Foreword

This booklet has been released a little later than normal given the troublesome and bizarre times we have experienced with the devastating bushfires locally and now the lockdown with Covid 19.

We, the AgKI board, certainly hope all Kangaroo Islanders affected by the fires have been able to establish and work through their recovery plans in whatever form that takes - our aim during this time has been to support our members in every way we can. We hope that our industry can return to full noise as soon as possible.

At least we are having a fantastic opening to the growing season, which will help to make producers' lives a little easier - we were due for some good fortune.

Similar to previous years, the Ag Trials booklet offers access to locally produced data and information which may help shape your soil, plant and animal management systems.

Specifically you will find continued work regarding improving production out of kikuyu pastures, improving soil health with local lime trials and soil testing data, animal health updates, cropping trials and some exciting new work with NDVI (pasture measurements from space) and weather/ soil probe stations.

This year's trials booklet was again collated by Lyn Dohle (PIRSA), who contributes so much to the local agricultural industry. Thanks to all those who have written papers for this year's booklet and to Faye Stephenson and Jacquie Skinner (PIRSA) who once again have assisted with proofing and formatting the articles. The printing of this publication would not be possible without the significant sponsorship from PIRSA and we also thank NR-KI for their contribution.

Rick Morris – Chair AgKI

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2. The information and data in this booklet is subject to change without notice.
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Contents

An Update from AgKI

Agriculture Kangaroo Island is the peak body for agriculture and primary production on Kangaroo Island. With approximately 150 members, we represent members across the breadth of the island, including both grain and livestock producers, along with other farming and production activities.

In 2019/20, AgKI:

- Developed and released our Strategic Plan for 2019-2022
- Completed work on the Feral Pig Survey Report
- Provided feedback re $1M Drought Funding provided to Council
- Represented members interests on the Bushfire Recovery Committee
- Met multiple times with Ministers and government agencies re bushfire recovery
- Worked with Livestock SA to assist with hay/ fodder deliveries after bushfires
- Completed KI Primary Production Snapshot
- Technology and Tools Day, delivered by NRKI
- Reporting to Royal Commission regarding bushfires

We have continued to deliver research, as a result of grant funding, for the following projects:

- Healthy, productive and perennial pasture systems
- Satellites to soils to productivity
- Healthy Soils
- Future Proofing Kangaroo Island
- Mixed Cover Cropping
- Technology and tools to increase adoption of smarter and more sustainable farming practices

We continue to work with key partners to ensure that our members are well represented, recognising that the agriculture/primary production is the largest industry sector on Kangaroo Island.

The MLA Agriculture Kangaroo Island Conference 2019 saw over 120 members, presenters and industry leader spend the day discussing latest methods, techniques and technology for cropping and livestock production. The day was a great success, mostly due to a superb group leading presenters, Nick Poole (FAR Australia), Cam Nicholson (Nicon Rural Services), Kevin Nash (Red Cross), Dr Christine Purdy (MLA), Richard Simpson (CSIRO Ag & Food), Tim Leeming (Paradoo Prime) and Dale Grey (Agriculture Victoria).

The Board

Our board members have continued to work hard in a very busy and challenging period. The current board members are:

Rick Morris (Chairperson)

Jamie Heinrich (Deputy Chairperson)

Steph Wurst

Caleb Pratt

Grant Flanagan

Tim Buck

Jenny Stanton

Caitlin Berry

Cr Sam Mumford (Council representative)

Lyn Dohle (PIRSA representative)

Damon Cusack (NRKI representative)

AGKI update (cont.)

We acknowledge our partners, who assist us to be in the position to advocate and support our members.

Platinum Partners:

Meat & Livestock Australia (MLA)

Natural Resources Kangaroo Island (NRKI)

Primary Industries & Regions South Australia (PIRSA)

Silver Partner:

G. & J. East (Strathalbyn)

Bronze Partners:

Landmark

Kangaroo Island Plantation Timbers

Elders

Partner:

Stoller

Finally, AgKI would like to acknowledge the enormous amount of help provided to members in the ongoing bushfire fighting and recovery activities. To all those organisations and individuals, both on Island and off Island, who provided their time, labour, materials and a wide range of donated goods and services we will be forever grateful for your support.

Join now

If you would like to become a member of AgKI and gain the many member benefits, please fill in the slip on this page and post it along with your payment. For more information or if you would like a membership brochure emailed to you with the BSB details, email to: admin@agki.com.au.

AGKI
AGRICULTURE
KANGAROO ISLAND

AgKI MEMBERSHIP FORM

Name: .....

Trading Name: .....

Postal Address: .....

.....

Phone number: .....

Email: .....

Enterprises (Please circle those you are involved in)

Wool | Prime lamb | Beef cattle | Cropping

Marron/aquaculture | Viticulture | Beekeeping

Other (please specify): .....

Payment: $99 GST incl.

Cheques or money orders should be made payable to 'Agriculture Kangaroo Island'

Please post this form and your payment to:

Agriculture Kangaroo Island
PO Box 794
KINGSCOTE, SA 5223

AGKI Strategic Plan 2019-2022

Vision:
Kangaroo Island agriculture sector that is sustainable and profitable

Mission:
Supporting our members' success via advocacy and promoting best practice through education, research & demonstration.

Values:
Representative - Informed - Relevant - Courageous

To Contact AGKI:

Phone: 0428 716 330
Email: admin@agki.com.au
Website: www.agki.com.au

AGRICULTURE KANGAROO ISLAND INC. - STRATEGIC PLAN 2019-2022

Vision	Kangaroo Island agriculture sector that is sustainable and profitable			
Mission	Supporting our member's success via advocacy and promoting best practice through education, research and demonstration			
Values	Representative - Informed - Relevant - Courageous			
Pillars	**Members & Organisation**	**Advocacy** *{annually}*	**Practice Improvement**	**Education & Support**
Key Objectives	**#1** Attract and retain producers as members of AgKI. *{annually}* **#2** Seek feedback from members regarding association and satisfaction with activities, to be included in future Strategic Plan reviews. *{annually}* **#3** Deliver program of annual member engagement opportunities and events. *{annually}* **#4** Build and implement Board succession plan for association. *{2020}* **#5** Create long-term financial plan for association. *{2020}* **#6** Deliver program of partner engagement opportunities and events, consistent with Partnership Packages, and feedback from partners. *{annually}* **#7** Collaborate with key agencies, particularly those that are Kangaroo Island based, particularly on matters of mutual interest. *{annually}*	**#8** Advocate on any matter that affects the sustainability and/or profitability of the agriculture sector on Kangaroo Island. **#9** Advocate on matters that affect producer's practice/methods: • Toxo vaccine • Animal welfare • Invasive animals and plants • Climate change • Stewardship • Others identified during period **#10** Advocate on matters that affect agriculture on Kangaroo Island: • Land Use / Protect viable ag. land • Farm water access and security • Single Tree clearance • GM • Biosecurity • Local Kill Facility • Others identified during period **#11** Advocate on opportunities identified to increase producer returns • Product branding • Local infrastructure • Improved communications (phone & internet) • Transportation • Minimisation of unnecessary red-tape and bureaucratic processes	**#12** Partner and support implementation of One Biosecurity initiative of PIRSA. *{annually}* **#13** Continue to seek funding for local research and extension. *{annually}* **#14** Create and deliver programs (as/when funding is available) for: • Soil Health – improving organic carbon • Income diversification • Invasive animals and plants • Improved land management (chemical, physical and biological) • Other opportunities identified during period. *{annually}* **#15** Identify characteristics / specifications of Top 20% Production, and lead program for high achievement in agriculture. *{annually}* **#16** Partner with members, producers and agencies to implement a regular program of testing innovative practices. *{annually}* **#17** Implement outcomes of *Ag-Adaptation Plan** as/when funding or opportunity becomes available. *{opportunity}*	**#18** Develop and implement programs of education and support for: • Trialling and adoption of new farming tools and technology • Farmer education – extension and research • Animal welfare education • Succession Planning • Other opportunities identified during period. *{opportunity}* **#19** Promote sector education and support opportunities for members. *{annually}* **#20** Hold biennial AgKI conference. *{2019, 2021}* **#21** Support and participate in Kangaroo Island Field Days, Kingscote and Parndana shows, and other significant events. *{annually and opportunity}* **#22** Provide platforms and opportunities for members to contribute to information sharing and education. *{annually and opportunity}* **#23** Member awareness and education of *Ag- Adaptation Plan**. *{2020}*

