STIRLINGS TO COAST FARMERS

# 2017 TRIALS REVIEW

## SCF CROP UPDATES

8 MARCH 2018

GROWING AGRICULTURE TOGETHER

## Welcome to the 2018 SCF Crop Updates and Trials Review

**With any luck**, you've got the budget sorted, orders in, the seeder out of the shed and are excited about the coming season! Today we hope to give you some of the latest research from around the state to help you make the best decisions going forward. To our sponsors and partners here today, we welcome you and thank you for your ongoing support and hope you find the day valuable.

**Stirlings to Coast Farmers** (SCF) are a local, not-for-profit farmer group in the southern Albany Port Zone of WA. Our group has a steadily increasing membership of 200 individuals, representing 80 mixed (livestock and cropping) farming businesses and over 350,000 hectares of farmland. SCF has an extensive field trials program, testing a range of cutting edge research under local conditions to help our members improve their business profitability and sustainability. By coming together to share our knowledge and experiences, SCF members are in a better position to adapt and prosper in what is an exciting time for agriculture and to weather out the harder times together as a community.

If you are interested in becoming an **SCF member** please speak to one of our team or go to our website www.scfarmers.org.au for more information.

We would also like to thank **Grain Growers** for sponsoring this evenings' networking session with a donation over the bar - much appreciated guys! Also thanks to **CBH** for sponsoring our lunch today – again very much appreciated!

**Don't forget!** More in-depth information about SCF's local trial results for 2017 is included in this booklet, so keep it as a handy resource!

**For more information about SCF and our current projects, see our website http://www.scfarmers.org.au/**

We would like to thank our GOLD sponsors:

and our silver sponsors:

Our agency research partners:

# Contents

# ‘Paddock to plate’ value chain for high rainfall zone noodle wheat

**John Blake, SCF R&D Consultant**

## INTRODUCTION

### Project Purpose:

1. To prove that the High Rainfall Zone (HRZ South) can produce high quality Udon Noodles and increase the continuity of supply in an exclusive market. *The MRZ and LRZ of Western Australia have to date been the exclusive Udon Noodle supply areas to international markets. WA is the only external source of wheat grain for Udon Noodle manufacture for Japan and Korea.*

2. To provide greater longer-term diversity and options for crop rotations in the southern HRZ. NOTE: the current dominant rotation of YIYO canola: barley is under threat with more disease and chemical resistance.

### Key findings from the 2016 and 2017 trials and grower experience:

Growing Noodle wheat has been perceived as high risk by growers in the High Rainfall Zone (HRZ) due to the risk of not making ANW1 grade. There are specialist noodle wheat growers in the HRZ who consistently grow higher yields with the latest noodle varieties, and achieve ANW1 for most grain produced, compared to current APW varieties. This is guiding the development of the HRZ Noodle wheat production package.

- **Effect of location:** A 30km distance North from the south coast within the HRZ, proposed as the *‘Chillinup Line,’* appears to be a critical agronomic cut off point for where the risk of downgrade or failure to meet specification is manageable. Noodle Wheat can be grown more successfully North of the ‘Chillinup line’, 30 km inland from the South Coast and East and West of the Stirling Ranges yet still in the HRZ.
- **Yield potential:** In the High Rainfall Zone (HRZ) of southern WA, some specialist growers are consistently able to achieve ANW1 and some can grow Zen at a higher yield than the standard variety options for APW and AH even with seasonal rainfall >450mm. Many specialist noodle wheat growers achieved a premium of $60 per ton over APW in 2017.
- **Seeding rate:** The new varieties Zen, Ninja and IGW-8048 yielded significantly more when sown at a higher sowing rate (150Kg/Ha). Further testing of seeding rates in 2018 will aim to fine tune optimum sowing rates for particular soil types between 80-150kg/ha in the HRZ.
- **Effect of harvest timing on grain yield:** There were significant differences in harvest yields when comparing the two different times of harvest (TOH). TOH1(all varieties) mean = 6.44b and TOH2 (all varieties) mean = 6.76a. However, in trials in 2016 the reverse result occurred. The impact of delayed harvest on end-product performance (Udon Noodles) is being tested. A major consideration in the HRZ is whether to harvest noodle wheat early and dry the grain.
- **The newer noodle wheat varieties are out-yielding Calingiri in the HRZ:** The small plot trials suggested there are now superior yielding varieties. The next line of varieties may also have improved end-product performance and premiums are being proposed.
- **Noodle wheat yields superior to Trojan and comparable to Scepter:** Trial results in NVT’s and SCF project. Scepter (AH) is yielding the same as Ninja (ANW), Zen (ANW) and IGW-8048 (ANW) at 80kg/ha. The price of ANW is usually higher than AH. This means that revenue per hectare will be higher growing ANW wheat based on these trial results.
- **Price:** Grower groups have recognised that differentiated products aid price stability in times of relative grain oversupply and higher competition. Grain for Udon Noodle wheat markets are less affected by downward price pressures than undifferentiated grade wheat prices however supply variation is an issue. Premiums remain project priority.

## SUMMARY:

The SCF variety specific HRZ Noodle Wheat production package has been developed. This HRZ package increases quantity and quality produced while reducing the risk of not meeting ANW specifications:

- Intergrain and AEGIC are undertaking end-product testing of trial plot samples from each treatment to refine our HRZ production package to better meet market specifications for noodles and other alternative products for out-of-specification noodle wheat being tested in a separate project by AEGIC. The testing will also provide a comparison between noodle wheat grown in our region compared to the Kwinana Port Zone to help demonstrate the comparable quality of APZ noodle wheat to Japanese customers who currently show bias against noodle wheat from this region.
- Grower groups recognize that in times of oversupply of grain and higher competition, differentiated products ➤

such as the Udon Noodle wheat markets and other specialist product markets are likely to be less affected by downward pressures than the standard grades (APW2 and AH) of wheat. Premiums remain the key in consultation with the market leaders.

- Intergrain has moved a major test site for advanced breeding lines (Stage 2 & 3) into the SCF region as part of the project agreement between Intergrain and SCF.

## TRIAL RESULTS

**Table 1:** Combined yields for Time of Harvest (TOH) one and two, for each variety in the plot trial located at West Kendenup in 2017. Means followed by same letter do not significantly differ (P = 0.05, LSD)

| Wheat Variety | Seeding rate (kg/ha) | Yield (t/ha) |
|---|---|---|
| IGW-8048 | 150 | 7.194a |
| Ninja | 150 | 7.101a |
| Zen | 150 | 7.006ab |
| Ninja | 80 | 6.684bc |
| IGW-8048 | 80 | 6.662bc |
| Zen | 80 | 6.523c |
| Scepter | 80 | 6.483c |
| Trojan | 80 | 5.916d |
| Calingiri | 80 | 5.821d |
| ***LSD P = 0.05*** | | ***0.408*** |
| ***Standard Deviation*** | | ***0.501*** |
| ***CV*** | | ***7.59*** |

- **Calingiri the lowest yielding noodle wheat:** Table 1 shows that each of the new noodle varieties can yield significantly more than Calingiri. Calingiri has been a very popular variety for growers but less so for the noodle manufacturers. The small plot trials suggested there are now superior yielding varieties to grow in the HRZ. However, the data in the broad-scale trials indicated the new noodle varieties need more specific agronomy. More in 2018 trials.

The 2017 trial data will be used to further improve the 'Noodle Wheat HRZ Production Package'. The HRZ Noodle Wheat industry working group (specialist growers, Farmanco and DIPRD)

| Buffer | Zen | Trojan | Calingiri | Zen | Ninja | Trojan | Ninja | Calingiri | Zen | Buffer |
|---|---|---|---|---|---|---|---|---|---|---|

***Figure 1:*** *Chris Tomlinson's broad-scale noodle wheat trial East Tenterden: drone image by Jake McGuire*

**Table 2:** Grain yields of 2017 noodle wheat trials

| TRIAL HOSTS | Anthony Hall Small plots | Tony Slattery broad scale | Chris Tomlinson broad-scale | Brian Aylemore broad-scale |
|---|---|---|---|---|
| **LOCATION** | Kendenup - West | Gnowellen | East Tenterden | Tambellup South |
| **SOIL TYPE & COMMENTS** | Forest Gravel Non-wetting Rhizoctonia | Loamy Duplex | Gravel Duplex Non-wetting | Sandy Duplex Non-wetting |
| **RAINFALL** | Decile 1 rain during Autumn | Decile 8 rainfall in Spring | Decile 2 rainfall at start | Decile 1 rainfall at start |
| **Rainfall Apr 1. to Oct 31.** | 361.6mm | 339.7mm | 330.7 | 233.1mm |
| **GRAIN QUALITY** | Ok for noodle segregation | Ok for noodle segregation | Ok for noodle segregation | Ok for noodle segregation |
| **VARIETY & YIELD (t/ha)** | | | | |
| Zen | 6.52c | 4.61 | 5.50* | 2.28 |
| Zen 150kg/ha | 7.01ab | | | |
| Ninja | 6.68bc | 4.91* | 5.29 | 2.23 |
| Ninja 150kg/ha | 7.10a | | | |
| Calingiri | 5.82d | 4.55 | 5.26 | 2.28 |
| IGW-8048 | 6.66bc | | | |
| IGW-8048 150kg/ha | 7.19a | | | |
| Trojan | 5.92d | 4.49 | 5.96* | 2.66 |
| Scepter | 6.48c | | | |

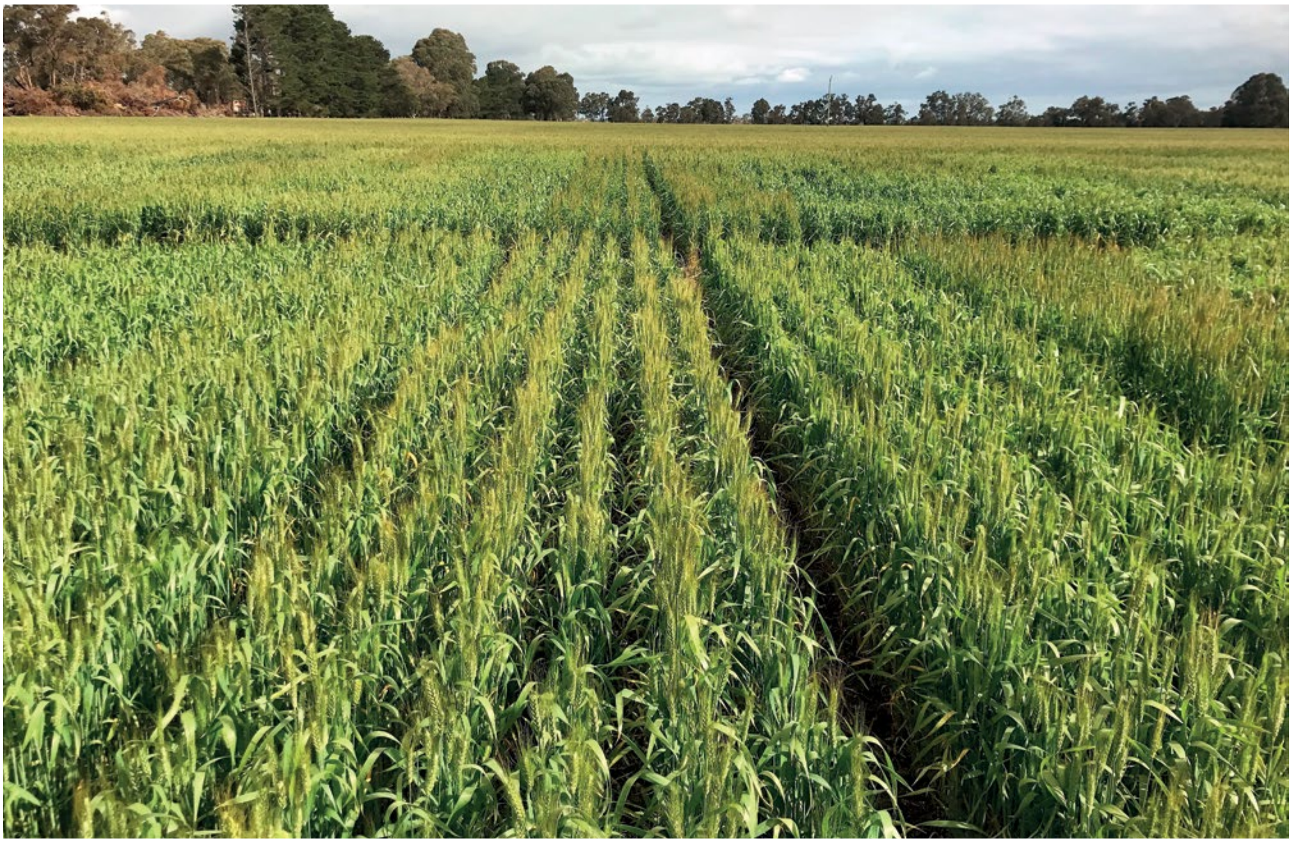


***Figure 2:*** *Noodle wheat plots at West Kendenup on 4 October 2017. During the dry start to the season (49mm for April, May and June) the trial site did not have a very high yield potential until 118.2mm of rain in July.*

## WA Noodle Wheat Industry International Forum

**Report by John Blake SCF & Jon Beasley SCF Board member**

Grower Panel members included Jon Beasley (Frankland and SCF Board). Jon was able to highlight the potential for HRZ Noodles to address the continuity of supply issue. Jon initiated the ongoing Forum discussions on a base premium being set to guide plantings and ultimate supply.

John Blake (SCF) spoke about the SCF HRZ Noodle wheat project that is developing HRZ Noodles agronomic management packages to manage the challenges. Industry and Japanese MAFF and Flour millers were invited to come and meet SCF in 2018 and see the progress being made. This was thanks to our partners in Intergrain, Farmanco – Brent Pritchard, DIPRD and CCDM and specialist SCF Noodle growers. The message of our project on HRZ Noodles on improving continuity of supply and quality got a lot of support and contacts in Japan: contact details via Richard Talbot of the Japanese consulate.

## CONCLUSIONS:

### Planned action and market development

The 'cliff-face' price drop for out of specification noodle wheat has been at the core of the problem of lack of supply. There is a reputational bias against noodle wheat from the HRZ by grain buyers for the Japanese flour mills. This region can develop long-term relationships with buyers in Japan in particular. Part of the strategy is to work with Intergrain, GIWA and AEGIC to develop market opportunities in South Korea, which does not have the same bias against HRZ suppliers. The biggest opportunity for us is also our biggest challenge – the Japanese market. Opportunities do exist for WA HRZ growers to obtain premiums for high quality noodle wheat by developing market opportunities, obtaining specific trade agreements and MOUs undertaken in collaboration with professional marketing bodies such as GIWA, AEGIC and Intergrain.

The following market development work is ongoing as part of this project:

- SCF is investigating alternative local uses for 'out of specification' noodle wheat. In July 2017, SCF was successful in gaining GGRD2 funding to investigate a multi-purpose grain processing facility in the Great Southern region.
- Concurrently, AEGIC has made some good progress in developing market information on alternative export grain markets for 'out of specification' noodle wheat.
- In January 2018, SCF developed a new research proposal to use out of specification noodle wheat as a supplementary feed for local livestock. This work is ongoing in partnership with the Sheep CRC.
- In September 2017, SCF was represented by John Blake (SCF agronomist) and John Beasley (SCF board member and noodle wheat grower) at the WA Noodle Wheat Industry International Forum held in Perth (see report attached). The focus was on i) continuity of supply and ii) product quality iii) market premiums. This aligns with this project's focus on market activities in 2018.
- With Intergrain launch the new noodle wheat variety IGW-8048 in Albany in May 2018.
- SCF will undertake further product testing in 2018 to demonstrate that noodle wheat from our region is equal in quality to noodle wheat from the northern wheat-belt areas.
- SCF with GIWA is to host a Japanese delegation to our region to highlight our production capabilities and contribution to future continuity of supply of high quality noodle wheat.


## ACKNOWLEDGEMENTS

- **The Royalties for Regions program administered by DPIRD which has funded the HRZ Noodles project**
- **SCF and Gillamii growers who hosted trials in 2016 and 2017:** Anthony Hall, Tony Slattery, Chris Tomlinson (Gillamii Group) and Brian Aylmore (Tolbrunup), John & Ashton Hood, Chris Kirkwood and Craig Pieper
- **CBH, GIWA, AEGIC, Intergrain and Farmanco.**

# Specialist Feed Wheat Hub: fit for purpose dual use wheat

## 2017 Field component of the dual-purpose feed wheat research

**Nathan Dovey, John Blake, Jake McGuire, Christine Kershaw**

Collaborators: Jeremy Lemon (DPIRD), Brent Pritchard (Farmanco) Claire Shadbolt, Kalyx Australia, Dow AgroSciences, Edstar Genetics, Australian Grain Technologies.

