075-AGR

Evaluation of a complex Corn x Teosinte population for adaptation to four cycles of Tennessee growing conditions

Grain corn is among the top two crops of row agriculture in Tennessee year after year. The genetic diversity of corn hybrids is high but could be increased by incorporation of new genes from wild, well adapted but primitive Teosinte and other international corn types that have been adapted to many climate patterns through natural and farmer led selection. The goal of this corn project is to incorporate genotypic variation from international corn cultivars and several Teosintes into modern corn inbreds, precursors to current hybrids, through local selection from a USDA produced multi-parent population being grown across 35 sites world-wide. This is a sort of reverse engineering of corn's evolutionary history. Here in middle TN, the corn seeds from the population were repeatedly planted and harvested from two different locations- Ashland City and Nashville from 2021-2024 over the period of 4 years for a total of four cycles (C1 to 4). The research work estimated yield and seed parameters for each cycle, by analyzing 1000 seed weight, as well as correlation of seed sizes and seed colors involving the yield contributing characters. Different parameters were observed by scanning with WinSeedle software such as plant height, cob number, cob width, cob length, kernel size, kernel number, kernel color, 1000 seed weight. Throughout the years of growing the corn prominent color combinations have been observed such as white, yellow, orange, red, and purple. The seed size based on 1000 seed weight showed significant variation in both location and over the four cycles ranging from 202 to 207g in C1 - Ashland City and from 239 to 242g in C1 – Nashville, from 221 to 231g in C2 – Ashland City and from 222 to 233g in C2 – Nashville, from 223 to 236g in C3 – Ashland City and from 227 to 260g in C3 – Nashville. The data collection process is currently ongoing for C4 in both Ashland City and Nashville. In the following year, the research will concentrate on screening the seeds, analyzing the genotypic ratios, DNA extraction and sequencing of the collected samples of corn to see the genotypic variations in determining the yield potential.