Keeping imidacloprid in the canegrub control arsenal

PUBLIC and private organisations have collaborated to develop a new best-practice training program for sugarcane growers that targets the safe and sustainable use of liquid imidacloprid products such as Confidor Guard Soil Insecticide and Nuprid 350SC.

The program encourages the correct placement of imidacloprid in the field to ensure maximum performance against canegrubs, and the strategic use of the product to ensure its industry longevity. By getting these use aspects right, research trial data indicates that our waterways and the Great Barrier Reef will benefit.

With the support of Sugar Research Australia (SRA) and the Queensland Government's Department of Agriculture and Fisheries (DAF), Bayer and Nufarm have worked together to create an instructional video, training package and an application slot depth measurement gauge for use in ratoon cane applications.

Initially, the group will train 750 growers in the Mackay

Achieving an application depth of 100 mm or more is essential to reduce imidacloprid loss via runoff.

IN-FIELD TRIALS: IMPACT OF APPLICATION DEPTH AND SLOT CLOSURE ON RUNOFF LOSSES OF IMIDACLOPRID

Imidacloprid represents the Australian sugar industry's best canegrub-management tool, but it has been detected in many water bodies, including groundwater, creeks, rivers and marine environments, posing a potential risk to the health of the Great Barrier Reef.

Challenges with application: In ratoon cane, it is commonly applied in liquid form with coulters within the cane row. Imidacloprid product labels state that, when applied in ratoons, the product must be placed at 100–125 mm depth and the slot must be covered; but it is not uncommon to observe application equipment that does not maintain the desired depth or fails to close the slot appropriately.

Rainfall simulation: To investigate the best application methods to reduce imidacloprid runoff, two rainfall-simulation trials were established in the Burdekin and in the Wet Tropics to assess the impact of depth and slot coverage on imidacloprid runoff when the liquid formulation is applied with a stool-splitter tine implement.

Overhead irrigation runoff: An additional runoff trial under overhead irrigation was set up in the Wet Tropics to test the efficacy of the StoolZippa to close the slot and reduce imidacloprid runoff losses when the product is applied at the correct depth of 100 mm.

Results

- The rainfall-simulation trials showed higher imidacloprid concentration in runoff from a shallow application at 50 mm compared to the recommended minimum 100 mm application depth. A press wheel reduced the imidacloprid concentration to nil when the product was applied at the correct depth of 100 mm; but it slightly increased the concentration in the case of the shallow application.
- In the overhead-irrigation trial, the StoolZippa increased the imidacloprid concentrations in runoff versus the slot left open, but these concentrations were still extremely low and not of environmental concern.

Recommendation: These trials indicate that ensuring the product is consistently applied at 100 mm depth is the best way to reduce imidacloprid loss via runoff when the product is applied with a stool-splitter tine implement. As trials were only conducted in loam soils at two locations, further trials are recommended over a range of soil types and geographic locations.

Drawn from the peer reviewed paper – 'Impact of application depth and slot closure on runoff losses of imidacloprid' – by Emilie Fillols and Aaron Davis

Published in 'Proceedings of the Australian Society of Sugar Cane Technologists, volume 42, 422–432, 2020'

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According to SRA, in 2000 and 2001 some one million tonnes of cane was lost to damage from canegrubs which, at current prices, would cost the industry in excess of $50 million.

Whitsunday and Wet Tropics regions with the eventual aim of the materials reaching all Australian sugarcane growers.

Three years of field trials

The program is based on several years of research work conducted by SRA and DAF (See box story page 13).

Emilie Fillols, Senior Researcher with SRA based at their Meringa Station said, "Growers should first consider if they need to treat their blocks for canegrubs, which is a decision based on a risk assessment.

"If treatment is necessary, achieving an application depth of 100 mm or more is essential to reduce imidacloprid loss via runoff. Three years of field trials in the Wet Tropics and the Burdekin have confirmed the critical importance of application depth in preventing loss of imidacloprid."

Correct usage vital

Nick Matthews, Market Development Agronomist with Bayer says that the imidacloprid products are critical tools to control cane grubs, but they need to be used correctly.

"Bayer has worked hard to prepare a relevant and easily accessible training video and presentation. Our first goal is to train all retail agronomists, and then work with the relevant productivity services organisations and other organisations to train their agronomists.

"While the minimum depth message is simple, achieving this in field in all areas poses many challenges. Our training video and materials cover a wide variety of machine types and situations."

For Dave Rumbold, Regulatory Lead ANZ with Nufarm, a practical contribution to the success of the program has been the imidacloprid Depth Gauge. One thousand of these handy tools will be made available, free of charge, to growers, agronomists and contract applicators. "These tools will allow growers to easily measure slot depth across several locations in their blocks to ensure they are achieving the minimum depths for efficient treatment," he said.

Richard Dickmann, Public Affairs and Sustainability with Bayer, said "The program is a great example of how industry, government and growers can work together to address issues for the ultimate benefit of both growers and our environment."

