Gamba grass (*Andropogon gayanus*)

**The problem**

Gamba grass is a major weed in the Northern Territory, with infestations primarily in the Darwin and Katherine regions of up to 1.5 million hectares. In Queensland, it affects at least 18,000 hectares in the Cape York Peninsula, with additional populations scattered across coastal and sub-coastal north Queensland. A small number of populations exist in the Kimberley region of Western Australia.

Gamba grass invades tropical savannas, including riparian habitats such as river banks, where it can become the dominant grass species. A decline in the diversity and abundance of native fauna and flora can occur directly through competition and indirectly through increased fire intensity.

Research in the Northern Territory demonstrates that intense wildfires fuelled by gamba grass are reducing tree cover. Being a large tussock grass, gamba grass biomass can be up to 10 times larger than native grasses, resulting in fire intensities up to three to eight times higher than native grass fires. These fires dramatically alter the structure of native vegetation, with woodlands potentially transforming into tree-free grasslands.

Gamba grass may also modify soil hydrology through its extensive root system and reduce soil nitrogen levels.

Unless gamba grass is intensively managed, it poses a major fire hazard and causes increased fire management and infrastructure costs. It also generates cultural and social costs through limiting access to significant cultural sites and the reduced availability of traditional foods and other resources for Indigenous Australians.

Collectively, with some other tropical grass weeds, gamba grass is recognised as a key threatening process under the *Environment Protection and Biodiversity Conservation Act 1999*.

**Key points**

- Gamba grass is highly invasive in the tropical savannas of northern Australia.
- It fuels intense fires that threaten the safety of people and property.
- Infestations also displace native plant species, causing a decline in the diversity and abundance of native wildlife.
- Infestations reduce the availability of traditional foods and other resources for Indigenous Australians.
- Minimising seed production and spread is critical to achieving effective management.
- An integrated control program using herbicides, fire and/or physical methods can achieve gamba grass management outcomes within the short term.

**The weed**

Gamba grass is a large perennial tussock grass native to tropical and subtropical savannas of Africa. It is found from Senegal on the west coast to Sudan on the east coast, south to Mozambique, Botswana and South Africa. It is adapted to areas with a three to seven month dry season and grows vigorously below an altitude of 980 metres.

Gamba grass was first trialled as a pasture plant in Australia in the 1930s, but was not widely available for...
planting until the 1980s. Gamba grass has since proved difficult to manage for pasture, despite its productive and palatable fodder.

Gamba grass grows 4.5 metres tall, with tussocks up to 70 centimetres in diameter. Active growth usually occurs over a four to eight month period, sometimes longer if adequate soil moisture exists.

Reproduction is from seeds. Flowering and viable seed production starts when the plant is two years old. Mature plants can produce between 15,000 and 244,000 seeds annually. This results in soil seed banks of 600 to 3500 seeds per square metre. However, seed longevity is short, with rapid decline in seed viability in the dry season and very low seed survival after 12 months.

How to identify gamba grass

Gamba grass can be distinguished from native grasses on the basis of its growth habit - tall, dense and erect tussocks. Plants may be up to 4.5 metres tall including the flowering stems which may extend 2.2 metres above the height of leaf foliage. The leaves have a distinctive white mid-rib and are covered with soft hairs (noticeable when holding rain water and dew). Late curing (remaining green) into the dry season also distinguishes it from native grasses.

Gamba grass flowers mostly in April although it may continue through to August if conditions are suitable. Seeds

Growth calendar

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<td>Seed drop</td>
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- General pattern of growth
- Growth pattern in suitable conditions
are generally formed from May to June and most seeds have been dropped by the end of August. Germination of seeds occurs whenever sufficient soil moisture is available, from early wet season storms in October through the typical commencement of the wet season in December. Plants that have been burnt or slashed earlier in the year can also flower and form seed from October to December.

How it spreads
Seeds can be spread by wind, water (including flooding), livestock and other animals, contaminated vehicles, machinery and hay. Riparian habitats such as riverbanks are important spread corridors, particularly into remote locations. Transport corridors facilitate dispersal over long distances as a result of passing traffic, roadside slashing and soil movement. Highly disturbed roadides also tend to provide favourable habitat for gamba grass.

