3D weed management

African lovegrass

Eragrostis curvula

African lovegrass is a highly persistent, summer growing, perennial grass weed. Its high growth rates and competitiveness can severely reduce or exclude other pastures, significantly reducing the amount of winter feed available and overall carrying capacity.

African lovegrass is a 'Weed of National Significance'. It has spread rapidly and has the potential to invade the whole of south eastern Australia, especially on lighter sandy and sandy loam soils. It is important to note that the African lovegrass weed species requires different management to the Consol lovegrass pasture species. African lovegrass plants are difficult to remove once established so early action is critical, particularly in spring and summer.

Deliberation

Stocktake

Early detection is critical – be able to identify it.

Map infestations on your farm.

Identify sources of infestation.

Plan strategies

Prevention – aim for zero tolerance.

Containment and eradication – for patchy invasion, prevent seed set, monitor and remove new and existing outbreaks.

Management – for extensive invasion, reduce seed set, reduce vigour, suppress emergence and growth, minimise economic impact and utilise as stock feed.

Diversity

Use several tools

Weaken, kill and prevent seed set, or manage to minimise impact.

Competitive pastures to compete from spring to autumn. Complementary, winter growing pastures to fill the feed gap.

Graze intensively from spring to early autumn.

Fertilise to optimise pasture quality and palatability.

Herbicide treatment to prevent seed set – from spring to autumn.

Crop rotations for 3-4 years with herbicide or cultivation to prevent seed set and plant competitive pastures to follow the final crop.

Feed supplements including urea, bypass protein and high energy supplements to encourage stock to consume less palatable weed foliage.

Diligence

Persist

Do it right, on time, every year.

Continue monitoring:

- New plants after rain, from spring through to autumn.
- The competitiveness of pastures.
- The effectiveness of each control measure.

Follow up:

- Adjust control measures for best effect.
- Adapt grazing or pasture management to increase pasture competitiveness.

Prevent

Stop seed set – spray or graze when the weed flowers.

Quarantine – isolate contaminated stock, clean vehicles, spray perimeters, limit movement of visiting vehicles.

Destroy new outbreaks – spot spray and chip/hoe to remove.

Neighbours – encourage neighbours to adopt similar weed management.

HELPING **PRODUCERS** MANAGE WEEDS IN GRAZING SYSTEMS

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3D weed management

To cost effectively manage African lovegrass use the '3Ds' of weed management:

What will it do?

African lovegrass can reduce the productivity of native grasslands and introduced pastures, and the overall carrying capacity of a farm.

African lovegrass dominates pastures. It is an aggressive invader, forming dense stands and growing vigorously through spring, summer and early autumn. It is not preferred by grazing animals, which further increases its competitiveness against more palatable pastures. African lovegrass competes readily in:

- Low or unreliable rainfall areas, prolonged dry periods or drought.
- Lighter textured soils such as sands and sandy loams.
- Lower fertility soils.
- Summer rainfall environments.

It readily invades and overtakes bare ground, degraded and stressed pastures.

African lovegrass has lower overall feed quality than other tropical grasses or temperate grasses at the same level of soil nutrition. It can be palatable and nutritious feed when actively growing but it is of low feed value in winter and when it has gone to seed. The feed quality can be maintained for longer by keeping the grass short and adding fertilisers.

Deliberation

Stocktake

The first step is to gain a clear picture of African lovegrass on your farm. Early detection needs to be a priority as it is difficult to control once established.

Where is it and how dense?

- Inspect each paddock for African lovegrass, preferably from spring to autumn when its seed head makes identification easier.
- Plot hot spots (eg, laneways, sheds and holding yards) and infestations on a farm map, including the weed density. For example:

Density	Plants / ha*	Groundcover
Light	100 (1 per 125m^2)	0.05%
Moderate	2,000 (1 per 5m^2)	1%
Dense	10,000 (1 per m^2)	> 5%

*Average across a paddock – may be as large patches.

