

Fusarium Wilt of *Hebe* Species

R. D. RAABE, Professor, Department of Plant Pathology, University of California, Berkeley 94720

ABSTRACT

Raabe, R. D. 1985. Fusarium wilt of *Hebe* species. Plant Disease 69:450-451.

Fusarium oxysporum, isolated from *Hebe odora* (*H. buxifolia*) and from *Hebe* cultivars 'Coed,' 'Lake,' and 'Patty's Purple' showing yellowing, browning, and occasional abscission of lower leaves, wilting, and vascular discoloration, was shown by experimental inoculation to be the cause of the problem. Ten *Hebe* species, two hybrids, and four cultivars were found susceptible. The fungus, named *F. oxysporum* f. sp. *hebae*, was not pathogenic to herbaceous or other woody members of the Scrophulariaceae that were inoculated.

About 20 yr ago, *Fusarium oxysporum* was isolated from plants listed as *Hebe buxifolia* (Benth.) Cockayne & Allan. According to McClintock and Leiser (3), this species is not cultivated and plants so listed probably are *H. odora* (Hook. f.) Cockayne. Infected plants were traced to a nursery in the San Francisco Bay area of California. A preliminary report was made and the fungus was named *F. oxysporum* Schlecht. f. *hebae* Raabe (4).

The nursery destroyed all the stock of *H. odora*, and the disease disappeared until 2 yr ago when it appeared in northern and southern California. It was found on *H. odora* and on *Hebe* cultivars 'Coed,' 'Lake,' and 'Patty's Purple.'

Symptoms appear as a yellowing and browning of the leaves, starting at the stem bases and progressing upward. Symptoms may appear on one side of the plant or on one branch as is characteristic of many of the Fusarium wilts. Infected plants usually are stunted. Symptomatic leaves frequently abscise, but abscission rarely progresses to the top of the plant before infected stems die. The tips of such stems bend downward, giving the appearance of wilt (Fig. 1). Shortly after leaf symptoms appear, the vascular system becomes completely brown. This is followed by a browning of the pith. Infected plants usually die.

Because this was a new forma specialis of *F. oxysporum*, the host range of the fungus was studied. Plants in the genus *Hebe* were collected as cuttings and were rooted in a mixture of half peat and half sponge rock. When rooted, they were transplanted into U.C. mix (half sand and half peat steamed at 82 C for 30 min) (1) in 7.6-cm clay pots until they were established. Plants then were removed from the root substrate and the roots were washed and dipped in a spore

suspension of the fungus. Inoculum was prepared from a monospore isolate of the fungus originally obtained from *H. odora* and then grown on potato-dextrose agar. After inoculation, plants were planted in U.C. mix in 10.2-cm pots and put in a greenhouse that varied in temperature from about 27 C during the day to about 21 C at night. Ten plants of each species were inoculated. After 6 wk, reisolation was attempted from one stem from each plant. Five cross sections about 3 mm thick and cut about 1.5 cm above ground level were surface-sterilized in 0.5% sodium hypochlorite for 1 min and plated on pea straw natural media (5).

Species found susceptible included *H. amplexicaulis* (J. B. Armst.) Cockayne & Allan, *H. bollonsii* (Cockayne) Cockayne & Allan, *H. bollonsii* (Cockayne) Cockayne & Allan × *H. lewisii* (J. B. Armst.) A. Wall, *H. matthewsii* (Cheesman) Cockayne, *H. odora* (Hook. f.) Cockayne, *H. salicifolia* (G. Forst.) Penn., *H. speciosa* (R. Cunn. ex A. Cunn.) Cockayne & Allan, *H. speciosa* (R. Cunn. ex A. Cunn.) Cockayne &

Allan 'Imperialis' × *H. franciscana* (Eastw.) Souster, and *Hebe* 'Autumn Glory.' *H. cupressioides* (Hook. f.) Cockayne & Allan was not susceptible.

Other woody plants inoculated included the following members of the Scrophulariaceae: paulownia (*Paulownia tomentosa* (Thunb.) Steud.), cape fuchsia (*Phygelius capensis* E. H. Mey. ex Benth.), and *P. aequalis* Harv. ex Hiern. Two members of the Bignoniaceae also were inoculated: trumpet vine (*Campsis radicans* Seem.) and common catalpa (*Catalpa bignonioides* Walter). Because *F. oxysporum* also has been reported on the woody plants *Albizia julibrissin* Durazz (2,7) and *Rhus typhina* L. (6), these plants were inoculated as were *R. chinensis* Mill., *R. coriaria* L., and *R. succedanea* L. All plants were grown from seed, and 10 plants of each were inoculated as described. In all experiments, rooted cuttings of *H. odora* also were inoculated. After 6 wk, all plants were assayed for infection as described above. The pathogen was isolated only from *H. odora*.

To test further the host range, herbaceous members of the Scrophulariaceae were grown from seed, transplanted in 7.6-cm pots, and inoculated as described. Plants included snapdragon (*Antirrhinum majus* L.), Cretan bear's-tail (*Celsia arcturus* Jacq.), foxglove (*Digitalis purpurea* L.), *Hebenstretia comosa* Hochst., linaria (*Linaria* sp.), monkey flower (*Mimulus tigrinus* Hort.), penstemon (*Penstemon gloxinoides* Hort.), butterfly flower (*Schizanthus*



Fig. 1. Young rooted cuttings of *Hebe odora*. Plant on right is an uninfected check. The other two plants show stunting, leaf drop, and wilting resulting from inoculation with *Fusarium oxysporum* f. sp. *hebae*.

Accepted for publication 12 December 1984.

The publication costs of this article were delayed in part by page charge payment. This article must therefore be hereby marked "advertisement" in accordance with 18 U.S.C. § 1734 solely to indicate this fact.

©1985 The American Phytopathological Society

pinnatus Ruiz & Pav.), wishbone plant (*Torenia fournieri* Lind.), and veronica (*Veronica spicata* L.). Rooted cuttings of *H. odora* also were included. After 6 wk, plants were assayed and *F. oxysporum* was isolated only from *H. odora*.

The fungus *F. oxysporum* f. sp. *hebae* found in *Hebe* was similar to other formae speciales of *F. oxysporum* in that its host range is limited to some members of a single genus. This is one of the few

reports of a woody plant found infected by a forma specialis of *F. oxysporum* that causes vascular wilt.

LITERATURE CITED

1. Baker, K. F., ed. 1957. The U.C. system for producing healthy container-grown plants. Calif. Agric. Exp. Stn. Man. 23. 332 pp.
2. Hepting, G. H. 1936. A destructive disease of the mimosa tree in the Carolinas. Plant Dis. Rep. 20:177-178.
3. McClintock, E., and Leiser, A. J. 1979. An annotated checklist of woody ornamental plants in California, Oregon & Washington. Univ. Calif. Div. Agric. Sci. Publ. 4091. 134 pp.
4. Raabe, R. D. 1957. Fusarium wilt of *Hebe buxifolia*. (Abstr.) Phytopathology 47:532.
5. Snyder, W. C., and Hansen, H. N. 1947. The advantages of natural media and environments in the culture of fungi. Phytopathology 37:420-421.
6. Toole, E. R., Snyder, W. C., and Hepting, G. H. 1948. A new Fusarium wilt of sumac. (Abstr.) Phytopathology 38:572.
7. Voronikhin, N. N. 1920. *Fusarium albizziae* n. sp. cause probable du deperissement d'albizzia jubbrissin Borss. Dans L'arrondissement di Batum. Vest. Fifiis Bot Sada 48:15-36.