BEHAVIOR OF SUNFLOWER $RP_{64}F_{50}$ AND $RP_{64}A_{89}$ HIBRIDS IN PIEMONTS AREA FROM SOUTHERN BANAT

Gh.DAVID, A BORCEAN

Banat's University of Agricultural Science and Veterinary Medicine from Timisoara, Faculty of Agriculture. 300645,Timişoara, Calea Aradului 119, România
E-mail:symposium_agro@usab-tm.ro

Abstract: *Extension of areas cultivated with sunflower within our country during the last decade to over 800 ths. Ha and up to over 1 million Ha in 1999, as consequence of the high demand on the internal and external market, is representing a real danger. This is due to the fact that the 6-7 years return period for the same lot can no more be observed. Such a return period is required due to the continuance in the soil of the several pathogen agents as Plasmopara helianthi Novot, Sclerotinia sclerotiorum (Lib) de Bary, Sclerotinia bataticola Taub. Research has been performed on a brown luvic soil. The precursory culture has been wheat. The experiments have been tri-factorial, factor A has been the cultivated hybrid (a_1 – RP64F50 –; a_2 PR64A89, factor B – the agricultural fond ($b_1 – N_{50}P_{100}K_{100}$; $b_2 – N_{100}P_{100}K_{100}$), and factor C cultivation density (c_1 – 45.000 plants/ha; c_2-50.000 plants/ha). Experiences have been performed during the experimental cycle 2010-2012. The studied hybrids have genetic strength to blight attacks (Plasmopara helianthi), species 304, already existing in our country. These hybrids are tolerant to Phomopsis and Sclerotinia, resistant to fall and breakage, resistant to dryness and heat, highly productive and having high content of oil. The crop results are revealing the superiority of PR64A89 hybrid that has overcome by 9% the crop of PR64F50.nIncreasing of nitrogen dose from N_{50} to N_{100} on the constant usage of $P_{100}K_{100}$ has increased the crop by 14%. Increasing the density from 45,000 to 50,000 plants/ha has lead to crop decreasing by 12%. Thousand seeds mass has been negatively influenced by increasing the density, on both fertilization levels, on both hybrids, oscillating between 58 and 61 g. at PR64F50 hybrid and between 60 and 65 g to PR64SA89 hybrid. A similar tendency has been manifested and the hectoliter mass has been situated between 43 – 45 kg/hl at PR64F50 and between 38-43 kg/hl at PR64A89. The content of oil in PR64F50 hybrid has decreased following the doubling of nitrogen dose from 45 to 42% and to PR64A89 46-44 %.*

Key words: *sunflower, technological links*

INTRODUCTION

The importance of sunflower oil, characterized by color, good taste and smell with high content of vitamins A, D, E, K and other aromatic substances, and moreover, the presence in seeds of all essential amino-acids (V. Vrânceanu, 2000) have resulted into the increase of the cultivated surfaces. The fact that this species is permanently attacked by a whole range of diseases such as: brown maculation and blight attacks (Diaporthe helianthi Munt.Cvet.f.c.Phomopsis helianthi Munt.Cvet), black stem (Phoma Macdonaldii Boerema) seedling blight rot (Sclerotium bataticola Taub.), white rot (Sclerotinia sclerotiorum (Lib) de Bary), grey rot (Botrytis cinerea Pers), and also the attack of some wolverine pests such as beetles (Agriotes sp.) darkling beetle (Opatrum sabulosum L),hamster (Cricetus cricetus L), leaf curling plum aphides (Brachycaudus helichrysi K), which requires the cultivation of some resistant hybrids that prevent such diseases from returning on the same field, earlier than 5-6 years. To those previously mentioned it is important to add plants that are mostly exposed to common diseases such as (bean oil, rape oil, bean), plants with high water consumption (sugar beet, Lucerne and Sudan grass), and plants most likely exposed to the attack of broomrape

(cannabis and tabacoo) – Gh.Bâlteanu, 1993, N,Sânea,Gh.David,1996, V.Tabără şi colab.2003, I.Borcean, A Borcean, 2004, Gh.David şi colab.2006.

The reduction of their return period on the same field is possible by extending such breakage, fall, heat, diseases resistant hybrids, or by using a proper high technology, representing issues highly debated by the present scientific paper.

MATERIAL AND METHODS

There have been studied the following hybrids: PR64F50 şi PR64A89, both of them belonging to the same Pioneer company.

