

Trial Site

2022

Demonstration Trial  
Site  
at Rylington Park  
Institute of Agricultural  
Training and Research



## Trial Demonstration Year Overview

Pasture Species Demo **P.1**

Barley Variety x N rate Demo **P.3**

Canola Variety Demo **P.5**

Canola N Placement and Rate Demo **P.5**

Hay Variety x Nutrition Demo **P.5**

### Pasture

New and old pasture varieties were demonstrated in a site with a high grass weed pressure. Annual ryegrasses showed their competitiveness while perennials struggled to dominate.

### Barley

Cyclops yielded well in the demo offering a good alternative to Planet. The barley yielded up to 7.7 t/ha although was impacted by bird damage.

### Canola

45Y28, Eagle and 4520P produced the highest yields, with yields reaching 6t/ha under 170N rates. Trifecta was the highest yielding TT and 45Y95 was the highest yielding Clearfield.

### Hay

BBAS Pasture Mix at 25 kg/ha with 80kg/ha of Cooe Oats was the highest yielding hay, although was slightly lower in metabolisable energy. The addition of balansa clover increased ME and protein but reduced fibre content.

## Pasture Species Demonstration.

The 2022 pasture demo showcased a multitude of species and varietal options available for sowing into pastures in the Great Southern region. The site was established to encourage discussion about each varieties' fit within our local farming systems and to explore their potential in the high rainfall zone.

## Legumes

Legumes are a cornerstone for many pasture systems. They provide free, fixed atmospheric nitrogen to the soil and companion grasses; and are favored by livestock due to their great palatability.

Three sub-clovers were sown into the Rylington Park Demo site, Coolamon, Bindoon and Izmir. **Coolamon** is a longer season variety with 136 days to flower. Coolamon has sufficiently hard seed to withstand false breaks and has a good seed set for sufficient regeneration. **Bindoon** is a highly productive mid-season growth sub clover with 112 days to flower and excellent seed set which is important for persistence as Bindoon is on the softer seeded side. **Izmir** is quite different in that it is an early maturing sub with only 85 days to flowering, making it suited to lower rainfall areas with short growing seasons. In areas with a minimum 375mm annual rainfall, it's high level hard-seed allows it to better withstand false breaks and variable seasonal conditions. In the higher rainfall regions, like Boyup Brook, we can utilise clovers which have a higher rainfall requirement of 700mm+

annually like Amigan, Quartz and Hilltop. **Amigan** is a red clover with semi-prostrate growth which is highly persistent in both pasture mixes and pure stands. **Quartz** is a medium leaf white clover that has a high stolon density, increasing its persistence within the field. For areas with more variable moisture availability or low fertility **Hilltop** white clover could be a good fit. It is able to handle variable weather conditions as well as thrive in hill country while also having a high stolon density.

Balansa Clovers have the benefit of good late-winter, early spring production compared to sub-clovers. They have the ability to handle waterlogging, moderate salinity and lower pH environments. Both varieties sown in this trial are hard seeded meaning they are less susceptible to false breaks. Balansa's are suited to sowing rates of 5-8kg/ha sole or 1-2kg/ha in mixes. **Viper** is a late flowering long season balansa clover suited to a minimum of 450mm annual rainfall environment. **Viper** has good early vigour with reliable regeneration. **Taipan** is a mid-maturing balansa clover which is ideally sown in a pasture mix and has a high dry matter production.

Vetch is a versatile legume which can be used for grain but is more commonly grown for forage or hay, **Benatas** vetch is a soft seeded late season annual legume suited to being sown solely or in a mix with forage oats which will produce high quality hay or silage. Sowing rates generally 20-35kg/ha into regions with a rainfall of 350-800mm.

## Brassicac

If you're looking for a high biomass winter feed Brassicas such as Raphno and turnips are a great way to provide quick and abundant feed with high digestibility and energy. Brassicas are low in fibre so grazing must be managed accordingly i.e. Providing roughage and adjusting livestock slowly to customize rumen microflora.

**Pallaton Raphno** is a hybrid between Kale and radish suited to an annual rainfall of 500mm+. It offers multiple grazings (5+ grazings under recommended management) with a flexible grazing window. Suits early autumn planting window at 8kg/ha in the aim to fill feed gaps early in the season and will persist to fill feed gaps into spring.

