

ESTABLISHING THE CROP ASSORTMENT OF WATER MELON (*CITRULLUS LANATUS*) DEPENDING ON THE ELEMENTS THAT DEFINE THE PRODUCTION

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Abstract

The aim of this study it was that of following the behavior in culture on field on RDCFCSS Dabuleni – Romania, on a sandy soil, of 12 cultivars of water melons of which 9 are hybrids of foreign provenance and 3 local varieties. It were made observations and determinations concerning the morphological characters and the production of the cultivars such as: the vegetative growth of plants, the flowering and the fruits binding date, the number of fruits/plants, the average weight of a fruit and the productions on cropping stages. Following the obtained results it was found that the highest production was registered on 'Baronesa' F1 cultivars and 62-269 F1 with 47.9 t/ha, followed by LF 6720 with 44.9 t/ha and 'Oltenia' with 43.6 t/ha.

Key words: water melon, temperature, fruits, production.

INTRODUCTION

Nowadays, in a competitive market conditions, the cultivators of vegetable species are becoming more interested to cultivate varieties and hybrids of foreign provenance with an acclimatization risk to the natural conditions of the specific area.

The choice of varieties and hybrids in relation to pedo-climatic conditions of the area it is possible only after a preliminary testing of those. Because the water melon fruits are consumed only in fresh conditions, the gustative qualities of those one have a particular importance.

The normal progress of the metabolic processes on vegetable plants is closely related to environmental factors. The direct factors that acts directly on plants, representing their condition of existence, are: climatic factors (light, heat, water and air) edaphic factors (the texture and the soil structure the chemistry and the trophicity of soil, the groundwater) and biotic factors (human and other living organisms) (Voican et al., 1998). From the point of view of requirements for temperature, the sandy soils area from the South of Oltenia

can be considered a very favorable area for growing water melons (Toma et al., 2007).

In the last decades the humanity is facing more and more with the effects of global change, customized on regional level. The increase of water melons productions is based on the use of biological material variety, hybrid) that are becoming more performant, that through the genetic heritage that they possessed it can adapt to the environmental conditions of the area.

Choosing the best varieties and hybrids in relation to the customer requirements and to the pedo-climatic conditions from the area, is possible only knowing in detail the specific of as many varieties and hybrids of water melons existing in our country and abroad (Maria Dinu et al., 2016).

The water melons profitable capitalize the pedo-climatic conditions specific to the sandy soils under the application of an irrigation regime well led (Marinica, 1998). For the sandy soils area, Nanu (1998), recommend the cultivars: 'Dulce de Dăbuleni', 'Crimson Sweet' and 'Red Star' F1 hybrid. The assortment of yellow and green water melons periodically renewed due to the appearance of new creations and in accordance with the

market requirements. As a result, it is therefore necessary to study some cultivars (varieties and hybrids) with high adaptability to the ecopedological specific conditions of the sandy soils in order to introduce them in culture.

The aim of this study was that to track the behavior in pedo-climatic conditions from the Southern Romania (RDCFCSS Dăbuleni) of 12 cultivars of water melon from which 3 varieties are aborigine creations and 9 foreign hybrids in order to recommend the most valuable for adaptability and productivity.

MATERIALS AND METHODS

The present study was conducted in the experimental field of RDCFCSS Dabuleni in 2016.

The experience was mono factorial and was placed after the method of randomized blocks. It has 12 variants with 4 repetitions and consists in 3 varieties and 9 hybrids.

The surface of a variant was of 20 m². The cultural experimental scheme was of 200 x 100 cm.

The variants specific were:

V1 – ‘De Dăbuleni’,

V2 – ‘Dulce de Dăbuleni’,

V3 – ‘Oltenia’,

V4 – ‘Susy’ F1,

V5 – ‘Baronesa’ F1,

V6 – ‘Oneida’ F1,

V7 – ‘Huelva’ F1,

V8 – ‘62-269’ F1,

V9 – ‘Fantasy’ F1,

V10 – ‘Tarzan’ F1,

V11 – ‘Grand Baby’ F1,

V12 – ‘LF 6720’ F1.

The experience was established by planting the seedling on 28 April 2016, previously produced in a solar greenhouse. The maintenance works applied to the culture it was the general specific ones to a water melon crop. Regarding the crop particularities, they relate to the use of plastic for mulch and to the use of drip irrigation system. It was performed morphological determinations on plants that were focused on the haulm length and also production determinations (number of fruits/plants, the average weight of a fruit, the total production). The obtained results were calculated and interpreted statistically.

RESULTS AND DISCUSSIONS

Regarding the climatic conditions in which was placed the experience (in field, on a sandy soil) it can say that the year 2016 (table 1) it has been especially from climatic point of view, excepting May month, in all the other months have recorded average temperatures over of each month multi annual average temperature.

