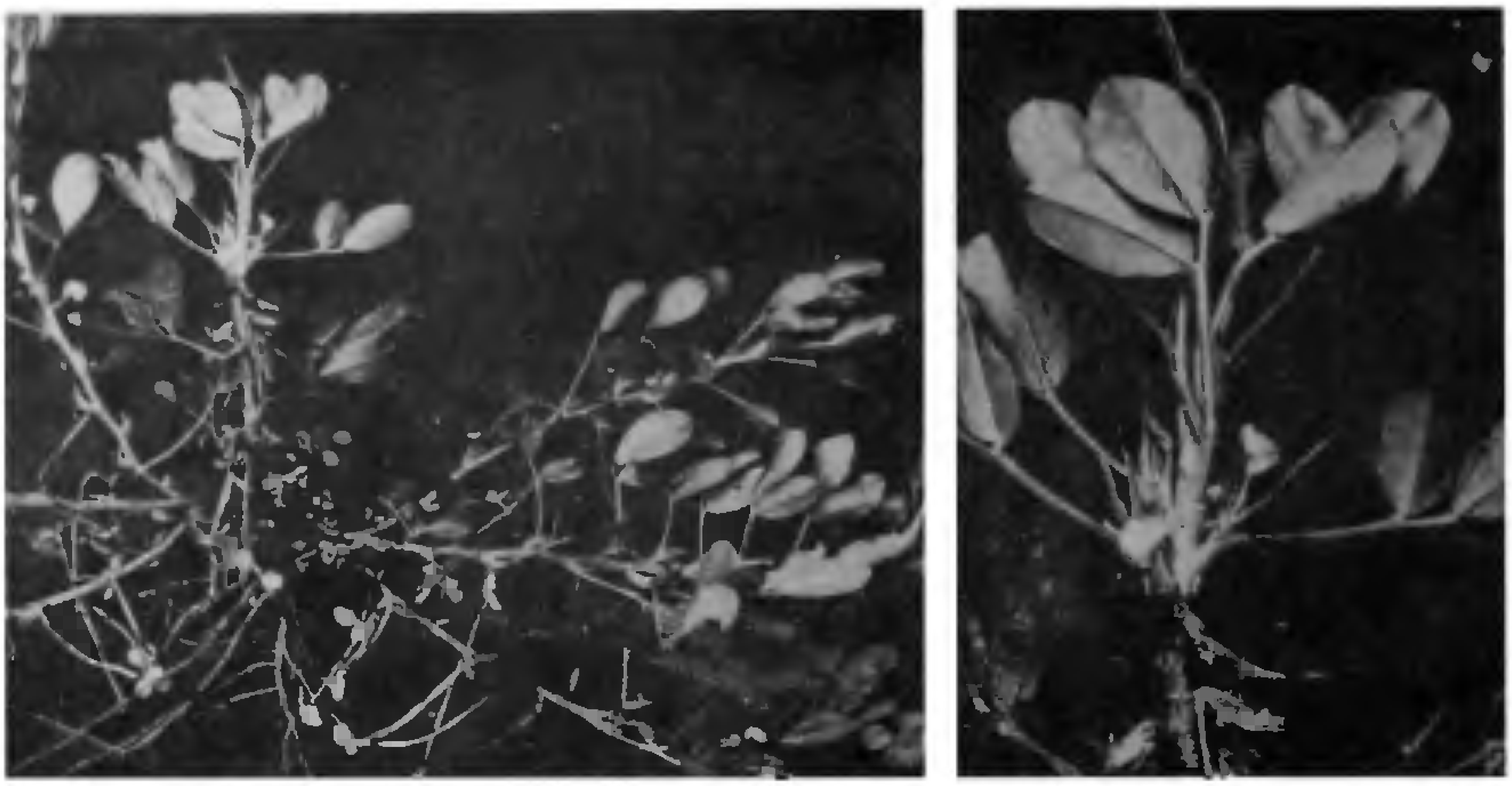

Figures 1 & 2. 1. An intermediate type plant with alternate distribution of vegetative and reproductive branches on $n+1$ order branches and with influorescences on the main stem. 2. Main stem enlarged to show flower in the axil.

