



PERENNIAL PASTURE SYSTEMS

MAKING PASTURE GO THE DISTANCE

PPS NEWS

PPS/GSSA MLA Pasture Update; Stawell, Monday April 1st, 4 PM start; \$25 includes dinner. See page 7 for details.

PPS Management Committee Annual Planning Meeting: The management committee, with reps from PPS girls & grass, held the annual planning session in Ararat on February 18th. In a five hour session, the event calendar was set out, projects reviewed and themes for the study tour (South East of S.A; this year) and conference decided. See page 4 for the proposed dates.

Long term planning: The PPS Management Committee is engaging an outside consultant to facilitate a committee session to review the direction of PPS and to set up a long term plan to ensure that PPS meets the needs and goals of members. If members have any comment or ideas on the future of PPS, please contact a member of the management committee. A summary document will be produced and forwarded to members.

Funding: The Wimmera Catchment Management Authority is continuing funding assistance for the PPS activities through funding from the Australian Government's National Landcare Program. The Glenelg Hopkins Catchment Management Authority is again assisting the PPS event program in 2019 through funding from the Australian Government's National Landcare Program. Rural Bank are again supporting the PPS *Girls & Grass group* in 2019, Rural Bank are also continuing as an annual conference sponsor.



PPS Girls & Grass group: The Girls & Grass advisory group are holding their planning meeting in late March to confirm activities for 2019.

GA Project: The PPS gibberellic acid project has been completed. The demonstration coordinators PPS Project Manager Rob and Rachael Campbell from Ag Vic have completed the final report and submitted it to MLA for sign off. It will be forwarded to members and placed on the PPS website when approval is received.



PPS Annuals Project: Results from 2018 are currently being analysed by consultant, Lisa Miller. A report will be sent to members when complete. Some very interesting results from the grazing cereal sites again last year.

PPS Weeds Project: PPS was successful in the application for an MLA EPDS demonstration focusing on annual grass control strategies in perennial pastures. The demonstration will be conducted in conjunction with Agriculture Victoria and Jo Cameron from the Ararat office will be assisting with the project. PPS has appointed an advisory group of members to oversee the demonstration consisting of Wayne Burton, Ash de Clifford (Tylers Rural agronomist), Rich de Fegely, and Hayden Price. A number of strategies are under consideration and demonstration sites will be put in place in throughout 2019.

NSW clover research: Belinda Hackney from NSW Agriculture has provided a paper for the newsletter on legume characteristics which can aid selection when making pasture sowing decisions; it is on pages 5 & 6. Thanks to Belinda for providing the information to PPS.

MLA Reference Group: S. A. PPS member Elke Hocking from Lucindale has been appointed to the new MLA Producer Adoption Reference Group which will provide strategic advice on the adoption of R & D. PPS wishes Elke well in her role.



Scenes from the PPS end of year event at "Overdale" Concongella in November which was supported by Rabobank and the Grampians Pyrenees PCP. *Left; taking in the view from Concongella Hill Right; Working on the challenge put out by guest speaker, Debi Ellis*



Tedera Demonstration Site; Kirkella, Stawell

PPS is hosting the first Victorian demonstration site for the perennial legume Tedera which has been bred in Western Australia and is now in development in the eastern states. Tedera is a perennial forage legume native to the Canary Islands, and has been under evaluation since 2006; The PPS site is at “Kirkella” near Stawell and the Tedera was sown in May & September 2017 with replicates trialling different sowing times, rates, depths and widths. While the autumn establishment was partially successful; there were replicates which had poor germination, possibly due to sowing depth differences. Two small areas were shallow sown in spring which established well. The plants which did establish have survived well although frost damage was noted during winter 2018.

