NEWP
NATIONAL ESTABLISHED WEED PRIORITIES

August 2024

Nationally significant weed nomination

Section A: General information

Purpose of this form	This form is for government and non-government organisations that have completed the first step in the nationally significant weed nomination process by submitting an EOI that met the threshold criteria. Use this form to nominate a nationally significant weed that is either a: • single species, or • group of closely related weeds that are similar in life-form and management requirements. Only nominate the weeds that were deemed eligible in your EOI. If you are nominating more than one weed or group of weeds, submit a separate nomination form for each.
Before applying	Ensure that you understand the nomination process described in the Guide to nominating a nationally significant weed.
To complete this form	1) Save the form to your desktop or device. 2) Complete the form using the latest version of Microsoft Word. 3) Sign the completed form and save it as a PDF.
Confidentiality	Mark any confidential material as 'CONFIDENTIAL' and explain the sensitivity.
Your application must include	☒ attachments such as letters of support, maps and research findings.
Closing date	9 pm AEDT, 12 January 2025
Email your application	Invasive Species National Coordination and Programs Department of Agriculture, Fisheries and Forestry Email weedpriorities@aff.gov.au

Section B: Weed species

Provide details of the weed or group of closely related weeds that we deemed eligible in the EOI step. For correct scientific names, see the Australian Plant Name Index.

1 Indicate type of nomination (select one box)

Single species ☒ Go to question 2

Group of closely related weeds ☐ Go to question 3

2 Single species

Scientific name *Cereus uruguayanus*

Common name(s) Willows Cactus, Night-blooming Cactus, Peruvian apple

It is also widely referred to in literature as *Cereus hildmannianus* subsp. *uruguayanus* or incorrectly as *C. peruvianus*.

3 Group of closely related weeds (add more lines if needed)

Weed 1

Scientific name _____

Common name(s) _____

Weed 2

Scientific name _____

Common name(s) _____

Weed 3

Scientific name _____

Common name(s) _____

Weed 4

Scientific name _____

Common name(s) _____

Section C: Lead organisation contact details

We will email all correspondence to the primary contact person and cc the secondary contact person. The primary contact must respond by the date requested and communicate with group members listed in Section D.

4 Lead organisation name (legal entity name) AgForce Queensland Farmers Limited

5 Australian Business Number (ABN) 57 611 736 700

6 Primary contact

Given name(s) Annie Family name Ruttledge

Position Senior Policy Advisor

Phone 0429 062 852 Email ruttledgea@agforceqld.org.au

7 Secondary contact person

Given name(s) Patricia

Family name Hawkins

Position *President - COWMAB*

Phone *0429349645* Email pmhawkins@outlook.com.au

Section D: Group members

8 List all other organisations that jointly support this nomination. (add more lines if needed)

Barcaldine Regional Council

Capricorn Pest Management Group

Castlereagh Macquarie County Council

Cattle Australia

Central Highlands Regional Council

Charters Towers Regional Council

CHRRUP Ltd.

COWMAB – Catchments of Woodbine Medway and Blackboy Creeks, QWaLC (Queensland Water & Land Carers)

Department of Primary Industries (Invasive Plants and Animals, Biosecurity Queensland)

Fitzroy Basin Association (FBA)

Goondiwindi Regional Council

Gunnedah Shire Council

Katherine River Pastoral Co Pty Ltd

Moree Plains Shire Council

Narrabri Shire Council

North West Local Land Services

Northern Slopes Landcare Association

Roblee Pastoral Co.

Western Downs Regional Council

Western Downs Regional Council

Willows Gemfields Recreational & Progress Association INC

NOTE: While it has not been possible (due to time constraints at this time of year) to get all organisations to review this nomination form, I have provided written evidence that all of these organisations support this nomination.

