Complementary Forage Options

Joe Jacobs
Future Farm Systems Research, Department of Primary Industries, Warrnambool, Victoria

Introduction

Project 3030 has been researching a range of forages that have the potential to increase dry matter (DM) production and consumption per hectare from home grown forages. In addition, the work has also focussed on not compromising the nutritive value of what is grown. Agronomy studies have focussed upon the production of winter forages for both grazing and forage conservation, improving the production of summer crops and integrating winter and summer forages into year round double cropping systems.

Winter Forage options

Annual ryegrass - sowing rate and N studies

In earlier studies, annual ryegrass was used as a comparison to winter forage cereals and performed well under limited grazing scenarios but became severely lodged by the time it was taken off for silage. We consider that the most benefit from annual ryegrass will be through optimising grazing regimes. Based on this premise, a two study was established to investigate the effect of sowing rate and N fertiliser regimes on different annual ryegrasses. The study used three annual ryegrasses – Progrow (a diploid), Winterstar (a tetraploid) and Abundant (a high sugar tetraploid). Each was sown at 10, 20, 30, 40 or 50 kg/ha in mid April. Nitrogen regimes were imposed after the first grazing. These were

- No nitrogen
- 15, 30 or 45 kg N/ha at every grazing

All treatments were grazed at the 2.5 to 3 leaf stage with six grazing events occurring in year 1 and five in year 2 between sowing and early November. Year 1 (2007) was considered to have had an almost ideal growing season with a good break and adequate rainfall throughout the winter/spring period. In contrast, in 2008, the break was later and during late July and August waterlogged conditions prevailed which was followed by a dry spring.

The effect on total DM yield over the two years is shown in Figure 1. For year 1 the data indicates that highest DM yields were achieved at a sowing rate of 40 kg/ha (9.9 t DM/ha). The DM yield at 30 kg/ha was 9.6 t DM/ha which showed an improvement of 300 kg DM/ha over the growing period between these sowing rates. The difference between 20 and 30 kg/ha sowing rates was 600 kg DM/ha. For year 2, the increases in DM yield moving from 20 to 30 kg/ha were 1100 kg DM/ha, with a further 600 kg DM/ha being produced by increasing the sowing rate to 40 kg/ha.

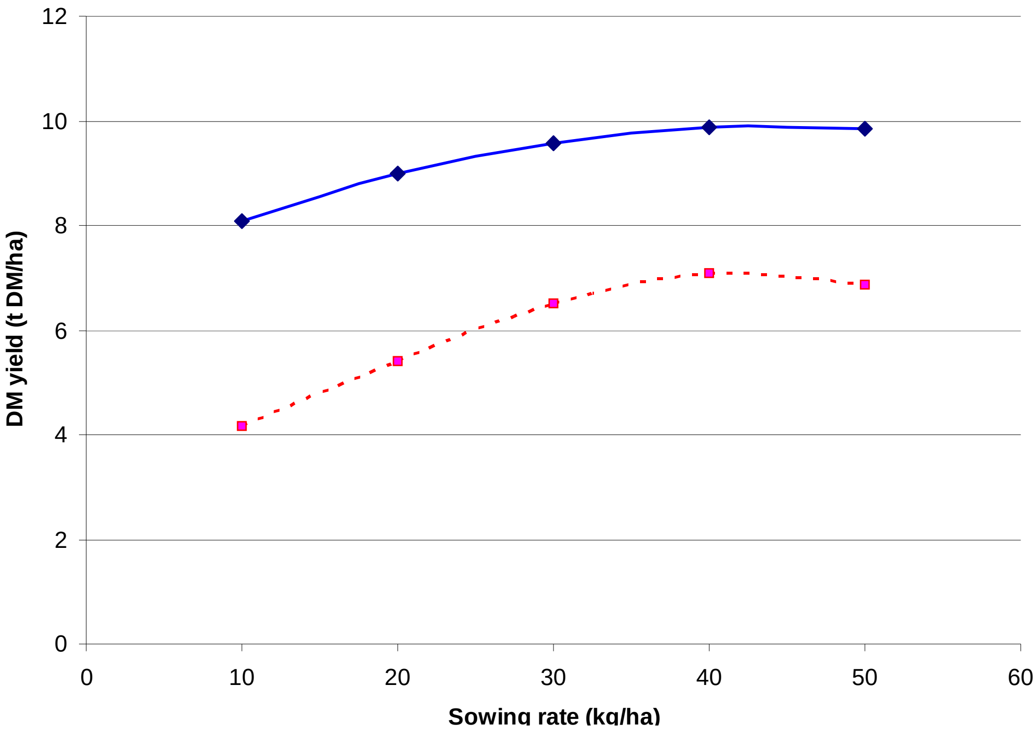

Figure 1. Effect of annual ryegrass sowing rate (kg/ha) on total dry matter yield (t DM/ha) in year 1 (solid line) and year 2(dotted line).

Based on an average over both years the additional DM grown was 850 and 1300 kg DM/ha at 30 and 40 kg/ha compared to the 20 kg/ha sowing rate. Assuming that this is utilised (80% utilisation) the additional feed consumed would be 680 and 1040 kg DM/ha for the two sowing rates.

There are number of ways to look at the value of this feed, including reduced supplementary feed costs and increased milk production potential. For the example in Table 1, we have chosen the increased milk production potential. An average herbage ME of 11.5 MJ/kg DM was used to calculate the values for additional ME consumed.

The data indicates that for the additional cost of 10 kg of seed, there is an opportunity to produce almost an extra 1500 L of milk for the growing period. These calculations were based on 5.5 MJ required to produce a litre of milk.

Table 1. Potential milk response to growing additional feed with increased sowing rates of annual ryegrass

ARG sowing rate (kg/ha)	Extra DM consumed (kg DM/ha)	Extra MJ consumed (MJ/ha)	Milk potential (L/ha)
20			
30	680	7820	1422
40	1040	11960	2175

For year 1 there were only small differences between annual ryegrass cultivars in terms of DM yield by grazing, with Progrow producing more feed at the first grazing, whilst both tetraploid cultivars produced more feed at the October grazing (Figure 2). Total DM yields over the trial period were similar.

