Bioeconomy Science Institute™

Serratia proteamaculans as a targeted biocontrol agent against the New Zealand grass grub

David Wright, Mark Hurst, Sarah Mansfield, Laura Villamizar, Maureen O'Callaghan, Jo Townsend, John Caradus

NZ Grass grub *(Costelytra giveni)*

Pasture damage NZD $585m per annum

5.8m dairy cows, 3.7m beef cattle, 23.6m sheep, 790k deer

Arable crops

Wheat 46,400 ha

Carrot seed – 50% global supply

Chemical controls being de-registered

2013

Diazinon given 15 year reprieve

By Ann Thompson

Hamilton News · 15 Aug, 2013 06:00 AM · 2 mins to read

2024

Home / The Country

Environmental Protection Authority looks to ban insecticide chlorpyrifos

RNZ

14 Nov, 2024 03:00 PM · 2 mins to read

2025

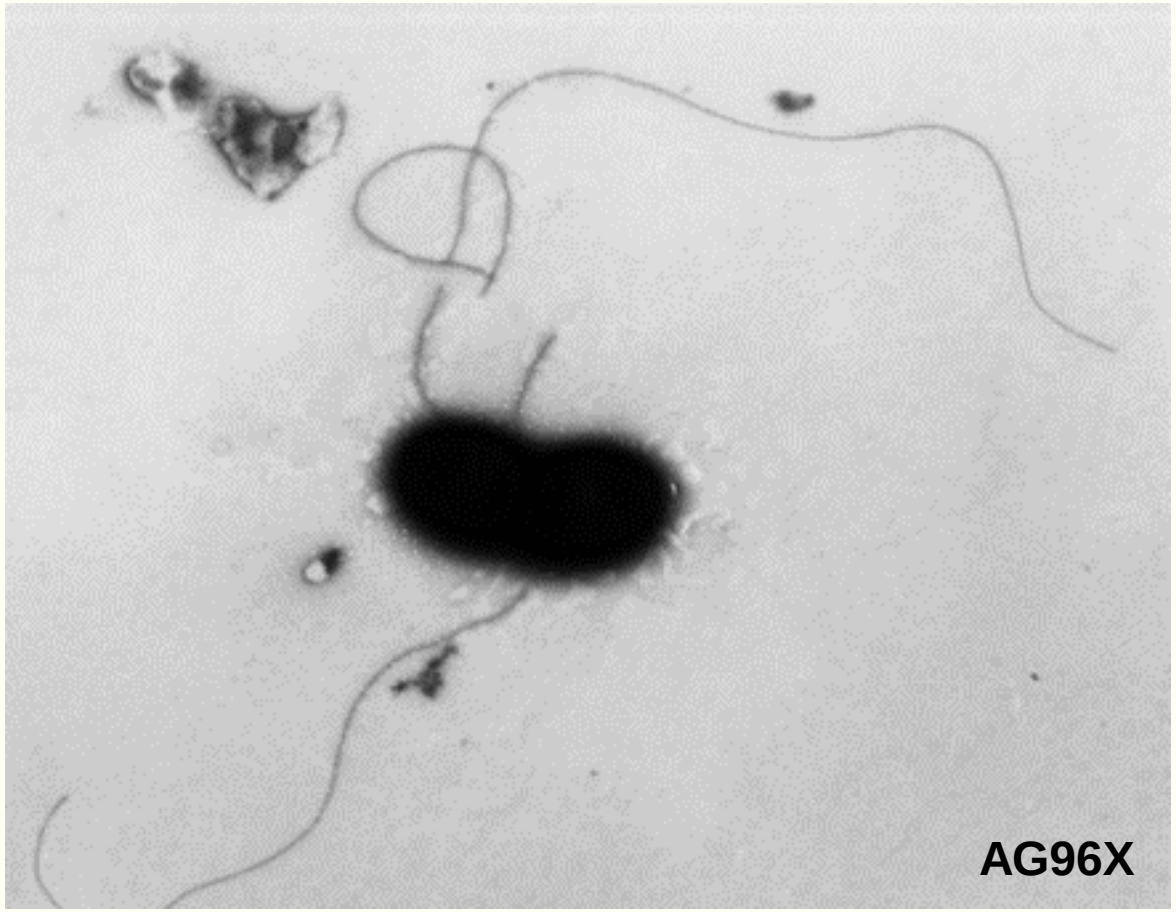
Alternative grass grub weapon now urgent

Federated Farmers

July 16, 2025

Federated Farmers urge fast-tracking new grass grub treatments as bans leave few control options.

