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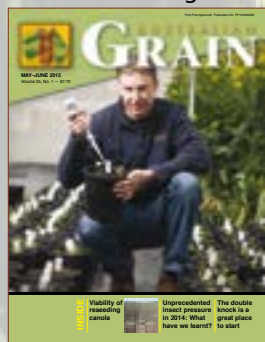
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**FRONT COVER**

Samples of stubble from last year's canola crops are needed to assist with ongoing research into fungicide tolerance in blackleg



fungus strains. Canola disease expert Steve Marcroft is coordinating a survey of 2014 canola paddocks and is appealing for help from growers and advisers. See article page 10. (Photo: GRDC)

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## In this issue...

### Research sheds light on viability of reseeding canola

Western Australian research investigating whether it is economic to reseed a canola crop that has established poorly suggests that in many cases it might not be worthwhile



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### Unprecedented insect pressure in 2014: What have we learnt?

The 2014 season was one long curve ball for grain growers in south-eastern Australia. A near-perfect start with good summer and autumn rain coupled with mild temperatures saw crops jump out of the ground. But, as it turned out, crops were not the only ones thriving under such conditions.



**See article . . . . . Page 12**

### The day the earth SHOOK!

No – it was not an earthquake. Nor was it an asteroid collision. Not even a tsunami. The shaking of the planet was caused by tractors! And if you don't believe me and think I must have been hallucinating, then read on!



**See article . . . . . Page 20**

### The double knock is a great place to start

It is double knock season in Australia. Glyphosate resistance has been confirmed in many fields across the country in at least 10 weed species. Public enemy number one is the world champion of herbicide resistance, annual ryegrass. Glyphosate resistant ryegrass has been confirmed in hundreds of fields in Australia and is suspected in thousands.



**See article . . . . . Page 25**

### The federal budget and agriculture

Overall, agriculture will benefit in the 2015–16 federal budget, build on confidence and support expanded investment. Much of the new funding is to facilitate investment in northern Australia and to respond to the ongoing drought in many parts of the country. There is also an expanded focus on biosecurity as well as beneficial tax changes for farmers.

**See article . . . . . Page 31**





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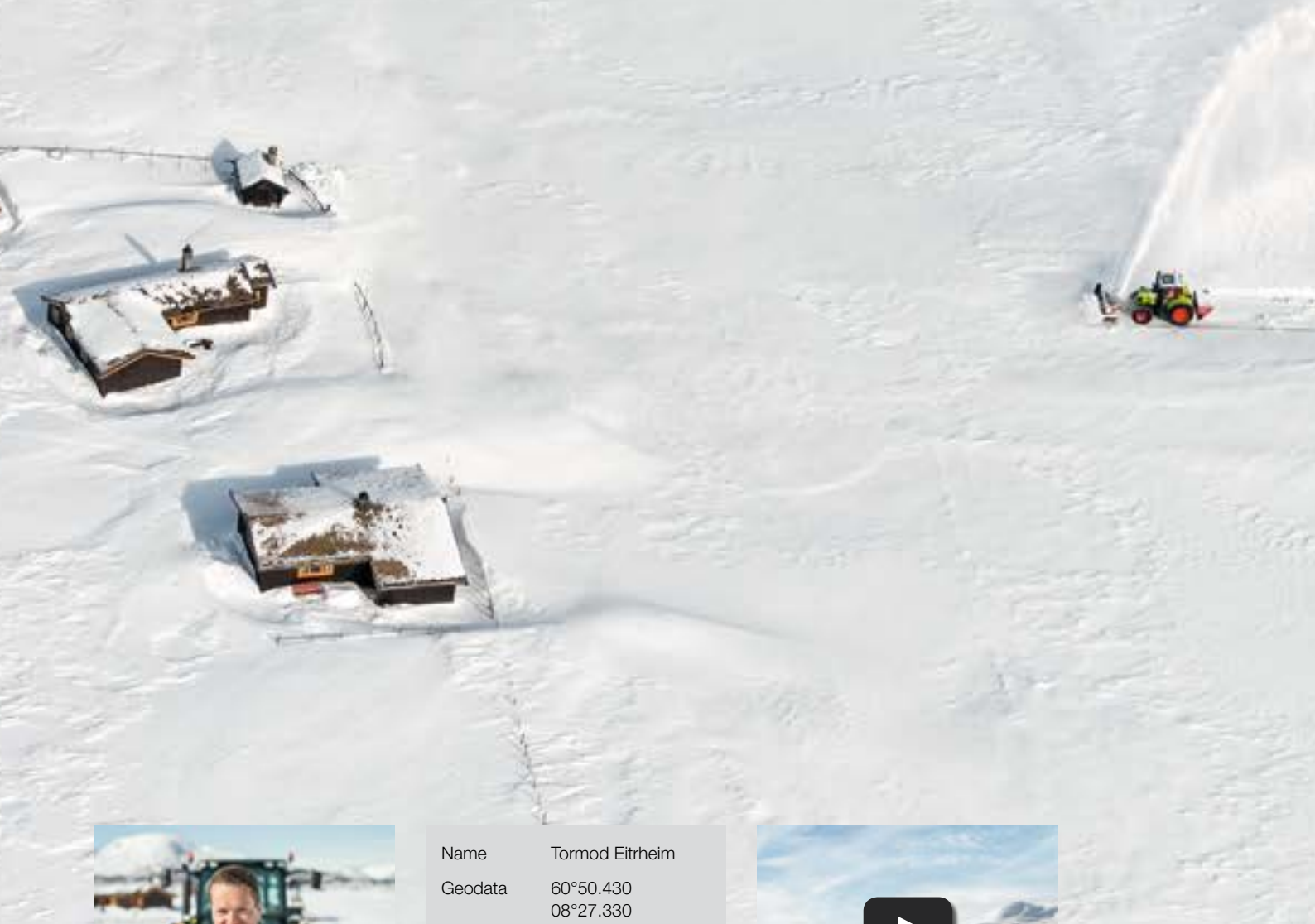
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# Research sheds light on viability of reseeding canola

**W**ESTERN Australian research investigating whether it is economic to reseed a canola crop that has established poorly suggests that in many cases it might not be worthwhile.

Department of Agriculture and Food (DAFWA) researcher Mark Seymour said trial results showed that sticking with low plant numbers sown early appeared to be an acceptable approach.

"But weeds could be a problem in canola crops that have low plant numbers as a result of poor crop establishment," he said.

As part of the 'Tactical break crop agronomy project', funded by the GRDC, Mark conducted trials last year aimed at determining the point at which reseeding a low density canola crop was worthwhile.

"Canola is often the first crop sown each autumn, but as the seed is small it is best suited to shallow seeding, making it susceptible to drying soil conditions," he said.

"If growers don't get a good break or follow-up rains they may have to consider reseeding two to three weeks later.

## Low plant density or sow again?

"The big question for growers is whether they should leave their low density crop – fewer than 10 plants per square metre – alone or reseed it."

The trials assessed sowing canola before or at the break of the season at plant densities of five, 10, 15 and 30 plants per square metre, compared with plots resown at 30 plants per m<sup>2</sup> over the top of five and 10 plants per m<sup>2</sup> and plots sown normally (not resown) at later dates at five to 60 plants per m<sup>2</sup>.

Mark said one of the trials saw the canola variety Pioneer 43Y23RR sown in the Northern Agricultural Region of WA on April 29, with about 90 per cent of plants establishing.

The second time of sowing at this site was May 16 when

conditions were drier and less favourable, resulting in about 40 per cent of plants establishing.

The resown plots involved the use of offset rows and seed was 'tickled in' to reduce damage to the earlier sown plants, with only 13 per cent of these plants establishing.

"As expected, the April sown plots out-yielded plots sown in May, at every comparable plant density," Mark said.

"In addition, April plots that had only five to 10 plants per m<sup>2</sup> produced equal or higher yields than later sown plots at higher densities.

"It is often difficult to reseed without damaging the plants that are already established, which suggests that in many cases it may not be economically viable to reseed low density canola crops under these conditions.

"These results are consistent with previous trials over a number of years which have shown that canola produces 60 to 80 per cent of its maximum yield at about 5 plants per m<sup>2</sup> and 80 to 90 per cent at 10 plants per m<sup>2</sup>."

## Don't compromise weed control

Mark said that while sticking with low plant numbers sown early appeared to be an acceptable approach, weed control could be compromised at these densities.

"In a plant density trial conducted by DAFWA at the Liebe Group trial site in 2013, we observed more annual ryegrass in triazine tolerant (TT) canola when the crop density was below 20 plants per m<sup>2</sup>, but plant density had no effect on ryegrass numbers in the Roundup Ready hybrid plots," he said.

"This indicates that if you have a competitive variety such as a RR hybrid and effective herbicides such as glyphosate, low crop densities will be less of an issue than for less competitive crops such as TT canola combined with – in this instance at least – a less effective herbicide system."



Trial results have provided information about whether it is worth reseeding canola that has established poorly, like this plot with fewer than five plants per m<sup>2</sup> (right) at Salmon Gums, Western Australia.





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# Fungicide tolerant blackleg – opportunity to screen your canola

**S**AMPLES of stubble from last year's canola crops are being sought from growers and advisers in the southern and western cropping regions to assist with research into fungicide tolerance in blackleg fungal strains.

Following the identification of blackleg isolates with tolerance to the fungicide fluquinconazole during a limited survey in 2014, further survey work is being undertaken to determine the distribution of the fungicide tolerant fungal strains, potential yield losses and how the tolerance may affect other fungicides.

With the support of the Grains Research and Development Corporation (GRDC), the National Canola Pathology Program will be surveying canola paddocks for fungicide tolerance in 2015.

As part of the survey, canola disease expert Steve Marcroft is seeking 2014 canola stubble samples from growers and advisers.

"We want to screen at least 200 stubble samples from the 2014 crop and from a wide range of regions," Steve said.

"To provide a sample for screening, growers are asked to simply collect 20 canola stalks from their 2014 crop, and record the cultivar name and fungicides used on the canola crop last year.

"We are happy to also screen stubble from crops that had no fungicide applied.

"Provision of paddock GPS is preferable but growers can just indicate the closest town for confidentiality purposes, if preferred."

Growers and advisers willing to provide stubble samples are asked to email Steve via [BlacklegMGP@gmail.com](mailto:BlacklegMGP@gmail.com) who will then provide a sampling protocol via email.

"We will screen the stubble samples and send the individual grower their result by the end of 2015 or earlier if possible. All data will be confidential and no names or farms will be reported."

There are no quarantine issues with fungicide tolerance.

In the meantime, Steve recommends that growers continue using fluquinconazole in 2015.

"But other blackleg management practices such as cultivar blackleg rating, separating crops from last year's stubble and rotation of cultivar resistance groups should be given a higher priority," Steve said.

Blackleg – a sexually reproducing pathogen – can cause severe yield loss in canola crops, but can be successfully managed through an integrated approach.

**More information on managing blackleg is contained in a GRDC Fact Sheet which can be viewed and downloaded at [www.grdc.com.au/GRDC-FS-BlacklegManagementGuide](http://www.grdc.com.au/GRDC-FS-BlacklegManagementGuide).**

**To view the latest GRDC grains research Update papers on blackleg and other canola diseases, visit [www.grdc.com.au/GRDCUpdatePapers](http://www.grdc.com.au/GRDCUpdatePapers)** ■



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**Steve Marcroft will be surveying canola paddocks for fungicide tolerance in 2015. (Photo: GRDC)**



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# Unprecedented insect pressure in 2014: What have we learnt?

■ By Alistair Lawson

**T**HE 2014 season was one long curve ball for grain growers in south-eastern Australia. A near-perfect start with good summer and autumn rain coupled with mild temperatures saw crops jump out of the ground. But, as it turned out, crops were not the only ones thriving under such conditions. Insect pests including green peach aphid (GPA) and the resulting beet western yellows virus (BWYV or synonym, turnip yellows virus) and diamondback moth (DBM) both proved headaches for growers at different stages of the growing season.

These pests – coupled with severe frosts and a spring drought – slashed the yield potential of many canola crops across South Australia, Victoria and southern New South Wales. But what did we learn from these experiences and how can we better manage our crops in future?

## GPA and BWYV in 2014

South Australian Research and Development Institute (SARDI) senior pulse pathologist Dr Jenny Davidson was in her office in early-June last year when she received a call about a problem with some canola crops in the lower north of SA.

"I went out and had a look and what I could see was canola seedlings from fence line to fence line turning purple and not growing," Jenny recalled. "Entire crops had been taken out and it looked like herbicide damage or nutrient deficiency, but there were crops behaving the same way on several farms, and growers and agronomists were talking about aphids and how many they had seen early in the season."

Damaged canola plant samples were sent to Dr Mohammad Aftab at the Department of Economic Development, Jobs, Transport and Resources (DEDJTR) at Horsham, Victoria, for virus testing. Every sample returned a positive test for BWYV.

The severity of the problem became even more apparent to Jenny when she and colleague, SARDI entomologist Greg Baker, spoke at a field day in the lower north at around the same time. They were expecting a handful of concerned growers to turn up, but ended up addressing a crowd of more than 100.

## The damage

"Just about every canola crop in the lower north was impacted by GPA and BWYV in some way or another," Jenny said.

But the lower north of SA was not alone. Across south-east Australia, from the Eyre Peninsula through to south-east SA, the

Victorian Mallee and southern NSW, 618 samples were sent to DEDJTR or SARDI, with about 40 per cent of those coming from SA regions (Table 1). Of the 618 tested from south-east Australia, 57 per cent of the crops were infected with BWYV. But 87 per cent of the crops that were tested from SA farms tested positive to BWYV.

While not every canola crop was infected or wiped out, Jenny says it was canola plants that were infected at the rosette stage which received the most severe damage.

"The crops that were infected at the rosette stage were the most severely damaged because the virus got into the phloem of the plant and prevented the translocation of nutrients and water throughout the plant," Jenny said. "Working on estimates, about 10,000 hectares of canola in SA was damaged to that level, as well as some isolated pockets of canola in southern NSW and the Victorian Mallee."

Jenny says less than about 10–15 per cent of canola in SA was very severely damaged and only yielded 500–600 kilograms per hectare, or 25 per cent of normal yield.

"Anything in that area would have been hit at an early stage. Just over half of the canola crops tested in SA yielded about one tonne per hectare or 50 per cent of normal yield. The hard thing



**SARDI entomologist Greg Baker says growers should start monitoring for DBM early in the year and work within the threshold guidelines in planning a control strategy.**

(Photo: Rebecca Jennings)



**SARDI senior pulse pathologist Jenny Davidson says the seasonal conditions in the first half of 2015 are contrasting to that of 2014, meaning the risk of GPA and BWYV is reduced this season.**

**TABLE 1: Incidence of BWYV in canola for SA regions in 2014 determined by virus testing of plant material at DEDJTR, Horsham**

SA district	Number of canola BWYV in 2014	
	Positive	Negative
Lower north	58	4
Mid north	10	0
Upper north	17	1
Lower Eyre Peninsula	36	18
Mid & upper Eyre Peninsula	36	8
SA Mallee	22	1
Yorke Peninsula	56	2
South East	16	5
Total (290)	251	39
	<b>86.55%</b>	<b>13.45%</b>





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**DBM is notoriously hard to control with insecticides because it is a periodic pest and has overlapping generations with the ability to rapidly develop resistance to insecticides.**

**Green peach aphid has been found to have widespread resistance to three chemical groups.**

is trying to figure out how much of that was BWYV, drought, frost and DBM, but there has been some work done in WA previously which estimates half of that yield loss comes from virus infestation – so about 15–20 per cent of yield loss from BWYV.”

### Why last year?

The weather conditions in 2014 played a big part in the incidence of GPA and BWYV in 2014. While both are quite common aspects of most cropping seasons, the weather in 2014 – good summer rain into autumn, combined with mild, almost subtropical temperatures – created a substantial green bridge for GPA to survive on over summer. This was also aided by the fact that there is a vast range of host broadleaf weeds for GPA.

“In May 2014 we had quite warm conditions,” Jenny added. “Looking at Bureau of Meteorology data from last year, across SA and into Victoria, May was about two degrees Celsius warmer than normal, which was when canola was emerging at the seedling stage. When there are warmer temperatures like that, the GPA population expands at an exponential rate.

“With higher temperatures there is increased replication of the virus in the plant – more than what there would normally be – which leads to stronger symptoms of BWYV in the plant.”

### Lessons for this year

So far, the weather conditions over summer and autumn in 2015 have been much less conducive to GPA than they were in 2014. Jenny says this means the risk of BWYV in crops this year is much lower than last year.

But one thing that was apparent from 2014 was the level of insecticide resistance among GPA populations. Dr Paul Umina from cesar and the University of Melbourne, is leading a Grains Research and Development Corporation (GRDC) funded project

looking at resistance levels in GPA populations across south-east Australia.

During autumn and spring in 2014, about 50 GPA samples were collected from SA, Victoria and southern NSW and screened for insecticide resistance. Paul says this revealed widespread resistance (Table 2) to the three chemical groups tested.

“Following DNA tests, aphids from all populations were found to be resistant to synthetic pyrethroids (SPs), such as bifenthrin and alpha-cypermethrin, and to carbamates, specifically pirimicarb,” he said. “The use of these insecticides is not expected to provide effective control against these GPA populations in the field.

“The field efficacy of organophosphates (OPs) is currently unpredictable. Some control may be achieved against populations found to be resistant, although the use of OP insecticides is risky and may not be effective, particularly if the population has been exposed to insecticides early in the season. When faced with GPA populations with known resistance to OPs, growers are advised to spray test strips within paddocks to determine field efficacy.”

A resistance management strategy for GPA is available from the GRDC website. Paul says growers should familiarise themselves with this strategy to ensure GPA are controlled in a strategic manner that will ensure the greatest possibility of preserving those insecticide products that are currently effective.

### Standing stubble helps

Another lesson from 2014 was that canola sown into paddocks with standing stubble helped to reduce the level of BWYV infection in the early stages of the season. Last year, Jenny says paddocks with standing stubble delayed the arrival of GPA into canola crops.

“In one of our field trials there was a paddock with stubble removed and stubble standing and there was a very clear line

**TABLE 2: Insecticide resistance in GPA**

Insecticide group	Example product names	Known resistance	Implications for GPA control
Pyrethroids (3A)	Astound Duo, Dominex Duo, Fastac Duo, Fastac Excel	Widespread	These chemicals are not recommended
Carbamates (1A)	Pirimor, Aphidex	Becoming widespread	Consider small strip field test to assess efficacy
Organophosphates (1B)	Dimethoate	Common	Consider small strip field test to assess efficacy
Sulfoxaflor (4C)	Transform	None	‘Best-bet’ option if widespread resistance present





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**TABLE 3: Insecticide resistance in DBM**

Insecticide group	Example product names	Known resistance	Implications for DBM control
Carbamates (1A)	Lannate, Marlin, Methomyl (Registration limited to certain states)	Expected, but not recently tested	Consider small strip field test to assess efficacy
OPs (1B)	Diazinon, Diazol (Registration limited to certain States)	Moderate-high, and widespread	Consider small strip field test to assess efficacy
SPs (3A)	Astound Duo, Dominex Duo, Fastac Duo, Fastac Xcel	High level and widespread	NOT recommended
Spinosyns (5)	Success Neo	Nil-very low	Recommended, rotate with other effective groups
Avermectins (6) (Affirm)	Affirm	Low-moderate	Recommended, rotate with other effective groups
<i>Bacillus thuringiensis</i> (11)	Delfin, Dipel	Nil	Recommended

where you could see the GPA had moved into the section with removed stubble first. If stubble is removed or there is a thin area of the paddock with smaller plants, that's where GPA will land first."

### DBM in 2014

Much like GPA, DBM thrived on the favourable weather conditions early in the 2014 growing season. In particular, the amount of brassica weeds and volunteer canola that germinated over the summer following good rain provided an ideal habitat for DBM populations.

The dry spring later in 2014 provided a further boost to DBM, according to Greg Baker.

"That lack of rain from August and throughout spring resulted in greater DBM survival in-crop," he said. "In many districts, DBM was reported to be increasing in abundance from late winter and, as spring progressed, the populations continued to climb. This resulted in greater spraying for DBM across the board than what occurs in most seasons."

### DBM damage and control

Greg says it is hard to gauge just how much yield loss DBM caused to canola crops across the southern region in 2014, as many crops had also been affected by GPA and BWYV which had impacted the yield potential of crops earlier in the season.

DBM is notoriously hard to control with insecticides because it has overlapping generations with the ability to rapidly develop resistance to insecticides (Table 3).

"Whenever you spray DBM barely half of the population will be in the susceptible larval stage – the rest will be eggs, pupae and adults, so it's a difficult target in terms of its age structure," Greg said. "And when you factor in its resistance development it makes it a challenging pest to control."

"We heard anecdotal evidence last year from respected agronomists that where there had been less spraying earlier in the growing season for GPA and other pests, the DBM didn't build up as rapidly or their populations plateaued below the economic threshold so growers didn't have to spray for DBM. By contrast crops treated with a heavier early spray program were more likely to require a DBM spray. Those agronomists were attributing that to the effect of the earlier spray treatments on the natural enemy populations."

### The 2015 outlook

Greg says the colonisation of DBM in canola crops this year looks to be at a lower level for much the same reason as the risk of GPA and BWYV is this year – a much drier summer and early autumn than last year and less of a green bridge on which to survive. But growers need to monitor the situation as the season progresses.

"Cold, wet winters tend to reduce and delay a spring build-up

of DBM whereas drier and warmer winter and early springs are conducive for DBM survival and population build-up," he said.

"While it is a favourable scenario for growers as we start the season, we can't be complacent because if warm and dry winter/spring conditions develop, DBM could still develop into damaging infestations come spring."

Greg said growers should start sweeping for DBM around early bolting and work within the threshold guidelines (Table 4) in planning a control strategy.

**TABLE 4: DBM threshold guidelines by crop stage**

Crop stage	Moisture stress	DBM larvae threshold
Pre-flowering	Y	30 per 10 sweeps
	N	50 per 10 sweeps
Early to mid-flowering	Y	>50 per 10 sweeps
Mid to late-flowering	Y	>100 per 10 sweeps
Pod maturation	Y	200 per 10 sweeps

#### More information:

Jenny Davidson, 08 8303 9389, [jenny.davidson@sa.gov.au](mailto:jenny.davidson@sa.gov.au)

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Paul Umina, 03 9349 4723, [pumina@cesaraustralia.com](mailto:pumina@cesaraustralia.com)

## PROJECTS UNDERWAY

The GRDC is funding a number of DBM projects.

#### ■ DBM control and insecticide resistance management

**(SARDI):** Tracking resistance levels to various insecticides in populations across western and southern Australia and facilitating the registration of new chemistries.

#### ■ Regional movement of DBM and colonisation of canola in southern Australia (University of Adelaide):

PhD project to improve the understanding of movement of resistance types within a population to manage resistance, and learn more about timing and sources of colonisation to better predict which seasons will present a risk of DBM damage.

#### ■ Options for improved insecticide use and canopy penetration in canola (University of WA):

investigating spray coverage and canopy penetration in canola, including a trial to be run this spring in the southern region.

