PERENNIALPASTURESYSTEMS
MAKING PASTURE GO THE DISTANCE

Innovative Use of Gibberellic Acid

PPS GA Demonstration; Interim Report No 2 - November 2017

The project is funded through the MLA EPDS program; and is being conducted in collaboration with Agriculture Victoria

Interim report prepared by Rachael Campbell; Extension Officer Agriculture Victoria, Ballarat & Rob Shea; PPS Project Manager, Ararat.

Abstract

Abstract
The Perennial Pasture Systems (PPS) group is conducting a three year demonstration of the use of Gibberellic Acid (GA) on winter pastures, funded by the MLA Enhanced Producer Demonstration Site (EDPS) program.
GA is made naturally in plant roots and stimulates shoot and cell elongatation promoting plant growth; this occurs naturally in plants during spring. The application of manufactured GA, sold commercially as "Pro Gibb™" and "Gala™" in winter stimulates plant growth and creates an increase in winter feed availability. The demonstration has two parts and each was replicated at five sites in year two (2017).

Demonstration one compared the extra winter feed produced using GA to nil treatments. All sites showed an increase in winter feed in response to the GA treatments in percentage terms, although the actual amount of extra dry matter produced seemed to be influenced by the amount of kg DM/ha at the time of treatment.

All host farmers were reasonably satisfied with the amount of extra winter feed grown and regard the use of GA as a useful tool in their pasture management. However, they do emphasise that the effective use of a GA program does require a fair degree of pre planning and flexibility to get the best results.

The second set of demonstration sites were looking at the effect of GA on annual grass weeds. This demonstration set out to assess whether GA application increased growth and palatability, allowing the weeds plants to be grazed heavily enough to affect their recovery and therefore be an aid to weed reduction in pastures. The concept of the demonstration came from observed results from GA use on a PPS member property in 2014.
Five sites were replicated to show the effect of GA treatment and grazing on silver grass (vulpia spp.), annual ryegrass (Lolium rigidum) and barley grass (Hordeum leporinum) using replicated nil and GA treatments followed by grazing with sheep.
No discernible differences were found at any of the sites in 2017, the reasons for this are analysed in the summary on page 19 and 20.

Background

The Perennial Pasture Systems (PPS) group was successful in an application to the MLA Enhanced Producer Demonstration Site (EDPS) program in 2015 to commence a gibberellic acid (GA) demonstration.

The project is titled "innovative use of gibberellic acid" and proposed a three year, two part demonstration of the potential benefits of GA in the PPS member region and beyond.

The use of GA to promote winter growth in perennial grasses was well documented by CSIRO in the 1950's and 1960's but due to its cost it was not taken up by the grazing industry as nitrogen fertilizer was a much cheaper alternative. In recent years the cost of GA has reduced and it has now become a useful tool in perennial grass management.

Although GA has re-emerged as a pasture management option, information on its use tends to be of a very general nature and PPS believes that there needs to be more specific guidelines for its use in our region.

As far as PPS is aware the only Victorian trial information available is from South West Victoria which is a much more favourable environment for pasture production. PPS is conducting demonstrations to produce a set of guidelines for GA use in less favourable environments as well as looking at both physical and economic aspects of its use.

PPS is also demonstrating the use of GA as a non toxic annual weed control measure in addition to the best practice GA use for our region. PPS plans to assess the effectiveness of GA as a non-toxic control measure for annual grass weeds. The demonstration will include measurements that will reveal any impact of GA applications on the control of annual weeds; this concept comes from observed effects in the region where silver grass (vulpia spp.) infestations have been reduced by a combination of GA applications and heavy grazing. The observations showed that GA sprayed areas of silver grass were suppressed by sheep grazing after the GA application while the adjacent unsprayed area remained ungrazed and grew strongly into the spring. Andrew Speirs from Meridian Ag confirmed that GA does have an effect in increasing growth in annuals when he was questioned at a PPS/Grasslands Society MLA Pasture Update in Stawell in March 2015.

PPS believes that GA will be an important component in the region's pasture systems with added winter feed availability enhancing animal welfare at critical times such as lambing. GA has the added environmental benefit of being a naturally derived product with no known detrimental effect to plants or animals.

Use of Gibberellic Acid (GA)

GA is made naturally in plant roots and stimulates shoot and cell elongatation promoting plant growth; this occurs naturally in plants during spring. The application of manufactured GA, which sold commercially in granular and liquid form as "Pro Gibb™" and "Gala™," in winter stimulates plant growth and creates an increase in winter feed availability. The best responses occur when there is adequate soil moisture and temperatures between 5 – 15° Celsius and the pasture is ungrazed for 21 days post treatment.

Project Oversight and Design

As with all PPS projects, an advisory group of PPS members was appointed to oversee the project and assist the PPS project manager in the implementation and management of the project.

GA Advisory Group;

Simon Brady "Jallukar Park" Rhymney

Jodie Greene "Millbanks" Elmhurst

Dennis Harrington "Tirranna" Mt Cole Creek

The project design, technical advice and dry matter assessments are being provided by Andrew Speirs; Meridian Agriculture Casterton.

Project data collection, recording, analysis and reporting are being carried out by PPS Project Manager; Rob Shea and Agriculture Victoria Extension Officer; Rachael Campbell.

Demonstration Site Locations

In 2017, five sites were selected for each demonstration and the treatments were as follows.

Phalaris based pasture production demonstration

1. Nil
2. Gibberellic Acid – optimum timing mid to late June, rate 10gms/Ha of Pro Gibb™ at all sites except Cuyuac where replicates of 10 and 20gms/Ha of Pro Gibb™ were applied.

Nitrogen treatments were included in the 2016 demonstration; the results showed little response to N application to pastures in winter as expected. The nitrogen treatments were not included in 2017.

Three replicates were implemented at boom spray width (dependent on the size of the host farmer's equipment).

Annual weed reduction demonstration

1. Control (Nil)
2. Gibberellic Acid

Host Farms

The Phalaris based pasture production demonstration sites were implemented by PPS members as follows,
Brady Family “Jallukar Park” Rhymney
Edgar Family; “Cuyuac” Nareen
Greene Family “Millbanks” Elmhurst
Holden Family “Overdale” Concongella
Small Family “Tottington” Paradise

The Annual weed reduction demonstration sites were implemented by PPS members as follows,
Dowie Family “Cotswold Slopes” Carisbrook
Greene Family “Millbanks” Elmhurst
Harrington Family “Tirranna” Mt Cole Creek.
Kindred Family “Lonsdale” Stawell
Small Family “Tottington” Paradise

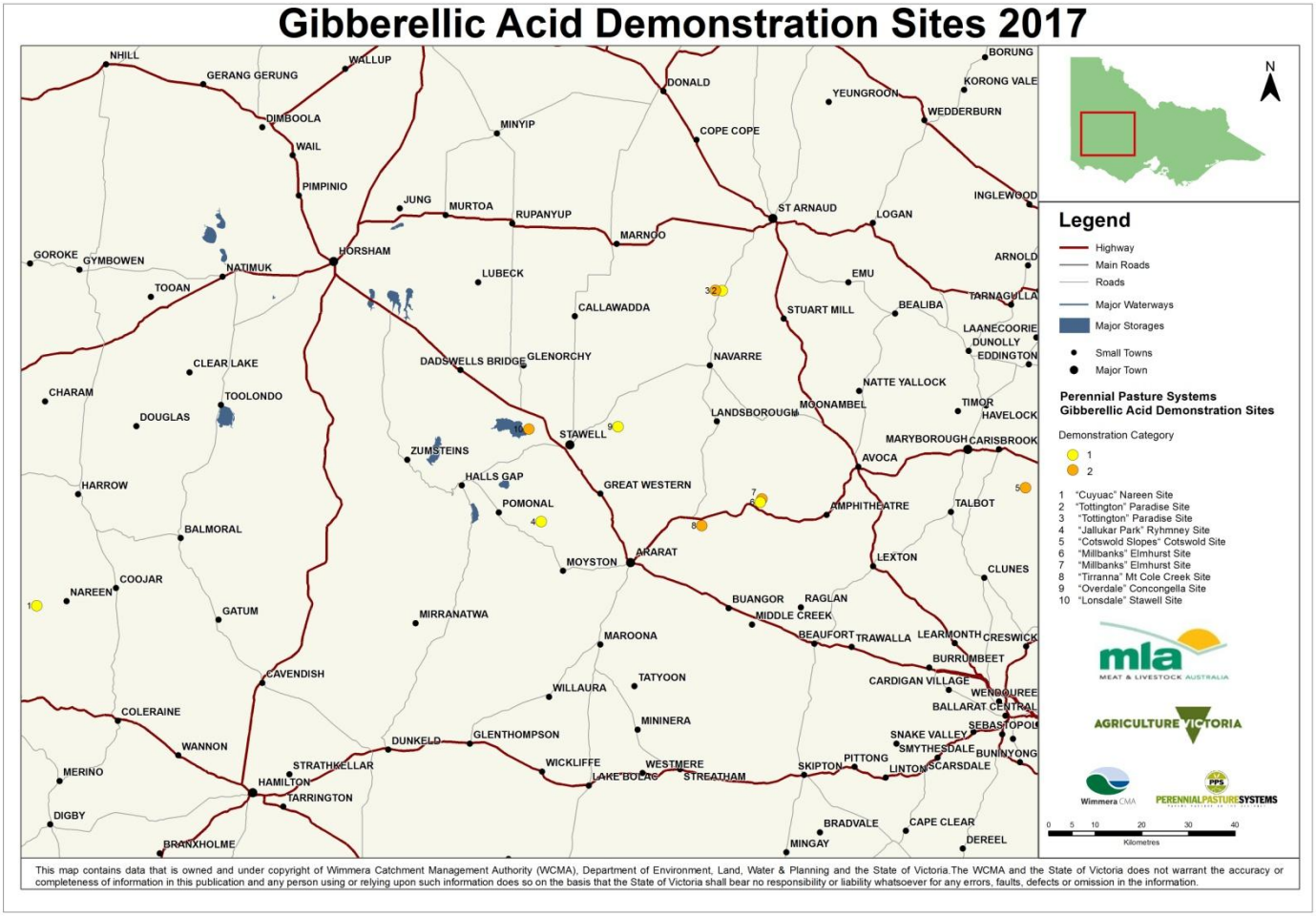

Figure 1: Map of PPS GA demonstration sites 2017, where category 1 represents the Phalaris demonstration and category 2 represents the annual weed demonstration.