Is it spreading and how?

Cross-check current infestations with old maps or your memory to determine:

- Are there any new outbreaks?
- Is the existing infestation spreading?

➥ A useful tool for assessing pastures is MLA's Pasture Health Kit

Where is it coming from?

African lovegrass spreads readily by seed. Identify the sources of infestation such as farm machinery, vehicles, livestock, planting seed, hay, nearby land and water movement.

Planning

Plan carefully so that a realistic strategy can be achieved that suits your farm, considering farm size, goals, farming system, budget and the extent of the infestation.

Set goals

Realistic goals for African lovegrass depend on the level of infestation:

- New or small infestations – detect early and eradicate quickly.
- Widely established infestations – eradication is very difficult in non arable areas, particularly as the seed is persistent. When eradication is not critical, manage and graze to reduce impact. Reasonably high animal productivity from African lovegrass dominated pastures can be achieved if it is well managed.

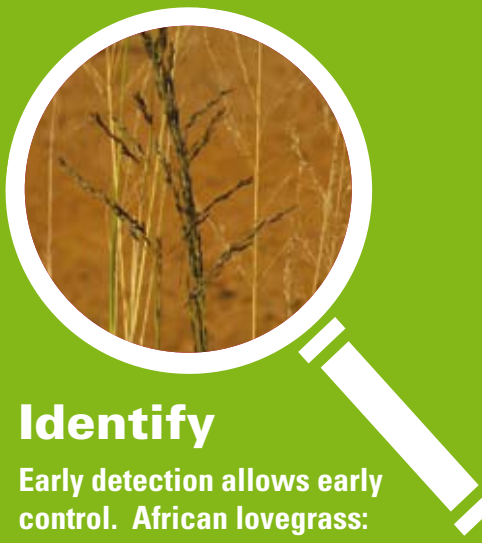
Develop strategies

Develop strategies for the whole farm and each paddock.

Infestation	Strategy
Clean paddocks	Prevention – stop it entering or establishing.
Scattered plants or small areas	Eradication – remove it.
Moderate-dense infestation	Contain – prevent seed set, reduce vigour and extent, and improve the competitiveness of crops and pastures.
Dense with sources of reinfestation	Manage – if African lovegrass is not a declared noxious weed in your area, contain in defined areas and manage to improve palatability.

Prioritise the paddocks on which to spend your time and budget:

Priority	Strategies
1	Keep paddocks clean – prevent seed entry, and seed set on sources of infestation.
2	Eradicate from low infestation paddocks.
3	Containment of moderate infestation paddocks.
4	Contain and manage infestations for improved palatability on heavily infested paddocks.
5	Gradual reduction of infestations.
6	Eradication from all paddocks (needs to be long term and may not be feasible).



Identify

Early detection allows early control. African lovegrass:

- Is a tussocky perennial grass.
- Grows to 30-70 cm high with a diameter of 25-35 cm at ground level.
- Begins flowering in spring or early summer with erect, open or compact seed heads that are a lead-grey or grey-green colour.
- Leaves are blue-green, long and narrow with curly tips.
- Has a ring of hairs below the base of the leaf blade.

It can be confused with some native and introduced grasses, but is clearly distinct from them:

- Spear and corkscrew grass (*Austrostipa* sp) look similar to African lovegrass in the early vegetative growth but have awns on the seed.
- Other native and introduced lovegrasses often look similar but have different seed heads.
- Consol lovegrass can be difficult to differentiate. Consol seed heads tend to be more compact, plants are later maturing and more palatable.

Case Study

Kerry and Susie Pfeiffer from Candelo in southern NSW have developed a system for managing and utilising African lovegrass.

The system is based on:

- Subdivision for grazing management (high density grazing pressure during spring)
- Supplementary feeding to enable continued grazing pressure (especially of poor quality senescent feed).
- Sowing clovers as part of an ongoing fertiliser program.