#### ■ Attract and kill technology for Diamondback Moth

**(University of New England):** Investigating the potential of a product with a food attractant to draw the moths with a toxicant which will provide a lethal dose of insecticide.



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# Trials provide further evidence of potassium benefits

**A** STUDY has confirmed that potassium applied early in the growing season can boost wheat yields during drought, and has provided further evidence of the need to maintain adequate levels of this nutrient.

The recently published Western Australian research also showed that while there may be reduced plant demand for potassium on mildly saline/sodic land, potassium fertiliser can improve barley plant growth on more moderately saline, potassium deficient soils.

"Results from the study have highlighted the importance of applying adequate rates of potassium early in the season which can result in significant benefits including protecting crops against drought," Murdoch University researcher Richard Bell said.

"Growers are encouraged to use soil tests to help identify which soils will respond to potassium fertiliser."

The study results were among information presented to researchers and consultants at recent potassium seminars.

The events, held at Northam, Katanning and Albany, were supported by the Grains Research and Development Corporation (GRDC) and the Belgium-based Sulfate of Potash Information Board.

Richard said the study, conducted in recent seasons, assessed if more potassium was required for optimal growth and yield of cereal crops under dry and saline conditions.

The work was conducted by Murdoch University and

Department of Agriculture and Food (DAFWA) researchers as part of the GRDC's *More Profit from Crop Nutrition* program.

Richard said one of the trials produced the unexpected result of applied potassium fertiliser boosting wheat yields only at the dry trial site (Dowerin), but not at the wetter sites (Bolgart and Borden).

This was despite soils at all three locations being deficient in potassium.

"At Bolgart and Borden, where good growing season rainfall was received, we expected but did not achieve a yield increase from potassium fertiliser," Richard said.

"This was most likely because a continuously moist soil profile during the year allowed for greater root uptake of potassium, which is a highly mobile nutrient.

"These results suggest that while a grower might not incur a yield penalty from low potassium levels when rainfall is evenly spread during the growing season, sufficient potassium levels under drought conditions are very important.

"In wheat, potassium deficiency during drought can reduce root growth in particular, which decreases access to soil potassium and is likely to increase the severity of deficiency symptoms."

The research also indicated yield benefits from applying potassium fertiliser early to cereal crops – within four weeks of sowing.

Richard said another trial conducted as part of the study found that adequate potassium helped barley plants tolerate moderate levels of salinity.

"On these moderately saline soils, yields were improved by increasing the potassium rate through applying sulphate of potash rather than muriate of potash (chloride toxicity from higher muriate of potash rates was possibly detrimental)," he said.

## Deficiencies becoming more common

Richard said potassium deficiencies were increasingly common on WA's sandplain soils and sandy duplex soils due to greater removal of the nutrient through increased hay, grain and straw production.

"Growers are realising that they need to maintain levels of this nutrient in their soils and are applying potassium fertiliser early in the growing season, sometimes before sowing," he said.

Richard said other recent research suggested that growers could often achieve increased profits by subsoil testing for potassium at depth (to 30 cm).

"Potassium fertiliser applied to soils with marginal potassium levels (40–50 mg/kg) in the 0–10 cm layer of the soil may not achieve increased yields if higher potassium levels are available at depth," he said.

Richard said consultants attending the potassium seminars were interested to find out maximum safe levels of banded potassium that could be applied at sowing in medium to low rainfall areas.

"James Easton, of CSBP, said field trials indicated that 15 kg of potassium per hectare could be safely applied and even higher rates were generally safe, provided that seed and fertiliser were separated in the drill row," Richard said.

More potassium research is being conducted this year, including trials to help determine if extra potassium can alleviate frost damage in wheat.

For more information about wheat nutrition and fertiliser, access the GRDC Wheat GrowNote at [www.grdc.com.au/GrowNotes](http://www.grdc.com.au/GrowNotes)



Wheat showing symptoms of potassium deficiency.



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# The day the earth SHOOK!

■ By Ian M. Johnston

**N**O – it was not an earthquake. Nor was it an asteroid collision. Not even a tsunami. The shaking of the planet was caused by tractors! And if you don't believe me and think I must have been hallucinating, then read on!

## The event

The occasion was Easter weekend 2004. The venue, a paddock near Cootamundra, where Australia's reputation for integrity, ingenuity, probity, absurdity and larrikinism was on the world stage. News editors around the world's capitals had the headlines put on hold, awaiting the outcome of this global event! Spy stealth satellites hovered unseen overhead. Watchful tall thin men, hiding behind dark sunglasses dressed in equally dark suits and dark hats, mingled with the crowd imagining they would remain unnoticed, but in fact might have well had signs around their neck spelling out FBI, OSS, M.I.4 or whatever.

So what was occurring that Easter weekend at Cootamundra? A world shattering event – that's what! No less than an international challenge by Australia to win The Guinness World Record for the greatest number of tractors ploughing simultaneously in the one paddock. So would the number have to be around 10, 20, 50 or could it be as many as 100? Guess again! The Irish held the world record at a whopping 1833!

We Aussies had to do better. A challenge indeed!

Some uncharitable souls suggested the Irish had only achieved that figure as a result of an inducement of a dozen free bottles of Harp lager for each contestant. They said that Ireland tilted to the south that day, as the only field sufficiently capacious was situated near Cork. It was further alleged that most of the tractors were Grey Fergies, on account of their slow road speed enabling their drivers to weave their inebriated way home without attracting the attention of the constabulary! (Only joking).

## Chaotic Cootamundra on Good Friday

Possibly because no one else was daft enough to take on the job, I was recruited by the organisers Vic Muscat and Brian Sainsbury, to do the commentating over the two days. What I was not told was that in order to have a necessary panoramic view of the proceedings, I would be elevated aloft in a wobbly hair raising scissor type contraption, the inspection of which by a work safety guy would have had it condemned to the nearest meltdown joint. I do not enjoy heights. In my view, ladders are things to walk under – not climb!

I arrived at the site on Good Friday to an unforgettable spectacle. Hundreds (and I mean hundreds) of trucks of all description, loaded with tractors, were either lining up patiently at the unloading ramps, lining up impatiently on the approach roads or clogging the main highway causing motorists and truckies, who had nothing to do with anything, to lose their patience.

Vic Muscat was weighted down with a gaggle of walkie talkies, each of which seemed to demand his urgent attention. Brian Sainsbury kept tearing off on a quad bike in an endeavour to direct the incoming trucks and plead with their drivers not to yarn at the unloading ramps, but move on and park their unloaded vehicles elsewhere.

But magically, a pretty lady with a welcoming smile and the stoicism of a New York cop, was creating order out of the mayhem. She warmly greeted and registered each arrival. By late afternoon over 1000 trucks had been unloaded and parked. Tractors of all descriptions were being fuelled, fixed, polished, cursed or seemingly abandoned. And this was only Friday!

Legions of tractor drivers, plus their wives and kids, were reunited with old friends, made new friends or simply dozed off following a long drive. Many had travelled from interstate and there was even a group who had journeyed from South Africa and brought their tractor along for the ride! Great stuff!

There were quite a few Brits in the crowd. In the main they



A batch of the arriving tractors being lined up. (Photo IMJ)



Early Sunday morning – the tractors await patiently. (Photo IMJ)





**They're off! Note the brave New Zealand journalist getting up close for a photo. (Photo IMJ)**



**The dust rises. (Photo IMJ)**

## Saturday

Saturday was only a fun day, with the actual world record attempt not scheduled until the Sunday. So a competitive tractor pulling contest had been organised.

Frankly I consider such competitions with a jaundiced eye, in much the same way as I do rodeos, camel racing and er – cock fighting. You see these grand old tractor classics entered into these events, many of which have survived for around a century, are routinely subjected to having massive weights attached to their driving wheels in order to gain additional traction, tyres

were a sullen lot. You see their cricket test team were getting used to being beaten by we Aussies. But more importantly, the attempt some months earlier by UK tractor enthusiasts to wrench the Guinness record from the wild Irishmen, had ended in a dismal failure! They could only marshal 771 tractors, despite the encouragement from all the Earls, Lords, Bishops and the new gentry (foreign speaking Squires) throughout the Realm, who magnanimously offered cups of tea to each contestant should they win!

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**They kept coming! Note the shadow of my scissor platform. The guy with me had the walkie talkie and relayed the numbers, which I passed on via the microphone to the spectators. (Photo IMJ)**

deflated to possibly six or seven psi (for the same reason) and engine governors 'worked over.' But worst of all – red neck drivers – the sort who would flog an old horse, thrash their poor old tractors mercilessly in an endeavour to outpull their rivals. Engines roar and black smoke pours from exhaust stacks.

OK so maybe that is a bit over the top. Perhaps I am just a softy who cares for old tractors. Anyway, I did the commentary from my perch but probably, despite the scores of loud speakers positioned around the ground, could not be heard over the protesting screams from the engines.

## Sunday – and the earth shook!

Another blistering hot day, not welcomed by farmers in the area praying for rain to end the drought. Not welcomed by me, aloft in my perch with only my old battered Akubra for shade.

By 10 am around a thousand tractors had been lined up like regiments of North Korean troops. Not nearly enough! But still convoys of trucks kept arriving with their colourful tractors and still the welcoming Red Lady signed them in and told the operators where to go – politely of course.

In between swigs of bottled water, I kept the crowds of spectators informed of the numbers and generally how things were shaping up. An obnoxious Irishman positioned himself in the shade below my roost and proceeded to yell up to me indicating we Aussies would never beat the Irish. I was tempted to pour the contents of one of my water bottles over him. But why waste water?

By high noon around 1500 tractors were lined up patiently awaiting the fire truck siren, which would be the 'go' signal. But remember, to defeat the Irish we required 1833. Still the trucks arrived. Delay the starting time from 2 pm until 3 pm and cross all fingers and toes! So I made the announcement – the start would be delayed. The Irishman laughed and shouted something quite vulgar which, being a gentleman I cannot repeat!

An hour later it was 1 pm and still we were approximately 200 tractors short! Stewth! Desperation time. I endeavoured to hush everyone and begged them to listen to my appeal. I urged all local farmers who had arrived tractorless to immediately hi-jack a truck with its driver and rush home, forgetting about speed limits, load a tractor and hasten back to the ground – immediately.

The response was amazing! Empty trucks raced away in all directions, and it seemed in no time at all they charged back into

the ground with the weirdest assortment of tractors imaginable. I deliberately did not notice that a few patriotic Aussies had returned with ride-on lawn mowers and even a grader or two. Who cared? The Irishman did, judging by his jumping up and down, accompanied by his shouting protests. But as everyone knows I am hard of hearing (too many hours driving a Chamberlain Super 90)! So I ignored him, but not before extending a friendly two finger wave!

It was actually 4 pm before the organisers gave the signal to the fire truck. The earth literally shook and the roar of exhausts could probably have been heard back in Sydney. (Acid rain reportedly fell on New Zealand the next day).

There were 1897 tractors of all types, each pulling an alleged plough, which commenced their crawl across the landscape! What a spectacle! The drivers were ecstatic. They waved and cheered as did the spectators. But the resulting dry red dust rapidly blocked out the sun and soon the tractors were all but hidden from view.

We Aussies had done it! We were now proudly the holders of The Guinness World Record for the greatest number of tractors ploughing in a single paddock – simultaneously!

Of the Irishman, there was no sign!

And yes, *The London Times* did feature the event! ■

## IAN'S CLASSIC TRACTOR QUIZ

A score of 8 or above would be considered excellent and reveal an indepth knowledge of classic tractors. Five or over is still a good result. If in doubt, by applying logic, quite possibly the answer will become obvious. Or maybe even an educated guess? (Consulting Google would be cheating!) Good luck and have fun – *Ian M Johnston*.

1. The Massey Ferguson MF 30 was manufactured in which country –  
**Turkey, South Africa or France?**
2. In 1953 the Ota Monarch lightweight tractor was taken over by which car company –  
**Morris, Jowett or Daimler?**
3. Which Australian firm produced a 4 wheel drive industrial tractor named 'The Crab' –  
**Conquip, Cranvel or Toft?**
4. The 411R was a model of which tractor –  
**John Deere, Nuffield or Fiat?**
5. Which British tractor firm produced a range of Oliver tractors for the USA market –  
**David Brown, British Leyland or Fowler?**
6. Name the German equivalent of The Nebraska Test –  
**Marburg Test, Hanover Test or Dusseldorf Test?**
7. The Best and Holt tractor firms amalgamated in 1926 to form which company –  
**White, Caterpillar or Moline?**
8. Which early American tractor firm is often credited (wrongly) as coining the term 'tractor' –  
**Hart Parr, Wallis or Emerson Brantingham?**
9. International Farmall tractors entered production in which year –  
**1924, 1934 or 1944?**
10. Farmliner tractors were manufactured in which Communist State –  
**Czechoslovakia, Romania or Poland?**

See answers on page 56.



## ASK AN EXPERT – HOW CAN I USE A MECHANICAL TACTIC AS THE SECOND KNOCK?

■ With Michael Widderick, Principal Research Scientist (Weeds), QLD DAF

**T**HE idea of a double knock for weed control is to use one tactic – usually a herbicide – to kill the majority of weeds and follow-up with another tactic – usually a herbicide from a different mode of action group – to kill any survivors. Our question this issue considers the possibility of using a non-herbicide tactic as the second knock in a low weed density situation.

Dr Michael Widderick says using a non-herbicide tactic to remove potentially herbicide-resistant survivors is a valuable addition to a weed management plan.

“We know that reliance on herbicides alone is not a wise approach,” he says. “Recent history in Australia proves that herbicide resistance will occur when herbicides are used repeatedly. The more diversity in weed control methods, the longer we will have access to effective herbicides.”

Non-herbicide tactics that can be used to eliminate survivors of a herbicide treatment in crop are harvest weed seed control (such as narrow windrow burning, chaff cart), grazing or slashing and hay making. In a fallow, the best option might be targeted cultivation. Remember it is all about controlling low density populations of survivors.

“A herbicide double knock is all about timing and relies on



**Dr Michael Widderick, Principal Research Scientist (Weeds), Queensland Department of Agriculture and Fisheries says new technology could make it easier to incorporate a non-herbicide option into the highly effective double knock weed control tactic.**

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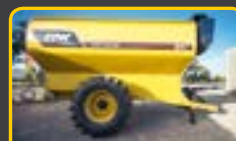


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Manual removal of low density weed populations may be a case of a 'stitch in time'.

## HOW TO ASK A WEEDSMART QUESTION

Ask your questions about using non-herbicide treatments in a double knock to manage herbicide resistant weeds on the WeedSmart Innovations Facebook page <https://www.facebook.com/pages/WeedSmart-Innovations/354441941389122>, 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.

using the second knock while weeds are still small," says Michael. "With a non-herbicide second knock the timing is less critical, provided surviving weeds are not permitted to set seed."

### How effective is cultivation in a zero-tillage system?

**Short answer:** Very effective.

**Longer answer:** In a double knock, the majority of weeds are killed with a first knock of herbicide, leaving a low density of weeds. These weeds can then be chipped or pulled and small patches can be cultivated without disturbing the rest of the paddock.

### Are there any new technologies that avoid manual chipping?

**Short answer:** Yes, two exciting new projects are in progress.

**Longer answer:** Low density can still mean a fairly large number of weeds, especially if you plan to chip them out. Two new projects are aiming to mechanise the identification and removal of weeds using non-herbicide methods. The first is a Department of Agriculture and Fisheries funded project at the Queensland University of Technology that is investigating ways to use robotics to find weeds and either microwave or chip them out. The second is a Grains Research and Development Corporation funded project that plans to build and test a set of quick-release individual tyne mechanisms for use on weed detector technology booms.

### Is harvest weed seed control a valid second knock?

**Short answer:** Yes, because it prevents surviving weeds from setting seed.

**Longer answer:** Harvest weed seed control methods include narrow windrow burning, chaff carts, direct baling and the Harrington Seed Destructor. All these methods provide a high level of weed control by collecting and destroying weed seeds present at harvest. Some weeds shed their seeds before harvest and may be better controlled with hay making, grazing or slashing and green manuring. These methods may be required if herbicide resistance has become a problem and there are too many survivors in crop.

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## The double knock is a great place to start



### Knock knock

Who's there?

Little old lady

Little old lady who?

I didn't know you could yodel!

It is double knock season in Australia. Glyphosate resistance has been confirmed in many fields across the country in at least 10 weed species. Public enemy number one is the world champion of herbicide resistance, annual ryegrass. Glyphosate resistant ryegrass has been confirmed in hundreds of fields in Australia and is suspected in thousands.

The double knock technique of glyphosate followed by paraquat is a very useful tool...when done right. The right sequence – glyphosate followed by paraquat; the right timing – anywhere from one to 14 days between knocks; the right rates – full rates of both herbicides.

Does it work for glyphosate resistant ryegrass? Yes. But you have to do it right, plenty of paraquat at the right time.

Unfortunately paraquat may be in short supply in some areas of Australia this year. Where this is the case we must prioritise where we use it and be prepared by having product on farm.

### Knock knock

Who's there?

Ryegrass

Ryegrass who?

**Glyphosate resistant ryegrass coming to a paddock near you if you don't do something about it.**

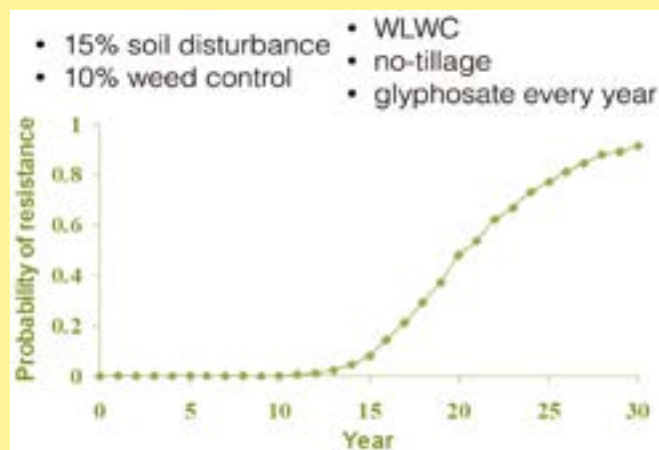
The double knock is a great place to start.

**F**ORMER AHRI researcher, Paul Neve (now based at Rothamsted Research) and Art Diggle from the Department of Agriculture and Food of WA built a computer model in 2003 to determine the probability of glyphosate resistance evolving for a range of knockdown strategies. Their model appears to be quite accurate.

The model predicted that after 12 to 15 years of continuous glyphosate the probability of resistance began to increase. Twelve years on and glyphosate resistant ryegrass is starting to escalate in Australia, just as the model said it would if we over-relied on glyphosate. The model ran a Wheat: Lupin: Wheat: Canola rotation sown with no-till seeding equipment.

Paul and Art also modelled some alternative strategies. Firstly,

**FIGURE 1: Annual glyphosate and no-tillage**



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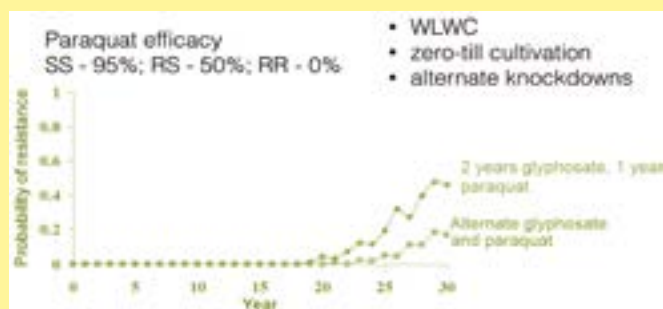
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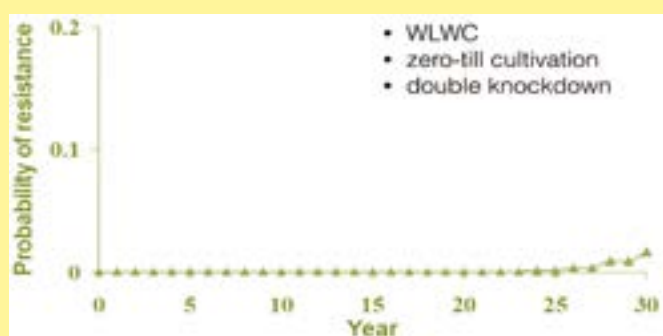
rotating between glyphosate and paraquat. This certainly reduced the probability of glyphosate resistance evolving.

**FIGURE 2: Annual glyphosate and paraquat**



Secondly, they modelled using the double knock technique – glyphosate followed by paraquat.

**FIGURE 3: The double knockdown**

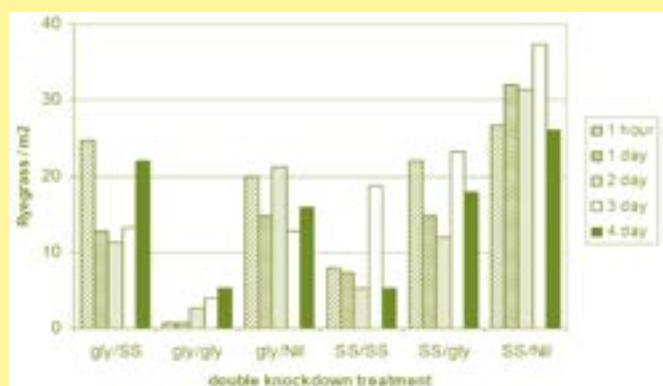


The computer model certainly suggests that the double knock technique is a winner. One could argue that the model was pretty accurate when it came to predicting the evolution of glyphosate resistance under a continuous glyphosate regime. This gives us some confidence that the model can accurately predict how good the double knock is to prevent the evolution of glyphosate resistance.

### Timing between knocks

What is the ideal timing between knocks? Back in the day, the recommendation was to apply the second knock five to 10 days after the first. But growers found that in some situations they were ready to seed before five days was up – hence the

**FIGURE 4: Surviving ryegrass (plants per m<sup>2</sup>) for a range of double knockdown treatments with varying intervals between knocks**



Gly = glyphosate 540 @ 900 mL/ha; SS = Spray.Seed (paraquat/diquat) 1.4 L/ha.

question – what is the shortest interval between knocks without compromising weed control?

Following is a quick review of a number of research trials.

The trial summarised by Figure 4 was conducted by Peter Newman in 2003 while working at DAFWA with GRDC funding.

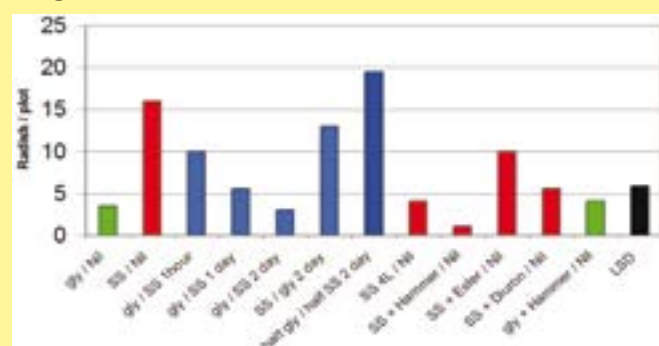
Ryegrass at the site was three to four leaf (623 per m<sup>2</sup>) and capeweed (116 per m<sup>2</sup>) was 5 to 15 cm diameter. Gly/SS refers to glyphosate followed by Spray.Seed and so on at various intervals between knocks from one hour to four days. This trial shows that all knockdown intervals worked for ryegrass.