**Appin** leafy turnip is a great option to be sown for quick winter feed (ready to graze in 6-10 weeks). Has a very high early growth rate up until first grazing. Produce tops and bulbs that are highly palatable to sheep and cattle. Requires minimum 600mm annual rainfall. Suitable to be sown in an annual or Italian ryegrass mix. **Pasja II** leafy turnip has a slightly earlier maturity than Appin so is ready to graze in 6-8weeks. It will give you multiple grazing opportunities with good regrowth potential. Suitable for mixes at 1-4kg/ha with annual and/or Italian ryegrass.

## Herbs

**Puna II** is a perennial chicory which delivers quality high palatable feed and high dry matter yields. It has a fast regrowth and will grow long into the season with its long tap root allowing it to extend down to utilise moisture at depth. Typically sown at 6-10kg/ha (sole) and 2-8kg/ha (mix) with a minimum annual rainfall of 500mm.

## Annual / Italian Ryegrass

Diploid ryegrass like **Concord II** and **Manta** can handle wetter environments and lower fertility soils. They have high tillering potential and are very competitive with weeds allowing them to be set stocked or rotationally grazed. In comparison, tetraploid ryegrasses like **Feast II** are very fast to establish and have high water-soluble carbohydrates contributing to better feed quality and animal performance than the diploids. Tetraploids are less tolerant to overgrazing so should be rotationally grazed.

## Perennial Ryegrass

Perennial ryegrasses generally require a minimum annual rainfall of 600mm and can persist for 3-5+ years given the correct management. At the Rylington Park site, four perennial ryegrass varieties were demonstrated; **Base** tetraploid ryegrass, **Vast** tetraploid ryegrass, **Platform** diploid ryegrass and **Mohaka** tetraploid hybrid ryegrass.

**BASE** provides excellent late season quality feed but also provides high production of feed in autumn / winter and will persist for 5+ years. **Vast** has a very late heading date (+36 days) to boost late season pasture quality. **Platform** is the shortest to heading (+12 days) out of all the perennial ryegrass varieties demonstrated. It has strong persistence of 5+ years and ability to provide even feed across the season. **Mohaka** is a perennial ryegrass which is crossed with Italian ryegrass genetics to form a hybrid ryegrass. In most cases it will have increased cool season growth with a slightly shorter persistence than a true perennial (2-4 years). Mohaka has a +20 day heading date meaning that it will push production late into spring. Ideal sowing rate for all varieties are 20-30kg/ha either solely or in mixes. The **AR37 Endophyte** associated with these perennial varieties provides top-tier protection against a range of insect pests to allow for long-term persistence.

## Deep-Rooted Perennial Grasses

A deep taproot system allows grasses like Phalaris, fescue and cocksfoot to be very persistent once established. **Confederate** is a winter active Phalaris which requires an annual rainfall of 500mm+. It has good autumn, winter and spring production along with good drought tolerance once established. It can be sown at 1-4kg/ha alone but suits sowing 1-3kg/ha with a legume companion such as sub clover. Phalaris is more tolerant to wet soils, flooding and saline soils over other pasture grass species.

**Aurus** is a summer active cocksfoot that has strong winter growth with good drought tolerance and can persist for 5+ years in a 700mm+ rainfall environment.

**Quantica** Tall Fescue has vigorous growth in spring, summer (given moisture) and early autumn, however, will be less active in winter. Requires minimum 700mm annual rainfall and is sown solely or in mixtures at 15-25kg/ha most suited to well drained soils and temperate regions.

