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1. A second R aleurone color factor on chromosome 2.*

The first R gene found to assort independently of the regular R locus on chromosome 10 was discovered by Styles in the strain Peru 1497 (News Letter 38:134; 39:172). His results showed that this duplicate R locus, designated R^g-2, is located at or near the B locus on chromosome 2.

The second R factor on chromosome 2 was found in the acquisition Bolivia 706. This factor conditions pale aleurone, green anthers, and a B-like plant color effect, and is neither paramutable nor paramutagenic. Attempts to separate the aleurone and plant color effects by crossing over were as yet unsuccessful. The data obtained are as follows:

I. Assortment with standard R^{st}: 'R'/r; R^{st}/r^g X $r^g r^g$.

Aleurone phenotypes from five plants

	pale	pale, stippled	stippled	colorless
Observed	166	186	189	193
Expected	183.5	183.5	183.5	183.5
X^2	1.67	0.03	0.16	1.49 = 2.35

.70> P > .50

II. Chromosomal location: r^g/r^g; Wx 'R'/wx T2-9b X r^g/r^g; wx/wx

Kernel phenotypes from three plants

	colored, waxy	colored, non-waxy	colorless, waxy	colorless, non-waxy
Observed	51	144	121	72
Expected	97	97	97	97
X^2	21.8	22.7	5.9	6.4 = 56.8

P < .01

Frequency of crossing over between 'R' and wx = 32%.

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*This investigation was carried out under the direction of Dr. R. A. Brink at the University of Wisconsin as a part of Ph.D. studies. The author wishes to express his gratitude to Dr. Brink for guidance and counsel.

III. Assortment with gl_2: C/c; r^r/r^g; b Gl_2 'R'/B gl_2 Inv 2a ♀

Seedling phenotypes from eight plants

red, glossy (colored seed)	green, glossy (colored seed)	non-glossy (colored seed)
18	4	535

Frequency of crossing over between 'R' and gl_2 (based on green, glossy seedlings only) = 17%.

Frequency of crossing over between 'R' and gl_2 (based on all glossy seedlings) = 8%.

IV. Assortment with Peru 1497 R^g-2: (R^g-2 Bolivia 706 X R^g-2 Peru 1497) ♀.

No colorless seeds were observed in the F_2 progeny; hence, these two R genes on chromosome 2 are closely associated and could be alleles.

V. Interaction with Pl: 'R'/r; pl/pl X r^g/r^g; Pl/Pl.

Plants derived from this cross were purple in color, resembling a B Pl phenotype.

The experiments reported by Styles and those described above show the existence of a duplicate R color factor (or factors) on chromosome 2, at or near the B locus. The R and B loci both condition anthocyanin formation. Furthermore, both loci are known to undergo heritable changes in expression (paramutation). These indications of homology between R and B were further supported by the finding that the Bolivia 706 R^g-2 gene, like B, boosts the expression of Pl.

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1. Cytoplasmic effect of the male gamete.

Results of our work with a double-cross maize hybrid show that the cytoplasm of a male gamete in maize can influence the hereditary expression of characters in the progeny. Furthermore, the expression of the male cytoplasm can be influenced by the female cytoplasm. These experiments open a new frontier in cytoplasmic inheritance.

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