Table 1. The climatic conditions - April - July 2016

Month	Specification	Temperature (°C)	Rainfalls (mm)
April	Minimum	0.8	60.2
	Maximum	31.4	
	Monthly average	15.0	
	Multiannual average	12.1	
May	Minimum	5.5	104.4
	Maximum	32.9	
	Monthly average	16.9	
	Multiannual average	17.4	
June	Minimum	16.9	53.2
	Maximum	37.7	
	Monthly average	23.6	
	Multiannual average	21.4	
July	Minimum	11.4	31.6
	Maximum	38.0	
	Monthly average	24.8	
	Multiannual average	23.2	

April was particularly warm registering a maximum temperature of 31.4°C and a medium temperature of 15°C much higher from the multiannual average temperature of the month that it is of 12.1°C.

The amount of precipitations from April was of 60.2 mm. The May was rich in rainfalls for the area, registering 104.4mm leading to a decrease of temperatures.

The minimum temperature of the month was of 5.5°C which negatively influenced the plants of water melons hardly planted.

The maximum of the month was of 32.9°C. The May monthly average was of 16.9°C lower than the multiannual average of the month with 0.5°C.

June and July were very warm and poor in rainfalls, the minimum temperatures exceeding the multiannual average. Thus, in June it was registered in average 23.6⁰C compared to 21.4⁰C which is the multiannual average with a minimum temperature of 16.9⁰C and a maximum temperature of 37.7⁰C, and the amount of precipitations were of 53.2 mm.

The medium temperature of July was of 24.8⁰C with limits between 11.4 – 38.0⁰C on the background of some low rainfalls, respectively 31.6 mm.

During the vegetation period it were made observations regarding the dynamic of the vegetative growth of the plants on each cultivar in part (Table 2).

The length of the water melons haulm on the fruit bind time it was between 1.84-2.35 m. It have been note by vigor the cultivars: ‘Huelva’ F1 (2.35 m), ‘Oneida’ F1 (2.14 m), ‘Dulce de Dăbuleni’ (2.11 m), ‘LF 6720’ F1 (2.06 m) and ‘Oltenia’ (2.03 m).

The phenological stage of water melon plant flowering highlights ‘Oneida’ and ‘Huelva’ cultivars (02.06.2016) then ‘Grand Baby’ and ‘LF 6720’ (03.06.2016) and then the Romanian varieties that have a deferall against the foreign hybrids of approximately 10 days. The set of the first fruits occured in the period of 9 - 15 June on cultivars of foreign origin and in the period of 20 - 24 June on indigenous cultivars.

This difference of fruit setting between Romanian and foreign cultivars is unfavorable to the sandy area in which the water melon crops are set up mainly for the production precociously.

Table 2. Morphological and production determinations at the cultivars taken into study (minimum values)

Cultivar	Length of haulm (m)	Flowering time	Time of binding - first fruits
‘De Dăbuleni	1.86	13.06	22.06
‘Dulce de Dăbuleni’	2.11	10.06	24.06
‘Oltenia’	2.03	10.06	20.06
‘Susy’ F1	1.91	2.06	9.06
‘Baronesa F1	1.98	6.06	13.06
‘Oneida’ F1	2.14	2.06	10.06
‘Huelva’ F1	2.35	2.06	10.06
‘62-269’ F1	1.88	7.06	15.06
‘Fantasy’ F1	1.84	6.06	13.06
‘Tarzan’ F1	1.89	7.06	15.06
‘Grand Baby’ F1	1.86	3.06	10.06
‘LF 6720’ F1	2.06	3.06	10.06

The cropping was done at technological maturity, and the production was registered on each variant in part, on harvesting stages. The first harvest (table 3) was on 13 July on foreign cultivars and on 22 July on indigenous cultivars

Table 3. The dynamic of water melon production depending on cultivar (average values)

Cultivar	Production (t/ha) on:		
	13 July	22 July	1 August
‘De Dăbuleni’	-	25.0	8.8
‘Dulce de Dăbuleni’	-	23.1	12.2
‘Oltenia’	-	21.0	22.6
‘Susy’ F1	13.3	17.5	1.8
‘Baronesa’ F1	13.9	28.5	5.5
‘Oneida’ F1	14.6	15.6	8.2
‘Huelva’ F1	18.0	18.8	5.0
‘62-269’ F1	19.0	25.0	3.9
‘Fantasy’ F1	8.8	24.1	-
‘Tarzan’ F1	8.2	22.0	-
‘Grand Baby’ F1	16.3	25.3	-
‘LF 6720’ F1	16.4	28.5	-

The productions obtained on 13 July were between 8.2 t/ha at ‘Tarzan’ F1 cultivar and 19 t/ha at ‘62-269’ F1 cultivar. It also noted through the registered production on this date the cultivars ‘Huelva’ F1 with 18 t/ha, ‘Grand Baby’ F1 with 16,3 t/ha and ‘LF 6720’ F1 with 16,4 t/ha.

At the second stage of harvest (22 July) all productions increased at all cultivars being between 15.6-28.5 t/ha. The cultivars ‘Fantasy’ F1, ‘Tarzan’ F1, ‘Grand Baby’ F1 and ‘LF 6720’ F1 completed their period of vegetation on 22 July, and the other cultivars on 1st of August.

