

QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES

DIVISION OF PLANT INDUSTRY BULLETIN No. 439

CUCURBIT POWDERY MILDEW ON PAPAWE

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SUMMARY

Controlled inoculations confirmed that an unusual occurrence of powdery mildew disease of papaw (*Carica papaya*) was caused by cucurbit powdery mildew (*Sphaerotheca fuliginea* (Schlecht.) Poll.).

In February 1967 (late summer), potted papaw (*Carica papaya* L.) seedlings in a glasshouse were observed to be severely affected by a powdery mildew. This was considered unusual, as the common powdery mildew disease of papaw in Queensland normally occurs only during winter. As Clare (1964) has indicated, the fungus responsible is probably *Sphaerotheca humuli* (DC.) Burr. (*S. macularis* (Fr.) Jaczew.).

Microscopic examination of the fungus showed that the ellipsoidal conidia were produced in chains and possessed well-developed fibrosin bodies, and that the hyphae lacked appressorial lobes. In addition, when conidia were germinated, some characteristically forked germ-tubes were formed (Figure 1). According to Hirata (1955), this type of germ-tube is restricted to *S. fuliginea* (Schlecht.) Poll. These characters are shown by all collections of powdery mildew from Cucurbitaceae in Queensland (Clare 1964, and author's personal observations), where the perithecial state has never been recorded, and are the basis on which the conidial state is referred to *S. fuliginea*. In contrast, the powdery mildew normally found on papaw has simple unlobed hyphal appressoria, and never produces forked germ-tubes. In this species, germ-tubes are usually of the long straight type illustrated by Hirata (1955) and Zaracovitis (1965) for other species of *Sphaerotheca* (Figure 1). Conidial *S. fuliginea* is also distinct from *Oidium caricae-papayae* Yen, *O. indicum* Kamat and *O. caricae* Noack as described by Yen (1966).

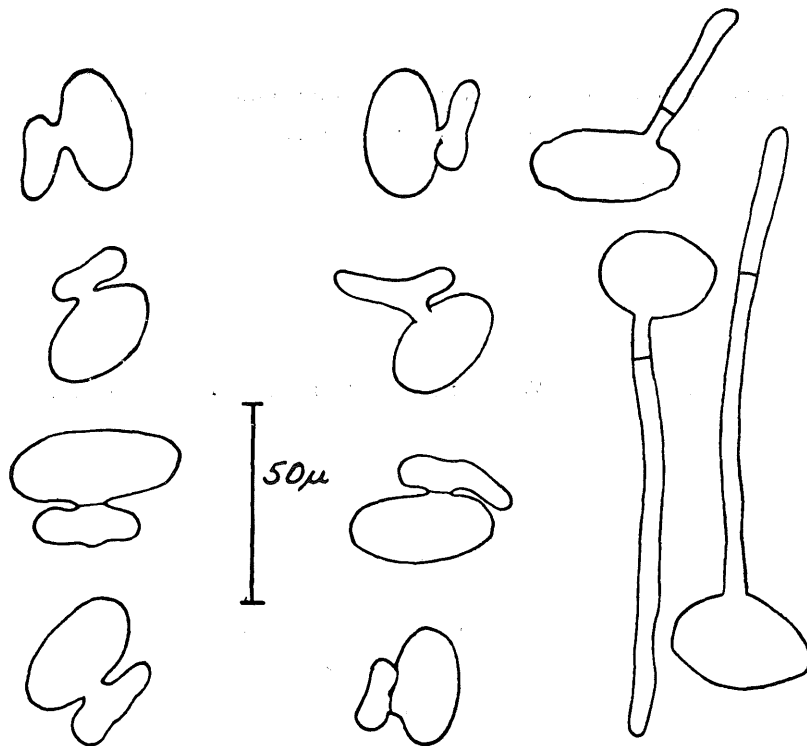


Fig. 1.—Germ-tubes formed by (left to right) *S. fuliginea* from papaw, *S. fuliginea* from cucumber, and *S. humuli* from papaw.

The possibility that this was the cucurbit powdery mildew on papaw was tested by controlled inoculations. Conidia were removed from the infected papaw plants with a dry camel's-hair brush and transferred to healthy leaves of cucumber (*Cucumis sativus* L. cv. Marketer) and papaw in the glasshouse. Inoculated leaves developed powdery mildew abundantly, while uninoculated leaves remained healthy. Similarly, conidia of *S. fuliginea* from cucumber and choko (*Sechium edule* Sw.) were used to inoculate papaw and cucumber, resulting in numerous infections (Figure 2). The results of these cross-inoculation tests confirm the determination based on fungal morphology that papaw is susceptible to the local cucurbit powdery mildew.

