NOTES

DEATH OF SIRATRO DUE TO VIOLET ROOT ROT

ABSTRACT

Death of the perennial tropical legume siratro (Phaseolus atropurpureus) *due to violet root rot caused by* Rhizoctonia crocorum *has been recorded in south-east Queensland. This is the first reported infection of siratro by a fungal root pathogen. Disease symptoms of infected siratro plants are described.*

INTRODUCTION

Siratro (*Phaseolus atropurpureus*) is the most widely sown perennial tropical legume in Queensland (Andersons Seeds Pty. Ltd., personal communication). There is no record of this species dying due to a root pathogen, although leaf infection by *Rhizoctonia solani* has been reported by Simmonds (1966) and Hutton (1968).

Rhizoctonia crocorum is a pathogen with a world-wide distribution and a host range of over 120 species (Hering, 1962). In Queensland it is a relatively common disease of lucerne (Purss, 1965) although only one other host, *Crotalaria aridicola*, has been reported here (Simmonds, 1966).

This note describes infection of siratro by violet root rot fungus at two sites in south-eastern Queensland. The causal fungus was observed in the mycelial form, *R. crocorum*, and not in the perfect state, *Helicobasidium purpureum*. The perfect state has never been recorded in Queensland.

VIOLET ROOT ROT SYMPTOMS ON SIRATRO

Infected siratro plants showed very characteristic root symptoms. A growth of reddish-brown to purple fungal mycelium occurred over the top eight inches or so of the taproot, often completely covering the surface. This was accompanied by a decay of internal tissues where the advancing internal margin of the rot sometimes showed as a reddish band. Usually the upper inch or so of the taproot had less superficial fungus than the lower part. The symptoms were very similar to those of infected lucerne. The patchiness of siratro infestation in the field was also similar to that shown by lucerne (Purss, 1965).

We have not been able either to isolate the fungus to test pathogenicity to siratro, or to obtain cultures from within Australia for such testing. We have assumed that *R. crocorum* is the cause of root rot of infected siratro plants and of their subsequent death.

FIELD OBSERVATIONS ON OCCURRENCE

Nanango

A species evaluation experiment was established in 1965/66 at Nanango in the South Burnett district on newly cleared solodic type soil derived from granodiorite. Included in the experiment were eight quarter-acre plots with lucerne (*Medicago sativa*) as the only legume, eight plots with siratro as the only legume, and eight with a lucerne/siratro mixture. Each plot was sown to one grass species. Measurements made in November, 1967 indicated there was a comparable density of both lucerne and siratro in each of the eight plots sown to the legume mixture.

There was widespread death of lucerne in some plots in late spring and summer of both 1967 and 1968. Over half the dead lucerne plants examined were affected by violet root rot. A decline in siratro density in irregular patches over the experiment was also noted over this period both in plots sown to siratro alone and to the lucerne/siratro mixture. Only rarely were siratro plants seen with recently dead top growth. All such dead plants, approximately 40, were found to be affected by violet root rot.

To demonstrate the relation between presence of lucerne and presence of siratro in the eight plots sown to a mixture of these legumes, 100 quadrats of 10 square links were thrown in each plot in January, 1969 and the presence or absence of each legume recorded. The percentage frequency (presence per 100 quadrats) of the two species in each of these eight plots is graphed in Figure 1.

