

MALLEEFARMER

ISSUE 14 • Autumn 2019



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Say hello to Kate
our new reporter



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Sheep and goat
EID update



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Ripper of a time
in the Mallee

***Celebrating Rob Sonogan's
outstanding contributions
to Sustainable Farming in
the dryland Mallee***



Australian Government

National
Landcare
Program



mallee
catchment management authority

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Glen Sutherland, Mallee CMA

Chair's Report

Sharyon Peart

Chairperson, Mallee CMA Board

Welcome readers to our first edition of 2019 of the Mallee Farmer magazine.

The summer season has been dry and very hot and our farmers across the Mallee are looking to see a wet break coming in autumn but the current prediction from the Bureau of Metrology isn't looking that way.

In this edition we are wishing Rob Sonogan the best in retirement after 40 years in the industry. He has provided so much information and knowledge to the Mallee region over his years in agriculture. And as our interview with Rob states "... he has been one of our most valued contributors, the author of our Seasonal Update for more than 20 years." We wish him the best for the future.

We also welcome Kate Wilson from AGRIVision Consultants who will be now providing the Seasonal update. Kate is a partner in a large grain producing operation in Victoria's

Southern Mallee region. Kate and her husband Grant are fourth generation farmers and with their two children they produce wheat, canola, lentils, lupins and field peas. Kate has been an agronomic consultant for more than 20 years, servicing clients throughout the Mallee and northern Wimmera.

We have some great articles in this edition on adapting to climate change, sustainable farming changes, the role of drones in agriculture, Mallee fowl volunteers and a Mallee Landcare update amongst others.

I also wanted to congratulate Mallee Sustainable Farming on their 21st year of operation. We have been great partners with MSF and look forward to continuing our involvement with them into the future.

Thank you to all the writers of our articles for this edition and I wish you all a productive 2019.



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Seasonal Conditions Update

By Kate Wilson

Senior Consultant, AGRIVision Consultants PTY LTD.

In this edition Mallee Farmer welcomes our new Seasonal Conditions Correspondent Kate Wilson. Kate is a partner in a large grain producing operation in Victoria's Southern Mallee region. Kate and her husband Grant are fourth generation farmers and with their two children they produce wheat, canola, lentils, lupins and field peas. Kate has been an agronomic consultant for more than 20 years, servicing clients throughout the Mallee and northern Wimmera. Kate is passionate about producing high quality grain, whilst enhancing the natural ability of the soil to do so. Kate is also passionate about research and the extension to bring about positive practice change to growers, a mission Kate actively undertakes as a member of the Grains Research and Development Corporation (GRDC) Southern Region Panel. Over to you Kate.

As I sit and write my final draft of this my first Seasonal Conditions report for Mallee Farmer, I have to readjust my rainfall figures. In many areas of the Mallee we have gone from miserable 80-100mm rainfall amounts up until early December to having received similar to double that amount



Kate Wilson

in a three day period in mid-December!

We have gone from one of the worst droughts in recent history to stories of growers sowing summer feed and cover crops! Only in the Mallee.

Given the extremely low growing season rainfall (GSR) across the region there have been some extraordinary yields.

Soil type, rotation and summer weed control were the deciding factors when GSR varied little from 70-100mm across the Mallee.

The better Mallee sandy/loam soils produced science-defying water use efficiencies (WUE) with yields of 2-3t/ha for cereals on 80mm GSR. Whilst these were the exception rather than the rule,

many growers were amazed at some of the yields attained.

Equally, cereals grown on heavier soil types with less favourable rotations struggled, with many yielding less than 0.5t/ha.

Frost was also a major limiting factor to yield in 2018. Unrelenting sub-zero overnight temperatures during flowering devastated many crops.

The highlight though was the record high prices for hay due to the continuing dry throughout NSW & QLD.

Unprecedented amounts of Mallee hay derived from the favourable 2017 season headed north and at record prices, in excess of \$400/t at the height of demand.

Coupled with excellent prices for cereals, lupins, peas and

beans and rising prices for lentils (many of which were held over from the big year of 2017), many growers have been able to minimise losses from what once would have been a disastrous season.

What a testament to farming practice change. Direct-drilling has changed the landscape of the Mallee. Coupled with improved varietal traits, new generation herbicides and built-for-purpose machinery, we are now able to endure an extremely low rainfall year, not just with minimal erosion but also minimal negative economic impact.

So, where to in 2019 and beyond?

Soil Testing

It is very tempting to minimise fertiliser applications after a drought year and that's a sound economic decision.

Our challenge this year though is the wide range of yields and fertiliser use/removal across our farms and paddocks.

Failed crops can have minimal phosphorus under the next crop, providing your P levels are above the critical required level.

Following a replacement theory (requirement and removal), a 0.5t/ha crop would require around 20kg of monoammonium phosphate (MAP) or 4.4kg P. Taking into account phosphorus being highly immobile and the spatial variability (how close the individual granules are) of fertiliser it may mean some plants cannot actually access adequate P in the critical first four to six weeks of growth.

Getting the rate up around 35kg MAP or 7kg P allows for the soil bank to be maintained as well as providing adequate starter P nutrition.

This will all vary greatly so soil-testing will be required to ascertain starting P levels.

Normal starter nitrogen levels will be the norm, 15-30 units of N depending on seeding system.

New Research -Sandy Soils Project

Frontier Agriculture is currently overseeing a GRDC Sandy Soils project, looking at soil amelioration and amendments.

There have been some really encouraging results thus far

and we should all be excited by the learnings we will gain from this project.

For more information

More information about the project here: <https://grdc.com.au/newsand-media/news-and-media-releases/south/2018/11/research-unlockingopportunities-to-conquer-sandy-soils>

Summer Weed Control

Twitter was abuzz this harvest with photos of summer spray misses and the negative impact on crops. Moisture conservation is king and is never more evident than in a dry year. Not only is summer weed control essential for moisture conservation, but also in controlling the green bridge. Aphids, including Russian Wheat Aphid, rust and other diseases can be minimised if we all control the green bridge over summer and throughout autumn.

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Mallee Farmer farewells Rob Sonogan

By Jacinta Allen-Gange

NewsAlert PR Mildura

Mallee Farmer is farewelling one of its most valued contributors, the author of our Seasonal Update for more than 20 years, Rob Sonogan.

Rob was one of a new generation of agronomists when he arrived in the Mallee in 1976 and he's worked alongside generations of farmers as a trusted source of advice, information and a "voice of reason". Mallee Farmer's regular contributing journalist, Jacinta Allen-Gange spoke to Rob about his time working in the Mallee.

When Rob Sonogan reflects on the evolution of Mallee farming systems over his career, he needs to look only as far as season 2018 to illustrate the transformation he's seen.

Rob arrived in the Mallee in 1976, just a few years before the notorious drought of 1982.

"That year had so much in common with 2018, virtually parallel in rainfall and conditions – but the outcome on the ground is 180 degrees, the scenario couldn't look more different," Rob said.

"We had rain in January 1982 but by September we had the new Victorian Premier John Cain up on a hilltop in Ouyen

looking at the erosion on the dunes around us," he said.

"We were working on a three-year rotation system and there'd been a long fallow from July, so by spring, 30 percent of the landscape was drifting because crops had simply failed to germinate. Sheep were being shot because you couldn't give them away.



Rob's Soil Conservation Department Mugshot taken soon after arriving in Swan Hill

"I was living in Ouyen during the summer of 1982-83 and we had 16 days in a row where the street lights came on because of the dust. By then, 80 percent of the Mallee was drifting."

Rob said the 1982 drought was a pivotal event.

"Farmers simply said we just can't let that ever happen again," he said.

"There were some technology emerging for trash retention farming, with blade ploughs and rod weeders, and some encouraging signs about the potential of moving away from the three-year rotation.

"For example the Soil Conservation Authority had

enforced erosion prevention areas beside channels where farmers weren't allowed to cultivate there and had to sow early and dry. In 1982 the roots got down into the sub-soil moisture and in those areas there was crop a foot high while the rest of the paddock was just desert.

"Also, at the time, the rule of thumb was not to sow until the second week in May – but we had one farmer at Tempy who for years, had sown barley on ANZAC Day.

"One year he got badly frosted but the other nine he had the best crops in the district. Sometimes the mavericks do stand out and, in this case, his approach was the future.

"But it was in 1992 when the really big breakthrough came with the introduction of Frame and then Yitpi wheat varieties. They were resistant to some of the big bogeys in cropping, diseases like Cereal Cyst Nematode.

"These new varieties yielded better, could be sown across all soil types unlike our conventional varieties of the time, and that was the big thing – before they came along, we had the machinery and infrastructure, but direct drill wouldn't yield for us.

"In all the trials we lost 20 – 25 percent of yield because we were always trying to sow direct drill into a medic pasture base. Once we got rid of the medic pastures approach, we could sow these new varieties directly into either a legume or cereal stubble and direct drill started to work."



Rob with his own 40 year-old salt tolerant Red gums, some of the first to be tested in the Mallee. Rob challenged conventional wisdom, becoming a recognised innovator and champion for the use of vegetation to control land salinisation in the Mallee.

Rob said Mallee production was now three to four times that of the 1980s.

“Of course, 85 to 90 percent of the Mallee is now cropped, compared to only 30 percent back then, but the yields so much better and it’s the consistency, even in poor years, of what can be produced that’s most exciting.

“Organic carbon levels seem to be dropping, though, so that’s an indicator that all is not well in the new system, and there are some research projects starting to hone in on some of those indicators that we need to do some things a bit differently. Reduced rainfall is also a big factor here!

“We’re seeing a swing back to more balanced legume and break crops and that might help minimise the decline in organic carbon.”

Even with the emerging challenges around chemical resistance, Rob is highly

optimistic about the Mallee’s future.

“There is some incredible and exciting robotics technology that is transforming farming again,” Rob said.

“They selectively pick out a weed in the crop and deal with it either with ‘greenseeker’ systems applying chemicals only to the weed or by plucking or microwaving for example.



Rob, also a passionate gardener

“The technologies are amazing -- they’re solar powered and simply going around the paddock and doing their job, then back to their dock. Intelligent robotics is here now and it’s getting cheaper all the time and I think it will actually supersede chemicals very soon. By default, we will have an almost chemical-free system.

“It’s exciting because that’s also transforming the opportunities for the next generation of farmers. Farmers coming back onto the farms now are highly educated and they see a business that is high-tech, rewarding and exciting, and as we go down the new technology route, it’s more sustainable.

“There’s so much potential around the corner it’s just mind-blowing and I’m still as excited to watch what’s ahead now as I was 40 years ago!”

From all of us (past and present) at Mallee Farmer. Thanks Rob – and enjoy your retirement!

Australian farmers are adapting to climate change

By Neil Hughes

2016-17 was a great year for Australian farmers, with record production, exports and profits. These records were driven largely by good weather, in particular a wet winter in 2016, which led to exceptional yields for major crops.

Unfortunately, these good conditions go very much against the long-term trend. Recent CSIRO modelling suggests that changes in climate have reduced potential Australian wheat yields by around 27% since 1990.