Section E: Current and potential range of the weed

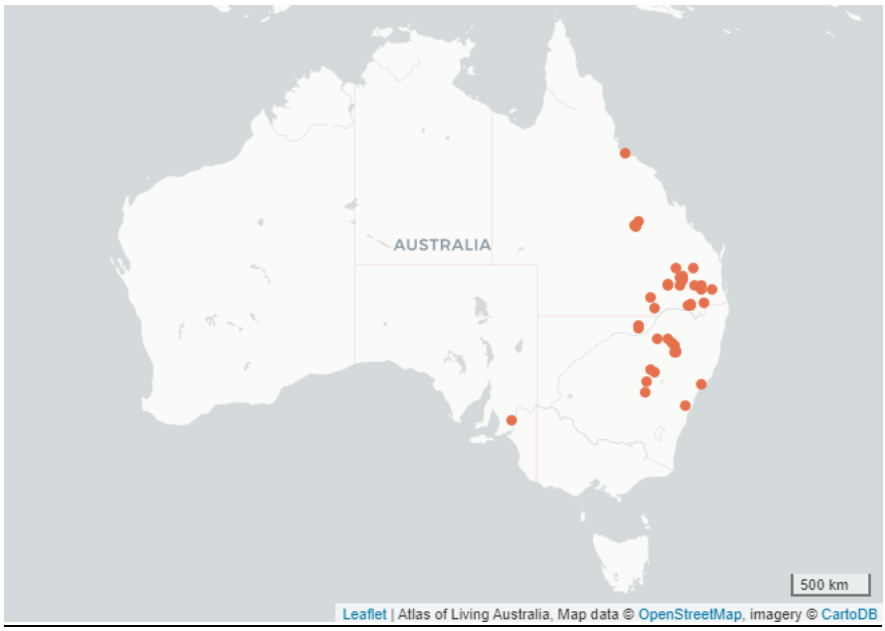
To be considered nationally significant, the weed must have the potential to impact more than one state or territory.

9 What is the current distribution of the weed in Australia?

Provide evidence to support your claim, including maps from the Atlas of Living Australia (or other documented sources) showing the current distribution of the species in Australia.

Please note: This plant is also widely referred to in literature as *Cereus hildmannianus* subsp. *uruguayanus* or incorrectly as *C. peruvianus*. This map and record of occurrences from the Atlas of Living Australia is only for *C.*

uruguayanus. It is possible this does not include occurrences of *C.uruguayanus* that have been misallocated to *Cereus hildmannianus* subsp. uruguayanus or *C. peruvianus*.



Occurrence records: records-2025-01-12.zip (**Citation URL:** https://doi.org/10.26197/ala.5b6e2458-9579-4e24-8840-4ee81d97d4fd)

Name	Licence	Record count
Qweeds - Queensland	Creative Commons Attribution (International) (CC-BY 4.0 (Int)) State of Queensland (Department of Agriculture and Fisheries) © State of Queensland (Department of Agriculture and Fisheries) 2023. Creative Commons Attribution (International) (CC-BY 4.0 (Int) 4.0)Creative Commons Attribution (International) (CC-BY 4.0 (Int) 4.x)	21
BRI AVH Data and Images	Creative Commons Attribution (International) (CC-BY 4.0 (Int)) This work is licensed under a Creative Commons Attribution (CC-BY) 4.0 License.	21
WildNet - Queensland Wildlife Data	Creative Commons Attribution (International) (CC-BY 4.0 (Int))	11

Name	Licence	Record count
NSW BioNet Atlas	Creative Commons Attribution (International) (CC-BY 4.0 (Int))	8
NSW AVH feed	Creative Commons Attribution (International) (CC-BY 4.0 (Int)) This work is licensed under a Creative Commons Attribution (CC-BY) 4.0 License .	2
Centre for Australian National Biodiversity Research (CANB) AVH data	Creative Commons Attribution (International) (CC-BY 4.0 (Int)) This work is licensed under a Creative Commons Attribution (CC-BY) 4.0 License.	2
NatureMapr	Creative Commons Attribution (Australia) (CC-BY 3.0 (Au)) Creative Commons Attribution 3.0 (Australia)	1
N.C.W. Beadle Herbarium (NE) AVH data	Creative Commons Attribution (International) (CC-BY 4.0 (Int)) This work is licensed under a Creative Commons Attribution (CC-BY) 4.0 License.	1

From Germination responses of the invasive hedge cactus (*C. uruguayanus*) to environmental factors

Large infestations occur in the Central Highlands region and in southern inland Queensland, with smaller infestations scattered across southern/central Queensland (QDAF 2022). *C. uruguayanus* is also present in several locations in New South Wales (Hosking et al. 2007). It is most prevalent in mixed eucalypt–brigalow woodlands on light clay soils but also occurs in areas of cleared improved pasture and on a range of soil types (Campbell et al. 2021).

Citations:

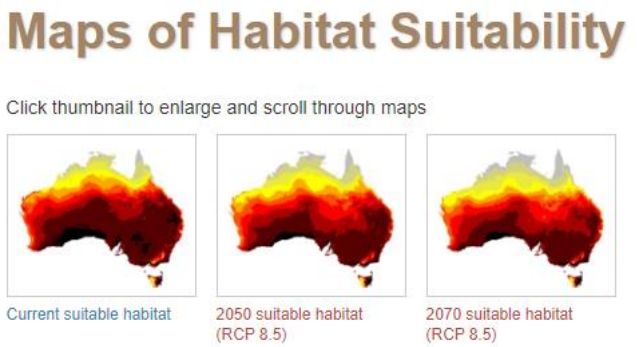
Campbell S, Bajwa A, Hosking K, Brazier D, Mellor V, Perkins M (2021) Herbicide options to control naturalised infestations of *Cereus uruguayanus* in rangeland environments of Australia. Plants 10:2227

Hosking JR, Conn BJ, Lepschi BJ, Barker CH (2007) Plant species first recognised as naturalised for New South Wales in 2002 and 2003, with additional comments on species recognised as naturalised in 2000–2001. Cunninghamia 10:139–166

10 What is the potential distribution of the weed in Australia?

Provide supporting information on the species ecology, climatic requirements, land-use impact and potential distribution maps if available from the literature. You are not expected to undertake species distribution modelling.

