Opportunities and challenges to increased lucerne adoption in New South Wales, Australia

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Abstract

A survey was conducted to identify and understand the key drivers of and the barriers to the broader adoption of lucerne in mixed farming systems across New South Wales (NSW), Australia. Three key segments of the NSW lucerne industry were interviewed either over the telephone or in person using a semi-structured interview format, including: i) 31 farmers from a range of locations, ii) 21 agronomists/advisers from either the public or private sectors, and iii) 12 representatives from retailers, distributors of lucerne seed in NSW and proprietary owners of Australian lucerne cultivars. It was estimated that the domestic lucerne industry in Australia consumes 1500-2000t of lucerne seed annually of which 40-60% is sold into NSW. The trends in seed sales over the past decade have been largely steady but this has coincided with a period of severe and extended drought over much of the target region which has had both positive and negative impacts on lucerne. The study showed that although lucerne has long been grown in NSW there are still substantial opportunities for increasing its adoption. Finding suitable companion plants to increase groundcover and reduce the risk of animal health disorders in lucerne swards as well as improving lucerne performance on acidic soils appear to be key opportunities warranting further research. However, the two key impediments to greater lucerne adoption were identified to be i) risk of establishment failure in dry years and ii) difficulties adapting existing cropping rotations to utilise more lucerne.

Key Words

Survey, seed industry, extension, lucerne market, alfalfa

Introduction

Lucerne is a critically important pasture species in Australian agricultural systems. It is high yielding even under dryland conditions and produces herbage that is high in protein and highly digestible to livestock. It is broadly adapted to a range of environments across southern Australia (Li et al. 2008) and has superior persistence under drought compared with other perennial pasture species commercially available in Australia (Hayes et al. 2010). Its high nitrogen fixation capacity also makes it an attractive break-crop for cropping rotations in mixed farming enterprises. In addition, lucerne has been shown to have positive impacts on soil health due to its superior capacity to extract soil water and mitigate the risk of soil salinisation (Ward 2006) and acidification (Dear et al. 2009).Yet, despite its many positive attributes lucerne is estimated to occupy only 2-4% of the land area in Australia to which it is theoretically suited, based on soil and climate (Irwin *et al*. 2001; Robertson 2006).

The Future Farm Industries Cooperative Research Centre has placed substantial emphasis on developing farming systems based on perennial plants in order to reduce environmental degradation in agricultural landscapes without sacrificing productivity. However, given the paucity of viable alternative perennial species currently available (eg. Li et al. 2008) it is almost inevitable that increases in the perenniality of contemporary farming systems will mainly be achieved through the increased utilisation of lucerne. New South Wales (NSW) was the first Australian state in which lucerne was cultivated, dating back to before 1833 (Auricht 1999). The aim of the present study was to capture current perceptions of

the lucerne industry in NSW after such a long period of development in order to identify opportunities for its further growth and development over the coming decades.

Methods

A qualitative survey was conducted with key stakeholders of the NSW lucerne industry in April 2008 – January 2010. Stakeholders were categorised into three groups; i) farmers, ii) advisers/extension or iii) seed supply chain. The survey consisted of interviews that were conducted in person (farmers, seed supply chain) or over the telephone (advisers) by 1-2 interviewers using a semi-structured interview format which identified key issues of interest to the researchers (Table 1). However, the issues of interest were presented in an open-ended format that encouraged the participant to speak openly about lucerne-related issues important to them and as a consequence the information gathered was not necessarily restricted to the topics outlined in Table 1. Interviews were recorded and transcribed into a document format before qualitative analysis.

Selection of survey participants

A purposeful sampling method was used to select survey participants in order to capture information-rich cases for study (Patton 1990). The farmer participants were selected on the basis of geographic location and their experience with growing lucerne. Geographically, the sample area was contained within the state of NSW, west of a theoretical line running approximately through Tamworth and Cootamundra, and east of a line running approximately through Walgett and Hay. The sample area was split into 6 regions on the basis of rainfall; northern (approximately north of Nyngan), southern (approximately south of Hillston) and central, and within these 3 zones an eastern (higher rainfall) and western (lower rainfall) region was identified by running a theoretical line approximately through Moree and between Condobolin-Forbes. Upon the recommendations of prominent advisers across the various regions, farmers were selected who had at least 5 years experience growing lucerne and who had either demonstrated success growing lucerne or had experienced difficulties. Thirty one farmers participated in the study, 10 each from the northern and central regions and 11 from the southern region.