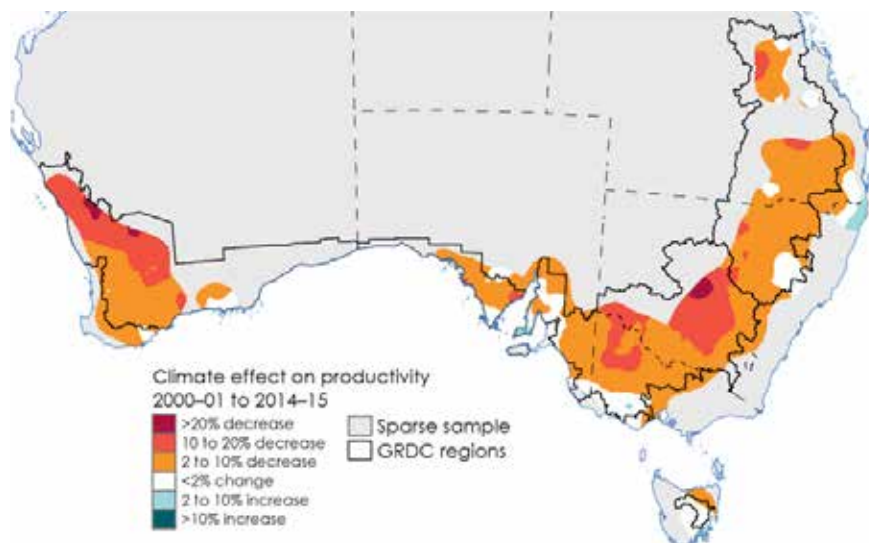
While rising temperatures have caused global wheat yields to drop by around 5.5% between 1980 and 2008, the effects in Australia have been larger, as a result of major changes in rain patterns. Declines in winter rainfall in southern Australia have particularly hit major broadacre crops (like wheat, barley and canola) in the key southeastern and southwestern cropping zones. There is strong evidence that these changes are at least partly due to climate change.

Climate change is affecting farm productivity

A recent study by the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) confirms that changes in climate have

had a negative effect on the productivity of cropping farms, particularly in southwestern Australia and southeastern Australia.

improving, these gains have been offset by deteriorating conditions. The net result has been stagnant productivity.



Key southwestern and southeastern agricultural zones have been especially impacted by climate change. ABARES

In general, the drier inland parts of the cropping zone have been more heavily affected, partly because these areas are more sensitive to rainfall decline. Smaller effects have occurred in the wetter zones closer to the coast. Here less rain can have little effect on – and can even improve – crop productivity.

Farmers are reacting

However, it's not all bad news. The study finds that Australian farmers are making great strides in adapting to climate change.

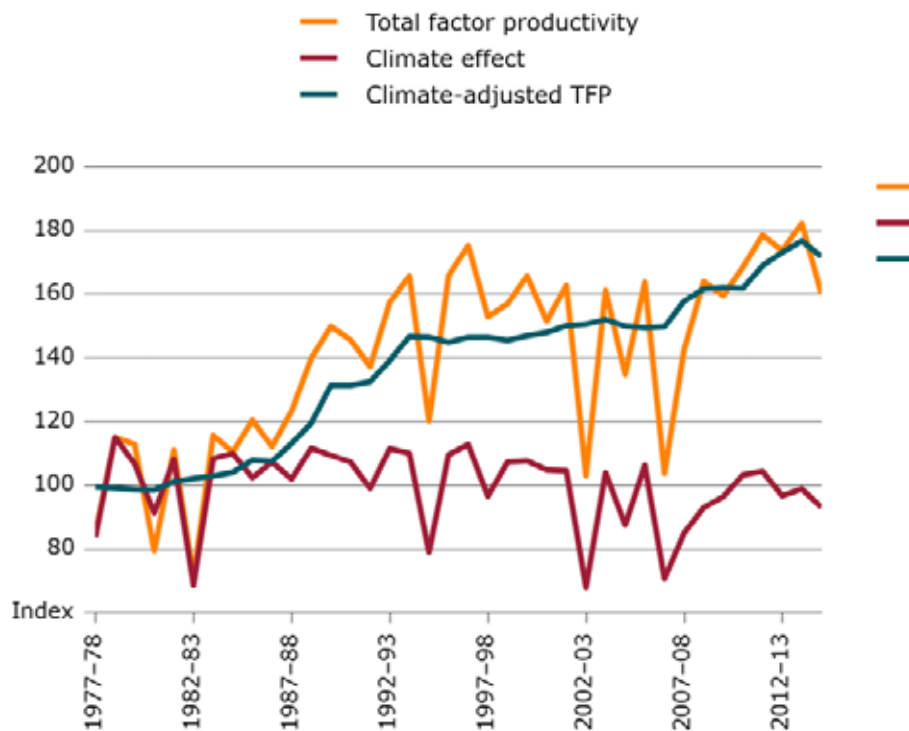
Much has been written about the fact that farm productivity in Australia has essentially flatlined since the 1990s, after several decades of consistent growth. The ABARES research suggests that changes in climate go some way towards explaining this slowdown.

After controlling for climate, there has been relatively strong productivity growth on cropping farms over the past decade. However, while farms have been

Furthermore, there is evidence that this resurgence in productivity growth is a direct result of adaptation to the changing climate. Our study found that over the past decade cropping farms have improved productivity under dry conditions and minimised their exposure to climate variability.

This contrasts with the 1990s, when farms focused more on maximising performance in good conditions at the expense of increasing their exposure to drought.

Anecdotal evidence suggests that winter cropping farms have made a range of changes over the last decade, to better exploit soil moisture left from the summer period. The most obvious is the shift toward conservation tillage during the 2000s, where some or all of a previous crop's residue (such as wheat stubble) is left in a field when planting the new crop. It seems that farmers are adapting to new seasonal



ABARES, Author provided

trends of rainfall, which for most cropping farms means less rain in winter and more in summer.

Is the Australian cropping belt moving south?

Previous research has suggested that the zone of Australia suitable for growing broadacre crops, known as the cropping belt, appears to be shifting south.

Our study found evidence to support this, with ABARES and ABS data showing increased cropping activity in the wetter southern fringe of the cropping belt in Western Australia and Victoria. At the same time, there have been declines in some more inland areas, which have been heavily affected by the climate downturn.

These shifts may be partly due to other factors – such as commodity prices and technology – but it's likely that climate is playing a role. Similar

changes have already been observed in other agricultural sectors, including the shift of wine grapes into Tasmania in response to rising temperatures.

What does this mean for the future?

At present there remains much uncertainty over future rainfall

patterns. While climate models and recent experience suggest a clear direction of change, there is little agreement over the magnitude.

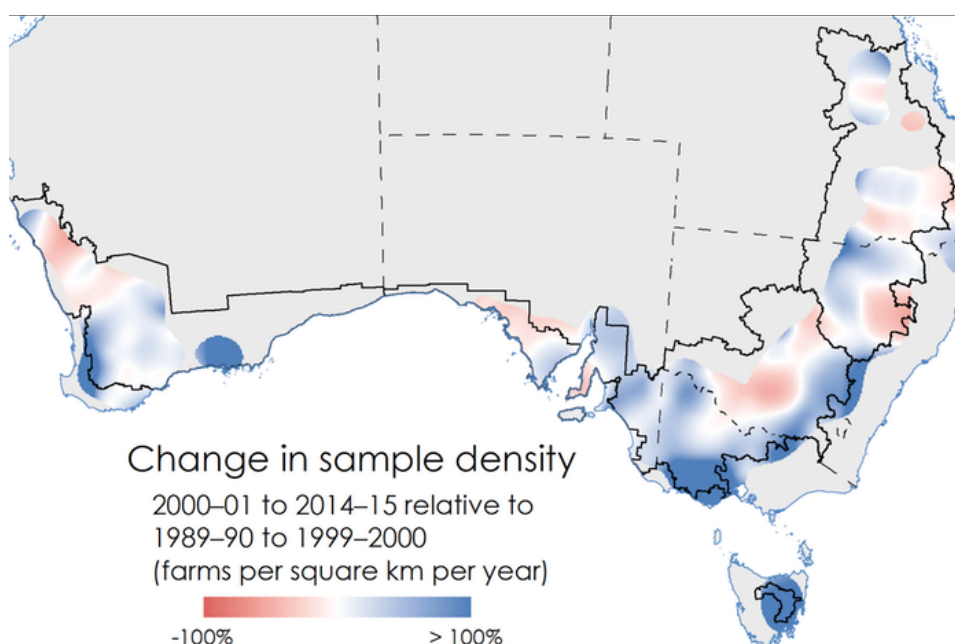
On the positive side, we know that farmers are successfully adapting to the changes in climate and have been for some time. However, so far at least, farmers have only been able to tread water: improving productivity just fast enough to offset the decline in climate. To remain competitive, we need to find ways to improve productivity faster, especially if current climate trends continue or worsen.

Acknowledgements

Neal Hughes is Director, Water and Climate, at the Australian Bureau of Agricultural and Resource Economics and Sciences, and a visiting fellow at the Australian National University's Crawford School of Public Policy.

This article was originally published on The Conversation.

<https://theconversation.com>



The cropping belt appears to be moving south. The blue represent increases in cropping farms in the 2000s relative to the 1990s, and red represents decreases. ABARES, Author provided .

Sustainable Farming Practice Change in the Mallee

Cameron Flowers

Southern Mallee Regional Agriculture Landcare Facilitator

During 12 years of living and working in the Mallee I have seen a number of changes to farming. Some of these changes have been due to things such as lifestyle, finances, technology improvements and climate change or changes in seasonal variability.

These changes have come about, some by choice and some by necessity, but they show that overall farmers are very adaptable.

When I started in the Mallee the big push was on for No-till or minimum till cropping. This resulted in the reduction or removal of stock from a number of farms and the removal of internal fences to create large paddocks. Stock were not seen as compatible with this new form of cropping.

We have seen that “No-Till” has benefitted the Mallee greatly with reductions in soil erosion and improvement in soil health and the sandier soils that are now coveted for producing good results. Stubble retention and cover crops are now words that are commonly used when talking about and planning where once it was grazing and working up. While No-Till cropping has been a success it has been a challenge to grow crops in some



Crops are diversifying in the Mallee

of the dry and drought years we have had. We have seen a shift to spreading the risk by reintroducing or increasing the numbers of stock on farms. Stock have also been a more attractive proposition as the prices and demand have increased.

Managing stock and No-Till has its challenges but farmers have again adapted to this in various ways. One of these methods is through the use of Stock Containment Areas. These have proven to be a valuable tool in managing stock and cropping, allowing for flexibility and improved grazing management. Stock Containment Areas have been very popular during drought times allowing farmers to hold onto stock and to preserve paddocks from over grazing and

the dreaded paddocks “blowing” from soil erosion. During wet seasons they have been a benefit in stopping compaction and pugging, and assisting in preserving soil health.

No-Till cropping and Stock Containment Areas form part of the ongoing changes that come under the banner of Sustainable Farming. This Sustainable farming is about improving soil health, protecting the environment, being adaptable and keeping farmers farming into the future.

Acknowledgements

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Australian Government's Regional Land Partnership's Mallee Threatened Species Services Project – Malleefowl Research & Development

By Gareth Lynch

2018-19 Adaptive Management Predator Experiment

Mallee Catchment Management Authority (CMA) has been successful in obtaining funding under the Australian Government's Regional Land Partnership program to undertake a wide range of on-ground works for the conservation of Malleefowl which is nationally listed under the Environment and Protection Biodiversity Conservation (EPBC) Act 1999 as vulnerable.