Climate modelling from the Weeds Futures website highlights the potential for this species to expand further, presenting a clear risk to biodiversity, agricultural practices, and the natural ecosystems on which our communities depend.



WeedFutures.net: Species Profile

The potential for range expansion (and infill) of *C. uruguayanus* within Australia is apparent—being supported by the prevalence of animal-vectored seed dispersal in the genus Cereus (see Gomes et al. [2014] for documentation of frugivory and seed dispersal of *C. jamacaru*), germination over a broad range of environmental conditions, and the likelihood of persistence via the soil seedbank.

Citation: Gomes VGN, Quirino ZGM, Araujo HFP (2014) Frugivory and seed dispersal by birds in Cereus jamacaru DC. ssp. jamacaru (Cactaceae) in the Caatinga of northeastern Brazil. Braz J Biol 74:32–40

From Herbicide Options to Control Naturalised Infestations of *C. uruguayanus* in Rangeland Environments of Australia

Cactaceae have many unique features (e.g., Crassulacean Acid Metabolism (CAM)) that allows them to establish and thrive in harsh and dry environments, making them a major threat to rangeland environments that they invade. The majority of soil types and climatic regions in Australia are favourable for cacti growth and ….. many exotic species have become naturalised following their deliberate introduction, mainly for ornamental purposes. Naturalised cacti populations can form dense, impenetrable thickets that limit access to grazing activities and reduce habitat quality. Furthermore, the spiny stems pose a significant health risk to humans, livestock and wildlife. As a result, 27 cacti species are listed as Weeds of National Significance (WONS) in Australia, all of which belong to the Opuntioideae sub-family and the genus Opuntia and Cylindropuntia. However, several Cacti species from other genera such as Epiphyllum, Harrisia and Cereus are also emerging or major weeds in different parts of the country.

C. uruguayanus is not a WONS nor a declared weed in any state or territory of Australia, but the presence of large and multiple infestations in the Central Highlands region of Queensland has led to it being declared a priority pest species under local government legislation. Large infestations also occur in southern inland Queensland at several locations and many smaller infestations are common across southern/central Queensland, as well as a limited number of locations in New South Wales. The species is most prevalent in mixed Eucalypt–Brigalow woodlands on light clay soils but also occurs in areas of cleared improved pasture and on a range of soil types. Endozoochory (i.e., seed dispersal via ingestion by vertebrates) appears to be the primary dispersal mechanism of *C. uruguayanus* and was attributed to the occurrence of isolated plants up to one kilometre away from a naturalised

population. Similarly, the invasiveness of the related cacti species *C. jamacaru* in South Africa was largely attributed to this dispersal mechanism.

From Dr Paul Forster, Principal Botanist & Austrobaileya Editor, Queensland Herbarium (see attached email):

The species can now be considered as naturalised, i.e. it is established in the environment and is reproducing, dispersing and expanding its range without human assistance.

Surprisingly, given its natural range in South America, *C. uruguayanus* seems to be well adapted to heavy clay soils that are characteristics of the Brigalow Belt Bioregion in Queensland, and the equivalent area in New South Wales. This is probably similar to the habitat the common pest prickly pear (*Opuntia stricta*) once dominated before the advent of *Cactoblastis* as the successful biocontrol agent. The species also grows successfully in more stony areas with skeletal soils, but is unlikely to reach similar densities as to where it occurs on clay. Potentially it could naturalise over the entire extent of the Brigalow Belt Bioregion and adjacent areas in Queensland. A caveat to these statements are that it is a slow growing perennial cactus, so infestations can be readily controlled if treated early (hence the increased value of investing in early intervention).

See also: Forster, PI, and Schmeider, M (2000). *Cereus uruguayanus* (Cactaceae) and its naturalised occurrence in Queensland, Australia. *Austrobaileya* 5, 671–677:

"Edozoochorial dispersal is thought to be responsible for the spread of this species in natural vegetation and

eradication is recommended."

