

Australian National Turfgrass Evaluation Program (ANTEP)

Seeded Couchgrass

Progress Report Establishment

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ANTEP 4: Seeded Couchgrass

Introduction

The Australian National Turfgrass Evaluation Program (ANTEP) was set up by the Australian Seed Federation (formerly the Seed Industry Association of Australia) in 1997. The main aim of ANTEP is to evaluate a range of turfgrass varieties under uniform maintenance practices and assessment criteria at different sites around Australia. There have been 3 previous ANTEP trials;

- ANTEP 1 (1998): Perennial Ryegrass (Melbourne & Sydney)
- ANTEP 2 (2002): Tall Fescue (Melbourne & Canberra)
- ANTEP 3 (2006): Perennial Ryegrass & Tall Fescue (Melbourne)

These trials have provided turf managers with useful data on which to make informed decisions on selecting varieties for their particular situation as well as providing an excellent educational resource for turf and horticultural students.

Warm-season grasses such as couchgrass (*Cynodon dactylon*) & kikuyugrass (*Pennisetum clandestinum*) are more efficient water users and have better drought tolerance than the cool-season grasses such as ryegrass (*Lolium perenne*), fescue (*Festuca sp.*) as well as Wintergrass (*Poa annua*) which have been traditionally used in sportsfields and on golf course fairways. A saving of approximately 40 to 50% in water use can be achieved with warm-season grasses compared to cool-season grasses and if the turf area is not being actively used over summer then the water savings may even be greater.

Another advantage of warm-season grasses is that without an adequate supply of water (e.g. under water restrictions), sports surfaces consisting predominantly of cool-season grasses will lose cover, become tufty, have excessive hardness and often become unsafe. Warm-season grasses have a greater capacity to maintain good density and have a creeping growth habit that is less likely to become tufty during periods of extreme heat and low rainfall.

With drought and water restrictions limiting the number of sports surfaces that can be watered many Municipal Councils have been converting their sportsfields to warm season-grasses. In cold environments or in situations with heavy winter use the playing surface is oversown in autumn with ryegrass to provide a winter surface. The ryegrass provides winter colour and prevents the couch and kikuyu from wearing out during the cooler months when it is not actively growing with the ryegrass stressed out during the following summer.

Couchgrass (oversown with ryegrass) is the preferred surface for most premier sports (football, soccer and cricket) due to its finer texture and lower thatch accumulation compared to kikuyu. It is commonly used in many high profile and irrigated sportsfields as well as on golf course fairways and tees. It can be established from vegetative material (e.g. by line planting or broadcast spreading) or from seed. Several of the commonly used couchgrass varieties, for example; Santa Ana, Legend, Conquest etc. can only be grown from vegetative material.

It is more than twice as expensive to establish a sports surface using vegetative material than from seed. This is a major issue for Municipal Councils that may have many sportsfields (often in excess of 50) when they want to convert to warm-season grasses.

For these reasons it was decided that the fourth ANTEP trial would evaluate seeded couchgrasses.

Methodology

- Location:**
- Mount Scopus Memorial College, Burwood, Victoria
 - North east corner of the main oval – an out of play area away from school buildings & outside the boundary line of the oval
- Soil type:**
- Sand profile
- Trial design:**
- Randomised block design with 3 replicates
 - Plot size is 2.0m x 1.5m (3m²)
 - 20 entries (18 seeded & 2 vegetative couchgrasses)
- Varieties:**
- **Advanced Seeds**
La Paloma; SR 9554; Veracruz; Yukon
 - **DLF Seeds**
Dune; Mirage II; IS-CD 10
 - **Heritage Seeds**
BAR 7 CD5; BAR C291-1; Riviera; Herit T2; Transcontinental
 - **PGG – Wrightson**
PSG 9BAN; PST-R60N-Foundation; PST-R6FLT; Sovereign (SWI-1012); SWI 1057; SWI 1070
 - **Vegetative Standards**
Legend; Santa Ana
- Site preparation:**
- The trial area was sprayed with glyphosate, rotary hoed, and levelled
 - The pH was amended to 6.0 - 6.5 (initial pH 5.3) using Dolomite lime
 - Starter fertiliser was incorporated into the profile prior to seeding
 - Starter fertiliser and a granular wetting agent were broadcast over the surface at seeding
- Seeding:**
- The trial was sown on the 6th January 2010
 - Seeding rates were 10g/m² for bare seed and 20 g/m² for coated seed (adjusted for 100% germination and for a 1:1 coating)
 - Plots were seeded using “shakers” and then lightly raked
 - The two vegetative couchgrasses were “line-planted” (7 rows, 10 - 15cm apart per plot) at a rate of approximately 1m² of washed sod per 20m²
- Maintenance:**
- **Nutrition**
 - A standard fertiliser program is being followed and is based on a low to moderate level of nutrition that closely reflects the maintenance level of the majority of couchgrass sportsfields (appendix 1)
 - **Irrigation**
 - The trial was irrigated on a daily basis for the first 4 weeks and then every second day for the next 3 weeks
 - Irrigation was then reduced to an as needed basis to prevent wilt (appendix 2)
 - The trial is being irrigated under a Water Conservation Plan approved by Yarra Valley Water

