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VEGETABLE GROWING

THE INFLUENCE OF THE CULTIVAR AND DENSITY ON THE SIMULTANEOUS FRUCTIFICATION AT CUCUMBER CORNICHON TYPE FOR MECANICAL HARVEST REASONS

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Key words: cucumber cornichon type, high density, mechanical harvest

INTRODUCTION

The mechanical harvest of the cucumbers Cornichon type for industry purposes is a reality in countries with high agricultural technology, where the quality standardizes of the fruits, the tools and the organization of the production are in favor of this system.

The mechanical harvest is successful only when the number of the industrialized fruits is high enough to assure a yield of 12/18 t/ha. Hence, to concentrate the fructification process is absolutely necessary and it can be carry out due to the action of some technological factors:

- selecting the right cultivar in order to have predominant gynoecious or gynoecious plants, with or without parthenocarpic fruits.
- assuring a high density of the plants in correlation with the vigor and the flowering particularities.
- preparing a very good quality germination bed.
- sowing the seeds with machines for a constant depth.
- applying the maintenance works for a uniform rise of plants.
- conducting the pollination.

In the present study, we followed the influence of the cultivar, the plant densities and the harvest moment.

MATERIALS AND METHODS

The trifactorial type 2x6x10 experiment with 120 variants has been realized by using the following factors:

a – type of harvest - 2 degrees - gradual harvest, once/over harvest

b – density – 6 degrees: 100.000, 120.000, 140.000, 160.000, 200.000 pl/ha.

c – cultivar – 10 degrees: 4 varieties: Cornichon de Paris, Budai Korai, Prizîv – 238 şi Velicolepnîi – 521 and 6 F1 hybrids: Cuba, Fruko, Fuga, K 113, K.B, Sandko.

The farming was realized using the specific calendar of the out door summer cucumbers. So, the sowing was made in the first decade of May.

The once - over harvest was made manual through ending the culture and taking down the fruits starting with those which reached 4 – 4,5 cm in length.

RESULTS AND DISCUSSIONS

The results regarding the total yield (average of 3 years) in ton/ha are presented in Table 1.

Table 1

The influence of cultivar, density and type of harvest on the total yield (ton/ha), Outdoor cucumbers Cornichon type

a) Gradual harvest

Cultivar	Density					
	100	120	140	160	180	200
Cornichon	14.49	16.85	15.40	10.68	7.91	4.95
Cuba	24.00	26.19	26.56	19.12	14.60	10.49
Velicolepnîi 521	20.14	25.52	23.47	17.18	14.38	11.08
Fuga F1	20.04	24.50	23.02	17.00	13.85	10.04
B.K	18.64	23.27	22.42	16.81	12.55	9.52
Sadko F1	17.41	20.71	20.98	15.44	11.45	8.15
Fruko F1	18.74	20.94	21.25	14.47	10.53	7.97
Prizîv 328	16.72	20.51	19.95	13.61	10.21	7.69
K.B F1	15.12	17.22	17.85	12.47	9.39	7.18
K.113 F1	14.907	17.05	17.61	13.18	9.98	7,08

b) Once-over harvest

Cultivar	Density					
	100	120	140	160	180	200
Cornichon	7.66	8.26	7.37	4.83	3.99	3.73
Cuba	9.76	12.76	12.29	9.26	7.51	6.39
Velicolepnîi 521	9.10	11.07	10.94	8.77	7.52	6.61
Fuga F1	9.40	11.97	11.78	8.01	6.95	6.79
B.K	9.53	12.16	11.43	7.97	7.30	6.06
Sadko F1	9.09	10.75	11.22	7.25	5.80	5.43
Fruko F1	8.92	10.68	9.68	6.83	6.05	5.28
Prizîv 328	8.13	9.57	12.00	6.72	5.97	4.63
K.B F1	8.11	11.93	11.77	6.60	6.03	4.87
K.113 F1	8.62	12.08	9.90	7.38	5.36	4,.53

The three experimental factors: type of harvest, density and cultivar have an essential effect over the yield level.

Using the gradual harvest, it can be obtained a yield higher with 50-150% than in once / over harvest. For the gradual harvest a yield of 16/20 ton/ha, for varieties and 20/25 ton/ha for hybrids, can be appreciated as a good or very good

yield. Using the gradual harvest, it was obtained a yield over 12 ton/ha for the best variants, these results being comparable with similar results reported in papers of the relevant literature.

Regarding the density, the best production results were obtained when the plant densities were 120.000 and 140.000 plants/ha, especially for Cuba, K 113 hybrids and Budai Korai variety for the graduate harvest, through ending culture. The results concerning the yield have been gathered in densities and cultivars and statistical analyzed using the variation analysis method not only for the all experiment but also for the sequences of it.

In Table 2 is presented a synthesis of the results obtained for a density of 120.000 plants/ha. It can be remarked that comparing with the Cornichon de Paris, for the rest of the variants there are significant positive departures.

Table 2

The synthesis of the experimental results

Total yield (ton/ha) of the cultivars at a plant density of 120.000 pl/ha

Nr	Variant (cultivar)	Production t/ha	The yield difference t/ha	Production %	The yield difference %	Significance
1.	Cornichon (Mt)	8.26	0.00	100.00	0.00	-
2.	Cuba F_1	12.76	4.50	154.47	54.47	***
3.	Velicolepnîi 521	11.07	2.81	130.02	30.02	***
4.	Fuga F_1	11.97	3.71	144.91	44.91	***
5.	B.K	12.16	3.90	147.21	47.21	***
6.	Sadko F_1	10.75	2.49	130.14	30.14	***
7.	Fruko F_1	10.68	2.42	129.29	29.29	***
8.	Prizîv 238	9.57	1.31	115.85	15.85	**
9.	K.B. F_1	11.93	3.67	144.43	44.43	***
10.	K.113 F_1	12.08	3.82	146.24	46.24	***

Dl 5 % = 0.81 t/ha – 9.80 %

Dl 1 % = 1.07 t/ha – 12.,95 %

Dl 0,1 % = 1.38 t/ha – 16.70 %

In addition, it can be remarked the behavior of the F1 hybrid / Cuba, with predominant female flowers, which was synthesized in Table 3. For this hybrid, the yield level is influenced by the raising of the plant density. In this way, when the density is 120.000 and 140.000 there are significant positive departures in production, which are above 25-30% over Cornishon de Paris. At higher densities – 160, 180 and 200.000 pl/ha the production start to decrease – even very significant.

Analyzing the influence of the experimental factors – density and cultivar over yield through once – over harvest, it can be noticed that:

- the density have a great influence over the yield differences with 72.34%; the cultivar influence was about 24.98%.

CONCLUSIONS

Choosing the adequate cultivar (hybrids with predominant female flowers and varieties with a favorable rapport between female and male flowers), it can be realized a substantial increase of the yield of the cucumber Cornichon type, comparing with the traditional sort Cornichon de Paris.

Increasing the plant densities to 120-140.000 plants/ha, it can be obtained a yield over 20-24 t/ha in case of the graduate harvest.

The graduate harvest through ending the culture involve a substantial decrease of the yield level, which exceed 12 t/ha only in the case of the hybrids with predominant female flowers at the density mentioned before.

Table 3

The synthesis of the experimental results

The influence of the density on total yield at F1 hybrid Cuba

Variant (Density pl/ha)	Production	The yield difference	Production	The yield difference	Significance
	t/ha	t/ha	%	%	
100.000 (Mt)	9.76	0.00	100.00	0.00	-
120.000	12.76	3.00	130.73	30.73	***
140.000	12.29	2.53	125.92	25.92	***
160.000	9.26	-0.50	94.87	-5.13	-
180.000	7.51	-2.25	76.94	-23.16	ooo
200.000	6.39	-3.37	65.47	-34.53	ooo

Dl 5 % = 0.81 t/ha – 8.29 %
Dl 1 % = 1.07 t/ha – 10.36 %
Dl 0,1 % = 1.38 t/ha – 14.,13 %

Because of the small differences in the productions at near densities (120-140.000 pl/ha), the spacing work cannot be justified in both technical or economical way.

Using perform ant hybrids at high densities in correlation with the plants vigor, it may be carry out the necessary conditions for the mechanical harvest with economical efficiency.

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SEEDS POSITION AND SEEDS TEGUMENT PARTICULARITIES INFLUENCES ON EMERGENCE OF MELONS

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Key words: seeds, melon, water melon, emergence

SUMMARY

In the last years, a ligning to the traditional practices of the farmers from countries where horticole exploatations with small and middle areas prevail, many romanian cultivators, have been opted to found the melon cultures – including water melons – by seedling planting.

This technologies variant contributes to improve production and to reduce significantly the seeds consume, as compared with the similar parameters of the cultures founded by direct sowing.

In the case of hybrid seeds, very expensive, the sowing technologies to produce seedling, more exactly, their position in the nutritive mixture into pots, included states regarding this aspect, states elaborates following some researches performed even by the producer firms.

This pepper presents the effects of the melons and water melons seeds position, on seedlings emergence dynamic.

MATERIALS AND METHODS

To realise these researches there were studied the effects of the yellow and water melons seeds position, on seedlings emergence dynamic, in the variants conditions and the states presented in the following table:

Table 1

Studied variants

Variant number	Position	Specification
1. vertical	↓	With the basal pole downward
2. vertical	↑	With the basal pole upward
3. horizontal	→	
4. oblique	↘	At 45º with the basal pole downwards
5. oblique	↖	At 45º with the basal pole upward

Those five variants have been utilised to realise an experiment in two stages, using F1 hybrids of water melon Farao, Szigetcsepi, LD-999 W 16, LD WA 736, LD 999 W 21 and Granit, and melon: LD 999 M 32; LD 999 M 35.

After the first stage, considered "informative" we have been carried out research in the second stage, according to the normal calendar to produce transplants early cucumbers, squash and melons.

To realise the programming phase in the greenhouse it has been used pots by plastic material with 8 cm a diameter, and it has been introduced a nutritive mixture prepared from black peat 70% and perlit 30 %.

The mixture was readily ram. Seeds were sown at 2 cm depth, respecting for each hybrids, the position presented above. There were performed usual imposed works.

The temperature into substrate was maintained in optimum limits, very near to the optimum for melons. Daily it has been performed observations, then determinations to register the number of the seed that coming out.

RESULTS AND DISSCUTIONS

Results concerning emergence dynamic

Following the determinations regarding seedlings appearing for water melon hybrids Granit and LD-99 W 21 there were noticed some remarks as follows:

- Massive emergence was registered after 9-16 days after sowing, the bigining of this phase being very different for those two mentioned hybrids.
- The seedling appearing dependents of the seed position into the nutritiv bixture at the sowing date. Therefore, seeds positioned according the variant 1, emergens the earliest, the phenophase bigining has been registered in the days 6-8, and the its maximum being after others two days.
- Similar results were registered at V2 too, while at V4, those two emergence moments presented above, have been noticed be late with 3-4 days.

For the melon the seed position didn't influence the emergence moment.

- The germination percent can be appreciated for those hybrids used in experiment (2 for water melon and 2 for melon) as being in normal limits.

Results obtained following the microscopical observations on seeds sections.

There were performed anatomical observation for water melon seeds, as well as for yellow melon seeds.

Table 1

Emergence dynamic

Hybrids	Variant	Days								Days necessary for emergence		
		1[x]	6[xx]	8	9	10	11	12	13			
		18.IV	23.IV	24.IV	25.IV	26.IV	27.IV	28.IV	29.IV			
										mass	beginning	end
Granit	I	-	14	18	18	18	19	19	19	6	7	11
	II	-	9	19	19	19	19	19	20	6	7	13
	III	-	9	19	20	20	20	20	20	6	7	9
	IV	-	4	18	19	19	20	20	20	6	7-8	11
	V	-	6	20	20	20	20	20	20	6	7	8
LD 999W21	I	-	-	16	19	19	19	19	19	7	8	9
	II	-	-	17	19	19	19	20	20	7	8	12
	III	-	-	13	15	16	17	19	19	7	8	12
	IV	-	-	7	14	15	16	16	17	7	9	13
	V	-	-	6	13	13	16	17	17	7	9	12
LD 999M35	I	-	13	17	19	19	19	19	19	6	7	9
	II	-	13	20	20	20	20	20	20	6	7	7
	III	-	14	16	20	20	20	20	20	6	7	9
	IV	-	15	17	19	19	19	19	19	6	7	9
	V	-	16	20	20	20	20	20	20	6	7	7

The observations and the photos carried out for the mentioned hybrids, with the aid of the microscope MC-7, emphasise the followings:

- at the external seed area there is the unistratiphied epiderme, makes up from long cells disposed in palisade;
- the subepidermal layers are make up by sclereids with thick walls, penetrated by fine channels;
- the thickness and the anatomical particularities of these layers, different for the two used hybrids are correlated with the need days number for emergence;
- parenchimatic cells from the seed tegument at Granit F1, are smaller, in a small number and finer as against those existent at LD 99 W-21 F1;
- because of these particularities, at the same seed position, at Granit F1, massive emergence was registered after 5-6 days from this phenophase debut, and at LD-99 W-21 F, the same phenophases have been manifested with 3-4 days later.

CONCLUSIONS

The necessary days number for emergence of water melon is influenced by their anatomical particularities and by the position had in the nutritiv substrat in the sowing moment.

At the same water melon, the seed position influences the hybrid emergence moment, being useful their arrangement in a vertical position. Sowing without the seeds position control, facilitates seedlings non uniformity and prolongs the period between sowing and planting, raising the warming cost.

The obtained results are in agreement with those obtained and published by others authors in the speciality literature from others countries.

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RESEARCH CONCERNING SOME CABBAGE VARIETIES BEHAVIOR IN GREEN HOUSE IN THE WEST PLAIN CONDITIONS

BERAR V., POŞTA GH.

Key words: early cabbage, variety, scheme planting

SUMMARY

The biological material for the research was represented by a collection of four varieties of early cabbage as: Golden Acre, Gloria Di Enkhuizen 2, Mercado De Copenhague and Dittmark.
The average head weight and the average production per surface unit, the variety Mercado De Copenhague (68,5 t/ha) is taking advance with its' 10% extra production compared to the average;
Utilization of some planting scheme properly to assure the needed nutrition space for plants growing and developing is the main factor to realize higher sustainable productions;
Is to be mentioned that Gloria Di Enkhuizen 2 variety needs larger nutrition spaces compared to the other varieties analyzed.

INTRODUCTION

Food value of cabbage is given by the high content of carbonate hydrates, minerals and vitamins which is mostly fully used by the human body.
The comestible part for cabbage is the head, usually consumed all seasons, as fresh, pickles, dehydrated or frozen.
For a equilibrate feeding is it recommended to be consumed 75 g/day equivalent of 27 kg yearly, 80% of this (22 kg) during winter.

MATERIALS AND METHODS

The researches were effectuated during 2002 year, at the experimental field of the Vegetable Department of the university, using comparative crops method in random blocks plots arrangement.
The biological material for the research was represented by a collection of four varieties of early cabbage as: Golden Acre, Gloria Di Enkhuizen 2, Mercado De Copenhague and Dittmark.
The experiment type was double-factorial:

A factor(variety): a1-Golden Acre; a2-Gloria Di Enkhuizen 2; a3-Mercado De Copenhague; a-4 Dittmark.
B factor(density): b1-66.666 plants/ha; b2-57.140 plants/ha; b3-80.000 plants/ha; b4-71.400 plants/ha.

During harvesting the observation were made concerning average weight of head and the shape index, taking into conclusion the production aspects for quantity and quality.
Experimental data processing using the current statistic models and the production data were calculated and evaluated using variance analyze.

RESULTS AND DISCUSSIONS

To establish the average production obtained for experimental varieties there were evaluations concerning the head weight all data presented in table no 1.

Table 1

Experimental results concerning average head weight and the production for early cabbage varieties cultivated in the green house using different densities

A Factor (variety)	B Factor (density)							
	b1- 66.666 pl./ha		b2- 57.140 pl./ha		b3- 80.000 pl./ha		b4- 71.400 pl./ha	
	weight (g)	prod. (t/ha)	weight (g)	prod. (t/ha)	weight (g)	prod. (t/ha)	weight (g)	prod. (t/ha)
a1-Golden Acre	862,0	57,4	977,5	55,8	603,5	48,2	685,6	48,9
a2-Gloria Di Enkhuizen 2	753,2	50,2	856,5	48,9	584,0	46,7	659,4	47,0
a3-Mercado De Copenhague	1028,8	68,6	1144,5	65,3	668,8	53,5	728,8	52,0
a4-Dittmark	966,4	64,4	1066,5	60,8	637,3	50,9	690,8	49,3

Concerning the average head weight, the estimative values are between 584,0 g (a2b3) and 1144,5 g (a3b2). The average values for this quantitative index are between 713,2 g (a1) and 892,6 g (a3).
Concerning the average production, taking into consideration the planting density, it was observed that this quantitative index is between 46,5 t/ha (a2b3) and 68,6 t/ha (a3b1). It is observing that only Mercado De Copenhague variety realized higher production than 50 t/ha for all four density variants, compared to the other experimental varieties which need higher nutrition space.
The experimental results concerning the interaction between varieties and planting density in order to realize average production per surface unit are presented in table no.2.

Table 2

Experimental results synthesized concerning the interaction variety-planting density in order to realize production for early cabbage (2002)

The variant	Average prod. (t/ha)	Relative prod. (%)	Dif. (t/ha)	Signification
a3b1	68,5	119,6	11,25	xxx
a3b2	65,3	114,0	8,05	xxx
a4b1	64,4	112,4	7,15	xxx
a4b2	60,9	106,3	3,65	xx
a1b1	57,4	100,2	0,15	-
x (Mt)	57,2	100,0	0,00	-
a1b2	55,8	97,4	-1,45	-
a3b3	53,5	93,4	-3,75	oo
a3b4	52,0	90,8	-5,25	ooo
a4b3	50,9	88,9	-6,35	ooo
a2b1	50,2	87,6	-7,05	ooo
a4b4	49,3	86,1	-7,95	ooo
a1b4	48,9	85,4	-8,35	ooo
a2b2	48,9	85,4	-8,35	ooo
a1b3	48,2	84,1	-9,05	ooo
a2b4	47,0	82,0	-10,25	ooo
a2b3	46,0	80,3	-11,25	ooo

DL 5% = 2,19 t/ha DL 1% = 2,93 t/ha DL 0,1% = 3,83 t/ha

Taking into consideration the presented experimental results we can observe that only Mercado De Copenhague and Dittmark varieties have presented average production very significant and distinguish significant positive for b1 and b2 variants. It is remarkable that Mercado De Copenhague realize 10% extra production compared to the average.

We mention that Gloria Di Enkhuizen 2 variety needs bigger spaces to grow and plant developing, observed both checking the crops and the average productions of this variety, there were very significant negative compared to the control variety.

In order to analyze the interactions variety-planting density it was calculated the correlation between average head weight and average production, all results are presented in table no.3.

Table 3

The correlation between average head weight and average production for early cabbage varieties cultivated in the green house using different densities

b1	b2	b3	b4
0,71 xx	0,78 xx	0,31	0,43

Analyzing the presented experimental data we could observe that only using densities between 57.140 plants/ha and 66.666 plants/ha there are correlations distinct significant between the two analyzed indexes.

During harvesting there have been observations for biometrical parameters which will characterize the shape index for the head of cabbage, all results presented in table no.4.

Table 4

Experimental results synthesized concerning genotype influence for some qualitative issues for cabbage heads for early cabbage varieties

	Variety			
	Golden Acre	Gloria Di Enkhuizen 2	Mercado De Copenhague	Dittmark
if	1,19	1,11	1,23	1,04

From presented data we can observe that only Dittmark variety have a globular shape for the cabbage head, all the others were kept in conic if interval.

CONCLUSIONS

Taking into consideration all the experimental results for the comparative culture with cabbage varieties grown in green houses, we can conclude the following:

-concerning the average head weight and the average production per surface unit, the variety Mercado De Copenhague (68,5 t/ha) is taking advance with its' 10% extra production compared to the average;

-utilization of some planting scheme properly to assure the needed nutrition space for plants growing and developing is the main factor to realize higher sustainable productions;

-is to be mentioned that Gloria Di Enkhuizen 2 variety needs larger nutrition spaces compared to the other varieties analyzed.

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A PEDOLOGICAL AND HYDROLOGICAL STUDY ON THE AREA OF THE R. I. V. F. G. – VIDRA (ROMANIA)

MARIA CENUŞĂ

Key words: forest steppe, brown-reddish, phreatic water, irrigation system.

SUMMARY

The Research Institute for Vegetable and Flower Growing VIDRA was set up by a governmental decree in the year 1967, being establised as hedquarters in the VIDRA village, Ilfov District, in the South – West part of the Capital of Romania, Bucharest at 20 km apart. From the geomorphological point of view, the territory of the R.I.V.F.G. – Vidra belongs to the plain of Vlăsia in the area of forest steppe. The formation and successive localization, from the North to South, of the series of types of chernozem soils is closely linked by the presence and the intensity of influence of the phreatic waters on the soils. This influence decreases in intensity in paralel with the increase of the distance from the Valea Salciei brook. The territorial development of the vegetable growing area of Vidra imposed the connection of chat area in 1976 to the irrigation system Arges – Vidra – Frumusani that included a water accumulation on the Salcia brook.

INTRODUCTION

From the geomorphological point of view, the territory of R.I.V.F.G. – Vidra belongs to the Plain of Vlăsia, that in its turn is a constitutive part of Romanian Plain (Martinique, 1960) at the Southern extremity of the above mentioned plain in the area of forest steppe at the interference between the plains of Burnas and Mostiştea. This area represents a prolongation of the Getic piedmont, built up on the alluvia carried by the rivers included between the Danube and Dambovitza.

MATERIALS AND METHODS

During the 1987-1994 period, the R.I.V.F.G.Vidra in cooperation with the Research Institute for Pedology and Agrochemistry belonging to the Academy of Agriculture and Forestry Sciences studied the physicol structure and chemical composition of the soil profiles carried out in different points of this territory.

RESULTS AND DISCUSSIONS

The shape of mesorelief on that is placed the territory of the RIVFG is a terrace of the Argeş river, mainely on its medium terrace and in a smaller degree, on its lower terrace. The territory under investigation presents heights from datum line varying between 63 and 59 meters in the frame of medium terrace and between 57 and 55

meters in the frame of the lower terrace. On the medium terrace the land presents a general slope ranging between 2,0 and 2,7 $^{0}/_{00}$ having an orientation on the West – East direction. The slope of passing from the medium terrace to the lower one has a slope of 3 – 5% with a Southern exposition.

From lithological point of view the territory is characterized by the fact that the surface parental material on which the soil has appeared is represented by a loess and clayey material that according to Cernescu N.1964, and Florea N., 1964, represents thin deposits laid over deposits having a coarse texture of terrace specific both the terraces of the Argeş river and the terraces of other rivers by the vicinity of Bucharest municipality. Loessoid parental material from the territory of the RIVFG Vidra has similar characteristics with ones of the Cca horizon of the soil profile, that means a argil content of 26 – 30%, an apparent density of 1,40 – 1,50 g / m^3, a total porosity of 50 – 54%. The permeabile complex is made up by two horizons: the first one at a depth of 3 – 12 m and a second one of 15 – 25 m. The profile of the brown reddish soil from Vidra territory is different from the profiles of the brown reddish soils from other territories (Ghencea, Băneasa, Baloteşti) by that the intensity of the brown reddish hue is less evident in the case of the Vidra territory, by comparison with other territories mentioned above.

The main physical traits of the soil from the territory of the RIVFG Vidra are represented by the useful physiological depth extremly high of the soil profile which exeeds 150 cm, by the medium clayey texture on the depth of 0-50 cm, by fine clayey–argil texture on the depth of 50 – 150 cm, by the presence of the weak primary/natural settlement in the B horizon as well as the of quasigeneralized presence of the hardpant; by a small total porosity, by a medium predominant field water capacity, by a medium great capacity for useful water, by a small infiltration speed and a high resistance to penetration, a low medium withering coefficient. The scanty physical characteristics of this soil is caused mainly by the natural settlement from the B horizon and by the anthropic one from the A horizon. These traits lead a low infiltration of the water during the rainy season causing water stagnation and insufficient drainage that lead to an excessive moisture. In the aluve mentioned periods such overwet soils from the depressions present an air deficiency and a cold thermic regime (Table 1)

The territory of the RIVFG Vidra belongs to the basine of the Sabar brook in the South and of basine of Valea Salciei in the North. On the other hand in the northern part of the territory there are the lakes Jilava, Berceni and Vărăşti. The territory under investigation is prived by a valley natural formed. The territory is characterized by the presence of two phreatic levels found under the depth of 4 meters for the main part of the analyzed territory. That depth could not influence soil and yields formation. The first layer of phreatic water is presented at a depth of 4-5 meters and is subjected to the seasonal fluctuations. The second layer of phreatic water is present at a width of 9-30 meters and it is uninfluenced by irrigations and rainfalls.

Table 1

Physical and hydrophysical indices of the brown - reddish soil from the RIVFG - Vidra

Thickness of the soil stratum (cm)	Field capacity for water		Coefficient of whitering		Volumetrical weight t / m^3
	%	m^3 / ha	%	m^3 / ha	
0	1	2	3	4	5
0 - 10	26,1	344,52	8,3	109,56	1,32
10 – 20	25,8	366,36	9,2	130,64	1,42
0	1	2	3	4	5
20 – 30	24,3	352,35	10,1	146,45	1,45
30 - 40	23,5	340,75	10,8	156,60	1,45
40 – 50	23,1	330,33	11,9	170,17	1,43
50 – 60	22,8	326,04	12,6	180,18	1,43
60 – 70	22,8	326,04	13,3	190,19	1,43
70 – 80	22,1	333,71	13,1	197,81	1,51
80 – 90	22,1	333,71	13,9	209,89	1,51
90 – 100	22,1	333,71	13,7	206,87	1,51
100 – 110	22,0	330,0	13,0	195,0	1,50
110 – 120	22,0	330,0	12,6	189,0	1,50
120 – 130	22,0	330,0	12,2	183,0	1,50
130 – 140	22,0	330,0	11,0	165,0	1,50
140 - 150	22,0	330,0	11,7	175,50	1,50

The development of the territory of Vidra for vegetable growing imposed connection of this zone in the year 1976 at the irrigation system of Argeş-Vidra-Frumuşani. A water accumulation on the Salcia brook was realized that led to the increase of the level of this brook with about 1-2 meters as well at the increase of the adiacent zone of phreatic influence on the soil. According to the solid residua and chlorine content this water of irrigation is classified in the C_3 group (but having very close values of C_2) and according to the CSR and SAR index it is classified in the group C_1 (1,06) and S_1 respectively (2,09) (STAS 9450-88). This used water, according to its mineral residua (683 mg/l), by Richards evaluation is classified in the group C_3 (500-1500 mg/l) that involves a high mineralization degree, but the danger of soil salinezation does not exist on a well drained ground. On the medium drained ground the danger of salinization is higher and there are necessary periodicalground washings in order to remove the salls accumulated in the physiologicalstratum of the soil. A such type of waters are recommended for the irrigation of theplants that are tolerant and medium tolerant to salinity on well drained soils. This high content of NaCl represents one of the restrictive factors for utilization of this type of water for irrigation. The content of CO^{-2}_3 of the water is high (~30 mg/l), and this value imposes great restrictiones for its utilization to irrigation. In fact, the presence of the soda is reflected by the values rather high of the soil reaction (pH=8.22)(Table 2)

Table 2

Characterization of the irrigation water used at the RIVFG – Vidra, 1994 (according to Maria Drăcea)

Elements under investigation	Measure unit	
HCO^-_3	mg / l	me
CO_3^{2-}	323,3	5,3
Cl^-	30,0	1,0
Na^+	122,5	3,45
K^+	78,0	3,39
Ca^{2+}	45,0	1,15
Mg^{2+}	53,3	2,66
SO_4^{2-}	31,37	2,58
Mineral residum	683 mg / l	
pH (H_2O)	8,22	

CONCLUSIONS

Soil structure is optimum, granular clods with a bad internal drainage. The organic matter content is medium, ranging between 1,4-3%, the clay content being of 30-35% and the sand content of 10-20%. The soil reaction is slight acid to neutral (pH =6,8). The soil is moderately supplied with nitrogen, 4-6 mg/100 g soil ($N\text{-}NO_3^-$ = 12,1 ppm, $N\text{-}NH^+_4$ = 14,1ppm, N mineral total= 24,7 ppm), moderately supplied with potasium, 12-15 mg/100 g soil (K_2O = 16,9 ppm) and low supplied in mobile phosphorus, 1,5 mg/100 g soil (P_2O_5 = 4,6 ppm). According to CSR index, whose value is of 1,06, the water is favorable for irrigation. NaCl content is rather high (~200 mg/l), and considering a total a solubile salts of 683 mg/l this means 30% from the total of contented salts.

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A STUDY CONCERNING THE CLIMATIC TRAITS SPECIFIC TO THE R. I. V. F. G. – VIDRA (ROMANIA)

MARIA CENUŞĂ

Key words: air and soil temperature, air humidity, sum of the rainfalls, speed of the wind

SUMMARY

The region covered by the Research Institute for Vegetable and Flower Growing VIDRA has the geographical coordinates of 26^0 11' 05" Eastem longitudes and 44^0 16' 08" Northern latitude. In order to characterize the local climate, the author used data and observations recorded by the meteorological station Vidra during the 1989-1997 period.

From the climatic point of view the area of the R.I.V.F.G. Vidra belons to frame of the continental temperate climate with slight influences of the northern mediteraneean climate.

MATERIALS AND METHODS

In order to characterize the local climate, the author used data and observations recorded by the meteorological station Bucureşti – Filaret, and data recorded in last years by the meteorological station Vidra (1989 – 1997).

RESULTS AND DISCUSSIONS

In the area of the R.I.V.F.G. Vidra very freqvently appear late frosts, in spring in the period of 1-10 April and early frosts of autumn in the period of 1-10 October. The total number of the days without frosts in medium is of 213. Annual average of temperature is of 10.3^0C with an minimum absolute of -32.5^0C (1942) and an absolute maximum temperature of $+41.5^0$C recorded in 1945. Annual sum of the dayly medium temperatures higher than 5^0C is of 4,000 C and of the ones higher than 10^0C is of 3,500 C. The soil temperature at a depth of 10 cm exceeds 10^0C starting with April. In July and August the soil temperature exeeds 28^0C. The highest amount of rainfalls, during an interval of 24 hours was of 119.7 mm recordening in August 1949. The medium level of the annual rainfalls is of 595 mm and the water deficit is of 140 mm. The hydroclimatic index is of about 81% for the whole year. The territory is characterized by the absence of a pedohydroclimatic surplus of humidity during the whole year. (Tabel 1)

Table 1

Climatic data recorded at the RIVFG – Vidra during the 1992 – 1997 period – monthly average values

Climatic parameter	Year	Month											
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Air average temperature	1992	- 1,0	0,2	5,9	11,5	15,6	20,3	21,7	24,4	17,6	12,4	6,3	-,14
	1993	- 1,5	-1,0	2,9	11,5	18,2	21,5	22,2	22,0	16,9	13,5	-2,4	1,6
	1994	2,1	0,6	8,2	12,6	18,1	21,2	23,1	23,1	21,8	11,2	2,8	0,1
	1995	- 2,1	5,2	6,0	10,5	14,9	20,8	23,4	21,5	16,4	10,2	1,1	-1,4
	1996	- 3,3	-3,9	0,3	10,0	19,7	23,2	23,2	21,7	15,6	11,0	5,3	-1,1
	1997	- 4,1	-0,1	3,1	5,8	18,0	20,1	20,0	20,1	15,2	9,0	5,7	0,8
Soil average temperature at 40 cm depth	1992	-1,8	-0,3	6,3	11,9	17,0	22,0	23,5	26,2	18,4	12,1	6,0	-2,0
	1993	-2,2	-0,8	2,5	11,8	18,8	24,0	25,3	25,1	17,2	13,4	-5,0	0,0
	1994	1,5	0,8	7,4	13,3	20,4	23,0	23,3	25,6	21,9	10,6	1,7	-1,0
	1995	-3,8	3,2	4,7	12,6	17,3	22,5	25,9	23,8	14,8	9,1	1,4	3,4
	1996	-5,1	-5,2	-2,0	9,2	21,3	25,8	26,2	22,5	15,7	11,3	4,9	-1,2
	1997	-5,0	-0,2	3,9	5,9	21,0	21,3	21,7	21,4	17,7	9,6	5,2	0,3
Nebulousness average, in hours of sun shining	1992	5,7	1,9	5,1	5,1	4,3	5,4	4,2	1,3	2,0	4,0	7,6	7,1
	1993	3,0	3,4	5,7	4,8	4,8	2,6	2,1	2,2	1,3	5,0	7,4	5,3
	1994	7,2	6,3	5,3	5,2	4,3	3,1	3,1	3,3	0,9	5,5	5,3	6,3
	1995	6,0	2,7	4,5	3,2	3,5	4,7	2,8	3,5	3,6	3,6	7,7	7,8
	1996	8,8	6,0	5,2	4,9	3,4	2,3	1,1	4,1	7,8	4,5	6,0	7,8
	1997	6,8	4,3	5,6	5,2	2,3	1,7	6,0	5,0	3,3	4,7	7,2	7,4
Air humidity average %	1992	93	84	80	75	64	65	66	54	57	74	75	90
	1993	79	77	85	67	73	60	59	61	64	76	83	86
	1994	91	82	67	67	54	67	71	60	59	80	78	89
	1995	88	78	76	75	63	87	56	61	72	75	88	95
	1996	87	94	87	76	69	63	58	62	76	79	88	93
	1997	93	87	77	70	60	71	78	79	69	79	92	87
Sum of rainfolls.	1992	0,5	10,6	29,6	44,0	25,9	33,5	30,6			1,4	8,0	37,0
	1993	1,3	14,3	95,3	22,2	106,1	49,2	104,0	23,1	15,4	48,0	35,6	31,7
	1994	9,6		16,4	29,3	20,5	63,9	148,1	9,7	2,0	89,0	27,9	57,6
	1995	17,0	11,1	33,3	29,8	15,8	190,6	38,7	34,6	38,5	3,0	29,7	2,8
	1996		57,6	10,0	45,7	47,3	59,7	21,0	41,5	32,5	28,2	58,0	23,3
	1997		2,8	76,3	133,0	78,7	66,6	46,7	90,3	8,2	81,8	52,5	34,7

Table2

Multiannual average values of some hydroclimatical and pedohydroclimatical indices for the Vidra area (according to IMH – Bucuresti-Filaret station)

Period of time under investigation	Hydroclimatic indices				Hydropedoclimatic indices									Frequency of the categories of hydroclimatic balance		
	T	P	ETP	IHC	D			UO – 1 / 2 CU			U 1 / 2 – 1 / 1 CU			insuficient	in equilibrum	in excess
					Period		Localisation	Period		Localisation	Period		Localisation			
	^{0}C		mm	%	days	%		days	%		days	%		< 90	91 - 110	> 110
Yearly	10,3	595	731	81	41	11	-	192	53	-	132	36	23.I-10.IV	71	22	7
Vegetative period 1IV-3IX	17,1	392	694	56	41	19	-	109	51	-	64	30	1.V-10.IV	98	2	0
Autumn	11,2	133	149	89	22	24	-	70	77	-	0	0	0	27	13	60
Winter	-7,1	112	6	1871	0	0	-	53	58	-	37	40	23.I-28.II	1	0	99
Spring	10,5	149	172	86	0	0	-	0	0	-	92	10-0	1.III-31.V	36	12	52
Summer	21,3	200	404	50	19	21	-	69	76	-	3	3	1.III-10.VIII	97	3	0
October	11,4	43	49	88	4	13	1-4	27	87	5-31	0	0	0	57	5	38
November	4,8	51	15	339	0	0	-	30	100	1-30	0	0	0	22	2	76
December	-0,5	43	2	2125	0	0	-	31	100	1-31	0	0	0	0	2	98
January	-3,3	38	2	1915	0	0	-	22	71	1-22	9	29	23-31	1	0	99
February	-1,2	32	2	1575	0	0	-	0	0	-	28	10-0	1-28	3	1	96
March	4,4	40	16	250	0	0	-	0	0	-	31	10-0	1-31	24	6	70
April	10,8	44	52	85	0	0	-	0	0	-	30	10-0	1-30	62	9	29
May	16,4	65	104	62	0	0	-	0	0	-	31	10-0	1-31	74	14	12
June	20,0	83	127	45	0	0	-	27	90	4-30	3	10	1-3	75	11	14
July	22,3	66	146	45	1	3	31	30	100	1-30	0	0	0	91	2	7
August	21,6	52	131	40	19	61	1-19	12	39	20-31	0	0	0	93	3	4
September	17,6	39	85	46	17	67	14-30	13	43	1-13	0	0	0	88	4	8

Key: T – temperature; P – rainfalls; ETP – potential evaporation + perspiration; IHC – hydroclimatic index (P / ETP x 100); D – humidity deficit (below the whitering coefficient UO – 1 / 2 CU); CU – humidity suitable for the first half of the useful capacity for water (U 1 / 2 – 1 / 1 CU); 1 – percent of the number of days of the analysed period

Table 2 present the total pedohydroclimatic deficit of humidity which has the value of 140 mm/year (19%) having a period of 41 days/year (11%). The predominant winds specific to the Vidra area are the North winds that blows from North-North East and East and the South wind that blows from the West-South-West. During a year the North wind blows 33.3% from the time and the South wind blows 27.3%. In the frame of a year the period of calm is 39.4%. The direction of the dominant wind is South-West, followed by the North-East direction that is characterized by a high yearly average speed reaching to 3m/s. The longest period of the sun shining is recorded during the months of June and July and the shortest one is recorded in December, January and February that are characterized by the highest nebulousness. The monthly values attained are over 200 hours during the April-September interval. The highest value is recorded in July with 325 hours of sun shining. During a year the values recorded are of 120 days with clear sky, 143 days are partial cloudy and 102 are total cloudy. In the Vidra area the months of July and August are characterized by an excessive drought the relative air humidity reaching sometimes 57%. Yearly average of the air humidity is of 70-75%. During the winter months the potential evaporation and perspiration is very low, but starting with March its value increases, reaching very high values in July (125mm), then gradually decreases reaching values of about zero in December. At a multiannual medium level, for a whole year, the potential evaporation and perspiration is of 731 mm.

CONCLUSIONS

The climatic characterization of the multianual average of the vegetativ period renders evident a medium value of 17.1^0C for the temperature, of 392 mm for the rainfalls, of 694 mm for the evaporation and perspiration, of 140 mm for the humidity deficit, of 109 days (51%) for the soil humidity oscillating in the first half of the active humidity interval and of 64 days (30%) for the humidity oscillating in the second half of the active humidity interval, of 56% for the hydroclimatic index (IHC).

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TECHNOLOGICAL LINK TO IMPROVE THE PHYSICAL CHARACTERISTICS OF THE NUTRITIVE CUBES USED TO TRANSPLANT VEGETABLES SEDLING

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Key words: copolymer, physical characteristics, transplant

SUMMARY

Obtaining agroalimentary foods is preponderant based on agricultural and horticultural species, cultivated on agricultural soils. The yield level depends in a very high measure of the pedological, climatical and technological factors. There fore, from the pedological viewpoint a special rol has the air water regim. The major objective of researches consists especially to achieve high amount of vegetable yield, as a consequence of the high quality of seedling transplanted in nutritive cubes, with improved physical feature. Using a vernacular polyacrylamide the purpose was to increase the disponible water reserves for plants, to improve the cubes pressing state, diminution of the seeming density values, respectively, as well as to improve the porosity, that in turn positively influences the nutrition regime, too.

INTRODUCTION

In legumiculture, for species where cultures are founding with transplanted seedlings in pressed cubes, the yield level is depended of the seedling quality that are planted either in protected areas or in the field.
Very often, obtaining good quality seedling is difficult, but especially in the case when the mixtures used to prepare the nutritive cubes don't assure optimum physical feature for seedlings growth and plants development.

MATERIAL AND METHOD

To modernize the technology for obtaining vegetable seedling transplanted in cubes, was utilized the product named commercial Fitpol C, to improve some physical features of the culture medium. From a large number of nutritive types, has been selected that composed by 30 peat + 30% leaves soil + 30 garden soil + 10% sand. It was choised this mixture based on a fact that it can be easily assured by the individual cultivators.
To test the Fitpol-C copolymer effect on physical characteristics of the nutritive mixtures has been established the following experimental variants:

1. control (nutritive cubes without Fitpol-C);
2. 0.25 g Fitpol-C in 100 g nutritive mixture;

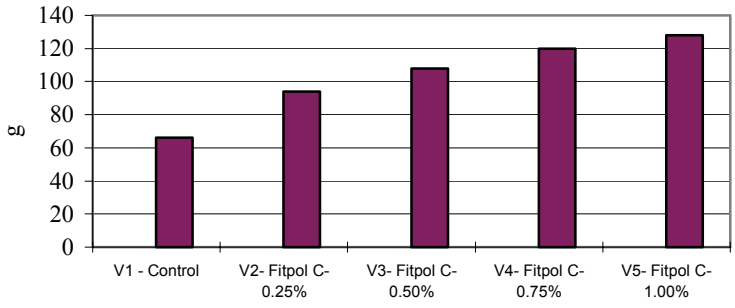
3. 0.50 g Fitpol-C in 100 g nutritive mixture;
4. 0.75 g Fitpol-C in 100 g nutritive mixture;
5. 1 g Fitpol-C in 100 g nutritive mixture.

The analyses and the determinations has been carried out according the technology elaborated by I.C.P.A., and the obtained data were statistical processes by variance analyses and of the Tukey test of multiple compared

RESULTS AND DISCUSSIONS

The results of the measurements performed in laboratory emphasize important increases of the absorbed water quantity in the case of the nutritive cubes with super absorbed hydrophilic product added (figure1). If at the control variant has been registered 38 g water/100 g nutritive mixture, at the nutritive cubes with Fitpol-C added, the absorbed water quantity has been ranged between 50-71 g , the increases being from 30 %, to 84 %. The differences between variants were distinct significantly.

Fig.1 The Influence of Fitpol Application on the Quantity of Water Absorbed by the Nutrient Pots



Initial humidity

Regarding initial humidity (Table 1), the determinations carried out on the undertake samples from the nutritive cubes, undisturbed arranged (Necrosov cylinder type with a volume of about 100 cm^3), emphasized 49% at the control variant and between 53-57 % at the variants with Fitpol- C, the increases being of 8.16%.

Table 1

Influence of Fitpol C by physical characteristics of nutritive cubs

Variant	Initial humidity	Apparent density	Penetration resistance	Saturated hydraulic conductivity	Total porosity
	% g/g	g/cm^3	Kgf/cm^2	mm/h	% v/v
Control	49	1.00	12	8	56
Fitpol C-0,25%	53	0.94	12	8	58
Fitpol C-0,50%	55	0.95	10	16	60
Fitpol C-0,75%	56	0.84	11	17	62
Fitpol C-1,0%	57	0.87	11	15	62
Dl 5%	2	0.05	2	1.7	2.6
Dl 1%	3	0.06	3	2.1	3.3
Semnification	xx	xx	x	xx	xx

Apparent density

The utilized press for nutritive cubes obtaining seriously affected the aggregation state of the nutritive substrata, of the nutritive cubes.

In this case, at the nutritive cubes from the control variant, apparent density was 1 g/cm^3. While at Fitpol-C variants, the values have been ranged between 0.75 and 0.94 g /cm ^{3}, the diminution was between 6 and 13 %.

Penetration resistance

Concerning the penetration resistance, the performed measurements emphasized a slow decrease of this physical feature values as a consequence of the adding in the nutritive mixture of some very high absorbent product doses (Fitpol-C).

Therefore, if at the control variant the penetration resistance was 18 kgf/cm^2, at the nutritive cubes with Fipol-C, the values are between 10 and 12 kgf/cm^2, the diminution being from 39 to 44%.

Saturated hydraulic conductivity

The nutritive substrata permeability represents an important physical characteristic and by its quality depends in a high measure the plants growth.

Saturated hydraulic conductivity at the nutritive cubes from the control variant and at those from the variants with 0.25 g Fitpol-C, was 8 mm/h, while at the nutritive cubes from the others three variants, were registered 15-17 mm/h., the differences between variants being statistical assured.

Total porosity

Macroporozity (pores with a diameter > 50 microns) has been influenced by some Fitpol-C doses application. If at the control variant, the total nutritive cubes porosity was 56%, at the cubes were the physical feature were improved, the values were ranged between 58 and 62%, therefore from the statistical viewpoint, the differences are significantly.

CONCLUSIONS

Based on the obtained results following the observations, analyses and determination in laboratory conditions, it can be concluded:

1. The absorbed water quantity by the nutritive cubes with improved feature was higher with 30-84% as compared with the control;
2. Initial humidity of the Fitpol-C containing cubes was higher with 8-16%;
3. Apparent density deceased from 1 g/cm^3 at the control variant cubes , to 0.75-0.94 g/cm^3 at those with Fitpol-C added, diminution being ranged between 5 and 16%;
4. The nutritive cubes permeability, with the improved physical characteristics, was higher with 87-112%, as compared with control variant;
5. Macroporozity increased with 4-11% as against the control.

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SOME ASPECTS OF THE SCIENTIFIC STUDIES CARRIED OUT AT THE DEPARTMENT OF VAGETABLE CROPS FLORICULTURE AND LANDSCAPE ARCHITECTURE

RUXANDRA CIOFU

During the last period of time, in our department, the scientific studies (which have an old tradition here) were carried on in progression, due to some research programs with financial support of CNCSIS, AMCSIT and Banca Mondiala and some doctorates activities, which included all the didactical team, PhD students and students.

The main objective of the whole research activity was to set up in a scientific way the new cultivation technologies, based on species and varieties with high biological potential, resistance to pathogens and to the adversities of the environment, high quality, and also to establish some environmental-friendly technologies corresponding with the sustainable agriculture concept.

In the last five years a number of eight grants were developed in our department (table 1).

The interdisciplinary researches like biology, physiology, biochemistry were most developed following our goals. A large number of young professors, finishing the doctorates became specialists in these fields and other take part in research activities like programs with governmental financial support as Relansin type and Agral type, which were launched in the university, at ICLF Vidra or non-governmental organizations.

A high number of scientific results were presented at different scientific conferences in Romania and abroad and were published into the both ASAS and Vidra annals, into the scientific works of the agronomic institutes, into the scientific magazines in Romania and abroad. Furthermore, these results were introduced in the new edited books or they were presented to the students directly, in courses and seminars.

Activities like drawing up technical projects in landscape architecture, consultation in vegetable crops and floriculture, communications of the results in press, radio and television were developed too.

In the scientific research activity, it must pointed out, the development of the international collaboration due to the Tempus program, which created the possibility of establishing bilateral relations with researchers from Italy and Belgium, countries where young professors improved their studies and developed studies of common interest.

Most of our professors are members of European Society – ESNA (New methods in agriculture research) where they take part in annual congresses and presented their results. This was one important way of our department, faculty and university to be presented, known and appreciated abroad.

Another aspect in our research activity is the preparation and the professional improvement through doctorates. The activity is supported and managed by two scientific coordinators with high professional class, Prof. dr. Corneliu Petrescu and Prof. dr. Victor Popescu. They coordinate in the present 19 PhD students (16 without frequency and 3 with frequency) from USAMV-Bucharest, or from scientific research institutes and from production units.

The research objectives of the doctorate studies, which are developed in different areas of the country (Bucharest, Braila, Buzau, Brasov) are:

To improve the cultivation technologies through the optimization of the vegetation factors and to find new and non-pollutant technologies (drop-irrigation, use of different substrates, fertirrigantion, so on) for: cabbage, broccoli, tomato, lettuce, pepper, onion and Lisianthus;

- To introduce modern and more rapid methods (like "in vitro") for propagation and for obtaining the plants for vegetables species (Chicorium intybus), flowers species (Roses, Hydrangea) and dendrological species (Clematis, Magnolia);
- To create F1 tomato hybrids with high ecological plasticity and high quality;
- To introduce new vegetables species, specifying the technology of some species with economical importance and not much cultivated in present: chicory, Brussels sprout, ornamental vegetables, and shrubs from Conifer family.

In the last five years at the Department of Vegetable Crops, Floriculture and Landscape Architecture or other disciplines from Faculty of Horticulture (Agrochemistry, Physiology) seven PhD theses were presented:

1. Agrochemical studies concerning the solanaceous production using different substrates and nutritive solutions – Hoza Gheorghita, 1997;
2. Contributions upon the study of the biology and technology of Polyanthes tuberosa L. – Toma Florin, 1998;
3. Contributions in establishing the cultivation technology of cucumber 'Cornichon' variety outdoors using the industrial system of production – Atanasiu Nicolae, 1999;
4. Establishment of some technological quality indicators of barley for beer – Elena Draghici, 1999;
5. Studies concerning the influence of the substrate and the nutritive solutions in container-culture of some ornamental shrubs – Costea Gabriela, 2001;
6. Studies concerning the physical and chemical processes in Freesia plants – Vasca Zamfir Diana, 2002;
7. Studies concerning the reduction of the obtaining time of the planting material at some ornamental shrubs with pollution resistance and drought resistance through conventional methods and micropropagation 'in vitro' – Dumitrascu Monica, 2002;

All these theses were very well appreciated for their remarkable results.

CONCLUSIONS

The objectives of our studies, the organization and the practical part of these are relevant for the research activity in our department:

- Scientific studies based on contracts (grants) with financial support of CNCSIS, government and Banca Mondiala.
- The join of the fundamental research with the practical research;
- Orientation to modern, ecological technologies;
- Presentation of some subjects with interdisciplinary interest;
- Coordination of a large number of students and young researchers;
- Encouraging young professors to elaborate and manage grants for young researcher teams;
- Collaborations in some research programs with other disciplines from USAMV and ICLF-Vidra, non-governmental organizations.

On the whole, it can be appreciated that the scientific task contain studies which can solve some practical problems and also fundamental studies, which have contributions in the development of the scientific knowledge in Vegetable Crops, Floriculture and Landscape Architecture.

Table 1

Scientific results obtained in grants

1. Studies concerning the diversification of the assortment for Vegetables Crops, Floriculture and Dendrology and the establishment of some specific technologies – Popescu Victor, 1997-1999	• The morphological characters were studied and some technological links were established for: Vegetables crops (shallot onion, celery for petiole, Brussels sprout, Chinese cabbage, fennel, sweet potato, chicory, basella, mangold); Floriculture (Pentas, Gardenia, Hoya, Stephanotis); Dendrology (Hybiscus, Spiraea, Viburnum, Carya).
2. The influence of some physical and technological factors on growing and development of some vegetables corresponding with the sustainable agriculture concept – Ruxandra Ciofu, 1998-2000	• Specifications concerning the influence of some physical factors on germination, plant development and the possibility of using some technological factors were made.
3. Non-conventional methods for producing vegetables seedlings on different substrates and nutritive solutions – Gheorghita Hoza, 2000-2001	• The establishment of some organic substrates for the seedlings production on lettuce, cabbage and cucumbers with the specification of the optimum components (manure, perlit) and their proportion • The necessary nutritive solutions for fertilization were established
4. studies concerning the soiless culture of tomato, pepper and eggplant in greenhouse – Popescu Victor, 2000-2002	• The optimal proportions of the substrates for the polyethylene bags with 20 l volume were: for tomato: forest compost 75% and peat 25%; for pepper and eggplant: perlit:manure:peat – 1:2:1

5. Studies concerning the use of the composts for the container-culture of ornamental plants in agreement with the species request and trading – Elena Selaru, 1999-2000	• Studies for the introduction of new species and varieties were made for Murraya, Podocarpus, Hoya, Syngonium, Lisianthus, Spathiphyllum; New information about the biology of the ornamental plants were brought, new organic components were identified. • Contributions in the production of the plant material
6. Studies concerning the establishment of a methodology for landscape evaluation of the natural and laid out sites and the elaboration of landscape projects – Ana Felicia Iliescu, 2000-2002	• The methodology and landscape evaluation card were made for gardens and parks and they were checked with an preliminary study • The methodology of analysis and evaluation was developed for urban sites with landscape potential, with a direct application in SW area of Bucharest, which were contained proposal maps for leisure activities and tourism
7. The management improvement of the practical instruction of the students from the Agricultural College of Bucharest – Popescu Victor, 2001-2002	• Both didactical and research material base were completed and modernized with new devices and equipment • Bilateral changes of students between Romania and England or Italy were brought a good documentation and specialization of them
8. The impact of some irrigation methods on yield, quality and environment using tomato and cucumber plants in different cultural systems – Ruxandra Ciofu, 2001-2003	• Studies regarding the soil density, total porosity and hydro-physics and chemical indicators were made for the experimental soil • The necessary water for the tomato and cucumber plants in the greenhouse and in the field was determinate • The establishment of the technical elements for the different irrigation methods was considerate.
9. Studies concerning the techniques for obtaining Bonsai from indoors ornamental plants – Elena Selaru, 2002-2004	• The behavior of different species of indoor flowers was analyzed after pruning, pinching and forced training using various methods • The establishment of some techniques for obtaining Bonsai for room decorations
10. Studies regarding new possibilities for increasing the economic efficiency of some vegetable species through the improvement of the seedlings production – Draghici Elena, 2002-2004	• Determinations of the plants growth were made for indoors tomatoes propagated through vegetative parts of the plant and the behavior to rooting of some hybrids in different substrates • New methods for obtaining tomato plants were studied
11. Studies concerning the cultural technology of Lisianthus russelianus – a new species in the present assortment – Petra Aurelia Sorina	• Observations and determinations concerning the behavior of the Lisianthus plants on different types of substrates were made. Variations in the pH values were also studied at blooming and flowering • It was considerate also a calendar for the technological stage for Lisianthus in Romania
12. Studies regarding the influence of the calcium fertilizers on the physiological processes and the fruit quality of solanaceous species – Petra Ovidiu Nicolae, 2002	• The evolution of the physiological processes was analyzed in different phases of tomato culture in greenhouses, when the calcium fertilizers were applied. • Optimal doses for a high quality tomato, pepper and eggplant fruits were established.

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THE INFLUENCE OF ARTIFICIAL AERO-IONIZATION UPON CUCUMBER SEED GERMINATION AND TRANSPLANT GROWTH

CIOFU RUXANDRA, PETRA O., ENACHE L., DOBRIN ELENA

Key words: artificial aero-ionization, pickling cucumbers, seed germination, transplant growth

SUMMARY

Natural aero-ionization is an important biophysical environmental factor influencing organisms and plants. Our research was aimed at pointing out the effects of artificial aero-ionization on seed germination and the growth of pickling cucumber transplants.

The paper presents the results of the influence of the artificially – produced positive and negative aero-ions applied to the pickling cucumbers seeds and transplants. Compared to natural aero-ionization, the artificial aero-ionization was administered in rates of 17,000 – 20,000 ions/cm^3 for 3, 6, 24 hours.

The negative ions had higher influence, but statistically – insignificant differences, compared to the positive ions. The best results in seed emergence were obtained from the seed exposure to negative ions for 3 hours which increase the emergence rate by 30% compared with the control. The most vigorous transplants were obtained from the seed treatment with negative ions for 6 hours.

INTRODUCTION

Vegetable technologies should face the new requirements of sustainable agriculture, defined as an environmentally friendly, economically viable and socially responsible system (C. Ingeles, 1992).

The research carried out in the field of electricity in general, and aero-ionization in particular, pointed out to the importance of natural and artificial ionization of air used in various fields, both as synthetic indicator of environmental impurity and as therapeutic factor (Enache, L., 1990; Tromp, S.W., 1974; Hamlyn, G.J, 1992). Natural aero-ionization is an important environmental biophysical factor, and the living organisms, among which plants whose structure includes different polar chemical compounds, react to any change in the electric parameters of their living environment. Most research directed mainly to man and animals consider the natural negative aero-ionization existent in some health resorts and its favourable action upon the living world. The observations in this field justify the opinion that artificially produced aero-ions, supplementary applied to natural ionization in certain concentrations and exposure durations, can be used to obtain qualitatively and quantitatively positive results with ecological and economic implications.

In Romania, Rusu F. and collab. (1986) mentioned the favourable influence of the ionized air upon tomato transplants, while Ciofu Ruxandra and collab. (1999) noted the positive effect of this physical factor upon the germination, growth and development of early radish. This paper is an extension of our preoccupations concerning the use of artificial aero-ionization as an ecological method of simulating seed germination, growth and fruition in field-grown cucumbers.

MATERIALS AND METHODS

In 2001, the experiments were carried out in two steps: in the laboratory and in the greenhouse. To produce artificial ions of both polarities, ***the laboratory experiments*** used an ion generator based on flows of electrons (Corona discharge). The ion concentration in air was 18,000-20,000 ions/cm³. The device was placed at 0.5 m distance from the biological material (seeds and transplants) under treatment. The seeds were placed in cardboard plates, and the transplants were treated at the 3-4 leaf stage. The exposure time was 3, 6 and 24 hours.

To avoid outer influences, the laboratory was tightly closed, and the inner temperature was maintained at 20-25 ºC, relative moisture 45-60%, and water vapours varied moderately around 10 mm Hg.

The greenhouse experiments were trifactorial, where: A - Factor – ion polarity, two graduations: a1 – negative ions; a2 – positive ions. B - Factor – treatment application stage, two graduations: b1 – seeds; b2 – transplants. C - Factor – treatment duration, four graduations: c1 – 0 hours, control; c2 – 24 hours; c3 – 6 hours; c4 – 3 hours. The experiments were placed in four-repetition blocks. Each repetition had 100 seeds and 20 transplants, respectively. The hybrid tested was of Dutch origin, Bejo 1802 F1.

The observations and determinations were aimed at:

- seed emergence – by determining the emergence rate (ER), the emergence mean time (EMT), and the emergence uniformity coefficient (EUC), according to the following formulae:

$$EMT = \frac{n \times t}{\sum n} \qquad EUC = \frac{(t'-t)^2 \times n}{\sum n}$$

where: EMT = emergence mean time; EUC = emergence uniformity coefficient; n = number of emerged seeds; t = number of days necessary for emergence; Σn = total number of analysed seeds; t' = emergence mean time (days);

- transplant growth – by determining the dynamics of transplant height and leaf number in 10 transplants from each repetition;

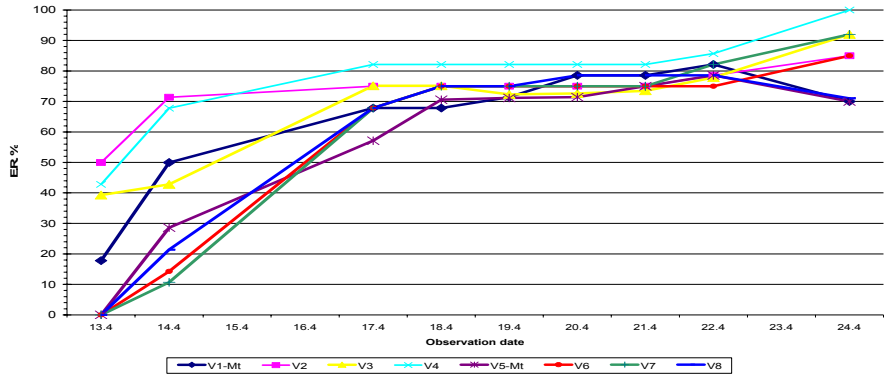
The statistical interpretation of the results was performed by the variance analysis (the Student test).

RESULTS AND DISCUSSIONS

The influence of aero-ionization upon seed germination in pickling cucumbers is presented in Figure 1.

Figure 1

Influence of aero-ionization upon seed germination in cucumbers



One can observe that the dynamics of seed germination is particularly influenced by the negative-ion treatment. During the first four days, the highest germination rate was recorded in variants V2 (24 hours) and V4 (3 hours). Over the following ten days, the differences between the eight variants were very reduced, although variant V4 was the first. The best results were obtained from seed exposure to negative ions for 3 hours. In this variant, the emergence rate was 100%, compared with the control (70%). Longer treatment (6 and 24 hours) reduced ER. The positive ions inhibited seed germination in the first part of emergence. The only variant with values closer to the control was V8 (3 hours). At the end of germination, the best results were recorded in V7 (6 hours). The emergence characteristics are differently modified according to the ion polarity (Table 1). Compared with the control, the negative ions treating the seeds for 3 or 6 hours determined the increase in the emergence rate by 30% and 22%, respectively, the decrease in the emergence mean time by 0.67 days, and the increase in the emergence uniformity coefficient by 2.75. The positive ions had a lower influence upon the emergence rate compared with the negative ones, as the highest difference from the control was 22% in 6 hours of treatment. Nevertheless, compared with the negative ions, the positive ones had a higher influence upon the

decrease in the emergence mean time and increase in the emergence uniformity coefficient.

Table 1

Influence of artificial ions upon the characteristics of seed emergence in cucumbers

Polarity	Variants, treatment hours	Emergence rate, E.R.		Emergence mean time, E.M.T.		Emergence uniformity coefficient, E.U.C.	
		%	Differences	Days	Differences	Value	Differences
negative	V1 control	70	-	3.52	-	1.54	-
	V2-24 hours	85	+15	4.28	+0.76	0.44	-1.1
	V3-6 hours	92	+**22**	2.85	-0.67	4.29	+2.75
	V4-3 hours	100	+**30**	2.85	-0.67	4.29	+2.75
positive	V1-control	70	-	3.52	-	1.54	-
	V2-24 hours	85	+15	2.5	-1.2	5.35	+3.81
	V3-6 hours	92	+22	3.21	-0.31	2.97	+1.43
	V4-3 hours	71	+1	2.14	**-1.38**	5.84	**+4.3**

Compared with the control, the differences in transplant heights were very significant in the 24- and 6-hour treatment, and distinctly significant in the 3-hour treatment. In the leaf number, the differences were very significant in all the cases, and the best results were recorded in the 6-hour treatment (15.9%).

CONCLUSIONS

- Artificial aero-ionization in a concentration of 18,000-20,000 ions/cm³ can be used as an ecological physical method for stimulating seed germination, and transplant growth.
- Negative ions have a higher influence, compared with the positive ones.
- The treatment applied to seeds has better results than in the case of transplants.
- Seed exposure to negative ions for 3 hours results in an increase of the emergence rate by 30%, compared with the control.
- The most vigorous transplants are obtained from the 6-hours negative ion treatment applied to seeds.

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BY DRIPPING IRRIGATION EFFECT ON YIELD AND MANAGEMENT WATER AT CUCUMBERS IN SOLARIUM

CAMELIA CURCAFA, N. ATANASIU, V. POPESCU,
VIORICA LUCHIAN

SUMMARY

Key words: dripping irrigation, cucumber

The vegetable culture in Romania can be achieved at European qualitative and quantitative standards only under proper irrigation conditions. The actual costs of the irrigation water and flow of certain local sources require a strict management of their use without diminishing its positive effect on the production.

In the past years, in the vegetable basin Matca, in the vicinity of Galati, it was noted a major increases of the vegetable production both on the field and in the greenhouses, by the introduction of some modern technological factors:

- plant assortment;
- fertilizing irrigation through dripping;
- protection of the early cultures with multistrat folia;
- use of certain ecologic methods for the prevention of the diseases and pests.

Reduction of water consume is very attentive controlled, both for its rational using and for irrigation cost reduction.

The extended paper presents the behavior of some new cornichon cucumbers hybrids (Crispina and Topaz), in polyethylene covered solar, with by dripping irrigation.

There are presented data which emphasis a yield level over 40 t/ha for the best variants, realized with an economical irrigation norms. Also, there are presented results concerning soil physical characteristics dynamic for the variants with by dripping irrigation and by water administration on gutters.

MATERIAL AND METHOD

For the achievement of this experiment it was used Crispina and Topaz cucumber hybrids, produced for commercializing purposes in view of being consumed as fresh cucumbers.

Topaz is a hybrid created in Romania, with semi-long fruit, bearing fruit through parthenocarpy, recomanded for protected cultures and consumption as fresh vegetables.

Crispina is a Dutch hybrid with Cornichon fruits types, ginoic and with a partenocarpic fructification, with multiples resistances and tolerances to diseases.

Specific elements of the culture technology:

The culture was achieved in standardized tunnel – type solarium, having the width of 5.4m, the plant seedling being made at 90 cm between the rows and at 33 cm between the plants on a row (density is of 3.4 plants/sq.m). The irrigation was made through watering in accordance with the following alternatives:

- classic watering through the water draining in ditches, at the surface of the soil;
- the local watering by using drop watering equipment with constituent parts made by T-System Europe (France).
- the watering norms have progressively increased in keeping with the following dynamics.

Table 1

Water consumption on phenostages (l/pl/day)
Cucumbers in solarium, 2001 - 2002

Phenostages	Ditch watering	Drip watering
The first 10 days after planting	0.25-0.35	0.2-0.3
Vegetative growth	0.35-2.12	0.3-1.5
Fruit bearing	2.12-3.3	1.5-2.5

The water consumption at the alternatives irrigated by water dripping was 30-40% lower than those irrigated through the ditch watering method.

By the combination of the two hybrids with the two methods of applying the watering, it resulted four experimental alternatives, in accordance with the table no.2

Table 2

Experimental variants
Cucumbers in solarium, 2001 - 2002

Variants no.	Hybrid	Watering Method
1	Crispina F1 (a1)	On ditches (b1)
2	Crispina F1 (a1)	Drip watering (b2)
3	Topaz F1 (a2)	On ditches (b1)
4	Topaz F1 (a2)	On ditches (b1)

RESULTS AND DISCUSSIONS

A particular attention was paid to the production data that were registered and reported in kg/plant and kg/sq.m.

The harvesting was made in the period May 2-7 June 13-15.

It was taken over fruit the Crispina F1 hybrid with a length of 9-12 cm. Data present in table no.3 point out that Crispina hybrids fruits, for the variant with the water application on ditches, have an average weight of 82.4 g. For the same hybrid, by dripping irrigation determined an increase of the fruits average weight (86.5 g).

The Topaz F1, fruit with the length of 14-17 cm present an average weight of 139.3 g, for the variant – by ditches water application and 145 g for by dripping irrigation variant.

Table 3

Production basic elements
Cucumbers in solarium, 2001 - 2002

Hybrid	No.fruit /plant	Fruit average weight	Production	No.fruit /sq.m	Production
		g	kg/pl.		kg/sq.m
Crispina (a1)	29.5	82.4	2.43	100.6	8.29
Crispina (a1)	34.3	86.5	2.96	116.8	10.11
Topaz (a2)	27.9	139.3	3.88	95.1	13.26
Topaz (a2)	31.2	145.1	4.53	106.2	15.42

At Crispina hybrid, it was noticed that during all the harvesting period, then were obtained 100.6 fruits/sq.m for variant by ditches water application and 116.8 fruits/sq.m for by dripping irrigation variants. By dripping irrigation determined to produce a higher fruits number/sq.m at the Topaz hybrid.

CONCLUSIONS

On basis of the analytical experimental data it can be drawn the following conclusions:

The two hybrids contribute to the achievement of a production level that can be considerate to be very good for the culture of cucumbers in greenhouses, in the Southern part of Romania.