Section F: Impact of the weed on multiple stakeholders

To be considered nationally significant, the weed must impact multiple stakeholder groups. Attach documents where relevant and list them in Section L.

11 Which land management groups are working to reduce the impacts of the weed?

Provide evidence demonstrating that the weed affects multiple stakeholder groups.

You may include:

- evidence from stakeholder organisations demonstrating why the weed is of concern
- efforts being undertaken to manage the weed
- links to relevant websites, weed management strategies or plans.

SEE ATTACHED DOCUMENTS IN SECTION L

Section G: Priority of the weed for management

To be considered nationally significant, the weed must be listed as a priority by government, industry and/or community organisations in more than one state or territory.

12 Which organisations have documented the species as a priority weed?

Provide supporting evidence (e.g. priority or target lists of weeds of concern), including the entity name that has listed the weed. Include links to relevant websites, weed management strategies or plans.

C. uruguayanus (Willows Cactus or Night-blooming Cactus) is listed by these organisations:

Central Highlands Regional Council: This council has declared *C. uruguayanus* a priority pest species due to its large and multiple infestations in the region. See ECM_826534_v9_Adopted 16 October 2015: Pest Management Plan required under Land Protection (Pest and Stock Route Management) Act 2002 amended 16 September 2015

A control project in partnership with the Central Highlands Regional Resources Use Planning Co-operative (CHRRUP) during 2009 (see Willows Cactus LoS_CHRRUP)

Department of Primary Industries (Invasive Plants and Animals, Biosecurity Queensland): The Queensland Department of Agriculture and Fisheries provides a fact sheet on managing Willows Cactus, including descriptions, impacts, and control methods.

Goondiwindi Regional Council: Their biosecurity plan lists *C. uruguayanus* as a weed and highlights the importance of managing its spread. You can access the document here

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Section H: Impact of weed nationally

To be considered nationally significant, the weed must have a demonstrated, nationally significant impact (economic, environmental, cultural or social).

13 What are the current and potential impacts of the weed?

Provide evidence demonstrating that the weed is causing nationally significant impacts and (if applicable) that the weed has the potential to cause further impacts. You may include evidence through a literature review and supporting evidence such as documents, reports, publications and testimonies.

Types of impacts include:

- Economic – impacts on yield (e.g. crop, pasture, forestry or other industries), animal production, weeds acting as alternative hosts for pests and diseases, increases in the cost of production or management, market access and product quality
- Environmental – impacts on vegetation structure, biodiversity and ecosystem function
- Social – impacts on human physical and mental health, social amenity (including services, infrastructure and non-First Nations cultural heritage)
- Cultural – impacts on First Nations culture and cultural heritage – oral traditions, arts, rituals, ceremonies and knowledge; traditional subsistence and sustenance resources; and place-based heritage.

Willows cactus causes dense infestations which impact on the ability of humans and animals to utilise areas for economic, environmental, social or cultural reasons. It can compete with desirable native and pastoral species reducing productivity of pastures, causing problems with watering and mustering, and threatening the habitat of native plants and animals.

Quotes:

"If left unchecked, it will impact and damage the wellbeing of our community. This would happen to the fossicking tourist influx that happens annually, who bring an extremely needed financial input, and thus we would be impacted gravely. This Cacti is a danger to humans and animals and is causing costly damage to the environment and our community."

As noted in the document Willows Rec Club - Willows Cactus, from the township of Willows (for which the common name for the species is derived).

"As the current Member for Gregory, I represent an electorate that spans 459,681 km², encompassing the Central Highlands Region and Woorabinda Aboriginal Shire, where the Willows Cactus is most prolific. Throughout my travels in the region, I have witnessed firsthand the rapid spread of this invasive species and the severe threat it poses to both our local environment and economy. Climate modelling from the Weeds Futures website further suggests that, without intervention, the cactus could continue its expansion at an alarming rate, worsening the current challenges. The spread of the Willows Cactus is already having significant and detrimental effects on our community. Its invasive growth disrupts local biodiversity, harms agricultural practices, and jeopardizes the health

of our ecosystems. The Fitzroy region, which forms part of my electorate, holds the highest population of cattle in Australia, with 2.5 million head recorded in 2021. This region also offers the ideal climatic conditions for the cactus to thrive and expand, as confirmed by recent climate data. If left unmanaged, the cactus will continue to spread rapidly into neighbouring states, further exacerbating its environmental and economic impacts."

See Letter of Support - Sean Dillon LNP, Member for Gregory (Assistant Minister for Primary Industry Development, Water & Western Queensland).

GS and SM Spencer Mayfield Willows Gemfields _ CASE STUDY NEWP nomination – Willows:

"We estimate these control activities cost my organisation $30,000. This figure will triple in the years to come because of the rapid spread of this vigorous cactus."

