

## Report on the Bio-control Lab for the Ministry of Agriculture

by William Wigmore

### Project: GEF-PAS Assistance for Bio-control Programmes

**Purpose:** This programme was initiated to upgrade a vacant room (8.0m x 3.5m) within one of the buildings at the Ministry of Agriculture for the purpose of rearing natural enemies for bio-control programmes.

**Background:** The Ministry of Agriculture has initiated numerous successful bio-control programmes in the country in previous years. These were mainly through the use of introduced natural enemies (bio-agents) from abroad. These programmes were mainly to manage insect pests with a few initiated for weedy species such as the Giant Mimosa *Mimosa invisa* and Lantana *Lantana camara*.

Over the years, we have seen the introduction of serious pests to other areas through increased trade and movement of people, from a more regular air and sea services between and within countries. One of the most damaging pest for the Cook Islands remains to be the Balloon vine *Cardiospermum grandiflorum* weed which was probably introduced some 30-years ago. This weedy vine affects which may eventually kill some plants on the coastal lowlands, valleys, and hilly areas. The vine creeps over shrubs and trees finally forming a dense mass of vegetation over the plant affecting photosynthesis. Fortunately, unlike other species which has been recorded from the Cook Islands in more recent times such as the *Merremia peltata* weed, which is also well established on Aitutaki and Atiu, this species is only found on Rarotonga. A minor related species though is found on Mitiaro, which is known as *Cardiospermum halicacabum*.

**Activities:** During the past year, the facility was mainly utilised to nurture nearly 2,000 Taro *Colocasia esculenta* plantlets as part of a Taro Improvement Programme with the purpose to cross-breed proven local varieties with selected Taro leaf blight disease tolerance lines from Samoa.

Although the facility is currently not being used for rearing purposes for any specific bio-control programmes, there are plans to rear various species of natural enemies as part of a regional project to manage certain weedy species in the country. The project has selected seven species including Mile-a-minute *Mikania micrantha*; Cockelburr *Xanthium pungens*; Giant Reed *Arundo donax*; African tulip *Spathodea campanulata*; Red passionfruit *Passiflora rubra*; Grand balloon wine *Cardiospermum grandiflorum* and Strawberry guava *Psidium cattleianum*.

In the next week (14<sup>th</sup> April 2015), the rust fungus *Puccinia spegazzinii* will be introduced to suppress the growth of Mile-a-minute weed. The fungus will be released directly to the field however, more of the future introductions for the other target weeds will include insects (gall forming wasps, seed feeding weevils and scale insect) which will be reared in the facility. The insect species will be selected after host status tests conducted in New Zealand.

The Ministry of Agriculture is grateful for the financial assistance of GEF—PAS and in-kind contribution of the Cook Islands Investment Corporation towards facilitating the upgrade of the room. The facilities no doubt will be put to greater use in the future as we conduct and engage in further bio-control programmes and activities. The facility will also be continually used for the nurturing of plant species such as Taro, Sweet potato, Cassava, Banana, Yams, Pineapple amongst others, as we continue to broaden our genetic base through introduction and breeding of new lines of important crops to enhance national food security and sustainable livelihoods.

### Some Past Successful Bio-control Programmes

Island(s)	Pest		Introduction of Bio-agent	
	Name	Problem	Name	Year/Country
Rarotonga	Glassy-winged Sharpshooter <i>Homalodisca vitripennis</i>	Sever sap feeder, potential carrier of a bacteria killing grape vines	Egg parasitoid (wasp) <i>Gnatocerus ashmeadi</i>	2007 ex Tahiti
Atiu	Coconut scale <i>Aspidiotus constructor</i>	Major pest on coconut trees and many other fruit trees	Ladybird beetle <i>Chilocorus circumdatus</i>	2008 ex Rarotonga about 1990 ex Australia
Rarotonga	Cuban laurel thrips <i>Gynaicothrips ficorum</i>	Large populations breeding on <i>Ficus benjamina</i> trees, Extreme nuisance	Minute pirate bug (predator) <i>Montandoniola moraguesi</i>	2010 ex Hawaii