FILLING THE FEED GAPS: PASTURE VARIETIES IN 2013

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TAKE HOME MESSAGES

- The cereal varieties and winter gap fill blend provide livestock with substantial feed during autumn and winter, then go on to produce high quality hay in spring.
- Clover, medic and forage brassica varieties provide nutritious feed over winter, spring and into early harvest time. These varieties also offer a disease break in a cereal rotation.
- Nutritional value of varieties was exceptional and would provide an excellent feed source for lactating ewes and lambs.

KEY WORDS

Clover, filling feed gaps, forage brassica, medic, Moby barley, Outback oats, pasture evaluation.

BACKGROUND

With varying rainfall and late autumn breaks, growers are faced with obvious feed gaps throughout the year. Feed gaps pose a risk to livestock producers: during these times they may be forced to supplementary feed grain or hay.

On any farm there may be several different pasture and feed sources (annual pasture, native or introduced perennial grass pastures, lucerne, grazing cereals, forage crops and crop stubbles) that can provide forage at different times of the year. Total farm feed supply determines how well a livestock enterprise and associated stocking rates match your growing season. However, it is important to also consider the quality of the pasture at different times of the year. Each different fodder type offers various rotational benefits and requires different grazing management strategies to suit its growth.

Previous BCG research, undertaken through the Grain & Graze 2 program, has showed that cereal varieties can successfully be grazed and either used for hay production or harvested for grain. This trial looks to assess other pasture and crop types, including legume pasture varieties, which may provide growers with added benefits in their rotations, help fill feed gaps and limit supplementary feeding.

AIM

To assess and evaluate a range of different pasture varieties at three different sites.

METHOD

Table 1. Management practices used in these trials at three locations.

	Marnoo	Hopetoun	Watchupga East
Sowing date	10 May	24 April	24 April
Seeding equipment	BCG cone seeder (knife points, press wheels, 30cm row spacing)		
Fertiliser at sowing	Granulock Supreme Z treated with Impact® (55kg/ha)		
Top-dressed	20 August Urea (50kg/ha)	23 August Urea (50kg/ha)	23 August Urea (90kg/ha)
Herbicides	Broadleaf pastures: Select® (150ml/ha) + Verdict (100ml/ha) Grasses and cereals: Broad strike (25g/ha)		

Trial management is described in Table 1 and pasture varieties are described in Table 2. Dry matter (DM) production was measured at various times at the three sites for each variety and crop type. Biomass cuts were taken immediately prior to simulated grazing using a mower which enabled complete and even grazing. Tissue samples were also taken at these times for feed testing.

Dry matter cuts taken at peak biomass were used as an indication of hay production. Peak biomass for most species occurs at flowering. After flowering, biomass is rapidly lost during the drying off phase.

Using DM and feed tests, dry sheep equivalent (DSE) grazing days were calculated as follows:

> *DSE grazing days = DM (kg/ha) – 30 (kg/ha; physically unavailable DM) x feed test metabolisable energy (ME) / 8 MJ, which assumes that each DSE requires 8 MJ/day.*

Table 1. Variety information for all pasture varieties sown at Marnoo, Hopetoun and Watchupga East, 2013.

Variety	Sowing rate in trial (kg/ha)	Feed availability	Rainfall (mm)	Life span (years)	Strengths
Ambassador cocksfoot	5	autumn / winter	>500	perennial	highly digestible, good acid soil tolerance
Jivet annual ryegrass	15	winter / spring	>600	<1	late maturing, rapid establishment, will respond to late rainfall
Tetrone annual ryegrass	15	winter / spring	>350	< 9 months	earlier maturing than Jivet, good winter growth
Perun festulolium	18	winter / spring	>700	2 April	longer summer growth, strong cool season growth
	Limitations/notes: not suited to hot dry climates for full persistency, can display lack of seedling vigour if sown in winter conditions				
Outback forage oats	75	autumn / spring	>400	1	excellent hay oat, early vigour, large leaf
	Limitations/notes: very little disease resistance to Red leather leaf				
Moby forage barley	65	autumn / winter	>350	1	very fast establishing, early vigour, can be continually grazed
Balance chicory	3	all year		2 March	good spring/summer production – deep root system
Ranger plantain	3	spring and autumn	>500	3 May	fast establishing, tolerant of drought and low fertility
	Limitations/notes: Susceptible to broad leaf herbicides				