Excellent growing conditions persisted and the Spray.Seed rate was more than adequate. Keep in mind that this ryegrass is not glyphosate resistant. The trial also shows that applying Spray.Seed first in the sequence worked well, but as you will see later, this is not the case for capeweed.

The trial shown in Figure 5 was also conducted by Peter Newman while working at DAFWA with GRDC funds in 2004.

This trial looked at a range of single and double knockdowns for large wild radish (up to 60 cm diameter). This trial shows that following glyphosate with Spray.Seed within one day can antagonise glyphosate. It is likely that the Spray.Seed shuts the plant down before glyphosate has had a chance to translocate.

**FIGURE 5: Surviving wild radish for a range of single and double knockdown treatments**



Gly = glyphosate540 @ 1.2 L/ha; SS = Spray.Seed 2 L/ha; Ester = 2,4-D Ester 80.

One day between knocks is OK, but two days is better. The trial also shows that Spray.Seed first in the sequence is a bad idea – as is half rates of herbicide – and there are a number of ways to kill large wild radish with Spray.Seed mixes.

This trial shown in Table 1 was also conducted by Peter

**TABLE 1: Double knock timing research, 2004**

Surviving grass weeds (plants/m <sup>2</sup> )				
Double knockdown treatment	Nil cultivation	Knife points	Full cut	Average
Nil/Nil	92	88	103	94
Gly/nil	0	0	0	0
Gly/SS 1 hour	43	12	5	20
Gly/SS 1 day	0	0	0	0
Gly/SS 2 day	1	0	0	0.2
SS/Nil	27	5	4	12
SS/Gly 2 day	39	20	6	22
LSD 5%	14	14	14	4

Note: Gly/SS 1 hour = glyphosate followed by Spray.Seed 1 hour later and so on for other treatments.  
Gly = glyphosate540 @ 1.5 L/ha; SS = Spray.Seed 2.4 L/ha.



Newman while working at DAFWA with GRDC funds in 2004. The grass weeds in this trial were primarily large tillering barley grass. Once again, glyphosate followed by Spray.Seed is the best sequence with one or two days between knocks. One hour between knocks was too close and Spray.Seed benefited from cultivation after spraying.

### Does it work on glyphosate resistant weeds?

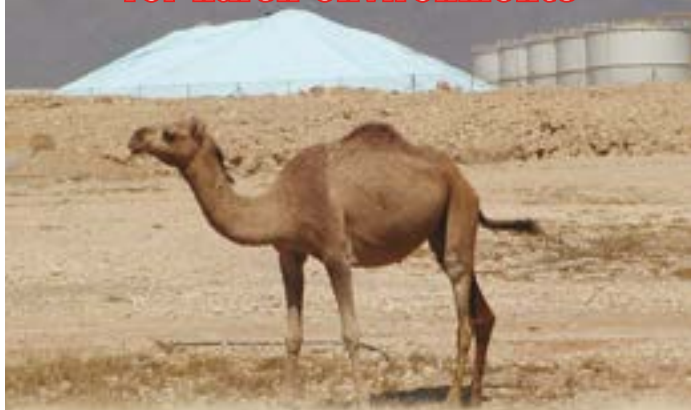
All of the trials discussed to this point were conducted on glyphosate susceptible weeds.

So begs the question – will the double knock work on glyphosate resistant weeds? This is the whole idea after all.



The 2004 Liverpool Plains' field trial was ground breaking. This was the first field trial to look at 'double knock' to control glyphosate resistant ryegrass. The results were graphic. On the left is resistant ryegrass sprayed with 1.2 L/ha glyphosate. On the right is the same plot after the double knock treatment using paraquat as the second knock.

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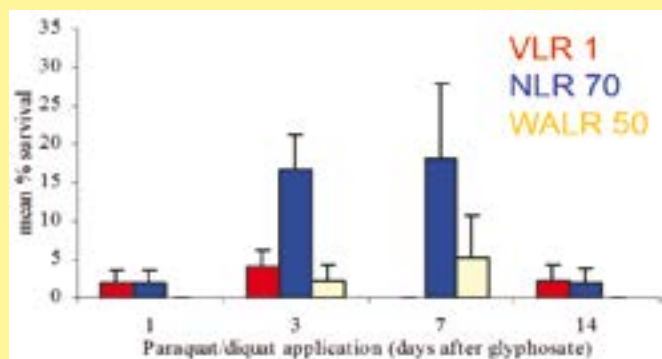
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**FIGURE 6: Timing between knocks with resistant ryegrass**



The pot trial shown in Figure 6 was conducted by Paul Neve while working at AHRI with GRDC funds. He tested three populations of ryegrass. VLR 1 is susceptible. NLR 50 is a glyphosate resistant population from NSW. WALR 50 is a glyphosate resistant population from WA.

This trial has the potential to make life hard! It shows that perhaps the best interval between knocks for glyphosate resistant ryegrass is either one day or 14 days – and not the period in between. But a higher Spray.Seed or paraquat rate may fix this problem. This pot trial was conducted on grass weeds that were four weeks old. The same pot trial was conducted on three week old ryegrass and all knockdown intervals worked well.

### Ground breaking field trial

The next trial was truly ground breaking stuff. This was the first double knock field trial (Table 2) to be conducted on glyphosate resistant ryegrass. The trial was conducted by Andrew Storrie, Agronomo consulting (formerly NSW DPI) and Tony Cook, NSW DPI. This 2004 trial concluded that the double knock certainly does work on glyphosate resistant ryegrass. The trial also showed that Spray.Seed followed by Spray.Seed gave 100 per cent control of glyphosate resistant ryegrass. This is not a double knock, but it is a useful salvage option for glyphosate resistant weeds.

Andrew Storrie commented that the key is to ensure that the paraquat or Spray.Seed rate is high enough. Don't skimp on the second knock.

**TABLE 2: Double knockdown field trials with resistant ryegrass – Liverpool Plains 2004**

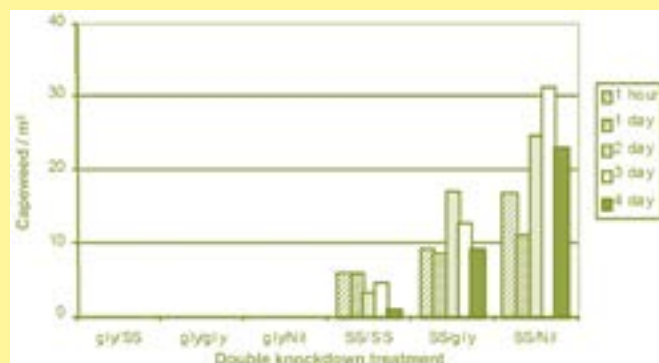
Application Time 1	Application Time 2	Application Time 3	% control of annual ryegrass
1.6.2004	9.6.2004	15.6.2004	
Ryegrass at 2.5 leaf stage	Ryegrass at 3 to 4 leaf stage (very early tillering)	Ryegrass at 4 leaf stage (early tillering)	
Gly		Para	100
Para		Gly	98
Gly		SS	98
SS		Gly	96
Para	Para		100
SS	SS		100
Gly			62

Where Gly = glyphosate 450 at 1.2L/ha; Para = Paraquat 250 at 1.5L/ha; SS = Spray.Seed 250 at 1.5L/ha

### The herbicide sequence

Glyphosate first is the best sequence for the double knock. In some trials, grass can be controlled well when paraquat or Spray.Seed is applied first but it doesn't work for broadleaf weeds. The data shown in Figure 7 is from the 2003 trial by Peter Newman already mentioned above. All of the capeweed died when glyphosate was applied first in the sequence but it did not when Spray.Seed was applied first.

**FIGURE 7: Surviving capeweed (plants per m<sup>2</sup>) for a range of knockdown treatments with varying intervals between knocks**



### Lethal rates are imperative

It is imperative that lethal rates of herbicide are used for both knocks. The whole idea of the double knock is to ensure that no resistant weeds survive. Cutting the rate of either of the knocks jeopardises this.

The starting point for paraquat as the second knock on annual ryegrass should be 1.5 L/ha and 2 L/ha for Spray.Seed for three leaf plants increasing with plant size and time between knocks.

For glyphosate resistant weeds, it is imperative that the paraquat or Spray.Seed rate is adequate to completely control the weeds based on when they germinate.

### Prioritise your fields

In the ideal world, the double knock would be applied to every field every year. But this is not always possible, particularly given the likelihood of paraquat shortages in some years. Below is a priority order list of fields that are best suited to the double knock:

1. Fields where glyphosate resistance has been confirmed or is suspected;
2. Fields that will be sown to a glyphosate tolerant crop this year eg. Roundup Ready;
3. Fields that were glyphosate tolerant crops or glyphosate chemical fallow last year;
4. Fields with high ryegrass burden;
5. Fields with weed species that benefit from the double knock for good control e.g. Fleabane (*Conyza* sp.); and,
6. The list could go on forever, but you get the picture.

Plan to double knock the fields listed above and make sure that you have product on hand.

### In a nutshell

Computer modelling and farmer experience shows that the double knock works. Remember...

- Glyphosate first.
- At least one day between knocks – two or more is ideal.
- Plenty of paraquat or Spray.Seed with excellent application.
- The double knock works on glyphosate resistant weeds, but don't skimp on the rates.





## THE RESEARCH VIEW

# Research queries N losses under northern conditions

### AT A GLANCE...

- Research on northern-grains region cracking clay soils found that fertiliser nitrogen (N) losses via ammonia volatilisation may not be as high as previously thought.
- Surface application of nitrogen fertilisers, applied either pre-sowing or in-crop, risks gaseous loss of the applied N via ammonia volatilisation but the magnitude of N loss in northern grains region had not previously been measured.
- The amount of N lost is affected by a number of factors including fertiliser compound, fertiliser form, type of application, timing of application, soil properties, rainfall amount and intensity, and the temperature and windiness after application.
- A rethink on fertiliser application practices could save time and operational costs.

**G**RAIN growers in Australia's northern cropping belt could save valuable time and operational costs by rethinking their fertiliser application practices, with research showing that fertiliser nitrogen (N) losses via ammonia volatilisation may not be as high as previously thought.

Northern growers typically apply nitrogen fertilisers such as urea directly into the soil (banding) or broadcast it on the surface then incorporate.

This is done to reduce the potential for ammonium-containing (eg. sulfate of ammonia) or ammonium-producing (eg. urea) fertilisers volatilising into the atmosphere as the gas ammonia.

Ammonia volatilisation is a chemical process that occurs at the soil surface when ammonium ions are converted to ammonia gas at highly alkaline pH – as occurs when urea is converted to ammonium.

The quantity of N lost as ammonia depends on a range of factors including fertiliser compound, fertiliser form, type of application, timing of application, soil properties, rainfall amount and intensity, and the temperature and wind after application.

Global estimates for ammonia volatilisation losses from fertiliser average 10–19 per cent of the N applied across all soil types, with an average of seven per cent loss in industrialised countries like Australia.

But losses at the paddock scale can be much greater with losses nearing 40 per cent recorded under some extreme conditions.

Previous research in southern Australian cropping soils has

## Consultants' Corner

Consultants' Corner is an initiative by *Australian Grain* highlighting current GRDC-funded research with a particular focus on the commercial implications of adopting cutting-edge research.

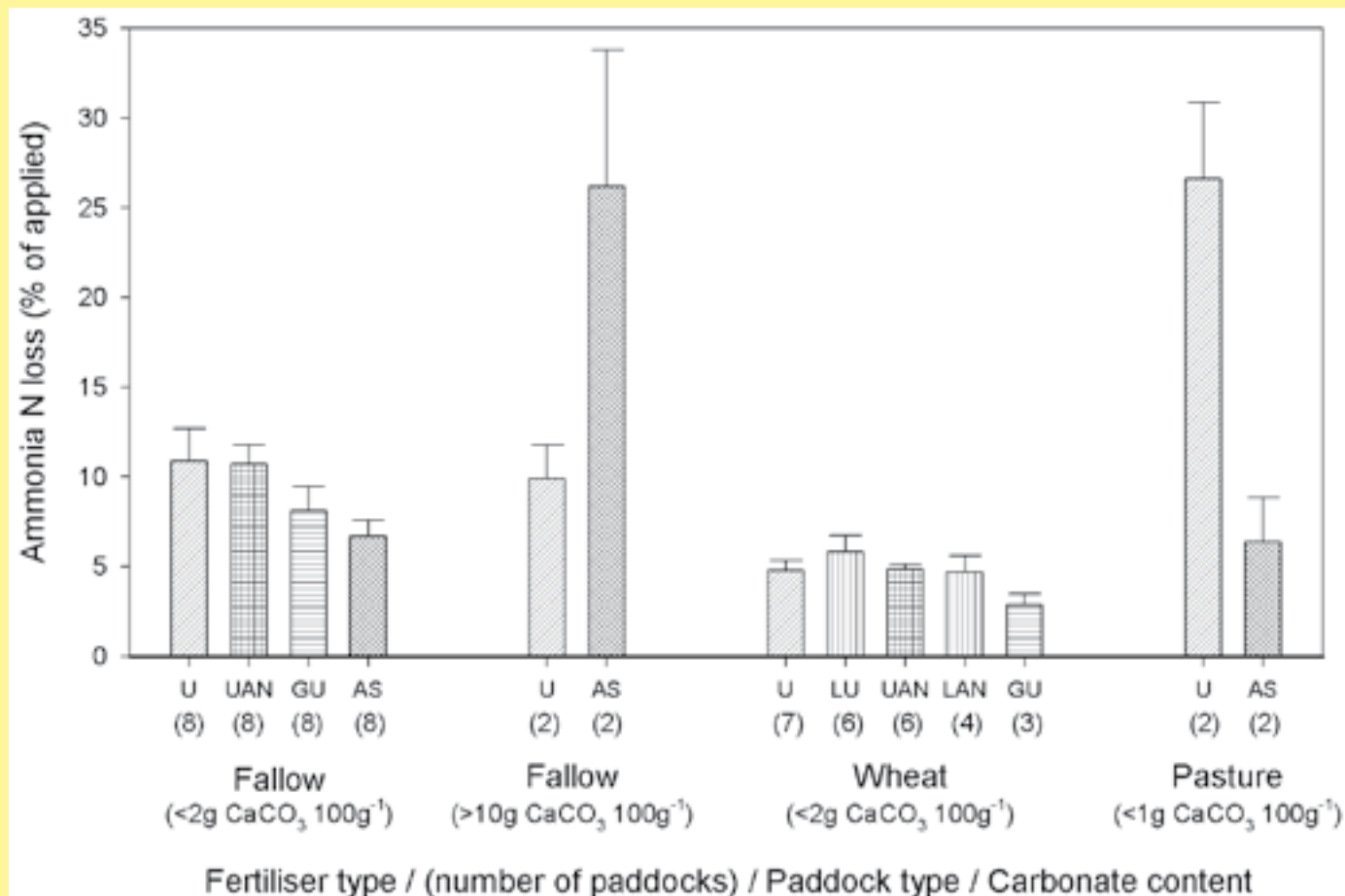
shown N losses ranging from 1.5–25 per cent with highest losses recorded on soil fertilised soon after rain or from paddocks with a substantial ashbed from burning of rice stubble.

In the northern grains region it is commonly accepted that



**Dr Graeme Schwenke has researched nitrogen volatilisation under northern conditions.**

**FIGURE 1: A summary of the cumulative N loss via volatilisation in this study, grouped by paddock type and fertiliser type, in 19 separate paddock experiments (219 site-months data)**



Bars are means (+ standard error) of results from 2–8 paddock experiments (number of paddocks in each group is given under bar). U = urea, UAN = urea ammonium nitrate solution, GU = Green urea®, AS = ammonium sulfate, LU = urea solution, LAN = ammonium nitrate solution.

surface application risks gaseous loss of the applied N via ammonia volatilisation – but the magnitude of N loss from soils had not previously been studied.

Dr Graeme Schwenke from the New South Wales Department of Primary Industries (NSW DPI) conducted 19 separate field experiments in north west NSW farmers' paddocks during 2011–13 as part of a GRDC supported research project.

"Since both soil properties and environmental conditions are known to influence ammonia volatilisation, our measurements needed to be field-based and non-intrusive," Graeme said.

"We used a micrometeorological technique to measure cumulative ammonia loss over a month-long period after application of two to six fertiliser products in 10 fallow paddocks, seven mid-tillering wheat crops, and two perennial grass-based pastures."

Cumulative ammonia volatilisation results for all fertiliser treatments in all field experiments are summarised in Figure 1.

### Less N loss in-crop

According to Graeme the N lost from urea as volatilised ammonia averaged 11 per cent when applied to fallow soils, and five per cent when applied to tillering wheat crops.

A soil's affinity for ammonia/ammonium is one of the most influential factors governing the potential for ammonia volatilisation through both cation exchange of ammonium and physical adsorption of ammonia in dry soils.

"The overall lowness of N losses in the current study is likely to

be related to the medium to high cation exchange capacity (CEC) of most vertosols used in the study," Graeme said.

"Critical CEC values of 25–32 cmol kg<sup>-1</sup> have been proposed elsewhere, below which ammonium adsorption is minimal, and above which ammonia loss is substantially reduced. The CEC of most soils in the study were above these critical thresholds."

In the study, losses from ammonium sulfate were typically less than those from urea, except when the soil contained less than two per cent calcium carbonate (lime).

At five of the eight low calcium carbonate fallow paddocks, ammonia loss from ammonium sulfate averaged 52 per cent less than from urea.

But where soils contained under 10 per cent calcium carbonate, N losses averaged below 20 per cent from ammonium sulfate applied to fallow soils. Calcium carbonate content did not affect losses from urea or other nitrogen fertilisers trialled.

"A combined statistical analysis of low calcium carbonate plots showed that ammonia volatilisation loss in the study was principally affected by the presence of a crop, fertiliser type, and the average wind speed at ground level," Graeme said.

"Losses were greater in fallow paddocks than in-crop and greater under windy conditions.

"As a consequence of the time of year of measurement, the in-crop paddocks (winter) tended to be drier soils, had less rainfall after application and lower temperatures during the measurement period than fallowed paddocks measured during autumn or spring.



“The in-crop paddocks also had crop canopies that provide protection from wind speed at ground level – the next most influential factor affecting volatilisation loss in our study.”

After the month of volatilisation measurements, Graeme said most of the non-volatilised applied nitrogen was recovered in the topsoil or plant tissue.

“The exception was where paddocks had had intense rainfall which likely caused nitrate leaching and denitrification,” he said.

### Leaching vs denitrification

Nitrate leaching is a physical process that occurs with the drainage of water through the profile. While nitrate movement within the profile is common in cracking clay soils, large-scale loss

of nitrate below the root zone is minimal in most conditions.

Nitrate denitrification is a biological process that occurs within the soil profile wherever there is sufficient available nitrate, labile carbon substrate, and low oxygen conditions such as in slowly draining soils. Losses are minimal in most dryland cropping soils, but may be high in waterlogged conditions.

“In contrast to the cropping paddock results, the two pasture paddocks trialled averaged 27 per cent N loss from urea because the spread fertiliser granules were caught in the foliage and thatch of the pasture and did not contact the soil. There was little rain after spreading on the pastures,” Graeme said.

**Additional detail on the N volatilisation research is available by downloading a copy of Graeme’s GRDC Update paper see [www.grdc.com.au](http://www.grdc.com.au)** ■

## THE CONSULTANT’S VIEW

# RESEARCH AIDS DECISIONS ON FERTILISER APPLICATION

■ By Peter McKenzie, Agricultural Consulting & Extension Services agronomist, Quirindi, NSW

Research on ammonia volatilisation supported by the Grains Research and Development Corporation (GRDC) is helping advisors and growers make more informed decisions on the cost effectiveness of fertiliser application strategies.

In simple terms, ammonia volatilisation occurs when nitrogen (N) fertiliser is lost from the soil surface as ammonia gas before it is utilised by a crop.

The extent of loss depends on a range of factors including; soil moisture, temperature, pH, naturally-occurring lime in the soil, ground cover, wind speed and direction, soil clay content, and fertiliser type.

Fertiliser loss to volatilisation can add unnecessary costs and, in some situations, impact significantly on a crop’s gross margin so it is important to have accurate estimations of potential loss when weighing up application options.

This research has significantly narrowed the knowledge gap about N fertiliser volatilisation, improving growers’ ability to quantify the risks and make management decisions that generate the greatest return per input dollar.

It is widely accepted that N fertilisers are ‘safer’ when incorporated than when surface spread, but pre-season broadcasting and in-season topdressing of wheat crops are practiced by many growers in the northern region.

The research results increase the management options in terms of logistics flexibility in getting N on, both pre and post season.

Splitting nitrogen application between sowing and in-crop can allow growers to lower their financial risk on fertiliser application by letting seasonal conditions drive decisions on how much to spend on nitrogen.

### Do we or don’t we?

That said, the highly variable nature of winter rainfall in the north means growers are often left in a “do we, don’t we” situation when it comes to fertiliser application ahead of a predicted rainfall event.

Rain is important not only for lowering the volatilisation risk for surface-spread fertilisers but also for promoting plant growth to take up the applied N.

Effective fertiliser management requires an assessment of calculated risk to determine the extent of loss if the predicted rainfall event doesn’t occur or the environmental conditions aren’t ideal.



**Peter McKenzie says that with the high cost of fertiliser, selection and application decisions need to be backed by good research.**

The ammonia volatilisation research holds important implications for industry in that it enables us to more accurately quantify fertiliser losses and translate that to a cost per tonne of grain.

Previously we relied on average estimations of between 30 and 40 per cent loss with pre-plant applications of ammonium sulfate fertiliser on vertosol soils whereas current research indicates that losses are more likely to be between 10 and 15 per cent in favourable conditions.

The research is also enabling us to finetune fertiliser management in high calcium carbonate (lime) soils with trials showing that N losses in soils containing greater than 10 per cent calcium carbonate averaged more than 20 per cent from ammonium sulfate applied to fallow soils.

Conversely, calcium carbonate content did not affect losses from urea or other nitrogen fertilisers trialled. So growers with high calcium carbonate content soils will incur less risk by tailoring their fertiliser type accordingly.

As a high input cost, fertiliser selection and application need to be managed well if growers are to maximise crop returns so this type of research is a valuable step forward in enabling industry to achieve that goal.



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# Suppressive soils in the defensive frontline against RLN

**T**HE battle against root lesion nematodes (RLNs) is 'going to ground' with new research suggesting suppressive soils can provide an effective defence against the parasitic pest which costs Australian grain growers more than \$250 million annually.

A four-year research project jointly funded by the Grains Research and Development Corporation (GRDC) and Queensland Department of Agriculture and Fisheries (DAF) has assessed the level and variation of suppressiveness in northern soils.

Each year in the northern region, susceptible wheat and chickpea varieties are impacted by RLNs (*Pratylenchus thornei* and *Pratylenchus neglectus*) with estimated yield losses of up to 50 and 20 per cent respectively.

