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## FRONT COVER

### New pulses for this season



Pulse Australia Senior Industry Development Manager – Northern Gordon Cumming inspecting a well-grown chickpea crop in northern NSW. See page 6 for a review of new pulse varieties for 2014.

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I KNOW a lot of industry analysts have been barking on for some time now about the imminent flood of Asian demand for our grain and oilseed exports, and the wondrous profits that will mean for our growers. And as time rolls on, with not much evidence of record prices fattening Australian wallets, I also know there are a lot of growers becoming very sceptical that this so-called 'Asian dining boom' will ever deliver long promised on-farm financial benefits. But a quick reminder of some of the astounding demographic shifts already happening in Asia, and China in particular, does give you confidence that we are in for a new and higher level of demand for our grain products.



A report from the World Economic Forum released late last year (*Outlook on the Global Agenda, 2014*), identifies a lot of very positive changes happening in Asia which should lead to sustained increases in economic growth in the region, increasing wealth of individuals and demand for grain-based food products. The report details the stunning explosion of Asia's middle class. The size of this group currently stands at 500 million and will mushroom to 1.75 billion by 2020 – more than a threefold increase in just seven years. And as the report says: The world has never seen anything like this before.

Important reforms in Asian economies and societies such as the adoption of free-market economics, more implementation of the rule of law, the nurturing of sophisticated scientific research – with a solid foundation in excellent education – are all nurturing this unprecedented demographic shift. And on the geopolitical level, there are no major conflicts in the region. A (relative) peace and prosperity in the Asian region pretty much rules the day.

The Food and Agriculture Organisation (FAO) also weighs in with some impressive numbers. In real terms, FAO estimates that per capita annual income of rural residents in China in 2011 was 10 times higher than that in 1978. With this growth in real incomes, consumption patterns have changed considerably and generally towards more livestock products – that is, animals that need to be fed a grain-based ration.

Since China joined the WTO in 2001, the value of Chinese agricultural trade (total of imports and exports) increased from US\$28 billion to around \$156 billion in 2012 – with an average annual growth rate of 17 per cent. Import dependence in that time doubled from six to 13 per cent. China's net trade deficit in agriculture and food widened further in 2012 to \$31 billion – up from \$18.5 billion just the year before.

Thanks largely to government decreed targets and policies, China has achieved a high level of self-sufficiency in the production of wheat, rice and coarse grains. But since 2006, China has had a net trade deficit in these commodities. Also, China has become the world's largest importer of oilseeds accounting for more than 50 per cent of global imports.

## A region on the move

From a long-suffering Australian agricultural commodity exporter's point of view, I think the big message in a baffling array of statistics and projections, is that Asia is a region only just beginning to hit its straps in terms of demand for farm imports.

To find out for yourself what's happening in the Asian or other international markets, why not join one of our farm study tours set down for 2014 (see the inside back cover).



# AUSTRALIAN GRAIN

[www.ausgrain.com.au](http://www.ausgrain.com.au)

## In this issue...

### Pulsating variety options for 2014

There is wide-spread enthusiasm amongst grain legume growers over the most recent additions to the range and mixture of improved varieties released for the 2014 season.



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### Farming in Brazil's Matto Grosso

Calling Bom Futuro ('Good Future' in Portuguese) a farm is like calling Sao Paulo (20 million people) a village. The scale of the farming operation is difficult to comprehend and even more impressive is that the whole thing seems to run very efficiently with a highly skilled and motivated workforce, with over 3500 people employed in the operation.



**See article . . . . . Page 14**

### Service with a smile

Years ago, in the days when Margery and I ran cattle up at Wherrol Flat, we had a neighbour named Jack. Last month he called in on the excuse he wanted to have a look at our Kubota ride-on mower. Well, you know how it is, we predictably started talking tractors. Jack had a gripe! Apparently he had decided to take the plunge and purchase one of these budget priced Chinese tractors that everyone seems to be selling these days.



**See article . . . . . Page 17**

### Biological insect pest control for stored grain

Exosect recently announced that Queensland University of Technology (QUT) is to trial Exosect's patented platform technology, Entostat, to deliver biological active ingredients for the control of Lesser grain borer (*Rhyzopertha dominica*) and Rust red flour beetle (*Tribolium spp.*) in stored grain. This will be the first bio-control agent for stored grain released in Australia.



**See article . . . . . Page 32**





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# Pulsating variety options for 2014

■ By Mary Raynes, Gordon Cumming and Alan Meldrum, Pulse Australia

**T**HERE is wide-spread enthusiasm amongst grain legume growers over the most recent additions to the range and mixture of improved varieties released for the 2014 season.

Pulse Breeding Australia (PBA) released seven new grain legume varieties in collaboration with their commercial partners – Seednet and PB Seeds Pty Ltd – and the National Mungbean Improvement Program (NMIP) released one new mungbean variety over spring of 2013.

Growers now have access to two new chickpea varieties, one a niche market desi and the other a very large kabuli chickpea, three field peas, one herbicide tolerant small red lentil, one mungbean and one lupin variety.

Along with the five varieties PBA released the previous year, growers now have access to new varieties offering herbicide tolerance options, improved agronomic traits, disease resistance and maturity for different rainfall and environmental conditions.

## Mungbean

The National Mungbean Improvement Program released the **Jade-AU** mungbean specifically for the northern region of Australia.

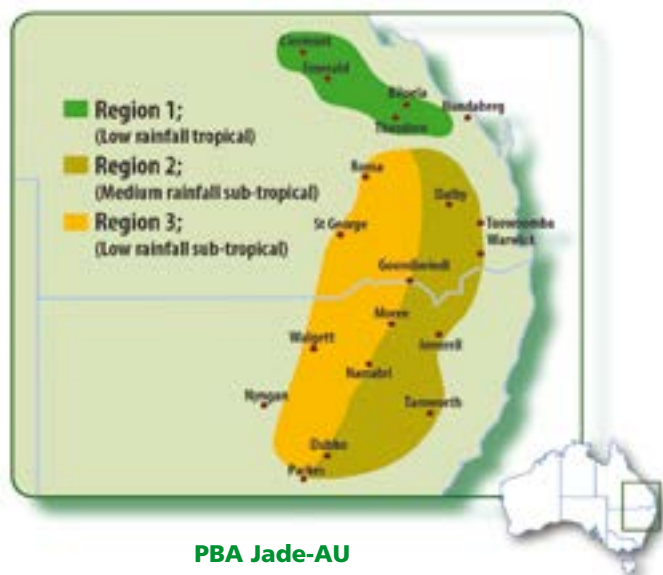
Jade-AU is a large-seeded, shiny green mungbean offering high yield and improved resistance to powdery mildew. Jade-AU is suitable for both spring planting (Sept/early Oct) and conventional summer planting (Dec/Jan).

It has consistently achieved yield increases of 12 per cent when compared to Crystal across all regions of central and southern Queensland and northern New South Wales.

Jade-AU grain quality is equivalent to Crystal and is highly acceptable in the market place.

This variety has the best available suite of resistance to powdery mildew (greater than Crystal), tan spot and halo blight (ratings are equivalent to Crystal). It is of an equivalent plant type and has similar production agronomy to Crystal and other current varieties.

**Released 2013 (MO7213). Australian Mungbean Association (AMA) members and seed re-sellers can supply clearly labelled AMA Approved Seed to growers. Breeder royalty included in the seed price.**



## Lentil

**PBA Hurricane XT** is a herbicide tolerant small red lentil with dual market purpose.

This variety has improved tolerance to the herbicides imazethapyr and flumetsulam, plus reduced sensitivity to some sulfonyleurea and imidazolinone herbicide residues (Group B).

It is a mid-maturing, early flowering, broadly-adapted variety with improved vigour and increased plant height over PBA Herald XT and Nipper.

The disease profile includes moderate resistance to ascochyta blight and moderate resistance to moderate susceptibility to botrytis grey mould (BGM). In prone areas, PBA Hurricane XT will require later protection to control BGM, particularly where early sowing has occurred.

The seed size and shape of PBA Hurricane XT is slightly larger than Nipper and PBA Herald XT, which gives it dual market purpose for splitting or dehulling.

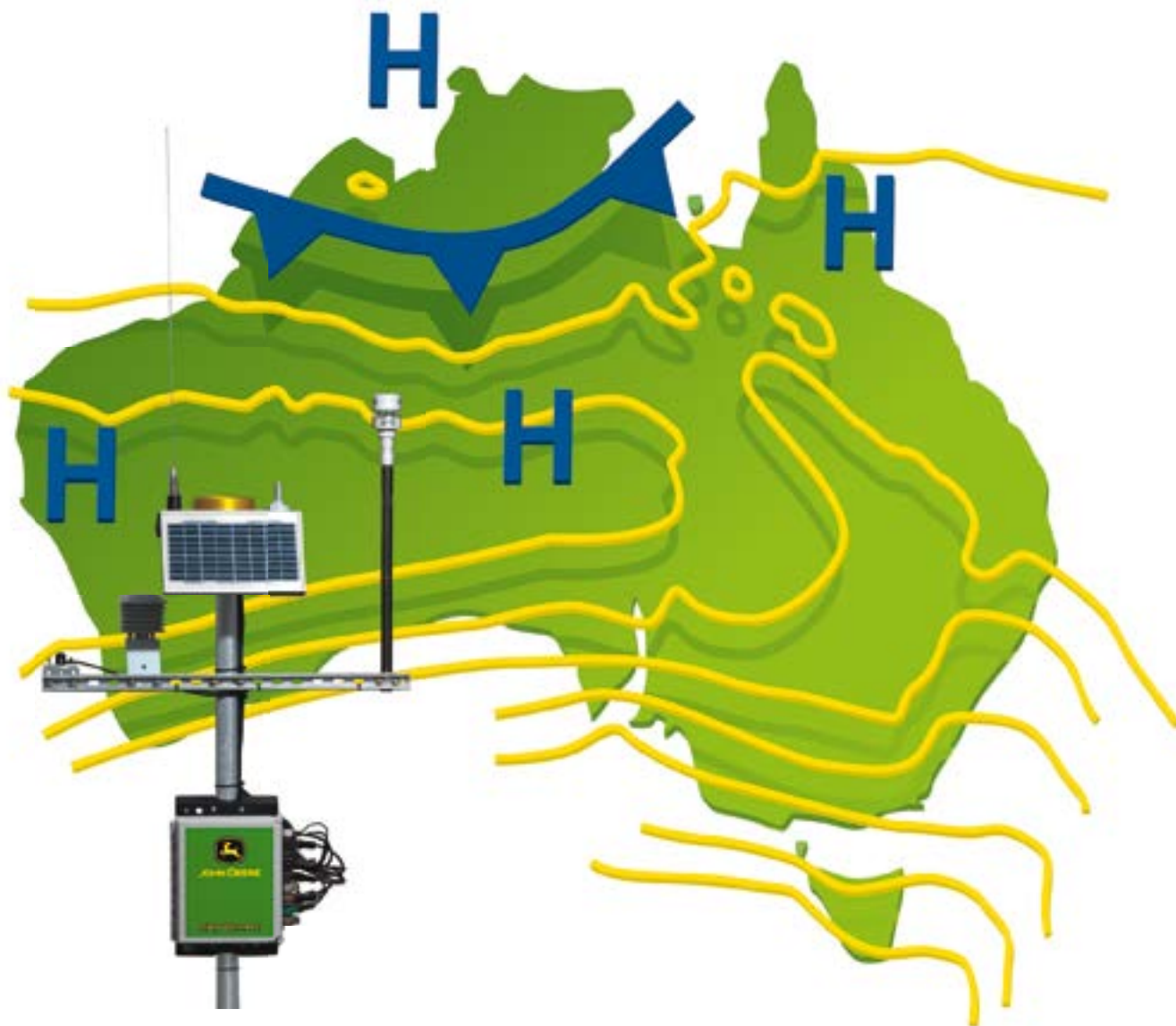
Although lower yielding than PBA Ace and PBA Bolt, PBA Hurricane XT may be preferred where more flexible weed control is desired.

PBA Hurricane XT – similar to PBA Herald XT and Nipper – has been found more sensitive to Group C herbicides such as



Mary Raynes and Wayne Hawthorne at the release of PBA Hurricane XT, a new small red lentil.





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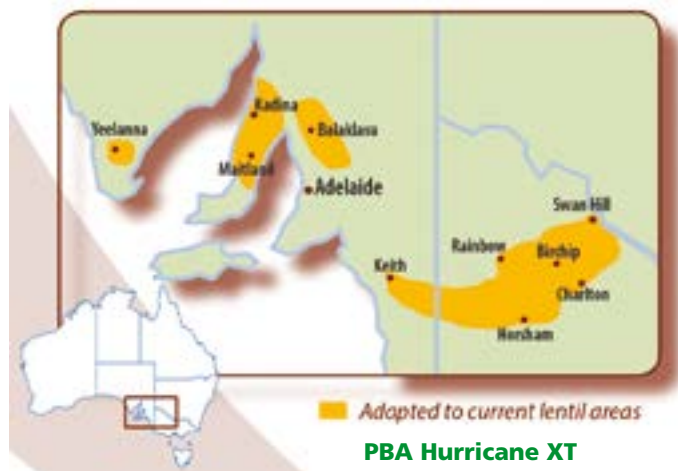


**JOHN DEERE**

\*Fonatanelle Hybrids, 2010. John Deere Field Connect Weather station available in Australia and New Zealand early 2014.

metribuzin and simazine than other lentil varieties. It is important to be cautious when applying these herbicides on variable soil types, especially if weather conditions conducive to crop damage are forecast.

Released 2013 (CIPAL1101). PB Seeds Pty Ltd. EPR \$5.00 per tonne (GST inclusive).



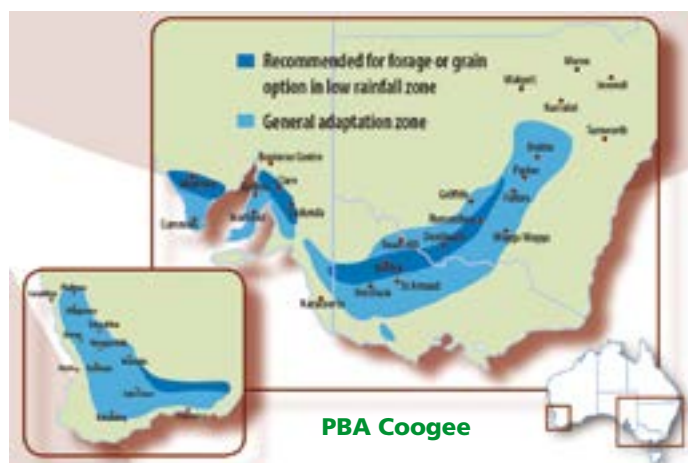
## Field pea

**PBA Coogee** is a conventional dual purpose dun-type field pea with powdery mildew resistance, and tolerance of elevated soil boron and salinity.

The conventional plant type of PBA Coogee is similar to the variety Parafield but with increased early season growth, more basal branching and longer vines.

This long season variety is mid to late flowering, has powdery mildew resistance and is moderately resistant to bacterial blight. Compared to other field pea varieties, PBA Coogee demonstrates improved boron and salt tolerance.

Released 2013 (OZP1103). Seednet. EPR \$2.60 per tonne (GST inclusive).



**PBA Hayman** is a tall vigorous, conventional forage field pea, ideal for silage and green manuring.

PBA Hayman produces smaller tare-style leaflets, a great number of basal branches that can grow over two metres long, and is renowned for its high production of biomass.

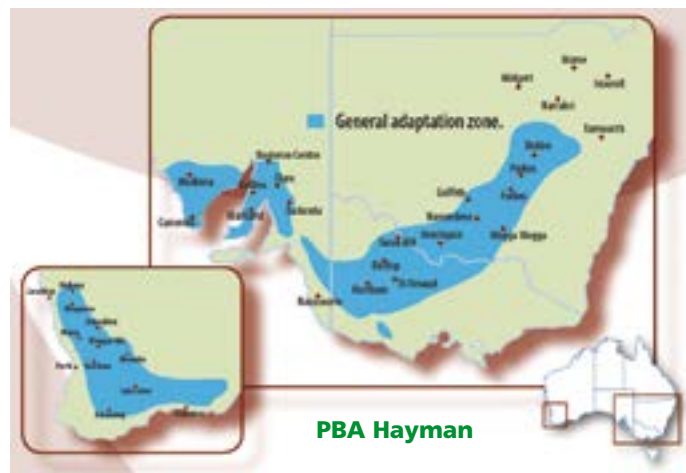
The lower yielding white seeded variety is considered a forage field pea only and an alternative to the traditional dual purpose field pea option, Morgan.

PBA Hayman is a late flowering and late maturing variety that vigorously grows over spring in favourable wet and sunny conditions.

PBA Hayman is resistant to powdery mildew and moderately resistant to bacterial blight –traits lacking in the benchmark dual purpose variety, Morgan.

