



Information sheet for the African boxthorn biocontrol agent, a rust fungus *Puccinia rapipes*

Funding acknowledgement

This new project supports community-led releases of a biocontrol agent to suppress African boxthorn and strengthen drought resilience across Australia's agricultural landscapes. This new project is funded by **the Australian Government's Future Drought Fund** and delivered by CSIRO under the national 'Nation-wide Weed Biocontrol Mass-Rearing and Release Network for Enhanced Drought Resilience in Australia's Agricultural Landscapes' led by the Centre for Invasive Species Solutions. For more information about the project: <https://invasives.com.au/news-events/5-9m-boost-for-national-weed-biocontrol/>

Project aims and desired outcomes

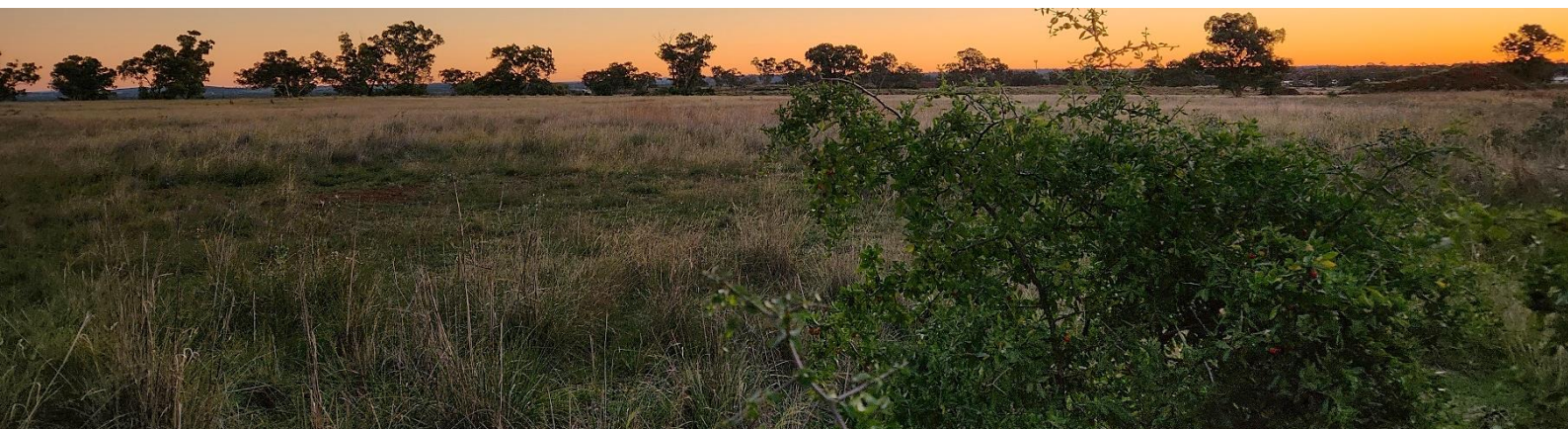
This project aims to tackle some of the worst invasive weeds in Australia including African boxthorn (*Lycium ferocissimum*) using safe and approved biocontrol agents. These weed species have been prioritised for biocontrol due to their impact on agricultural productivity, biodiversity and drought resilience. The ultimate goals of this African boxthorn biocontrol project are to:

- Achieve widespread establishment of the fungus, *Puccinia rapipes*
- Reduce African boxthorn's invasion potential
- Enhance drought resilience values related to agricultural productivity, biodiversity and cultural values
- Build community capacity for long-term weed management

Background information on the biocontrol agent

The biocontrol agent is a rust fungus, *Puccinia rapipes*, that infects the leaves of African boxthorn. It was originally isolated from diseased boxthorn plants in South Africa. Through extensive host-specificity studies undertaken by the CSIRO, the fungus was shown to be highly specific to African boxthorn and cannot damage native Australian vegetation. In 2021, the fungus was approved for release into the Australian environment as a biocontrol agent to assist with the control of African boxthorn.

The rust fungus infects young leaves of African boxthorn, causing yellowing of the leaves followed by the development of pustules. The pustules produce fungal spores which are dispersed by wind. The spores land on the leaves of nearby African boxthorn plants and, under humid conditions, will germinate and infect new leaves. Infected leaves will die back over time. This may result in extensive defoliation of an individual plant if the fungus establishes widely and causes severe disease. Infection by the rust fungus can also disrupt the photosynthetic capacity of the plant, reducing overall plant growth and reproductive output. Further information can be found here: <https://research.csiro.au/african-boxthorn/>



What does participation involve?

