PPS FESCUE PROJECT; L.PDS.2004

FESCUE; A LOW RAINFALL PASTURE TOOL?

Aim; ***to demonstrate that winter active fescue can be a valuable pasture systems tool in the <550mm rainfall zone in Victoria.***

2021 Results Report

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Background

Approximately 40% of PPS member farms are located north of the Great Dividing Range in Central Western Victoria. The area, south of the Wimmera and Central plains, consists of light soils and the region typically has a short growing season due to low spring rainfall and high evaporation; this is becoming increasingly frequent with “bob tail” springs reducing production capacity.
PPS has conducted small scale plant variety trials in the region and the results have shown that winter active fescues may have a role in increasing pasture production while at the same time reducing the risks of low spring rainfall.

Currently, dry spring conditions cause a rapid utilisation of pasture feed followed by long periods of supplementary feeding; often in containment areas. The grazing of perennial species like phalaris through a dry spring can impose stresses that lead to plant losses in subsequent years. PPS considers that winter active fescue sown on part of the farm could increase overall dry matter production and also allow spelling of phalaris and other species to aid the build up of plant reserves before grazing later in the spring. The addition of further perennial species on farm will assist in keeping adequate ground cover over summer. The use of winter active fescue is currently limited in the region and PPS believes that a successful demonstration could show its potential benefits to the pasture system.

Winter active fescues have been demonstrated to fulfil a role in perennial systems in Southern Victoria but their early heading trait and potential earlier loss of feed quality has meant that management issues have arisen and phalaris remains the favoured perennial grass variety in most cases. PPS demonstrated this outcome at a paired paddock project at a high rainfall site near Elmhurst. This was part of an MLA funded project (SO901) conducted from 2009 to 2012. At Elmhurst, total dry matter production from winter-active fescue was similar to winter-active phalaris but mid-spring feed quality and persistence were questioned.

The winter active fescues, Resolute and Flecha, were included in a PPS pasture variety trial site Eversley, north of the divide, which commenced in 2012. Results showed that total production from the winter active fescue cultivars was similar to the winter active phalaris cultivars. These trials also demonstrated that the winter active fescues could be as persistent as Holdfast GT Phalaris and Uplands Cocksfoot.
A further pasture variety trial at Tottington near Paradise, established in 2014 had similar findings as the Eversley trial. At Tottington, total dry matter production from 2015-2017and persistence for Flecha winter active fescue was similar to Holdfast GT Phalaris.

From the trials previously conducted, PPS members concluded that winter active fescue could be a productive and persistent perennial grass option for use in below 550 mm rainfall zone, where phalaris had historically been used with success. PPS members considered that the traits that winter active fescue exhibits may make it a useful perennial grass in the drier regions where its rapid early spring growth could be harvested by stock whilst at the same time allowing other perennial pasture species/varieties to be rested to maximize growth to be utilised in later spring and summer.

PPS aims to demonstrate the use of winter active fescues in these drier regions, measure its productivity and persistence under full scale paddock grazing and look at their potential to integrate into pasture systems.

PPS believes that a successful demonstration would increase the use of winter active fescue in a clover or medic mix as either the sole grass variety or in a mix with Uplands cocksfoot. The demonstration would also show the benefits of the fescue in allowing other pastures such as phalaris and/or lucerne to have a period of rest in early spring to increase production and build up root reserves. The fescue pastures may also serve a role in animal health by providing “safe” pastures in the case of staggers outbreaks in phalaris or ryegrass pastures.

Benefits

A successful project would demonstrate to producers in the <550 mm rainfall that the attributes of winter active fescues could be utilised to increase productivity through increased late winter dry matter production and persistence of other perennial cultivars through management systems change.
The increased frequency of below average spring rainfall in the low rainfall regions are resulting in shorter growing seasons which is impacting on overall farm productivity as well as reducing pasture persistence.

PPS considers that a proportion of winter active fescue pastures on the farm may be able to break this cycle.
The replacement of degraded annual species with perennial fescues will give an immediate increase in dry matter production.

As well, as the production increase by replacing low performing annual pastures with high production perennials, there is well documented improvement in land management through reduced run off, increased ground cover, improved water use efficiency and reduced risk off nitrate leaching.

While the benefits of adding winter active fescues may be sufficient to improve farm production and sustainability; PPS aims to demonstrate its ability to enhance the production of phalaris and lucerne based pastures where they are present.

The project aims to demonstrate that utilising the rapid late winter/early spring growth of the fescue would allow phalaris and other pastures to have a period of spelling which would maximise growth in drier seasons and reduce the risk of multiple stresses which has been found by CSIRO to reduce persistence of phalaris plants. PPS also found this as an outcome in the MLA PRS conducted from 2014 to 2017.

Although winter active fescue has performed well in the PPS Tottington pasture variety trial; it has not been widely adopted as a sown pasture variety in the region. PPS believes that this is in part due to winter active fescue's reputation of producing a bulk of feed which is underutilised and loses feed quality during spring. PPS aims to demonstrate that changing the grazing management of winter active fescue in lower rainfall areas and integrating it into the pasture systems on farm can increase pasture production and longevity of improved pastures.

Demonstration Summary

Demo 1
Measurement of existing pastures
Two pastures were measured in 2020 for dry matter production, feed quality, pasture composition and stock movements. The pastures were established in 2019 with winter active fescue and uplands cocksfoot; a mix that should be well suited to the <550 mm region. Results from 2020 can be found at - https://www.perennialpasturesystems.com.au/post/fescue-project-fescue-a-low-rainfall-pasture-tool

Table 1; Existing sites

Existing Sites	**Location**	**Paddock**	**Date sown**
Overdale	Concongella	Rams	2019
Mount Glen	Joel South	Timber	2019

Demo 2
Establish new winter active fescues for evaluation
Four 12 Ha winter active fescue established in 2020 with appropriate legumes added to the pasture mix.

Table 2; 2020 sites

2020 sites	**Location**	**Paddock**	**Date sown/ 2020**
Overdale	Concongella	X Road	13th May
Rosehill	Paradise	Cottage 1	6th May
Silver Gully	Winjallok	Trav's	6th May
Gollops	Avoca	Lloyd's	28th April

