

## Success with Princess-77 seeded couch

DR. PHILLIP FORD, TURF AGRONOMIST, PGG WRIGHTSON TURF (AUSTRALIA)

### WHY COUCH?

Couchgrass (*Cynodon dactylon* and hybrids, known as bermudagrass in many countries) provides an excellent quality natural turf surface suited to a wide range of sports. Its main advantage over cool season ( $C_3$ ) grasses such as perennial ryegrass, tall fescue or Kentucky bluegrass is drought resistance. Couch drought resistance is due to a combination of factors:

1. It has around 30% lower daily ET rate than  $C_3$  grasses
2. Couch roots improve through summer, unlike  $C_3$  roots which decline over summer
3. Couch is not susceptible to Heat Stress
4. Couch resurrects quickly after rain or irrigation, even after prolonged drought

Couch is so drought resistant that irrigation can be considered optional in all but the driest climates. It may go into summer dormancy after prolonged drought, but it survives with an intact surface which will green up rapidly whenever rain falls. Many sports fields and fairways in Melbourne for example, are simply not irrigated despite regular droughts and summer temperatures up to 45°C.

Couch has a number of other agronomic advantages when compared to a  $C_3$  grass such as perennial ryegrass. It tolerates a wide range of cost-effective herbicides that allow selective control of virtually all dicot and monocot weeds including *Poa annua*, perennial ryegrass, kikuyu, summer grass and crabgrass. It also responds well to growth regulators, so its growth and dormancy can be easily manipulated. It is highly tolerant to saline or poor quality irrigation water. It is also highly wear tolerant. It produces rhizomes and stolons which allow recovery from damage from below-ground and across the surface. It tolerates mowing from 2mm to 32mm. It is low-input and nearly 'idiot proof' so the management expertise required, as well as the management cost, is low.

In addition to these advantages, a couch surface is amenable to winter oversowing with perennial ryegrass. The matrix of couch leaves, stolons and rhizomes combine with the extra biomass of oversown perennial ryegrass to provide a more durable, wear tolerant surface with excellent colour and playability through winter. Ryegrass protects the couch from winter traffic, resulting in better grass retention. This is seen most prominently in high wear zones, late in the winter, the business end of the season. (see our research report Assessment of football surface quality and couchgrass recovery with or without winter oversowing with perennial ryegrass). Because the perennial ryegrass is actively growing over the winter (especially if the perennial ryegrass is a highly winter-active Mediterranean cultivar such as Colosseum, Arena 1 or the Sports Oval blend) you get active recovery from traffic, and also the benefits of Evapotranspiration pumping water out of the rootzone. See our 10 point plan (Guide to Winter Oversowing) and other research reports for more detail.

*Note: a couch surface can be oversown with perennial ryegrass to improve winter performance, but a perennial ryegrass surface can't be oversown with couch to improve summer performance.*

Couch does have its disadvantages, of course. It doesn't tolerate shade, and it loses colour and becomes dormant over winter. Oversowing with perennial ryegrass can overcome these problems to a large extent. Some facilities use pigments to mask the discolouration. In southern Australia and the North Island of New Zealand, short-dormancy couch varieties will only be dormant for around three months, usually June-August. Like any turfgrass, couch can suffer from nematodes and soil grubs. It also suffers from the root-rotting disease spring dead spot, which is usually well controlled by a single preventative application of a fungicide in late summer.

In short, couchgrass provides an excellent turfgrass surface on low inputs of water, chemicals, labour and management. It is a great choice for sports fields, cricket wickets, bowling greens, golf fairways and other sporting surfaces, as well as parklands and domestic lawns. But it has to be the right couchgrass. There are dozens of cultivars to choose from, some that can only be grown by vegetative means (i.e. sprigged, line-planted or sodded) and some that can be grown from seed.

### **WHY PRINCESS-77?**

Princess-77 is a high quality couch cultivar that can be established from seed. There has been a perception that seeded couch cultivars don't match the quality of the best vegetative couch varieties, but research in Australia and the US with Princess-77 has changed that perception. For example, in trial work for the Victorian Golf Association, Princess-77 "exhibited the short dormancy and high quality in the same bracket as Santa Ana, Legend and Wintergreen" (ref: Low Input Fairway Grasses, 1999) and in the US, "new seeded cultivars perform much better than older seeded types and perform as well as the established vegetative hybrids" (ref: Richardson, Karcher and Boyd, 2005), with "characteristics equal to or superior to the best vegetative varieties, and the advantage of less expensive establishment" (Baltensperger, 2014). Princess-77 is an intraspecific hybrid, progeny of two parental clones with high turf quality, and sold as F1 (first generation) certified seed from those parents (Baltensperger, 2014).

