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**COMPARATIVE LM & SEM
STUDIES OF POLLEN IN TWO VARIETIES OF
JATROPHA GOSSYPIIFOLIA L. (EUPHORBLACEAE)**

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ABSTRACT

Palynology of two *Jatropha gossypifolia* varieties viz., *J. gossypifolia* var. *elegans* and *J. gossypifolia* var. *gossypifolia* are described under LM and SEM. Omniperturate pollen with details of spoderm ornamentation are described. Based on exine ornamentation and several other characters it is suggested that the variety *J. gossypifolia*, *gossypifolia* be elevated to the rank of species.

Key Words: LM & SEM *Jatropha gossypifolia* : two varieties.

INTRODUCTION

Euphorbiaceae is eurypalynous (Erdtman, 1952; Punt, 1987.), Bahadur *et al.*, (1997) have recently made a comparative LM & SEM study of various Indian *Jatrophas* and brought to light the significance of various components of sporoderm ornamentation in relation to taxonomy of the genus. Erdtman (1952) first studied the pollen of *Jatropha* and proposed the "Crotonoid pattern". Later, Miller and Webster (1962) investigated 11 species of *Jatropha* and *Cnidoscolus* and commented on the variation in croton pattern of exine. Bahadur *et al.*, (1997) have described finer details of sporoderm sculpture of 9 taxa. Since the varietal aspects in relation to taxonomy were not studied hence this paper.

MATERIALS AND METHOD

Pollen grains of both the taxa under study were collected from wild plants in University campus and acetolysed following Erdtman (1952) and voucher slides and

herbarium specimens are stored in sporotheca collection and Herarium. SEM observations were made on acetolysed grains and sputter coated with gold and photographed with Phillips SEM installed at Central National Herbarium, Botanical Survey of India, Calcutta.

OBSERVATIONS AND DISCUSSIONS

The LM & SEM observations of pollen of both the *Jatropha gossypifolia* varieties is provided as under:

LM Observations:

Jatropha gossypifolia var. *gossypifolia*:

Pollen \pm spheroidal, radially symmetrical. 55.5 μm in diam. inaperturate (omniaperturate), heavily sculptured with pilate/clavate processes aligned reticulately (hexagonally) to form a crotonoid pattern; crotonoid pattern lax. processes 2.3-3.0 μm long. heads + triangular, 1.5 μm in diam., lumina fairly large. psilate. ectexine much thicker than endexine which is feebly developed.

SEM Observations:

Jatropha gossypifolia var. *gossypifolia*:

Pollen \pm spheroidal, inaperturate (omniaperturate). densely sculptured with clavate/pilate processes. aligned reticulately in a crotonoid pattern : processes confined to angles of faint brochi: crotonoid pattern lax. muri delimiting lumina faint. heads of clava/pila essentially triangular with prominently crenate margins. clava prominently striate. striae average. grooves broader or of same width as ridges: striae in radial pattern of heads of processes: lumina large. generally smooth. locally with 1-3 very small. free clava/pila (Plate 1, Fig. 1-2).

LM Observations:

Jatropha gossypifolia var. *elegans*:

Pollen \pm spheroidal, radially symmetrical, 66 μm in diam., inaperturate (omniaperturate), heavily sculptured with pilate/clavate processes aligned reticulately (Penta or hexagonally) to form crotonoid pattern, processes 2.3 - 3.0 μm long, heads \pm triangular, 2.3 μm in diam., lumina of moderate size 3.0 - 3.8 μm in diam., with a few much smaller free pila/clava, ectexine thicker than endexine which is feebly developed.

SEM Observations:

Jatropha gossypifolia var. *elegans*:

Pollen \pm spheroidal, inaperturate (omniaperturate), densely sculptured with clavate/pilate processes, aligned reticulately in a crotonoid pattern; processes