For more information: Nick Matthews – Bayer E. enquiries.australia@bayer.com

For instructional video – Sugarcane Imidacloprid Stewardship Program: *www.crop.bayer.com.au*

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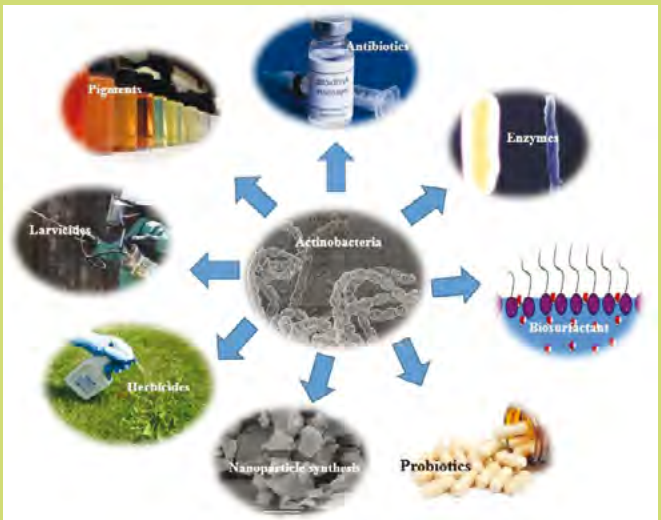
Native bushland's soil fertility secret

IN hotter, dryer conditions with climate change, a secret agent for more sustainable agricultural production could lie in harvesting the diverse beneficial soil microbiome in native bushland settings, scientists say.

New research from CSIRO, Flinders University and La Trobe University highlights the importance of soil biological health and further potential to use organic rather than chemical farm inputs for crop production.

"We know antibiotics are very useful in pharmaceuticals, and actinobacteria found plentifully and in balance in various natural environments play a vital role in the plant world," says lead author Dr Ricardo Araujo, a visiting Flinders University researcher from the University of Porto in Portugal.

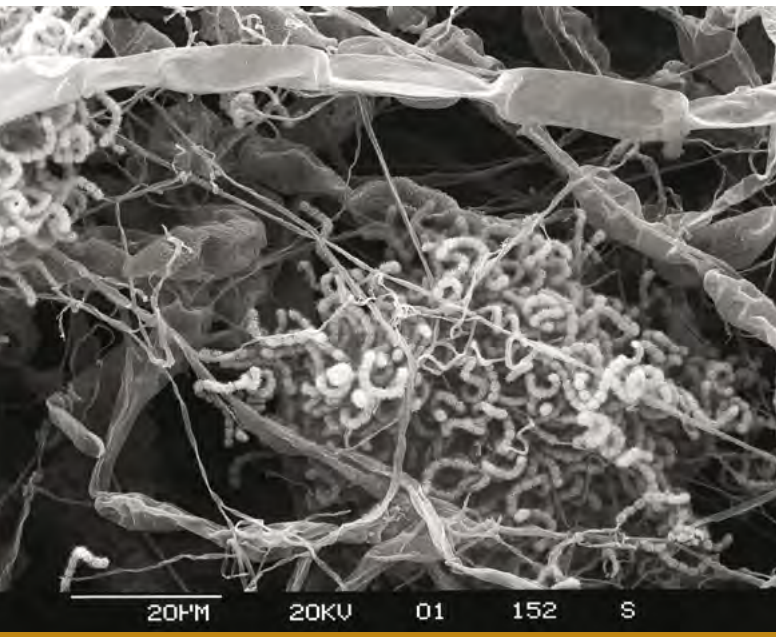
FIGURE 1: Biotechnological applications of Actinobacteria



"These actinobacterial communities contribute to global carbon cycling by helping to decompose soil nutrients, increase plant productivity, regulate climate support ecosystems – and are found in abundance in warm, dry soil conditions common in Australia."

A new article in Soil Biology and Biochemistry is one of the first dedicated studies of Australian actinobacterial diversity in different areas of the Southern Hemisphere – using the bacterial gene sequence dataset generated through the 'Biomes of Australian Soil Environments' project with soil samples from across the nation, including mainland, the island state of Tasmania as well as King Island, Christmas Island and the Northern Antarctica for comparative soil profiles.

CSIRO Agriculture and Food senior principal research scientist, Associate Professor Gupta Vadakattu, says the differences we found between mainland Australia and more remote locations showed how agriculture has had an impact on the diversity of actinobacterial.



Actinobacterial communities contribute to global carbon cycling by helping to decompose soil nutrients, increase plant productivity and regulate climate support ecosystems.

Similarities in actinobacteria profiles – King Island and Antarctica

"Our study shows how native vegetation is a reservoir for these important soil microorganisms, and this could be used to enrich adjoining agricultural soils," says Associate Professor Vadakattu, adding an intriguing finding was the similarity in actinobacteria profiles of King Island and areas of Antarctica where these continents were once connected.

"Patterns of actinobacteria dispersal suggest only a small fraction of them had the capability of spreading throughout the Southern Hemisphere, especially across oceans."

Prof Chris Franco and Associate Professor Vadakattu Gupta with a handful of native bushland soil, rich in actinobacteria.

Flinders University colleague Professor Chris Franco, says biotechnology has long benefited from actinobacteria for human and animal health products, and increasingly in sustainable agriculture.

"The diversity and structure of soil antinobacterial communities are influenced by multiple factors, representing one of the most abundant soil bacterial taxa across a diverse range of ecological regions – from deserts to Antarctica," Chris says.

"There is much more we need to learn about their potential in primary production and retaining and incorporating native plants in our ecosystems."

The new article, 'Biogeography and emerging significance of Actinobacteria in Australia and Northern Antarctica soils' (August 2020) by R Araujo, VVSR Gupta, F Reith, A Bissett, P Mele, CMM Franco has been published in Soil Biology and Biochemistry (Elsevier) DOI: 10.1016/j.soilbio.2020.107805

For more information: ***www.scimex.org*** ■

A secret agent for more sustainable agricultural production, could lie in harvesting actinobacteria from the diverse beneficial soil microbiome in native bushland settings.