The Mallee CMA in conjunction with the National Malleefowl



Protecting new plantings in the corridor



The projects hopes to see more of these in the future

Recovery Team, the Victorian Malleefowl recovery group (VMRG), the National Environmental Science Program (NESP) and Annuello Landcare Group will be undertaking an Adaptive Management Predator Experiment (AMPE) at Annuello and Wandown Fauna and Flora Reserves (FFR).

What is the Adaptive Management Predator Experiment?

The project will investigate the effects of predation on Malleefowl population dynamics and provide information on the effectiveness of baiting strategies at reducing fox numbers. Two sites will be established covering 17,057ha:

- One treatment (fox baiting) site at Annuello FFR across 14,957ha; and
- One control site (no fox baiting) at Wandown FFR across 2,100ha.

The project will form part of the National Malleefowl Recovery Team's National AMPE to address a knowledge gap of assessing the efficacy of fox baiting programs and its impacts on Malleefowl.

This project represents the establishment of additional AMPE sites within the Victorian Mallee to further enhance the 'representativeness' of Malleefowl habitat being monitored by this national program.

How will it be implemented?

To commence this project, Malleefowl monitoring baselines will be established using Light Detection and Ranging (LiDAR) technology and ground truthing to determine the presence of Malleefowl mounds. An assessment of existing Malleefowl monitoring sites within target areas will also be undertaken to ensure that any recently constructed mounds are incorporated into the program.

Fox baiting will occur in the Annuello FFR at a higher intensity than it has previously been undertaken. Fox abundance), and the associated effectiveness of baiting strategies will be informed by:

- Determining the number of baits taken as a surrogate for fox population density estimates;

- The installation of remote sensor cameras and analysis of photos to track changes in the abundance of foxes and cats.

Camera-traps will also support measurements on the abundance of a range of medium to large animals. Analysis of these results will reveal the secondary effects of reducing fox numbers on other predators, such as cats and dogs, as well as other invasive species (e.g. deer, pigs, goats, rabbits,

abundance) and any subsequent effects on Malleefowl nesting activity. Data collected as part of this activity will be analysed both at the site level and as part of the national program, to further inform continual improvement and adaptive management processes.

Complementary works

Complementary on-ground works will be undertaken to re-connect and enhance fragmented habitat for other Malleefowl populations at

During this time, all adjoining landholders are encouraged to participate in the control of pest plant and animals to ensure maximum results are achieved.

For more information on the Regional Land Partnership's Mallee Threatened Species Services Project, contact the Mallee CMA State Investment Project Officer Derrick Boord on 03 5051 4377 or visit the Mallee CMA website at www.malleecma.vic.gov.au



A new vegetated wildlife corridor under development

hares) and native animals (e.g. kangaroos, echidnas, emus). Mound activity data collected by the Victorian Malleefowl Recovery Groups volunteer monitoring program will be incorporated into project reporting to support assessments of fox management on local Malleefowl breeding populations. All data collected will be analysed by ecological statisticians.

What will the project hope to achieve?

Outcomes from these activities will contribute to a greater understanding of fox baiting effectiveness (i.e. level of baiting required to reduce fox

the Berrook, Bronzewing, and Yaapect State Forests. Consisting of stock exclusion fencing, revegetation works, and pest plant and animal control, these works will be delivered by Greening Australia, Department of Environment Land Water and Planning, Mildura Rural City Council and Yarriambiack Shire Council.

All works commenced in November 2018 and will conclude in June 2019.

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New 2, 4-D label instructions to reduce spray drift incidents

By Glen Sutherland

Northern Regional Agriculture Landcare Facilitator

Avoiding off-target spray drift damage remains a very high priority for the agriculture sector. Inappropriate spray drift can (and has) caused widespread damage to crops, the environment and even affected animal and human health, sometimes hundreds of kilometres away from where the spray drift originated.

Agriculture industry bodies, Government regulators, chemical manufacturers and resellers, farm advisers and agronomists, together with researchers, continue to work in partnerships towards reducing the incidents of spray drift. One such recent partnership has resulted in changes to the label instructions for the use of herbicides containing 2,4-D.

As of 3 October 2018, the new 2,4-D label instructions came into effect and old labels have been suspended. Users of 2,4-

D must comply with the new label instructions, even if they are using products with old labels.

The Grains Research and Development Corporation (GRDC) in conjunction with Birchip Cropping Group (BCG) recently held Effective Spray Application Workshops which included information about the changes. The workshops were conducted by Australia's leading spray application specialist, Bill Gordon who presented information on enhancing the performance of spray outfits, improving product application and mitigating spray drift.

Bill delivered a comprehensive rundown of the new requirements for the use of 2,4-D and explained that the APVMA has issued permit PER 87174 "The New Instructions" to allow persons to possess,

have custody of, supply, and/or use 2,4-D products currently on farm and in retail outlets. Supply at the point of retail sale must include the new instructions being provided with each container supplied.

A copy of the permit via the APVMA website: <http://permits.apvma.gov.au/PER87174.PDF> These changes affect about 220 products, and the new instructions for use include:

- A requirement not to spray in inversion conditions and additional information on recognising inversion conditions;
- Downwind mandatory no spray zones for both aquatic and terrestrial off target vegetation (including sensitive crops, gardens, landscaping vegetation, protected native vegetation or protected animal habitat);
- A requirement to use nozzles producing droplets no smaller than the Very Coarse spray quality category;
- Mandatory record keeping requirements; and
- Advisory statements about spray application over summer.

The new requirements do not change or restrict other aspects of the currently approved use patterns and should not affect availability of the product.

Products containing 2,4-D continue to be under review by the APVMA. For more information visit: <https://apvma.gov.au/node/12351>



Very Coarse rated spray nozzles in action

Celebrating Twenty One years of Mallee Sustainable Farming

By Tanja Morgan

Program Manager Mallee
Sustainable Farming

The millennium and 1982 droughts were devastating for Mallee farmers, with harvest for the most part a non-event. However, in the midst of yet another drought, the region's farmers have this year found successes to celebrate: 2018 still saw some production across much of the Mallee, thanks in part to the work local farmers have contributed over more than two decades in partnership with Mallee Sustainable Farming.

For 21 years Mallee Sustainable Farming (MSF) has remained a proudly farmer-led organisation, aiming to boost agricultural productivity and profit and support farmers in the tristate Mallee region by conducting research, development and extension in the latest farming practices.

Over two decades MSF has stayed true to its charter to connect researchers and advisers from leading organisations with Mallee farmers for region-specific on-farm research, trials and education programs.

"This year has seen decile 1 rainfall conditions across the Mallee from northern NSW to more southern areas of South



MSF Board Members cut the TwentyOne cake at the magazines October 2018 launch

Australia and Victoria," says MSF Executive Chair and Trentham Cliffs farmer Daniel Linklater.

"Comparing this year to the droughts of 1982 and 2002, MSF is proud to have played a significant role in changing the landscape for the better with a reduction in soil erosion and farmers in many cases still able to achieve some crop production.

"The Mallee was a place once known for heat and dust. These days that dust now remains safely locked into productive paddocks, thanks in large measure to MSF's work in advancing, proving and promoting the advantages of improved farming systems, starting largely with the adoption of no-till."

Some of the highlights of the past 21 years include:

- The widespread introduction and adoption of no-till and stubble retention farming techniques
- Establishment of core research sites at:
 - Allen Buckley's Waikerie property

- Peter and Hannah Loller's Karoonda property
- Jim Maynard's 'Kerribee' near Gol Gol
- Matt Curtis's Merbein property
- Robin Shaefer's 'Bulla Burra' at Loxton
- Ian Hastings' Ouyen property

- Trials across 46 Farmer Focus paddocks hosted by farmers across the region
- Educating thousands of farmers at MSF Field Days
- Hundreds of in depth local research projects into areas such as rotations, nutrition, soil microbiology, soil water, agronomy, tillage and protein
- The Strengthening Our Communities project to increase access to farmer support systems and build morale in drought-affected rural communities during the millennium drought.

To celebrate the first 21 years of MSF the organisation has

launched a commemorative magazine: *TwentyOne: The First 21 Years of Mallee Sustainable Farming*. The 94-page publication includes interviews with farmers, researchers and MSF volunteers; historical photos; and highlights of the past 21 years, and sets a course for where the next 21 years may take the MSF and agriculture in the region.

“Even though this is a drought year, this is an important opportunity for us to celebrate how far we’ve come and increase awareness of our work with the aim of benefiting even more farming families,” Mr Linklater says.

“The true heroes of this story are our local farmers, whose open-mindedness to taking risks and trying new things have allowed for the radical changes we have seen.

“Current MSF work examining best management of sandy soils, seeps, pastures and livestock and frost will continue to develop improved farming practices through farmer driven

collaboration with researchers and advisers.

“Together we are literally changing the landscape and the face of farming in the Mallee.”

Copies of *TwentyOne: The First 21 Years of Mallee Sustainable Farming* have been sent to the Prime Minister, Agriculture Minister and other federal, state and local MPs as an example of a best-practice grassroots program supporting farmers to be self-reliant in a dry climate. It’s also hoped seeing what

has been achieved over the past 21 years will encourage the government’s continued resourcing of agricultural research and extension projects by Mallee Sustainable Farming and other organisations.

The magazine was previewed at the MSF AGM in Mildura on 17 October and is now being distributed to Mallee Sustainable Farming subscribers. To register for a free downloadable copy, visit <http://www.msfp.org.au/twentyone>



Demonstrating soils amelioration MSF Field day

Update on Landcare Activities for the Mallee Farmer

Eastern Mallee Landcare Groups

By Sue Pretty

Local Landcare Facilitator for Eastern Mallee and South Eastern Mallee Landcare Consortiums.

The Eastern Mallee Landcare consortium includes Annuello, Kooloonong-Natya, Manangatang, Nyah West and Waitchie Landcare Groups. With funding support from the Mallee CMA, the Eastern Mallee Landcare groups continued their feral animal and weed control battle, completing numerous projects across the district during February to July 2018. Manangatang Landcare Group held a Governance Training day at Piangil on the 8th of August. The training was run by Justice Connect trainer Kaela Hughes. The training was funded by a

Community Skills Development Grant from the Department of Environment, Land, Water and Planning and members of all 5 Landcare Groups attended. The training covered key legal issues affecting Landcare Groups and generated plenty of discussion around roles and responsibilities and OH&S.

South East Mallee Landcare Consortium

The South East Mallee Landcare Consortium includes; Berriwillock, Birchip, Culgoa, Curyo-Watchupga, Lalbert, Nullawil, Sea Lake and Ultima

Landcare Groups. During February to June the groups were engaged in rabbit and weed control projects across much of the district. Groups conducted 1080 carrot baiting, rabbit ripping, and weed control projects to manage invasive Boxthorn and Cactus infestations.

A committee of management has been formed for Lake Marlbed Reserve near Curyo with members from Curyo-Watchupga and Birchip Landcare Groups. The committee will oversee projects funded by the Mallee CMA to update gravel tracks, car parks, signage and walking tracks.

