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FRONT COVER

Trials hosted by the Mingenew Irwin Group, in WA's northern cropping region, have shown that aeration can reduce insect burdens by an average of 60 per cent in stored seed grain. While not killing

insects, the trials demonstrated that aeration does slow their life cycles and lowers the density of the pests. Cost savings can be around \$2 per tonne.

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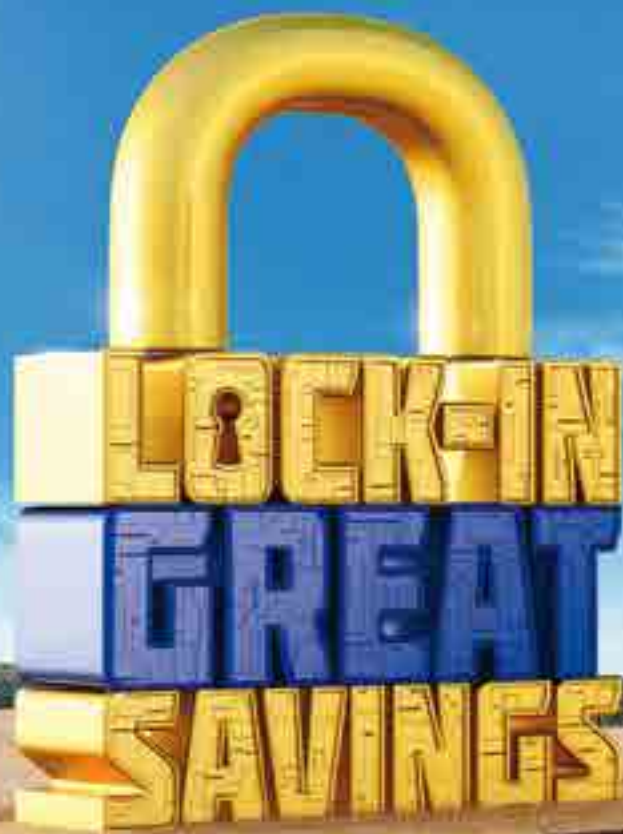
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WITH an above average national winter grain crop done and dusted – and our summer crops generally looking pretty good – it's an opportune time to check on what the global grains' balance-sheet is (really) telling us. International prices, particularly for wheat and coarse grains, have been declining over the past 12 months because the traders tell us that the world is apparently awash with grain. But does the global balance sheet really support this?



In 2000, the USDA put total world production of wheat, coarse grains and rice at 1840 million tonnes.

To look a little deeper into these numbers, global wheat production that year was 583 mt from 216 million hectares giving an average wheat yield of 2.66 tonnes per hectare.

Total use of wheat in 2000 was around 590 mt, so after digging into stocks on hand, the global balance sheet for 2000 had wheat ending stocks of around 163 mt.

Add to this wheat reserve the ending stocks of coarse grain and rice and the world had about 487 mt of grain on hand as we entered the new millennium. And back in 2000, the world's population had just reached 6 billion people – in other words, around 81 kg of grain in reserve for every human mouth on the planet (for the ease of comparison, I'll leave animals out of the equation for the moment).

Fast forward to the present state of the grain balance sheet.

For the current season, the USDA estimates total world production of wheat, coarse grains and rice at 2467 mt – a 34 per cent increase in 15 years. Of this total, global wheat production is projected to be 735 mt from 225 million hectares giving an average wheat yield per hectare of 3.27 tonnes.

This is a total wheat production increase of 26 per cent in 15 years and an increase in average yield of 23 per cent – very impressive numbers. Those traders are right! The world must be awash with grain... or is it?

Current global grain consumption and grain reserves tell a slightly different story.

The USDA estimates total use of wheat, coarse grains and rice this year to be 2461 mt – up 31 per cent in 15 years – with ending global grain stocks of 489 mt. This is virtually the same tonnage of grain in reserve on the planet as 15 years ago (487 mt), but now we have 1.4 billion more mouths to feed.

In other words, by the end of 2016 there will only be 66 kg of grain in reserve for every human mouth – a drop of more than 18 per cent in 15 years. And these reserves will come under even more pressure as the human population increases (by about 1.3 per cent each year) and the amount of grain fed to animals keeps rising – it has just hit the 1000 mt per year mark – or more than 40 per cent of all grain produced. There's also about six per cent of the world's grain directed to biofuels.

So what does all this mean for grain prices? The back of the envelope is not quite big enough to delve into issues such as which countries hold what grain reserves, the substitution of one grain for another in various feed rations, how much more area can be brought into grain production or how to maintain yield increases in coming years. But what the envelope does show is that if you look at the global grain balance sheet through longer term glasses, the numbers suggest ever tightening grain supplies ahead, and you would hope, much better international prices.



AUSTRALIAN GRAIN

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In this issue...

Weeds are sick at the sight of them

Allelopathic traits were never important in plant breeding in the past because there was a suite of herbicides available to control weeds. Now, with high levels of herbicide resistance, there is a renewed and worldwide focus on allelopathy in several crops, including wheat, rice and canola.



See article Page 8

Aeration trials reduce insects and deliver savings

Trials hosted by the Mingenew Irwin Group in WA, have demonstrated that aeration can reduce insect burdens by an average of 60 per cent in stored seed grain, and deliver cost savings of about \$2 per tonne.



See article Page 18

Immature compost can harm your crops – no bull!

Soil health specialist Dr Pam Pittaway has warned farmers of the danger of using immature compost on crops of all kinds, and advised that either curing organic compost yourself, or testing it and the soil for nutrients, is the best way to ensure organic amendments benefit crops.



See article Page 27

The harvest moon – Part 2

In the previous issue, Ian recounted his harvesting experiences at Auchtermuchty, and now the story progresses to the next phase – the threshing.



See article Page 35

How much does harvest weed seed control cost?

Life is full of trade-offs. Do I buy the quality beer or go for volume? Should I take the high paid job or the job with lots of holidays? The answer to the second question may dictate the answer to the first!



See article Page 40



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ASK AN EXPERT – CAN WE CHOOSE CANOLA VARIETIES SO THAT WEEDS ARE SICK AT THE SIGHT OF THEM?

■ With Jim Pratley, Research Professor in Agriculture, Charles Sturt University

Allelopathy: *The chemical inhibiting of one plant by another.*

A LLELOPATHIC traits were never important in plant breeding in the past because there was a suite of herbicides available to control weeds. Now, with high levels of herbicide resistance, there is a renewed and worldwide focus on allelopathy in several crops, including wheat, rice and canola.

Canola plants have varying abilities to interfere with the germination and growth of other nearby plants, including weeds. This interference is usually a combination of allelopathy and competition. Determining which canola varieties carry the genetic capability to produce allelopathic substances that suppress important weeds is of great interest to Charles Sturt University (CSU) research professor, Jim Pratley and his team.

"Modern plant breeding programs assess the productivity and other traits of a new hybrid in a weed-free environment," says Jim. "This means that genotypes that have allelopathic capability do not have an opportunity to demonstrate their value to a real-world farming system where weed pressure is an inevitable part

of plant production."

Research at CSU has focused on screening canola genotypes for their effectiveness in controlling ryegrass and has found that some varieties in the current genotype collection provide good non-herbicide control over the target weed, annual ryegrass, and a number of other species such as shepherd's purse, Paterson's curse and brassica weeds like wild turnip.

"More non-herbicide tools are required to help manage herbicide resistant weeds," he says. "Crops that can be sown into weedy paddocks and that can suppress weed seed germination using allelopathy or reduce the number of weeds setting seed through crop competition offer a useful tool for growers."

How do you identify the difference between allelopathy and competitiveness in a hybrid?

Short answer: It can't be done in the field. This is for the lab only.

Longer answer: In the laboratory, the canola plants are grown in agar, in a weed-free environment for one week. Then the target weed seed is introduced and the development of the weed root system is monitored. The plants do not need to compete for light, nutrients or water so any suppression of root development can be ascribed to the herbicidal effect of the substances that the canola plants have exuded into the agar.

Can a variety be both competitive and allelopathic to weeds?

Short answer: Yes, but not always.

Longer answer: Once the allelopathic capability of a variety is established, researchers grow the variety in the field with no



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Professor Jim Pratley (right) and PhD student Md Asaduzzaman are very keen to see the research work on allelopathy in canola continue as the importance of non-herbicide weed control options increases.

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herbicides applied to control weeds. Any additional weed control that is achieved in the field can be ascribed to the ability of the hybrid to out-compete the weeds present for light, nutrients and water resources.



The team at CSU have screened half of the available canola genotypes to rank them according to their ability to contribute the genes required to produce the allelopathic substances to suppress annual ryegrass and other key weed species.

Is canola the only crop that has allelopathic potential?

Short answer: No. Researchers around the world are also finding wheat and rice cultivars vary in their allelopathic capability. In other countries, this information is being actively pursued in the respective plant breeding programs. Research in this field in Australia is sadly lagging behind.

Longer answer: Work in the area of allelopathy is not new but it has not featured as a high priority trait in plant breeding programs in modern agriculture, particularly since herbicides have been widely used in cropping systems. Many older varieties and cultivars have much stronger allelopathic ability than modern ones. This trait can be re-introduced into high performance varieties and hybrids using either traditional plant breeding methods or gene transfer. Keep in mind that weeds also have allelopathic capability and are not afraid to use it. ■

HOW TO ASK A WEEDSMART QUESTION

Ask your questions about genetic research that is helping to manage herbicide resistant weeds using WeedSmart Innovations Facebook page <https://www.facebook.com/pages/WeedSmart-Innovations/354441941389122>, Twitter @WeedSmartAU or the WeedSmart website <http://www.weedsmart.org.au/category/aska-weedsmart-expert/>

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Dual purpose canola recovers well from heavy grazing

GRAZING his Pioneer brand 45Y86 hybrid canola in a dual purpose strategy was a first for NSW farmer Richard Thompson in 2015, and the move paid off for him in a big way.

Richard, who farms near Cassilis in the Upper Hunter Valley, had been happy with the performance of 45Y86 over the past couple of seasons, but wanted to step things up.

"Year-in-year-out 45Y86 has competed with, if not been better than wheat, which has traditionally been a safer crop in this area," Richard explained.

"But we only put in 140 hectares of canola and I wanted to do a bit more than just try to pull the perfect crop off in terms of improving the margin overall – so we had a go at using it as a dual-purpose crop."

Wet conditions from 50 mm of rain at the start of April meant Richard had to delay his plans to get the variety in the ground until the 15th of that month.

"We sowed the 45Y86 at a rate of 2.8 kg per hectare with 80 kg per hectare of Granulock 15 and then had another almost 50 mm about a week later – so it came out of the ground beautifully," Richard said.

Ideal conditions prompted dual purpose decision

It was those perfect conditions that prompted Richard to use the canola for a dual purpose, with 2500 lambs grazing the crop



Richard Thompson is now a convert to dual purpose canola.

for around eight weeks, from May 13 until July 22.

In preparation for the 'lock-up' of the crop, Richard applied 100 kg per hectare of urea on July 9, with 30 mm of beautifully incorporating rain over the following fortnight.

But the state of the crop following the heavy grazing period had Richard worried.

"I was very keen to spray it out at that stage – it was just starting to bud up, so I was a bit worried that it was grazed a bit late, especially for the last paddock they grazed.

"When we did take them off it was very bare, but I told Dupont Pioneer Area Sales Manager Sam Gall the two things it had going for it was plenty of nitrogen and wet feet.

"While there was nothing above the ground at all, Sam and I decided it was worthwhile to give it a run to see what it could do, and it ended up working out alright," Richard explained.

The crop improved rapidly from lock-up, growing leaf and flowering all at once, and impressed Richard immensely.

"It was amazing, we ended up yielding 1.2 tonnes per hectare with 45 per cent oil, so how it performed was phenomenal – but I should say the good nitrogen and moisture had a big impact on the result.

"I was very happy with the overall performance of the variety as a dual purpose crop – basically I'd covered all my costs and made a little bit of money from the grazing – so in effect the harvested grain minus freight costs was straight profit," he said. ■

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Australian start-up turns flaxseed into superbug fighter



Flaxseed oil has a high percentage of alpha-linolenic acid – this is excellent for the manufacture of anti-microbial products

AUSTRALIAN start-up Kayban has developed the world's first anti-microbial healthcare range made from organic flaxseed oil following a collaboration with CSIRO.

The company hopes the range of topical lotions and washes, called Bio3 Guardian, will provide their main revenue stream and has plans to take the innovation to the global healthcare market.

According to independent tests, the products are fast-acting and effective at killing golden staph (*Staphylococcus aureus*), a prevalent superbug that led to 1621 hospital-acquired infection cases in 2013–14.

Flaxseed oil contains alpha-linolenic acid, an omega-3 fatty acid with known anti-microbial properties.

With the support of a Victorian Government Innovation and Technology Voucher, Kayban and CSIRO developed the method for extracting the crucial alpha-linolenic acid from organic flaxseed.

"The challenge was to come up with a cost-effective manufacturing technology that consistently produced excellent quality, highly enriched alpha-linolenic acid," CSIRO organic chemist, Dr Peter Duggan said.

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"What we've achieved is a smarter, more efficient process that's been pivotal in Kayban's journey to commercialising a unique saleable product."

The technology has been transferred to Melbourne-based CSIRO spin out, Boron Molecular, to extract the flaxseed component for Kayban on a multi-kilogram scale.

Kayban will then work with another local manufacturer to formulate the end product.

"It's hugely rewarding that this research collaboration has led to new business and growth opportunities for three Australian small to medium enterprises (SMEs)," Peter said.

"Here at CSIRO, we take pride in our role as a key player assisting local SMEs and manufacturers to bring their high technology products to the market."

Kayban Director, Frank Palermo, said Bio3 Guardian was a better way for preventing the spread of infection.

"Our products contain a unique antimicrobial formula that uses natural flaxseed oil properties, instead of ethanol, to kill bad bacteria while leaving essential good bacteria intact," Frank said.

"It's a moisturising, all-natural alternative to ethanol-based products that can cause skin to dry and crack upon repeated use and increase chances of developing conditions like dermatitis.

"That's going to benefit nurses, doctors and patients in hospitals and aged care homes who regularly need to use sanitisers and disinfectants to maintain hygiene or care for wounds."

IDEAL OIL COMPOSITION

According to Alex Pascolo, Project Manager for the Melbourne-based company Kayban, there are two main reasons organic flaxseed oil is used in the production of their anti-microbial products.

- The products are to be used on the human body so remaining as natural as possible is important. Using organic flaxseed ensures that there are no harmful chemicals making their way into the final products; and,
- Flaxseed oil has a composition ideal for the production of anti-microbial lotions. The flax oil is put through a process which extracts the alpha linolenic acid (ALA) contained in the oil. ALA is found in a number of different oilseeds but flaxseed oil has a very high percentage – ranging from 51 to 55 per cent ALA.

Flaxseed sourced from the US

Due to a very small market for organic flaxseed oil in Australia, Kayban has to source its flax oil from Florida in the US where a consistent supply is assured.

For every 1000 litres of flax oil processed, only around 200 litres of ALA is extracted. Kayban is exploring methods to improve the efficiency of the extraction process.

Across the range of Bio3 Guardian anti-microbial products, there is one per cent weight by volume of ALA in each 500 ml container.

For more information contact Alex Pascolo on 1300 529 226 or visit: www.bio3guardian.com.au



Frank Palermo, Director, Kayban with the Bio3 Guardian range of anti-microbial lotions based on organic flaxseed.

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NATIONAL ROUNDUP OF

National overview

For the most part, the national property market within the grain producing areas has remained stable. The drivers of activity remain the institutional investors seeking agricultural assets for portfolio diversification, and agribusinesses seeking to secure commodity supplies. But very recently, there has been an increased activity from existing family operations.

The winter crop for 2015 was very good for a number of regions, particularly in the northern grains area with yields reportedly exceeding historical averages. The season was not a high rainfall year, but instead, well-timed rain to maximise plant production. In talking to many producers and agents, the general sentiment is that family-sized businesses are keen to get into the market and expand operations – but they wanted the last crop behind them for some comfort.

A dry spring finish negatively impacted on Southern and Western Australian grain, legume and oilseed production with yields trending closer to long term averages. Frustratingly, this was after ideal winter rains which had many regions well positioned for a strong production year. Some areas, notably within the Mid North and Mallee (South Australia) and

Wimmera (Victoria), also experienced frost impacts, and a heavy rain event in November affected quality. As a result, below average yields were recorded in these regions.

The Australian dollar has devalued significantly in the past 12 months and this has helped farm gate prices remain relatively stable in a global market where world stocks have generally increased. The devalued dollar is also helping Australian agricultural land represent very good value relative to overseas options – particularly for offshore investors.

The Free Trade Agreements finalised last year will also hold future benefits to exporters. These agreements also give confidence to investors from FTA signatory countries, that Australia is a preferred place to invest.

Interest in farms in reliable rainfall areas

We have noticed a definite uplift in enquiry and values for property in reliable 450 to 550 mm plus rainfall areas. For example, within areas of Western Victoria there is clear evidence of value increases over the past two year period in the order of 10 to 15 per cent for arable land. We expect this trend to continue

as reliability of year on year rainfall – and therefore production – becomes a key investment criterion, particularly for institutional investors.

The next 12 months will likely see more institutional investment, for example by joint ventures coupled with sale and lease back arrangements. We also expect a general uplift in transaction activity between neighbours, particularly for smaller operations that do not meet the scale criteria of larger corporate investors.

But buyers are expected to continue to look very closely at long-term productivity and gross margins/earning capacity when making a value assessment on farmland. To this end, the availability of accurate records on production, rainfall, farming methods, grain storage capacities and other essential farm practices are of critical importance in any sale/purchase negotiations. Enterprises wanting to take advantage of the inflow of capital to agriculture to assist them in expanding their operations need to make themselves investment ready. Due diligence packs, operational and ownership structures and business plans need to be in place to help make a successful sale.

With this feature, *Australian Grain* – in conjunction with Colliers International – presents a national and unique overview of grain farm sales. Indicative selections of individual farm sales over the past 12 months are categorised into the three major agro-economic cropping regions and further categorised into average wheat 'yield bands'.

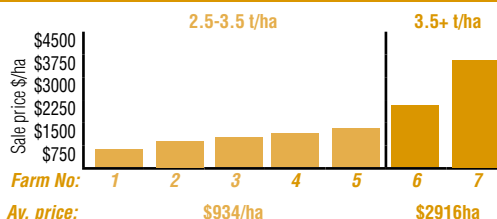
For the first time, prospective buyers and sellers (or just interested observers) have a national insight into current trends in the value of cropping farms across Australia according to region and production capability.

Yield bands:

Farm sales are categorised into Northern, Southern and Western Cropping Regions of Australia. Individual farm sales are further categorised into 'yield bands' reflecting the average yield history for wheat production on that farm.

1.5–2.5 t/ha wheat = 7–12 bags/ac
2.5–3.5 t/ha wheat = 12–17 bags/ac
3.5+ t/ha wheat = 17+ bags/ac

Indicative Farms Sales Western Region, 2015



- Farm 1 Little Italy, WA – \$717/ha (1603 ha):** Cropping property located in WA's eastern wheatbelt.
- Farm 2 Lake Biddy, WA – \$804/ha (1057 ha):** This eastern wheatbelt farm comprises two non-contiguous allotments with approximately 850 hectares of cropping land.
- Farm 3 Pingrup, WA – \$960/ha (1712 ha):** Located in the eastern wheatbelt with around 1500 hectares of cropped land with the balance of the area being pockets of native mallee vegetation.
- Farm 4 East Newdegate, WA – \$999/ha (2001 ha):** Farm located in the southeastern wheatbelt with around 1900 hectares of cropped land.
- Farm 5 Needilup, WA – \$1192/ha (1677 ha):** Located in the southeast of the Great Southern region with around 1250 hectares of cropped land.
- Farm 6 Popanyinning, WA – \$2122/ha (1414 ha):** Cropping holding located in the southern wheatbelt region with approximately 1200 hectares of arable land.
- Farm 7 East Pingelly, WA – \$3710/ha (1428 ha):** Well improved cropping property in the southern wheatbelt with open land comprising productive grey sandy loam soils over clay.



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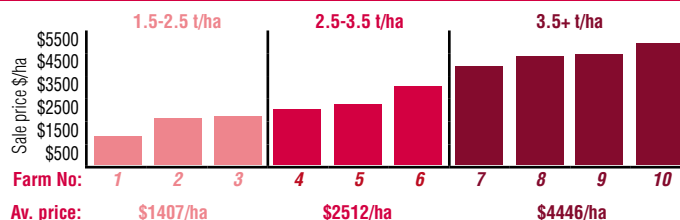
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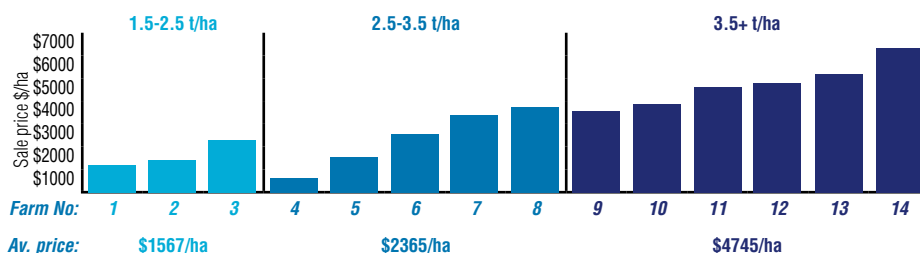
GRAIN FARM SALES

Indicative Farms Sales Northern Region, 2015



- Farm 1 Talwood, QLD – \$981/ha (1618 ha):** Small mixed farming property with about 60% developed to cropping. Soils predominantly brigalow-belah with balance poplar box.
- Farm 2 Goondiwindi, QLD – \$1610/ha (6195 ha):** Approximately 1345 ha good quality heavy floodplain brigalow-belah melon hole soils under dryland cultivation. Balance is 4850 ha of open coolibah woodland grazing with Mitchell, bluegrass pastures and winter herbage.
- Farm 3 Southwood, QLD – \$1630/ha (2635 ha):** Around 1400 ha of brigalow-belah soils with a moderate melon hole influence. Balance is brigalow-belah with heavy melon hole areas. Bought by local operators with grain and cattle interests.
- Farm 4 Goondiwindi, QLD – \$2183/ha (1420 ha):** Approximately 930 ha of good quality heavy floodplain coolibah soils under dryland cultivation with 490 ha of open coolibah woodland grazing (Mitchell, bluegrass pastures and winter herbage).
- Farm 5 Condamine, QLD – \$2272/ha (2201 ha):** Well developed dryland cropping property with a mix of heavy grey and black clays associated with belah type soils and some lighter brigalow-belah red loams. Basic list of structures.
- Farm 6 Tullooona, NSW – \$3082/ha (2580 ha):** Most of the farm (2386 ha) developed for dryland cropping on generally uniform soils of heavy black alluvial self-mulching clays extending to slightly lighter grey clays.
- Farm 7 Boggabilla, NSW – \$3950/ha (1538 ha):** Well developed dryland cropping property with a mix of heavy grey clays associated with belah, coolibah alluvium soils and some lighter brigalow-belah red loams. Sound, but not extensive, list of structures.
- Farm 8 North Star, NSW – \$4435/ha (2435 ha):** A very high proportion of the farm is well developed dryland cultivation area with excellent black and red brigalow soils through to a belah influence.
- Farm 9 North Star, NSW – \$4457/ha (485 ha):** Around 90% of the property is developed. Soils comprise red brigalow influenced, good quality, self-mulching cracking alluviums.
- Farm 10 Moree, NSW – \$4942/ha (850 ha):** Well-developed cropping holding with alluvial soil type and long runs. Purchased by an adjoining landholder.