Their suggestion to others with African lovegrass is to "get on top of it before it gets away and move to a more intensive grazing management system".

➥ To read more about how other farmers have managed African lovegrass, see "3D Weed Management: African lovegrass Case Studies" available from MLA & AWI.

A staged, long term strategy is usually needed for dense infestations. Start with management actions to reduce and weaken the weed enough to then contain it in small areas.

Actions

Develop an annual operating plan that clearly identifies the timing of critical must do actions and tools for your strategy.

The critical must do actions for any strategy are:

- Prevent seed entry.
- Prevent seed set.
- Routinely monitor (particularly in spring, summer and after control measures) all points identified in the stocktake where African lovegrass can enter each paddock, along with any new outbreaks and regrowth.
- Quickly kill new outbreaks and exhaust seed reserves by spot spraying and chipping, repeated over several seasons, always before seed set.
- Suppress emergence and growth with competitive pastures to maintain carrying capacity.
- Graze to keep the weed short and use supplements and/or fertiliser to improve its palatability and minimize its impact on your enterprise.

Suitable plans include a combination of tools such as:

- Non arable areas – manage the weed with grazing, and supplements/fertiliser to improve palatability, competitive perennial pastures (native and/or introduced) and spot spraying especially along perimeters.
- Arable areas – as for non arable land, plus herbicide control in cropping rotations, followed by competitive pastures.

Example – African lovegrass plan for arable land with pasture

Stocktake

- African lovegrass moderately infested across 1 paddock.

Source

- Purchased sheep 2 years ago.

Strategy

- Manage African lovegrass in this paddock.

Actions

- Quarantine and remove stock from infested paddocks.
- Crop for three years, ensuring no weed seed set, and all weeds are killed in fallow periods between winter grazing crops.
- Plant strong introduced perennial pasture and manage for the persistence of existing native pastures.
- Graze heavily during spring and summer.
- Monitor and spot spray African lovegrass with glyphosate in all other paddocks and adjoining areas during summer to prevent seed set.

Diversity

Effective control requires the combination of a range of tools acting on African lovegrass over its lifecycle. Select a set of tools to achieve your chosen strategy – prevention, containment, eradication or management.

The most effective strategies are a combination of carefully timed tools:

- Competitive, summer growing pastures.
- Complementary, winter active pasture species (to fill feed gap).
- Herbicides (in pastures or crop rotations).
- High density strategic rotational grazing.
- Slashing, chipping and spot-burning.

Prevent seed entry

Minimise the risk of seed entry and establishment by paying constant attention to likely sources of infestation such as:

Farm machinery & vehicles	Clean down and/or quarantine to designated areas that can be monitored.
Livestock movements	Seeds take up to 7-10 days to pass through livestock and can still be viable. Restrict livestock from unknown or infested land for 10 days to specific areas that can be easily monitored.
Seed & hay harvested from infested areas	Seeds may contaminate summer crops, winter crops, pasture seed or hay harvested from infested areas. Take care with purchase and monitor into the next few seasons any areas where hay is fed and pastures and crops are planted.
Nearby land	Undertake regular surveillance of farm boundaries, particularly along roadsides.
Water movement	Carefully monitor along creeks, waterways and overland flow areas.

Pasture management

Healthy pastures prevent or greatly reduce African lovegrass from establishing as it readily establishes on bare ground. Pasture competition also greatly enhances the effectiveness of other tools.

Choose a competitive pasture that has:

- Strong, summer growing, perennial grasses as they occupy space, provide groundcover and competition.
- Complementary, winter active species (eg, clovers) to fill the feed gap that is left by African lovegrass' low growth in winter.

Maintain good soil fertility and monitor and control pests to ensure good pasture health.

Understanding African lovegrass

In planning an effective African lovegrass control strategy it is helpful to understand the biology of the plant.

