A NEW LEAF DISEASE OF *MACADAMIA*

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Macadamia (*Macadamia integrifolia*) nut has been introduced recently in India. The kernels of the nuts are very delicious, sweetish in taste and resemble almonds in flavour and consistency. They are eaten raw or roasted and also used in confectionary.

A new leaf spot disease of *Macadamia integrifolia* caused by *Pestalotiopsis* (*Pestalosia*) *versicolor* Spag. has been observed at the farm of Indian Institute of Horticultural Research, Hessaraghatta (India) in August, 1980. In early stages of infection small circular to irregular spots appear which coalesce with age forming irregular leaf patches.

The mycelium of the fungus on PDA was cottony white in colour. Acervuli are noticed in the cultures after 4–5 days. The conidia are typically 5 celled, elevate or elliptic, the 3 middle cells are dark brown with end cells and are hyaline. At the end of the apical cells, 3 hyaline divergent setae are present. Conidia produced on PDA measured 16–23·5 μ × 3·5–6·5 μ, whereas the conidia obtained from the host measured 15–25 μ × 3·5–7·00 μ.

The fungus was identified on the basis of cultural studies and the culture is deposited in CMI, England as No. IMI-252747.

Though already reported on some other plants, *Pestalotiopsis* (*Pestalosia*) *versicolor* has been found causing leaf spot of *Macadamia* for the first time.

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FUNCTIONAL MALE STERILITY IN CASSAVA

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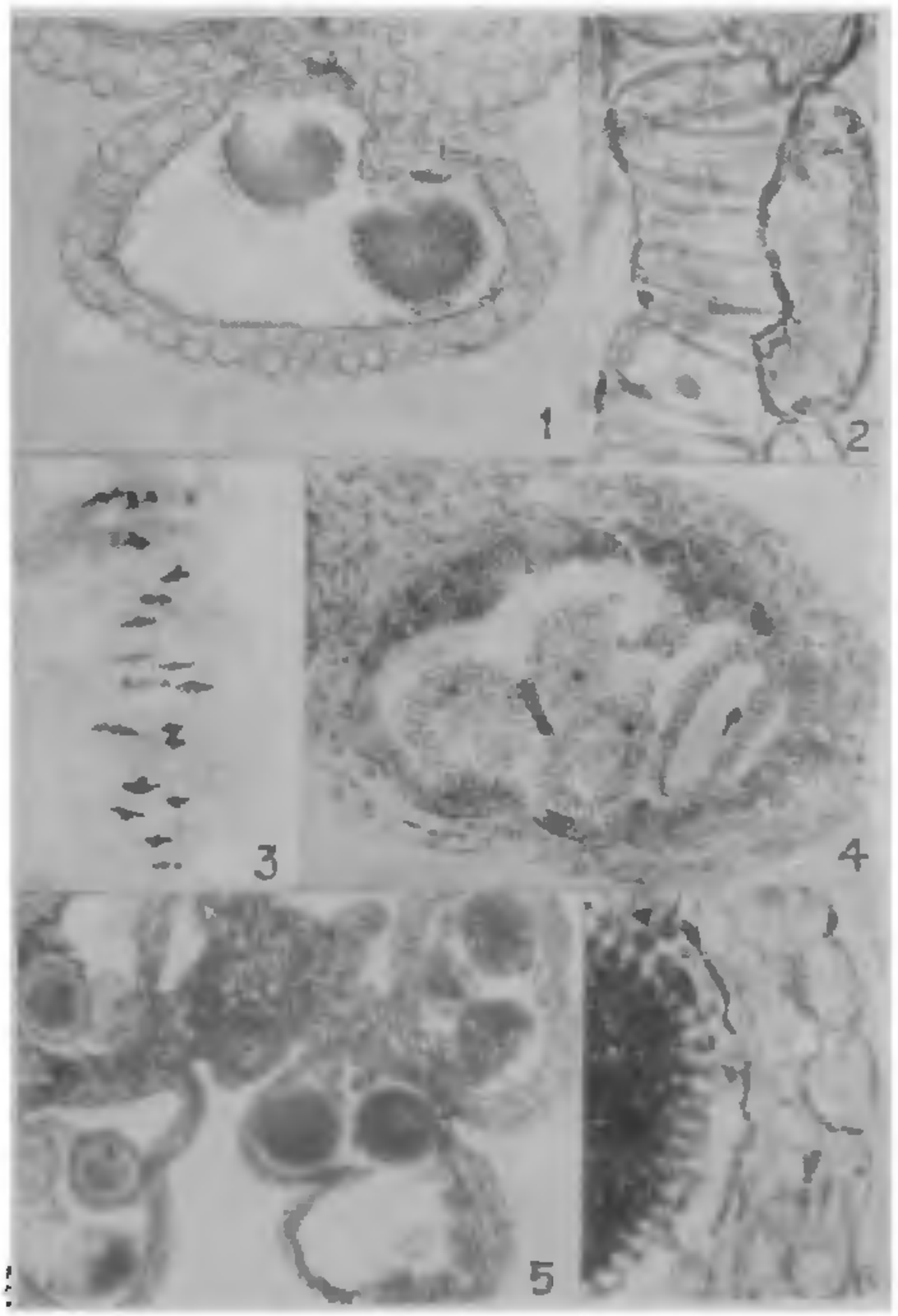
CASSAVA (*Manihot esculenta* Crantz) is an important tuber crop. The prevalence of male sterility in cassava had been reported to be due to the non-disjunction of microspores from the tetrad resulting in empty anthers[3] or the abnormal behaviour of tapetum[6] or abnormal pairing in pachytene[4]. In a seedling population derived from a tetraploid clone of cassava, a plant was found to be functionally male sterile even though it contained 73% fertile pollen. Microsporogenesis was studied in detail in this clone and compared with a normal male fertile clone.