**Ag-Adaptation Plan: Climate Change Action Plan*

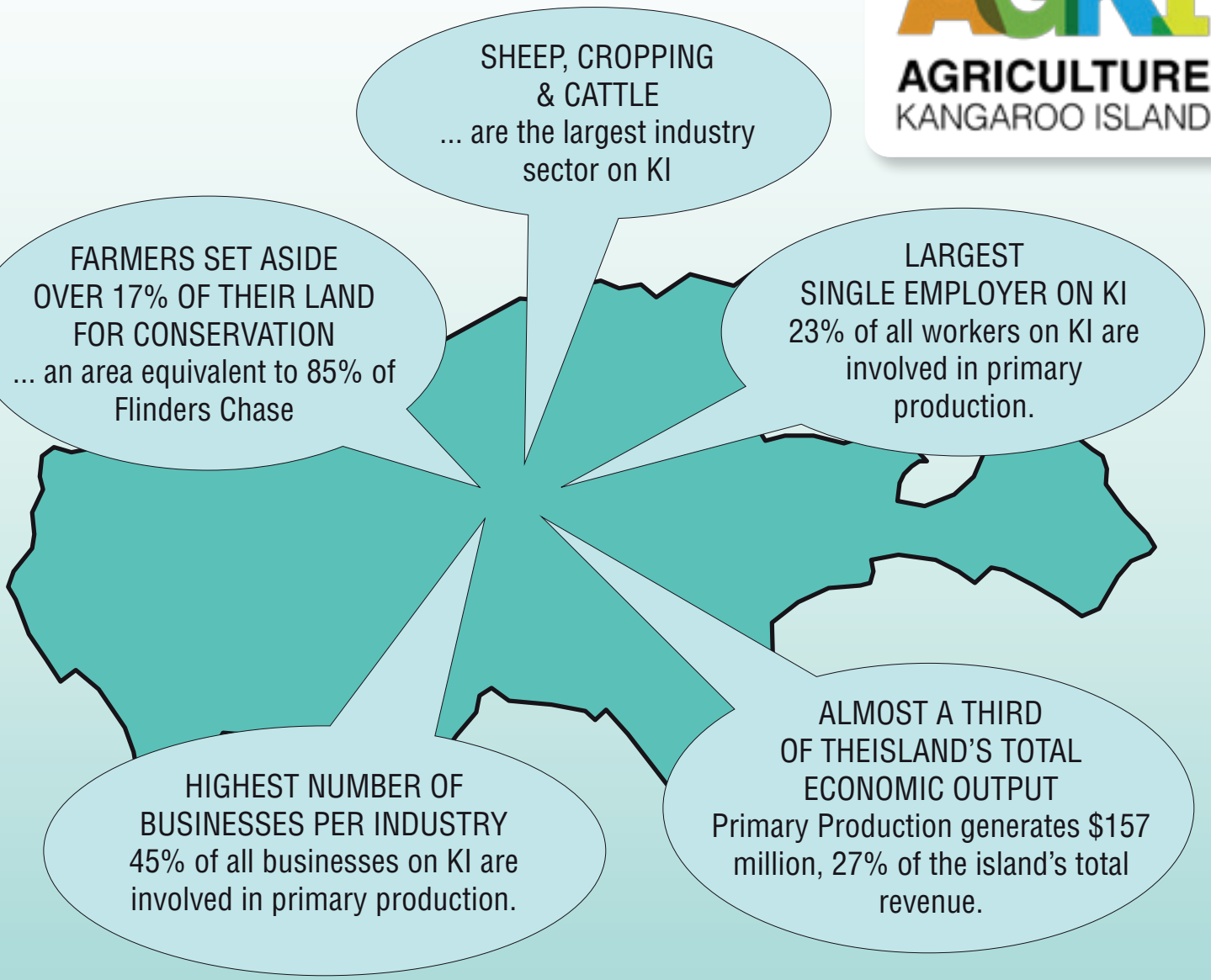
Key Measures	**#1.1** Annual membership retention drive is held. **#1.2** Identification of all producers is completed for Kangaroo Island. **#1.3** All producers are approached to become members. **#2.1** Annual survey of members is held regarding the association and their satisfaction of the activities held. **#2.2** Survey results are considered at annual review of Strategic Plan. **#2.3** Survey results are used to plan future years' events. **#3.1** Annual program of member events and engagement opportunities is developed. **#3.2** Annual program of member events and engagement opportunities are delivered. **#4.1** Board succession plan is built. #4.2 Board succession plan is implemented. **#5.1** Workshop held regarding long-term financial planning for association. **#5.2** Long-term financial plan is built for association. **#6.1** Working with Partners, develop a program of partner engagement events and opportunities. **#6.2** Deliver program of Partner engagement events and opportunities. **#7.1** Identify matters of mutual interest with key agencies. **#7.2** Where appropriate, work in collaboration, delivering outcomes for members.	**#8.1** Identify matters that affect the sustainability and/or profitability of the agriculture sector on Kangaroo Island. **#8.2** Board to determine position of AgKI, in consultation with members. **#8.3** AgKI advocates position on behalf of members. **#9.1** Identify matters that affect the producers practice/methods **#9.2** Board to determine position of AgKI, in consultation with members. **#9.3** AgKI advocates position on behalf of members. **#10.1** Identify matters that affect agriculture on Kangaroo Island **#10.2** Board to determine position of AgKI, in consultation with members. **#10.3** AgKI advocates position on behalf of members. **#11.1** Identify opportunities that will increase producer returns. **#11.2** Board to determine position of AgKI, in consultation with members. **#11.3** AgKI advocates position on behalf of members.	**#12.1** AgKI partners with PIRSA in supporting the One Biosecurity program on Kangaroo Island. **#12.2** Information about the One Biosecurity program is forwarded to AgKI members by appropriate means. **#13.1** Opportunities are identified for Research and Extension work. #13.2 Applications are submitted for opportunities identified. **#13.3** AgKI delivers the projects funded by any successful applications for research and extension, supported by partners, contractors and members. **#14.1** Identify funding sources to deliver programs of practice improvement (as per list) **#14.2** Deliver the program of practice improvement, supported by partners, contractors and members. **#15.1** Identify the characteristics / specifications of Top 20% production. **#15.2** Develop and deliver a program to members regarding Top 20% production. **#16.1** Identify practices and partners to participate in testing of innovative practices. **#16.2** Deliver program of testing of innovative practices. **#16.3** Report on outcomes of testing. **#17.1** Identify outcomes and opportunities of ***Ag****-Adaptation Plan** that AgKI can participate in. **#17.2** Seek funding to deliver programs that meet outcomes identified. **#17.3** Report to members and partners that outcome has been completed.	**#18.1** Identify opportunities, including funding, to develop programs of education and support (as per list). **#18.2** Deliver programs of education and support (as per list), supported by partners, contractors and members. **#19.1** Identify sector education and support opportunities and promote to members. **#19.2** Where appropriate, support members to attend such opportunities. **#20.1** Develop and plan biennial AgKI Conference. **#20.2** AgKI Conference held in 2019. **#20.3** AgKI Conference held in 2021. **#21.1** Attend and participate in Kangaroo Island Field Day (when held). **#21.2** Attend and participate in Kingscote and/or Parndana Shows, where appropriate. **#21.3** Identify other events and opportunities to educate and support members. **#21.4** In events identified, participate where appropriate. **#22.1** Identify platforms and opportunities for members to contribute to information sharing and education. **#22.2** Support members in contributing to information sharing and education. **#23.1** Develop awareness program for *Ag- Adaptation Plan**. **#23.2** Deliver awareness program for *Ag- Adaptation Plan**.

**Ag-Adaptation Plan: Climate Change Action Plan*

KANGAROO ISLAND

Primary Production Snapshot

AGKI
AGRICULTURE
KANGAROO ISLAND



SHEEP
600,000

CATTLE
19,600

CROPPING
13,000 ha

APIARY
3,300 hives

POULTRY
73,300
(10.5 million eggs)

VINEYARDS
110 ha

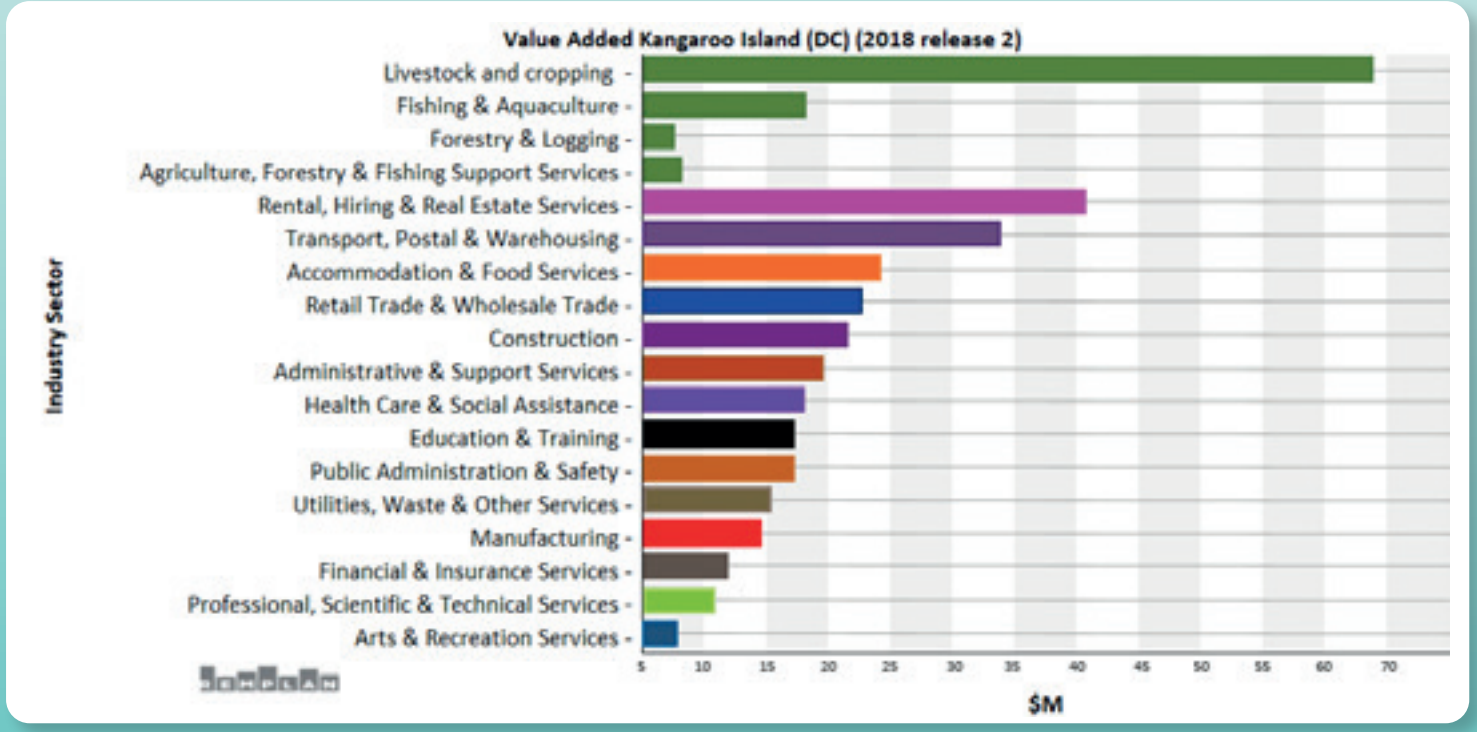
POTATOES
345 ha

FARMLAND
162,000 ha

Kangaroo Island
had one of the
HIGHEST RATES OF ADOPTION
of
LANDCARE
in the nation during the
Landcare decade
(1990-2000)

SHEEP
numbers peaked in
1989/1990 at
1.25 MILLION

FIRST CROPS GROWN IN SOUTH AUSTRALIA
were grown at Cygnet River in the 1820s, prior to formal settlement



Source: REMPLAN Economy Report - Value-Added by Industry Sector 2018

Dollar figures quoted above represent the Value-Added per industry, which is the sector contribution to Gross Regional Product.

SA Livestock Biosecurity

Biosecurity is about the daily practices employed to combat threats to health and well-being. It is vital in any system, including farming and especially livestock production. The health and well-being of the producer, family, staff, visitors, soil, plants and animals are of utmost importance to the profitability and sustainability of the business.

Livestock producers know that the health of animals is vital to a thriving production system. Disease threats must be treated seriously.

The livestock industry, in partnership with PIRSA, developed a voluntary online Biosecurity program in August 2018 called One Biosecurity. It provides the solution to livestock disease issues and helps producers meet the demands of livestock production in the 21st century.

Some of the benefits of registering with One Biosecurity include:

- An approved biosecurity plan in a simple, free, online process (all producers in Australia must now have a farm biosecurity plan on record for the Livestock Production Assurance program).
- The program generates an Animal Health Declaration for stock transportation
- All records will be available on a single site
- Provides a credible framework for risk-based trading to assist with purchasing decisions
- It will provide credible assurance to existing domestic and international markets and help us meet potential new market access requirements
- The more producers registered on One Biosecurity, will give the livestock industry greater resilience and flexibility to meet the demands and challenges of changing markets and potential exotic disease threats like Foot and Mouth Disease.

To realise the benefits personally, protecting yourself and the industry, you need to create your own One BioSecurity account.

Go to www.onebiosecurity.pir.sa.gov.au to register.

The more producers who register with One Biosecurity, the stronger the program becomes and the greater protection it will offer to our livestock industries.

Once registered, producers create an online profile containing details of their farming enterprises and biosecurity practices and status. Producers can then choose to make this status public for other registered users to view, when appropriate.

Take home messages

The One-Biosecurity program benefits:

- It provides livestock producers a credible tool that enables them to combat endemic diseases.
- Helps demonstrate and promote their good biosecurity practices.
- It maintains and attracts premium market access.
- It helps industry, collectively combat the threat of an exotic disease outbreak.

For further information or help, contact:

One Biosecurity:
Website: https://onebiosecurity.pir.sa.gov.au/home
Phone: (08) 8429 3300
Email: 1BSupport@sa.gov.au

Kate Buck, Animal Health Advisor:
Phone: 08 8553 4922, 0419 091 156 Email: kate.buck@sa.gov.au

Post Fire Livestock Biosecurity

It becomes important post fire to prevent further property impacts by managing farm biosecurity, to balance caring for livestock and paddocks whilst limiting the introduction of new pests, diseases or weeds. Each property has a unique situation whether that is re-stocking a property, agisting stock off property for a period of time or purchasing in feed, it's important to mitigate risks. Taking a planned approach to re-build a property that includes consideration of biosecurity risks, results in increased health of the animals and in turn allows for increased survival, fertility and herd growth.

Introduced sheep present a risk of disease introduction. Sheep can appear healthy while at the same time carrying a range of diseases. Purchasing sheep with a disease status equal to or higher than the properties current status is essential to maintain biosecurity. The risk associated with buying infected sheep cannot be totally eliminated, but can be significantly reduced by making careful enquires and obtaining a completed and signed National Vendor Declaration (NVD) and Sheep Health Declaration (SHD) and by using the One Biosecurity system.

Lameness

Purchased sheep or those returning from agistment should be examined for footrot, paying particular attention to lame sheep or those with misshapen, deformed or recently pared hooves.

