**The Use of Teosinte in the Improvement of Corn Inbreds**

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It is generally recognized that the varieties and inbreds of corn vary widely in their tolerance to heat and drought. Annual teosinte is a variable species composed of many varieties, and its varieties may also possess different degrees of ability to withstand the hazards of their environment. Although the varieties of teosinte are not so well known as those of corn, observations indicate that some of them are superior to most, or perhaps all, varieties of corn in tolerance to heat and drought. Teosinte hybridizes readily with corn and the hybrid plants are fertile. It is conceivable, therefore, that some of the germplasm of teosinte may be transferred into inbred lines of corn by standard breeding procedures, and modified lines recovered which are superior to the originals.

Accordingly, a program was undertaken several years ago, with the purpose of determining whether such a method of improvement of inbred corn lines is possible.

A preliminary report of this work was issued in 1947 (4). A final report of this work was published in 1950 (4).

Materials and Methods

Several Texas corn inbreds were modified by transferring teosinte germplasm into them and the recovered lines compared with the original corn inbreds, but the two principal inbreds studied in this manner were 4R-3, a white line, and 127C, a yellow one. Inbreds 132A and 102A have been added to the program, but the work with these is still in preliminary stages.

Inbreds 4R-3 and 127C were crossed with Florida teosinte, backcrossed to the respective inbreds from one to three times, and selfed each generation afterwards. One group, to be discussed later, was developed simply by repeated selfing in generations after F1. In the development of the modified lines, no effort was made to select by observation. Plants were backcrossed and selfed at random, and only those plants or ears that were seriously affected with disease, insect damage, sterility, or other abnormalities were discarded.

The results to be reported at present evolved from two main types of study: (a) tests of heat tolerance of the modified inbreds themselves in comparison with the original inbreds as standards; and (b) tests of yielding ability in field plots of the original and modified inbreds in hybrids with a uniform tester, the hybrid containing the original line being considered the standard in most instances.

The procedure followed in the test for tolerance to heat was a modification of that used by Hunter, Laude, and Brunson (2) and by Heyne and Laude (1). Inbred plants of 4R-3 and of the uniform single cross tester were either substituted or added as a second standard.

In making the hybrids in preparation for yield tests, single crosses were chosen as testers. As a rule, it was one with which the original inbred or its hybrid was transferred into the inbred. An exception was WF9 × 38-11 as the tester in 1947. This single cross is a low yielding in our region, and it was chosen for that reason.

The original inbred crossed with the tester was used in standard in most tests, but in several instances another tester was added, in which the original inbred × another tester was crossed to the uniform single cross tester as a second standard.

All of the tests were conducted in the locality of College Station, Tex.

Experimental Results

**TEOSINTE CHARACTERS OF MODIFIED INBREDS**

Effects of the teosinte parentage may be seen by inspection in the modified lines themselves and their hybrids when crossed to testers. There are too numerous to describe, but common among them are increase in number of ear-shoots and tillers, greater frequency of staminate spikelet tips, narrower leaves, and increased branchiness of the plant. All of these characters are found to be less pronounced in hybrids of the inbreds of corn, except for uniformity. The soil used for the first five tests was a thorough mixture of sandy loam and compost, and the sixth was relatively homogeneous Houston loam.