

# A NOTE ON THE POLLEN MORPHOLOGY OF *CORCHORUS CAPSULARIS* LINN.

## *C. OLITORIUS* LINN. AND THEIR HYBRID

THE study of the pollen biology of the Indian jute started with Banerjee<sup>1</sup>, and in recent years both pollen morphology and its germination have been studied by several workers<sup>2-5</sup>. The present note relates to the pollen morphology of two cultivated species, namely, *C. olitorius* L. (var. J.R.O. 620) and *C. capsularis* L. (var. J.R.C. 412), and their hybrid with the former as female and the latter as male.

The material for the present study has been supplied by Dr. R. D. Iyer, Division of Genetics, I.A.R.I., New Delhi. The hybrid was running in its ninth generation, and the species *C. capsularis* has been x-radiated (20 kr). A notable change in external morphology of the hybrid has been the development of leaf-like stipules, which in both the parents are papillate.

For making pollen preparations, the flower was placed in 70% alcohol, crushed and washed with water and covered with glacial acetic acid followed by acetolysis<sup>3</sup>. The data on pollen morphology are given in Table I.

syncolporate and parasyncolporate grains in very minor percentages.

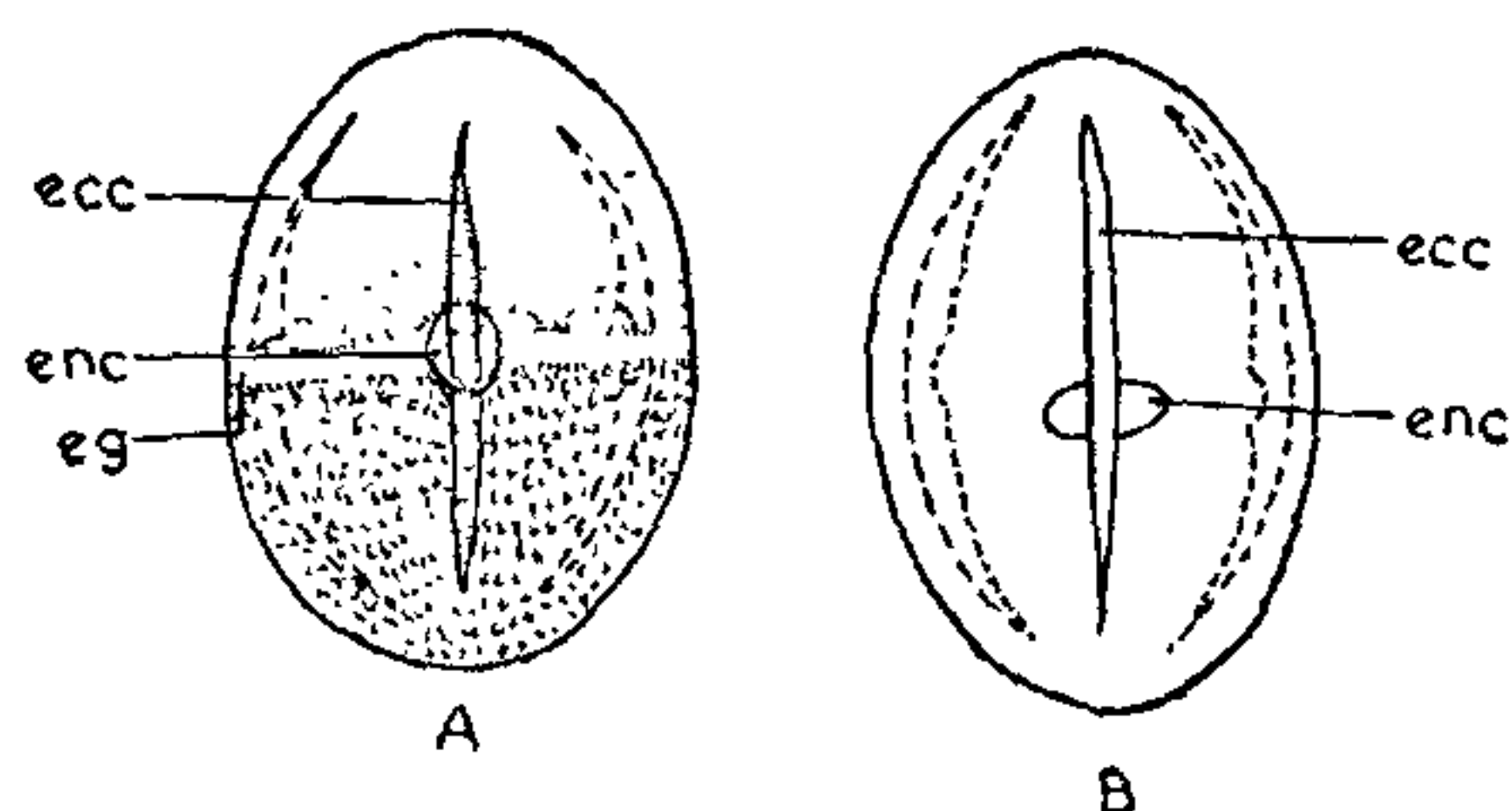


FIG. 1. Palynogram of *Corchorus capsularis* (A) and *C. olitorius* (B). ecc., ectocolpium, enc., endocolpium. Magnification,  $\times 1,000$ .

Datta<sup>2</sup> described the pollen morphology in the species of *Corchorus* including that of *capsularis* and *olitorius* as tricolpate (rarely tetracolpate and hexacolpate) while Erdtman<sup>3</sup> described the grains in the genus as tricolporate.

