MANAGING WEEDS IN BUSHLAND

Weed management in bushland is about the protection and restoration of our diverse natural ecosystems. Developing an effective weed management strategy is integral to a successful outcome of any control program.

A first step in developing a strategy is gathering information on the distribution of native flora (flora that has adapted to and is well established in the bushland patch) and the patterns of disturbance across your bushland patch (vegetation condition map).

Weed management in bushland involves monitoring the spread and invasion of weeds, and controlling them at the earliest possible stage. This includes the use of a variety of control techniques.

Key points
- Grass weeds are often spread around the landscape by roadside maintenance machinery involved in grading and slashing activities.
- Invasion of many grasses is often facilitated by fire and loss of canopy cover.
- Animals can carry grass seeds on their skin and fur. Horses and dogs are the most important dispersers.

Invasion of many grass species recorded in Western Australia have been introduced from other countries, mainly for agricultural purposes. Today, they also provide mechanisms for grass weed dispersal. Grading drags seed and tillers along road verges and slashing during flowering stimulates seed dispersal and growth.

Weed management in bushland is about the prevention of further spread and re-infestation. It involves the early and effective exploitation of environmental weeds leading to the exclusion of alien flora.

Controlling spread:
- Obtaining road building material from a weed free source.
- Controlling soil disturbance as much as possible. Care must be taken to remove soil from around the target weed species so that the machinery involved in grading and slashing activities can be used to spread the weed seed.
- Promoting an understanding of the threat of environmental weeds to our precious bushland.
- Preventing contamination of unpolluted areas.
- Encouraging community participation.

Getting involved - The Environmental Weeds Action Network

The Environmental Weeds Action Network (Ewan) is a community initiative to tackle the problem of environmental weeds in bushland and waterways. It brings together community members in both urban and rural areas, local government, weed scientists and ecologists to save our indigenous flora from the threat of weeds.

The aims of Ewan include:
- Promoting an understanding of the threat of environmental weeds to our precious bushland.
- Providing useful information about weed control in native vegetation and elsewhere.
- Encouraging government at all levels of the need for appropriate legislation and funding for weed control.
- Researching methods of weed control.
- Encouraging community participation.

Contact Ewan:
Telephone (08) 9457 2896 or visit our web site at: www.members.iinet.net.au/~ewan

Acknowledgments:
Published by Environmental Weeds Action Network and printed funded by the State Weed Committee.

Much of the information has come from “Bushland Weeds, A Practical Guide to Their Management” by Kate Brown and Kate Broskos.


References

THE PERENNIAL TUSSOCK FORMING GRASS WEEDS

Veldgrass (Ehrharta calycina)

Forrest, B. (1999) Natural History of the South Australian National Biodiversity Institute, South Africa. All other illustrations by Libby Stahlert.

Compiled by Kate Broskos and Gracey Paczkowski (ULAH) 2009.

Urban Nature
Department of Conservation and Land Management
Swan Region
PO Box 1187
BENTLEY DELIVERY CENTRE WA 6963
Ph: (08) 9358 4333
Fax: (08) 9368 4299

STATE WEED PLAN

Veldgrass (Ehrharta calycina)
Grass Weeds in Western Australia

Almost one third of the 700 grass species recorded in Western Australia have been introduced from other countries, mainly for agricultural purposes. Today these introduced grasses are seriously impacting on the nature conservation values of bushlands across south-western Australia.

What are perennial tussock forming grasses?

Reproducing by seed and/or tillers (basal branches of grasses) perennial tussock forming grasses are perennial grasses that form dense, usually erect, clumps. They do not spread via flowers (below ground stems that root and shoots at nodes) or rhizons (stems that run along the soil surface). As clumps age, each year’s old leaf material and flowering stems accumulate, creating large fuel loads. This group of grasses makes up one of the most serious groups of environmental weeds in south-west WA.

