

Autumn Alive!



Beaufort Flats



Gingin



Badgingarra

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2003

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## From the President

DAVID MONKS, BADGINGARRA



This years weather has been consistently inconsistent. The early rains and hint of a good season was dashed by an unprecedented dry spell late May through June. When the rains finally came, they didn't stop for 2 weeks in some areas.

Perennials have again come through with flying colours in these trying times. They have been invaluable utilizing out of season rainfall to provide high quality feed when annuals have been dying. Tagasaste has been a lifesaver for many providing a wonderful drought reserve of top quality feed with minimum of tannin problems.

North of Perth, the C4 grasses continue to grow through the winter. Apart from giving nutritious feed, this winter growth is increasing water use and boosting the plants capabilities in spring. It is also opening up the opportunity for cheaper out of season livestock finishing, possibly for export cattle and store sheep.

For this years plantings, please contact your seed supplier and lodge your order. Irwin Hunter & Co. will put the seed together but only sells on orders from your seed suppliers. Its on a first come first served basis so don't get caught short if you want quality seed. Also remember the biggest risk with perennials is establishment failure.

To really understand where we are winning with Evergreen, we need to measure all stages of production from the pasture to the product. We need the hard numbers to analyze what is and isn't working and why. Both time and money preclude most of us from gathering this data, hence the requirement for funding

To this extent, our discussions with AWI and Grain & Graze are progressing very well and we are looking at making formal announcements soon. Dr. Len Stephens, (the new CEO of AWI) told me recently that in his opinion, "the need for perennials in WA is essential". The Grain & Graze team with Bob Wilson, Tim Wiley and Philip Barrett Lennard representing Evergreen, must be congratulated as the G&G committee recognized their application was the best and most capable of using available funds in Australia .

Your committee and administrators have been working hard to make this happen, so results can be achieved at the grass roots level. If we get what has been promised, Evergreen will have some serious funding behind it and will have achieved a level of credibility essential for further funding opportunities. Together, we will have made it happen and can be proud of our achievements.

Good luck with the season and please contact me if I can be of any assistance.

## Short Bites from the Editor

PHIL BARRETT-LENNARD, EVERGREEN FARMING

### Potash Deficiency

Brian Leach recommends being alert for signs of nutrient deficiencies in spring in annual clovers grown with sub-tropical perennials. Vigorous growth of the grasses can rob clovers of potassium and greatly reduce seed set, reducing clover density over time. This will cause a reduction in nitrogen supply for the pasture. A fertiliser application in late August could ensure against this and improve quality of summer feed.

## Short Bites from the Editor

PHIL BARRETT-LENNARD, EVERGREEN FARMING

### Station Country?

The photo below is of a 2002 spring-sown paddock at Glen Oliver's, North Stirling. It contains Lucerne, Tall Wheat Grass, Puccinellia, Rhodes, Old Man and Wavy Leaf Saltbush. It was sown with a Great Plains no-till drill. The sowing rate of the saltbush was a handful of each!



The paddock is beginning to resemble station country with a saltbush plant every 5 to 10 metres and grass in between. It looks to be a very profitable and

sustainable system on country that is under serious threat from salinity.

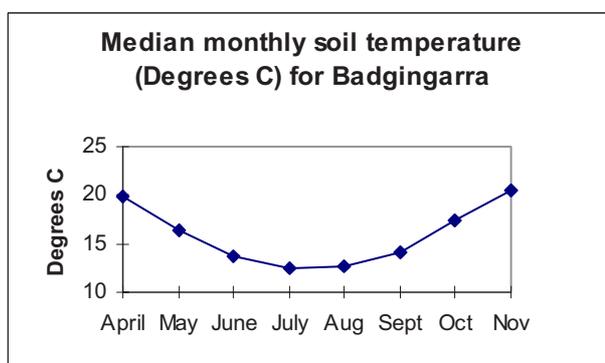
### Grazeburst

CSBP have a new spring fertiliser on the market called Grazeburst. It is ideally suited to perennial grass stands as it contains 26% Nitrogen, 4% Phosphorus, 8% Potassium and

6% Sulphur. I would recommend using Grazeburst at 150 to 200 kg/ha in late August or early September. At these rates, Grazeburst would eliminate the need for Super Potash in autumn.

### Soil Temperature

The following soil temperature data comes from the Badgingarra Research Station. It shows that July and August have the coldest average soil temperatures of approx. 12.5 C. However, soils warm up quickly in spring with September averaging 14 C and October 17.5 C. This confirms our recommendations that seeding time around Badgingarra should be late August and early September.



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## Sub-tropical perennial grass species

Tim Wiley, Dave Rogers, Ken Angell, Nadine Morgan, Department of Agriculture and Philip Barrett-Lennard, Evergreen Farming

Perennial grasses are slowly gaining momentum as a viable pasture option in the Western Australian Mediterranean environment.

### Rhodes Grass

Rhodes grass (*Chloris gayana*) is a sub-tropical perennial grass that can be grown over a wide range of soil types from light textured sandy loams to heavy textured soils. It is a tufted perennial with fast growing runners that allow the plant, under the right conditions, to rapidly cover the ground surface. It will combine well with annual legumes.

Rhodes grass forms strong bunch-type stools; its runners anchor at the nodes and produce plantlets. This has been found to be very effective for erosion control.

It has moderate frost tolerance, but is primarily a summer grower. Rhodes grass is reported to have good salt tolerance though this attribute needs further investigation in WA. It is not particularly waterlogging tolerant.

Rhodes grass has very light and fluffy seed that makes it difficult to handle. When sown on its own, the seed needs to be mixed with a carrier to enable it to flow through seeding machinery.

On soils where there is a shallow (<3 m) water table, it can be very productive. On dry sites it can become moisture stressed in late summer but it is very drought tolerant and will not die out. Being a sub tropical grass, Rhodes grass will not germinate in winter as soil temperatures are too low. It is best sown in spring as temperatures are rising.

Rhodes grass has performed well under grazing in Western Australia. The quality of the grass decreases rapidly with flowering so good grazing management is necessary to get the most out of the stand. It also has added benefits on lighter soils as its running growth habit gives it good soil stabilisation attributes.

