

BLACK CROSS, CAUSED BY A NEW SPECIES OF PHYLLACHORA ON BANANA

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Phyllachora musicola sp. nov. is described—the cause of black cross on bananas in American Samoa, Bougainville, Fiji, Netherlands New Guinea, New Britain, New Guinea, New Hebrides and Papua. The disease has not been recorded on *Musa textilis*.

THIS disease has been known for the past four years and is widespread on bananas in New Guinea and the large islands of New Britain and Bougainville. It normally occurs as a sterile hypophyllous stroma which begins its development on the main lateral veins of the leaf and grows in the form of a cross. However, development along the lateral vein is more extensive than the growth at right angles which is parallel with the midrib of the leaf, and arms of the "cross" are therefore unequal, and sometimes double or multiple.

Mature ascospores were first found on a collection made in June, 1960 (2805a) in the Markham Valley, New Guinea. When this material was maintained in a humid atmosphere for 24 hours white masses of spore exudates occurred along the arms of the fungoid stroma. Considerable efforts were made to get both the exuded spores and those remaining in the perithecia into culture. Isolations were carried out in Papua and at the Commonwealth Mycological Institute, but without success. This is a common character of *Phyllachora*.

In November, 1960, Professor Bugnicourt sent to the C.M.I. a specimen of "black cross" which had been collected in Fiji. This was in excellent condition and it possessed mature ascospores, thus providing an interesting extension of the range of collections of this species. What is indeed surprising is that such a characteristic and conspicuous fungus has not been described before.

In June, 1961, Mr. A. Johnston sent to the C.M.I. five collections from American Samoa, Fiji and New Hebrides.

Stands of *Musa textilis* (Abaca, Manila hemp) growing near bananas at Bubia, New Guinea, and at Keravat, New Britain, have shown no sign of the disease.

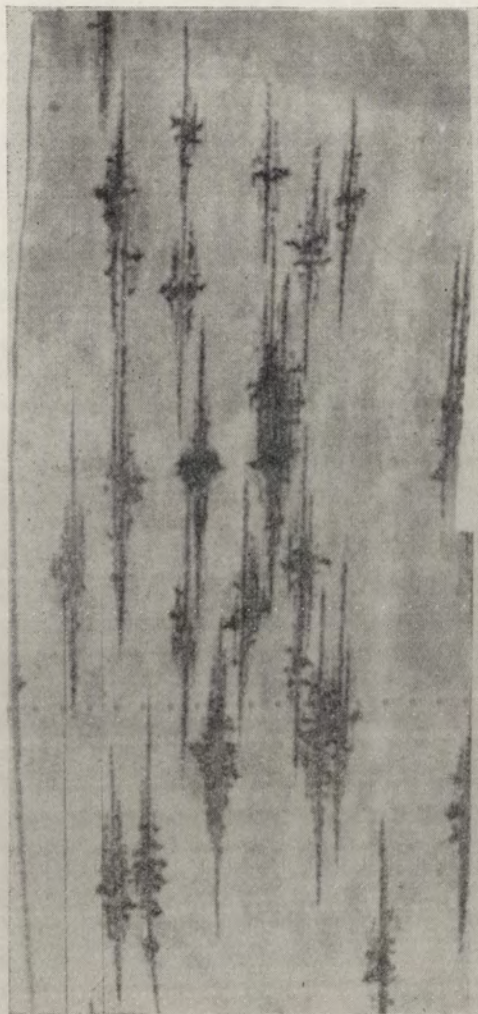


PLATE 1.—*Phyllachora musicola* sp. nov., causing black cross disease of banana.
(Undersurface of leaf, natural size.)

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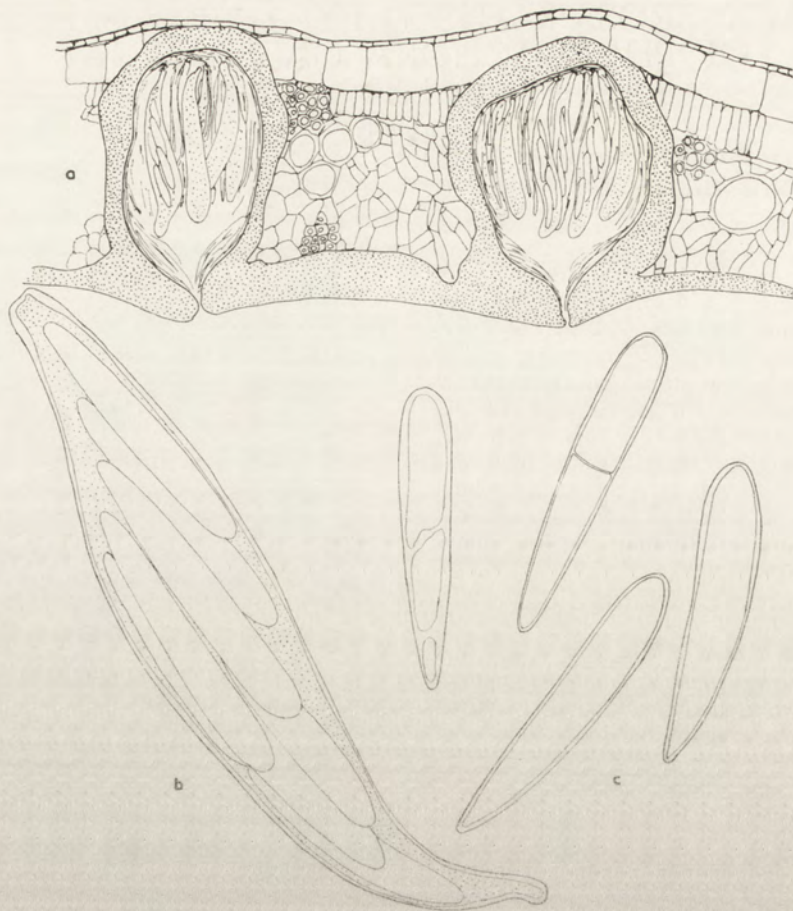