These serious bushland weeds, mostly from southern Africa, include Perennial Veldgrass (Ehrharta calycina), Tambookie Grass or Coolatai Grass (Austrostipa compressa) and Love Grass (Eragrostis curvula).

Fire and the spread of perennial tussock forming grasses in Bushland

Many grasses, especially tussock forming species, have long narrow vertical leaves that are efficient in strong light allowing sunlight to penetrate deep into the clump. This structure allows the production of a large biomass in a small space.

• Stems and leaves die each year and new ones develop.
• Over time the dead material accumulates and creates a significant fire hazard. Grass weed invasion then changes the fire frequency and intensity in a particular bushland patch.
• These changes are self-perpetuating, as the disturbance caused by fire tends to promote flowering and then germination and establishment of seedling grasses.
• Post-fire increases in nutrients, light and space availability are then effectively exploited by invasive grasses leading to the exclusion of native flora.

Human activities, including inappropriate management practices, provide mechanisms for grass weed dispersal. Grazing dogs seed (and tillers) along road verges and slashing during flowering spreads seed. Road building material including soil and gravel can carry grass seed. Animals can carry grass seeds on their skin and fur. Dogs, horses and humans (among others) readily disperse seeds along bush roads, through bushland, depositing seed with their manure. Many management plans suggest dogs and horses should be kept out of bushland. Performing annual mowing and pasturing at these stages reduces the number of seedlings and resprouting tussocks.

Impacts of perennial tussock forming grasses

These grasses form large dense clumps that suppress and displace native flora particularly native herbs and grasses.

• They cut down native flora, reducing light to seedlings and young grasses and leading to the exclusion of native flora.

Grass invasion within the bushland following fire will increase dramatically if there is no intensive control program. Following unplanned fire resources should be allocated for controlling road grass seedlings and resprouting tussocks.

How do these Grass Weeds Spread?

Seed is important for the spread and establishment of many perennial grasses. An understanding of seed dispersal mechanisms allows us to limit further spread and re-infestation.

• Wind plays a central role in dispersal and many grasses occupy open habitats subject to frequent winds.
• Water can disperse large numbers of seeds. The light weight of many seeds allows them to float easily. Upstream and uphill source populations need to be managed. Drain outlets can have sumps incorporated to allow seed to settle and collect.

Human activities, including inappropriate management practices, provide mechanisms for grass weed dispersal. Grazing dogs seed (and tillers) along road verges and slashing during flowering spreads seed. Road building material including soil and gravel often carry grass seed. Animals can carry grass seeds on their skin and fur. Dogs, horses and humans (among others) readily disperse seeds along bush roads, through bushland, depositing seed with their manure. Many management plans suggest dogs and horses should be kept out of bushland. Performing annual mowing and pasturing at these stages reduces the number of seedlings and resprouting tussocks.

Spot spraying with a grass selective herbicide controls many tussock forming perennial grasses. The herbicide is applied to the foliage. Grass weeds are susceptible and have little impact on most native species. However some native grasses are susceptible.

Establishment of perennial grasses, grass selective herbicides must be applied when the plant is actively growing but before boot stage.

Fire, grazing and mowing

Fire, grazing and mowing are the main control methods for the control of these grasses.

• Handweeding small populations in good condition bushland by using a hand tool to cut through the roots below the crown tissue. Minimum soil disturbance as much as possible. Care must be taken to remove all dormant buds at the base.
• Slashing is generally used in conjunction with a herbicide treatment. Tussocks are slashed to the base to remove the bulk of old material and to promote vigorous growth; this should be done during the vegetative phase to maximise the regrowth of leafy green material. When regrowth is leafy and vigorous, plants are spot sprayed with the appropriate herbicide. Note: Slashing without follow-up herbicide treatment may increase productivity of some grasses. This appears to be true of Love Grass in the Perth region.

Different growth stages of a tussock forming perennial grass

Vegetative growth occurs after the first autumn rains and involves the production of shoots, Mostly leaf blade. Herbicides are best applied at this stage. Grazing and mowing usually results in increased production of leafy linear material.

