



Case study

Cotton pest management

Australia is home to some of the world's most voracious cotton pests, and CSIRO is leading the way in developing sustainable, environmentally-friendly ways of dealing with them.

The challenge

Tackling emerging pests and delaying Bt resistance

CSIRO's insect-resistant genetically modified (GM) cotton varieties, which control caterpillars of *Helicoverpa* (the main pest of cotton), have reduced insecticide use by 85 per cent. Bollgard II™, also known as Bt, is the genetically modified trait from Monsanto used in our cotton for built-in insect protection.

Ironically, reduced insecticide use against *Helicoverpa* has allowed other pests to survive and emerge as important pests. CSIRO is looking at these emerging pests, including aphids, mirids, whitefly, thrips and jassids to improve our management strategies.

We are also looking at ways to significantly slow resistance developing in *Helicoverpa* caterpillars to the Bt insect-resistance trait used in our cotton. This requires an integrated approach to pest management as well as close working relationships between key stakeholders in the cotton industry and our breeding and pest management research teams.

Our response

Integrated pest management: a holistic approach to dealing with pests

Our scientists study and advocate an holistic approach to pest management known as IPM (Integrated Pest Management). IPM seeks to manage pests using a wide range of methods:

- using plants with resistance to the pests, such as Bt-cotton

- destroying over-winter food sources of pests, particularly weeds
- managing over-winter forms, for example the pupae of *Helicoverpa*
- using trap crops that are more attractive to pests than cotton
- conserving 'beneficials' (predators or parasites that destroy pests)
- effective sampling to understand the abundance of pests versus beneficials
- using pest thresholds to decide when control is needed
- preferentially using selective insecticides that preserve beneficials
- using broad spectrum insecticides as a last resort
- tolerating non-economic damage
- adopting strategies that limit exposure of pests to selection from insecticides
- using strategies to dilute resistance, such as creating nurseries of susceptible insects.

Our IPM research has contributed to the development of the *Integrated pest management guidelines for cotton production in Australia*¹, the *Guide to pests and beneficials in Australian cotton landscapes*², and the *Cotton Pest Management Guide*³ which provide growers with core information to support improved pest management. Cotton insect management tools are also delivered through our [CottASSIST online](#)  decision support system.

The results

Conserving beneficial insects and delaying Bt resistance

Our research findings and pest management publications are widely used by the Australian cotton industry to make decisions about when, how much and what insecticides to spray in order to conserve beneficial insects while minimising crop damage from pests.

Thanks to our research and evidence-based strategies for delaying insect pest resistance to Bt cotton – such as planting non-GM refuges where non-resistant insects can pass on their susceptibility to the rest of the population – Australian cotton growers are keeping one step ahead of insect pests such as *Helicoverpa*.

1. Deutscher SA, Wilson LJ, Mensah RK. (eds). 2004. Integrated Pest Management Guidelines for Cotton Production Systems in Australia. The Australian Cotton Cooperative Research Centre. Paragon Printers Australasian.
2. Williams S, Wilson L, Vogel S. 2011. Pests and beneficials in Australian cotton landscapes. Cotton Catchment Communities CRC. 96 pp.

3. Mass S. 2014. Cotton Pest Management Guide 2014-15. CottonInfo Team. Cotton Research and Development Corporation.

Find out more

 [CottASSIST](#)

 [Monsanto](#)