

(GA<sub>3</sub>) has neither any promotory effect on the growth nor on alkaloid production (table 2) in sweet potato suspension cultures.

Further work is needed for maintaining and/or enhancing the biosynthetic potentiality of the tissue, by isolation and selection of stable cell lines of sweet potato by plating the cells and subjecting them to selection pressures.

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## UNCOMMON CUTICULAR ORNAMENTATION ON THE STIGMA SURFACE OF MANGO (*MANGIFERA INDICA* L.)

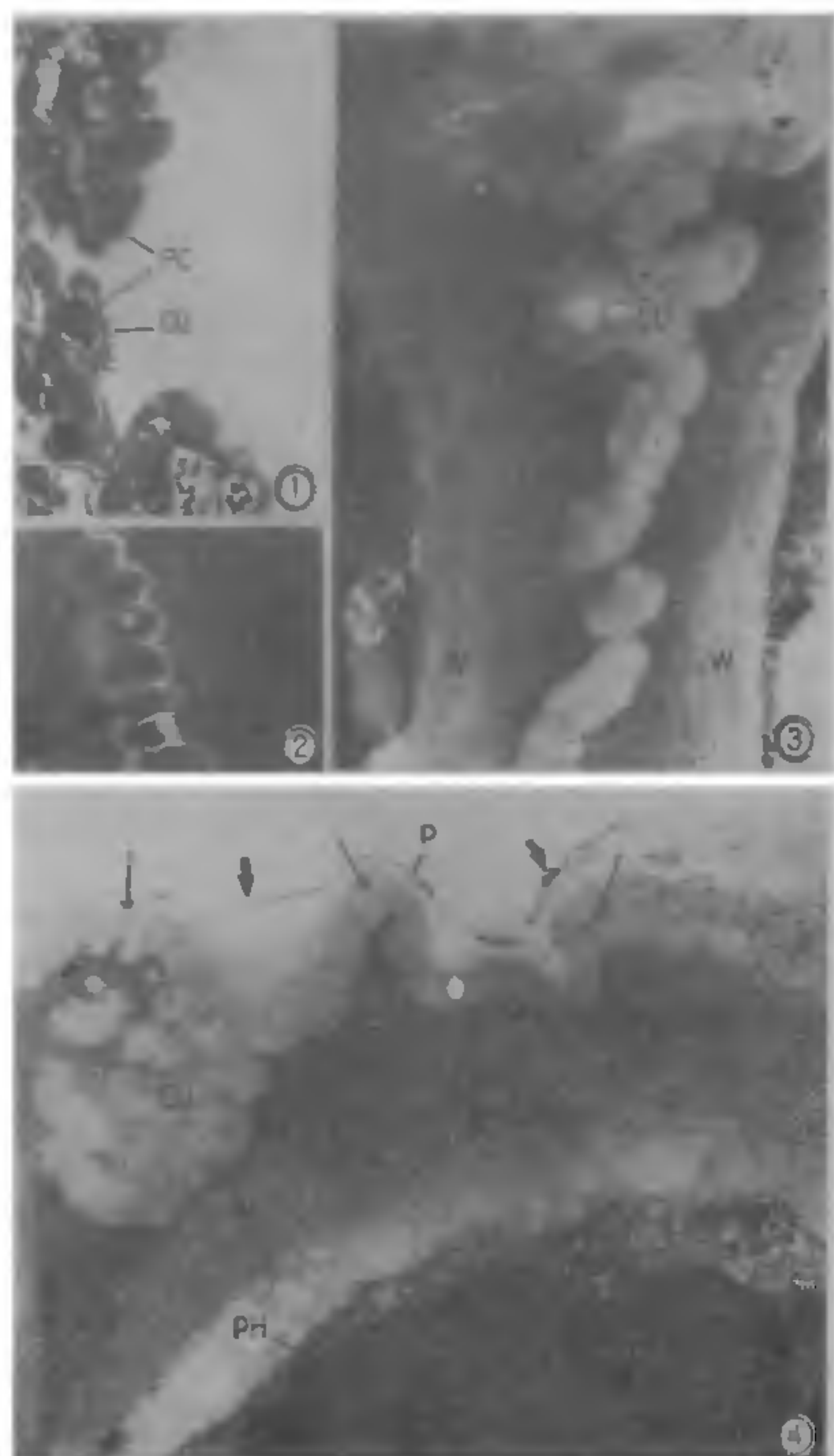
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*MANGIFERA INDICA* L. produces staminate and bisexual flowers on the same panicle. Though, more than 3,000 flowers are borne on a single panicle<sup>1</sup>, only a few of them give rise to fruits. To understand the reasons for the poor fruit-set in mango, the present investigation was undertaken to study its reproductive cycle. An unevenly thick and ornamented cuticle covering the papillae cells and its uncommon nature has been observed.

