Table 1
Comparison of R Expressions from Testcrosses of R^6R "Heterozygotes"

Unselected	Selected	Selected	Selected	Standard
17.30	15.06	19.44	15.10	20.94
17.36	14.04	15.18	16.64	20.90
15.55	16.88	16.16	17.64	20.88
15.82	16.37	19.42	18.50	20.66
16.16	16.36	16.84	18.54	20.94
16.06	15.26	17.96	17.00	20.96
Pooled $\bar{X}$ 16.38	15.66	17.50	17.23	20.88

Three families of selected light kernels are compared with standard R and unselected kernels, all of which were planted out and testcrossed to Inbred W23. Kernel selections for planting were based on an R^6R^6 x RR (standard) mating where pigment repression was observed in certain R^6R^6R kernels.

Bernard C. Mikula
Richard Sherman
Robert Locy

2. Tassel induction and alteration of R^1 expression by short-term LD treatments.

In Vol. 41 MGCNL we reported that the degree of pigmentation from R^1 (paramutated R) in testcrosses could be related to the environmental treatments which RR^{st} plants had been given during the 3rd and 4th weeks of seedling development. Plants which received LL (constant light) conditions had lower aleurone pigmentation scores than those plants which received LD (12 hr. light: 12 hr. dark) during the 3rd and 4th weeks. It was believed that tassel initiation took place during this interval and that the effect of environment upon R^1 expression might in some way be correlated with the tassel induction period. A preliminary report follows on the relationship of these two points.

Light was supplied by six 200W daylight-type fluorescent bulbs approximately 1 m above the seedlings which were grown in 4" pots at 22°C in constant light. At given ages during the 3rd and 4th weeks of development (Table 2) plants were exposed to various numbers of 24 hr. LD periods then returned to LL (constant light) conditions. At the end of 30 days all plants were transferred to field conditions and testcrossed in the summer to assay the effect of the LD treatments on R^1 expression. It was of interest to know: (1) how soon plants were susceptible to

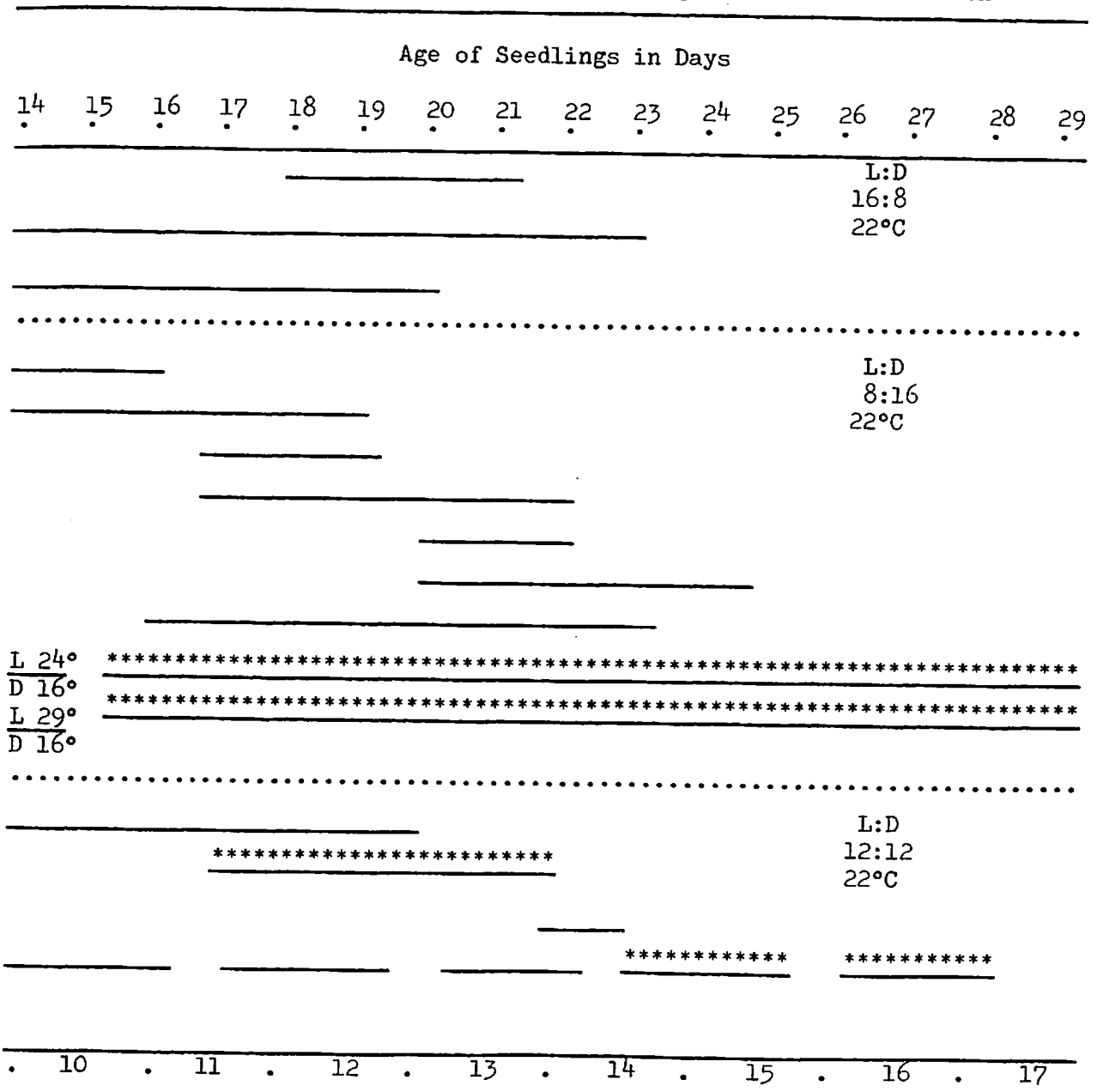
tassel induction, (2) what daylength conditions were necessary--given our light intensities and temperature regimes, (3) how few cycles of an LD period were sufficient for tassel induction.

