Table 2. Combined distribution of 9 small (21 plants each) F_3 progenies which showed joint segregation for chi-6 and bulf. F_3 progenies derived from cross st chi-6 Bulf x St Chi-6 bulf.

Population	Chi-6 Bulf	Chi-6 bulf	chi-6 Bulf	chi-6 bulf	Total
C379-6-39	100	47	41	0	188

New crosses have been initiated to get corroborating evidence and improved estimates of linkage not only between bulf and chi-6 and st, but also between bulf and other markers on chromosome 3.

The estimate of percent recombination between sjt and chi-6 was 37-5, which is consistent with estimates presented earlier (PNL 5:26) and with other evidence obtained in 1979 but not reported.

LINKAGE: RELATIONS OF A MUTANT CONFERRING MECHANICAL STERILITY

Marx, G. A. New York State Agricultural Experiment Station, Geneva, NY USA

After treating one of his lines with EMS, L. G. Cruger recovered a mutant which affects floral morphology and reproductive behavior. Subsequently he made seeds of the mutant available to me.

Mutant behavior is, in a number of respects, similar to that of crpt (crumpled petal), a mutant isolated and described by Sharma and Aravindan (PNL 3:50-51, 1971). Flowers are characterized by exserted pistils and crumpled petals and stamens. This abnormal floral morphology leads to mechanical sterility because the anthers are denied close proximity with the stigma. Still, based on the description of crpt, the two mutants appear to have some important dissimilarities. Unlike crpt, the plants are not waxless, fertility of selfed plants apparently is normal, and flowers are not typically "ball-shaped".

Plants homozygous for this recessive gene may show a range of mutant expression. Sterility appears to be enhanced under field conditions, whereas greenhouse conditions seem to promote more normal floral morphology and greater fertility (occasionally completely normal). Typically in the greenhouse the flowers are near normal in size, the corolla is more or less tubular when fully open, and the banner is not reflexed backward. The keel may be rather sharply curled and the filaments of the stamens compressed and twisted at the apex of the keel. Depending on the specific conditions, the pistil may or may not extrude from the keel.

Even in the field, where conditions are generally favorable for mutant expression, and where sterile plants can easily be distinguished from normal sibs in segregating populations, sterile plants occasionally produce a few seeds. Progeny tests revealed that such seed was a product of selfing. In general, the flowers borne at the higher reproductive nodes have a greater tendency to produce selfed seed. In this and some other respects, mutant behavior resembles the mutant re (infecunda) reported by Nilsson (Hereditas 17:71-99, 1932; see also Lamprecht, Agr Hort. Genet. 18:181-204, 1960). Thus, given the uncertainty of identity among crpt, re, and the Cruger mutant, a name and symbol for the latter will not be suggested pending the outcome of allelism tests. The designation "mes" is only a working symbol for convenience.

In crosses between the Cruger mutant and normal fertile lines, the F1's were fertile and the F2 ratios were in accord with monogenic control. There was no indication of the deficiency of recessives as was noted by Nilsson and by Lamprecht for re. Moreover, there is rather clear evidence of linkage with af on chromosome 1 (Table 1). Lamprecht (1960) found re to be loosely linked (ca. 35-40% CrO) with A on chromosome 1, but the contingency chi-square for linkage between A and the Cruger mutant did not reach statistical significance in one small population of 212 plants (Table 1

Table 1. a. Joint segregation in two coupling phase crosses for Af and a gene conferring mechanical sterility ("mes").

Population	Af "Mes"	Af "mes"	af "Mes"	af "mes"	Totals
B279-309-319	130	26	32	24	212
B279-320-324	76	19	20	21	136
	206	45	52	45	348

	Chi-square
Segregation for Af-af	= 1.53^{ns}
Segregation for "Mes"-"mes"	= 0.14^{ns}
Contingency	= 28.10^{***} CrO = 13 ± 3%

b. Joint segregation in a coupling phase cross between A and a gene conferring mechanical sterility (designated "mes").

Populations	A "Mes"	A "mes"	a "Mes"	a "mes"	Total
B279-309-319	125	33	37	17	212

	Chi-square
Segregation for A-a	= 0.02^{ns}
Segregation for "Mes"-"mes"	= 0.23^{ns}
Contingency	= 1.95^{ns}