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ORIGIN AND SEQUENTIAL PATTERN OF MATURATION OF FOLIAR SCLEREIDS IN *MOURIRI GUIANENSIS* AUBL. (MELASTOMATACEAE)

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Foster[1] has reported terminal sclereids of varied types in all the investigated species of *Mouriri* Aubl. Further he has observed considerable fluctuations in terminal and diffuse patterns of distribution of sclereids in the cleared laminae of *M. guianensis* Aubl. According to him this plant 'has proved the most variable of all the entities investigated with respect to sclereid morphology'. In agreement with Foster's findings, Morley[2] has also confirmed fluctuations in the sclereids in this species. This mixed pattern[3] of leaf sclereids in this plant warranted a detailed study particularly in respect of their origin and sequential pattern of maturation.

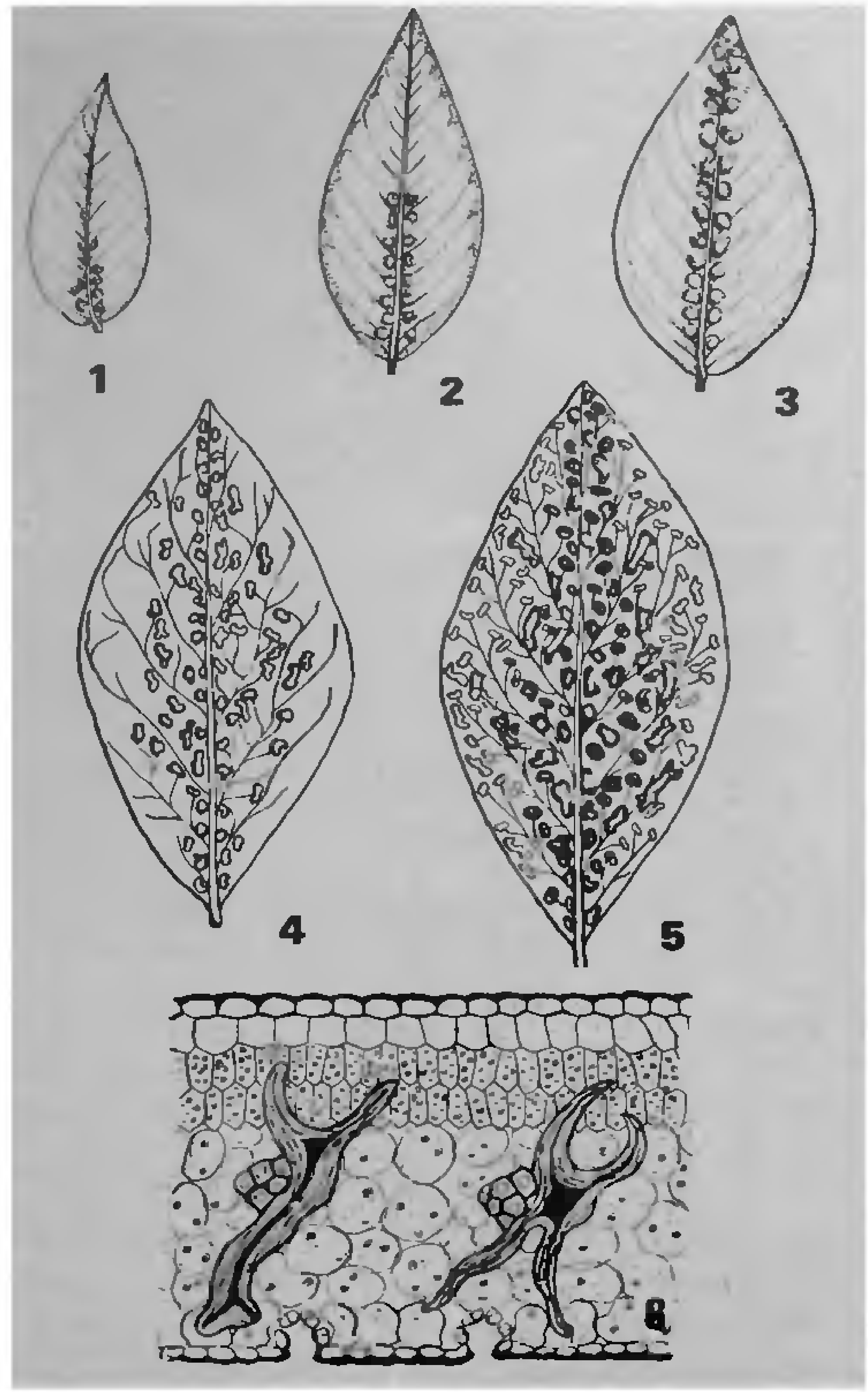
Fresh leaf specimens were collected from a medium-sized tree growing in the vicinity of the famous Banyan tree of the Indian Botanic Garden, Howrah, India. About 20 leaves, namely of different sizes corresponding to different age groups from the young primordial stage to old leaves were collected from the tree and subjected to sectioning and clearings following the methods suggested earlier[4].

