THE VARIABILITY OF SOME CHARACTERS AND FEATURES WITH A FEW INBRED MAIZE LINES IN THE CONDITIONS OF CENTRAL OLTENIA

VARIABILITATEA UNOR CARACTERE ŞI ÎNSUŞIRI LA UNELE LINII CONSANGVINIZATE DE PORUMB ÎN CONDIŢIILE ZONEI CENTRALE DIN OLTENIEI

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Abstract: *The phenotype variability of inbred lines can be interpreted as a fundamental factor in achieving a high heterosis with the hybrids in which those inbred lines are included. The inbred lines are characterized by the presence of less developed plants, shorter, with a lower yielding capacity, reduced growing rhythm, lower adapting capacity as a result of inbreeding process. By inbreeding is not always produced the degeneration yet the segregation and expression of the negative or unfavourable genes. In such conditions, the selection becomes more difficult. Our research has identified the way these characters can be avoided.*

Rezumat: *Variabilitatea fenotipică a unor linii consangvinizate de porumb poate fi interpretată ca factor de bază în realizarea unui heterozis performant la hibrizii în care sunt incluse liniile respective. Liniile consangvinizate se caracterizează prin existenţa plantelor mai puţin viguroase, mai scunde cu o capacitate de producţie mai redusă, ritm de creştere şi dezvoltare încetinite, o capacitate de adaptare mai scăzută, ca urmare a consagvinizării.*

Prin consagvinizare nu se produce întotdeauna o degenerare ci, favorizând segregarea şi exprimarea genelor cu efecte negative şi favorabile, selecţia devine mai eficientă.

Keywords: *maize, hybrids, features, inbred lines*
Cuvinte cheie: *porumb, hibrizi, însuşiri, linii consangvinizate*

INTRODUCTION

The research has been carried out at the Research Station of Simnic, on a brown-reddish luvic soil within the Plant Breeding Laboratory, Seed Production and Plant Protection. The material was represented by 13 inbred lines (7 Romanian and 6 foreign). The methodology for the evaluation of the studied material represented by inbred lines has consisted of experimenting on these lines in comparative trials of two rows in three replications. The planter performed the planting, 2-3 seeds in a place. The eliminating of the exceeding plants was made at 4-6 leaves phase ensuring a density of 50,000 plants/hectare. The experiment was set up using the randomized block method.

MATERIAL AND METHOD

There have been made measurements of the plants during the milk – wax phase of the maize for each variant measuring 30 plants in order to get an average value. For every line of the two there was used as control the values of the normal inbred line. The variability degree of the two studied factors was established by analysis of the variation chain taking account of $x \pm sx$ and s%. As we can see, in the case of the plant height the crossing of lc 349 with the androsterile source has conducted to a more pronounced heterosis in comparison with the one achieved with lc 85206, the plant height being at lc 349 T with 10.8% and with lc 349 ES with 8.6% more than lc normal. As regard the height of the main cob insertion, the values of the androsterile lines are similar with the ones of the androfertile analogues.

RESULTS

The results concern the following aspects:

- plant features: the total height (including the panicle), the insertion height of the main cob, the number of cobs per plant, number of leaves per plant, foliar surface, number of branches per panicle.

- cobs features: the length, the number of rows, number of grains in a row, the cob diameter, the rachis diameter, the grain depth.

- performance features: the grain yield, the dry matter, the grain capacity, the mass of a thousand grains and the mark of cob tilth.

The amplitude of the variation of the values that represent the height of the plants as s% show a higher uniformity of the normal lines in comparison with the androsterile ones and of the two, more uniform is lc 85206. Regarding the insertion height there are not significant differences in all 6 cases that are the variants of the two analysed inbred lines. Overall, it can be appreciated that the uniformity of the insertion height shows that the selection works applied during the crossings with the androsterile source have been properly conducted and the androfertile analogues obtained both with the T type ms and ES ms have phenotypical uniformity that is indispensable for the obtaining of performant hybrids.