The grain is soft seeded, ensuring that there are no hard seeds carried over to germinate in following crops. Grain yield can vary but is generally between 30–80 per cent greater than normal field pea crops and is suitable for stockfeed.

Released in 2013 (OZP0902). Seednet. Breeder royalty included in seed price.



**PBA Coogee is a conventional dual purpose dun-type field pea with powdery mildew resistance, and tolerance of elevated soil boron and salinity.**





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Pythium 

Smuts 

Bunt 





**Mary Raynes, Pulse Australia Industry Development Manager – Southern and Dr Jason Brand, DEPI Senior Research Agronomist – pulses at the release of PBA Wharton, the first field pea variety suitable for production in the northern regions of New South Wales.**

**PBA Wharton** is a kaspera type dun field pea and is a semi-leafless, semi-dwarf type plant.

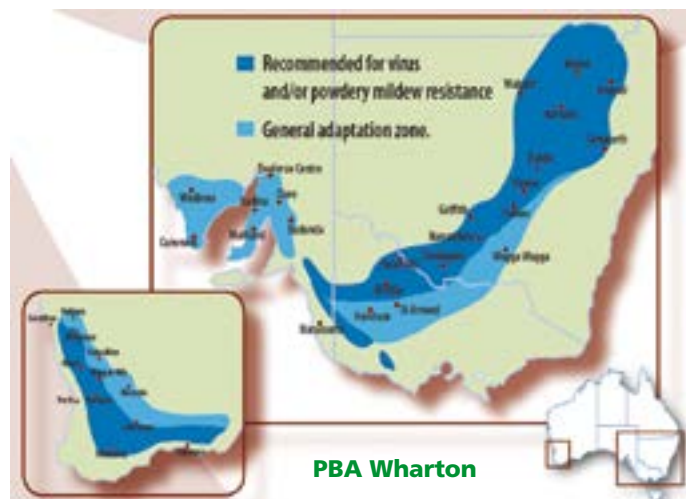
A superior yielding, early to mid season flowering, early maturing variety (similar to PBA Gunyah), it is best suited to the short to medium growing regions across southern Australia. PBA Wharton is notably the first field pea variety suitable for production in the northern regions of New South Wales.

PBA Wharton is a semi leafless field pea with an erect growth habit, pink flowers and is shatter pod resistant at maturity, similar to Kaspera. The grain colour and seed size is also similar to Kaspera, but PBA Wharton grain is more spherical and smoother (no dimples).

This variety offers improved resistance to powdery mildew, bean leaf roll virus (BLRV) and pea seed-borne mosaic virus (PSBMV).

Growing PBA Wharton allows more flexibility in delayed sowing because it is both early flowering and resistant to powdery mildew, which is more likely to occur late in the growing season. Growers should follow the same regional sowing, harvest and weed management recommendations for kaspera type varieties such as PBA Gunyah to achieve optimal yields. Additionally, PBA Wharton is more suitable to the practices of croptopping and delayed sowing for blackspot management.

Released 2013 (OZP0805). Seednet. EPR \$2.60 per tonne (GST inclusive).



## Chickpea

**PBA Maiden** is a premium large seed size, high quality desi chickpea variety recommended for the medium to low rainfall environments of southern Australia and grown principally for niche, whole-seed international markets.

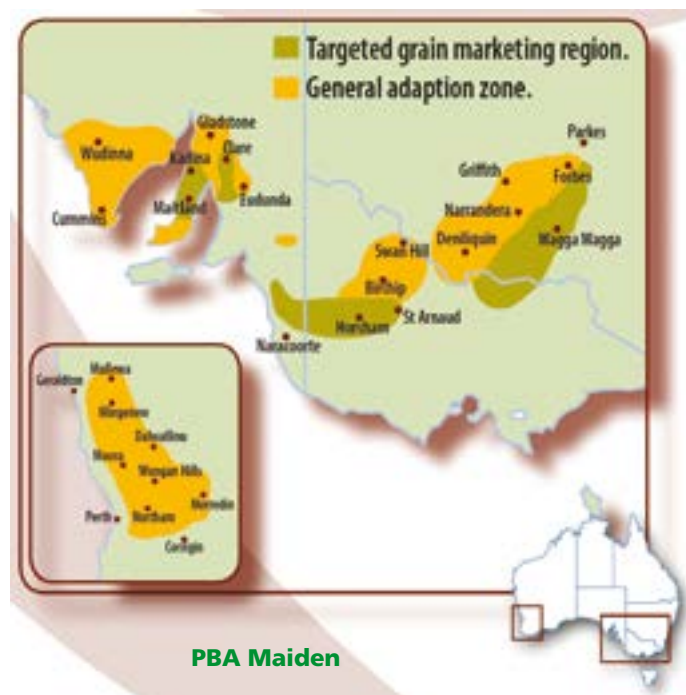
The seed size of PBA Maiden is greater than earlier southern desi varieties (28 per cent larger than PBA Slasher) and the seed coat is yellow-tan in colour. PBA Maiden yields similar to PBA Slasher.

PBA Maiden is moderately resistant to foliar infections of ascochyta blight, similar to PBA Striker, greater than Genesis 836, but less than Genesis 090 and PBA Slasher. PBA Maiden is susceptible to botrytis grey mould (BGM) similar to PBA Slasher, PBA Striker and Genesis 836 and is susceptible to phytophthora root rot. PBA Maiden is not recommended for Queensland, northern NSW or phytophthora-prone areas.

Growers are advised to investigate delivery and marketing options for PBA Maiden prior to growing the variety due to its unique and favourable seed characteristics.

PBA Maiden is well suited to the whole-seed desi markets, such as those in Bangladesh.

Released 2013 (CICA0717). Seednet. EPR \$4.40 per tonne (GST inclusive).







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Geoff O'Neill,  
'Lano',  
Edgeroi, NSW

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**Pulse Australia Senior Industry Development Manager – Northern Gordon Cumming inspecting a well-grown chickpea crop in northern NSW.**

**PBA Monarch** is the first kabuli variety released from the PBA chickpea breeding program.

This medium sized (predominantly 8–9 mm) kabuli chickpea with a light beige seed coat is particularly well adapted to the short season, medium rainfall environments of southern Australia. This is primarily due to the variety's improved adaptation through earlier flowering and maturity compared to Genesis 090, Almaz and Genesis.

PBA Monarch demonstrates a consistent yield advantage



in Australia (7–13 per cent) over all current medium and large seeded kabuli varieties.

Being moderately susceptible to ascochyta blight, similar to Almaz, PBA Monarch will require management for the disease. This includes a minimum of three fungicide applications throughout the vegetative and podding phases in the disease-prone regions of southern Australia.

PBA Monarch is susceptible to BGM, similar to Genesis 090, Almaz and Genesis and Kalkee. Careful paddock selection is required as this variety is very susceptible to phytophthora root rot and is vulnerable to weather damage at harvest.

Favourable feedback on the seed quality of PBA Monarch by both domestic and international traders has been received.

**Released 2013 (CICA0857). Seednet. EPR \$7.50 including GST.**

## Lupin

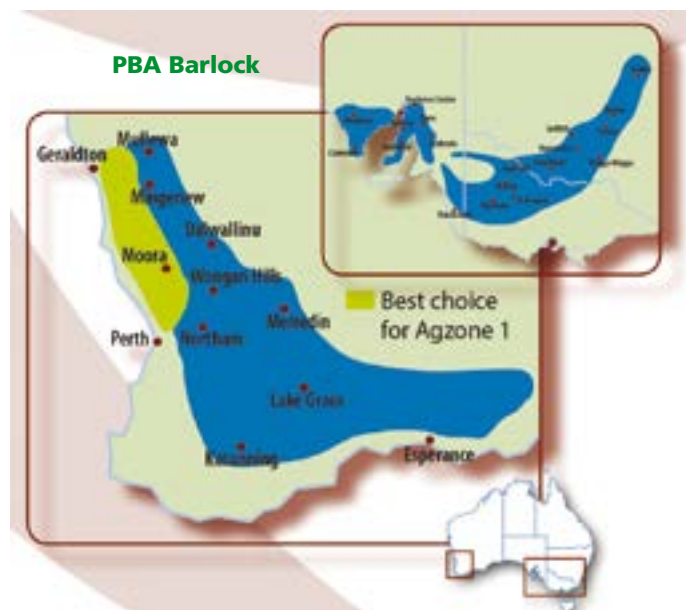
**PBA Barlock** is an early flowering and maturing narrow leaf lupin variety.

PBA Barlock is resistant to anthracnose, has improved resistance to pod shattering over Mandelup (equal to Tanjil), and is moderately resistant to phomopsis stem blight. Furthermore, PBA Barlock is tolerant to metribuzin herbicides.

It is a high yielding variety suitable as a replacement for Tanjil and Wonga in most lupin growing areas of Western Australia. PBA Barlock has a slight long term yield advantage on the Eyre Peninsula of South Australia and provides significant yield improvement in most regions across Western Australia.

Seed of this variety is being bulked up in the eastern states of southern Australian in 2014 with clean, weed- and disease-free seed being made available to growers in 2015. Commercial seed is available to Western Australian lupin growers for the 2014 season.

**Released 2013 (WALAN2235). Seed supply is limited in Victoria, New South Wales and South Australia until 2015. EPR \$2.75 per tonne including GST.**



**More information: The Variety Management Package (VMP) for each variety is available on the Pulse Australia website, [www.pulseaustralia.com.au](http://www.pulseaustralia.com.au)**

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# PULSES HAVE CAPTURED THE ATTENTION OF THE UNITED NATIONS

The General Assembly of the United Nations, meeting in New York, recently has voted to declare 2016 as the 'International Year of Pulses'.

Hakan Bahceci, President of the global pulses peak industry body, CICILS IPTIC, said the declaration was an acknowledgement of the vital role pulses have in sustainable agriculture and healthy diets across the world.

"Beans, lentils, peas and chickpeas have been the cornerstone of global nutrition for centuries," he said. "This UN-dedicated year will raise the profile of pulses and the important role they can play in health and nutrition, food security and environmental sustainability."

## Greatest opportunity in a century

Pulse Australia CEO, Tim Edgecombe, said the announcement was the first step in the greatest opportunity in a century to give pulses the attention they deserve.

"Pulses can improve food security for people experiencing shortages and also have a role to play in tackling lifestyle-related diseases such as obesity and diabetes," said Tim. "These crops also improve cropping systems and are profitable for farmers."

Peter Wilson, Pulse Australia chairman, is convinced that the International Year of Pulses will focus additional research attention and nutritional programming on pulse foods, which will lead to increased dietary uptake.

"Increased pulse consumption will grow both healthy people and a healthy planet," he said. "Pulse Australia and the industries it represents deeply appreciate the United Nation's dedication to the task."

Beyond traditional markets, pulses have steadily increased in popularity as people around the world recognise their appeal as nutritious, versatile foods that are an essential component of healthy diets.

"Australia, along with all major producing and consuming countries worldwide, supported the proposal and welcomes the decision of CICILS IPTIC to set aside \$1.1 million as a preliminary reserve to fund activities related to the Year," said Peter.

"Pulse Australia will coordinate a national committee to work with government, farmers, NGOs, retailers, food manufacturers, health and science organisations and UN bodies to make the Year a success in Australia and contribute to raising the profile of pulse crops and foods globally."

"With rates of diabetes and obesity on the rise around the world, the International Year of Pulses presents an opportunity to recognise pulses for their exceptional potential to offer nutritional well-being to people everywhere," said Tim Edgecombe. "2016 will also be an important occasion to learn about the world's wonderful pulse culinary traditions, and to discover new ways to create healthier foods in the future."

### Contacts:

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**Hakan Bahceci, President of the global pulses peak industry body, CICILS IPTIC, and instigator of the proposal for 2016 to be named the UN International Year of Pulses. (PHOTO: Sharon Watt)**



**Pulse Australia chairman, Peter Wilson, believes the International Year of Pulses will lift the profile of the role pulse crops play in sustainable agriculture and healthy diets across the globe. (PHOTO: Sharon Watt)**

## NEW BROADLEAF CROPPING ALLIANCE

The essential role of broadleaf crops (and pastures) in broadacre farming systems is well documented and both growers and advisors acknowledge the significant benefits. Despite this, the adoption of broadleaf crops is below optimal levels for overall farm system profitability and sustainability.

Pulse Australia, Australian Oilseeds Federation (Australian Sunflower Association and Soy Australia) and GRDC signed-off in December 2013 on a new three-year industry development project to provide growers and advisors with the knowledge and confidence required to lift the proportion of broadleaf crops grown in Australian farming systems.

The two major factors perceived to be limiting the area sown to broadleaf crops are input costs relative to potential dollar returns (price risk) and reliability (production risk). To fully realise

the economic benefits growers also need to fully understand and meet market demand and quality requirements.

The specialist Broadleaf Cropping Alliance team will provide targeted and highly relevant support services and materials to growers, advisors and agronomists and will work closely with R&D providers (including GRDC funded projects) and state departments.

For more information on any topic/issue relating to the production and marketing of all pulse crops, canola, sunflower and soybean contact:

Gordon Cumming, Pulse Australia Senior Industry Development Manager: Ph: 0408 923 474; E: [gordon@pulseaus.com.au](mailto:gordon@pulseaus.com.au); [www.pulseaus.com.au](http://www.pulseaus.com.au)

### Additional contacts:

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Soybean: Joe Kochman; Soy Field Officer – 0408 736 356

Canola: Don McCaffery; NSW DPI – 0427 008 469

# Good future for farming in Brazil's Mato Grosso

■ By David Dowling, Associate Editor, *Australian Grain*

**C**ALLING Bom Futuro ('Good Future' in Portuguese) a farm is like calling Sao Paulo (20 million people) a village. The scale of the farming operation is difficult to comprehend and even more impressive is that the whole thing seems to run very

efficiently with a highly skilled and motivated workforce, with over 3500 people employed in the operation.

The Bom Futuro group has operations throughout the state of Mato Grosso in mid-west Brazil. For a number of years, Mato Grosso has been the frontier in the massive development of agriculture in Brazil, joined in recent years by the phenomenal growth in another state, Western Bahia. Contrary to popular belief, this agricultural expansion has not occurred by cutting down the Amazon rainforest – it is all cerrado country, savannah lands reminiscent of northern Australia with a reliable rainfall of around 1250 mm per year.

For hundreds of years, the cerrado lands were considered unsuitable for farming and were the 'wild west' of Brazil, full of cowboys and outlaws. The soils were infertile and quite acidic, suitable for grazing native pastures and supporting only sparse low woodlands. But starting about 50 years ago, Brazilian scientists began to show that the soil problems could be corrected and the first farming began in this far flung area which had no roads or infrastructure to speak of. Even today, the lack of infrastructure and logistic support remains the main impediment to farming.

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**Fish farm manager, Jules Ignacio, shows some of the product ready for shipment.**

lime in the first few years, along with suitable fertiliser inputs and rotations, the cerrado country could produce outstanding yields. This began one of the biggest farming 'land rushes' in history and the development of a soybean farming area to rival the midwest of the United States. Not that they are limited to soybeans – cotton does just as well along with corn, rice and many other crops.

### **Birth of an empire**

In 1982, Fernando Maggi Scheffer with his brothers Elusmar and Erai along with Jose Maria Bortoli moved to the Mato Grosso to start farming. They met with early success and found international financiers were more than willing to fund their massive expansion plans.

These days the group farms around 340,000 hectares of country in Mato Grosso state – almost the size of the Australian cotton crop. They also have 1320 hectares of plantation timber, almost 20,000 hectares of pasture and 160 hectares of fish farm.



**Part of the staff amenities on Bom Futuro's Filadelfia farm.**

Production levels vary from year to year, but the group currently produces about 550,000 tonnes of soybeans each year and has the capacity to store over 500,000 tonnes in 15 warehouses. Their 90,000 hectares of cotton represents about 15 per cent of the Mato Grosso cotton crop. They have nine cotton gins to process the crop.

Large areas of corn, rice and beans are also produced, often as second crops in their rotation system. Seed is produced for their own use and for sale and their seed operation has 30 per cent of the Mato Grosso cotton market and 17 per cent of the soybean market.

Cattle are also produced on the pasture country and as part of the rotation, with currently about 40,000 head under management. The latest venture is the fish farming operation producing tilapia and native fish in 160 hectares of ponds producing over 2000 tonnes of fish fillets each year.

Production and processing on this scale requires a lot of energy, so Bom Futuro decided to generate their own power. They have invested in a series of small scale hydroelectric power plants in areas up to 200 km away from their farms and now supply over 60 per cent of their own electricity needs.

Incredible numbers, but matched by those of another group founded by their cousin Andre Maggi, also mostly in Mato Grosso. Andre's son, Blairo, later became a long serving governor of the state and contributed much to the infrastructure needed to develop the region.

### **A wonderful welcome**

For such a large and busy organisation, Bom Futuro is remarkably welcoming to visitors, as we found when the 2013 *Greenmount Travel Farm Study Tour* arrived in August. The night before our visit, they arranged a video and question and answer session over dinner in the nearby town of Campo Verde.

