Integration of biological and microbial control of *Helicoverpa armigera* on transgenic *Bt* cotton

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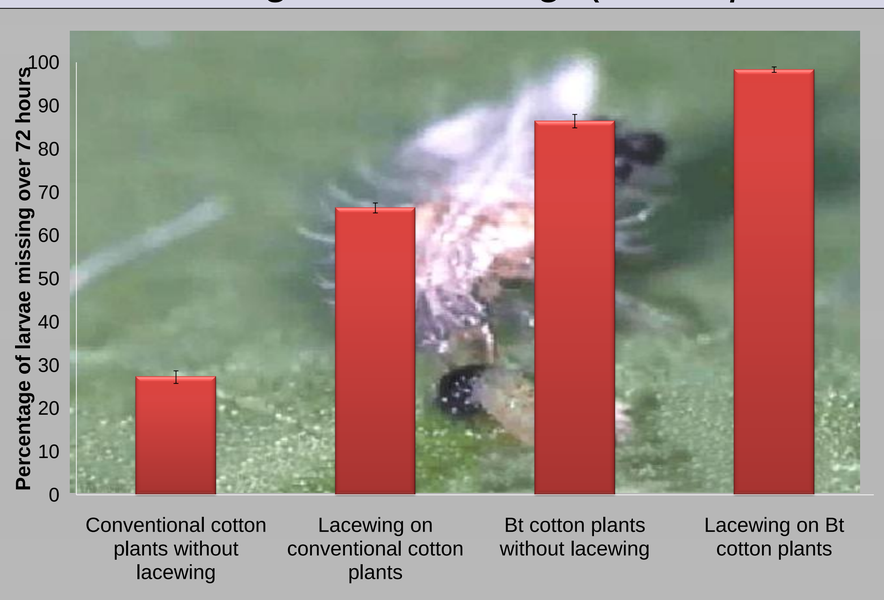
- Cotton bollworm (*Helicoverpa armigera*) is the most devastating insect pest of cotton production in Australia and around the cotton world.
- Introducing transgenic cotton has dramatically reduced pesticide use in Australia. However, (as in other countries) there are reports of surviving *Helicoverpa* on *Bt* cotton.
- Transgenic *Bt* cotton needs to be integrated with other control techniques, e.g. biological control with predators, microbial control.

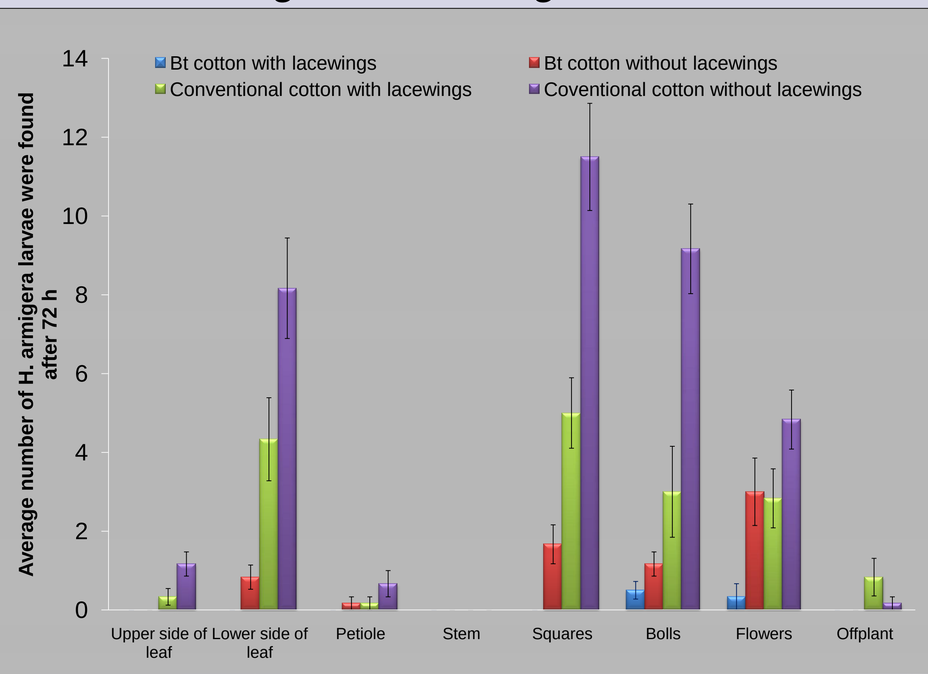
***Aim**: To investigate the performance of green lacewing (insect predator) and a new fungus* on transgenic Bt cotton.*

Green lacewing:

- Potted cotton plants were maintained in controlled environment cabinets (20-30ºC, 50-60% RH and 14:10 L:D period).
- Seven *H. armigera* neonates were placed on leaves, petioles, stems, squares, flowers and bolls (49 neonates per plant).
- Two green lacewing (4 day-old) larvae were released onto each plant.
- Remaining *H. armigera* larvae on each location were recorded after 72 hours.