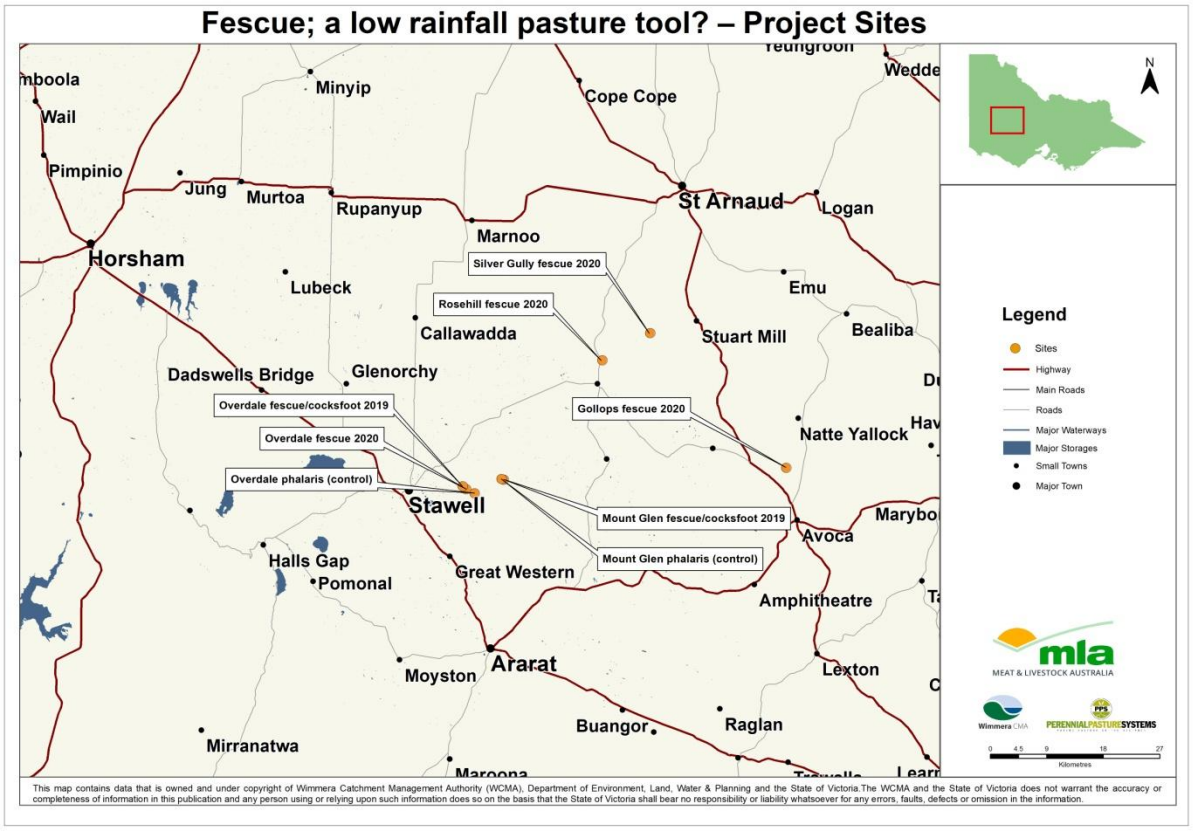

Fig. 1: Location of project sites

Demo 3

Assess effect of adding winter active fescue on other perennial pastures.

PPS will evaluate the effect of adding fescue to pasture systems in the <550mm rainfall region.
The addition of fescue with its mid winter growth habit should allow producers to rest other perennials such as phalaris, allowing them to produce spring feed and improve root growth.
PPS believes that, in addition to increasing overall feed availability, the system should improve persistence of the other perennial pasture.

PPS has appointed an advisor to set up measurement and observation methods to evaluate the effect on phalaris based pastures. Two of the sites established in 2020 have a phalaris pasture in close proximity to the fescue paddocks for evaluation. This part of the project commenced in 2021; farmer case studies will add to the assessment.

Fig. 2 PPS field walk; Overdale fescue site 26/11/21

Demonstration Sites

Demonstration 1;

Table 3; 2020 Dry Matter comparision (2018 sown pastures)

Collection date	Mt Glen fescue/cf	Mt Glen phalaris	Overdale fescue/cf	Overdale phalaris/cf
25-Aug	889	863	1225	363
22-Oct	3749	2290	1987	961
18-Dec	987	685	1094	463
Total	**5625**	**3838**	**4306**	**1787**

While the results are not directly comparable due to soil type, nutrient levels and pasture composition differences; they show that the fescue-based paddocks produced more dry matter than the phalaris comparisons. No measurements were taken from these sites in 2021.

Demonstration 2

Three of the fescue based pastures established for the demonstration in 2020 were measured for dry matter production and three for feed quality in 2021.

The Rosehill site was affected by very dry conditions after establishment in 2020 as well as competition from Wimmera ryegrass. It was not measured for dry matter production but the variety of species within the pasture made it a valuable resource for feed quality testing. Fescue, Australian phalaris and Wimmera ryegrass were tested for feed quality comparison at Rosehill, as was fescue and a Holdfast GT pasture at Overdale and the fescue/uplands cocksfoot pasture at Gollops. Phalaris pastures at Overdale & Silver Gully were included in the dry matter production measurements for comparison. No comparison pasture was available close to the fescue at Gollops.

Figs. 3 & 4 Gollops fescue site at Avoca. September 2021

Seasonal Conditions

2021 was one the best growing seasons on record with a late March autumn break & adequate soil moisture through to late November at all the demonstration sites.

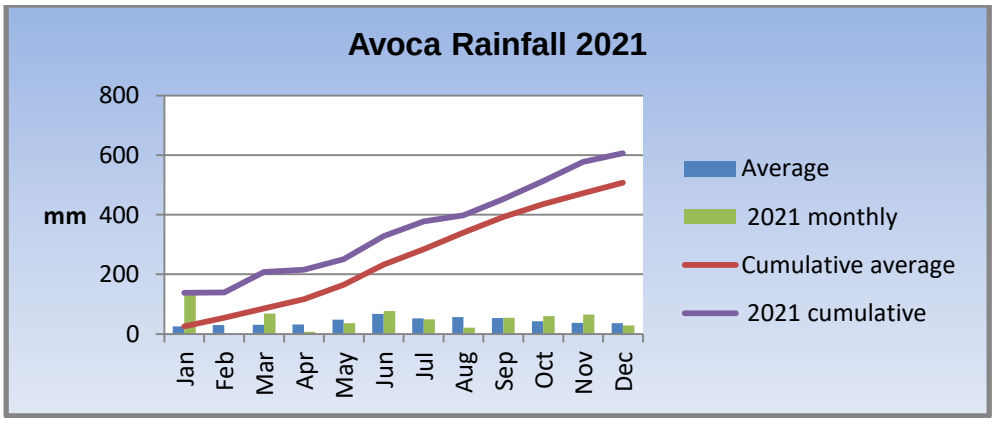

Fig. 5; Avoca rainfall 2021, Gollops site is approx 10 km north of Avoca

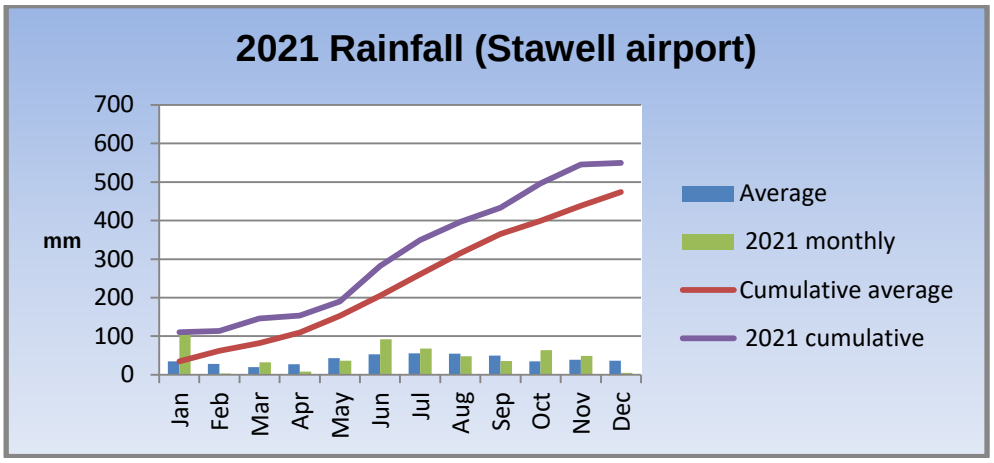

Fig. 6; Stawell rainfall 2021, Overdale site is approx 12 km east of Stawell Airport.

