6.4 Evaluation of annual clover varieties in a cropping system - Dunkeld, Vic

Location:
Dunkeld Research Site.

Researchers/Authors:
Cam Conboy, PlantTech
E: cconboy@planttech.com.au
P: 0428 134 796
Reece Hardwidge, Seedmark, PlantTech
E: rhardwidge@planttech.com.au
P: 0428 178 719

Acknowledgements:
SFS, Rohan Wardle & Toby Campbell

Background/Aim:
Annual clovers are another tool in the rotation in medium-high rainfall zones, to grow higher amounts of dry matter in a single year. Whilst balansa has been used extensively in the region- there are several types- and also other annual species that may fit in well. The idea of these trials was to investigate the dry matter potential of these varieties.

Take home messages:
- Bolta Balansa (3.2t/ha DM), Lightning Persian (3.03t/ha DM) and Elite II Berseem (2.94t/ha DM) produced the highest amounts of DM at Dunkeld.
- The site was somewhat a rundown pasture site, which got very wet in winter, and this did not favour Arrowleaf type clovers.
- Elite II providided good intial dry matter early- but then only provided extra dry matter with late rains. Persian clover only provided extra dry matter with late rain also.
- The Balansa clovers had superior growth in these conditions, with Bolta being the longer season type, providing more dry matter.

Paddock Preparation:
A randomized block design of 4 replicates, using 20m x 1.8m plots was used.

Sowing:
Mininera:15 May 2009
Dunkeld: 14 May 2009

Fertiliser:
75kg/ha MAP Evolite at sowing

Pesticide:
11 Jun 09 - 100ml Fastac + 100ml Dimethoate

Herbicides:
Knockdown; Roundup & Hammer; 18 Aug 09 Liase + Verdict 520 + Select + Hasten + Raptor; Ecopar 400ml/ha + Thistlekillem 750 500ml/ha

Cuts:
Mininera - 24 Nov - Cut whole plot, weighed. 100g sample dried and weighed.
Dunkeld - 11 Nov

2009 GSR: 465mm (Mininera)
529 mm (Dunkeld)
2009 Avg: 535mm (Mininera)
624 mmm (Dunkeld)

Varieties	Sowing Rate	Characteristics
Elite Berseem Clover	(20kg/ha)	Winter active, upright annual clover, with a late spring flush of growth. Ideal for hay production with good clover scorch tolerance and not known to cause bloat.
Cefalu Arrowleaf Clover	(10kg/ha)	Annual clover, early maturing (110days)- suited to well drained soils. Upright growth habit, acid soil tolerance, very hard seeded.
Zulu II Arrowleaf Clover	(10kg/ha)	Annual clover, with erect type growth. Mid season variety (130 days) Ideal in mixes or to improve protein in hay mixes. Ideally suited to acid, loamy reasonably drained soils. Large tap root- able to survive drier spells.
Arrotas Arrowleaf Clover	(10kg/ha)	Annual clover- late maturing.
Nitro Persian Clover	(10kg/ha)	Early maturing (114 days), hard seeded, small leafed Persian. Tolerates waterlooging, resistant to clover scorch and performs well in heavier soils.
Lightning Persian Clover	(10kg/ha)	Mid season (140days) soft seeded, large leafed Persian, Vigorous winter, erect growth- tolerates waterlogging and mild soil salinity.
Laser Persian Clover	(10kg/ha)	Late season Persian clover, with ability for multiple grazings and hay production. Large leafed with soft seed – ideal nitrogen fixer and forage option.
Frontier Balansa	(5kg/ha)	Early maturing (100 days)- tolerates waterlogging and mild soil salinity. Hardy balansa, that tolerates range of herbicides, grazing, and will regenerate well from hard seed.
Paradanna Balansa	(5kg/ha)	Mid season (120 days) balansa that performs well in range of conditions.
Bolta Balansa	(5kg/ha)	Longer season, annual clover. Prolific growth with potential for good seed set, the season length of Bolta suits hay production very well. Tolerates heavier soils and some water logging.

Results and Discussion:
The Dunkeld forage site in 2009 presented some challenges, with lower ph, fertility, waterlogging and weed infestations- but that being said, highlighted how annual clovers performed in a renovation phase. The site was worked and then sown into, but needed spraying with Raptor/Verdict/Select and also Ecopar/MCPA to control Onion Grass, Capeweed, Erodium, Mallows and other weeds. This knocked around biomass initially, as annual clovers tend to have good early growth- and absorb a lot of the herbicide- taking time to metabolise. Most clovers had produced their dry matter in mid spring- however, the later varieties such as Elite II, Lightning and Laser kicked on with late rain.

The Balansa clover varieties- Frontier, paradanna and Bolta – all handled the wet conditions, and grew through limited fertility. Bolta produced more dry matter, purely to season length compared with Frontier and pardanna. The arrowleaf varieties didn't handle the wet heavy soils very well, and although Arrotas did have some late growth- there still wasn't much dry matter produced.
Persian clovers handled the heavy wet soils well, and offered some winter growth.

Summary:
Annual clovers offer a good crop rotation for a variety of seasons;

- Bolta Balansa and Laser Persian Clover performed well in heavy, wet soils
- Arrowleaf clovers didn't perform well in heavy soils.
- More work needs to be done to develop varieties and fits for soil types and systems.

Table 1: Dry Matter Yield of Annual Clovers

Variety	Cut 1- 10 Nov t/ha DM	SD	Cut 2 – 18 Dec t/ha DM	SD
Elite II Berseem	1.905	Bc	1.044	a
Cefalu Arrowleaf	1.573	Bc		
Zulu II Arrowleaf	1.4	C		
Arrotas Arrowleaf	.463	D	.419	b
Nitro Persian	1.579	Bc		
Lightning Persian	2.758	A	.272	b
Laser Persian	1.840	Bc	.994	a
Frontier Balansa	2.328	Ab		
Paradanna Balansa	2.897	A		
Bolta Balansa	3.205	A		
CV	**2.57**		**5.31**	
LSD	**.148**		**.59**	

Means followed by the same letter do not significantly differ.

Figure 1. Evaluation of Annual Clover Varieties (Kg of DM/ha)