

Rat's tail grasses

Sporobolus pyramidalis, *S. natalensis*, *S. jacquemontii* and *S. fertilis*



Rat's tail grasses are invasive grasses that can reduce pasture productivity, out-compete desirable pasture grasses and cause significant degradation of natural areas. They are often referred to as weedy *Sporobolus* grasses.

These species were originally introduced as contaminants in pasture seed and have now adapted well to large areas of eastern Australia. They have low palatability when mature, are difficult to control and can quickly dominate a pasture, especially following overgrazing or soil disturbance. They can affect cattle health and productivity (including finishing times, weaning percentages and weights).

Four species of introduced *Sporobolus* grasses are invasive plants in Queensland:

- giant rat's tail grass (*Sporobolus pyramidalis* and *Sporobolus natalensis*)
- American rat's tail grass (*Sporobolus jacquemontii*)
- giant Parramatta grass (*Sporobolus fertilis*).



Legal requirements

Giant, American and giant Parramatta rat's tail grasses are restricted invasive plants under the *Biosecurity Act 2014*. They must not be given away, sold, or released into the environment without a permit. The Act requires everyone to take all reasonable and practical steps to minimise the risks associated with invasive plants and animals under their control. This is called a general biosecurity obligation (GBO). This fact sheet gives examples of how you can meet your GBO.

At a local level, each local government must have a biosecurity plan that covers invasive plants and animals in its area. This plan may include actions to be taken on certain species. Some of these actions may be required under local laws. Contact your local government for more information.

Description

Rat's tail grasses are robust, tufted, perennial grasses growing up to 2 m tall. They are difficult to distinguish from other pasture grasses before maturity. However, their leaves are noticeably tougher than those of any other species.

They can also be difficult to distinguish from native *Sporobolus* grasses; however, the native grasses tend to be shorter and softer and have less dense seed heads than giant rat's tail grass. The seeds of all species are indistinguishable in pasture seed samples using current identification techniques.

Giant rat's tail grass

Giant rat's tail grass grows to 0.6–1.7 m tall, with a seed head of up to 45 cm long and 3 cm wide. Seed head shape changes from a 'rat's tail' when young to an elongated pyramid shape at maturity. Unlike Parramatta grass and giant Parramatta grass, giant rat's tail grass does not develop 'sooty spike' on its seed heads.

Distribution of *S. natalensis*—Rockhampton (Queensland) to Port Macquarie (New South Wales). Distribution of *S. pyramidalis*—Cooktown (Queensland) to Central Coast (New South Wales).

American rat's tail grass

American rat's tail grass grows to 50–75 cm tall, with a seed head of up to 25 cm long and 0.5–3 cm wide. Distribution—Cape York (Queensland and Northern Territory) to South East Queensland.

