

Tentative maximum map distances for C to I have been calculated for each of the four assumed structures:

1. I C: Four possible cases. 0.0013 map units maximum.
2. C I: One possible case. 0.00032 map units maximum.
3. I c: One possible case. 0.064 map units maximum.
4. c I: One possible case. 0.097 map units maximum.

An additional test for the fourth constitution was obtained through the use of a terminal deficiency. Deficiency to Cⁱ is approximately two units, providing a much more efficient marker than yg. Plants of constitution Def Cⁱ +/C sh were used as pollen parent on c sh, and colorless Sh were selected. These crossover plants were then backcrossed to c. In 75 plants, averaging over 300 gametes per plant, no colored exceptions were found. Combining these data with the numbers in the standard test, a maximum C-I distance for structure c I of 0.079 units can be derived.

2. Spontaneous mutation of Cⁱ.

For Cⁱ X c, 422,513 gametes have yielded only 6 possible cases of mutation to C; these have not yet been tested for confirmation. All are from Cⁱ/c individuals, in the crossover tests above. For Cⁱ X C, a large-scale test in detassel plot last summer gave the following (1955 data is included for cumulative total):

Year	Whole Seed Self Color	Whole Seed Variegated	Variegated Sector	Colored Pits	Colored Scutellum	Diffuse Color	Total
1955	0	3	0	0	0	0	11,970
1956	6	82	19	12	4	4	797,400
	6	85	19	12	4	4	809,370

Of the six whole-seed-self-color cases, four are unusually small, and could be deficiencies for Cⁱ. The other two are normal in size. The three variegated cases from 1955 have been tested; two had non-corresponding embryo, and the other was deficient for Yg. This type of kernel, of which 5 have now been analyzed, clearly arises from terminal breaks and breakage-fusion-bridge cycles. Thus no more than 6 mutation cases were obtained (7.4 per million), and perhaps as few as 2 can be valid (2.5 per million).

3. Anthocyanin synthesis and intensifier.

The bronze-metallic sheen in the pericarp of in in kernels, reported in News Letter 29: 7, 1955, is probably the effect called "brassy" by Fraser in the original description of in. Various combinations of in with other aleurone factors have been checked for this effect:

(A ₁ A ₂ Bz ₁ C R)	<u>Constitution</u>	<u>Pericarp Sheen</u>
	Pr in	yes
	pr in	occasional
	a ₁ Pr in	yes
	a ₁ pr in	occasional
	a ₂ Pr in	yes
	bz ₁ Pr in	yes
	c Pr in	no
	Ci Pr in	no
	r Pr in	no

These interactions can be interpreted simply as indicating that C and R actions precede the effects of in, assuming that a diffusible substance is produced in excess in in kernels, and that this substance develops into a brown pigment (not anthocyanin) when it enters the pericarp. It is suggested that C and R are essential for the production of this substance.

A logical construction for the sequence of action, using the available information, is (C, R); In; A₁; (Bz₁, A₂). The position of Pr is not clear, but probably preceding A₂, at least.

4. High-haploid line.

Further data on frequency in self progenies of the two sources of stock 6 (see News Letter 30: 98, 1956) were obtained this year:

Stock 6 Sels

<u>Year</u>	<u>Haploids</u>	<u>Total</u>	<u>% Haploids</u>
1955	15	760	1.97**
1956	36	1,184	3.04
Both years	51	1,944	2.62**
(Hap. X sib) Sels			
1955	35	1,222	2.86
1956	156	4,540	3.44
Both years	191	5,762	3.31
Grand Total	242	7,706	3.14

** Highly sign. diff. from grand total.