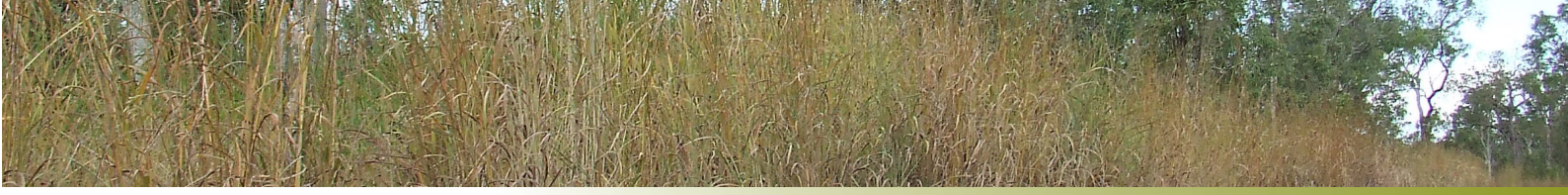


CENTRE FOR
INVASIVE SPECIES SOLUTIONS

INVASIVE GRASSES **WEED** FACT SHEET

Making a difference to on-ground management of invasive grasses — working together in a coordinated approach

Worldwide, grasses are desirable species due to their value as pasture, crops, and as amenity and soil stabilisation plantings. Many exotic perennial grasses experience few climatic or soil limitations, have highly effective seed dispersal mechanisms, respond favourably to disturbance and can equally establish without the assistance of human disturbance.

Introduced grass species were chosen for their fast-growing nature, persistence under grazing and the belief they provided superior nutrition over Australian native grasses. However, these productive and competitive traits, coupled with a history of introduction spanning over 200 years, have resulted in exotic grasses becoming one of Australia's most problematic challenges.

Weeds are estimated to impose an overall average cost of nearly $5 billion across Australia, with grasses being one of the most difficult groups to manage. This does not include the cost to the environment, with invasive grasses threatening our native grasslands and grassy woodlands.

"In Australia, invasive grasses have major environmental and agricultural impacts."

grasses are the introduced, perennial grasses, African lovegrass (*Eragrostis curvula*), Chilean needle grass (*Nassella neesiana*) and serrated tussock (*Nassella trichotoma*).

Chilean needle grass and serrated tussock are recognised as Australian Weeds of National Significance due to their negative impacts on agriculture, environment and society.

African lovegrass is a rapidly spreading grass weed with massive impacts on livestock, pasture production and biodiversity.

Gamba grass (*Andropogon gayanus*) is also a WoNS and is a significant problem in Northern Australia where it poses multiple threats to the savanna ecosystems including eight times higher fuel loads than native ecosystems resulting in intense wild fires, tree canopy destruction, and a serious threat to life and property.

Serrated tussock (*Nassella trichotoma*).
Image: Ali Bajwa (NSW Department of Primary Industries)

Gamba grass (*Andropogon gayanus*).
Image: Andrew Mitchell (CISS)

Serrated tussock (*Nassella trichotoma*) invades valuable pasture lands and creates dense stands, producing millions of seeds that contribute to its remarkable invasion.
Image: Andrew Mitchell (CISS)

Grasses can be very challenging — why?

Grasses can be difficult to identify. If land managers could easily identify invasive grasses, they could act early and manage infestations before weeds spread and become difficult to control.

Invasive grasses can persist and spread unnoticed during climatic events such as drought, fire and floods.

Identification is often easy at reproductive growth stages of the invasive grasses but that is too late for effective management.

Chilean needle grass (*Nassella neesiana*) seeds.
Image: Andrew Mitchell (CISS)

African lovegrass (*Eragostis curvula*) infloresences at seed maturity.
Image: Andrew Mitchell (CISS)

What opportunities exist?

Best management practice information offers opportunities to boost invasive grass management. While Chilean needle grass and serrated tussock have best practice manuals and tools, the latest research, regionally relevant information and integrated management options offer improved management. Land managers would benefit from ongoing research which will inform best management practice information for African lovegrass.

Land managers stand to benefit from a coordinated RD&E effort which can help drive a national approach to exotic perennial management.

The Invasive Grasses Management Program is part of the National 10 Year Investment Plan for Weed RD&E (2021–30) facilitated by the Centre of Invasive Species Solutions (CISS).

The program aims to establish large-scale experimental sites across Australia to develop and demonstrate the best management practices for major invasive grasses. These sites will be complemented by adaptation sites on working farms and public land, where farmers, graziers and other land managers can trial emerging solutions.

