Control of giant Parramatta grass

Agnote DPI/354, revised September 2001
John Betts, District Agronomist, Grafton
David Officer, Pastures Research Officer, Grafton

INTRODUCTION

Giant Parramatta grass (*Sporobolus fertilis* formerly *Sporobolus indicus var major*) is a serious, aggressive weed that has invaded large areas of pasture on the North Coast of NSW. This introduced pest is a declared noxious weed and continues to spread along the coast and inland with extensive infestations on the Far North Coast, Manning and Hunter River regions and isolated infestations on the South Coast, Northern Tablelands and Slopes areas of NSW and South-East Queensland.

Giant Parramatta grass is a threat to grazing lands because:

- it can reduce pasture production, animal performance and the value of grazing land;
- it is a vigorous, persistent and invasive perennial grass of poor quality and low palatability;
- it is well adapted to a wide range of climatic and pasture conditions and is capable of rapid spread on the North Coast of NSW, southern Queensland, and inland summer rainfall areas;
it produces a large number of seeds that can remain viable in soil for several years;
seed is spread by vehicles, machinery, livestock and floods (it is not spread by the wind).
Giant Parramatta grass is also a problem along roadides and in national parks, forests, picnic areas, parks and ovals. These infestations are a source of seed which can spread to clean areas, as well as being a fire hazard in winter and spring.

IDENTIFICATION
Giant Parramatta grass is a coarse tussocky grass that grows to a height of 70 cm to 2 m. The seed heads are up to 40 cm long and resemble a rat’s tail (see figure 1).
The branches at the bottom of the seed head often droop away from the central stem.
The seeds, which are about the size of sugar grains, form at the ends of each floret. They are initially white and turn yellow-brown at maturity. Giant Parramatta grass flowers and seeds in the frost-free period of the year, with the main seeding in late summer/autumn.
Single tussocks grow up to 40 cm in diameter and produce more than 200 seed heads per year. The tussocks hay off in the autumn, leaving a distinctive straw of seedless heads.
Giant Parramatta grass is often confused with two similar grasses:
• A smaller species of Parramatta grass (Sporobolus africanus, formerly Sporobolus indicus var capensis) is similar to the giant species, except in size and aggressiveness. This smaller species (usually up to 50 cm high) is very common but is not a serious weed.
• Giant Rats Tail grass (Sporobolus pyramidalis and S. natalensis) introductions from Africa that are serious weeds in Queensland and isolated areas of the NSW Far North Coast. These species have a growth habit and appearance very similar to giant Parramatta grass, except that at maturity they have much more open seed heads and are often slightly taller and coarser with longer leaves. These aggressive weeds should also be controlled in the same way as giant Parramatta grass.

STOPPING THE INTRODUCTION AND SPREAD
It is very important that landholders keep their properties free of giant Parramatta grass because once it is established and seeding, control is difficult and expensive. Vigilance and quick action to eliminate newly invading plants and small infestations are the key to keeping giant Parramatta grass off a property.
General guidelines

- Learn how to identify giant Parramatta grass. A big step towards winning a war is to know the enemy. Information on how to recognise this weed is available from agronomists with NSW Agriculture and the noxious plants officers with your local government authority.

- Avoid travelling, as far as possible, through paddocks where giant Parramatta grass plants are seeding. This lessens the chance of seed being picked up and spread by vehicles and livestock.

- Provide washdown areas for vehicles and machinery. High pressure hoses (either water or air) should be used to dislodge loose seed on vehicles or machinery after movement through infested areas and before entering clean areas.

- Regularly inspect the washdown areas and their associated drains. Any suspect plants should be eliminated quickly to prevent seeding.

Landholders

- Purchase of cattle from infested properties during the main seeding period for giant Parramatta grass (January to April) is likely to introduce giant Parramatta grass onto your farm.

- Keep access to yards and roads clear. Remove or spray to prevent the grass from seeding.