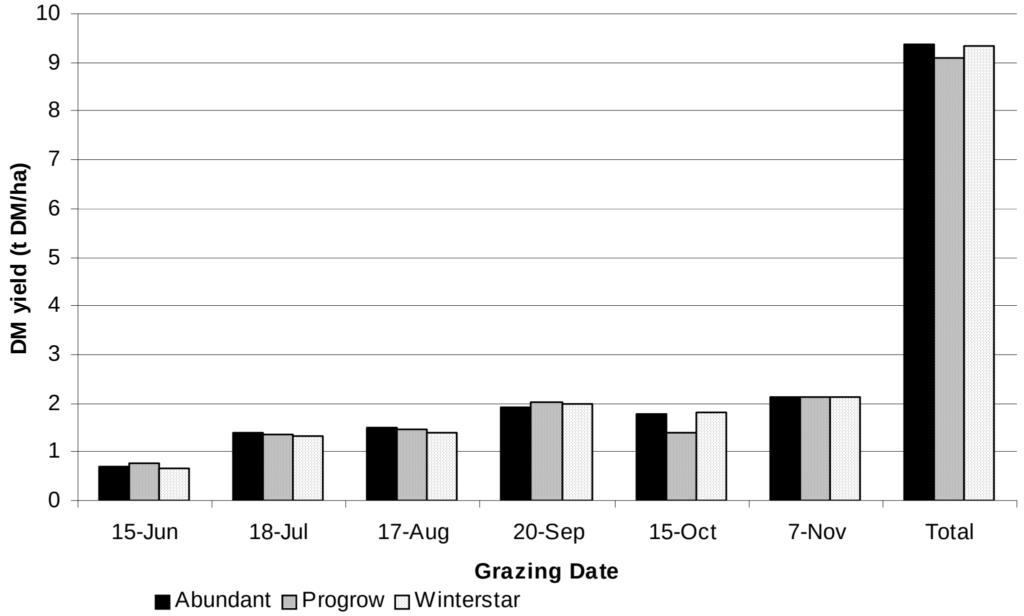

Figure 2. Effect of grazing and annual ryegrass cultivar on total DM yield (t DM/ha) in year 1.

For the second year, differences between cultivar DM yield at each grazing was more evident with the tetraploid cultivars tending to perform better earlier in the season (Figure 4). By spring DM yields at each grazing were similar for all cultivars.

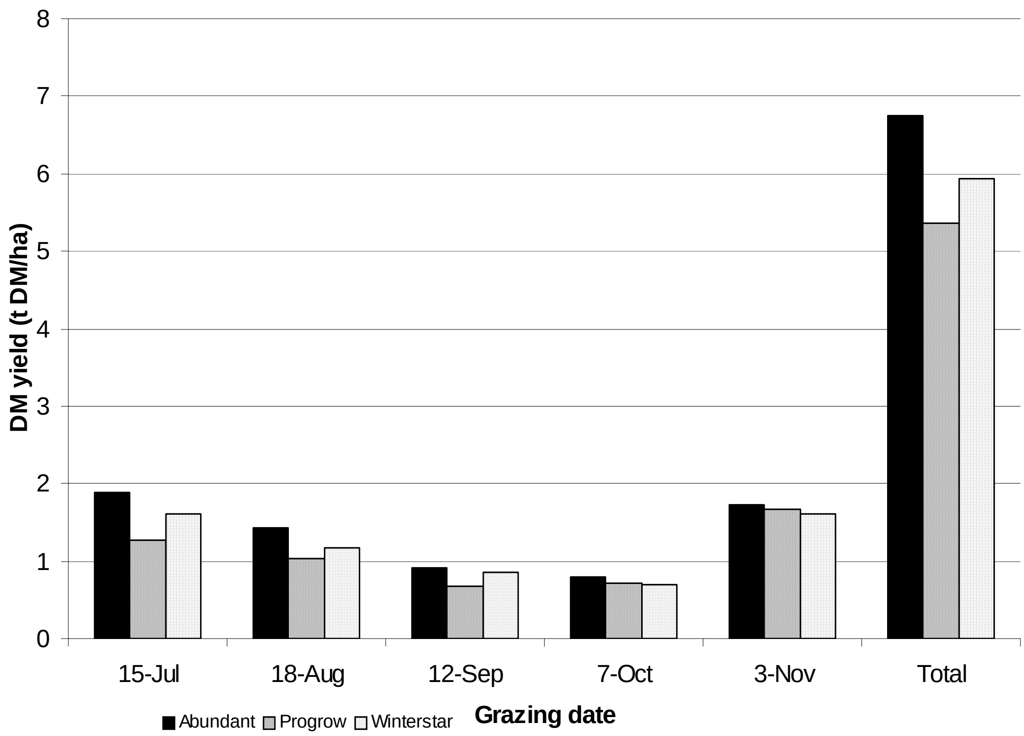

Figure 3. Effect of grazing and annual ryegrass cultivar on total DM yield (t DM/ha) in year 2.

Figure 4 presents the effect of N application on total DM grown for each year. Response rates were 15.3, 11.9 and 8.5 kg DM per kg N for year 1 and 12.3, 7.3 and 5.4 kg DM per kg N for year 2 applied at the 15, 30 and 45 kg N/ha application rates. Additional DM grown over the growing period was 0.92, 1.43 and 1.53 t DM/ha in year 1 and 0.74, 0.87 and 0.97 t DM/ha in year 2 for the 15, 30 and 45 kg N/ha application rates. Based on urea costs of $800 t (inc spreading) the cost of this additional feed in year 1 and 2 was 11.3, 14.5, 20.6 c/kg DM and 14.1, 23.9 and 32.5 c/kg DM respectively.