Farmer 2016 trial hosts: Iain Mackie, John Howard, Andrew Slade, Jeff Stoney, Mark Adams

Farmer 2017 trial hosts: John Howard, Curwen family, Steve & Brad Lynch, David Pyle and Preston family.

**Note:** In 2017, long season wheat trials were included in WA, for the first time, as part of the National Variety Trials (NVT) program. One long season NVT wheat trial was located at South Stirlings in 2017.

***Figure 1:*** *Steve and Brad Lynch's broad-scale long season wheat trial at Perillup in 2017. This was the highest yielding trial site grown by SCF in 2017.*

### Introduction

Stirlings to Coast farmers (SCF) sowed two small plot trials and four broad-scale farmer trials in 2017. A generally wet summer produced optimism for reasonable sowing conditions for winter wheats to be sown in late March to mid-April. Unfortunately, by April the soil profile was starting to dry out and the break in the season was delayed. This meant that most seeding dates were between the 20th of April and the 12th May, apart from Curwen's broad-scale trial which was sown on March 30th.

We confirmed that a late April sowing date suits the long spring type wheats like DS Pascal, Trojan or main season wheats like Scepter and Cobalt. At these sowing dates, there was no yield advantage to growing winter type wheats (like Naparoo, Manning or Longsword) over spring type varieties. DS Pascal is a new APW variety that is approximately 10 days longer than Mace wheat. DS Pascal has a good overall disease resistance package, is high yielding and possesses outstanding sprouting tolerance to pre-harvest rain. NVT yields for DS Pascal have been poor at South Stirlings, Kendenup and Kojonup in 2016 and 17. However, most NVT trial sowing dates were mid-May and our data suggests that DS Pascal is better suited to a mid-April sowing date.

The newly released "Longsword" (formerly RAC-2341) was tested by SCF in 2017. In the main variety trial with two times of sowing (TOS) it yielded nearly 1t/ha less (5t/ha) than the top yielding variety at the site (6t/ha). However, in the intensive nitrogen by seeding rate trial, Longsword and DS Pascal yielded 5.51t/ha and 5.74t/ha respectively from more replicates. Longsword is a winter type wheat, and its ability to achieve 5.51t/ha from a May 12th sowing date is pleasantly surprising. SCF aims to test if an earlier sowing date could increase yields further and if Longsword suits the practice of grain and grazing.

Feed grade wheats did not yield any better than established spring type varieties like Trojan and Scepter. Additionally, Trojan and Scepter are classified as APW and AH respectively, which means they fetch a much higher price than feed grade wheats. SCF research staff speculate that winter type wheats may only achieve competitive yields when sown before April 15th.

The other opportunity for long season wheats is an enhanced ability to graze them with minimal yield penalty and greater management flexibility. SCF will be conducting trials in 2018 to provide data that to address each of these possibilities. A grazing wheat that has a robust final yield and achieves a APW or higher would be a perfect fit for the high rainfall zone in the lower great southern. DS Pascal and Longsword are the two most likely varieties to achieve this goal.

NB: Longsword is currently rated as feed wheat. Wheat Quality Australia is currently assessing Longsword for an Australian Hard (AH) classification.

CBH are currently testing all samples from the 2017 broad-scale and plot trials. It is hoped that a high yielding feed wheat variety like Cobalt or Naparoo could potentially be blended with another milling wheat or be have an alternate use that would attract a price premium over and above feed wheat.

Both large plot and small plot intensive field experiments were conducted in 2016 and 2017 to examine possibilities for specialised feed wheat production in the SCF target area. The aim of the experiments was to begin investigations that will lead to practical guidelines or agronomic packages for production of wheat suitable for the high energy feed wheat market.

## Methods

Potential, specialty feed wheats were tested at four farm sites and sown at, or close to the break of the season in late March or April. At each farm-scale site we measured the farmers "standard practice" wheat or barley package versus the long-season wheat agronomic package. Not all varieties were tested at all sites. Varieties that have a vernalisation, or cold requirement (e.g. Manning) were included, as well as some later maturing spring types such as Trojan and DS Pascal. Main season wheats such as Scepter and Cobalt were also tested at the various sowing dates in 2017.

The main plot trial at Manypeaks included 10 varieties each with two separate times of sowing (TOS) for a total of 20 treatments. The two sowing dates were April 20th and May 12th, 2017, approximately three weeks apart. Kalyx did a fantastic job ensuring that each sowing time was matched to rainfall events. This provided two excellent plant germinations from each TOS date, which meant we could make fair comparisons between the sowing dates.

The plot trials at Manypeaks also included an intensive nitrogen by seeding rate trial for two varieties; DS Pascal and Longsword. Using two varieties to explore nitrogen and seeding rates meant we were able to conduct more intensive treatments to develop the agronomic package for long season wheats.

The small-scale plots were visually rated for plant establishment and early growth, plus regular phenology scoring was conducted by Emma Clarke, DPIRD researcher, from mid-August until physiological maturity. Heavy spring rainfall caused water-logging at the plot trial site, plus the farm-scale sites at Pyle's and Prestons. Curwen's also received heavy rain during this period, but the trial site was very well drained. At Perillup, the amount of spring rainfall received was not excessive and allowed the wheat to achieve excellent final yields.

## Results and discussion

Excellent yields were achieved at both the trial plot site and the farm-scale trial sites. Brad and Steve Lynch's trial site, in Perillup, was a stand-out, achieving a top of 7.31t/ha for Cobalt wheat. Prestons's broad-scale trial site was very dry in the April to June period. However, the season turned around with significant rainfall coming in July and continuing for the remainder of the growing season. This site also suffered water-logging late in the season. David Pyle's farm-scale trial also got very wet in the spring from flooding rains. Some of the trial site plots were removed from the data set, due to water-logging damage. Curwen's trial site was seeded into good sowing conditions for winter wheats in WA. We demonstrated that March 30th is far too early to be planting Cobalt, main season wheat in this region. The poor yields from Cobalt were likely due to frost damage because it matured so early. We also included Rosalind barley in the Curwen trial, sown at the later date of May 10th. Rosalind achieved the highest yield at the site by a significant margin. This highlights the local areas suitability to growing barley.

**Table 1:** Variety by time of sowing (TOS) mean yields at the Manypeaks plot trial site in 2017. TOS 1 was April 20th and TOS 2 was May 10th. Mean yields followed by the same letter do not significantly differ (P =0.05 LSD).

| Variety | TOS | Yield t/ha | Significance | Grade | Ranking |
|---|---|---|---|---|---|
| Naparoo | 1 | 6.06 | a | Feed | 1 |
| DS Pascal | 2 | 5.94 | a | APW | 2 |
| DS Pascal | 1 | 5.80 | abc | APW | 3 |
| Cobalt | 1 | 5.78 | abc | Feed | 4 |
| Scepter | 2 | 5.69 | a-d | APW | 5 |
| Naparoo | 2 | 5.67 | a-d | Feed | 6 |
| Trojan | 2 | 5.54 | a-e | APW | 7 |
| Trojan | 1 | 5.40 | a-f | APW | 8 |
| Cobalt | 2 | 5.40 | a-f | Feed | 9 |
| Edge-086B10 | 2 | 5.37 | a-f | N/A | 10 |
| Planet barley | 2 | 5.15 | b-g | Feed | 11 |
| Longsword | 1 | 5.04 | c-g | Feed | 12 |
| Scepter | 1 | 5.02 | c-g | H2 | 13 |
| Longsword | 2 | 4.97 | d-g | Feed | 14 |
| Edge-086B10 | 1 | 4.84 | e-h | N/A | 15 |
| Manning | 1 | 4.78 | e-i | Feed | 16 |
| Sunlamb | 2 | 4.73 | f-i | Feed | 17 |
| Sunlamb | 1 | 4.14 | hij | Feed | 18 |
| Planet barley | 1 | 4.05 | ij | Feed | 19 |
| Manning | 2 | 3.94 | j | Feed | 20 |
| ***LSD P = 0.05*** | | | | | ***0.7811*** |
| ***Standard Deviation*** | | | | | ***0.4753*** |
| ***CV*** | | | | | ***9.26*** |

- The plot trials top yielding variety was Naparoo, which was sown on the 20th of April. Naparoo is a true winter type that needs early sowing to be successful in WA. The next best performers in the plot trials were Cobalt, DS Pascal and Scepter. DS Pascal achieved little yield differences between the two seeding dates. This indicates that April 20th – May 12th appears to be a suitable window to seed that variety in the local area. Scepter had a big yield difference between each TOS indicating that it was much better suited to the May 12th sowing date. Trojan and Longsword were also very stable between each TOS indicating suitability to this sowing window. Longsword is a true winter type that currently has little WA data available. Further TOS trial data is required to investigate how much earlier the variety can be sown and whether this will lead to increased yields.

Sunlamb was much better suited to the second TOS. However, the yields of Sunlamb across all trial sites were generally poor, indicating a poor fit for our environment. The coded line from Edstar Genetics, Edge0618B10, is a long spring type wheat. Yield performance was fair in this trial and warrants further testing in 2018. Manning wheat was the latest maturing variety in this data set. The yield achieved at TOS 1 was still inferior to other varieties in the trial. At the Curwen trial site, located only 10km north of the plot trials, Naparoo yielded 0.74t/ha more than Manning, with a March 30th sowing date. Trial results from 2016 and 2017 suggest that Manning and Sunlamb are not suitable to our local environment.

Finally, the new barley variety "Planet" was included in this trial as a reference. TOS data indicate that May 12th was a more suitable sowing date than April 20th. Barley traditionally yields more than wheat in the local area. In this trial, the wheat yielded higher and achieved greater revenue per hectare.

Although Naparoo topped the yields of the plot trials, its highest achievable grade is only feed. Farmers are more interested in revenue generated per hectare, rather than yields alone. Revenue was calculated by multiplying yield by price. Table two shows the top five revenue grossing varieties, are all milling grades or higher. Naparoo (TOS 1), the highest yielding variety, is sixth on this list and achieves a gross revenue of $185 less than Scepter (TOS 2).

**Table 2:** Variety by time of sowing (TOS) yields and gross revenue ($/ha) at the Manypeaks trial site in 2017. TOS 1 was April 20th and TOS 2 was May 12th. Mean yields followed by the same letter do not significantly differ (P =0.05 LSD). Wheat prices were calculated on the 14th of February 2018.

| Variety | TOS | Grade | Price $/tn | Revenue (S/ha) | Difference $ | Ranking |
|---|---|---|---|---|---|---|
| DS Pascal | 2 | APW | 270 | 1603 | 0 | 1 |
| DS Pascal | 1 | APW | 270 | 1565 | -38 | 2 |
| Scepter | 2 | APW | 270 | 1537 | -67 | 3 |
| Trojan | 2 | APW | 270 | 1497 | -107 | 4 |
| Trojan | 1 | APW | 270 | 1458 | -145 | 5 |
| Naparoo | 1 | Feed | 240 | 1454 | -149 | 6 |
| Scepter | 1 | H2 | 288 | 1445 | -158 | 7 |
| Planet barley | 2 | Feed | 275 | 1417 | -186 | 8 |
| Cobalt | 1 | Feed | 240 | 1386 | -217 | 9 |
| Naparoo | 2 | Feed | 240 | 1360 | -243 | 10 |
| Cobalt | 2 | Feed | 240 | 1295 | -308 | 11 |
| Edge-086B10 | 2 | N/A | 240 | 1288 | -315 | 12 |
| Longsword | 1 | Feed | 240 | 1209 | -395 | 13 |
| Longsword | 2 | Feed | 240 | 1192 | -412 | 14 |
| Edge-086B10 | 1 | N/A | 240 | 1162 | -441 | 15 |
| Manning | 1 | Feed | 240 | 1147 | -456 | 16 |
| Sunlamb | 2 | Feed | 240 | 1134 | -469 | 17 |
| Planet barley | 1 | Feed | 275 | 1113 | -490 | 18 |
| Sunlamb | 1 | Feed | 240 | 993 | -610 | 19 |
| Manning | 2 | Feed | 240 | 945 | -658 | 20 |

**Table 3:** Summary of mean yields (t/ha) of the the nitrogen (N) rates by seed rates (kg/ha) trial, conducted at Manypeaks in 2017. All treatments received 125kg/ha Gusto Gold (12.5 units N) at sowing. Urea was applied by hand. N1 & N2 had Urea applied from two applications. N3 & N4 had Urea applied with four separate applications.

| N Treatment | DS Pascal 90 kg/ha | Protein % | DS Pascal 140 kg/ha | Protein % | Longsword 90 kg/ha | Longsword 140 kg/ha |
|---|---|---|---|---|---|---|
| N1- 71 units | 5.67a-e | 11.2 | 5.52b-e | 11.4 | 4.88f | 5.33c-f |
| N2- 101 units | 5.21ef | 11.1 | 5.50b-e | 11.4 | 5.25def | 5.35c-f |
| N3- 145 units | 5.88abc | 12.8 | 6.16a | 11.2 | 5.72a-e | 5.77a-e |
| N4- 182 units | 5.81a-d | 13.0 | 6.19a | 13.2 | 5.75a-e | 6.05a-b |
| ***LSD P = 0.05*** | | | | | | ***0.57*** |
| ***Standard Deviation*** | | | | | | ***0.27*** |
| ***CV*** | | | | | | ***4.7*** |

The yield benefits from feed wheats, are not high enough to compensate for the lower price achieved in SCF trials. At a mid-April sowing date, local farmers should be growing traditional spring wheats that achieve grades of APW or higher. To test the yield performance of winter type wheats further, we need to get more data from early April sowing dates. We also need to further evaluate the benefits of grazing winter wheats to add value to the mixed farming enterprise. Plans are under way to test each of these objectives in 2018.

Table three shows no significant differences between seeding rates of 90 to 140kg/ha. However, there is a trend towards greater yields at the higher sowing rate, with three of the four 140kg/ha treatments, yielding higher than the 90kg/ha treatments. Increasing N rates tended to increase mean yields for all treatments as would be expected.

DS Pascal shows a significant difference between the N2 (101 units) rate and the N3 (145 units) rate. Longsword shows a similar trend between these two N rates, but the difference is not statistically significant. Neither variety has significant differences between the N1 and N2 treatments or the N3 and N4 treatments. This indicates the optimum N application in this trial, for N use efficiency and yield, is N3 (145 units) for both varieties at both sowing rates.

Table four summarises the broad-scale yields for each of the four sites. The broad-scale sites work in tandem with the plot trials to validate the data in more realistic farming conditions. The control treatment for each trial site was Trojan wheat, except for Curwen's trial site, where Rosalind barley was used.

**Table 4:** Grain yield (t/ha) from the broad-scale dual-purpose long season wheat trials in 2017. The asterisk indicates a result based on one replicate only. Interpret these numbers with caution. Yield's in bold indicate the top yield at that trial site.

| Farmer | Curwen | Lynch | Pyle | Preston |
|---|---|---|---|---|
| **Variety** | **t/ha** | **t/ha** | **t/ha** | **t/ha** |
| **Rosalind** | 5.23 | | | |
| **DS Pascal** | | 6.64 | 4.72 | 3.8 |
| **Trojan** | | 6.92 | 3.57* | 4.12 |
| **Cobalt** | 2.8 | 7.31 | 4.5 | 4.78 |
| **Naparoo** | 4.55 | 6.62 | 3.97 | 3.87 |
| **Longsword** | | | 4.46 | 4.51 |
| **Mace -3/6** | | | | 3.32 |
| **Manning** | 3.81 | | | |
| **Sunlamb** | 3.01 | 4.95 | 3.6* | 3.2 |
| **Site mean** | 3.88 | 6.49 | 4.14 | 3.94 |
| **Location:** | **S. Stirlings** | **Perillup** | **Manypeaks** | **Cranbrook** |
| **Sowing date:** | **March 30th** | **April 27th** | **April 26th** | **April 20th** |

In two of the four trials, the farmer control had the greatest revenue and a third site, Prestons's, Trojan was ranked second. Trojan remains a very well adapted variety in local conditions. New varieties and agronomic packages need to be measured against this varieties performance.