Rhodes grass spreads by runners. These runners will root down from the nodes if the soil surface is wet. In dry summers, Rhodes can put out runners up to 3 m long that have not rooted down. These runners can be removed and killed by grazing.

There are several varieties of Rhodes grass available.

**Finecut** A selection from Katambora with higher leaf to stem ratio

**Topcut** Selected from Callide for hay production

**Callide** The most common variety in WA, later flowering.

**Katambora** Earlier flowering than Callide and almost as productive.

**Pioneer** Earliest flowering, least productive, less palatable.

**Finecut** A selection from Katambora with higher leaf to stem ratio.

**Topcut** Selected from Callide for hay production.

**Nemkat** Nematode resistant. Has not been tested in WA. Earlier maturity types are better suited to marginal growth areas and/or soil types that have poor moisture holding characteristics. The later the maturity, the more suited they are to higher rainfall areas and possible higher input management.

### Bambatsi panic

Bambatsi panic (*Panicum coloratum*) has bluish coloured leaves with a prominent white midrib.

Bambatsi has erect to semi-prostrate growth. It can remain greener during winter than many other sub-tropical grasses as it is able to produce basal shoots in response to winter rain. It establishes well on a wide range of soil types and although it may not produce as much biomass as other grasses it is usually more palatable and has higher nutritional value. It is very persistent once established but has poor seedling vigour.

Bambatsi is a drought and waterlogging tolerant sub-tropical grass. It also has some tolerance to frost.

Bambatsi has been one of the better performing grasses in Western Australia.

Pastures dominated by panic species may cause photosensitisation.

### Green and Gatton Panic

Green and Gatton panic (*Panicum maximum*) have fine soft leaves and slender stems that are very palatable. It can grow to a height of 1.5 m and has a richly branched root system that facilitates rapid growth after light showers of rain.

Despite having a concentration of roots close to the soil surface it still shows good drought tolerance. It responds readily after rain. Green and Gatton Panic will not tolerate waterlogging and are sensitive to frost. It tolerates shade.

It seems to be a good performer on drier, lighter soils. It is not suited to very heavy soils.

The persistence can be disappointing but this may be associated with inappropriate management, such as heavy grazing pressure. It will persist well if managed properly and not set stocked.

Green and Gatton panic are very palatable and are usually grazed preferentially in a mixed sward. Spelling may maintain its vigour. Sparse stands will thicken up if allowed to seed and a damaged stand will regenerate from natural seeding.

### **Setaria**

Setaria (*Setaria sphacelata*) is a tufted grass that can grow to a height of over 2 m with a spike-like flower head. Setaria performs well on a wide range of soil types. It tolerates acid soils.

Setaria is amongst the most cold tolerant of the sub-tropical grasses. They are also tolerant of temporary waterlogging and drought.

There are several varieties being tested in WA including **Solander, Splenda, Kazungula** and **Nandi**. So far, Solander and Splenda have been the best performing varieties under WA conditions.

They have been one of the more successful perennial grasses grown in Western Australia and should be included in most mixes.

Setaria is well accepted by cattle but has a rather low sodium content and high oxalate content, especially if fertilised with nitrogen. Pure stands of setaria may cause a problem in horses called ‘big head’ due to oxalates.

### **Signal Grass**

Signal grass (*Brachiaria decumbens*) is one of the newest sub-tropical perennial varieties being looked at in Western Australia. It is a bunching grass that can also spread from runners giving good ground cover.

It performed quite well last season in WA and is showing promising results on a range of soil types this year. It is very responsive to high fertility.

It is reasonably drought tolerant, but can only handle waterlogging for a short period of time.

In Queensland, Signal grass has been found to be very competitive with weeds, even in low fertility areas. This is due to the dense cover it can form.

Intensive grazing, which prevents old leaf accumulating, gives the best performance with high animal output.

Freshly harvested seed is dormant and should not be planted in that season.

Signal grass is an excellent species to include in a mixture.

### **Kikuyu**

Kikuyu (*Pennisetum clandestinum*) is a sub-tropical grass that spreads by both above and below ground runners. It is very tolerant of hard grazing. Good grazing is needed to prevent the leaves becoming rank and also to allow annual clovers to survive in a sward.

New plantings of kikuyu are highly palatable and nutritious.

In areas north of Perth, kikuyu will be restricted to areas with shallow (<1 m) fresh water tables. On the south coast it will grow over most of the landscape.

### **Digit Grass**

Premier Digit grass (*Digitaria eriantha*) is a bunch grass with fine leaves and grows to 1.5 m. It has had limited testing in WA as yet and we are unsure where it will best fit.

It is suited to a wide range of soil types from the lower fertility, lighter-medium, medium to heavier textured soils, however it performs best on the light to medium soil types. It has good drought tolerance, poor waterlogging tolerance and some frost tolerance.

It can be slow to establish but once established it is persistent under heavy grazing. It is also very palatable. The seed is expensive, so if you wish to include it in the mix, use only a small amount.

### **Jarra Grass**

Jarra grass (*Digitaria milanijana*) is a prostrate grass that spreads by runners. It has long mauvish coloured stolons, and produces flowers that are 0.5-1.2 m tall.

It does not tolerate waterlogging.

So far it has had limited testing in Western Australia.

Although it does show some promise, it has not been as productive or as drought resistant as other grass species.

### **Options for salt land**

#### **Tall Wheat Grass**

Tall wheat grass is a **temperate** perennial tufted grass. It is summer active, and with sufficient moisture it will grow well in spring, summer and autumn. It may grow up to 2m in height with good palatability if managed well.

Tall wheat grass has the ability to grow in poorly drained and saline soils while also being able to withstand a summer drought.

The most common variety is Tyrell. A new and improved variety called Dundas has been released.

#### **Puccinellia**

Puccinellia is a **temperate** perennial grass that forms tussocks up to 40 cm high and 40 cm wide. It spreads readily from self sown seed under rotational grazing. The plant grows during winter and is dormant over summer.

