



NSW Weed Biocontrol Taskforce Newsletter Summer News 2022

Welcome to the summer news from the NSW Weed Biocontrol Taskforce.

The Taskforce is a voluntary collaboration of members from several agencies responsible for managing weeds in NSW. This Newsletter is designed to summarise key information from Taskforce biannual meetings. Our meetings are designed to build an environment for sharing information and facilitating collaboration on current and future biocontrol programs.

There are many positive activities in the world of biocontrol, and we would like to share with you some of our current success stories and spread the word about exciting upcoming biocontrol agent developments.

We hope you enjoy reading this issue!

Biocontrol agents for public good: access and international protocol

Weeds do not adhere to international borders, so the search for biocontrol agents to restore the balance between a weed and its natural enemies requires investigation in the weed's country of origin. To work successfully in this space, global cooperative partnerships and protocols are entered into to ensure that all developments and benefits that arise from this work are fairly and equitably shared.

- All developments in biocontrol are for public good and any benefits must be shared.
- There are international agreements in place to ensure that this remains so.
- Australia is a signatory to these international agreements including the Convention on Biological Diversity.



Logo from Nagoya Protocol website

The **Convention on Biological Diversity** (CBD) implemented in 1993 is a multilateral treaty with the objective of developing national strategies for the conservation and sustainable use of biological diversity.

It has three main goals:

- the conservation of biological diversity (biodiversity)
- the sustainable use of its components
- the fair and equitable sharing of benefits arising from genetic resources.

The **Nagoya Protocol** implemented in 2014, is a supplementary agreement to the (CBD).

It provides a legal context for the sharing of benefits arising from the use of genetic resources (i.e., biocontrol agents in our case). The agreement sets out core obligations for the end user, such as establishing conditions for agent access and ensuring benefits are shared.

cont.. Biocontrol agents for public good: access and international protocol

The supply and transfer of biocontrol agents between organisations must be agreed and outlined under a **Material Transfer Agreement (MTA)**. This is a contract that governs the transfer of tangible research materials when the recipient intends to use it for research purposes. The MTA defines the rights of the provider and the recipient with respect to the materials and any derivatives.

NSW Department of Primary Industries (NSW DPI) is a signatory to **MTAs** with our international partners. The MTA governs the transfer of the material for research, teaching and identification purposes and material must not be used for commercial purposes. As such our biocontrol agents are for public good only and not for financial gain!

To ensure our sustainable access to current and future biocontrol agents, we need your help to inform and educate others on the responsibilities towards agent access.

Now open! The Don Mackenzie Weed Biocontrol Facility

The Don Mackenzie Weed Biocontrol Facility in Lightning Ridge was officially opened for business on 25 November 2020. This new weed biocontrol mass-rearing facility was named in honour of Angus Donald (Don) Mackenzie (1954-2019) for his long-term contribution and commitment to invasive weed management throughout the North West of NSW. Don was passionate about strategic weed control and was committed to progressing the education and training of fellow weeds officers and community members while simultaneously providing extensive expertise and advice to professionals at a local, regional, state, and national level. The construction of the Don Mackenzie Weed Biocontrol Facility was made possible through funding provided by the NSW Government.

