

Evaluation of Sub Clover Varieties in a Cropping System, MFMG 2010

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Location

MFMG Frances & Connurra

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Summary of Findings

- Antas Sub Clover (brachycalium type) grew significantly more DM than all other sub clovers, (7.94t/ha at Connurra) an increase of 80% over standard Trikkala Sub Clover.
- The more biomass you grow, the more Nitrogen you fix. Using rules of thumb (25kg/ha N per 1t DM).
- Generally speaking earlier flowering varieties will grow more dry matter early, while later flowering varieties will make most of late rains. In practice, a spread or mix of flowering dates may be prudent in a paddock situation.
- More work required to show possible yields, both as monocultures and as mixes for rotational options.

Background/Aim

Sub clover has long been a base legume of cropping systems in Southern Victoria/South Eastern South Australia. The base of this system has been Trikkala Sub Clover, however in recent years, newer varieties have different season lengths and improved DM production. Sub clover, not only increases protein and feed quality in forage, but adds Nitrogen to the grazing/cropping system. A general rule of thumb has been to suggest that sub clover can fix between 20-30kg/ha of N per 1t/Dm fixed- so that the more biomass one can grow - the more nitrogen can be fixed.

Methods/Treatments

Paddock preparation: A randomized block design of 3 replicates, using 10m x 1.8m plots was used

Sowing:	Frances SA (Canola 09)	Connemurra (Canola 09)
	13 May	29 May

Fertiliser: 75kg/ha MAP at sowing
100kg/ha Urea Broadcast 8 Sep 10 (All non-legumes)

Herbicide; 1L/ha Roundup Powermax + 2.0L/ha Triflur X IBS (except grasses) 23 July
500ml/ha Select + 1L/100L Hasten (Leafmore + Scimitar)
500ml/ha Select + 500ml/ha Agritane 750 + 1L/100L Hasten (Clovers)
2.5L/ha Buttress (Cereals, Scimitar)

Cuts: 18/19th Nov 10: Sub sample, dried and weighed for dry matter

GSR:	432mm	519mm (April- Nov)
AR:	618mm	694mm (April- Nov)

Table 1: Varieties

Summary of Sub Clover Varieties

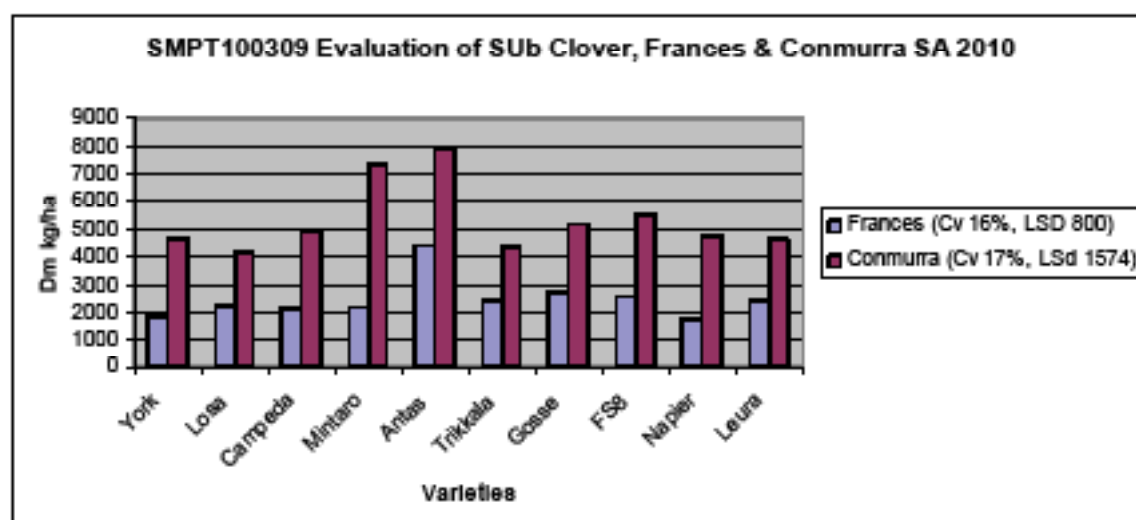
Variety	Sp.	Seed Colour	Rainfall Zone	Maturity	Days to Flower	Hay	Grazing	Grain/Seed
Losa	Subteranneum	Black	350-850	Early	97	Y	Y	N
York	Sub	Black	475-700	Mid	112	Y	Y	N
Camperda	Sub.	Black	400-700+	Mid	123	Y	Y	N
Tridala	Yannicum	White	400-700	Mid	112	Y	Y	N
Gosse	Yannicum	White	500-800+	Mid	128	Y	Y	N
Antas	Brachy	Black	450-800+	Mid-Late	134	Y	Y	N
Denmark	Sub	Black	500-850+	Late	144	Y	Y	N
Napier	Yannicum	White	600-850	Late	140	Y	Y	N
Leura	Sub	Black	600-850+	Late	151	Y	Y	N