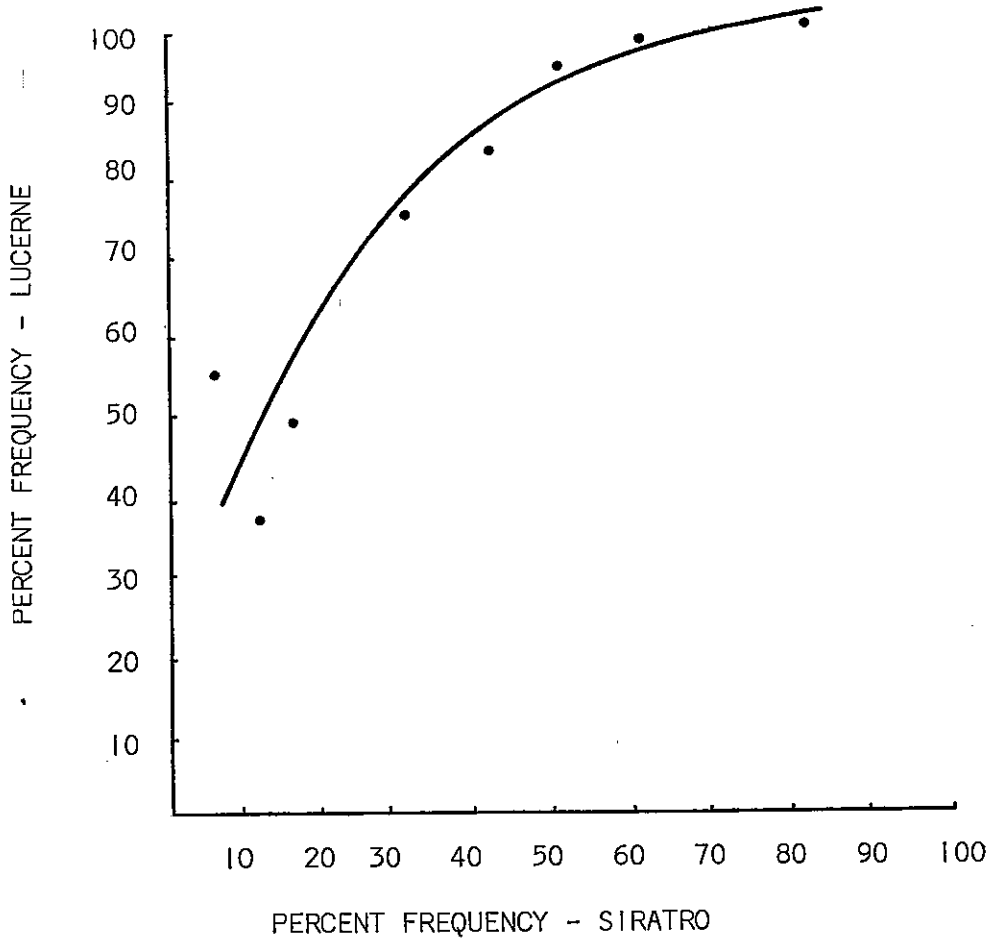

FIGURE 1
The percentage frequency (presence per 100 quadrats) of both lucerne and siratro sown to a lucerne-siratro mixture at Nanango.

In the five lucerne-siratro plots in which there was the greatest death of lucerne and siratro (Figure 1), there was a significant relation between the presence of lucerne and siratro within each plot at $P<0.05$ in one plot and $P<0.01$ in four plots. Thus in each of these plots survival of lucerne was significantly associated with survival of siratro where there was only one sown grass species and a minimum of soil and slope variation. This strongly suggested a common cause of the wide-spread death of each species. The most likely cause in this instance was that of common susceptibility to violet root rot. The evidence suggested that violet root rot can be an important factor in limiting the persistence of siratro as a pasture legume in areas where *R. crocorum* is present.

Beaudesert

A species evaluation experiment, similar to that at Nanango, was laid out at Beaudesert in 1965/66 on newly cleared prairie soil. Dead siratro plants affected with violet root rot were first noticed in January, 1969. There was less death of siratro or lucerne at Beaudesert than at Nanango.

DISCUSSION

It seems certain that the number of dead siratro plants seen in the field at Nanango were fewer than those that actually died due to violet root rot. Two reasons are suggested for this observation.

Firstly, death of infected siratro plants was usually noted during dry conditions when death of these plants was difficult to detect due to leaf death of healthy plants.

Secondly, infected siratro plants surviving into autumn could have been killed by the disease before spring regrowth commenced following the last frost. In such an event death would not have been revealed by dead topgrowth*.

As violet root rot is a relatively common disease of lucerne in Queensland (Purss, 1965) it is reasonable to assume that other areas of siratro have been or will be affected by this disease. Observations on lucerne suggest that an infested area should not be re-sown for some years.

Because of the reported wide host range, however, it is possible that violet root rot can persist on weeds even in the absence of siratro or lucerne. Infected peppercress (*Lepidium hyssopifolium*), for example, was found at Nanango. Hull and Wilson (1946) considered that weed infestation was a major factor in initiating outbreaks of violet root rot in sugar beet.

The occurrence of this disease in recently cleared areas at Nanango and Beaudesert also suggests that the fungus may be indigenous there, although no infected native plants have been found at either site. Whitney (1954) has reported similar outbreaks on newly cleared soils in Canada.

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*This suggestion was, in fact, confirmed during the 1969 winter at Nanango.