The session included some of their top farm managers and agronomists and they were a very impressive group who obviously knew their stuff. Hopefully they also received something in return by being able to pick the brains of some of our people on the management of *Helicoverpa armigera*. The sudden emergence of *armigera* as a pest in Brazil has created some huge problems for their cotton and soybean production in particular.

The following day we reached the start of the first Bom Futuro farm near the outskirts of Campo Verde and drove, and drove across their country. For most of the time, the land as far as the eye could see was Bom Futuro.

The operation is broken up into smaller production units marked by massive grain storages and machinery sheds. The company provides good clean accommodation units for many of the staff as well as some excellent staff amenities including meals and even a movie theatre in one case.

When one of the young agronomists was asked why he didn't chase a higher salary overseas or in another part of the rapid agricultural development in Brazil, he just pointed to the Bom Futuro logo on his shirt. The staff have immense pride in working for the organisation and it carries a lot of status among their peers.

Far from being a slash and burn destroyer of Amazon rainforest, the group has a strong environmental record. All of their land and activities are approved by the state environmental regulator, they manage over 160,000 hectares of native woodland and produce their own renewable power. There is particular pride in the operation of the fish farm, right in the middle and close to their farming operations.

For details on the *Greenmount Travel Farm Study tours* on offer in 2014 see [www.greenmounttravel.com.au](http://www.greenmounttravel.com.au)



# Service with a smile?

■ By Ian M. Johnston

## Jack's problem

Years ago, in the days when Margery and I ran cattle up at Wherrol Flat, we had a neighbour named Jack. Last month he called in on the excuse he wanted to have a look at our Kubota ride-on mower. Well, you know how it is, we predictably started talking tractors.

Jack had a gripe! Apparently he had decided to take the plunge and purchase one of these budget priced Chinese tractors that everyone seems to be selling these days. He reasoned that as he now only owns a small rural/residential block, an inexpensive lightweight tractor would be ideal for his few hectares.

For a while his new tractor performed quite adequately, in fact it was a handy little gadget and seemed to be reasonably well engineered. The problems commenced when the gearbox suddenly started making strange noises.

Now Jack is a philosophical sort of cove and over the years, having owned numerous tractors, he knew that whatever the make, a tractor is a mechanical thing and as such, mechanical faults can and do occur. So not unduly concerned, he contacted the selling agent from whom he had acquired the tractor.

He was told that it was likely he had been over-taxing his machine as no other owner had ever experienced such a

problem. Jack was then assured that if he drained the gearbox and refilled it with a heavier grade of oil, the noise would disappear. But if this did not solve the problem Jack need not be too concerned, because, as the tractor was only five months old,



A Lanza Bulldog field service wagon, fully equipped with spare parts and all tools necessary to attend to any Bulldog model up to 30 years of age. (Photo copied from a 1956 Lanza brochure)

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if he pulled the gearbox to pieces and indeed found an errant bearing or cog, all he had to do was return the faulty component at his cost and a replacement part would be dispatched to him within a couple of weeks or so free of charge!

The dealer pointed out, that had Jack read the fine print of the warranty he would have known it extended to only the replacement of parts and did not include labour.

Understandably, Jack has placed the matter in the hands of his lawyer.

After listening to Jack's story, my opinion is that his main problem is not the tractor, but rather the dealer in question. I happen to know of a number of hobby farmers who have invested in a Chinese tractor and are totally satisfied with their purchase and the dealer service. Also I reiterate Jack's comments. Any tractor can breakdown, the all important thing is the integrity and continuity of the back-up service during the life of the tractor, provided by the dealer.

## Back in the Bulldog days

Over half a century ago, I was a field rep for Lanz Australia Pty Ltd. The company considered the processing of orders for spare parts for its Bulldog tractors as a priority function. Providing an order was received at the Sydney office prior to around 4.30 pm, whether it be in the form of a telegram or letter (yes, people wrote letters in these days) or even a telephone call (although there were not too many of these, as rural party lines were unreliable and usually failed to work in wet weather), Ulrich Schultz, the spare parts manager, had a system in place that assured the parts would be selected, wrapped and delivered to Central Railway by 6 pm. The parcels would then be placed in the guard's van attached to the rear of the night passenger trains, which in these days radiated out to all the western farming districts.

A farmer owning a Bulldog therefore would have his parts sitting waiting to be collected early the following morning, at his

local railway siding, within 24 hours of the order being received in Sydney. All this half a century ago – in the steam train era!

It should be noted that Lanz carried a 99 per cent availability stock of parts for all Bulldogs up to 30 years of age!

Should a farmer require field service (although Bulldogs rarely broke down) they could request either an immediate visit from their local dealer or indeed book a visitation by a German factory trained technician, who would arrive in a specially fitted out Volkswagen Kombi van, complete with a stock of spare parts.

## Early Fordson tractor service

During the lifespan of the original Fordson tractor, from 1917 to 1928, around three quarters of a million were produced, which represented in excess of 50 per cent of the world's total tractor production, and this with only the single Model F. A staggering and unparalleled market penetration, about which today's tractor manufacturers can only dream.

There are two simple reasons for this Fordson unprecedented sales success.

Firstly the design was basic therefore inexpensive to manufacture, particularly when considering the economy of scale involved. (It is obviously cheaper per unit to produce a thousand items as compared to the costs of tooling up to make one). Certainly the Fordson had more than its share of idiosyncrasies, but then all tractors of the period were somewhat crude in the design department. The model F sold for a fraction of the price of most other tractors and yet many of the higher priced machines lacked the relative reliability of the Fordson.

The second reason for the runaway success of the Fordson was its service back-up and parts availability. Henry Ford enjoyed a similar market penetration to his tractor with his remarkable Model T Ford automobile. But as the introduction of the Model T preceded the tractor by nearly a decade, a world wide Ford dealership network was already in place. Accordingly in most instances, rural based Ford car dealers automatically became also Fordson tractor agents, complete with a thorough understanding of the value of providing excellent after sales service.



**This magnificent example of a Lanz Bulldog Model S has been restored by John Vella. Owing to the massively rugged design of the single cylinder two stroke semi-diesel engine and the heavy duty six speed transmission, it was almost unknown for these heavyweights to give mechanical problems. (Photo IMJ)**



**An early 1920s Fordson Model F photographed at a rally near Henty, Vic. Although comparatively reliable, they did require constant attention to be kept in operation. When a Model F broke down, a farmer had the choice of either towing it into town behind a horse or summoning the local Model T Ford car agent to undertake the journey to the farm. (Photo IMJ)**





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The Benz Sendling performed well, once the engine was started! Being the world's first tractor sold with a full compression diesel engine, few mechanics at the time understood its complexities. The tractor was dangerously unstable on sloping ground and required the outrigger wheels to prevent a capsize. This unit is available for inspection at the Booleroo Steam and Traction Preservation Society Museum, SA. (Photo IMJ)

## Service the Benz Sendling way!

In 1922 the German firm of Benz Sendling released the world's first tractor powered by a full compression diesel engine. The three wheel configuration featured a large diameter skeleton steel rear wheel, driven from the engine by a massive overgrown bicycle chain.

Each of the two cylinders of the 32 hp 5.3 litre engine had individual heads. To start the engine from cold, it was first necessary to insert a lit igniter into a special orifice located in each combustion chamber, prior to the formidable task of hand cranking. On a freezing winter morning, the cranking of the big flywheel could prove to be a daunting task.

One particular South Australian farmer had the courage to invest in a Benz Sendling, much to his later regret. On the first



A 1915 Moline Universal awaiting restoration at the Barr Colony Heritage Museum, Lloydminster, Saskatchewan. This unit is one of the few remaining examples of these Reliable engined row crop tractors. (Photo IMJ)

day of the busy harvest season, valuable hours were lost as he endeavoured unsuccessfully to crank the diesel engine into life. Eventually, following a considerable degree of expletive language and aching arms, it did start.

The tractor exhibited the same degree of stubbornness the next day!

The frustrated farmer came to the conclusion that he had no alternative but to keep the engine of the tractor running day and night during the entire harvest season.

By way of protest, following the completion of the harvest,

the farmer decided to withhold his monthly hire purchase payments until the local Benz Sendling dealer, Messrs E. Schrappe of Tanunda, rectified the starting problem. In retaliation, in the early hours of one morning, Messrs E. Schrappe sent a serviceman to the farm to remove the cylinder heads from the engine until the payments were resumed. The final outcome of this extraordinary episode remains unrecorded.

## The saga of the Moline Universal

Whilst carrying out research in Ohio in 1997 I spent time with Dan Ehlerding of Jamestown, a noted farmer and classic tractor collector.

Dan recounted the time back in 1915 when his grandfather Howard Ehlerding purchased a brand new Moline Universal Row Crop 10 hp



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tractor, which was duly delivered to the farm on the back of a wagon and unloaded.

With great expectation and anticipation, Mr Ehlerding watched as the local agent proceeded to go through the motions of starting the engine. This proved to be a dismal anticlimax, as the engine simply refused to start! Over the following week the agent returned daily to the farm armed with an assortment of tools, but failed to start the Reliable two cylinder engine. It appeared that the engine was Reliable by name only.

A factory technician was eventually summoned from the Moline plant at nearby Columbus. The week grew into a month and still the engine declined to start. In desperation an engineer from the Reliable Engine Co headquarters at Portsmouth (Ohio) was called in to solve the problem. (It is interesting to contemplate the obvious lay-back attitude compared with how such a serious matter would be treated today. But of course all this occurred in 1915.) Parts were exchanged, components were dismantled and inspected, but inexplicably the engine still could not be fired into life.

Mr Ehlerding was a patient man but the situation was by now desperate. There were acres waiting to be tilled and the traded-in horse team had already been sold by the agent.

A thoroughly frustrated and disillusioned Mr Ehlerding decided to have no further dealings with the tractor agent. He had taken a deal of persuasion to even consider one of these 'new fangled' tractors and now regretted the decision.

There was only one thing left to do. He contacted a reputable horse trader and negotiated a deal whereby he purchased a complete horse team – and traded in his tractor!

## The Ferguson system

The little grey Ferguson tractor, introduced in 1946, is now recognised as being one of the all time great tractors. The 3-point linkage method of attaching implements to the tractor, was



**The Ferguson 3-point linkage system on the rear of an award winning 1957 Ferguson 35, restored by John Casey of Shepparton. (Photo IMJ)**

A large computer mouse is positioned vertically. On its top button is a logo consisting of a circle divided into six colored segments (red, yellow, green, blue, purple, and orange). A black cord extends from the bottom of the mouse, curving downwards and to the right.

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**A Standard Vanguard van, complete with Ferguson livery, restored by R. H. Bare of Casula, NSW.**

invented by Ulsterman Harry Ferguson and is now adopted by all tractor manufacturers.

Ferguson insisted that his tractors and a range of matching implements represent a system of mechanised farming and The Ferguson System was sold and eagerly embraced around the world.

But there was another factor that greatly added to the popularity of Ferguson tractors. Harry Ferguson created the most efficient after-sales service back-up the tractor industry had yet

seen which, at the time, no other company could match.

Each dealer was obliged to purchase a Standard Vanguard van (or fleet of) fully equipped and painted in the Ferguson tractor livery. As a teenager in Scotland I can vividly remember encountering these smart and distinguished service vehicles wherever I travelled in the rural countryside. I was surprised to discover upon my arrival in Australia in 1952, that identical Ferguson System Vanguard vans seemed to be everywhere, particularly throughout the dairy and orchard regions of Victoria and NSW.

Accordingly, a farmer who purchased a Ferguson was assured of immediate and competent on-farm service.

## Conclusion

It is obvious that in the competitive tractor world, no manufacturer or dealer can hope to remain in business without providing a professional high-class back-up service to his farmer customers.

The giants of the industry including John Deere, Case IH, New Holland, Kubota, Massey Ferguson, Fendt and so on, could never have achieved their stature and magnitude if they had not, since their inception, exercised a rigorous policy of after sales service for their customers. A philosophy which they insisted had to be shared by their dealers around the globe.

It is a manufacturer's responsibility to appoint only caring and trustworthy dealers. No matter how good the product, without the right backing, the marketing of any item of farm machinery is doomed to ultimate failure.

My friend Jack wholeheartedly agrees! ■

## IAN'S MYSTERY TRACTOR QUIZ

**Question:** Can you identify this tractor by the controls?

**Clue:** An unusual model – but a well known make.

**Degree of difficulty:** Go to the top of the class if you get it right!

**Answer:** Page 48



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# Quantifying quality under elevated CO<sub>2</sub>

■ By Justine Severin, BCG



**T**HE impact of rising atmospheric carbon dioxide (CO<sub>2</sub>) levels on Australia's grains industry is being closely examined by scientists involved in the Australian Grain Free Air CO<sub>2</sub> Enrichment (Agface) program at Horsham in the Victorian Wimmera.

With CO<sub>2</sub> levels predicted to rise by about 40 per cent over the next 40 years, the Agface program – a joint initiative of the Department of Primary Industries, the University of Melbourne and the GRDC – was set up in 2007. The objective was to provide tools and information that will enable the grains industry, through policy makers and pre-breeders, to remain productive and competitive despite changes in climate.

According to researchers, increases in atmospheric CO<sub>2</sub> will bring with it both benefits and challenges. Because CO<sub>2</sub> acts as a fertiliser, it promotes improved water use efficiency, plant growth and yield, but under elevated levels grain quality is reduced. Agface scientists are investigating how the grains industry might realise the potential of this 'CO<sub>2</sub> fertilisation effect' while maintaining grain quality, and under which conditions it will be beneficial.

The aim is to identify the combination of management techniques and germplasm that will ensure sustainable production in the Australian grains industry under future environments.

## The program

The Agface program seeks to gain knowledge of cultivar traits and cropping systems capable of performing under elevated atmospheric CO<sub>2</sub>. BCG (Birchip Cropping Group) is involved in an extension capacity, charged with the task of raising awareness about the Agface program and the work being done to address issues that will emerge as a consequence of rising CO<sub>2</sub> levels.

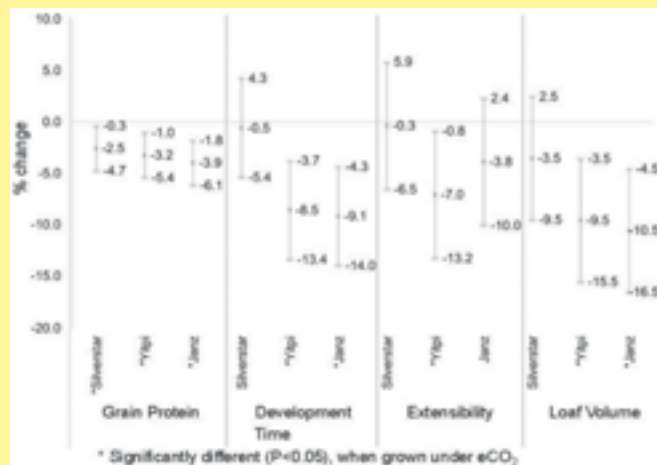
As well as looking at traits future varieties will need, Agface researchers are working on projects focusing on grain quality (including the impact on bread and noodle making), increased nitrogen uptake and how pulse and wheat rotations can address this, the behaviour of pests and diseases in an elevated CO<sub>2</sub> (eCO<sub>2</sub>) environment and below-ground processes.

## A laboratory without walls

Agface research involves fully replicated wheat trial plots grown under CO<sub>2</sub> levels expected in 2050 (550 parts per million) and compared with plots grown under the current CO<sub>2</sub> concentration (370 ppm).

The research takes place at a purpose-built facility at Horsham which achieves elevated CO<sub>2</sub> levels by means of a cleverly engineered system that sees CO<sub>2</sub> injected into the atmosphere from pipes circling the research plots. The Horsham facility is one of only six such sites operating in agro-ecosystems internationally and the only one in

**FIGURE 1: Percentage change (from ambient CO<sub>2</sub> to eCO<sub>2</sub>) over three years for grain protein content, dough development time, extensibility and loaf volume for the three wheat varieties**



the southern hemisphere. It is also the only FACE site in the world representing low rainfall, rain-fed grain production.

In 2010, 2011 and 2012 wheat cultivars grown at the Horsham facility included Janz, Silverstar, Yitpi and H45. Large scale quality analyses were completed on the machine harvested wheat samples.

## Grain quality

According to data collected so far, elevated CO<sub>2</sub> has been found to adversely affect important grain traits such as protein




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**DEPI senior research scientist Dr Cassandra Walker with loaves of bread baked from dough samples from wheat varieties grown under ambient CO<sub>2</sub> compared with those grown under elevated CO<sub>2</sub>. The loaves are in front of an extensograph, a machine which measures dough rheology.**

content, mixing properties and baking properties, as well as the micronutrients in wheat.

But different wheat cultivars interact differently when grown under elevated CO<sub>2</sub> conditions which will allow breeders to select for adaptations.