On account of the fruit particulars, Topaz F1, with medium fruit (medium weight on harvesting – 145.1 g) is more productive than the Crispina hybrid, the fruit whereof was harvested at the average weight of 86.5 g.

Table 4

Water consumption
Cucumbers in solarium, 2001 - 2002

Variants	Density	Water consumption	Water consumption	
	plant/sq.m	l/plant	l/sq.m	%
Crispina F1 (a1)	3.4	100.582	342	100
Crispina (a1)	3.4	61.176	208	60.8
Topaz (a2)	3.4	105.882	360	100
Topaz (a2)	3.4	66.176	225	62.5

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RESEARCH REGARDING THE *IN VITRO* GERMINATION OF SOME CICHORY HYBRIDS (*CICHORIUM INTYBUS L.*)

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Key words: *witloof chicory*, genotypes, seeds, *in vitro* culture media, germination rate.

SUMMARY

Traditionally, witloof chicory (*Cichorium intybus* L) multiplies by seeds sown in open field. The aim of the present work was to preserve the heterozis effect of witloof chicory hybrids by *in vitro* vegetative multiplication. It is thus possible, to combine the advantages of hybridisation with those of the clonal propagation. In this sense, we proceeded at the *in vitro* initiation of five chicory hybrids: 'Turbo', 'Bea', 'Zoom', 'Totem' and 'Fiero' and one common variety by sowing them on sterile culture media. The seeds were sterilized with a mercuric chloride solution (0.05%) and inoculated for germination on two culture media: Murashige&Skoog (1962) and respectively, Quoirin&Lepoivre (1977). The result showed that the best culture medium for the chicory seeds *in vitro* germination was Quoirin&Lepoivre. Low concentration of macroelements and high content of B_1 vitamin influenced positively the germination rate. 'Turbo', 'Bea' and 'Totem' hybrids had the best germination rate (100%). In the same time, 'Turbo' presented the fastest and the most uniform germination, 100% - registered in the first 8-9 days from inoculation, on both used media. The common variety tested had the lowest germination rate (30% onto MS medium) even the percentage was doubled on QL medium. After germination, plantlets started to grow and were used for *in vitro* vegetative multiplication, using the axillary shoots method.

INTRODUCTION

The witloof chicory hybrids production is very expensive and must be realized every year. Besides, the production of F_1 hybrids is hindered by the fact that chicory is a typical pseudo-self-compatible plant (Coppens d'Eeckenbrugge, 1990). Because of that the cross-breeding is never absolute, generating a more or less homogenous population. Tissue culture systems could prevent the lack of homogeneity, and moreover, once one obtained a valuable hybrid, this could be vegetative multiplied *in vitro* (clonal propagation).

In this work we propose to bring into operation a rapid *in vitro* vegetative multiplication technique using as initial material hybrid seeds of witloof chicory.

MATERIAL AND METHODS

As initial plant material, *Cichorium intybus L*. seeds originating from five hybrids: 'Bea', 'Turbo', 'Zoom' (Vilmorin, France), 'Totem' and 'Fiero' (Johnny's selected seeds, U.S.A.) and a common variety for production (Plant Hart's seeds, U.S.A.) were used.

Seeds sterilization by stirring for three minutes in a mercuric chloride solution (0.05%) was followed by three rinses with sterile distillate water.

Sterile seeds were sown on two culture media with different salts concentrations: Murashige&Skoog (1962) - high concentrated (4561.93 mg/l) and Quoirin&Lepoivre (1977) - medium concentrated (4045.71 mg/l). Another difference between the two media was regarding the vitamins mixtures used: Walkey 2, for QL with 0,4 mg/l thiamin (B1 vitamin) and inositol, and MS vitamins that contains also some other vitamins such as: nicotinic acid, pyridoxine and glycine as aminoacid.

Sugar concentration was the same for both used media (2%) and the agar concentration for QL and MS medium was 0.5% and respectively 0.7%. The media preparation was conform to the common protocol, the pH being adjusted before sterilization to 5.80 (for QL) and 5.97 (for MS).

After the seeds inoculation on 15 ml microtubes, the germination was conducted in dark for 7 days at 23±1°C day / 19±1°C night temperatures in the growth chamber. After the germination start, singles tubes were placed in light at 40 μE m-2 s-1 and a photoperiod of 16/8 hours.

RESULTS AND DISCUSSIONS

The chicory seeds started to germinate after six days from their inoculation, and afterwards, the germination rate and dynamic were studied.

'Turbo' registered the best germination rate on both culture media (100%), followed by 'Bea' and 'Totem' with 100% on QL medium and only 80% on MS medium. 'Zoom' had the same percentage of germination on both media used (50%) and 'Fiero' had 40% germinated seeds on MS and 50% seeds on QL medium. The common variety we studied registered a germination rate of 30% and 60% on MS, respectively QL medium (fig. 1).

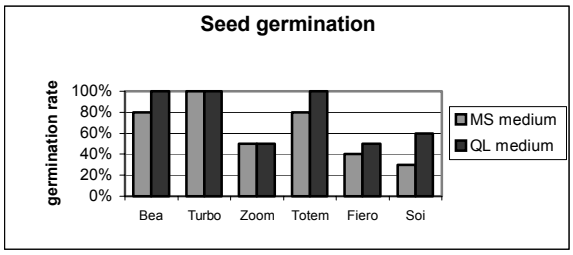

Fig. 1 – Chicory seed germination rate (%) on both culture media used

Regarding the germination dynamic, one can easily observe that 'Turbo' had the fastest and more uniform germination on both media (all the seeds germinated in the first 8-9 days from their inoculation on the culture media). 'Totem' also germinated 90% in the first 8 days, but 10% germinated only after a

month on QL medium. Even if the germination rate was lower on MS medium (only 80%), all 'Totem' seeds germinated within two weeks (fig. 2).

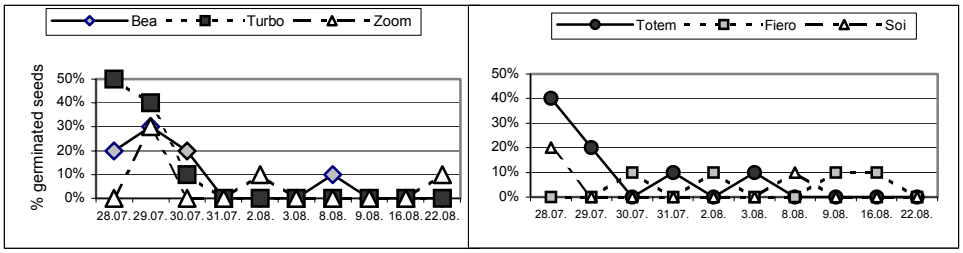

Fig. 2 - Seed germination dynamic on MS medium

'Bea' had a germination dynamic similar for both media used, the seeds germinated within 12 days on QL medium and 17 days on MS medium. On QL medium (fig. 3) we observed that the 'Zoom' hybrid germinated also in 12 days, but on MS the seed germination was belated (10% of the seeds germinated only after a month).

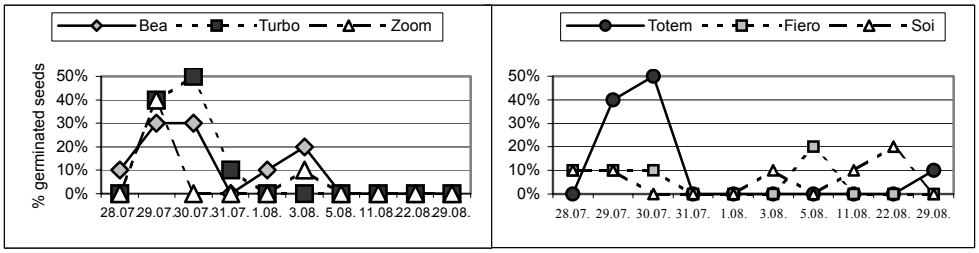

Fig. 3 - Seed germination (%) on QL medium

'Fiero' germination lasted between the 9th and 15th day on QL medium and between 8th day and 25th day on MS medium (fig. 2). The common variety studied behaved twice better on QL medium (regarding the germination rate), but the seeds germination was pretty low, the last 20% seeds germinated within a month on QL medium. On the contrary, on MS medium the last 10% (from the total of 30% germinated seeds) germinated in 17 days.

Finally, we concluded that all the hybrids studied germinated better on QL medium, poorer in salts concentration than MS medium. QL, in the same time, was richer in thiamin (0.4% mg/l) compared with only 0.1 mg/l found in the MS vitamins mixture.

After seven weeks from the plants appearance we measured the hybrids growth (fig. 4) and the observation made outlined the performance of the QL medium. Although the 'Fiero' hybrid had the smallest germination rate, it registered the highest growth rate on QL medium (3.3 cm) followed by 'Totem'

and ‘Zoom’. In general, on QL culture medium occurred the greatest heights. ‘Bea’ had the lowest growth rate on both media used.

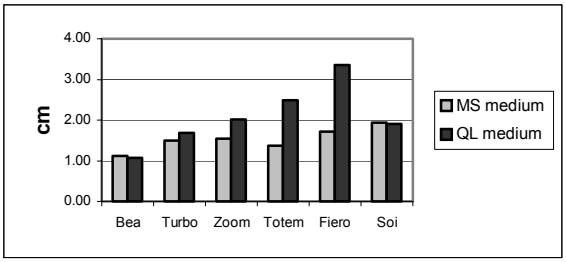

Fig. 4 – Growth development for the studied hybrids

CONCLUSIONS

The results obtained clearly underline that the best culture medium for the initiation stage of the *in vitro* chicory culture, started from seeds, is Quoirin&Lepoivre medium, the germination percentage on this medium being clearly superior to that registered on the Murashige&Skoog medium.

The sterilization method (mercuric chloride – 0.05% solution, with a 3 minutes time sterilization) was best for this stage, not even one seed presenting any infection symptom.

‘Turbo’, ‘Bea’ and ‘Totem’ hybrids had the best germination rate onto QL medium (100%).

‘Turbo’ hybrid presented the fastest and the most uniform germination (100% - registered in the first 8-9 days from inoculation) onto both media used.

Finally, we conclude that Cichorium intybus L. seeds germinate better in the terms of using an initiation medium with a lower concentration of mineral salts and a higher concentration of B1 vitamin. Therefore we recommend the use of Quoirin&Lepoivre medium for the in vitro initiation culture of chicory.

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RESEARCHES CONCERNING THE USE OF THE AXILLARY SHOOTS TO OBTAIN TOMATO TRANSPLANTS

DRAGHICI ELENA, STROE ELENA

Key words: tomato, axillary shoots, transplants

SUMMARY

Starting from the tomato plant property of forming adventitious roots on axillary shoots, the present paper aims of studying the possibility of benefit from the plant parts removed from the valuable hybrids cultivated on greenhouse, and using them to establish either tomato crops in solarium, or even on early field cultures. The material is represented by Marissa hybrid, characterized by good diseases resistance and highly productivity, used preferentially in greenhouse culture. The axillary shoots removed from the plants have been placed in five different substrates to form roots, in order to be used as transplants. The variants of substrates have been: V1: Perlite 100% (P); V2: Sand 100% (S); V3: Manure 100% (M); V4: Peat 100% (P); V5: Perlite 25% + Sand 25% + Manure 25% + Peat 25%. The transplants phenotypic characteristics were analyzed 30 and 45 days after placing them in rooting substrates.

INTRODUCTION

For early tomato cultured in tunnels and in the field, high productivity hybrids, characterized by different resistances to diseases and parasites, are used. Knowing that tomato seeds are very expensive, practical solutions to reduce production costs are to be found. By the other hand, greenhouse cultivated tomato involve an obligatory technologic operation: the total remove of axillary shoots. The aim of this work is to identify the potential exploitation of these axillary shoots, placing them in different substrates in order to form roots. The influence of the substrate on shoot rooting and the period of time were analyzed.

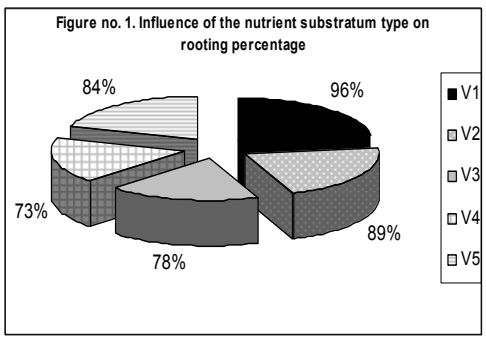
MATERIALS AND METHODS

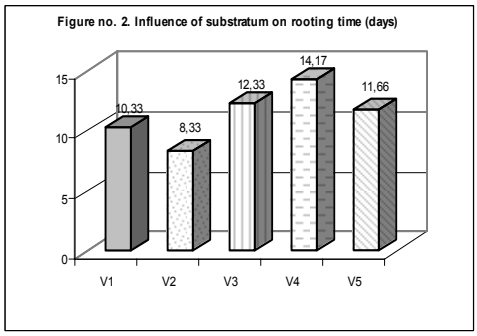
The material is Marissa hybrid, with highly production and undetermined raise, characterized by good resistance to verticilium, fusarium and nematodes. The hybrid is preferentially used in greenhouse and tunnels, but also in early field cultures.
The method consists of removing the shoots from the axillary nod of plant and placing them in five different variants of substrate: V1: Perlite 100% (P); V2: Sand 100% (S);

V3: Manure 100% (M); V4: Peat 100% (P); V5: Perlite 25% + Sand 25% + Manure 25% + Peat 25%.

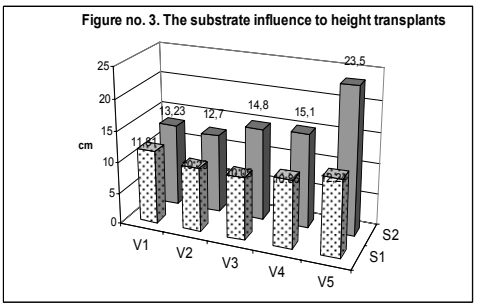
RESULTS AND DISCUSSIONS

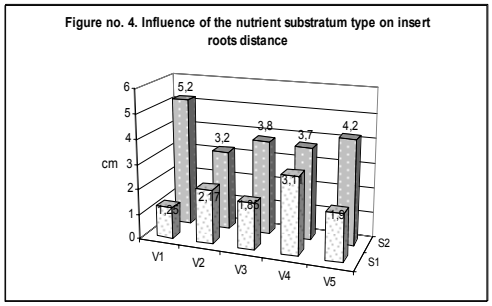
Researches demonstrated that substrate type is influencing the shoots rooting on tomato. The percent was 96% for 1st variant (Perlite 100%), and only 73% for 4th variant (Peat 100%) (please look at the figure no. 1).





The variant of substrate is also very important for the type of roots which are developed: adventitious roots' raising was preferentially induced. Therefore, the variant 2 (Sand 100%) recorded adventitious roots elongation after about 8 days, comparative with the variant 4 (Peat 100%), where the period was about 14 days (figure no. 2).





The total weight of transplants recorded the most important value 12.24 g at 30 days, respective 23.5 g at 45 days on variant 5. The lowest total weight was recorded on V2 (Sand 100%), about 12.70 g at 45 days (figure no. 3).

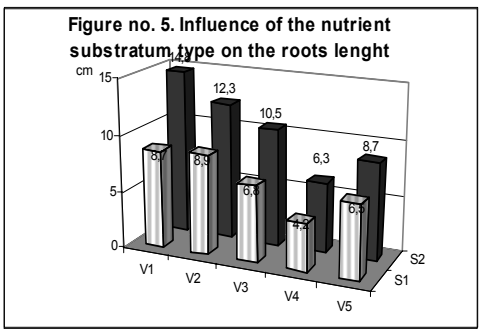


Figure no. 5. Influence of the nutrient substratum type on the roots lenght

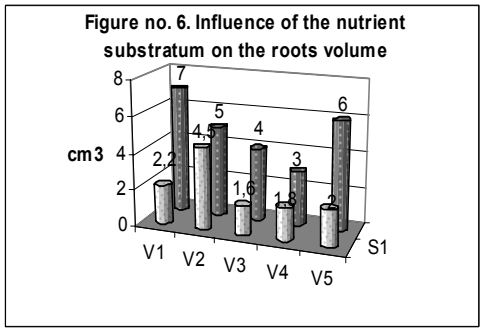


Figure no. 6. Influence of the nutrient substratum on the roots volume

The type of substrate influenced in different way the distance of root insertion The biggest insert distance of roots was on V1(figure no. 4). The roots length was also determined by the type of substrate. As can see in figure no. 5, the longest roots were observed on V1.

Regarding the influence of the substrate type on roots system volume, presented on figure no. 6, it is remarked the biggest volume on V1, and the lowest on V4.

Table 1

Phenotypic characteristics of transplants on different substrates

Specification	Transplant age (days)	V1	V2	V3	V4	V5
Leaves number	30	4	4	4	5	6
	45	6	5	10	6	7
Diameter (mm)	30	4.2	4.8	5.3	4.6	4.3
	45	7.1	5.2	6.1	8.1	6.4
Steam and leaves weight (g)	30	5.05	3.67	3.50	5.31	2.56
	45	8.383	3.99	12.931	7.183	18.53
Roots weight (g)	30	0.40	1.66	0.37	1.06	0.93
	45	5.87	2.32	7.49	4.76	5.32
Root numbers	30	47	69	27	42	48
	45	71-76	33-41	33-41	49-53	61-67

Data regarding the dynamic of leaves apparition after 30, respective 45 days after placing the shoots on substrate are presented on table no. 1.

It is easy to see that after 30 days the number of leaves was about 4 on V1, V2 and V3, and 6 on V5. After 45 days the biggest number of leaves was recorded on V3 (10 leaves), and the lowest on V2 (5 leaves). The transplant diameter after 30 days was about 4.2 mm on variant 2, and 5.3 mm on variant 3. After 45 days the diameter values were 5.2 mm on V2 and 8.1 mm on V4. The biggest roots number was influenced by the type of substrate used on V1 (between 71 and 76).

CONCLUSIONS

The percent of rooting was 70% at V4 (Peat) and 95% at V1 (Perlite).

It is possible to obtain useful tomato transplants for other crop systems, with very good roots in only 30 days after the harvest of axillary shoots.

The period to form roots was longer on V3 (Manure) and V4 (Peat), due to a very alkaline pH of the nutrient substrate.

The yields were bigger and earlier than of the crops obtained normally from seeds, because the first inflorescence was formed at the 2nd leave from soil.

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THE INFLUENCE OF SUBSTRATUM COMPOSITION AND VOLUME ON GREENHOUSE TOMATOES GROWN ON ORGANIC SUBSTRATA

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MARIA APAHIDEAN, MANIUTIU D.

Key words: tomatoes, greenhouse, organic substratum

SUMMARY

Greenhouse tomatoes grown on organic substratum allows to increase early and total yield given the conventional cropping in soil (1,2,3). The main advantages of peat bags culture refer to a high decrease of substratum volume (about 4-5%), of water requirement (8-10%) and nutrients used (3-8%) given the soil culture requirements. Also for soilless culture, steam soil desinfection, which is very expensive, is eliminated (1). Besides a better nutrition with nutritive solutions and using electronic means can be provided.

The experiment was developed between 1999-2000 years in USAMV Cluj-Napoca greenhouse. The best results concerning early yield were obtained at variants with 8 l substratum for a plant indifferently of substratum type used: new mixture, old mixture, new + old mixture or new mixture + perlite.

INTRODUCTION

With a view to finding new technological solutions for growing greenhouse tomatoes yield, at USAMV Cluj-Napoca was studied the possibility of growing soilless tomatoes, on organic substratum, using cheap and easy local available materials. On this aim both the possibility of brown peat replacement with re-used substratum or perlite and determination of best volume of substratum recommended for a plant were studied.

MATERIAL AND METHOD

The research concerning substratum composition and volume, recommended for greenhouse tomatoes grown on organic substratum, was organized as a bi-factorial experience:

A factor – substratum composition: a_1 - new mixture, a_2 – old mixture, a_3 – new mixture (50%) + old mixture (50%), a_4 – new mixture (50%) + perlite (50%)

B factor – the volume of substratum recommended for a plant: b_1 – 6 l, b_2 – 8 l, b_3 – 12 l.

New mixture was made from brown peat (80%) and long duration follow soil + well decomposed manure (20%), fertilized with macro and micronutrients.

Old mixture had the same composition but it was used one year before for tomatoes culture too. Before of re-using it was steam disinfected and fertilized.

The culture was done in polyethylene bags with different volume of substratum for a plant: 6, 8 and respectively 12 l. Marpha F_1 hybrid was used as biological material. Plants density was 42.000 per hectare. The planting of transplants in experimental culture was done in the second part of January in both experimental years. Usual technology for I^{-st} cycle tomatoes culture was applied as well additional fertilization with N, P, K and micronutrients were applied. An irrigation pipe was laid along the middle of the double rows and small-bore tubings were moved into position to water each plant.Were done observations concerning growth and plants fructification, quantity and quality of yield.

RESULTS AND DISCUSSIONS

The plants vigorous, manifested by plant height and average number of leaves, records better results at variants with 12 l substratum for a plant indifferently of it's composition. Concerning fruit setting percentage it didn't differ too much from a variant to another one. It was beyond 78% for all variants, the best values being recorded for 8 l substratum for a plant variants both for new mixture (81,48%) and for new mixture (50%) + old mixture (50%).

Early yield in case of both experimental years (1999-2000) had considered to be that one recorded till 31 of May. Data concerning combined influence of both experimental factors on tomatoes early yield reveal some important findings *(table 1)*. Thus lower early yield recorded in 1999 was owed to an unfavorable climate in the beginning of plants growth (low temperatures, high cloudiness). On the other hand in 2000 was recorded a remarkable early yield, about 8,31 - 8,75 kg/m^2, for same of the variants. On an average for both experimental years, new mixture and old mixture (50%) + new mixture (50%) substrata provided early yield efficiency for variants with 8 l substratum per plant given the control with 6 l substratum per plant. The best early yields recorded were owed to an increase of substratum volume per plant but these results were not statistical provided for an increase of volume from 8 to 12 l for a plant.

The best total yields were recorded for all variants with 8 l substratum per plant indifferently of substratum composition. Total yield efficiencies were 29,8% for new mixture (50%) + perlite (50%), 25,2% for new mixture, 24,5% for old mixture and 21,7% for new mixture (50%) + old mixture (50%).

On an average of both experimental years, the evolution of total yield was similar with the evolution of early yield. It increases with increase of substratum volume but between 6 and 8 l of substratum differences statistical provided were not recorded *(table 1)*.

Table 1

The influence of substratum volume and composition on greenhouse tomatoes (Average 1999-2000)

Variants	Early yield				Total yield			
	Kg/m^2	%	± D	Significance	Kg/m^2	%	± D	Significance
I	6,07	100,0	-	-	11,66	100,0	-	-
II	7,15	117,8	1,08	***	13,26	113,7	1,60	***
III	7,58	124,9	1,51	***	14,24	122,1	2,58	***
IV	5,83	96,0	-0,2	-	12,11	103,9	0,45	-
V	6,56	108,1	0,49	*	14,28	122,5	2,62	***
VI	7,01	115,5	0,94	***	14,43	123,8	2,77	***
VII	6,48	106,8	0,41	-	12,62	108,2	0,96	**
VIII	6,87	113,2	0,80	**	13,49	115,7	1,83	***
IX	6,75	111,2	0,68	**	13,83	118,6	2,17	***
X	6,71	110,5	0,64	**	13,18	113,0	1,52	***
XI	6,84	112,7	0,77	**	14,23	122,0	2,57	***
XII	7,03	115,8	0,96	***	14,38	123,3	2,72	***
DL 5%			0,47				0,68	
DL 1%			0,64				0,93	
DL 0,1%			0,88				1,28	

I – new mixture, 6 l/plant; II – new mixture, 8 l/plant; III– new mixture, 12 l/plant; IV – old mixture 6 l/plant; V -old mixture 8 l/plant; VI - old mixture 12 l/plant; VII – new + old mixture, 6 l/plant; VIII - new + old mixture, 8 l/plant; IX -new + old mixture, 12 l/plant; X – new mixture + perlite, 6 l/plant; XI – new mixture + perlite, 8 l/plant; XII -– new mixture + perlite, 12 l/plant

The yield quality was influenced both by substratum volume and by substratum composition. Thus extra quality fruit proportion was beyond 75% from total volume of yield for all variants. However this proportion was higher (85-86%) at variants with medium volume (8 l) and high volume (12 l) than at variants with low volume of substratum (6 l). High extra yield efficiencies given the control were obtained for old mixture (40,27%) and new mixture + perlite (40,27%) for 8 l substratum per plant.

CONCLUSIONS

1. Early yield for variants with new mixture (50%) + perlite (50%) was significantly better than early yield for variants with old mixture and old mixture (50%) + new mixture (50%). The best early yields were obtained at variants with 8 l substratum for a plant indifferently of substratum type used.

2. The higher the volume of substratum the better the total yield was. However yield differences between variants with 12 l substratum (14,8%) and variants with 8 l substratum (11,5%) are not economic justified.

3. Extra quality yield was beyond 75% from total yield of tomatoes for all experimental variants but it increases too little (from 85% to 86%) for an increase of substratum volume from 8 to 12 l for a plant.

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THE BEHAVIOR OF SOME GARDEN BEAN VARIETIES IN BĂRĂGAN FIELD

GLĂMAN G-H., MARGINE A., TUDOR Z

For correct and updated information, with regard to the production potential, of technologic and agronomic features, as well as on the possibilities of adaptation at different environmental conditions, of some of the newest creations of garden bean varieties in the country and abroad, UNISEM S.A. organize during 2000-2002 rigorous tests.

The tests have been conducted at SC UNISEM Ialomiţa branch, farm No. 1 Scânteia, abode in Câmpia Bărăgan (Bărăgan field) at km 15 on the highway Slobozia-Brăila, on a soil chocolate cernoziom with humus contents of 4,5% in irrigation conditions.

The respective tests have been made both in the system of basic cultures, as well as successive cultures, for production of green pods as well as seeds.

MATERIALS AND METHOD

The tests have been conducted using 12 varieties, i.e.:

A: For basic and successive cultures:

- Aura, Aurelia, Elena, Lavinia, Lena-origin I.C.L.F. Vidra-România ;
- Almere, Novores, Tilla- origin Pop –Vriend-Holland
- Valja –origin Saatzucht Quedlinburg Gmbh-Germany

B: Only for successive cultures

- Achim, Beatrix, Goldstern, Goldtime, Option, Olga, Sinta, Taipan - origin Saatzucht Quedlinburg GmbH-Germany

The experiments have been made through C.C.O. according to the valid norms of experimental technique for such tests, with the placement of variants in latine rectangle, with 4 repetitions.

The experimental dates obtained with regard to green pods and seed yields have been statistic calculated according to the method of variant analyze.

The culture tehnology was the usual one, with the remark that, in order to see the behaviour of the varieties to the pathogen agents in conditions of natural infection, there weren't used phytosanitary treatments.

RESULTS OBTAINED

The experimental dates obtained with regard to the morphologic features (plant, green pods, seeds), physiological features of green pods for basic culture are presented in tables 1,2,3,4 and 7 and those referring to the phenology and physiological features of plants, precocity and green pods yield for sucessive cultures are presented in tables 5 and 6.

CONCLUSIONS

The pedoclimatic conditions in Câmpia Bărăganului (Bărăgan field) are very favorable for garden bean cultures, both for green pods and seeds production.

The highest yield (9,52 t/ha green pods and 2822 kg/ha seeds) was obtained by the variety VALJA - origin – Germany followed by NOVORES and ALMERE for green pods production and ELENA and NOVORES for seed production.

Among the autochthonous varieties, imposed itself LENA with 8,26 t/ha (with 8,26% less than VALJA), ranking from this point of view of the experience on second place (table 7)

The experimental varieties for basic culture were:1-early,7 mid-early,2 mid-late, and 2 late, with small differences of days with regard to the consumption maturity of pods, which allows the spreading of green pods production only for a short time, maximum 10 days.

I.S.T.I.S. – through the tests conducted at garden bean during the experiments, and afterwards, authorized the registration in the Official List of Varieties (Hybrids) of Culture Plants in Romania of the varieties also tested by us, in production conditions: VALJA, BERGAMO, NARBONE, XERA, ALMERE, TILLA and NOVORES, which confirms the exacted and scientific probity of our results.

The imported varieties of garden bean constitute, among others, a mean of enriching the germoplasm base, necessary in the amelioration work for obtaining new varieties. Besides, we have successfully benefited from this base in the creation of a new garden bean variety – UNISEM 1 – homologated in 1999.

As a deficiency, we believe, of the range of garden bean varieties tested, we mention the small number of varieties with yellow pods (AURA, GOLDSTERN, GOLDTIME), 3 out of 20 varieties tested!!!

Table 1

THE COMPARISON OF GARDEN BEAN VARIETIES IN CÂMPIA BĂRĂGANULUI MORPHOLOGIC CHARACTERS WITH REGARD TO: PLANT, GREEN PODS AND SEEDS

Crt. no.	Varieties	Morphologic features with regard to:										
		Plants		Green pods						Mature seeds		
		Type of growth	Height cm	Shape	Color	Size			No. of seeds in pod	Shape	Color	MMB (mass of 1000 seeds)
						Length cm	Ø mm	Weight g				
1	AURA	semi-climbing	45-55	cylindric, slightly flattened	yellow	8-10	7-8,5	6-6,5	4-8	Kidney shape	white	300
2	AURELIA	erect	50-55	straight with curved top	light green	12,5-13	9-11	5-5,5	4-6	Kidney shape	white	280
3	ELENA	erect	45-50	straight, with curved	light green	10-12	9,0	4-4,5	5-7	Kidney shape narrowed	white	240
4	LAVINIA	erect	50-55	straight, cylindric	light green	10-12	7-9	6-6,5	5-7	Kidney shape flattened	white	330-400
5	LENA	semi-climbing	45-50	straight, slightly curved at top	light green	11-13	9,5	5-5,5	5-7	Kidney shape lengthened	white	260
6	ALMERE	climbing	50-55	straight, lightly curved	green	10-12	8,5-9,5	4,5-5	5-7	Kidney shape	white	280
7	BERGAMO	erect	40-45	cylindric, slightly curved	green	12-13	8-9	4-4,5	6-8	Kidney shape	white	230
8	NARBNE	erect	45-50	cylindric with sharp top	green	12-13	8-8,5	4,5-5	6-8	Kidney shape	white	260
9	NOVORES	climbing	50-55	cylindric, slightly curved	green	11-12	8-9	4,5-5	6-8	Kidney shape	white	265
10	TILLA	semi-erect	45-50	cylindric with sharp point	green	10-12	7-8	4-4,5	5-6	Kidney shape lengthened	white	275
11	VALJA	semi-erect	55-60	straight with obtuse top	green	11-13	8-9	4-5	5-7	Kidney shape	white	270-290
12	XERA	erect	45-50	straight with obtuse point	green	13-14	8-9	4-5	6-8	Kidney shape	white	180

Table 2

THE BEHAVIOUR OF SOME GARDEN BEAN VARIETIES IN CÂMPIA BĂRĂGANULUI
PHISIOLOGIC FEATUREAS: VEGETATION PERIOD, TECHNICAL MATURITY OF THE PODS, BEHAVIOUR TO THE PHATOGEN AGENTS

Crt. no	Varieties	Preco-city	No. of days from springing till:			Resistance at pathogen agents				
			Consumption maturity	Seeds maturity	Technical maturity of pods	M.P	Ps.P	XAN	COLL. L	Ur.P
1	AURA	01	47	75	91,2%	-	-	+	-	-
2	AURELIA	02	49	80	91,2%	-	-	+	-	-
3	ELENA	02	47	72	70%	-	-	+	-	-
4	LAVINIA	04	53	80	71%	-	-	+	+	-
5	LENA	02	48	75	69,5%	-	-	+	+	-
6	ALMERE	02	47	75	92,6%	+	+	-	+	-
7	BERGAMO	02	50	77	92,7%	+	+	+	-	-
8	NARBONE	02	47	74	91,9 %	+	+	+	+	-
9	NOVORES	03	50	80	90,8 %	+	+	-	+	-
10	TILLA	02	48	76	91,7%	+	+	-	+	-
11	VALJA	03	49	77	93,1%	+	+	-	+	+
12	XERA	04	52	78	91,6%	+	-	-	+	-

Rezistence of pathogen agents: M.P. – commun mozaic of bean
Ps.P- Pseudomonas phasealicola
XAN – Xanthomonas phaseoleali
COLL.L.- Clolletothrichum lindemuthianum, Ur.P.- Uromyces pisi + resistant; - sensible

Table 3

THE BEHAVIOUR OF SOME GARDEN BEAN VARIETIES IN CÂMPIA BĂRĂGANULUI
TOTAL YIELD OF: GREEN PODS AND SEEDS

Var. no.	Varieties	Green pods Production			Signi-ficance	Var. no.	Varieties	Seed production			
		t/ha	%	Differences to the average t/ha				t/ha	%	Differences to the average	Significance
11	VALJA	9,52	116,90	1,32	xxx	11	VALJA	2,88	119,00	0,46	xxx
9	NOVARES	9,23	112,56	1,03	xxx	3	ELENA	2,68	110,34	0,26	xx
6	ALMERE	8,77	106,95	0,57	xx	9	NOVORES	2,50	103,30	0,08	-
5	LENA	8,62	105,12	0,42	xx	4	LAVINIA	2,46	101,65	0,04	-
1	AURA	8,35	101,82	0,15	-		AVERAGE	2,42	100	-	-
4	LAVINIA	8,35	101,82	0,15	-	6	ALMERE	2,38	96,34	-0,04	-
2	AURELIA	8,26	100,73	0,06	-	5	LENA	2,24	92,56	-0,18	0
	AVERAGE	8,20	100	-	-	2	AURELIA	2,30	90,90	-0,22	0
10	TILLA	8,16	99,51	-0,04	-	8	NARBONE	2,16	89,23	-0,26	00
3	ELENA	8,00	97,56	-0,20	-	1	AURA	2,10	86,77	-0,32	000
8	NARBONE	7,44	90,73	-0,76	000	10	TILLA	2,8	85,95	-0,34	000
12	XERA	7,23	88,17	-0,97	000	12	XERA	1,88	77,68	-0,54	000
7	BERGAMO	6,45	78,65	-1,75	000	7	BERGAMO	1,85	76,44	-0,57	000
Average of experience		8,20	100	-	-	-	-	2,30	100	-	-
Average of autochthonous varieties		8,1	101,34	0,11	-	-	-	2,33	101,30	0,03	-
Average of imported varieties		8,11	98,90	-0,09	-	-	--	2,24	97,39	0,06	-

DL – 5% = 395 kg/ha
DL – 1,0 % = 520 Kg/ha
DL – 0,1 % = 673 Kg/ha

DL – 5% = 174 Kg/ha
DL – 1 % = 229 kg/ha
DL- 0,1 % = 297 Kg/ha

Table 4

THE BEHAVIOUR OF GARDEN BEAN VARIETIES IN CÂMPIA BĂRĂGANULUI
MAIN BIOCHEMICAL FEATURES OF GREEN PODS*)

Var. no	Varieties	Determinations with regard to:				
		Dry soluble substance refractometric degrees	Total sugar %	Amidine %	Cellulose%	Titrated acidity (malic acid g/100g)
1	AURA	7,4	2,46	1,72	1,10	0,070
2	AURELIA	7,5	2,65	2,15	1,3	0,053
3	ELENA	9,2	3,29	2,97	2,14	0,072
4	LAVINIA	8,2	2,92	1,05	1,46	0,055
5	LENA	8,0	2,87	1,87	1,15	0,053
6	ALMERE	7,8	2,78	1,45	1,42	0,060
7	BERGAMO	7,9	2,83	2,35	1,21	0,050
8	NARBONE	8,3	2,96	2,44	1,23	0,047
9	NOVORES	7,5	2,52	1,12	1,17	0,065
10	TILLA	7,6	2,70	2,23	1,34	0,068
11	VALJA	8,5	3,02	1,51	1,12	0,066
12	XERA	6,5	2,26	2,41	1,40	0,071

*) Biochemical determinations have been done at I.C.D.I..P.V. „HORTING" Bucureşti – Berceni

Table 5

THE BAHAVIOUR OF GARDEN BEANS IN CÂMPIA BĂRĂGANULUI
PHENOLOGIC ASPECTS OF THE PLANTS – SUCESSIVE CULTURES

Crt. no	Varieties	Data's with regard to:					The behavior at pathogen agents				
		Sowing	Springing	Start of flowering	Mass flowering	Consumption maturity of green pods	MP	Ps.P	XAN	COLL.L	Ur.P
1	AURA	29.07	7.08	6.09	13.09	7.10	-	-	+	-	-
2	AURELIA	29.07	5.08	8.09	15.09	9.10	-	-	+	+	-
3	ELENA	30.07	6.08	6.09	11.09	6.10	-	-	+	-	-
4	LAVINIA	30.07	6.08	6.09	13.09	6.10	-	-	+	+	-
5	LENA	30.07	5.08	6.09	15.09	7.10	+	-	+	+	-
6	ALMERE	29.07	6.08	9.09	16.09	10.10	+	+	-	+	-
7	BERGAMO	29.07	4.08	10.09	16.09	12.10	+	+	+	-	-
8	NARBONE	30.07	6.08	13.09	17.09	13.10	+	+	+	+	-
9	NOVORES	29.07	5.08	16.09	25.09	21.10	+	+	+	+	-
10	TILLA	29.07	5.08	7.09	14.09	9.10	+	+	-	+	-
11	VALJA	30.07	6.08	10.09	16.09	11.10	+	+	+	+	+
12	XERA	30.07	4.08	14.09	19.09	14.10	+	-	-	+	-
13	ACHIM	30.07	7.08	8.09	15.09	9.10	+	+	+	-	+
14	BEATRIX	30.07	7.08	6.09	13.09	8.10	+	+	+	+	-
15	GOLDSTERN	30.07	5.08	10.09	16.09	12.10	+	+	+	-	+
16	GOLDTIME	30.07	5.08	6.09	13.09	8.10	+	+	+	-	+
17	OPTION	30.07	4.08	12.09	17.09	15.10	+	+	+	+	+
18	OLGA	30.07	5.08	6.09	14.09	8.10	+	+	-	+	+
19	SINTA	30.07	6.08	11.09	16.09	12.10	+	+	+	+	+
20	TAIPAN	30.07	4.08	6.09	14.09	8.10	+	+	+	+	+

Table 6

THE BEHAVIOUR OF GARDEN BEAN VARIETIES IN CÂMPIA BĂRĂGANULUI
PRECOCITY AND GREEN PODS PRODUCTION- SUCESSIVE CULTURES

Va-ri-ant no.	Varieties	No. of days necessary from:				Pre-co-city	Production t/ha green pods	Σ° C from	
		Sowing to springing	Springing to flowering	Springing to harvesting	Springing till seeds maturity*)			Sowing till flowering	Sowing till harves-ting
1	AURA	9	29	60	71	00	8,6	869	1233
2	AURELIA	7	34	65	92	04	6,2	895	1402
3	ELENA	7	31	61	74	02	4,1	843	1292
4	LAVINIA	7	31	61	74	02	3,8	843	1292
5	LENA	6	32	64	78	02	4,8	843	1292
6	ALMERE	8	34	65	80	02	5,9	908	1500
7	BERGAMO	6	37	69	81	02	3,5	922	1491
8	NARBONE	7	38	68	74	02	5,8	945	1376
9	NOVORES	7	42	77	87	03	3,9	1014	1553
10	TILLA	7	33	55	78	02	4,8	882	1476
11	VALJA	7	35	66	73	02	3,6	896	1407
12	XERA	5	41	71	74	02	4,5	869	1495
13	ACHIM	8	32	63	85	03	7,7	843	1526
14	BEATRIX	8	30	62	84	03	6,7	896	1526
15	GOLDSTERN	6	36	68	87	03	6,4	843	1526
16	GOLDTIME	6	32	64	87	03	4,8	927	1526
17	OPTION	5	39	72	89	04	7,3	843	1526
18	OLGA	6	32	64	87	03	8,0	927	1526
19	SINTA	7	36	67	86	03	7,2	843	1526
20	TAIPAN	5	33	65	88	04	4,8	910	1526

*) Refers to the maturity in wax of the seeds

Table 7

THE BEHAVIOUR OF GARDEN BEAN VARIETIES IN BĂRĂGAN FIELD
CLASSIFICATION OF GARDEN BEAN VARIETIES ACCORDING TO:

A. GREEN PODS PRODUCTION

Class	Varieties	Prod.*)	Class	Varieties	Prod*)	Class	Varieties	Prod.*)
I-st	VALJA	9,52	V-th	AURA	8,35	IX-th	ELENA	8,00
II-nd	NOVORES	9,23	VI-th	LAVINIA	8,35	X-th	NARBONE	7,44
III-rd	ALMERE	8,77	VII-th	AURELIA	8,26	XI-th	XERA	7,23
IV-th	LENA	8,62	VIII-th	TILLA	8,16	XII-th	BERGAMO	6,45

B. BEAN PRODUCTION

Class	Varieties	Prod**)	Class	Varieties	Prod**)	Class	Varieties	Prod**)
I-st	VALJA	2882	V-th	ALMERE	2385	IX-th	AURA	2105
II-nd	ELENA	2684	VI-th	LENA	2247	X-th	TILLA	2085
III-rd	NOVORES	2509	VII-th	AURELIA	2205	Xi-th	XERA	1884
IV-th	LAVINIA	2463	VIII-th	NARBONE	2169	XII-th	BERGAMO	1857

*) green pods production in t/ha
**) seeds production in kg/ha.

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ON THE INFLUENCE OF KEMIRA-TYOE FERTILISING ON THE QUANTITATIVE AND QUALITATIVE LEVELS OF TOMATO YIELDS IN UNHEATED SOLARIA

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Key words: fertilising, irrigation systems, forced and protected cultures, technology, chemical fertilisers, and economic efficiency**.**

SUMMARY

Fertilising, in general, in vegetables culture, constitutes one of the basic technological elements which, together with cultivar (precocity, determined/undetermined growth, etc.), leading in vegetation (the structure of the axial growth and development system – one, two or more stems), time of planting, irrigation system (classical – with drains, sprinklers or modern – by dripping) etc. influence tomato yield level both quantitatively and qualitatively. In forced and protected cultures fertilising has new dimensions due to plant growth rhythm, as a result of optimising microclimate factors, among which temperature is very important. Correlating fertilising and needs resulted from technology has a determining role in yielding. This paper presents a comparison between both quantitative and qualitative yield levels in different irrigation systems, using different chemical fertilisers, and their economic efficiency.

INTRODUCTION

The ratio between air part and root system is different between glasshouses and solaria, on one hand, and field cultures, on the other hand. This is what happens in the case of tomatoes too (Măianu & Ghidia, 1974). The ratios between air part mass and root mass, between fruit mass and air part mass are different in field tomatoes and glasshouse tomatoes (Anstett, 1968).

A proper use of mineral fertilisers involves detailed knowledge of plant's needs during vegetation. One should also well know the role of each macro- and micro-element, as well as the effect of excess or lack on tomato growth and development (Apahidean, 1998).

Davidescu (1981) emphasises that one of the most important steps in growing glasshouse and solarium tomatoes is to provide the culture with the necessary mineral elements, as their optimal mineral nutrition is different from that of field culture tomatoes because of different conditions.

Ceauşescu & al. (1983) emphasised that there are a series of malfunctions in the fructification process even though potassium is in proper amounts in the soil, but the K : N, P, Ca ratio is not proper. Lack of magnesium has negative effects on fruit quality: that is why fertilisers for glasshouse and solarium tomatoes must contain it (Butnariu & al., 1992).

Searching the most efficient chemical fertilisers with a proper N:P:K ratio has always been a constant in our research work together with other technological aspects of cultivating tomatoes.

MATHERIAL AND METHOD

The experiment concerning the influence of basic and phase Kemira fertilising on yield and quality in solarium tomato culture focussed on two hybrids: Platus F_1 – with determined growth; and Jeremy F_1 – with undetermined growth.

Setting the culture was done on April 10, 2001 for both hybrids in the solaria at the S.C. Agronin S.R.L. Curtici (Sere Curtici), District of Arad.

Culture reclamation was done between July 25 and 30 for the Platus F_1 hybrid and between September 10 and 15, for the Jeremy F_1 hybrid.

Planting density was of 3 plants / m^2, the experiments being of the bifactorial type:

Factor A – the hybrid: a_1 – Platus F_1; a_2 – Jeremy F_1;

Factor B – fertilising and irrigating system: b_1 – classical and drain fertilising systems; b_2 – classical and dripping fertilising systems; b_3 – modern and drain fertilising systems; b_4 – modern and dripping fertilising systems.

The modern fertilising system consists of using Kemira fertilisers (complex soluble fertilisers with micro-elements for fertilising irrigation and foliar fertilising and complex fertilisers for basic, starter and micro-elements treatments.

RESULTS AND DISCUSSIONS

Processing experimental data was done after statistical methods by the variance analysis method with a view to emphasise not only average values of yield and its variance limits, but also differences between classical and modern fertilising and irrigation systems for each hybrid.

The differences emphasise the value of each hybrid taking into account the ensuring of yields under the circumstances.

Tables 1 and 2 show the results concerning the influence of fertilising in both fertilising and irrigating systems in both hybrids, the quality of the production and a mathematical interpretation of the differences in yield.

It is obvious that from the point of view of the average yield level per ha in Platus F_1 modern fertilising variants with chemical ferilisers of the Kemira type b_3 and b_4 in both irrigation systems with statistically ensured yields as significant and distinctly significant. In the case of the Jeremy hybrid, one can notice the b_2, b_3, b_4 variants with yields statistically ensured as significant and distinctly significant.

Table 1

Synthesis of experimental data

Factor A	Fator B	Average number of fruit/pl	Average weight / fruit (g/piece)	Average yield		Extra and 1st quality yield	
				Kg/pl	Kg/ha	Kg/ha	%
a_1	b_1	17,6	142,3	2,504	75.124	61.076	81,3
	b_2	24,8	118,0	2,927	87.802	75.422	85,9
	b_3	26,3	121,6	3,197	95.917	79.707	83,1
	b_4	29,5	133,1	3,927	117.805	109.794	93,2
a_2	b_1	41,8	101,8	4,254	127.617	93.137	76,9
	b_2	45,6	117,1	5,340	160.214	127.210	79,4
	b_3	48,4	112,4	5,440	163.200	131.213	80,4
	b_4	50,7	128,9	6,533	195.998	176.594	90,1

Table 2

Analysis of the variance

Variant	Yield (t/ha)	Relative yield (%)	Difference (± t/ha)	Significance of the difference
a_1b_2-a_1b_1	87,8-75,1	116,9	+12,7	-
a_1b_3-a_1b_1	95,9-75,1	127,7	+20,8	*
a_1b_4-a_1b_1	117,8-75,1	156,9	+42,7	**
a_1b_3-a_1b_2	95,9-87,8	109,2	+8,1	-
a_1b_4-a_1b_2	117,8-87,8	134,2	+30,0	*
a_1b_4-a_1b_3	117,8-95,9	122,8	+21,9	*
a_2b_2-a_2b_1	160,2-127,6	152,5	+32,6	*
a_2b_3-a_2b_1	163,2-127,6	127,9	+35,6	**
a_2b_4-a_2b_1	195,9-127,6	153,5	+68,3	**
a_2b_3-a_2b_2	163,2-160,2	101,9	+3,0	-
a_2b_4-a_2b_2	195,9-160,2	122,3	+35,7	**
a_2b_4-a_2b_3	195,9-163,2	120,0	+32,7	*

DL 5% = 19,05; DL 1% = 34,99; DL 0,1% = 77,54.

Table 3 is a synthesis of the conclusions supplied by mathematical statistics methods of variance analysis.

Table 3

Economic efficiency

Factor A	Factor B	Average yield kg/ha	Extra and 1st quality yield		Income (thousands of ROL/ha	Expenses (thousands of ROL/ha)	Profit	
			Kg/ha	%			(thousands of ROL/ha)	(%)
a_1	b_1	75.124	61.076	81,3	1.083.516	679.312	404.204	100
	b_2	87.802	75.422	85,9	1.279.890	822.765	457.125	113,1
	b_3	95.917	79.707	83,1	1.390.125	829.21	560.804	138,7
	b_4	117.805	109.794	93,2	1.743.042	1.122.610	620.732	153,5
a_2	b_1	127.617	93.137	76,9	1.413.484	880.873	532.611	100
	b_2	160.214	127.210	79,4	1.790.552	1.210.563	579.989	108,9
	b_3	163.200	131.213	80,4	1.830.452	1.215.110	615.342	115,5
	b_4	195.998	176.594	90,1	2.274.360	1.476.239	798.121	149,9

CONCLUSIONS

1.The modern fertilising system based on chemical fertilisers of the Kemira-type proved to be superior to the classical one: the proof – the high yield level and its quality.

2.Yields in dripping irrigation variants associated with modern fertilising are superior quantitatively and qualitatively to those obtained in the drain irrigation variant, even under modern fertilising conditions.

3.Vegetable yield quality for both hybrids, Platus and Jeremy, is superior for extra and 1st quality in the modernised fertilising system and even greater when the latter is associated with dripping fertilising system.

4.Economical efficiency calculi confirm the above-mentioned conclusions and profit rates particularly in the modernised and dripping irrigation fertilising variants.

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THE WATER PI INFLUENCE ON CUCUMBER NURSERY TRANSPLANT GROWING

GHEORGHIŢA HOZA

Key words: water PI, cucumber, nursery transplant

SUMMARY

For nursery transplant producing were used many substrata prescriptions, but the irrigation was effectueted with normal water comparatively with PI water.

The results obtained showed that PI water had a positive influecne on the plant grown in nursery transplant phasys. This aspect manifests itself by a good vigor, big deseases resistance, the reduction of the producing period, etc. This type of researches is at beginning and it must continue in the next years to verify the effects of PI water at cucumber and another vegetable plants.

Pi water, considered the water of life, was obtained for the first time by Akihiro Yamshita at Nagoya University, in 1964 year.Water PI is a bioenergisated water used for the first time in Japain and Corea, and after 1990 in USA and Europe. The PI water can be made from potable water by mechanical and biological purification and loaded with bioenergy by Lifeenergy device.

From the former researches it was demonstrated that this water had multiple utilities and positive effects. Thus, in medicine is used for curing differents kind of diseases (cancer, hepatitis, toxins elimination, the stimulation of hepatic function), in food industry, agriculture, etc. In this last case, it was constated a good grown of the plants, the production increase, the diseases resistance increase, etc. In this idea, begins a study regarding cucumber reaction at PI water, because the cucumber plants are very pretentious at water irrigation quality.

MATERIAL AND METHOD

The study was affected in warm glass-rooms, into Didactic yield of Horticulture Faculty. It was used Levina F1, hybrid with a big capacity of shutting and a big production capacity.

Sowing was effected in the first decade of March 2002, direct in plastic pots, on many substrata variants. The substrata compositions had: leaves soil, manure, top soil and sand for control variant and perlite, manure and top soil in different proportions for the other variants. For irrigation was utilized normal water comparatively with PI water to see their influence on cucumber nursery transplant.

The experimental variants were:

V1 - control (substrata by: 40% leaves soil + 30% manure + 20% top soil + 10% sand, irrigated with normal water);

V2 - 50% perlite + 50% manure, irrigated with normal water;

V3 - 50% perlite + 50% manure, irrigated with PI water:

V4 - 50% perlite + 50% top soil irrigated with normal water;

V5 - 50% perlite + 50% top soil irrigated with PI water,

V6 - 33% perlite + 67% manure irrigated with normal water;

V7 - 33% perlite + 67% manure irrigated with PI water;

V8 - 30% perlite + 67% top soil irrigated with normal water;

V9 - 30% perlite + 67% top soil irrigated with PI water.

During the nursery transplant period were effectuated the specifically works. Also, were effectuated observations and determinations regarding the cucumber nursery grown, the leaves form and it was appreciated the obtained nursery quality.

EXPERIMENTAL RESULTS

From these researches we constated that PI water had a visible positive influence on seeds germination and on the plants grown. At variants irrigated with PI water was obtained a germination percent of 98%, and the rise time was diminuated with 4 days comparatively with the variants irrigated with normal water.

Analyzing in dynamics the nursery transplant grown, we observed that the rhythm of the cucumber growing irrigated with PI water was more accelerated than the rhythm at variants irrigated with normal water. The nursery obtained were vigorous from the first phases of the research

Table 1

The dynamics of high cucumber nursery transplants growing

Variant	10.04.2002	17.04.2002	24.04.2002
V1- mt	11.4	15.8	18.5
V2	12.9	18.8	19.4
V3	13.7	19.6	21.1
V4	12.2	16.5	19.7
V5	13.0	17.9	19.8
V6	11.8	14.8	18.3
V7	12.2	15.3	19.1
V8	12.6	14.2	18.9
V9	13.4	16.1	19.3

The nursery transplant quality, appreciated by the high of the plants, the number of leaves, the thickness of the stem, the root system growing, the weight of the plants etc., was superior at irrigation with PI water. Thus, the nursery transplant irrigated with PI water had a high of 22.5 cm in the first 38 days after germination, and the nursery transplant irrigated with normal water had only 20.8 cm after 43 days (fig. 1). Very good conditions of growing had the root system at variant irrigated with PI water. The roots length was of 23 cm for the irrigation wit PI water and 16.5 cm form the irrigation with normal water (table 2).

Table 2

The cucumber parameters in planting moment

Variant	High of	Number of	Stem thick-	Roots system		Average fresh weight		
	plant (cm)	leaves (buc)	ness (mm)	lenght (cm)	volume (cm^3)	root	aerian part	p.a./r
V1 - MT	19.8	6.6	5.3	20.6	3.5	2.2	11.3	4.6
V2	20.8	6.8	5.5	22.7	3.8	2.4	10.9	4.5
V3	22.5	7.0	5.8	23.2	4.0	3.3	17.7	5.3
V4	20.4	6.6	5.1	18.7	3.6	2.2	10.8	4.9
V5	22.1	6.9	5.7	21.9	3.9	3.3	16.2	4.9
V6	19.8	6.2	5.3	19.8	3.5	2.1	10.7	5.9
V7	21.7	6.8	5.8	22.3	3.6	3.3	16.9	5.1
V8	20.8	6.4	5.1	19.6	3.3	2.1	10.5	5.0
V9	21.5	6.8	5.6	21.7	3.5	3.2	16.9	5.3

The PI water influenced positive also the weight of the plant. Thus, a young cucumber plant had over 20 g for the variant irrigated with PI water, and only 13 g for the variant irrigated with normal water (fig.2).

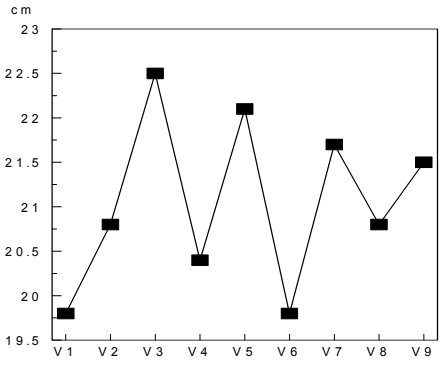

Fig. 1 The high of the cucumber plants

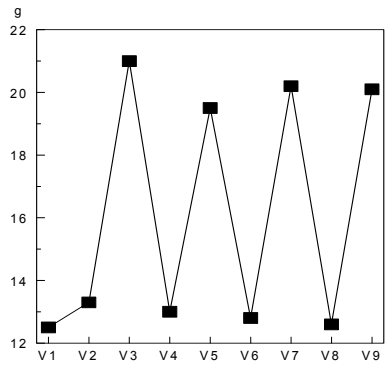

Fig. 2 The total fresh weight of cucumber plants

CONCLUSIONS

The PI water use in nursery producing technology determinate:

3.1. The germination capacity growing of the seeds and the reduction of germination period;

3.2. The fast nursery transplant grown comparatively with nursery transplant irrigated with normal water;

3.3. The reduction of nursery transplant period and the obtaination of nursery transplant with superior quality parameters (thickness of stem, number of leaves, weight, etc.).

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EFFECT OF SEEDS TREATMENT WITH ANTIFUNGIC VEGETALE EXTRACTS ON TOMATO SEEDLING

VIORICA LUCHIAN, IRINA PETRE, STELICA CRISTEA, ŞTEFANA JURCOANE, ANDREEA BARLOGEANU, N. ATANASIU, ELENA BOCA, RODICA MATEESCU

Key words: vegetable extracts, tomato, *Alternaria pori*, *Fusarium oxysporum*

SUMMARY

The biological control of different phytopatogenical fungus began in the same time with the discovery of micromycete Trichoderma sp. antagonistic capacity, obtaining many encouraging experimental results in vitro and in vivo.

As concern the vegetal extracts using as biocontrol agents against phytopatogenical fungus, there are yet less results.

Using these vegetale extracts presents advantages as compared with the chemical control, because there aren't the risk of water, soil and finite products pollution.

INTRODUCTION

Tomato – *Lycopersicon esculentum* represent in present one of the most important legumicole culture, having a large spreading on all the world.

Some of the most dangerous diseases frequently meeting in tomato culture are: brown tomato spot (Alternariose) – *Alternaria pori* asnd *Fusarium oxysporum* – withering (tomato fusariose).

These two pathogens frequently attack tomato culture. Inside the structures where there isn't maintained an adequate cultural hygiene, the attack can be manifested even if from the seedling phase.

These were the reasons why there was tried to test natural bioproducts, which have been presented efficacy in the experiments realized in laboratory, at this specie.

MATERIAL AND METHOD

To perform this experiment, there was used tomato seeds cv. Dacia.

Seeds were counted and placed in Petri dishes.

Before seed using there were carried out determinations concerning seeds germination percent, using the germinator, by classical methods. The germination percent was 74%.

- 5 Petri dishes have been infected with alternariose spores suspension;
- 5 Petri dishes with fusariose spores suspension.

The Petri dishes have been maintained in, laboratory, for 2 hours, for infection and spores adhering on seed, after that seeds have been dried on a filter paper sheet.

After drying the infected seeds with alternariose suspension spores have been treated with ecological bioproducts (100 seeds for each variant) according to the following plan:

V0 – control – uninfected seed – untreated

V1A – infected and untreated seed

V2A – infected seed – treated with 4 ml horseradish extract

V3A – infected seed – treated with 4 ml garlic extract

V4A – infected seed – treated with 4 ml fennel extract

V5A – infected seed – treated with the synthesis product Sumilex 50 PU, 0,05%

After drying the infected seeds with fusariose suspension spores have been treated with the ecological bioproducts (100 seeds for each variant) according to the following plan:

V0 – control – uninfected seed – untreated

V1F – infected and untreated seed

V2F – infected seed – treated with 4 ml horseradish extract

V3F – infected seed – treated with 4 ml garlic extract

V4F – infected seed – treated with 4 ml fennel extract

V5F – infected seed – treated with the synthesis product Topsin 70 PU, 0,05%

Seeds have been maintained in those extracts 2 hours, after that they have been sowed in plastic pots. In every pot there were been sowed 10 seeds.

For each variants there were been sowed 5 pots for repetition 1 and 5 pots for repetition 2, so, each variant had 100 seeds. There was sowed on 25 May in plastic pots to begin with the mixture disinfecting.

RESULTS AND DISCUSSIONS

There were carried out a series of observations regarding to:

- emergence percent;
- plants number emerged on each variant.

The determination have been realized at the emergence beginning, during emergence period and during massive emergence (7.06), as well as at 7 days after massive emergence (14.06), both for the infected varints with fusariose spors and for those infected with alternariose spores.

From the table 1 data, it can be observed that at the emergence biginning, seeds from the variant V2 (horseradish treated) had a percent of 70% emerged plants, this percent being excelled only by the Sumilex treated variant. On 7.06, the emerged plants percent was 90% at the 3 variant, with garlic extract treatment.

At the last counting, it is observed that the highest emerged plants percent was registered at the variants V3 and V2.

Table 1

Emergent plants number – alternariose spores infected plants

Var.	3.06		5.06		7.06		14.06	
	emerged plants number	% emerged plants	emerged plants number	% emerged plants	emerged plants number	% emerged plants	emerged plants number	% emerged plants
V0A	30	100	48	100	73	100	92	100
V1A	12	40	20	41	34	46	21	23
V2A	21	70	54	112	65	89	62	67
V3A	19	63	50	104	66	90	59	64
V4A	15	50	41	85	60	95	60	65
V5A	22	73	52	108	70	95	72	78

In the case of the fuzariose infection (table 2) and vegetale extracts treatment, it was noticed that the best results have been obtained at the variants V2 – horseradish treated and V3 – garlic extract treatment.

Table 2

Emergent plants number – alternariose spores infected plants

Var.	3.06		5.06		7.06		14.06	
	emerged plants number	% emerged plants	emerged plants number	% emerged plants	emerged plants number	% emerged plants	emerged plants number	% emerged plants
V0F	30	100	48	100	73	100	92	100
V1F	12	40	20	41	34	46	21	23
V2F	21	70	54	112	65	89	62	67
V3F	19	63	50	104	66	90	59	64
V4F	15	50	41	85	60	95	60	65
V5F	22	73	52	108	70	95	72	78

After fusariose infection and vegetale extracts treatment, it was observed that at the first evaluation performed on 3.06, the best results have been obtained at V2 variant, horseradish treated and at V5 variant were seeds have been treated with the synthesis product Topsin.

At the following determinations it was noticed that at the variant V2 (horseradish treatment) there were obtained the best results, with 76% emerged plants.

CONCLUSIONS

Following the performed tests with the vegetal extracts on tomato seeds infected with fusariose and alternariose spores, it can be formulated the conclusions as follows:

- In the case of alteranriose infection, the best results have been obtained by seeds treatment with horseradish and garlic extracts. The same situation has been registered for the infections with fusariose.
- It is suggested to continue the investigations and to test the vegetale extracts on others legumes species.

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RESEARCH CONCERNING THE POSSIBILITIES TO INCREASE CUCUMBER YIELD BY USING SOME ECOLOGICAL BIOSTIMULATORS

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Key words: *Bacillus subtilis, Trichoderma sp*., cucumbers, biostimulators

Bioproducts with antagonistic function used to preventing and controlling pathogenic fungus, were obtained with *Bacillus subtilis* and *Trichoderma sp*. For instance, a *Trichoderma viride* was used as microbial fertilizer, as well as fungicide.

Using *Trichoderma viride* as microbial fertilizer in greenhouses significantly reduces the diseases in cucumbers seedlings, thus reducing the number of applied phytosanitary treatments.

Microbial antagonists obtained with bacteria or fungi are used to preventing controlling some fungi from the *Verticillium*, *Cladosporium*, *Fusarium*, *Sclerotinia* genus.

To apply the active substances directly on seed has a destructive effect on pathogens which thus are transmitted, and it assures a protection of roots against the pathogen attack, too.

Microbial products present some advantages compared with the chemical products: less risk residues in soil, water and foods; less risk of freatic water contamination; high capacity to control plant diseases, alone or in combination with chemical products, when their capacity increases.

INTRODUCTION

High productions, with high quality and efficiency, can be obtained only in the cultures with a good physiological and phytosanitary condition. Yearly, diseases induced by this fungus cause important crop loss, of about 30-50%. These diseases are controlled with the aid of antifungus substances, obtained by chemical methods, produced by many foreign or native firms. Economic and productive advantages, as well as the polluting effects of some of these substances, are well - known.

Next to the chemical substances, literature describes methods to obtain biological products with a control potential for the pathogenic fungus which attacks plants, especially legumes.

MATERIAL AND METHOD

To obtain the biostimulators, some microorganisms from *Bacillus* and *Trichoderma* genus were used.

A high microorganism number was isolated and tested in the laboratory, two bacteria (*Bacillus subtilis* BSV and *Bacillus subtilis* BSU) and a fungus – *Trichoderma viride* were selected.

To produce the antagonists, four phases were performed:

In the first phase, the inoculum culture was obtained by the bacteria and fungi cultivated on a rich glucose medium, which contained: soybean flour, wheat barn, corn steep liqueur, mineral salts and microelements.

The second phase of the bioprocess was concerned with the microorganism growth and development, followed by the sporulation on a similar medium as for the inoculum.

In the third phase, the sporulated biomass was separated from the liquid side, by cooling or by centrifugation.

The fourth phase was to dry the bacterial biomass by atomization and vacuum centrifuge for fungus.

To test the bioproduct on cucumber plants, the following methods were used:

For each variant, 1 g Levina hybrid cucumber seeds were weighted, then the seeds were numbered; 120 seeds were taken for each variant.

The weighted and numbered seeds were put into four different pots. Separately, there were weighted 1.0; 1.5; and 2-g product that were put into 3 recipients. 50 ml water was added and the recipient content was very well homogenized. With the aid of a pipette, 5 ml solution was taken off and the seeds from pots were treated. The seeds were preserved in the solution for 2 hours. Then, they were sown in pots. The studied variants are presented in Table 1.

Table 1

Studied variants at cucumbers treated with biostimulators, Bucharest, 2001-2002

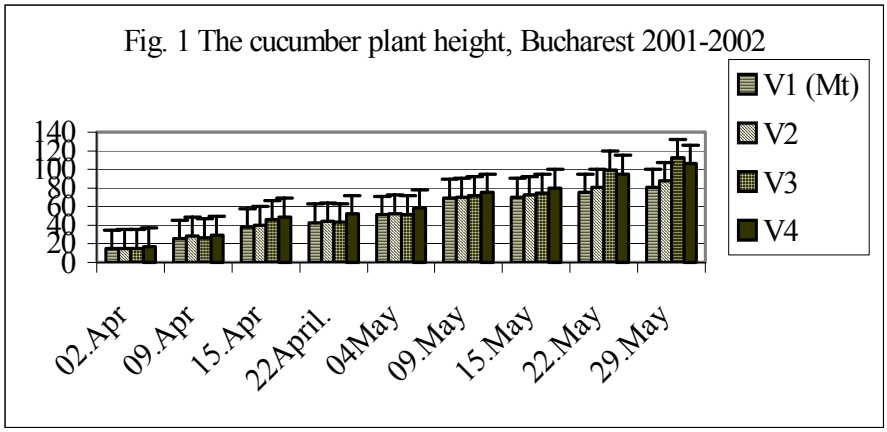
Variant	Specification
V1 – Control	5 ml water
V2	1.0 g product - 5 ml solution
V3	1.5 g product - 5 ml solution
V4	2 g product - 5 ml solution

RESULTS AND DISCUSSIONS

After sowing, determinations concerning the seedling number and the percentage of their appearance were performed.

At the last determination, it was noticed that the percentage of the cucumber plants appearance for the biostimulator variants was higher as compared with the untreated variants. This was 99.1% in V_2 and 96.4% in V_3, as against 91.6% in the control variant.

The determinations regarding the cucumber plants height in culture emphasized that the plant height was higher in the biostimulator treated variants, especially inV_3 – 115 cm and V_4 -112 cm (Figure 1).