Figure 2: Post GA treatment pasture at Tottington.

Phalaris based pasture production demonstration

Data Collection

All sites had pasture composition measured using the pasture stick method. This was conducted before and after treatments and the Phalaris based pasture production demonstration sites were cut and had dry matter results calculated. Feedtests were conducted on the Phalaris based pasture production demonstration sites with samples collected in July at Jallukar Park, Millbanks and Overdale as well as Cuyac in November.

Results and Observations (to date);

Although there were differences in the quantities of dry matter collected at the sites there was a fairly consistent pattern in the responses to the treatments. These results are shown in figure three showing the percentage increase in dry matter at each site.

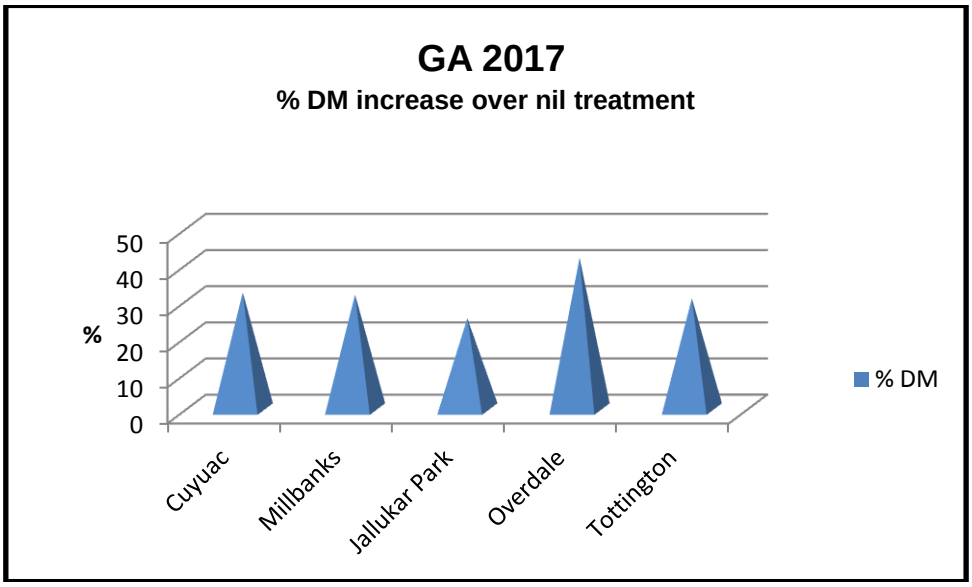

Figure 3: Graph showing the percentage gain in GA replicates at each site.

Site Results

Cuyuac: Nareen

The replicates at Cuyuac included treatments of10 gms/Ha and 20gms/Ha of Pro Gibb™, the Cuyac pasture is a high quality three year old Holdfast GT Phalaris based pasture. The pasture had an estimated 1400 kg/dm/ha on June 22nd when the treatments took place.

The higher rate of Progibb™ gave a larger response (+218 kg/dm/Ha). A section of each replicate was cut, weighed and then dried to produce a dry matter estimate for each treatment. The cuts took place on the 17th of July, 24 days after treatment applications. The results from the Progibb™ @ 20gms/ha are the figures used in the site comparisons.

Figure 4: Untreated replicate at Cuyuac, ten days after treatments

Figure 5: GA replicate at Cuyuac, ten days after treatment

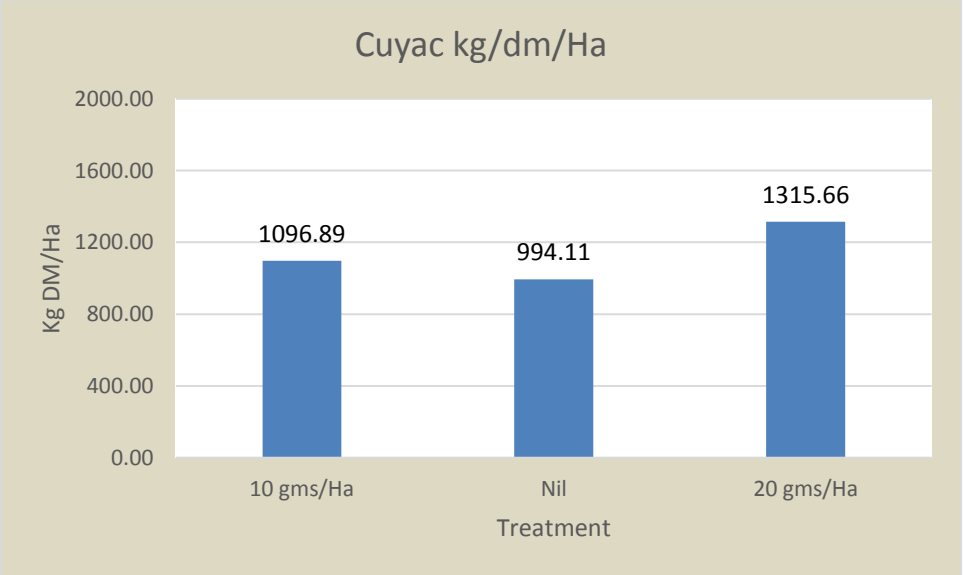

Figure 6: Cuyuac Dry Matter results

Figure 7: GA treated phalaris at Cuyac showing growth differences between replicates. Left Nil, Right + GA @20 gms/Ha

Host farmer comments; Andrew Edgar
"This is the second year that we have got a result from the higher rate of GA; we need to investigate this further at other sites".

Jallukar Park: Rhymney
The Phalaris and clover paddock at Jallukar Park is a well established pasture, at the time of treatment it had the approximately 1400 kg dm/ha.

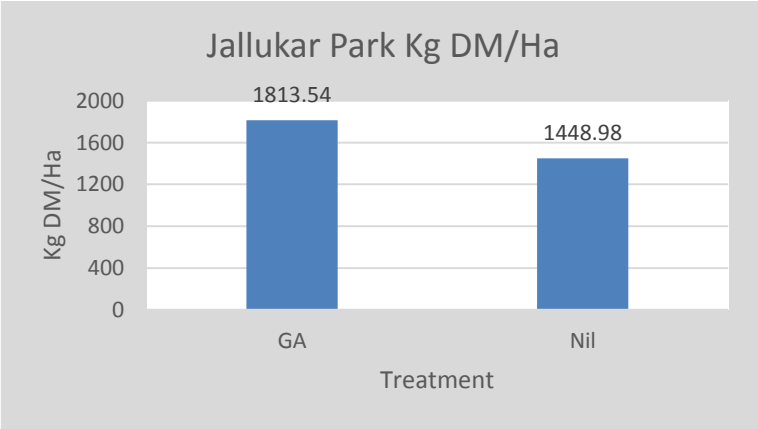

Figure 8: Jallukar Park DM results

The GA treatment at Jallukar Park was completed on June 22nd. The pasture cuts took place on July 14th, 22 days after the GA was applied.

Host farmer comments; Simon Brady
"We have had two years of great pasture growth; unusually things have been quite wet here. I probably didn't need the extra feed from the GA this year but wanted to continue seeing the results of the project".

Millbanks: Elmhurst
The treatments at Millbanks were completed on the 9th of June and the pasture cuts took place on July 3rd, 24 days after the applications. The Millbanks site is an eleven year old Holdfast phalaris and clover pasture and had approximately 900 kg DM/Ha when the demonstration was set up.