A systems approach is key to achieving successful adoption and adaptation. Research activities are supported by engagement, extension and education activities to maximise the adoption of the best management practice.

Once fully implemented the program aims to:

- attract the close gaze of at least 4,000 graziers and other land managers across Australia,
- engage at least 2,000 participants in research, development and practical activities, and
- demonstrate the productivity, natural resource and social benefits of invasive grass management on at least 40 properties, expanding to self-motivated trials and adoption on a further 1,000 properties within the life of the program.

"National Invasive Grasses Management Program – leading the way for coordinated weed management"

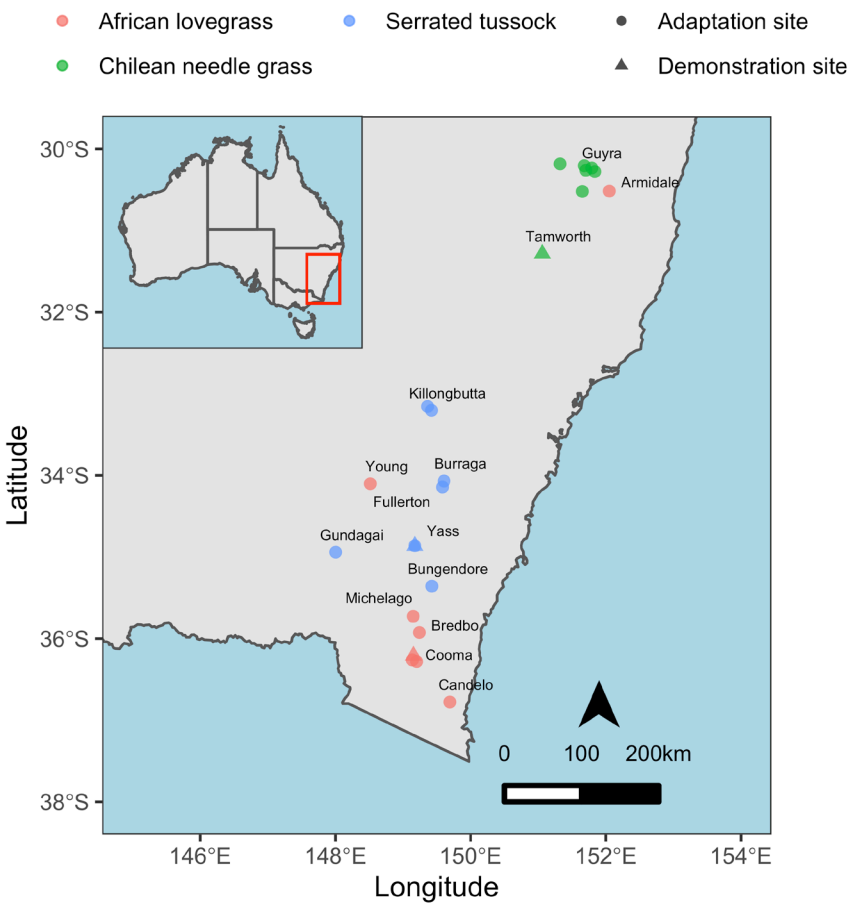
What's happening right now?

NSW Department of Primary Industries (DPI) has kicked-off phase one of the program by establishing three demonstration sites in NSW for African lovegrass, Chilean needle grass and serrated tussock. In addition, 21 adaptation sites, seven sites for each species, have been established across NSW through co-funding from the Australian Government's Department of Agriculture, Fisheries and Forestry.

Key results from the NSW demonstration sites

African lovegrass

- Flupropanate is the only herbicide that provided long-term, effective control of African lovegrass.
- The application of glyphosate mixed with some Group 1 herbicides after slashing provided effective control, from 80% to 90%.
- A double-knock with paraquat, glufosinate or glyphosate further improved the control to more than 90%.
- These residual herbicides could be a useful short-term alternative to flupropanate in suppressing seedling emergence when used in conjunction with effective post-emergent herbicides, which can be used to kill the mature plants.
- Spray-topping with lower doses of herbicides at early flowering stage provided 95% seedset control.
- Winter crops, including grazing wheat, chicory and lucerne mix, phalaris and clovers provided effective suppression.



Demonstration and adaptation sites for three invasive grasses across NSW

Map: Ali Bajwa (NSW Department of Primary Industries).

African lovegrass (*Eragostis curvula*) is proflic seed producer with a highly competitive growth habit which suppresses pasture growth and productivity.