The same trends were evident in the broad-scale trials as the plots. Cobalt yielded extremely well with a mid-late April sowing date. Naparoo was a solid achiever

**Table 5:** Revenue per hectare ($/t) in the broad-scale long-season wheat trials in 2017. Revenue was calculated by the price (February 14th 2018) multiplied by the yield (t/ha). The asterisk indicates a result based on one replicate only. Interpret these numbers with caution.

| Farmer | Curwen | Lynch | Pyle | Preston | Revenue Ave. | Difference |
|---|---|---|---|---|---|---|
| **Variety** | **$/ha** | **$/ha** | **$/ha** | **$/ha** | **$/ha** | **$/ha** |
| **Rosalind** | 1438 | | | | 1438 | 0 |
| **DS Pascal** | | 1793 | 1227 | 988 | 1336 | -102 |
| **Trojan** | | 1868 | 964 | 1112 | 1315 | -123 |
| **Cobalt** | 672 | 1754 | 1080 | 1147 | 1163 | -275 |
| **Naparoo** | 1092 | 1589 | 953 | 929 | 1141 | -298 |
| **Longsword** | | | 1070 | 1082 | 1076 | -362 |
| **Mace -3/6** | | | | 956 | 956 | -482 |
| **Manning** | 914 | | | | 914 | -524 |
| **Sunlamb** | 722 | 1188 | 864 | 768 | 886 | -553 |
| **Site mean** | $968/ha | $1638/ha | $1026/ha | $998/ha | | |
| **Location:** | **South Stirlings** | **Perillup** | **Manypeaks** | **Cranbrook** | | |
| **Sowing date:** | **March 30th** | **April 27th** | **April 26th** | **April 20th** | | |

across all sites without being exceptional. DS Pascal and Longsword generally performed very well, although there was only enough seed to include Longsword at two sites. Longsword is currently undergoing evaluation by Wheat Quality Australia, for an Australian Hard (AH) grading. A classification of AH will make a massive difference to profitability compared to its current grade of feed. DS Pascal was granted APW classification in WA in 2017.

SCF have identified Longsword and DS Pascal as two varieties with a potential fit for our area. Both varieties have limited yield data available in WA conditions. DS Pascal has performed poorly in NVT trials at South Stirlings and Kendenup in 2016 and 2017. However, the sowing dates for each of these trial sites has been mid-May. SCF 2017 trial data suggests mid-April is the ideal sowing time for DS Pascal. Longsword is a true winter type, which make its yield stability with sowing dates from April 20th to May 10th, somewhat surprising. SCF aim to test the yield potential of Longsword with earlier sowing dates and to test its suitability for grazing.

Cobalt remains a very high yielding feed wheat that should be sown in the traditional “main” season wheat sowing window. Farmers remain pessimistic about growing feed grade wheats in their programs. Quality testing of all long-season wheats in the 2017 SCF program is ongoing with CBH, AEGIC and Agrifoods. Cobalt ultimately needs a boost in price to achieve any level of adoption from SCF members. Naparoo needs more data with earlier sowing dates to fairly test its viability in our local environment.

Grain yield results from the 2016 and 2017 season were reviewed based on growing seasonal rainfall. For example, for a location where the growing season rainfall (GSRF) was 450mm and an average one third of it was lost due to soil evaporation, run-off and deep drainage, and the transpiration use efficiency is assumed to be 20kg/ha/mm, then the potential grain yield can be estimated as < Ypot= (GSRF - GSRF/3) x 20 or (450-150) x 20 = 6t/ha >.

The small plot experiment produced yields approaching this estimated potential indicating that the varieties and management variables tested were satisfactory for the season. The chief challenge for farmers in all seasons is to match the management to the seasonal conditions.

We have identified some varieties that will be suitable for our farming systems in the lower Albany port zone. Precise quality specifications are not yet known and end product testing is in progress with CBH, AEGIC and Agrifoods. Collaboration with plant breeders from Australian Grain Technologies (AGT) and Dow AgroSciences is being negotiated to test new “unreleased” varieties in the SCF long-season wheat trials in 2018. These varieties will replace Manning and Sunlamb which are unsuitable to our local environment.

***Figure 2:*** *Curwen's feed wheat trial site in 2017 at South Stirlings. This trial was sown into a moist soil profile on March 30th.*

# MLA Producer Demonstration Sites – Pedigree Matchmaker demonstrations

**Stirlings to Coast Farmers**
**Jonathan England, AgInnovate**

The Stirlings to Coast Farmers Sheep Technology Project, funded through Meat and Livestock Australia, includes two farmer sites where Pedigree Matchmaker technology has been used to generate pedigree information. 2017 was the first phase of the three-year project.

The equipment chosen for this demonstration was a Sapien Technologies pedigreescan panel. The advantages of this system compared to the older Pedigree Matchmaker are as follows:

- Integrated panel – no external cables and data recorder
- Low battery usage – eliminates need for solar panels or frequent battery changes
- Bluetooth connectivity – allows data to be downloaded direct to a laptop without cables.
- The download software is free from the Sapien website.

## Jeff and Kate Stoney

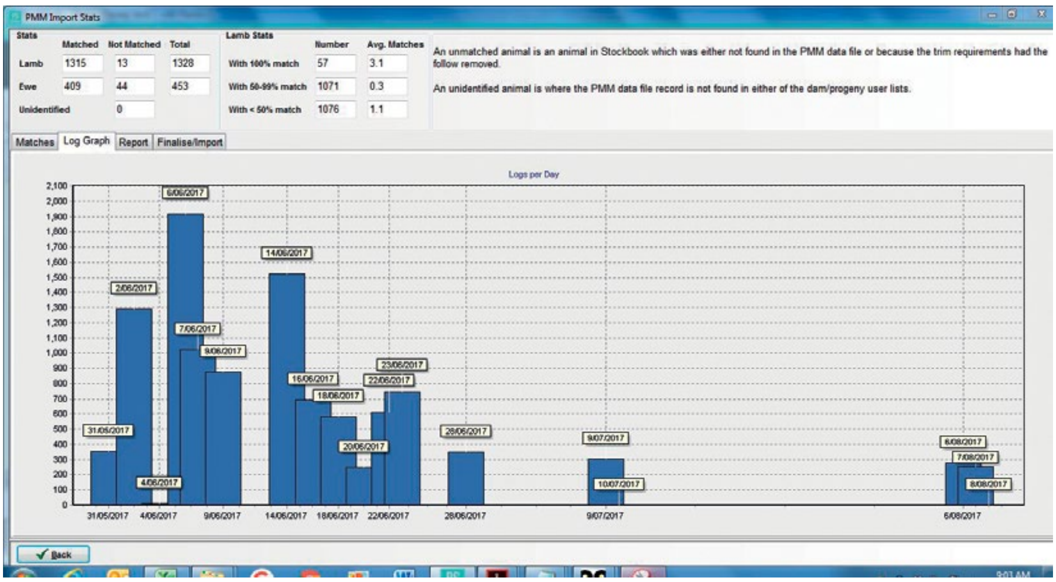
The first farmers to use the pedigreescan panel were Jeff and Kate Stoney from Gnowellen in WA. Their Merino ewes and lambs were given free access to a lick feeder in a large outer yard associated with the sheep handling facilities prior to installation of the pedigreescan unit. Although there was considerable feed available in the paddock, the sheep did use the feeder. The entry gateway was narrowed prior to the installation of the panel to make the sheep less afraid of accessing the yard once the panel was installed.

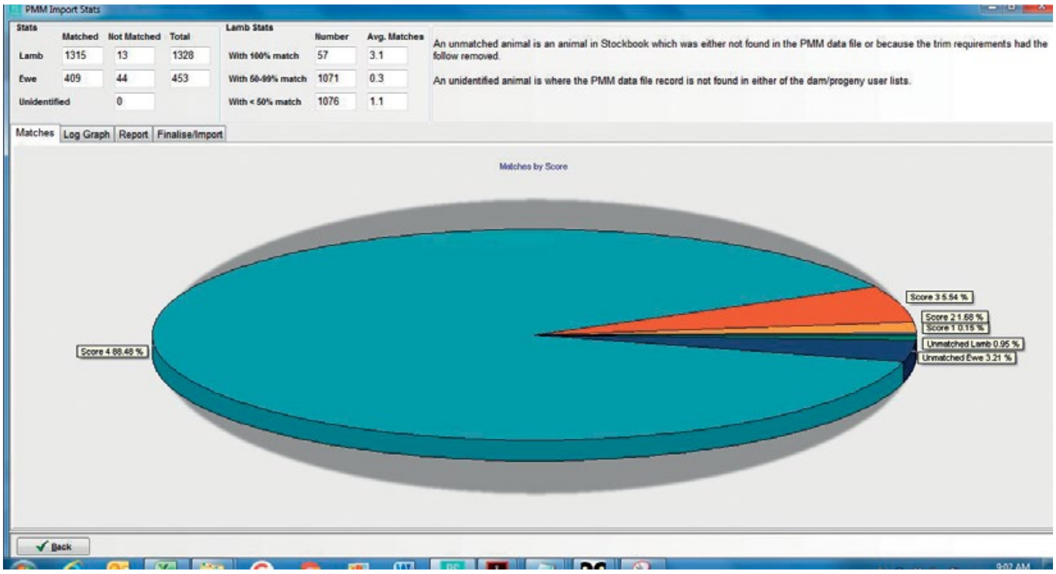
On the 31st May 2017, Jonathan England from AgInnovate and Kate Stoney set up the Sapien pedigreescan panel in the gateway to the yards already being used by the sheep to access the feeder. There was another set of gates in another part of the feeding yard, that we used to force the sheep into the yards, so that the only way out was through the pedigreescan setup.

The big problem we found with the setup was that once all of the sheep in the yards, the leader sheep that were first through the panel turned straight back around the corner and ended up next to the mob. As a result the decoy sheep disappeared from sight, and the sheep stopped walking through. Putting a wing fence up straight out from the corner of the yard alleviated the short term problem with sheep walking out. The fence was then taken down so that ewes and lambs wouldn't get separated on their way in, and as a result the wing effect was lost.

The Stoney's found that the sheep wouldn't go into the yard by themselves, so Kate pushed the sheep into the yard through the alternative entrance on a daily basis, and let them walk out by themselves. This did get tag reads by force, but as the data shows, the number of accurate reads was low.

Kate also felt that the beep emitted by the unit as each tag was read, scared the sheep. Stoneys went away and during that time, the battery on the unit went flat. When they returned, they found the sheep walking freely through the unit. One could then assume that they had become very familiar with the setup, however when the battery was changed, the beep from the unit once again became a disincentive for flow of sheep.



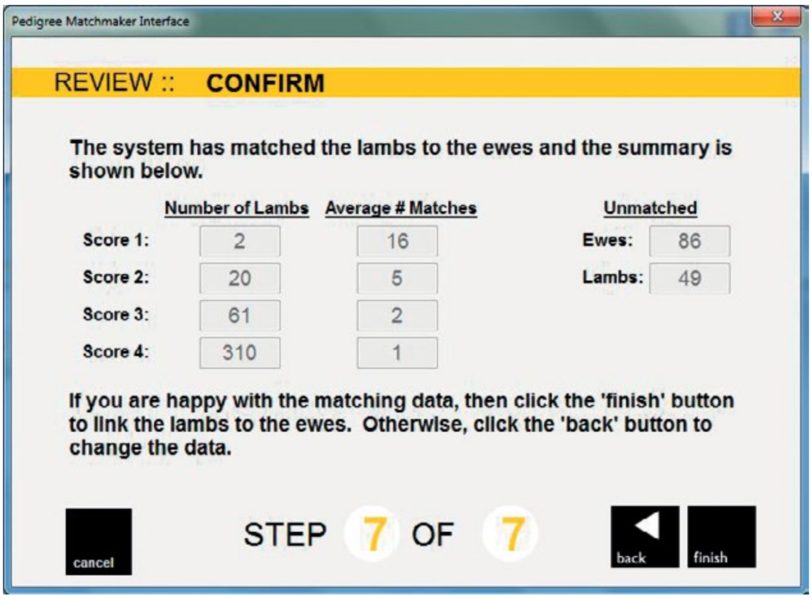



The daily log of tag reads from the Practical Systems Stockbook PMM function at Stoneys' is shown on page 16. It is easy to see the movements in and out, and the days when the battery went flat and/or when the sheep were not pushed in through the alternative gateway. It is important to get the setup right, have a large deep cycle battery, and potentially get the beep turned off.

Due to the low number of reads the sheep, and the disturbance within the mob when the sheep were "pushed" into the yard, there were not many matches.

The confusion within the mob caused lambs to be identified with low accuracy to a number of ewes. This can be seen reflected in the total number of lamb matches (1315) in the Stockbook summary above even though there were only 398 lambs in the mob. On average each lamb was associated with more than 3 ewes, albeit poorly.

Sapien Technologies koolcollect (kc) has a pedigree matchmaker analysis application, and the output from this agrees with the output from Stockbook (SB). This can be seen below.



- High reliability results have a good number of matches and a high match% or proportion score. As either of these decrease, so does the reliability score. Scores of Class 1 and 2 give accurate results, however with a careful visual analysis, some Class 3 sheep with either a high match% (proportion score) can be used, providing there are multiple reads. I would be reasonably happy with a score 3 lamb with 6 matches at 75%, where the majority of matches were with one ewe. Similarly 3 matches at 100% would be acceptable in this case, as obviously that lamb only matched with that ewe and on more occasions than could be random). Thirty five lambs from the mob met the criteria of Score 1, 2 or acceptable Score 3.

| Reliability | Number Matched | Matches | Match % |
|---|---|---|---|
| Class 1 | 2 | >10 | 100% |
| Class 2 | 7 | >5 | 100% |
| Class 2 | 4 | >5 | >75% |
| Class 2 | 8 | 4 | 100% |
| Class 2 | 4 | 4 | >75% |
| Class 3 | 10 | 3 | 100% |
| **Total Matched** | 35 | | |

## Andrew Slade

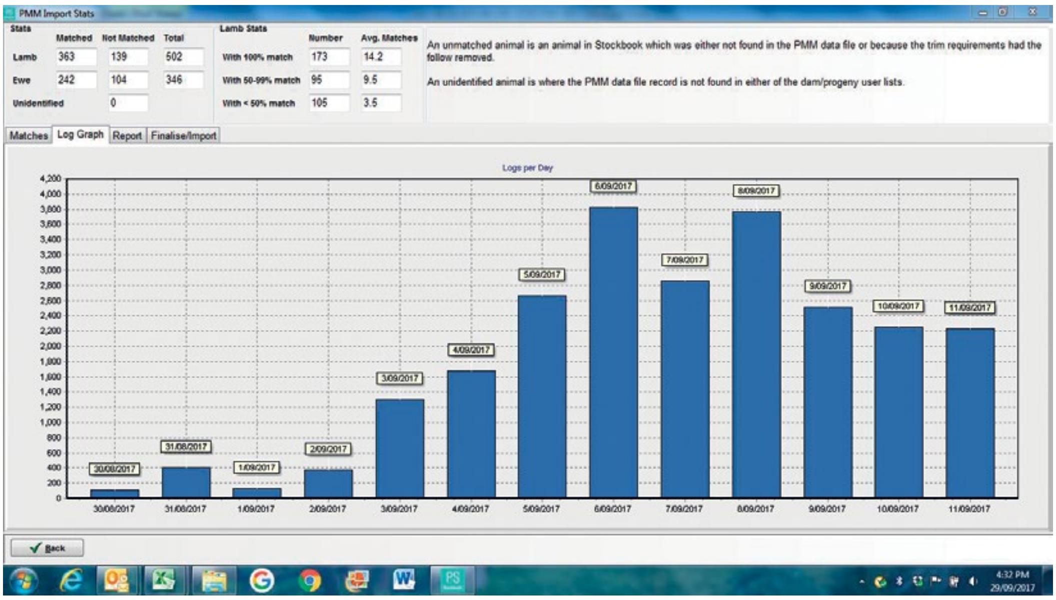
Andrew Slade's at Kendenup was the second location for the setup of the unit. He did not train his ewes for any period prior to setup on 30th August and ran it until 30th September.

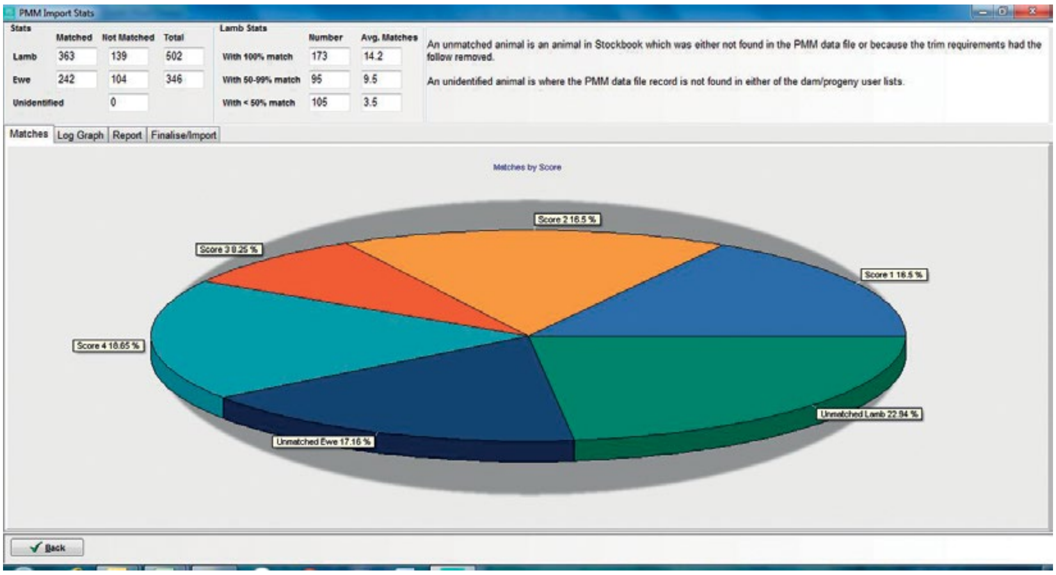
Andrew started with one group of 220 ewes and 266 lambs on 30/8 and added another group of 53 ewes and 72 lambs on 6th September, and a final group of 54 ewes and 61 lambs on the 9th, just two days prior to the completion of the use of the pedigreescan.

