1975

1975 Lupin diseases

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EXPERIMENTAL SUMMARY - 1975 - LUPIN DISEASES

SCLEROTINIA OF LUPINS (S. sclerotiorum) (75MT33)

Introduction

Sclerotinia stem rot, a fungal disease, is becoming increasingly important. This disease can attack the stem at any point from the stem base to the first laterals. Lodging can result if the canker is severe enough. Superficial cankers can disrupt sap flow resulting in poorly filled pods. The fungicide Benlate is used overseas to control Sclerotinia in bean plantings. Accordingly, a fungicide trial was planned to estimate yield losses resulting from Sclerotinia infection. A secondary aim was to examine any yield response which could be attributed to reported growth promoting properties of benomyl.

Site history

Sown on paddock at Mt Barker Research Station where lupins were infected with Sclerotinia in 1974. However, stubble destruction by the Manager had been extremely efficient with 0.5 of sclerotiorum per unit of soil sampled.

A spore trap was operating during May, June, July and early August to monitor for air-borne ascospores of the fungus.

Methods

Benlate was applied to 6.3 m x 6.3 m plots as one, two or three sprays at four-weekly intervals from mid July onward. A Burkard volumetric spore trap was situated in the middle of the experimental block.

Results

Sclerotinia did not appear in the trial. Brown spot(P. setosa) appeared on lupin stems late in the season. It was not controlled with Benlate and did not appear to affect yield.

Treatment	Mean treatment yields (kg)
Control	3.1
One spray (Jul.)	2.2
Two sprays (Jul. Aug.)	3.2
Three sprays (Jul. Aug. Sep.)	3.3

Spore counts (Sclerotinia, Stemphylium, Pleiochaeta, Diaporthe):-

May	-
June	Few Sclerotinia spores intercepted in mid June after rain.
	Diaporthe and Stemphylium spores abundant.

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Spore Counts (Sclerotinia, Stemphylium, Pleiochaeta, Diaporthe) :

July	No Sclerotinia spores. Diaporthe, Stemphylium and Pleiochaeta spores present after rain.
August (1 week)	No Sclerotinia spores. Diaporthe and Stemphylium abundant.

Apothecia (fruiting bodies) could not be detected on old infected lupin stubble during the period May-July, considered to encompass conditions most likely for apothecial formation to occur. Accordingly, spore trapping was discontinued after the first week of August and examination for apothecia was discontinued.

Other observations

A planting of 66A01-2 a few hundred metres from the Sclerotinia trial site was observed to have severe Sclerotinia infection at the end of November. Unicrop and Uniharvest plots adjacent to the infected 66A01-2 plots were not infected. In the affected plots, the presence of a flower blossom adhering to the stem was commonly noted to be the site of initiation of a Sclerotinia stem canker.

Comments

It was apparent that during the 1975 season at Mt Barker, Sclerotinia inoculum was released far later in the season than would be predicted from studies of the disease on vegetables in the Perth Metropolitan area.

Observations of infection first appearing after flowering would suggest that air-borne spores produced in September-October were responsible for the initiation of disease.

The fact that the disease did not occur on the experimental site was probably due to the cleared areas around plots allowing air circulation to occur. This would have created an unfavourable microclimate for disease initiation and development.

In the experiment, Benlate had no effect on yield thus not supporting reported observations of growth-promoting effects of the fungicide on other leguminous crops.

BROWN SPOT OF LUPINS (P. setosa)

Introduction

The aim of the trial was to correlate brown spot disease level with yield losses.

Site History

The site chosen was on the property of A. Smith, Tenindewa. One paddock (A) had the following history: lupins 1973, wheat 1974, lupins 1975. The adjoining paddock (B) had pasture 1973, wheat 1974, lupins 1975.

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Methods and Results

There were obvious differences in levels of brown spot infection of the two paddocks when 9 week old seedlings (14 leaf stage) were assessed at the end of July.

Paddock A : Moderate-heavy infection

Paddock B : Light-moderate up to 200 metres from inoculum source in paddock A.

Light-very light beyond this distance.

Eight $\frac{1}{2}m^2$ quadrats were selected for each of the three levels of disease. Ratings were made by counting the number of defoliated leaves from the base upward. Five plants were assessed from each quadrat. Quadrats were hand-harvested at the conclusion of the experiment.