The Tedera development project is supported by MLA, Dept of Agriculture and Food; Western Australia and Seednet



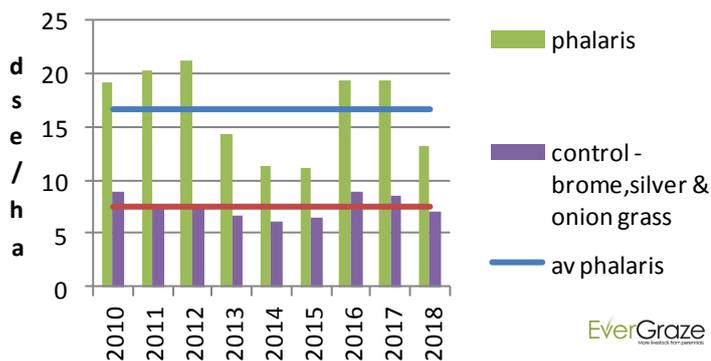
Tedera at “Kirkella” in December 2018

Simon Crane; National Manager Seednet commented on the photos.

“The sheep probably left it alone if there was other green material to graze – in WA we see them very keen on Tedera when it’s the only green material available in late summer / early autumn”.



Mooneys Gap stocking rate 2010-2017



Mooneys Gap EverGraze Site

The PPS Mooneys Gap phalaris site was established in 2009 as part of the EverGraze project. The site is approx 10 km north east of Ararat.

The pasture is persisting well with a good balance of Holdfast GT phalaris and sub clovers. The paddock does have some barley grass as well.

The graph on the left shows the stocking rate for the year as well as that of the adjacent control pasture. The stocking rate reduced in 2018 as grazing was restricted by the below average rainfall (471 mm—average is 600 mm). A analysis of stocking rates and annual rainfall using the French—Schultz method shows that the pasture is still performing well. The graph below shows the results; a figure of 1 or greater suggested that the stocking rate was close to optimum.

Stocking Rate Analysis: Calculating stocking rates as a percentage of the French-Schultz formula.

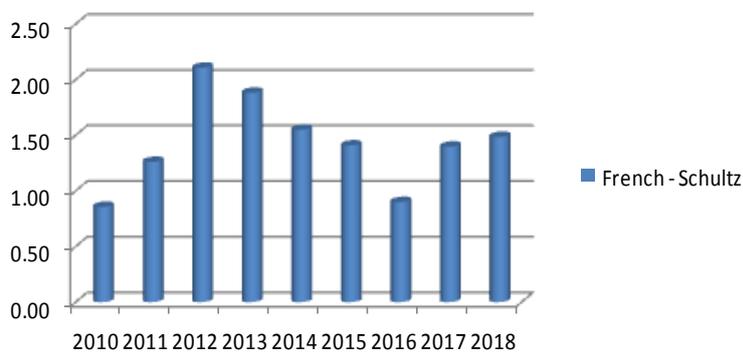
The French-Schultz livestock carrying capacity was developed by two S.A. scientists Reg French and Jeff Schultz in the 1980’s. It calculates the potential stocking rate under ideal conditions in relation to rainfall.

The formula calculates the potential stocking rate as 1.3 dse/ha for every 25mm of annual rainfall above 250 mm or in old terms 1 DSE/Acre for every inch rainfall above 14 inches

**E.G. 500 mm rainfall ; 500 mm – 250 mm = 250mm
250 mm; 25=10 10x1.3 = 13 dse/ha.**

Note the formula assumes optimum conditions and this needs to be taken into account when using the formula. (personal communication. – the late Reg French).

Mooneys Gap Stocking Rate - French - Schultz comparison



Belinda Hackney from NSW DPI, Wagga prepared a paper titled "Under performing legumes" for the 2018 PPS conference. Unfortunately due to a health issue Belinda was unable to attend in person (she has fully recovered).

Belinda's paper was presented in her absence and she provided answers to questions via email. PPS thought they would be a useful addition to the March newsletter.

Can sowing with DAP or MAP impact nodulation? – small amounts of fertiliser containing nitrogen can be helpful for establishing new pasture as seed only has enough nutrients on board for a short time, but too much nitrogen can potentially decrease nodule formation. However, the bigger issue with DAP and MAP is that while they contain good levels of N and P, they contain little S (typically less than 2%), therefore if S-deficiency is an issue, the problem may be exacerbated by using MAP or DAP. A better choice would be a starter-type product which contains a more balanced quantity of N, P and S and is specifically formulated for the purpose of establishing pastures. Single super is also often ok in a legume based pasture, but if soils are very low in nitrogen, then a starter-type product may be a more wise choice. In the mixed farming areas for our trials in NSW we tend to use single super, but switch to Starter fertilisers in the tableland areas just because the tableland soils are often extremely low in nitrogen.