Growth: African lovegrass is a spring/summer/autumn growing perennial grass that is susceptible to frost. It germinates during the warmer months from spring to early autumn. African lovegrass is an opportunistic coloniser of bare ground when favourable conditions provide adequate moisture to germinate following summer rainfall. It readily competes with temperate pastures, common in southern Australia, that have little active growth during summer.

Spread: Flowering begins in spring or early summer. Seeds usually mature from January to March, however this can be as late as May if moisture is available or as early as spring if seasons are warm.

African lovegrass produces large amounts of seed under harsh conditions that are spread by wind, water, animals, footwear, vehicles and machinery.

Weakest point: The seedling stage is the weakest point in the growth of African lovegrass. Due to the small seed, seedling growth is initially slow and vulnerable to strong competition. When temperatures and evaporation rates are high and soil moisture limiting, strong competition from summer growing perennial pastures is especially effective.

Herbicides are useful for preventing seed set and killing plants, particularly in prevention, eradication and containment strategies.

How competitive is your pasture now?

Check your pasture to see if the species composition and density is strong enough to compete against weeds. Typically (there are significant differences between species) ideal pasture plant densities are:

Rainfall zone	Ideal pasture plant density	Groundcover
Low (< 400 mm)	10 plants/m^2	>90%
Medium (400-700 mm)	15 plants/m^2	>90%
High (>700 mm)	30 plants/m^2	>90%

Grazing management

High grazing pressure in spring and summer can keep African lovegrass short and palatable. This needs to be balanced with the need to encourage the competitiveness of desirable pasture species and the need to reduce seed spread by controlling stock movements between infested and clean paddocks when the grass is in seed.

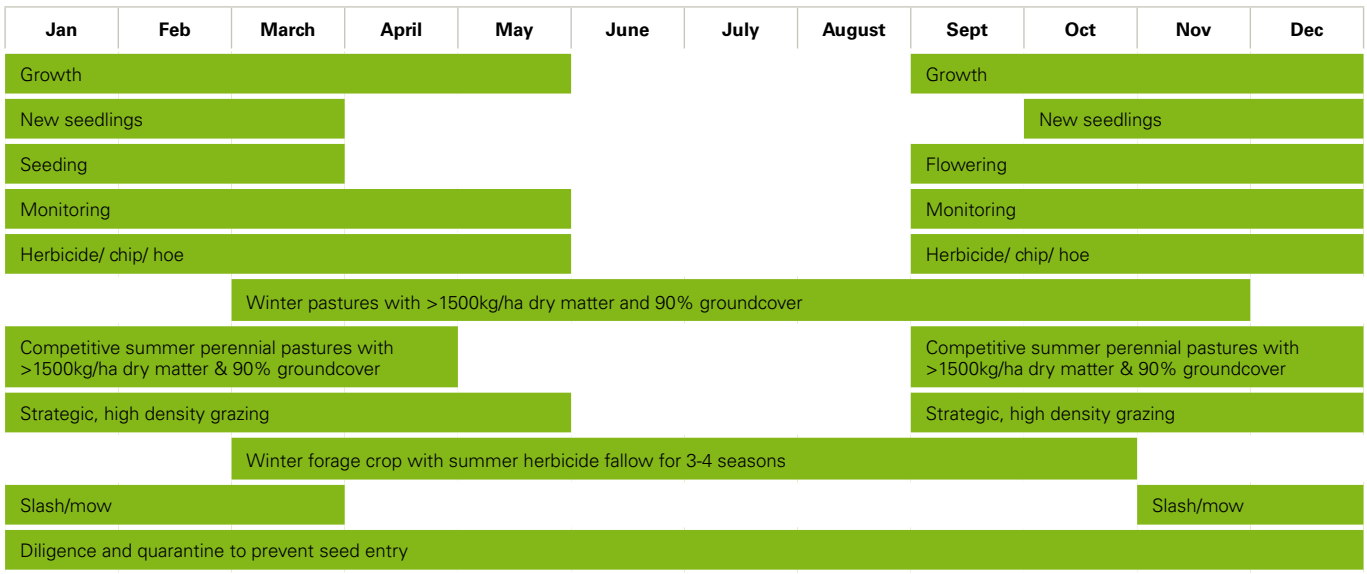
Feed supplements like urea, by-pass protein and high energy supplements (eg, molasses) encourage stock to graze African lovegrass once it has gone to seed in autumn/winter.