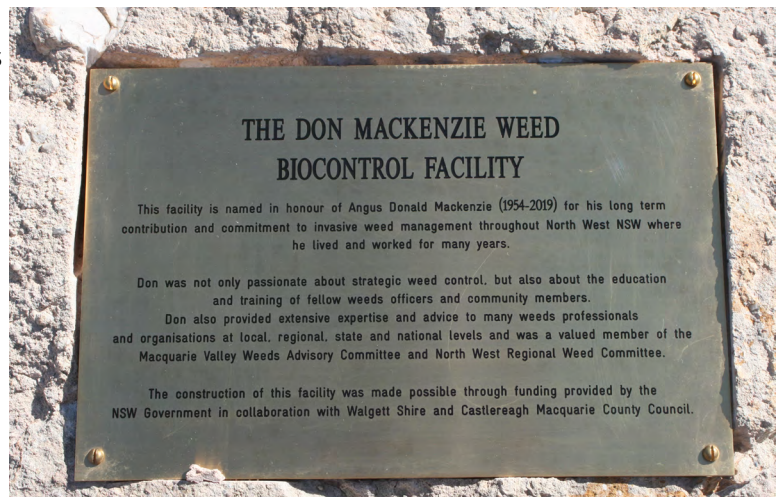


Image above: Plaque dedicating the building to Don Mackenzie

Image below: The crew outside the facility at the opening ceremony



Over the next two years, this new facility will concentrate exclusively on tackling the Hudson pear (*Cylindropuntia pallida*) invasion in north-western NSW. This program is led by NSW Department of Primary Industries (NSW DPI), in collaboration with North West Local Land Services, Castlereagh Macquarie County Council, Northern Slopes Landcare and Horizon Ecological, has four components:

- Determination of the full distribution of Hudson pear in the 200,000 Ha thought to be invaded by the cactus, using high resolution aerial imagery and machine learning.
- To mass-rear and release the cochineal (*Dactylopius tomentosus*, a soft-bodied scale insect that feeds solely on Hudson pear) biocontrol agent lineage ('californica var. parkeri') widely throughout the invaded range of Hudson pear.
- Monitor the agents' impact and dispersal at two key sites (Cumborah and Grawin).
- Provide a community engagement component to support the rearing and release of agents.

To fast-track the release of the cochineal, an innovative exchange program was been developed. Landholders were encouraged to bring fresh tubs of fresh Hudson pear segments (cladodes) to the mass-rearing facility and swap these for tubs of segments containing the biocontrol agent. Over the next couple of years, the new facility is anticipated to rear enough agents to flood the core infestation of Hudson pear.

Since initial releases (November 2017) significant impacts by the agent are being observed. At the two long-term monitoring sites, the cochineal has spread unaided to almost all Hudson pear plants. Moreover, plants are dying from the agent's impact.



Images above: When Hudson Pear is 'cactus' by Andrew McConachie

A training package has been developed for educating land managers on how to redistribute, assess and record the biocontrol agent's impact. Check out the Youtube videos hosted by Northern Slopes Landcare Association.

Workshops were also conducted in Lightning Ridge, Cumborah and Grawin to train the community in the approach to be followed for the integrated management of Hudson pear. AQF3 training was provided to enable the community to upskill in units that included the use of chemicals to control pests, weeds and diseases and transport and store chemicals. These were very well attended (all courses offered were at full capacity) with 85 community members from Lightning Ridge, Grawin, Cumborah, Lightning Ridge Miners Association, Grawin Glengarry and Sheeppards Miners Association and National Parks and Wildlife Services attending.

Stay tuned! While this facility is currently being used for Hudson pear biocontrol, it will be utilised in the future to mass-rear biocontrol agents for other priority weeds of north-western NSW.

The NSW Biocontrol Taskforce would like to acknowledge the support and extensive research program to control several invasive cactus species in Australia that has spanned greater than 90 years since the introduction of the first species of cochineal (*Dactylopius* spp.) by the Commonwealth Prickly Pear Board in 1925 from the United States of America. Since this time, NSW in collaboration with Queensland Department of Agriculture and Fisheries have invested heavily in sourcing and testing appropriate lineages or different types of the cochineal, *Dactylopius tomentosus*, and matching these to the eight invasive *Cylindropuntia* species in eastern Australia. Six lineages of *D. tomentosus* are now used to successfully control all eight species. A tremendous effort to enable the long-term sustainable management of invasive cacti.

Salvinia control: wonderful weevil success with Terry Inkson (MidCoast Council)

In a 5ha farm dam, MidCoast Council have made the management of Salvinia (*Salvinia molesta*) look super easy through repeated inundations with the Salvinia weevil biocontrol agent (*Cyrtobagous salviniae*). Check out the before and after pictures below!

