

It will be seen in Table 1 that homozygous \underline{R}^f :Jana also produced two seed color mutants of type $\underline{g} \underline{r}^f \underline{K}$. These are mutants that would be expected if the plant and seed color effects of the \underline{R}^f segment were independent components. On this basis the origin of the two $\underline{g} \underline{r}^f \underline{K}$ mutants would be ascribed to mutations of the seed color determiner \underline{R} to \underline{r} in the $\underline{g} \underline{R}^f \underline{K}$ chromosome, since the mutant chromosomes are of the same \underline{g} and \underline{K} constitution as the $\underline{g} \underline{R}^f \underline{K}$ chromosome.

In general it is evident that \underline{R}^f :Jana mutated more frequently to \underline{r}^g (rate = 1.16×10^{-4}) than to \underline{r}^f (rate = 0.11×10^{-4}), and that the mutations were chiefly the result of non-crossover alterations. It also appears evident that a large proportion of the seed color mutants from \underline{R}^f :Jana were of the type that would be expected if (P) and (S) were a single entity with two kinds of action. Whether, however, the \underline{R} segment of \underline{R}^f :Jana actually consists of a single element cannot be definitely concluded on the basis of the present results, since a small proportion of the mutants were of the type expected from the action of two independent genes. For the moment, the significance of this finding still remains unclear. Although it is possible that the seed color factor of \underline{R}^f :Jana mutated independently of the plant color element, it is also conceivable that the origin of the \underline{r}^f mutants may be attributed to some other mechanism which is not apparent at the present time. It is also puzzling, in view of the high frequency of oblique crossing over in stocks of \underline{R}^f :Cornell, to find so few oblique crossovers in the progeny of \underline{R}^f :Jana. It may be that the structure of \underline{R}^f :Jana is a complex of two spatially segregated parts so oriented as to be nearly incapable of separation by crossing over. One may suggest from these results that the origin of the \underline{r}^g mutants is due to a suppressive type of mechanism, inhibiting both plant and seed color. However, there is no evidence that indicates such a mutator system present in the stock. The seeds of each of the \underline{r}^g mutants were closely examined for dominant mutations, but no spots or sectors of colored aleurone were found. A similar examination was made of the plant tissues.

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2. New abnormal chromosomes 10.

A number of altered abnormal chromosomes 10 arose as a result of crossing over in abnormal 10/duplicated abnormal 10 heterozygotes. The effect of these altered chromosomes 10 on preferential segregation was studied in backcrossed ears produced by pollinating female plants of \underline{R} altered $\underline{K}/\underline{r} \underline{k}$ constitution by $\underline{r} \underline{k}/\underline{r} \underline{k}$. The results to date are summarized below.

Culture	Type of chr. 10	Numbers of		Percent Altered
		Altered K	Unchanged k	
58:243-3	new knob ^o (2) *	1416	1365	51
-7	Trisomic-K10, k10, new knob ^o (3) *	565	536	51
-9	new knob ^o (4) *	161	133	54
-10	interstitial K10	1480	1456	50
-20	Trisomic-K10, k10, interstitial K10	1177	1181	48
-23	Trisomic-K10, k10, interstitial K10	1459	1282	53
-24	altered abnormal 10 with 2 knobs on 10L	1231	1184	50
-27	Trisomic-ring-10, k10, new knob ^s (2) **	1457	1417	51
-28	Trisomic-ring-10, K10, k10	834	862	49

Culture	Type of chr. 10	Numbers of		Percent
		Altered K	Unchanged k	Altered K
-36	interstitial K10	1024	1027	50
-39	Trisomic-ring-10, K10, k10	687	656	51
-44	new knob ^o (5) *			
-49	new knob ^s (3) **	3195	2590	55
-51	ring-10			
-57	Trisomic-K10, k10 ring-10	755	865	47
-59	new altered chr. with the 3 prominent chromomeres and 4 $\frac{1}{2}$ distal chromomeres; shorter than K ^o .	1263	1003	53

* altered abnormal 10 without the heterochromatic segment; similar to knob ^o (1).

** altered abnormal 10 lacking about one-half of the heterochromatic segment; similar to knob ^s (1).

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3. Further analysis of the $R^{\frac{B}{b}}$ non-crossovers.

A number of additional seed color mutants were analyzed to supplement the data of the $R^{\frac{B}{b}}$ non-crossovers reported in 1958 C. S. H. S. This was considered necessary because of the possibility that the frequency of the critical crossover class may have been exceedingly rare. The retests were made using the same $R^{\frac{B}{b}}$ non-crossovers as in the original experiment. The results to date are summarized below.

Culture	Non-crossovers		Crossovers	
	$r^{\frac{1}{2}}K$	$r^{\frac{B}{b}}k$	$r^{\frac{1}{2}}k$	$r^{\frac{B}{b}}K$
$R^{\frac{B}{b}}nco-2$				
1958 data	28	6	13	0
1959 data	1	0	3	0
Total	29	6	16	0
$R^{\frac{B}{b}}nco-3$				
1958 data	10	5	24	1
1959 data	2	3	13	0
Total	12	8	37	1
$R^{\frac{B}{b}}nco-4$				
1958 data	24	11	17	1
1959 data	7	0	1	1
Total	31	11	18	2

These results support the previous conclusion that (p) is deficient in non-crossovers 2, 3, and 4.

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