For the past three years, the wheat quality research team at DEPI Horsham have examined how elevated CO<sub>2</sub> effects grain protein, grain weight and screenings, endosperm hardness and test weights.

But the program goes a step further, with the wheat milled and the flour's baking and milling qualities examined. Elements such as dough rheology, flour colour, milling yield, dough mixing

**FIGURE 2: The loaves of two of cultivars under ambient and eCO<sub>2</sub>. Leaves from wheat grown under eCO<sub>2</sub> are smaller and denser**



properties, water uptake, mixing stability, dough strength and extensibility are all tested.

Protein is a major determinant for processing quality and there have been significant decreases in grain protein under elevated CO<sub>2</sub> levels.

Research scientist Cassandra Walker said depending on variety, wheat grown under elevated CO<sub>2</sub> was generally one to 1.5 per cent lower in grain protein content than its equivalent grown under ambient conditions.

Additionally, dough rheology properties were adversely affected by elevated CO<sub>2</sub> which is significant from a baking perspective.

"Potential, grain now classified as AH could become ASW," Cassandra said.

"But some varieties aren't as affected as others."

The impact of elevated CO<sub>2</sub> is especially evident after baking with loaves made from wheat grown under elevated CO<sub>2</sub> – the leaves are smaller and denser (up to a 10 per cent reduction in volume).

"A likely consequence of this reduction in baking quality is increased baking costs and a demand for higher quality wheat," Cassandra said.

"This would flow on to the farmer with increased input costs, particularly in terms of fertilisers and nutrients."

### Nutritional changes

Agface research also indicates that in the future wheat micronutrients could be reduced as a consequence of higher CO<sub>2</sub> levels.

Agface project leader Glenn Fitzgerald said while this effect is less well documented, it is critical to future human and animal nutrition and food security.

"Changes in grain nutritional qualities would impact people most severely in developing nations where much of the food consumed is plant based," he said.

"These aspects are being actively studied in Agface."

### Where to from here?

Maintaining productivity in the future will require new crop cultivars that can maintain yield and grain quality under elevated CO<sub>2</sub> in conjunction with changes in rainfall patterns and increasing temperatures.

So far the research has found the quality premium grade wheats such as Yitpi and Janz suffer greater effects of elevated CO<sub>2</sub> than H45 or Silverstar.

The Agface facility is helping researchers to provide vital information on benchmarking cultivars such as Janz and Yitpi and monitor potential new cultivars.

Data from this research will help ensure key quality parameters such as protein content, dough rheology and loaf volume – are not compromised as CO<sub>2</sub> increases in the future.

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## THE RESEARCH VIEW

# Sorghum growers reap the benefits of ongoing stay-green research

## AT A GLANCE...

- Ongoing research into the drought-resistant stay-green trait will lead to the development of higher-yielding sorghum hybrids for northern region growers.
- Current research aims to produce improved stay-green hybrids for northern region growers with yield increases of 5 per cent to 20 per cent in commercial situations depending on the growing conditions.
- Australian growers will benefit from global collaborations with the US, India and Africa which are enabling sorghum researchers to validate drought-adaptation mechanisms and expand the genetic diversity of the Australian breeding program.

**A**USTRALIAN sorghum growers will reap the benefits of ongoing research into the drought-resistant stay-green trait through access to improved higher-yielding hybrids.

The current research is helping to equip scientists with a greater understanding of the physiology underpinning the stay-green trait and the gene networks controlling the trait.

The research provides insight into drought adaptation mechanisms from the gene level through to the organ, whole plant, crop and system levels.



(Left to right) Dr Niaba Teme (Mali), Dr David Jordan, Dr Sidi Coulibaly (Mali) and Dr Andrew Borrell in a sorghum experiment at the Hermitage Research Facility, Warwick.

## Consultants' Corner

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

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This understanding is critical to the progression of plant breeding programs and the development of a new generation of crops adapted to drought.

Ultimately, scientists are also working toward the integration of stay-green genes into grain crops that are less well-adapted to dry environments such as rice, wheat and maize.

Research into the stay-green trait in sorghum has been supported by organisations like the GRDC for more than 10 years and has been widely promoted as a means of improving grain yield, grain size and lodging resistance.

This research has been a partnership between the Queensland Government (DAFFQ), The University of Queensland (QAAFI) and Texas A&M University in the US.

Current research aims to produce improved stay-green hybrids for northern region growers with yield increases of up to 30 per cent in drought conditions compared with normal varieties under experimental conditions.

In commercial situations this could translate to yield increases of five per cent to 20 per cent, depending on the growing conditions.

Sorghum is one of the most efficient crops in terms of water usage but hot northern region summers coupled with frequent dry spells often restrict yields to less than three tonnes per hectare.

## Pioneering research

For the past 30 years, DAFFQ researchers at the Hermitage Research Facility near Warwick have been investigating the stay-green trait in sorghum – a characteristic first discovered in sorghum during the early 1980s by Dr Darrell Rosenow in the US and Dr Bob Henzell in Australia. These pioneering researchers discovered that stay-green allowed sorghum crops to better tolerate heat and moisture stress while retaining yield potential.

Principal Research Fellow at the University of Queensland (UQ) and Centre Leader at the Hermitage Research Facility, Dr Andrew Borrell, has spent many years studying the stay-green trait in sorghum and said the current research was drawing together all existing knowledge of the trait to further the understanding of the genes and gene networks controlling the trait.

Andrew works closely with Dr David Jordan (UQ), Dr Barbara George-Jaeggli (DAFFQ), Dr Emma Mace (DAFFQ), Professor John Mullet (USA) and Dr Trish Klein (USA) on gene discovery aspects of this research.

Candidate genes underpinning stay-green have been identified and studied in four chromosomal regions known as Stg1, Stg2, Stg3 and Stg4 with the prime objectives of the research to understand the function of the key genes in each region and clone the key genes. Three additional chromosomal regions are now being evaluated.

“Current work is focusing on gene discovery, proof-of-function studies, modelling the interaction of key Stg genes with each other and with the environment, and the role of Stg homologs in other major cereals,” Andrew said.

Andrew believes the ongoing stay-green research holds a critical key to improving the value of sorghum production, as well as the long-term drought-adaptation of other major crops in Australia.



Identical sorghum lines with (right) and without (left) the stay-green trait in a field experiment at ICRISAT, Hyderabad, India.



Dr Andrew Borrell (right) with Dr Victor Kongo (left) from Tanzania on a visit to the Biosciences for East and Central Africa (BECA) headquarters in Nairobi, Kenya.



“Stay-green affects the canopy development of plants – it reduces the number of tillers, the number of leaves per stem, and also the size of the larger leaves,” Andrew said.

“The consequence of this is the conservation of soil water early in plant growth, allowing the plant to use that water to grow grain instead.”

Sorghum plants with stay-green maintain green leaves and stems when water is limited during the grain-filling period.

This results in higher grain yield, larger grain size and increased lodging resistance under dry conditions – and generally with no cost under more favourable conditions.

Several sorghum hybrids with varying levels of the stay-green trait are commercially available and are widely grown across the northern cropping region.

As with the adoption of any new technologies, management practices may need to be altered slightly to optimise the benefits, particularly with regards to harvesting as stay-green crops can take longer to desiccate.

### Global focus

The stay-green research also now has a global focus. In recent years, enhancing drought adaptation in sorghum has been the focus of various international collaborations with sorghum researchers in the US, India and Africa, heralding numerous benefits for Australian growers, including the validation of drought-adaptation mechanisms across a range of diverse environments and expanding the genetic diversity of the Australian breeding program.

African and Australian scientists are working together to develop improved drought adapted sorghum for Australia's northern grain belt and Sub-Saharan Africa. This work is funded by the CGIAR's Generation Challenge Program and is co-led by Andrew and David.

The African project is being undertaken in Mali and was recently expanded to Niger and Burkina Faso in West Africa as well as Sudan, Ethiopia and Kenya in East Africa.

“One of the objectives of the research is to determine the impact of changes in plant height and photoperiod sensitivity on the expression and value of stay-green. We want to know whether stay-green will still work in very tall sorghum plants and our research to date shows that it does,” Andrew said.

The skills and reputation of the Australian sorghum group in breeding for drought adaptation have recently been recognised by a large grant from the Bill and Melinda Gates Foundation to enhance the rate of genetic gain in sorghum breeding programs in Australia and Ethiopia. This project, led by David, will explore a range of genetic and management strategies to combat terminal drought conditions.

In another international partnership, drought-adapted sorghum is being developed for Australia and India.

This research, funded by the Australian Centre for International Agricultural Research, has found that stay-green increases the quality of the stover, as well as enhancing grain yield, creating dual purpose sorghums.

This work is led by Dr Vincent Vadez at the International Crops Research Institute for the Semi-Arid Tropics in Hyderabad, India, with Professor Graeme Hammer and Andrew Borrell co-leading the Australian end.

“It was particularly exciting to discover that stay-green increases the quality of sorghum stover, leading to higher milk yields in cattle in India, in addition to increasing grain yield,” Andrew said.

“This dual purpose characteristic could also be valuable to Australian famers.” ■

## THE COMMERCIAL VIEW

### GROWERS CAN REAP REWARDS WITH STAY-GREEN

■ By Paul McIntosh, Landmark senior agronomist, Toowoomba

Stay-green is a critically important trait to sorghum growers in Australia's summer cropping belt who face almost constant challenges from hot, dry weather.

On-going research aimed at equipping scientists with a better understanding of the genes and gene networks that control the stay-green trait is a valuable step in improving the drought tolerance of sorghum hybrids.

At the end of the day if that helps growers produce a higher yielding crop on less moisture that uses nitrogen efficiently and has a reduced likelihood of lodging, then it's a positive for the industry.

As with any technology, there can be challenges with the production of stay-green sorghum crops under certain seasonal conditions but those challenges are far outweighed by the potential yield and adaptation benefits.

It is important to recognise that stay-green is an extremely valuable component of some of the commercial hybrids but it is simply that – a component within a whole genetic package.

Netting the productivity benefits of that hybrid relies on a whole range of factors including seasonal conditions, agronomic management pre-plant and in-crop, desiccation and harvest management.

Management practices need to be tailored accordingly, particularly when it comes to desiccation as it is common for stay-green sorghum crops to require at least 90 per cent physiological maturity before effective dry-down will occur.

Additionally, if growers adhere to the over 90 per cent physiological maturity timing, they will see the benefit of speedy dry-down results from a glyphosate spray if grain moisture is around 20 per cent. Put simply, growers just need to be a little more patient with stay-green crops or harvest issues may occur.

The upside to longer desiccation is lodging resistance, due largely to stay-green hybrids' ability to maintain green leaves and stems for a longer period where post-flowering water stress has occurred.

The production of stay-green crops can deliver growers significant benefits in terms of yield potential, larger grain size and ability to cope with post-flowering moisture stress. But like any sorghum hybrid, they require a considered and integrated management plan that takes into account everything from pre-plant moisture to planting practices, weed and pest control and harvest preparation.



Paul McIntosh.

# Desiccation timing critical to sorghum crop success

## AT A GLANCE

- Timing of desiccation is critical to maximising yield and grain quality and avoiding lodging issues.
- Black layer (abscission layer) formation in the field is the best tool to safely schedule spray-out timing.
- Ensure spraying is carried out in the prime time of day, water quality is good, water volume is accurate and a seven day withholding period is adhered to.
- Dry conditions will affect the speed of the dry-down process.

**M**AXIMISING the profitability of this season's sorghum crops could be as simple as a well-timed desiccation. That's the opinion of Landmark senior agronomist Paul McIntosh who said the timing of spray-out was critical to preserving yield and grain quality and avoiding lodging issues.

"There are some basic rules I adhere to when it comes to desiccation timing of all sorghum varieties," Paul said.

"Don't judge physiological maturity by the colour of grain; get out into the crop and look at black point percentage numbers on the sorghum seed; and look on the bottom of the sorghum head on the southern side to determine if physiological maturity has reached this last area of grain turning.

"If grain moisture is less than 25 per cent with over 90-odd per cent physiological maturity, then spray-out results are going to be far more positive and much quicker."

GRDC supported research suggests that black layer (abscission layer) formation in the field is the best tool to safely schedule spray-out timing as it can help growers determine their risk approach and modify it as needed on a paddock and variety basis.

When spraying, Paul said growers needed to ensure that application was carried out in the prime time of day, usually early morning when stomates are open; ensure water quality was good, water volume adequate and adhere to seven days withholding period.

"It is also important to remember that healthy green leaves will always accept glyphosate into the plants' system more

effectively and that spraying post first frost is a usually a 'no-no' for continuing the spray-out program."

The current dry conditions will impact on the speed of the dry-down process – according to Pacific Seeds summer grains agronomist Trevor Philp – and growers should have their harvest preparations finalised before undertaking desiccation.

"Due to the dry hot growing environment, stalk rot pathogens such as charcoal rot and fusarium stalk rot may well be present and desiccation could aid in their rapid development. This type of situation will further reduce the timeframe from spray-out to harvest and may predispose the crop to lodging," Trevor said.

"In badly drought-affected crops growers may find some of the plants have already dried off. These plants won't die from a glyphosate application prior to harvest and some regrowth will occur after the next rain.

"In severely drought-affected crops, it may pay to do an initial harvest, wait for rain and then desiccate the field. This will reduce the risk of lodging and improve the effectiveness of the spray out."

When accessing the crop for physiological maturity, Trevor said the crop should also be checked for lodging potential with tell-tale signs being early matured heads and plants that are fully senesced.

"When the leaves are stripped back on these plants the stem will be discoloured and soft when squashed at the base. When the stem is split, the base of the stem will be discoloured," he said.

"If a crop is showing early symptoms of these stalk rots, earlier harvest should be considered. especially at the current price."

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Trevor Philp, Pacific Seeds, 0427 568 517; trevor.philp@pacseeds.com.au ■



Typical charcoal rot (LEFT) and fusarium stalk rot symptoms of sorghum. It is not uncommon to have both pathogens present after desiccation.





# Previews are a big benefit for CQ sorghum grower

**G**ETTING an early look at the performance of new Dupont Pioneer sorghum varieties is a big incentive for Orion graingrower Mark Baker to be involved in Strike trials.

Hosting a trial on his property 'Wandana' in 2013, Mark says he got a lot out of simply walking through the plots with the Pioneer plant breeder.

"I walked with him through all the different new varieties to see how they were performing – there is just so much benefit in seeing the new varieties on your country, so that you know how that variety performs on your soil types.

I would be happy to be involved again – 2013 was the first year they've done the Strike trials, but I've had Pioneer Seed trials for the previous five or six years," he says.

Mark also had great success with G33 sorghum in the 2012 season, planting 650 hectares dryland of the variety.

"We planted it in early February at 50,000 seeds per hectare and had a good strike with it, it had really good seedling vigour and never looked like it was stressed – even though it was getting dry towards the end, it still performed quite well.

"With good standability, low screenings and a good yield, averaging 3.95 tonnes per hectare, I was very pleased," Mark said.



Orion graingrower Mark Baker.

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# Biodegradable packaging from cotton waste

■ By Rosalie Marion Bliss, Agricultural Research Service – USDA

**S**UMMER flip-flops, garden planters, paver stones, and outdoor decking actually have something in common. If based on work conducted by Agricultural Research Service engineer Greg Holt and colleagues, all of these products can be made from agricultural waste and would biodegrade nicely.

Greg is working on a wide variety of composite materials using waste such as cotton burs, cotton seed hulls, cornstarch, gypsum, kenaf, flax, switchgrass, and wheat straw. He is with the ARS Cotton Production and Processing Research Unit in Lubbock, Texas.

One of Greg's recent projects is providing a type of biomass that is just right for use with a new process that literally grows custom packaging material. The process involves combining cotton gin waste and fungi inside a cast, called a 'tool' where the two ingredients become one, resulting in a spongy-looking material similar in appearance to polystyrene foam. The custom-shaped end product is providing a cost-effective 'green' alternative to extruded polystyrene foam packaging – an estimated \$2 billion market in the US alone. Products include custom packaging that protects, for example, computers and other breakables during shipping.

Greg's industry partner – New York-based Ecovative Design – developed the patented method that uses fungi as a workhorse. The technology uses the fungal growth stage, called 'mycelium.' First, woody cotton waste is blended, pasteurised, and embedded into a customised cast tool. Then, the tool is injected with the fungus. The mycelium grows onto, in, and around the cotton waste, eventually forming a new, consistently textured, solid mass. Once the tool is opened, a custom-shaped bio-package emerges that is then put into a kiln-like oven, where the live fungi are killed.



The material can be made to custom fit a wide variety of products.

"The final formed protective package insulation is biodegradable, compostable, and flame retardant, yet it has the cushioning strength of synthetic packing material," says Greg. Ecovative Design is manufacturing these cost-competitive packaging parts for their corporate clients, including Dell, Steelcase, Crate & Barrel, and others.