The PR64F50 hybrid is half-early and tolerant to sunflower broomrape (Orobanche cumana) E race having a genetic resistance to sunflower Downy Mildew, race 304 and 710. It proved to be very tolerant to Phomopsis and Sclerotinia. Moreover, there has also been registered a high resistance to fall and breakage and tolerance to dryness and heat with an oil content of 45- 47%.

The PR64A89 hybrid has been half-late, with genetic resistance to Sunflower Downy Mildew, good tolerance to brown maculation and blight attacks, tolerant to white rot and seedling blight rot, residence to dryness and heat, and also with 46- 47% oil content. Research has been performed during the period 2010 -2012 on a luvic brown soil. The precursory culture has been wheat.

The experiments have been tri-factorial, organized in three repetitions, with the following stages of the factors:

Factor A – cultivated hybrid (a_1 – PR64F50; a_2 – PR64A89);

Factor B - agrifund (b_1 – N_{50} P_{100} K_{100} ; b_2 - N_{100} P_{100} K_{100});

Factor C – plants density (c_1 – 45.000 plants/ha; c_2 – 50.000 plants/ha).

Determinations have been performed regarding the crop, thousand seeds mass, hectoliter mass, oil percentage, resistance to fall, heat and attack of Phoma and Sclerotinia.

RESULTS AND DICUSSIONS

The crop results have been presented in table 1 showing that the experimental cycle for year 2012 has been less favorable, than other years.

Table 1

The crop results obtained during the experimental cycle from 2010-2012

A Hybrid	B Agrifund	C- plants density/ha		A Factor Environments			
		45.000	50.000	Crop Kg/ha	%	Difference Kg/ha	Significance
PR64F50	$N_{50}P_{100}K_{100}$	2689	2403	2677	100	Witness	-
	$N_{100}P_{100}K_{100}$	3010	2609				
PR64A89	$N_{50}P_{100}K_{100}$	2826	2550	2924	109	247	X
	$N_{100}P_{100}K_{100}$	3360	2963				

DL 5% =168 DL 1% =253 DL 0,1%=405

C Factor environments

Note	45.000	50.000
Crop	2971	2631
%	100	88
Difference kg/ha		- 340
Significance		000

DL5 % = 141 DL 1%=187 DL 0,1% =244

B Factor Environments

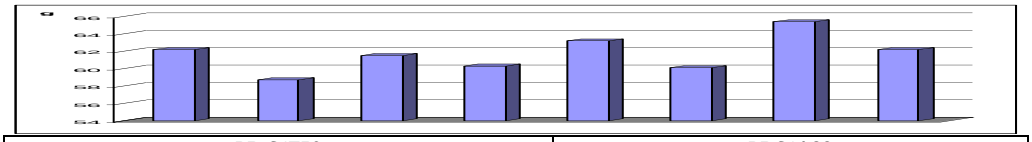
Note	$N_{50}P_{100}K_{100}$	$N_{100}P_{100}K_{100}$
Crop	2617	2985
%	100	114
Difference kg/ha		368
Significance		XXX

DL 5% =81 DL 1%=108 Dl 0,1%=140

This was especially because of high temperatures and dryness registered during their blossom period – fertilization period – seeds' filling, medium results have been acceptable , the crops varying in the research field between 2403 kg/ha and 3360 kg/ha. It has been noticed that the PR64A89 hybrid has been overcome by the PR64F50 hybrid on fertilizers amount and the densities studied with 9%, respectively 247 kg/ha.

As regards the influence of agricultural fond, it has been noticed that by increasing the nitrogen dose from N_{50} to $N_{100,}$ in case of those two hybrids, the crop has increased with 14%, resulting into 368 kg/ha. The increase of the culture density from 45.000 to 50.000 plants/ha, as not irrigated land, has determined the decrease of the crop with 12% resulting into a loss of 340 kg/ha.

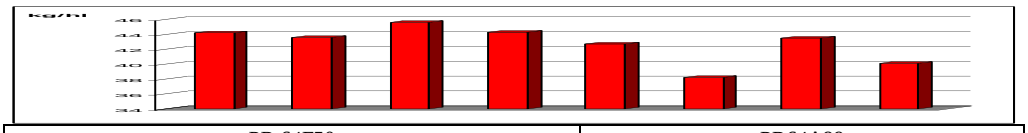
Figures 1and 2 show the results regarding the evolution of mass features according to the studied factors.