Indicative Farms Sales Southern Region, 2015



- Farm 1 Telopea Downs, SA/Vic – \$1223/ha (7028 ha):** Large cropping and grazing operation located on the SA/Vic border north of Kaniva.
- Farm 2 Merrigal, NSW – \$1296/ha (1159 ha):** Around 1100 hectares is farmed on this Central West plains property to the north of Dubbo. Mainly black self mulching soils through to red loams.
- Farm 3 Urana, NSW – \$2181/ha (648 ha):** This Riverina farm (west of Wagga Wagga) was purchased by a neighbour.
- Farm 4 Merrinee, Vic – \$564/ha (1561 ha):** 1550 ha of this northwestern Victorian (Sunraysia) farm is cropping land on red sandy loams.
- Farm 5 Watchupga, Vic – \$1558/ha (1027 ha):** 1000 ha of dryland cropping on this northern Victorian property southwest of Swan Hill.
- Farm 6 Forbes, NSW – \$2516/ha (636 ha):** Approximately 95% of this Central West NSW farm is cropped.
- Farm 7 Walbundrie, NSW – \$3330/ha (1261 ha):** This eastern Riverina property is 90% arable with red loam to heavy grey clays.
- Farm 8 Corowa, NSW – \$3855/ha (515 ha):** This is a dryland farming holding west of Corowa in the upper reaches of the Murray River.
- Farm 9 Karkoo, SA – \$3588/ha (668 ha):** This is a well-improved cropping property in the lower Eyre Peninsula region.
- Farm 10 Murtoa, Vic – \$3960/ha (262 ha):** Small scale cropping operation in the Wimmera.
- Farm 11 Chatsworth, Vic – \$4697/ha (1631 ha):** This Victorian Western Districts cropping enterprise features productive clay loam soils.
- Farm 12 Conmurra, SA – \$4768/ha (1330 ha):** An aggregation of four properties, this operation is located south west of Lucindale in the South East region of SA.
- Farm 13 Mullaley, NSW – \$5091/ha (1335 ha):** This is a well-developed holding on the Liverpool Plains farming predominantly heavy black basalt soils.
- Farm 14 Woorndoo, Vic – \$6367/ha (948 ha):** This is a large scale cropping property in the Western Districts with mainly grey clay loam soils.

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Aeration trials reduce insects and deliver savings

TRIALS hosted by the Mingenew Irwin Group (MIG) in Western Australia's northern cropping region, have demonstrated that aeration can reduce insect burdens by an average of 60 per cent in stored seed grain, and deliver cost savings of about \$2 per tonne.

Grains Research and Development Corporation (GRDC) Western Regional Panel member and Mingenew grower Darrin Lee was one of four growers to host the trials, and said he was astounded by the visual difference between the contents of insect traps set at the aerated and non-aerated silos.

"When I checked the insect traps I was staggered by the difference – I didn't realise there would be so many insects and pests in the non-aerated silos," he said.

Under the three-year project, MIG partnered with The University of Western Australia and the Kondinin Group, with support from the GRDC and the Plant Biosecurity Cooperative Research Centre, to assess the effectiveness of aeration in improving stored grain quality.

Slower insect life cycles – fewer insects

While aeration will not kill insects, the MIG trials demonstrated that it can considerably slow insect life cycles and reduce insect densities by an average of 60 per cent compared with the non-aerated silos – and in one case by 72 per cent.

Reducing insect burdens in stored grain is part of the GRDC 'National Grain Storage Extension Project' strategy to prevent the spread of insect resistance to phosphine – the only effective fumigant available to growers for controlling grain storage insects.

The aeration system in the Mingenew trials reduced temperatures in the grain to an average of 19°C, with the temperature in aerated silos being as much as 12°C lower than in the non-aerated silos, which helped to reduce the rate of insect reproduction and growth.



GRDC Western Regional Panel member Darrin Lee has been impressed by the results of aeration trials hosted on his family's Mingenew property.



GRDC grain storage extension officer Ben White installs a controller on a silo at Mingenew as part of a three-year project to assess the effectiveness of aeration in improving stored grain quality.

There was also an improvement in seed viability, with only 2.3 per cent of unviable seed in the aerated silos, compared with 4.6 per cent in non-aerated silos.

A cost-benefit analysis, conducted by GRDC grain storage extension officer Ben White, demonstrated that growers were \$2 per tonne better off with aerated silos when storing seed wheat at current prices.

The analysis included the cost of aeration equipment and controllers, which depreciated over the three years of the project.

The total calculated cost of storing grain in an aerated silo was \$11.56 per tonne, compared with costs estimated at \$13.50 per tonne for storing grain in non-aerated silos – including the cost of storage and fumigations to control insects, as well as seed losses, based on a seed cost of \$300 per tonne.

Darrin said the aeration system used in the trials was simple to use, could be retrofitted, was not overly expensive and could potentially be linked to eight silos.

"There was also no need to use toxic chemicals – how clean and green is that?" he said.

"I have always been diligent when it comes to grain storage practices, including the use of good, sealed silos and hygiene measures.

"But being involved in these trials has reinforced to me the vital importance of farm hygiene and biosecurity measures."

Darrin said he was now using aerated, chemical-free sealed storage silos to store albus lupins intended for the human consumption market.

More information about the trial is available in the GRDC Grain Storage Supplement. It is available at www.grdc.com.au/GCS119, and was included in the November–December 2015 edition of the GRDC magazine Ground Cover. To subscribe to Ground Cover visit www.grdc.com.au/groundcover.

Practical information about all aspects of grain storage is available on the GRDC Stored Grain Information Hub storedgrain.com.au.

By investing in grain storage research, the GRDC aims to support growers to introduce and maintain excellent stored grain management for human consumption, stockfeed and seed.



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Consultant Chris Warrick who heads up the Grains Research and Development Corporation's (GRDC) Grain Storage Extension Project said there were excellent resources available to assist growers attempting storage for the first time or wanting to update their knowledge.

"The GRDC's Stored Grain Information Hub has all the latest information on grain storage, including economics, specific storage requirements for different grains and seeds and up to date chemical information," he said.

"It's also handy if you need a refresher on the basics for whatever reason, but essentially keeping it clean, keeping it cool and keeping an eye on it is key."

Hygiene is particularly important post-harvest, particularly removing grain residue from empty storages and grain handling equipment including silos, augers, field bins and harvesters.

"Don't park them all in the shed and head off to the beach for your summer holiday. Clean equipment by blowing or hosing out the residues and dust and then consider a structural treatment," Chris said.

"In terms of temperature, aim to keep grain less than 22°C through summer to slow storage pest activity, and when grain first goes in, ensure that aeration fans are run continuously for the first two to three days to push the first cooling front through and create uniform moisture.

"After that, run fans during the coolest 9–12 hours every day for at least five days and then aim for around 50 hours of quality air at air flow rates of two to four litres per second, per tonne. The ultimate aim is to maintain grain at or below 18°C, at which point most storage pests stop breeding.

"An aeration controller will perform the cooling process at the right time, aerate the grain with the coolest air and ensure fans don't operate when the relative humidity is higher than 85 per cent, which can re-wet and damage grain if operated for extended periods."

Monthly monitoring

Once grain is in storage it needs to be monitored at least monthly, taking samples from the bottom and, when safe, from the top too."

Chris says should you plan to fumigate, using the right type of storage is the first and most important step.

"Only use fumigants, like phosphine, in a pressure-tested, sealed silo. Research shows that fumigating in a storage that is anything less than pressure sealed doesn't achieve a high enough concentration of fumigant for a long enough period to kill pests at all life cycle stages, risking resistance and re-infestation," he said.

"Phosphine resistance is wide spread, so the best practice of planning, monitoring and treating effectively to maintain quality of your grain is also of significant importance to the shelf life of this fumigant."

For more information or advice please go to www.storedgrain.com.au or call the 1800WEEVIL hotline.



Chris Warrick says keep stored grain clean and cool and to monitor it at least monthly to maintain quality.



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Improving soil health using compost manure

DARLING Downs Qld grain and cotton grower, John Cameron, has been using composted feedlot manure for many years and believes this organic soil amendment plays an important role in maintaining the long term sustainability and profitability of his farming operation.

According to John, the strategy is about maintaining good soil health and building resilience into the production system. Combined with minimum tillage, stubble retention and good soil management practices, John believes his soil now has the capacity to deliver in tough seasons as well as responding in good times.

John applies composted feedlot manure at a rate of four to five tonnes per hectare every five years. This works out to two cotton crop cycles per application, but can be pushed out to three crop cycles if necessary. The manure is applied to the soil surface in standing wheat stubble.

"I use compost because it is in a more stable form. I don't have to work it in until I'm preparing to plant the next cotton

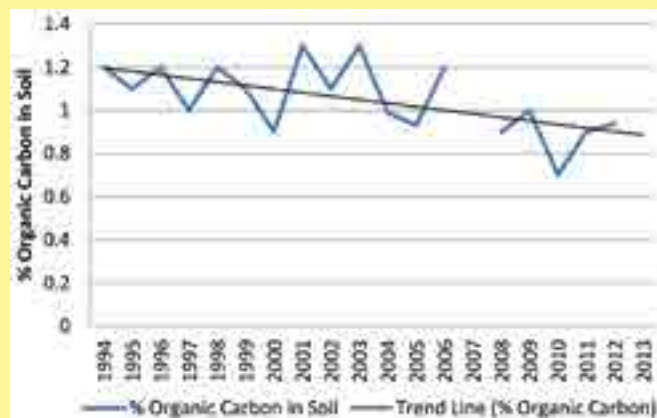
crop. Rain helps wash it into the soil profile and being a self mulching soil, a lot of the product falls down the cracks in the soil," said John.

"We can also apply it at a time when we are not busy, making management easier. One limitation is the soil must be dry. Compaction with this heavy gear is a real concern and must be managed."

The compost provides all of John's crop phosphorous, potassium and micro-nutrient needs, particularly zinc and sulphur. Soil tests have shown an improvement in both phosphorus (P) and potassium (K) level over time (Figures 2 and 3) although soil organic matter levels have not changed significantly (Figure 1).

John doesn't rely on nitrogen (N) from the compost. Nitrogen is still applied as urea. He fertilises for a five bale per hectare dryland crop but believes his soil now has the resilience and

FIGURE 1: Organic carbon levels measured pre-planting from 1994 to 2012 indicate a steady decline in organic carbon over time even though organic amendments have been applied to the system



BACKGROUND...

"Kintyre," Bongeen, Queensland, Darling Downs

- Cameron family farming operation.
- 1500 hectares dryland crop area.
- Cracking black soils with approx 330 mm water holding capacity.
- Crops: Principle focus is cotton, with the primary rotation consisting of cotton double cropped into wheat every two years. Sorghum is substituted for cotton, and barley or chickpeas planted instead of wheat if conditions are not favourable for a cotton/wheat program.
- Beef feedlot manure compost is applied ideally at every second cropping event, or as financial conditions allow.



Darling Downs grower John Cameron (left) with agronomist Jamie Innes. (PHOTO: Melanie Jenson)

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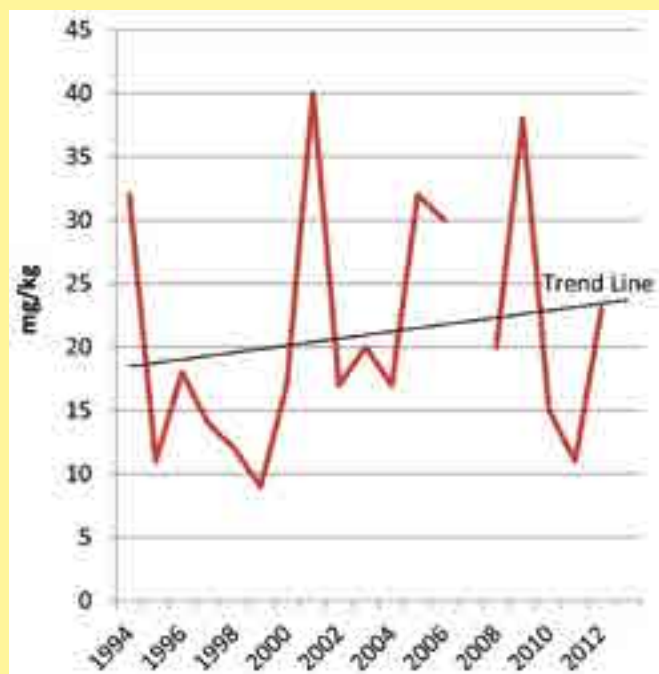


buffering capacity to produce a 10 bale per hectare crop given the right conditions, without any further fertiliser applications. This was evident in the 2012–13 season when his dryland crop average was over 10 bales per hectare.

“The crop didn’t show any nutrient deficiencies and really performed,” said John. “It takes time for the system to start to work. Once it is up and working for you there are real differences.

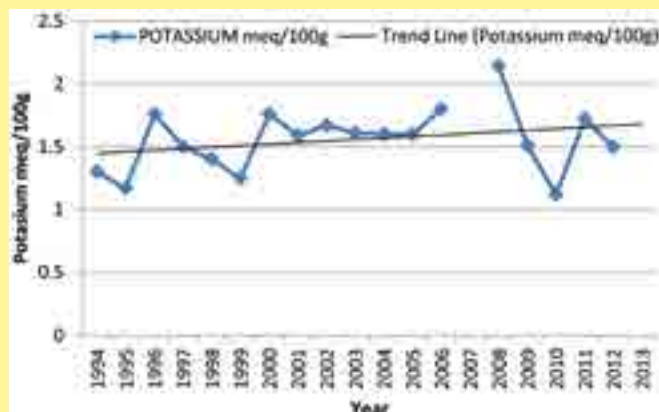
“The compost combined with crop rotation, stubble retention and minimum tillage have seen improvements in soil condition and the capacity of the soil to respond in both good and bad seasons.”

FIGURE 2: Phosphorus Colwell P levels (mg of phosphorous per kg of soil) pre-planting from 1994 to 2012



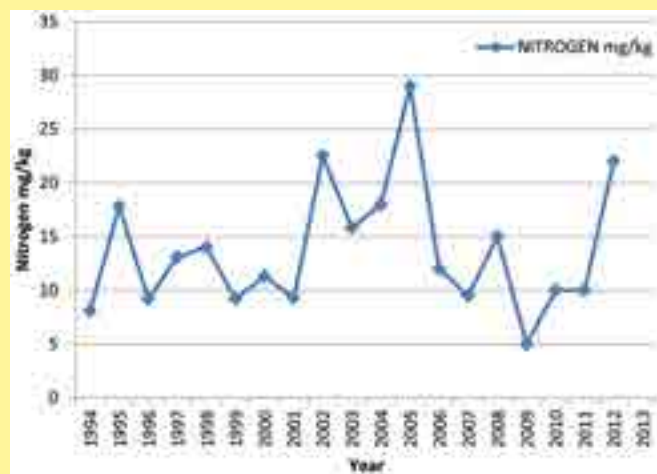
Peaks in the graph correlate with amendment applications followed by a period of crop removal. The overall trend line indicates a steady build up of P in the soil profile.

FIGURE 3: Exchangeable potassium (K) levels (cmol of potassium per kg of soil) pre-planting from 1994 to 2012



Peaks in the graph correlate with amendment applications followed by a period of crop removal. The trend line indicates a steady increase in K levels over time.

FIGURE 4: Available N levels (mg/kg) preplanting from 1994 to 2012



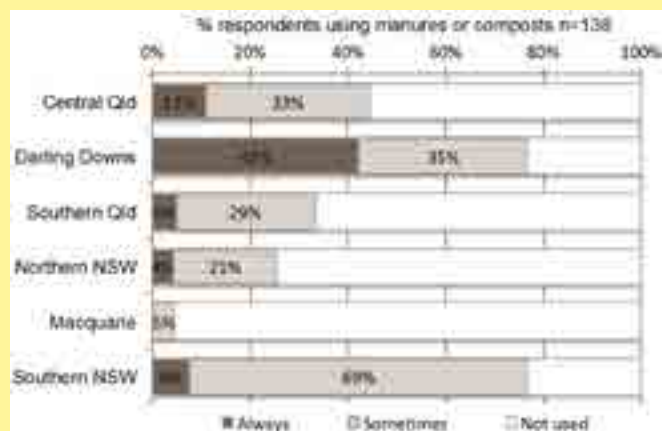
The trend line indicates an increase in N over time.

Organic amendments and crop nutrition

The use of soil organic amendments is now common place amongst cotton growers in some regions, particularly on the Darling Downs. CRDC’s 2013 Cotton Grower Practices Survey showed 42 per cent of respondents from the Downs are ‘always’ including manures and composts in their nutrition program.

Growers who have been using these products over a period of time are confident there is a significant, positive effect on their soils which is helping to meet crop nutrient requirements – but measurement of these effects and putting values on the benefits has proven difficult to achieve.

FIGURE 5: Compost users. Proportion of cotton farms using manures as part of a nutrition program



Source: Cotton Growing Practices: 2013 Findings of CRDC’s survey of cotton growers.

Numerous research studies have shown that manures can improve not only the nutrient status, but also the physical properties and the organic carbon levels of soils.

But these studies, including local research looking at locally available products, have tended only to demonstrate soil benefits with application rates much higher than are logistically and financially sensible in Australia’s farming systems.

The benefits reported in association with low application rates have been more variable, so despite significant research effort aimed at clarifying the real impact of organic amendment use



Stubble retention is an important part of maintaining good soil health and a robust production system.
(PHOTO: Melanie Jensen)

in cotton systems, there are currently few general guidelines available to farmers for making the switch from synthetic to organic products.

Despite the difficulties in measuring their impact, the uptake of organic products has continued to increase, driven mainly by grower's own observations of soil and crop performance, their practical experience and interaction with other, like-minded growers.

Products presently being used across the Darling Downs include biosolids, raw manures derived from cattle, chicken and piggery operations, composts of raw manures and composted cotton gin trash, and other composted material from green waste.

Availability and price are the two main drivers of product use and explain why use amongst cotton growers is higher on the Downs and in Southern NSW compared to other cotton regions.

For more information, visit the CottonInfo soil health webpage:
www.cottoninfo.com.au/soilhealth

WHAT IS SOIL ORGANIC MATTER?

Soil organic matter includes everything that is of biological origin and by definition, rich in carbon. It is composed of dead and decomposing plant material, litter, humus, soil biota (fungi, bacteria, earthworms and so on) and their waste material.

Soil organic matter plays an important role in the three key aspects of soil fertility:

- **Biological functions:** Organic matter supplies nutrients for plant growth and provides energy and nutrients for soil micro-organisms.
- **Physical functions:** Organic matter stabilises soil structure and promotes soil aggregation, improves soil water storage and infiltration.
- **Chemical function:** Organic matter increases soil cation exchange capacity, buffers soil pH, reduces effects of salinity and sodicity.

The soil biological system is extremely complex and only a fraction of soil organisms have been identified.

One of the most important processes in soil is nutrient cycling, with organic matter typically providing the largest pool of soil nutrients. It's estimated that 80–90 per cent of the biological activity in soil is carried out by bacteria and fungi, with biological activity resulting in the release of nutrients (mineralisation) from organic matter in a form available for plant uptake.

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Using immature compost can harm your crops – no bull!

SOIL health specialist Dr Pam Pittaway has warned farmers of the danger of using immature compost on crops of all kinds, and advised that either curing organic compost yourself, or testing it and the soil for nutrients, is the best way to ensure organic amendments benefit crops.

Speaking at a recent symposium about soil health at the University of Southern Queensland (USQ) in Toowoomba, Pam said knowing the microbial stability of your amendment and its salt content were the best ways to ensure your crop got the optimum nutrients.

"If you know the salt content of your amendment, and the plant-available and total nutrient content of your amendment, you might be able to reduce the amount of NPK fertiliser you put on your crop," Pam from USQ's National Centre for Engineering in Agriculture (NCEA) said.

This could result in farmers greatly reducing their inorganic fertiliser bills – but Pam said the age and content of the organic amendment, or fertiliser, needed to be taken into consideration, and the purchase of product of indeterminate age or properties was a risky business.

Microbial feeding frenzy

"As soon as you put on something with readily available carbon as well as nitrogen and phosphorus, you stimulate a microbial feeding frenzy which can starve your crop. If soil microbes have access to fast food, they take up luxury amounts of available N and P, out-competing plant roots," she said.

"Adding manure or compost high in potassium can also burn plant roots, as potassium is a soluble salt," she said.

"And when growers continue to add fertiliser nitrogen on top of past organic amendments, they can get an uncontrolled growth flush which commits your plants to an extra load – if they can't support that during the growth period, they can end up shedding tillers, or can lodge."

Pam said root disease was also a possible symptom of over-feeding crops with organic amendments.

"The best way to get root disease in a crop is nutrient imbalance."

Slow, balanced nutrient release for best results

Australian horticulture and agriculture uses a vast range of organic amendments, including pig and poultry manure produced, cured and used on-farm, and commercially produced preparations, most of which incorporate straw or green waste as a source of carbon.

Pam said the best result from using cured compost is when a slow organic release is achieved which synchronised nutrient release with plant demand and minimised grower expenditure on nitrogen, phosphorus and potassium (NPK) inputs.

"My advice is if you can't afford good cured compost, invest in more soil testing, and put immature products on your least valuable crop."

Pam said producers needed to be aware of the business model of some waste management businesses, which sought a fast turnaround on organic amendments.

"Some businesses need to push product out the gate to make space for more waste, and while Australian Standards say certain aspects of organic amendments must be tested, those results won't necessarily tell you what's best for your crop or soils."

"Instead of a six-week turnaround, which is what some waste-management businesses operate on, you want to use organic amendments that have been cured for 16 to 20 weeks, because immature compost could do more harm than good."

She said farmers should also be aware of the environmental risks of over-application of organic amendments, which can put phosphorus surplus to the crop's requirement into waterways.

Pam has conducted studies on a number of organic amendments including cotton trash, feedlot manure, sugarcane waste, and sawdust in broadacre and horticultural applications.

"Fully cured compost costs more but immediately conditions your soil. Humus-like organic acids in cured compost are very good at holding moisture and buffering against acidification, and can make more phosphorus available. Adding humus-like, cured compost builds the stable, long-term organic fraction back into your soil."

"If it is fully cured, you can build a slow-release nitrogen bank which will release nutrients in synch with the crop's development."

For further information: National Centre for Engineering in Agriculture visit: www.usq.edu.au/research/research-at-usq/institutes-centres/ncea



Dr Pam Pittaway uses rapid methods to measure humified soil carbon in the water quality laboratory at USQ's National Centre for Engineering in Agriculture. Pam says using fully cured compost will produce a slower and more balanced nutrient release and much healthier crops.

Growers guiding frost research agenda

GRAIN growers from across Australia are playing an influential role in shaping the research direction for the Grains Research and Development Corporation's National Frost Initiative (NFI).

Six growers from the southern, western and northern cropping regions have been appointed to the NFI's steering committee which also comprises consultants and scientists. With years of experience managing frost in their own farming environments, the growers bring a comprehensive range of advice and support to the NFI, which is a multi-disciplinary program to mitigate the effects of frost.

GRDC General Manager of Genetic Technologies, Juan Juttner, says grower engagement is pivotal to ensuring the NFI's research focus remains relevant and aligned with grower needs.

"By having grower representation on the NFI steering committee, we know the frost-related issues confronting our grain producers are being captured and that the GRDC's investment in research, development and extension is addressing key concerns with practical outcomes," Juan said.

The steering committee's second meeting was held in South Australia in late 2015 where members met with growers in frost-prone areas. They also inspected the GRDC-funded frost screening nursery in Loxton.

The nursery is one of three trial sites (also Wickepin in WA and Narrabri in NSW) where current wheat and barley varieties are being benchmarked for sterility at flowering under frost conditions.

Assessment of the frost susceptibility of wheat and barley varieties is being carried out under the collaborative Australian National Frost Program (ANFP) which is a key component of the GRDC's NFI.

The three-pronged initiative is committed to the following approaches:

- **Genetics** – aiming to develop more frost-tolerant varieties;
- **Management** – investigating if there are preventive products, stubble and nutrition management practices or other measures that growers could implement to reduce the impact of frost; and,
- **Environmental prediction** – focusing on predicting the impact of frost events on crop yields and mapping frost events at the farm scale to enable better risk management.

Practical and effective strategies

NFI steering committee member and Toowoomba-based plant breeder John Sheppard said targeted frost research investment by the GRDC would help growers develop practical and effective frost mitigation strategies.

"Growers across the national grainbelt know only too well the devastating effects of frosts which can occur pretty much at any time in the growing season," John said.

"The effect can be devastating on cash flow and subsequently an individual grower's financial resilience.

"And the amount of impact on cash flow can depend on crop type – for example, chickpeas may reset pods if there is sufficient moisture – and frost severity. A mild frost can cause some grain in the head to be lost due to damage to the plant's reproductive organs while a severe frost event of minus 9°C can cause stem frosting and complete crop loss.



NFI steering committee member and Toowoomba based plant breeder John Sheppard says 'fear of frost' is estimated to be costing growers around 20 per cent of a crop's yield potential due to later than optimal sowing times.