A key to the success of any couch variety is suitability to the local climate. Most couchgrass varieties are healthy enough in a sunny, sub-tropical climate, but only a few will perform well in a borderline climate where air and soil temperatures are below 17°C for more than half the year, as found in southern Australia and the North Island of New Zealand. Princess-77 has been healthy for many years and performed well even in Ballarat, where many couch cultivars simply don't survive the winter, so it has a proven track record in cool climates.

Be careful interpreting reports from the US that show Princess-77 has poor cold tolerance. This is due to its short dormancy which exposes it to Winterkill in the severe climates experienced in many states of the US. Winterkill occurs when a cold front in autumn or in the spring suddenly drops the temperature to -7°C or lower. When this happens, any couch that is caught out with green foliage will snap-freeze and die, whereas a couch that is completely dormant will not be killed. It's a bit confusing – in those climates, a long dormancy couch has good cold tolerance and a short dormancy couch has poor cold tolerance. Fortunately, if you live in an area where temperatures don't go below -7°C then you don't need to worry about Winterkill, and you don't need a long dormancy couch. In fact, it would be much better to use a short dormancy couch, such as Princess-77.

A major advantage of seeding couch is the ease of establishment. It's faster, cheaper and more user-friendly to sow and establish Princess-77 than any sprigging or line-planting operation. If you have never sown a seeded couch before, consider the following points:



*Princess-77 germination in Ballarat after nine days*

- Establishment from seed is fast. When done well and at the correct time of the year, germination should occur within seven days and full cover to the point of mowing can be achieved in six weeks. In contrast, sprigging takes around 12 weeks and line-planting more like 15 weeks to reach full cover. This has been demonstrated in several trials (See [www.pggwrightsonturf.com.au](http://www.pggwrightsonturf.com.au) 'Comparison of establishment of seeded couch vs sprigged couch cultivars' and Pennington Seed – 'Why you should plant seeded bermuda').
- Faster establishment is particularly valuable if a project is delayed and planting can't be done until late summer. As our trials at Ballarat showed in a February planting, Princess-77 rapidly covered the ground and provided a good winter cover that resisted weed invasion, whereas the vegetative planting (Santa Ana) was caught with only around 10% cover by the onset of cold weather, exposing the ground to weed invasion and compromising the whole project, with problems right through the following spring and summer.
- Seed can be bought and stored safely until required. In contrast, sprigs need to be harvested in some way, then planted within a few days to prevent them either drying out or heating up and composting.
- Princess-77 seed is certified, proving that it is genuine F1 hybrid Princess-77. An accompanying P&G statement shows the purity and germination rate of the seed. With a vegetative product you are never entirely sure that the cultivar provided is the one you specified, as there is no sod certification system in Australia or New Zealand.
- Certified couch seed is free from pest, disease and weed propagules. In contrast, couchgrass vegetative material or sod can carry weed seeds, runners or bulbs, and mites, insects and nematodes and diseases such as spring dead spot or black fungus from its donor site to a new site. This may even include pests that are already resistant to pesticides.
- Princess-77 seed can process through quarantine quite easily, unlike sprigs. This provides access to a good quality couch in projects where the vegetative cultivars aren't available.
- Seeding can be a one person job, using a conventional seed drill or direct-drill. Seed germination and establishment is rapid even by direct drilling into a killed-out surface that hasn't been cultivated. In contrast, sprigging or line-planting requires a contractor with specialist machinery and a team of workers.
- At a sowing rate of 40kg/ha and a seed cost of \$60/kg (as an example), Princess-77 will cost around \$2,400/ha for the product. Add the cost of a contractor using conventional seeding equipment, and the total cost should be well below \$5,000/ha. Sprigging or line-planting will usually cost over \$12,000/ha. It also has to be said, there have been many failures over the years with vegetative establishment projects, for a whole range of reasons, and many disputes between client and contractor. And sodding is even more expensive, at least \$50,000/ha.
- Rapid establishment by seed means that water consumption after four weeks or so should be reduced compared to sprigging or line-planting.
- Seed can be hydromulched onto a new surface. Hydromulching is a relatively new way to establish turf, but recent projects using a range of turf species applied with modern wood-fibre mulch (e.g. Flexterra® High Performance Flexible Growth Medium™ (HP-FGM™) or Conwed 2000) have shown the process to be very successful.