Boosting the natural suppressiveness of northern soils is rapidly becoming the new frontline defence to control, and eventually reduce, RLN populations when used in conjunction with a best practice integrated management program.

Practices such as the use of tolerant or resistant varieties, crop rotation, no-till, stubble retention and good farm hygiene are generally effective in managing RLN populations but costly losses can still occur.

Disease suppression relies on the vast array of organisms in soil to provide a biological buffering against pathogens.

DAF Senior Soil Microbiologist at the Leslie Research Facility in Toowoomba, Dr Nikki Seymour said in glasshouse assays, *P. thornei* increased only two to five times in unheated soil compared with 17 times when soil was heated prior to planting to eliminate the general soil biological community.

"The research has shown by incorporating a small amount of unheated soil into heated soil (10 per cent unheated) during seeding, RLN multiplication rates reduced between 60 and 89 per cent," Nikki said.

"This demonstrates that specific organisms in the soils contribute to pathogen suppression, and crucially we've found it is not a physical or chemical property of the soil *per se* affecting multiplication."

Funded by the GRDC, the four-year research project



***Pratylenchus thornei* with *Pasteuria* spores attached. *Pasteuria* is a promising biological control agent being studied. (Photo: DAF)**

investigated disease suppression across 26 different paddocks on over 70 sampling sites in the northern region.

The impact of farm practices on the suppressiveness of soils to RLNs was studied as part of the project with results showing that factors such as pastures in rotation had a limited impact on soil suppression.

While cropped soils were generally found to be just as suppressive as nearby native grassland or scrub, frequent tillage on cropped soils had significant impact on nematode multiplication.

"Growers practicing no-till, stubble retention practices and cropping when soil moisture allows are probably doing the best they can to enhance their suppressiveness in the top soil," Nikki said.

"Without these practices, we estimate that RLN multiplication would be significantly greater especially in top soils and therefore lead to much greater losses in productivity of susceptible crops.

"As RLNs multiply right down the soil profile, practical means of increasing soil biology through improving carbon deposits are needed to reduce multiplication further.

"Research in this project has identified specific antagonists of the RLN – including some for the first time – in our northern grain growing soils, but more targeted research is required on how to measure and enhance these organisms in our soil."



**DAF Senior Soil Microbiologist at the Leslie Research Facility in Toowoomba, Dr Nikki Seymour. (Photo: DAF)**



# GRDC takes a 'ground up' approach to RD&E

■ By Sharon O'Keeffe, GRDC Manager Regional Grower Services – North, Boggabri

**I**SSUES identification and research prioritisation are core business for the Grains Research and Development Corporation (GRDC). Defining an issue at ground level – whether it is production or profitability focused – is the first step in finding a solution.

Working from the ground up is the key philosophy of the GRDC to ensure that grain levies are invested as effectively as possible.

An example of an issue that may require research, development and extension (RD&E) is soil sodicity which is constraining grain yield.

Fleshing out the issue requires asking questions such as:

- Is it affecting emergence in some crops more than others?
- Is it reducing production by inhibiting the exploration area of the plant roots? or,
- Is the effect nutritional or due to restricted water uptake or both?

Then, to gauge the priority of the issue and its significance to the northern grain-growing region, the area affected needs to be identified and the cost and future cost to production and profitability determined. Assessing what research work is already in the pipeline and what, if any, gaps are apparent is also critical.

## Identifying solutions

The process then flows into identifying possible solutions or research questions. These may be longer-term genetic solutions such as looking for germplasm with adaptive traits that increase tolerance to sodic soils, or they may be medium-term research questions such as 'are there more effective crop rotations to increase water use efficiency under sodic soils?'

Alternatively, the issue may have a short-term solution such as developmental work that builds on previous research to adapt it to the local farming system – for example, investigating adaptation of current varieties in the local area.

Or the solution may be extension-driven, such as ensuring adequate communication of the results of previous research into crop tolerance and recommendations made.

Most often an issue requires work at all levels. Issues can be local, regional or national and all are equally important.

The issues identification and prioritisation process enables the scope of the issue to be clearly understood and the best type or types of responses to be determined.

It is through this rigorous process of gathering and assessing issues locally that GRDC can make well-informed and strategic investments on a regional and national scale.

The GRDC has recently released *From The Ground Up* – Northern Region report which can be downloaded from the Resources section of the GRDC website.

This report outlines the processes and means by which the GRDC sources and addresses local issues in the GRDC northern region.

It also outlines how these issues are addressed in the shorter term – specifically through the GRDC Northern Regional Panel, the four GRDC Grower Solutions projects across the northern region and GRDC Regional Grower Services.



Sharon O'Keeffe, GRDC Manager RGS – North.

The GRDC has been investing in grains-related RD&E for more than 20 years. During this period, the GRDC, with its partners, has generated a mass of information from research outputs and findings, much of which remains relevant today.

## The role of RGS

It is the role of GRDC Regional Grower Services to oversee the packaging of this information into easy-to-use products and services tailored to growers in their local region. As the regional manager for the north, my role is to identify and oversee regional RD&E needs, as well as manage the regional delivery of information and promote the GRDC's products and services. This would not be possible without direct feedback from growers within the region.

The GRDC relies on industry input to help shape the future of grains research and development in Australia and always welcomes feedback or queries on research issues via any of the northern panel members or myself by email at [sharon.okeeffe@grdc.com.au](mailto:sharon.okeeffe@grdc.com.au) or phone 0409 279 328. ■

# Chickpea input supply tight

■ By Cindy Benjamin

**A** COMBINATION of solid market indicators and good soil moisture levels in many grain growing districts in Queensland and northern NSW has prompted growers to seriously consider increasing the area planted to chickpeas this season.

Pulse Australia chairman, Peter Wilson, believes the market challenges that have troubled the industry over the past three

years have resolved and the outlook is very positive for the 2015 season.

"Desi chickpea markets have recovered extremely well after a combination of large crops, the strong AUD and a weak Indian rupee saw prices come under pressure," he said. "But with supply and demand coming back into balance for desi chickpeas we have seen prices recover well and currently represent good value to growers."

Pulse Australia nation development manager, Gordon Cumming says grower intentions suggest that the sown area for 2015 is likely to far exceed the 2014 production area. "There could be as much as a 15 per cent increase in sown area above the five-year average for the northern grains region," he says. "This is great news for the industry but brings with it some potential problems with input supplies being tight."

"We know the supply of desi chickpea seed is very tight and some pre-emergent herbicides are in limited supply or not available," says Gordon. "Growers intending to plant chickpea this season should discuss their planting needs with their reseller as a matter of some urgency."

While the immediate concern centres on inputs for planting, Gordon believes there may also be restricted supplies of some crop protection products such as fungicides and insecticides during the season.

"Growers may consider pre-purchasing some inputs for use later in the season to avoid potential delays or lack of supply at critical times," he says. "Discussing their requirements for the whole season with their supplier will also help companies respond to the expected high demand for crop inputs."

More information: [www.pulseaus.com.au](http://www.pulseaus.com.au)



Stored soil moisture and market prices are prompting growers to increase the area sown to desi chickpea in Queensland and northern NSW.

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## THE RESEARCH VIEW

# Topping up wheat with foliar phosphorus – does it work?

### AT A GLANCE...

- Wheat Leaves need to be healthy to uptake foliar-applied phosphorus.
- An adjuvant is required in the formulation for the phosphorus applied to stick to the leaf and be taken up.
- Earlier applications of foliar phosphorus (tillering) results in a lower fertiliser recovery than at flag leaf emergence through to mid-booting.

## Consultants' Corner

Consultants' Corner is an initiative by *Australian Grain* highlighting current GRDC-funded research with a particular focus on the commercial implications of adopting cutting-edge research.

**W**ITH prices for phosphorus (P) fertiliser expected to increase, strategies that result in more efficient use of fertiliser P offer potential value to growers.

Recent surveys of grain cropping soils for levels of available P

suggest that many soils have marginal to adequate supplies of available P due to build-up from previous fertiliser applications.

In these soils, the crop requirements for additional fertiliser are marginal and highly dependent on seasonal rainfall, and opportunities exist to optimise the management of fertiliser P.

Therese McBeath from CSIRO in South Australia is among a team of researchers testing whether it is possible to top up P supply with in-season foliar application to the plant in seasons of higher yield potential, and as a result reduce the amount of fertiliser applied at sowing time. This study, also involving researchers from the University of Adelaide as well as Wharminda-based consultant Ed Hunt, is being funded by the Grains Research and Development Corporation (GRDC) through the More Profit from Crop Nutrition phase II program.

Therese says the efficacy of foliar P is controlled by several factors:

- Plant physiology (wettability of leaf, crop nutrient status);
- Growth stage (leaf surface uptake, leaf area available for product interception);
- P formulation (P source and adjuvant, rate); and
- Soil P fertility.

"These factors do not affect the efficacy of the foliar P independently and the outcomes of their interactions are difficult to predict," Therese said.

"The area of leaf available to intercept foliar applied product controls the maximum possible recovery.

"One of our aims is to determine the 'window of opportunity' where we could maximise the amount of fertiliser intercepted by the leaves at the peak of leaf demand for P in growth room and field experiments. Properties of the leaf surface regulate



CSIRO researcher Therese McBeath (centre), flanked by research team members Evelina Facelli from the University of Adelaide (left) and University of Adelaide PhD student Courtney Peirce.



**This research is looking at the 'window of opportunity' of foliar P applications to wheat.**

the absorption and movement of the product applied into crop plants."

A second aim of the research is to investigate these factors in detail in order to identify the conditions under which foliar P is likely to be more effective, and which additives (adjuvants) in the formulation are likely to improve the efficacy of the product.

"We are also investigating the optimum combinations of P source and adjuvant, timing and rates suitable for different levels of soil and crop P fertility," Therese said.

"To do this we are using a multi-disciplinary approach where we use detailed measurements of the processes and conditions controlling the efficacy of foliar P uptake to inform field-based evaluation of foliar P in wheat crops."

## **Evaluation of when, what and how much P**

### **When to apply?**

In theory, the timing of canopy closure of wheat falls within the timing of peak uptake of P (between tillering and head emergence).

To study the effects of timing of foliar application on P uptake and response of wheat plants to foliar-applied P, the research team established a growth room experiment where phosphoric acid was sprayed at various growth stages of wheat (tillering to flowering) with plants harvested 10 days after each application, and another subset of plants grown through to maturity.

Therese said application of foliar P resulted in a transient increase in plant biomass (65 per cent) and P uptake (33 per cent) when plants were sprayed at booting, with differences measurable 10 days after the application of the foliar product, but not at maturity.

### **What level of P fertility?**

Therese said previous research by the team indicated that P deficient plants had leaves with a reduced ability to take up foliar applied P.

"The leaves were smaller and the structures that control the uptake of solutes were compromised (for example, stomata and leaf hairs were not properly formed).

"In fact, the severely P deficient wheat leaves were not able to take up any foliar-applied P despite the leaf being dipped in the fertiliser solution rather than being applied as a spray.

"This is a very interesting finding and fits with our hypothesis

that the only potential fit for foliar P is as a 'top up' fertiliser in soils with marginal to adequate P status and in seasons of higher yield potential.

"With this finding in mind, we have avoided situations of severe P deficiency, such as on highly calcareous soils," Therese said.

The team's motivation to work in this area was based on an earlier study where they measured a 25 per cent grain yield response to a foliar P top-up with phosphoric acid in the growth room in one of the two soils evaluated.

But having completed several growth room studies with foliar phosphoric acid, the ability to achieve a consistent and predictable positive effect on wheat growth appears elusive, despite being able to trace that the foliar product has been taken up by the plant and that it had increased the total amount of P uptake.

"Because of inconsistencies in the response of wheat to foliar-applied P, we have screened a range of agricultural soils in South Australia for responsiveness of wheat to different levels of soil and foliar (booting) applied P to identify the most appropriate soil type and P rate for field evaluation," Therese said.

In soils where plants showed a relative yield of greater than one in response to soil P applied, doses of foliar-applied P ranging from 0 to 4 kg P per hectare equivalent were tested.

"In all cases, the relationship between anthesis dry weight and sowing-applied P did not differ substantially between different inputs of foliar-applied P.

"The outcome of this screening work has been that while we have been able to identify soils in which wheat is very responsive to varying rates of soil-applied P, identifying soils in which wheat plants are highly responsive to varying rates of foliar-applied P remains elusive."

### **What to apply and how much?**

Through collaboration with Dr Craig Priest who is based at the University of SA's Ian Wark Research Institute, University of Adelaide PhD student Courtney Peirce has looked at the interactions between different formulation (in particular different adjuvants in combination with phosphoric acid) and wheat leaves using contact angle and spreading drying measurements in order to evaluate the importance of the adjuvant in the formulation.

Commercially available adjuvants were compared with a laboratory grade surfactant and the products were tested as a range of concentrations that included the label rate.

In the absence of adjuvants, the wheat leaves were very difficult to wet and phosphoric acid without adjuvant did not stick to the leaf surface, resulting in droplet bounce and loss of fertiliser to the soil.

With adjuvants – while the interaction between the leaf and the formulation was quite different at the first measurement taken after 20 seconds – all formulations caused complete wetting of the leaf, taking 13–20 minutes for the commercial adjuvants, compared to 10 seconds for the laboratory grade surfactant.

The slower spreading time correlated with smaller leaf area coverage for each droplet.

Therese said that in addition to the contact and spreading measurements, a radiolabel was used to measure how much of these formulations was taken up by wheat plants and how much moved away from the point where it was absorbed.

"Despite the differences in spreading behaviour of the adjuvants, the uptake was the same for all treatments when measured seven days after application and at maturity.

"Between 79 per cent and 94 per cent of the foliar-applied P



was absorbed by the wheat leaf and 24–57 per cent of the foliar-applied P moved away from the point where it was absorbed. The translocation was higher for treatments applied at flag leaf emergence and less efficient for the treatments at tillering.

“Despite higher P uptake when foliar P was applied, there were no differences in the yield of treatments when compared to a control treatment with no foliar P application.”

Therese said that in preparation for the 2015 growing season, an evaluation of a range of formulations in combination with different adjuvants in a growth room experiment comparing the effect of seven products combined with three different adjuvants on wheat growth, P uptake and peak biomass was recently completed.

“Plants were grown in a highly P-responsive soil, with foliar fertilisers applied at flag leaf visible (GS37). The use of an isotopic technique enabled us to trace the recovery of the foliar-applied fertiliser. Preliminary results indicated significant increases in biomass with some foliar-applied P sources other than phosphoric acid.”

## Field evaluation of when, what and how much

Based on the preliminary evaluations that were completed in the lab and growth room and with the support of collaborating farmers and advisers, some field experiments were implemented in 2014.

Three replicated small plot trials were set up on SA's Eyre Peninsula (EP) and two replicated paddock strips in Victoria's Wimmera, as well as a further four paddock demonstration strips.

“Across these trials, we implemented a range of sowing P treatments, foliar P rates, adjuvants and timings, but in all cases the foliar P was applied as phosphoric acid,” Therese said.

“We measured the tissue P concentration at all replicated sites at GS31 prior to the application of foliar P and while there were no indications that any of the plants were deficient in P, we were able to pick up some higher tissue P concentrations in response to higher inputs of P fertiliser at sowing.

“On Eyre Peninsula, we followed up after the application of foliar P by sampling the flag leaf (which emerged after the application of the foliar spray) to see if we could measure a difference in plant P content with the two different doses of foliar P but we did not find any differences.”

Therese said grain yield was recorded at all sites using quadrat cuts, while EP sites were also harvested using a plot harvester and some Wimmera sites had commercial harvester measurements of grain yield per treatment.

“We were not able to measure a significant response to inputs of sowing soil-applied or in-season foliar-applied P,” she said.

“Sites on EP had above-average winter rains with below-average spring rain, while most parts of the Wimmera experienced very much below-average rainfall throughout the growing season.

“We believe that this would have played a significant role in eliminating grain yield responses to P.”

## To sum up

Therese said the research team had been able to identify sites responsive to inputs of soil-applied P fertiliser and effectively load wheat plants with P applied to the foliage from stem elongation to mid-booting under controlled conditions.

“But we are continuing to work to find situations where foliar-applied P has a significant impact on grain yield.”

Further information: Therese McBeath, CSIRO, phone 08 8303 8455, email [therese.mcbeath@csiro.au](mailto:therese.mcbeath@csiro.au)

## THE COMMERCIAL VIEW

Consultant and grain grower Ed Hunt, of Wharminda on South Australia's Eyre Peninsula has long been interested in the concept of applying foliar phosphorus to wheat.

Which is why he has been only too happy to assist Dr Therese McBeath and her CSIRO-University of Adelaide research team in their studies as part of the GRDC-funded More Profit from Crop Nutrition phase II program.

“I've always had an interest in this work and have swapped notes with Therese over the years,” said Ed, who has been involved in trials on Eyre Peninsula where response to foliar P was being monitored last year.

“We know that plants respond early to foliar P, but we don't yet know if they'll respond later.

“Because of the dry spring we didn't achieve any significant responses in last year's trials so it will be interesting to see what future research produces.”

Ed said that even though it was “early days” in terms of the research, it was known that it was difficult to load up plants with foliar P early in the season because of insufficient leaf area to take up major elements.

“This is why it's important for us to know whether application of foliar P later in the season is going to be a worthwhile option.”

Ongoing research will look at when plants respond best to foliar P, the value in applying foliar P later in the season, the most effective adjuvants to use and the best form of foliar P.

Contact details: Ed Hunt, Mob 0428 289 028.



Ed Hunt is part of the research team looking at the response of wheat plants to later foliar applications of P.



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# Honing in on local issues

**T**HE GRDC has confirmed its commitment to the successful Regional Cropping Solutions Network (RCSN) initiative by reappointing Julianne Hill as a coordinator in the western region. Julianne's role, which previously covered RCSN groups in the Albany, Esperance and Kwinana port zones (Kwinana West and Kwinana East), has been expanded to include the Geraldton port zone.

GRDC western regional panel chairman Peter Roberts said the RCSNs were a vital part of the GRDC's issues identification process for the western grain growing region.

"The five western region RCSNs meet formally twice a year with the main objective of identifying issues critical to ensuring the prosperity of the grains industry in their area," he said.

"Comprising a mix of growers and industry professionals, they are helping to validate priorities determined by the GRDC western regional panel.

"Julianne works closely with the RCSNs to identify top issues



**Julianne Hill says the GRDC RCSN initiative has created valuable links between growers, GRDC personnel, researchers and other industry representatives.**

affecting local growers and helps develop and coordinate short-term projects with the aim of overcoming barriers and creating the desired practice change."

Julianne said the GRDC RCSN initiative had created valuable links between growers, GRDC personnel, researchers and other industry representatives and increased the GRDC's 'on the ground' presence in WA.

"The RCSNs have also identified some novel strategies to address important issues," she said.

"For example, a GRDC RCSN research project investigating the effect of stubble management on the impact of frost on grain crops was instigated at the suggestion of a grower on the Albany RCSN.

"The project linked with DAFWA and Living Farm to add value to work being undertaken by the Facey Group which was also interested in learning more about these stubble interactions.

"The GRDC RCSN research project made some valuable initial findings and has since expanded to become a bigger GRDC project which aims to develop stubble management guidelines for frost-prone cropping areas in Australia," Julianne said.

Julianne will be assisted in her expanded GRDC RCSN role by Gilly Johnson and Cameron Weeks (in the Geraldton port zone).

**More information about the RCSN initiative, including access to the GRDC RCSN western region annual report *From the Ground Up*, is available at [www.grdc.com.au/rcsn](http://www.grdc.com.au/rcsn)**

**Prior to her role as GRDC RCSN coordinator, Julianne worked for several years for the Department of Agriculture and Food (DAFWA) and with her husband, owned and ran a broadacre farm at Ravensthorpe until 2010.**

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# Alternative pH testing method shows promise

■ By GRDC western regional panel member, Paul Kelly

**A** STUDY into the use of instantaneous pH probes inserted directly into moist soil to measure pH has found they are capable of making accurate measurements and are cheaper than traditionally used soil tests when many samples are required across a paddock.

The research found the probes were a cost effective way of indicating areas of low and high pH and to help guide where to best apply lime in paddocks.

The work was conducted in Western Australia's Northern Agricultural Region by Planfarm agronomist Richard Quinlan and funded by the Grains Research and Development Corporation (GRDC) through the Regional Cropping Solutions Network (RCSN) in the Geraldton port zone.

Soil pH is typically measured by taking a soil sample and sending it to a laboratory where the soil is mixed in a solution of 1:5 CaCl<sub>2</sub> and measured with a glass probe.

Whilst this industry standard is an accurate method, it is relatively slow and expensive and therefore limits the number of samples that are typically taken across a paddock.

But instantaneous pH probes provide the potential to relatively quickly and cheaply measure soil pH at many sites across a paddock, allowing pH and lime application maps to be drawn.

Mapping soil pH and applying lime only to parts of the



**GRDC western regional panel member Paul Kelly says a GRDC RCSN project investigating pH probes complements ongoing investment by the GRDC into helping growers better manage soil acidity.**

paddock where it is needed – rather than blanket rate applications – is essential for improved liming efficiency and cost-effectiveness.

In 2014, a trial conducted as part of the project by Planfarm showed variable rate application of lime, based on a map generated through sampling with instantaneous probes at a density of 2.6 hectares per sample in a paddock, was 18 per cent cheaper than using a blanket lime application strategy.

Richard found the instantaneous probes, which are widely used by grain growers in parts of eastern Australia, could make adequate measurements when soil moisture content was at least two per cent.

This increase in conductivity correlated with an increase in test accuracy.

To produce effective pH or lime application maps from the probe data, paddocks needed to be sampled about every two to three hectares.

But Richard said the optimum sampling density would depend on soil variation within a paddock.

The work found that the probes were effective on some sands and loam soils, generating results in about 15 seconds.

But a longer response time (the time taken for a probe to settle on a measurement) of about 30 seconds was needed on yellow sands.

Richard stresses that, like traditional soil tests, the probes only measure the pH of a particular soil in a particular spot in the paddock, and in paddocks with highly variable pH, more samples are required.

A limitation of the instantaneous probes is that their sample depth is only 0–10 cm.

Much of the decision making process regarding the quantity of lime that needs to be applied to paddocks depends on soil pH levels at 10–20 cm and 20–30 cm.

Sampling just the 0–10 cm layer doesn't provide enough information.

Planfarm has subsequently incorporated instantaneous probes on a prototype mobile pH testing unit that can insert the probe to a depth of 30 cm, making it more useful for WA's soil pH profile.

The GRDC RCSN project complements an ongoing, significant investment by the GRDC into helping growers better manage soil acidity.

Soil acidity research led by the Department of Agriculture and Food (DAFWA) is part of the collaborative research effort 'Soils Constraints West' which aims to develop and deliver solutions for a range of soil constraints limiting productive grain cropping in WA.

Soils Constraints West represents more than \$33 million of new research aimed at addressing non-wetting soils, subsoil constraints, soil compaction and soil acidity over five years.

The GRDC encourages growers to adopt long-term liming strategies to address soil acidity, which costs WA agriculture more than \$500 million per year in lost productivity.