Variety	Sowing rate in trial (kg/ha)	Feed availability	Rainfall (mm)	Life span (years)	Strengths
Bouncer brassica	3	autumn / winter	>500	<9 months	early maturing, high DM production
Sub zero brassica	3	autumn / winter	>500	1-1.5	exceptional frost and heat tolerance, early maturing rape
Winter gap fill blend	80	autumn through to spring	>350	1	ready to graze 6-7 weeks from early autumn planting, great mix for filling any feed gap
	Limitations/notes: Moby forage barley 75% + Jivet tetraploid annual italian ryegrass 15% + Cavalier spineless burr medic 7% + Bouncer brassica 3%				
SowSmart HDL blend	20	winter / spring	>400	1 (subsequent years following seedset)	outstanding dry matter production and nitrogen fixation, provides a break in the rotation
Zulumax arrowleaf clover	5	winter / spring	>450	1 (subsequent years following seedset)	excellent late winter/spring growth, limited bloat potential
Dalsa sub clover	10	winter / spring	>325	1 (subsequent years following seedset)	hard seeded, very strong seed burial
Clare 2 sub clover	10	winter / spring	>325	1 (subsequent years following seedset)	high DM production
	Limitations/notes: Very weak seed burial strength				
Hatrik sub clover	10	winter / spring	>450	1 (subsequent years following seedset)	mid maturing, good water logging tolerance
Bartolo bladder clover	8	winter / spring	>350	1 (subsequent years following seedset)	hard seeded, high winter production
SARDI persian clover	5	winter / spring	>300	1 (subsequent years following seedset)	hard seeded, early to mid maturity, good waterlogging tolerance
Turbo persian clover	8	winter / spring	>450	1	late maturing, grazing and multi-cut type
Enduro balansa clover	3	winter / spring	>350	1 (subsequent years following seedset)	early maturing, hard seeded
Caliph barrel medic	10	winter / spring	>250	1 (subsequent years following seedset)	good early vigour and aphid resistance, high levels of hard seed
Bindaroo button medic	10	winter / spring	>300	1 (subsequent years following seedset)	high seed producer, extremely hard seeded, semi prostrate growth habit
Silver Snail Medic	12	winter / spring	>350	1 (subsequent years following seedset)	relatively upright growth habit, very hard seeded
Cavalier spineless burr medic	10	winter / spring	>350	1 (subsequent years following seedset)	pods with no hooks, adaptable to large range of soil types – down to 4.5pH CaCl, relatively soft seeded medic
L56 lucerne	5	spring / summer	>350	5-Oct	excellent all rounder, fantastic pest and disease package
L70 lucerne	5		>350	3-Jun	good all-round dryland performance
L91 lucerne	5		>350	3-May	excellent early vigour

RESULTS AND INTERPRETATION

All three sites were exposed to different rainfall and soil conditions. Marnoo received considerably higher growing season rainfall (GSR) than the other two pasture sites (Figure 1), which meant that more measurements could be taken due to earlier growth.

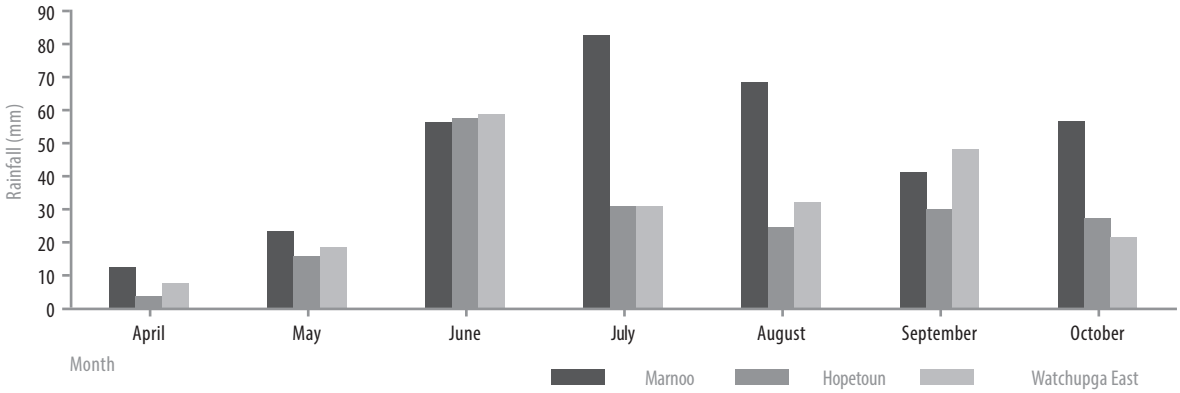

Figure 1. Growing season rainfall data for Marnoo, Hopetoun and Watchupga East pasture sites, 2013.

Watchupga East and Hopetoun sites

The Watchupga East and Hopetoun sites received only 221mm and 192.4mm GSR, respectively. These levels of rainfall are well below what is recommended for all varieties. Due to the late break at both of these sites, an early grazing was not possible. Peak biomass (with the exception of lucerne varieties) at the Hopetoun site was recorded on 17 September and at the Watchupga East site on 16 October. Cereal or ryegrass varieties were the highest yielding varieties at both sites (Table 3). These species tend to offer more feed during this feed gap due to early vigour after emergence. The lucerne varieties were not yet at peak biomass; more growth was seen in the spring.