"Yield losses due to frost are hard to quantify," says John. "But for example in the northern region, it is estimated that about 10 per cent of the region's wheat production is lost to frost damage while more than a 20 per cent yield suppression can be attributed to later than optimum sowing due to growers' fear of frost.

"Crop and variety selection is a difficult process which should involve a decision matrix that includes paddock rotations, knowledge of current varieties, their maturity grouping, disease status, paddock nutrition levels and end-user requirements."

John said information gained from trials conducted at the various trial sites across the country would allow growers to select varieties of wheat and barley based on their relative susceptibility to frost under similar paddock conditions.

"Ideally we should aim to have crops flowering just after the last damaging frost of the season but that can be easier said than done. We should remember there are no frost tolerant varieties – there is no silver bullet variety – but having statistically accurate information will allow growers and advisers to make informed decisions."

The NFI steering committee:

Peter Roberts (committee chairman), GRDC Western Regional Panel chair and grain grower, Dunn Rock, WA; Gary Lang, Facey Group, Wickepin, WA; Craig Brown, Synergy Consulting, Perth, WA; Allan Mayfield, Allan Mayfield Consulting, Clare, SA; Tanja Morgan, grain grower, Jabuk, SA; Dr Neil Fettell, GRDC Northern Regional Panel member and agricultural research consultant, Condobolin, NSW; Emma Robinson, grain grower, 'Westbury Pastoral', Temora, NSW; Rob Taylor, grain grower, Grenfell, NSW; David Brownhill, grain grower, Spring Hill, near Quirindi, NSW; Dr John Kirkegaard, CSIRO Agriculture, Canberra, ACT; Peter Taylor, grain grower, Lubeck, Victoria; John Sheppard, plant breeder, Iredale, Queensland; Dr Francis Ogbonnaya, GRDC General Manager Capacity and National Programs.

Understanding the choice to go gluten or wheat-free

■ By Sinead Golley, CSIRO

IN recent decades, fat, sodium, carbohydrates, sugar and protein have all been targeted as 'bad' dietary factors. Right now the focus seems to have shifted to gluten – a protein found in cereal grains, especially wheat but also in rye and barley.

For a small proportion of consumers – such as those diagnosed with coeliac disease or wheat allergy – the avoidance of wheat and other gluten-containing foods is essential. Symptoms for sufferers can include nausea, vomiting, cramping, bloating, abdominal pain, fatigue and even very serious conditions such as liver disease.

The prevalence in the population of coeliac disease and wheat allergy, while significant, sits between 1–2 per cent.

But the growing number of consumer foods labelled as either gluten or lactose free, and the popularity of restrictive diets like the paleo diet, would suggest more people are making the choice to go gluten or wheat-free – above what the coeliac and wheat allergy statistics would suggest.

To understand more about this trend, we conducted a nationwide survey of nearly 1200 people. The aim of the research was not only to quantify the prevalence of wheat avoidance in Australia but also to pioneer understanding of the drivers underpinning this decision.

Wheat avoidance in Australia

The data collected revealed that as many as one in 10 Australian adults, or approximately 1.8 million people, were currently avoiding or limiting their consumption of wheat-based products. Women were more likely to be avoiding wheat than men.

The survey also revealed that over half (53 per cent) of those who were avoiding wheat were also avoiding dairy-based foods.

Why is this an issue? According to current Australian Dietary Guidelines, both grain and dairy-based foods are an important component of a balanced diet. They contribute significantly to the daily dietary fibre and calcium intake of both adults and children. They also deliver other important nutrients such as protein, vitamins and minerals, and – if eating whole grain – resistant starch.

So why are people choosing to avoid wheat?

The reasons behind this decision are complex. Some respondents reported that they were avoiding wheat due to a diagnosis of coeliac disease (1.1 per cent), or because a family member has been diagnosed with coeliac disease. Others stated they were avoiding wheat for weight-control or taste preferences.

But the vast majority of the survey's wheat-avoiding respondents – which equates to 7 per cent of (non-coeliac) Australians – were avoiding wheat-containing foods to manage a range of adverse symptoms they attributed to the consumption

of these products. Symptoms were mostly gastrointestinal in nature (bloating, wind and abdominal cramps) but also included fatigue/tiredness.

When asked if they had any formal diagnosis including that of an intolerance, allergy, or coeliac disease which required them to avoid wheat, most (84 per cent) of these symptomatic individuals said no.

So what sources are people relying on when it comes to making decisions such as avoiding wheat? There is a great deal of information which links the consumption of specific foods to adverse symptoms.

According to our data, those who decide to eliminate wheat tend to do so based on advice from sources such as complementary practitioners (for example, naturopaths) family, friends, the media, and to a lesser extent their GP or a medical specialist.

Is wheat really so bad?

Up until recently it was thought that gluten was only really a problem for individuals with coeliac disease. Our findings, plus the extraordinary rise in popularity of the gluten-free diet in Australia and elsewhere, suggest that, apart from coeliac disease and wheat allergy, other conditions associated with the ingestion of wheat are emerging as health care concerns.

Currently, the driver of most of the research activity in this area is the concept of non-coeliac gluten sensitivity (NCGS).

NCGS is defined as adverse reactions to the consumption of gluten, where both allergic and autoimmune mechanisms have been ruled out and where gastrointestinal symptoms improve on a gluten-free diet. Many aspects of NCGS remain unclear, including prevalence, clinical spectrum, physiological mechanism and treatment. There is also considerable debate as to whether it is in fact gluten or some other component of wheat that triggers the reported symptoms.

Fructans, for example, are short-chain carbohydrates which are found in wheat-based products, as well as other foods. For a proportion of the general population fructans – along with other short-chain carbohydrates (collectively called FODMAPS) – can trigger symptoms like bloating, wind or cramps.

Our finding that people may be avoiding more than one dietary component at a time has the potential to complicate being able to know exactly which dietary components, and in what doses, are to blame for their symptoms. Further research is needed in this area.

Until then, there is a risk that a significant proportion of Australians may be undertaking diets that are unnecessarily restrictive, with the potential danger of associated nutritional imbalances. Also of concern is the finding that the majority of symptomatic respondents appear to be bypassing conventional medical advice in their decision to go wheat-free.

We would be remiss not to draw attention to the potential risk here of a serious clinical condition going undetected.

Source: *The Conversation* - see www.theconversation.com/au

THE CONVERSATION



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Making more from sorghum with targeted agronomy

AT A GLANCE...

- Yield holds the key to maximising sorghum profitability.
- Optimising grain sorghum production in the low – medium and medium – high rainfall zone requires a greater emphasis on matching agronomic management to the environment rather than just on hybrid selection.
- GRDC supported research is evaluating the role that hybrid, sowing time, nutrition, row spacing and plant population plays in optimising sorghum yield potential.

IMPROVING sorghum productivity in the northern New South Wales and western Queensland cropping belt will hinge on growers' abilities to better match agronomic management to growing conditions.

That's one of the key findings from a four-year research project funded by the Grains Research and Development Corporation (GRDC) into sorghum agronomy and the role that hybrid, sowing time, nutrition, row spacing and plant population plays in optimising yield potential.

The research, conducted in collaboration with NSW Department of Primary Industries (NSW DPI), aims to boost grower confidence in the reliability and potential profitability of sorghum as a cropping option and raise the yield bar in areas where sorghum is already an important rotational crop.

Leader Northern Dryland Cropping Systems with NSW DPI, Loretta Serafin said research data confirmed that sorghum profitability was yield-dependant and that careful agronomic management was the key driver in maximising yield potential.

"The figures tell a clear story – if you want to make more money from sorghum, you need to improve yield," Loretta said.

"In order to optimise grain sorghum production in both the low – medium and medium – high rainfall zone there needs to be a greater emphasis on matching agronomic management to the environment rather than just on hybrid selection.

"Certainly hybrids have a role to play based on their suitability

for the environmental conditions and the relevant plasticity of their characteristics such as tillering, but in the trials conducted to date, the genetic potential of the hybrid has rarely been the limiting factor."

Major agronomic drivers

"The major agronomic drivers of yield seen to date have been crop nutrition – in particular nitrogen and phosphorus in combination – row configuration in the western (NSW) zone and achieving optimum planting densities."

The research has been conducted across two projects – sorghum production west of the Newell Highway in northern NSW targeting the matching of suitable hybrids to optimum plant populations and row configurations; and high yielding sorghum agronomy in the eastern zone, on the Liverpool Plains.



NSW Department of Primary Industries' Leader Northern Dryland Cropping Systems, and GRDC northern region panellist Loretta Serafin.

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Preliminary trial results are suggesting bigger financial returns are possible from improved sorghum nutrition management compared to hybrid selection and plant population.

Sorghum west of the Newell

The Western Zone Project encompassed a series of nine dryland trials over four years between 2010 and 2014 and evaluated three primary factors – row configuration, plant population and hybrid selection although additional data was gathered on issues such as crown rot, soil water and nitrogen.

The results suggest that early plant sorghum is currently a more attractive proposition for growers than late plant sorghum, mostly due to logistical and rotational reasons. But Loretta said the results needed to be considered in context given that the three late plant trials were all undertaken in the 2012–13 growing season.

“Currently the case for or against early or late sowing time is largely based on the impacts on the farming system as there is insufficient data to build a more robust case on the impact on crop yield,” Loretta said.

“Early plant sorghum, sown in September–October is intended to escape the summer heat at flowering as well as splitting the labour and equipment requirements more evenly across the year so winter crop planting and summer crop harvest do not coincide.

“Early planted sorghum is also typically harvested while conditions are still warm meaning a quick dry down time, no grain drying and harvest before the pressures of winter planting.

“The early harvest timing also allows the option of a double crop back into chickpeas or a winter cereal should sufficient rainfall occur to re-fill the soil profile sufficiently, speeding up the move back into the more dominant winter cropping sequence.”

The western trial work also found that yield declined as effective row spacing increased. The solid plant configuration produced the highest yields, on average 4.19 tonnes per hectare, compared to 3.47 and 3.48 tonnes per hectare for single skip and super wide respectively and 2.73 tonnes per hectare for double skip.

The one trial site with a 2.0 metre solid plant treatment averaged 3.13 tonnes per hectare. This equates to the solid plant yielding 17 per cent more than the single skip or super wide and 34 per cent more than the double skip.

“That said, the average yield of these sites was 3.46 tonnes per hectare which is more than a one tonne per hectare higher than the long term average for grain sorghum in the north west,” Loretta said.

“So we need to be mindful of the high risk of planting solid in these western environments as well. Indeed, using a single skip or superwide configuration is a good compromise, limiting your risk of total crop failure in a dry year but still capturing some of the top end yield potential in the better seasons.”

Additional recommendations from the western zone trial work include targeting plant populations in the realm of 30,000–50,000 plants per hectare and selecting hybrids which have a moderate to high level of tillering as this mechanism allows plants to respond to variable environmental conditions.

Medium-high rainfall sorghum

The second sorghum agronomy project – the High Yielding Cereals Project – began in the 2014–15 season and targets the medium – high rainfall zone where sorghum is reliably grown but crop modelling suggests there is disparity between potential crop yield and the actual yield harvested by growers.

This trial work is attempting to partition the impact on grain yield of altering various agronomic factors such as hybrid, plant population, row configuration and nutrition.

Three trials were conducted in the 2013–14 season at two sites – dryland trials at Pine Ridge and dryland and irrigated sites at Breeza.

Each trial included the following treatments:

- Two times of sowing – ideal and late plant;
- Two row configurations – 90 cm solid (two rows per plot) and a twin row (four rows with pairs of two rows 7.5 cm apart);
- Three hybrids – MR Buster (as a current commercial benchmark) and two recently released hybrids, MR Scorpio and 85G33;
- Three plant populations – 50, 75 and 100,000 plants per hectare;
- Three nitrogen application rates – 0, 100 and 200 kg per hectare applied as urea at sowing; and,
- Three phosphorus application rates – 0, 10 and 20 kg per hectare applied as triple superphosphate at sowing.

“The aim of the trials was to allocate proportions of the final crop yield to various agronomic decision points – for example, if no nitrogen was applied to a sorghum crop but all other management decisions were optimised, how much yield would a grower lose?” Loretta said.

“Preliminary results from the High Yielding Cereals Project suggest that growers and agronomists should address nutritional issues as a priority for sorghum compared to the relatively minor responses to hybrid and population to ensure that crops are meeting their water limited yield potential.”

Similar to the trial work undertaken in the western zone, the early plant sorghum out-yielded the late planted sorghum under both the dryland and irrigated trials in the High Yielding Cereals Project.

The performance difference between hybrids was small, but Loretta said the difference between varying agronomic factors was much larger, in particular the varying of nitrogen rate.

She said optimum plant populations were between 50,000–75,000 plants per hectare in both the irrigated and dryland trials and there was minimal difference in the yields of 90 cm row spacing compared to the twin row configuration.

Further detail on the trials is available by downloading a copy of Loretta's Update paper from the GRDC website <http://www.grdc.com.au/Research-and-Development/GRDC-Update-Papers/2015/02/Sorghum-agronomy-to-maximise-yield-potential>

Sunflowers making profitable use of summer rain

■ By Cindy Benjamin

SUNFLOWER production remains one of the most profitable summer cropping options available to growers. With the planting window remaining open for longer than most other summer crops sunflowers can take advantage of any late summer rain. The window for later planted sunflowers generally closes at the end of January.

In the northern production regions of NSW and Queensland – where 95 per cent of Australia's sunflowers are grown – sunflowers can take advantage of deep, stored moisture and withstand the more extreme temperatures early in the growing season.

Australian Sunflower Association committee member and agronomist Paul McIntosh recommends early assessment of soil moisture using a probe or corer, with 80 cm of good soil moisture required to ensure a respectable crop. After soil moisture, nutrition is the next item to check.

"A 1.25 to 1.5 tonnes per hectare dryland crop will need about 60 to 85 kg per hectare of available N in the root zone. An irrigated crop achieving 3.0 tonnes per hectare will need around 130 kg per hectare of N," says Paul.

"Sunflowers will utilise phosphorus applied at planting and also relies on arbuscular mycorrhizal fungi present in the soil to access soil-bound P during the season. Application of 10 kg per hectare of actual P in Queensland and northern NSW regions is commonly required and research suggests heavier rates of P may be required the further south you travel."

Paul advises growers to check zinc and sulfur levels in their soil tests. "Zinc can be compounded with the phosphorus fertiliser and sulfur deficiency is becoming more prevalent in many areas," he says. "In sunflowers there is an important interaction between nitrogen and sulfur. Seed weight, seed numbers per plant, quality and oil percentage are likely to suffer if the N:S balance is wrong."

In older cropping soils potassium can also be limited or accumulated in the surface layer. Potassium is fairly immobile in the soil so it is important to test K levels down the profile, not just in the surface layer. Paul recommends taking advice from an experienced local sunflower accredited advisor to ensure the crop has access to sufficient potassium to ensure stalk strength and to boost the plant's ability to cope with drought conditions.

"I strongly suggest that growers pre-apply the nitrogen and potassium products as sunflower germination and seedling emergence can be affected if concentrated levels of these elements are in close proximity at planting time," he says.

Second year of trials

NSW DPI and the Grains Research and Development Corporation (GRDC) have embarked on their second season of trials in northern NSW under the minor crop agronomy project. Research sites have been established at Gurley, east of Moree and Pine Ridge on the Liverpool Plains to investigate optimal planting configuration and plant population for each of the current hybrids.

Field walks are planned for January at both sites to allow growers and agronomists an opportunity to make their own observations and discuss the trials with the researchers. For more

information please contact Loretta Serafin, Leader, Northern Dryland Cropping Systems, NSW Department of Primary Industries on 0427 311 819 or loretta.serafin@dpi.nsw.gov.au.

Sunflowers have also been planted at Mungindi, Queensland as part of a \$14 million investment by the GRDC, Queensland Department of Agriculture and Fisheries (QDAF), NSW Department of Primary Industries (NSW DPI) and the CSIRO to assess future farming systems for the northern grains region.

This investment in Northern Farming Systems comprises one core trial site at Pampas west of Toowoomba, plus six regional sites at Emerald, Billa Billa, Mungindi, Narrabri, Spring Ridge and Trangie.

QDAF research agronomist Andrew Erbacher says these trials



Sunflowers enjoying the heat in November 2015 at the Mungindi trial site. This research is part of a \$14 million investment by the GRDC, Queensland Department of Agriculture and Fisheries (QDAF), NSW Department of Primary Industries (NSW DPI) and the CSIRO to assess future farming systems for the northern grains region. (PHOTO: Rebecca Raymond, QDAF)

are to assess likely future farming systems that could replace our aging systems, which are facing continued challenges of fertility decline, herbicide resistance in weeds and increasing soil-borne disease.

"The trials are measuring the impacts of increasing or reducing crop intensity, using a more diverse range of crops (including sunflowers), and managing soil nutrition using different fertiliser budgets, pulse crops and pastures," he says. "The systems are being assessed in term of water use efficiency (grain production per millimetre of rainfall), nutrient use efficiency, weeds, diseases, pest populations and soil health."

This work is expected to continue for the next 5–10 years and provide valuable insights into key grain farming strategies for the future.

CQ research focussed on disease

In Central Queensland QDAF senior plant pathologist (virology) Murray Sharman is preparing to run trials to test existing and new sunflower hybrids against Tobacco Streak Virus (TSV). The TSV field trials will be located around Clermont and growers will have opportunity to visit the site early in 2016.

Generally, growers and advisers remain wary of the potential impact of TSV in Central Queensland but Murray assures growers that GRDC research has shown that TSV no longer poses a serious threat to the sunflower industry in Central Queensland when tolerant hybrids are used and potential disease sources around crops are minimised.

For more information about sunflower production, check the Better Sunflower website www.bettersunflowers.com.au or talk to your local advisor or accredited sunflower agronomist.

Innovation critical to grain industry's future

A SIGNIFICANT shift away from growing the 'best' crop to growing the most 'profitable' crop will define the future for the grain industry, according to Arthur Gearon.

The fifth-generation grain grower from Queensland's Darling Downs brings a strong economic focus to his new role on the Grains Research and Development Corporation's (GRDC) northern panel.

Based at Chinchilla, Arthur operates Bealla, a 1500 hectare cropping and cattle property with his wife Nikki and parents Paul and Naureen.

The young grain grower said innovative research and new technology were driving change in the paddock with family-owned grain enterprises becoming increasingly more strategic and focused on improving yields and, in turn, profitability.

"The grains industry is vibrant and will be vital for food production into the future, but the strength of that future really lies in our ability to adapt to challenges such as climate change and variable markets," he said.

"Being at the forefront of Australia's global grain industry is an exciting place to be, and being part of the GRDC northern panel enables me to be at the research front as well, helping drive change and improve profitability into the future."

Arthur said research development and extension were critical to the future of northern grains production.

"Producers are constantly being pushed at both ends in producing grain and making a profit. The only driver there to push them forward and progress is research and developing that on-farm through extension is crucial," he said.

"One area of particular interest to me is herbicide resistance and how we, in a research sense, pursue that issue and identify what solutions are open to us.

"It may not be in a drum, it may be a new form of technology – potentially robotics, microwave or steam – and that has the capacity to be a major game changer for agriculture and grains."

Arthur said as a young producer with a family history in the sector and a diverse network of contacts, he was keen to utilize and develop his skills as part of the GRDC northern panel.

"The panel needs to listen, to be the eyes and ears of the GRDC on the ground," he said.

"We will be a focused voice back to the GRDC so producers are being heard and at the same time, we will be making sure the GRDC's work is getting back to the producer and being applied on-farm."



Chinchilla grower Arthur Gearon is enthusiastic about a grains industry future that is focused on profitability and cutting edge technology.

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Advocating practical research to combat challenges

ANDREW McFadyen believes there's a solution for every challenge. With a lifetime of experience in the northern grains industry, he's encountered his fair share of production challenges but at the same time, he has seen the enormous contribution that practical and targeted research, development and extension (RD&E) makes to the development of effective solutions.

Andrew grew up on his family's property at Lake Cargelligo and is now based at Coolah in central western New South Wales as cropping manager and agronomist for the Paspaley Rural portfolio of properties.

His agronomy background and infectious enthusiasm and passion for the grains industry have led to an involvement beyond the paddock. Andrew has had former roles on the Central East Research Advisory Committee and NSW Farmers Coolah branch, and current roles as a board member and chair of the Grain Orana Alliance and a recently appointed member of the Grains Research and Development Corporation's (GRDC) northern panel.

"I'm passionate about the grains industry, its innovation, resilience, potential profits and I am also inspired by the people," he said.

"I grew up on the family farm, and have kept my boots dusty for 16 years as a private, and now corporate, on-farm agronomist and I have to say the challenges and opportunities across both sides of our industry are not dissimilar.



Northern panellist Andrew McFadyen is a firm believer that there's a solution for every challenge.

"This experience prompted me to put my hand up to join the panel, and hopefully the knowledge I have gained in different roles over the years can be used to help drive innovation and research in our industry."

Andrew sees Australia's capacity to supply high quality and nutritious food to a growing global population as an unprecedented opportunity for the northern grains industry into the future.

"Other opportunities lie in further developing our cropping and herbicide technology and furthering the pathology and entomology knowledge and expertise that we're exposed to," he said.

"By really analysing how we can improve and innovate across all the elements that go into growing a crop, I believe the opportunities are endless.

"Our research and extension professionals are second to none and with the guidance support of the panel I believe RD&E will drive our future profit."

Long term solutions

Maximising future profit will hinge on the development of workable long-term solutions to key challenges such as "where to now" with zero till systems and the escalating issue of herbicide resistance, according to Andrew.

"The evolution of minimum and zero till has been critical in providing us with the ability to capture and store soil moisture, reduce erosion and grow crops with confidence. But now we have the conundrum where we are seeing herbicide resistance increasing.

"So the herbicides that allowed us to set up our no till cropping systems are now starting to break down and that's a huge challenge to us as growers, advisers and researchers.

"We need our systems to be profitable of course, but they also need to be sustainable. Our herbicides need to be effective and we need to preserve our valuable soils.

"The panel has no one important role – we need to be the glue between all the elements of our essential RD&E to ensure the GRDC charter is met, and that our research can become a tool in the shed for the growers."

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Fettell backs the delivery of science to growers

A FIRM belief in the power of science to improve agricultural production and a passion for farming drives Neil Fettell's work in the grain industry.

It's a passion cultivated during more than 30 years as a grains researcher with the NSW Department of Primary Industries and the University of New England, and is the motivating reason behind him joining the Grains Research and Development Corporation's (GRDC) northern panel.

As a member of the 11-strong panel, Neil aims to use his science background to help drive research awareness and uptake in the paddock.

"I currently work as a research adviser for my local farming systems group, Central West Farming Systems, and run a small farm with my family just west of Condobolin. This, combined with my many years of research gives me a real breadth of experience," he said.

"I have worked mostly in low rainfall farming systems on everything from cereal crops to pulses, looking at things like soil water and using it efficiently.

"These days I am particularly focused on crop physiology and how modern genetics can help us to breed and manage crops better."

When Neil says 'us', he is talking about the industry as a whole, and sees the role of RD&E as most beneficial to those on the ground.

"The grain industry is a pretty exciting place to be but we need to keep making productivity gains for farmers to stay in business and be sustainable," he said.

Applying good science on-farm

"The only way we can do that is by bringing good science into how farmers grow crops and ensuring research is targeted at specific issues on-farm making it relevant and effective.

"The northern grain industry is like the rest of Australia where the challenge is to improve productivity and keep an eye on international research to make sure it comes back to our farmers."

Neil said a previous term on the GRDC southern panel had given him a valuable insight into the effectiveness of the panel structure when it comes to connecting researchers and grain growers.

"One of the key strengths of the GRDC is the panels, which sees local representatives talking to growers, identifying issues, making sure the research gets done and critically, ensuring the most up to date knowledge gets back to the growers."



Neil Fettell's strong science background will help him provide valuable input into the future RD&E investment strategy for the northern region.

Nasma – new faba bean for northern Australia

PULSE Australia has recently appointed Paul McIntosh to the role of industry development manager for the northern region. Paul describes the latest faba bean variety released from the pulse breeding program as 'adding superior seed size to the excellent adaptation qualities of PBA Warda for the northern region'.

