

# Verticillium Wilt of Alfalfa in Wyoming

F. A. GRAY, Associate Professor, and D. A. ROTH, Assistant Professor, Plant Science Division, University of Wyoming, Laramie 82071

## ABSTRACT

Gray, F. A., and Roth, D. A. 1982. Verticillium wilt of alfalfa in Wyoming. *Plant Disease* 66:1080.

Verticillium wilt of alfalfa, caused by *Verticillium albo-atrum*, was observed in Wyoming for the first time in the fall of 1981. The disease currently appears to be restricted to irrigated alfalfa in north-central Wyoming. The isolate of *V. albo-atrum* from alfalfa also was pathogenic on sainfoin in a greenhouse test.

Verticillium wilt (VW), incited by *Verticillium albo-atrum* Reinke & Berth., has long been a serious disease of alfalfa (*Medicago sativa* L.) in northern Europe (6). VW was reported in eastern Canada in 1962 but not the following year (1). VW was first reported in the United States from Washington and Oregon in 1976 (3) and has since been found in Idaho (2), Wisconsin (4), Montana (D. Mathre, personal communication), and British Columbia, Canada (2,8).

Verticillium wilt of sainfoin (*Onobrychis viciifolia* Scop.), caused by *V. albo-atrum*, was reported in Germany in 1938 (7). Greenhouse studies conducted in England showed that the alfalfa strain of *V. albo-atrum* did not produce symptoms in sainfoin (5). However, Aubé and Sackston (1) reported that in greenhouse studies conducted in Canada, sainfoin was quite susceptible to *V. albo-atrum* isolated from alfalfa in Canada and Europe. Their data were given as percentage of plants from which the fungus was reisolated and did not indicate whether disease symptoms were present.

The purpose of this paper is to report the occurrence of VW on alfalfa in Wyoming and the pathogenicity of a Wyoming isolate of *V. albo-atrum* from alfalfa on sainfoin.

## MATERIALS AND METHODS

In November 1981, alfalfa with symptoms characteristic of Verticillium wilt were observed on a ranch in north-central Wyoming. A survey of all alfalfa fields on the ranch showed similarly affected plants in approximately 809 ha

(2,000 acres). All fields were planted with either the cultivar Thor or 10-19 Brand. All fields had plants showing VW-like symptoms, with the exception of fields in the first year of production. Stand dieback was observed in fields 3 yr old and older. The ranch is located at approximately 1,219 m (4,000 ft) of elevation and consists primarily of gently rolling hills with good drainage. The area receives approximately 30.5 cm (12 in.) of precipitation annually with an average of 95 frostfree days. Most fields are sprinkle irrigated; a few are flood irrigated. Average soil pH of several fields tested was 6.8. Fields are cut either twice or three times depending on weather conditions. No other diseases were detected during the survey. Diseased plants were collected at random and taken to the laboratory for isolation.

Isolation of a *V. albo-atrum*-like fungus was accomplished using techniques described by Christen and Peaden (2). A culture was sent to A. A. Christen, Washington State University, IAREC, Prosser 99350, for positive identification.

Pathogenicity studies were conducted on 9-wk-old plants of alfalfa (Vernal) and sainfoin (Remont) as described by Christen and Peaden (2). Plants were observed for VW symptoms after 4 wk, and isolations were made from diseased plants.

## RESULTS AND DISCUSSION

*V. albo-atrum* was readily recovered from plants having VW-like symptoms collected from the field. The fungus was culturally and morphologically identical to *V. albo-atrum* isolates from alfalfa in the Pacific Northwest (A. A. Christen, personal communication).

In the pathogenicity studies conducted in the greenhouse, the percentage of alfalfa and sainfoin plants healthy, symptomatic, or dead 4 wk after inoculation was 10, 30, 60 and 0, 50, 50, respectively. One week after inoculation

and transplanting, both uninoculated and inoculated alfalfa as well as uninoculated sainfoin plants appeared to be recovering and had new growth. Only the inoculated sainfoin plants failed to show any signs of regrowth. Symptoms of VW first appeared on alfalfa 8-10 days after inoculation. Leaves of affected plants turned pale yellow and showed severe curling and twisting. After the same period of time, most of the sainfoin plants were severely stunted and leaves were gray-green. *V. albo-atrum* was readily isolated from affected alfalfa and sainfoin plants.

The occurrence of VW at 1,200 m of elevation in Wyoming indicated that this disease may become established at the higher elevations in the mountainous regions of the western United States. This is the first report of VW on alfalfa from Wyoming and extends the range of VW in the United States.

Because sainfoin is grown in several northwestern states, including Wyoming, efforts should be made to determine whether VW has become established in this crop grown in the field.

## ACKNOWLEDGMENTS

We would like to thank A. A. Christen for identification of *Verticillium albo-atrum* and Ron Hossfeld (Padlock Ranch Company Manager), who made us aware of the problem.

## LITERATURE CITED

1. Aubé, C., and Sackston, W. E. 1964. Verticillium wilt of forage legumes in Canada. *Can. J. Plant Sci.* 44:427-432.
2. Christen, A. A., and Peaden, R. N. 1981. Verticillium wilt in alfalfa. *Plant Dis.* 65:319-321.
3. Graham, J. H., Peaden, R. N., and Evans, D. W. 1977. Verticillium wilt of alfalfa found in the United States. *Plant Dis. Rep.* 61:337-340.
4. Grau, C. R., Delwiche, P. A., Norgren, R. L., O'Connell, T. E., and Maxwell, D. P. 1981. Verticillium wilt of alfalfa in Wisconsin. *Plant Dis.* 65:843-844.
5. Isaac, I., and Lloyd, A. T. E. 1957. Wilt of lucerne caused by species of Verticillium. *Ann. Appl. Biol.* 47:63.
6. Kreitlow, K. W. 1962. Verticillium wilt of alfalfa. A destructive disease in Britain and Europe not yet observed in the United States. U.S. Dep. Agric. *Agric. Res. Serv.* 34-20. 15 pp.
7. Richter, H., and Klinkowski, M. 1938. Wirtelpilz-Welkekrankheit an Luzerne und Esparsette (Erreger: *Verticillium albo-atrum* Rke. et Berth.). [The whorl fungus wilt disease of Lucerne and Sainfoin (causal organism: *Verticillium albo-atrum* Rke. and Berth.)] *Nachrichtenbl. Dtsch. Pflanzenschutzdienst (Berlin)* 18:57-58. Abstr. taken from: *Rev. Appl. Mycol.* 17:754.
8. Sheppard, J. W. 1979. Verticillium wilt, a potentially dangerous disease of alfalfa in Canada. *Can. Plant Dis. Surv.* 59:60.

Accepted for publication 2 June 1982.

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0191-2917/82/11108001/\$03.00/0

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