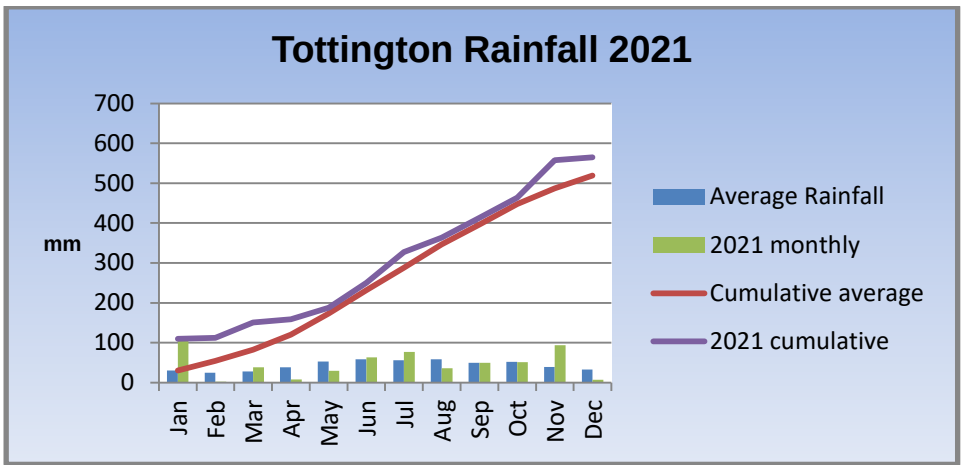

Fig. 7; Tottington rainfall 2021

The Rosehill site is approx 10 km south of Tottington and the Silver Gully site is approx 8 km SSE. The Tottington weather site is a manual BOM rainfall site & is diligently monitored by PPS members Tom & Jenny Small.

Pasture Composition

The pasture composition of the Silver Gully, Overdale & Gollops site was assessed in spring. Two assessments were taken at Gollops as there were small areas of silver grass (vulpia spp.) & both areas were used in the feed quality measurements.

Two assessments were also taken in the Silver Gully fescue pasture with a urea treatment and a control used in the results; more information on the urea treatment result is on page 9.

Rosehill pasture composition was not assessed as only individual species were used in the feed quality measurements.

Figs. 8 & 9 Overdale fescue at Concongella, Sept 2nd 2021

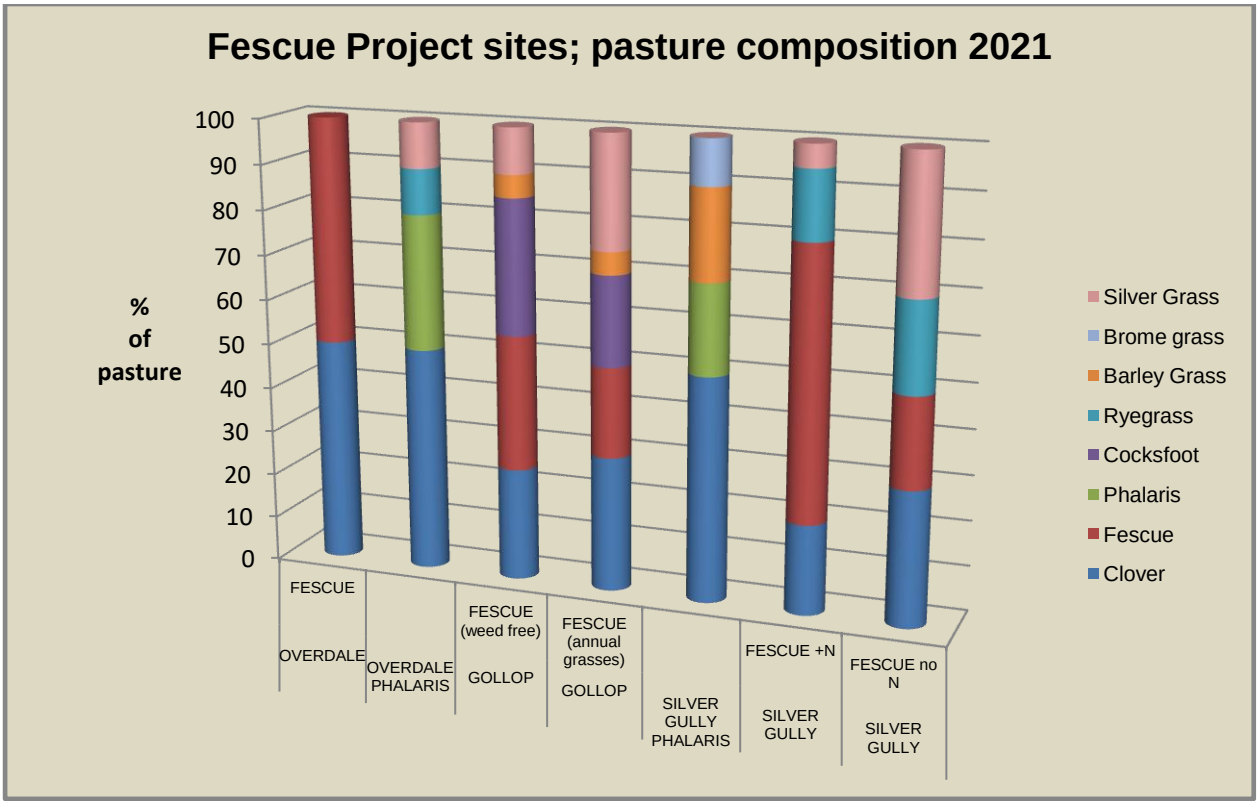

Fig. 10; Project site pasture composition, spring 2021

Nutrient Responses

The fescue paddocks sown in 2020 were soil tested in autumn 2021 and the results are listed in table 4. Results have been colour coded for interpretation – adequate (green), marginal (orange), low (red).

Table 4; soil test results

April 2021 0 – 10 cm	pH (water)	pH (CaCl)	Phosphorus (Olsen)	Potassium Mg/kg	Sulphur Mg/kg	Aluminium Cmol/kg	Organic Carbon (W&B)
Gollops	N/A	5.30	12	335	10	N/A	N/A
Overdale	5.85	5.31	7.6	139	44	0.1	2.67
Rosehill	5.45	4.61	12	154	7.6	1.5	2.75
Silver Gully	5.51	4.72	33	85	27	1.3	1.86

The fescue growth at Silver Gully during winter was well below expectations and it was decided to add nitrogen (N) in the form of urea & potassium (K) in the form of potash to ascertain if low levels of those nutrients were limiting growth. Urea & potash were applied to areas under pasture cages on September 2nd at levels that would alleviate any pasture growth restrictions. Tissue tests were taken on November 2nd and the results are listed in table 5. Results have been colour coded for interpretation – adequate (green) & low (red).