- **Mowing**
 - The first cut occurred at 7 weeks (rotary mower, 50mm cutting height)
 - The trial was then cut twice per week with the height gradually lowered to 25mm (appendix 3)
 - The first cut with a cylinder mown occurred at 11 weeks
 - The trial is being maintained at a height of 25mm (the same height of cut of the rest of the oval)
- **Pesticides**
 - Pesticides will only be applied to prevent complete sward loss.

Assessment

Establishment: The trial was assessed during establishment for;

- **Germination:** % of replicates germinated
assessed 6 days after seeding (6 DAS)
- **Vigour:** visual estimate based on ground cover, plant height, maturity and health
assessed 10 days after germination/emergence (16 DAS)
0 = poor and 5 = excellent
- **Turf cover:** visual estimate of ground cover (%) at 4, 8 and 12 weeks

Full Sward: Once full cover is attained the trial will be assessed quarterly for;

- **Quality:** visual estimate integrating colour, uniformity, density, texture, growth habit and smoothness
0 = poor and 5 = excellent quality
- **Colour:** visual estimate of the inherent colour of the variety
0 = very light green and 5 = very dark green
- **Density:** visual estimate of living plants per unit area
0 = bare ground and 5 = very dense

Dormancy & Spring Green Up: Weekly assessment during May to June (dormancy) and August to September (spring green-up) will be undertaken with the assessment of colour; visual growth & quantitative measurement of turf height using a rising disc apparatus.

The incidence of insect pests, disease and weed invasion will also be monitored (*visual estimate of the % area damaged or taken up by weeds*)

Rainfall, minimum & maximum air temperature and soil temperature (at each assessment) were also recorded and are summarised in appendix 3.

Statistical Analysis

Analysis of variance was used to compare varieties and the Least Significant Difference (LSD) calculated. The LSD is used to determine statistical differences between varieties by subtracting one variety's mean from another variety's mean. Statistical differences occur when this value is larger than the corresponding LSD value.

Results and Discussion

The establishment assessments are summarised in the following tables.

Germination (% replicates germinated)

Variety	6 DAS
DUNE	100%
LA PALOMA	100%
SR 9554	100%
TRANSCONTINENTAL	100%
YUKON	100%
MIRAGE II	67%
PST-R60N	67%
PST-R6FLT	67%
RIVIERA	33%
SOVEREIGN	33%
BAR 7 CD5	0%
BAR C291-1	0%
HERIT T2	0%
IS-CD 10	0%
PSG 9BAN	0%
SWI 1057	0%
SWI 1070	0%
VERACRUZ	0%
LEGEND	-
SANTA ANA	-
LSD (p<0.05)	52%

Vigour (0 = poor to 5 = excellent)

Variety	16 DAS
SR 9554	4.5
DUNE	4.0
TRANSCONTINENTAL	3.8
LA PALOMA	3.7
MIRAGE II	3.3
PST-R60N	3.3
PST-R6FLT	3.3
LEGEND	3.0
SANTA ANA	3.0
SWI 1070	3.0
SOVEREIGN	2.7
YUKON	2.3
HERIT T2	2.0
PSG 9BAN	2.0
BAR C291-1	1.8
BAR 7 CD5	1.3
SWI 1057	1.2
IS-CD 10	1.0
VERACRUZ	1.0
RIVIERA	0.7
LSD (p<0.05)	1.1

* DAS = Days after seeding

Tuf Cover (%)

Variety	4 WAS	8 WAS	12 WAS
HERIT T2	67	97	100
MIRAGE II	77	93	100
PST-R60N	80	97	100
PST-R6FLT	73	95	100
SWI 1057	57	92	100
DUNE	73	98	98
IS-CD 10	60	95	98
LA PALOMA	80	95	98
SR 9554	83	97	98
SWI 1070	72	97	98
TRANSCONTINENTAL	77	97	98
BAR 7 CD5	45	82	97
BAR C291-1	65	92	97
PSG 9BAN	53	93	97
RIVIERA	40	90	97
SOVEREIGN	82	97	97
VERACRUZ	62	93	97
LEGEND	28	77	95
YUKON	52	80	95
SANTA ANA	20	77	93
LSD (p<0.05)	27	8	ns

