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Foliage Diseases of Lucerne

By S. C. CHAMBERS, M.Sc., Plant Pathologist

Lucerne is subject to several foliage diseases in Western Australia, the more important being common leaf spot, rust and downy mildew. These fungal diseases are all favoured by humid conditions and are especially prevalent in lucerne stands growing under irrigation.

Lucerne growing in Western Australia has been limited mainly because of the restricted summer rainfall in many areas and the consequent need for irrigation. Nevertheless, in recent years there has been an increasing interest in lucerne establishment, particularly on the newly-developed areas of deep sand in the Esperance Downs district.

Summer rainfall however is not the only limiting factor in the growth of lucerne. Diseases can sometimes make it difficult to establish and maintain a profitable stand. Among the more important disorders of lucerne in Western Australia are common leaf spot, rust and downy mildew. All three diseases attack the foliage.

The infected leaves gradually turn yellow and fall from the plants, considerable defoliation occurring during prolonged periods of wet, moderately cool weather.

Carry-over and Spread
The fungus is carried over unfavourable periods on the diseased leaves which have fallen to the ground.

Under wet conditions and temperatures of 60° to 70° F., thousands of tiny fungal seeds (ascospores) are ejected from the disc-shaped fungal bodies on the fallen leaves. These are blown by the wind into neighbouring or distant stands and infect the foliage. Should favourable conditions continue, more ascospores are produced in the newly developed spots and cause further spread of the disease.

COMMON LEAF SPOT

This disease is caused by the fungus Pseudopeziza medicaginis and usually appears first on the lower leaflets, gradually spreading up to the younger foliage.

Symptoms
Small, circular, dark-brown spots, about one tenth of an inch in diameter, develop on the leaflets (Fig. 1) and occasionally on the leaf stalks and stems. These spots usually remain relatively small, and eventually a small disc-shaped, blackish-brown fungal structure is formed in the centre of each spot.

RUST

Lucerne rust is caused by the fungus Uromyces striatus and is favoured by high humidity and temperatures between 70° and 85° F.
Common leaf spot of lucerne

Under surface of leaf showing rust pustules
Symptoms
The disease becomes evident as small reddish-brown pustules mainly on the undersurface of the leaflets (Fig. 2). Spots may also occur on the stems, especially during warm humid weather when growth is lush.

The colour of these pustules is due to masses of fungal seeds (spores) which if touched, leave a reddish brown smear on the skin. Rust is the only leaf spotting disease of lucerne with this characteristic, and therefore can be easily identified by this smear test.

Carry-over and Spread
The rust organism is believed to survive unfavourable periods either as spores or as fungal strands in the basal parts of lucerne stems.

In Europe, the disease has been reported to carry-over on two species of Euphorbia (E. cyparissias and E. helioscopia). However, the rust fungus has not been detected on the introduced E. helioscopia (sun spurge) in this State nor on any other species of Euphorbia.

Rust is spread by the reddish brown spores which are produced abundantly under warm humid conditions, and are carried by wind to other stands.

DOWNY MILDEW
The fungus *Peronospora trifoliorum* causes this disease which affects seedlings more seriously than established stands. Downy mildew is most prevalent in the early spring as it is encouraged by humid conditions and temperatures of 50° to 65° F.

Symptoms
Usually the first evidence of downy mildew is a yellow or light green blotching of the leaflets (Fig 3) especially at the top of the stem. At the same time a purplish grey mould develops on the undersurfaces of the affected leaflets and the leaf margins tend to roll downwards.

Under favourable conditions, entire stems may be affected, the stem tissue becoming yellow, stunted and swollen, whilst the leaflets turn completely yellow before collapsing.
Carry-over and Spread

The disease is carried over the summer months as fungal strands (mycelium) in the crown buds of affected plants and also as resting spores (oospores) in the diseased plant debris in the soil.

With the return of favourable conditions, the fungus invades the developing shoots and produces a mould growth on the undersurface of the new leaves. Spores are produced in enormous numbers by this mould growth and are wind borne, thus spreading the disease through the stand.

The oospores in the plant debris germinate and also cause further infections.

Control

The only practical measure for combating these three diseases is to graze or cut back the stand and remove the affected hay from the paddock. This will help to eliminate the sources of infection and also check the diseases by reducing the humidity in the stand.

On some properties, these diseases are prevalent because more lucerne is grown than is needed and the plants become rank through infrequent grazing or cutting. To reduce the incidence it would be advisable to reduce the area of the stand and to cut more often.

Where lucerne is grown under irrigation, it is advisable to water heavily two or three times each week, rather than lightly each day. This will reduce the humidity in the stand and so render conditions less favourable for the diseases.
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