

FACTSHEET

Buffel Grass – Collective term for *Cenchrus ciliaris*,
C. pennisetiformis

Buffel Grass Control

Buffel grass has been recognised as one of the greatest pest threats to the arid rangelands of South Australia. It is referred to as a 'transformer species' meaning it has the ability to alter entire ecosystems through the alteration of fire regimes and competition with native plants.

In recognition of its social and environmental impacts, buffel grass has been declared as a weed under the *Natural Resources Management Act 2004*.

Buffel Grass Biology

Buffel grass is an erect, tussock-forming, deep rooted perennial grass 0.2 – 1m high. It has an extensive, fibrous root system which resides mainly in the top 20cm of soil. Due to this extensive root system, buffel grass has the ability to respond rapidly to summer rain. Falls of 20mm can see the weed grow and flower in as little as three weeks after the rain event.

This weed has the ability to produce prolific small seed which are enclosed in burrs. It has the potential to disperse great distances by wind, water and animals. However, human spread via vehicles and machinery is regarded as a major cause of new infestations in South Australia.

Buffel grass generally has active growth during summer months and is dormant (i.e. does not actively grow) during winter. However, seasonal and regional variation in temperature and rainfall can result in buffel grass growth year round.

Integrated Weed Management

Integrated weed management (IWM) is a term used to describe the long term management of a weed using a combination of different prevention and control techniques. An IWM approach will be tailored for a given weed based on its ecology, density and the land-use in which it occurs.



Cenchrus ciliaris



Cenchrus pennisetiformis



Dense buffel grass (*Cenchrus ciliaris*) infestation north of Ernabella, SA

Successful weed management will include a combination of the following:

- Prevention of weed invasion and spread.
- Correct identification and knowledge of the weed's lifecycle.
- Mapping, recording and monitoring weed populations.
- Control decisions based on best available knowledge, including cost and short and long-term environmental impact.
- A control strategy or plan that uses a combination of methods to reduce the weed population.
- Control and management actions incorporated into daily property activities.
- Monitoring and evaluating the effectiveness of management decisions.
- Follow-up control and management measures.

Prevention

Refer to the PIRSA Buffel Grass Hygiene fact sheet for information on how to prevent the entry and spread of the weed by vehicles and machinery.

Non-Chemical Control

Manual Removal

Manual removal/chipping is the physical removal of the entire tussock from the ground using a hoe, mattock or shovel. Once removed from the ground, shake soil from the roots or leave in a position with the roots exposed to dry out.

If chipped-out whilst in flower, burn in-situ or bag the whole plant and remove from the site and destroy. Ensure that all fire regulations and warnings are strictly adhered to.

Soil disturbance created by chipping is likely to promote new germinations, therefore follow-up surveillance and control should be undertaken following summer rains.



Fibrous buffel grass (*Cenchrus ciliaris*) root system

Suitable for:

- All land-use situations with low density infestations or isolated outliers.
- Follow-up treatment to control regrowth and/or new germinations.

Timing:

- All year, preferably before flowering.
- Ensure to treat regrowth following summer rains.

Advantages:

- Completely removes and kills plant.
- Can be carried out opportunistically.

Disadvantages:

- Labour intensive.
- Uprooted plants may survive if moist soil is left around the roots.
- Likely to promote new germinations due to soil disturbance.

Mulching

Mulching is the physical application of material such as straw, wood chippings, plastic sheeting, carpet or similar to prevent weed growth. This method will prevent the growth of smothered vegetation and prevent wind-blown seed distribution.

For best results:

- Manually remove buffel grass plants.
- Apply a mulch layer at least 10cm thick to smother vegetation.
- Plant seedlings or tube stock into the mulch layer to provide competition with emerging weeds.
- Undertake regular surveillance and control of emerging buffel grass by either spot spraying or manually removing germinations following summer rains.
- Maintain the depth of mulch over time to continue suppression of buffel grass.