The history of the sheep should be established as well as any previous foot bathings, treatments or vaccinations. The latest version of the National Sheep Health Declaration must be obtained and reviewed closely.

Introduced sheep should ideally be kept isolated until they have passed through a suitable footrot transmission period, usually a spring or after an early autumn break. Your local PIRSA inspector is available to help with these inspections if possible prior to departure, on arrival or during the spread season.

Ovine Johne's Disease (OJD)

To avoid introducing OJD (a silent wasting disease), it is vital that stock introductions come from flocks with low risk of OJD. Low risk properties are ones that have undergone testing or inspections for OJD or with an accredited SheepMAP status.

Due to the long incubation period of OJD, it is ideal to isolate introduced sheep for as long as feasible. It is vital in higher rainfall areas to continue vaccinating against OJD and is the best defence against the disease. If non-vaccinated sheep are purchased, then vaccinate on arrival.

Lice

Introduced sheep should be thoroughly checked for lice and treated with an effective chemical if evidence of infestation is found. Isolation of introduced sheep must also be a priority as the first signs of sheep lice may not appear for 3 months or more from the time of arrival.

If lice is introduced, vigilance will help detect the outbreak in the early stages, so that spread to other mobs can be prevented and damage kept to a minimum.

Internal Parasites

Drench resistance of internal parasites in sheep is an increasing concern for producers. To limit the risk of introducing drench resistant worms, it is recommended to drench sheep on arrival (with an effective chemical) before moving them on to an isolation area.

WormBoss (www.wormboss.com.au) is valuable resource when selecting which drench to use, or seek professional advice in your area to identify known worm trends and resistance.

Post Fire Livestock Biosecurity (cont.)

Toxoplasmosis

When introducing sheep from other areas of the state be mindful of them being naive to our feral Cat population. If they have not been exposed to parasite Toxoplasma gondii, which is excreted by infected cats, the sheep can contract Toxoplasmosis.

This disease can cause early or late abortion if infection occurs during pregnancy and will result in low lambing percentage. Usually maiden ewes are more susceptible due to low immunity to the parasite.

After sheep have been exposed to T. gondii once, immunity occurs and protects animals throughout their life. There is no vaccine available presently in Australia so the best defence is to try and break the cycle of infection by removing any diseased livestock or wildlife carcasses promptly away from sheep grazing areas to avoid attracting cats that feed on them.

Weeds

It can take months to years before visual signs of an introduced weed incursion become visible due to long incubation period and seasonal germination. Weed seeds such as Patterson's curse, Horehound and Bathurst Burr are just a few of the common noxious weeds carried on sheep that can be spread to new areas.

Once noxious weeds enter a property, germinate and produce seeds, they become difficult and costly to control. Often total eradication cannot be certain unless they are kept to a restricted area, and rapid detection and prompt eradication measures take place.

Isolation

The sheep diseases, parasites and the noxious weeds listed above are just a few of many potentially undesirable introductions that can accompany sheep introductions. Even when following a biosecurity plan for purchasing in sheep, the risk of purchasing unwanted extras cannot be fully eliminated. For this reason the use of a specific isolation area for new arrivals is essential. The isolation area should have:

- adequate fencing to ensure containment of sheep
- careful location chosen to minimise contamination to other paddocks and areas between woolshed and yards
- If possible, try to eliminate drainage from the contamination area to other areas of the farm (e.g. reducing the spread of OJD).
- The use of isolation areas and planned stock movements makes it possible to confine diseases or pests to a specific area of the property. If needed, this area can then be cropped or grazed by non-target species until the incursion has been dealt with or a sufficient period of time has passed to ensure that the disease agent present on the soil or pasture no longer poses a risk.

For farmers that are considering agisting sheep off property until feed is available, it is important to select an agistment property that allows you to maintain your biosecurity status. This will require:

- checking with the property owner the length of time the agistment paddocks have been destocked; a longer time will reduce disease risk
- checking the Johne's disease status of sheep kept on the property in the previous 2 years
- and ensuring the water quality/quantity is suitable for the type of livestock.

Livestock moved for agistment must be accompanied by a valid waybill and the movement must be recorded on the National Livestock Identification System (NLIS) database.

Biosecurity is also important when stock return to your property from agistment. Hold them in a separate isolation paddock for at least 2 weeks to assess their health status before returning them to the general livestock paddocks.

Feed shortage created after a fire or dry season is another biosecurity risk. When buying in feed, ensure you know the biosecurity status of the property it comes from and inspect the feed for pests and weeds before feeding out.

To minimise the pest and weed risk feed out in paddocks in the same place each time or use a 'sacrifice paddock' and regularly inspect the area.

Keeping any problems to a defined area will make it easier to eradicate.

Take home messages

- Do your homework before introducing or re-introducing stock – purchase low risk stock at the same or better biosecurity status
- Isolate mobs (as long as possible)
- If in doubt check it out; ask a professional to assist
- Plan & manage what is introduced.

For advice, inspection services and assistance, contact:

Your local vet

Your livestock advisor

Kate Buck, Animal Health Advisor:
Phone: 08 8553 4922, 0419 091 156 Email: kate.buck@sa.gov.au

One Biosecurity:
Website: https://onebiosecurity.pir.sa.gov.au/home
Phone: (08) 8429 3300 Email: 1BSupport@sa.gov.au

Footrot Update

What is footrot

Footrot is a contagious bacterial disease of sheep and goats. Footrot is classified as inflammation of the interdigital skin and potential under-running of the hoof caused by the bacteria *Dichelobacter nodosus* (*D. nodosus*).

It can cause significant economic loss to producers through reducing:

- ewe fertility
- wool growth
- growth rates
- sheep sales.

Severe footrot can also be a significant animal welfare issue.

Controlling or eradicating footrot can be costly. However, the long term benefit of eradicating footrot from a flock far outweighs the cost.

Development of Footrot

Like all diseases, there are three main factors that affect the development and severity of footrot in a flock:

Agent – In the case of footrot this is the bacteria *D. nodosus* and the potential virulence of the strain of *D. nodosus* present in the flock.

Host – The susceptibility of the sheep in the flock. Some breeds are more susceptible to footrot than others. No breeds of sheep are resistant to footrot.

Environment – Footrot requires warm, moist conditions to develop and adequate pasture length to enable transmission of the bacteria from sheep to sheep.

Diagnosis of Footrot

There are two main ways to diagnose footrot in a flock and both require inspection of a significant number of sheep:

Clinical Diagnosis – Where it is possible to inspect sheep during a "spread period" (warm, moist with adequate pasture length), hooves can be inspected and pared to reveal the most severely affected sheep in the flock. The percentage of sheep suffering severe footrot lesions can then be used to form a diagnosis of benign or virulent footrot.

Laboratory based diagnosis – Often, the time of year, current climate and other management factors do not allow for an accurate clinical diagnosis, especially during dry times or in traditionally drier parts of the state. For this reason the South Australian Footrot Management program utilises a laboratory test called the "Elastase Test" to assign a flock diagnosis. By submitting samples from multiple infected sheep across the flock, the Elastase test can return results which indicate how severe a footrot infection may be under ideal development conditions.

When a flock has footrot

If a flock has been detected with footrot, there are movement restrictions that apply under the South Australian *Livestock Act 1997*.

When there is a suspicion a flock has severe virulent footrot, sheep:

- cannot be sold to other graziers
- must not be sold in a public market
- must not be allowed to stray onto public roads or neighboring properties
- sheep with footrot can be sold directly to an abattoir for slaughter provided they are "Fit to Load".

Specific trading options will be assigned to all flocks detected with footrot in South Australia. Those options may vary depending on the severity of footrot diagnosed.

Reminders of State footrot program

- All forms of footrot remain a **notifiable disease** and must be reported to PIRSA.
- Quarantine orders are no longer being issued (unless producers fail to undertake reasonable measures to manage footrot). There are restrictions under the Livestock Act 1997 that relate to notifiable diseases; it is an offence to move animals affected with a notifiable disease under Section 30 (1) of this Act.
- Virulence is no longer solely based on visual assessment, it is now determined through laboratory testing.
- While movement restrictions remain in place for virulent strains of the bacteria, there will be increased opportunity for trade with benign/intermediate strains of the disease provided there is accurate declaration of flock status.
- It's important to seek professional advice on controlling and eradicating footrot.
- National Vendor Declarations (NVDs) and National Sheep Health Declarations (NSHDs) are still **compulsory**. When purchasing stock from interstate, ensure you request these documents as they are not compulsory for all states.
- The new July 2019 version of the NSHD requires declaration of all forms of footrot, both benign and virulent.
- Laboratory based diagnosis will be the primary method used to classify the severity of footrot detected in a flock.
- There will be increased ability for infected producers to trade sheep based on their flock's diagnosis. Buyer beware means you need to check the status of animals BEFORE you purchase – check the NVD and NSHD. Movement restrictions into SA remain in place.

KI footrot situation as of mid-2020

- The bushfires have disrupted a lot of footrot eradication programs. Some properties with high stock losses due to the fires have chosen to totally de-stock to get rid of footrot.
- There are currently **NO** properties under quarantine order for virulent footrot due to the new program changes that came in 2018. About 30 properties have some trading restrictions in place due to virulent or intermediate to virulent footrot present in their sheep.
- There were a handful of properties that successfully completed their eradication programs. Congratulations to them on their efforts; it takes a lot of diligence to complete a successful program.

For further information:

PIRSA Website:
www.pir.sa.gov.au/biosecurity/animal_health/sheep

Kate Buck, Animal Health Advisor:
Phone: 08 8553 4922, 0419 091 156
Email: kate.buck@sa.gov.au

Ovine Johne's Disease Update

OJD 'Silent Disease' Update 2020

Changes to the management of Ovine Johne's disease (OJD) in sheep, in South Australia, have been phased in since July 2018.

A reminder of the state OJD program that producers should note:

- Movement restrictions relating to OJD for sheep entering SA are no longer in place. To minimise the risk these animals may pose it is recommended that all sheep entering SA should be vaccinated for Johne's disease, either before entry, or on arrival in SA.
- Completed National Vendor Declarations (NVD) and National Sheep Health Declarations (NSHD) remain mandatory for all sheep entering and/or moving within SA.
- Johne's disease in sheep remains a notifiable disease and must be immediately reported to PIRSA Animal Health. See the reporting animal disease page for instructions if you suspect OJD is present in sheep or other species .
- Without movement restrictions, there is increased ability for producers with OJD infected flocks to trade sheep. Producers need to check the status of animals BEFORE purchasing - check the NVD and NSHD. If you do not understand the OJD risk, seek advice from PIRSA or your local veterinarian before purchasing animals.

The removal of movement restrictions is in response to numerous factors, including:

- the inability to continue to reliably detect infected flocks
- to assist producers to restock once dry conditions ease by making sheep trade between States easier
- to create a stronger alignment in South Australia to the national management arrangements for the disease through the national OJD program.

South Australian OJD Management Program

PIRSA administers the South Australian OJD Management Program that is supported and funded by the SA Sheep Advisory Group (SASAG) through the Sheep Industry Fund. The program aims to reduce the economic impact of OJD in sheep through:

- encouraging producers to voluntarily investigate and manage Johne's disease in their flocks
- ensuring declaration of OJD disease risk is made for all sheep sold or entering SA through use of the National Sheep Health Declaration
- increasing industry awareness through education of OJD risks and their management
- promoting low-risk trading and best livestock management practices.

Voluntary OJD testing

Producers can choose to investigate or monitor for OJD in two ways:

- voluntary abattoir inspections (producer requested)
- voluntary on-farm testing by private veterinarians and PIRSA animal health officers.

Abattoir testing

Voluntary Abattoir surveillance can be used to:

- provide low disease risk assurance; abattoir 500 and 150 status
- monitor the levels of the disease in a known infected flock
- alert producers to new infections.

Producers can request that their sheep be inspected for OJD when sending sheep through abattoirs. Voluntary inspections can also be arranged at participating abattoirs interstate.