## Pasture Mixes

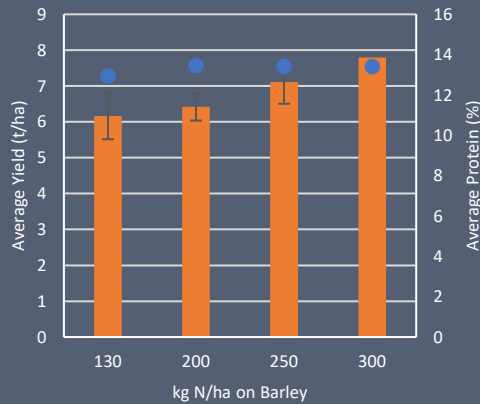
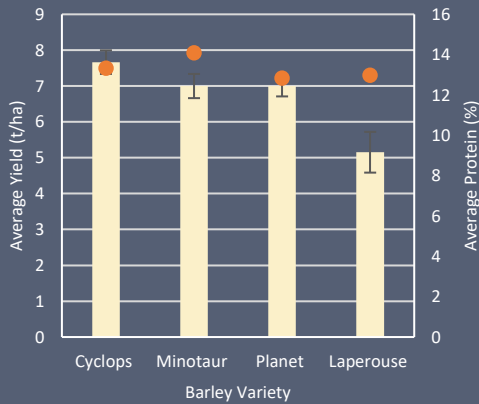
### Ag Supplies Ryegrass Blend:

A mix of 3 tetraploid ryegrass varieties (Ascend, Astro and Abundant) with complimentary season maturity. Astro and Abundant ryegrass will provide quick winter dominant feed whilst Ascend will thrive in late winter / early spring grazing. Ideally sown at 25-40kg/ha; this mix requires a minimum of 500mm annual rainfall for best production. Can also be sown in combination with cereals to produce high quality, high production hay.

### Ag Supplies Pasture Mix:

Contains the same ryegrass varieties as the **Ag Supplies Ryegrass Blend** with the addition of Taipan Balansa clover and Shaftal Persian clover. Both clovers in this blend have a tolerance to waterlogging conditions and will contribute quality feed to fill the feed gap in late winter / early spring. This mix is suited to be sown at 25-40kg/ha and requires a minimum of 500mm annual rainfall. As with Ag Supplies Ryegrass Blend it can also be sown in companion with a cereal to produce high quality, high production hay.





## Nitrogen Response in Barley And Variety Yields and Protein

Each Variety received 130N, 200N and 250N treatments. Yields from these three treatments were combined to produce an average yield for each variety shown in the graph on the far left.

The graph on the right shows the average yield for each N treatment averaged across all varieties. Only Laperouse had a 300N treatment. All treatments received 18P, 33K and 32S

**Temora** Tall fescue has more winter activity compared to **Quantica** and is more summer dormant allowing them to tolerate summer drought conditions. Temora is an early maturing variety and can persist for 5+ years under 400mm+ annual rainfall. Typically recommended to be sown at 10-15kg/ha.

## Barley Variety and N Rates.

A block of barley varieties and N rates were seeded to showcase yield potentials in the area and display the varieties growth patterns and characteristics. The site included, Planet, Laperouse, Minotaur and Cyclops. **Planet** is a proven high yielding malt variety in the region with a competitive prostrate growth pattern. Although Planet is the benchmark for yield, grain weight can often be low and planet has a susceptibility to net blotches that needs to be managed accordingly. **Laperouse** is an alternative to Planet with better

hectolitre weights and improved disease resistance except for its susceptibility to scald.

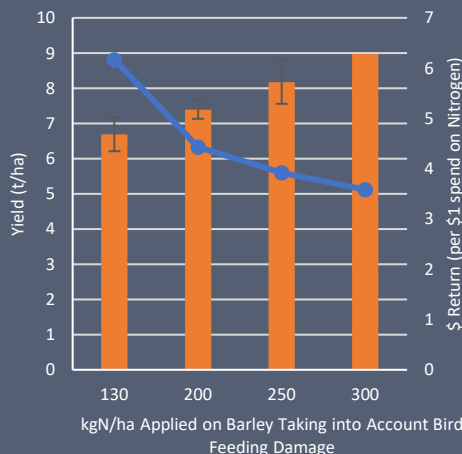
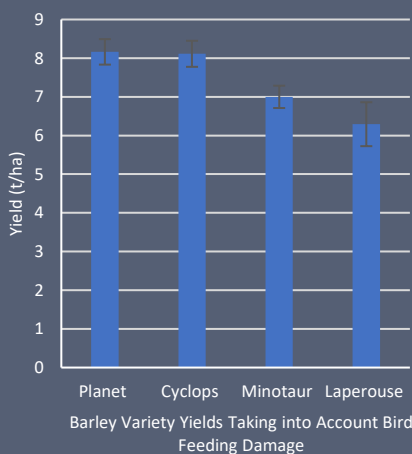
**Minotaur** is a newer variety with a prostrate growth type and improved test weight and STNB resistance compared to Planet. It is adapted to deliver more stable yields across a wider range of environmental conditions. **Cyclops** is an erect quick-mid variety which has been yielding competitively compared to Planet in a broad range of environments. It has improved STNB resistance and was planned to enter into stage 2 evaluation for Malt in 2023.

