



Tropentag, October 6-8, 2009, Hamburg

“Biophysical and Socio-economic Frame Conditions  
for the Sustainable Management  
of Natural Resources”

## Do Green Lacewings (*Mallada signata*) Contribute to the Mortality of *Helicoverpa* on Transgenic Bt Cotton?

HABIBULLAH BAHAR, JOHN STANLEY, PETER GREGG, ALICE DEL SOCORRO

*University of New England, Agronomy and Soil Science, Australia*

### Abstract

Over 85 % of the Australia cotton crop is transgenic, expressing Bt genes for the control of the key pests *Helicoverpa armigera* and *H. punctigera*. Using Bt cotton has reduced the number of pesticide applications, paving the way for a more concerted effort with integrated pest management (IPM), especially enhancing the impacts of natural enemies. There is field evidence that *Helicoverpa* larvae are surviving on Bt cotton. This study examines the predatory performance of a generalist predator, the green lacewing (*Mallada signata* (Schneider)) feeding on *H. armigera* eggs and larvae on Bt (Bollgard II®) or conventional cotton. Prey consumption rates on single leaves were measured under laboratory conditions in small arenas. Prey consumption rates on whole plants of Bt and conventional cotton varieties were investigated in controlled environment cabinets. *H. armigera* eggs or larvae were distributed evenly across seven plant positions; the stem, petioles, squares, flowers, bolls and upper and lower sides of leaves. Two, four-day-old, lacewing larvae were released and surviving *Helicoverpa* eggs and larvae recorded after 24 for *H. armigera* eggs and 72 hours for *H. armigera* larvae experiments. In the small arenas, lacewing larvae fed on similar numbers of *H. armigera* eggs (ave. 15) or larvae (ave. 8) whether searching Bt or conventional cotton leaves. Likewise, similar numbers of eggs were consumed by lacewing larvae searching whole plants of either Bt (ave. 15) or conventional (ave. 14) varieties in 24 hours. On whole Bt cotton plants 83 % of the *H. armigera* larvae died. Mortality increased to 98 % when the two lacewing larvae were present. Lacewings on conventional cotton consumed 65 % of the prey. This ‘mopping-up’ of surviving *Helicoverpa* on Bt cotton by lacewing larvae has the potential to reduce immediate pest damage but perhaps more importantly remove potentially Bt-resistant genotypes.

**Keywords:** Biological control, green lacewing, *Helicoverpa armigera*, *Mallada signata*, transgenic cotton