In the male fertile clone, the microspores develop in the usual way and the tapetum begins to shrink as the microspores separate from the tetrad and completely disappear when the pollen grains reach maturity (Fig. 1). The endothecium is single layered with well-developed fibrous thickenings (Fig. 2) and the dehiscence of anthers takes place at about noon.

In the functionally male sterile clone also, meiosis is normal with 18 bivalents at MI (Fig. 3) and the microspores disjunct in a normal way ruling out the possibility of partial pollen sterility to the non-separation of microspores from the tetrad, though such a type of male sterility is reported in a number of clones of cassava[3, 5]. However, the tapetal cells begin to show fusion among themselves (Fig. 4) and occasionally the tapetum is discernible even after anthesis (Fig. 5).



FIGS. 1–6. Figs. 1–2. Male fertile. Fig. 1. Mature anther, × 110. Fig. 2. Endothecium with thickening, × 500. Figs. 3–6. Functionally male sterile. Fig. 3. MI with 18 bivalents, × 800. Fig. 4. Anther showing the fusion of tapetal cells, × 300. Fig. 5. *Tapetum* discernible even at anthesis, × 75. Fig. 6. Endothecium without thickening, × 350.

The failure of tapetum to degenerate at the proper time and provide nutrition to the developing pollen grains may be the cause of pollen sterility to the extent of 27% noticed in this clone. The occurrence of complete pollen sterility due to the persisting tapetum or its delayed generation has already been reported in an exotic clone of cassava[6] and in a number of other plants[2,7,8].

The cells of the endothecial layer remain as parenchymatous without developing the characteristic fibrous thickenings (Fig. 6) in contrast to normal fertile clones. There is complete absence of dehiscence of anthers and the pollen are never liberated in this clone. The failure in the dehiscence of anthers is attributed to the absence of fibrous thickenings in the endothecium. The non-development of fibrous thickenings resulting in non-dehiscence of anthers is reported in orchard-grass[1]. The occurrence of a functionally male sterile clone in cassava is being reported for the first time.

The presence of 73% fertile pollen in the clone presently reported makes it apparently "male fertile" because of the fact the clones having about 50% pollen fertility have been found to effect high seed set. Though this clone is apparently pollen fertile, the absence of dehiscence and retaining the pollen indefinitely inside the anthers make it functionally male sterile.

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DEVELOPMENTAL STOMATOGRAPHY ON *THE FLORAL PARTS OF HYOSCYAMUS NIGER* LINN.

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While abundant information is available regarding vegetative stomatal studies in family Solanaceae, contemporary literature on floral parts of the family is scanty[1–5]. The present paper reports the development and topographical studies of stomata on the calyx, corolla and pericarp of *Hyoscyamus niger* Linn.

The material under investigation was treated with 5% KOH solution for 6–8 hours and subsequently macerated by Jeffery's technique[2]. Whole mounts of epidermal peels, stained with haematoxylin, were examined for ontogenetic and structural details.

The calyx and corolla are amphistomatic and the stomates on these parts are aniso-mesogenous, aperigenous and para-mesogenous[1]. However, the pericarp exhibits stomata on the inner epidermis only and these are of aperigenous type. Contiguous stomata have also been occasionally recorded on the pericarp.

Epidermal cells on all the aforesaid floral parts are uninucleate, elongated in various directions and irregularly arranged with sinuous anticlinal walls. The epidermal cells of the pericarp are peculiar in being pitted (Figs. 12, 14, 15). In aniso-mesogenous type, the meristemoid is cut off in a corner of an epidermal cell, the former being distinguishable from the latter by its smaller size, densely stainable cytoplasmic content and conspicuous nucleus (Fig. 10). The meristemoid behaves like an apical meristem from which are derived a guard mother cell and three unequal subsidiary cells by successive divisions (Figs. 8, 13). The meristematic activity is confined to the central smaller cell only which undergoes final division by a straight wall giving rise to a pair of guard cell initials surrounded by three unequal subsidiaries (Fig. 9). Eventually these initials enlarge and assume the characteristic crescentic shape (Fig. 2).

In aperigenous type, the meristemoid surrounded by 4-6 epidermal cells (Fig. 4), directly undergoes a division giving rise to a pair of guard cell initials. An aperture appears between the two guard mother cells in the course of time thus resulting in the formation of aperigenous stomates (Figs. 3, 11, 12, 14, 15).

In the case of para-mesogenous stomates, the guard cells of mature stomata are flanked by two subsidiary cells parallel to the long axis of the aperture and the polar sides are covered by the epidermal cell (Fig. 7). Consequent to the meristemoid dividing by a slightly curved wall two unequal cells are formed (Figs. 4, 5). While the larger differentiates into the first subsidiary cell, the smaller one divides again by a curved wall producing the second subsidiary cell and a guard mother cell (Fig 6). The latter undergoes a vertical division in the usual manner to give rise to a pair of guard cells.

Contiguous stomata are found to be juxtaposed and parallel during the course of the present study (Fig. 1). Average stomatal size in calyx, corolla and pericarp