

# RESEARCHES REGARDING THE REACTION OF SUNFLOWER LOCAL AND FOREIGN HYBRIDS TO IRRIGATION

## CERCETĂRI PRIVIND COMPORTAREA UNOR HIBRIZI DE FLOAREA SOARELUI AUTOHTONI SI STRĂINI LA IRIGARE

**PISTALU V.<sup>1</sup>, COTIANU R.<sup>1</sup>, LAZIN Valentina<sup>1</sup>**

e-mail: cotianu\_razvan@yahoo.com

**Abstract:** *Given the importance of sunflower crop for our country, we consider in this paper we managed to bring a modest contribution to improving research on the behavior of sunflower hybrids to irrigation under stress, to increase crop production and quality. Experiences that have been organized to develop knowledge of the behavior of sunflower hybrids to irrigation under stress, to increase crop production and quality of soil and climate conditions in the South of Moldova. It was also intended as hybrids behaved in the study take in terms of quality indicators*

**Key words:** *irrigation, stress condition, resistance to drought*

**Rezumat:** *Având în vedere importanța deosebită a culturii de floarea soarelui pentru țara noastră, considerăm că prin prezenta lucrare am reușit să aducem o modestă contribuție la îmbunătățirea cercetărilor privind comportarea unor hibrizi de floarea soarelui la irigarea în condiții de stres. Experiențele au avut ca scop principal completarea cunoștințelor privind comportarea unor hibrizi de floarea soarelui la irigarea în condiții de stres, în scopul sporirii producției și calității recoltei în condițiile de sol și clima din zona de sud a Moldovei. De asemenea, s-a urmărit cum s-au comportat hibrizii luați în studiu din punct de vedere al indicilor de calitate.*

**Cuvinte cheie:** *irigare, condiții de stres, rezistența la seceta*

### INTRODUCTION

Sunflower is one of the most valuable cultivated plants due to high productivity and multiple uses of its products to feed people, livestock and industry (Bîlteanu, 1998).

Efficient use of natural resources for sunflower production in order to obtain economic cost, requires rigorous zoning hybrids, depending on climatic resources and their biological requirements. Productions economic optimum is greatly influenced by judicious choice of the most suitable hybrids for each area of culture (Terbea et al., 1995). This paper presents new approaches to technological links sunflower practical relevance of inputs, as a related issue of agriculture in our country.

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<sup>1</sup>"Bioterra" University of Bucharest, Romania

## MATERIAL AND METHOD

He was placed a sunflower experience culture in a batch experimental field uniform in terms of fertility and relief. Wheat plant was run in all the years of experimentation. Cultivation was performed under optimal technology, culture specific area for seven hybrids: Favorite (blank), PF 100, PRO 229, PR64A15, PR64A89, PR64A83 - Hybrids half later and PR63A90 - Hybrid early. Experimental module type was prepared by the method bifactorial parcels subdivided into three repetitions. The factors studied were:

### Factor A: The water supply

a1-unirrigated, a2-irrigated at the minimum humidity threshold of 50% of the IUA-time watering of 850 m<sup>3</sup>/ha, a3-irrigated at the minimum humidity threshold of 50% of the IUA with reduced watering time by 25% (640 m<sup>3</sup>/ha).

### Factor B: Hybrid cultivated

b1 - Favorite (blank) b2 - P.F. 109, b3 - PRO 229; b4 - PR63A90, b5 - PR64A15, b6 - PR64A89, b7 - PR64A83.

## RESULTS AND DISSCUSION

The data presented reveal the same types in each year of experimentation. Due to climatic variations of the three years of experimentation, scientific results are accurate, sunflower being done in a normal year, a dry year (during the growing season) and a wet year. Following these investigations is possible to extrapolate results obtained in the areas of environmental and soil conditions similar to those in the area in which the area south of Moldova.

Comparing the averages from the two experimental factors graduations is apparent that the highest yields were obtained by perfusion culture with standard pedological 850 m<sup>3</sup>/ha at P min 50% IUA and PR64A89 hybrid cultivation, namely 38.6 q / ha. If you make multiple comparisons between variants and hybrids cultivated irrigation, resulting superiority same options.

Influence of insufficient humidifying water on sunflower production, as an experiment during 2008-2010, is presented in Table 1.

