

SHORT COMMUNICATION (I)

A Pollinating Technique in Maize (*Zea mays* L.)

INTRODUCTION

In an effort to improve existing maize varieties by the simple recurrent selection procedures at the Universiti Pertanian Malaysia, Sarawak Branch Campus, we adopted the tassel bag method of hand pollination on three varieties: UPM Sweet Corn, Thai Opaque, and Mardi Composite I.

This method involves covering both the female flower (shoot) and the male flower (tassel) before the appearance of the silk and the shedding of pollen. The tassel is covered with a brown bag to collect pollen and the shoot is covered to prevent contamination from undesirable pollen. In cross-pollination, the pollen is dropped into silk of a different plant. Pollination must be done from 10.00 to 11.30 a.m. before the pollen die.

After pollination, fertilization occurs and the grain is ready to be harvested 47 - 52 days after pollination.

PENDAHULUAN

Dalam usaha memperbaiki jenis-jenis jagung yang sedia ada dengan cara pemilihan berulang yang mudah di kampus cawangan Sarawak, UPM, kami telah menggunakan cara pendebungaan tangan dengan membungkus tangkai bunga jantan tiga jenis jagung: UPM Sweet Corn, Thai Opaque dan Mardi Composite.

Melalui cara ini, bunga betina dan bunga jantan hendaklah dibungkus sebelum keluarnya benang sutera ('bulu' jagung) dan gugurnya debunya. Bunga jantan dibungkus dengan beg perang (coklat) untuk mengumpul debunya dan bunga betina ditutup untuk mengelakkan pencemaran (kontaminasi) daripada debunga yang tidak diinginkan. Dalam pendebungan-kacukan, debunya digugurkan ke atas benang sutera suatu pokok yang lain. Pendebungan mesti dilakukan dari jam 10.00 - 11.30 pagi sebelum debunya musnah.

Selepas pendebungaan, persenyawaan berlaku dan bijirin bolehlah dituai dalam lingkungan 47 - 52 hari selepas pendebungaan.

MATERIALS

(1) Tassel bags - 30 cm. × 15 cm. made of ordinary brown wrapping paper with wax coating on the outside; (2) Shoot bags - 20 cm. × 7 cm. of wax paper; (3) Pocket knife; (4) Stapler and staple pins.

PROCEDURE

I. *Cover female flower or shoot from foreign pollen*
Cover all top shoots with the shoot bag before silk (stigma) appears to prevent foreign pollen from pollinating emerging silk. The shoot can be located easily emerging out of the leaf sheath at the stem node (Plate 1). It usually appears when the male inflorescence or tassel is appearing or has appeared.

II. *Cover the male inflorescence or tassel to collect pollen*

In Sarawak, the tassel (male part of the plant producing pollen) appears 42 days after planting in UPM Sweet Corn, 47 days after planting in Thai Opaque and 54 days after planting in MARDI Composite I. About one to two days later, anthesis of the tassel occurs and anthers appear shedding pollen. Wait till half of the anthers on the tassel has shed pollen. Then cover whole tassel with the brown tassel bag and staple the bag (Plate 2). Tassel will shed pollen for three to four days. When covering the tassel, ensure that it is completely dry since wet tassel will not shed pollen.

III. *Cutting silk one day before pollination*

Usually silk appear from the shoot when the tassel has nearly completed shedding

pollen or when the tassel has already completed shedding pollen. Cut back about 3 cm. from tip of shoot to get maximum diameter of silk as seen from the cross section of the cut surface (Plate 3). Cutting back of shoot one day ahead of pollination is necessary to expose the silk and to obtain a nice bushy growth to prepare it for pollination on the next day. When cutting back the shoot care must be taken not to cut the cob as well. Otherwise abnormal growth and uneven emergence of silk will result.



Plate 1: Cover the female flower or shoot with a glassine bag as soon as it emerges from the leaf sheath.

