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SOFT ROT OF APPLE CAUSED BY *CLATHRIDIUM CORTICOLA* (FCKL) SHOEM AND MULLER

THE occurrence of the soft rot of apple (*Malus pumila*) in India due to *Clathridium corticola* is being reported for the first time. Surveys conducted in the local fruit market and store houses revealed that the disease is common and serious. It rendered the fruits unfit for consumption. The disease was common on Red delicious variety whereas American and Maharaja varieties were less susceptible. The disease manifests itself at first as a small brownish black lesion which enlarges rapidly in diameter and depth. The affected area becomes soft and mushy (Fig. 1).

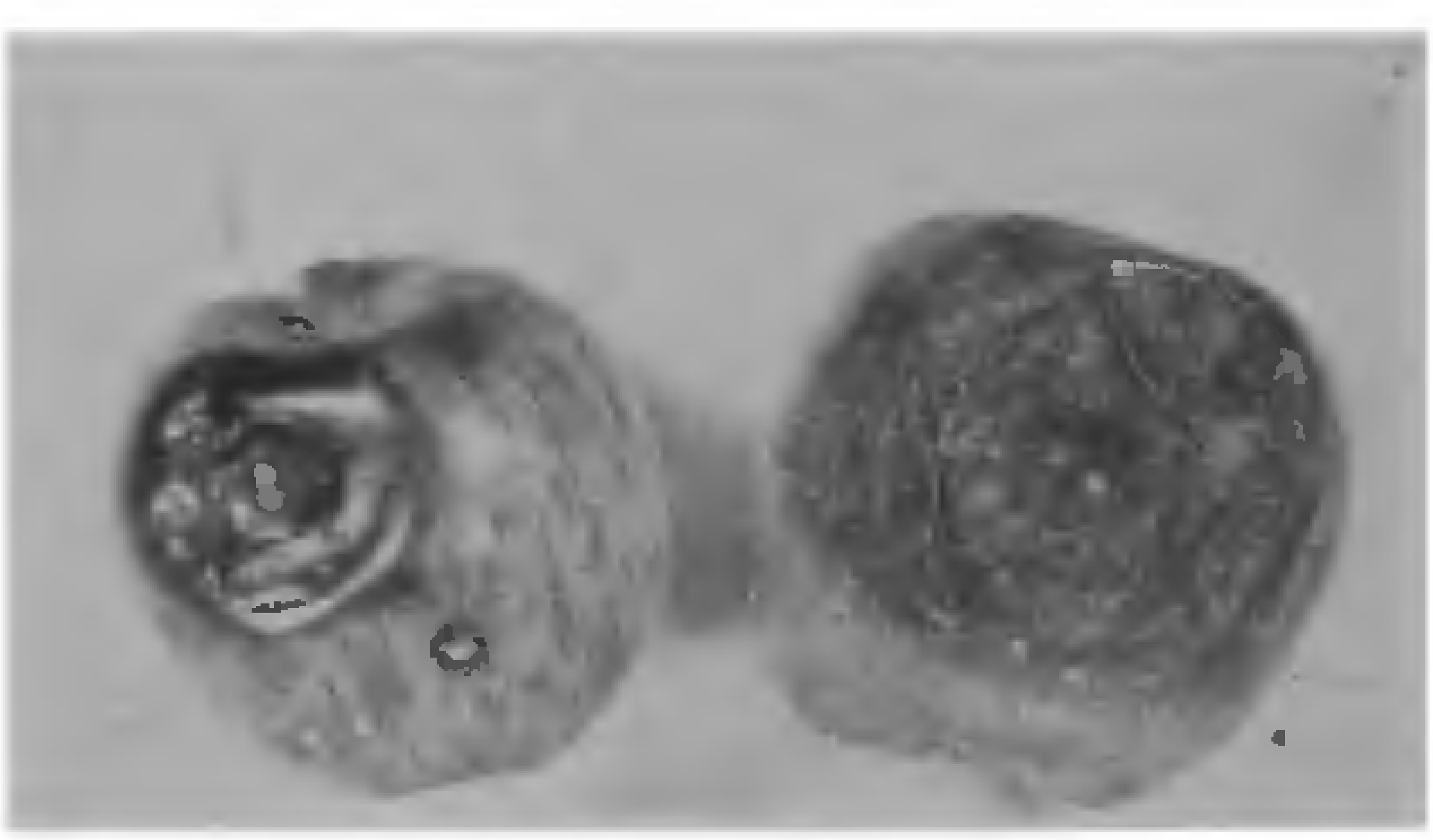

FIG. 1. Diseased fruits of Apple infected with *Clathridium corticola*.

