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FURIA CRUSTOSA, FUNGAL PATHOGEN OF FOREST TENT CATERPILLAR IN FLORIDA

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The forest tent caterpillar, Malacosoma disstria Hubner, can defoliate many tree species (Badger & Waters 1956, Futuyama & Wasserman 1981, Lorimer 1979). During spring 1987, epizootics were observed decimating forest tent caterpillars in Central Florida. Numerous cadavers were collected and the pathogen was identified as Furia crustosa MacLeod & Tyrrell (1979). The purpose of this note is to report the first observed Florida occurrence of F. crustosa on the economically important M. disstria.

Cadavers were mounted within a few hours after collection and placed in humid chambers to induce the fungus to sporulate. Mycelium and sporulating structures were mounted in lactophenol-cotton blue for light microscopy. For scanning electron microscopy, pieces of diseased cadavers were fixed in 8% glutaraldehyde and critical point dried following the procedure of Samson et al. (1979).

Projected primary spores, mycelial fragments from the haemocoeol and resting spores were transferred to various mycological media, including Sabouraud, soil extract and malt extract agars with additional antibiotics. In spite of numerous attempts and up to 10 days of observation, the fungus did not grow on the artificial media tested. Dried specimens are deposited at the Herbarium of the Centraalbureau voor Schimmecultures (CBS).

Percent disease estimates were made by rapidly counting diseased and healthy larvae from 1-5 feet on three trees separated by 100 ft in each infestation.
On April 24, 1987, large numbers of fourth instar *M. disstria* were observed in the Greenswamp Wildlife Management Area in Central Florida. This area is 52,000 acres of protected state-owned land in the middle of approximately 50 square miles of Central Florida designated the greenswamp. Two heavy *M. disstria* infestations were observed, one at Devil's Creek and one at Orange Lake, feeding primarily on *Nyssa sylvatica* Marsh var. *biflora* (Walt.) Sarg. (black gum) and *Prunus* spp. (cherry). These infestations

Fig. 1. (A) Typical pose of dead larva of *Malacosoma disstria* (2x), (B) Phase contrast micrograph of the resting spores (1000x).
were separated by about 3 miles and localized to 1-2 acres. The caterpillar aggregates were disbanding on May 8, 1987, and thousands of 4th instar larvae were observed on various plants. Some feeding was still occurring. Two diseased caterpillars were observed. On May 15, 1987, at both locations, about 10% of the observable caterpillars were diseased; 90% were still 4th instar and appeared healthy. Diseased and dead caterpillars took a characteristic pose with the rear prolegs holding the substrate and the head raised at a 45° angle (Fig. 1A). On May 21, 1987, only a few 4th instar larvae were alive. The remainder were dead or had pupated in a variety of trees and low woody shrubs. Diseased caterpillars were located from 1-3 feet above ground level attached to bromeliads which are common in Florida swamps. A very few were found on twigs or higher than 10 feet above the ground. Diseased caterpillars deteriorated within 2 or 3 days. It was subsequently difficult to locate them on the original substratum where they had died.

Our morphological studies of the *F. crustosa* specimens collected from forest tent caterpillar in Florida generally confirmed the description by Tyrrell & Ben-Ze'ev (1990) except that true rhizoids or cystidia were not found. Ben-Ze'ev & Kenneth (1982) suggested that rhizoids might be present in *F. crustosa* following indications in the original description (MacLeod & Tyrrell, 1979). Our observations did not show that the caterpillars were attached to the substratum by rhizoids. The cadavers were characteristically held fast by the prolegs. This typical position of the cadavers was also seen when

![Fig. 2](image). Phase contrast microscopy of spores of *Furia crustosa* (A) and (B) primary spores (1000x), (C-E) secondary spores (1000x).
the caterpillars were only infected by resting spores (Fig. 1B, Fig. 3E), a stage which was regularly present. In some cases, mycelial and sporulating structure hyphae were observed growing out of the prolegs and other body parts. The Florida specimen did not deviate significantly from those described by MacLeod & Tyrrell (1979) from other parts in eastern North America, except that secondary spores could be observed (Fig. 2, Fig. 3). Tyrrell & Ben-Ze'ev (1990) did observe secondary spores. In the first description, the ornamentation of the resting spores was depicted by SEM micrographs made from air-dried material, giving an impression of a pronounced roughening. Although shrinkage also occurred in our critical point-dried specimens, our micrographs showed

![Scanning electron micrograph of spore of Furia crustosa](image)

**Fig. 3.** Scanning electron microscopy of spore of *Furia crustosa* (A) early infection of larva, showing spores and hyphae penetrating the cuticle (500x), (B) primary spore (2750x), (C) (1700x), and (D) (1825x) primary spores and development of secondary spores, (E) (800x) and (F) (1000x) resting spores.
an ornamentation of the epispore which is more in accordance with that observed in light microscopy.

This is the first report of an epizootic caused by *Furia crustosa* on *Malacosoma disstria* in Florida.

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REFERENCES CITED