Fig. 11;
N & K plot at Silver Gully fescue site, Winjallok
15th October 2021

Table 5; Silver Gully tissue tests

Silver Gully tissue Tests 2/11/21	Nil	+ N	+ N + K	+ K
Total N % (Dumas)	1.0	1.7	1.9	1.1
Potassium %	1.4	1.60	2.0	1.60
Phosphorus %	0.21	0.29	0.34	0.28
Cobalt (mg/kg)	0.19	0.23	0.08	0.07
Sulphur %	0.17	0.19	0.31	0.23
Calcium %	0.19	0.22	0.30	0.18
Magnesium %	0.12	0.15	0.18	0.12
Sodium %	0.15	0.46	0.50	0.18
Chloride %	0.60	0.90	1.30	0.69
Copper mg/kg	2.7	4.6	5.1	3.7
Zinc mg/kg	16.0	49.0	66.0	42.0
Manganese mg/kg	150.0	140.0	140.0	190.0
Iron mg/kg	93 (high)	86 (high)	64 (high)	66 (high)
Boron mg/kg	4.7	4.0	9.7	5.9
Molybdenum mg/kg	0.240	0.360	0.430	0.310
Selenium mg/kg	0.130	0.120	0.130	0.110
Nitrogen/Sulphur Ratio	5.9	8.9	6.1	4.8

The nitrogen (N) results where urea was added were in the low range suggesting that much of the added N was used in the extra growth in the treated areas. The potash plots have produced a similar outcome in the K tests.
An interpretation on the high iron figures was provided and as the paddock is adjacent to a dirt road, it appears to explain the result. *Samples are high in iron (Fe), but this is not usually a problem. High leaf Fe may be due to soil or dust (clay) contamination from nearby tracks or roadways.*

The pasture composition was assessed in October as a percentage of the pasture bulk and the response to N is clear as can be seen in figure 12.

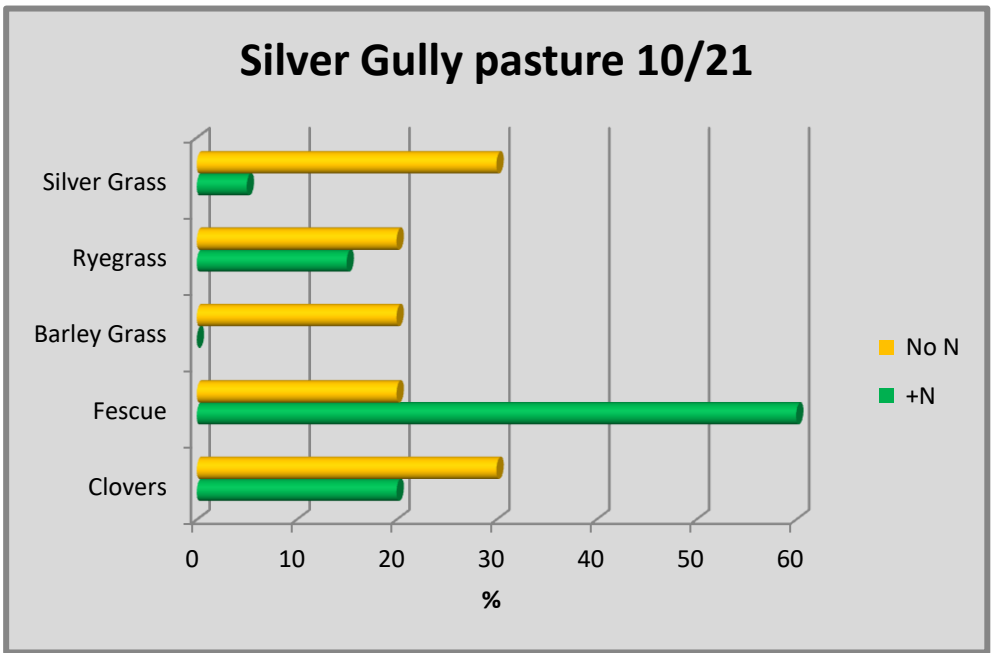

Fig 12; percentage of Silver Gully pasture bulk in October 2021

The pasture cuts after the N & K application show a clear response to the combined added nutrients but no advantage where there were applied separately.

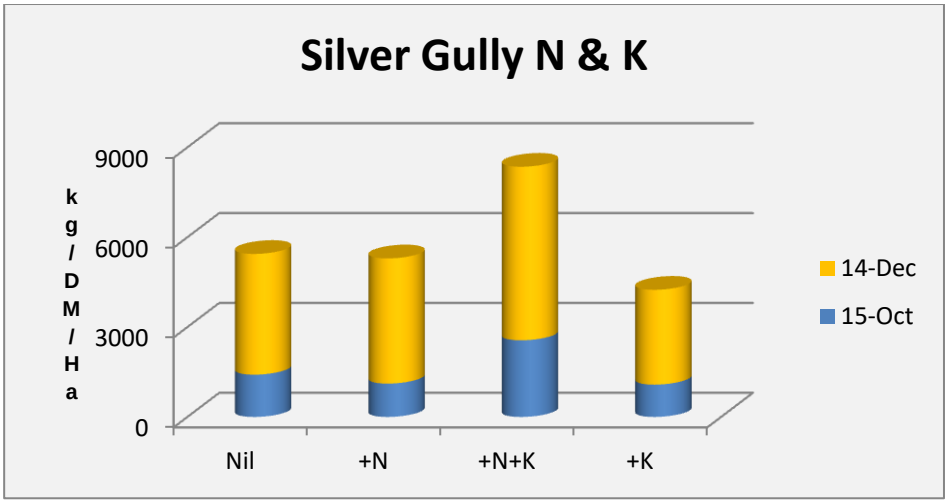

Fig. 13; N & K dry matter response at Silver Gully

Dry Matter Production

Three of the sites established in 2020 were measured for dry matter production and two of the sites had a comparison phalaris based pasture measured as well. The Rosehill site wasn't measured for dry matter production due to the annual ryegrass issues which would have compromised DM results. The site provided a useful comparison between varieties for feed quality testing.
The Silver Gully and Gollops sites have clay loamy soil; the Overdale sites have a sandy loam with a high gravel content with has the tendency to lose soil moisture rapidly.

Dry Matter was measured by mowing plots protected from grazing by pasture cages then drying and weighing the measured samples.
Note; the December dry matter measurement at Gollops was an estimate after lambs, which were very healthy on the fescue/cocksfoot pasture, managed to move the pasture cages and graze under them.

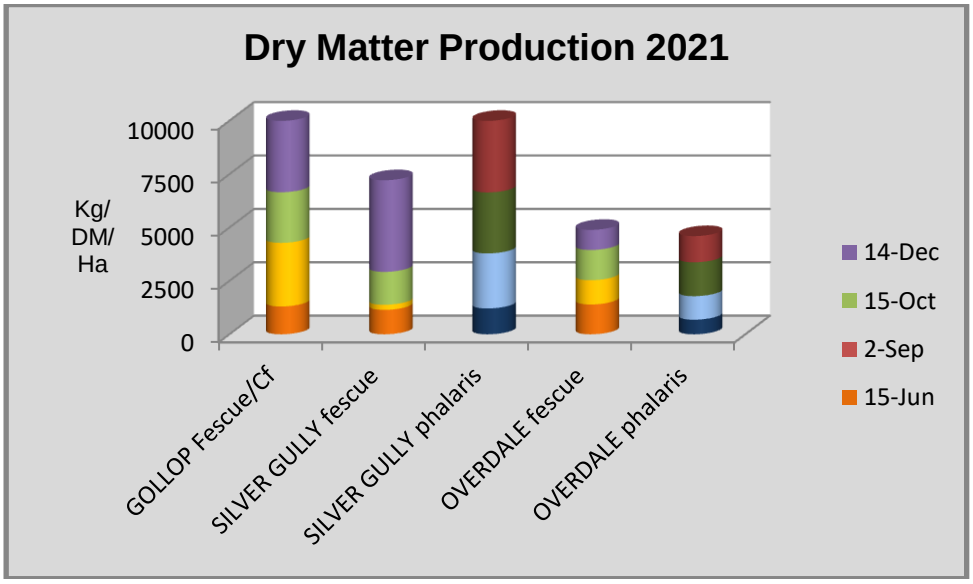

Fig 14; Dry Matter production 2021

The results show that Fletcha fescue can produce dry matter results comparable to phalaris under good conditions as can be seen by the Gollops fescue and Silver Gully phalaris results. The Silver Gully fescue growth was restricted by the P and K deficiency as seen in the previous section of the report.
The Overdale pastures on the tough, gravelly paddocks were much lower but showed very little difference between the fescue and the phalaris based pastures.

