References

Brown, C. M. and D. W. Graffis. 1976. Intercropping soybeans and sorghum in oats. Illinois Research 18(2): 3-4.

Lassiter, F. 1973. Plant beans into standing grain. No-Till Farmer. June: 1,19.

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1) Induced cytoplasmic sterility in soybeans.

One of the M_4 progenies of PK-71-39 soybean irradiated with 10 Kr gamma rays showed segregation for sterility in soybean in 1976. It had 18 sterile plants and 4 normal plants, indicating that a single dominant gene was responsible for sterility. The sterile plants had no seeds and, therefore, this appeared to be a dead end for this mutant. Nevertheless, the 4 normal plants were separately harvested and their progenies evaluated in 1977. The results were very interesting, as indicated in Table 1.

Table 1

Breeding behavior of normal plants from segregating rows

Progeny no.	No. of plants	
	Sterile	Fertile
1	35	2
2	53	1
3	5	0
4	22	1
Total	115	4

As evident from the table, all the 4 progenies consisted primarily of sterile plants with occasional fertile ones. Pooled over all progenies, there were 115 sterile plants and 4 fertile plants. The progenies of these 4 normal plants were again evaluated in 1978. The results were very similar to what was observed in 1977, as indicated in Table 2.

Table 2

Breeding behavior of second generation normal plants from segregating rows

Progeny no.	No. of plants	
	Sterile	Fertile
1	2	0
2	16	1
3	29	0
4	45	1
Total	92	2

These data indicate a definite pattern. In every generation, the progenies consist of about 97-98% sterile plants and 2-3% normal plants. These normal plants again give rise to similar progenies in the succeeding generation. Apparently, sterility in this line seems to be determined by the cytoplasm. The occasional fertile plants probably arise due to temporary restoration of fertility in the out-crossed seeds produced on the fertile plants in the previous generation. Thus, the external pollen provides a restoration factor whose effect lasts for one generation, as suggested in Table 3.

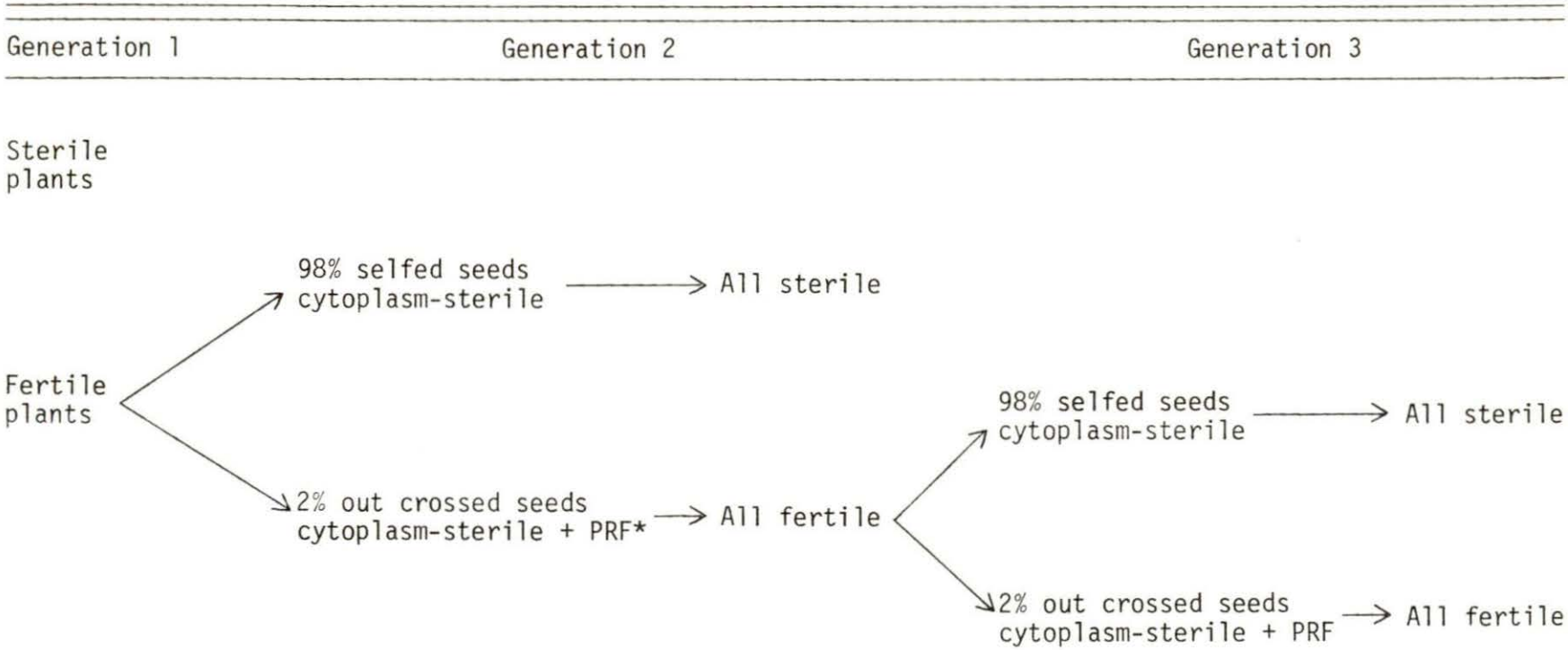
Attempts were made to verify this assumption by artificial pollination on the normal plants in 1978. However, only a few crosses could be attempted because of the limited number of buds on the two normal plants. Consequently no success was achieved.

The sterile plants were indistinguishable from the normal ones until the onset of flowering, after which the differences became apparent. The flowers of sterile plants had small aborted pollen which did not take aceto-carmine stain. In order to check female fertility, about 500 flowers were artificially pollinated with normal pollen but no seed set was observed. Thus, this mutant involved both male and female sterility.

As it is, this mutant has no practical utility and it may probably be lost in the next generation. However, this has indicated a possibility of inducing cytoplasmic male sterility in crop plants.

Table 3

Possible mechanism for fertility restoration



*Paternal restoration factor.

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