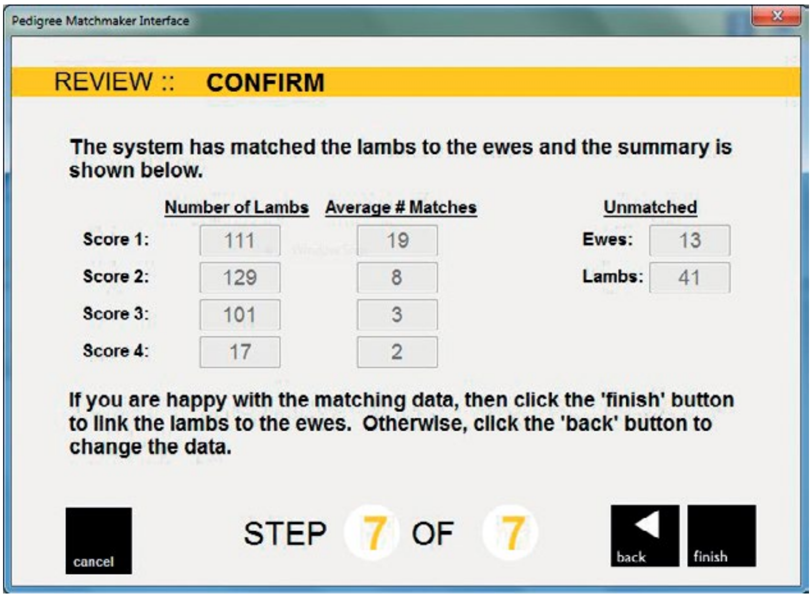
His composite ewes did not baulk at the sound of the unit, and used it as generally expected. The outputs from the Stockbook and koolcollect programs for the data collected are shown below.

There were 240 lambs that achieved match scores of 1 and 2. This is a great result with all but 18 of the 266 lambs in the first mob matched. There were also 169 lambs with matches of score 3 or 4, or completely unmatched. These are certainly from the second and third groups, which didn't have enough time to accumulate enough matches. With the late addition of mobs, it is not surprising that there were a significant number of low match scores. Of the 3 scores, there were an additional 3 lambs that had 3 matches with a reliability of 100% . There were an additional 11 lambs that had more than 5 matches each with a reliability of at least 70%.

Overall Andrew Slade's was a great result, and it would have been ideal to have a longer period of access to the pedigreescan unit for the second and third mobs.






### Recommendations at Stoneys':

1. Ewes and lambs are run in a smaller paddock
2. Less paddock feed is available to ensure that ewes require the use of a feeder to attract them through the pedigreescan unit.
3. The entry and exit is in a position where sheep exiting maintain the flow of decoy animals upon exit.
4. The beep associated with a tag read is disabled. This requires the data unit to be returned to Sapien for modification.

### Recommendations at Slades':

At Slades' it would be better to either mother up only one mob to improve the overall outcome or leave the additional mobs longer access to the unit.

# Can nil disturbance seeding systems overcome water repellence in non-wetting gravels and other soil health issues over time?

**John Blake, SCF**

Email address: john.blake@scfarmers.org.au
Phone number: (M) 0438 761 950

**Brad Wood, host farmer**

Email address: beauvalley@bigpond.com
Phone number: (M) 0427 514 069

## Key Points

- Three seeding systems, disc (slot), tyne and tyne-after-cultivation were tested over two seasons in a paddock with a long history of minimal soil disturbance. Soil water repellence, plant establishment and yield were compared.
- In the wet 2016 season, the effect of soil water repellence was minimal and soil disturbance caused by disc, tyne or tyne-after-cultivation did not significantly affect plant establishment or yield.
- In the dry 2017 season, plant establishment and yield of field peas was higher in the disc seeder treatment than the tyne or tyne-after-cultivation treatment.

## Introduction

Growers and agronomists have observed a reduction in non-wetting and increase in plant establishment where disc seeders (slot seeding) are used, rather than tyne seeders. These observations reflect trials by Dr. Margaret Roper in Munglinup demonstrating that by not disturbing the soil, old root pathways are preserved and act as a conduit for water infiltration through the bio pores. These soil water pathways seem to persist well into the next season but are destroyed by the soil disturbance typically caused by tyne seeders.

SCF partnered with South Coast NRM and the GRDC to validate these observations of non-wetting soil improvement, using a paddock belonging to the Wood family at Kendenup, that has been continuously cropped for the last 18 seasons using a disc seeding system. SCF proposed to evaluate long-term nil disturbance seeding systems by re-applying conventional tyne seeding systems across parts of the paddock and measuring the effects on soil condition and crop performance.

The long-term nature of this trial is important as there is a lack of long-term farming systems studies, especially in WA, with almost all trials being discontinued before reaching 10 or more years of recorded measurements.

## Trial Design

This trial tested three seeding treatments over two seasons, 2016 and 2017:

1. Nil disturbance – disc seeding
2. Tyne seeding- conventional one pass seeding
3. Maximum disturbance- scarifying the soil immediately before seeding with the tyne seeder

We then compared differences in soil water repellence, plant establishment and yield. Brad seeded canola in 2016 and field peas in 2017.

***Figure 1:*** *Jeremy Wood disc (slot) seeding plots of field peas on May 2017. Soil conditions were marginal. The local area was experiencing decile 1 rainfall conditions at seeding time.*

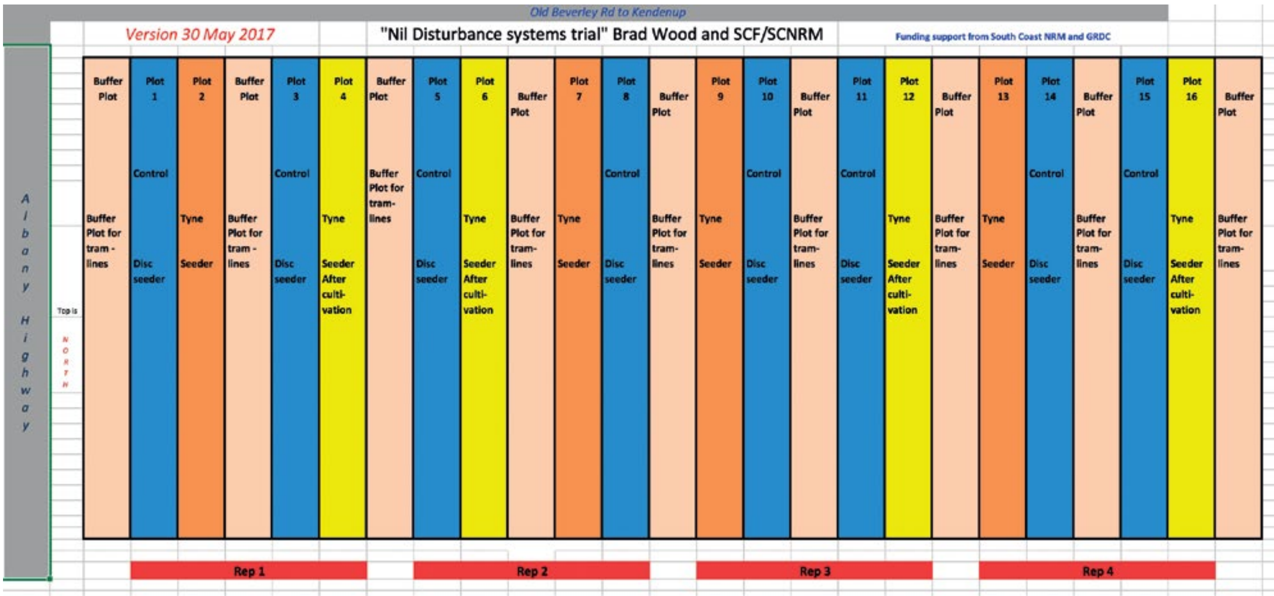



***Figure 2:*** *Diagram of the trial layout showing the three treatments plus the buffer plots which are used by the farmer to apply herbicides and fertilisers.*

The plots were 10m wide by 250m long. Brad Wood used his Daybreak single disk seeder to seed the "control" disc treatment. Another local farmer, Ben Oldfield, was contracted to seed the "tyne seeder" and "tyne after cultivation" treatments. Brad Wood used his scarifier to plough the soil to a depth of 15cm immediately prior to Ben seeding with the tyne seeder for the "tyne after cultivation" treatment. All seeding treatments were completed on the same day; in 2016 canola was sown on May 13th and in 2017 field peas were sown on 1st June.

Buffer plots were included to allow inputs, such as fertilizer and herbicides, to be applied to the plots without wheel damage occurring in the treatment plots themselves. The Wood family are controlled traffic farmers (CTF) and this trial design allows them to maintain their tramlines without compromising the trial results.

After seeding all trial maintenance was performed by the farmer who applied the same inputs as the rest of the paddock. SCF conducted assessments on plant numbers established after seeding and yield at harvest using a weigh trailer.

Glenn McDonald (DPRID soil researcher) conducted soil testing over the site, including top soil water repellence measured using the Molarity of Ethanol Droplet (MED) test. The site averaged <2.5 for this test indicating severely non-wetting soils which is typical of the Forest Gravels in the Southern region.

The trial layout was determined after soil testing and mapping the paddock for high, medium and low productivity zones. These were based on yield map history, biomass imagery, targeted soil tests and soil mapping. The mapping was completed in Feb-March 2016 and Feb-March 2017.

## Results

The trial was challenged in the first year (2016) with the soil water levels well above the field capacity of the Forest Gravel soil for three months of the growing season (Decile 9). Tillage treatments exacerbated the surface waterlogging, but the disc sown treatment was significantly more trafficable. The benefit of a long-term trial is, of course, being able to compare treatments over the full range of seasons. The second growing season (2017) was a stark contrast, with a very dry start (Decile 1) and plant establishment occurred under marginal soil moisture conditions. Plant establishment of the field peas was reduced in all of the tillage treatments (see results below). The drying topsoil in the seedbed was exacerbated by the tyne treatments in comparison to the disc seeding.

### Plant count results

In the 2016 season there were good rains following seeding of canola on May 13th, which meant the expression of non-wetting, in this typical Forest Gravel, was minimal. The start of the 2017 was the other extreme with field peas sown into marginal moisture conditions in early June.

| 2016: Canola | |
|---|---|
| Nil disturbance treatment | 34 plants/m$^2$ |
| Tyne seeder treatment | 41 plants/m$^2$ |
| Tillage to 15cm soil depth immediately prior to tyne seeding | 40 plants/m$^2$ |

| 2017: Canola | |
|---|---|
| Nil disturbance treatment | 25 plants/m$^2$ |
| Tyne seeder treatment | 20 plants/m$^2$ |
| Tillage to 15cm soil depth immediately prior to tyne seeding | 17 plants/m$^2$ |

***Figure 3:*** *Field peas on the 20th August 2017. There was improved plant establishment and biomass in the disc seeding treatment (on the right, averaging 25 plants/m$^2$) compared to tyne treatments (on the left averaging 20 plants/m$^2$).*

## Harvest results

In 2016 there were no significant differences between the treatments (as marked by*) which was not an unexpected result due to a combination of factors (see below Table 1):

i. Treatments have longer term effects and are not expected to impact on crop performance in the initial years of the study

ii. Non-wetting in 2016 was not an issue, even in April, with a decile 10+ first half of the growing season.

iii. Canola is an indeterminate plant type and can compensate for lower plant densities. There were more than enough canola plants for its potential yield to be fulfilled.

In 2017 the yield of field peas in the disc seeding treatment was significantly higher (as marked by^) than the other treatments. This reflected the higher plant establishment in the disc seeder treatment in a tough, decile 1 season.

With just two seasons of results there are already differences measured in the seeding/disturbance treatments. The coming seasons with cereal and legume crops plus (hopefully) more moderate rainfall will provide a better understanding of nil disturbance seeding systems in Forest Gravel soils.


## Acknowledgements:

South Coast NRM, Brad Wood and the Wood family – Beau Valley Farms, Dr Margaret Roper – CSIRO researcher, Glenn McDonald – Soil researcher, Chris Gazey –Soil scientist, Jeremy Lemon – Senior DPIRD Agronomist, Alice Butler – DPIRD Development Officer Grains R & D


**Table 1:** Table of the treatment average yields for 2016 (canola, decile 10) and 2017 (field peas, decile 1) (each having four replicates).

| Year | Seeding system | Slot seeder (Disc) | Tyne seeder | Tyne seeder post cultivation |
|---|---|---|---|---|
| **2016** | Canola Kg/Ha | 1959* | 1956* | 2034* |
| **2017** | Field peas Kg/Ha | 1490^ | 1150 | 1080 |

# Deep ripping results over several sites and seasons are not always clear

**Jeremy Lemon, DPIRD Albany, Josh Goad, Kojaneerup, Reece Curwen South Stirling and many regional DPIRD and grower group staff**

## Kojaneerup

- The deep ripping site at Kojaneerup showed no consistent canola yield response in 2017
- Two consecutive frosts and extreme rainfall in late September reduced yield potential
- Small differences in yield were not consistent within yield zones nor replicates.

Deep ripping below any compacted layers on deep sands has reliably increased grain yields in most situations. This trial established in 2014 showed good yield responses in a barley crop in 2016, the year deeper ripping was implemented.

The trial site is typical south coast deep pale sand over gravel and clay at 50 to 120cm depth. The site has been clayed and limed with incorporation in both the years of application. The site has a seasonal water table under much of the lower flat area and a sandy rise at the east end. A shallow ripping treatment to 35cm was applied to alternate 12m wide plots the 700m length of the site in 2014. Randomised and replicated deeper ripping treatments to 120 and 70cm were done over the original site in February and May respectively in 2016.

Mako canola was sown over the site on 24 April 2017 and subsequent fertiliser, herbicide and fungicide applications were all part of normal paddock operations. The trial was direct harvested in mid November with yield data extracted for analysis from the yield map. Care was taken to harvest all plots within alternate replicates in the same direction to reduce the risk of harvest direction influencing mapped yield.

Canola yields in 2017 were reduced by waterlogging and frost with a site average yield of 1.7t/ha. August rainfall was above average followed by an exceptional 24 September event of over 140mm (Figure 1). Soil pits in deep sand at the west end of the trial site had shallow water indicating a perched water table at about 30-40cm during August and early September, the pits filled with water at the end of September for 2-3 weeks. The area experienced frost on 12, 13 and 23 September.

In previous seasons yield zones and ripping responses were evident over most of the site. However, in 2017there was little yield zone and no consistent treatment differences (Table 1). While plots ripped at 120cm had on average higher yields than those ripped at 70cm, these responses are not statistically significant (Figures 2a and 2b; Table 1).