On-farm testing

Voluntary on-farm testing of flocks with symptoms of Johne's disease can be conducted by private veterinarians or by PIRSA Animal Health staff.

Flocks showing signs of a distinct 'poor tail end' of the mob, weight loss or increased mortality can sometimes be confused with nutritional diseases or internal parasites. Thorough disease investigations are recommended to ensure accurate diagnosis and minimise the economic impact of endemic diseases.

Subsidised disease investigations may involve either post-mortems of clinically affected animals or pooled faecal testing from between 50 to 100 high-risk animals.

How to manage OJD risks

A Property Disease Management Plan (PDMP) can be individually developed for each property to assist producers to manage their OJD risks through PIRSA's One Biosecurity program.

Animal Health Officers will work with producers to develop pathways to lower the impact of the disease and help achieve a low risk status.

Depending on best practice related to individual production symptoms, the PDMP may include recommendations regarding:

- vaccination with Gudair
- strategic grazing practices
- straying animals
- trading options
- property declarations and tagging of sheep.

If producers fail to meet reasonable biosecurity measures to manage OJD, orders may be placed on the property under the Livestock Act 1997.

Declaration of OJD Risk - buyer beware

The National Sheep Health Declaration is required for all sheep movements between properties in South Australia and contains information on the:

- history of the flock
- OJD testing
- abattoir monitoring
- vaccination.

Before purchasing sheep you are urged to review information in the National Sheep Health Declaration. This will help you decide if it's suitable to introduce the animals to your property.

Sheep Market Assurance Program - SheepMAP

The Sheep Market Assurance Program (SheepMAP) is part of the National Johne's disease Control Program. It is a classification scheme to assure sheep breeders and their clients that participating flocks have been objectively assessed as having low risk of being infected with Johne's disease.

SheepMAP is voluntary and the costs are borne by the participating flock owners. Producers can register with the program to promote their low risk Johne's disease status.

Producers are also encouraged to buy sheep from flocks participating in the SheepMAP program.

'Approved Vaccinate' Status

To be eligible for 'approved vaccinate' status on the National Sheep Health Declaration, sheep must be:

- vaccinated with an approved OJD vaccine before 16 weeks of age and marked with a 'V' National Livestock Identification System tag
- vaccinated after 16 weeks and from a flock that meets one of the following criteria:
  - registered to a SheepMAP flock
  - has returned a negative Pooled Faecal Culture 350 or High Throughput Johne's 350 in the two years before being vaccinated
  - has a current Abattoir 500 status.

OJD Update (cont.)

OJD on Kangaroo Island

Due to the efforts of the KI farmers by continuing to vaccinate against OJD and taking control measures, we have reduced the presence of clinical disease on the island considerably.

At the end of 2019:

- There are only a handful of properties with a known infected OJD status on KI
- There have been no new detections since voluntary testing has come in place
- No properties on KI are under quarantine order for OJD and trading options for infected properties have increased.

KEEP VACCINATING

Vaccinating sheep with Gudair® vaccine is highly recommended in high rainfall climates such as KI. This is especially important given the history of the disease on KI and the fact that many replacement stock from the mainland have been introduced since the fires. Many sheep without a known OJD status have been introduced, some from areas interstate with a high prevalence of disease. When you notice a problem at the 'tail' of the mob, the sheep most likely have had OJD for a few years already. That's why it's known as the 'silent disease'.

Vaccinating does not eradicate the disease and the bacterium can stay in the soil for many months, so if vaccinating discontinues clinical signs are likely to increase.

Vaccination must be complemented with sound biosecurity practises. The new One Biosecurity program provides the only credible framework for risk based trading. It also places biosecurity as a key factor for decision making in your livestock enterprise. All sheep and cattle producers in SA should be registered on the One Biosecurity web portal.

Take home messages

- KEEP VACCINATING!
- Know the disease status of livestock introductions.

For further information:

PIRSA Website:
www.pir.sa.gov.au/biosecurity/animal_health/sheep

Kate Buck, Animal Health Advisor:
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High Rainfall Farming

Building Resilience & Profitability

Background

This three year project is focused on building resilient farm businesses and strengthening farm decisions by combining the highly successful Grain & Graze decision making procedures with four key parameters of vital real time information:soil moisture, pasture availability, commodity prices and climate data.

Extensive workshops and activities are being delivered to farmers (especially women and young farmers) and the wider farmer industry to build confidence and skills. The culmination of the project will result in a website dashboard with optional push notifications of the four key parameters, thus providing information that increases farmer and agronomist ability to make better on-farm management decisions.

During 2019, four Women on the Land workshops were held; Sheep Health & Production by Colin Trengove, Grazing Management by Darren Gordon, Farm Communications by Jeanette Long and Soils & Pastures 101 by Lyn Dohle. The project involves a collaboration between Southern Farming Systems, Federation University (Ballarat), Glenelg Hopkins Catchment Management Authority, MacKillop Farm Management Group and Agriculture Kangaroo Island.

Results

The project is partially funding the installation of up to 30 soil moisture probes and the upgrade of up to 50 weather stations across the high rainfall zone in Tasmania, Victoria and South Australia. On KI, three 120cm deep Adcon soil moisture probes and weather stations were installed in April 2020. These are located at Buck's (Gosse), Heinrich's (Parndana) and Berry's (Birchmore). This information is uploaded every 15 minutes and can be found at the following web address:

http://toip-server.net.au:8080/custdata/agbyte/kihrz/agb_index.html

This website showcases the rainfall and temperature variability across the Island which is proving to be very interesting.

Pasture Availability

Quite possibly, the most exciting part of this project is the recalibration of the new and improved Pastures from Space. The project aims to be able to provide estimates of pasture availability from satellite images, such as growth rates and feed on offer. Another feature being worked on is estimating historic pasture growth in the paddock. There are 22 paddocks being monitored on 22 farms. The paddocks are in South Australia (7 sites – 2 on KI), South West Victoria (9 sites), Gippsland (2 sites) and Tasmania (4 sites).

On KI, pasture calibration cuts will be taken over the next two growing seasons (2020 and 2021), from a perennial kikuyu pasture on Bucks' and an annual pasture on Berrys'. The resolution of the new Pastures from Space is intended to be around 10m2 pixels instead of the previous 6ha pixel.

Snapshot of Birchmore's Adcon Telemetry live data

Funding/Sponsors:

National Landcare Program (Smart Farming Grants)

Berry Partners

Buck Pastoral

A, T & J Heinrich

AgKI for administering the funding

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Kangaroo Island Landscape Board

A message from the Chair

I would like to welcome the members of the inaugural KI Landscape Board, which will come into effect on the 1st July, including Ms Ros Willson, Prof Gaye Crowley, Mr Michael Pengilly, Mr Peter Davis, Dr Peggy Rismiller and Ms Jenny Stanton.

The KI Landscape Board will see a move to a board more at arms-length from government, with local accountability, re-setting the way our natural resources are managed, putting the community back at the heart of our work and driving genuine outcomes for levy payers.

Our back-to-basics approach will balance environmental sustainability with economic productivity, recognising that our ability to produce food and fibre from the land will only be viable, profitable and socially acceptable if the natural environment is also nurtured putting Kangaroo Island in a strong position to lead the way.

The Board will be there to help, working alongside landholders. From water management to sustainable agriculture, I hope that the board will quickly establish itself as an enabler for the community, a helping hand to strive for the same goals, not an obstacle that needs to be overcome.

Helping landholders to recover from the devastating bushfires will be central to the Board's projects and programs over the next few years.

Andrew Heinrich
Chair of the KI Landscape Board


Quentin Chester Photography

Overview of the Board's Resilient Agriculture Project

Tackle soil acidity — continue to support soil testing, provide interpretation and technical advice on what this means for productivity and management action, maintain the KI soils database and lime sands sale database.

Build soil health — continue the strong focus on exploring cost-effective ways of improving soil structure while building soil carbon and soil microbiota for improved production and profitability.

Refine grazing management systems — promote better management of pastures on the island, reducing soil erosion and improving pasture production.

Optimise native vegetation — maintain and enhance native vegetation so that it continues to deliver multiple production benefits, including shelter for stock, wind breaks, erosion and runoff control, pest suppression, landscape level resilience, and social amenity benefits.

Adapt to a changing climate — build local capacity and knowledge, support innovative approaches, trial new technologies, identify opportunities, support transition.

Adapt to a changing market — explore and promote ways that local producers can benefit from increasing investor and consumer demand for sustainable and ethically produced food and fibre, capitalizing on KI's brand image and maintaining social license to farm.

Tools & Tech — showcase and promote the uptake of existing and emerging tools and tech to improve on-farm decision making to improve production and profitability, improve environmental outcomes, facilitate adaptation, and build resilience.

Integrated Pest Management — increase knowledge and capacity relating to IPM principles and practices and how they can be used on KI to drive increased profitability and improved environmental outcomes.

This project is supported by the Kangaroo Island Landscape Board through funding from the Australian Government's National Landcare Program.

Kikuyu Pastures

Maximising Growth in Winter

Background

There has been widespread adoption of kikuyu by many farmers on Kangaroo Island and in many ways, it's a perfect fit. Kikuyu is tough, robust and responds well to any summer rainfall events. It stands up well to hard grazing and grows on most soil types. However, like many things, they are sometimes not quite as good as the advertising promises, and kikuyu's failure may be that it grows too well and can cause a lack of pasture feed during the winter months.

Many KI farmers have noticed a *'kikuyu induced winter drought'* when clovers struggle to perform. This can occur if there is a weak break of the season. The kikuyu outcompetes the clover seedlings and an excess of standing kikuyu biomass prevents light and moisture from reaching the soil surface.

What was done

Two demonstration sites were established to look at options to supress kikuyu growth to allow other pasture species to establish. The trials were on D & A Florence's property near Vivonne Bay and M & R Willson's property on Dudley Peninsula.

At each site, glyphosate @ 1L/ha (of 450g/L composition) and Clethodim @500ml/ha were applied in separate strips to suppress the kikuyu, in addition to a no herbicide treatment. As Clethodim is a grass suppressant, only the clover and clover + rye were seeded into the Clethodim strips. Clover (Seaton Park) @ 5kg/ha, Rye Grass (Adrenalin) @ 25kg/ha, clover + rye grass mix and Cape Barley (Forage Cereal) @ 60kg/ha were then seeded on strips across the herbicide and non herbicide plots. All treatments were compared to a buffer plot, with no herbicide and no reseeding (refer to Figure 1).

At both sites, additional demonstrations were established to investigate options to control silver grass in kikuyu pastures. The four treatments were applied; Clethodim @500ml/ha, Simazine @500g/ha, Simazine @ 1000g/ha and Clethodim @500ml/ha + Simazine @500g/ha. Plant counts were taken across all plots.

CLETHODIM	NO SPRAY	GLYPHOSATE
	Clover 5kg/Ha	
	Buffer	
Clover 5kg/Ha + Rye Grass 25kg/Ha		
	Buffer	
Rye Grass 25kg/Ha		
	Buffer	
Cape Barley 60kg/Ha		
	Buffer	

Figure 1: Demonstration plot treatment layout.