Birchip Landcare Group has conducted a successful fruit fly project in the Birchip area. The project distributed fruit fly traps and educated the community on the importance of managing fruit fly in our backyards and orchards and controlling its spread. The group held a field day on improving remnant native vegetation at the property of Damien Maher on the 18th of August. Other activities of the Birchip Landcare group included Boxthorn and rabbit control, tree planting and fencing, and investigating improvements to Pump House Reserve.

In 2019 the South East Mallee Landcare groups will continue to protect remnant Buloke vegetation communities by controlling feral plants and animals with funding from the Victorian Government Supports Biodiversity On-ground Action (BOA) and Victorian Landcare Grants (VLG).

Birchip Landcare group will be part of an exciting joint project

with Trust for Nature, funded through the Mallee CMA, investigating the distribution of the Plains-wanderer in the Birchip area. The Plains-wanderer, a small, ground dwelling bird native to grasslands, was once widespread in the district, but due to habitat clearance and predation is now critically endangered. The group will use song meters at sites previously known to have recorded observations. The song meters record bird calls and the data can then be analysed to discover if the Plains-wanderer is still present at the site.

Nullawil Landcare Group has been funded by the Victorian Landcare Grants to conduct an investigation of the Utewillock Wetland east of Nullawil. The project includes a survey and community engagement activity. The flora and fauna survey will be conducted by Wildlife Ecologist Damien Cook (Rakali Consulting). By documenting the environmental values of the site an Environmental Water



Nullawil Landcare Group members, Rohan Forrester, Wade Humphreys and Donald Cooper assist South East Mallee Landcare Facilitator Sue Pretty checking nest boxes at Utewillock wetland near Nullawil



Trainer Kaela Hughes from Justice Connect (Not-for-profit Law)

Management Plan can be developed that will identify the long-term objectives and water requirements of the wetland. A community wildlife evening was held at the wetland in early February to discuss the survey findings, demonstrate the fauna survey methods, and allow the community to participate and learn about the unique animals and plants of their area. We are looking to water their sites into the future.



In the coming months Eastern Mallee Landcare groups will begin their 2019 rabbit control campaign with funding support from the Victorian Landcare Grants (VLG) and Biodiversity On-ground Action (BOA) Grant.

The experts – where and when you need them

Communities.grdc.com.au is home to experts in Crop Nutrition and Field Crop Diseases.

Grain growers and advisers looking for the most current crop nutrition and disease information cannot go past GRDC Communities, a national online network that provides information and advice 24/7.

By Jodie Harrison

Knowledge Broker, Biosecurity and Agriculture Services, Department of Economic Development, Jobs, Transport and Resources.

Delivering real-time information exchange with grains experts, GRDC Communities also supports research-based learning networks: Crop Nutrition, Field Crop Diseases and Stored Grain. These three networks are supported by the Grains Research & Development Corporation (GRDC), in partnership with Agriculture Victoria and the New South Wales Department of Primary Industries.

Agriculture Victoria Knowledge Broker, Jodie Harrison, said these networks help decision-making around crop nutrition and disease by providing the latest information straight from the experts.

“GRDC Communities provides direct access to crop disease and nutrition experts, no matter where you are – out in

the field on your mobile device, at home, or at your desk” Ms Harrison said.

“This service is an online learning network that complements regular information gathering systems, like Mallee Farmer, and is an extension of your current advice channels.”

GRDC Communities gathers experts in crop nutrition, grain storage and diseases and offers:

- Real-time information exchange between farmers and research & development experts;
- Coordinating sources of information and decision-support tools, streamlining the task of finding the right information;
- Timely, relevant, peer-reviewed and up-to-date information; and
- The opportunity to pose a question directly to the expert panel via the Ask an Expert tool.

Ms Harrison said the service taps into public and private sector research, development and extension specialists.

“GRDC Communities helps scientists, industry organisations, advisers and

growers share and exchange ideas and deliver the best research-backed information available, in a range of formats”.

You can access GRDC Communities through a number of channels – the website, social media, and through Ask an Expert. All the GRDC Communities tools, channels and information are free for all members of the grains industry to access.

Further information

Visit the website at Communities.grdc.com.au or follow GRDC Communities on Twitter @AuCropNutrition and @AusCropDiseases or Facebook at Aus Crop Nutrition and Field Crop Diseases.



HOME CONTACT US COMMUNITIES



Department of Primary Industries

Avifauna within Buloke Woodlands

Gareth Lynch

Background

Buloke woodlands are listed as endangered under the Federal Environment Protection and Biodiversity Conservation (EPBC) Act 1999. They are also listed as threatened under the Victorian Flora and Fauna Guarantee (FFG) Act 1988. Buloke woodland communities provide habitat for a distinctive suite of fauna and are critical for a number of birds using the hollows of large, old trees for nesting. In particular, birds of prey such as the Wedge tailed Eagle, Little Eagle, Brown Falcon, and Black Falcon will quite often nest in these large mature Bulokes.

The community typically comprises an open tree canopy (up to 15m tall) with a sparse and highly variable ground layer dominated by grasses and herbs, sometimes scattered shrubs and/or small trees. The structure and species

composition of the community varies depending on soil properties (pH of the sub-soil), the size of the remnant, recent rainfall (or drought conditions) and by its historical level of disturbance (e.g. grazing, land clearing and fire).

Buloke Woodlands comprise a number of vegetation communities found throughout the Mallee Catchment Management Authority (CMA) region and encompass a number of closely-related woodland communities in which Buloke (*Allocasuarina luehmannii*) is usually the dominant tree, with other species locally co-dominant i.e. Slender Cypress Pine (*Callitris gracilis*), Yellow/Blue Gum (*Eucalyptus leucoxylon* subsp. *pruinosa*) and Grey Box (*Eucalyptus macrocarpa*) (Cheal et al., 2011). Within Victoria, these species form part of the broader suite of 'Semi-arid Non-eucalypt Woodlands' associations which support a diverse range of fauna including some fascinating bird assemblages.

Buloke Woodland associations

These associations are found

throughout both private and public land and many species of birds can be regularly encountered.

Semi-arid Herbaceous Pine-Buloke Woodland

This community is entirely restricted to public land in Victoria's northwest, with sites primarily occurring in Murray-Sunset National Park (NP), Wyperfeld NP and Hattah-Kulkyne NP. The remainder of this community is found within adjacent State Forest land licensed for grazing.

Semi-arid Shrubby Pine-Buloke Woodland

This community is restricted to Victoria's northwest Mallee region, where the majority of sites are present within either the Murray-Sunset NP or on various public land reserves including Mallanbool FFR and Yarrara FFR (e.g. State Forests, Flora and Fauna Reserves, Rail Reserves, etc.).

Semi-arid Grassy Pine-Buloke Woodland

This community is widely distributed throughout the central and southern Mallee areas, with most sites occurring on public land areas in Wyperfeld National Park, particularly the Pine Plains area.

Semi-arid Northwest Plains Buloke Grassy Woodland

This community is restricted to sites within the southern Mallee area (and the Wimmera region). The majority of these sites occur on private land and along roadsides.

Buloke Grassy Woodland

This community is predominately found in the Wimmera and Victorian Northern Plains, is



Brown Treecreepers find a home in Buloke woodlands

found in areas that surround Birchip in the southern Mallee.

Interesting facts about birds in Buloke Woodland

Raptors such as Peregrine Falcon, Spotted Harrier, Brown Falcon, Nankeen Kestrel, Australian Hobby Falcon, Brown Goshawk, Collared Sparrowhawk, Black Kite, Wedge-tailed Eagle, and Little Eagle the FFG listed threatened Black Falcon, have all been observed throughout these communities and call them home. Passerine species that are characteristic of these woodlands include the Grey Butcherbird, Pied Butcher Bird, Striated Pardalote, Singing Honeyeater, Striped Honeyeater, Red Capped Robin, Yellow Thornbill and the FFG listed threatened Major Mitchell's Cockatoo, Gilbert's Whistler, Hooded Robin, Apostle Bird Grey Crowned Babbler, and White-browed Treecreeper are known inhabitants of these communities. In addition, the Bush-stone Curlew, and the Red-tailed Cockatoo (both listed as endangered in Victoria) may be encountered.

Terrestrial fauna known to inhabit these communities include the Bearded Dragon, Lesser Long-eared Bat, Fat-tailed Dunnart

and Yellow-footed Antechinus.

What threats do Buloke Woodlands face?

The woodlands have been extensively cleared in the past and the remnants that survive face ongoing major threats from incremental clearance, grazing by rabbits, stock, goats, kangaroos, invasion by exotic plants, herbicide and fertiliser application, and inappropriate fire regimes.

What is Mallee CMA doing to help Buloke Woodlands?

Currently, the Mallee CMA has been successful in obtaining funding under the Australian Government's Regional Land Partnership program to undertake a wide range of on-ground works to protect and enhance Buloke Woodlands.

On-ground works will involve 'Protecting and Enhancing Priority Buloke Woodlands on Private Land' through stock exclusion fencing and supplementary planting through 'Revegetation of Priority Buloke Woodland Remnants'.

Further on-ground works will focus on 'Enhancing Priority Buloke Woodland Ecological

Communities on Public Land' on local government roadsides focussing on pest plant and animal control.

All on-ground works will contribute towards enhancing overstorey and understorey vegetation within Buloke Woodland communities which will reinvigorate natural processes and enhance the ecological function of the sites, thereby providing an ideal habitat for known bird species that inhabit these locations.

All works will be completed within the Avoca and Yarriambiack target areas and will focus on the Semi-arid Northwest Plains Buloke Grassy Woodland community and Buloke Grassy Woodland.

Delivery of works will be completed by Buloke Shire Council, Swan Hill Rural City Council, Yarriambiack Shire Council, Landcare Groups, Barengi Gadjin Land Council, and Private Landholders.

What community engagement programs will Mallee CMA undertake to promote Buloke Woodlands?

Whole of community capacity building activities will be delivered to improve awareness and appreciation of Buloke Woodland ecological communities in regards to their values and threatening processes, and the progress/achievements of work being done through RLP to enhance critical Buloke Woodland habitat through the management of grazers and weeds and assisted regeneration techniques. Local stakeholder and interest groups will be invited to participate in field trips to



Belah hollows provide excellent bird nesting sites

selected Buloke Woodland ecological communities (including the assisted regeneration demonstration site) that promote the ecological character/values of Buloke Woodlands, the risks posed by key threatening processes, and progress being made in addressing these threats.

This program will continue to build relationships with key community groups, particularly Landcare Groups and BirdLife Australia. These groups, as well as other delivery partners and the broader community, will be invited to participate in a regional monitoring program for Buloke Woodlands, which will focus on determining the effectiveness of management interventions/actions using key indicator species including Singing Honeyeater, Striped Honeyeater, Red Capped



Apostle Birds are enthusiastic colonists of Buloke woodlands

Robin, Yellow Thornbill, Willie Wagtail, Restless Flycatcher, Brown Treecreeper and the FFG listed threatened Major Gilbert's Whistler, Hooded Robin, Grey Crowned Babbler, and White-browed Treecreeper (Buloke Woodland specific insectivorous birds). In addition, a Citizen Science program focusing on Buloke Woodland condition, regeneration and survival will be

delivered with local community groups.