Salvinia is a perennial floating water weed which forms dense mats that smother the waters surface. Introduced to Australia in the 1950's as an ornamental plant, Salvinia quickly became invasive and problematic with infestations being able to double in area in as little as two weeks. Dense floating Salvinia mats have devastating impacts on aquatic ecosystems. The mats limit sunlight, reduce oxygen availability, and create anaerobic conditions that are destructive to all other aquatic life. In addition, they impede recreational activities and alter the visual appeal of waterways.

Salvinia thrives in still or slow flowing, freshwater bodies particularly with high nutrient levels in eastern and northern Australia. If reproductive buds are protected within a thick mat it can survive in brackish water, at low temperatures, during frosts and during extended dry periods. Reproduction of Salvinia in Australia is solely by vegetative growth, so it's no wonder that new infestations easily occur from either water dispersed Salvinia fragments or via pieces attached to animals or machinery that make their way to new water bodies.

Investment in the biocontrol of Salvinia for Australia dates to the 1970's where CSIRO scientists began the search for agents in Brazil. By 1980 the first release of the tiny (2mm long) black weevil was approved for release in north Queensland. After demonstrating considerable impact by reducing Salvinia to a few small patches, the weevil has since been widely redistributed throughout coastal and sub-coastal eastern Australia and the Northern Territory, with control occurring in warm tropical sites in under three years.

Adult Salvinia weevils are small (about 2mm long) and black. You can find them feeding on the growing tips of plants. Larvae tunnel through the horizontal stems, particularly in younger parts of the plant causing the weed to break apart, sink and decompose on the bottom of the waterway. In warm conditions, weevils typically complete their life cycle in six weeks and do the most damage particularly when Salvinia is healthy and green. As such, the best time to introduce the weevil to your site is early spring to allow for time for populations to build up over the summer. Weevils breed slower at temperatures less than 20 °C and cease breeding below about 17 °C. Site-specific characteristics including temperature, shade, nutrient concentration, waterbody size and type may influence the level of weevil establishment and control. As such repeated releases may be required to achieve success. Keep an eye on your site through continual monitoring and re-introduce more agents when necessary.

The Salvinia weevil can be sourced from NSW DPI's state weed biocontrol mass-rearing centre at Grafton Primary Industries Institute. Please register your interest via our [registration form](#).



Images from top to bottom:

- Adult salvinia weevil (NSW DPI)

Photos by Terry Inkson MidCoast Council:

- Before salvinia control (2004)
- Release of the salvinia weevil with Brad Shultz (November 2007)
- After control by the salvinia weevil in a 5 Ha farm dam on the mid coast of NSW (2009)

NSW biocontrol success with English (Scotch) broom - Forestry Corporation

Spring and summer 2020/2021, was an exceptional season in the central west for the growth and spread of the Broom gall mite (*Aceria genistae*) on English (Scotch) broom (*Cytisus scoparius* subsp. *scoparius*). After several years of prolonged drought and bushfires, the 2020/2021 season saw consistent rainfall allowing the mite to thrive.

James Stewart from Forestry Corporation NSW first collected the Scotch broom gall mite from established populations within Eusdale Nature Reserve at Yetholme, NSW in 2016. The method used to redistribute the mite was simple. At mite infested sites, Scotch broom branches containing galls were tied together in bunches containing at least 20 galls. These bunches were then transported immediately to the new location, and each bunch tied onto healthy Scotch broom plants so that mites could easily transfer onto fresh material.

The Scotch broom gall mite is microscopic and invisible to the naked eye. They feed on plant sap within buds and existing galls. As they feed, growth regulating chemicals produced by the mites cause abnormal stimulation of plant cell growth and the plant produces galls (swollen growths). The female mites then lay eggs inside the gall which can grow to 10mm and harbour 100's of mites. Once they emerge from the gall, mites migrate to new stem buds to protect themselves against the winter and are easily dispersed by wind to reinfest other plants. Gall formation reduces flowering and seed production, stunts plant growth and when heavily attacked shrub death can occur.