Results

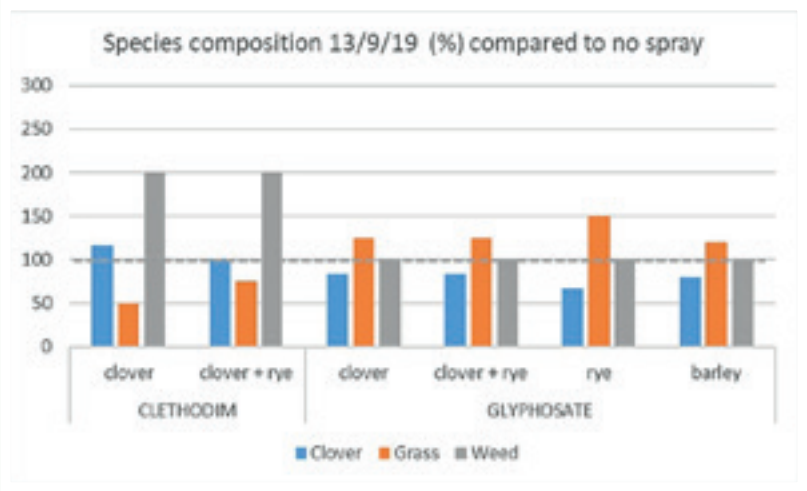
All sites were demonstration sites i.e. not replicated trials, therefore, care must be taken with the interpretation of results. The treatments were based on 'best practice' work conducted in WA and the sites were set up on KI to show what may be possible.

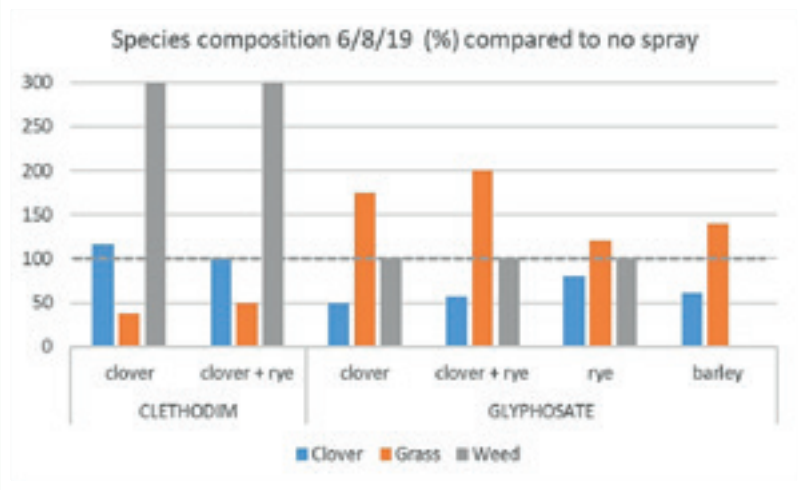
Kikuyu suppression with herbicides and adding extra pasture seed

Given the almost perfect start to the season in May 2019, the 'kikuyu induced winter drought' didn't really occur. Thus the existing pasture base of clover was not unduly supressed by the kikuyu. For this reason, the control plots (no seeding and no herbicide) performed as well as the treatments.

Clethodim is a grass selective herbicide and consequently suppressed the grass component, resulting in increased clover but also encouraged the dominance of broad-leafed weeds, especially capeweed. Glyphosate initially decreased the clover content in favour of the grasses, but this increase in grass effect lessened over time.

Work done interstate has shown that adding rye grass or forage cereals to the kikuyu, where there is a good clover base, can increase the amount of feed produced.





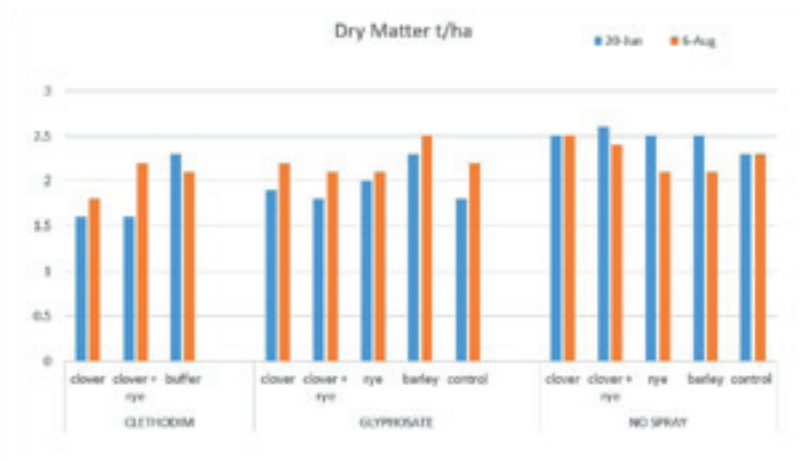


Figure 2: Options to Increase Pasture Growth

Kikuyu Pastures (cont.)

Silver grass control

Simazine and Clethodim are both used to control grasses and in this case, can be used to control silver grass. Compared to the control, simazine was the most effective treatment to control silver grass, which also increased the percentage of kikuyu. Doubling the rate of simazine from 500g/ha to 1000 g/ha did improve the control of silver grass, but more trials would be required to ascertain if the extra expense in chemical is warranted. Simazine works best if incorporated with moisture.

Clethodim only slightly reduced the impact of silver grass (trial work in WA has found it will supress but not kill silver grass). It also reduced the amount of rye grass and kikuyu. However, corresponding to the other demonstration work, it did increase the percentage of clover.

	% of total actual counts			
	Clover	Kikuyu	Sliver Grass	Rye Grass
CLETHODIM	36	25	29	11
CLETHODIM + SIMAZINE	31	51	2	16
SIMAZINE	18	61	2	20
SIMAZINE X2	20	61	0	20
CONTROL	17	33	32	18

Figure 3: Silver Grass Control

Take home messages

- If there is an early and good break to the season, chemical manipulation of kikuyu pastures may not be warranted
- If the kikuyu pasture has a good clover base, Clethodim will encourage the growth of clover but also broad leafed weeds
- If its late break or poor start, consider chemically suppressing the kikuyu and sowing in a rye grass or forage cereal
- Compared to the control, simazine was the most effective treatment to control silver grass and also increased the percentage of kikuyu.

Funding/Sponsors:
AgKI through the Australian Government National Landcare Program Smart Farms Small Grants
M & R Willson
D & A Florance

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Mixed Cover Crops

Testing for Sustainable Farming

Background

There has been much discussion around the globe about mixed species cover crops and their benefits - improving soil organic carbon, structure and health, along with decreasing weed and disease levels for following crops. Whilst cover crops are a key component of some farming systems overseas (e.g. parts of the USA) it is yet to be adopted widely in southern Australia.

The project which runs until July 2022 is a collaboration between the South Australian No Till Association (SANTFA), the Grains Research and Development Corporation (GRDC) and Ag Ex Alliance grower groups of which Ag KI is a member. It aims to support grower groups to identify and demonstrate the establishment and management of suitable multi species cover crops across a range of environments and assess the impacts of cover cropping on soil health, nutrient cycling, organic carbon, invertebrate populations and soil moisture.

In addition, whilst many potential cover crop species and varieties exist, there is a distinct lack of local knowledge to make informed decisions on appropriate cover crop species selection. Each grower group will have the opportunity to assess the suitability of potential plant species with a species evaluation screening. There will also be the opportunity to assess the optimum timing and alternative methods to terminate cover crops.

More information about the project can be found on the CSIRO website at:

https://research.csiro.au/mixedcovercrops/

Results

On Kangaroo Island there are two farmer demonstrations and a species evaluation screening.

Farmer Demonstrations

One of the farmer demonstrations is located on Boundary Road, Royston Park in the Hundred of Haines, belonging to Pontifex Farming. In December, a cover crop mix (canola, plantain, Japanese millet, sunflowers, forage brassica and turnips) were aerially spread by plane prior to harvesting the wheat in anticipation that the chaff would cover the seed. One strip was not aerially spread which was spread with straight French White millet seed. The wheat was also harvested at different heights – one with a stripper front and one with a conventional knife to a height of ~30cm.

The site received 60mm at the end of January and so there was successful establishment. Anecdotally, it appeared that the shorter stubble height and hence more chaff covering the seed, gave rise to higher plant establishment. There was a potential herbicide carryover which unfortunately saw the forage brassicas and turnips disappear ~2 months post germination possibly from Sakura carryover.

In autumn 2020, this paddock will be sown with a winter cash crop of broad beans and then another mixed species cover crop will be aerially spread pre-harvest. Once again, a strip will be left to be filled in with a single species, with four sections along this strip kept fallow as the control. Then in April 2021, soil samples will be taken from the wider paddock that contained the mixed species, the fallow (control) and the single species to evaluate any changes in the soil arising from the various plant species combinations.

The site will also host a roller crimper to assess its effectiveness in terminating the mixed species cover crop at various growth stages in Summer/ Autumn 2021.

Mixed Cover Crops (cont.)

The second farmer demonstration was earmarked for the property Dalmore at Stokes Bay of W & J Stanton. Fire raged through the site early January leaving behind no ground cover. French White millet, Tillage Radish and sunflowers were spread on the surface in anticipation of a large rainfall event at the end of January but with only 15mm falling there was only sparse establishment of the seeds in the wheel track turns.

After reconsideration, the Stanton demonstration will be rebirthed as a perennial mixed species demonstration located on the Caledonia property on Timber Creek Road. In autumn 2020, this will be sown to Holdfast GT phalaris, Monti & Yanko subterranean clover and Endurance plantain. This will obviously remain a permanent pasture. The reason for the relocation to the south east of Parndana was because NR KI are keen to measure invertebrate pests in the native vegetation compared with the paddock.

The pasture mix will be sown over the whole paddock with 4 x 30m seeder strips left unsown (control) and 4 x 30m strips sown with straight phalaris. In April 2021, soil samples will be taken from the wider paddock, the control and straight phalaris strips to evaluate any soil changes between the various species composition.

Species Screening Evaluation

There are many potential cover crop species available to farmers. After a comprehensive literature review performed by Jenny Stanton as part of the project, which can be found on the website listed above, ten species were shortlisted. On November 27th 2019 with assistance from Damon Cusack NR KI, 14 treatments, with four repetitions totalling 56 plots, were sown into dry soil on the expectation of rain that failed to eventuate on the property 'Dalmore'.

Jenny Stanton standing next to the AgKI plot seeder after sowing the species evaluation screening trial.

The aftermath of the species screening evaluation trial 8 days post incineration.

The species chosen were; Tillage Radish, Red Caloona cowpeas, safflower, cereal rye, linseed, Shirohie millet, French White millet, Bennett winter wheat, buckwheat, sunflower and the mix "Summer Max" from AGF Seeds which is a blend of Greenland forage rape, Tillage Radish, Crown sorghum and Shirohie millet.

Unfortunately, the site was incinerated on the 3rd January by the bushfire storm that ripped through the property, so the evaluation will be repeated in spring 2020.

Take home messages

- If spreading cover crop seed on the surface, aim to spread prior to harvest and harvest low so that there is a good covering of chaff on the seed.
- If there is no cover – it needs to be sown into the soil or else have a decent rainfall event of 40-60mm which is highly unpredictable/ unreliable in summer!
- Be wary of herbicide residues in your selection of species.

Acknowledgements:
National Landcare Program (Smart Farming Grant)
Pontifex Farming
Stanton Family
NR KI for assisting with seeding
Ag KI for administering the funding

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Soil Health Report

Results from 2018-19 Soil Tests

Background

In 2018-19, Agriculture Kangaroo Island (AgKI) received funding and support from the Australian Government National Landcare Program Smart Farms Small Grants (through NR-KI) and PIRSA, to assist landholders to undertake soil testing on their properties and provide interpretation of soil test results. Soil test kits were made available to all producers via the Kingscote PIRSA Office and soil augers made available for loan. In the 2018-2019 season, 24 Kangaroo Island farmers submitted 117 soil samples for testing.

Results

Soil pH

Soil pH is important for optimum production of crops and pastures. If the soil pH falls below pH 5.5 ($CaCl_2$) then nutrients such as phosphorus, magnesium, calcium and molybdenum become less available; microbial activity starts to decline (including Rhizobia) and toxic amounts of aluminium can be released into the soil solution. (Refer to Table 1 for minimum pH targets.)

Table 1: Target for minimum Acidic pH

Land Use	pH ($CaCl_2$)
Extensive Grazing	5.0 – 5.5
Intensive cropping/grazing	5.5
Most horticultural crops	5.5 – 6.5

Most soil samples taken during the 2018-2019 season were below critical pH levels. Figure 1 shows that the average pH in all Hundreds were below 5.5 (pH $CaCl_2$). Six of the seven Hundreds had an average pH of 5.2 or below. At these levels, pH will be limiting farm productivity and profitability and therefore liming should be a high priority.