## Cyclops and Minotaur Produced Competitive Yields of 7.7t/ha and 7t/ha Respectively.

Multiple barley plots sustained **bird damage** within the season which impacted some of the varieties performance. The above graphs demonstrate final yields and protein without accounting for losses.

Cyclops topped the yields averaging 7.7 t/ha with 13% protein while Laperouse was the lowest, yielding only an average of 5.15 t/ha with a 12.9% protein. Minotaur had the highest average protein of 14% and Planet the lowest at 12.8%.

There was no significant difference in N rates from 130-300 kgN/ha although a good N response trend can be seen. The highest N treatment yield was 7.8t/ha receiving 300N, 0.7t/ha more than the 250N treatment. This trend only strengthened when bird damage was accounted for. The below graphs show the manipulated yield data that accounts for visual estimations on bird damage. From this data we can extrapolate that planet and cyclops were the highest yielding varieties at Rylington. Barley varieties available in the 2023/24 season to look out for, that appear promising for the Boyup Brook area, are Combat (feed), Zena (CL Planet equivalent) and IGB IGB22102T (promising yield and disease characteristics).



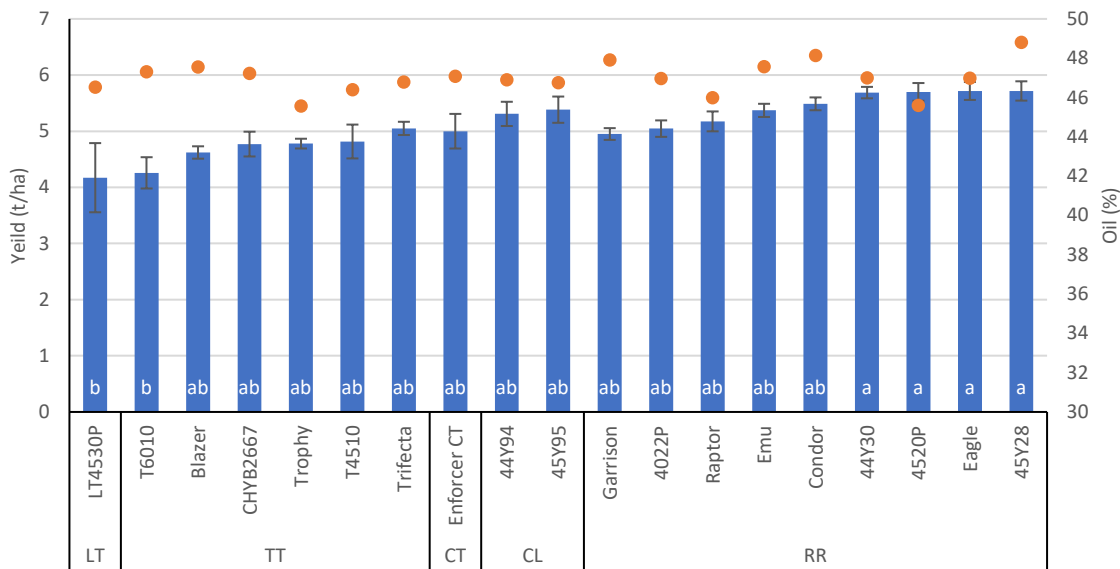
## Barley Nitrogen and Variety Yields When Accounting for Bird Damage

Bird Damage was visually noted down at seeding and yields were adjusted to account for the damage observed.

To warrant our investment decision we are generally looking for a return on investment of at least \$2 for every \$1 spent. This may be higher or lower depending on your attitude to risk.