The fungus isolated from the diseased fruits proved pathogenic on inoculations through injured portion of the healthy fruit. Reisolation yielded the same fungus inoculated with. It seems a wound pathogen. In morphology, the fungus resembles with the type description except few variations in the colour of fungal colony and size of the spores. No perfect stage has been observed. Isolate grew well on PDA. It was also grown on Czapek's- malt extract- oat meal- host pulp- and peptone maltose agars where the growth was not luxuriant as on PDA.

The isolate was incubated at an optimum temperature of 28° C. Sporulation was noted when the dishes were kept at low temperatures. The fungus shows psychrophilic tendencies. It is an ascomycete. This report also constitutes the first record of the genus from India.

The living culture of the fungus has been deposited at I.A.R.I., New Delhi, and the Commonwealth Mycological Institute, Kew, England, under reference No. 191203.

The authors are thankful to Dr. Sutton, and the Director, C.M.I., Kew, England, for their help in the identification of the pathogen.

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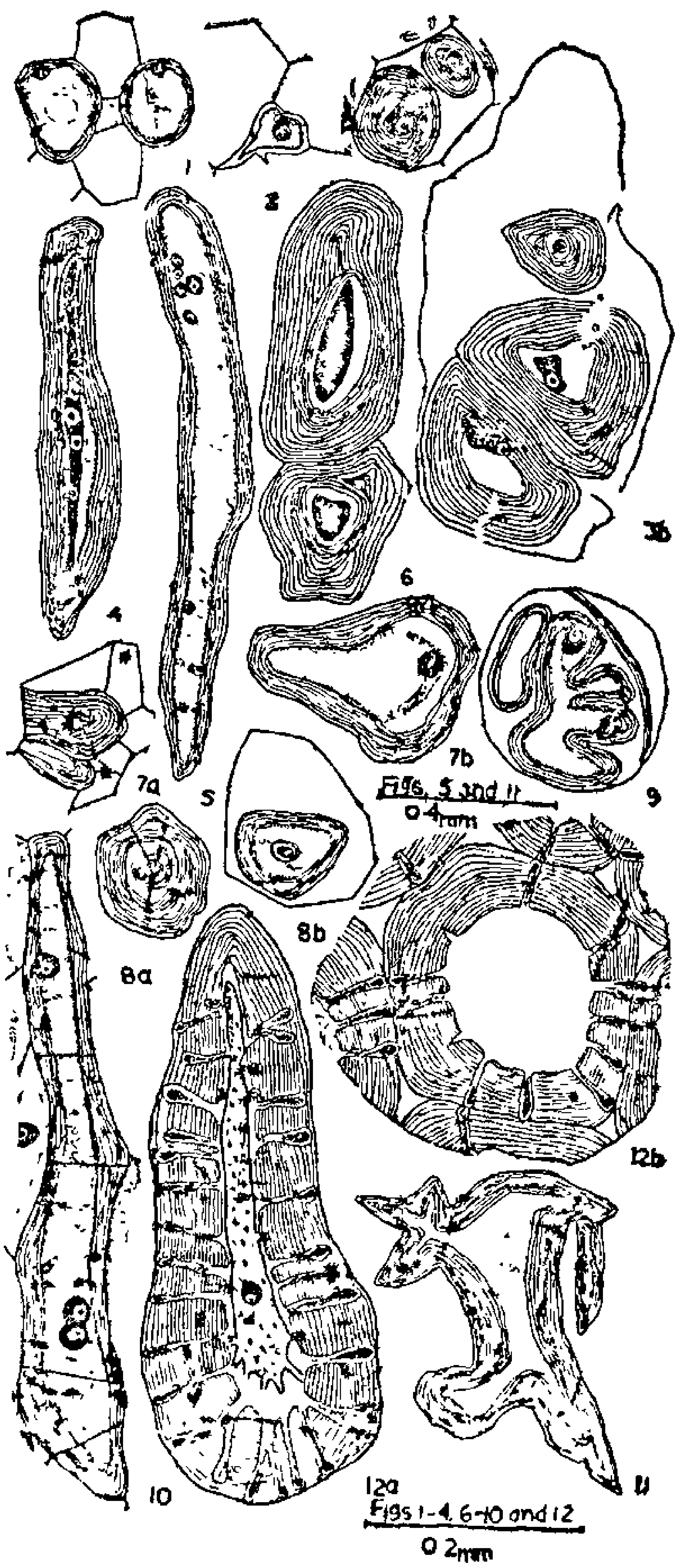
DEVELOPMENT AND MORPHOLOGY OF SCLEREIDS IN SOME SPECIES OF *GNETUM*