- Inspect traffic areas regularly (e.g. roads, yards, logging tracks, phone and power lines). Any suspect plants found in these areas should be treated promptly.

- Where necessary, replant small holding paddocks using species competitive with giant Parramatta grass. Competitive grasses such as kikuyu, pangola grass, (planted vegetatively), setaria, Rhodes grass and some paspalum species may be suitable depending on soil type and environment.

Buying stock

- Check the source of stock. If buying stock from areas infested with giant Parramatta grass follow the guidelines outlined in this Agnote.

- Use a small holding paddock (preferably close to a residence for regular inspection) to hold incoming stock for a minimum of 5 days. Most seed passes through an animal in 4 to 5 days, while very little remains after 7 days. A holding period of at least 5 days is suggested to empty out and allow seed to fall from the hide or legs of animals which may have been on infested pastures.

Farm hygiene

- Stock that graze infested paddocks should be mustered when the grass is dry. The seed coat of giant Parramatta grass is mucilaginous so it sticks readily to wet surfaces such as an animal’s coat or vehicle tyres made damp by the rain or dew.

- When rotating stock from infested to clean paddocks run the stock in a small holding paddock (free of giant Parramatta grass) for a minimum of 5 days, allowing the seed to pass through the animal so reducing the chance of it being transmitted to clean areas.

- Wash all implements thoroughly after slashing or mulching paddocks infested with giant Parramatta grass. This removes any loose seed on the machinery and prevents its transfer to clean paddocks.

- Insist that any contract equipment coming onto a property be allowed entry only after thorough cleaning.

- Question people from all public utilities (electricity, phone, etc.) about the areas they have visited and whether the vehicle and/or equipment has been properly cleaned prior to the visit to your property.

- Keep all access roads and yards clean, inspecting for, and treating, any suspect plants.

- When purchasing sowing seed, request a certificate of analysis from the vendor. This certificate gives a full description of the seed batch’s viability and contamination by weed or other seeds. Avoid purchasing seed that is contaminated with seeds of Sporobolus species or where no certificate of analysis is available.

- Sowing a vegetative buffer may be appropriate where there are well defined infestations of giant Parramatta grass, e.g. a paddock or property boundary. A dense vegetation buffer should be sown around the perimeter of the infestation using a suitable pasture mixture. The buffer should be kept free of giant Parramatta grass helping to reduce the spread of seed to clean areas.

Stock transporters

- Thoroughly wash all vehicles after being on an infested property and before entering any property free of giant Parramatta grass.

- Wherever possible, avoid travelling in paddocks where giant Parramatta grass plants are in head. If this cannot be avoided travel through
these paddocks in the afternoon when the grass is dry and there is less chance of seed being picked up by the vehicle.

- Regularly inspect washdown areas and the accompanying drains. Any suspect plants which are found should be promptly controlled.

Stock agents and saleyards

- Provide washdown facilities for stock transports.
- Saleyards and holding paddocks need to be inspected regularly. Suspicious plants should be quickly removed and destroyed or treated with the appropriate herbicides.

CONTROL STRATEGIES

The most appropriate control program for each situation depends on:

- the degree of infestation
- the land’s capability
- the type of stock enterprise and its cash flow
- the type of pasture present or needed.

Light infestations

- Cut seed heads and put them in a bag for destruction before digging out or spraying the plant. Dig out or spot spray any giant Parramatta grass as soon as you find it. (For more information on spraying consult the table on page 11. After digging out plants it is good to fill the divot with Kikuyu runners or seed of grasses that will compete with giant Parramatta grass seedlings.
- Don’t overdo your spot spraying — only direct the herbicide onto the crown and green leaves. Spraying the seed heads is ineffective, and only spreads the herbicide further, often killing surrounding desirable species.

Heavier infestations

If the infestation is too heavy to be spot sprayed or dug out, you need to decide whether to:

- keep the existing pasture base and manage the giant Parramatta grass to reduce its population and minimise its effects, or
- remove the existing pasture and replace it with more competitive and productive species.