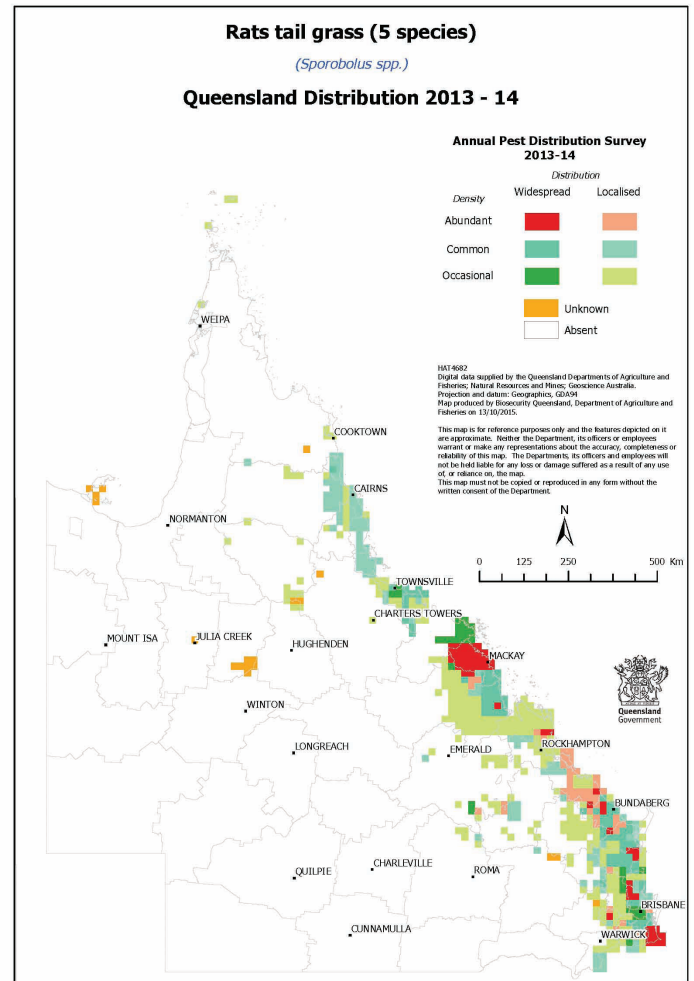
Giant Parramatta grass

Giant Parramatta grass grows to 0.8–1.6 m tall, with a seed head of up to 50 cm long and 1–2 cm wide. The branches of the seed head are pressed against the axis and overlap, although lower ones generally spread at maturity. Distribution—Mossman (Queensland) to Central Coast (New South Wales).

Life cycle

Rat's tail grasses flower and seed in the frost-free period of the year, with the main seeding in late summer/autumn. It can produce up to 85,000 seeds per square metre in a year, with initial seed viability of about 90%. A significant proportion of seed remains viable for up to 10 years).

Map 1. Distribution of rat's tail grass Queensland



Methods of spread

Rat's tail grasses are spread by livestock (up to 30 000 viable seeds/beast/day) in manure and on fur and hooves, feral and native animals and by fast-flowing water over turf. The sticky seeds can spread on vehicles and machinery (especially slashers and earthmoving equipment) as well as in hay and untested pasture seed.

Habitat and distribution

Giant rat's tail grass has adapted to a wide range of soils and conditions.

Ecoclimatic modelling suggests giant rat's tail grass is suited to conditions present in 30% of Australia (223 million ha) and 60% of Queensland (108 million ha), including areas receiving as little as 500 mm average annual rainfall.

Control

Managing rat's tail grasses

The GBO requires a person to take reasonable and practical steps to minimise the risks posed by rat's tail grasses. This fact sheet provides information and some options for controlling rat's tail grasses.

Always commence control programs in areas of light infestation, and work towards the denser infestations.

Prevention and early detection

Maintain vigorous, dense pastures and use higher grass seed sowing rates to reduce the chance of invasion and to increase competition against rat's tail grass seed establishment. Do not expect heavy grazing to control rat's tail grasses—research indicates that grazing may actually favour its spread.

When moving stock from infested areas into clean areas, spell the stock in yards for at least five days. Similarly, spell stock purchased from known or suspected infested areas before releasing them into larger paddocks. Alternatively, quarantine new stock in a densely pastured, well-monitored holding paddock. Move stock when there is no dew or rain, to decrease the amount of seed sticking to their coats (see Table 1).

Establish weed-free buffer strips along boundary or perimeter fences, drainage lines and roadsides to restrict the spread of rat's tail grasses. Always clean machinery thoroughly after working in infested areas. Follow integrated control strategies using herbicides and other control methods, combined with good property hygiene.

Consider the attributes of replacement pasture grasses when deciding what to sow. If possible, choose grasses that are:

- well adapted to local environmental conditions and soil types
- stoloniferous or rhizomatous in growth habit
- resistant to heavy grazing
- palatable and productive
- competitive all year (i.e. do not open up in late winter/spring)
- not inclined to decline as soil fertility decreases
- fast to establish.

If a sown pasture species does not contain most of these attributes, it is unlikely to be successful as part of a rat's tail grass control program.

Some pasture species, while providing strong competition once established, are weak competitors with rat's tail grasses in their early stages of establishment (e.g. Koronivia grass and Bisset creeping blue grass). These grasses are most successful against rat's tail when sown with other grasses that are vigorous when young and provide early competition against rat's tail grasses (e.g. Rhodes grass).

Biological control

Bundaberg Regional Council and the New South Wales Department of Primary Industries (DPI) have investigated a naturally occurring crown rot fungus (*Nigrospora oryzae*) which has had success on giant Parramatta grass to assist with giant rat's tail grass management. Biosecurity Queensland is investigating other potential pathogens. To date no agent is proving effective on rat's tail grasses.

Management strategies

Always commence control programs in areas of light infestation, and work towards the denser infestations.

If, after considering the management options set out below, you choose to use a herbicide option, ensure you apply all herbicides strictly according to the directions on the label and the directions of any Australian Pesticides and Veterinary Medicines Authority (APVMA) permit. You **must** read APVMA permit 9792 if you wish to prepare or use products for the control of rat's tail grasses in situations other than those specified on the product label.

