

Advertising

Michael Cook

(National Advertising Manager)

P: 07 4659 3555

F: 07 4638 4520

M: 0428 794 801

E: advertising@greenmountpress.com.au

Editor

Lloyd O'Connell

Associate Editor

David Dowling

Production and Design

Mick Allan

CONTENTS OF ADVERTISEMENTS are the responsibility of the advertisers. All statements and opinions expressed in Australian Grain are published after due consideration of information gained from sources believed to be authentic. The following of advice given is at the reader's own risk, and no responsibility is accepted for the accuracy of the matter published herein. No portion in whole or part may be reproduced without permission of the publisher.

Copyright 2017.

Published by Bereku Pty. Ltd.,

40 Creek Street, Brisbane

Registered by Australia Post Publication No.

PP100002295. ISSN 1449-2970.

Published bi-monthly.

Grain Yearbook published in April

FRONT COVER

The mouse ran up the crop...

There aren't too many downsides to a record winter crop but one is the huge feed source the crop residue creates for invasive pests such as mice. There are reports from around

the country that mouse numbers are on the rise. NSW DPI has released some new and timely information to help minimise the frequency and severity of mouse plagues.

See article page 33.
(PHOTO: Julianne Farrell)



Contents

Editorial	4
How does our cropping profitability perform on the world stage?	6
New Zealand farming couple grow record-breaking wheat crop	14
Australia's wheat yields stalled	16
Know N status to capitalise on this winter season	17
Teaching plants to be better spenders	20
Red clover: Antibiotic alternative for cattle	22
Classic Tractor Tales...	
The Froelich story	23
Marketing...	
China is solving its cornucopia...	25
Digging deeper: How global wheat supplies will tighten	26
Weedsmart – Ask An Expert...	
How can I avoid sub-lethal dosing when spraying weeds?	27
Don't start mixing until the water quality is right	29
Does soil Ph affect weed management?	31
Reducing the frequency and severity of mouse plagues	33
New invasive species research centre to maintain momentum	36
New knowledge emerging from Russian wheat aphid research	38
Farming in Foreign Fields...	
Profiling the sustainability of wheat farming in the US	40
Soak up grower knowledge on soil moisture	42
News & New Products	43
District Reports	44

Focus Sections

Southern Australia Focus

Covering cropping systems of Southern NSW, Victoria, South Australia, Western Australia and Tasmania

Sheep make money while eating weed seeds	i
Chickpeas lose disease resistance	iii
RLEM insecticide resistance discovery in the south	vi
Insecticide preservation central to RLEM strategy	vii
Growers get the jump on costly soil-borne diseases	viii

Northern Focus

Covering Northern NSW and Queensland

Yellow leaf spot trials and the economics of spraying	i
Corn technology allows for effective weed control	vi
Reducing discounts in cotton colour for more profit	vii
Nuffield scholars make a world of difference	viii



Veritas®

True broad spectrum Performance.



Introducing new Veritas® Fungicide for Wheat, Barley, Chickpeas and Lentils. The combination of strobilurin plus triazole chemistry in Veritas® is rapidly absorbed and translocated within the plant to provide outstanding protection and maximise the yield potential and quality of your crops.

With proven outstanding control of all key diseases affecting Wheat and Barley crops and the ability to effectively manage Ascochyta Blight and Grey Mould in Chickpeas and Lentils under permit*, Veritas® truly does provide broad spectrum performance.

* The use of Veritas® in Chickpeas and Lentils is covered until 30th September 2017 by APVMA Permit Number PER81533.

†Veritas is not currently registered at the time of printing. Registration expected May 2016.

ADAMA

To find out
more about
Veritas® use your
QR reader.



Veritas

7662

THE XPERT IN CEREAL DISEASE CONTROL.



The fungal disease solution for barley, oats and wheat. Its unique formulation, extensive registrations and dual mode of action, provides unsurpassed efficacy and flexibility.

Nufarm
tazerxpert
FUNGICIDE



nufarm.com.au/tazerxpert

© Nufarm Australia Ltd. All trade marks (®,™) are owned by Nufarm Australia Ltd or used under license.



Grow a better tomorrow.

WE keep hearing the world is awash with grain – and particularly wheat – and that exporters, such as Australian grain growers, are going to have to wait for a significant hiccup somewhere before we start to see better international prices. And of course we all hope that hiccup happens “somewhere else.” There are some recent signs that we may have touched both the bottom of the price trough – and somewhere near the top of the global stored wheat pile.



A more detailed look into wheat production trends and, in particular, the make-up of the projected 258 million tonnes of global wheat stocks at the end of this year, gives cause for optimism that things might just be turning around.

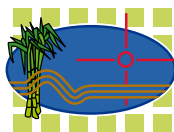
US Wheat Associates analyst Stephanie Bryant-Erdmann digs deeper into the latest USDA figures (see article page 26) and finds that ending 2017–18 wheat stocks held by the major importing countries are forecast to be at their lowest level in six years. At the same time, the ending stocks held by the major eight exporting nations (Australia, Argentina, Canada, the EU, Kazakhstan, Russia, Ukraine and the US) are forecast to be 62 mt – or 17 per cent less than last season.

And to add even more perspective, overall wheat production in 2017–18 is forecast to decline to 738 mt – the first drop in global wheat production for five years.

China, as always, will also have a big impact on the global market. Of the 258 mt of projected ending wheat stocks in 2017–18, almost half of this tonnage (128 mt) will be held in China. Including China in the global wheat stocks to use ratio (a fundamental indicator of how demand and supply in the market is balanced), you come up with 35 per cent. Leave China out of the equation and the global ratio is 21 per cent.

Here's to a hiccup “somewhere else!”

3D GPS LANDFORMING



Survey and Design – My Plans or Yours

- ▲ Irrigation Development. ▲ 400hp Tractors, 4.5m Buckets.
- ▲ Dryland Development. ▲ Low Loader, Semi Tipper.
- ▲ Storages, Channels, etc. ▲ Now Available.
- ▲ Will Travel Anywhere. ▲ Over 20 Years' Experience.

GARSON & CO PTY LTD
PHONE NEIL 0427 769 086

**For all advertising enquiries please contact
Michael Cook on**

Ph: 07 4659 3555, Mob: 0428 794 801
E: advertising@greenmountpress.com.au



AUSTRALIAN GRAIN

www.ausgrain.com.au

In this issue...

Know N status to capitalise on this winter season

Knowing the N status of paddocks is critical if grain growers are to fully capitalise on a wet start to a winter cropping season.



See article Page 17

The Froelich story

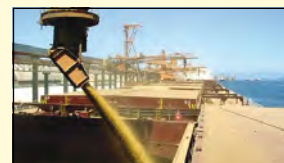
A tractor engine of 2155 cu. ins. capacity (35.313 litres), usually conjures up mental images of super powerful Caterpillar or perhaps GM diesels – the fact that this tractor engine has only one cylinder is astonishing.



See article Page 23

How global wheat supplies will tighten

While markets focused on USDA's latest global supply and demand values, a deeper look provides perspective for wheat buyers. Breaking the supply values down into three categories – importer, exporter and China – shows some interesting trends.



See article Page 26

Don't start mixing until water quality is right

Water quality is often overlooked as a possible contributor to herbicide failure and can lead to confusion over the herbicide resistance status of weeds on a property.



See article Page 29

New knowledge emerging from RWA research

Less than a year after Russian wheat aphid (RWA) was first detected in Australian cereal crops, considerable new knowledge is emerging from GRDC research investments activated in the wake of the pest's discovery.



See article Page 38

Get a genuine head start this harvest season.



Maximise uptime

Preventive maintenance costs you less than unexpected downtime.

Maximise performance

Get professionally checked, optimised, adjusted and fitted with genuine John Deere parts.

Maximise value

A genuine service history means your machine will hold value when you come to sell.

Hit the ground running with a comprehensive pre-season service of your harvesting equipment at your local John Deere dealership. There is no better way to get you operating at maximum harvesting performance from day one.

Book in at your local John Deere dealer today or visit JohnDeere.com.au/PeakPerformance to find out more.



JOHN DEERE

**NO DEPOSIT
REPAYMENTS
ON COMBINE
SERVICING & PARTS
UNTIL 31 MARCH 2018***

*For no-deposit, no repayment service and repairs until 31 March 2018, spend \$11,000 (inc. GST) or more. Final payment due 31 March 2018. Offers available to existing John Deere Financial approved commercial customers with active contract or new commercial customers with unencumbered security on machine being serviced or repaired. Interest calculated on the JDF Floating Rate of the day. Fees and charges apply. If not amended or withdrawn earlier, the promotion expires on 31/03/18.

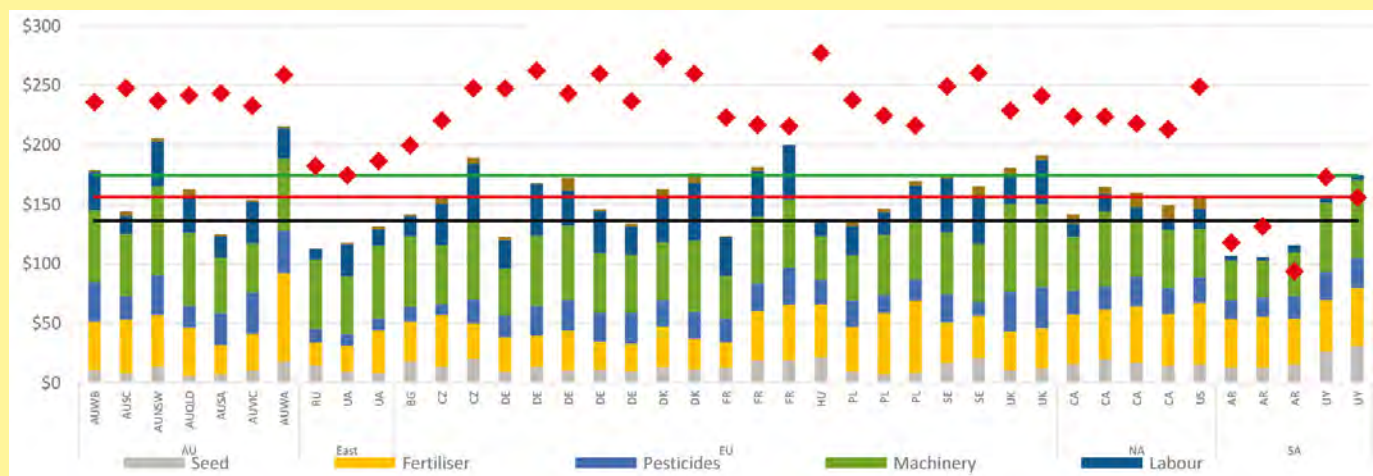
BACKING AUSTRALIAN AGRIBUSINESS

whatever the forecast

Through good times and bad, we're proud to support Australian agribusiness. We've been doing it for 155 years, and with more than 550 local bankers in 110 locations, we'll keep on delivering the local knowledge and high quality service primary producers can rely on in the moments that matter.

**Talk to your NAB Agribusiness banker
or call 13 10 12.**

FIGURE 2: Average wheat income and costs per tonne (\$US) of production for the period 2009–13



P25 and P75 refers to the 25th and 75th percentiles for the total production costs of the dataset.

with a continuous dataset for the five year period of 2011 to 2015 have been included.

Wheat yield

The five year average yields of wheat in this analysis range from 1.6 tonnes per hectare (AUVic) to 9.7 tonnes (EU) with the EU standing out as the highest yielding region with a range of 4.7 tonnes per hectare to 9.7 tonnes (Figure 1).

Within this group the highest yields are achieved on the typical farms from the Western European countries (including the UK).

The feedback from the network partners in the countries

where the production systems are still developing is that there is a wide variation in performance between individual farms due to production knowledge and access to working capital.

Many farms in Ukraine and other Eastern European countries are constrained by insufficient working capital as well as limited agronomic technology. The implication is that these regions are effectively under-producing and therefore have the capacity to increase production with greater adoption of modern agronomic techniques and increased availability of working capital.

Wheat yields from the non EU farms ranged from 1.6 tonnes per hectare (AUVB) to 5.4 tonnes (Ukraine).

Wheat price

Grain prices are presented on a farm gate basis per tonne net of freight to end point and all selling costs (Table 1). The price reflects the total value of grain produced including premiums or discounts for quality or grade.

The wheat price has been relatively consistent across regions with \$US31 per tonne difference between the 25th and 75th price percentile. The median price for the dataset was \$US225.

Jaylon produces quality tarpaulins for harsh environments



Jaylon has fabricated tarpaulins for over 60 years and is Australia's leading manufacturer of hay and grain covers — supplied throughout Australia and around the world!

As well as heavy-duty long-life tarpaulins supplied to major grain handlers, Jaylon is also able to supply silo bags, wall liners, ground sheeting and economy tarpaulins to meet individual storage requirements.

With manufacturing facilities in both Perth and Brisbane...

JAYLON HAS GOT AUSTRALIA COVERED!



Telephone: 08 9249 2088
Facsimile: 08 9249 3690
Email: graincovers@jaylon.com.au

TABLE 1: Average farm gate wheat price (\$US/t) for the years 2011–15

Typical farm regions	Farm gate price (\$US/t)			
	Average	25th Percentile	Median	75th Percentile
AU4000WB	\$236			
AU4500SC	\$247			
AU3000NSW	\$237			
AU1550QLD	\$241			
AU2800SA	\$243			
AU3500VIC	\$233			
AU5500WA	\$259			
Australia	\$242			
East Europe	\$181			
EU	\$235	\$223	\$238	\$247
North America	\$225			
Argentina	\$114			
Uruguay	\$164			
All farms	\$219	\$214	\$225	\$245

TRUE BLUE EOFY DEALS ON NOW

PULL A GREAT EOFY DEAL ON T8 & T9 TRACTORS



TRUE BLUE



**ORDER BEFORE 30TH JUNE 2017 FOR A GREAT FINANCE
RATE ON SELECTED DEALER AND COMPANY FLOOR STOCK**

With seeding season fast approaching our EOFY deals on T8 & T9 tractors couldn't come at a better time. For starters you'll enjoy a low finance rate of just 0.95% on selected dealer and company floor stock. If you order before June 30. Plus the T8 & T9 tractors are big on the features that'll make your farming operation more profitable.

So for amazing EOFY deals visit your local New Holland dealer today.

0.95%*
P.A. FINANCE

3 YEAR
WARRANTY



VALID UNTIL
30TH JUNE 2017



Prostate Cancer
Foundation of Australia
Major Partner

*Terms and conditions apply. Finance rate subject to term and deposit requirements. Finance provided by CNH Industrial Capital Australia Pty Ltd AFS License No. 286664. Offer is available to business customers only and subject to credit approval. 3 year warranty comprises the manufacturers base warranty and Service Plus Protection Plan. Contact your local dealership for full details.

CNH
INDUSTRIAL CAPITAL

TABLE 2: Average and median production costs per tonne of wheat production for the period 2011–15

Region/Farm	Cost per tonne of production (USD)					
	Seed	Fertiliser	Pesticides	Labour	Machinery	Total
AU4000WB	\$11	\$41	\$33	\$32	\$60	\$179
AU4500SC	\$8	\$45	\$20	\$15	\$52	\$144
AU3000NSW	\$14	\$43	\$34	\$38	\$74	\$206
AU1550QLD	\$5	\$40	\$19	\$31	\$62	\$163
AU2800SA	\$7	\$25	\$26	\$18	\$47	\$124
AU3500VIC	\$10	\$31	\$34	\$35	\$41	\$154
AU5500WA	\$18	\$74	\$36	\$25	\$61	\$215
Australia	\$10	\$43	\$29	\$28	\$57	\$169
East Europe	\$11	\$26	\$10	\$17	\$56	\$120
EU	\$13	\$36	\$22	\$33	\$53	\$160
North America	\$16	\$46	\$21	\$13	\$49	\$154
Argentina	\$13	\$41	\$17	\$4	\$34	\$109
Uruguay	\$28	\$46	\$24	\$4	\$62	\$165
All farms	\$14	\$38	\$22	\$25	\$52	\$155

The prices for the Australian farms have been relatively high and consistent between farms. The combined average for the Australian farms of \$US242 per tonne compares very well to other regions and is just under the 75th percentile of the dataset.

In general, the South American farms have recorded the lowest prices in the dataset. In particular the Argentinian prices are extremely poor which has significantly limited the profitability of the enterprise.

Income and costs (Figure 2)

Wheat income includes all proceeds from sales of wheat grain and by-products such as straw. In most cases, grain sales make up the vast majority of the income on each farm.

Total crop income ranged from \$US330 (AR) to a high of \$US2383 per hectare (EU). The EU region stands out as a distinct group with high income and high cost of production. Income ranged from (in \$US) \$1034 to \$2383 per hectare. Total costs ranged from \$700 to \$1654 per hectare. For the non EU farms, income ranged from \$330 (AR) to \$903 per hectare (US). Total costs range \$305 (AUWB) to \$636 per hectare (CA).

Comparing costs and income on a tonne of production basis reduces the level of variation between the farms and the regions. On this basis the EU farms are no longer distinctive as a group and the Argentinian farms are clearly the lowest cost producers. Total costs of production ranged from \$US107 per tonne (Argentina) to \$US206 per tonne (AUNSW).

One common feature across all farms is the high cost of fertiliser and machinery. While there is some level of variation between the individual farms these two items were consistently the highest cost items.

There is a high level of variation in costs per tonne of wheat production within the Australian group ranging from the highest for the dataset (AUNSW \$US206 and AUWA \$US215) to some of the lowest (excluding Argentina).

The high average cost for AUNSW is the result of the exceptionally poor yield in 2013 of 0.8 tonnes per hectare. This will have a disproportionate effect on the average costs per tonne in the short term – assuming that such low yields occur far less frequently than one in four years. The production costs per tonne for the individual years were (in \$US) \$165, \$431, \$123 and \$103

TABLE 3: Summary of wheat enterprise margin (\$US) per tonne of production

Typical farm regions	Wheat enterprise margin (\$US/t)				
	Average	25th Percentile	Median	75th Percentile	+ decoupled
AU4000WB	\$57				\$59
AU4500SC	\$104				\$105
AU3000NSW	\$31				\$31
AU1550QLD	\$79				\$79
AU2800SA	\$119				\$119
AU3500VIC	\$79				\$79
AU5500WA	\$43				\$43
Australia	\$73				\$74
East Europe	\$61				\$62
EU	\$79	\$58	\$78	\$102	\$125
North America	\$71				\$72
Argentina	\$5				\$5
Uruguay	-\$1				-\$1
All farms	\$67	\$48	\$64	\$94	\$90



Aviator
Xpro®

Take your yield to new heights

**The new benchmark for foliar disease
management in canola.**

Aviator® Xpro® will deliver class-leading disease control in canola, setting the crop up for an extended period of clean and healthy growth leading to;

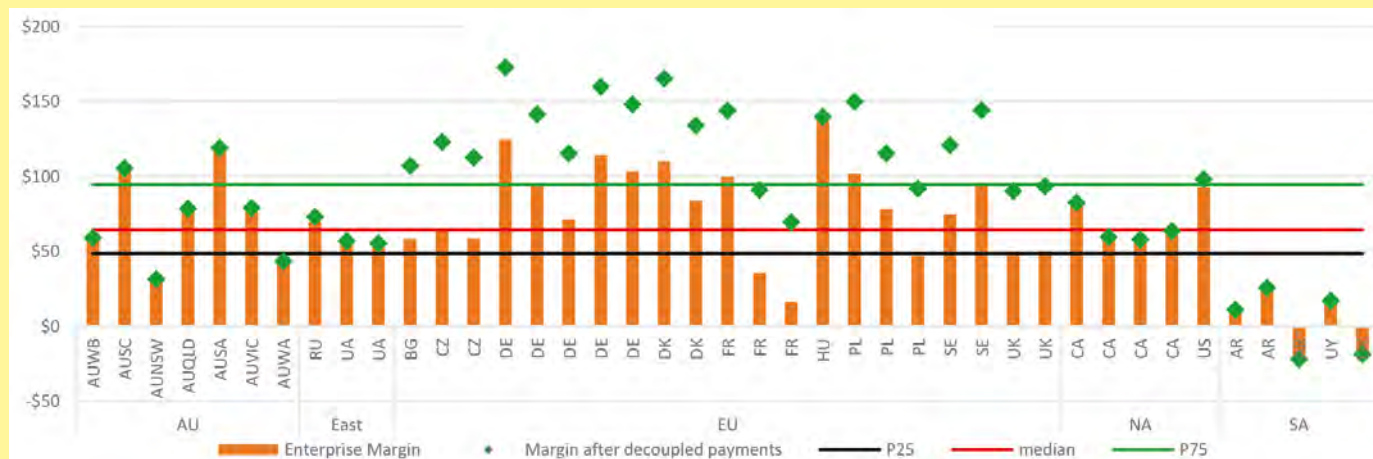
- **Unbeatable yields**
- **High return on investment**



For more information visit www.crop.bayer.com.au/aviator

Bayer CropScience Pty Ltd ABN 87 000 226 022 Level 1, 8 Redfern Road, Hawthorn East, Vic 3123 Technical Enquiries: 1800 804 479 enquiries.australia@bayer.com
Aviator® and Xpro® are Registered Trademarks of the Bayer Group.

FIGURE 3: Average wheat enterprise margin (\$US) per tonne of production of wheat for the period 2011–15 – including decoupled payments



P25 and P75 refers to the 25th and 75th percentile margin.

(Table 2). The Argentinian farms have the lowest costs per tonne of production with an average of \$US109 per tonne (dataset median \$US156 per tonne) which is driven for the most part by the significantly lower machinery and labour costs. A key point of difference on these farms is the exclusive use of contractors for all cropping activities. According to the network partners, this is common practice in the grain growing regions of Argentina.

As a region, Australia had the highest costs of production with an average of \$US169 per tonne ranging from a low of \$US124 to \$US215 per tonne. This represents a range of \$US91 per tonne.

Similarly, the EU group ranged from \$US123 to \$US200 per tonne averaging \$US160 per tonne.

The high production costs of the AUWA farm (\$US215 per tonne) is relatively consistent across years and is primarily due to a high cost structure across the board. Fertiliser in particular is the highest cost in the dataset at \$US74 per tonne reflecting a relatively high input system.

East region farms (Russia and Ukraine) have a cost base of \$US120 per tonne which is approximately \$US40 per tonne less than the Australian average. The difference is primarily driven by low fertiliser, pesticides and labour costs. But wheat prices recorded were approximately \$US60 less which has eroded some of the competitive advantage.