What are the opportunities for the community to learn about birds in Buloke Woodlands in 2019?

The 'Buloke Woodlands Condition Assessment' Citizen Science program will support volunteers to undertake surveys of priority Buloke Woodland ecological communities (sites will be determined in consultation with community groups/volunteers). This will help document where regeneration of Buloke Woodland composite species is occurring, where regeneration is not occurring, and what factors are influencing findings (e.g. grazing, weeds, environmental characteristics).

In addition, the Mallee CMA will be looking to improve the capacity of community members by encouraging participation in the 'Buloke Woodland Avifauna Monitoring Program'. This will support volunteers to undertake woodland bird surveys (using established BirdLife Australia monitoring guidelines) within Buloke Woodland ecological communities of varying condition. This will help document the differences in avifauna assemblages within these communities based on habitat condition indices, with data being uploaded into the Birdata app, contributing to BirdLife Australia's Woodland Birds for Biodiversity program. More about the Birdata app and Birdlife Australia at <https://birdata.birdlife.org.au/get->

started

For more information on the Regional Land Partnership's Mallee Threatened Ecological Communities Species Services Project, contact the Mallee CMA Regional Land Partnerships Project Officer Gareth Lynch on 03 5051 4377 or visit the Mallee CMA website at www.malleecma.vic.gov.au

Acknowledgements

This project is supported by Mallee Catchment Management Authority, through funding from the Australian Government's National Landcare Program.

Further information

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A familiar Buloke Woodland vista

Serradella as an alternative to vetch on Mallee sands

By Roy Latta

A progressive shift from cereal dominance to more diverse rotations in the Mallee has increased the demand for forage legumes. Current returns from the livestock industries support this farming option as an alternative to growing legume field crops. This is evidenced by the extent of vetch sowings.

Serradella is an aerial seeded legume that has been widely grown on Western Australian sands as an alternative to lupin. Serradella is sown as pod which requires a period of seed softening in the field prior to germination. This allows it to be undersown or spread in the crop in the year prior to the legume phase with little or no competition to the crop.

This article briefly summarises a four year study evaluating serradella as a potentially more productive alternative to vetch on Mallee sands. The experiment was commenced at Walpeup in 2015 on a neutral pH sandy loam. As part of a wider study it compared the 2016 and 2017 biomass production and the subsequent 2017 and 2018 wheat yields as a result of:

- Serradella pod segments sown with barley in April 2015 with,

- Volga vetch sown into barley stubble in April 2016.

Growing season rainfall of 300, 214 and 90 mm was recorded in 2016, 2017 and 2018 respectively.



Pasture-Serradella

In 2016 the vetch produced more biomass than the serradella with similar subsequent 2017 wheat grain yields and quality. However when the legumes were allowed to regenerate in 2017 the serradella produced almost 6 t/ha of biomass while the vetch failed due to low plant populations. Subsequent 2018 wheat yields and quality reflected the increased 2017 serradella production. Table 1 2016 biomass (tDM/ha) seed yields (t/ha) and 2017 biomass (tDM/ha) of forage legumes and the subsequent



2017 and 2018 wheat yields (t/ha) and protein contents (%)

The study supports further evaluation of serradella as an option for sandy soils not well suited to vetch, especially where an extended weed or disease control strategy is required. Successful on-farm seed supply needs to be assured to provide better or comparative economics.

For more information

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Latta R (2017) Low cost pasture legume establishment for sandy soils in the Victorian Mallee. In: Proceedings of the 18th Australian Society of Agronomy Conference, Ballarat, VIC.



	2016		2017		2017	2018	
	Biomass (tDM/ha)	Seed yield (t/ha)	Wheat (t/ha)	Protein (%)	Biomass (tDM/ha)	Wheat (t/ha)	Protein (%)
Serradella pods	3.5	1.45	3	8.1	5.8	3.2	10.6
Volga vetch	4.7	1.86	3.4	8.2	0.1	2.6	8.9

New project shines the spotlight on novel pasture systems

by Michael Moodie

A new project “Dryland Legume Pasture Systems” (DLPS) aims to discover resilient low-cost pasture legumes with appropriate management packages to provide livestock and cropping benefits to the low-medium rainfall mixed farming regions of Australia.

Background

The extent to which annual pastures provide benefits to livestock and crops is dependent upon the quality of the pasture base. Whilst there is scope to improve the pasture base on many mixed farms in the low to medium rainfall zone across southern Australia, pasture renovation rates and the uptake of new pasture legume cultivars is low.

The DLPS project will evaluate the potential for novel pasture systems to provide benefits to both the livestock and cropping enterprise. There are two main components of novel pasture systems that will be researched through this project over several years:

- New legume pasture species/cultivars that have not traditionally been grown in the target region. Each species may provide benefits such as increased production on certain soils types; improved value to livestock; the ability for seed

to be retained; hard seed characteristics that provides a viable pasture after many cropping phases.

- Alternative pasture establishment systems aimed at reducing the cost of pasture establishment and potentially improved productivity from greater water use efficiency. These include:

- Twin sowing where hard seed/pod is sown with the crop before the pasture phase. Little or no pasture is expected to establish in the crop phase. Hard seed “softens” over the summer period and germinates to produce a viable pasture in the following autumn.
- Summer sowing where hard seed/pod is sown in the summer prior to the pasture phase where the hard seed “softens” and germinate to produce a viable pasture in autumn.

Twin and summer sowing systems will be compared to autumn sowing with scarified (soft) seed. Twin and summer

sowing systems are potentially beneficial as the hard seed/pod can be produced on-farm and used without the need for expensive scarifying or processing to “soften” the pasture seed.

Annual medics, which are already widely grown in low rainfall mixed farming areas across south-eastern Australia, will be compared to legumes that have been less well tested such as rose clover, bladder clover, serradella and biserrula. A feature of these legumes is their aerial seeded habit and retention of seed, allowing seed to be farmer harvested and resown. Legume production, nitrogen fixation, nutritive value and ability to regenerate after cropping phases will be measured.

The project will provide growers with information on the value of the most promising pasture legumes to livestock production (palatability and nutritive value in season and through senescence) and for the crops that follow (e.g. N, soil water, weeds, pests and soil borne diseases).

In 2018, seven sites were established in the low-medium



Figure 1. Map illustrating experimental sites (blue markers).

rainfall regions of southern Australia (Figure 1) including a site located at Piangil in the Victorian Mallee. The core research sites will be supplemented with the

Legume	Relative DM (% site mean)
Studenica Common Vetch	215
Toreador Disc Medic	141
EP Harbinger Strand Medic	137
Barrel Medic	130
Pildappa Strand Medic	120
PM250 Strand Medic	115
Astragalus Early	107
Scimitar Burr Medic	104
Capello Woolly Pod Vetch	103
Jaguar Strand Medic	83
SARDI Rose Clover	66
Casbah Biserrula	50
Bartolo Bladder Clover	45
Trigonella 5045	42
Margurita French Serradella	34

Table 1. Ranked performance (Spring dry matter production in year of sowing) of legume entries across two or three sites in South Australia.

establishment of on-farm demonstration sites in 2019.

Results/findings

Trials commenced in 2018, however legume establishment and growth has been adversely affected at several sites by challenging seasonal conditions. There was a delayed break to the season and growing season rainfall was less than 60% of the long term average at most sites. Ranked performance of the legume pasture across the Lameroo, Loxton and Waikerie sites is shown in Table 1. For the measure of spring dry matter production, the medics (except minima) outperformed other pasture legume species, however medic production was inferior to vetch (Table 2). These initial rankings may change in

the longer term due to seed set, hardseeded breakdown etc., but nonetheless the rankings highlight that the medics performed well under very low rainfall conditions on Mallee soils (loams at two of the three trials). The greater production of vetch indicates that the medics are achieving about two thirds of the production potential in the establishment year, so room for improvement remains. The potential benefits offered by other legume species, including improved ease of seed harvest, improved nutritive value and



Very healthy Trigonella in full growth

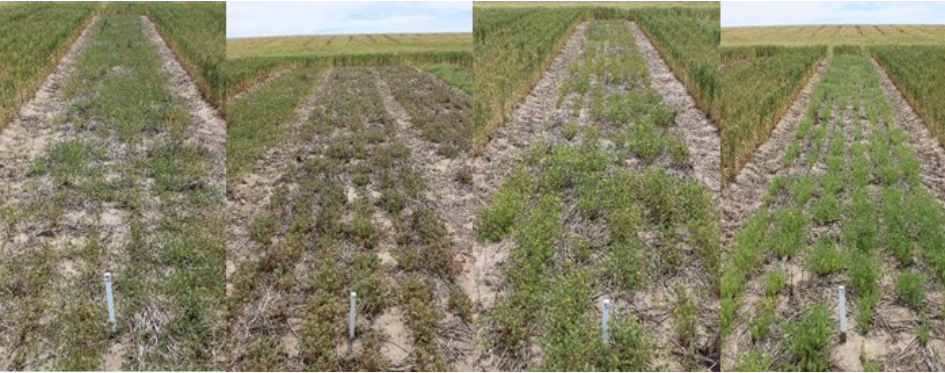


Figure 2. Pastures at Lameroo experimental site. From L-R PM250 medic, Rose clover, Trigonella balansae (5045) and Margurita serradella. Bill Daveron 24 October



Figure 3. Bonnie Flohr (CSIRO) addressing farmers at the Lameroo site at an MSF field day.



Pasture Plots Southwest NSW near Buronga

N-fixation may come at the expense of some dry matter production.

Implications of the findings

The late break and below average rainfall provided a tough test of the productive capacity and seed set of the different legumes. These circumstances are consistent with climate change predictions and therefore provide a relevant and rigorous test. We are optimistic that some sensible shortlisting of the different legumes will be possible.

New legume material with novel traits continues to be developed for the DLPS with superior lines of boron tolerant medic, legumes

with high nitrogen fixation capacity, increased early vigour and earlier flowering. These are expected to enter the field program in the next two years.

The long term farming systems trials will continue in 2019 with assessment of establishment systems a key focus. The systems trial at Piangil in the Victorian Mallee will enter its first year of pasture production in 2019 with eight pasture species being compared with twin, summer and autumn establishment techniques.

For more information

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Regional Agricultural Landcare Facilitator Program

By Glen Sutherland

The Mallee's dryland farming communities have a new-look support service to help them to continue to take up sustainable farm and land management practices and adapt to the challenges of changing market demands and climatic conditions.

The Regional Agriculture Landcare Facilitator (RALF) program is building a national network of agriculture focused, regionally based, facilitators who are being established through the support of the Australian Government's National Landcare Program's Regional Land Partnerships (RLP) Initiative.

RALFs will be engaging and informing farmers, community groups and agricultural industries about emerging ideas, climate change activities, land management practices and any new government policies to help improve the sustainability, productivity and profitability of agriculture.

About the RALFs and what they will be doing in their regions.

