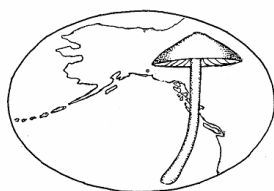


# Pacific Northwest Fungi



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## First report of powdery mildew of *Lactuca sativa* (garden lettuce) caused by *Golovinomyces* *cichoracearum* in the Pacific Northwest

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The powdery mildew fungus *Golovinomyces cichoracearum* (DC.) V.P. Heluta ( $\equiv$  *Erysiphe cichoracearum* DC.) (Erysiphales) occurs on a wide range of Asteraceae (Braun, 1987). Although *G. cichoracearum* has been studied in the Pacific Northwest for many years (Shaw, 1973a, b), new information on its host range continues to emerge. Recent new host records for *G. cichoracearum* in the region

include *Cirsium arvense* (L.) Scop. (Newcombe and Nischwitz, 2004; Dugan and Glawe, 2007) and species of *Coreopsis* (Glawe et al., 2006). During continuing surveys for powdery mildew fungi in the region, this fungus recently was found on *Lactuca sativa* L. (garden lettuce) growing in a private garden in Seattle, King County, Washington. Although occurring there on

lettuce for many years, it has not been reported from this host in the Pacific Northwest. Herein we document the occurrence of *G. cichoracearum* on *L. sativa* in the Pacific Northwest with illustrations of the fungus from fresh material.

Plants were started indoors in September, 2006 and then several weeks later transplanted to an unheated cold frame. The cultivar was 'Brunia.' Powdery mildew developed in about 2 months and persisted through the winter. Disease signs (Fig. 1) were typical of a powdery mildew disease and included superficial, rather effuse, whitish colonies ranging up to 2-cm in diameter on adaxial leaf surfaces. Mycelia produced whitish accumulations of conidiophores and conidia. Hyphae were superficial with nipple-shaped appressoria (Fig. 2) and produced conidiophores (Figs. 3, 4) with cylindrical foot cells measuring (38.5-)40.5-64.5 x 11-13 µm and chains of conidia. Conidia (Fig. 5) were hyaline, short-cylindrical to ovoid, lacked fibrosin bodies, and measured (34-) 35-42.5(-45) x 16-19.5 µm. The teleomorph was not observed. Based on morphological features of the anamorph and the asteraceous host (Braun, 1987) the fungus was determined to be *G. cichoracearum*.

*Golovinomyces cichoracearum* has been reported (as *E. cichoracearum*) from a number of *Lactuca* species in North America, including *L. canadensis* L. (California and North Carolina), *L. tatarica* (L.) C.A. Mey. var. *pulchella* (Pursh) Breitung (as *L. pulchella*) (California and Montana), *L. serriola* L. (syn. *L. scariola* L.) (California, Idaho, North Carolina, North Dakota, Washington and Wyoming), and *L. spicata* (Lam.) Hitchc. (North Dakota) (Farr et al., n. d.). The fungus has been reported from *L. sativa* in California, Florida, and Michigan (Farr et al., n. d.). Because it occurs on *Lactuca* species throughout much of North

America it seems likely that it occurs on *L. sativa* across a broader geographical area than has been reported.

Powdery mildew is a frequent problem on cold frame-grown lettuce during the winter months in Seattle, rendering the older leaves unusable for salads. The teleomorph of *G. cichoracearum* was not found on the plants examined in this study. Observation of actively sporulating mycelia in non-heated cold frames suggests that Asteraceae which overwinter in western Washington might serve as a source of conidia (primary inoculum) for initiating new infections of this fungus.