Enterprise margin (Figure 3)

Wheat profitability on the farms from Canada, the US and Australia compare more favourably to the EU farms. The margin for AUSC and the AUS were within the group of the highest margins at \$US104 per tonne and \$US119 per tonne respectively.

Profitability was highly variable within the EU group with margins ranging from \$US16 to \$US139 per tonne. The median profit for the EU group was \$US78 per tonne.

The average profit margin for the North American farms was \$US71 per tonne.

To sum up

- The lowest yielding farms were from the Australian group.
- Australian farms were generally low yielding with moderate to high levels of yield variation between years.
- Production on AUNSW was the most variable in the dataset.
- EU farms were generally high yielding with relatively low levels of variation between years.
- Australian farms achieved high grain prices.
- Argentinian farms had the lowest costs per tonne of production, lowest prices and lowest margins in the dataset.
- Machinery cost per tonne of production were the highest single cost for all farms.
- Profitability per tonne of production for the Australian farms was competitive with the EU, Canadian and US farms.
- Low prices generally lead to low levels of profitability.

For further information contact Ashley Herbert – E: ashley@agrarian.com.au

The support of GRDC (Project No AAM00001) and *agri benchmark* is gratefully acknowledged as well as the invaluable assistance from colleagues: Nic McGregor, Agvise Management Consultants, Merredin, WA; Brett Symes ORM, Bendigo, Victoria; James Hillcoat, Rural Directions, Freeling, SA; Rob Sizer, Agripath, Tamworth, NSW; and, Peter Wylie, Agripath Dalby, Qld.



Farms from Eastern Europe – such as the Ukraine (pictured) – have a cost of production per tonne around \$US40 less than in Australia.



Knowledge grows

Not all foliar are equal



YaraVita™

Key nutrients to optimise yield in cereals, canola and legume crops.

YaraVita products are designed and formulated specifically for use in agriculture and horticulture. All products are tested to ensure crop safety, to be effective as a nutrient source, highly compatible with other agrochemicals and are easy to use. All YaraVita products are backed by field and glass house trials to ensure they supply plant available nutrients to satisfy crop needs. The TankmixIT app contains the latest agrochemical compatibility information to provide trouble free co-application.



New Zealand farming couple grow record-breaking wheat crop

NEW Zealand farmers Eric and Maxine Watson have entered the renowned book of Guinness World Records after producing the world's highest yielding crop of wheat. The couple produced a staggering 16.791 tonnes per hectare, beating the previous record of 16.519 tonnes held for two years by a UK farmer.

On average, irrigated wheat yields in New Zealand are around 12 tonnes per hectare, demonstrating how remarkable the new record is.

The crop was planted in mid-April 2016 and harvested mid-February this year.

Eric says it's a big relief to have achieved the record, especially after coming close in previous years.

"We're absolutely delighted to have set a new record – I feel a bit overcome in a way, it's quite an achievement.

"It's a very good feeling after all these years of achieving high yields to get the world record, after all, it's what we set out to do. Possibly one of the things that will come out of this is recognition of the New Zealand arable industry. It's very small but there are some good farmers out there and it's good to have the record back in New Zealand again," says Eric.

Eric puts a large part of his success down to his partnership with Bayer and Yara. Bayer, for its agronomy advice and range of crop protection herbicides and fungicides; and Yara, for its nutrition input.



New Zealand farmers – and world record holders – Eric and Maxine Watson.

"We've been achieving high yields for several years but have never bothered about the world record. The record definitely became harder to achieve after the 16.5 tonne barrier was broken in the UK harvest of 2015," adds Eric.

Bayer New Zealand Crop Science Country Manager, Scott Hanson, says the record is not only an important achievement for the Watsons, but for New Zealand as a whole.

"For me, the record demonstrates the skill set that we have in New Zealand in the arable industry. The New Zealand grain and seed industry is an important part of the global seed market. Farmers like Eric and Maxine demonstrate what New Zealand can do at a global level truly promotes our industry to the world.

"We hope that achievements such as this will help promote New Zealand as a global leader in growing grain and seed for both the local and global markets. Two years ago we worked with Warren Darling of Timaru to get the world record for barley. The addition of the wheat world record firmly puts New Zealand at the forefront of worldwide farming.

"In particular, the Canterbury region is demonstrating that it not only has some of the best arable growing conditions in the world, but also some of the best and most knowledgeable arable farmers in the world.

"Bayer is focused on improving crop yields through developing innovative products and crop management programs. Our aim is to make New Zealand the highest yield producing country in the world," said Scott.

Yara Fertilizers New Zealand Arable Specialist, Paul Johnston, was involved with the overall crop nutrition advice for solid fertiliser inputs of nitrogen, phosphorus, potassium, sulphur and magnesium. Paul explains, "Regular herbage testing was also a very important factor as this guided the timely inputs of foliar trace elements."

As for the future, Eric believes he can do even better.

HARVESTING MADE EASIER WITH DAVIMAC CHASER BINS



SET NEW STANDARDS FOR HARVEST 2017
AUSTRALIAN DESIGNED AND BUILT WHEEL AND TRACK CHASER BINS

UNDERCARRIAGE OPTIONS:

- ✓ SINGLE AXLE
- ✓ DUAL AXLE
- ✓ 24" OR 36" TRACKS





DAVIMAC.COM.AU
Contact your local Davimac dealer today.

DAVIMAC



The iconic Aussie adjuvant in the trusted green can



- Australian made ✓
- With Australian canola oil ✓
- For Australian farmers ✓
- Cross-labelled on 27 pesticides brands ✓



www.vicchem.com
Phone 03 9301 7000

"It is an exceptional yield, but I could always do better and that's my aim. There were things I saw when I was out there in the combine harvester and I thought, yeah, I could do this a whole lot better," adds Eric.

Key facts about the world record wheat crop

- Winter wheat, variety Oakley;
- Planted mid-April 2016, harvested mid-February 2017;



Eric saw some things from the harvester seat that convinced him they can grow an even higher yielding crop.

- Location – Paddock 15, Wakanui, Canterbury, New Zealand;
- Yield – 16.791 tonnes per hectare;
- Harvested from 11.89 hectares; and,
- The harvest will most likely go into animal feed for dairy cows.

For more information please see <http://bayer.com.au/>

ABOUT ERIC AND MAXINE WATSON

The Watsons have held a long time desire to excel as arable farmers on their 490 hectare farm located east of Ashburton.

They bought their farm in 1992 and with the help of one staff member grow a wide range of crops for seed production, including cereals, grasses, vegetables and pulses.

With a focus on detail, the couple are pioneers in the field of computerised variable rate irrigation ensuring crops get the exact quantity of moisture required without wasting water.

Healthy soil is another focus area with regular nitrogen testing aimed at minimising fertiliser use wherever possible.

The couple constantly try to improve farm performance and describe their business as a clear partnership that shares strategic planning and overall management.

They have won numerous farming awards, including Lincoln University's 'South Island Farmer of the Year' Award and the 'Supreme Award' in the Canterbury Ballance Farm Environment Awards.

Achieving the Guinness World Record is the pinnacle of their many successes.

AUSTRALIA'S WHEAT YIELDS STALLED

Australia's average wheat yields – which had more than tripled due to technological advances between 1900 and 1990 – did not increase from 1990 to 2015.

Recent research by CSIRO scientists, published in the journal *Global Change Biology*, found that Australia's yield potential (determined by the climate and soil type, managed using best practice and current technology) declined by 27 per cent over the past quarter of a century.

CSIRO team leader Dr Zvi Hochman said the study found that Australia's wheat-growing zone had experienced an average annual rainfall decline of 2.8 mm over the past 25 years or 28 per cent per cropping season, and a maximum daily temperature increase of around 1°C over the same period.

These observations are consistent with the higher end of future climate change projections for the wheat zone over the coming 26 years.

"Our results are a serious concern to the future livelihood of wheat farmers in marginal growing areas and to the Australian economy, as well as future global food security," Zvi said.

"Wheat farmers are making the most of developments in farming technology and adapting them to their needs.

"But their best efforts are merely enabling them to keep pace with the impacts of a changing climate."

He said that despite the adverse trend in growing conditions farmers have so far managed to maintain yields at 1990 levels of around 1.74 tonnes per hectare.

Closing the potential Vs actual yield gap

This shows that wheat growers are closing the gap between potential and actual yield.

"1990 was a watershed year for Australia's wheat industry, with a continued decline trend in yield potential since that year," Zvi said.

The study analysed 50 weather stations with the most complete records across Australia's wheat growing regions.

"We found that the loss of yield potential is not evenly distributed across Australia's wheat zone," Zvi said.

"While some areas have not suffered any decline, others have reduced yield potential by up to 100 kg per hectare per year."

Wide annual variation in climate, yield potential and actual yields are normal in Australia.

But the probability of seeing the trends shown by this study across 50 weather stations over 26 years, through random seasonal variability is less than one in 100 billion.

"Assuming the climate trends we have observed over the past 26 years continue at the same rate – even if farmers continue to improve their practices – it is likely that the national wheat yield will fall," Zvi said.

"We estimate that the recent average yield of 1.74 tonnes per hectare will fall to 1.55 by 2041.

Although the study focused on wheat, the findings would be broadly applicable to other cereal grains, pulses and oilseed crops, which grow in the same regions and same season as wheat.

Know N status to capitalise on this winter season

KNOWING the nitrogen (N) status of paddocks is critical if grain growers are to fully capitalise on a wet start to a winter cropping season.

With storm rain and Cyclone Debbie delivering good falls during March, a number of growers in the northern cropping region will start the winter season with a full profile of soil moisture and a vastly improved crop yield outlook.

But last year's unseasonably wet winter followed by a dry summer is likely to impact on plant available N (nitrate and ammonium) for 2017 winter crops, according to Professor Mike Bell from the University of Queensland's Alliance for Agriculture and Food Innovation (QAAFI).

Understanding the impact of wet weather on a soil's fertility status is imperative if growers are to maximise the yield potential of this year's crops through the effective planning of a fertiliser strategy, including rate and method of application.

Growers are likely to focus their planning on N given that it is the most likely yield limiting nutrient and N fertiliser represents one of the most significant input costs in farm budgets.

"The key message for growers is 'know your nitrogen levels'. Running nutrient budgets to determine how much was removed in 2016 and therefore how much needs to be returned is fine until something unusual happens and last winter was the 'something unusual'," Mike said.

Resetting the nutrient calculator

"In these situations, growers will need to reset their nutrient calculators in order to obtain an accurate assessment of plant available nutrient levels.

"The biggest issues with N are likely to be in paddocks that were wet or waterlogged (big N losses) or conversely yielded well above average (high removal rates). Fields where there were failed chickpea crops may also add uncertainty, with the N contribution varying according to how well the crop had grown and fixed N before being overcome by waterlogging or disease.

"Feedback suggests that there are a number of soil tests coming back with no detectable nitrate, meaning that the reliance on fertiliser N will be higher than usual this year. So there may well be growers who would normally expect to have 50/60/70 kg of N in their profile and it simply isn't there.

"Where chickpea crops failed but vegetative growth had been good, there may be higher-than-normal N reserves, but the lack of summer rain (until March) may mean this N is still in undecomposed residues and not showing up in soil tests. Availability to a winter cereal will depend on temperature and moisture availability from now on, making planning for pre-season N applications more challenging."

The GRDC advocates that one of the best ways to assess plant available nitrogen (nitrate and ammonium) levels in the soil profile is to take soil cores and test for nitrogen levels.

Soil sampling to at least 60 cm is the preferred coring depth and this is particularly important for areas that have been fallowed from 2016 as the nitrate can be placed deeper in the profile.

The challenge for growers is that N applied now will not all be available to this season's winter crop – distribution through the soil profile is dependent on moisture moving deeper into the soil profile and taking nitrate with it.

If the profile is already full, that movement will be limited and

fertiliser N may be marooned in topsoil where roots can't access it. Whether that unused N is still there for the next crop season will depend on seasonal conditions.

"Put simply, in seasons where residual N is limited like after 2016, the earlier fertiliser N is applied the more chance it has to move down the soil profile to where crop roots can access it," Mike said.

"Later applications of N are very dependent on seasonal conditions to encourage lots of shallow root activity, or to move that N deeper into the soil profile after a dry period."



Mike Bell advises growers to reset their nutrient calculators in 2017.



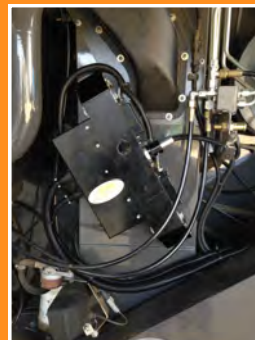
Are you leaving money in the field?

Losing Yield?

Loads being downgraded?

Using too much or too little N Fertilizer?

The CropScan 3000H On Combine Analyser helps you find the **Protein/Nitrogen/Yield** balance.... Otherwise you are just guessing



What is it costing you by not measuring and managing your Nitrogen?



For more information call our Sales Team on **02 9771 5444** or visit our website **www.nextinstruments.net**

MANAGING HELICOVERPA

Controlling *Helicoverpa armigera* and *Helicoverpa punctigera* in pre-podding chickpeas is often considered unwarranted due to the plant's ability to compensate for *Helicoverpa* damage and the low likelihood of incurring yield or quality losses during vegetative and early flowering stages.

The economic threshold calculator developed by Queensland DAFF is based on this principle, with an emphasis on controlling the most damaging larval stages between pod set and maturity.

However, strategic use of nucleopolyhedrovirus (NPV) such as Vivus Max during chickpea flowering has been used for many years by many growers to manage *Helicoverpa* leading into the critical podding stage.

Using Vivus Max early shows significant value in certain crops (such as soybeans) when used during flowering against pre-threshold populations of *Helicoverpa*. This technique relies on larvae dying from NPV infection and releasing huge amounts of the virus. In this way a single, low rate Vivus Max application can be used to "inoculate the crop" with NPV, and establish a natural virus infection cycle for many weeks or months.

AgBiTech, in collaboration with consultants and growers throughout the northern grain belt, undertook a trial program over several seasons to evaluate the early (pre-podding, sub-threshold) use of Vivus Max in chickpeas. The key questions to answer about this use pattern were:

1. Can it provide useful suppression of *Helicoverpa* during pod-fill?
2. Does the suppression delay the onset of economic threshold populations of *Helicoverpa*?

3. Is this sufficient to delay the need for threshold applications of insecticides or reduce the likelihood of needing a clean-up spray close to harvest?
4. Can early NPV reduce the level of pod damage compared to a conventional management strategy (i.e. threshold application of insecticides)?
5. Does a half rate of Vivus Max (75 mL/ha) provide an effective "inoculation dose"?

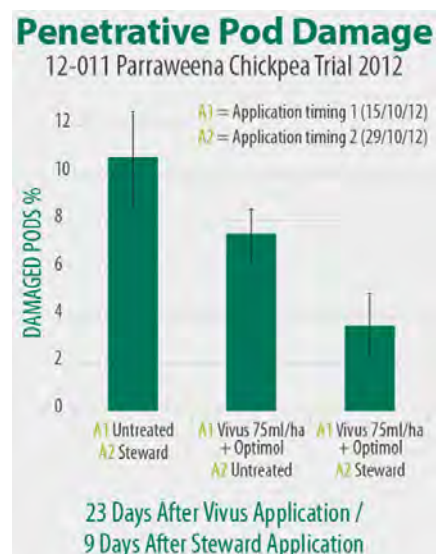
Trial Program

Large-scale trials were conducted from Quirindi, NSW to Emerald, Qld using commercial / grower spray equipment. The trials were laid out in single fields that were initially split into two. One half was managed using the normal commercial insecticide regime and the other half was treated with a pre-threshold application of Vivus Max. Each section was managed individually, and in some cases each section was further split as the season progressed to allow for different treatment regimes.

Damage Reduction

The key benefit of using NPV early is that the presence of the virus minimises the number of larvae that develop beyond 3rd instar and into the most damaging stages. This greatly reduces the "sub-threshold" damage that occurs prior to the application of a knockdown insecticide, and will also minimise damage from larvae that may survive an insecticide spray.

This graph shows that under high insect pressure, a single application of Vivus Max (applied two weeks before the crop reached economic threshold, when it was sprayed with Steward) provided greater damage reduction than the threshold spray of Steward. This



IN CHICKPEAS WITH NPV

exceptional level of performance from NPV is not usual, but shows that when applied early and under good conditions, Vivus Max can be very effective in chickpeas. The combination of the early Vivus Max with a threshold Steward spray was the best performing treatment and provided over 60% damage reduction compared to Steward alone.

Delayed/Fewer Insecticides

It is often reported that early applications of Vivus Max in chickpeas delays larval numbers reaching economic threshold. Results from the trial program confirmed this effect in the majority of situations – an example can be seen in the graph [below] where threshold levels were delayed by 10 days due to the use of Vivus Max. In addition, the number of 4th and 5th instar larvae remained low in the Vivus Max treated area. Depending on the season, delaying the first chemical insecticide can have the effect of eliminating the need for a “clean-up” spray close to harvest.

Why Vivus Max instead of Synthetic Pyrethroids?

Under sub-threshold conditions, application of synthetic pyrethroids (SP's) for *Helicoverpa* control will have limited



NPV infected larva in chickpeas

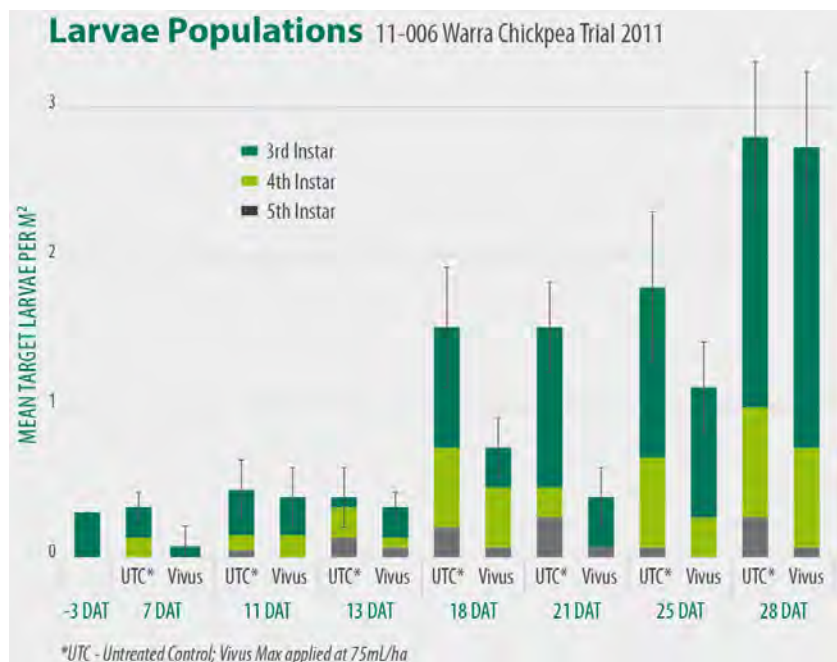
to no economic benefit. SP's usually offer good control of eggs and larvae that are present, but have short residual control. NPV inoculation using Vivus Max will provide ongoing suppression of *Helicoverpa* for many weeks, with no disruption to beneficial species that may be present (such as ants and spiders).

The Recommendation

The trial program showed that early applications of Vivus Max at low rates gave a consistent economic benefit to chickpea farmers under both low and high pressure scenarios. AgBiTech's recommendation is as follows:

- Use Vivus Max at the registered rate of 75mL/ha (with or without Optimol);
- Apply after larvae first appear and before the presence of pods – larvae must be present to get the “NPV inoculation” benefit; and,
- If possible, time applications to be applied in mixture with other pesticides – Vivus Max is highly compatible in mixture.

For further information
contact AgBiTech on 1800 242 519
or visit www.agbitech.com



AgBiTech
VIVUS MAX
Advanced *Helicoverpa* Biocontrol

Always read the product label prior to using Vivus Max
Vivus and Optimol are Trademarks of AgBiTech Pty Ltd

Teaching plants to be better spenders

ENERGY is an all-important currency for plants, and scientists from the University of Western Australia have now calculated the cost of one of their biggest expenses. The knowledge could be a key to creating more energy efficient crops.

To grow and maintain themselves, plants must constantly create new proteins and break down existing ones. The process, called 'protein turnover', uses much of a plant's energy.

Armed with a new technique, researchers have determined exactly how much a plant needs to spend on specific proteins. The knowledge can be used to help plants become better energy spenders.

Dr Lei Li, lead researcher on the study from the ARC Centre of Excellence in Plant Energy Biology said this means they can now measure how long a plant protein lives and how much energy a plant needs to spend in order to keep that protein around and functional.

"We've calculated the lifespan of over a thousand proteins and, importantly, the energy investment needed by a plant to maintain each of them," Lei said.

"Essentially we've figured out the cost, to a plant, of each protein".

The researchers found that the half-lives of the proteins

studied can vary from several hours to several months. This led them to investigate the specific characteristics which determine how quickly a protein is turned over, and how much energy is needed to do it.

The comprehensive study also revealed the features that allow a protein survive longer. This knowledge could be applied to help plants engineer more robust, less energy expensive proteins.

Balance between expenditure and need

Co-researcher Prof Harvey Millar said it's much like spending money on a product you need.

