

Persistent perennials? An advisor's perspective

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Abstract: *Perennial pastures, native or improved, are the backbone of the livestock industry. Getting them to persist has always been a challenge. With the considerable costs of establishing an improved perennial pasture, farmers today are asking more of the species and varieties they sow. This paper touches on some of the many factors contributing to the persistence (or lack thereof) of perennial pastures and gives an insight into the preliminary results of the Meat & Livestock Australia Pasture Variety Trial conducted at Blayney, on the Central Tablelands of NSW.*

Key words: management, phalaris, ryegrass, cocksfoot, lucerne, sub clover

Introduction

What is persistence? By definition, persistence is 'to continue steadily in some state, purpose or course of action, in spite of opposition – to last or endure, continuing or permanent, perennial, holding to morphological character, continuing in function or activity' (The Macquarie Dictionary, 1990). Farmers and advisors can think very differently about the persistence of pasture. Is there an objective 'benchmark' that determines persistence, or is it just the comfort level of pasture survival of each individual farmer? To most, there are many aspects to an answer, and many that apply in some districts don't apply in others. Take species or varieties for example, which is often where farmers start: we have great variations in rainfall adaptation, fertility, soil type and summer dormancy (just to name a few) – all within the one species. Selecting an individual variety from within a species can be further complicated by landscape, soil depth, water holding capacity, subsoil constraints, and most importantly, the grazing strategy to be imposed. By no means do the above cover all situations, and, as advisors and farmers, we can cast the mind very widely when looking at pasture species/variety selection. I have a favourite saying, and individuals should not take offence, that goes: "Any mug can sow a pasture, but it takes a bloody good mug to keep it".

To that end, I believe persistence starts and stops with us. As farm owners, managers, or advisors, we all need to have a good look at the person in the mirror and ask the hard question

– how good a manager of pasture persistence am I? Barring turning the tap on and off, pasture persistence depends on us.

The paddock experience

"Farmers are an important source of knowledge for determining both the key factors affecting pasture persistence and for providing indications of the importance of various farm management practices" (Daly *et al.* 1999). All of us have strengths and weaknesses, and as a group, our best learning comes from combining our ideas and experiences; listening to the failures as well as the successes. The New Zealand experience quoted above was prompted by the responses of 100 farmers to interviews aimed at determining the key practices they believed affected the persistence and stability of their perennial pasture mixtures. Daly *et al.* (1999) asked farmers to list the important factors and significant events influencing the pasture persistence of a key paddock. The 'top 6' responses and the proportion of farmers nominating these were:

Fertility/regular fertiliser	29%
Grazing management	28%
Species	22%
Establishment	9%
Moisture	7%
Soil type/quality	5%

Although taken from the other side of the 'Ditch', it highlights just how much this group of farmers believe they are in control of their pasture persistence. If we asked the same question on the Tablelands of NSW, would the

responses be similar, or are our parameters to persistence different? Maybe our rankings would be different, but there is still much that is within our control.

As an advisor, I see far too little effort put into the planning and preparation of a pasture. Such an activity doesn't even get a mention in the survey above, and is often brushed over in 'how to sow pasture' publications. However, in practice many will do a spring fallow, keep it weed-free over summer, and sow pasture the following autumn. Whilst this is much better than no spring fallow, for me the planning process starts at least 12 to 18 months earlier, with 'winter cleaning', 'spray topping', hay and/or silage options, grazing pressure, as well as fallows – all considered (among others) as good preparation activities.

Pasture variety trial – Blayney 2012 to 2015

The Pasture Variety Trial Network (PVTN) was commenced in 2011 as part of the Feedbase Investment Plan of Meat & Livestock Australia (MLA). One site was established in Victoria in 2011, and another five sites were established in 2012 over eastern Australia, from Tasmania to Central NSW. The Blayney site is the most northerly site and preliminary observations will be reported here.

