Annual grass control strategies in a perennial pasture system

A systems approach to reduce annual grass in perennial pasture systems to ultimately improve meat and wool quality post farm.

2020 Results Report

Advisory group members;
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The advisory group considered a range of possible control methods, focusing on barley Grass; these were implemented as detailed in this report on member farms in 2020.

Background

The incursion of annual weeds into pastures and a reduced number of herbicide options for their control has prompted PPS to look for a broader range of management techniques on which this three year on farm demonstration is focused.
Barley grass (predominately), Brome and Silver grasses continue to be an issue in pastures, especially after periods of dry conditions and perennial pasture thinning. These annual grasses have huge impact on the ability of growers to turn off seed free meat and wool, thus incurring price downgrades to various extents, in addition to the price downgrades there are significant animal health issues that arise from the sharp seeds. The invasion of annual grasses also has a deleterious effect on desirable pastures; competing for light and moisture.
Current control methods are mostly herbicide based with some mechanical techniques also carried out in the form of slashing or hay making. Current practices are not reducing the problem sufficiently to minimize the impact of the invasive weeds. Barley grass has benefited from the increase in soil fertility associated with pasture improvement and has become an increasing problem since the dry years of 2014 – 15.
PPS is testing for herbicide resistance on selected member farms to gauge if resistance is an emerging problem locally; initial results are available in this report.
PPS members are currently exploring alternative methods of annual weed control which are outlined below:

- Pasture competition – Over sowing productive species into older perennial pastures to reduce the opportunity for annual grasses to invade the pasture.
- Spray topping – Employing optimal timing of spray topping practices and investigation into alternative chemical options.
- Dry sowing of clover – Sowing clovers in late summer to have them emerge at the autumn break to increase early competition.
- Seed removal options – Hay, Silage or mechanical topping. The use of silage has been shown to be effective in the region but has not been widely adopted by producers. A successful demonstration could change this.
- Grazing management – using sheep or cattle to harvest bulk feed early in the season, with the aim to reduce seed set over several seasons.

PPS aims to demonstrate single or combined methods of reducing annual grass weeds in perennial pasture on member farms.

Contents

Demonstration summary 2020

Demonstration 1: Sowing into existing pasture

- Ryegrass was oversown into three demonstration sites in 2020.
- Barley grass chemical weed control was successful at all sites.
- Oversowing with rye grass has produced valuable feed in 2020, measurements in 2021 will determine if any barley grass supression in subsequent years will be observed.

Demonstration 2: Hard seeded legumes

- 2/5 sites were successful in germinating Arrowleaf clover in 2019.
- The Mullingar site first germinated in 2019 has shown some barley grass supression, feed tests in this report show its early season value.
- While providing useful feed where germination was successful barley grass can still set sufficient seed to remain an issue.

Demonstrations 3 & 4: Chemical options and chemical resistance testing

- No spray topped paddocks were looked at in isolation in 2020, this was looked at in combination with oversowing (demonstration 1).
- Chemical resistance sampling continued in 2020 with the identification of a single resistant site, it is unclear if this results is due to past herbicide use or contamination. Resistance to Paraquat was first observed in the 1980's.
- Samples have been collected for further testing in 2021.

Demonstration 5a: Mechanical removal of hard seeds (silage)

- 2019 silage site was monitored in 2020 with areas that were ensiled showing a reduction in barley grass seed heads with no further treatment. (201 heads/m^2(silage) and 2079 heads/m^2 (control).
- 2020 silage site also showed a reduction in seed head counts from a second germination of barley grass post silage.
- The feed test results from both sites are varied highlighting the need for feed testing to ensure animal requirements are met.

Demonstration 5b: Mechanical removal of hard seeds (hay)

- The hay simulation site at Mooney's gap has shown a reduction in seed heads compared to 2019 assessments.
- This is the third year the site has been cut and removed with seed head numbers remaining fairly stable at the treatment site (see figure 18).
- This is a small simulation site with treatment and control, results may indicate a benefit from hay, although seed heads remain viable.

Demonstration 6: Grazing management

- Despite hard grazing showing some early promise in seed head reduction, counts after the late germination show no difference from the ungrazed portion of the paddock (under cages).
- The imposition of this type of grazing is impractical due to the numbers of sheep and the close montitoring required.
- It is unlikely that grazing will have any effect on barley grass.

PPS annual weed control in perennial pastures (2019-2021)

Despite the challenges that COVID-19 posed, the demonstration has progressed well. Group engagement remained strong which is reflected by great attendance at online events. The project met its milestones with no delays. This demonstration and the PPS Annual Forage project were selected to speak at the 60th Annual Grasslands Conference of Southern Australia (GSSA) which was held online in July and August. Both were highly regarded. A further achievement was the silage webinar in June with guest speaker Michelle Jolliffe (Agriculture Victoria). The links to the recordings of these events can be found below.

Growing conditions in Ararat have been good (590.8mm/year), with the autumn break beginning in April although winter rainfall in some areas was below average for the period. Stawell airport shows rainfall below average (432.4mm/year) with winter rainfall well below long term averages.

