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RESEARCHES CONCERNING THE RESISTANCE FROST OF THE TABLE GRAPE VARIETIES GROWN IN STEFANESTI-ARGES VINEYARD

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Abstract

In order to achieve this paper we have studied the freezing resistance and the effect of low temperatures over the viability of the winter shoots at certain grapevine varieties for the tablegrapes cultivated in the vineyard Stefanesti-Arges. The research concerned the varieties: Argessis, Golden of Stefanesti, Moldova, Augusta, Canner and clones: Muscat Adda 22 St., Perlette 10 St., grafted on Kober 5BB rootstock. The research took place in the period 2010-2012. As a result of the study, we have noticed the sensitivity of Perlette and Augusta varieties at the low temperatures of the winter. We have presented data concerning the determining procedure of the percentage of viable shoots.

Key words: *table grapes, fertility, productivity, resistance.*

INTRODUCTION

The experiment was conducted in 2010-2012, in the collection of INCDBH Stefanesti ampelographic - Arges. The study was made of grape varieties and clones obtained and cultivated vineyard table Stefanesti. Vineyard area is characterized by the following ecoclimatic elements Stefanesti: length of the growing season for grape-vines, on average 177-178 days; The annual average temperature 9.8-10.1ºC, global heat balance of vegetation period 3530ºC, 1350ºC useful heat balance; average temperatures of the warmest months (July, August 34,7ºC and 34,9ºC) insolation duration of vegetation period on average 1430 hours; real heliothermic index of 1.86 during the growing season. Therefore fits well studied varieties in demand environmental and showed good behavior even at lower temperatures.

The soil is loamy collection is located, the average supply of phosphorus, potassium and slightly carbonated, with a slightly acid pH (6.2 to 6.4). Rootstock used for grafting these varieties was Kober 5BB, planting distance between rows of 2.5 m and 1 m row between plants, resulting in a total of 4,000 vines / ha.

As regards the geographical location, the Stefanesti vineyard is located between 44°42′ and 44°55′ northern latitude, at the southern limit of the platform Candesti, in the contact zone with Campia Romana. The viticultural plantations are located at altitudes between 200 and 415m, the maximal altitudes being the Izvorani Hill (415m) and the Pietroasa Hill (325m).

MATERIALS AND METHODS

In the wine-growing practice on one hand and the grapevine varieties amelioration operations on the other hand, it has been observed that, the heredity of the characters and features of new varieties obtained by sexual hybridization are more obvious, as the genitors are genetically further and have distant origins. In the characters of the first variety prevails.

Following the manifestation and the degree of hereditary variability for one or more characters, in the wine-growing practice, the research analyzes a series of characters including: the growing force, the number of grapes on a grapevine, the production per grapevine, the sugar quantity, the acidity of the grape must, various maturation age, the resistance to diseases and pests, the resistance to drought and frost, etc.

In the present paper there have been tested four varieties of table grapes with different maturation ages under the aspect of their resistance to the low temperatures in the years 2010-2012.

Experimental scheme is situated in linear blocks with three variants 3 repetitions, each repetition with 12 stocks. Placing such experiences two-way 4x3 (varieties) and 2x3 (clones) for each experimental year (2010-2012) was the same, taking into study two factors, namely:

Factor A - Variety, which included graduations:

-a_1 Argessis;
-a_2 Auriu de Stefanesti;
-a_3 Moldova;
-a_4 Augusta;
-a_5 Perlette 10 St.
-a_6 Muscat Adda 22 St
-a_7 Canner

Factor B - loads of fruit with differentiated application of cutting bearing vineyards, which included graduations:

-b_1 load of 15 eyes per vine fruit, cutting the drill;
-b_2 load of 20 eyes per vine fruit, cutting the heart;
- of 25 eyes per vine fruit, cutting the string;

RESULTS AND DISCUSSIONS

Grape-vine buds lose their viability when the temperature falls below -20 in winter... 22ºC for wine varieties and below -18...-20°C at the table (Damian et al, 2004; Dumitriu I.C., 2008). The meteorological data have been extracted from the database of the Stefanesti Institute, collected during the interval 1991–2010 (Figure 1).

