

replacement of water in the olfactory cavity of the fish and their dilatation and compression are caused by the movements of the jaw bones which are generally synchronized with the breathing movements of the fish. We have observed that these sacs are able to draw water into the olfactory chamber through both the anterior and posterior nasal openings; however, expulsion of water always takes place through the latter. It has been concluded that accessory sacs are invariably present in sedentary or semi-sedentary fishes; in actively swimming fishes, however, they may or may not be present.

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#### IDIOFIBROSCLEREID—A DESCRIPTIVE TERM FOR WANDERING MESOPHYLL FIBRES

THE association of fibres with foliar tracheary elements is a widespread phenomenon in many seed plants. In the majority of the investigated species they are found to closely accompany the spirally thickened foliar veins and veinlets. In certain cases they show some deviations and often intrude into the adjacent mesophyll or sometimes extend beyond the vein-endings (Fig. 1).

The correct designation of such fibre-like elements presents a problem in terminology. Several terms like fibrovascular cambiform<sup>1</sup>, sclerenchymatous idioblasts<sup>2-4</sup>, extraxylary wandering fibres<sup>5-6</sup>, fibriform sclereids<sup>7</sup>, strands of thick-walled fibres<sup>8-9</sup> and foliar sclereids<sup>10</sup> are used to describe such types of fibres which accompany the foliar veins and veinlets.

The pattern of distribution of these fibre-like sclereids is of significant morphological interest. They vary from simple elongated fibres, to short fibres with or without branching,

intruding into the adjacent mesophyll. Sometimes, they are independently disposed more or less parallel to the tracheary elements. In some species they are very much branched and in transections appear like idioblastic sclereids<sup>9-10</sup>. Ontogenetically it has been shown in *Manilkara hexandra* (Roxb.)<sup>4</sup> Dubard and *Cynometra polyandra* L.<sup>11</sup> that the initials of these fibres are transformed spongy cells situated near the differentiating procambial strands. So, it is evident that these elements are more or less intermediate between idioblastic sclereids and strands of fibres. They do not fit into any distinct type of new sclereids recognised by many workers. Hence the term idiofibrosclereid has been proposed to such fibre-like forms which accompany tracheary elements which assume a variety of peculiar shapes.