Buffel grass (*Cenchrus ciliaris*) securely placed in shrub with roots exposed to dry out

Suitable for:

- All land-use situations with low density infestations or isolated outliers.
- Organic farming situations.
- Small, high density infestations in areas where vegetation rehabilitation is required. For example, creek banks or native grasslands.

Timing:

- All year, preferably before flowering.

Advantages:

- Does not require chemical application.
- No soil disturbance.
- Prevents surface seed from blowing.

Disadvantages:

- Not suitable for large-scale infestations.
- Non-selective.
- Can be expensive.
- Labour intensive.



Buffel grass (*Cenchrus ciliaris*) fire at Oak Valley, SA



Buffel grass (*Cenchrus ciliaris*) tussock re-shooting after fire

Fire

Fire can be a very useful tool in the management of buffel grass. Buffel grass fires will not kill the mature tussock however they will remove the biomass and destroy surface seed if a very hot fire.

Given the survival of both the tussock and soil seed bank following fire, burning must only be used in combination with other control methods.

Fire will stimulate regrowth of the buffel grass tussock and promote new germinations. Be sure to carry out follow up control when there is enough green leaf for uptake of foliar herbicide (approximately 3 – 4 weeks following burn if sufficient moisture available). Avoid using fire for at least 1 – 2 years following the application of flupropanate, as it reduces the herbicide residual in the soil.

Before any planned burn, all necessary permissions must be obtained from the Local Council, Native Vegetation Authority and the South Australian Country Fire Service.

Suitable for:

- Core high density populations where there is a significant seed bank present at the site.

Always use fire with caution as buffel grass fires burn extremely hot and can spread rapidly. Always seek appropriate permissions prior to burning buffel grass.

- Large scale, high density infestations where it is desirable to reduce biomass and therefore the amount of herbicide required.
- Native grasslands, where periodic biomass reduction is required to maintain the health of the native vegetation.
- Degraded pastures where the removal of dry matter prior to ploughing is required.

Timing:

- Effective in late spring when biomass is dry and upcoming conditions are suitable for active growth.
- In native pastures, winter burns may be more effective due to the presence of competition.

Advantages:

- Significantly reduces the buffel grass seed bank.
- Can be beneficial for native grasslands providing follow-up buffel grass control is undertaken.
- Reduces the amount of chemical required for control.

Disadvantages:

- May expose large areas of bare ground.
- Fire is beneficial to buffel grass if appropriate follow-up control is not undertaken.
- Burning can result in off-target impacts to some native species such as *Maireana* spp. and *Triodia* spp.
- Buffel grass fires burn extremely hot and can change direction rapidly in windy conditions. Be sure to burn with extreme caution.



Spot spray of roadside buffel grass (*Cenchrus ciliaris*) at Baroota, SA

Chemical Control

Herbicides

Herbicides are an effective tool against buffel grass which are best integrated with other control measures.

Herbicide use requires appropriate timing and application rates to successfully control buffel grass. The situation will dictate the appropriate herbicide to use.

Calibration of spray equipment is essential in ensuring the appropriate application rate and should be carried out on a regular basis.

Chemical Selection

A number of herbicides are available for the control of buffel grass in South Australia.

For all current label and minor-use permit details for buffel grass control, visit the Australian Pesticides and Veterinary Medicines Authority at: www.apvma.gov.au

The two chemicals recommended for buffel grass control are currently registered under the minor use APVMA permit PER9792.

These two key chemicals are glyphosate and flupropanate, which can be used either on their own or in conjunction with each other depending on the density and location of the buffel grass infestation.

It is illegal to apply any herbicide outside label directions or outside of an APVMA permit. Always consult the herbicide label and follow all safety directions regarding the handling, use and storage of chemicals.

Glyphosate

Glyphosate is a non-selective foliar herbicide that kills green, actively growing plants. Care should be taken when applying glyphosate to minimise off-target damage.

Characteristics of glyphosate:

- Absorbed through the leaves and green stems.
- Fast acting – kills treated plants one to four weeks after treatment.
- Non-residual – stops working once in contact with the soil.

Suitable for:

- All land use situations, however the application method will vary depending on the situation.