It is necessary to mention that the microbial product had an antifungus effect too, because the treated plants were more resistant to diseases, as compared with the control variant.

Yield analyses of the cucumber plants demonstrated that the highest yield was obtained inV_3 (1.48 kg/plant), compared with 1.05 kg/plant in the control (Table 2).

Table 2

Yield indicators in biostimulator treated cucumbers, Bucharest, 2001-2002

Variant	Yield	Yield	Mean fruit weight	Fruit number	
	kg/m^2	kg / plant	g/fruit	on plant	on m^2
V1	2.21	1.05	80.6	9.59	20.13
V2	2.76	1.37	86.3	11.3	23.73
V3	3.67	1.48	92.3	16.3	34.23
V4	3.49	1.40	90.7	15.8	33.18

The total yield registered was 3.67 kg/m^2 in V_3 and 3.49 kg/m^2 in V_4, with significant differences against the control (Table 3)

CONCLUSIONS

Using the bioproducts based on *Bacillus subtilis* and *Trichoderma viride* in cucumber plants determined an increase of the risen plants, 99.1% in V_2, and 96.4% in V_3, as compared with 91.6% in the control.

Plant height and leaf number was significantly higher in the treated variants, compared with the untreated ones.

Table 3

Synthesis of the experimental results concerning total yield Biostimulator treated cucumbers, Bucharest, 2001-2002

Variant	Yield	Yield difference	Relative yield	Yield difference	Significance
	kg/m^2	kg/m^2	%	%	
V1 (Ct)	2.21	-	100	-	-
V2	2.76	0.55	124	24	x
V3	3.67	1.46	166	66	xxx
V4	3.49	1.28	157	57	xxx

Dl 5% = 0.30 kg/m^2; Dl 1% = 0.70 kg/m^2; Dl 0.1% = 1.20 kg/m^2.

In the treated variants, yield was with 24-67% higher, compared with untreated control. Also, the fruit weight increased, as well as the fruit number on a plant and on m^2 area.

Tests will continue and the best results will be recommended in production.

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MANAGEMENT OF INTEGRATED CONTROL OF THE WEEDS IN ONION DIRECT SEED

MIRON V

Key words: Herbicides, onion, direct seed

Grădina este un laborator de farmacie!
L. Binet
Din care ar trebui să ne servim mai des!
M.V

SUMMARY

Utilization in a more complex way, by efficient technologies of the high potential yielding ability of the new cultivars represents the fundamental problem of any agriculture system which aims to a high productivity. The modern technologies of growing give a great importance to identification and control of the diseases, pests and weeds in order to reduce the losses caused by these factors. The concept of integrated control appeared in the beginning of ’70 and implies drawing up of some technologies which joint together all the methods of prevention and control in order to obtain the best results from economical point of view. This concept does not exclude utilization of chemical products, but their use in a rational way, in minimum doses but efficiently and their replacement in some technological links with other methods which can assure at least effectiveness in the weed control.

MATERIAL AND METHOD

This trial was carried out on a private farm using the onion variety Diamant and herbicides having a good selectivity for the growing plant (table 1). On the farm was applied a technology of growing recommended by the R.I.V.F.G. Vidra but it was correlated with the specific of this trial. Species of weeds identified in the control plot reached 47 pices/sqm of monocotyledonous and 68 pieces/sqm of dicotyledonous respectively.

RESULTS AND DISCUTION

The range of herbicides used assured an efficient control of the species of dico- and mono-cotyledonous weeds (table 1) and an optimum selectivity for the growing plant.

Species of dicotyledonous weeds were efficiently controlled by the herbicide STOMP 330 EC and GOAL 2 X L P in a rotation of 83and 85 respectively. Monocotyledonous weeds were efficiently controlled by the

herbicides AGIL 100 EC, FUSILADE FORTE, PANTERA 40 EC. Monocotyledonous weed existed in the phytocenosis and they are recommended for the yields which proved to be assured from statistics point of view (table 2).

CONCLUSIONS

- In the vegetable crops, competition of weeds creates greater troubles than in other agricultural crops;
- There are sufficient reasons in order to try the control of the weeds by the aid of herbicides;
- Application of herbicides became an indispensable auxiliary for the increasing both of labor productivity and quality of the harvest;
- Weeds are regarded as "green enemy" of the agricultural crops and they can compromise completely the onion crops;
- In the system of integrated control of the weeds in the frame of the integrated management of plant protection (IMPP) one hat to manifest a flexibility characterized by elements of miniaturization for the large farms;
- We recommend for the chemical control of the weeds in the onion crops the following receipt of herbicides:
  - Goal 2 X L P 1 l/ha
  - Stomp 330 EC 6 l/ha applied after seed
  - Ramrod 48 F 6 l/ha applied after seed

To control only monocotyledonous weeds species existed in the phytocenosis we suggest application of:

- Agil 100 EC 1.0 l/ha
- Fusilade forte 1.0 l/ha
- Pantera 40 EC 1.5 l/ha

For the onion crops grown in the field having in the phytocenosis both dicotyledonous and monocotyledonous weeds we recommend application of the herbicides in combination by preemergent application and during the vegetative period respectively

Table 1

Effectiveness of the herbicides in weed control

Product	Rate kg, l/ha	Appli-cation	Weeds total			Monocotyledonous			Dicotyledonous		
			No/sqm	Control %	EWRS note	No/ sqm	Con-trol %	EWRS note	No/ sqm	Con-trol %	EWRS note
Check, untreated	-	-	115	-	-	47	-	-	68	-	-
Goal 2 X L P	1	Post	45	61	7	28	8	7	17	85	5
Stomp 330 CE	6	Preem	38	67	7	26	45	8	12	83	5
Ramrod 48 F	6	Preem	36	69	7	22	47	8	14	80	6
Agil 100 EC	1	Post	72	49	7	4	92	4	68	-	-
Fusilade forte	1	Post	71	49	7	2	96	3	69	-	-
Pantera 40 EC	1.5	Post	73	51	8	5	89	5	68	-	-

Table 2

Selectivity of some herbicides applied in onion crops

Product	Rate kg, l/ha	DCI	Moment of application	EWRS note
Goal 2 XL P	1	Oxyfluorfen	Postem	1
Ramrod 48 F	6	Propaclor	Preem	1
Stomp 330 EC	6	Pendimetalin	Preem	1
Agil 100 EC	1	Propaquizalofop	Post	1
Fusilade forte	1	Fluasifop-p-butil	Post	1
Pantera 40 EC	1.5	Quizalofop-etil	Post	1

Table 3

Synthesis of the yields obtained

Product	Rate kg,l/ha	Moment of application	Yield t/ha	Yield %	"D" t/ha	Sem.
Check, untreated			22,2	100	-	-
Goal 2 X L P	1	Post	24,5	110,3	2,3	xx
Stomp 330 CE	6	Preem	24,8	111,7	2,6	xx
Ramrod 48 F	6	Preem	25,1	111,9	2,9	xx
Agil 100 EC	1	Post	25,6	115,3	3,4	xxx
Fusilade forte	1	Post	26,6	119,8	4,4	xxx
Pantera 40 EC	1.5	Post	25,5	114,6	3,3	xxx
					1,72 2,28 3,22	

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RESEARCHES REGARDING THE USE OF FERTILIZATION SYSTEM AND DIFFERENT SUBSTRAT ON EGGPLANTS CULTURE ON SACKS

POPESCU V., GABRIELA NEAŢĂ, ELENA DRĂGHICI

Key words: substratum, fertilization, eggplant

SUMMARY

The glasshouse culture presents some problems abort the intensive soil use. In the research were used two culture substrata formed from 1 part of peat: 1,5 parts of fallow soil for substratum (V1), 2 parts perlit, 2 parts manure and 1 part peat for substratum 2 (V2), and control (V3) was considered soil from glasshouse . Biological material used in research was Rima hybrid eggplant Holland provenience. On the vegetation period, the culture was weekly fertilized after classical scheme Fertilization process was made in a uniform way at all variants by fertirigation. There were made agrochemical analyses at eggplant fruits in dynamics the results show the superiority of variant 1 in comparison with control. Nitrates analyses shows a high crop quality without any problem of toxicity.[1, 2, 3]

INTRODUCTION

The technology of plants in conservatory spaces requires the use of high quantities of organically and chemical fertilizers, also high quantities of water and so the soil became rich in salts with negative effects on plants growth. By using soil from glasshouse for a long period of time soluble salts retained in soil determined a supersaturating effect and a decrease of crop. Also to obtain a high quantity of organic fertilizers is difficult, because the producers preferred to use these products in their farms.

The researches made in the last time, tried to substituted manure and other organically products needed for horticulture using some mixture of compost. In the same time to reduce the quantity of materials with organically roll, it were used the sacks culture.

The aim of that research was to experiment of some culture layers in polyethylene sacks on vegetable culture of eggplants, respectively in glasshouse.

MATERIALS AND METHODS

The research was made in glasshouse of Vegetable Department of Horticulture Faculty of University of Agricultural Sciences and Veterinary Medicine Bucharest.
The culture was started in March 2001. There were used as substrata materials: manure, peat, fallow soil and perlit. The components were measured in volumetric

way. Mixtures of different components were homogenized and introduced in polyethylene sacks with 10 dm^3 capacity. As control was established the soil from glasshouse. Experimental variants were:

V1- control- soil from glasshouse;

V2- peat 1 part, manure 1,5 parts and fallow soil 1 part;

V3- manure 2 parts, peat 1 part and perlit 1 part.

Biological material used was Rima hybrid eggplant. The age of nursery transplant was 85 days and the number of plants on every variant was 30. At eggplant culture was applied the necessary working about phytopathology control. Eggplants were nursery on 2 and 3 branches. After 180 days eggplants were cut, so the fruits attended maturity.

Initially was made the agrochemical analyses of substrata and was elected the phase's fertilizer process. In fertilization process were used complex fertilizers dissolved in water. Every variant was weeded with a constant quantity of water. Along vegetation period were registered the quantity and quality of eggplant fruits.

RESULTS AND DISCUSSIONS

Quality results. The samples to establish the quality of crop was made in dynamic with consume period. The results were compared with data from scientific literature from Romania and abroad.

Agrochemical control at eggplant fruits revealed a low content of unmethabolised nutritive elements. So the nitrate contents vary in low limits, respectively between 109 and 289ppm. These values revealed a high methabolic process of nitrogen. The results of nitrate values were compared with the value presented by O M S of 450ppm, the values of experimental crop were under these toxic values and the crop quality was good. The phosphorus and potassium contents of eggplant fruits were registered in the normal limits. Variant 3 was the best variant from the point of view of nutritive elements absorption process (fig 1, 2, 3). The correlation between the nitrogen substratum content and the nitrates absorption process in eggplant fruits was equilibrated and the mobilization of nutritive elements in substratum was constant,(fig 4).

Crop results of 180 days. On vegetation period the plant blossoms were earlier at variants V3 after 115 days and V2 after 118 days in comparison with control V1, respectively 124 days.

From the point of view of crops quantities the highest values were obtained at variant 3, eggplants on substratum 2 respectively of 3.42kg/plant. The crops obtained at Metric Square varied with substratum. The highest value was at variant 3 with 9.47kg/m^2 in comparison with control, 6.61kg/m^2 (table 1).

Fig.1:Nitrate contents in eggplant fruits

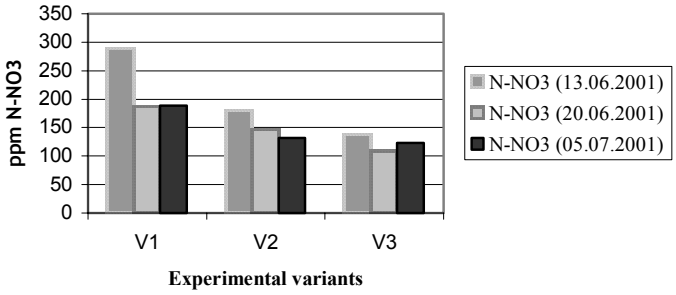

Fig.2. Phosphorus contents in eggplants

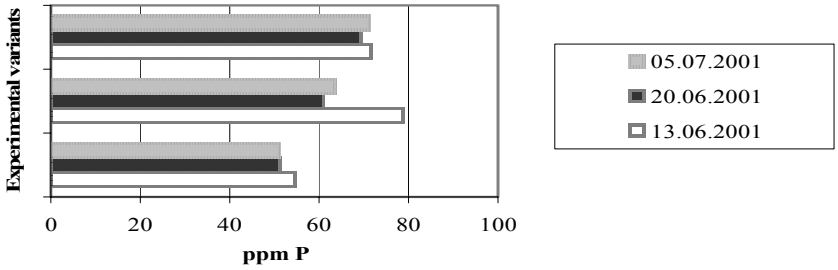

Fig.3:Variatia continutului de potasiu in vinete

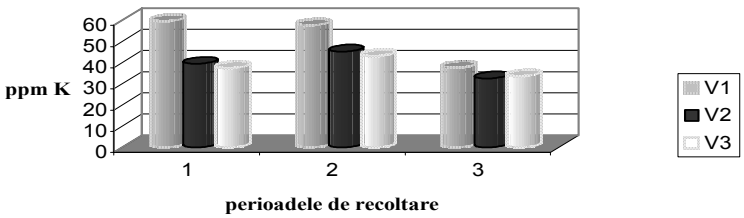

Fig.4. Correlation between the content of nitrogen from substratum and the absorbtion of nitrates in eggplant fruits

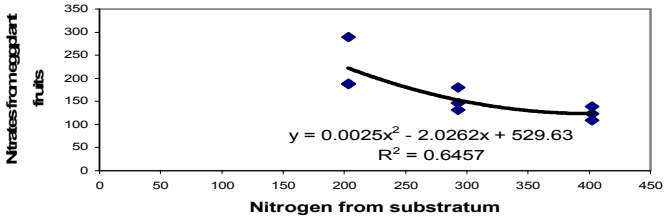

Table 1

The influence of substrata in eggplant crop at 180 days

Experimental variants	No of fruits	Medium weight (g/fruit)	Crop Kg/m^3
V1-control	110	217	6.61
V2	131	223	8.03
V3	152	228	9.47

Statistically analyzed the crop obtained the results from both variants were distinctively significant in the both substratum variant (table 2).

Table 2

Statistically analyse of experimental variants

Experimental variants	Crop Kg/m^3	%	Diferences	Signification
V1-control	6.61	100.00	Mt	Mt
V2	8.03	121.48	1.42	***
V3	9.47	143.26	2.86	***

DL 5%-0.17kg/m^2
DL 1%-0.28kg/m^2
DL 0.1%-0.5kg/m^2

CONCLUSSIONS

1. Eggplants agrochemical analyses in dynamic show a good quality of crop without toxic problems;
2. Along vegetation period of time the blossom process was earlier at variants V2 and V3 in comparison with control;
3. The highest crop was obtained at variant 3 , respectively substratum 2 and the values were 3.42kg-plant and 9.47kg-m2;
4. The statistical analyses shown values distinctivelly significant at variants 2 and 3.

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THE STUDY OF VARIETY AND SOWING PERIOD INFLUENCE ON THE PRODUCTION OF GREEN (RAW) PODS AT GARDEN BEANS

ZOIA TUDOR, A. MARGINĂ

Due to the very special specificity of the pedoclimatic conditions from Bărăgan Field, aiming with priority the temperature and humidity, taking into consideration the agrobiologic features of first rank of garden beans, it imposed itself the necessity of research (during 2000-2002 at the experimental Center belonging to UNISEM S.A., Ialomiţa branch, situated in Scânteia commune) on two main chains of the technology of culture of garden beans, represented by the **variety** cultivated in different **periods of sowing**, according to a certain level of soil temperatures (almost stable) at the sowing depth (5-10 cm) and not according to a certain data, that can be changeble(years with early or late spring).

METHOD AND MATERIAL

The research has been conducted (according to a bi-factorial experience: factor **b**- the variety with 5 degrees and factor **a**- sowing epoch with 4 degrees. The experience covered 20 variants whose specific role is presented and can be followed in ***table 1.***

Table 1

Experimental variants
and graduations (ranking) of the two studied factors (**a** and **b)**

Variants	Factor *b* (variety)	Factor *a* (t^0C in soil, at the depth of 5-10 cm, that became relative stable at some valoric levels corresponding to epochs of sowing in the field)
V_1 b_1a_1	b_1 Unisem 1	a_1 7 - 9^{0}C
V_2 b_2a_1	b_2 Novorex	
V_3 b_3a_1	b_3 Lena	
V_4 b_4a_1	b_4 Julia	
V_5 b_5a_1	b_5 Palanacka rana	
V_6 b_1a_2	b_1 Unisem 1	a_2 10 - 12^{0}C
V_7 (Mt) b_2a_2	b_2 Novorex (Mt)	
V_8 b_3a_2	b_3 Lena	
V_9 b_4a_2	b_4 Julia	
V_{10} b_5a_2	b_5 Palanacka rana	
V_{11} b_1a_3	b_1 Unisem 1	a_3 13 - 14^{0}C
V_{12} b_2a_3	b_2 Novorex	
V_{13} b_3a_3	b_3 Lena	
V_{14} b_4a_3	b_4 Julia	
V_{15} b_5a_3	b_5 Palanacka rana	
V_{16} b_1a_4	b_1 Unisem 1	a_4 15 - 16^{0}C
V_{17} b_2a_4	b_2 Novorex	
V_{18} b_3a_4	b_3 Lena	
V_{19} b_4a_4	b_4 Julia	
V_{20} b_5a_4	b_5 Palanacka rana	

Each variant had 4 repetitions with randomised exposure in the experimental field.

The calculation and interpretation of experimental datas obtain has been done according to the classic method of variant analyses and according to a new methodology ***"Craiova"*** which evidence in a greater measure the vericity of experimental results obtained and the higher possibility of apreciation of the possibility of their repetability (in similar conditions to the ones in which they were obtained).
The essential specific parameters of this new methodology ***"Craiova"*** are presented and can be followed in ***table 2.***

Table 2

Levels of significance of probabilities of reproduction the experimental results of the studied variants, (**"Craiova"** method**)**

Variable value of favorability indice (I)		Ranking, as signification level, of the probability of reproduction (constancy) experimental results [xxx]
absolute [x] (valoric units)	proportional (V)[xx (%)]	
I < 1[xxx]	V > 100%[xxxx]	very insignificant (000)
1 ≤ I < 2	100% ≥ V > 50%	distinct insignificantl (00)
2 ≤ I < 3	50% ≥ V > 33,3%	insignificant (0)
3 ≤ I < 4	33,3% ≥ V > 25%	significant (x)
4 ≤ I < 5	25% ≥ V > 20%	distinct significant (xx)
I ≥ 5	V ≤ 20%	very significantly (xxx)

This new methodology, comared to the classical one, presents some advantageous features:
- the use of a very simple and easy calculation, being eliminated the complicated and difficult calculus specific to the classical method, renouncing totally at the use of "mean" of some valoric quantum, taking into consideration all the repetitions of all variants from an experience, though eliminating the individuality of each variant, besides, the new methodology brings striking out the individuality of each variant as real, decisive factor of the ranking (graduation) of significance.
- there are mentioned the limits of variability of variants.
- it is refered to the ranking of significance, as well as the non-significance of each variant, not only of the insgnificance of the favourable and negative differences.

RESULTS OBTAINED AND DISCUSSIONS

The results obtained are presented and can be followed in ***table 3 and 4*** calculated according to the classic method of variant's analyses and in ***table 5*** and ***6*** calculated based on this new method ***"Craiova".***

Analyzing the values from ***table 3*** can be mentioned the followings:

- the productions of green pods obtained on variant decreased gradually, generally from the first till the last sowing epoch, this is from about 9-10 t/ha till about 3-6 t/ha, those smallest yields belonging to the last sowing epoch, being determinate by the high temperatures that occurred in the flowering stage, being known that such temperatures are harmful in the fruiting process at beans.
- the highest yield was obtained at **V_6 ('UNISEM 1')** variety, sowed in the second epoch, when the temperatures in soil at the depth of 5-10 cm was relative stable at the level of 10-12°C);
- 'UNISEM 1' variety obtained the highest production compared to the other varieties in the third sowing epoch, but showed a sensibility, somehow pronounced stressing at temperature variations over the level of 14^0C, having as effect the negative variation of production.
- the significance of production differences compared to the witness was missing (at all variants, with only one exception **(V_{17}).**

With regard to the influence of each of the two factors studied **(b şi a)** on the production of green pods of garden beans at the technological maturity, it has been observed that, during the graduations interaction of those factors, components of experimental variants, the factor **b** (the variety) showed a smaller role, providing a variation of production (in the limits, not very much apart, of 7,163 – 8,624 t/ha, with a difference between them of 1,461 t/ha, and factor **a** (sowing epoch) exerts a considerable pronounced role with regard to the determination of production variation, (in almost wide limits, among them 5,689- 9,061 t/ha, registering, between them a difference of 3,372 t/ha , that is much more compared to the one mentioned for factor **b**.

The gradual increasing in temperatures lead to the strong diminishing of production (***tab. 4***).

It is true, the only determinant element of the significance of graduation (ranking) consists in the size of variability's intervals between the repetitions of an experimental variant, in the well known sense that the increase of value size of those intervals that is of their sum induce a lowering of the valor level of significance, and vice versa.

Or, otherwise said, however great is the proportion between the sum of values of the repetitions and the one of the intervals between them (the first amount being as big compared to the second one, which has to be as small), however the valor level of the significance is higher and opposite. Of course, however the higher is this ratio the lower will be the proportion (%) of the sum of values of the interval, compared to the one of repetition values, but in this case, how low this proportion (%) is, the higher the levels of significance are, and opposite. Then, how can be understood the fact that **V_{17}**

in ***table 3*** present a negative difference clearly significant, and the differences of all the other variants are totally lacking significance, although at $\mathbf{V_{17}}$ the proportion between the sum of repetition values and the values of variability intervals is 0,9, and the proportion above mentioned is 108,08 %, which means that the sum of the values of variability intervals is even greater than the sum of the repetition values (***tab. 5***).

Besides, how can be justified the fact that, for example, in the case of some variants **(V_4, V_9)** in which the respective proportion represent only about 6-7 % is not mentioned any significance, according to the classic method of the variant analyses?

Of course, in no way, because such discrepancies are aberrant!

A correct graduation of the levels of significance of experimental variants is shown in ***tables 5*** *and* ***6***, according to the new method **"Craiova".**

Table 3

The complementary influence of the two factors (**b** şi **a**) on the production of green pods at garden beans -as average for the three experimental years (2000-2002) (the classical method of variation analyses)

Variants specificity		Absolute production t/ha	Relative production %	Differences of yield comapred to the witness ± t/ha	Signification of production differences
V_1	b_1a_1	9,256	102,91	+ 0,262	
V_2	b_2a_1	9,153	101,77	+ 0,159	
V_3	b_3a_1	9,340	103,85	+ 0,346	
V_4	b_4a_1	10,244	113,90	+ 1,250	
V_5	b_5a_1	7,312	81,30	- 1,682	
V_6	b_1a_2	10,545	117,25	+ 1,551	
V_7 (Mt)	b_2a_2	8,994	100,00	witness	-
V_8	b_3a_2	7,949	88,38	- 1,045	
V_9	b_4a_2	8,946	99,47	- 0,048	
V_{10}	b_5a_2	6,882	76,52	- 2,112	
V_{11}	b_1a_3	8,941	99,41	- 0,053	
V_{12}	b_2a_3	6,970	77,50	- 2,024	
V_{13}	b_3a_3	7,348	81,70	- 1,646	
V_{14}	b_4a_3	8,501	94,52	- 0,493	
V_{15}	b_5a_3	9,031	100,41	+ 0,037	
V_{16}	b_1a_4	5,755	63,99	- 3,239	
V_{17}	b_2a_4	3,536	39,32	- 5,458	00
V_{18}	b_3a_4	6,102	67,85	- 2,892	
V_{19}	b_4a_4	5,970	66,38	- 3,024	
V_{20}	b_5a_4	7,083	78,75	- 1,911	

DL 5% = 4,052 t/ha; DL 1% = 5,416 t/ha; DL 0,1% - 7,121 t/ha.

Table 4

Factors **b** (variety) and **a**
(t^0C becoming relative stable in the soil at the depth of 5-10 cm in the sowing period) influence on the production of green pods at garden beans- calculated on the three experimental years (2000-2002)

The ranking of factors **b** and **a**	Absolut production t/ha	Relative production %	Yield differences compared to the witness ± t/ha	Signification of production differences
Factor **b** (variety)				
b_1	8,624	120,40	+ 1,461	
b_2 (Mt)	7,163	100,00	Mt	-
b_3	7,685	107,29	+ 0,522	
b_4	8,415	117,48	+ 1,252	
b_5	7,577	105,78	+ 0,414	
DL 5% = 2,026 t/ha; DL 1% = 2,708 t/ha; DL 0,1% = 3,561 t/ha.				
Factor **a** (t^0C)				
a_1	9,061	104,51	+ 0,396	
a_2 (Mt)	8,665	100,00	Mt	-
a_3	8,158	94,15	- 0,507	
a_4	5,689	65,65	- 2,976	00
DL 5% = 1,812 t/ha; DL 1% = 2,422 t/ha; DL 0,1% = 3,184				

Table 5

The influence of factors (**b** şi **a**)
on the variation of green pods production at garden beans-
calculated for the three experimental years – (2000-2002) - ("**Craiova**" method)

Variants specificity	Specifications							Graduation of variants signification
	Production					Value of favorability indice (I)		
	absolut t/ha	relative %	Differences compared to the witness ± t/ha	Limits of variants variability t/ha		absolute valoric units	propor-tional (V) %	
				superior	inferior			
V_1 b_1a_1	9,256	102,91	+ 0,262	12,536	5,830	2,8	35,44	0
V_2 b_2a_1	9,153	101,77	+ 0,159	12,321	5,236	2,8	34,61	0
V_3 b_3a_1	9,340	103,85	+ 0,346	11,982	6,509	3,5	28,29	x
V_4 b_4a_1	10,244	113,90	+ 1,250	10,955	9,821	14,4	6,94	xxx
V_5 b_5a_1	7,312	81,30	- 1,682	9,471	5,268	3,4	29,53	x
V_6 b_1a_2	10,545	117,25	+ 1,551	13,411	7,536	3,7	27,81	x
V_7 (winess) b_2a_2	8,994	100,00	Mt	11,589	5,929	3,5	28,85	x
V_8 b_3a_2	7,949	88,38	- 1,045	8,839	7,044	8,9	11,19	xxx
V_9 b_4a_2	8,946	99,47	- 0,048	9,543	8,366	15,0	6,67	xxx
V_{10} b_5a_2	6,882	76,52	- 2,112	7,521	5,786	10,8	9,29	xxx
V_{11} b_1a_3	8,941	99,41	- 0,053	13,964	2,521	1,8	56,17	00
V_{12} b_2a_3	6,970	77,50	- 2,024	10,357	2,786	2,1	48,59	0
V_{13} b_3a_3	7,348	81,70	- 1,646	9,179	6,330	4,0	24,91	xx
V_{14} b_4a_3	8,501	94,52	- 0,493	11,500	6,593	2,8	35,27	0
V_{15} b_5a_3	9,031	100,41	+ 0,037	10,393	7,214	6,6	15,19	xxx
V_{16} b_1a_4	5,755	63,99	-3,239	12,286	2,330	0,9	113,47	000
V_{17} b_2a_4	3,536	39,32	- 5,458	7,357	1,054	0,9	108,08	000
V_{18} b_3a_4	6,102	67,85	- 1,892	9,107	2,107	2,0	49,26	0
V_{19} b_4a_4	5,970	66,38	- 3,024	9,839	1,607	1,5	64,81	00
V_{20} b_5a_4	7,083	78,75	- 1,911	10,071	3,143	2,4	42,18	0

CONCLUSIONS

* In the pedoclimatic conditions from Câmpia Bărăganului – Slobozia zone, the highest production of green pods at the technological maturity was obtained by the variety **'UNISEM 1'** sowed when the temperatures in soil, at the sowing depth, were almost stable and between 10-12^{0}C.

*The garden bean can be sowed when in soil at the sowing depth (5-10 cm), were obtained almost stable temperatures, between 7-12^{0}C and in any case not under the level of 13-14^{0}C, as production lowers considerably.

Table 6

The influence of factors: **b** (variety) and **a** (t°c) on the production of green pods at garden beans calculated for the three experimental years (2000-2002)

Variants specificity	Specifications							Ranking of variants signifi-cation
	Production					Values of favorability indice		
	absolut t/ha	relative %	Dif. compared to the witness ± t/ha	Limits of variants variability t/ha		absolut (I) units	proportional (V)	
				superior	inferior			
Factor b - variety								
V_1 b_1	8,624	120,40	+ 1,461	10,545	5,755	4,5	22,27	xx
V_2 b_2 (Mt)	7,163	100,00	Mt	9,153	3,536	3,6	27,43	x
V_3 b_3	7,685	107,29	+ 0,522	9,340	6,102	4,6	21,54	xx
V_4 b_4	8,415	117,48	+ 1,252	10,244	5,970	4,3	21,74	xx
V_5 b_5	7,577	105,78	+ 0,414	9,031	6,882	5,2	19,19	xxx
Factor a (t^{0}C)								
V_1 a_1	9,061	104,51	+ 0,396	10,244	7,312	7,7	13,06	xxx
V_2 a_2(Mt)	8,665	100,00	Mt	10,545	6,882	4,6	21,72	xx
V_3 a_3	8,158	94,15	- 0,507	9,031	6,970	9,3	10,70	xxx
V_4 a_4	5,689	65,65	- 2,976	7,083	3,536	4,1	24,50	xx

*The influence on the production variation of green pods of garden beans, at the technological maturity, is dominant for the sowing epochs, compared to the variety ones.

* With reference to the calculation mood and the interpretation of experimental dates, was evidenced, in a favorable manner, the new methodology **"Craiova"** which, due to its authentic veracity, compared to the classical method of variation analyses, eliminates any "aberrant" discrepancies, because it creates certain possibilities for correct appreciation and establishing of different levels, quoted as signification, of the probability of reproduction of experimental results, in similar conditions to the ones in which they were tested.

[x] The value of proportion between the sum of repetition values from one variant and the sum of values of variability intervals existing in the same repetition (The values of variability intervals represent the valor differences between the repetition with the highest value and each of the repetition with smaller values, all belonging to the same variant).

[xx] The proportion (%) of sum of values of variability intervals compared to the sum of repetition values, all belonging to the same variant.

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FLORICULTURE AND DENDROLOGY

FORMATION AND ANATOMY OF ADVENTIOUS ROOTS IN KOLKWITZIA AMABILIS CUTTINGS

DUMITRAŞCU MONICA.

Key words: Kolkwitzia amabilis, cuttings, adventitious roots, callus

SUMMARY

The adventitious roots can be pre-formed or induced. *Kolkwitzia amabilis* cuttings were cut transversely and longitudinally, manually and xylotom along the internodes and in the callus area generatet at the cutting basis. In all the variants, two types of induced adventitious roots were observed: "normal"roots formed on the internode, and atypical roots differentiated in the callus situated at the cuttings base. A partial explanation of the weak rooting in the *Kolkwitzia amabilis* cuttings may be the secondary wood of the shoots consisting mainly of fibers and narrow beams disposed in one series. Nevertheless, even though the shoot cambium produces few main medullar beams, functional adventitious roots are formed at the same place. Also, not only callus is formed at the cutting base. If the callus is cut or broken down, roots may be observed within it. A significant part of these roots may not relate directly to the vessel system of the cutting, due to the structural differences between the vascular elements of the cutting and the roots differentiated in the callus.

INTRODUCTION

The adventitious roots can be pre-formed or induced (Girouard 1967, Haissing 1974,Romberger & al. 1993, etc.). In the first case, the adventitious root formation is preceded by the early formation of some prime roots that remain in a dormant state for a long time. In the second case, the adventitious roots are formed locally due to the suddenaction of some external or internal factors.

Pre-formed adventitious roots: Their formation was studied in species belonging to the genere: *Salix, Populus*, *Acer, Pyrus, Ulmus*, *Jasminum, Ribes, Citrus, Thuja, Cupressus*, s.a. (Priestley and Swingle 1929, Carlson 1938, Shapiro 1958, Haissig 1974, Fahn 1995).

In all the species, there was a tendency of prime root formation in the secondary parenchyma located near the leaf or branch marks, as well as on the edge of medullary beams. In most cases, cambium is directly involved in the formation of these prime roots. Although recorded, their pericyclic origin is more rare. The prime roots stay at rest within in the internal bark, while their differentiation is extremely slow. Thus, even in nine-year-old branches, such prime roots cannot be easily seen (Fahn 1995). At same point, the prime root starts growing and penetrates the bark. Its advance is made by crushing the cells in its way, or by forming some hydrolytic cavity

before the adventitious root (Romberger & al. 1993). In some *Populus* species (Romberger & al. 1993), the prime roots located between the secondary phloem and prime peridermis persist to the formation of the next peridermis and then they die; the new prime adventitious roots are differentiated under the most internal strata of the ritidoma.

The induced adventitious roots

There are woody species that have no pre-formed adventitious roots; nevertheless, they are able to form adventitious roots quite rapidly. Although there are exceptions, relations were recorded between the anatomical structure of the stem (shoot) and the rhizogenesis capacity. -A positive correlation between the adventitious root formation and the medullar beam thickness. Thus, the cuttings of several species of *Ceratonia, Agathis, Pyrus* and *Carya* form roots very slowly as they have narrow medullar beams (White and Lovell 1984, Fahn 1995). In their turn, the *Tamarix* ssp. And Vitis vinifera cuttings form roots easily as they have thick medullar beams.

- A negative correlation between the adventitious root formation and the sclerification level of the bast tissue and perivascular fibers (Mahlstede and Watson 1952, Beakbane 1961).
- A positive correlation between the adventitious root formation and the relative continuity of the bast tissue bands or their very early formation (Girouard 1967, Brutsch &al. 1977).
- A positive correlation between the adventitious root formation and the capacity of callus formation at the cutting end, and adventitious root formation in the callus (Mackenzie 1986).

MATERIAL AND METHOD

The cuttings were cut transversely and longitudinally, manually and at xylotom along the internodes, in the areas where the adventitious root formation were noticed, and in the callus area generated at the cutting basis. The sections were rendered visible by hydrate chloral, and were colored in carmine-alaunat and iodine – green. The drawings were made in the clear chamber, and the photographs in the MC-7 microscope.

RESULTS AND DISCUSSION

In all the variants, two types of induced adventitious roots were observed: “normal” roots formed on the internodes, and atypical roots differentiated in the callus situated at the cuttings base.

1. Adventitious roots formed on internodes

Before describing their formation, a few explanations are required concerning the structure of the Kolkwitzia amabilis shoot. Thus, the main node beams produced by the cambium are scarce. The secondary wood is diffuse-porous, mainly formed of fibers. The wood vessels are isolated or in pairs, while the beams are in one series.

The adventitious root formation is initiated in the cambium of a leaf mark when the secondary structure is incipient or at a main medullar beam when the secondary structure is in an advanced state. At the beginning, the adventitious root has a dome-like shape, while growing, it penetrates the primary bark, or the phloem and periderm, coming at the shoot surface.

The cross sections through these young adventitious roots show the exterior rhizoderm covered with absorbents hairs. The exoderm is slightly evident, which can be explained by the early periderm formation. The bark –like parenchyme is developed, its cells containing starch grains. The endoderm has specific thick cell radial walls. The central cylinder has an external one-layer pericycle where the ramifications (radicles) of the main adventitious roots originate. The roots are polyarchical and have 5-8 xileme poles and 5-8 phloem poles.

By developing the primary xileme, the woody fascicles occupy the whole root centre. The first cambium archs occur towards the external phloem; by division, they start producing new vessels. Consequently, the central cylinder is flat at the beginning, and the xileme is elongated and star-shaped. As the secondarey xileme forms more quickly than the phloem, the generating area becomes circular. In these adventitious roots, cambium produces no medullar beams.

Felogene occurs in the pericycle, producing secondary suber towards the exterior and parenchyma cell layers towards the interior. After periderm formation, the external primary bark cells become necrotic and begin to exfoliate.

The adventitious roots formed on internodes are functional, as the absorbent hairs prove.

2. Roots differentiated in callus

All the variants formed abundant callus at the cutting base, mainly as the result of cambium activity. Various bast-woody and circular vessels can be differentiated in all the directions of the callus. The formed cambiums produce especially secondary wood towards the interior and less secondary bast towards the exterior. Thus, secondary organs are formed directly within the callus. Due to their polarity, they can be considered roots. They are also morphologically visible, as they can be easily separated from the surrounding callus. Due to cambium activity, the roots grow mainly in thickness and less in length. The wood and secondary bast structures are atypical. The secondary wood consists mainly of woody parenchyma. The wood vessels are few

and deformed. The secondary bast in cross section has compressed and tangentially elongated vessels.

Within the bast parenchyma cells located on the external bast area, felogene is slowly differentiated and starts functioning, producing mainly secondary suber and less feloderm.

The callus cells becomen wooden and the very thick cell walls are crossed by various simple punctuations. The callus is supposed to function in a similar manner with the radicum velamen tissue in orchids, absorbing water through the punctuations. The roots differentiated in the callus never penetrate it, as they absorb the necessary nutrients from the callus; the callus and roots make up a hypertrophic globullar formation at the end of the cutting.

CONCLUSIONS

A partial explanation of the weak rooting in the *Kolkwitzia amabilis* cuttings may be the secondary wood of the shoots consisting mainly of fibers and narrow beams disposed in one series. Nevertheless, even though the shoot cambium produces few main medullar beams, functional adventitious roots are formed at the same place. Also, not only callus is formed at the cutting base. If the callus is cut or broken down, roots may be observed within it. A significant part of these roots may not relate directly to the vessel system of the cutting, due to the structural differences between the vascular elements of the cutting and the roots differentiated in the callus. Nevertheless, there is no satisfactory structural justification for the weak rooting in the *Kolkwitzia amabilis* cuttings. Consequently, as the *Kolkwitzia amabilis* cuttings have the certain capacity to generate adventitious roots, the explanation should be in the physiology of this plant.

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SOME RESEARCHES CONCERNING THE INFLUENCE OF pH TO FLOWERING ON SPECIE *LISIANTHUS RUSSELIANUS* HOOK.

PETRA SORINA., ZAHARESCU MIHAELA, DAVIDESCU VELICICA

Key words: Lisianthus, substrate, pH, growing, flowering

SUMMARY

Lisianthus is new introduced specie in international crops, for its suitability as cut flower and pot plant. It has been introduced in Romania in 1988 and now researches are in course for its conduct in our country's climatic conditions.

The crop culture presents a few particularities because of the plant needs and its characteristic morphology especially the root system. This is very sensitive at the substrate quality modifications (loose degree etc) especially of the pH. Scientifically literature situates its limits between 5.7 and 7.5.

INTRODUCTION

The purpose of the experience is to study the reaction of the plants at 4 variant of substrate and the correlation between the pH and the number of flowers on plants.

MATERIALS AND METHODS

The experience has been installed in Greenhouse of Floriculture-Faculty of Horticulture, Bucharest.

Young plants of lisianthus (a variety from 'Heidi' series) obtained by seedling and transplants have been used as biological material.

Regarding the organization of the experience a groundbed has been divided in 4, each part representing in fact one variant of substrate different as pH and composition (Table 1).

Table 1

The characteristics of culture substrates

No.	Variant	The substrate's composition	The substrate's pH
1	V1	leaves soil, brown peat, sand	7.00
2	V2	brown peat	5.11
3	V3	brown peat, blond peat, leaves soil	5.80
4	V4	black peat	6.32

The young plants have been pinched for uniformity and it presented 3-4 pairs of leaves by the time of planting. The spacing have been made at 20 cm x 20 cm. Measurements and biometric observations have been made during the experience regarding the height of the plants, the total and the primary shoot number of leaves, shoots and its height. In a 52 days interval (17.09-7.11)- the flowering period – notifications have been made 2 times a week about the number of the flowers (depending of developing phases: visualized bud, green bud, colored bud, open flower, whited flower).

Also, samples of soil have been taken and analyzed for the 4 variants of substrate regarding the chemical composition and the pH (Table 2).

Table 2

The chemical analysis of the culture substrates

Variants	pH		Soluble salts (%)	
	initial	final	initial	final
V1	7.00	7.54	0.39	0.24
V2	5.11	5.33	0.35	0.289
V3	5.80	6.25	0.36	0.317
V4	6.32	6.60	0.104	0.086

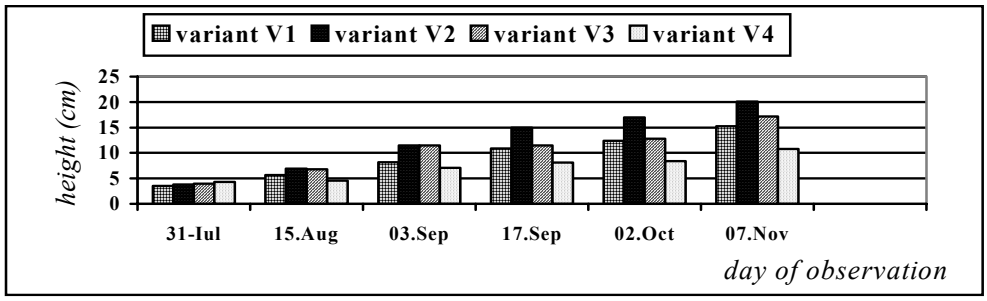
The pH modification by the end of the culture could be a contribution of the fertilizing solution and water (irrigation).

RESULTS AND DISCUSSIONS

Concerning the growing in height of the plants, starting with the second measurement we observed that the best evolution was unregistered by the plants in variant V2 (pH=5.11) and variant V3 (pH=5.80) with 20.12 cm and 17.16 cm respective. In the V4 variant the plants have been more shorten- 10.75 cm- (Figure 1).

Figure 1

The height plants evolution in time (comparative study)

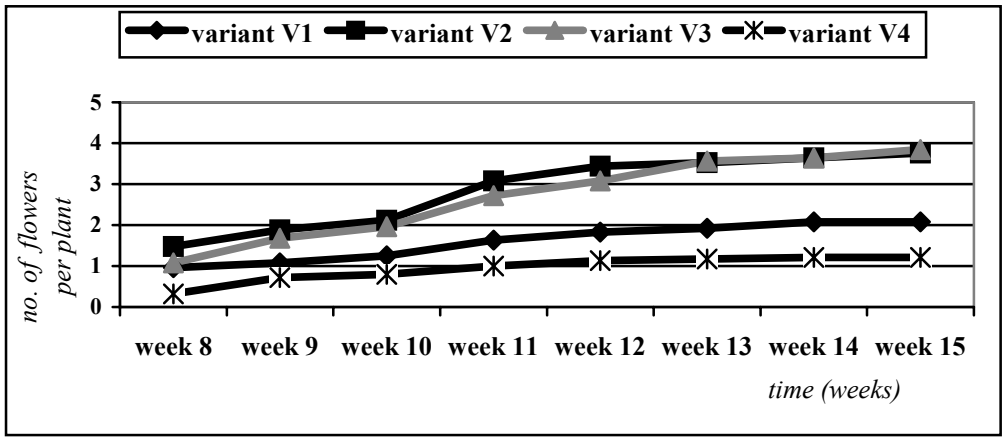


Regarding the number of flowers formed the variants V2 (pH=5.11) and V3 (pH=5.80) had a good evolution on flowering period with the following values:

3.76 and 3.84 flowers per plant. The variants V1 (pH=7.00) and V4 (pH=6.32) had a slower evolution with the following values: 2.08 and 1.21 flowers per plant (Figure 2).

Figure 2

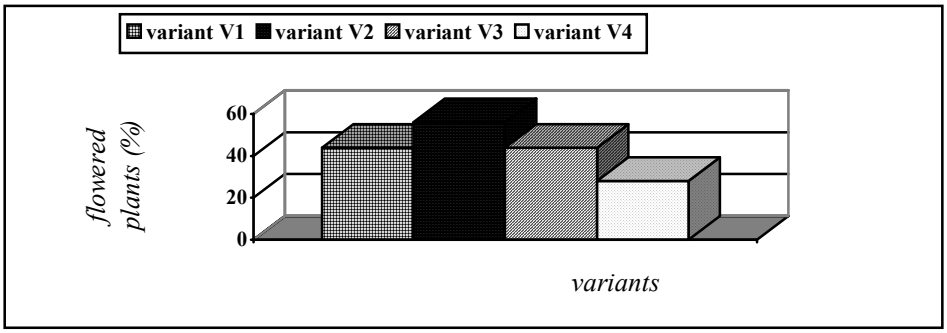
The dynamic of flowering



In the case of each variant a certain percent of flowered plants have been recorded: V1- 44%, V2- 56%, V3- 44%, V4- 28%. The variant V2 had the highest percent of flowered plants ant the variant V4 the lowest (Figure 3).

Figure 3

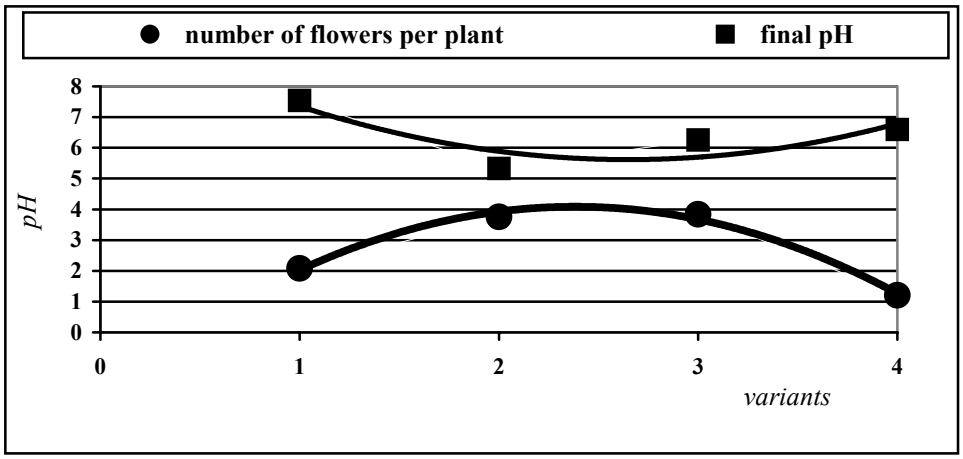
Percent of flowered plants



We also observed that between the pH of the culture substrate and the number of flowers per plant exist a correlation (Figure 4).

Figure 4

The correlation between the pH and the number of flowers per plant



CONCLUSIONS

- During the vegetation period the best results have been obtained in variant V2, which stand out with the plants height and the number of flowered plants. The chemical composition of the second substrate and its pH imposed precocity to the plants in forming the stems and flowers.
- The plants from the variant V3 also had a good evolution. The number of flowers formed has been the highest from all and the quality of stems also.
- In the variant V1 the plants have growth and developed slower than the plants from the variants V2 and V3.
- The plants from variant V4 had the smallest values of all concerning the height of the plants and the number of flowers.
- If the pH of substrate is lower the number of flowers per plant is higher.

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STUDIES CONCERNING THE EFICIENCY OF THE IN VITRO MICROPROPAGATION UPON THE PRODUCTION OF THE POLYANTHES TUBEROSA L. BULBS

TOMA FL.

Key words: tuberose, bulbs production, eficiency

SUMMARY

The tuberose is one of the most beatiful and appreciated bulbous flower. But the production of the flower bulbs is a long and difficult process. Our researches show a very important shortage of this process if the production of the bulbs is realised by "in vitro" tissue culture. We was reduced the duration of the production of the flower bulbs to only one year comparatively with two-three years by classical methods. Also, we increasing very much the number of the flower bulbs through the "in vitro" production of the planting.

It is very well known that the "in vitro" production of the planting has an youthful and reforceful effect upon the biological material.

The aim of our study was to observe how the "in vitro" micropropagation can solve the difficulties concerning the production of the flower bulbs of tuberose.

The dates presented in this work belong to a very ample researches program concerning the study of the biology and the technology from Polyanthes tuberosa L. specie.

MATERIAL AND METHOD

The biological material was perfomed by bulbs with 1,0 – 1,5 cm diameter, belong to an aboriginal population from Bucharest area.

One half of bulbs was planted in the field and the another half was used for the initiation of the "in vitro" tissue culture.

We followed the descendent for each category of bulbs (vitro and field) and after two years of in the field culture we recorded all the bulbs by size category.

We used four sizes categories for the bulbs, by the diameter: first class–over 3,1 cm, second class – 2,6–3,0 cm, third class – 1,6–2,5 cm, fourth class – 1,0–1,5 cm.

RESULTS AND DISCUSSIONS

We was observed the very significantly differences between the two categories of bulbs concerning the number and the quality of descendents. In the scheme A we see that one bulb obtained "in vitro" produce in the first year 20,77 bulbs. All its descendents produce after two years of in field culture 65,30 of first class (97,14 % flower bulbs), 161,14 bulbs of second class (45,71 % flower bulbs), 2511,14 bulbs of third class and 5278,1 bulbs of fourth class.

Scheme A. The descendents of the one bulbs obtained "in vitro"

First year (in vitro culture)

	in vitro		*in vitro*		*in pot*	
bulbs obtained	---------->	4 explants	--------->	6,2 aclimatizated	------->	20,77 bulbs
in field	*prelevation*		*culture*	plants	*culture*	

Second year (in field culture)

	in field		0,75 bulbs	=	15,57	bulbs of first class
20,77 bulbs	---------->	20,77 plants x	0,25 bulbs	=	5,19	bulbs of second class
vitro	*culture*		3,40 bulbs	=	70,61	bulbs of third class
			14,20 bulbs	=	294,93	bulbs of fourth class

Third year (in field culture)

	in field		0,00 bulbs	=	0,00	bulbs of first class
15,57 bulbs of	---------->	15,57 plants x	0,10 bulbs	=	1,55	bulbs of second class
first class	*culture*		7,90 bulbs	=	123,00	bulbs of third class
			12,70 bulbs	=	197,73	bulbs of fourth class
	in field		0,50 bulbs	=	2,59	bulbs of first class
5,19 bulbs of	---------->	5,19 plants x	0,10 bulbs	=	0,51	bulbs of second class
second class	*culture*		3,70 bulbs	=	19,20	bulbs of third class
			8,20 bulbs	=	42,55	bulbs of fourth class
	in field		0,25 bulbs	=	17,65	bulbs of first class
70,61 bulbs of	---------->	70,61 plants x	0,30 bulbs	=	21,18	bulbs of second class
third class	*culture*		5,40 bulbs	=	381,29	bulbs of third class
			11,20 bulbs	=	790,83	bulbs of fourth class

	in field	0,10 bulbs	=	29,49 bulbs of first class
294,93 bulbs of	-------> 294,93 plants	x 0,45 bulbs	=	132,71 bulbs of second class
fourth class	*culture*	6,50 bulbs	=	1917,04 bulbs of third class
		13,40 bulbs	=	3952,06 bulbs of fourth class

total bulbs of the third year : 49,73 bulbs of first class
155,95 bulbs of second class
2440,53 bulbs of third class
4983,17 bulbs of fourth class

In the scheme B it comes out that one bulb obtained in field produce in the first year 0,00 bulbs of first class, 0,10 bulbs of second class, 3,80 bulbs of third class and 12,30 bulbs of fourth class. All this descendents produce after two years of in field culture 18,38 bulbs of first class (70 % flower bulbs), 67,00 bulbs of second class (24,28 % flower bulbs), 1161,29 bulbs of third class and 4271,24 bulbs of fourth class.

Scheme B. The descendents of the one bulbs obtained in field

First year (in field culture)

	in field		0,00 bulbs of first class
bulbs obtained	----------> 1 plant	--------->	0,10 bulbs of second class
in field	*culture*		3,80 bulbs of third class
			12,30 bulbs of fourth class

Second year (in field culture)

	in field	0,60 bulbs	=	0,06 bulbs of first class
0,10 bulbs of	----------> 0,10 plants	x 0,15 bulbs	=	0,01 bulbs of second class
second class	*culture*	2,90 bulbs	=	0,29 bulbs of third class
		6,50 bulbs	=	0,65 bulbs of fourth class
	in field	0,25 bulbs	=	0,95 bulbs of first class
3,80 bulbs of	----------> 3,80 plants	x 0,40 bulbs	=	1,52 bulbs of second class
third class	*culture*	3,80 bulbs	=	14,44 bulbs of third class
		12,40 bulbs	=	47,12 bulbs of fourth class
	in field	0,00 bulbs	=	0,00 bulbs of first class
12,30 bulbs of	----------> 12,30 plants	x 0,25 bulbs	=	3,07 bulbs of second class
third class	*culture*	4,30 bulbs	=	53,89 bulbs of third class
		12,20 bulbs	=	150,06 bulbs of fourth class

Third year (in field culture)

	in field	0,20 bulbs	=	0,20 bulbs of first class
1,01 bulbs of	----------> 1,01 plants x	0,10 bulbs	=	0,10 bulbs of second class
first class	*culture*	3,60 bulbs	=	3,63 bulbs of third class
		6,80 bulbs	=	6,96 bulbs of fourth class
	in field	0,65 bulbs	=	3,65 bulbs of first class
5,62 bulbs of	----------> 5,62 plants x	0,15 bulbs	=	0,84 bulbs of second class
second class	*culture*	2,80 bulbs	=	15,73 bulbs of third class
		5,50 bulbs	=	30,91 bulbs of fourth class
	in field	0,20 bulbs	=	13,52 bulbs of first class
67,62 bulbs of	----------> 67,62 plants x	0,30 bulbs	=	20,88 bulbs of second class
third class	*culture*	3,60 bulbs	=	243,43 bulbs of third class
		12,00 bulbs	=	811,44 bulbs of fourth class
	in field	0,00 bulbs	=	0,00 bulbs of first class
197,83 bulbs of	-------> 197,83 plants x	0,20 bulbs	=	39,56 bulbs of second class
fourth class	*culture*	4,20 bulbs	=	830,88 bulbs of third class
		12,00 bulbs	=	2373,96 bulbs of fourth class

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total bulbs after three years : 18,38 bulbs of first class
67,00 bulbs of second class
1161,29 bulbs of third class
4271,24 bulbs of fourth class

CONCLUSIONS

- the in vitro production of the tuberose planting have a very strong youthfuly effect upon the bulbs; this method of multiplication short the duration of production of the flower bulbs and increase the number of the flower bulbs, too.

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STUDIES CONCERNING THE CORRELATION BETWEEN THE ECOLOGICAL FACTORS AND THE GROWING AND THE DEVELOPPMENT OF THE POLYANTHES TUBEROSA L. PLANTS

TOMA FL., ELENA SELARU, SORINA PETRA, DIANA VASCA

Key words: tuberose, temperature, humidity, growing and development

SUMMARY

Polyanthes tuberosa L. is a bulbous flower with very high needs concerning the ecological factors, especially the temperature and humidity. The aim of our studies was to establish the level of these two factors for all the phenological phases of the plants. In the air the temperature of 20-22 ° C is the inferior critical level for the start of the bulbs vegetation and the optimal level for the storage of the bulbs in the rest period. In the soil, the start of the bulbs vegetation is possible at the temperature 12-15 ° C but the optimal level is 25-30 ° C. The relative humidity must be 70-80 % both in the vegetative period and in the rest period. The growing and the flowering of the plants are optimal at the temperature of 30-35 ° C and at the high humidity conditions.

INTRODUCTION

The ecological factors are very important for each specie in the traverse the phenological phases of the growing and development. Our study, belong to an ample researches program concerning the biology and the technology of Polyanthes tuberosa L. specie. We followed to establish the optimal level of temperature and humidity for each phenological phase, both in the rest period and in the vegetative period.

MATERIAL AND METHOD

The biological material was represented by bulbs obtained “in vitro” belong to an aboriginal population from Bucharest area.

The experimental variants were performed by the variation of the level of the temperature and humidity and the size of the bulbs, too (table 1).

The bulbs were planted in field at the fin of May month. We followed the growing and the development of the plants by biometrical measurements.

RESULTS AND DISCUSSIONS

The start of vegetation is most rapidly at the variants which the storage of the bulbs was realized at 20-22 ° C temperature and 70-80 % relative humidity (table 2, fig. 1).

Table 1. Experimental variants

Variants	Diameter of bulbs (cm)	Temperature in the rest period (° C)	Relative humidity of air (%)
V1	> 3,1	8-10	50-60
V2	> 3,1	20-22	70-80
V3	2,6-3,0	8-10	50-60
V4	2,6-3,0	20-22	70-80
V5	1,0-1,5	8-10	50-60
V6	1,0-1,5	20-22	70-80

Fig. 1. The variation of the start of bulbs vegetation

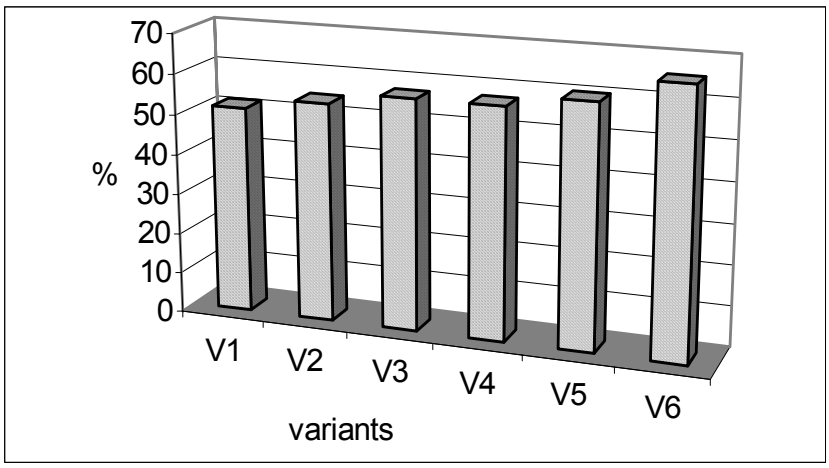


Table 2. The start of bulbs vegetation

Variants	Bulbs started in vegetation (%) after:			
	3 weeks	4 weeks	5 weeks	6 weeks
V1	51,42	88,57	100	100
V2	54,28	91,42	100	100
V3	57,14	91,42	100	100
V4	57,14	94,28	100	100
V5	60,00	91,42	100	100
V6	65,70	97,14	100	100

Also, the speed of the growing is clearly superior of the same variants (table 3).

We find again the favorable effect of the high temperature and relative humidity from the rest period of bulbs in the elements of flowering of the plants (table 4). The plants regenerated from bulbs storage in the rest period at 20-22 º C temperature and 70-80 % relative humidity have an early blossoming and the quality of flowers is also, superior (fig. 2).

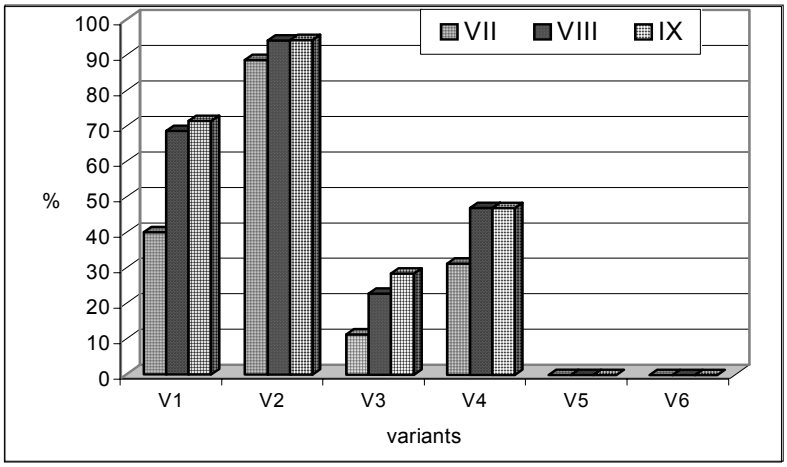
Table 3. The growing of the plants

Var	No. of leaves				Length of leaves (cm)			
	VI	VII	VIII	IX	VI	VII	VIII	IX
V1	8,3	29,7	65,1	74,3	10,82	28,40	37,12	41,27
V2	11,6	38,2	76,9	87,8	12,57	36,40	46,43	49,54
V3	7,9	18,6	40,7	45,2	8,70	26,70	28,17	29,88
V4	10,8	25,7	51,5	58,4	10,90	28,70	37,30	37,97
V5	5,4	20,5	43,2	57,2	9,70	30,29	34,25	35,70
V6	6,1	31,4	52,7	63,5	10,20	34,57	40,10	43,12

Table 4. The elements of the flowering of the plants

Var	Flowered plants (%)			Length of the flower stems (cm)			Length of the inflorescence (cm)		
	VII	VIII	IX	VII	VIII	IX	VII	VIII	IX
V1	40,0	68,6	71,4	12,4	65,7	103,5	1,2	14,9	30,9
V2	88,6	94,3	94,3	18,5	81,3	115,4	2,2	20,9	38,9
V3	11,4	22,9	28,6	5,8	54,4	85,3	0,7	9,2	23,4
V4	31,2	47,1	47,1	11,9	67,2	97,5	0,8	12,0	29,4
V5	-	-	-	-	-	-	-	-	-
V6	-	-	-	-	-	-	-	-	-

Fig. 2. The variation and the dynamical of the blossoming of the plants



The number and the quality of the bulbs produced by plants of the fin of vegetation are superior at the variants which a high thermal and humidity regime in the rest period (table 5).

Also, an high thermal and humidity regime in the rest period encourage a superior quality of the bulbs, especially for the bulbs of the first and second class of size.

Table 5. The variation of the number and the quality of bulbs

Var	Number of bulbs of size:				Weight of bulbs of size:			
	I	II	III	IV	I	II	III	IV
V1 a	0,25	0,05	5,2	9,3	45,0	25,0	8,5	3,2
V1 b	0,25	0,05	5,3	12,0	53,4	27,5	9,3	2,7
V2 a	0,05	0,15	7,3	9,3	45,0	28,3	8,7	3,5
V2 b	0,05	0,25	7,4	12,4	55,0	31,6	9,9	2,8
V3 a	0,60	0,05	3,1	6,8	50,8	25,0	7,2	3,4
V3 b	0,60	0,10	3,2	8,4	55,0	27,5	8,1	2,8
V4 a	0,40	0,05	3,8	6,5	48,5	25,0	7,7	3,5
V4 b	0,45	0,05	3,8	8,9	57,2	30,0	8,3	2,8
V5 a	0,65	0,35	2,8	9,4	40,0	24,0	8,8	3,6
V5 b	0,70	0,30	2,8	11,5	47,3	28,3	9,1	3,2
V6 a	0,75	0,25	3,3	10,8	42,5	25,5	8,7	3,5
V6 b	0,75	0,25	3,4	14,2	51,0	30,0	9,5	3,4

a – bulbs storage in the rest period at 8-10 º C and 50-60 % RH
b – bulbs storage in the rest period at 20-22 º C and 70-80 % RH

CONCLUSIONS

- the temperature of 20-22 º C and the relative humidity of 70-80 % are optimal for all the phenological phases in the vegetation period;
- in the rest period the temperature 20-22 º C and the relative humidity of 70-80 % determine a considerable increase of the weight of the bulbs and also, an easy increase of the number of the bulbs of third and fourth size category.

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STUDIES ON PROPAGATION CAPACITY AND AFTER PLANTING EVOLUTION OF *PASSIFLORA CAERULEA* PLANTS

DIANA ZAMFIR VÂŞCĂ, MĂDĂLINA GORAŞ

Key words: cuttings, growth, Passyflora, propagation,

SUMMARY

During these studies were made observations on the cuttings propagation capacity of Passiflora caerulea plants, placed on different rooting medium. The aim was to obtain high quality plants in a short period.

There can be concluded that the cutting method, using stem cuttings, with two or three nodes, placed on perlit as substrate, gave the best results. There were made biometrics observations such as: roots number and length, offshoot length and leaves number.

After planting, the best evolution was observed in the substrate made of: 45 % leaf compost, 22,5 % well- rotten manure, 22,5 % sod land and 10 % sand, placed in 12 cm diameter pots. There were followed: offshoots number and length, leaves number.

INTRODUCTION

Passiflora caerulea is one of the eldest houseplant, because of its beautiful and complicate flower structure, colored in blue with red, white and violet nuances, in a pleasant contrast with the dark green leaves.

This species offer multiple ways for ornamental purposes it can be used in pots or suspended vase, on different leading manner.

The plants are relatively easy to take care of, placed in sunny places and well-drained substrate.

MATHERIALS AND METHODS

These researches, performed on the U.S.A.M.V. Bucharest flower greenhouses, use the experimental data, which come from two consecutive years of study. The experimental variants are represented by stem cuttings, with two or three nodes and one or two leaves, placed in different root medium, which re presented in the Table no.1.

The biometrics observations were based on measuring and observing the following parameters: rooting percent, roots length, offshoot length and it's number of leaves. The rootbounded cuttings were planted on eight and twelve-cm diameter pots, filled up with different culture substrates, as we can see in Table no.2. After planting, we made the following observations and measure: shoots number and length, leaves number on every shoot.

Table 1

Rooting experimental variants

Experimental variants	SPECIFICATION	
	Nodes number	Rooting medium
V_1	3 nodes, 2 leaves	40% SD + 40% LC + 20% S
V_2		Sand
V_3		Perlit
V_4		Jiffy 7
V_1	2 nodes, 1 leaf	40% SD + 40% LC + 20% S
V_2		Sand
V_3		Perlit
V_4		Jiffy 7

SD- sod land, LC – leaf compost, S- sand.

Table 2

Planting of rootbounded cuttings

Experimental variants	SPECIFICATION			
	Culture substrates	Pot diameter (cm)		Cuttings number
Vm	30%LC +30%WM +30%SD +10% S	8	12	20
V_1	45%LC+22,5%WM+22,5%SD+10%S	8	12	20
V_2	22,5%LC+45%WM+22,5%SD+10%S	8	12	20
V_3	22,5%LC+22,5%WM+45%SD+10%S	8	12	20

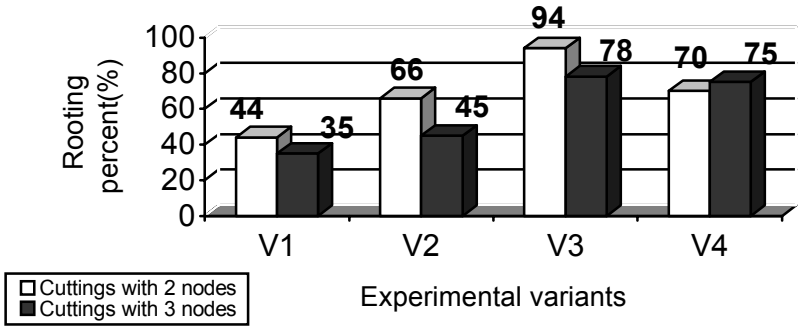
LC – leaf compost, WM- well- rotten manure, SD- sod land, S- sand

RESULTS AND DISCUTIONS

The rooting percent has the higher value on variant V_3 (perlit), 94% and respectively 78 %, for the both cuttings type, and the smaller value on the variant $V_{1,\ 44}$ % and respectively 35 %. It was generally higher on the cuttings with two

nodes, compared with the three nodes ones, with the exception of the variant V_4(Figure no.1).

