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Light and Electron Microscopic Observations of *Cladosporium* sp. Growing on Basidia of *Exobasidium camelliae* var. *gracilis*

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Cladosporium is a very large anamorphic fungal genus containing saprobic, endophytic, plant pathogenic and fungicolous species. Fungicolous species obtain nutrients by growing on other fungi and can be parasites, commensals or saprobes. In this study we used light and electron microscopy to study a species of *Cladosporium* found growing on the basidia of *Exobasidium camelliae* var. *gracilis* in an attempt to elucidate the nutritional relationship between the two species. *E. camelliae* var. *gracilis* is a plant pathogenic fungus that producing its basidia (Fig. 1) in a layer on the abaxial surface of an infected leaf of its host, *Camellia sasanqua*. A razor blade was used to obtain small pieces of infected leaves whose under surfaces were covered with basidia bearing discrete colonies of *Cladosporium* sp. (Fig. 2). Samples were prepared for study as follows. For SEM a standard fixation procedure [1] involving the use of glutaraldehyde and OsO_4 was employed. Following fixation, samples were washed in distilled water, dehydrated in a graded ethanol series and critical point dried. Samples were mounted on specimen stubs using conductive tape, sputter-coated with gold and examined using a JEOL 6400 microscope operating at 15 kV. For TEM, samples were fixed as described above, dehydrated and infiltrated in Spurr's resin [2]. Following resin polymerization, thin sections of samples were cut using an ultramicrotome equipped with a diamond knife, collected on slot grids, allowed to dry on formvar-coated aluminum racks, post-stained and examined with a Zeiss 902A microscope operating at 80kV. For light microscopy, approximately 1µm thick sections of fixed samples were cut with a diamond histo-knife, collected on glass microscope slides, stained with toluidine blue O and examined and photographed using bright field light microscopy.

Young healthy basidia of *E. camelliae* var. *gracilis* appear as erect, swollen hyphal tips lining the undersurface of an infected leaf (Fig. 1). Fig. 3 shows the hyphae and spores in a colony of *Cladosporium sp*. growing on a layer of basidia. A light microscopic view of a section of a similar colony is shown in Fig. 4. As evident in Fig. 4, the underlying basidia are completely collapsed. However, a few intact basidia are evident near the margin of the colony. Examination of thin sections with TEM provided no evidence that hyphae of *Cladosporium* sp. actually penetrate living basidia. It appears that *Cladosporium* sp. somehow causes the underlying basidia to undergo lysis and release their contents. The hyphae of *Cladosporium* sp. then appear to grow in a saprobic fashion as they ramify throughout this dead material. This is in contrast to the situation in some species of *Cladosporium* in which their hyphae actually penetrate living hyphae and spores of their host fungi.

[1] K. Enkerli et al., Can. J. Bot. 75 (1997) 1493
[2] J. Taylor and C. W. Mims, Can. J. Bot. 69 (1991) 1207

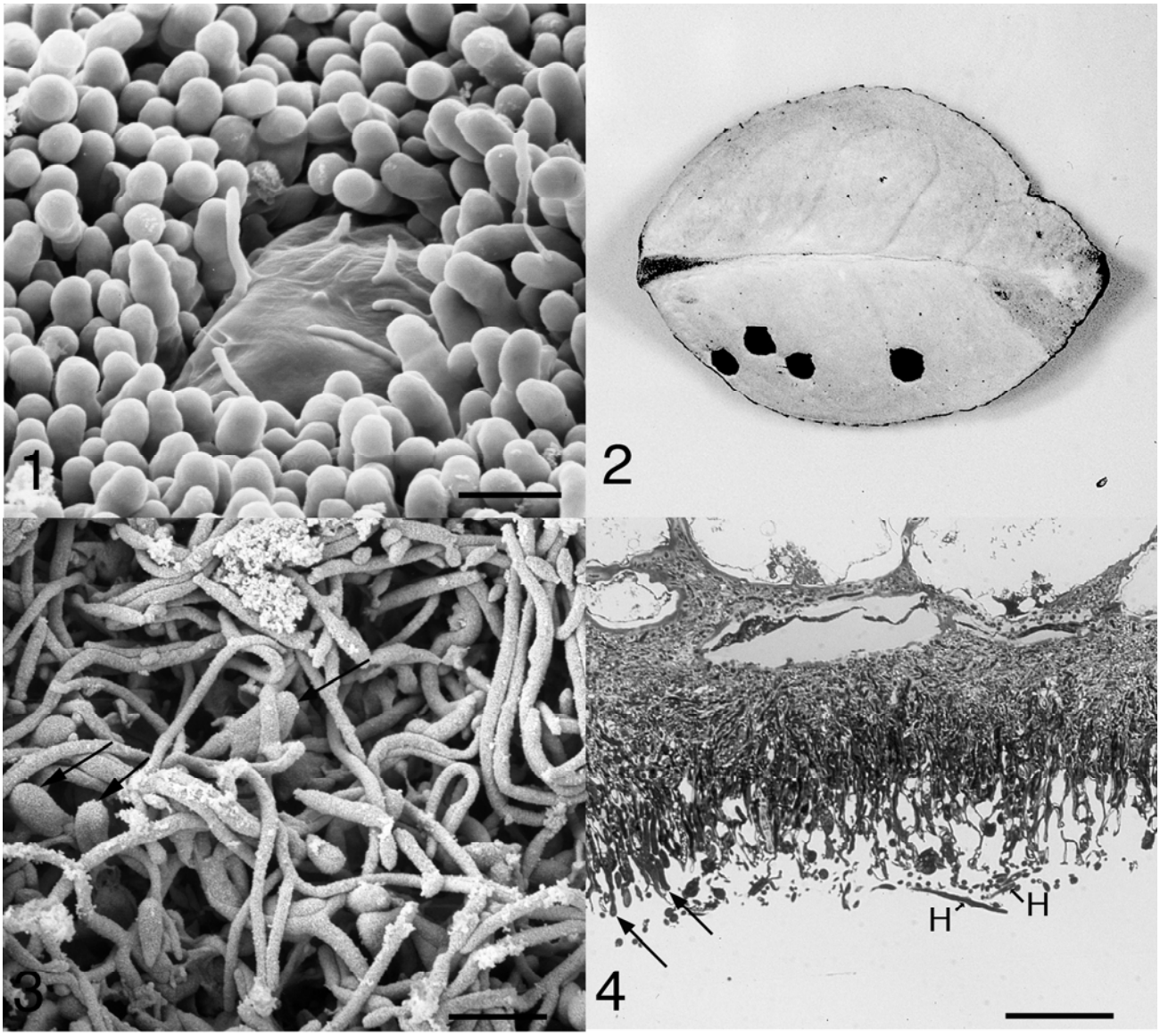

FIG. 1. Scanning electron micrograph of basidia of *Exobasidium camelliae* var. *gracilis* on the underside of an infected leaf of *Camellia sasanqua*. Bar = 20 μm.

FIG. 2. A near life size image showing a white felt-like layer of basidia on the underside of an infected leaf. The four dark regions that are visible are colonies of *Cladosporium* sp.

FIG. 3. Scanning electron micrograph of hyphae and spores (arrows) of *Cladosporium* sp. growing over the basidia of *Exobasidium camelliae* var. *gracilis.* Bar = 20 μm.

FIG. 4. Light micrograph of a thick section of a colony of *Cladosporoium* sp. stained with toluidine blue O. A few hyphae (H) of *Cladosporium* are visible. Note the absence of intact basidia above the hyphae. A few intact basidia (arrows) are visible near the margin of the colony. Bar = 0.05 mm.

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