

A GOOD WEED



Newsletter of the Weed Society of New South Wales Inc.

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Heliotropium amplexicaule (Blue Heliotrope), a widespread weed in grazing paddocks, amenity areas and roadsides. Eradication of this weed is exceptionally difficult.

Image: Bec Miller

Featured stories in this edition

- ◆ **Australian Weeds Conference - program and special features**
- ◆ **Feature story: Coolatai grass - hard to beat**
- ◆ **Biosecurity weed warnings**
- ◆ **The A to Z of weed identification**

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Editor's note

Welcome. I'm always on the lookout for new and novel stories. If you have anything noteworthy for inclusion into the Spring edition, please contact me.

Tony Cook, Newsletter Editor

THE PRESIDENT'S REPORT

KIM HIGNELL

The year is moving very quickly for many of us who are time poor with workloads, but the wheels just keep on turning.

The Australasian Weeds Conference (21AWC) is getting closer and I for one can't wait to go. The preliminary program is now up online and I am finding it hard to choose which sessions to attend. There are some great topics to be presented. I am looking forward to learn from our international keynote speaker from keynote speaker Professor Antonio DiTommaso from Cornell University, USA with his presentation on "*Climate Change and Weed Migration: What do we know and what next?*" I hope that you can get the opportunity to attend this conference. If you are interested in going don't forget that you can get members discount of \$100. I am looking forward to the conference and I hope to see you there.

There is a special feature in this edition of AGW that highlights the latest conference program and additional symposia within the conference.

Both the cropping and environmental weed professionals will be catered for. Each specialty will have a tailor made symposium; one will deal with agronomical weed challenges and the other recent advances in biological control of weeds.

I would also like to thank the team (conference committee) working quietly and confidently behind the scenes to get this conference up to the world-class standard that it is today. Thank you!

The Society had three applications from members for our Travel Assistance Grant for 2018 and each were successful in obtaining the grant to present at the 21AWC. Well done to Hasum Khalaf, Husham Alqaderi and Xiaocheng Zhu. Good luck in your presentations at the conference. I am looking forward to reading your article about your adventures at the conference in the next addition of AGW.

I would like to thank Sam Porter for doing the best that he could as the Secretary and hope that all goes well in the future for him and his family. I would also like to thank our wonderful committee member Maria Edmonds for stepping up and filling his shoes as our temporary Secretary until November. Please if you would like to help the Society in anyway please consider positions on the committee at our AGM in November. More on the AGM in the next AGW.

If you would like to continue receiving this wonderful newsletter "A Good Weed" and our publication "Just a Little Weed", can you please ensure that all your contact details including address and email are up to date, so that the Society can continue to provide this service to you. Contact the Secretary of the Society with all new details.

I would like to welcome all of our new members to the Society. Hope that you enjoy the benefits of being a member of our wonderful Society.

Finally yet importantly, I would like to remind all members that their membership fees are now due.

Happy weeding till the spring issue

Kim Hignell
President



COOLATAI GRASS— HARD TO BEAT

EDITOR'S PREAMBLE

I have to be brutally clear. Coolatai grass is a weed I've rated as No 1 weed for many years. My first experience with it was spraying and assessing an experiment west of Ben Lomond (Northern Tablelands) in the early 1990's. The standard grass herbicides were used at a good range of rates to see whether we could determine a suitable rate to control this weed. After almost falling face first while carrying the hand-held spray boom because the Coolatai grass obscured the large rocks on the moderate sloped ground, I gained an instant dislike of the weed.

As it came to treatment assessments, the dislike intensified as the best plots would barely rate a suppression score and that was with very high rates of flupropanate (back then it was Frenock). Most other tussocky grass weeds I've dealt with would usually succumb to either glyphosate and/or flupropanate. A formidable weed I concluded. As years passed, I occasionally did more work on Coolatai grass and gathered more ecological information about the plant. Actually there was a vast majority of unpleasant aspects and a few positive impacts of this plant. More ecological details will be revealed further into this story. In summary, if I was to rate this weed out of 10, I'd give it 9.5 out of 10.

HISTORY

Hyparrhenia hirta (Coolatai grass) was thought to have been first introduced from southern Africa to Queensland and northern NSW in the late 1800's. As such the common derives from a locality in northern NSW. CSIRO and some State Government departments also introduced a range a material in the 1950's and 1960's in an effort to find a hardy perennial grass that would survive heavy grazing and grow in a winter dominant rainfall zone.

DESCRIPTION

Coolatai grass is a perennial tussock grass, up to 1.5 m tall, that spreads by seed. Its main growth period is in late spring to summer, but where winters are

not severe it can remain green all year. It is deep-rooted (up to 3 m) and drought-resistant. It readily resprouts from its tough basal crown after defoliation or seasonal dormancy and can respond rapidly to summer rainfall. Leaves are pale greyish-green, hairless or nearly so; older leaves are rough to the touch. The leaf blade is flat, 1–5 mm wide, with a prominent midvein and a long membranous ligule at its base where it adjoins the sheath. The inflorescence is long and much branched; each branch ends in a pair of racemes made up of grey-white, hairy flowers along a stalk. At the base of each branch is a floral leaf that may turn reddish in colour. Five to eight pairs of spikelets are closely packed along each raceme; one in each pair has an awn. The tiny (approximately 2 mm long) grain is dispersed inside an awned, hairy husk.



