COMPARATIVE RESEARCHES ON THE BEHAVIOUR OF RECORDED AND RECOMMENDED HYBRIDS OVER THE A, B AND C HYBRIDS AS REGARD THE GRAIN YIELD IN SIMNIC – CRAIOVA ZONE

CERCETĂRI COMPARATIVE PRIVIND COMPORTAREA HIBRIZILOR ÎNREGISTRAȚI ŞI RECOMANDAȚI FAȚĂ DE HIBRIZII A, B ŞI C ÎN CEEA CE PRIVEŞTE PRODUCȚIA DE BOABE ÎN ZONA SIMNIC - CRAIOVA

C. SALCEANU*, N. VOICA, L. OLARU*, H. BADESCU*

**University of Craiova, Faculty of Agriculture*

Abstract: *The corn hybrids are grown for their heterosis potential, which enhances the plant yield as well as the physiological features as drought resistance, bending resistance and pest resistance and so on. Recently, our country has received several hybrids originated from abroad, especially from western countries as US and France. In order to have reliable data on the comparison between old local varieties and hybrids and these new hybrids we have researched them in several years at the Research Station of Simnic. The results have shown good characteristics of these hybrids in comparison with the local varieties.*

Rezumat: *Hibrizii de porumb sunt cultivați pentru potențialul lor de heterozis care măreşte producția, precum şi caracteristicile fiziologice, cum sunt rezistența la secetă, rezistența la frângere ori la diverşi dăunători ori boli. În ultimul timp, ţara noastră a primit mai mulți hibrizi străini, din ţările vestice, în special Statele Unite şi Franța. Pentru a obține data de încredere, în ce priveşte comparația dintre hibrizii locali şi aceşti hibrizi, am cercetat în mai mulți ani, în experimente la Staţiunea de Cercetări Agricole Şimnic. Rezultatele au arătat caracteristici bune ale acestor hibrizi în comparație cu hibrizii locali.*

Keywords: *corn, hybrids, cross pollination, inbred lines*
Cuvinte cheie: *porumb, hibrizi, polenizare încrucişată, linii consangvinizate*

INTRODUCTION

Romania has good climatic conditions for corn growth. The most suitable area for the corn crop culture is Southern part where the soil is rich and the clime is mild. Nevertheless, in some years drought conditions appear and highly increase the risk of crop failure. Of 10 years, three are very wet, 3 are very dry and the rest is average. In Simnic area, the climatic conditions are as follows: it is located at 6 km away from Craiova. Geographically, it is located at $44^0$and 19' northern latitude and 23^0 and 60' eastern longitude and 92 m altitude. It is at the transition zone between Danube Plain and the Oltenia hills. The soil where the experiments took place is brown – reddish luvic with 1.5% - 1.8% humus, low acid, pH = 5.6 rich in clay and good hidric regime for the corn crop. The temperature regime is substantially excedentary in April and May that affect in this period the corn plant.

MATERIAL AND METHOD

The studied material are represented by simple corn hybrids resulted from the cross pollination of the three inbred lines on each inbred group, type A lines, B and C that have produced 6 hybrids for every type lines using the mathematical model n (n-1), in our case, 3 (3-1)=3 x 2 = 6 hybrids. The formulas for each hybrid are written in the table 3 where we have 18 hybrids in total and two control hybrids, the simple Hybrid Olt and a KWS hybrid that belong to the germen company that operates in our zone.

The 20 hybrids that were tried within the 2005 – 2006 period have been statistically researched in special trials with 20 treatments and 3 replications. The results were statistically interpreted and there was calculated the DL for two steps of significance.

The plant density, was 70/29 cm, 50.000 plants per hectare and the previous crop for 2005 experiment was wheat and for 2006 experiment, corn for silage. The autumn plough was performed for every experiment in late fall, in November, for management reasons.

The fertilization was performed during the spring using complex fertilizers $N_{60}P_{60}$ kg. a.i./ha. After emerging in spring there have been applied 60 kg/ha ammonium nitrate/hectare.

The weed control was made by manual and mechanical hoeing and a pre-emergent herbicide, Guardian, 2.5 l/ha and a post-emergence herbicide, 2,4 D.

In 2006 there was need an herbicidation by Mistral due to the reduced effect of Guardian because the soil was dry.

The rainfall regime in 2004-2005 year is characterized by excedent rains in all vegetation months of the corn. The multiannual average of April, May, June, July, August and September that sum 305 l/sm are spectacularly overpassed. The above moths sum 825 l/sm and the excedent of 520 l/sm is close to the average rainfall of the zone.

