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First Report of Powdery Mildew of Onion (*Allium cepa*) Caused by *Leveillula taurica* in the Pacific Northwest

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A powdery mildew disease of onion (*Allium cepa* L.) has been observed infrequently in the Columbia Basin of Washington State since 1996 (G.Q. Pelter, *personal communication*), but there are no published reports of this disease in the Pacific Northwest. In July 2003, the disease was observed in several onion crops at mid-bulbing (10- to 12-leaf) growth stage at a very low incidence (< 1% plants affected) in Grant County, WA. The causal agent was determined to be *Leveillula taurica* (Lév.) G. Arnaud. Foliar symptoms included infrequent, circular to oblong (5 to 20 mm), chlorotic to necrotic (white) lesions (Fig. 1). Signs of the disease included effuse, white patches of conidiophores on leaves.

In July and August 2004, the disease was observed on onions at mid-bulbing growth stage in a Washington State University onion cultivar trial near Quincy, Grant County, WA. The trial included replicated plots with 47 onion cultivars planted within a furrow-irrigated commercial bulb crop. Powdery mildew was observed in at least two replications of each of the following cultivars (seed company name provided in parentheses): 'Gunnison', 'BGS 194', and 'BGS 196' (Bejo Seeds); 'SWO 6011' (Global Genetics); 'W20' (Nippon Norin); 'Golden Spike', 'EX 15122', and 'SVR 5819' (Seminis Vegetable Seeds); and 'Flamenco', 'Granero', 'Salsa', 'Tesoro', 'SX 7002', and 'SX 7004' (Nunhems). The disease was not observed in the surrounding crop of 'Tamara'. Powdery mildew also was diagnosed in July 2004 on leaf samples of several cultivars received from a proprietary seed company field trial in Franklin County, WA.

The pathogen exhibited characteristics typical of *L. taurica*. Vegetative hyphae grew superficially on the epidermal surface or intercellularly among mesophyll cells (Fig. 2). Conidiophores (Fig. 3) emerged in groups of 2 to 8 from stomata, were multiseptate, and bore single conidia. Conidia were either lanceolate (Fig. 4A) or cylindrical to ellipsoid (Fig. 4B), and measured (36-) 49-66 (-67) × (15-) 16.5-23 µm. The teleomorph was lacking. Internal mycelium, conidiophores emerging from stomata, dimorphic conidia (lanceolate first-formed conidia, and cylindrical to ellipsoid later-formed conidia), and the host species are diagnostic for *Leveillula taurica* (Lév.) G. Arnaud (1,2) (also designated as *Oidiopsis sicula* Scalia or the illegitimate synonym *O. taurica* E. S. Salmon [4]). A voucher specimen was deposited with the Mycological Herbarium of the Plant Pathology Department at Washington State University.

Leveillula taurica has been reported on onion in Israel (4) and southeastern Europe (2), and on the onion cultivar 'Henry's Special' in CA (3). The fungus has been reported from many host species in numerous families (1). According to Braun (1,2), *L. taurica* is best regarded as a composite species consisting of many host-specific races. Observation of powdery mildew on only one cultivar in CA (3), and on 14 of 47 cultivars in Washington in 2004, suggests the possibility of cultivar specificity among isolates pathogenic to onion. Additional research is

needed to determine whether alternative hosts or a teleomorph might play a role in the epidemiology of this onion disease, and to assess the potential for crop losses associated with this pathogen.

Fig. 1. White (necrotic) lesion (15 mm in length) on an onion leaf caused by *Leveillula taurica*.

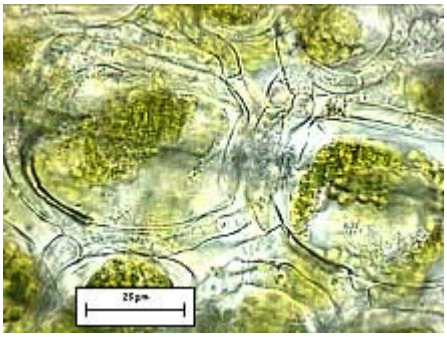

Fig. 2. Internal mycelium (hyphae encircling host mesophyll cells) of *Leveillula taurica* parasitizing *Allium cepa*.

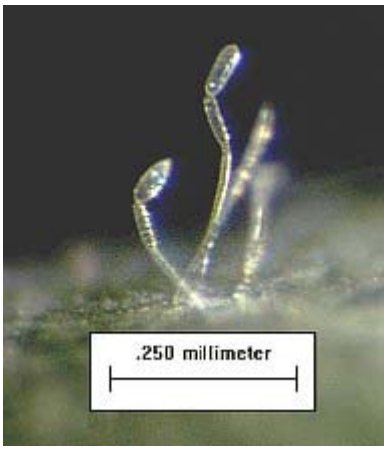

Fig. 3. Conidiophores of *Leveillula taurica* emerging from a stoma of *Allium cepa*.

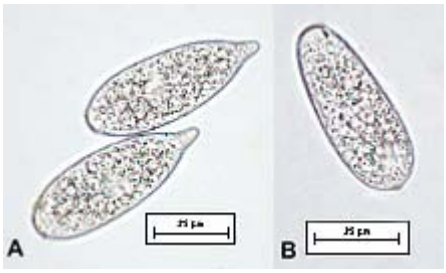

Fig. 4. Conidia of *Leveillula taurica* produced on *Allium cepa*. (A) Lanceolate conidia. (B) Cylindrical conidium.

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