Seedling Coolatai Grass: long sparse hairs on the foliage and a pink base Image: Tony Cook



Established Coolatai Grass: Leaves can be silvery blue in warmer months Image: Tony Cook



*The ideal environment for Coolatai grass— roadsides
Image: Bec Miller*



*Branched racemes - not many grasses have this feature
Image: Tony Cook*



*A tussock has densely arranged tillers, eventually higher densities displaces most species
Image: Tony Cook*

LIFE CYCLE

Being drought tolerant, it has the ability to rapidly respond to rain, flowering in a matter of weeks. It is well adapted to fire, with tussocks surviving hot burns. Both these characteristics give the species the ability to quickly flower and set seed when environmental conditions are favourable.

Its sole means of reproduction is by seed. Seed yields are low compared to many grass species with 4 to 10% of the florets producing viable seed. Seed is produced both sexually (with pollen) and asexually (without pollen - apomixis). Asexual seed formation allows Coolatai grass to produce viable seed in the absence of pollen.

Although Coolatai grass seed will germinate at temperatures between 5° and 40° C, its optimum temperature range for germination is from 20-30°C. Seedlings are small, weak and killed by heavy frost and temperatures below 10° C.

The main recruitment period for seedlings is therefore in spring for much of southern Australia. Coolatai grass will flower and set seed from spring to autumn, however it will flower all year if conditions are suitable. This demonstrates that the plants in Australia have no photoperiod requirement (i.e. day neutral) or cold requirement (vernalisation) to promote flowering. The period from germination to flowering is approximately 90 days. Seedheads mature unevenly and the seed is shed quickly on maturity.



Tall relative, thatch grass, H. rufa

Image: Harry Rose

There are only three *Hyparrhenia* species found in Australia, *H. rufa* is also becoming an issue along the Central Coast and Hunter regions

Source: Weeds CRC

How to identify *Hyparrhenia* species in Australia

	Tambookie grass (<i>H. filipendula</i>)	Coolatai grass (<i>H. hirta</i>)	Jaragua grass (<i>H. rufa</i>) (2 subspecies)
STATUS	NATIVE	WEED	WEED (tropical)
Plant habit	Tufted grass to 1.5 m tall	Dense tussocks to 1.5 m tall	Tussocks to 2 m tall; annual or perennial
Flower racemes	In pairs, 15–25 mm long, upper raceme on a thin stalk, 7–8 mm long	In pairs, 15–50 mm long	In pairs, 20–50 mm long
Spikelets / racemes	Smooth or hairy	White hairs	Rust-coloured hairs
No. of awns per raceme	1–3	5–7, rarely 8	9 or 10
Awn	40–50 mm long	15–25 mm long	16–22 mm long
Current distribution in Australia	NSW, Qld	ACT, NSW, Qld, SA, Vic., WA	NT, NSW, Qld

**Look alike species:
Left to Right**

Barbed wire grass

Kangaroo grass

Red grass

Image: Tony Cook



Name	Coolatai grass <i>Hyparrhenia hirta</i>	barbed wire grass <i>Cymbopogon refractus</i>	kangaroo grass <i>Themeda australis</i>	redgrass <i>Bothriochloa macra</i>
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Habit	Dense tussock to 1.5 m.	Aromatic perennial to 1 m.	Dense tussocky perennial to 1.5 m, blue to pale green growth turning reddish-brown at maturity.	Straggly perennial to 1 m.
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Seedheads	Paired racemes 15-50 mm long, whitish or greyish.	Paired racemes with sparse hairs, bending downward as they mature. Firm to touch.	Loose interrupted panicle to 25 cm long, spikelets single or in pairs. Papery to touch.	3-6 racemes arising from a single point, upright and close packed. Soft to touch.
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Distribution and Habitat	Common in Northern NSW and increasing infestations in southern NSW especially on roadsides.	Common in the eastern half of NSW, widespread on low fertility soils.	Widespread across NSW Heavily grazed when young. Can form dense stands of coarse material not readily grazed.	Common in the eastern half of NSW. Common in heavily grazed pastures.
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Source: NSW DPI WeedWise

HOW DOES IT SPREAD?

Coolatai grass spreads by means of tiny seeds with hairy, awned husks that adhere to clothing, animals, vehicles and tools, especially when wet. Human activities such as slashing or traffic assist in spreading the weed, especially along roadsides. It spreads along drainage lines, indicating that water can also transport the seeds. In pastures and stock routes livestock can spread seeds.

Coolatai grass is self-fertile, enabling new populations to arise from a single plant. Large populations can produce sufficient seed to spread rapidly, in spite of the apparently low proportion of florets that set viable seed. Seed can germinate readily in different light regimes, over a wide range of temperatures, pH levels and under marginal water stress. Seedlings can emerge from a depth of up to 9 cm. Seedling recruitment can occur within established stands and in soil with a plant litter layer.