Use strategic, high density rotational grazing to keep African lovegrass short when it is actively growing in spring, summer and early autumn. Even converting from set stocking to a paddock rotation is helpful.

Encourage desirable pastures to rebuild root reserves and set seed to improve their persistence, density, vigour and productivity. On most perennial pasture and clover types:

- Rest paddocks after an autumn break so annual species can establish.
- Adjust stocking rates when required during early spring so that annual legumes can seed down adequately and temperate perennials can also flower and rebuild root reserves.
- Where African lovegrass is not dominant, allow good recovery periods after grazing (30-50 days).
- Use relatively short grazing periods (2-30 days) during active growing phases of perennial pasture species.

Match control strategies to the biology of the weed



- Keep the total herbage (perennial plants, annual grasses, legumes, weeds) above 1500 kg/ha dry matter by adjusting stocking rates to suit the season.
- Fertilise with superphosphate as needed to increase growth and competitiveness of desirable pasture species (eg, clovers) to fill the winter feed gap left by African lovegrass.

Herbicides

Herbicides are useful for preventing seed set and killing plants, particularly in prevention, eradication and containment strategies.

Registered and on-permit options include flupropanate and glyphosate. Check options carefully before use.

Flupropanate is slow acting with a residual effect. Spot spray in spring/ summer if you can identify African lovegrass. If spraying after September then add glyphosate to flupropanate to prevent seeding.

Glyphosate can be used for spot spraying in a pasture or for broad acre spraying when totally removing a pasture for cropping or establishing a new pasture.

Herbicides are most effective when pastures are strong enough to compete with the weakened weeds. Care is needed in application as herbicides can leave bare ground that may be readily reinvaded by African lovegrass and other weeds.

Timing is critical: Apply herbicides in spring or summer at flowering, before seed set and when African lovegrass is actively growing.

Cropping rotations

Cultivation and/or glyphosate used between winter crops can considerably reduce seed reserves.

To be effective against African lovegrass, crop rotations need to:

- Be two to three years or longer.
- Use herbicide or cultivation to totally prevent weed seed set.
- Be followed by planting a strong, perennial, competitive pasture with control of African lovegrass seedlings in the pasture establishment phase.

Cropping is more effective on heavier textured soils of high fertility and in higher rainfall environments where the sown perennial pasture will be able to compete adequately with African lovegrass. It can also be useful where the level of infestation is low (scattered plants only) or where the soil seed bank is low.

Mechanical control

Cultivation can be effective if complete weed kill is achieved. However, be wary that African lovegrass establishes readily on bare ground. Use herbicide to control emerging weeds, and/or have a competitive crop or pasture well established before the weed germinates.

Choose a diversity of carefully timed tools for the must do actions

Tools	Prevent new seed entry and seed set	Kill existing plants	Reduce vigour	Minimise impact
Grazing	Hold stock 10 days before moving from infested to clean paddocks. Check if animals come from infested areas.	Use strategic rotational grazing during the growing period, especially after spring, summer and early autumn rain.		Strategic, rotational grazing. Urea, by-pass protein and molasses supplements to utilise African lovegrass as a stock feed when palatability is low.
Pastures	Ensure pastures are competitive all year round. Maintain 90% groundcover.	Suppress emergence and growth. Ensure pastures are competitive in summer – keep herbage above 1500kg/ha dry matter Fertilise to increase competitiveness of desirable pasture species.		Competitive summer pastures. Complementary winter pastures. Fertilise to increase palatability and encourage winter active species. Maintain 90% groundcover.
Herbicides	Spray any new entrants and seed sources.	Apply in spring, summer, autumn. Spot spray individual plants. Broadacre to remove a pasture (cropping, new pasture establishment).		
Cropping		Winter forage crops for 3-4 seasons using cultivation and/or glyphosate in the summer fallow. Summer cropping with crops that allow use of an appropriate herbicide before flowering.		Grow profitable crops as part of an integrated control program.
Mechanical	Quarantine visiting vehicles and equipment. Clean equipment before use.	Chip individual plants.		Slash to reduce seed set. Slash or burn to reduce weed bulk.
Quarantine	Minimise risk of entry & watch all possible entry sites.			Isolate stock that graze the weed.