Managing giant Parramatta grass in a pasture

If you decide that removal is not economical or is physically impossible, then your emphasis should be on containment, and getting the best out of the pasture. How you do this depends on the type of country and other pasture species present.

For low fertility country, the main improved pasture option to reduce the impact of giant Parramatta grass is to undertake a minimal cost pasture program involving the following steps.

- Graze hard and/or wick wipe in autumn. Slashing or mulching to reduce heavy autumn growth may also be an option but remember that slashing can spread seed and is expensive (see the note below on slashing).
- Consult a local pasture sowing guide or adviser and surface sow or direct drill well adapted pasture legumes (e.g. Haifa white clover, Wynn cassia, Maku Lotus) with appropriate fertiliser.
- Follow up with appropriate fertiliser topdressing to promote good legume growth.
- Use a glyphosate wick wiping program to progressively remove the giant Parramatta grass (see the section on wick wiping (page 6) for details.
- As the pasture develops, the option of using flupropanate at a later stage may also be feasible but not for pasture used by lactating dairy stock.

Another option is a ‘live with it’ method, where economics do not justify other control options. If grazed short and kept leafy, giant Parramatta grass has similar quality to carpet grass in summer and is better quality than carpet grass in spring. However, when it gets rank and in seed its feed quality is very poor.

Therefore grazing management should aim to keep giant Parramatta grass as short as possible through higher intensity stocking, wick wiping or judicious slashing. ‘Chemical slashing’ using sub-lethal rates of glyphosate through wick wipers is a cheaper alternative to slashing. Subdividing large paddocks with regular rotation of stock helps to increase grazing intensity.

A note on slashing

Slashing when the plant is in seed can rapidly spread the seed. Slashing when seeding is only recommended where giant Parramatta grass is dominant, as slashing sparse infestations when seeding can rapidly increase the density of the infestation.

If the ‘live with it’ approach is used then it is vital that seed be prevented from spreading from infested properties to clean ones. Keeping roadways, tracks, yards and fence lines adjoining clean neighbours free of giant Parramatta grass assists in reducing the spread of seed. (See the section on Stopping the Introduction and Spread, page 2).
In local government areas where giant Parramatta grass is declared a W2 noxious weed, the ‘live with it’ approach is not an option. For better quality country containing improved tropical grasses (e.g. kikuyu, setaria, Rhodes grass or paspalum), the recommendation is the same as for improving pasture on low fertility country, but with further options of:

- using high rates of nitrogen fertiliser (up to 300 kg N/ha in three to six split applications from October to March) to increase growth of the improved tropical grasses
- using the herbicide flupropanate to selectively kill giant Parramatta grass in kikuyu, setaria* or paspalum. Flupropanate must not be used on pasture that is being used for lactating dairy animals.

(* There is some evidence that certain cultivars of setaria vary in their tolerance to flupropanate).

**Replacing existing pasture**
Replacing existing pasture is a more intensive approach for arable land or for better class country.

Ultimately a vigorous, perennial, summer growing, grass-based pasture must be established to provide competition. This can be done as soon as the giant Parramatta grass has been removed or preferably, it can be done after the rotation of a series of winter and summer crops has reduced the giant Parramatta grass seed reserves in the soil. The crops also have the advantage of producing extra green feed or a cash crop of grain.

**For winter crops:**
- Cultivate or boom spray with glyphosate.
- Sow to ryegrass/oats or ryegrass/oats/clover (see local sowing guides or your District Agronomist for details).

**For summer crops**, the options are a summer legume or a maize and sorghum crop.

**Summer legume crop:**
- Cultivate, then spray and incorporate trifluralin as a pre-emergent herbicide to control grass, including giant Parramatta grass seedlings in the crops.
- Sow lablab, cowpeas or soybeans.
- Post-emergent herbicides are available for seedling grass control in soybeans, lab lab and cowpeas.
- Soybeans and other summer legume crops can also be established by direct drill methods using glyphosate before sowing and then following up with one of the pre or post emergent grass herbicides.