- RALFs will be acting as a key contact point for farmers, industry and community groups and will be supporting agriculture-related project activities and services in their regions and will be focusing

predominantly on working with community members and groups that have a sustainable agriculture emphasis;

- Building partnerships that will



Mallee RALFS supporting local workshops and field days

best serve farmers such as connecting agency, industry, grower and community groups so that they can work together to address common opportunities, concerns and difficulties;

- Assisting farmers, community groups and agricultural industries to develop projects and seek new funding opportunities such as those periodically on offer through the National Landcare Program's Regional Land Partnerships initiative;
- Seeking out new knowledge, such as research results, through participating in 'Communities of Practice' to better understand complex issues, improve networks and help develop solutions to agricultural challenges; and
- Updating the Australian Government about emerging issues and events within

the region such as reporting on the impacts of seasonal conditions on farmers, emerging farm management and issues affecting sustainable agriculture.

The Mallee Catchment Management Authority has established two RALF positions in the region. Cameron Flowers is based in Birchip and Glen Sutherland is in Mildura. The dividing line for the two roles is approximately South and North of the Mallee Highway from the SA to NSW border. Both Cameron and Glen are keen to engage with their respective communities about their roles and what's on offer through the National Landcare Program's Regional Land Partnerships Initiative.

For more information

For more information contact either Cameron or Glen on the numbers below. Cameron's Mobile: 0427 509 663 Glen's Mobile: 0417 396 973

This project is supported by Mallee Catchment Management Authority (CMA), through funding from the Australian Government's National Landcare Program



RALFS importing experts to the region

Victorian Sheep and Goat EID Program Update

The introduction of an electronic National Livestock Identification System (NLIS) for sheep and goats in 2017 was first reported in edition 12 of the Mallee Farmer (March 2017). At the time, the NLIS was described as an important reform that would enable prompt tracking of individual animals during disease and food safety emergencies, helping to maintain and expand market access for Victoria's livestock industries. The rollout of the program continues and this article provides a re-cap of the NLIS together with an update of the program.

The NLIS (Sheep & Goats) system uses electronic ear tags, identifying each animal with its own individual number. The tag contains an electronic Radio Frequency Identification Device (RFID) that can be read visually, and also electronically with a handheld wand or fixed panel scanner.

There are clear advantages that the system offers through supporting innovation and increased productivity through the supply chain. The system underpins the solid reputation that Australia enjoys overseas as being a premium producer of clean, safe food. Producers have also recounted many potential flock management benefits of the system on the farm.

Agriculture Victoria has recently reported that the sheep and goat industries have certainly embraced the NLIS since its introduction and has collected important data which supports this view. The data clearly demonstrates this with:

- Close to 20 million electronic NLIS (Sheep) tags purchased by producers;
- Investment in research and development and collaboration between industry, third party providers and government has resulted in the development of new and innovative software and equipment;
- All Victorian sheep processors now have infrastructure to meet mandatory requirements and from 31 December 2017 have been scanning electronically tagged sheep;
- All Victorian sheep selling saleyards have new

infrastructure to meet mandatory requirements and since 31 March 2018 over 1 million sheep have been scanned and uploaded to the NLIS database;

- Producers have commenced recording property to property movements on the NLIS database from 31 March 2018.

Agriculture Victoria advises that the next major milestone for the NLIS for sheep and goat producers started on 1 January 2019. All sheep and non-exempt goats introduced from interstate and born after 1 January 2019 must be tagged with an electronic NLIS (Sheep) pink post-breeder tag before being dispatched from a Victorian property.

Interstate producers need to continue to meet their individual state requirements for tagging and identification of sheep and goats.



Lambs in yard with their new EID Tag

However, if Victorian producers buy lambs and kids born interstate after 1 January 2019, they must apply an electronic pink post-breeder tag before the animals leave the Victorian property, unless they are already tagged with an electronic NLIS (Sheep) tag.

Victorian producers can purchase electronic NLIS (Sheep) tags for 2019 born lambs and kids at subsidised prices. From 1 January 2019, tags will be available from \$0.55, depending on the type of tag purchased. Producers can buy electronic tags of any

colour at subsidised prices to identify 2019 born lambs and kids. Producers can buy up to 110 per cent of electronic tags purchased in 2018, to identify 2019 born lambs and kids. This includes pink post-breeder tags. As per the existing tag ordering process, producers can order more than their allocation of subsidised electronic tags if there is a genuine business need and suitable evidence can be provided.

Agriculture Victoria also advises that there are new requirements for anyone selling

livestock. All advertisements selling livestock including in print, on Gumtree, Facebook and Auctions Plus, now need to include the Property Identification Code (PIC) of where the livestock is kept (except where a livestock agent is used).

For more information

To find out more about the NLIS program, including subsidised tags, log on to www.tags.agriculture.vic.gov.au or call the NLIS helpline on 1800 678 779 during business hours.



Foxes a critical threat to Mallee Fowl

Landscape scale improvement the target for new biodiversity projects

Jacinta Allen-Gange

NewsAlert PR Mildura

Work is underway on the biggest landscape-scale biodiversity initiative ever undertaken in the Mallee.

The Mallee Catchment Management Authority was successful in all nine of its bids for funding under the Victorian

Government's 2018-19 Biodiversity Response Planning round.



Feral cat in tree hollow at Hattah

The funding represents the largest funding amount awarded to a Victorian CMA this year and Mallee CMA Manager for State Investment Nicole Wishart said it reflected the strength and range of the region's biodiversity values.

"The Mallee has the most biodiversity values of any region in Victoria and it's fantastic that this new funding, which is delivered over three years, will allow us to continue the inroads we're making on protecting those values," Mrs Wishart said. "We're getting some amazing support in our communities because farmers and other local groups who are coming on board can actually see the difference we're making to the landscapes around them."

The Biodiversity Response Planning projects will bring

together stakeholders including traditional owners, private landholders and public groups under nine projects:

- Mallee Parks: The Cowangie Connection – Weed, rabbit, fox and goat control within Murray-Sunset National Park, Big Desert Wilderness Park and the agricultural landscape between them to improve ecological pathways for more than 200 native species including Mallee Emu-wren, Major Mitchell's Cockatoo and Lined Earless Dragon;
- Annuello and Wandown: Enhancing Mallee to Murray biolinks - Integrated weed, rabbit and fox control to improve connections in the Murray River Scroll Belt region, supporting species including Malleefowl,

Regent Parrot, Bandy Bandy and Yellow Swainson pea;

- Safeguarding the Hattah Ramsar Lakes and Raak Plain Catchment Areas – Rabbit, weed and fox control, ultimately improving the condition and connections within a landscape recognised nationally for its saline and fresh wetlands;
- Yarrara Ridge: Conserving Victoria's semi-arid environments – Rabbit, weed and fox control supporting the largest remnants of Belah woodlands in Victoria;
- Improving conservation of the southern Mallee Dunefields - Rabbit, weed and fox control, targeting remnants within the agricultural landscape of the Wathe and Bronzewing

Dunefields, a landscape recognised for its ecological uniqueness;

- Controlling feral Cats in the Mallee – A project to reduce cat predation impacts in Hattah-Kulkyne National Park and Big Desert State Forest, and supporting and improving development of cat control strategies and tools;
- Robinvale to Nyah: Conserving Robinvale Plain and Murray Fan bioregions - Rabbit, weed, pig, goat and fox control to address key threats and improve connectivity of Robinvale Plain and Murray Fan bioregions;
- Tyrrell: Preserving an ancient salina landscape – Rabbit, weed and fox control to improve the condition and connectivity of a landscape recognised nationally for its geological significance as an ancient salina system; and
- Cardross: Conserving biodiversity within a peri-urban landscape – Rabbit and weed control and revegetation to support priority habitat within the Cardross Lakes system and improve areas previously under grazing licence.

Along with private landholders and traditional owner groups, the projects will draw together partner organisations including Parks Victoria, Department of Environment, Land Water and Planning, Mildura and Swan Hill Rural City Councils, Buloke and Yarriambiack Shires, Lower Murray Water and the Arthur Rylah Institute.

“This work is successful because it collaborates with different groups and takes a landscape-based approach to pest animal and plant control,” Mrs Wishart said.

“We are now starting to see some real benefit from those partnerships within communities, particularly with farmers, by acknowledging the work they already do and supporting them to broaden the environmental approach they’re taking.

“Under these projects, by working together we will be supporting the biodiversity and values of more than 250,000 hectares of our unique Mallee landscape, which is a really significant achievement.”

For more information

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Goat Control also supported under this program.

“Ripper” results from Mallee Sandy Soils trials

By Michael Moodie

Initial findings from local research is showing benefits of physical disturbance by deep ripping and rotary spading on sandy soils.

Background

The research is part of the GRDC project ‘Increasing production on sandy soils in the low-medium rainfall areas of the southern region’, where there is evidence for limited rooting depth and crop water extraction. Key aims of the research are to improve access to cost effective techniques to diagnose and overcome the primary constraints to poor crop water-use on sandy soils. Two research sites have now been established in the Victorian Mallee at Ouyen (2017) and at Carwarp (2018). Trials at each location have focused on building subsoil fertility through the addition of organic or inorganic inputs and physical intervention to reduce subsoil

resistance through deep ripping or rotary spading.

Results and Findings

Exploration of the sandy soils profiles has shown that a high level of penetration resistance exists below a depth of about 20

30 cm. Deep ripping in 2017 led to a grain yield increase of 0.85 t/ha relative to the control which yielded 1.9 t/ha. In 2018, some plots were re-ripped to compare the effect of a single deep rip against an annual deep rip. Annual ripping treatments

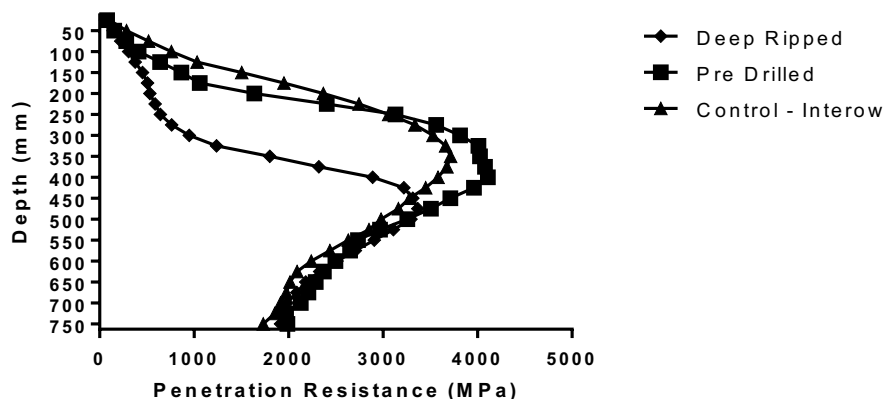


Figure 1. Change in penetration resistance down the soil profile at Ouyen following deep ripping.

cm. For example, at the Ouyen site penetration resistance peaked at 4000 MPa at a depth of about 30 cm. Generally, root growth is restricted beyond 2000 MPa and deep ripping to 30 cm at this site in 2017 reduced resistance to less than 1000 MPa (Figure 1).

Reducing penetration resistance through physical intervention by either deep ripping or rotary spading has improved grain yield at Ouyen for two consecutive seasons. Both machines loosened soil to a depth of about

increased yields by 0.6 t/ha while treatments which were ripped in 2017 still yielded 0.4 t/ha better than the control in 2018 (0.9 t/ha) (Figure 2).

