Flowering Dynamics and Kernel Set in Maize Vary With Plant Population Density and Nitrogen Fertilizer Levels. (C04-westgate122308-Oral)

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Abstract:

Current models for simulating maize yield do not consider the quantitative and dynamic nature of silk emergence and pollen shed, which are the critical processes controlling seed set and genetic purity. We are developing mathematical descriptions of flowering and pollination in maize based on simple measures of tassel and ear development to establish minimum pollen density requirements and to predict kernel set under field conditions. Detailed quantitative information on male and female flowering were collected under a wide range of management conditions and related to kernel set. Nitrogen fertility (50 to 300 kg/ha) did not alter pollen production, or the dynamics of pollen shed at the population level. Tassel size, pollen grains per plant, rate of silk emergence, number of silks exserted per plant, and the timing of pollen shed and silking for the population all varied with plant population (1 to 16 pl/m2). Kernels per exserted silk decreased from 97 to 57% with increasing plant population. A high level of Nitrogen fertility did not improve yield per plant or kernel set. Progress on modeling kernel set in these treatments from their pollen shed and silking dynamics will be presented.

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