In this demonstration, returns did diminish as N rates increased, but we were still receiving favourable returns even at the higher 300N rate. For example, at the higher 300N rate we were still receiving a return of \$3.58 per \$1 spend on nitrogen. Pricing assumptions being \$310/t grain price for Barley and a Urea price of \$1190/t. Importantly, this demonstration site had a good level of background nutrition and yield responses in the field could therefore be greater.





## Block Variety Demo

On the North side of the trial five varieties were sown in larger blocks. The Clearfield variety 44Y94 produced the highest yield of 6.5t/ha followed by 4520P and 45Y28 yielding 6.1t/ha.

Similar to the main canola trial site Trifecta yielded higher than Blazer with a yield of 5.9t/ha and 5.4t/ha respectively.

## Demo Management

Sowing date: 18<sup>th</sup> May

Seeding Fertiliser: 140kg/ha of 80% Kill Plus/ 20% Ag Manganese

Total Nitrogen Rates: 170N

## Canola Varieties

### Top yielding varieties for each system

45Y28 continues to yield well being the benchmark Roundup Ready variety in the Kojonup / Boyup Brook area. Newer varieties Eagle, 4520P and 44Y30 also produced impressive yields in the trial with no significant difference found amongst these top 4 yielding varieties at the Rylington Park demonstration site. Eagle is a mid-season Triflex canola variety produced by Nuseed as a replacement for Condor in 2023. BASF's canola variety 4520P is an early-mid season variety possessing the Podguard trait that gives it good pod strength. 44Y30, the newer canola seed variety from Pioneer is an early-mid season variety which is an alternative to the mid-season 45Y28.

Of the Clearfield varieties in the demonstration there were no significant differences in yield with 45Y95CL producing 5.38t/ha vs 44Y94CL at 5.31t/ha. 45Y95CL and 44Y94CL are both Pioneer Seeds varieties with 45Y95CL having a mid-season length whilst 44Y94CL has an early-mid season maturity.

Amongst the TT varieties Trifecta topped the yield results at 5.05t/ha, however, there was no significant difference found across all but one of the TT varieties. Trifecta (mid-season) and Trophy (mid – early season) are both Nuseed varieties that are adapted to the medium – high rainfall zone. Having not performed as well in this particular demonstration, Blazer, produced by Pacific Seeds, has shown very good yield potential and suitability to the medium – high rainfall environment.

### Performance of Canola System

The highest yielding canola system was Roundup Ready, closely followed by the Clearfield system. Varieties containing the Triazine Tolerance gene were slightly lower yielding in this demonstration when grouped against the other canola systems.

### Broadening our Focus away from Yield.....

Roundup Ready varieties provide ease of management and good broad spectrum in-season weed control. Keep in mind though, it is best practice to alternate systems away from Roundup Ready tolerant canola to reduce the selective pressure we apply to the weed populations which can lead to resistance. Clearfield varieties may lack broad-spectrum weed control but have a competitive yield, good residual brome control and have a reduced receipt penalty than GM varieties lending themselves to potentially higher gross margins. Same goes with Triazine tolerant canola however, these varieties do have a yield fitness penalty when it comes to possessing the triazine gene with increasing resistance to clethodim and Atrazine reducing our weed control capabilities within the TT system. Stacked varieties also have this yield penalty but provide more flexibility in weed control options. Another emerging system to keep an eye out for is Glufosinate tolerant canola which brings a new mode of action and system for weed control.

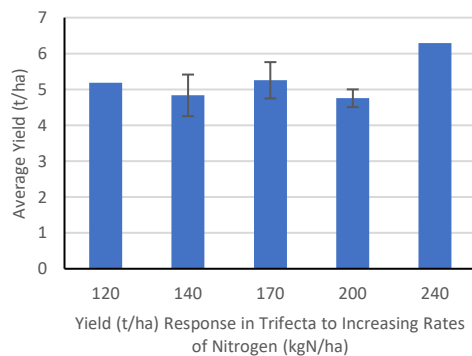




# Nitrogen Rate and Placement on Canola

## N rates on Trifecta

Raising our N rates in canola has allowed growers to capture much higher yield opportunities. Five rates of nitrogen were applied to Trifecta on the highly productive and highly fertile soil at Rylington to determine the most productive and profitable N rate. The nitrogen was split with 21 units of N applied before seeding, 14N at seeding and 50N at 4-5 leaf. The remainder was applied as urea at bolting with two timings at 8 leaf and bolting for the highest 240N treatment. All plots received 18P, 33K and 32S.