Rotary spading using a spade and sow system at Ouyen

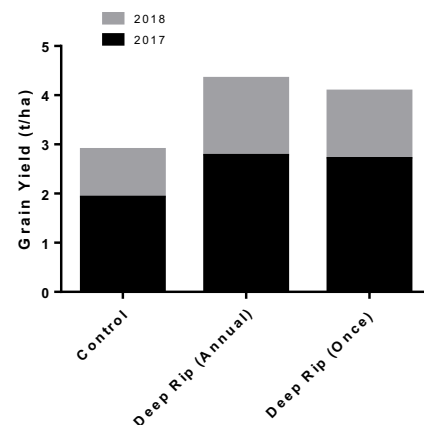


Figure 2. Cumulative grain yield (2017-2018) at Ouyen for the control, deep rip annually (2017 and 2018) and deep ripped once (2017 only) treatments.

has also increased grain yield relative to the control, with a combined benefit of 0.5 t/ha over two seasons. However where the organic input chicken litter has also been incorporated with the spading operation, the cumulative grain yield has doubled from 2 t/ha to 4 t/ha over the two seasons.



Deep Ripping at Carwarp

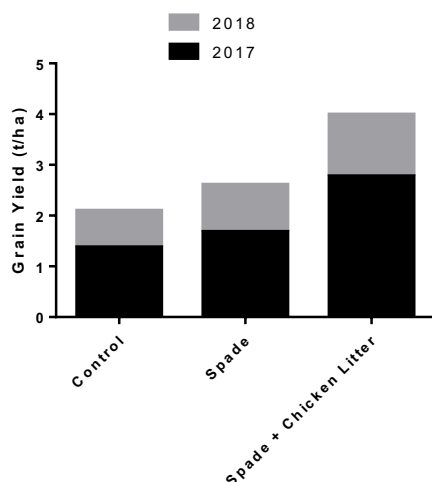


Figure 3. Cumulative grain (2017-2018) yield for the control, spading only and spading + chicken litter treatments at Ouyen.

A new trial established at Carwarp in 2018 with first year results also confirm a benefit of deep ripping and spading. This trial compared the depth of mechanical intervention with ripping being conducted to 30 or 60 cm and compared to spading. All mechanical interventions had a large effect on grain yield, doubling the yield of the control (0.5 t/ha). There was only a slight yield advantage of physical disturbance deeper than 30 cm (Figure 4).

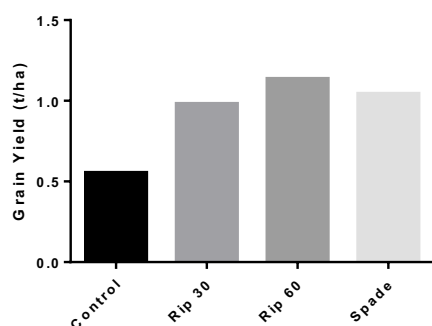


Figure 4. Grain yield responses at Carwarp in 2018 to deep ripping to 30 cm, deep ripping to 60 cm and rotary spaded (30 cm).

Implications of the findings

Alleviating physical barriers to root growth through practices such as deep ripping and rotary spading are providing the most consistent yield increase on



Combined Spading and Sowing at Ouyen Trial Site

sandy soils in the Victorian Mallee. Thus far, the responses to physical intervention have generally been more consistent than responses to organic inputs. The exception to this is gains from the application of chicken litter at Ouyen which has led to a cumulative grain yield response of 2 t/ha across two seasons. The responses to chicken litter demonstrates the potential to improve gains through increasing the nutrient fertility of sandy soils. However the addition of home grown biomass, such as vetch and cereal hay, did not provide significant yield responses on sandy soils in 2018. Therefore addressing physical constraints through deep ripping or rotary spading appears to be a good place to start for farmers who are looking to increase production on underperforming sands in the Victorian Mallee.

For more Information

This work is funded under the GRDC project CSP00203; a collaboration between the CSIRO, Mallee Sustainable Farming Inc. Frontier Farming Systems, the University of South Australia, the SA state government through Primary Industries and Regions SA, AgGrow Agronomy, and Trengove Consulting.

Please contact Michael Moodie michael@moodieag.com.au or 0448 612 892 for further information.



Women on Farms 2019 Gathering West Gippsland

By Glen Sutherland and Mary Hughes

The Mallee Farmer recently became aware of the next Women on Farms gathering scheduled in March 2019. The organisers were approached to see if they were interested in promoting the event through the Mallee Farmer and the response was very positive and they provided the following descriptor of the event. "As it will be held in West Gippsland, a panorama of green hills and good rainfall, the very locale will be balm for the eyes, hearts and bodies of those women who come from their dry properties in the Victorian inland. See the attached photo depicting a typical beef cattle property, busy female farmer and green, green pastures".

There is no doubt that those visiting the event from the Mallee will see a very different landscape to ours, very inviting indeed.

STRIDING FORWARD', is the motto of a group of farming

women from West Gippsland who have been meeting and celebrating rural life for thirty years. Now they are preparing a special event which will be shared with women from across Victoria. The 30th state wide annual gathering of farming women will be held in Warragul in March 2019.

'We are working really well together in putting together a great weekend programme. We want women from Victoria's rural areas to see what we have here and why a farming life in West Gippsland is fantastic.' Said Lyn Link of Garfield North. Lyn is chairing the organising committee. Her commitment is obviously shared by the others who are planning tours, workshops, special dinners, inspiring speakers and plenty of time-out to chat.

'Striding forward is an apt motto for those having to face and

overcome farming difficulties,' observed committee member Mary Hughes of Neerim, 'climatic variations, market upsets, power outages, animal diseases and rising costs all challenge farmers to move on and focus on the longer term.'

The dates for the Warragul Gathering are 29 – 31 March 2019. As information is finalised it will be made available through rural media, Facebook and welcome contact with the West Gippsland group.

For further information about this event and Women on Farms West Gippsland: Mary Hughes, Neerim, 03. 56284195



Rotations to control herbicide resistance in the Southern Mallee

By Roy Latta

This article summarises a collaborative Mallee Sustainable Farming, Mallee Catchment Management Authority and land holder research project. Established in 2014 the Yaaapeet study evaluated and

demonstrated crop rotations and associated chemical options to control annual grass. Herbicide resistance levels in the annual ryegrass population measured at the commencement of the study found a medium resistance level to Group A and a low resistance to Groups B and M. With this in mind the research project aimed to demonstrate and validate options for depleting weed seed banks over successive seasons. The project confirmed the importance of testing of annual ryegrass populations to understand the specific herbicide resistance issue and therefore identify best options to address any problems through rotational and management strategies.

Method

The four-year study measured annual ryegrass populations through 5 rotations. Each component of each rotation occurred in each year. Weed control chemistry for each crop was applied with and without best practise products. Hay cutting and brown manuring was also used as alternative annual grass management strategies. Wheat, Corack and Grenade CL, were sown at 50 kg/ha, canola, Stingray TT and 43C80 CL, at 2 kg/ha and field peas, Wharton, at 100 kg/ha. DAP at 52 kg/ha was applied at seeding coupled with 50 kg/ha of Urea on canola. A further 50 kg/ha of Urea was applied mid-

season to canola and cereals that did not follow a pulse in the rotation. Sowing was carried out post weed emergence, late May-early June in all 4 years, following a double knockdown as required. Pre-emergent herbicides were applied immediately prior to sowing, post emergent herbicides 8 and 14 weeks post seeding. Broad-leaf weed control was applied along with pesticides and fungicides as required to all crops. All herbicides were applied at registered label rates. Table 1 presents the herbicide groups and management treatments applied to the 5 rotations. Table 2 presents the application rates and active ingredients (a.i.).

The use of broadleaf crops with selective grass control (group A) controlled annual ryegrass plant numbers (treatment 5 2014 and treatment 4 2015). Group B herbicide applied to treatment 2 2014 reduced annual rye grass plant numbers compared to treatments 3 and 4. The group M herbicide applied as a brown manuring treatment and post hay cut in 2015 controlled all the annual grass. The pre-emergent Group J herbicide reduced annual ryegrass numbers, treatments 3 and 4, compared to treatment 1 2014, Group D pre-emergent trifluralin. 2017 treatments 2 and 5 maintained a low annual ryegrass population, treatments 3 and 4 less than 1 plant each 100 m2.

Total wheat production was higher in response to the higher input treatment 2, compared to treatment 1. The comparative hay production reflected their single production season, treatment 1 2017, treatment 2 2015 (low rainfall). Treatments 3, 4 and 5 with two years wheat and two years broadleaf crop (field pea and canola) had similar yields irrespective of variety or rotational sequence.

Discussion

There was no evidence of the identified group A medium level of annual ryegrass herbicide resistance when a mixture of group A's (fops and dims) were applied at label rates at optimum times. However this was partly due to no measured herbicide resistance to Select (dim) at a high rate compared to Achieve (dim) with a 50-60% survival rate. The low level of groups M and B herbicide resistance identified in the initial population testing was not evident. The very low levels of ryegrass plants in the alternative crop

rotations are possibly a result of external seed contamination due to the replicated small plot experimental design. Wheat yields were generally higher in response to the Group J Tri-allate, treatments 2, 3 and 4. However variable costs were less for treatments 1 and 5 with no Group J Tri-allate applied.

Further information and contact details

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Table 1 The five crop rotations and annual grass control pre- and post-emergent herbicide groups and management strategies applied over the 4 year study

No	2014	Herbicide groups applied		2015	Herbicide groups applied	
		Pre-emerg	Post-emerg		Pre-emerg	Post-emerg
1	Wheat	D M		Wheat	D M	
2	Wheat CL	D J M	B	Wheat	D J M	Hay M
3	Wheat	D J M		Field Pea	D M	M BM**
4	Wheat	D J M		Field Pea	D M	A*A***
5	Field Pea	D M	A*	Wheat	D M	
No	2016			2017		
1	Wheat	D M		Wheat	D M	Hay
2	Wheat	D J M		Wheat	D J M	
3	Canola TT	D J M	A*	Wheat CL	D J M	B
4	Canola Imi	D J M	A*B	Wheat	D J M	
5	Canola Imi	D J M	A*B	Wheat	D M	

*A*Includes both a Haloxypol and Clethodim Group A herbicide

** BM Brown manure treatment

*** Second application a Group A Haloxypol only

Table 2 Chemical trade names and rates of each chemical group applied

Group	Chemical (a.i.)	Trade name	Application rate
D	Trifluralin 480 g/L	Trifluralin	1.5 L/ha
J	Tri-allate 500 g/L	Avadex	2 L/ha
M	Glyphosate 450 g/L	Glyphosate	1.5 L/ha
A	Clethodim 360 g/L	Select	500 ml/ha
A	Haloxypol 520 g/L	Verdict	35 ml/ha
B	Imazamox 33 g/L & Imazapyr 15 g/L	Intervix	600 ml/ha

Table 3 Four year crop rotations and mature (October) annual rye grass densities (plants/m²)

No	Rotation and annual ryegrass (plants/m ²)							
	2014		2015		2016		2017	
1	Wheat	29	Wheat	9	Wheat	22	Wheat Hay	128
2	Wheat CL	<1	Wheat Hay	0	Wheat	2	Wheat	1
3	Wheat	2	Field Pea BM	0	Canola TT	0	Wheat CL	<0.01
4	Wheat	2	Field Pea	0	Canola Imi	0	Wheat	<0.01
5	Field Pea	<1	Wheat	8	Canola Imi	0	Wheat	0.25

Table 4 Total 2014 to 2017 grain and hay yields (t/ha) from the 5 treatments

No	Rotation	Wheat	Field pea	Canola	Hay
1	Wheat-Wheat-Wheat-Wheat Hay	5.9			2.9
2	Wheat CL-Wheat Hay-Wheat-Wheat	7.9			2
3	Wheat-Field Pea BM-Canola TT-Wheat	4.7	BM	0.8	
4	Wheat-Field Pea-Canola Imi-Wheat	4.8	0.8	0.8	
5	Field Pea-Wheat-Canola Imi-Wheat	4.4	0.8	0.8	

The Role of Drones in Improving Agricultural Outcomes

By Geoffrey Craggs

Research Analyst, Northern Australia and Land Care Research Programme, Future Directions International.

