

THE COTTONY LEAK OF EGGPLANT FRUIT CAUSED BY  
PYTHIUM APHANIDERMATUM

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In connection with a study of the genus *Pythium* pursued for several years, the writer has found it expedient to test out the pathogenicity of the various types encountered, by inoculating them into certain plant products obtainable on the market. An assortment including, for example, watermelons, cucumbers, squashes, potatoes, and cabbage has been found to provide a suitable variety of host materials, the reactions of which together give a general indication of the virulence of any particular organism tested. Eggplant (*Solanum melongena* L.) fruits were similarly found convenient and have been employed to some extent. They appear subject to attack in varying measure by a considerable number of strains of the type distinguished by smooth oogonia, subspherical sporangia (or "conidia"), and the production of cottony aerial mycelium, that have been assigned largely through custom to *Pythium debaryanum* Hesse. However, these forms were in all cases less energetic in their parasitism than *Pythium aphanidermatum* (Edson) Fitzpatrick. Strains of the latter, whether derived from cucumbers affected with cottony leak,<sup>1</sup> from watermelons affected with buff blossom-end rot, from pea roots affected with root-rot, or from dead female rootknot eelworms, *Caconema radicum* (Greef) Cobb., uniformly proved very rapid in bringing about destruction of inoculated specimens.

That such parasitism is not confined to experimental material became evident through the receipt from C. D. Sherbakoff of a culture of a fungus isolated from diseased eggplant fruit collected by E. L. Felix in a field near Knoxville, Tennessee, September 18, 1923. According to a communication from Mr. Felix, the fungus in question had been responsible for an estimated loss of one per cent of the crop. It was readily identified as *Pythium aphanidermatum*, exhibiting the characteristic morphology of this species—numerous swollen digitate or lobulate processes that promptly develop into multiple sporangia, and sexual apparatus in considerable abundance, of which the most distinctive element is the intercalary antheridium with its dome-shaped or barrel-shaped protuberant part broadly adnate to the oogonium.

<sup>1</sup> Drechsler, Charles. The cottony leak of cucumbers caused by *Pythium aphanidermatum*. Jour. Agr. Res. 30: 1035-1042. 1925.

On July 20, 1925, a decay of eggplant fruits similar to that resulting from artificial inoculation with *Pythium aphanidermatum* was encountered in a number of fields in the vicinity of Bradentown, Florida. Some diseased specimens were collected and bits of affected tissue planted on cornmeal agar, with the result that 18 pure cultures of *Pythium aphanidermatum* were obtained, each from a separate, individual affected fruit. A close adherence to the morphology represented in isolations of the fungus from other sources permitted the identification of these strains with much certainty. On cucumber fruits they brought about the pronounced softening of tissue and produced the abundance of extramatrical mycelium associated with cottony leak.

The decay of eggplant fruits induced by *Pythium aphanidermatum* is an unusually rapid one, the rapidity being indicated, for example, in Plate V, A and B, representing photographs taken, respectively, 48 hours and 72 hours after inoculation by means of an incision at the blossom end. The destruction of the fruit, which measured 125 mm. in length and 110 mm. in diameter, was complete 78 hours after inoculation, at which time the extramatrical mycelium had become so profuse as to clothe the specimen almost entirely in a cottony weft. Externally the progress of the fungus becomes evident in the disappearance of the normal purple pigment, so that the affected region is distinguished by a tan coloration rather similar to that characteristic of lesions caused by *Phomopsis vexans* (Sacc. & Sydow) Harter. The zonation and surface depression distinctive of the latter parasite is absent however, the epidermis instead generally becoming minutely wrinkled, and rubbing off from the underlying tissue on very slight friction. Internally the advance of the parasite is marked by dark sepia-brown discoloration and pronounced softening in texture of invaded parts. Although, owing probably to the firmness of the outer tissues, affected eggplant fruits are at the beginning somewhat less watery than cucumbers attacked by the same parasite, in the more advanced stages a brownish liquid usually drains off in quantity. The name "cottony leak" applied to the cucumber trouble would seem to be equally appropriate here.

In the fields visited, the occurrence of the disease was confined to limited areas where poor drainage was keeping the soil in a soggy condition, especially in the furrows between the rows. All of the infected fruits were found resting with the blossom-end in contact with the moist ground, to which they were cemented, as it were, by a heavy weft of mycelium, so that, upon lifting the fruit, masses of soil were found adhering in a moldy cake. Infection in all cases appeared to have begun at the blossom end and progressed toward the stem end. No high-hanging fruits were found affected with cottony leak in any portion of any of the fields, wet or dry.

The value of adequate drainage as a method of control is clearly indicated. The season during which eggplants mature in Florida would seem generally too dry to permit the trouble to become a serious one. In the absence of pertinent information, it would seem, however, that in the more northern latitudes where rains in July, August, and September are frequently sufficient to keep the ground saturated several days at a time, losses from cottony leak might well assume proportions deserving of consideration. Owing to a certain degree of resemblance, particularly in external discoloration, of the affected fruit with fruit attacked by *Phomopsis vexans*, it is highly probable that the disease, where observed, has generally been attributed to the latter parasite. Several observers have informed the writer that instances of fruit-rot have come to their attention in which no indications of pycnidia were to be found on large well-developed lesions.

It may not be amiss to add that a species of *Pythium* of the "debaryanum" type was isolated in a single case of eggplant fruit-rot, which was found capable of reproducing the disease when inoculated into the healthy fruit. Its effect on the tissues was very similar to that of *Pythium aphanidermatum*, but the rate of destruction was approximately only one-half as rapid, and the production of aerial mycelium relatively meager. Undoubtedly, as in the similar disease of cucumbers, the capacity of the extramatrical mycelium abundantly produced by *Pythium aphanidermatum* to effect penetration through the unwounded external tissues of the host, rather than a superior degree of virulence, is responsible for the preponderance of this species in naturally infected eggplant fruit.

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## EXPLANATION OF PLATE V

FIG. A. Eggplant fruit 48 hours after inoculation by incision at blossom end with pure culture of *Pythium aphanidermatum*; lower distal half of fruit tan-colored externally, and epidermis folded in minute wrinkles.  $\times \frac{3}{4}$ .

FIG. B. Same fruit as in A, but 24 hours later; exterior entirely tan-colored, except a small proximal region at upper left-hand corner of picture; copious development of extramatrical mycelium from earliest invaded portion.  $\times \frac{3}{4}$ .