In the interspecific hybrid of *C. capsularis* ( $\sigma$ ) and *C. olitorius* ( $\varphi$ ) the occurrence of *capsularis* pollen type in a high frequency has been quite

TABLE I

Data on pollen morphology of two species of *Corchorus*

Species	Size of pollen grain	Average size of pollen	Equatorial girdle	Size of ora	Shape of ora
<i>C. capsularis</i> Fig. (1 A)	$24 \mu \times 32 \mu$ $28 \mu \times 25 \mu$	$35 \mu \times 28 \mu$	Present	$11 \mu \times 6 \mu$	slightly lo-longate
<i>C. Olitorius</i> (Fig. (1 B)	$39 \mu \times 32 \mu$ $28 \mu \times 21 \mu$	$35 \mu \times 28 \mu$	Absent	$7 \mu \times 11 \mu$	la-longate

Pollen grains are 3-zonocolporate in both the species, the endocolpium being slightly lo-longate in *C. capsularis* and la-longate in *C. olitorius*. Further, in *C. capsularis* an equatorial girdle connecting the endocolpium is characteristic, although not well marked, in some grains. The exine is about  $3 \mu$  thick and the surface is reticulate.

In the hybrid, *C. capsularis* pollen type (characterised by the lo-longate endocolpium and the equatorial girdle) was seen to dominate forming about 78% as compared to the *C. olitorius* type. It may further be pointed out that the girdle is very firmly developed in the hybrid grains as compared to the one in the parent species, namely, *C. capsularis*. In both *C. capsularis* and *C. olitorius* there are

significant which indicate the dominance of the male character over that of the female. In a similar work, Srivastava *et al.*<sup>5</sup>, observed that in the hybrid of *Amaranthus spinosus*  $\times$  *A. dubius*, the dominance of *spinosus* type grains could be considered to indicate that the species *A. dubius* embodies in it the *A. spinosus* type genome also. In the present study, the *capsularis* grains dominate in the hybrid. However, the *capsularis* type of grains in the hybrid has been found to possess highly developed equatorial girdle as compared to the equivalent parent species, which should be an indication about the genomal changes (mutational or meiotic) undergone by the hybrid, at micro-morphological levels.

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### A MODIFIED SCHEDULE FOR SUGARCANE CHROMOSOMES

*Saccharum* complex consisting of several species and cultivars poses a formidable problem in cytological investigations due to its high and variable number of small chromosomes and tenacious cell connections. The existing techniques do not yield enough intact cells for reliable chromosome studies besides being too protracted<sup>1,2</sup>. The present study therefore reports a modified Battaglia's fluid<sup>3</sup> and a modified Feulgen stain<sup>4</sup> for effective maceration and rapid processing of root meristems.

The sett roots of hardy cultivars—Co 421, Co 602, Co 740, and Co 1287—are used in the study. The aspects checked are: (a) rapidity of fixation, (b) maceration, (c) nucleo-cytoplasmic contrast and (d) preservation of nuclear details. After modification the following fixing fluid, stain and schedule have been found suitable.

**Fixing Fluid.**—5 parts of absolute alcohol, 2 parts of 2 N HCl, and 1 part each of acetic acid, chloroform, and formaldehyde.

**Feulgen Stain.**—6 gm more of potassium metabisulphite is added for 100 ml of stain than prescribed by the conventional methods<sup>4</sup>.

**Schedule.**—(1) Fix the roots in the above fixative for 30–45 minutes, (2) wash and store in 70% alcohol at room temperature or proceed directly. Storage at room temperature for a day gave more lasting results in some materials, (3) hydrolyse in N. HCl for 15 minutes, (4) stain in the modified Feulgen stain for 5–20 minutes, and (5) squash in 10% acetic acid.

The present schedule is exceedingly rapid taking only 60–75 min, due to the modified fixative and stain, as against several hours with others<sup>1,2,4</sup>

besides ensuing easy and satisfactory maceration into intact cells and preserving cellular contrast.

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### DETECTION OF CELL WALL BREAKING ABILITY BY CELLULASE OF *ALTERNARIA BRASSICAE* (BERK.) SACC.

THE cellulolytic enzymes hydrolyse cellulose yielding soluble sugars small enough to pass through the cell walls. From this definition, it follows that these enzymes are extracellular<sup>3</sup>. The edible tissues of higher plants like most fruits, vegetables and roots consist of parenchymatous cells. These are separable into unicells and the naked cell walls are then easily degraded with cellulase<sup>7</sup>.

The fungus *A. brassicae* isolated from severe type of leaf spots of mustard (*Brassica campestris* L.) had been observed<sup>2</sup> to produce cellulase constitutively at 5 day incubation period and pH 5.6 at  $25 \pm 1^\circ \text{C}$ . The addition of 0.5% of L-rhamnose in the basal CMC-N (carboxymethylcellulose-nitrate) medium stimulated the production greatly<sup>1</sup>. The culture filtrate was centrifuged at 5,000 rpm for 10 min. and used as enzyme solution. The ability of this enzyme to degrade the cell walls of potato tuber (*Solanum tuberosum* L.) was investigated. Cylindrical plugs, 8 mm in diameter, were cut from healthy potato tubers and the plugs were injected with distilled water under vacuum for one hour. Discs of 0.4 mm thickness were cut with a sliding hand microtome from these plugs. They were washed quickly with distilled water and stored under it. Five discs were placed in each 3 ml enzyme solution + 2 ml of 0.2 M citrate-phosphate buffer of pH 5.6 in a watch glass. At intervals of 2, 4, 8, 16 and 24 hours, the discs from each watch glass were removed and treated with chlorozinc iodide