The biocontrol agents collected from Eusdale Nature Reserve have successfully established on Scotch broom populations at Sunny Corner State Forest area along Kirkconnell School Road and in Hampton State Forest. Due to prolonged drought over several years, it did take time and good weather conditions for populations to build up and spread from these new locations.

The 2020/2021 season had exceptionally favourable weather for populations of the mite to thrive. As such, populations of the mite have built up, evidenced by galls as large as 10 cent pieces. The gall mite is now having an impact in the region and is well established at several locations. Scotch broom plants are now showing great signs of stress caused by the mite including stunted growth throughout the Yetholme, Black Springs and Sunny Corner regions of central NSW.



Images above: Scotch Broom infected with the gall mite; from smaller initial infestations (left) to increasing (middle) and full sized galls (right). Photos by James Stewart, Forestry Corporation NSW

First biocontrol agent in Australia to be released against *Sagittaria*!

“Water is the giver of life”, yet our creeks, wetlands and irrigation canals are under threat from *Sagittaria* (*Sagittaria platyphylla* and *Sagittaria calycina*), aggressive aquatic weeds native to the United States of America. In Australia, *Sagittaria* is an aggressive invader that blocks and impedes waterflows, threatens native habitats and costs millions of dollars annually in herbicide control.

After a culmination of over ten years of research by Dr Raelene Kwong and her team at Agriculture Victoria, the fruit-feeding weevil (*Listronotus appendiculatus*) has now been approved by the Australian Department of Agriculture, Water and Environment for release against *Sagittaria*. This is the first of three biocontrol agents Dr Kwong and her team have been investigating, that will attack both *S. platyphylla* and its close relative, *S. calycina* (arrowhead).

Adult fruit-feeding weevils lay eggs on the flowers and developing fruits of *Sagittaria*, and after hatching the larvae burrow into the fruiting heads where they feed on the seeds. The larvae then bore down into the plant stem where they undergo a transformation to become adults and emerge by chewing through the stem. Their entire life cycle takes approximately two months and as a result there can be three to four generations of fruit-feeding weevil produced from spring through to autumn. Over the winter period, adults seek shelter under bark or in fallen litter to re-emerge the following spring. You can often see mating pairs sitting on the top of flowering stems.

Agriculture Victoria and the New South Wales Department of Primary Industries are collaborating to establish a mass-rearing and release program for the fruit-feeding weevil. This program is jointly funded through by the New South Wales Government as part of its ongoing commitment to strengthening biosecurity across the state, Murrumbidgee Irrigation, Yanco Creek and Tributaries Advisory Council, NSW Environmental Trust, NSW Weed Society, and the NSW Biocontrol Taskforce.

Stay tuned! First releases to occur in 2022.

Both of these *Sagittaria* species are fast growing water weeds capable of aggressive growth and rapid spread. They can block irrigation channels, impede water flows and choke natural watercourses and wetlands.

Sagittaria calycina has distinct, arrow-shaped leaves. It chokes waterways and irrigation channels and is most prevalent in the New South Wales Riverina region where it is a weed of rice crops.

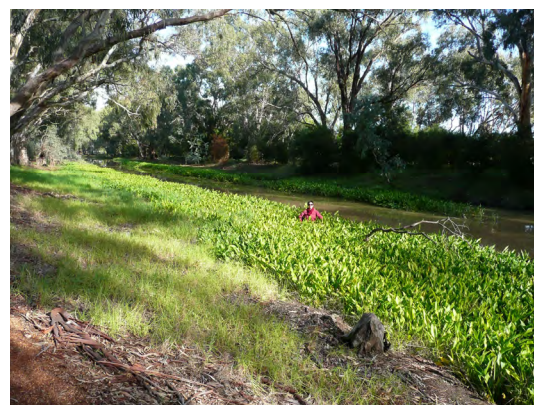
Sagittaria platyphylla has oval/linear shaped leaf blades with pointed tips and has a much wider distribution which extends from southern Victoria through New South Wales and into northern Queensland. Small populations also occur in Western Australia, South Australia and the Northern Territory.



