

2. The amount of aborted pollen in VV/WR and WR/WR plants in segregating families.

A preliminary experiment has been made to determine whether the presence of the mutable allele, variegated pericarp, is associated with an effect on fertility of the plant as measured by the frequency of aborted pollen grains. The test population was a series of sister families involving a VV/WR hybrid twice backcrossed to a highly inbred WR parent. VV was a variegated allele from a single source. The recurrent WR parent was a commercial line known as Wisconsin Inbred 8, which now constitutes seven-eighths of the germplasm.

Tassel segments of 50 plants from each of 12 sister families were collected during the summer of 1951. Six families had a parent ear with a light variegation grade, and six had parent ears with medium variegation grades. Pollen from the anthers of three spikelets, usually sampling three tassel branches, was stained with an iodine solution. Percentage of aborted pollen was based upon the microscopic examination of approximately 400-450 pollen grains per plant. The results are presented in Table 1.

The differences in average percent of aborted pollen between the segregating VV and WR progenies in any family are small, and random in direction. Heterogeneity within a progeny group was common, and often was very considerable. An occasional tassel chimera was observed, with great differences found in pollen sterility in anthers from spikelets in separate tassel branches. These chimeras occurred in both VV and WR plants.

When the material is grouped in accordance with the variegation class of the parent ears (light and medium), non-significant differences in percent of aborted pollen are noted in the paired VV and WR classes. Variation between families within a group is large in all four cases. Thus the differences in manner of phenotypic expression of the light and medium classes of variegation apparently are not associated with any developmental dissimilarities which would be detected as differential pollen sterility percentages.

The net amount of sterility observed, 14%, is considered high for a line whose parentage is seven-eighths Inbred 8. Though no pollen sterility counts were made on Inbred 8, it is improbable that inherent sterility of as much as 14% of the pollen would have permitted its selection and use as a commercial inbred. Furthermore, selfed ears of Inbred 8 are fully filled.

It may be a fact, therefore, that there is a larger amount of pollen abortion in the test families segregating for VV than in the closely related inbred line 8. This point should be checked by direct comparison. The present results show, however, that within the test families, the VV/WR plants produce no more aborted pollen than the WR/WR individuals. This observation demonstrates that the pollen abortion is not directly associated with the mutable gene VV, at the P locus.

Table 1.

Percent of aborted pollen among the progeny of *VV/WR* sister families  
of light and medium classes of variegation.

Family	Parental variegation class and grade		VV Progeny		WR Progeny	
			Number of plants	Average percent of sterility	Number of plants	Average percent of sterility
62-1	Light	(1)	24	8.1	25	9.6
62-3	"	(1)	18	11.2	27	12.4
62-4	"	(1)	27	12.1	22	15.8
62-8	"	(1)	21	16.1	23	12.9
62-6	"	(2)	25	20.0	22	21.8
62-7	"	(2)	21	18.2	24	19.3
Total			136	14.3	143	15.1
62-9	Medium	(3)	14	18.0	29	19.6
62-10	"	(3)	32	16.6	14	16.0
62-11	"	(3)	20	6.7	26	9.7
62-14	"	(3)	28	7.1	20	11.8
62-18	"	(3)	25	11.4	22	9.2
62-19	"	(3)	24	15.5	23	14.2
Total			143	12.4	134	13.5

R. E. Anderson