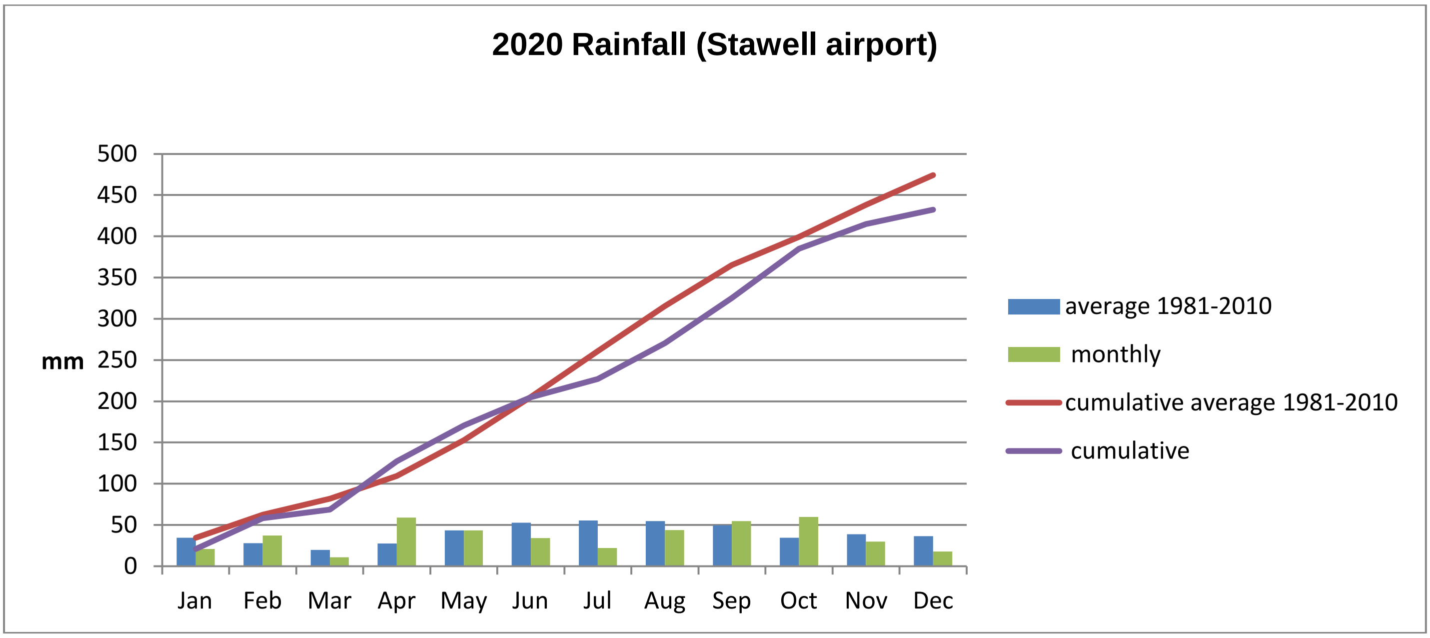

Figure 1: Stawell airport rainfall 2020

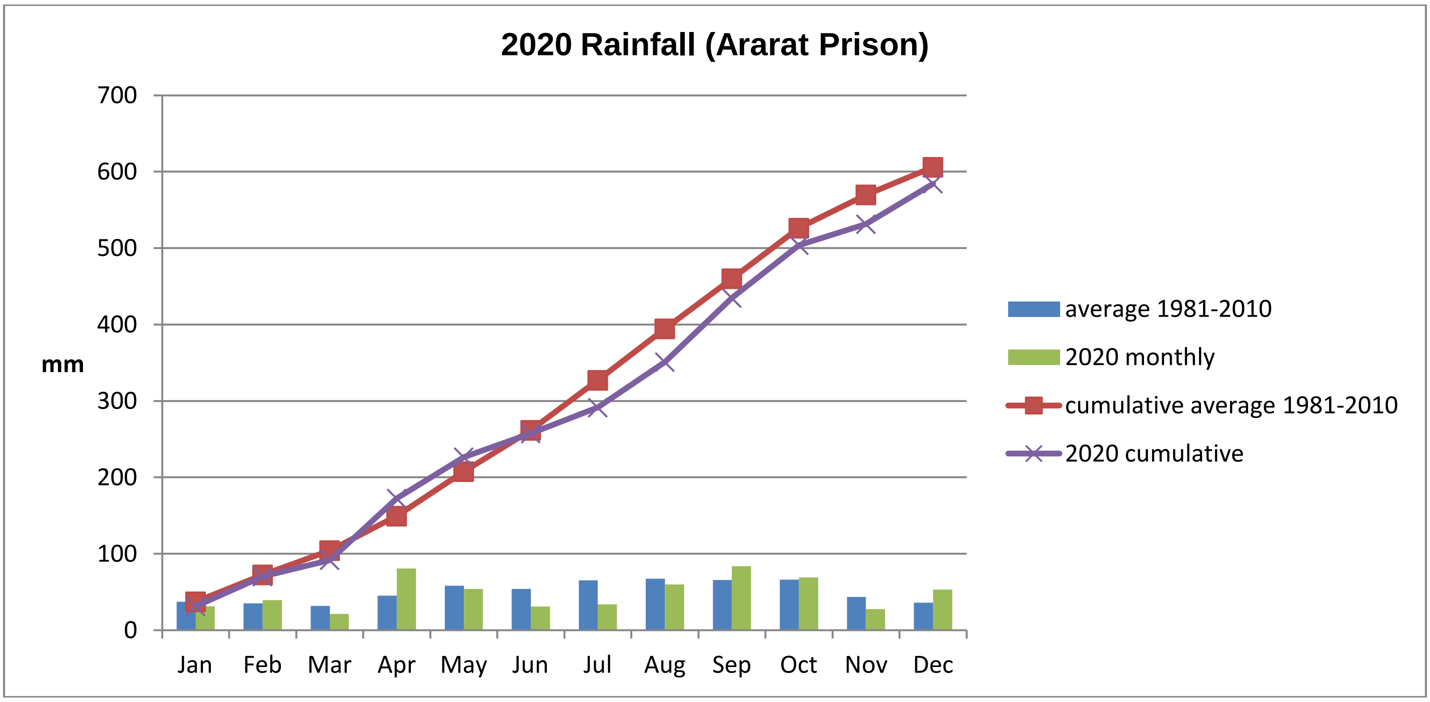

Figure 2: Ararat Prison Rainfall 2020

Table 1: Events 2020 calendar year

Date	Event description	No. producers	No. service providers
10/06/2020	Silage webinar, guest speaker Michele Jolliffe. Topic: making quality silage in our region. Link to recording	16	8
22/07/2020	Grassland Society of Southern Australia's 60th Annual Conference; guest Speaker Tess McDougall. Topic Project overview and results from year 1 and year 2. This event composed of three distinct extension products. 1. Development of a paper for publication within the conference proceedings, 2. Presentation to 140 live participants of the conference, link to recording 3. The development of an article for the Grasslands Newsletter which was distributed in September 2020 Link (Page 14 & 15) 4. Delivery of project overview to PPS AGM 14/10/2020.	140 25	N/A 4
March 2020	2019 results report sent to members & posted on PPS website	200+	30
March 2020	Update & case study on barley grass control methods included as appendix to PPS newsletter	193 copies to member farms.	332 copies to external contacts incl. Ag Vic, CMA's, MLA & interstate & NZ farmers.
June 2020	Report on chemical resistance delivered to the members via the PPS Newsletter in June.	As Above	
December 2020	Results from 2019 silage treatment included in PPS newsletter and Beef Sheep Newsflash	>3500 subscribers	

Figure 3: Sampling at Invergarry October 2020

Demonstration 1: Sowing into existing pasture

Objective: To increase the competition by over sowing in old pastures using desirable, fast growing species to crowd out annual species such as barley Grass. Control areas were used as a comparison to the treatments at all sites.

Treatments

Table 2 Sowing into existing pasture sites and methodologies

2020 sites	Locality	Existing Pasture	Weed control	Variety	Date sown	Rate (kg/ha)
Mooney's Gap	Ararat	Lucerne	Clethodin 360 & Verdict 520 (barley Grass) Simazine, Diuron, Di-par (broadleaf, marshmallow)	Verdura Tetrapolid (ryegrass)	1 June	16 kg
Marenda	Mt Dryden	Phalaris/ sub clover	Nil (control) and Gramoxone (May) MCPA broadleaf (July)	Tetila (ryegrass)	14 May	16 kg
Millbanks	Elmhurst	Phalaris/ sub clover	Spraytop 2019 & Gramoxone autumn 2020	Tetila (ryegrass)	2 May	15 kg

Mooney's Gap site

Annual ryegrass was sown into the EverGraze Lucerne paddock in 2020. This stand was planted in 2009 and is thinning, oversowing this site will extend the longevity of this site before it needs to be sown again.
An area of the paddock was sown at twice the rate of the rest of the paddock (32 kg/ha compared to 16 kg/ha) to ascertain if it had any effect in reducing barley grass infestation. No observable difference was noted. This site will be observed again in spring 2021 for any carry over effects.

Marenda site

The paddock that was over sown site at Marenda has performed exceptionally. It was oversown with Tetila ryegrass in May 2020, areas of the paddock had a spray top (glyphosate) and the entire paddock benefitted from an application of nitrogen. The pasture cuts showed up to 5000 kgDM/ha taken off much of the paddock which had the full treatment (ryegrass, Nitrogen and weed control). Feed test results are shown below for this paddock, in 2021 these tests will be used to perform a cost analysis to show if there is a cost benefit relationship to the treatments (over sowing and weed control). Feed test results from across the season taken on the 9th September and the 9th November show the over sown ryegrass (where weed control has occurred) is still at 11 MJME/kgDM where other areas of the paddock this has fallen to 9 MJME/kgDM this area also yielded 1 tDM more than other areas of the paddock.
The reduction in barley grass in the oversown part of the pasture is shown in Figure 5; the sites have been GPS marked and will be measured for barley grass infestation in 2021.

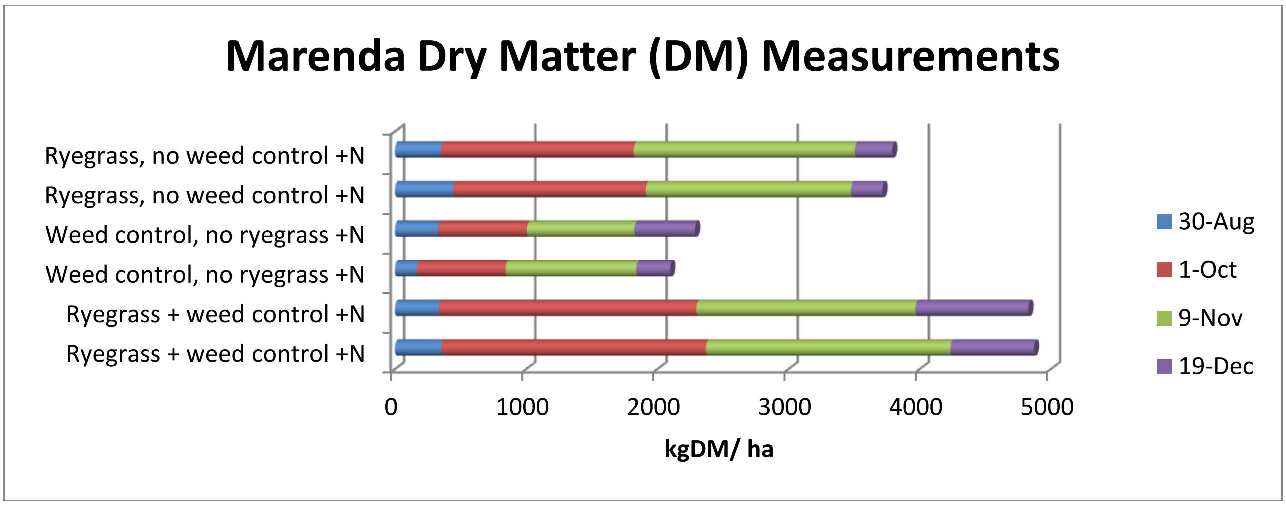

Figure 4: Marenda Dry Matter results (kgDM/ha), spring 2020

Table 3: Feed test results Marenda September 2020

9th September	Crude Protein %	Energy MJ/Kg DM	Digestibility % (DOMD)
Ryegrass + weed control	33.8	12.6	82.9
Ryegrass no weed control	27.6	11.3	70.6
Weed control (no ryegrass)	26.9	11.1	69.4

Table 4: Feed Test results Marenda November 2020

9th November	Crude Protein %	Energy MJ/Kg DM	Digestibility % (DOMD)
Ryegrass + weed control	14.5	11.0	73.2
Ryegrass no weed control	17.6	9.0	59.1
Weed control (no ryegrass) Note: moderate clover content	20.9	9.1	59.4

Millbanks

Old phalaris pasture was over sown with Tetila ryegrass after weed control. A control area was established, and no treatments (ryegrass or weed control) were applied. The weed control was effective; but Ben and Jodie commented that "the barley grass reduction can be relatively short lived as late season rains cause further germinations." The assessments in October showed a large reduction in barley grass in the treated areas when compared to the control.

