

4. Further data on an unstable gametophyte mutant.

In last year's News Letter data were presented which indicated that an unstable gametophyte mutant involving preferential segregation, although usually deleterious to the gametophytes which carry it, may in some instances confer an advantage so that backcross ratios instead of being "high" sugary are "low" sugary. This possibility was tested further in the summer of 1958. Thirteen plants from a stock which originally was "high" sugary and which had become almost "normal" sugary with minor but significant fluctuations in the direction of "high" sugary were backcrossed by and on homozygous sugary with the following results:

	Total Seeds	No. Sugary	Percent Sugary
Backcrosses by sugary	4816	2388	49.6
" on " ; Row 148	4660	2347	50.4
" on " ; Row 347	5596	2703	48.3

The ratios in the first two series of backcrosses do not differ significantly from normal 1:1 ratios but the deviation in the third series is significant at the .01 level. Also one of the plants in the population had 44.5% of sugary seeds when backcrossed on Row 347 and 56.3% when backcrossed on Row 148. Both deviations from 50% are significant and show that the gametophyte factor is still present in the population and indicate that its behavior is governed to some extent by the genotype of the styles in which the pollen tubes grow. Since the gametophyte factor is linked with the Su gene all populations with significantly less than 50% of sugary seeds are presumably the product of the gametophyte factor conferring an advantage upon the gametophytes which carry it.

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5. Cytology of unstable mutants.

Several of the unstable mutants reported by Mangelsdorf in last year's News Letter have been studied cytologically in F_1 hybrids with an inbred strain of Wilbur's Flint. Nonhomologous association between the long arms of chromosomes 2 and 4 was found in the F_1 involving an unstable dwarf, which in tests by Galinat using B-chromosome translocations was found to have its locus on chromosome 4. In this same F_1 the long arms of chromosome 1 folded back on themselves in nonhomologous pairing for a length from the knob position to the end.

One of the stocks involving the unstable defective, de^{t5} , has probably an inversion in the short arm of chromosome 9 comprising about

two-thirds of the length of the arm.

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6. Cytological observations on extracted "teosinte" chromosomes from maize varieties.

In last year's News Letter, Mangelsdorf reported the extraction from Latin-American maize varieties through repeated backcrossing to the inbred, A158, of chromosomes having genetic effects similar to those of teosinte chromosomes. Some of these strains of A158 which had been modified by substituting extracted teosinte chromosomes have now been studied cytologically in F_1 hybrids with an inbred strain of Wilbur's Flint which is virtually knobless. The following observations have been made.

Knobs on the long arm of chromosome 1 have been introduced into A158 from Honduras 1639 and Venezuela 1536. A knob on the long arm of chromosome 2 has been introduced from Guatemala 197.

Asynapsis was observed in approximately two-thirds of the short arm of chromosome 3 and in almost the entire length of the short arm of chromosome 7 in a strain of A158 modified by introducing chromosomes from Nicaragua 501. Asynapsis was also observed in a derivative of Honduras 1639 in about one-fifth of the long arm of chromosome 2 and in the long arm of chromosome 4 involving a segment from the regular knob position to the distal end. In the derivative of Venezuela 1536, there occurred an asynaptic loop about four chromomeres in length in the long arm of chromosome 2 adjacent to the centromere.

Nonhomologous association was found in approximately one-third of the long arm near the centromere in chromosome 2 of a derivative of Nicaragua 500. The association was with a chromosome not yet identified.

Chromatid bridges and fragments were present at anaphase 1 in the F_1 hybrid of Wilbur's Flint with a derivative of Cuba 398. The chromosome involved has not been identified, perhaps because the segment is too short to regularly form a loop at pachytene.

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7. Chromosomes in three teosinte varieties.

Florida-type teosinte from Honduras. A collection of teosinte from Honduras resembles Florida teosinte in vegetative characteristics