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Dynamics of Ear Grain Set in Maize under Drought Stress at Flowering

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Abstract

Drought stress is becoming a more severe problem than ever before for the stability of grain yield of maize (*Zea mays* L.) in tropical and subtropical dry land areas. Drought stress at flowering affects silk receptivity and kernel set and largely reduces grain yield. The ability of a plant to complete grain set within few days under drought stress is essential for a good residual yield. In this study, the dynamics of daily grain set are being tested on vigorous sweet corn hybrids, which have a high potential grain number and are comparable in flowering time to conventional maize. The silks of seven sweet corn mother plants were pollinated on seven consecutive days with pollen from two different sources (either sweet or normal maize). Pollen from normal maize (dominant allele) produces grains with hard texture, which serve as visual marker among the sweet grains (recessive allele) to visualise which grains have been pollinated on a specific day. The result of the field experiment conducted at the National Corn and Sorghum Research Institute in Thailand indicated that pollination proceeds from the lower middle part of the ear to the top and the bottom. More than 85 % of the ovaries were fecundated within the first four days after silk emergence. Drought stress did not affect pollen vitality, but slowed down the dynamics of silk emergence. As a result, kernel number decreased towards the tip of the ear under stress, compared to well-watered conditions, and the number of kernels per ear was significantly reduced.

Keywords: Drought, grain set, pollination, sweet corn, *Zea mays*