

# Nature's workforce



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## Help biodiversity work for you Create a harmonious work environment

The native vegetation and habitats on and around cotton properties provide places for your natural workforce to work and live. To find out who is working for you, monitor the insects and spiders in the surrounding native and non-crop vegetation.



Assassin bug consuming a *Heliothis* larvae. Photo Paul Grundy

### In Summary

#### The Science

Studies have shown that generalist insect predators i.e insects which feed on a range of other insects, including pest insects, live in native and non-crop vegetation surrounding cotton fields. Different insect predators prefer different vegetation types and so a variety of vegetation types is needed to support an adequate range of generalist insect predators.

#### Helpful Hints

- Keep your native vegetation
- Manage for natural regeneration.
- Incorporate natural refuges into your IPM system to help conserve beneficial insect predators.

- Collect and sow seeds or plant trees, shrubs and grasses that naturally occur on and around your property on the same soil types.

#### Benefits to the Farmer

Native vegetation harbours beneficial insects and nature's other pest controllers (birds and bats).

#### Am I making a difference?

Beat three tree or shrub branches with a small stick onto an esky lid to catch insects. Identify beneficial insect predators using the Cotton Pest Management Guide.



Cotton Catchment Communities CRC

## What does the science say?

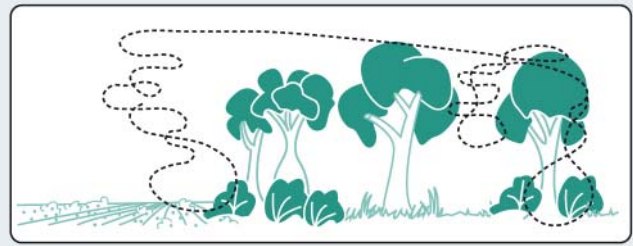
Studies have shown that the beneficial invertebrate predators of pest insects live in the habitats surrounding cotton fields. Invertebrate predators have been found in pastures, travelling stock routes, native windbreaks and in remnant river red gums adjoining cotton fields. It also appears that different invertebrate predators of pest insects prefer different vegetation types. Green lace-wings prefer trees and were hardly ever recorded in pastures. Likewise damsel bugs prefer grasses and pastures and were rarely sampled in trees. Red-and-blue beetles appeared on many vegetation types but amongst trees seemed to prefer melaleucas and casuarinas. This suggests that a variety of vegetation types is needed to support

a suite of generalist invertebrate predators. In other words, different habitats are important in supporting beneficial invertebrates such as generalist insect predators.

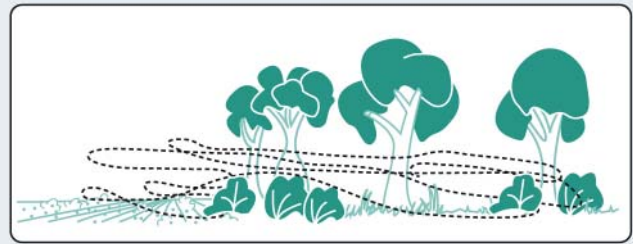


Yellow night stalker eating a mirid

Micro-bats are small insect-eating bats, tiny enough to fit in the palm of your hand. Micro-bats have been recorded on cotton properties where it is likely they contribute to insect pest control. Some are fast flyers catching moths while flying; others are slow flyers, picking insects off the vegetation. To ensure control of a range of insect pests a number of different species of micro-bats is required. This can be achieved through providing a variety of woodlands for the micro-bats as each has specific habitat preferences. Some prefer riparian areas, others prefer denser tree stands, while others prefer scattered trees. Again, a variety of woodlands is important for a diverse mix of micro-bat species



*Mormopterus* sp. 4



*Scotorepens balstoni*

This diagram illustrates foraging patterns of two microbats which have been recorded on cotton farms and forage over crops (adapted by MacKinnon (unpublished) from Churchill, 1998, "Australian Bats", Reed New Holland).

## What can you do?

Look at what native vegetation you have on your cotton property and consider how it may be working for you and its role in improving biodiversity. Even a single tree can play a role in providing habitat for birds, bats and invertebrates, but generally the rule of thumb is that more species are better than one.

- Incorporate natural refuges into your IPM system to help conserve beneficial insects.
- Acquaint yourself with the local trees, shrubs and grasses growing in your region and consider introducing species which are missing in your remnant vegetation (be sure that they are compatible with existing native vegetation).
- Collect and sow seeds or plant trees, shrubs and grasses that naturally occur on and around your property on the same soil type.

- Keep your native vegetation, it is far easier to retain, restore and rehabilitate existing native vegetation than to start establishing from scratch.
- Make yourself aware of the services provided by the non-cotton habitats and quiz the family and farm workers on what benefits could be derived from those habitats.



Lesser long-eared bat (*Nyctophilus geoffroyi*) captured over a cotton field in Northern NSW. Photo: Dave Larsen.

### Are you making a difference?

Invertebrates respond fairly quickly to changes in land management. Try something different and monitor the invertebrates in the habitats surrounding the cotton fields. One simple monitoring method is a variation on using the beat sheet in cotton. Take an esky lid, fill with a little water and hold it under a branch, then give the branch a sharp tap with a stick. The lid with water should catch the spiders and insects falling from the branch. Count the number of species and use the Cotton Pest Management Guide to identify insect predators. Do 3 branches per tree or shrub, sampling 10 to 15 trees in this way. Repeat a few times throughout the cotton growing season as invertebrate densities are able to rapidly change within a short period of time.



Insects such as ants can contribute significantly to the degree of natural mortality in weed seed banks and are recognised predators of *Heliothis* in young cotton. Vegetation diversity and the presence of leaf litter and fallen logs can encourage ants. Photo Lewis Wilson

### Benefits for the cotton grower

- Native vegetation harbours beneficial insects and other pest controllers (bats, birds).
- More potential for pest control by different insect predators (invertebrates and micro-bats) which reduces risks of control failure if one species is lost through a catastrophic event.
- Greater number of ecosystem services provided by the natural systems (e.g. pollination, soil conservation, reduced erosion).
- More habitats to enjoy and more species to discover.
- Option value of saving and retaining native vegetation...once it is gone it is very difficult to replace.

### Benefits for biodiversity

- Maintenance of habitat for plants and animals.
- More habitats mean greater opportunities for a variety of flora and fauna to thrive.
- Balanced ecosystems without any one species dominating habitats.
- Species which are local to the area are not lost.

## For more Information:

### Web pages

[www.cottoncrc.org.au](http://www.cottoncrc.org.au) (see industry tools)

[www.landwaterwool.gov.au](http://www.landwaterwool.gov.au)

### Scientific Publications

Carruthers, S & Hodda, M. (2004) An uncertain future: Paddock trees in agricultural landscapes. *Thinking bush* 3, pp 8-9.

Rencken, I. (2006) An investigation of the importance of native and non-crop vegetation to beneficial generalist predators in Australian cotton agro-ecosystems PhD Thesis. University of New England.

Williams, J. (2005) Native Vegetation and Regional Management: A guide to research and resources. Greening Australia Ltd, Yarralumla ACT.

### Identification Guides

Pyke, B.A. and Brown, E.H. (1996) The cotton pest and beneficial guide, CRDC and CTPM.

Cotton IPM Guidelines



Australian Government

Department of Agriculture, Fisheries and Forestry  
National Landcare Programme