

approximately the same length as the extra chromosome) will be added to test for the possible presence of "distributive pairing".

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3. The duration of synizesis.

A Black Mexican sweet corn plant was grown outdoors in a pot and brought into the laboratory at sporocyte stage. The stem was opened and the intact tassel (still attached to the plant) was spread out on a plate supported by a ringstand clamped to the pot. Anthers were removed from every second or third spikelet and scored for stage. The entire tassel and its supporting plate were then enclosed in a plastic bag to prevent drying. (Intact spikelets retained a fresh appearance throughout the entire experiment). Remaining anthers were removed periodically and scored for stage. Assuming that the 13 spikelets bracketed at the beginning of the experiment by spikelets at synizesis were themselves at that stage, the approximate duration of synizesis in this plant (at 25° C) is estimated to have been 50-52 hours. The time to typical early pachytene stage varied from 17 hours to 54 hours, and the mode was in the 46-50 hour class. It is thought that those spikelets requiring near maximum time most nearly represented a full synizetic duration, the others probably having progressed beyond earliest synizesis at the beginning of the experiment. From fewer observations it is guessed that the duration of pachytene under these conditions was approximately 5 hours, and the remainder of meiosis about 1 hour.

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1. Genetics of tillering.

The studies on attempted identification of tillering genes by means of a series of 17 translocations are continuing. Two sets were planted out last year. One group, involving grassy-tillered stock, showed no tillers in either the wx/wx crosses or the Wx/-

crosses, even though these 1800 plants were observed up until frost in October. The other group, involving Pawnee stock, had tillers in equal numbers among 1800 plants in both wx/wx and Wx/- groups. Each of the groups lacked 4 crosses with the proper translocations, however, and these were made in 1964. The cool growing season may also have affected expression of grassy-tiller. Studies on these two and on five other tillering stocks will be continued through 1965.

2. Studies involving the gene rootless.

As reported in the 1962 MGCNL, the gene rt/rt may be modified in its expression by addition of IAA, IBA or NAA in several concentrations when applied at regular intervals throughout the growing season. During 1964, two observations on rt/rt were made to which I have not found previous reference. The stocks employed (Coop stocks) yielded two types of plants from which selfs were obtained. One of these formed only 6-8 roots while still a seedling; no more roots were ever initiated or formed. Such plants had to be supported if they were not to be lost. Eleven such plants were found in 350 plants. All of the other plants in this number were genetically rt/rt and they also did not form true brace roots. They did, however, form fibrous roots at nodes, or just above them, as in normal plants, provided that the nodes were underground. It is most probable that the darkness influenced root formation. Selfs have also been obtained in these stocks. Relationships between light, the gene rootless, auxin production, transportation, destruction and correlations with root formation are under current study.

3. Studies involving the gene Knotted.

Homozygous Kn/Kn stocks have been obtained in which the knots which develop are up to 5 cm in length. Ontogenetic formation of these knots can be either retarded or arrested completely by NAA applied daily to the plants in the proper concentration. Anatomical correlations of untreated and treated plants in various stages of development and in normal, heterozygous and homozygous individuals are being studied.

4. Masking of v4 by growth substances.

This mutant is best expressed under cool growing temperatures; this past season provided ideal conditions for a study of overcoming the effects (i.e., causing the plant to become greener sooner). Each of the substances IAA, IBA and NAA was effective, provided they were applied daily during the growing season. At a time when control plants were only pale green in the older leaves and clear yellow in the younger leaves, IBA caused the older leaves to be more intensely green, but had little effect on the very youngest leaves, which were often yellower than in control plants. NAA caused all leaves to be greener and shorter than controls. IAA had least effect, but still plants were greener than controls. Three rows of 60 plants each in four randomized groups per row formed the basis of these results.

5. Dry-weight increases in 2 genetic strains of milo.

10-day interval treatments of both 38-day and 44-day milo with TIBA, an auxin antagonist, results in dry-weight increases in roots and shoots. Such data indicate that the plants may owe their dwarfness to an excess rather than a deficiency of substances concerned with cell elongation. Studies are continuing.

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1. Mutagenic effects of barley stripe mosaic on corn.

The most common effect, and the one most extensively studied, is a type of segregation distortion. One set of typical data is presented in Table 1. Progenies 752 and 753 were A a and a a in genotype and were derived from a 1963 culture exhibiting segregation distortion. Male and female transmission deviate significantly from the expected 50:50.