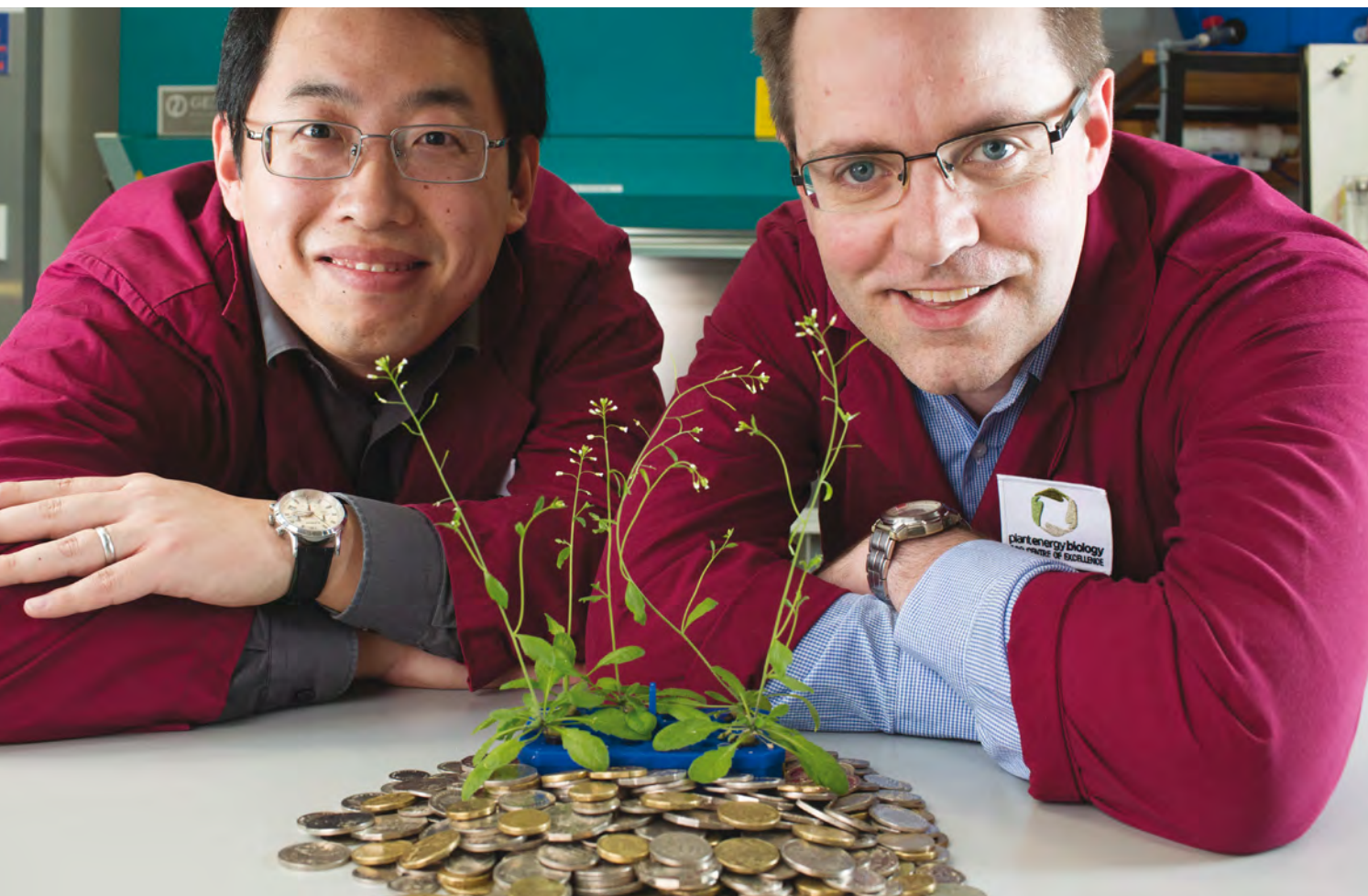
"The best option is to balance between whatever will last you the longest, but cost you the least."

"If we can teach plants how to more wisely use their energy budget to meet requirements and to face environmental challenges, then the result will be more energy efficient and productive plants."

"This is particularly valuable for agriculture, where current crop plants are not going to be able to meet future food requirements."

"In a world faced with increasing populations and limited land for agriculture, more energy efficient plants are necessary to feed us into the future."

The study was published in the journal *The Plant Cell*.



Dr Lei Li and Prof Harvey Millar determine how much plants need to spend on specific proteins. (PHOTO: James Campbell Luck)

EFFICIENCY INGRAINED



TRACTA577932-SP-4G

Time isn't the only thing you'll be saving with a new 4 Series Self-Propelled Sprayer.

The class leading 36 m and 40 m wide carbon fibre booms are 39% and 35% lighter,[†] helping increase yield potential by reducing crop damage and soil compaction. The 40 m boom will reduce the number of passes needed, giving you 8% more hectares covered per day.

Better still, the ExactApply™ intelligent nozzle control system ensures consistent droplet size and spray pattern at much higher speeds, reducing overlaps and giving you the right application, in the right spot, at the right time. Every time.

Speak to your John Deere dealer today or visit JohnDeere.com.au/Ingrained



JOHN DEERE

2.80% P.A.
FINANCE AVAILABLE*
ON SELECTED
SELF-PROPELLED
SPRAYERS
INCLUDES BONUS
MOBILE WEATHER

*Bonus Mobile Weather included at no charge. Conditions apply. Finance available through John Deere Financial Limited to approved commercial applicants only. Finance is based on 30% deposit, GST back and 4 year term with 4 annual repayments. Fees and charges apply. Other terms and rates are available. These offers are valid on new R4023, R4030, R4038 and R4045 Self-Propelled Sprayers. If not amended or withdrawn earlier, the promotion expires on 31/07/2017. †When compared to a John Deere 36 m steel boom.



Red clover: Antibiotic alternative for cattle

■ By Sandra Avant, Agricultural Research Service, USDA

AT A GLANCE

- Red clover is a forage plant for cattle;
- ARS scientists discovered an antimicrobial compound in red clover; and,
- The compound may help reduce antibiotic use in animals.

A COMPOUND found in a common forage plant may help to reduce use of growth-promoting antibiotics in cattle, goats, sheep, and other ruminants. At the ARS Forage-Animal Production Research Unit (FAPRU) in Lexington, Kentucky, scientists discovered a natural antimicrobial compound – biochanin A – in red clover. They found that biochanin A can inhibit and kill a group of ‘protein-wasting’ bacteria typically treated with antibiotics.

Ruminants are unique in that they have an upper digestive system that consists of four compartments, says FAPRU microbiologist Michael Flythe. The largest compartment, the rumen, contains many types of helpful bacteria, such as those that break down fibre and allow animals to get energy from grass or hay.

But other types, such as hyper ammonia-producing bacteria (HAB), are referred to as ‘wasteful’ because they digest protein and convert it into ammonia.

“When the bacteria ferment protein, it reduces protein available to the animal,” Michael says. “And these wasteful bacteria make ammonia that can pollute the environment. It’s excreted from animals and can end up in groundwater.”

Reducing the use of antibiotics

The goal in production is for the animals to absorb the protein from feed, rather than degrade it into ammonia. Traditionally, producers achieved this by giving cattle antibiotics that kill HAB, enabling the animals to get enough protein. But there is a strong push to reduce antibiotic use for growth-promotion purposes.

Michael first demonstrated that biochanin A could kill wasteful bacteria in the laboratory. Since then, FAPRU animal scientist Glen Aiken has conducted successful field trials with cattle given feed mixed with biochanin A.

Results showed that the compound kills wasteful bacteria and promotes weight gain in animals.

“The red clover compound kills HAB, which boosts the animal’s performance and helps the environment by reducing excretion of ammonia,” Glen says.

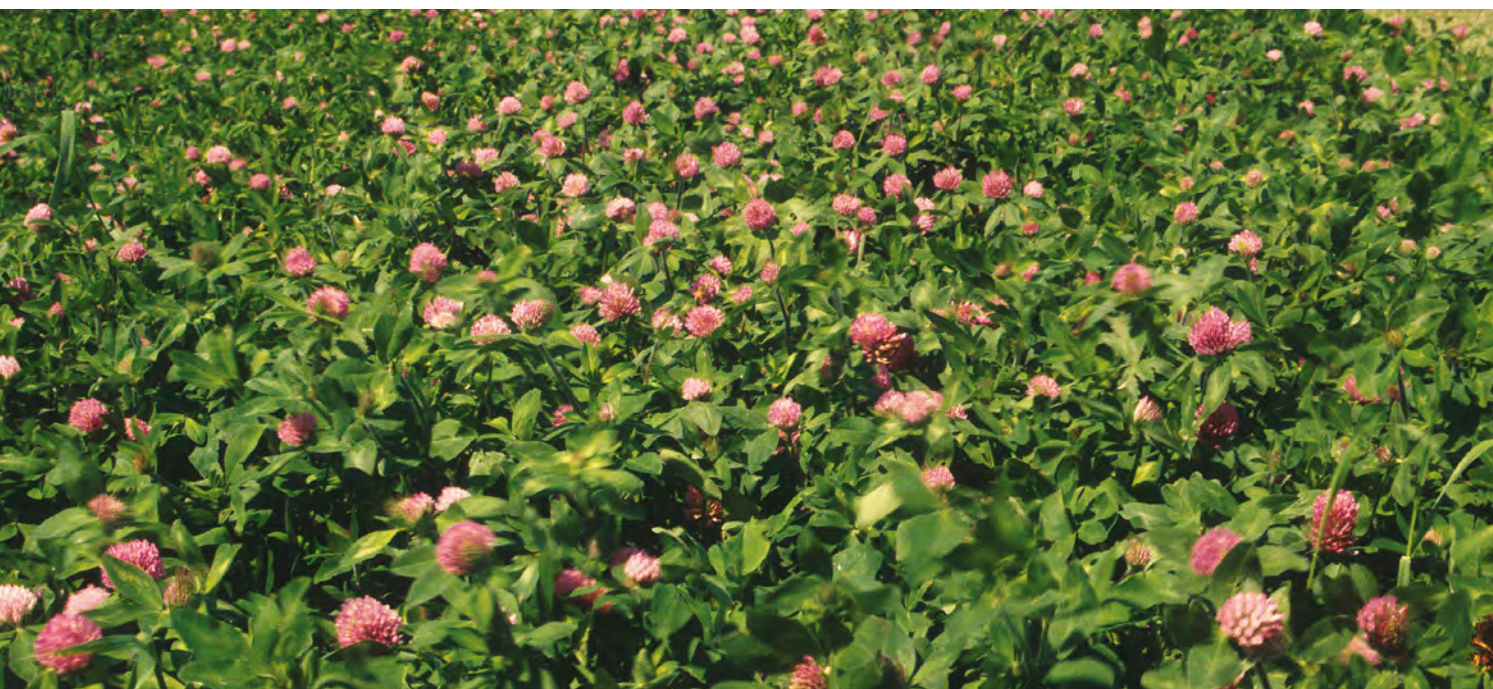
“Red clover is something producers would use with growing beef cattle,” Michael says. “They would limit its use in cow-calf herds because biochanin A has estrogen-like activity that might interfere with reproduction.”

The compound differs from other treatments in that it doesn’t have to be extracted from the plant or made into a product, Michael says. It’s found in the clover, which can easily be grown.

“In human nutrition, one trend is ‘functional food,’ which has benefits beyond basic nutrition, such as the beneficial compounds in wine,” Michael says. “We think of red clover as ‘functional feed.’ It provides protein and is a natural and effective alternative to antibiotics.”

More information:

Michael Flythe, Research Microbiologist, Email: Michael.Flythe@ars.usda.gov
Glen E Aiken, Research Animal Scientist, Email: Glen.Aiken@ars.usda.gov



An antimicrobial compound in red clover can benefit cattle. (PHOTO: R.R. Smith)



The Froelich story

■ By Ian M. Johnston

A tractor engine – with a difference

When I mention a tractor engine of 2155 cu. ins. capacity (35.313 litres), it usually conjures up mental images of super powerful Caterpillar or perhaps GM diesels, powering vast dump trucks or excavators, of the type commonly deployed by the mining industry.

Then when I add the fact that the tractor engine I have in mind possesses only one cylinder, such a statement is inevitably accompanied by gasps of astonishment.

But I keep the best for last, when I further add the fact that this massive power plant was only capable of producing a feeble 16 brake horse power! Such an astonishing revelation invariably initiates uncomplimentary exclamations such as – “Nonsense,” “Can’t be,” “He’s been at the whisky,” “He’s past it.” For a moment my credibility has gone into a steep decline.

But those who are regular readers of my tractor epistles know full well I am not given to producing false or erroneous facts (well not usually). Which leads to the question, what is this engine I am waffling on about?

I am referring to the engine which powered the first ever agriculture tractor.

Froelich

Away back in 1892 (even I wasn’t around then) John Froelich, an agricultural contractor, wandered down to his local supermarket to purchase an engine. Well, to be honest, it wasn’t exactly a supermarket. Even Mr Aldi (like me), hadn’t been born

yet. But surprisingly, there were reportedly no less than 50 makes of internal combustion engines in the USA at that time. In actual fact, most were never progressed beyond the experimental stage. Well let’s face it – using gunpowder as fuel, a common practice, was not conducive to the encouragement of potential buyers!

But in 1892 there were 10 petrol powered units on the American market that actually sort of worked. It is worthy of contemplation that most of the credit for the development of petrol powered engines is directed to the Europeans – Karl Benz, Gottlieb Daimler, Nikolaus Otto, etc. Actually, the first commercial liquid fuelled engine was designed in 1876 by an American named George Brayton. (My apologies to all my German soul mates).

Anyway, back to Froelich. His activities as an agricultural contractor included dragging a threshing machine around farms in his local Ohio district. His tow vehicle was by necessity a cumbersome steam powered traction engine, which he disliked intensely. You see its heavy weight meant that it frequently bogged. It had a thirst like an Irish navy. He had to rise up from his matrimonial bed in the wee small hours to light its (the engine’s) boiler fire. Plus it had the irritating habit of shooting sparks into his customer’s wheat fields with disastrous results.

Tractors had not been invented yet, so John Froelich reckoned it was high time they were. Hence, his necessity to acquire an internal combustion engine.

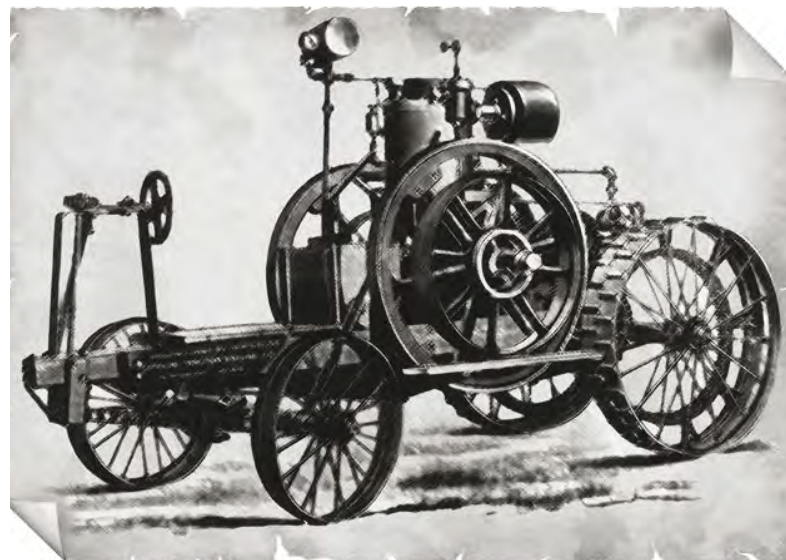
The Van Duzen engine

The engine he purchased was a single cylinder Van Duzen 2155 cubic inch capacity unit, manufactured in Columbus, (later Cincinnati) Ohio, by Van Duzen Gas and Gasoline Engine Company. Its dimensions were such, that it was designed to operate in a horizontal position. Froelich then shopped around and acquired an assortment of gears, wheels, axles and other hardware, originally intended for steam traction engines.

He assembled the lot on a tired old timber chassis, sourced



John Froelich 1849–1933.



Early drawing of the Froelich ‘tractor’.



Froelich 'tractor' created from original drawings, on display at Deere & Co. Corporate H.Q. Moline, Illinois. (Photo IMJ)



Waterloo Boy tractor.

from an abandoned traction engine. But there was a problem! The resulting kinetic energy of the ponderous engine immediately broke the engine mounts, causing all sorts of complications.

Back to the drawing board, er – blacksmith's shop. Solid brackets were produced, well capable of restraining the errant engine. So instead of the engine flopping around on its chassis, the entire contraption alarmingly shot backwards and forward causing everyone to flee for their lives!

Third time lucky! The engine was mounted vertically this time, with accompanying reinforcements added to the chassis. It tried, but was unable to punch the machine through the floor.

With fingers and toes crossed, Froelich hitched his tractor to his threshing machine and ventured forth. (Although it should be noted that the term 'tractor' was not coined for another two decades, excepting back in Mediaeval times, when the term applied to a torture machine, designed to straighten the backs of unfortunates suffering from campyocormia – rickets).

The Van Duzen's 16 bhp struggled to pull the thresher on anything but a level road. Fortunately, in Ohio much of the country resembles a bowling green. But perish the thought of the contraption ever having sufficient power to pull a plough. So Froelich's 'thing' was destined to simply haul the thresher to a farm and then be hooked up to an endless belt for the purpose of driving the mechanism. But I guess that is all he desired in the first place.

To its considerable credit, over a two month period, Froelich's machine was responsible for threshing 70,000 bushels of wheat.

Froelich reputedly produced at least one other 'thing', which he sold to a friendly farmer, who proved to be decidedly unfriendly when it kept breaking down. He returned it and demanded his money back!

Waterloo

In recognition of Froelich's inventiveness, he was invited to join The Waterloo Gasoline Traction Engine Company in the capacity of Chief Design Engineer. His prime assignment was to design a commercially viable petrol powered traction engine. The trouble was – his prototypes proved singularly unviable! He left (i.e. was sacked from) the firm in 1895, the same year the name was changed to Waterloo Gasoline Engine Company.

Waterloo stationary engines were well accepted throughout rural North America. A chap named H.W. Leavitt took over

from Froelich and was able to produce, what proved to be, an excellent capable tractor, which he sneakily modelled on a rival tractor known as The Big Chief, manufactured by The Waterloo Foundry Company. It so happened that Leavitt once worked for that company. Shades of shenanigans maybe? (Please note – this titillating piece of information is not widely known. Remember you heard it first from me, but I would deny any knowledge of it in court!)

Enter Deere and Company. For some years this giant agricultural machinery manufacturer had been experimenting with John Deere tractors of varying descriptions. Although from a historical aspect, these tractors were technically interesting, they were also technically abysmal!

Accordingly, Deere and Company made a successful offer to purchase The Waterloo Gasoline Engine Company in 1918. Voila, in one fell swoop, they had a range of creditable tractors, with which to challenge their opposition – International Harvester, Emerson-Brantingham, J.I. Case Threshing Machine Company, Avery Company and others.

Conclusion

Although John Froelich's contribution to the development of the farm tractor is actually of little consequence, he should be remembered as the individual who first had the vision and was prepared to put his thoughts into action. He had no recourse to previous examples, as there were none. Metallurgy was in its infancy and he certainly had no computer with which to consult. ■

IAN'S MYSTERY TRACTOR QUIZ

Question: Can you identify this rare tractor?

Clue: It is VERY English.

Degree of difficulty: Tricky – to say the least.

Answer: See page 48.





Yellow leaf spot trials and the economics of spraying

■ By Lislé Snyman, Greg Platz and Clayton Forknall – Dept of Agriculture and Fisheries Queensland

AT A GLANCE...

- Crop rotation and reducing surface stubble decrease inoculum levels.
- Do not sow susceptible wheat varieties into wheat stubble.
- Economic response to fungicide application is a factor of varietal susceptibility, severity of the epidemic, product choice and timing of application.
- Increasing moisture periods increase the incidence and severity of yellow spot.

SUCCESSFUL yellow spot disease management requires an integrated disease management approach including crop rotation (in other words, avoid wheat on wheat), timely application of fungicides to protect the money leaves (flag and flag-1), removal of stubble and using resistant varieties. Crops deficient in nitrogen and/or potassium have been shown to be more vulnerable to infection. Stubble of susceptible varieties harbours more inoculum.

This means avoid sowing a susceptible variety into stubble from a previously infected susceptible crop at all cost.

Yield loss associated with yellow spot

The impact of yellow spot on grain yield of a susceptible variety under conditions favourable for disease development was demonstrated in the variety Banks, where yield losses reached 60 per cent. Most of that could be attributed to a reduction in grain size.

In an attempt to quantify yield losses caused by yellow spot in current varieties, a trial was conducted in 2013 with four varieties ranging from moderately resistant (MR) to susceptible (S) to yellow spot. Varieties included were Leichhardt (MR), Kennedy (MSS), Kidman (S) and EGA Gregory (S).

Treatments applied included a full fungicide treatment, early spray (GS31), late spray (GS39), early+late spray and a nil fungicide treatment. The full fungicide treated plots were sprayed on three occasions, approximately two or three weeks apart, with the first spray 14 days before the early application.

Results indicated significantly higher yield loss in the varieties EGA Gregory and Kidman, rated susceptible to yellow spot. In both these, the full spray application yielded significantly higher than all the other treatments.

The full spray was significantly higher than the late spray and the nil spray only for Leichhardt (MR).

WHAT IS YELLOW SPOT?

Yellow spot is a stubble-borne fungal disease caused by the pathogen *Pyrenophora tritici-repentis*. It causes yield loss and reduced grain quality. Yield loss depends on varietal resistance and severity of the disease.

Symptoms include tan-coloured oval lesions becoming darker in the centre with a yellow margin, often observed in young seedling leaves from where the disease moves up the plant under suitable conditions. As lesions merge and coalesce, they produce large areas of necrotic tissue, causing leaf death and reducing photosynthetic area.

The fungus survives as small, black fruiting bodies on stubble. From there, fungal spores are released after rain events and spread onto nearby seedlings, resulting in primary infection. Secondary spread occurs when asexual spores are produced on leaves and dispersed by wind, infecting new leaves and neighbouring crops.

At least six hours of leaf wetness with temperatures of 15–28°C are required for the successful infection of leaves from stubble. Secondary infection (leaf to leaf) is favoured by leaf wetness, high humidity and optimum temperatures between 15°C and 25°C.



Yellow spot on wheat seedlings.

TABLE 1: Economics of fungicide application in 2016 yield response trials

Variety	Treatment	Fungicide cost (3 sprays – \$/ha)*	Yield (t/ha)	Yield increase (%)	Income (\$/ha)**	Extra net (\$/ha)
Bounty (MS)	High disease	0	6.00	0	1500	0
	Nil disease	60	6.16	2.60	1540	-20
Suntop (MSS)	High disease	0	6.14	0	1535	0
	Nil disease	60	6.78	9.44	1695	100
Wallup (S)	High disease	0	5.55	0	1387	0
	Nil disease	60	6.12	9.31	1530	82
EGA Gregory (S)	High disease	0	4.96	0	1240	0
	Nil disease	60	5.71	13.13	1427	127
Scout (SVS)	High disease	0	4.93	0	1232	0
	Nil disease	60	6.36	22.48	1590	297
Phantom (VS)	High disease	0	4.89	0	1222	0
	Nil disease	60	5.97	18.09	1492	210

*\$20 per hectare per application.

**\$250/t APH1/APH2 Goondiwindi.

In the variety Kennedy (MSS), the full spray was significantly higher than the nil spray, the late spray and the two sprays (early+late).

Another trial conducted in 2015 included five varieties, ranging from MRMS to SVS and a range of disease levels – nil disease (full sprayed treatment), very low disease, low disease, medium disease and high disease levels. The yield response of the different varieties at different disease levels are shown in Figure 1.