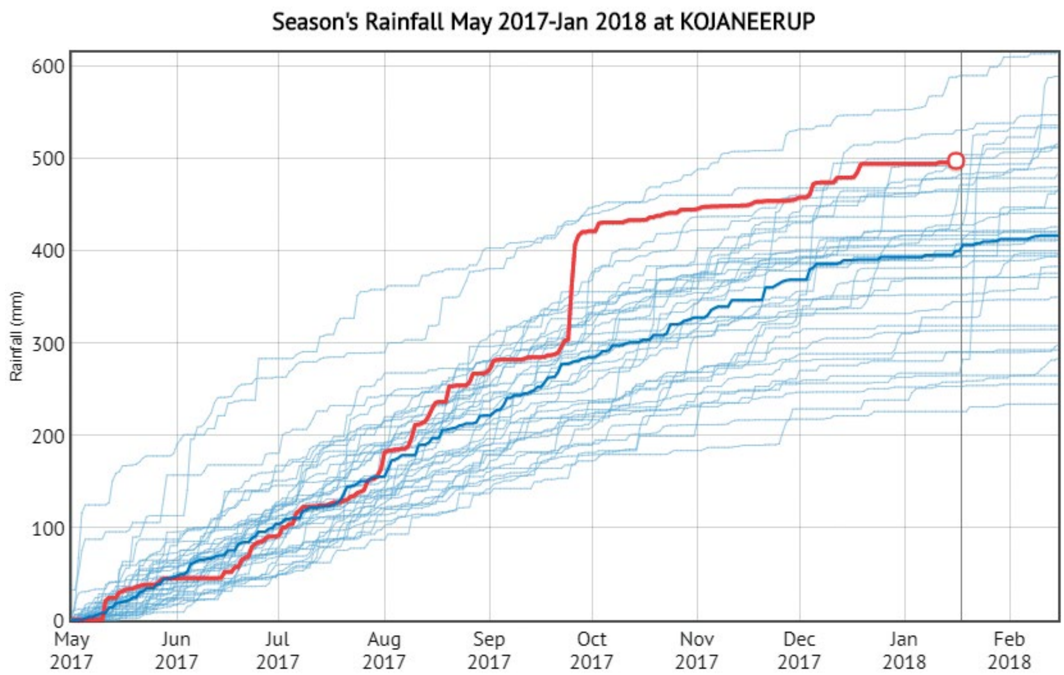
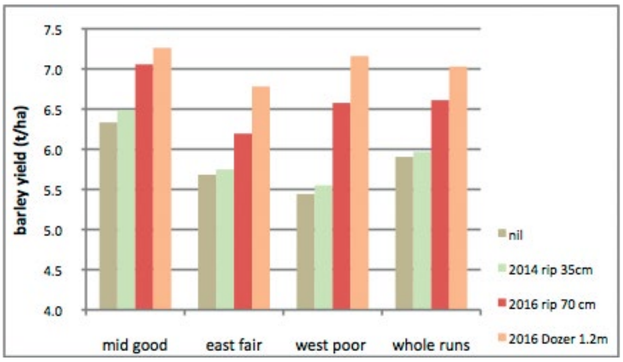



***Figure 1:*** *May 2017 to January 2018 rainfall at Kojaneerup from CliMate web app.*

**Table 1:** 2017 canola grain yield from deep ripping treatments at Kojaneerup. Zones are based on yields mapping between 2014 and 2016.

| Yield zones/ treatment | Whole plots | W fair | W poor | E fair | Centre good |
|---|---|---|---|---|---|
| nil | 1.76 | 1.86 | 1.76 | 1.64 | 1.86 |
| 2014 rip 35cm | 1.75 | 1.85 | 1.73 | 1.74 | 1.69 |
| 2016 rip 70cm | 1.76 | 1.48 | 1.80 | 1.68 | 1.84 |
| 2016 rip 120cm | 1.84 | 2.03 | 1.67 | 1.82 | 1.93 |
| F prob | 0.479 | 0.102 | 0.353 | 0.312 | 0.145 |
| lsd 10% | 0.067 | 0.29 | 0.282ns | 0.187ns | 0.163 |
| lsd 5% | 0.085 ns | 0.365 | 0.355ns | 0.236ns | 0.206 |



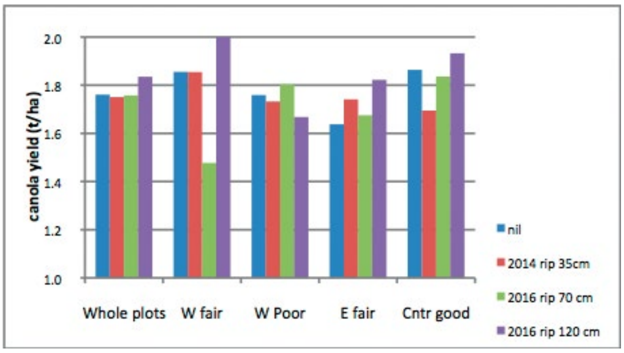




***Figure 2a and 2b:** 2016 barley and 2017 canola grain yields from deep ripping treatments at Kojaneerup. Whole plot length and selected yield zones are presented.*

Penetrometer measurements in early September 2017 showed residual soil loosening to depth. The nil ripping treatment shows a typical compaction peak at 35-40cm of 4.5MPa, well above a root stopping strength of about 2.5 to 3.0MPa. The depth of compacted layer is also typical of cropped deep sands along the south coast extending from 25 to 60cm (Figure 3). Compaction has been effectively reduced by the Helipper working at 75cm depth and even more effectively softened by the 120cm dozer ripping. The dozer ripping has made soil looser below 45cm than the nearby bush (Figure 3).

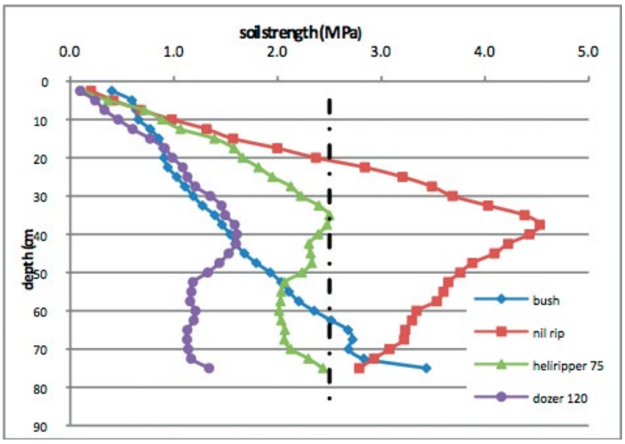



***Figure 3:** Soil strength profiles measured in September 2017 compared with uncleared adjacent bush. Dozer ripping was in Feb 2016 and Helipper May 2016.*

Measurements will continue on this site to explore the longevity of the deep ripping response.

## Bloxidge Road

The east end of Bloxidge Road site is similar to Kojaneerup with deep sand over gravel and clay at 80-100cm. This site has a very different pH with acid sand to depth compared to a slightly acid to neutral profile at Kojaneerup. There is also a shallow gravelly sand section at the west end to look at the same treatments on a different soil type. At the Bloxidge road site deep sand response was not as big as Kojaneerup, probably due to the acid soil profile.

At Bloxidge road, yield was measured by weigh trailer and for the 2017 canola, only the gravel end was measured. At this site relative yields of the five strips were very similar to 2016 barley showing a continued response to ripping with 35cm being better than 70cm depth (Figures 4a and 4b). Results from this demonstration are not replicated, treat results with caution.

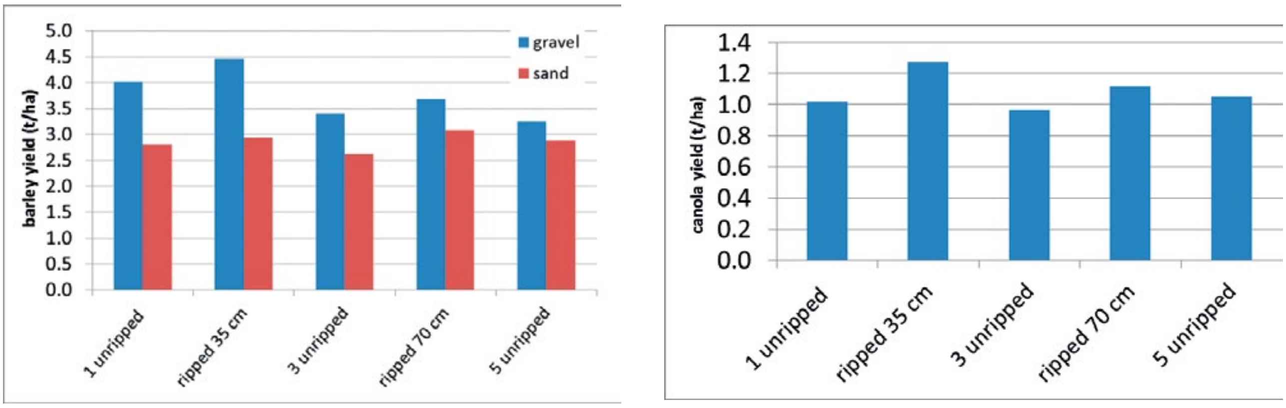



***Figure 4a and 4b:*** *2016 barley and 2017 canola yield responses to ripping with a Helripper to 35 and 70cm. Only the gravelly laterite part was measured at harvest in 2017.*

## Other southern sites

Several other sites between Esperance and West of Kojonup have ripping treatments on a variety of soils. Results of these trials are summarised in Table 2. Using these results to predict responses on soils other than deep sands is difficult. Also conducting replicated trials with farm scale machinery introduces soil variation across most sites making confident conclusions at smaller responses challenging to determine, but what the results suggest are:

- Only deep compacted sands are likely to have consistent responses.
- We can't always pick a consistent winning treatment on other soils, 35cm or deeper and use of inclusion plates
- There is often seasonal variation in response even at one site
- Responses do continue in CTF systems (so far)
- Amendments (lime, gypsum, chook manure) can increase yields either 1) increasing nil rip yields and there is no further response to ripping or 2) amendment enhancing ripping response
- Best responses on gravel and clay to shallow (30-40 cm) ripping, deep sand needs deeper ripping to get below compaction layer
- Response mechanisms depend on soil type and season – non wetting, subsoil compaction, or mineralisation of organic nitrogen by cultivation

Thanks to participating growers, GRDC investment in Subsoils and Building regional capacity projects.

**Table 2:** Summary of southern deep ripping site responses 2015-2017

| season | site | Coomalbidgup sand/gravel | Munglinup sand/gravel | Kojaneerup 70-120cm sand | S Stirling 80-100cm sand | S Stirling sandy gravel/laterite | Ongerup 10-20cm loam d'plex | Muradup gravel 40cm duplex | Broomehill sandy loam duplex |
|---|---|---|---|---|---|---|---|---|---|
| 2015 | crop | no trial | wheat | canola | no trial | no trial | wheat | no trial | wheat |
| | unripped | | 2.87 3.57 | 1.68 | | | 3.05 | | 1.5 |
| | ripped | | 3.28 4.16 | 1.88 | | | 3.53 | | 3.15 |
| | YR range | | 0.4-0.6 | 0.2-0.3 | | | 0.5-0.8 | | 0.9-1.5 |
| | % YR | | 12% | 15% | | | 17% | | questionable |
| | highest yield for least input | | Best response to 60 cm and slotting. Lime increased yield | 45cm ripping best. 35cm ripping ineffective. Unreplicated | | | 30cm best, not consistent among TD treats. No response in chook manure block. | | 50cm and slotting best. Variable site with questionable conclusions |
| 2016 | crop | wheat | barley | barley | barley | barley | barley | barley | barley |
| | unripped | 5.5 | 2.2 | 5.9 | 2.80 | 3.5 | 2.77 | 4.3 | 2.7 |
| | ripped | 6.0 | 2.7 | 7.03 | 3.09 | 3.7 | 3.85 | 4.63 | 3.1 |
| | YR range | 0.0-0.7 | 0.9 | 1.1-1.7 | 0.29 | 0.2 | 0.4-1.0 | 0.3 | 0.0-0.4 |
| | % YR | 9% | 23% | 19% | 10% | 6% | 35% | 7% | 9% |
| | comment | Best yield 70cm wings increased response, slotting no further response | Lime increased yield. Deeper ripping and inclusion increased yield | Increasing yield with depth to 120 cm, all yield zones | Unreplicated, variable control yields | Unreplicated, variable control yields | Chook manure increased yields. Slotting and 40cm ripping best result | Best yield at 35cm, deeper not as good. Discs at 15cm just as good | Mixed result with slotting. Negative result on chook manure block |
| 2017 | crop | canola | canola | canola | canola | canola | canola | canola | lupins |
| | unripped | 2.0 | 1.5 | 1.7 | not harvested | 1.02 | 0.76 | nothing useful | no results |
| | ripped | 2.2 | 1.8 | 1.8 | | 1.2 | 0.96 | | |
| | YR range | 0.1-.03 | 0.3 | 0.0-0.1 | | 0.1-0.3 | 0.2 | | |
| | % YR | 10% | 20% | inconsistent | | 17% | 25% | | |
| | highest yield for least input | Best yield 70cm. Wings increased response, slotting no further response | Lime increased yields, slotting ns. Best yield 30cm | Waterlogging and frost, no consistent responses. 120cm OK on whole plots | | Best response 35cm. Unreplicated. Consistent control yield. | Chook manure increased yields. Part frosted, best yield 30cm rip. | | |

# Effective baiting options for the control of conical snails in the Albany port zone

**Kathi McDonald, SCF, and Svetlana Micic, DPIRD**

## Project objectives

It is expected that the main outcome of this project will be that growers will have easy access to information on the most effective bait options for conical snails in the Albany port zone for their farming system.

Our objective is to work out what are the most important factors affecting bait efficacy on small pointed snails. Is it rainfastness, bait formulation active in the baits or the rate applied per hectare? Currently, this is confused by various formulations of various sized baits with differing rainfastness and reported palatability.

The project reports field data only for the 2017 season. Different results may be achieved under different environmental conditions, especially given that snail activity is highly dependent upon environmental conditions.

## Methodology

### Grower baiting practices survey

In consultation with the other grower groups in the Albany and Esperance port zones, and CBH and DAFWA, a survey of grower baiting practices was designed and distributed to over 200 growers via the online Survey Monkey program, and 'hard copy' paper versions completed at Spring Field days across the region in September and October 2016. Surveys were distributed to all growers attending Spring Field days across the South Coast, and all members from the grower groups covering the southern Agricultural zone were invited to complete the survey on-line. There was no specific selection of participants apart from that they were all likely to be members of a grower group. Responses from 'hard copy' surveys were manually entered in to Survey Monkey, and all results analysed utilising the Survey Monkey analysis tool. A summary of results was written up and is included as an addendum to this report (Appendix A).

### Caged baiting trials

For each of the 3 caged bait trials, cages were placed in a randomised block design in a shadehouse, with 4 replicates.

Small conical snails were collected in the field. Only those of uniform size, greater than 0.5mm, and found on the top of grass stalks to ensure they were actively moving were collected.

Snails and baits (applied at label rates) were placed in to cages containing a substrate of sand and peat, with 50g of stubble placed on the surface. The substrate was at field capacity and up to 10 mL of water was added daily to ensure substrate was moist enough to initiate snail movement. Temperatures in the enclosures ranged from 10°C to 32°C. For a list of treatments for each of the caged trials, please see Appendix B.

Counts of live and dead snails were conducted 14 days later.

Results were analysed using ANOVA that incorporated the factorial treatment structure and were reviewed by a statistician.

A letter was sent to all commercial registrants of snail bait products requesting permission to include their product and publish results in trial 3. Only those products readily available and with the registrant's permission were included. A copy of the letter is included in Appendix C.

### Field trials

Three sites were chosen in paddocks with a known history of snail infestation, at different locations on different soil types – forest gravel, sandplain and Kalgan loam (see location table below). All sites were set up in the same way, and all were sown by the host farmers to canola. Monthly rainfall data from nearby weather stations was collected over the duration of the trial and is presented with the results.

Trials were pegged in one bank, with 3 replicates. Three treatments were applied at each site – nil baiting, rainfast bait and a non-rainfast bait. All baits were applied at label recommended rates. Each of these treatments was applied at the following times;

- Treatments applied post-harvest
- Treatments applied pre-seeding, at time of first weed control (Autumn)
- Treatments applied post-seeding, pre-emergence
- Treatments applied at crop germination

Host farmers applied all herbicides, fertilisers etc as per rest of paddock

Two weeks after the final bait application, plant damage assessments (% of cotyledon and true leaves damaged by snails) and counts of live and dead snails in 4 x $0.1m^2$ quadrats per plot were recorded.

Results were analysed in GENSTAT ANOVA with a split plot design and were reviewed by a statistician.

### Field cage trials – snail mortality

Twenty four large snail proof cages (plastic tubs with the ends cut out) were dug in to the ground along the fence line adjacent to the field trial at Kendenup in the late summer. Snails were collected and placed along with bait treatments in the cages at the same time as treatments were applied in the adjacent field trial. There were 3 treatments x 8 replicates for each time of application. All baits were applied at label recommended rates. Snails from half the reps were collected 20 days after and were placed on moistened filter paper. Active live snails were counted 24 hours later. The remaining 4 reps were harvested 24 hours prior to the next time of application, with snails collected and placed on moistened filter paper, and counts of active live snails taken 24 hours later.

Results were analysed in GENSTAT ANOVA with a split plot design and were reviewed by a statistician.

## Results

### Bait practices grower survey

Please refer to the attached report, *'Snail and slug baiting practices grower survey – summary of results'* for complete results for the survey. The main points from the report are listed below.