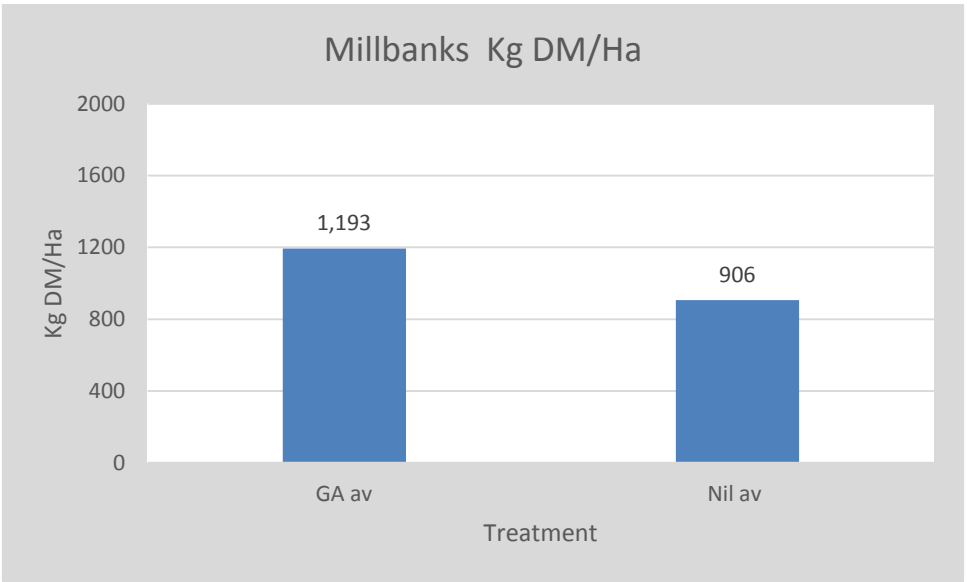

Figure 9: Millbanks DM results

While the results at Millbanks showed an increase in the GA treatment average, it should noted that there was little difference between the three GA and two of the nil plots. Plot no 6, which was a nil, produced much less than the other plots which brought the nil average down skewing the results somewhat.

Table 1; Milbanks plot results

Plot	Treatment	DM %	DM ha
1	GA	0.132	1172.6
3	GA	0.12	1164.8
5	GA	0.13	1242.0
	GA av	0.13	1193.1
2	Nil	0.15	1072.5
4	Nil	0.13	1148.7
6	Nil	0.17	496.4
	Nil av	0.15	905.8

Treatment	DM %	DM kg/ha	% diff
GA av	0.1	1193.1	31.7
Nil av	0.1	905.8	0.0

Note: if plot 6; nil wasn't poor there would be no diff between treatments.

If the results of plot 6 are removed the increase in DM from the GA treatment goes from 31.7% to 7.4%. Note the dry matter cut areas of the replicates were selected at random and there was no obvious reason for the low result from plot 6.

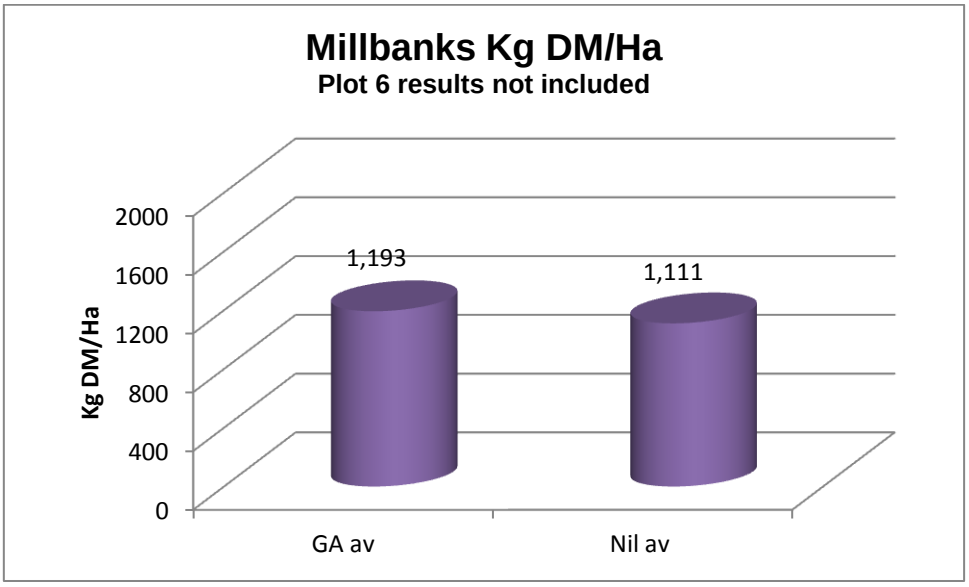

Figure 10: Millbanks DM results with the nil plot 6 result removed

Host farmer comments; Ben Greene.
"I was rather disappointed with the result when the low nil result was taken out of the equation. I am looking forward to next year's results to see how they line up".

Overdale; Concongella
The GA treatment on Overdale was applied on June 15th. The pasture cuts took place on July 3rd, 17 days after the after the GA was applied. The pasture had approximately1700 kg dm/Ha when treated.

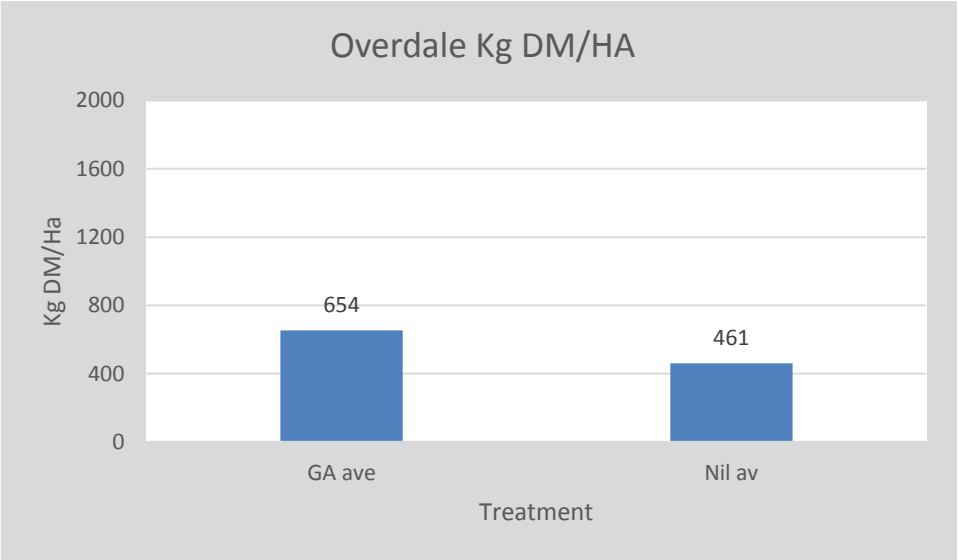

Figure 11: Overdale DM results.

Host farmer comments; Mal Nicholson.
"It got very dry in June, which may have affected the pasture growth, it looked like a fair difference between the GA and the nil but the overall DM results are a bit on the low side. It got me thinking that GA may have another use in this region which is fairly low rainfall. We may be able to use GA on phalaris pastures in dry winters to ensure that we get an advantage from the perennial pasture if the spring is also dry and growth is below average".

Tottington; Paradise
The Tottington GA treatment was applied on July 23rd when the paddock had an estimated 1400 Kg DM/Ha. The pasture cuts took place on August 24th, 32 days after the after the GA was applied.

Figure 12; Rachael Campbell from Agriculture Victoria comparing growth between a nil (left) and a GA plot.

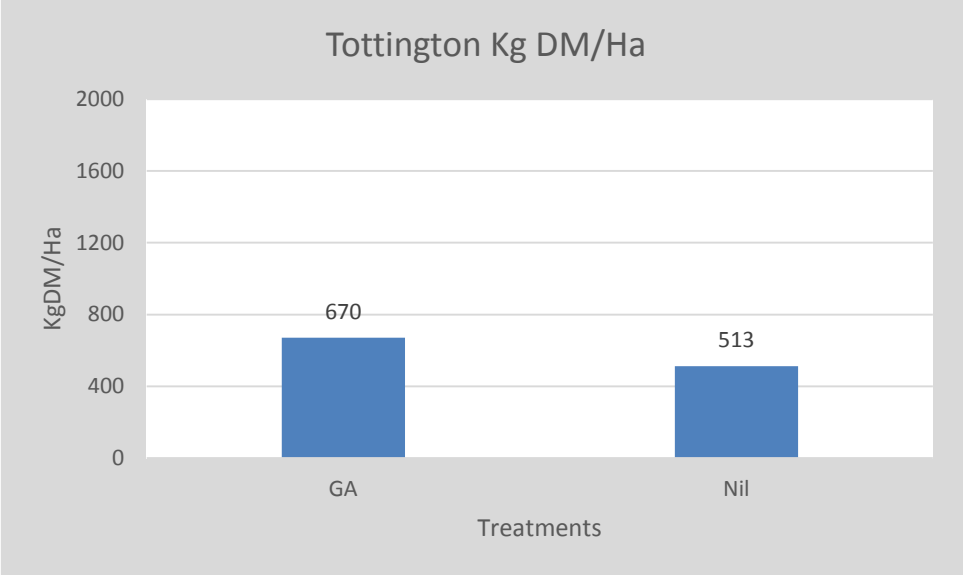

Figure 13: Tottington DM results.

Figures 14 & 15; Andrew Speirs' dog Ace was ready to help set out the mowing plots; but it didn't last.