IV. Pollinating procedure

Pollination is possible only on a dry sunshine day from 9.00 a.m. to 11.30 a.m. No seed set will occur if pollination is done at noon, since pollen is shed at about 9.00 a.m. when the dew on the plant has dried up and live only for two to two-and-a-half

hours depending upon the temperature of the day. Do not pollinate when the bag is sogging wet after a rainy night. As a rule of thumb, pollination is ready when the bees start buzzing around the tassel of neighbouring maize plants.

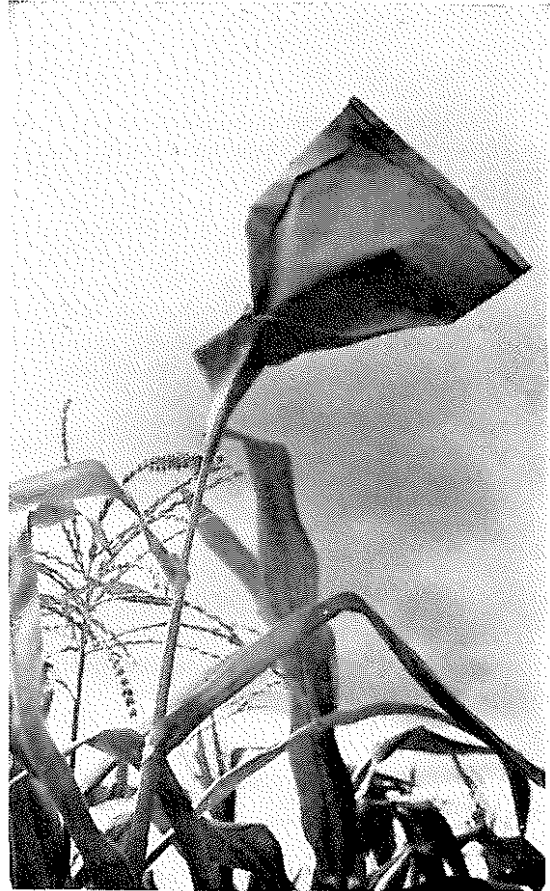


Plate 2: On the day before pollination, cover the tassel when 50% anthesis has occurred. Pollen will be shed in the bag the following morning.

At about 10.00 a.m. the following day after covering the tassel, tap the tassel bag to encourage more pollen to be shed and collected in the bag. Break the tassel off from the plant and shake the pollen out of the bag. Meanwhile, remove the shoot bag to expose about 2-3 cm. silk that has grown overnight. Shake tassel bag over bushy growth of silk to drop all pollen dust to collect on the silk. Cover pollinated silk and shoot over with the shoot bag and a second cover with the tassel bag. Staple

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tassel bag to stem as illustrated (Plate 4). The pollinated silk is covered to prevent pollen bearing insects from entering the silk and contamination by foreign pollen.



Plate 3: On the day before pollination cut the top portions of the shoot and cover it with the shoot bag. Cutting is necessary to prepare the silk for pollination the following morning.

V. Maturity

Seed reach physiological maturity when the black layer is formed at the hilar region of the grain in the case of our corn 47 to 52 days after pollinating. Although the moisture content is still high, we can harvest the ears since further waiting will cause the seed to germinate on the plant.

The technique above also applies when we do cross-pollination. In cross-pollination, the procedure outlined above is carried out except that the pollen come from the tassel of a different plant.

Tassel bags made out of brown paper seem to give a higher shelling percentage than those made out of plastic. The poor shelling percentage derived by using plastic tassel bags was a result of high humidity produced by the transpiring tassel which moistened and clogged all pollen during anthesis on a sunny morning. Thus, less viable pollen were available during pollination.



Plate 4: At about 10.00 a.m. the following morning, tap the tassel bag, break the tassel from the plant and shake the pollen out of the bag to drop onto the silk. Then cover pollinated shoot with the tassel bag and staple it to the plant.

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