## PRINCESS-77 + HYDROMULCH

Modern hydromulch products, based on thermally-refined wood fibres amended with tackifiers, are a dramatic improvement over the old paper or straw mulches. They hold much more water and bond firmly to the soil surface to trap moisture in the rootzone, providing an excellent matrix for germination. They protect against water or wind erosion, and last for many weeks before decomposing. Hydromulch is especially suitable for couch, as it has a very small seed which mustn't be buried too deep. Recent successful sowings of fine fescue on coastal, dunes courses has demonstrated the effectiveness of hydromulching turf seed onto exposed sand. Fine fescue is slow and tricky to establish, but the wood fibre hydromulching has worked well. Until the trials reported below, we were not aware of any projects establishing Princess-77 with wood fibre mulch, but it seemed like a good idea. Two trials were initiated for summer 2015/16, both on sand-based soccer fields being converted to couchgrass. In both cases we used Princess-77 at 40kg/ha, applied with 2 t/ha Conwed 2000, a wood fibre mulch with tackifier.



The first site was in Melbourne, where Princess-77 was hydromulched onto one third of the field, with the other two thirds being line-planted with Santa Ana. An adjacent field was line-planted with AgriDark. The areas were sown on 25th November, 2015, and turf coverage was estimated visually over the summer. After sowing there was an unusually cool period, with eight out of the next 14 mornings below 12°C and only one day exceeding 30°C. The optimum temperature for couch germination is 20-25°C (Evans and Parsons, 2010), so conditions weren't ideal. Nevertheless, Princess-77 showed good germination at 14 days, and by six weeks the better areas were well grassed and maturing well, to the point of requiring only limited irrigation. In contrast, both Santa Ana and AgriDark at six weeks had only reached the surface in their lines, with around 5% coverage.



*Princess-77 establishment at six weeks*



*Line-planted Santa Ana at six weeks*





*Line-planted AgriDark at six weeks*

By 11 weeks Princess-77 was producing rhizomes, a key milestone in couch establishment. Apart from a few thin areas over droughty drain lines, the Princess-77 was well advanced, ready for its normal maintenance regime of mowing etc. In contrast, Santa Ana had very poor coverage, allowing weeds to invade, and slowing down the progress of the whole field. These results are consistent with other trials comparing seeded couch establishment with sprigging or line-planting.



*Princess-77 establishment at 11 weeks*





*Line-planted Santa Ana (left) vs hydromulched Princess-77 (right) at 11 weeks*



*Princess-77 rhizomes at 11 weeks*

AgriDark showed good establishment rate, catching up to Princess-77 by week 14. That's the typical pattern with line-planting, very little sign of couch for the first month or so, as the couch establishes in its lines, then a rapid lateral spread. One would normally expect near full coverage in 12 weeks with line planting, which AgriDark achieved in this case. Santa Ana was another story – it became clear very early on that something had gone wrong with its planting. Even by 16 weeks it had only reached 35% groundcover, and its lack of coverage had allowed remnant perennial ryegrass and new infestations of kikuyu to become a problem. This is very unlike Santa Ana and corroborates a point we made earlier - many vegetative establishment projects simply go wrong for some reason.