Image: Ali Bajwa (NSW Department of Primary Industries).

Flupropanate provided excellent control of mature African lovegrass plants as well as the seedling emergence at the demonstration site near Cooma, NSW.

Image: Hanwen Wu (NSW Department of Primary Industries).

The glyphosate application at a low dose aborted the development of viable seedheads (left) as compared to full seed production in the untreated control (right) at the demonstration site near Cooma, NSW.

Image: Hanwen Wu (NSW Department of Primary Industries).

Chilean needle grass

- Slashing had no significant effect on Chilean needle grass control except for the five months assessment where slashing conditions and herbicide treatments had a significant interaction.
- Glyphosate provided the most effective and quickest control at 87% 1.5 months after application. This treatment also resulted in the lowest weed biomass 2.5 months after application. Glyphosate control remained very good until 8 months after application, up to 93%, before control started to decrease to 78% at 10 months after application.

Chilean needle grass demonstration site at Loomberah near Tamworth, NSW.

Image: Bill Davidson (NSW Department of Primary Industries).

Dense Chilean needle grass often outcompetes native pasture species and produces a large number of seeds that can easily penetrate sheep carcasses.
Image: Bill Davidson (NSW Department of Primary Industries).

- Flupropanate was slow acting with poor control early on. Five months after starting the trial, the flupropanate pre-emergent treatment was highly effective and equally effective in slashed and unslashed treatments, up to 93% control. However, the post-emergent application of flupropanate was more effective in slashed conditions, 94% control, compared with unslashed conditions which delivered just 33% control at that stage.
- Ten months after starting the trial, flupropanate was the most effective treatment with 86% and 90% control for pre or post-emergent applications.
- The pre-emergent herbicides pyroxasulfone and flumioxazin did not provide any control.

Effective control of Chilean needle grass with glyphosate (top) and flupropanate (centre) treatment as compared with the untreated control (bottom) 10 months after application at the demonstration site near Tamworth, NSW, November 2021.
Images: Bill Davidson (NSW Department of Primary Industries).

Serrated tussock

- The application of a mixture of glyphosate and a high label rate of flupropanate provided the most effective control at 92% when assessed 45 days after application. However, glyphosate alone and in combination with Group 1 or 2 herbicides also provided good control, 77% to 80%.
- Sole applications of flupropanate, haloxyfop and imazapyr have provided poor control, 17% to 50% so far.
- Effective control with most treatments involving glyphosate was reflected in low densities of living serrated tussock plants.
- Researchers are observing how the slow-acting flupropanate treatments respond over spring and summer.

Technical Officer, Michael Hopwood of the NSW Department of Primary Industries is slashing the serrated tussock and other vegetation (mainly thistle) to be removed before the application of different herbicides at the demonstration site at Lade Vale near Yass, NSW (May 2022).

Image: Ali Bajwa (NSW Department of Primary Industries).

Effect of slashing followed by glyphosate (left) and glyphosate plus flupropanate (right) application on serrated tussock at 45 days after treatment at Lade Vale demonstration site, near Yass NSW (July 2022).

Images: Ali Bajwa (NSW Department of Primary Industries).

Delivering the findings to stakeholders

The NSW DPI project team has held workshops and field days, extended their findings through webinars and podcasts to the concerned landholders across NSW and interstate and highlighted the research in mainstream and social media.

Ongoing engagement, extension and education activities are planned for the next 12 months.

Chilean needle grass field day at Loomberah near Tamworth (December 2021).
Image: Stephen Johnson (NSW Department of Primary Industries).

African lovegrass field day at Cooma, NSW (June 2022).
Image: Hanwen Wu (NSW Department of Primary Industries).

"The future of invasive grasses — management at a national level"

This project is funded by:

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NSW GOVERNMENT

The Invasive Grasses Program is intended to grow. Demonstration sites will inform the adaptation sites. Adaptation sites will inform landholders and landholders will inform other landholders. Networking is an essential element.

Phase Two will see the establishment of demonstration and adaptation sites across Victoria, South Australia, Queensland and the Northern Territory for relevant invasive grass species. There are plans to establish sites in the ACT, Tasmania and Western Australia.

CISS is currently working with the states and territories to develop this national scale approach to overcome the impacts of invasive grasses across Australia.

For more information contact:

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Stakeholder engagement workshop on serrated tussock bes0t management practice in Bathurst, NSW (June 2022).
Image: Ali Bajwa (NSW Department of Primary Industries).