The species is tolerant of saline and waterlogged conditions. It tolerates saline soils better than tall wheat grass but is less vigorous.

### **Mixes**

#### **Evergreen mix**

A commercial mix of the most promising species is now on the market. It is called the “Evergreen mix” and is available through local stock firms. This mix contains the most promising sub-tropical grasses that have been extensively tested across WA. The mix contains Callide, Katambora and Finecut Rhodes grass, Bambatsi panic, Gatton panic, Signal grass and Splenda Setaria.

This mix will be suitable for most soil types. However the “Evergreen mix” can be customised for local conditions. On saline areas add some Tall Wheat Grass and Puccinellia. Where there is shallow fresh water or on the south coast add some Kikuyu. Chicory could also be added to boost the feed quality.

*continued on page 7*

## Pre-sowing weed control for Summer crops and pastures

Wayne Smith, Agronomic Acumen, [www.agronomy.com.au](http://www.agronomy.com.au)

We are all used to spraying knockdowns in Autumn or early winter in preparation for sowing winter crops and pastures.

Unfortunately, the same rates and strategies do not always work when preparing a paddock for sowing in Spring. Stronger rates are required to prevent weeds re-shooting later on. Pests are also another issue and are usually overlooked. If anything, we have found pests more of a problem in Spring sowings than in Autumn.

### Strategy

It is important to sow summer grasses and pastures into a paddock that has been knocked down (dead) for preferably a month before sowing. Rotting fungi can cause major germination problems with some species if sown into wet, dying vegetation.

One knockdown is not usually the best strategy, and grazing hard then spraying and sowing regularly fails with many old weeds re-shooting. Also, having a full cover of dead vegetation or stubble greatly increases the success of the summer grasses and crops by keeping the soil surface cooler, and small rainfall events evaporate less.

It is usually best to kill the bulk of material 4-7 weeks before sowing to give it time to rot down and die. A second and third knockdown is often required for best establishment and less weeds, with the final knockdown being just before sowing.

As much as possible, that final knockdown should be with Sprayseed or Gramoxone type products, with the addition of insecticides.

### Detail

The main knockdown chemical is of course glyphosate (eg Roundup). If there is a lot of bulk, the first

knockdown is normally something like 1.5-2L/ha Glyphosate CT + adjuvants, which I will discuss later.

This will then need time to rot down and will normally expose other weeds previously shaded out by the taller weeds. A glyphosate + spike + adjuvants is then usually required 1-4 weeks prior to sowing. If there was *not* a lot of bulk, this may be the first knockdown.

So if there are the usual weeds, plus weeds like marshmallows, clover, capeweeds, geranium, radish, doublegee's etc..., a spike is often required as glyphosate is not sufficient on its own.

Because a range of grasses or pastures may be sown, residual chemicals like Ally are not used in case of damage to some species. Therefore the main "spikes" to add to glyphosate are Affinity (or Hammer), and 2,4-D ester 80%. 2,4-D ester should not be used anywhere near horticultural crops (eg tomatoes or vineyards), and should be used very carefully if anywhere near sensitive crops like canola and lupins. MCPA LVE can be used instead, but at four times the rate of Ester-80. It is still not safe to use though if near horticultural crops. It is more expensive too than Ester-80®.

Affinity is a granular form of Hammer (a liquid). For simplicity I will refer to using Hammer (but Affinity can equally be used at a different rate to allow for concentration differences).

Hammer will control broadleaf weeds and has no residual and therefore is safe to use in-front of any crop or pasture. It is very hot on marshmallows, and is weakest on geranium. Typical rates are 25-50ml. Spray oil should always be used,

except experience with Flexi-N has shown that this also greatly improves the control without requiring oil.

A typical spray would be 1.0-1.5L Glyphosate CT + 40ml Hammer + 0.5% Uptake + adjuvants (covered in more detail later). Because Hammer is a contact chemical, the spray volume should be >50L/ha, and low drift nozzles should *not* be used.

200-300ml 2,4-D ester should be added to speed up the kill of broadleaf weeds, and to improve the control of geranium. However, Sprayseed or Gramoxone sprayed soon after a Roundup spray will usually control the geranium.

The final spray just before sowing should as much as possible be Sprayseed or Gramoxone with something like 100ml Chlorpyrifos + 200ml Cypermethrin. If Bryobia mites are present, the Chlorpyrifos should be replaced with 150ml Lemat (290g/L). Weevils, beetles, falsewire worms and all sorts of caterpillars regularly cause grief and the above mix will control most pests.

A typical rate of Sprayseed would be 800mL to 1.25L/ha, but this spray should preferably be within 10 days of the previous glyphosate spray. This is because it is easier for a weed to recover if there is enough time between a glyphosate spray and the Sprayseed. We used to have many failures with weeds re-shooting if we were more than 10-days between the Roundup and Sprayseed sprays.

If there are only grasses that need controlling, it is cheaper to use Gramoxone instead of Sprayseed. As a rough rule of thumb, use ~70% of the Sprayseed rate to get the same kill. If there are broadleaf weeds, it is better to use Sprayseed.

### Adjuvants and tips

There are two main factors to improve Roundup's effectiveness, and these are acidity and ammonium sulphate. The third factor is penetration into hard to control weeds.

Ammonium Sulphate is cheap and costs <50c/ha, but can improve glyphosate effectiveness on some weeds by 10-20%. Standard rate is 1% of solution, so 1kg per 100L. If using pre-made solutions like Liase or Ammo, the rate is 2% of solution because their concentration is lower. There are now many suppliers of spray-grade, or tech-grade ammonium sulphate crystals, and all are very easy to dissolve (cheaper too☺).

Ammonium Sulphate has also been shown to assist in killing glyphosate resistant ryegrass. This alone would be a good enough reason to make the addition of Ammonium Sulphate standard practice.

However, it also provides a few other tricks. It can acidify the solution, a good thing with glyphosate. It also assists in compatibility of glyphosate with triazine and urea chemistry's, like Atrazine and Diuron (not something you would be adding unless sowing sorghums, millets, corn etc...).