Serratia proteamaculans AGR96X



Manuka beetle

Grass grub

Day 0 → Day 12

90-100% mortality 5-7 days post treatment

Novel Mode of Action

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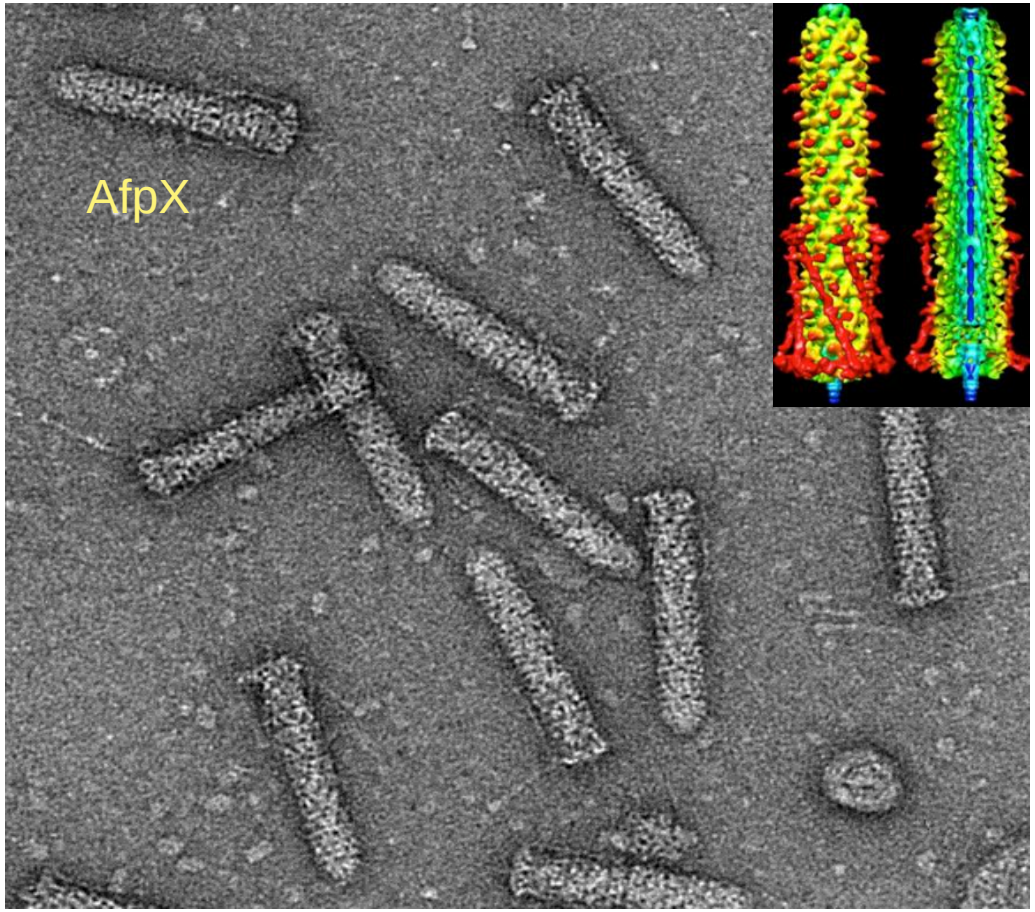
INVERTEBRATE MICROBIOLOGY