For further examples and details of impacts **please see attached documents including case studies, letters of support, articles etc.**

Section I: Support for national coordinated action

For a weed to be considered nationally significant, you must be able to demonstrate the benefit of a nationally coordinated approach to managing the weed.

Provide evidence of the likely benefits of, and stakeholder support for, taking a nationally coordinated approach to containing the species spread and improving its management. You may include evidence through a literature review and supporting evidence such as documents, reports, publications and testimonies.

14 What are the goals and actions that require national coordination to manage the weed?

I. Recognition that the species is invasive in certain regions and local government areas, but not in others.
II. Importation of material should be restricted, as should the sale of material in nurseries or online. We understand that this species is reported to be still commercially available under the name "rain predicting cacti'.
III. A national project with allocated funding for local weed management contractors and associated assistance for impacted landholders to control the pest plant on private land.
IV. Amplification of awareness raising activities including resources for management, how to reduce spread and other ways that individuals, communities and business can help.
V. A research programme dedicated to biological control agents for this and other invasive Cactaceae present in Australia.

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15 What benefits would a nationally coordinated approach bring to management of the weed?

- Pooling of resources, expertise and funding leading to more efficient and comprehensive management efforts as well as awareness raising.
- Reduced potential for efforts to be counterproductive when there is a cohesive plan in place – for example, when there is no wider plan for control, efforts of private landholders can feel meaningless due to reinfestation from unmanaged local infestations.

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16 What are the barriers or challenges to applying a nationally coordinated management approach?
Currently, there are no herbicides specifically registered for the control of *C. uruguayanus* in Australia

However, research has identified several effective herbicides that can be used to manage this invasive species using various techniques (e.g. see Herbicide Options to Control Naturalised Infestations of *Cereus uruguayanus* in Rangeland Environments of Australia).

Other barriers and challenges to implementing a nationally coordinated management approach to control *C. uruguayanus* in Australia include:

1. It is not currently declared under any state or territory regulation – providing little imperative for management (even though there is evidence to suggest that it can spread widely and thus early intervention is crucial).
2. Limited funding and resources hinders the ability to carry out extensive control measures across impacted country.
3. The majority of the public are not aware of the issue, and ceasing horticultural spread including buying, selling or otherwise sharing the plant is crucial but challenging.
4. There is very limited research into the ecology/biology of the species.
5. The multiple names by which this plant is known renders it very difficult to gather comprehensive data on the distribution and impact of the species. In addition to its accepted name *Cereus uruguayanus*, it is referred to in the literature as *Cereus hildmannianus* subsp. *uruguayanus* and *C. peruvianus*.
6. Effective management requires collaboration between various government agencies, non-governmental organisations, and local communities, is vital but can be difficult to achieve.

Addressing these challenges requires a concerted national effort to align plans, secure funding, raise awareness, and foster collaboration among all stakeholders.

Section J: Invasiveness of the weed

To be considered nationally significant, the weed must have invasive characteristics.

17 Describe the invasive characteristics of the species.

Provide evidence, including supporting references and risk assessments (if available), demonstrating the invasiveness of the species. Consider the species reproduction strategy, dispersal (human mediated and natural), growth and competitive ability, and ability to colonise and establish.

From Dr Paul Forster, Principal Botanist & Austrobaileya Editor, Queensland Herbarium (see attached email):

The species can now be considered as naturalised, i.e. it is established in the environment and is reproducing, dispersing and expanding its range without human assistance. The species produces large nocturnal flowers that are most likely visited by invertebrates such as moths and by vertebrates such as bats. The species produces large fleshy fruit with seed suspended in edible pulp. The fruit and seed are attractive to vertebrates such as birds and bats and it is thought that they are the primary dispersal agents for the species. The species has been in Australia a long time (perhaps over a century), but has only relatively recently (last 30 years) started to be invasive; this may be due to small changes in climate that have favoured seedling establishment, and/or fruit predation host switching by local vertebrates (bats/birds) that has resulted in non-human mediated dispersal. Because the species is vertebrate dispersed, potentially dispersal is effectively local (less than 100m from a parent plant); however, instances will occur where long distance dispersal occurs (anywhere up to 10km).

Because the species is vertebrate dispersed, local active control and elimination will always require follow-up survey and treatment for recruitment of new individuals from adjacent/nearby seed sources.

See also: Forster, PI, and Schmeider, M (2000). *C. uruguayanus* (Cactaceae) and its naturalised occurrence in Queensland, Australia. *Austrobaileya* **5**, 671–677:

"Edozoochorial dispersal is thought to be responsible for the spread of this species in natural vegetation and eradication is recommended."