This is a collaborative project in which CSIRO provides fungal biocontrol release kits, resources, and support (e.g., online, through workshops) free of charge. We will provide registered participants with biocontrol agent release kit(s) that contains a vial of the rust fungus spores, along with step-by-step instructions and materials to apply the spores to the target African boxthorn plants. These will be distributed via post or courier services.

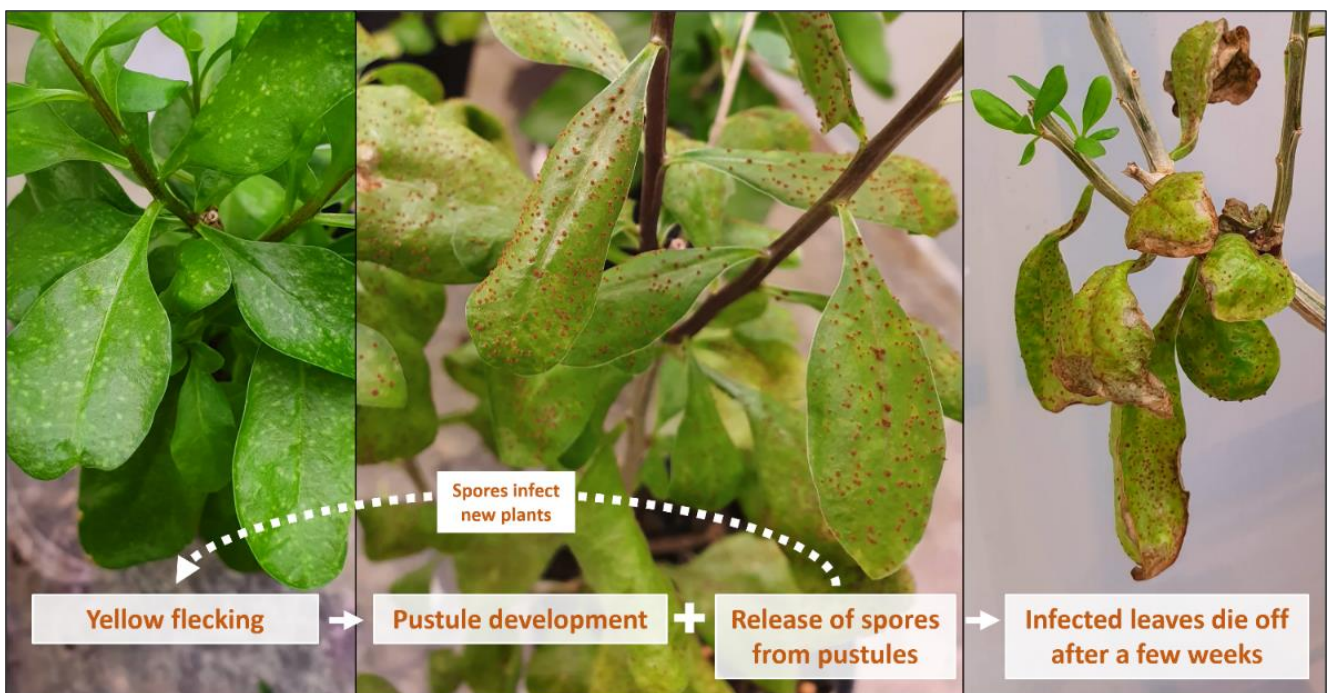
One biocontrol kit will contain enough material to spray 8 or more boxthorn branches. You will need to ensure that each kit released is separated by at least 200 m to enable broadscale distribution of the fungus in the local landscape. If the fungus establishes, it will naturally spread to other nearby African boxthorn plants.

The biocontrol agent should be released in areas with the following attributes:

- Dense infestations of African boxthorn, to increase the opportunities for other leaves and plants to become infected by the fungus.
- On healthy, juvenile plants or mature plants with fresh growth. The fungus has a strong preference for new leaf growth over old growth.
- In areas where the African boxthorn population will not be managed by the application of chemical herbicides, slashing or other control methods over the next several years. This will give time for the fungus to become established and spread across multiple growing seasons.

In exchange for receiving the fungal biocontrol agent, participants will provide CSIRO with data on the location of their release sites, along with baseline estimates of the abundance of African boxthorn infestations. Participants are also encouraged to revisit their release sites approximately 10 weeks after application (or in spring) to assess the presence or absence of the fungus. Monitoring will be supported through a monitoring sheet and guidance from CSIRO experts, with assistance available to help identify the fungus if needed.