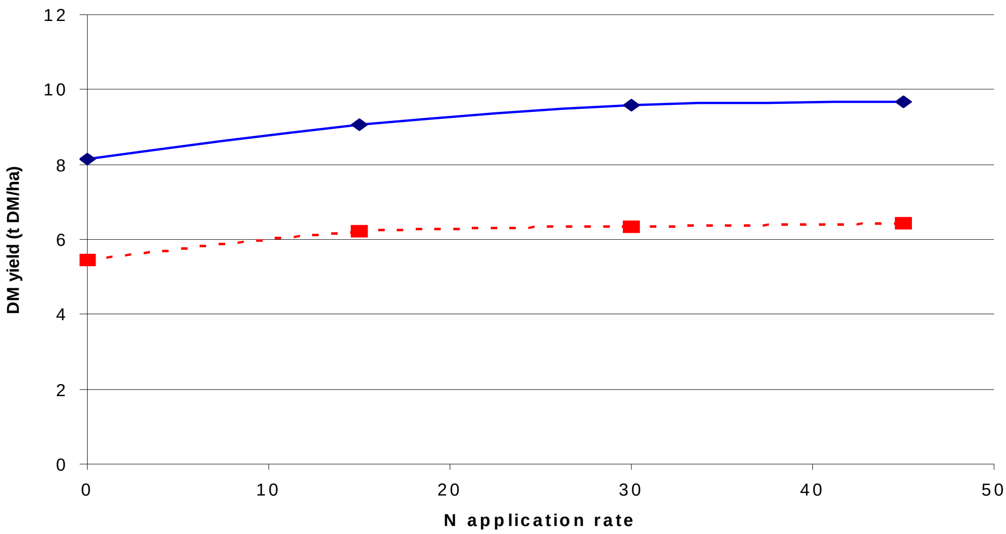

Figure 4. Effect of nitrogen (N) application on total dry matter yield (t DM/ha) in year 1 (bold line and year 2 (dotted line).

Whilst yet to be fully analysed, data for ME and CP of the annual ryegrass cultivars at each grazing indicates only small differences between cultivars with all cultivars maintaining a high ME and CP right through the study.

Summary

Question	Answer
DM yield potential	Grazing – Up to 10 t DM/ha from April to early November Silage – up to 14 t DM/ha with limited grazing early in season. But severe lodging likely and subsequent loss of harvestable material
Sowing rates	Rates of 30-40 kg/ha appear economical
N options	Robust responses with rates up to 30 kg N/ha after every grazing (0.5-1 kg N/day)
Nutritive characteristics	Grazing – ME of 12 MJ/kg DM likely for most of growing season if grazed at appropriate stages of growth. High CP (above 30%) may be an issue at times

Effect of growth stage on DM yield and nutritive value of triticale and wheat

The data from the first two years of studies showed that the nutritive characteristics of forage cereals at harvesting for silage was moderate in terms of ME and CP for forage cereals. These crops were harvested at soft dough (GS 85) which according to overseas data is considered the ideal time to optimise the relationship between DM yield and nutritive value.

Over these first two years, spring conditions were not typical with early ends to the growing period affecting grain fill, coupled with frosts at flowering which may have hindered grain set. Over the last two years more detailed measurements have been taken of DM yield and nutritive characteristics at different stages of growth in attempt to gain a better picture of how growth stage affects these factors.

Figure 5 shows the changes in DM yield as growth stage progresses whilst Figure 6 overlays ME and CP content with DM yield changes. Figure 5 highlights that both cereals grew at similar rates until the boot stage (GS 47), thereafter, growth rates for triticale were significantly higher than for wheat resulting in DM yields at soft dough (GS 84) of 17 and 12.8 t DM/ha for triticale and wheat respectively.

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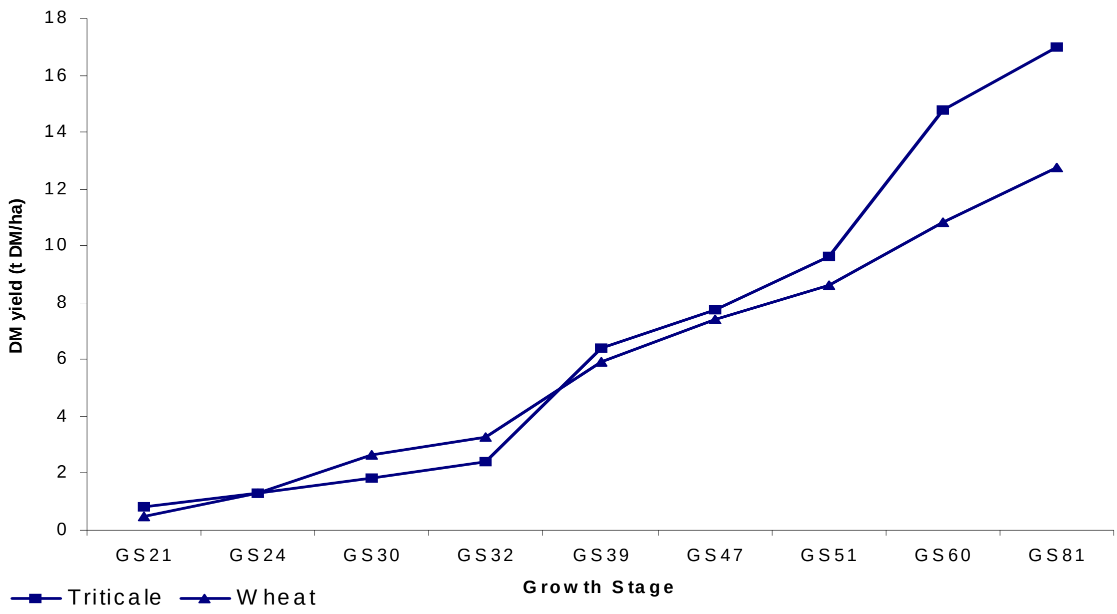

Figure 5. Dry matter yield changes of triticale and wheat with increasing crop maturity