Host farmer comments; Tom Small.
"We were later than the other sites in applying the GA; not by choice as our whole family got caught by the flu outbreak. Like Mal, I was a bit disappointed by the low overall DM in both the GA and nil plots. No real complaints though as we had a great season. I am wondering if GA has a greater effect on low fertility sites than those which are not lacking in nutrients".

Pasture Quality Effects
Pasture composition counts were undertaken prior to the treatments and in early and late spring. No major differences were recorded between the treatments.
The graphs below show the late spring results, the pasture composition was measured by using the pasture stick technique and also by conducting a visual assessment of the pasture. The results below show the phalaris content and the clover content for each treatment using both assessment methods.

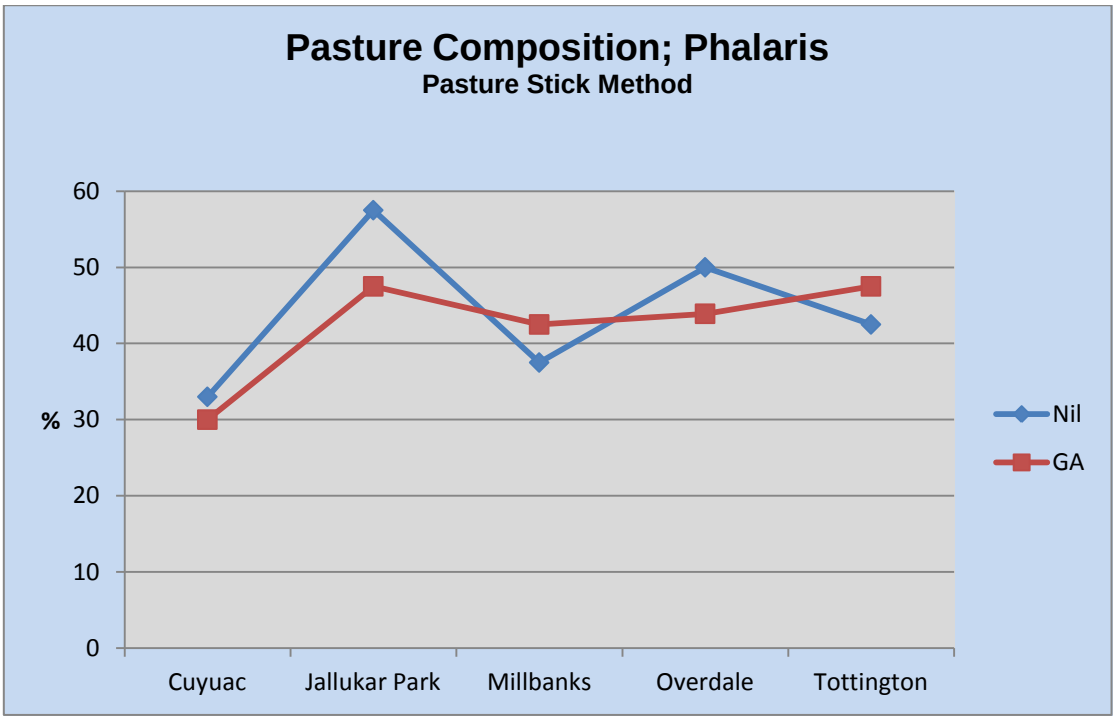

Figure 16: Estimate of phalaris % in the pasture for each site and treatment. Pasture stick method

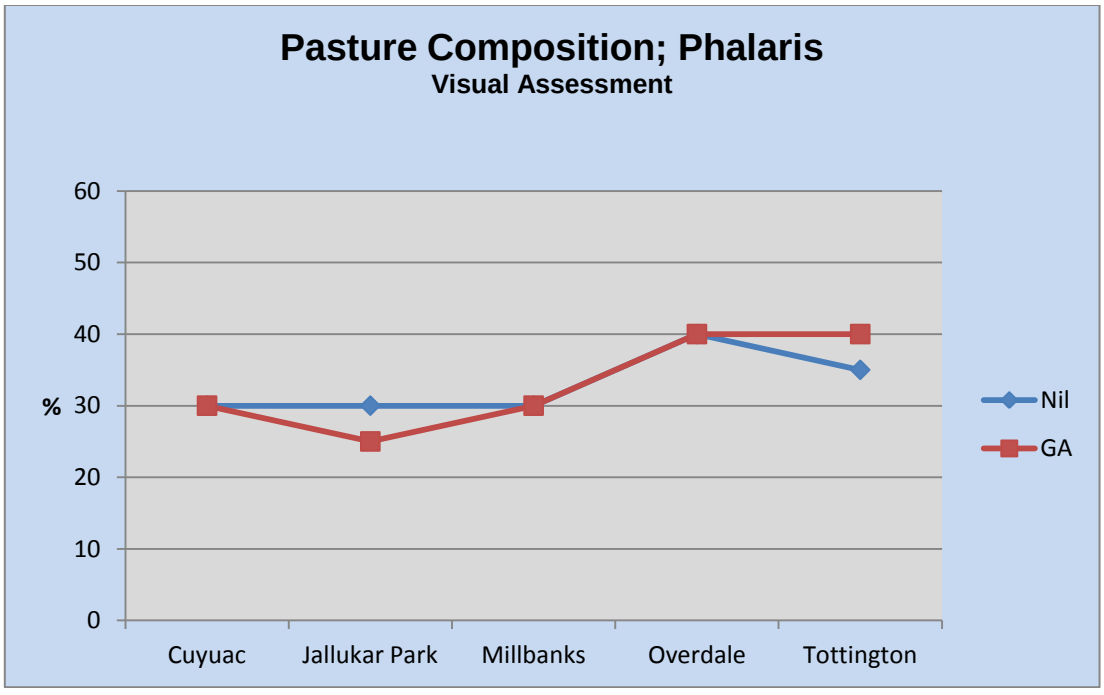

Figure 17: Estimate of phalaris % in the pasture for each site and treatment. Visual assessment method

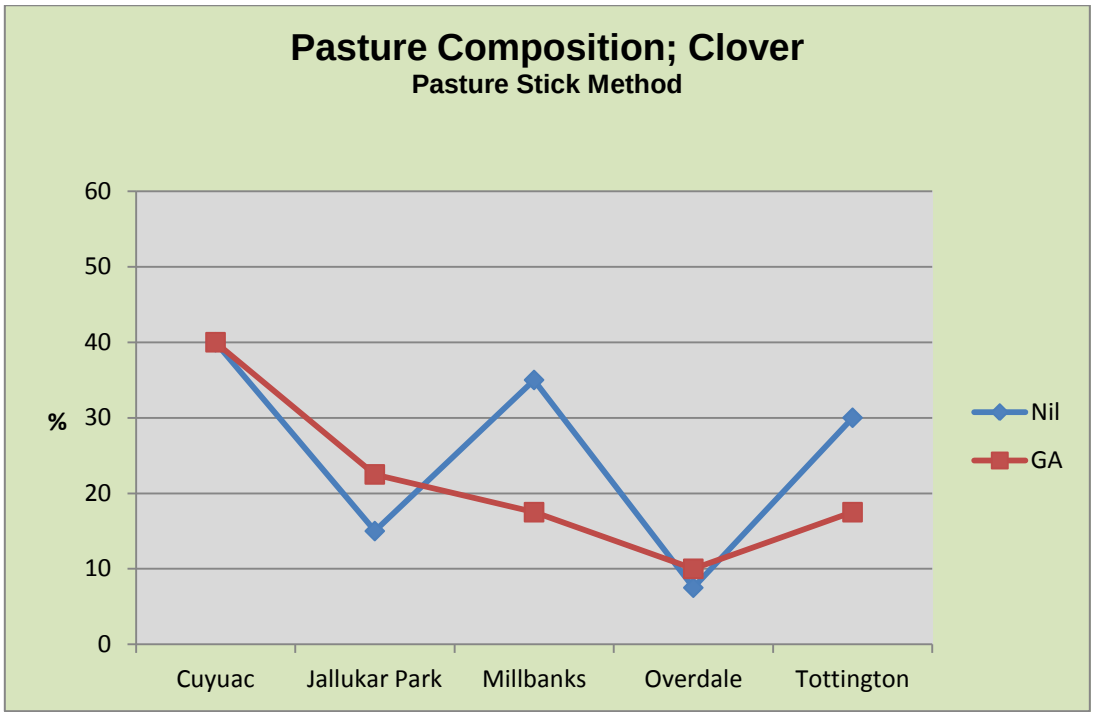

Figure 18: Estimate of clover % in the pasture for each site and treatment. Pasture stick method

