

Each F_3 progeny reacted the same to cultures 901ab, 917a, 928b, and 929d. All seedlings were susceptible to cultures 904d and 921b. The segregating F_3 progenies gave a satisfactory fit to a 3:1 ratio ($\chi^2 = 0.931$, $P = .50-.30$).

The preceding data indicates that a single dominant gene for resistance to *P. sorghi* is present in the Blacks Y. D. inbred line. Differential rust reactions indicate that this gene is different from those previously identified. Appropriate crosses have been made to determine its allelic relationship to the known genes for rust resistance.

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1. Diffuse.

Diffuse (Df), a dominant inhibitor partially epistatic to red pericarp (P^{rr}) pigmentation, was reported in 1954 (Jour. Hered. 45: 47-50) as giving about five per cent recombination with T2-4b (2L.81 4L.53, from 1956 revised list of Anderson & Longley, M.G.C. News Letter No. 30). Df assorted independently of T1-4a, T2-4l, and T2-7c. These data excluded the mid-regions of the long arm of chromosome 2 and the short arm of chromosome 4 as possible sites of Df. They did not permit a decision between the two possible locations of Df indicated by the close linkage with T2-4b.

Subsequent tests (see table) show that Df gives about 2.8 per cent recombination with T1-4b, and also is closely linked with T4-9b and T4-5f. It assorts independently of two different translocations marking the long arm of chromosome 2. Thus the site of Df appears to be near, and proximal to, the point on chromosome 4 marked by T1-4b.

Three families gave aberrant recombination ratios on the hypothesis that Df is located on the distal portion of the long arm of chromosome 4. Linkage with T2-5f (2L.91 5L.10) was indicated in one family. Df assorted at random in two other families segregating T4-5b (4L.76 5L.68). Mislabeling of the reciprocal translocation stocks may be involved in these three cases; or possibly, Df is a transposable element.

As noted in 1954, kernels from a relatively large patch which was colorless or near-colorless as the result of Df action in P^{rr} plants gave the same kind of progeny as typical dark diffuse kernels from the

same ear. It was concluded from this result that the light colored area did not represent a mutation of the Df gene, but was a "pattern" effect. A family grown in 1957 from a similar colorless area, however, gave colorless offspring; whereas plants grown from typical Df kernels on the same ear gave typical Df offspring. The reason for these contradictory results remains to be found.

Family	Mating	Marker locations (Longley & Anderson)	Number of offspring				Per cent Recom- bination
			Semisterile		Normal		
			Df	df	Df	df	
12-465	Df/T1-4b x df	1S.55 4L.83	1	62	62	1	
-466	"		1	78	69	2	
-480	"		3	80	70	4	
Total			5	220	201	7	2.8
12-467	Df/T4-9b x df	4L.90 9L.29	6	75	61	20	
-468	"		4	55	41	7	
-469	"		2	41	58	2	
-481	"		9	88	97	10	
-482	"		5	28	30	1	
-483	"		2	78	76	12	
-484	"		1	30	59	7	
-485	"		2	63	106	4	
Total			31	458	528	63	8.7
12-470	Df/T4-5f x df	4L.50 5L.80	12	93	84	17	
-471	"		12	91	89	16	
-486	"		21	131	100	15	
-487	"		15	92	91	12	
Total			60	407	364	60	13.5
12-472	Df/T2-5f x df	2L.91 5L.10	41	61	50	41	
-488	"		61	63	62	51	
-489	"		60	70	46	58	
Total			162	194	158	150	47.0
12-474	Df/T2-3d x df	2L.67 3L.48	55	70	45	47	
-475	"		39	43	42	44	
-490	"		46	61	51	46	
Total			140	174	138	137	47.0

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2. Transallelic action of self-colored mutants from stippled (R^{st}) in heterozygotes with self-colored aleurone (R^f).

As previously reported, standard R^f is changed invariably to a weakly pigmenting form, termed $R^{f:st}$ in plants heterozygous for stippled