

MANAGING THE MAJOR ALFALFA DISEASES

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ABSTRACT

Limiting the potential economic damage of alfalfa diseases to a production field are normally accomplished by a combination of two factors; **genetics** and **cultural practices**. Chemical control is generally considered uneconomical for disease control in alfalfa with the exception of seed treatments that limit damping off problems under abnormally wet planting conditions. Selecting an **adapted** variety that has genetic resistance to the major diseases, combined with proper cultural practices that limit disease infection are the growers best defense to the major alfalfa diseases.

Keywords: Alfalfa, plant pathology, disease control, cultural practices, management, alfalfa diseases

INTRODUCTION

Much progress has been made by alfalfa breeders in the last 30 years improving the genetic resistance of alfalfa varieties to diseases. Utilization of these genetic advances in the selection of adapted resistant varieties is still the best and most economical means of insuring maximum yield, quality, and stand life. Variety selection should be based on knowledge of which alfalfa diseases are most prevalent in a grower's field and are historically known to reduce yield and stand life. Knowledge of any potential new diseases reported in the area should be also considered in the selection of a variety with disease resistant traits. Cultural practices for disease management should use a two pronged approach (1) **Disease Prevention** and (2) **Practices that limit disease build-up and severity**.

Commonly used management practices include the following; (1) buying certified disease free seed; (2) preventing pathogen spread between fields by cutting newer disease-free stands before entering older diseased stands; (3) Disinfecting equipment between fields to prevent diseased soil and plant residue transfer to un-infected fields. Land preparation and irrigation practices that limit excess water conditions, are beneficial in preventing disease severity. Land leveling, timing and length of irrigation, sprinklers vs flood irrigation, and limited reuse of irrigation water from diseased fields should all be considered in a proper management plan to reduce the economic effect of alfalfa diseases.

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MAJOR ALFALFA DISEASES AND CONTROL MEASURES

Crown Rot Complex

(Complex of various pathogens: Fusarium, Pythium, Rhizoctonia, Phoma & Stagonospora)

Optimal disease conditions - Can occur in most soil types but damage can be more severe in the presence of nematodes or root feeding insects that create sites for entry into root system. Recent studies have shown that crown rots may be more severe as they result of crown damage due to livestock grazing and/or wheel traffic. More common in warm climates.

Symptoms - Stunting of plants; Red to reddish brown discoloration inside the root that becomes more severe with age of stand.

Control - Resistant varieties; Root knot nematode resistance may also be desirable to complement Fusarium wilt resistance. This reduces exposure of the plant to the pathogen by nematode feeding on the roots. Variety selection for grazing and/or wheel traffic tolerance may also reduce severity of crown rots that are the result of mechanical crown damage.

Phytophthora root rot (*Phytophthora megasperma f. sp. medicaginis*)

Optimal disease conditions - Occurs most often in soils with poor drainage, or where water stands for an extended amount of time. (> 24 hours)

Symptoms - Stunting and/or plant death in low areas of field where water stands. Damaged plants may have taproot girdled at same depth as water table in soil. Damaged roots may be brown in color. Top growth may be wilted due to poor water uptake from damaged roots.

Control - Resistant varieties; cultural practices that promote better drainage i.e. deep plowing, laser leveling, planting on beds and tiling.

Bacterial wilt (*Clavibacter michiganense subsp insidiosum*)

Optimal disease conditions - Can occur in most soil types but damage can be more severe in the presence of nematodes or root feeding insects that create sites for entry into root system. More common in cold climates.

Symptoms - Stunting of plants; Yellowish to brown discoloration inside the root that becomes more severe with age of stand.

Control - Resistant varieties. Cultural practices that limit crown/root damage resulting from cultivation, grazing, or repeated wheel traffic damage.

Fusarium wilt (*Fusarium oxysporum f.sp. medicaginis*)

Optimal disease conditions - Can occur in most soil types but damage can be more severe in the presence of nematodes or root feeding insects that create sites for entry into root system. More common in warm climates.

Symptoms - Stunting of plants; Red to reddish brown discoloration inside the root that becomes more severe with age of stand.

Control - Resistant varieties; Root knot nematode resistance may also be desirable to complement Fusarium wilt resistance. This reduces exposure of the plant to the pathogen resulting from nematode feeding on the roots. Cultural practices that limit crown/root damage resulting from cultivation, grazing, or repeated wheel traffic damage.

Anthracnose (*Colletotrichum trifolii*)

Optimal disease conditions - Occurs most often in spring or fall and spreads rapidly under warm wet conditions from spores produced on lower stems of infected plants.

Symptoms - Early stages may appear as individual straw colored stems on plants that display a curved top "Shepherds Crook". Diamond shaped lesions will occur on lower part of the stem. Advanced stages will be seen in the crown tissue as a dark black or coal color. Plant death usually occurs at this stage.

Control - Resistant varieties; Avoid spreading spores from plant debris on harvest equipment to uninfected fields. 10% Clorox wash of harvest equipment cutter bar may be advisable when moving from severely infected fields into new fields.

Stagonospora root rot (*Stagonospora meliloti*)

Optimal disease conditions - Spores are produced on lower stems and leaves and are spread by irrigation water or rainwater to other plants. Root infection develops from stem and crown infections.

Symptoms - Evidence of the pathogen may be seen in cross sections of taproots or large stems as pockets of red-orange specks in the tissue. This pathogen is considered by some pathologists as one of the major causes of stand decline in California. It has also been identified as one of the causal agents of crown rot. Major effect of pathogen is seen in second and third years of stand.

Control - Resistant varieties are not known. No effective cultural control measures are known at this time. Cultural practices and/or nematode resistance that reduces root exposure to the pathogen, may possibly reduce disease severity.

Rhizoctonia (*Rhizoctonia solani*)

Optimal disease conditions - Wet humid conditions; Root damage generally occurs in warm soils or those conditions that favor high-temperature flooding injury (scald)

Symptoms - Seedling damage may appear as damping off; Root damage in established fields occurs as elliptical shaped lesions on the taproot at the point where the lateral roots emerge.

Control - Some varietal differences may occur however no clear-cut control is available. Use cultural practices that reduce prolonged excessive moisture conditions.

REFERENCES

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