Powdery Mildew (*Leveillula taurica*) on Native and Cultivated Plants in Arizona

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ABSTRACT

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Leveillula taurica was observed for the first time in Arizona on tomato, guar, and on the native hosts *Nicotiana trigonophylla* (wild tobacco) and *Caesalpinia gilliesii* (desert bird of paradise). The disease occurred from mid-September through November over the southern half of the state.

The powdery mildew fungus *Leveillula taurica* (Lev.) Arn. or its conidial stage, *Oidiopsis taurica* Tepper, has been associated with more than 700 host species worldwide. The more common hosts of this fungus include pepper (*Capsicum annuum* L.), tomato (*Lycopersicum esculentum* Mill.), alfalfa (*Medicago sativa* L.), and cotton (*Gossypium barbadense* L. and *G. hirsutum* L.). Although there are numerous reports of *L. taurica* from Africa, Asia, and the Mediterranean area, the literature holds fewer than a dozen reports from North America (4). The first report of *L. taurica* from North America was in 1912 on several mesquite species (*Prosopis chilensis* Stuntz., *P. juliflora* (Swartz) DC., and *P. glandulosa* Torr.) in Texas and adjacent areas of Mexico (10). In mid-November 1952, the fungus was reported from kenaf (*Hibiscus cannabinus* L.) in Florida (3). *L. taurica* was found on *Diplacus aurantiacus* Jeps., in Berkeley, CA, throughout 1972 (13). Recently, *L. taurica* occurred at epidemic levels on tomato in the Imperial and Central valleys of California (1,6) and in Utah (11) during late spring and early summer (May–August). Several weed hosts have also been reported in California (2).

L. taurica is an important pathogen of guar (*Cyamopsis tetragonoloba* (L.) Taub.) in India and Pakistan. The fungus infects leaves, stems, and pods, resulting in eventual defoliation and reduced yields. The disease on guar usually occurs from August to October and is more often severe in arid areas (5,8,9,12). Recently, there has been an interest in growing guar in Arizona, where it is planted from late May through June. Pods are harvested in late October through November, and the gum is used in oil drilling and other industries.

This is the first report of the occurrence of *L. taurica* on native and cultivated plants in Arizona.

MATERIALS AND METHODS

Field observations of *L. taurica* on guar were made during surveys in 1982, when guar was widely planted over the southern half of the state. During 1981 and 1983, guar was grown primarily in experimental plantings.

The identity of the fungus was confirmed by microscopic observation of the two types of conidia (naviculate and cylindrical) and the subepidermal mycelium. The lengths and widths of 25 conidia were measured in each of nine collections. The conidial dimensions were 50–65 × 13.8–15.6 μm.

RESULTS AND DISCUSSION

Table 1 lists the distribution of *L. taurica* on all Arizona hosts during 1978–1983. *L. taurica* was first observed in the field in mid-November 1981 on guar grown at the Citrus Experiment Station in Yuma, AZ (J. Troutman, *personal communication*). To our knowledge, this is also the first report of the fungus on guar from North America. During the 1982 growing season, guar was planted in more than 5,000 A in Arizona, a substantial increase over previous years. In most fields inspected during September 1982, powdery mildew was not observed; however, between 25 October and 3 November 1982, *L. taurica* was observed throughout guar-growing areas, including most of the major agricultural areas of the state. During 1983, guar was planted in fewer areas than in 1982. Powdery mildew was observed from mid-October through November throughout guar plantations. The infection of guar was characterized by copious production of conidiophores on both surfaces of the leaflets. Affected areas showed no discoloration or only slight chlorosis. As infection progressed, entire leaflets and petioles were eventually colonized and defoliation ensued. Infections of stems, flowers, or pods were not observed. The perfect stage of the fungus was not observed on any collection. Although infection was extensive in most fields examined, there was probably little yield loss attributable to the disease because the disease appeared so late in the growing season, after pods had been set and were nearly mature.

In the Sudan, *L. taurica* has been reported on both *Gossypium barbadense* and *G. hirsutum* cotton during the winter months. There, the disease is only important on young seedlings and little infection is reported after the four- to five-leaf stage (7). The disease has not yet been observed on cotton in Arizona. During the fall of 1982, one guar field examined (Harquahala Valley, Maricopa Co.) had many volunteer cotton plants. Even though at least 90% of the guar plants were heavily infected with *L.*

Table 1. Observations of *Leveillula taurica* in Arizona

Host	Year	Counties
Guar	1981	Yuma
	1982	Cochise, Maricopa, Pima, Pinal
	1983	Pima, Pinal
Tomato (greenhouse)	1978	Pima
Tomato (field)	1983	Cochise
Desert bird of paradise	1983	Pima
Wild tobacco	1983	Pima

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taurica, no mildewed cotton plants were found, even where cotton leaves were in direct contact with infected guar leaves. Because cotton plants had nearly mature bolls at this time, it is presumed that the plants were too old to be infected.

During 1983, *L. taurica* was observed on several hosts in addition to guar. During September, powdery mildew was observed on field-grown tomato in Cochise County (R. B. Hine, *personal communication*). Although the disease was first observed in Tucson on greenhouse-grown tomatoes on 15 August 1978 (M. E. Stanghellini, *personal communication*), the 1983 observation was the first field record for Arizona. Symptoms on field-grown tomatoes were similar to those reported previously in California and Utah (1,6,11). Sporulation in the field was less abundant than that on the greenhouse-grown tomatoes, however.

L. taurica was also observed on native desert bird of paradise (*Caesalpinia gilliesii* Wall.) and wild tobacco (*Nicotiana trigonophylla* Dunal.). We believe this is the first report of this fungus on these two hosts. The ability of the fungus to infect native hosts is particularly important because these native plants might serve as an inoculum reservoir for adjacent cultivated plants.

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