**Maize and sorghum crop:**
- Cultivate and apply a suitable pre-emergent herbicide to control grass weeds including giant Parramatta grass seedlings.

Cropping followed by establishment of a competitive perennial pasture is an option on arable land.
• Maize and sorghum can also be established by direct drill methods using glyphosate and pre-emergent herbicides for weed control.
• Repeat the winter crop/summer crop rotation for several years if feasible. (Preventing giant Parramatta grass from seeding reduces its seed reserve.)

Further information on suitable herbicides can be found in the NSW Agriculture publication Weed Control in Summer Crops.

Establishing permanent pasture
Cultivate or boom spray with glyphosate at suitable rates to kill existing competition including giant Parramatta grass.
• Sow down to a vigorous, summer-growing, grass-based pasture such as kikuyu, setaria, Rhodes grass or a suitable paspalum species. (However, note that some paspalum species such as Bahia grass may be considered a weed on fertile country). Tall grasses such as setaria or Rhodes grass will not be suitable where wick wiping is to be used.
• Sow between September and March, depending on local conditions.
• Include well adapted legumes such as Haifa white clover, Maku Lotus, Safari Kenya clover, Shaw creeping vigna or Wynn cassia (consult a local sowing guide for a suitable legume for your situation).
• A sowing technique that has worked well is to broadcast the seed and fertiliser into glyphosate-sprayed giant Parramatta grass then mulch the dead grass to cover the seed. It is important that the mulch cover should be light, as heavy mulch can increase pasture seedling disease and also reduce establishment.
• In later years, if giant Parramatta grass starts to re-invade from seed reserves, spray with flupropanate (except where pasture is used for lactating dairy animals).

See pages 9–11 for details of pasture grass tolerance to flupropanate.

CHEMICAL CONTROL – WICK WIPING WITH GLYPHOSATE

Permit for off-label use
The use of a wick wiper to apply glyphosate to giant Parramatta grass is not specified on the label of the product. However, the National Registration Authority (NRA) has issued a permit (PER4697, expires 30 September 2006) for the application of glyphosate by wick wiper on giant Parramatta grass.

Wick wiping with glyphosate is an important tool for giant Parramatta grass control.
Use of the wick wiper
Selective application of the herbicide glyphosate through a pressurised wick wiper is an important tool in giant Parramatta grass control and management.

This tool, however, must be considered as a part of an overall pasture management plan that involves:

- grazing management
- in some situations, slashing or burning to pre-condition the stand
- encouraging a strong, competitive pasture understorey to replace the giant Parramatta grass.

In heavy giant Parramatta grass infestations and where replacement pastures are considered inappropriate or uneconomic, the pressurised wick wiper can be used to apply glyphosate at a low rate to reduce seeding and improve grazing quality. This is a cheaper and more effective method than slashing.

A range of pressurised wick wiper types and brands is available, the most common being wand and carpet or mat types.

Pressurised wick wiper guidelines
Old giant Parramatta grass tussocks tend to be made up of many stems (culms), some of which are dormant or are not connected to the main tussock. When wick wiping with glyphosate, some of these stems are not contacted by the herbicide and will regrow a few weeks after wiping. It is therefore important to plan a wick wiping program of several wipings over a 2–3 year period.

Giant Parramatta grass pre-conditioning
Heavy grazing, slashing/mulching or, in some situations, burning may be appropriate. Carry this out in late winter or spring in preparation for wiping. This phase is essential to remove the tall, rank and dead growth from the previous season. If it is left standing, much of the glyphosate will be wasted on this dead material.

Continue to graze throughout the spring and early summer at sufficient pressure to reduce the height and bulk of desirable grasses so as to achieve a height difference between the pasture and giant Parramatta grass. Cattle will readily graze giant Parramatta grass in spring and early summer.