There is one other trick to improve glyphosate performance, and that is to improve its penetration into hard to kill weeds. The best addition is to use Wetter TX or Pulse adjuvants, or Li-700. Li-700 is preferred because it is cheaper, it still behaves like a wetter, and is also one of the best for acidifying a solution and assisting with hard water problems.

We use Li-700 at 0.2% of solution. At 0.1% it behaves like a wetter and acidifier. At 0.2%, it behaves like a penetrant as well, which can greatly help in getting glyphosate into hard to kill weeds, like silvergrass. There are now several imitations of Li-700 and all are as good as each other - they all contain the same active ingredients.

So our first and second glyphosate sprays would have the addition of 1% Ammonium Sulphate crystals, and 0.2% Li-700. These two products go into the spray tank first because they are water conditioners. The addition of both helps in controlling tough weeds like silvergrass, Love-grass, Guildford grass etc...

I wish you all the best in your endeavours to have the countryside forever green. It is the right thing to do.

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with the latest  
perennial news!  
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9475 0753**

### Sub-tropical perennial grass species

*continued from page 5*

*The following species are not recommended for WA.*

#### **Buffel Grass**

Buffel grass (*Cenchrus ciliaris*) is very hardy and drought tolerant but does not tolerate waterlogging or salt.

Buffel grass responds quickly to moisture and fertility but flowers very rapidly after germination. This makes it less palatable and nutritious than other sub-tropical grasses. Many varieties also have a high oxalate content. This species is not recommended as it has potential to become an agricultural weed.

#### **Purple Pigeon Grass**

Purple pigeon grass (*Setaria incrassata*) is closely related to other species of setaria but has a larger seed and is easier to harvest and sow than many other small seeded grasses. However its performance has so far been disappointing in southern Western Australia. Splenda or Solander setaria would currently be a better choice in WA.

#### **Creeping Bluegrass**

Creeping bluegrass (*Bothriochloa insculpta*) is popular in Queensland although as yet it has had little testing in Western Australia. It is a prostrate grass that spreads by runners. It prefers heavier soils and is tolerant of low nitrogen levels. The seed is light and fluffy and can be difficult to sow.

There is simply not enough experience under Western Australian conditions to recommend this species.

#### **Para Grass**

Para grass (*Brachiaria mutica*) is a long trailing grass that is very tolerant of waterlogged conditions. It can be planted from runners or by seed and can be very productive in wetter areas. It has also shown some promising salt tolerance, however at Muchea it has shown little or no tolerance to salinity. It is very sensitive to frosting. Para grass sets little seed so seed is quite expensive however, it can be transplanted using runners and root sections.

This species is not recommended as it has potential to become a weed of irrigation areas or waterways.



**Don Loch from the Queensland DPI** visited Western Australia in late August to run a series of seed production workshops. He suggests that early summer will be the best time to harvest seed here in WA. Preparation would include total weed control, lots of nitrogen fertiliser and de-stocking from around September 1. Harvest would be in late November or early December.



This site was sown last spring at **McGregor's** and shows that the **setaria is the best established**. The Evergreen tour visited the site in autumn when it appeared the poorest of the sites sown around Kojonup. Being a heavier soil (gravelly loam), it had suffered badly from the dry first summer. However, after the opening rains, it has bounced back. The annual legume component has improved significantly, an added benefit of spring sowing. Last year (and adjoining paddocks this year) the pasture was predominantly Guilford grass with very little sub clover. It is now a clover dominant pasture. pic 28 July 2003.



**Lucerne on the Esperance Downs Research station.** Matt Ryan will sow paddocks to mixes of perennial grasses and then run a trial looking at weaner cattle performance on a range of different perennial pastures. pic 31 July 2003.

**Sub-clover and Rhodes grass co-existing** very nicely at North Dandalup. The challenge is to ensure this happens every year. Tight grazing at the break and maintaining soil fertility (especially potash) will greatly assist.





After an 18 month drought the perennials are starting to recover at the **SGSL trial site at Keith Carter's, east Wubin**. Bambatsi panic was the most drought tolerant species. But Premier digit grass has survived well and is bouncing away after the recent rain. While Premier has not been as productive as other species on other sites it may have some advantages in very low rainfall regions. pic 23 May 2003.



**Raised beds** that have been formed on **Gary Peacock's SGSL** site at Bibby Springs. This is a 70 ha paddock on duplex sand with areas of salt scald and a waterlogging problem. Gary says that after heavy rains in June (~ 120 mm), the beds and shallow drains are moving water off the paddock successfully. pic June 2003.



Very heavy rains on 13 August have caused **flooding on the main perennial pasture trial site at Bibby Springs**. This is an opportunity to test the waterlogging tolerance of a wide range of species. It is still too early to tell which species may be adversely affected. pic 13 August 2003.



**John Paul Collins (Dept Ag & SGSL)** in the **Tall Wheat grass and Balansa plot** at the trial site on Russel Thomson's farm on the Beaufort Flats. The Balansa has returned to the plots and the Tall Wheat grass become more palatable after applying some improved management practises. ie potash fertiliser, RLEM control and heavy rotational grazing. Pic 6 June 2003.

## Establishing sub-tropical perennial grasses

Tim Wiley, Ken Angell, Dave Rogers, Nadine Morgan, Department of Agriculture, and Philip Barrett-Lennard, Evergreen Farming

Sub-tropical perennial grasses can be established by sowing in spring. The method of sowing will depend on the machinery available to a farmer. However there are some principles that must be followed to ensure effective establishment.

### Total weed control

It is essential that all the existing pasture is killed before sowing perennials. Perennial grass seedlings are not very vigorous and do not compete with established annual pasture plants. Even newly germinated annual plants will be very competitive against the perennial seedlings. However annual seedlings that germinate after the perennial seedlings should not prevent establishment. It is the annual seedlings that germinate before the perennials that do the most damage.

By killing the annual pasture in early spring, moisture will be conserved at the surface and in the profile. This will improve perennial grass germination. Under these conditions there can even be an adequate germination without rain.

If the soil profile is full of moisture and there are no established annuals present, then there will be enough moisture for sub-tropical perennials to survive the first summer without rain. With a very dry summer the sub-tropical grass may not grow much but because of their exceptional drought tolerance they will at least survive.