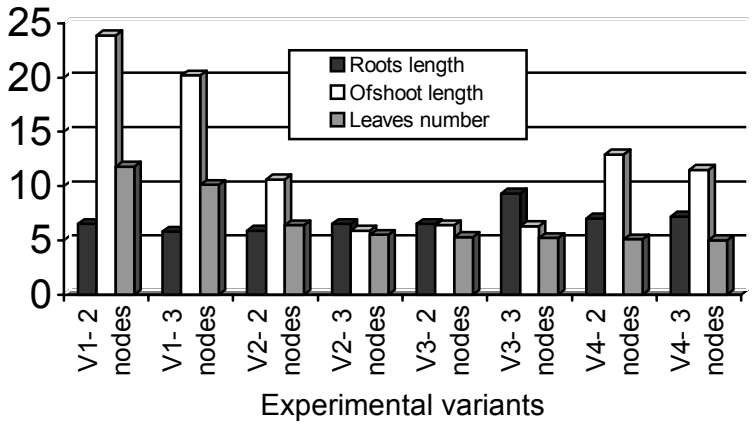
Figure no. 1. The rooting percent of the cuttings



Biometrics parameters of the rooted cuttings are presented in Figure no.2.

Length of the roots had the higher value on variant V_3 cuttings (9,3 cm) the most uniform were the roots of the variant V_4 and the shortest roots were founded on variant V_1 (5,8 cm). The growth of the roots was maximum on the cuttings with three nodes, except variant V_1.

Figure 2. Biometrics parameters of the rooted cuttings



The cuttings on variant V_1 are the tallest (23,9 and respectively 20,2 cm) and on the variant V_3 them are the shortest (6,4 and respectively 6,3 cm). There can be remarked that the cuttings with two nodes, on variant V_2 had almost doubled growth compared with the three nodes ones on variant V_2.

The extreme value of leaf number was recorded on variant V_1 , with the higher value (11,8 and respectively 10,1), and variant V_4 with the smaller value (5, 1 and respectively 5,0).

In Table no. 3 are presented the experimental data for the observation and measurement on the new plants, obtained after planting the rootbounded cuttings on different culture substrates.

Table 3

New plants growing resultates, after pot planting

Experimental variants	Pot diameter (8 cm)			Pot diameter (12 cm)		
	Shoots number	Shoots length.	Leaves number	Shoots number	Shoots length.	Leaves number
V_m	2	28.7	13.1	1	41.3	10.3
V_1	1	44.7	16	2	52.2	15.3
V_2	2	28	12.7	2	49.2	15.4
V_3	1	33.8	13.9	2	47.5	13.7

In 12-cm diameter pots, the growth is better than in 8-cm diameter ones, with the best resultates on variant V_1 and the lower on V_m.

Leaves number suffered a considerable variation depending on the experimental variant and pots diameter.

CONCLUSIONS

Based on the experimental data which were obtained in the presented studies, there can be taken some conclusions:

♦ Rooting percentage was the best using perlit (V_3) as rooting medium and lowest in substrate made of different components (V_1).

♦ Roots length had the maximum value on variant V_3(perlit), and the minimum value on sand (V_2)

♦ Three nodes cutings registered better results than two nodes ones, but the differences were insignifiant.

♦ Pot diameter has an influence on plants growth. That was higher in 12 cm pots compared with 8 cm pots.

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FRUIT GROWING

HIGHBUSH BLUEBERRY CULTURE A SOLUTION TO ENHACE THE VALUE OF THE LAND WITH ACID SOILS AND LOWER PRODUCTIVITY IN THE HIGH HILLS AREA NEAR THE MOUNTAINS

C. BĂDESCU

Key words: highbush blueberry

SUMMARY

The high bush blueberry has been introduced in Romania in 1968, when the first field was planted at Bilcesti located in Arges at 840m altitude. At Bilcesti the main research work concerned varieties and suitability for our climatic and soil condition.

The studies made in the last 20 years have confirmed the exquisite capacity of production for the most varieties in study. For Coville and Pemberton we have got a 20 years average production of 6-7 tons although the suitability of the soil was not the best.

Coville proves to be the most valuable bot for the productivity and for the quality of the berries. The exquisite productivity of this variety was confirmed by the average production of 12-14 kg/bush obtained for many selection.

INTRODUCTION

Blueberries have recently become recognized as one of the foremost health foods. The fruits are consumed fresh and processing.

Berries were useful for the treatment of bladder stones, for lungs and liver disorders, for treating diarrhea to soothe mouth ulcers as well as in the treatment of gout and rheumatism, even to relieve the symptoms of typhoid fever, their myopia (short-sightedness). The most effective medicinal use for blueberry extract appears to be for improving micro-circulation, thus its effects on the capillaries serving the eyes, mucous membranes of the digestive and pulmonary systems, to improve circulation to the connective tissues, water retention in the legs, varicose veins and arthritis sufferers.

Cultivated blueberry production in United States, the most blueberry producer, increased from 57,000 tones in 1986 to 83,000 tones in 1995. “The first field of blueberry in Romania was planted in 1968 at Bilcesti on Prof. Nicolae Stefan’s initiative, with biological material imported from United States. Bilcesti is located north of Arges district, in the high hills area near the mountains with an average

altitude of 800-870m. Research concerning varieties, agrotechnics, multiplying and breading have been made since 1968.

MATERIALS AND METHODS

The varieties studies were made in a trial culture planted in 1980 we made measurements concerning the vigor of the bushes and the main indexes for productivity (average number of berries/cluster, average loading with berries of the bush, the size of berries). The results were compared with those obtained in other experimental fields planted in 1968 and after 1968.

RESULTS AND DISCUSSIONS

For most varieties of blue berry in the trial field, which is the issue of our research the bushes had a relatively high growth. How ever the size was smaller in the trial field than the bushes planted in 1968. They had an average volume tree times smaller(Coville-1980 0,3-0,4 mc –Fig.1. and Coville-1968 Fig.2.)

Fig. 1 Blueberry bush Coville 35 years "Marinescu"

Fig. 2 Coville 23 years "Castel"

On this location Pemberton, Atlantic, Burlington and Zuckertraube had the highest bushes(0,499-0,422 mc average volume in 1995-2002)

Average production for the 13 varieties ranged among 3,99 and 7,01 t/ha. (Table 2.). Among the varieties we have studied Pemberton and Coville had the best average production 6,84 and 7,01 t/ha.

Within the 20 years of study the berries had different sizes (Table 3). In 2000 the doughtiest in the last 45 years (rainfall lower than 500mm) the berries were the smallest. Comparing with the averages values in 20 years, the biggest berries(2 g) had Coville, Blueray, Bluecrop. The number of berries per cluster ranges among 1-8 even

13-14 berries. However the average number of berries per cluster is almost 5 for all varieties.

Table 1. Biometrical indexes for 13 varieties bushe1995-2002

	Average indexes 1990-2002		Bushes volume 1995/2002		
Variety	Height (cm)	Diameter(cm)	Medium	Max	Min
Bluecrop	117	90	0,254	0,391	0,191
Blueray	114	100	0,272	0,332	0,220
Herbert	105	106	0,266	0,346	0,218
Ivanhoe	124	106	0,315	0,420	0,269
Coville	120	102	0,307	0,368	0,233
Rubel	117	112	0,352	0,422	0,284
Burlington	117	123	0,426	0,521	0,365
Zuckertraube	124	124	0,422	0,521	0,362
Atlantic	130	126	0,499	0,593	0,451
Pioneer	126	118	0,422	0,511	0,322
Pemberton	141	131	0,593	0,750	0,484
Collins	111	100	0,314	0,362	0,258
Weymoth	83	86	0,102	0,234	0,086

Table 2. Production of 13 high bush blueberry varieties 1983-2002

	Production 1983/2002(t/ha)						
Variety	M 1983 1987	M 1988 1992	M 1993 1997	M 1998 2002	M 1983 2002	MAX	MIN
Bluecrop	5,01	2,91	6,48	8,23	5,66	23,85	1,48
Blueray	4,92	4,10	6,28	7,48	5,70	12,78	3,74
Herbert	4,70	2,03	7,15	6,81	5,17	12,84	2,36
Ivanhoe	4,75	3,55	5,14	5,37	4,70	11,28	1,95
Coville	4,80	4,30	9,58	9,35	7,01	21,62	2,29
Rubel	4,99	1,45	7,42	6,12	4,99	10,19	1,47
Burlington	5,07	1,80	6,48	7,12	5,12	10,61	1,92
Zuckertraube	5,01	1,20	4,72	6,69	4,41	12,4	0,55
Atlantic	4,83	1,95	5,04	5,46	4,32	10,48	0,89
Pioneer	5,03	1,95	5,96	6,92	4,96	17,18	0,99
Pemberton	5,12	4,17	8,18	9,89	6,84	13,51	3,47
Collins	4,80	2,10	3,69	5,85	4,11	15,90	1,62
Weymoth	4,84	2,01	4,74	4,00	3,90	7,89	1,09

The most valuable variety for Bilcesti climatic and soil condition is Coville. The results of our present study and results from other 3 experimental fields' show that a high productivity can by obtained. Productions of 5-7 kg/bush were achieved in the field with cloned trials. At this selection record production of 15-17 kg/bush were achieved in several years.

The results obtained at Bilcesti on the basis of the studies during over 30 years attest the suitability of the areas near the mountains for the high bush blueberry.

Through planting the culture on an acid soil (pH 5,2-5,5) and by applying a strict technology mainly for planting and maintaining in the first 3-4 years after

Table 3. Berries size a 13 high bush blueberry varieties 1995-2000,

	Average size of berries							
Variety	1995/2002					1983/2002		
	1998	1999	2000	2001	2002	Medium	Max	Min
Bluecrop	1,84	1,73	0,94	1,88	1,82	1,69	1,88	0,94
Blueray	1,82	1,72	1,12	1,75	1,97	1,74	1,97	1,12
Herbert	1,12	0,93	0,76	1,23	1,06	1,06	1,23	0,76
Ivanhoe	1,49	1,70	0,78	1,32	1,48	1,41	1,70	0,78
Coville	1,94	1,94	1,20	1,68	2,11	1,86	2,11	1,20
Rubel	1,01	0,81	0,58	0,90	1,17	0,90	1,17	0,58
Burlington	1,13	0,82	0,56	1,10	1,17	1,00	1,17	0,56
Zuckertraube	1,30	0,82	0,45	0,87	0,68	0,92	1,30	0,45
Atlantic	1,15	0,64	0,44	0,87	0,94	0,88	1,15	0,44
Pioneer	1,05	0,84	0,60	1,01	0,93	0,95	1,08	0,60
Pemberton	1,67	1,32	0,84	1,40	1,40	1,37	1,67	0,84
Collins	1,74	1,34	0,85	1,67	1,32	1,38	1,74	0,85
Weymoth	1,56	1,23	0,50	1,22	1,17	1,17	1,56	0,50

planting the productivity can be very high. Most of the varieties can give production over 6-7 tons per hectare and the most valuable even more 10 tons per hectare for 25-30 years or more.

CONCLUSIONS

1.The soil and climatic conditions in the high hills near the mountains ar suitable for high bush blueberry culture.

2.Average production for 20-30 years of full yield were more than 5 tons per hectare; Coville, Blueray, Bluecrop and Ivanhoe can give more 10 tons per hectare when the weather is favorable.

3.The berry's size range among 0,8-0,9 g (Pioneer, Zuckertraube, Rubel, Atlantic) and 2-2,2g (Coville, Blueray, Bluecrop, Ivanhoe)

4. To enhance the value of the acid soils with lower productivity in the high hills area near the mountain in Romania, we should extend blueberries culture, especially because the blueberries are highly required on the international market.

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35 YEARS OF RESEARCH IN THE FIELD OF THE HORTICULTURAL PRODUCTS MARKETING

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Key words: marketing, conditioning, storage, postharvest, research, project

SUMMARY

The paper presents the main of the research, design and experimental production in the field of fruit and vegetables marketing, undertook by ICDIMPH – HORTING in its 35 years existence in the period of centralized economy as well as after 1989, in the transition towards the market economy stage. Now, a re-launching of research and design is necessary, by approaching aspects that correspond to the necessities of the strategies elaborated by the decision-making bodies and also aspects that correspond to those of the small and middle economic agents, involved in the marketing of the horticultural products. The authors believe that it's very important that the institute to become a research, design and production unit, one that could ensure the control and autentification of the quality of the horticultural products destined to large consume, the bringing up-to-date of the technologies, the achievement of new competitive products, the granting of consultance and the training of private economic agents.

The fresh horticultural products represent a very important source of nourishment, its essential place in human diet due its complex biochemical composition. It represents 20-30% of the daily diet ratio.

Romania has an important horticultural potential, and that led to the establishment of a organized system for the superior marketing of the horticultural products, in the latter half of the 20th century. The superior marketing involves the appeasement of the market demands by providing fresh and processed horticultural products throughout the year.

This determined some specialists in the field (Professors I.Ceausescu, A.Negrila, N.Stefan, I.F. Radu, I.Burzo, as well as dr. C.Iordachescu, dr. I.Mircea, eng I.Kicsales) to establish, 35 years ago, the "Institute of Research for the Marketing of Fruit and Vegetables, now know as the "Institute of Research and Development for the Processing and Marketing of Horticultural Products – HORTING.

The founding of the institute sought to solve the main aspects of research and design linked to the superior marketing of horticultural products within the country's centralized network represented by the "Fruit and Vegetables Central" (CLF), with the subsidiary IJLF's, and the "Canning Trust" with the adherent factories. The Institute was meant to be a pilot-unit of research, design, experimental production and marketing. The research activity had an applicable and fundamental character, set in several directions:

- conditioning and storage of fresh horticultural products;
- the processing of horticultural products (fruit and vegetables cans, natural juices, dehydrated and frozen products;
- aromatic concentrates and soft drinks;
- package, transport, mechanization, organization and the marketing economy of horticultural products;
- cultivation of flowers and vegetables in glasshouses.

In the beginning, the Institute had 328 employers, 166 which were researchers and designers, organized in 6 research labs and designing workshop. Over the years, the Institute grew, reaching a work force of 1.100 employers in 1990, 200 of wich were reasearchers, and designing engineers, having 18 analysis labs and research points throughout the country. The research endovement was relatively fit (climate, rooms, experimental cold stockage cells and with A.C., gaschromatograph, penetrometer, microscopes, aparatus for shocks and vibrations).

In order to modernize the products sale, the Institute created a "Fortuna" type store, self-serving, equiped with commercial furniture, conceived by the Institute; in this store, for the first time in Romania, pre-packed products sale was introduced as well as other Institute-achieved products (cans, juices, soft drinks). Also, this store offered taste samples in order to find out the consumer opinion.

The achievement of the above – presented objectives was made by aproaching a varied research theme of fundamental aspects (the biochemistry, the biophysics and the postharvest physiology of horticultural products, the changes that appear in the course of processing) and applicable aspects (the postharvest evolution of pests and parasites; determining the pollution substance remanence; elaborating technologies of conditioning, packing, transport, delivery and stocking in cooled and mechanicaly aired spaces, with A.C., AM, ULO etc; the marketing and computerizing in the commercialization process; the varying of the sorts of cans, juices, concentrates and soft drinks based on fruit and vegetables, dietary products, childern's products; the improvement of the main flower and vegetable species, grown in glasshouses and the modernization of the growing technologies; strategies elaborated with the decizion-making bodies).

The main achievements can be syntetized as followes:

- conditioning and stockage technologies – 55 (grapes, apples, tomatoes etc);
- physiological and biochemical methods of analysis, of finding out the pollution degree, of preventing and controlling the diseases and postharvest pests – 92;
- new types of packages and package auxiliaries (plates, baskets, covers) and delivery (export palettes, corner cupboards) - 70;
- packing – prepacking technologies (ellaborating NTR) - 75;
- quality standards for fresh and processed horticultural products - 235;
- standards and technological instructions for cans – 306;

- new registered sorts of cans processed products – 247 (20 of which for the childern and 10 for the sick);
- natural, pasteurized juices - 17;
- aromatic concentrated "BRIFCOR" type - 17;
- aromatic concentrates for domestic consumption - 18;
- soft drinks - 35;
- concentrate juices - 6;
- biotechnologies for obtaining pectolitic enzimes ;
- new registered of fruit and vegetables – 11 (6 of which – tomatoes: Gloria, Splendid, Nemarom, Diva, Lucia, Solara);
- maintaining the national flower collection – 850 sorts;
- data basis, by using the calculating technique for the characterization of the horticultural resources and the knowedge of the machine system adherent to the sector - 5;

The designing activity was meant to practically render the results obtained by the research compartiment.

The main activities are: • designing over 45 machines destinated to canning factories (1 ant 2 t/h tomato paste concentrate installation; green beans processing plant); to potato storage houses (potato conditioning line), to fruit and vegetables storage facilities, to prepacking sections;

- achieving necessary documentation for some 250 objectives (storage facilities for fruit and vegetables with cooling and mechanical airing, pectin factory in Dej; concentrate juice factories in Carei and Rm. Sarat (tomato-paste-producing sections); projects for technological engineering for the bringing up-to-date the botling lines (joined by ICPIAF Cluj) factories and canning sections, wining centre, industrial mushrooms factories, natural palinka and alcohol distilleries, cooling sections for fruit and vegetables; fruit, vegetables and potatoes storage houses, drying sections for fruit and vegetables etc.

Since 1990, the designing activity has considerably decreased, until now 64 projects being ellaborated, the number of employers of the design sector has also been drastically reduced, now reaching only 6.

The experimental production of the Institute, achieved in the microproduction section as well as in the glasshouse sector, has materialized in:

- annual storing in the cooling spaces, of 180-200 t of fruit and vegetables.
- can production of 2130 t (vegetables – 440 t; tomato paste – 12t; mustard – 2009 t, vegetables and meat cans – 8.5 t, fruit cans 247 t);
- soft drinks – 330 t;
- aroma concentrates – 1074 bottles (250 ml);

• glasshouse vegetables – 3750 t (100 t export), obtained from a surface of 36 hectares;

• 5.600.000 cut flowers (32.000 export).

Presently, the number of employees is of 88 (25 researchers and 3 design engineers), but with tremendous effort, the structure of the initial research thematic and the design profile remained the same. The difficult financial status is directly and unfavorably sever berating on the modernization of the research equipment, equipment that is obsolete, both morally and physically.

The relaunch of the research activity within ICDIMPH – HORTING is necessary and legitimate, because the restructuring of the marketing field of the horticultural products nationally consists, as far as concerned, a prioritary and a "SINE QUA NON" term in our country's efforts to join the EU. The Institute, through its specialists stoll at hand, can decisively contribute in achieving the marketing sector's modernization strategies by:

• modernizing the fresh stockage-conditioning technologies of fruit vegetables according to the necessities of the small and middle economic agents and EU demands; • the quality control of fresh, processed horticultural products, by reequiping the chemical, biochemical and microbiological analysis laboratory. This way, the emission of quality certificates can be provided, certificates recognized nationally and internationally • achievement of natural processed products, with a high nutritional value, destined to satisfy the public demands; • achievement of nutraceutical products (fortifying foods, enriched with nutritional principles) based on vegetables and fruit; • achievement of nectars, juices and soft drinks from fruit and vegetables, using indigenous raw material • the equipment of the pilot microproduction section (cans, juices and soft drinks) for the achievement and promotion of competitive products, with a high nutritional value, compared with the ones existing on European markets • elaborating projects for marketing objectives (storage facilities, factories, can sectors and soft drinks) of medium and small capacity that would answer the necessities of the private economic agents and the development strategies elaborated by the decizion – making organism.

Our point of view is that ICDIMPH – HORTING must be once again a representative economic unit in the field of marketing, capable of answering the decizion making-bodies and the necessities of the private economic agents, providing the quality control of the horticultural products (fresh and processed), the achievement of superior quality products, giving consultance, elaborating projects, training those involved in the distribution of fruit and vegetables, all the benefit of the superior marketing of the horticultural products, and the ensuring of the consumer's protection.

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THE BEHAVIOR OF SAME COLUMNAR APPLE HIBRIDS, GENETIC RESISTANT AND ENGRAFTING ON THE LIBERTY ROOTSTOCK

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Key words: columnar apple, rootstock Liberty

In the orchard with high density the columnar apple it's a economical alternative. Her dressed status it's represented by axis with same short fruits branches, there are same productivity particularities and that recommended this apple for family garden and commercial garden with short space.

The research proposing creation of the new columnar apple varieties, resistant genetic at the main apple deaseas (*Venturia inequalis*, *Podosphera leucotricha*). This proposing was partial solving obtained in present the Macexel variety and a lot of hybrids with genetic resistance.

MATERIALS AND METHOD

The researches was carried in the experimental field of Growth Fruits Department, Horticulture Faculty with three types of columnar apple: Golden (G), Jonathan (J) and Mixt (M). The engrafting was effectuated in spring year 2001 in the franc rootstock (Liberty).

In the Golden group was included the hybrids: CR-B_3, CR-B_6, CR-B_9; in Jonathan the hybrids: CR-B_5, CR-B_8 and Mixt the hybrids: CR-B_1, CR-B_2, CR-B_{10}.. The distance between row was 100 cm and between trees on the row 50 cm.

In the vegetation season was an effectuated observation concerning the rootstock diameter, the tree high, the axis ramifications, leaves dimension, precocity, the fruits fecundation.

The fruits production in 2 year was estimated on the tree and limb for a 20 000 trees / ha density. The soil was worked mechanic.

For the protection insects against the trees was treated in the season of vegetation

RESULTS AND DISCUTION

The results of this paper are presented in the next tables, were described the productivity, compatibility, the estimated production etc.

Table 1

The behavior of the columnar apple, genetic resistant in association with rootstock franc- Liberty

Tip	Hybrid	Rootstock diameter (cm)	Graft diameter (cm)	Graft high (cm)	No. spurs anticipate	Distance between buds (mm)	No. leaves /tree	Average surface of the leave ($cm^{2)}$	The leaves surface (m^2/pom)
Golden	CR-B 3	2,38	2,38	132	25	12	314	28,2	0,88
	CR-B 6	2,32	2,22	86	28	12	460	21,4	0,98
	CR-B 9	2,29	1,85	133	21	12	410	30,2	1,20
Jonathan	CR-B 5	2,23	2,07	113	-	14	208	30,1	0,62
	CR-B 8	2,38	2,07	131	-	16	219	26,2	0,57
Mixt	CR-B 1	2,16	1,96	116	-	16	214	25,8	0,55
	CR-B 2	2,54	2,46	125	-	15	268	22,1	0,59
	CR-B 10	2,54	2,29	121	-	13	260	28,7	0,74
Average		2,35	2,16	119,6	-	13,7	235,3	26,5	0,76

CR-B columnar resistant Băneasa

Table 2

The increment axis characteristics and leaves of the same columnar apple engrafting on the rootstock franc – Liberty

Tip	Hybrid	Tree high (cm)	No. branches on the axis	Leaves					
				Axis 2 year and ramifications		Axis – 1 year		Tree	
				No.	The surface of the leaves cm^2	No.	The surface of the leaves cm^2	No.	Surface of leaves cm^2
Golden	CR-B 3	271	36	364	6824,4	72	2030	436	8864,4
	CR-B 6	272	34	419	8112,0	95	2033	514	10145,0
	CR-B 9	280	29	414	9784,8	86	2597	503	12381,8
Jonathan	CR-B 5	260	6	260	4145,1	57	1715	317	5860,1
	CR-B 8	265	8	302	4087,2	63	1650	365	5737,3
Mixt	CR-B 1	250	4	254	4179,6	52	1348	306	5527,6
	CR-B 2	268	7	283	4574,7	61	1348	344	5922,2
	CR-B 10	278	9	273	4853,0	70	2009	343	6862,0
Average		269,1	16,6	321,7	5820	55,6	1472	321,1	7292

Table 3

The productivity of the columnar apple hybrids

Tip	Hybrid	Fruits / tree			Yield estimated	
		Flower fecundate (No.)	No. fruits	Weight estimated (g)	Kg/tree	t/ha
Golden	CR-B 3	33	18	165	2,97	59,4
	CR-B 6	29	21	171	3,59	71,8
	CR-B 9	32	25	181	4,52	90,4
Jonathan	CR-B 5	25	13	168	2,18	43,6
	CR-B 8	-	-	-	-	-
Mixt	CR-B 1	14	8	161	1,28	25,6
	CR-B 2	11	6	145	0,87	17,4
	CR-B 10	-	-	-	-	-
Average		18,0	11,37	1,92	1,92	38,52

CONCLUSIONS

1. From the lot of columnar hybrids was selected 3 tip: Golden , Jonathan and Mixt (Golden x Jonathan).

2. Golden tip was appreciated very good because the branches are very short and resistant, he have been many lives with resistance at *Venturia inequalis*.

3. Same hybrids are very appreciated, they have a very good productivity beginning with second year after engrafting.

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PRUNUS TOMENTOSA, A SWEET CHERRY SPECIES FOR THE ORCHARD WITH HIGHT DENSITY

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Key words: shweet cherry, hight density

SUMMARY

Prunus tomentosa had the chance to be research in Romania in the Fruits Growth Department from Horticulture Faculty.

The first information's concerning the Prunus tomentosa had been obtained from old chinoise men and chinoises rechercheur from Changli Institute province Hebei – China. In the first time the chinoise sweet cherry was used in the decorations green space, but in this moment the Prunus tomentosa is a very appreciated fruits species for his rouge and blank fruits. The Prunus tomentosa may be using with successful for engrafting. It's a very good rootstock for the peach and is using in the improvement the vigor of the sweet cherry.

MATERIAL AND METHODS

Te researches were effectuated in period 2000-2002, using the biological material obtained from seedling. In the first and year second after seeds were effectuated phenological observations for detecting the very good trees. The main measuring effectuated: determination the trunk diameter, high of the tree, the branch number, the productivity index, the weight steam (the branches weight, the shoots and leaves weight), the surface at the trunk transversal section etc.

The sweet cherry biotypes were grouped after productivity and the precocity in fructification.

RESULTS AND DISCU SSION

From the 29 biotypes (table 2); 9 had a little growth potential (A), 12 biotypes had a medium growth potential (B) and 9 had a great growth potential (C).

The difference between trunks diameter was very significant, the growth increment increasing 153 % (A-B), 147 % (B-C) and 226 % (A-C). The same situation was unregistered in the high of the tree, number of the branches and total branches increasement.

Between the vigor of tree and length of the shoot is a positive correlation.

After the technologies characteristics, 9 are biotypes very precook (21-23.05) 5 are biotypes with precocity (23-25.05) and 7 are biotypes with semi precocity (27-28.05).

The Prunus tomentosa are a very higher capacity to differentiate de fruit bud and in the second year from seedling make the first harvest.

The biotypes with a very good productivity was, 21 (815 g/tree), 27 (760 g/tree) and 30 (630 g/tree).

The percentage in edible parts was small at biotypes 29 (82%); 14 (81,17%) and 8 (81,34%), and the smallest at biotypes 21 (67,05%), 23 (68,15%) and 25 (68,15%).

The productivity index was higher at biotypes: 6, 9 (A), 21 and 27 (group B).

The researches concerning the structure and development the lives at Prunus tomentosa evidentiated is the visible different between biotypes.

The biotypes with small vigor had the small leaves and shoots without many flower buds.

Table 1

The leaves productivity at Cerasus tometosa biotip

Typ	**No.leaves/ tree**	**The leave average surface cm^2**	**Productivity $1m^2$ leave**		
			Year increasement m.l	**Fruits**	**Flower bud /m.l.**
A	830	10	6,81	0,151	210
B	1207	12	5,20	0,181	231
C	1308	14	5,46	0,159	215
X	1115	12	5,82	0,163	230

Table 2

The growth particularity of same Prunus tomentosa biotypes (2002)

Biotype	Trunk diameter (cm)	The higher of the tree (m)	The branches number	Total year growth (m)
3	0,9	1,24	56	5,07
6	0,7	0,85	38	4,45
9	1,0	1,80	37	2,05
12	0,9	1,33	39	7,22
16	0,7	1,20	20	3,29
17	0,7	1,10	30	6,89
18	0,7	1,03	28	6,21
26	1,0	0,94	21	2,30
x	0,82	1,19	33,62	7,44
4	1,50	1,57	48	21,53
5	1,30	1,80	46	13,46
8	1,30	1,80	45	13,46
11	1,20	1,86	23	6,68
13	1,10	1,50	26	7,22
19	1,20	1,50	33	7,84
20	1,20	2,00	51	10,73
21	1,30	1,65	46	7,52
22	1,30	1,08	31	6,06
23	1,10	1,40	45	3,88
27	1,30	1,36	51	9,93
29	1,40	1,38	36	10,56
x	1,26	1,57	40,83	9,90
1	2,10	2,10	77	13,51
2	1,60	1,24	36	8,36
10	1,70	1,75	59	21,53
14	2,00	1,75	17	8,05
15	1,70	2,09	73	12,52
25	1,80	1,70	59	12,15
28	1,70	1,68	64	12,66
30	2,40	2,14	58	13,76
31	1,80	1,85	79	19,75
x	1,86	1,62	75,60	12,18

CONCLUSIONS

1. From seedling was obtained the different biotypes with features variable: vigor, precocity, productivity;
2. The biotypes most productive was 21, with 815 g fruits / tree in 2 year and 27, with 760 g fruits/tree.

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THE HIBRIDS SWEET CHERRY X CHERRY, POTENTIANLI ROOTSTOCK

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STANCIU IULIANA, MĂMULARU DANIELA

Key words: hybrids, sweet cherry, rootstock

SUMMARY

In the last year the researches was conducted in reducing the vigour of the trees for increasing the number of the trees in the orchards. Until this moment for accompli the project was using the traditional methods technologic, biological and chemical. For break the vegetative increase was using new modality to conduct the trees.

In this moment using the rootstock with vigor very small it's a possibility too cheep. For the sweet cherry the researches used rootstock as: Camil, Edabriz, P-Hl 6, Weiroot 53 and F8, Gisela 5 and 10 for reducing the vigor with 40-65 % from F12/1.

MATERIALS AND METHOD

The vegetal material was represented by 250 hybrids sweet cherry x cherry obtained from sweet cherry varieties; Germersdorf, Armonia, Ulster and Boambe de Cotnari and cherry varieties; Morella neagră târzie, Fertila lui Miciurin, Spaniole and locale populations from Vrancea.

The seeds hybrid was seedling and 53 hybrid trees represented the base for researches. Ten year ago we obtained the hybrids with small vigor .

From 1999, the hybrids were study regarding the vigor capacity of shooting and ramification, period of blooming, precocity and productivity.

The soil was worked manual and mechanic for winds control and for the insects control we used pesticides recommended.

RESULTS OBTAINED

The natural hybrids sweet cherry x cherry was divided in 4 categories: small vigor, middle vigor, grand vigor and very grand vigor.

The small vigor rootstock is represented to small diameter trunk and axis (table 1) and many short ramifications.

After 4 year the hybrids with small vigor had the diameter trunk section between 4,90 – 10.0 cm^2 and a high between 1,53 - 2,96 m. From 10 hybrids, 6 was very precocity the fruits production oscillated between 3,10 – 7,90 kg fruits per tree.

Table 1

A. The fructification particularity to same hybrids with small vigour

Hybrid	Trunk section surface (cm^2)			Ramifications / semiscaffold linear meter (no.)				Prod. Kg/tree 2001
	99	00	01	total	spurs	Bunches	middle	
H 6	1,14	2,62	7,54	27	6	9	12	6,43
H 7	1,28	2,53	7,54	12	8	3	1	3,10
H 10	1,18	2,48	6,15	25	4	17	4	6,10
H 11	1,05	2,53	10,0	12	10	-	1	-
H 15	0,96	2,42	6,60	16	16	-	-	-
H 23	0,98	2,63	7,45	12	12	-	-	-
H 25	0,82	2,43	4,90	12	2	10	-	6,50
H 28	0,93	2,28	6,60	20	7	12	1	4,10
H 36	1,26	3,46	9,07	18	7	8	3	7,90
H 42	0,79	2,90	4,01	15	15	-	-	-

For the orchards with high density we recommended the hybrids: H 10; H 25; and H 28.

From middle vigor category we recommended the hybrids (table 2): H 4, H 22 and H 40.rte high (5,12-9,10 kg/tree).

In according with our programmed were the hybrids: H 8 H 22, from grand vigor category because the blooming is very later.

The hybrids from 4-th category are not corresponding with our programmed and they are eliminated.

Table 2

B. The fructification particularity to same hybrids with middle vigor

H.	Trunk section surface (cm^2)			Ramifications / semiscaffold linear meter (no.)				Prod. Kg/tree 2001
	99	00	01	total	spurs	Bunches	Middle	
H 8	16,2	21,1	34,1	18	4	8	6	8,32
H 12	10,1	16,3	24,9	5	3	-	2	2,43
H 22	4,30	7,80	12,4	9	-	1	8	6,15
H 26	6,14	12,5	21,2	8	5	-	3	3,50
H 17	8,10	17,3	30,1	20	8	10	2	5,20
H 29	7,23	15,9	31,1	6	6	-	-	-
H 33	5,21	10,1	22,8	13	13	-	-	-

Table 3

C. The fructification particularity to same hybrids with big vigour

H.	Trunk section surface (cm^2)			Ramifications / semiscaffold linear meter (no.)				Prod. Kg/ tree 2001
	1999	2000	2001	total	spurs	Bunches	middle	
H 2	16.3	21.9	38.4	8	4	4	-	2,35
H 5	21.4	43.2	63.5	5	5	-	-	-
H8	14.3	20.1	34.1	8	6	2	-	3,20
H 9	30.2	50.6	94.9	10	10	-	-	-
H 27	25.4	45.1	63.5	7	7	-	-	-
H 32	17.2	26.1	44.1	3	3	-	-	-
H 37	15.2	25.4	46.5	10	5	2	3	2,60
H 38	13.1	20.1	33.1	12	8	2	2	2,75
H 39	11.3	19.4	33.1	10	5	2	3	3,25

Table 4

D. The fructification particularity to same hybrids

H.	No. crown ramifications		Weight permanent elements / weight unpermanent elements	kg steem /cm^2 trunk section
	Permanent	unpermanent		
	>4 year	1-4 year		
H 2	7,8	6,30	1,23	0,36
H 5	9,4	6,80	1,38	0,25
H 8	5,0	7,40	0,67	0,36
H 9	15,10	17,00	0,88	0,33
H 27	5,00	9,30	0,53	0,22
H 32	2,50	4,00	0,62	0,14
H 37	3,50	4,80	0,72	0,17
H 38	6,25	5,95	1,05	0,36
H 39	3,25	6,15	0,52	0,28

CONCLUSIONS

1. For orchards with high density we recommended the hybrids: H 10, H 25 and H 28. They are very precocity and productivity.
2. For the intensive orchards can be using the hybrids: H 4, H 22 and H 40, with middle vigor and productivity.
3. For the semiintensive orchards the hybrids: H 8, and H 32 are very indicated.

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VALUABLE APPLE TREE VARIETIES – PRINCIPAL SURSE OF GERMOPLASMA

G. GRADINARIU, M. ISTRATE, M. DASCALU

INTRODUCTION

In Romania the apple germoplasma material consists in more than 1100 genotypes. More than 700 varieties and local selections are genetically disease resistant. The collection from University of Agronomic Sciences and Veterinary Medicine Iasi contains over 200 varieties. Among these, there are 65 local varieties and biotypes which are disease resistant. This genetic material is mainly used in the breeding program of our University.

From a number of 250 new selections 16 were confirmed to be disease resistant and released as new varieties: Aromat de Vara, Frumos de Voinesti, Auriu de Bistrita, Rosu de Cluj, Delia, Ancuta, Pionier, Voinea, Generos, Romus 1, Romus 2, Romus 3. These represent 10 % of all varieties engrafted in nursery. Besides these well-known varieties of a great importance, there are the traditional varieties, too: *Rosu de Geoagiu, Domnesc, Patul, Masanski, Sovari, Cretesc Rosu, Tiganci, Cretesc Auriu de Valcea, Radaseni, Falticeni, Viesti, Rosioare Calugaresti etc.* Researchers led to the conclusion that in Romania many more ignored apple varieties exist. These varieties have an important value as a germoplasma material in order to create new varieties, which are resistant to stress factors and are intended especially for industrialization.

OBJECTIVES OFTHE RESEARCH

Increasing the productive potential of the varieties; increasing the quality of the fruits; increasing the genetically resistance against the attack of certain diseases and pests; improvement of the resistance against natural stress factors: temperature (extreme limits), water (deficit or excess), salt content, polluting agents; late flowering; height of growing and the type of fructification; creation of varieties with precise destination (for fresh consumption, industrialization, etc.).

METHODS OF RESEARCH

Five in every repetition randomly arranges the varieties.
The study of the varieties has in view:

a) plant: fenophasis of fruit-setting organs; fruit-setting type; productive potential, disease, frost, pests and drought resistance.

b) fruits: quality, disease and mechanical damage resistance; the using pretability of fruits (fresh consummation, juice, marmalade etc.), storage capacity, etc.

All elements are studied on multiple graduations and according to national and international standards. Based on these studies we established the characteristics of each variety or biotype, the ways to use them and the most appropriate methods we can use in order to create new varieties and hybrids.

The registration and processing of data is made for each variety every year.

The valuable varieties obtained are recommended for multiplication and for replacing the ones, which react improperly to certain stress factors. As methods of research are used: examination, hybridization, mutagenesis, androgenesis etc.

RESULTS AND DISCUSSIONS

During the research the following varieties have been studied:

Summer varieties: 01. Remus (vf), 2. Romus 1 (vf), 3. Romus 2 (vf), 4. Romus 3 (vf), 5. Aromat de Vara.

Autumn varieties: 6. Frumos de Voinesti, 7. Auriu de Bistrita, 8. Pionier (vf), 9. Voinea (vf), 10. Falticeni, 11. Ardelean, 12. Gloria

Winter varieties: 13. Ciprian (vf), 14. Generos (poly), 15. Delia, 16. Ancuta, 17. Poiana, 18. Radaseni, 19. Delicios de Voinesti, 20. Domnesc, 21. Patul, 22. Masanschi, 23. Sovari, 24. Cretesc Rosu, 25. Cretesc Auriu de Valcea, 26. Viesti, 27. Rosu de Cluj, 28. Rosu de Geoagiu, 29. Poinic, 30. Rosioare Calugaresti, 31. Tiganci

These varieties represent approximately 40 % from the total Romanian apple production (app. 600000 t), the rest of 60 % is obtained from imported varieties from the Golden Delicious and Red group. Although, the official Romanian assortment includes 36 varieties, from which 20 are native and 16 are imported. These varieties provide a fresh fruit consumption during the whole year since July. The winter varieties have storage capacity for 6-8 months

The production shown in table 1 is a 6 years average production with variations from 13.7 t/ha to 29.8 t/ha. These values were influenced by the ecological and technological conditions. The differences of production from one year to another were caused by a lower adaptability capacity, a scanty genetic material, etc. The poor productions can be improved trough amelioration and optimization of the growing technology. The quality of the fruits (table 2) is very different from a variety to another. However, this is alike or even greater, than the quality of the imported varieties. On the other hand, the Romanian varieties have a less appealing commercial aspect because of the unsuitable agrotechnics.

We also specify that the majority of Romanian varieties are tolerant and resistant against disease, drought, frost, and other stress factors. They also adapt very easily to different ecological conditions.

Table 1

Average production

Nr.	Variety	Average production (1996-2001) t/ha	Nr.	Variety	Average production (1996-2001) t/ha
1	Remus (vf)	26.4	16	Ancuta	13.7
2	Romus 1 (vf)	22.5	17	Poiana	20.3
3	Romus 2 (vf)	42.0	18	Radaseni	17.8
4	Romus 3 (vf)	23.2	19	Delicios de Voinesti	28.3
5	Aromat de Vara	22.5	20	Domnesc	22.7
6	Frumos de Voinesti	22.0	21	Patul	20.2
7	Auriu de Bistrita	24.5	22	Masanschi	20.1
8	Pionier (vf)	20.2	23	Sovari	17.5
9	Voinea (vf)	21.0	24	Cretesc Rosu	22.3
10	Falticeni	18.6	25	Cretesc Auriu de Valcea	21.5
11	Ardelean	22.0	26	Viesti	20.8
12	Gloria	21.3	27	Rosu de Cluj	23.3
13	Ciprian (vf)	29.8	28	Rosu de Geoagiu	24.1
14	Generos (poly)	19.3	29	Poinic	25.5
15	Delia	22.4	30	Rosioare Calugaresti	21.4
			31	Tiganci	29.5

CONCLUSIONS

In Romania there is a rich native germoplasma material in apple species, which can be successfully used to create new varieties and valuable hybrids.

The majority of Romanian varieties are tolerant or resistant against disease, drought, frost, and other stress factors.

The productions can be considerably improved through amelioration and better agrotechnics.

The characteristics of Romanian varieties (the dry substance, sugar, vitamins and mineral substances content) are greater than those of the imported varieties, but the commercial aspect is less appealing.

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Table 2

Chemical composition of the varieties

Nr.	Variety	Dry subst. (g %)	Total sugar (g %)	Total acidity (g %) (malic acid)	Ascorbic acid (mg %)	K (mg %)	Ca (mg %)	Mg (mg %)
1	Remus (vf)	12.87	10.10	0.90	6.10	110.2	1.38	6.50
2	Romus 1 (vf)	11.45	8.33	0.93	6.40	118.4	1.16	6.85
3	Romus 2 (vf)	12.04	9.10	0.93	5.20	91.8	1.48	5.70
4	Romus 3 (vf)	12.32	5.26	0.38	5.30	115.6	1.58	5.56
5	Aromat de Vara	13.75	10.90	0.54	10.20	120.3	2.34	6.47
6	Frumos de Voinesti	12.05	8.18	0.32	4.52	121.3	1.74	6.12
7	Auriu de Bistrita	14.81	12.66	0.56	7.50	130.0	2.15	5.78
8	Pionier (vf)	12.93	9.71	0.47	3.75	110.4	3.83	8.17
9	Voinea (vf)	13.03	10.53	0.41	4.48	112.9	3.58	11.29
10	Falticeni	12.85	11.00	0.53	5.35	121.3	3.00	7.50
11	Ardelean	11.46	10.42	0.43	5.37	127.1	3.20	8.16
12	Gloria	12.70	11.30	0.50	5.85	110.1	2.47	6.39
13	Ciprian (vf)	13.67	12.10	0.57	6.85	123.5	3.14	7.85
14	Generos (poly)	13.50	11.50	0.60	7.80	120.3	3.00	7.25
15	Delia	12.94	9.90	0.57	5.37	116.9	2.54	6.38
16	Ancuta	13.61	9.33	0.38	5.83	118.3	2.87	7.14
17	Poiana	12.70	10.55	0.50	5.65	115.2	2.90	6.54
18	Radaseni	13.51	9.90	0.67	7.91	123.5	3.12	5.75
19	Delicios de Voinesti	14.19	11.12	0.27	4.80	121.3	3.00	6.24
20	Domnesc	14.75	12.64	0.40	5.37	115.5	2.75	6.30
21	Patul	14.37	12.12	0.43	4.48	124.7	3.17	6.28
22	Masanschi	14.00	11.84	0.48	9.03	120.3	3.20	6.00
23	Sovari	14.29	12.31	0.47	5.35	119.8	2.95	6.74
24	Cretesc Rosu	14.50	11.35	0.57	5.18	117.0	2.78	6.32
25	Cretesc Auriu de Valcea	13.18	10.94	0.68	4.75	114.7	2.10	5.90
26	Viesti	13.26	10.53	0.67	5.80	119.5	3.20	6.15
27	Rosu de Cluj	14.05	12.08	0.57	4.66	121.3	3.00	6.07
28	Rosu de Geoagiu	13.80	11.75	0.62	4.85	120.1	3.08	5.90
29	Poinic	13.51	11.45	0.41	7.00	119.3	2.85	5.87
30	Rosioare Calugaresti	13.46	11.46	0.52	4.75	109.1	3.54	6.12
31	Tiganci	14.05	12.35	0.42	6.30	117.3	3.87	5.85

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RESEARCHES REGARDING THE MULCHING MATERIAL INFLUENCE ON THE PRODUCTION AND QUALITY AT STRAWBERRY

D. HOZA

Key words: strawberry, mulch, straws, plastics

SUMMARY

The obtained of the fruits with quality at strawberry in not possible without soil mulching for avoid the contact of the fruits with the soil. In the current practice are used many materials, each of them with advantage and unadvantage, regarding early fruit production, material cost, etc.

At the comparatively use of the straws mulch, transparent plastics, black plastics with the nude soil we constated that the strawberry fruits became mature earlier on black transparent mulch. 39,2% from the total production was earlier for black transparent mulch, comparatively with 11,2% at straws mulch and 17,4% at transparent plastics mulch. The numbers of the fruits extra and first quality was of 92,1% for black plastics mulch, 86,6% for straws mulch and 81,7% for transparent plastics mulch, comparatively with 71,3% at control.

The black plastics use gives a good protection of the strawberry fruits and assures a good quality, comparatively with the other materials.

The mulching of strawberry culture after blossom represents a normal working for fruit's protection and reduces the infections with pathogen agents. Until 80's it has been used almost exclusively straws mulch. In present there is the tendency to use the plastics mulch.

In the present paper we present the results of some studies regarding the effects of mulching materials of quantity and quality at strawberry production.

MATERIAL AND METHOD

This experience was organized in Buzău zone, in 2001-2002 periods, and we used Premial variety, a new cultivar with very good production potential. For fruit protection, we used straws and plastics, and the experimental scheme was:

V1 - control nude soil;

V2 - straws mulch;

V3 - black plastic mulch,

V4 - transparent plastic mulch.

The planting distance was of 70/35/30 cm, with a density of 63500 plants/ha. The strawberry culture had irrigation system, and was done all normal and especial working for this culture (irrigation, fertilization, phytosanitaire

protection, soil working, etc.).

EXPERIMENTAL RESULTS

The plastics use as a mulching material comparatively with straws mulching and nude soil gave good results from the production and qualities of the fruits point of view (table 1)

Table 1

The production capacity of some strawberry varieties depending of mulching materials

Variants	Total production		Early production		Fruits of extra and first quality
	t/ha	%	t/ha	%	
V1 - control	30,55	Mt	8,11	26,54	71,3
V2 - straws mulch	33,90	110,90	3,8	11,20	86,6
V3 - black plastics	34,45	112,76	13,5	38,92	92,1
V4 – transparent plastic	32,70	107,03	5,7	17,43	81,7

The total production obtained was bigger at all mulched variants arriving to 34,45 t/ha at V3, 33,9 t/ha at V2 and 32,7 t/ha at V4 comparatively with 30,55 t/ha at control. The black plastic use brings a production increase of 12,76% comparatively with the control. Good results were also obtained at straws mulching variant, where the production increase was of 10,9%.

From the economical point of view, very important is the early production because the prices are bigger than later. The biggest early production was obtained at V3 (black plastic mulch), 39% from the total production, followed by control with 26,54%. Small values were obtained at V2 and V4, with 11,2 and respectively 17,4%. This aspect can be explained because of the black plastics and nude soil that warm themselves quickly and determine the fruit ripening.

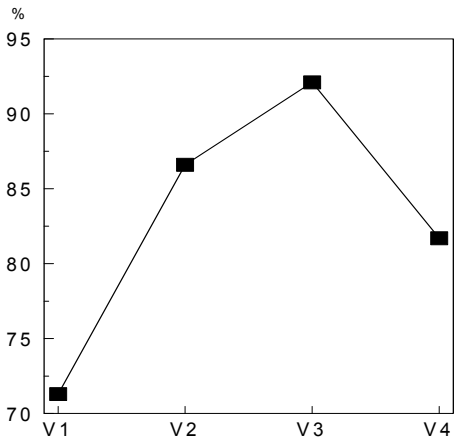

Fig. 1 Fruits of extra and first quality

From the quality point of view, the control assured the least results, with 15-29% under mulching variants. The third variant arrived at 92,1% with fruits of extra and first quality, that is with 29% more than the control (fig. 1).

The good results were also obtained at the second and the forth variant, with 86,6% and respectively 81,7% fruits of extra and first quality.

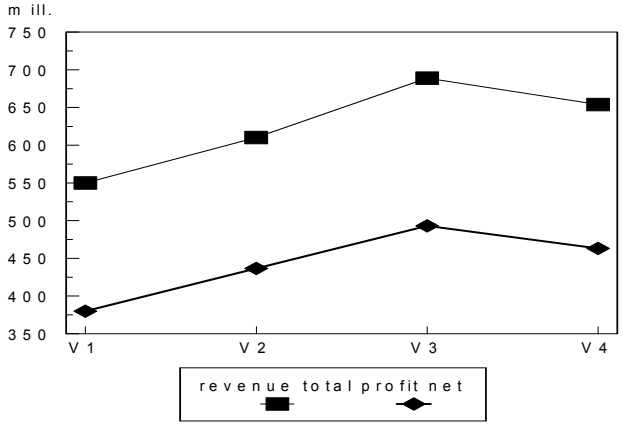

Fig. 2 Total revenues and net profit of strawberry culture

The economical study for the chosen variants will show a very good rentability for strawberry culture, if it obtains a good production, over 30 t/ha. Thus, for a medium price of 18000 lei, in 2002 year, at control variant was obtained 380 million's lei profit/ha, while, at third variant the profit was of 493 million's lei/ha (table 2).

Table 2

Economical efficiently of strawberry culture

Variant	Total production t/ha	Total expenses Millions lei	Mulching expenses	Total revenues Millions lei	Net profit millions lei
V1	30,55	170,0	-	549,9	379,9
V2	33,90	173,5	3,5	610,2	436,7
V3	34,45	196,0	26	689,0	493,0
V4	32,70	191,0	21	654,0	463,0

CONCLUSIONS

1. The natural conditions from Buzău region are very good for the growing and fructify of the strawberry;
2. The culture mulching with vegetal and synthetically material assures a production increase of 7-13%;
3. The black plastic use for strawberry mulching assures a production increase of

10,9% and a good quality of the fruits (29,2% extra and first quality);
4. The strawberry culture is very profitable from the economical point of view.

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THE EFFECT OF LOW SPRING TEMPERATURE ON APRICOT AND PEACH TREES IN BUCHAREST ZONE

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Key words: apricot-tree, peach-tree, frost spring

SUMMARY

The spring of 2002 year was very unfavorable for termophile fruit growing species, thanks to the low temperatures which came before and through the blossom time at apricot and peach tree. 5 days before the apricot blossom the temperature was of -9°C, and in the blossom time it was of -7°C, and this aspect determined very much lost of flowering buds and flowers. In these conditions, the fruits production was very small, in a way lost of flowering buds and flowers, and in a other way the low percent of fruits tied.

At apricot tree were analyzed 6 varieties (Dacia, Excelsior, Comandor, Sulmona, Mamaia and Favorit) and the production obtained was under 11 kg/tree.

For peach tree were analyzed also 6 varieties (Redhaven, Catherine, NJC-89, Florin, Filip and Costin) and the production obtained was between 4,9 and 8,3 kg/tree, which is less for the varieties productive potential.

Except the technological factors, the fruit's production is influenced by the climatic factors. In yield culture, the climatic factors cannot be controlled and sometimes they produce big problems.

The fruit tree resistance at spring frost is different depending of species, phonologically phases, temperature level, etc. The apricot and peach species are less resistance at difficult spring conditions

In this paper we present the results of a study effectuated in 2002 's spring, a difficult climatic year for horticulture.

MATERIALS AND METHODS

The observations and the measures were effected in the Fruit growing department didactic yield, in an apricot plantation aged 7 years and a peach plantation aged 8 years. Were used 6 varieties for both species: Dacia, Excelsior, Comandor, Sulmona, Mamaia and Favorit for apricot and Redhaven, Catherine, NJC-89, Florin, Filip and Costin for peach.

For both species the planting distance was of 4/3 m and there were done the specific activities.

The determinations effectuated, followed especially the grade of affectation of buds, flowers and fruit productions by the spring frost influence.

The viability buds' testing was done by longitudinal cutting with the blade, after 24 hours of maintaining the branches at the room's temperature.

EXPERIMENTAL RESULTS

The low temperatures in spring affected direct the fruit production by distroing the buds and flowers and indirect by reducing the tying percent of fruits and increasing the physiological falling.

At apricot (table 1), after the first frost, the grade of affectation was not important, the buds' lost was under 20%, with small differences between the studied varieties (fig. 1). The second frost, which came in blossoming period when the trees' resistance lowered, affected very much the flowers. Thus, the flower buds frostily percent arrived at 70,3% for Sulmona variety; 69,7% for Excelsior and Favorit varieties and it lowered at 54,3% for Comandor variety.

Table 1

The affected level for buds and flowers at apricot by spring frost 2002

Variety	Percent of buds destruction	Percent of flowers destruction	Percent of fruits tied	Yield kg/tree
Dacia	61,3	14,5	16,3	5,1
Excelsior	69,7	16,2	11,4	3,8
Comandor	54,3	18,4	22,3	11,2
Sulmona	70,3	17,9	12,5	4,4
Mamaia	68,4	18,1	14,5	7,5
Favorit	69,7	15,6	19,2	8,3

Because of the low temperature, the remained flowers, especially on the top of the branches, tied few fruits, under 22,3%. Little tie had Sulmona and Excelsior varieties with 12,5 and 11,4% and a better tie had Comandor and Favorit varieties.

The obtained production was among 3,8 and 11,2 kg/tree, bigger at Comandor and smaller at Excelsior (fig. 2).

Similarly situation was obtained at peach (table 2). All the six varieties studied were very hard affected by the frost. Even if the peach blossomed later than the apricot it was affected by the frost, the lost was almost the same like in the apricot's case. Before blossom it was unaffected about 35-40% from the flowering buds. The number of fruits formed on the each branch was of 22,4-18,6 depending on the variety.

The tied percent was quite small, between 18 and 24%, bigger values at Catherine variety and smaller at Redhaven variety.

The physiological falling was raised for the a little grade of tie and it affected direct the fruits' production.

From the production point of view, the values were among 4,9 kg/tree at Costin variety and 8,3 kg/tree at Catherine variety (fig.3).

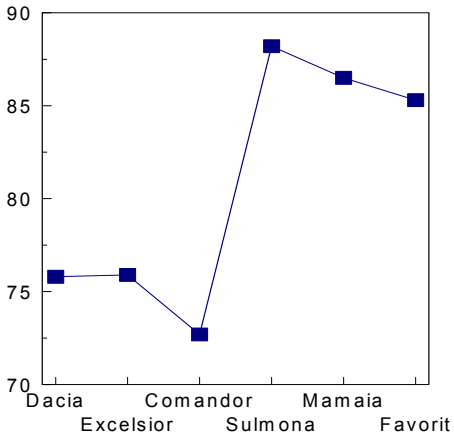

Fig. 1 Percent of flowering buds and flowers destructor

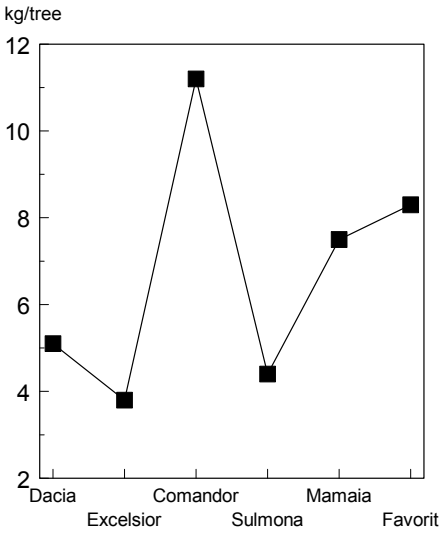

Fig. 2 Apricot productions

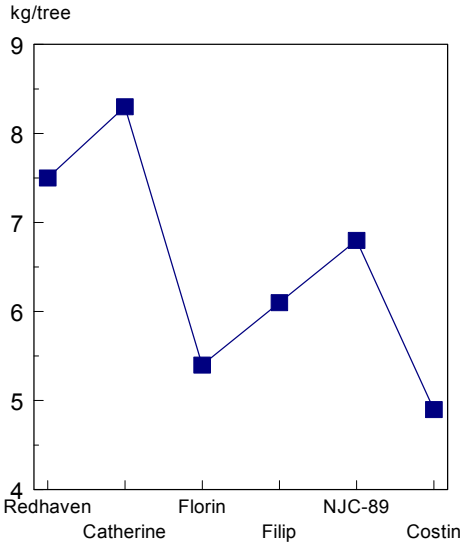

Fig. 3 Peach productions

Table 2

The affected level for buds at peach
by spring frost 2002

Variety	Percent of buds destruction	Number of flowers on branch	Percent of fruits tied	Percent of physiological fall	Yield kg/tree
Redhaven	62,4	24,2	18,5	12,5	7,5
Catherine	67,4	20,7	24,2	16,2	8,3
Florin	66,3	19,8	23,6	15,2	5,4
Filip	55,6	18,6	20,7	17,3	6,1
NJC-89	61,3	22,4	19,9	18,5	6,8
Costin	59,8	18,3	22,3	25,4	4,9

CONCLUSIONS

From this research results the following conclusions:

3.1. The low temperatures of -7°C and -9°C affected the flowering buds and the flowers at apricot in percent of 75-88%;

3.2. The peach was affected only at the buds, in percent of 55,6%-67,4% depending the varieties;

3.3. For both species, the production level did not surpass 33%-35% from the normal production.

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PRELIMINARY RESEARCHES REGARDING PARAMETERS CROWN REDUSE AFTER SUMMER PRUNING AT APRICOT TREES

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Key words: apricot-tree, pruning, crown parameters

SUMMARY

The summer pruning at apricot tree, made after fruit tied or after fruit harvesting makes a possibility for reducing of negative effects of spring frost. Thus, this mode of pruning determined small parameters crown reducing.

From this point of view, the researches effectuated by 6 apricot varieties (Dacia, Excelsior, Comandor, Sulmona, Mamaia and Favorit) shows that it eliminates a smaller quantity of biomass at winter pruning 4,2-6,9 kg/tree, comparatively with green pruning 4,2-9,4 kg/tree, effectuated after fruits tied and 4,3-8,6 kg/tree effectuated after fruits harvesting respectively.

The trees growing are little diminuated for trunk diameter and for yearly branches. The trunk diameter is smaller with 3,56% at pruning after fruits tied and with 4,27 at pruning after fruits harvesting.

The total growing soma was also little reducing, with 6,48% for the first pruning and with 5,44% for the second pruning.

The tree pruning represents a basic work for the fruit growing plantations to assure constant and quality productions. At apricot, the tendency to pass at the green pruning exists to reduce the effect of the spring frost.

In present paper we present comparative results regarding the pruning moment effect on apricot tree.

MATERIAL AND METHOD

The present research was made in the Didactic yield of Fruit growing Department from Bucharest, in 2001-2001 period, in an apricot plantation established in 1994, regarding the pruning moment effect by some new apricot varieties (Dacia, Excelsior, Comandor, Sulmona, Mamaia and Favorit).

The experimental variants were:

V1 - dry pruning - control;

V2 - pruning after fruits tied;

V3 - pruning after fruits harvesting.

During the research period the soil was kept free of weeds and was effectuated specifically works.

Were made observations and determinations regarding the crown parameters, the wood quantity eliminated at pruning, the growing of the branches, etc.

EXPERIMENTAL RESULTS

The apricot varieties reacted different at the pruning moment, the results obtained were presented on.

From the eliminated biomass at pruning point of view, we constated that at dry pruning it was eliminated a small quantity comparatively with the green pruning (table 1).

Tabel 1

Biomass eliminated and trunk diameter at some apricot varieties (mean 2001-2002)

Variety	Biomass (kg/tree)			Trunk diameter (mm)		
	V_1	V_2	V_3	V_1	V_2	V_3
Dacia	5,2	6,3	5,9	92,5	90,6	88,5
Excelsior	3,4	4,2	4,3	82,1	81,2	80,4
Comandor	6,9	8,1	7,8	99,7	95,3	94,8
Sulmona	4,2	6,7	6,5	85,3	84,9	84,5
Mamaia	6,6	8,2	8,1	91,4	86,3	86,4
Favorit	6,9	9,4	8,6	101,2	96,4	96,5

At Comandor and Favorit varieties were eliminated 6,9 kg/tree biomass, these varieties had a big vigor, comparatively with Excelsior and Sulmona varieties at which were eliminated 3,4 and 4,2 kg/tree biomass.

At green pruning, the biomass quantity was bigger than the first pruning, because it was eliminated wood and leaves. We observed that at the pruning after fruits harvesting the biomass quantity was less than at the pruning after fruits tied.

The thickness of the trunk was bigger at dry pruning variant than the green pruning variant with 3,56-4,27%. Between the green pruning variants, in general, at pruning after harvesting variant the trunk diameter was smaller, 98,53 mm comparatively with 99,11 mm.

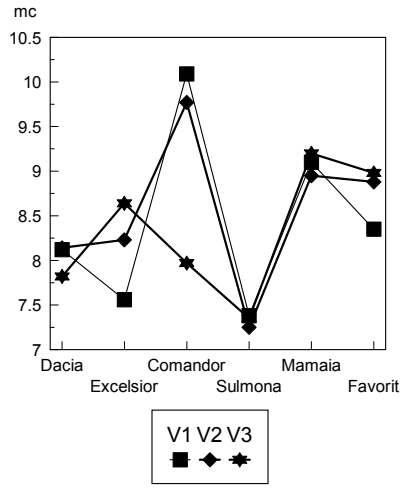

Fig. 1. The crown volume at some apricot varieties

From point of view the crown parameters, we constated that exist differences of tree vigor between the varieties (table 2). Thus, Excelsior and Sulmona varieties had the thin trunk, and Comandor and Mamaia varieties had the trunk thick. The trees high were maintained by pruning, but existed little differences between varieties. The Comandor and Favorit varieties had higher trees (3,85-3,98m) and Excelsior and Sulmona had lower trees (3,75 m).

The crown volume was bigger at Comandor and Mamaia varieties, with 9,08-9,26 m^3 and smaller at Excelsior and Sulmona with 7,32-7,81 m^3 (fig. 1).

The annual grown soma was bigger at dry pruning variant (2083,3 m), that green pruning (1948 m respectively 1970 m) with 5,44-6,48%.

CONCLUSIONS

1. At green pruning was eliminated a bigger quantity of biomass than at dry pruning, with 29,3% for the first moment and 24,1% for second moment;
2. The green pruning reduce the trunk grown with than dry pruning with 3,56% respectively 4,27% depending of the pruning moment;
3. The green pruning, after harvesting represents a possibility of reducing the trees dimension, expressed by the trunk thickness, the trees high and the total grown soma.

Table 2

Crown parameters at some apricot varieties after dry and gree pruning

Variety	Variant	High trunk (cm)	High tree (m)	Trunk diameter (mm)	Crown diameter (m)	Crown volume (m^3)	Total grown soma(cm)
Dacia	V_1	60	3,95	90,5	2,85	8,12	2230
	V_2	65	3,80	89,3	2,95	8,14	2150
	V_3	63	3,75	87,5	2,90	7,82	2210
Excelsior	V_1	52	3,75	82,1	2,80	7,56	1635
	V_2	60	3,80	80,2	2,95	7,23	1430
	V_3	55	3,70	79,4	2,85	7,64	1410
Comandor	V_1	50	4,10	107,3	3,10	10,05	2450
	V_2	55	3,95	94,3	3,15	8,77	2265
	V_3	50	3,90	94,8	2,80	7,97	2320
Sulmona	V_1	55	3,80	83,3	2,75	7,38	1865
	V_2	50	3,70	93,9	2,70	7,25	1680
	V_3	55	3,75	93,5	2,75	7,35	1710
Mamaia	V_1	45	3,80	89,4	3,05	9,10	2010
	V_2	50	3,70	85,3	2,95	8,95	1820
	V_3	50	3,90	85,4	3,00	9,20	1930
Favorit	V_1	60	3,85	99,2	2,95	8,35	2310
	V_2	55	3,90	95,4	3,00	8,88	2160
	V_3	50	3,80	95,5	3,05	8,98	2240

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SOME ACHIEVEMENTS IN CROP TECHNOLOGIES FOR THE FRUIT TREES OF ROMANIA

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Key words: tree spacing, pruning systems, erosion control

SUMMARY

The paper presents a synthesis of the results on investigations concerning the main technological measures in the Romanian fruit growing during the last 30-35 years. Based on a large number of indicators and parameters 5 important cropping systems were described and characterized as representative for Romania. Data reported emphasized the superiority of the intensive and super-intensive systems versus the classical systems that was replaced starting with years 1974 – 76 by the other two mentioned above. Among the main elements belonging to these cropping systems, the results of investigations on tree spacing crown shapes and pruning systems were presented shortly. Research data on the erosion control systems for sloped lands, the improvement the soil – air – water regime, the groundcover management and fertilizer application systems, the soil compaction state and measures of its remediation for the soils in orchards were also highlighted in this paper. Finally, some general and specific objectives for a perspective research were proposed in order to modernize Romanian fruit growing.

INTRODUCTION

The bad situation of fruit trees in Romania after the World War Two (very small orchard plots, a mixture of more species and trees of various ages in the same plot, a large spacing of trees, a high thickness of tree crows, the scarcity of material basis and crop management system, etc.) imposed as a first objective in orchard technology to find the best measures in order to rebuild the existent orchard and to increase their fruit yield potential. Thus a series of measures was defined and parameterized, like the differentiated regeneration and fruit bearing pruning, soil management and fertilizer application systems, measures aimed to control diseases and pests, etc. By applying such measures the bearing alternation was controlled and the fruit yield and quality were improved.

In the same period, as a consequence of establishing new orchards, especially over the sloped hillsides, investigations were carried out in order to find better ways of controlling erosion, preparing the soil prior to tree planting, improving the soil water regime by application of irrigation and drainage measures.

Starting with years 1962 – 1964, by the investigation theme approached, the scientific research proposed a transition from the extensive traditional fruit growing to an intensive modern and economically efficient one. Both the specialization of some Romanian investigators abroad and the imported biological

material specific in fruit growing (rootstocks, new varieties, etc.) contributed to this orientation.

MATERIALS AND METHODS

The lots of aspects involved and the small of number of pages awarded, only some brief statements were done, regarding the materials and methods used, taking into consideration the role of synthesis this paper.

RESULTS AND DISCUSSIONS

1. Achievements in fruit – growing ecology.

Results obtained from investigations performed during the last 30-35 years with regard to both the complex characterization of the main vegetative factors and their influence on the growth and fruit bearing processes were the basis to define the agricultural land fertility evaluation (notes) for trees and small fruit trees, as well as for choosing the soils for fruit growing (Teaci et. al., 1985; Voiculescu, 1999).

Valuable data on physical properties of soils located in the fruit growing zones and some aspects of their amelioration were presented by Canarache (1986).