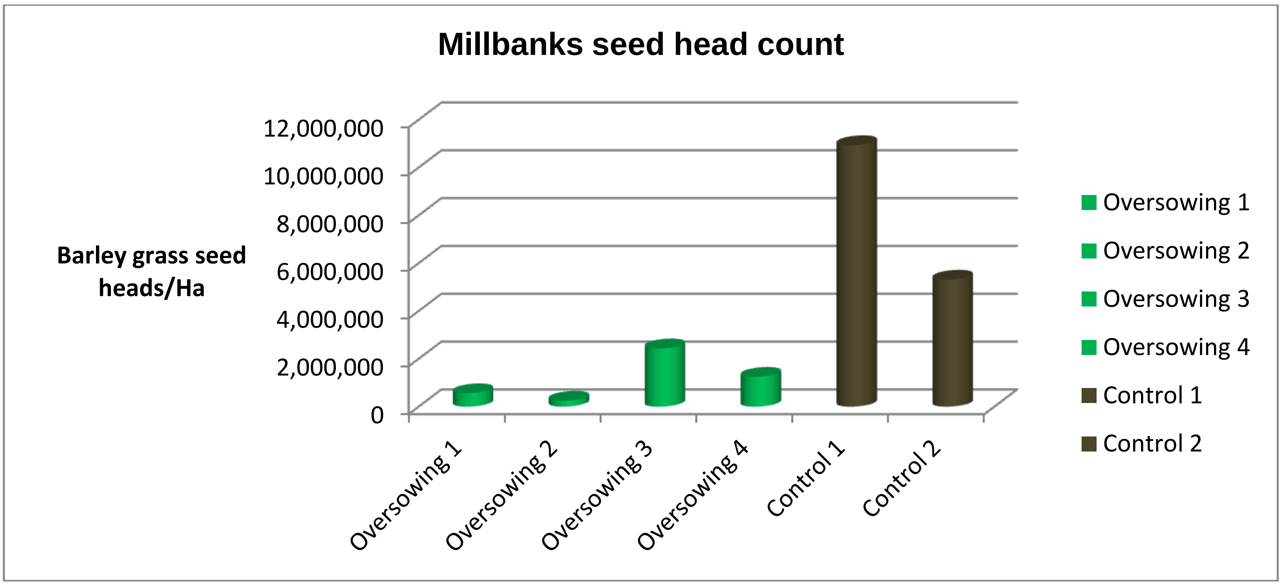

Figure 5: Millbanks barley grass seed head counts October 2020

Discussion

The over sowing of ryegrass has produced valuable feed at all sites. Measurements in 2021 will determine whether it has reduced the amount of barley grass in the pastures in the medium term. Weed control at the sites in the 2020 season has been relatively successful, late rains have caused a secondary germination of barley grass. The decrease in seed head counts at the sites has minimised the potential for seed head damage. This has broadened the class of animals that could benefit from the nutrient dense feed on offer.

Demonstration 2: Hard seeded legumes

Objective: To assess if competition provided by hard seeded legumes will control annual grasses in multiple years -
(1) Can early sown Arrowleaf provide competition for annual grasses?
(2) Will residue of hard seed germinate in subsequent years & suppress annual grasses?

This demonstration is based on information provided to PPS members at a legume workshop in October 2017 by Dr Belinda Hackney, from NSW DPI, where trial work has proven successful in introducing clover into existing pastures by direct drilling prior to the autumn break. PPS aimed to demonstrate the method and also to evaluate the effect of adding hard seed from clover establishment will increase pasture competition in subsequent years and reduce barley grass establishment through increased competition.

PPS selected six sites offered by members and supplied scarified and unscarified seed to be evenly mixed and used at 8 kg/ha.

Treatments

Table 5 Hard seeded legume sites and methodologies 2019

2019 Sites	Locality	Soil	Date sown	Method
Cuyuac	Nareen	Clay loam	27/5	Broadcast, rolled
McLean	Joel South	Sandy loam	27/3	Direct drilled (DD), disc depth10mm
Rockvale	Addington	Clay loam	5/5	DD
Ben Nevis Farms	Tulkara	Sandy loam	4/5	DD
Mullingar	Ararat	Loam	6/3	Light scarify, Broadcast, Heavy stocking rate
Mullingar (Scarified seed only)	Ararat	Loam	May	Chemical weed control, Broadcast, Heavy stocking rate

Results

In 2019, only three of the sites were successful in establishing Arrowleaf Clover; Ararat (2 sites) & Addington. Both sites also successfully germinated Arrowleaf in the second year, to varying extents. Mullingar, as seen by the image below (Figure 6) has been the most successful site although results indicate that there are areas of the paddock where Arrowleaf was highly successful and areas where it was less successful. Barley grass is still present with silver grass showing a marked reduction.

The paddocks that were established successfully in 2019 were revisited in 2020. Counts from the Mullingar, (Figure 6) site show some reduction in barley grass in areas where Clover establishment was greatest. Of note is the clear reduction in silver grass in these areas is of benefit; pasture composition estimates for the site are in fig. 10.

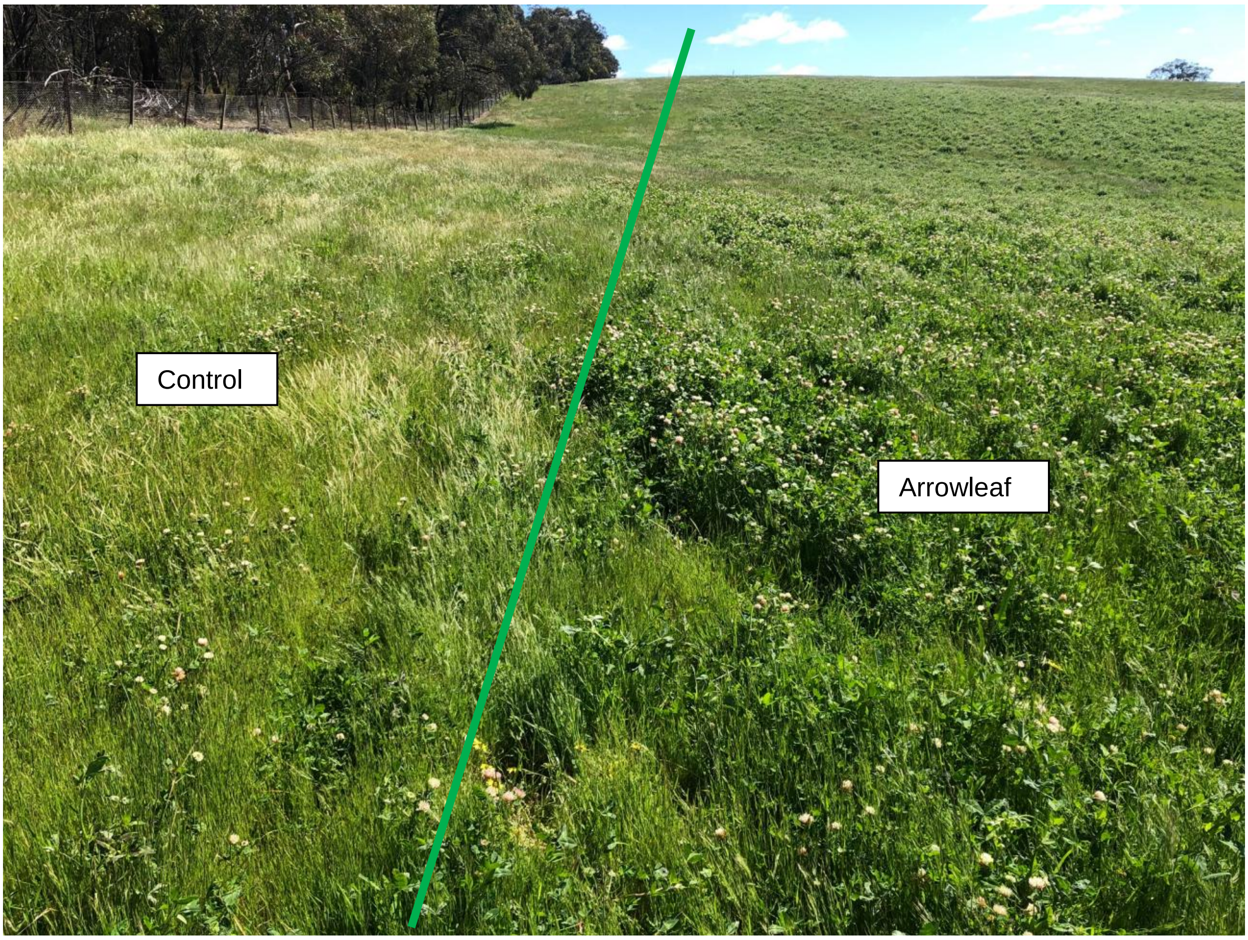

Figure 6: Mullingar Arrow leaf clover November 2020

Feed Quality

The Arrowleaf at Mullingar was tested for feed quality throughout the spring and summer. The results are shown on pages 10 and 11.