FIG. 1.—*Phyllachora musicola* sp. nov. a—T.S. of banana leaf showing two perithecia (x 125); b—mature ascus (x 1000); c—four ascospores, one with pseudoseptum (x 1000).

Phyllachora musicola sp. nov.

Stromata atra, hypophylla, elongata, secundum venas laterales cum cruce in medio crescentia, 3-6 cm. longa. *Perithecia* 10-40, in et sub stromatibus, subglobosa vel ovata, 200-240 micron dia. *Paries perithecii* 12-18 micron crassus, pallidus, brunneus, pseudoparenchymatous. *Asci* unitunicati, 8-spори, clavati, 115-140 x 16-20 micron. *Ascosporae* obliquae distichae, hyalinae, continuae, clavatae sed apice angustiore acuto, 35 x 6.5-8 micron. Paraphyses numerosae, fibrosae.

Habitat in foliis *Musae* species, Bubia, Markham Valley, New Guinea. Coll. D. Shaw, 2805a (I.M.I. 81614).

Description

The clypeus begins to develop on the main lateral veins on the abaxial side of the leaf. From its primary infection it spreads along the vein for about 3 cm. on either side. Simultaneously it grows out vertically and somewhat irregularly, parallel to the leaf midrib and about 0.5 cm. on either side of the lateral vein, thus producing the typical "black-cross" appearance of the mature stroma. On the upper or adaxial surface of the leaf the mature stroma appears as a series of black dots. The surrounding leaf tissues are at first discoloured and then become light-brown and occasionally whitish in the centre.

In sections the stroma or clypeus is well developed and occludes the cells of the ventral epidermis and sub-epidermal layers. Up to 40 perithecia develop beneath each clypeus; these occupy the whole midrib and displace the palisade cells below the adaxial surface of the leaf. The base of each perithecium thus appears as a black dot below the dorsal epidermis.

In section they are oval to globose 200-240 micron dia. with a pseudoparenchymatic wall 12-18 micron wide. The apices of the perithecia are completely immersed in the clypeus and the ostiole is visible only as a minute aperture.

The asci develop from the base of the perithecium amongst the abundant paraphyses. They are unitunicate, somewhat clavate in shape but with the widest part near the centre of the ascus. They measure 115-140 x 16-20 micron and have eight obliquely distichous ascospores.

The ascospores are smooth, hyaline, aseptate and clavate but pointed at the narrow end; they measure 35-50 x 6.5-8 micron and occasionally develop a central pseudoseptum. No pycnidia or conidial state was observed associated with the stroma.

The hosts are bananas, and once would have been given as *Musa sapientum*. We have now been advised that probably most if not all of the collections would be *M. acuminata* Colla cult. var. but flowers and fruit were usually

not available for examination, and as other species of *Musa* occur in New Guinea and the adjacent islands, the collections are listed as *Musa* species.

Distribution

The following collections represent the known distribution of this species:—*American Samoa*, Tutuila June 61, A. Johnston, I.M.I. 87363, 87362. *Bougainville*, Kieta, Nov. 59, D. Shaw 2551. *Fiji*, Koronivia, Nov. 60, F. Bugnicourt; Koronivia, June, 61, A. Johnston, I.M.I. 87361 87362. *Netherlands New Guinea*, Rendani and Wosi, May 60, D. Shaw and A. Johnston 96b and 83b; Amban and Serui, May 61, D. Shaw and A. Johnston 129b and 155b. *New Britain*, Keravat, Nov. 60, D. Shaw 3040c. *New Guinea*, Bubia, Finschhafen, Kar Kar Is., Madang, Markham Valley, March-Nov. 60, D. Shaw, 3051, 2854a, 2708b, 2411, 2805a and 3052. *New Hebrides*, Vila and Mele, June 1961, A. Johnston, I.M.I. 87359 and 87360. *Papua*, Abam nr. Daru, Gehua, Kapogere, Laloki River, nr. Port Moresby, Oriomo River, July 57-Nov. 60, D. Shaw, 3050b, 1587a, 2173a, 2828a, 2924, 2898a.

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