

## NOTES ON SOME FUNGI FROM SOUTH INDIA—VIII

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### *Phytophthora palmivora* Butl.

On *Artocarpus hirsuta* Lamk. causing severe defoliation, Kottayam (Kerala), 16-7-1959, T. S. R.

*Artocarpus hirsuta* is common in many of the residential compounds in Central Kerala. During the heavy rains in July a certain amount of defoliation has been observed in some trees growing in Kottayam District for the last three years. But in July 1959 several trees exhibited severe leaf-fall with over 50 to 80 per cent. of the leaves shed. The same type of defoliation was evident in some jack (*A. integrifolia* Lamk.) trees also. The increased severity this season is mainly due to the heavier rainfall (between 20 and 30 inches more than normal in June and July) received during 1959.

The leaves that are shed are either green or yellowish. Normally no lesions are seen on them. But in some, the basal portion of the midrib and the lamina on either side of this are affected and form a narrow dark-brown inverted V-shaped patch. However the petioles of the fallen leaves are always darkened and shrunk. The cortical portion of the twigs bearing the foliage exhibits considerable shrinkage and the presence of longitudinal splits. Sometimes the bark rots and sloughs off exposing the wood. Dieback of twigs is common.

Microscopic examination of the petiole and the twigs revealed that the tissues were permeated by non-septate hyaline hyphæ. These were mainly intercellular but the vessels in the vascular tissue had also been penetrated. When surface sterilised bits of the affected twigs or petioles were placed in Petri dishes containing sterilised water numerous sporangia of *Phytophthora* were produced in 24 hours. From these the fungus was brought into pure culture.

A woolly white aerial growth was formed on Quaker oats agar, filling the dishes and tubes in the course of a week. Numerous sporangia and chlamydo-spores were produced in a week. The sporangia were of the characteristic obpyriform shape, prominently papillate, terminal or intercalary and measuring  $35-60 \times 30-50 \mu$ . The chlamydo-spores were more or less spherical,

intercalary and measured 40–60  $\mu$  in diameter. Even after two months oogonia or oospores were not observed in the cultures. The fungus was found to resemble some of the isolates of *P. palmivora* and was identified as a strain of this species.

Inoculation experiments were carried out with this isolate on young plants of *A. hirsuta*. The terminal young shoots and the petioles were readily infected in the course of a week and the leaves were shed. High humidity had to be maintained for successful infection. Positive infection of rubber shoots (*Hevea brasiliensis* Muell.) was also produced by this isolate. When tender shoots were inoculated typical symptoms of 'shoot rot' occurred causing rotting of the tender stem and the young leaves. The infection proceeded from the apex downwards to the lower storey of leaves. Rubber appears to be readily infected by more than one strain of *P. palmivora*. *A. hirsuta* is a new host for *Phytophthora* and defoliation of the trees is brought about by this pathogen just as in rubber. Young shoots of jack were also susceptible. The petiole was infected and the leaves were shed.

#### *Aecidium* sp.

On leaves of *Tylophora asthmatica* Wight, Kottayam (Kerala), 25-5-1959, T. S. R.

Spots amphigenous, circular or irregular, yellow to yellowish-brown half to one inch in diameter; pycnia mainly epiphyllous, subepidermal, slightly protruding, flask-shaped, 90–120  $\times$  60–80  $\mu$ ; æcia hypophyllous, peridiate, 300–370  $\times$  210–270  $\mu$ , peridial cells strongly verrucose on the inner surface; æciospores globose, minutely verruculose, catenulate, 30–40  $\times$  25–31  $\mu$ , wall hyaline, sometimes irregularly thickened, contents yellowish orange.

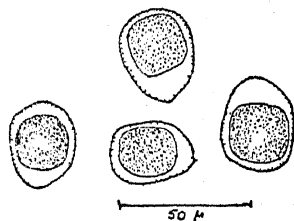


FIG. 1. Aeciospores of *Aecidium* sp.

Other stages of the rust were not present and hence it is placed in the form genus. A close resemblance to *A. nummulare* Berk. is noticed.

#### *Sclerotium rolfsii* Sacc.

On *Citrus maxima* Merr. causing die-back of branches, Kottayam (Kerala), 10-7-1959, N. R. Pillay.

A whitish growth of the fungus covered the affected branches and twigs and caused the drying of the foliage and die-back of the branches during the rainy season in July 1959. On the surface of the branches embedded in the white growth were numerous round reddish-brown sclerotia of the fungus.

***Pellicularia filamentosa* (Pat.) Rogers**

On leaves of *Canna indica* L. causing blight, Pudukad (Kerala), 15-7-1959  
T. S. R.