A summary of feed quality requirements is provided below, obtained from “Drought Feeding and Management of Sheep; A Guide for Farmers and Land Managers 2018”; published by the Victorian Government Department of Economic Development, Jobs, Transport and Resources, April 2018.

Energy

Energy is the most important requirement for all livestock and is the most common limitation during a drought or any feed-limited situation. An animal’s requirement for energy is measured in megajoules (MJ) and expressed as metabolisable energy (ME). One megajoule is equivalent to 1,000 kilojoules. Metabolisable energy is the amount of total energy that can be utilised by the animal. When referring to pasture energy values, the term digestibility is used. Digestibility refers to how much of the feed is retained and used by the animal. If the digestibility of a feed is 75 per cent, then for every kilogram of dry matter eaten, 750 g is retained by the animal and 250 g is excreted.

Energy requirements can be estimated in Dry Sheep Equivalents or DSE ratings. This measure gives all classes and sizes of animals an energy rating that can be used for estimating stocking rates. A DSE is the energy required to maintain the body weight of a 2-year-old non-lactating sheep in condition score 3. The body weight of the standard dry sheep is not always consistent but is generally 45–50 kg, requiring between 7.6 and 9.7 MJ ME/day.

More commonly, as sheep have got bigger, a 50 kg wether is considered to be 1 DSE. A 50 kg wether can still vary in its requirements for energy, depending on its genetics, how much activity it is doing, if it is cold or bare shorn, and even how much extra energy it might need to digest poor-quality feed. Estimates of energy requirements are just that – estimates – and they need to be adjusted and monitored for your animals and the conditions. But the DSE system is useful as a simple estimation of the different energy requirements across classes of sheep. For example, if a dry 50 kg wether is considered to be 1 DSE, requiring 8.3 MJ ME to maintain weight at Condition Score 3, a 50 kg ewe with one lamb at foot would be classed at 2 DSE, requiring 16.6 MJ ME.

The daily energy requirements and DSE rating for different classes of sheep are given in Table 3.1, along with minimum crude protein as a percentage of the dry matter of the diet fed.

Table 6: 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	6-8
	45 kg CS 2	0.8	6.5	
	50 kg CS 2	0.9	7	
	50 kg CS 3	1	8	
	60 kg CS 3	1.1	9	
Pregnant Ewes Last 4 weeks before lambing (single)	45 kg CS 2	1.2	10	8-10
	50 kg CS 2	1.5	12	
	60 kg CS 3	1.8	14.5	
Ewes With lamb at foot (single)	45 kg CS 2	1.8	15	12–14
	50 kg CS 3	2.2	18.5	
	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).

Digestibility

Digestibility is provided on a feed analysis report as DDM (Digestible Dry Matter) or DMD (Dry Matter Digestibility), depending on the company doing the analysis, and is reported as a percentage of dry matter. It is the percentage of the dry matter actually digested by the animal. High-quality feeds will have a figure over 65 per cent. Feeds below 55 per cent are of poor quality and even if sheep are given free access, they will be unlikely to be able to maintain their live weight if it is supplying all of the diet.

Protein

Protein is measured as crude protein as a percentage of dry matter. Protein contains nitrogen, and this is used to estimate the protein content of feeds. A portion of the nitrogen in feed is non-protein nitrogen (nitrates, ammonia and urea); crude protein is a measure of both this and the true protein (amino acids).
Crude protein values give a good indication of whether or not a particular feed will satisfy the protein needs of an animal.

Some supplements, such as grain legumes, are high in protein and will be useful if they are cost effective and practical. Supplements that are likely to be low in protein include cereal hays, straws, low-quality pasture hays and some cereal grains. Protein can range from 6 to 19 per cent in hay. Silage can show similar variation, and in the case of cereal grains, protein can vary from 5 to 16 per cent. Lupins are very high in protein and are often added to a cereal grain to increase the protein level of the diet.

Forms of non-protein nitrogen such as urea can be used to increase the rate of digestion of high-fibre feeds such as hay and straw, but caution is needed as products such as urea can be toxic if consumed in large quantities. In general terms, at least two-thirds of an animal's crude protein intake should be provided as true (natural) protein. That is, not more than one-third of the crude protein should be represented by non-protein nitrogen (NPN). These additives should not be included in levels above 2 per cent of the diet.

