

Phytophthora Root Rot of Alfalfa

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ALFALFA HAS LONG BEEN KNOWN to be intolerant to "wet feet" or poor drainage. Thinning of stands often occurs in the seeding year on poorly drained soils or during wet years. Now it is known that *Phytophthora* root rot can cause these stand depletions because the causal fungus, a water mold, requires high soil moisture for infection.

Phytophthora root rot is prevalent throughout the North Central states, some northeastern states and in irrigated fields of some western states. A survey in Ontario, Canada, indicated that *Phytophthora* root rot is present in most of the soils where alfalfa is grown.

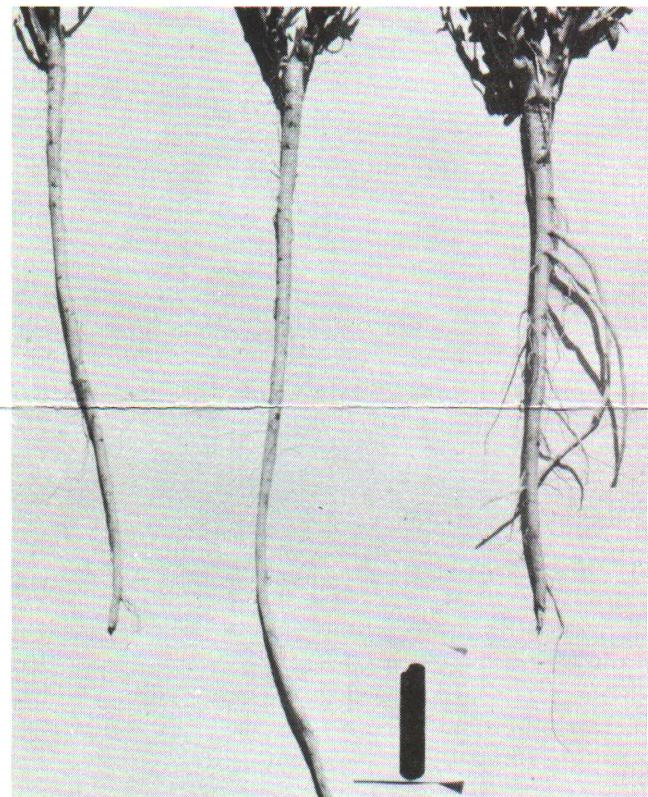
Phytophthora root rot is caused by the fungus, *Phytophthora megasperma* Drechs. Under natural conditions this particular fungus infects only alfalfa. It can attack at any stage of development but does most damage to young seedlings. Apparently the fungus is present in many, if not most, soils but damage is most severe when the soil is excessively wet. The symptoms of *Phytophthora* root rot are distinct from those due to flooding injury which looks more like scalding.

The fungus moves in free soil water and invades the fine lateral roots, causing extensive killing. Growth is stunted, and yield of forage is reduced, although top growth may appear normal. The fungus also invades the taproot where a lateral root emerges. A yellowish-brown rotted area, changing into a rough, blackish lesion, appears on the taproot. If the soil becomes drier, the decay ceases. The remaining root lesion resembles the feeding injury caused by some root curculio insects.

If the soil continues very wet, the fungus continues to grow inward, cutting off the taproot. The top of the plant will show signs of wilting, turn somewhat yellowish and may even defoliate. New lateral roots may form to permit the plant to survive but make it highly subject to drought injury or later winter injury. If new roots are not sufficient to sustain growth, the plant dies, resulting in thinned stands.

Disease losses can be reduced by providing good soil drainage. Management practices should be directed toward providing rapid percolation of surface water during excessive rainfall. Longer-term disease control

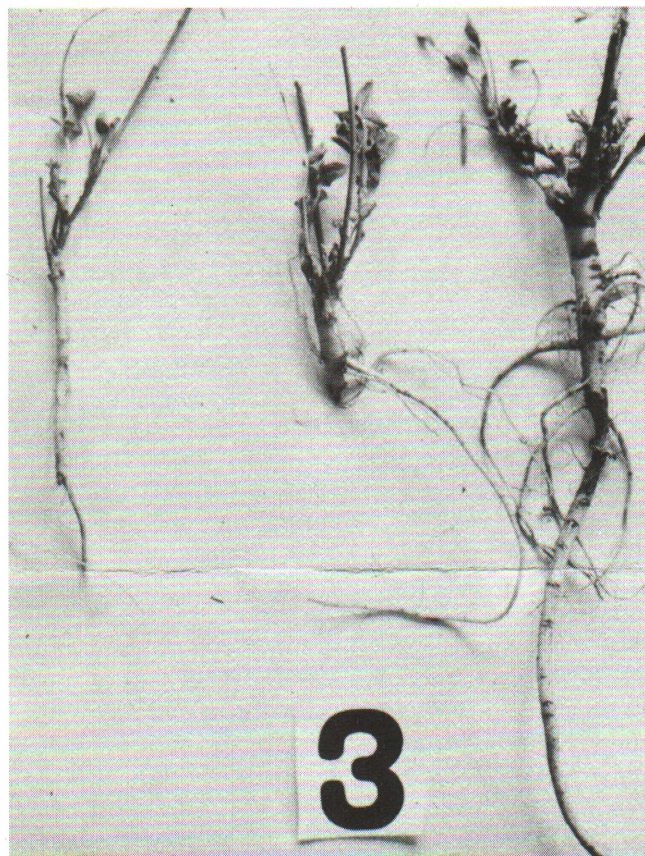
awaits development of resistant varieties. Most varieties commercially available are very susceptible. The U.S. Department of Agriculture and the Minnesota Agricultural Experiment Station developed and, together with state experiment stations in Iowa, Michigan and Missouri, have recently released the variety Agate which has a high level of resistance to *Phytophthora*. Ramsey, another variety released by the Minnesota station has more resistance than Vernal, the most commonly grown variety in the North Central states. Further observations and trial plantings are necessary to determine if these varieties are sufficiently superior in other respects to those presently recommended to warrant their use on soils likely to have imperfect drainage.



Healthy taproots of alfalfa.



Shallow blackish lesions of *Phytophthora* root rot scattered on taproots.



More advanced decay due to *Phytophthora* root rot resulting in severed taproot. Note surviving lateral roots.



Taproots severely decayed by *Phytophthora* fungus. Such plants are subject to drouth and winter injury.