



Research reveals extensive aphid insecticide resistance

Researchers have discovered that the extent of insecticide resistance in populations of the green peach aphid (GPA) has escalated across Australia.

GPA is a pest of canola and some pulse crops, and also attacks several horticultural commodities.

Studies funded by the Grains Research and Development Corporation (GRDC) have found that widespread resistance to synthetic pyrethroids, pirimicarb and organophosphates exists in Victoria, South Australia, New South Wales and Queensland.

The research, led by science-based company **cesar**, has been investigating GPA insecticide resistance in cropping regions over the past 12 months and during that time has screened 27 populations over an area spanning more than 1700 kilometres across eastern Australia.

This work has been conducted in collaboration with the South Australian Research and Development Institute, New South Wales Department of Primary Industries and the Queensland Department of Agriculture, Fisheries and Forestry.

Several populations of GPA are also being screened in Western Australia by CSIRO. It was in Western Australia in 2010 that pirimicarb resistance was detected for the first time in Australian populations of GPA, although tolerance to pirimicarb had been identified many years previously.

Dr Annette Anderson, of **cesar**, says that of the 27 populations tested in eastern Australia, 13 showed high resistance to synthetic pyrethroid insecticides. This indicates resistance to this chemical group has become significantly more common over the past 10 years.

Organophosphate resistance, which has been observed in Australia for many years, was also identified in populations across all states.

“More alarming was the discovery that 11 populations were resistant to pirimicarb,” Dr Anderson said.

“At the population level, we have identified resistance to all three chemical groups – synthetic pyrethroids, carbamates and organophosphates. GPA resistance to insecticides has been known overseas for some time, however the widespread resistance to all three chemistries is something that has only been observed recently in Australia.”

Dr Anderson said the levels of resistance identified were far greater than what was anticipated.

“In some populations, aphids exhibited more than 10,000 times the resistance to synthetic pyrethroids than the control population,” Dr Anderson said.





Director of **cesar**, Dr Paul Umina, said the confirmation of widespread resistance to pirimicarb was particularly concerning for pulse and oilseed growers because this chemical has been seen as a fallback for aphid populations resistant to other chemical groups. Pirimicarb is aphid-specific and less harmful to other invertebrates when applied to crops so is compatible with an integrated pest management (IPM) approach.

Dr Umina said the next steps in the research would be to understand if individual aphids have resistance to all three chemistries and to explore the genetic make-up of GPA populations.

“If we discover that individual aphids have resistance to organophosphates, synthetic pyrethroids and carbamates, it will mean the likely reproduction of fully resistant offspring (GPA can reproduce asexually to produce clones of themselves) and will have significant implications for the ability of growers to control GPA in their crops.”

Several other crop aphids are also being screened as part of the project to establish baseline sensitivity data to enable early detection and rapid responses to any changes in susceptibility to insecticides if/when they arise.

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For Interviews

Annette Anderson, **cesar**
Phone 03 9349 4723

Contact

Sharon Watt, Porter Novelli
Phone 0409 675100

Caption: Dr Annette Anderson, **cesar**: “In some populations, aphids exhibited more than 10,000 times the resistance to synthetic pyrethroids than the control population.”

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