### Killing annual pastures

Paddocks to be sown to perennials in spring should be hard grazed to utilise the feed available and to set the pasture up to be killed. By grazing heavily in late winter it also means that other paddocks can get away. There should be little loss of grazing over the whole farm from killing the spring flush of annual pastures in just one paddock.

Experience suggests that it is best to start killing the annual pasture about four to five weeks prior to sowing. Starting the control of the annual pasture early provides an opportunity for a second weed kill of newly germinating annual pasture plants. Early weed control will also build soil moisture levels.

### Herbicides

Established pastures can be killed using higher rates of knock down herbicides. Ideally, a hard grazed paddock should be spelled for 1 to 2 weeks prior to spraying with knockdowns. This allows the plants to freshen up and have more new leaf for chemical uptake.

The double knock method is preferred for killing well established pastures. The pasture is sprayed with glyphosate first and followed up with Spray.Seed® 5 to 10 days later. Use at least 2 L/ha glyphosate on pastures in spring. Increase

the glyphosate rate in areas close to horticulture, because it may be unsafe to use Spray.Seed® as a second knock.

Add insecticides in the second spray for red legged earth mite control to set the paddock up for over sowing annual legumes in the following year.

Avoid using soil residual herbicides such as Atrazine as it will affect some sub-tropical species.



Fig. 1. Suggested sowing date windows for sub-tropical grasses.

### Time of sowing

Sub-tropical grasses have a mechanism to prevent seed from germinating when the soil is too cold. The exact temperature for germination varies slightly between species. There will also be some variations between plants within any line of seed.

The soils on south facing slopes will not warm up as quickly as soils on north facing slopes. The colour of the soil surface can also influence soil temperatures. Areas that are waterlogged can take much longer to warm up due to the effect of evaporation from the soil surface. These wet areas can take up to 6 weeks longer to reach the critical temperature than other soils. Sowing too early on wet areas has not given good establishment.

### Sowing method

Sub-tropical grasses can be sown with most machinery. It is necessary to mix the seed with fertiliser or some other carrier to get the seed to flow through the seed box and tubes. For very fluffy seeds like Rhodes grass it takes a minimum ratio of 25 kg of fertiliser mixed with 1 kg seed to get it to flow easily. Coated seeds overcome this problem.

It may be easier to use bagged fertiliser than bulk. Add the required amount of grass seed to each bag of fertiliser and then mix. It is important to re-calibrate your seeder, as the grass / fertiliser mix will flow more slowly than straight fertiliser.

### **Minimum tillage**

Minimum tillage machines with knife points and press wheels have given the most reliable establishment so far. Apply as much pressure as possible on the press wheels. This will improve germination and also help to create a small furrow to collect rain. Deep cultivating narrow points will help the seedling roots to chase the moisture down the profile. It is important to set the machine up so that the grass seed just drops on to the surface. This may require taking the tubes out of the boots and dropping the seed just in front of the press wheel.

### **Conventional combines**

When using conventional combines mix the grass seed with fertiliser and sow through the fertiliser box. The tynes can be in the ground during seeding, but the tubes must be removed from the boots so that the seed drops onto the surface.

Roll the soil straight after sowing with a heavy roller. This is essential to achieve the good seed soil contact needed for germination. The compaction of the surface also helps to draw the moisture up to the seed.

### **Cultivation**

Cultivation dries the soil surface out. With cultivation, the paddock should be prepared early so that there is time to get a good rain on it. The paddock should also be rolled to help bring the moisture back to the surface.

### **Top dressing seed**

Seed can be topdressed on to the surface and then rolled in. It will need to be mixed with a carrier to help it flow through the topdresser. The very light seed will not be thrown far by a topdresser and, on still days, this results in narrow strips of grass seed behind the spreader. Topdress the seed on a windy day and work across the wind to get a good spread between runs.

### **Seed placement**

Perennial grass seed is very small. These seeds will not germinate from depth. They should be placed on the surface, or no deeper than 5 mm, and rolled in.

### **Sowing rate**

The recommended rate for sowing sub-tropical perennial grasses is 2-4 kg/ha. This should be increased on non-wetting soils. If using 'coated' seed (seed covered with fertiliser), use a higher sowing rate, as there are less 'seeds' per kilogram.

Permanent perennial pastures should be sown as mixtures with as many different species as possible. When sowing mixes of sub-tropical grasses make the seed mix up to a total

of 2 to 4 kg/ha. If you include lucerne, this should be added in addition to the 2 to 4 kg/ha of grass seed. Lucerne can out-compete grasses, so caution should be observed.

### **Seed quality**

The germination percentage of seed can vary considerably between lines of seed. For Rhodes grass a germination percentage of 50% would be considered quite good.

Germination percentage rarely exceeds 70%. In some seed lines this can be as low as 10%. Adjust your sowing rates accordingly.

Always ask for a germination seed test from your supplier and compare prices on the cost per kilogram of germinable seed.

Currently there is no sub tropical grass seed being produced in WA. All seed is imported from the eastern states. This seed must go through strict quarantine to enter WA. This is to ensure that there are no noxious weeds.

**Do not bring seed into WA that has not been through WAQIS quarantine!!!**

### **Ordering seed**

While sub-tropical grass seed will not be sown until spring it is important to order your seed in early winter to ensure supply. Most grass seeds are harvested in late autumn in Queensland and NSW. This seed is used domestically and exported around the world. By the following spring the quantities of seed available that meet WA standards can be limited. Get your order in early.

### **Cover crops**

Cover crops should not be needed with perennial grasses. They may be useful with cultivation, however they should not be needed with minimum tillage. On very sandy soils a low rate of a cereal can help to prevent wind erosion.

When using cover crops they should be sown in alternate rows to the perennial seed. Use a maximum of 5-10 kg/ha of a cereal or 1 kg of millet.

### **Early grazing**

The seedlings of sub-tropical grasses are very small and fragile. Initially they have only one fine root that is easily broken off. New stands of grass should not be grazed until the plants are well anchored and can't easily be pulled from the ground. How long this will take depends on the amount of soil moisture or summer rain. Under ideal conditions some stands could be grazed within two months of sowing. In other situations the stand may need to be locked up until the following winter.