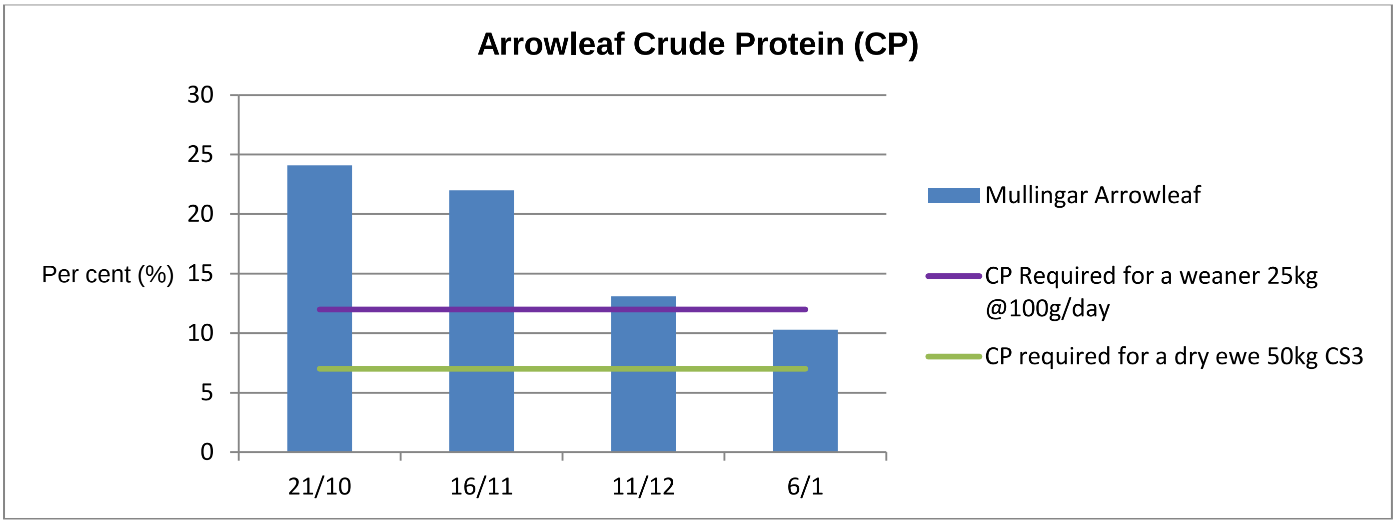

Figure 7: Crude protein measurements Arrowleaf clover, spring/summer 2020

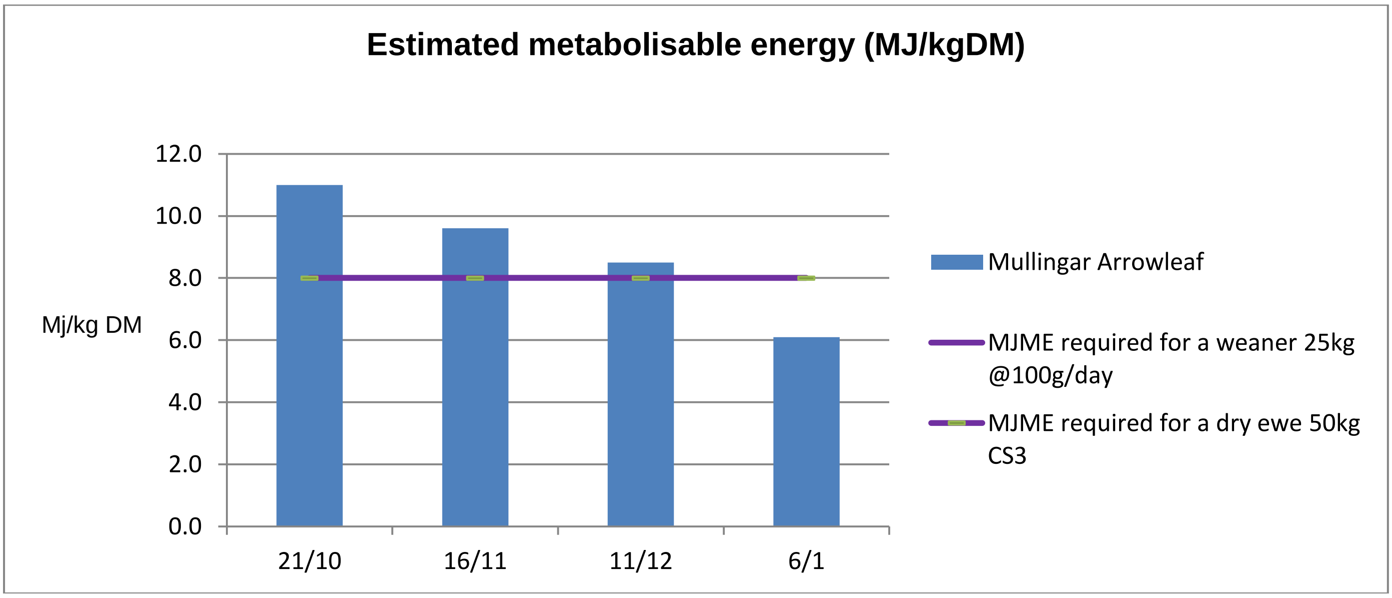

Figure 8: Metabolisable energy measurements Arrowleaf clover, spring/summer 2020

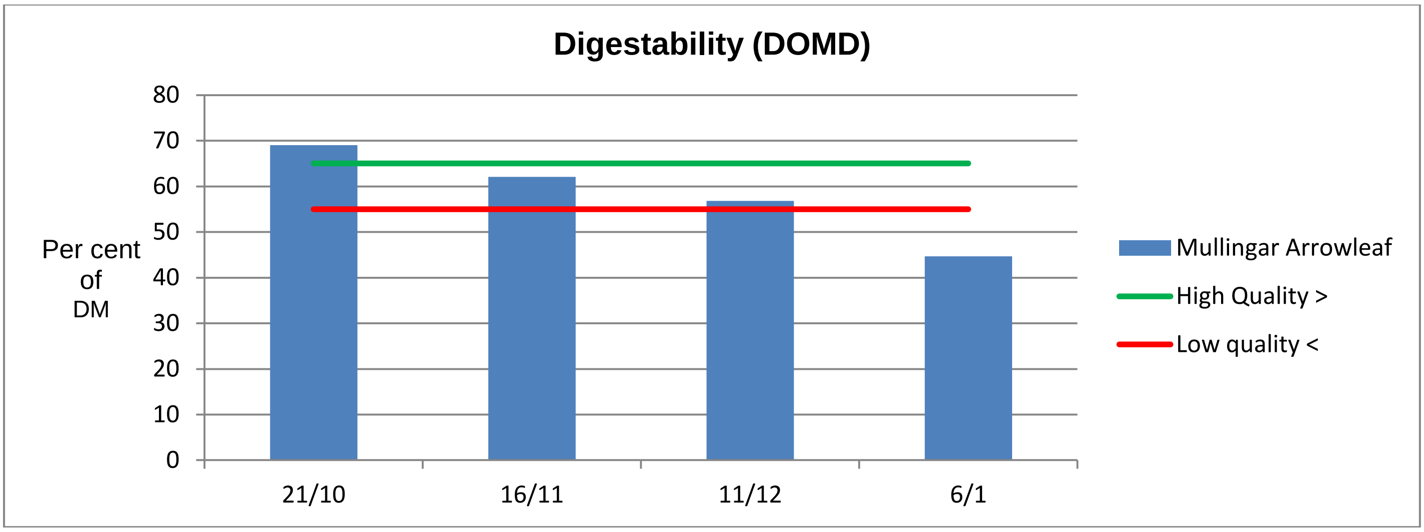

Figure 9: Digestibility Arrowleaf clover, spring 2020

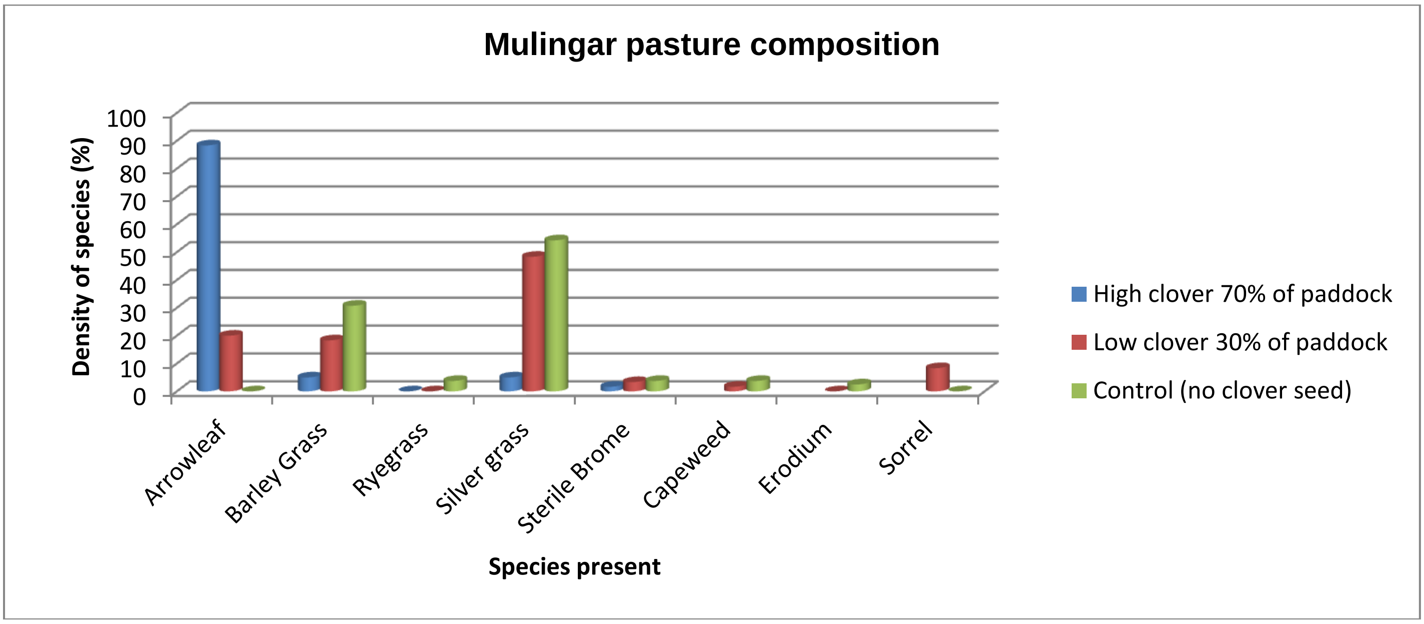

Figure 10: Mullingar pasture composition October 2020

The result suggests that even when the barley grass growth is suppressed by good clover establishment; it will be able to set sufficient seed to remain a problem in subsequent years.

PPS will monitor paddocks in the clover demonstration for the next two years to assess any reduction in barley grass content.

Rockvale at Addington was inspected on 8th Dec; it still had some Arrowleaf in pasture but there was no effect on barley grass content.

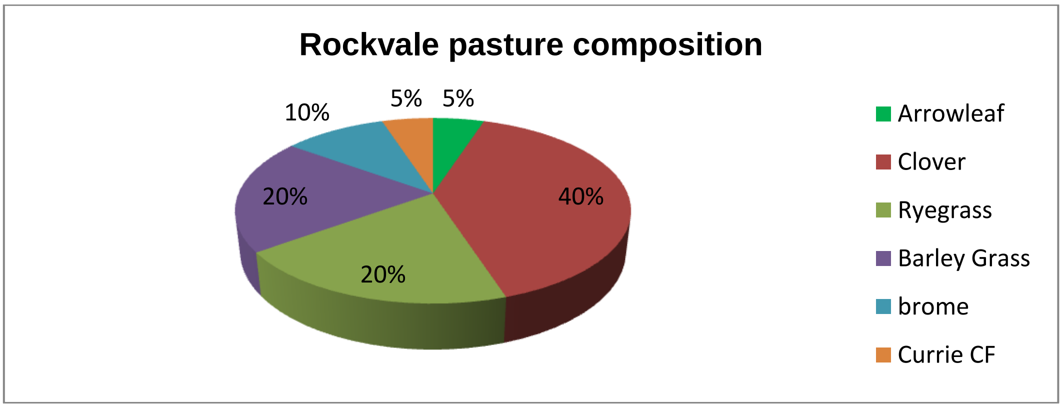

Figure 11: Pasture composition Rockvale, Addington, October 2020

Demonstration 3: Chemical options and resistance testing

Objective: To assess conventional spray options for the removal of annual grass species

Spray Topping

No spray topping paddocks (in isolation) were assessed in 2020,the success of previous treatments has been varied depending on the timing of the application and periodic rainfall events post treatment. Pastures which had single spray top treatments in prior years were inspected and showed no reduction in barley grass numbers to the level required for long term control. In consultation with the steering committee in February 2020 it was decided that spray topping in isolation was not having any great effects so the site at Marenda was instigated.

Demonstration 4: Chemical resistance

Barley grass has been sampled from PPS members' farms to test for resistance to glyphosate, quizalofop, paraquat and diuron. Twenty two samples have been tested to date. In 2019 no resistance was exhibited.

In 2020 one site exhibited resistance to paraquat. This resistance gene was first identified in the 1980's and could be attributed to past herbicide use or contamination.

Samples from barley grass paddocks with a history of chemical controls in 2020 sent for germination testing. No results to date.

Demonstration 5: Mechanical removal of hard seeds

Objective: To assess if the mechanical removal of seed heads is a viable option for barley grass control.

Treatments:

1. Nil
2. Cut pasture and remove residue for silage
3. Cut pasture and remove residue for hay

2019 Silage results and discussion - Tulkara

Two demonstration sites were selected to assess the effect of removing barley grass through the making of silage. A paddock at Tulkara with a high barley grass content was made into silage in mid-October with a control area left for comparison. A second pasture at Glenlofty with high quality perennial grass and sub clover pasture and almost no barley grass was also included in the demonstration to assess differences in feed quality between the pastures.

