3·8 μ interspersed with hyaline sterile threads measuring 33–56 μ × 1·9 μ.

Type isolated by Agnes Madhuravani, from the rhizosphere soil of *Nicotiana tabacum* variety Cigar Havana 307 and deposited in the mycological collections, Bangalore University, under No. 28.

Stromata discreta vel gregaria, olivacea, carbonacea, globasa vel irrgularia, papillata, usque 3 mm diam. stromate basali tota altitudine triplo breviore. Pycnidia 3–7 in catervis botryosis, singula 112–262 μ × 130–206 μ. Pycniosporae unicellulares, crassis parietibus, primo subhyalinae, tum ad maturitatem fuscae evadentes, subellipticae vel obovatae, Magnitudinis 13–26 μ × 8–15 μ. Conidiophori longi, hyalini, continui, 22–41 μ × 1·9–3·8 μ saepe filis sterilibus magnitudinis 33–56 μ × 1·9 μ interspersi.

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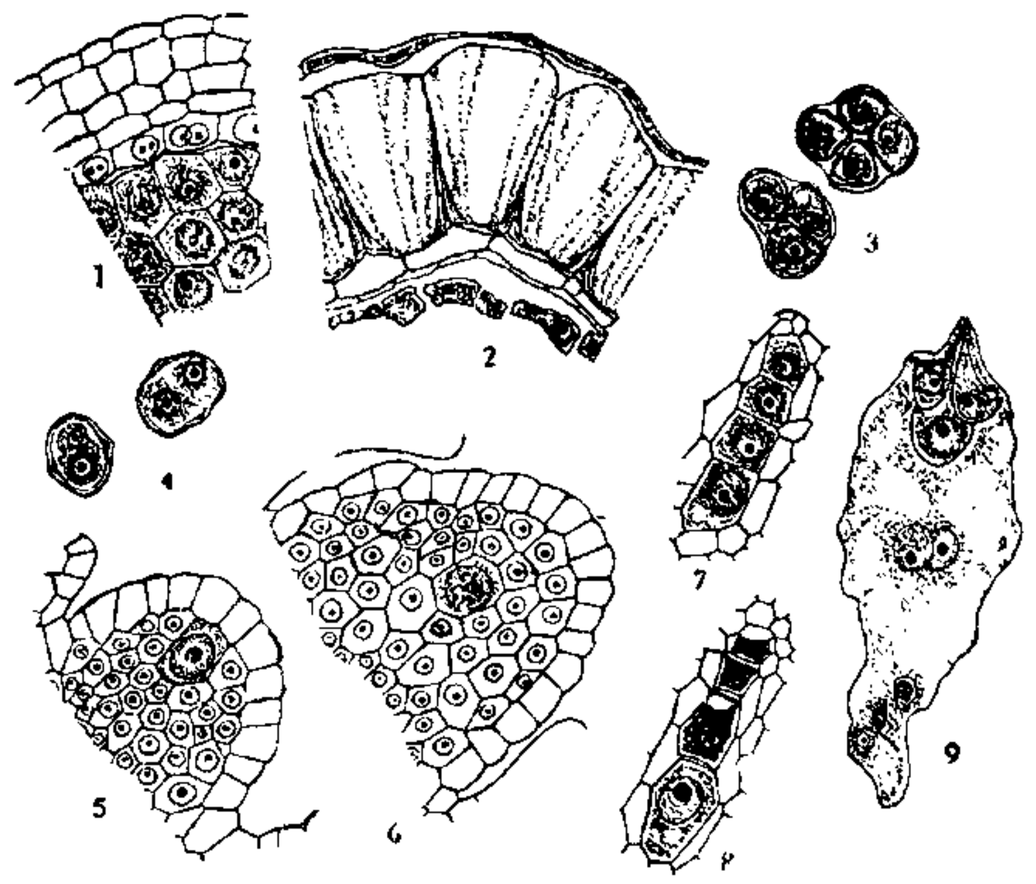
1. Tilak and Ramachandra Rao, *Mycopath. Mycol. appl.*, 1964, **24**, 362.

GAMETOGENESIS AND GAMETOPHYTES IN *AGLAIA ROXBURGHIANA* BEDD.

EARLIER embryological studies in MELIACEAE include contributions made by Garudamma (1956, 1957), Gavde (1963), R. B. Ghosh (1962 *a*), Juliano (1934 *a*, *b*), Karsten (1891), Mauritzon (1935 *e*), Nair (1956, 1958, 1959 *a*, *b*), Nair and Kanta (1961), Narasimhachar (1936), L. L. Narayana (1958), Paetow (1931) and Wiger (1935 1936).

Aglaia roxburghiana Bedd. belonging to the tribe Melioideae is a small tree with brownish-grey, somewhat rough, bark and pinnate leaves. Flowers arise in axillary panicles. They are polygamo-dioecious, globose, actinomorphic and hypogynous.

Bisexual flowers are protandrous. Each anther is tetrasporangiate. The young anther wall is composed of four cell layers external to the tapetum, two ephemeral middle layers, the endothecium and the epidermis (Fig. 1). The cells of the glandular tapetum are mostly uninucleate but a few of them are also binucleate. The endothecium develops very conspicuous fibrillar thickenings by the time the microspores separate from the tetrads. The epidermis persists in a degenerate condition (Fig. 2). Simultaneous cytokinesis in the microspore mother cells follows meiosis. The microspore tetrads are tetrahedral or isobilateral (Fig. 3). The pollen grains are two-celled when they are shed. They have a smooth exine and a thin intine (Fig. 4). A small percentage of young pollen grains degenerates.