Table 1. Key prompts used in semi-structured interviews conducted with farmer, adviser and the lucerne seed supply chain participants.

Farmers, n = 31	Advisers, n = 21	Supply chain, n = 12
Understanding the property	Understanding the participant	Understanding the business
▪ Enterprise mix ▪ Size ▪ History ▪ Management	▪ Occupation/role ▪ Geographic location ▪ Employer ▪ Clientele	▪ Size, scope, objectives ▪ Suppliers, customers & competitors ▪ History
Use of pastures	Lucerne enterprises	Trends in lucerne industry
▪ Rotations/ No. of paddocks ▪ Pasture species ▪ Purpose of pasture ▪ Livestock enterprise	▪ Current level of lucerne adoption ▪ Optimum target of lucerne ▪ Factors to enhance adoption	▪ New players and market consolidation ▪ Volume of seed sales ▪ Emerging opportunities for growth
History of pasture use	Lucerne trends	Lucerne breeding
▪ Background, species ▪ Pasture improvement	▪ Regional data ▪ Explanations of trends	▪ Processes ▪ Public vs private

- Motives for change
- Source of information

Challenges of pasture improvement

- Successes and failures
- Overcoming the challenges
- Source of advice
- Lessons learned

Hopes for the future

- Aspirations for the farm
- Constraints to those aspirations
- Future role of lucerne
- Changing current practice

- Constraints to further adoption

Role of advisers

- Factors affecting advisors' attitudes to lucerne
- Source of information
- Adequacy of information
- Lessons learned in lucerne extension

Identify farmer participants

- Best practice farmers
- Farmer using lucerne
- Farmer reluctant to use lucerne

- Successful cultivars
- Plant Breeders Rights

Sales & Marketing

- Sources of information
- Contact with growers
- Successful extension methods
- Challenges in marketing
- Market segregation

Looking forward

- Emerging challenges
- New opportunities
- Domestic vs export
- Changing current practice

Advisers were also selected based on geographic location as well as experience with lucerne and their employment category. Twenty one advisers participated including 6 from the northern region, 7 from central and 8 from the south, although at least 2 of these reported to have clients from more than one zone. Nine advisers were from private industry firms that included major agronomic retailer firms and private consulting specialists. The remaining 12 were employed by government agencies, mainly the department of Industry & Investment NSW although 2 were employed by Catchment Management Authorities.

Seed supply chain participants were selected on the basis of their role within the lucerne industry rather than geographic location. A total of twelve interviews were conducted with people representing major retail firms in NSW, proprietary owners of Australian lucerne cultivars, seed wholesalers and lucerne breeders.

Results and discussion

There was general consensus between supply chain participants that the domestic market currently consumes 1500-2000 t lucerne seed annually (range of estimates: 800-2500), generally below that estimated previously by Wolfe (2003) . It was not possible to tell if the figures quoted in the current study referred to bare or coated seed. There was a general consensus that NSW represents roughly 50% of domestic lucerne seed sales (range of estimates: 40-60%). Supply chain and adviser participants indicated that the largest market segment for domestic lucerne seed was for dryland, extensive applications in mixed (grazing & cropping) farming enterprises with one southern adviser commenting "In southern NSW broadacre cropping enterprises [growers] use 3-5 years of lucerne and back into the cropping phase. Lucerne is pretty much self sustaining in the mixed farming area because people have got their systems working quite nicely". Similarly, an adviser from the north-western plains indicated that the "use of lucerne is increasing on the cropping areas as part of the rotation"

However, important niche markets remain, including lucerne for hay production or for dairy farms, both of which are often irrigated enterprises.