- Small pointed conical snails are an increasing problem in the Albany and Esperance port zones, with almost half of the survey respondents indicating snail presence on their farms. Almost 60% of those with presence reported a level of infestation that required a baiting program.
- Most growers are only recently becoming aware of the problem, although some have recognised snails as an issue for over five years.
- Canola and barley were the crops reported as most affected by snails (and canola by slugs).
- Snails were found across all soil types on respondent's farms, most commonly occurring on sandplain and duplex soils (these are also the most common soil types across the south coast). Slugs were predominantly recorded on clay and, to a lesser extent, duplex soils.
- Of those respondents that had applied baits in the past five years, most applied baits only once in the year, although 40% did apply baits twice. Most baits were applied in the post-seeding period, but some did also apply pre-seeding. Generally, growers that applied baits twice a year applied them pre- and then post-seeding.
- The level of infestation is the greatest consideration for respondents on whether to apply baits.
- Metaldehyde baits were by far the most commonly applied. These are also the most widely available with the largest range.
- Baits are mostly applied at recommended label rates, and are applied via spreader (baits alone). Some application via spreader (with fertiliser) or plane (aerial) was also reported.
- Respondents were mixed in whether they considered baits an effective control for snails, with almost 60% being unsure. Baits were considered an effective control for slugs by most.
- Apart from baiting, burning (of windrows and whole paddock) and good farm hygiene/biosecurity were considered as control measures.

Delivery to CBH of snail contaminated grain does not appear to have been an issue for most respondents, however almost 15% did record that they had some difficulty in the past five years.

### Caged bait trials

In the caged trials, baits caused significantly ($p<0.001$) more snails to die than the control (nil baits) (Figures 1 and 2). However, there were no significant differences in how well the baits worked. Baits with the active ingredients metaldehyde, methiocarb and iron all caused similar mortalities to small conical snails (Figure 1).

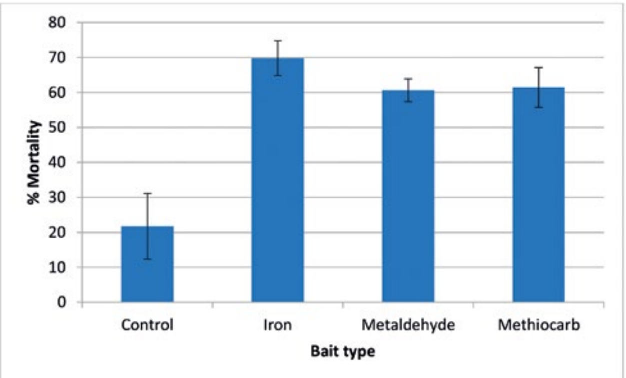



***Figure 1:*** *Percentage (%) of dead snails at Day 14 after being exposed to different bait types. Error bars represent the standard error of the mean.*

- Metaldehyde baits with a higher percentage of active ingredient did not cause more mortality than baits with less active (Figure 2).

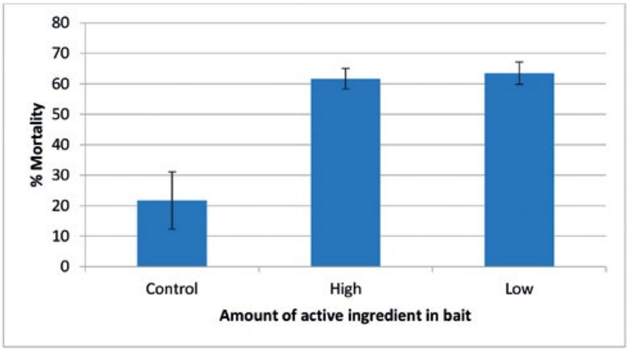



***Figure 2:*** *Percentage (%) of dead snails at Day 14 after being exposed to baits with the same active ingredient but varying amounts of active ingredient in each bait. Error bars represent the standard error of the mean.*

However, the number of bait points was a significant ($p<0.001$) factor in snail mortality. The more bait points there were, the more snails were killed (Figure 3).

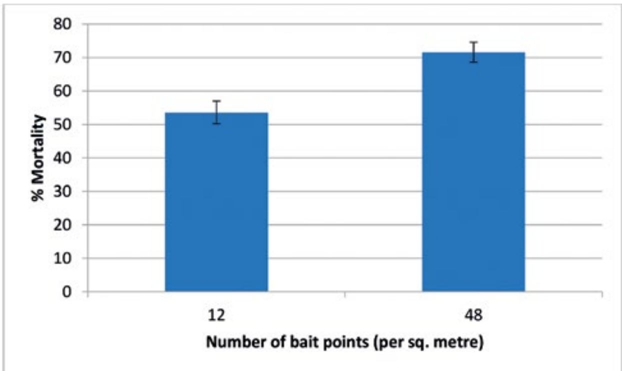



***Figure 3:*** *Percentage (%) of dead snails at Day 14 after being exposed to baits with either 12 or 48 bait points per square metre. Error bars represent the standard error of the mean.*

Rainfast and non-rainfast baits caused similar mortalities to small conical snails (Figure 4).

However, by Day 14, there was a difference in the structures of the baits. Non-rainfast baits had begun to degrade and were no longer shaped as a pellet, whereas rainfast baits still held their integrity as a pellet.

Analysis of photographs taken at Days 7 and 14, showed that over 80% of snails had not moved in baited enclosures, whereas 100% of snails had moved in the control. This indicates that by Day 7 snail death had already occurred in baited treatments.

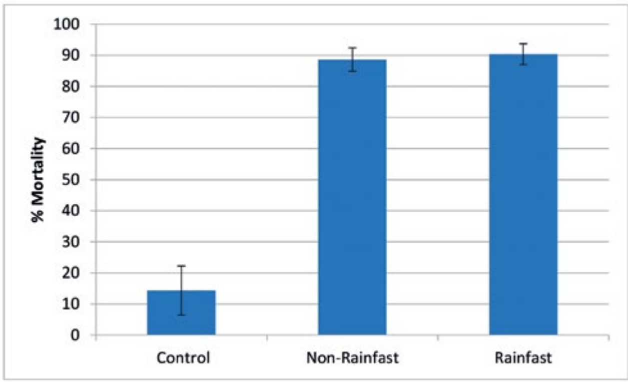



***Figure 4:*** *Percentage (%) of mortality in snails at Day 14 after being exposed to rainfast or non-rainfast baits. Error bars represent the standard error of the mean.*

Metaldehyde based baits caused similar mortalities to snails as iron based baits. There was no significant difference ($p=0.178$) between these formulations.

When all bait types were grouped together, metaldehyde and iron based baits caused similar mortalities in snails and were not significantly different ($p=0.164$).

Bait formulations containing iron caused similar mortalities in snails so were not significantly ($p=0.679$) different.

However, different bait types containing metaldehyde were found to be significantly ($p=0.038$) different in the number of snails killed (Figure 5) when compared to the control.

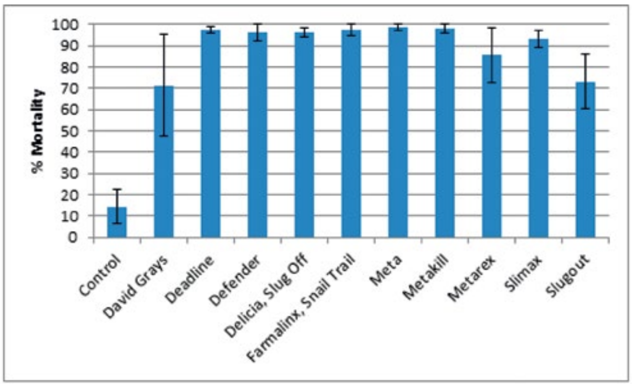



***Figure 5:*** *Percentage (%) of mortality in snails at Day 14 after being exposed to different metaldehyde based baits. Error bars represent the standard error of the mean.*

The amount of active ingredient in the baits does not explain the differences above as baits with the lowest amount of active ingredient, eg Meta contains 15 gai/kg, caused 98% mortality to snails in this trial.

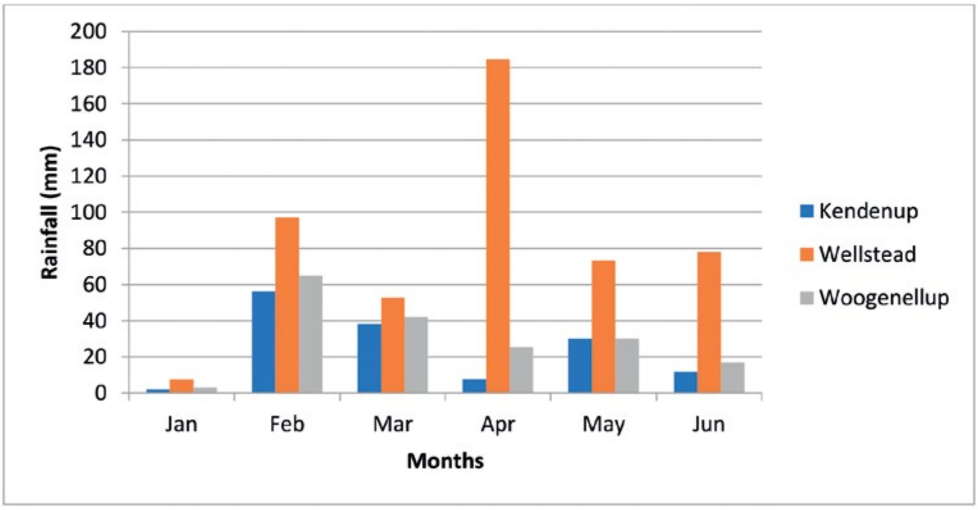



***Figure 6:*** *Monthly rainfall totals for weather stations located near each of the three trial sites.*

## Field trials

Monthly rainfall data was collected from nearby weather stations for each trial site and is presented below. Wellstead recorded consistently higher rainfall over the duration of the trial than either Woogenellup or Kendenup.

It was not possible to monitor the number of live snails at each site, as snails moved between plots. A single snail count was conducted at the end of the trial at each site. Different numbers of live snails were present over the three sites, Woogenellup had on average 149 snails; Wellstead 159 snails and Kendenup 56 snails per square metre.

Statistical analysis of each site separately did not show a significant difference in the number of snails between treatments or amount of damage between plots.

The Kendenup trial site had low snail numbers and very low levels of crop damage were assessed as a result.

The Wellstead site did show a significant interaction in the treatments. The interaction reflects that post-emergence there were significantly ($P = 0.017$) lower snail numbers as a result of bait treatments (Table 1).

**Table 1:** Average snail numbers at Wellstead for all plots counted 14 days after final bait application.

| Time of bait application | Control | Non-rainfast bait | Rainfast bait |
|---|---|---|---|
| **Post-harvest** | 25.0 | 42.5 | 51.7 |
| **Pre-seeding** | 12.5 | 24.2 | 51.7 |
| **Pre-emergent** | 44.2 | 33.3 | 6.7 |
| **Post-emergent** | 87.5 | 8.3 | 10.0 |

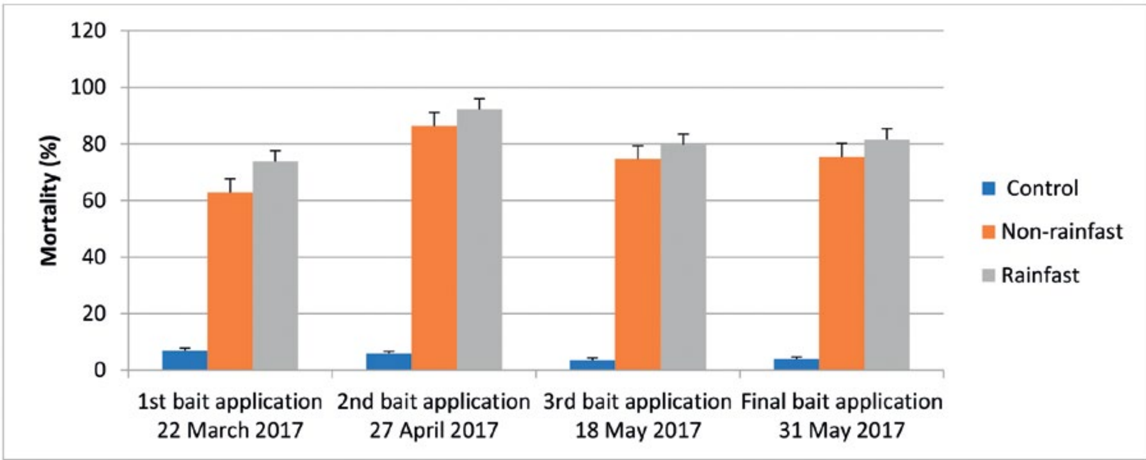



***Figure 7:*** *Percentage mortality in small pointed snails exposed to baits after 4 different times of baiting. Error bars represent standard errors.*

### Caged field trial – snail mortality

The timing of assessments of mortality of small pointed snails at 20 days was not significantly different to that of mortality assessed at 20+ days (P>0.05). This means that within 20 days snails that were going to consume the baits did so. Consequently, there was only one time of assessment of mortality of snails exposed to baits at the last baiting time.

Baits applied in April caused more mortality than baits applied at any other time (Figure 7, see previous page). In this case, there was also a difference between the two baits, the rainfast bait caused significantly (P=0.015) more mortality in snails than the non-rainfast bait.

## Discussion of Results

The grower survey on baiting practices highlighted the increasing spread and impact of snails and slugs to growers in the southern agricultural regions of WA. While the findings also indicated that the majority of growers with a snail problem did engage in a baiting program, 60% of these were unsure as to the effectiveness of baits to control small conical snails. This project investigated the effectiveness of a range of baits and baiting strategies in the glasshouse and in the field across three different soil types.

The caged trials in the glasshouse showed that there was no difference in snail mortality from different bait formulations or amount of active ingredient. The main influence on snail mortality was the number of bait points per square metre – the more bait points the higher the snail kill. Snails did not appear to be attracted to particular baits, but only randomly came across them. Snails fed on all baits they came across. These results highlight the importance of having properly calibrated spreaders and achieving an even spread of baits across the paddock to increase the chances of snails coming across the baits and feeding upon them.

The field trials compared a non-rainfast bait with a rainfast bait, applied at four different times – post harvest, pre-seeding, pre-emergence, and post-emergence, across three different soil types – forest gravel, south coast sandplain and Kalgan loam. Despite having a paddock history of high snail numbers and crop loss due to snail damage (as indicated by the host farmer, and the main reason this site was selected) the Kendenup site had over all low snail numbers. It is possible that because of the generally dry conditions experienced at the site during the trial (Figure 6) snails were not actively moving and feeding and so were not visible. This fact highlights the importance of projects continuing over multiple seasons to ensure results take in to account seasonal variation in real world situations.

The remaining sites showed significantly increased snail numbers on control plots compared to baited treatments. All baiting treatments were effective in reducing snail numbers. There were no differences observed between the two bait types in the field, however there was a difference between bait timing, with less snail numbers found in plots baited after seeding.

Results from Wellstead did show a significant interaction between time of applications and bait treatments. There was no difference in snail numbers at the end of the trial between the two bait treatments for the two earliest times of application. This could possibly be due to the act of seeding burying any remaining baits on the plots and making them unavailable to snails that moved in to the area post-seeding. Snail numbers were lower for the rainfast baits compared to the non-rainfast baits for the pre-emergent time of application. This occurred in April when the site experienced high rainfall (figure 6) and non-rainfast baits applied at this time may have been compromised.

Results from the forest gravel field site at Kendenup were not included due to low snail numbers. Snails had been observed, though not counted, actively moving in greater numbers at this site earlier in the season (March). While receiving some good early rains in summer and early March, the site had not received significant further rain and was very dry over the trial period. It may be that snails that were previously actively moving at the site had returned to a dormant state due to the dry conditions and simply were not feeding, on either baits or plants. Despite a similar rainfall pattern (Figure 6) the site at Woogenellup did have high snail numbers. This site had significant quantities of stubble and trash retention, and the soil under this was noticed to be damp, possibly providing the snails with moist refuges to continue their life cycle despite the lack of rain. Mating and egg laying was observed at the time of final assessment (mid-May) at Woogenellup.

Baits applied in April in the field cages caused more snail mortality than at any other time. It may be that this coincided with a time that snails were most active and there were little alternative feed sources to 'distract' snails from the baits.

To minimise crop damage, baits need to be applied close to the time of germination, when snails are actively moving and feeding. Previous studies have found that cultural activities such as windrow or paddock burning can also be effective at controlling snail numbers but are only appropriate on heavier soil types that are not liable to be subject to wind erosion.

Further research investigating the implications of multiple versus single baiting options in a season, and the resulting impact on snail populations at the end of the season (at harvest) as well as prevention of damage to emerging crops at the beginning of the season, would better enable growers to make decisions on the most appropriate baiting strategies for their farm.

## Conclusion

Small pointed conical snails are becoming an increasing issue in the Albany and Esperance port zones. Snails were reported across all soil types with canola and barley the crops most commonly impacted by snail activity.

Growers commonly bait once a year, post-seeding. For those that bait twice a year, baits are generally applied pre- and then post-seeding. Metaldehyde baits are the most commonly used bait type, generally applied via a spreader, baits alone, or sometimes mixed with fertiliser. A small amount of aerial application was reported.

Despite many of the grower respondents to the survey engaging in a baiting program, almost 60% were unsure as to its effectiveness in controlling small pointed conical snails.

