

Note

***Verticillium balanoides*, a nematode endoparasite associated with pine needles of collapsing Japanese red pine trees in Tsukuba**

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Accepted for publication 29 March 2000

***Verticillium balanoides*, isolated from nematodes associated with pine needles of collapsing Japanese red pine trees in Tsukuba, which is new to Japan, was redescribed with illustrations.**Key Words—*Acrostalagmus*; endoparasite; identification; nematode; *Verticillium*.

Several Japanese red pine trees in Namiki public park, Tsukuba were completely or partially collapsed in July 1980, and unidentified nematodes were recovered very frequently from needles of dead tree branches plated on water agar. In addition, *Verticillium* species sporulated on nematodes in water agar. Some nematode bodies were disintegrated (Fig. 3) and occupied internally with hyphae, which also extended outside (Figs. 1, 2). Spore masses developed on the single, paired or verticillate phialides on the conidiophores (Figs. 4, 5). This was just like the sporulation of *V. sphaerosporum* Goodey described in the previous report (Watanabe, 1980). However, it was different from the latter in conidial shape. The former formed more or less maize-kernel-like or acorn-shaped conidia, and the latter, globose to ellipsoidal and cylindrical conidia.

In the key to the nematode-destroying fungi by Cooke and Godfrey (1964), *Acrostalagmus zeosporus* Drechsler (1946) and *Cephalosporium balanoides* Drechsler (1941) are more or less triangular in conidial outline (Drechsler, 1941, 1946; Dowsett et al., 1982), but others have globose or non-triangular conidia. These two species are morphologically close to each other, but they are differentiated more strictly based on conidial shape and dimensions (the former, inversely elongate-nuciform, mostly 3.5–4.6 μm long, 1.7–2.1 μm wide; the latter, invertedly nuciform, 2.4–2.8 μm long, 2.3 μm wide). The synonym *Verticillium balanoides* (Drechsler) Dowsett et al. (1982) was adopted by Gams (1988) for these and several others in his comprehensive treatment on nematophagus *Verticillium*. Thus, accepting Gams' broad species concept in *V. balanoides*, I iden-

tified the nematode endoparasite associated with pine needles as *V. balanoides*.

Verticillium balanoides (Drechsler) Dowsett et al. in Neth. J. Pl. Path. **94**: 127, 1988. Figs. 1–8

Colonies on potato-dextrose agar (PDA) after incubation for 12 d at 20°C, 7–7.5 mm, at 25°C, 8–8.5 mm, at 28°C, 8–10 mm, at 30°C, 1–2 mm, for 17 d at 25°C, 11–12 mm, at 28°C, 12–14 mm, at 30°C, 2–4 mm, white, non-aerial; reverse white. Conidiophores erect, hyaline, branched with single, paired or verticillate phialides bearing terminal spore masses, nearly 10 μm diam, phialides flask-shaped or gradually tapering toward tips, mostly 12.5–15 μm long, 1.5 μm wide. Conidia hyaline, more or less maize-kernel-like, triangular in outline, rounded at the proximal end, gradually tapering to the distal end, 3.5–4.5 \times 1.5–2 μm .

Habitat. On nematodes associated with dead needles of *Pinus densiflora* Sieb. et Zucc., Tsukuba, Japan.