## Which waste works best?

In a test of types of gin waste, the lab evaluated the physical and mechanical properties of six different cotton-byproduct blends as a substrate for fungal colonisation to manufacture the molded packaging materials. "We wanted to learn which ones met or exceeded the same characteristics of extruded polystyrene foam," says Greg.

The six proprietary recipes consisted of cottonseed hulls, gypsum, or cornstarch blended with two sizes of cotton burr particles – fine or coarse. Each blend was then inoculated with a single fungus using two different inoculation methods, grain and liquid, for a total of 12 treatments.

The 12 treatments were evaluated for numerous physical and mechanical properties. Overall, the treatments tested well, and the results indicated that the blend and inoculation method needed are based on the end use of the product. "The materials are water resistant, but they degrade into organic matter on sustained contact with water or soil," says Greg.

The study was published in September 2012 in the *Journal of Biobased Materials and Bioenergy*.

## A substitute for other products

In another project, Greg worked with a team to evaluate agricultural waste materials that can be used for recyclable, termite-resistant particleboards and pressboards and for thermoplastics (melttable at high heat), such as outdoor decking planks.



Biomass packaging material made using technology developed by ARS, collaborators, and Ecovative.





**ARS and Ecovative made this protective cushion, which is moulded especially to fit tsunami buoys and prevent damage prior to launch by NOAA.**

Because wood fibre is a premium product, manufacturers would like to use recyclable agricultural waste materials in place of some of the wood fibre in composite building materials. Composite boards and planks are used in nonstructural applications. Previous laboratory-scale research had shown that waste from cotton production holds great potential as a fibre filler, but the team wanted to test the products on a commercial scale.

The process of ginning seed cotton generates a significant amount of waste – as much as several million tons each year – which contains woody cotton burrs, stems, and other materials. For the study, Greg and colleagues Sreekala Bajwa and Dilpreet Bajwa, both with North Dakota State University, evaluated using cotton burrs and stems as filler. The study was supported by Cotton, Inc., and the test materials were manufactured at a Greenland Composites Inc, facility in Greenland, Arkansas.

For the study, the team manufactured thermoplastic composite boards on a commercial scale with four different levels of added cotton burrs and stems. The four levels were 0 (controls, containing only wood fibre), 12.5, 25, and 37.5 per cent by weight. The samples were tested for physical and mechanical properties that are relevant to nonstructural building applications, including water absorption, thickness swelling, thermal expansion, strength, hardness, and nail-holding capacity.

Testing showed that the commercial-scale samples they made by adding cotton burs and stems were comparable to the control boards containing only wood fibre. The study demonstrated overall that up to 12.5 per cent of the wood fibre used in commercially available wood-plastic composite materials can be replaced or supplemented by cotton burrs and stems with no significant deterioration in mechanical and physical properties that are important for all composites.

Testing of composites produced from cotton burrs and stems showed that up to 25 per cent of the wood-fibre filler could be replaced without significantly increasing the composites' water-absorption and expansion performance, Greg says.

### **Bales that come wrapped**

The researchers also added a different, but relatively new, agricultural waste to composites during the study. New round modules are wrapped in a protective film made out of low-density polyethylene. These cotton module wraps (CMWs) are removed at cotton gin facilities. If not recycled, they could become an environmental burden.

The researchers demonstrated the potential of using shredded CMWs as an ingredient in thermoplastic composites. They added

up to 30 per cent by weight of CMW to composite boards, as a replacement for wood-fibre filler. They showed that CMWs could replace up to 30 per cent of total composite weight while maintaining the physical and mechanical properties of commercially available composites used for decking, window and door components, and landscaping products.

"We want to give ginners a way to sell their wastes for value-added applications," says Greg.

### **Protecting buoys that protect us**

The National Oceanic and Atmospheric Administration (NOAA) has introduced its next generation of tsunami-warning buoys placed at strategic locations throughout the oceans. These buoys work together to monitor and measure tsunamis in the deep ocean, forming an array. NOAA needed a mouldable, biodegradable material to keep the buoys and instrumentation from getting damaged during and after launch into the ocean.

ARS scientist Greg Holt and Ecovative, created a biodegradable material made from a proprietary blend of biomass substrates and cotton byproducts to cushion the buoys. NOAA's Pacific Marine Environmental Laboratory based in Seattle, Washington, has successfully tested the new material in a variety of oceanic conditions and hopes to launch buoys wrapped in the protective cushioning in the near future.

The technology was developed by Ecovative with support from Greg, research leader of the ARS Cotton Production and Processing Research Unit, a division of the Cropping Systems Research Laboratory in Lubbock, Texas.

**This research is part of Quality and Utilization of Agricultural Products, an ARS national program (#306) described at [www.nps.ars.usda.gov](http://www.nps.ars.usda.gov).**

**Gregory A. Holt is in the USDA-ARS Cotton Production and Processing Research Unit, 1604 E. FM 1294, Lubbock, TX 79403; Ph: +1 (806) 746-5353.** ■



**A tsunami buoy is launched into the ocean from a NOAA ship.**

# THE GRDC PANELISTS' VIEWS

## WINTER CROP LESSONS BOOST PRODUCTIVITY POTENTIAL

■ By GRDC Northern Region Panellist, John Sheppard

With the winter crop done and dusted, growers will be closely assessing crop performance as a key determinant of overall profitability.

For some, the results will simply confirm what they already knew through consistent monitoring and recording of input costs and agronomic data throughout the season.

For others the result may highlight some unexpected inconsistencies in the crop's performance raising questions over disease prevalence or the success of weed or pest management programs.

### Learning from experience

Whichever the case, the benefit comes through the experience and those lessons can stand us in good stead for the next winter season and the one after that.

As it was once said, 'there is only one thing more painful than learning from experience and that's not learning from experience'.

Importantly, probably 80–90 per cent of questions over crop performance can be answered now when the appropriate sampling and testing can be done, enabling growers to implement relevant strategies to minimise the risk of the same issues arising next winter.

On-going research and development work supported by organisations like the GRDC means technical information with regards to crop, pest and disease management is constantly being updated, new varieties are regularly released and information delivery systems are continually improving.

Not only does this information availability and support network enable growers to grow a better crop, it can help improve their entire farming system.

The performance of individual crops is increasingly reliant on the effectiveness of the farming system as a whole and the successful integration of pest, weed and disease management programs.

The emergence of concerning issues such as herbicide resistance will require growers to regularly and thoroughly assess every part of their farming operation from variety selection and sowing timing to herbicide use and tillage practices.

The theory of 'best practice' integrated crop production is one thing – successfully putting it into practice is another and it requires a special and diversified skill set, a channel of information for technical advice and good record keeping.

It requires continual effort, time and information gathering but can translate to tangible agronomic and financial rewards over the longer term.



John Sheppard.

## KNOW YOUR WHEAT

■ By GRDC Northern Region Panellist, Keith Harris

As growers take stock of this year's winter crop performance and instigate some early planning for the 2014–15 season, it is critical to recognise the implications of variety impurities and 'over the fence trading' for on-going crop management, quality and yield.

Ensuring variety purity and correct identification of seed play a significant role in protecting a grower's investment in next year's crop.

Issues have arisen once again this year over contamination of varieties and the presence of 'off-type' plants in cropping paddocks which have serious implications for disease and agronomic management.

Put simply, some growers believed they were growing one particular variety of wheat only to find that it wasn't exactly what they thought. This can cause a range of issues from incorrect sowing times and greater susceptibility to diseases like stripe rust, to market downgrades over protein discrepancies.

All of these issues affect the profitability of the crop due to factors such as the unnecessary application of fungicides, and make it extremely difficult for agronomists to give appropriate management advice.

The implications of not protecting variety purity are even greater from an industry perspective as incorrect identification, and therefore management, jeopardises the resistance rating of individual varieties and industry confidence in resistance breeding for diseases like stripe rust.

### Preserving seed integrity

There are several precautionary actions that growers can take to preserve the value and integrity of their seed for upcoming seasons. These mostly centre on on-farm hygiene practices to ensure that field bins, the seeding truck, header and silos are thoroughly cleaned as part of routine management to avoid cross-variety contamination. Correct identification of seed lots for planting and accurate labelling of silos for seed storage are also critical management practices.

The issue came to the fore last year when 23 commercial Sunvale seed lots from growers were genetically tested through the University of Southern Queensland and 16 were found to have at least five per cent contamination with other varieties that were very susceptible to stripe rust.

Over the past three years the GRDC has invested heavily in the development of a new commercial DNA test to cost-effectively identify the variety and purity of wheat and barley samples.

GrainGrowers has taken on the role of facilitating the commercialisation of this test into the Australian marketplace.

The samples are sent to the GrainGrowers' offices in North Ryde, Sydney, where they are prepared and the DNA is extracted for varietal identification. The pricing for the samples is available on the GrainGrowers website [www.graingrowers.com.au](http://www.graingrowers.com.au).



Keith Harris.



## THE RESEARCH VIEW

# Break benefits on Mallee soils – the long and short

### AT A GLANCE...

- Break options including a low-cost volunteer medic-based pasture have led to wheat yield gains of over 0.7 tonnes per hectare on some Mallee soils and in some cases significant effects in the third year after the break
- Across a range of soil types, seasons and break types, breaks have led to a typical cumulative benefit of almost 1.0 tonnes per hectare of wheat over two to three seasons
- This relatively consistent level of benefit is likely to be the result of a changing range of physical, chemical and biological drivers that differ across soils, season and break types
- Canola was shown to greatly reduce Rhizoctonia risk compared to other options
- Pasture was shown to provide the highest N mineralisation potential in the second wheat crop
- Although break yield effects were generally similar across the soil types, there are considerable differences in gross margin benefits due to the differences in break crop yields and the wheat yields that could have been achieved when the break option was grown
- The ability to reduce the opportunity cost of growing break crops and taking advantage of potential for second and third year break effects are important for maximising the value from break options.

**W**HEAT is a relatively low risk crop but relying on continuous cropping can increase the vulnerability to weeds, disease and declining nutrition and lead to increased costs.

The inclusion of break crops can address these issues, but in a low rainfall environment this often involves growing a crop that is riskier than cereal.

Over the past four years, several field trials in the Mallee have been looking closely at both the performance of break crops and their impact on the performance of subsequent wheat crops, and the reasons for that impact.

The trials led by CSIRO Research Scientists Dr Therese McBeath and Dr Rick Llewellyn have been funded through the Grains

## Consultants' Corner

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**Growers attending the MSF field day at Karoonda were told that break options including a low-cost volunteer medic-based pasture have led to wheat yield gains of over 0.7 tonnes per hectare on some Mallee soils and in some cases significant effects in the third year after the break. (Image CSIRO)**

Research and Development Corporation's Water Use Efficiency projects and associated CSIRO Sustainable Agriculture Flagship and Mallee Sustainable Farming projects.

Rick says one interesting aspect of the research has been the impact of a range of break crops and a low-cost medic-based pasture, evaluated over three subsequent wheat crops on a range of soil types at Karoonda in South Australia.

"The study has highlighted the importance of evaluating the benefits of break crops (or pasture) over several years, and recognises that there are often different drivers of the break effect, such as disease, nutrition and stored soil water, across different soil types and seasons," Rick said.

## Evaluating break crops

Trials were established near Karoonda (320 millimetre average annual rainfall) over different soils ranging from heavy swale to deep sand dune.

Single-year break crops were grown in 2010 and 2011, comprising legume (peas and lupins), canola, rye (grain and grain plus 'graze') and volunteer pasture on a paddock that had a cereal history of at least four years.



**CSIRO Research Scientist Dr Therese McBeath and Mallee Sustainable Farming agronomist Michael Moodie speaking at Karoonda about the local field trial results. (Image CSIRO)**

Wheat was grown following break crops with 16 kg N per hectare applied as urea and 9 kg N per hectare as DAP, all at seeding, in addition to P and S and micronutrients.

In 2010, the best break effect was following peas (+0.93 t/ha) and pasture (+0.83 t/ha) when averaged across all soils. In 2011 the first-year break effects followed a similar pattern.

Rick said it was worth noting that in general, soil type was not found to be a statistically significant influence on the break effects.

Rick said both peas and pasture caused a significant second year effect on wheat production in 2011.

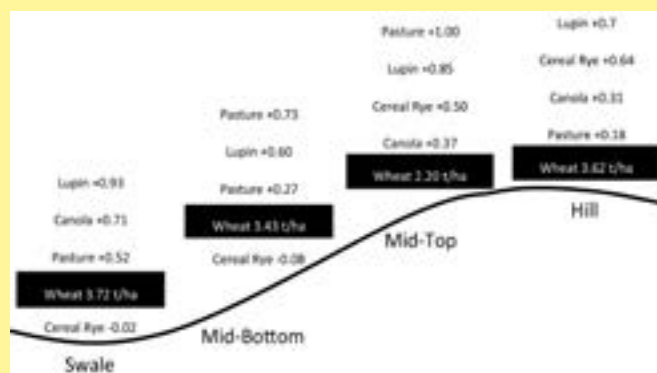
"In 2012 there were some significant second year break effects with lupins, pasture and canola all leading to significant wheat yield gains compared to continuous wheat.

"Pasture grown in 2009 led to a statistically significant third year break effect in 2012."

Rick said the relationship between the yield of continuous wheat and wheat following a break showed that a break crop gave an average cumulative benefit over two to three years of about one tonne per hectare across all break types and soils.

The results showed that the break effects on cereal yield may be best considered as relatively consistent 'tonnage' effect rather

**FIGURE 1: Yield gain in the 2011 wheat crops that followed various break crops grown in 2010 at Karoonda – continuous wheat yields 2011 are shown in the black boxes**



LSD (p<0.05): Swale = 0.42 t/ha; Mid-Bottom = 0.41 t/ha; Mid-Top = 0.49 t/ha; Hill 0.53 t/ha





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than a 'percentage of yield effect' (Figure 2). This is consistent with earlier findings of Angus et al. (2008).

"For example, in drier low yielding years, extra water left behind by a break phase can be just as important as the extra nitrogen in wetter high-yielding years. Or the disease break effect and extra residual water on a heavy, constrained, poor-yielding soil can be just as important as the extra nitrogen supplied on a high-yielding nitrogen-hungry sand."

The size of the first, second and third year effects across all breaks (except cut rye) and all soils are shown in Figure 2. This shows that the benefits of breaks are relatively consistent in terms of the gains in wheat yield, irrespective of wheat crop yield, soil type or the range of break options.

The cumulative effect of the breaks over three years are shown in Figure 3. It can be observed that a big yield boost in year one after a break can sometimes come with reduced benefits in year two.

"The results so far show that the breaks have led to a total benefit of almost one tonne per hectare of wheat over three years across the range of soils and break types," Rick said.

Rick said the drivers for the break effects varied across soils, break types and seasons. They included increased soil-available N,

higher available soil water levels at sowing following breaks and disease differences.

An example of potential disease risk reduction is shown in Figure 4. Cereal crops have promoted the build-up of *Rhizoctonia* inoculum, whereas canola reduced inoculum levels.

*Rhizoctonia* inoculum was lowest after the canola crop and highest after the wheat crop across all soils (Figure 4).

The strong performance of the volunteer pasture, which had a medic base but wasn't maintained grass free, is partly explained by the estimated N mineralisation potential shown in Figure 5.

Soil that was under pasture in 2010 had significantly more potential to supply N to the 2012 crop than where break crops were grown in 2010.

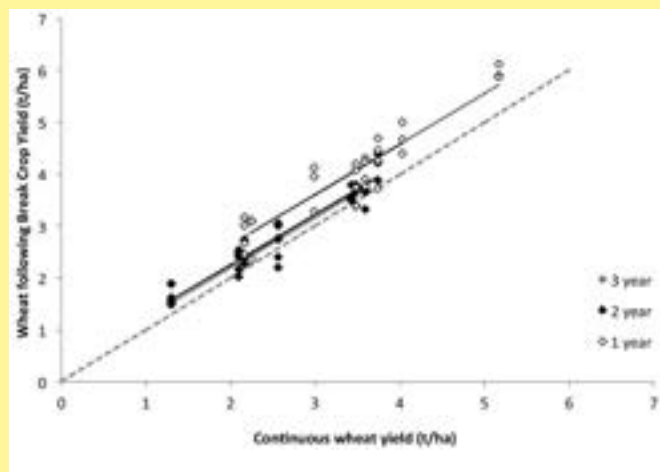
Four-year cumulative gross margins have been calculated for each soil type by crop sequence combination where breaks were grown in 2009 (Table 1).

"While the effects of break crops on wheat yield were generally similar across the soil types, there were considerable differences in relative gross margins due to the differences in the yields of the break crops and the wheat yields that could have been achieved when the break option was grown in 2009," Rick said.