The optimum time for the first wick wiping of giant Parramatta grass is at early seed head development, usually December-February, depending on the season. Wiping at this time reduces further seed head development. If preventing further seed head development is not an issue, good results can be obtained by delaying the first wipe until April or May with the second wipe the following summer to pick up juvenile plants and parts of the tussock that regenerate.

In favourable seasons, the first wipe can be as early as October/November, but a high percentage of these plants can recover from dormant stems in the giant Parramatta grass tussock.

Giant Parramatta grass needs to be green and actively-growing for wiping. Results are poor when the weed is wiped under moisture and heat stress.

Wick wiping method for a high-percentage kill
The herbicide used is glyphosate 360 g/L or glyphosate 450 g/L (various trade names).

The volume must be sufficient to get 2.5 L per ha of glyphosate 450 or 3 L per ha of glyphosate 360 to give a high-percentage kill (see NRA permit PER4697).

The mixture of glyphosate to water will depend on the output of the wick-wiper. An output of 10–15 L per ha of solution (glyphosate and water) gives sufficient coverage in most giant Parramatta grass stands — refer to the section on calibrating a pressurised wick wiper for more details.

Better coverage can be achieved by wiping twice in opposite directions but reduce the rate of glyphosate by half for each wipe if using this approach.

There needs to be sufficient giant Parramatta present to take the herbicide from the wick wiper without dripping. If dripping during operation occurs, then the solution output needs to be reduced and the mixture changed accordingly.

Caution: These rates can cause severe off target pasture damage if there is insufficient height difference between giant Parramatta grass and the pasture, or if dripping occurs.

Several wipes over a 2–3 year period may be necessary for good control of giant Parramatta grass. Under good conditions, the first wipe (summer/autumn) should control most of the adult plants. Continue to graze the pasture as cattle may tend to graze the wiped areas of pasture more than the unwiped areas.
Sufficient grazing pressure is needed to maintain a height differential between the pasture and the surviving giant Parramatta grass plants. Cattle grazing the wiped plants will help remove the dead material before the next wipe.

Glyphosate has a nil withholding period for grazing stock.

A second wipe in autumn (March–May) will be needed to control surviving adult and juvenile plants. Continue grazing at a suitable rate to encourage the competing pasture species.

Further wiping in the following summer will also be necessary to control surviving juvenile seedling plants. Precondition the pasture through grazing management to remove any dead or rank growth and maintain a height differential between the desirable species and giant Parramatta grass.

The second and subsequent wipes will require progressively less herbicide mixture per hectare.

Wick wiping for better grazing quality
Wick wiping (also called chemical slashing or pasture-topping) can be used to improve the grazing quality of giant Parramatta grass.

If giant Parramatta grass can be kept in a short, leafy state, its feed quality can be the equal of carpet grass. It has an advantage over carpet grass, however, in that it begins to grow much earlier (August).

A rate of 0.5 – 1.5 L/ha of glyphosate 360 g/L or 0.4 – 1.2 L/ha of glyphosate 450 (allowed by NRA permit no. PER4697) wiped onto giant Parramatta grass at early seed head initiation in summer is normally sufficient to stop the majority of the seeding. This also retards the plant, reducing rank growth in late summer and autumn.

This technique keeps giant Parramatta grass in a better grazing state, making it more palatable and improving its potential use by cattle. Because a low rate of glyphosate is used, little off-target damage occurs and there is less requirement for pasture and giant Parramatta grass preconditioning. Wick wiping dead material does, however, waste herbicide.

This technique is quicker, cheaper and more effective than mechanical slashing and also produces giant Parramatta grass of better grazing quality.

Calibrating a pressurised wick wiper
Most wick wipers are difficult and time-consuming to calibrate. The following simple technique can be used to measure the output of the wick wiper and, at the same time, kill a patch of giant Parramatta grass.