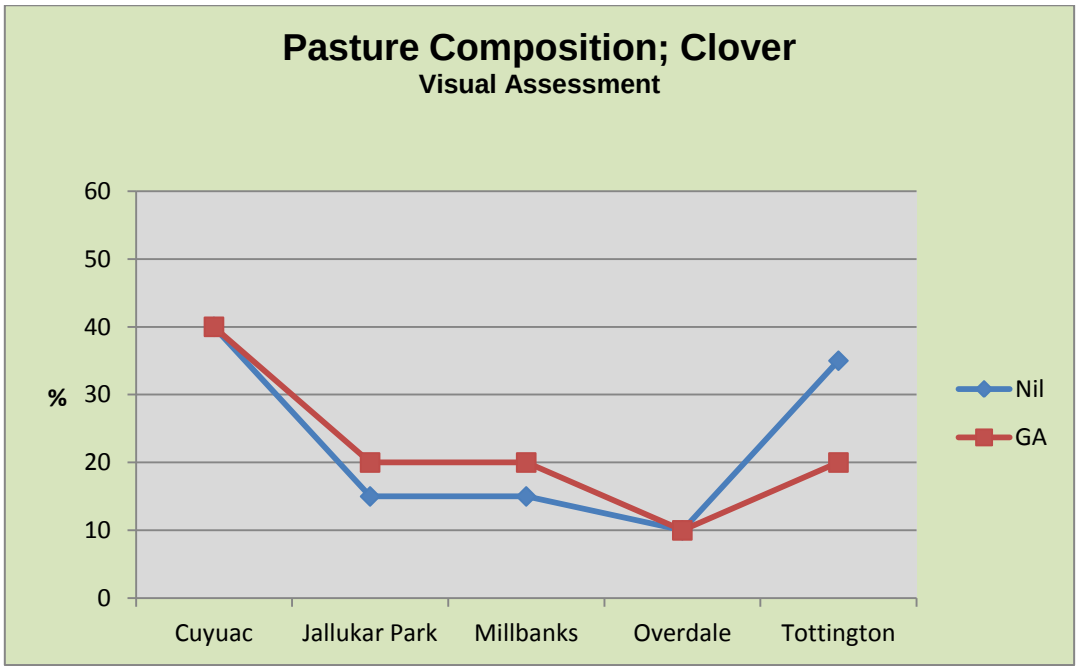

Figure 19: Estimate of clover % in the pasture for each site and treatment. Visual assessment method

Feed tests

Pasture quality tests were carried out on phalaris collected at the Jallukar Park, Millbanks and Overdale sites when the DM cuts were conducted in July. The results showed a feed quality penalty for the GA treatment at Millbanks, but not at the other two sites.

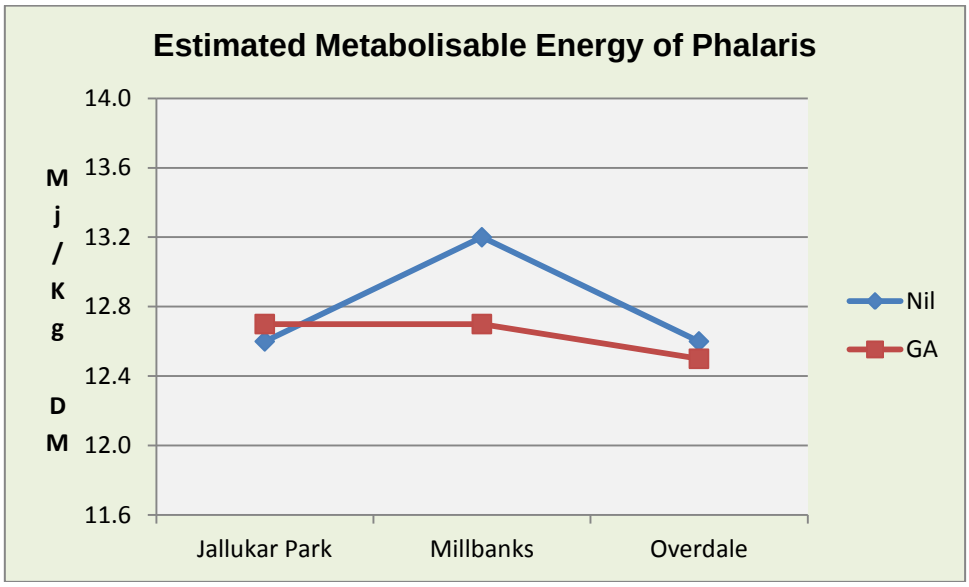

Figure 20: Estimated metabolisable energy from post treatment Feed Tests

Table 2; summary of post treatment Feed Test results - ***Jallukar Park: Rhymney***

JALLUKAR PARK	Nil	GA
Crude Protein %	30.9	27.5
Neutral Detergent Fibre % (NDF)	40.4	40.4
Digestibility (DMD) (% of dry matter)	82.4	83.3
Est. Energy (MJ/kg DM)	12.6	12.7

Table 3; summary of post treatment Feed Test results - **Millbanks; Elmhurst**

MILLBANKS	Nil	GA
Crude Protein %	32.2	28.7
Neutral Detergent Fibre % (NDF)	38.5	41.6
Digestibility (DMD) (% of dry matter)	86.4	83.2
Est. Energy (MJ/kg DM)	13.2	12.7

Table 4; summary of post treatment Feed Test results - ***Overdale; Concongella***

OVERDALE	Nil	GA
Crude Protein %	27.5	18.8
Neutral Detergent Fibre % (NDF)	38.8	41.3
Digestibility (DMD) (% of dry matter)	82.9	81.9
Est. Energy (MJ/kg DM)	12.6	12.5

Spring Feed Test

A spring feed test was conducted on phalaris plant samples taken from a GA replicate and a nil replicate at Cuyac; Nareen. The samples were collected on November 9th. Results showed little difference between the samples which suggests that there is no feed quality reduction in using GA during winter.

Table 5; summary of spring Feed Test results – Cuyac; Nareen

TEST	+GA	NIL GA
Dry Matter %	*20.4*	*21.7*
Moisture %	*79.4*	*78.3*
Crude Protein (% of dry matter)	*22.3*	*23.1*
Acid Detergent Fibre (% of dry matter)	*23.6*	*22.2*
Neutral Detergent Fibre (% of dry matter)	*42.7*	*43.3*
Digestibility (DMD) (% of dry matter)	*77.6*	*79.4*
Digestibility (DOMD)(Calculated) (% of dry matter)	*72.6*	*74.1*
Est. Metabolisable Energy (Calculated) (MJ/kg DM)	*11.7*	*12.0*
Fat (% of dry matter)	*4.0*	*4.1*
Ash (% of dry matter)	*10.2*	*10.1*

SPRING DM
The GA site at Overdale was rested during part of spring; there were no visual DM differences between treatments in spring at the sites.

***Phalaris based pasture production demonstration;* Summary**
All sites showed an increase in winter feed in response to the GA treatments. Good autumn rains had produced sufficient pasture growth on most farms for winter feed requirements despite a dry June. Therefore, production of extra pasture growth was not critical in 2017.

The responses in DM production to the GA application was higher than the 2016 results, Figure 21 shows a comparison between the two years on farms that have been part of the demonstration in both years. It should be noted that the paddocks at Cuyac and Millbanks are the same pastures while a different paddock at Jallukar Park was used.

The positive response to the higher rate of GA (20gms/Ha, which is the recommended rate for ryegrass application) suggests that higher rate replicates should be included in the 2018 demonstration.

The results show a lower growth rate in both the control and GA replicates at the two northern sites (Overdale and Tottington) although they show a similar increase to GA in percentage terms when compared to the other sites. At these sites the dry June probably had a great impact on slowing pasture growth more than at the other sites.

All host farmers were satisfied with the amount of extra winter feed produced, although Ben Greene questioned the benefit on Millbanks when the results were adjusted to remove the one very low Nil treatment DM measurement.

Anecdotal evidence from discussions with the region's farmers who have used GA in winter suggest that they see it as a tool to use in certain circumstances rather than to fit it into annual winter pasture management.

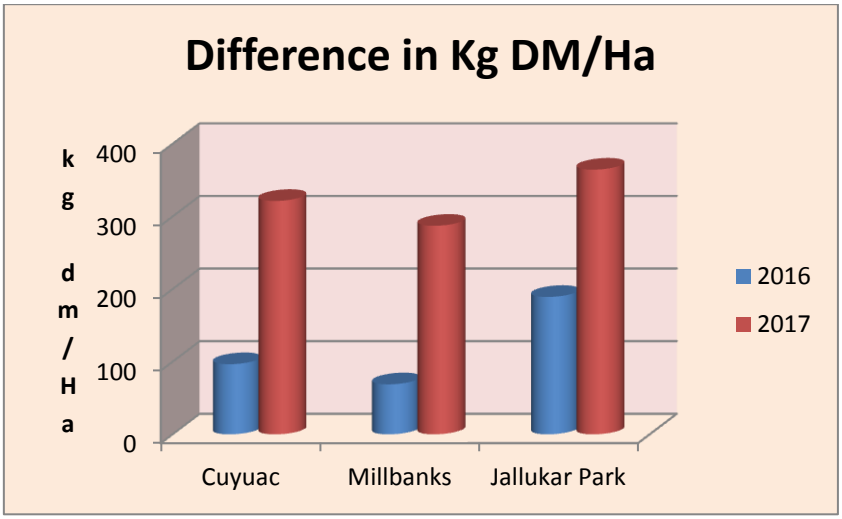

Figure 21: Differences in DM on repeat host farms 2016/17

Annual weed reduction demonstration

Background: The concept of the GA annual pasture demonstration sites came following observations made by PPS members during a farm inspection as part of the "EverGraze Whole Farm Grazing Strategies" course conducted by Geoff Saul and facilitated by PPS in 2014. During the inspection of a productive phalaris pasture at "Overdale" Concongella which been treated with GA, it was noted that an area of silver grass (vulpia spp.) near a rocky outcrop, which was not part of the phalaris pasture, had been preferentially grazed by sheep and had plant numbers reduced compared to the main area of silver grass around the rocks.
Mal Nicholson from "Overdale" explained that the area of affected silver grass had received an overspray of GA during the phalaris treatment and must have been subsequently grazed out by sheep when they were put into the paddock.
PPS considered that this may be a method of suppressing problem annual weeds at the same time as providing a small amount of extra winter feed for stock.