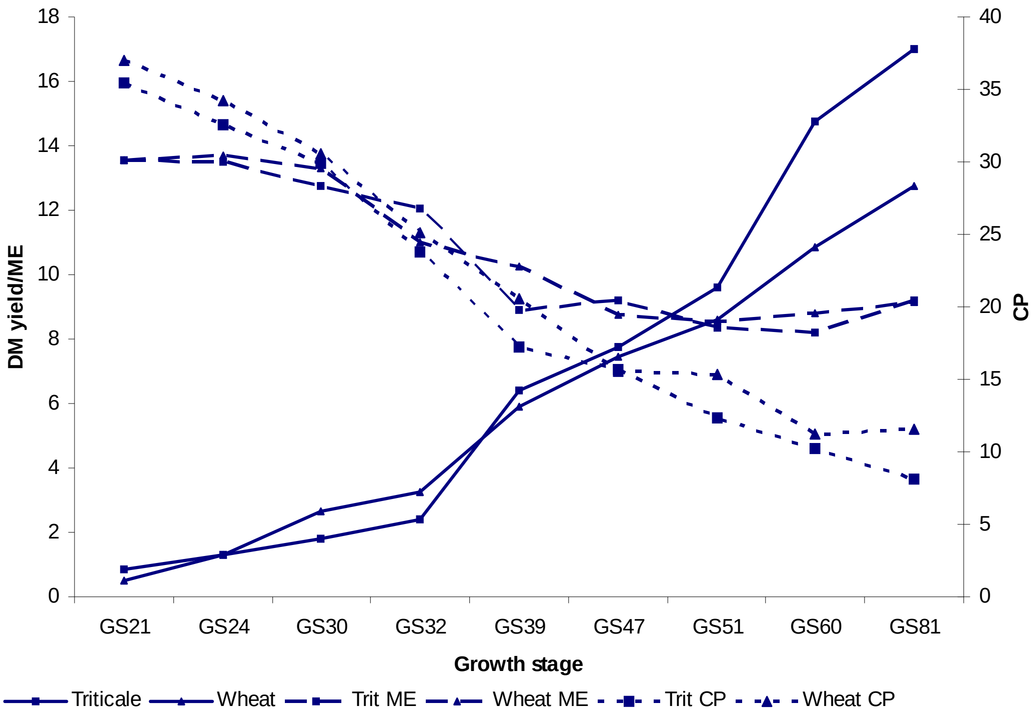

Figure 6. Impact of crop maturity on DM yield, metabolisable energy and crude protein content of triticale and wheat

Both ME and CP declined as growth stage progressed, with CP declining right through to soft dough resulting in values of around 8 % for triticale and 12% for wheat. In contrast, ME declined until flowering to early ear development, thereafter, there were small improvements in ME as starch begins to be deposited in the grain. This data raises questions as to the value of deferring cutting further in order to further improve the ME of the forages. The potential downside would be a higher DM content at ensiling (above 40%) which may impact on compaction of the material in the silo and also aerobic stability once the silo is opened.

Effect of stage of growth on silage nutritive characteristics

Based on the findings from the study above, a separate study was undertaken to further elucidate the effect of cutting cereals at key stages of growth on resultant silage ME and CP. This work was undertaken to provide key data under our conditions as oppose to relying on overseas information.

The study involved cutting three cereals (triticale, wheat or oats) at either boot (GS47), flowering (anthesis) (GS65), milk (GS75) or soft dough (GS84) and then precision chopping and ensiling the material. At the earlier stages of growth the material was ensiled both directly and wilted for 24 hours. In addition, each crop was ensiled either untreated or with one of two additives. The additives were different bacterial inoculants with different fermentation pathways.

The ME at boot of all silages was above 10 MJ/kg DM, however by anthesis only oats remained at this level (Figure 7). Generally ME declined through anthesis and milk, but for triticale and wheat did improve by the soft dough stage of growth. For oats, ME declined as growth stage advanced with no improvement by soft dough. DM yields at boot were 5.1, 7.9 and 7.5 t DM/ha for triticale, wheat and oats and 17.9, 10.9 and 10.4 t DM/ha by soft dough. When costs for sowing, crop management and ensiling were calculated, this equated to $325, 210, 221 t DM at boot and $92, 152 and 159 t DM at soft dough for triticale, wheat and oats respectively. Costs per MJ were 3.1, 2.0 and 2.1 c/MJ at boot and 1.0, 1.6 and 1.8 c/MJ at soft dough for the three crops.

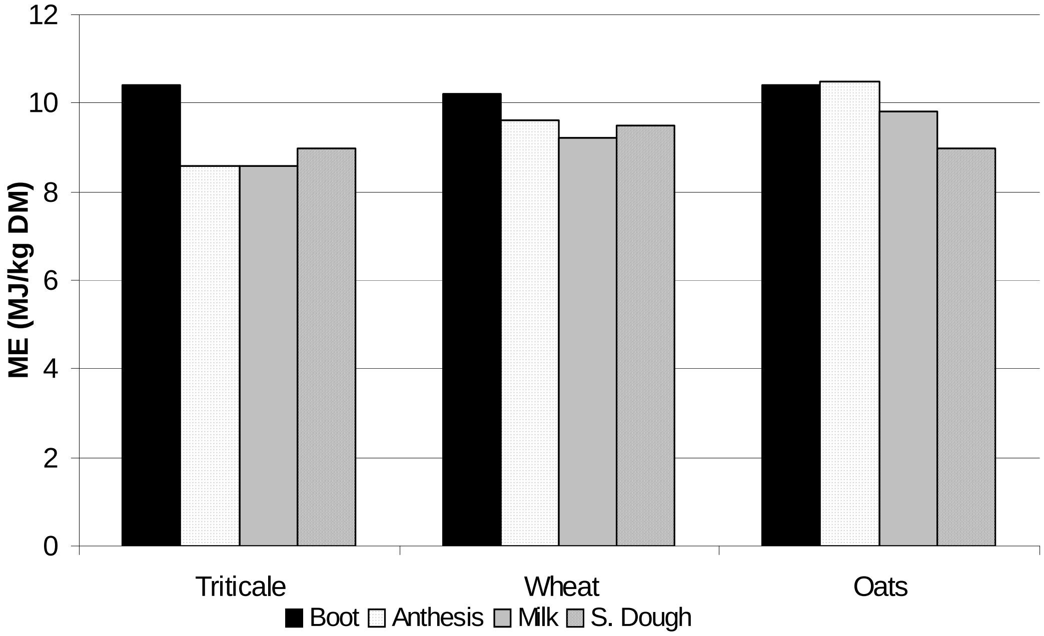

Figure 7. Effect of stage of growth on silage ME for different cereal silages.