Making silage from barley grass infested pasture is showing promise in some areas, however given the region's topography, it's not a method that could be used at most demonstration sites. At the first site at Tulkara (east of Stawell) feed tests showed that the silage was good quality, measuring 12.9 MJ Metabolizable Energy (ME) and 17.3 % Crude Protein (CP) and classified in the A2 quality range (Australian Fodder Industry Association); the feed budget below gives an indication of the potential with the silage alone.

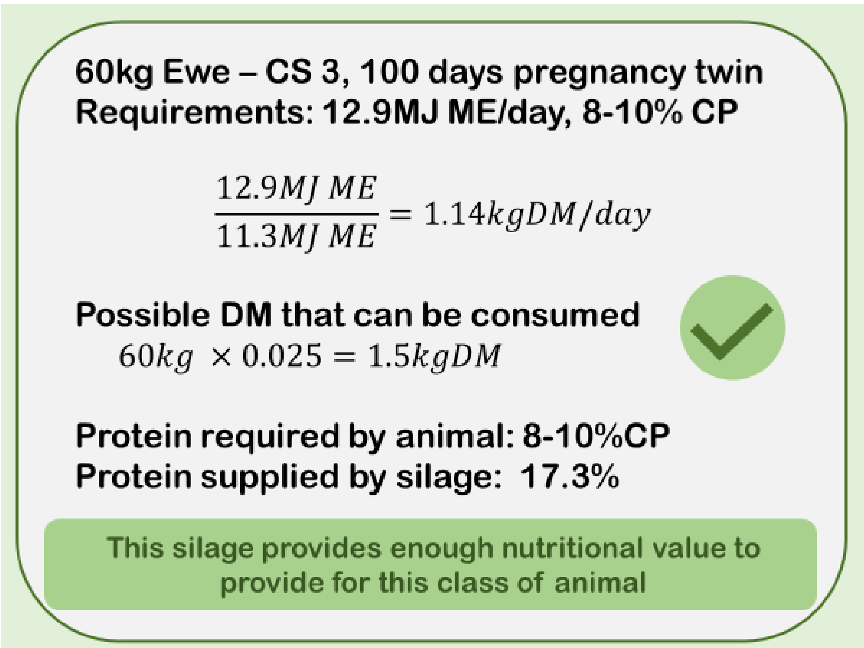

Figure 12: Simple feed budget for 2020 silage (using feed test results)

Seed viability testing of the silage made from barley grass measured zero viable seeds. This means that although the seed head is still present, the seeds won't germinate and the infestation can't be spread to another area. We are hoping to replicate these results with 2020 silage production.

Figure 13: Tulkara silage demonstration site May 2020

Figure 14: Tulkara Silage site October 2020

A clear reduction in barley grass was seen in the 2019 silage (treatment) site compared to the uncut (control) site in both May (Figure 13) and October 2020 (Figure 14).

Pasture assessments in October 2020 involved counting barley grass seed heads in the silage (treatment) and uncut (control) sites. The results indicated a large reduction in barley grass seed heads where silage was made in 2019, with approximately 2000 seed heads/m2 in the control site and 200 seed heads/m2 in the treatment sites (Figure 15).

The overall reduction in barley grass seed heads, combined with the zero viability of the seed heads within the silage is a positive result for the group.

Demonstration host Hayden described the silage production as a 'useful tool'. "It didn't get rid of all the weeds, but it got rid of a lot," he said.

Hayden was also pleased with the pasture quality in 2020, following silage production. “By harvesting the silage in 2019 there’s a lot more ryegrass than I expected, which led to great palatability and utilisation in 2020. I would certainly do it again.” Hayden said.

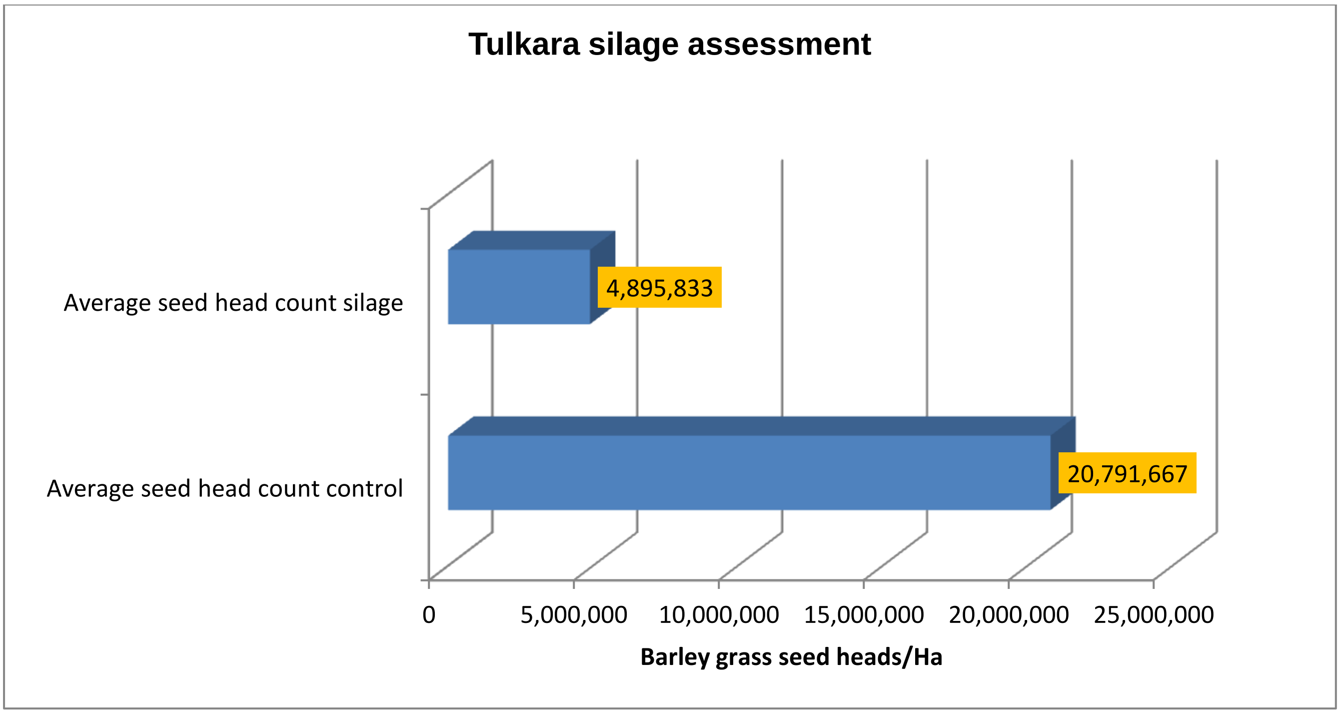

Figure 15: Tulkara barley grass seed head counts assessed in October 2020

2020 silage results and discussion – The Oaks

Figure 16: 2020 silage site prior to cutting October 2020

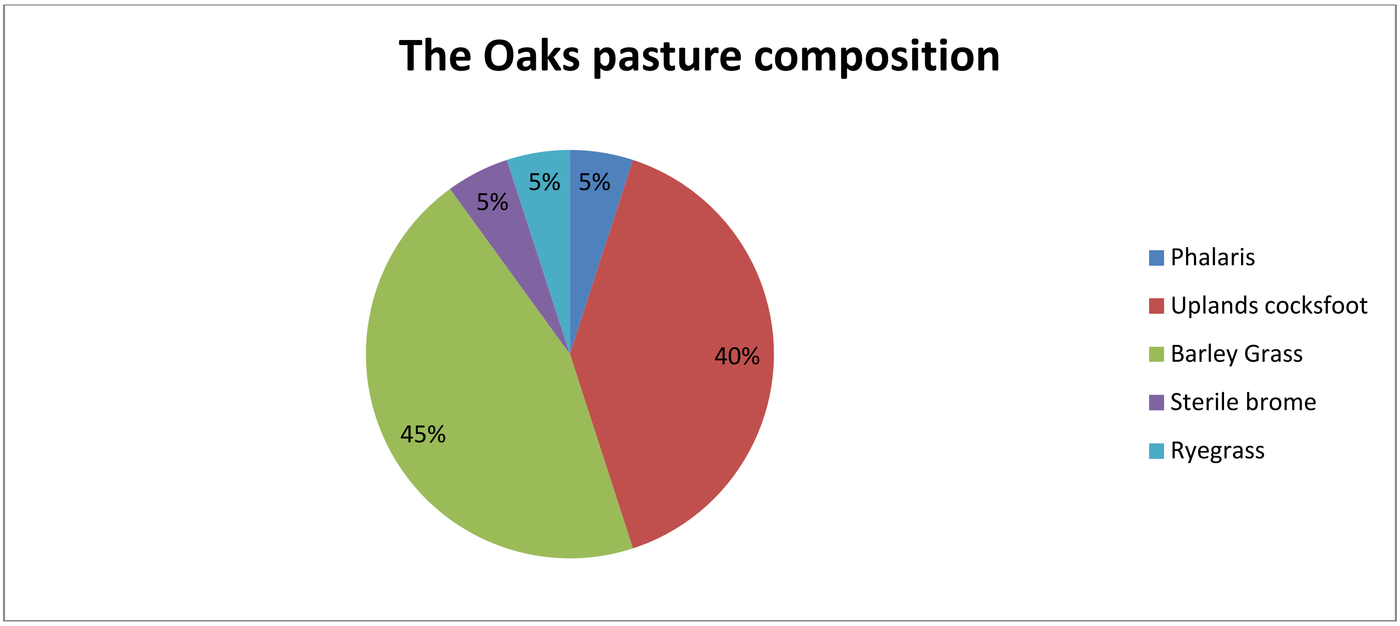

Figure 17: 'The Oaks' Pasture composition assessed pre silage October 2020

This pasture composition was taken prior to the silage being cut in October 2020 and is shown by Figure 16.