No 1 culprit for Coolatai grass spread. Ample organic mix on top of the deck and axils Image: Tony Cook



Can move soil, can move weed seeds Image: Tony Cook



Community concerns has led to warning signs Image: Tony Cook

The most likely course of events for Coolatai grass to spread from the early roadside isolated plants to near monoculture in grazing paddocks and areas of sensitive environmental value is rather disturbing. The sequence of event is best summarized in the text box below. Each step in the sequence may take 5-15 years to complete.

- | |
|---|
| <p>START</p> <ol style="list-style-type: none"> 1. ISOLATED ROADSIDE PLANT(S) 2. DENSE INFESTATIONS (1-3 M ALONG ROADSIDE—SLASH ZONE) 3. LINEAL INFESTATION SLOWLY GETS WIDER 4. INFESTATION JUST REACHES Paddock FENCELINE 5. OCCASIONAL PLANT INFESTS GRAZING Paddock 6. INFESTATION DOMINATES WITH STANDARD GRAZING PRACTICES 7. NATIVE ANIMALS MOVE SEED TO MORE SENSITIVE ENVIRONMENTS 8. ROADSIDE TO TOP OF HILLS COVERED WITH COOLATAI GRASS <p>FINISH</p> |
|---|



A critical moment, when Coolatai grass jumps the fence into a grazing paddock Image: Tony Cook



DISTRIBUTION

Coolatai grass has some core infestations in northern inland NSW, however a network of infestation emanate along the major northern highways and main roads where slashing is common. The New England Highway is almost fully laced with the weed (only light infestations between Glen Innes and Armidale, the rest is moderate to bad). The Pacific Highway is moderately infested in patches but gets worse closer to Sydney. Lighter infestations are on the Princes Highway down to Kiama.

If one wants to see the severity of long term and significant problems caused by Coolatai grass, a drive around Inverell and Warialda will show what time can do if a weed is allowed to spread. In many cases there will be close to monocultures of the weed in many grazing paddocks and the weed has infiltrated into sensitive areas.

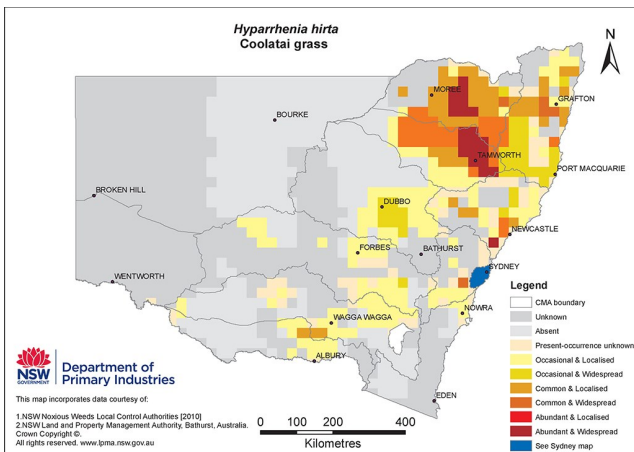
On the other hand, studies have shown that with significant management inputs where Coolatai grass is kept short, it can be a highly productive pasture and meet the feed requirement of dry stock. Coolatai grass also has the benefit of not having damaging seeds like wiregrasses (*Aristida* spp.) and corkscrew grass (*Austrostipa* spp.), however there are other more easily managed tropical perennial pasture species available that also have benign seed.

If large areas have been dominated by Coolatai grass, management strategies of rotational grazing, spring burning and/or slashing will be essential. The maintenance of a legume component in a Coolatai grass dominated pasture is difficult.

The method of cultivating and sowing short term forage crops or lucerne seems to increase the productivity of infested paddocks, assuming that the ground is arable. However, in undulating country, it is difficult to control the Coolatai grass on contour banks and this acts as a new source of seeds once these paddocks enter the longer term pasture phase.

Coolatai grass is not an issue in regularly cropped grain areas. The more frequent cultivations is only of the only major weakness of this weed.

The agricultural areas at greatest risk of serious impacts is the hilly low fertility areas. Although some claim that Coolatai grass can increase the pasture biomass in these areas, the quality of this bulk is very low and only poses as a fire risk due the extreme flammability of the plant.



Distribution of Coolatai grass, mainly confined to north-west NSW
Image: NSW DPI WeedWISE

IMPACTS IN AGRICULTURAL SYSTEMS

Coolatai grass readily invades pastures and dominates them, particularly where ground cover is low (less than 70%) due to the grazing regime (set stocking) and low soil fertility. Failure to appropriately manage a Coolatai grass dominated pasture will see a monoculture of tall rank growth of low digestibility (<40%) and protein (<7%). Sheep production will be poor and cattle will need supplementary nitrogen or protein to be able to utilise the feed.

Most graziers feel that if you don't already have Coolatai grass you don't want it as there are more easily managed perennial and annual pasture options available.