At the last stage of harvesting, respectively at 1st of August the productions yield were between 1.8 t/ha at ‘Susy’ F1 cultivar and 22.6 t/ha at ‘Oltenia’ cultivar. The average number of fruits/plants harvested was between 1.5-2 fruits/plants (table 4). The lowest number of fruits per plant was recorded at ‘Fantasy’ F1 cultivar, while the highest one was recorded at cultivars ‘Oneida’ F1, ‘Huelva’ F1 and ‘LF 6720’ F1. A healthy plant of water melon can produce 1-4 fruits per harvest.

Regarding the average weight of a fruit of water melon this ranged between 3.6-5.3 kg/fruit. The biggest fruits were recorded on cultivars ‘Oltenia’, ‘Baronesa’ F1 and ‘62-269’ F1. These registered results are confirmed by

the existent data from literature. A study conducted by Sari et al. (2007) present results according to the average weight of water melon fruits ranged between 1.885-8.033 kg. The similar results were reported also by Pakyurek și Yanmaz (2008), in a study of a genotypes assortment of 13 water melons, where it was identified an average fruits weight between 1 – 4 kg. Ayhan et al. (2014) identified some cultivars of water melon with an average weight of fruits between 1.29-3.96 kg. Cordova et al. (1995) classified the water melons according to the weight of fruits in this way: the fruits with a weight of 4 kg are considered as being small, the fruits with a weight between 4 - 6 kg are considered as being medium and the fruits with a weight between 8 - 12 kg are considered as being giant.

Table 4. The number of fruits per plant and the average weight water melon fruits depending on cultivar

Cultivar	Number of fruits/plant	Fruit weight (kg)
'De Dăbuleni'	1.8	3.8
'Dulce de Dăbuleni'	1.8	3.8
'Oltenia'	1.6	5.3
'Susy' F1	1.7	3.6
'Baronesa' F1	1.9	5.0
'Oneida' F1	2.0	4.0
'Huelva' F1	2.0	4.0
'62-269' F1	1.8	5.2
'Fantasy' F1	1.5	4.4
'Tarzan' F1	1.6	3.9
'Grand Baby' F1	1.9	4.4
'LF 6720' F1	2.0	4.5

The production of water melon (table 5) registered at the 12 cultivars taken into study was between 32.6 – 47.9 t/ha.

The biggest productions as against the control were achieved on cultivars 'Baronesa' F1 and '62-269' F1 which realized 47,9 t/ha, followed by 'LF 6720' with 44.9 t/ha 'Oltenia' with 43.6 t/ha, 'Huelva' F1 with 41.8 t/ha and 'Grand Baby' F1 with 41.6 t/ha. It was elected the cultivar 'Oltenia' as control because it is cultivated mostly in Dabuleni area and it produce appreciable quantities of fruits. The production differences as against the control were between 4.3-1.3 t/ha, having positive differences. The smallest productions of water melon were obtained at cultivars 'Susy' F1, 'Fantasy' F1 and 'De Dăbuleni'.

Table 5. The total production at the water melon studied cultivars (average values)

Cultivar	The obtained production (t/ha)	± Dif. As against Mt.(t/ha)
'De Dăbuleni'	33.8	-9.8
'Dulce de Dăbuleni'	35.3	-8.3
'Oltenia'	43.6	Mt.
'Susy' F1	32.6	-11.0
'Baronesa' F1	47.9	+4.3
'Oneida' F1	38.4	-5.2
'Huelva' F1	41.8	-1.8
'62-269' F1	47.9	+4.3
'Fantasy' F1	32.9	-10.7
'Tarzan' F1	30.2	-13.4
'Grand Baby' F1	41.6	-2.0
'LF 6720' F1	44.9	+1.3

DL 5% = 17.30 t/ha;

DL 1% = 23.57 t/ha;

DL 0.1% = 31.68 t/ha.

The production of 'Oltenia' variety is remarkable for the sandy area from the Southern Romania, being the only Romanian variety with a production over 40 t/ha.

Between the foreign cultivars only five of them registered productions over 40 t/ha, three of them being precocious (62-269 F1, 'Huelva' F1 and 'LF 6720' F1).

CONCLUSIONS

From the obtained results about the behaviour in culture, in the pedoclimatic conditions from RDCFCSS Dăbuleni we notice the following cultivars:

- concerning the number of fruits/plant, 'Oneida' F1, 'Huelva' F1 and 'LF 6720' F1, and by the average weight of a water melon fruit, the cultivars 'Oltenia', 'Baronesa' F1 and '62-269' F1;
- precociousness was noted by the cultivars '62-269' F1 with 19 t/ha and 'Huelva' F1 with 18 t/ha on 13th of July.
- the biggest production was recorded on cultivars 'Baronesa' F1 and '62-269' F1 that achieved 47.9 t/ha, followed by 'LF 6720' with 44.9 t/ha; 'Oltenia' with 43.6 t/ha; 'Huelva' F1 with 41,8 t/ha and 'Grand Baby' F1 with 41.6 t/ha.

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