Can urea use make legumes 'lazy'? – yes, it takes energy to fix nitrogen, so if plants can obtain enough nitrogen by other means they will tend to take the easy option.

Would feeding a poor-performing subclover nitrogen make it grow better? – 'Application of N to poor-performing subclover would likely increase its production. However, this is quite a poor way to use an expensive product. Grasses are generally more responsive to N than are legumes and application of N to subclover will not increase its capacity to fix nitrogen. If subclover is performing poorly, then it is important to figure out why. Is it associated with nutrient deficiency, disease, soil pH? Try to identify the problem and devise strategies to overcome them. Applying N-fertiliser to a subclover based pasture is a poor long term strategy to increase production.

Use of Molybdenum – molybdenum is important for legume nodulation and also in grasses as it is needed to reduce nitrate back to ammonium in the process of protein formation. Molybdenum deficiency often appears as 'patches' in a paddock where plants appear stunted and sometime pale. In legumes, the nodules may appear very pale or white where molybdenum availability is limited.

'Molybdenum can be applied on the seed at sowing (but do not use sodium molybdate for this purpose as it is toxic to rhizobia on the seed) and this gives good distribution across the paddock. In established pastures, Mo is most commonly applied through use of Mo-fortified superphosphate. Check the concentration of Mo in Mo-fortified superphosphate as it is available at different concentrations so that you know how much you are applying.'

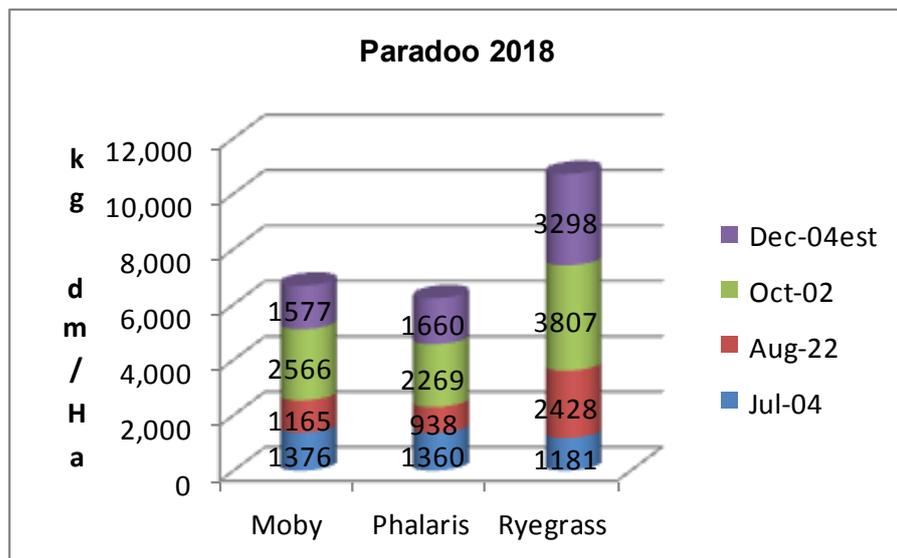
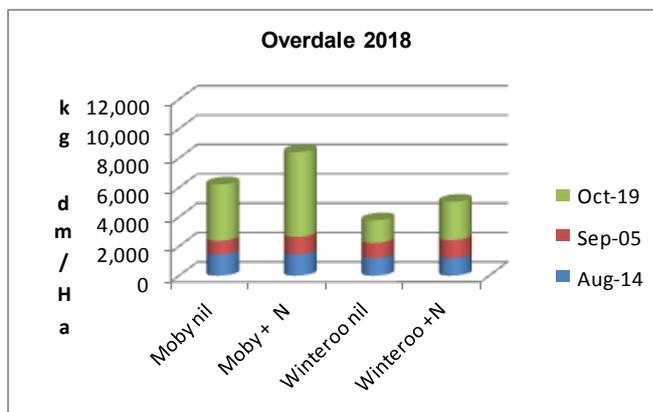
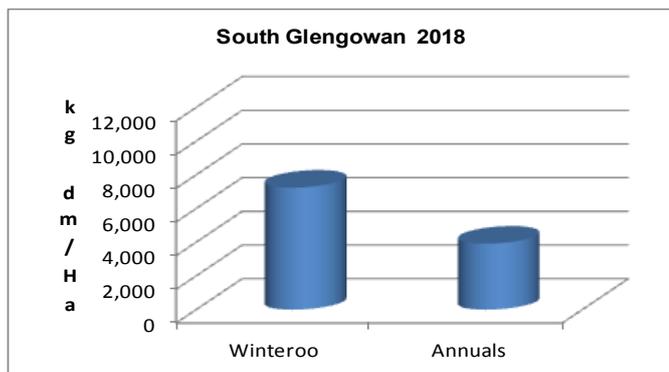
A couple of good resources on molybdenum below:

https://www.dpi.nsw.gov.au/_data/assets/pdf_file/0007/166399/molybdenum.pdf

<https://grdc.com.au/resources-and-publications/all-publications/bookshop/2015/07/inoculating-legumes>

High Production Annual Forage in Perennial Systems

PPS are currently working on the analysis of the 2018 results from the annuals project; the report will be sent to members when complete. The graphs below show the DM results from "South Glengowan" Joel Joel, "Overdale" Concongella, and "Paradoo" Pigeon Ponds. Results from the other two sites and analysis will be in the 2018 report.



Above; Moby Barley at Overdale; Concongella, October 2018

~ PPS DIARY DATES ~

MLA PASTURE UPDATE - PPS will again be combining with the Grassland Society to conduct an MLA Pasture Update. Monday April 1st - Stawell Town Hall 4pm – 8.30 pm - Cost; \$25 - includes smoko & dinner. RSVP by April 9th. See flier on Pages 7 & 8.



PPS Winter Farm Tour - details to come

PPS 11h Annual Conference - Ararat; Wednesday September 11th

PPS 11th Annual Study Tour - South East S.A.; Friday October 4th to Sunday October 6th or Monday October 7th TBC

PPS end of year farm tour & BBQ - Friday November 29th; venue TBC

PPS Girls & Grass

Continue with the series of coffee mornings; dates TBA

24th July—dinner, Xmas in July; venue TBA

Non PPS Events

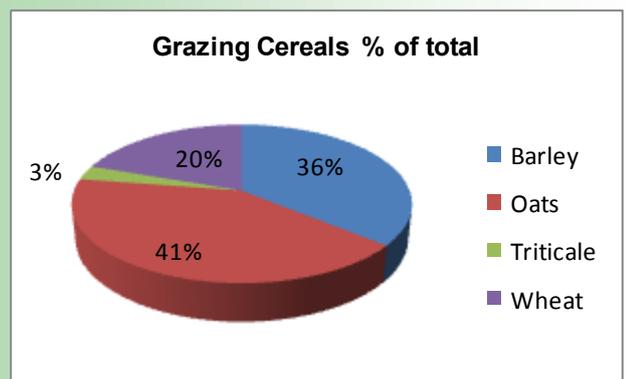
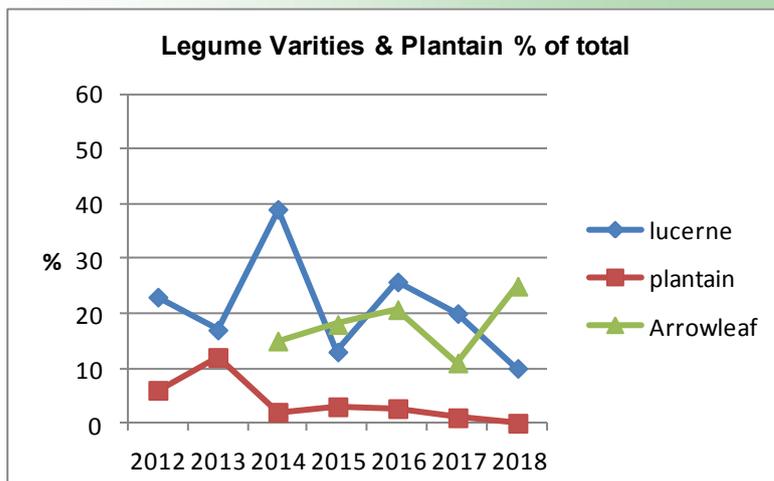
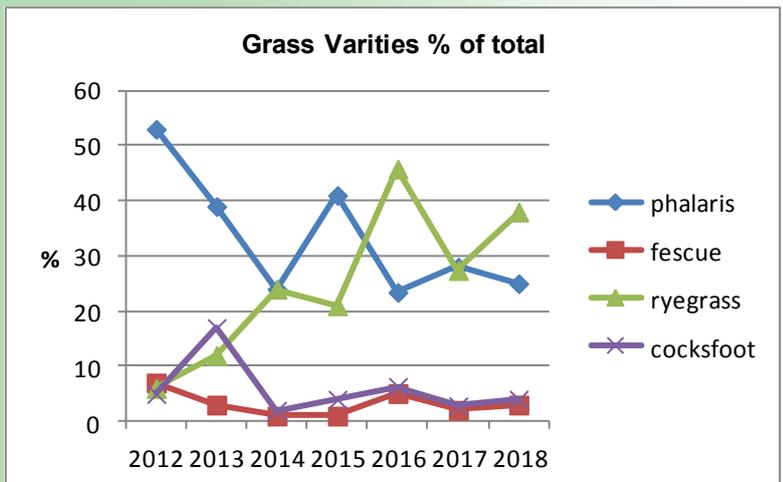
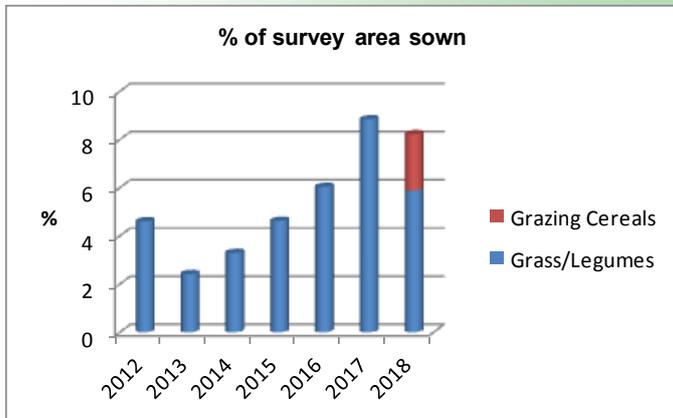
BestWool/BestLamb conference; Bendigo June 19th (dinner June 18th). Better Beef Conference; Bendigo—June 18th
Grassland Society 60th Annual Conference; Creswick, July 16—18

PPS 7th Annual Pasture Establishment Survey

PPS has surveyed members on their pasture establishment program for 2018; 46 members responded, covering an area of 57,612 Ha. Ten of the respondents didn't sow new pastures in 2018; 4,738 Ha (5.88%) of the total area surveyed was sown to new pasture and the graph below compares this with previous years. It should be noted that the annual estimate of new pasture establishment for similar regions in Australia is 1%. Grazing cereals were added to the survey in 2018 and 2.34% of the area surveyed had grazing cereals established..