"PBA Nasma has a larger seed size than other varieties grown in the northern region," he says. "Its large and uniform seed size and bright colour makes it readily acceptable in the human consumption market of the Middle East."

PBA Nasma produces medium sized beige to brown seeds in the range of 61–79 g per 100 seeds, which is approximately 15–20 per cent larger than PBA Warda. Seed colour changes during storage are similar to PBA Warda.

"Growers who have planted PBA Warda in the past will find PBA Nasma equally well adapted to northern New South Wales, where it has out-yielded PBA Warda by three per cent in both rain fed and irrigated trials and offers a similar level of resistance to faba bean rust and tolerance to bean leaf roll virus (BLRV) as that of PBA Warda," says Paul.

PBA Nasma is a product of the PBA faba bean program led by Dr Jeff Paull, Adelaide University, in collaboration with leader of the northern pulse breeding node, Dr Kedar Adhikari, University of Sydney. An End Point Royalty (EPR) of \$3.85 per tonne (GST inclusive), which includes breeder royalties, applies upon delivery of this variety.

Download the variety management package (VMP) for PBA Nasma, which can be found on the Pulse Australia website:
www.pulseaus.com.au/growing-pulses/bmp/faba-and-broad-bean

For more information please contact Paul McIntosh, on 0429 566 198 or by email paul@pulseaus.com.au



Area of adaptation for PBA Nasma, a new faba bean variety for the northern region.



PBA Nasma is well adapted to the northern region and particularly to northern NSW where it has out-yielded PBA Warda by three per cent in both rain fed and irrigated trials.

ASK AN EXPERT – HOW CAN SUMMER CROPS HELP DRIVE DOWN WEED SEED NUMBERS?

■ With Paul McIntosh, Northern Region Extension Agronomist, AHRI

IN the northern region, summer crops present great opportunities for growers to challenge problem weeds while still turning a profit. Sorghum, mungbean, sunflower, maize, cotton, millets, peanut and soybean all bring different benefits to the crop sequence or rotation. Along with the ability to use different selective herbicides there are also opportunities to include non-herbicide tactics like cultivation, grazing, hay or silage making and green manuring.

Paul McIntosh, Australian Herbicide Resistance Initiative northern region extension agronomist says growers can be creative and add more diversity to their cropping system – confronting herbicide resistance in weeds head-on.

“Taking a paddock-by-paddock approach there are many things to consider when deciding what to plant and when,” he says. “Along with tackling weeds there is an opportunity to break disease cycles, better utilise stored soil moisture and manage key nutrients such as nitrogen and phosphorus.”

“The weed spectrum, the size of the weed seed bank and the presence of herbicide resistant plants are important pieces of



Paul McIntosh, Australian Herbicide Resistance Initiative northern region extension agronomist says there are great opportunities for growers to be creative and to add more diversity to their cropping system – confronting herbicide resistance in weeds head-on with summer crops.

information,” says Paul. “If there is an impending weed blow-out in your main crop then it is even more important to introduce more non-herbicide tactics to your weed control plan.”

What are the best options if I have grass weed problems, including volunteer cereals?

Short answer: Broadleaf crops like mungbeans, sunflowers and soybeans, or competitive grass crops like maize, forage and grain sorghum.

Longer answer: There are more in-crop herbicide options for maize than sorghum, including a maize hybrid that is imidazolinone tolerant. Forage sorghum or millet cut for hay or green manure could be a competitive option. Mungbeans, soybeans and sunflowers have both pre-emergent and in-crop herbicide options to treat grass weeds.

How can I make the most of the weed control benefits in a summer crop?

Short answer: Use as many tactics as possible.

Longer answer: All crops are prone to weed competition early. Sowing into clean paddocks is the aim so it is best to implement as many pre-sowing treatments as practical, including knockdown and residual herbicides prior to or at sowing and possibly using some mechanical removal of old or large plants. If intending to double crop your winter crop ground then pre-harvest desiccation is very effective on in-crop weed escapes. Any planting operation should have an effective plant establishment population, coupled with uniform seedling emergence and plant spacing.

What's the best way to deal with resistant grass weeds using crop rotation?

Short answer: Implement an effective plan with at least a two-season sequence to target grass populations.

Longer answer: Determine which herbicide options are still effective on the problem weeds and choose a crop that is compatible with that herbicide. Also consider crops that allow non-herbicide tactics to be implemented to run down the weed seed bank as quickly as possible. Some weeds have very persistent or dormant seed, so a long-term strategy is essential. ■



Sorghum, mungbean, sunflower, maize, cotton, millets, peanut and soybean all bring different benefits to the crop sequence or rotation for weed control, disease breaks and to manage nutrients and soil moisture.

HOW TO ASK A WEEDSMART QUESTION

Ask your questions about genetic research that is helping to manage herbicide resistant weeds using WeedSmart Innovations Facebook page <https://www.facebook.com/pages/WeedSmart-Innovations/354441941389122>, Twitter @WeedSmartAU or the WeedSmart website <http://www.weedsmart.org.au/category/aska-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.

Reclaiming productive land from woody weeds

THE old saying, 'you get what you pay for', certainly rings true for cattle farmer Darryl Johnston, particularly when it comes to controlling woody weeds.

Darryl, a fifth generation cattle producer, farms with his brother, Scott, and their father, Darryl, at Gloucester and Wherrol Flat, near Wingham in New South Wales.

He and wife Jodie, daughter Shelby (16) and son Clancy (13) live at the Wherrol Flat property, which comprises 475 hectares, while the Gloucester property is 1296 hectares.

Over the two farms, the Johnstons run 900 head of Angus and Shorthorn cattle and crop about 200 hectares of annual and permanent pastures for finishing cattle.

They turn-off between 250–300 head of cattle annually, predominantly supplying steers to the European Union (EU)

market and the Meat Standards Australia (MSA) program and, more recently, the farm assurance program, which requires cattle to be chemical and hormone-free and grass-feed only.

"We breed all our own cattle, but we don't have any particular weight targets – it just depends on which market we're aiming for," Darrell said.

"We try and leave our options open so we don't have all our eggs in one basket. We want to be able to meet the right market at the opportune time.

"If it gets dry in the spring, we'll sell steers to the feedlots, but thankfully we haven't had to do that for a few years."

Woody weeds are a big issue

He said they had significantly increased their pasture focus over the years, including reclaiming land previously overcome by woody weeds.

Weeds such as blackberry and lantana are the biggest issues for the Johnstons, particularly at Gloucester. The land is quite rugged and undulating, so aerial spraying via helicopter has been the most efficient way of tackling the problem.

Darrell said they had tried various herbicides and found Grazon Extra, applied at label rates according to the weed they were targeting, to be the most effective.

The Johnstons acquire their herbicide through Gloucester Rural Supplies. Darrell said they had an excellent relationship with Manager Troy Higgins – the result of knowing and working with him for many years.

"We've spent a lot of money getting on top of the problem over the years," Darrell said.

"Like anyone, we're always trying to save money, so we tried generic branded herbicides and while the results were reasonable, they weren't as good as what we've seen with Grazon Extra.

"The other aspect is you just don't have that element of support. We know we can call our Dow (AgroSciences) representative, which for us is Jon Dadd out of Tamworth, for any queries or issues and he's available to help.

"They back their product 100 per cent.

"You get what you pay for and we're certainly getting results, there's no doubt about that."

Grazon Extra contains active ingredients aminopyralid, picloram and triclopyr to control a range of environmental and noxious woody and herbaceous weeds.

Generic products use a picloram triclopyr formulation and do not contain aminopyralid, making a significant difference to the end result and level of weed control achieved.

"When you've got big application costs, you're far better off using the superior product to get maximum impact, otherwise you're wasting time and money," Darrell said.

"We can cover a massive amount of country in half a day using the helicopter, so it saves us a lot of time and labour. Plus the amount of spraying we have to do now has decreased because the weed infestations have reduced.

"We've been able to retrieve a massive amount of country that was otherwise useless because of the blackberry and lantana.

"It's very productive country, it was just overgrown. We've now been able to crop pastures and it's back in full production."



Cattle producer Darryl Johnston chats to Gloucester Rural Supplies Manager Troy Higgins about the benefits achieved using Grazon Extra, from Dow AgroSciences, against woody weeds on his properties at Wherrol Flat and Gloucester.

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New pulse varieties for 2016

■ By Cindy Benjamin

IN spring 2015, Pulse Breeding Australia released two faba bean varieties and a lupin variety for planting in 2016, giving growers more choice in all three grain growing regions across Australia.

Pulse Australia's national manager, Gordon Cumming says the global demand for all pulse grains remains positive and the area sown to pulses in Australia is on the rise.

"Pulse Breeding Australia continues to produce robust varieties for pulse growers that are well adapted to a variety of agro-climatic regions and highly accepted in our international markets," he says.

"The combination of great varieties, continually improving agronomic advice and grower experience is supporting the pulse industry's growth and providing excellent returns to growers in addition to all the break crop benefits of a legume crop."

PBA Jurien – new lupin for WA

The release of a PBA Jurien (previously Walan 2385) combines disease resistance and very high yield in one variety with adaptation to all lupin zones in Western Australia.

Industry development manager (western) Alan Meldrum says PBA Jurien is a very high yielding variety, averaging 10 per cent more yield than Mandelup, adapted to all growing areas in WA.

"Rarely does a new variety offer growers such a jump in yield across all environments with enhanced disease resistance," Alan says. "PBA Jurien delivers a statewide five per cent increase in yield in all lupin zones over PBA Barlock and an average yield increase over Mandelup of around 10 per cent. PBA Jurien is now the recommended variety for all lupin zones in WA."

PBA Jurien has robust disease status for a wide range of diseases, including being moderately resistant (MR) to bean yellow mosaic virus (BYMV), equivalent to Jenabillup. BYMV, spread by aphids, can lead to large yield losses in the higher rainfall southern regions. It is resistant (R) to phomopsis, which is much better than Jenabillup's moderately susceptible (MS) status. This reduces the risk of lupinosis in stock grazing PBA Jurien

stubbles after rain. Combined with a yield improvement over Jenabillup of 4 to 7 per cent, PBA Jurien is now the most suitable variety for the south coast and south west regions, replacing Jenabillup in Lupin zones 4 and 8.

PBA Jurien is resistant (R) to anthracnose and is slightly higher yielding than PBA Barlock, making it highly suited to the west coast regions where anthracnose is a yield threat.

PBA Jurien has medium to large seed, similar to Mandelup. The protein content of PBA Jurien is similar to Jenabillup and slightly higher than Mandelup. The seed coat is pale, similar to Mandelup.

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DAFWA lupin breeder Jon Clements (left) and Pulse Australia industry development manager at the official variety launch and naming event for PBA Jurien in early September, 2015.



Area of adaptation for PBA Jurien.

protein variety Coromup, PBA Jurien may not be a suitable replacement as its protein level is only equivalent to Mandelup.

Advice from Seednet is that seed supplies of PBA Jurien for 2016 are expected to be good. An End Point Royalty (EPR) of \$2.75 per tonne (GST inclusive), which includes breeder royalties, applies upon delivery of this variety.

All the details of PBA Jurien are included in the Variety Management Package, which can be found on the Pulse Australia website: www.pulseaus.com.au/growing-pulses/bmp/lupin

For more information please contact Alan Meldrum, Pulse Australia (Industry Development Manager – Western) on 0427 384 760 or by email alan@pulseaus.com.au

PBA Zahra – new faba bean for southern Australia

Faba bean growers in South Australia, Victoria and southern NSW now have another variety to consider for planting in 2016.

Pulse Breeding Australia officially released PBA Zahra, a large seeded faba bean suited to the Middle Eastern markets, from the industry's breeding program in October 2015.

Pulse Australia industry development manager—southern region, Mary Raynes says the new variety has achieved an average 5 per cent higher yield compared to similar, older varieties such as Fiesta VF, Farah and Nura.

"PBA Zahra is a possible direct replacement for PBA Rana, which was released in 2011, the only other large seeded faba bean variety adapted to the southern region," Mary says. "PBA Zahra has a uniform seed size and colour and has superior grain quality to PBA Rana. In longer season environments particularly, PBA Zahra also delivers a significant long-term yield advantage over PBA Rana."

PBA Zahra is particularly responsive to high yielding situations where the yield advantage over PBA Rana can be over 10 per cent. In higher rainfall districts PBA Zahra has a distinct advantage due to its lower susceptibility to disease. It is resistant to the most prevalent strain of ascochyta blight (pathotype 1) found in the southern region. It is equivalent to PBA Rana and PBA Samira, and less susceptible than Farah and Fiesta VF, to chocolate spot and faba bean rust.

PBA Zahra produces large, light brown, plump grain, comparable in size to PBA Rana. The overall grain colour is uniform and bright and there is generally a low rate of darkening during storage.

PBA Zahra should be suitable to co-mingle with PBA Rana for a medium-large faba bean category for export to the major food markets in the Middle East.

Bred by Dr Jeff Paull of Adelaide University, PBA Zahra has an end point royalty (EPR) of \$3.85 per tonne (GST inclusive), which includes breeder royalties and applies upon delivery. Seed is available from the commercial partner, Seednet.



PBA Zahra has a good overall level of disease resistance to the most prevalent strain of ascochyta blight (pathotype 1) found in the southern region and is less susceptible to chocolate spot and faba bean rust than Farah and Fiesta VF.



Pulse Australia industry development manager (southern) Mary Raynes with Jason Brand (Pulse research agronomist, Victorian government), Dr Jeff Paull (PBA faba bean breeder, University of Adelaide) and Rohan Kimber (Pulse crop pathologist, SARDI) at the launch of the newest faba bean variety for southern Australia, PBA Zahra.

Download the variety management package (VMP) for PBA Zahra, which can be found on the Pulse Australia website:

www.pulseaus.com.au/growing-pulses/bmp/faba-and-broad-bean

For more information please contact Mary Raynes, Pulse Australia (Industry Development Manager – Southern) on 0408 591 193 or by email mary@pulseaus.com.au



Area of adaptation for PBA Zahra, a new faba bean variety for the southern region.

Nasma – new faba bean for northern Australia

Pulse Australia has also released the new faba bean PBA Nasma for the northern Australia cropping region. PBA Nasma adds superior seed size to the excellent adaptation qualities of PBA Warda for the northern region. Its large and uniform seed size and bright colour makes it readily acceptable in the human consumption market of the Middle East.

Seednet is the commercial partner for all three new varieties. Enquiries regarding seed supply should be directed to Nevenka McLennan, Seednet, on mobile 0408 283214 or email Nevenka.McLennan@seednet.com.au

For more detailed information refer to the Pulse Australia website www.pulseaus.com.au

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Fleabane is a hard to kill weed but there are chinks in its armour

THERE are many hard to kill weeds, including flaxleaf fleabane, but one approach delivers consistent success – spray small weeds and use the double knock technique.

At the end of grain harvest in the southern and western regions flaxleaf fleabane will be establishing and growing strong root systems ready to take up any soil moisture available over summer. Flaxleaf fleabane plants feature hairy leaf surfaces, thick cuticle and few stomata – a combination that affords the weed a natural tolerance to herbicide.

In South Australia fleabane seeds start germinating in late winter to late spring, but initial seedling growth rate is very slow. With suitable spray conditions being few and far between over summer, fleabane is able to establish and take advantage of any small falls of rain to produce up to 120,000 viable light fluffy seeds per plant that disperse on the wind and in runoff water over summer and autumn.

Weeds researcher Ben Fleet from the University of Adelaide says the timing and staggered germination of fleabane – coupled with the need to treat plants when they are small – is a combination that makes the weed very difficult to control with herbicides.



In all seasons a double-knock of paraquat after glyphosate treatment ensures a higher level of fleabane control when applied to young plants (before stem elongation). Strong crop competition is the most sustainable management tool for managing this difficult weed which thrives in no-till farming systems, along paddock borders and in any gaps in a crop.

"All flaxleaf plants have a natural tolerance to herbicides but they are much more susceptible to herbicide control when the plants are young – less than a month old," Ben said.

"While rosette stage plants can be easily killed with lower rates of glyphosate, once stem elongation begins, a far greater dose is likely to be required to achieve similar results.

"In NSW and Queensland, glyphosate resistance has been identified in flaxleaf fleabane populations, indicating that while glyphosate has proven an effective tool on fleabane, increasing resistance will mean this herbicide will be less effective in the future."

In summer fallow herbicide control trials at Bute and Pinnaroo in South Australia, robust rates of glyphosate provided the greatest level of control. Use of paraquat in a double knock herbicide strategy helped to achieve high levels of control, but only when the first herbicide application was capable of providing at least 60 per cent control in its own right.

"Controlling fleabane in summer conserved 45 mm and 71 mm of soil moisture at the Bute and Pinnaroo sites respectively, as measured in April," Ben said.

Not just problem weeds in the north

Flaxleaf fleabane, melons, sow thistle, windmill grass and feathertop Rhodes grass have all been associated more with the northern region but in fact they are all weeds that perform well in zero and minimum tillage systems. As these practices are becoming more common in the south and west, so the associated weeds are becoming more of a problem, particularly in years with mild, wet spring and autumn conditions.

"The mix of weeds present in a summer fallow varies dramatically between seasons in the southern region as these weeds respond to the prevailing seasonal conditions," Ben said.

"A few years ago, the combination of wet springs and good summer rainfall led to serious infestations of fleabane on many farms in South Australia. Then the subsequent run of dry springs and summers led to a decline in fleabane populations on farms to the point where researchers had difficulty in finding suitable trial sites."

Glyphosate impact varies with seasons

Ben emphasised that the efficacy of glyphosate on fleabane varied considerably in different seasons.

"For example, glyphosate alone applied at 2 L/ha provided a modest 55 per cent weed kill in 2012 but gave 97 per cent control in 2014. In all seasons a double-knock of paraquat after glyphosate treatment ensured a higher weed kill."

Ben said that while herbicide control can be effective, particularly when plants are treated at the seedling stage (rosette), it is also important not to under-estimate the value of crop competition in the winter cropping phase.

"Fleabane seedlings are highly sensitive to crop competition and any bare patches in a paddock provide an ideal environment for fleabane establishment," he said.

"Under moisture stress conditions in spring there tends to be extremely high seedling mortality."

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

Biomass database to open new markets for farmers

AUSTRALIA'S farmers could benefit from a new database being developed by the Rural Industries Research & Development Corporation (RIRDC) which will map out the locations of existing and potential biomass that could be purchased for renewable bioenergy generation.

Biomass is any organic matter of plant or animal origin and it can be used to generate electricity and heat or to produce liquid fuels for transport. Biomass is available in many forms, such as agricultural products, forestry products, and municipal and other waste.

Traditionally mainly woody biomass has been used for bioenergy, but more recent technologies have expanded the potential resources to those such as agricultural residues, oilseeds and algae.

The database that is being developed by RIRDC, with \$3 million support from the Australian Renewable Energy Agency (ARENA), will bring together data on biomass resources across Australia, providing a clearer picture of where untapped sources of biomass are available.

RIRDC's Managing Director, Craig Burns said the \$6.2 million project would help the Australian bioenergy sector become better integrated and ultimately more productive and efficient.

Link farmers with the bioenergy industry

"This database will build better linkages between biomass producers, many of whom are farmers, and bioenergy

generators; and that will make it easier to develop biomass generation and biofuel projects in Australia," Craig said.

"Once developed, the database should also help farmers and businesses get more value from organic material destined for landfill, disposal or other low value uses by more easily identifying potential buyers for that biomass.

"Once RIRDC has collected the data it will be used to map where biomass resources currently are or where they are predicted to be and then group this with other data on transport infrastructure, land use capability and demographics."

RIRDC will work with states and territories to collect data on the location, volumes and availability of biomass for inclusion on the ARENA-supported Australian Renewable Energy Mapping Infrastructure (AREMI) platform. AREMI is a centrally accessible repository for ARENA project information and shares mapping data and information with the renewable energy industry.

"There is huge growth potential in the bioenergy sector with bioenergy currently accounting for nearly one per cent of Australia's electricity production, and seven per cent of renewable electricity production. Biofuels account for approximately one to three per cent of Australia's fuel consumption," Craig said.

The first tranche of data is expected to be uploaded to the database in mid-2016 and the project is scheduled for completion in November 2020.

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Research uncovers how to better manage crops grown in gravel soils

A STUDY into gravel soils by researchers at The University of Western Australia may help farmers growing crops in soils with high gravel content optimise the amount of fertiliser they apply.

The glasshouse study found that the concentration of phosphorus in the matrix of gravel soils from residual and applied fertiliser had a greater effect on wheat growth, than the total amount of phosphorus in the pot.

Gravel soils make up approximately three million of the 18 million hectares of arable land in south west Western Australia. Gravel forms an important component of soil especially in the high rainfall cropping zone.

Adamu Sanidanya, who conducted the research as part of his Master of Agriculture studies at UWA, said understanding water relations in gravel soil and how it affects phosphorus uptake in wheat is critical for better crop management, particularly when making fertiliser recommendations and estimating yield potentials of crops.

Wheat was grown in pots with soil containing varying proportions of gravel and different concentrations of phosphorus in the soil matrix. Plant height, number of tillers, leaf score, dry shoot and root weight were measured after six weeks of planting.

Dr Ken Flower from UWA's School of Plant Biology who co-supervised the research, said the results showed that short term wheat plant growth was dependent on the concentration of

phosphorus in the soil matrix, rather than the gravel content or total amount of phosphorus in the pot.

Lower fertiliser rates may be possible

"The implication is that lower rates of fertiliser could be applied to soil with increasing gravel content to achieve the same concentration of phosphorus in the soil matrix," Ken said.

"Although, it should be remembered that these findings apply to wheat grown for only six weeks."

Adamu was supervised by Drs Ken Flower and Gavan McGrath from UWA's School of Plant Biology, and School of Earth and Environment, and Dr Bill Bowden from the Department of Agriculture and Food Western Australia. His research was supported by the CSBP Fertilisers Agriculture Science Sponsorship.

For more information, contact ioa@uwa.edu.au

CSBP SPONSORSHIPS...

CSBP Fertilisers is a major manufacturer and supplier of fertilisers and the sponsorship serves to encourage research into fertiliser efficiency, and encourage talent to the agricultural industry. Applications for the CSBP Sponsorship are open until February 20, 2016.



Research by UWA Masters Student Adamu Sanidanya will help more efficient fertiliser management on gravel soils.

Elders agronomist wins national Adama award

A SENIOR agronomist from Elders in Kojonup in Western Australia has been named as the inaugural winner of the *Adama Young Agronomist of the Year* award.

Courtney Piesse toppled a field of 100 young agronomists around Australia to take out the award.

Adama Chief Executive Officer, Darrin Hines, congratulated Courtney on his win, adding that he demonstrated tremendous agronomic skills throughout the competition.

"Courtney has proven to be an agronomist who farmers can trust and rely on across the full scope of their operations," Darrin said.

Courtney and the two runners-up, Andrew McMahan from Manangatang, Victoria, and Matt Foulis from Wilmington, South Australia, will head overseas in 2016 for an agronomy study tour hosted by Adama for taking out the honours.

Now in his eighth year at Elders, Courtney grew up on his family's sheep and cropping farm at Kojonup before he obtained degrees in agricultural science and commerce at The University of Western Australia.

On graduating, he worked on local farms around Kojonup for a year before taking up his first professional role at Elders Merredin as an agronomist in 2008.

"I kicked off my career at Elders by working with eastern



Courtney Piesse, senior agronomist with Elders in WA, has won the inaugural Adama Young Agronomist of the Year award. A Kojonup 'local', Courtney joined Elders eight years ago.

wheat belt farmers who were very generous with young agronomists like me," Courtney said.

"These farmer clients allowed me to expand my skills and trial new techniques with them, so I thoroughly enjoyed my four years at Merredin and the opportunity to learn more about farming in a medium to low rainfall environment."

In 2011, he returned to Kojonup with Elders as agronomist and was appointed senior agronomist for the Great Southern before the company gave him another opportunity to broaden his horizons with a move into horticultural agronomy just three months ago.

As a result, Courtney is adapting his agronomy skills to crops such as potatoes, onions, leafy vegetables, table grapes and tree crops in Midland and Bunbury, broadacre crops in Williams and summer crops in the Pilbara.

How to address lower gross margins

"No matter which farm enterprises our clients are involved in, I believe the key issues for agronomists like me are how we address diminishing gross margins for farmers and how we filter the wealth of information they receive to make their operations viable and sustainable."

