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Producer Research Report

Winning Against Seeds in South East of SA

SA Grass Seeds Working Group



The SA Grass Seeds Working Group identified the need to explore companion species for lucerne as a tool to manage silver grass seeds in sheep production.

Winter cleaning of lucerne has been a successful tool to create a seed free environment for lambs in spring, however there are potential health and environmental risks associated with having a pure lucerne stand.

There are no new companion species available to sow with lucerne to prevent silver grass infestations. Old practises, such as over sowing with cereals in winter and preventing silver grass seed set are still the best options.

The project

By removing the grasses from lucerne pasture through winter cleaning, producers are left with a highly digestible, high protein and low neutral detergent fibre pasture, which in turn causes animal deaths and relatively poor daily live weight gains due to animal health problems. Health problems may include redgut and bloat, and nutrient problems such as protein overload and ammonia toxicity.

Winter cleaning of pure lucerne stands on sandy soils can also result in the loss of topsoil through drift, as well as leaving significant bare areas subject to further weed invasions.

It is believed that identification of appropriate companion species for lucerne can overcome these health and environmental issues and provide a more balanced and productive pasture for livestock as well as providing greater competition for silver grass.

Objectives

1. Identify companion species for lucerne that reduces the plant density and kilograms of dry matter per hectare of silver grass in a lucerne stand by 10% compared to Marlo oats (district practice), in the companion species trial and normal practice on the demonstration farms;
2. Take plant density counts and dry matter cuts of silver grass;
3. Eight producers to host a demonstration site to trial a companion species for lucerne on their properties;
4. Increase lamb production (kilograms of lean weight per hectare) on demonstration farms by 8kg LW/ha;
5. Informative and effective grass seed feature article in state rural media in 2005, 2006 and 2007;
6. Identify companion species for lucerne that reduce the plant density and kilograms of dry matter per hectare of silver grass in a lucerne stand by 100%; and
7. Fact sheet produced based on trial results (provided conclusive results are obtained from the project).

What was done

Demonstration Sites

Lamb producers in the upper south east of South Australia were invited to attend a field day at a lucerne companion species and lucerne cultivar trial site. The field day aimed to explore the opportunities for using companion species to manage silver grass and seed contamination of sheep. Following the field day, interest was sought from attendees to host a demonstration site trialling a companion species of their choice.

Demonstration sites were then established across six properties in the region.

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Demonstration site setup

The six participants selected a strategy for annual grassy weed control in lucerne that best suited their environment (rainfall and soils) and farming system. Five participants focused on silver grass, and one on barley grass.

Each participant tested different strategies on a paddock (or paddocks). Selected strategies were compared to other participants' paddocks and past experiences.

Understand site hosts were involved in an introductory workshop to demonstrate the required monitoring requirements, and to develop their pasture assessment skills.

Monitoring

Monitoring on demonstration farms included:

- Pasture measurements – Food on offer (kg DM/ha);
- Pasture composition;
- Assessment of bare soil;
- Feed test;
- Grazing;
- Date stock entered and exited the paddock, plus number and type of stock;
- Management activities (ie. spraying, fertiliser, grazing etc);
- Rainfall; and
- Photos to show demonstration sites throughout the trial.

Tintinara lucerne cultivar trial site

This paddock received excellent preparation. A rundown lucerne stand was sprayed with Roundup® over summer 2002/03 to kill couch.

Lupins were sown in 2003, after the paddock was worked to stimulate dormant couch buds, and sprayed again for couch control. In 2004, clay was spread and worked-in. Nine lucerne varieties were sown in two repetitions.

Companion species trial

In late June 2005 the paddock was sprayed-seeded, and companion species were sown across a part of the lucerne cultivar trial site.

The following species were sown;

- Saia oats;
- Italian ryegrass;
- Puna chicory;
- Wimmera ryegrass;
- Perennial ryegrass;
- Gala brome;
- Prosper and Resolute tall fescues;
- Cape barley;
- Currie cocksfoot;
- Atlas;
- Siroa phalaris; and
- Perennial veldt.

Dry matter production wasn't measured in the first year, but was very low from annuals (oats/ryegrass or barley) and insignificant from the perennials. Visual assessments were completed during 2006 and 2007.

In July 2007 the paddock was spray-seeded, then oversown with Saia oats.

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What happened?

Successful establishment and persistence of lucerne and companion species was hampered by a very dry year in 2006 and a run of three exceptionally dry springs in 2006, 2007 and 2008.

The run of dry years, and establishment failures, also influenced the attitudes of participants to the project and data collection as producers re-allocated their time and attention to drought survival activities.

There were also four technical supervisors during the life of the project (as a result of staff turnover), which negatively impacted producer enthusiasm when hit by bad seasons. This led to misconceptions about project requirements and outcomes. While the project did not show companion species to be a successful management option to combat silver grass, there were some valuable lessons to be learned.

Lucerne cultivar trial results

The emphasis was on keeping silver and brome grasses out of the paddock through management. Lucerne establishment was good.

