

## RESEARCH ON THE BEHAVIOR OF SOME SUNFLOWER CULTIVATIONS IN THE SPECIFIC CONDITIONS OF THE NORTH AREA OF OLT COUNTY

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### **Abstract**

*The sunflower, unlike other phytotechnical plants, tolerates drought much better, this is primarily due to the better developed root system with a high capacity to absorb and solubilize water and nutrients from the soil, for a longer period of time, its ability to reduce evapotranspiration and, respectively, the possibility of a rapid return of the leaves to the state of turgor, but the production decreases proportionally to the intensity and duration of these processes. To achieve high performance, sunflower cultivars must have stable F1 heterosis, high seed oil content, high production capacity, short growing season, uniformity in average plant height, high resistance to agents pathogens. In the ecopedological conditions of the Bărăști - Olt area, on a preluvosol type soil, research was carried out on a number of 6 hybrids: Favorit, Performer, Venus, Saturn, Alex, Vera, the production results highlighting their different adaptation to specific culture conditions. The highest yields were recorded for the Performer hybrid -3935 kg/ha and the Venus hybrid -3786 kg/ha. All hybrids achieved productions above 3000 kg/ha.*

**Key words:** hybrids, pathogens, rezistence, production, fertilizer.

### **INTRODUCTION**

The sunflower gained a prominent place in world agriculture, after the First World War, having a series of economic advantages (Vrânceanu, 2000), such as: the ability to achieve large oil productions per surface unit, the ease of to extract the oil with simple equipment; the superior quality of the oil. Romania is considered the first country in the world to create hybrids based on nuclear androsterility, genetically marked (Fundulea 52, Fundulea 53) and introduced into production in 1973. Currently, all hybrids cultivated in the country and abroad are created on the basis of androsterility cytoplasmic and the new hybridization technique, taking over

some important genes from wild species (for the restoration of pollen fertility, resistance to diseases and scabies, to various herbicides). Romanian sunflower cultivars are recognized for the fact that they have great ecological plasticity and lend themselves very well to mechanized harvesting. Considering the increasing market demand for sunflower seeds, in recent years they have started to be taken into consider some aspects related to the highest possible content of oleic acid in the seeds, the introduction of cultivars resistant to imidazolinone or sulfonylurea herbicides. to establish their behavior under different culture conditions (Vrânceanu, 2000, Vulpe 1979; Ștefan 2016). This paper presents some results of the research carried out

under concrete growing conditions in the northern area of Olt county, on a preluvosol type soil, with a number of 6 sunflower hybrids.

### MATERIAL AND METHOD

The research was carried out between 2015-2017 at S.C. SEMROM S.A. Oltenia, punctual work Bărăști, Olt county. Classical cultivation technology was applied. Basic fertilization was carried out with NPK complex fertilizer in equal ratios N15 P<sub>2</sub>O<sub>5</sub> 15 K<sub>2</sub>O 15 in a dose of 250 kg-ha, when preparing the seed bed. During the vegetation phase, facial fertilization was carried out with ammonium nitrate, in the

amount of 200 kg/ha, at the stage of 6-8 leaves. The experiment was located according to the randomized block method with 4 repetitions, the surface of the experimental plot being 14 m<sup>2</sup>, on a preluvosol type soil, with an organic matter content of 2.88% and pH 6.4.

### RESULTS AND DISCUSSIONS

It is known from the specialized literature that the production of seeds and their oil content are influenced by the temperature, the rainfall regime and the relative humidity of the air. Tables 1 and 2 present the main climatic factors studied during the growth period.

Table 1. Climatic conditions at Bărăști –Olt during the vegetation period of sunflower hibrids (2015-2017)

Climatic conditions	MARCH			APRIL			MAI		
	2015	2016	2017	2015	2016	2017	2015	2016	2017
Average air temperature (°C)	9,3	6,2	5,5	13,2	12,4	11,8	17,7	18,3	16,5
Maximum air temperature (°C)	24,3	20,9	22,1	25,5	25,1	22,3	35,8	31,2	29,8
Minimum air temperature (°C)	-3,1	-4,0	+7,5	2,0	0,5	0,0	5,1	4,2	5,3
W% air (minimum values)	65	79	85	76	77	73	70	75	76
Monthly precipitation (mm)	128	40,1	54,7	79,5	25,6	40,5	22,7	27,6	89,7

Table 2. Climatic conditions at Bărăști –Olt during the vegetation period of sunflower hibrids (2015-2017)

Climatic conditions	YUNE			YULY			AUGUST		
	2015	2016	2017	2015	2016	2017	2015	2016	2017
Average air temperature (°C)	22,2	21,2	20,4	21,7	23,1	22,8	17,2	23,1	23,7
Maximum air temperature (°C)	36,4	35,3	34,2	36,4	36,6	34,0	37,2	39,0	37,3
Minimum air temperature (°C)	9,4	7,8	5,7	9,8	10,0	11,5	12,5	11,4	6,0
W% air (minimum values)	71	77	78	67	69	75	67	68	68
Monthly precipitation (mm)	57,6	77,4	120,2	41,2	98,6	57,6	2,4	25,6	37,1

The average air temperatures recorded in March (table 1), between 9.3 and 6.2, were favorable for the rapid and uniform emergence of the sunflower hybrids studied, with the exception of 2017, when average air temperatures of 5.5 °C., a fact that was reflected in the extension of the interval between sowing and emergence. The average temperatures during the growing season were around 17 °C.