Three occurrences of this fungus on papaw in the field have been noted. Each time young plants were involved, and in one instance they were growing adjacent to a heavily mildewed cucumber vine. Microscopic characters of the fungus in these three collections agreed with those described above for *S. fuliginea*. This mildew has not been found infecting mature papaw trees in Queensland.

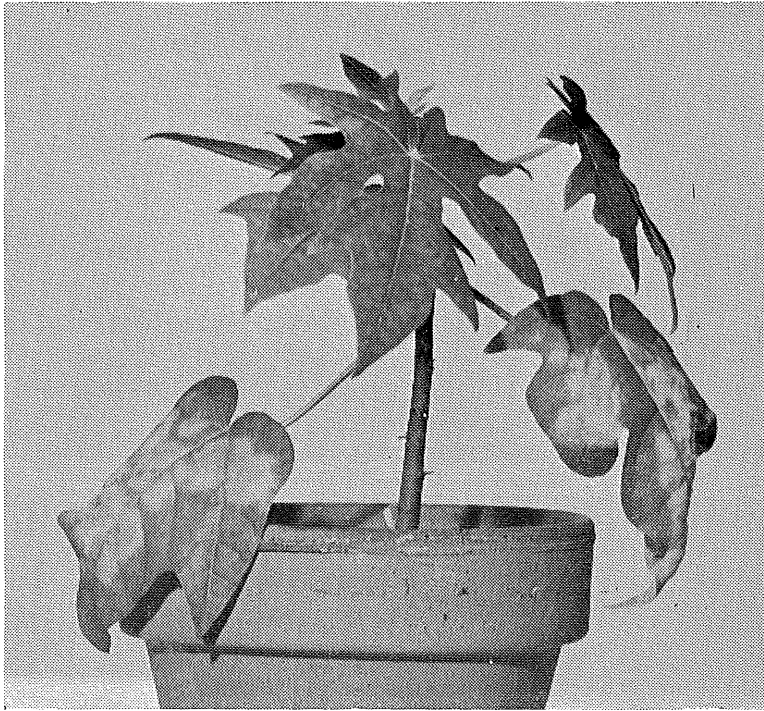


Fig. 2.—Infection on papaw after inoculation with conidia of *S. fuliginea* from choko.

Miller (1938) reported glasshouse infection of papaw seedlings by cucurbit powdery mildew in California, and successfully inoculated seedlings with inoculum from field-grown cucumber. He also found infection of papaw by the cucurbit mildew in the field, but did not indicate what species of powdery mildew was involved. Most American reports refer to the cucurbit powdery mildew as *Erysiphe cichoracearum* DC., but Kable and Ballantyne (1963) have shown that eight collections of the fungus from New York State were conidial *S. fuliginea*. Also, Yarwood and Gardner (1964) have indicated that in California the powdery mildew on cucurbits usually contains well-developed fibrosin bodies, suggesting that the same species is present there.

Strains of the local cucurbit powdery mildew have been transferred to hosts outside the family Cucurbitaceae under glasshouse conditions by the author. Species infected include *Cyamopsis tetragonoloba* (L.) Taub., *Dolichos uniflorus* Lam., *Phaseolus lathyroides* L., *P. vulgaris* L., *Vigna vexillata* (L.) A. Rich., *Hibiscus esculentus* L., and *Verbena hybrida* Voss. This report extends the Queensland host range of *S. fuliginea* to another family.

REFERENCES

- CLARE, B. G. (1964).—Erysiphaceae of south-eastern Queensland. *Pap. Dep. Bot. Univ. Qd* 4:111-44.
- HIRATA, K. (1955).—On the shape of the germ tubes of Erysipheae II. *Bull. Fac. Agric. Niigata Univ.* 7:24-36.
- KABLE, P. F., and BALLANTYNE, BARBARA J. (1963).—Observations on the cucurbit powdery mildew in the Ithaca district. *Pl. Dis. Reprtr* 47:482.
- MILLER, P. A. (1938).—Cucurbit powdery mildew on *Carica papaya*. *Phytopathology* 28:672.
- YARWOOD, C. E., and GARDNER, M. W. (1964).—Unreported powdery mildews. III. *Pl. Dis. Reprtr* 48:310.
- YEN, W. Y. (1966).—Etude sur les Champignons parasites du Sud-Est asiatique VI: Un nouvel *Oidium* récolté à Taiwan (Formose) sur *Carica papaya*: *Oidium caricae-papaye* Yen (n.sp.) *Revue Mycol.* 31:311-6.
- ZARACOVITIS, C. (1965).—Attempts to identify powdery mildew fungi by conidial characters. *Trans. Br. Mycol. Soc.* 48:553-8.

(Received for publication April 27, 1967)

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