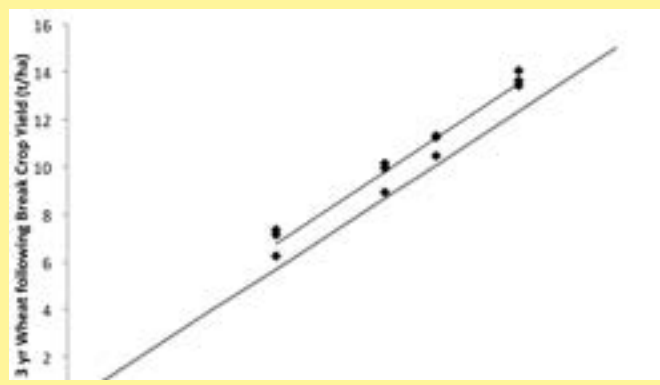
Where breaks were grown in the relatively poor yielding year of 2009, profitability over the four-year sequence was generally higher than continuous wheat (Table 1).

"This was particularly the case on the swale, where wheat performed poorly in 2009," Rick said.

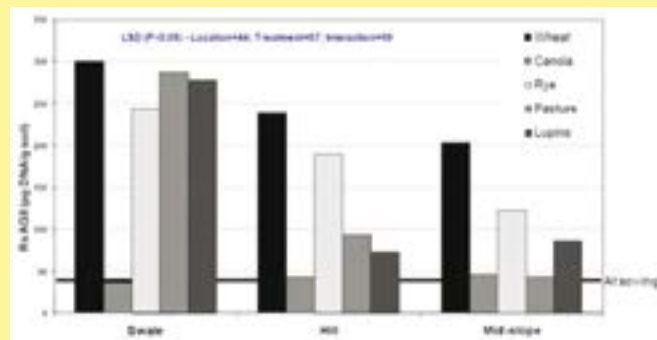
**FIGURE 2: Wheat yield one year, two years and three years after break, showing benefit of breaks compared to continuous wheat (dotted 1:1 line) – data includes all break crops, soil types and years**



**FIGURE 3: Cumulative yield of wheat over three years after breaks showing benefit of breaks compared to continuous wheat (1:1 line)**

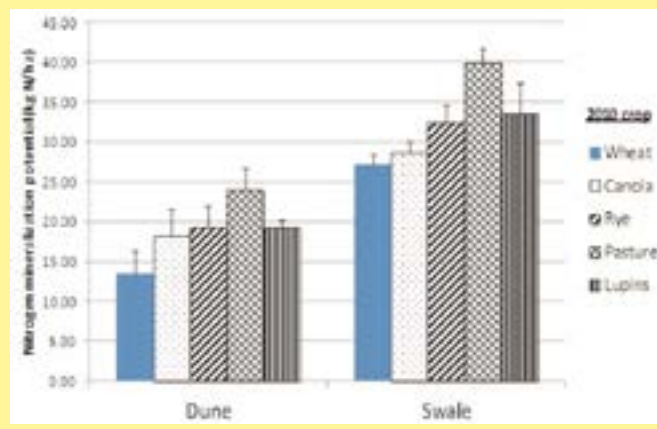


**FIGURE 4: *Rhizoctonia solani* AG8 inoculum levels measured in 2011 following different crops grown in 2010**



Gupta et al. 2011 in collaboration with GRDC project CSP00150 – Managing *Rhizoctonia* disease risk in cereals).

**FIGURE 5: Effect of 2010 break crops on N mineralisation potential (estimate for decile 5 season) measured at time of sowing in 2012**





**TABLE 1: Gains in cumulative gross margin from break crops compared with continuous wheat across different soil types**

Rotation				Swale	Mid-Bottom	Mid-Top	Hill
2009	2010	2011	2012	\$/ha	\$/ha	\$/ha	\$/ha
Peas	Wheat	Wheat	Wheat	+283	+113	+52	+80
Rye grain	Wheat	Wheat	Wheat	+75	+62	+119	+112
Rye grazed	Wheat	Wheat	Wheat	+301	-133	+60	-217
Pasture	Wheat	Wheat	Wheat	+250	+74	+233	+191

Costs are calculated using the Rural Solutions Farm Gross Margin Guide, grain prices are five-year average, pasture biomass valued at \$35/t/ha. Gains (or losses) are presented relative to the cumulative gross margin for the four years of continuous wheat (Swale \$2989/ha, Mid-Bottom \$2488/ha, Mid-Top \$1267/ha and Hill \$2038/ha).

"Breaks grown on the swale in 2010 were expected to be less profitable over the sequence as wheat would have been a highly profitable option compared to most breaks in that year."

Given the possibility of benefits in the third year following

the breaks, the trial continued in 2013 in order to evaluate the longer-term profitability of break options grown in 2010.

Contact Rick Llewellyn, CSIRO, Waite Campus, Adelaide, Phone 08 8303 8502, Email [rick.llewellyn@csiro.au](mailto:rick.llewellyn@csiro.au)



CSIRO Research Scientist Dr Rick Llewellyn (left) speaking to growers at Karoonda about field trials in the Mallee that have been looking closely at both the performance of break crops and their impact on the performance of subsequent wheat crops, and the reasons for that impact. (Image CSIRO)

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# New rice naturally fends off weeds

■ By Jan Suszkiw, Agricultural Research Service – USDA

**R**ICE is a staple food for more than half the world's population, with Africa and Asia leading consumption of this nutritious, energy-rich grain. No matter where it's grown, though, rice faces stiff competition from weeds.

But not all rice is so easily bullied. Certain indica rice types from Asia, in fact, produce root secretions called 'allelochemicals' that, along with other competitive traits, naturally keep weeds at bay. Despite their prospects for reducing herbicide use, weed-suppressive varieties haven't caught on with too many growers, largely because of their poor grain quality.

Now, a Stuttgart, Arkansas, team of Agricultural Research Service and University of Arkansas Division of Agriculture (UADA) researchers has worked to tackle the problem by crossing the indica rices with southern US long-grain cultivars. In 2013, in the journal *Plant and Soil*, the team reported its most recent success, STG061-35-061, a newly developed rice line that combines the best of both worlds. This line has the agronomic traits sought by the rice industry as well as weed suppression (allelopathy).

According to David Gealy, a plant physiologist at ARS's Dale Bumpers National Rice Research Center in Stuttgart, the new line is the top pick of some 50 total rice lines that were selectively developed for such traits as high grain yield and quality, early maturity, stem strength, pest and disease resistance, and allelopathy to barnyardgrass and other weeds. David conducted the evaluations as part of a cooperative rice breeding-and-selection program together with UADA rice breeder Karen Moldenhauer and ARS plant geneticist Melissa Jia.

## A winning combination

STG061-35-061 owes its winning combination of agronomic and allelopathic traits to the commercial cultivars Katy and Drew – both tropical japonica rice types – and PI 312777, an indica line.

The team's trials included multiyear tests of the new cultivar's yield, height, and flowering time in both weed-infested and weed-free plots, with barnyardgrass as the dominant species. Several commercial cultivars, including Katy, Drew, and Lemont, along with several indica lines, were also tested for comparison.

In preliminary yield trials, conducted in 2008 and 2009, weed-suppression ratings for the new cultivar were 41 per cent higher than Katy, 68 per cent higher than Lemont, and about equal to PI 312777. In weed-free plots, the new rice averaged about 5000 kg of grain per hectare versus 5400 for Drew; 4000 for Katy; and 4300 for Lemont.

Although tall growing, the new cultivar's sturdy, upright stems kept it from lodging. Its kernels also scored well on industry tests for cooking and milling properties, with quality similar to Francis and other long-grain rices that were evaluated. Marker-based analysis of the new rice also revealed its inheritance of genes for resistance to rice blast, a devastating fungal disease of rice worldwide.

"These traits should enhance its inherent competitiveness against weeds and its suitability for use in organic or other low-input systems," the team notes in the *Plant and Soil* article.

David Gealy and Melissa Jia are with the USDA-ARS Dale Bumpers National Rice Research Center, 2890 Highway 130 East, Stuttgart, AR 72160; Ph: + 1 (870) 672-9300, ext. 226 [Gealy], Ph: + 1 (870) 672-9300, ext. 278 [Jia]. ■



STG061-35-061 is a new rice line that combines desirable traits like high grain quality with a natural ability to suppress costly weeds like barnyardgrass. (PHOTO: David Gealey)





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# WA grower finds value in Strike trials

**D**ESPITE a poor start to the 2013 season writing-off canola trials on his northern WA wheatbelt property, such is Karl Suckling's belief in the Dupont Pioneer Strike program, he is already keen to be involved again in 2014.

Karl farms with his family north of Northampton, and with a lack of canola variety information for his district they decided to get involved with Pioneer trials three years ago.

"Pioneer was really good, they came on board and gave us a heap of seed in their new lines and we just worked with them to try and evaluate their varieties in our environment up here, which is medium rainfall zone in the northern WA agricultural region," he says.

Such has been the impact of the first two years of trials, one of those tested, 43Y23, now makes up between a third and a half of the family's canola program each year.

"One characteristic of the 43Y23 which really impressed me was its reduced shatter," Karl says. "In 2012 we had a wind event about four days before we harvested the trial, and we had 70 km



Karl Suckling.

per hour north-easterly winds on a 35 to 40 degree day and we lost up to half a tonne of yield with some varieties being trialed.

"While 43Y23 still lost yield – around 150 kg per hectare compared to 500 kg in some of the worst varieties – it was much better than the others," Karl says.

## Impressed with the seed quality

He has also been impressed with the general quality of Pioneer seed, describing it as 'big and plump' compared to other varieties.

"We grew three other varieties in 2013, one of those the seed size was nearly 300,000 seeds per kg whereas the Pioneer seeds was generally around the 180,000 seeds per kg, meaning a good stability of seeding rates, which is important to us," Karl said.

Karl planted a Clearfield Strike trial in 2013, but unfortunately it was written off after a difficult start.

"It got four millimetres of rain on it just after we put it in and half of it came up and half of it didn't, so we had to write it off due to a lack of uniformity. But the information we gained out of the previous two years of trials was great, and that's why we were keen to do a Clearfield Strike trial in 2013 – there's no better information you can gain than on your own farm, in your own environment and under the management you use.

"I hope to be involved in the Strike program in 2014, testing Roundup Ready or Clearfield varieties," Karl says. ■

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# Dry conditions support domestic prices

**A** SIGNIFICANT influence on Australian grain prices in 2014 will be the prolonging drought we are seeing in the north eastern part of Australia. December and early January has proven dry through southern Queensland and northern NSW which is closing the window to get significant plantings of sorghum in the ground. So it is becoming less and less likely that we will see increased supply of grain providing some relief to feeders in these areas.

As a result, sorghum and other grain prices in the northern areas have continued to track higher as buyers have to search further and further south to satisfy their grain requirements. Grain from around the West Wyalong areas of NSW is now working into the Darling Downs of Queensland.



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January 8, 2014

that be carting from areas further south in NSW and/or at the extreme end, bringing a boat around from one of the southern states Victoria, SA or WA.

Malt barley is likely the first commodity to work in terms of bringing a shipment around from the southern states given maltsers are located at Brisbane.

The cost of doing this would be in the vicinity of \$40 for fobbing costs + \$40 sea freight + \$20 unloading + \$15 road freight port to end-user giving a total cost of around \$115 per tonne.

So if Port Adelaide is trading at \$250 per tonne, theoretically, it could be shipped to Brisbane for around a price of \$365 per tonne. But AQIS restrictions and so on make many traders reluctant to do this hence the willingness of the trade to pay in the vicinity of \$375–380 per tonne. Sellers in the north can use Profarmer Price Discovery to determine what their grain could be worth by looking at other parts of Australia.

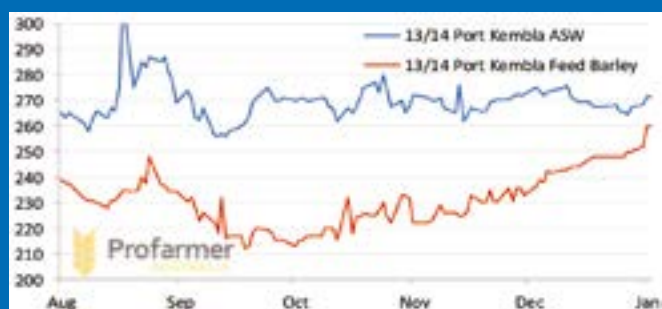
Another consideration is that destocking rates were very high through 2013 in the north. So we may see lower feedlot requirements later in the year if some rain eventuates to improve pasture growth.

**Brisbane prices**



The flow on effect of this is that we have seen grain values in the Port Kembla zone also start to be pulled higher as grain from this zone starts to be pulled toward the north.

**Port Kembla prices**



This has also helped to support values in Victoria, SA and WA given limited shipments will be exported from the northern port zones. So there is a bigger reliance on the southern export orientated states to execute export commitments. This is evidenced by busy shipping stems in these states.

## Will northern prices keep going higher?

The short answer to this question is no. The long answer is the northern prices will be dictated by 'import parity'. Prices will reflect the cost of freight to bring grain into the area whether

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While we do not expect prices to just continue to track higher in the north, merchant appetites remain strong.

### Will prices in southern states be supported?

Again the short answer is, more than likely, no. The long answer is that Victoria, SA and WA prices will continue to be determined by export markets given the production surpluses in those states.

Thankfully, thus far, the higher reliance on exports being executed out of these states has corresponded with strong demand from importers for Aussie grain. So Aussie cash prices in these states have performed well. But we expect this may not last forever.

Put yourself in a merchant's shoes. Exports of Australian grain are normally heavily front ended in the year to take advantage of demand ahead of competition from the northern hemisphere crop in the middle of the year. So merchants are trying to engage with growers to cover commitments during harvest and early this year. Given this, we maintain our view that there is risk of less buyer appetite later in the year. ■

## BULLS AND BEARS FROM LATEST USDA REPORT

The first USDA WASDE report for 2014 (released January 10) was bearish for wheat, neutral on oilseeds and bullish for feed grains. The report confirmed feed grain was too cheap with feed demand shifting away from wheat, towards corn. The change in numbers was generally larger than the world market anticipated and as a result we have seen part of the funds' large 'bet' on corn prices moving lower, get unwound.

### Wheat – bearish

- The global wheat crop continues to get bigger with an estimated lift of 1.24 million tonnes (mt) over the past month to production of 711.42 mt and consumption fell 1 mt over the month. This pushed world ending stocks above the market's expectations.
- US ending stocks also fell below expectations.
- Wheat use fell as cheaper corn works its way into feed rations.
- The increase in global supply estimates came from Russia and China finding an extra 1 mt of production each.
- Argentina's production was decreased only slightly to 10.5 mt from 11 mt – most expect it closer to 9.5 mt.
- Australia's production (USDA estimate) was left at 26.5 mt with 19.5 mt exports, domestic use at 6.55 mt and stocks at 4.8 mt (predominantly in WA and SA).

### Corn – bullish

- The USDA report decreased ending stocks both globally and in the US.
- Production also dropped in the US by 1.6 mt due to a yield reduction which shocked the market.
- US ending stocks are still set to double year-on-year.

### Soybeans – neutral

- Soybean estimates came in more in line with expectations.
- US stocks will remain historically tight again this year but rises in Brazilian production to 89 mt (a record) will provide some relief to the global balance sheet with the Chinese being relentless buyers.

## WHEAT INDUSTRY ADVISORY TASKFORCE: WHEAT STOCKS

*Profarmer* has long been a supporter of well-informed, transparent markets to provide the best long term outcomes for farmers and consumers.

The recent Wheat Industry Advisory Taskforce (WIAT) report into wheat stocks is a step in the right direction, but falls way short of what is required to provide the sort of grain market which will attract investment in the future. Agricultural commodity markets are dynamic, with lots of moving parts: weather, currency, commodity prices, freight, political interference, etc. This means these markets need a constant supply of relevant information to reflect what is always an evolving market situation.

Accurate stocks information is a cornerstone to allow a market to reflect the correct supply and demand situation, and therefore shift prices higher (shortage) or lower (surplus) for an informed market. The reality in Australia is that this information is held by the major public warehouse (BHCs), right down to individual grade and quality specs at site level – in real time. No other parties have access to this information, which means that non-BHC traders are at a significant disadvantage in trying to buy grower grain – it reduces competition for grain.

Minister Barnaby Joyce released the report pre-Christmas and has accepted all recommendations of the WIAT. One of the 'outs' for the government on this issue, is that there is no consistent view across all the grower groups about stocks reporting, in particular from WA.

*Profarmer* is puzzled as to how growers can get more for their grain when the market does not know it is there (by keeping the numbers in the hands of the BHCs only), compared to having an aggregated reporting of stocks by grade at port zone level. This issue is often reported as a domestic market issue, but it is not only domestic. Exporters cannot bid for grower stock (with any confidence) if they are operating in a 'blind space' as to what quantity and what quality is in the BHC system.