Congratulating Courtney on his award, Nick Fazekas, Elders General Manager – Retail, said Elders was committed to attracting and retaining talented agronomists like him because of the key role they play in enhancing the viability of farmer clients.

"In many ways, Courtney Piesse reflects the new face of Elders and our 120 member agronomy team, who share a passion for driving innovation and technology to farmers and the wider industry," he said.

"That's why we continue to invest in training and developing our people – a commitment we share with Adama to nurture young talent for the future of our rural industries."

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Grower profitability front and centre for panellist

MAINTAINING and increasing grain grower profitability, and addressing the production issues underpinning profitability through a multifaceted, coordinated approach.

These are the challenges Stuart Kearns is up for as a Grains Research and Development Corporation (GRDC) Western Regional Panel member.

He is the GRDC's Executive Manager Regional Grower Services and has recently joined the panel in an executive capacity, bringing with him almost two decades of experience with the GRDC, in which time he has focused primarily on grower services.

Stuart is one of 11 members of the panel, led by chairman Peter Roberts, comprising grain growers, scientists and advisers.

"I've been with the GRDC since 1998 and in that time I've worked in many different roles," he said.

"But the constant theme of my tenure has been grower issues and engaging with growers – understanding their issues and what's impacting them in the paddock, knowing what's burning a hole in their back pocket and what's keeping them awake at night."

Work across multiple areas

Stuart said the GRDC had increasingly moved towards addressing growers' production issues through programs of work across multiple areas, or 'initiatives', rather than with single research projects.

"It's not just one project or one response to issues such as weeds or soil constraints – these areas are being pulled together and coordinated by a program of four or five different projects that are working on different elements of these issues," he said.

"In the area of weed management, for instance, the GRDC is investing not only in the Australian Herbicide Resistance Initiative, but short-term, tactical Regional Cropping Solutions Networks (RCSN) projects, as well as long-term molecular research," he said.

Stuart is one of five GRDC executive managers and in this role is responsible for leading its Regional Grower Services team, which

aims to ensure that research and development (R&D) outcomes are delivered to growers and benefit their farm businesses.

The team comprises staff based in the GRDC's Canberra and regional offices, including Manager Regional Grower Services – West, Roger States in the Perth office.

"Their fundamental role is to understand what growers' issues are and to respond in a timely way, and the main way in which we understand these issues is through RCSNs," Stuart said.

"Once we identify the issues that are of greatest concern, we look for the best possible solution – which might be putting a research project in place, developing existing research results, or developing new 'products and services'.

"Regional Grower Services is currently working on a range of 13 products and services – colloquially called the Baker's Dozen – that includes hard copy publications, digital applications and face-to-face events."

Stuart said the GRDC had recently implemented significant changes to its structure and operations.

"This has occurred right through the organisation – from our staff and their roles and descriptions, right through to our regional presence, the way we do business and the way in which we engage with growers on a regional basis," he said.

"The changes go a long way to preparing for the needs of growers today, and their needs in coming decades."

Changed landscape

Stuart said change was needed as the landscape in which the GRDC operated was very different to what it was when the GRDC was established in 1990.

"The value of the Australian grains industry has grown considerably – we were an \$8.5 billion industry less than 10 years ago, and now we find ourselves operating in a \$15.5 billion industry," he said.

"We've also witnessed a refocussing of state governments away from R&D which is changing the way in which we operate and the way in which we need to partner with other organisations.

"In addition, we've heard loud and clear from growers that they want to see the GRDC's investment portfolio being directed at a very local level."

Stuart is a strong advocate of the benefits of a nationally coordinated R&D system.

"Australia represents two per cent of the world's R&D in grains, and we need to have a system that enables the industry to connect with other organisations globally – to find solutions to grower issues in the cheapest, most effective way," he said.

"And while Australia does have researchers and agronomists across the country, we don't have all the capacity we need in each state.

"A classic example is wheat rust – we have a lot of research capacity localised at The University of Sydney in the Australian Cereal Rust Control Program, which provides services to wheat pre-breeding efforts throughout Australia.

"We build and maintain that capacity in that particular location rather than trying to fragment or duplicate it across the country."

The GRDC plans and invests in RD&E for the Australian grains industry. Its primary objective is to drive the discovery, development and delivery of world-class innovation to enhance the productivity, profitability and sustainability of Australian grain growers and benefit the industry and the wider community.



RDC Executive Manager Regional Grower Services Stuart Kearns has recently joined the GRDC Western Regional Panel, bringing with him almost two decades of experience with the organisation, focused on providing services to growers.

International grain market news

AT A GLANCE...

- AUD declines following negative signs out of China.
- USDA January report supports ongoing fundamentally bearish view of the market but US winter wheat plantings were lower than expected.

China rattles currency market

The Australian dollar continued its recent overall downward trend of the past 12 months, dropping below 70 US cents and coming close to dropping below levels not seen since 2009.

The Chinese Central Bank, who periodically set the value of the Yuan against the US\$, announced a larger decline than was expected, which led observers to believe that economic conditions and growth may be worse than the Chinese Government has previously indicated. These concerns were shown through declines in various stock market and currency values, including the A\$. The weaker A\$ bodes well for the competitiveness of Australian grain exports hence it has supported futures values in A\$ terms.

But as China is the world's second largest economy, a significant consumer and importer of commodities, and Australia's largest trading partner, concerns about economic growth leads to concerns about the potential impact on China's demand for imported food products.

The A\$ also recorded a sharp decline against the Euro. With European countries being a key buyer of the current season's export canola, this has supported the \$A value of Matif futures and in turn has supported Australian canola values.

As economic conditions in the US and Western Europe continue to improve, the US\$ and Euro will continue to find support, which continues to put downward pressure on the relative value of the A\$.



Speculators push around markets

In early January the CBOT March 16 wheat futures price rallied, largely due to market speculative funds, who continue to hold a large net short position in wheat futures.

Speculators began the year by taking a noticeably negative

view of grain prices for the coming year, following a series of strong harvests globally. Also, an increase in supply from Argentina is expected, following the election of a new pro agriculture government, which will add to already strong competition in export markets.

With speculative funds holding such a large bet that prices will go lower, any signs that this is not the case may see futures values supported as funds rush to cover short positions.

USDA report

The January 2016 USDA world agricultural supply and demand report was contrary to market expectations in that the winter wheat seeding for the US was reported at 36.6 million acres, against an expected value of around 39.3 million acres. This estimate, if correct, means the smallest US winter wheat acreage since 1913.

This saw values supported despite the fact that the overall 2015–16 wheat balance sheet was more bearish with a larger crop and lower use expected.

The numbers for global canola and soybeans remained relatively steady, with neither total production or total use moving by more than 0.1 per cent. But of interest was the fact the USDA reduced US production estimates of soybeans due to lower yields.

The decrease in the estimated production and total use of corn was more significant. The 5.94 million tonnes downsizing of the global production estimate is largely attributable to South Africa, where ongoing drought has seen that country's estimated level of production reduce by 4 mt. The downward revision of the total use estimate of 3.98 mt ensured that the ending stocks figure was revised down by only 2.91 mt.

Notwithstanding the above, macro factors including negative signs out of China and the recent US interest rate rise continue to act as a dampener to commodity markets. Overall, the USDA report supported the ongoing bearish view of commodities markets underpinned by overall increases in global production and decreases in total use.

Pulses summary

Deep demand internationally is keeping prices for most Australian pulses at very high levels, and we suspect this won't change significantly in the short term. Below is a quick wrap up of what we are seeing in current markets.

Chickpeas

Chickpeas on the east coast maintained strong pricing throughout the harvest period. This is being fuelled by strong demand in the Indian subcontinent where they are again suffering through a dry Rabi crop after less than average monsoon rainfall. Demand for Australian chickpeas generally softens around this period with the upcoming harvest in the subcontinent – this is not the case this year.

With the lack of local production, India and neighbouring countries will need to import more product than the recent average to keep up with demand. Already we are seeing strong pricing for new crop chickpeas out of Queensland and NSW, with farmgate prices above \$800 per tonne depending on location.

For those who are confident with forward contracting



Chickpeas have been fetching \$800 per tonne on-farm.

chickpeas, this could be something worth considering to cover some downside risk.

Along with other factors, if this year's Indian monsoon is average or better, import demand for chickpeas may soften early in 2017 or before.

Field peas

Field peas are following a similar trend to chickpeas for all the same reasons. In early January prices in Victoria and SA lifted at least \$30 per tonne into most locations. Peas in these states are struggling to meet No1 grade in many cases, mostly due to the lack of spring rainfall. The trade is accommodating this as most buyers are now working on either the No2 specification – or No1 with no retention requirements.

For those with traditional Dun type peas, marketing these can be more difficult as there is less demand for these types from the major importing countries. It is seriously worth considering changing over to a Kasper type variety to make marketing your peas easier, and possibly with higher returns.

Lentils

Lentil prices in Australia are holding up well, with prices in early January in Victoria and SA trading between \$1200–\$1450 per tonne depending on variety and delivery point.

Growers have benefited from a very competitive local market as traders and packers scrambled to grab their share of the relatively small volume available. Internationally, several factors are now weighing down these high prices. In India, large volumes of Canadian red lentils are being hurried through the local system and being traded to neighbouring countries struggling with the current high prices of Australian lentils. Such is the price difference between current levels and of the early contracted Canadian lentils into India, some are actually making their way into Australia after being processed in India and re-exported.

A major factor limiting export trade currently is a maximum retail price (MRP) for split lentils imposed by the Sri Lankan government in an attempt to curb rising prices in their local retail market. This has all but stopped the contracting of Australian lentils into Sri Lanka.

Faba beans

Faba beans have again followed a similar trend to recent seasons, starting relatively strong around \$400 per tonne coming into harvest and steadily rising into the new year, now sitting around \$500–\$565 depending on variety and delivery point. As with lentils, growers have benefited from the local trade fighting for the limited available crop.

Resurgence in Chinese appetite not in the pot

LAST year, strong Chinese appetite supported Aussie barley and sorghum values at historical highs. The market is indicating this lucky star is unlikely to shine quite so bright this season.

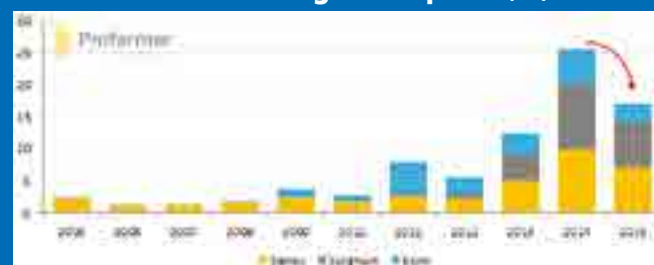
China is awash with supply of their local corn. While the Chinese government has lowered the price they are paying their farmers for corn, they are also using non-tariff measures (like tougher quarantine requirements) to slow down imports of feed grain.

These import protocols are making it increasingly complex for Australian exporters to export to China. It is forcing exporters to be more choosy about where they accumulate grain, or to find alternative destinations to the Chinese market.

The USDA is forecasting a sharp decrease in Chinese imports of feed grains this season as the chart below highlights. Actual results could be even lower than this come the end of the season pending the effectiveness of Chinese policy efforts.

Australia isn't the only exporter impacted by such policies as US sorghum has also found homes in the Chinese market.

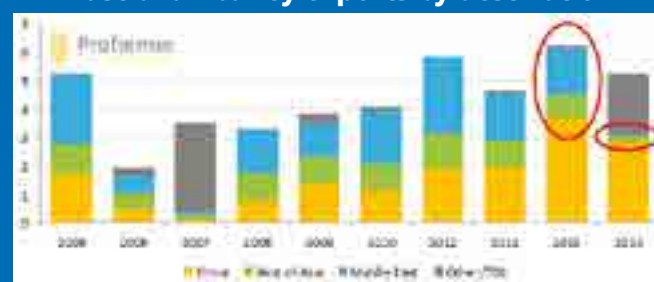
Chinese feed grain imports (mt)



China hasn't always been such a large consumer of Australian barley. As the chart below shows, last season strong Chinese appetite squeezed out a lot of traditional consumers of Australian feed barley such as the Middle East (including Saudi Arabia) and other Asian markets (such as Japan).

Although we are currently operating at lower price levels to last season, current values are reportedly bringing a return of interest from countries like Saudi Arabia – a traditional and very important market for Australian feed barley.

Australian barley exports by destination



Australian grain sector in 'war of attrition' along the supply chain

SHIFTING towards a more collaborative grains supply chain will be a 'winning strategy' needed to help address the overcapacity that currently exists in Australia's grain storage network, according to a recently-released industry report.

The report, *Australian Grains – the next hunger games*, by agribusiness banking specialist Rabobank, says the creation of partnerships (through 'shared value agreements') along the supply chain will determine the relative winners and losers in an increasingly competitive grains industry.

And report author, Rabobank senior grains and oilseeds analyst Graydon Chong expects it to 'play out as a war of attrition', with those grains industry players who actively seek to 'create shared value' better placed to gain long-lasting benefits arising from the changes to the industry.

"We have seen small infrastructure owners or new entrants successfully adopt this strategy (forming partnerships along the supply chain) to compete in the potentially overcapitalised supply chain, but we expect to increasingly see growers, traders, end users, storage and logistic providers form partnerships," he says.

Graydon says the move towards a more collaborative supply chain is likely to involve value-for-volume partnerships, including initiatives such as multi-seasonal volume commitments by growers in exchange for price premiums or storage, or fee discounts for end users and grain storage owners.

"This should augur well for growers, as bulk operators have to increasingly compete for grain through offering more attractive propositions," he says, "and this is likely to see the traditional service provider and customer model replaced by one that is much more focussed on business partnerships."

Shared value proposition for growers

The report highlights the 'exponential increase' in Australia's on-farm storage facilities, with on-farm capacity estimated to sit around 15 million tonnes, and further growth pegged in coming years.

"This trend has been sparked by the

marked decline in centralised commercial storage facilities and has seen us enter a cycle of asset underutilisation – not only in regards to on-farm storage, but also off-farm infrastructure – as an increasing number of storage facilities compete for volume," Graydon says.

In light of this increased competition, the report says owners of grain storage infrastructure who are able to secure long-term certainty of grain throughput will be best placed.

"This may mean partnering with grain marketers, end users or supply chain operators in a volume-for-value partnership, or for growers there may be opportunities to partner with other producers to build scale and market power by attracting volume benefits and storage fee discounts," he says.

Graydon says with storage facilities shifting on-farm, the risk dynamics involved in the grain supply chain are also transferring to growers.

"When storing grain on-farm, farmers are responsible for maintaining grain quality as well as, managing risks associated with pests and OH&S," he says. "So these risks need to be carefully weighed up when investing in on-farm storage."

Post farmgate asset utilisation

The report says the formation of partnerships in the grain bulk handling network will also be key to avoiding duplicated grain storage and handling infrastructure and ensuring the best use of existing assets.

"For example, we are starting to see increased co-investment in grain port infrastructure, which are some of the first horizontal partnerships in the bulk-handling part of the supply chain we have seen since deregulation," Graydon says.

Rabobank expects these partnerships to have an increasing influence on the flow of grain through the supply chain, as they maximise asset utilisation, provide long-term accumulation certainty and help minimise price volatility.



Rabobank senior grains and oilseeds analyst Graydon Chong.



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Cutting export subsidies is good news for growers

■ By the Australian Export Grain Innovation Centre

THE Australian Export Grain Innovation Centre (AEGIC) has welcomed The World Trade Organization's (WTO) agreement to abolish all agriculture export subsidies. AEGIC Chair, Terry Enright, said the removal of the subsidies should make Australia more competitive against most other grain exporters.

"Australia has very low levels of subsidies compared to many of its major competitors which means our growers have not been competing on a level playing field.

"Australian grain producers have been feeling the cost-price squeeze for some time now and having to compete with subsidised countries has been compounding this in terms of profitability and long-term viability."

The Organisation for Economic Co-operation and Development (OECD) stated producer support estimates – or subsidies – as a percentage of gross farm receipts were 7.1 per cent for the US, 13.5 for Russia, 14.3 for Canada and 19 for the European Union.

In contrast, producer support estimates in Australia sit at only 2.7 per cent.

Terry cautioned while the agreement is positive it will have less impact for Australian growers in cases where competitors had similar or lower levels of producer support to Australia – an example being Ukraine.

"Australia is facing increasing competition from emerging low cost grain producers, such as Ukraine which has about half the level of subsidies when compared to Australia. So the WTO agreement will not improve Australia's competitiveness against Ukraine.

"Australia also faces an increasingly challenging production environment. There is an ongoing need for research, supported by industry and government, to cost-effectively boost Australian production and assist its grain industries to adapt and adjust to climate change."

How competitive is our export grains industry?

AEGIC is currently analysing the competitiveness of the Australian export grains industry compared with its major competitors.

These analyses are showing the productivity of Australia's grain production is growing slower than what it needs to be in order to maintain market share.

A report comparing Australia with Canada – *The Puck Stops Here! Canada Challenges Australia's Grain Supply Chains* –



Terry Enright.

released in 2015 found Australian supply chains lack the rail efficiency of the Canadian supply chains and identified key areas where Australia can improve its competitiveness.

"Grain exports have totalled about \$9 billion annually over the past four years making it Australia's most valuable agricultural export and it is vital the sector examines the competitive pressures coming from other grain-producing nations," Terry said.

"The ultimate aim is to enhance the international competitiveness and value of Australia's export grain and to return pre-farm gate value to grain growers."

WTO TAKES A FEW STEPS FORWARD

■ By Dalton Henry, US Wheat Associates, Director of Policy

While achieving progress in multilateral trade negotiations among WTO members is often frustrating, some steps in the right direction were taken at the December 2015 agreement at the WTO Nairobi Ministerial meeting. The agreement immediately eliminates export subsidies for developed countries and calls for a phase-out for developing countries.

Though the world's largest traditional user of agricultural export subsidies – the European Union – has moved away from the subsidies, agreeing to eliminate them is no small matter.

The Nairobi agreement also addressed export credit and financing rules.

But... there's more work to be done

Despite these gains, USW is disappointed that the Ministerial reauthorised the use of transportation, marketing and processing subsidies for agricultural products for developing countries. This exception could provide cover to bad actors who have violated past agreements to the detriment of producers around the world. USW will continue working with the Office of the US Trade Representative (USTR) to ensure developing country members do not abuse this exception.

The Ministerial reflected differing views on future WTO negotiation priorities. At least the agreement recognises that work would continue on Doha's remaining issues in agricultural trade. This includes public stockholding programs, which India uses to subsidise its farmers, and a 'special safeguard mechanism,' which would allow countries to 'snap-back' tariffs on products in the face of rising imports. The continuation of these negotiations is especially concerning given some countries' insistence on using these negotiations to roll back progress at the WTO.

We must ensure that WTO members hold firm on past agreements, allow no more backpedaling on domestic subsidies and return their focus to the original goal – liberalising trade policies to promote economic growth for all participants.

'Supreme' reigns supreme in udon noodle wheat quality tests

TWO new varieties of premium Australian noodle wheat have lived up to the high expectations of the Japanese udon noodle market in recent sensory tests conducted by the Australian Export Grains Innovation Centre.

The two varieties, Supreme and Zen, underwent thorough testing by the AEGIC Sensory Panel over a four week period with the assistance of a visiting Japanese noodle expert.

Mr Akifumi Omori, representing the Japanese Flour Millers Association, aided AEGIC in the assessment of several advanced udon and ramen noodle lines during December 2015.

AEGIC Wheat Quality Technical Markets Manager Dr Larisa Cato said Supreme and Zen cemented their premium noodle status by coming out on top in noodle appearance and eating quality.

"Supreme in particular displayed a unique combination of excellent noodle colour and texture," Larisa said. "Supreme has also been evaluated separately in Japan by the JFMA, and was very highly rated by the JFMA Sensory Panel."

Larisa said AEGIC collaborated regularly with the JFMA on behalf of the Australian wheat industry to ensure Australian noodle wheat reached the expectations of the Japanese market.

"Udon noodle lines are required to be evaluated by a trained sensory panel as part of the Australian Noodle Wheat (ANW) classification process, through Wheat Quality Australia. The AEGIC Sensory Panel undergoes annual training by visiting Japanese noodle experts," she said.

AEGIC hosted Mr Omori for a four week testing period. During the visit, AEGIC also arranged for Mr Omori to visit the Clark family's Westview farm in Bolgart to witness Australian noodle wheat production first-hand, as well as some in-country CBH receival points and Kwinana Port.

AEGIC also facilitated meetings with breeding companies Australian Grain Technologies and InterGrain. InterGrain bred Supreme and Zen.

AEGIC thanks CBH, InterGrain, AGT and the Clark family for their support. ■

NOODLE WHEAT IN AUSTRALIA

Australia, in particular Western Australia, has a long history of breeding and supplying high quality noodle wheat to Japan and Korea. Consistent quality and stable supply of Australian noodle wheat is of high importance to these markets.

AEGIC is committed to securing the future of this industry and will continue to work towards strengthening this relationship.

In September 2015, AEGIC released *Western Australia's Noodle Wheat Industry – Current Status and Future Challenges*. This report, commissioned by the Wheat Council of the Grain Industry Association of Western Australia (GIWA), urged the Australian grains sector to consider the future direction of this important industry.

The Japanese market, together with the Korean noodle market, collectively imported around 1.6 million tonnes of Western Australian wheat consisting of 700,000 to 800,000 tonnes of ANW grade wheat blended with a similar amount of APW, in ratios specific to each country of destination.

- Australian noodle wheat is preferred for the production of premium udon noodles due to its excellent starch quality (high swelling properties), bright flour colour and excellent colour stability, medium dough strength and medium protein levels.
- In addition to wheat and flour quality testing, sensory testing is also an important means of evaluating wheat varieties for classification into ANW.
- Ideal udon noodle should have a unique balance of softness and firmness, often described as 'soft noodle with slight surface firmness' combined with good elasticity and stickiness.
- Colour is also important. Favourable traits include good colour and colour stability, with superior udon noodles being described as having a 'bright, creamy, slightly yellow colour'.



The AEGIC Sensory Panel puts the two new noodle varieties to the ultimate test – how do they taste?

Drones have sky-high potential for grain

GRAIN grower and Nuffield scholar Ben Boughton has had a lifelong passion for technology and agriculture, so when Unmanned Aerial Vehicles (UAVs) – or drones – started being used for agriculture he learned how to build his own!

Ben and his wife Olivia work in his family's business – Gilroy Farms – which is a 2000 hectare dryland cropping enterprise near Moree in northern NSW.

While looking for the next big leap forward to help boost production on Gilroy, Ben was determined to explore the UAVs' capacity to boost data capture on-farm. His 2014 Nuffield Scholarship, sponsored by the Grains Research Development Corporation (GRDC), allowed him to do just that.

His recently released report outlines the findings from his two year scholarship, which included travel to South Africa, Kenya, Russia, Czech Republic, Poland, Germany, Canada and the US to investigate how UAVs and how they might be used in the Australian grains industry.

"I felt restricted by existing data collection methods for precision agriculture, and dreamt of being able to collect data at unprecedented temporal, spatial and spectral resolutions for a reasonable price with full ownership and control," he said.

"There is much value for the grains industry in accessing precise data for better paddock management, but at the moment collecting this data is expensive, time consuming and often confusing.

"Considering how tight margins in the grain industry can be, and the need to bump up productivity to meet global food



Ben Boughton caught up with fellow Nuffield Scholar and agronomist, Daryl Chubb while in Canada and 'swapped notes' on new UAV research.



GRDC-sponsored 2014 Nuffield Scholar Ben Boughton (left) visiting Swift Radioplanes in Prescott, Arizona.

demand, I do feel the UAV is a technology that can – and inevitably will – add value to our industry.

"There's still some way to go, though. As a burgeoning industry, it is missing a lot of foundation R&D – and this can be quite costly – and not all of those products currently in the marketplace are created equal."

Ben spent the majority of his research time in North America expecting to be visiting universities, but instead, discovering a number of start-up companies and even farmers pushing forward further development of UAVs.

"A UAV itself is not as technologically advanced as it sounds – it's just a vehicle. It's the sensor that really needs to be excellent and advanced, and this area is certainly under heavy development by several start-up companies I was able to visit," he said.

"Eventually this technology could be fantastic for our grains industry particularly through applications such as weed and disease monitoring, water movement and vegetation mapping, facilitating variable rate fertiliser application and yield forecasting.