Feed Quality

Winter-active fescue runs to head earlier than phalaris and cocksfoot. This means there is the potential for the digestibility, (energy content) and protein of the herbage to decline earlier than the other perennial species, but this will depend on how it is managed by grazing at that time. As there are preconceived ideas about the feed value of winter active fescue declining as spring progresses more rapidly than other species, it is imperative that the project obtain quantifiable evidence to test this during the course of the demonstration.

Herbage samples of individual species were taken from the trial paddocks and sent to the FeedTest™ laboratory at Werribee for analysis.

Table 6; Energy & protein requirements for sheep. Source; Agriculture Victoria

Table 3.1: Energy and protein requirements of a range of classes of sheep.

Class of stock	Live weight (kg) and Condition Score (CS)	DSE rating	Energy requirement MJ ME/day	Approximate protein requirement CP (%)
Adult dry sheep (wether or ewe dry or early stages of pregnancy)	40 kg CS 2	0.7	6	
	45 kg CS 2	0.8	6.5	
	50 kg CS 2	0.9	7	
	50 kg CS 3	1	8	6-8
	60 kg CS 3	1.1	9	
Ewes Pregnant last 4 weeks before lambing (single)	45 kg CS 2	1.2	10	
	50 kg CS 2	1.5	12	8-10
	60 kg CS 3	1.8	14.5	
Ewes With lamb at foot (single)	45 kg CS 2	1.8	15	
	50 kg CS 3	2.2	18.5	12–14
	60 kg CS 3	2.6	21.5	
Weaners	15 kg (growing at 100 g/day)	0.8	6.5	16
	15 kg (growing at 200 g/day)	1.2	10	18–20
	25 kg (growing at 0 g/day)	0.7	6	9–12
	25 kg (growing at 100 g/day)	1.0	8	12–14
	35 kg (growing at 0 g/day)	0.8	6.5	9–11
	35 kg (growing at more than 200 g/day)	2.5	21	15–18

Note that weather and other conditions can change energy requirements (see Chapter 4 – Feeding sheep - how much and how often).

The pasture results are concentrated on crude protein, energy & digestibility. Protein & energy requirements are shown in table 1; 50 kg dry sheep & 25 kg weaners are used in the results. The digestibility levels used are – high quality >65% and low quality <55% which are taken from FeedTest™ information.
Please Note *- The observations and comments on the feed quality of the sampled pastures are those of the PPS Project Manager and further information should be sourced before utilising the results.*
PPS plans a workshop in 2022 with qualified advice on feed quality parameters and stock management.

Protein

The protein levels for all varieties fell during November except for the Nov 10th test on Gollops Uplands which had a protein level of 31.8%. The sample was retested by FeedTest™ using a different method and returned the same result.
The protein level at all sites was below that required for weaner sheep by December and levels continued to fall with only Gollops Uplands having high enough crude protein for dry sheep by early January.

The fescue samples recorded variable protein results with Gollops declining rapidly, Overdale declined at a slower rate than Gollops but at a faster rate than the Overdale phalaris. The Rosehill fescue produced variable protein results and did not decline on an even level; it was the highest protein of all samples in the 18th December tests.

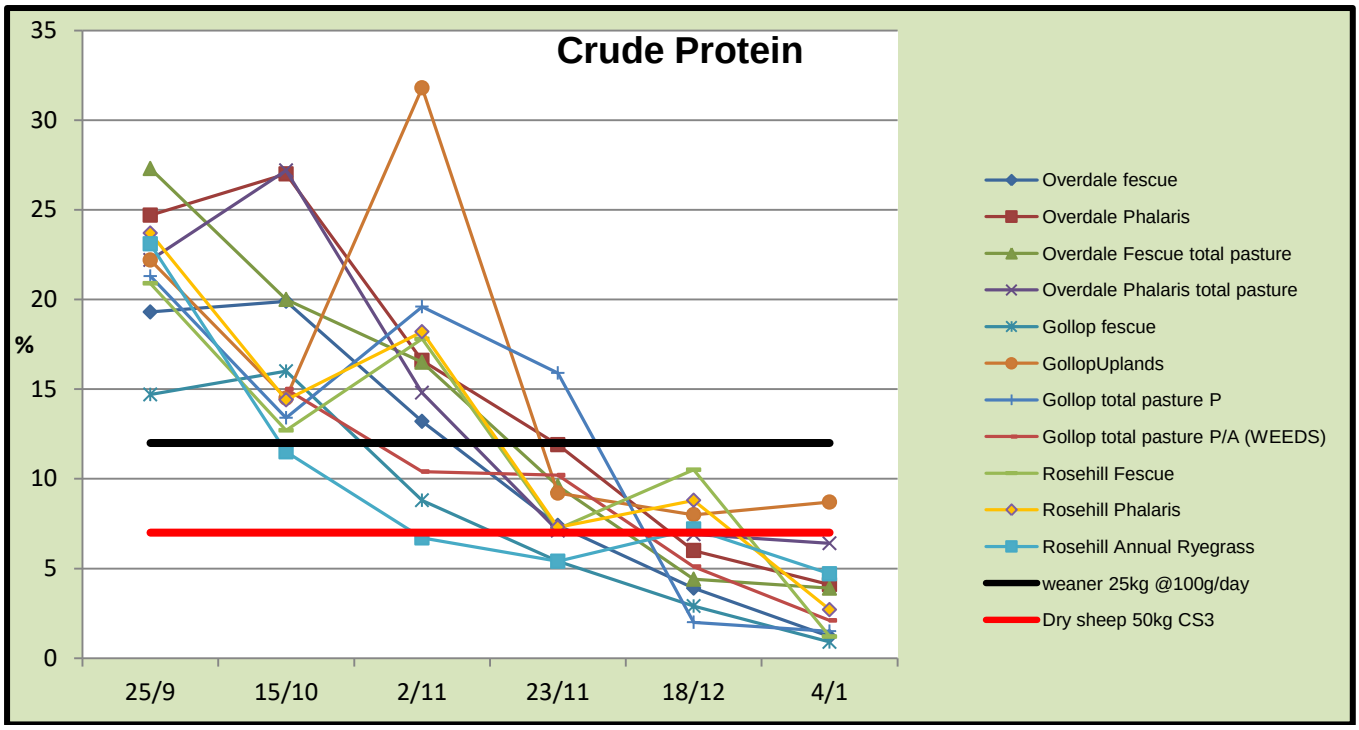

Fig. 15 protein test results

Energy

The energy levels of all samples fell progressively throughout spring & early summer. The fescue levels declined at a faster rate than phalaris, uplands cocksfoot or Wimmera ryegrass but the differences were not great. The Rosehill fescue produced variable energy results & did not decline on an even level

