

New biocontrol agents for the Cook Islands



New weed biocontrol agents for the Cook Islands.

Six invasive weeds that have serious negative impacts on agriculture and/or natural forest habitats in the Cook Islands have been identified as priority targets for biocontrol. Many of these weeds are also a problem in other South Pacific nations. A six-year programme which commenced in November 2013, with funding provided by the NZ Ministry of Foreign Affairs and Trade (MFAT), has enabled the release of six biocontrol agents (insects, mites and fungi) to better control these weeds.

For many of the weeds present on the Cook Islands, biocontrol (using co-evolved natural enemies) is the only viable, sustainable solution. Biocontrol agents have already been successfully used to control weeds such as Lantana (Tātarāmoa) and giant sensitive-weed (Pikika'a Papa'ā) in the Cook Islands.

Biocontrol benefits and advantages.

Biocontrol agents have been used successfully around the world for over 100 years. They are healthier for the environment than using chemicals and eliminate the risk of accidentally harming other plants or adding to herbicide run-off and pose no health risks to humans. Biocontrol is often highly cost-effective because once established the agents provide continuous long-term weed suppression without further intervention. Biocontrol agents spread to areas that are inaccessible where they would not otherwise be controlled.

Target Weed	Biocontrol Agent
Mile-a-minute <i>Mikania micrantha</i>	<i>Mikania</i> rust fungus <i>Puccinia spegazzinii</i>
Grand balloon vine <i>Cardiospermum grandiflorum</i>	Grand balloon vine rust fungus <i>Puccinia arechavaletae</i>
Red passionfruit <i>Passiflora rubra</i>	Red postman butterfly <i>Heliconius erato cyrba</i>
Strawberry guava <i>Psidium cattleianum</i>	Strawberry guava scale <i>Tectococcus ovatus</i>
African tulip tree <i>Spathodea campanulata</i>	African tulip tree gall mite <i>Colomerus spathodeae</i>
Cocklebur <i>Xanthium strumarium</i>	<i>Xanthium</i> rust <i>Puccinia xanthii</i>

Host range testing and safety.

Approval from the Cook Islands National Environment Service is necessary prior to any new agent being released. A comprehensive environmental impact assessment (EIA) has been prepared for each biocontrol agent in accordance with section 36 of the Cook Islands Environment Act 2003 and section 68 of the Cook Islands Biosecurity Act 2008. All biocontrol agents are rigorously tested following internationally accepted best practice host-range testing guidelines to ensure that they will only damage the weed being targeted. As the prevalence of the weed is reduced, the agents are predicted to become less common and not switch to other plants. Indeed, three of the six agents have been released previously in other countries with no unexpected negative consequences.

Distributing the agents.

The Cook Islands Ministry of Agriculture is working in conjunction with the Natural Environment Service and the Cook Islands Natural Heritage Trust to ensure that the agents are dispersing to all areas of the island where the weeds are a problem. Where necessary some of the agents will be moved manually to speed up the establishment phase.

Agents released during the current MFAT-funded programme have only been released on Rarotonga to date, but many of them could be redistributed to control weed infestations on other islands. Permission and consultation will be undertaken before distributing the agents to other islands.

What can be expected.

Biocontrol agents will not usually eliminate a weed completely but if successful they can reduce weed infestations to an extent that greatly benefits agriculture and/or allows native ecosystems to recover. The six agents released attack the foliage and/or stems of their host plants reducing the overall biomass. As the population of the agents builds the damage visible may be in the form of defoliation or galling (insects and mites) or appear as pustules on the leaves (fungus). Biocontrol can take years to succeed, but results can be achieved more rapidly in tropical areas. Results are rarely uniform with variation from place to place and even year to year.

Mile-a-minute (*Mikania micrantha*)



Biocontrol agent: *Puccinia spegazzinii* rust fungus

Cocklebur (*Xanthium pungens*)



Biocontrol agent: *Puccinia xanthii* rust fungus

Red Passionfruit (*Passiflora rubra*)



Biocontrol agent: *Heliconius erato cyrba* butterfly

African tulip tree (*Spathodea campanulata*)



Biocontrol agent: *Colomerus spathodeae* mite

Strawberry guava (*Psidium cattleianum*)



Biocontrol agent: *Tectococcus ovatus* scale insect

Grand balloon vine (*Cardiospermum grandiflorum*)



Biocontrol agent: *Puccinia arechavaletae* rust fungus

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