The above article indicates that fasciation and monstrosity is indicated in this species. This raises concerns for more aggressive invasive populations. Increased reproductive structures can enhance the plant's ability to spread, and together with its spines the larger size impedes access and movement of humans and animals, allowing it to out-compete other species and disrupt grazing activities.

From Germination responses of the invasive hedge cactus (*C. uruguayanus*) to environmental factors

C. uruguayanus are likely to demonstrate extended (>3 yr) persistence under field conditions

Very little information is currently available on the seed biology of *C. uruguayanus*, but the closely related *C. jamacaru* is well studied. The latter species is native to northeastern Brazil and has been recorded as being invasive in Kenya (Witt and Luke 2017) and being a transformer, namely a weed that has changed the character, condition, form, or nature of an ecosystem over substantial areas relative to its extent (Richardson et al. 2000).

Section K: Feasibility of management

To be considered nationally significant, the proposed management approach must be technically feasible, practical and cost effective, and there is a demonstrated level of stakeholder support to manage the weed.

Provide evidence demonstrating how the weed is currently being managed, effectiveness of current management techniques and potential management options that might improve effectiveness (if known). Include evidence of existing or proposed collaborative initiatives to manage the weed, details of any benefits of the weed, as well as any potential conflicts in views about the need to manage the weed. Include references and/or supporting documentation to support your response.

18 How is the weed currently being managed through existing strategies, plans or processes?

Central Highlands Regional Council: This council has declared *C. uruguayanus* a priority pest species due to its large and multiple infestations in the region. See ECM_826534_v9_Adopted 16 October 2015: Pest Management Plan required under Land Protection (Pest and Stock Route Management) Act 2002 amended 16 September 2015

> A control project in partnership with the Central Highlands Regional Resources Use Planning Co-operative (CHRRUP) during 2009 (see Willows Cactus LoS_CHRRUP)

Department of Primary Industries (Invasive Plants and Animals, Biosecurity Queensland): The Queensland Department of Agriculture and Fisheries provides a fact sheet on managing Willows Cactus, including descriptions, impacts, and control methods.

Goondiwindi Regional Council: Their biosecurity plan lists *C. uruguayanus* as a weed and highlights the importance of managing its spread. You can access the document here

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19 What is the effectiveness of current chemical, biological and mechanical control options for the weed?

If known, indicate cost (per hectare) of current control options.

Mechanical Removal (Digging and Burning):

- Effectiveness: Digging out and burning cacti is a direct and effective method for removing individual plants, but it can be labour-intensive and time-consuming, especially in areas where the cacti are widespread. This method is often not practical when dealing with large infestations, as it requires significant manpower and resources.

- Challenges: It is not scalable for large populations of cacti and may result in the cacti regrowing from fragments left behind. Additionally, the process of burning can have environmental risks, such as affecting surrounding vegetation and wildlife.

Chemical (Drilling and Glyphosate Injection):

- Effectiveness: Drilling and injecting glyphosate (a systemic herbicide) into the cactus stems is a highly targeted method. It allows for precise control, killing the plant without the need for widespread chemical application. Glyphosate is absorbed through the plant's vascular system and stops growth.
- Challenges: This method requires careful application to avoid harm to surrounding vegetation. It is also labour-intensive and may not be effective if the plant is too large or too old. Glyphosate use in some regions is controversial due to environmental and health concerns, though it remains a common and efficient method for invasive plant control.

Biological

- Effectiveness: No specific biocontrol program has been undertaken on Willows cactus, but an introduced mealy bug (*Hypogeococcus festerianus*) insect has become established in Queensland and is now present in willows cactus infestations near Cecil Plains, Miles and Tara in southern inland Queensland. It has shown promise in preventing the cactus from producing fruit, thus preventing further spread. This mealy bug feeds on the cactus, potentially reducing its reproductive ability and controlling its growth. It is hoped that it will be as highly effective in controlling Willows Cactus as the *Cactoblastis cactorum* (cactus moth) was in controlling Prickly Pear in regions including Central Queensland. For organic producers, the mealy bug method stands out as a slow but viable option, as it avoids synthetic chemicals while still providing a form of control. However, given the slow nature of this biological control, it may need to be used in combination with other methods for quicker results, such as manual removal.
- Challenges: Biological control methods are slow to show results and may take several years to have a significant impact. The mealy bug's effectiveness can also depend on environmental factors, and it may not be suitable for all regions or ecosystems. However, it is a valuable option for organic producers or in areas where chemical treatments are not preferred.

Conclusion:

Each of these control methods has its own set of strengths and challenges. A multi-pronged approach—combining mechanical removal, chemical treatments, and biological control—could offer the most efficient and sustainable long-term solution to managing Willows cactus, particularly in areas where the cacti are widespread. The biological method of using *Hypogeococcus Pungens* offers a promising option for organic producers, though patience is required for its success.