### **Pests**

The sub-tropical perennial grasses have shown to be tolerant of most insects. In mixed stands of sub-tropical and temperate (e.g. tall wheat grass) perennial grasses, locusts and wingless grasshoppers have selectively grazed out the temperate species. In most cases, post sowing insect control will not be needed with sub-tropical grasses, but inspect your new stands regularly. Kangaroos will be the biggest threat.

## Herbicide Tolerance of Sub Tropical Perennial Grasses Demonstration

David Rogers, Farming Systems Development Officer, Geraldton

### Summary

- Sub tropical perennial grasses are very tolerant to a range of herbicides, however effective control was achieved with an application of glyphosate.
- Sub tropical perennial grasses have the ability to provide valuable feed in the autumn feed gap with very little summer rain.

### Background and Aim

Perennial pastures offer a lot to a farming enterprise that incorporates stock. These pastures can improve productivity by providing out of season green feed and have the potential to be used as a management package to assist in controlling herbicide resistance. Perennials can also deliver positive environmental benefits by accessing deeper water reserves in the soil, potentially reducing recharge, and through nutrient recycling. The long-term cover that perennial pastures provide will stabilise the soil and reduce erosion. Sub tropical perennial grasses are being adopted throughout the Northern Agricultural Region, however many landholders are concerned about the possibility of escapes of perennial pastures and their weed potential to neighboring paddocks.

Treatment	Ratings			
	2 Weeks	4 Weeks	3 Months	6 Months
Sprayed 21/05/2002				
1. glyphosate 1L/Ha	2.3	7.0	6.0	5.5
2. glyphosate 2 L/Ha	4.3	9.3	10.0	8.7
3. glyphosate 4L/Ha	5.3	9.8	10.0	9.8
4. SpraySeed® 1L/Ha	6.3	5.9	5.2	4.7
5. SpraySeed® 2L/Ha	8.2	6.0	5.5	4.7
6. chlorsulfuron 20g	1.0	1.5	0.5	0.0
7. Monza® 25g	0.7	0.0	0.0	0.0
8. atrazine 2L/Ha + diuron 0.5L/Ha	0.0	1.4	0.2	0.0
9. Spinnaker® 150ml + Lexone 200g/Ha	0.0	1.3	0.3	0.0
10. Fusilade® 0.5 L/Ha	1.2	4.5	4.0	2.7
11. Fusilade® 1L/Ha	1.0	6.7	5.0	5.7
12. Select® 0.25L/Ha	0.3	3.5	3.0	1.0
13. Select® 0.5 L/Ha	1.3	4.7	3.5	1.7
14 Select® 1L/Ha	1.0	6.7	5.0	4.7
15. Verdict® 440ml/Ha	1.0	6.7	6.2	4.5
16. Verdict® 800ml/Ha	1.2	8.3	7.0	6.0
17. Hoegrass® 1L/Ha	0.3	0.0	0.0	0.0
18. Hoegrass® 2L/Ha	0.7	0.3	0.5	0.0
19. Wildcat® 0.5L/Ha	0.7	1.2	1.7	0.0
20. Wildcat® 0.5L/Ha	1.3	2.5	1.2	1.2

**Table 1.** Herbicide treatment and control ratings (ratings run from 0 - No effect to 10 - total control).

The aim of the trial was to demonstrate and evaluate the use and effectiveness of a range of herbicides to control a mature Sub Tropical Perennial Grass stand.

### Results

In April 2002 after no summer rain the site had 2.2t/ha of dry matter available with a digestibility of 64% and a crude protein level of 12%. This was from a total cut sample. From comparable grab samples on Rhodes Grass results showed 74% digestibility and 21% crude protein.

The site was not grazed and was then pegged and sprayed as a herbicide trial in May 2002.

Trial Details	Site 1
Property	David and Bev Brindal (Mingenew)
Plot size and replication	3m x 20m, 3 replicates
Soil type	Yellow sandplain pH-surface 4.75 (CaCl <sub>2</sub> )
Paddock rotation and history	The site was established to a sub-tropical grass mix including Rhodes Grass, <i>Solander setaria</i> and <i>Bambatsi panic</i> in September 2001. Following good late rains it established well and continued to stay green and productive throughout the 2001/2002 summer. In 2002 the stand was dominated mostly by Rhodes grass with lower numbers of <i>Bambatsi</i> and <i>Solander setaria</i> . 2000 & 2001 Perennial Pasture Prior to 2000 Wheat/Lupin Rotation

### Comments

- Of the herbicide treatments applied glyphosate was the only one to give adequate control with 2L/ha providing good control and 4L/ha giving total control.
- Sub tropical grasses provided good out of season green feed and could be quite a valuable autumn feed gap feed source. The digestibility and protein levels obtained in the total and grab samples were more than adequate for maintaining stock and were preferable to dry feed that at that time of year had a digestibility of about 50% and crude protein of around 6% (inadequate levels for maintaining stock).
- In general the clump grasses (*Solander setaria* and *Bambatsi panic*) were more tolerant of the herbicides than Rhodes Grass.
- There was a wide range of effects from the different chemicals. Some had no effect at all, others did not reduce the amount of biomass but inhibited flowering and others defoliated the grasses right back to the crown but did not kill the plant. These chemicals may have valuable uses in pasture manipulation and potential over-cropping in these grass stands.
- It is also important to keep in mind that this is only this year's results. Seasonal issues, time of spraying, management of the sward and how that impacts on the effectiveness of herbicides on these grasses, are not well understood.

## Companion legumes for perennial grasses

Tim Wiley, Department of Agriculture, Jurien Bay

Sub-tropical perennial grasses have a relatively low requirement for Phosphorous and Potassium but a very high requirement for Nitrogen. It appears that perennial grasses supplied with nitrogen are less affected by drought over summer. In a recent CSBP trial, Rhodes grass responded to 250 kg/ha of FlexiN.