Salinity

Saline soils are defined as soils that contain a high enough level of soluble salts in the root zone that can adversely affect plant growth. Ideally, soils should have a salinity level of less than 2 dS/m (for salt sensitive plant species). Of the soil samples taken in this period, all samples were below 2 dS/m.

Organic Carbon

The organic carbon test is a useful indicator of organic matter status, therefore of overall soil fertility, microbial activity, and the structural stability of the soil. The ideal target level of organic carbon varies with soil type i.e. sandy soils greater than 1% is desired, through to greater than 2% in clay soils. Of the soils tested, all were well above critical values.

Soil Nutrients

Maintaining an adequate nutrient status in the soil is paramount to determining the productivity of the soil. Phosphorus, potassium and sulphur are essential nutrients for plant growth and yield. (See Table 2 for target levels).

Table 2: Target levels for essential nutrients

Soil Nutrients	Target levels	
	Ironstone Soils	Sandy Soils
Phosphorous (Colwell)	35-45 mg/kg	>20 mg/kg
Potassium (Colwell)	>120 mg/kg	>120 mg/kg
Sulphur	6-8 mg/kg	>10 mg/kg

During 2018-2019, almost all of the samples collected from Hundreds with predominantly sandy soils had phosphorus levels greater than 20 mg/kg. Of the Hundreds with predominantly ironstone soils, about half of the samples had phosphorus levels lower than the recommended level of 35-45 mg/kg (Figure 2).

The majority of soil samples in all Hundreds had potassium levels above 120 mg/kg (Figure 3).

Of the Hundreds with predominantly ironstone soils, the majority of samples had sulphur levels greater than 6-8 mg/kg (Figure 4). Of the Hundreds with predominately sandy soils, the majority of samples from the Hundred of Haines were below the critical value of 10 mg/kg.

Figure 1: Average soil pH($CaCl_2$) results for each Hundred during the 2018-19 season. The black line indicates the target pH level of 5.5($CaCl_2$)

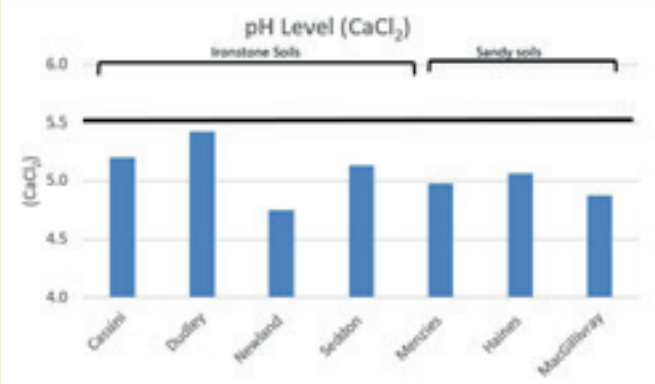


Figure 2: Average soil phosphorus levels for each Hundred during the 2018-19 growing season. The black lines indicate the target soil phosphorus levels for both sandy soils and ironstone soils.

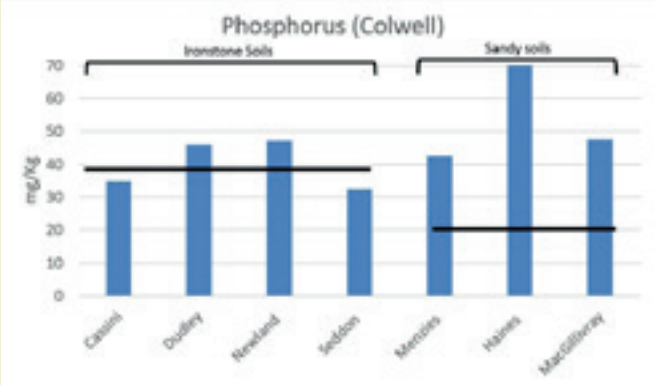


Figure 3: Average soil potassium levels for each Hundred during the 2018-19 season. The black line indicates the target soil potassium level of 120mg/kg.

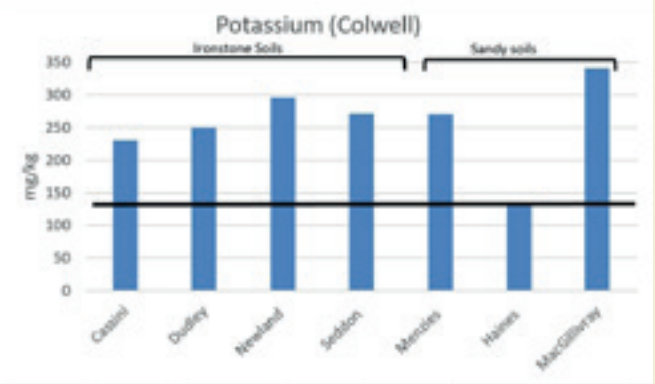
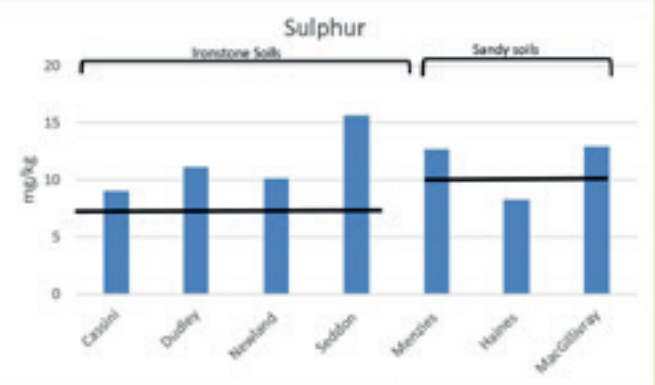


Figure 4: Average soil sulphur levels for each Hundred during the 2017-18 season. The black line indicates the target soil sulphur levels.



Soil Health Report (cont.)

Table 3: Summary of Results for Sandy Soils

Note mg/kg is the same as ppm

	pH level ($CaCl_2$)	Phosphorus (mg/kg)	Potassium (mg/kg)	Sulphur (mg/kg)	Conductivity (dS/m)	Organic Carbon (%)
	Target Levels of Sandy Soils					
	>5.5	>20 mg/kg	>120 mg/kg	>10 mg/kg	0-2 dS/m	>1.0%
HUNDRED (no. samples)	Average (range)	Average (range)	Average (range)	Average (range)	Average (range)	Average (range)
Haines (19)	5.1 (4.3 – 6.4)	73 (5 – 461)	134 (33 – 433)	8 (1.3 – 13.6)	0.07 (0.01 – 0.157)	2.3 (1.04 – 3.8)
MacGillivray (23)	4.9 (4.4 – 5.4)	48 (19 – 94)	341 (59 – 868)	13 (4.8 – 29.2)	0.12 (0.041 – 0.174)	3.8 (2.22 – 4.84)
Menzies (14)	5.0 (4.3 – 5.8)	43 (15 – 82)	271 (116 – 425)	13 (6.2 – 65.9)	0.20 (0.097 – 0.977)	2.9 (2.28 – 4)

Table 4: Summary of Results for Ironstone Soils

	pH level ($CaCl_2$)	Phosphorus (mg/kg)	Potassium (mg/kg)	Sulphur (mg/kg)	Conductivity (dS/m)	Organic Carbon (%)
	Target Levels of Ironstone Soils					
	>5.5	>35-45 mg/kg	>120 mg/kg	6-8 mg/kg	0-2 dS/m	>2.0%
HUNDRED (no. samples)	Average (range)	Average (range)	Average (range)	Average (range)	Average (range)	Average (range)
Dudley (43)	5.4 (4.6 – 7.6)	46 (15 – 103)	250 (71-504)	12 (3.5 – 22.1)	0.13 (0.049 – 0.296)	3.1 (1.06 – 5.91)
Cassini (6)	5.2 (4.9 – 5.4)	35 (24 – 64)	231 (156 – 313)	9 (7.7 – 11.2)	0.16 (0.129 – 0.238)	3.6 (2.88 – 4.67)
Newland (6)	4.8 (4.4 – 5.2)	47 (9 – 115)	297 (215 – 493)	10 (4.7 – 15.2)	0.10 (0.042 – 0.193)	4.1 (2.78 – 5.05)
Seddon (6)	5.1 (4.7 – 5.6)	33 (23 – 60)	272 (211 – 323)	16 (13 – 17.8)	0.18 (0.113 – 0.314)	4.8 (4.32 – 5.57)

Summary

The 2018-2019 soil tests carried out by Kangaroo Island farmers indicate that overall, soils in the area are on target or above for organic carbon. All hundreds, except for Haines, were on target or above for potassium, except for some soils in the Hundred of Haines

The average soil phosphorus levels were low in the predominantly ironstone soil Hundreds and sulphur levels were also low on some properties especially with sandy soils. Across the Island, soil pH ($CaCl_2$) levels were below critical values. Areas where low pH is occurring will reduce the availability of essential nutrients such as phosphorus to the plant and will result in limiting overall farm productivity.

The most cost effective and practical way to address low pH is through the application of lime. Low nutrient levels can be addressed through the application of fertilisers. Always seek advice from your local agronomist or consultant to ensure you are applying the right fertilizer or lime at the correct rate.

Soil types vary within each Hundred, so care must be taken in the broader interpretation. In addition, the data only reflects the number of samples taken in each Hundred, which may represent only a few properties. The data and resultant graphs can only be interpreted to the point of identifying trends over time.

Take home messages

- Soil testing is essential for monitoring soil fertility levels
- Of all the soil samples taken the majority were below critical levels for pH
- Phosphorus levels were low on some properties particularly with ironstone soils
- Sulphur levels were low on some properties especially with sandy soils.

Funding/Sponsors:

Agriculture Kangaroo Island through the National Landcare Program Smart Farms Small Grants

KI NRM Board (now KI Landscape Board) through the Australian Government's National Landcare Program

PIRSA

Note: The information used was sourced from individual Kangaroo Island Farmer soil tests and analysed using CSBP Analytical Laboratory.

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Lime Trials

Background

Soil acidification affects 40% of topsoils and 30% of subsurface soils across South Australia, at an annual loss of production cost of $88 million (2018). Liming your soil has the potential to save you yield penalties, but how do we do this most effectively and efficiently? This three-year research trial aims to investigate the impact of precision lime application rate, placement and product on cropping land and will evaluate cost effective ways to ameliorate subsoil acidity. There are two parts to the trial:

- Rate response trial – comparison of three rates of surface-applied lime sand with a control (no lime)
- Novel treatment (rate, incorporation) trial – comparison of two rates of lime sand, comparing surface-applications of the different rates, plus seeing what the effects of incorporation of a high rate of lime are, using offset discs (10-15cm) to manage sub soil acidity.

AgKI are delivering the trial as part of this multi-state project. There are 10 sites in total – one on Kangaroo Island, two in the South East of South Australia, two in Tasmania, two in Gippsland and three in Southwest Victoria. The project will run over three seasons, finishing in June 2022.

Other partners involved in this project are Precision Agriculture, Federation University (CeRDI), Australian Fertiliser Services Association, Victorian Lime Producers Association, Victorian Department of Agriculture and Glenelg Hopkins Catchment Management Authority.