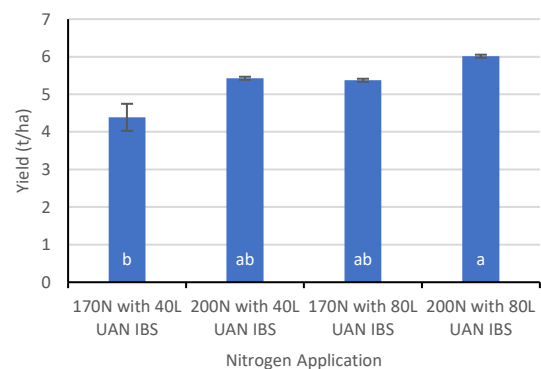


The highest yield came from the 240N plot which yielded 6.3t/ha although this was from only one un-replicated plot of 240N. Data analysis showed no significant yield response to increasing nitrogen above 120N.

As a rule of thumb, 1t/ha of canola will remove ~40kg N/ha but require twice this amount assuming a 50% nitrogen recovery. A 2t/ha crop will require around 160kg N/ha with some of this being supplied by soil N reserves. Keep in mind when a lot of the focus is on nitrogen, it's important to not forget about potassium, phosphorus, and sulfur. Sulfur particularly being crucial for the synthesis of oil and protein in canola as well as for the plant's vegetative development.

## Flexi-N IBS on Blazer

Flexi-N was trialed IBS on Blazer canola to determine if increasing upfront N would increase N efficiency for those who don't have liquid systems on their seeder bar and to determine an N response up to 200N. Two total rates of N were applied (200 and 170N) and two rates of N were applied IBS (40N and 80N). In the lower rate applied IBS the rest was made up for by applying more urea at bolting.

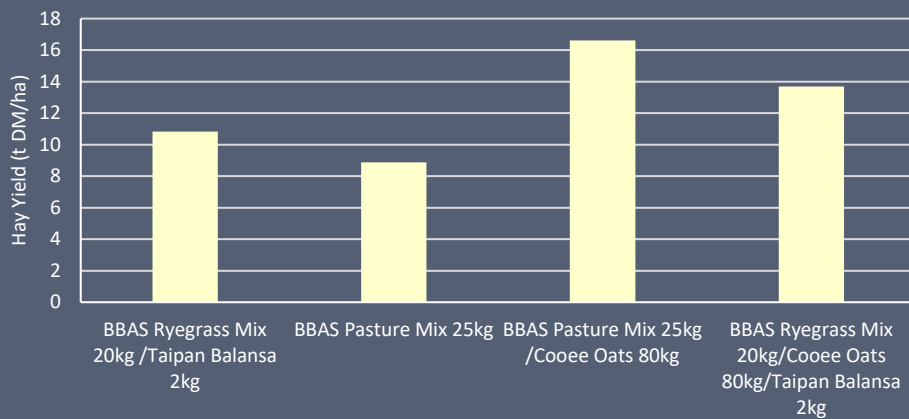


Plots receiving 200N yielded almost 1t/ha more than plots receiving 170N; yielding 5.72t/ha  $\pm$  0.45SE and 4.88t/ha  $\pm$  0.24SE respectively. Applying more N upfront was beneficial with 80L/ha IBS producing significantly higher yields than 40L/ha IBS with an average yield of 5.69t/ha  $\pm$  0.19SE and 4.91t/ha  $\pm$  0.33SE respectively. It is always best to apply as much nitrogen as practical upfront around seeding in a non-leaching environment. Always apply fertiliser to the root zone where possible or apply top-dressed when there is follow up rainfall expected to bring the fertiliser down into the root zone.

## Lupin Seeding Rate x PK

To determine the ideal seeding rate and super potash application rate on lupins at Rylington Park. Lupins were sown at 100 and 120kg/ha and a standard rate of 140kg/ha of 80% Ktill Plus/ 20% Ag Manganese was applied at seeding to all plots. Super potash 4:1 was then applied at rates of 0, 100, 150 and 220kg/ha. Results showed no significant difference between the control and additional super potash and no significant difference between seeding rates.

