

Maize is Not Day Neutral

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There have always been claims from maize scientists that maize is day neutral (an example inaugurating and completing the recent decade: Ma, *Curr Biol* 8:690, 1998; Colasanti and Muszynski, in *Maize Handbook*, Springer, New York, NY, 2008). The claims are false. Maize is not a day-neutral plant; it is a short-day plant (facultative long night). When someone wants to learn whether the maize subspecies has a reaction to nightlength, maize scientists are telling them that the subspecies has no inclination.

Coming from maize scientists, the false claims are assumed to be the conclusion of the scientific community by a review of the scientific record. The false claims are then publicized, propagated, and referenced as being both founded and authoritative (recent example: <http://extension.oregonstate.edu/mg/botany/light2.html>, accessed 2008).

Some of the claims attempt to qualify the assertion, despite the fact that qualification has historically been ignored. The Corn Belt Dent is arbitrarily said to be like day neutral, and then, ensuing and peripheral studies condense the claim to say that maize is day neutral. Consequently it remains evident that this playing with this term is unwarranted. No one has caught on that doing so has directly falsified the science.

Firstly, maize is not the Corn Belt Dent; the Corn Belt Dent is one type of maize among hundreds. Secondly, the Corn Belt Dent is not day neutral; even its early maturing strains are facultative long night, with a few strains nearly night neutral, night neutral, and facultative short night (Francis et. al., *Crop Sci* 9:675-677, 1969; Birch et. al., *Field Crops Res* 55:93-107, 1998; Kiniry et. al., *Agron J* 75:700-703, 1983; Tollenar and Hunter, *Crop Sci* 23:457-460, 1983; Warrington and Kanemasu, *Agron J* 75:749-754, 762-766, 1983; Hunter et. al., *Can J Plant Sci* 54:71-78, 1974). The night-length reaction happens even in an F1 of the original Corn Belt Dent lines B73 and Mo17 - where it is being subdued by heterosis (Ellis et. al., *Crop Sci* 32:398-403 and 1225-1232, 1992; Bonhomme et. al., *Crop Sci* 34:156-164, 1994; Kiniry et. al., *Agron J* 75:687-690, 1983).

The overwhelming and indisputable fundamental nature of the night-length reactivity of the maize subspecies (not to mention its species) is facultative long night. People who are knowledgeable about the maize subspecies are aware of the evidence for maize originating in the tropics and that most of the races there will flower later when taken and cultivated at high latitudes. Conversely, they know that taking temperate maize to cultivate in the tropics is no doubt a terminal proposition. Every study that has attempted to evenly draw from existing maize diversity and assess night-length reactivity leaves no manner of uncertainty nor any vestiges for debate about this matter. The studies repeatedly conclude that, by far, most of the 250 races of maize have a facultative long-night nature (cf. key references: Brutnell, *Plant Physiol* 130:160, 2002 [author's note: maize has a phytochrome gene]; Stevenson, *Crop Sci* 12:864-868, 1972; Weissinger and Goodman, unpublished 1977 [cross-section of the 250 races]; other references: Salamini and Brandolini, *Breeding Strategies for the Improvement of Maize Production in the Tropics*, FAO, Firenze, IT, 1985, p. 98-99, 143-157 [a fantastic manual on maize's nature]; Brewbaker, personal communication 2003; Gouesnard, *Genet Resour Crop Evol* 49:471-481, 2002).

Saying that maize is day neutral not only misses the point but the claim has no basis in science. Casually using the term in science writing about maize has not been a good idea, even in an article concerning an anomalous strain. Only a description need be used, or the reader alerted in the introduction that the scenario is an anomaly. The only expressions that ever need to be used throughout the literature are "facultative long night" or "facultative short day."