4. Studies with dwarf and brachytic stocks.

Studies of dwarfing in maize begun in 1948 have been broadened to include physiological and anatomical aspects, in addition to genetic and agronomic studies.

Conversion of the standard inbred lines WF9, 38-11, L317, and Hy2 (parental lines of U.S. 13) to brachytic-$_2$ versions has been continued. Brachytic-$_2$ versions has been continued. Brachytic-$_2$ lines thus far developed have been somewhat disappointing in agronomic characteristics, particularly disease resistance, but F_1 hybrids between certain br_2 stocks bear ears which approach normal size.

Three separate and distinct mutant stocks homozygous for br-$_2$ have now been obtained, and there appears to be evidence that mutations to this type occur with unusual frequency. The three stocks ("R4 dwarf", "Oakes dwarf", and "W28 dwarf") differ phenotypically in both the mature and seedling stages, but give brachytic F_1's when intercrossed. "R4 dwarf" plants are indistinguishable from normals in the seedling stage, and classification in segregating cultures is difficult until shortly before tasseling. Seedlings of both "Oakes dwarf" and "W28 dwarf" show some shortening of the mesocotyl in the early seedling stages but this has not been found sufficiently consistent to make classification in segregating populations reliable. Physiological and anatomical studies with br-$_2$ are in progress, and include among their objectives evaluation of the effects of this gene (or gene complex) on agronomic characters of the plant. Linkage studies also are in progress.

Similar studies of the genetics, physiology, and anatomy of the "W8 dwarf" mutant also are being conducted. This mutant can be classified easily in segregating populations by its production of very short leaf-sheaths of the earliest foliage leaves. In several thousand seedlings observed, the development of leaf blades, coleoptile, and mesocotyl has been normal in homozygous "W8 dwarf" plants. Mature plants of this mutant are essentially brachytic in growth form. All crosses between the "W8 dwarf" and other dwarf and short stocks in our collection have given normal F_1's.

Our collection of dwarf and short mutant types of maize now includes between forty and fifty stocks. We would be grateful to receive seed of any dwarf or short types, and would be happy to furnish limited quantities of seed of our stocks to anyone interested in having them.

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