Chipping (hoeing) or hand weeding can be used for new infestations where there are a few, sparse African lovegrass plants. However, this can be challenging as the plants are well anchored in the soil and difficult to pull out. It is important to remove all the root system so that the plant can't recover. Follow-up is needed to look for seeds that may have germinated.

Mowing and slashing won't kill African lovegrass but can maintain its palatability for longer by slowing it from going to seed and growing rank. There is a risk of spreading seed.

Burning won't kill this grass. It has been used to remove dead material in winter and improve feed quality. However, fire can also harm other species and African lovegrass generally recovers quickly with a competitive advantage on the bare ground. Fire should only be used as part of an integrated management approach.

Biological control

No biological controls are currently available for African lovegrass.

Diligence

African lovegrass is likely to be an ongoing challenge for many properties. The key is to be diligent to achieve critical outcomes:

- Persist with control to keep on top of it.
- Prevent seed set.
- Prevent it from entering and establishing.

Monitor infested areas constantly, particularly in winter, spring and after control measures. Review and record areas of infestation by updating farm maps and/or counting weed density in quadrats to determine:

- Is the weed density reducing?
- Is it contained to existing areas?
- Are infested areas reducing in size?
- How effective was each control activity?
- Are summer pastures healthy and competitive?

Timing must be right – be sure control measures are effective before seed sets in spring, summer or early autumn. Plan carefully so African lovegrass control activities fit with other workloads.

Put into your farm diary the critical actions for your strategy:

- Winter/spring – ensure pastures are competitive coming into spring, and maintain more than 1500 kg/ha desirable species in infested paddocks.
- Early spring through to autumn – graze and/or slash to keep African lovegrass short and palatable, apply herbicide and/or chip/hoe to prevent/delay it going to seed.
- Spring/summer/autumn – monitor to detect outbreaks and assess control measures.

Follow up – if control measures haven't worked, repeat or use another tool before seed sets.

Integrate your weed management plan with your overall farm management strategy to ensure that it can be achieved.

Review and modify the plan based on progress, successes and failures. Adapt to seasonal conditions if needed to ensure pasture is competitive and to act on unusual outbreaks.

Further information

For more information on African lovegrass or pasture management, contact your local agricultural office or agronomist. You may also find useful information from:

Australian Wool Innovation
www.wool.com.au
Ph: 1800 070 099

Meat & Livestock Australia
Weed Removers – Pasture Improvers Workshop

MLA Pasture Health Kit

www.mla.com.au
Ph: 1800 675 717 – option 3

3D Weed Mangement: African Lovegrass Case Studies
available from AWI and MLA

WEEDeck – identification
www.weeds.org.au/weedeck

CRC for Australian Weed Management
www.weeds.crc.org.au
Ph: 08 8303 6590

NSW Department of Primary Industries
Primefact 121 – Consol lovegrass
www.dpi.nsw.gov.au
Ph: 02 6391 3100

Department of Primary Industries Victoria
Landcare Notes – African lovegrass
www.dpi.vic.gov.au
Ph: 136 186

Queensland Government Natural Resources and Water
Fact Sheet – Pest Series – African lovegrass

www.nrm.qld.gov.au
Ph: 07 3237 1435

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