Caged trials showed that there is no difference in the efficacy of a rainfast versus non-rainfast bait. However, the trials did suggest that non-rainfast baits lose their integrity after 14 days in wet conditions.

All active ingredients cause mortality to snails. However, there is more product choice in the metaldehyde range. In this range of products, Meta is one of the least expensive products on the market ($4/ha) and is non-rainfast; Metakill is rainfast, is more expensive ($8/ha) and contains 35 gai/kg more than Meta.

However, the caged trials show that the amount of active ingredient per bait does not affect mortality in snails.

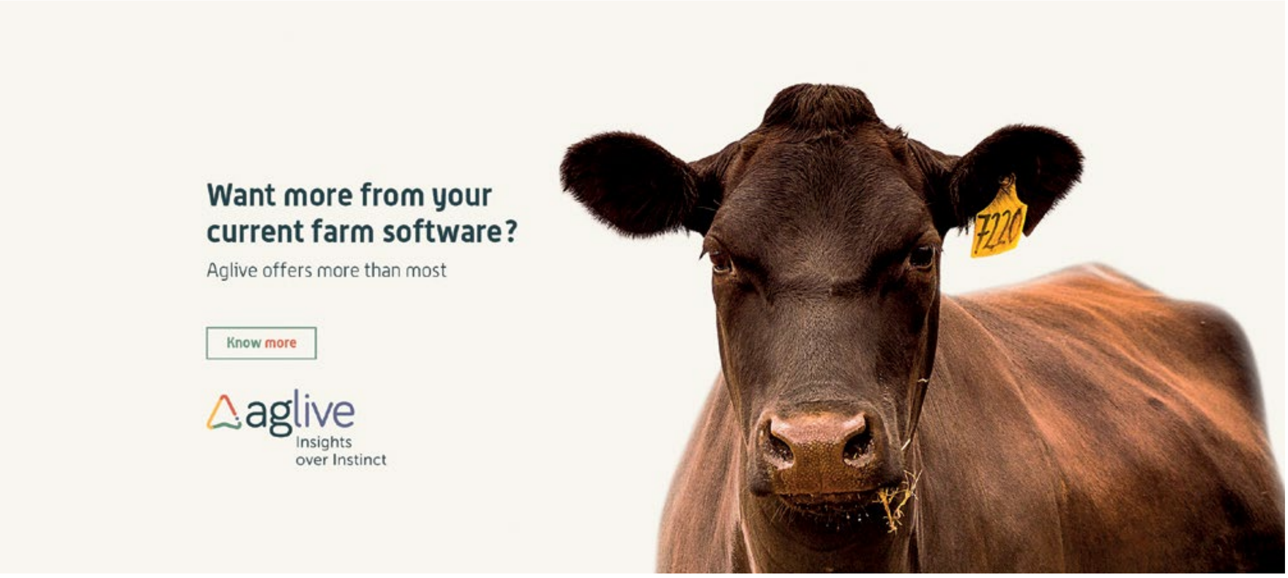
In the field trials, less snails were found in plots with baits applied 2 or less weeks prior to crop germination. Baits applied 4 or more weeks prior to crop germination, need to be reapplied to suppress snail damage to germinating crops.

Results from Wellstead showed a significant interaction between the bait types and time of applications. It appears that at times of high rainfall/intense rainfall events, non-rainfast baits may be compromised and not as effective at controlling snail numbers.

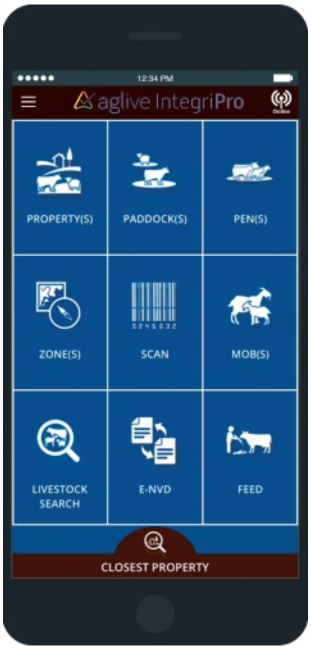
Results from the field cages at Kendenup showed that baiting late in April when snails are actively moving and feeding will lead to a better kill.

From the results of the caged and field trials, it can be concluded that for protection at crop emergence, growers should be baiting close to the time of crop emergence. Depending on environmental conditions, cheaper non-rainfast baits can be just as effective as rainfast baits. However, the non-rainfast baits do lose efficacy in wet conditions and if longer term crop protection is needed, the rainfast baits are likely to be more effective. Multiple applications of non-rainfast baits may be another option.

# SCF Regional Brand and Traceability Project



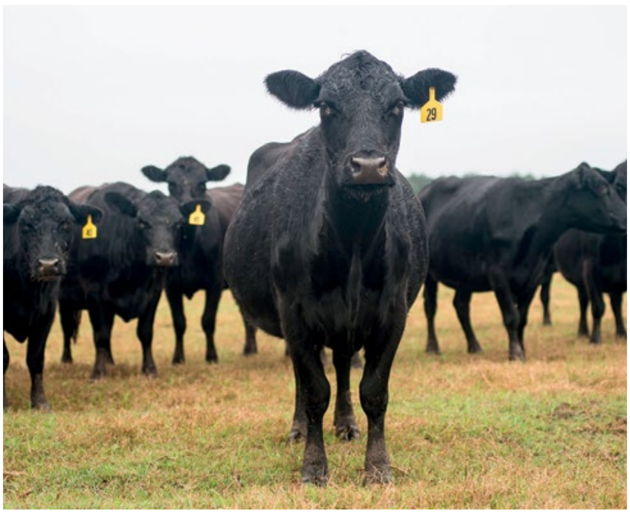

**SCF members may soon have the option of using a regional meat brand to promote their high-quality meat products. SCF have partnered with MLA and Melbourne-based start up agtech firm, Aglive, to begin on-farm trials in early 2018. The trials (on 10 properties) will test a digital app that enables you to map your paddocks, assign animals, monitor feed & treatments and integrate RFID wands for full animal traceability on-farm, during transport through to the processor.**




The Aglive IntegriData® software allows for improved stock inventory management, ownership audit & control. It uses real time mapping technology to create a unique digital trail which associates each animal with its place of origin. Completely portable, you can manage mob or individual livestock movements from your smartphone, tablet or desktop exploring the potential benefits of using the only MLA-accredited digitised NLIS. In other words, this system can be used to verify brand claims all along the supply chain but is also useful on farm as a grazing management tool.

***These trials will take this product one step further by involving transport companies and meat processors to send information back to the farm about livestock movements and meat quality.***

Globally, the transformation towards a digitised supply chains is growing. With this, comes an increasing need for supply chain integrity assurance. This project demonstrates that SCF members are on the front foot with digital product traceability, which is expected to open up new opportunities for high quality branded products in the future from our region.



## On-Farm Trials

The trials will be held on member's farms within the region for both sheep and cattle. Host members will be provided with all equipment and training in how to use the system. This will entail coming to a training workshop in March to learn how to use the system and then someone coming on to your farm to help set up the system with your animals. These 12-month trials are expected to commence in March 2018 and will be completed within one season. They will be the first of their kind in Australia. Host members may also be invited to sit on the steering committee to help evolve the regional brand and the traceability system and steer its direction.

For more information about the system see: www.aglive.com. More information about the brand will follow in early 2018, once the project officially commences.

# SCF Co-operatives Project

**Farmers working together cooperatively in the Great Southern region of WA to bring economic prosperity and community benefits to the WA agricultural industry through value chain cooperation.**

Seeking to capitalise on high value commodity markets and value-added food production opportunities, the Stirlings to Coast Farmers group (SCF) have embarked on a new initiative to establish a farmer's Co-operative in the Great Southern region of WA.

With increasingly competitive commodity markets, there is a real appetite among farmers to diversify business risks and increase competitiveness through collaboration. By working together, farmers can realise real efficiency gains that they would not be able to achieve as individual businesses without incurring significant debt and risk. The new co-operative enterprise would be strategically aligned with member's needs and designed to create benefits of scale enjoyed by larger farms without member's losing control of their own individual family farm businesses.

The Stirlings to Coast Farmers group have been discussing ways to address competitiveness challenges for its members since 2016. In late 2017, SCF was granted $140,000 from the Federal Government's Farm Co-operatives and Collaboration Pilot Program for six months' work on a feedlot feasibility project. A further $495,000 was granted from the State Government's Grower Group R&D Fund for work over 18 months on a feasibility project for a grain processing facility and farmer-owned cooperative enterprise. Both projects commenced in August 2017 and are operating concurrently together.

The purpose of the proposed co-operative enterprise would be to help farmers in the region focus on real efficiency gains at the individual farm level (defensive strategy) whilst developing new value-adding opportunities (offensive strategy) at the industry level, thereby creating a path for farmers in the region to become more competitive.

For more information see SCF website:
**www.scfarmers.org.au**


RAB00917-12601



# New SCF projects starting in 2018

### Demonstrations of Legume Crops for Reliable Profitability in the Western Region

Hosting three broad-scale demonstration sites and partnering with Farmanco to run three crop sequence modelling workshops within two-years. We will sow 2-3 pulse crops (e.g. faba beans, field peas, lentils) in paddock-scale strips (much like the wheat projects) in year one. We will measure the key components of the pulse crops and follow up the assessments in the following seasons crop (likely be barley or canola). This will give a practical demonstration of how the whole cropping system benefits from adding pulses. The data generated will be used by Farmanco to run different crop sequencing models to predict the profitability of adding pulse crops to your cropping rotations. It is hoped that we will find at least one viable pulse cropping option in each location. Worst case scenario, we will find three crops that won't work in an environment and this will reduce the need for farmers to experiment with unprofitable pulse crops! (Funded by GRDC).

We will also sub-contract out one of the trial sites to Southern Dirt and in return we will host a couple of trial sites for their projects (see the two 'shared' projects at the end).

Image source: https://commons.wikimedia.org

### "Ripper Gauge" Demonstration

This project involves implementing four deep ripping demonstration sites within the APZ on four different soil types. The trial demonstration sites will include different ripping machines depending on the subsoil constraints at the trial site that need fixing. The main soil constraint mentioned in the application was compaction, but also non-wetting topsoils, waterlogging and acidity. Just like the legumes trial we will subcontract out two sites to the Southern Dirt group and involve FBG and Gillami where appropriate.

We have provisionally selected two trial sites for this project. One with Josh Goad, on the Stirlings' sandplain, and one with the Squibb family at Tambellup on a clay soil. The Goad family having recently purchased a *Trufab Tilco* deep ripper will make installation costs at that site, much cheaper. Additionally, SCF have been in contact with Tim Pannell from the *Rocks Gone* company (same company that invented the *"Reefinator"*) about demonstrating their new machine, the *"Depth Charger"*. Comparisons between these two would be useful because the *Depth Charger* is nearly double the cost of the *Tilco*. These two machines can have inclusion plates added to them. Inclusion plates re-locate material from the surface down the back of the ripping tyne. This means that lime, gypsum or topsoil can be placed deeper into subsoil. SCF have been particularly interested in this concept for delivering lime into acidic subsoils.

The SCF R&D Committee will need to decide which inclusion treatments we want to see at each site. The trials need to be implemented before seeding this year, so the timeframes are tight (funded by GRDC).

## Snails, slugs and slaters in Western Australia: Case studies of growers in WA's south coastal region

This project is to create a case study booklet (20 case studies) highlighting the various methods and activities that farmers in the Albany, Esperance and South Australian port zones are doing to control slugs, snails and slaters. We anticipate there will be more case studies on snails and slugs, rather than slaters. To see an example, of a similar booklet produced, go to https://grdc.com.au/RCSN-BreakCropsRotations.

An example of things that farmers are doing, might be baiting strategies, using stripper fronts, burning windrows from the header, etc. (funded by GRDC).

SCF have also been confirmed an additional $60,000 for the next three years from DPIRD to conduct extension activities on the snail threat to the grains industry in our region. There are obvious synergies between these two projects.

## Shared projects

### Optimising timing and rate of nitrogen application in waterlogging conditions in the Western Region

SCF, in partnership with Southern Dirt, will run three demonstrations sites across the APZ to gain a better understanding of nitrogen management in waterlogged conditions in barley and canola crops. The GRDC understands that farmers and advisors are unsure about how much N to apply, when to apply it, and what form of N to apply in waterlogged conditions. Also, how much N do you apply at different levels of waterlogging? For example, transient waterlogging versus being able to ride your Jet ski in the barley paddock (Jeremy Walker style)? (funded by GRDC).

### Summer cropping demonstrations for the Western Region

SCF and Southern Dirt are conducting a summer cropping demonstration project with three trial sites run over two years. Being a summer cropping project, the trial will probably start at the end of this year depending on the summer seasonal conditions.

We think this trial has a great fit for SCF members, given the number of farmers planting summer crops every year. This trial would involve growing 2-3 summer species in a demonstration paddock and then following the effects (hopefully beneficial) to the following winter crop grown in the same paddock. The trial site will have lots of assessments taken which is why there is a reasonable amount of money allocated to the project (funded by GRDC).

**Questions or comments?**
**Call SCF R&D Coordinator, Nathan Dovey on 0429 468 030**

## Partner/Sponsor Trials

### Canola Nutition Package

**FARMER:** Allison

**LOCATION:** Mount Barker

**YEAR:** 2017

**CODE:** NPKS17C1

**AIM:** To determine the canola requirement for nitrogen (N), phosphors (P), potassium (K) and sulphur (S) on a forest gravel.

**PADDOCK HISTORY:** 2016: barley (4 t/ha) with 130 kg/ha Agflow CZ (80%) + AgMn (20%); 2015: canola (2 t/ha) with 130 kg/ha Agflow CZ (80%) + AgMn (20%); 2014: barley. 2.5 t/ha lime applied in 2014.

**SOIL ANALYSIS:** Jan 2017

| Depth (cm) | pH | EC | OC | Nit N | Amm N | P | PBI | K | S | Ex Ca | Ex Mg | Ex K | ESP | Al |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-10 | 5.7 | 0.05 | 4.0 | 17 | 2 | 26 | 179 | 72 | 11 | 10 | 0.9 | 0.16 | 7% | 0.6 |
| 10-20 | 5.2 | 0.02 | 1.6 | 5 | 1 | 11 | 111 | 64 | 7 | 3 | 0.3 | 0.14 | 3% | 1.0 |
| 20-30 | 5.9 | 0.02 | 1.5 | 4 | 1 | 10 | 87 | 67 | 8 | 4 | 0.4 | 0.17 | 3% | 0.6 |

Colwell K: 57, 92, 66 mg/kg; Exch K: 0.14, 0.20, 0.15 cmol/100kg. DTPA Cu: 0.5 mg/kg; DTPA Zn: 0.5 mg/kg

**NULOGIC RECOMMENDATION:** For 3.0 t/ha canola (30% gravel) 99N, 14P, 23K, 0S.

**MANAGEMENT:**

| | | |
|---|---|---|
| **Seeding:** | 5 May | 2.5 kg/ha 650TT canola |
| **Fertiliser:** | 14 Jun<br>29 Jun | NS41 and urea<br>NS41 and urea |
| **Pesticides:** | 5 May<br>25 Jun | Knockdown, 3 L/ha Treflan, 1.1 kg/ha Atrazine + Insecticide (Farmer)<br>500 ml/ha Select, 70ml/ha Verdict, 1% Hasten, 1% SoA (Farmer) |
| **Harvest:** | 24 Nov | |

**RAINFALL:** Jan-Mar mm; Apr-Oct mm ()

The research contained in this document was funded by CSBP as part of our commitment to maximising the sustainability and profitability of our customers' farming operations.

**TREATMENTS, RESULTS AND CONCLUSIONS:**

| Trt | Description | IBS (kg/ha) | Treatments Banded (kg/ha) | 4-6 Leaf (L/ha) | Budding (L/ha) | N | P | S | K | Harvest Yield (t/ha) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Nil | - | - | - | - | 0 | 0 | 0 | 0 | 2.07 |
| 2 | No N | - | 220 Big Phos | - | - | 0 | 30 | 17 | 0 | 2.88 |
| 3 | 60 N | - | 165 Agflow Extra | 110 NS41 | - | 60 | 30 | 20 | 0 | 3.37 |
| 4 | 120 N | - | 165 Agflow Extra | 110 NS41 | 173NS41 | 120 | 30 | 35 | 0 | 3.47 |
| 5 | No P | - | 46 Urea | 110 NS41 | 173 NS41 | 120 | 0 | 25 | 0 | 2.34 |
| 6 | 15 P | - | 83 Agflow Extra/23 Urea | 110 NS41 | 173 NS41 | 120 | 15 | 30 | 0 | 3.45 |
| 7 | No S | - | 131 AgNP/15 Urea | 84 Urea | 132 Urea | 120 | 30 | 0 | 0 | 3.61 |
| 8 | + K | 50 MoP | 178 K-Till Boost/5 Urea | 110 NS41 | 173 NS41 | 120 | 30 | 36 | 37 | 3.52 |
| | | | | | | | | | **Prob** | <0.001 |
| | | | | | | | | | **LSD** | 0.184 |

The most limiting nutrient in this trial was phosphorus (P). There was a 1.1 t/ha response to 15 kg P/ha but no additional response to 30 kg P/ha.

