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IDENTIFICATION OF DIFFERENTIAL AGRONOMIC TRAITS IN EARLY STAGE TEOSINTE, FLINT, DENT, AND SUGAR (SWEET) CORN VARIETIES IN COMPETITION WITH WEEDS

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ABSTRACT

Weed competition reduces corn yield. Today's corn monoculture relies heavily on herbicide inputs to maintain yield. However, teosinte, corn's ancestor, was successfully grown in mixed production systems. Harnessing genes and traits that allow teosinte to be a better competitor but which may have been lost during corn domestication could help producers reduce herbicide inputs and maintain yield. The first step to finding those genes is to identify varieties of corn and lines of teosinte that have a higher tolerance of weeds or greater weed suppressive ability. Five introductions of teosinte and 14 varieties of corn (including dent, heritage, and sweet corn types) were cultivated with and without weed pressure. Early and end of season growth characteristics including leaf area, plant height, stem diameter, biomass, and yield, when possible, indicated a wide range of weed tolerance. Differences between weedy and weed-free treatments within a type ranged from 1-10% in corn height, 3-20% in leaf area, 1-27% in corn biomass (July), 0.4-28% in top collar height (September), and 2-17% in grain yield on a per cob basis at harvest (October). Varieties demonstrating the greatest and least deviations in these measurements between treatments have been selected for preliminary molecular analysis (data not available at this time). Identifying early season growth characteristics and gene expression associated with maintaining high yield under weed stress conditions can, in the long term, lead to better understanding the mechanisms of crop tolerance, its heritability, and reducing weed control inputs.