The correlation between disease rating and yield is expected to be significant. There was yield loss of 60% of high-scoring quadrats when compared with those of low disease rating. This is in general agreement with the harvest results from the two paddocks - 739 kg/ha from Paddock B and 1546 kg/ha for Paddock A.

A similar experiment was conducted on the property of C. Armstrong, Margaret River.

Soil type was heavier - sandy loam.

Same paddock (Area A: Peas 1974, Lupins 1975
(Area B: Lupins 1974, Lupins 1975.

Six quadrats were rated for each of 4 disease categories.

Moderate-heavy	-	Area B
Moderate	-	Area B
Light	-	Area A, 5m from lupin trash boundary
Very light	-	Area A, 10m " " " "

Similar results were obtained as for the previous experiment. However, the disease gradient with distance from inoculum was greater. Brown spot was in the light-very light category 10 metres from old stubble. This could be the result of the paddock being protected from wind thus reducing disease spread by wind-blown rain-splashed conidia.

BROWN SPOT OF LUPINS (75GE33)

Introduction

Brown spot (P. setosa) is the most damaging of lupin diseases in northern areas. An experiment was designed to :

(a) assess the effect of disease on yield; and

(b) to estimate the disease gradient with increasing distance from lupin trash.

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Site History

Plots of lupins were sown, so that half the length extended into 1974 lupin trash.

Results

Brown spot did not develop.

Comments

Some lupin plantings on 1973 trash in the same area developed brown spot (lupins 1973, wheat 1974, lupins 1975). It is thought this experiment should be repeated. At least six similar sites should ensure that at least one develops the disease.

GREY LEAF SPOT OF LUPINS (75M033)

Introduction

Aim

To compare performance of grey leaf spot resistant 66A01-2 with Uniharvest and to attempt to relate any yield differences with different disease levels.

Site History

No previous lupins, but area notorious for damaging levels of the disease in previous seasons. (Coastal Highway, Dandaragan).

Method

Randomized block, 2 treatments x 10 reps. of 40 m plots.

Results

Grey leaf spot infection very light, insufficient for disease/yield comparisons. No other disease occurred.

	Mean Treatment Yields
Uniharvest	14.1 kg (2 174 kg/ha)
66A01-2	15.8 kg (2 436 kg/ha)

Comments

66A01-2 plots yielded consistently higher than Uniharvest. It would appear that some other gene difference other than for resistance is operating.

GREY LEAF SPOT OF LUPINS (75MT34)

Introduction

The aim of the trial was to compare performance of the grey leaf spot resistant variety, 66A01-2, with Uniharvest in a high disease risk situation.

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Site History

Lupins in 1973 (Mt Barker Research Station).

Methods

Randomized block, 2 treatments x 10 reps of 40 m plots.

Results

Grey leaf spot infection was extremely light, insufficient to detect disease or yield differences between the two varieties.

	Mean treatment yields (kg)
Uniharvest	11.0
66A01-2	9.8

Comments

The stem collapse syndrome, of unknown origin, was responsible for a slight but probably not significant yield reduction of 66A01-2 lupins in this experiment.

Apparently, environmental conditions were not suitable for the development of the disease. Inoculum was present in July and August, as determined by spore trapping for 75MT33. After almost a week of continuous moist humid days in September, the disease was established but failed to develop further probably because this was followed by a period of dry conditions.

GREY LEAF SPOT OF LUPINS (75AL27)

Introduction

Aim

To compare performance of grey leaf spot resistant 66A01-2 with Uniharvest and to attempt to relate my yield differences with different disease levels.

Site History

No previous lupins, gravelly sand. Emu damage with subsequent weed growth occurred on half the block facing bush. (Property of B. Bailey, Forrest Hill via Mt Barker).

Method

Randomized block, 2 treatments x 10 reps of 60 m plots.

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Results

Very light infection present at end of November, insufficient for disease/yield comparisons. However, the stem collapse syndrome was evident on 66A01-2 plots, especially on the northern side of the trial where lupin growth was denser.

	Mean Treatment Yields
Uniharvest	12.0 kg/pkot
66A01-2	10.6 kg/plot

Comments

The higher yield of Uniharvest over 66A01-2 (expected to be significant) is attributed to stem collapse of the latter. In the absence of this condition (plots 14-17) the situation was reversed - yield of 66A01-2 was higher than Uniharvest. Again, this difference could not be attributed to differences in grey leaf spot disease level.

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