Monoploid ht seedlings were significantly more susceptible to leaf blight than were the diploid (ht ht) seedlings. There was no significant difference in susceptibility between 2n, 3n, and 4n seedlings carrying two, three, and four doses, respectively, of ht.

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2. The use of purple embryo marker in screening for twin embryo seeds.

We have been screening large populations of corn seeds for monoploids by crossing our test lines, as female parent, to purple embryo marker. In a population of about 83,000 kernels, we found four seeds, each of which possessed two distinct embryos. On all four kernels, each of the two embryos showed the purple color. It was apparent in two of these kernels that the twin embryo could not have been detected unless the pigment was present. The female parent was line 65:225-1, which is homozygous Ht.

We suggest the use of purple embryo marker to facilitate the detection of such seeds in programs where the primary purpose of research is to uncover kernels with twin embryos.

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1. Linkage intensities of lutescent-1.

The lutescent mutant in maize has been characterized (MNL 39:146-147). Its expression has been found to result from two recessive genes, lutescent-1 (lu_1) and lutescent-2 (lu_2) (MNL 41:150-152). One of these genes, lu_1, has been located on chromosome 5, and preliminary F_2 studies indicated close linkage with a_2.

A testcross was carried out between plants hybrid for lu_1, lu_2, a_2, bm_1, bt_1, and pr, and one homozygous for lu_1, lu_2, and pr. The latter plant was heterozygous for bm_1 and bt_1, but did not carry a_2. The seeds with colorless aleurone resulted from the segregation of a gene other than a_2 since no linkage could be demonstrated between the aleurone color gene and any of the other chromosome 5 markers. The results of this testcross are presented in Table 1. A high percentage of inviability was encountered among seeds homozygous for bt_1, and the values shown have been corrected to allow for this inviability.

Acceptable 3:1 monohybrid ratios were observed for colored vs. white seeds, full vs. brittle seeds, green vs. brown midrib, and green vs. lutescent leaf. It will be noted that 3:1 represents a testcross ratio for green and lutescent since duplicate genes are involved. A 1:1 ratio was observed for purple vs. red seeds. Dihybrid segregations involving lutescent plant, and brittle seed, brown midrib, or red aleurone all

Table 1

Testcross phenotypes from crosses between lutescent and chromosome 5 markers: $\underline{a}_2$ (anthocyanin), $\underline{bm}_1$ (brown midrib), $\underline{bt}_1$ (brittle endosperm) and $\underline{pr}$ (red aleurone)

Phenotypes				Number of seedlings
Aleurone	Endosperm	Midrib	Leaf	
Purple	Full	Green	Green	179
			Lutescent	106
		Brown	Green	1
			Lutescent	0
	Brittle	Green	Green	2
			Lutescent	0
		Brown	Green	55
			Lutescent	0
Red	Full	Green	Green	170
			Lutescent	50
		Brown	Green	3
			Lutescent	0
	Brittle	Green	Green	9
			Lutescent	1
		Brown	Green	128
			Lutescent	4
White	Full	Green	Green	132
			Lutescent	59
		Brown	Green	1
			Lutescent	0
	Brittle	Green	Green	1
			Lutescent	0
		Brown	Green	47
			Lutescent	10
			Total	958

deviated highly significantly from the expected ratios and indicated linkage.

In order to calculate linkage intensities between *lu*$_1$ and the other markers, individual recombinant types had to be determined and the frequencies of detected recombinants used to calculate the frequency of the total recombinants. For example, when considering *pr* and *lu*$_1$, four recombinant gamete types are possible: *Pr Lu*$_1$ *Lu*$_2$, *Pr Lu*$_1$ *lu*$_2$, *pr lu*$_1$ *Lu*$_2$, and *pr lu*$_1$ *lu*$_2$. When crossed to the homozygous recessive, only one of these gametes will produce the recombinant phenotype: red aleurone, lutescent plant. Since 55 of this phenotype were observed, the total number of recombinant gametes produced by the hybrid would be 55 x 4 = 220. This represents 31% of the total plants, indicating a map distance of 31 units.

The other distances were calculated on the basis of the recombinant phenotypes observed multiplied by eight, since, out of the eight recombinant genotypes possible, only one will produce the double recessive recombinant phenotype. The distances calculated in this way are: *lu*$_1$ - *bm*$_1$ 12 units, and *lu*$_1$ - *bt*$_1$ 13 units. According to the maps of Neuffer (MNL 40:167-172), these data would place *lu*$_1$ at map locus 9 on chromosome 5.

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2. Inheritance patterns and distribution of the low temperature-chlorosis genes in Oh51A.

A low temperature-chlorosis effect in maize inbred line Oh51A has been described (MNL 41:152-153). F_1 and F_2 populations were on hand which involved this line of Oh51A as one parent and material which displayed no low temperature response as the other parent. Seeds from these populations were germinated at 10 ± 1°C and were scored for the chlorotic condition. All F_1 seedlings were green. In the F_2 population 710 seedlings were green and 53 were chlorotic, a good fit to a 15:1 ratio (p=0.45). These results indicate a bigenic pattern of inheritance. It appears that two recessive genes are required for this expression. These genes have tentatively been designated cold-chlorotic-1 and -2(*cc*$_1$ and *cc*$_2$).

In an effort to determine whether or not this was a universal trait in Oh51A, seeds of this line were obtained from a number of agricultural experiment stations across the country. The results of germinating these seeds at 10 ± 1°C are presented in Table 1. It is apparent from these data that this trait is not universal with this line. It was indeed fortuitous that the original material used for this work, obtained from the Pennsylvania Agricultural Experiment Station, was homozygous for these genes.