Results

Table 1: Dry Matter Yield

Variety	Frances t/ha DM	Significant Diff	Conmurra t/ha DM	Significant Diff
York	1.850	c	4.878	b
Losa	2.237	bc	4.180	b
Campeda	2.144	bc	4.884	b
Mintaro	2.209	bc	7.355	a
Antas	4.419	a	7.940	a
Triskala	2.440	bc	4.384	b
Gosse	2.718	b	5.170	b
FS8	2.553	bc	5.584	b
Napier	1.759	c	4.785	b
Leura	2.483	bc	4.874	b
CV	18 %		17%	
LSD	.800		.817	

Figure 1: Evaluation of Sub Clover Varieties (t of DM/ha)



Discussion

Once again, Antas has produced large amounts of dry matter; as it has at other sites across southern Australia. There is a growing weight of evidence to suggest that it performs across a broad range of pH and soil types and consistently produces large amounts of dry matter. A brachycalcium sub, it is large seeded with large leaflets and has good early seedling vigour. This means it grows well heading into winter, even through waterlogged soil- and had many stolons with the large leaf, which shows big DM improvements on other varieties. Second year trials at other locations have shown that despite Antas being somewhat an aerial seeder, it does seed down and produces leading dry matter in its second year.

Joining Antas is a new Brachy named Mintaro. Mintaro is 2-3 weeks early in flowering and with a greater seed burying habit, will provide a greater fit in lower rainfall and regeneration environments. Both Antas & Mintaro seem to have fast metabolisms- recovering from insect attack or herbicide application rapidly.

In terms of other sub clovers, early subs such as Losa and Campeda performed well being able to grow through a wet winter. Some of Campeda's performance may be attributed to its ability to fix and hold many types of rhizobia already in the soil. Recent SARDI research has shown Campeda is better able to utilize the rhizobia present in the soil than other sub varieties. Gosse has grown more dry matter than Trikkala, though not significantly- and its mid season maturity has suited this site well.

Interestingly, later season varieties such as Napier and Leura have done well at Dunkeld- maybe with extra moisture.

The site contained heavy populations of wimmera ryegrass and wild radish - which were able to be sprayed out. This offered another measure of weed control and nitrogen fixation. As follow up work, it would be interesting to see a cereal oversown on both the forage and sub clover plots- to see what N and crop yield would be. Further work needs to be done - on both pure stands, maturity mixes (i.e. Early/Mid/Late) and mixed with grasses/cereals.

Summary

Sub has traditionally been seen as the lower producing partner for ryegrass and phalaris, the results of Antas and Mintaro in these and other trials has shown that these broadly adapted varieties may be able to provide a dramatic increase in on-farm clover production. It is worth noting that both Antas and Mintaro produced more dry matter than any of the annual clovers. Further work needs to develop how these subs will fit into cropping/grazing systems. Cropping systems in South Eastern SA need to consider rotations for weed, disease and nitrogen breaks. Upcoming trials should reassess dry matter with earlier sowing dates, as well as nitrogen fixation rates, assessing sub clover as a viable break crop/ grazing option. In addition further work needs to be done with companion species and blends, to increase production and nitrogen fixation.