

LATENT WITHER-TIP INFECTION ON CITRUS

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IN most of the citrus gardens of the Central Provinces and Berar, small pinkish-white fungal areas, varying from half an inch to two inches in diameter, were observed on trunks and main branches of orange plants. Twigs measuring more than half an inch in diameter were also occasionally infected. Water-shoots and young twigs were always found free from the infection. These thin crust-like small areas may either be scattered on different parts of a branch or some of them may coalesce together forming larger patches. In almost every garden, where wither-tip disease happened to occur in severe form, these patches were found in abundance and were specially noticeable in localities like Nagpur, Saoner, Rasoolabad, Jalgaon, Burhanpur, Pandhurna and Dhamtari. Mosambi plants at Saoner and Pandhurna were also found covered with such patches.

It has been observed that during summer months, the mycelium of the fungus survives in the form of pink coloured stroma in small cracks in the bark of orange or mosambi trees and persists as inter- and intra-cellular parasite in one or two layers of the cortical tissue. An examination of the fungus proved it to be *Colletotrichum gloeosporioides* Penz.

Branches of three-year old orange plants were artificially inoculated with pure cultures of the pathogen. Typical symptoms of wither-tip disease with severe die-back of the young shoots appeared after four weeks of inoculation and were specially marked under humid conditions. Pinkish-white patches were formed on the inoculated branches of the plants. On reisolation and examination, the fungus proved to be identical to the strain of *Colletotrichum gloeosporioides* by which it was inoculated.

On rice-meal agar medium the fungal colony appears pink in colour, with dark-brown pin-head like acervuli dotted all over the surface. Small hyphal knots are produced. Aerial mycelium is scanty and irregular. The hyphæ are first hyaline but later turn light-black in colour, varying in diameter from 2.9 to 7 μ (average 4.17 μ). Spores are unicellular, oval in shape with two to three oil globules and in mass present a pinkish appearance. The size of the spores vary, breadth from 4.13 to 7 μ and length 8.46 to 15.0 μ (average 5.5 by 13.0 μ). The dimensions of the acervuli are variable. The setæ, measuring 56 to 133 μ in length, are four to five celled

with a gradually tapering terminal cell; the two basal cells presenting a jointed appearance. At the two ends of an acervules the setæ are longer and broader than those in the middle.

Investigations of several authors have given strong reasons that the size and shape of the spores of *Colletotrichum gloeosporioides* are extremely variable. Penzig's⁵ (1887) measurements are 16 to 18 μ by 4 to 6 μ while that of Rolfs⁶ (1904) 10 to 16 μ by 5 to 7 μ . Burger³ (1921) has found great variability in spores of different strains of this fungus, the mean length varied from 11.5 to 20.3 μ and the mean width of the same strain varied from 3.2 to 6.4 μ . Chaudhari⁴ (1936) has isolated four strains and has mentioned that the length of the spores vary from 11.2 to 21.0 μ and the breadth from 2.4 to 7.0 μ , the mean values being 13.0 μ and 5.5 μ respectively which corresponds to the mean values of the spores of the strain of *C. gloeosporioides* isolated by author. Baker, Crowdy and McKee² (1940) in reviewing the progress of investigations in latent infection by *C. gloeosporioides* and allied species state that numerous isolations of the fungus from grape-fruit and papaws fall into three groups. The strain of *C. gloeosporioides* isolated by the author appears somewhat similar to the strain A, No. 316 mentioned by Chaudhari⁴ (1936) and falls more or less within the second group of Baker, Crowdy and McKee² (1940).

Baker¹ (1938) had described the occurrence of latent infection in citrus fruits due to *Colletotrichum gloeosporioides* and mentions that in Trinidad dead wood bore conidia of the fungus. The presence of the acervuli of *C. gloeosporioides* on dead wood has invariably been observed by the author. It has been further noticed that in spite of systematic and severe pruning of the diseased trees in a garden, wither-tip disease appeared during the periods of low temperature and high humidity, and produced die-back symptoms. It therefore appears that the persistence of *C. gloeosporioides* in small pockets and cracks on the main branches and trunk is in every likelihood a method to tide over the unfavourable atmospheric conditions of the Central Provinces and Berar as they are specially apparent during summer months of high temperature and low humidity. With the advent of high humidity and low temperature during rainy months, the fungus becomes active and gives rise to wither-tip disease. Further study on the problem is in progress.

SUMMARY

1. Small pinkish-white fungal areas of *Colletotrichum gloeosporioides* Penz. were observed on trunks and main branches of orange plants. In certain localities mosambi plants were also infected.

2. Water shoots and young twigs were always found free from the infection.

3. During summer months the mycelium of the fungus survives in the form of pink coloured stroma in small cracks in the bark of orange or mosambi trees and thus tides over the unfavourable atmosphere condition.

4. Mycelium on the host persists as inter- and intra-cellular parasite in one or two layers of the cortical tissue.

5. The disease could be induced artificially.

6. Measurements of the spores, setæ and hyphæ are given.

7. The isolated strain of *C. gloeosporioides* corresponds to strain A, No. 316 of Chaudhari and practically falls within the second group of Baker, Crowdy and McKee.

8. Acervuli of the pathogen has been observed on dead wood also.

REFERENCES

1. Baker, R. E. D. .. "Studies in the pathogenicity of tropical fungi. II. The occurrence of latent infections in tropical fruits," *Ann. Bot. Lond.*, 1938, N. S. ii, 8, 919-31.
2. ———, Crowdy, S. H., and McKee, R. K. .. "A review of latent infections caused by *Colletotrichum gloeosporioides* and allied fungi," *Trop. Agri. Trinidad*, 1940, 17, 128-32.
3. Burger, O. F. .. "Variations in *Colletotrichum gloeosporioides*," *Jour. Agr. Research*, 1921, 20, 723-36.
4. Chaudhari, H. .. "Diseases of citrus in the Punjab," *Indian Jour. Agri. Sci.*, 1936, 6, 72-109.
5. Penzig, O. .. *Studi botanici Sugli agrumi e sulle piante affini*, Roma, 1887, pp. 590.
6. Rolfs, P. H. .. "Wither-tip and other diseases of citrus trees and fruits," *U.S. Dept. Agr. Bur. Plant Ind. Bull.*, 1904, 52, 9-20.