More information about soil acidity and lime is available at the GRDC Soil Acidity in WA Hot Topic at [www.grdc.com.au/SoilAcidityWA](http://www.grdc.com.au/SoilAcidityWA) or on DAFWA's soil acidity webpages at [www.agric.wa.gov.au/soil-acidity/managing-soil-acidity](http://www.agric.wa.gov.au/soil-acidity/managing-soil-acidity)



**A GRDC RCSN research project conducted by Planfarm has found that instantaneous pH probes are a cost effective way of indicating areas of low and high pH in paddocks.**



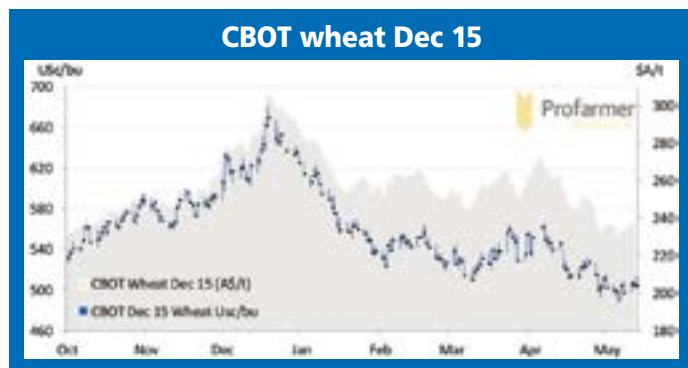
# International grain scene

## AT A GLANCE...

- Wheat values found pockets of isolated support in mid May but these were difficult to maintain.
- USDA's first look at the 2015 world agricultural balance sheet gives the market an in-depth look at what might be in store for the 2015 season.
- Whilst the USDA (May WASDE) report is insightful it remains an estimate and a lot can change yet from here.
- USDA report weighs heavily on oilseed values.

## Wheat markets

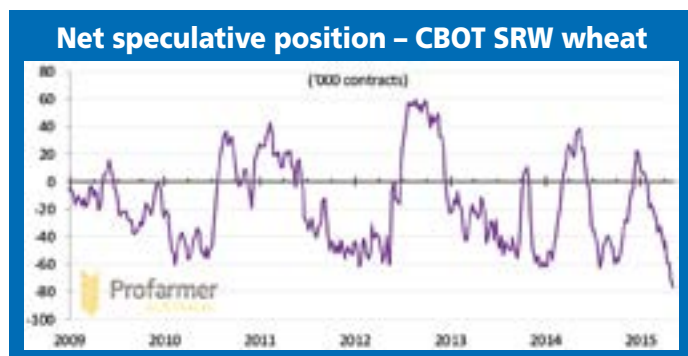
CBOT wheat managed a modest rise in mid-May with new crop Dec15 futures up 6.75 USc/bu week on week, and in A\$ terms, up A\$1 per tonne.



The firmer tone was largely due to lower than expected yield estimates for the Kansas HRW wheat crop following the US wheat quality crop tours. These crop tour reports found that drought and winter kill damage was more severe than previously anticipated hence the yield estimates which ensued reflected this.

This news saw wheat markets supported. Support was led by some short covering by speculative funds who continue to hold a record net short position in CBOT wheat. For these market participants a net short position will return increased profits if the market keeps falling, but profits will deteriorate if price rises.

Hence any news which has the potential to be supportive of values has a tendency to encourage these funds to buy futures to offset their short position.



But the May USDA report brought a somewhat bearish tone to the market as their first look at the 2015 global grains balance sheet confirmed global production is currently estimated to exceed consumption in 2015 seeing estimated stocks to use increase accordingly.

The USDA forecast EU, Ukraine, Russia and India to have smaller crops in 2015 as EU and Black Sea yields retreat from

## "STOCKS TO USE" – WHY DOES IT MATTER?

The May 12 WASDE USDA report gave us the first official look at what the 2015 global grain balance sheet might look like. Some of the key numbers the market was looking at were ending stocks and stocks to use of each commodity in different parts of the world.

### What is "stocks to use"?

Stocks to use is the ratio of ending stocks to consumption in any given year. Stated as a percentage it tells us what percentage of this year's consumption we are expected to carry in to next year. For example a stocks to use ratio of 25 per cent suggest we have a quarter of required grain in storage.

The higher the stocks to use ratio is, the bigger the buffer of carry over stocks is in the event we face production challenges in the coming year.

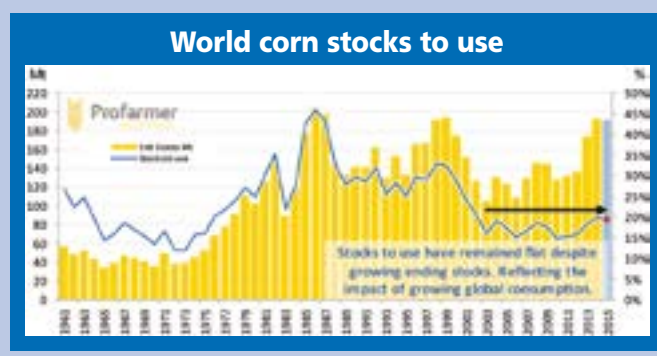
Ending stocks numbers on their own are not a good enough indicator as although they reflect how much grain we have, they don't take into consideration how much grain we need or where it is located.

### Why does it matter?

Stocks to use provides us with an indication of how sensitive the market may be to a negative production outlook.

For example, when stocks to use are abundant, the market knows that even if there is a hiccup with production there's going to be enough grain around to meet demand. Hence in years like this the market tends not to react as strongly to small negative production developments.

But when stocks to use are tight, every skerrick of grain matters and therefore the smallest negative production developments can command a strong market reaction.



last year's record performance and weather causes havoc to the Indian harvest. The net impact was a world wheat crop of 719 million tonnes – down 7.5 year on year. Smaller crops in EU and Black Seas regions could see reduced competition in the export market this year from low cost producers which has the potential to be supportive of export values this year vs last.

But lower world production was offset by increased stocks with 201 mt of wheat expected to be carried in to the 2015 marketing year, 11 mt higher than 2014 season carry in.

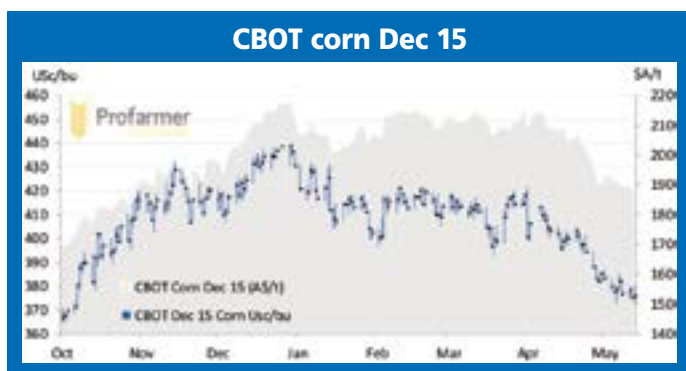
Global consumption was forecast to increase 1.1 mt year on year to 717 mt with increased human consumption offsetting lower stock feed use. But at current estimates, production remains in excess of consumption for the 2015 marketing year. Hence resulting in a 'relaxing' of the balance sheet with global stocks to increase over 2 mt in the coming season and in turn the stocks to use ratio increases to 28.4 per cent.

From our perspective, the weather damaged Indian wheat crop continues to provide market opportunities for Aussie wheat with an estimated 500,000 tonnes of wheat to have been sold to India for blending with lower quality local wheat this year. Some are saying this number could continue to increase as the year progresses.

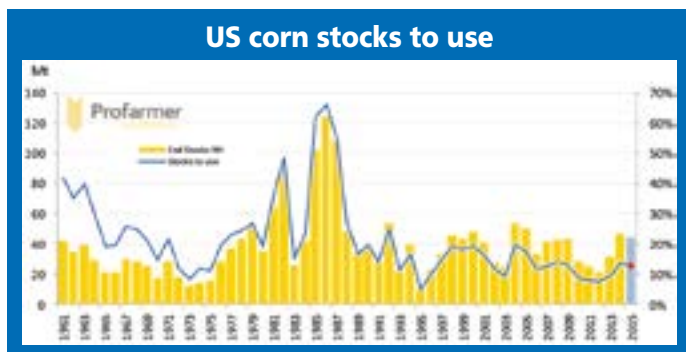
Furthermore, growing consumption of higher quality food grade wheat should bode well for Aussie product.

## Corn markets

CBOT Dec15 corn values fell 2.25USc/bu in mid-May or A\$2.80 per tonne in A\$ terms. Corn continues to come under pressure as US farmers race to get the crop in the ground. Despite the slow start, US farmers planted 56 per cent of their crop in just two weeks taking total planting progress to 75 per cent complete.



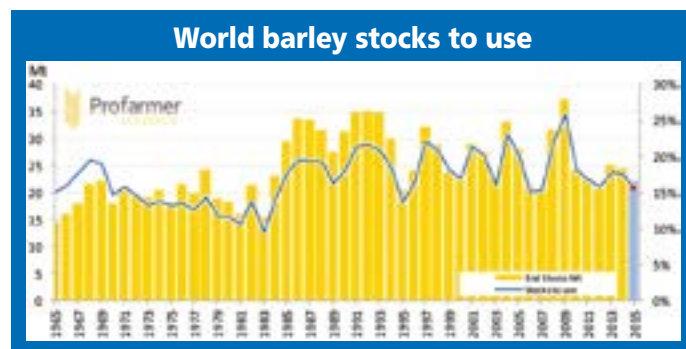
Despite the record pace, a smaller US crop is still expected in 2015. The May USDA report estimated a 14.9 mt year on year reduction in US corn production. Higher exports are also anticipated, and stocks to use are expected to tighten nearly 0.9 per cent to the end of 2015.



The net outcome of the USDA's global corn balance sheet is smaller production and larger usage which is expected to see consumption exceed production in 2015. Subsequently, world stocks and stocks to use are forecast to contract in 2015.

Chinese corn production is expected to increase in 2015 which is likely to weigh on Chinese feed grain imports. China continues to grapple with their bulging feed grain stockpiles and regulators have been paying increasing attention to all feed grain imports over recent months rather than just corn volumes. A larger Chinese corn crop may further support increasing scrutiny which continues to loom as a potential risk to Australian feed grain exports including barley and sorghum which have become increasingly dependent on the Chinese market place over recent years.

But it was a more positive picture for barley with world production forecast 1.2 mt lower year on year, with smaller crops expected in particular in the Black Sea/EU producing nations. Global demand was forecast to increase 0.6 mt and production was expected to fall short of consumption seeing stocks and in turn stocks to use, tighten year on year.

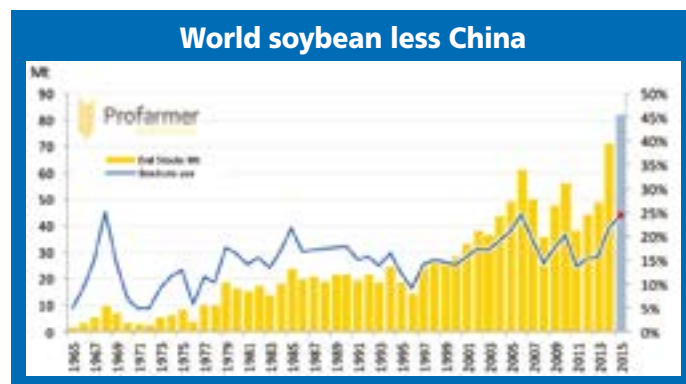


## Oilseed markets

Soybeans came under pressure in mid-May, particularly after the May USDA report.

Although US soybean production was forecast to fall 3.2 mt in 2015, US ending stocks are still forecast to receive a replenishment of 4.1 mt boosting stocks to use 4.1 per cent to 13.4 per cent.

Whilst global production estimates were near unchanged, consumption increased 12.5 mt year on year. But despite this a considerable replenishment of soybean stocks is expected.



The picture wasn't quite as bearish for canola which is expected to see a sharp reduction in stocks to use this year. Production is forecast 3.5 mt lower with the biggest reductions in Canada, China and the EU.

Ending stocks were forecast 1.7 mt lower year on year as production is expected to be insufficient to meet global demand. ■



# The federal budget and what it means for agriculture

■ By Alan Oster, Group Chief Economist, NAB

## AT A GLANCE FOR FARMERS...

- Establishment of a \$5 billion Northern Australia Infrastructure Facility to provide concessional loans for major infrastructure projects such as ports, railways, pipelines and electricity generation;
- \$101.3 million to upgrade roads in northern Australia to improve the efficiency of cattle supply chains;
- Drought assistance;
- \$250 m in concessional loan funding to continue the program in 2015–16, of which \$150 m is for Drought Concessional Loans and \$100 m for Drought Recovery Concessional Loans;
- \$20 m in 2015–16 to extend access to social and mental health services to drought-affected communities, as well as \$1.8 m in 2015–16 for a further 10 counsellors through the Rural Financial Counselling Service; and,
- \$60.8 m over four years, including \$25.8 m to help farmers manage the impact of pest animals in drought-affected areas and \$35 m for local council grants for infrastructure in drought-affected areas.

### Tax changes

- In addition to the tax changes outlined for small businesses, primary production businesses will be able to claim an immediate tax deduction for water facilities as well as – from July 1, 2016 – fencing. They will also be able to claim three-year depreciation for all capital expenditure on fodder storage assets.

### Quarantine measures

- Maintained funding for quarantine border security; expanded surveillance and offshore audits to manage biosecurity risks (expense and revenue not for publication at this stage due to ongoing consultation with industry); and,
- Increases in agricultural production levies totalling \$13.8 m over five years to improve biosecurity for the banana and bee industries and for the chicken industry for emergency response to avian influenza.

### Other

- \$1.5 m over two years for a mechanical fuel load reduction trial to mitigate bushfire risk where conservation values would be compromised by fuel reduction burns; and,
- Savings of \$30.9 m over four years from the National Food Plan, redirected to initiatives associated with the Agricultural White Paper.

OVERALL, agriculture will benefit in the 2015–16 federal budget, build on confidence and support expanded investment. Much of the new funding is to facilitate investment in northern Australia and to respond to the ongoing drought in many parts of the country. There is also an expanded focus on biosecurity as well as beneficial tax changes for farmers.

The \$5 billion Northern Australia Infrastructure Facility will provide concessional loans for major infrastructure projects such as ports, railways, pipelines and electricity generation in northern Australia. Critically, this



Alan Oster.

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is intended to underpin further agricultural development in northern Australia.

The idea of transforming northern Australia into a 'food bowl' for Asia has been around since the 1950s. This budget goes some way towards recognising the huge capital investment that will be required to attempt to significantly boost intensive farm production in the region. But forecast spending on the measure over the forward estimates period is only anticipated to be \$800 m, suggesting it will take a number of years for the funding to be allocated. Further, with interest rates already at record lows, it is unclear how much additional investment the measure will create. The budget also provides \$101.3 m to upgrade roads in northern Australia to improve the efficiency of cattle supply chains.

Perhaps unsurprisingly, drought assistance features prominently in the budget, with additional funding to extend concessional loans for another year and further funding for management of pests, local council funding and expanded access to social and mental health services in drought affected areas.

Farmers in parts of Western Queensland have had no useful rain for three to four years, and after some optimism at the start of the year, the finish to the northern wet season was generally disappointing. Rolling over funding for another year will provide a lifeline to farmers in these areas ahead of the next wet season.

## The wider economy

The focus of this budget is very different from last year. Given the political problems of last year's budget, the focus has been on attempting to make this budget as politically saleable as possible. Also, unlike last year, the 2015 budget is relatively neutral in its impact on the broader economy. Essentially, new expenditures have been broadly offset by savings.

More than any budget in recent memory, most of the key changes were pre-announced/leaked – again to emphasise the 'no surprises' focus. Consequently, the key spends include a \$5.5 bn small business package (ie. turnover of less than \$2 million per annum), including tax cuts and, more importantly, a five per cent tax discount (up to \$1000) to other tax payments, as well as immediate write-offs of new assets up to \$20,000.

Elsewhere there is \$3.5 bn (over five years) spending on childcare incentives (linked to stalled family tax benefits savings); a new infrastructure fund for Northern Australia (\$800 m); extra incentives for employment of older Australians; drought spending (\$330 m); border/terrorism spend (\$500 m); a payment to offset Western Australia's GST issues (\$500 m); extra spending on the Pharmaceutical Benefit Scheme (\$1.6 bn) and the reversal of the past year's doctor rebate savings.

The savings were equally well flagged. These include:

- A new law on cross-border profit shifting;
- GST on intangible/services (Netflix tax);
- Pension savings by lowering the non-home asset threshold to \$800,000 (\$2.4 bn);
- Tightening of the paid parental schemes (anti-double dipping between private and public schemes);
- The withdrawal of Melbourne East West Link money (\$1.5 bn); and,
- Further public service efficiency dividends.

The budget really is a combination of redirected policy spending broadly offset by substantial increases in revenue to GDP – bracket creep. Outlays broadly grow in line with GDP, which is better than the previous upward trend. Also, the economic impact of the budget on the economy is relatively neutral.

Broadly, the government's forecasts are very similar to NAB's, so we see the projections as credible. Of course to the extent we have all overestimated growth – especially in a low wage growth and falling commodity price world – the budget remains open to the disappointments (especially on the revenue line) that we have seen in recent years. But with a credible set of forecasts (and a deliberately conservative iron ore price assumption – Treasury's \$US48 vis-à-vis NAB's \$US60 per tonne) the rating agencies should be relatively satisfied. Equally we would not expect the very negative reaction of consumers to this year's budget. That said, we would not really expect much of a kick to business confidence, outside of micro business.

Of course the budget is not the complete current fiscal story. There is still the Tax White Paper to come. The budget had little on big tax and superannuation questions. Also, there is still the debate about what happens to government's removal of \$80 bn in state funding for health and education in the out years. And finally, despite the government's best efforts, what happens in the ensuing political process is anyone's guess.

## Fiscal outcome

The underlying cash deficit for 2014–15 is estimated at \$41.1 bn and \$35 bn in 2015–16 (or 2.1 per cent of GDP and below market expectations – but near NAB's). The projected deficit then moves down to \$14.4 bn in 2017–18 (0.8 per cent of GDP) with an eventual return to surplus in 2019–20.

Basically the reduction in the deficit is driven by returning revenues, which rise from 23.9 per cent of GDP in 2014–15 to 25.7 per cent in 2017–18 (accruals basis). Outlays move from 26.1 per cent to 26 per cent of GDP in the same period.

## Economic outlook

There is little fundamental difference between Treasury's and NAB's economic outlook. At the margin, we are slightly less optimistic in the near term (NAB 2.3 per cent growth, Treasury 2.5 per cent in 2014–15) but slightly more optimistic in 2015–16 (NAB 2.9 per cent Treasury 2.75 per cent). An interesting difference here is our slightly more pessimistic view on business investment.

At the margin, Treasury has a slightly higher unemployment rate in year average terms in 2015–16 (NAB 6.25 per cent Treasury 6.5 per cent).

Finally, on the critical nominal GDP forecasts (for budget deficit forecasting) there is little difference between NAB and the Treasury (both around 1.5 per cent and 3.5 per cent in the next financial year).

## Financial markets

On financial markets there was modest but nonetheless positive market reaction to the budget. The \$A has pushed higher, although it was trading higher before the budget's release. Bond futures improved (ie. yields lower), presumably because the debt program is a little less than expected and the major ratings agencies have been quick to say the budget doesn't pose any immediate threat to the AAA rating.

For more detailed analysis from NAB Group Economics, visit [nab.com.au/fedbudget](http://nab.com.au/fedbudget)





# Australian grain industry's future in Asia

**R**ISING to the challenge of expanding Asian markets was a common theme at the Australian Grains Industry Conference (AGIC) event in Singapore in March this year.

In opening the conference, Australian High Commissioner to Singapore, Phillip Green, said that focusing on Asian markets will bring great dividends.

Phillip told the meeting that the Asian customer had enormous buying power and congratulated the Australian industry on engaging with its customers through forums such as AGIC Singapore 2015. He highlighted the need to understand that what the consumer wants at the supermarket checkout is changing rapidly.

This sentiment was echoed by James Campbell from ANZ who highlighted the growth of the middle class in Asia and that, as a high quality supplier, this should be the target for the Australian grains industry. He noted that Australia would not have the volume to meet the demand being generated by population demographics – but had a major role to play in meeting the needs of the middle class.

## More tonnes from less rainfall

Ron Storey from Australian Crop Forecasters noted that Australian farmers were producing more tonnes from less rainfall and that this was underpinning security of supply for customers.

Ron noted that customers need to be more informed about the implications of drawing grain from multiple Australian origins and highlighted the customer shift from a commodity market to a customised market.

Managing Director of global miller Interflour, Greg Harvey, told delegates that growing per capita consumption of flour across Asia would see demand grow significantly and also highlighted that demand is becoming more customised.

The conference also heard from major Australian grain marketers and handlers CBH and GrainCorp who presented 2014–15 crop data by region. This showed that growers were responding to end-user market signals by choosing newer wheat and barley varieties that better met market requirements.

## Continued investment needed

Conference Organiser Rosemary Richards said a consistent theme throughout the conference was that Asia is the future for Australia's grain industry and while Australian wheat held a premium position in the market, continued investment in quality, supply chains and understanding changing customer requirements was needed.

"The conference provided a great opportunity for all in the industry to gain even greater insights into global and local trends and will hopefully further assist in the facilitation of dialogue between the industry and customers, and ultimately expansion of opportunities for Australian grain into the Asian region."

Visit [www.ausgrainsconf.com/asia](http://www.ausgrainsconf.com/asia) to download the proceedings from AGIC2015 Singapore.

For more information contact: Rosemary Richards 02 9427 6999 or 0411 564 128.

# Agribusiness salaries lag behind other industries

**S**ALARY growth in agribusinesses is lagging badly behind other industries, according to a new report released by agribusiness recruiters, Agricultural Appointments.

The 2015 Salary and Trend Report shows that six out of seven agribusiness roles surveyed have grown at a slower rate than average wages over the past 20 years – in some cases, substantially slower.

The report, based on Agricultural Appointments' remuneration records since 1995, shows Farm Managers and Product Managers have fared the worst. In some cases their wages have grown at less than a third of the rate of average wages.

Sales Reps and Technical Managers' wages have grown at just half the rate of average wages.

Technical Sales Reps and Quality Assurance Managers saw their salaries grow slightly faster in the 20 years to 2015, but they still lagged behind average wages growth by 25 per cent.

Only Agronomists' salaries grew faster than average wages between 1995 and 2015.

## Hard to attract good candidates

"With skills shortages in agriculture and agribusinesses making it difficult to find good candidates, remuneration has become a key battleground in attracting the best candidates," says Agricultural Appointments' managing director, Dr Ray Johnson.

The 2015 Salary and Trend Report sets out what people are being paid in the industry as well as what agribusinesses should be doing to attract and keep the best employees. This includes the importance of Generation Y, the rise in demand for agricultural products from Asia as well as the difficulties of attracting potential employees to rural and remote areas.