Above and below: *Sagittaria* fruit-feeding weevil photos by Rae Kwong, Agriculture



Above: An infested irrigation channel in northern Victoria, Nathan Harms, United States of America colleague is standing in the channel. Photo by Rae Kwong, Agriculture Victoria.



Above: Rae Kwong standing in a *sagittaria* infestation in Broken Creek, Numurkah, Victoria. Credit: Agriculture Victoria

Available now!

Biological control of weeds: a practitioner's guide for south-east Australia

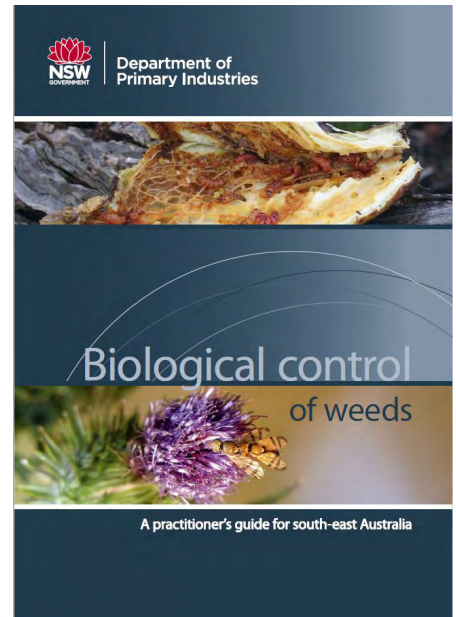
Australia has a long and distinguished history of successful weed management using biological control (biocontrol). It is a technology that has proven to be environmentally friendly, self-sustaining, and cost effective.

The [Biological Control of Weeds Manual](#) is available for download through the NSW DPI website. This manual was written to assist weed practitioners interested in utilising and maximising the benefits of weed biocontrol as part of their weed management plans in south-east Australia.

The key steps for undertaking weed biocontrol programs for more than 50 weed species in south-east Australia are addressed, as well as information being provided for:

- weeds and their background
- how to identify biocontrol agents (the weed's natural enemies) and their potential impact on the weed
- how to source biocontrol agents
- how to redistribute these agents
- how to monitor establishment and dispersal of such agents.

This manual was financially supported by the NSW Department of Primary Industries, Local Land Services (Murray, Central Tablelands, North West), and the NSW Weed Biocontrol Taskforce.



Looking forward to the following...

The 21st Weeds NSW & VIC combined Conference Albury Entertainment Centre 21-24 March 2022

The conference theme is – discover through recovery. We will be having an interesting and engaging trade booth at the conference with lots of biocontrol information, the taskforce prospectus, flyers, a pdf copy of the new biocontrol manual and several examples of live biocontrol agents! The [conference website](#) has all the details.

Conference photo competition

The Weed Society of Victoria are hosting the photo competition for the conference. Subject topics are:

- As time goes by
- Weedy art and craft
- Up close and personal
- Recovery
- My 'favourite' weed
- A weedy funny photo

Entries for the photo competition due 12 March 2022.

Guidelines are available online at:

https://www.nswweedsconf.org.au/photo-competition/Wper_submission)



New agents are on their way!

- **African Boxthorn** (*Lycium ferocissimum*) – application to release the rust fungus (*Puccinia rapipes*) was submitted by CSIRO and is currently under assessment.
- **Cabomba** (*Cabomba caroliniana*) – approval has been granted to release the weevil (*Hydrotimetes natans*). A colony is currently being established by the team at CSIRO for future releases.
- **Fleabane** (*Conyza bonariensis*) – approval has been granted to release rust fungus (*Puccinia cnici-oleracei*). Current work by the team at CSIRO is focused on refining the mass-rearing method and developing a release method.
- **Pereskia** (*Pereskia aculeata*) – application to release the stem-wilter bug (*Catorhintha scaffneri*) was submitted by NSW DPI.
- **Sea spurge** (*Euphorbia paralias*) – initial releases of the leaf and stem blight fungus (*Venturia paralias*; syn. *Passalora euphorbiae*) have now occurred and current research by CSIRO is focused on developing effective methods for production and releases.