On average 40-45 plants/m<sup>2</sup> is an ideal target plant population although there is little to no yield penalty in seeding lupins up to 70 plants/m<sup>2</sup>. The optimum seeding rate to achieve 40-45 plant/m<sup>2</sup> is usually around 80-120kg/ha depending on seed size and germination percentage. In most situations 120kg/ha is adequate, with a higher plant population being more desirable for weed suppression.



## Hay Yield VS Quality

The addition of oats increased the total forage yield of both the ryegrass and pasture mixes but at the expense of legume content.

Always maintain a high seeding rate of clover and ryegrass, around 25kg/ha, when adding oats into hay mixes.



Hay Variety	Moisture %	Acid Digestible Fiber %	Digestible Dry Matter %	Metabolisable Energy ML/KgE	Crude Protein %	Water Soluble Carbohydrates %	Neutral Detergent Fibre %
BBAS Ryegrass Mix 20kg /Taipan Balansa 2kg	7.7	29.4	62.9	9.2	4.3	29.5	50
BBAS Pasture Mix 25kg	7.5	29.5	62.9	9.2	3.5	28.9	51.7
BBAS Pasture Mix 25kg /Cooee Oats 80kg	7.7	28.9	60.9	8.9	4.8	16.9	52.5
BBAS Ryegrass Mix 20kg/Cooee Oats 80kg/Taipan Balansa 2kg	8.8	26.2	66.5	9.8	5.5	24.4	48.1

## Hay Nutrition and Yield

Cereals, ryegrass and clover can be sown together to produce high yielding forages which can then later be utilised in spring as silage or hay. The species and proportion of each sown as well as the timing of the cut will have a large influence on the final yield and quality of silage/hay. The Boyup Brook Pasture Mix and Ryegrass Mixes were tested in combination with Cooee oats and Balansa clover.

The plots received 140kg/ha of 80% Ktill Plus/ 20% Ag Manganese at seeding plus 180N applied in two applications in June and July. All plots received an Ecopar 500ml + MCPA Amine 400ml broadleaf spray and were left uncut/ungrazed during the year.

Both the BBAS 20kg Ryegrass Mix / 2kg Taipan Balansa and the 25kg of BBAS Pasture Mix have a similar ratio of clovers to ryegrass. The pasture mix at 25kg contains the 20kg of the same ryegrass as the Ryegrass mix but with a total of 5kg total of Taipan Balansa clover and Shaftal Persian clover. The ryegrass mix with 2kg Taipan Balansa yielded higher than the Pasture mix potentially indicating a shift in species dominance towards ryegrass in the absence of the 2.5kg/ha of Shaftal Persian Clover. Introducing oats to either mix increased the yield by 2-7t DM/ha.

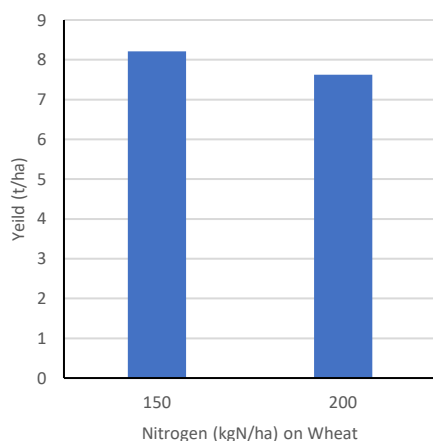
Typically forage quality declines as the plant goes from vegetative growth to reproductive whereas dry matter yield typically increases until flowering. The hay samples were tested late

in the forage's maturity when biomass was high and quality was low. This resulted in crude protein levels lower than the required levels to maintain mature stock conditions.