No significant differences were observed between any of the treatments in the varieties Stampede (MRMS), Bounty (MS) and EGA Gregory (S), with very little yield loss observed across treatments. The nil disease treatment yielded significantly higher than the high disease treatment in Viking (MSS), with no significant differences between the diseased treatments. The biggest yield loss was observed in Phantom (SVS), with a 25.9 per cent yield increase in the nil disease over the high disease treatment. The high disease treatments only delivered a moderate epidemic.

Similar results were observed in the variety Bounty (MS) in 2016 under heavier epidemics with no significant difference in yield between any of the treatments and very little yield loss. Variable results were obtained in the varieties Suntop (MSS), Wallup (S) and EGA Gregory (S) where the nil disease treatments yielded significantly better than some of the diseased treatments, but not all of them (Figure 2). The high disease treatment of EGA Gregory suffered a yield loss of 13.2 per cent when compared to the nil disease, higher than yield loss measured in the varieties Suntop (9.5 per cent) and Wallup (9.3 per cent).

A significant yield advantage of 22.5 per cent was evident in Scout (SVS) and 18.2 per cent in Phantom (VS) when comparing the nil disease and high disease treatments.

What do the results tell us?

Results obtained varied between varieties and seasons. Over the three years, varieties with higher levels of resistance to yellow spot were less impacted by the disease, whereas bigger yield loss occurred in varieties rated as S or worse.

Variable results were obtained across years in EGA Gregory and could possibly be attributed to differences in disease pressure, environment and the maturity of the variety. Research back in the 1980s by Rees and Platz found that disease levels on later maturing varieties were generally lower than on earlier varieties at any given time.

Yield losses of approximately 20 per cent were observed under moderate disease pressure in varieties rated S to VS with Phantom ranging between 18.2 per cent in 2016 and 25.9 per cent in 2015 whereas yield loss in Kidman was 23.1 per cent in 2014 and 22.5 per cent in Scout in 2016.

An examination of the economics of fungicide application (Table 1) for the control of yellow spot, shows that fungicide application is more profitable in more susceptible varieties.

But it is important to note that the differences quoted here were a result of three sprays used in the full spray/nil disease treatment and the same level of control may not be possible with

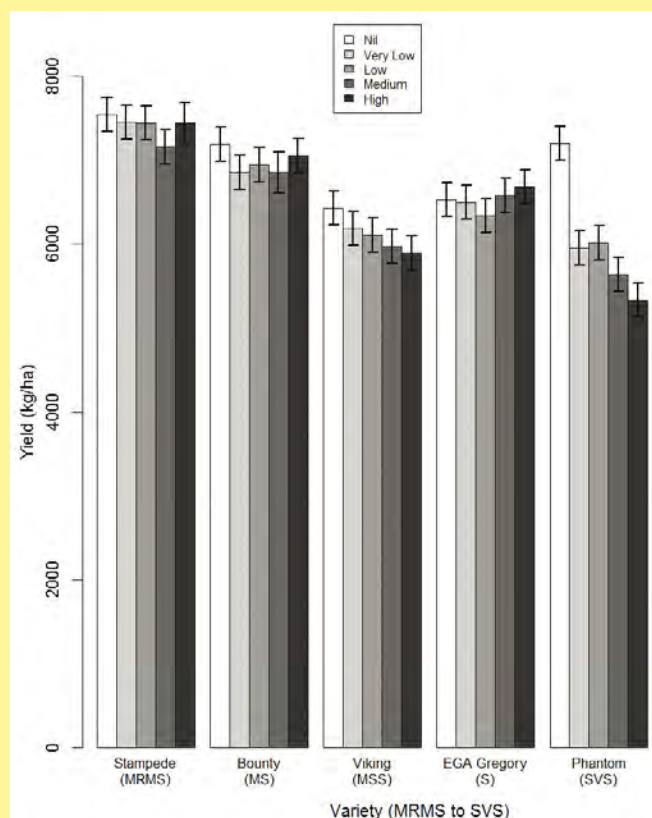
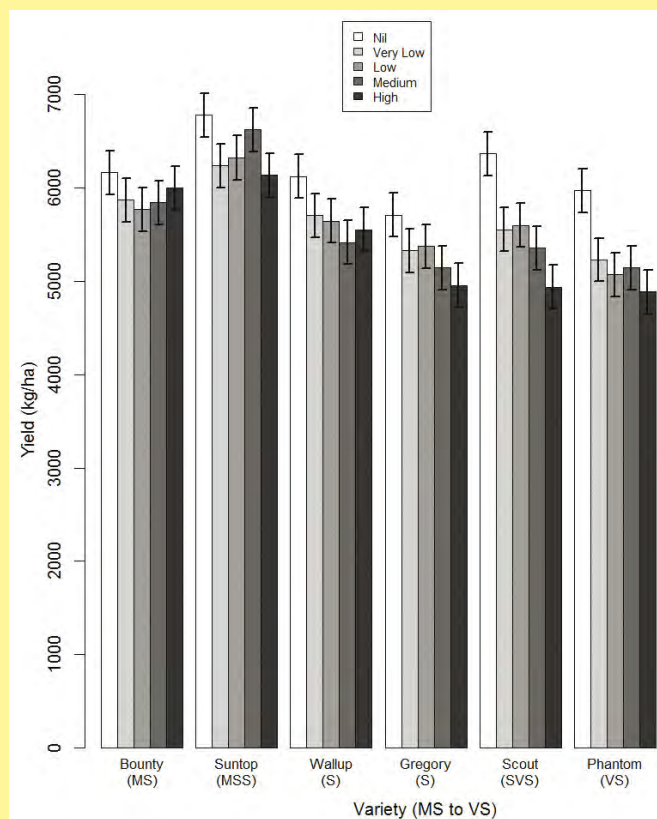
FIGURE 1: Yield response of wheat varieties to different levels of yellow spot in 2015

FIGURE 2: Yield response of wheat varieties to different levels of yellow spot in 2016



Fungicides are of the most benefit in the management of yellow spot disease when applied before the infection event.

economic benefit in applying fungicide to a variety with good levels of resistance, unless disease pressure is very high and the environment conducive to further disease development.

Management of yellow spot is best achieved with an integrated approach of varietal resistance, stubble management, crop rotation and timely fungicide application if required.

Disease control will be easier in varieties with some level of resistance even though responses to fungicide application may not be as impressive as in a VS variety.

Always be aware that fungicides are more effective if applied prior to infection events.

A much greater proportion of our wheat cropping area is now sown to varieties with useful levels of resistance to yellow spot than a decade ago. So it is worthwhile to consider the economics of fungicide application in relation to varietal resistance and epidemic potential before spraying. The preliminary data shown here suggests that application of fungicides to varieties that are rated less than MSS may not always be profitable.

Yield loss response curves for the wheat/yellow spot system are being developed under a national GRDC project and will aid in making these critical management decisions.

The research undertaken as part of this project is made possible by the significant contributions of growers through both trial cooperation and the support of the GRDC – the authors would like to thank them for their continued support.

The authors would also like to thank the technical and farm staff at Hermitage Research Facility for their assistance.

Contacts:

Lislé Snyman, DAF QLD, Ph: 07 4660 3661, E: lisle.snyman@daf.qld.gov.au

Greg Platz, DAF QLD, Ph: 07 4660 3633, E: greg.platz@daf.qld.gov.au

Clayton Forknall, DAF QLD, Ph: 07 4529 1218,

E: clayton.forknall@daf.qld.gov.au

a single fungicide application. The timing of a single fungicide application will be crucial in minimising yield loss.

These results support earlier findings that a single fungicide application can be very economical on susceptible varieties in high yielding, high disease pressure years.

To sum up

These results confirm previous reports that yield and quality losses as a result of yellow spot infection, are greater in more susceptible varieties than in varieties with some level of resistance to the pathogen. Consequently, it is important to consider the

WCX BELT CONVEYORS

Westfield's WCX belt conveyors are designed for gentle handling, but built strong to last long. The WCX Series has a full line up of belt conveyors up to 120', low profile field loaders, long swing-away conveyors and drive over conveyors.

WESTFIELD



WESTFIELD AUGERS AUSTRALIA PTY LTD
1800 635 199 | admin@westfieldaugers.com.au
www.westfieldaugers.com.au

IT'S NOT AN ORDINARY CONVEYOR...
IT'S A WESTFIELD

WHEN YOU'VE ONLY GOT ONE CHANCE



Rexade™

HERBICIDE

ARYLEX™
ACTIVE



Dow AgroSciences

Rexade™ herbicide with Arylex™ active, the ONE herbicide for wheat that:

- Controls three major grass weeds
- Suppresses three other grass weeds
- Controls more than 24 broadleaf weeds
- Compatible with many broadleaf herbicides
- Allows freedom in winter crop rotations
- Comes in a user friendly GoDRI™ formulation

Giving you the opportunity to spray once and have the job done.

Registered for use on triticale and wheat, except durum varieties.

Solutions for the Growing World

© TM Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow



NEW CHEMISTRY, NEW THINKING, NEW PARADIGM.

WITH THE FLEXIBILITY THAT YOU HAVE
ALWAYS WANTED.

Paradigm™ Arylex™ Active Herbicide delivers a low dose, wide spectrum solution for the control of broadleaf weeds.

Widely compatible with the ability to safely go across wheat, barley, oats and triticale, Paradigm fits easily into your spray programme. Increase your productivity with less downtime due to tank clean out, changing the spray mix or worrying about compatibilities. Get some precious time back and make life easier.

Shift to the new Paradigm Arylex Active.

For more information call 1800 700 096

www.dowagrosiences.com.au

Paradigm™
HERBICIDE
ARYLEX™ ACTIVE



**Confidence
in a drum**



Dow AgroSciences

Solutions for the Growing World

© TM Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow

Corn technology allows for effective weed control

WEEED control is top of the priority list when selecting a corn variety for paddocks containing Johnson grass and nut grass at 'Whyalla' in southern Queensland.

Gino De Stefani manages the enterprise for Whyalla Beef, near Texas on the Queensland/New South Wales border, which includes a 50,000 head feedlot supplying the global market with high quality beef.

In turn the farming enterprise supplies the feedlot with high quality fibre, including hay and silage as well as high moisture corn.

Pioneer brand P1813-IT hybrid corn has been in the rotation for the last six years, specifically to allow for control of in-crop weeds.

"We have identified Johnson grass and nut grass as issues, and the IT technology gives us the ability to use a particular herbicide to control them in-crop, which you can't do with conventional corn varieties," Gino explains.

"The P1813-IT has performed well for us, particularly considering the unusually hot conditions we experienced in 2016–17, it stood up to them and performed well.

"We've used other varieties and the P1813-IT just seems to hang in there and that's why we continue to plant it, especially in the paddocks where we have identified these particular weed problems."

In the cleaner paddocks, Gino grows other varieties, including Pioneer brand P1467 hybrid corn, which has also impressed with its performance.

In the 2016–17 season P1467 produced an average yield of 13 tonnes, while the P1813-IT, in better country, yielded 14 tonnes

per hectare, down to 10 tonnes per hectare as a wet product, at moisture of 27 per cent.

"There's potential for these varieties to get up to 18 tonnes per hectare in good areas of the pivot – overall I'm happy with the performance of the two varieties given the soils they're planted into and the seasons we have experienced," Gino says.

Reduced seeding rate

"Interestingly, we also reduced our planting rate by 10,000 seeds to 55,000 seeds per hectare and yet maintained yield.

"The reduced seeding rate gave the plants more room, producing bigger cobs and kernel size – given the dry season, both our variety and planting rate choices allowed for enhanced production."

Gino has also been impressed with the support Pioneer has provided in matching the right varieties to his environment and soil types.

"They have given us a lot of technical advice on growing corn and getting the best potential yield. Pioneer has also been helpful in promoting the high moisture product to other growers," he explains.

Gino says they'll continue with P1813-IT because of the versatility it brings to their farming system.

"We can use a broader range of herbicides for in-crop weed control, and it also shows good standability and yield to help us meet our gross margin targets," he says.

"We'll also continue using the P1467 in our better country – it's the old saying, why change something that works, and these two varieties work for us."



Despite often difficult conditions, Gino De Stefani is able to produce high quality, high moisture corn for the 50,000 head feed-lot.

Reducing discounts in cotton colour for more profit

A THIRD generation Dalby farmer and Nuffield Scholar has taken steps to curb the cost of colour downgrades in cotton, which each year strips the industry of millions of dollars in profits.

Matt McVeigh, who was awarded a Nuffield Scholarship in 2015, travelled across 11 nations during his study – India, Qatar, Turkey, Singapore, France, the United States, Mexico, Brazil, Argentina, Vietnam and China – to research the problem and find better ways colour downgrades can be managed.

“Australia’s fibre quality has improved throughout our cotton producing history and it is important that the industry continues to maintain this reputation,” Matt said.

“Australia currently receives a premium for cotton that meets all base fibre property levels. This premium is well respected and appreciated by the industry as input costs rise.

“But when Australian cotton colour is below base grade, heavy discount values apply.”

Colour degradation penalties in cotton fibre costs the Australian cotton industry millions of dollars a year through discounts that are applied to cotton that is below base grade. This occurs when rain falls on the open cotton boll – a factor which is outside of farmers’ control.

Matt operates a third generation, 6000 hectare cotton and grain farm near Dalby on Queensland’s Darling Downs, where



Matt McVeigh travelled to 11 different countries during his Nuffield year searching for better ways to reduce colour downgrades and discounts in cotton.

**NEW TO
Australia!**

3420 SERIES PARALINK™ HOE DRILL FAR & WIDE, NARROW & EASY



Watch the TransFold™ engineering unfold
at YouTube Channel BourgaultVideo.

www.bourgault.com.au

1 3420QDA Quick Depth Adjust

Get the best of both worlds with the 3420QDA; the QDA is the only independent depth control drill on the market that offers quick seed depth adjustment. Producers no longer need to put their emergence at risk with the old “set & forget” practice. Precision and convenience is now available with the 3420QDA.

2 3420XTC eXtra Terrain Contouring

Achieve unprecedented seed depth accuracy in challenging terrain. The 3420XTC is equipped with the Paralink™ XTC Seed Opener Assembly. The XTC Seed Opener has a 1:1 opener to gauge wheel ratio for exact seed placement over ridge tops and through water runs.

The 3420 PHD™ is available in 24.4 m and 30.5 m models. Talk to your local Bourgault Dealer today to find out more about the 3420 PHD™.



Better communication needed

"Growers would benefit from better communication from cotton gins about the importance of uniform moisture in the module stages. Cotton quality should be the key priority for the cotton gins, and moisture management and drying technology should be utilised if available and not currently used," he said.

"To help farmers reduce their colour downgrades, using a mini cotton gin can provide feedback on the quality of the crop and allow the grower to make changes if any issues arise."

Matt said in order to reduce cotton downgrades, each stage of the supply chain must be more open to sharing information about why cotton has been valued at the allocated price.

"Collaboration in the supply chain from the farmer to the spinning mill is encouraged to gain an understanding of the issues faced by each sector," he said.

"This can also provide valuable feedback as to why downgraded cotton has been allocated the current value.

"Many growers would appreciate the ability to investigate the current Premium and Discount sheet or at least be provided with the rationale behind those values. A graduated system for colour downgrade values would also make this process more equitable and simpler for the cotton industry.

"Colour downgrades are not the sole responsibility of any one stage of the supply chain. Each sector should ensure better management and handling of the fibre and utilise new technology to reduce colour issues where possible," Matt says.

**Matt can be contacted on Mob: 0427 577 879 or
Email: matt@mcveighpartnership.com.au**

he grows cotton, sorghum, corn, mung beans and chickpeas using zero-till farming methods. The stimulus for his Nuffield Scholarship topic came about when he saw how quickly crops could be downgraded due to poor weather conditions and the residue left behind by pests such as the silverleaf whitefly and aphids.

His scholarship was generously supported by Cotton Australia and the Cotton Research and Development Corporation (CRDC).

The work undertaken through his Nuffield Scholarship has led Matt to provide some recommendations for cotton growers, and in doing so, has highlighted better communication between industry stakeholders as key to reducing downgrades due to colour.

NUFFIELD SCHOLARS MAKE A WORLD OF DIFFERENCE

The call is out for the next wave of dynamic, young primary producers who want to join the world's pre-eminent agricultural study program and become 2018 Nuffield Scholars.

Nuffield Australia CEO, Jodie Dean, said the call has coincided with 2017 Scholars from a range of agricultural industries travelling across the globe as they embark upon their Global Focus Program (GFP).

"I have recently been travelling with some of the 2017 Scholars to Brazil, Chile, Washington DC and Eastern Europe as they complete their GFP, a six-week, group tour to develop an understanding of global agriculture and best practice," Jodie said.

"This includes meetings with progressive agri-businesses, producers, trade organisations and international governments.

"Travelling in a small group, with fellow Aussies as well as Scholars from other countries, they are exposed to the agricultural sector at an international level, as well as creating lifetime friendships and personal development.

"In addition, these Scholars will also undertake seven to eight weeks of personal study that aligns with their topic."

Nuffield Scholarships are amongst the most prized and respected research, leadership and development offerings in the Australian agriculture sector.

To date, there are more than 400 Scholar Alumni in Australia who, through their scholarship, have gained significant insights into global agriculture. Scholars have influenced industry and community change, boosted agricultural productivity, and provided new industries and economic development to rural communities in Australia.

But the opportunity to benefit from the scholarship experience also extends beyond the Scholars themselves.

"Many leading businesses and organisations invest in Nuffield and, as such, contribute to the prosperity of the industry and further positioning Australia as a global agriculture leader, and this opportunity is open to others committed to the future of the sector," Jodie said.

"Nuffield is excited that our investors recognise the value of leadership development and the future of the industry by providing a \$30,000 bursary to embark on a 16-week program over a two-year period."

Jodie said there were also opportunities for agricultural businesses across the supply chain to engage with, and support Nuffield's flagship event, the 2017 National Conference, which this year will be held in Darwin.

"The National Conference is a unique opportunity to hear from our 2016 returning Scholar group as they share their insights and learnings as it applies to their industry here in Australia, which is not available at any other single event."

"Successful applicants, for a 2018 scholarship will be formally presented with their awards at the 2017 National Conference, to be held in September, and commence their program at the 2018 Contemporary Scholars Conference in the Netherlands next March."

The Scholarships are open to Australians who are between the ages of 28–45, who are engaged in farming or fishing as an owner, manager or active member of a farming business.

**Applications for 2018 scholarships close on June 16, 2017.
For more information see www.nuffield.com.au**

Sheep make money while eating weed seeds

FOR mixed farming operations like 'Marbarrup', west of Kojonup, WA there are a stack of good reasons not to light up chaff heaps – they are just too valuable.

Ben and Emily Webb farm 2150 arable hectares and run 4500 dual purpose Merinotech ewes and their offspring on crop stubble and 935 hectares of non-arable pasture. Their recent investment in a chaff cart to provide non-herbicide weed control also provides them with a valuable feed source over summer and better livestock production.

"In a trial that Ed Riggall at AgPro Management ran on our property in the summer of 2015–16 the sheep gained more weight when they had access to canola chaff heaps compared to grazing a similar paddock without chaff heaps," said Ben.

"The sheep grazed the canola for six weeks over December and January, gaining an extra 3.8 kg per head over the gains made by sheep just grazing stubble."

Saving time and money

The nutrient analysis of the canola chaff heaps showed the feed value was 7.3 per cent crude protein and 6.1 MJ per kg DM metabolisable energy. Not only did the sheep gain additional weight, the Webbs also saved time and money on supplementary feed that would be required to achieve the same weight gain.

Ed Riggall calculated the benefit of grazing chaff heaps for a



Hyola 600 RR canola (pictured) and RT canola provides a high biomass crop that competes well with weeds and produces high quality chaff heaps for the Webb's Merinotech sheep.

typical, model farm of 2000 hectares with 50 per cent crop and running 9.5 DSE per hectare would be an average saving of over \$29,000 per annum and an internal rate of return on investment (ROI) on a chaff cart of 36 per cent per annum over 20 years.

This is averaged across livestock weight gains achieved on

WCX BELT CONVEYORS

Westfield's WCX belt conveyors are designed for gentle handling, but built strong to last long. The WCX Series has a full line up of belt conveyors up to 120', low profile field loaders, long swing-away conveyors and drive over conveyors.

WESTFIELD



WESTFIELD AUGERS AUSTRALIA PTY LTD
1800 635 199 | admin@westfieldaugers.com.au
www.westfieldaugers.com.au

IT'S NOT AN ORDINARY CONVEYOR...
IT'S A WESTFIELD

canola, barley, wheat and oats chaff heaps in a detrimentally wet season.

"In addition to this considerable benefit, we also saw a 25 per cent improvement in lambing percentage in the ewes grazing the canola heaps compared to those just grazing stubble," said Ben. "This is a direct consequence of the higher productivity from heavier ewes in higher body condition."

Ben has found that the sheep do a good job of knocking down the heaps, particularly when a large mob is given access to the paddock for a short time. Prior to seeding grazed chaff heaps Ben often runs over them with a scarifier to spread the residue more evenly. This makes it easier to seed through the heaps and reduces the need to burn in autumn.

Burning the heaps

"Ungrazed heaps definitely shed rainfall better but under the right conditions the grazed heaps still burn very well if we decide that's the way to go," he said.

"The sheep do best on the canola stubble so that is our priority for grazing. The canola heaps don't generally need much done with them after grazing but I often burn the wheat, oat and some barley chaff heaps after grazing because they can be a pain to seed through."

"We have trialled narrow windrow burning here a few times but find that it is often too wet to achieve a good result. Moving to the chaff cart and grazing the heaps has been working better for us."

Scientific studies have shown that sheep do not spread weed seeds as the seeds are destroyed as they pass through the sheep's gut. A study by CSIRO scientists in 2002 concluded that less than four per cent of annual ryegrass seeds consumed could survive passage through a sheep's digestive system and similarly a 2010 international study showed both annual ryegrass and wild radish seeds were destroyed after two days in the rumen.

The Webbs use the chaff cart on all their cropping land and have seen a reduction in herbicide use across the whole farm. In addition to harvest weed seed control with the chaff cart, the Webbs have also been including as many high biomass, competitive crops in

FIGURE 1: Liveweight of sheep grazing canola chaff dumps compared to grazing paddocks without chaff dumps at 'Marbarrup', Kojonup WA



Note: 18 mm of rain fell at the two-week stage of the trial and a further 97 mm of rain fell eight weeks into the trial.

their rotation as possible. Their current program includes canola, barley, lupin and wheat, with trial paddocks of faba bean.

Ben has found that growing RR and RT canola has provided excellent biomass production and allows them to restrict the use of clethodim to the lupin phase of the cropping program only.

