Do green lacewings *(Mallada signata)* contribute to the mortality of *Helicoverpa* 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.

Aim:

To investigate the capacity of green lacewing larvae (*Mallada signata*) as a potential biological control agent of *Helicoverpa* on transgenic *Bt* cotton.

Methods:

In Small Arenas:

❖*Twenty Helicoverpa* eggs or 10 neonate larvae were transferred onto individual cotton leaves in 750ml plastic cups. One green lacewing larva was released and the numbers of remaining *Helicoverpa* eggs or larvae recorded after 24 hours.

On Whole Plants:

❖ Potted cotton plants were maintained in controlled environment cabinets at 20-30ºC, 50-60% RH and 14:10 L:D period.

❖ Seven *Helicoverpa* eggs (Expt. 1) or 7 neonates (Expt. 2) were distributed on leaves, petioles, stems, squares, flowers and bolls (i.e., 49 eggs or neonates per plant).

❖ Two green lacewing larvae were released onto each plant.

❖ Remaining *Helicoverpa* eggs and larvae were recorded after 24 and 72 hours, respectively.

Results:

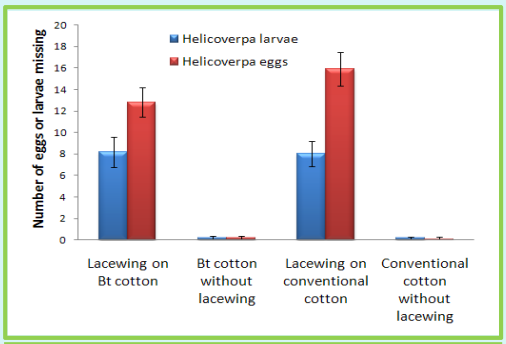

Fig 1: Number of *Helicoverpa* eggs or larvae missing after 24 hours on cotton leaves in small arenas (plastic cups).

❖In the small arenas, green lacewings fed on similar numbers of *Helicoverpa* eggs or larvae whether searching *Bt* or conventional cotton leaves.

❖*Bt* cotton alone (i.e., *Helicoverpa* larvae feeding on *Bt* cotton plants) caused 86% mortality over 72 hours.

❖Green lacewings alone (i.e. lacewings hunting *Helicoverpa* larvae on conventional cotton) caused 66% mortality.

❖Lacewing larvae hunting *Helicoverpa* larvae on *Bt* plants, i.e., lacewings plus *Bt* caused 98% mortality.

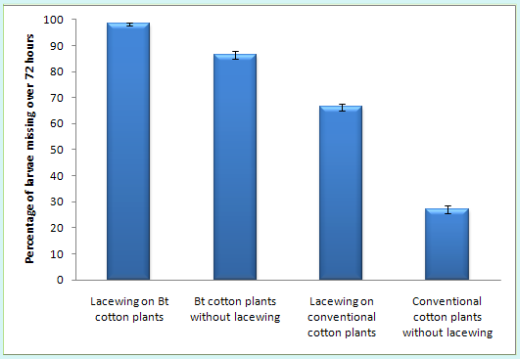

Fig 2: Percentage of *Helicoverpa* larvae fed on by lacewing larvae in 72 hours on whole cotton plants.

Conclusion:

Green lacewing larvae consumed similar numbers of *Helicoverpa* eggs on *Bt* or conventional cotton plants and added significantly to the mortality of larvae on Bt cotton. The mortality of *Bt* and green lacewing larvae was synergistic over the 72 hours period, suggesting conservation of green lacewing would be useful in IPM for *Bt* cotton.

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