20 What other control options could be implemented to improve effectiveness of management?

Targeted Biocontrol Methods:

Hypogeococcus Pungens is primarily used for controlling *Harrisia* Cactus but has shown adaptability in targeting Willows Cactus as well. This is an important development, as it suggests that the mealy bug has potential as a biological control agent for a broader range of invasive cactus species. However, targeted biocontrol could involve the introduction or enhancement of specific organisms that are more suited to Willows Cactus or its ecosystem.

Alternative Biocontrol Agents:

No specific biocontrol program has been undertaken on Willows cactus. Some naturalised populations show significant infestations of scale insects; however, we are not aware if these have been identified as such.

- Insect and Mite Species: Other types of mealy bugs, scale insects, or caterpillars that specifically target the Willows Cactus could be explored. For example, the *Lagocheirus funestus*, which are known to feed on Opuntia cactus species, may show promise as they typically target the cactus' tissues and reproductive structures.
- Fungal Pathogens: Specific fungi that affect cactus species could be studied for their potential in reducing cactus populations. Pathogens like these often have the advantage of being host-specific, reducing risks to non-target species. Some bacterial/fungal pathogens that cause rot affect many cultivated cacti, so research into these and their occurrence on cereoid cacti (those in *Cereus* or related to them) cultivated in Australia may help.
- Herbivorous Insects: Beyond mealy bugs, other herbivorous insects such as cactus weevils could be investigated further. These insects damage cactus plants by feeding on their stems or roots, leading to reduced plant health and reproduction.

Key Considerations for Biocontrol:

- Host Specificity: Ensuring that biocontrol agents are effective specifically on Willows Cactus and do not negatively affect native species or other important plants in the region.
- Environmental Compatibility: The chosen biocontrol agents should thrive in the local environment, and their potential to spread or adapt in ways that could disrupt the ecosystem must be evaluated.
- Long-Term Monitoring: Biocontrol agents may require ongoing monitoring to assess their impact on the target species and any unintended consequences in the ecosystem.

Camels

Camels have indeed been trialled in some areas as a potential biological control agent for cacti, including the Willows Cactus, due to their ability to eat the plant without being harmed by the thorns. While this could be an effective control method for organic producers, research on its efficiency and sustainability is still lacking.

Advantages of Using Camels:

- Natural Grazing: Camels can graze on cacti, reducing the overall size and spread of the plant, especially in remote areas where mechanical or chemical methods might be impractical.
- Low Environmental Impact: Compared to chemical herbicides, camels offer an environmentally friendly solution for controlling invasive cacti, which aligns with organic farming principles.

Challenges and Research Needs:

- Effectiveness: While camels can eat the cactus, the extent to which they can reduce cactus populations over time remains unclear. It's possible that they may only reduce the growth of the cacti in localised areas rather than eliminating large-scale infestations.
- Carrying Capacity and Management: Camels would need to be managed properly to ensure they do not overgraze other plants in the area, leading to further ecological imbalances.
- Sustainability: The long-term effectiveness of camels as a control method needs to be assessed. For example, will camels continue to graze the cacti consistently, or will they move to other food sources once the cactus population is reduced?
- Impact on Other Species: The introduction of non-native animals, such as camels, could potentially have unforeseen ecological impacts. Research is needed to assess whether camels might harm other plants or animals in the ecosystem.

3. Combining Methods for Integrated Management:

Given the limitations of any single approach, combining multiple control methods in an integrated management plan can improve the overall effectiveness of Willows Cactus control. Possible combinations include:

- Mechanical removal of large, mature plants, especially in high-density areas, followed by biocontrol agents such as mealy bugs or insects that can target the younger, regenerating plants.
- Grazing by camels in conjunction with biological agents like mealy bugs or weevils to limit both growth and reproductive capabilities of the cactus.
- Targeted herbicide application (e.g., glyphosate injection) on larger or particularly resistant cacti, combined with the use of camels or biological agents for ongoing control.

Conclusion:

While *Hypogeococcus pungens* and camels both show promise, further research is needed to fully understand their effectiveness as targeted control methods for Willows Cactus. The combination of multiple approaches, including biocontrol, grazing, mechanical removal, and chemical treatments, would likely provide the most sustainable and efficient solution for managing this invasive species, particularly for organic producers. Integrating research into the specific environmental conditions and the ecological impacts of these methods will be crucial in developing a balanced, effective long-term control strategy.

Additional comments:

Research on the biology/ecology of Willows cactus would be beneficial, particularly regarding its population dynamics and growth rates.