Application:

- Apply by spot spray or broad-acre ground boom.
- When spot spraying, always apply with a carefully directed spray to avoid over-spray.
- Complete coverage of the plant is necessary to kill buffel grass.

- Take care to avoid over-spray to reduce damage to non-target species.
- Adding a surfactant and/or wetting agent may improve glyphosate penetration. A dye marker is also recommended for spot spray applications to avoid spray misses or double applications.
- Low label rates of herbicide can be used as a short term option to prevent seed set in the current season.

Cautions:

- If spraying around waterways, use a glyphosate formulation that is registered for use in this situation.
- Timing is critical when broad-acre applications are used in pasture situations. Always seek specialist agronomist advice if in doubt.

Timing

Spot spray – apply any time of the year when buffel grass plants are green, actively growing and not moisture stressed. Optimum time for application is November – June following summer rains.

Broad-acre spray prior to sowing crop or pasture – improved control can occur by removal of dead vegetation, and by encouraging fresh green growth. To do this either burn the paddock, slash or heavily graze two to four weeks before spraying.

- Spray-top to prevent seeding – best results are obtained if applied prior to flowering, November – June depending on summer rains.
- Generally for annual pasture species, spot spray with glyphosate to treat buffel grass after annuals have set seed.

Advantages:

- Able to target other weeds at the same time when spot spraying.
- A quick method of killing buffel grass.
- No withholding period for stock.
- When applied accurately, is very effective.
- Glyphosate is non-residual and will therefore have no impact on the native seed bank at the site.

Disadvantages:

- The buffel grass seed bank will not be affected by glyphosate except through

ongoing seed bank depletion by sustained control efforts.

- Glyphosate is non-selective. Over-spray may open up bare areas and increase the risk of soil erosion and weed re-invasion, especially in a dry year.

Flupropanate

Flupropanate is a slow acting herbicide predominantly absorbed through the roots and also the leaves. It can take 2 – 12 months or longer to kill the plant, particularly if affected by drought.

Characteristics of flupropanate include:

- A residual action in the soil that prevents or limits the growth of emerging buffel grass seedlings. Residual life varies depending on soil type and rainfall, but may generally last 2 years in sandy soil.
- The time it takes to kill plants may be reduced by large rain events or soil movement from flooding. Residual action in soil may allow tolerant desirable pasture species to increase in density, providing good competition for buffel grass once the residual effect has gone.
- Some selectivity, but may cause non-target damage, particularly to native species. See below for more information.
- A long withholding period for grazing animals which may have large implications for grazing management. Spot application: 14 days following treatment; broad-acre application: four months following treatment. Lactating cows and goats must not be grazed in treated areas.

Selectivity

Many introduced and native grass species are tolerant to flupropanate; however, many are not.

Before using flupropanate to control buffel grass it is important to know the composition of the pasture and/or native plants and how each species may be affected by flupropanate. Using flupropanate, particularly in native pastures, may change the composition of vegetation. For example, high rates of flupropanate can reduce the abundance of weeping grass (*Microlaena stipoides*) and increase the abundance of red-leg grass (*Bothriochloa macra*).

Flupropanate selectivity is also influenced by the application rate. For example, some plants have a low tolerance at high label rates.

Do not sow grasses into flupropanate treated areas until at least 100mm of leaching rain has fallen.

Native species that are tolerant of flupropanate at the recommended rates include:

- Kangaroo grass (*Themeda triandra*)
- Red-leg grass (*Bothriochloa macra*)

Susceptible species

The following species are known to be susceptible to flupropanate:

- Weeping grass (*Microlaena stipoides*)
- Wallaby grass (*Austrodanthonia* spp.)
- Spear grass (*Austrostipa* spp.)
- Bottle washers (*Enneapogon nigricans*)
- Legumes, particularly young subterranean clover.