Site background

The site chosen was a degraded pasture in the spring of 2011 and was intended for a cropping phase. Timely fallow sprays were used over the summer, and the site was scarified and harrowed over the autumn to stimulate as much weed emergence as possible. With a knockdown spray prior to sowing, the trial was sown on 22 May 2012. The soil is a brown loam, with pH (CaCl₂) of 5.4 in the 0–10cm sample, decreasing to 4.8 at 10–20 cm depth and then increasing to 5.4 at 20–60 cm depth. Phosphorus (P) and sulphur (S) levels were marginal and a nutritional program was implemented so as not to limit species performance in the trial. Soil temperature at the time of sowing was much lower than desired, 6.5°C at 5 cm depth, and

the site received 40 mm of rain within 48 hours of sowing.

The trial

Six species were planted with a varying number of varieties, submitted by seed suppliers participating in the MLA PVTN. Perennial ryegrass (30 varieties), phalaris (12 varieties), cocksfoot (12 varieties), fescue (12 varieties), lucerne (20 varieties) and sub clover (20 varieties) were established.

Establishment, dry matter and persistence measurements were recorded (full trial detail will be reported in the final MLA publication). As the whole site is being managed on a 'stock exclusion' basis, pasture cuts were timed to reflect when a grazing would have normally occurred and dry matter measurements were taken. Persistence measurements were taken annually and compared plants present with the initial establishment measurements taken in Year 1. The persistence measurement uses a 'gap analysis' protocol, where 12 metres of plant row (in this case the middle 4 rows × 3 m in length) are assessed for the presence of the desired species in each 5 cm interval.

Like most areas of the Tablelands during the 2012 to 2015 period, the trial received below average rainfall for most of its duration. That said, there was one 'typical' summer, one autumn and one winter, but unfortunately no two in the same year!

Results and discussion

Although not yet formally analysed or reported by MLA, the data presented provides some commentary on the role particular species and varieties have in improved pastures on the Central Tablelands of NSW. For the full report and statistically analysed data, readers should seek the MLA project report when it is released. Only persistence data is being referred to in this paper, and individual variety names have been removed until the final report is released.

Perennial Grasses

The persistence data of this trial must be treated with caution due to the lack of time to which

the species have been exposed. Two and a half years is hardly long term data, however, there have been some very interesting results. Note that caution also needs to be taken when interpreting the data that has not been analysed.

For the perennial ryegrass (PRG) trial, where 30 varieties were sown, the average establishment measurement, across all varieties, was 94%. The current persistence measurement is 53%. While averages are good, a lot of detail is lost. The measured persistence across all the PRG varieties (Fig. 1) is a wide range of 11% to 79%.

Making broad statements like 'PRG doesn't persist in my area' may in fact reflect a variety trait, or could be a consequence of the management an individual has imposed on that variety. Figure 1 clearly indicates that 'persistence' is much stronger in some varieties than others. The management imposed on this trial has been identical for every variety. That said, when a 'grazing event' was conducted, not all varieties were at the same growth stage. The

differences in maturity types and genotypes (combination of diploid and tetraploid types) complicate this 'persistence' measurement even further. Farmers need to be aware of the 'length of season' of the varieties they sow, as this strongly influences when a pasture should be grazed and when it should be rested.

The persistence of the other grass species, cocksfoot, fescue, and phalaris can be compared against PRG at this site, purely on the basis that their management has been identical. Nutrition, 'grazing management', weed and insects have all been managed the same way. Figure 2 shows the average persistence of each species two and a half years after sowing, and again only provides a broad overview as much of the data is missing.

Legumes

Grazing management, I believe, is the greatest contributor to the long term persistence of legumes in perennial pastures. This applies to

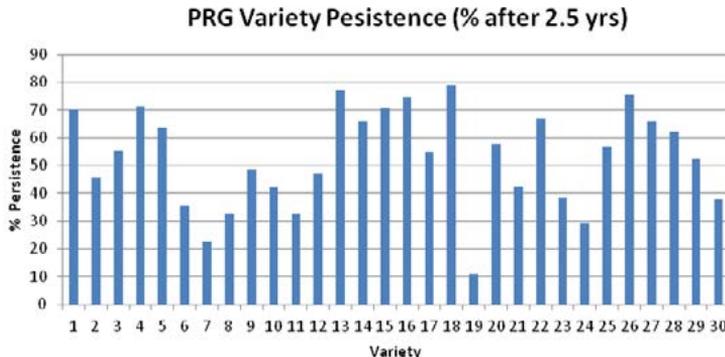


Figure 1. Perennial rye grass persistence by variety (names removed until statistical analysis is conducted) at Blayney PVTN site – 2.5 yrs after sowing.