With its ongoing advancements, the use of drone technology is becoming important across a range of sectors including agriculture.

Introduction

Unmanned aerial vehicles, commonly known as drones, operate without a human pilot aboard. Rather, they fly either autonomously, using onboard computers, or by a ground-based controller, via a system of communications between the two. Drone technology, and their use is rapidly increasing: unmanned vehicles are in use across a range of sectors, including defence, journalism and film photography, express shipping and delivery, thermal sensor drones for search and rescue operations, law enforcement and border control surveillance and weather forecasting.

In agriculture and food production drones are becoming important tools for farmers, land managers and scientists to review and monitor the status of their crops and animals. The Western Australian Department of Primary Industries and Regional Development (DPIRD) are using drones across a range

of applications to enhance its effectiveness in helping to manage land use. FDI has taken the opportunity to interview Nick Wright, a DPIRD Research Officer, to discuss the use of drone technology in Australian agriculture.

and Normalised Difference Vegetation Index (NDVI) mapping, which can deliver data relating to crop health, plant stress and even show frost affected areas. These types of products can be used as inputs into variable rate machinery



Figure 1: Nick Wright with a quadcopter and digital data. Source: Nick Wright, DPIRD

Interview

FDI - How do you see farmers using drones now and in the future?

Nick Wright - Now

Currently the practical use of drones in agriculture is limited but I believe there is great potential. The limitations revolve around a combination of software, hardware and legal restrictions. Even so, consumer level drones are quite common amongst farmers. At recent agricultural field days in Western Australia, I had the opportunity to talk to farmers about their use of drones, which included checking crops for waterlogging, unobtrusive monitoring of lambing ewes, head counts of sheep while they are in a paddock, and even finding lost sheep in bushland.

There are also a growing number of contractors offering tailored drone services for farmers, including 3D mapping, high-resolution ortho-mosaics

to optimize processes such as fertiliser distribution. The same drone technology can provide early warnings about crop pests and diseases and can even be applied to identify water leaks in irrigation setups. Currently, most of this technology has limited scope due to the cost and time needed to capture and process the data, especially when outsourcing these tasks to contractors. High quality drones, however, are becoming more affordable and software to review and analyse the data is becoming more user friendly.

Internationally, drones are being used to spray rice crops, replacing manual spraying with increased efficiency. Drones are even being used to plant trees by shooting seeds, that are encased in a nutrient rich pod, into the ground from a low altitude. With one operator commanding six drones, up to 100,000 trees can be planted per day.

Nick Wright - Future

I believe that future automation, combined with computer image recognition, will be the key to getting the most out of drones for agricultural use. Assuming relatively modest advances in technology and some legislative changes, I can see a future where we will have fully automated drone systems. These drones will fly over paddocks capturing data, which will then be processed by a computer to look for weeds or crop damage. This could be carried out on a frequent basis, so you would know very soon if you had a problem that needed to be addressed. In the same vein, this type of system could be used to map summer weeds, which, depending on the scale, could then be sprayed by the farmer or by another drone with a built-in spray system. Drones with the ability to spray are already available - they range in capacity up to 15 litres, providing viability to spot spraying.

A similar system could be used to monitor sheep grazing to check the amount of pasture left in a paddock. It is currently possible to undertake this type of identification and analysis, but it involves quite a bit of manual work. In the future, these systems would need to be fully automated to really be of use to farmers.

The availability of a drone system that requires little human interaction really opens up a lot of opportunities, such as high-resolution time series data sets that farmers could use to monitor plant growth, salinity, waterlogging, erosion, animal movements and much more. In addition, the adoption of improved wireless technology would allow drones to offload high resolution images in near real time. This

would enable decisions to be made immediately, which could be followed up with action by, for example, a spot spraying drone or by an alert being sent to a farmer, advising the need for further intervention.

FDI - How will their use benefit farmers?**Nick Wright -**

I believe drones will offer two fundamental benefits to farmers, including significant savings in time by undertaking menial tasks and gathering a large amount of useful data. The time-savings will come from tasks that can be automated and performed with increasing frequency and potentially greater accuracy, such as monitoring of crops, pasture, stock watering points and more. For instance, currently, fixed winged drone technology is being developed to monitor boundary fences on pastoral stations, which could potentially save days of manual monitoring each year.

With respect to data collection, even 'consumer' drones can currently map landscapes in 3D, which could aid farmers in surface water management, erosion monitoring and planning cropping run lines. When additional sensors are added to drones, they become even more capable. For example, adding a multispectral sensor allows the drone to capture data on crop health, vegetation cover and more.

The frequency at which an automated drone system could cover a farm would dramatically reduce the time taken to identify pest infestations, such as areas of canola affected by slugs or

wheat affected by fungal disease such as leaf rust. Addressing insect pests as soon as possible is critical to mitigating damage and the availability of quantifiable data can make decision-making easier. For example, if a farmer was able to see exactly how much of their crop was frost-affected, it could affect the amount of grain they are willing to sell prior to production.

FDI - Are there emerging technologies and what impacts might they have on farming?**Nick Wright -**

Most drones currently being used in agriculture are of the quadcopter variety. These typically get around 30 minutes of flight time, with their lithium polymer batteries, which can be limiting when dealing with farm scale tasks. This limitation is being felt in many industries and therefore a lot of research is being done in this area. The only solution to longer flight times is efficiency, which is possible with fixed-wing drones. These drones have a more traditional plane-like form and once airborne, are significantly more efficient than quadcopters, many with multi-hour flight times. The fixed-wing drones also travel much faster so can cover very large distances. They are limited however, to lighter payloads.

Uses for drones are limited by the types of sensors available. Currently, most drones being used by farmers only have a photographic camera and basic GPS receiver; this alone can be used in a multitude of ways. With additional sensors, such as multispectral, hyperspectral, range finding and mapping

(LIDAR), high precision global positioning systems (GPS) and thermal, the potential uses increase dramatically. These additional sensors are available now but for the most part, are only used by researchers and contractors. As prices come down however, and the ease of use increases, adoption rates will follow.

programs are emerging that can recognise specific features within a photograph. This technology is currently being used by DPIRD to detect skeleton weed in broadacre farms; this technology could also be applied to many other weed varieties or signs of pests within a crop. Further out, I can imagine similar technology

drones is research-based. This includes 3D mapping of erosion following flood events, the use of thermal sensors to track and count feral pig populations, automated detection of skeleton weed using image recognition, crop monitoring for frost, pests and diseases, and more. For instance, on a trial examining the effectiveness of treatments on water repellent soils, a drone was used to capture data to measure early plant establishment and ground cover, which is strongly linked to crop yield. A drone was used in this instance as manually capturing the required amount of data would have been time consuming and laborious.



Figure 2: Drone can enable 3D mapping technology. Source: Nick Wright DPIRD

With advances in sensor technology, it has recently become viable to buy third party multi-spectral sensors which can be strapped to the underside of 'off the shelf' purchased drones. The data from these sensors can be processed for a multitude of valuable uses. The non-integrated nature of these add-on sensors, however, makes them somewhat cumbersome to use and processing the data can also be unwieldy for the end user. Additional sensors must interface seamlessly with the drone and data processing must be streamlined before they can achieve mass market success.

Another emerging technology that is starting to become available is image recognition, powered by artificial intelligence. Computer

being used to analyse livestock for signs of distress.

A prerequisite for the type of technology being adopted is software integration and automation. From what I have seen, few farmers are prepared to spend the time and effort required to get the most out of the current types of drones, due partly to software and legal limitations. For drones to be commonly adopted by farmers, the systems must be completely automated, including scheduled flights, automatic recharging, automatic data offloading and data analysis. Only when this automation occurs will we see large-scale adoption by farmers.

FDI - What is your department doing to promote the use of drones?

Nick Wright -

Most of DPIRD's work with

Some of DPIRD's use requires high-end drones with additional sensors, which push the envelope of what is currently possible. Over time, however, these features will become more accessible to farmers as drone and sensor prices drop.

By developing uses and work flows for drones, DPIRD is promoting uptake of the technology and general growth in the drone market. Recently, DPIRD displayed its use of drones at Western Australia's Mingenew Midwest Expo, Dowerin and Newdegate Machinery Field Days and at the Perth Royal Show. The displays showed farmers what DPIRD is doing in the drone space and gave them an idea of that they could be doing with drones in the future.

For more information

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The Last Word... Mallee's Most Wanted

Glen Sutherland

*Northern Regional Agriculture
Landcare Facilitator*

On the welcome list of things summer brings like the festive season, longer daylight hours, cricket, tennis and warmer weather, BBQs with friends and family and a chance to have some down time.

But I bet what you won't find on any farmers welcome list is summer weeds.

And if we made a list of the worst of the summer weeds, the declared noxious weed in New South Wales, Victoria and South Australia, silverleaf nightshade would be near the top. Silverleaf is also a Weed of National Significance (WoNS).

Here are the reasons why:

- It's not as invasive as other weeds, but with a foot hold, it's very difficult and expensive to control;
- Sheep are considered the main culprit in spreading silverleaf from paddock to paddock, they eat the mature berries and the seeds survive digestion;



Silverleaf Nightshade

- It has an extensive very tough root system for its size, typically up to 2 metres deep and wide;
- Silverleaf loves cultivation, new plants will readily establish from disbursed root segments; and
- Like other summer weeds it fleeces soils of precious moisture and nutrients needed for the next winter crop.

An important step forward has recently been made in providing land managers with the most up-to-date knowledge and methods for the control of this pest plant with the release of 2018 Australian Best Practice Manual for the Control of Silverleaf Nightshade. The manual brings together a combination of research findings and the collective experiences of two of the most recognisable experts in the field, Dr Hanwen Wu (NSW DPI) and Dr John Heap (PIRSA). The manual

comprises comprehensive easy to read sections on the weeds history and biology plus the current distribution and spread. Much of the manual is a hands on guide to developing an integrated weed management plan of action to combat existing weed infestations and to manage possible future on farm incursions. Of particular note is the inclusion of six case studies highlighting the practical experiences of farmers who have overcome silverleaf in very different terrains, climates and locations.

The manual also provides a rich source of where to find further information and state agency contacts. Copies of the manual can be downloaded from the link below, interestingly it is the only weed I know that has its own dedicated web site.

<http://silverleafnightshade.org.au>

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