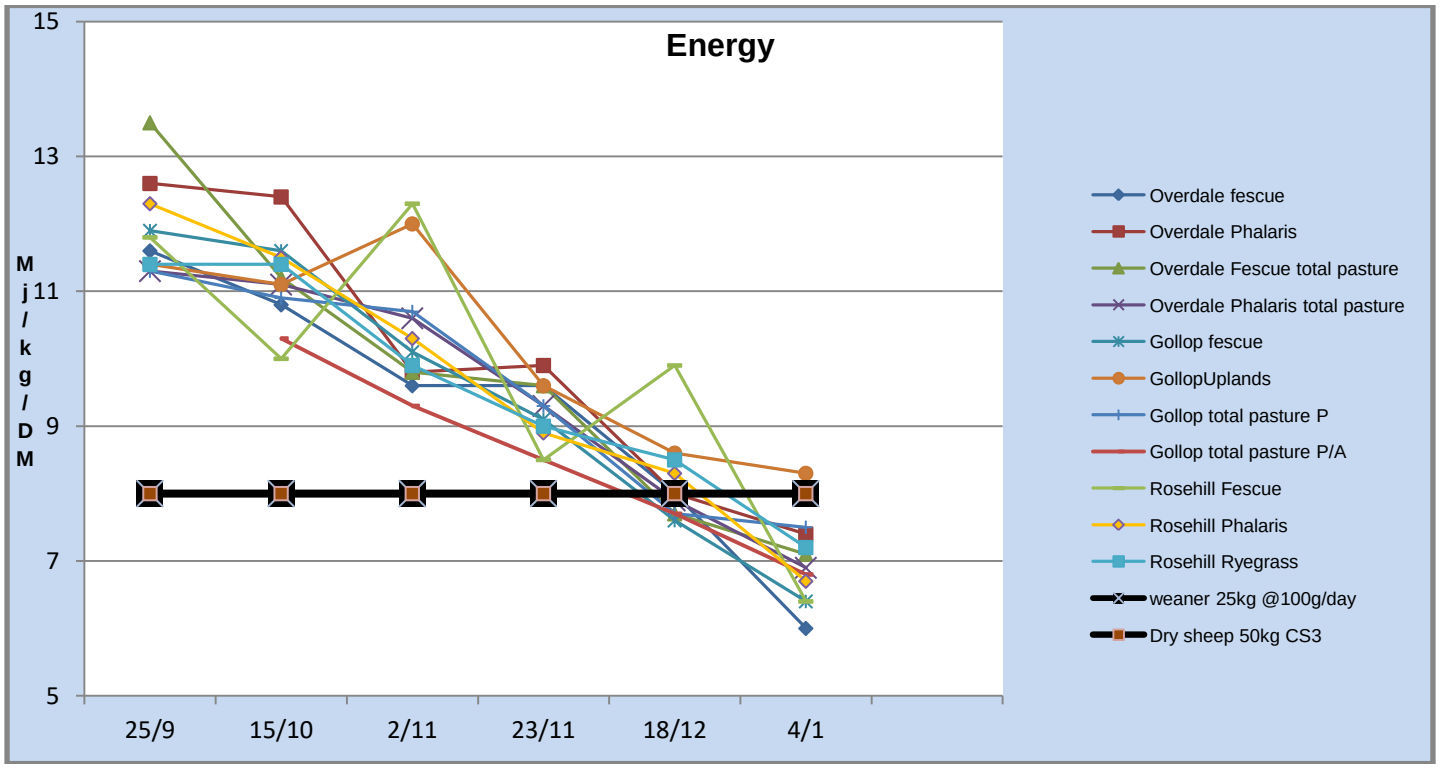

Fig. 16: energy test results

Digestibility

The fescue at Rosehill again produced variable results as it did for energy and protein. All other samples declined in digestibility at a fairly even rate. The fescue samples ended with lower digestibility than the other samples by early January but all were below the critical low quality level.

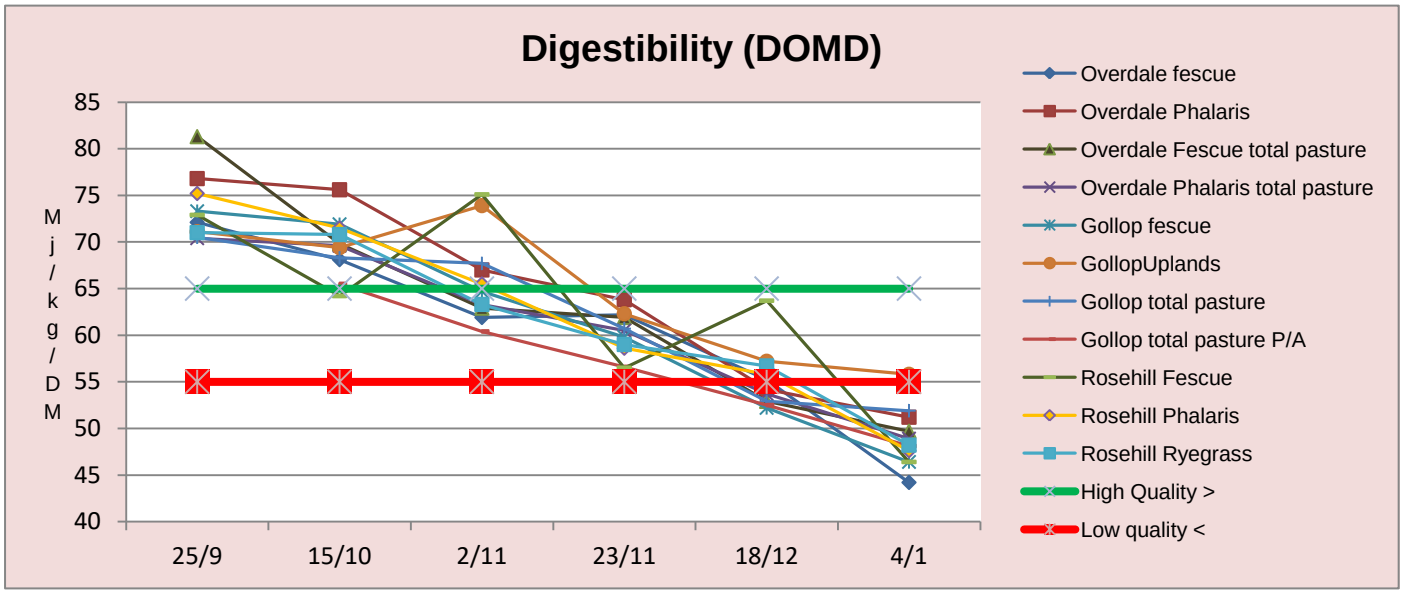

Fig. 17; digestibility test results

Table 7; indicative dates when project grasses fell below the feed quality required for each category.