Burns well . Beware in summer, drivers throwing live cigarette butts and roadside Coolatai grass is a bad combination
Image: Tony Cook



Pasture paddock, left: Roadside area, right. Coolatai grass well on its way for making life difficult for this grazier
Image: Tony Cook

IMPACTS IN NATURAL ECOSYSTEMS

Coolatai grass poses a huge risk to the biodiversity of the fragmented areas of native ecosystems remaining across NSW as it easily invades relatively undisturbed ecosystems. The mechanisms of how this occurs are still not fully understood but Coolatai grass has a number of characteristics that allow it to invade a range of ecosystems:

- plants are long lived
- able to produce fertile seed from a single plant
- seed is mobile – wind, water, animals, vehicles
- seed will germinate over a wide range of temperatures
- seeds are able to germinate and establish at the soil surface in the presence of leaf litter
- established plants are tolerant of drought, fire and herbicides

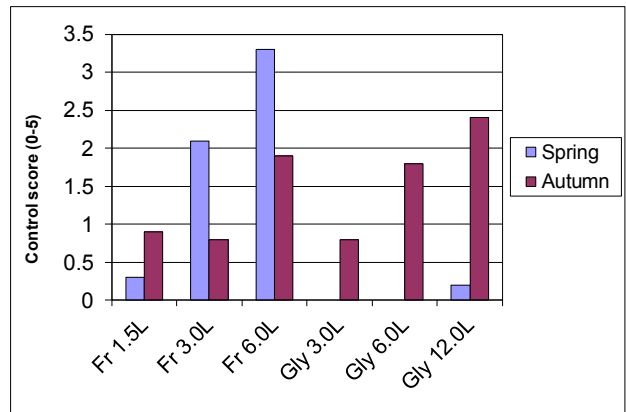
Studies in northern NSW have shown that Coolatai grass infestations have reduced the number of plant, invertebrate and frog species in threatened white box, yellow box and Blakeley’s red gum communities.

LIMITED CHEMICAL CONTROL AND NO BIOLOGICAL CONTROL

Currently there are no biological control options. There are only two herbicides permitted to use via APVMA minor use Permit 9792 (Expires 30/11/2020), they are glyphosate and flupropanate. There is also a label use for flupropanate as a spot treatment.

Experience indicates that all these treatments will assist with getting a moderate to good brownout of the weed, however Coolatai grass usually recovers within 6 to 12 months. Glyphosate based treatments are more cost effective, need to be spot applied for patchy infestations and appear to be more effective when the season is cooling down (April to June). Repeat application is essential as regrowth is likely and seedling Coolatai grass plants are often missed in the first spray.

Pasture replacement in the bare areas made by spot treatment is critical. Some graziers in north-west NSW are resorting to competitive sub-tropical grass pastures to prevent such weeds encroaching by establishing them in well prepared relatively weed free seedbeds.



Tolerance to herbicides (Fr = flupropanate, Gly = glyphosate). An effective control score is greater than 3. The top rate of flupropanate will not be selective.
Image: Tony Cook

IN WRAPPING UP

Coolatai grass rates very highly as a weed. Although not impacting on cropping it has significant negative impacts in environmental and grazing areas. The limited effectiveness of herbicides, the ability of the weed to develop into monocultures and thus force the demise of native and useful grazing pasture species are some of the reasons why this weed one to be concerned about.

References for this article and more information can be obtained from the following:

<http://weeds.dpi.nsw.gov.au/Weeds/Details/179>

http://archive.dpi.nsw.gov.au/__data/assets/pdf_file/0007/347155/coolatai-grass-weed-management-guide.pdf



JOIN US FOR THE 21ST AUSTRALASIAN WEEDS CONFERENCE

The Weed Society of New South Wales Inc., on behalf of the Council of Australasian Weed Societies Inc., will be hosting the 21st Australasian Weeds Conference in the popular Sydney beach-side suburb of Manly from 9 - 12 September 2018.

THE EARLY BIRD REGISTRATIONS CLOSE

AUGUST 13TH

IF YOU ARE A MEMBER OF A STATE WEED SOCIETY YOU **SAVE \$100 AND IF YOU PAY PRIOR TO THE EARLY BIRD DATE YOU**

SAVE AN EXTRA \$110

TOTAL SAVING \$210

The conference is a must-attend for all Weeds Society members working to mitigate and manage weeds across Australasia. It will bring together more than 250 delegates from the weeds community to discuss new developments and share information

about cutting-edge and best weed management practices.

This is a valuable opportunity to network with peers from around the world, engage with industry sponsors, listen and participate in presentations and field trips on a variety of topics, including:

- ◆ New technologies in weed management
- ◆ Biological, mechanical, and chemical weed control and research
- ◆ Herbicide resistance
- ◆ Weeds of crops and pastures
- ◆ Environmental weeds and Weeds of National Significance

Program highlights:

The three-day agenda is packed full of topics on building capacity to manage weeds, assessing weed risks, and the latest research on weed eradication.

- ◆ Hear from **keynote speaker Professor Antonio DiTommaso**, from Cornell University, USA, on climate change and weed migration. What is our current situation and what does the future hold?





- ◆ Explore the current research on **Weeds of National Significance** and their impact on the environment. How can we better manage these persistent weeds for better drinking water?
- ◆ Hear from **keynote speaker Dr Peter Turner, Invasive Species Policy and Programs Team Leader for Department of Primary Industries**, on how to harness the power and passion of weed management for improved weed biosecurity in NSW.
- ◆ Join one of five **popular [post-conference field trips](#)** and see weeds management in action, from Sydney's Northern Beaches to the Blue Mountains. Separate registrations required.