The graphs below show the 2018 results as well as comparisons to previous years.

It was decided to add Arrowleaf clover pasture establishments to the survey from 2014 as they are now forming part of many member's pasture systems as a crop/pasture rotation or as a pasture prior to perennial grass establishment. It is interesting to note the large rise in ryegrass sowings in 2017 and 2018, most are short term cultivars and were established to provide quick feed to fill feed gaps.



Understanding hard seed, maturity time, rooting depth and growing characteristics of annual pasture legumes to improve pasture performance

There are an increasing number of annual legume species and varieties within these species and this can make it confusing when choosing what legumes you might include in your pasture. There are a few key things to keep in mind when choosing which legume or legumes to grow.

1 - Hard seed – when legumes produce seed, depending on species, variety and growing conditions, the proportion of seed that is resistant to germination varies. Some varieties produce no hard seed, while others might contain very high levels of hard seed. If this seed remains in the paddock, as in a regenerating pasture situation, then the hard seed will break down over the summer and early autumn period. Species and varieties within species that have a high hard seed content and which break down more slowly over summer will be less susceptible to seedling loss via false breaks than those that have a low initial hard seed content and break down more rapidly. Additionally, species with a higher hard seed content will generally be more persistent in the seedbank over time. When seed is purchased for sowing of pasture, the seed will generally have been scarified which means that the seed coat has been scratched and this ensures that the seed sown will germinate rapidly once sown and rain is received. Purchased seed, because of scarification, will have a very low hard seed content.

