

With regard to the factor h_2 , it has been possible to make the following observations:

- (1) - The selfing of heterozygous plants produces normal and starchy kernels in the ratio 3:1. Consequently the endosperm must be, just as for h , trebly recessive to show the starchy character.
- (2) - Apart from its action on the structure of the endosperm (entirely starchy and slightly reduced), the factor h_2 has, at least within strain MR 368, an effect on the germination of the kernels: their germinating capacity is reduced (20-80% on filter-paper in the laboratory at 20°C., 1-30% in the field); germination is slower and the root system of the seedlings very rudimentary.
- (3) - The h_2/h_2 plants that survive till flowering mature normally and their height, ear size and leaf number are similar or slightly inferior to those of normal plants. The various specific characters of the strain, the flowering and maturity dates are unaffected.
- (4) - Hybrids between MR 368 h_2/h_2 and other inbreds (flint or dent) with normal kernels have been obtained as well as back-crosses of this hybrid to the original doubly recessive stock. In the ears from these back-crosses starchy kernels have been observed but always in a ratio inferior to 50% and sometimes very low (5%); on the other hand the germinating capacity and the weight of the starchy kernels proceeding from these back-crosses are equal or slightly inferior to those of the normal kernels of the same ears.

Consequently, in the inbreds used for the hybridizations there are dominant factors (in the recessive state with inbred MR 368) which, even in the presence of genotype h_2/h_2 , mask the phenotype h_2 , and other ones that weaken the effects of the gene.

A study of the descendants of these back-crosses, now in progress, should lead to more accurate information about the number and the mode of action of these inhibiting or modifying factors.

2. Distribution of the effect of heterosis on some vegetative or agronomic characters of maize.

A series of 34 single hybrids created with flint or dent inbreds have been studied from the viewpoint of the effect of heterosis. On 40 plants for each hybrid and on 15 plants for each inbred, the following characters have been measured: interval from emergence to flowering (number of days from emergence date to male flowering date), ear height and total plant height (in centimeters), total leaf number, ear length (in cm.), relative ear height (percentage of total plant height), number of rows, average weight of kernel, and yield (quintals/hectare at 12% moisture). In each case the "heterotic deviation" has

been calculated, defined as the difference between the value of the hybrid and the average of the two parental values:

$$D = H - \frac{P_1 + P_2}{2}$$

For each character 34 deviations are thus obtained (one for each hybrid); their average m is calculated as well as the standard error of their distribution and the relation m/s in absolute value which reflects both intensity and regularity of the effect of heterosis. Moreover, the average relative deviation has been calculated (as percentage of the average value of the parental inbreds).

Character	Average m	Standard error s	m/s	Relative deviation
Interval emergence-flowering	- 6.7	1.4	<u>4.9</u>	- 9.5
Ear height	+ 27	11	<u>2.5</u>	+ 46
Total height	+ 51	14	<u>3.6</u>	+ 38
Relative ear height	+ 1.9	2.9	0.7	+ 4.3
Leaf number	- 0.8	0.7	1.1	- 4.4
Ear length	+ 3.5	1.1	<u>3.2</u>	+ 27
Number of rows	+ 0.3	0.7	0.5	+ 2.5
Ear number per plant	+ 0.23	0.32	0.7	+ 13.1
Kernel weight	+ 58	35	1.7	+ 26
Yield	+ 28	9.2	<u>3.1</u>	+ 147

The effect of heterosis is significant (5% level, m/s values underlined) for interval emergence-flowering (precocity), total height, ear length, yield and ear height. The most marked effect of heterosis is observed on flowering precocity ($m/s = 4.9$); the hybrids flower an average of 6-7 days before the parental strains; next comes total height ($m/s = 3.6$), the hybrids being an average of half a meter ($m = + 51$) taller than the parents. The number of rows of the ear is generally but little affected by heterosis (lowest m/s value: 0.5).

Finally, the effect of heterosis on yield, although the most important (147%) with regard to the yield of the strains, has been in these trials less constant ($m/s = 3.1$) than on earliness, height or length of the ear.

3. Heredity of male sterility (Texas and U.S.D.A. types) in hybrids of dent x flint.

In order to obtain some information on the behavior of Moroccan flint inbreds in crosses with male-sterile stocks of the cytoplasmic