BIOLOGICAL CONTROL: THE PAST, PRESENT AND THE FUTURE

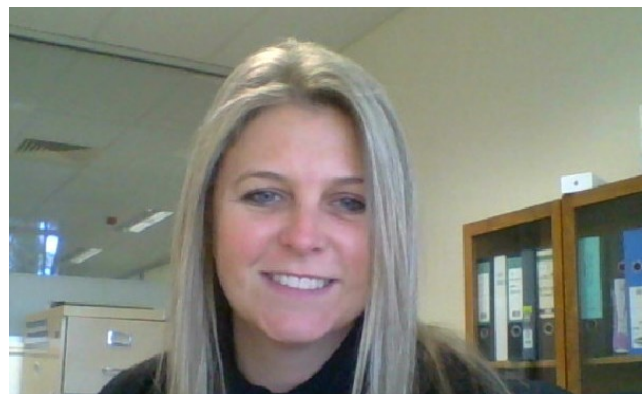
We are pleased to announce that a special symposium on weed biological control will be held at the 2018 conference, showcasing cutting-edge research on agent development, testing and post-release monitoring and evaluation.

The symposium will bring together leading researchers and managers in biological control for terrestrial and aquatic weeds utilising classical and novel molecular technologies to optimise agent impacts on target weeds.



Keynote speakers: Prof Antonio DiTommaso and Dr Pete Turner

Images: Cornell University and Tony Cook



Dr Kerinne Harvey

Image: Kerinne Harvey

Symposium highlights:

- Hear from Dr Kerinne Harvey, Researcher Leader in NSW DPI, on frontiers in biocontrol research – unpacking the past, present and history of the discipline in an Australian context
- Hear from international researchers on exploration and optimisation of biocontrol agents for throughout Europe
- Learn about recent and prospective agents being developed for New South Wales and Queensland
- Hear evidence on native vegetation recovery following biocontrol of environmental weeds

The symposium is open to all conference delegates, with ample time for discussions, questions and knowledge-sharing. We look forward to seeing you in September!

Kim Hignell,

President of the Weed Society of NSW and Chair of the 21st Australasian Weeds Conference.

THE FULL PROGRAM IS NOW AVAILABLE TO VIEW VISIT
[**WWW.21AWC.ORG.AU/PROGRAM**](http://WWW.21AWC.ORG.AU/PROGRAM)

BIOSECURITY WARNING

HAY MOVEMENT

LOOK OUT FOR NEW WEEDS

As drought conditions prevail across much of New South Wales, primary producers are being warned to take precautions to reduce the risk of weed seed spread.

Grains Research and Development Corporation (GRDC) Crop Protection Officer North Vicki Green said the movement of hay between regions and states had the potential to spread problem weeds.

“Like grain, hay can contain a lot of weed seeds and in the current drought conditions stockfeed is being transported vast distances as producers source whatever they can, from wherever they can,” she said.

“During dry times I have heard anecdotal reports of hay contaminated with weed seeds affecting different properties more than 500km apart, resulting in significant infestations of new weeds.

“There is also the chance that these weed seeds will be herbicide resistant.

“This is a potentially serious problem for agricultural production in general, with negative impacts for both cropping and pasture.”



What weed seeds could be within this round bale?

Image: GRDC

Mrs Green said the issue of monitoring and managing new weed infestations was often compounded when it rained by the fact landholders were then focused on drought recovery practices, such as seeding, rather than weed control.

To minimise the potential for weed seed spread through the movement of hay and grain as stockfeed, the GRDC advises landholders to follow the NSW Department of Primary Industries (DPI) Grains Farm Biosecurity Guidelines and take the following precautions:

- ◆ Check the origin of your hay or grain and be aware of potential weed risk. Risk can be assessed by requesting a commodity vendor declaration and asking the seller what/if weeds were present at the time of cutting hay.
- ◆ Observe any restrictions on the movement of plant material interstate and within states
- ◆ Check hay for weeds as you feed out: this may alert you to future issues.
- ◆ If possible source locally grown feed to reduce the chance of introducing new weeds to your region.
- ◆ Feed stock in a designated quarantine paddock: this will limit the area where weed seeds are dispersed for easier monitoring and management after rain. Keep stock in paddock after feeding for sufficient time for them to empty out. This paddock needs to be monitored after rain events for weed germination.
- ◆ Feed away from watercourses to reduce risk of weed spread.
- ◆ If transporting hay or grain, clean down vehicles after delivery in designated area to reduce risk of spread and make future monitoring and management easier.
- ◆ Monitor hay and grain storage areas, paddocks and roadways for new weeds.
- ◆ Post rain, identify or seek assistance to identify any new weeds to ensure the selection of appropriate control strategies.



Director of Weed Research with the University of Sydney, Dr Michael Walsh said it was critical grain growers were proactive and took measures to reduce potential weed and herbicide resistance spread during the drought.

