THE DISTRIBUTION, STRUCTURE AND ONTOGENY OF SCLEREIDS IN *DENDROPThCE FALCATA* (L.f.) ETTINGS*

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INTRODUCTION

The present paper deals with the distribution, structure and ontogeny of sclereids in *Dendropthce falcata*, a parasitic member of the family Loranthaceae. The structure and distribution of sclereids in other species of this genus has been described by Solereder (1908), d’Almeida and Desai (1942), and Rao and Kelkar (1951).

MATERIALS AND METHODS

The plant is found parasitising on *Mangifera indica* L., *Anogeissus pendula* Wall. and *Chrysophyllum roxburghii* L. growing in the departmental garden. The material from all these hosts was collected and fixed in form-acetic acid alcohol. Both hand and microtome sections of leaves, petioles, and stems, macerated preparations of leaves, floral parts, fruits and seeds, and cleared whole mounts, were examined. The material for maceration was kept in conc. HNO₃ for 6-48 hours depending upon the thickness of the tissue. It was then washed, dehydrated, cleared in xylol and mounted in canada balsam. A treatment with phloroglucin and conc. HCl imparts a bright red colour to the lignified walls of the sclereid (Foster, 1942). This was useful for studying its structure and ontogeny. For permanent preparations, safranin-light green, crystal violet-orange G and Hematoxylin-orange G were the combinations used.

**Distribution of sclereids.**—The sclereids are found in the cortex and pith of the stem and mesophyll of the leaf. They also occur in smaller numbers in mature floral parts, like the perianth and ovary and in the walls of ripe fruits. In leaves they occur near the midrib and veinlets (Figs. 1 and 2 and

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* A preliminary paper on the foliar sclereids of this species was read at the Indian Science Congress, 1962.
Figs. 1-14. Figs. 1-2. T.s. leaf showing distribution of sclereids (scl.), × 65. Figs. 3-10. Various forms of sclereids, × 400. Figs. 11-14. Adult sclereids from pericarp, fruit and leaf respectively showing lamelllose wall and crystal (cr.), × 400.
Sclereids in Dendrotheca falcata (L.f.) Ettings

Photo 1) and are more abundant in the basal and central regions of the leaf; however, their number decreases towards the periphery and apex (Photo 2). The haustorial portion also contains a few sclereids.

**Structure of Sclereids.**—The sclereids in this taxon may be placed under the astrosclereids of Tschirch (1889) and Foster (1942). The foliar and stem sclereids vary in shape and size. They are Y-shaped (Figs. 3 and 4), H-shaped (Fig. 5), I-shaped (Fig. 6), star-shaped (Fig. 7) or sometimes irregularly branched (Figs. 8, 9 and 10). In the perianth the sclereids are oval (Fig. 11) and in fruits they vary in shape (Fig. 12).

**Ontogeny.**—An ontogenetic study reveals that young leaves and floral parts show no sclereids. Their development shows that they are transformed mesophyll cells, as in other angiosperms.

The sclereid initial (Fig. 15) differentiates mostly near the midrib and also in the mesophyll. It is thin-walled and shows an inconspicuous nucleus as in *Boronia* (Foster, 1955). It can be distinguished from the neighbouring cells by its larger size, denser contents and absence of chloroplasts. In the next stage, the nucleus becomes more prominent and the sclereid cell gradually develops tubular protuberances, which in turn grow into intercellular spaces of the mesophyll tissue. The cell contents migrate into these protuberances. The wall of the sclereid becomes gradually thickened (Figs. 16–20) and lamelllose. At the same time, simple pits develop on the wall of the sclereid (Figs. 22–26). A crystal now appears in the empty lumen of the sclereid and sometimes it touches the wall of the sclereid (Figs. 11–14).

The adult sclereid (Figs. 11–14) has a stratified wall without pits and nuclei, is devoid of cell contents and has a prominent crystal in the lumen. The sclereid may develop singly or in groups of 2, 3 or more (Figs. 27, 28 and 29). The fully developed, branched sclereid thus corresponds to the astrosclereid of Foster (1942). An interesting feature is the presence of a crystal particularly in the fully formed sclereid and its absence in earlier stages. This leads one to think that the crystal may represent the result of the breakdown of the cell contents or it may be of the nature of an excretory product.

Not only the leaves and stems, but also the sepals, petals, stamens, ovaries, fruits and seeds were examined. Leaves from plants growing on different hosts were examined to see if there would be any difference in the distribution and form of sclereids. No such difference was noticed. The structure and distribution of these sclereids are uniform, no matter on what host the parasite thrives.
Figs. 15–29. Stages in ontogeny of sclereid, × 400.
Sclereids in Dendrothoe falcata (L.f.) Ettings

SUMMARY

The sclereids found in the stem, leaf, perianth and fruits of this species correspond to the category of astrosclereids. Their ontogeny reveals that they are transformed cells of the mesophyll. An interesting feature is the presence of crystals in the adult sclereids.

REFERENCES


EXPLANATION OF PLATE XXIII

PHOTO 1. T.s. leaf showing the distribution of sclereids in the leaf tissue near the midrib, × 58.8.

PHOTO 2. The basal portion of cleared mount of leaf showing the sclereids in surface view, distributed mainly on the sides of the midrib and veinlets (V), × 88.2.

PHOTO 3. An adult sclereid with lamellations and crystal embedded in the wall, × 282.

PHOTO 4. A developing sclereid (indicated by arrow) showing pits all over, × 540.