The style in mango is formed laterally on the ovary with the pointed stigma surface having compactly arranged finger-shaped papillae cells. The stigmatic surface including the protruding convex surfaces of papillae cells is covered by a wavy and unevenly thick cuticle (figure 1). The cuticular deposition is massive at the corners of the compactly arranged cells and comparatively thin at their convex surfaces (figure 4). The cuticle is also deposited deep into the spaces between some of the loosely arranged papillae cells (figure 3). There are narrow channel-like configurations in the cuticle, which presumably facilitate the components of the pellicle to ooze out and spread out over the cuticle. The outer layer of the pellicle is electron opaque and is thin (figure 4, thick arrows). The papillae cells also contain abundant phenolics in their vacuoles (figure 4).

The ornamented region comprising the cuticle showed positive fluorescence when mounted in auramine O (figure 2). The presence of such a thick and wavy cuticle on the stigmatic surface is uncommon. Comparatively thick and continuous cuticle enclosing the stigmatic papillae cells and the secretion product has been reported in some wet stigmas<sup>2-4</sup>. In *Trifolium pratense*, the highly impermeable cuticle covering the exudate makes a mechanical blocking of pollen at the stigma, which could be a significant determinant of breeding behaviour in self-fertile species<sup>2</sup>. In *Vicia faba*, the cuticle is thickened over the prominences left by epidermal papillae, thinning out between<sup>4</sup>. In all these plants with wet stigmas, mechanical 'tripping' of the cuticle is essential to allow the pollen to come in contact with the secretion for its germination.



**Figures 1-4.** 1. Thick section showing the ornamented cuticle covering the papillae cells ( $\times 360$ ); 2. Fluorescence photograph of the stigmatic surface stained with automine O. Note the ornamentation showing bright fluorescence indicating the presence of cutin. ( $\times 320$ ); 3. Electron micrograph showing the thick cuticle deposited between two contiguous papillae cells ( $\times 12,000$ ); 4. Thick and wavy cuticle on the surface of papillae cells. Note the massive cutin deposition at the corner of two compactly arranged papillae cells. The thin arrows indicate the channel-like configuration in cuticle and the thick arrows point to the pellicle. The vacuoles of the papillae cells contain abundant phenolic materials ( $\times 12,000$ ). [CU = cuticle, ML = middle lamella, P = pellicle, PC = papillae cell, PH = phenolic material, W = wall].

However, in the dry stigmas on the other hand, the hydrated pellicle—comparable to the exudation in wet stigmas—is present on the outer region of the cuticle and the pollen germinated should erode the cuticle before its penetration<sup>5</sup>. In cruciferae, as in

many other plants, Linskens and Heinen<sup>6</sup> observed that the emerging pollen tube tip must penetrate the cuticle of a contiguous stigma papillae before it enters the style and this requires the activation of cutin esterase (cutinase) at the point of entry.

In the dry stigma of mango, the cutin depositor even penetrates deep into the intercellular spaces between the loosely arranged papillae cells. Flowering in mango occurs during the dry season; the thick cuticle that covers the stigma surface is probably an adaptation to prevent desiccation. However, this adaptation prevents the entry of many pollen tubes, since the pollen grains should have an effective cutinase system to erode the thick cuticle. In the absence of such pollen grains, many ovules may remain unfertilized in a panicle and would result in the reduced fruit set. However, mechanical 'tripping' of the stigma surface with a brush before pollination would help in overcoming this barrier.

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#### ON THE CYTOLOGY OF *PENNISETUM ORIENTALE* RICH ( $2n = 56$ )

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*PENNISETUM ORIENTALE* Rich, is an evergreen perennial forage species considered to be highly nutritious, palatable and drought-resistant. Cytological studies in this species revealed chromosomal races with  $2n = 18, 27, 36$  and  $45$ , all derived from