

The F_1 hybrid of the diploid species, T. maizar (FTG65-1237) and T. floridanum, in addition to having glabrous sheaths is highly pollen sterile and at meiosis in the microsporocytes there are varying numbers of paired and unpaired chromosomes which are irregularly distributed to the microspores.

These Tripsacum species hybrids are being grown for additional genetic tests and cytological studies at the Fairchild Tropical Garden in Miami, Florida along with an extensive live plant collection of the perennial relatives of corn.

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5. Irregular transmission of the Su^d marked chromosome from Tripsacum in an addition monosomic stock of corn.

The starchy-marked (Su^d) chromosome, derived from Tripsacum as an addition chromosome on corn, gave a wide range of transmission rates in reciprocal crosses made on 112 ears (rows 66-1029 to 1064) grown under somewhat adverse conditions in Florida in January 1966. Transmission through the female ranged from less than 1% to 77% with an average of 6%. Transmission through the male ranged from less than 1% to 85% with an average of 15%.

Whenever the male and female transmission of the Su^d chromosome differed by more than a few per cent, it was always the male transmission which was higher. Sudden large increases in the rate of male transmission of this extra chromosome do not appear to be inherited. The cross su gl, x 66-1038-3 Su^d gave 66% starchy kernels while the reciprocal cross with the same two plants gave only 11% starchy kernels. These wide differences between male and female transmission in reciprocal crosses disappeared in 16 selfed progeny ears (67-266, 267) with a range of 13.8% to 25.2% Su^d and an average of about 19% derived from both crosses. There is, however, a slightly higher rate of male transmission over female transmission which, under good pollinating conditions at least, does appear to be inherited (see next item).

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6. Consistent low female and high male transmission of the Su^d Tripsacum addition monosomic of corn.

Reserve seed of the 66-1038 stock which gave 11% Su^d female and 66% Su^d male transmission in Florida was grown in Massachusetts in 1967 and reciprocally crossed to the sugary background. In the cross with Su^d as the male parent, two sugary seed parents were used with one from the related su seed and the other from an unrelated su tester stock. The results follow:

| <u>Su^d Source</u> | <u>No. Kernels</u> | <u>% Su^d as female</u> | <u>Related No. kernels</u> | <u>% Su^d as male</u> | <u>Unrelated No. kernels</u> | <u>% Su^d as male</u> |
|------------------------------|--------------------|-----------------------------------|----------------------------|---------------------------------|------------------------------|---------------------------------|
| 67-268-2 | 526 | 6.85 | 638 | 14.3 | 378 | 11.9 |
| -3 | 408 | 6.40 | 199 | 15.6 | --- | ---- |
| -4 | 771 | 8.85 | 486 | 19.1 | 124 | 13.7 |
| -5 | 611 | 6.37 | 911 | 16.6 | 252 | 11.5 |
| -6 | 575 | 7.25 | --- | no tassel | --- | ---- |
| -7 | 486 | 7.20 | 500 | 13.0 | 237 | 17.3 |
| -8 | 644 | 6.06 | 461 | 15.4 | 259 | 17.7 |
| -9 | 564 | 4.97 | 533 | 18.3 | 387 | 10.3 |
| -10 | 639 | 5.31 | 548 | 17.1 | --- | ---- |
| Ave. female = 6.58% | | Ave. male = 16.0% | | Ave. male = 13.7% | | |

The expected frequency of Su^d on selfing would be the sum of male and female transmissions minus half of the frequency of double unions of Su^d. Using the above data from reciprocal crosses with the combined average for the two Su^d male crosses, we have as follows:

$$\begin{aligned} \text{Expected on selfing} &= 15 + 6.6 - \left(\frac{6.6 \times 15}{2}\right) \\ \text{Expected on selfing} &= 18.8\% \end{aligned}$$

This expected frequency of the Su^d phenotype on selfing is almost identical to the observed (19%) reported in the previous item for self-pollinations.

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7. Morphology of the Tripsacum chromosome carrying the homeolog for su of corn.

Galinat and Mangelsdorf (MNL 40:99-100) have reported a genetic comparison of some of the 18 possible addition monosomics of corn in which the different Tripsacum chromosomes carry the dominant alleles for some of the known recessives on different corn chromosomes. This report represents the preliminary cytological comparison of one of these Tripsacum chromosomes (referred to as the Su^d chromosome) that covers the recessive allele at the su locus on the short arm of chromosome 4 of corn. As already reported the Su^d chromosome does not cover either la on the short arm or gl₃ on the long arm (MNL 41:119). Additional evidence now indicates that gl₂ on the long arm also is not covered by the Su^d chromosome.

The material studied was from two related lines of addition disomics (67-258 & 67-259 in this item and 67-260 following). The homozygosity for the extra chromosome pair from Tripsacum in these two stocks originated independently within the selfed progenies of 20+1 families stemming originally (six generations back) from a single 20+1 plant. The Su^d chromosome was selected among the segregates from the second backcross of (4n su g corn X 4n T. dactyloides Fla.) X su gl₃ corn to su gl₃ corn.