Under tough seasonal conditions, winter cereals (Outback oats and Moby forage barley) and ryegrass varieties produced more feed than clover, medic or lucerne varieties (Table 3). Winter gap fill blend (Moby forage barley 75%, Jivet Tetraploid annual Italian ryegrass 15%, Cavalier Spineless Burr medic 7% and Bouncer brassica 3%) measured a high dry matter production due to the 75% of Moby barley. Although having adequate dry matter production, clovers, medics and lucerne varieties were relatively low compared with cereal and ryegrass crop types . This could be due to low rainfall and slightly alkaline soil types.

Table 3. Summary of dry matter production at peak biomass production for each variety at the Hopetoun and Watchupga East sites.

Variety	Hopetoun dry matter (t/ha) 17 September	Watchupga East dry matter (t/ha) 16 October
Ambassador Cocksfoot	0.46	1.92
Balance Chicory	0.23	1.41
Bartolo Bladder clover	0.87	2.21
Binaroo Button medic	1.27	1.33
Bouncer brassica	1.84	1.26
Caliph Barrel medic	1.56	1.88
Cavalier Spineless Burr medic	2.13	2.66
Clare 2 sub clover	0.82	2.99
Dalsa sub clover	0.46	1.21
Enduro Balansa clover	0.73	1.35
Hatrik Sub clover	0.47	2.16
Jivet annual ryegrass	2.91	3.93
L56 lucerne	0.38	0.41
L70 lucerne	0.56	0.82
L91 lucerne	0.78	1.08
Moby forage barley	3.84	2.87
Outback forage oats	3.69	4.38
Perun festulolium	1.96	3.12
Ranger plantain	0.58	1.27
SARDI Persian clover	1.13	2.02
Silver Snail medic	1.85	2.63
SowSmart HDL blend	1.03	2.25
Sub Zero brassica	2.41	2.09
Tetrone annual ryegrass	3.17	3.84
Turbo Persian clover	0.93	0.9
Winter gap fill blend	4.02	2.97
Zulumax Arrowleaf clover	0.76	1.69

Marnoo

Emergence was very even across the Marnoo site, in response to 344.2mm GSR. Most of the varieties showed amazing growth in response to regular rainfall events. Varieties all had good early vigour (Figure 2) and were able to be 'grazed' on 1 August. Moby barley, Outback oats and the winter gap fill blend had the most dry matter present at this first grazing, due to their early growth habit. Growth to the second grazing (25 September) was dominated by Tetrone, which produced an additional 9.8t/ha after being grazed. All varieties recovered well from grazing and, in the majority of cases, biomass production at the second cut was more than three times that achieved from the first grazing, with the exception of Moby barley and winter gap fill blend. Peak biomass was measured on 31 October with Moby barley and outback oats measuring 16t/ha and 15.9t/ha respectively, indicating that these two varieties were exceptional cereal hay producers.

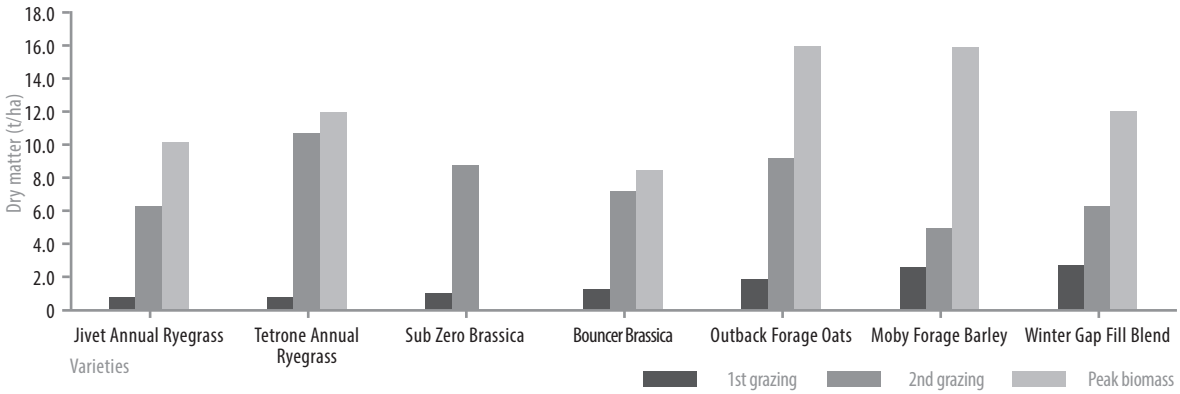

Figure 2. Dry matter production for varieties that were able to be grazed early.

These varieties are targeted for autumn/winter feed gap times. There was no peak biomass result for Sub Zero brassica due to sampling error.