RESULTS

In the first table there are presented the yields for the hybrids that were obtained by reciprocal crossings between studied inbred lines. In 2005 year that was excedentary as rainfall within the corn vegetation period there can be noticed that the all 20 treatments in comparison with the control variant of the 6 hybrids of A type, four hybrids has given distinctively significant yield differences that were inferior to the control variant. With the type B hybrids, there were two hybrids that were inferior to the control and the ones of the C type are superior in high rainfall conditions in four cases in comparison with the control variant.

The KWS hybrid has recorded the highest yield output and the Olt hybrid is at the average level of the experiment taken as control.

CONCLUSIONS

From the presented results, there can be summarized the following conclusions:

1. The value of the local germplasm of the corn populations of the zone is confirmed in drought conditions.
2. In high rainfall years, (2005) the hybrids obtained from inbred lines that were extracted from local populations give inferior yields in comparison with the loco hybrids (Olt) as well as for foreign hybrids (KWS).
3. When the level of the rainfall is moderated yet it overpasses the multiannual average in 2006 it is the same inferior situation for the local germplasm, in comparison with the initial material used for the obtaining of the corn hybrids.
4. The upward sentences regard only the inbred lines that were extracted from the local populations that underwent three mass selection cycles (Pm3).
5. When we use divergent lines from two synthetic hybrids of local populations that undergo two recurrent selection processes, 2(SRR) we get results that place the genetic material over the actual corn hybrids characteristics.

Table 1

The yields given by the hybrids that were obtained by reciprocal crossings between inbred lines that were previously analysed at SCDA Simnic

Var.	Group	Hybrid	Real. 2005			Real 2006		
			Q / ha	%	S	Q / ha	%	S
1	A	l.c.1x1c.2	98.7	90.7	00	57.8	93.7	0
2		l.c.1x1c.3	93.3	94.9		53.2	86.2	00
3		l.c.2x1c.1	96.8	98.1		49.6	80.4	00
4		l.c.2x1c.3	91.6	84.2	00	53.2	86.2	00
5		l.c.3x1c.1	92.0	84.6	00	55.6	90.1	00
6		l.c.3x1c.2	93.0	85.5	00	56.6	91.7	00
7	B	l.c.4x1c.5	100.4	92.3	00	62.9	101.2	
8		l.c.4x1c.6	110.2	101.3		62.9	100.5	
9		l.c.5x1c.4	113.6	104.4		67.7	109.7	x
10		l.c.5x1c.6	107.3	98.6		59.9	97.8	00
11		l.c.6x1c.4	100.0	91.1	00	62.3	100.9	
12		l.c.6x1c.5	112.5	103.4		69.9	113.3	xx
13	C	l.c.7x1c.8	112.6	103.5		58.8	92.3	00
14		l.c.7x1c.9	118.2	108.6	xx	63.4	102.7	
15		l.c.8x1c.7	117.6	108.1	xx	71.3	115.5	xx
16		l.c.8x1c.9	118.0	108.4	xx	70.0	113.4	xx
17		l.c.9x1c.7	117.0	107.5	xx	67.4	109.2	xx
18		l.c.9x1c.8	114.9	105.6	X	65.2	105.6	x
19		Olt	113.9	104.7		69.3	112.3	xx
20		KWS	120.7	110.9	xx	59.0	95.6	0
Control – the average of the experiment			108.8	100.0	-	61.7	100.0	-
Dl = 5 %			**5.3 %**		**5.0 %**			
1 %			**7.1 %**		**6.7 %**			

ITERATURE

1. HAS, I.- 2004 – Heterozisul la porumb, cap 9 din ,, porumbul Studiu Monografic„ vol I coordonatori M. Cristea, I. Cabulea, T. Suba, ed. Academiei romîne, Bucureşti, 2004, p. 311 -362.
2. ILICEVICI, S., RADU A. – 1998 – cercetări şi rezultate privind utilizarea germoplasmei locale ân ameliorarea porumbului la SCA Şimnic. Lucrări Ştiinţifice, SCA Şimnic, vol III, 11.
3. ILICEVICI, S. – 1994 – Posibilities and limits of local germoplasm utilization for realizing superior maize hybrids. Romanian Agricultural research, A publication of ICCPT Fundulea – Romania, November 2 / 1994, p.1.
4. SARCA T., 2004 – porumbul – studiu monografic cap. 10 Ameliorarea porumbului. Editura Academiei Române.
5. VOICA N. şi colab. – 2003, Genetica Vegetală. Editura Universitaria Craiova.