- Select a patch of heavily-infested giant Parramatta grass.
- Select a speed of approximately 4.5 – 6 km per hour. This is a comfortable working speed on most terrain.
- Mix up 6 L of solution using 2 L glyphosate 360 and 4 L water.
- Select a suitable setting on the variable switch.
- Apply the mixture to the area until the tank runs out and then measure the area covered.
- Divide the output (6 L) by the area covered in ha to give the output in L per ha for that setting and ground speed.

Example
The area covered with six litres of mixture was 300 metres long; the mixture allowed six runs; the width of the wick wiper was 3 m.

The width covered was 3 m x 6 runs = 18 m. The area covered was therefore 300 m x 18 m = 5400 square metre or 0.54 ha (1 ha = 10,000 square metres).

Divide the six litres by 0.54 = 11.1 litres per ha. To apply 3 L per ha of glyphosate, we will need 3 L glyphosate + 8.1 L of water to make up our 11.1 litres of mixture per ha.

Operating a pressurised wick wiper
Points to remember when operating a pressurised wick wiper include:

- Pre-wet the wands or mats with tank or good-quality water.
- Re-do the first wiper run.
- Run the wick wiper as high as possible above the desirable pasture species (at least a 20–30 cm height difference) but ensuring plenty of herbicide wipes on the giant Parramatta grass.
- An operational speed of 4.5 – 6 km per hour (a brisk walking pace) is a comfortable working speed for most situations. Maintain the constant speed used in calibration of the wick wiper.
- Avoid herbicide dripping during operation, this wastes herbicide and damages off-target species.
- The wick wiper will retain some herbicide when the job is complete. Add some water to the empty tank and re-wipe some of the earlier-wiped areas.
- Hose down the wick wiper in a safe place to remove giant Parramatta grass seed. As there also may be some herbicide residue on the wands or carpet, do not hose down where desirable pasture species may be damaged.
OTHER CHEMICAL OPTIONS

Herbicides are very effective on giant Parramatta grass but are not appropriate for all situations. They will only kill the existing plants; the seed reserve in the ground is largely unaffected. This means that giant Parramatta grass is capable of rapid regeneration from seed after the herbicide eliminates or reduces the cover. When used, herbicides should only be part of a total control program.

A range of herbicides have been tested for giant Parramatta grass control, and flupropanate and 2,2-DPA were found most effective. (2,2-DPA products contain 740 g of active ingredient per kg of product as the sodium salt. It is sold under the trade names of Propon® and Cerelon®. Glyphosate is less effective on giant Parramatta grass, but is widely used for spot spraying or suppression of existing pasture for sowing of crops or improved pasture. Glyphosate is better suited than 2,2-DPA for this method of pasture or crop establishment.

Flupropanate rate and timing

NRA Permit 3567 (expires August 2003) specifies application rates of 1.5 L to 2 L/ha to control giant Parramatta grass from July to December only.

Flupropanate is absorbed mainly through the crown and roots of the grass. It is more effective when applied in drier periods (late winter/spring on the NSW North Coast) when there is less likelihood of heavy rain taking the herbicide out of the root zone.

In a trial by NSW Agriculture at Grafton, a late winter/spring application of 2 L/ha of flupropanate killed all, or almost all, giant Parramatta grass treated. In comparison, 1.5 L/ha applied at the same time was about 5% less effective than the 2 L/ha rate.

Flupropanate is softer on the non-target summer grasses in late winter/spring when there is little or no growth. To preserve Kazungula setaria, apply flupropanate at only 1.5 L/ha in late winter/spring. On occasions severe damage has occurred on Narok, and Solander setaria and Rhodes grass. Consult your local agronomist if using flupropanate on these grasses. Flupropanate applied in early summer, under good growing conditions, has often been too severe, killing a high percentage of desirable grasses.

Kikuyu, paspalum and Bahia grasses are more tolerant of flupropanate, and have suffered much less damage at rates up to 2 L/ha in late winter/spring. However, they too are likely to be damaged by flupropanate when actively growing in moister, warmer conditions.

