3. Control of the $a_2^{m(r-pa-pu)}$ allele.

From $a_2^{l\ 1511}$, an unstable allele (En system) at the a_2 locus (Peterson, 1968 Genetics), a number of derivatives are obtained. One phenotype, a solid pale, is designated $a_2^{m(r-pa-pu)}$. This allele is stable pale in the absence of En; in the presence of En, it is colorless and mutates, expressing both pale and deep purple sectors. These conclusions on the nature of the allele are based on the following series of crosses.

If mutable kernels heterozygous for this allele and a standard a_2 are testcrossed (Cross #1), approximately 1/2 of the Bt progeny are mutable and 1/2 are stable pale.

Cross #1--$a_2^{m(r-pa-pu)}$ Bt/a_2 bt x a_2 bt/a_2 bt

	Bt				
	(A) colored	(B) pale-stable	(C) purple & pale dots on colorless bkgd	(D) colorless	(E) A+B+C%
9 2143-4	0	52	53	6	50.4
9 2150-2	3	156	142	8	47.1

The colored Bt progeny in column (A) have been shown to be germinal mutations of the $a_2^{m(r-pa-pu)}$ allele and the colorless Bt progeny in column (D) are assumed to result from crossing over between a_2 and Bt.

The original $a_2^{m\ 1\ 1511}$ mutable allele contained En. In testing for the presence of En among the progeny of cross #1, the $a_2$bt/$a_2$bt segregants from Cross #1 were crossed by an En tester - $a_2^{m(r)}$. In the progeny of these crosses approximately 1/2 of these $a_2$bt/$a_2$bt segregants contained En. Therefore one En was segregating independently of the a_2 locus in Cross #1.

Stable pale kernels from column (B) were also tested by crossing to the same En tester and these were found not to contain En. The critical cross on the identify of this allele was made when these same solid pale kernels were further tested for response to a known En by crossing to an En containing stock ($a_2$bt/$a_2$bt En). From this cross, $a_2^{m(r-pa-pu)}$Bt/$a_2$bt x $a_2$bt/$a_2$bt En, approximately 1/2 of the plump seeded progeny (Bt) were stable pale and 1/2 were mutable, the latter identical in phenotype to the kernels in column (C) in Cross #1 - i.e. having a colorless background with pale and purple dots.

This series of crosses is evidence for the presence of some activity at this allele in the absence of En. Further, in the presence of En, it responds giving pale and purple sectors--thus the designation r-pa-pu.

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4. Attempted intergeneric crosses involving maize and sorghum.*

Sixteen maize cultivars (Table 1) and 16 sorghum cultivars (Table 2) were planted at the Agronomy Field Research Center, Ames, Iowa, on three dates (delayed approximately 10 days) during the growing season of 1970. A total of 1,667 control pollinations were made (891 maize x male-fertile sorghum and 796 male-sterile sorghum x maize). The maize cultivar Gangtok-Sikkim matured too late to nick with any male-sterile sorghum and the maize cultivar Pollo was barren; therefore, Gangtok-Sikkim was excluded from all crosses and Pollo was used only as a pollen parent.

Silks were shortened on approximately 1/2 the maize ear shoots pollinated; several ears with shortened silks were self-pollinated and served as checks of damage caused by the cutting procedure. Also, some ears with silks generally considered "too mature" to pollinate were pollinated.

Several male-sterile sorghum heads were bi-pollinated (approximately 48 hours between pollinations) and a few heads were tri-pollinated (approximately 24 hours between pollinations).

Eight ear shoots from each of the maize cultivars (N28 x Mo17), (A619 x A632), and A619 were pollinated by Tx7078 sorghum. Silks were shortened on four of the plants and were left uncut on the remaining four plants. Two ear shoots of each type (shortened and normal silks) were treated on two consecutive days (beginning 24 hours after pollination) with 0.8 ml gibberellic acid solution (45 ppm GA in 0.05% Tween 20) and two ear shoots were untreated. Similarly, eight sorghum heads each of male-sterile Wheatland, Martin, and Kafir 60 were pollinated by the maize

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