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1. Partial desynaptic maize.

In one backcross progeny, (0_7 x In 3a) x In 3a, segregation for normal and partially sterile (59% ovule abortion, on average) plants was observed. Examination of the microsporocytes of the partially sterile plants revealed that the sterility is due to the premature separation (desynapsis) of several homologous chromosomes.

The partial desynaptic plants had been crossed with the normal testers. Meiosis and fertility of all the F_1 plants were normal. Results of segregation for normal and partial desynaptic plants of eleven F_2 progenies (Table 1) indicate that partial desynapsis is due to a recessive gene.

Table 1
Segregation in the F_2 Progenies Resulting From Crosses Between the Normal and Partial Desynaptic Plants

Progeny No.	No. of normal plants	No. of partial desynaptic plants	Total
8008	46	11	57
8010	141	41	182
9021	143	50	193
9022#	142	5	147
9023	106	25	131
9024	63	15	78
9025	143	38	181
9026	191	56	247
9027	250	80	330
9056	92	29	121
9057#	156	25	181

deviates from 3:1 ratio.

In order to test whether or not the new gene was allelic to the asynaptic mutant, as, crosses were made between the partial desynaptic and asynaptic plants. All the F_1 plants resulting from such crosses were normal. The F_2 plants were classified into normal and sterile ones according to the seed set on the mature ears. If the new and asynaptic genes are not allelic, a ratio of 9 normal to 7 sterile plants should be expected. This is true in 11 out of 14 F_2 progenies tested (Table 2).

Besides desynapsis, other abnormalities such as the formation of a plasmodial mass, uncoiling of chromosomes, chromosome breakage, etc. which have been described in asynaptic maize can also be observed in the microsporocytes of the partial desynaptic plants. However, the partial desynaptic maize differs from the asynaptic one in several aspects which are briefly described as follows:

For the asynaptic maize both Beadle (1930, 1933) and Miller (1963) have reported that the intensity of asynapsis varies from complete to very

Table 2
Segregation for Normal and Sterile Plants (Asynaptic and Desynaptic) in the F_2 Progenies Resulting From Crosses Between Partial Desynaptic and Asynaptic Plants

Progeny No.	No. of normal plants	No. of sterile plants	Total
9028	161	98	259
9058	37	25	62
9059	40	29	69
9061	30	25	55
9062#	49	11	60
9063	62	50	112
9065	39	22	61
9066	30	19	49
9067	40	31	71
9068	20	21	41
9069	17	13	30
9070#	14	24	38
9071#	50	23	73
9072	24	29	53

deviates from 9:7 ratio.

low. The degree of desynapsis has been checked in many desynaptic plants. On the average, only 35% of PMC's have 2 or more univalents at MI, but the number of univalents never exceeds 10. Thus, the action of the partial desynaptic gene is weak as compared to that of as.

In the asynaptic sporocytes, Miller (1963) has shown that the intensity of asynapsis at zygotene or pachytene is similar to that at diakinesis or MI, indicating that the homologous chromosomes which failed to pair at diakinesis or MI did not pair at early prophase I. Several hundred pachytene configurations of 8 desynaptic plants have been checked carefully. In no case was a completely asynaptic bivalent observed. Only occasionally, a small region of a bivalent was not synapsed. The failure of pairing of chromosomes in the partial desynaptic plants, thus, occurs after the pachytene stage.

The abnormal spindle described by Beadle and Miller in asynaptic sporocytes has not been observed in the desynaptic maize.

Double foldback of a portion of a bivalent has been found at the pachytene stage in desynaptic maize. Its occurrence varied from anther to anther. More foldbacks were found in chromosome 4 than in other chromosomes. Since such foldback bivalents were rare, the direct relationship between foldback and desynapsis is doubtful.

Work is in progress to locate this gene in a specific linkage group.

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