



Evaluation of Forage Varieties in A Cropping System 2009

Location; McKillop Farm Management Group, Frances SA

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Summary of Findings

- A range of forage varieties were grown as rotational options at the MFMG site at Frances.
- Drummer Annual tetraploid ryegrass (6.482t/ha DM) grew the largest amount of dry matter, followed by Graza 80 (5.491t/ha DM) and Grassmax (5.099t/ha)
- The annual clovers grew signifcantly less dry matter, with Laser Persian Clover growing (3.025t/ha DM), Zulu Arrowleaf (3.008t/ha DM) and Bolta Balansa (2.977t/ha)





- The cereal/grass based options grew more DM and offered more competition, but legume & broadleaf crops offered different herbicide options, disease breaks and in case of legumes, nitrogen fixation.
- More work required to show possible yields, both as monocultures and as mixes for rotational options

Background/Aim

Following on from work by Seedmark PlantTech in 2008, there is investigation in using alternative crops in medium to high rainfall zones. It was determined that more data needed to be collected to establish dry matter and production in these zones. The main reasons for alternative rotations are;

- Disease Break- 2009 saw blackleg in canola, scald in barley, septoria in oats and stripe rust in wheat- in a prevalence not seen since the wet winters of old. Extending gaps in rotation will reduce stubble and innoculum levels, assisting disease control
- Herbicide Rotation- without a doubt Wimmera Ryegrass is becoming a greater issue and if different herbicide groups can be used, or crops offer greater competition or are cut or grazed, this will help reduce the RG problem.
- Nitrogen Fixation- Legumes offer some extra soil nitrogen, through soil rhizobia. A rough rule of thumb is 25kg/ha N for every 1t of Forage produced.

Methods/ Treatments

Paddock Preparation

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

Frances SA (TT Canola 08)

Sowing; 28 May

Fertiliser; 100kg/ha MAP at sowing

Pesticide; 11 Jun 09; 100ml Fastac + 100ml Dimethoate

Herbicide; Knockdown; Roundup & Hammer

Clovers + Rape ; 19 Aug 09; Liase + Verdict 520 + Select + Hasten Clovers & Grasses; 19 Aug 09; Tigrex

Cuts; 28 Sep 09- Cut whole plot, Sub sample, dried and weighed for dry matter

GSR; 437 mm (April- Nov) AR 489 mm

Varieties (Brackets denotes sowing rates)

Leafmore Forage Rape (5kg/ha)- Brassicas have traditionally been a spring sow option, but may have a fit for winter crop rotations, high quality stockfeeds- as a solo crop or in a mix. Leafmore has improved cold tolerance and quick regrowth post grazing. The natural biofumigant properties of a brassica, combined with flexible grass control options, make it an alternative rotation.

Gairdner (100kg/ha) Long season malting barley that has been used in a number of situations for grain and graze. Ability to grow dry matter earlier in the season, with minimal yield impact if locked up prior to GS32.

Drummer Annual Ryegrass (30kg/ha) Annual tetraploid ryegrass. Large leafed ryegrass with exceptional winter growth. Offeres maximum competition with Wimmera Ryegrass, with ability to shade out and also exceptional regrazing time.





Grassmax Annual Ryegrass (20kg/ha) Highly winter active diploid ryegrass. This ryegrass is densely tillered, making it an ideal hay rotation that actually outcompetes weeds, including Wimmera Ryegrass. Can be mixed with clovers to provide extra protein, and is still susceptible to grass herbicides when the time comes to remove it for cropping.

Blaza Crimson Clover (10kg/ha) Annual clover with early- medium growth habit. Suited to low fertility or opening a paddock up, Blaza is a low prostate clover.

Zulu II Arrowleaf Clover (10kg/ha) Annual clover, with erect type clover. Ideal in mixes or to improve protein in hay mixes. Ideally suited to acid, loamy reasonably drained soils.

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.

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.

Graza 51 (50kg/ha) Highly vigorous, highly digestible forage oat. Winter active with upright growth habit- rapid growth and regraze times.

Graza 80 (50kg/ha) Vigorous forage oat, with high tiller density and maximum dry matter. Wide leaves with high WSC.