“When it does rain landholders need to monitor for weed seedlings, especially where they have fed out hay or grain. Ideally they need to continue monitoring through the growing season and even into next season,” Dr Walsh said.

He said one of the biggest risks for Queensland and New South Wales grain growers during the current drought was the spread of herbicide resistant annual ryegrass populations.

He said annual ryegrass was a dominant species of southern Australian pastures that was frequently cut for hay.

“Since its deliberate introduction as a pasture species in the early 1900s, annual ryegrass has become widespread across temperate areas of Australia, demonstrating potential for adaptation to all cropping regions,” Dr Walsh said.

“Its distribution has increased northward and westward in New South Wales to now be a serious problem in the northern cropping region.

“A compounding factor with the spread of annual ryegrass is the fact many populations have developed resistance to both selective and non-selective herbicides.”

But Dr Walsh said for those struggling with drought it was really a matter of containing any potential problems by feeding out introduced hay or grain in a restricted area and then monitoring and managing weed issues when it rained.

NSW DPI grains biosecurity officer Rachel Taylor-Hukins agreed it was difficult to totally eliminate the risk of introducing weeds with hay or grain.

“The Grains Farm Biosecurity Program recognises this and recommends landholders make it a priority to restrict the area where livestock are fed, and monitor and take appropriate action to control any germinated weeds before they set seed and have time to establish a seedbank,” Ms Taylor-Hukins said.

Biosecurity Queensland General Manager Invasive Plants and Animals John Robertson said prevention was better than cure.

“Farmers should ask about any weeds that were present where the fodder was grown and not accept the fodder if they are not confident about the response,” he said.

Extensive resources are available through the GRDC website to assist landholders with weed identification, management and control.

ADDITIONAL EDITORIAL NOTE
NOT ONLY COULD WEEDS BE SPREAD ONTO FARMS, WE MUST ALSO BE AWARE OF THE SPREAD ONTO ROADSIDES



Roadsides are also at risk of weed seed, particularly glyphosate resistant weeds *Image: abc.net.au*

For a guide to weed identification go to the Weed ID: The Ute Guide page on the GRDC website.

For assistance with Integrated Weed Management go to the GRDC website.

For tips of managing weeds and reducing herbicide resistance risk go to the WeedSmart page on the GRDC website.

For more information about NSW DPI Biosecurity guidelines or plant pest information contact 1800 084 881.



**NEW OFFICE OF ENVIRONMENTAL
BIOSECURITY**

An announcement by federal agriculture minister David Littleproud to establish an office of environmental biosecurity will better prepare Australia to prevent and respond to new harmful pest, weed and disease invasions.

The decision was announced 29 June 2018 as part of a \$138 million boost in investment for national biosecurity, including \$7.6 million over five years to establish the office, headed by an Environmental Biosecurity Protection Officer, within the Department of Agriculture and Water Resources.

“This much-needed focus on environmental biosecurity will go a long way towards equalising the treatment of the environment in our national biosecurity system,” Invasive Species Council CEO Andrew Cox said.

“Australia suffers from a devastating legacy of feral cats, foxes, weeds and most recently myrtle rust. Every year at least 20 new potential weeds spread into the wild while numerous new feral animals, invasive fish, ants and exotic diseases of native plants and animals are discovered.

The new Environmental Biosecurity Protection Officer will complement existing positions that focus on industry biosecurity and human health: the Chief Veterinary Officer, the Chief Plant Protection Officer and the Chief Health Officer.

“This investment is part of the Coalition’s comprehensive plan to keep Australia’s industries and environment safe from invading biosecurity threats,” Minister Littleproud said.

“A further \$36.5 million will be allocated for a team of biosecurity analytics specialists to help tell us which passengers, countries and imports are likely to bring in pests and diseases. Our data and ana-

lytics will also tell us when pests are extending their range in other countries which could heighten our exposure to them.

Other important initiatives in the announcement include:

- \$33.5 million over five years for 69 Indigenous biosecurity rangers in northern Australia, making this program permanent.
- \$25.2 million over five years for a biosecurity innovation program that will support strategic research and development, including into environmental biosecurity.
- \$36.5 million for improved biosecurity analytics.
- \$35 million in contingency funding for new incursions.

Some of the benefit of this new funding include:

- ◆ Enhanced assurance and verification activities to enhance enforcement of our strict standards
- ◆ Monitoring pests and diseases overseas so we can reduce the risk of them getting to Australia
- ◆ More surveillance, monitoring and response around ports



Increased funding for biosecurity matters is money well spent

***Image:
WA Dept Primary Industries & Regional Development***

IDENTIFYING PLANTS: START WITH THE BASICS

To successfully manage weeds, pests or diseases they must be correctly identified. Misidentification leads to incorrect control practices which is costly and often making the problem worse.

Many people still rely on common names of weeds for their identification, however this leads to problems because many species have multiple common names. Some names are only used within some states or even districts such as *Fallopia convolvulus* which is known as climbing buckwheat in Queensland and black bindweed in New South Wales. A more interesting example is *Conyza sumatrensis* which is normally called tall fleabane in most places. However, on the north coast of New South Wales it is often known as cobbler’s pegs. Cobbler’s pegs are actually *Bidens pilosa* which look totally different.