### Voluntary vs mandatory?

While most would support the notion of self-regulation rather than government regulation, the test will be what penalty applies for non-compliance if a party does not contribute their data? If the industry is serious about this system being voluntary, then it should immediately adopt reporting across all grains – not just wheat. It will cost little, if any more, to collect the data for all grains than it does for wheat. If there is resistance to this, it means the main players are interested in the absolute minimum of information to the market.

### Timeliness

Monthly reporting is way too slow during harvest periods when the price moves are at their peak around grades which are in either short supply or in surplus.

The USDA system of detailed crop reporting exists because of the 'Great Grain Robbery' of the early 1970s. The Russians moved in and bought up several million tonnes from a few US traders in the space of a day, leaving the US wondering whether it had sufficient grain to meet both its export and domestic needs. How long might it be in Australia before we repeat that lesson?



# US Wheat Associates check on Asian markets

■ From a report by Shawn Campbell, US Wheat Associates Assistant Director

**F**ROM December 5 through December 15, 2013 a five-member US Wheat Associates delegation traveled China and Japan to assess these markets and particularly to gain a greater understanding of the importance of these markets and the work it takes to keep customers informed about reliability, quality and value.

The following is extracted from a tour report by the USWA delegation and provides an interesting competitor's viewpoint for Australian growers.

## China

China is a rapidly expanding market for US wheat, importing Hard Red Spring (HRS), Soft White (SW) and Soft Red Winter (SRW). While China is the largest wheat producer in the world, its domestic production has concentrated more on quantity rather than quality. As a result, Chinese millers need imported wheat to meet the country's growing middle class demand for high quality wheat food products. But the Chinese government controls wheat imports as a matter of national security.

The word of the day in China was 'expansion'. The team spent most of its stay in the Qingdao region, heart of the Chinese wheat belt and the Chinese milling industry.

Even though demand for US wheat from millers like these companies is very high, the Chinese government hampers private wheat imports.

Every year, the Chinese government issues a wheat import tariff rate quota, or the right to import a certain amount of wheat at a lower tariff level (in this case, one per cent *ad valorem*). The majority of the quota goes to the state trade entity, COFCO, and only a small portion goes to the private milling industry.

Even with these challenges, US wheat exports to China have been steadily growing over the past eight years.

## Japan

Japan is a very important market for US wheat, with consistent, large bi-weekly tenders for HRS, Hard Red Winter (HRW) and SW.

The USWA Tokyo Office has operated for close to 60 years. The long-term relationship between the Japanese industry and USWA, built on mutual understanding and respect, has helped sustain US wheat exports through many events.

The Japanese wheat market is one of the most developed in the world, so USWA's efforts there mostly focus on providing up-to-date market information, collaborating with Japanese and US wheat industries and maintaining US market share against rivals like Australia and Canada.

There have been some shifts in consumption, particularly with the younger generation putting a greater emphasis on frozen and convenience wheat food products.



Younger generation Japanese are demanding more wheat-based convenience foods.

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# Ancient grains spice up modern diets

**B**Y now you've probably caught up that quinoa is pronounced 'keen-wah' instead of 'quin-oh-a', but it's not the only ancient ingredient you're likely to see as a regular addition to Australian tables this summer.

Other pseudo-grain friends amaranth and buckwheat, plus grains freekeh, farro and millet, are also making an entrance, according to the Grains and Legumes Nutrition Council (GLNC).

As well as adding new flavours to your table, pseudo-grains and ancient grains add a new dimension to a dish – a story. Whether worshipped by ancient Aztecs in central America or a staple for the all-conquering Roman legions in Europe, these grains have travelled through time to reach your plate.

GLNC – the authority on the nutrition and health benefits of grains and legumes – and nutritionist Catherine Saxelby, offer this review of some of the ancient grains and how they are being incorporated into modern diets.

## How's a pseudo-grain different to a grain?

Pseudo-grains are from a different family of plants to true grains like wheat, oats, rice, barley and rye. While pseudo-grains differ in origin, they are often referred to as grains as they are nutritionally similar to grains and are cooked and eaten in much the same way.

## Why do we need them in our diet?

As well as adding variety to your meal, pseudo-grains and ancient grains are also bursting with essential nutrients for health and wellbeing. Just like more traditional grains – oats, wheat, rye, barley, brown rice – pseudo-grains and ancient grains contain all of the essential parts of a whole grain which are rich nutrients and contain health protective phytonutrients.

## Six popular ancient grains

### Quinoa

Worshipped by the ancient Aztecs, the protein power of quinoa is impressive – not only is quinoa higher than most grains in protein, it is one of the few plant foods which is a complete protein, meaning it contains significant amounts of all of the essential amino acids. In addition, quinoa is gluten free, has a low Glycemic Index (GI), high in fibre and is a source of magnesium, which plays a key role in energy production.

TIP: While beige quinoa is most commonly available you can also find red, purple and black quinoa. To make perfectly cooked quinoa every time try this:

- Add one cup of quinoa to three cups of water, bring to a boil then simmer for 12–15 minutes. Drain and rinse with lukewarm water.
- Spread the cooked quinoa out on a tray, drizzle with some olive oil and dry off in the oven at 160°C for 10 minutes until slightly golden, light and fluffy.

### Amaranth

A close cousin of quinoa, amaranth is a small round grain that packs a nutritional punch. Amaranth is high in protein, fibre, is gluten free and is also higher in healthy oils than other grains.

Unlike other grains, when cooked amaranth never completely softens – this means amaranth is suited to making healthy breakfasts, porridges, and soups, or you can buy (or make) popped amaranth to mix into baked snacks, mueslis or granola.

TIP: To cook amaranth, simply add 2½–3 cups of water to 1 cup of dry grain and boil for 20–25 minutes.

### Buckwheat

Buckwheat has a unique triangular shape and despite its name, it is not related to wheat. Nutritionally similar to quinoa it contains significant amounts of all of the essential amino acids, has a low GI, high in fibre, is gluten free and is particularly high in niacin, which helps release energy from food.



A summer salad using quinoa.



Buckwheat pancakes.





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With an earthy flavour, buckwheat is versatile in the kitchen – as a side dish, in salads or in baking, and is commonly used to make pancakes. Toasting buckwheat improves the taste and shortens cooking time.

TIP: To cook buckwheat, add 1¾–2 cups of water to one cup of buckwheat and simmer for 12–15 minutes.

### Freekeh

Freekeh is the name given to any grain which is harvested while green (or immature) and then roasted. Freekeh has a low GI and because the grains are harvested green, they retain higher amounts of protein, vitamins, and minerals. The freekeh available today is made from roasted green wheat but in the near future other varieties of freekeh may be available made from other grains including green barley and triticale.

Freekeh is easy to prepare and can be used in salads, as a side dish or in pilafs.

TIP: To prepare, use one cup of grain to 2½ cups of water. As a guide, cook for 15 minutes for cracked freekeh and 40 minutes for whole Freekeh. Drain.

### Emmer (Farro)

Farro is the Italian name for emmer which is an ancient variety of wheat. It was one of the first grains ever domesticated by humans. Ancient varieties of wheat are nutritionally similar to modern day wheats, but are generally higher in protein and fibre, particularly insoluble fibre which is important for digestive wellbeing.

Emmer is versatile and is ideal for use in salads, soups, baking

or as a side dish such as pilaf. Emmer and other ancient wheats must have their outer husk removed to be eaten.

TIP: To cook add two cups of water to one cup of emmer and simmer for 20–30 minutes. Drain.

### Millet

Before rice was widely eaten in Asia, it is thought that different varieties of millet were the staple grain. Millet is almost always consumed as a whole grain and so delivers protein, fibre and B group vitamins.

Millet has a mild flavour which pairs well with many foods and can be prepared to produce a fluffy side dish similar to couscous or a creamy like porridge.

TIP: To cook add 2–2½ cups of water to one cup of millet and simmer for 20–30 minutes. Toasting millet before cooking helps to bring out the full flavour.

### Where to buy them

Ancient grains and pseudo-grains are becoming more available as more and more people realise their nutritional and culinary potential. You can now find these grains in local supermarkets as well as in specialty stores or online.

You may have also spotted these ancient grains popping up in different grain foods like breakfast cereals, breads, crispbreads and readymade meals/side dishes.

For more information and recipes on ancient grains check out Catherine Saxelby's new book *Ancient Grains – Whole Food Recipes for the Modern Table*. For more information on the nutrition and health benefits of grain foods visit the Grains & Legumes Nutrition Council [www.glnc.org.au](http://www.glnc.org.au)

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# Better and healthier cakes ahead?

■ By Marcia Wood, Agricultural Research Service – USDA

**E**XPERIMENTS led by USDA Agricultural Research Service food technologist Mukti Singh are showing how to boost the fibre content in white layer cake – or lower the calories – without significantly undermining many of the key qualities of this all-time-favourite dessert.

Mukti's edible-fibre experiments focused on corn bran, the corn kernel's fibre-rich outer layer. She determined that purified, finely ground corn bran can be used as a substitute for up to 20 per cent of the flour called for in the American Association of Cereal Chemists' 'gold standard' test recipe for white cake. That amount of fibre didn't significantly affect qualities such as colour, crumb grain size (an indicator of structure), volume, moisture (moist – but not soggy – is ideal), and springiness (the unfrosted top surface of a good cake will spring back when gently touched).

What's more, the 25 volunteer taste-testers who sampled the 20-per cent-corn-bran-enhanced cake rated it as 'acceptable'. In taste-tester lingo, that counts as a vote of confidence.

Mukti estimates that one slice of an 8-inch (20 cm), six-slice, two-layer white cake made with that amount of bran would provide about 5 grams of healthful fibre. A slice from a standard white layer cake would provide about 1 gram.

A peer-reviewed scientific article that Mukti and colleagues Steven F Vaughn and Sean X Liu, all with the ARS National Center for Agricultural Utilization Research in Peoria, Illinois, published in 2012 in *Biocatalysis and Agricultural Biotechnology* has details that may interest bakers and companies that make cake mixes for commercial or home baking.

## Rare quality data

The study is among the few that provide publicly accessible data about the effects that relatively high concentrations of purified, finely ground corn bran can have on the quality of white cake.

In tests aimed at cutting calories – without sacrificing quality – Mukti worked with a patented, ARS-developed process that

uses steam-jet cooking to encapsulate microdroplets of cooking oil (in this case, canola) with flour and water. The cream-textured mixture that results can then be dried to form a smooth-flowing, shelf-stable powder that's ready for the mixing bowl.

Explains Mukti: "Encapsulation helps distribute the oil evenly throughout the cake, so you can use less of it and still have some of the smooth mouthfeel of a higher oil, higher calorie cake." And the approach offers busy bakers the convenience of having oil already included in the mix, so there's no need for pouring, measuring, or cleanup of this ingredient.

In these tests, Mukti used only 25 per cent of the cooking oil called for in the standard test recipe. She showed that cakes made with the flour-oil-water 'composites' were softer and springier, and stayed moist longer, than cakes made with the same amount of nonencapsulated flour and oil.

Noted briefly in *Agricultural Research* in March 2010, the work was reported in detail in the *Journal of Food Processing and Technology* in 2012. The study presents what is likely the first data, published in a scientific research journal, about use of the composites in cake. The findings provide a foundation for further research and development, including taste-testing.

**Mukti Singh is with the USDA-ARS National Center for Agricultural Utilization Research, Functional Foods Research Unit, 1815 N. University St., Peoria, IL 60605; Ph: +1 (309) 681-6357.**



**Bakery cakes like this one may one day have more fibre. Scientists are using finely ground corn bran as a substitute for some of the flour used to make white layer cake, raising its fibre content without sacrificing quality.**  
(PHOTO: Stephen Ausmus)

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**CROPLANDS**

# Biological insect pest control for stored grain

**E**XOSECT recently announced that Queensland University of Technology (QUT) is to trial Exosect's patented platform technology, Entostat, to deliver biological active ingredients for the control of Lesser grain borer (*Rhyzopertha dominica*) and Rust red flour beetle (*Tribolium* spp.) in stored grain. The program is being funded by the GRDC.

Insecticide resistance and a shortage of effective pest management options are significant international problems for the grain storage sector. The evolution of resistance to insecticides, withdrawal of chemical controls, market access restrictions and consumer demand have led to a very limited range of control options. The Australian grain industry relies heavily on phosphine fumigation to meet market requirements for insect free grain.

This new technology employs Exosect's proprietary delivery platform, Entostat, to deliver the biological, *Beauveria bassiana*, to control grain beetles, weevils and other stored grain insects. European regulatory field trials commenced in 2012 and in January 2013, a program for the control of Larger grain borer (*Prostephanus truncatus*) commenced in Ghana and Tanzania.

## First biocontrol

The efficacy trials to be carried out by QUT will assist in

## WHAT IS ENTOSTAT?

Entostat powder is the platform technology for Exosect's range of products. Derived from a natural 'food grade' wax which is sustainably harvested from palm trees, Entostat powder acts as a delivery system for a wide range of chemistry.

As the name suggests "Entostat" powder exhibits electrostatic properties. Even through very slight movement, it develops an electrostatic charge. Insects similarly develop an electrostatic charge as they fly through air or walk across physical surfaces. When placed in contact with insects, the powder adheres to them and can be passed from one insect to another through direct contact.

This patented platform enables the use of very low doses of active ingredient and has potential applications in many sectors including agriculture (agrochemical and biological formulation and reformulation, seed treatments, bio-control), apiculture, public health and animal health.

securing early regulatory approval in Australia for the first biological control in grain storage.

Dr Caroline Hauxwell, Associate professor at QUT, says that about 80 per cent of Australia's cereal grains are treated by phosphine fumigation.

"Reliance on only a few chemical controls increases the risk of resistance so new economically viable control options and resistance management strategies are urgently needed."

Exosect's CEO, Martin Brown says that Exosect has, for the past seven years, been leading a UK government funded consortium to develop the first biological grain protectant for the European market.

"The Australian grain industry had an average annual gross value of production at the farm gate of more than \$9 billion and it plays a vital role in the Australian economy. We are delighted that this technology is being supported by the GRDC to assist Australian cereal producers and handlers with the increasing difficulty in post-harvest pest control," Martin said. ■

## ABOUT QUT

QUT is a leading university with a global reputation based on real-world learning experiences and real-world research solutions. Our graduates are among the most employable in Australia and include six Rhodes Scholars (three in the past four years).

QUT currently has more than 44,000 students across three campuses. About 20 per cent of students are studying at postgraduate level, and 16 per cent of our students come from overseas. Academic programs from bachelor degree to PhD are offered in business, creative industries, education, health, science and engineering, and law.

QUT collaborates with leading Australian and international researchers, commercial partners and agricultural industries to develop and use biopesticides in integrated pest management strategies. Research has reduced chemical insecticides through registration of three new biopesticides, now used on over a half a million hectares of crops annually, and the establishment of a successful manufacturing company.

QUT invertebrate microbiology researchers work closely with biopesticide industries for product development and integration of technologies into Australian farming systems.



**Trials are underway testing the efficacy of Australia's first bio-control of grain storage pests such as lesser grain borer (LEFT) and rust red flour beetle.**



# Much to learn in seed coating technology

**W**HILE Ashley Fraser, from Rutherglen in north-east Victoria, believes there are great benefits to be had from seed coating technology, there is also much yet to discover. The 2012 Nuffield Scholar studied how seed coating can both protect and enhance crop growth.

"I set out to try and build a tool-box of all the different coating options that we would have available to us, and if we had an issue in the soil-bed with seed or whatever, we could then select a seed treatment that best suits an application to resolve that issue," he explains.

Ashley says seed coatings are commonly used for treating nutrition deficits in soil, control of disease and plant stress.

"These sorts of problems can be turned around by the use of a fungicide, insecticide or trace element seed treatments. Also, an inoculant can be used to stimulate the microbial activity in the soil, which then lets the plant better uptake nutrients," he says.

During his scholarship Ashley travelled extensively through Asia, continental Europe, Canada and the US, and the lack of knowledge on seed coating technology surprised him.

## A worldwide knowledge gap

"Certainly in Australia there's not a lot of knowledge, but then there's a knowledge gap right around the world in this area, and this is where I really need to speak with the top international researchers to gather an understanding and try and bring that back to Australia.

What I've found is that we're still trying to understand all the variables, and every time I looked at a different type of seed coating, I ended up back in a soil nutrition discussion – so the two go hand-in-hand in what we can achieve," Ashley said.

He says while chemical companies are putting large amounts of money into research, it is information not readily shared, meaning independent data is lacking for farmers and suppliers.

"I spoke with a lot of industry guys, a lot of private companies and obviously your big chemical companies that are pouring billions of dollars into research – the value of the seed treatment sector worldwide is forecast to be \$3.5 billion by 2016, so it's a huge market share.

Therein lies the challenge, because a lot of the seed-coating data is held in commercial confidence by companies for commercial gain," he says.

Ashley says while there are challenges, the use of seed coat technology in Australia is an area ripe for progress.

"Absolutely, it just needs a concentrated approach and to have everyone talking to one another and have that public dialogue.