The amount of precipitation during the growing season (March-August) in 2015 was 215.8 mm, in 2016, 295.1 mm and 399.8 mm in 2017. From the analysis of the data in tables 1 and 2 it follows also, the relative humidity of the air had values higher than 70%, in March, April and May, in all years of experimentation, with the exception of 2015, which was 65%, values higher than 70% in all years in June and close to 70% in July and August. Corroborating all these aspects, it results that the sunflower's temperature requirements have been satisfied, the quantified data being shared with those from specialized literature, the humidity factor being deficient during the growth period for the year 2015. The sunflower has the ability to adapt to different environmental conditions through the way the vegetation grows, through the characteristics of resistance to drought and temperature variations. The sunflower is picky about heat, the hybrids achieve high productions, when they accumulate over 2100 °C, this desideratum being possible when average temperatures over 18 °C are recorded in the April-August period (tables 1 and 2). The sunflower is one of the

drought-resistant plants due to its very strong root system, able to use water from the deep layers up to 150 cm deep, the porosity of the plants, the storage of some amounts of water in the core of the stem and especially as a result of the fact that, the plants bear the temporary dehydration of the tissues (withering of the leaves), the amount of precipitation during the growing season in the experimental years satisfying the plants' requirements (tables 1 and 2).

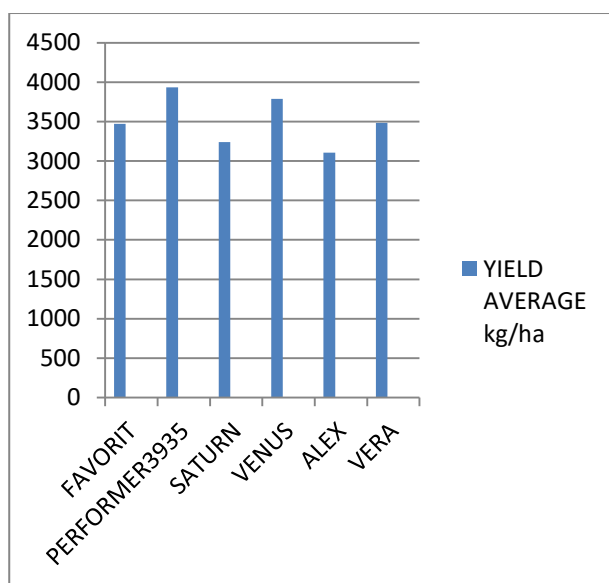
Analyzing the production results obtained from the sunflower hybrids studied between 2015-2017, in the culture conditions specific to the northern area of Olt county, a differentiated adaptability of the 6 cultivations can be found, the productions obtained oscillating from one hybrid to the other. Thus, the Favorit hybrid, tested as a control variant (simple hybrid created in 1992 at I.C.C.P.T. Fundulea, early, very productive - more than 3700 kg/ha achieved an average production/ha in the three years of experimentation of 3472 kg. The Performer hybrid has achieved 3935 kg/ha, with 13.3% more than the control variant, respectively 463 kg/ha, resulting in a very significant increase in production. Higher production than the control variant also achieving Venus hybrids (3786 kg/ha, with 9.0% respectively 314 kg/ha more) and Vera (3482 kg/ha, by 0.2%, 10 kg/ha more). Saturn and Alex hybrids achieved lower productions compared to the control variant, respectively 3240 kg/ha (-232 kg/ha, -6.7 %) and 3104 kg/ha (-368 kg/ha, -10.6 %)(table 3, figure 1).

Table 3. Summary results of production on sunflower hybrids 2015-2017

Nr. crt.	Hybrids	Yield average		Diference (kg/ha)	Significance
		Kg/ha	(%)		
1	FAVORIT	3472	100	0	Mt
2	PERFORMER	3935	113,3	463	XXX
3	SATURN	3240	93,3	-232	o
4	VENUS	3786	109	314	XXX
5	ALEX	3104	89,4	-368	ooo
6	VERA	3482	100,2	10	-

DL 5 %                    208 kg/ha  
DL 1 %                    285 kg/ha  
DL 0,1 %                305 kg/ha

Figure 1. Summary results of production on sunflower hybrids 2015-2017



existence of the spongy marrow inside the stem, having a high capacity to store water and make it available to the plants when water stress sets in, the ability of the plants to autoregulates the leaf surface, through the loss of the basal leaves (reducing the amount of water, which is lost through evapotranspiration) are the elements that give it resistance to drought.

The earliness of the hybrids is another factor that must be taken into account considering the onset of heat during the flowering period (drought associated with high temperature).

## CONCLUSIONS

The climatic conditions in the northern area of Olt county (Bărăști) are favorable for the culture of sunflower hybrids. The sunflower shows great ecological plasticity. The pivoting root system, with numerous lateral roots that develop both vertically and horizontally, the presence the rough pericytes both on the stem and on the leaf apparatus (character of xerophytism), the

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