Frost is a concern every year and the Webbs have been heavily impacted in the past few years. One of the greatest difficulties being the unpredictability of frosts – early one year and late another. Ben sows Calingiri, a noodle wheat, and Trojan, a bread wheat as early as possible to minimise the risk of frost damage.

Achieving low resistance levels

Annual ryegrass, brome grass and wild radish are the Webb's top-three weed challenges and to-date the herbicide resistance status is low. A 'quick test' performed last year indicated that resistance to clethodim was building and this was a significant motivator for Ben and Emily to invest in the chaff cart. Prior to sowing Ben applies a double knock of glyphosate followed by paraquat mixed with a pre-emergent herbicide.

Ben applies in-crop herbicides as required and hand rogues any surviving wild radish plants. To reduce seed set they also crop top lupins and spray glyphosate under the swathe when windrowing canola. Ben has also been trialling windrowing in wheat and barley, primarily as a harvest management tool that also has benefits for late frost avoidance and to reduce seed set in late germinating weeds. On the rare occasions that weeds have got out of hand the Webbs have also used hay production as a way to reduce seed set and drive down weed numbers.

Planting on 229 mm (9 inch) row spacing and paired rows, Ben opts for higher end seeding rates for all crops to maximise yield and competition with weeds. Cutting the crop as low as possible and utilising the stubble as fodder makes planting on narrow rows easier to achieve.

For more information about managing herbicide resistance visit the Weedsmart website: www.weedsmart.org.au



Not burning the chaff heaps does allow more weeds to persist but as this photo shows, the chaff cart does a good job of cleaning up the whole paddock and concentrating the weeds in a very small area.

Chickpeas lose disease resistance

ALL chickpea crops in Victoria and South Australia will need to be closely monitored this year for Ascochyta blight (AB) infection as all current varieties are now rated as either susceptible to moderately susceptible to infection.

A virulence change in the AB pathogen of chickpeas has occurred, with severe AB infection detected in previously resistant chickpea varieties across both states in 2015 and 2016.

South Australian Research and Development Institute (SARDI*) pulse pathology principal research scientist, Dr Jenny Davidson, says while AB infection is more severe in high and medium rainfall zones, effective disease control strategies are also required in low rainfall regions as severe disease outbreaks can occur in these environments during wet seasons, as was the case in 2016.

"Moderately susceptible varieties will generally require three to four strategic fungicide sprays ahead of rain events, offering two to three weeks of protection, starting at six to eight weeks post-sowing," advises Jenny, whose research is supported by the GRDC.

"And susceptible varieties will require regular fungicide sprays every two to three weeks throughout the growing season in front of rainfall events."

As the pods of all commercial varieties are susceptible to AB, Jenny says they will also require fungicide sprays during pod setting ahead of rain fronts to protect the pods from seed staining and seed abortion.

Agriculture Victoria pulse agronomist Dr Jason Brand says growers also need to factor into their 2017 management strategies the impact of early sowing following recent rainfall

throughout SA and Victoria, as rapid early growth can lead to a greater risk of AB infection.

Jason, leader of the GRDC Southern Pulse Agronomy program investment, reports that while outbreaks of AB were significant in Victorian chickpea trials last year, crops generally recovered well from the disease once conditions dried out.

He says the AB pathogen will survive on stubble and organic matter for a number of years, so growers must observe a minimum three-year rotation between chickpeas in the same paddock, and avoid planting adjacent to the previous year's chickpea stubble.

It is imperative that all chickpea seed is treated with a thiram-based fungicide to prevent seed transmission of AB on to emerging seedlings.

Jason says ongoing research into pulse diseases in the southern cropping region will also include further assessment of the impact of AB on seed quality.

Information on management of ascochyta blight in chickpeas can be found on the GRDC website at <https://www.grdc.com.au>.

*SARDI is a division of Primary Industries and Regions South Australia (PIRSA) ■



Dr Jenny Davidson says while AB infection is more severe in high to medium rainfall zones, effective disease control strategies are also required in low rainfall regions.

NEW TO Australia!

3420 SERIES PARALINK™ HOE DRILL

FAR & WIDE, NARROW & EASY

BOURGAULT

Watch the TransFold™ engineering unfold at YouTube Channel BourgaultVideo.

www.bourgault.com.au

1 3420QDA Quick Depth Adjust

Get the best of both worlds with the 3420QDA; the QDA is the only independent depth control drill on the market that offers quick seed depth adjustment. Producers no longer need to put their emergence at risk with the old "set & forget" practice. Precision and convenience is now available with the 3420QDA.

2 3420XTC eXtra Terrain Contouring

Achieve unprecedented seed depth accuracy in challenging terrain. The 3420XTC is equipped with the Paralink™ XTC Seed Opener Assembly. The XTC Seed Opener has a 1:1 opener to gauge wheel ratio for exact seed placement over ridge tops and through water runs.

The 3420 PHD™ is available in 24.4 m and 30.5 m models. Talk to your local Bourgault Dealer today to find out more about the 3420 PHD™.

WHEN YOU'VE ONLY GOT ONE CHANCE



Rexade™

HERBICIDE

ARYLEX™
ACTIVE



Dow AgroSciences

Rexade™ herbicide with Arylex™ active, the ONE herbicide for wheat that:

- Controls three major grass weeds
- Suppresses three other grass weeds
- Controls more than 24 broadleaf weeds
- Compatible with many broadleaf herbicides
- Allows freedom in winter crop rotations
- Comes in a user friendly GoDRI™ formulation

Giving you the opportunity to spray once and have the job done.

Registered for use on triticale and wheat, except durum varieties.

Solutions for the Growing World

© TM Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow



NEW CHEMISTRY, NEW THINKING, NEW PARADIGM.

WITH THE FLEXIBILITY THAT YOU HAVE
ALWAYS WANTED.

Paradigm™ Arylex™ Active Herbicide delivers a low dose, wide spectrum solution for the control of broadleaf weeds.

Widely compatible with the ability to safely go across wheat, barley, oats and tritcale, Paradigm fits easily into your spray programme. Increase your productivity with less downtime due to tank clean out, changing the spray mix or worrying about compatibilities. Get some precious time back and make life easier.

Shift to the new Paradigm Arylex Active.

For more information call 1800 700 096

www.dowagrosiences.com.au

ParadigmTM
HERBICIDE
ARYLEXTM ACTIVE



**Confidence
in a drum**



Dow AgroSciences

Solutions for the Growing World

© TM Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow

RLEM insecticide resistance discovery in the south

SCIENTISTS have discovered insecticide resistance in redlegged earth mite (RLEM) in the southern cropping region.

Recent laboratory studies on several RLEM populations in South Australia have confirmed resistance to both synthetic pyrethroids, including bifenthrin and alpha-cypermethrin, and organophosphates, including omethoate and chlorpyrifos.

This is the first time resistance has been detected in Australian RLEM populations outside of Western Australia.

Research, in which the GRDC invests, suggests that whilst it is too early to determine just how widespread the distribution of resistance is in the south, resistant samples have come from more than one paddock.

Entomologist Dr Paul Umina, from cesar and The University of Melbourne, says further sampling will be undertaken this year to enable more detailed mapping of the extent of resistance in the southern and northern regions.

RLEM is a threat to the profitability of a range of Australian crops and pastures, with canola, lupins and legume seedlings the most susceptible to attack. Mite feeding can lead to distortion or shrivelling of leaves and affected seedlings may die at emergence when mite populations are high.

RLEM are most active from autumn to late spring. Infestations are commonly controlled using seed treatments, or foliar

applications of synthetic pyrethroid and organophosphate insecticides.

Paul says the discovery of resistance in samples collected from



RLEM feeding can lead to distortion or shrivelling of plant leaves and affected seedlings may die where there are high populations present.

STOP THEM DEAD HALT THE SPREAD

Aphid control in cereals and canola



TransformTM **WG**
INSECTICIDE
ISOCLAST^{ACTIVE}

Viruses such as Barley Yellow Dwarf Virus (BYDV) and Beet Western Yellows Virus (BWYV) can decimate cereal and canola crops. The primary vector for these viruses are aphids. With **TransformTM WG insecticide**, you can take back control of your crop and stop the virus in its tracks.

- Outstanding aphid control
- Approved for use in canola and all winter cereals
- Effective across a wide range of temperatures
- New Mode of Action – no resistance

For more information call 1800 700 096
www.dowagrosiences.com.au



Dow AgroSciences

Solutions for the Growing World

®TM Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow.

SA in 2016 means growers and advisers will need to reconsider their RLEM strategies, requiring a focus on ensuring insecticide applications are used judiciously against this pest as part of an integrated approach to control.

“As an industry, we must do everything we can to prevent further resistance development,” Paul says.

To guide growers and their advisers in their efforts to control RLEM and reduce the risk of resistance occurring, a Resistance Management Strategy (RMS) for South Australia, Tasmania, Victoria and southern New Wales has been developed (in addition to a separate strategy for WA).

The RMS for the *Redlegged Earth Mites in Australian Grains and Pastures*, developed through the National Insecticide Resistance Management (NIRM) working group and endorsed by CropLife Australia, has been published by the GRDC and is available for viewing and downloading at www.grdc.com.au.

The strategy's key recommendations include not using the same chemical groups across successive spray windows (on multiple generations of mites) and reserving co-formulations (or chemical mixtures) for situations where damaging levels of pests are present and a single active ingredient is unlikely to provide adequate control, according to Paul.

“The most important message is this: Only use chemicals when needed, and if they are required, rotate between different groups of chemicals,” he says.

Other recommendations in the RMS, as part of an overall integrated pest management (IPM) approach include:

Consider the impact on target and non-target pests and beneficial invertebrates when applying insecticide sprays. Where

possible, use target-specific ‘soft’ insecticides, especially in paddocks with resistant RLEM.

- Correctly identify the mite species to ensure the most effective insecticide and recommended label rate is used. Misidentification and incorrect insecticide selection may result in poor control and contribute to selection for resistance;
- Assess mite and beneficial populations over successive checks to determine if chemical control is warranted. Use economic spray thresholds where available and do not spray if pest pressure is low; and,
- Monitor RLEM numbers before and after insecticide application to determine control levels achieved. Where poor control is observed re-evaluate future control tactics and seek expert advice.

Growers are again this year being encouraged to use a RLEM insecticide resistance testing service, available at no extra cost to growers through a national GRDC-funded project led by the University of Melbourne, in collaboration with cesar, the Department of Agriculture and Food Western Australia and CSIRO.

Dr James Maino, a cesar researcher, is urging growers to pay close attention to RLEM populations sprayed with insecticide so that any potential resistance can be detected early before developing into a more serious issue.

“If growers notice poor efficacy from spraying or experience chemical control failures over autumn and winter, we want to know about it,” James says.

Growers and advisers suspecting chemical resistance in RLEM should contact James on 03 9349 4723. Samples will then be collected from the property and follow-up advice as to the status of resistance will be provided. ■

INSECTICIDE PRESERVATION CENTRAL TO RLEM STRATEGY

A resistance management strategy aims to conserve the effectiveness of the limited insecticide options available for controlling redlegged earth mites in grain crops and pastures. It is one of two regionally relevant strategies developed by the National Insecticide Resistance Management (NIRM) working group of the Grains Pest Advisory Committee (GPAC), and endorsed by CropLife Australia.

GPAC is a GRDC-funded project which provides strategic advice on pest issues.

RLEM (*Halotydeus destructor*) is a major threat to a variety of Australian crops and pastures, with canola, lupins and legume seedlings the most susceptible to attack.

Department of Agriculture and Food WA (DAFWA) entomologist Svetlana Micic said high levels of resistance to synthetic pyrethroids (SPs), including bifenthrin and alpha-cypermethrin, were becoming more common across the WA grainbelt.

“In addition, localised resistance to organophosphates (OPs), including omethoate and chlorpyrifos, has been discovered on multiple WA properties,” Svetlana said.

NIRM chairman and entomologist Paul Umina, of cesar, said growers needed to understand how to minimise the development of resistance and encouraged them to adopt the recommendations of the Resistance Management Strategy which would help guide their selection of control options.

He said the rotation of different chemical groups was central to the strategy and would minimise the selection pressure for resistance to the same insecticide group across consecutive generations of RLEM.

“Do not use the same chemical group across successive spray windows (on multiple generations of RLEM) as this will select for resistance to that chemical group,” Paul said.



Redlegged earth mite is a threat to a variety of Australian crops and pastures, with canola, lupins and legume seedlings the most susceptible to attack. (PHOTO: Andrew Weeks)

“In addition it is recommended that co-formulations or chemical mixtures are best reserved for situations where damaging levels of RLEM and other pest species are present, and a single active ingredient is unlikely to provide adequate control.”

Paul said growers should at all costs avoid the practice of ‘insurance’ sprays and advised that using the broadest range of integrated pest management (IPM) strategies was the best way to avoid future spray failures and prevent or delay the development of insecticide resistance.

Growers who find RLEM that survive registered rates of insecticide treatments can arrange for resistance testing to be conducted by contacting Svetlana on svetlana.micic@agric.wa.gov.au, 08 9892 8591 or 0427 772 051.

The Resistance Management Strategy for the Redlegged Earth Mite in Australian grains and pastures – western region – is available as a GRDC Fact Sheet at <http://grdc.com.au/FS-RLEM-Resistance-strategy-West>

Growers get the jump on costly soil-borne diseases

GROWERS across the southern cropping region are avoiding extensive yield and economic losses by knowing the risk of soil-borne diseases before they sow their crops.

Many growers in South Australia, Victoria and Tasmania have had their soils tested to determine the levels of disease-causing pathogens present through the PredictaB DNA-based soil testing service provided by the South Australian Research and Development Institute (SARDI*) and supported by the GRDC.

Results of those tests indicate that take-all is at slightly higher levels than last year, with around 21 per cent of samples tested showing a medium to high disease risk, according to SARDI principal scientist Dr Alan McKay.

"The risk of crown rot in the southern region has declined, with 22 per cent of 2017 samples so far in the medium to high disease risk category, compared with almost double that last year," Alan says. "That is most likely due to greater breakdown of inoculum in break crops."

The risk of yield loss caused by rhizoctonia, root lesion nematode and cereal cyst nematode is similar to last year at 27 per cent, five and one per cent of samples tested respectively. Medium to high levels of eyespot have been detected in 15 per cent of samples from SA.

\$200 million in losses each year

On average, Australian grain growers each year incur more than \$200 million in lost production due to cereal root diseases such as take-all, rhizoctonia root rot, crown rot, root lesion nematode, cereal cyst nematode, stem nematode and blackspot of peas, which can cause significant yield losses by limiting water and nutrient uptake.

Diseases can also lead to reduced crop competition for weeds, increased crop damage from some herbicides and a reduction in cropping options.

"But if growers know which soil-borne pathogens are in their soils prior to seeding, they can take evasive action and avoid potentially serious crop losses," Alan says.

By using PredictaB – a unique DNA testing service for soil-



SARDI soil scientist Dr Alan McKay says if growers know which soil-borne pathogens are in their soils prior to seeding, they can take evasive action and avoid potentially serious crop losses.

borne pathogens – and combined with advice from an accredited agronomist, growers can implement management strategies before losses occur.

Alan says results are typically used to guide management decisions at the beginning of the cropping season as very little can be done once the crop is sown.

"Results from tests also enable growers to monitor the effect of changed farming practices and seasons on disease risk and allow them to make better informed variety, rotation and paddock management decisions," he says.

Potential high-risk paddocks include:

- Those with bare patches, uneven growth, and whiteheads in the previous crop;
- Paddocks with unexplained poor yield from the previous year; newly purchased or leased land;
- Cereals on cereals or following grassy pastures; durum crops (crown rot); and,
- Paddocks coming out of chickpeas (root lesion nematodes).

Growers wanting to determine the risk of disease in their paddocks can access PredictaB diagnostic testing services through a SARDI-accredited agronomist. The agronomist will interpret the results and provide advice on management options to reduce the risk of yield loss.

About 1800 agronomists and consultants across Australia have been PredictaB accredited through SARDI's annual Agronomist Root Disease Risk Management training courses, supported by the GRDC.

SARDI processes PredictaB samples weekly from February to June, and less frequently at other times of the year.

PredictaB tests for most of the soil-borne diseases of cereals and some pulse crops, including:

- Crown rot (cereals);
- Rhizoctonia root rot;
- Take-all, including the oat strain;
- *Pratylenchus thornei*;
- *Pratylenchus neglectus*;
- Cereal cyst nematode;
- Stem nematode; and,
- Blackspot in field peas.

The testing service also focuses on demand for identifying new diseases, and new tests are regularly added to the portfolio of issues that can be identified. New tests currently reported as tests under evaluation (risk categories still being determined) are ranked within a population density in the interim, and include eyespot, *Pratylenchus quasitereoides* and *Pratylenchus penetrans*.

The testing service is being adapted to the different geographical regions throughout Australia's grain-growing areas.

The use of PredictaB as a diagnostic tool has increased over recent years with recent development of capability to test for both soil-borne and foliar pathogens.

The GRDC is exploring ways to encourage further use of the test to improve broadacre crop performance and minimise economic losses.

More information on soil-borne disease management can be found in the GRDC's stable of GrowNotes™ resources via <https://grdc.com.au/Resources/GrowNotes>.

***SARDI is a division of Primary Industries and Regions South Australia (PIRSA) ■**

China is solving its cornucopia...

■ By Peter McMeekin, Nidera Australia Origination Manager

GLOBAL corn production is forecast to be lower in the coming season, but it is difficult to see values moving significantly higher despite the strong US corn export numbers over the past few months. The biggest declines are forecast for China and the US, but these will be partly offset by the larger crops projected for Canada and the EU.

There are a number of factors in play, which combined, appear to be capping global corn values at the moment. By May 22 the US crop was 84 per cent planted. Sure, there is talk of some areas that have been flooded and may have to be replanted, and yes, some of this area may be switched to soybeans – but there are no huge, overwhelming production concerns.

In South America, corn production is setting new records, with Argentinian production pegged at 39 million tonnes (mt) and the Brazilian crop forecast is now sitting at 95 mt. Harvesting of the Safrinha (second corn crop) in Brazil is about to commence. A large proportion of this harvest goes into the export market and this will put enormous pressure on the pace of US exports as consumers turn to the cheaper South American options in the second half of the year.

The last factor, is the high clearance rates in China's grain reserve auctions during May. China recently announced an end to its corn stockpiling program so the sell down was expected, but the quantities sold have been at the upper end of trade expectations. In one week in mid May more than 4.5 mt were cleared from state reserves, but it is the quantities of older season stocks within that total, which have been impressive. More than 4 mt of 2013–14 season corn was offered with 3.56 mt sold – a clearance rate of more than 89 per cent.

But the corn stockpile was estimated to be as high as 230 mt before May's sell down began.

Apart from clearing old, deteriorating stock, the aim is to find a

price that is high enough to keep the local farmers happy and low enough to keep domestic feed mills in business – and to choke off imports. But the reserve stocks are also held in the north of the country – in the heart of the main production regions – and the majority of the consumptive demand is in the south of China.

The average auction price last week was about 1400 Renminbi (Rmb) per tonne and the average cost of freight from northern China to the southern consumers is around 350 Rmb. This equates to 1750 Rmb CNF south China or US\$254 CNF using a Rmb/USD exchange rate of 6.9.

The latest USDA report has projected China's corn imports at 3 mt and a fall in domestic supply of around 14 mt, mainly due to reduced plantings. On the demand side, feed and residual use is expected to increase based on continued relatively low internal market prices, efforts by the government to promote the use of domestic supplies (reserve stock auctions, government subsidies of more than US\$40 per tonne to stockfeed manufacturers to use domestic corn), and reduced imports of corn substitutes.

Impact on Australia

This is where it impacts the Australian producer. Two of the primary corn substitutes are feed barley and sorghum. Australian sorghum has simply been uncompetitive into the Chinese feed ration this season, with prices elevated well above US origin sorghum due to a 50 per cent reduction in production.

But US sorghum prices have also been quite resilient compared to global feed barley values. This has meant that Chinese imports of feed barley have increased to record levels this year at the expense of sorghum – and despite the plentiful supplies of corn.

But this hasn't come without a cost as the world price of feed barley has done plenty of work to the downside to buy this Chinese demand. ■



You'll stick with **All Clear[®]DS**

Because little else does!

When it comes to removing damaging residues from your boom sprayer, All Clear DS outperforms all other tank cleaners on the widest range of products.

Innovation. Quality. Solutions.
* Registered trademark of AgNova Technologies Pty Ltd.



agnova.com.au



Digging deeper: How global wheat supplies will tighten

■ By Stephanie Bryant-Erdmann, US Wheat Associates Market Analyst

WHILE markets focused on USDA's latest global supply and demand values, a deeper look provides perspective for wheat buyers. Breaking the supply values down into three categories – importer, exporter and China – shows some interesting trends.

The USDA expects world wheat supply in 2017–18 to fall 2 million tonnes (mt) year over year to 993 mt due to a 2 per cent decline in its estimated production of 738 mt. If realised, it would be the first production decline since 2012–13. The anticipated decrease in exporter and importer supplies will be larger, but that decrease is masked by estimated increases for China.

Removing China's 2017–18 projected beginning stocks and production from global wheat supply reveals an 18.2 mt, or approximately 2 per cent, decline in global supplies.

The major wheat importing countries

Ending stocks in major wheat importing countries for 2016–17 – soon to be 2017–18 beginning stocks – are expected to fall to a six-year low of 68 mt. Production in the importing countries is expected to increase 5 per cent year over year, lifted by a 10 mt increase in India after two poor crops there.

Total importing country supplies are expected to remain stable at 300 mt, with beginning stocks falling and production increasing only marginally in importing countries. But it should be noted that 107 mt – roughly 35 per cent – of that supply will remain in India.

What's happening with the exporters?

The USDA forecasts supplies in the top wheat exporting countries of Argentina, Australia, Canada, the European Union (EU), Kazakhstan, Russia, Ukraine and the US to decrease by 4 per cent, or roughly 19 mt year over year, to 451 mt.

A 10.5 mt year over year increase in exporter beginning stocks partially offsets the anticipated 7 per cent decrease in production.

Of the major eight exporters, only the EU and Argentina expect to see increases compared to last year.

The Chinese puzzle

USDA expects Chinese beginning stocks to climb to 111 mt – up 14 per cent – over 2016–17. If realised, China will hold 43 per cent of 2017–18 total global wheat beginning stocks.

Chinese wheat production is also expected to rise in 2017–18

to 131 mt, up 2.15 mt from 2016–17, yet Chinese wheat consumption is expected to decline 2 per cent to 116 mt due to an anticipated decrease in wheat feeding.