"Further research is definitely needed into what data we can collect, how we can use it, and how we can improve spatial accuracy, as well as improving the workflow between manufacturer, remote sensing specialist, agronomist and farmer."

For more information contact Ben on 02 6754 8617 or bboughton@gmail.com. Nuffield Australia provides opportunities to Australian primary producers and managers to travel the globe investigating a research topic important to them and Australian agriculture. Scholars are provided with a \$30,000 bursary to embark on a 16-week program consisting of both group and individual travel over a two-year period.

To keep up to date with the latest from Nuffield Australia, see www.nuffield.com.au



The harvest moon – Part 2

■ By Ian M. Johnston

In the previous issue, Ian recounted his harvesting experiences at Auchtermuchty, and now the story progresses to the next phase – the threshing.

1951, Easter Colzie, Auchtermuchty

It was March. The wild gales that had swept Scotland during the long bitter winter had eased. But frozen snow still glittered on the higher hilltops and remained sullen and stubborn in the shadowy recesses of the glens.

Predictably the blackfaced ewes had survived by huddling together, usually in the lee of a drystone dyke or a rocky escarpment. Each morning Old John climbed up into the hay loft and through a trapdoor, lowered a massive roped bundle of clover hay upon our shoulders. Burdened with our loads, Eck, Gordon and I would stagger through knee deep snow up the glen in search of the sheep. Frequently they were completely covered by the snow and rendered invisible, the only clue to their location being a patchwork of snorkel-like breathing holes staining the virginal whiteness. Having provided the vital sustenance to the grateful ewes, we returned to Old John's loft for more hay and yet another laborious trudge up the glen.

But now the March days were rekindling a cheerfulness of spirit and well-being. Early spring brought stunningly beautiful crisp days. Solid wee blackfaced lambs skipped and raced around their anxious mothers like naughty children. Plump green buds emerged, firstly on the chestnut trees followed by the sycamores. Skylarks sang their tiny hearts out as they soared aloft out of sight.

But most importantly, it was threshing time!

Eck's geometrically and artistically perfect corn stacks (a euphemistic term as corn is not grown in Scotland and oats are frequently and incorrectly referred to as 'corn') had endured the assault of the winter blitzkrieg unscathed. The wheat straw thatching had behaved impeccably, resulting in the oat sheafs remaining dry. This, despite the stacks having been subjected to incessant rain storms and blankets of snow.



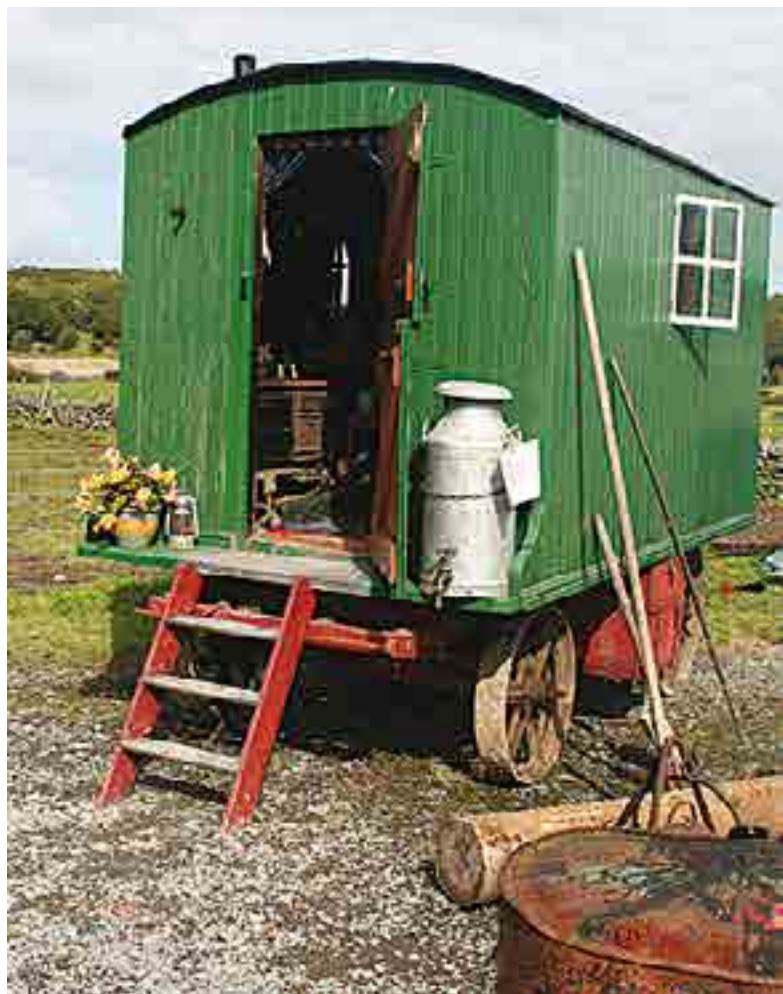
Attaching the endless belt.

Monday

The morning of the second Monday in March heralded for me a time of considerable expectation. In between feeding the Aberdeen Angus steers in the byre and mucking out the stable, I kept ducking out and gazing down towards the distant main Auchtermuchty/Grange of Lindores Road, which snaked past the entrance to the farm. My vigilance was eventually rewarded by the sighting of a pall of dense black smoke from around a bend, heralding the imminent arrival of Archie MacDuff and his threshing mill.

In Scotland during the early 1950s, only the owners of wealthy farming estates (usually located in the fertile Lothians) could contemplate the purchase of one of the new combine harvesters, which were arriving from the USA in limited numbers. Also, labour saving bulk grain handling lay ahead in the future. Accordingly, wheat, barley and oat sheafs were 'warehoused' in stacks until the threshing contractor arrived in the spring.

The tenant farmers in the Auchtermuchty region knew that Archie MacDuff would be in their area in March. So following a somewhat boisterous meeting in the Ploughman's Arms, a



An iron wheeled worker's sleeping/kitchen/washroom caravan.



The threshing scene – posing for a photo.

schedule of dates had been agreed upon. As it happened, Old John Ferguson's Easter Colzie was to be first cab off the rank.

Although it seemed an impossibility, the black smoke belching from MacDuff's coal fired Fowler traction engine, increased in density and putridity as the perspiring machine tackled the long climb up to the farm. Which was not surprising really, as it not only hauled the double-decker bus size threshing mill, probably weighing around 15 tons, but also an iron wheeled trailer transporting five tons of coal, plus a men's iron wheeled sleeping/kitchen/washroom timber caravan, at least half the size of a railway carriage!

It took the remainder of the day to park the caravan and trailer, plus line up the steamer to the threshing mill. The latter, which provided the power to drive the mill, was placed around 60 feet behind its rear. An endless leather belt was then connected from the belt pulley of the Fowler to the 6 foot diameter pulley of the threshing mill.

Aligning the two together was in itself a challenging task, beyond the ability of a mere mortal – or so Archie MacDuff told me. Over the distance of the 60 feet, as little as one inch out of line would see the belt thrown dangerously, as it engaged the not inconsiderable load of driving the heavy threshing mechanism. An agricultural student (ie. me!) standing anywhere near the high speed flopping belt would indicate worrying suicidal and maniacal tendencies and deserve a kick 'up the bum' according to Old John!

Tuesday

Seven am and Easter Colzie resembled a Saint Swithin's Day fair ground! Folk were everywhere. Old John who glowered

at everyone, Davie his bad tempered 21 year old son, Eck the foreman, Gordon the tractorman, Archie MacDuff and his two clay pipe smoking mates, an assortment of around 20 dungaree clad ploughmen, byremen, and orramen, plus a chattering of farmer's wives and daughters all borrowed from the surrounding farms. It was customary for the district's farmers to help each other with the threshing. They sent their labourers and women folk to which ever farm the threshing was taking place. In return everyone was treated to a crowded lunch in the always spacious farm kitchen. The menus never varied.

The first day's offering was mince, champed totties and neeps (mashed potatoes and swedes), thick chunks of bread to mop up the mince, together with large mugs of scalding black tea, tasting as if they had been made with iron filings. The second day's fare was identical, except the mince had been watered down to make it 'go' further. The third day (usually the final day), the same again, except the mince now resembled thin soup!

Archie had been up since before dawn, lighting the fire under the boiler of his traction engine. As I led the four big Clydesdales out to the trough for their morning slurp, I noticed sooty smoke coiling from the tall chimney stack of his decidedly menacing, but for the moment deceptively serene contraption.

Eck had climbed a wobbly ladder and scrambled onto the summit of the stack closest to the threshing mill, and was engrossed in forking the protective thatching onto a trailer, which had arrived behind Gordon's grey Fergy.

Several bales of jute sacks had been placed adjacent to the grain discharge-shoots of the thresher. There were also several hanks of twine, in readiness for the sowing of the sacks. An empty 44 gallon oil drum and a 4 foot length of stout broom handle was also in evidence, for which purpose I was soon to discover!

Old John instructed me to harness up Jock The Terrible and back him into the shafts of the flat top hay wagon, in preparation for using it as a staging platform for the sheafs of oats.

Jock was in one of his cantankerous moods and refused to lower his head, which meant I could not reach up high enough to pull the bridle over his flattened ears. With the aid of a three legged milk stool, I was suitably elevated and finally succeeded with the bridle and also was able to thrust the heavy collar over his bobbing head. The cart-saddle and the breaching presented no problems, except when I tightened the girth and Jock's rear near-side iron shod hoof lashed out. But I was prepared and he missed!

Three piercing blasts on Archie's steam whistle proclaimed in unmistakable terms, that the threshing was about get underway.



Hard at work.



Morning tea.

The threshing

The thumping revs of the big steamer momentarily slowed as Archie MacDuff eased a lever forward and the endless belt connected to the thresher trembled into motion. The bewildering range of spindles, pulleys, chains, fans and cranks of the thresher grumbled into life. The threshing drum, which separated the grain from the straw, produced a roar as it settled into its high speed rotation.

Two women climbed aloft to the top of the now pulsating thresher mill and knelt in position over the cavity, through which the sheaves would be fed to the drum. Eck was able to pitchfork the sheaves from the top of the adjacent stack, directly to the first of the two women, who deftly cut the binding twine around the sheafs with a long razor sharp knife, enabling the second woman to feed the now loose straw into the drum. A knife dropped into the drum would have likely resulted in Archie ordering the immediate execution of the offender!

As Eck's stack was reduced in height, the sheaves were forked onto Jock The Terrible's cart and from there to the two women. Then Eck moved on to the next stack – and so on.

But there was also much activity near the rear of the thresher. Two of the visiting orraman were positioned at the grain discharge shoots. The thick jute sacks were attached by dangerously sharp pointed hooks to the two grain outlets, which were opened or closed alternatively. One was shut off whilst the other spewed its stream of oats into one of the sacks. As one sack filled it was removed and replaced with another. This was physically hard work as the four bushel sacks took only a few minutes to fill. Failure to have an empty sack in place in time was unthinkable, as the grain would keep coming and Archie would have had a fit! (not a pleasant thought).

Each filled sack was dragged over to a weighing machine and lifted onto its platform. A farmer's daughter was provided with a scoop and it was her job to either add to or take from each, an amount of grain until the sack weighed precisely one hundredweight – 112 pounds (50.8 kg).

A fellow with bulging muscles then dragged the sack to where others had been positioned, lined up like a regiment of Scots Guards. An old retired ploughman with a long grey beard, attacked each with a bag needle and twine. In seconds he expertly securely sewed the sacks, leaving a pair of ears exposed for grasping. Watching him at work, I half expected the old fellow's whiskers to become entangled with the twine!

Now it was my turn, and this was seriously hard yakka! Accompanied by three other luckless souls, working in rotation, two of us grabbed either end of the broom handle, lowered it to the base of the sack, then by grasping an ear (of the sack that is) with the other hand, we were able to heave the sack upright on to the 44 gallon drum. But there is more. Each in turn backed up

to the sack and rolled it onto our back and lumped it, either up a flight of wooden steps leading to the grain loft (pew) or take it to a waiting Albion lorry that had been sent by MacTavish and Sons, the local flour miller.

“Chelmsford” Rowena, NSW, November 1979

Margery and I watched as the last of the tri-axle semi-trailers hauled its 40 tonnes of grain out through our front gate and headed for the Grain Elevator Board's silo at Cryon. The three headers had completed the stripping in record time and in perfect weather – the temperature rising to around 38°Celsius each day. The contractor had responsibly pressure cleaned his headers at the NSW/Queensland border, to assure that no 'nasties' were introduced into our paddocks.

It had been an anxious but relatively easy two weeks for me. I had spent most of the time driving around in the wee Suzuki Jeep, making sure everything went like clockwork – and it did! The contractor had arrived on time, as had the semi trailers. There had been no dramas at the silo, our grain was free of black oats, turnip seeds and burrs. It would be classified as Prime Hard.

But I do confess to (with a degree of nostalgia) remembering my involvement with the Auchtermuchty harvest all those years ago. 'The good old days'? – well yes and no. But in truth, I am glad I experienced them, for had I not, I would be unable to appreciate the farming evolution, during which it has been my privilege to participate.

Author's note: There are no obtainable photographs of the events described. The graphics used are of unrelated but similar early threshing scenes. ■

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 Steel Horse was a model of which tractor —
Howard, Hanomag or HSCS?
2. The original colour of Farmall tractors was —
Grey, blue or red?
3. The Bristol 20 crawler was powered by which make of engine —
Anzani, Austin or Ford?
4. The 1962 MF 85 was replaced by the MF —
89, Super 90 or 203?
5. The rowcrop version of the Fordson N was named the —
Rowcropper, Do All or All-Around?
6. Steyr-Daimler-Puch tractors were imported into Australia from —
Germany, Austria or Italy?
7. The Lanz Bulldog factory was located in which German city —
Munich, Emden or Mannheim?
8. The Trackmaster was a crawler version of a —
Fowler, Allis Chalmers or David Brown?
9. In 1928 Massey Harris obtained the rights to which tractor —
Wallis, Sawyer or Twin City?
10. Australian tractor firm A.H. McDonald and Co. was established in —
1903, 1913 or 1923?

See answers on page 56.

Farming in Foreign Fields...



Doing it their way

WHEN Larry Young climbed into the cab of his first soft drink route truck, the southwest Missouri farm boy began a journey that would lead to the executive suites of several of the nation's leading beverage companies. Now, nearly 40 years later, Larry leads the Dr Pepper Snapple Group as its CEO. His off-work hours are spent with several charities he and his wife, Colette, actively support, and, since late 2011, building a world-class game and hunting ranch.

"I shot my first buck at age eight," Larry says. "Hunting has been a lifelong passion of mine."

His success at business has afforded Larry the opportunity to hunt all over the world. "I've seen some of the top preserves. I knew, when I got the chance, I'd like to build one my way."

His plans were set into motion when he moved to Texas, working at Dr Pepper's headquarters in Plano. He and Colette began the search for a property within an hour's drive of the Dallas area, and located a former hunting ranch near Commerce, Texas, that had fallen into disrepair.

Working as a team, they set out to bring the property up to their standards. "We each have our talents," Colette says. "Larry has his vision for the land, and I have focused on the aesthetics of the properties and the buildings." Reflecting Larry's corporate

Larry and Colette Young have built a world-class game ranch.

role, the Youngs named it the 10-2-4 Ranch after Dr Pepper's iconic slogan.

They both share the goal of building a high-quality herd of whitetail deer and select exotic hoofed animals including axis, nilgai, black buck and sika thriving in a natural environment.

In Texas, large, high-fenced hunting ranches are a popular way to provide a quality hunting experience. The Youngs currently have about 1700 acres (690 hectares) high-fenced for wildlife and 500 acres (200 hectares) low-fenced for a 150-head Angus cow-calf herd. Another 190 acres (80 hectares) is in crops including corn for deer feed.

Improving every acre

Immediately after purchasing the property, the Youngs began improving virtually every acre. "We limed, we fertilised, we sprayed for weeds, and we planted some good grasses and legumes to get nitrogen back into the soil," Larry explains.

As they began working the land, Larry wanted to get better equipment than what he initially started working with.

He recalls going into an equipment dealership where the



Larry Young checks on one of the numerous food plots that have been established for deer feed.



The ranch offers an upscale hunting experience.

salespeople didn't show much interest in talking with him. "I went on down the road to the Case IH dealership," he says. There, he found a salesperson much more willing to help him.

That initial meeting has turned into a relationship resulting in a line of Case IH tractors on the ranch ranging from a Steiger 350 and a Magnum 290 used for deep ripping and heavy discing to several Puma, Maxxum and Farmall models, most equipped with loaders.

Larry says he personally puts most of his hours on the Puma 185, and says their two Maxxum 115s are the ranch's most versatile tractors. During peak hay-making times, Colette often pitches in. Having similar controls among the tractors is an advantage, she adds.

"We like this Case IH equipment," Larry says. "It stands up well to what we do here, and our salesman and his company provide the best service you'll ever get."

Deer feed and crop production

The Youngs have established numerous food plots for deer consisting of oats for grazing, Austrian winter peas, vetch, crimson clover and chicory. Each grows at a different pace to provide a food source throughout the year. At the end of the growing season, they'll cut these plots for hay for the cattle, then plant alfalfa clover for its nitrogen value, which is also baled. Then, more annuals are planted.

"It's a constant rotation," Larry says, and it's a reason why they keep their tractors busy.

Along with good grazing, the deer have access to corn fed through automatic release timers. High-protein pellets with added minerals and nutrients are also available to help overall health and encourage antler growth.

The Youngs initiated the deer herd by purchasing animals with good genetics from other ranches. "We bought a bunch of good does, and then began bringing in the bucks," Larry says. Now, breeding takes place naturally.

Harvesting the animals

Harvesting the animals is part of the overall life cycle, and here, the Youngs have sought to make hunting on the 10-2-4 Ranch an exceptional experience.

Ranch guests have their choice of several accommodations. One bunkhouse can sleep and feed up to 14 hunters and is equipped for after-hunt relaxation with a pool table, card tables, big screen TVs and plenty of opportunity for conversation.

Their main lodge offers a higher level of accommodation

including private bedrooms, a comfortable lodge feeling, and a separate building called Rosie's Cantina for late-night card games that won't disturb others. At every turn, in every building, Colette's flare for reflecting an upscale Texas hunting experience comes through.

Most hunting is done from stands, with 'spot and stalk' hunting an option. Bird hunters can get the assistance from some of the ranch's 20 bird dogs and retrievers.

Whether a hunter wants to leave with a trophy, or meat, or simply a Texas hunt experience, the Youngs can accommodate through relationships with taxidermists, and on-site processing. If the meat's not desired, the ranch shares it with several local food banks. Because the Youngs want to carry a near one-to-one ratio of buck to does for all the game animals, their autumn 'meat hunt' also helps local charities.

As they show a visitor around the property, the Youngs take a lot of pride in describing the many improvements they've made. Seven ponds ranging from 35 acres (14 hectares) to some tear-drop ponds in draws have reduced erosion, provide new water sources and waterfall habitat, and are stocked with crappie, bass and bluegill. Like the deer and exotics, the fish receive added protein. "Everything here eats well," Larry says.

Conservation is key

Conservation is a core part of all their efforts. Native grasses are thriving on their renovated lands – Larry says the Nature Conservancy has identified nearly 100 native grasses and forbs on the property. Where hard-surfaced roads are needed, they've used reground asphalt – equipment shed roofs drain into large rain barrels, where the water is saved for the sprayer.

While the ranch has five employees, Larry and Colette are hands-on in all aspects of the operation, and lived here nearly full-time during their first year of ownership as they began putting their plans in place.

They are far from done. Larry would like to add another 2000 acres (810 hectares) or so, and then add a feed pellet mill in another step toward total sustainability.

Meanwhile the 10-2-4 Ranch is building a reputation for some 'monster' whitetail bucks and all around good hunting.

And, the ranch fills one more very important role. "With my job, I'm working with investors, a board of directors, and 20,000 employees. I can come out here, climb onto one of these tractors, and take off without a soul around me," Larry says. "I can stay on one of these tractors all day. It's a great stress relief." ■

How much does harvest weed seed control cost?



LIFE is full of trade-offs. Do I buy the quality beer or go for volume? Should I take the high paid job or the job with lots of holidays? The answer to the second question may dictate the answer to the first!

Harvest weed seed control (HWSC) is full of trade-offs. Some options are excellent but expensive. Others are cheap but require compromise.

For example, narrow windrow burning appears cheap, but has a high hidden cost of nutrient removal and requires a lot of labour to burn the windrows. The Harrington Seed Destructor is the dead opposite.

In this AHRI insight we quantify the cost of six HWSC tools. One of the tools can cost as little as 10c per hectare while another can cost as much as \$60 per hectare. The cheaper tool may seem the obvious choice, but it is not quite that straight forward.

There are currently six HWSC tools being used by Australian grain growers. All remove weed seeds at harvest but they come at different capital cost, running cost and cost of nutrient removal. To compare these tools we must first consider the running cost, and then add the nutrient cost to get a realistic comparison.

There are three categories of HWSC

		% of crop residue removed
1. Remove chaff fraction only	Chaff cart, chaff deck, chaff line	10–25%
2. Remove chaff and straw	Narrow windrow burn, bale direct	40–50%
3. No residue removal	Harrington Seed Destructor (HSD)	0%

Running cost

The running cost of the various tools was calculated assuming that the harvester covers 2000 hectares each year. A bigger area will reduce the finance cost per hectare and vice versa. The running costs include:

Finance	Six per cent interest over eight years
Labour	Burning of windrows and chaff dumps – approximately \$2/ha
Extra fuel	3 L/ha to run the HSD, extra 0.5 L/ha to tow chaff cart
Maintenance	HSD, chaff cart and chaff deck

The capital cost and the running cost of these tools in the Table on the next page are indicative figures only – but they are in the ballpark.

Once we know the running cost, we then need to add the cost of nutrient removal per tonne of grain harvested and multiply by yield. To do this we assume that 50 per cent of



The chaff line technique is the cheapest option.

nutrients in the residue is returned to the soil if it was to be retained. This is a rubbery figure and can be adjusted. The biggest nutrient costs are potassium (K) and nitrogen (N). Some growers have soil with very high K levels and wish to ignore this cost. There are other benefits of full residue retention that we are aware of but unable to quantify in dollar terms.

Chaff line

The chaff line technique is clearly the cheapest. Chaff lining involves making a simple chute to divert the chaff only fraction (off the sieves) into a narrow windrow which is left to rot / germinate while the straw is chopped and spread.

This system is very interesting and is in the early days of development. There are many questions yet to be answered about the implications of leaving strips of high weed seed banks. Observations by growers using this system suggests that low numbers of weeds germinate in the chaff line. There are 'unknowns', but it is certainly worth a try in a paddock or two. Low cost, low tech, low labour. Check out <http://ahri.uwa.edu.au/spoiled-rotten/>

Chaff deck

The chaff deck is also low cost and is well suited to growers with controlled traffic farming systems. Once again there are concerns that the weed seeds are left in the paddock rather than being destroyed. Anecdotally, growers who have been using this system for many years comment that their permanent tramlines are getting cleaner the longer that they use this system.

Chaff cart

The chaff cart is relatively low cost with low nutrient removal and has a big future for mixed farmers. Some growers are grazing their chaff dumps with a lot of success, with no need to supplementary feed sheep or burn the dumps. They simply seed through what is left. Check out <http://www.weedsmart.org.au/webinars/win-the-war-against-weeds/>

■ **Narrow windrow burning** is best suited to lower rainfall environments with high potassium soil.

	Chaff removal only			Chaff and straw removal		No residue removal
	Chaff cart (new)	Chaff deck	Chaff line	Narrow windrow burn	Bale Direct	Harrington Seed Destructor
Capital cost	\$75,000	\$15,000	\$200	\$200	\$140,000	\$200,000
Running cost per ha	\$8.90	\$1.65	\$0.10	\$2.08	\$23.17	\$24.40
Other financial benefits	Feeding sheep			Selling bales		
	PLUS			PLUS		PLUS
Nutrient removal cost per tonne of wheat harvested	Assuming 50% recovery of nutrients, cost of nutrient removal is \$2.50 per tonne of wheat harvested			Assuming 50% recovery of nutrients, cost of nutrient removal is \$8.25 per tonne of wheat harvested		Nil



The chaff deck technique fits well in controlled traffic systems.