The CP content of all silages made from crops declined as the crops matured, with final values being below 12% (Figure 8). If these silages were fed when actively growing pasture constituted a major part of the diet, then it is unlikely that further protein supplementation would be required. However if these silages were to be fed with other silages and/or cereal grains, then the addition of a protein supplement would be likely.

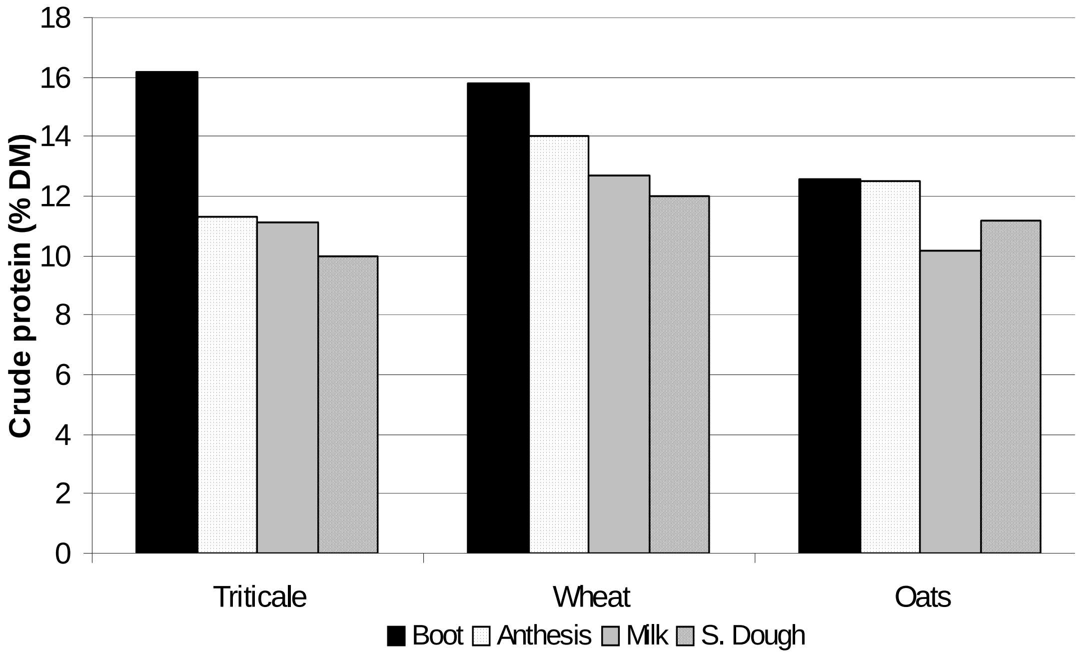

Figure 8. Effect of stage of growth on silage CP for different cereal silages.

All of the silages made were well fermented with the majority of pH values below 4.0 for the direct ensiled silages and 5.0 for the wilted silages. Ammonia – N as a proportion of total N was generally below 10% indicating well fermented silages.

The two additives used did result in different fermentation pathways, with both resulting in well fermented and stable silages.

Cereal and Pea combinations: Effect on DM yield and nutritive value for whole crop silage

Winter forage cereals offer potential on dryland dairy farms for both grazing and ensiling opportunities, but questions remain over the nutritive value of resultant silage as a feed for lactating dairy cows. This study evaluated the potential of growing peas in combination with forage cereals to improve the nutritive value of silage whilst maintaining dry matter (DM) yields.

The study was undertaken over two years and used wheat (cv Wedgetail) or triticale (cv Crackerjack) in a range of combinations with peas (cv Kaspa). Treatments were 100% cereal (W100; T100) or 100% pea (P100) and combinations of cereal and pea at 75:25 (W75P25; T75P25), 50:50 (W50P50; T50P50) and 25:75 (W25P75; T25P75) with ratios based on sowing rate (137 kg/ha). Additional N (100 kg N/ha) was applied to all treatments when the cereal crops reached stem elongation (GS 32).

At GS 85, the crops were harvested using a precision chop forage harvester and samples taken to ensile in small laboratory scale 4 kg silos. Material for each treatment was ensiled either untreated or with silage additives (LaSil or Sil-All 4x4 in year 1 and Tri-Lac, LaSil or Sil-All 4x4 in year 2). Silos were opened 120 days after ensiling and samples analysed for DM content and fermentation and nutritive characteristics.

This study was undertaken over the same two years as the previously mentioned annual ryegrass study and therefore was impacted by two quite different growing seasons. Despite the differences between growing seasons the DM yields for each treatment are remarkably consistent.

Triticale tended to out yield the corresponding wheat treatments, a feature we have consistently seen in all studies. Of interest was the DM yield of peas which was not significantly different to any of the wheat treatments.

Based on this data, one would suggest growing peas as a monoculture may be an option, however without the support of a cereal type crop they tend to lodge easily and resultant silage yields may be poor.

Costs per tonne of ensiled material ranged from $102 t DM for the triticale to $138 t DM for the peas.