Data Collection
All sites had pasture composition measured using the pasture stick technique as well as a visual assessment. This was conducted before the GA was applied to three replicates and both the GA and nil replicates were assessed in late October – early November to evaluate the effect of the GA on annual weeds. The spring assessment used just the visual method as it was obvious that there was no difference between replicates at all sites.

Results and Observations (to date);
Five sites each year have been selected to demonstrate the technique; unfortunately both year one and year two results have shown little difference between the treated and control areas at all sites.

Site Results

Cotswold Slopes; Carisbrook
The pasture is an old phalaris stand with a variety of annual weeds in the paddock. Host farmer David Dowie designed a two part demonstration with three treatments on each. Part of the paddock was cut for hay in 2016 as a method to reduce annual grass seed; the rest of the pasture was not cut. Three different rates of GA were used on each section of the paddock; Pro Gibb was used at 10 ml/Ha, 20 ml/Ha and 30 ml/Ha.

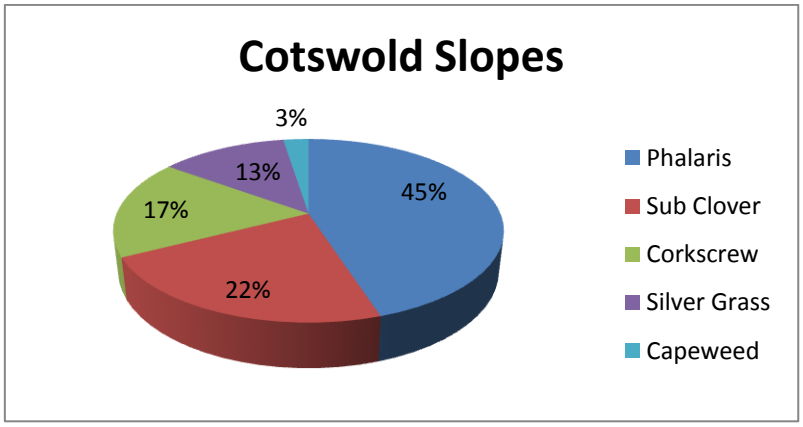

Figure 22: Cotswold Park pasture composition 29/6/17 (pasture stick method)

The pasture was sprayed with GA on the 29th of June with a pasture density of 900 Kg DM/Ha, and then it was heavily grazed post treatment. The pasture was assessed on October 12th and minor differences were found between treatments in regards to annual weed content (Figures 23 and 24). Both the assessors considered that paddock bias was the most likely explanation and the differences were too low to make any conclusions on any effect of the GA treatments. Regardless of the cause the reduction was too low to have any positive impact on annual weed reduction in the pasture.

Host farmer comments; David Dowie
"We really didn't see any difference in the treatments throughout winter and spring; the sheep didn't appear to preferentially graze any particular section of the paddock".

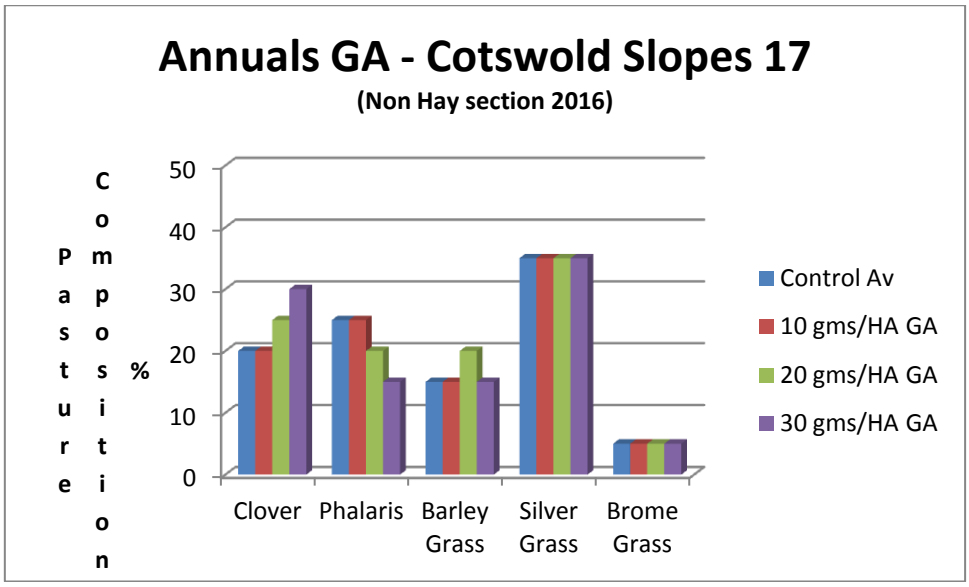

Figure 23: Cotswold Park (non hay section 2016) post treatment pasture composition (visual assessment method)

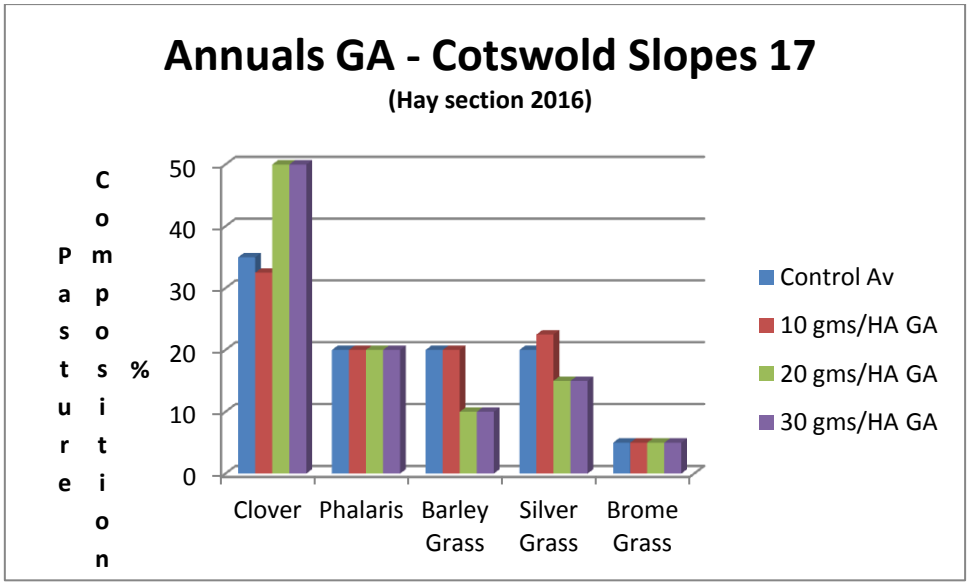

Figure 24: Cotswold Park (hay section 2016) post treatment pasture composition (visual assessment method)

Figure 25; Cotswold Park pasture prior to treatment

Lonsdale; Stawell

The pasture at Matt Kindred's Lake Lonsdale property is the Uplands pasture that is being measured in the PPS Cocksfoot comparison project. It was sown in 2009 and there is still a strong stand of Uplands in the paddock. In 2016 and 2017 the paddock had a bad infestation of silver grass (vulpia spp); therefore this is why it was included in this demonstration.

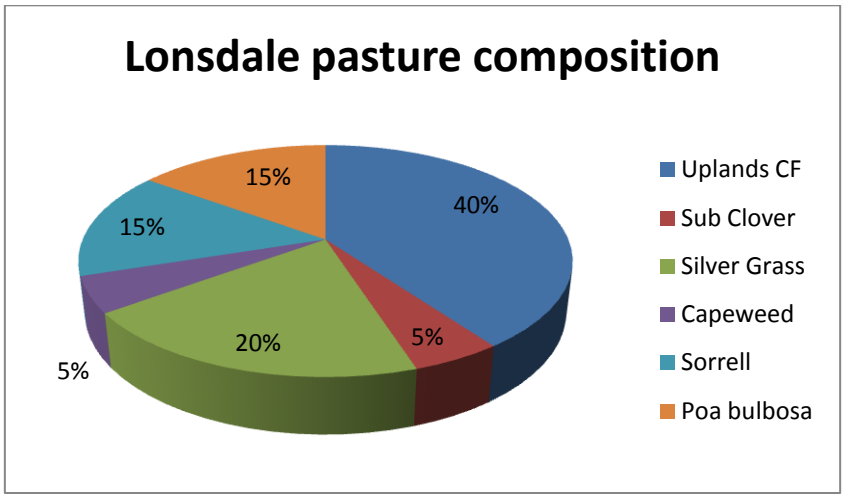

Figure 34: Lonsdale pasture composition 13/6/2017 (pasture stick method)

A section of the pasture was treated with GA in June at the standard 10mg/Ha when the paddock had a pasture mass of 1400 Kg Dm/Ha. No post treatment effect was observed.