Cautions:

- Some desirable grasses, such as native species and perennial improved species, may be damaged by flupropanate.
- Flupropanate effectiveness may alter according to soil type. Flupropanate can become more active in lighter soils (sandy) than heavy soils (clay).
- Resistance to flupropanate has already developed in a few populations of the weed serrated tussock which is similar in many ways to buffel grass. Care must be taken to avoid repeated buffel grass treatment with herbicides of the same group to prevent resistance.
- The residual effects of flupropanate must be carefully managed in your soil. Avoid repeated spraying that will increase existing residual flupropanate in your soils to levels where large areas of susceptible species are damaged.
- Application of flupropanate on land that contains a high proportion of susceptible species can leave ground bare and exposed to reinvasion.

Suitable for:

- Spot spraying in all situations, particularly when densities are light and scattered. Spot spraying high density infestations of buffel grass in native pastures and grasslands may also be effective.
- Broad-acre application in introduced pastures due to their greater tolerance levels and ability to recover.
- Treatment with flupropanate alone when there is a high density large scale infestation and a significant soil seed bank to encourage competition of desirable species.

Application

May be used in spot, broad-acre (ground or aerial) applications. If broad-acre spraying, the boom sprayer should have an automatic rate controller and should be correctly calibrated. This is particularly critical for aerial application. Always ensure rates are applied according to the label.

Spot spray using a carefully directed spray with a low volume knapsack, quick spray (or similar). Spray to the point of run-off and be sure to spray the inter tussock space in well-established, high density infestations. Specific application at this point will reduce the risk of non-target damage, as flupropanate is largely taken up through the roots.

Flupropanate can be mixed with glyphosate to provide a quick knockdown whilst having a residual effect for emerging buffel grass seedlings. However, glyphosate reduces the effectiveness of flupropanate and should only be added when absolutely necessary. If quick control is wanted close to seeding, just use glyphosate or a mixture of flupropanate and glyphosate.

Flupropanate can decrease its residual activity if the area is burnt after application.

Undertake broad-acre applications of flupropanate with care as off target damage to susceptible species may occur.

Timing

Spot spray at any time of the year.

Ideally apply flupropanate directly prior to the vegetative stage of growth of buffel grass (prior to significant summer rainfall) to allow sufficient time for herbicide to take effect prior to flowering. This may be three months before flowering, depending on rainfall.

Advantages:

- Residual herbicide will reduce the growth of buffel grass seedlings for an extended period—up to a number of years under very low rainfall conditions.
- Tolerant desirable species are able to establish and stabilise an area while the tussock degrades.

Disadvantages:

- Residual effects may reduce the growth and establishment of the crop or pasture.
- Long withholding period for broad-acre applications may be a deterrent due to grazing management issues.
- Application of high label rates of flupropanate may result in a loss of highly productive desirable pasture species.
- Lactating stock must not graze treated areas.

Glyphosate and Flupropanate

Suitable for:

- Broad-acre buffel grass infestations where there are few potential off-target species.
- Spot spray isolated outliers where it is desirable to prevent seed set and deplete the soil seed bank.

Application:

- Spot spray at a rate of 1000L of water per hectare.
- Broad-acre spray at a rate of at least 300L of water per hectare.

Cautions:

- Addition of other herbicides and/or surfactants/adjuvants can reduce the effectiveness and residual capacity of flupropanate.

Timing:

- Apply during the vegetative stage of growth to enable foliar uptake of the glyphosate.

Advantages:

- Prevents seed set, controls mature tussocks and prevents the emergence of new seedlings for approximately two years in sandy soil.

Disadvantages:

- Non-selective – will result in off target impacts to susceptible species.
- Relies on a rapid response to summer rainfall to treat infestations prior to seed set.

For Further Information

For resources on identification and state-wide buffel grass management visit Biosecurity SA – Buffel grass webpage: www.pir.sa.gov.au/biosecurity/weeds_and_pest_animals/plant_pests_in_south_australia/weed_id/plant_id_notes/buffel_grass

For buffel grass control advice contact your local Natural Resources SA office:
www.naturalresources.sa.gov.au/home

For more information on herbicide rates visit:
www.pir.sa.gov.au/___data/assets/pdf_file/0020/232382/PIRSA_WeedsControlHandbook.PDF

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Native Vegetation Council

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