Weed Biocontrol agent and release site registration form

The Taskforce has a new process for you to receive weed biocontrol agents from any of our mass-rearing facilities in NSW.

This weed biocontrol agent and site registration form will provide NSW DPI and the Taskforce with the ability to plan and prepare biocontrol agents for you in a timely manner.

We further request information on your weed priorities so we can plan for the future while better servicing your current needs.

Please register your requests by filling in the form [Weed biocontrol agent and release site registration form](#).

How is the Taskforce funded? \$\$\$

The **NSW Biocontrol Taskforce** comprises of a voluntary collaboration of members from a number of like-minded agencies responsible for managing weeds. The role of the Taskforce includes obtaining and facilitating commitment and investment, mass rearing and establishment of agents, monitoring, training, prioritising agents for action in NSW, and communication of research progress.

To achieve this the Taskforce is funded and promotes biocontrol research alongside rearing, release, and monitoring programs through a **shared investment commitment**.

A **shared investment commitment** involves interested parties becoming financial members of the NSW Biocontrol Taskforce. Membership is offered at different levels to enable interested investors to choose a commitment that best suits their requirements. Taskforce members, in return for the annual membership contribution, receive biocontrol agents, training, information and communication. This allows for greater flexibility and value to investors. This innovative model is designed to facilitate collaboration, drive innovation, and provide an efficient biocontrol agent delivery pipeline for members.

To inquire about becoming a member, please email weed.biocontrol@dpi.nsw.gov.au with your details.

NSW Biocontrol Taskforce biocontrol agents

Table 1. Current agents available for redistribution in NSW

Weed	Weed scientific name	Agent	Agent scientific name	Who to contact
Cat's Claw Creeper	<i>Dolichandra unguis-cati</i>	Jewel Beetle	<i>Hylaeogena jureceki</i>	weed.biocontrol@dpi.nsw.gov.au
<i>Cylindropuntia</i> spp.	<i>Cylindropuntia</i> spp.	Cochineal	<i>Dactylopius tomentosus</i> and their lineages (A range of lineages are available for biocontrol)	Mat Savage (msavage@cmcc.nsw.gov.au) or Jo Skewes (nwcactus@nsla.net.au) weed.biocontrol@dpi.nsw.gov.au
Harrisia cactus	<i>Harrisia martinii</i>	Mealybug	<i>Hypogeococcus festerianus</i>	weed.biocontrol@dpi.nsw.gov.au
Madeira vine	<i>Anredera cordifolia</i>	Madeira beetle	<i>Plectonycha correntina</i>	weed.biocontrol@dpi.nsw.gov.au
Sagittaria Arrowhead	<i>Sagittaria platyphylla</i> <i>Sagittaria calycina</i>	Sagittaria fruit-feeding weevil	<i>Listronotus appendiculatus</i>	weed.biocontrol@dpi.nsw.gov.au
Salvinia	<i>Salvinia molesta</i>	Salvinia weevil	<i>Cyrtobagous salviniae</i>	weed.biocontrol@dpi.nsw.gov.au
Wandering trad	<i>Tradescantia flumenensis</i>	Smut fungus	<i>Kordyana brasiliensis</i>	Ben.Gooden@csiro.au
Water hyacinth	<i>Eichhornia crassipes</i>	Water hyacinth weevils (temperate) (sub-tropical)	<i>Neochetina bruchi</i> <i>Neochetina eichhorniae</i>	weed.biocontrol@dpi.nsw.gov.au
Water lettuce	<i>Pistia stratiotes</i>	Water lettuce weevil	<i>Neohydronomous affinis</i>	weed.biocontrol@dpi.nsw.gov.au

The [Weeds Extranet](#) has information on other weed biocontrol agents.

Don't forget to register your requests via the [Weed biocontrol agent and release site registration form](#)

Many thanks for your support this season
Steering Committee: NSW Weed Biocontrol Taskforce

For further information about the Taskforce please contact weed.biocontrol@dpi.nsw.gov.au