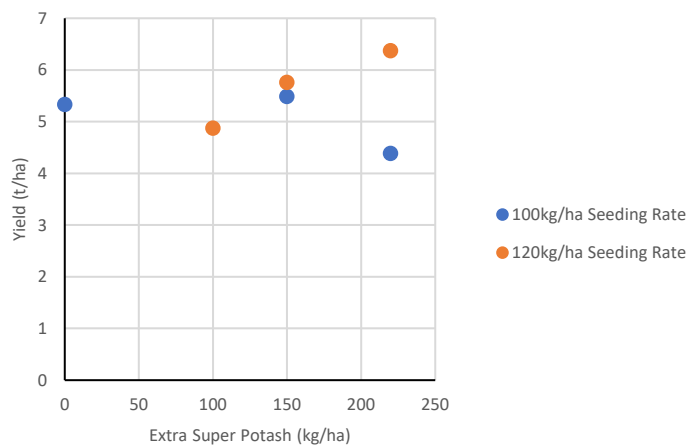
### Keeping a good mix of cereals, ryegrass and clovers can help balance yield and quality

Metabolisable energy was similarly low with levels remaining stable across all samples. Fibre was low in the Ryegrass Mix + Oats + Balansa mix which had a sample consisting mostly of ryegrass with a slightly higher portion of leaves than the Pasture Mix with Oats which would have helped to lift the crude protein and lower the fibre.

All error bars in the booklet represent standard error



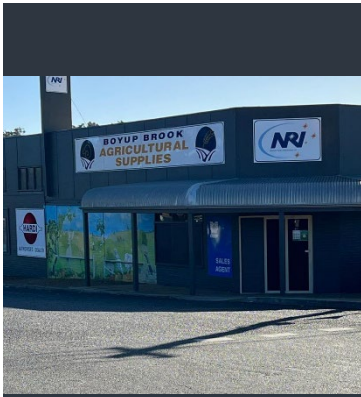
Appendix 1. Wheat response to nitrogen (1 plot each)



Appendix 2. Lupin Response to Seeding Rate and Extra Super. All plots received a base application of 18P, 10K and 3S

Table: Canola variety trial yields and quality

Canola Variety	Yield (t/ha)	Oil (%)	Protein (%)	Moisture (%)
LT4530P	4.17	46.5	20.7	5.7
T6010	4.26	47.3	20.9	5.7
Blazer	4.62	47.6	22.5	5.4
CHYB2667	4.77	47.3	21.3	5.5
Trophy	4.78	45.6	21.3	5.8
T4510	4.82	46.4	21.3	5.6
Garrison	4.95	47.9	20.0	5.4
Enforcer CT	5.00	47.0	20.9	5.4
4022P	5.05	46.8	20.7	5.5
Trifecta	5.05	46.8	21.9	5.3
Raptor	5.18	46.0	20.8	5.8
44Y94	5.31	46.9	20.5	5.4
Emu	5.37	47.6	22.0	5.4
45Y95	5.38	46.8	20.7	5.3
Condor	5.49	48.1	21.0	5.4
44Y30	5.69	47.1	20.5	5.6
4520P	5.70	45.6	20.6	6.0
Eagle	5.72	47.1	21.0	5.5
45Y28	5.72	48.8	19.0	5.6



## For Further Information

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## Events in 2022

- **Rylington Park Field Day**

The day covered the local oat NVT, Summit fertiliser trial, ADAMA herbicide trial as well as the Boyup Brook Ag Supplied Demonstration site on the 23<sup>rd</sup> of September

- **ADAMA motorbike tour**

The Boyup Brook Ag Supplies Demonstration site featured as part of the ADAMA motorbike tour

## Appreciation

- **Pioneer Seeds, Nuseed, BASF, PGG Wrightson Seeds, Nutrien, ADAMA, Sipcam, Syngenta, CSBP & Southern Wire**

Boyup Brook Agricultural Supplies would like to thank you for your support and advice. We would like to thank those who donated their time as well as those who supplied the trial with seed, chemicals and fertiliser, your continued support is much appreciated.

- **Boyup Brook Shire and Rylington Park**

Thank you to the shire of Boyup Brook for the trial site and a special thank you to Mark and Erlanda Deas for their assistance and continued use of their paddock.



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Feedback on the trial and data is appreciated so don't hesitate to get in contact with David Lane or any of the agronomists or staff at Boyup Brook Ag Supplies or Kojonup Ag Supplies if you wish to discuss this years or last year's trial and/or what you would like to see in future trials.