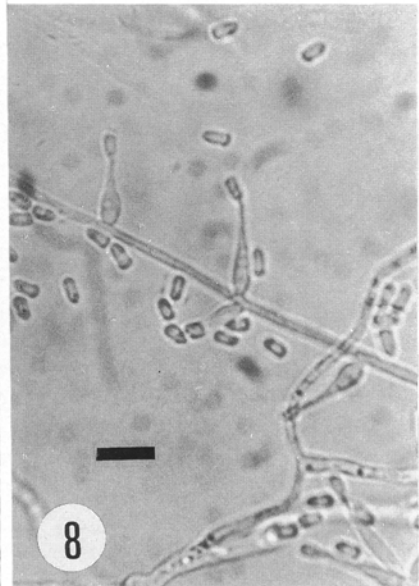
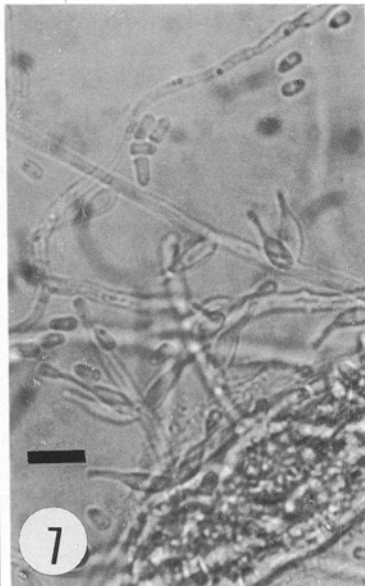
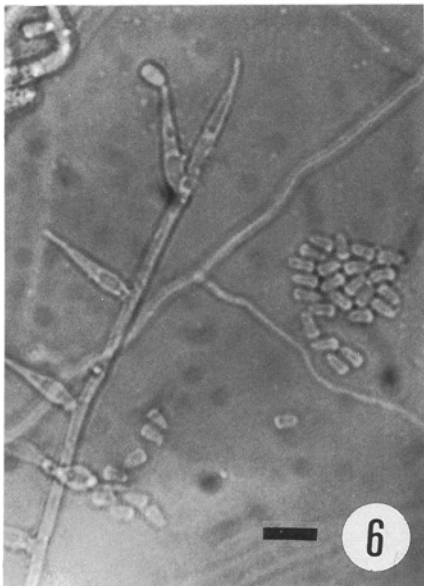
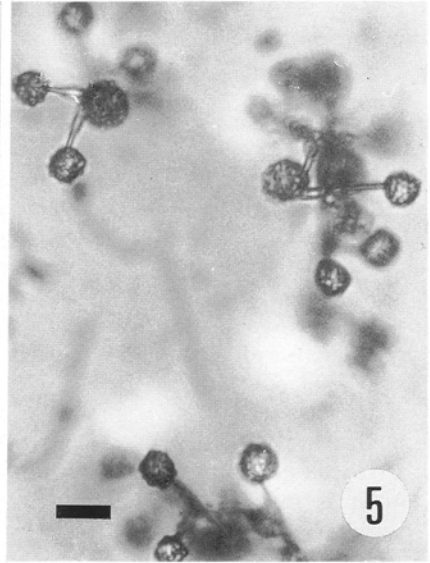
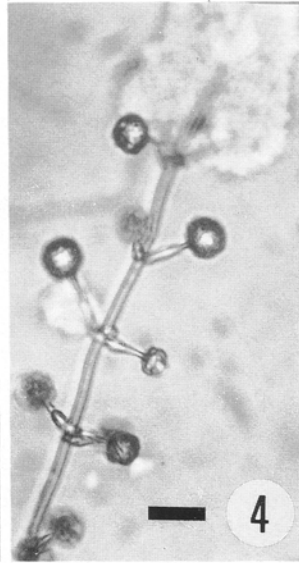
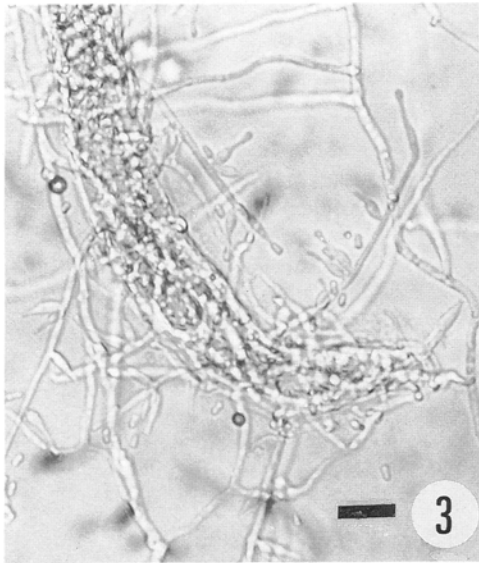
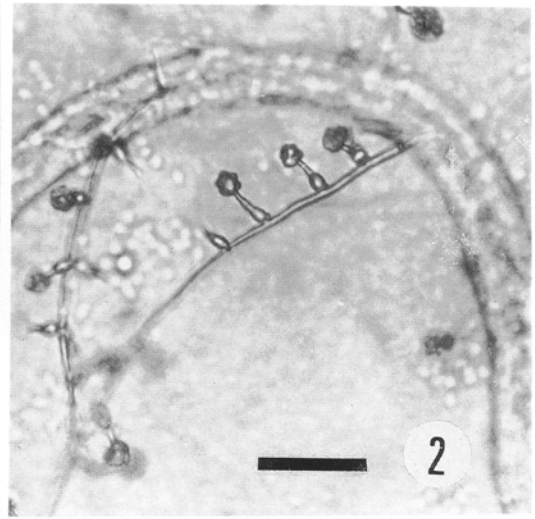
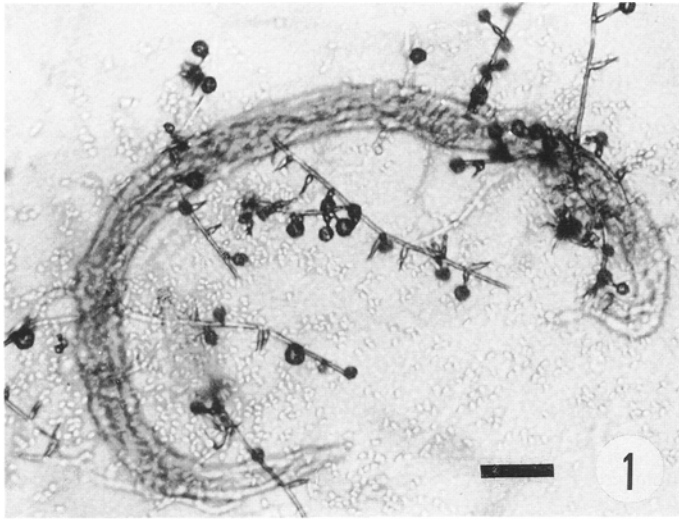
Material examined. Japan, Ibaraki, Tsukuba, cultures from needles of dead branches of *P. densiflora*, 22 July 1980, T. Watanabe. Three isolates (TW 80-33, -35, -36) deposited at the Gene Bank, National Institute of Biological Resources, Ministry of Agriculture, Forestry, and Fisheries (MAFF 237890, 237891, 237892) at Tsukuba, Ibaraki, Japan.

Dictyochlamydospores were not observed, and no particular attention was paid to adhesiveness of the conidia during this study.

This fungus may have been unreported in Japan.

Acknowledgements—Part of this study was conducted at the National Institute of Agricultural Sciences (presently National Institute of Agro-Environmental Sciences), Tsukuba SC, Ibaraki, Japan in 1980–1983.

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Figs. 1-8. *Verticillium balanoides*.

1, 2. Sporulation on dead nematodes. 3. A disintegrated nematode body filled with hyphae, and elongated hyphae outside the body undergoing sporulation. 4, 5. Spore masses developed terminally on paired or verticillate phialides. 6-8. Conidiophores with single (6, 8) and verticillate phialides (7) and detached conidia.
Scale bars: Fig. 1, 50 μm ; Fig. 2, 45 μm ; Figs. 3-5, 15 μm ; Figs. 6-8, 7.5 μm .