Sub-tropical Pasture Options in the Mallee

Aim

To continue to evaluate the persistence of established sub-tropical pastures in the Mallee.

Method

The purpose of this trial was to continue the evaluation of the persistence of seven sub-tropical pasture species established at Hopetoun in 2006. Seven pasture species (six grasses and one legume, Table 1) were chosen to be evaluated in a replicated small plot trial at Hopetoun on a sandy loam with clay at depth and moderate subsoil constraints (EC > 0.5dS at 50 cm). Of these seven species, seed size varied widely, subsequently each variety was sown at two rates (3kg/ha and 6kg/ha) to identify the most successful sowing rate. The pastures were sown using a conventional seeder with rolling 'sheep feet' harrows on 10 November 2006. Only Bothriochloa bladhii ssp. Glabra (cv. Swann) was broadcast and harrowed in as it did not consistently flow through the seeder. Site hygiene was maintained by hand weeding during the season and slashing in January.

Total biomass was measured by cutting all plant material of the sown pasture species within a randomly placed quadrat. Biomass production was measured in November, December 2009 and January 2010.

Location:	Hopetoun
Replicates:	4
Sowing date:	10 November 2006
Sowing Rate:	3kg/ha
Pasture type:	Listed in Table 1
Seeding equipment:	Conventional (combine), 150mm sweeps, rolling harrow, 175mm row spacing.
Fertiliser:	Urea 100kg/ha (42kg N/ha)

Table 1. Subtropical pasture species sown at Hopetoun in November 2006.

Species	Cultivar (cv.)
Panicum maximum	Gatton
Panicum maximum	Petrie
Panicum coloratum	Bambatsi
Panicum coloratum	ATF-714
Digitaria milanjiana	Strickland
Bothriochloa bladhii ssp. glabra	Swann
Desmanthus virgatus (legume)	Marc

Results

After the established pastures period of dormancy during the winter months, an inspection in November found that on Gatton, Petri, Bambatsi and ATF714 had persisted. Late September rainfall promoted those pastures species to continue to promote biomass in November and December. Furthermore, above average November and December rainfall meant significant biomass was produced. Plant numbers were recorded at the first dry matter cut and inconsistencies between plant numbers and dry matter were found and subsequently were deemed to have little value for the purpose of this project and no longer recorded.

Table 2. Monthly rainfall (mm) recorded at the site in 2007-2009 and the long-term averages (LTA) for Hopetoun.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2007	15	19	29	24	92	15	37	4	12	5	48	29	329
2008	29	0	1	13	30	16	29	7	4	6	24	36	195
2009	0	0	16	36	27	29	30	25	31	6	88	29	317
LTA	14	12	12	16	29	32	32	35	30	27	20	15	348

Biomass

Biomass measurements were made in November and December 2009 and January 2010. The application of fertiliser N in early January improved biomass production however, the further would also be required at the beginning of summer to increase plant growth.