Transition occurs when the growing points stop producing vegetative growth and start developing flowers and the tissue between nodes elongates. Because of internode elongation, slashing or mowing at this stage can remove many auxiliary buds, thereby reducing leaf production in the regrowth.

Flowering begins when the seed head is just emerging from the leaf sheath (boot stage) and continues through to seeding. Most grass selective herbicides are only effective if applied prior to the flowering stage. Slashing or mowing during flowering may facilitate the spread of seed.
**Tambookie Grass or Coolatai Grass**

<table>
<thead>
<tr>
<th>Species</th>
<th>Common name</th>
<th>Native to</th>
<th>Growing season</th>
<th>Flowering</th>
<th>Reproductive pathway</th>
<th>Seed production</th>
<th>Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ehrharta calycina</td>
<td>Tambookie or Coolatai Grass</td>
<td>Southern Africa</td>
<td>C4</td>
<td>Summer</td>
<td>C4</td>
<td>Opportunistic seed</td>
<td>Resprouts, invades roads and rail lines, increases runoff into bushland, and on the feet and in the coats of animals.</td>
</tr>
<tr>
<td>Hyparrhenia hirta</td>
<td>African Lovegrass</td>
<td>Southern Africa</td>
<td>C4</td>
<td>Spring</td>
<td>C4</td>
<td>Opportunistic seed</td>
<td>Resprouts, invades roads and rail lines, increases runoff into bushland, and on the feet and in the coats of animals.</td>
</tr>
<tr>
<td>Hyparrhenia rosei</td>
<td>Yellow Tussock Grass</td>
<td>Southern Africa</td>
<td>C4</td>
<td>Spring</td>
<td>C4</td>
<td>Opportunistic seed</td>
<td>Resprouts, invades roads and rail lines, increases runoff into bushland, and on the feet and in the coats of animals.</td>
</tr>
</tbody>
</table>

**Tambookie Grass or Coolatai Grass**

- **Some general biology**
  - Perennial tussock forming grasses often resprout following slashing or fire.
  - Old plants carry high fuel loads. Each year new stems and leaves are produced and the older ones accumulate on the plant as dead material.
  - Some grasses increase in native bushland following fire or soil disturbance.

- **Invasion into bushland can be associated with loss of tree canopy cover and an increase in available soil nitrogen that often follows fire.
- Flowering occurs in spring.
- Ripe seed is present on plants between October and January.
- Fire enhances seed production.
- Up to 75000 seed m⁻² in recently burnt areas of Banksia Woodland.
- Seed can germinate any time of the year following rainfall.

**Where does it grow?**

- Perennial Veldgrass is native to Southern Africa where it occurs in many habitats on a range of soil types.
- In Western Australia it is a widespread weed of roadsides and bushlands from Carnarvon around to the Nullarbor on road verges, disturbed ground and in adjacent bushland.

**Love Grass**

- **Some interesting biology**
  - C4 grass so most active period of growth and flowering is through the warmer months but in the Perth area will flower any time after rain.
  - Generally a weed of highly disturbed edges but will move into otherwise undisturbed bushland following fire or soil disturbance.
  - Ripe seed is present generally between January and March but can be present at other times.
  - Seeds germinate in autumn or spring if sufficient moisture is available.
  - The seed is small and light and moves short distances in the wind.
  - Seed is mainly spread as a contaminant of soil and gravel used in road making. It is also spread by road maintenance machinery involved in slashing and moving along road sides, in water flow and run off into bushland and on the feet and in the coats of animals.

**Where does it grow?**

- African Lovegrass is native to Southern Africa where it grows in high rainfall areas on sandy to loamy soils.