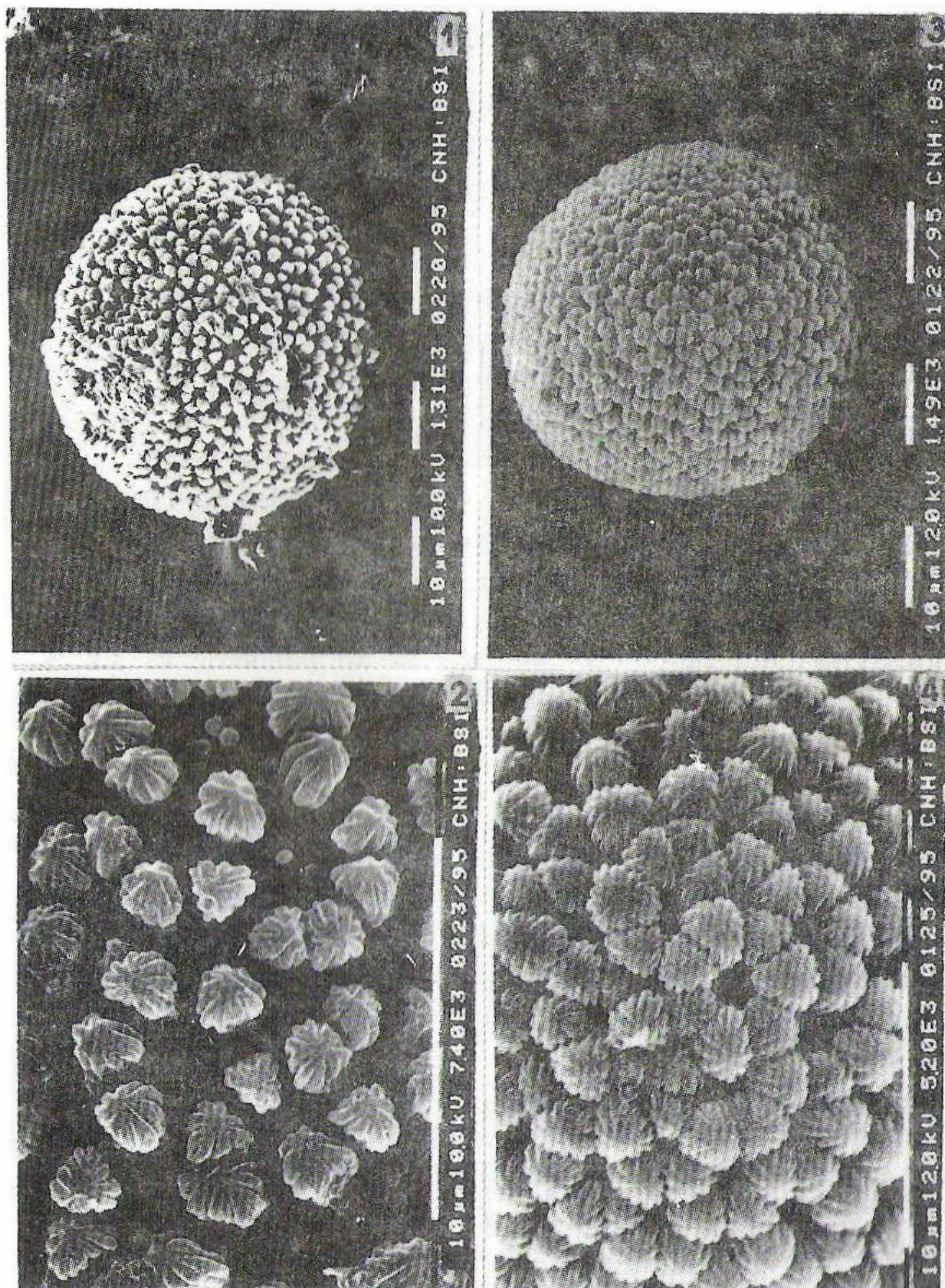


Plate 1

Fig. 1 Scanning Electron Micrograph of the pollen of *J. gossypifolia* var. *gossypifolia* showing inoperturate processes and lax crotonoid pattern.

Fig. 2 A portion of the above showing clearly crotonoid pattern, triangular prominently striate pila, 1-3 smaller pila in lumina.

Fig. 3 Scanning Electron Micrograph of the pollen of *J. gossypifolia* var. *elegans* showing inoperturate compact pila processes and dense crotonoid pattern.

Fig. 4 A portion of the above showing triangular prominently striate pila processes and dense crotonoid pattern.

(Magnification is shown on micrographs as a bar)

apparently confined to angles of faint brochi, crotonoid pattern dense with heads of clava/pila crowded, abutting on each other laterally; heads of processes triangular with crenate margins; clava prominently striate, striae 12-17 (average 13), ridges and grooves of same width, striae in a radial pattern around a central smooth area on clava/pila heads; lumina small, irregular, smooth with no free processes. (Plate 1, Fig. 3-4).

J. gossypifolia var. *elegans* (Pohl.) Muell has been recorded as early on 1827 and described as *Adenorpium* but later transferred by Klotzoch (1853) to *Jatropha* and reduced to variety under *J. gossypifolia* by Mueller (1866). Cited by Rao and Raju (1994), they have stated, 'they have recognised 2 sympatrically growing yet unmistakably different varieties of *J. gossypifolia* var. *gossypifolia* and *J. gossypifolia* var. *elegans* and commented for the need to review the entire botanical and phytochemical literature in India and recommended segregating them into two varieties on the basis of set of morphological characters.

In our studies on various aspects of *Jatropha* species, we noted that *J. gossypifolia* var. *elegans* to be more common than *J. gossypifolia gossypifolia* which grows in isolated patches and not at all pannictic as stated by Rao and Raju (1994); although crosses between them are fertile leading to formation of viable seeds (unpublished). Study of hybrid and in particular pollen characters would through useful information.

Apart from the distinct differences in sporoderm microcharacters, the two varieties differ in series of differences as follow; viz.

J. gossypifolia var. *elegans*: Plants with dark brown stem and dark purple leaves becoming green, flowers purplish, sepal with 8 glands, sepal tip devoid of gland, capsule hirsutulous, seeds light brown with black linear streaks, aril 8-10 lobed. Chemotaxonomically, this variety has indoles and gallic acid and steroidal nucleus.

J. gossypifolia var. *gossypifolia*: Plants with light green stem, leaves greenish from beginning, flowers light yellow, sepal with about 15 glands, sepal tip ending in gland, capsule densely hirsutulous, seed light brown with dark brown streaks, aril 15 lobed. Indoles and gallic acid are absent:

In view of the several palynomicrocharacters as well as other vegetative, floral and fruit characters pointed out above, the authors propose to elevate *J. gossypifolia* var. *gossypifolia* to the rank of species and this will be discussed elsewhere.

ACKNOWLEDGEMENT

We thank Dr. G.V.S. Murthy, Botanical Survey of India, Howrah for scanning the pollen grains.

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