Some herbicides permitted or registered for giant rat's tail grass control have withholding periods and significant ongoing management requirements in grazing and dairy farming. If you have or may have dairy or beef cattle on your property at any stage in the future, carefully consider these requirements when choosing herbicides for use on your property.

Some details of management options are provided below.

Scattered plants and light infestations

Choose **one** of the following options:

- (a) spot spray with glyphosate
- (b) spot spray with flupropanate
- (c) use glyphosate through a pressurised wick wiper
- (d) hand chip, bag and remove stools from the paddock and burn them.

Dense infestations on arable land

(a) Cropping option

First summer (early)

1. Boom spray with glyphosate as per label or permit directions and burn prior to ploughing.
2. Spot spray or hand chip fence lines, headlands, drainage lines, shelter belts etc. for weedy rat's tail grasses missed in cultivation. Plant a long-season forage sorghum variety using a recommended pre-emergent herbicide.
3. Spot spray or hand chip any surviving rat's tail grasses to prevent reseeding.

Second summer

1. Boom spray with glyphosate to control new seedlings and crop regrowth prior to cultivation.
2. Follow the same procedures and similar cropping as for the first summer.

Third summer

1. Boom spray with glyphosate to control crop regrowth and any rat's tail grass seedlings.
2. Plant paddocks with improved pastures using minimum tillage techniques to restrict bringing buried seed to the surface. Use a direct drill planter or surface broadcasting and rolling techniques. Plant fast-growing pasture grasses at triple the standard sowing rates to compete with rat's tail grass seedlings.
3. Fertilise the pasture for fast pasture establishment.
4. Spot spray or hand chip rat's tail grass seedlings.

(b) Pressurised wick wiper option

To be effective, this option requires three treatments over an 18-month period.

First treatment (midsummer)

1. Make sure there is a 30 cm height difference between rat's tail grasses and other pasture plants by selective grazing of the 'good' pasture.
2. Wick wipe rat's tail grass using glyphosate as per label or permit directions.
3. Graze using increased stocking rates after wick wiping.

Second treatment (late summer or autumn)

Wick wipe rat's tail grass using glyphosate as per label or permit directions.

Third treatment (next summer)

Wick wipe rat's tail grass using glyphosate as per label or permit directions.

Dense infestations on non-arable land

Choose **one** of the following options:

- (a) In summer, apply glyphosate through a pressurised wick wiper (if terrain and timber allow).
- (b) In summer, boom or blanket spray with glyphosate in split applications as per label or permit directions (see Table 2) and replant the pasture using fast-growing pasture grasses at double the standard sowing rates.

- (c) In winter or spring, boom or blanket spray with flupropanate as per label or permit directions.

Further information

Further information is available from your local government office, or by contacting Biosecurity Queensland on 13 25 23 or visit www.biosecurity.qld.gov.au.

Table 1. Best practices for management of rat's tail grass infested paddocks

Dos	Don'ts
<p>Cattle</p> <ul style="list-style-type: none"> • Manage the grazing and stocking rate to maintain good ground cover of pasture. • Muster only in the afternoon when plants and seeds are dry. • Restrict cattle to a small paddock or a laneway (on hay) for five days after grazing the rat's tail grass paddock. • Muster on foot or on horseback to prevent seed contamination of machinery. <p>Machinery</p> <ul style="list-style-type: none"> • Provide a specific hose-down tarmac to clean contaminated machinery. • Keep roadways, laneways, stock routes and machinery corridors free of rat's tail grass. <p>General hygiene</p> <ul style="list-style-type: none"> • Enclose specimens for identification in tied fertiliser bags. <p>Pasture management</p> <ul style="list-style-type: none"> • Maintain pasture vigour with a maintenance fertiliser program. • Use band seeding if possible, as this is the 'safest' method to plant legumes into an infested pasture. • Plant the recommended competitive pasture grasses. <p>Hay and pasture seed</p> <ul style="list-style-type: none"> • Determine the origin of hay and ask for a weed hygiene declaration. • Feed hay in a yard, feedlot or small holding paddock. • Only purchase seed from a reputable seed merchant. <p>Control strategies</p> <ul style="list-style-type: none"> • Choose the best control strategy based on the paddock situation and the rat's tail grass population before starting the job. • If dairy or beef cattle will be in the paddock at any time in the future, carefully consider the exclusion and withholding requirements of the herbicides and their long-term implications before commencing treatments. • If spot spraying with glyphosate, operate close enough to step on the plant and spray downwards. • Use low-pressure spraying equipment to reduce the risk of overspraying. • Always spot spray the single 'scout' plants around the perimeter of the infestation first, then work inwards. 	<ul style="list-style-type: none"> • Don't overgraze, as this will create bare patches that allow rat's tail grass seedlings to emerge. • Don't muster on wet days or when the soil is muddy. • Don't deliberately overstock paddocks infested with rat's tail grass • Avoid creating bare ground from trampling around mineral licks etc. <ul style="list-style-type: none"> • Don't slash infested paddocks unless they are part of a wick wiping program. • Don't drive vehicles through infested paddocks. <ul style="list-style-type: none"> • Don't drive around the farm with a suspected rat's tail grass specimen in the cabin or in the back of the ute. <ul style="list-style-type: none"> • Don't allow soil fertility run-down, as this favours rat's tail grass establishment. • Don't renovate an infested pasture. • Don't burn the pasture unless it is part of a wick wiping, pre-cropping pasture replacement strategy. <ul style="list-style-type: none"> • Don't knowingly purchase hay contaminated with rat's tail grass. • Don't buy seed without knowing its origin. • Don't buy seed unless it has a weed hygiene declaration. <ul style="list-style-type: none"> • Don't spot spray with glyphosate using a high-pressure gun from the cabin of the ute. • Don't wave the spray gun around—if the rat's tail grass is dense, you should not be spot spraying. • Don't overspray with glyphosate past the point of spray run-off.