During the south-west monsoon rains in July 1959 a severe leaf blight occurred in a bed of Cannas in Pudukad destroying most of the foliage. To begin with, circular or irregular isolated or confluent lesions appear in different parts of the leaf-blade. These are dark-brown in the centre and surrounded by dull-green water-soaked margin about 4-5 mm. in width. In the course of four or five days the infection spreads and the entire leaf turns brown and is involved in a wet rot. When a diseased leaf is dried between sheets of blotting-paper some of the lesions appear as greyish-white patches against a dark-brown background.

The fungus mycelium can be detected especially on the lower surface of the lesions as branched whitish threads. Internally the hyphæ are mainly intercellular and hyaline. Sometimes the substomatal air-spaces contain aggregates of hyphæ. The entry into the tissues is through the stomata. Wherever the hyphal penetration had occurred the chlorophyllous tissue was turned brown in colour and the cells shrunk.

The pathogen was readily isolated from surface-sterilised bits of the affected leaves. On Quaker oats agar a rapid growth occurred with limited aerial mycelium. Many sclerotia developed in the course of a week. These were separate and 1-3 mm. in diameter or aggregated into bigger masses. The colour varied according to age, being initially cream but soon turning tawny brown. The surface was soft and velvety.

Leaves of healthy *Canna* plants were inoculated with this isolate. In 48 hours lesions developed on all the inoculated leaves. In five more days entire leaves turned brown, the discolouration extending to the upper portion of the sheaths also. The spread of infection was rapid in rainy weather but was arrested when it became bright.

The foliage of young rubber (*Hevea brasiliensis*) plants were also readily infected. Lesions were formed in two days. In a week the leaflets were completely affected and some of them were shed. Others were held together by the mycelial growth between the contacting leaflets. The symptoms

produced were identical with those observed in the target spot disease of rubber caused by *P. filamentosa*.

This fungus has been recorded on several crop plants and weeds in Kerala. Ramakrishnan K. and T. S. (1949) obtained artificial infection of *Canna* leaves on inoculation with an isolate of *P. filamentosa* from *Maranta arundinacea* L. Now natural infection of *Canna* has been observed. The present isolate of the pathogen exhibits some cultural variations from the isolate on *Maranta*. It appears that many strains of this species occur in Kerala. They are not however specialised in their parasitism and readily pass on from one host to another. The high rainfall during the south-west monsoon period is apparently favourable for their development and spread.

***Corynespora cassicola* (Berk. and Curt.) Wei**

Wei, C. T. (1950), "Notes on *Corynespora cassicola*," Mycological Papers, 34, Commonw. Myc. Inst. Kew.

On leaves of *Hevea brasiliensis* Muell., Kottayam (Kerala), 10-12-1958.

Leaf spots circular to irregular, varying in size from 1-6 mm. in diameter, amphigenous, centre brown to whitish, with a dark-brown margin, often with a yellowish halo round the spot, sometimes having a shot-hole appearance; conidiophores emerging singly or in small tufts or produced on aerial mycelium on the surface of the spot, brown, septate, variable in size,

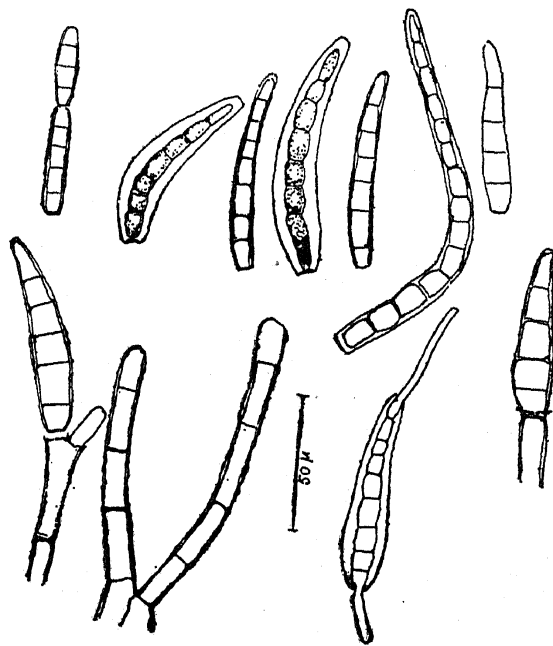


FIG. 2. Conidiophores and conidia of *Corynespora cassicola*

85-300  $\times$  6-10  $\mu$ , proliferating through the terminal scar or through injured ends; conidia borne singly or in chains, connected with the conidiophore by a hyaline isthmus, obclavate or cylindrical, multiseptate with 2-14 septa, straight or often slightly curved, tapering towards the apex, pale-brown, often with a thick wall, prominent hilum, 40-210  $\times$  8-18  $\mu$ .