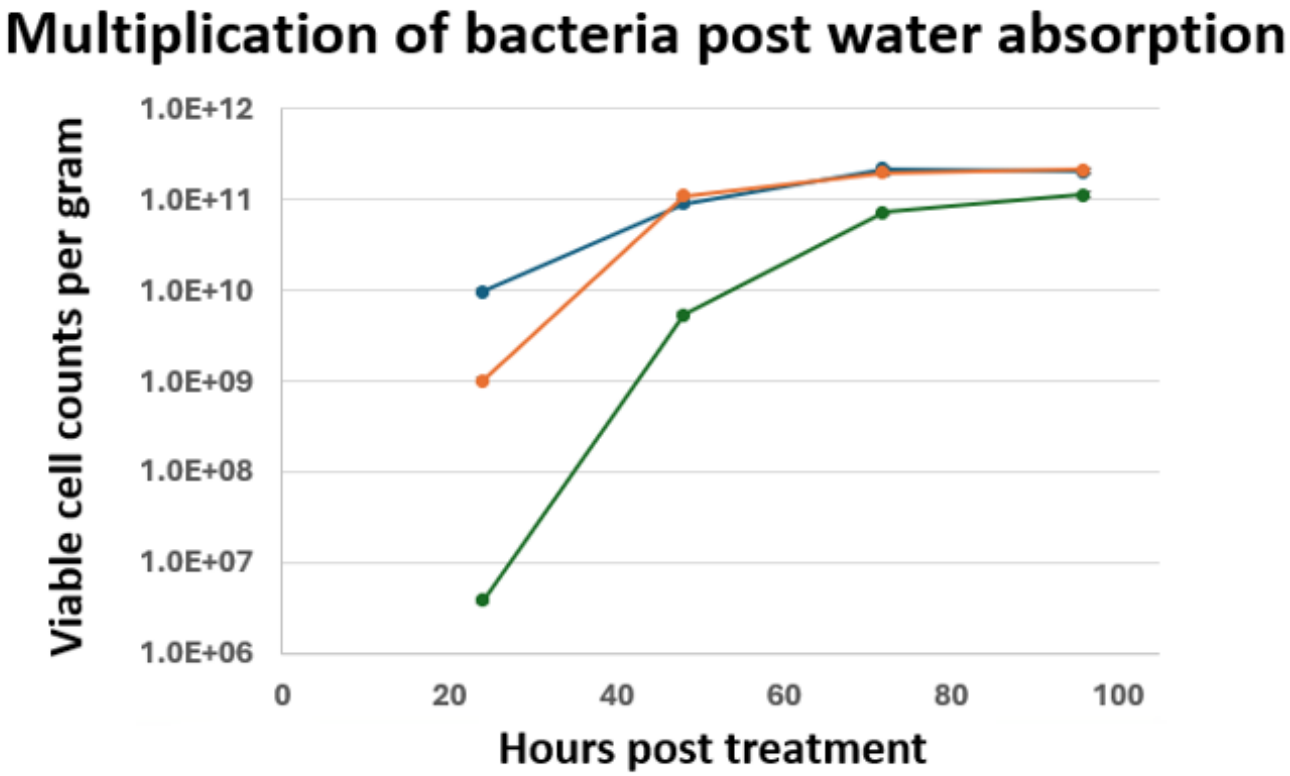
Serratia proteamaculans Strain AGR96X Encodes an Antifeeding Prophage (Tailocin) with Activity against Grass Grub (*Costelytra giveni*) and Manuka Beetle (*Pyronota* Species) Larvae

Mark R. H. Hurst,[a,b] Amy Beattie,[a] Sandra A. Jones,[a] Aurelie Laugraud,[c] Chikako van Koten,[c] Lincoln Harper[d]

[a]Forage Science, AgResearch, Lincoln Research Centre, Christchurch, New Zealand
[b]Bio-Protection Research Centre, Lincoln, Christchurch, New Zealand
[c]Knowledge and Analytics, AgResearch, Lincoln Research Centre, Christchurch, New Zealand
[d]Curtin University, Department of Environment and Agriculture, Centre for Crop and Disease Management, Bentley, WA, Australia

