Controlling aphids for early disease control

Summary: In the 2001 season there was no benefit from the application of an alphacypermethrin insecticide application to barley and lentil crops. The dry summer of 2000/2001 resulted in very few host plants for aphids and virus diseases and threshold levels for disease carry over potential were not reached. In wet summers with many host plants surviving it is possible that preventative spraying with alphacypermethrin could be worthwhile.

Background

At the start of the 2001 season many growers were advised to apply an insecticide to barley and lentils as a preventative spray to reduce the spread of any potential disease. Aphids are known to be carriers of diseases such as Barley Yellow Dwarf Virus (BYDV) in cereals and other viruses in pulse crops, and early control is essential to stop the spread of disease. Once aphids are established in a crop it is probably too late to achieve control of the disease because the damage has been done. Early control is essential and using an insecticide, such as an alphacypermethrin, is known to result in some knock-down effect on aphids but the chemical also acts as an anti-feeding agent.

The questions raised were whether applying a preventative spray regardless of conditions was good practice (ie. does it help in controlling disease?) and was it cost effective?

Methods

Two insecticides were applied to barley and lentils at two growth stages (4 and 6 leaf) at three sites (Birchip, Rupanyup and Woomelang). The spray treatments were applied in a nearest neighbour design, so that a spray treatment was always located adjacent to a control. The treatments were not replicated. Alphamax was the alphacypermethrin used, some of the treatments included Dimethoate to increase the activity of the insecticide mix as a knock-down. The treatments were:

Timing	Treatments
4 leaf	Alphamax 0.125L
4 leaf	Alphamax 0.125L + Dimethoate 0.1L
4 leaf and 6 leaf	Alphamax 0.125L
4 leaf and 6 leaf	Alphamax 0.125L (at four leaf) plus Alphamax 0.125L + Dimethoate 0.1L (at six leaf)

Results
At no stage were aphids or diseases such as BYDV visible in the barley crops, and other viral diseases were also not observed in the lentil crops.

There were no effects of the spray treatments on yield at any of the three sites (Tables 1).

Table 1. Yields (t/ha) for insecticide treatments

	Barley			Lentils		
	Birchip	**R'yup**	**Woom.**	**Birchip**	**R'yup**	**Woom.**
control	2.0	3.5	4.2	0.6	1.4	2.0
4 leaf Alphamax	2.0	3.7	4.4	0.7	1.3	1.9
4 leaf Alphamax + Dimethoate	2.1	3.2	4.2	0.7	1.2	2.0
4 + 6 leaf Alphamax	1.9	3.4	4.0	0.3	1.8	2.2
4 leaf Alphamax plus 6 leaf Alphamax + Dimethoate	1.7	3.6	4.0	0.6	1.5	2.3

Interpretation
BYDV only survives on living plants, it cannot survive in stubble, in the soil or on the seed. The disease survives over summer on green grass material and is spread to cereal crops by aphids. The greatest threat of the spread of virus diseases such as BYDV is in seasons with wet summers when both aphids and the disease can survive over summer. The 2001 summer and autumn were quite dry and very little grass material survived over the summer months (except for in the irrigation districts, on edges of channels etc) and it was expected that the likelihood for the spread of virus diseases such as BYDV was going to be low. The results of the trial work undertaken supports the view that there is little point in preventative spraying if the threat of disease is low, at none of the three sites was there a benefit of the insecticide application (refer to Table 1).

It is expected that in season with significant summer and autumn rains, when many perennial and annual grasses survive, that there may be useful effects on disease prevention from the use of insecticides at the early stages of crop growth. The Agriculture Department in WA and CSIRO are working on a model which uses summer rain to forecast potential aphid and disease outbreak risks.

In the 2001 season, growers who applied insecticides to their barley and lentil crops would more than likely not have achieved an economic benefit. The conditions prior to sowing were not conducive to the spread of both the aphids and viruses.

Commercial Practice
In seasons with wet summers and autumns (or for those growers cropping adjacent to irrigation districts) the return from applying insecticides to young crops (in the first 12 weeks of growth) may well be beneficial to stop the spread of viral infection through the control of aphids. In seasons with dry summers when there is no living grass material to act as hosts to both the aphids and virus it is unlikely that applying an insecticide is worthwhile. The BCG will repeat this work in a season when there has been significant rain over summer and autumn.