

Differences in insecticide sensitivity shown in FAW

NEW research indicates there are variable levels of sensitivity to some insecticides between populations of fall armyworm (FAW) in different geographical areas of Australia. CSIRO researcher Wee Tek Tay says the research provides evidence that two geographically separated populations – a WA population from Kununurra in the Kimberley region and a north Queensland population from Walkamin in the Tablelands region – show variable levels of sensitivity to insecticides.

“Geographic variability in insecticide responses is not unexpected and is commonly observed in the closely related species *Helicoverpa armigera*,” Tek says. “The current findings don’t necessarily indicate distinct genetic differences in the populations – results of genomic analyses are pending – but they do have implications for growers trying to manage FAW in the field.”

In the absence of a FAW population susceptible to insecticides, bioassays were conducted using *H. armigera* as a comparison. Colonies of insects were raised in the laboratory for the tests using individuals sampled from limited areas. This means they are not necessarily representative of the population in that region, so some caution is needed in interpreting the findings.

NSW Department of Primary Industries (DPI) researcher Lisa Bird said an independent and complementary study of FAW susceptibility in five populations from north Queensland and one population from Kununurra also revealed geographic differences in sensitivity to some synthetic insecticides.

Both the CSIRO and the NSW DPI studies found that FAW populations were between 50 and 150 times less sensitive to the pyrethroid alpha-cypermethrin compared with susceptible strains of *H. armigera*.

“NSW DPI also found that FAW populations from north Queensland were between 56 and 181 times less sensitive to another pyrethroid – gamma cyhalothrin – compared with susceptible strains of *H. armigera*,” Lisa said.

Both researchers found similar levels of variability in sensitivity to methomyl, ranging from three to 11 times less sensitive, in populations from north Queensland compared with susceptible strains of *H. armigera*. In contrast, CSIRO found its WA population to be 52 times less sensitive.

Relative tolerance to indoxacarb was found in all FAW populations tested.

Variability of insecticide response

This highlights the variability of FAW’s response to an insecticide even from within the same general region. It is possible FAW has a natural level of tolerance to indoxacarb.

While chlorantraniliprole sensitivity was found to be similar in north Queensland populations compared with *H. armigera*, the WA colony tested by CSIRO was 15 times less sensitive. But there may still be significant variability in sensitivity to this chemistry within the Kununurra region and further work is needed to document the full range of naturally occurring geographic variability between Australian FAW populations.

Sensitivity to emamectin and spinetoram was found to be similar in all FAW populations and *H. armigera*.

GRDC Biosecurity Manager Jeevan Khurana said that these results provided evidence that geographically different FAW populations in Australia can vary in their responses to insecticide.

“This new knowledge helps to guide insecticide choice. As always, growers are encouraged to judiciously select and rotate products to reduce selection pressure,” Jeevan said.

“While these studies don’t directly reflect field rates and conditions, it is important for growers to consider insecticide sensitivity when making decisions about product choice. Always use the full rate as stated on the label or permit. Where a rate range is specified – such as on current FAW permits for indoxacarb and chlorantraniliprole in maize – it is recommended to use the higher rate in accordance with the permit instructions.

“In addition, particular attention should be made to targeting early instar stages (hatchlings to second instar) before FAW entrenchment in the whorl or cobs can occur, and spray coverage (water volume, spray quality etc) should be optimised to ensure the larvae are receiving a lethal dose of the insecticide.”

Jeevan said this ongoing work was improving understanding of FAW’s genetic make-up, insecticide sensitivities and current resistance status, and would assist in the development of sustainable management strategies for the populations present in different areas of Australia.

Biopesticide approval for FAW

Jeevan welcomed the recent approval by the Federal Department of Agriculture, Water and the Environment (DAWE) for the importation of the biopesticide – Fawligen – a naturally occurring caterpillar virus which specifically targets FAW.

This decision will allow Qld DAF and the Australian company AgBiTech to start local trial work investigating the effectiveness of the virus in Australia and assessing any potential adverse impacts.

More information about FAW and its management has been consolidated into the Fall Armyworm Continuity Plan. This plan captures the global experience and uses that to inform and anticipate challenges for Australian agriculture.

This project is led by CSIRO with co-investment by the Australian Centre for International Agricultural Research (ACIAR), CRDC, GRDC, FMC Australasia and Corteva Agriscience.

Growers are encouraged to monitor crops to identify signs of infestation early. This pest is still notifiable in most regions – if you suspect FAW, report it immediately to the Exotic Plant Pest Hotline on 1800 084 881.



Two different populations of fall armyworm are showing varying sensitivities to insecticides. (PHOTO: Lyle Buss Univ of Florida)