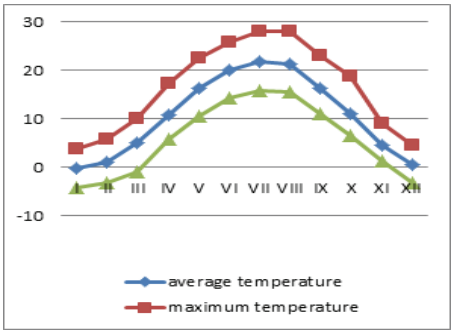

Figure 1. Average temperatures (ºC) 1991-2010

Grape vines can grow in the most common areas as one of the most affected by low temperatures below resistance. Damage caused by winter frosts can reduce production both quantitatively and qualitatively important economic effects for both growers and winemakers as, traders etc (Fennel A., 2004; Grecu V., 2010).

Parallelism exists between the annual cycle of temperature and annual biological cycle of the vine allowed for optimal thermal thresholds for main plant phenophases taken (Olteanu I., 2000).

In order to diminish the impact of climate change it is necessary to adapt the cultural practices to the evolution of climate over time (Bucur M. et al, 2012).

During winter quantities of starch accumulated in strings begin to decrease and the concentration of sugars begin to rise. These changes are associated with the development of frost grape-vine. Readiness of the vine vines for winter can be appreciated by determining carbohydrate accumulated in strings. Throughout the winter synthesize starch thus increasing the concentration of sugars in string, which is used as a barrier against injury caused by frost. Towards the end of winter there is a reverse conversion of carbohydrates so that will have high concentrations of starch and sugars decrease (Bennett J.S., 2002; Georgescu M et al., 1986; Matei P. et al., 2009).

Table 1. Report wood / marrow and starch concentration in the string, the varieties studied (average 2010-2012)

Varieties	Version	Report wood/marrow	Starch %
Argessis	V_1	0,27	4,3
	V_2	0,25	4,1
	V_3	0,24	4,0
Auriu de Stefanesti	V_1	0,25	5,2
	V_2	0,27	5,4
	V_3	0,23	5,8
Moldova	V_1	0,33	5,7
	V_2	0,30	6,1
	V_3	0,31	6,3
Augusta (control)	V_1	0,37	5,2
	V_2	0,38	5,4
	V_3	0,35	5,0

Dates on the ratio of the diameter of the wood/marrow and shows a correlation between the size of the report and frost resistance of the varieties studied. Thus the variety Moldova the report was on average 0.31, the variety Augusta of 0.37 while Argessis and Golden Stefanesti

varieties this ratio was 0.25, 0.27 respectively (Table 1). Hence the improved frost resistance of varieties Argessis and Golden Stefanesti irrespective of the applied pruning.

Table 2. Report wood / marrow and starch concentration in the string, the clones studied (average 2010-2012)

Clones	Version	Report wood/marrow	Starch %
Perlette 10 St.	V_1	0,34	5,1
	V_2	0,30	5,4
	V_3	0,28	5,6
Muscat Adda 22 St.	V_1	0,35	5,1
	V_2	0,31	5,3
	V_3	0,30	5,0
Canner (control)	V_1	0,35	4,8
	V_2	0,37	4,5
	V_3	0,30	4,6

The clone Muscat Adda 22 St. this report was from 0.31 to 0.35, the clone Perlette 10 St. from 0.28 to 0.34. At the same time the control (Canner apiren variety) this ratio was approximate values of the two clones from 0.30 to 0.37 (Table 2). This suggests that neither witness had chosen better behavior frost, so the two clones irrespective of the applied pruning showed almost the same values of the ratio wood/marrow.

To assess the degree of fertility of a variety of fertility coefficient calculated absolute and relative (CFA CFR), and productivity is to acquire plant and fruit shape keep it on the hub until full maturity (Dumitriu I.C., 2008).