Participants will contribute voluntarily to the release activities and are not remunerated by CSIRO for their involvement. Participants are expected to hold and manage their own liability for how they choose to engage in the project, including any on-ground biocontrol agent release activities. It is the responsibility of each participant to ensure they have obtained permission from the relevant landowner/land manager/custodian to release the African boxthorn biocontrol agent at their nominated site/s.



The natural infection process of the biocontrol agent

Introducing African boxthorn and its impacts

African boxthorn (*Lycium ferocissimum*) is a highly invasive woody weed that threatens biodiversity, agricultural productivity, and drought resilience across Australia. It forms dense, thorny thickets that outcompete native vegetation, obstruct access to land, and degrade habitat for wildlife. Infestations are widespread in farming regions and natural landscapes, particularly in areas already vulnerable to climate stress. Its resilience to drought and ability to spread rapidly make it a priority target for national biocontrol efforts.

A new biocontrol solution: a rust fungus, *Puccinia rapipes*

CSIRO is leading a national initiative to deploy the rust fungus *Puccinia rapipes* as a biocontrol agent against African boxthorn. This fungus has been approved as a safe, host-specific and effective tool for suppressing boxthorn infestations and improving drought resilience. Once established, it weakens boxthorn by damaging leaves and reducing plant vigour, which may help reduce fruit and seed production and limit spread and supports the recovery of native vegetation.

Because the fungus does not spread rapidly on its own, human-assisted release is essential. Through mass-rearing facilities, biocontrol kits, and coordinated fieldwork, CSIRO and its partners will distribute the fungus to hundreds of sites across Australia, empowering communities to lead the charge in sustainable weed control.

Project overview

This new project is funded by **the Australian Government's Future Drought Fund** and delivered by CSIRO under the national 'Nation-wide Weed Biocontrol Mass-Rearing and Release Network for Enhanced Drought Resilience in Australia's Agricultural Landscapes' led by the Centre for Invasive Species Solutions. This new project supports community-led releases of a biocontrol agent to suppress African boxthorn and strengthen drought resilience across Australia's agricultural landscapes. Project activities will commence in October 2025 and run through to mid-2029. Project goals include:

- Establish *Puccinia rapipes* at over 400 release sites nationwide.
- Reduce African boxthorn infestations and their impact on biodiversity and productivity.
- Enhance drought resilience through sustainable weed suppression.
- Build community capacity for long-term biocontrol and land management.

How you can get involved

CSIRO is inviting farmers, Indigenous groups, and community organisations to help roll out the new biocontrol solution for African boxthorn. Participants will be able to register interest and receive biocontrol kits containing the rust fungus *Puccinia rapipes*, along with clear instructions for its release and monitoring. You will be supported through workshops, training events, and field demonstrations to safely release the fungus and contribute data via national platforms. By joining the network of release sites, you will help suppress a major weed, strengthen drought resilience, and play a vital role in shaping the future of biocontrol in Australia.

Who eligible to participate

All interested stakeholders are welcome to participate in this project. CSIRO will provide the rust fungus *Puccinia rapipes*, along with training, release kits, and monitoring guidelines. Participants will contribute their time and effort to release the fungus at local sites and track its impact. This includes managing site access and any necessary approvals.

The program is especially suited to farmers, community groups, and government agencies already working to control African boxthorn. A key focus is partnering with First Nations organisations to co-design and deliver biocontrol activities that reflect local values, knowledge systems, and land management priorities. We welcome conversations about how this engagement can be supported through training, funding, or other mechanisms.

To learn more, visit: <https://research.csiro.au/african-boxthorn/current-research/future-drought-funding/>

To submit an express interest, please email: boxthornbiocontrol@csiro.au.

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If you would like to chat to someone on the CSIRO African boxthorn biocontrol team, please call:

Ben Gooden (02) 6218 3896

Caroline Delaisse (02) 6218 3525

research.csiro.au/african-boxthorn



The fungus appears on leaves as small, dark brown, raised bumps called “pustules”



High infection can happen



Low infection may also be seen

Can use of the biocontrol agent replace herbicide application or other control methods?

Biocontrol may provide a sustainable, landscape-scale approach for African boxthorn management with no chance of off-target damage to crops or native vegetation. Given that the fungus will not kill African boxthorn altogether, it will complement but not replace the need for other control methods. However, widespread establishment and spread of the fungus may gradually reduce the quantity of chemical herbicide required to suppress weed populations.

What happens if I cannot detect the fungus after release? Has it failed?