Confusion often arises here; you need the seed you have sown to establish and go through to produce seed before you have hard seed present in the seed bank. I often get asked by people where they have had an establishment failure, 'I have sown a legume variety with a lot of hard seed but it looks like the weather is against me and it won't produce any seed but I should be ok because of its hard seed content, right?' Unfortunately, no, hard seed only comes into play once you have had seed set in what you have sown. So the variety you have sown might have moderate to high hard seed levels, but it has to set seed in the paddock before you actually have hard seed present in the soil seed bank.

How important is hard seed and how might that influence your choice of species and varieties? It depends. If you are intending to sow a long-term pasture, then it's likely you'll want legume species and varieties with moderate to higher hard seed levels. If your seasonal conditions are highly variable and you experience conditions frequently in late summer and early autumn that cause germination of a lot of seedlings that subsequently die without follow up rainfall, then choosing species and varieties with more hard seed will likely be useful. Hard seed content varies within and between species.

For example, some subterranean clover varieties may only have 10% hard seed when left in the paddock over summer and early autumn, while some newer varieties have over 40%. Similarly, some varieties of French serradella have no hard seed while others have around 55% hard seed remaining in mid to late autumn when left in the paddock. Some species retain extremely high levels of hard seed.

For example, biserrula generally has over 85% seed remaining hard when left in the paddock over summer and autumn and in some cases with biserrula, it may be better to crop the paddock in the year following initial seed set to allow hard seed to break down. So the key thing to remember with hard seed is that higher levels of hard seed can help with long term persistence, but when you purchase seed for sowing, it will generally be scarified to a very high level of germination and therefore you need to achieve seed set in the paddock you are sowing before you reap the benefit of hard seed.

2 - Maturity time – this refers to the time from sowing until flowering. In general, the earlier a legume commences flowering, the earlier it will complete seed production. So in most cases, the shorter the growing season, the earlier maturing species or variety within species you will need to choose in order to ensure seed set is completed. Often, where there is a wide variation in seasonal conditions or where landscapes are variable, a range of maturity times will be included in a mix; this provides greater surety for seed set and can also assist in prolonging feed availability. One thing to remember is that maturity time is often only useful to compare varieties within a species and not very useful for comparing across species. A good example of this is within subterranean clover and arrowleaf clover. An 'early' maturing subterranean clover variety will generally take around 100 days or less to flowering and a 'mid' maturing subterranean clover will generally flower 115-130 days after sowing while an 'early' maturing arrowleaf variety will generally commence flowering 130-140 days after sowing. The description of 'early' is not very useful for comparison across these species and in any case subterranean clover and arrowleaf differ considerably in other characteristics that can impact survival, for example rooting depth.

