Limiting immigration of suspected vectors of Australian lucerne yellows (ALuY) disease

L.J. Pilkington[1], G.M.Gurr[1], M.J. Fletcher[2], E. Elliott[3], A. Nikandrow[2] and R. Van de Ven[2]

[1]University of Sydney Orange, P.O. Box 883, Orange, 2800, New South Wales, Australia

[2]Orange Agricultural Institute, NSW Agriculture, Forest Road, Orange, 2800, New South Wales, Australia

[3]New South Wales Agriculture, P. O. Box 369, Forbes, 2871, New South Wales, Australia

Email: leigh.pilkington@orange.usyd.edu.au

ALuY

Australian lucerne yellows (ALuY) is a serious lucerne disease in Australia with a suspected phytoplasma etiology. Plants suffer reduced vigour and seed production is severely affected.

Three leafhopper species are suspected as vectors: *Orosius argentatus* (Evans), *Austroagallia torrida* (Evans) and *Batracomorphus angustatus* (Osborn) (figure 1).

O. argentatus is a known vector of several phytoplasma diseases.

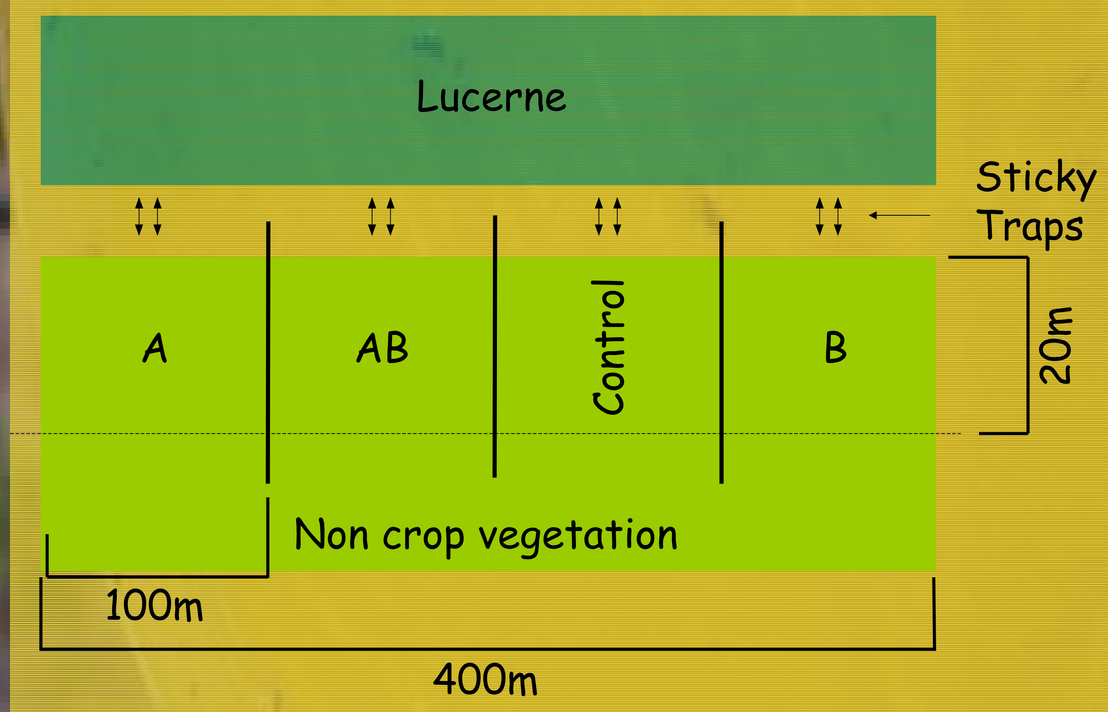
O. argentatus

A. torrida

Figure 1

B. angustatus

A field experiment was conducted using four sites as blocks to evaluate crop-margin treatments for their effect on leafhopper movement. Two 20 m wide strips alongside opposite boundaries of each lucerne field were divided into four blocks, each with four random treatments with plots of approximately 100m by 20 m (figure 2).



A=Herbicide (0.465 L ha-1 300 g L-1 dimethoate)

B=Insecticide (1.5 L ha-1 360 g L-1 glyphosate) Figure 2

Insect movement into and out of the lucerne crop was monitored using 90mm yellow sticky traps placed 2 m from the crop margin. Traps were mounted on two posts per plot each with two traps facing in each direction, positioned between 75 and 93 mm from the ground (a five trap example can be seen in figure 3).

Figure 3

The traps were collected and replaced twice weekly for the 50 days after treatments were applied. Leafhopper data was analysed using ANOVA in GENSTAT.

Catches were greater in lowest traps suggesting that insects were moving short distances from nearby vegetation rather than undergoing long-range dispersal.

One site was excluded from analysis due to the severe effects of the drought desiccating the crop and non-crop vegetation lowering counts of all insects.

Treatment with insecticide or herbicide significantly reduced the overall movement (immigrating to or emmigrating from the crop) of leafhoppers compared with the untreated control.

A square root transformation ($\sqrt{(x+0.5)}$) was performed on all data and significant treatment effects were found for two of the three leafhopper species examined.

A. torrida

Herbicide was the most effective treatment, causing a significant (F pr. 0.005) reduction in catches compared with the control.

O. argentatus

Herbicide and insecticide treatments caused significant (F pr. 0.029 and F pr. 0.004 respectively) reductions in catches compared with the control.

Conclusion

Leafhopper movement (into and out of the crop) can be limited by the application of herbicide or insecticide to non-crop vegetation adjacent to the crop.

Leafhoppers are vectors of many plant diseases and controlling their movement into a crop, whether by removing leafhoppers directly or removing alternative leafhopper host plants and possible pathogen reservoirs from the immediate vicinity of the crop, may also limit the development of these diseases within the crop environment.

These sites are currently being examined for ALuY development adjacent to these treated areas.

the university of sydney orange faculty of rural management

RIRDC RURAL INDUSTRIES RESEARCH AND DEVELOPMENT CORPORATION

NSW Agriculture