With supply up and consumption down, 2017–18 Chinese ending stocks are expected to grow to 128 mt, up 15 per cent from last year and a new record.

If realised, Chinese ending stocks would account for 49 per cent of all global wheat ending stocks for 2017–18.

Global supply and demand estimates give broad perspective for purchasing decisions, but customers should take care to remove Chinese stocks from the equations because the entire volume will stay in China.

In other words, China's ending stocks skew the total global stocks-to-use ratio higher to 35 per cent. Without China, the global ratio would be 21 per cent.

Buyers should also note that USDA's first estimates for 2017–18 wheat production use trendline yields and average harvested area. As last year demonstrated, weather can significantly affect yield potential, abandoned acres, quality and total production.

For example, the actual effect of the late April freeze and snow in the US Midwest, as well as increasing plant disease pressure, on hard red winter production and quality will not be revealed until harvest.

Buyers should continue to monitor conditions around the world, and recognise that global wheat supplies are much tighter than traditional global supply and demand estimates show. ■

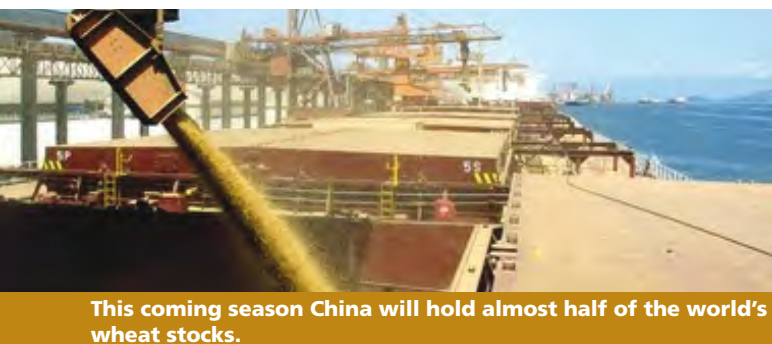
US FREEZE WILL REDUCE HIGH QUALITY WHEAT SUPPLY

It is still too early to project specific effects on wheat yields for marketing year 2017–18 from the late-season cold and snow event in Kansas and parts of Colorado, Texas and Nebraska – but those close to the situation suggest the freeze and snow only add fuel to an already established trend.

"The big story with hard red winter wheat in general before the blizzard headlines was about the reduction in planted area," said Kansas Wheat CEO Justin Gilpin. "Lower planted area, now combined with higher abandonment in this crop, encouraged USDA to project a drop in hard red winter wheat production by 9.36 mt."

Justin said he expects the situation in HRW will help reduce the total US wheat stocks-to-use ratio by perhaps 10 per cent – but carryover stocks still support a relatively high ratio of 40 per cent.

"But it needs to be pointed out that this does not reflect the balance sheet for the high quality milling wheat that buyers here in the United States and around the world should watch closely," said Justin. "The available stocks-to-use number for quality supplies is projected to be to be much tighter on a global basis."



This coming season China will hold almost half of the world's wheat stocks.

ASK AN EXPERT – HOW CAN I AVOID SUB-LETHAL DOSING WHEN SPRAYING WEEDS?

■ With Bill Gordon, Spray Application Consultant, Nufarm

THERE has been a distinct shift in the spectrum of weeds seen on farms across Australia toward species, such as fleabane, sowthistle, feather top Rhodes grass and skeleton weed, which have a natural tolerance of herbicides.

Bill Gordon, spray application consultant with Nufarm Australia says these 'hard-to-kill' species often have hairy surfaces, thick cuticles, reduced translocation due to plant stress or internal mechanisms that metabolise the product.

"The application rate and technique are critical when managing these weeds," he says. "If the application is compromised there is a good chance that the weed will survive and go on to set seed."

"In weeds that are generally susceptible to a herbicide mode of action we see low dose rates inadvertently applied through insufficient coverage, incorrect formulation or adjuvant choice and stressed plant condition, which all impact on the uptake of the herbicide."

The choice of droplet size, carrier volume and sprayer setup all contribute to the delivery and effective uptake of the herbicide. If a population of susceptible weeds are exposed to long-term low dose application there is strong selection for plants that can survive and set seed, leading to increased herbicide resistance over time.



Bill Gordon, Nufarm spray application consultant says herbicide application rate and technique are critical when managing the 'hard-to-control' weeds that are often the dominant weed species found on farms.

EXCEL
Agriculture

Farming for the Future

www.excelagr.com.au

www.gyral.com.au



EXCEL CR600 PARALLELOGRAM TYNE UNIT

- 600lb spring stump jump (optional 800lb)
- 1/2" incremental shank adjustment for seed depth

- 1 1/4" stainless Parallelogram pin on polymer bushes
- Tungsten scrapers fitted to drum coulters as standard

- 1 bearing & marine seal size for coulter & press wheel axle
- 20" 6mm coulters with rubber coated drums both sides

Sales Team: Brian 0427 722 925 Graeme 0427 700 779 Ron 0427 293 653 Stewart 0457 922 001

GMW1255ADWORLD



Coverage can be up to 60 per cent less at the base of standing stubble compared to the inter-row. Penetration into standing stubble can be difficult, but is easier to manage than trash on the ground.

“Correct plant identification and knowing the resistance status of the population is key to choosing the most appropriate product, most effective rates and the recommended adjuvant,” says Bill. “Water is the cheapest thing that goes in the spray tank so use sufficient total application volumes to achieve the coverage required for the mode of action group, particularly in paddocks with plenty of stubble.”

What are the common spray application mistakes that can contribute to herbicide resistance?

Short answer: Mismatching rates, application volumes and not rotating modes of action.

Longer answer: Application technique and the choice of product, rate, water volume and adjuvant are generally within the grower's control. Weather conditions and the plant size and stress are harder to work around. In ideal conditions the aim is to apply the right rate of the right product to the right target to achieve plant death and prevent seed set. Herbicide resistance is

known to evolve, often un-noticed, along fencelines and other green bridge situations.

How does stubble affect the dose delivered to the target weed?

Short answer: Coverage can be up to 60 per cent less at the base of standing stubble compared to the inter-row.

Longer answer: Standing stubble can intercept many droplets before they reach the target weeds. Choose an appropriate spray quality for the target and the mode of action. Use visual indicator tools such as water sensitive paper to ensure adequate coverage is achieved where it is needed. Penetration into standing stubble can be difficult, but is easier to manage than trash on the ground.

For soil applied products, use a very coarse or larger spray quality to maximise contact with the soil. Keep in mind that if a tank mix partner is targeting emerged weeds adjust the spray quality to suit both mode of action and target types. Often the compromise is a coarse spray quality at higher application volumes.

How can I counteract the edge effect to apply the correct dose on paddock borders?

Short answer: Large headlands and slow down!

Longer answer: Maintain wide enough headlands to allow easy turning and entering the paddock with the full spray pressure. Using a minimum hold in the controller for non-residual products will prevent the rate dropping too low and ensure the nozzle's spray pattern does not collapse.

For residuals, slow down and increase application volume to minimise overdosing that may impact on crop establishment, or increase plant back periods. ■

HOW TO ASK A WEEDSMART QUESTION

Ask your questions about the affect of soil pH on weed management on the WeedSmart Innovations Facebook page WeedSmartAU, Twitter @WeedSmartAU or the WeedSmart website <http://www.weedsmart.org.au/category/ask-a-weedsmart-expert/>

'Weedsmart' is an industry-led initiative that aims to enhance on-farm practices and promote the long term, sustainable use of herbicides in Australian agriculture.

Kwik-Kleen GRAIN CLEANERS

- Capacities to 100 tph
- Removes impurities
- Lower screenings
- Increased Profit
- Safer stored grain



CLEAN + PROTECT + CONVEY = PROFIT

GRAINSAFE Aeration Systems Fan Controllers

- Harvest earlier
- Reduce insect damage
- Protect grain quality
- Higher germination
- Any storage type



Walinga Agri-Vac GRAIN CONVEYORS

- Models: 10 t/hr to 100 t/hr
- 'Suck & Blow' any direction or location
- Increased operator safety
- Easily transported



CUSTOMVAC
AUSTRALIA

FREE CALL: 1800 242 699
EMAIL: mail@customvac.com.au

www.customvac.com.au

Don't start mixing until the water quality is right

WATER quality is often overlooked as a possible contributor to herbicide failure and can lead to confusion over the herbicide resistance status of weeds on a property. The careful management of spray events is highlighted in the WeedSmart 10 Point Plan for managing herbicide resistance.

Spray application specialist, Craig Day of Spray Safe and Save at Cowra, NSW says water should be considered as one of the chemicals in any mix, given that water quality varies markedly depending on its source.

"It would be great if all herbicide sprays were applied using rainwater but that is often not practical," he says. "The pH, hardness, electrical conductivity and dissolved solids in water all interact with the herbicides and adjuvant products in a mix. It is essential that these parameters are all addressed before any crop protection products are added to the water."

Water tests are cheap insurance

Craig says a water test is a cheap way to ensure that the herbicide applied will be as effective as possible in a weed control program.

"Generally, water is considered hard when the calcium carbonate levels exceed 300–400 ppm," he says. "If glyphosate is added to hard water, the calcium and glyphosate ions react, effectively reducing the uptake of the glyphosate into the plant."

"By adding ammonium sulfate to the water, the positively charged calcium ions bind with the negatively charged sulfate ions. When glyphosate is added to properly agitated and dissolved ammonium sulfate solution the glyphosate does not bind to calcium ions," Craig says.

It is critical that no undissolved ammonium sulfate, via a handling system or within the spray tank, comes into contact with 2,4-D amine formulations. The resulting precipitate is irreversible.

Hard water

"Hard water will affect formulations of 2,4-DB, glyphosate, 2,4-D amine, Lontrel Advance and Tigrex. If hard water is used with these formulations, there is a greater potential for a reduction in the effectiveness of the chemical," he says.

Water with a pH over 8 supports alkaline hydrolysis, which can affect the efficacy of many herbicide and insecticide products, and is often associated with hard water. Like the example of 2,4-D in hard water, chemicals tend to separate out over time in a high pH environment and the mix become less effective over time.

"The trend toward larger spray tanks means that product is in the tank longer and will be adversely affected when there is a high pH," says Craig. "At a pH of 8, which is common for tap water in many areas, many products will only remain fully potent for a matter of 1.5 or 2 hours at the most. The use of an acidifying surfactant helps lower the pH to an optimal 4.5 or 6."

Padman Stops



Innovative Irrigation Solutions

FREECALL

1800 254 594

Working with farmers to develop outstanding results in irrigation for a smarter future in farming.



Bankless Channel

We can provide Drop Boxes to suit any size layout. From 12-200mg/day.



Through the Bank

The Pipe End can be paired with a downstream bubbler to optimise coverage and minimise erosion.



Maxi-flow Culverts

Our uniquely designed Culvert provides high strength and maximum flow.

Check out the Padman Stops website for a full range of our products

www.padmanstops.com.au

"Aside from herbicides, organophosphates and carbamates are particularly susceptible to alkaline hydrolysis so pH needs careful consideration when spraying aphids with a carbamate formulation."



Spray application specialist, Craig Day of Spray Safe and Save at Cowra, NSW says water should be considered as one of the chemicals in any mix, given that water quality varies markedly depending on its source.

Water quality tests

When obtaining a water quality test, Craig suggests that growers ask specifically for the presence of bicarbonates in water to be included in the report. "A bicarbonate level of 75 ppm and above will lead to reductions in the efficacy of 2,4-D amine and Group A formulations," he says. "Ammonium sulfate can be used to reduce the effect of bicarbonates on Group A herbicides, but will produce little improvement on 2,4-D amine formulations."

"Both total dissolved salts and saline water cause stability issues that can result in separation and blocking of filters, especially if there is insufficient agitation during the mixing process. Also, high salt levels in water will resist manipulations of pH."

Craig recommends growers get their water source tested regularly. "If you take two samples and retain the second jar of water you can use it to calibrate your eye using a pool and spa testing kit and the test results. This can become an ongoing monitoring tool," he says.

Batching tank issues

Another problem Craig commonly sees is the incorrect use of batching tanks, where products are concentrated in small tanks without sufficient water. He suggests that growers avoid having the entire tank load amount of acidifying adjuvant in direct contact with other chemistry and that 2,4-D amine is never allowed to sit on undissolved ammonium sulfate.

"Similarly, high concentrations of glyphosate and 2,4-D amine in a batching tank can cause the glyphosate to lose its effectiveness," he says. "It is very important that water is conditioned first, and that sufficient water and ample agitation is used when preparing a spray load. Time is always against growers but there is no point hurrying just to apply a load that won't work because the chemistry is wrong in the tank."

As new products come to market, Craig suggests growers ask their advisors where the product fits in the mixing order and to highlight any interactions with water quality parameters.

"Ask your advisor to provide the correct mixing order when writing the advice sheet," he says. "You will then have this advice to follow and can record the mixing order on file. This information, and a water quality test, will help unravel any issues with a spray's efficacy and – in combination with a herbicide resistance test – assist with developing a robust herbicide program."

For more information about managing herbicide resistance visit the WeedSmart website: www.weedsmart.org.au

Charlton's

FISHING

TACKLE • BAIT • ICE



MAIL
ORDER
WELCOME

**AT CHARLTONS FISHING YOU'RE
IN THE BEST COMPANY...**

Minnkota Humminbird Abu Garcia Penn
Daiwa Shimano G-loomis Jackall

18 Kerwick Street Redbank Q 4301 Ph: 3818 1677 www.charltonsfishing.com.au

Does soil pH affect weed management?

WEED smart
every weed every seed
every farm every year

■ By Dr Abul Hashem, Weed Science Principal Research Officer, DAFWA

SOIL acidity limits productivity on approximately 50 per cent of Australia's agricultural land and several important weed species have a competitive advantage over broadacre crops on soils where the surface soil pH level is less than 5.5 or the subsurface pH is less than 4.8.

Efforts to improve soil pH have a two-pronged effect on crop production.

■ Firstly, agricultural crops yield better when they are grown in soils where the pH is in the optimal zone; and,

■ Secondly, crops are better able to compete with weeds.

Having lower weed numbers in-crop means the herbicides applied are more likely to be effective and also there is less potential for weed seed to be added to the soil's seed bank.

Trials show dramatic impact

Where soil acidity was removed as a constraint to production, DAFWA researcher Chris Gazey and Joel Andrew from Precision SoilTech measured a total biomass increase of 160 per cent



DAFWA Principal Research Officer Dr Abul Hashem demonstrated the effect of lime application on the suppression of annual ryegrass four years after application. Annual ryegrass numbers were reduced from 139 to 56 plants per m² (59 per cent reduction) at the Merredin trial site.



The last supper.

- Attractive & palatable for a better kill
- Lasts longer than others come rain, hail or shine
- Bait spreads further with fewer passes

METAREX®

ALL WEATHER SLUG AND SNAIL BAIT

agnova.com.au

Innovation. Quality. Solutions.

® Registered Trademark of De Sangosse, France.

AgNOVA TECHNOLOGIES



Weeds do not usually prefer acidic soils, they are just able to take advantage of the reduced competition for resources. By adding lime to acidic soils it is possible to lift the pH, allowing crops to perform better and out-compete the weeds.

compared to the control (unlimed) acidic profile in a trial at Kellerberrin, WA and the weed biomass was reduced to only three per cent of the total biomass.

It is usually several years before a lime application has a measurable effect on soil pH, especially in the subsurface. In our GRDC-funded trials at Merredin, Wongan Hills and Eradu from 2010 to 2014 with researchers from the Australian Herbicide Resistance Initiative (AHRI) at the University of Western Australia, we saw reductions in populations of wild radish, annual ryegrass and barley grass of between 40 and 70 per cent in the fourth year of the trial as a result of lime applications.

Surface pH can also impact on the breakdown processes of residual herbicides, potentially impacting future crop safety and exposing later generations of weeds to sub-lethal doses of the herbicide.

Crop competition is one of the most effective non-herbicide weed control tactics available and managing the soil's surface and sub-surface pH is central to enhancing plant growth and productivity, giving crops the winning edge against weeds.

How does managing soil pH affect weed biomass?

Most broadacre crops are suited to soil pH above 5.5. In more acidic soils, weeds can take advantage of the soil moisture and nutrients to grow and set seed, adding to the soil weed seed bank.

A small shift in soil pH can have a large impact on the availability of aluminium in the soil. Soluble aluminium restricts the growth of plant roots and this limits the plant's ability to access water and nutrients, particularly in seasons where there is a dry finish, resulting in reduced yield and smaller grain size. Weeds do not usually prefer acidic soils, they are just able to take advantage of the reduced competition for resources.

By adding lime to acidic soils it is possible to lift the pH, allowing crops to perform better and out-compete the weeds.

Does soil pH affect the breakdown of residual herbicides?

In low pH (acidic) soils, imidazolinones breakdown slower, resulting in increased persistence. The opposite occurs with triazines and sulfonylureas, which persist much longer in high pH (alkaline) soils.

Residual herbicides that breakdown through reactions with water (hydrolysis) are strongly affected by soil pH.

Triazines (Group C sub-group) and sulfonylureas (Group B sub-group) are broken down through chemical hydrolysis in neutral or acid soils. This process is much slower in alkaline soils, potentially restricting crop choice and exposing late germinations to sub-lethal doses of the herbicide.

The other main method of residual herbicide breakdown is through microbial degradation. Soil pH generally does not affect this process, except in the case of imidazolinones (Group B sub-group), which persist for longer in acidic (low pH) soils.

Can I expect a crop yield benefit from lime application?

If pH is currently a limiting factor, then applications of lime will improve crop yield.

WA growers Alex and David Leake applied lime to plots on their property at a rate of five tonnes per hectare, about 20 years ago. Limed plots produced 60 per cent more barley biomass than unlimed plots and, in addition, unlimed plots contained proportionally more ryegrass than limed plots.

Increased crop competitiveness and potentially better herbicide efficiency on soils with good pH, combine to fight weeds and reduce the weed seed bank over time.

'Weedsmart' is an industry-led initiative that aims to enhance on-farm practices and promote the long term, sustainable use of herbicides in Australian agriculture.

Reducing the frequency and severity of mouse plagues

■ By Quentin Hart¹, Glen Saunders and Geoff Robards, NSW DPI

AT A GLANCE...

- Recent reports indicate that mouse numbers are on the rise.
- Monitoring is the key to ensuring the frequency and severity of mouse plagues is kept as low as possible.
- Effective mouse management involves reducing the availability of food and shelter for mice, in combination with poison bait control if required.
- Farmers are advised to check paddocks, especially where stubble loads are high.
- Once mice are in plague numbers, there is little farmers can do to control their population.

THE house mouse, *Mus domesticus*, originated near the present border of Iran and the former USSR, from where they spread to Europe and subsequently throughout the world. They were probably introduced into Australia by the first European settlers and quickly established throughout the continent. Within 100 years of introduction, mouse plagues were being reported which resulted in devastating damage to agricultural production.

The house mouse is not restricted to houses or buildings as its name might suggest. They are found in pretty much all habitats and have adapted to a wide range of environmental conditions. They are common on all agricultural lands, particularly cereal and summer cropping areas. Mice are generally described as 'commensal' rodents – that is, they live with humans, and are adapted to living in houses and buildings. Most farm buildings have a few mice.



Regular inspections around buildings and crops – at all growth stages – is the key to detecting a build up in mouse numbers.

Two Storms that hit rodents hard

Now there are two Storm[®] rodent baits, including a new soft formulation, so farmers can quickly bring rat and mouse infestations under control and keep their properties protected.

Find out more at pestcontrol.basf.com.au or call your local BASF sales manager

ALWAYS READ AND FOLLOW LABEL DIRECTIONS. © Copyright BASF 2017 ® Registered trademark of BASF.

NEW



BASF
We create chemistry





A mouse nest. (PHOTO: David Croft)

In the field, mice are always present but in most years are in relatively low numbers. Refuge areas such as channel banks and dense pastures are ideal habitat where detection is difficult. Poultry and pig sheds or grain storage facilities are also favoured, particularly if the ground can be excavated easily to establish burrows.

Distinguishing features

Mice have prominent incisor teeth that grow continuously – the length of the teeth is controlled by gnawing. Material may be gnawed yet not tasted or swallowed, so it is difficult to devise a repellent coating against mice.

The introduced house mouse is distinguished from Australian native mice by:

- Their teeth – the house mouse has a well-marked notch or ledge behind the tip of the upper incisors into which the lower teeth fit whereas native species have smooth chisel edges.
- The number of nipples on the female – native species have only four teats whereas house mice have 10.

Food

Mice consume a wide range of foods, eating 3–5 g daily. In a field situation, mice survive on the seeds of native grasses and thrive on introduced cereal grains. In food storage areas, their diet can include grains, vegetables, meat, fruit and dairy products.

They are particularly attracted to high protein grains and aromatic vegetable oils. When selecting a bait type, it is important to know that mice will sample all foodstuffs within their range, but may not return to a particular feed type for many days.

Water

Mice can successfully live and breed without free water if the moisture content of the food is at least 15 per cent. Where mice live in sheds and areas where the food supply has a low moisture content, they need 1–2 ml of water daily to survive.

In these situations their activity can be limited by cutting off their access to water.

Reproduction

Mice can start breeding at 6–10 weeks of age and produce 10–12 litters per year. The gestation period is 19–21 days, with the female re-mating almost immediately after giving birth. Young mice begin eating solid food at 11 days and are weaned at 21 days of age. They have a life span of only one year in field situations.

Litter size is generally five to six but can be up to 10. The

young are born hairless and blind in a nest of collected materials such as grass, paper, hair, cloth remnants or anything soft that is available.

If there is no infant mortality, one breeding pair of mice could theoretically result in 500 mice within 21 weeks.

In Australia, mice living under field conditions have a seasonal pattern of breeding. This generally begins in early spring and continues until cold or wet conditions develop in late autumn (approximately eight to nine months duration). Mice living in unfavourable seasonal conditions may have a shorter breeding period, while those with nests in the warmth of buildings or haystacks are likely to have an extended breeding period.

Plagues

Mouse plagues tend to occur when there is plenty of food and water available, environmental temperatures are not extreme, soil is moist and easy to dig, nesting conditions are favourable and diseases, parasites and predation are at a low level.

Widespread mouse plagues in Australia were reported as early as 1900 and they have occurred on average once every four years since then. Mouse plagues can have dramatic agricultural, environmental and sociological impacts.

Behaviour

Mice are most active at night but can also be seen during the day, particularly around buildings or areas with adequate cover. Their home range is limited to an area of about 5 m² in closed buildings, but in crop situations, with available food and water, the home range may be even less.