Most seeds (90 per cent) fall within 5 metres of the parent plant, with less than 1 per cent falling more than 10 metres away. As a result, spread tends to be incremental. However, outlier populations can develop via other spread vectors. The rate of spread through native vegetation has been recorded at 110 to 333 metres per annum in the Northern Territory and appears to be greater within disturbed versus undisturbed woodlands, and along riparian habitats. Fire is a major disturbance factor which may assist control but will also contribute to invasion if not used within an integrated control program.

Where it grows
Gamba grass grows best in the seasonally dry tropical savannas. While it can persist in areas with 400 to 3000 millimetres of annual rainfall, it prefers 750 to 1500 millimetres of rainfall per annum and a distinct three to seven month dry season.

Gamba grass can invade a range of habitats, from wetland margins to upland savanna. It is often abundant along

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Dense infestation of gamba grass in northern Cape York, Queensland. Photo: Queensland Department of Agriculture, Fisheries and Forestry.
riparian and roadside corridors. While capable of surviving in a range of soil types, it prefers loams with moderate fertility. It also prefers full sunlight but can persist under light shade.

**Potential distribution**

Gamba grass poses a significant threat to substantial areas of Australia's tropical savannas. Currently, gamba grass only occupies an estimated 2.1 per cent of its potential range. Hence, efforts to reduce its spread could generate significant benefits.

**What to do about it**

The effective management of gamba grass and restoration of the environment and pastures depends on an integrated approach. This includes spread prevention, grazing land management, physical control, chemical application and fire. The approach can be optimised through the development and application of property weed management plans. It is recommended that technical resources and advice be sought when developing such plans.

The following information regarding management is primarily adapted from the Department of Natural Resources, Environment, the Arts and Sport (NRETAS) Weed Management Plan for Andropogon gayanus (Gamba grass), 2010.

**Prevention of spread**

Spread prevention is the most successful and effective way of managing gamba grass, and a range of practices should be considered. The designation and use of wash down areas will reduce seed spread via machinery and vehicles. Avoiding vehicle movement through infestations, treatment of roadside occurrences and education of property staff and contractors will assist in limiting seed spread. The movement of contaminated products such as fodder and soil should also be avoided.

Transport avenues, areas of soil disturbance, water points and other high risk areas should be regularly monitored to achieve early detection of new outbreaks.

**Chemical control**

Gamba grass is susceptible to glyphosate-based chemicals but application must always be in accordance with chemical label directions and other legal obligations, such as vegetation management or biodiversity legislation. For best results, gamba grass should be sprayed while it is actively growing and immature. Spraying plants prior to reaching full height, or following regrowth from slashing and/or burning will reduce time and chemical requirements.

Chemicals should be sprayed over the entire tussock using a fine spray with low application pressure. Using dyes helps to identify areas that have been treated and encourages optimal spray coverage. Plants which are suffering heat or water stress may not uptake the chemical effectively. Therefore, avoid spraying plants when temperatures are extremely high or when plants are in standing water. To facilitate pasture and environmental restoration, care should be taken to minimise overspray onto native plants.

Chemical control requires at least two treatments within a growing season. The initial treatment of existing mature plants and any seedlings should ideally follow the onset of wet season rains when there is active growth (usually November to December). A follow-up treatment should be applied around two to four weeks later to target newly germinated seedlings or plants potentially missed.

A further inspection of the management area will be required before April to ensure no plants have survived and to treat any seedlings that have germinated. Breaking the plant's life cycle through control and prevention of seed production is the key to managing gamba grass.
Physical control

Although most infestations are best controlled using chemicals, some physical control options are available. Slashing can be useful as part of an integrated control program. While it won’t kill gamba grass, it can be used to reduce fuel load, decrease seed production, increase competition with other plants, assist access and reduce costs of future herbicide application. Slashing young plants in May will prevent seed maturation. It is critical that all machinery and vehicles be washed down before moving to areas free of gamba grass to prevent spread.

Ploughing, grading or scraping can also be used, although multiple applications may be necessary together with follow up application of herbicides. Care should be taken to minimise soil disturbance, which will promote germination of soil seed banks. Due to erosion risk, such options should only be considered during May to September. Permits may be required if native vegetation is likely to be damaged. Machinery should be clean before beginning operations and cleaned down following operations to prevent seed spread.

Individual plants, if not too large, may be removed by hand or using a mattock. It’s important that the entire root mat be removed and excess soil shaken off to ensure the plant dies.

