final report

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Managing ARGT by using Safeguard ryegrass and Twist Fungus”

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PRODUCER INITIATED RESEARCH DEVELOPMENT

PIRD 05/W02 Final Report

"Managing ARGT by using Safeguard ryegrass and Twist Fungus"
Conducted by the Ballidu Woolpro Group.
Coordinated by Merrie Carlshausen

Project Objective

The group set up a project to provide growers with management information to significantly reduce the risk of ARGT on their farms. They chose to use what was seen to be the most beneficial baseline strategies of two biological control agents, these being nematode resistant ryegrass (Safeguard) and Twist Fungus. The group were confident this would give growers the ability to reduce the risk of ARGT deaths in livestock by 70-80%.

Methodology

The group planned to meet their objective by

- Determining the ratio levels of Safeguard to background ryegrass required to achieve effective introgression of nematode resistance genes in the local ryegrass population.
- Determining the ideal time of sowing to maximise the chance of successful introgression through simultaneous flowering of both ryegrass varieties.
- Demonstrating the effect of twist fungus on the levels of the causal organisms of ARGT.

In year 2006, four sites were chosen to test the level of successful introgression of nematode resistance between ryegrass under different conditions. These sites were on the following farms: Sadlers, Olivers, Driscols and Metcalfs

1. 2 sites were chosen at Sadlers and Metcalfs. These sites had a high level of measured seed gall nematodes due to high levels of native ryegrass. To maximise the chances of the Safeguard outnumbering the local population by 3:1, a delayed sowing was done to reduce the background ryegrass population with a knockdown. These sites would be ideally sown 3-4 weeks after the break. The sites received twist fungus treatment - the fungus needs nematodes for successful infection of ryegrass.
2. The other 2 sites (Olivers and Driscols) were chosen for their low ryegrass population because they had been spray topped the previous year. The sites were sown early i.e. sown as soon as practicable after the break. This was to maximise the chances of synchronised flowering between the local ryegrass and the sown Safeguard ryegrass – as this is required for successful introgression.
3. All the sites were designed with 6 random replicates of Safeguard and native ryegrass. The site on Sadlers farm was fenced off to enable sheep grazing assist with synchronizing the flowering of both species.

The buffering effect of the seed bank was minimized through specific seed head collection sites.

Results

The first germination of the ryegrass was to be sprayed out across all plots before the Safeguard plots were sown, however this was to be the start of 2 very frustrating years of attempting to set up and measure ratio populations of Safeguard to native ryegrass. We were hoping to increase the chances of obtaining an approx ratio of 3:1. The seeding rate was 8kg/ha of Safeguard, but with the late break to the seasonS and very low winter rainfall we were unable to establish the ratio. Plant counts taken indicated the native population always outnumbered the Safeguard which was the opposite outcome required for successful introgression to be achieved.

Twist fungus was applied at a rate of 200g/ha after ryegrass emergence.

The plot trial at Sadlers was grazed 6-8 weeks after establishment each year to assist simultaneous flowering.

Throughout the project, 2006 and 2007 the Food on Offer (FOO) measurements were never above 700kg/ha of dry matter, therefore they were not grazed during the Spring. In fact over the period of the trials, the stock numbers have depleted to less than ½ the normal carrying capacity. Retaining any stock has often been achieved through agisting stock off farm (in other regions) or hand feeding.

Due to the difficult seasons, achieving the original milestones were stymied and hence changed significantly. In discussion with MLA it was decided to keep the group formed and to deal with the seasons as a cohesive group. The sites remain as an area for the grower's interest for future activities for ARGT work if so determined.

As a result of the changed direction for milestones the group decided they would come together at convenient and timely intervals to discuss and compare strategies in dealing with dry seasons; bench marks of their sheep system; identify educational and information that would assist them in their sheep enterprise; change management strategies; travel to other areas and investigate technology and practices used by sheep farmers in other regions.

As a result of the changed direction over the two years the group has:

- Each year had a 1 day workshop during autumn, with speakers and ‘experts’ presenting dry season strategies; grazing options - feed lotting and confined feeding; cost comparisons of grain and feeding strategies; nutritional information and requirements, recognizing early ARGT symptoms, treatments, costs; minimizing erosion and environmental impacts;
- Each year completed a benchmarking calculator and conducted workshops to discuss and compare each others sheep system;
- A workshop in which they had discussions on dealing with ARGT in dry seasons; how to identify emerging ARGT on the heads and benefits of Twist Fungus; pasture species and management; followed by a pasture Field walk;
- Presentation on sheep meat and wool marketing and farm business management.
- A spring field walk was also conducted in September determining what improved pastures were achieving best production in a dry season.
- Sheep update through the Grain and Graze program;
- Conducted a Low Stress Stock handling course

- A 2 day tour in which they visited high dse sheep enterprises, met and spoke with farmers on sheep handling strategies, visited state of the art shearing sheds and yards; visited the states largest feedlot and visited alternative industries.

Analysis of data

There was no official analysis of the trials due to the lack of collectable data although each year farmers collected ryegrass head samples to measure the galls on their sites. The galls were present although there was no indication of bacterial build-up in those paddocks.