Making grape-vine through several physiological phases represented by floral induction, differentiation and outside bud, inside the bud, inflorescence growth, flowering, pollination and fertilization, the first fruits and baking. All these steps must be carried out normally for a good production and quality depend on the percentage of shoots that appear on the block (Iuoras R. and Pop N., 2000). Fertility and productivity are qualities that characterize biological and technological agrobiological value variety and the grape-vine. Fertility and productivity are correlated with each other and directly affect grape production (Stoian I. and Namolosanu I., 2006).

Table 3. The fertility varieties and clones studied at INCDBH Ştefăneşti-Argeş (average 2010-2012)

Variety	TO	OV	TL	LF	NI	CFA	CFR
Argessis	21	14	14	6	9	1,50	0,64
Auriu de Stefanesti	25	17	17	13	19	1,46	1,11
Augusta	16	15	15	9	11	1,22	0,30
Moldova	28	17	17	8	8	1,00	0,47
Perlette 10 St.	17	9	9	1	1	1,00	0,11
Muscat Adda 22 St.	28	17	17	8	8	1,00	0,47
Canner	22	13	13	4	4	1,00	0,31

TO-total eye; OV-eye viable, TL-total shoots, LF-fertile tillers, NI-number of inflorescences, CFA-coefficient of absolute fertility, CFR-coefficient of relative fertility

The highest value CFA was recorded in variety Argessis (1.5) and the lowest in all varieties had suffered from frosts of 2012 (Table 4). The highest value CFR was recorded in variety Golden Stefanesti. (1.11) and lowest for clone Perlette 10 St. (0.11).

Table 4. The losses of buds at varieties studied (2012)

Variety	Version	% losses of buds
		2012
Argessis	V_1	35
	V_2	32
	V_3	30
Auriu de Stefanesti	V_1	30
	V_2	28
	V_3	25
Augusta	V_1	59
	V_2	60
	V_3	55
Moldova	V_1	35
	V_2	32
	V_3	30
Perlette 10 St.	V_1	55
	V_2	52
	V_3	50
Muscat Adda 22 St.	V_1	30
	V_2	35
	V_3	32
Canner	V_1	60
	V_2	62
	V_3	65

Between the lower threshold of spring and autumn leaf fall that occurs when normal conditions, length of the growing season ranges which ranges from 153-225 days in Romania. (Oltenu I., 2000). Losses buds were evident in varieties Augusta (55-60%) and Canner (62-65%), regardless of the type of cut applied (Table 4).

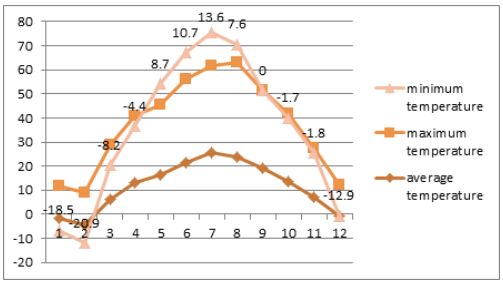

Figure 2. Value of the temperatures (ºC) 2012

Destructive temperatures, low temperature limits, the alternation and the duration of this low temperatures, produced important damages to grapevine in general and the table grape varieties in particular (Stroe M et all, 2009; Stroe M. and Bucur M., 2012).

The minimum temperatures in 2012 were significantly smaller in average years 1991-2010 (-20.9^{0}C in February) (Figure 2).

CONCLUSIONS

Dates on the ratio of the diameter of the wood/marrow and shows a correlation between the size of the report and frost resistance of the varieties studied. Hence the improved frost resistance of varieties Argessis and Golden Stefanesti irrespective of the applied pruning.

Argessis variety, showed the lowest resistance to frost it in hate -20.9ºC temperatures had a viability of 70% and variety Canner of 40%.

Most resistant variety of the studied work was Argessis with a viability of over 70%, so again showed resistance to frost.

Losses buds were evident in varieties Augusta (55-60%) and Canner (62-65%), regardless of the type of cut applied

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