



## IRRIGATION RESEARCH & EXTENSION COMMITTEE

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FOR IRRIGATION CROPPERS

### **Emerging insects and strategic control**

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# EMERGING INSECTS AND STRATEGIC CONTROL

*Stuart McColl, CESAR Consultants - Consultant – Sustainable Agriculture*

## TAKE HOME MESSAGES

- **Reliance on prophylactic pesticide use for pest control can lead to pest resurgence, secondary pest outbreaks and pesticide resistance**
- **Strategic control strategies that consider all pest and beneficial species in cropping and pasture systems need to be adopted.**
- **Information is available for the strategic control of some major crop pests**
- **Research is ongoing and aims to further extend our knowledge in this area**

Current pest management in the grains industry is heavily dependent on the use of broad-spectrum pesticides. This approach is reactive and generally does not consider all pest and beneficial invertebrates present within cropping and pasture systems. Prophylactic chemical applications can lead to pest resurgence, secondary pest outbreaks, development of pesticide resistance, and invariably impacts on beneficial species that may be capable of suppressing pest populations. For pest management in the grains industry to achieve long-term sustainability, we need to adopt control strategies that include more judicious pesticide use, incorporate cultural and biological control and consider the biology and ecology of pest and beneficial species.

Pesticides will still remain an important part of pest management for the foreseeable future. However, more strategic use of pesticides will improve the sustainability of pest control. Using 'soft' pesticides and seed treatments that are selective to plant feeding invertebrates has less impact on natural enemies. Spot spraying and timing sprays for susceptible life stages can improve control and reduce applications. It is also important to rotate chemical groups to reduce the risk of pesticide resistance developing. Inclusion of cultural control strategies is important for discouraging pest population growth and promoting natural biological control in cropping and pasture systems.

Shelterbelts with diverse vegetation provide refuges for many predatory species which move into adjacent paddocks to feed. Rotation with break crops can prevent pest numbers becoming established and weed management can reduce breeding sites and pest reintroductions. Grazing management in pasture has also been shown to reduce pest levels for some species. However, underpinning the effectiveness of more integrated control strategies is the accurate identification of pests and their natural enemies coupled with accurate monitoring of their numbers to ensure appropriate control options are used.

## **WHAT HAVE WE LEARNT SO FAR? – CASE STUDIES**

**Earth mites** are perhaps the most important establishment pests of pastures and broad-acre crops in southern Australia. There are several important pest species, which are similar in appearance however they have been shown to differ markedly in aspects of their biology that are important from a control perspective. This makes species identification critical as control options that work for one species may be ineffective against others. A summary of our current knowledge and strategic control options for each group is provided below. Research is continuing including GRDC funded trials assessing several 'softer' insecticides for control.

### **Redlegged earth mites**

- Insecticide seed dressings (e.g. Gaucho®, Cosmos®) target only those species which feed on crop plants, therefore minimising impacts on other non-target invertebrates
- Spring spraying strategies (e.g. TIMERITE®) aim to control the final generation of mites prior to the production of diapause eggs, leading to reduction in mite numbers the following autumn
- Foliar applications of insecticides may still be required but should only be applied when fully necessary. In some instances border sprays are sufficient.
- In-season weed control can help prevent the build up of mite populations

### **Blue oat mites**

- At least three recognised pest species that have different host plant preferences – crop rotations can be successful when one species is particularly problematic.
- Ideal time to target blue oat mites is in autumn, approximately 2-3 weeks after emergence. This approach enables time for the majority of diapause eggs to hatch but be prior to the production of the next generation.
- Spring spraying for RLEM is unlikely to be effective as BOM produce diapause eggs much earlier in the growing season

### **Balaustium mites**

- Have a naturally high tolerance to several classes of insecticides. Encapsulated formulations (e.g. Trojan®, Karate®) have recently shown some promise in laboratory bioassays (this has yet to be examined in the field).
- Non-chemical control options are required - for example, recent research has shown that pest numbers (e.g. earth mites and lucerne flea) in paddocks can be dramatically reduced by predators and other beneficial invertebrates residing in adjacent windbreaks or shelterbelts.

### **Bryobia mites**

- Appear to be a sporadic pest, common in autumn and spring but uncommon in winter
- Organophosphate-based chemicals, such as omethoate and chlorpyrifos, are more effective against bryobia than synthetic pyrethroids such as bifenthrin and alpha-cypermethrin

**Lucerne flea** are an important pest of crops and pastures throughout southern Australia. They are in highest numbers in autumn and spring and show a preference for broad-leaved plants such as clovers and lucerne. Organophosphate chemicals are more effective against lucerne fleas than synthetic pyrethroids. Predatory snout mites are also capable of providing control of lucerne flea in some situations. Control of weeds and suitable grazing management can also reduce lucerne flea numbers.

**Aphids** can be problematic in cereals, oilseeds and pulse crops, usually in spring as the weather becomes warmer. Some aphid species can also transmit important plant viruses to crops earlier in the growing season. Beneficial invertebrates such as parasitic wasps, ladybirds, hoverflies and lacewings can play an important role in biological control when low to moderate numbers of aphids are present. When chemical control is required, selective insecticides, such as pirimicarb, are available which are aphid specific and less harmful to beneficial invertebrates.

**Weevils** can be problematic at certain times of the year in most commonly grown broad-acre crops. *Mandalotus* weevils have recently been identified as an emerging threat to the grains industry. They may attack canola, cereals and pulses and can cause significant damage to crops at emergence. Despite this, there has previously been very little research conducted on this group, with the last significant studies dating back to the 1930's. There are over 100 known species in the *Mandalotus* genus; however research is required to determine which species are most problematic and to develop sustainable management options for these.

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