*Princess-77 at 14 weeks*



*Line-planted Santa Ana at 14 weeks, showing kikuyu invasion*





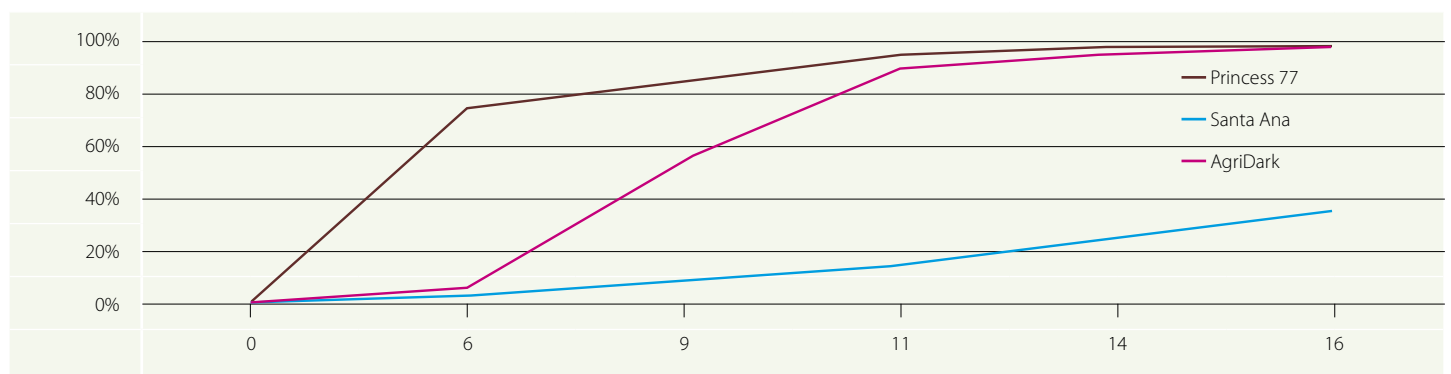
Line-planted AgriDark at 14 weeks

The establishment rates of the treatments are shown below:

TABLE 1: VISUAL ESTIMATES OF PERCENTAGE GROUND COVER IN THE MELBOURNE TRIAL

Cultivar	Weeks after sowing/Percentage ground cover				
	6	9	11	14	16
Princess-77	75%	85%	95%	97%	97%
Santa Ana	3%	10%	15%	25%	35%
AgriDark	5%	55%	90%	95%	97%

GRAPH 1: VISUAL ESTIMATES OF PERCENTAGE GROUND COVER AT K.M. REEDY RESERVE, HALLAM





The other trial site was in Auckland, where a full sand-based soccer pitch was established with Princess-77 and Conwed 2000 hydromulch. Once again, Princess-77 germinated well in the hydromulch, and achieved near full cover in six weeks, to the extent that regular mowing and maintenance could start, and irrigation could be cut back. A positive feature of the Auckland site was that the surface had been recently lasered and was beautifully smooth. Being able to keep wheeled traffic off the surface is a real bonus, especially if the field will be closely mown with a cylinder mower. Another feature of this site was that each end of the field, beyond the goal line, was also hydromulched with Princess-77. The profile there consisted of the native soil, and the couch established extremely quickly and uniformly in those zones, showing the benefit of better nutrition and moisture retention compared to the sand rootzone.



*Hydromulch application of Princess-77 in Auckland, December 2015*



*Princess-77 in Auckland, March 2016*



Both trial sites taught us some important lessons about hydromulching a seeded couch:

1. Despite the assistance of the mulch, newly germinated couch seed is vulnerable to drying out. Treat it like bent grass for the first month or so, until the roots get a bit deeper.
2. Because you are dealing with a vulnerable, newly germinated seed, any problems with lack of moisture (e.g. due to poor sprinkler performance) will readily show up. These weak areas aren't the fault of the grass, they are design faults.
3. In the best areas, the seeded couch reached full establishment in around six weeks, to the point that irrigation could be cut back, and regular mowing could start. There is no reason a whole field can't be established that quickly if the rootzone and irrigation is well designed.
4. Wood fibre mulch should only be applied with a machine that is able to handle it, using a contractor with experience with the product.
5. Establishing couch, whatever planting method, requires generous nitrogen applications until fully covered.

The establishment phase was only part one of this trial. Both fields were oversown with perennial ryegrass in April, and part two of the trial is to see how they handle the winter and how well they come through the transition phase in October, when the ryegrass will be removed. But in terms of establishment, seeding couch with a wood fibre mulch has more than lived up to our expectations and offers several benefits in terms of cost, speed of establishment and simplicity of process.

#### **Further reading:**

*Baltensperger, A.A. (2014): A century of seeded bermudagrass production – and more to come. Golf Course Management, November 2014.*

*Ford: <http://www.duraturf.com.au/assets/files/Research%20Article%20seeded%20couch.pdf>*

*Evers, G. W. and Parsons, M.J. (2010): Temperature Influence on Seeded Bermudagrass Germination. Texas Journal of Agriculture and Natural Resource 22:87-93*

*Richardson, M.D.; Karcher, D.E. and Boyd, J.W. (2005): Winter survival of seeded bermudagrasses. USGA Greens Section Record, April 2005.*

*(also see [www.pggwrightsonturf.com.au](http://www.pggwrightsonturf.com.au) for other reports)*