Soil nitrogen (N) reserves were adequate to produce 2.9 t/ha but yield was increased to 3.4 t/ha with 60 kg N/ha. Increasing the N rate to 120 kg N/ha did not significantly increase yields above the yield produced with 60 kg N/ha.

There was no response to either potassium (K) or sulphur (S).

There was a response to soil wetter (SE14) banded with Flexi-N in unreplicated plots at either end of the trial, so the yields in the main trial may have been higher with a wetter applied.

Plant test results from end of June sampling indicated low copper (Cu) concentrations (< 4 mg/kg) which could be limiting for next year's cereal crop. Boron (B) concentrations were marginal for canola (average 16 mg/kg).

# Partner/Sponsor Trials continued

## Pasture Fertiliser Strategies following Bluegums

**FARMER:** Metcalfe

**LOCATION:** Manypeaks

**YEAR:** 2017

**CODE:** PKB17

**AIM:** To (1) demonstrate the benefits of Super Phos Extra, muriate of potash (MoP) applied in autumn and late winter, and NKS11 applied in late winter, and (2) determine the requirement for boron (B).

**PADDOCK HISTORY:** Bluegums up to 3 years ago. 2.5 t/ha Walco lime (80% NV) and 220 kg/ha Super CZM applied in 2016. Sowed 15 kg/ha 75% rye (Leura) /25% sub clover (Antas) mix with diploid and tetraploid ryegrass.

**SOIL ANALYSIS:** November 2016

Black sandy gravel

| Depth (cm) | pH | EC | OC | Nit N | Amm N | P | PBI | K | S | Ex Ca | Ex Mg | Ex K | Ex Na | eCEC | Ex Al % | B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-10 | 5.6 | 0.04 | 3.3 | 5 | 4 | 14 | 77 | 81 | 10 | 6.3 | 1.17 | 0.16 | 0.33 | 8 | 1 | 0.6 |
| 10-20 | 4.8 | 0.03 | 1.5 | 2 | 1 | 5 | 71 | 46 | 16 | 1.4 | 0.44 | 0.08 | 0.13 | 2 | 11 | 0.4 |
| 20-30 | 5.1 | 0.02 | 1.3 | 1 | 1 | 5 | 48 | 43 | 8 | 2.0 | 0.69 | 0.09 | 0.09 | 3 | 5 | 0.4 |

DTPA Cu 1.7 mg/kg; DTPA Zn; 1.1 mg/kg (0-10cm)

**NULOGIC RECOMMENDATION:** For 7 t/ha Dry Matter (80% legume): 40P, 24K, 0S.

**MANAGEMENT:**

**Fertiliser:**
14 Mar Super Phos Extra, MoP and Ulexite
22 Aug MoP and NKS11

**RAINFALL:** Jan-Mar: 170 mm; Apr-Oct: 627 mm (Manypeaks)

The research contained in this document was funded by CSBP as part of our commitment to maximising the sustainability and profitability of our customers' farming operations.

**TREATMENTS, RESULTS AND CONCLUSIONS:**

| Trt | Autumn (kg/ha) | Treatment Autumn (kg/ha) | Late Winter (kg/ha) | P | S | K | B |
|---|---|---|---|---|---|---|---|
| 1 | 50 MoP | - | - | 0 | 0 | 25 | 0 |
| 2 | 50 MoP | 150 Super Phos Extra | - | 14 | 15 | 25 | 0 |
| 3 | | 150 Super Phos Extra | 50 MoP | 14 | 15 | 25 | 0 |
| 4 | 50 MoP | 150 Super Phos Extra | 135 NKS11 | 14 | 27 | 50 | 0 |
| 5 | 50 MoP | 300 Super Phos Extra | - | 27 | 30 | 25 | 0 |
| 6 | | 300 Super Phos Extra | - | 27 | 30 | 0 | 0 |
| 7 | 50 MoP | 300 Super Phos Extra | 135 NKS11 | 27 | 42 | 50 | 0 |
| 8* | 50 MoP | 300 Super Phos Extra | 135 NKS11 | 27 | 42 | 50 | 2.5 |

*25 kg/ha Ulexite (2.5 kg/ha Boron)

This site was very responsive to Super Phos Extra and mildly responsive to potash.

Over the season, with 50 MoP applied, there was a 1.6 t/ha pasture dry matter response to 150 kg/ha Super Phos Extra and a 2.7 t/ha to 300 kg/ha Super Phos Extra - a 50% increase in pasture production.

Where 150 kg/ha Super Phos Extra was applied, there was an indication of an early response to MoP applied in March but this was not statistically significant.

Where 300 kg/ha Super Phos Extra was applied, there was a 0.3 t/ha response in spring to 50 kg/ha MoP applied in August.

Plant tests indicated that potassium (K) was marginal where not applied.

There was no response to boron (B). Plant tests in late June indicated that B would not be limiting (>25 mg/kg). Copper levels were very high (15 mg/kg average).

| Trt | N | P | S | K | 8-May DM (t/ha) | 28-Jun DM (t/ha) | 22-Aug DM (t/ha) | 20-Sep DM (t/ha) | 23-Oct DM (t/ha) | Total DM (t/ha) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 25 | 1.0 | 1.9 | 0.9 | 1.0 | 0.3 | 5.5 |
| 2 | 0 | 14 | 15 | 25 | 1.4 | 2.0 | 1.6 | 1.2 | 0.6 | 7.1 |
| 3 | 0 | 14 | 15 | 25 | 1.2 | 2.0 | 1.5 | 1.2 | 0.9 | 7.0 |
| 4 | 25 | 14 | 27 | 50 | 1.2 | 2.0 | 1.5 | 1.3 | 1.1 | 7.5 |
| 5 | 0 | 27 | 30 | 25 | 1.7 | 2.0 | 1.8 | 1.3 | 1.2 | 8.2 |
| 6 | 0 | 27 | 30 | 0 | 1.8 | 2.0 | 1.7 | 1.3 | 0.9 | 7.9 |
| 7 | 25 | 27 | 30 | 50 | 1.4 | 2.0 | 1.8 | 1.4 | 1.1 | 7.5 |
| 8* | 25 | 27 | 30 | 50 | 1.7 | 2.0 | 1.7 | 1.5 | 1.3 | 8.2 |
| | | | | **Prob** | 0.19 | | <0.001 | 0.06 | <0.001 | <0.001 |
| | | | | **LSD** | ns | | 0.20 | 0.23 | 0.23 | 0.41 |

*25 kg/ha Ulexite (2.5 kg/ha Boron)

# Partner/Sponsor Trials continued

## Long Term Potassium Strategies

**FARMER:** Williss

**LOCATION:** Kojaneerup

**YEAR:** 2017

**CODE:** K17B1

**AIM:** To determine potassium (K) requirements over a barley canola rotation.

**PADDOCK HISTORY:** 2016: canola (2 t/ha) with 110 kg/ha Agflow/24% MoP; 2015: 4 t/ha barley; 2014: 2 t/ha canola. 2.5 t/ha lime applied in 2015. Site was clayed 5-6 years ago.

**SOIL ANALYSIS:** April 2017

| Depth (cm) | pH | EC | OC | Nit N | Amm N | P | PBI | K | S | Ex Ca | Ex Mg | Ex K | Ex Na | eCEC | Ex Al % | Al |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-10 | 4.6 | 0.10 | 1.1 | 28 | <1 | 6 | 9 | 38 | 11 | 2.8 | 0.53 | 0.08 | 0.10 | 3.7 | 3 | 2 |
| 10-20 | 4.8 | 0.04 | 0.6 | 10 | <1 | 4 | 4 | 12 | 5 | 1.2 | 0.24 | 0.02 | 0.08 | 0.5 | 14 | 2 |
| 20-30 | 5.0 | 0.03 | 0.4 | 6 | <1 | 6 | 6 | 15 | 5 | 0.7 | 0.16 | 0.02 | 0.06 | 0.3 | 13 | 1 |
| 30-40 | 4.8 | 0.05 | 0.2 | 10 | <1 | 6 | 5 | 12 | 7 | 0.3 | 0.08 | 0.02 | 0.08 | 0.6 | 29 | 2 |
| 40-50 | 4.9 | 0.04 | 0.1 | 12 | <1 | 7 | 5 | 15 | 8 | 0.3 | 0.06 | 0.04 | 0.05 | 0.6 | 28 | 1 |

DTPA Cu: 0.2 mg/kg; DTPA Zn 0.5 mg/kg.

**NULOGIC RECOMMENDATION:** For 4.0 t/ha barley: 93N, 23P, 33K, 0S.

**MANAGEMENT:**

| | | |
|---|---|---|
| **Seeding:** | 4 May | 95 kg/ha La Trobe barley (treated with Systiva) |
| **Fertiliser:** | 4 May | 100 L/ha Flexi-N banded (basal) |
| | 14 Jun | Urea, MoP and NK21 |
| | 13 Jul | 1 L/ha CopTrel 500 |
| **Pesticides:** | 4 May | Knockdown (Farmer); 2.5 L/ha Boxer Gold, 300 ml/ha Lorsban |
| | 13 Jul | 300 ml/ha Prosaro |
| **Harvest:** | | |

**RAINFALL:** (Jan-Mar): mm; (Apr-Oct): mm – ()

The research contained in this document was funded by CSBP as part of our commitment to maximising the sustainability and profitability of our customers' farming operations.

**TREATMENTS, RESULTS AND CONCLUSIONS:**

| Barley | | | | | |
|---|---|---|---|---|---|
| Trt | Banded (kg/ha) | Z23 (kg/ha) | N* | P | K |
| 1 | 101 Agstar Extra | 64 Urea | 86 | 14 | 0 |
| 2 | 120 K-Till Extra | 69 Urea | 86 | 14 | 13 |
| 3 | 140 K-Till Extra Plus | 65 Urea | 86 | 14 | 18 |
| 4 | 120 K-Till Extra | 100 NK21 | 86 | 14 | 31 |
| 5 | 120 K-Till Extra | 69 Urea + 64 MoP | 86 | 14 | 45 |
| 6 | 120 K-Till Extra | 69 Urea + 90 MoP | 86 | 14 | 60 |

*Includes 100 L/ha Flexi-N banded at seeding

Results K strategies on barley trial (La Trobe variety).

Sown 4th May 95kg/ha La Trobe.

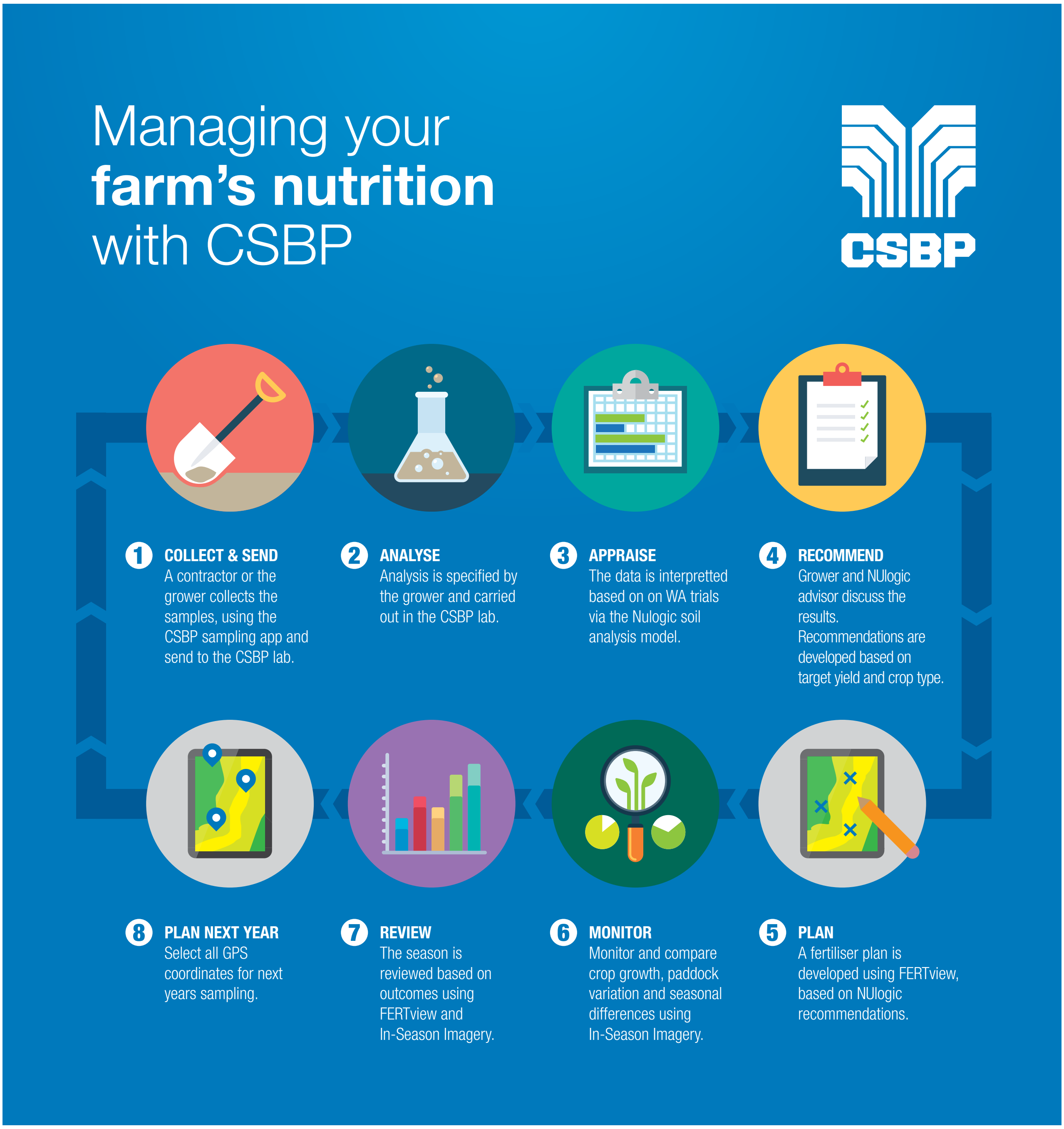
Basal out 100L/ha Flexi-N at seeding .

Strong response to K with a trend to higher yields from 45 kg K/ha plus applied.

Colwell K 38 (0-10cm) and then <15 down to 50cm

The LSD highlights significant variation across the site (inundated with waterlogging from heavy late September rains see pic ).

| Trt | Banded (kg/ha) | Z23 (kg/ha) | N | P | K | Yield (t/ha) |
|---|---|---|---|---|---|---|
| 1 | 101 Agstar Extra | 64 Urea | 86 | 14 | 0 | 3.09 |
| 2 | 120 K-Till Extra | 69 Urea | 86 | 14 | 13 | 3.88 |
| 3 | 140 K-Till Extra Plus | 65 Urea | 86 | 14 | 18 | 3.78 |
| 4 | 120 K-Till Extra | 100 NK21 | 86 | 14 | 31 | 3.77 |
| 5 | 120 K-Till Extra | 69 Urea + 64 MoP | 86 | 14 | 45 | 4.38 |
| 6 | 120 K-Till Extra | 69 Urea + 90 MoP | 86 | 14 | 60 | 4.26 |
| | | | | | **Prob** | 0.04 |
| | | | | | **LSD** | 0.76 |


Managing your farm's nutrition with CSBP
CSBP
1 COLLECT & SEND
A contractor or the grower collects the samples, using the CSBP sampling app and send to the CSBP lab.
2 ANALYSE
Analysis is specified by the grower and carried out in the CSBP lab.
3 APPRAISE
The data is interpretted based on on WA trials via the Nulogic soil analysis model.
4 RECOMMEND
Grower and NUlogic advisor discuss the results.
Recommendations are developed based on target yield and crop type.
5 PLAN
A fertiliser plan is developed using FERTview, based on NUlogic recommendations.
6 MONITOR
Monitor and compare crop growth, paddock variation and seasonal differences using In-Season Imagery.
7 REVIEW
The season is reviewed based on outcomes using FERTview and In-Season Imagery.
8 PLAN NEXT YEAR
Select all GPS coordinates for next years sampling.

**Stirlings to Coast Farmers Inc.**
PO Box 1413, Albany, Western Australia 6331

P: 08 9842 6653
E: ceo@scfarmers.org.au

M: 0429 236 729
www.scfarmers.org.au