What was done

The trial site was established in early 2019, on Simon & Marissa Veitch's property off Jenkins Rd, MacGillivray. The starting topsoil (0-10cm) $pHCaCl_2$ was 4.8; for the rate response trial, the following treatments were randomly applied in four replicates, using lime sand:

- Control: no lime was applied
- Treatment 1: low rate of 0.5t/ha to target a rise in $pHCaCl_2$ from 4.8 to 5.0 (0.6t/ha lime sand)
- Treatment 2: moderate rate of 1.8t/ha to target a rise in $pHCaCl_2$ from 4.8 to 5.5 (2.4t/ha lime sand)
- Treatment 3: high rate of 3.2t/ha to target a rise in $pHCaCl_2$ from 4.8 to 6.0 (4.1t/ha lime sand)

For the novel treatment trial, four treatments and a control were applied in four replicates at each site, to improve the starting $pHCaCl_2$ from 4.4 (topsoil 0-10cm), 4.6 (subsoil 10-20cm) and 4.9 (20-30cm) to 5.8 (0-10cm), 5.3 (10-20cm) and 5.0 (20-30cm). A set of offset discs were used to incorporate the lime in applicable plots. The treatments are as follows:

- Control: No lime + no cultivation
- Treatment 21: Farmer rate surface lime – applied at 1.85t/ha (2.5t/ha lime sand)
- Treatment 22: High rate surface lime – applied at 4.0t/ha (5.4t/ha lime sand)
- Treatment 23: High rate surface lime + incorporation – applied at 4.0t/ha (5.4t/ha lime sand)
- Treatment 24: Incorporation only (no lime)

The site was sown with lupins on 13 May 2019, in a lupins/wheat/wheat rotation. Monitoring was undertaken throughout the year, including establishment counts (June/July) and vigour scores (September). The site was harvested on 7 December 2019. Pre-seeding soil sampling will be undertaken in April/May 2020.

Results

A summary of the first year of monitoring results is included below. Note that it is the first year of monitoring and we wouldn't expect to see significant results due to the slow nature of lime mobilisation.

The highest yielding treatment on average was the high rate of lime to pH 6.0 in 0-10cm, which yielded 3.16t/ha, closely followed by the control (no lime), which yielded 3.15t/ha. The moderate rate and low rate performed similarly, with an average difference of 0.01t/ha between them, yielding 3.07t/ha and 3.06t/ha, respectively. In the novel treatment trial, the high rate + incorporation treatment was the highest yielding on average, at 2.83t/ha. Incorporation only treatments yielded on average 2.77t/ha, surface high rate yielded 2.65t/ha, surface lime farmer rate yielded 2.49t/ha and the control yielded 2.30t/ha. Yield was not significant.

There was a significant difference in $pHCaCl_2$ in the surface (0-10cm) for the incorporation trial, where surface lime farmer rate (2.5t/ha) is significantly different to the incorporation only treatment, but not significantly different to the control.

Establishment ranged between 9.36 and 15.11 plants/m2 on average. The surface lime farmer rate (2.5t/ha) was significantly different to the other treatments. However, this did not follow through to yield (not significant). Vigour was scored visually and ranged between 2.00 and 4.75 on average, and was not significant. Protein and moisture were not significant.

Table 1: Lime rate response and novel treatment summary statistics.

TREATMENT	$PHCaCl_2$ 0-10cm		Establishment (plants/m^2)		Vigour (visual score 1-6)	Yield (t/ha)	Protein (%)	Moisture (%)
Lime to pH 6.0 in 0-10cm	4.29	a	10.25	a	3.25	3.16	28.60	10.93
Control 1	4.29	a	10.32	a	4.25	3.15	28.13	11.13
Lime to pH 5.5 in 0-10cm	4.27	a	11.29	ab	4.00	3.07	28.65	10.98
Lime to pH 5.0 in 0-10cm	4.31	a	9.36	a	4.50	3.06	28.88	10.95
High rate + Incorporation	4.35	ab	11.18	ab	2.00	2.83	29.00	10.75
Incorporation only	4.24	a	11.21	ab	3.25	2.77	28.88	10.85
Surface high rate	4.29	ab	12.43	ab	3.25	2.65	28.43	10.85
Surface lime farmer rate	4.43	b	15.11	b	4.75	2.49	29.00	10.93
Control 2	4.40	ab	13.46	ab	3.88	2.30	28.95	10.88
Mean	*4.32*							
l.s.d	0.13							
P Value	0.04							
CV %	1.90							

Lime Trials (cont.)

Take home messages

- The target soil pH$CaCl_2$ range in a cropping system is between 5.5 and 6.5
- We know lime moves slowly: **1cm per year**; if you have a subsurface acidity issue, it will be more efficient to incorporate lime, rather than to leave it on the surface
- In the first year of monitoring, establishment and lime in the 0-10cm showed significant differences between some treatments. This did not follow through to significant differences in yield. Monitoring will continue for another two years.
- Tools are available to help you understand the economics
  - **Lime Cheque:** estimate lime application rates for acidic soils & compare the costs of lime from different suppliers
  - **Acid Cost:** estimate the losses in production for a farm business caused by acidic soils
  - **Maintenance Lime Rate Calculator:** estimate the replacement lime required to counteract the annual acidification of the surface soil layer

Funding/Sponsors:

Agriculture Kangaroo Islandin conjunction with Southern Farming Systems, through funding from the Australian Government's National Landcare Program.

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Soil Testing

Making the Best of Technology

Background

Precision Agriculture (based in Victoria), has now been mapping paddocks on KI since 2013. But are we making the best use of this technology? It's one thing to have the 'pretty maps' and a spreader that will apply lime and fertiliser to match paddock variability, but how does that relate to grazing pressure and other sub-soil constraints? Can Normalised Difference Vegetation Index (NDVI) and Electromagnetic (EM) mapping be used to determine what factors are important in driving pasture growth rates?

NDVI is one of the many vegetative indices to quantify plant growth/biomass. It is calculated from reflected wavelengths captured by a multi spectral camera mounted on a drone, plane or satellite. NDVI uses red and near-infra-red wavelengths (NIR). All plants reflect blue, green and red light but healthy plants reflect more infra-red light than stressed or dead plants. The NDVI values are generally from 0 to 1 with 1 being the healthiest. A very low number usually indicates bare ground. Plants not photosynthesising will have a value of less than 0.45. For healthy plants NDVI is generally between 0.45 and 0.8.

The NDVI shows the relative variations in pasture growth but it does not identify the limiting factors and therefore ground truthing is important. If there are low values and if agronomic issues such as diseases or pests or other issues such as waterlogging have been eliminated then it is likely to be a soil issue.

EM38, or electromagnetic induction mapping, transmits an electromagnetic signal into the soil and receives the magnetic field and the difference is measured. The strength of the signal received can be used to measure sub-soil characteristics including moisture, soil texture (amount of clay) and salinity as well as identifying potential constraints.

What was done?

Two demonstration sites (Rick and Annie Morris's, Mt Taylor Rd (paddock Bunkers North and South) and Bolto Partners, Woods Rd (paddock Bills A & B) were set up to correlate pH and nutrient mapping (using Precision Agriculture) (refer to Figure 1), with NDVI pasture growth monitoring (using Decipher), and sub-soil constraint mapping (using EM38).

This project used Decipher, that is a free on-line NDVI web-site that uses satellites with a 10 metre resolution. This was used to correlate soil data with pasture growth rates. The NDVI data is a composite of stacked data over time from the peak growing period (July to October). It is likely that NDVI would correlate with soil pH, phosphorus, exchangeable sodium percentage (ESP) and other soil properties. Refer to Figure 2.

An EM38 survey was undertaken at both sites, mapping at two depths 0 - 0.75m and 0 - 1.5m to determine if there were any correlations between soil properties mapped by Precision Agriculture and EM38.

Results

Table 1 shows the correlation between NDVI and EM38 with soil properties. An R2 => 0.6 means that there was an equal or greater than 60% correlation. Where there is no correlation, is an indication that the soil factors are already at satisfactory levels, so that they are not a driver of pasture growth/biomass (NDVI). For NDVI, the highest correlation with soil properties was with potassium (R2=0.71) and magnesium (R2=0.70) for Bunkers north; soil pH for bunkers south (R2=0.65); and soil pH for Bills B (R2=0.72).

On the Bunkers paddock, it appears that soil pH (south), potassium (north) and magnesium (north) may be the limiting factors for pasture growth. In the Bills paddock, soil pH (Bills B) may be the limiting factor for driving pasture growth.

Figure 1: PrecisionAg soil mapping data Morris site

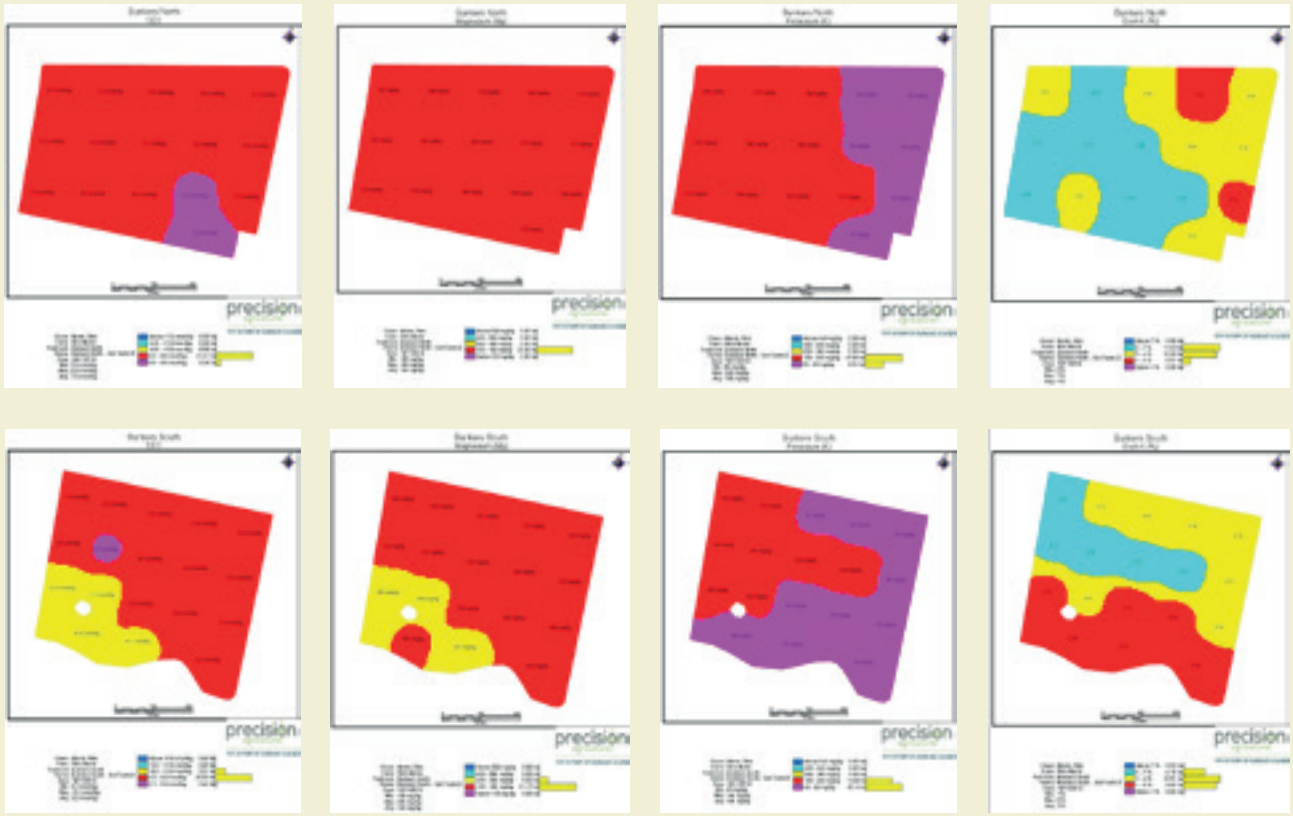
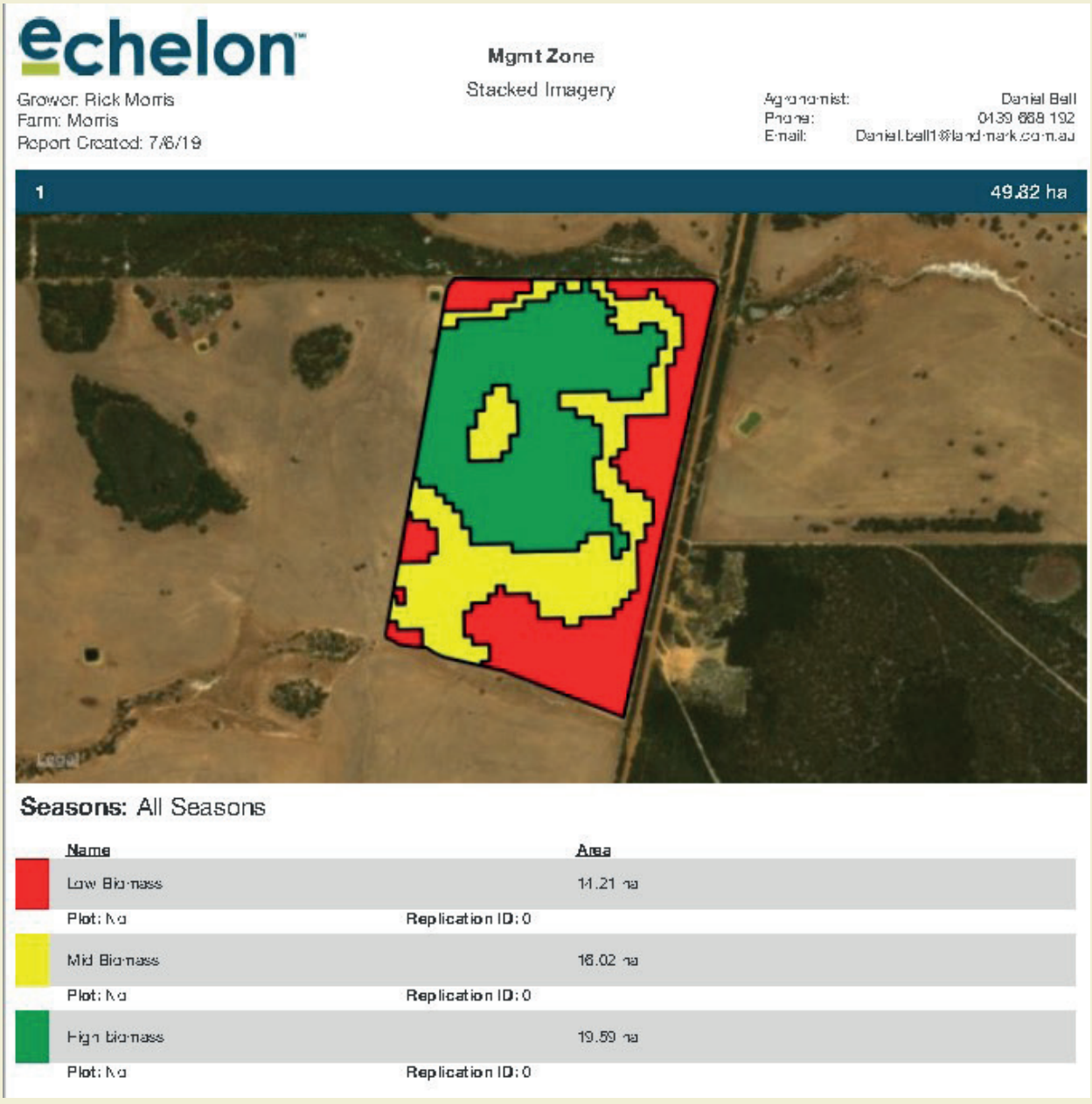