*Table 1*

**Influence of insufficient humidifying water on sunflower production, average in 2008-2010 period**

Factor A	Production	Unirrigated		Irrigated at P min 50 % IUA with m=850 m <sup>3</sup> /ha	
		Difference q/ha	Significance	Difference q/ha	Significance
A1- unirrigated	22.9	Mt1	-	-13.8	0
A2 - irrigated at P min 50 % IUA with m=850 m <sup>3</sup> /ha	36.7	13.8	***	Mt2	-
A3 - irrigated at P min 50 % IUA with m=640 m <sup>3</sup> /ha	35.2	12.3	***	-12.3	0

DL 5%= 0.24 q/ha    DL 1%= 0.37 q/ha    DL 0,1%= 0.59 q/ha

It appears that reduce watering by 25% rule to the rules calculated, has reduced production to 36.7 q / ha to 35.2 q / ha. Taking into account the very high costs of irrigation water reduce watering rule is an economical solution for efficient irrigation application (Jinga et al., 2000; Sisesti-Ionescu and Jinga, 1982).

Influence on the production of hybrid sunflower cultivated as an average during 2008-2010 experiment is shown in Table 2 and Figure 1.

Following analysis of these data shows that hybrid highest production of 33.3 q / ha was PR64A89.

Production growth compared to the control obtained was 3.6 q / ha. Of the seven hybrids studied, averaged over the years by the study were also noted PR64A83 and PR64A15, with production of 32.9 q / ha or 32.3 q / ha.

*Table 2*

**Influence of hybrids on sunflower production, average in 2008 – 2010 period**

Factor B	Production	Hybrid Favorit		Hybrid PF100	
		Difference q/ha	Significance	Difference q/ha	Significance
B1 - Favorit	29.7	Mt1	-	-0.7	000
B2 - P.F 100	30.4	0.7	***	Mt2	-
B3 – PRO 229	30.9	1.2	***	0.5	*
B4 - PR63A90	31.4	1.7	***	1	***
B5 - PR64A15	32.3	2.6	***	1.9	***
B6 - PR64A89	33.3	3.6	***	2.9	***
B7- PR64A83	32.9	3.2	***	2.5	***

DL 5%= 0.40 q/ha

DL 1%= 0.54q/ha

DL 0,1%= 0.69 q/ha

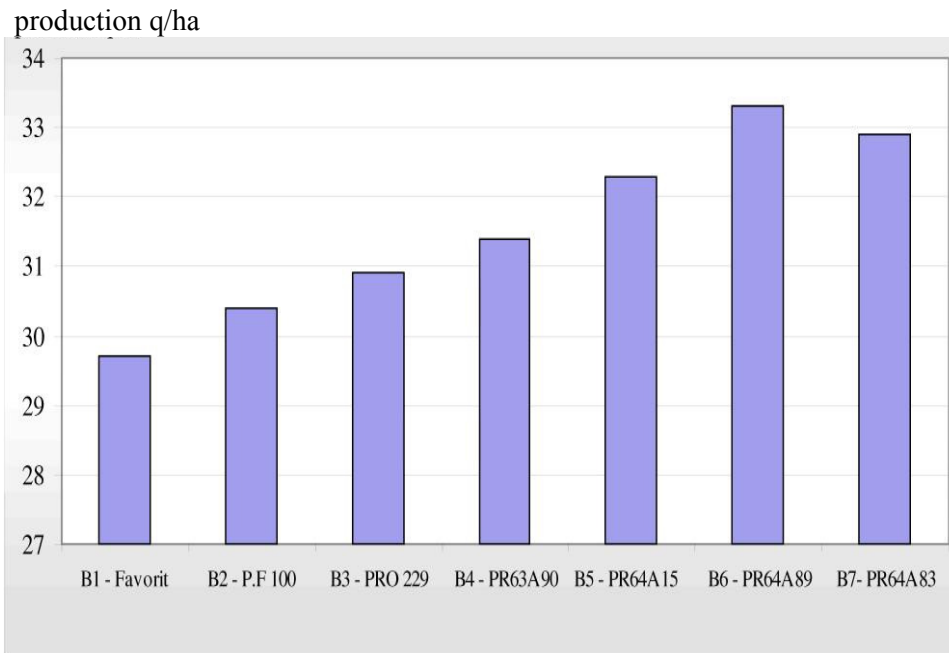
Hybrids obtained lowest yields were favorable and PF 100, 29.7 q / ha or 30.4 q / ha, with significant production minuses.