Our modern naming system of genus and species comes from Carl Linnaeus (1707-1778) who divided flowering plants into groups depending on their flowers and fruits.

Unfortunately identifying plants by flowers and fruits is too late for most management strategies. Therefore, it is good to use vegetative characteristics to identify plants. This has the major benefits of early weed identification which are cost effective



Identification of weeds gets increasingly difficult when the growth stage is smaller. Image: Bec Miller

Note: The answer to this one is located on page 19

allowing timely management strategies to be implemented.

Starting point for identification

Land plants are divided into groups of increasing complexity in structure, particularly the vascular tissue and how they reproduce and spread. It is generally accepted that land plants commence with green algae and goes through to the flowering plants.

Green algae - contain chlorophyll, no roots or vascular tissue.

Mosses & liverworts - have absorbing organs, not roots

Club mosses - single veins in small leaves, and union of stem and leaf without a break in the vascular tissue of the stem. Reproduce by spores.

Horsetails - hollow, jointed stems, reproduce by spores and have an extensive root system

Ferns - highly dissected leaves which unroll from the tip, reproduce by spores and often have rhizomes

Gymnosperms - seeds borne upon scales in a cone or as a naked seed - cycads, ginkgo, conifers

Angiosperms - flowering plants - seeds enclosed in a seed case or ovary – monocotyledons and dicotyledons

The starting point to narrow down and identify the



What plant group would this belong to?

Image: Tony Cook

Note: The answer to this one is located on page 19



majority of weeds (flowering plants) is to figure out whether they are monocotyledons or dicotyledons. It is all also handy to know over half of weeds come from 5 families of flowering plants - Asteraceae, Brassicaceae, Fabaceae, Poaceae (monocot) and Iridaceae (monocot).

Monocotyledons can be identified by the following characteristics:

- ◆ plants are herbaceous (no woody parts)
- ◆ single seed leaves
- ◆ leaves lack a leaf stalk, with each leaf consisting of an upper strap-like blade and a sheathing base that encloses the stem
- ◆ ligule on the upper leaf surface is membranous or hairy
- ◆ leaf veins are parallel with no single main vein
- ◆ roots are fibrous

Dicotyledons:

2 seed leaves (cotyledons)

Shoot system consisting of:

- main axis (stem)
- leaves attach to the stem at nodes
- each leaf consists of lamina, leaf stalk (petiole) and strongly developed main vein with lateral veins (reticulate)
- buds in leaf axils and at the end of stem

Root system - primary or tap root, with lateral roots

Plant – environment associations

Knowing the types of environment in which certain weeds like to grow can help narrow down the possible candidates. Weeds like annual ryegrass however will grow over a range of environments. Some examples are given below.

Acidic soils prone to waterlogging in winter

Docks (*Rumex* spp.), rushes and toad rush (*Juncus* spp.), sedges (Cyperaceae), loosestrife (*Lythrum* spp.), crassula (*Crassula* spp.)

Lighter textured, acidic soils

Capeweed (*Arctotheca calendula*), matricaria (*Oncosiphon piluliferum*), *Geranium* spp., *Erodium* spp., sorrel (*Acetosella vulgaris*), annual ryegrass, *Vulpia* spp., wild radish (*Raphanus raphanistrum*), Paterson's curse (*Echium plantagineum*), Indian hedge mustard (*Sisymbrium orientale*).

Lighter textured, alkaline soils

Capeweed, skeleton weed (*Chondrilla juncea*), brome grass, annual ryegrass, wild turnip (*B. tournefortii*), spiny emex (*Emex australis*), medics, rough poppy (*Papaver hybridum*)

Clays

Fumitory (*Fumaria* spp.), deadnettle (*Lamium amplexicaule*), turnip weed (*Rapistrum rugosum*), charlock (*Sinapis arvensis*), variegated thistle (*Silybum marianum*), paradoxa grass (*Phalaris paradoxa*)



Spiny rush (*Juncus acutus*) thrives in acidic water logged areas

Image: Tony Cook

Collecting plants for identification

It is always a good idea to collect specimens for correct identification. There are plant identification services at the various State herbaria. If it is a new species for an area there will often be no charge however if it is a common weed or plant, there will be a fee.

See this link on how to properly collect and prepare specimens for identification.

https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0018/304326/Collecting-and-preparing-plant-specimens-for-identification.pdf



*Some samples sent in the mail (to NSW DPI) such as this grass / mud combo needed time to grow out in pots
Image: Tony Cook*

How to photograph a plant to get an accurate identification

With smartphones being ubiquitous technology, everyone has the tools to take great photos, but it is annoying to receive blurry images someone expects you to give a miraculous ID from.

Firstly, make sure that your images are in focus! Take a series of images. Include the whole plant then get close enough to show detail. Don't have the subject mixed in with lots of other plants. Isolate the plant you want to photograph from the background or other plants.

You also want light on the front of the subject and not have bright light or reflection behind the subject.

Finally, you actually want a flower/seed head and a leaf and stem in the image. These must be in the same plane (side-by-side) otherwise something will be out of focus.