* WAS = weeks after seeding

Key observations

- Germination was evident in approximately half of the varieties 6 days after seeding. There were 5 varieties where germination of all 3 replicates was evident.
- There was a significant difference in vigour between the varieties 16 days after seeding
- There was a significant difference in cover at 4 & 8 weeks after seeding;
 - 4 WAS average cover was 62% (ranged from 20 to 83%)
 - 8 WAS average cover was 92% (ranged from 77 to 98%)
- The seeded varieties generally had better early establishment than the two vegetative varieties;
 - all seeded varieties had significantly greater cover than the vegetative varieties at 4 WAS
 - the majority of seeded varieties (all but two) had significantly greater cover than the vegetative varieties at 8 WAS
- There was no significant difference in cover at 12 weeks after seeding with all varieties having greater than 90% cover

Acknowledgements

Thanks to Mount Scopus Memorial College for hosting and maintaining the trial site and to Nuturf for providing the fertiliser.

Appendix 1: Fertiliser Program

	Timing	Product	%N	%P	%K	Rate (kg/ha)	N kg/ha	P kg/ha	K kg/ha
Establishment	Pre sow	Dolomite (pH = 5.3)	-	-	-	2500	-	-	-
		Poly plus Starter	18	10	9	500	90	50	45
	At seeding	Poly plus Starter	18	10	9	250	45	25	22.5
		Stamina G	-	-	-	400	-	-	-
	At 4 weeks	Poly plus Starter	18	10	9	250	45	25	22.5
	At 8 weeks	Poly plus Super	30	1	5	175	52.5	1.75	8.75
At 16 weeks	Poly + Starter (autumn)	18	10	9	250	45	25	22.5	
							278	127	121

	Timing	Product	%N	%P	%K	Rate (kg/ha)	N kg/ha	P kg/ha	K kg/ha
Full Sward	Winter	Nil	-	-	-	-	-	-	-
	Spring	Poly plus 2% Fe	24	2	9	250	60	5	22.5
	Summer	Poly plus Super	30	1	5	200	60	2	10
	Autumn	Poly plus Starter	18	10	9	100	18	10	9
		Poly plus Balance	20	0	18	150	30	0	27
							168	17	69

Appendix 2: Irrigation

Date	WAS	Comment
06-Jan-10	0	Trial seeded commenced watering twice daily for 45 minutes with a hand hose to keep surface moist
14-Jan-10	1	hand watering once per day for 40 minutes
06-Feb-10	4	hand watering every second day for 40 minutes
22-Feb-10	7	only irrigated as part of main oval irrigation cycle (30 minutes per station), twice per week on average to prevent wilt

Note;

during the first 7 weeks the trial was also watered when the main oval was irrigated

Appendix 3: Mowing

Date	WAS	Comment
06-Jan-10	0	Trial seeded
22-Feb-10	7	First cut, rotary mower, 50mm
01-Mar-10	8	Drop height to 40mm
08-Mar-10	9	Drop height to 35mm
15-Mar-10	10	Drop height to 30mm
25-Mar-10	11	First cut with cylinder mower, 25mm

Note;