Analysis of these data lead us to recommend that the climatic conditions in southern Moldova and areas with similar climatic conditions to be cultivated hybrids PR64A89, PR64A83 or PF 100 in irrigated at 50% P min IUA with m = 850 m3/ha.

The climatic conditions of the experimental period 2008-2010, watering norm which provided a high yield of 850 m3/ha was.

Decrease the watering rules with 25% or 640 m3/ha caused decrease production by 4-6%, loss which is offset by the savings to reduce irrigation norm. It is found that in 2008-2010, the change in climatic elements rise to the application of three to five in both irrigation watering, irrigation norm being

m<sup>3</sup>/ha 3200-4250, 1920-2250 m<sup>3</sup>/ha respectively.



**Fig. 1** - Influence on cultivated hybrid sunflower production in 2008-2010 period

Irrigation of all variants studied, the better use of irrigation water was recovered at the time of irrigation irrigated soil, reduced by 25%, the coefficient EVAI with values of 0.51 - 1.67 kg increase/m<sup>3</sup> irrigation water (Table 3).

*Table 3*

**Irrigation water use efficiency under insufficient humidifying sunflower hybrids during 2008 - 2010**

Factor A	Factor B	Number of waterings	Irrigation norm m <sup>3</sup> /ha	Increase production	EVAI kg increase/m <sup>3</sup>
A2- irrigated at Pmin 50% IUA with m=850 m <sup>3</sup> /ha	B1 – Favorit	5	3400	1310	0.39
	B2 - P.F 100			1470	0.43
	B3 - PRO 229			1600	0.47
	B4 - PR63A90			1720	0.51
	B5 - PR64A15			1700	0.50
	B6 - PR64A89			1180	0.35
	B7- PR64A83			1220	0.36

A3- irrigated at Pmin 50% IUA with m=640 m <sup>3</sup> /ha	B1 – Favorit	5	2560	1300	0.51
	B2 - P.F 100			1400	0.55
	B3 - PRO 229			1490	0.58
	B4 - PR63A90			1540	0.60
	B5 - PR64A15			1517	0.59
	B6 - PR64A89			1680	0.66
	B7- PR64A83			1710	0.67

On irrigated with watering time reduced by 25% compared to the soil, ie of 640 m<sup>3</sup>/ha, EVAI index showed high values. This version PR64A15 growing hybrids, PR64A89 and PR64A83 determined EVAI obtain coefficients of 0.59, 0.66 and 0.67 kg respectively increase/m<sup>3</sup> irrigation water, in the context of an acceptable standard savings by reducing irrigation by 25%.

## CONCLUSIONS

Based on these results, averaged across experimental period, ie the period of agricultural 2008 - 2010, the following conclusions regarding insufficient humidifying water and hybrid cultivated in climatic conditions in southern Moldova:

- Sunflower crop requirements for humidity are provided by the administration of 3-5 waterings depending on climatic evolution in culture (3 waterings a year of heavy rainfall and 5 watering in a dry year);
- Administration optimal irrigation regime means the application of rules of 850 m<sup>3</sup>/ha soil watering when soil moisture decreased from 50% IUA Pmin;
- Norma irrigation is 4250-1920 m<sup>3</sup>/ha, depending on the nature of the agricultural year (dry, normal or wet).
- Insufficient humidifying water principle "to obtain as much with as little" and bringing new social and market requirements, it is possible that this decrease soil standard value stands at 25% of full time and if the hybrid allow the cultivated expression and increased production potential;
- In terms insufficient humidifying water irrigation system components are as follows: Rule 640 m<sup>3</sup>/ha watering, watering number 3-5 depending on climate evolution in crop agriculture, irrigation norm 1920-3200 m<sup>3</sup>/ha.
- After use insufficient humidifying water variant provides a reduction in irrigation norm with beneficial implications 630-1050 m<sup>3</sup>/ha of irrigation water costs.
- Hybrids recommended in irrigated crop in the south of Moldova are: PR64A15, PR64A89 or PR64A83, according to financial possibilities in each farm.

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