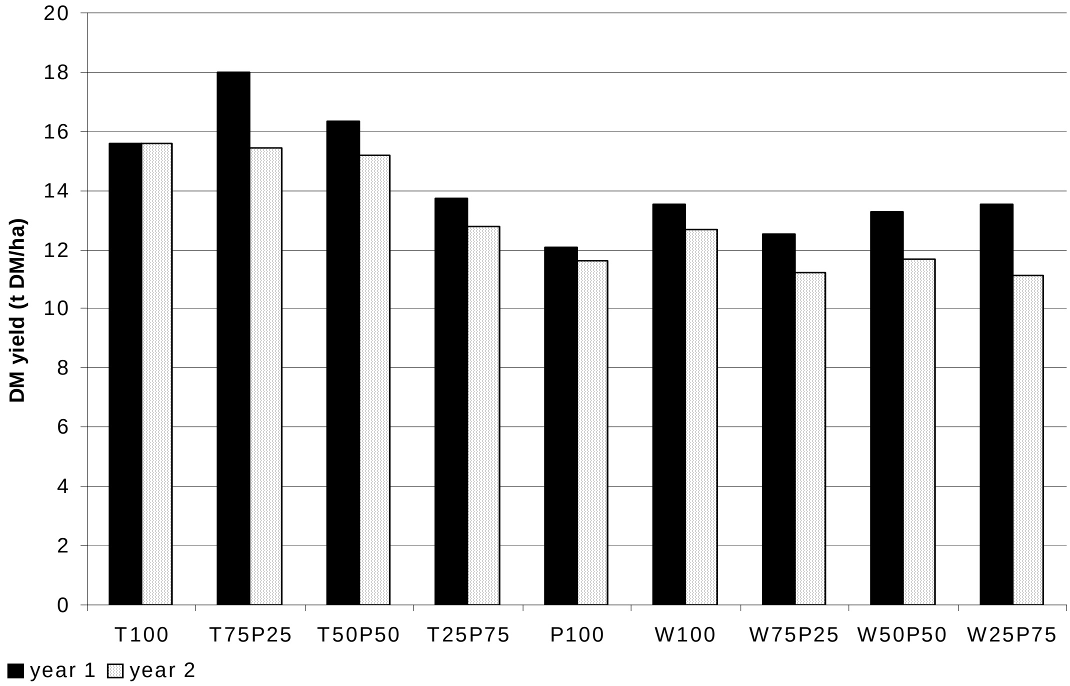

Figure 9. Dry matter yields (t DM/ha) of cereal/pea combinations over year 1 and 2.

The resultant silages (year 1 data only) highlight the high nutritive characteristics of peas in contrast to the forage cereals (Figure 10). Where peas were included at rates above 50% of the mix, the CP and ME were generally higher than for the cereal monocultures. Furthermore, if total ME per ha (GJ/ha) is calculated, the P100 (138.5 GJ/ha) out yields all treatments except T50P50 and T75P25 and the P100 also produces the most CP per ha.

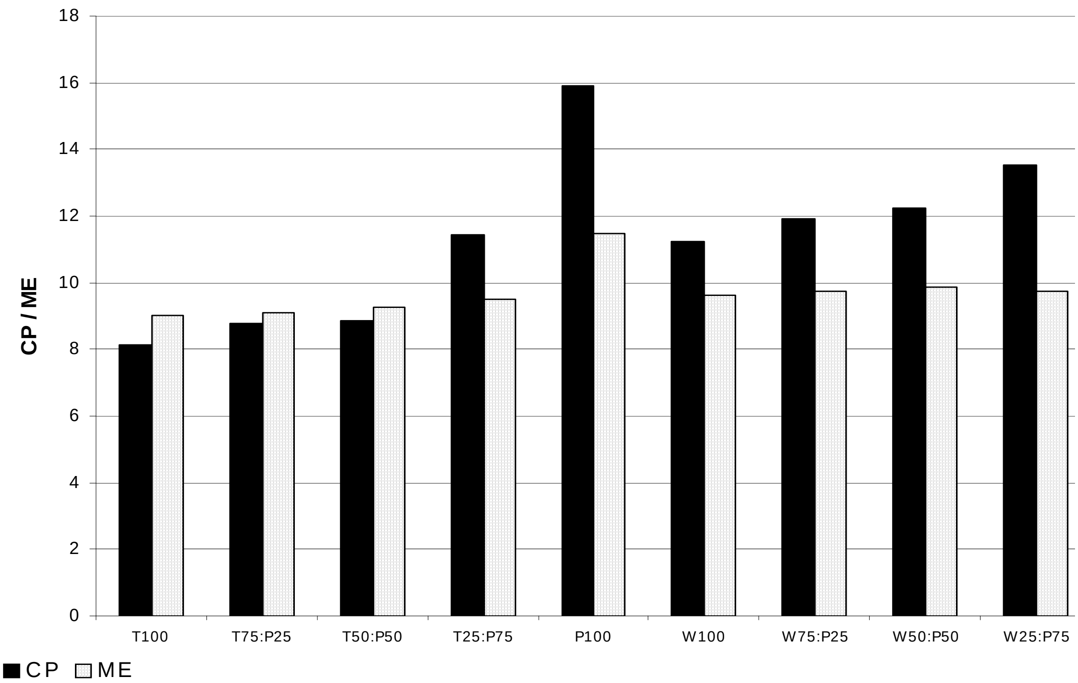

Figure 10. The metabolisable energy (MJ/kg DM) and crude protein content (% DM) of ensiled cereal/pea mixes.

The DM content of peas at ensiling was markedly lower than all other treatments and at the levels observed it would generally be considered appropriate to wilt prior to ensiling. At this DM content, the WSC as a proportion of fresh weight was 2%, below the level considered required for adequate fermentation to occur. Whilst this may indicate difficulties with ensiling, the fact that the CP content of the pea silage has remained constant in relation to the fresh material indicates a more controlled fermentation with little loss through extensive proteolysis.

One of the benefits of direct ensiling is a reduction in the likelihood of field losses, therefore it may be possible to either defer ensiling until the DM of the standing crop increases or ensile with a higher DM material such as a forage cereal. Analysis of fermentation parameters (pH, ammonia-N, lactic, acetic acid) highlights that all silages were well fermented (Table 2).

