First Report of Powdery Mildew of *Gaillardia* × *grandiflora* (Blanket Flower) Caused by *Leveillula taurica* in North America

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Gaillardia × *grandiflora* Van Houtte. (Blanket flower) (Asteraceae) is an herbaceous perennial planted in landscapes for its colorful flowers. During recent surveys of field-grown plants at a propagation facility in Yakima Co., WA, a powdery mildew disease was observed on the cv. 'Baby Cole.' The powdery mildew fungus in question was determined to be *Leveillula taurica* (Lév.) G. Arnaud, previously unknown from *Gaillardia* species in North America. This report documents the occurrence of *L. taurica* on *Gaillardia* × *grandiflora* and provides information on disease symptomatology as well as features distinguishing this fungus from other powdery mildew pathogens of *Gaillardia* in North America.

Disease symptoms included chlorotic regions on leaves that occasionally became necrotic (Fig 1A). Diseased leaves became covered with whitish accumulations of conidiophores and conidia (Figs. 1B and 2). Conidiophores (Fig. 3) emerged in groups of 2 to 8 through stomata, were multiseptate, measured (79-) 82-163 (-184) × (5.5-) 6-8 (-9) µm and bore single conidia. Conidia were either lanceolate or cylindrical (Fig. 4) and measured (45.5-) 50.5-68.5 (-73) × (15-) 17-20.5 (-22) µm. The teleomorph was lacking. Diagnostic characteristics indicative of *L. taurica* included internal mycelium with conidiophores emerging through stomata, dimorphic conidia (lanceolate first-formed conidia and cylindrical to ellipsoid later-formed conidia), and the host genus (1).

Fig. 1. Powdery mildew symptoms caused by *L. taurica* on *Gaillardia* × *grandiflora*. **A.** Diseased plant in field. **B.** Infected leaves showing adaxial surface (top) and abaxial surface (bottom).

Fig. 2. Conidiophores produced by *L. taurica* on *Gaillardia* × *grandiflora*.

Fig. 3. Conidiophores of *L. taurica* emerging through a stoma on a leaf of *Gaillardia* × *grandiflora*.

Fig. 4. Cylindrical (left) and lanceolate (right) conidia produced by *L. taurica* on *Gaillardia* × *grandiflora*.

Leveillula taurica previously was reported from other species of *Gaillardia* in south Asia, the Mediterranean region, South Africa, and the former USSR (2). In North America, reports of powdery mildew diseases of *Gaillardia* species implicated *Erysiphe cichoracearum* DC. [more recently designated *Golovinomyces cichoracearum* (DC.) VP Gelyuta] in Montana and Oklahoma, and *Sphaerotheca* [*Podosphaera* (sect. *Sphaerotheca*)] species in Montana, Oregon, Washington, and Wyoming (2). Microscopically, *L. taurica* is distinguished readily from other species which produce monomorphic conidia in chains from conidiophores formed on ectophytic mycelia.

Leveillula taurica first was determined to occur in Washington in 2004 on *Allium cepa* L., *Solanum tuberosum* L., and *Triglochin maritima* L. (5). The fungus also occurs in Idaho and British Columbia (3,4,6). Within the Pacific Northwest, the only known teleomorphic host remains greenhouse-grown *T. maritima* plants in eastern Washington (5). Because of the very broad host range of *L. taurica* (1), it is possible that hosts other than *Gaillardia* were the source of inoculum for the observed disease outbreak. It would be useful to determine whether perennial hosts such as *Gaillardia* species could be involved in overwintering of the fungus in the absence of the teleomorph.

The fungus caused significant losses, estimated at more than 25% of production, at the location studied by making infected plants unsuitable for use in propagation. Further research is needed to assess more fully the host and geographical ranges of *L. taurica* in the Pacific Northwest, and the possible role of multiple hosts in the epidemiology of the diseases it causes.

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