RED STRIPED PERICARP OF CORN

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During September of 1964, a longitudinal red striping of kernels of field corn was observed in Essex and Kent Counties in southwestern Ontario. The discoloration was limited to the pericarp and varied in intensity from a faint streak on the side of the kernel to an almost complete reddening, with streaks extending over the crown (Fig. 1). The reddening was most noticeable on the round kernels near the tip of the ear. In all respects, the condition resembled the "red-stripe" reported from southern Michigan, northeastern Indiana, and northwestern Ohio in 1963 (2) and from more widespread areas in 1964 (5). The cause of the red-stripe has not been determined.

Ears with red-striped pericarp were present in most fields examined in Essex and Kent Counties. The intensity of the condition varied considerably from plant to plant, but there appeared to be no great differences in incidence among commercial hybrids. However, inspection of numerous inbreds and single crosses harvested at the Harrow Research Station revealed the absence of red-stripe in several cases. Therefore, grain samples from several genotypes, each randomized in three replicate blocks, were examined for red-stripe. The samples contained 200 to 400 kernels from the centre portions of three ears that were collected at weekly intervals during the autumn and oven-dried to determine kernel weight and moisture contents. The samples were rated for red-stripe on a 0 to 5 scale, representing no discoloration to almost complete reddening of all kernels, respectively.

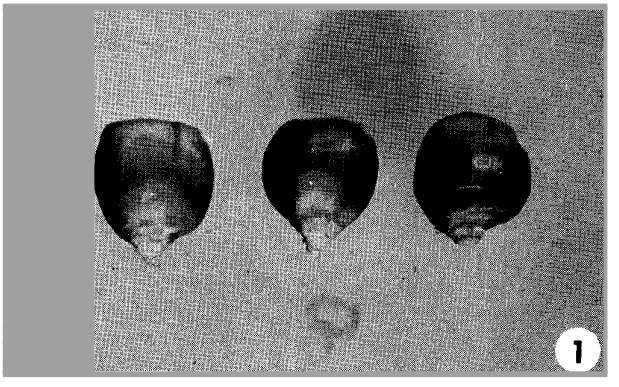

Fig. 1. Kernels of dent corn showing the pattern and range of intensity of red-stripe.

Kernel samples collected on the earliest date, Sept. 3, had very little or no red-stripe (Table 1). Apparently the discoloration did not occur until a few days to two weeks before physiological maturity.

The only single-cross of known parentage entirely free of red-stripe, CH159 x CH3, was made up of inbreds with practically no striping whereas the parents of single-crosses showing considerable striping had high red-stripe ratings (Table 1). The data wouldindicate that there is some genetic control over the expression of red-stripe.

In cold germination tests carried out by Hoppe's method (3), there were no differences in per cent germination between samples with and without red-stripe from the same population. Both untreated and Arasan-treated seed were tested. Seedlings from red-striped seed did not differ in appearance from those derived from normal seed.

Apparently, many factors condition the appearance of red-stripe. Its occurrence late in the growing season, shortly before maturity suggests a physiological or an environmental effect. There is also a genetic effect on the expression of red-stripe. The possibility of a transmissible pathogenic factor involved in red-stripe is suggested by its apparent "spread" from an area involving three States in 1963 to a much wider area across the United States and Canada in 1964 (2, 5).

Literature cited

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2. Anonymous, 1964. Three states affected by red-striping. Buckeye Farm News. February. p. 38.
3. Hoppe, P.E. 1957. The rolled towel seed tester for corn. U.S.D.A. Leaflet No. 425.
4. Kunze, R.E. 1964. Corn disease is threat to farmers in 1964. Buckeye Farm News. February. p. 18, 20.
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Table 1. Incidence of red-striped pericarp in inbreds and single-crosses grown at the Research Station, Harrow, Ontario, in 1964.

Inbred or Single-cross	Approx. date of physiological maturity[1]	Red-stripe Rating[2]				
		Sept. 3	Sept. 10	Sept. 16	Sept. 24	Oct. 1
M13	Sept. 12	0.7	2.3	2.3	3.0	--
A374	Sept. 12	0	0.3	1.3	0.3	--
W153R	Sept. 12	0	0.3	2.3	1.3	--
US153	Sept. 12	0.3	1.3	2.3	3.0	--
W37A-R1	Sept. 15	0	0	1.3	2.0	--
CH159	Sept. 20	0	0	0	0.3	--
CH160	Sept. 20	0	0	0.3	0	--
CH3	Sept. 25	--	0	--	0	0.3
CH9	Sept. 25	0.3	--	1.3	3.3	3.0
Oh51A	Sept. 28	--	1.0	2.0	2.7	3.0
M14	Sept. 28	--	0.3	1.3	1.3	2.3
A374 x CH159	Sept. 12	0	0	0.3	0.3	--
W37A-R1 x CH9	Sept. 12	0	1.0	1.0	0.7	--
W37A-R1 x W153R	Sept. 12	0	0	1.0	1.7	--
W37A-R1 x WF9	Sept. 15	0	1.3	1.0	2.7	--
W37A-R1 x Oh51A	Sept. 15	0	0.7	1.3	1.3	--
CH159 x CH3	Sept. 25	--	0	0	0	0
B14 x CH9	Sept. 28	--	1.3	1.3	1.7	1.5

1 Date of maximum kernel dry weight.

2 Based on 0 to 5 scale; 0 = no stripe; 5 = intense discoloration of all kernels.