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Adapted and Non-Adapted Tropical Corn in Central Iowa: 2. Biomass Production and Composition

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Abstract:

Adapted and Non-Adapted Tropical Corn in Central Iowa: 2. Biomass Production and Composition

Biomass production in the midwestern United States has largely been focused on corn (*Zea mays* L.) grain for ethanol production and more recently on corn stover for lignocellulosic ethanol. Corn production in this region is profitable and productive. As an alternative to conventional corn, tropical corn genotypes have been evaluated, but mainly for grain production; nevertheless, yields have fallen short of U.S. Corn Belt populations. Tropical corn is the term used for corn coming from tropical regions. Tropical corn has been adapted for early flowering for potential use in breeding programs under central Iowa conditions. Since adapted and non-adapted tropical do not produce acceptable grain yields in central Iowa, they alternatively showed potential for vegetative development and biomass yields. However, the comparison between tropical corn and commercial hybrids for biomass production has not been explored in depth. The findings of this research will show the potential of tropical germplasm with heightened biomass productivity based on quantity and quality of the lignocellulosic feedstock.

Field trials were established at Sorensen Research Farm in Boone County, IA during the 2014 and 2015 growing seasons. Six genotypes (four hybrids of 104 relative maturity [RM], 110 RM, 114 RM, 120 RM, and two tropical corn of 130 RM) were planted on 20 May 2014 and 13 May 2015 to evaluate biomass yield and fiber composition. Tropical corn had higher grain moisture at harvest, later flowering times, and taller plants than conventional corn. Tropical genotypes resulted in 20% greater biomass yields than temperate hybrids, and they showed equal quality in fiber composition. Although results showed that tropical corn is susceptible to 10% more stem lodging over conventional corn, this might be explained by the relative differences in lignin content in relation to the plant height of the genotypes. Overall, unadapted tropical corn appears to be well-suited as a lignocellulosic source for ethanol production.

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