

Verticillium Wilt of *Tagetes* spp.

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ABSTRACT

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Verticillium wilt of *Tagetes* spp., caused by *Verticillium dahliae*, is described for the first time. The disease was noted in Sinaloa, Mexico, and Shasta County, CA, in 1981. Twelve cultivars of *T. erecta*, four cultivars of *T. patula*, one cultivar of *T. tenuifolia*, and two cultivars of *T. erecta* × *T. patula* were shown to be susceptible to the isolates of *V. dahliae* from Mexico and California in greenhouse studies. Isolates of *V. dahliae* from cotton and chrysanthemum were also pathogenic to *T. erecta* cultivar Red Rooster.

Marigolds (*Tagetes* spp.) are popular garden plants grown throughout the world. *T. erecta* L. also is grown for the xanthophyll pigments that occur in the petals. About 3,500 ha of *T. erecta* are grown annually in the State of Sinaloa, Mexico, where the crop is sown in October and harvest ends in June.

In March and April 1981, scattered plants in about 1 ha showed premature yellowing and death in two fields near Los Mochis, Sinaloa, Mexico. *Verticillium dahliae* Kleb. was the only pathogen recovered from the xylem tissue. During June 1981, *V. dahliae* also was isolated from marigolds from Shasta County, CA, with symptoms of vascular wilt. The purpose of this paper is to report the pathogenicity of several isolates of *V.*

dahliae to various species and cultivars in the genus *Tagetes*.

MATERIALS AND METHODS

Pathogenicity of the Mexican isolate of *V. dahliae* was tested by dipping roots of 3-wk-old seedlings of *T. erecta* 'Hawaii' in an aqueous suspension of conidia produced on potato-dextrose agar medium (PDA). The conidial suspension was adjusted to about 5×10^4 conidia per milliliter with a hemacytometer. Seedlings were planted in a pasteurized potting mixture and maintained in the greenhouse at 20–30 C.

For evaluation of species and cultivars, the inoculum described was added to a sand-peat potting mixture. Seeds of *Tagetes* spp. were planted in the infested soil and maintained in a greenhouse at 18–26 C. In some experiments, roots of seedlings were dipped in the inoculum.

The California *Tagetes* isolate of *V. dahliae* was compared for pathogenicity with a cotton isolate and a chrysanthemum isolate using cotton (*Gossypium hirsutum* L. 'Acala SJ2'), chrysanthemum (*Chrysanthemum morifolium* Ramat. 'Fuji Mefo'), and *T. erecta* 'Red Rooster.' Seeds were sown in soil infested

with each *Verticillium* isolate. The chrysanthemums were rooted cuttings. Each treatment was replicated five times in individual clay pots.

RESULTS AND DISCUSSION

All *Tagetes* spp. tested became infected and showed Verticillium wilt symptoms when grown in *Verticillium*-infested soil or inoculated by the root-dip method. The following *Tagetes* spp. and cultivars were found susceptible to Verticillium wilt: *T. erecta* 'Crackerjack,' 'Double Lemon,' 'Double Orange,' 'First Lady,' 'Gold Coins,' 'Gold Lady,' 'Hawaii,' 'Primrose Climax,' 'Red Rooster,' 'Snowbird,' 'Sweet'N Gold,' and 'Yellow Climax'; *T. patula* L. 'Golden Gem,' 'Happy Orange,' 'Happy Red,' and 'Harmony Boy'; *T. tenuifolia* Cav. 'Lemon Gem'; and *T. erecta* × *T. patula* 'Gold Nugget' and 'Yellow Nugget.' The cotton and chrysanthemum isolates of *V. dahliae* also caused disease symptoms in Red Rooster and were recovered from four of five and five of five plants, respectively. Symptoms of Verticillium wilt in *Tagetes* were most severe when plants were inoculated with the *Tagetes* isolate followed by the chrysanthemum and cotton isolates.

Considering the wide host range of *V. dahliae* (1), it is surprising that Verticillium wilt of *Tagetes* spp. went unreported for so long.

LITERATURE CITED

- McCain, A. H., Raabe, R. D., and Wilhelm, S. 1979. Plants resistant or susceptible to Verticillium wilt. Div. Agric. Sci. Univ. Calif. Leafl. 2703. 10 pp.

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