Table 2. Effect of forage and additive on pH, the proportion of total nitrogen present as ammonia-N, acetic acid content (g/kg DM), lactic acid content (g/kg DM) and on total fatty acid content (TFA) (g/kg DM)

	pH	%TN as NH_4	Acetic	Lactic	TFA
T100	3.72	7.92	15.80	79.1	95.5
T75P25	3.81	8.07	16.10	63.8	80.6
T50P50	3.81	8.16	16.58	86.7	103.6
T25P75	4.09	7.73	24.48	89.7	115.4
W100	3.97	10.48	13.93	57.1	71.7
W75P25	3.97	10.42	18.69	67.9	87.1
W50P50	4.11	11.17	25.15	87.8	115.0
W25P75	4.27	10.42	22.40	95.2	119.8
P100	3.81	11.37	21.93	114.9	139.2
Control	3.94	9.56	18.67	85.4	105.4
Sil-All®4x4	4.00	9.42	20.29	75.7	98.0
LaSil AS Plus™	3.91	9.60	18.30	86.3	105.1

Summary

Question	Answer
Which crops are best	Triticale and wheat as dual purpose (grazing and silage), oats for grazing
DM yield potential	12-20t DM/ha achievable.
Nutritive characteristics	High at grazing (12 MJ/kg DM and 20+ CP) Moderate at silage (8-10 MJ/kg DM, 10 CP) Can improve with use of companion species – legumes, chicory
Sowing rates	100 kg/ha appears ideal
Grazing options	One grazing does not adversely affect final silage yields. Graze before stem elongation (GS30)
Optimum time to cut for silage	Consider balance between yield and nutritive characteristics Importance of follow on summer crop and available soil moisture
Robustness	Handle late breaks better than ARG Susceptible to frosts during flowering – leading to poor grain fill
Cost per t DM	Depends on harvest time Boot $200-300/t DM Soft dough $90 – 160 / t DM

Current studies 2009

Grazing studies

Brassica/Annual ryegrass mixes

Annual ryegrass when sown in autumn provides feed through early winter and well into spring. Dry matter yields of up to 10 t DM/ha are achievable for well managed annual ryegrass pastures. Whilst quicker to establish than perennial pastures, newly sown annual ryegrass pastures can often take 2-3 months to reach a point where it is ready for grazing. It is proposed that the inclusion of a ‘cover crop’ of brassicas will allow for earlier grazing without compromising the growth of the developing annual ryegrass. Such a system should therefore provide earlier DM production and in turn increase total DM production.

This study aims to investigate the potential of using a brassica species in conjunction with annual ryegrass as a way to manipulate the DM yields and nutritive characteristics of annual ryegrass based pastures.

Based on previous studies that compared different annual ryegrass cultivars and sowing rates, it was shown that a sowing rate between 30 and 40 kg/ha resulted in higher DM yield and consumption than for either 10 or 20 kg/ha. However, sowing at 50 kg/ha provided no additional advantage. In addition, anecdotal recommendations for the use of brassica crops in winter suggest a sowing rate of 3 kg/ha when sown alone or up to 2 kg/ha when sown with annual ryegrass. Based on this available information, a series of treatments that combine the annual ryegrass with a brassica species are proposed (Table 3).

The annual ryegrass cultivar used will be one of the newer Tetraploids available, whilst the brassica will be Winfred (*Brassica napus* L.), a hybrid brassica previously used with success in autumn and winter.

Table 3. Sowing combinations of Winfred and annual ryegrass

Treatment	Brassica - Winfred (kg/ha)	Annual Ryegrass (kg/ha)
	Sown together	
1	1	15
2	2	25
3	3	35
4	1	15
5	2	25
6	3	35
7	1	15
8	2	25
9	3	35
10	0	15
11	0	25
12	0	35

Oat/Annual ryegrass mixes

Previous research has shown that cereal forages are more resilient to late autumn breaks and can provide greater quantities of autumn/early winter feed than annual ryegrass. In contrast, annual ryegrass has the ability to provide feed with excellent nutritive characteristics through winter and into late spring, whilst cereals tend to have lower nutritive value as the season progresses. It is proposed that the inclusion of a ‘cover crop’ of Oats will allow for earlier grazing without compromising the growth of the developing annual ryegrass. Such a system should therefore provide earlier DM production without adversely affecting total DM production.

This study aims to investigate the potential of using Oats in conjunction with annual ryegrass as a way to manipulate the DM yields and nutritive characteristics of annual ryegrass based pastures.

Based on previous studies that compared different annual ryegrass cultivars and sowing rates, it was shown that a sowing rate between 30 and 40 kg/ha resulted in higher DM yield and consumption than for either 10 or 20 kg/ha. However, sowing at 50 kg/ha provided no additional advantage. In addition, anecdotal recommendations for the use of Oats in winter suggest a sowing rate of up to 120 kg/ha when sown alone or up to 100 kg/ha when sown with annual ryegrass. Based on this available information, a series of treatments that combine the annual ryegrass with a Oats are proposed (Table 4).

The annual ryegrass cultivar used will be one of the newer Tetraploid cultivars available (Abundant), whilst the Oats will be a variety called Gallileo. In addition to the proposed annual ryegrass and Oats treatments, another option using a newly developed ryecorn will be included as a comparison for potential future work with this species.

Table 4. Sowing combinations of oats and annual ryegrass

Treatment	Oat Forage	Annual Ryegrass (kg/ha)
	Sown together	
1	0	15
2	0	25
3	0	35
4	80	0
5	100	0
6	120	0
7	80	15
8	80	25
9	80	35
10	100	15
11	100	25
12	100	35
13	120	15
14	120	25
15	120	35
16	Ryecorn 100 kg/ha	0

Silage studies

Companion cropping with winter cereals

Previous studies have established the potential for growing high DM yields using cereals and harvesting at the soft dough stage. However, there are also limitations to this option, (i) the resultant nutritive value limits it’s use for early lactation diets and (ii) subsequent summer crops appear to struggle due to lack of soil moisture at sowing. Studies are proposed that will investigate options of sowing other forages with winter cereals. A pilot study has highlighted the potential of using a late maturing pea (Kaspa) with either triticale or wheat. Preliminary data indicates that there may be value in sowing mixes of wheat and peas, whilst for triticale it would be better to sow the crops separately to exploit their potential. Other legumes (vetches, beans, annual clovers) may offer potential as either mixed or monocultures that would be mixed at ensiling.