While adding artificial nitrogen can be very profitable, we expect growing your own nitrogen with legumes will always be cheaper. However the challenge is to keep a productive companion legume in a perennial grass pasture.

Some perennial grasses have been sown with a perennial legume. Perennial legumes being tried with the grasses are lucerne, Lotononis, Strawberry clover and Siratro. Except for the Strawberry clover on wet country, it is too early to tell how well these mixes will work.

Growing winter active, annual legumes with the sub tropical grasses appears to be a good system. There are some very good examples of these mixes.

Blue lupins and perennial grasses work very well together on poor sand. The blue lupins grow up and shade the grasses through winter and early spring when the grasses are dormant. The blue lupin stubble supplies lots of Nitrogen for the summer growth of the grasses. Arthur Dewar and Jane Bellinge at Gingin have had paddocks under this system for up to 6 years. Not only have the perennial grasses been improving each year but they are seeing a dramatic improvement in the health of their annual pasture component as well.

On higher fertility soils, balansa, persian and sub clovers are ideal companions for sub-tropical grasses. They provide high quality feed through winter and spring and supply nitrogen for the grasses to use in summer and autumn.

Soil type should determine which annual legume species are grown. These will be the same species you would use in a standard annual pasture. However there may be a need to use earlier maturing cultivars, as there will be more competition for moisture in spring.

The level of hard seed produced by an annual legume may also be important.

Competition for moisture at the break of the season between the legume and the grass may create more "false breaks". A higher level of hard seed would help offset these losses. However, hard seed breakdown over summer is largely driven by heat and temperature fluctuations. Monitoring of soil temperatures at Badgingarra has shown that the soil is substantially cooler under perennial pastures over summer. This may slow the rate of seed softening to an unacceptable level. This conflicting issue is being addressed in trial work.

The new hard seeded Cadiz serradellas under development by the Department of Agriculture may be the answer. They produce hard seed that slowly softens over the autumn. Potentially they could be the ideal companion legume.



## Sub-tropical grasses and legumes persist well over first summer

Geoff Moore, John Titterington and Brad Wintle  
(Salinity CRC; Department of Agriculture, South Perth)

One of the keys to successful perennial pastures is to have a good plant density at the end of the first summer. Bunch grasses are unlikely to recruit under normal rotational grazing practices. For these species, the number of plants at the end of the first summer is essentially the perennial density. On the other hand, for stoloniferous species like Rhodes grass the plant density can increase as new plants form from runners, so a low plant density can yield a satisfactory perennial pasture.

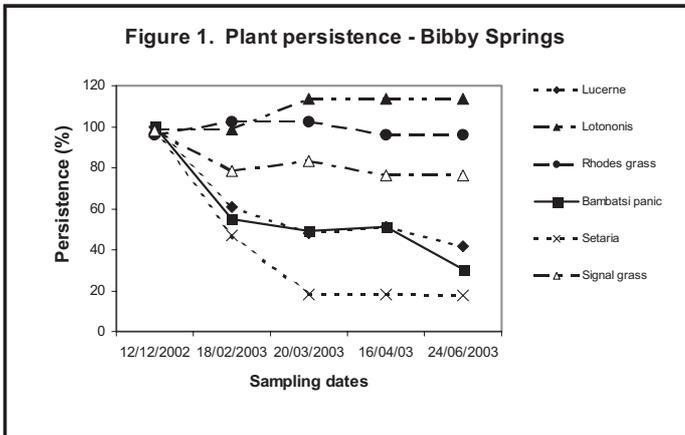
However, what is the effect of an initial high plant density on plant survival in a dry summer? Some demonstration strips of sub-tropical grasses and legumes gave us the opportunity to investigate this question.

We established 25 demonstration plots of sub-tropical grasses and legumes on a grey sand at Bibby Springs, which is winter-wet and summer dry and has a pH in calcium chloride of ~5.0. The plots were sown as monocultures on the 3<sup>rd</sup> of October 2002 with a small experimental cone seeder fitted with lucerne points and single disc openers followed by press wheels. The sowing rates of 2 to 5 kg/ha for the sub-tropical species were adjusted for low germination, so plant establishment was much higher than with many commercial paddocks. Each

Lucerne (Sceptre)	26 plants/m <sup>2</sup>
Lotononis (Miles)	11 plants/m <sup>2</sup>
Rhodes grass (Callide)	13 plants/m <sup>2</sup>
Bambatsi panic	88 plants/m <sup>2</sup>
Setaria (Splenda)	23 plants/m <sup>2</sup>
Signal grass	17 plants/m <sup>2</sup> m

Rhodes grass, signal grass and Lotononis all maintained their plant density with minimal plant deaths over summer. The plant density for Splenda setaria was reduced from 23 plants/m<sup>2</sup> to 4 plants/m<sup>2</sup> over the summer, but the % groundcover increased, indicating that the remaining plants were a substantial size by the end of autumn (Figure 2). The Bambatsi panic had excellent establishment (88 plants/m<sup>2</sup>), and as expected with such a high density many plants died over summer. In June there was still 27 plants/m<sup>2</sup> remaining, but a similar plant density could have been achieved with a much lower initial plant density.

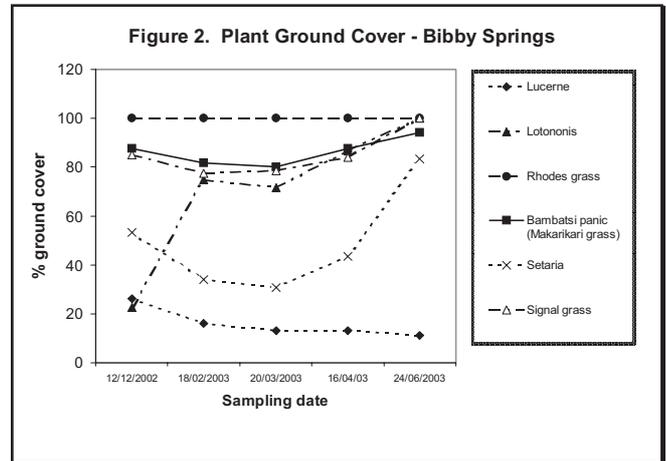
If we consider the % groundcover (Figure 2), the stoloniferous (creeping) grasses had complete or almost complete groundcover early in the season. Lotononis, a stoloniferous, perennial legume reached complete groundcover by the end of autumn.



species was sown as a single plot 20m x 2.4m (i.e. unreplicated), but we installed 3 permanent quadrats per plot (80cm x 50cm) in early December and measured plant persistence at regular intervals (~4 weeks) through to June.