Sheep Requirements	Crude Protein Requirement Weaner 25kg @100g/day		Crude Protein Requirement Dry sheep 50kg CS3		Energy <8 Mj/kg/DM		Under High Quality Less than 65 %DM		Low Quality Less than 55 %DM	
	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021
Fescue										
Overdale 2020 Fletcha	21/10	10/11	2/12	26/11	2/12	4/1/22	2/12	18/12	28/12	4/1/22
Overdale 2018 Fletcha	16/11	--	2/12	--	16/11	--	2/12	--	2/12	--
Cocksfoot										
Overdale Uplands	5/11	--	2/12	--	2/12	--	5/11	--	NR 2020 still > 55% on 28/12	--
Phalaris										
Overdale Holdfast GT	21/10	26/11	2/12	18/12	2/12	4/1/22	21/10	26/11	2/12	18/12
Fescue										
Gollops Fletcha	2/12	26/11	28/12	18/12	28/12	18/12	2/12	2/11	NR 2020 still > 55% on 28/12	18/12
Cocksfoot										
Gollops Uplands	NR	26/12	NR 2020 CP still 13.5 on 28/12 2021 CP still 8.7 on 4/1/22	NR	NR 2020 Energy still 8.5 on 28/12 2021 Energy still 8.3 on 4/1/22	NR	2/12	18/12	28/12 2021 still > 55% on 4/1/22	NR

Note; Two fescue pastures were measured for feed quality at "Overdale" Concongella in 2020. One was the newly established pasture which was only lightly grazed during its first year; the other was established in 2018 & was rotationally grazed in line with the farm program. Grass varieties were separately measured in the paddocks with mixed swards.

Grazing Management & Stocking Rates

Grazing Management

All pastures were rotationally grazed using the guidelines provided by project advisor, Lisa Warn; Warn Ag which are included in Appendix 1; “Pasture Management Protocol”. The good spring rainfall allowed for very high growth rates in all pastures and there was higher than optimum residue in pastures going into summer. This was the case for most pastures in the region in 2021, when some PPS members used a pasture mulcher to reduce annual grass, mainly barley grass (Hordeum leporinum), residue and PPS considers that this may be a useful tool for removing excess growth after seed heading. A demonstration will be considered in year three of the project if there are good spring conditions.

Stocking Rate

As the spring growth got ahead of available stocking pressure in spring, it was decided to calculate a theoretical maximum stocking rate for the grazed sites. The assumptions were a 70% utilisation of available feed (30% trampling etc.) and 1 kg of dry matter per day per 50 kg dry sheep. The results are shown in figure 18.

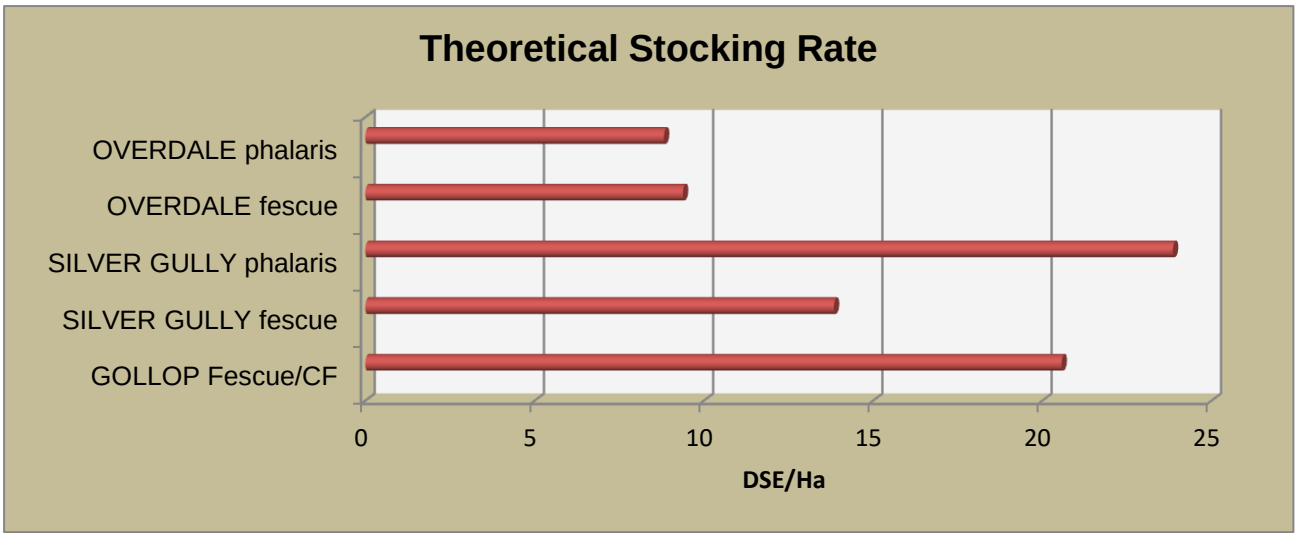

Fig. 18; theoretical potential stocking rate

Paddock Size

One of the sites was subdivided in 2021 in line with findings from the PPS Phalaris Persistence Project, an MLA EPDS completed in 2017. A positive correlation was found in phalaris frequency with decreasing paddock size. The results showed that Phalaris pastures over 20 Ha in size have a lower persistence rating than those under 20 Ha. PPS suggested that grazing management through preferential grazing may be the reason for this, but other factors such as different soil types unsuited to phalaris may be another. The correlation can be seen in figure 19.
It is possible that this effect could be the same for other perennial grass based pastures. Lloyd and Lorraine fenced the Avoca site into two paddocks which has aided grazing management and will possibly enhance the persistence of the Fletcha fescue and the Uplands cocksfoot.

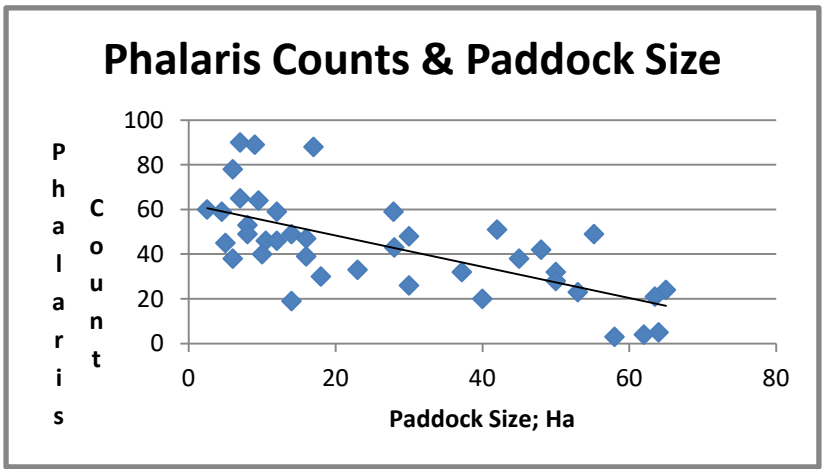

Fig. 19: Effect of paddock size % on phalaris content (y=62.31-0.6996x)

Fig.20; subdivision at the Avoca site

Demonstration 3

Assess effect of adding winter active fescue on other perennial pastures.

The addition of fescue with its mid winter growth habit should allow producers to rest other perennials such as phalaris, allowing them to produce spring feed and improve root growth. PPS believes that, in addition to increasing overall feed availability, the system should improve persistence of the other perennial pasture.

Due to the extra availability of spring moisture in 2021, all pastures were able to produce close to their potential so there was no opportunity to assess the effect of having fescue in the pasture system. PPS will attempt to do this in 2022 but should also be able to get anecdotal information from site hosts assessing the addition of fescue based pastures in their systems.