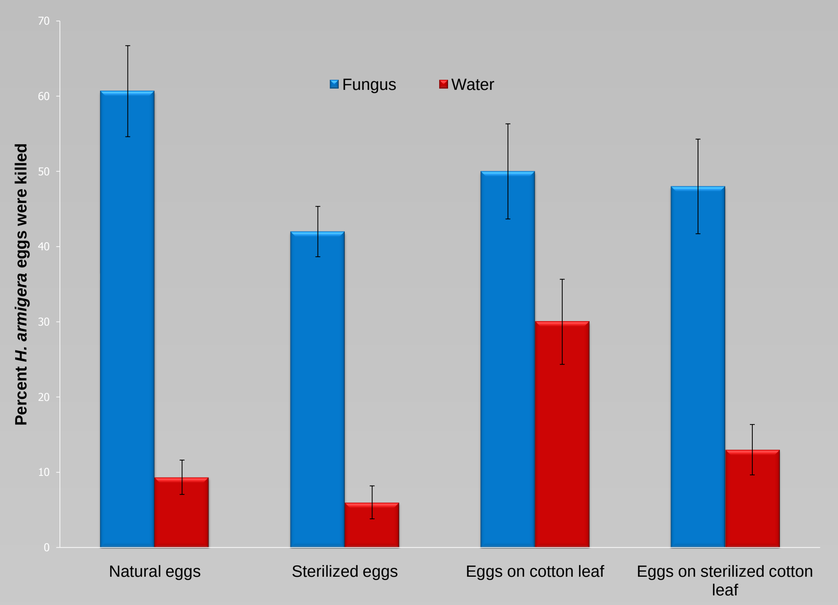
- *Bt* cotton alone caused 86% mortality over 72 hours.
- Green lacewings on conventional cotton gave overall mortality of 66%.
- Green lacewing and *Bt* together caused 98% mortality.



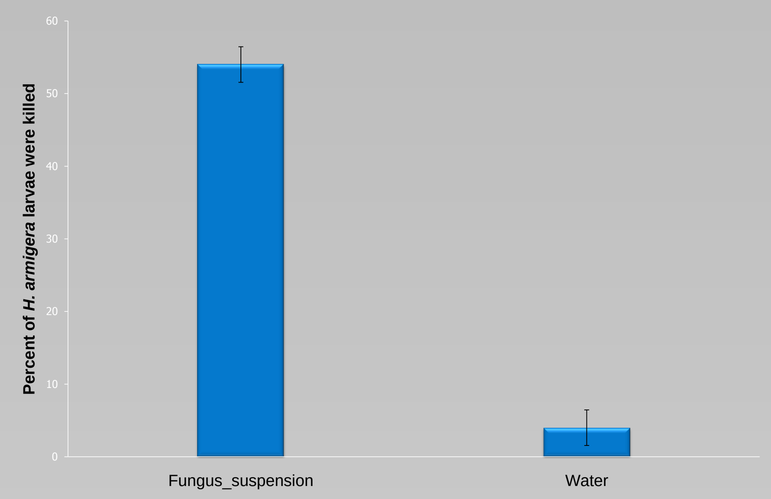
- Higher numbers of *H. armigera* larvae were found in reproductive parts (square, flower, boll) compared to vegetative parts.
- The presence of green lacewings reduced survival of *H. armigera* significantly.

The fungus

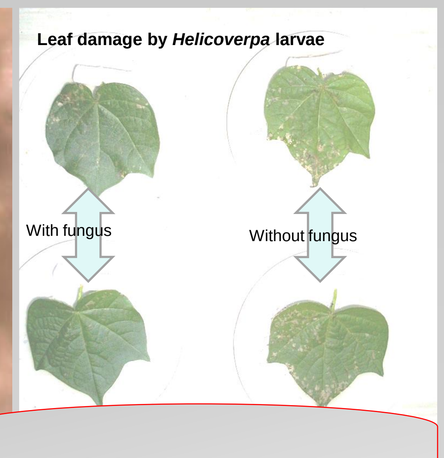
- Ten *H. armigera* eggs or larvae were placed onto different surfaces.
- *Fungus* suspension was sprayed on the surface.



The fungus killed *H. armigera* eggs in all cases



The fungus killed over 50% of the *H. armigera* larvae



* This is a new fungus so we are not allowed to reveal the name due to commercial sensitivity.

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Conclusion: Green lacewings and the new fungus are potential bio-control agents for controlling *H. armigera* surviving on transgenic *Bt* cotton.