This disease has a superficial resemblance to 'birds-eye spot' disease of rubber caused by *Helminthosporium heveae* Petch. But the persistent halo and the earlier change in the colour of the spot to white help to distinguish this from the other. Further the malformation and crinkling of the tender leaves which are sometimes noticed in plants infected by *H. heveae* have not been observed in this case. However microscopic examination will be the decisive method of diagnosis. This disease is prevalent more during the drier months and sometimes causes defoliation.

The fungus was isolated by single spore method. On Quaker oats agar a luxuriant greyish aerial growth is formed. The substratum is coloured deep pinkish violet. A grey aerial growth develops on sterilised rubber leaves. Conidia and conidiophores are produced in cultures also. Symptoms of infection become evident five to six days after inoculation. Tender leaflets are infected in three to four days. On mature leaflets the incubation period may sometimes extend to nine days.

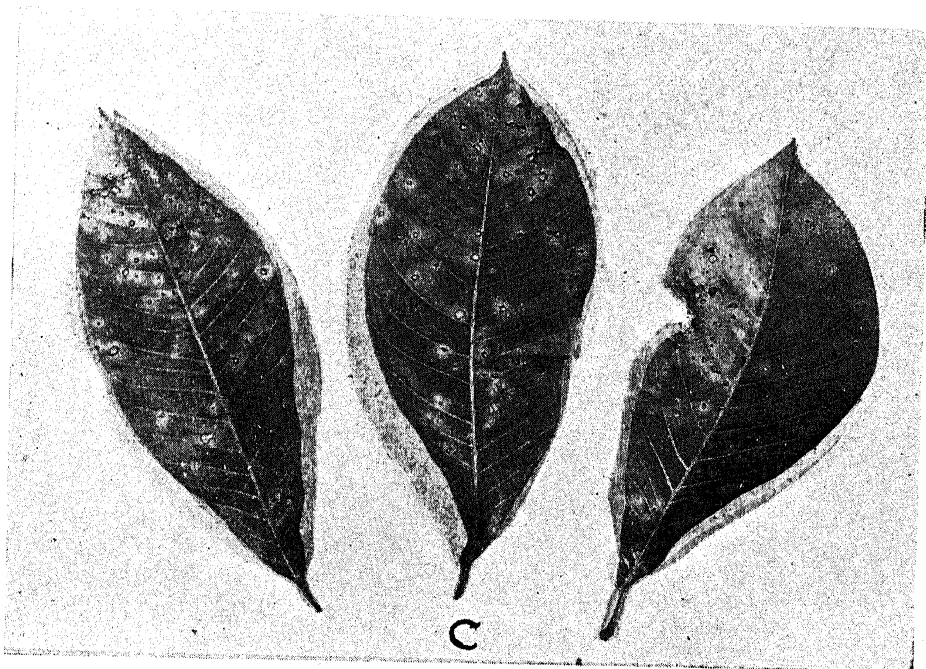
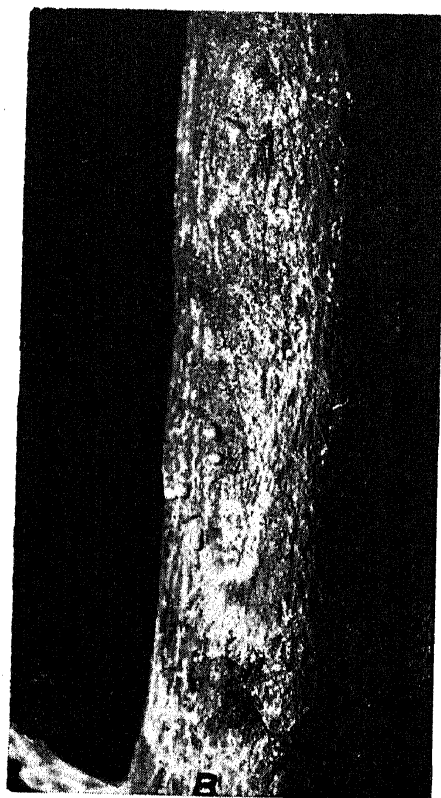
Entrance is effected through either surface of the leaflets.

The fungus closely resembles *Helminthosporium*. Among its synonyms are more than one species of *Helminthosporium*. However both in morphological and cultural characters this fungus differs from *H. heveae*.

I am indebted to Dr. R. S. Vasudeva, Head of the Division of Mycology, I.A.R.I., New Delhi, for kindly arranging for the despatch of specimens and slides to the Commonwealth Mycological Institute, Kew, for the identification of *Corynespora*.

#### REFERENCE

- Ramakrishnan, K. and Ramakrishnan, T. S. .. *Indian Phytopath.*, 1949, 1, 129-36.



- A. Photograph of *Artocarpus hirsuta* showing defoliation.  
B. A branch of *Citrus maxima* with *Sclerotium rolfsii* growing on it and with a few sclerotia.  
C. Leaflets of *Hevea brasiliensis* with leafspots caused by *Corynespora cassiicola*.