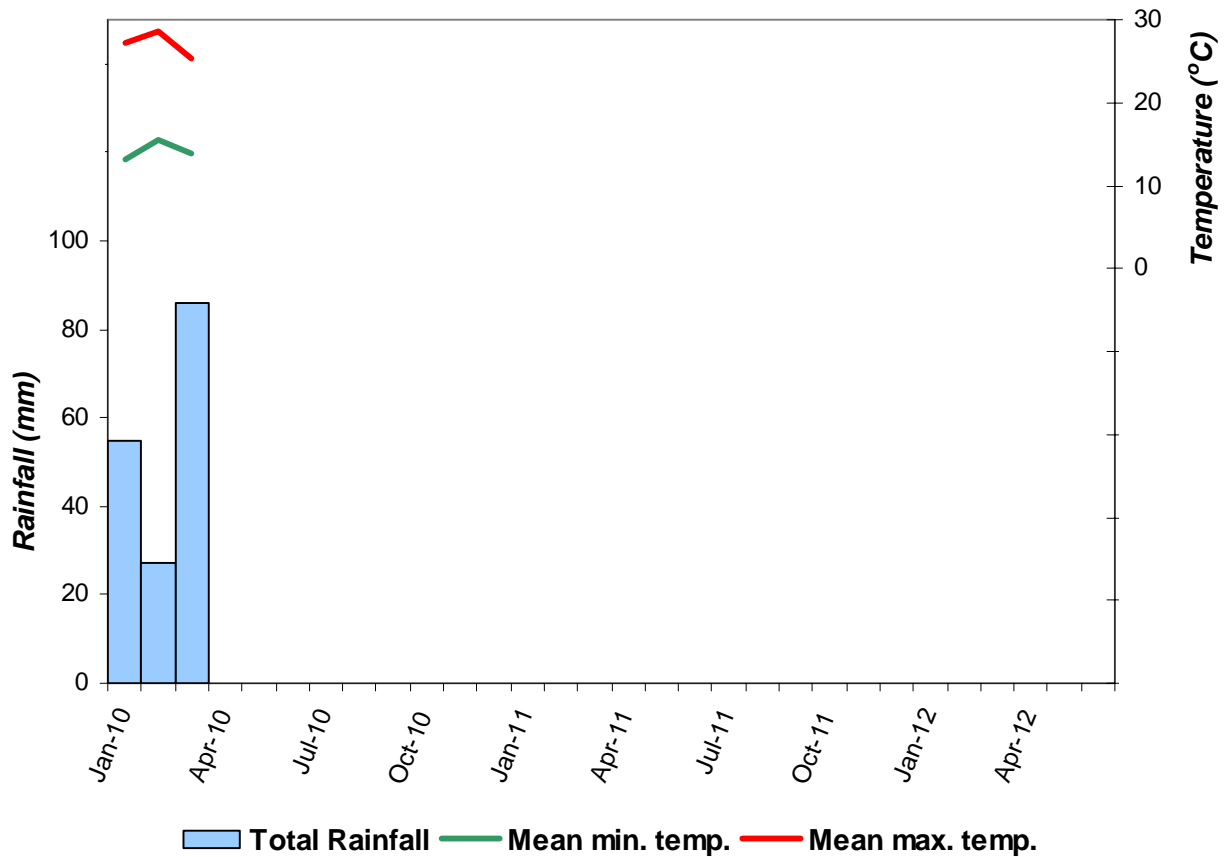
mowing frequency - two cuts per week

the trial is still being cut at 25mm twice a week

growth has slowed down significantly since Easter

Appendix 4: Mean minimum and maximum air temperature & total rainfall

Date	Min. temp. (°C)	Max. temp. (°C)	Rainfall (mm)
Jan-10	13.2	27.2	55
Feb-10	15.6	28.5	27
Mar-10	13.9	25.4	86



Appendix 5: Soil temperature (10cm depth) at each assessment

WAS	Date	°C
0	6-Jan-10	27.0
4	3-Feb-10	26.0
8	3-Mar-10	24.0
12	26-Mar-10	21.0

Appendix 6: Observational Plots

A small observational trial containing 5 single plots (i.e. non replicated) was set up adjacent to the main trial;

Turfgrass	Plot Size	Seeding Rate
Common Couch (½ rate)*	2 m ²	5 g/m ²
Common Couch (full rate)*	2 m ²	10 g/m ²
Improved Couch (bare seed)*	2 m ²	10 g/m ²
Improved Couch (coated seed)*	2 m ²	20 g/m ²
Seeded Kikuyu	4 m ²	20 g/m ²
Seeded Seashore Paspalum	4 m ²	10 g/m ²
Seeded Zoysia	4 m ²	15 g/m ²

* 2 split plots - half versus full seeding rates & bare versus coated seed

The observational trial was maintained and assessed in the same manner as the main trial

Turfgrass	Germ. 6 DAS	Vigour 16 DAS	% Cover		
			4 WAS	8 WAS	12 WAS
Common Couch (½ rate)	100%	3.0	50	95	100
Common Couch (full rate)	100%	4.0	75	95	100
Improved Couch (bare seed)	100%	2.0	50	95	100
Improved Couch (coated seed)	100%	2.0	50	95	100
Seeded Kikuyu	100%	2.5	30	70	90
Seeded Seashore Paspalum	0%	0.5	10	75	85
Seeded Zoysia	0%	0.5	5	55	70

Germination: % of replicates germinated, Vigour: 0 = poor to 5 = excellent
DAS = Days After Seeding & WAS = Weeks After Seeding

Key observations

- Germination was evident 6 days after seeding with all the Seeded Couchgrass plots as well as the Seeded Kikuyu.
- The Seeded Seashore Paspalum and Seeded Zoysia had poor vigour 16 days after seeding and were slower to establish than the other turfgrass species.
- There was no difference in vigour or rate of cover between the bare and coated seeded couchgrass
- There was slightly better early establishment with the higher seeding rate compared to ½ seeding rate but both had attained 95% cover by 8 weeks after seeding.

Trial Photos



Seeding with shakers



Line planting vegetative couchgrasses



Trial overview: 4 weeks after seeding



Trial overview: 8 weeks after seeding



Trial overview: 14 weeks after seeding

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