Australian lucerne yellows: spatial and temporal analysis of symptom severity and purported vector density

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ALuY

Australian lucerne yellows (ALuY) is a serious lucerne disease in Australia but little is known of its etiology.

Information on spatial and temporal appearance of symptoms is important in understanding the economic impact of the disease.

When combined with data on densities of insect species, likely vectors may be identified

Methods

Three newly sown lucerne stands in the Lachlan Valley of New South Wales were studied between November 2000 and November 2001.

Each stand was divided into a number of subregions using a grid format (figure 1).

Symptom severity was assessed on three to five occasions over this period . Vacuum samples of insects were also taken from within the crop and bordering vegetation.

Evidence suggests a phytoplasma etiology, so leafhoppers were counted.

Bordering vegetation included exotic weeds such as heliotrope (*Heliotropium europaeum*), paddy melon (*Cucumis myriocarpus*) and bitter melon (*Citrullus lanatus*), native grasses and canola (*Brassica napus*).

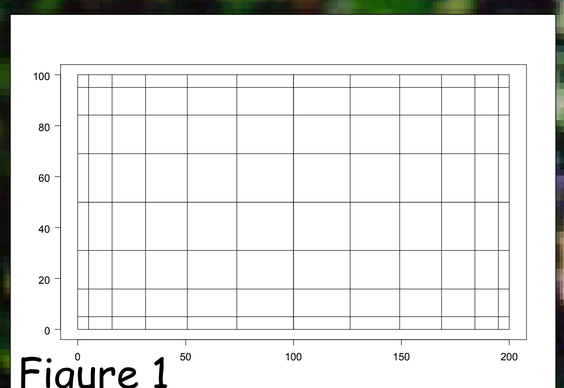

Figure 1

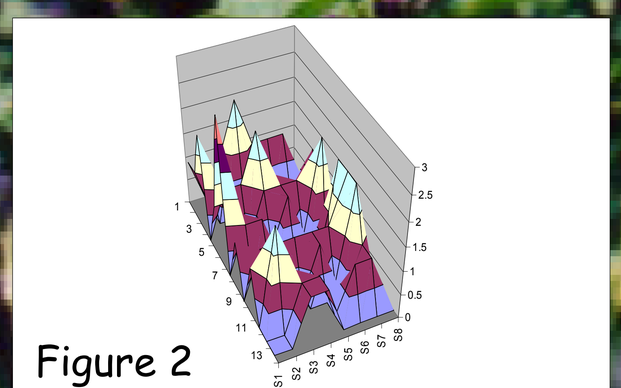

Figure 2

Results

ALuY symptoms developed in all three stands within 32 weeks of sowing, indicating that economic loss may be suffered even in very young lucerne stands.

Spatial analysis of symptom severity indicated symptoms were most severe along the edges of the crop. Figure 2 shows a graphical representation of the number of symptomatic plants in each of the 104 sub regions of one site.

A theoretical insect distribution is shown in figure 3 matching closely with the disease symptom distribution. Although none of the three leafhoppers examined showed a similar distribution several important pieces of imformation are still apparent in this study.

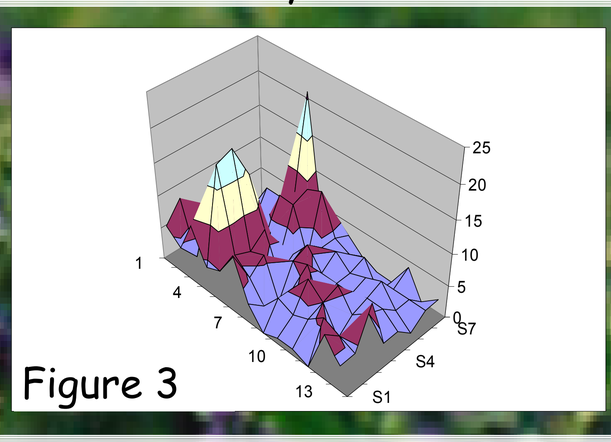

Figure 3

All three possible insect vectors (*Orosius argentatus* (Evans), *Austroagallia torrida* (Evans) and *Batracomorphus angustatus* (Osborn)) showed a strong edge effect (figure 4).

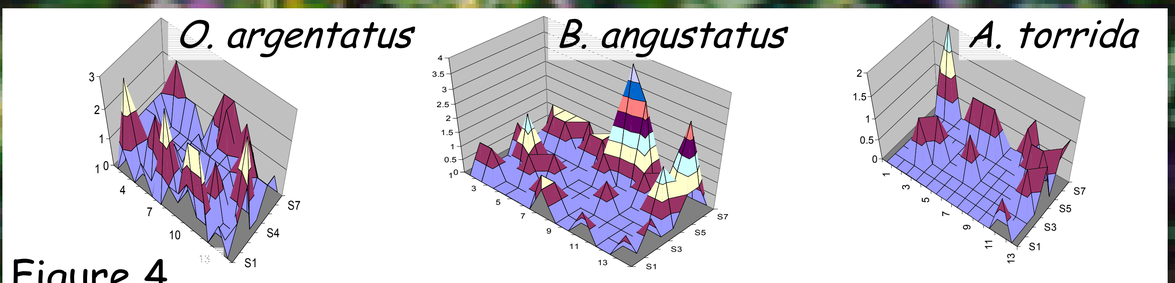

Figure 4

Conclusions

✓ALuY appears in newly sown crops within 32 weeks indicating a much shorter incubation period (six to eight weeks known for other phytoplasmas).

✓The disease, ALuY, was mapped and tended to be more severe on crop margins.

✓Three purported leafhopper vectors of ALuY showed no statistically significant spatial correlation disease symptoms, but nevertheless also tended to be more severe on crop margins .

With further work currently underway to determine the vector responsible for transmitting ALuY it may be possible to develop a management strategy for the disease limiting the movement of the vectors into the crop

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