PR 64F50				PR64A89			
N_{50} P_{100} K_{100}		N_{100} P_{100} K_{100}		N_{50} P_{100} K_{100}		N_{100} P_{100} K_{100}	
45.000	50.000	45.000	50.000	45.000	50.000	45.000	50.000
62,2	58,7	61,5	60,3	63,2	60,1	65,4	62,2

Figure 1.Thousand seeds mass variation

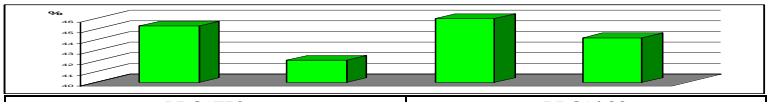
Figure 1 demonstrates that in case of both hybrids, on both fertilizer amounts, that by increasing the plants' density has been registered a tendency of decreasing the value of thousand seeds mass. The duplication nitrogen dose in case of fertilizers has increased the value of the thousand seeds mass in case of both hybrids and within the density of both plants.



PR 64F50				PR64A89			
N_{50} P_{100} K_{100}		N_{50} P_{100} K_{100}		N_{50} P_{100} K_{100}		N_{100} P_{100} K_{100}	
45.000	50.000	45.000	50.000	45.000	50.000	45.000	50.000
44,2	43,6	45,6	44,3	42,7	38,2	43,5	40,1

Figure2. Hectoliter Kg/hl mass variation

In the research study, the hectoliter mass varied between 38,2 kg/hl and 45,6 kg/hl. By increasing the nitrogen dose and by increasing the density of the culture from 45.000 to 50.000 plants/ha, the sensitive hectoliter mass has decreased.



PR64F50		PR64A89	
N_{50} P_{100} K_{100}	N_{50} P_{100} K_{100}	N_{50} P_{100} K_{100}	N_{50} P_{100} K_{100}
45,3	42,1	46,0	44,2
43,7		45,1	

Figure 3. Content of oil % according to the type of hybrid and fertilization degree

Figure 3 presents the content of the oil according to the cultivated hybrid and the nitrogen fertilization level.

The intermediate results obtained during the reference period showed a variation between 42,1% and 46,0%

Results present us a negative influence regarding the increase of nitrogen, which, in case of both hybrids, led to the decrease of the oil content.

In table 2 there are presented the results of the observations resulted from the two intermediate samples for each studied hybrid.

Table 2

Grades awarded according to Phoma şi Sclerotinia falling resistance, resistance to heat

Note	Resistance:			
	Fall	Heat	Phoma	Sclerotinia
PR64F50	8	8	7	7
PR64A89	8	8	8	7

Legend: 6-satisfying; 7- good; 8- very good; 9-excellent.

The results prove that the two hybrids studied within our research study have very good and excellent resistance within the research study.

CONCLUSIONS

The pedoclimatic conditions from piedmont area from the southern part of Banat, on a brown luvic soil where the experimental cycle 2010- 2012 took place proved that the intermediate crop registered 2924 kg/ha in case of PR64A89 hybrid, 9% higher than that the one registered at PR64F50 hybrid (2677 kg/ha). The increase of nitrogen from N_{50} to N_{100}, on a constant agrifund of P_{100} K_{100} resulted into an increase of the crop with 14%.

The increase of the density from 45.000 plants/ha to 50.000 plants/ha determined the decrease of the crop with 12%. The thousand seeds and the hectoliter mass in case of both hybrids and on both fertilization levels have negatively influenced the increase of the plants density.

The content of oil has diminished by increasing the nitrogen in case of both hybrids into study. The grades awarded for the hybrids resistance to fall and heat proved to be satisfying in case of experimental hybrids.

The PR64F50 hybrid has been appreciated with 7 as regards its resistance to Phoma and Sclerotinia, while the PR64A89 hybrid has received 8 as regards its resistance to Sclerotinia.

BIBLIOGRAPHY

1. BILTEANU,GH. 1998, Fitotehnie, Vol.2.Ed.Ceres, Bucureşti.
2. BORCEAN I.,BORCEAN A.,2004 Cultura şi protecţia integrată a cerealelor, leguminoaselor şi plantelor tehnice. Ed.de Vest Timişoara.

3. DAVID GH, PIRŞAN P.,IMBREA F.,2006 Tehnologia plantelor de câmp – Cereale,leguminoase pentru boabe şi plante tehnice. Ed.Eurobit Timişoara
4. SÂNEA N.,DAVID GH., 1996 Floarea soarelui, aspecte ale tehnologiei de cultură în Banat.Agricultura Banatului nr.4, pag.4-5.
5. TABĂRĂ V.,PUSCĂ I.,BÎRLEA V.,MĂCIEŞANU D.,2003 Tehnologia culturii florii soarelui.Agricultura Banatului nr.3 – 4 pag.6.
6. VRÎNCEANU AL.V.,2000 Floarea soarelui hibridă. Ed.Ceres, Bucureşti.