Young mice are forced to seek new areas during periods of high breeding and this is one of the factors associated with the development of a plague.

When mice move, they tend to follow the same path from refuge to feeding area. Paths are often confined to walls, pipes or natural barriers, so the tell-tale smear marks can be an indication of mouse activity.

In the field, distinct tracks through the vegetation become obvious.

Mice can swim and remain under water for lengthy periods. They can dig, jump upwards at least 30 cm, jump downwards at least 2.5 m without injury and squeeze through openings as small as 8 mm in width.

In addition they can climb almost any rough surface, climb upside down and run down ropes and coated electric wires.

Predators

Predation may play a role in regulating mouse numbers until there is a rapid population build up. Predators are unlikely to have any effect on numbers once plague proportions are reached.

A noticeable increase in the number of predators in an area may indicate a large increase in the mouse population.

The main predators of mice are foxes, feral cats, snakes and all birds of prey. The presence of itinerant bird species such as the black-shouldered kite may be an indicator that mouse populations are increasing.

Domestic cats have no impact on localised mouse populations, contrary to popular myth.

Disease

Although disease can cause a sudden decline in mouse numbers, marking the end of a mouse plague, declines in numbers occur mainly when mice are stressed from restricted food and shelter. It is more likely that overcrowding will allow parasite infestations to develop and contribute to the spread of disease.

Impacts of mouse plagues

Sown crops

Mice cause damage to almost all sown crops, no matter whether they are winter or summer crops or seeds of cereal, oilseed, maize or pasture. By digging into the loose soil immediately after sowing, mice are able to establish nests and feed on the seed or newly emerging seedlings.

Most crops suffer damage prior to seedling emergence and when the grain or seed begins to mature. But in cereal crops such as wheat, mice chew the growing nodes of the plant and can stop the development of the head or cause the stem to collapse.

Mice can also damage horticultural crops like melons, pumpkins and tomatoes.

Stored produce, buildings and machinery

Mice will be active in most farm areas where produce is stored. Normally, there may be little pressure put on such storage until there are mice in plague numbers that will test security to the limit. Mice can find the smallest hole and gnaw on it until it is large enough to allow entry.

During a plague it is difficult to maintain the mouse-free status of any facility unless there has been a mouse-proof component incorporated into the initial design and construction.

In machinery sheds, mice can cause expensive damage to electrical wiring, plastic and rubber components and upholstery.

Human and animal health

In Australia, rodents can carry a variety of infectious diseases which may be transmitted to humans and other livestock, including:

- Bacterial infections – Leptospirosis, *Leptospira celledoni*; Lyme disease, *Borrelia burgdorferi*; melioidosis, *Pseudomonas pseudomallei*; salmonellosis, *Salmonella* spp.; *Streptobacillus moniliformis*; *Spirillum minus*; *Campylobacter* spp. and *Leptospira icterohaemorrhagiae*.



From very few, mouse numbers can build up rapidly.
(PHOTO: David Croft)

- Fungal infections – Ringworm, *Trichophyton* spp.
- Viral infections – Ross River virus.
- Rickettsial infections – Queensland tick typhus; scrub typhus (mite transmitted).
- Parasitic infections – Fleas; mites; tapeworms; nematodes, *Physaloptera* spp.
- Protozoan infections – Pneumocystosis; toxoplasmosis, *Toxoplasma gondii*.
In particular, mice can transmit:
- Salmonella to one another, to humans and to domestic animals;
- Encephalomyocarditis virus to pigs;
- Fungal skin diseases (ringworms) to cats and humans; and,
- Leptospirosis to humans and domestic pigs.

the  gate

Helping you access short term,
skilled labour now



The-Gate is essentially a service introducing Australian farmers needing short-term skilled labour, to keen and experienced young workers with farming backgrounds.

The-Gate offers a pool of skilled international farm workers with header and other large machinery experience.

**So to get the ball rolling on solving your short-term labour needs,
go to www.the-gate.com.au and register (for free) on The-Gate's database or
contact Catherine on 0408 717 459**

www.the-gate.com.au the  gate



Shed with galvanised barrier. (PHOTO: David Croft)

Strategic management

A strategic approach to management is required to reduce the frequency and severity of mouse plagues. Monitoring is essential to provide early warning of a build-up in mouse numbers to allow early intervention. Effective mouse management involves a combination of land management practices to reduce food and shelter availability, supplemented by poison bait control as required.

Monitoring

Regular inspections around buildings, crop perimeters and throughout the crop at all stages of sowing and crop growth is the key to detecting a build-up in mouse numbers.

Mouse chew cards can be used to assist this process, with practical guidance on the preparation and use of these available at: <http://www.pestsmart.org.au>

The Grains Research and Development Corporation (GRDC) has supported national mouse monitoring programs and activity reports can also be obtained from the 'MouseAlert' website: <https://www.feralscan.org.au/mousealert/>

Seasonal conditions can provide a prompt for when crop producers should step up their monitoring activity – for example, warmer weather after a period of high rainfall resulting in ample food availability from high yielding crops.

CSIRO provides the following general guidance for monitoring:

- There can be unexplained variability in mouse activity from one paddock to the next on some properties. It is therefore advisable to monitor across multiple paddocks to get a true indication of numbers to inform management decisions.
- Look for evidence of active burrows, rather than relying solely on mouse chew cards as these are not as effective when abundant alternative food is present.
- To look for active burrows, walk about 30 metres in from the edge of the paddock and set a 100-metre long x 1 metre wide transect through the crop, following the furrows. Walk slowly along the transect scanning for evidence of mouse burrows, taking note of any burrow that looks active and recording the number of burrows per 100 metre transect, and then repeat across two to four transects.
- If there are more than two to three active burrows per 100 metres, there is a mouse problem.
- Corn flour can be used to mark potentially active burrows, but the transect will need to be inspected the next day for signs of activity.

Control techniques

Deterrents

Although numerous physical and chemical deterrents have been suggested and used for repelling mice, none have proved to be successful. Ultrasonic devices and coated or impregnated wires for example have been extensively tested in Australia and overseas and have not been found to have any value in repelling mice.

Reducing mouse access to food and shelter

Mouse control should be part of an organised and ongoing program aiming to reduce the frequency and severity of plague events. Mouse-proofing facilities, grazing or mowing irrigation channel banks, keeping rubbish around farm buildings to a minimum, minimising spilt grain and general good farm hygiene should reduce the potential for a rapid and unexpected mouse build-up. Reducing harbour for mice (for example, through rolling of stubbles and slashing crop perimeters) increases predation risk and may limit the foraging activity of mice.

Once mice are in plague numbers, farmers can do little to control their populations. Mouse numbers explode when food, temperature and nesting conditions are favourable, but there are a number of control options that are available when a plague is imminent.

NEW INVASIVE SPECIES RESEARCH CENTRE TO MAINTAIN MOMENTUM

Deputy Prime Minister and Minister for Agriculture and Water Resources, Barnaby Joyce, has officially announced \$20 million dollars of Australian Government funding towards a new invasive species research centre, called the Centre for Invasive Species Solutions.

The new research centre will build on the success of the Invasive Animals Cooperative Research Centre's (IA CRC) decade long track record of providing solutions to some of Australia's most challenging and complex national problems, and continue to maintain strong collaborations between the Australian and state and territory governments', industry and research agencies.

Tackling a national problem

Helen Cathles, Chair of Invasive Animals Limited said that these are extremely exciting times as we take the best of our work forward and I welcome the Government's announcement and applaud the Minister's passion to tackle this important national problem.

"Over the past decade, we have seen some audacious goals achieved in invasive animal management and have laid some great foundations to minimise the impacts of invasive species on the prosperity, health and sustainability of communities and environments in Australia and progressively internationally.

"Just over the past twelve months, research investment has seen new pest control tools hit the farm gate, there was the first new complementary feral predator toxin in 50 years being available, and then a new strain of rabbit calicivirus was released nationally with community involvement at over 550 sites around Australia. This will have huge benefits for all Australians and our economy," Helen said.

The new centre will begin on July 1, 2017 and more information about the centre's current progress can be found at www.invasives.com.au

Barriers

Unless the building has been constructed with good concrete foundations and sheet metal barriers, the cost of erecting barriers at a later time has to be weighed up against the potential value of any loss. The costing involved in construction of mouse-proof barriers would need to include foundations, walls, floors, doors and windows, rooves and eaves, sewerage and drains.

Details on mouse-proofing are available from the major pest control companies and the GRDC.

Traps

Trapping will have little impact on numbers in a mouse plague and is only suited to domestic situations. Traps may be useful early in a plague to reduce invasion of a home or to monitor the initial rate of population increase.

The most attractive trap baiting material is a small patch of leather or felt soaked with peanut butter, linseed or any other vegetable oil and secured to the trigger plate.

Bacon rind, pumpkin seeds, raisins or cheese securely fixed on to the trigger plate also work well.

Poisons

Small-scale baiting

The use of poison bait around buildings and storage facilities may be relatively successful for controlling small populations of mice. But once mice begin to plague and the numbers of dead mice appear to be increasing, there may be little or no effect on the overall population.

Most of the mouse poisons available are anticoagulants. These are safer than acute poisons, for use around humans and domestic animals, except pigs, which have very low tolerance to anticoagulants.

Large-scale (broad-acre) baiting – Zinc phosphide

Zinc phosphide is the only registered rodenticide for broad-acre baiting. Bait can only be applied by aerial application or accurately calibrated ground application equipment.

The rate of application of zinc phosphide is one kg per hectare to achieve an even coverage of two to three grains per m². At this rate there should be sufficient bait to kill about 20–30,000 mice per hectare.

CSIRO provides the following general guidance for zinc phosphide baiting:

- Apply bait according to the label.
- Apply bait six weeks prior to sowing if there is sufficient evidence to bait (if planning to bait only once, then bait at sowing).
- Allow at least four to six weeks before re-application of baits to minimise the chance of bait aversion. This allows mice that have previously tried the bait to try it again and also targets new animals in the population that are susceptible to the bait.
- If baiting at sowing, apply directly after sowing (for example, bait spreader on the back of the seeder). Mice increase foraging activity after sowing because of the soil disturbance. If a novel food is available on the surface, they will eat that in preference to digging up the planted seed. Baiting more than 24 hours after sowing will not be as effective.
- Bait over large areas. Encourage neighbours to bait at the same time if they also have a mouse problem. The larger the area treated, the lower the chance of re-invasion post treatment.

'Manager Invasive Species Strategy and Planning, Invasive Plants and Animals, Queanbeyan; based on material prepared by Glen Saunders and Geoff Robards.

NSW DPI's new Reducing the frequency and severity of mouse plagues primefact is available on the DPI website, <http://www.dpi.nsw.gov.au>

achmea  australia

Farm insurance that started with a glass jar

Over 200 years ago 39 farmers put money into a glass jar, to be compensated in the event one of them had a haystack fire. This mutual approach to farm insurance remains alive and well in Achmea Australia today.

As one of the world's largest co-operative insurers we are committed to reducing farm production risk. Our glass jar represents our dedication to a mutual partnership built on trust and transparency. We exist above all to keep farmers farming, no matter what.

Talk to your local
Achmea Australia Risk
Specialist today by calling

1300 724 214 or visit
achmea.com.au/find-a-risk-specialist

This advertisement is general in nature. You should consider your objectives, financial situation and needs, and any relevant Product Disclosure Statement, before making any financial decisions. Product Disclosure Statements are available from the 'Downloads' section of our website www.achmea.com.au.
Achmea Schadeverzekeringen N.V. ABN 86 158 237 702 AFSL 433 984



New knowledge emerging from Russian wheat aphid research

LESS than a year after Russian wheat aphid (RWA) was first detected in Australian cereal crops, considerable new knowledge is emerging from Grains Research and Development Corporation (GRDC) research investments activated in the wake of the pest's discovery.

Now present in parts of South Australia, Victoria, Tasmania and southern New South Wales, RWA is the focus of several unprecedented GRDC-supported research undertakings aimed at helping the grains industry combat the pest.

The GRDC has been investing in research to confirm:

- Susceptibility of commercial wheat and barley cultivars to RWA;
- Assessing potential sources of plant resistance;
- Determining aphid biotype;
- RWA biology, ecology and economic thresholds under Australian conditions;
- An investigation into alternate hosts for RWA;
- Trials looking at insecticide efficacy; and,
- Development of practical resources for growers and advisers.

GRDC Manager of Disease Traits, Lauren Du Fall, is overseeing key host resistance-related experiments – the first of their kind in Australia – being carried out by the South Australian Research and Development Institute (SARDI*) and led by entomologists Greg Baker and Maarten van Helden.

One of those projects has involved assessing RWA susceptibility of current commercial varieties.

Commercial varieties and RWA tolerance

"A total of 85 Australian commercial lines have been screened for RWA susceptibility at the seedling to tillering stage," Lauren says.

"A range of symptom expression was observed in a preliminary screen of a selection of current commercial bread wheat, barley and durum wheat varieties, indicating that there may be a level of tolerance or resistance present in current commercial cultivars that could be further developed.

"But susceptibility to RWA is a complex assessment and further data will be required to confirm these results, assess the impact on yield and determine whether it will be valuable to provide resistance ratings of varieties."

Another undertaking has focused on assessing sources of RWA plant resistance. A glasshouse experiment has been conducted where diverse germplasm from around the world was screened with RWA to determine potential sources of resistance that might be utilised in breeding new varieties.

"Through assessing sources of resistance and the biotyping work, it appears we have access to germplasm with potential genetic resistance that could be developed through breeding to deliver Australian grain growers new resistant varieties if that is considered to be an economically viable and sustainable approach to controlling RWA by commercial breeding companies," Lauren says.

"We are really getting on the front foot here to provide breeders and industry with all of the information necessary to make informed decisions on the most appropriate strategy to manage RWA as an endemic pest to south-eastern Australia."

Some of the germplasm screened exhibited higher levels of resistance than those of current commercial cultivars.

Resistance only part of an IPM strategy

Although the plant resistance research is generating encouraging insights, Lauren says it must be remembered that while plant resistance has been deployed as a management strategy in areas of the world where RWA is a serious risk, the aphid has responded through the evolution of new biotypes attacking these resistant plants.

The GRDC is therefore emphasising that genetic plant resistance will not be 'the solution' to RWA control, but it may instead form part of an integrated pest management strategy that includes green bridge management, agronomic practices, strategic use of insecticides, and exploitation of natural enemies of the pest.

While the introduction of RWA presents yet another pest for growers to control, experts supported by the GRDC believe it should be a manageable pest.

In 2017, growers are advised to assess local risk and adopt a threshold-based management strategy. Managing the green bridge well prior to sowing will be an important tool to minimise exposure to RWA pressure in 2018.

More information on management of RWA and links to relevant resources are available via the GRDC website at www.grdc.com.au.

*SARDI is a division of Primary Industries and Regions South Australia (PIRSA). ■



GRDC Manager of Disease Traits, Lauren Du Fall and SARDI entomologist, Greg Baker at the Waite research precinct in South Australia.



PIONEER®
BRAND • SEEDS

“G22 STOOD UP TO THE HEAT”

BRADEN BULLOCK,
Oakey — QLD

**PLANT TOUGH.
PLANT PIONEER®
BRAND SORGHUM**

GenTech Seeds
Exclusive producer distributor
of Pioneer® brand products

Pioneer® brand products are provided subject to the terms and conditions of purchase, which are part of the labelling and purchase documents.
®, TM, SM, Trademarks and service marks of Pioneer Hi-Bred International, Inc. © 2017, GenTech Seeds Pty Ltd. No part of this advertisement can
be reproduced without prior written consent from GenTech Seeds Pty Ltd.

Farming in Foreign Fields...



Profiling the sustainability of wheat farming in the US

By Elizabeth Westendorf, US Wheat Associates Policy Specialist

ROY Motter farms 2500 acres (1000 hectares) in the Imperial Valley of California, and while that may be small compared to other US wheat farms, his operation supports three families. Motter has been farming with his two brothers-in-law since the 1970s, and he oversees their wheat production. They grow *Desert Durum* (a registered brand name) wheat, as well as lettuce, cabbage, onions, sugar beets, sugarcane, alfalfa (lucerne) seed and hay, Sudan grass, melons and tomatoes.

"I chose to start farming more than 40 years ago because I like being outdoors, and I like the dynamics of working for yourself and making those decisions," said Roy. "Farming is multi-dimensional; every crop is different and has different demands."

WHEAT DIVERSITY AND SUSTAINABILITY

- Roy Motter is one of six US wheat farmers featured in a US Wheat Associates series on sustainability representing the six major US wheat classes, grown in distinct regions and local micro-climates.
- The series suggests that while aggregate measures of sustainability are important, they fail to capture the nuances of a crop that is grown across many different climates, soil types and farm environments.
- The profiles show the differences in farming practices across the country and how those practices enhance the sustainability of US agriculture.

Wheat is not the biggest crop on the Motter farm, but it is an essential rotation crop for whole farm profitability.

For Roy, wheat is a pivotal part of their approach to sustainable farming.

"We can't grow our money crops – lettuce, onions and sugar beets – year after year," said Roy. "You have to have a rotation, and wheat is a good rotational crop for us. It lets us control weeds and disease that affect the other crops and gives the ground a chance to rest."

Farmers in the US Southwest increase economic water productivity (the dollar value of crop production per acre-foot of water consumed) by 9 to 21 times by rotating wheat production with vegetable production.

And in an arid climate like the Imperial Valley, maximising water productivity is vital.

"We get a lot of criticism for using irrigation water from the Colorado River. But if you want to sustain a growing world population with food and fibre, you must modify the environment to satisfy those needs," said Roy. "If we want to talk about sustainability issues in relation to wheat crops, the primary issue is to use our water as efficiently as we can, and we work to improve that every year."

Roy's reliance on irrigation does not mean his farm is less sustainable. The Imperial Valley grows 85 per cent of the nation's lettuce in the winter months of the year, and with or without its wheat production, the region will continue to grow its vegetable crops.

By rotating wheat with that lettuce production, Roy reduces



Roy Motter cautions that farming sustainability is not a "one size fits all" concept.

the amount of water his farm uses. In fact, over the past 30 years, farmers in the desert Southwest have reduced their water usage for barley and wheat by approximately 30 per cent and consistently invest money in water and energy conservation efforts.

US wheat farmers deal with unique challenges and growing conditions. For Roy, those challenges are managing water use in an arid climate and controlling crop diseases without the benefit of a cold winter in between growing seasons.

Roy and his family's farm have thrived because they use rotation and best practices to maximise soil health and production while minimising required inputs. This formula is one that all farmers strive to balance, and each go about it in ways that make the most sense in their region. Sustainability is not "one size fits all."

Learn more about Roy and his farm at www.uswheat.org/factsheets. There is also more information about US farmers, ranchers, fishermen and foresters share their values, sustainability experiences and conservation practices at the US Sustainability Alliance.



The location of the Motter family's farming interests.



SOIL SOLUTION



**35% w/v Calcium
25% w/v Sulphur**

- Liquid claybreaker
- Reduces impact of high sodium (salt) soils
- Boosts calcium & sulphur levels
- Fast acting liquid



min. 40% Calcium w/v

- Superior acid soil correction
- Boosts calcium levels
- Fast acting liquid



**35% w/v Calcium
12% w/v Magnesium**

- Corrects acid soils
- Boosts calcium & magnesium levels
- Fast acting liquid



ULTIMATE
AGRI-PRODUCTS

1800 634 204
www.ocp.com.au

Soak up grower knowledge on soil moisture

GROWERS in Western Australia's eastern grainbelt are implementing practical methods to conserve precious soil moisture in response to increasingly fluctuating rainfall and variable soil types.

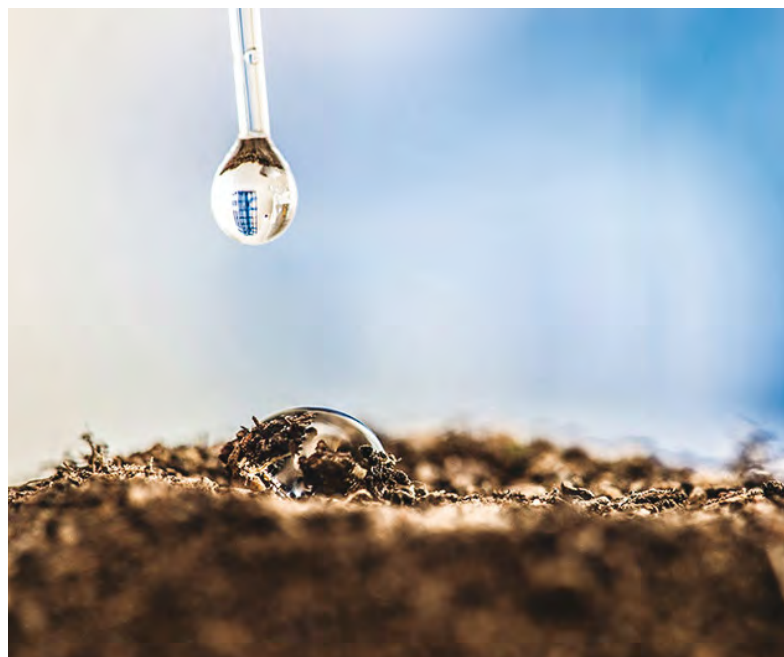
A new Grains Research and Development Corporation (GRDC) Regional Cropping Solutions Network publication *Managing Soil Moisture* outlines how a number of growers in this region are optimising production and reducing risks in the face of these challenges.

The case study booklet was initiated by the Kwinana East port zone RCSN group whose primary role is identifying the top locally-specific grains issues to improve grower profitability.

GRDC RCSN coordinator Julianne Hill said that since its inception in 2011, the group's members had consistently identified soil moisture management as one of the top two priorities in this region, along with business management.

"GRDC has significant investments in soils, water use efficiency and soil moisture conservation and the Kwinana East RCSN was interested in identifying and extending information about practical methods that could be employed to address these issues under local conditions and on local soil types," she said.

"The group initiated the production of the soil moisture case study booklet as a way of highlighting what growers in lower rainfall areas are doing differently to utilise available soil moisture and boost crop productivity and profits.



The publication *Managing Soil Moisture* was initiated by the GRDC Kwinana East port zone RCSN group.
(PHOTO: Evan Collis Photography)

"*Managing Soil Moisture* includes information about a range of techniques being used by 10 growers profiled in case studies that explore how they are optimising production and reducing risks in their lower rainfall area.

"It identifies and explains practical and zone-specific measures being used successfully by growers or being tested by advisers and researchers to improve water use efficiency and boost resulting crop production."

