

# The Changing Bt Resistance Landscape

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## Summary of main points

- There have been no reports of field failures of Bollgard II due to resistance.
- A higher frequency of Cry2Ab genes are obtained using F<sub>1</sub> screens compared to F<sub>2</sub> screens.
- The higher F<sub>1</sub> value is most likely to accurately reflect the field situation.
- When frequencies from F<sub>1</sub> tests are used in computer models, the number of generations until failure of Bollgard II is four times fewer than when frequencies from F<sub>2</sub> tests are used.
- Data from F<sub>1</sub> tests show a significant increase in the frequency of resistance alleles to Cry2Ab in 2007/08 compared to previous seasons for *Helicoverpa armigera*.
- When data from 2007/08 are included in the series, F<sub>2</sub> tests show an increase in the frequency of Cry2Ab resistance alleles in *Helicoverpa punctigera* since the introduction of Bollgard II.
- The industry is concerned about the high and potentially increasing frequency of Cry2Ab resistance alleles in populations of *Helicoverpa* species.
- The results from resistance testing in 2008/09 will determine whether it is necessary to alter the Resistance Management Plan for Bollgard II.
- Given current levels of concern, it is critical that refuges are maintained to produce sufficient numbers of unselected susceptible moths that can dilute any potential resistance. Correct and timely pupae busting is also essential.
- The occasional reports of larvae surviving at threshold levels in Bollgard II fields are not due to Bt resistance or the absence of Bt genes in plants.
- Survival may be due to a modified or existing behaviour of larvae that enables them to target sites of the plant that do not express at high levels (e.g., pollen in flowers).
- It is also possible that survival is due to a temporary decline in the expression of toxins.
- Irrespective of the mechanism, it is recommended that larvae at threshold levels in Bollgard II fields are controlled by spraying because these larvae may be exposed to low doses of toxin which could select for resistance.

## Relevant literature:

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