Investigations performed during the last 15 – 18 years within the Fruit Growing Ecology laboratory from the Fruit Research Institute Piteşti-Mărăcineni brought a worth contribution for choosing and dimensioning the fruit-tree crop technologies. (Amzăr and Budan, 1991; Budan and Amzăr, 1986)

2. Achievements in the fruit growing phyto-technique.

Investigations performed in Romania following year 1962 were aimed to adjust modern principles on the intensive tree crop system for some fruit species from various countries to the specific conditions of this country. In the some time they tried to develop a series of original investigations in various fields mentioned as follows.

2.1. Crop systems.

Based on the experience accumulated (Coman, 1987; Cepoiu, 1989; Isac, 1992; Ştefan, 1993) 5 crop systems were defined: a) extensive (orchards established before 1962); b) semi-intensive; c) intensive, d) super-intensive and e) the meadow orchard system.

The results of investigations with regard to the characteristics, indexes and parameters defining the first four system mentioned above are presented in table 1. These data showed that in the case of intensive system the net annual income was 5,8 higher than the extensive system. The super-intensive system gave even higher differences (11.7 time higher) versus the extensive one. As a consequence, starting with years 1974 – 76 the extensive fruit – tree crop system was practically abandoned and the new orchards were organized according to the intensive system,

and less frequently after the super-intensive one. For the, more vigorous species and cultivars the semi-intensive crop system was used.

2.2. Tree planting spacing.

Adopting the new cropping systems and the modern sort of material (foreign and local) imposed as the tree planting spacing for all species according to the crop zones. Thus, in case of apple scientific investigations for the intensive and super-intensive cropping systems were carried out, especially for narrow tree – crowns, weak and mid-vigor rootstocks and early cultivars as well. Large scale investigations were also performed in order to decide on the best tree-planting spacing for stone-fruit trees, nut etc.

Table 1

Defining tree cropping systems by indexes and characteristic parameters (after Isac, 1992)

No.	Cropping system	Trees	Crown width	Crown starting level	Period of optimum manage-ment	Produc-tivity h/T	Economical efficiency in thousands of lei (Prices prior to the date of 1.11.1990			
							A	B	C	D
1	Extensive	180	4-7	1.5	30-35	88	23.0	34.6	10	3.5
2	Semi-intensive	400-600	2.5-3.5	1.0	20-25	-	-	-	-	-
3	Intensive	700-1650	1.5-2.0	0.5	28-22	37	66.2	42.0	20	20.3
4	Super-intensive	1800-8000	0.8-1.2	0.3	12-15	24	83.2	29.0	30	41.1

Investments for: A – Orchard establishing; B – Orchard maintenance; C – Average fruit yield (t/ha); D – Net income

Note: In calculating the economical efficiency the following figures were considered: extensive system = 180 trees, intensive system = 830 trees; super-intensive systems = 3500 trees

2.3. Tree-crown shapes.

Investigations developed in this country after 1962 tried to adjust the crown principles for the „oblique palmette" from Italy under the natural conditions and biological material existing in Romania (Isac, 1992). Based on the adjustments achieved the palmette above mentioned fit well for all the apple-tree and pear-tree cultivars, as well as for many varieties of fruit stone species. In addition to the palmette, other tree-crown shapes were approached both for intensive and super-intensive orchards.

2.4. Tree pruning

Adopting new sorts with totally different biological behavior versus the old, local sorts, determined a high research development in tree pruning. The major objective of such investigations was to find out optimal parameters for the balanced ratio between vegetative growth and fruit bearing, differentiated between fruit-tree species and the human action for this process. In this field relevant results were obtained (Isac, 1970; Isac et al, 1998, Parnia, 1999).

2.5. Controlling fruit tree growth and bearing by help of bio-active products.

Some growth bio-regulators concentrations and application periods were found (Alar,85; Etrel; Cultar). Their effect was as a function of tree species, physiological state and age, as well as of the climatic conditions, bio-regulators concentrations and application period (Sabina Stan, 1986).

3. Achievements performed by using soil types, water and nutrients.

3.1. Defining land use systems and erosion control in orchards.

Investigations carried out showed that on sloped hillsides up to 10-12% slope gradient, tree planting parallel to the general direction of contour lines associated with mowed sod strips between tree rows can meet as optimal the erosion control requirements and orchard mechanical works (Moțoc, 1963; Popa, 1962; Iancu, 1967; Neamțu, 1980).

For the some purpose, on steeper lands other works were recommended like land modification to terraces of various types and dimensions. However terrace behavior in time showed that in addition to some limited advantages, the costs of this systems were as much as 14 times higher versus the cropping system using tree rows parallel to control lines. This was also 4 times higher than the cropping system using technological traffic lanes and tree bands described by Isac and Iancu (1982).

3.2. Improving soil physical and chemical properties within soil excess water.

Almost 63% from orchards in Romania were located on heavy-clay soils, natural and man-made compacted and possessing a low soil air and water permeability. In order to improve the soil water regime, some measures on land preparing before tree planting like plowing deep loosening, deep plowing and others after planting (e.g. land modeling in rills and furrows) were carried out (Lazăr et. al., 1987, Iancu, 1997).

3.3. Soil management systems. In the orchards of Romania, located on large areas, two soil management systems were mainly performed between tree rows: cultivated strips and mowed sod strips. For both groundcover management systems on the tree rows, below tree crowns, individually or as strips of various sizes, the soil was kept as bare fallow made through various works, herbicide application or mulch formation. Investigation performed under various soil and climate conditions emphasized the characteristics and effects of these ground cover management systems (Şuta, 1977, Dumitrache et al., 1977, Milițiu, 1993; Iancu et al., 1997).

3.4. Fertilizer application.

Over 80% of orchards in this country were located on medium, weak or very weak fertility soils and 60% of them cover the last two soil categories. Experiments on how to apply fertilizers, meaning their type, rates or application periods, specifically over argilo-illuvial soils, eroded or sandy soils showed a series of aspects like: 1) finding threshold values for the mobile P and K soil content below which P and K fertilizer application had positive effects in fruit growing

(Pasc, 1980); 2) finding of optimum values for the N, P and K leaf contents in apple and plum, in order to use them as nutrition indicators of fruit trees (Pasc, 1975, Iancu and Negoiță, 1996), 3) monitoring the fertilizer application effects on some soil properties and tree growth and fruit bearing (Şuta, 1977, Bunea, 1989, Davidescu and Davidescu, 1992, Iancu, 1996). 4) the effects of various technological sequences on fruit quality and fruit bearing (Gherghi, 1983, Radu, 1985).

3.5. Irrigation application in orchards.

Investigations carried out in the last 30-35 years on irrigation application in fruit growing brought valuable contributions regarding; 1) crop water uptake by using direct methods (balance of soil water storage, lysimeters) in apple, plum, peach, apricot as well as findings on crop coefficients (Ionescu, 1977; Iancu, 1975, Grumeza et al, 1989); 2) the effects of various soil water contents strictly controlled by covering soil with poly-ethylene on tree growth and fruit bearing as well as on some other physiological processes in apple and plum (Iancu, 1977); 3) the effects of irrigation application by classical methods and modern methods on tree growth and fruit bearing.

3.6. Soil compaction in orchards

Soil properties of the orchard soils worsen as effect of the intensive technological traffic used, as a rule, on the some areas. Trying to improve soil physical properties by deep loosening measures in the existing orchards did not show positive results due to the re-compaction shortly after loosening and breaking of a high percent of tree roots (Iancu and Neamțu, 1983).

In order to identify the directions to which the efforts should be oriented in the Romanian fruit growing research we tried to estimate the weights for the main technological sequences participation in performing the in come and the income growth index for an intensive apple orchard (table 2). The highest weight in achieving the income (thousands of lei/ha) was shown by the phyto-sanitary treatments and harvest followed equally by irrigation application and fruit bearing normalization. However, judging the values of the applied technologies after the efficiency index, the first place belonged to the „amortization rate" due to the inclusion of orchard establishing and maintenance costs till the first year of fruit bearing. The main contribution to these costs had the high biological value of the young trees to be planted and the intensive character of orchards.

4. Conclusions and perspectives on crop technology development in fruit growing.

The scientific research development in fruit growing technologies in closely related to a series of aspects on fruit growing development as a whole. The lack of sufficient space does not allow us to present the main directions to modernize and improve the Romanian fruit growing. We will present, however, some important directions on development of the scientific research on crop technologies.

4.1. Objectives with a general character.

- The approach of investigations on fruit growing technologies as a whole or as a multidisciplinary investigations by using some new, modern methods.

- The use and capitalization of the genetic engineering in order to possess new biological forms capable to: utilize more efficiently the sun light, reduce crop transpiration, increase dry matter quantity improve soil nutrients content, and create cultivars more resistant to stress factors, diseases and pests.

Table 2

Efficiency of resource utilization on technological sequence in an intensive apple – tree orchard

Technological sequence	Costs		Participation rate for income performance		Efficiency index
	(thousands / ha)	(% of total)	(thousands / ha)	(% of total)	col.3 / col. 1
Soil management	3 850	7	5 400	6	1.40
Soil fertilizer application	6 800	12	10 600	12	1.56
Irrigation application	5 000	9	9 000	10	1.80
Normalization of fruit bearing by pruning and bio-regulator application	6 000	11	10 700	12	1.78
Phyto-sanitary treatments	20 000	36	30 000	34	1.50
Harvest	9 000	16	12 000	14	1.33
Amortization rate	5 000	9	10 000	12	200
Total	55 650	100	87 700	100	

- Creating new planting systems and improving the old ones as well as the cropping technologies and the equipment oriented to the „precision agriculture" in fruit growing aimed to optimize the relationships between the environment and tree physiology in order to improve crop parameters.

- Development of the modeling concept in fruit growing.

4.2. Objective with a specific character.

- The higher increase in tree growth and fruit bearing to identify their sources of variation and methods of manipulation.

- The knowledge of the soil water stress quantified by morphological and physiological indicators for all the tree growth and fruit bearing crop phases.

- The knowledge of the soil water stress effects on the fruit chemical composition and quality that should be accepted in practice.

- The long-term knowledge of the ground cover management effects on soil fertility, organic matter content, soil workability, erosion control etc.

- The increase in herbicide application efficiency and decrease of its impact on the environmental pollution and human health in fruit growing.

- The increase in knowledge of the mechanisms through which the bio-regulators influence the tree growth and fruit bearing in order to obtain a higher fruit yield of a better quality and more efficiently economic.

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METHODS AND TECHNIQUES FROM MANAGEMENT OF THE HORTICOLS COMPANYS

VICTORIA MANEA, ELENA STOIAN, ALINA MĂRCUȚĂ

Key words: instruments, assessment, working capital, liquidity, the debt ratio, the output of the capital, financial results, company.

SUMMARY

Decision making inside a company involve the improvement of the previously financial results, to be used in planning for future activities.

The instruments that a company can use are the accounting documents (the assessment, the income statement) and the budgets.

The assessment gives a situation of the company to a given date: it is a photograph of the company on this date and the income statement measures flows of the company during a given period. All these instruments help the manager for finds the best solutions for their firm.

The assessment

The assessment gives a situation of the company to a given date: it is a photograph of the company on this date. The assessment is fed by the countable recording of all flows of the company and represents the accounts of situation. It breaks up into two great parts: credit and liability.

The credit of the assessment is the image of what the company has. The assets are presented by order of increasing liquidity. The liability of the assessment is the image of what the company owes. The elements of the liability are presented by order of increasing current liability. The liability itself consists of two large components: own capital stocks and debts.

At these large stations of the assessment accounts of regularizations in the active and the reserve accounts are added in the passive.

The total of the accounts of credit is always equal on the whole of the accounts of liability.

The production is an indicator which will be preferred to analyze the service firms or the companies industrial.

It makes it possible to appreciate the amount that a company draws from its activity before deduction of the expenses inherent in manufacture and marketing.

The production corresponds to the amount of the sales (produced and services) of the company, modulated by the variation of stocks (increase or reduction) when they exist and increased immobilized production (work completed by the company for itself).

The credits of the assessment correspond to the assets which the company has. They are of two natures: permanent assets (or fixed assets) and current assets.

The fixed assets are elements which are intended to be used in a durable way for the activity of the company. They are not consumed with the first use and are intended to last during several years.

The fixed assets are born from the investments intended to increase the production or the productivity of the company, to replace the production equipment weakening, to improve the safety or working conditions, to increase the value or the lifespan of a good.

The stockholders' equity is partly high liability of the assessment. They constitute stable resources of the company and comptablement determine what the company is worth.

The stockholders' equity is consisted of the resources brought by the associates or the shareholders (authorized capital) and of the profits generated by the company at the time of its activity (reserves and result).

The reserves gather the benefit of the former years which were not distributed to associate or shareholders to be reinvested in the company.

The carry forward again is an office plurality of the benefit of the former year’s not distributed and nonaffected in reserves.

That the result of the exercise is profit (benefit) or overdrawn (loss), it will be carried in the passive of the assessment in the stockholders' equity.

The provisions play a key role in the establishment of the assessment. Their over-estimate to reduce a too significant benefit or their undervaluation to inflate a too weak result can mask certain realities of the company and transform the aspect of the assessment.

The assessment divides the debts into two categories:

- the financial debts are obtained from the bond market or from the credit institutions
- debts resulting from the business activity, representing its engagements towards the suppliers (after obtaining terms of payment), the personnel, the tax department, the social welfare...

A financial analysis of the debts makes it possible to observe them according to their degree of current liability and consequently to distinguish the debts with length and medium term (more than one year) and the current liabilities. An additional state of the assessment "State of the debts" details the debts of the company according to their duration.

The debts with length and medium term approach the stockholders' equity of the company and constitute the invested capital.

The current liabilities form the resources in the short run intended to finance short-term employment (assets at less than one year).

The income statement

The income statement measures flows of the company during a given period: it is a film of the activity of the company. The production of the income statement is obligatory at the end of the each financial year. The establishment of this document makes it possible to release the result of the company, loss or benefit, and thus to measure the possible enrichment of associated or shareholders.

The income statement is fed by the countable recording of flow generating an increase or a reduction in richness of the company. In other words, all that is generating of receipt is entered in "products" and what the company consumes constitutes of the "loads". The products and the loads are organized in the income statement according to principal functions' of the company. Thus, we distinguish from the products and running costs, from the products and expenses financial and the exceptional products and loads.

Working capital

The working capital corresponds to the surplus of invested capital on the permanent assets. The invested capital is the stable resources of the company. These elements of the liability, in top of assessment, are consisted of the stockholders' equity and the long-term debts (at more than one year).

It is logical that these durable resources are used to finance the cycle of investment (assets permanent at more than one year). The working capital is thus supposed to have a value close to zero.

However, it is preferable that the working capital is positive because it then constitutes a mattress of safety for the company. Indeed, this surplus makes it possible to consolidate the cycle of exploitation and to preserve a balance even in the event of failing customers or of depreciated stocks. It thus reinforces the confidence of the banks and lenders short-term.

The Requirement in working capital

This concept is not to confuse with the working capital. The requirement in working capital results from the cycle of exploitation, together of current operations related to the activity of the company: provisioning, transformation, and sale. The shift which exists between the committed expenditure and the receipts generated by the sales generates a need for financing. The times suppliers remain generally insufficient to compensate for the renewal of stocks and the credits customers.

It is this need for financing which one calls requirement in working capital. It is determined by calculation: **Stocks + Credits customers - Current liabilities (suppliers, tax and social)**

This requirement in working capital can entirely or partly be compensated by the surplus of the invested capital (positive working capital). The possible remainder of the requirement in working capital will have to be financed by bank credits of treasury.

Liquidity of the Company

The working capital ratio compares the short-term credit with the short-term liability, like the requirement in working capital does it, and thus makes it possible to measure the solvency of the short-term company.

The Debt ratio

This ratio measures the share which all the debts compared to the total assets of the company represent (or on the whole of its resources since the credit of the assessment is equal in the passive). The more this ratio is raised, the more the company is involved in debt. It is estimated that a ratio with more than 80 % means that the company is heavily in debt.

The opposite reading of this ratio, is Total credits/Total debts, measures the autonomy of the company.

However, there is necessary to remain careful on the real valorization of the credits. Indeed, the credibility check of the assets makes it possible to possibly correct their book value to bring them closer their economic value. Thus, for example, an over-estimated patrimonial valorization would result in overestimating the solvency of the company.

The Output of the Capital

The shareholders who gave their confidence to the company while bringing capital to him are inclined to observe the output of this capital, i.e. to measure the benefit generated compared to their investment.

The ratio of financial profitability is equal to:

Net income/Stockholders' equity

Commercial profitability is determined by the pricing policy, the rotation of the credits is related to the volume of activity and the lever of debt is associated the financial policy of the company.

One sees as well as a company can just as easily be profitable thanks to a large volume of businesses to weak commercial margin (great distribution) or to a lower volume of businesses with products with strong margin (luxury).

The lever of debt is high if the debt of the company is significant. It presents a multiplicative factor interesting for the shareholders when the result benefits, but its incidence will be dangerous in the case of a loss.

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MODALITIES OF FINANCING AGRICULTURE ENTERPRISE

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Key words: business, company, resources, horticulture, leasing, the stockholders' equity, the financial result, credit.

SUMMARY

The successful business developing of the company with horticulture profile involves the existence of financial resources. If, at the beginning of a business, the basic resource for finance are brought in by the investor, later during the production process the necessity for new resources appears, which will contribute to achieve economical growth, financial balance and also the growth of liquidity of the company. The financial sources can be private or from outside sources.

For the horticulture financing of company one uses financial sources private (the stockholders' equity, the financial result) and outside resources (leasing, credit).

The Stockholders' equity

The stockholders' equity is partly high liability of the assessment. They constitute stable resources of the company and comptablement determine what the company is worth.

The stockholders' equity is consisted of the resources brought by the associates or the shareholders (authorized capital) and of the profits generated by the company at the time of its activity (reserves and result).

The reserves gather the benefit of the former years which were not distributed to associate or shareholders to be reinvested in the company.

The carry forward again is an office plurality of the benefit of the former years not distributed and nonaffected in reserves.

That the result of the exercise is profit (benefit) or overdrawn (loss), it will be carried in the passive of the assessment in the stockholders' equity.

The financial result

The financial result is generated by the financial activity of the company. It is obtained by the difference of the financial products (returned of the participations in other companies, income of the placements of treasury...) and financial expenses (interests on loans, losses on transactions on foreign currency...).

The result running before tax will be consequently equal to the turnover decreased by the financial result (if the financial expenses are higher than the products financial) or increased financial result (in the contrary case).

The result running before tax is an indicator of management of great importance. It indeed makes it possible to modulate the fruit of the principal activity of the company with the financial impact which its debt can cause.

The net income is differently called "the benefit" when this one is positive or "the loss" when the net income is negative.

Before obtaining the net income, there remain certain components to be examined.

It is advisable to recall that the result running before taxes is determined by products and loads related to the current exploitation of the company (industrial, commercial and financial).

But certain elements known as exceptional can play a part during the exercise. They are exceptional products (appreciation and countable net amount of the sold fixed assets, unexpected products relating to the exploitation of the former years...) and exceptional loads (sinister, penal taxes or penal, credits become irrecoverable, countable net amount of the fixed assets put at the reject or flights, depreciation of the yielded fixed assets...). The difference between exceptional products and loads determines the exceptional result.

The sum of the result running before tax (turnover + financial result) and of the exceptional result determines the taxable income. In conclusion, the net income is obtained by the sum of these partial results (current result + exceptional result) decreased by the amount of the income tax.

The leasing

The concept of financial leasing as a source of term finance, arose in the 1960's, though leasing itself has existed for centuries. Financial leasing, as it is defined today, developed over a significant period of time passing through different stages of evolution, beginning with simple rental arrangements.

Leasing is a complex of property relations that arise when property (the asset to be leased) is acquired and is subsequently assigned for temporary use. Under a financial lease, one party (lessee) can use property belonging to a leasing company (lessor) purchased on the lessee's order, in return for lease payments. The most important part of this agreement is that the property ownership (sustained by the leasing company) is separated from the economic use of the asset (in the lessor's possession). The leasing company is concerned with the lessee's ability to generate cash flow sufficient to cover leasing fees, and not with his credit standing, assets or capital. This kind of agreement is especially convenient for new, small or medium-sized enterprises, which usually do not have a credit history. The leasing property serves as collateral (guarantee) in the deal.

Leasing is now an important source of medium term finance in many countries. Different projects illustrate the role of leasing in promoting new capital

investment whether it is to provide essential tools for small businesses or to finance orbiting satellite systems.

Leasing is profitable for all parties of a lease transaction. The leasing mechanism allows the lessee to allocate scarce financial resources to new capital investments, as the lessor is concerned with projected cash flow during the period of equipment lease to be able to receive lease payments, rather than with the volume of assets or the lessee's capital or credit history. The leasing mechanism channels investment into the capital assets which allows the enterprise to start production and generate sufficient income to cover lease payments.

By channeling funds directly into new equipment, leasing companies avoid the problem faced by banks and other financial institutions, of funds being diverted by borrowers for non priority uses.

From the supplier's point of view, leasing helps to sell his product. On the whole, development of the leasing sector has contributed to economic development in a number of ways:

- **Leasing creates additional competition amongst sources of finance.** Leasing has lowered the cost and increased the supply of finance, particularly fixed rate finance for investment. In developing countries, leasing has frequently been able to fill a gap in the finance market place and has enabled firms to rely less on overdraft facilities.
- **Leasing increases the volume of capital investments.** To a certain degree the growth of the leasing sector can be accounted for by the fact that leasing has gradually become a substitute for other types of financing. But mostly it can be explained by the fact that leasing is an additional form of long-term financing.
- **Leasing functions as a sales aid.** In addition to supporting the sales campaigns of equipment suppliers, leasing encourages the domestic manufacture of machinery by introducing vendor leasing schemes.
- **Leasing supports industrial modernization and small business.** Leasing companies play an important role in providing financing to small and medium enterprises, considering first and foremost the expected cash flow, rather than their credit worthiness.
- **Leasing helps in the implementation of industrial and fiscal policies.** In addition to mobilizing liquid assets in building a company's capital, leasing has proved to be an important stabilizing factor at the time of economic recession, as leasing considerably increases the efficiency of privileged taxation on capital investments.

The credit

The credit is a mechanism by which a debtor obtains an amount of money of a creditor in exchange of the promise of a payment differed from the counterpart, raised of an interest.

The credit institutions are banks or other financial organizations. Some are specialized in the lending to the private individuals or the companies. All the deposit banks propose appropriations in addition, especially consumer credits, mainly in the short run, but also in the medium and long term.

Certain establishments of the banking environment with special statute offer appropriations in particular sectors: agricultural credit, building and loan association, hotel credit or maritime credit.

Lastly, the granting of appropriations constitutes the single vocation of certain specialized financial establishments which do not belong to the banking structure. Those cannot receive deposits and thus function with their own resources and those which are granted to them by the banks. They are in particular the establishments of financing of the hire-purchases, of the institutions credit real, the establishments of leasing.

The term of the credit can be short, average or long. 1. The short-term credit is granted for one term lower than two years, generally with an aim of carrying out a precise operation. It can take the form of simple overdraft facilities or an overdraft authorized on the currant account of the recipient, or of a loan or a transfer of credit by the means of operations of discount. 2. The medium-term credit is one duration maximum from five to seven years. 3. The long-term credit, from one term higher than ten years, is intended to satisfy permanent needs or to finance fixed assets which diminish over a long period. It is granted only on stable resources and against mortgage securities, guarantees and hypothecations.

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BUSINESS PLAN OF THE FIRM

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Key words: business plan, company, financial data, supporting documents, product, service, management, marketing

SUMMARY

The business plan is a written document that clearly defines the goals of a business and outlines the methods for achieving them. It serves as your company's roadmap. The role a business plan is: acts as the management and financial blueprint for a business start-up and profitable operation of a business venture; explains specifically how a business will function and details how a business will be capitalized, managed, and marketed.

There are many reasons why a business plan should be prepared. Each is sufficient by itself for why one must go through the exercise of preparing the actual business plan. Regardless of the specific reason, the underlying goal of preparing a business plan is to insure the success of the business. Here are the main reasons why a business plan should be prepared:

- Provides you with the road map that you need in order to run your business. It allows you to make detours, change directions, and alter the pace that you set in starting or running the business.
- To assist in financing. Whether one is starting up a small business or is an entrepreneur, banks and financial institutions want to see that you know where you are, where you are going, and how you are going to get there.
- The plan will tell you how much money you need, when you will need it, and how you are going to get it. In other words, how you will do your financing?
- Helps you to clearly think through what type of business you are starting, and allows you to consider every aspect of that business.
- Raises the questions that you need to have answered in order to succeed in your business.
- Establishes a system of checks and balances for your business so that you avoid mistakes.
- Sets up bench marks to keep your business under control.
- Helps you develop the competitive spirit to make you keenly prepared and ready to operate.
- Makes you think through the entire business process so that you do not open the business blindly or lack vital information in opening and maintaining your business.

- Forces you to analyze competition.

Elements of a Business Plan: 1. Cover sheet, 2. Executive Summary, 3.Table of contents

A. The Business: Description of business, Marketing, Competition, Operating procedures, Personnel, Financial data.

B. Financial Data: Loan applications, Capital equipment and supply list, Balance sheet, Break-even analysis, Pro-Forma income projections (profit & loss statements), Pro-forma cash flow

C. Supporting Documents: Personal financial statement (all banks have these forms), Copy of proposed lease or purchase agreement for building space, Copy of licenses and other legal documents, Copy of resumes of all principals, Copies of letters of intent from suppliers, etc.

The Business Plan - What It Includes

What goes in a business plan? This is an excellent question to ask. And, one that many new and potential small business owners should ask, but oftentimes don't ask. The body of the business plan can be divided into four distinct sections:

1) the description of the business, 2) the marketing plan, 3) the management plan, 4) the financial management plan

Addenda to the business plan should include the executive summary, supporting documents and financial projections.

1. Description of the business

In this section, provide a detailed description of your business. An excellent question to ask yourself is: "What business am I in?" In answering this question include your products, market and services as well as a thorough description of what makes your business unique. Remember, however, that as you develop your business plan, you may have to modify or revise your initial questions.

The business description section is divided into three primary sections. Section 1 actually describes your business, Section 2 the product or service you will be offering and Section 3 the location of your business, and why this location is desirable.

2.The Marketing Plan

Marketing plays a vital role in successful business ventures. How well you market your business, along with a few other considerations, will ultimately determine your degree of success or failure. The key element of a successful marketing plan is to know your customers -- their likes, dislikes, expectations. By identifying these factors, you can develop a marketing strategy that will allow you to arouse and fulfill their needs.

Identify your customers by their age, sex, income/educational level and residence. At first, target only those customers who are more likely to purchase your product or service. As your customer base expands, you may need to consider modifying the marketing plan to include other customers.

Develop a marketing plan by answering these questions. Potential franchise owners will have to use the marketing strategy the franchisor has developed; however, it should be included in your business plan and contain answers to the questions outlined below.

- Who are your customers? Define your target market(s).Are your markets growing? steady? declining? Is your franchise market share growing? steady? declining? Has your franchisor segmented your markets? Are your markets large enough to expand, depending on franchisor restrictions? How will you attract, hold, increase your market share? Will the franchisor provide assistance in this area? Based on the franchisor's strategy, how will you promote your sales? What pricing strategy, if any, has the franchisor devised?

3. The Management Plan

Managing a business, requires more than just the desire to be your own boss. It demands dedication, persistence, the ability to make decisions and the ability to manage both employees and finances. Your management plan, along with your marketing and financial management plans, sets the foundation for and facilitates the success of your business.

Like plants and equipment, people are resources -- they are the most valuable asset a business has. You will soon discover that employees and staff will play an important role in the total operation of your business. Consequently, it's imperative that you know what skills you possess and those you lack since you will have to hire personnel to supply the skills that you lack. Additionally, it is imperative that you know how to manage and treat your employees. Make them a part of the team. Keep them informed of, and get their feedback regarding, changes. Employees oftentimes have excellent ideas that can lead to new market areas, innovations to existing products or services or new product lines or services which can improve your overall competitiveness.

Your management plan should answer questions such as:

- How does your background/business experience help you in this business?
- What are your weaknesses and how can you compensate for them? Who will be on the management team? What are their strengths/weaknesses?
- What are their duties? Are these duties clearly defined? What are your current personnel needs? What are your plans for hiring and training personnel? What salaries, benefits, vacations, holidays will you offer? What benefits, if any, can you afford at this point?

4. The Financial Management Plan

Sound financial management is one of the best ways for your business to remain profitable and solvent. How well you manage the finances of your business is the cornerstone of every successful business venture. Each year thousands of potentially successful businesses fail because of poor financial management. As a

business owner, you will need to identify and implement policies that will lead to and ensure that you will meet your financial obligations.

To effectively manage your finances, plan a sound, realistic budget by determining the actual amount of money needed to open your business (start-up costs) and the amount needed to keep it open (operating costs). The first step to building a sound financial plan is to devise a start-up budget. Your start-up budget will usually include such one-time-only costs as major equipment, utility deposits, down payments, etc.

The start-up budget should allow for these expenses.

Start-up Budget: personnel (costs prior to opening), legal/professional fees, occupancy, equipment, supplies, salaries/wages, income, utilities, payroll expenses, licenses/permits, insurance, advertising/promotions, accounting,

An operating budget is prepared when you are actually ready to open for business. The operating budget will reflect your priorities in terms of how your spend your money, the expenses you will incur and how you will meet those expenses (income). Your operating budget also should include money to cover the first three to six months of operation. It should allow for the following expenses.

Operating Budget: personnel, rent, loan payments, legal/accounting supplies, salaries/wages, dues/subscriptions/fees, repairs/maintenance, insurance, advertising/promotions, depreciation, payroll expenses, taxes, miscellaneous, expenses.

The financial section of your business plan should include any loan applications you've filed, a capital equipment and supply list, balance sheet, break-even analysis, pro-forma income projections (profit and loss statement) and pro-forma cash flow. The income statement and cash flow projections should include a three-year summary, detail by month for the first year, and detail by quarter for the second and third years.

This is the elements which must include in the lime pit business and which can ensures its success.

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SCIENTIFIC RESEARCH RESULTS IN FRUIT GROWING AND VITICULTURE IN WESTERN ROMANIA

NEDELEA G., DRĂGĂNESCU E., DOBREI A., MIHUŢ E.

Western Romania in general, and the region of Banat in particular, is characterized by a softer thermal regime and by a satisfactory rainfall regime that ensure very favorable conditions for growing and fruiting in most species, including thermo-philous ones (fig-tree, almond-tree, peach-tree, apricot-tree, sweet chestnut-tree, etc.), which made people call it 'the Romanian California'. Western Romania people developed a prosperous, profitable agriculture on average family-private exploitations. Between the wars, Banat's agriculture (the most prosperous region in Western Romania), as Professor Ionescu-Siseşti said after a visit there, equaled German or France agriculture:

"It is in the region of Banat that I saw modern intensive exploitations as I had seen in Western Europe. What characterizes the estates I have seen is their almost industrial organization. Capital investments raised the exploitations to a high level of intensity. Agriculture is characterized by the same intensive feature.

The farmer in the Banat's Plain is wealthy and well to do. In the village of Cenad I saw tens of farms whose farmers owned 10-15 ha, big houses with numerous rooms, systematic stables, sheds, barns, breed cows, harvesting machines, cultivators, sowing machines, as North American farmers do." (Ionescu Siseşti, "Agricultura Banatului, in Viaţa Agricolă, nr. 15/1921).

Scientific research in Banat started has been carried out at the stations in Cenad, Ceala (District of Arad) and, after World War II, at the stations in Caransebeş, Lipova, Miniş, Timişoara (meadows), Lovrin and, sporadically, in some ex-State's Agricultural Farms n Honorici, Recaş, Buziaş, etc.

Without minimising researches carried out in these important stations, we shall say that the most fruitful, the most serious and the most continuous (over 60 years) researches have been carried out at the former Agronomic Institute in Timişoara, the University of Agricultural Sciences and Veterinary Medicine of the Banat in Timişoara.

Research in the field of horticulture benefited from the contribution of a series of personalities such as Gheorghe Constantinescu, a Member of the Romanian Academy, Professor Vasile Sonea, Professor Ienică Butescu, Professors H. Butnaru, Gh. Predescu, I. Mihacea, and the researchers N. Mutaşcu, I. Mihalca, Gh. Calistru, P. Popa, etc. Nowadays, research in horticulture is being carried out

by Professors Emil Drăgănescu, V. Berar, A. Horgoş, Maria Bălă, A. Dobrei, E. Mihuţ, and by a series of assistants and candidates for a doctor's degree.

In the field of fruit growing, researches have focussed on a wide range of aspects among which: biology of growth and fructification; improving the cultivars; improving culture technology; the study of local germ-plasma in apple-tree, pear-tree, plum-tree and especially in sweet chestnut-tree; the influence of unfavorable weather conditions on floral organs, the area being frequently affected by late frosts.

In the field of growth and fructification biology, we have studied the metabolism of differentiation in flowering buds in pear-tree (Drăgănescu, 1969-1975), with a focus on sugar, protein, total and essential amino-acids dynamics, on cell-juice concentration, on respiratory ratio, on the dynamics of N, P, K as pre-emergent and during fructification bud differentiation.

On the same line of research, Gh. Predescu and E. Drăgănescu (1970-1982) have been carrying out chemical analyses of fructification branches in apple-tree, pear-tree and cherry-tree in relative rest and during flowering and fructification pheno-phases, analyses that resulted in an interesting dynamics: Drăgănescu (1070-1972) showed that vegetative buds have, while opening (when meristems are growing), a more intense respiration than flowers and comparable to that of seeds while germinating.

Species improvement has been carried out in Timişoara, Caransebeş, and partially in Lipova.

In Timişoara, benefiting from the support of dr. V. Cociu, we have worked on peach-tree (peaches, nectarines, and …,), on apricot-tree and partially on morello cherry-tree and on sweet chestnut-tree.

In Caransebeş, they have made numerous competitive cultures of hybrids, valuable cultivars and clones in apple-tree, pear-tree, plum tree, cherry-tree and morello cherry-tree (Mutascu & Băncilă).

The Didactic Station in Timişoara has carried out four experiments on peach-tree (new cultivars of nectarines), the Station being a pioneer in promoting nectarines in Banat (Drăgănescu & Predescu).

The most valuable proved to be the Romamer 2, Independence, HNA, HNB, Regina 280-2-B, ARK 90, NJN 55, etc.

New cultivars of cherry-tree such as Cerna, Rubin, Van, Bing, Stella, etc. have come to enrich the older range of the Hedelfinger, Mari timpurii, Germerdorfer cultivars.

Drăgănescu and Predescu (1970-1980) have emphasised in both morello cherry-tree and plum tree a smaller plasticity in cultivars but an ecological plasticity due to the great number of cultivars and local biotypes. Thus, the Ilva and Northstar cultivars fit the Caransebeş area, but they are unsatisfying in Timişoara. The Pitic cultivar fits Iaşi but it is completely unsatisfying in Timişoara.

Partial assortment researches have been carried out in apple-tree, pear-tree, and plum tree and particularly in sweet chestnut-tree, with the introduction of grafted cultivars such as Sibisel 44, Precocious Sibisel, Geoagiu 65, Pestişani, Victoria and Suşiţa, cultivars that start fruiting at the age of 5-7.

As far as technological improvement is concerned, we have worked on introducing new crown systems (palmetto, thin spin, Pillar, Palspindelbuch) and new row grouping systems in orchards (technological alley plantations). We have partially experimented differential fertilizing (green fertilizers in particular) and dripping irrigation (starting with 1994). The Department, together with Drăgănescu and Predescu has been the promoters of introducing long-cut in peach-tree with the establishment of differential behavior to this cut in relation to fertile knots position.

Local germ-plasma is an important source of genes in improving and not only. Due to its favorable climate and to the connections Banat has with Western European countries, we have developed numerous local types that can be used as such or in genetic combinations. We (Drăgănescu, Mihuţ and Blidariu) have identified valuable local cultivars of apple-tree and pear-tree (the Haţeg, Caransebeş and Târgu Jiu basins), plum tree (the Bozovici and Ezeriş basins), sweet chestnut-tree (the Timişoara, Lugoj-Chizătău, Mehadia-Globul rău basins).

Western Romania also benefits from a very mild climate, the end of January and the beginning of February being warm. That is why thermo-philous species (peach-tree, apricot-tree, but also cherry-tree and morello cherry-tree) end their deep rest, the buds swallow and late frosts at the end of April affect flowers and young fruits in particular.

Researches carried out in the years 1978, 1982 and 2002 (Predescu & Drăgănescu) emphasized significant differences between cultivars. We have shown that numerous cultivars of peach-tree, morello cherry-tree and even cherry tree have a higher resistance than that mentioned in literature.

In the field of viticulture, the main aspects under study have been improving assortments, improving culture technology, establishing un-protected vine culture areas, establishing controlled origin cultivars and improving vilification chains.

Researches carried out by Gh. Constantinescu, I. Mihacea, Gh. Predescu, and N. Dragomir focused on the study of Banat's assortment (Creaţă, Majarcă, Steischiller) whose valuable clones have been promoted for grafting.

Under the guidance of Gh. Constantinescu, two doctoral thesis subjects have been established: the study of ecological relationships in wine cultivars in the conditions of Banat, completed by Gh. Calistru, and the study of ecological relationships of table cultivars in the conditions of Banat, by I. Mihacea.

These subjects resulted in establishing the proper assortment for the proper viticulture centre.

As far as culture technology improvement is concerned, we have insisted on introducing semi-high and high forms and on establishing cultivars fit to the

latter. We have also studied frost-resistant cultivars in order to figure out unprotected culture areas.

As a consequence, protected culture has totally been given up, low areas and hallows forms being out of question in viticulture.

In order to increase profitability, we have established fit areas for high quality viticulture of the DOC and DOCC categories.

I. Mihacea and his collaborators have also established, through physical-mechanical and chemical analyses the proper time for harvesting wine cultivars on viticulture centres.

A. Dobrei has been working on improving the fertilizing system of table cultivars in the conditions of the viticulture centre in Recaş.

Both researches in the field of fruit growing and researches in the field of viticulture have been applied in private and/or mixed capital, state or privately-owned fruit growing and in viticulture organizations.

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THE DIVERSIFICATION OF THE SORTS RANGE OF PROCESSED HORTICULTURAL PRODUCTS WITH SPECIAL DESTINATION

MIOARA NEGOITA, LUMINIA CATANA, MONICA DINCA, MIRUNA BIBICU

Key words: fortifying products, products for diabetes

SUMMARY

The current paper presents the result of research in the field of fruit and vegetables processing in order to obtain new products, with special destinations: products for diabetic patients, fortifying products.

INTRODUCTION

The body's energetic and trophic needs are realized only trough balanced diet. This implies not only the exact understanding of the body's energetic demands reported to age and activity, but also the calories and nutritive substances content of the consumed food products.

Due to the complex biochemical composition (simple glucides, easily absorbed mineral elements, vitamins etc), vegetables and fruits are important sources of essential nutrients. Thus, fruit and vegetables are raw materials in creating new sorts that can ensure diversified nourishment for the ones that suffer from different affections (diabetes, overweight, anemia etc).

MATERIALS AND METHODS

The experiments done in the Institute's laboratories, the following raw materials have been used: strawberries, sour cherries, black currant, tomatoes, apricots, peaches, spinach, quinces, tomato paste, carrots; as auxiliary materials: sugar, sweeteners, bee honey, spices, raising, wild rose flour, ascorbic acid, etc; 200 ml, 720 ml, 370 ml bottle caps.

Several experimental sorts have been realized in order to obtain hipocaloric compotes and diabetic's destined sauce, having as variable factor fruit species, the sweetener type, raw materials optimum sorts.

The product for diabetic and overweight patients was achieved in similar technologic conditions as the sugar-containing products, respecting the same quality standards for the used raw materials.

The sweetener dosage used by unit was established by the sweetened degree of the products and set correspond to the sugar quantity mentioned in the technological manufacturing instructions of sugar products.

THE RESULTS

Using the lab analysis, the recipient and technologies were established for the following products:

a) fruit and vegetables processed products for the diabetics and overweight patients:
   - hypocaloric compotes
   - aromatic tomato sauce for the diabetic patients

b) fruit and vegetables fortifying products for the persons with nutritional deficiencies:
   - peach cream, with iron & vitamin C
   - quince, raising and wild rose paste
   - carrot jam, with honey and queen-bee milk

The achieved products destined to the diabetics and overweight patients, were clinically tested at:

The N. Paulescu Metabolism Diseases Clinic;

Table 2

Quality index of diabetics and overweight patients

Specification	UM	Hypocaloric compote	Aromatic tomato sauce	Cooked spinach for diabetics
Dry soluble substance	%	5-8	10	6
Soluble glucides	%	4-7	7,3	2,58
Proteins	%	0,3-0,4	1,46	3,20
Lipids	%	0,15-0,25	0,3	3,90
Sodium chloride	%	-	0,90	1
Total acidity	%, ac.citric	-	0,67	-
Energy value	Kcal/100g	16-29	37,8	58,22

The Clinical Emergency Children's Hospital (Marie Curie) – the diabetology section.

The fortifying products were tested inside the Alfred Russescu Institute for the protection of the Mother and Child in Bucharest. The tested sorts were received with great pleasure by the patients and appreciated organoleptically.

The observations made by testing specialist stated at:

- the products may be used in the daily ratio of diabetic patients, without causing increases of glicemic value;
- the products are natural sources of vitamin C and iron.

In order to establish nutritional efficiency, the optimum sort realized products were analyzed organoleptically and biochemical.

The results are presented in tables 1 and 2.

Table 2

Quality index of fortifying products

Specification	UM	Peach cream with iron & vitamin C	Quince raising and wild rose paste	Carrot with honey and queen bee milk
Dry soluble substance	%	25	67,8	72
Soluble glucides	%	23,50	65,15	67,35
Proteins	%	0,50	0,89	0,83
Lipids	%	-	0,50	0,70
Total acidity	%, malic ac.	0,73	0,70	0,82
β-carotene	mg/100g	0,30	-	6,85
Potassium	mg/100g	235,60	307,80	140,85
Calcium	mg/100g	21,50	35,08	19,85
Iron	mg/100g	5,26	3	0,49
Magnesium	mg/100g	9,25	15,35	8,5
Energy value	Kcal/100g	98,40	275,31	304,08

Fig.1 and fig 2 present the concentrations of K acesulpham and sucralosis.
Fig. 3 present energy value compotes achieved with sweetener and sugar.

CONCLUSIONS

1. Using sweeteners (K acesulphame, sucralosis) to obtain new products is thermally stable, without remanence of taste.
2. The glucide content in products obtained to diabetic and overweight patients was of 10g/100g, and the energy value was of 60 cal/100g.
3. The achieved fortifying products harmoniously combine the natural nutritional principles of fruit and vegetables.
4. The fortifying products are destinated to the persons with nutritional deficiencies (children, pregnant women, old people etc).

Fig.1. The sucralose solution concentration used in preparing hipocaloric compote

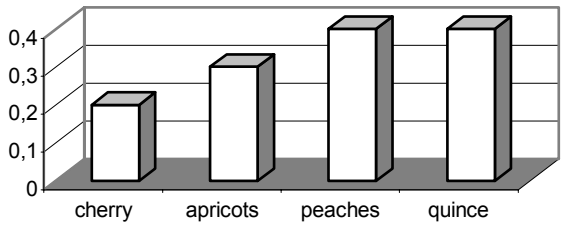


Fig.2. The concentrations of the acesulphame solution used in preparing hypocalorc compotes

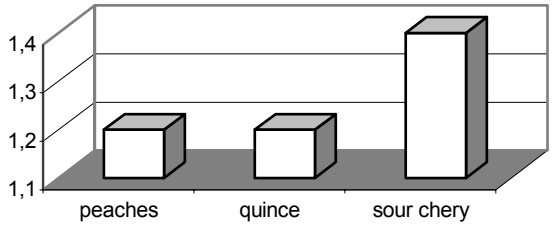
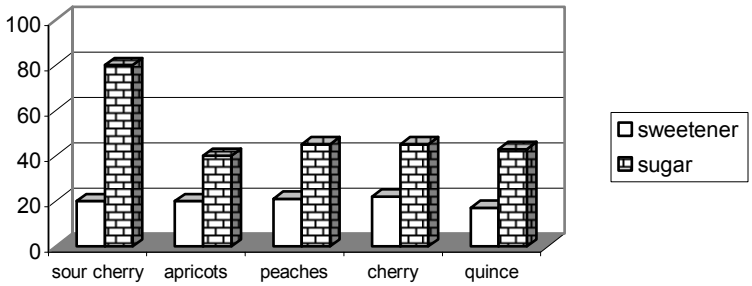


Fig.3. Energy value of compote



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THE WALNUT CNPC-02 THE VALUE BIOTIP FOR THE SEMIINTENSIVE ORCHARD

PĂUN C., CEPOIU N., APOSTOL DRAGOŞ, CEPOIU ANDREEA LORETA

Key words: orchard, walnut,

SUMMARY

In the countries with old tradition in fruits growth the walnut is a very important, concerning the surface and the varieties. The walnut is one from the little species with a great hybrid diversities obtained from natural selection.

The great surface with walnut are meeting in China, S.U.A., France, Italy, Germany etc. where was created the special system for mechanization the technology. Its one from the growth with the higher mechanization degree and the low consume of the work force. The mains works of the soil, the protection, the irrigation, the harvesting and fruits conditioning are effectuated mechanic in totality.

MATERIAL S AND METHODS

The research was initiated in Fruits Growing Department with contribution of the Prof. Dr. Cepoiu Nicolae. The program was started with prospecting the main region of country for detected the important walnut locals' forms. Was selected byotip with values features from alignment orchard, from family garden and naturals hybrids.

The fruit of this biotype was seedling in the experimental field of the Pomiculture Department from obtained the new hybrids. For stored the main biological features were harvesting the grafting branch, engrafted in the franc rootstocks from *Juglans nigra.* The engrafting was effectuated in 1996 with yearly branch.

RESULTS AND DISCUSSIONS

The researches started with phenological observations: initializing of the vegetation, the blooming started, the fecundating capacity of the flower, the fruits quality. Was effectuated biometrics measured of the trunk and the crown (table 1). From material initial was conserved for researches 11 representatives' biotype.

Table 1

The morphological features of the walnut byotip

The selection zone	Biotype	Trunk diameter (cm)	High of the trunk (m)	High of the tree (m)
Dâmbovița	CNPC 24	36	1,7	7,4
	CNPC 63	41	1,8	5,3
	CNPC 36	20	1,6	6,1
Prahova	CNPC 15	34	1,4	6,0
	CNPC 02	23	1,2	4,8
	CNPC 14	43	1,8	5,7
	CNPC 21	38	1,5	4,8
Buzău	CNPC 58	40	1,7	6,3
	CNPC 47	40	1,5	5,8
	CNPC 12	32	1,4	6,0
	CNPC 07	26	1,5	6,7

We observed the great difference between the trunk diameters from one hybrid to another, increasing from 20 to 43 cm. The higher of the trees was between 4,8 m (CNPC – 02) and 7,4 m (CNPC – 24).

The fruit was examined making determinations concerning the average weight of the fruits, average weight of the kernel, the percent of the kernel.

The selected biotype have been round and ovoid fruits.

The CNPC –02 had the fruits features at the same with France and S.U.A varieties. The same of these varieties had the lower fruits, but the trees are very imported for their resistance of bacteriosis and antracnosis, for the more catkins number and the later started in vegetation.

Table 3

The quality features of the selected byotip fruits

The selection zone	Biotype	The average weight of fruits (g)	The average weight of kernel (g)	Fruits form	Percent of kernel (%)
Dâmbovița	CNPC 24	8,6	5,70	Round	67
	CNPC 63	9,4	7,52	Ovoid	80
	CNPC 36	10,7	6,20	Round	58
Prahova	CNPC 15	9,6	6,81	Ovoid	71
	CNPC 02	14,2	11,90	Ovoid	84
	CNPC 14	11,3	7,68	Ovoid	68
	CNPC 21	10,7	7,59	Round	71
Buzău	CNPC 58	9,8	6,46	Round	66
	CNPC 47	12,1	8,71	Round	72
	CNPC 12	12,1	8,83	Ovoid	73
	CNPC 07	10,7	7,06	Ovoid	66

Table 5

The quality and productivity of same byotip

Biotype	Yield of fruits			
			Difference against control	
	kg/tree	t/ha	kg/tree	t/ha
CNPC 63	7	3,5	0	0
CNPC 02	9,4	4,7	+2,4	+1,2
CNPC 47	4,6	2,3	- 2,4	- 1,2
Jupâneşti	7	3,5	Mt	Mt

CONCLUSIONS

1. The researcher effectuated finished with identification the value biotype, CNPC – 02 with higher productivity, precocity and quality of the fruits;
2. The behavior of the CNPC – 02 was excellent and we recommended his multiplication and established the commercial orchards with this variety;
3. Was identificated biotype with round and ovoid fruits, the light color of the kernel and resistance to the main diseases.

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THE BEHAVIOR IN NURSERY OF THE APPLE VARIETIES WITH AND WITHOUTH GENETIC RESISTANCE ENGRAFTING ON THE CHINOISE ROOTSTOCK

PĂUN C., CEPOIU N., SULTAN MIHAELA, STANCIU IULIANA, MĂMULARU DANIELA, VOICU FLORENTINA

Key words: genetic resistant, franc rootstock, Hebei province from China

SUMMARY

In our country researches concerning the apple franc rootstock using was effectuated by Banatean (1940), Bordeianu (1960), Tudosescu (1969), Bodi (1962), Parnia (1966), Modoran (1962).

In the time of the visite in China at Academy of Agricol Sciences Hebei-China (1999) Prof. dr Nicolae Cepoiu from UŞAMV Bucureşti selected 4 apple populations with small vigueur, genetic resistent and very high production.

This pupulation was named: P.F.Hebei-1, P.F. Hebei-2, P.F. Hebei-3 and P.F. Hebei-4.

MATERIALS AND METHOD

Seeds of apple population's namede represented the biological material: franc rootstock Hebei 1, Hebei 2, Hebei 3 and Hebei 4. For 95 days the seeds was storage in the temperature law and after this period was seedling (March 2000 in the seedling school. The experience was established in 4 variant and 4 repetitions, on the 130-m2-field surface. In the end of first year of vegetation was eliminated one row and the seedling school was transformed in the first field of nursery. In the 2002 spring the seedling was engrafting at 10 cm and 40 cm higher of the soil. The period of researches was 3 year and in this time the trees engrafting had a very good evolution. The soil was worked manual and mechanic for wids control and for the insects control we used pesticides recommended.

RESULTS OBTAINED

The dates from the table 1 confirm a very good evolution of the trees selection PF Hebei 1, 2, 3. The greatest increasing in the high and diameter had the rootstock PF Hebei 2 (88,04 cm higher and 10,9 mm in diameter), and the smallest PF Hebei 3 (63,16 cm higher and 7,9 mm diameter).

The capacity of synthesis was assured by leaves surface; 1001,3 - 1643,1 cm^2. All the trees formed in average 1,7- 4,2 shoots.

Table 1

The increasement particularity of the trees and leaves at the apple selections from Hebei-China

Variant (selection)	Repetition	High (cm)	Colet diameter (mm)	No. leaves/ seedling	Leave surface (cm^2)	Total leaves surface (cm^2)
V1 P.F.Hebei-1	1	75,30	9,3	37,7	33,11	1248,2
	2	71,40	8,1	35,7	29,14	1040,2
	3	79,10	9,8	39,6	28,18	1115,9
	4	72,00	9,1	36,0	31,12	1120,3
	x	74,45	9,0	37,2	30,38	1130,1
V2 P.F.Hebei - 2	1	91,30	11,5	45,6	36,12	1647,0
	2	83,10	10,3	41,5	38,41	1580,5
	3	87,31	10,8	43,6	35,10	1530,3
	4	90,45	11,2	45,2	40,11	1812,9
	x	88,04	10,9	43,9	37,43	1643,1
V3 P.F.Hebei-3	1	55,10	7,1	29,3	26,39	773,2
	2	66,18	8,3	33,1	32,38	1068,4
	3	59,63	7,6	31,4	30,41	954,8
	4	70,73	8,8	36,1	34,16	1233,1
	x	63,16	7,9	32,5	30,83	10001,9

T*able 2*

The increasement particularity of the trees apple, (second year of de vegetation)

Variant	Repe-tition	Total high (first and second year) (cm)	Colet diameter (cm)	No. ramifications	Steem diameter (cm^2)	No. ramification	
						cm^2	m.l.
V1 P.F.Hebei-1	1	161	1,34	36	1,40	25,7	22,3
	2	173	1,26	39	1,24	31,4	22,5
	3	151	1,30	41	1,32	31,0	27,1
	4	149	1,42	35	1,58	22,1	23,4
	x	158	1,33	3737	1,38	27,5	23,8
V2 P.F.Hebei -2	1	175	1,86	43	2,71	15,8	24,5
	2	186	1,93	46	2,89	15,9	24,7
	3	153	1,72	38	2,32	16,3	24,8
	4	171	1,65	41	2,11	19,4	23,5
	x	171	1,79	42,0	2,50	16,8	24,4
V3 P.F.Hebei-3	1	121	1,23	21	1,16	18,1	17,3
	2	118	1,18	30	1,09	27,5	25,4
	3	123	1,23	14	1,36	10,2	11,3
	4	131	1,29	26	1,28	20,3	19,8
	x	123	1,25	22,7	1,22	19,0	18,4

CONCLUSIONS

1. All selections can be multiplied easy in the nursery, are compatible with varieties engrafting and have been a very good resistance at (*Venturia inaequalis*);
2. For the orchards situated in the field with thin soil we recommended selection PF Hebei 3, because the roots has a medium increasing and a very good affinity with all the engrafting varieties.

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SYNTHESIS OF RESEARCHES REGARDING THE KIWI FRUIT (*ACTINIDIA SP.*) PROPAGATION

STĂNICĂ FL., CEPOIU N., PETICILĂ A.

Key words: varieties, hybrids, cuttings, basal heating, rooting substrates, bark grafting, *in vitro* micropropagation, culture media.

SUMMARY

After the plantation in Romania of the first kiwi orchards in Ostrov and Bucureşti, in 1993 with imported plants from Italy, several researches to establish the proper propagation technology were done. Cutting was one of the principal propagation methods. Using the basal heating techniques, the semi-hardwood and hardwood cuttings of *Actinidia deliciosa* and *Actinidia arguta* varieties and selections were treated with alpha naphtyl acetic acid (2,000-3,000 ppm). Composed rooting substrates, double layers and mixed, with: wood flour + perlite; wood compost + perlite and cotton waste + perlite were used. The rooting percentage and the quality of formed roots were strongly influenced by specie, variety, cutting moment, substrate type used and basal and atmospheric temperature. Grafting of non-interesting kiwifruit male plants was realized in Ostrovit plantation, Ostrov, Constanţa using the bark method with waxed scions from 'AD 20', 'Hayward' and 'Katiuscia' female cultivars. Success percentage varied between 75.70% and 98.50% for the grafting points. In the second year after grafting, the total number of shoots formed per plant was 37.00 for 'AD 20', 31.67 for 'Katiuscia' and only 15.33, for 'Hayward'. 'AD 20' produced the largest number of fruits with an average of 92.76 fruits/plant. Viewing the possibilities of large-scale introduction in culture, studies for establish the micropropagation methodology was done. Starting material was represented by Hayward, Tomuri, Katiuscia and AD 20 varieties (*Actinidia deliciosa*), AA2, AA5, AA6 and ARM (*Actinidia arguta*) and the hybrid Z (*Actinidia deliciosa*x*Actinidia arguta*). Five culture media with different compositions and hormonal balances depending on micropropagation phase: initiation, multiplication, rooting and acclimatization, were tested. Spring was the best period for *in vitro* culture initiation when shoots had 5-10 cm length. The CO_2 Laser for micro cuttings preparation and sterilization for 15 minutes in mercuric chloride ($HgCl_2$) 0.1%, were used. S 2,5 culture medium was the best for the multiplication phase with 4 weeks subculture duration. Shoots rooting with 0.5-1.0 mg/l IBA or IAA and cytochinines elimination were obtained during the last multiplication subculture. Acclimatization in tap water or on peat+perlite gave the best results. Between the studied methods, micropropagation is the one that presented most advantages and has to be extended for kiwi plant multiplication.

INTRODUCTION

After the plantation in Romania of the first kiwi orchards (*Actinidia deliciosa, Actinidia arguta*) in 1993, several researches were done to establish the proper technology of cultivation (Stănică and Cepoiu, 1996). In the same time, intense studies were applied for plants rapid propagation using conventional and unconventional methods (Stănică et al., 1994, 1995, 1996, 2002, Famiani et al., 1995). The Laser technique was involved for micro cuttings preparation (Cepoiu et

al., 1994) and typical researches regarding the *in vitro* propagation of several varieties and hybrids were done (Stănică et al., 1994, Grigore and Stănică, 1995, Stănică, 1998). The present paper has the aim to make an introduction of the most important results obtained during the last ten years of research in the field of *Actinidia* species propagation.

MATERIALS AND METHODS

A. Cutting. The biological material was represented by varieties and selections of *Actinidia deliciosa*: 'Kramer', 'Katiuscia', 'Tomuri', 'Hayward', 'AD 20', 'AD 24', 'AD 25', 'Z1', *Actinidia arguta*: 'AA 2', 'AA 5', 'AA 8', 'ARM' and *Actinidia deliciosa* x *A. arguta* hybrids: 'Z0'.

Hardwood cuttings of 20-25 cm length were used in two different periods: 15 November and 15 February. The cuttings base was immersed in a hydro alcoholic solution of NAA (α naphtyl acetic acid), 2000 ppm for 10 seconds.

Five different types of rooting substrates were used: V1 - perlite on wood flour; V2 - perlite on wood compost; V3 - perlite on cotton waste; V4 - perlite mixed with wood compost and V5 - perlite.

During the rooting period the temperature at the cutting's base was maintained constantly at 22-25°C, while in the air, at 15-18°C. A rooting bench represented the cutting plant with thermostat, type U.S.A.B. 2, functioning with hot water in a close circuit.

Soft cuttings and semi hardwood cuttings were also rooted in April-June and July-August. In the first case, a CO2 Laser (229,18 W/cm^2 power density) was used to cut the shoots and the leaves. Rooting was stimulated by IBA (1500 ppm) treatment for 1-5 seconds. Perlite was used, as rooting substrate.

B. Grafting. In Ostrovit plantation in Ostrov, after the first blossom, some kiwifruit hybrids non-interesting males were marked to be eliminated. In consequence they were prepared to be graft on the place, with valuable female scions.

Scions were taken in the second part of January from selected plants of ‘AD 20’, ‘Hayward’ and ‘Katiuscia’ cultivars. Until the grafting moment (beginning of May) scions of 1-2 buds length, covered with a thin layer of paraffin were preserved in plastic bags, in refrigerator at 3-4°C.

The bark grafting method was applied by placing the scions on the superior part of the grafted branch to avoid the shoots breaking. For tying different materials as polyethylene strips, Flexiband rubber strips and Bendaflex were used. Cut surfaces were protected with Arborinn, special wax product.

After 1 months, was calculated the number of success grafts. At the end of the first year the number and the length of the scions shoots and anticipates was counted and respectively, measured.

C. *In vitro* propagation. The biological material was represented by the *A. deliciosa* varieties (Hayward, Tomuri, Kramer and Katiuscia), *A. arguta* (AA2 and ARM) and an *A. deliciosa x A. arguta* hybrid (H Z).

For *in vitro* culture initiation shoots tips took from green house plants two weeks after the bud breaking were used. Explants sterilization by immersion in sodium hypochloride 0.6% and mercuric chloride ($HgCl_2$) 0.1%, for 20 de minutes and respectively, 15 minutes, were used.

As culture media for the initiation phase were prepared low concentration macroelements MS modified media: K1, K3, KM (Grigore and Stănică, 1995). For the multiplication phase, K2, K3, KL, KL1 and S 2,5 media with higher cytochinines concentrations were tested. *In vitro* shoots' rooting was stimulated with 0.5-1.0 mg/l IBA or IAA and cytochinines elimination during the last multiplication subculture.

For acclimatization rooted shoots were placed in test tube with different nutritive solutions and tap water or in peat+perlite substrate. At the end of the 30 days subculture, the different parts of explants (callus, shoots, roots) were weighted for calculating the absolute (grams) and relative (%) increment. The obtained shoots were numbered and measured, the callus hardness was appreciated using a 1-5 scale and the observations about the shoots and callus aspect and colour were made.

RESULTS AND DISCUSSION

A. Cutting. Rooting percentage was strongly influenced by variety and rooting substrate (Table 1). Varieties from *Actinidia deliciosa* rooted till 86.6% of cuttings while for *A. arguta* the rooting percentage arrived at 92.2%. The best rooting substrate remained perlite (V5).

Table 1

Rooting percentage (%) of kiwifruit hardwood cuttings

Variety and Hybrid	V1 perlite/ wood flour	V2 perlite/ wood compost	V3 perlite/ cotton waste	V4 perlite+wood compost	V5 perlite
Hayward	38.4	56.6	29.7	-	-
Katiuscia	80.9	75.0	50.0	68.3	**86.6**
Kramer	52.1	**84.6**	31.1	80.3	85.9
Tomuri	68.9	83.1	63.6	-	-
AD20	60.0	77.7	62.1	81.5	81.0
AD24	43.5	78.3	64.5	75.0	78.9
AD25	50.0	76.9	58.6	80.0	81.8
Z1	44.3	75.0	44.8	77.5	**88.8**
Z0	70.0	82.3	60.0	81.8	81.3
AA2	-	-	-	89.4	90.0
AA5	-	-	-	91.6	92.0
AA8	-	-	-	88.2	**92.2**
ARM	-	-	-	91.1	91.1

B. Grafting. The grafting success percentage was 100% for the grafted plants and varied between 75.7% and 98.5% for the grafting points. 'Katiuscia' registered the highest number of succeeded grafted points per plant.

In the second year after grafting, plants formed flowers and to bearing fruits. The growth rhythm was also very high. As one can in the table 2 and figures 2.1. and 2.2., the number of frames per plant varied between 2.67 for 'Hayward' and 4.00 for 'Katiuscia'. These values are unusual for the "pergoletta" training system that is formed only by 2 opposite frames per plant.

The total number of annual shoots formed per plant was high for 'AD 20' (37.00) and 'Katiuscia' (31.67) and medium for 'Hayward' (15.33). 'AD 20', growth two times more than 'Katiuscia' and 3 times more than Hayward, reaching 20.08 m per plant. The average length of the annual shoots was low caused by the lack of irrigation and by the fruit competition.

'AD 20' produced the largest number of fruits with an average of 92.76 fruits/plant. The highest number of fruit per plant arrived even at 193.00 at this cultivar. 'Hayward' didn't produced fruits during the second year after grafting.

Table 2

Biometric characterization of kiwi plants frames and annual growths in the second year after grafting

Cultivar	Frames			Annual growths		
	Number	Total length	Average length	Number	Total length	Average length
AD 20	2,71	2,41	0,89	37,00	20,08	0,54
Katiuscia	4,00	3,73	0,93	31,67	10,50	0,33
Hayward	2,67	1,78	0,67	15,33	6,53	0,43

Figure 2.1. Frames number and total length

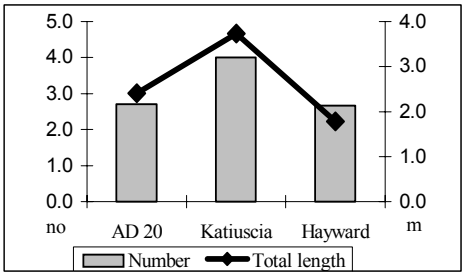
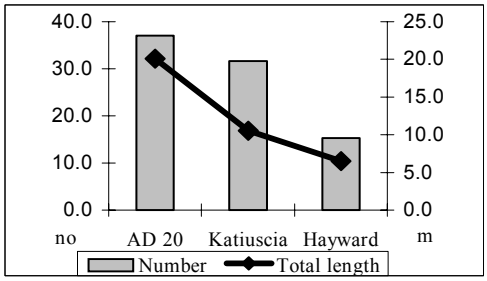


Figure 2.2. Annual growths number and total length



C. *In vitro* propagation. At the beginning of the initiation phase *Actinidia arguta* shoots tips grew faster than the *A. deliciosa* ones, but at the end of the period the total growth was higher (Table 3).

Table 3

Kiwi explants growth dynamic during the initiation phase

Variety Hybrid	Explant medium length (cm)		
	Inoculation	After 5 days	After 20 days
Katiuscia	0.79	0.88	1.35
Kramer	1.19	1.32	1.64
Tomuri	0.50	0.50	2.50
H Z	0.42	0.47	0.99
AA 2	0.70	1.70	2.20
ARM	0.70	1.00	2.40

Kramer formed the longest shoots and Katiuscia the highest number of nodes per shoot (Table 4). Hayward has the highest multiplication rate (2.25) while HZ and Tomuri the lowest (1.75).

Table 4

Behaviour of kiwi explants during the multiplication phase

Variety/Hybrid	Shoots number	Shoots length	Multiplication rate
Hayward	1.25	2.92	2.25
Tomuri	0.70	1.76	1.70
H Z	0.75	1.64	1.75

During the acclimatization the longest roots were obtained on K3-Z (X/2) and K3-Z media and the highest viability in tap water.

CONCLUSIONS

A. Cutting. *Actinidia deliciosa* varieties: Katiuscia, Tomuri, Kramer and Hayward had the highest rooting percentage. AA5, AA8, and ARM varieties from *Actinidia arguta*, obtained also very good results on rooting.

The optimal period for cutting was between the end of January and mid February.

Basal heating at 22-24°C and lower atmospheric temperature (15-18°C) were essential for obtaining a high rooting percentage.

The best results were obtained when perlite on wood compost (V2) and perlite on wood flour (V1) were used.

On double layer variants (V1, V2 and V3) the root's length was higher than in one layer variants (V4 and V5) but the root's number per cutting was lower.

Between the root's length and root's number per cutting an indirect relation was found.

Actinidia arguta had the best response at the semi hardwood cutting and the best moment was beginning of August for both species.

B. Grafting. The bark grafting method gave very good results on all analyzed varieties. The percentage of success varied between 75.7% and 98.5%.

Waxed scions preservation at 3-4°C gave excellent result in terms of viability and aseptically.

The best binding material for the grafting point was the black self-adhesive tape named Bendaflex.

After the grafting is necessary to preserve on each plant only 2 principal +1 reserve, vigorous scion shoots to form the frame structure. When the shoots reach the necessary length for each frame they must be toped to stimulate the formation of anticipates shoots.

The elimination of the 'wild' rootstock shoots has to be done as much as necessary. In the same time, during the first year, is necessary to bind 3-4 times the scion shoots in order to avoid the breaking under the self-height and wind action.

C. *In vitro* propagation. The best stage for the in vitro culture initiation is when the new shoots reach 5-10 cm length.

The proper sterilization of the material took from the green house was made with mercuric chloride ($HgCl_2$) 0.1%, for 15 minutes for *Actinidia deliciosa* and 10 minutes for *A. arguta*.