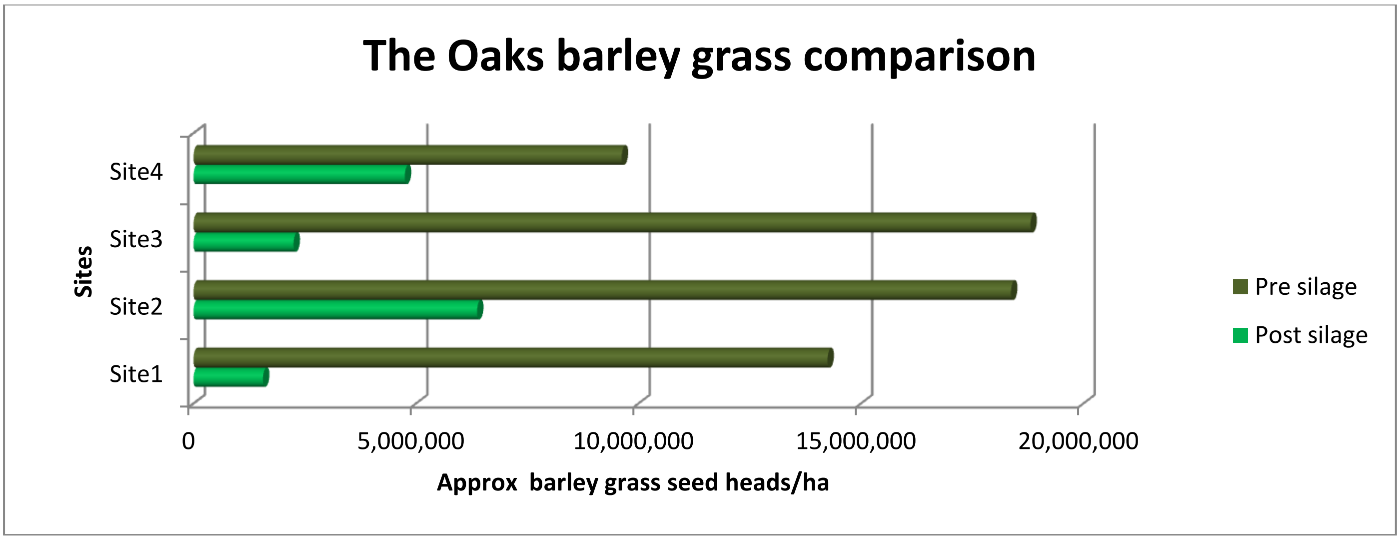

Figure 18: Barley grass germination comparison pre and post silage Oaks October-November 2020

After the silage was removed an October rainfall event allowed a subsequent germination of barley grass which was measured in December 2020. The results shown above (Figure 18) indicate that the relative amount of barley grass that germinated at the site was much less than the initial germination after the autumn break. This site will be monitored in the 2021 season, similar to Tulkara.

Feed test results of 2019 and 2020 in comparison

Table 7: Feed test comparison 2019 and 2020 silage

	Silage 20/10/2019 Tulkara	Silage 10/10/2020 The Oaks
Dry Matter (%)	60.4	58.6
Crude Protein (%DM)	17.3	11.4
Neutral detergent fibre (%DM)	48.2	61.9
Dry Matter digestibility (%DM)	75.3	65.2
Metabolisable energy (MJ/kgDM)	11.3	9.9

The feed test results from 2019 and 2020 are shown above. The digestibility of the 2020 silage is very low in comparison due to the higher fibre content of the feed. This is interesting since this silage was cut at an earlier time than the 2019 silage, arguably in a better growing season. It shows the variability of the results and the necessity of feed testing to ensure you know what you are feeding out. The 2019 silage was made from a predominantly ryegrass pasture (with a significant barley grass incursion) the 2020 silage site was predominantly uplands cocksfoot also with a significant barley grass incursion; this would account for some species related differences in results. The 2019 silage site was ensiled with an inoculant, which could also explain some of the difference in results.

In a feed budget the silage alone can be eaten by a 60kg ewe in condition score three at 100 days pregnancy (twin). In later stages of pregnancy or lactation the silage would need to be supplemented. The 2020 silage is not of a quality to be able to be fed to any class of growing stock without supplementation.

Hay results and discussion

The removal of barley grass seed heads through hay making was simulated by the cutting and removal of cut material by a hand mower and catcher. The dry spring in 2018 meant that very little haymaking was conducted which lead to the decision to do the simulation. An area was cut at Mooney's Gap near Ararat on October 3rd 2018 with the adjoining area mapped as a control.

It is important to note that this is a very small trial site and results may not be transferrable to larger scale applications. The simulation was repeated on the same area on November 6th 2019 and again in 2020.

The removal of barley grass heads in the hay simulation has shown a reduction in the estimated seed head/Ha. While this is appearing to be a useful strategy on a single paddock basis, although hay quality will be marginal and the seed heads in the hay are still viable and will create infestations where it is fed out. Considerations could be made to feeding out the hay in containment, minimising the area that the hay is fed out on and therefore minimising the weed spread.

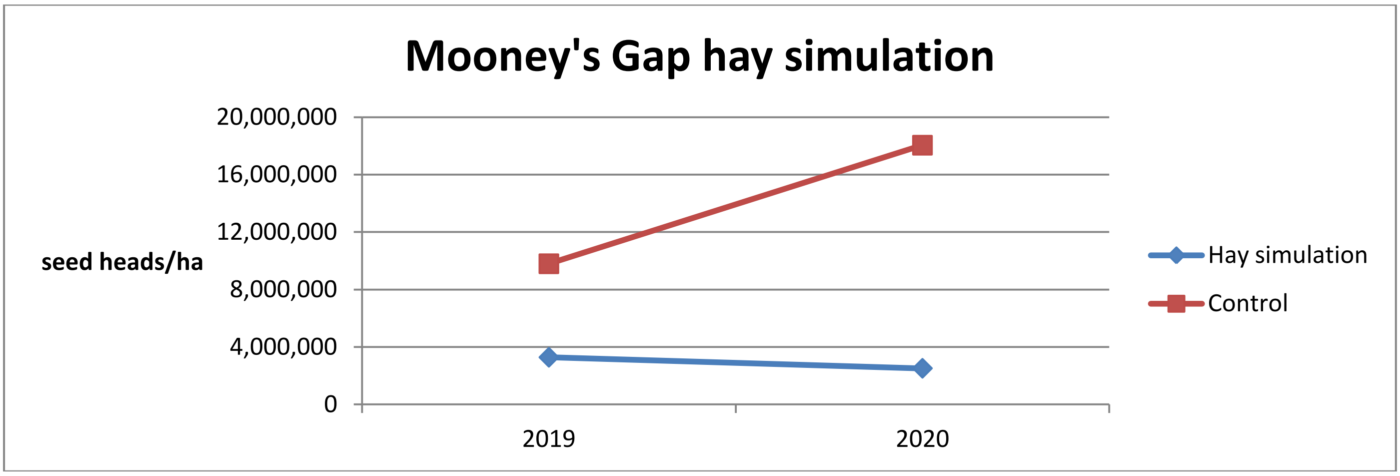

Figure 19: Mooney's gap seed heads per hectare Assessment October 2020

Figure 20: Hay simulation site, Mooneys Gap, October 2019

Demonstration 6: Pasture management with GA or heavy grazing

Objective: To assess if grazing by sheep can reduce the seed set of barley grass.

Treatments:

1. Nil (under cage)
2. Giberellic acid no grazing (under cage)
3. Giberellic acid grazing
4. No giberellic acid, grazing

Methods:

Table 8 Grazing management methodologies

Mooneys Gap	Ararat	Giberellic acid applied 1/07/20	Stocked at 25 DSE/ha from July 1st to August 4th and 61 DSE/ha from 28th August to 14th September. Destocked prior to October assessment.