All remaining varieties which were unable to be grazed early in August, were first measured on 25 September (Figure 3). The absence of early grazing value is due to the spring growth habits of these varieties. Perun festulolium provided the most biomass at this time of grazing. Turbo persian clover produced 1t/ha more than most of the other medic and clover varieties.

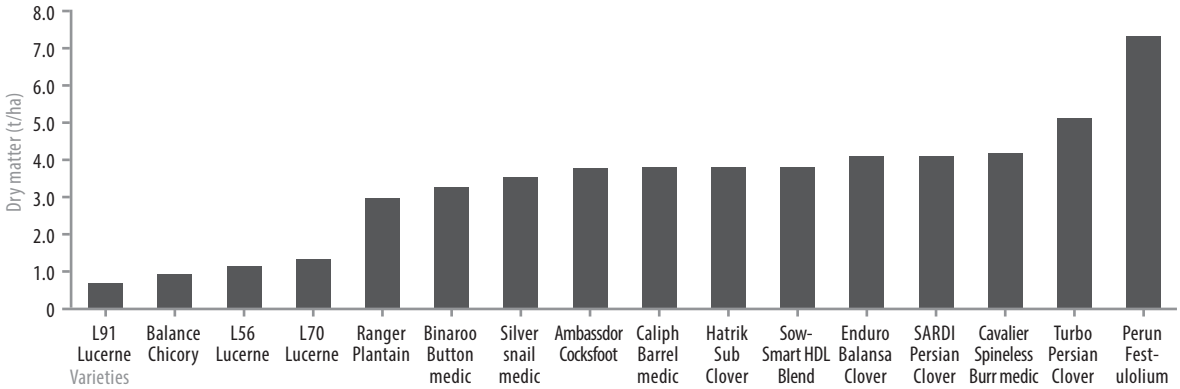

Figure 3. Varieties able to be grazed on 25 September. These varieties are targeted for winter/spring feed gap times.

Most of the varieties exceeded the minimum nutritional requirements of lambs and lactating ewes (Table 4). DSE grazing days were calculated and a number of varieties produced over 5000 DSE grazing days, mainly in the winter spring feed gap period. Some earlier autumn/winter feed producing varieties were still able to produce between 1000 and 4000 DSE grazing days (Table 4).

Table 4. Dry matter production (t/ha) and grazing value of crops grazed at two different timings at the Marnoo site.

Variety	Date sampled	Crude protein (% of DM)	Neutral detergent fibre (% of DM)	Digestibility DMD (% of DM)	Est. metabolisable energy (MJ/kg DM)	DSE grazing days
Tetrone ryegrass	1-Aug	32.7	29.7	87.4	13.4	1374
Bouncer brassica		31.9	28.3	81.9	12.5	2078
Jivet ryegrass		31.4	36.6	83.1	12.7	1222
Sub zero brassica		30.8	19.3	89.5	13.8	1967
Winter gap fill blend		29.2	36.7	79.4	12	3990
Outback oats		27.3	38.5	79.6	12.1	2874
Moby barley		24.6	41.5	77.6	11.7	3832
L56 lucerne	25-Sep	26.4	34.4	69.5	10.3	1494
Ambassador cocksfoot		18.8	45.8	76.7	11.6	5510
Sow smart HDL blend		22	30.9	77.7	11.8	5708
Ranger plantain		26.1	34.1	76.8	11.6	4379
Caliph Barrel medic		24.2	n/a	72.6	10.9	5232
SARDI Persian clover		22.9	30.5	78.8	11.9	6114
Balance chicory		25.3	30.8	74.4	11.2	1344
Silver snail medic		23.1	32.6	72.2	10.8	4860
Enduro Balansia clover		20.5	31.5	79	12	6150
Turbo Persian clover		29	27.8	79.4	12	7725
Cavalier spinless burr medic		25.4	31.8	74	11.1	5814
Perun Festulolium		19.5	52.6	71.1	10.6	9779
Minimum requirement for lactating ewes and lambs		>16%	>30%	>75%	>11 MJ Kg/DM	

COMMERCIAL PRACTICE

There are a number of new varieties on the market capable of fitting into current mixed farming systems that experience feed gaps during harvest and in the early autumn. Numerous pasture types are able to meet the nutritional requirements of livestock systems at crucial times when supplementary feeding is most common.

Given favourable seasonal conditions, clover, medic and brassica varieties are able to provide nutritious feed over winter, spring and into early harvest. These varieties also offer a disease break in a cereal rotation. The cereal varieties and winter gap fill blend are able to provide substantial feed during autumn and winter, then go onto produce high quality hay in spring. Previous trial results have shown that Moby barley can be grazed as early as six weeks after sowing.

The nutritional value of varieties was exceptional and would provide an excellent feed source for lactating ewes and lambs. Clovers and medics are two nitrogen fixing pasture types that could replace vetch in rotations for increased grazing opportunities.

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