SCLEREIDS have been described by Esau[1] as arising "either through a belated sclerosis of apparently ordinary parenchyma cells (secondary sclerosis)" or directly from cells that are early individualized as sclereid primordia. It has been suggested that sclereids make up for the deficiency of lignified tissue in the plant[1]. They have been reported in vegetative as well as floral organs of several higher plants including *Gnetum*[2-5]. The present note deals with some interesting features in their development and morphology of ten species of *Gnetum*, *viz.*, *G. africanum* Welv., *G. columbianum* L., *G. cuspidatum* Bl., *G. gnemon* L., *G. microcarpum* Bl., *G. nodiflorum* Brongn., *G philippiensis* Warb., *G. scandens* Roxb., *G. ula* Brongn., and *G. venosum spruce.*

The material was prepared for microtomy following standard procedures. Herbarium material was softened in hydrofluoric acid or 5% KOH solution. Embedded material was soaked in a mixture of water, glycerine and acetic acid (5 : 5 : 1) for two weeks prior to sectioning. Sections were cut 8–12 μ thick and stained with safranin, fast-green or crystal-violet, erythrosin combinations. Material and slides of several species of *Gnetum* were kindly placed at the author's disposal by Professor V. Puri, of the Meerut University.

Sclereids are widely distributed in the plant body in cortex, pith, bract, perianth of male flowers and ovules. A sclereid develops from an ordinary parenchyma cell with dense granular cytoplasmic contents. Such a cell enlarges and the lignin is deposited on the primary wall and soon, secondary walls are also laid down inside, leaving a narrow lumen (Fig. 1). In the development of smaller sclereids, the cells do not enlarge (Fig. 2). During the development of a giant sclereid an ordinary parenchyma cell elongates considerably. The thickenings are deposited in concentric layers and the stratifications marking successive layers of material deposition are clearly visible. In some cases, giant sclereids seem to be formed from more than one cell. In a few cases, two or three sclereids have been seen developing within a cell (Figs. 3 *a*, 3 *b*). Sometimes the nucleus of a developing sclereid increases enormously and occupies the entire lumen of a cell (Fig. 4). Occasionally, a sclereid has, up to six nuclei in its lumen (Fig. 5).



FIGS. 1–12

At maturity sclereids are empty but occasionally, a lightly stained granular substance is present. In *G. nodiflorum* lumen of some the sclereids is occupied by tannin (Fig. 6). Crystals of various forms are observed in secondary walls, in lumen, nuclei, and nucleoli of sclereids of *G. gnemon* and *G. venosum* (Figs. 7 *a*, 7 *b*).

Rarely, a part of sclereid remains unsclerosed and the protoplasm migrates in it (Figs. 8 *a*, 8 *b*). "This may be due to the fact that after sclereids have ceased to grow, their apices continue growing, even after full sclerosis"[6]. In many species, secondary walls of sclereids get folded or separated from primary walls (Fig. 9). In *G. scandens*, a few giant sclereids show septa (Fig. 10). According to Rao[7] "the presence of septa constitute an important structural aspect in morphology of sclereids". Sometimes sclereids send out branches in intercellular spaces. Branching may be of various degrees (Fig. 11).

Secondary wall of sclereids, in many cases, is traversed by numerous branched or unbranched pit canals filled with granular content. Pit aperture is either circular, elongated or slit-like (Fig. 12 *a*). Pit canals of adjacent sclereids lie opposite each other and appear to be connected at times. The chalazal portion of the seed of *G. microcarpum* is completely occupied by such sclereids (Fig. 12 *b*).