Table 1

The analysis of the calculated variation with 6 characters of the plant with the studied inbred lines

Genotype	Total height (cm)	Cob insertion height (cm)	Number of cobs to 100 pl. (prolificit.)	Foliar surface (dm^2)	Branches/panicle	SGUT Emerg-bloom
F 408	243*	88*	1.39**	39.52	5.0^{000}	759.9
F 406	208	55^{00}	1.10	47.26	9.2	750.8
F 403	175	60^{0}	1.17	33.97	13.6***	750.8
Ş 235	233	83	1.30*	40.65	9.4	750.8
Ş 151	220	95**	1.34**	48.42	15.0***	750.8
Ş 64	233	93*	1.35**	58.24**	10.6	769.6
Ş 13	175	83	1.03	44.87	13.4***	780.2
K 5361	188	75	1.14	27.37^{00}	4.2^{000}	659.3
K 8112	170^{0}	60^{0}	1.11	34.32	4.6^{000}	740.3
K 9340	215	73	1.15	47.23	4.6^{000}	793.5
K 7448	193	68	1.20	37.38	4.8^{000}	787.8
K 4432	205	90*	1.03	47.72	4.6^{000}	838.3
K 7619	165^{0}	68	1.17	42.28	4.4^{000}	838.3
Average	205	75	1.12	42.15	9.30	766.95
S2E	439.5	69.86	0.01	21.89	0.83	7682.1
DL 5%	37	15	0.13	8.33	1.62	156
DL 1%	52	21	0.18	11.69	2.28	219
DL 0.1%	74	29	0.25	16.50	3.22	309

Table 2

The analysis of the calculated variation with 6 characters of the cob with the studied inbred lines

Genotype	Cob length (cm)	No. of grains rows on a cob	No. of grains in a row	Average mass of a cob (g)	Average diam.	Average diam of the rahis (cm)
F 408	17.8	14.3	35.3	134.3	3.7	2.4
F 406	16.7	15.6	35.0	146.6	3.8	2.4
F 403	13.6	14.7	28.8	154.3	4.0	2.9*
Ş 235	15.7	16.8	37.4	128.7	3.9	2.8
Ş 151	13.0	14.5	32.5	146.0	4.2	2.6
Ş 64	18.3	12.9	45.0***	150.8	3.2*	2.1
Ş 13	18.8*	15.8	37.8	115.8	3.5	2.4
K 5361	13.8	12.4	20.8^{00}	93.4^{00}	3.8	2.4
K 8112	14.7	17.3*	29.5	134.8	32.9	2.3
K 9340	16.0	16.6	30.5	140.9	4.0	2.6
K 7448	18.3	13.2	31.3	96.5^{00}	3.6	1.9*
K 4432	16.1	15.1	33.5	128.0	3.9	2.5
K 7619	15.3	14.0	30.8	120.2	3.9	2.3
Average	15.9	14.9	32.7	134.6	3.9	2.4
S2E	3.56	2.60	13.40	173.62	0.17	0.06
DL 5%	3.4	2.9	6.5	23.5	0.7	0.4
DL 1%	4.7	4.0	9.1	32.9	1.0	0.6
DL 0.1%	6.7	5.7	12.9	46.5	1.5	0.9

Table 3

The analysis of the calculated variation for 4 characters of performance with the studied inbred lines

Genotype	Average grain yield (q/ha)	Dry matter (%)	Grain randam. (%)	MMB
F 408	46.1	78.1	79	328**
F 406	55.5**	75.98	77	263
F 403	46.9	75.7	78	297
Ş 235	39.8	77.9	72	206^{0}
Ş 151	47.4	80.5	76	208^{0}
Ş 64	47.7	78.8	76	229
Ş 13	29.9^{00}	79.6	72	183^{00}
K 5361	38.3	83.4*	79	260
K 8112	42.6	73.3*	75	315**
K 9340	50.0*	75.8	71	290
K 7448	32.3^{00}	80.5	78	263
K 4432	44.9	76.0	72	231
K 7619	36.3	80.3	79	231
Average	43.3	78.1	76	252
S2E	18.11	5.70	69.07	732.90
DL 5%	7.58	4.25	14.79	48.19
DL 1%	10.63	5.96	20.76	67.64
DL 0.1%	15.01	8.42	29.31	95.49

CONCLUSIONS

1. The phenotype variation of some inbred maize lines can be interpreted as a basic factor in achieving a high heterosis with the following hybrids.

2. The theoretical researches and the practice of breeding have influenced the hybridation between inbred lines as the most effective method

3. With the researches about the androfertile and androsterile inbred lines, on the whole there can be appreciated that uniformity of the plant height of insertion shows that the breeding works with the androsterile source have been properly conducted and the androsterile analogues as T ms type and ES ms have phenotype uniformity that is indispensable for the elite hybrids of the future.

4. With all cases of phenotypical differentiation of the studied lines, it is close as value with the local inbred lines and the foreigner ones, cobs features as well as the performance features. This observation illustrates the fact that the breeding methods have reached a standardization level and that it is more and more difficult to find hybrid combinations that overpass the existing material.

LTERATURE

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