Learning from the PIRD

- There is no one silver bullet to combat ARGT. However, we can minimize the stock fatalities through the use of a suite of tools to control ARGT ie: Control of ryegrass in the cropping rotation, the use of twist fungus, heavy early grazing, slashing at head emergence, sowing safeguard, Italian or a tetraploid ryegrass for increase production, effective spray topping, early recognition of bacterial formation on the heads, regular monitoring for early detections of ARGT symptoms in the flock.
- How difficult it is to do meaningful trials dealing with the seasonal conditions.
- Learned that early planning takes some of the stress out droughts.
- We now focus on the areas that impact most on the productivity through benchmarking.
- That in normal years we don't optimize production from our sheep system.
- We don't do enough trading of sheep.
- It's OK to get in touch with researchers and how to talk with them.
- It is important to objectively view our sheep systems.
- Learned more from the group discussions and picking each others ideas and suggestions.
- Learned how to do pasture cuts and measure FOO.
- Learned how to handle stock more effectively.
- Learned how to keep sheep records, put them into the benchmarking calculator and discuss the analysis and comparisons. Structuring decisions around the figures.
- Sheep can be easier to handle if you are set up properly with appropriate equipment.

The impact of the project

Although the hard data from the project was difficult to collect there has been change in the outcomes of stock deaths from the toxicity of ARGT. One farmer had over 400 sheep losses in the year prior to the project commencement. There were no major losses during the project or since which could be attributed to various factors. Eg: A greater recognition of the toxicity in the ryegrass plants, a greater understanding of the of the disease and early recognition of the symptoms, a greater focus on monitoring, the dry season diminishing the development of ARGT. However as a result of the project the following practises are adhered to:

- Each of the growers in the group use Twist Fungus as a prophylactic treatment for future control of the nematode reaching the seed head.
- They all have a suite of tools that can be implemented to reduce the threat of loosing stock to ARGT.
- Growers in the ARGT high risk areas now test each year for galls and check for infection. Farmers don't think they have lost sheep to ARGT in the last 2 years, which could be a result of using the 'suite of tools to combat ARGT, being more aware, educated or possibly the dry years, although a dry year does not alone eliminate ARGT.
- We have created networks and contacts valuable to our business. Eg: ring researchers who can have more detailed information or broader knowledge on a topic than growers; farmers who can provide agistment; marketing people; people who have adopted practices that we are considering adopting and asking their opinions, ideas etc; people we can use as a 'sounding board'; getting an objective view from others; seed merchants.
- We are more objective in decision making through the use of benchmarks.

Environmental benefits

- There are no obvious environmental benefits, although through the project all growers are aware of measuring dry matter and being conscious there is adequate ground cover available over autumn after stocking the paddocks over summer. Many growers will choose to confine feed or feedlot, although as a result of the high grain and fodder prices and low yields in 2007 the rationale for keeping sheep and using this strategy this year has lessened.

Open days, field walks and workshops

- All the learning and extension opportunities were well attended by the group, most business were represented each time, quite often there was more than one person from a business attending.
- Open days and events were well attended. The Dry season Workshop had an attendance of 70 people.
- The Low Stress Stock Handling Course was filled to capacity.

Group Satisfaction

As with many areas of Australia over the last 5 years, the region in which the group farms has suffered extremely challenging seasons- Late openings and drought or low rainfall winters. This has made the groups original objectives for this project impossible, although with the group's redirection they feel satisfied with their experience. The energy for the group in 2008 has diminished and I think there are several reasons for this:

1. Financially the growers have made a conscious decision due to the droughts and high grain prices to focus on highest financial returns which has meant cutting back their sheep numbers.
2. Sheep meat and wool don't compare well with the cropping system, due to the low sheep commodity prices and high grain prices. The marketing of sheep meat and wool have suffered from dry years and the high A$ more so than grain.
3. Environmentally the growers have made the decision to decrease stock numbers so as to reduce the effects of wind erosion and degradation.
4. Due to the dry seasons most farmers have adopted no or minimum tillage, aligning with this 20% of the 'no-til' system farmers within the region have no stock.
5. As a rule, growers made the decision not to confine feed and feedlot in 2007/8 due to the high grain and fodder costs.
6. Finally, a grower group such as this one requires an energetic and knowledgeable 'driver' to organize, coordinate and report for the group. Unfortunately, with the rural downturn this can be difficult position to fill.

Doing the project better

This project could have been a 'winner' with at least one 'normal' season to set up the trials and give the growers added enthusiasm for the outcomes. In saying this, the group maintain they have many 'real' benefits from being involved in the project. Particularly the ARGT 'toolkit' of strategies, the trials experience, the learning they have implemented on their farms from the group stimulation and the networks they have created.
They are still concerned about the repercussions of ARGT although they are hopeful with the work CSIRO has been doing on an ARGT vaccine and a replacement bacterium.
The growers would have liked to have the cost of fencing and setting up watering points included in a project funding as this is a costly area of trials. People who are prepared to 'donate' for the whole industry should not necessarily shoulder the costs as well.

Interested in doing another project

This group is not interested in doing another project in the near future. They have continually been planning, implementing, measuring, making decisions and reporting for more than 5 years and their focus is on optimizing their farming opportunities due to the challenges they have experienced over the past 5 years. This is not to say they wouldn't consider future options when endeavouring to seek solutions to challenges.

Recommending other Groups run their own trials

The group recommends growers get involved with finding solutions to their farming challenges wherever possible, understanding there are limitations and some reservations ie: time and resources involved, often the lack of available experts, dealing with the difficult seasons and wanting answers to the questions when you may not get that satisfaction.
The group also appreciates the opportunities MLA has provided the growers in this area and the faith they had in them to assist in finding answers to their ARGT

questions. The Participatory Active Research (PAR) is an invaluable process for growers, researchers and hence the outcomes of the collaborative relationship. This is another reason why they would recommend being involved in a PIRD.

Organization and management of PIRD

It has been useful having Gerald Martin as an MLA contact person to answer queries and prompt for reports milestones etc. I had long delays with payments in 2007 which became unnecessarily complicated. It would be useful if it was an efficient and straight forward process.

Report written by Merrie Carlshausen on behalf of the Ballidu Woolpro Group. 23.5.2008