Take home messages from year 1 & 2

- Promising results for winter active fescue in the < 550mm rainfall zone.
- Full weed management prior to pasture establishment is critical for successful perennial pasture establishment. This wasn't able to be completely undertaken at two sites due to the timing of the project and while the pastures have been improved they are probably below the potential outcomes. MLA has recognised the issue of the length of PDS projects and they have been extended for up to 5 years instead of the previous 3 year time frame.
- Winter active fescue can be successfully sown with Uplands Cocksfoot and Arrowleaf and/or Sub Clovers
- Uplands Cocksfoot appears to compliment the fescue pasture by added bulk feed during winter and spring and providing extended feed quality late in the spring.
- Early sown fescue pastures can be grazed with caution; it is important to avoid overgrazing and affect long term persistence of the pasture.
- Nutrient requirements must be monitored through soil tests and possibly plant tissue tests.
- Nutrient deficiencies must be addressed to attain maximum potential growth of fescue.
- The fescue responded to nitrogen and potassium at the Silver Gully site showing that N & K deficiencies can limit production.
- Fescue will tolerate low pH (4.8 CaCL), moderately high levels of Aluminium & moderately saline soils. It is most productive at pH levels of 5.0 – 6.5 (CaCl); *Agfacts Tall Fescue Agriculture NSW (2003)*
- The Fescue feed quality declined slightly faster than phalaris and Uplands cocksfoot in 2022 but the differences were not great and could be easily managed by slightly earlier supplementary feeding.
- Mulching after seed head production maybe a useful method of reducing dry feed residue in fescue pastures but it has not yet been used in the demonstration.
- Results from the current and previous PPS demonstrations shows that total dry matter production of the winter-active fescue cultivars compares favourably with winter-active phalaris cultivars. Previous PPS trials highlight that production is lower from Australian phalaris and Uplands cocksfoot. Previous PPS trials also show that winter active fescue can be as persistent as Holdfast GT phalaris, Australian II phalaris and Uplands cocksfoot.
- Grazing plans to utilise rapid fescue growth need to be implemented.

References;

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Appendix 1; Pasture Management Protocol

PPS FESCUE PROJECT: L.PDS.2004

FESCUE: A LOW RAINFALL PASTURE TOOL?

Aim: ***to demonstrate that winter active fescue can be a valuable pasture systems tool in the <550mm rainfall zone in Victoria.***

Pasture Management Protocol

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Project technical advisor.

Grazing management

Rotational grazing allows plants to be rested between grazings. This allows plants to replenish carbohydrate reserves in their tiller bases (in crown of plant), improve the size of the root system and produce more leaf area for the next grazing event. Over time, the perennial plants increase in size which increases total pasture (kg DM/ha) grown over the year, will provide better ground cover and reduce invasion of weeds. Native perennial grasses and annual grass species (eg. annual ryegrass ryegrass) will also benefit from rotational grazing.

Rest periods

The length of the rest period varies with the time of the year.

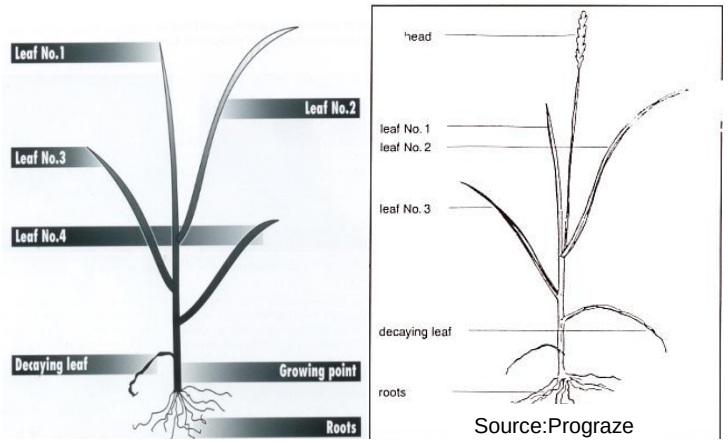
<u>From autumn to early spring:</u>
To decide when a pasture is ready to graze, the best indicator to use is the number of leaves per tiller that have regrown on the perennial grass. Once the full number of leaves have grown back per tiller, the oldest leaf will start to die. At this point the plant has replenished its maximum levels of carbohydrate reserves so it is ready for the next grazing.

The target for perennial ryegrass and **fescue** is 3 leaves per tiller and for **phalaris** and cocksfoot it is four (Figure 1). Cocksfoot can sustain up to 5 live leaves per tiller before the oldest leaf starts to die off, but grazing at the 4-leaf stage achieves a good balance between adequate rest and good feed quality. Leaf regrowth rates are driven by temperature (&moisture) not by soil fertility.

Pasture availability/Feed on offer (kg DM/ha) is another indicator that can be used to decide when a paddock is ready to graze. This works well where all paddocks in the rotation have similar species and high soil fertility. If paddocks have very different fertility levels, the paddocks will have different levels of pasture available (kg DM/ha) when they are at the appropriate leaf stage.

Some typical rest periods for paddocks, between grazings, as a guide are:

- Autumn: 30-40 days
- Winter: 40-50 days
- Spring: 18-22 days (OR can set stock for lambing)
- Summer: 70 + days (depends if get rain or not)



Source: Watson

Source:Prograze

Figure 1. Autumn-early spring: Leaf stage is an indicator of when perennial grasses are ready to graze. **Phalaris** (left) has 4 live leaves per tiller and perennial ryegrass and **fescue** have three.

From mid-spring to early summer:

Once the grasses move from the vegetative phase to the reproductive phase, leaf stage is not relevant to deciding when to graze.

For newly sown pastures, the priority is to allow the perennial grasses to run to head and flower before grazing off. If old perennial pastures have become rundown, due to overgrazing or dry conditions, allowing them to run to head in spring will improve their summer survival and growth the following year.
Phalaris usually starts to undergo stem initiation (can feel the nodes at the base of the plant) around mid-October. Rest for around 6-weeks after that to allow stem elongation and flowering to occur.
Fescue (Mediterranean/winter active) usually runs to head around a month before Phalaris.

For established pastures with good plant numbers and plant size, the priority at this time of year when growth rates are high is maintaining feed quality for as long as possible. The rest period can be shortened. The aim is for stock to trim up the pasture and maintain even utilisation, but not eat pasture down low at each grazing.

From mid-summer to the autumn break:

After the pastures have hayed off, the priority is to evenly graze the pasture off before the autumn break. The rotation can be slowed down. If the non-growth period is December to April (150 days) aiming for 2 grazings of each paddock during that time to utilise the dead feed, hence the suggested 75 days rest period. If there is some summer rain and pasture growth, this rest period can be reviewed.

Grazing duration

During the growing season, grazing a paddock for a week or less, will reduce the risk of re-grazing the newly emerging shoots (which start to grow 2-3 days after initial grazing) and this will also improve the overall pasture growth rates.

Grazing height

In dairy systems, leaving a high pasture mass residual (at least 3 cm) after grazing has been shown to increase perennial ryegrass growth rates and persistence. However, on sheep/beef farms trying to leave this amount of pasture residual after grazing is not always practical, particularly just after the autumn break. Also, different species have difference tolerances to grazing depending on their growth habit and position of growing points. For phalaris, fescue or cocksfoot pasture a more achievable target could be 1-2 cm (500-800 kg DM/ha) residual in autumn-winter. A higher pasture residual needs to be left moving into spring (eg. 4-5cm/1200-1400 kg DM/ha) and early summer (8-10cm/1800-2000 kg DM/ha). The aim is to have the dead feed eaten down to around 1000 kg DM/ha at the time of the autumn- break to allow good clover germination.