S 2,5 medium was the best for the multiplication phase with 4 weeks duration. For rooting induction we recommend the increase of the auxin content (IBA or IAA) at 0.5-1.0 mg/l during the last proliferation subculture. In the same time, it is necessary to reduce the cytochinines concentration.

Acclimatization of rooted explants can be made in tap water (viability 92%) or in peat+perlite substrate under mist conditions.

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ECONOMIC EFFICIENCY OF APPLE FRUIT VALORISATION ACCORDING TO QUALITY

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Key words: genetically – resistant varieties, quality variation index, average quality

SUMMARY

Very often, the fruit tree-growing exploitations sell their gross production directly from the unit immediately after harvesting, without storing it. The present paper aims at printing out the economic differences in apple within the fruit tree-growing area of Voineşti, Dâmbovița, comparing the gross selling for a unique price per kilogram with the retail selling of the quality – classified harvest.

INTRODUCTION

The economic results of the production activities are influenced by several factors such as: the exploitation size, average productions, product quality, available financial resources, the exploitation manager's experience, pedoclimatic factors, etc. Production valorisation also plays an important part.

MATERIAL AND METHOD

The data resulted from the actual results of apple production in a family exploitation located in the fruit-tree growing area of Voineşti, Dâmbovița. The varieties grown were Jonathan, Golden Delicious, Generos, Florina. The data analysis was performed by calculating some technical and economic indicators (income, expenses, profit), while the variety quality assessment was made by determining the quality variation indices and the average quality coefficient of the variety and the group of varieties.

RESULTS AND DISCUSSION

The fruit quality classification was based on the standard diameter: 66 mm – Extra quality, 60 mm – first quality, 55 mm – second quality; the fruit had fallen prematurely from the trees improper for consumption were used for distillation. The prices of the area in 2001 were different, according to quality class: 5,500 ROL/kg – Extra quality; 4,500 ROL/kg – first qualities; 3,500 ROL/kg second

qualities; 800 ROL/kg for industrial processing. For the gross selling, the price in the area was 3,300 ROL/kg. Table 1 presents the production results obtained and the income from the two valorization methods.

The production expenses were higher in the Jonathan and Golden Delicious varieties, compared with the Generos and Florina, as the latter recorded less expense for phytosanitary protection due to their genetic resistance to scab and powdery mildew (Table 2).

Table 1

Production and income obtained from gross and quality – class apple selling

Variety	Average production t/ha	Production according to quality class		Price thousand ROL/t	Income from valorization according to quality class		Income from gross valorisation ROL/ha	Selling income difference according to quality class	
		Fizic t	%		Thousand ROL	%		Thousand ROL	%
Jonathan	19.7	E 2.95	15.0	5500	16,225	21.7	65.010	+9678	+148
		I 7.29	37.0	4500	32,805	43.9			
		II 6.70	34.0	3500	23,450	31.4			
		Ind 2.76	14.0	800	2208	3.0			
	Total	19.70	100.0	(3791)	74688	100.0			
Golden delicious	18.6	E 3.35	18.0	5500	18,425	26.5	61.380	+8079	+132
		I 5.60	30.0	4500	25,200	36.3			
		II 6.70	36.0	3500	23,450	33.8			
		Ind 2.98	16.0	800	2384	3.4			
	Total	18.6.0	100.0	(3734)	69,459	100.0			
Generos	17.5	E 3.68	21.0	5500	20,240	28.8	57.750	+12,575	+218
		I 7.35	42.0	4500	33,075	47.0			
		II 4.38	25.0	3500	15,330	21.8			
		Ind 2.10	12.0	800	1680	2.4			
	Total	17.50	100.	(4019)	70,325	100.0			
Florina	15.8	E 3.63	23.0	5500	19,965	30.6	52.140	+13,104	+251
		I 6.95	44.0	4500	31,275	47.9			
		II 3.64	23.0	3500	12,740	19.5			
		Ind 1.58	10.0	800	1264	2.0			
	Total	15.80	100.0	(4129)	65,244	100.0			

Moreover, when production is aimed at valorization according to quality class, the production unit cost increases by 200 ROL/kg as a result of fruit classification.

The profit was calculated as difference between the selling income and the total expenses, and varied from one variety to another. The analysis of the profit obtained from the two valorization methods pointed out to the following:

- the producer would be more economically advantaged if selling occurred according to quality criteria;

- the additional profit per hectare might vary between 4279.5 thousand ROL and 9926 thousand ROL, which means an increase in the profit of 27.1-38.1 %, compared with the gross selling;

- the additional profits per hectare were almost twice higher in the genetically – resistant varieties, compared with the standard ones (Jonathan, Golden,etc)

Table 2

Profit from gross and quality – class selling

Variety	Gross selling			Quality – class selling			Profit difference	
	Income thousand ROL/ha	Production expenses thousand ROL/ha	Profit thousand ROL/ha	Income thousand ROL/ha	Production expenses thousand ROL/ha	Profit thousand ROL/ha	Thousand ROL/ha	%
Jonathan	65,010	44,325	20,685	E 16,225	7227,5	8997.5	+5738	+27.7
				I 32,805	17.860,5	14.944.5		
				II 23,450	16.415,0	7035,0		
				Ind 2208	6762,0	-4554,0		
Total	65,010	44,325	20,685	74,688.0	48,265.0	26,423.0		
Golden Delicious	61,380	45,570	15,810	E 18,425	8877.5	9547.5	+4279,5	+27.1
				I 25,200	14,840.0	10,360.0		
				II 23,450	17,755.0	5695.0		
				Ind 2384	7897.0	-5513.0		
Total	61,380	45,570	15,810	69.459,0	49,369,5	20,089.5		
Generos	57,750	25,812	31,938	E 20.240	6164.0	14,076.0	+9057,7	+28.4
				I 33.075	12.311.3	20,763,7		
				II 15.330	7336.5	7993,5		
				Ind 1680	3517.5	-1837,5		
Total	57,750	25,812	31,938	70.325,0	29.329.3	40,995,7		
Florina	52,140	26,070	26,070	E 19.965	6715.5	13,249,5	+9926	+38.1
				I 31.275	12875.5	18,399		
				II 12.740	6734.0	6006.0		
				Ind 1264	2923.0	-1659.0		
Total	52,140	26,070	26,070	65.244,0	29,248.0	35,996.0		

The following emphases the influence of fruit quality in the two groups – standard and genetically – resistant upon the economic results obtained from valorization according the quality class.

The I_q variation index of quality according to variety groups was calculated by the formula: $I_q = \frac{Q_1}{Q_0}$

Where Q_1 = Average production of genetically – resistant varieties according to quality class

Q_0 = Average production of standard varieties according to quality class

The values obtained were I_q Extra = 1.16; Iq I quality = 1.11; Iq II quality = 0.60; Iqind = 0.64.

Calculated for variety groups, the same index was Iq = 0.87. The same is illustrated by the average quality coefficient Kri, calculated for each variety and each group, according to the formula:

$$K_{ri} = \frac{\sum qi\, xR_i}{\sum qi} \quad \text{sau} \quad K_{ri} = \frac{\sum gixRi}{100}$$

where: q_i = product quality according to quality class;
q_i = production share according to quality class;
R_i = quality group coefficient

The calculated values were: K_{ri} Jonathan = -2.47; K_{ri} Golden = 2.50; K_{ri} Generos = 2.28; K_{ri} Florina =2.20. The value of the coefficient is inversely related to the variety quality; therefore, the order of the varieties from the view-point of quality is: Florina, Generos, Jonathan, Golden D. (also see their correspondence with total and additional profits from quality-class selling).

CONCLUSIONS

1. The current practice of production valorization in gross system is economically disadvantageous for the fruit producers;
2. This results in profit loss which can reach more than 30 % of the total;
3. The apple varieties which are genetically resistant to some disease have superior productions of average quality compared with the standard varieties, and their valorization according to quality class can increase profits for the producers.

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VITICULTURE AND OENOLOGY

STUDY ON THE EFFECT OF THE EXTRACTION ENZYME QUANTITY ON THE COLOR OF MERLOT MUST AND WINES I. CHROMATIC PARAMETERS EVOLUTION DURING MACERATION-FERMENTATION PROCESS

ANTOCE OANA ARINA

Key words: chromatic parameters, Merlot, extraction enzymes, CIELab method

SUMMARY

The paper describes the differences in the chromatic parameters measured according to the CIELab method of five Merlot wines treated with various doses of enzyme for color extraction. The evolution of color during the maceration-fermentation process is followed by measuring the parameters *a*, *b* and L. The location of color in the chromatic space is described in the *ab* diagram. The evolution of the dry content is also shown.

INTRODUCTION

The color of wine is affected by several factors, among the more important being grape variety, pH, temperature, enological treatments and aging. Higher extraction of color is important in wine not only for ranking higher in sensorial analysis and consumer preferences, but also because in parallel with color some other compounds are extracted that are beneficial for human health (such as resveratrol), although they have no effect on the wine color [*Korbuly, J. et al.,* 1998.]. For that reason an attempt was made to attain a higher maceration level with an extraction enzyme tested for Merlot wines production.

Usually, in the recommendation for use of any enzyme product there is a specified range for the quantity that should be added. For the color extraction enzyme employed in this study the suggested range of use was between 1 and 8 g/hl, without any other explanation concerning the expected effect in case of using the maximum or the minimum recommended amount. Under these circumstances, selecting the exact dose of the enzyme to use is not very easy, especially when it is used for the first time. In this study a laboratory test was made in order to determine if the dose can make a difference in the chromatic parameters.

MATERIALS AND METHODS

The color extraction was performed by using one commercially available enzyme, on the Merlot grape variety. In the experiment 4 pectolitic enzyme concentrations were employed, all in the producer's recommended range. The enzyme (3.000.000 PU/g; 6100 FDU 55%/g) was added in the following quantities: 1 g/hl, 2 g/hl, 4 g/hl and 8 g/hl. The control wine contained no added enzyme. No selected yeast and no sulfur dioxide were added to the samples, since it is known that SO_2 also has an effect on the extraction of color [Bakker, J. *et al.*, 1998].

The color parameters were measured with a Unicam spectrophotometer with Chroma software, by using the CIELab method [*Oana Arina Antoce et .al.*, 2000].

In this study, we measured the color evolution during the maceration-fermentation process, following the evolution of the dry content and the chromatic parameters. From the data obtained we tried to establish the differences in the evolution of the color in the samples obtained without enzyme and with various quantities of extraction enzymes.

RESULTS AND DISCUSSIONS

In order to determine the differences in maceration process in the presence of the extraction enzyme, first the evolution of the dry content was followed. Although it was expected to observe a faster decrease in the dry content in the case of the samples containing the enzyme, caused by advanced skin maceration, the evolution of this parameter was almost identical in all five cases, irrespective of the amount of enzyme in the sample (*Fig. 1*). This fact indicates that this type of enzyme is not very effective in breaking the cell walls to lead to a faster maceration and clarification of the must, as a pectolitic enzyme would, but that the extraction of color is based on releasing the anthocyan molecules from larger compounds, after the later are already in the juice.

From the dry-content curve we could establish, however, the duration of the maceration-fermentation process, that ended when the curve reached its lowest point and remained constant. This happened after 9 days, when the wine started to clarify naturally (*Fig. 1*).

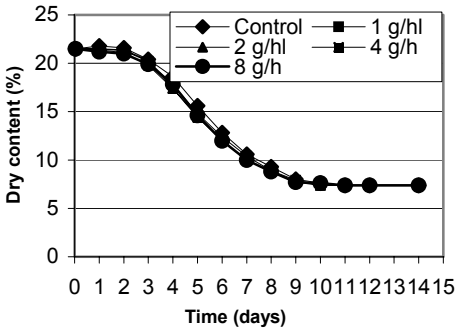

Fig. 1. The evolution of dry content for the Merlot juice samples treated with 0, 1, 2, 4 and 8 g/hl extraction enzyme

During the process of maceration-fermentation, the chromatic parameters L, *a* and *b* were determined once a day. However, the evolution during all the 9 days of these chromatic parameters did not follow a regular trend, fact that is obvious from the rather large standard deviations and standard errors of these parameters (Table 1).

Table 1

Statistical parameters of the chromatic parameter *a*, describing the localization of the color on the axis green-red

Sample	Mean	Standard deviation	Standard error
Control	0.521	0.454	0.144
1 g/hl	0.489	0.505	0.160
2 g/hl	0.372	0.388	0.123
4 g/hl	0.489	0.489	0.155
8 g/hl	0.826	1.224	0.387

During this period the extraction of color was not linear, fact demonstrated by the small increases and decreases in the *a, b* and L parameters in the first 4-5 days (*Fig. 2*).

These small variations recorded in the color parameter evolution were actually due to the adsorption-desorption at the skin surface, phenomena that are known from the literature to happen rather randomly. Consequently, measuring the parameters in the first days was not of very much help in predicting the effect of the enzyme extraction on the final wine color.

However, the improvement in the color was noticeable after the 6^{th} day of the fermentation process, reaching a peak in the 8^{th} day, but decreasing again in the 9^{th} (*Fig. 2*). The larger values of the color parameters were encountered for the

sample extracted with 8 g/hl on the 8th day, but the adsorption on the skins led to one of the lowest points on the next day.

Only after the 9th day, when the yeast settled down and the wine started to clarify, the increase in color was reliably measured.

In the *ab* diagram (*Fig. 2.4*) the parameter *a* describes the relative position of the color between green and red, while the parameter *b* describes the relative position of the color between blue-yellow. Although all the samples are gathered in the red color space, in the first days of maceration fermentation the color was darker, and grew brighter toward the end of the fermentation, when the solids settled down, and the medium transparency increased. In the beginning of fermentation, the points are scattered around of the green-red axis in the red region, neither the blue or yellow component being significant. After the first 5 days the yellow component becomes significant, its influence being visible in the final red color.

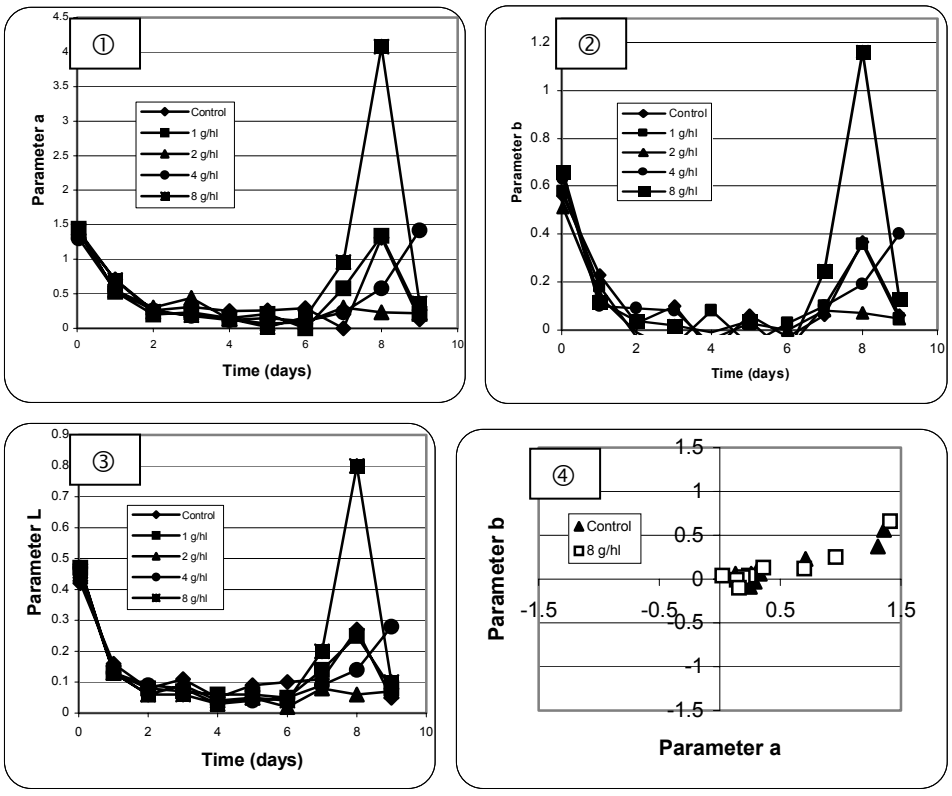

Fig. 2. The evolution of the chromatic parameters a, b and L during the maceration-fermentation process, for the samples treated with 0, 1, 2, 4 and 8 g/hl extraction enzyme (2.1.; 2.2.; 2.3.) and the *ab* diagram describing the evolution of the color (2.4.)

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STUDY ON THE EFFECT OF THE EXTRACTION ENZYME QUANTITY ON THE COLOR OF MERLOT MUST AND WINES II. CHROMATIC PARAMETERS EVOLUTION IN THE FIRST DAYS AFTER FERMENTATION

ANTOCE OANA ARINA

Key words: chromatic parameters, Merlot, extraction enzymes CIELab method

SUMMARY

The effects of a commercial extraction enzyme on chromatic parameters were assessed by using the CIELab method. The samples were compared to substantiate the evolution of the chromatic parameters during the first days after the completion of fermentation, and also by calculating the extraction rate, in order to establish the optimum amount of enzyme to be added for Merlot wines. The highest values of the chromatic parameters were obtained for the highest enzyme quantity used in the study, while the lower quantities gave mixed results, not directly proportional to the employed dose. After one year of maturation, the color parameter were relatively uniform for all the samples, irrespective of the enzyme quantity applied, except for the color intensity, which was higher for all the samples prepared with enzymes, compared to controls.

INTRODUCTION

In a previous study, the influence of the extraction enzyme dose on the evolution of the chromatic parameters during the maceration-fermentation process was evaluated. The results showed that, during this process, there is no clear pattern that describes the color evolution, due to the effects of the adsorption and desorption phenomena on the grape skins and solids. Therefore, in order to assess the possibility of selection of a optimal dose, the study had to be continued for the after-fermentation period.

MATERIALS AND METHODS

The samples tested were Merlot wines obtained from musts treated with the following quantities of a commercial extraction enzyme: 0 g/hl, 1 g/hl, 2 g/hl, 4 g/hl and 8 g/hl.

In this study, the color evolution was measured immediately after the completion of the maceration-fermentation process and the color of the wines was also assessed after 12 months.

For the color characterization, the uniform chromatic space CIELab 1976 was used. First the X, Y, Z tristimulus were obtained from the absorption spectra of

the wine samples in the visible intervals (380-770 nm). Thus the relation of the concentration of colored compounds with the values of the chromatic parameters L, *a* and *b* is more precise, since the parameters have been obtained using the absorbants at all wavelengths in the visible spectral at 1 nm intervals. This allows the detection of small color differences in the samples.

For measuring the color parameters a Unicam spectrophotometer and the Chroma software were employed. The CIELab method is described in previous papers [*Arina Antoce et al*., 2000].

RESULTS AND DISCUSSIONS

According to the dry-content evolution in all the samples, the fermentation was finished in the 9th day. Only after that day, when the yeast settled down and the wine started to clarify, the increase in color could be reliably measured and the results are plotted in Figure 1.

As it can be seen, all the parameters have a similar evolution, with a noticeable increase in the parameters level for the sample with 8 g/hl enzyme. From the 12 day, the increase of the values for all parameters ceased, after that the levels remained constant or started to decline slightly (Fig. 1.1, 1.2, 1.3).

The speed of the extraction also varied with the dose of enzyme. Actually, this is the only parameter that clearly shows a difference between the control and the samples with enzymes. However, the lowest extraction rate is obtained not for the control sample, but for the samples with 1 and 2 g/hl, followed by the control, the sample with 4 g/hl and then the highest extraction speed is obtained with 8 g/hl enzyme (Table 1). Taking into consideration the errors due to the small number of points used for the linear regression, we could say that the samples with 1 and 2 g/hl do not significantly differ from the control. Moreover, except for the sample with 8 g/hl that obviously displays a higher color extraction, the rest of the samples reach almost the same level in the 15th day (Fig. 1.1-1.3).

Table 1

Extraction rate computed as the slope of the line describing the evolution of the parameters *a* and L between the 9th and 12th day from the enzyme adding

Sample	Extraction rate after parameter *a* (days^{-1})	Extraction rate after parameter L (days^{-1})
Control	0.275	6.588
1 g/hl	0.258	6.181
2 g/hl	0.253	6.079
4 g/hl	0.282	6.769
8 g/hl	0.331	7.852

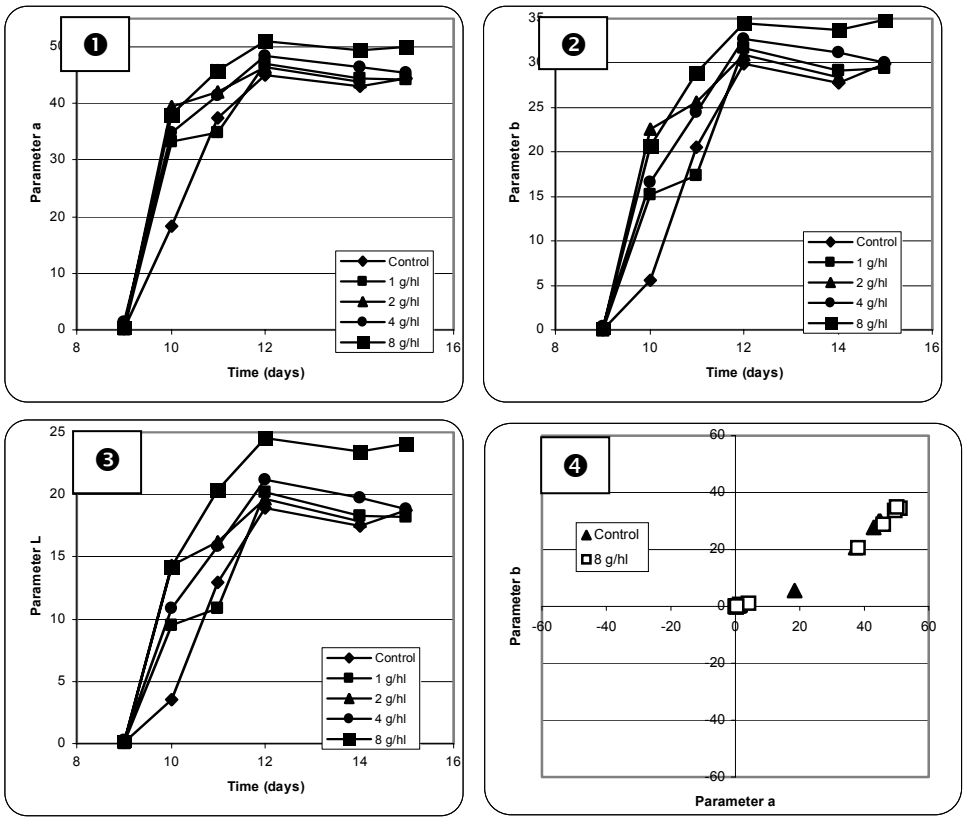

Fig. 1. The evolution of the chromatic parameters *a*, *b* and L immediately after the completion of fermentation for the samples treated with 0, 1, 2, 4 and 8 g/hl extraction enzyme (1.1.; 1.2.; 1.3.) and the *ab* diagram describing the evolution of the color (1.4.)

By plotting the parameter *a* versus parameter *b* (Fig. 1.4) the color of the samples is better described. From the plotted data points in Figure 1.4 it can be seen that all the samples are gathered in the red color space. However, in the first days after fermentation, the color was darker (the value of L, the color luminosity of the sample, between 0.05-0.28), and grew brighter towards the end of the fermentation, when the solids settled down, and the medium transparency increased (L between 18-24). In the beginning of clarification, the points are close to the center of the plot, and only after the clarification the color locates itself definitely in the red region. After 1 year the luminosity is between 29 and 33 (Table 2).

Also, from Table 2 we could draw another conclusion: that after one year of maturation, the wines have similar chromatic parameters, and that the beneficial effect observed for the sample with 8 g/hl enzyme is not so important anymore.

However, it is obvious that all treated wines expressed higher color intensity than the control sample after one year, even though, among all the samples, the one with the highest quantity of added enzyme displayed the lowest intensity.

Table 2

Chromatic parameters *a, b* and L, hue and intensity of the color after a year from the production date

Sample	**L**	***A***	***B***	**Hue** =Δ420/Δ520	**Intensity** =Δ420+Δ520+Δ620
Control	32.83	54.63	39.47	0.597	4.855
1 g/hl	30.33	55.20	42.44	0.574	5.562
2 g/hl	29.08	53.54	39.50	0.576	5.465
4 g/hl	29.37	54.40	41.84	0.569	5.673
8 g/hl	32.19	55.99	41.78	0.580	5.132

CONCLUSION

The purpose of this experiment was to establish the optimal dose of a particular extraction enzyme to be used in the Merlot wine production.

As it could have been expected, the largest amount of enzyme gave the highest color parameter values, as measured immediately after the completion of fermentation. The rest of the tested quantities gave mixed results for different parameters measured or calculated. In this case, we could conclude that, to be sure of a maximum effect, we could simply add the maximum quantity specified by the producer. However, it still remains a question to be asked: would this be economically beneficial? In other words, is the increase in the color intensity and chromaticity sufficiently higher than the one obtained with lower enzyme oncentrations, so that the money spent to increase the added enzyme is justified? And this especially when we also observed that the beneficial effect of the highest enzyme quantity was not maintained after a year of maturation.

The study should however continue, testing some other extraction enzymes, that might give more reliable results, hoping to find some parameters that could be measured in the beginning of the extraction and then allow a forecast of the final effect, parameters that could also be useful for selecting the appropriate dose of enzyme.

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DETERMINATION OF THE MICROBIOLOGICAL HYGIENE LEVEL IN A WINE PRODUCTION FACILITY DURING WINEMAKING CAMPAIGN

ANTOCE OANA ARINA, LAURA DORINA DINU

Key words: hygiene, microorganisms, winemaking

SUMMARY

In order to assess the hygiene conformity in a winemaking facility, microbiological tests were performed for the air, water and some surfaces in the production area, as well as for the determination of the microorganism number in the final wine. In spite of some non-compliances found, the overall process hygiene was satisfactory, and the non-conformities can be easily remedied.

INTRODUCTION

Due to its high alcohol concentration, wine does not usually contain pathogenic microorganisms, therefore many winemakers overlook the importance of the hygienic working conditions. However, although the human health may not be affected by the microorganisms found in wine or on the surfaces of a wine production facility, the wine itself could be greatly spoiled by microbial contaminants, leading to important losses in quality. The hygiene level in the production areas during winemaking is determining for the quality of the future wine, and this should take into consideration the air, water and surfaces that can come in contact with wine. This study aims to determine the microbiological levels in air, water and some surfaces in a winemaking facility during the vinification campaign.

MATERIALS AND METHODS

The microbiological methods for the assessment of the contamination degree are the classical ones, described in standards and handbooks (Arina Antoce, 2001, Arina Antoce and Laura Dinu, 2002).

For the air control the traditional Koch method is used, consisting of openly exposing for a certain time of some Petri dishes with nutritional media and incubating them to allow the collected microorganisms to grow. The number of microorganisms is calculated for a volumic unit, in accordance with the Omelianski equation: germs/m³ air = ($n \times 10000$) / [$S \times (T / 5)$], where T is the exposure time, S is the surface of the Petri dish and n the number of the grown germ colonies on the medium.

For the water control sampling was aseptically performed by disinfecting the tap with alcohol, leaving about 3 liters of water to flow away, than collecting it in a

sterile atmosphere created with two Bunsen burners. The water is inoculated on growth media on Petri dishes and incubated at 37°C.

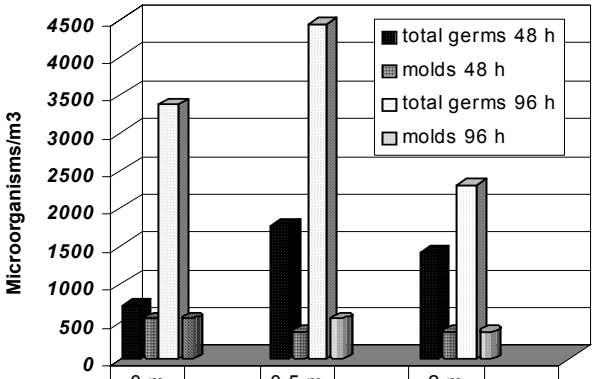
The control of the surfaces is performed with a very wide spread technique, with a sterile rolling cotton rod that that is rubbed against the tested surface. The microorganisms attached to the cotton rod are then grown in liquid media and counted by using the ten fold dilution method.

For the final product control, the sampling is done through a flexible pipe from the tank into a sterile vial.

RESULTS AND DISCUSSIONS

Air Microbiological Control

The atmosphere does not have a specific microflora, but permanently contains microorganisms from the soil, water, flora and fauna, including humans. The density of these germs is variable, depending on the proximity to the soil, most of the microorganisms being located in the lower tropospheric layers. In the winemaking facility studied the germ content of the air was tested in three different layers, at ground level, at 0.5 m from the ground and at 2 m from the ground. The results obtained after 48 and 96 h of incubation are shown in *Fig. 1*.



	0 m	0.5 m	2 m
total germs 48 h	708	1769	1415
molds 48 h	531	354	354
total germs 96 h	3362	4423	2300
molds 96 h	531	531	354

Air layer

Fig. 1 Germ number in the air at three levels from the ground (0, 0.5 and 2 m) counted at 48 and 96 h of incubation

The control was repeated at the end of the fermentation, before racking, and this time no microorganism grew on the Petri dishes. In the meantime the room has

been properly cleaned and the drop in the outside temperature also contributed to the sharp decrease in the airborne germs, that were practically undetectable.

Water Microbiological Control

Like the air, water naturally contains saprophyte microbes, as well as some accidentally released pathogens. The control of water aims to determine whether the water supply complies with the requirements for the specific technology, in our case for cleaning of the equipment and floorings, water not being an ingredient in winemaking, addition of water in wine being forbidden by law.

In accordance with the drinkable water standard – STAS 1342-91 – the bacteriological indicators to which the water supplied by the city distribution network must comply allow for a total number of bacteria that develop on media at 37°C of 100 UFC/cm^3. 1 ml of the water sample was inoculated on growth media and the number of grown colonies were as following:

- 2 bacterian UFC/cm^3 after 48 h of incubation
- 2 bacterian UFC/cm^3 plus 1 fungus UFC/cm^3 after 72 h of incubation.

None of the grown microorganisms was pathogenic. Our results showed that the city water supply is in conformance with the microbiological requirements, the germ level being very much under the legal limit.

Microbiological Control of Surfaces

The control of the surfaces is the most important for the microbiological contamination of must and wine, because these products may or in some cases have to come in direct contact with certain surfaces.

The surfaces selected for control in this study were the upper and lower part of the crushing device and the all-purpose table located nearby the crusher. The results are presented in *Table 1*.

Table 1

UFC determined on selected surfaces in the winemaking room

Surface tested	Controlled area (cm^2)	Total UFC	UFC/cm^2
Upper crusher	60	50	0.83
Lower crusher	30	100	3.33
Table	100	120	1.20

The highest level of contamination was recorded at the lower part of the crusher, where the unwashed traces of the grape juice produced the previous day formed a perfect medium for the growth of the microorganisms. Also, the table had high levels of microorganisms. However, the microorganisms observed on these surfaces were only yeast, a normal microflora for the grape juice and wine. These wild yeasts proliferate in musts, but as the alcohol concentration increases they are selected according to their resistance and are eventually killed.

In accordance to O.M.S. 976/1998 the number of microorganisms allowed on the working surfaces that are in direct contact with the product in food industry flows can reach a maximum of 2 UFC/cm^2. In our case the crusher is the device

that has direct contact with the grape juice, being actually the device that generates the juice from the berries. In its upper part, the level of microorganisms is under the legal limit, but in the lower part, were the juice tends to accumulate, the limit is exceeded, meaning that it is not enough that the device was washed after usage, but the washing water should be drained or dried. The microbial level on the table is also under the legal limit and this surface has no contact with the juice or wine.

Final Product Microbiological Control

For an overall evaluation of the process hygiene the final product should be tested. Before the racking of the newly obtained Fetească Regală wine a sample was collected and analyzed. The wine tasting analysis revealed that the wine complies with the requirements (*Table 2*).

Table 2

Final product organoleptic analysis

Sample	Appearance			Smell	Taste
	Limpidity	Body	Color		
Fetească Regală wine, 2001, (half-flavored grape variety)	Clear, without deposits or particles in suspension	Light, low extractivity	Yellow-greenish typical for the fresh healthy white wine	Discrete floral and fruity flavor, a bit nonrefined	Dry, balanced acidity

Taking into consideration that the wine completed its fermentation for over one month and the drop in outside temperature favored the settlement of the solids, including the dead yeasts, in the sample studied no viable microorganism was found. On the Petri dishes no colony grew, either after 48 h or after 72 h of incubation. This fact does not necessarily mean that the wine is sterile, but that there are less then 10^3 microorganisms/ml, the level acceptable for a non-bottled stored wine.

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STUDY REGARDING THE PREFERENCES IN WINE OF THE ROMANIAN WINE SPECIALISTS

ANTOCE ARINA, GÎȚOI MARIUS, GRIGORICĂ LIVIU, NAMOLOSANU IOAN

Key words: wine types, consumer preferences, A.D.A.R.

SUMMARY

The preferences in wine of the Romanian wine tasters and winemakers were analyzed, as a starting point for a larger study involving consumers of alcoholic beverages. The results of this study revealed that the specialists consume alcoholic beverages in moderate quantities and always select wines with low sugar content, with fruity flavor, equally for white and red wines. The grape varieties of choice were Italian Riesling and Sauvignon Blanc for whites and Cabernet Sauvignon and Merlot for red wines.

INTRODUCTION

In our very trendy wine market and in a dynamic economical environment, it is very important to know better the preferences of the consumers, so that the offer adapts and complies with the requirements. In this respect, a study of the consumer preferences is under way at our department, in order to establish the tendencies of the Romanian wine market. As a first result, we present here the conclusions we derived from the study of the preferences of the wine specialists, results that will be used as guidelines for further studies on usual consumers.

MATERIALS AND METHODS

This study was performed during a reunion of the Romanian Authorized Wine tasters Association (A.D.A.R.) based on a questionnaire designed in our Department of Viticulture and Enology. The persons that answered the questionnaires work only in the field of winemaking, fact that is supposed to mean better knowledge of the types of wine and wine vocabulary then the common consumer. The total number of wine tasters involved in the study was 19.

RESULTS AND DISCUSSIONS

Since all the tested persons are working in the wine field it is obvious that all of them are consumers of alcoholic beverages. It is however interesting to analyze the quantity and the types of beverages they actually drink. Therefore, one of the questions regarded the weekly consumption of beer, wine and strong alcoholic beverages, and the distribution of the answers is plotted in *Figure 1*.

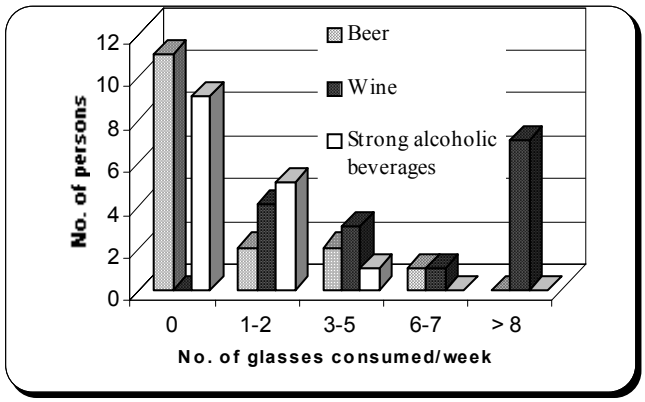

Fig. 1. The weekly consumption of beer, wine and alcoholic beverages measured in glasses of beverage

Most of the wine tasters (7 out of 19) declared that they consume more than 8 glasses of wine a week, the rest having a moderate consumption of all the beverages types. This does not mean that drinking 8 glasses of wine a week is not a moderate consumption, since this actually represents around 1 glass of wine at a main meal, fact that is even recommended in the scientific literature as being best for health. We can also notice that none of the wine tasters consumes more than 5 glasses of any strong alcoholic beverage in a week, the overall alcoholic intake being judged as moderate. Moreover, 9 out of 19 wine tasters declared that they are not consuming at all strong alcoholic beverages (group "zero glasses/week", *Fig. 1*). Even more interesting is that 11 out of 19 stated that they never drink beer, the most popular beverage on the Romanian market.

The type of wines usually consumed were assessed according to the following parameters: color, year of harvest, sugar concentration (Fig.2).

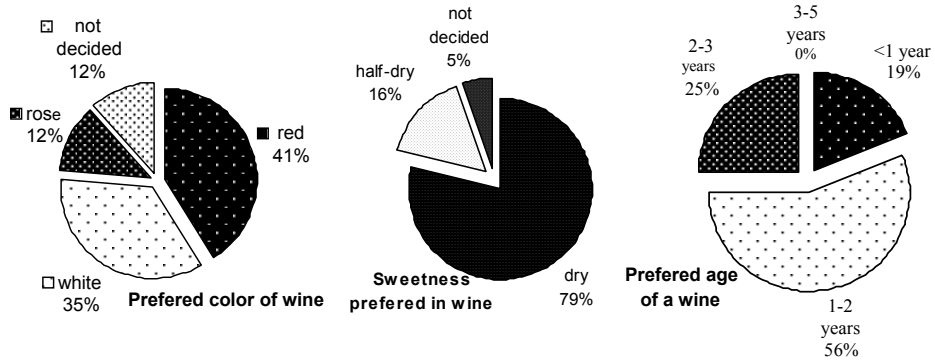

Fig. 2. Preferences of wine specialists regarding the color, sweetness and age of the wines destined for daily consumption

Taking into consideration only the wine color, the preferences were equally divided for the red wines (7) and white wines (6), with 2 tasters that indicated rose wine as their first choice. Regarding the sweetness of wine the vast majority of specialists (15 out of 19) preferred dry wines and only 3 of them half-dry wines, but no one selected wines with more than 12 g/l sugar. This fact clearly dissociates the preferences of the wine specialists from those of the common consumers, the latter normally going for wines with significant amount of sugar. As for the age of wine usually consumed, the preference was in favor of wines of 1-2 years old, followed by 2-3 years old and young wines, under 1 year from the production. This distribution reflects exactly the wine offer in Romania, where wines of over 3 years old are not readily available or affordable for daily consumption; therefore it does not come as a surprise that nobody indicated older wines as a normal choice.

Preferences for the grape variety are widely distributed, especially due to the fact that the grape assortment in Romania is very large, and the wine specialists tend to appreciate more the varieties they cultivate and process in their region (*Fig. 3*). If we take into consideration all the responses, irrespective of first, second or third choice of the variety, then we can conclude that for the white wines the Italian Riesling ranks first, followed by Sauvignon blanc, and for the red wines, the first was the Cabernet Sauvignon, followed by Merlot, although for the reds, these two most preferred varieties were not necessarily the first choice of the wine taster (*Table 1*).

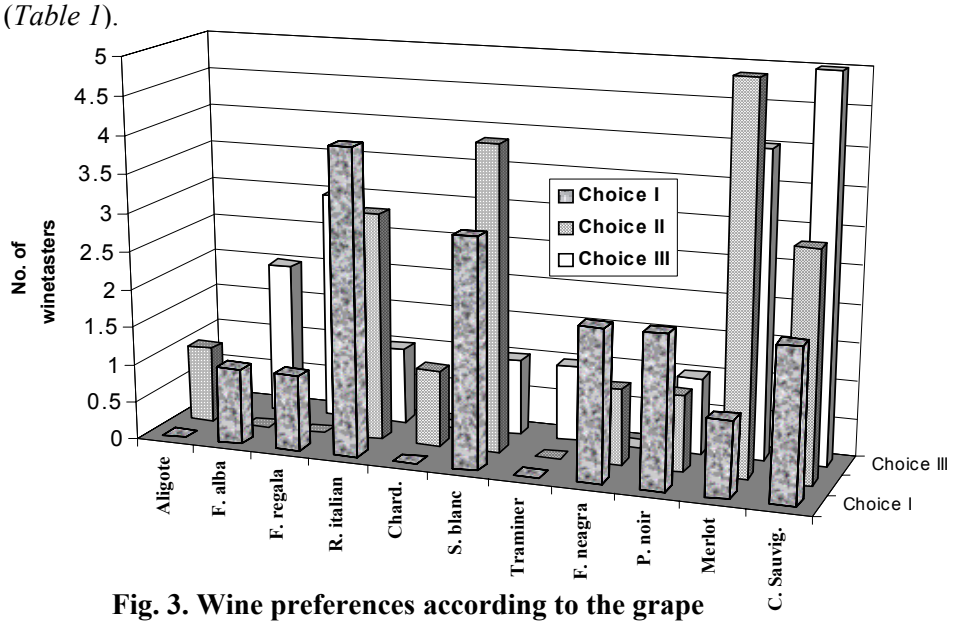

Fig. 3. Wine preferences according to the grape variety, ranked based on choices

Table 1

Preferences according to the grape variety (no. of tasters)

	Choice I	Choice II	Choice III	**Total selections**
Aligote	0	1	0	1
Feteasca alba	1	0	2	3
Feteasca regala	1	0	3	4
Riesling italian	4	3	1	**8**
Chardonnay	0	1	0	1
Sauvignon blanc	3	4	1	**8**
Traminer	0	0	1	1
Feteasca neagra	2	1	0	3
Pinot noir	2	1	1	4
Merlot	1	5	4	**10**
Cabernet Sauvignon	2	3	5	**10**

Concerning the qualities appreciated at a certain type of wine we noticed many differences even among the specialized winetasters, fact confirming once more that the wine appreciation is very much personal (*Fig. 4*). For white wines, the most desirable is the fruity flavor. Also appreciated in a white wine are the overall vigor and floral aroma. Some winetasters selected the woody aroma for whites, a tendency that is more and more seen worldwide, especially for the wines of Chardonnay and Sauvignon Blanc.

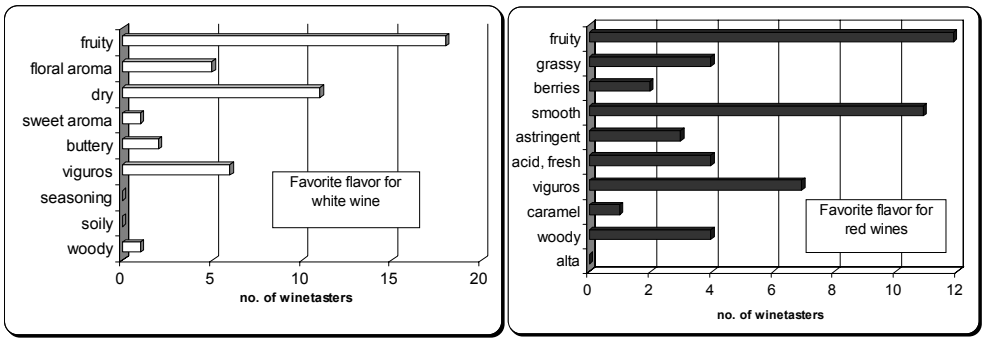

Fig. 4 Flavor qualities desirable in white and red wines

Interestingly, in red wines it was also the fruity character that was most appreciated, together with the smoothness, although the expected "vigorness" was also very much present among the preferences. For the red wines the options were more diversified, each specialist usually selecting a mixture of flavors, i.e., grassy and berry and woody and/or astringency at the same time.

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CHARACTERISTICS OF VINE CULTURE ON THE TERRACED VERSANTS

CHEREGI V.

Key words: sloping land, soil erosion, sloping canal, terrace, versant, and gradient

ABSTRACT

The culture of vine found on the terraced lands presents some characteristics regarding the climatic, edaphic and orographic conditions. More favourable conditions of humidity are found on the terraces on the foot of the slope and more reduced on the terraces on the central and superior part of the versant. Higher temperatures and more intensive light are recorded on the superior third of the slope and more reduced ones on the inferior part. The natural fertility of the soil is higher on the inferior third of the versant and decreases by passing to the central and superior third of the versant. The fertility differs on the same terrace, being higher upstream and lower downstream the platform.

By chamfering, a certain surface of the reclaimed land is lost, according to the land slope.

Taking into account the sensibility of the Riparia gloire father plant to drought, lime, soil fertility, it is not reccommended to be used on the terraces.

The varieties of the table grapes will cover the terraces with the most fertile soils, those of high quality red wines will cover the superior third and the varieties of white wines will cover the rest of terraces on the versant.

For facilitating the mechanization, the upstream interval will be of 1.5m and the downstream one will be of 1.7m.

Due to the fact that the slope of a platform is reduced at ½ in time, the vines in the upstream part of the platform are planted with 5cm lower in comparison with the soil level, and in the downstream part of the platform with about 5cm above the soil level.

About 70% of the Romanian viticulture covers sloping lands, lands submitted to erosion; thus, they are also submitted to great losses of soil, which contains considerable quantities of humus, phosphorous, nitrogen and potassium.

Soil erosion depends on the slope of the land, the length of the slope, quantity and intensity of precipitation. Its aggressiveness is stronger on sloping lands with no slope canals, ditches parallel with the contour lines, which are able to take over the high volume of precipitation; thus, preventing the concentration of water streams, and surface leaches.

On the versants, whose slope is between 14-24%, the water erosion of the soil is controlled by the reclamation of the versants in terraces, which follows the contour

lines. These terraces can have horizonthal platform – where the volume of precipitation is insufficient and the soil has a high permeability or can have a platform inclined with 5-6% along the slope, in order to facilitate the removal of water excess, where the volume of precipitation is annually higher than 500mm.

The embankment of the versant has always to be begun from the foot to the top; thus, after making the first terrace, the fertile soil on second terrace to be pushed on the first one where it will be levelled up; and after making the second terrace, the fertile soil on the third terrace will be pushed and levelled up on it, and so on. The last terrace will remain with no fertile soil, but it usually coincides with a road.

After embankment some gradients result, having a hight, lower or higher, according to the slope of the land and wideness of the terrace. In order to prevent the soil erosion, these gradients are weeded with perennial herbs, and in some cases are strenghtened with stone.

The large share of the viticulture practiced on terraced lands imposes the knowledge of agro-phytotechnic characteristics in these culture conditions. The culture of vine on these lands is facing some differences, characteristics regarding the climatic, edaphic and orographic conditions.

The displaced relief creates microclimatic differences with more favourable conditions of humidity on the terraces on the foot of the slope and more reduced on those on the central and superior side of the versant.

A higher temperature and a more intense light are recorded in the superior third of the versant and a more reduced one on the inferior side. For instance, between the soil temperature at 10cm depth on the superior extremity of the terraced versant and that on the inferior extremity, there is a surplus difference of about 2.5C for each day of July, leading, during to the whole vegetation period, to a surplus of 330C. Differences in temperature are also recorded at a depth of 40-50cm, where the roots have a higher density.

Due to the processes of erosion and silting, the natural fertility of the soil is higher in the inferior third of the versant, decreasing by passing to the middle and superior third of it. Fertility differs even on the same terrace, being higher downstream and lowers upstream the platform.

The process of getting closer to the gradient of the downstream row exposes the vine logs to dryness and the planting of the last row too close to the base of the upstream gradient places the vine logs on the land with the lowest fertility.

By chamfering, a certain surface of the reclaimed land is lost according to the slope of the land. Thus, on the versants with a slope of 14-15%, the losses are of 15% and on the versants with a slope of 21-25% the losses are of 22-28% of the reclaimed land surface.

The selection and placement of the varieties are made according to the direction of production and of the different regime of temperature, light, humidity and fertility on different parts of the versant. Taking into account the sensibility of Riparia gloire father plant to drought, lime and soil fertility, it is not reccommended to be used on terraces. The varieties of table grapes will cover lands with fertile soils, those of high quality red wines will cover the superior third and the varieties of white wines will cover the other terraces on the versant.

For the mechanization of works on the upstream region, the distance from the row to the gradient will be of 1.5m and on the downstream region; the vine row will be placed at 1.7m to the gradient limit.

The process of planting vine also presents some characteristics in comparison with the usual technique.

Due to the fact that, in time, the slope of a platform is reduced to about ½, the vines on the upstream platform are planted with 5cm under the soil level and on the downstream platform with about 5cm above the soil level. In order to homogenize the depth of the displaced soil, it is reccommended as the planting holes to be made upstream the picket. A layer of manure will be applied at 3-4cm under the level of root settlement.

The viticultural plantations on the terraces present a series of agro-phytotechnic characteristics.

Tillages applied rationally lead to the homogeneousness of the soil fertility degree on the platform and to the achievement of some high productions of grapes. As concerns the fertilizers, there are applied 30-40t/ha of manure altogether with 100-200kg/ha of phosphorous and 200-300 kg/ha of potassium.

The fertilizers will also be applied differently on the terraced platforms, that is, they will be doubled upstream in comparison with the downstream region.

On the lands that represent the object of this paper, there are reccommended the local or sprinkling irrigation and on the lands with a longitudinal slope lower than 1.5%, the furrow irrigation can be applied.

For a better exploitation of gradients, the vine on the peripheral rows in the upstream or downstream region has to be led on high stems, increasing the space offered to each vine, thus, increasing the production.

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THE ORGANIC FERTILIZATION OF VITICULTURAL PLANTATIONS

CHEREGI V.

Key words: humus, soil erosion, manure, mulch, green fodder.

ABSTRACT

The necessity of the organic fertilization of the viticultural plantations appears as a consequence of the high productions given by these plantations and also as the result of the intensive consume of humus. Humus by its action causes the soil improvement, improves the water, air and heat regime, feeds the microflora which is useful in the soil, favours the crumb structure, improves the action of mineral fertilizers, favours the availability of nutritive substances for roots, diminuishes the soil erosion, neutralizes some substances, such as pesticides. On the viticultural soils, there are some losses of humus, of about 2%; thus, it has to be constantly renewed by new shares of organic matter.

The most advantageous method of applying manure is that in deep ditches, of 35-45cm, made at the middle of an interval of 2m between rows, which partially replaces the subsoiling work.

The viticultural plantations are generally placed on sloping plots, plots that are submitted to erosion, thus submitted to great losses of soil, which contains high quantities of humus, nitrogen, phosphorous and potassium. The necessity of organic fertilization of viticultural plantations appears not only on the sloping plots but also on the other plots on the plateaus.

In the "biological viticulture" the usage of this type of fertilizer presents a special importance, because through it, the humus is maintained among some percents; it leads to the achievement of some abundent and healthy crops from an alimentary point of view.

Humus, by its action, causes the improvement of the soil by improving the air, water and heat regime; feeds the microflora useful in the soil; favours the crumb structure; improves the action of mineral fertilizers; favours the availability of nutritive substances for roots; diminuishes the soil erosion; neutralizes some substances, such as pesticides.

The lack of humus causes negative effects such as: the silting of the soil after rain; it increases the danger of erosion on the sloping plots; the soil takes deficiently the water from rains; the nitrogen will be slightly leached; the soil becomes sensible to

the repeated passage of tractors; the positive activity of microrganisms from soil decreases.

The organic matter that reaches the soil, such as: manure, leaves, straws after their decomposition and mineralization due to some microorganisms, are transformed into humic substances.

The sources of organic matter can belong to the plantation itself, that is: leaves, weeds, offshoot tips, herbs, minced vine shoots; but also some other added by man, such as manure, compost, green fodder, different materials used as mulch, etc.

The organic mass and nutritive substance of the leftovers from the vine culture, in comparison with those of the manure, is presented in table 1.

Table 1

The organic mass and nutritive substances of the leftovers from the vine culture, in comparison with those of the manure (according to W. Hillebrand et co. 1995)

Specification	**Dry mass (t/ha)**	**Nutritive substances in the dry mass (kg/ha)**		
		N	**P2O5**	**K2O**
Wood	1.2 – 1.6	8.5 – 11.5	2.6 – 3.4	7.7 – 10.3
Husks of grapes	0.8 – 1	18 – 22	5 – 7	26 – 30
Offshoot tips	1.8 – 2.8	20 - 40	3 - 8	10 - 20
Sum	3.8 – 5.4	48 - 73	11 - 19	44 – 60
Manure 10t/ha	1.7 – 1.8	50	25	60

The more favourable for the micoorganisms lif the air, water and heat regime is, the more intensive the humus consumes is.

The frequent tillages hurry up the degradation of the humus by facilitating the penetration of the oxygen, which stimulates the activity of microorganisms.

To the diminution of humus, it can also contribute the weed killing, the excessive stamping of the soil in any weather conditions and the lack of fertlization with manure or composts.

There are some losses of humus of about 2% on the viticultural soils. As a consequence, it has constantly to be renewed by shares of organic matter. The humus content of the viticultural soils varies between 1.5 – 3%.

The application of organic matter uses different procedures, that is: by spreading, in holes, in ditches.

The application of organic matter by spreading presents the disadvantage that the nutritive elements are incorporated too close to the surface of the soil, in

comparison with the optimal spreading region of the roots, fact that determines the partial capitalization of the fertlizers.

The application into holes of the organic fertilizers presents the disadvantage that these holes are made close to the vine log, region where the absorption is lower, because here there are found the clinging roots. As in the case of manure spreading and its application in holes, a disadvantage is that some weeds spring from the manure, which have to be removed by consequently manual weedings.

The application of organic fertilizers in ditches has two variants that is:

a) in deep ditches of 25-35cm, one on each side of the row at 35-45cm.
b) In deep ditches of 35-45cm, made in the middle of the interval.

Variant "a" has the disadvantage that sectiones too many roots and is too close to the vine log (35cm). The second variant, "b" has the advantage that re-introduces the manure at the level where most of the vine roots are found (45cm), and the roots are sectioned at a distance of 1m in comparison with the vine log causing less and easier injuries.

The opening of the ditches in the middle of the intervals is made with the viticultural cultivator plough, equiped with a body of a plough with 2 earth boards on the right and left. The work depth of the plough is of 45-50cm. The manure can be applied in the ditch both mechanically with the machine of manure spreading that has the two doors fixed, so that the manure to fill the dich, and manually with monoaxis trailers which can enter on an interval of 2m between rows.

The covering of the manure from the ditch is made mechanically by the help of viticultural cultivator plough, equipped with two bodies of the plough, which turn the furrow.to the middle of the interval.

The weeds sprung from the manure are destroyed by a mechanical tillage with the cultivator, because they usually spring off in the central area of the interval.

The opening of these ditches in the middle of the interval replaces on a certain extent the periodical subsoil work; because of this, the fertilization will be made on the second interval, being finished after two years.

The effect of organic fertilizers lasts 4 years, after which the fertilization is repeated.

By the fertilization with organic fertilizers, we have in view the increase of humus content in the soil and of its capacity to retain water, the improvement of structural stability, the facilitation of tillages, the stimulation of biological activity in the soil, and the supply of the most nutritive elements necessary for vines.

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PHYTOSANITARY TREATMENT PROGRAMME AT VINE FOR THE YEAR 2003

V. CHEREGI

Key words: phytosanitary protection, phenological phases, Ridomil MZ, Vectra Talstar 10 EC, Folicur E50

SUMMARY

The phytosanitary protection has an important place in vine disease and pest control. As the phytosanitary protection to be efficient, it has to be well known vine's... where treatments are applied as well as the disease and pest that has to be controlled.

The quantity and quality of vine production depends upon the phytosanitary treatments.

When applying the treatments, we have to take into account the concept of „biological viticulture”

The phytosanitary protection represents an important link as regards the crop technologies of vines.

The multitude of diseases and pests that can attack the vine, imposes to the specialist the application of a protection integrated program, which has to include the setting of phenological phases or the treatment application period, the disease and pest which have to be controlled, the commercial name of the product, its concentration and dosage.

CONCLUSIONS

1. The application of phytosanitary treatments at vine represents a necessity because the quantity and quality of production depends of them.
2. The ecological trend and the concept of biological viticulture have to be taken into consideration when applying the treatments.
3. There will be used the systems of integrated control in order to avoid any failure.

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PHYTOSANITARY TREATMENT PROGRAMME AT TIME FOR THE YEAR 2003

No. Trea-tment	Diseases and pets	Phenological phase	Application period Decade/ Month	Recommended pesticides		Observations
				Commercial name	Dose on ha	
0	1	2	3	4	5	6
1	Bacterial cancer antrenosis, excoriosis mites, lice	Vegetative repose Bud's inflation	1,2,3, / april	Turdacupral 50 PU or Bordoleon juice Cu SO_4 + dehydrated line or Vondozeb + Talstar 10 EC	6 7.5 7.5 2 0.2	The treatment is aplied os worning in case of great biological reserve
2	Midem blight mites	Offshoot's growth	3 / april - 1 / may	Ridomil MZ Noaked sulphur or Rubigan + Karate 2.5 EC	3.0 5.0 0.6 0.2	
3	Midem blight mites	Reease of grope bunches	2.3 / May – 1 / june	Bravo + Talstar 10 EC or Folicur E 50 Or Ridomil MZ Or Vectra	4 0.2 2.5 3.0 2.0	
4	Blight, mildew botrytis, moth	The beginniysof flowering	1.2 / June	Fundazol Or Topsin Or Shovit 71.5 PU Or Dithane M45	1.5 1.5 2.0 2	

0	1	2	3	4	5	6
5	Blight, mildew botrytis	The end of the flowering	3 / june	Vondozeb Or Mikal Or Vectra Or Ridomil MZ	2 30 2.0 3.0	
6	Blight, grey rot midew, suites	The intensive growth of offshots	1 / july	Ridomil Cu + Demitan 200 SC Or Vectra + Neoron 500 EC Or Mikal + Neoron 500 EC	3 0.6 2.0 0.5 3.0 0.5	
7	Blight, grey rot midew, suites	The complete formation of grope bunches	2.3 / july	Topsin + Ekalux S Or Champion 50 WP + Dipel DS Or Kocide 101 + Topsin + Ekalux S	1.5 1 3 0.5 4 1.5 1	

0	1	2	3	4	5	6
8	Grey rot, blight, mildew	The beginning of the rifing proies at the carlier varieties	1,2 / august	Kocide 101 + Fundazol Sau Champion 50 WP + Koncher	4 1.5 3 1.5	
9	Grey rot, blight, mildew, moths		3 / august - 1/ september	Koncher + Dithane M 45 + Supersect Sau Champion 50 WP + Topsin + Ekalux	1.5 2 0.25 3 1.5 1	The tratment is aplplied in the periods with many raims.

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RESEARCH CONCERNING THE RELATIONSHIP BETWEEN THE YIELD QUANTITY AND QUALITY OF GRAPEVINE

L.DEJEU, MIHAELA SAVU, MIHAELA COMŞA, MARIANA ANDREI

Key words: grapevine pruning, bud load, yield, quantity, quality

SUMMARY

This study presents the effect of five types of pruning (multiple Guyot; Guyot with periodically renewed arms; Guyot on demi-high stem; Cazenave cordon; spur-pruned cordon) and three bud load (10; 15 and 20 buds/m^2) on the yield and on the sugar concentration in the must at Feteasca regala cultivar.

The yield value varied between 3.35 kg/vine at multiple Guyot and 4.37 kg/vine at Guyot on demi-high stem. The yield value, function of the bud load was comprised between 3.19 kg/vine at 10 buds/m^2 and 4.58 kg/vine at 20 buds/m^2.

The highest values of sugar concentration in the must were registered at Guyot with periodically renewed arms (171.9 g/l) and the lowest at Cazenave cordon (155.0 g/l). There has been noticed the existence of a quantity-quality antagonism, in the sense that, while increasing the yield value, we register a diminution of the sugar concentration in the must and the alcoholic potential of the wine with a 1.5 – 2 % volume.

The improvement of the yield quality represents an important aim of modern viticulture. Even from the setting up of the plantation, the viticulturist has much posibility for obtaining qualitative grapes productions. Besides the appropriate choice of the soil, an important role is given to the cultivar choice, to the rootstock, to the planting density, to the row orientation. The quantity and the quality of the yield are, then, influenced by the climatic and pedologic conditions, by the training of the vine, by the bud load, by the fertilization, irrigation, soil maintenance, phytosanitary treatments, by the grapes health, the harvesting moment [1; 2; 3; 4; 5; 6].

A series of strategies have been elaborated, trying to optimise wine grape quality [2; 4; 5]. Starting from the considerable influence of training system and bud load on the expression of grape composition, the aim of this paper is to study the influence of the types of pruning and bud load on the quantity-quality relationship.

MATERIAL AND METHOD

The study was realized between 1999 and 2001, in the didactic field of the Viticulture and Vinification Department from the Horticulture Faculty, Bucharest. The vineyard was established in 1995 with the cultivar Fetească regală, clone 21 Bl, on the Kober 5 BB rootstock, at row and vine spacing of 2.2 and 1.2 m respectively.

The relationship between the yield quantity and quality was studied on five types of pruning (multiple Guyot-low training-; Guyot with periodically renewed arms; Guyot on demi-high stem; Cazenave cordon and spur-pruned cordon) in connection with three bud loads (10; 15 and 20 buds/m²).

To evaluate the effect of pruning, we have examined yield (kg/vine), must sugar (g/l) and titratable acidity (g/l H_2SO_4).

RESULTS AND DISCUSSION

Following the influence of the type of pruning on the yield/vine, as the average of the three experimental years (table 1), we notice that at Guyot on the demi-high stem type of pruning it was registered the highest yield value (4.37 kg/vine), and the lowest at multiple Guyot (3.35 kg/vine).

Table 1

Grape yield (kg/vine) at different types of pruning (1999-2001)

Type of pruning	Yield (kg/vine):			
	1999	2000	2001	Average
Multiple Guyot	1.90	5.34	2.82	3.35
Guyot with periodically renewed arms	2.40	5.32	3.52	3.74
Guyot on demi-high stem	2.71	5.22	5.20	4.37
Cazenave cordon	2.65	3.70	5.45	3.93
Spur-pruned cordon	2.97	4.93	3.49	3.79
Average	2.52	4.92	4.08	3.84

Table 2

The bud load increase determined a yield growth, from 3.19 kg/vine to 10 buds/m² at 4.58 kg/vine at 20 buds/m² (table 2).

Grape yield (kg/vine) at different bud load (1999-2001)

Bud load (buds/m²)	Yield (kg/vine):			
	1999	2000	2001	Average
10	2.05	3.92	3.61	3.19
15	2.48	4.82	3.87	3.72
20	2.90	6.03	4.81	4.58
Average	2.47	4.92	4.09	3.83

As for the sugar accumulation in the must at grape harvesting (table 3) the highest values were registered at Guyot with periodically renewed arms (171.9 g/l) and the lowest at Cazenave cordon (155.0 g/l).

There is little difference regarding the sugar accumulation between the different bud loads given at pruning, as the average of the three experimental years (table 4).

Table 3

Sugar concentration in the must (g/l) at different types of pruning (1999-2000)

Type of pruning	Sugar concentration in the must (g/l):			
	1999	2000	2001	Average
Multiple Guyot	163.5	171.1	168.1	167.5
Guyot with periodically renewed arms	162.2	171.5	182.2	171.9
Guyot on demi-high stem	157.3	177.7	162.5	165.8
Cazenave cordon	148.6	164.8	151.6	155.0
Spur-pruned cordon	157.5	164.9	178.3	166.9
Average	157.8	170.0	168.5	165.4

Table 4

Sugar concentration in the must (g/l) at different bud load (1999-2001)

Bud load (buds/m²)	Sugar concentration in the must (g/l):			
	1999	2000	2001	Average
10	162.1	176.3	163.6	167.3
15	149.7	166.3	162.8	159.6
20	158.2	170.1	172.7	167.0
Average	156.6	170.9	166.3	164.6

Following the correlation between yield (kg/vine) and sugar content (g/l), there is a close relation at all types of pruning. The reduction of the sugar concentration in the must from 196 g/l to 170 g/l results from the increase of grape yield at Guyot on demi-high stem in 2001, from 1.8 to 6.4 kg/vine (figure 1). The wine's alcoholic potential diminishes with 1.5 % volume by tripling the grapes' yield/vine.

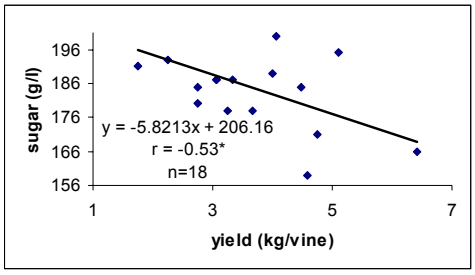

Fig. 1. Corelation between yield (kg/vine) and sugar (g/l) at Guyot on demi-high stem, 2001

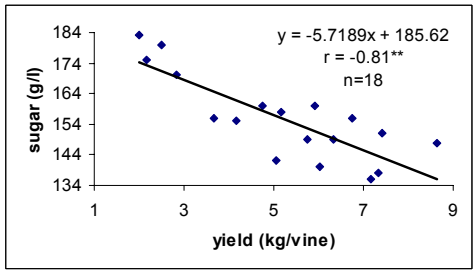

Fig. 2. Correlation between yield (kg/vine) and sugar (g/l) at Cazenave cordon, 2001

The increase of the medium yield average from 2.0 to 8.0 kg/vine at Cazenave cordon determines the reduction of the sugar concentration from 174 g/l to 144 g/l (figure 2).

By the yield increase from 3.0 kg to 6.0 kg/vine at spur-pruned cordon, there has been obtained a diminution of the sugar concentration from 180 g/l to 163 g/l, the difference representing the equivalent of an alcoholic degree (figure 3).

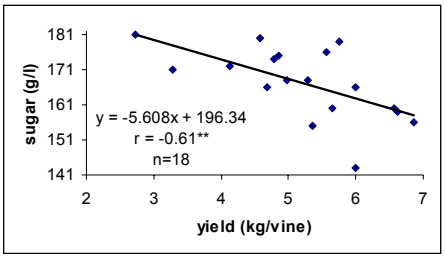

Fig.3. Correlation between yield (kg/vine) and sugar (g/l) at spur-pruned cordon,2001

CONCLUSIONS

1. The type of pruning used had an important influence both on the yield and on the sugar concentration in the must.
2. The largest yields were obtained at Guyot on demi-high stem (4.37 kg/vine), and the highest values for sugar concentration in the must were registered at Guyot with periodically renewed arms (171.9 g/l).
3. There is an antagonism between yield and sugar accumulation; while increasing the yield, we register an diminution of the sugar concentration in the must with 20-30 g/l and a alcoholic potential of wine with appreciatively 1,5-2 % volume.

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MODERN TECHNOLOGIES FOR AN ECOLOGICAL VITICULTURE

DUMITRIU I.C., BEJAN C.

Key words: minimum tillage, bio-ecological fertiliser, residue vine distilation, residue grapes press.

SUMMARY

The present study was carried out in order to emphasise the impact of ecological fertilizer applications using viticulture by products (residue vine distillation, residue grape press) on the main soil physical properties like: bulk density, soil compaction degree, total porosity, as well as on the fungi and bacteria micro flora activity in soil, as well as on vineyard parameters like: viability and grape yield from both a qualitative and quantitative view point.

INTRODUCTION

Reduction in the useful soil edaphically volume, as well as the unfavourable soil physical properties due to the monoculture in vineyards are characterised by an intensive anthropic soil compaction, and increase in bulk density and a decrease in global drainage, soil porosity, and water storage capacity *(2)(3)(4)*.