Fire

Fire is often used as a pasture management tool across northern Australia and can be integrated into gamba grass management. While gamba grass fires can be destructive and difficult to manage, fires can be used pre-emptively to reduce high fuel loads. Fire may also be used to kill seedlings, reduce seed production, encourage new foliage before herbicide application, reduce herbicide control costs and improve site access.

The best time for burning is during the late wet to early dry season when fires tend to be lower intensity and easier to manage. To assist burning at this time, herbicide treatment may be used to create dry matter to sustain a fire. Seed dispersal (through thermal air currents) and invasion risk to adjoining native pastures may need to be considered. In addition to other fire management considerations, fire breaks may need to be wider for gamba grass fires due to high fuel loads and fire intensity.

Grazing management systems

Established gamba grass infestations should be managed in a way that minimises seed production and spread into clean areas and adjoining properties. This can be achieved by maintaining stocking rates at a level that will keep the grass below a height of 60 to 90 centimetres. Above this height, plant tussocks tend to become unpalatable and produce large quantities of seeds. Intensive management of stocking pressure and pasture monitoring is required to minimise spread.

Containment and outlier management

A strategic approach to gamba grass management is required at both property and broader levels. This involves the identification of eradication zones—where eradication is technically and economically feasible and the management of outlier infestations is expected—and containment zones, where core infestations are prevented from increasing in area.

Since large infestations are present in some regions, a zonal management approach helps align resources and allows more feasible and realistic goals to prevail. The Northern Territory has a weed risk management system that guides territory-wide management, which incorporates management and eradication zones.
**Legislation**

Gamba grass is a declared weed in Queensland, Western Australia and the Northern Territory.

Gamba grass is a class B/C and class A/C in the Northern Territory, which requires containment, control and/or local eradication.

In Queensland, gamba grass is a declared Class 2 plant, which requires all landowners to take reasonable steps to keep their land free of the pest.

Gamba grass is considered a class P1/ P2 in Western Australia, which requires eradication and prevention of entry.

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**Weed control contacts**

Contact the weed control authority in your state for up to date information on pesticides and legislation.

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<tr>
<th>State / Territory</th>
<th>Department</th>
<th>Phone</th>
<th>Email</th>
<th>Website</th>
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<tbody>
<tr>
<td>NT</td>
<td>Dept of Land Resource Management</td>
<td>08 8999 4567</td>
<td><a href="mailto:weedinfo@nt.gov.au">weedinfo@nt.gov.au</a></td>
<td><a href="http://www.lrm.nt.gov.au/weeds">www.lrm.nt.gov.au/weeds</a></td>
</tr>
<tr>
<td>QLD</td>
<td>Department of Agriculture, Fisheries and Forestry</td>
<td>13 25 23</td>
<td><a href="mailto:callweb@daff.qld.gov.au">callweb@daff.qld.gov.au</a></td>
<td><a href="http://www.daff.qld.gov.au">www.daff.qld.gov.au</a></td>
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<tr>
<td>SA</td>
<td>Biosecurity SA, Dept of Primary Industries and Regions SA</td>
<td>08 8303 9620</td>
<td><a href="mailto:nrmbiosecurity@sa.gov.au">nrmbiosecurity@sa.gov.au</a></td>
<td><a href="http://www.pir.sa.gov.au/">www.pir.sa.gov.au/</a> biosecuritysa/ nrm_biosoecurity/weeds</td>
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<tr>
<td>WA</td>
<td>Dept of Agriculture and Food</td>
<td>Ausralian Pesticides and Veterinary Medicines Authority</td>
<td>08 9368 3333</td>
<td><a href="mailto:enquiries@agric.wa.gov.au">enquiries@agric.wa.gov.au</a></td>
</tr>
<tr>
<td>Australia wide</td>
<td>Dept of Agriculture</td>
<td>02 6210 4701</td>
<td><a href="mailto:contact@apvma.gov.au">contact@apvma.gov.au</a></td>
<td><a href="http://www.apvma.gov.au">www.apvma.gov.au</a></td>
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**Acknowledgements**

Compiled by: Nathan March, Queensland QDAFF, November 2011.

**Key references:**

- NT Weed Risk Assessment Report: *Andropogon gayanus* (Gamba Grass) December 2008. Department of Natural Resources, Environment, the Arts and Sport
- Weed Management Plan for *Andropogon gayanus* (Gamba Grass) 2010 Department of Natural Resources, Environment, the Arts and Sport.

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