A study has been established to explore the potential of sowing a range of legumes with wheat to improve the nutritive characteristics of the resultant silage without impinging on silage yields. Legumes being used are peas, vetch, balansa clover, shaftal clover, arrowleaf clover, red clover and white clover and have been sown alone or in combination with wheat.

Double cropping studies

The aim of this proposed research is to draw together the key findings from the previous studies on summer and winter crops to develop sustainable systems for double cropping. These forage systems will need to have increased adaptability and resilience to seasonal variability, longer term climate change, be more resource efficient (water, nutrients, feed conversion efficiency), have a positive impact on carbon and greenhouse gas management, and be economically viable.

The double cropping research will focus upon:

- Integration of summer and winter crops into year round forage systems
- Pattern of forage production (DM yield and nutritive characteristics) and contribution to total feed supply

Based on the findings from studies in 3030 Phase I and previous modelling the treatments proposed are presented in Table 2. Each of these systems has the potential to fill known feed gaps either by grazing in situ or through forage conservation. Each in turn, has challenges in terms of the transition from one forage crop to the next and it would appear that it is the timing of this transition that in effect will make or break each option.

Table 3. Double cropping options

0-12 months		**12 – 24 months**		**24-30 months**
Perennial ryegrass				
Brassica	Wheat (Boot)	Brassica	Wheat (Boot)	Brassica
Brassica	Wheat (SD)	Brassica	Wheat (SD)	Brassica
C4	Wheat (Boot)	C4	Wheat (Boot)	C4
C4	Wheat (SD)	C4	Wheat (SD)	C4
Brassica	ARG (graze, cut at early ear)	Brassica	ARG (graze, cut at Early ear)	Brassica
C4	ARG (graze, cut at early ear)	C4	ARG (graze, cut at early ear)	C4
Brassica	Wheat/Pea (SD)	Brassica	Wheat/Pea (SD)	Brassica
C4	Wheat/Pea (SD)	C4	Wheat/Pea (SD)	C4
Brassica	O/S wheat	Brassica	O/S wheat	Brassica
Chicory/Plantain/red clover/Arrowleaf clover	O/S wheat	Chicory/Plantain/red clover/Arrowleaf clover *	O/S Wheat	Chicory/Plantain/red clover/Arrowleaf clover *

* top-up if required

The basis for each treatment is as follows:

1. Cereal/summer crop options

Initial modeling for 3030 highlighted the potential for cereal/turnip systems to produce 20 t DM/ha per annum. This figure has been realised in 3030 phase I, but has been produced primarily through high cereal DM yields. These high DM yields have however been associated with feed of at best medium nutritive value (9 - 9.5 MJME/kg DM and 8 – 10% CP) with limited use in the diet of lactating animals (late lactation and dry cow periods). The poor production from the brassica component of the system was a combination of relatively late sowing (waiting for cereals to be harvested at soft dough) leading to low soil moisture at sowing, dry summers (2006/07 was decile 1), severe insect damage and high weed burdens. The treatments put forward here will determine the value of earlier (boot) and later (soft dough) harvesting of the cereals and the impact this has on conserving soil moisture. In turn this will provide an opportunity to determine the impact of early and late sown brassica crops and this impact on DM yields. The brassica used in this study will be Winfred, a regrowth forage which should provide at least 2 grazings. The C4 species, millet will also be tested as an alternative to a brassica crop. The benefit of using a forage such as millet will be to eliminate insect damage, however, it is likely that the nutritive value will be lower than that of a brassica forage. In addition, there is likely to be challenges with early sowing due to it's need for soil temperatures of 16^{o}C or above at sowing. The matrix of treatments proposed will enable us to elucidate the benefits and disadvantages of each combination.
These systems will provide an grazing in early winter, a high yielding conserved feed in spring and at least 2 grazings over summer. Both early winter and summer are periods when production from perennial ryegrass is low and other options to meet herd requirements are needed. The conserved feed (depending on nutritional value) be fed when other feeds grown on farm are limiting. The treatments will also enable a comparison of early and late cut cereal silage in terms of DM production and nutritive value.

2. Annual ryegrass/summer crop options

In contrast to cereals, annual ryegrass provides greater flexibility in terms of its ability to be grazed over winter and spring or being locked up for silage in spring. Previous studies indicate that under grazing regimes DM yields of over 10 t DM/ha are attainable, whilst the addition of forage conservation in spring may further increase this figure. Whilst these DM yields may not be as high as those observed with cereals, the nutritive value is consistently higher and therefore annual ryegrass can be used to provide a substantial part of dietary requirements at any stage of lactation.

The proposed systems will aim to graze annual ryegrass through winter (4-5 grazings) and then lock up for silage in mid September with an aim to cut at early ear emergence (end October. This will be then be followed with either a brassica crop or millet. The brassica to be used in these treatments will be the same as for the cereal double cropping treatments (Winfred).

3. Cereal/Pea / summer crop options

Previous component studies have highlighted the potential of using peas with wheat. When peas where included in a 50:50 mix with wheat there was no effect on DM yield and it is likely that nutritive value was improved (awaiting analytical data). Using this mixture provides an opportunity to increase the flexibility of where cereal silage fits into the feeding regime.

This system would not be grazed in early winter as the legume component may not be able to handle grazing pressure. With the incorporation of peas, the cereal/pea mix will be sown in late April, therefore providing an opportunity for additional grazing from the summer crop part of the system.

4. Chicory/Plantain/red clover/Arrowleaf clover (salad mix) / cereal option

The ‘salad mix’ when established in spring has been shown to persist for 2-3 years in mixed perennial pasture swards. It is proposed that a spring established ‘salad mix’ sward could be oversown with a cereal the following autumn and successfully compete for resources over the autumn/winter/spring period until the cereal is removed for silage. The ‘salad mix’ would then remain over the next summer. Depending on plant survival, decisions would be made as to whether additional ‘salad mix’ was sown in spring after the cereal silage was removed. If the ‘salad mix’ does contribute to DM production in spring, there is a strong likelihood that it will also improve the nutritive value of the cereal silage.