Download a free copy of the 2015 Salary and Trend Report at [www.agri.com.au/2015-trend-report](http://www.agri.com.au/2015-trend-report)

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*My first article in the February-March 2015 edition of Australian Grain provided an overview of how a risk-based planning process can help farmers better manage agricultural risk, by addressing three core questions: Where are we at risk? How could we respond? How do we execute the most effective measures?*

*This second article examines how farmers can respond to risk through taking out crop insurance: Why might you need it? What insurances are on offer? And what has been the experience of growers?*

*The starting point is to recognize that grain production is a relatively low-margin and increasingly, a high-volume business with large fixed costs. As such, unexpected drops in volume and/or prices can severely hamper the farm's ability to generate revenue to cover total costs.*

*This makes crop insurance a potentially attractive solution. The key message is that value not cost, is the key.*



## Value not cost, is the key to selecting the right crop insurance

### AT A GLANCE...

- The value of crop insurance derives from its scope to reduce the downside risk in farm income.
- Some low-cost insurance products may not be worth buying, while other, more expensive products may be worth every penny.

### Why buy crop insurance?

Insurance is a special kind of product, which involves an exchange of money for money – not money for goods. Crop insurance works by evening out farm income over the years. Insured farmers pay premiums in the good years in exchange for substantial payouts in poor harvest years.

The value-added aspects of taking out crop insurance come in four direct ways, and one indirect way. Directly, farmers can:

1. Reduce the likelihood that the farm will have to raise costly external capital at the wrong times.
2. Improve the likelihood that there will be sufficient internal funds available to take advantage of attractive investment opportunities, for example when other, non-insured farmers may not have the cash.
3. Negotiate with their bank for a lower borrowing rate, if the level of cover reduces their downside revenue risk substantially.
4. Reduce the likelihood of default, which in turn can improve contractual terms with other parties such as bankers, customers, employees and suppliers.
5. Indirectly, an important but hard-to-quantify benefit of insurance is the confidence that it brings to the decision-maker.

Insured growers who face less downside risk on their income are more likely to make better cropping decisions rather than 'cut corners', for example by:

- Optimising the sowing window for yield potential, rather than sowing late to avoid the risk of frost in spring
- Spending the right amount of cash on crop protection, rather

than trying to save money by reducing the quality and quantity of inputs.

- Taking advantage of grain price spikes early in the season by increased forward selling, rather than waiting until the grain is harvested before selling.

Above all, knowing that they are protected against catastrophic risk, insured growers may find they enjoy life more due to reduced financial stress.

### What crop insurances are available in Australia?

The four main types of crop insurance are shown in Table 1.

- Index-based products such as weather insurance products, which are modelled using an index of parameters, such as rainfall or temperature over the cropping season. They offer the opportunity to hedge with a raft of relatively new and increasingly readily available information sources including weather stations, soil moisture probes and Normalised Difference Vegetation Index (NDVI) data.
- Named-peril insurance covers single perils (such as a hail, fire, storm or frost event) and the sum insured is based on the assessed value of the loss incurred by the farmer.
- Yield-based multi-peril crop insurance (MPCI) covers multiple peril events that can cause widespread losses (including drought, flooding and disease). Typically the sum insured is based on the value of crops insured and the payout is the yield shortfall below a pre-agreed threshold, multiplied by a pre-agreed price.
- Revenue-based MPCI provides protection against revenue loss in the face of multiple perils, thus insuring a farmer against both yield and price risk. Perils covered include water stress, flood, hail, wind, frost, lightning, excessive rain, temperature stress, cyclone, tornado, wildlife, accidental fire, bushfire, and insect or pest manifestation or plant disease.

### What has been the experience of growers?

Coonamble NSW grain farmer David Taylor says that: "Multi-peril insurance gives you the confidence to move through a farm business program as you should and provides you with the



**TABLE 1: Available crop insurance products and their features**

Type of insurance	Companies with the product	Product	Advantages	Disadvantages
Index-based products	Celsius Pro	Parametric Certificates of Insurance	Contracts are relatively low-cost to administer and fast to settle. Expanding range of indices available such as NDVI data	Sensitive to basis risk – that is, there may be a low correlation between a farmer's actual loss experience and the index-based loss indemnification received
Named-peril insurance	IAG (CGU & WFI) QBE	Various	Well-developed products in Australia	Generally offer limited protection to the overall farm business
Yield-based multi-peril crop insurance	Allianz Australia through Primacy Underwriting Agency	Prime Guard	Minimal application process for farmers wanting to join the program	Comes with ambiguous exclusions, potentially increasing loss assessment and administration costs
Revenue-based multi-peril crop insurance	Latevo International	Certainty	Deals with the problem of moral hazard and adverse selection through a rigorous, up-front assessment process	Comes with an up-front assessment fee

security to manage any down side created by a broad range of perils.”

With his total farm acreage yielding below average, David was one of eight growers across Australia who made an insurance claim on the Latevo MPCl policy in 2014. His claim, approximately 50 per cent of his production cost, was paid out in full, placing David in a good financial position to prepare for the 2015 season.

Those farmers around Coonamble not covered by MPCl cautiously prolonged their sowing decisions until seedbed moisture conditions improved – delays that proved to be too long. Their crops struggled to mature before being hit by a burst of dry, hot spring weather.

## To sum up

In May 2015, the month when the Bureau of Meteorology confirmed (along with almost every other national weather bureau) that El Niño thresholds have been reached in the tropical Pacific for the first time since March 2010, less than one per cent

of Australian grain farmers have taken out MPCl for this season.

To paraphrase the British economist John Maynard Keynes: the difficulty lies not so much in the new ideas of crop insurance. It is in escaping from the old ideas.

In Australian agriculture there is a sub-culture that believes in the macho line: “This is a rough, tough industry and farmers are bound to go bust”.

But today, new forms of crop insurance such as MPCl and Index-based Products are not only affordable but also a potentially valuable tool in the grain farmer's risk management arsenal.

Looking forward, successful producers will be those who are best able to develop business strategies, which focus on avoiding downside risks using crop insurance, together with strategies, which embrace risk and make the most of the opportunities it presents. An expanding range of crop insurance products provides innovators with new opportunities to create more wealth.

Further information Jay Horton, Strategis Partners, Ph: 02 9238 6886, E: [jay.horton@strategispartners.com.au](mailto:jay.horton@strategispartners.com.au), [www.strategispartners.com.au](http://www.strategispartners.com.au) ■



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*A national study finds that Australians are now eating almost 30 per cent fewer core grain foods.*

# Risk of weight gain if you go against the grain

**A**USTRALIANS are eating 29 per cent fewer core grain foods than in 2011, which puts them at increased risk of excess weight gain and chronic disease, a national 2014 study released in April has shown.

The 2014 Australian Grains & Legumes Consumption & Attitudinal Study (Consumption Study), presented at a Consumption Symposium in Sydney on April 30, canvassed the habits of more than 3000 Australians aged two to 70 years.

Delegates at the Consumption Symposium, hosted by independent authority – the Grains & Legumes Nutrition Council (GLNC) – were shown that new dieting fads – such as the low carb high fat diet, Paleo diet and mainstream shift to gluten-free diets – have resulted in a significant decline in the consumption of core grain foods.

According to Michelle Broom, GLNC General Manager and an Accredited Practising Dietitian, the Consumption Study presents evidence-based information on the health and nutritional benefits of grains and legumes to balance the hype of new dieting trends.

“The 2014 Consumption Study has exposed a rapid decline in the amount of core grain foods Australians are eating – falling a massive 29 per cent in just three years,” Michelle said.

“Fad diet trends have resulted in widespread confusion about the benefits of eating core grain foods and legumes. We need to

educate people about the health consequences of cutting these nutritious foods out of their diets.”

Alarmingly, the study found six per cent of all Australians are not consuming any grain foods at all – and many are possibly making this decision without medical advice. Michelle said these people may be missing out on essential nutrients while putting themselves at greater risk of an expanding waistline and chronic diseases such as heart disease, stroke, cancer and type 2 diabetes.

“The study found that women, in particular, are at risk of missing out on the benefits of core grain foods. In fact, Aussie women aged under 50 need to increase core grain consumption by 50 per cent to reach recommended levels,” said Michelle.

The fall in grain food consumption is driven by people eating fewer breads and rolls – the largest category of core grain foods – as well as white pasta and noodles; while there has been a rise in the consumption of flatbreads and tortillas since 2011.

One in 10 respondents aged 15 years and above avoided

## WHAT THE CONSUMPTION STUDY REVEALS ABOUT OUR EATING HABITS

- Core grain foods are a staple of the Australian diet. Almost 95 per cent of respondents ate these foods on the day prior to the survey, with an average intake of 3.9 daily serves. However, most people are not eating enough to reap the health benefits.
- The amount of grain foods people are eating is in decline for most categories – with the exception of rice and flat breads.
- Breads and rolls are the most commonly eaten core grain foods. Yet both the number of people eating breads and rolls and how much they consume has decreased since 2011, driven by declines in white bread consumption.
- Breakfast cereals are the second largest contributor towards core grain serves in 2014.
- Mixed dishes are the third largest category, such as a sandwich with various fillings, stir fry with rice, pasta with sauce and sushi.

For recommendations on types of grains and how much to eat, visit: [www.glnc.org.au/grains-2/recommended-amounts](http://www.glnc.org.au/grains-2/recommended-amounts)



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wheat in their diet in 2014, although this was down from 16 per cent in 2011.

"Many diets that exclude whole food groups are hailed as the secret to weight loss and good health, but consumers should be warned these claims are not usually backed by the whole picture of the science," Michelle said.

## FOUR REASONS TO PUT GRAINS AND LEGUMES BACK ON THE MENU

A GLNC secondary analysis of the National Nutrition and Physical Activity Survey 2011–12 provides four reasons why you shouldn't go against the grain and cut core grain foods or legumes from your diet without professional medical guidance.

### 1. Grains and legumes may help you stay trim

**KEY FINDING:** Adults who eat six or more daily grain serves are less likely to be overweight and are more likely to have smaller weight circumferences. Likewise, adults who include legumes in their diet are also more likely to have a smaller waist circumference than people who do not eat legumes.

### 2. Grains and legumes reduce your risk of chronic disease

**KEY FINDING:** People who eat six or more daily serves of core grain foods are less likely to be at risk of developing a serious ongoing health problem, such as type 2 diabetes, heart disease, stroke, high blood pressure and some cancers. People who eat legumes are also less likely to develop chronic disease, such as type 2 diabetes.

### 3. Grains and legumes help boost essential nutrients in your diet

**KEY FINDING:** People who eat the recommended daily grain serves are more likely to reach their recommended daily intake for iron, magnesium, iodine, zinc, thiamin and folate. People who ate legumes had higher total daily intakes of fibre, protein, iron, magnesium, zinc, iodine and folate compared with non-consumers.

### 4. Grains and legumes help boost your fibre intake

**KEY FINDING:** Higher core grain consumption and legume consumption is linked with higher fibre intake. Women who eat six serves of core grain foods daily are the only ones meeting the recommended 25 g of fibre per day.



According to Michelle, there is a large body of evidence that people who eat quality grains, like whole grain breads, are the ones who avoid putting on extra kilos.

The Consumption Study further reveals Australians' high consumption of discretionary grains – such as biscuits, cakes, muesli bars and pizza – which account for a significant one third (32 per cent) of our total grain food choices. Most people would benefit from swapping these for core grain foods.

"The 2014 Consumption Study reinforces the need for more education about the health and nutrition benefits of grain foods and legumes, as people may be putting themselves at risk by cutting out these foods.

### More education needed


"Australians are buying into the idea of a quick fix to lose weight by radically changing their diet. While this may seem to be a more appealing proposition than the age-old messages of balance and moderation, these people are missing out on the health benefits of grains."

"There is confusion among Australians about grains and legumes so broader education and awareness would help people to better understand why they should eat them, how much they should be eating and how to make better food choices when out shopping," Michelle added.

"Based on the body of evidence and the Australian Dietary Guidelines, the Grains & Legumes Nutrition Council recommends that Australians enjoy grain foods three to four times per day, choosing at least half as whole grain or high fibre."

Visit [www.glnc.org.au](http://www.glnc.org.au) for more information.

Consumption Study report: **Australians at Risk: 2014 Grains & Legumes Consumption & Attitudinal Study.**



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# Grains can play a key role in shifting out of high-calorie habits

■ By Rosalie Marion Bliss, Agricultural Research Service – USDA

**A** NEW US study suggests that weight-loss interventions that centre on hunger-reducing food choices and behavioral support can produce favourable shifts in 'self-reward' areas of the brain. The study addresses concerns by weight-loss experts that when instant gratification, or addictive-type food involvement, becomes entrenched in the brain, it may be nearly impossible to reverse.

The study volunteers were 13 overweight or obese men and women assigned to one of two study groups. One group was placed on an at-home weight-loss intervention of lower calorie foods for six months with a goal of losing about one to two pounds (450 to 900 grams) per week. The other was a no-intervention control group eating normally at home.

To satisfy brain areas linked with cravings – the intervention group's diet provided about 45 to 50 per cent of daily calories from 'slow-digesting' carbohydrates and high-fibre foods. High-protein foods and healthy fats each provided about 25 per cent of the other daily calories.

The group received one hour support sessions most weeks and meal plans that centered on hunger reduction, portion-control, and high satisfaction. They were told to evenly space meals and snacks, and to freely use foods from a list of those with very few calories that could be eaten any time. These tips were designed to keep blood sugar levels even (versus spiking) and control hunger.

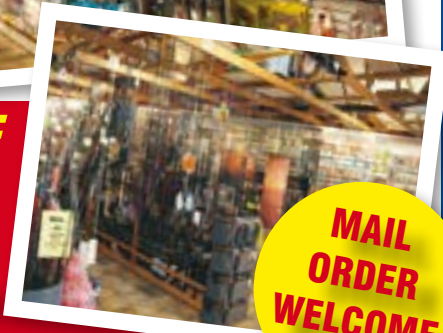
The study was conducted by senior coauthor Susan B. Roberts – an expert in developing programs for weight management – and colleagues. Susan is with the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA) at Tufts University in Boston. The center is funded by USDA's Agricultural Research Service. She is also professor of both nutrition and psychiatry at Tufts University.



Meals designed to reduce hunger include foods that are high in fibre, such as beans, lentils, peas, artichokes, bulgar wheat, pumpkin, and barley. The dish shown here is a barley soup. (PHOTO: Peggy Greb)

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Susan has focused her work on 'innate nutritional neurobiology', which is about helping people learn what 'pushes their buttons' when it comes to staying in control of what they eat.

"The abundance of affordable commercial foods that contain added sugars and low-satiety, refined grains and starches are food cues that stimulate the American palate," says Susan. "Our studies have shown that just viewing pictures from mouth-watering food advertisements can activate brain-reward pathways and trigger the urge to eat."

### How the brain stimulates cravings

By understanding how brain circuitry stimulates eating in response to visual and actual food cues, Susan has linked reducing cravings and increasing satisfaction with successful weight-control programs.

For the study, the team used magnetic resonance imaging (MRI) to assess neuronal activity in the brain's reward-response areas. The findings indicate that it is possible to change the cycle of constantly craving unhealthy foods by retraining the brain to stop activating its reward centres on exposure to a steady stream of high-calorie food cues (see opposite).

"A particular challenge is ongoing exposure to commercial foods that are formulated to overactivate the brain and trigger constant cravings," Susan says.

All volunteers had two MRI brain scans – one at the beginning and one at the end of the six-month study. During scanning, the volunteers were shown 20 images of high-calorie foods and 20 images of low-calorie foods. They rated the desirability of each image on a scale of 1 (none) to 4 (extremely) while blood flow to key brain areas was measured. Higher blood flow indicated greater neuronal activity.

Susan was not surprised that the intervention group achieved significant weight loss – about 14 pounds (6.3 kg).

### Low calorie food more desirable

"Our key finding is that intervention-group participants had greater neuronal activity on their brain scans when viewing low-calorie food images at the end of the six-month period versus when they viewed the same images before the intervention – a

significant favourable shift," she says. "More studies to assess whether these positive changes in neuroplasticity can help people sustain weight loss over time are needed."

This research is part of ARS National Program #107, Human Nutrition. ■

## STRATEGIES TO CONTROL CRAVINGS ARE THE KEY

Susan B. Roberts has been studying complex brain responses to the dramatically changed modern food supply that is described in the "Dietary Guidelines for Americans" (DGAs) 2010.

The DGAs report that during the past four decades, the amount of food on hand to purchase from the US market – in terms of average daily caloric availability – has increased by 600 calories per person.

### Managing body weight

Susan emphasises a moderately low carbohydrate intake rather than a very low carb intake, in keeping with the Recommended Dietary Allowance (RDA) for carbohydrates of 130 grams, or 520 calories, per day. "Carbohydrate intake at the lower end of the recommended range, rather than below it, is optimal for weight control," says Susan. "It is a good level where people can enjoy some carbs, but not so many that they trigger food cravings and eating-control issues."

Another key to managing body weight is getting ample food fibre, which is a subset of the carbohydrate group, says Susan. The daily adequate intake for fibre is 25 grams for women and 38 grams for men. Unfortunately, dietary fibre intake among US consumers averages only 16 grams per day, according to ARS data from the Food Surveys Research Group in Beltsville, Maryland.

"For losing weight, I recommend at least 40 grams of fibre per day," says Susan. "Fibre is one of our weight-control cornerstones because it helps achieve the feeling of fullness after eating."

Good sources of fibre include legumes (beans and peas), vegetables, fruits, nuts and seeds, and whole grains.



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# Farming in Foreign Fields...

## Green energy in agriculture



**T**HE Hollo family of Serbia has a long farming tradition. Robert Hollo began working on a farm at the age of five, and now he shares and develops his farm work together with three sons – Robert, Roland and Ronald. To make their business more efficient, they split activities.

One son is in charge of animal husbandry, the second takes care of crop production and the third oversees mechanisation and commercial aspects. The first company they have established is ZZ Nagyret, which consists of 20 cooperative members and has now been working successfully for 12 years. The second firm, Hollo Company, was established in 2012 and specialises in business

**The Hollo family's farm and household in Serbia are heated by biomass from soybean crop residue. Compared to conventional forms of heating, this is cheaper, cleaner, better for the environment and provides energy independence.**

trade, such as distribution of premix for pigs and fertilisers, and the purchase and storage of grain. The average repurchase is about 21,000 tonnes of grain per year.

These two companies today have 30 employees. The Hollo family has 500 hectares but they work with 380 subcontractors, covering 3500 hectares of land.

The Hollo family believes that it is possible to expand and take on new things all the time. The main thing required is the dedication and diligence of employers. Besides these two companies, they also own Hollo Farm, which produces Dutch breeds of gilt pigs for Topigs, annually producing around 3000 animals. An interesting fact is that the Hollo family has the biggest boar in Serbia – it is about 500 kg and has almost made it into the *Guinness Book of World Records*.

### Soybean hay bales for warming

A few years ago, in order to reduce costs and provide cheaper energy, they used bales of soybean crop residue to warm the pig farm and households. Guided by this, they asked about experiences in other countries and managed to find a strategic partner in the Czech firm BPI (Bridge Power Investments). Robert said that the normal technique of burning crop residues is the worst and most damaging method of disposing of excess crop residues. In comparison to conventional forms of heating, biomass heating is cheaper, cleaner, better for the environment and provides energy independence.



**The Magnum 250 is used for baling with the Case IH LB433R and for tillage with a Pöttinger Servo 65-6 six-furrow plough.**



Case IH equipment helps them create the best agricultural conditions for their business and collect crop residues that allow them to manufacture straw pallets.

This project contributes to the employment of 70 people from the Odžaci and Sombor areas.

Farmers who sell crop residues will have extra income and lower processing costs. This means that these two municipalities have saved around 2,500,000 euro (\$A3,507,000), while Serbia could receive income from direct exports of 9,000,000 euro (\$A12,626,000) per year.

Robert Hollo said that he is very happy that a company like BPI recognised their potential and the potential of all people who own land in Serbia.

BPI has signed contracts to export straw pallets to EU countries for the next 10 years.

The Hollo Family and BPI believe that this project is their future and they have now agreed for another five or six such plants to be built in Vojvodina.



**The Puma 155 is used to transport large rectangular bales. It has a special selfloading and unloading side car.**

## MODERN FARM EQUIPMENT – HIGH-TECH OR HIGH-STRESS?

■ By Brian O'Connell – Editor *Australian Sugarcane*

Don't you just love farming? It may be risky, it may be arduous, but it's never dull. I was recently reading through a report in *The Australian Sugarcane* magazine by Queensland farmer Michael Hetherington and was intrigued and mystified by his reference to 'Arduino'. My first thought was that he had discovered a new coffee blend but no, Michael was talking high-tech.

According to Wikipedia (a dictionary or encyclopaedia would be just so low-tech) Arduino is an open-source computer hardware and software company. The company designs and manufactures kits for building digital devices and interactive objects that can sense and control the physical world. Arduino boards may be purchased pre-assembled, or as do-it-yourself kits.

So Michael was very definitely talking high-tech and I'm sure his comments echoed the thoughts of many of his neighbours. Michael observed that electronics have delivered so much in terms of ease of operation and efficiency but what about reliability?

"Reliable means what?" says Michael in his report. "It works perfectly until it stops working. Or does it mean that when it breaks down (as everything mechanical must) it is economically repairable. I say both."

Michael's comments reminded me of another recent report I had come across on a similar issue.

### Unlocking the giant black box

WIRED is a website ([www.wired.com](http://www.wired.com)) that looks at how technology is changing every aspect of our lives – from culture to business. It recently commented on the use of computers and precision equipment in farm machinery.

The article noted that modern electronic systems afford the kind of precision and predictability that farmers 20 years ago couldn't have even imagined. But for most farmers this means they are essentially driving around a giant black box outfitted with cultivating, seeding or harvesting tools.

The writer's main concern was that only the manufacturers have the keys to the electronic inner workings of that giant black box.

Modifications and troubleshooting require diagnostic software that farmers don't and often can't have. Even if a farmer managed to access the right software, calibrations sometimes require a



factory password – a password that, in the WIRED case under US copyright law, the manufacturer has every legal right to use.

### Remember when?

What with a few family gatherings in recent times, my father and my siblings had cause to be reflective. We're a lucky family in that our reflection was of a warm and happy nature. Much of this reflection was to do with "remember when?"

Remember when we always travelled with a tool box, a fan belt, a coil of wire and a swag – and they were all used regularly?

Well today I still travel with that gear but I can't recall how many years ago it was that I had cause to use any of it.

Modern vehicles are more reliable, more comfortable, safer and more economic to operate. Mind you, when and if I do break down it will be the swag that will be of most use because I wouldn't know where to start under the bonnet – if it's still called a bonnet?

And I suspect that's where we all are when it comes to modern farm equipment. We might be able to repair the 'old girl' but there's not many of us that would want her as our main workhorse any more.

True, we are very heavily reliant on the manufacturers. We rely on them to deliver the electronic wizardry and we rely on them to service it. And yes, that makes us vulnerable to the manufacturer. But if a farmer feels they're being ripped off with poor service or overly high service charges then there are other suppliers more than happy to satisfy their requirements.

# KI growers hop into the quality end of the market

■ By Richard Holdcroft

**T**HROUGH innovative marketing, Kangaroo Island's KI Pure Grain has turned the disadvantage of its remote location into a powerful brand statement.