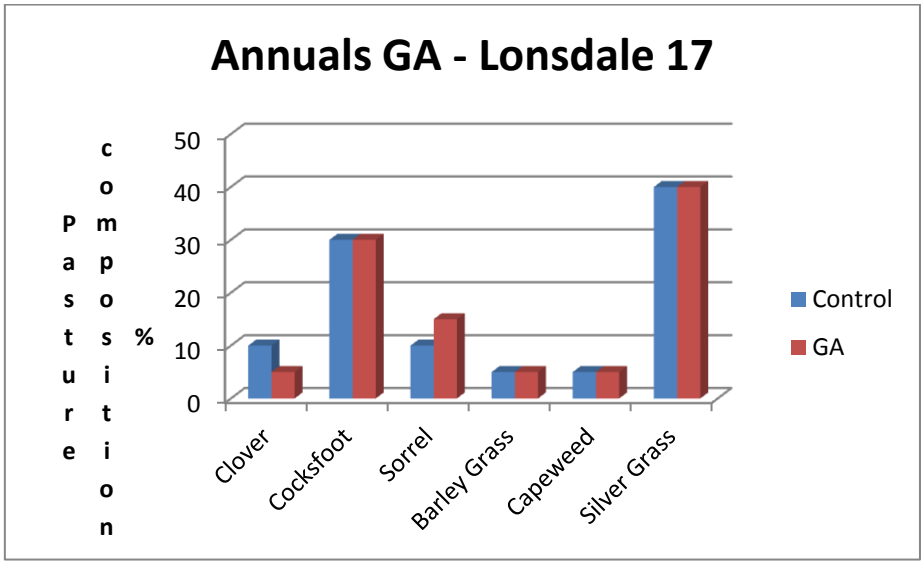

Figure 35: Post treatment pasture composition; pasture stick method

Host farmer comments; Matt Kindred

"The GA had no effect of the silver grass where I sprayed the demonstration strip; I spray topped the paddock in October, hope that does the job".

Millbanks: Elmhurst

The annual weed reduction demonstration paddock at Millbanks is the pasture established in 2009 as part of the PPS pasture variety site project funded by the MLA PDS program. It is a Holdfast GT phalaris and sub clover pasture which has proven to be a highly productive pasture since establishment. The pasture has had an increase in barley grass in recent years and it was included in the annual weed reduction demonstration to measure any effect that GA application combined with heavy grazing had on the barley grass. The pasture had GA applied on a section of the pasture on June 29th and was stocked with ewes and lambs through late winter and early spring.

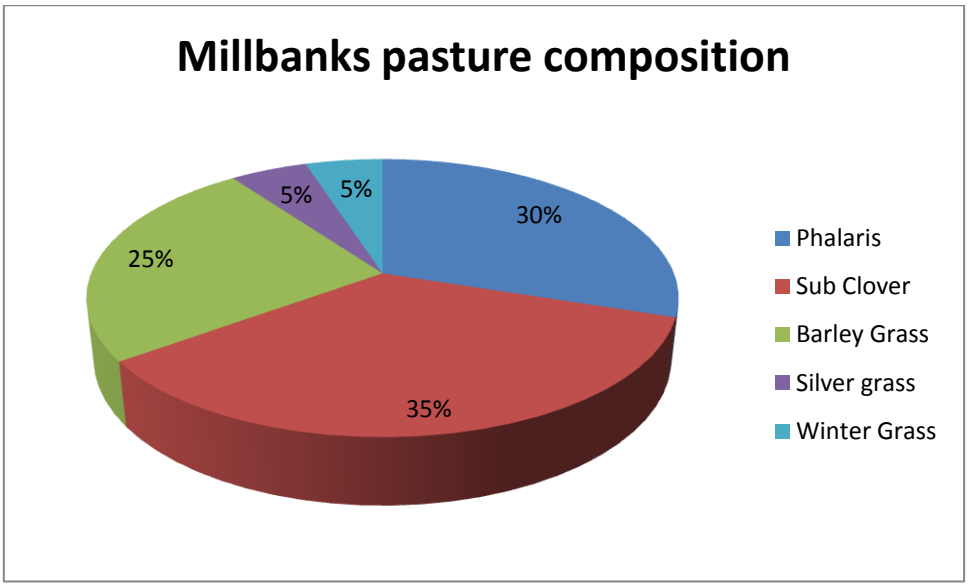

Figure 36: Millbanks pasture composition 12/6/2017 (pasture stick method)

The treatment had no positive effect on annual grass reduction.

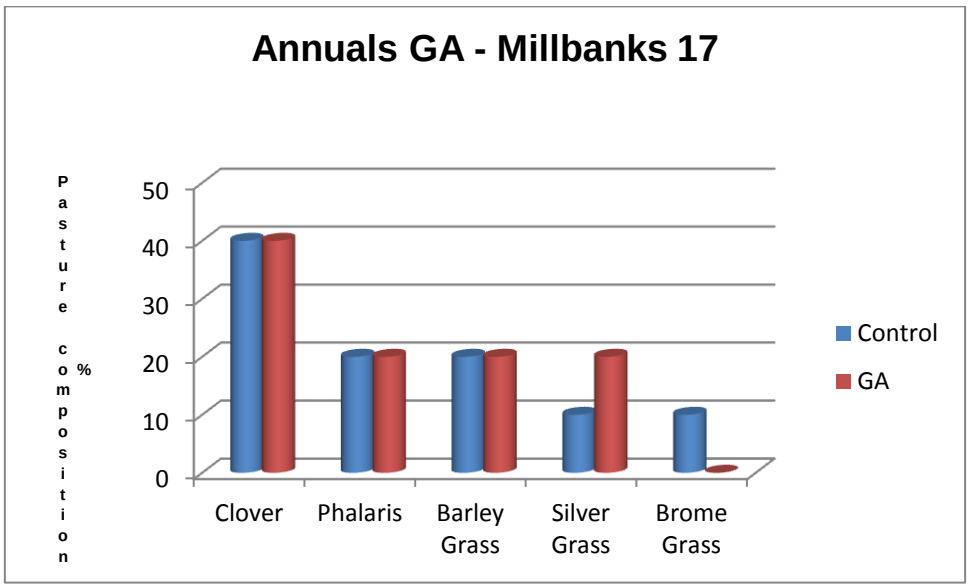

Figure 33: Post treatment pasture composition; visual assessment method

Host farmer comments; Ben Greene
Pre treatment; "Why do we need to do it again? We showed last year it didn't work; happy to do it if it helps the project though".
Post treatment; Ben made no comment!

Tirranna: Mt Cole Creek
The Tirranna pasture is an old phalaris stand with a heavy infestation of silver grass (vulpia spp.); it was decided to apply GA to different sections of the paddock at weekly intervals with the aim to implement varying grazing intervals post treatment. Progibb was applied at 20 Kg/Ha and the first section was sprayed on July 2nd and a different section was sprayed weekly for three weeks. The pasture was grazed in August; no major differences were identified in any of the treatments when compared with the control (nil) areas.

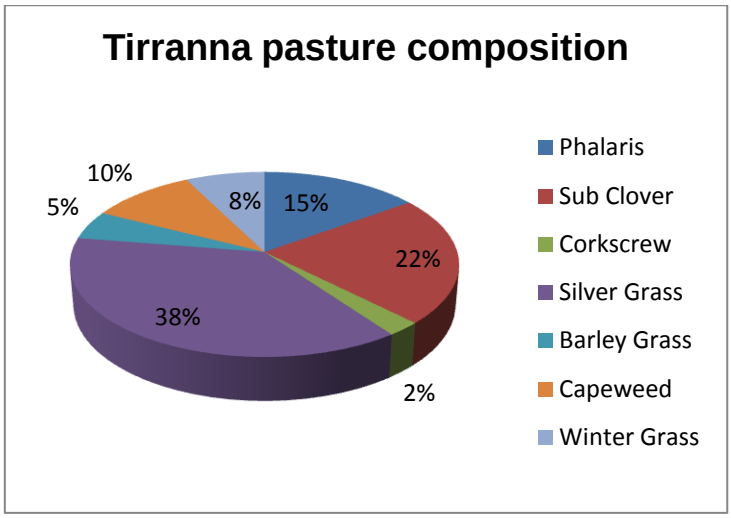

Figure 34: Tirranna pasture composition 25/6/2017 (pasture stick method).