**Perennial Veldgrass**

- **Some interesting biology**
  - Plants grow actively over winter and spring going into dormancy over summer.
  - Highly invasive on sandy soils in bushland on the Swan Coastal Plain.
  - Invasion into bushland can be associated with loss of tree canopy cover and an increase in available soil nitrogen that often follows fire.
  - Flowering occurs in spring.
  - Ripe seed is present on plants between October and January.
  - Fire enhances seed production.
  - Up to 75000 seed m⁻² in recently burnt areas of Banksia Woodland.
  - Seed can germinate any time of the year following rainfall.

**Where does it grow?**

- Perennial Veldgrass is native to Southern Africa where it occurs in many habitats on a range of soil types.
Weeds in Bushland

African Lovegrass (Hyparrhenia hirta)

Perennial grass, African Lovegrass occurs from Carnarvon around to the Geraldton around to Esperance particularly on the sandier soils. It is able to establish on a range of soil types.

Invasion into bushland can be associated with loss of tree canopy particularly after fire. High soil tolerance, including dry, hard, rocky soils and deep dry sands. It has wide soil tolerance, including dry, hard, rocky soils and deep dry sands.

Where does it grow?

In Western Australia, Tambookie Grass grows from Geraldton around to the Nullarbor on road verges, disturbed ground and in adjacent bushland. In Western Australia, Tambookie Grass occurs from Carnarvon around to the Nullarbor on road verges, disturbed ground and in adjacent bushland.

Some general biology

- Old plants carry high fuel loads. Each year new stems and leaves are produced and the older ones accumulate on the plant as dead material.
- These grasses increase in native bushland following fire or soil disturbance.

Love Grass

Some interesting biology

- C4 grass so most active period of growth and flowering is through the warmer months but in the Perth area will flower any time after rain.
- Generally a weed of highly disturbed edges but will move into otherwise undisturbed bushland following fire or soil disturbance.
- Seed is present generally between January and March but can be present at other times.
- Seeds germinate in autumn or spring if sufficient moisture is available.
- The seed is small and light and moves short distances in the wind.
- Seed is mainly spread as a contaminant of soil and gravel used in road making. It is also spread by road maintenance machinery involved in slashing and moving along road sides, in water flow and run off into bushland and on the feet and in the coats of animals.

Where does it grow?

African Lovegrass is native to Southern Africa where it grows in high rainfall areas on sandy to loamy soils.

In Western Australia, African Lovegrass occurs from Carnarvon around to the Nullarbor on road verges, disturbed ground and in adjacent bushland.

Tambookie Grass or Coolatai Grass (Ehrharta calycina)

- Perennial Veldgrass forming grasses form large dense clumps that suppress and displace native flora particularly native herbs and grasses.
- They change intensity, seasonality, patchiness and frequency of fires in bushland impacting on the canopy structure and on the diversity of flora and fauna.

Some general biology

- Tambookie Grass or Coolatai Grass is native to Australia where it occurs in many habitats on a range of soil types.

In Western Australia, it is a widespread weed of roadsides and bushlands from Carnarvon around to Esperance particularly on the sandier soils.

Suggested methods of management and control

- Cut out plants, erode rhizomes are removed, spray with grass selective herbicide in winter/spring. Follow-up with slashing or mowing.
- For larger infestations, spot spray with 1% glyphosate + grass selective herbicide or cut near ground level with suitable grass selective herbicide.
- Follow up seedling control - spray 1 mL/L Fusilade® + wetting agent.
- May require more than one application.

To help you identify the weeds that may be present in your area, the table below provides a list of some common weeds found in Western Australia, along with their identification details:

