Downy Mildew of Alfalfa

What You Should Know

- There are three downy mildew species that can occur on alfalfa. The most common one is *Peronospora trifoliorum*.
- In 2019 we found in Utah the second species that mostly occurs in Europe and Asia - *Peronospora aestivalis*.
- All downy mildew species overwinter in the crown and buds of infected plants.
- Only the first cutting is affected.
- Resistant varieties can help minimize damage.

Fig. 1. Field symptoms of downy mildew in alfalfa

Fig. 2. Close-up of foliar symptoms

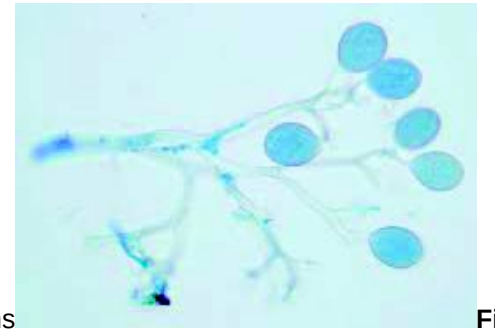

Fig. 3. Spores and fruiting structures of downy mildew[1]

Fig. 4. Downy mildew growth on underside of leaf

Introduction

Downy mildew is an obligate parasite. Even though they look like fungi they are not. They belong to the Oomycota and are more closely related to algae than true fungi. The most common alfalfa downy mildew species in the USA is Peronospora *trifoliorum*. In Utah, we found P. *aestivalis*, a species more common in Europe and Asia.

Symptoms

The initial symptoms of downy mildew in alfalfa consist of yellow or chlorotic spots on new leaves (Fig. 1 and 2). The spores and fruiting structures (Fig. 3) emerge from the leaves. On the underside the leaves are covered in a white to pale violet colored fungal growth (Fig. 4). Once plants get systemically infected, they can have stems that have a wider diameter and a rosette-like growth at the tip.

Disease Cycle

The pathogen overwinters in the cortex of the crown as well as in bud tissue. During the following spring the downy mildew colonizes the infected buds and shoots as they grow and spores develop on the new leaves. The spores are then blown by wind to neighboring alfalfa plants and infect the leaves. The spores are very fragile and only survive for a few hours to a few days without suitable host tissue to infect. Only young leaf tissue is susceptible to infection. Once the tissue has matured the pathogen can

no longer colonize it. Therefore, usually only the fi rst cut of alfalfa is negatively affected. The pathogen is only a problem during cool, wet spring weather. Germination can occur at temperatures between 39-84F. Optimum temperature for germination is 64F. The spores require standing water on leaves for germination (Skinner and Stuteville, 2015).

Management

Cultural Practices

Cutting - The first cut of alfalfa in the spring should not be delayed because inoculum as well as susceptible host tissue is
removed. The downy mildew spores are very short lived and will be dead before new susceptible tissue has grown. Cutting also reduces humidity in the canopy thus reducing the risk of infection.

Resistant varieties - There are resistant varieties available for P. trifoliorum. If these varieties are also resistant to P. aestivalis is currently unknown. There is no list of varieties that are resistant to downy mildew as this is a characteristic the varieties are not rated for.

Chemical Control

Seed treatment - Seed treatments using products containing mefenoxam and metalaxyl can reduce seedling infection of new alfalfa plantings.

References

- Skinner, D.Z. and Stuteville, D.L. 2015. Downy mildew; in : Compendium of Alfalfa Diseasaes and Pests. APS Press

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Authors

Claudia Nischwitz, Associate Professor and Extension Plant Pathologist, Utah State University