FIGS. 1–9. Fig. 1. Portion of anther lobe showing epidermis, endothecium, middle layers, tapetum and spore mother cells. Fig. 2. Portion of mature anther lobe showing epidermis, fibrillar endothecium, middle layers and tapetal remnants. Fig. 3. Tetrahedral and Isobilateral tetrads. Fig. 4. Two-celled pollen grains. Fig. 5. L.S. of ovule showing Archesporial cell. Fig. 6 L.S. of ovule showing deep seated megaspore mother cell. Fig. 7. Linear tetrad of megaspores. Fig. 8. Linear tetrad of megaspores with upper three degenerating. Fig. 9. Organised embryosac. (All figures, × 400.)

Ovary is ovoid, 1–2-celled with 1–2 ovules in each cell. The pendulous ovules are anatropous, bitegmic and crassinucellate. The micropyle is formed by the inner integument. At about the time meiosis occurs in the microspore mother cells, a single hypodermal archesporial cell differentiates itself in the nucellus (Fig. 5). It cuts off a primary parietal cell which forms 4 or 5 parietal layers and the megaspore mother cell becomes deep seated (Fig. 6). Cytokinesis in the megaspore mother cell accompanies meiosis and the chalazal megaspore of the linear tetrad (Figs. 7 and 8) develops into an eight-nucleate embryo sac of the Polygonum type

(Fig. 9). The synergids are hooked and the egg hangs down below the synergids. The three antipodal cells are ephemeral.

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1. Garudamma, G. K., *J. Indian bot. Soc.*, 1956, **35**, 222.
2. —, *Ibid.*, 1957, **36**, 227.
3. Gavde, S. G., *J. biol. Sci. India*, 1963, **6**. 11.
4. Ghosh, R. B., *Curr. Sci.*, 1962, **31**, 165.
*5. Juliano, J. B , *Philipp. J. Agri.*, 1934, **23**, 11.
6. —, *Ibid.*, 1934, **23**, 49.
*7. Karsten, G., *Flora*, 1891, **90**, 36.
*8. Mauritzon, J., *Bot. Notiset.*, 1935, p. 490.
9. Nair, M. C., *Rev. Internac. Bot. Exptl.*, 1958, **10**, 145.
10. —, *J. Indian bot. Soc.*, 1959, **38**, 353.
11. —, *Ibid.*, 1959, **38**, 367.
12. Nair and Kanta, *Ibid.*, 1961, **40**, 382.
13. Narasimhachar, S. G., *Curr. Sci.*, 1936, **5**, 298.
14. Narayana, L. L., *J. Indian bot. Soc.*, 1958, **37**, 147.
*15. Paetow, W., *Planta*, 1931, **14**, 441.
*16. Wiger, *J. Diss. Lund.*, 1935.
*17. —, *Notiser*, 1936, p. 585.

* Original not seen.

EVALUATION OF INTERRELATIONSHIP BETWEEN CATION EXCHANGE CAPACITY OF LEAF AND ROOT IN ARECANUT, *ARECA CATECHU* L.

IN recent days, root cation exchange capacity measurements have provided a promising tool in soil fertility and plant nutrition studies. Cation exchange capacity (CEC) of roots which is reported to be correlated with yield[5] and cation accumulation in plant tops[2] also shows a linear relationship with its content of uronic acid[4]. The CEC-uronic acid relationship holds good not only for the root but for leaf as well. The uronic acid content of leaf is more than that of root because of the fact that CO_2 evolves also from compounds which do not take part in the cation exchange process[4]. Efforts have been made here to examine the relationship between CEC of leaf and root of arecanut, *Areca catechu* and study their related mineral nutrition problems.

Initial work was confined to the standardization of a leaf sampling method which would give representative CEC value without much variation. For this purpose, about a two-year old arecanut seedling of VTL-local was selected. Spindle was taken as zero and the leaves in the seedling were numbered upward down. Leaflets were collected at base, middle and tip positions from both the sides of leaf and for all the leaves of the seedling. Leaf sampling was made from three seedlings selected at random from the nursery. Simultaneously, root samples were also collected from these seedlings by the procedure adopted earlier[6]. Leaf samples were washed with distilled water. Plant samples comprising of root and leaf were dried separately in an oven at 80° C, milled to pass through 1 mm sieve and their CEC determined by adopting Crooke's method[1]. A perusal of the data presented in Table I shows that although the middle leaflets of first leaf showed the highest CEC, it was more consistent in the middle leaflets of second leaf, and, therefore, future sampling of leaf was done from the middle leaflets of second leaf for CEC estimation.

TABLE I

CEC of arecanut leaf as affected by position and leaf number

(Expressed on oven dry basis as meq/100 g)

Leaf number \ Leaflet position	Base	Middle	Tip	Mean (leaf)
1	13·490	14·386	13·253	13·710
2	13·013	14·050	13·410	13·491
3	12·876	13·330	13·410	13·205
4	12·780	13·093	13·250	13·041
Mean (position)	13·039	13·714	13·330	13·362
LSD (Position)				0·238*
LSD (Leaf number)				0·275*
LSD (Leaf position × Leaf number)				0·477*

* Significant at 5% level of probability.

TABLE II

Table of coefficients of correlation

Interaction		value
Root CEC *vs* Leaf CEC	..	+0·834‡
Root CEC *vs* Ca+Mg+K	..	−0·217 NS
Root CEC *vs* K/Ca+Mg	..	−0·361 NS
Root CEC *vs* P	..	+0·505 NS
Leaf CEC *vs* Ca+Mg+K	..	−0·043 NS
Leaf CEC *vs* K/Ca+Mg	..	−0·412 NS
Leaf CEC *vs* P	..	+0·266 NS

‡ Significant at 0·1% level probability, NS = Non-significant.

In order to examine the relationship between CEC of leaf and root, 13 cultivars of *Areca catechu* L, were included in the present