One interesting feature common to all the ten species of *Gnetum* is the presence of macrosclereids (giant sclereids) in the mid-cortical region of the ovule-bearing node. These sclereids give the appearance of tracheids.

The sclereids have been classified into four types, *viz.*, macrosclereids, brachysclereids, asterosclereids and osteosclereids[8,9]. However, Rao[10], on the basis of morphological data recognises six main types, *i.e.*, spheroidalsclereids, osteosclereids; fusiform sclereids, filiform sclereids, asterosclereids and crystalliferous sclereids. All these types are present in *Gnetum*. In their structure and development, they show a remarkable similarity with those of angiosperms.

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COMPLEX INFECTION OF TOMATO (*LYCOPERSICUM ESCULENTUM*) WITH CUCUMBER MOSAIC AND TOMATO LEAF CURL VIRUSES

FERN leaf symptoms in tomato are known to be caused by either cucumber mosaic or tobacco mosaic viruses[1] while leaf curl symptom is reported to be produced by tomato leaf curl virus[2]. Diseased seedlings of tomato plants were observed showing both fern leaf and leaf curl symptoms in the year 1972 in the experimental plot of Virology wing, Lucknow University, Lucknow. Such plants showed an extremely stunted growth and failed to survive.

Transmission tests, host range and physical properties showed the presence of Cucumber Mosaic Virusein infected plants. The virus was transmitted more efficiently by aphids in a stylet borne manner and the symptoms in such plants appeared earlier than in mechanically inoculated ones. Characteristic symptoms including filiformy of the leaves were observed in inoculated plants after 7–8 days of virus inoculation. However, the leaf curling symptoms did not appear in either mechanically inoculated test plants or in plants where transmission was done by aphids (*Myzus persicae* Sulz.). The growth in such plants was reduced in comparison to healthy test plants.

In a second test white flies used in the transmission test were given an acquisition feeding of 24 hours on diseased leaves of originally infected plants and were then transferred on healthy tomato seedling for 48 hours. Symptoms including reduction in size of leaves and curling of leaf lamina appeared 10–12 days after transmission. However, none of the inoculated plants showed filiformy of the leaves characteristic of CMV infection.

To establish the complex infection of tomato plants by CMV and TLCV, four batches of tomato seedlings each having 15 plants were selected. First batch was inoculated with CMV (maintained on *Lagenaria vulgaris*) through *Myzus persicae* Sulz. which were given an acquisition feeding of 2 minutes and an inoculation feeding of 24 hours. The second batch was inoculated by tomato leaf curl virus (maintained on *L. esculentum*) through white flies given an acquisition feed of 24 hours and an inoculation feeding of 48 hours. In the third batch the first inoculation was done with CMV through *M. persicae* and thereafter a challenge inoculation was made after 5 days with tomato leaf curl virus. The last batch was left as control.

Observations revealed the typical symptoms of fern leaf and leaf curl viruses in first and second batch respectively while in third batch an extreme stunting of the plants was noticed accompanied with both fern leaf and leaf curl symptoms. However, the symptoms of leaf curl dominated over fern leaf syndrome. All the plants in this batch died after 25 days of second inoculation. It is evident that the complex form (CMV + TLCV) of the infection can occur in tomato plants posing a threat to the crop in early stages of plant growth. It is inferred that these two viruses have a synergistic action on the host ultimately leading to its premature death.

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VARIATION IN THE SOMATIC CHROMOSOMES OF *PANCRATIUM TRIFLORUM* ROXB.

THE genus *Pancratium* (in Greek, all powerful; referring to its medicinal value) is an Old World genus belonging to the family Amaryllidaceae. This genus includes 14 species whose distribution extends from the Mediterranean eastwards to India and southwards to Africa (Bailey, 1933). *Pancratium illyricum* the "Spider Lily" is the best known in horticulture. Two chromosomal races a diploid $2n = 22$ (Brumfield, 1941) and a tetraploid $2n = 44$ (Sato, 1938) are found in this species.

Of the three species of *Pancratium* reported from South India (Gamble, 1915), *Pancratium triflorum* is found in all Districts upto 2,000 ft. It has beautiful scented white flowers with an attractive staminal corona connecting the six stamens (Fig. 1). The bulb of this species is used as a remedy for skin diseases by the tribals of Malabar.