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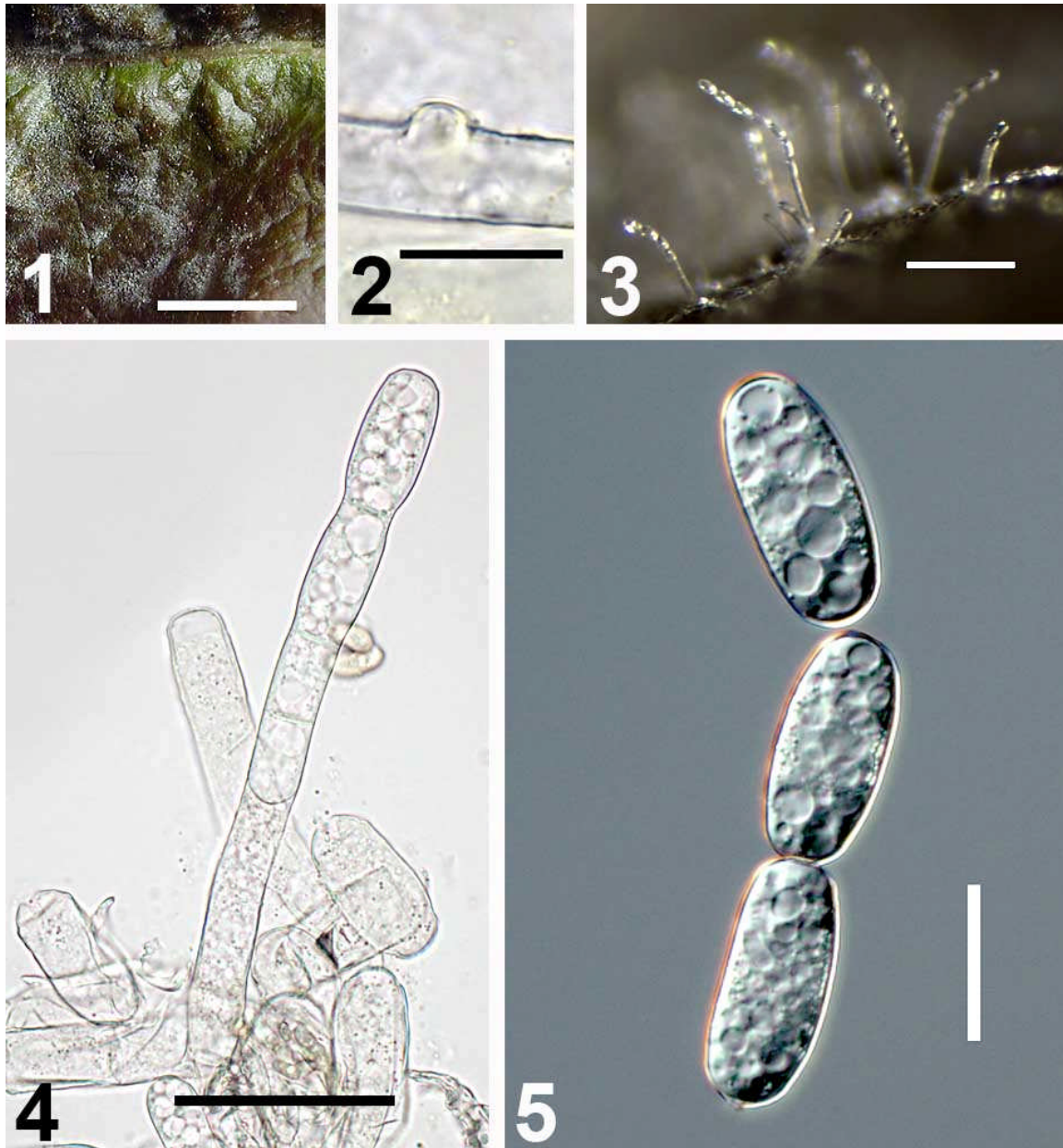
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Figs. 1-5. *Golovinomyces cichoracearum* on *Lactuca sativa*. 1. Mycelia on leaf. Scale bar = 1 cm. 2. Appressorium by brightfield microscopy. Scale bar = 15  $\mu\text{m}$ . 3. Conidiophores forming chains of conidia. Scale bar = 250  $\mu\text{m}$ . 4. Conidiophore with developing conidia, by brightfield microscopy. Scale bar = 50  $\mu\text{m}$ . 5. Conidia by differential interference contrast microscopy. Scale bar = 25  $\mu\text{m}$ .