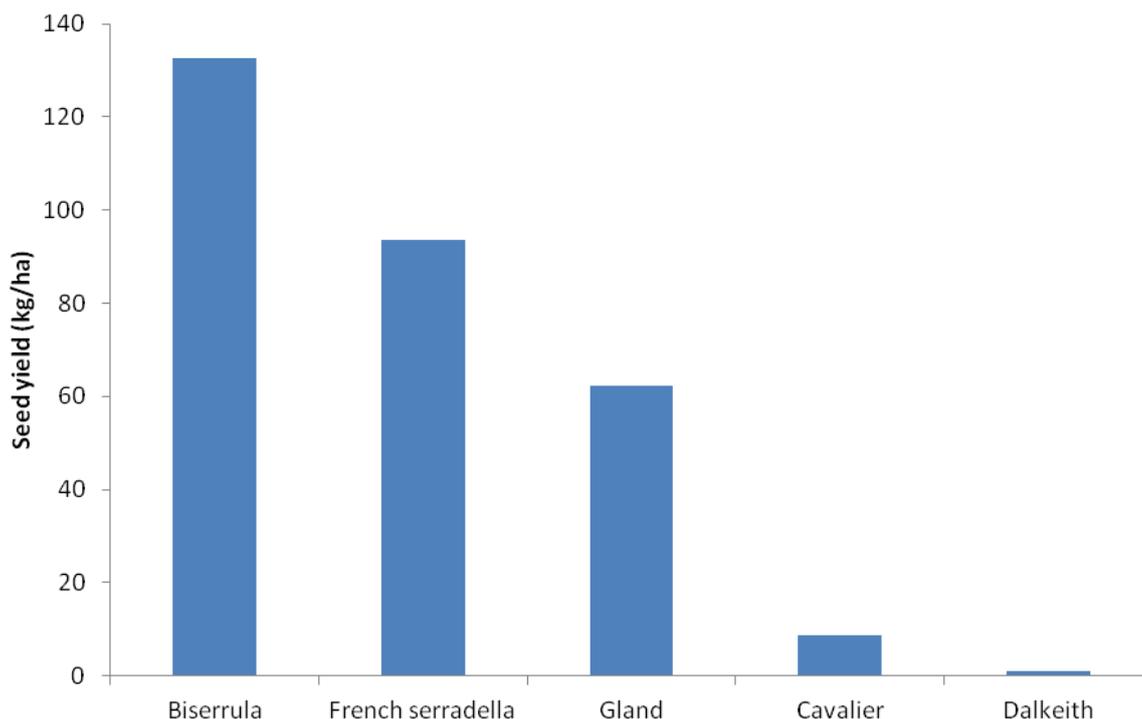
3 - Rooting depth – annual legumes differ considerably in rooting depth. Plants with deeper, rapidly developing root systems have greater capacity to survive false breaks in late summer and early autumn and are better able to withstand moisture stress in spring. This increases the probability of setting and maintaining an annual legume seedbank, particularly where seasonal and year to year variation in growing conditions are more extreme. Subterranean clover and annual medics are relatively shallow rooted with the majority of the plant root system in the top 50 cm of the soil profile. Species such as arrowleaf clover, biserrula and serradella can have root systems extending 1.5 m or further into the soil profile. Deeper root systems can also enable plants to maintain active growth later in the growing season which can result in higher plant quality later in the season which can have benefits for livestock production.

4 - Determinate and indeterminate growth – traditional annual legume species such as subterranean clover and annual medics are described as having a determinate growth pattern. This means by and large, they have a known period of vegetative growth, a defined period of reproductive growth and then senesce (die off). Other newer annual legume species such as arrowleaf clover, balansa clover, bladder clover and gland clover are also described as having a determinate pattern of growth. In contrast, biserrula, French serradella and yellow serradella, while having an annual lifecycle, have an indeterminate growth pattern. This means that the plants, once they enter reproductive growth phase, they can continue to flower, produce seed and produce green leaf material while moisture is available. Plants with indeterminate growth may produce more seed and have capacity to provide green feed later in the growing season.

How can maturity time, rooting depth and/or indeterminate growth help in establishing an annual legume seed-bank? An example from NSW.

The growing season in NSW in 2018 was extremely tough with 100% of the state in drought. A field trial was established at Kikoira, (NW of West Wyalong), in NSW in May 2018. Approximately 30 annual legume species were sown in a replicated field trial to evaluate their potential in the medium to low rainfall mixed farming zone.

Measurements of germination, herbage production and seed production were taken. Species sown included annual medics, subterranean clover, gland clover, biserrula and French serradella. Total growing season rainfall was 84 mm compared to a long term average of 198 mm. Seed yield varied significantly between species (Figure 1). The two indeterminate deep-rooted species, biserrula (cv. Casbah) and French serradella (cv. Margurita) produced more seed than other species. Gland clover (cv. Prima) is a shallow-rooted but early maturing species (around 90 days from sowing to flowering) and it also produced a reasonable amount of seed given the seasonal conditions. The annual medic (cv. Cavalier) and subterranean clover (cv. Dalkeith), both shallow-rooted determinate species produced very little seed and both would be insufficient to ensure regeneration in the following year.



Source: Dr Belinda Hackney, NSW DPI; Graham Centre CSU

Figure 1. Seed yield (kg/ha) of five annual legumes at Kikoira, NSW in 2018

So what legumes should you grow?