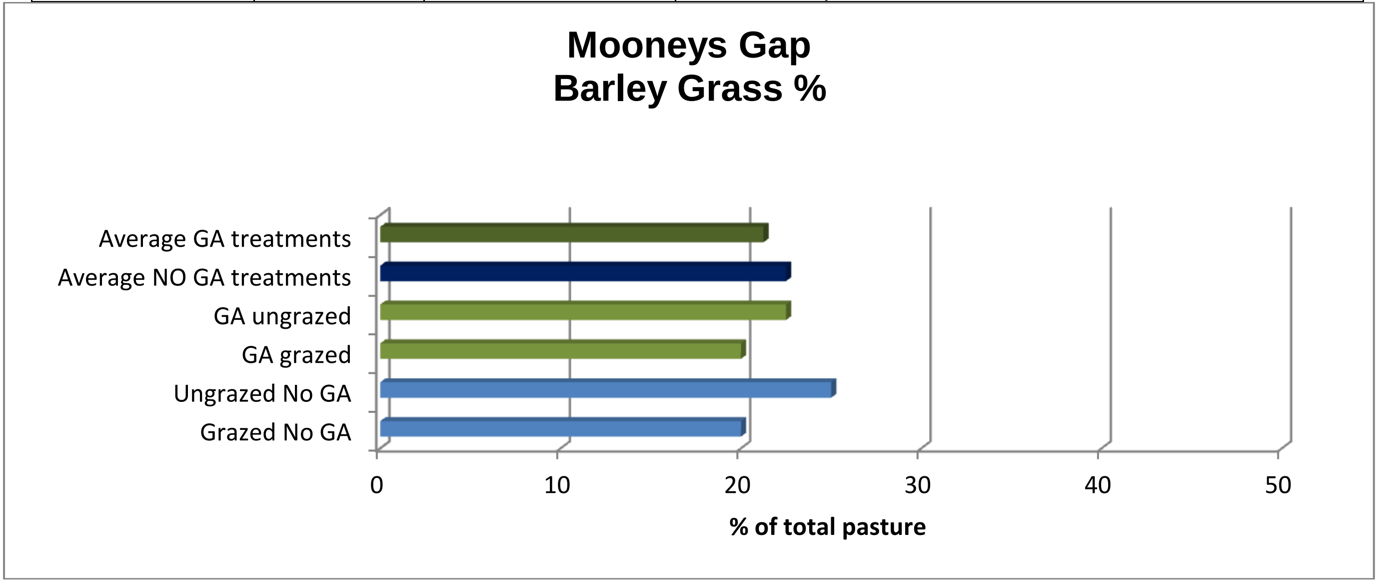

Figure 21: Mooneys Gap barley grass assessments October 2020

Figure 22: Sample being cut at Mooney's Gap October 2020

No meaningful differences were measured at Mooney's Gap in October 2020 between grazed and ungrazed treatments with or without gibberellic acid (GA) application.
Three sites at "Invergarry" Langi Logan had GA strips applied to ascertain if it had any effect on barley grass population. No differences were observed in spring at any of the three sites where GA was applied.

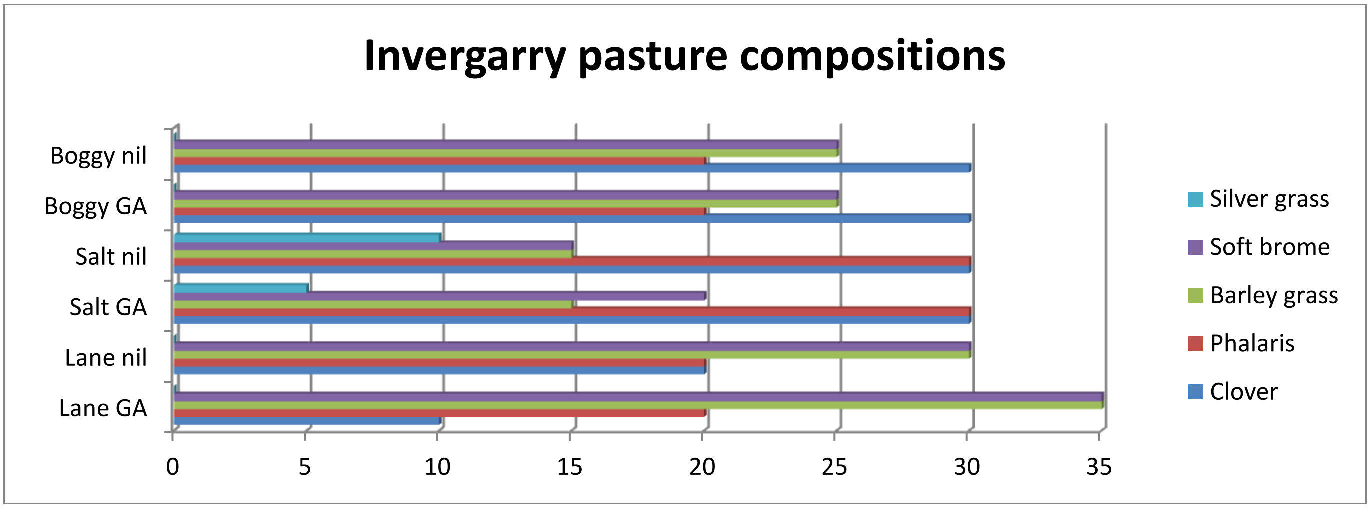

Figure 23: Invergarry pasture composition assessments taken from 3 sites (Boggy, Salt and Lane paddocks) October 2020

Results and discussion

The paddocks where gibberellic acid was used showed no relationship between the application of gibberellic acid and a reduction in barley grass i.e. all measurements showed consistent barley grass amounts (shown in Figure 23)

Grazing

After last year's failure to adequately graze the 14 ha paddock, a smaller site was chosen. With close monitoring, hard grazing (residual 4cm) was imposed on a holding paddock with a lot of stock movement enabling very high stocking rates for very short periods without any stress on the sheep. The early results showed a reduction in barley grass heads on the hard grazed area but late seeding after an above average October rainfall has grown enough seed to cause reinfestation.

An adjoining paddock was set stocked at approximately 8 sheep/ha (Figure 24) and pasture cages were used to replicate an ungrazed area. The barley grass counts are shown in Figure 25.

This practice of hard grazing is impractical on a large area as very large numbers of sheep are required for short periods with close monitoring of the animals.

Figure 24: Hard grazed paddock in foreground and set stocked paddock behind fence October 2020

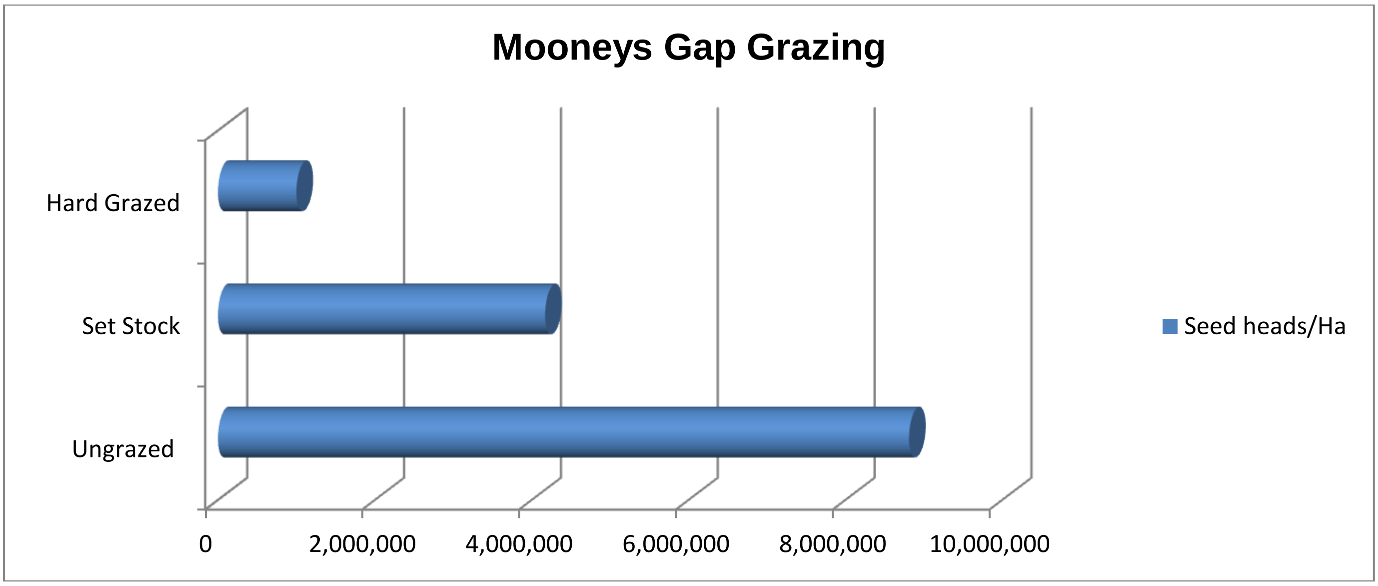

Figure 25: Barley grass counts taken in October 2020

Barley grass had a subsequent germination after above average October rainfall which partially reduced the margin of difference between the grazed and ungrazed portions of the paddock.

Figure 25; example of barley grass which germinated post control in mid December 2019 at Quamby, Dobie 2019

Conclusion

The advisory committee will be meeting in February or March to discuss the findings and plan for the final year of the project.

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"The Annual grass control strategies in a perennial pasture system" demonstration is being conducted in partnership with Agriculture Victoria.

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