Treatment	1 27° x 24°	2 27° x 27°	3 27° x 30°	4 27° x 33°
Mean value for recombination between C and Sh	10.10	9.31	9.04	6.21

No ears were collected from the 27° x 36°, as the pollen was inviable, possibly an effect of the constantly high temperature in the 36° glasshouse.

"t" tests showed no significant differences between treatments 1 and 2, between 2 and 3 and between 3 and 4, but a significant difference was observed between treatments 1 and 4 and 2 and 4. It was therefore considered worthwhile repeating the experiment with more sophistication, and this is being done.

The possibility of B chromosomes producing these differences was considered but eliminated when, on examination, no B chromosomes were found to be present in any of the stocks. These stocks have been grown for 15 years in Melbourne, where the fluctuation in recombination values seemed to be correlated with fluctuation in temperatures from year to year, and this prompted the carrying out of the experiment under controlled conditions.

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1. Phenotypic stability in maize.

Phenotypic stability in maize has been the subject of many investigations. It has been demonstrated that the degree of phenotypic stability exhibited by various genotypes in response to environmental variations is not the same for all characters considered. Furthermore differences in phenotypic stability between genotypes may change after exposure to different environmental variations.

In a previous report (M.N.L., 1967) we presented data on phenotypic stability of eight inbred lines and all their F_1 crosses in relation to the effect of plant spacing. These results indicated that various plant characters are affected by spacing in the field. The degree of change is under genetic control in two of the four characters studied. No significant genetic differences in stability were observed in the flowering time

and leaf length. A single plant randomization design was adopted, so that the genotypes were in competition.

The experiment has been repeated in 1967 using seven of eight inbred lines and all their single crosses, without reciprocals. The field lay-out was in two blocks, each divided into three subunits, one for each level of plant density. Each family was grown in 3x7 plots with two replications per subunit. The measurements were taken on plants guarded by plants of the same genotype. Three plants were used for each plot. In this way the competition effect between genotypes was avoided.

The levels of plant density were the same as in the previous experiment, namely 5(I_1), 7(I_2) and 9(I_3) plants per m^2. The characters studied are shown in Table 1. In this table the overall F_1 and parental means for each treatment are reported. The analysis of variance indicates that the increase of plant density modifies the expression of the characters studied. The only difference not significant is that of leaf length.

Table 1

Characters		I_1	I_2	I_3
Flowering time*	$\overline{F}_1$	9.08	9.91	10.11
	$\overline{P}$	15.70	15.30	16.06
Plant height	$\overline{F}_1$	154.76	155.05	156.83
	$\overline{P}$	117.58	114.97	111.29
Stock diameter	$\overline{F}_1$	25.04	23.08	21.52
	$\overline{P}$	19.21	18.41	16.23
Leaf length	$\overline{F}_1$	73.15	72.84	73.08
	$\overline{P}$	54.31	54.25	52.05
Ear weight	$\overline{F}_1$	129.29	110.24	93.20
	$\overline{P}$	46.93	36.64	31.05
Plant weight**	$\overline{F}_1$	72.67	60.34	52.87
	$\overline{P}$	40.39	33.64	26.04

* male flowering time

** dry weight

Differences in stability between F_1 and inbred lines are observed for plant height and ear weight. Considering plant height, it appears that the increase of plant density results in an increase of the mean value in the F_1 and a decrease in the inbred lines. A similar behavior was also observed in the previous experiment. Analysis of variance of combining ability has been performed for each character at each level of plant density.

The general combining ability (g.c.a.) and specific combining ability (s.c.a.) mean square are reported in Table 2. Both the items are highly significant ($P < 0.01$) for all the characters studied. The combined analysis provided a test for genetic-environmental interactions (genetic-density).

Table 2

Characters	Items	D.F.	Variances		
			I_1	I_2	I_3
Flowering time*	g.c.a.	6	58.973	71.308	62.570
	s.c.a.	21	29.165	22.728	23.676
Plant height	g.c.a.	6	1337.355	1207.588	1428.914
	s.c.a.	21	982.533	1076.176	1367.365
Stock diameter	g.c.a.	6	95.849	95.299	77.424
	s.c.a.	21	20.106	15.090	17.094
Leaf length	g.c.a.	6	1252.473	1624.187	1537.047
	s.c.a.	21	252.061	250.850	322.916
Ear weight	g.c.a.	6	8152.269	7322.777	4528.067
	s.c.a.	21	4493.349	3390.590	2374.413
Plant weight	g.c.a.	6	2784.826	1562.708	1063.460
	s.c.a.	21	853.637	589.001	488.621

*All the items are highly significant ($P < 0.01$)

Considering plant height and ear weight we notice a significant genetic-environmental interaction for the s.c.a. Proportional variation of the two components of genetic variation has been observed for plant weight. Further analyses will be accomplished in order to obtain a better evaluation of the observed effects and yield information about the genetic control of phenotypic stability.

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