The development of sclereids was traced from the earlier stage of their formation. Transections of the embryonic leaves exhibited a compact arrangement of cells with intercellular spaces in between them. In slightly later stage, the mesophyll exhibited a clear differentiation into palisade and spongy cells. With the onset of tissue differentiation some of the young sclereid initials made their independent appearence in the spongy region, and also terminal or sub-terminal to the developing vascular strands. Formation of the sclereid initial was not limited to the early phase of tissue maturation but occurred over a relatively extended period of time. In transection diffuse sclereid initials appeared as isolated polygonal cells in tight contact with the adjacent cells of the mid vein portion of the expanding lamina. At the same time a few enlarged cells were found in terminal or subterminal position with reference to developing vascular strands.

At this stage one could recognise in prosclereid cell certain enlarged globular nucleus measuring up to a size of 17.85 μ. diameter. As development continues, adjacent air spaces between the mesophyll cells enlarge and also in the vicinity of young sclereids. Size and shape of these intercellular spaces varied within wide limits. The polyhedral sclereid initials enlarged and showed highly individualistic growth.

A study of a series of transections revealed that sclereid initials and branches may begin their growth simultaneously or sequentially at different levels in the various parts of the mesophyll. With general enlargement, the sclereid initials soon loose their original polyhedral shape and appear as an irregularly lobed structure. Their extending lobes push their ways into the neighbouring air spaces. In a little later stage the lobes of these developing sclereids traverse into the palisade and spongy tissues (figure 6). At this stage the sclereid appears as a shallow lobed structure with spread out arms (figure 6). The peroid of development of these individualistic sclereid is relatively short. The general feature of growing sclereids irrespective of their position as diffuse or terminal to deveveloping vascular strands is more or less the same. In the early stage of development the wall of the sclereid initial is indistinguishable from that of neighbouring cells. As development continues the sclereid appears to acquire a thickening along the entire wall and with maturation a thick secondary wall is deposited, leaving a reduced lumen. Usually deposition of the secondary wall occurs first in the older parts of the body which have ceased growth and extends gradually to the younger parts of the cells.

