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1. A gene for resistance to Puccinia sorghi in the variety Blacks Yellow Dent.

Studies reported in the 1955 and 1956 Maize Genetics News Letters have shown that the strains B38, K148, Guzco, and GG208 each have a dominant gene for resistance to leaf rust. Furthermore, these genes appear to be in an allelic series.

A rust resistant early generation inbred line has been established from the variety Blacks Yellow Dent. This inbred line differs genetically from the previously reported sources of resistance as indicated by the differential rust reactions shown in the following table:

Reactions to five cultures of Puccinia sorghi

Source of resistance	901a	908R	921a	927R	930R
B38	0;	0;	0;	3	0;
K148	1-	3	1-	3	1-
GG208	1-	1-	0;	1-	3
Guzco	0;	0;	0;	0;	0;
Blacks Y.D.	0;	3	3	3	0;

Inheritance of resistance was studied in the F<sub>3</sub> from the cross Blacks Y.D. x B14 (a susceptible inbred). Progenies of 102 F<sub>2</sub> plants were evaluated separately with 6 cultures of P. sorghi. Twenty seedlings from each ear were classified for reaction to each rust culture. The following table shows the results obtained:

Rust culture	Parent Reactions		F <sub>3</sub> Reactions			Expected ratio	X <sup>2</sup> Value	P Value
	Blacks Y.D.	B14	Res. <sub>2</sub>	Seg.	Susc.			
901ab	Res.	Susc.	24	51	27	1:2:1	0.176	0.95-0.90
917a	Res.	Susc.	24	51	27	1:2:1	0.176	0.95-0.90
928b	Res.	Susc.	24	51	26	1:2:1	0.089	0.98-0.95
929d	Res.	Susc.	24	51	27	1:2:1	0.176	0.95-0.90
904d	Susc.	Susc.	0	0	102	All susc.		
921b	Susc.	Susc.	0	0	102	All susc.		

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