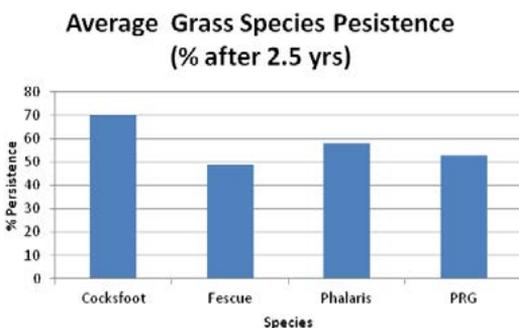


Figure 2. Average persistence of all varieties of each grass species at Blayney PVTN site – 2.5 yrs after sowing.

both lucerne and sub clover, with particular attention required to 'time of grazing'. Grazing too hard on the crown of lucerne will damage the plant and potentially expose it to disease, and so reduce persistence. With sub clover, a full understanding of 'growing season' length of a particular variety is a must to ensure the variety chosen has the chance to set seed and persist. This is becoming even more important with the rise in the number of varieties of the brachycalycinum sub species of sub clover. These sub species have very limited ability to

bury their seed, so grazing them at the wrong time can have a very significant impact on seed production. Graziers do need to manage seed set of brachycalycinum varieties differently to the true ‘sub clover’ varieties that bury their seed.

The average establishment of the 20 lucerne varieties at the Blayney trial site was 77%. However with time, persistence has declined

significantly to just 36% on average, at the end of the third year of the trial. The range of persistence has been from 14% to 55%. The most notable observation of this data set is the greater decline in persistence of the ‘winter active’ and ‘highly winter active’ varieties (varieties 15 to 20 in Figure 3) compared to the ‘winter dormant’ varieties (varieties 1 to 5 in Figure 3) and ‘semi-winter dormant’ varieties

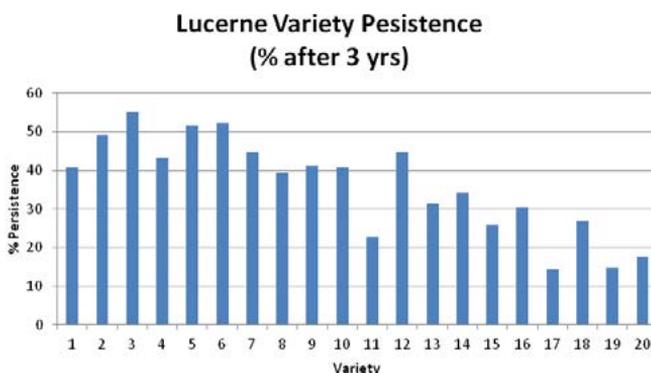


Figure 3. Variety persistence of Lucerne at Blayney PVTN site – 3 yrs after sowing.

(varieties 6 to 14 in Figure 3). It is generally regarded that semi-winter dormant and winter dormant varieties persist longer under grazing (Lattimore and McCormick, 2012).

Conclusion

The simple ‘take home message’ is: be very clear and understand what you want the pasture to do within your business. Ask suppliers, fellow graziers, or researchers about the attributes of a species or variety before making a selection. The making of a good persistent pasture begins and stops with you. Planning and preparation cannot be understated, and I encourage everyone to seek assistance in understanding the basics before sowing new pastures. Management of fertility status, weed levels, insect pressure and grazing all contribute strongly to the long term persistence of your pasture.

The trial data presented here will be statistically analysed and reported by MLA, along with data from the other PVTN sites. Unfortunately, it is not possible to make particular varietal or species decisions until that data is available. However, there is plenty of information

available and more importantly there is a lot of experience in the industry that advisors and farmers should look to use.

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