- **The bale direct system** is profitable where a big market for straw bales exists close to the farm.
- **The Harrington Seed Destructor (HSD)** quoted in the Table above represents the currently available tow-behind unit. The capital and running cost of the HSD is high but there is no nutrient removal cost.
It is likely that the new integrated model will come to the market with lower capital cost and lower fuel consumption. Clearly, expensive capital items such as the HSD are best suited to larger farms that can average out the capital cost over a larger area.

To sum up

The integrated destructor mill is very exciting. Early indications are very good and when it comes to market it has the potential to change everything. This may well become the main option for cropping-focused farms with very few trade-offs (if the price is right!).

The chaff cart has a big future for mixed farmers, they are good for the sheep and good for the crop.

The chaff deck and chaff line are good low cost options for controlled traffic farmers, but the weeds are still in the paddock. We need to continue to research these options.

Bale Direct is profitable in the odd and usually rare situation, where a big market for bales exists.

Narrow windrow burning is a great place to start, but given we're burning half our residue, shouldn't be a long-term option.

No compromise

We are looking for the ultimate system with no trade-off. A system that is cheap, reliable, and convenient. For mixed farmers, the chaff cart may well be it. For the crop dominant farmers the integrated destructor mill will hopefully be the answer.

In other words, quality beer with lots of holidays!

At Dinner Plain the pace is easy going...

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Phenotyping unit speeds quest for better crown-rot resistance

TECHNOLOGY being developed by Dr Cassy Percy and her team at the University of Southern Queensland (USQ) promises to speed up the process of identifying crown rot in developing wheat and barley varieties.

Being funded by the Grains Research and Development Corporation (GRDC) over five years, the Integral Genetic Solutions to Crown Rot program is a collaboration between three organisations: USQ, CSIRO and the University of Sydney.

The University of Sydney is developing crown rot-resistant germplasm, CSIRO is developing markers for specific genes associated with crown-rot resistance, and Cassy of USQ's Centre for Crop Health (CCH) is leading the development of reliable phenotyping methods.

Looking for signs in the field

"What we are looking for are signs that distinguish resistance, tolerance and susceptibility in the plants while they are growing in the field, and this part of the project is collecting data using a number of cameras and sensors," Cassy said.

This hardware has been mounted on to an in-field unit developed by USQ's National Centre for Engineering in Agriculture (NCEA) in conjunction with CCH.

Crown rot is a significant disease of winter cereals in Australia, and is caused by the stubble-borne fungi *Fusarium pseudograminearum* or *F. culmorum*.

Symptoms during the growing phase include browning of the crown, lower leaf sheaths and tiller bases, and the disease can cause yield losses of up to 90 per cent in durum, and 50 per cent in wheat and barley in GRDC's northern region.

"Crown rot is a huge issue, and while it's important to develop

varieties with other traits like resistance to drought or frost, crown rot is something the industry can't afford to lose focus on," she said.

The in-field phenotyping unit is using algorithms to assist in the interpretation of images, and offers a faster and more consistent method of analysing each variety's reaction to crown rot than assessment with the naked eye.

"We normally have to sit in a room for months and months going through material we've collected each season, and that makes it extremely time-consuming."

"The disease expression is also environmentally determined, and it has therefore been hard to get consistent results that we can confidently hand on to pre-breeding companies quickly."

"My challenge has been to improve phenotyping methodology to assist breeding companies and fellow researchers so they can identify resistant germplasm, and this in-field unit is certainly helping us on that path."

Capturing different wavelengths

The unit developed at USQ uses cameras which capture different wavelengths as picked up by thermal, hyperspectral and RGB imaging, and it is initially being used on trial varieties being grown at Wellcamp near Toowoomba.

"We've been running the machine fortnightly, and we're working with the NCEA team to look for crop-growth patterns which indicate the variety's reaction to crown rot."

The overall project started in July 2015, and includes trials at Gatton and Narrabri, run respectively by CSIRO and the University of Sydney. ■



Brice Kaddatz from Suncoast Gold Macadamias, Gympie, talks with USQ's Dr Cassy Percy at the Future Farm Field Day about the Centre for Crop Health's work in phenotyping crown rot in cereals.

World record yields and harsh Australian conditions!

ALBIT is a new biological plant growth stimulant in Australia. Last northern hemisphere cropping season, Albit helped achieve a higher canola (oilseed rape) yield than the previously recorded world record of 6.7 t/ha. But this world record was recently outdone by a canola crop grown in Eastern Europe that had Albit applied as a seed dressing and as an in-crop spray. In 2015, an Estonian farmer Margus Lepp, using Albit, harvested 6.86 t/ha of canola and 10.7 t/ha of winter wheat. In 2014 trials on sorghum were done in Queensland with a yield increase of 34.7%.

The active ingredient of Albit is the natural biopolymer Poly-beta-hydroxybutyrate (PHB) and Albit is the first product to use PHB as its basis. PHB is derived from the bacteria

Bacillus Megatherium which occurs naturally on plant roots to stimulate growth and protects plants from chemical and ecological stresses.

The Albit preparation is added pre-sowing and in conjunction with spray liquids. What is important is that you only need about 40 ml/ha of the Albit product. Thanks to these properties Albit helps to increase plant yield by an average of 5–20% (with canola, up to 40%). It is very unique to have these properties contained in one bottle. Looking at the environmental and agronomic challenges confronting agriculture in Australia, this product seems to be a perfect solution for the local farming conditions.

In Australia, Albit will help to solve:

- **Problems with drought and heat:** Albit increases the plants' drought and heat-resistance by 10–60% and grain quality (content of gluten in wheat, oil in canola) and reduces mycotoxin. Albit also helps to reduce the need for moisture by approximately 10% and as a result, plants become more drought-resistant.
- **Problems with plant stress:** When applied with traditional pesticides and fertilisers, Albit reduces stress caused by chemical treatments. Adding Albit to herbicides increases yield by an average of 16.6% over a herbicide-only treatment.
- **Problems with yield:** Albit increases crop yield by an average of 5–20% (wheat by 0.3–0.5 t/ha, sorghum by 0.3 t/ha, rice by 0.7 t/ha, vines by 1.93 t/ha and cotton by 0.6 t/ha). Albit is very concentrated (one litre for 25 hectares). Albit stimulates plant growth through the activation of the soil's microbial community which inhabits plant roots and soil.
- **Problems with plant diseases:** Via natural mechanisms of immunisation, Albit protects plants against a wide range of plant diseases (rots, rusts, spots, wilts etc). Application of Albit can reduce fungicide costs by around 50% and conventional fertilisers by 10–30%. Albit is used during seed treatment and for spraying in-crop. As a result you will spend less (or sometimes no) money on fighting plant diseases. You can also decrease significantly the amount of fertilisers that you would normally use. Thanks to Albit the root area of the plant will be bigger and able to take up more nutrients. (It is also possible that Albit can control Panama disease – we are currently looking for partners who would like to test our product on contaminated bananas in Australia.)

How do Australian farmers benefit by using Albit?

Please visit our homepage www.albitpartner.com.au for your particular area of agriculture. Each farmer will find benefits by using Albit for their own business and will be able to increase the quantity and the quality of yield. For example, in 2014 US cotton trials, Albit gave a yield increase of 22%. This result was achieved by using only 45 ml/ha of Albit. As a rule, Albit is added as a seed treatment and sprayed in-crop.

\$3 to \$6 return for every \$1 spent on Albit

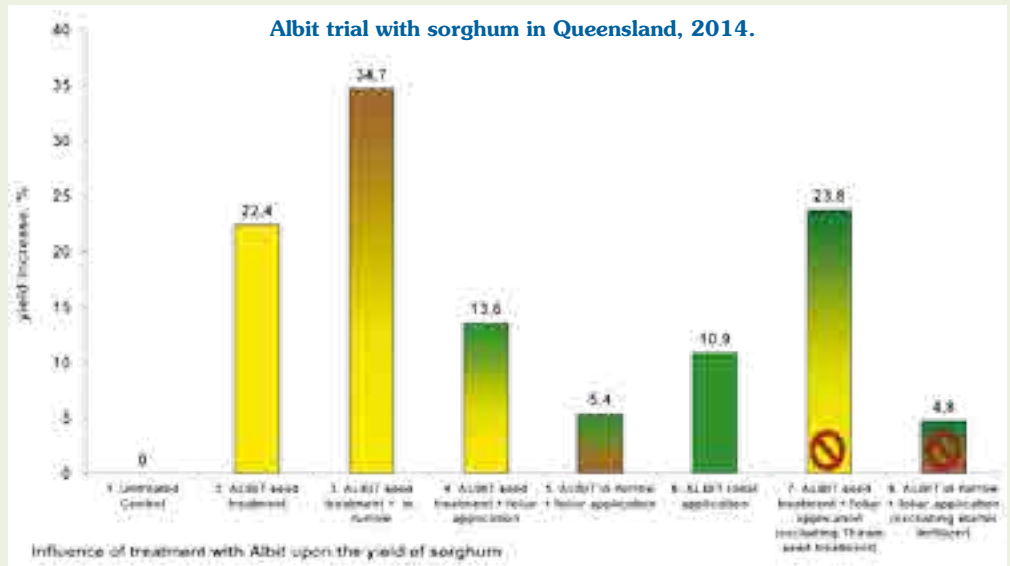
Every \$1 invested in Albit will earn you \$3–\$6 in return. With canola, cotton, rice, cucumber, grape, various peanuts etc – this result can be doubled. The cost of production will decrease while the crop's quality and competitiveness will grow – a very rare thing in agriculture, particularly in Australia. The more valuable the crop, the more profit a farmer will be able to gain with Albit.

This is confirmed by numerous farmers all around the world with their bigger profits and world record yields.

Bio-stimulant Albit is a new innovative product in Australia and New Zealand – it is a great opportunity for all Australian farmers to grow better and more profitable crops in a dry and harsh climate.

For more information please contact Sven Villemson by email at info@albitpartner.com.au or call on 0412 883 597
Or visit our website: www.albitpartner.com.au

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Farmer Margus Lepp achieved a 10.7 t/ha winter wheat yield and a record-breaking 6.86 t/ha yield of canola using Albit.



Researchers advance insight into wheat's genetic code

■ By US Wheat Associates

AN international research team has produced a whole genome assembly of a hard wheat variety that they believe represents a major step in the effort to break the grain's complicated genetic code. With a genome assembly, it becomes easier to determine the location and function of important genes within each chromosome. That could now happen within two years, the team said, which will help wheat breeders develop superior varieties more quickly.

The International Wheat Genome Sequencing Consortium (IWGSC) coordinated the project led by researchers in Germany, Canada and the US, including Kansas State University (KSU) wheat geneticist Dr Jesse Poland.

Funding came from KSU through the US National Science Foundation, several Canadian research organisations and Illumina, Inc.

"This announcement is very good news for wheat farmers,

millers and wheat food processors," said Justin Gilpin, executive director of Kansas Wheat.

In announcing Dr Jesse Poland's role in the project, KSU noted that to understand the significance, it is important to understand why sequencing the wheat genome continues to be such a massive undertaking.

The wheat genome itself is huge, with 16 billion total base pairs of DNA – far more than other significant staple crops like rice and corn. Building a full reference sequence with that many pieces has traditionally been virtually impossible.

Instructional manual

"Having the whole genome sequence is like providing an instructional manual for building better plants," Jesse said. "Until now, the pages in the manual were out of order and 40 per cent of them were missing. Having a complete manual, with everything in the right order, will allow to us quickly identify genes responsible for traits such as pest resistance, yield and quality.

"With this genomic information we could potentially make the breeding cycle two to three times faster and bring better varieties to farmers in a fraction of the time."

"Getting this genome assembled is very important because it enables breeders to use innovative technologies like gene editing," said Steve Joehl, Research and Technology Director with the National (US) Association of Wheat Growers.

Demand for wheat keeps growing

Even though the world enjoys an abundant supply at this moment, demand for wheat continues to grow year after year. Yet wheat is always vulnerable to weather extremes. In many countries, other crops offer greater profit margins for farmers who have precious little new land available. But consumers insist that farmers produce more with less impact on the environment. To meet these increasing challenges, researchers must improve the productivity of wheat.

Ultimately, genetic wheat research will lead to new varieties with crop traits to help increase yield potential and protect the plant from stresses like disease and drought.

Australia is also an active participant in the IWGSC.



With this wheat genome breakthrough, the plant breeding cycle maybe two or three times faster.



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A secure and anonymous exchange

Part of the **NZX** group

New apps set to revolutionise crop management

AUSTRALIAN grain growers can now 'tap their fingers' and access crop variety comparison and disease diagnostic information following the release of two innovative new mobile apps.

Developed by the Australian National Variety Trials (NVT) program and funded by the Grains Research and Development Corporation (GRDC), the *NVT Long Term Yield Reports* app and the *Crop Disease Au* app are revolutionising growers' abilities to make informed and on-the-spot management decisions to improve productivity and profitability.

The *NVT Long Term Yield Reports* app enables growers to access and interpret Australian variety data while the *Crop Disease Au* app offers instantaneous access to current state specific disease resistance ratings, disease information and an extensive disease image library.

NVT is a national GRDC-funded program managed by Australian Crop Accreditation System Limited (ACAS) which provides industry with independent and rigorous information on the performance and characteristics of individual crop varieties.

NVT general manager Neale Sutton said the new apps paved the way for growers to bolster the performance of their farming system by quickly and easily matching variety selection to environment and likely pest or disease prevalence.

"These new apps will give growers all the relevant information on over 100 crop/disease combinations," Neale said.

"They take variety analysis and crop diagnostics from the desk to the paddock, meaning growers can make informed management decisions outside the confines of the office.

"Digital resources like the new apps are becoming the new frontier for farm businesses to improve gross margin potential, offering easily accessible and interpretable information that allows them to manage environmental and production risks right across the farming system."

Up to date and offline information

GRDC varieties manager Tom Giles said the new apps would utilise live feeds from the NVT database, ensuring variety information was constantly up-to-date and information on new varieties would become available immediately on release. Importantly, once the apps have been updated they are able to be used offline.

"Given that the *NVT Long Term Yield* app looks at the long term cross-site analyses', this will be fantastic for growers and agronomists to really interrogate both the yield performance and stability of individual crop varieties," Tom said.

"The release of the *Crop Disease Au* app will enable growers to select the appropriate variety for a farm rotation, whether that involves nematodes or a crown rot risk, as well as in-season diseases such as rust and ascochyta blight."

The disease resistance ratings presented in the *Crop Disease Au* app have been devised in collaboration with a working group of pathologists from state-based departments, universities and private researchers funded by GRDC and can also be found on the NVT website www.nvtonline.com.au

Both apps are now live and available for Apple, Android and – in the case of the *NVT Long Term Yield* app – on tablet and as a desktop tool.

To download the app for your mobile device or desktop computer, visit the apps section of the NVT website <http://www.nvtonline.com.au/apps/>. ■



GRDC varieties manager Tom Giles says the new NVT apps will deliver instantaneous and up-to-date information on new crop varieties by utilising live feeds from the NVT database.



The National Variety Trials provide independent and comparative assessments of individual crop varieties.

Avoiding workplace accidents

IN 2013, the agriculture, forestry and fisheries industry had the highest fatality rate of any industry sector in Australia. Whilst most workplace injuries and fatalities in agriculture are related to vehicle accidents, many incidents (approximately 19 per cent) are related to being trapped between stationary and moving objects or being trapped by moving machinery or equipment.

In March of 2013, an employee at Australia Milling Group Pty Ltd's Narrabri (NSW) site sustained severe lacerations to his right arm whilst conducting maintenance on an auger and subsequently getting his arm caught. This prompted the company – now trading as AGT Foods Australia – to conduct an overhaul of its Work Health and Safety Management policies and procedures under the Work Health and Safety Act 2011.

The incident in March 2013 made it clear to AGT Foods that its work health and safety management system did not adequately respond to the specific hazards and risks which apply to the Narrabri site. As part of an Enforceable Undertaking from Work Cover NSW, AGT Foods has taken steps to identify how the incident occurred, how the causes were addressed and how future incidents of the same nature can be avoided.

These steps are detailed below to provide a practical example of how similar incidents can be prevented in other workplaces.

How the incident occurred

AGT Foods Narrabri site is a grain packing facility that predominately loads bulk pulses and grains into shipping containers for export. On the day of the incident, the worker who was to unfortunately sustain the injury, was working with two other employees to pack bulk containers of chickpeas from a silo using a discharge auger machine. The shear bolt broke on the discharge auger and packing was ceased to conduct maintenance

on the bolt. The shear bolt had been undergoing continual maintenance for the same issue; therefore, the worker began fixing the bolt as he had seen other employees do on previous occasions. At the time of the incident, there was not a written safe work method on how to change or fix a shear bolt.

Due to the positioning of the auger, the worker had to sit/lay down on the ground to get access to the bolt. Whilst trying to move positions, his leg bumped a switch which caused the auger machine to activate because it was not locked out at the time of fixing the shear bolt. The worker had his arm in the auger at the time of bumping the switch and as the auger started and began turning he sustained deep lacerations to his right arm.

The injured worker was immediately taken to hospital. He was then transferred from Narrabri to Newcastle hospital for treatment. After his initial time in hospital, the worker required frequent travel to Newcastle for follow up treatment.

The worker returned to work on light duties at the Narrabri site in mid-January 2014.

How the cause of the incident was addressed

There have been many steps taken to address the cause of the incident and ensure the ongoing safety of staff on-site at Narrabri and all AGT Foods Australia sites. Many of these have required additional investment into improved engineering on-site and creating a cultural improvement on-site which emphasises the importance of a safer and more productive workplace.

Consultation, discussion and training with employees

- Straight away, a toolbox meeting was held on-site regarding the interim procedure for operating discharge augers involving two persons until emergency stop controls could be installed and a debrief was held regarding the incident.



Emergency stop and isolation points were installed near the discharge auger.

- A PowerPoint presentation on the company's Lock Out Tag Out (LOTO) procedures was produced and all workers at the Narrabri and other AGT Foods Australia sites underwent training and instruction in relation to the LOTO procedures on March 28, 2013.

Company policies and procedures updated and communicated (with regards to safety)

- A Safe Operating Procedure for conveyors and augers was developed and employees were trained in relation to the procedure.
- An Isolation Register was developed for the Narrabri site to document employee compliance with LOTO procedures.
- Workers were instructed in relation to the AGT Foods Australia Safety Hazard Identification/Control Risk Assessment procedures.
- AGT Foods Australia Job Safety and Environmental Analysis (JSEA) for conveyors/augers was developed for the preparation of work plans.

Engineering improvements

- Tags, locks and a lockout board and emergency stop controls were installed locally at the silo discharge augers within two weeks of the incident occurring.
- Separate isolation points were installed locally at the bulk silos at the Narrabri site on April 4, 2013.
- Work performed on silos to engineer-out risks associated with shear bolts breaking.

Structural and personnel changes

- Significant structural changes to the management of the Narrabri site were made to ensure the implementation of safety requirements on-site and improve safety culture within the business.
- Personnel changes reinforced the company's commitment to a more productive and safer workplace.

How future incidents can be avoided

Working with moving machinery, vehicles and motors means that the grains and agriculture industry has a very high risk of workplace incidents and injuries. To combat this, all relevant stakeholders must be engaged in contributing to a safer environment to work in.

For AGT Foods Australia, this has required a significant change in company culture to ensure that the safety of staff and visitors to its sites is a number one priority.

From senior management to seasonal harvest employees to the truck drivers delivering grain, there is now a mandatory requirement to complete a safety induction for AGT Foods Australia sites. This has been rolled out in conjunction with updating the company's work health and safety system and with regular external audits.

AGT Foods Australia has also made some large investments to engineering and production capabilities on-site to ensure there is less movement on-site of vehicles, employees and grain where possible. This has subsequently led to on-site efficiency gains and has also improved the overall safety and productivity culture with staff. They can see the improvement in day to day operations in terms of ease of activities, employee safety and preventative maintenance.

If AGT Foods Australia had been operating correctly under the WHS Act back in March 2013, the incident would not have occurred at all. But the company has since rectified the legacy issues of its site management that allowed such an incident to occur.

On-the-go protein and oil monitoring

CASE IH is releasing a new on-combine grain analyser in 2016 that allows farmers and contractors to monitor grain protein in cereals and oil percentage in oilseeds in real time while harvesting, using technology previously only available to grain buyers and handlers. The 3000H Grain Analyser is available to order for model year 2016 Axial-Flow 240 Series combines, shipping from mid-2016.

Tim Slater, Case IH Product Manager Hay & Harvest, says the new technology is a breakthrough for farmers, allowing them to improve productivity and maximise profit by efficient management of protein or oil content.

"The 3000H is Australian designed and developed to deliver fast and accurate results," he says. "Information is fed to a ten-inch touchscreen display in the cab, including real time mapping of quality. With the use of the 3000H, customer trials showed the potential to incrementally increase profit by blending wheat from different paddocks to ensure the best price at the silo. Due to the new sorting ability, revenue could be increased by \$40 per hectare or more in some circumstances."

"Our trial customers are seeing payback on their investment in the 3000H within a matter of weeks because of this new ability to segregate and blend grains. In addition, our customers can compare yield versus grain quality to measure the efficiency of crop inputs such as nitrogen fertiliser – potentially saving on input costs too," says Tim.

"We are giving priority to customers who forward order new Axial-Flow 240 Series combines, allowing them to order the 3000H as an option."

To get the best deal on a Case IH Axial-Flow combine built exactly the way you want it talk to your local Case IH dealer and place your Big Red Combine Forward Order by March 1, 2016.
For more information see your local Case IH dealer or visit www.caseih.com. ■



On-combine testing for protein and oil content can increase revenue by \$40 per hectare or more.

Farmgard breaks new ground

FARMGARD is breaking new ground with their recent appointment as the national distributor and agent for world renowned Överum mouldboard ploughs.

Överum mouldboard ploughs have been sold in Australia since the mid-seventies with hundreds of units now operating throughout the country. They are highly regarded for their strength, precision and economical performance and are a welcome addition to Farmgard's range of cultivation equipment.

Based in Sweden, Överum has been selling mouldboard ploughs since 1850, making it the world's most longstanding specialist in ploughs both as manufacturer and as a world distributor of ploughing systems. The Överum name is synonymous with the historical development of the modern plough as we know it today. From the 1880s when thousands of their horse drawn ploughs were exported to Russia, Överum went on to achieve the following world milestones in plough design and manufacture:

- 1928 first tractor plough;
- 1944 first mounted tractor plough;
- 1950 first fully automated plough;
- 1959 first reversible plough (mechanical);
- 1968 first S-plough with the frame that now defines the modern day plough; and,
- 1978 the first hydraulic reversible plough.

Now owned by the Kongskilde Group of Denmark, Överum offers over 20 different models. There's a full range of reversible, mounted, semi-mounted, trailed and wagon ploughs each with varying furrow widths from single through to 10 furrow and suited to tractors ranging from 50–350 horsepower.

The celebrated Överum XL board is still unrivalled in its ability to plough a shallow but wide furrow. It's ideal for pasture ploughing and for achieving perfect furrow and cover with very low HP requirement. The plough pulls easily and the working depth can be chosen according to conditions so that wide furrows can be ploughed shallow or deep with good results.

The new spring loaded disc coulter helps maintain the desired

depth. It's designed to follow the body out of the soil when releasing stones. It's better protected and more suitable when combining the discs with skimmers.

Överum mouldboard plough bodies are designed to be economical. The furrow slice with its twisting curve requires minimal energy consumption despite the fact that the XL-body leaves a wide furrow for today's wide tractor tyres. Smart design delivers excellent performance in different ploughing conditions and results in limited wear and real cost savings.

New features

The latest Överum mouldboard ploughs have a new hydraulic stone release system with increased lifting height, which prevents overloading of material and welding seams and gives the plough longer life. The stone release resistance is easy to adjust. Lower pressure is used in light soils giving a soft and gentle stone release, and less stones are pulled up on the surface. Higher pressure is required in heavy soils to prevent the plough from releasing simply because of soil resistance.

Överum wearing parts are made from heat-treated Swedish steel. The raw material is chosen with great care and heat-treated according to Överum's own method, which gives the surface layer both hardness and wearing resistance while at the same time giving the centre, toughness and impact strength.

Överum's investment in product development translates into quality, robust and precision products. At the leading edge of computer technology, all design features are tested even before a prototype is built. This combined with Överum's history of craftsmanship, manufacturing knowledge, and skill at hot bending and hardening, contribute to the international demand for the Överum mouldboard plough range.