Improving water use efficiency

Julianne said the tactics being used by the case study growers included:

- Spraying summer weeds straight away, even at harvest if need be;
- Measuring and monitoring soil moisture content;
- Paddock preparation and agronomic management to increase the soil water 'bucket' size; and,
- Tactical spray fallows.

"Across the Kwinana East region, there has also been increasing interest in trialling new technologies such as soil moisture probes, with some growers feeding the data into crop modelling and prediction tools such as *Yield Prophet*, and looking at alternative summer weed control options. This booklet explores some of these developments," she said.

Julianne said many of the growers featured in the booklet had experienced consecutive years of drought or low growing season rainfall.

"In the Merredin area, for example, five of the lowest rainfall years in the past century occurred in the decade to 2015," she said.

Managing Soil Moisture, which includes links to useful resources, is available at <https://grdc.com.au/RCSN-ManagingSoilMoisture> and <http://www.rcsn.net.au/publications>

At Dinner Plain the pace is easy going...

Dinner Plain is the place where the family can be together by the fireside or miles apart exploring the cross-country trail network.

Where you stroll the treelined streets simply for the sights or to meet friends for a restaurant dinner or drinks at the bar. The village itself helps set the community atmosphere, natural building materials and earthy tones blur the line between man made and alpine environment. Over 200 lodges and chalets with all the conveniences of a modern resort.

Dinner Plain is the place for your next holiday.

Explore our website at
www.dinnerplain.com
or call our info number **1300 734 365**
or email to **info@dinnerplain.com**

Dinner Plain
Visitor Information
Centre

Aussie adjuvant gets another tick

FARMERS have more reasons to trust Hasten this season, following another chemical company endorsement – this time from Adama – where the technical department has cross-labelled new insecticide, Skope, with the iconic Australian adjuvant.

Launched by Vicchem in 1994, Hasten has become a home-grown success story for the Melbourne-based adjuvant company due to its growing popularity across the crop protection industry and farming fraternity.

Vicchem's business development manager, Owen Connelly, said Hasten was one of the few brands in the broadacre and cotton adjuvant market today that could genuinely claim 'Aussie icon' status.

"The fact that Hasten is made by Australia's own Vicchem for local farming conditions – using locally-grown canola oil – is reassuring for many grain, cotton and oilseed producers these days," he said.

"Plus Hasten has a very solid research base. It's manufactured to the highest quality standards and subject to ongoing trials to ensure safety to users, crops and the natural environment."

The latest endorsement from Adama brings to 27 the number of major herbicides and insecticides used by cotton and broadacre farmers that are cross-labelled with Hasten, recognisable by its distinctive green can (see chart).

National marketing manager for Adama, Adam Phelan, said the inclusion of Hasten on Skope's product use label reflected the high level of trust and confidence in Hasten.

"Skope is registered for wide-spectrum performance against many cotton pests including green mirid, silverleaf whitefly, heliothis, cotton aphid and green vegetable bug," said Adam.

"At Adama, we take pride in the quality of our insecticides and place great importance in optimising the insect control provided by Skope," he said.

"Throughout the development phase of Skope, we noticed silverleaf whitefly control was significantly improved when applied with Hasten and so we have included it as our label recommendation when targeting this difficult pest.

"We wanted to ensure Skope performs to the highest standard so recommending it be applied with a quality adjuvant makes a lot of sense. Applied together, Hasten and Skope are proven performers," Adam said.

Other leading crop protection brands that have endorsed the patented technology of Hasten in the past 20 years include Bayer, Sumitomo, Sipcam and BASF.

Adjuvant safety studies

Recent studies into adjuvant safety in relation to users, crops and the natural environment have confirmed positive results for Hasten.

Vicchem's research division technical manager Peter Jones said all adjuvants had the potential to cause crop phytotoxicity which plant chemists believed was due to cellular breakdown.

"Based on our long term studies, canola-derived Hasten produced relatively less cell damage than mineral oil adjuvants including Uptake and non-ionic surfactant adjuvants including BS1000," said Peter.

On environmental safety, he said Vicchem had also studied the effect of these same adjuvants on beneficial insects and predatory mites.

"Our results showed that Hasten was generally safer than the other two adjuvants tested, which can be harmful to predatory green lacewing, predatory mite and parasitic wasp when sprayed directly at typical use rates."

For more details, contact Owen Connelly on (03) 9301 7000 or go to www.vicchem.com.au

HASTEN CROSS-LABELLED PESTICIDE USE

Product	Chemical company	Hasten rate per 100L of spray volume
Arvesta Motsa*	Tomen/Arysta	1L
Atlantis*	Bayer	1L
Blazer*	UPL	1L
Cheetah* Gold	Bayer	1L
Decision*	Sipcam	1L
Flame* 240g/L product only	BASF	1L
Gesaprim* and other atrazine products	Syngenta	0.5–1L
Hammer*	FMC	0.5–1L
Hussar*	Bayer	1L
Intervix*	BASF	0.5L
Logran* B–Power	Syngenta	0.5L
Midas*	BASF	0.5L
Movento	Bayer	0.5 –1.0 L/Ha
OnDuty*	BASF/Cropcare	0.5L
Precept*	Bayer	0.5–1L
Raptor* WG	BASF	0.5 or 1L
Select* and other Clethodim 240EC products	Sumitomo	0.5–1L
Sharpen*	BASF	1L
Shogun*	Adama/Farmoz	0.5L
Spinnaker* and other 700g/Kg Imazethapyr products	BASF	0.5L
Targa*Bolt	Sipcam	1L
Terbyne*	Sipcam	0.5L
Topik* and other Clodinafop 240EC products	Syngenta	0.5L
Tordon* Regrowthmaster	Dow	0.5L
Skope	Adama	1.0L/Ha
Valor	Sumitomo	0.5–1.0L
Velocity*	Bayer	1L

*Third Party Trademark



Vicchem technical manager, Peter Jones and business development manager, Owen Connelly.

District Reports...

May–June 2017

Western region



WESTERN AUSTRALIA SUMMARY

The 2017 season has been a frustrating start for many growers – most of the state has had good sub-soil moisture where there has not been enough rain to get a germination. Growers have relied on isolated storms to get crop into moisture and up out of the ground. The trend of promising rain fronts fizzing out has continued for April and looks to continue in the short term.

Thunderstorms in the eastern areas around Southern Cross on May 8 means growers that did get rain will get crop in but the storms were isolated and most missed out.

The Department of Agriculture and Food WA reports that whilst most climate prediction models are indicating below average rainfall from May to July 2017, climate models indicate an El Niño event is likely to develop in the Pacific Ocean, as well as an Indian Ocean Dipole-positive event in the tropical Indian Ocean in 2017. The latest update shows fewer models indicating the development of these events, yet a clear majority still remains.

Most of the intended canola is now sown, and due to the lack of rain, there is a slight reduction overall in plantings from what was projected in April 2017. The result from the chance of rain over the weekend of May 13–14 determines the final area. Canola crops that are up are generally patchy with split germinations within individual paddocks. The canola yield potential is still good for the southern half of the state but if rain does not fall in the north, yield potential will drop off.

Lupin plantings look to be slightly lower than April 2017 estimates. The intended barley area looks to have increased from last month being substituted for the reduction in canola plantings.

Milling oats for grain are clearly going to be down on 2016 at this stage, but this could change in the next month as the total cereal plantings in the medium to high rainfall areas still have a long way to go.

GIWA gratefully acknowledges the support of DAFWA and contributions from independent agricultural consultants and agronomists in the production of this report.

Grain Industry of Western Australia Crop Report
May 12, 2017

NORTH

Between mid February and mid May the northern ag region has been very dry with most areas without a rainfall recording. Many growers started planting in April and some have almost

planted their whole program. Some coastal growers are only just getting seeding underway.

Over recent days two cold front systems have crossed the region with falls of between 8 and 25 mm in some western areas. Large areas of the region are into double figures for rainfall between May 18–21.

For some eastern growers this will be enough to get their crops germinated and to join the new moisture up with that stored from summer rain.

Once again, controlling summer weeds pays off with good levels of subsoil moisture where weeds were taken out. But in adjoining paddocks without weed control, the soil is bone-dry as far as you can dig – plus there is the problem of weed residues.

We still need follow-up rain in a week or so but most growers are a bit happier now that there is some moisture around to get planted crops away.

Peter Norris
Agronomy For Profit, Geraldton
May 21, 2017

SOUTH COAST

Over the past two months, seasonal conditions on the South Coast have been very good. Seeding started for a small minority around March 28 with some early canola – this canola is now at the very early stages of flowering.

April was very dry with growers having to seed deeper to chase subsoil moisture. By the beginning of May, soil conditions were getting very marginal for seeding with most crops going in dry.

But on May 11 the whole region received between 10 to 80 mm of rain. For those farmers finding 10 to 30 mm in their gauges, the timing and amount was perfect.

For those receiving more than 30 mm, soil conditions are now quite wet given high stored soil moisture levels from the big summer rains which fell in February.

Most growers will be finished seeding by the end of May. Post emergent spraying and top-up nitrogen applications are now underway.

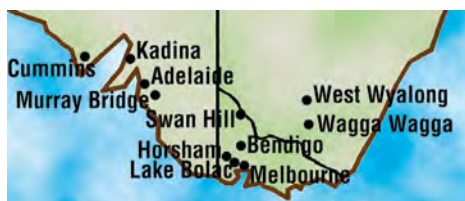
In general, the South Coast season looks to have good potential.

Quenten Knight
Precision Agronomics Australia, Esperance
May 21, 2017



Newly emerged Bolt lentils in the Mt Ridley district to the north of Esperance on WA's South Coast. Many farmers in this area are growing lentils for the first or second time. Lentils performed very well in the 2016 season.

Southern region



SOUTH AUSTRALIA SUMMARY

Thanks to relieving rain at the end of April – followed by a mainly dry May – the winter crop seeding program in SA is well progressed with some already finished in the areas favoured by the late April rain. Seasonal conditions have also been conducive to good weed control prior to seeding.

While the crops in the eastern half of the state have generally established very well, the Eyre Peninsula and other western districts are off to a very patchy start.

Strong winds and sand blasting of newly emerged crops in these western areas have held crops back and have even caused some re-seeding.

Seeding trends in 2017

The glamour crop this year appears to be canola. Timely

District Reports...

May–June 2017

rains and a better price outlook has prompted growers in many districts to increase the area sown to canola. And this increase would have been even bigger if there was more seed available.

Seed sales suggest that the lentil area will also be up on last year. This pulse has a limited domestic market and some analysts are saying that the industry is nearing that limit.

Barley has fallen out of favour with a marked reduction in area sown this season while the wheat area appears likely to remain relatively stable.

VICTORIAN MALLEE

Mallee growers were celebrating in late April when 50–90 mm fell across the region just prior to Anzac Day, providing the perfect break. Dry sowing is now the norm in the Mallee, so to be fortunate enough to have a moist seedbed and subsoil moisture has meant that most sowing programs have, or are close to concluding. Fortunately, the break also provided an opportunity to get a good knockdown ahead of sowing.

Following a very high yielding 2016, there were stubble

Seasonal rainfall across the grain regions – 25 year averages and year to date

Brought to you in association with  JOHN DEERE	25yr Annual Average (mm)		2017 rainfall to date (mm)		Summer 25yr Annual Average (mm)		2016–17		Autumn 25yr Annual Average (mm)		2017 to date		Winter 25yr Annual Average (mm)		2016		Spring 25yr Annual Average (mm)		2016	
Emerald Qld	553		327		255		165		99		225		70		262		122		68	
Toowoomba Qld	667		463		277		148		129		348		88		205		177		158	
Roma Qld	574		312		254		179		113		183		78		132		131		155	
Goondiwindi Qld	615		269		256		185		119		147		103		142		140		163	
Narrabri NSW	628		345		226		145		112		228		130		266		165		201	
Gunnedah NSW	638		216		224		186		106		125		129		172		181		189	
Dubbo NSW	615		254		198		155		122		237		135		307		160		248	
West Wyalong NSW	461		146		120		85		80		104		125		287		135		254	
Wagga Wagga NSW	554		130		132		116		115		85		153		216		152		260	
Swan Hill Vic	321		158		71		37		64		126		87		94		99		140	
Bendigo Vic	514		246		108		102		106		174		160		230		143		249	
Horsham Vic	379		158		77		86		71		103		122		138		108		154	
Lake Bolac Vic	524		188		113		101		102		113		156		189		152		259	
Murray Bridge SA	374		123		67		102		81		76		122		136		103		155	
Kadina SA	347		109		56		165		82		32		114		158		91		116	
Cummins SA	400		112		50		124		94		15		172		197		83		93	
Esperance WA	622		278		80		201		146		100		250		233		143		153	
Wagin WA	396		262		43		230		98		76		166		133		88		63	
Northam WA	399		288		40		262		89		40		188		171		83		55	
Mingenew WA	354		122		27		87		93		13		175		208		60		41	
Moora WA	383		179		41		165		88		24		185		242		69		52	
Mullewa WA	325		185		47		181		97		7		133		162		48		18	

Last rainfall reading May 22, 2017.

District Reports...

May–June 2017

management issues for some growers where burning paddocks was, on occasions, the only option to avoid blockages and further problems such as seed/soil contact or herbicide efficacy issues.

Also as a result of last year's high yielding crops and wet spring, mice have been at high levels in patches across the Mallee, particularly in barley stubbles where crops lodged and dropped heads on the ground. There has been a lot of monitoring and strategic baiting, and in a few instances, re-sowing of paddocks.

As sowing draws to a close across the region, there will be a lot of boom sprayers busily applying both pre-emergent and post-emergent sprays. Another decent rainfall event is forecast for May 17–18 which will be very welcome as the topsoil has been drying out since the late April rainfall event.

This rainfall at the beginning of the season creates the right conditions for disease carryover from 2016 so growers will have to be vigilant and monitor all crop types for disease. Pests will be on the radar, particularly the Russian wheat aphid, so monitoring will be a priority.

Given the climate outlook for winter and spring – average to below average rainfall and the possibility of an El Niño development – growers will be strategic and top-dress crops with caution.



Crops are progressing well in the Mallee thanks to the very timely and excellent April–May rainfall. (PHOTO: BCG)



Between 50 and 80 mm fell across the Mallee during April with flooded roads and water pooling in paddocks a common sight. (PHOTO: Jess Lemon, BCG)



Mice have been very active across the Mallee, particularly in barley stubble paddocks. (PHOTO: Kelly Angel, BCG)

There's still a lot of grain on hand from 2016 so moving this before next harvest will be a priority to make storage room on-farm and to bring in some mid-season cash flow.

Ciara Cullen
BCG Extension Manager, Birchip
May 19, 2017

NSW STATE SUMMARY

During April, rainfall was slightly below average across most of NSW, below average in the north east, some coastal areas and areas of the central west and north west and above average in the south and far west.

The April rainfall provided sufficient topsoil moisture to allow both preparation for – and sowing of – winter crops. But follow-up rainfall will be necessary in many areas.

The favourable price for canola led to a high demand for seed, with hybrid seed in short supply. Chickpeas are also popular given current prices and the possibility of a drier season.

Difficulties have been encountered in handling heavy stubbles

District Reports...

May–June 2017

from last year's record winter crops. An increased amount of stubble burning occurred to facilitate paddock preparation, crop sowing (particularly of canola) and to reduce disease and weed burdens.

The outlook for May to July indicates drier than normal conditions are likely across NSW, with warmer than normal daytime temperatures.

Pasture growth

Pastures generally responded well to the April rainfall, particularly in the central and southern areas of the state. Pasture growth improved across areas of southern, western and central western NSW and was maintained across areas of coastal NSW and the tablelands. Growth remained limited across some areas of NSW. Seed of some pasture species such as Phalaris and lucerne is in short supply, with an increased interest in pasture sowing in some areas.

Relative to historical records, pasture growth ranged from average to above average across areas of northern, eastern, southern and central NSW. Growth was below average growth across limited areas of the state.

Good winter growth and pasture establishment will be dependent on a continuation of mild conditions into early winter and on follow up rainfall.

Stock condition is average to good, with an increase in pasture growth allowing supplementary feeding to be scaled back in many areas.

NSW DPI, Seasonal Conditions Summary
May, 2017

Northern region



LIVERPOOL PLAINS

Summer crops

On the Liverpool Plains sorghum has been below average with the severe summer heat and lack of rain at critical times. Exceptions to this were in the Bundella/Premier valley and some crops at Blackville which were lucky enough to be under some good storms.

But generally, well below average was the norm. Sorghum yields varied from two to three tonnes per hectare at Mullaley to five to six tonnes around Spring Ridge on good long fallows and everywhere in between. Quality has varied too with a mixed bag of Sorghum 1 and Sorghum 2 across the plains.

Dryland cotton was also generally disappointing due to the dry season. Yields varied from 1.5–4.5 bales per hectare with most in the two to three bales per hectare mark. Quality is down with significant discounts expected once ginned and classed. Strippers are scarce given the large dryland acreage around Moree.

Irrigated cotton is looking OK with only average yields expected due to long periods of high temperature and irrigations not keeping up with daily crop water use in January and February.

Winter crops

Winter plant has seen some canola already go in. A decent rainfall event is needed and hopefully will come at the end of the week to firm up winter crop planting.

On our farm, sorghum is all off and we are preparing to plant chickpeas. Planting will get underway in early June.

Lauren McGavin
Precision Seeding Solutions, Premier
May 17, 2017

DARLING DOWNS

Weather conditions

The March rain has opened up the possibilities for winter cropping, with the 200 mm plus wetting the soil down to at least 60 cm with good moisture. Dry conditions through April to mid-May has allowed summer crop harvesting to continue.

Summer crop

The main late sown crop was mungbeans, with the crops planted later into January yielding better and of a higher quality. Most crops have returned between 1.0 and 2.0 tonnes per hectare, but there have been some excellent dryland crops south of Pittsworth yielding up to 2.5 tonnes per hectare.

Insect pressure was low to moderate, and there was late disease with powdery mildew.

Dryland soybeans are being harvested now at 2.0 to 2.5 tonnes per hectare, whilst the summer corn crop yields are very dependent on subsoil moisture at planting.

The major disappointment has been dryland and irrigated cotton which just did not have enough moisture, and growers have experienced disappointing yields and large dockages for quality.

2017 winter crop

On the eastern Downs the chickpea area will be almost 50 per cent up on last season's record planting – despite the risk of disease – as seen on any volunteer chickpeas this summer.

West of Dalby it will be 30 per cent up on 2016.

Some growers have started to plant before this weekend's forecast rain, as well as deep planting with tynes. But most growers will plant with discs and will need a planting rain hopefully in time for an early June plant.

There is some interest in wheat and barley, especially for stubble cover and rotational reasons and some local market demand for barley is lifting its area over last season. Wheat growers are taking the opportunity this season to try more of the new varieties, although the area will be down on average, similar to 2016.

Hugh Reardon-Smith
Agronomist, Landmark Pittsworth
May 16, 2017

District Reports...

May–June 2017

CENTRAL QUEENSLAND

Summer

The past summer was generally too dry and hot for sorghum with only limited mungbean planted. This resulted in a very large fallow area with only limited summer crop across the region.

Traditional summer rain was very late arriving, with fallow soil profiles only starting to refill when district wide rain arrived in March assisted by Tropical Cyclone (TC) Debbie. The timing of TC Debbie ensured surface moisture would be suitable for wheat planting in April throughout CQ.

Winter crop

Wheat

Wheat planting commenced in early April in the Northern Highlands, as soon as paddocks could be accessed following TC Debbie. Wheat planting was in full swing in the Southern Highlands and had commenced in the Dawson and Callide by the third week of April.

Planting continued until soil moisture was too deep; farmers then switched over to planting chickpeas. Rain on May 10 created a second wheat planting opportunity, especially for the Dawson and Callide where rain totals were higher (50–75 mm).

This rain will also contribute towards secondary root development for April planted wheat, ensuring these crops develop an adequate root system to access sub-soil moisture and grow yield.

At my estimate, about 200,000 hectares of wheat has been planted by mid-May and at least 75,000 hectares more could be planted as late as mid-June, providing there is sufficient surface moisture. There could be 300,000 hectares of wheat this winter.

Chickpea

Chickpea planting started as early as the second week in April in the Northern Highlands, but really ramped up in late April/early May as wheat planting stalled due to moisture depth. The price of chickpea remains very high, tracking around \$900 per tonne port. This price is encouraging another large area to be planted to chickpea.

The area planted to chickpea will probably set another record, exceeding last year's record crop – an estimated 250,000 hectares plus of chickpeas. Worryingly, back-to-back chickpea plantings in some regions have been significant, raising the spectre of *Ascochyta* blight, moulds, in-crop weeds and other agronomic issues.

ANSWER TO IAN'S MYSTERY TRACTOR QUIZ

The tractor is a 1949 Turner Yeoman of England. This superb but rare example was the ninth produced. It featured a V4 diesel engine of 40 hp, originally designed for powering Cornish fishing boats. The tractor pictured was completely restored by the author and is now considered the finest remaining specimen.



Deep planted chickpea emerging on 50 cm rows. Typical of many CQ cropping fields this winter.

Water level

The Fairbairn dam is currently at 45 per cent or 589,000 ML as of May 10.

Livestock and pastures

Sporadic summer storms around Alpha and Springsure resulted in good wet seasons in these regions. Rain from TC Debbie arrived late for much of CQ resulting in less than an ideal pasture volume heading into winter. Most pastures hayed off by the start of May and quality has deteriorated.

Stock are generally in good condition and surface water supplies are adequate for most producers.

TC Debbie caused flash flooding which resulted in stock losses from the eastern river valleys around and to the north of Duaringa, including the Clarks Creek area.

Max Quinlivan
Department of Agriculture & Fisheries, Emerald Qld
May 17, 2017

ADVERTISERS' DIRECTORY

Achmea.....	37	Garson & Co.....	4
Adama	1	Jaylon Industries.....	8
AgBiTech.....	18-19	John Deere	5, 21
AgNova	25, 31	NAB agribusiness.....	7
Australian Grain Technologies	Insert	New Holland.....	9
BASF	33	Next Instruments.....	17
Bayer CropScience.....	11	Nufarm.....	3
Bourgault Australia..	N, S	Organic Crop Protectants	41
Case IH	OBC	Padman Stops.....	29
Customvac Australia ..	28	Pioneer.....	39
Charltons Fishing.....	30	Simplicity Australia	IFC
Davimac	14	The Gate	35
Dinner Plain.....	42	Vicchem	15
Dow AgroScience	N, S	Westfield Augers.....	N, S
Excel	27	Yara Australia	13