Crossover percentages are higher than normal for the Bt-Pr and Pr-Gl regions but the suggested three-point order is Bt-Pr-Gl. My stocks of gl_8 and gl_{10} have either become mixed or these 2 glossies are identical.

G. F. Sprague

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1. Genetics of tillering.

A project has been initiated to investigate what if any genetic basis exists for tillering in some of the races such as Parker's Flint in contrast with many midwest inbreds and other races such as Zapalote Chico. Crosses have been made this winter in Florida between Parker's Flint and a series of translocations compiled by E. G. Anderson and E. B. Patterson. In addition, tillering and non-tillering sibling plants from several backgrounds were selfed in 1961; these seeds will be grown and the progeny checked further this coming year.

It is the aim of this project to try to relate expressed morphology more closely to genetic background. Since environment plays a seemingly significant role in tiller development, knowing whether or not specific genes for tillering exist in a particular plant should provide a means of separating environmental and genetic influences on tiller and presumably other aspects of plant development with greater accuracy than is now possible. The aid of E. G. Anderson, E. B. Patterson and W. L. Brown has been enlisted in various ways.

N. H. Nickerson

2. Responses of certain tassel and dwarfing genes to growth substances.

A series of tests was run during 1961 on na_1, na_2, py, br_1, cr_1, d_1, d_2, nl, rt, ba, Cg, and Tp. Groups of plants were subjected to one of the following treatments: Gibberellic acid, naphthalene acetic acid, indole butyric acid, GA-NAA, GA-IBA. Treatments were applied in several concentrations at two-day intervals. NAA stimulated root growth and stalk stiffness, but decreased branching, stature, leaf size, inflorescence size and fertility. IBA stimulated overall growth, but not height; leaves were wider, often longer, more tillers developed, they produced functional inflorescences and root growth was enhanced. GA retarded root growth and inhibited development of lateral branches. In a few cases, it increased height. Generally, effects of IBA-GA or NAA-GA were additive. br_1 / br_1 was markedly affected by GA; leaves were only 1/3 as wide as controls, plants were shorter and with culms 1/2 as great in diameter and inflorescences did not develop. nl / nl plants remained nl; ba / ba plants remained barren. Stature was only slightly modified in na_1 and na_2 plants. rt plants formed roots when treated with IBA or NAA. Tp and Cg plants behaved under effects
gl of GA treatment as previously published; with IBA their increase in vigor was marked, while with NAA they showed few growth differences from controls.

Studies are continuing this year on effects of these and other growth substances alone and in combination on the above-listed and other mutant forms. The purpose of such investigations is to ascertain whether or not effects of specific genes which differ from their alleles in normally-growing plants can be modified or overcome by applied substances which have been found to influence plant growth. The most clear-cut example is still the overcoming of $\underline{d_1}$ by GA discovered by Phinney. Another which may be equally clear-cut is overcoming of rt by auxins, noted above. Suggestions as to genes which could be tested will be welcome.

N. H. Nickerson
R. E. Lindahl

3. Responses of stalk and tassel mutants to TIBA.

Tri-iodo benzoic acid (TIBA) is a synthetic substance which has been shown to cause loss of polar movement of auxin (IAA). During 1961, groups of ts_1, ts_2, ts_4, Ts_5, Ts_6, sk, Cg, Tp and la plants were subjected to daily treatments of either dist. H_2O, 100 µg, 500 µg or 1000 µg of TIBA from 2 weeks of age until tassel emergence. In general, doses below 500 µg were ineffective in causing growth changes. An exception was sk / sk, where doses of 100 µg inhibited brace root development entirely and resulted in greatly foreshortened plants; sk / sk plants treated with higher doses died. In ts_1 / ts_1 plants, main shoots were killed and 2 tillers developed, each with ts_1 tassels. Plants were also 1/2 height of controls. ts_2 / ts_2 plants were reduced in height by the higher concentrations but were essentially unchanged in tassel appearance. ts_4 / ts_4 plants were slightly increased in height by 100/µg doses; the effect was more pronounced on + / ts_4 plants. Ts_5 and Ts_6 plants were shortened by higher concentrations, but they did not die. 1000 µg doses caused a general chlorosis and often death of tips of leaves as well as general inhibition of brace root development. They also apparently prevented normal cell differentiation in some strains; stalks were of smaller diameter and far more flexible than controls. Tiller production of Cg and Tp was not strongly affected, but a lowering in height over controls was common. la / la plants did not remain upright, but fell over from lack of roots rather than from the ageotropic growth characteristic of control la / la plants. These studies are being continued.

N. H. Nickerson
M. T. Shealey

4. Effects of high concentrations of auxins on normal maize plants under field conditions.

Field-grown plants of the hybrid Spancross showed no detectable growth responses to season-long daily treatments with NAA, IBA and IAA in concentrations ranging from 10^{-8} up to 10^{-3}, the effective ranges of auxin activity employed in laboratory experiments. In preliminary trials of concentrations somewhat higher than these levels, detectable growth effects were obtained. Studies are continuing to find out the limits of tolerance of these substances and their effects on growth of other inbreds, races and hybrids.

P. R. Kremer
N. H. Nickerson