<table>
<thead>
<tr>
<th>Species</th>
<th>Common name</th>
<th>Photosynthetic pathway</th>
<th>Growth season</th>
<th>Flowering period</th>
<th>Seeds</th>
<th>Seedling control</th>
<th>Management and Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pennisetum setaceum</td>
<td>Fountain Grass</td>
<td>C4</td>
<td>late spring, summer</td>
<td>seed, wind, water, bird</td>
<td>viable seed</td>
<td>Spot spray with 1% glyphosate + grass selective herbicide or cut near ground level with suitable grass selective herbicide. Follow up seedling control.</td>
<td></td>
</tr>
<tr>
<td>Pennisetum macrourum</td>
<td>Elephant Grass</td>
<td>C4</td>
<td>late spring, summer</td>
<td>rhizomes, tillers</td>
<td>viable seed</td>
<td>Cut out - ensure rhizome removal; spray with grass selective herbicide or cut near ground level with suitable grass selective herbicide. Follow up seedling control.</td>
<td></td>
</tr>
<tr>
<td>Eragrostis curvula</td>
<td>Rough Cat's tail</td>
<td>C3</td>
<td>late spring, summer</td>
<td>seed, wind</td>
<td>viable seed</td>
<td>Resprouts, cut out small populations - ensure tiller bud removal; Spot spray larger infestations with 3% glyphosate + spraytech oil. A number of treatments may be required within the first one year. Spray seedlings at 5 cm stage with Pythalex™ at 50 mL/L. Resprouts, cut out small populations - ensure tiller bud removal; Spot spray larger infestations with 3% glyphosate + spraytech oil. A number of treatments may be required within the first one year. Spray seedlings at 5 cm stage with Pythalex™ at 50 mL/L.</td>
<td></td>
</tr>
<tr>
<td>Piptatherum miliaceum</td>
<td>Pussy Tail</td>
<td>C3</td>
<td>late spring, summer</td>
<td>seed, wind</td>
<td>viable seed</td>
<td>Resprouts, cut out small populations - ensure tiller bud removal; Spot spray larger infestations with 3% glyphosate + spraytech oil. A number of treatments may be required within the first one year. Spray seedlings at 5 cm stage with Pythalex™ at 50 mL/L.</td>
<td></td>
</tr>
<tr>
<td>Paspalum C4 late spring, summer</td>
<td>seed, wind</td>
<td>viable seed</td>
<td>Spot spray with 1% glyphosate + grass selective herbicide or cut near ground level with suitable grass selective herbicide. Follow up seedling control.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eleusine indica</td>
<td>African Feather Grass</td>
<td>C4</td>
<td>late spring, summer</td>
<td>seed, wind</td>
<td>viable seed</td>
<td>Cut out small populations - ensure tiller bud removal; Spray with 1% glyphosate + grass selective herbicide or cut near ground level with suitable grass selective herbicide. Follow up seedling control.</td>
<td></td>
</tr>
<tr>
<td>Echinochloa crus-galli</td>
<td>African Lovegrass</td>
<td>C4</td>
<td>late spring, summer</td>
<td>seed, wind</td>
<td>viable seed</td>
<td>Resprouts, cut out small populations - ensure tiller bud removal; Spray with 1% glyphosate + grass selective herbicide or cut near ground level with suitable grass selective herbicide. Follow up seedling control.</td>
<td></td>
</tr>
<tr>
<td>Holcus lanatus</td>
<td>Love Grass</td>
<td>C4</td>
<td>late spring, summer</td>
<td>seed, wind</td>
<td>viable seed</td>
<td>Resprouts, cut out small populations - ensure tiller bud removal; Spray with 1% glyphosate + grass selective herbicide or cut near ground level with suitable grass selective herbicide. Follow up seedling control.</td>
<td></td>
</tr>
<tr>
<td>Perennial Veldgrass</td>
<td>Perennial Veldgrass</td>
<td>C4</td>
<td>late spring, summer</td>
<td>seed, wind</td>
<td>viable seed</td>
<td>Resprouts, cut out small populations - ensure tiller bud removal; Spray with 1% glyphosate + grass selective herbicide or cut near ground level with suitable grass selective herbicide. Follow up seedling control.</td>
<td></td>
</tr>
</tbody>
</table>
| Perennial Tussock Forming Grass Weeds of the Jarrah Forest and Swan Coastal Plain: biology, management and control