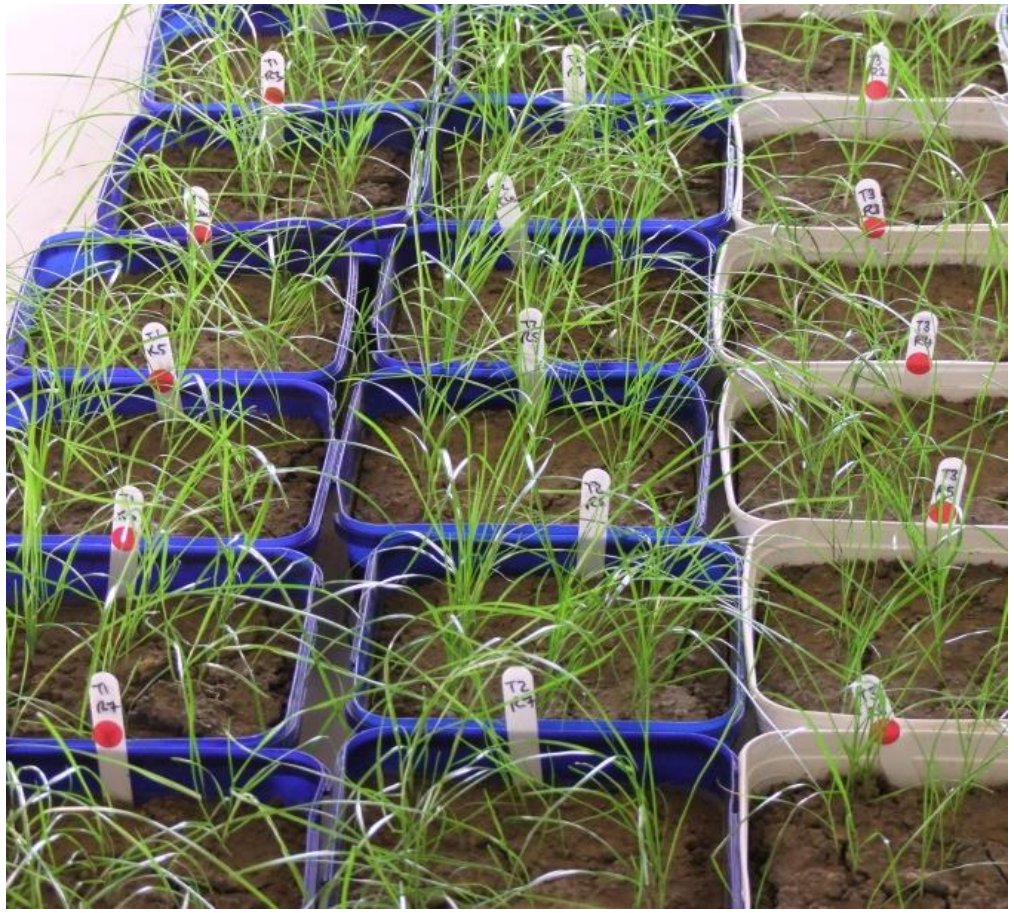


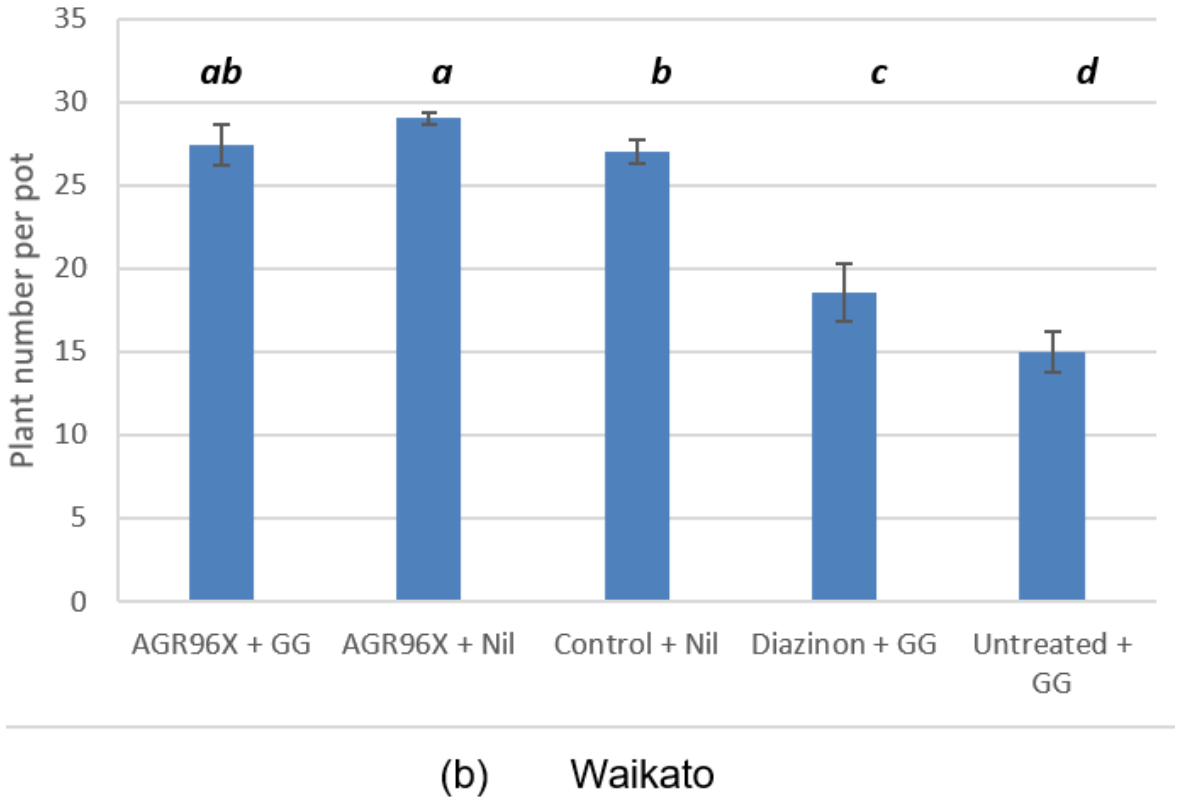
Drillable granule formulation



Application using existing machinery

Pot trials - emergence





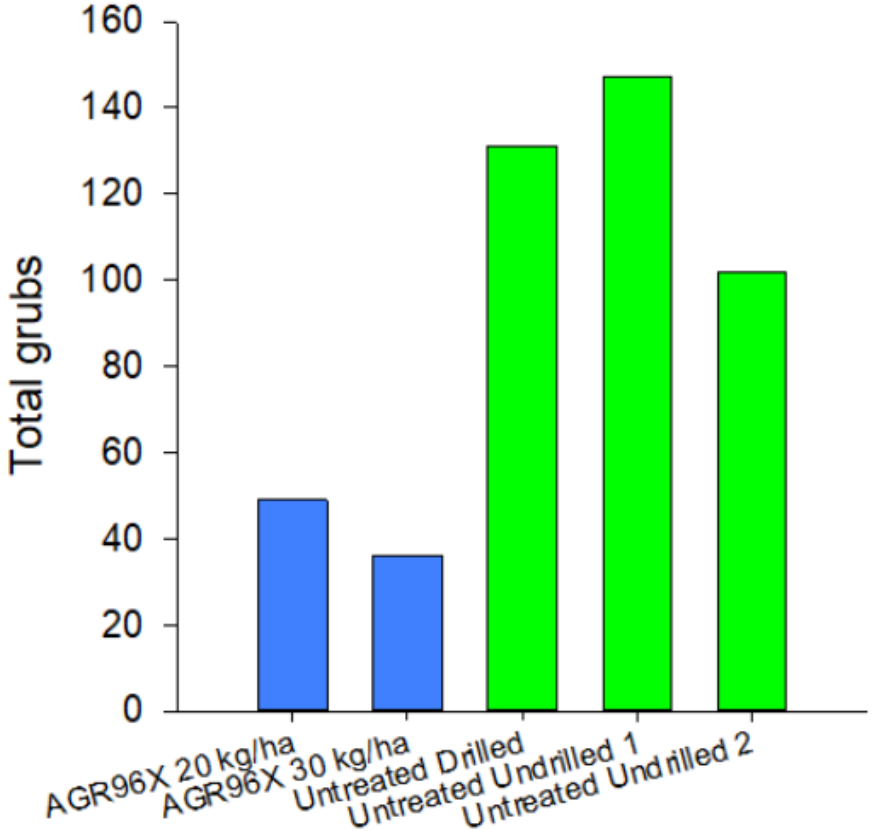
Replicated field trials

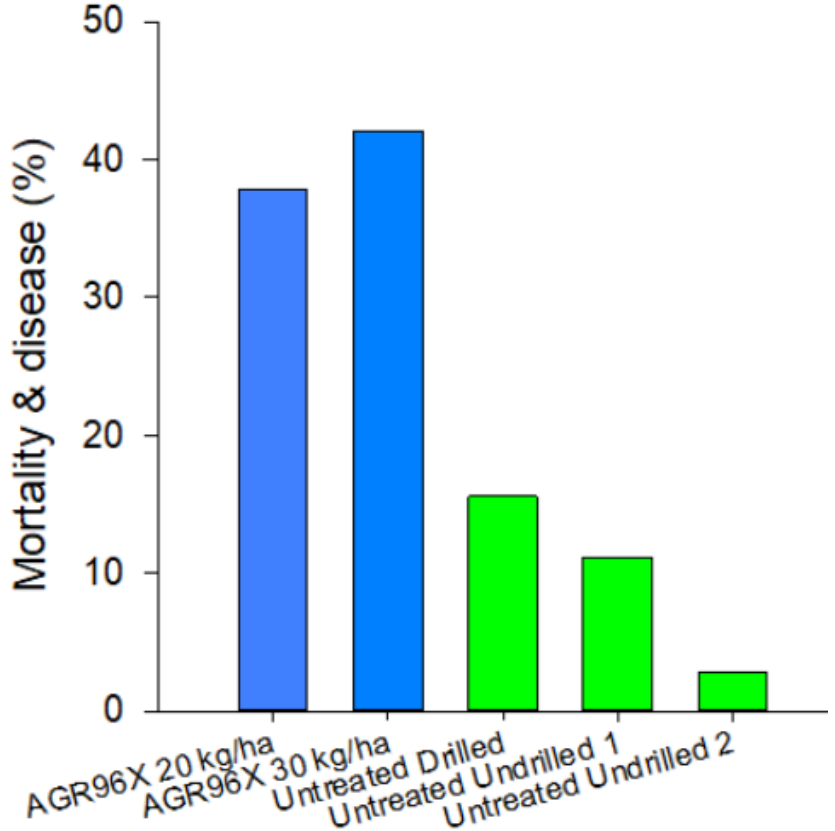
Summary field trials

- 20 field trials
- 4 seasons
- 5 geographical regions
- Significant reductions in grass grub number and/or increase in disease
- Mean 42% mortality AgR96X cf 25% diazinon or chlorpyriphos
- Increased seed yield in clover, wheat, and barley relative to untreated controls
- No phytotoxicity

Demonstration sites

Demonstration sites





Commercialisation

- Commercialisation partners Grasslanz Technology Limited and Midlands Holdings Limited
- Full registration package submitted
- Plan to get product to market before Diazinon is lost in 2028

Contact: david.wright@agresearch.co.nz

Bioeconomy Science Institute™

david.wright@agresearch.co.nz

bioeconomyscience.co.nz

Thank you

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Serratia spp. bacteria evolved in Aotearoa-New Zealand for infection of endemic scarab beetles

Mark R. H. Hurst[a,b], Maureen O'Callaghan[a], Travis R. Glare[c] and Trevor A. Jackson[a]

[a]Resilient Agriculture, AgResearch, Lincoln Research Centre, Christchurch, New Zealand; [b]Bioprotection Aotearoa, Lincoln University, Lincoln, Christchurch, New Zealand; [c]Wine and Molecular Biosciences Department, Faculty of Agriculture and Life Sciences, Lincoln University, Lincoln, New Zealand