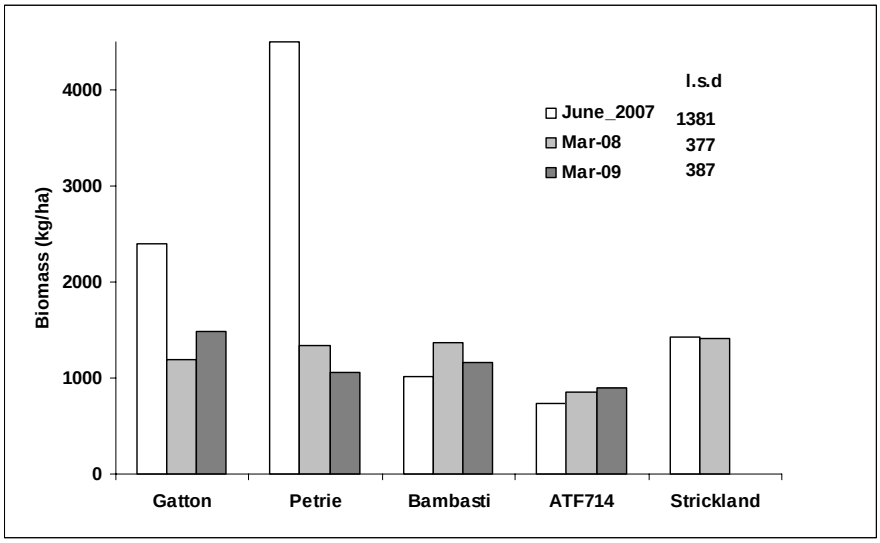

Figure 1. Biomass measured at June 2007, March 2008 and March 2009.

Interpretation

Establishment and biomass production in 2008 were less in all species than in 2007. This is probably related to lower rainfall and more days with temperature >40^{o}C, and also related to the decline in plant numbers. Apart from the fertiliser applied at sowing, no further nitrogen was applied and typically pastures begin to slow their growth in response to the decline in soil mineral N. At the time of measurement (June/July), plants are senesced and some of the biomass produced over summer would be lost. Sub-tropical pastures become dormant over

winter (particularly with the onset of frost events) and regenerate in spring once moist soil reaches temperatures of 18°C or greater in the topsoil (0-10cm depth). Provided that winter-growing pasture or weed species are controlled, the dormancy of these sub-tropical species over the winter months may mean that some of the winter and early spring rainfall can be stored in the soil profile until plants begin to grow in spring. The 2007 spring rainfall was below average, which would have limited production in November and December, despite later months receiving above average rainfall.

The grasses *P. maximum* cv. Petrie or Gatton and *P. coloratum* cv. Bambatsi have shown to be the most productive and appear suitable for the region, assuming that they continue to persist. While *P. coloratum* cv. ATF-714 produced less growth it did maintain a good plant population and is suitable for further testing under grazing. *D. milanjiana* cv. Strickland did not perform well and is not suitable to the region. Whilst the legume *D. virgatus* cv. Marc produces low biomass, it did have adequate plant numbers in 2008 to be a viable pasture and in practice is a key 'high protein and N-fixing' component of a mixed grass/legume pasture.

Due to the exceptional growth and competitive nature of the sub-tropical pastures, it was observed that there was less barely and ryegrass during winter where there was successful pasture establishment. There were high densities of ryegrass observed in the *D. virgatus* cv. Marc and *B. bladhii cv.* Swann plots. The site did not require any further herbicide application or hand-weeding in the summer of 2007/2008, except in the plots where establishment failed.

Application

The cost of the seed for most of the varieties used in this trial is relatively expensive (approximately $20/kg). At this cost, based on the data presented in this trial, the lower seeding rate (3kg/ha) would be recommended. The summers of 2006/2007 and 2007/2008 were exceptional for early summer rainfall and this favoured the establishment and productivity of these varieties. If the incidence and magnitude of summer rainfall increased under climate change, then sub-tropical pastures could find a fit in Victorian Mallee farming systems provided these species can persist under commercial grazing. Sub-tropical species may also be an option for the hay market, as out-of-season hay production could be profitable. They may also have potential as a tool to assist with management of resistant ryegrass.

Capturing and making the most of any out-of-season rainfall can be time-consuming and expensive. Having a highly competitive pasture that can provide good competition against summer weeds, green feed over summer and nearly 100 percent ground cover, would be extremely valuable. However, good establishment is essential, and more work needs to be done to ensure the results obtained in this trial can be repeated on different soil types and in different seasons.

Communications

- A media article prepared for the Mallee Farmer (to be submitted).
- Information from this project (and the previous pasture work done by BCG) discussed at BCG Main Field Day, September 2009 and FFICRC forum, February 2010.
- Web page (on BCG site) updated with information from the 2009 season.
- Final report on the performance of perennials over the 2009 season.