In general, farmer and adviser participants did not indicate that there was a strong trend evident in the overall size of the domestic lucerne market, with two southern advisers commenting "Lucerne has probably remained stable or decreased a little bit as people have chased the cash-flow with grain cropping". "[Lucerne sales have been] very stable over the past ten years to increasing"

Prolonged and widespread drought has impacted upon farming enterprises across much of NSW since 2001-02, and in some regions remains an ongoing concern. In some ways, drought has served to reduce the levels of lucerne sold due to reduced cash flow available for pasture improvement and an increased risk of establishment failure due to dry seasonal conditions. One southern advisor commented “Perennial pastures have suffered hugely in the last couple of years due to drought, so a lot of existing pastures have been quite degraded by the drought and [there are] a lot of crops going in this year as the pastures are so degraded”. This was supported by an experience of a southern grower “One paddock that we lost in the drought had 90 [lucerne] plants/metre and its gone …it just all died at once”, and a northern grower concurred “I am going away from lucerne a little bit, they haven’t persevered through these dry times, they only seem to last 3-4 years and are gone”

On the other hand, drought has highlighted the superior drought tolerance and valuable high quality forage that lucerne provides suggesting that investment in lucerne, on some farms at least, was not cut to the same extent as other on-farm investments in response to the drought. Respondents from across the sample region were advocating the benefits of lucerne in drought, such as this southern adviser… “You would have had to have your head in the sand not to be aware of it [lucerne] and as I say you look at bright green paddocks in the middle of Jan/Feb when we have had good rain, you would have to be deaf, dumb and blind to not be aware of the benefits of lucerne... Even in the driest conditions and I have seen it for the last 10 years and we have had some very tough springs and into summer, if the lucerne has been treated right, bang it survives”.

This was supported by some grower experiences, with a central grower reporting “it was probably the best drought we have gone through as far as recovery. When it did rain we kept them [sheep] on those lucerne paddocks for four weeks plus we had feed to go on with”. A northern grower commented “just to give an example we have had three and a half months without rain and our lucerne looked dead and now it’s all just freshly shot - she’s a very tough plant”. A southern grower described the role lucerne might play in minimising risk associated with intensive cropping…“This system is not working anymore and cost of inputs is high and the risk factor with drought. So we are happy to attack the resistant ryegrass problem and our tool is going to be lucerne - that chimes in well with returns on our lamb enterprise”

However, growers still identified problems that were inhibiting their ability to increase the area of land they had sown to lucerne. Many of these were lucerne-specific, including poor tolerance to acid soils (mentioned as a constraint by 10 growers), high level of bare ground (11), animal health disorders, mainly redgut and bloat (11) and poor lucerne persistence (2). Significantly, the study also identified other issues not specifically related to lucerne but which impacted negatively on the capacity of farmer participants to grow more lucerne. Most notable was the constraints placed upon them by the crop rotation (11), which included factors such as the relative inflexibility of lucerne relative to annual crops, and the large paddock sizes preferred in cropping phases which make lucerne difficult to manage and utilise. Other factors identified included farm debt levels (3), farmer age (2), family situation (2), livestock enterprise (4) and a lack of suitable companion species (4).

Importantly, few growers explicitly described low ground cover and risk of animal health disorders as being a constraint to their broader adoption of lucerne although a large number identified them as issues of concern that required active management when growing lucerne. Strategies commonly used to manage bare ground included growing lucerne in mixtures with companion species such as subterranean clover and restraining from controlling weeds with herbicides, though it was broadly acknowledged that these strategies were not always effective. The management of animal health issues involved the same practices as well as providing supplementary fodder to livestock grazing lucerne at key times. All of these strategies add to the complexity and management required of lucerne in the context of broader farming enterprises, and we postulate that the increased management requirements attributed to these factors would in fact serve to inhibit the broader adoption of lucerne in NSW.

Conclusion

This study showed that there are substantial opportunities to increase lucerne adoption in NSW. Lucerne clearly has a lot to offer in terms of superior drought tolerance (Hayes et al. 2010), which is broadly

recognised by the industry. There seems to be substantial opportunity to increase the area sown to lucerne in NSW such as by identifying suitable companion species to increase ground cover and reduce risks associated with livestock health such as redgut or by improving lucerne sward productivity on acidic soils. The biggest impediments to greater lucerne adoption identified in the current study were i) risk of establishment failure due to drought and ii) adapting existing cropping rotations to utilise more lucerne. These issues appear to be the top priorities for any future lucerne research and development initiative in south-eastern Australia.

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