In heavy giant Parramatta grass infestations where high soil seed reserves are present, a rapid reinfestation from these reserves can occur over the next 2 to 3 years following flupropanate application.

A second application of flupropanate 2 to 3 years later usually gives a much longer control period due to reduction in soil seed reserves and better pasture competition.

2,2-DPA rate and timing

The herbicide 2,2-DPA is registered for control of various perennial grasses. It is absorbed through the leaf and has no plant tissue residual.

In a trial by NSW Agriculture at Grafton, 10 kg/ha gave consistently good results on giant Parramatta grass – about the same as for flupropanate at 2 L/ha. The trial showed that 5 kg/ha of 2,2-DPA was inferior to 10 kg/ha, but that the difference was fairly small when applications were made under ideal conditions for this herbicide.

2,2-DPA is most effective when plants are actively growing. Late summer/autumn applications are usually the most reliable.

Residual effects of flupropanate

Flupropanate is residual to some extent in soil and in plant tissue. In the soil, flupropanate is removed by leaching and is broken down quite rapidly under anaerobic (oxygen-free) conditions in the subsoil.

Flupropanate has a strong affinity for the fibrous material in plants and may have residual activity for some time through absorption onto seeds or incompletely decayed plant material in the soil. This residual activity does not prevent giant Parramatta grass from re-invading from seed and so competitive species need to be in place.

In animals, flupropanate is of low toxicity and is quickly eliminated from the body.

WITHHOLDING PERIODS AND RESIDUAL EFFECTS OF 2,2-DPA AND GLYPHOSATE

2,2-DPA and glyphosate could potentially avoid some of the problems surrounding flupropanate, such as long withholding periods, long reseeding intervals and slow brownout. There is no withholding period for grazing after treatment.
with 2,2-DPA or glyphosate and paddocks could be spot sprayed without withdrawing animals.

After waiting a minimum period of 30 days, pasture can be seeded into areas treated with 2,2-DPA using zero or minimum till techniques.

Annual pasture can be reseeded 1 day and perennial pastures 7 days after treatment with glyphosate using zero or minimum till techniques. Glyphosate is better suited than 2,2-DPA.

ACKNOWLEDGMENTS
The authors thank the following for their assistance in the preparation of this document: Members of NSW North Coast Weed Advisory Committee, Kerry Moore, District Agronomist, Kyogle and Bede Clarke, District Agronomist, Casino.

Figure 2 is reproduced with permission of the Department of Natural Resources, Qld.

Photographs are by John Betts and David Officer.

IMPORTANT NOTES

Disclaimer
The information contained in this publication is based on knowledge and understanding at the time of writing (March 2001). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of New South Wales Department of Agriculture or the user’s independent adviser.

The product trade names in this publication are supplied on the understanding that no preference between equivalent products is intended and that the inclusion of a product name does not imply endorsement by NSW Agriculture over any equivalent product from another manufacturer.

Always read the label
Users of agricultural or veterinary chemical products must always read the label and any permit, before using the product, and strictly comply with the directions on the label and the conditions of any permit. Users are not absolved from compliance with the directions on the label or the conditions of the permit by reason of any statement made or not made in this publication.

Parts of the chemical use pattern quoted in this publication are approved under permits issued by the National Registration Authority and in force at the time the publication was prepared. Persons wishing to use a chemical in the manner approved under permit should obtain a copy of the relevant permit from the NRA and must read all the details, conditions and limitations relevant to that permit, and must comply with the details, conditions and limitations before using that chemical.
Summary of the use of the recommended chemicals flupropanate, 2,2-DPA and glyphosate for the control of giant Parramatta grass.

Note that some of the usages and rates indicated are off-label uses that are permitted by permit from the National Registration Authority. Off-label usage without having a copy of the permit and following the directions on that permit is illegal. See pages 6–9.