Table 2 shows that tassel induction for the W22 inbred line could be brought about in 12:12 LD conditions when the plants were 23 days old, if the LD cycles were continued for three 24-hr cycles. Three 24-hr. cycles did not bring about tassel induction earlier than the 23-25 days of seedling age. Six days, however, did bring about tassel formation when the LD periods began on the 17th day and continued through the 22nd day of seedling life. 16:8 and 8:16 LD cycles were not successful for tassel induction at the given temperatures and light intensities. Tassels formed in 8:16 LD periods when day and night temperatures were varied from 24° day to 16° night or 29° day to 16° night--this temperature regime was continued over a 14 day period. There are, of course, many combinations of variables which have not been tried. Effort was made to find the shortest and earliest time during which the seedling was susceptible to tassel induction, given the limited growth chamber space and growing conditions available at the time.

Since three LD cycles can induce tassel formation, can these same LD cycles affect $\underline{R}^1$ expression? The effect of short tassel inductive periods on $\underline{R}^1$ pigment expression from the $\underline{RR}^{st}$ treated plants is given in Table 3. As reported previously, plants given only LL conditions score lightest upon testcrossing. Plants given LD conditions score darker than those given constant light conditions for the first 30 days of seedling development. It appears from our preliminary results that three 24-hr. LD cycles can condition a darker $\underline{R}^1$ expression compared to $\underline{R}^1$ expressions from plants given only LL conditions during this same period. Seven days of LD cycles also conditioned a darker $\underline{R}^1$ expression. Field-grown plants in 1967 gave consistently darker $\underline{R}^1$ testcross scores than had been noted in previous years; these scores are in the range of those plants which had the LD cycles.

Table 2

Light (L): Dark (D) Treatments of Maize Seedlings for Tassel Induction



*** represents LD treatments which resulted in tassels; ___ represents LD treatments which failed to produce tassels. The length of the line above represents the length of the treatment and the age of the plant during the LD conditions.

Table 3
Effect of Short-term LD Cycles on $\underline{R}^1$ Expression

	Age of Plant in Days and No. of Cycles of LD				
LL	17-23 7	23-25 3	23-26 4	23-29 7	Field Grown
12.84	14.50	16.14	14.38	16.30	15.91
11.88	13.82	15.60	14.71	16.50	16.13
12.18	12.76	16.26	16.46	12.73	14.24
10.65	12.88	12.96	12.66	14.44	16.05
12.72	14.26	11.24	13.82	15.25	15.22
9.14				16.16	17.98
12.26				14.26	15.91
11.52					14.57
11.65	13.64	14.44	14.41	15.09	15.75 Pooled $\overline{X}$

Testcross results of $\underline{RR}^{st}$ plants given LD cycles during the 3rd and 4th weeks of seedling development. Plants were kept under constant light except for the periods of LD treatment indicated.

This work was made possible by a Visiting Fellowship from the Center for the Biology of Natural Systems, Washington University, St. Louis under Public Health Service Grant No. ES-00139-01.

Bernard C. Mikula
Carolyn Trowbridge

ESTACION EXPERIMENTAL DE AULA DEI
Zaragoza, Spain
Department of Plant Physiology

1. Modified phyllotaxis in maize. Dispersion, spirodistichy, decussation, and similar alterations in other parts of maize plants. Multiple germination in distichous, spirodistichous and decussate plants.

In an inbred line of maize, inherited decussate phyllotaxis was observed in association with brachysm and other modifications in height. Some other abnormalities were found, such as alterations in the position of grains in the ear, increased numbers of plumules, plurality of embryos and multiplicity of plants after germination.