It is important to note that the fungus will only infect African boxthorn at high severity under optimal conditions for growth and spread – that is, when warm and moist and the host African boxthorn plants are healthy and vigorous at early stages of growth. As such, we expect that the fungus will not establish in all instances. The fungal spores require specific microclimate requirements for germination and infection. The fungus will only become widely established in the Australian environment after many years of sustained releases by various participants. As such, participants are encouraged to release the fungus on multiple occasions where the initial releases may have failed.

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For further information

the CSIRO African boxthorn biocontrol team
boxthornbiocontrol@csiro.au
research.csiro.au/African-boxthorn/



Australian Government
Department of Agriculture,
Fisheries and Forestry



Future
Drought
Fund



CENTRE FOR
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Australia's National
Science Agency

Community-led biocontrol for African boxthorn and drought resilience

This project received funding from the Australian Government's Future Drought Fund

African boxthorn is a thorny, drought-hardy invader choking out native plants and degrading farmland across Australia. CSIRO is leading a national biocontrol initiative using the rust fungus *Puccinia rapipes*: a safe, approved biocontrol agent that weakens African boxthorn and supports ecological recovery across invaded landscapes. This project invites farmers, First Nations groups, and community stakeholders to receive biocontrol release kits, and take part in training for release and monitoring. By joining the national network, you will help suppress a major weed, build resilience to drought, and contribute to sustainable, community-led weed control.



Registering your interest

The fungus is available for release in all Australian states and territories. We welcome collaboration with stakeholders interested in making multiple releases across broad regions, integrated into existing African boxthorn control programs. This approach will maximise the impact of the fungus at the landscape scale.

Please email Caroline Delaisse at boxthornbiocontrol@csiro.au to register your interest to participate in the biocontrol program. As part of the registration, the CSIRO will provide a registration form for participants to complete, which requires information about the location(s) of the African boxthorn infestation on which you plan to release the fungus. The registration form needs to be completed prior to receiving the agent.

The biocontrol agent will be provided to registered participants during times of peak African boxthorn growth. In most parts of Australia, optimal timing is autumn to early spring. Releases will usually not be made during late spring or summer. However, summer releases may be suitable in some cool temperate areas or during periods of high rainfall. The agent will be distributed **until June 2028**. The specific timing of delivery will be determined by quantity of available material for release and level of demand from registered participants.

Frequently asked questions

Is it safe to release the biocontrol agent into the Australian environment?

In 2017, CSIRO began rigorous evaluation of the risks that the fungus *Puccinia rapipes* could pose to non-target plants in Australia. This extensive host-specificity testing was performed in a quarantine facility and involved exposing African boxthorn and non-target plant species to the fungus under optimal conditions for infection. It was found that the fungus is highly specific to African boxthorn (*Lycium ferocissimum*) and Goji berries (*L. barbarum*, *L. chinense* and *L. ruthenicum*; of which the rust can be easily treated with fungicides already used by goji growers). Based on these research results and following a comprehensive risk assessment process and public consultation, the Federal Department of Agriculture, Water, and the Environment (DAWE) approved the release of the biocontrol agent into the Australian environment. The information package that supported the application to release the agent in Australia, which includes all results, can be found here: <https://www.awe.gov.au/biosecurity-trade/policy/risk-analysis/biological-control-agents/risk-analyses/completed-risk-analyses/puccinia-rapipes>

Please note that the fungus has been approved for release into the Australian environment, and no further biosecurity risk assessments are required for site-level releases. CSIRO has secured the necessary permissions for the fungus to enter all states and territories across Australia. However, each participant may need to navigate additional permissions related to site access and safety while conducting on-ground activities.

How does the fungus affect African boxthorn health and populations? What is its natural spread potential?

In the Australian environment, the fungus will not kill African boxthorn. Provided that the biocontrol agent establishes widely and causes severe disease symptoms on African boxthorn, it is expected to reduce the reproductive output and growth of the weed in the long term. This will in turn reduce its invasion potential in various ecosystems but will not eradicate it altogether.

The rate of spread of the fungus will be ascertained by long term monitoring. It is expected that the fungus will spread from one plant to the next very slowly, but the rate of spread will accelerate once the overall abundance of the fungus builds up in the local African boxthorn population. Based on our knowledge of other successful biocontrol agents that have been released previously in Australia, broadscale spread of the fungus would be expected to take several years and will not occur within the first season of release. As such, 'success' in the short term for this research project is to first establish the presence of the fungus in the Australian environment.