Northern Territory Government

DEPARTMENT OF **LAND RESOURCE MANAGEMENT**


Commonly known as UU, *Eueupithecia cisplatensis* is a new biocontrol agent for parkinsonia

A new biocontrol agent for Parkinsonia

Mass rearing, release and monitoring of *Eueupithecia cisplatensis* the NT.

Parkinsonia aculeata L. (Fabaceae), native to the Americas, is an invasive woody shrub/tree of semi-arid and tropical rangelands and a weed of national significance. It has both economic and environmental impacts as it readily forms thickets in riparian habitats and floodplains; it impedes access to water, mustering and outcompetes native vegetation including nationally significant migratory water bird habitat.

In 2013, a new biocontrol agent *Eueupithecia cisplatensis* (UU) became available for release in Australia. The DLRM Weed Management Branch began the mass rearing and release of the host specific leaf feeding moth, in collaboration with WA and Queensland agencies.

A colony for mass rearing of UU is established in DLRM facilities in Berrimah, where larvae are produced for release at sites across the Territory including Adelaide River, Katherine Region, the Barkly Pastoral District and Victoria River District. Release sites are identified in collaboration with DLRM regional weed officers and local land managers to ensure that sites used are unlikely to be controlled through other means in the short term. The long term aim is to ensure the moth is widespread and all populations of parkinsonia are affected by it.

Monitoring will be conducted throughout the project to determine establishment, rates of spread and the agents effectiveness. The monitoring is closely linked to a national UU project coordinated by the CSIRO, Brisbane.

Rearing efforts have been refined and greater output has been achieved as a result; this is allowing greater numbers to be released per site, and in turn we can now release at more sites than originally intended.

Not all parkinsonia stands are suitable as release sites - factors such as dieback can greatly affect the health of the stand and this will reduce the agent's ability to establish.

Early signs of establishment have so far been detected in the NT and in Queensland.

This biocontrol agent will not replace other methods of control for parkinsonia; it has the potential to form part of an integrated weed control program, including chemical and physical control options. The program aims to reduce parkinsonias' ability to photosynthesise as a result of feeding damage to the leaves. This should in turn reduce the weed's reproductive output, and its ability to compete with native vegetation.

Parkinsonia biocontrol

Timeline

The Penthobruchus bores holes into the Parkinsonia seed pods to later emerge as adults

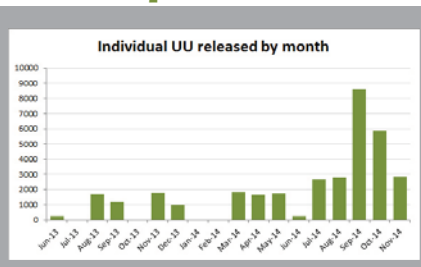
Parkinsonia has been the target of biocontrol since 1983

Penthobruchus (*Penthobruchus germaini*) is the only one of three agents previously released on parkinsonia that has established. The juveniles of this agent feed on mature seed. This agent is now widespread across the NT and in many regions, has greatly reduced the brown seed available, which in turn reduces the plant's ability to spread and colonise.

Remember...

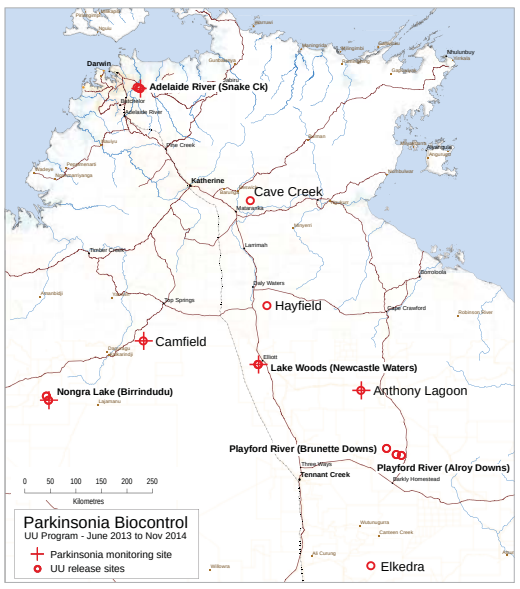
- Biocontrol can only assist in a broader management plan.
- Biocontrol won't be the magic bullet solution to parkinsonia control, it may reduce canopy density, seed production and rate of spread of the infestation.
- If we can establish UU on all infestations of parkinsonia in the NT, it will assist in the reduction of other management costs.
- The effect that UU has on parkinsonia will only be deduced in years to come because biocontrol agents typically take many years to establish and build up populations to the level required to inflict damage.
- Land managers must continue to manage their parkinsonia through other means because if UU establishes, it will only slow it down, not kill it.

Releases per month



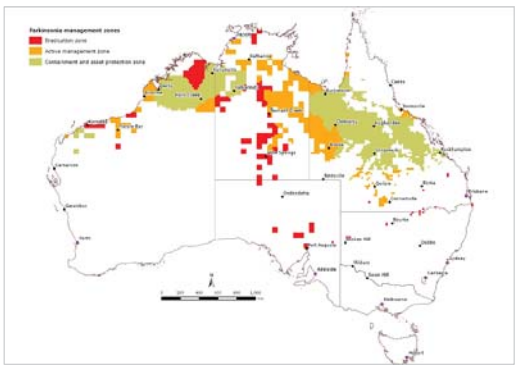
These graphs depict the number of larvae and pupae released by month and the cumulative total UU released. Ability to increase production of the agent has increased with time as we learn, refine and adapt the techniques involved in insect breeding. We are now able to release more larvae at more sites than initially planned.

UU release sites



Release sites for UU (red circles), and parkinsonia monitoring sites (crosses) in the Northern Territory, November 2014.

Parkinsonia distribution


Parkinsonia distribution and its management zones in Australia. Source: Australian Weeds Committee 2012, *Parkinsonia* (Parkinsonia aculeata L.) *strategic plan 2012–17*, Weeds of National Significance, Australian Government Department of Agriculture, Fisheries and Forestry, Canberra.

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Monitoring and evaluation

For any biological control program, there are two main types of monitoring to consider:

1) Monitoring the establishment and abundance of the agent

2) Monitoring the health of the target

To monitor UU, we beat leaves and branches over a standard size drop sheet. The output is the number of larvae detected per area sampled. One challenge is that the density of larvae changes in time and space. Therefore it needs to be repeated many times.

To detect and measure the health of parkinsonia, we are establishing five long term monitoring plots in different regions of the NT. Each plot is one hectare in size. Thirty plants are randomly sampled from the plot and will be measured once a year in May. We will also measure soil seed bank once a year in November.

To evaluate the impact of UU, it is necessary to consider the results of both the UU and the parkinsonia monitoring.


Source: ABC – Daniel Fitzgerald


To monitor UU populations, plants are beaten and larvae caught on drop sheets (top). The health of parkinsonia is monitored by measuring attributes of tagged parkinsonia plants (bottom)

Biocontrol steps


CSIRO

Step 1: Potential agents are host tested (by CSIRO, Brisbane) on many plants to ensure they only eat the target plant.


Step 2: First shipment of agents received by the Weed Management Branch staff from CSIRO Brisbane, May 2013.


Step 3: Mass rearing commenced. Breeding cages are illustrated.


Step 4: Once larvae are quite large, approximately 14 days old, they are ready for release.


Step 5: Larvae are released, over 1000 each time.


Step 6: With enough individuals released at a site, populations may become self-sustaining (adult moths shown).

Acknowledgements
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