The soil was moist at seeding and there was stored water in the soil profile from winter-spring rainfall, but total rainfall from seeding until March 30<sup>th</sup> was only 2.5 mm, when the site received 44 mm over two days.

The results for some of the species showing promise in the West Midlands are summarised below. Figure 1 shows the change in plant density from December to June, relative to the plant density on the 12<sup>th</sup> of December. The average plant densities on this date were as follows:



A few temperate species (lucerne, tall wheat grass, chicory, plantain) were included, although the time of sowing was later than optimal for these species. The lucerne density decreased in mid-summer and the plants appeared severely moisture stressed, but it has maintained reasonable plant numbers in a dry summer. The chicory established well, but then appeared to have died over summer, before recovering well after the March rain. The tall wheat grass had excellent establishment, but died over summer, as did the plantain.

Many thanks to Carpenter Agriculture for use of the site.

## Seed Quality, the starting point for all successful pasture

Ray Candy, Irwin Hunter & Co

The purchase of seed for sowing is generally considered by farmers and some others to be an expense rather than an investment, thereby adopting the approach of least cost being the best philosophy.

Whilst this sounds good in practice the old saying of “*You get what you pay for*” applies. Purchasing pasture seed is no different to purchasing other goods for your day to day requirements, you want the best value for your dollar invested.

This is where the issue of seed quality is one of the most important components of the purchasing decision and one that should not be taken lightly. It is important to appreciate that the **future success of your income** generated from the pasture sown is an investment over time and not a short term investment.

In the case of Sub Tropical pasture seeds it is even more critical to ensure only high quality seed is sown as seed as the pasture plants need to have good establishment vigour, giving them the best chance to establish the necessary root and plant structure before the finishing of spring rains. Sowing into a well prepared seed bed with rising soil temperatures is only one part of the equation.

For seed varieties supplied by Irwin Hunter & Co and included in the *Evergreen Pasture mix*, as with all other pasture seed lines we purchase, there is a high minimum standard that is applied to each of the key components that make up a line of seed. These are the purity status, interim and final germinations, and weed seed content. It is an internal quality control system that is strictly adhered to where lines that do not meet the minimum criteria are not purchased.

In addition to our own quality check system, all lines of seed are placed through the Agriculture Quarantine system and inspected upon arrival to ensure they match the respective documentation for authenticity and to ensure lines are free from insects and other undesirable matter.

There are situations where farmers are tempted to purchase seed lines that are quoted as “being cheap”, without having access to all the appropriate information.

The table shown is based on Seed Lot A, Gatton Panic, with a retail price of \$19.50 per kg plus GST, sown at 2 kgs per ha to give 64 live seeds per square metre. Seed Lot A reflects good quality seed line with 80% purity and 40% germination; Seed Lot B reflects lower quality seed line with 70% purity and 20% germination.

The table below illustrates what the true cost difference can be between good and poor lines of seed. This calculation can be adapted and applied to any seed purchasing situation where there are the known factors of Purity, Germination and Price. Whilst this scenario is hypothetical, there have been instances where lines of seed

have been quoted and sold that reflect the situation detailed below.

The table shows if seed lot B was purchased in lieu of Lot A, it would result in a significantly higher actual seed cost per hectare where the seeding rate was adjusted to achieve the same live seeds sown as in seed lot A. This

Lot No	Price /Kg	Seed quality (Purity & germination)	Pure live seed %	Sowing rate/ha (adjusted on Lot B to give the same live seeds/ha as Lot A)	Seed cost /ha
A	\$19.50	80 x 40	32%	2 kgs/ha	\$39.00
B	\$16.00	70 x 20	14%	4.5 kgs/ha	\$72.00

illustrates the point that purchasing cheap seed is an expensive option.

Whilst it may be difficult to secure all of the relevant information at the time of purchasing your seed it is important to ensure the seed has come from a reputable seed supplier and is in clearly labelled bags with the correct variety name, and where appropriate have the respective labelling attached.

Seed is an investment in the future profitability of a farming operation and whilst it is considered by some to be expensive, the above evidence shows that purchasing poorer seed lines can have a negative contribution to the bottom line.

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## Introducing the “Evergreen Mix”

The “Evergreen Mix” is a blend of sub-tropical grasses trialled over a number of sites by both Evergreen Farming members and the West Australian Department of Agriculture.

The species are suitable to a range of soil types, and have proven to be of significant grazing value from Esperance to Northampton.

The “Evergreen Mix” consists of the following varieties in a 20kg bag.

Variety	%
Callide Rhodes (Coated)	10
Finecut Rhodes (Coated)	5
Katambora Rhodes	5
Bambatsi Panic (Coated)	15
Gatton Panic (Coated)	25
Signal	30
Splenda Setaria	10

Recommended Retail - \$14.75 / kg (plus GST).

Recommended sowing rate - 4 kg/ha.

The “Evergreen Mix” is recommended for this coming spring sowing season and is available now from most major seed sellers.



## Introducing the “Evergreen Salt Land Mix”

The “Evergreen Salt Land Mix” is a blend of temperate and sub-tropical grass species trialled over a number of sites by Evergreen Farming members.

The species are suited to a range of slightly saline and waterlogged soil types.

The Evergreen Salt Land Mix consists of the following varieties in a 20 kg bag.

Variety	%
Tall Wheat Grass	50
Puccinellia	5
Finecut Rhodes (coated)	10
Katambora Rhodes	10
Bambatsi Panic (coated)	15
Splenda Setaria	10

Recommended retail price - \$12.64 / kg (plus GST)

Recommended sowing rate - 6 kg/ha



Perennial grass mix on the Beaufort Flats

*For more technical information contact:*  
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