Table 1: Correlation between NDVI, EM38 and soil properties

PADDOCK	R^2=>0.6 compared to NDVI	R^2=>0.5 compared to NDVI	R^2=>0.6 compared to EM38 (shallow & deep)	R^2=>0.5 compared to EM38 (shallow & deep)
Bunkers North	Potassium (K), Magnesium (Mg)	pH, cation exchange capacity (CEC), Exchangeable K EM38 shallow		
Bunkers South	pH	K, Exch K, Exch Mg	CEC, Exch Na, Exch K, Mg, Ca, Na	CA, Mg
Bills A	Nil	K, Exch Sodium (Na)	Exch Na, Na, exch Ca, Mg	
Bills B	pH	Calcium (Ca), CEC		Mg

Figure 2: NDVI data Morris site



Soil Testing (cont.)

Where the soil pH, potassium and magnesium are low this is likely to be having an impact on pasture growth (low NDVI). Once the soil pH and potassium levels are improved then this could lead to better pasture growth /biomass and improved NDVI. The ideal soil pH is 5.5 ($CaCl_2$) and for potassium greater than 120 mg/kg.

For EM38 (shallow and deep) the highest correlation with soil properties was mainly with the cation exchange capacity and exchangeable cations (calcium, magnesium, potassium and sodium). The cation exchange capacity (CEC %) is related to the amount of clay within the soil. The higher the conductivity (or EM38 reading) the higher the amount of clay and therefore generally the higher the CEC.

There was a high correlation with sodium (%) with EM38 (shallow - deep) for Bunkers combined (R2=0.70 - 0.68); Bunkers south (R2 0.88 – 0.85) and Bills A (R2 0.92 – 0.89) and this could be due to the impact of high sodium (sodic soils), where the exchangeable sodium percentage (ESP) is greater than 12%.

Summary

In summary, NDVI is a guide for pasture growth and there are now many NDVI on line programs. However, these only indicate pasture growth and not the limiting factors. EM38 is used to pick up the conductivity of soil properties including soil texture (clay) and salt. For both NDVI and EM38 ground truthing is important.

Take home messages

- NDVI is a tool to measure the health and vigour of plant growth.
- Low NDVI levels can show that there are limitations to plant growth. If agronomic factors such as pests and diseases and other factors such as waterlogging are eliminated, then soil factors are likely to be an issue.
- EM38 can be used to measure soil texture (clay), CEC, salinity and other sub-soil constraints.
- At the Morris site the key limitation to productivity was potassium and magnesium and at Bolto's it was pH.

Funding/Sponsors:

Agriculture Kangaroo Island through the Australian Government National Landcare Program Smart Farms Small Grants

Rick & Anne Morris

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Carbon Farming

Kangaroo Island Biodiverse Carbon Pilot Project

Background

In 2018, Kangaroo Island was identified by the Department for Environment and Water (DEW) as a primary location for carbon farming due to the climate, location, and potential brand marketing opportunities for local farms and businesses. Through a Kangaroo Island Biodiverse Carbon Pilot, a number of findings were made on revegetating land and earning carbon credits through the Commonwealth Government's Emission Reduction Fund (ERF).

A key principle of the project was to grow biodiverse native vegetation to maximise on-farm benefits while minimising the impact on prime agricultural land. Most importantly, the project aimed to reveal the benefits and barriers to carbon farming, as it is still a novel land management option currently with low levels of uptake and understanding in South Australia.

In November 2018, Kangaroo Island NRM Board put out a call for Expressions of Interest from private landholders to participate in the pilot. The pilot focused on two ERF revegetation methods for storing carbon, Human Induced Regeneration (HIR) and Environmental Planting (EP). HIR projects achieve revegetation through natural regeneration, while EP projects involve active revegetation through planting of tube-stock or direct seeding.

Results

The results of the pilot concluded that there is good potential for carbon farming on Kangaroo Island through establishment of HIR projects in areas of periodically cleared mallee. The business case for such projects is strong with low establishment costs and attractive profits from projected carbon credits. The management action for these projects could simply be to cease periodic clearance and potentially fence off the project area. Good records of land management activities need to be kept for at least ten years prior to registration. This can include photos, invoices, diary records, etc.

The pilot further found that, compared to HIR projects, Environmental Planting projects faced more challenges. Several Environmental Plantings, often with the intended agricultural function of providing shelter to stock, were found to be too small to be economically viable. From the perspective of a carbon project developer, planting areas of at least 20 ha are needed. It is worth noting that one of the recommendations delivered by a recent expert review of the ERF was for the Commonwealth to "Create tailored small-scale ERF methods for particular types of agriculture projects, including shelterbelts", that would offer "…streamlined measurement, reporting and verification requirements, reducing transaction costs and driving participation from small agriculture projects".

If the carbon price increases in the future these smaller project areas may become more economically viable even in the absence of new methods. The pilot has increased understanding of costs and revenue associated with undertaking carbon-farming projects through the ERF.

There are also potential alternatives to ERF participation, with organisations such as Trees for Life and GreenFleet having carbon programs that allow for smaller project areas. These programs will pay for project establishment costs but with no ongoing carbon credit revenue for the landholder.

Carbon Farming (cont.)

Some potential planting projects were found by Council to be located on “prime agricultural land” or to be commercial block plantings and therefore classified as “Forestry”. As a result, these projects were not compliant with local planning provisions. The Department for Environment and Water will look to work with Kangaroo Island Council and other local government authorities to develop guidelines that clarify where and how carbon farming projects could be implemented on private land.

The December-January bushfires did have an impact with private landholders reassessing their priorities. Consequently, the tubestock and seed that had been earmarked for the pilot have now been gifted to KI Nursery to assist with the bushfire recovery effort.

Funding/Sponsors:

The Biodiverse Carbon Credit Pilot Project is a South Australian State Government funded project.

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Or go to the NRKI website at:
https://www.naturalresources.sa.gov.au/kangarooisland/land-and-water/KI_Biodiverse_Carbon_Credit_Pilot_Project

Bats

Their Role in an Agricultural Landscape

Background

Insectivorous bats save billions of dollars to the US agricultural industry in insect control. Preliminary investigation by J. Kuhne (2019) of the critically endangered southern bent-wing bat at Naracoorte, South Australia, over a brief period showed that bats consumed at least 67 moth species, several of which are considered pests of the agricultural industry (of 32 identified species, 13 were labelled agricultural pests, and the status of 11 others was unknown). Several international studies demonstrate the positive impact of bats on cropping, but few studies have taken place in Australia. In addition, bats can significantly reduce insect loads on livestock. Insect control by bats is an important part of the green and healthy image of an agricultural region.

Many people have observed bats in their sheds or houses (often the lesser long-eared bat) and believe as a consequence that bats are abundant. However, we have at least 7 bat species on Kangaroo Island, and not all are widespread. Different bat species may feed on different insects, so bat diversity is important when insect control is considered.

Chocolate wattled bat hunting insects by echolocation.

Bats (cont.)

Survey of the bats of Kangaroo Island

The University of South Australia is conducting the first ever systematic bat survey of the island to determine what bat species are associated with what geographic locations and conditions, and the impact of this summer's bushfires on the bat populations. The fires burnt the bat detectors that were on the western side of the island, so funding is being sought to continue the survey, and some detectors will be borrowed.

A project involving the community comprises the construction and deployment of nest boxes for bats, with the objective of facilitating the survival of bats in burnt landscapes. These boxes are measured, individually numbered, and geolocated. They will be monitored to determine what species benefit from what types of nest boxes. All work is guided by scientific principles so that findings may be analysed and questions answered, with implications for agricultural management as well as bushfire recovery.

Diet of the bats of Kangaroo Island

When the survey of the bats is completed and the data have been analysed, the diet of bats will be sampled to determine what species eat what insects, but funding will be necessary before this second project can start.

Assistance is sought from the agricultural community to:

- Authorise bat surveys on properties. (Detectors of high-frequency sounds made by bats when they hunt insects are left from 2-4 nights and then removed. They do not record other sounds such as voices.)
- Authorise the deployment of nest boxes on their properties (burnt and unburnt sites on the Western half of KI)
- Collect dead bats for the SA Museum (DNA analysis)
- Authorise bat trapping possibly later on this year. (Bats are trapped and marked with glow tags that fall off after a little while. They are then released, and their calls are vouchered once the species has been identified.)
- Identify location of roosts (sheds, trees, etc.).

For further information and participation:

If you are interested in participating in the discovery of the role of bats in agricultural landscapes on KI, please contact:

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