

1. The paramutagenic action of R^{sc} is significantly higher than that of $R^{n.c.}$
2. The introduction of Mp in the R^{st} genome, while exhibiting an effect upon the stippled phenotype, does not seem to be associated with a change in its paramutagenicity.

The data so far obtained suggest that two functions exhibited by the unstable R alleles, i.e. their capacity to induce paramutation and their production of a variegated phenotype in the aleurone, do not have a common genetic basis. On the contrary the data point to the existence of two independent components associated with the R locus governing these different functions. The paramutagenic capacity of other stippled derivatives and the relationship between paramutagenic potential of R^{st} and crossing over in its adjacent regions are now under investigation. The accomplishment of these tests will allow a more general formulation of the conclusions here presented.

Giuseppe Gavazzi
Carlotta Maldotti

3. Phenotypic stability in maize.

The phenotypic expression of the genotype may vary with environmental conditions and the kind and the amount of that variation cannot be the same for all genotypes. Many efforts have been made to study the genetic control of variability of the phenotypic stability. The object of this study was to examine the phenotypic stability of different genotypes in relation to the effect of plant spacing. This effect is of great interest in plant breeding and in research concerned with the nature of gene action involved in determining quantitative traits.

The aims of this work are twofold: (1) to obtain information about the possibility of selecting strains to be used with high plant density and (2) to get additional information on the genetic control of variation of phenotypic stability.

Sixty-four genotypes from a complete set of diallel crosses between eight inbred lines formed the experimental material. They have been planted at three different levels of plant density, namely 5, 7 and 9 plants per m^2 . The experimental design was the following: two blocks were divided into three plots, one for each level of plant density. For each plot, five plants of each family were used. In order to distribute equally the competition effect between genotypes, a single plant randomization was used. The measurements taken in the field were the following: flowering time (tassel), plant height, leaf width and length. Parental and F_1 means of all characters considered for each level of plant density are presented in Table 1. The variance between densities provides an inverse measure of the stability over the range of environmental variation considered in this experiment (Griffing and Langridge, 1963). This parameter was estimated for each family in both blocks. The logarithms of the estimated variances (Sheffe, 1949) have been used for diallel analysis of variance (Table 2) according to the model of Hayman (1954).

The main results of this experiment can be summarized as follows:
Flowering time. The increase of plant density delayed the flowering of both inbred lines and F_1 's. However, the experiment did not exhibit any kind of genetic control of the variability of this effect. The parental lines and the F_1 's did not show any significant difference in behavior.

Plant height. The biometrical analysis showed that the variability of phenotypic stability between genotypes is genetically controlled. The genetic variance turned out to be of the additive type. On the other hand, the variation in mean values for plant height is due to an increase of plant height in the F_1 's and a decrease in the inbreds.

Leaf width. The increase of plant density reduced the leaf width. The mean values presented in Table 1 do not show any consistent difference between inbreds and F_1 's in this effect. However, the analysis of variance indicates that the variation of phenotypic stability has a genetic basis of the non-additive type. A significant maternal effect was also noticed.

Leaf length. The data here analyzed show that this character is quite stable within the range of variation considered in this experiment.

Table 1

		I_1	I_2	I_3
1) Flowering time	$\overline{F_1}$	28.31	28.46	30.85
	\overline{P}	33.26	33.31	35.50
2) Plant height	$\overline{F_1}$	199.80	207.78	207.76
	\overline{P}	145.74	153.76	144.33
3) Leaf width	$\overline{F_1}$	9.04	8.45	8.33
	\overline{P}	6.53	6.06	5.47
4) Leaf length	$\overline{F_1}$	76.41	76.10	76.34
	\overline{P}	61.41	61.66	61.66

1) Days from the 1st of July
 2), 3) and 4) expressed in cm.

Table 2

Items	D.F.	Variances			
		Flowering time	Plant height	Leaf width	Leaf length
a	7	1.2239 ^{n.s.}	6.1603**	1.5498 ^{n.s.}	2.7192 ^{n.s.}
b	28	0.5884 ^{n.s.}	1.0686 ^{n.s.}	2.8156*	1.9041 ^{n.s.}
b ₁	1	0.4243 ^{n.s.}	0.2893 ^{n.s.}	2.0015 ^{n.s.}	0.5303 ^{n.s.}
b ₂	7	1.1204 ^{n.s.}	0.7141 ^{n.s.}	4.0483**	3.2292 ^{n.s.}
b ₃	20	0.4104 ^{n.s.}	1.2316 ^{n.s.}	2.4250*	1.5089 ^{n.s.}
c	7	1.6970 ^{n.s.}	2.0857 ^{n.s.}	2.7827*	2.3927 ^{n.s.}
d	21	2.2624 ^{n.s.}	2.0390 ^{n.s.}	2.3734	2.4011 ^{n.s.}
Total	63				

n.s. = not significant; * = significant ($P < 0.05$); ** = highly significant ($P < 0.01$); \bar{a} = additive variance; \bar{b} = unfixable variance; \bar{b}_1 = mean dominance; \bar{b}_2 = dominance variation between parents; \bar{b}_3 = dominance not ascribable to \bar{b}_1 or \bar{b}_2 ; \bar{c} and \bar{d} = variances due to differences between reciprocal crosses.

E. Ottaviano

UNIVERSITY OF MINNESOTA
St. Paul, Minnesota

1. Establishment of knob stocks.

Relatively few maize stocks are available with known knob constitutions. The purpose of this study was to establish stocks with many different combinations of distinctive knobs. Knobs at fifteen positions located on chromosomes 1 through 9 were available from the following Mexican races of maize, listed with their source identifications: Zapalote Grande (Chis. 236) and Harinoso de Ocho (Sin. 7) from Dr. E. C. Johnson; Zapalote Chico (Zapl x³-1-1-1-1) and Wilbur's Flint from Dr. W. L. Brown. Abnormal chromosome 10 was found to be segregating in Zapalote Grande but was not transmitted to the F_1 's used in this study.

The Mexican races were crossed with Wilbur's Flint (knobless) and the F_1 's were backcrossed to the knobless stock. Sporocytes were taken from