The company's success story dates back to 2009, when four disgruntled island grain farmers, frustrated by the high costs associated with their geographic isolation and at not being able to control the freight, storage, handling and marketing of their own produce, banded together with a mission to secure premium returns for local grain growers.

Sitting just off the coast of mainland South Australia, the island is seven times the size of Singapore and has a population of less than 5000. For such a small operation in such a remote location, the challenge of taking on international markets seemed daunting.

But the timing of their move was fortuitous. In a world increasingly concerned with food safety, the island – long recognised for its pristine, unpolluted environment – turned out to be just what many consumers were looking for.

## Close consumer relationships

KIPG has established a close relationship with Japanese consumers. They place great value on the region's high-quality produce, which meets their high food safety standards by virtue of being free of any genetically modified content, segregated, safe and traceable.

"With a food self-sufficiency ratio of below 50 per cent, Japan is heavily reliant on food imports," explains Steven Fairbrother, general manager of the Australian office of Japanese trading house Kanematsu.

"Japanese consumers have been burned by repeated food scares, especially from China, and they are happy to pay more for quality," he said.

Contact with Japanese customers was established with the help of Austrade, and with exploratory trips to Japan to meet potential buyers and their end consumers.

"We sat with a group of mothers and listened to what they want," KIPG chairman Neil Pontifex says, "and it was all about minimal chemicals, GM free, food safety."

Kanematsu was the first Japanese business ever to set up office in Australia and is this year celebrating 125 years of operations here. It originally came in search of Australian wool, but these days it imports a wide range of goods, including KIPG's premium food products.

These include some 4000 tonnes of KIPG-branded canola a year. In Japan, the grain is processed into oil, where it is valued for cooking tempura-style recipes.

The premium that KIPG earns on the seed is no obstacle for cashed-up Tokyo households, and more than covers the high costs of transport off the island that have bedevilled local producers for so long.

## Paddock to plate

What makes KIPG's brand so prized is its "paddock to plate" control system, which enables it to monitor grain production – from seeding to harvest and storage – with repeated quality testing.

It guarantees that each shipment can be traced back to the individual farm where it was harvested, contains no genetically modified material and has been grown with minimum chemical inputs. Buyers are given regular updates on the status of crop progress, storage and shipping.

"If the island could double production tomorrow, we could sell it," said Steven.

In recent years, broad beans have proved to be a remarkable growth opportunity for the company. The beans flourish in the island's often-waterlogged clay soils, and are in high demand across Asia and increasingly in Europe. This year some 6000 tonnes will be exported, and more of the island's sheep farmers are being encouraged to plant beans and help meet a demand that far exceeds supply.

The beans are much more labour intensive than canola, requiring cleaning, sorting and packing. In February KIPG's new \$1.4 million bean processing plant came online, enabling it to meet the high specifications of demanding customers in Malaysia and elsewhere.

Kangaroo Island also produces a range of premium raw, organic eucalyptus and canola honeys, which KIPG markets alongside its grain products in Japan on behalf of the island's apiarists.

## Mutual trust

The mutual trust that has been established between the island and its customers is now carefully nurtured. Every year a delegation from the companies that make up the Japanese distribution chain are hosted on the island, where they tour farms and KIPG's processing facilities.

In turn, KIPG visits Japan to keep its finger on the pulse of its key market.

KIPG has grown to the extent that it now represents almost all grain growers on the island, farming approximately 35,000 hectares of land. Total output exceeds 15,000 tonnes of grains a year, including high-quality wheat largely sold to local customers such as Arnott's for premium biscuits, including Tim Tams.

Already the recipient of several agri and business awards, KIPG was a finalist for the Brand South Australia Regional Awards in 2013 and 2014. The company's achievements point the way for other Australian exporters seeking to add value to agricultural commodities and to establish footholds in the markets of Asia and the world.



Kangaroo Island growers are cashing in on a lucrative and trusting Japanese market.



# Creating a coeliac-safe wheat

■ By Julia Debes, US Wheat Associates

**W**HAT would it take for coeliacs to be able to have their wheat – and eat it too? That is exactly what Dr Chris Miller hopes to achieve in a research project funded by Kansas (US) wheat farmers through the Kansas Wheat Commission. Chris, the senior director of research, innovation and quality at Engrain, is working to lay the groundwork for creating a coeliac-safe wheat – and one that could still make a great-tasting, good-looking loaf of bread.

## Step 1: Identifying reactivity

Chris will first identify the level of coeliac disease reactivity in 300 different cultivars in four different categories – currently planted Kansas wheat varieties, historically popular wheat varieties, new experimental wheat lines and wild wheat relatives.

Chris will literally put these samples to the test – relying on the reaction between human antibodies and wheat proteins.

Antibodies are the defenders of the human body, each developed to remove a specific ‘threat’. For people with coeliac disease, a portion of their antibodies have identified gluten as something that may cause harm to the body. When they consume gluten, antibodies defend, which causes damage to the small intestine.

Every coeliac sufferer’s sensitivity to gluten is a little different, which is why some just get an upset stomach and others end up in the hospital after consuming gluten. This means there is not one antibody that reacts to one protein. Instead, an array of human antibodies and their variations react to potentially hundreds of different wheat proteins – or even just fragments of proteins.

To match wheat proteins with the custom-made human antibodies with which they react, Chris will use a process called antibody staining. He will take all of the individual proteins from one wheat variety and stick them in a gel – like pieces of fruit in Grandma’s prize jelly.

The human antibodies are then washed with a coloured stain and then mixed into the gel. If the human antibody finds its wheat protein target – they stick together and show up as a coloured band. Proteins without an attached antibody remain invisible, and unmatched antibodies simply wash away. The more dense the colour, the more antibodies that reacted, or the higher level of reactivity for that specific wheat variety to human coeliac disease.

With this information, Chris can rank each cultivar for their level of reaction. Wheat breeders can use Chris’s rack-and-stack to screen new and upcoming varieties for lower naturally occurring levels of reaction for human coeliac disease.

## Step 2: Down to the DNA

But each person’s immune system has different antibodies, so Chris must identify any wheat protein fragment that could potentially react to any one person’s antibodies and create a coeliac reaction.



Research is underway to create a coeliac-safe bread based on wheat flour.

To find the exact epitopes, or protein fragments, that react to human coeliac disease antibodies, Chris will use a process called immunoprecipitation. In this process, a single antibody is adhered to the surface of a microscopic magnetic bead.

The miniature magnets are then fixed to a surface – like hundreds of super tiny magnets stuck to a fridge. Then, the proteins from a single wheat sample are washed over the surface. The reactive proteins stick, the others simply wash away. From there, Chris can isolate and sequence the reactive cereal proteins. These sequences provide targets to sequence the specific genes that cause a human coeliac disease reaction.

## Results benefit more than farmers

At the end, Chris will have created the most comprehensive study of wheat proteins related to coeliac disease ever published. Kansas wheat farmers are the only group supporting research into the identifying the exact DNA that causes a coeliac reaction as well as the levels of reactivity in wheat varieties. But the results would be life-changing for the millions with coeliac disease.

As Chris said, “This is a huge contribution to science – not just to Kansas, but to all of human health.”

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# Don't sow field pea too early

■ By Alan Meldrum, Pulse Australia industry development manager

**B**LACKSPOT control in field peas is critical to avoid yield losses. Careful paddock selection to avoid a recent history of field pea is important to minimise the risk of blackspot spores from old stubbles reaching a newly emerged field pea crop. Delaying sowing until after spores from the previous season have been released and rendered ineffective is the next most important decision.

The Department of Agriculture and Food (DAFWA) Field pea blackspot sowing guide for Western Australia provides the latest sowing guide for locations in WA. The sowing guide is based on recommendations from the very robust 'DAFWA Blackspot Model' and provides a best bet guide to the safest time to plant field pea in various localities. Sowing before



Alan Meldrum, Pulse Australia.



Blackspot disease control is central to disease management and maintaining yield potential in field pea.



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the forecast indicates it is 'safe' to do so is likely to lead to higher disease pressure and consequently poorer crop yield.

Seasonal conditions in 2015 in Western Australia appear to be following a similar path to those that occurred in 2013 particularly in the Esperance region. Good soil moisture early in the season enabled growers to sow crops early, finishing their programs with field pea but before it was safe to do so. The result was a high level of blackspot disease and the resulting yields were only half what was expected, leaving many growers very disappointed.

In 2015, this same scenario is possible. April rain in WA has had growers planting canola, beans and lupins early before moving into wheat. Many growers were ready to plant field pea by mid May, but in some of the key field pea growing districts the blackspot sowing guide is indicating that the blackspot risk was still too high (in WA up to the week of May 19).

Blackspot disease occurs when the spores from stubble material are released after a period of rain and low temperature, and then the spores land onto emerged field pea. If the spores land onto bare soil, they cause no harm. The aim of the model is to forecast when the spore release has happened in each district, such that the spore release occurs before field pea has germinated.

This year, as in 2013, the early rainfall has not coincided with a sharp drop in temperature, meaning that there has not been a significant spore release. Delaying the completion of seeding for 2015 is a small price to pay for a healthy field pea crop.

Discuss your specific situation with your advisor or agronomist.

For more detailed information refer to 'Field pea disease management: Southern and Western Region' on [www.pulseaus.com](http://www.pulseaus.com) by clicking on the 'Publications' button or contact Alan Meldrum on 0427 384 760 or [alan@pulseaus.com.au](mailto:alan@pulseaus.com.au)



# New herbicide registration for some legume crops

## AT A GLANCE...

### Sakura controls five key weeds

- Annual ryegrass (including populations resistant to other Modes of Action);
  - Barley grass;
  - Annual phalaris;
  - Toad rush; and,
  - Silver grass.
- With suppression of two more weeds:
- Brome grass (*Bromus diandrus* only); and,
  - Wild oats.

### Other key points

- Long residual control;
- Three-day pre-sowing application window;
- Registered for use in wheat and triticale; and,
- Now registered in chickpeas, lupins and field peas for the 2015 planting season.

**S**AKURA 850 WG Herbicide is now registered for the 2015 planting season for application prior to planting of chickpea, lupin and field pea crops. Bayer recommends always using Sakura according to the most recent approved label.

These new registrations will offer winter grain growers a very effective new option for control of difficult-to-manage grass weeds in these grain legume crops.

Gordon Cumming from Pulse Australia says that with the current pressure on chickpea herbicides, Sakura's new registration is timely.

"Whilst Sakura's use pattern and weed spectrum may not suit the more traditional chickpea growers, it may provide some additional options, particularly where annual phalaris is a problem."

### High level of control

According to Bayer, Sakura consistently provides a high level of weed control in wheat and triticale crops compared to other pre-emergent herbicides. That high level of grass weed control can minimise yield loss caused by weed competition, and allow growers to plant their crops during the ideal sowing window.

Trial have shown that Sakura can provide comparably high levels of weed control in chickpea, lupin and field pea crops with good crop safety in most varieties (see charts).

These new registrations will extend growers' ability to overcome major grass weed problems with the optimum combination of herbicide and crop rotations over several seasons.

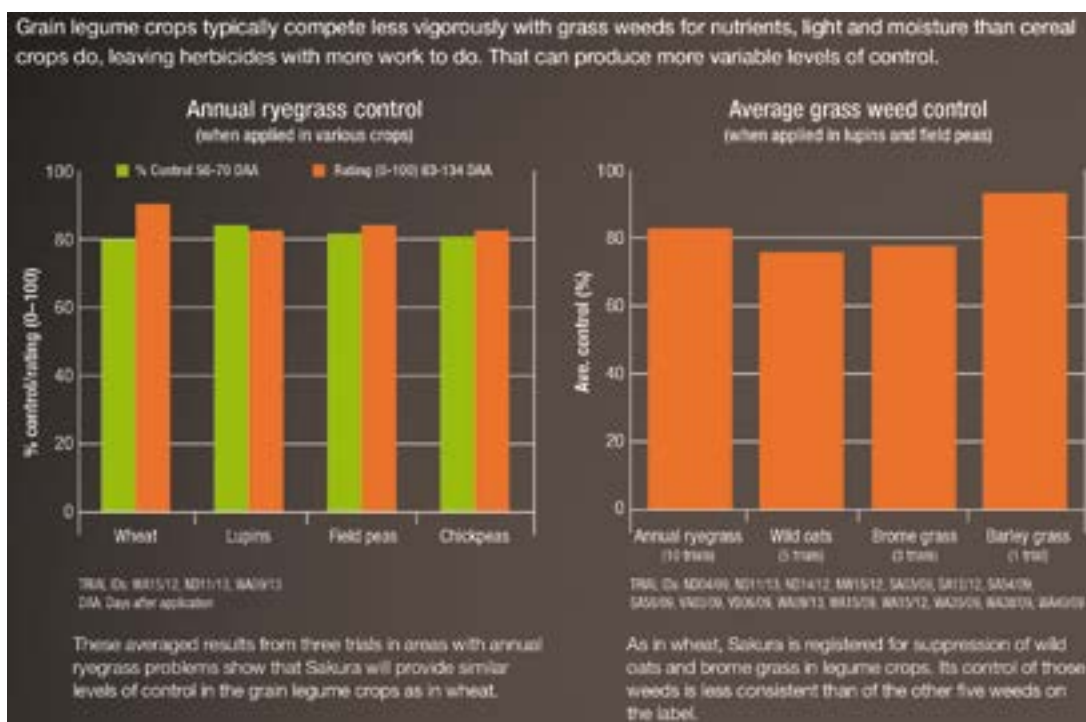
### Don't leave it until it's too late

It's all too easy to ignore increasing herbicide resistance until it's too late.

As part of an overall resistance management strategy, the Group K chemistry of Sakura can help keep products from other chemical groups viable as rotation options – and that in turn can help you manage the overall cost of your weed control program.

The three most important things you can do to delay or avoid the build-up of herbicide resistance are:

- Use the full label rate;
- Rotate herbicide modes of action; and,
- Integrate other methods of weed control into a management program.



# Hasten paired with Sharpen in resistance fight

**G**RAIN growers have more reason to trust Australian adjuvant, Hasten, when spraying crops this winter following another third-party endorsement and encouraging new results from adjuvant safety studies.

Launched in Australia by family-owned company Vicchem in 1994, Hasten has become something of a home-grown success story in the crop protection industry and the wider farming fraternity.

According to Vicchem's business development manager, Owen Connelly, Hasten is one of the few brands in the adjuvant market today that can genuinely claim 'Aussie icon' status.

"The fact that Hasten is made by Australia's own Vicchem for local farming conditions – using Australian-grown canola oil – is a compelling proposition for many grain and oilseed producers," he said.

"But equally as important, Hasten has a 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 comes from global farm chemical manufacturer BASF who recommend Hasten on its Sharpen label. Sharpen is a systemic group G herbicide with standalone control claims for a wide range of broadleaf weeds.

BASF's marketing manager for broadacre crop protection, Chris Tyrrell, said the inclusion of Hasten on Sharpen's label was driven by a high degree of trust and confidence in Hasten.

"We take pride in the quality of our herbicides and place great

importance in optimising the weed control provided by Sharpen. As custodians of this product, we wanted to ensure Sharpen performs to the best of its ability and that includes the quality of the adjuvant with which it is recommended. Hasten is a proven performer with Sharpen.

"As a high quality ESO, Hasten gives us full confidence that Sharpen will perform to our high expectations. Sharpen and Hasten provide a powerful new resistance management tool in Australian farming systems."

Owen said the patented technology of Hasten was already endorsed by more than 25 leading crop protection brands – including Bayer, Sumitomo, Sipcam and Adama – before this latest development with German-based, BASF.

To reinforce the new alliance, BASF and Vicchem ran a joint promotion with key rural resellers earlier this year whereby sales agronomists were offered a litre of Hasten with a kilo of Sharpen as an incentive to encourage more farmer to try the winning combination for the first time.

Owen said the exercise had been a success with resellers, agronomists and farmer customers alike and would consider doing more joint promotions of this kind with other key supply partners.

## Adjuvant safety studies

In news from Vicchem's research division, technical manager Peter Jones reports encouraging results from a series of studies exploring adjuvant safety as it affects users, crops and the natural environment.

Peter said all adjuvants had the potential to cause crop phytotoxicity which plant chemists believed was due to cellular breakdown.

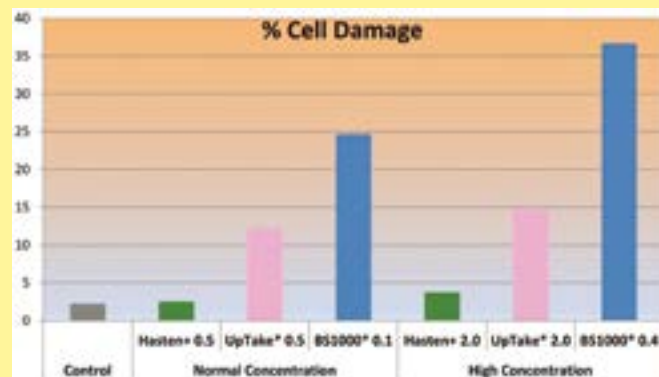
"Based on our lab studies, canola-derived Hasten produced relatively less cell damage than mineral oil adjuvants including Uptake and non-ionic surfactant adjuvants including BS1000," he said.

Peter said Vicchem had also studied the effect of these same adjuvants on beneficial insects and predatory mites.



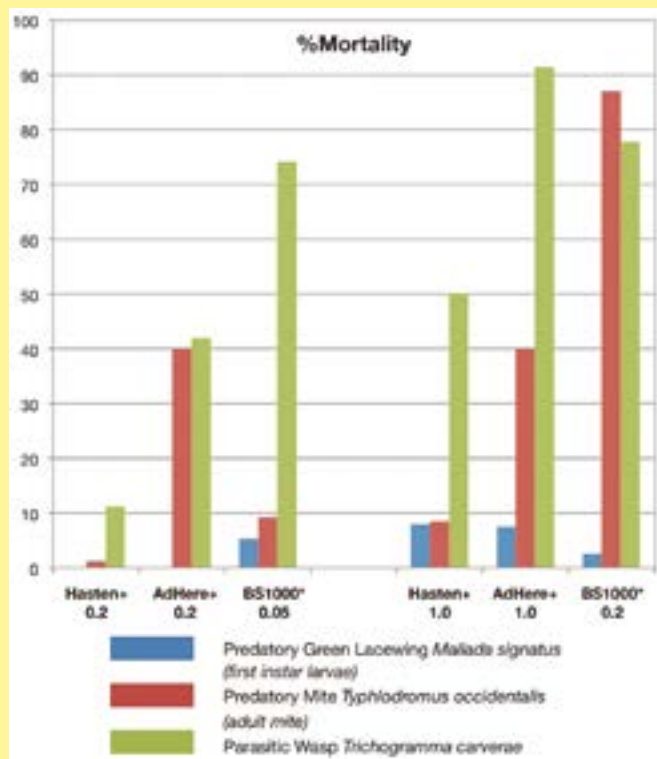
Vicchem's business development manager, Owen Connelly.

**FIGURE 1: Based on Vicchem's lab studies, canola-derived Hasten produced relatively less cell damage than mineral oil adjuvants**





**FIGURE 2: This Vicchem trial 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**



"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."

In other developments, Peter said Vicchem was exploring opportunities to use some of the outstanding properties of Hasten in the development of new products, tailored-made for certain pesticide types.

### Help penetrate waxy cuticle of weeds

"A key strength of Hasten is its ability to help systemic selective herbicides penetrate the waxy cuticle of target weeds without damaging crops.

"We are now trying to incorporate those properties of Hasten into new adjuvant products in a targeted way.

"For example, we are now designing an adjuvant that will one day be recommended for knockdown herbicide use only and another that is specifically formulated for use with systemic fungicides.

"Ultimately, it's about being more exact with the science and using novel ingredients to get the best result from every pesticide type and application scenario."

Owen said Vicchem would launch a national media campaign under the Aussie Icon theme to promote these latest findings and achievements in June 2015.

For more details, contact Owen Connelly at Vicchem's Coolaroo headquarters on (03) 9301 7000 or go to [www.vicchem.com.au](http://www.vicchem.com.au)

## The business of carbon offsets

**D**URING March and April this year the Kondinin Group held five farmer workshops for SA farm-based businesses considering carbon offsets projects.

Farmers from mixed farming, cropping, livestock and forestry growing, together with agricultural and farm management consultants attended the workshops in Bordertown, Cleve, Cummins, Wudinna and Jamestown.

In the workshops, participants worked through key steps for building a business case for a farm-based business considering participation in the Emissions Reduction Fund (ERF).

Kondinin Group's Project Manager Nilay Gencturk said the delegates used an excellent carbon farming business manual written by economists and lawyers, with two Excel templates to carefully work through different cost and revenue scenarios.

"This hands-on part of the workshop really helped farmers to step through all the pros and cons to quantify the risks and recognise all the benefits of carbon farming and ERF participation," Nilay said.

"A farmer considering participation in the ERF needs to know all the facts before deciding whether a carbon farming project is going to be right for them. The workshop discussions certainly were highly regarded by the farmers who attended."

### Consider carbon farming as an additional farm enterprise

The Australian Farm Institute Director, Mick Keogh says farmers should consider carbon farming as an additional farm enterprise that may complement their current enterprises.

"An ERF project should be approached with the same degree of caution and research as they would any other new enterprise. Like any farm enterprise, carbon farming presents opportunities and challenges, which need to be well understood before decisions are made," Mick says.

"The workshops provided a useful first step in the process of gaining a sufficient understanding in order to make an informed decision about whether an ERF project would work as part of a farm business.

"The workshops provide a valuable explanation of how ERF projects work, and also provide some universally relevant material about enterprise budgets. The manual is also a very useful reference for farmers who have attended a workshop and would like clarification on specific issues."

Mixed sheep and cropping farmer, Toni-Louise Cockburn attended the Jamestown workshop and says the workshop was a good introduction to the carbon farming topic giving her a better understanding of the ERF.

The workshop program designed by Kondinin Group was supported with funding from the Australian Government. All delegates attend free-of-charge.

Delegate places are still available for the final SA workshops running at Kingscote (Friday, June 19), Mount Gambier (Friday, June 19), Kadina (Monday, June 22) and Kapunda (Wednesday June 24) and Karoonda (Monday, June 29).

Register online at [www.farmingahead.com.au/cfi](http://www.farmingahead.com.au/cfi) or contact Wendy Thomson on 1800 677 761.

To see a full list of workshop dates and locations visit [www.farmingahead.com.au/cfi](http://www.farmingahead.com.au/cfi).

For further enquiries please contact: Nilay Gencturk, Kondinin Group Tel: (02) 8252 9415 Email: [nilay.gencturk@kondinin.com.au](mailto:nilay.gencturk@kondinin.com.au)

# District Reports...

May–June 2015

## Western region



### STATE WIDE SUMMARY

WA growers remain optimistic about the prospects for the 2015 season particularly with the very welcome widespread rainfall in mid May.

Rainfall from Cyclone Olwyn in late March and widespread rain in early April delivered good levels of soil moisture to the majority of the grainbelt. This is providing confidence in yield potential and causing an increase in the total area planned to be cropped. The mix of effective weed control prior to sowing and deep soil moisture removes some of the normal production risks of grain farming at this early point of the season.