This agro-technical, non-conventional field, correlated with the soil, climate and ecological conditions specific to the vineyards like: mean annual value of the temperature of 10^0 C, precipitation - 700 mm etc, emphasized the benefit of ecological fertilizer application using viticulture by products on soil hydrological properties conservation and amelioration *(1)(5)*.

MATERIALS AND METHODS

- Improving the main qualitative and quantitative indexes of grape yield by application of bio-ecological fertilizers like grape residues enriched in microelements specific to each crop phenophase;
- Revitalizing and amelioration of soil micro flora, soil physical properties as well as an increasing in the soil organic and mineral content by using this non - conventional, viticulture-agrotechnique system;
- Reducing and even cancellation of soil pollution caused by the classical mineral fertilizer application through this technology utilization;
- Readjustment of the ecological viticulture concept on the place it is worth to have whiting the viticulture technologies used by vineyard farmers in Romania;
- Cost- effective rehabilitation of the financial-economical activity of the Experimental Station by application of bio-ecological fertilisers in vineyards instead of mineral fertiliser application.

EXPERIMENTAL TREATMENTS

Three soil ecological management treatments were differentiated in vineyards when performing the RELANSIN Program during years 1999-2002:

- I : minimum tillage – green fertilizer application;
- II : manure fertilizer application (40 t / ha);
- III : bio-ecological fertiliser applications using grape residues by products enriched with microelements.

RESULTS AND DISCUSSIONS

a. A trend of den easing bulk density (BD) versus the control treatment was noted for the III treatment where the minimum value was 1,33 g/cm^3, fig.2; the positive effect in soil of this by product differentiated this treatment of the other ones with a BD of 1,39 g/cm^3 for the II treatment and 1,4 g/cm^3 for the I one.

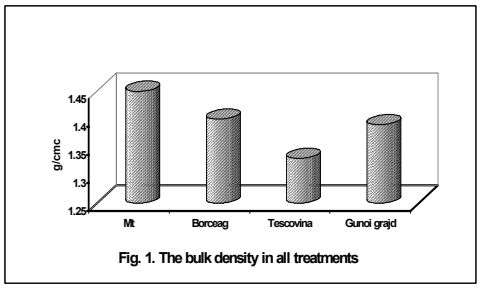

Fig. 1. The bulk density in all treatments

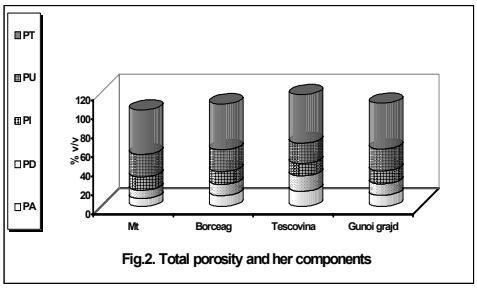

Fig.2. Total porosity and her components

b. Total porosity (TP) showed a positive response to the bio – ecological fertilizer application, where TP values were higher compared to the control (fig. 2), by about 2% in the II treatment and 4% in the III one.

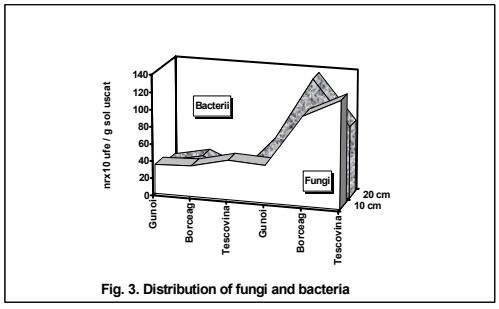

Fig. 3. Distribution of fungi and bacteria

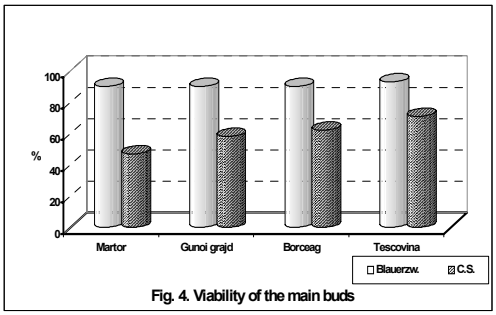

Fig. 4. Viability of the main buds

c. There was also a positive influence of the II and III treatments, specifically for the last one, concerning the activity and distribution of fungi and bacteria in soil (fig. 3), as compared to the control treatment, especially with the first 20 cm depth.

d. Viability of the main buds determined on the bearing elements showed on increasing trend from the control to the other treatments (fig. 4). The III treatment had the minimum eye lasses, and this physidegic aspect could be explained through the benefit effect of the organic fertilizer application on soil, in

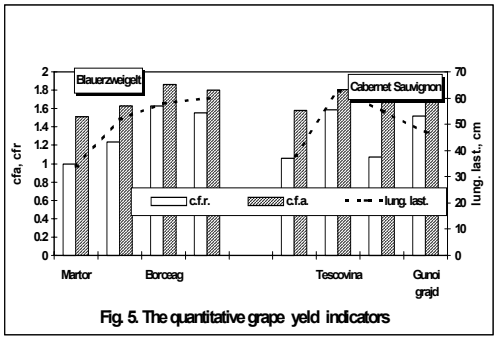

Fig. 5. The quantitative grape yeld indicators

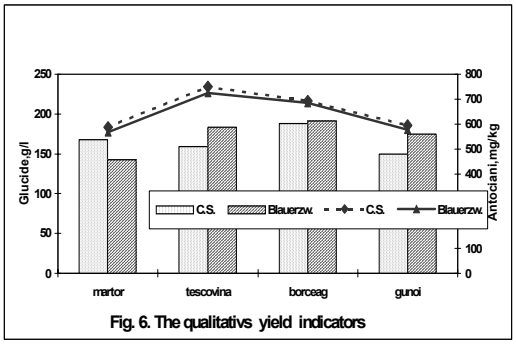

Fig. 6. The qualitativs yield indicators

general and the addition of the leaf fertilizer application on vine craps.

e. The III treatment with no mineral fertilizer application showed a positive influence on some quantitative grape yield indicators (fig. 5). The evolution of the absolute fertility coefficient values and absolute productivity index was increasing, the minimum values were for the control. In both situation the III treatment was close to the manure treatment from the profit view point*(5)(6)*.

f. Grape yield quality expressed through glucide and anthocyans content showed that the II and III treatments had close and higher values versus the control, explaining this way their positive impact.

Table 1

The net profit of the III treatment

Nr	Specification	V III	V control	VIII – V control
1	Fertilisation (mii lei)	28.448	252.000	- 223.552
2	Benefit total (mii lei)	2.856.000	2.688.000	+ 168.000
3	Profit (mii lei)	2.827.552	2.436.000	+ 391.552
4	Profit rating (%)	99,00	90,62	**8.38**

g. A decrease in material expenses associated with an increase in profit per vineyard area units *(6)(7)* was observed within the III treatment compared to the control (table 1). The net profit was 391 000 000 lei and a profit rate was 8,38%, in the III treatment and the indicators used here were up-dated for an inflation rate of 40% for 2001.

CONCLUSIONS

I. Application of non-conventional fertilizers (grape residues) in vineyards showed a positive impact on both soil physical properties and agro-biological parameters of craps vineyard.

II. Using bio-ecological fertilizers lead to a decrease, and to an increase in profit due to the reduction in material expenses per vineyard area unit.

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THE INCIDENCE OF PRE-FERMENTATIVE TECHNIQUES ON FLAVOR COMPONENTS OF THE MUSCAT OTTONEL SORT

HEROIU ELENA, SAVULESCU GEORGETA

Key words: terpenoid compounds, the pressing, the maceration, the hyperoxigenetion.

SUMMARY

The performed researches evidenced that membrane all kinds contain the same elements of de flavor are locating in special in the membrane of the berries, the difference between the intensity of the flavor and the quality are reflect in the proportion of this components. The typicality of a wine is given by the ensemble of different flavors where flavor characteristic of every variety of grapes has the principal role and then the flavors producing in the fermentative phase.

The continuous accumulations of the free and bound terpenes in precursors in the time of growing up the grapes, represents an important fact in the settle of the optimum moment for the harvest and for the technological practices in the elaboration of the wines.

The maceration and the pressing is accompanied by the growing rich of the must from grapes in the components by the flavor like in phenolic compounds-support of the oxidation of the grape musts, that confirms the rich of the membranes in the terpenols.

The hiperoxigenation can be used at juices grapes of the flavor sorts.

INTRODUCTION

The wines obtained from different grape sorts are distinguished by their organoleptic characteristics; new wines are defined by a series of sensorial characteristics, materialized in persisting and intense fruitful flavors. Obtaining wines of a real typicality characteristic needs mandatory existence of technological requirements in conducting the elaboration process, as well the use of certain flavor preserving and stabilizing techniques.

The typicality of a wine is given by the ensemble of variety flavors which the principal role is given to the characteristic flavor of a grapes variety and then the flavors produced in the pre-fermentative phase or even in the fermentative phase.

The determination of the moment of harvesting has a special importance in the fixing of winemaking techniques because the evolution of free flavor presents a maximum of 7-10 days before the technological maturity of the grapes, while the precursors of flavor are growing. From this motive in the application of technological operations we must know if we can transform the precursors in free flavors or to look to obtain a crop with a possible maximum of flavors.

MATERIALS AND METHODS

The researches made at S.C.D.V.V. – Stefanesti in the period of 2000 – 2001 on Muscat Ottonel sort, regarded:: the influence of the year of the harvest on terpenoid compounds – compounds characteristic of variety flavor: the influence of macerating temperature; the influence of pressing; the influence of hiperoxigenation on the balance between the terpenoid compounds and the phenolic compounds.

Work scheme: the healthy grape sulphiting with a doze of 3g/100kg, smashed and macerated in the rotary tanks 12 hours – for the influence of the pressing on the terpenic compounds and the phenolic compounds – and pressed immediately for the witness solution, as the scheme:

V0 – vinificated in white ; V1 – ravac; V2 –grape must pressing ;

V3 – assembled grape musts – 75% ravac and 25% pressing.

The influence of macerating and the temperature of macerating were followed in the year 2001, on grape sulfiting with 3g SO2/100kg, after the next scheme:

V0 – vinificated in white ; V1 : V2 ; V3 -macerating 8 , 12 and 24 hours at 22^0 C

V4 and V5 – macerating 12 and 24 hours, at 8^0 C

The influence of hiperoxigenation over the flavored profile and over the grade of clearness was realized through the solutions:

Vo – grape musts limpid through static decantation

V1 –grape musts limpid through flotation, barbotation of the air (20 % O_2).

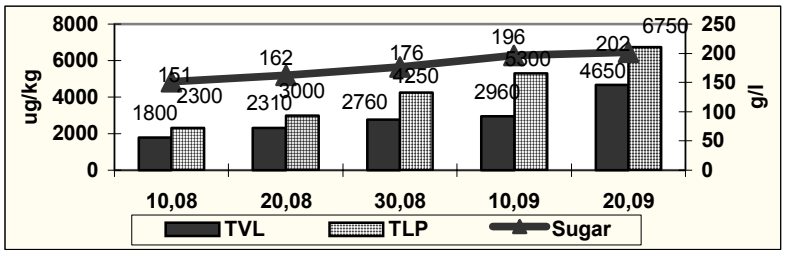
Analytics determinations have been effected after the methods made in ICVV laboratories; for the terpenic compounds were used cromatographic and spectrophotometric methods, made in the laboratory in S.C.V.V. Stefanesti.

RESULTS AND DISCUSSIONS

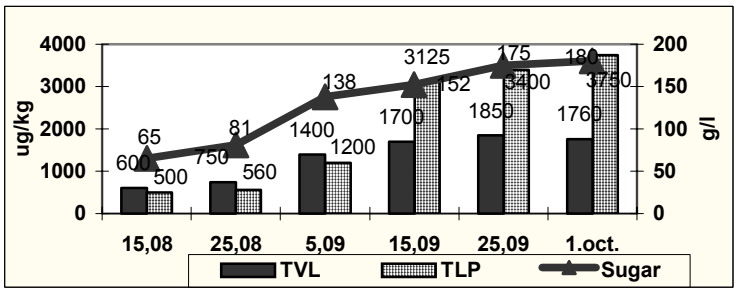
The elaboration of wines with high characteristics of typicality and fruitful, has as a first factor the sort of grapes which, healthy, harvested at the optimum moment and transported in good conditions, imprints his “imprints” in the obtained wines.

The years 2000 and 2001 are been characterized through over temperatures in the time of maturating, differentiating in the last part when the year 2000 has recorded big quantities of precipitations, unlike the year 2001 when the drought prolonged until the harvest time.

From fig. no.1, we can appreciated as an accumulation of the terpenic compounds was in a direct relation with the accumulation of the sugar like in the conditions of 2001 year, the content is much more low than the 2000 year and even much more low than the flavored potential of the sort.



Harvest 2000



Harvest 2001

Fig. 1 The evolution of maturating of grapes from Muscat Ottonel in the year 2000 and 2001

The pressing processes are accompanied by an enrichment of the grape must in terpenoid compounds:

- the must from grapes of pressing has enriched by 1,3 times in free terpenols (TVL) and by 2,4 times in bound terpenols in precursors (TLP) then the ravac (which is confirmed by the localizing them in the berry), but the enrichment in phenolic compounds in high quantity, too (fig. no 2).
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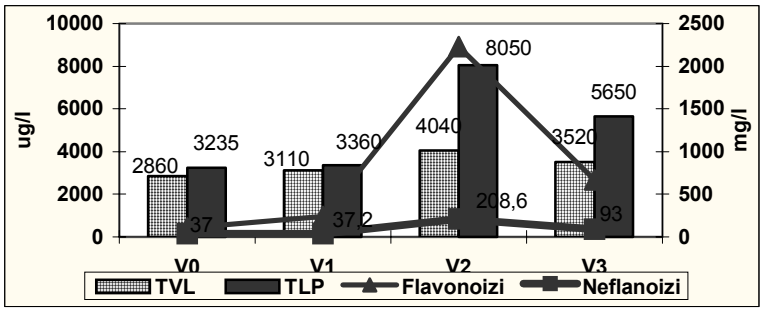

Fig. 2 The pressing influence over the composition of the grape musts from the Muscat Ottonel sort (harvest 2000)

The macerating process at a law temperature leads to higher contents of terpenoid compounds and to lower content in polifenols.

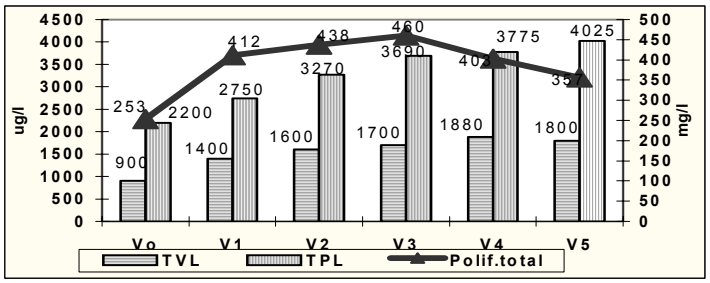

Fig. 3 The macerating influence and the temperature of macerating over the composition of the grape musts from the Muscat Ottonel sort

The hiperoxigenation doesn't influence the content in terpenoid compounds, not only at the free fraction but at the bound in the precursors, but we see an obviously reduction in the case of polifenols(fig no. 4.)

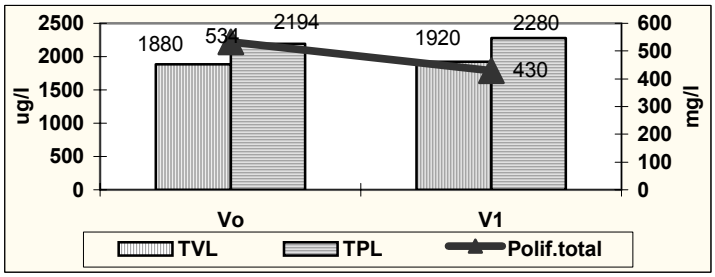

Fig. 4 The hiperoxigenation influence over the composition of the grape musts from the Muscat Ottonel sort

CONCLUSIONS

- The content in the components of the variety flavor is dependent by the climate conditions.
- The maceration at a low temperature to a grape must, enriched in characteristic components of the flavor variety and unless rich in phenolic compounds.
- The pressing is accompanied by the enrichment of the grape must in the flavor compounds, as well as in phenolic compounds.
- The hiperoxigenation can be used at grape must of the flavor sorts.

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AGROBIOLOGICAL AND TECHNOLOGICAL CHARACTERISTICS OF SOME NEW ROMANIAN GRAPE VARIETIES FOR SUPERIOR RED WINES

ADRIANA INDREAŞ, FLORENTINA RĂDOI, ELENA HEROIU

Key word: new Romanian grape varieties, red wines

ABSTRACT

Obtaining new wine grape varieties with superior characteristics comparing with the existing varieties adapted to the production and exportations it's one of the main goal of the improvement and selection work in Romania.

In the last past years one of the main work it was focused on the enlargement of the varieties range for red wines and the extension of their cultivation area.

As a result of the improvement and selection work in Romania they have been homologate two new wine grape varieties at S.C.V. Drăgăsăni: Novac and Negru of Drăgăşani. This study contains the analysis of the behavior of these varieties in the vineyard and the physiochemical characteristics of the obtained wines.

MATERIAL AND METHOD

The new varieties Novac and Negru of Drăgăşani have the same genitors (Negru Vârtos and Saperavi) and they have been homologated in 1997, respectively in 1993. For these varieties they were studied the fertility and productivity, the quantitative production and it's quality comparing with the Merlot variety as a control in three vineyard centers: Drăgăsăni, Valea Călugarească and U.S.A.M.V. Bucureşti.

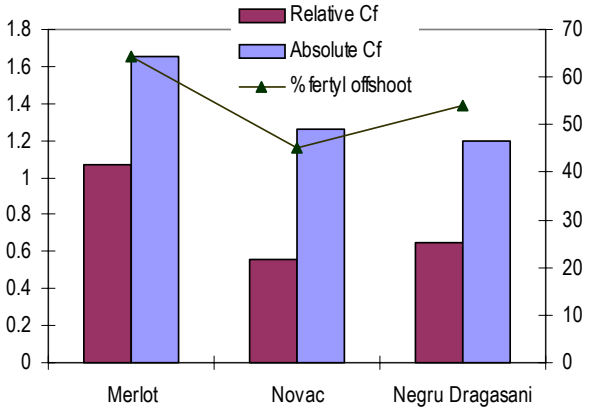


Fig. 1 - **The fertility of the new red wine grape varieties** (data from U.S.A.M.V.B)

The physiochemical analysis of the wines has been done, especially for the polyphenolic content and the anthocyanins. The wines belong to the harvests 1998 and 2001 in Drăgăşani.

RESULTS AND DISCUSSION

The fertility expressed by the proportion of fertile offshoots and by the values of the two fertility coefficients was studied at U.S.A.M.V. Bucharest (Fig.1). From this point of view the new varieties are inferior to the control.

Instead, the new varieties productivity is bigger than the control as a result of their grain weight and of the grape comparing with the control (Fig.2 and 3).

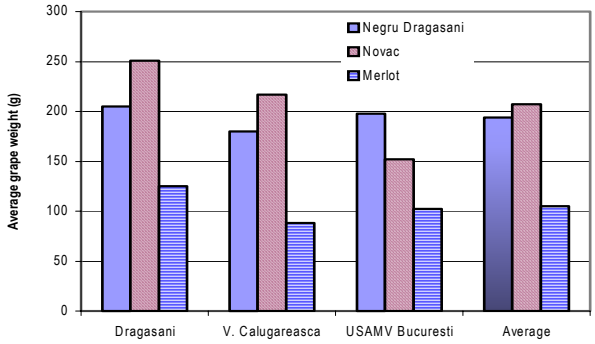
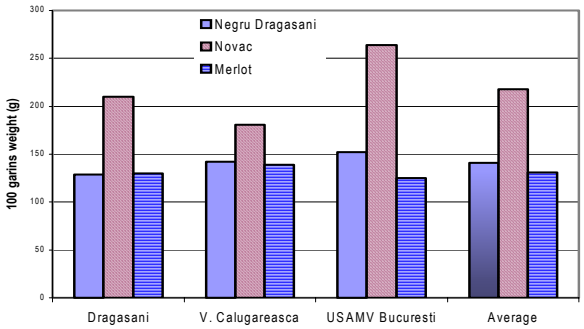


Fig.2 - **Average variation of the grape weight for the new red wine varieties**

Fig.3 - **Variation of the 100 grains weight for the new red wine varieties**



At the same level productivity for the control Merlot of 9.1 t/ha and 9.6 t/ha for Negru of Dragasani variety and a productivity of 13,9 t/ha for Novac variety, the sugars content it is superior for the new varieties. In the same time the acidity (g/l H_2SO_4) shows almost the same level for the control and the new varieties (Fig. 4 and 5).

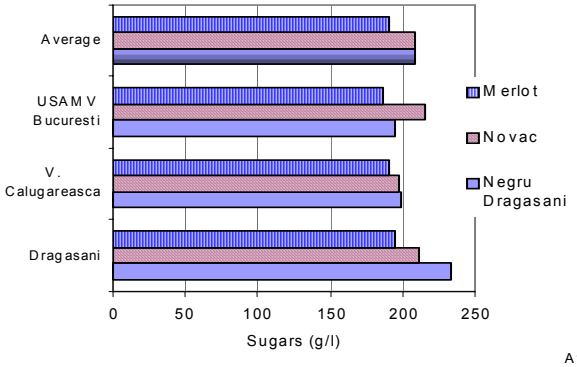


Fig. 4 - **Sugars content for the new wine red grapes varieties**

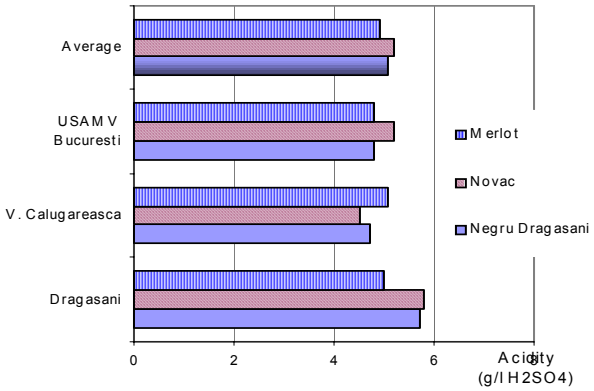


Fig. 5 - **The acidity for the new wine red grapes varieties**

The obtained wines from the two new Romanian varieties, Novac and Negru fo Drăgăşani, have a substantial similarity regarding the polyphenols with a maximum content in galic acid of 1600 mg/l. Comparing with the control, the last one, Merlot variety contain less polyphenolic compunds. Instead, the tanins from the total polyphenols rise the same level for the control and the new variety Novac (Fig. 6).

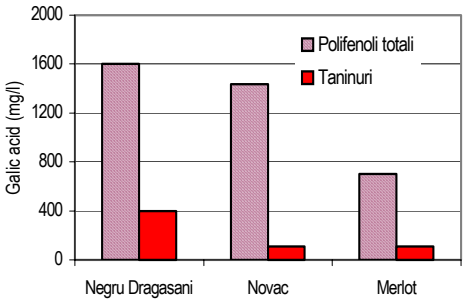


Fig. 6 - **The phenolic compounds for the new wine red grapes varieties**

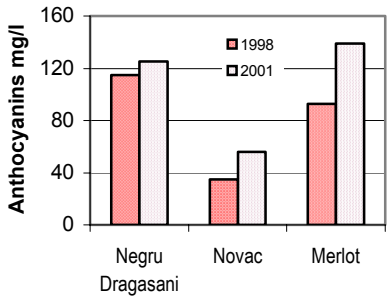


Fig. 7 - **Anthocyanin content for the new red wine grape varieties**

A very important compound of the red wine grape varieties is the anthocianins content. From the two new varieties, only the Negru de Dragasani variety accumulate constantly the same level as the control Merlot (115 mg/l, respectively 93 mg/l). The Novac variety is proved to be in a deficit regarding these compounds, their values arriving at half level from the control value (35 mg/l) (Fig. 7).

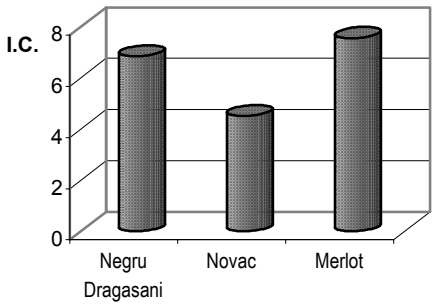


Fig.8 - **The color intensity of the red wines obtained from the new varieties**

Because of its anthocyanins content the Negru de Dragasni variety shows a more pronounced color intensity, very close to the control level (5.5 - 7.0), while the Novac variety it is close to the value of 4.5 (Fig. 8)

The three colors ratio contribution in the final color of the wine it is almost the same for the two new varieties and the control and vary between the following limits:

- blue 9,9 - 15,5 %
- red 48,46 - 63,46 %
- yellow 26,6 - 37, 66 %

CONCLUSIONS

The two new wine red grape varieties Novac and Negru of Dragasni are superior comparing with the control (Merlot) by their productivity and by some of their quality characteristics. Good color intensity, closer to the control, was found for the Negru of Dragasani variety.

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PERSONALITIES OF THE VITICULTURE AND OENOLOGY DEPARTMENT, SCHOOL BUILDERS

NĂMOLOŞANU I., OŞLOBEANU M., POMOHACI N., DEJEU L.

SUMMARY

The paper presents the personalities of the Viticulture and Enology Department, University of Agricultural Sciences and Veterinary Medicine, Bucharest.

It points out I.C. Teodorescu and G. Constantinescu's contributions to the development of viticulture in our country, to the organization of the viticulture research station and to the orientation of the scientific research in the domain. Their contribution was recognized at an international level, by O.I.V.

There are also presented many personalities who gave their contribution to the development of university education and to the main research directions.

The scientific research of Viticulture and Enology Department has a long tradition and has always enjoyed a good national and international appreciation.

The first steps of the university scientific research in this field developed as a modern science after 1884, when the phylloxera appeared in our country, as a means to recover viticulture using grafted vines on a rootstock of North American origin.

The first important personality of the Viticulture and Enology Department who dedicated his whole life to this aim was Vasile Brezeanu (1864 – 1917). He is the author of the first "Treatise of Viticulture". Vasile Brezeanu was an remarkable contributor of specialized magazines at that time, and, at the same time, he initiated the publication of "The Viticulture Review", in 1912.

After 1920, I.C. Teodorescu (1886 – 1978) followed V. Brezeanu at the Viticulture and Enology Conference. He published many papers of viticulture guidance in our country, the book of his life being the "Treatise of Viticulture", published in 1941.

Starting with 1926, I.C. Teodorescu, professor of Viticulture and director of the Viticulture Department in the Agricultural Ministry, contributed to the development of the scientific research in this field.

I.C. Teodorescu distinguished himself as an initiator of the research, regarding the study of some valuable varieties of vine. He pleaded for the reevaluation of the autochthonous varieties, which were no longer used in the post-phylloxera period. He fought against the extinction of the direct producer hybrids.

After Romania's adhesion to the International Office of Vine and Wine (1927), I. C. Teodorescu represented Romania, informing the International Forum about our viticulture reality.

As a Professor, he guided young students who were to become professorial staff in our department or in the Faculty of Horticulture, as: Gherasim Constantinescu (1902-1979), Teodor Martin (1909 – 1987), Marin Neagu (1912-1989), Dionisie Bernaz (1896-1984) etc.

The founder of this school is considered to be Professor Gherasim Constantinescu, who was not only a teacher, an important scientist (author of more than 400 publications), or a skilful manager, but also an international personality.

Gherasim Constantinescu won many academic rewards, as the one of corresponding member (1955) and then full member (1963) of the Romanian Academy, honorary member of the Italian Academy of Vine and Wine in Siena – Italy (1963), full member of the Academy of Agricultural Sciences and Forestry, Bucharest (1969). He was also named vice-president of OIV in Paris (1965-1968), then president of this important international forum (1968 – 1972), and honorary president of OIV (1971-1979).

One major step was the improvement of some techniques in viticulture illustrated by Teodor Martin. His research concerned a wide range of problems, such as: the elaboration of the criteria for establishing the unprotected vine culture and the half-protected ones, during winter; the rational application of the means of improving grape quality, the criteria evaluation to estimate wood maturity at rootstock.

These theoretical and practical aspects were presented in the 250 published works, among which the most important ones were the "Treatise of Viticulture" (published in three editions in 1960, 1962 and 1968), awarded by OIV (1962), then the monographic papers "Table – grape culture" (1973) and "Unprotected Vine Culture" (1978).

There are also other important names to be mentioned for having contributed to the development of this field, such as: Dionisie Bernaz, D.D. Oprea, Magdalena Georgescu, Nicolae Tăloi, Dumitru Rusnac and others.

A second sequence which marked Romanian Viticulture school was the genetic improvement of the vine by sexed hybridization and clone selection, due to Professor Marin Neagu. He published more than 200 papers, the most important ones being: "Selection of the horticultural plants" (1967), "Amelioration of horticultural plants and seed production" (1975).

Marin Neagu proved the validity of the theory concerning homologous series of hereditary variability of vine, as a general rule for plants, first proposed by N. I. Vavilov. He also studied vine photoperiodism, sex heredity or genetic variability as part of the Vitaceae type.Marin Neagu obtained Augusta table grape variety and selected Crâmpoşie, for wine.

Gherasim Constantinescu obtained the first vine varieties homologated in our country: Anca (1967), Timpuriu de Bucureşti (1969), Coarnă neagră selecţionată (1970) şi Coarnă neagră aromată. Creating the Negru Tinctorial variety, he obtained the direct producer hybrid from the 3rd generation, with biologic resistance. Meanwhile Vasile Dvornic created valuable table varieties: Triumf (1970), Select (1970) and Chasselas de Băneasa (1978). These were the first steps to create new varieties in Greaca, Odobeşti, Drăgăşani, Cluj, where other 40 cultivated varieties were homologated.

A 3rd sequence of the our viticultural school refers to ampeloraphic studies. The "Treatise of Ampelography" published by academician Gherasim Constantinescu, is the amplest study in the specialized literature and one of the most important in the world. It comprizes 8 volumes, which means 5 460 pages and was awarded with the OIV International Prize. There are also coauthors of this study, such as: Vasile Dvornic, D:D: Oprea, Magdalena Georgescu, Nicolae Tăloi, Milu Oşlobeanu, Nicolai Pomohaci, Adriana Indreaş, Viorel Stoian, Elena Severin etc. There are also other collaborators, who were not in the Department: Leon Văleanu, Ilie Poenaru, Victor Lăzărescu, Liviu Jianu, Gheorghe

Bălțatu, Valkeriu D. Cotea, Ştefan Oprea, Boris Baltagi, Elena Negreanu, Olga Alexei, Elena Boureanu and others.

A fourth sequence is marked by the Viticultural Ecology, whose most important representant is Gherasim Constantinescu.

The research in the field begun during the Inter-war period and referred mainly to the study of the vine varieties in grafting combinations, with different rootstocks.

The data obtained from the research were used in the study "Viticulture's Zoning" realized 1953 – 1955. This paper is the first in our country to deal with viticultural zoning, at a national level. It was followed and improved by "Viticulture's Microzoning", which extended the scientific investigation to the viticultural centre level.

This problem represented the subject of a monographic study "Viticulture Zoning in Romania", published by M. Oşlobeanu and collab., in 1991 and awarded by O.I.V. Among the specialiasts who contributed to these studies about viticultural zoning, we remind Milu Oşlobeanu, Nicolai Pomohaci, Viorel Stoian, Magdalena Georgescu, Nicolae Varga, Boris Baltagi, Mihai Sâmpetru and others.

After naming Gherasim Constantinescu as a director of the Viticultural Department in the ex-I.C.A.R. (1949), the first important activity was the direction of the research activity, on the basis of a research program for the viticultural centres in Odobeşti, Drăgăşani, Murfatlar, Blaj and Valea Călugărească. For the same purpose, Gherasim Constantinescu, as a scientifical director of ICHV (1957 – 1968) and then as general director of I.C.V.V. Valea Călugărească (1968 –1972) created new viticultural research stations in Iaşi (1957), Miniş (1957), Ştefăneşti-Argeş (1959), Greaca (1959) and Dăbuleni (1959).

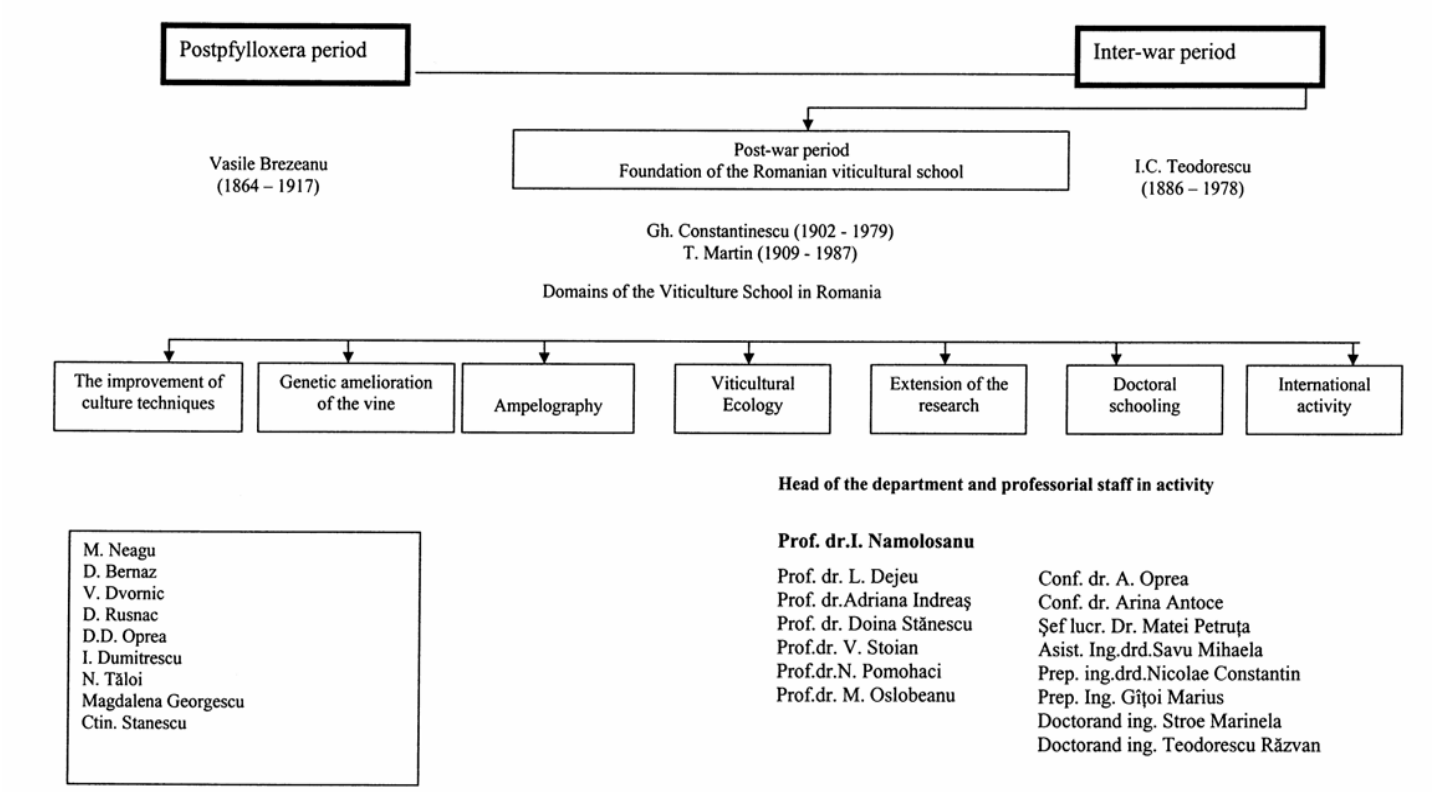
An important sequence which amplified and diversified the spectrum of the activities carried on by the viticultural school in Romania is the doctoral thesis guidance (Gherasim Constantinescu, Teodor Martin, Nicolai Pomohaci, Milu Oşlobeanu, Viorel Stoian, Ioan Năməloşanu); more than 100 doctoral thesis were presented.

Romanian viticulture school was world-wide. Our country organized the XIIth O.I.V. congress, in Bucharest, 1968. Romania also organized the first International Symposium of Viticultural Ecology, in Constanța, 1978.

The high reputation of the School is also reflected in the scientific papers signed by Gherasim Constantinescu, Teodor Martin, Marin Neagu, Dumitru Oprea; Viorel Stoian, Milu Oşlobeanu, Nicolai Pomohaci, Liviu Dejeu, published in "Bulletin de l'O.I.V.", and other periodical publications.

These are only a few sequences of what Romanian Viticulture school means. We are grateful to all the professorial staff in the Department who gave their contribution to the development of this school up to our days.

Fig. 1 Activities of the Romanian Viticulture School founded by the Viticulture and Oenology Department of the Horticulture Faculty – USAMV Bucharest



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THE MICROZONATION OF THE GRAPE VINE IN THE VINEYARD CRAIOVA HILLS DEPENDING OF THE CLIMATE AND GEOPEDOLOGIC CONDITIONS

OLTEANU I., GIUGEA N

Key words: macrozonation and microzonation, climate and geopedologic conditions

ABSTRACT

The cartografiation at a great scale of the wine-growing zones offers to the wine-grower an important level of reference for the geographic zone of production. The adaptation of the variety at the regional climate has an importance for the macroclimate level.

The special variability of the local climate and of the geopedologic conditions determined by: the topography and the geographic position of the land represents the important information in the carrying of the grape vine microzone

INTRODUCTION

The microclimate, very much studied in the latest period (Smart 1976, Becker 1978, Carbonneau 1980, 1986; Oslobeanu and colab 1990, Olteanu and colab 1991; Giugea N. 2000 etc) is influenced by the direction, strength and the metabolism of the grape vine and also depending of the type of soil.

A microzone inside the surface of study contains identified surfaces which can represent one or more basic surfaces. At the microzone level have importance the local pedoclimate (the interaction soil - radicular system) and the mezoclimate (the interaction vegetative system natural- natural environment) which represent factors with influence in the precocity of the vegetative cycle at the grape vine.

Starting from these consequences, it was carried and the microzone of the studied surface, where have been identified basic territorial units, taxing account the pedoclimate and mezoclimate.

MATERIAL AND METHOD

In order to identify the ecologic homogeneous surfaces with favorability for quality, we used specific methods for he domain and recommended OIV.

The studies supposed the characterizing of the climate and geopedologic conditions of the vineyard Craiova Hills. The biochemical physiological itinerary of the maturing in the conditions of influences about the precocity of the vegetative cycle and the quality.

RESULTS AND DISCUSSIONS

1. The characterizing of the wine-growing subzone Oltenia

The global analysis of the natural and anthropic factors from the wine growing surfaces of Oltenia decides the level of reference for the characterizing of these subzones:

- The studied zone is situated in the great structural entity of the Moesic Platform. This zone was covered by sea water (Sarmatic Sea) until the end of the tertiary.
- In zone appear longer rocks from Precambrian until the end of the quaternary. The most important storehouses are those of quaternary, represented by loess (loess of hill and loess of valley), by alluvial sail and gravel. At the superior part of the Pliocen storehouses there are old storehouses of "terra rosa" with limestone wrinkles, above them being formed later the dark-reddish soils (fig 1);
- The relief is very heterogeneous. It is recommended the base of the slopes for the varieties of consumption grapes and the middle of the sunny slopes for the varieties of grapes for wine.

1. The area of dark-reddish soil in Oltenia (after Şorop and colab.)

2. The climate and geopedologic conditions of the vineyard Craiova Hills.

The study of the variable influence main natural and anthropic factors about the wine growing production about every variety permitted the microzone inside the studied surface Banu Maracine

The main units of soils are constituted in a surprising "mosaic", favorable for a quality wine-growing; thus, we meet the soil dark-reddish weak levigated, favorable to the culture on the plane lands, dark-reddish erosioned and pseudogleizate soil on the northern sides, the dark-reddish middle erosioned soil on the southern sides, and along the narrow valleys and at the basis of the sides, the dark-reddish coluvo-aluvial soil;

The vineyard is characterized by the stability of the climate system, from the point of view of the altitude and latitude, characterized by mild winters, hot summers and insufficient rainfall in the period of vegetation

Comparing the summary climate profile of the vegetation period in a few wine-groving centers and vineyards of the oenoclimate zone A_3 in Romania and

some wine-growing regions in France, one can observe ample fields of variation, characteristic for two countries with obvious similitude's (tab 1).

Table 1

The summary climate of same wine growing regions and centers in France and Romania

FRANCE						ROMANIA					
Wine –growing Region (centre)	T_n	T	i	P	A	Wine –growing Region (centre)	T_n	T	i	P	A
Aude – Languedoc	21,9	3351	1465	316	3750	Samburesti	21,3	3226	1536	385	4627
Cotes du Rhone- Drome	22,5	3375	1737	469	4893	Costesti-Titu	21,6	3236	1511	357	4640
Cotes du Rhone Vaucluse	22,9	3461	1745	371	5085	Minis	21,1	3291	1490	365	4666
						Corcova	21,8	3313	1546	374	4682
						Nicoresti	21,5	3246	1506	317	4688
						Valea Calugareasca	21,8	3343	1505	374	4724
						Dragasani	21,7	3316	1576	385	4557
						Vanju Mare	22,2	3382	1549	309	4772
						Pietroasa	22,4	3411	1520	395	4786
						Buzau	22,2	3380	1539	339	4830
						Murfatlar	22,2	3284	1646	232	4930
						Banu Maracine	22,9	3356	1606	320	4956
						Tulcea	22,4	3343	1633	238	4998

Procesing after St. Tedorescu; A Popa; Gh. Sandu (1987)

T_n – Average temperature of the air in the month of July 1- The average of the years 1921-1950
T – Sum of the temperature degrees in the period of vegetation; 2 -The average of the years 1961-1970
I - Sum of the sunstroke hours in the period of vegetation: 3- The average of the years 1991-2000
P - Sum of the rainfall in the period of vegetation;
A – Oenoclimate aptitude

3. The oenoclimate characterizing of the year production

The action and contribution of the variety and of the edaphic and orographic factors at he defining of the production quality are influenced by the climate conditions which can improve the quality of the grapes and in the some time, they reduce their quality.

In order to define the characteristics of the year production, we carried and summary climate profiles for the wine-growing centers Banu Maracine and Segarcea.(tab 2).

Table 2

The influence of the climate profiles about the year –production in the centers Banu Maracine and Segarcea

Vineyard	Thermic ballance	Sunstroke	Rainfall(mm)		The index of oenoclimatic aptitude
			IV-IX	VIII-IX	
Unfavourable years					
Banu Maracine	3203	1540	482	70	4389
Segarcea	3038	1536	388	141	4436
Moderate favorability years					
Banu Maracine	3171	1566	387	88	4746
Segarcea	3205	1482	415	85	4522
Favorable years					
Banu Maracine	3452	1550	209	54	4990
Segarcea	3327	1566	463	109	4681
Very favorable years					
Banu Maracine	3698	1857	223	74	5204
Segarcea	3454	1484	368	76	4820

The unfavorable years from the oenoclimate point of view represents a weight of 1/10 in the booth wine-growing centers. Even in these years, the recommended varieties for every wine-growing center permit the carrying out of some finite products, which can be appointed in the category of the superior wines. We can assert that the vocation of the two wines growing centers for wines of superior quality of type DOC and DOCC is considerable (especially red wines at Banu Maracine).

CONCLUSIONS

The microzone of the grape vine permits the capitalization of the positive influences of the natural and anthropic factors, doing possible the maintaining of the rename and prestige of the wine-growing products from Oltenia;

By microzone appreciating the directions of the established wine growing production, one can observe the priority of the vineyard Craiova Hills in the carrying out of the red wines of a superior quality;

By carrying out the climate profiles one can define the oenoclimate favorability of the crop year. The very favorable crop-years impose positive correlations between the precocity of the varieties and the elements of the qualitative potential.

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RESEARCHES ON THE CLONAL MULTIPLICATION OF THE *Vitis vinifera*

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GRIGORESCU MIHAELA VICTORIŢA

Key words: culture "i*n vitro*", clonal multiplication, culture media, grape varieties

SUMMARY

The main objective of this researches follows the caulinars growths for the "in vitro" culture; they have been used two culture media (A factor with the graduations a_1 – Murashige-Skoog and a_2 – modified MS) and four grape varieties (B factor with the following graduations: b_1 – Victoria, b_2 – Ozana, b_3 – SO_4 greffing plant, b_4 – Ruggeri 140). The experimental plan it was arranged on subdivided parcels.
As a result of the calculation of the variance analysis and of the limited differences the modified MS medium is more efficient than the simple MS medium. The biggest rate growth was found for the Victoria variety (b_1), following by Ozana (b_2), and the smallest were the greffing plant SO_4 (b_3) and Ruggeri (b_4).

INTRODUCTION

The clonal multiplication by "in vitro" cultures represent at this time a main research subject for many laboratories which are trying to find the possibilities to a rapid propagation of the valuable genotypes having a superior multiplication rate comparing with the conventional method of vegetative multiplication.

The tissues and vegetative cells cultures offers specials conditions in order to increase the plant improvement; by this way it is possible to create3 in a short time haploid plants, isogenic lines, hybrids with a high economical value, free virus plants, resistance to illness and insects, to salt media, to dryness, frozen, herbicide, etc. The used methods represent important ways to induce the genotype variability; the obtained descendents because they are not identical copies of the parent they have a rapid evolution of the kariotype finally being industrial cultivated in phytostates.

MATERIAL AND METHOD

The aseptic manipulations have been done in a room without persons traffic; the equipment was sterilized as well as the instruments which were introduced in the sterile box; after the inoculation the vessels have been passed in the growing room having a with control for the thermic estate, hydric estate and for

the light. For the solid objects it was done a pre-sterilization for 1 – 3 hours at 160°C (dry sterilization) followed by the autoclavation and fire sterilization.

The media and the distillated water have been sterilized by autoclavation at 120°C for 15 – 40 minutes depending on the volume of the liquid.

The nodal fragments harvested from the vineyard have been fragmented in small parts and than sterilized using a $HgCl_2$ solution of 0,1% concentration, for 15 minutes followed by 5 rinsing with double distilled and sterile water. After the sterilization all the material have been inserted and than inoculated in the sterile box on the media in vessels followed by the growth process in the growing rooms.

The goal of the experiment it was the study of the caulinar growth "in vitro" and the factors took in work were:

A factor – the graduation of the cultivation media:

- a_1 – Murashige-Skoog medium (1962)
- a_2 – modified MS medium

B factor – the grape varieties with the following graduation:

- b_1 – Victoria
- b_2 – Ozana
- b_3 – greffing plant SO_4
- b_4 – greffing plant Ruggeri 140.

RESULTS AND DISCUSSION

The variance analysis. The table 2.1 shows that the two media have a significant influence on the growth rate of the nodal fragments or on the total length measured on the same date for all the culture vessels.

Table 2.1

Variance analysis of the nodal fragments length

Variability cause	SP	GL	S^2	F. calc.	F. tot.	Significance
Big parcels	159,87	5			22,6	
Repetitions	49,75	2			159,93	X
Culture medium (A)	108,37	1	108,37	123,85	3417,9	
Error (a)	1,75	2	0,87		3,56	
Small parcels	586,75	18			6,19	XXX
Grape varieties (B)	449,45	3	149,81		11,7	
Error (b)	25,16	12	2,09		3,56	
Interaction (AxB)	112,12	3	37,37	17,82	6,19	XXX
Total	746,62	23			11,7	

Different form the factor A (the medium), the grape varieties show a very significant influence on the nodal fragments growth, probably because of the

differences in the hormonal resources, which represent a genetic characteristic of the varieties.

From the same table it is possible to observe that the influence of the variety it is bigger when the two factors are interacting during the nodal fragments growth (A x B).

Comparing the interaction of the two influence factors it result that there are differences betwen the different degree of the significance (table 2.2 and 2.3).

Table 2.2

The behaviour of the grape varieties on Murashige – Skoog medium

Variant, Murashige – Skoog (a_1)	Nodal fragments lenght		Difference	Significance
	mm	%	mm	
Victoria (b_1)	17,66	100	0	N
Ozana (b_2)	8,33	47,1	-9,34	000
SO_4 (b_3)	13	73,5	-4,67	00
Ruggeri (b_4)	12	67,9	-5,67	000 .

DL 5 % = 2,57;
DL l % = 3,61;
DL 0,l % = 5,1

Table 2.3

The behaviour of the grape varieties on modified Murashige – Skoog medium

Variant, modified Murashige – Skoog (a_2)	Nodal fragments lenght		Difference	Significance
	mm	%	mm	
Victoria (b_1)	26	100	0	N
Ozana (b_2)	13,66	52,5	-12	000
SO_4 (b_3)	10	38,4	-16	000
Ruggeri (b_4)	18,33	70,5	-7	000

DL 5 % =2,57;
DL l % = 3,61;
DL 0,1% = 5,1

The monofactorial analysis of the experimental data regarding the "in vitro" nodal fragments growth on the MS medium (a_1) (table 2.4 and 2.5) prove a distinct significant influence of the medium a1 on the nodal fragments growth comparing with the modified MS medium (a_2) which has an very significant influence on the nodal fragments growth.

Table 2.4

Variancy analysis for the Murashige – Skoog medium (a_1)

Variability cause	SP	GL	S^2	F. calc.	F. tot.	Significance
Repetitions	33,5	2	44,3 1,97	22,46	4,81 10,01 24,92	XX
Variants	132,91	3				
Error	11,83	6				
Total	178,25	11				

Table 2.5

Variance analysis for the modified Murashige – Skoog medium (a_2)

Variability cause	SP	GL	S^2	F. calc.	F. tot.	Significance
Repetitions	18	2	142,88 2,22	64,29	4,81 10,01 24,92	XXX
Variants	428,6	3				
Error	13,33	6				
Total	459,99	11				

CONCLUSIONS

As the results of the observations and measurements, here are the conclusions:

1. The nodal fragments growth on the two culture media shows that modified MS medium is more efficient.
2. Regarding the studied grape varieties, it was noticed the difference caused by the influence of the hormonal resources which actually represents genetically characteristics.
3. The biggest growth rate of the nodal fragments were found for Victoria variety (b_1), followed by Ozana variety (b_2), and the smaller and sensible equal for the greffing variety SO_4 (b_3) and Ruggeri (b_4).

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STUDY OF SOME DECISIVE STIMULATIVE FACTORS OF THE YEASTS ACTIVITY

POPA A., DANIELA POPA

Key words: must fermentation, yeasts activity

ABSTRACT

The research results obtained for a long period of time (1995-2002) pointed out the fact that the temperature of the fermentation's medium, the concentration in sugars and the internal surface of the must are the most important factors of the yeasts activity's stimulation.

INTRODUCTION

In the conditions of the oenological fermentations type, the yeasts are especially confronting during the stationary phase with an ensemble of physical and chemical conditions totally unfavourable. In these conditions the stimulative factors of the yeasts activity are often sinergicaly interfering, by fortifying their effects.

Due to the fact that the literature of speciality has just few informations, even incomplete justified, regarding these aspects, our research team considered to be necessary the study of some factors which are stimulating the yeasts activity during the grape's must sugar metabolisation.

MATERIAL AND METHODS

Among the yeasts activity's stimulating factors, we studied the temperature and the internal surface of the must during the fermentation process.

Concerning the stimulative effect of the temperature on the yeasts activity, during the fermentation process were recorded the metabolised sugars quantities and the number of the yeasts cells.

Were pointed out the limits of sugars metabolisation by yeasts, in different fermentation medium. With a view to assure the must with changeable internal surface, were applied must clarification treatments before beeing inseminated with yeasts.

RESULTS AND DISCUSSION

By recording the fermented sugars and the yeasts microflora from the effervescence medium (figures 1and 2) were established different rates of sugars metabolisation and yeasts multiplication, determined especially by the fermentation temperatures, the abundance of musts' energetically substances and the appearance of the stress factors on the fermented medium (ethanol, propionic and butiric acids a.s.o.).

Fig.1. Total fermentated sugars to Merlot variety (210g/l) depending to the temperature of fermentation and at different determination moments

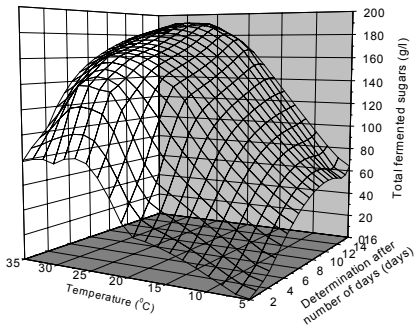
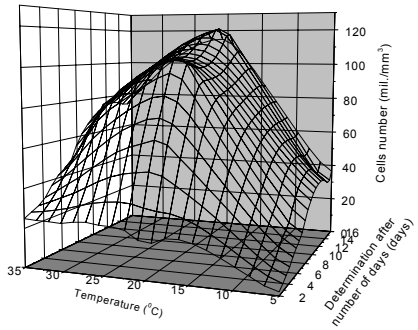
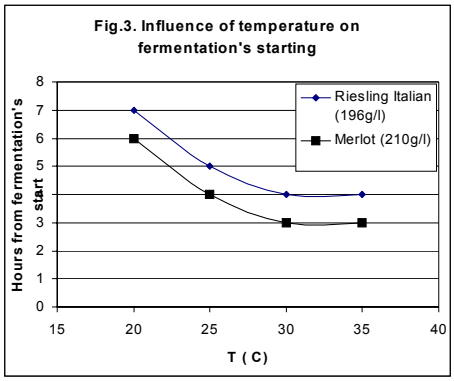
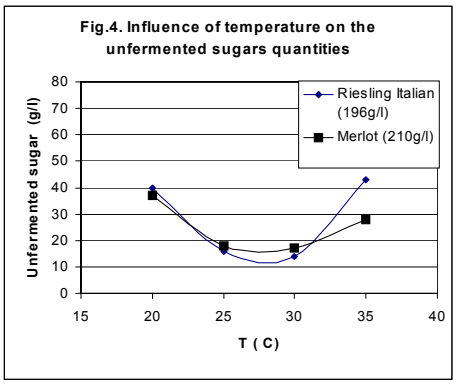


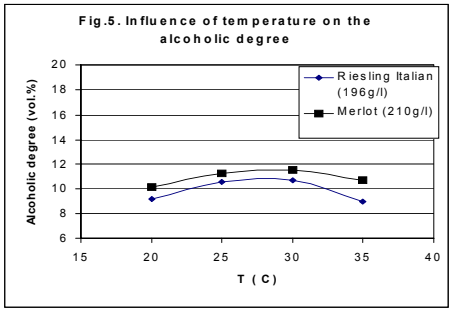
Fig.2. Cells number for Merlot variety (210g/l) depending on the fermentation temperature at different determination moments



The results concerning the maximal limit of sugars metabolisation and the duration of the **lag phase** (accommodation) are presented on figures 3, 4 and 5.







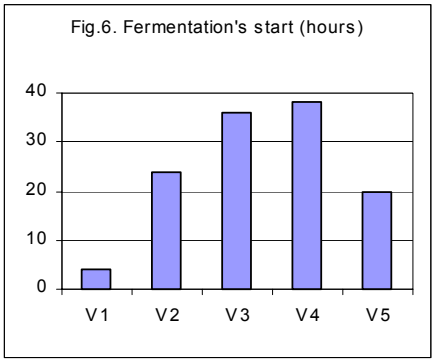
The musts' fermentation's starting is realized after 3-4 hours from insemination, when the temperature is of about 30-35^{0}C and only after 5-7 hours, when the must is fermented at 20-25^{0}C.

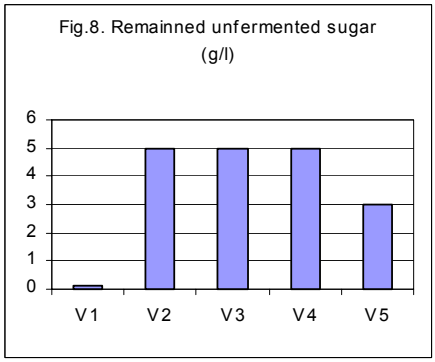
The highest proportions of alcohol, obtained after 15 days of fermentation were recorded when the temperature during the process of fermentation is comprised between 25-30^{o}C.

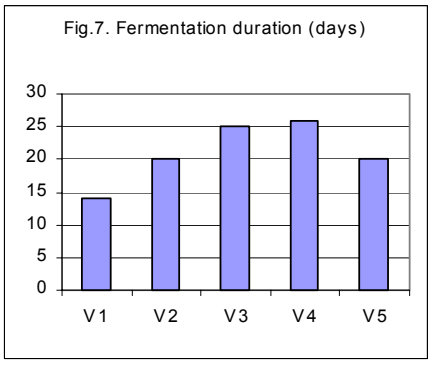
At temperatures higher than 35^{o}C, the alcoholic fermentation is practically blocked; in this way, considerable quantities of unfermented sugars are remaining, which are unfortunately crossing other metabolic ways than the one of the alcoholic fermentation; finally there are obtained some products that are not found in the normal wine composition.

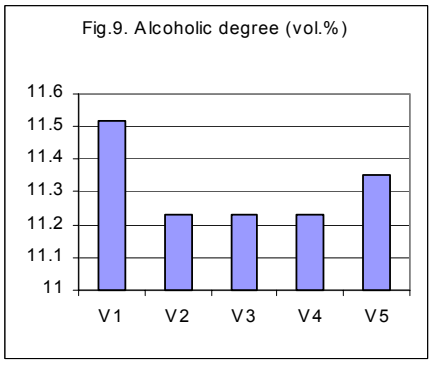
The yeasts govern the fermentation's medium with a rapidity depending mostly also by the internal surface of the product that must be fermented (figures 6,7,8,9).

The faster fermentation's starting process is realized when the must was not decanted (has maximal internal surface); in this case the fermentation process is









V1- Undecanted must 60 mg. SO_2/l
V2- Decanted must after 8 hours; clarificated 1g/l bentonite and 200 mg. SO_2/l
V3- Decanted must after 8 hours at 4^{o}C; 60 mg. SO_2/l
V4- Decanted must after 8 hours at 4^{o}C; filtred SKS; 60 mg. SO_2/l
V5- Decanted must after 8 hours at 4^{o}C; filtred SKS; 0.5g/l diatomee, 60 mg. SO_2/l

The faster fermentation's starting process is realized when the must was not decanted (has maximal internal surface); in this case the fermentation process is shorter, the efficiency of the sugars metabolisation is increasing and the wines remain with insignificant remainder sugars.

CONCLUSIONS

1. The assessment of the fermentative activity of the yeasts strain is pointed out by the rapidity and the efficiency of substrate's fermentation.
2. The fermentation temperature and the internal surface of the submitted must to the fermentation process are influencing the duration of the lag phase (accommodation), the fermentation process length, and also the limit of metabolizing the sugars through the alcoholic fermentation pathway.

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POLLEN SIZE VARIABILITY WITHIN SOME TABLE GENOTYPES OF *VITIS VINIFERA*

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Key words: grapevine, pollen grains, unreduced pollen, heterozygosity

SUMMARY

Pollen size was investigated in 10 table cultivars and 3 valuable clones of grapevine. The measurements carried out on samples of pollen stained with acetocarmine by using light microscopy revealed a relatively large variation in pollen size, not only intervarietal, but also intravarietal in several genotypes. Thus, the measured diameter of pollen grains ranged between 16.2 and 21.2 μm in cv. Napoca and between 22.5 and 35.0 μm in cv. Afuz Ali, respectively. As expected, the degree of variation and differences between the investigated genotypes were even higher when the calculated volume of pollen grains was compared. For instance, the volume of pollen grains ranged between 2,225 and 8,177 μm^3 in clone 1-48-25, and between 5,961 and 22,438 μm^3 in cv. Afuz Ali, respectively. The largest variation in pollen size was found in cvs. Muscat of Alexandria, Afuz Ali, Coarna neagra, Calina, and clone 1-48-25. It is likely that the presence of giant pollen grains in several grapevine cvs. is a consequence of irregular meiosis, and the frequency of such pollen grains, which can be considered unreduced gametes, would be of interest in breeding for triploid or tetraploid cultivars. Even more interesting is the case of the grapevine cultivars in which the graphical distribution of pollen size showed two distinct peaks, revealing either their complex hybrid origin, or a high frequency of unreduced pollen.

INTRODUCTION

In grapevine, like in many other species, the pollen grains shown a relatively large variability. In the last decades, several studies focussed on pollen characterization in various grapevine genotypes. Previous account of certain features of pollen and, related to this, on genetic biodiversity, were given by Martens *et al*., (1989) and Pop *et al*., (1990). It was emphasized that not only the shape of pollen is characteristic for a certain genotype, but also the variation in size and the frequency of unreduced pollen formation. Thus, it is a well known fact that within the diploid plants of grapevine the pollen grains are small and relatively uniform in size, while within the polyploid plants they are larger and have a much more irregular shape. There were also reports on the mixture of small and large pollen grains found within the mixoploid genotypes of grapevine, such as chimeras.

The results reported in several fruit species such as cherry, peach, apple, strawberry, blueberry and grapevine (Sanford, 1983), revealed that the 2n pollen tends

to have nearly twice the volume (or 1.3 times the diameter) of reduced pollen. According to Prasad (1972) and Sanford (1983), a pollen diameter exceeding 31 μm or a volume ratio (maximum/mean value) higher than 1.9 are very reliable indicators for distinguishing the grapevine genotypes producing unreduced gametes. Such differences in volume make it relatively easy to detect genotypes producing such 2n or "giant" pollen, by microscopically measurements. The 2n gametes occurs widely, though sporadically, due to environmental and genetic factors, and might result in formation of polyploid plants (Sacerdote *et al.*, 1981; Zhang *et al.*, 1998). Ploidy changes are of major interest for practical breeders because they affect crossability, fertility, cell size and heterozigosity.

The present paper is directed to study the variability in size of mature pollen of some important genotypes of *Vitis vinifera.*

MATERIALS AND METHODS

Bud flowers were collected just before anthesis from mature plants of 10 table grapevine cultivars and 3 valuable clones, and dried at room temperature. For the microscopically observations on pollen size, the samples were stained in 1 % acetocarmine and the diameter were measured with an eye micrometer for at least 200 pollen grains in each grapevine genotype. Measurements were made over two different seasons and the data were compared by calculation of both the mean diameter and volume of pollen grains in different cultivars, as well as by graphical representation of variation observed in diameter of pollen grains.

RESULTS AND DISCUSSIONS

A great variation in pollen size was revealed by the microscopically measurements, depending on the grapevine genotype. For instance, with cv. Napoca and clones 1-48-25 and 1-40-7, the mean values of the diameter (Table 1) were lower than the minimum value (20.4 μm) reported so far for the grapevine cultivars belonging to *Vitis vinifera*. Moreover, with the above-mentioned genotypes, the most frequent classes of pollen diameter had lower diameter and volume. On the contrary, pollen grains with higher diameter than maximum reported previously in other table grapevine (32.8 μm) were found with cv. Afuz Ali.

Table 1

Pollen size variability in some table cultivars of grapevine

Genotype	Diameter of pollen grains		Volume of pollen grains	
	Mean value/ amplitude of variation (μm)	Diameter ratio (maximum value/mean value)	Mean value/ amplitude of variation (μm^3)	Volume ratio (maximum value/mean value)
Muscat Hamburg	22.7 21.2-27.5	1.3	6,122 4,986-10,884	1.8
Italia	24.3 21.2-27.5	1.3	7,509 4,986-10,884	1.4
Muscat of Alexandria	21.7 17.5-30.0	1.7	5,348 2,805-14,130	2.6
Afuz Ali	27.8 22.5-35.0	1.5	11,244 5,961-22,438	2.0
Coarnă neagră	26.9 18.7-32.5	1.7	10,187 3,422-17,965	1.8
Călina	27.8 23.7-32.5	1.4	11,244 6,967-17,965	1.6
Alphonse Lavalleé	21.4 18.7-25.0	1.3	5,129 3,422-8,177	1.6
Napoca	18.0 16.2-21.2	1.3	3,052 2,225-4,986	1.6
Augusta	23.8 21.2-26.2	1.3	7,055 4,986-9,412	1.3
Bezsemen	24.5 21.2-28.7	1.3	7,634 4,986-12,372	1.6
1-48-25	18.9 16.2-25.0	1.5	3,590 2,225-8,177	2.3
2-91-4	24.9 22.5-28.7	1.3	8,080 5,961-12,372	1.5
1-40-7	21.9 18.7-25.0	1.3	5,497 3,422-8,177	1.5

An interesting observation was that in some genotypes such as Muscat of Alexandria, Afuz Ali, Coarna neagra and 1-48-25, the distribution of pollen grains within the classes of diameter values (data not shown), revealed by graphic representations, showed a major peak which was assumed to be corresponding to the normal pollen (n), and a minor peak which is likely to be corresponding to the

unreduced pollen (2n). The presence of more than 3 pores in most of the "giant" pollen grains can be considered as a confirmation of this assumption.

As expected, the amplitude of variation within the same grapevine cultivar and the differences between various cultivars were much more relevant when the calculated volume of the pollen grains was compared. Thus, the mean value for the volume of pollen grains varied between 3,052 μm^3 with cv. Napoca and 11,244 μm^3 with cvs. Afuz Ali and Calina (Table 1). Considering the volume ratio (maximum/mean value) in grapevine pollen grains higher than 1.9 which is attributed exclusively to unreduced gametes, the results obtained by us with genotypes Muscat of Alexandria, Afuz Ali, Calina and 1-48-25 are indicating a high frequency of unreduced pollen formation.

CONCLUSIONS

The results obtained with the investigated table grapevine cultivars and clones allowed the identification of several genotypes in which the formation of unreduced pollen seems to be a current event. These genotypes could be potentially useful for the manipulation of ploidy in table grapevine. On the other hand, the obtained results on variability in pollen size enabled us to better characterize the different table grapevine genotypes from the point of view of their heterozigosity, which has major implications in breeding and genetic improvement.

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CONTRIBUTIONS TO THE MACROCLIMATE STUDY FROM VITICULTURAL CENTRES OF THE MOLDAVIAN HILLS REGION

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Key words: grapevine, enological climate, zoning

The enoclimate determines the area in which the grapevine is spread worldwide, the differences in the cultivated varieties, in the quality of wines and their typicality. For this reason, the quantitative analysis of the favorability degree of different regions and viticulture centre became indispensable. The discrimination is done in accordance with the heliothermal and hydric resources, as well as some temperature limitations during the cold season, on the basis of some synthetic indexes such as: hydrothermal index (Seleaninov, 1936), heliothermal index (Branas, 1946), bioclimatic index (Constantinescu et al., 1964).

MATERIAL AND METHOD

In order to evaluate the macroclimate from viticulture centre of the Moldavian Hills region, the following internationally accepted three indicators were used, namely: drought index – IS (Ch. Riou and et.al.,1994), heliothermal index – IH (P. Huglin, 1978) and the night cooling index – IF (J. Tonietto, 1999).