The best performing lucerne cultivars (in terms of dry matter production and persistence) after four years of establishment were Sardi 7, Hunterfield, Flairdale, Hallmark and Seedmark Multifoliate. There was no difference in silver grass content between any of the cultivars.

Observations were made on the companion species. None of the perennial companion species survived the first summer, except for Puna chicory, and none of the annual species regenerated in the autumn.

None of the companion species provided significant dry matter. Observations made in October, indicate around four plants per square metre of chicory plants survived from the first sowing three years earlier (varying from 0–5 plant/m²). Contribution of chicory to dry matter production, relative to lucerne and annual weeds, was negligible, and there was no obvious reduction in silver grass populations relative to the remainder of the paddock.

There were no visual differences observed in the presence of silver or brome grass between companion species sown, both annual and perennial, however the paddock has been kept moderately clean of silver grass, couch and brome grass through winter cleaning.

Sowing perennial winter active companion species into an established lucerne stand can be very risky in any year except with above average winter/spring rains. Chicory produces feed at the same time as lucerne, but is useful from an animal nutrition perspective.

Winter cleaning and sowing cereals for grazing or hay every year on sandy paddocks may increase risk of soil erosion over summer/autumn especially on hill tops as there is very little residual cover and a high percentage of bare ground between lucerne plants.

There was a poor emergence of oats due to wind, however very little silver grass set seed.

Demonstration paddocks results

Silver grass composition ranged from less than 10% to 25 % in the demonstration paddocks when assessed after two years of pasture.

One paddock contained no silver grass, but 71% barley grass. Previous experience indicates silver grass re-infestation of up to 50% following two years in pasture with no control measures.

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Another paddock, sown with phalaris (Holdfast and atlas), lucerne (Silverado) and tall fescue (Resolute) was the most productive paddock in terms of lucerne and companion species establishment and persistence, but still contained 25% silver grass. It produced enough phalaris and tall fescue to contribute to pasture dry matter for grazing, and fill in bare areas between lucerne plants. This paddock had the least amount of bare ground.

Visual assessments of feed on offer (FOO) during 2006, 2007 and 2008 indicated kilograms per hectare of FOO was rarely higher than 1500kg/ha dry matter per year, with annual pasture use around 5kg/ha dry matter per day. This suggests a stocking rate of 3.75 DSE/ha/year (allowing 400kg DM/DSE/yr), compared with the district average stocking rate of 5–7 DSE/ha/yr.

Around 3500kg/ha dry matter was produced in each of 2007 and 2008 on one paddock, reflecting an annual stocking rate of 8.75 DSE/ha. It is believed that clay spreading on surface (and sub-surface clay at around 30cm) was essential in the successful establishment of perennial grass companion species phalaris and tall fescue at this site. In the other demonstration paddocks there was poor establishment and significant areas of bare ground.

Discussion

The project set out to identify appropriate companion species for lucerne to overcome health and environmental issues associated with pure lucerne stands, provide a more balanced and productive pasture for livestock and manage silver grass. It was believed that companion species sown with lucerne would provide greater competition for silver grass and therefore reduce its presence.

This project did not show companion species to be a successful management option to combat silver grass in lucerne stands. Poor establishment and persistence of the companion species (and in some cases the lucerne) on the demonstration sites and lucerne trial site meant there was not enough bulk from desirable species to successfully compete against the silver grass.

The poor performance of companion species is likely to be influenced by the exceptionally dry conditions experienced during the project, in conjunction with management practices.

In order to fully understand the use of companion species as a tool for managing silver grass, the factors influencing successful establishment of companion species must be further investigated. These factors would include their ability to compete for water in a lucerne stand, and the suitability of different soil and seasonal conditions. Companion species must be able to establish well and early if they are to effectively compete against silver grass.

Managing silver grass

A good establishment of lucerne reduces, but does not eliminate, re-invasion of silver grass. The high proportion of bare ground in a spaced lucerne stand makes it easy for prolific seeding plants like silver grass to proliferate.

Silver grass seeding can be prevented using a combination of spray topping, winter cleaning, sowing a cereal crop early winter using pre-emergent herbicides and using in crop selectives such as Raptor®. Using the same herbicide group in subsequent years will create herbicide

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resistance in silver grass. Winter cleaning thin lucerne stands (<10 plants/m²) on un-clayed paddocks, then sowing cereals for grazing and hay, can increase wind erosion risk on sandy rises during summer/autumn as there is minimal residual cover between lucerne plants.

Clay spreading will help reduce bare ground and subsequent silver grass invasions by increasing annual legume cover and helping perennial companion species to persist.

Perennial grasses (as companion species to lucerne) are only likely to help with silver grass control on clay spread paddocks where rainfall is more than 500mm, but are unlikely to eliminate this weed.

Perennial companion species (grasses) struggle to compete with lucerne and annual weeds for available soil moisture. On deep un-clayed sandy soils, the soil dries out too quickly in spring for perennial grasses to survive over summer. Perennial veldt grass is the most promising – but even that requires a thin stand of lucerne to persist (< 7 plants/m²).

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