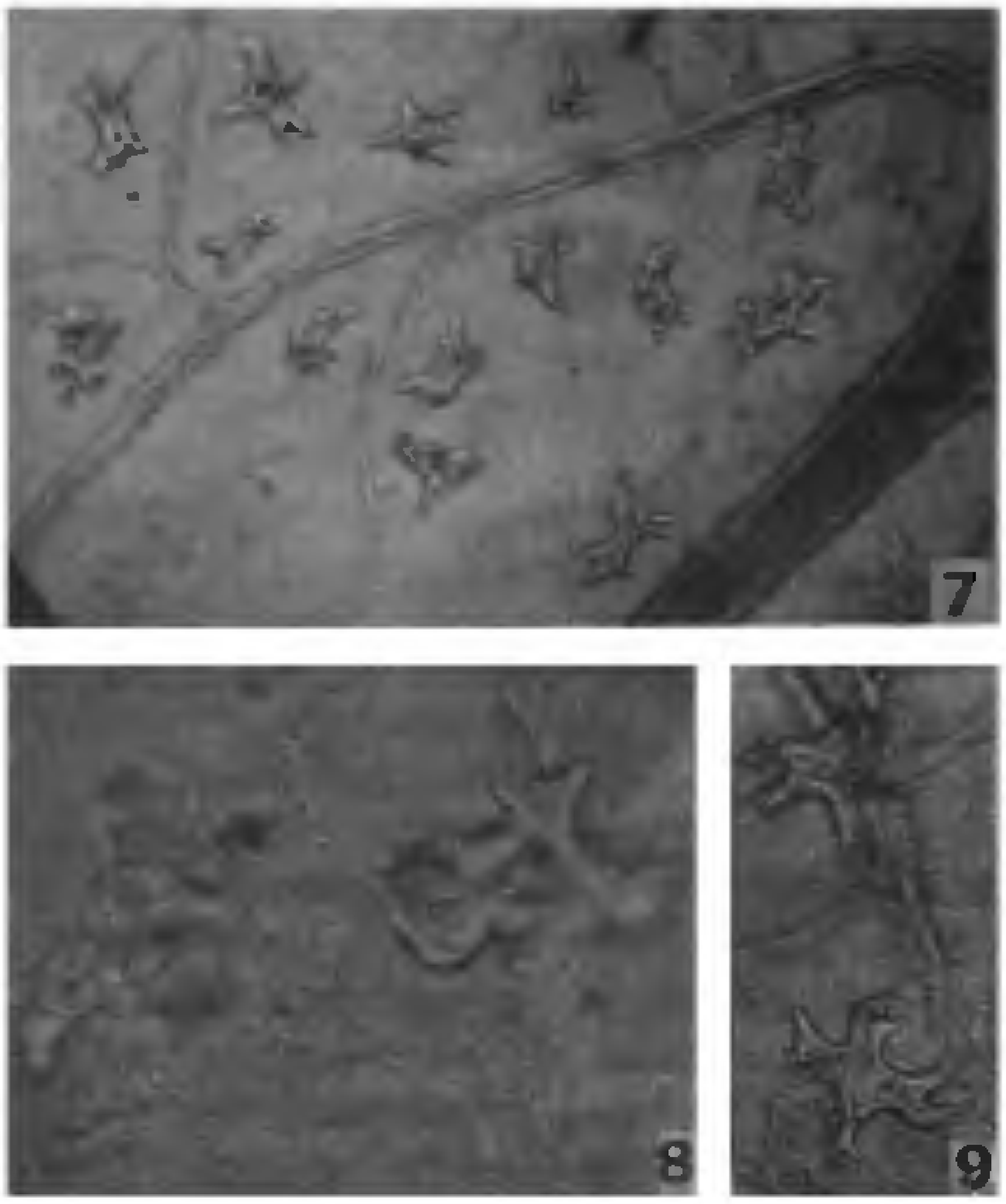
It was observed in cleared leaf primordia of different age groups the midrib showed gradual increase in thickness at the base, often petering out into a thin strand at the leaf apex. From the midrib the lateral veins of the first order extended towards the leaf margins. Subsequently smaller branches were noticed. At this early stage the prosclereidal initials are not visible perhaps due to absence of lignin on their cell wall. However, their visiblity starts with the aquisation of secondary wall. The first recognisable sclereids are in the vicinity of the midrib of the basal region of the leaf (figure 1). In the other leaves slightly older than the young leaf primordia, the number of sclereids increased up to the apical region of the leaf (figures 2,3). In the next series of older leaves one could recognise veins of different orders. At this stage the sclereids were visible not only near the midrib region but also showed perfect terminal or subterminal relationship with the vein endings in the leaf expanse (figure 4). Further survey of slightly larger leaves revealed that the number of terminal sclereids increased centrifugally towards the margin (figure 5).