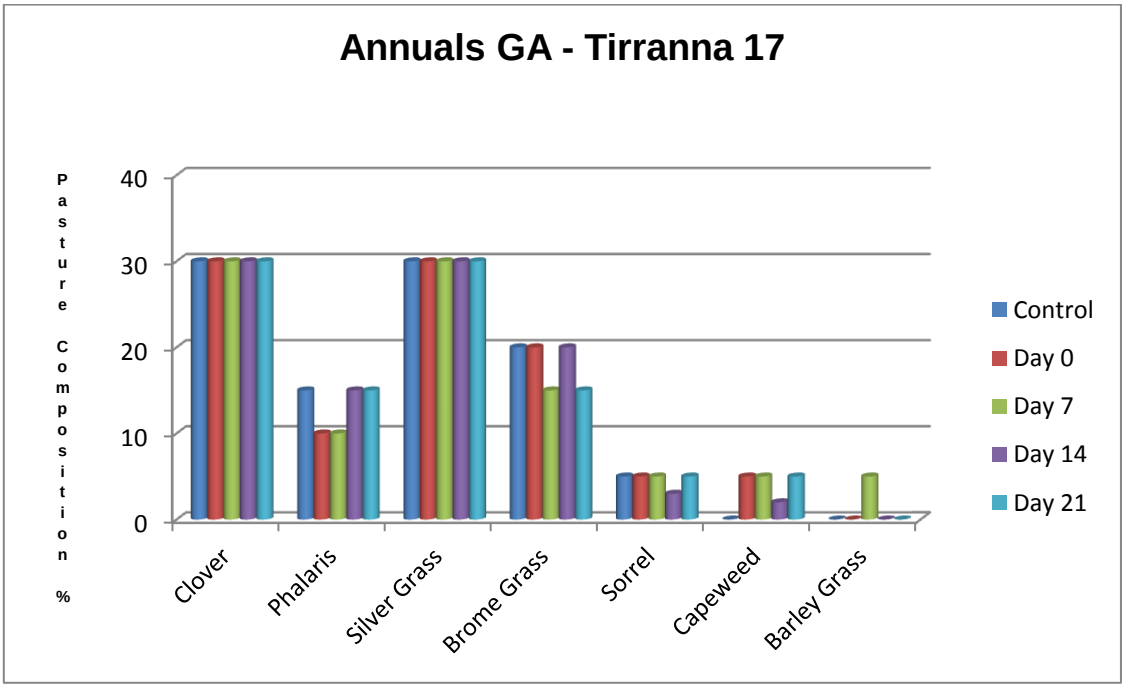

Figure 35: Tirranna post treatment pasture composition; visual assessment method

Figure 36: Unaffected silver grass in the Tirranna pasture

Tottington; Paradise

The Tottington site was situated in a small area near the Avon River; it has some perennials in the pasture consisting of phalaris, cocksfoot and kikuyu. Two rates of GA were used; 10 ml/Ha and 20 ml/Ha of Progibb.

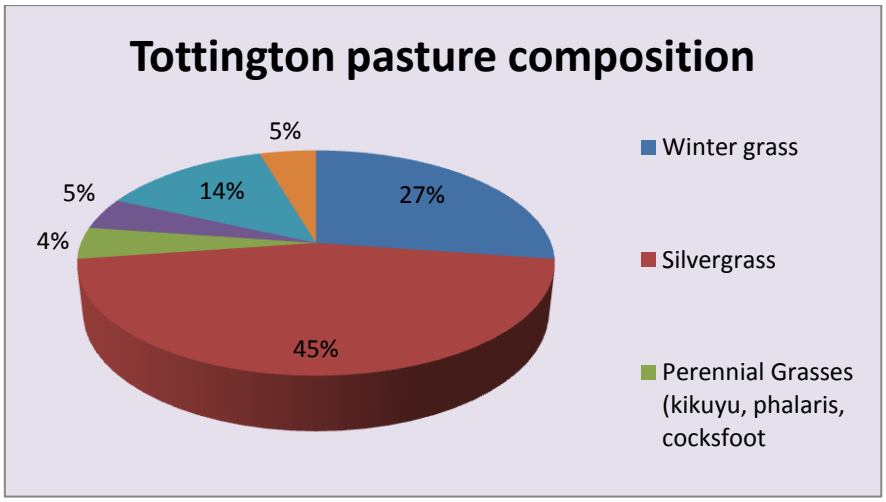

Figure 37: Tottington pasture composition 25/6/2017 (pasture stick method).

The spring pasture assessment showed little difference between the treatments.

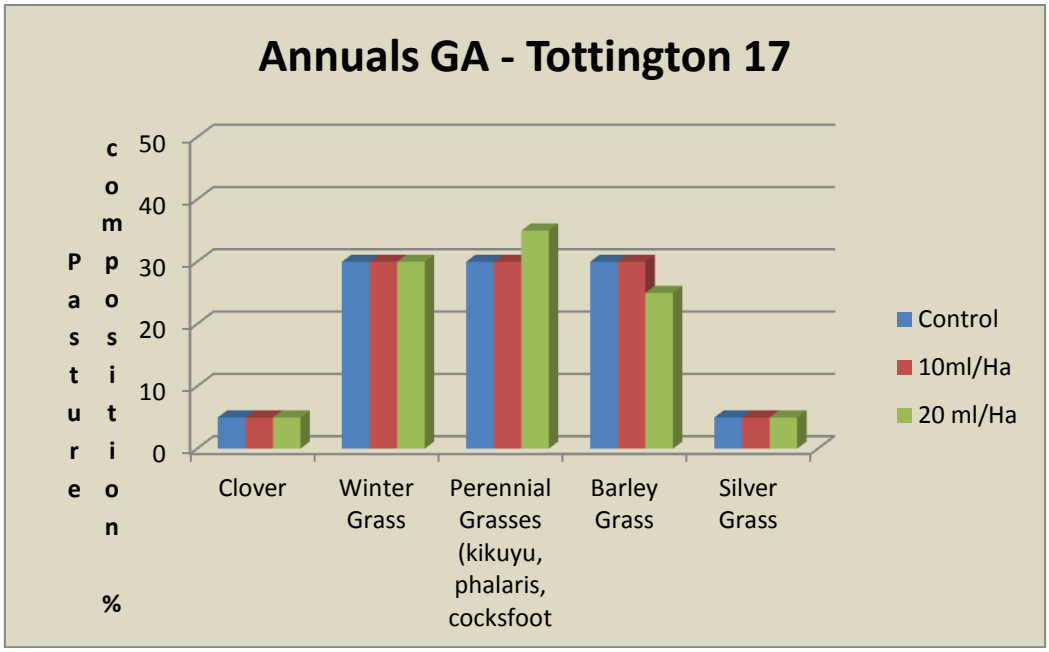

Figure 38: Post treatment pasture composition; visual assessment method

Annual weed reduction demonstration; summary

The annual weed reduction demonstration sites again failed to replicate the effect seen on silver grass at Overdale in 2014. It also failed to produce any meaningful reduction in the other targeted annual grasses; barley grass and annual ryegrass.

In 2016 PPS gave four possible explanations to the failure of the treatment to produce the desired results in relation to the observed effects on silver grass.

1 The timing of the GA treatment may not have been at the time when the silver grass is vulnerable to being “grazed out” after a period of induced growth.

2 The GA treatment may have had a growth and/or palpability effect on the silver grass but there was insufficient grazing pressure able to be applied in what was a winter with above average pasture growth.

3 The interval between the GA treatment and grazing pressure on the silver grass may not have been the correct timing to commence the grazing.

4 It may be a case of the "null hypothesis", which refers to a general statement or default position that there is no relationship between two measured phenomena, or no association among groups. The null hypothesis is generally assumed to be true until evidence indicates otherwise. Therefore it may be that there was no association between the GA application and the fact the silver grass was suppressed when observed on the property in 2014.

As there was no difference in annual weeds at any of the sites despite introducing new treatments with GA rates and timing of sprays; the conclusion is that PPS have addressed the first three possibilities. This means that point four is the likely explanation – ***it doesn't work!***

Future Planning

The project advisory group and GA demonstration coordinators Rob Shea; PPS Project Manager and Rachael Campbell; Extension Officer Agriculture Victoria will analyse the 2017 results and plan to meet with project advisor Andrew Speirs in early 2018. The trial results and design will be discussed and plans for the 2018 demonstrations and potential sites will be decided by the project advisory group.

Phalaris based pasture production demonstration

Discussion will include a review of the DM measurement methods; the technique was modified slightly in 2017. Further investigation will be conducted on the comments of Mal Nicholson (page 8) and Tom Small (page 9) regarding the use of GA in the drier northern part of the region in regard to GA use in drier winters and soil fertility.

A financial and animal performance analysis using production data (dry matter production, pasture composition, benchmarking against LTEM FOO guidelines) will be conducted at the completion of year three of the demonstration. The coordinators have been in discussion with Andrew Kennedy from Agriculture Victoria who is assisting in formulating a method to conduct the analysis.

Annual weed reduction demonstration

Discussions with the project advisory group, project advisor and project funder will consider whether it is worthwhile continuing with the annual weed reduction demonstration given the nil results so far.

References

Gibberellic Acid; its history and how does it work – Presentation by Andrew Speirs, PPS/GGSA MLA Pasture Update Stawell 24/3/15
ProGibb™; Product label
Gala™; Product label

PPS wishes to acknowledge the following people for their assistance with year two of the PPS GA demonstration project.
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Project measurement assistance: Lisa McDonald, Bec & Sylvie Mace, Darren Hulm; Meridian Agriculture, Casterton
Project management assistance: Rachael Campbell; Agriculture Victoria, Ballarat
Project coordination assistance: Martin Dunstan & Gervaise Gaunt; Agriculture Victoria, Renelle Jeffery: MLA
Project analysis: Andrew Kennedy; Agriculture Victoria, Hamilton

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