Table 2. Herbicides for the control of rat's tail grasses

Situation	Application method	Herbicide ¹	Rate	Comments
Pasture, grazed woodlands and agricultural situations prior to sowing, tree and vine crops, lucerne and agricultural non-crop situations	Boom spraying	Glyphosate 360 g/L (e.g. Roundup Biactive, Weedmaster Duo)	6 L/ha	
Wasteland, forest and conservation areas, margins of aquatic areas, roadsides and easements, rights-of-way, commercial and industrial areas and public service areas	Boom spraying Double knockdown split application		3 L/ha + 3 L/ha	Follow up the first treatment with a later knockdown treatment such as herbicide or tillage
Pasture, grazed woodlands and agricultural situations prior to sowing, tree and vine crops, lucerne and agricultural non-crop situations	Spot spraying		1 L per 100 L water	
Wasteland, forest and conservation areas, margins of aquatic areas, roadsides and easements, rights-of-way, domestic, commercial and industrial areas, turf, playing fields, golf courses, public service areas and areas surrounding agricultural buildings	Double knockdown split application	1 L + 1 L per 100 L water	Follow up the first treatment with a later knockdown treatment such as herbicide or tillage	
	Wick wiping	3.3 L per 10 L water		
Pasture, grazed woodlands, agricultural non-crop situations	Boom spraying	Flupropanate 745 g/L (e.g Tussock, Taskforce)	1.5–2 L/ha	Do not use in channels, drains or watercourses
Wasteland, forest and conservation areas, roadsides and easements, rights-of-way,	Suppression of seedlings in improved pasture		0.5–2 L/ha	Do not reseed treated areas until at least 100 mm of leaching rain has fallen
Pasture, grazed woodlands and agricultural non-crop situations	Spot spraying		200 mL per 100 L water	Do not spray near desirable susceptible trees
Wasteland, forest and conservation areas, roadsides and easements, rights-of-way, commercial and industrial areas, golf courses, public service	Wick wiping	500 mL per 10 L water	Do not apply above 3 L/ha to steeply sloping sites	

¹Read APVMA permit PER9792 for rates for products containing glyphosate 450 g/L or glyphosate 540 g/L.

The herbicides in Table 2 are permitted under PER9792 (expires 30 November 2020). You **must** read the permit if you wish to prepare or use products for the control of rat's tail grasses in situations other than those specified on the product label. The permit is available on the APVMA website www.apvma.gov.au

Read the label carefully before use and always use the herbicide in accordance with the directions on the label.



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Fact sheets are available from Department of Agriculture and Fisheries (DAF) service centres and our Customer Service Centre (telephone 13 25 23). Check our website at www.biosecurity.qld.gov.au to ensure you have the latest version of this fact sheet. The control methods referred to in this fact sheet should be used in accordance with the restrictions (federal and state legislation, and local government laws) directly or indirectly related to each control method. These restrictions may prevent the use of one or more of the methods referred to, depending on individual circumstances. While every care is taken to ensure the accuracy of this information, DAF does not invite reliance upon it, nor accept responsibility for any loss or damage caused by actions based on it.