RESULTS AND DISCUSSIONS

The data that we obtained on the basis of the three synthetic indexes (indicators), concerning the 53 viticulture centres of Moldavian Hills region, are presented in Table 1.

Taking into account these results it can be concluded that there are six types of viticulture macroclimate in the region of the Moldavian Hills, as follows:

1.The humid, cool, with cold nights viticulture macroclimate type **(ISoo IH2 IH4).**

This climate is specific for the Bozieni independent viticulture centre, in Neamţ (in the world this type of viticulture climate can be found in other viticulture centre such as: Freisburg, Nantes (France).

2. The half-humid, temperate, with cold nights viticulture macroclimate type **(ISo IH3 IF4)**. We can find this type in seven viticulture centre, such as: Hârlău, Frumuşica (from Cotnari vineyard), Parincea (from Zeletin vineyard), Hlipiceni, Plugari, Vaslui and Răcăciuni (as independent viticulture centres).

3. The temperate viticulture macroclimate type with mild drought and cold nights **(IS1 IH3 IF4)**

Table 1

THE VITICULTURAL MACROCLIMATE TYPES AND THE VITICULTURAL CENTRES FROM THE MOLDAVIAN HILLS REGION							
IS00 IH2 IF4	IS0 IH3 IF4	IS1 IH3 IF4			IS1 IH4 IF4	IS2 IH4 IF3	IS2 IH4 IF4
1. Bozieni	1. Hârlău	1. Cotnari	14. Tutova	27. Panciu	1. Iveşti	1. Smârdan	1.Scânteieşti
-	2.Frumuşica	2. Cucuteni	15. Bălăbăneşti	28. Tifeşti	2. Tecuci	-	2. Pechea
-	3. Parincea	3.Tg. Frumos	16. Bujoru	29. Păuneşti	3. Grivița	-	3. Hanul lui Conache
-	4. Hlipiceni	4. Copou	17. Smulți	30. Odobeşti	-	-	-
-	5. Plugari	5.Bucium-Tomeşti	18. Oancea	31. Jariştea	-	-	-
-	6. Vaslui	6. Uricani	19. Bereşti	32. Boloteşti	-	-	-
-	7. Răcăciuni	7. Comarna	20. Nicoreşti	33. Coteşti	-	-	-
-	-	8. Huşi	21. Buciumeni	34. Tâmbureşti	-	-	-
-	-	9. Avereşti	22. Băleni	35.Cârligele	-	-	-
-	-	10.Vutcani	23. Zeletin	36. Vârteşcoi	-	-	-
-	-	11. Murgeni	24.Dealu Morii	37. Probota	-	-	-
-	-	12. Bohotin	25. Tănăsoaia	38. Corod	-	-	-
-	-	13. Ianca	26.Gohor	-	-	-	-
1/2	7/12	38/70			3/7	1/2	3/7

This is typical for 38 viticulture centre and it concerns the great majority of the vineyards corresponding to this viticulture region (such as Cotnari, Iaşi, Huşi, Panciu, Odobeşti, Coteşti etc). It is the most frequent type of viticulture climate that we find in the European viticulture – oceanic type and transition temperate type.

4. The warm-temperate viticulture macroclimate type with temperate drought and cold nights **(IS1 IH4 IF4)**

It concerns a number of three viticulture centre, such as Iveşti, Tecuci (from Iveşti vineyard) and Grivița (as an independent viticulture centre). It is typical to the temperate-continental climate with excessive elements.

The appearance of this shade of warm-temperate climate in this viticulture region (IH4) is due to great differences between the average of maximal monthly temperatures and the average of normal monthly temperatures (during 01.04. – 30.09.) and also due to a high degree of continentals.

5. The warm-temperate viticulture macroclimate type with temperate drought and cool nights **(IS1 IH4 IF3)**

It was identified only in the viticulture centre in Smârdan (from Covurlui vineyard). In this case we talk about an IH4 equal to 2158 units, that is very close to the superior limit of IH3.

6. The warm-temperate viticulture macroclimate type with great drought and cold nights **(IS2 IH4 IF4)**

It is specific to viticulture centre in Scânteieşti, Pechea (from Covrului vineyard) and in Conachi's Inn (as an independent viticultural centre).

As part of this macroclimate type there are two viticultural centers which have values very close to the inferior limit of the IS2 indicator (Scânteieşti with IS2 = -113,6 mm and Conachi's Inn with IS2 = -124,1 mm), but there is also a viticultural centre such as Pechea which presents medium values for the synthetic indicator that we have taken into consideration.

CONCLUSIONS

The dates on the basis of table show that the balance of the six types of viticulture macroclimate is very different. For instance:

- 70% for the **IS1 IH3 IF4** climate type (temperate drought, temperate climate and cold nights)
- 12% for **IS0 IH3 IF4** (half humid climate, temperate, with cold nights)
- 7% for **IS1 IH4 IF4** type (temperate drought, temperate climate, cold nights) and for **IS2 IH4 IF4** type (high drought, temperate climate, cold nights)
- 2% for the following macroclimate types: **IS00 IH2 IF4** (humid climate, cool, with cold nights) and **IS2 IH4 IF3** (great drought, temperate climate, with cold nights).

These data are used in order to appreciate the thermic and hydric resources related to the grapevine request and also related to the maturation conditions of the grapes. Accordingly, from all data we obtained a general estimation of each one of the 53 viticulture centers located in the Moldavian Hills.

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ACHIEVEMENT WITH *IN VITRO* PROPAGATION BIOTECHNOLOGIES FOR VINE AND OTHER HORTICULTURAL SPECIES AND THEIR COMMERCIAL MARKETING

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Key words: *in vitro* culture, grapevine, horticultural species, efficiency

SUMMARY

Biotechnological potential of Phytotronic Center of S.C.D.V.V. Ştefăneşti – Argeş gives the possibility of obtaining of grapevine planting material of high biological value and also industrial multiplication of other horticultural species. This paper shows some aspects on profit evaluation which is possible to be realized by emplementation of results obtained by virus elimination technology in Romanian viticulture in the next years.The technique of *in vitro* multiplication of some horticultural species has been established and, also, in the laboratory studies are carried on the try to behaviour to the *in vitro* micropropagation of other species. This paper shows some aspects on profit evaluation which is possible to be realized by emplementation of results obtained by virus elimination technology in Romanian viticulture in the next years.

INTRODUCTION

In Romania, the major goals of *in vitro* tissue culture have been complied with two distinct directions but complementary, however:

- basic research, pre-eminently in the institutes of biology and universities;
- practical research *in vitro* agricultural and pharmaceutical institutes.

In vitro techniques are looked upon us major sanitary methods because enable a plentiful multiplication of virus free plants for all horticultural species (Brezeanu and Anghel, 1986; Teodorescu and Neculae, 1999).

The establishment of Phytotronic Center Ştefăneşti – Argeş has been of vital importance and hallmarked the path from theoretical to practical research, highlighting once more the particularly biological potential in this area and its prospects in Romania.

With respect to that, the research work and technological transfer were focused to development of vine nursery stock of high biological quality as well as the commercial propagation of other horticultural species.

MATERIALS AND METHODS

The practical research has been the major concern of the most research workers, who would employ the plant micropropagation as a tool of *in vitro* culture techniques in order to develop by these means a new industry of biological material.

a) For grapevine propagating material, the microculture is a rather difficult technique as the majority of research in this field. Thanks to an ever increasing improvement of this technique, optimum cultural conditions were set up (medium composition, photoperiode in the growth chambers, climatic factors at acclimatization), in order to get virus free plants and increased yields of healthy plants in the propagation process (Buciumeanu and Vişoiu, 2001).

b) For other horticultural plants (fruit trees, ornamentals, vegetables), the stages of *in vitro* propagation were carried on according to well known technology but at the some time with the latest methods related to the species and genotypes involved (Neculae and Teodorescu, 1994 a,b; Teodorescu and Neculae, 1994 a,b; Teodorescu and Neculae, 1999; Teodeorescu and Marinescu, 1999).

RESULTS AND DISCUSSIONS

a) *In vitro* propagation of grapevine planting material with the aim at producing virus free plants has been the main target of the research programs initiated at the Phytotronic Center of S.C.D.V.V. Ştefăneşti, working out the technologies for grapevine material propagation since 1988 (Oşlobeanu et al., 1988; Bădiţescu et al.,1991; Buciumenu et al., 1999, 2001).

The undergoing studies for eliminating the major viruses (fanleaf, arabis mosaic, leafroll serotyp 1+3, fleck), by thermotherapy and/or *in vitro* culture have opened the opportunity and conditions to improve and make more efficient some technological sequences (promotion of some unique noutrient media for the initiation and multiplication phases, reduction of photoperiode in the growth chambers, improvement of *in vitro* micrografting techniques).

Having in view that the technology for grapevine nursery stock production of high biological value is going to be emplemented in the near future all costs involved were taken into account for the profit evaluation. In addition, all the other expenses for producing prebasic material as well as the revenues estimated until 2010 are considered. The analysis of costs, revenues and financial figures per produce categories was done for 15 cultivars.

Therefore, in the propagation and acclimatization stage of virus free plants, the costs will be about 5.5 higher than revenues thus leading to a normal deficit at that time.

Starting with the second year, the costs needed to plant propagation in the isolating nuclear glasshouse will be significantly reduced and the revenues from the marketing of extra – acclimatized plants will go up. Our evaluation have shown that only since the 6-th year, the level of revenues will outrun that of costs which one can see that the efficiency of technology implementation comes in time and will have a special impact on the efficiency in production and marketing process of grapevine nursery stock by S.C.D.V.V. Ştefăneşti – Argeş. For instance, the profit rate in this sector, which produces the most valuable grapevine planting material of high quality will reach 362.76%. Extrapolating these results to the entire production capacity of the station – respectively for 200 – 300 cultivars, the total profit will be 86.598 million lei, for an estimated business figure of 110.469 million lei.

b) Other horticultural species. The studies carried out enabled us to formulate the composition of nutrient media and in particular the ratio auxin/citokinin for the period when the explants are kept in aseptic conditions.

Our achievements stand for an accomplished research and *in vitro* propagation techniques are available for the following spacies: artichoke (*Cynara scolymus*), pototo (*Solanum tuberosum*), strawberry (*Fragaria sp.*), chrysanthemum (*Chrysanthemum sp.*), ficus (*Ficus benjamina)*, gardenia (*Gardenia jasminoides*), carnation (*Dianthus caryophillus*), gerbera (*Gerbera jamesonii*), gloxinia (*Gloxinia hybrida*), apple (*Mallus sp.*), paulownia (*Paulownia tomentosa*), pear (*Pyrus sp.*), plum (*Prunus sp.*), rhubarb (*Rheum rhaponticum*), pomegranate (*Punica granatum*), water lettuce (*Pistia startiotes*), tarragon (*Artemisia dracunculus*), rose (*Rosa sp.*), African violet (*Saintpaulia ionantha*), water hyacinth (*Eichornia crassipes*).

Presently, in the laboratories of S.C.D.V.V. Ştefăneşti, studies are carried on to try the behaviour to *in vitro* propagation of other species, such as: lavender (*Lavandula angustifolia*), rosemary (*Rhosmarinus officinalis*), gypsophila (*Gypsophila paniculata*), begonia (*Begonia elatior*), and various rose cvs. (*Rosa sp.*), peach (*Prunus persica dwarf*).

CONCLUSIONS

The stages and an adequate work for achieving the technology for propagating highly valuable grapevine nursery stock require high costs which gradual raise of revenues and in time could provide one of the greatest efficiency.

In vitro propagation laboratories at S.C.D.V.V. Ştefăneşti have the facilities to implement the biotechnologies for the commercial propagation of a wide range of horticultural species in order to meet the market needs for nursery stock.

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CRITERIA AND VARIABLES FOR THE CHARACTERIZATION OF THE INITIAL AND FUNCTIONING STATE OF A VITICULTURAL PLOT

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Key words: microzoning, ecological potential, viticulture, plot characterization

SUMMARY

The paper presents a methodology for the evaluation of the quality of viticultural plots performed on the basis of three elements: the initial state of the plot, the functional state of the plot and quality of the obtained wine. Each of the mentioned components is assessed by using specific variables and criteria. The variables selected for the evaluation of a plot are ranked in classes of quality and the range varies between 0 and 100 points.

INTRODUCTION

The present study is part of the effort for achieving the viticultural microzoning absolutely required in order to harmonize the national legislation with the international one. The goal of this work is the elaboration of an objective methodology for the ranking of the microzones located within a certain viticultural area.

This study aims to establish the criteria and variables for the characterization of viticultural plot, both in its initial state and in the functioning state.

MATERIALS AND METHODS

The elaboration of the methodology for the evaluation of the quality potential of viticultural plots was achieved by following the steps listed below:
a) Establishment of criteria for the evaluation of quality potential of viticultural plots and selection of the initial and functional variables of microzones based on the scientific literature (Dejeu L., 1984, Roiu C. *et al.*, 1995; Fregoni M., 1998);
b) Establishment of quality ranking (quality weight) and quality classes;
c) Evaluation of the quality potential of the viticultural plot.

RESULTS AND DISCUSSIONS

The initial state of the viticultural plot is evaluated, on one hand, on the basis of the biologial criteria, and on the other hand on the basis of the ecological criteria (climate, orography and soil). Each criterium is defined by descriptive variables

(grape variety, rootstock clone etc.) and explicit variable (altitude, slope, exposure), as it is presented in Table 1.

Table 1

Criteria and variables for the characterization of the initial state of the viticultural plot

Characterization of the criteria		Characterization of the variable	
Criterium	**Quality weight (points)**	**Variable**	**Quality weight (points)**
Plot biology	40	Grape variety	15
		Rootstock	5
		Clone	5
		Age	10
		Plantation density	5
Climate	30	Rainfall	10
		Temperature	10
		Insolation	10
Orography	20	Altitude	5
		Slope	5
		Exposure	10
Soil	10	Soil type	2
		Texture	3
		pH	2
		Water reserve	3

Table 1 suggests that the quality of the initial state of the plot is influenced up to 40% by the biological criterium, 30% by the climate, 20% by the orography and 10% by the soil.

The functioning of the viticultural plot as a part of the "terroir"/vine/wine system is evaluated on the basis of the following criteria: grape variety phenology, degree of maturation, productive potential and enological potential of the variety.

The phenology-related variables consist of the main phenological phases of the vine (budding, blossoming, ripening, full maturity), while the maturation-related variables are represented by the pulp and phenolic maturity. The productive potential comprises the relative fertility coefficient, grape weight and yield. The enological potential is estimated on the basis of the weight of the berry, solid/liquid fraction ratio, sugar content, acidity, phenolic components of the skins and seeds.

The above criteria have been assigned specific weights as follows: 10% for phenology, 30% for the degree of maturation, 20% for the productive potential, and 40% for the enological potential (*Table 2*) .

The variables used for the evaluation of the quality potential of the viticultural plot can be grouped in general variables and grape variety-related variables. In the first group are included the altitude, slope, exposure, type of the

soil etc., and in the second group are included specific variables such as pulp maturity, phenolic maturity, relative fertility coefficient etc.

Table 2.

Criteria and variables for the characterization of the initial state and for the functioning state of the viticultural plot

Characterization of the criteria		Variable		
Type	Quality weight (points)	Description		Quality weight (points)
Grape variety phenology	10	budding		2
		blossoming		2
		ripening		3
		full maturity		3
Degree of grape variety maturation	30	pulp maturity		10
		phenolic maturity		20
Productive potential	20	relative fertility coefficient		5
		grape weight		5
		yield		10
Enological potential	40	weight of the berry		5
		solid/liquid ratio		5
		must	sugar	5
			acidity	3
		skins	DO280	5
			anthocyans	5
			tannins	5
		seeds	anthocyans	5
			tannins	2

The quality classes defined on the basis of the general variables for the viticultural plot are presented in *Table 3*.

The assessment is based on the grades obtained by a specific plot, the grades being the arithmetic media of the points recorded for all the three aspects evaluated (*Tab 1-3*), that are the initial state, the functional state and the quality classes.

The accumulated points for each state of the plot represent the sum of the points for all variables. The points are calculated by multiplying the quality weight of each variable (*Table 1-2, column 4*) with the number of point for the quality class (*Table 3, column 4*).

Validation of the methodology: Under this methodology, the global rating of each plot varies between 0 and 100 points. A differentiation into classes is also set, with a class interval of 30 points. The first class, with global ratings between 70 and 100, corresponds to plots with very good quality potential. The second class

(40 ~ 70 points) includes plots with good quality potential. Plots with ratings less than 40 points are considered not recommendable for the production of red wines.

Table 3

Quality classes defined by the general variables regarding to the initial state of the viticultural plot

Criterium	Variable	Group	Quality class (%)
Plot biology	Grape variety	recommended varieties	100
		authorized varieties	80
	Plantation age	3-10 years or > 25 years	80
		10-12 years	100
		12-25 years	90
	Plantation density	> 4200	100
		3700-4200	90
		3200-3700	80
Orography	Altitude	< 100 m or > 250 m	80
		101-250 m	100
	Slope	slight slope	30
		medium slope	80
		high slope	100
	Exposure	N-N	30
		N-E	35
		N-W	40
		E	50
		S	100
		V or S-E	80
		S-V	90
Soil	Texture	Coarse	80
		Medium	100
		Fine	60
	Soil type	Anthropic carbonated	100
		Anthropic cambic	90
		Reddish-brown or brown	80
		Other	70
	pH	slightly acid	80
		Neutral or slightly alkaline	100

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BOTANY AND PHISIOLOGY

SOME ASPECTS REGARDING THE INFLUENCE OF THE TYPE OF PRUNING AND BUD LOAD ON PHOTOSYNTHESIS, TRANSPIRATIONAND RESPIRATION RATES AT GRAPEVINE

I. BURZO, L. DEJEU, MIHAELA COMŞA, MARIANA ANDREI

Key words: grapevine; pruning; photosynthesis; transpiration; respiration

SUMMARY

The aim of this study is to investigate the variation of photosynthesis, transpiration and respiration of Fetească regală cultivar leaves, clone 21 Bl, on Kober 5 BB rootstock at four types of pruning (multiple Guyot; Guyot on demi-high stem; Cazenave cordon; spur-pruned cordon) and three bud loads (10; 15; 20 buds/m²). The photosynthesis rate varied between 2.39 and 10.29 µmol CO_2/m²/s,the transpiration between 0.89 and 6.63 mmol H_2O/m²/s and the respiration between 286.39 and 300.71 mg CO_2/kg/h, depending on the type of pruning, bud load and the phenological stage. The highest photosynthesis rate was registered for the multiple Guyot pruning (low training) and 15 buds/m². The highest transpiration rate raised the maximum values at the beginning of the flowering, at spur cordon pruning (3.54 mmol H_2O/m²). The intensity of the respiration process showed smaller variations between different types of pruning and bud load.

The intensity of the photosynthesis process is conditioned by many factors such as: genetic ones (variety, rootstock), biologic ones (leaves' age, plants' age, phenological stage), climatic ones (temperature, light intensity, precipitations, wind and humidity), pedologic ones (soil type, humidity, fertility, depth), as well as by the technologic factors. As for the technologic factors, an important role is given to the training of the grapevine (low, medium, half-high or high), to the pruning type, to the bud load given at pruning, to the soil maintenance, fertilization, irrigation etc [1, 2, 3, 4].

The aim of this paper is to study the intensity variation of the photosynthesis, transpiration and respiration processes at different types of pruning and bud load given at pruning.

MATERIAL AND METHOD

The experiment was carried out between 2000-2001 in the didactic field of the Department of Viticulture and Enology, University of Agronomical Sciences and Veterinary Medicine, Bucharest. There has been studied the Fetească regală cultivar, clone 21 Bl, on the Kober 5 BB rootstock in a plantation founded in 1995, with the distances of 2,2/1,2 m. The determinations were made at four pruning types: multiple Guyot (low training); Guyot on demi-high stem; Cazenave cordon and spur-pruned cordon, and three bud loads (10; 15 and 20 buds/m²).

The intensity of the photosynthesis, and transpiration processes, the photosynthetical active radiation and the leaves temperature were established with automatical analyser ADC-LCA 4. The intensity of the respiration process was determined by measuring the CO_2 quantity released/kg/h. The fifth leaf on the fertile shoots was used for the tests.

RESULTS AND DISCUSSION

The tests were made on 17 May 2000, before flowering (when the photosynthetical active radiation - PAR - varied between 1763 and 1796 µmol/m²/s, and the leaf temperature between 27.7 and 33.6ºC), on 2 August 2000, at version (when PAR was comprised between 1760 and 1784 µmol/m²/s, and leaf temperature between 29.1 and 33.5ºC), on 18 May 2001, before flowering (when PAR varied between 2015 and 2057 µmol/m²/s, and leaf temperature between 24.1 and 30.7ºC), on 15 June 2001, at fruit set (when PAR was comprised between 1850 and 1906 µmol/m²/s, and leaf temperature between 28.6 and 35.4ºC).

The highest values of the photosynthesis process intensity (table 1) were registered at the multiple Guyot pruning (7.50 µmol CO_2/m²/s), followed by Cazenave cordon, Guyot on demi-high stem, and the lowest values at spur-pruned cordon (5.52 µmol CO_2/m²/s).

Table 1

The influence of the type of pruning on the intensity of photosynthesis

Type of pruning	Intensity of photosynthesis (µmol CO_2/m²/s):				
	17.05.2000	2.08.2000	18.05.2001	15.06.2001	Average
Multiple Guyot	10.12	3.82	6.82	9.26	7.50
Guyot on demi-high stem	9.46	2.31	5.74	5.59	5.77
Cazenave cordon	10.29	2.39	6.25	4.51	5.86
Spur-pruned cordon	8.26	3.02	5.41	4.90	5.52
Average	9.65	2.75	6.05	6.06	6.11

Following the influence of the bud load on the intensity of the photosynthesis (table 2), the highest values are registered at 15 buds/m², at 40 buds/vine, respectively (6.62 µmol CO_2/m²/s) and the lowest values at 10 buds/m², at 27 buds/vine, respectively (5.67 µmol CO_2/m²/s).

Table 2

The influence of the bud load on the intensity of photosynthesis

Bud load (bud/m²)	Intensity of photosynthesis (µmol CO_2/m²/s):				
	17.05.2000	2.08.2000	18.05.2001	15.06.2001	Average
10	8.88	1.59	7.32	4.89	5.67
15	10.64	4.69	5.17	6.01	6.62
20	9.45	2.37	6.64	7.67	6.53

Following the intensity of the transpiration process in dynamics (table 3), the highest values were proved to be obtained (in 2000) at the determination before flowering (2.42 mmol $H_2O/m^2/s$ at multiple Guyot and 3.54 mmol $H_2O/m^2/s$ at spur-pruned cordon). At the beginning of the fruit maturation, the transpiration values were highly diminished (1.01mmol $H_2O/m^2/s$ at multiple Guyot and 1.51 mmol $H_2O/m^2/s$ at spur pruned cordon).

Table 3

The influence of the type of pruning on the intensity of transpiration

Type of pruning	Intensity of transpiration (mmol $H_2O/m^2/s$):				
	17.05.2000	2.08.2000	18.05.2001	15.06.2001	Average
Multiple Guyot	2.42	1.01	2.86	4.51	2.70
Guyot on demi-high stem	2.79	1.13	4.17	6.37	3.61
Cazenave cordon	3.02	1.04	4.12	6.63	3.74
Spur cordon	3.54	1.51	4.06	4.84	3.48
Average	2.94	1.17	3.80	5.58	3.37

The intensity of the transpiration process grows from the low training (multiple Guyot) to half-high training (Guyot on demi-high stem, Cazenave cordon, and spur-pruned cordon).

Table 4 presents the intensity of the transpiration process, function of the bud load. We notice that, during the four moments of determination, once with the increase of bud loads from 10 to 15 and 20 buds/m^2, the transpiration process intensifies up to the maximum value of 20 buds/m^2 (3.64 mmol $H_2O/m^2/s$).

Table 4

The influence of the bud load on the intensity of transpiration

Bud load (bud/m^2)	Intensity of transpiration (mmol $H_2O/m^2/s$):				
	17.05.2000	2.08.2000	18.05.2001	15.06.2001	Average
10	2.83	0.89	4.17	4.52	3.10
15	2.97	1.67	3.19	5.81	3.41
20	3.02	0.96	4.04	6.56	3.64

The intensity of the respiration process of the grapevine leaves showed smaller variations than the ones on photosynthesis: 286.39-300.71 mg CO_2/kg/h. Tables 5 and 6 show the little difference between the pruning types and bud load.

CONCLUSIONS

The intensity of the photosynthesis process depends on the type of pruning, bud load and on the moment of determination; before flowering its value was comprised between 5.41 μmol CO_2 /m^2/s (on 18.05.2000, at spur-pruned cordon) and 10.29 μmol CO_2 /m^2/s (on 17.05.2000, at Cazenave cordon). As the average of

the four moments of determinations, multiple Guyot pruning registered the highest photosynthesis intensity (7.50 μmol CO_2 /m²/s).

Table 5

The influence of the type of pruning on the intensity of respiration

Type of pruning	Intensity of respiration (mg CO_2/kg/h):				
	17.05.2000	2.08.2000	18.05.2001	15.06.2001	Average
Multiple Guyot	289.73	288.61	295.70	300.00	293.50
Guyot on demi-high stem	289.33	288.12	299.08	299.52	293.65
Cazenave cordon	290.94	286.39	300.71	297.22	293.81
Spur cordon	287.63	290.95	299.25	298.25	293.96
Average	289.40	288.51	298.68	298.74	293.83

Table 6

The influence of the bud load on the intensity of respiration

Bud load (bud/m²)	Intensity of respiration (mg CO_2/kg/h):				
	2.08.2000	4.09.2000	1.06.2001	10.07.2001	Average
10	288.02	288.81	296.36	298.96	292.86
15	290.63	288.61	300.70	298.65	294.64
20	289.49	288.56	297.91	299.31	293.81

The bud load of 15 buds/m² lead to the highest photosynthesis values (6.62 μmol CO_2 /m²/s).

The intensity of the transpiration process was the lowest at multiple Guyot (2.70 mmol H_2O /m²/s) and 10 buds/m² (3.10 mmol H_2O /m²/s), and the highest at Cazenave cordon (3.74 mmol H_2O /m²/s) and 20 buds/m² (3.64 mmol H_2O /m²/s).

The respiration value slightly varied with the type of pruning and bud load.

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HYPOHIDRIC STRESS IMPACT ON SOYBEAN [GLYCINE MAX (L.) MERR.] DURING SEEDS GERMINATION AND SEEDLING GROWTH PERIOD

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Key words: soybean, seeds germination, seedling growth, hypohidric stress

SUMMARY

Seeds of Victoria cv. of soybean *[Glycine max (L.) Merr.]* were allowed to germinate and growth in Petri ditches on paper wetted with distilled water and simulating hypohidric stress conditions using mannitol solutions of different osmotic potentials, with a view to evaluate water stress impact on some physiological and biochemical parameters. Between the analyzed parameters, significantly differences have been obtained between studied variants for some of them. Therefore, the α - amylase activity reduced in the case of water stress conditions, interrelated with a reduction of the respiration rate at the seedling level, the peroxidase activity decreased at the hypocotyls level, as well the increase of the osmotic pressure at the same organ, in hypohidric stress conditions, can be considered as possible indicators to characterized the soybean seed tolerance to water stress, during seed germination and seedling growth.

INTRODUCTION

Seed quality is determined by factors such as purity, percentage and uniformity of germination, vigor, storability and pathogenically condition of a seed lot [5]

Plants responses to hypohidric stress has been analyzed by many researchers who often pointed out the yield decreases, as a result of water stress, as well as the reduction of seeds quality. Taking into consideration that soybean is a specie with high pretensions to humidity factor during seeds germination and seedling growth, the first objective of our research, has been the hypohidric stress influence on seeds germination, researches that emphasized the relations between stress severity, germination faculty and velocity coefficient of seeds germination [3].

In this paper, there are presented some results regarding the evaluation of the influence of hypohidric stress during soybean [*Glycine max* (L.) Merr.] seeds germination and seedling growth, on some physiological and biochemical parameters, with a view to know some possible indicators of the tolerance to water stress.

MATERIAL AND METHODS

The used biological material was soybean seeds *[Glycine max (L.) Merr., cv. Victoria]*, and the determinations have been performed during seeds germination period [1] and seedlings growth, in hypohidric stress conditions, using increasing mannitol solutions concentration, to obtain the osmotic pressures of 7,5 atm.; 8,5 atm.; 9,5atm., and 10,5 atm., respectively.

The following physiological and biochemical parameters have been determined: - membrane stability by electrolyte leakage test [7]; soluble protein content by biuret method [6]; α-amylase activity [6]; peroxidase activity by a spectrophotometrical method using the dosage with guaiacol [8]; osmotic sap cell pressure in function of the sap dry substance content and respiration rate using an infrared analyzer - Riken.

RESULTS AND DISCUSSIONS

One of the first physiological indicators has been the electrolyte leakage, which is relevant during seeds imbibitions [3], but in the same time its values during seedling growth are very interesting as well. As we can see in figure 1, the electrolyte leakage on the fifth day of seeds germination is

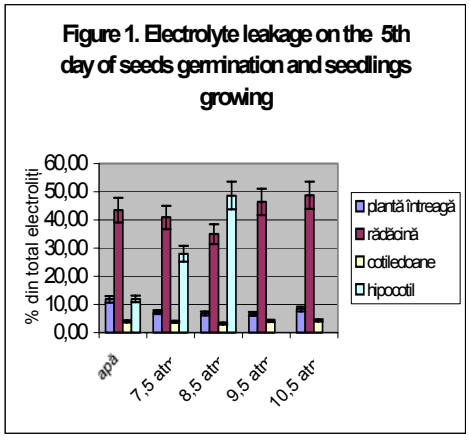


Figure 1. Electrolyte leakage on the 5th day of seeds germination and seedlings growing

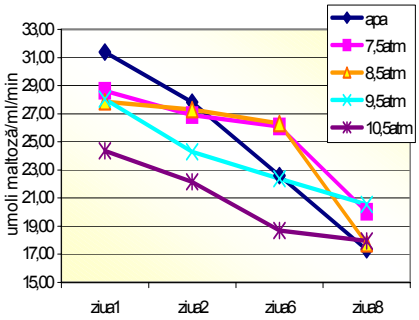


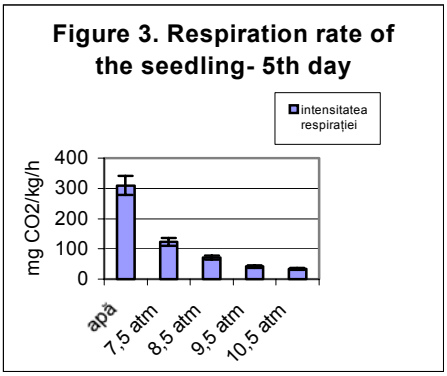
Figure 2. Amylase activity dynamic during seeds germination and seedlings growth

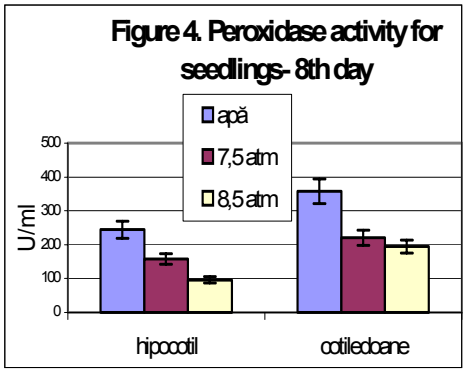
interrelated with the stress severity and is different in function of the seedling organ. More stable membranes exhibiting slower electrolyte leakage as shown Blum [2], and for our experiment, this affirmation is valuable for hypocotyls, in conditions of a good water supply. The conductivity test was first developed as a vigor test for prediction of garden

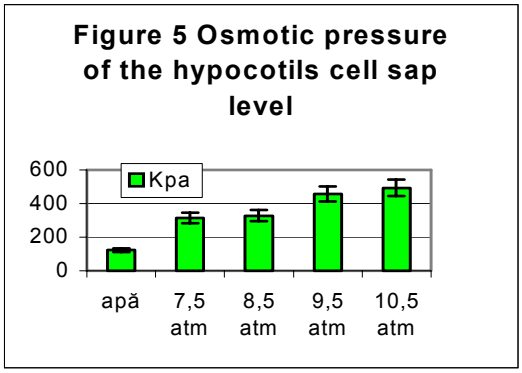
peas (Pisum sativum L.) field emergence and provides a measurement of electrolyte leakage from seeds [4].

The reduction of seeds hydration induced a reduction of the rate of biodegradation processes of the reserve organic substances. For instance, the activity of α- amylase, the most important enzyme implicated in the amidon mobilization process, is very interesting. As we can see in Figure 2, in the situation of the control, α- amylase activity was very intensive, especially after 24 hours from the imbibitions start, and then its rate decreased gradually, probably in relation with the diminution of the substrate, too.

The diminution of the enzymatic activity is accompanied by a decrease of the seedling respiration rate (data for the 5th day) (Figure 3) as well there are differentiated values of the soluble protein content for cotyledons.







Regarding others possible indicators to characterize seedling stress tolerance, it can be considered the peroxidase activity, also, especially that determined at the hypocotyls level, where the differences between variants are significantly (Figure 4). In the same time, in water stress condition the osmotic pressure of the cell sap increased significantly at the hypocotyls level (Figure 5), as compared with the control.

CONCLUSIONS

1. The test of the electrolyte leakage at the hypocotyls level can be used to characterize membrane stability as a physiological indicator for soybean tolerance to hypohidric stress.

2.α-amylase activity has been registered significantly low values during determinations period, as well as respiration rate of seedling has been significantly reduced progressively, and according to water stress severity.

3. The peroxidase activity, also, especially that determined at the hypocotyls level, emphasized low values in water stress conditions, while the osmotic pressure of the hypocotyls cell sap had higher values.

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THE INFFLUENCE OF THE CULTIVAR TYPE ON THE DYNAMICS OF THE ACTIVITY OF SOME OXYDATIVE ENZYMES DURING THE VEGETATION PERIODE IN THE APPLE TREE LEAVES

AURA DOBRESCU, DANIELA BĂLAN

ABSTRACT

This paper is a comparative study concerning the evolution of the activity of some oxidoreductases during the phenological phases on the leaves of six apple tree cultivars with different harvest time in order to reveal some metabolically particularities. The results showed that the enzymatic activity is a specific feature of the cultivars and it doesn't depend on the harvest time of fruits.

INTRODUCTION

The purpose of researches performed was to reveal some metabolically particularities of six apple tree cultivars with different harvest time by studying the dynamics of the activity of some oxidases (catalase and peroxidase) and of FAD-dependent dehydrogenases in their leaves.

The determinations were made comparatively on two basic apple tree cultivars: Jonathan and Golden Delicious and also on four apple tree cultivars: Pionier, Generos, Prima, Frumos de Voineşti, which are studied and checked in our country's condition for certain years; in the present they are massively multiplied in order to be cultivated.

The oxidases and the dehydrogenases studied in this paper belong to the class of oxidoreductases, which are the main component of the bioenergetics systems. These enzymes have an important role in the plant organisms by catalysing the reactions of oxidations and reductions, which have major effects in achievement of plant maturity (1).

The analyses have as a purpose the investigation of the activity of catalase and peroxidase, hem-enzymes functionally related, which are implicated in biodegradation of hydrogen peroxide. This is a strong oxidant, therefore its high accumulation in cells is noxious (5).

The main reactions which are catalysed by FAD-dependent dehydrogenases are: dehydrogenation of amino acids in the presence of molecular oxygen; some reactions in the respiratory chain, when the flavinenzymes oxidize $NADH,H^+$ and succinate; dehydrogenations of some substrates with low redox potentials (such as pheredoxine, dihydrolipoic acid etc.) (5).

This analyse was considered useful because the oxidases and the dehydrogenases are directly implicated in the metabolic activity of cells.

MATERIALS AND METHODS

The measurements were made in dynamics beginning with May till September. As biological material, there were used fresh-harvested leaves from six apple-tree cultivars: Pionier, Generos, Prima, Frumos de Voineşti, Jonathan and Golden Delicious that belong to the collection of the S.C.C.P. Voineşti, district of Dâmbovița.

The catalytic activity of catalase and peroxidase was determined by titrimetrical method; the results are exprimed in enzymatic units e.u.(μmolls H_2O_2/g vegetal tissue/min).

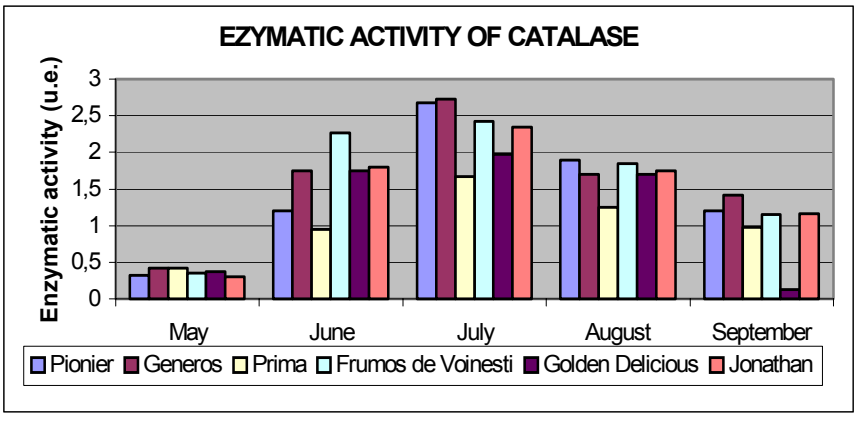
For determination of *catalase activity* was prepared the enzymatic extract by pounding of vegetal material with distillate water. The extract is let to action on a certain quantity of H_2O_2, then the excessive substrate is titred with potassium permanganate 0,1 N (6). The *peroxidase activity* was determined by Mihlin and Bronovitkaia (3) in an enzymatic extract prepared by pounding the vegetal material with acetate buffer, pH = 4,7. This method is based on capacity of quinones to oxidize the ascorbic acid. As protons and electrons donor was used pyrocatechine in the reaction catalysed by peroxidase.

The *activity of dehydrogenases* was spectrophotometrically determined. The method is valid for determination of FAD-dependent dehydrogenases activity. It is based on the capacity of dehydrogenases to transfer the hydrogen from different substrates to 2,3,5-triphenyltetrazolium chloride (TTC), which is reduced and is transformed in triphenylformazan red coloured. The intensity of colour of this substance is proportional with dehydrogenases activity and is spectrophotometrically determined at wavelength λ = 480 nm. The results are exprimed in mg TTC/g fresh weight material.

RESULTS AND DISCUSSIONS

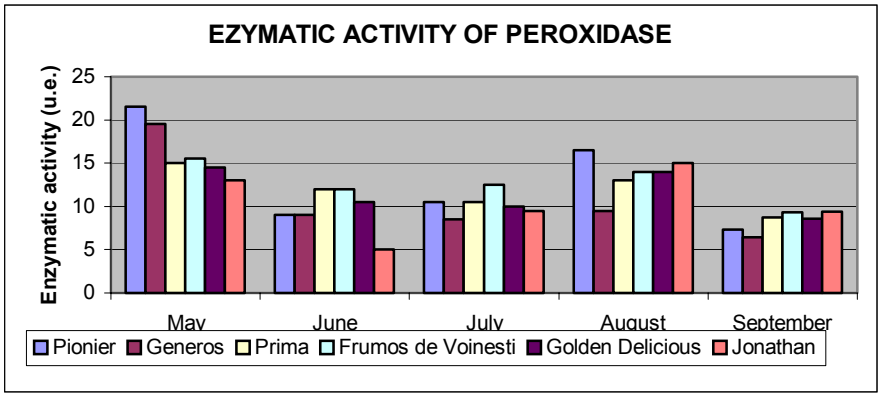
The dynamics of *catalase activity* is inconstant during the vegetation periode: increase continuously from May till July, when it registered the maximal value (between 2,725 enzymatic units at Generos cultivar and 1,675 e.u. at Prima – Figure 1).

Figure 1. The dynamics of catalase activity
(μmolls H_2O_2/g vegetal tissue/min)



The catalase activity decreases in August and reached the lowest values in September (between 1,42 e.u. at Generos cultivar and 0,125 e.u. at Golden Delicious).
The *peroxidase activity* had a different evolution: the maximal values were registered in the beginning of vegetation period (May): between 21,5 e.u. at Pionier and 13 e.u. at Jonathan (Figure 2). Afterwards the activity of peroxidase registered a small decreasing and it reached another maxim in summer (August). In September it decreased till 0,125 e.u. at Prima and 0,98 e.u. at Golden Delicious.

Figure 2. The dynamics of the peroxidase activity (μmolls H_2O_2/g vegetal tissue/min)



The differences between the catalase and peroxidase activity may be caused by the fact that these enzymes can substitute each other in the catalysing of hydrogen peroxide biodegradation, so that the tissues are not affected.

For the *dehydrogenases activity*, the determinations showed an increasing from May, when was registered 0,096 mg TTC/g fresh weight material as an average value of all cultivars till July, when all cultivars reached the maxim of the dehydrogenases activity, between 0,136 mg TTC/g fresh weight material at Pionier and 0,262 mg TTC/g fresh weight material at Generos (figure 3).

In order to differentiate more precisely the cultivars regarding on the activity of these oxydoreductases, the table 1 reproduces the average values registered by each cultivar during the growth and the maturation processes in the leaves.

The highest mean value for catalase activity during the vegetation period was reached by the Generos cultivar (1,65 e.u.).The Pionier cultivar registered the highest value of peroxidase activity (12,96 e.u.). The dehydrogenases reached the highest value at Prima cultivar (0,132 e.u.).

Also, the lowest mean values of enzymatic activities were registered by different cultivars: at Prima cultivar (1,1 e.u.) for catalase, at Jonathan (10,38 e.u.) for peroxidase activity and at Pionier for the dehydrogenases (0,09 e.u.).

Figure 3.The dynamics of the dehydrogenases activity
(mg TTC/g fresh weight material)

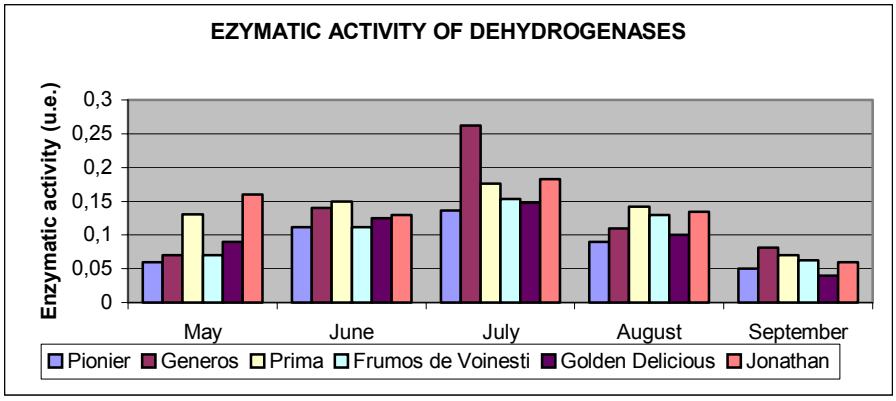


Table 1. The mean values of enzymatic activities for each cultivar

CULTIVAR	THE MEAN OF EACH CULTIVAR		
	Catalase	Peroxidase	Dehydrogenases
Pionier	1,26	12,96	0,09
Generos	1,65	10,58	0,132
Prima	1,1	11,84	0,133
Frumos de Voinesti	1,6	12,66	0,105
Golden Delicious	1,18	11,52	0,1
Jonathan	1,47	10,38	0,115

CONCLUSIONS

The dynamics of the catalytic activity of the studied enzymes is a cultivar feature, seeing that the determinate values in leaves are different between the cultivars.
The time when the studied cultivars reach the harvesting maturity of fruits do not influence the evolution of catalytic activities, which is the same for all the cultivars:
the catalase activity increased continuously from May till July, when were registered maximal values; afterwards the catalase activity decrease.
the peroxidase activity was higher in the beginning of vegetation period; afterwards it registered a small diminution, then it reached another maxim in summer; in September decreases again.

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RESEARCH RESPECTING INFRARED FT-IR MICROSCOPY OF VEGETAL TISSUE

D. MIHAIESCU, I. BURZO

Key words: Microscopy, FT-IR.

SUMMARY

Microscopy using a Centaurus FT-IR instrument is used to analyze a number of plant tissue samples. The analyses include different plant tissues from some species analyzed by reflection, ATR and transmission techniques. Using the mapping facility, a large area of the sample can be characterized by infrared spectra, point to point and also the distribution of some specific organic compounds.

In recent years, infrared micro spectroscopy has progressed from a difficult technique to a routine method of analysis. This is due to the merger of highly sensitive Fourier transform infrared spectrometers with precision infrared and optical microscopes. Infrared micro spectroscopy is now widely used in the fields of biochemistry, failure analysis, forensic chemistry, semiconductor processing, and polymer science. Recently, there has been an interest in using the infrared microscope as an imaging probe. Imaging techniques are used in techniques such as electron microprobe analysis, laser electron microscopy, surface enhanced Raman spectroscopy, and nuclear magnetic resonance spectrometry. Infrared imaging begins by coupling an infrared microscope to a computer-controlled, two-dimensional
motorized stage. A series of infrared spectra can then be obtained at specific X and Y positions of the sample. This four-dimensional data array (X vs. Y vs. frequency vs. intensity) can be compressed to three dimensions by choosing a specific frequency to examine. Therefore, a single image will represent the change of intensity of a specific frequency over the spatial range of the sample. A series of images based on different functional groups can be obtained by varying the frequency to be displayed. This Functional Group Images (FGI) provides a means of non-destructive evaluation of the chemical composition of a sample on microscopic scale.

The samples to be investigated were sections in plant tissues on silicon wafer for the transmission technique and on a high reflexive surface for reflection technique. The purpose of this study was to demonstrate the advantage of utilizing infrared microscopy as an alternate technique in plant analysis and also to find the best sampling and sample preparation method.

MATERIAL AND METHOD

The data were collected on a Nicolet NEXUS spectrometer interfaced to a CENTAURUS microscope equipped with a Nicolet high-sensitivity, MCT detector. A Spectra-Tech motorized stage was mounted on the microscope along with a 10X Triton objective. All collection, stage movement, and data reduction routines were trolled by the Nicolet data station. All spectra were collected at 8 cm-1 resolution using 16 co-added scans for a measurement. The ATR spectra were obtained with a ZnSe ATR accessory for the microscope objective.

Sample preparation was performed by microtome cutting and the best spectra were obtained after a sample desiccation.

RESULTS

For the first step of this study, tissue sections were analyzed by infrared microscopy using ATR, reflection and transmission techniques. The best results were obtained by transmission using a silicon wafer as sample holder (IR transparent) but results can be affected by sample preparation method (sample thickness must be uniform in the mapping area).

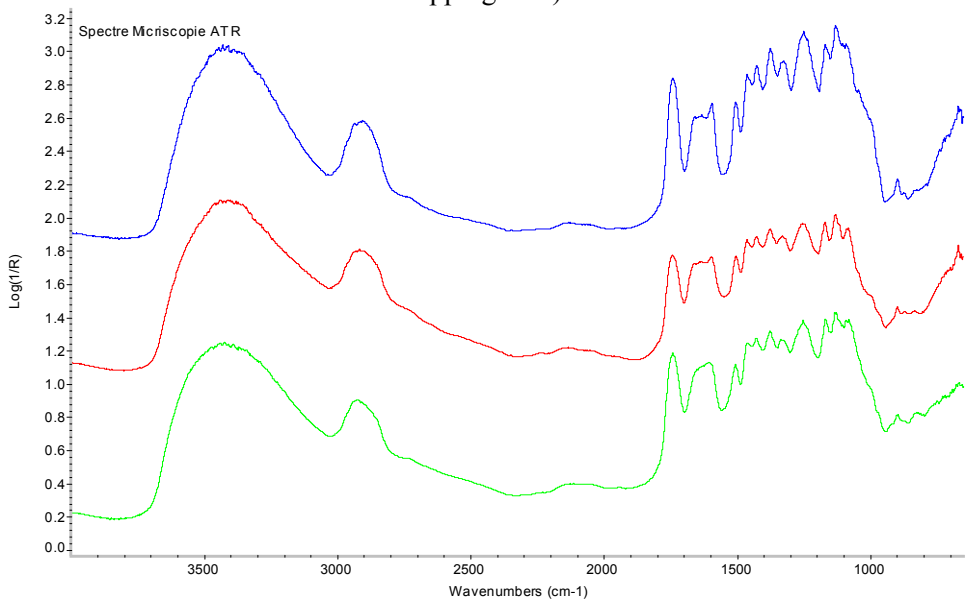

Fig. no. 1 Spectra collected by ATR technique

Good spectra (see fig.no.1) can be collected also using ATR sampling method, were the quality of spectra is not related to sample thickness. The major impediment for ATR mapping is an auto focus and contact alert device to perform

sample contact point to point. Also, contact of ATR crystal with tissue sample can change its surface and affect the results.

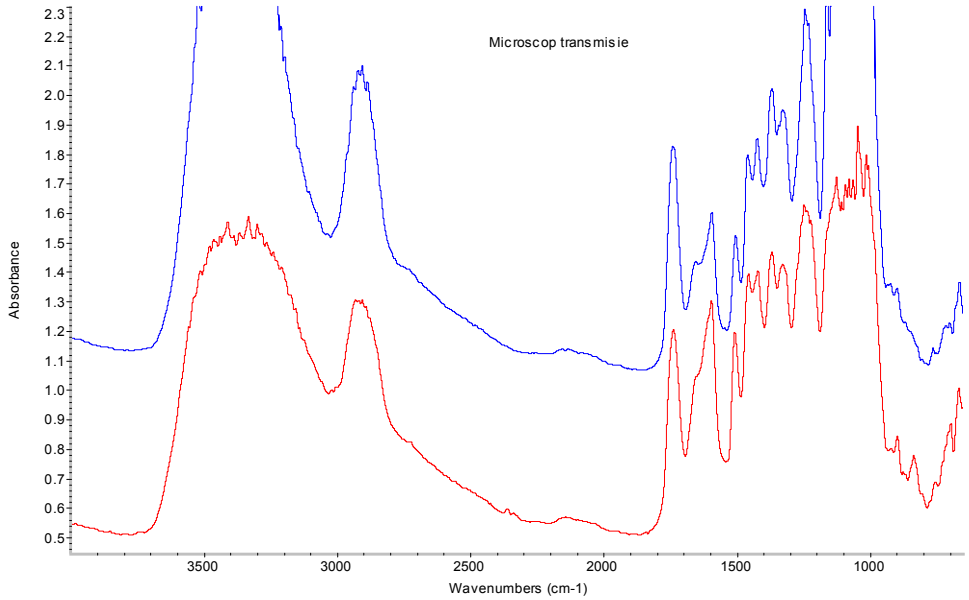

Fig. no. 2 Spectra collected by transmission technique

As seen in fig.no.2, transmission spectra are close to ATR (as absorption)

CONCLUSIOS

In conclusion, the coupling of an infrared microscope with a motorized X-Y stage allows the technique of infrared imaging to be performed. The critical step in this kind of application is to find the best sample preparation and sampling method according to sample properties. The application of infrared imaging in both reflectance and transmission can yield valuable information revealing the thickness and spatial distribution of characteristic organic compounds in the sample.

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AGRICULTURE

THE INFLUENCE OF THE FORERUNNER PLANT, FERTILISATION LEVEL AND CLIMATIC CONDITIONS ON THE TOTAL WET AND DRY GLUTEN CONTENT OF WINTER WHEAT SEEDS CULTIVATED ON BROWN LUVIC SOILS IN THE WESTERN PLAIN OF ROMANIA

BANDICI GH., DOMUŢA C., ARDELEAN ILEANA

Key words: rotation plant, created agrofund, brown luvic soils

SUMMARY

The quality of the cultivated plants depends on the employed cultivar and hybrid, climatic characteristics during the cultivation year and not in the last order, on the applied technology.

INTRODUCTION

There are important references in scientific literature which emphasize the implication of different factors in influencing the quality of the obtained production. *Hera Cr. (1986),* underlines the importance of nitrogen on the increase in protein content, on wet and dry mass gluten also on the amelioration of quality indeces of gluten. The authors mention the role of the ameliorative plant (pea) on the wheat quality indeces. *Bodea Elena (1968)* mentions the important role of the regionalist wheat races on the quality of raw protein and gluten.

The role of the forerunner plant and fertilization, especially with nitrogen on the wheat quality (materialised in a higher protein and wet as well as dry gluten wheat content) regardles to the soil fertilisation level which supported the cultivation of the experimental race, is underlined by several authors:*Dincă D., and al. (1971); Zăhan P.şi Soreanu I., 1970; Oproiu Elena, Cernescu Lidia (1970); Caramete C. and Popescu S., (1970).*

The production quality is a property connected to several physical and chemical characteristics of plants and confers a positive note to the aplied agrotechnical measures, having in view the correlation of quality with the obtained production on a surface unit.

MATERIALS AND METHODS

A multifactorial experiment (subdivided plots) was developed at S.C.A.Z Oradea – Romania on a brown luvic soil with a loamy-clay texture (32,7 % clay in the0-20 cm layer) with low fertility. The experiment took place during 1995 and 1996, years characterized by climatic differences. 1995 was a normal, favorable year and 1996, a less favorable year, dry. The forerunner's plant and fertilization level as functions of climations were observed in the quality of winter wheat seeds.

Laboratory analysis of the obtained product's quality was performed taking in the account the total, wet and dry gluten content of winter wheat seeds cultivate Delia.

RESULTS AND DISCUSSIONS

The gluten content of wheat seeds was positively correlated to the forerunner plant, fertilization level (mineral or organo-mineral fertilizers) and climatic conditions.

It is worth to mention that even if the wet gluten content (tables 1 and 2) was superior in the favorable 1995 year as compared to the less favorable, dry year 1996, the cultivation of the wheat after corn or pea (crop rotation of 3 and 4 years) as opposed to monoculture determines substantial increases of 12,11 – 17,06 g. /100 g d.w. in 1995 as compared to 4,90-7,90 g/100 g d.w. in 1996.

Table 1

The influence of the forerunner plant and fertilization level on the total wet gluten content of the seeds in wheat cultivated on brown luvic soils, Oradea 1995

Observed factor	Wet gluten		Difference ±
	g / 100 g d.w.	%	
a. Forerunner plant			
Wheat monoculture (Mt)	26,08	100	-
Corn (G - P)	38,19	146,4	+ 12,11
Pea (M - G - P)	43,14	161,0	+ 17,06
Pea (M - G - P - P)	40,66	155,9	+ 14,58
b. Fertilization level			
N_0P_0 (Mt)	31,93	100	-
$N_{120}P_{80}$	39,04	122,3	+ 7,11
$N_{100}P_{80}$ + 10 t/ha manure	40,09	125,5	+ 8,16

Table 3 shows the important influence of the forerunner plant and fertilization level on the gluten (dry) content in 1995. As compared to wheat monoculture (10,92 g/100 g d.w.) the cultivation of wheat after corn or pea determines substantial increases of this qualitative indicator which varied between

15,87-19,01 g/100 g d.w. Same table shows the positive role of mineral and organo-mineral fertilization on the dry gluten content. As compared to the unfertilized witness (1,68 g/100 g d.w.) the mineral and organo-mineral fertilization determined increases up to 16,18 g/100 g d.w. in $N_{120}P_{80}$ and 16,80 g/100 g d.w. in $N_{100}P_{80}$ + 10 t/ha manure.

Table 2

The influence of the forerunner plant and fertilization level on the total wet gluten content of the seeds in wheat cultivated on brown luvic soils,Oradea 1996

Observed factor	Wet gluten		Difference ±
	g / 100 g d.w..	%	
a. Forerunner plant			
Wheat monoculture (Mt)	22,40	100	-
Corn (G - P)	27,30	121,9	+ 4,90
Pea (M - G - P)	28,90	129,0	+ 6,50
Pea (M - G - P - P)	30,30	135,3	+ 7,90
b. Fertilization level			
N_0P_0 (Mt)	24,70	100	-
$N_{120}P_{80}$	27,60	111,7	+ 2,90
$N_{100}P_{80}$ + 10 t/ha manure	29,40	119,0	+ 4,70

Table 3

The influence of forerunner plant and fertilisation level on the total content of dry gluten in seeds in wheat cultivated on brown luvic soils,Oradea 1995

Observed factor	Wet gluten		Difference ±
	g / 100 g d.w..	%	
a. Forerunner plant			
Wheat monoculture (Mt)	10,92	100	-
Corn (G - P)	16,41	150,3	+ 5,49
Pea (M - G - P)	19,01	174,1	+ 8,09
Pea (M - G - P - P)	15,87	145,3	+ 4,95
b. . Fertilisation level			
N_0P_0 (Mt)	13,68	100	-
$N_{120}P_{80}$	16,18	118,3	+ 2,50
$N_{100}P_{80}$ + 10 t/ha manure	16,80	122,8	+ 3,12

In the dry 1996 year, same influence were remarked concerning the analyzed factors (table 4) on the dry gluten content, even if the values of the quantitative indicator were diminished.

Under these conditions, the forerunner plant was more important than the fertilization level with respect to the values of the studied qualitative indicator.

Thus, the cultivation of wheat in crop rotations determined increases that oscillated between 24,6-39,1 %, as compared with wheat monoculture where the values were around 6,90 g/100 g d.w. of dry gluten. The mineral or organo-mineral fertilization influenced the dry gluten content only with 11,5-20,0 % as compared to the unfertilized alternative.

Table 4

The influence of forerunner plant and fertilisation level on the total content of dry gluten in seeds in wheat cultivated on brown luvic soils, Oradea 1996

Observed factor	Wet gluten		Difference ±
	g / 100 g d.w..	%	
a. Forerunner plant			
Wheat monoculture (Mt)	6,90	100	-
Corn (G - P)	8,60	124,6	+ 1,7
Pea (M - G - P)	9,40	136,2	+ 2,5
Pea (M - G - P - P)	9,60	139,1	+ 2,7
b. . Fertilization level			
N_0P_0 (Mt)	7,80	100	-
$N_{120}P_{80}$	8,70	111,5	+ 0,9
$N_{100}P_{80}$ + 10 t/ha manure	9,40	120,5	+ 1,6

Under these conditions, the forerunner plant was more important than the fertilization level with respect to the values of the studied qualitative indicator. Thus, the cultivation of wheat in crop rotations determined increases that oscillated between 24,6-39,1 %, as compared with wheat monoculture where the values were around 6,90 g/100 g d.w. of dry gluten. The mineral or organo-mineral fertilization influenced the dry gluten content only with 11,5-20,0 % as compared to the unfertilized alternative.

One can conclude that there is a positive correlation of wet and dry gluten content and the analyzed factors. The better the forerunner plant (pea) was together with a higher fertilization level (organo-mineral) the higher were the qualitative indicators of the wheat seeds.

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RELATIONSHIP BETWEEN VEGETAL REMAINS (ROOTS + STUB) AND AGROFUND – CROP ROTATION PLANT

BANDICI GH., DOMUŢA C., ARDELEAN ILEANA

Key words: rotation plant, created agrofund, brown luvic soils, root, stub, vegetal mass, wheat, seeds,

SUMMARY

An important problem refers to soil weeds seed bank with special reference to brown luvic soils and relationship between vegetal remains (roots + stub) and agrofund – crop rotation plant. A great number of seeds can be found in first 20 centimeters of soil (plowing layer). This fact causes a high weeds density which has a negative effect on the cultivated plants leading to partial or total crop loss.

INTRODUCTION

Brown luvic soils are characterized by acid reaction, low internal drainage, low structuring level (27-36%), temporary water excess and high content weed seed bank. All these factors are considered to be limited in Romania..

An important problem refers to soil weeds seed bank with special reference to brown luvic soils. A great number of seeds can be found in first 20 centimeters of soil (plowing layer). This fact causes a high weeds density which has a negative effect on the cultivated plants leading to partial or total crop loss (Staicu Ir, 1969; Zahan P., 1969 and 1972).

MATERIALS AND METHODS

The influence of crop rotation plant, created agrofund on the amount of organic matter (stub + roots) accumulated in soil in winter wheat culture is presented in table 1.

Data from table1 show that in wheat monoculture, with 1.9 t/ha total dry weight accumulated in soil, the cultivation of wheat after corn or pea in 2 yr., 3 yr. respectively crop rotation, determined an increment of organic matter accumulated in soil with 15.8-52.6%. Highest dry matter quantity was found in wheat cultivated in combination with a crop rotation plant as pea of 2.9 t/ha, at values with 1 t/ha higher as compared to monoculture and even to short rotation (W-C) with 0.3 t/ha.

Highest contribution to biomass accumulation in soil had wheat stub with 85.7% of total amount as compared to root lower contribution of 14.3%.

This quantity of dry weight as roots contribution (14.3%)not negligible if taking into account the more rapid decomposition in soil of roots as compared to stub which contains more cellulose and decomposes slower ,in soil under the attack of decomposing microorganisms.

In what concerns created agrofund, data from table 1 show that mineral or mixed fertilization doubles the amount of total dry weight accumulated in soil (2.7 and 2.8 t/ha, respectively) as compared to the unfertilized alternative of 1.4 t/ha. In this case, stub realizes a greater amount of total biomass in d.w. (85.5%) as compared to roots' contribution of only 14.5%.

Table 1

The influence of crop rotation plant and created agrofund on vegetal remains accumulation in soil (stub + roots) in wheat cultivated on brown luvic soils, Oradea 1996

Factor under study	Vegetal mass in d.w.				Diff. ± t/ha
	Root t/ha	Stub t/ha	Total d.w.		
			t/ha	%	
a. Crop rotation plant					
Wheat – monoculture (Mt)	0,4	1,5	1,9	100	-
Corn (G - P)	0,3	1,9	2,2	115,8	+ 0,3
Pea (M - G - P)	0,3	2,6	2,9	152,6	+ 1,0
Average (%)	14,3 %	85,7%	100 %		
b. Created agrofund					
N_0P_0 (Mt)	0,4	1,0	1,4	100	-
$N_{120}P_{80}$	0,3	2,4	2,7	192,8	+ 1,3
$N_{100}P_{80}$ + 10 t/ha manure	0,3	2,5	2,8	200,0	+ 1,4
Media (%)	14,5 %	85,5 %	100 %		

In what concerns weeds seed bank in soil, in wheat cultivated on brown luvic soils, in corroboration with crop rotation plant, created agrofund and their interaction, one can conclude (based on data from table 2.).

- weeds' seed numbers in soil reached highest values in crop rotation when wheat was cultivated after pea, 39,642 seeds/$m^{2,}$ followed by wheat monoculture with 32,722 seeds/m^2.
- Lowest number of weed seeds/m^2 was found in wheat cultivated after corn, of 29,976seeds/ m^2. The explanation lies in the nature of corn cultivation which implies tillage that destroys an important amount of weeds. This reduces infestation source of soil with weed seeds as compared to wheat cultivated after pea that do not need tillage. Accordingly, weed seeds source is greater, seed bank provision, also, in plots where wheat was cultivated after pea.

It is worth to remark that numbers in weeds of dicotyledons are greater as compared to weed species of monocotyledons (table 2) regardless to crop rotation plant employed (dicotyledons- 57.1%, monocotyledons- 42.9%).

Table 2 shows a strong influence manifested in case of created agrofund on weed seeds bank from soil. As compared to unfertilized alternative (22,042 weed seeds/m^2), mineral fertilization and mixed fertilization determined the raise of weed seeds in soil to 37,570 and 42,728 weed seeds/m^2, respectively. In the case of created agrofund, weed seeds proportion is greater for dicotyledons (61%) both in fertilized or fertilized alternatives.

Table 2

The influence of crop rotation plant and created agrofund a weed seed bank in soil, in wheat cultivated on brown luvic soils, 0-20 cm deep, Oradea 1996

Observed factor	Weed seeds/m^2				Diff.± nr./m^2
	Monocoty	Dicoty	Total weeds		
	nr./m^2	nr./m^2	nr./m^2	%	
a. Crop rotation plant					
Wheat – monoculture (Mt)	13 787	18 935	32 722	100	
Corn (G - P)	11 993	17 983	29 976	91,6	**- 2 746**
Pea (M - G - P)	18 120	21 521	39 642	121,1	**+ 6 920**
Average (%)	**42,9**	**57,1**	100		
b. Created agrofund					
N_0P_0 (Mt)	5 137	16 905	22 042	100	-
$N_{120}P_{80}$	17 363	20 207	37 570	170,4	**+ 15 528**
$N_{100}P_{80}$ + 10 t/ha manure	17 450	25 278	42 728	193,8	**+ 20 686**
Media (%)	**39,0**	**61,0**	100		

CONCLUSIONS

Concerning weed seeds numbers/m^2 and floristic composition in monocotyledons and dicotyledons:

- weeds/m^2 numbers as determined before harvest were greatest in wheat monoculture, 177 weeds per surface unit. These numbers decreased significantly in crop rotations as follows: 37 in 2 yr. crop rotations and 23 weeds /m^2 in 3 yr. crop rotations which represents (in %) 13 and 20.9% of total number of weeds identified in wheat monoculture (177 weeds /m^2).
- The dominant weed species among monocotyledons was *Apera spica-venti* and among dicotyledons, *Raphanus raphanistrum*, *Chenopodium album* and

Matricaria inodora, regardless to crop rotation. There was not reported any distribution pattern of weed species depending on the rotation.

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Zea mays	Crop rotation	Rotation plant, created agrofund, brown luvic soils, root, stub, vegetal mass, wheat, seeds	**A 02**
xxx	Agriculture enterprise financing	Business, company, resources, horticulture, leasing, the stockholders' equity, the financial result, credit	**FG 12**
xxx	Ecological factors	Air and soil temperature, air humidity, sum of the rainfalls, speed of the wind	**VG 05**
xxx	Fresh horticultural products	Marketing, conditioning, storage, postharvest, research, project	**FG 02**
xxx	Horticulture company management	Business plan, company, financial data, supporting documents, product, service, management, marketing	**FG 13**
xxx	Horticulture company management	Instruments, assessment, working capital, liquidity, the debt ratio, the output of the capital, financial results, company	**FG 11**
xxx	Horticulture history	Personalities, history	**VG 07**
xxx	*In vitro* achievements	*In vitro* culture, grapevine, horticultural species, efficiency	**V&O 18**
xxx	Infrared micro spectroscopy	Microscopy, FT-IR.	**B&P 04**
xxx	Nutritive mixture	Fitpol C copolymer, physical characteristics, transplant	**VG 06**
xxx	Pedology and hydrology	Forest steppe, brown-reddish, phreatic water, irrigation system	**VG 04**
xxx	Phytosanitary control	Phytosanitary protection, phenological phases, Ridomil MZ, Vectra Talstar 10 EC, Folicur E50	**V&O 07**
xxx	Products for diabetics	Fortifying products, products for diabetics	**FG 15**
xxx	Scientific research activity	Personalities, history	**FG 14**
xxx	Scientific research activity	Personalities, history	**V&O 12**
xxx	Scientific research activity	Tree spacing, pruning systems, erosion control	**FG 10**