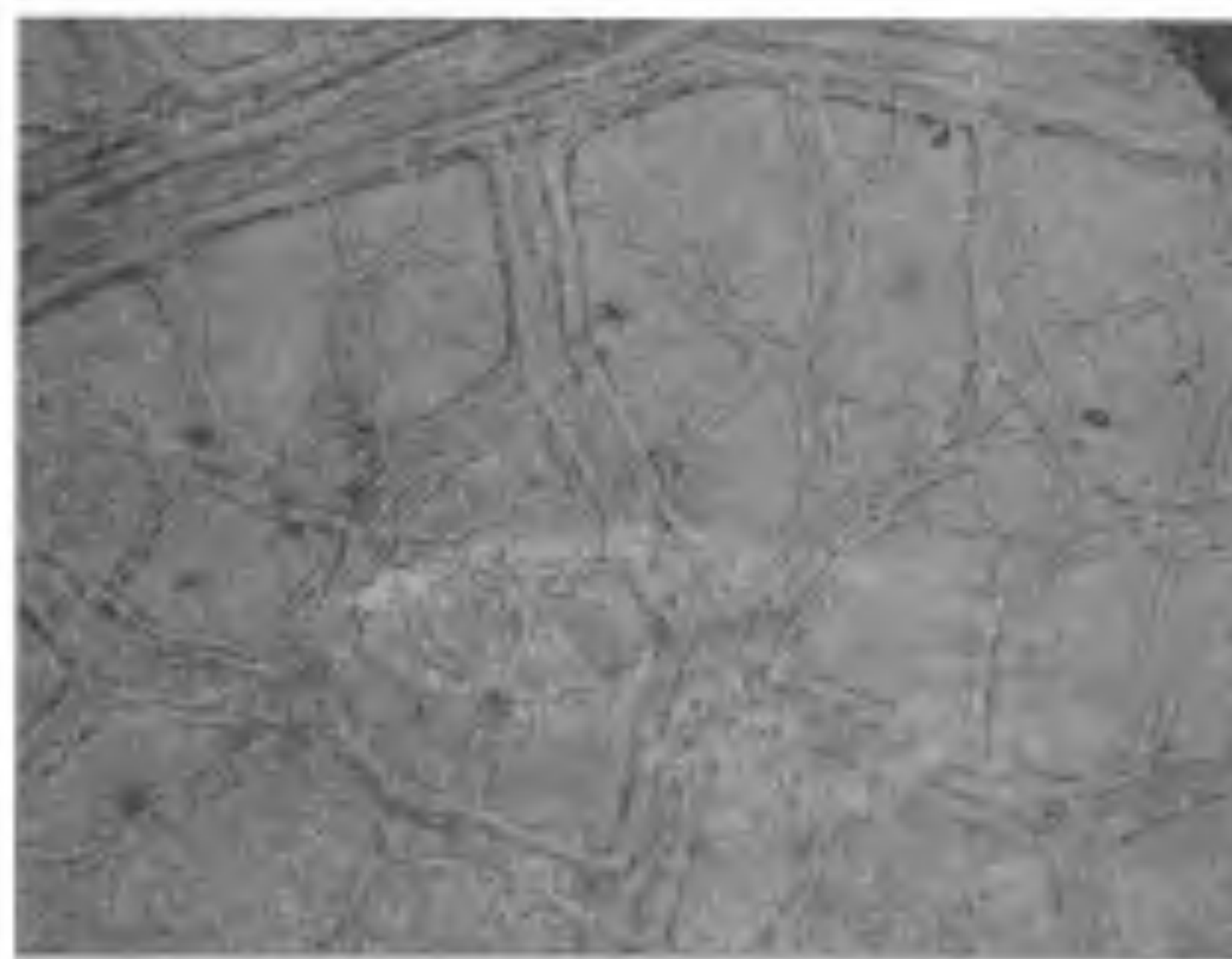


FIG. 1. Cleared lamina of *Loropetalum chinense* Oliv. showing idiofibrosclereids,  $\times 40$ .

Idiofibrosclereids are sparingly or profusely developed in the leaf expanses and are readily observed in cleared leaf sectors of many taxa of phanerogams. Due to failure of earlier workers in applying a suitable clearing technique to understand the correct orientation of these peculiar fibres various terms were employed to describe them. Structurally, they possess a cell wall of uneven thickness and a lumen of irregular width. An examination of several such base forms has revealed that they can be distinguished from vascular fibres by their bizarre ends, larger transectional area, flat fibre-like bases, uneven and striated wall thickening and lumen of irregular width. By their profuse and sometimes crooked branching they do not approximate the form of a regular fibre as generally understood.

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#### RESPONSE OF GREENING PATHOGEN OF CITRUS TO CERTAIN TETRACYCLINE ANTIBIOTICS

GREENING disease of citrus has been found to be of very common occurrence in India<sup>7-9</sup>. Recently, mycoplasma like bodies have been found to be present in the phloem cells of greening affected sweet orange seedlings indicating that they may be the causal agent<sup>5</sup>. Mycoplasma like bodies associated with citrus greening disease have been isolated and cultured on artificial medium in this laboratory<sup>2</sup>. In September 1970, experiments were conducted at the Indian Agricultural Research Institute to test the effect of three tetracycline antibiotics, aureomycin (chlortetracycline hydrochloride), achromycin (tetracycline hydrochloride) and ledermycin (dimethyl chlortetracycline hydrochloride), Cyanamid India Ltd., products on the greening affected citrus plants. The results of these tests are presented in this paper.

Sixteen two-year-old-potted seedlings of sweet orange (*Citrus sinensis* Osbeck) infected with greening disease by grafting were used for the experiment. Sets of four plants were sprayed with each of the three antibiotics at 500 ppm till dripping stage and the fourth set of four plants was sprayed with water and served as control. Sprayings were repeated at weekly intervals for ten weeks.

After twelve weeks it was observed that three out of four plants under each of the treatments under achromycin and ledermycin

spray showed recovery from greening symptoms whereas no effect was observed on plants sprayed with aureomycin and those sprayed with water. The recovery was mostly observed in the new growth which became completely green and devoid of stunting which is characteristic of severely greening affected plants. None of the control plants showed any changes in foliage and remained stunted with chlorotic leaves. The plants have remained in this condition during the course of observation for six months from the start of the experiment.

The diseases ascribed to mycoplasma have been shown in the past to respond to tetracycline compounds<sup>1,4,10</sup>. Recently, the stubborn disease of citrus in the U.S.A. which is related to greening disease has also been suggested to be due to mycoplasma and the diseased plants have shown suppression of symptoms by tetracycline antibiotics<sup>3</sup>. Achromycin has also been found to have suppressive effect on symptoms of citrus greening disease in the Philippines<sup>6</sup>. Thus the tetracycline compounds offer a new field for investigations against the yellows type of virus diseases which have been attributed to mycoplasma like bodies.

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