The 2015 season will see a much greater change in the mix of crops grown in Western Australia than seen in recent past seasons. Several factors are influencing this change:

- Canola prices have declined in the last 12 months lowering the profit potential. Additionally, the rapid rise in the area of canola sown in recent years has caused some agronomic issues to emerge, principally root lesion nematodes and sclerotinia. These two factors have caused a decline in the area expected to be planted to canola this year.
- There is increased interest in growing oats with growing demand for exports. Combined with the improved yield performance of newer varieties such Boddington and Williams, this has driven a large increase in the intended oat area in 2015.
- Lupin plantings are increasing with growers reporting competitive profits compared to canola, and in some cases wheat.

**Grain Industry Association of WA (GIWA)**  
May 8, 2015

### NORTH

The past nine weeks have been an exercise in severe contrast in our area. Significant rain fell in most areas in the first few days of March and continued on. Most areas had almost weekly rainfall until the middle of April. Rain totals were from around 30 mm in the south west of the region up to around 300 mm in the north east over the six week period. Conditions in mid April could not have been better.

The contrast is that the past three and a half weeks have been warm and dry. Moisture has receded in sand soils up slope but is still close to the surface on loam soil areas lower in the landscape.

The temptation of very early planting was there and some

growers took it on and have canola that is well established and looking good. We won't know until September if it was a good decision or not.

Cropping program seeding has progressed well and the first growers will be completed seeding next week. Some growers have just started but will be completed by the end of the month.

The early rains presented good knockdown herbicide opportunities and most growers have been spraying since the middle of March. This, and seeding into drying conditions, mean crops are emerging very clean with very few weeds at this stage.

Most areas have crop out of the ground where the crops were sown onto moisture. There are some concerns for some of the crop, particularly expensive Roundup Ready canola, that was sown and dried too rapidly to emerge. We hope enough will come up with the next rain to make a viable stand.

Generally it has been an expensive start to the season but the subsoil moisture should have been worth it. The forecast is for a reasonable rain this weekend and we all hope it comes off to allow a wet finish to the seeding programs.

**Peter Norris**

**Agronomy For Profit and Synergy Consulting, Geraldton**  
May 12, 2015

### SOUTH COAST

The past two months on the South Coast saw some very good rain at the beginning of April which provided an ideal opening to boost stored soil moisture levels and to allow for a very good germination of weeds.

Most growers were able to get some very good knockdown weed control and in most cases, a double knock treatment.

Canola seeding commenced in mid April and by mid May, some growers had finished their entire cropping program.

Crop establishment has been very good with minimal agronomic problems.

Rainfall has been mixed during May with the inland Mallee struggling for a good follow-up rain whilst the coast has received adequate showers.

Post emergent weed control has just begun in the early sown canola.



**Seeding Mace wheat at Daren and Kym Curnow's Scaddan Farm with two 8310 JCB Fastracs. The Curnow's use a 12 metre controlled traffic farming system.**



# District Reports...

May–June 2015

## Southern region



### SOUTH AUSTRALIA

The winter crop in South Australia is off to a promising start.

The state recorded above average rainfall during April. Totals for the month were above average across eastern, central and western agricultural districts, particularly across southern parts of the central and northeast pastoral districts.


But April totals were average tending to below average in the southeast agricultural areas.

Seeding barley at Graeme and Jenny Perk's farm near Grass Patch.

With such an early start – and mostly quick maturing crop varieties being sown – it is likely to be a very early harvest this season.

**Quenten Knight,**  
Agronomist, Precision Agronomics Australia  
May 13, 2015

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

<div>Brought to you in association with</div> <div></div> <div>JOHN DEERE</div>	25yr Annual Average (mm)		2015 rainfall to date (mm)		Summer		Autumn		Winter		Spring	
			25yr Annual Average (mm)	2014–15	25yr Annual Average (mm)	2015 to date	25yr Annual Average (mm)	2014	25yr Annual Average (mm)	2014		
Emerald Qld	549	157	242	283	112	20	60	36	122	161		
Toowoomba Qld	662	294	272	339	130	206	82	69	121	85		
Roma Qld	578	159	247	286	128	43	72	87	126	43		
Goondiwindi Qld	608	337	251	308	124	147	66	72	135	30		
Narrabri NSW	633	313	227	148	119	234	126	110	160	36		
Gunnedah NSW	660	222	234	178	118	139	129	140	177	74		
Dubbo NSW	609	253	197	239	132	91	128	129	152	38		
West Wyalong NSW	444	149	113	166	86	27	118	108	126	54		
Wagga Wagga NSW	537	170	130	133	114	64	151	123	143	103		
Swan Hill Vic	322	44	73	20	65	29	89	46	95	45		
Bendigo Vic	514	128	109	77	102	61	167	155	136	108		
Horsham Vic	384	98	75	84	70	26	132	90	107	36		
Lake Bolac Vic	529	243	117	78	100	185	160	144	152	74		
Murray Bridge SA	369	159	66	65	76	101	128	111	99	46		
Kadina SA	343	55	58	31	77	37	120	94	88	26		
Cummins SA	395	121	51	47	87	92	175	209	82	26		
Esperance WA	615	137	80	30	142	129	249	242	144	163		
Wagin WA	402	106	46	16	95	90	171	136	89	88		
Northam WA	404	99	42	19	85	80	192	173	86	101		
Mingenew WA	366	43	31	1	92	39	176	144	68	99		
Moora WA	384	126	43	51	86	76	783	140	72	37		
Mullewa WA	309	269	48	40	90	230	131	56	50	74		

Last rainfall reading May 18, 2015.

# District Reports...

May–June 2015

The heaviest rainfall occurred between April 16 and 18 when an upper level trough moved over central and eastern parts of SA. The resulting rainband produced locally heavy falls of greater than 60 mm – some stations in the Flinders districts had their highest April daily rainfall on record on the 17th.

Broad areas of the northern agricultural and the southern pastoral districts received more than 80 per cent of their average rainfall for April in just one day. Some stations recorded two to three times their long-term April average, resulting in their highest total April rainfall on record.

In mid May, useful rainfall was again recorded in southern South Australia. A vigorous cold front produced moderate rainfall totals in parts of southeastern South Australia, with light falls continuing in a cold, southwesterly airstream behind the front as a strong high pressure centre became established in the Great Australian Bight.

Rainfall totals from this event were between 10 mm and 50 mm on the Yorke and Eyre peninsulas and into southeastern districts.

Bureau of Meteorology  
May 19, 2015

## WESTERN MURRAY VALLEY

It has been a very dry start to 2015 for the WMV. with only a small rainfall event of 25–30 mm in January and another 25 mm mid April and 18 mm early May. This hasn't been enough moisture on clay loam/clay soils to get crops emerging. The only crops emerged are pre-irrigated or sandy/sandy loam soils.

But the dry start was a reprieve for corn and rice growers having a hassle free harvest. This autumn was the first time many double croppers with corn could harvest at the correct moisture (14 per cent) without additional drydown costs.

### Corn harvest

Double cropped paddocks following canola/barley/pasture had average corn yields of 11.5–13 tonnes per hectare. This



Mick Barlow farms in the Moama district. Mick recently harvested this paddock of P1070 corn which delivered a final yield 12.4 tonnes per hectare.

is predominantly due to shorter season length varieties. The standout performer was P0021 (100 Comparative Relative Maturity – CRM).

Early sown main season corn has been exceptional with yields from 12–17.5 tonnes per hectare. The most consistent variety has been P1070 (110 CRM). Early contract prices were excellent with most farmers receiving \$295 per tonne on farm. Without contracts, prices have slipped back with other commodities to \$265–\$270 per tonne on farm.

*Quick sums => Average yield 13 tonnes x \$295 = \$3835 per hectare – production costs \$2500 = gross return \$1335 per hectare. With little to no summer rainfall crop used 7.6–8 ML per hectare, therefore returning around \$170 per ML.*

### Rice harvest

Around 98 per cent of the rice is harvested with the odd grower still dragging the chain due to late water drainage. Yields have been exceptional. The district average for the WMV is usually 8.6 tonnes per hectare – this year it is uncommon to hear of yields less than 9.5–10 tonnes per hectare. Reiziq, Sherpa and Opus have been the standout performers. Some areas near Bunnaloo experienced low temperature induced sterility. This wasn't a management issue – crops within the recommended sowing window experienced this. These paddock yields dropped back to 6.5–7.5 tonnes per hectare.

*Quick sums => Average yield 10 tonnes per hectare x \$380 (maybe \$400??) = \$3800–4000 per hectare – production costs \$2700 per hectare = gross return \$1100–1300 per hectare. Average water usage has been 13–14 ML per hectare, therefore returning around \$90 per ML.*

Both summer crops (corn and rice) have been very profitable to grow. But growers who had to source temporary water opposed to allocation would have had an average water cost of \$120 per ML. As an irrigation area we are hoping for higher allocations and more affordable water.

The Murray Irrigation Limited system is currently on 63 per cent allocation and temporary water prices have been trading from \$110–\$135 per ML.

### Winter cropping

About 80 per cent of the winter crop has been sown – unfortunately without rain interruptions. Ten days of 60 km per hour winds has made getting knockdown and pre-emergent herbicides out a dawn operation only.

With big wheat and barley crops in 2014, even the best airseeders couldn't cope with high stubble loads. Consequently, more stubble burning has occurred this year to get the crops in.



Harvesting Shepra rice at David Jarrott's farm 'Mayrung' in the Deniliquin district. This field yielded 11.7 tonnes per hectare.



# District Reports...

May–June 2015



Monti and Antas clover showing excellent growth five weeks after an irrigation.

## Dryland crops

Canola area is slightly reduced (from 20 down to 15 per cent) with the dry summer and dry start. Majority of plantings are Triazine Tolerant (Bonito, Stingray and Hyola 559TT). A substantial increase in round-up ready canola has occurred due to increasing awareness of herbicide (Group A and B) resistant ryegrass and wild oats.

The legume area on dryland is low again (5–10 per cent) with lupins (Mandelup/Myallie) on some sandhills, vetch (Morava/Popany) for hay in some problem weed paddock and peas (Twilight/Gunya/Kaspa) going in late for the ryegrass control/crop topping option.

La Trobe barley performed very well last year compared to the benchmark Hindmarsh, with La Trobe officially becoming malt it will now be 80 per cent of the barley grown with some Baudin/Commander/Gairdner on irrigation. A concerning swing towards barley opposed to wheat has occurred after last year's excellent yields and record prices. Barley area will increase from 30 per cent of the area to nearly 50 per cent. Wheat and canola area will be reduced.

Dryland wheat will be slightly reduced to make room for barley with the two main varieties being Mace (AH) and Corack (APW). Both of these varieties have performed consistently on dryland and irrigation areas.

## Irrigated winter crops

Most irrigators have made the correct decision to pre-irrigate paddocks before sowing after last year getting caught out with 100 mm irrigation + 130 mm rainfall on top! The major issue for pre-watering has been the high water usage. Normally we budget on 1–1.25 ML per hectare to pre-irrigate a paddock. But due to the very dry summer, irrigators have been using 1.6–2 ML per hectare – It's DRY! This has blown the water budget out for most irrigators as increased demand has seen temporary water prices rise to \$130 per ML.

There has been a significant increase in faba bean area with last year's good prices (\$500–\$550 per tonne) even with an expected price drop to \$350–\$400 per tonne. Growers are certainly looking for a 'profitable' legume break to aid in weed management and better performance of following cereals.

Canola area is consistent with reliable yields and weed control options, even with the reduction in forward contract prices (\$460 per tonne). Round-up Ready canola with its superior yield to TTs and weed control options, is working very well and will become more common.

Irrigated barley hasn't increased a lot. Growers with limited



Early red legged earth mite infestations have put pressure on clovers and brassicas in the Western Murray Valley.



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# District Reports...

**May–June 2015**

water may opt for barley over wheat for one irrigation for an increased return per ML. Most of the irrigated barley is Baudin (some Gairdner/Commander) targeting six to eight tonnes per hectare. Growers who irrigate once aim for four to five tonnes per hectare and are using Hindmarsh/La Trobe.

Chara wheat is still the benchmark variety for early sowing targeting seven to eight tonnes per hectare. But local experience is showing Mace and Corack can achieve similar yields with the correct management (we managed 11 tonnes per hectare at our Barooga IKC trial site on border check flood irrigation).

A new variety to the area is Trojan (APW) a highly adaptable medium – high rainfall – irrigation type. This will give us an earlier sowing window than Mace/Corack without the falling numbers issue Chara has.

## Pastures

With excellent lamb prices – and never before seen cattle prices – mixed farming irrigators have allocated two to three irrigations to growing ryegrass/clover pastures or some early forage cereals.

Early pasture growth has been good, but high red legged earth mite, blue oat mite and lucerne flea pressure has warranted early control.

We are looking for that elusive 10–20 mm to get the crops up and growing and some confidence to start a nutrition program once crops reach four to five leaf stage.

As growers nearly finish cereals it's a pertinent time to remind them that boomsprays need thorough decontamination as the first crop sprayed is usually canola!

Fingers crossed for decent rainfall in the winter/spring.

**Laurence Pearce**  
**Agronomist – IK Caldwell, Deniliquin NSW**  
**May 18, 2015**

## MALLEE

What has been happening in the Wimmera/Mallee?

It has been a challenging time for growers, particularly when making decisions about which crops to sow, by when and how deep. The seeding zone in the Mallee has been marginal to dry, while the Wimmera has been dry. As Kenny Rogers sings: "You've got to know when to hold 'em and know when to fold 'em." While a plan is important, you may need to change it.

We know that there will be limited soil water in the profile if less than 50 mm of rainfall fell over summer. The true break has been swinging towards later in the year for most and the likelihood of El Niño has significantly increased. This has heightened the importance of adopting lower risk farming strategies for the season. Consequently, many growers have decreased or removed canola from their rotations and are considering increasing fallow proportions on appropriate soil types.

BCG recently launched a growth, adoption, production and profit (GAPP) pilot project (funded by Vic State Government), targeting growers who are looking to improve their farm management skills and the profitability of their businesses.



**The BCG GAPP group is targeting improved management skills and higher business profits.**

At the first round of GAPP meetings held in March, it was really encouraging to meet with and discuss agronomic and business management strategies with 70 young and 'young at heart' growers at Horsham, Rupanyup, Hopetoun, Birchip and Manangatang. Who said the farming population was aging?

**De-Anne Ferrier**  
**Research Officer, Birchip Cropping Group**  
**May 13, 2015**

## NSW OVERVIEW

- Rainfall during April was above average across 79 per cent of NSW. Excellent rainfall across most cropping areas allowed timely sowing of winter crops and improved winter forage crop production.
- Heavy rainfall occurred across the Illawarra to mid-north to north coast late in April, as a result of east coast lows. This resulted in damage to forage crops, cane, bananas and macadamias, waterlogging of pastures and damage to infrastructure.
- Pasture growth improved across most of NSW during April but has been slow in areas including the west, central west and tablelands. Growth remained relatively stable across the mid-north to north coast, but was affected by the heavy rainfall, waterlogging and flooding.
- Relative to historical records, April pasture growth was average or above across much of western and central NSW and the northern slopes. It was average on the coast and below average across areas of north western NSW.
- Forage crops responded to the April rainfall and further sowings were carried out.
- Winter crop sowing has commenced in most areas, except in areas west of the Newell Highway in the north west of NSW.
- Cotton harvesting was delayed by the April rainfall but summer crop yields have generally been good.
- Continuing below average run-off in many inland areas has meant stock water supplies remain low.
- In mid May, rainfalls totals of 10 to 60 mm were recorded across a wide area of the Central West and southern NSW boosting winter crop prospects.
- May 20 also saw useful falls in the cropping regions of NSW's North West Slopes and Plains.



# District Reports...

May–June 2015

- An El Niño event has commenced. These events are associated with a likelihood of reduced winter/spring rainfall, higher daytime temperatures, lower than normal streamflow and an increased risk of frost across inland NSW. But the warm sea surface temperatures currently occurring in the eastern Indian Ocean are contributing to the outlook for wetter than normal conditions in NSW during May to July.

NSW Department of Primary Industries  
May 19, 2015

## Northern region



### DARLING DOWNS

#### Summer crop

Sorghum and cotton yields have been excellent this summer for many growers, depending on planting time.

The sorghum crops planted in the spring did suffer from the November heatwave and dry conditions, bringing yields back to three to four tonnes per hectare. The December planted crops fared much better with cooler conditions in January and February and some timely rainfall.

Yields from these crops have been well above average, with irrigated sorghum yielding to 12.5 tonnes per hectare and dryland to 10 tonnes per hectare. The earlier harvested crops have had good quality, whilst crops coming off now are having some screening issues due to setting up for top yields and having a dry finish. There is still about 10–20 per cent of the crop to be harvested.

The cotton yields have been outstanding. Most of the crop was irrigated and with good heat units and no waterlogging through the season, some records have been broken with irrigated yields to 15 bales per hectare and the crop averaging 10 bales per hectare.

Spring planted corn however was disappointing as it suffered from the heatwave in November, but the summer planted crops look good as they approach harvest. There was a large planting of mungbeans, based on the very strong prices, which encouraged growers to double crop. Yields on long fallow ground were good at up to 2.5 tonnes per hectare and many crops achieved 2.0 tonnes per hectare. But the double cropped



Oats emerging on the eastern Darling Downs after being dry planted before the very timely late April rain.

paddocks were only average, with most yielding between 1.0–1.6 tonnes per hectare, although this still gave a good return with the prices.

#### Winter crop

The April rain was excellent across the Eastern and Central Downs, with most growers receiving 90–140 mm of soaking rain, which has filled winter moisture profiles, allowed irrigators to fill their storages, and started next summer's soil profiles with 60 cm of wet soil.



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# District Reports...

May-June 2015

The main planting interest is chickpeas, due to the very strong prices, and the area is expected to be up to three times the normal planting area on the Downs. Seed supply has become the major limiting factor for any more acreage as the crop is starting to be planted now. Sixty to 70 per cent of this year's crop will be double cropped into predominately sorghum ground – the rest planted into a short fallow.

There is good interest in barley, especially after it performed so well last season and its close spread in price to wheat. The area will be similar to last season which was above average, and planting is underway.

The wheat area will be below average again, even more so if there is not a follow-up rain to assist planting. This season we have seen a huge uptake of the newer varieties of both barley and wheat as growers chase yield for the feedlot markets, rather than protein.

The outlook for this winter is for a good start but a likely dry finish. So the crops will once again be relying on stored soil moisture, which is good at this stage.

**Hugh Reardon-Smith**  
Agronomist, Landmark Pittsworth  
May 14, 2015

## WESTERN DOWNS

The summer crop season is drawing to a close on the Western Downs but there is still a lot of sorghum still waiting to be harvested.

Grain moisture levels are slowly creeping down but the high moisture is holding up harvest with some growers contemplating grain drying as an option.

Yields on the harvested crops have varied depending on the planting time. The slightly later crops planted in January benefited more from the late summer/early autumn rain.



Sorghum generally performed well in the Chinchilla area this summer, particularly the later planted crops. This double skip crop received extremely beneficial rain in late summer and early autumn.

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Cotton crops in the area (mainly irrigated) have been picked with yields the best many growers have seen.

### Winter crops

The soaking rain early in May has set up the winter plant extremely well around Chinchilla. Unfortunately this rain didn't travel much further than Miles to the west.

But some growers west of Miles are nonetheless planting and making use of the good moisture profile by planting deep. With the strong chickpea prices, the area of peas in the district is about 60 per cent above normal while the wheat area is down slightly.

**Nikolaus Fritz**  
**Agronomy – Landmark, Miles**  
**May 14, 2015**

## CENTRAL QUEENSLAND

### Weather

This past summer crop season saw rainfall on the Central Highlands characterised by good rain in January and only scattered storms during the followings months. This was good for those properties that were under the storms but there was no widespread general summer/autumn rain to fill the gaps.

The Callide had good rain in January, an extreme event in February and has been pretty dry since. Whereas the Dawson has generally had moderate to good rainfall throughout the summer crop period.

Currently the Central Highlands are dry with some areas 'in drought'. The Callide had dried since big rain in February but has had some rain to allow some winter crop planting. The Dawson is generally fairly wet.

### Summer crop

**Sorghum:** I estimate about 250,000 hectares of sorghum was planted in CQ this summer. Dry conditions reduced the area planted to sorghum in some districts as well as an increase in the area planted to mungbeans. While there was sufficient soil moisture early to set up a high yield potential, the final yield was determined by (either or all) good luck ('you got the rain'), good

# District Reports...

**May–June 2015**

management (good weed control and soil water management) and soil depth.

Yield was variable with a large number of crops going one to two tonnes per hectare and suffering significant lodging (over 50 per cent in many paddocks especially in paddocks with shallow soils). A few top yielding crops achieved three to four tonnes per hectare, but 2.5 tonnes per hectare was more common in crops that didn't lodge. Harvest is 60–80 per cent complete – more in the southern highlands and Callide and more to do in northern highlands and Dawson.

**Mungbeans:** High prices and an increased confidence in newer, better varieties were a major driver for an increase in the area planted to mungbeans in CQ this season. I estimate about 15,000 hectares of spring mungbeans was planted throughout CQ – much of this in the Callide Valley – and about 30,000 hectares of summer mungbeans. There are some excellent crops and a very low incidence of disease. Yields were generally modest especially in late finishing summer crops (0.7–1.2 tonnes per hectare). Mungbeans harvest is all but complete.

**Cotton:** CQ irrigated cotton farmers had good growing conditions and good harvest conditions with a better than average yield achieved on most farms. The area planted to irrigated cotton at Emerald (11,000 hectares) was about half that of an average year.

### Winter crop

Limited winter crop has been planted and only dry conditions are stopping a huge planting. Many paddocks have good moisture at depth but have a dry 10–20 cm top layer. High prices (\$800 per tonne) and the ability to deep plant to chase moisture will result in a big increase in area planted to chickpea this winter.

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# District Reports...

May–June 2015



A maize crop that was almost ready to be cut for silage was decimated by a grasshopper plague at Joe Johnstone's farm 'Can-Berra', near Banana. (Photos: Carly Harris)

Depending on your frost risk, April is early, May conventional and June is late for CQ wheat planting.

May is the preferred month to plant chickpeas.

## Livestock and pastures

Rainfall in early summer grew good quality, but short, grass. With limited follow-up rain, most paddocks are already grazed short especially where stocking numbers are high. Rainfall now will grow winter herbage but not bulk grass.

## Grasshoppers

Hatching of grasshopper swarms have followed the rain with damage in both crops and pastures across a wide area of CQ, in the Clermont, Gindie and west of Springsure districts during March and more recently in the Dawson. Many sorghum crops have been sprayed three to four times to minimise damage.

Within a couple of days, grasshoppers had reduced a maize crop at Banana grown for silage, to stalks only (see photos).

## Water

The Fairbairn dam is currently at 53 per cent capacity or 690,000 ML.

**Maurice Conway**  
Department of Agriculture, Fisheries & Forestry  
Emerald, Queensland  
May 14, 2015

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