

# Biological Control of Parkinsonia

January 2018

## Distribution

Parkinsonia (*Parkinsonia aculeata*), a Weed of National Significance (WoNS), is a branched spreading shrub or small tree native to the Americas. It was first introduced into Australia as an ornamental and shade tree around 1900, planted near water bores, dams and homesteads.

Parkinsonia is now found throughout semi-arid Australia. In the Northern Territory, parkinsonia occurs in various densities, predominately on the Barkly Tablelands, in the Victoria River district and in the Gulf region.



Parkinsonia

## Impacts

Parkinsonia can form dense thickets that impede mustering, restrict stock access to water, displace native plants and animals, alter stream flows and harbour feral animals, particularly pigs.

## Control

It is no longer feasible to eradicate this weed where large infestations occur, focus is now on controlling growth and spread. The successful long-term management of weeds depends on a combination of biological, chemical and physical control.

The release of biological control agents does not reduce the importance of controlling the weed with chemical or other methods. Successful biological control will reduce the cost of an integrated control program.

## Biological control

When an introduced weed is present in an ecosystem without any of its natural predators it has an unnatural advantage over the native vegetation. Biological control is an attempt to reduce the advantage that the weed has by introducing some of its own natural predators (agents). It is not an attempt at eradication. Biological control agents weaken target weed species and make them less competitive. Biocontrol is an extremely safe method of weed control as the predators chosen are studied closely for many years and selected because they are specific to the weed. Agents are not capable of surviving on the native vegetation of the area, and so pose no threat to the native ecosystem. They are carefully chosen to be host-specific.

## Biocontrol agents UU and UU2

Several insects including, *Rhinacloa callicrates*, *Mimosestes ulkei* and *Penthobruchus germani* have been released to control parkinsonia in Australia with limited success. However, the most recent insect to be released is showing significant promise. *Eueupithecia cisplatensis*, commonly known as 'UU', and its close relative *Eueupithecia* sp. 2, or 'UU2', are moths, whose caterpillars (larvae) defoliate parkinsonia plants by feeding on the leaves. UU was identified as a potential biocontrol agent during field surveys in Argentina and Paraguay where parkinsonia occurs naturally. UU2 was found in south Argentina and Paraguay at a warmer latitude and completes its lifecycle in three-quarters the time of UU. It is possible UU2 may be better suited to Northern Territory conditions than UU.



UU adult

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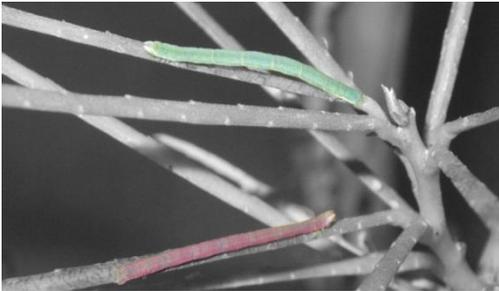
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## Rearing and releasing UU

UU has already been released onto parkinsonia across Northern Australia, including in the Northern Territory from 2013 to 2015. In 2013 Government agencies in QLD, WA and the Northern Territory were provided with live UU specimens by CSIRO. The NT Weed Management Branch developed its own successful UU rearing program which led to the moth's release across the Northern Territory.

Captive rearing of UU2 in the Northern Territory has started in early 2016 and release onto parkinsonia infestations has begun while monitoring of UU populations continues.



UU caterpillars (can be green or brown/red)

## Potential Impact on parkinsonia

Female UU and UU2 moths lay distinctive, rigid strands of brown or green eggs on parkinsonia plants, which hatch into green looping caterpillars. The caterpillars feed on parkinsonia leaves limiting the plant's ability to photosynthesise, resulting in a reduction in plant health, growth rate and seed production. The caterpillars are voracious feeders and can completely strip plants of all foliage.

Parkinsonia has very few predators in Australia, and the leaves are mostly undamaged by other agents. This means that the potential for UU and UU2 to impact on parkinsonia infestations is great.

Measuring the degree to which UU damages parkinsonia after release will be an important part of the parkinsonia biocontrol program. Northern Territory Government Weed Management Branch staff are working with

pastoral land managers and CSIRO to monitor and measure the degree to which UU has been damaging parkinsonia since its release.

## Quarantine

Preliminary studies on UU and UU2 biology and host specificity in Argentina, showed good results. UU was imported into an Australian quarantine laboratory where further testing was completed on a broad range of plant species. A total of 67 plant species were tested in Australia and in Argentina. Testing has proven UU to be entirely host specific to parkinsonia, enabling the species to be approved for release with confidence that it will not impact on any plant species other than parkinsonia.

CSIRO risk assessment reports for UU and UU2 have determined that the probability of off-target effects and potential consequences that would be associated with the release of UU and UU2 are negligible, which meets Australia's determined level of protection.

The Department of Environment also has an approval process for the import and release of biological control agents under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*. There was consultation with this Department prior to the release of CSIRO's risk assessment reports and support has since been provided.



UU captive rearing cages