Överum mouldboard ploughs will be backed up by Farmgard's renowned after sales parts and service backup and will carry a large range of genuine parts in stock.

For more information or to contact a local dealer call Farmgard on 1800 327 642 or check our website at farmgard.com.au



Överum Vari Flex EX allows hydraulically adjusted furrow widths.



The latest Överum mouldboard ploughs have a hydraulic stone release and a greater lifting height.

Turning up spray efficiency

TECHNOLOGY from the Netherlands is now being used by some of Australia's leading broadacre farmers to improve the efficiency of herbicide spraying. Over the past four years, the WEEDit optical spot sprayer has been scaled up and engineered to take on tough Australian farming conditions, with help from agricultural spray equipment specialist, Croplands.

The near infrared sensors detect weeds by recognising the active chlorophyll present in all living plants. A signal is then sent to a solenoid to activate the right nozzle as it passes over the weed, so that no herbicides are applied to bare ground.

Bill Burgess, Sales and Marketing Manager for Croplands, said WEEDit technology dramatically reduces chemical use, allowing growers to preserve soil moisture more cost effectively.

"WEEDit is really taking off with large scale cotton growers and broadacre farmers across Queensland and New South Wales, and it is also popular in the Riverland and Mallee regions of South Australia and Victoria where summer weed control and conserving soil moisture is critical," he said.

He added that WEEDit could be an important tool in managing herbicide resistance because it allowed growers the freedom to use tank mixes and chemicals that would normally be unaffordable in a blanket application.

Croplands has been working with parent ag chemical company, Nufarm, to improve the efficiency of WEEDit using tank mixes and contact chemicals.

"With WEEDit many farmers are not only seeing it as a spot spraying tool, but a tool to delay on the onset of herbicide resistance. The two main contributing factors of herbicide resistance are the repetitive use of glyphosate and poor application of chemicals," Croplands WEEDit category manager, Steve Norton explains.

"We find with conventional sprayers and the WEEDit sprayers that flat fan nozzles, regardless of angle, apply chemical well to one side of the plant in the direction we are travelling."

Coverage to back side of plant as well

"To be able to use contact herbicides in your herbicide resistance strategy we need to focus on coverage, as it is imperative for weed control," Steve said.



The WEEDit camera is at the heart of the spot spraying technology.

"Further trial work in conjunction with Albuz has led us to develop a full ceramic cone which penetrates both forwards and backwards creating good coverage to the backside of the plant. These wide angled 80 degree full cone nozzles are very effective on elongated plants, such as fleabane and skeleton weed."

"These nozzles maintain their pattern and are very effective at application speeds of under 18 km per hour, which is ideal for WEEDit and best practice application."

Albuz ATF full cone nozzles are now available as an option for new and existing machines – cone nozzle caps are required. ■



Recent trials have resulted in improved cone nozzles for better spray coverage of weeds.

Name change

IMPACT Fertilisers Australia Pty Ltd changed its name to Ameropa Australia Pty Ltd on January 1, 2016. The company will however, retain the Impact Fertilisers brand as a trading name which means that customers will see very few changes.

There has been no change to the ownership of the company, the Board of Directors or senior management – but simply a change of company name.

Since 2010, Impact Fertilisers has been a wholly owned subsidiary of the Ameropa Group, a private, family owned international agri-business. Jim Mole, the CEO of Ameropa Australia explained that: "The change in name to Ameropa Australia Pty Ltd allows us to bring our Australian brands under the umbrella of one company name. It also recognises the global backing of our parent company.

"The signage at our fertiliser distribution centres and depots, as well as at our SSP manufacturing facility, will remain proudly as Impact Fertilisers," added Jim. "Impact has a long history serving Australian agriculture and will continue in its mission to make the purchase and use of fertiliser easy for our customers."

Impact Fertilisers covers the entire east coast fertiliser market with nine fertiliser distribution facilities on the mainland and eight depots in Tasmania offering quality fertiliser products.

For more information contact Jim Mole, CEO, Ameropa Australia Pty Ltd at jmole@ameropa.com.au – 03 9649 2849, or visit www.ameropa.com.au ■

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Western region



WESTERN REGION SUMMARY

The GIWA December forecast for total grain production in Western Australia for the 2015–2016 harvest was put at 14.18 million tonnes (see Table below). Harvest progressed at a steady pace throughout November in most of WA's grainbelt, with isolated storms and lingering grain moisture causing some delays.

The tragic and dreadful fires in the Esperance region caused the loss of four lives and at least a weeks' delay to harvest along with a considerable loss of grain from both the fire and the very strong winds that fanned it.

Yields across the regions were somewhat as expected. Grain quality was lower than hoped for with screenings very high in barley and high in wheat. Protein in both wheat and barley was lower than is usually seen in a season like 2015.

There appears to be much less barley achieving Malt grades than usual. All regions – other than the south east – reported very high screenings in barley, making cleaning to achieve Malt grade uneconomical, or even totally impractical. Barley produced along the South Coast and in the wider Esperance region is much less affected after a favourable season.

Canola continues to be the shining light of the season with above average yield and very good quality reported in almost all regions. This is in large part to the very early planting of canola in April, enabling the plant to be far less affected by the dry spring due to being more mature in early September than cereal crops.

Lupins have recorded average to above average yields in better soil types in the Geraldton zone, but along with all other crops, did not perform well in the coastal districts across to Mingenew and Three Springs.

2016 seed quality is a concern

A consequence for this year of the 2015 season's dry finish is

the quality of seed for planting in 2016. Retained seed of wheat, barley, oats and lupins needs to be tested for germination and vigour. Additionally, sowing rates and seed dressings may need to be reassessed to take into account the smallness of the grain. For lupins, there is a high risk of manganese deficiency in the seed, which should be assessed through seed testing.

Despite the infrequency of rainfall during 2015, the season at times showed promise of good yields. But the dry spring put paid to any record breaking production numbers for WA.

Grain Industry Association of Western Australia

NORTH

Harvest has been complete for over a month on most farms. Generally conditions have been dry since the last report with a few exceptions. Thunderstorms have again given a few wet strips with Morawa getting a 50 mm event in late December. Some other areas also had isolated storm rainfall.

Summer weeds are a problem in these areas but generally weeds numbers are very low.

The frost damage last year did turn out worse for some growers than expected. High in the landscape sand areas with deep valleys were the worst affected. Farms dominated by this topography had significant losses. Severe frost damage occurred from Balla to Mingenew with a few other areas damaged as well.

Other than these updates there has not been much happening in our area. Holidays are underway and many growers are enjoying a summer break. Hopefully you managed to get one too.

Peter Norris

Agronomy For Profit and Synergy Consulting, Geraldton
January 14, 2016

SOUTH COAST

Conditions on the South Coast have been extreme over the past two months. The 2015 season was set to deliver so much for the region. The expectations of a record crop did not happen for many farmers while for others it will be a season to forget for many unfortunate reasons.

On November 17 a catastrophic fire ripped through over 130,000 hectares from North Cascade through to South East Scaddan. The fire was started in crown land several days earlier by lightning strike and was fuelled by plus 40 degree temperatures and winds gusting over 80 km per hour.

Tragically four lives were lost in the fire storm – three European farm workers and Scaddan farmer, Kym Curnow. The loss of human life has been very sobering for the entire South Coast farming community – in addition to the loss of crops, livestock and farm infrastructure.

For those not effected directly by the fire, the strong gusting hot winds resulted in significant yield loss due to pod shatter in canola and head loss in both wheat and barley. It was not uncommon to see barley head loss in the order of 1.5 to over 2 tonnes per hectare.

GIWA 2015 WA crop production estimates (tonnes)

Port zone	Wheat	Barley	Canola	Oats	Lupins	Field pea	State total
Kwinana	3,934,000	936,000	488,000	252,000	140,000	7000	5,757,000
Albany	1,626,000	1,105,000	400,000	232,000	52,000	6000	3,421,000
Esperance	1,286,000	887,000	437,000	17,000	20,000	21,000	2,668,000
Geraldton	1,799,000	80,000	203,000	12,000	240,000	1000	2,335,000
Totals	8,645,000	3,008,000	1,528,000	513,000	452,000	35,000	14,181,000

GIWA production estimates are for December 8, 2015 and include grain retained on-farm and direct sales to exporters and domestic end users, and therefore differ from CBH delivery estimates.

Standing canola crops lost half of their yield potential, whilst wheat not as badly effected by the wind, still lost 0.3 to 0.5 tonnes per hectare. The overall yield loss for the region due to fire and wind was estimated to be in the order of 500,000 tonnes.

Another harvest extreme was the mild weather with frequent

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A common scene of exposed soil within the fire zone – wind erosion is a major problem.

drizzle and rain, making it very difficult to harvest grain within the correct moisture specifications. Growers had to work very hard on grain moisture management to keep the harvest wheels turning. As a result, harvest was very lengthy stretching out for over eight weeks. Towards the end of harvest most growers were jumping between the header and boomspray to control summer weeds that germinated throughout harvest.



Satellite image from early January showing the distinct lack of soil cover within the fire zone.

Barcoo...

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For those in the fire zone one of the major priorities has been to try and prevent wind erosion of the fragile topsoil. Some farmers have sown cover crops of barley, wheat or millet – others are just waiting for a decent rain to stabilise the soil or make a start to seed some form of cover crop.

The positive of the 2015 season is that many growers produced some of their best crops ever, showing the potential of the region and the robust farming systems they have in place.

Quenten Knight,
Agronomist, Precision Agronomics Australia
January 7, 2016

Southern region



SOUTH AUSTRALIA SUMMARY

The 2015 cropping season ended with a heatwave during the middle of December. Several locations reported record high December temperatures. Rainfall was very much below average across the southern half of the state, whereas the northern pastoral districts saw average to above average rainfall, mainly from a trough of low pressure that crossed in the second half of the month.

The SA mean temperature for December was a record 2.69°C above average, well clear of the previous record from 1972. The state's mean minimum temperature was also a record at 2.42°C above average, and the mean maximum temperature was 2.96°C above average (second-highest to 1972).

Numerous sites set new December records for highest mean daily maximum temperature, highest mean daily minimum, or highest mean temperature.

Ironically, the month began with below average temperatures across southern parts of SA, and a few locations in the central districts recorded their lowest December temperature on record on December 2. But these cooler temperatures were short lived.

Temperatures remained above average for much of the month, and became extremely warm in the third week when heatwave conditions extended across large areas.

Rainfall anomalies as well

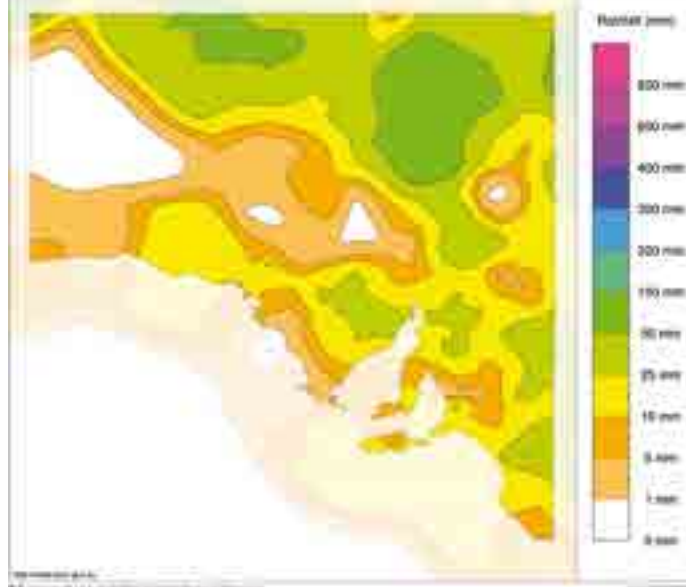
Dry conditions persisted across southern agricultural districts throughout the month, resulting in December rainfall that was very much below average in those areas, and several sites reporting their lowest total December rainfall since 1991.

But in the north of SA, a trough of low pressure brought moderate to locally heavy falls around December 21, and gave total monthly rain above the December average.

The first three weeks of January has recorded some useful rain

over the SA cropping regions and very unseasonable summer rain in the northern pastoral districts (see rainfall map). This has resulted in a rare and rapid inflow of water to Lake Eyre from nearby catchments.

South Australian rainfall totals (mm) January 1 to 24, 2016.



Bureau of Meteorology

WIMMERA/MALLEE VICTORIA

Victorian rainfall totals January 1 to 24, 2016.



Harvest results were disappointing in many parts of the Victorian Mallee. There were small isolated patches where cereals yielded 1.5 tonnes per hectare. But the majority of areas were well below average. Of particular note was the lower quality of feed barley. Headers stopped rolling in mid to late November.

Grain prices have fallen a bit since the finish of harvest even though the Aussie dollar has dropped. Insurance options such as multi-peril crop insurance are being researched heavily.

Some parts of the Mallee received up to 75 mm in January from thunderstorms. The El Niño is past its peak but hot summer conditions, including heat waves, have occurred along with horrible windy weather.

Some early spraying on sandy paddocks has taken place where rain fell. Weeds are germinating over heavier soil types and will be sprayed in the coming few weeks.

In general, most growers are trying to keep input costs

down given the previous poor season – and in many cases – the previous two years.

There is minimal stored soil water at this stage, with the exception of areas where larger rainfall amounts fell. This means that crop planning will include low risk crops for the season ahead.

De-Anne Ferrier and Claire Browne
Birchip Cropping Group
January 15, 2016

NSW OVERVIEW

Storms and heavy rainfall in early November affected harvesting of the NSW winter crop. In the western areas of the cropping belt, particularly in the north west, many of the barley, canola and faba bean crops had already been harvested before the storms.

But the wheat harvest was underway or had recently commenced in these areas when the storms occurred. Yields and grain quality were affected. In the south, heavy early sown and irrigated crops lodged, which slowed harvest.

Late sown crops performed poorly in areas of the north west and south west. In the central and eastern areas of the NSW cropping belt, winter crop yields generally varied from below average to close to average, with early sown crops performing best and some reaching above average yields.

The area sown to 2015–16 summer crops is lower than normal in southern and central NSW and in the western half of the north

District Reports...

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west. Early sown summer crops benefitted from the November rainfall.

Early December was dry across much of inland NSW. Apart from the north east of the state, most rainfall occurred from mid-late month, with heavy rainfall across the central to mid-north coast and Hunter valley.

Rainfall during December was average across 62 per cent of the state. Above average rainfall occurred across areas of western NSW, the Hunter valley, central coast and areas of the central and northern tablelands and mid-north coast. Below average rainfall occurred in areas of the far south west, north west, northern central west, southern tablelands and the south east. .

Pasture growth declined across most of inland NSW during December as a result of the generally dry conditions early to mid-month.

Summer crops

Summer crop growth and yield prospects were enhanced by the mid-late December rainfall in areas of the north west and central and southern NSW, with areas of the north and

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

<div><div>Brought to you in association with</div><div></div><div>JOHN DEERE</div></div>			Summer		Autumn		Winter		Spring	
	25yr Annual Average (mm)	2016 rainfall to date (mm)	25yr Annual Average (mm)	2015–16 to date	25yr Annual Average (mm)	2015	25yr Annual Average (mm)	2015	25yr Annual Average (mm)	2015
Emerald Qld	539	57	252	164	112	20	60	43	122	74
Toowoomba Qld	663	41	277	143	130	212	82	63	121	181
Roma Qld	572	60	252	118	128	54	72	100	126	73
Goondiwindi Qld	612	121	254	256	124	158	96	133	135	79
Narrabri NSW	630	68	227	109	119	252	126	98	160	114
Gunnedah NSW	650	26	232	99	118	163	129	107	177	112
Dubbo NSW	603	14	199	74	132	138	128	172	152	120
West Wyalong NSW	443	8	119	31	86	33	118	189	126	95
Wagga Wagga NSW	541	11	130	49	114	85	151	259	143	160
Swan Hill Vic	318	1	73	7	65	37	89	83	95	41
Bendigo Vic	509	13	108	27	102	84	167	113	136	79
Horsham Vic	379	8	77	20	70	38	132	61	107	46
Lake Bolac Vic	519	2	114	37	100	82	160	113	152	67
Murray Bridge SA	369	2	67	9	76	129	128	83	99	54
Kadina SA	339	2	57	12	77	54	120	112	88	60
Cummins SA	391	0	50	9	87	104	175	176	82	59
Esperance WA	614	23	78	68	142	155	249	211	144	104
Wagin WA	395	38	43	76	95	97	171	107	89	52
Northam WA	399	25	38	34	85	81	192	176	86	40
Mingenew WA	354	18	27	19	92	57	176	137	68	33
Moora WA	382	14	41	18	86	77	183	221	72	40
Mullewa WA	326	22	46	31	90	230	131	135	50	13

Last rainfall reading January 21, 2016.

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north west receiving excellent follow-up rainfall in early January. Modelling by QAAFI suggests that the yield prospects for sorghum (grown after a winter fallow) in northern NSW are close to average in many areas. Prospects are above average in the north east and the south of the Liverpool Plains but somewhat below average in the northern central west and the north of the Liverpool Plains.

The generally excellent January rainfall to date will have improved prospects further (see rainfall map).

New South Wales rainfall totals (mm) January 1 to 24, 2016.



**NSW Seasonal Conditions Summary, NSW DPI
January, 2016**

Northern region



DARLING DOWNS

For an El Niño summer, the rainfall has been well above expected right through the spring and early summer, resulting in a wide planting window and some very good growing conditions. The only 'downer' has been storm damage, particularly the mini cyclone that cut a path from east of Cecil Plains to north of Bowenville two days before Christmas, decimating crops, tipping over irrigators, taking roofs off sheds, houses and silos, and bringing down 81 power poles. It is estimated that 5000 hectares of cotton alone were lost, along with corn and sorghum.

But overall the crops are looking excellent with early corn being silaged and early sorghum being dessicated and harvested. At the other end of the window, there has been late corn sown,



Darling Downs sorghum badly storm-damaged December 23, 2015.



The same sorghum crop (see above) about two weeks later.



January 16, 2016 and the storm-damaged crop has made an impressive recovery.

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The cereal area will be down a bit, due to the subdued prices, and barley will continue to enjoy more popularity over wheat with extra demand from the feedlots. There may also be some interest in durum wheat – again due to prices.

Overall

The growing conditions have been generally good and summer yield potentials are strong, with a positive outlook for the winter plant.

Hugh Reardon-Smith
Agronomist, Landmark Pittsworth
January 15, 2016

WESTERN DOWNS

Last year's winter crop generally ended up very well, although a few crops were hailed out before harvest. Chickpea yields were extremely good ranging from 2 to 3.5 tonnes per hectare.

Wheat and barley also benefited from the late August rain with some crops producing 5 tonnes per hectare.

Summer crops this season went in early but hail caused some to be replanted.

Early sorghum crops are now ready for spray-out and don't look too bad at all.

A massive mungbean planting occurred over the Christmas period encouraged by the currently high prices – this has cut into the area planted to sorghum.

There has been some early insect pressure but rain at the beginning of January has these summer crops off to a good start.



Corn damaged by the pre-Christmas storms.

and a large planting of mungbeans taking advantage of the good conditions and good prices. The mungbean area is up at least 50 per cent on last season – with the planting window from December 9 to January 15 – and variety split evenly between Crystal and Jade. The early crops are now starting to bud.

There were a few spring crops of mungbeans, but these have been disappointing with poor quality from the storm rain, and low vigour from the cooler November and December conditions.

Spring sown sorghum was attacked by heliothis at early grain fill with up to 10 grubs per head needing control, but the pest pressure has eased since then. The early crops have started to be harvested on the Western Downs with above average yields at five tonnes per hectare, but with some screenings from the dry finish there. The storm rain through the season has not been evenly distributed, so there will be variations in yield and quality.

Sorghum coming into flower now is suffering some midge pressure.

Early sunflowers had to withstand Rutherglen bug pressure at budding and heliothis pressure pre-budding on the leaves. For both sorghum and corn, the regular rainfall allowed pre-emergent herbicides to work well and keep paddocks fairly clean of weeds.

Most of the grain crops are back 5–10 per cent in area on last season due to the increased planting of winter crop in 2015, and once again, soybeans will be a small area due to wet conditions restricting planting opportunities.

Cotton is up to 25 nodes, flowering and close to cut out. Yield potential is high at present – both in irrigated and dryland crops – thanks to the regular rainfalls. There has been high heliothis pressure in the cotton and constant mirid pressure.

One outcome of good and regular rainfall is that weeds grow – so fallow spraying has been an ongoing necessity throughout the past two months.

Winter outlook

2016 will be another large chickpea season with possibly more planted than in 2015, which in itself was double the usual area. This is because of favourable conditions and the continuation of a very strong price. Some estimate the chickpea area may be 10–20 per cent up on 2015.



Mungbeans on the Western Downs.

Nikolaus Fritz
Agronomy – Landmark, Miles
January 18, 2016

District Reports...

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CENTRAL QUEENSLAND

The weather

Currently CQ is mostly hot and dry. All districts have received well below average rainfall for summer so far. The Dawson, particular Bauhinia Downs but also Baralaba, Moura and Theodore look good but are hoping for follow-up rain soon. The Callide was wet before Christmas but has missed all the storms and is now very dry. The Central Highlands is the driest and had widespread but very patchy storms at Christmas. Emerald, Capella and Clermont received more rain than the southern highlands (Gindie to Rolleston) but in patchy isolated storms.

In some paddocks there has been significant runoff and subsequent soil erosion. This was caused by short duration but high intensity storms on either ploughed paddocks or paddocks with low stubble cover due to a couple of missed crops.

The limited rainfall – while mostly not enough to fill the soil moisture profile sufficiently to plant summer crops – was enough to grow some grass for at least a short time before the hot weather burnt it off. Most pasture paddocks have very little stubble, which allowed more water to runoff and this caused local flooding in a few creeks.

Winter crops

Wheat: Lack of planting rain resulted in only a small area of wheat being planted in CQ in the 2015 winter. The area was perhaps as low as 15,000 hectares (down from an average of 200,000 hectares) and most of that was in the Dawson/Callide Valleys. While the yields on the Central Highlands were generally very low (less than 1 tonne per hectare), excellent yields of 4 tonnes per hectare were achieved in the better crops in the Dawson.

Chickpea: About 45,000 hectares of chickpea were planted across CQ, most of this on the Central Highlands and almost all of it deep planted to chase soil moisture. Low soil moisture resulted in fewer plants and patchy establishment. This caused problems at harvest (and beyond) with late maturing plants still holding green pods. Yields of 0.75 to 1 tonne per hectare were

average. Cooler weather during the Central Highlands' chickpea harvest resulted in very few header fires. But a couple of weeks later in the Dawson/Callide region, hotter, drier weather and bigger crops resulted in many header fires during their harvest.

The better chickpea crops in the Dawson/Callide yielded more than 2.5 tonnes per hectare.

Summer crops

Sorghum: Most properties and most paddocks are still too dry to plant sorghum with only a few able to plant the wettest paddocks. Less than 5 per cent of the expected area of sorghum (around 10,000 hectares) has been planted. Most farmers will plant up to mid-February.

Mungbeans: Dry weather has resulted in a vastly reduced area planted to mungbeans in CQ than was anticipated. Good rain in the Callide/Dawson in early summer resulted in a large mungbean crop for the Callide and a fair area of sorghum and mungbeans in the Dawson. At least one mungbean crop has effectively been lost to charcoal rot in the Callide.

Cotton: About 18,000 hectares of cotton was planted on the Emerald irrigation area this summer – up from about 15,000 hectares last year. If you have irrigation water for when the cotton needs it, this crop loves drought conditions – lots of heat and fine, clear, cloudless skies.

The rain at Christmas reduced irrigation needs without the prolonged cloudy days which reduce yields. Yields for this season are looking good, with better crops hopefully able to yield up to 12 bales per hectare – a good crop for this part of the world.

Livestock and pastures: All of CQ needs a big rainfall event to recover pasture paddocks. There is still good grass at Bauhinia Downs and fair to good grass on offer across most of the Dawson. Pastures in the Callide district are dry and wilted. Where the storm rain did fall across the Central Highlands, a short green pick has grown but only where more than one storm fell.

Irrigation water: The Fairbairn Dam is currently at 32 per cent capacity or 420,000 megalitres. Without a significant inflow this summer, allocations for next season will need to be drastically reduced.

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Emerald, Queensland
January 15, 2016

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