Within areas deemed to be susceptible to the species being invasive (mainly Brigalow Belt Bioregion in Queensland and adjacent equivalent in New South Wales), the species should be removed from cultivation and not offered for sale.

See also CSIRO PUBLISHING | The Rangeland Journal "A novel stem-applied herbicide-capsule methodology for control of the invasive cactus *C. uruguayanus* ", *The Rangeland Journal.*

21 What is the likely level of cooperation among stakeholders and land management groups to collaboratively manage the weed?

Include any potential conflicts in views about the need to manage the weed.

Include details of any benefits (economic, environmental, social or cultural) of the weed that need to be considered.

As with all control and management activities, increasing any obligations to undertake control would need to be matched with assistance, especially to those with limited resources or capacity.

While *C. uruguayanus* is primarily considered an invasive species in Australia, some people do appreciate its unique appearance and use it as an ornamental plant. There are also those who believe that its fruit are attractive to wildlife. However, its invasive nature means it can spread rapidly and outcompete native vegetation and pastures, reducing the ability of humans and animals to utilise land and causing economic and ecological concerns.

Section L: Attachments

You must include relevant attachments, such as letters of support, maps and research findings.

22 List the attachments that you have included in support of your nomination. (add more lines if needed)

20241128 NEWP nomination questions
ABC ARTICLE_IMPACTS OF WILLOWS CACTUS
Barcaldine Regional Council - LOS - Willows Cactus
Carinyah CASE STUDY NEWP nomination - Willows Cactus
Charters Towers Regional Council - LOS - Willows Cactus
CHRC - LOS - Willows Cactus
CHRC pest management
CPMG Willows Cactus
DPI - LOS - Willows Cactus
Email from P Forster Principal Botanist & Austrobaileya Editor, Queensland Herbarium and Biodiversity Science
FBA Letter of Support_COWMAB Landcare_NEWP_2024_FINAL
Fw Outcome of your NEWP EOI
General Manager - Invasive Plants and Animals - Letter of Support for Agforce - Signed 20.12.24
GS and SM Spencer Mayfield Willows Gemfields_ CASE STUDY NEWP nomination - Willows
KRPC Willows Cactus
Letter of Support - Sean Dillon LNP - Willows Cactus
Letter of Support Willows Cactus
LOS - Colin Boyce MP - Willows Cactus Nomination for the National Established Weed Priorities List - Nov 2024
Marshmere CASE STUDY NEWP nomination - Willows Cactus
mowbray CASE STUDY NEWP nomination - Willows Cactus
Other organisations supporting the nomination_Email from Hugh Leckie
plants-10-02227-v2
Roblee Willows Cactus
Sandy Creek CASE STUDY NEWP nomination - Willows Cactus
Support Letter - NEWP Nomination - CHRC Willows Cactus
Support letter for AgForce and COWMAB to nominate Willows Cactus and Harrisia Cactus for the NEWP list
Weed Science article_Panetta et al. 2024
Western Downs Shire - LOS - Willows
WILFORD- Willows Cactus
Willows cactus - information sheet
Willows cactus CHRC fact sheet
Willows Cactus LoS_CHRRUP
Willows Rec Club - Willows Cactus
willows-cactus

Section M: Declaration

To be completed by the primary contact named in Section C of this application.

I declare that:

- I am authorised to submit this nationally significant weed nomination on behalf of the lead organisation
- group members have reviewed and agreed on the content of this nomination. I will provide evidence of this authority to the department on request.

I have read and understood the privacy notice and Privacy Policy.

Full name Annemieke Ruttledge

Signature (type or insert signature)

Date (dd/mm/yyyy) 12/01/2025

Section N: Privacy notice

'Personal information' means information or an opinion about an identified, or reasonably identifiable, individual.

By completing and submitting this form you consent to the collection of all personal information contained in this form.

The Department of Agriculture, Fisheries and Forestry collects your personal information (as defined in the *Privacy Act 1988*) in relation to this form on behalf of the National Established Weed Priorities (NEWP) Steering Group and the Environment and Invasives Committee (EIC) Weeds Working Group for the purposes of assessing your nationally significant weed nomination and related purposes. If you fail to provide some or all of the personal information requested in the form, the department may be unable to process your nomination.

The department may disclose your personal information to the NEWP Steering Group; EIC Weeds Working Group; Australian, state or territory government agencies; persons or organisations where necessary for the purposes described, provided the disclosure is consistent with relevant laws, particularly the Privacy Act. Your personal information will be handled in accordance with the Australian Privacy Principles.

See the department's Privacy Policy to learn more about accessing or correcting personal information or making a complaint. Alternatively, email our Privacy Officer at privacy@aff.gov.au.