Results

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Variety		
	t/ha DM	Signif Diff
Graza 51 Forage oat	4.062	abc
Graza 80 Forage oat	5.491	ab
Grassmax Dip Annual RG	5.099	ab
Drummer Tp Annual RG	6.482	а
Leafmore Forage Rape	2.338	cd
Blaza Crimson Clover	2.977	bcd
Zulu Arrowleaf Clover	3.008	bcd
Laser Persian Clover	3.025	bcd
Bolta Balansa Clover	2.687	bcd
Gairdner Barley	4.115	abc
CV	4%	

Table 1; Dry Matter Yield

Figure 1; Evaluation of Forage Varieties (Kg of DM/ha)







Discussion

The Frances site was a good representation of the area- good fertility and weed control, with the paddock being very wet, on the edge of winterlogged- similar to winters of old. The season was reasonable- up to the point of cutting, when abnormally hot temperatures cooked a number of crops. In essence most of the forage crops escaped this, however some of the longer season clover varieties (Eg Bolta, Laser) may have gone on and produced more dry matter, had late spring been milder.

The trial aimed to firstly show that various amounts of quality dry matter can be grown in a cropping rotation, and that secondly added benefits of ryegrass control, disease break and nitrogen fixation. Drummer, an early flowering tetraploid ryegrass topped the trial at 6.482t/ha DM. This shows promise not only because they produce winter dry matter which is critical, but also, as work by Ferris (2007) has suggested that using early-mid flowering tetraploids sown in problem areas of herbicide resistant annual (wimmera) ryegrass, can dramatically reduce resistant populations. Thus tetraploid ryegrass, in pure stands or mixed with annual clovers, maybe a valuable rotational tool in combating resistant ryegrass. Graza 80, a specifically bred forage oat yielded 5.491t/ha DM, and also provided great competition for wimmera ryegrass, with dense tillers, a thick prostate mat and big leaves. Due to extreme wetness at site from Aug-Sep, the site was not mown earlier, and if it was- then it would be reasonable to assume that grass and forage cereal yields would be even higher. It also possible, that if these growing points were kept down with grazing, then post-cutting regrowth would be better- enabling a late 3rd cut-providing even more dry matter.

The hybrid type forage rapes, including Leafmore, performed disappointingly at the Frances site. In other regions, they have been used successfully as an autumn sown option for high value winter growth and feed, much like canola is viewed in a cropping rotation. However, it would appear they suffer the same strain of blackleg as canola, and this was highlighted at Frances, with early leaf lesions, stem cankers and a lack of dry matter production.

The annual clovers produced around 3t/ha DM, with Laser producing 3.025t/ha DM. In reflection, the site wasn't sown until the 28th May- which is fairly late for these plants which do better with warmer soil temperatures, and early seedling vigour prior to the cold and wet of winter. Once the soil became waterlogged- not much growth occurred through July and August. In addition at





point if cutting, a wave of hot weather "cooked" a lot of plants, and although a second cut could have been made in late November, the results would have been fairly patchy. It does show however that Arrowleaf, Persian and Balansa all have a place during a legume forage rotation.

Further work needs to be done show the value of forage rotations in med- high rainfall zones. Trial work at other locations has shown mixing both annual grasses and annual clovers increases dry matter, greater than the 2 grown separately. Additionally work needs to be done on weed control, yield and grain quality of crops following the forage.

Summary

.With increasing pressure on rotations, there are a number of forage options that can be considered;

- On higher fertility sites, with better N levels- Annual ryegrass such as Drummer and Grassmax as well as forage cereals such as Graza 80 and 51 are an option
- Brassicas (Leafmore) should be avoided on canola stubble
- On lower N sites, Blaza Crimson Clover, Laser Persian Clover, Zulu Arrowleaf clover and Bolta Balansa grow reasonable hay and fix Nitrogen
- Further work needs to be conducted to evaluate competition value (esp with Wimmera RG) and yield benefits to following crops.

References; Ferris, DG (2007) Evolutionary Differentiation in Iolium L (ryegrass) in response to meditererrean-type climate and changing farming systems of Western Australia. School of Plant Biology, Faculty of Natural and Agricultural Sciences, University of Western Australia.