ROLE OF SWEET CORN CANOPY ARCHITECTURE IN CROP-WEED INTERACTIONS.

Yim F. So* (1), Martin M. Williams II (2), Jerald. K. Pataky (1), and Adam Davis (2), Univ. of Illinois, Urbana, IL 61801 (1), Invasive Weed Management Unit, USDA-ARS, Urbana, IL 61801. (2).

Sweet corn canopy architecture influences crop tolerance (CT) to weed interference and weed suppressive ability (WSA) of the crop based on effect on weed growth and fecundity. A quantitative analysis of specific traits responsible for CT and WSA could enhance the impact of hybrid characteristics on weed management in sweet corn. Twenty three sweet corn hybrids from nine seed companies were grown in the presence and absence of wild proso millet in Urbana, Illinois in 2006. Inclusion of hybrids was based on *a priori* qualitative observations of variation in canopy architecture and stress tolerance. Several canopy morphological and phenological traits were characterized from crop emergence to harvest. Crop tolerance to weed interference was determined as weedy ear mass or ear number as a percentage of weed-free yield. At the time of crop harvest, WSA was determined from wild proso millet biomass and fecundity as the inverse of the weed response within a hybrid as compared to a weedy monoculture response. Significant variation among hybrids was observed for most CT, WSA, and canopy traits. Positive correlations ranging from 0.22 to 0.34 ($P < 0.05$) were observed between CT and WSA traits, indicating that there was a slight positive relationship between CT and WSA among these 23 hybrids. Sixteen of the 17 canopy traits were significantly correlated with CT and WSA. Several traits that describe late-season canopy were positively associated with CT traits, including late-season height (0.38 to 0.44), late-season light interception (0.27 to 0.37), leaf area near anthesis (0.28 to 0.42), shoot biomass near anthesis (0.36 to 0.48), and maturity (0.32 to 0.54). Several traits that characterize early canopy development were positively associated with WSA traits, including seedling vigor (0.24), upright leaf angle (0.22), early-season light interception (0.25), and early-season LAI (0.23). Differences in CT and WSA among the hybrids and their significant correlations to canopy growth and development lead us to hypothesize that certain crop traits could be used as indicators of CT and WSA among hybrids. Traits that are associated with late-season canopy morphology appear to provide information on CT, while traits that are associated with early canopy development are useful for describing WSA. Based on these results, we hypothesize that both early development of the crop canopy and final canopy architecture affect crop-weed interactions.

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