An effective technique is to hold the leaf/stem and flower/seed head up to the sky at arm's length with the sun behind you. The image will be in focus, well-lit and have necessary detail to allow identification.



*Getting a quality image of leaves and flowers of this weed (Geranium molle) is critical for best results
Image: Bec Miller*



Special features of a weed appear much sharper using the sky as a background

Image: Andie Storrie

For further information on weed identification Online Australian herbaria

Atlas of living Australia – <https://www.ala.org.au/>

New South Wales Royal botanic Gardens – Flora online <http://plantnet.rbgsyd.nsw.gov.au/search/simple.htm>

**WEED BIOSECURITY
WARNING: BOUQUETS**

Australian brides have embraced the latest wedding trend of having native flower bouquets, yet their flannel flowers, waratahs and banksias are often ironically arranged with noxious weeds.

Declared pests, including cotton bush and asparagus fern, are not just a nightmare for landholders, livestock, and native ecosystems, some can also be toxic to humans and animals.

So why are brides carrying them straight toward their future husbands or wives?

Ignorance is wedded bliss. Biosecurity experts say many florists and wedding planners are oblivious to how harmful some plants can be.

Vaughn Byrd, chair of the Peel Harvey Biosecurity Group in south-west Western Australia, said he was alarmed to learn of the use of cotton bush in bridal bouquets.



Weeds appear to be making their way as bouquet components
Image: Jeremy Wong

"I really question how many florists actually know it's a declared species," he said.

"The biggest issue is ignorance, quite frankly." Weeds are estimated to cost Australia's agriculture industry more than \$2.5 billion every year, and their use in floristry has been banned in WA since 2007, so when one of Mr Byrd's volunteers spotted an arrangement containing cotton bush at a local wedding expo, he was baffled.



Cotton bush (Gomphocarpus fruticosus) is popular
Image: Meggie Morris

"I'll put my hand up. I'm one that's had cotton bush, but I spray it regularly," Mr Byrd said, who is also a landholder.

"Cotton bush is toxic, it will take over.

"It's filled with thousands and thousands of little seeds.

"It will just choke out your pastures, it will take over everything, it will get to the point where livestock have difficulty actually travelling through it — financially, it could cripple people."

Australia's peak body representing the cut flower industry has been trying to educate its florists about their destructive use of weeds for years, but the executive officer of Flowers Australia, Shane Holborn, said work was slow because many of them thought they were doing farmers a favour.

"The critical point for us is education and people understanding why it's a problem, because at the moment they really just don't get it," Mr Holborn said.

"A lot of the response is, 'why is it a problem when we're taking these weeds out of the environment?' They don't really understand what happens next — that by taking those weeds out, selling them and then passing them around, they're potentially spreading them and that costs the community and the environment. It's terrible, really."

Mr Holborn said some pest plants were so deeply rooted in the wedding industry that they were collo-



quially referred to as things like 'bridal creeper'.

Others, such as pampas grass, were the subject of a huge eradication campaign from Perth to Albany, but a quick search on social media shows how popular the weed remains on wedding tables and arbours across WA.



Pampas grass (Cortaderia selloana) is a favourite table decoration in WA ***Image: Meggie Morris***

Roadside value versus street value

While growers of native flowers are currently struggling to meet the demand of a quickly growing trend, some florists are picking weeds from abundant patches on the side of the road.

"In fact they've got a joke name for that sort of stuff — they call it 'road-sidea'."

"At the moment, if a florist sees a massive weed patch of asparagus fern, they'll just note it and then go back to it whenever they need to get some foliage," Mr Holborn said.

Mr Holborn said weeds were free, easy to access, earned sellers a solid profit and fit the 'back to basics' aesthetic that many contemporary brides and grooms wanted.

However Mr Holborn said there were native plants that could be used in their place.

"Things like koala fern, goanna claw, dingo ferns, emu feathers — they're all native foliage that have almost the exact appearance of the weeds that are currently being used," Mr Holborn said.

"They're already developed and they're already commercially available, but oftentimes they're just a fraction more expensive and you can't find them for free on the side of the road often either."

ANSWERS TO THE WEED PICTURES ON PAGE 15

The first photo on page 15 was a seedling Tropical Soda Apple plant. Admittedly that was an extremely difficult one to identify because it could have been identified as many possible dicotyledonous species. If you narrowed it down to a *Solanum* species, well done. Top of the class if you got it completely right.

One lesson from this example is to wait just a few weeks for these plants to grow and they might develop features that could significantly narrow down the field of possible plants.



Tropical Soda Apple with 2 to 3 true leaves. Characteristic spines are developing. This is typical of some other Solanum species but knowing this has reduced the possibilities significantly ***Image: Bec Miller***

The second photo on page 15 showed the changing of the asexual stage (prothallus) to the sexual stage of ferns. The prothallus might look like moss or liverworts to some people, but the clue in the photo was the new fern leaves emerging.



Liverworts can look like fern prothallus....very tricky ***Image: Tony Cook***

In the next edition of A Good Weed we investigate Non-conventional chemicals

Will they find a good fit for weed control?



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