phenotypic effect. It is interesting to note that P2-5-1-X itself shows some leaf striping abnormality but it is much less pronounced in the line than in its crosses in which P2-5-1-X is used as seed parent. P2-5-1-X possesses as much vigor as might be expected from most relatively homozygous lines.

Several similar cases of maternally inherited loss of vigor characterized by similar phenotypic alterations have been found in WF9, $WF9^S$, $WF9^T$ and in several hybrids or segregating populations of hybrids of WF9, $WF9^S$ and $WF9^T$ with other inbreds. Some of these types have been extremely variable in expression, but it has not yet been possible to determine whether this variability is due to a "mutability" of the cytoplasm or whether it is due to segregation of "resistant" and "susceptible" genotypes, with respect to the cytoplasm. One strain of this type has been backcrossed, as male, to a normal appearing strain of WF9 for two generations; the backcrossed plants as yet show no sign of the vigor reduction or striping characteristic of the male parent.

William L. Brown
Donald N. Duvick

PURDUE UNIVERSITY
Lafayette, Indiana
Department of Botany and Plant Pathology

1. Embryo transplantation in corn.

Hall reported in Hereditas (1954) that crossability between wheat and rye could be increased if the wheat plants used for the crosses grew from embryos which were transplanted onto rye endosperm. The wheat transplanted onto rye endosperm and pollinated with rye pollen produced about 5 times as many hybrid kernels as the wheat transplanted on wheat endosperm. This result encouraged me to investigate the effect of embryo transplantation on crossability between a dent-sterile popcorn and a dent corn inbred. The relative ease of controlled pollination, the large number of seeds on a single ear of corn, the large seed and ease in grafting would make this investigation easier than the wheat and rye experiment.

A technique was developed for transplanting an embryo from one seed to another. The seed is soaked in water until the embryo and the endosperm can be separated with the least damage. The length of time of soaking depends on the corn variety. In this experiment, 149-5AA was soaked for 15 hours and L317 for 12 hours. Corn starch paste, a rubber band, and a splint were used to hold the grafted seed together. The grafted seeds were planted in sterilized soil in small pots in the greenhouse within one hour after grafting.

L317, a dent inbred, and 149-5AA, a dent-sterile popcorn, were used. The former is ga/ga in genotype and the latter Ga^s/Ga^s. None or few seeds are produced when 149-5AA is used as a seed parent and pollinated by L 317. Full seed set results when L317 as the female is pollinated by 149-5AA.

The following transplantations were made:

1) L317 grafted on 149-5AA endosperm (D/P)
2) 149-5AA grafted on 149-5AA endosperm (P/P)
3) 149-5AA grafted on L317 endosperm (P/D)

For ease in further discussion the symbols listed above will be used to refer to the various grafted types.

The rate of germination in grafted seeds is slower than non-grafted seeds. The grafted seeds germinated within 7-10 days while the non-grafted germinated 3-4 days after planting.

The P/P grafts have a high percentage of viable plants while the P/D grafts have a very low percentage, indicating a certain kind of inhibition or incompatability between the embryo and the endosperm of the two different varieties. The inhibition is only in one direction because the D/P group showed a much higher percentage of viable plants (See table 1). The cause of the unilateral inhibition is not yet known.

It is interesting to note that the dent-sterile popcorn which will not set seed with dent corn pollen produces few viable plants when its embryos are grafted onto dent corn endosperms. Whether this inhibition has any relationship to the constitution of the plants at the Ga^s/ga locus is a matter for speculation. Experiments are in progress to attempt to gain evidence on this point.

Table 1. Viable plants resulting from grafted seeds.

Kind of Grafting	No. of Grafted Seeds	Viable Plants	% of Viable Plants
D/P	36	21	58.3
D/P	30	14	46.7
D/P	45	25	55.5
D/P	45	28	62.2
P/P	90	52	57.8
P/P	105	99	94.3
P/D	100	6	6.0
P/D	108	8	7.4

Table 3. Number of seed set in the crosses specified below:

Date of Pollination (August)	Pollen Parent: L 317 grafted on 149-5AA						Pollen Parent: L 317					
	Female Parent						Female Parent					
	149-5AA grafted on 149-5AA		149-5AA		149-5AA grafted on L317		149-5AA grafted on 149-5AA		149-5AA		149-5AA grafted on L317	
	No. X's	Total Seed Set	No. X's	Total Seed Set	No. X's	Total Seed Set	No. X's	Total Seed Set	No. X's	Total Seed Set	No. X's	Total Seed Set
15	4	24	5	1	-	-	6	11	5	4	-	-
16	4	2	3	11	-	-	2	9	3	15	-	-
20	1	7	-	-	-	-	1	13	-	-	-	-
21	1	28	4	120	-	-	1	9	3	76	-	-
22	2	9	6	90	-	-	2	21	3	28	-	-
23	2	88	3	75	-	-	2	51	3	149	-	-
25	3	46	2	11	1	15	3	25	2	17	1	8
26	2	55	3	105	2	7	2	70	3	106	1	6
27	-	-	1	15	-	-	-	-	1	3	-	-
29	-	-	-	-	1	4	-	-	-	-	1	15
Total	19	259	27	428	4	26	19	209	23	398	3	29
Mean		13.6		15.8		6.5		11		17.3		9.7

Another interesting observation is the height of plants from the P/P and P/D grafts. The rate of growth of the two types was significantly different from early seedling stage until before maturity. However, the difference is not significant at maturity (See Table 2). The few P/D grafts that grew to maturity showed a much slower early growth rate than the P/P grafts, indicating possibly a lingering of the effect responsible for the low rate of germination. At seedling stage, the P/D grafts were about one-half of the height of P/P grafts and about the same height at maturity. Thus the factor responsible for the slow early growth of plants from the P/D grafts does not affect the later stages.

Table 2. Plant heights in cms. of P/P and P/D at various time intervals after plantings.

Number of Days After Planting	P/D	P/P	t-test
12	5.55	13.40	10.97**
19	16.10	34.19	8.87**
33	40.25	64.75	6.12**
47	50.75	75.25	6.45**
58	79.25	105.87	6.85**
67	109.87	116.25	1.91-
86	160.75	163.62	.52-

- not significant at 5% level.
** significant at 1% level.

Crosses were made using D/P (L317 on 149-5AA) and non-grafted L317 as pollen parents on grafted and ungrafted 149-5AA. Equal numbers of crosses of these pollen parents on 149-5AA were made at the same time to eliminate environmental influence in comparing the effect of the two pollen parents. The total average difference is not significant in any cross (See Table 3). Thus, the embryo transplantation didn't result in any increase in crossability between 149-5AA and L317.

Virgilio R. Carangal

2. The effect of Pt on tassel development.

In reporting on Pt (A.J.B., 1954, Vol. 41), it was remarked that Pt surprisingly did not apparently affect tassel development in spite of its extreme effect on ear development. Since that time it has been found that in certain genetic backgrounds, the tassels of Pt plants may be drastically altered. The commonest effect within a spikelet is a proliferation of pistillate tissue produced by the meristem cutting off new rings of tissue successively at its periphery. Each ring may