

Short Communication

SHOOT-CUTTING IS NOT NECESSARY FOR CONTROL-
POLLINATION IN MAIZE

B. S. DHILLON

Punjab Agricultural University, Ludhiana 141 004

(Received: March 31, 1998; accepted: October 17, 1998)

Maize is a cross-pollinated crop. Control-pollination is carried out to produce seed for crop improvement and related researches. Self-pollination is carried out to develop inbred lines; sib-pollination to maintain inbred lines and populations and increase their seed on a small scale; cross-pollination to develop hybrids and outbred families; etc. An alternative is to produce seed in isolation plots but that is very costly and is made use of in a limited number of cases when seed requirement is large, or a tester is to be crossed as a pollinator with a number of other materials or in methods like modified ear-to-row and modified S1 selections. Thus, control-pollination is very important in maize research.

For control-pollination ear shoots are covered with shoot bags before the emergence of silk from the ear shoot husk tips. The shoots are many times cut to within 1 to 2 cm of the husk tips before these are covered with the shoot bags, to facilitate early and simultaneous emergence of all silks. The shoot-cutting is a regular practice in many maize research programmes around the world including those in India (author's personal observation), and is used in other programmes if ears are to be pollinated before the normal emergence of silks [1]. The shoot-cutting has implication with regard to the selection for anthesis silking interval (ASI) and husk cover, and labour input as discussed below.

ANTHESIS-SILKING INTERVAL

The ASI, the interval between the initiation of pollen shedding and silks emergence, is an important trait. Selection experiments conducted at the International Maize and Wheat Improvement Center (CIMMYT), Mexico, have shown that shorter ASI is associated with tolerance to drought [2]. Further, a shorter ASI contributes to reduced barrenness, and maize breeders in the temperate areas have been selecting at higher plant densities to have coincidence of pollen shed and silk emergence [3]. The shoot-cutting before the emergence of silks excludes the possibility of observing the date of silk emergence and, consequently, the ASI, unless some other arrangements

are made to record these data. Rather it advances silk emergence and acts against the natural selection for reduced ASI when the plants are selfed or sib-pollinated. Further, shoot-cutting exposes the ear to contamination if silks are present in the husk tips at the time of shoot-cutting.

HUSK COVER

Good husk cover is desirable. It protects the ear against the damage due to ear rot, ear insects, birds, rain etc. No useful selection can be done for this traits when the husk tips of ear shoots have been cut at the time of pollination.

LABOUR INPUT

The requirement of labour, a costly input, to cover ear shoots for control-pollination nearly doubles if ear shoots are covered after cutting their husk tips. The shoot-cutting not only increases the labour input but the labour is wasted to do an undesirable job.

Thus, the husk tips of ear shoots should not be cut except in special cases when the nicking between diverse parents needs to be promoted. The experiences at CIMMYT for the last many years show that normally no difficulty is encountered in control-pollination if uncut ear shoots are covered with the bags used for control-pollination (S. K. Vasal, pers. commun.).

ACKNOWLEDGEMENT

This paper is an outcome of author's discussions with Dr. S. K. Vasal, Maize Programme, CIMMYT, Mexico and the author acknowledges this with thanks.

REFERENCES

1. W. A. Russel and A. R. Hallauer. 1980. Corn. *In: Hybridization of crop plants* (ed. W. R. Fehr and H. H. Hadley). Amer. Soc. Agron. - Crop Sci. Soc. Amer., wis., USA: 299-312.
 2. CIMMYT. 1992. *Enduring Design for Change: An Account of CIMMYT's Research, Its Impact, and Its Future Directions*. CIMMYT, D. F., Mexico: 118.
 3. A. R. Hallauer. 1985. Breeding methodologies for temperate maize. *In: Breeding strategies for Maize Production Improvement in the Tropics*. (ed. A. Brandolini and F. Salamini). Food and Agriculture Organization and Istituto Agronomico per L'Oltremare, Firenze, Italy: 156-176.
-