<table>
<thead>
<tr>
<th>Application timing</th>
<th>Flupropanate ¹</th>
<th>2,2-DPA ²</th>
<th>Glyphosate ³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late winter/spring application has given best results</td>
<td>Summer and autumn. Apply when plants are actively growing</td>
<td>Summer and autumn. Apply when plants are actively growing.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Withholding period for stock</th>
<th>Flupropanate ¹</th>
<th>2,2-DPA ²</th>
<th>Glyphosate ³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blanket application – 4 months. Spot spraying – 14 days. Stock not to be grazed on flupropanate treated areas for 14 days before slaughter. Lactating dairy animals must not be grazed on flupropanate treated areas</td>
<td>No withholding period, and does not present the same problems as flupropanate, particularly for lactating dairy animals</td>
<td>No withholding period, can be used where grazed by lactating dairy cows.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Selectivity</th>
<th>Flupropanate ¹</th>
<th>2,2-DPA ²</th>
<th>Glyphosate ³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clovers and Maku Lotus tolerant. Paspalum, Kikuyu and Bahia grass tolerant but can be damaged a 2 L/ha rate in summer. Kazungula setaria can be severely damaged in summer with less damage at 1.5 L/ha rate in winter/spring. Severe damage has occurred on Narok and Solander setaria and Rhodes grass. (Consult your local agronomist if using flupropanate on these grasses). Carpet grass is susceptible to flupropanate but may be less damaged in spring application.</td>
<td>Relatively non-selective will cause severe damage to desirable grasses such as Kikuyu, Paspalum etc. Therefore need to reseed well adapted pasture species.</td>
<td>Relatively non selective. Will cause severe damage to desirable grasses such as Kikuyu, Paspalum etc. when blanket applied. Therefore need to reseed well adapted pasture species. Also used for control and manipulation of giant Parramatta grass growth when selectively applied through a pressurised wick wiper.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Soil residual – time to plant back to pasture or crop</th>
<th>Flupropanate ¹</th>
<th>2,2-DPA ²</th>
<th>Glyphosate ³</th>
</tr>
</thead>
<tbody>
<tr>
<td>After at least 100 mm of rain</td>
<td>After a minimum of 30 days</td>
<td>No damaging soil residual. Annual pasture can be planted 1 day after application perennial pasture 7 days after application. However it is best to wait for total brownout of plants.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Speed of action</th>
<th>Flupropanate ¹</th>
<th>2,2-DPA ²</th>
<th>Glyphosate ³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very slow – up to six months to kill</td>
<td>Symptoms visible within about a week and full effect in six weeks</td>
<td>Symptoms visible 3-7 days, full effect may take 20-30 days.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rate</th>
<th>Flupropanate ¹</th>
<th>2,2-DPA ²</th>
<th>Glyphosate ³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spot – 200 mL/100L&lt;br&gt;Boom – 1.5 to 2 L/ha&lt;br&gt;A pesticide permit allows flupropanate to be used from July to December.</td>
<td>Spot – 1 kg/100L&lt;br&gt;Boom – 5-10 kg/ha</td>
<td>Spot – 1L Roundup Biactive®&lt;sup&gt;3&lt;/sup&gt;&lt;br&gt;360g/L/100L water&lt;br&gt;Boom – 6L Roundup Biactive®&lt;sup&gt;3&lt;/sup&gt;&lt;br&gt;360g/L/ha. Best applied in two applications each of 3L per ha. 6 weeks to 2 months apart.</td>
<td>Wick wipe 3L glyphosate &lt;br&gt;360g/L per ha. 2.5L glyphosate&lt;br&gt;450g/L per ha. Output 10-15 L solution per ha for good coverage.</td>
</tr>
</tbody>
</table>

1. Product contains 745 g/L Flupropanate present as the sodium salt and is sold under various trade names such as Taskforce®, Kenock®, Tussock®.

2. Product contains 740 g/kg 2,2-DPA present as the sodium salt and is sold as Propon® and Cerelon®.

3. Product contains 360 g/L glyphosate and 450 g/L glyphosate and is sold under various trade names such as Roundup®, Glyphosate®.