The best legumes to grow in your pastures are the ones that best suit your soil, climatic, production goals and management strategies. If you are growing traditional pasture legumes and having good success with them, then there is probably no reason to change what you are doing.

If traditional legumes are not performing as you would expect, then it is important to find out why. For example, is there something you can change in terms of soil fertility or other management that might improve their performance? If not, then it might be worth considering trying new species but make sure you choose those that best suit your climate and soil (physical and chemical conditions) and that you obtain information on how to grow and manage them – some have quite different requirements to traditional species.

This does not necessarily mean they are harder or easier to manage, just different. If you do decide to try new legume species, then it is advisable to start small. Select a clean paddock that has had preferably a three year weed clean up. Sow the legume at a reasonable rate (5-10 kg/ha depending on species) and make sure you use the appropriate inoculant group – a legume that doesn't fix nitrogen will use it from soil reserves. Manage the legume for seed set in the establishment year.

So in short, no matter what legumes you choose to grow, consider the maturity time that will suit your area, consider rooting depth as something that may be useful to increase capacity for seed production, reduce seeding losses where false breaks may occur and prolong the growing season and characteristics such as indeterminate growth might be a mechanism to improve reliability of production and persistence.

Hard seed content is important to consider too in terms of establishing a persistent seed bank but remember you are generally buying and sowing scarified seed and you have to have your legumes set seed before you have hard seed in the seed-bank.

Pasture update

Stawell Town Hall

Monday 1st April 2019

4.00pm– 8.30pm

MLA and the Grassland Society of Southern Australia have partnered with Perennial Pasture Systems to bring together a range of speakers to present up-to-date research topics at an MLA Pasture Update.

Lisa Miller; [MLA Feedbase Four](#) project coordinator

New [MLA Feedbase Adoption Projects \(FAP\)](#) coming your way
The FAP 4 is four extension projects developed - based on what producers said they want, which is:
Pastures to persist and perform
Healthy Soils
Less Weeds, More Feed
More sub clover

Steve Cotton, Dynamic Ag

The dry season; what did we learn? What to do next time.

Acting Snr. Sgt. Simon Grant; Victoria Police, Ararat

Stock Theft & Rural Crime

[Fertiliser advisor panel:](#)

[Facilitated by PPS member Charlie de Fegey](#)

[Shane Dellavedova; Dellavedova Fertilisers](#)

[Andrew Speirs; Meridian Ag](#)

[Lisa Miller; Southern Farming Systems](#)

- [Fertiliser strategies after a dry year](#)
- Potash responses
- Molybdenum
- Lime or Phosphorus or both
- Your fertiliser questions answered

Registration form - Stawell

Registrations by 28 March

Company name:

Name:

Postal address:

Postcode:

Phone: Mobile: Fax:

Email address:

Special dietary requirements:

<input type="checkbox"/> DIRECT DEPOSIT	<input type="checkbox"/> CREDIT CARD
(please email office@grasslands.org.au with your details if paying by direct deposit)	Please deduct my credit card for \$ _____
BANK: <u>Bendigo Bank</u>	<input type="checkbox"/> <u>Mastercard</u> <input type="checkbox"/> Visa
ACCOUNT NAME: GSSA BSB: 633-000 Account:143187599	Credit Card Number ____ / ____ / ____ / ____
Reference: 'Surname' then ' <u>Stawell PU</u> '	Expiry ____ / ____
<input type="checkbox"/> CHEQUE <input type="checkbox"/> MONEY ORDER	Name on card:
	Signature:

Time: 4:00pm – 8.30pm

Venue: Stawell Town Hall, Stawell

Admission: \$25.00 (GSSA and PPS members, MLA levy payers); \$50.00 (non-members)
(includes afternoon tea and dinner)

RSVP: Thursday 28th March 2019 to
GSSA Secretary Melinda Caspersz
1300 137 550 office@grasslands.org.au
or
PPS Project Manager Rob Shea
0438 521 357 yadin@netconnect.com.au

Registration: Complete the registration form and send as per contact details or submit with payment on the day – EFTPOS available



For further information, Contact Organiser Rob Shea 0438 521 357