Figures 1-5. Outlines of a developing leaf; semi-diagrammatic representation of acropetal sclereid formation. ca $\times$2. **4-5.** Old cleared leaves showing patternized sequence of ramiform sclereids. ca. $\times$4. **6.** Transection of leaf showing mesophyll layers and terminal ramiform sclereids $\times$250.

Thus one could observe the mainfestation of scelerids acropetally at first followed by centrifugal appearance in the leaf expanse. Invariably the first visible sclereids adjoining the midrib are of diffuse type followed by terminal sclereids of varied shape in the expanded lamina portion (figures 7–9).

The origin and sequential patterns of sclerefication of sclereids have been worked so far in a few seed plants. In *Boronia serrulata* Sm.[5] the sclereid initials show basipetal sequence and their development synchronised with the maturation of veinlets in the leaf. In *Camellia japonica* L.[6] it is basipetal in the vicinity of midrib and later along the margins. In *Niebuhria apetala* Dunn.[7] the initials originate near midrib and



Figures 7–9. Photomicrograph: **7.** Cleared lamina showing terminal and diffuse pattern of sclereids in the vicinity of midrib, ×50. **8.** Terminal sclereids ×100. **9.** Diffuse sclereids, ×100.

margin first and later extend centripetally and centrifugally in the expanding lamina. In the case of *Fagraea fragrans* Roxb[8]. and *Gnetum gnemon* L.[9] the basipetal initiation of sclereid initials along the midrib is followed by sclerification in an acropetal direction. The above mentioned patterns stand in contrast with the acropetal initiation above the petiole along the midrib towards the apex and subsequent sclerification in centrifugal directions as observed in the present study.

In view of the differences of initiation and variable sequential sclerification in different plants, it is necessary to work some more examples before arriving at definite conclusion on this point. However, it is safe to conclude that despite variations of sclereid initiation and maturation they are under patternized sequence of development. This raises some questions as to the nature of the control of their initiation, diversity, positional relationship with the differentiating procambial strands and sclerification of leaf sclereids. The entire process involves various factors working together or sequentially and this clearly needs further study.

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EUROTIUM REPENS DE BARY VAR. *COLUMNARIS*—A NEW VARIETY OF *ASPERGILLUS REPENS*

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A NEW variety of *Aspergillus repens*, isolated repeatedly from the soil collected from Indian Soil Salinity Station, ICAR Sub-station Canning, West Bengal, has been described for the first time.

Eurotium repens De Bary Var. *Columnaris* Varshney, Sarbhoy & Chowdhry

Colonies on Czapek-Dox agar restricted, compact attaining a diameter of 2.5 cm in 15 days at 26–28° C, Scheel's green (R* Plate VI) dark brown to black at maturity. Conidial heads tightly columnar. Conidiophores, smooth 110–330×5–10 μm in diam, vesicles subglobose to elongate, 6–12.6 μm. Metulae 7–12.6×2.8–3.5 μm. Conidia ovate to subglobose, elliptical, spinulose, 4.9–11.2 μm (mostly 5.6–9.8 μm). Cleistothecia and ascospores rarely observed.

Colonies on Czapek-Dox agar with 20% sucrose grow rapidly, attaining a diameter of 4.5 cm in 15 days at 26–28° C with thin margins, heavily sporulating, predominantly cleistothecial, primuline yellow (R., Plate XVI) (figure 1). Reverse Yellow. Exudate none. Conidial heads abundant, more tightly columnar, upto 240 μm in diam. Conidiophores smooth, hyaline, 180–575×6–10 μm, broadening at the apex

* Ridgway, R. 1912, Colour Standards and nomenclature, Published by the author, Washington, D.C.