"We've certainly got to do a lot of trial work under our own conditions, in our own soil types, with our own species of crops, and really try and work out now what

works, what doesn't and what the parameters are that we've got to work within," he concluded.

**Ashley's scholarship was supported by the GRDC.**

**Nuffield Australia is an organisation which provides opportunities to Australian farmers between the ages of 28 and 40 to travel the globe investigating a research topic important to them and Australian agriculture.**

**Recipients of the 2014 Nuffield Scholarship program have been announced – to learn more about their travels and research, and to keep up to date with the very latest from our organisation, connect with us at [www.nuffield.com.au](http://www.nuffield.com.au), on twitter @nuffieldaust or on Nuffield Australia's Facebook page.** ■



**Ashley Fraser, from Rutherglen in north-east Victoria, was surprised by the lack of knowledge on seed coat treatments around the world.**



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Knowledge grows

# Farming in Foreign Fields...



## Tight, well-constructed bales

*High capacity baler and tight bales gives an Arizona producer more options for hay and straw sales*

**W**ITH abundant sunshine, ample irrigation water and warm temperatures year round, farmland around Yuma, Arizona, is challenged to produce two and three crops of vegetables per year. The romaine lettuce, cantaloupes, onions, edible beans, black-eyed peas and other crops John Boelts grows on more than 600 hectares spread across several farms in the Yuma Valley help meet North America's appetite for wholesome and nutritious food grown to high and accountable quality standards.

These crops also require rotations every few years to give the land a rest and to keep potential soil-based diseases at bay.

Hay crops are a natural choice for rotations. John, who had long relied on a custom operator for his hay operations, decided in 2012 to handle the cutting and baling himself.

"Timing was the main thing," he says. "We were working with a good operator, but now we can make hay totally on our own schedule."

Timing is critical, as John had entered a contract to provide hay to a large dairy near Phoenix with specific quality expectations. Cutting and baling at optimum times captures maximum protein and palatability.

Large bales are the logical choice for mechanical handling and efficient highway transport. John looked at several large balers on the market, including some models popular with Western commercial operators, and settled on the newest model in the Case IH large baler line – the LB434 large square baler.

One reason, he says, is the ability of this baler to produce tight, well-constructed bales in a variety of crops.

"We don't just do alfalfa (lucerne)," John says. "We bale wheat straw, sudangrass and a bit of milo straw, so we were looking for a machine that would work well for all of these crops."

He says they demoed other balers with similar features, but settled on the LB434 baler in part for the way it could package these lightweight crops into 1000 pound (450 kg) bales. "That

**John Boelts uses the Case IH LB434 Series baler to bale a variety of crops used as rotations for his vegetable operations.**

takes a pretty robust machine, and this does it very well. I've been very pleased," John says.

"It's increased our ability to market wheat straw bales because we can get a full truckload of bales," he says.

This new baler has also provided a more competitive option for export of sudangrass. John says sudangrass for export typically works better in small bales, but now, with this new baler, he's able to offer big bales with enough weight for efficient shipping.

### Heavier-duty design

The LB4's ability to handle light materials as well as heavier crops is a result of its 'matched capacity' design in which all systems are sized to work together, efficiently. For example, the pickup system is the width of the bale chamber to let the crop transition smoothly in the chamber.

Heavier-duty, more durable components are used in the LB4

**A BUSY BALER: With a long growing season and the need for good crop rotations to support vegetable crops, John Boelts keeps his baler busy. Here's his estimate of a year's use:**

Crop	Av. yield (t/ha)	Hectares*	Tonnes
Lucerne hay	25	130	3265
Milo straw	6.6	100	272
Sudangrass	16	162	2540
Wheat straw	5.7	243	1360
		<b>635</b>	<b>7437</b>

\* Includes multiple cuttings



Series balers compared to the previous LB3 Series balers for increased durability and the ability to perform in a wide range of crops.

The flywheel in the LB4 Series balers is larger in diameter to maintain a higher level of inertia for smoother operation as loads vary. It runs faster, at 48 strokes per minute, compared to the LB3 Series at 42 strokes. The speeds of other components have been increased as well to provide a bales-per-hour increase of up to 20 per cent and increase in bale density of up to 5 per cent compared to the LB3 Series.

Throughout, this baler is designed for commercial-scale production. Indeed, just for his own use, John has kept the baler plenty busy. Thanks to his area's year-round growing season, during the nine months he's owned the baler, John figures he has produced more than 8000 bales.

"The reliability has been excellent," he says.

Daily service is made easier with a standard central lube system that continually provides oil to drive chains, and an automated greasing system that delivers grease to critical components. "There's a lot going on with this baler; I'm glad it has this automated system," John says.

Case IH recommends matching the LB4 Series baler to a tractor of at least 125 PTO hp (150 PTO hp with the optional rotor cutter). During this author's visit, John was using a Case IH Puma 200 CVT tractor. Rated at 175 PTO hp, it easily handled the baler in the light late-season alfalfa John estimated was yielding about a 2.25 tonnes per hectare.

He was baling at a brisk 10 to 13 km per hour, and was confident in the baler's performance at that speed based on information from the Pro 700 display. It provides detailed baling monitoring, including chamber load information. "The monitor has 'load ranges' on it to let me know that I'm producing a nice uniform bale," he says.

Steering sensors on each side of the pickup monitor windrow position and provide visual steering guidance on the Pro 700 display.

A rotor cutter is a popular option for the LB434 baler, and produces bales with the material cut into short lengths for increased palatability. "We looked at the cutter options, but between the rotary head on the swather, and the performance of the baler, our dairy customer is satisfied with the overall quality and leaf retention," John says.

The swather he refers to is a Case IH WD2303 swather

equipped with a 16-foot (4.9 m) disc mower he purchased as part of his move into self-sufficient hay harvesting. In addition to the speed and capacity disc mowers are known for, John says the WD2303 has ample power and, importantly, good air conditioning.

"I can't say enough about this swather," he says. "It's simple, and that powerplant ... we threw 7-foot (2.1 m) tall sudangrass at this swather that was yielding 4 tons per acre (9 t/ha) in 120-degree summer weather, and it performed really well. There were no cooling issues, and the air conditioning blew like ice. This cab is large with a lot of glass, and the air conditioning does fine."

John Boelts and his partner, Kent Inglett, operate Desert Premium Farms LLC based in Yuma, Arizona.

## AGRITECHNICA MACHINE OF THE YEAR 2014

With the Quadtrac, Case IH has won the XXL tractor category at the 2013 Agritechnica in Hannover Germany where nearly 2900 Ag-machinery exhibitors from 47 countries welcomed over 450,000 visitors, including 112,000 from abroad.

On the third evening of the exhibition, the industry accolade "Machine of the Year 2014" was awarded to Case IH in the presence of well over 600 participating guests. The highly coveted trophy, which has become an important recognition of achievements in the industry, was awarded because of the innovative concept of the new Case IH Quadtrac series.

The Quadtrac tractors feature the largest cab in the industry and an unsurpassed surround vision. The cab offers an exclusive suspension system which balances and absorbs any forward, sideways or seesaw cab movements, thus providing superior operational comfort and control.

### Traction and soil protection

The Quadtrac particularly impressed the jury with its peak performance in terms of traction and soil protection. With four independent tracks, the chassis provides for a consistent footprint of more than 5.6 square metres – exceeding the contact area of comparable tractors in this class by more than 25 per cent. This huge contact area increases traction whilst greatly reducing soil pressure and almost completely avoiding slippage.



Arizona farmer John Boelts says the new baler will expand the role hay and other baled products will have in their operation.



## 'ASK AN EXPERT'

■ Testing for herbicide resistance with Plant Science Consulting Director and Adelaide University weed science team researcher, Peter Boutsalis

**A**N application of herbicide may cost thousands of dollars, all of which might be wasted if the weeds being targeted are resistant to the products applied. Testing for herbicide resistance can identify which herbicides will work on your weeds.

Dr Peter Boutsalis said the greatest value in testing for herbicide resistance on your property is to have confidence in the products and application methods you are using.

"Testing takes the guesswork out of the equation and gives farmers baseline information that they can use to monitor changes in the weeds on their farms," he said.

"If low level resistance is identified early there are many more management options available compared to situations where full blown resistance has taken hold."

Peter said the over use and over reliance on particular herbicides will unavoidably lead to herbicide resistance developing. "We often hear of farmers applying herbicide even though they are not sure if it will work," he said.

The \$300 to \$400 cost of testing is insignificant compared to the cost of wasted herbicide, lost production and the costs of driving down a large seed bank of resistant weeds.

### What herbicide resistance tests are available to farmers in Australia?

**Short answer:** The 'quick' test using the whole plant and the 'seed' test.

**Longer answer:** The 'quick' test uses plant samples collected on-farm and sent to the laboratory. The plants are revived and planted into pots then tested against the required herbicides. The 'seed' test requires the collection of ripe seed, which is planted out at the laboratory. After dormancy has been broken and the seedlings have started to grow they are tested for their response to herbicides. Both tests are equally accurate. The 'quick' test can not test for resistance to some pre-emergent herbicides, such as trifluralin.

### Which is the most common test that farmers use?

**Short answer:** The seed test.

**Longer answer:** Collecting seed before or at harvest is the most common method used. The collected seed must be mature, from green to when the seed changes colour. Before harvest collect 30 to 40 ryegrass seedheads or several handfuls of wild oats seed.



**Getting the dose right is critical when managing weeds. Knowing if in-crop weeds will die from herbicide applied at the registered rate or not can save money and indicate the need for other strategies to minimise weed seed set.**

After harvest it is common to find seedheads still in the paddock or samples of contaminated grain can be sent for analysis.

### Where is the best place to collect samples?

**Short answer:** From suspicious or high risk areas.

**Longer answer:** Herbicide resistance can develop in high risk areas like fencelines or at random through a paddock. Visual observations and changes on the yield monitor in the header can indicate good places to collect seed. If collecting plant samples, look for weeds at the early tillering stage that appear to have 'escaped' previous herbicide treatment. Collect 50 to 100 small plants or fewer larger plants. Shake off the soil from the roots, place in a plastic bag and send to the laboratory.

### What's involved in sending samples?

**Short answer:** Pick, pack, register and ship.

**Longer answer:** Each sample needs to arrive at the laboratory with suitable identification and instructions. Register the samples online to get a unique sample number and to provide the information required, such as which herbicides you want to test against. Plant Science Consulting and Charles Sturt University both offer commercial herbicide resistance seed testing. Find the details under Point 4 of the 10 Point Plan on the WeedSmart website. ■



**Weed seed collected at or after harvest should be sent for testing as soon as possible to allow 8 to 10 weeks for testing prior to making decisions for the next season's crops. These wild radish are showing varying resistance to the herbicide Eclipse.**

## HOW TO ASK A WEEDSMART QUESTION

Ask your questions about testing for herbicide resistance, or any herbicide resistance management strategy, using Twitter @WeedSmartAU or on the WeedSmart website <http://www.weedsmart.org.au/category/ask-a-weedsmart-expert/>

Questions will be answered online, through our interactive blog, and may also be shared with other growers through this column.

'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.



## The Focus Paddock study



**A**USTRALIAN golfer Adam Scott keeps his eye on the ball. His ability to concentrate and focus amongst the chaos of a major golf tournament is outstanding. We would all love to focus on one task and do it well, but the reality of life is that we are rarely afforded this luxury. For grain growers, managing resistant weeds is just another thing to fit into the complexity that is farming.

Growers that afford themselves the time and motivation to focus on managing resistant weeds are having a win. They declare war on the weed seed bank and have a 'take no prisoners' attitude. One grower commented that he "would never declare a cease-fire on the war on weeds". He means business!

The results of a long term 'Focus Paddock' study are proof that when growers put their minds to it, they can beat resistant weeds. The growers that use a diverse range of tools are winning the numbers game and reducing their weed seed bank.

### Study into iots 14th year

The Focus Paddock study was a GRDC funded, Department of Agriculture and Food of WA project conducted by Peter Newman over the past 13 years. Peter is now the leader of communications with AHRI and is continuing to monitor these focus paddocks. This study started with 31 focus paddocks, 27

of which are continuing to be monitored. Four paddocks have dropped off due to changes in ownership/land use (such as one paddock was planted to trees). Ryegrass was monitored by quadrat counts each spring to determine the number of surviving ryegrass in crop or pasture.

### 97 per cent reduction in ryegrass

Growers in this study have successfully eroded their ryegrass numbers in crop by 97 per cent. In the spring of 2001 there were 187 ryegrass plants/m<sup>2</sup> on average in crop or pasture. That number was just five ryegrass plants/m<sup>2</sup> in the spring of 2013 (Figure 1).

### How did they do it?

Firstly, they universally used pre-emergent herbicides at full label rates. As ryegrass evolved higher levels of resistance to post-emergent grass-selective herbicides in the early 2000s, growers began to make the switch to using more grass-selective pre-emergent herbicides, in particular trifluralin.

In 2001, only 50 per cent of the paddocks were sprayed with grass-selective pre-emergent herbicides. This increased to 95 per cent of paddocks by 2010 (Figure 2). These herbicides typically achieve 75 per cent to 90 per cent ryegrass control.

While there is no resistance to these herbicides in these paddocks at present, there are always surviving ryegrass due to the efficacy that is achievable with pre-emers.

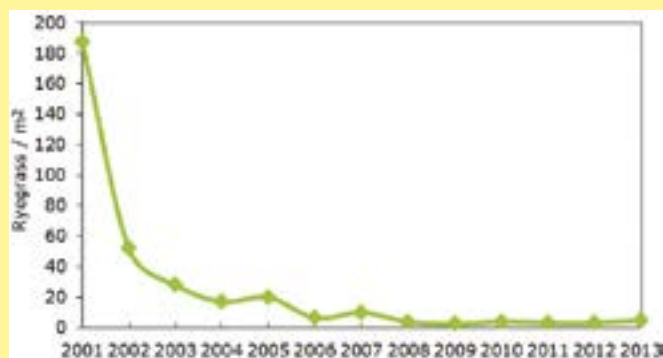
### But pre-emergent herbicides alone are not the answer

Given that pre-emergent herbicides give 75 to 90 per cent control of ryegrass, there are obviously always weeds that set seed. It would seem crazy to spread these weed seeds back out over the paddock. A low number of surviving weeds in crop each year is not acceptable as they contribute to the future seed bank. This is bad news for two reasons:

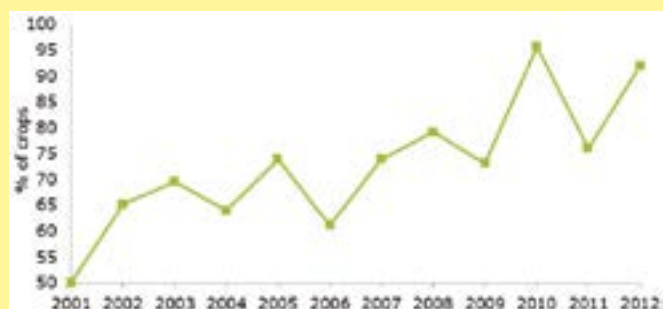
- There are weeds in the following crop; and,
- These weeds are sprayed with more herbicide and resistance is selected for.

Figure 3 demonstrates the benefits of using harvest weed

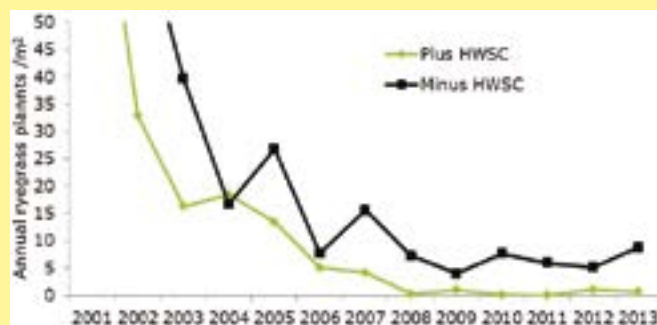
**FIGURE 1: Average surviving ryegrass in August (27 focus paddocks in the study)**



**FIGURE 2: Pre-sowing herbicide use. Percentage of crops with trifluralin, SU, Prosulfocarb or pyroxasulfone**



**FIGURE 3: Focus paddocks – surviving ryegrass in spring**



Plus HWSC – 12 growers using HWSC in 38% of crops  
Minus HWSC – 14 growers using HWSC in only 11% of crops



**This is what 11 ryegrass plants per square metre looks like.**

seed control (HWSC). In the 'plus HWSC' group, 10 growers used windrow burning and two growers used chaff carts.

#### **The plus HWSC group:**

- 12 growers in this group who have used HWSC, on average, in 38 per cent of crop years.
- The selection criteria for this group was that they must have used HWSC at least four times over the 13 year period and/or used HWSC for the past three years in a row. This group is larger than has been reported in the past because a number of growers have adopted HWSC in the past three years.
- Average cropping intensity was 91 per cent over 13 years.
- Ryegrass density of this group has been one plant/m<sup>2</sup> or fewer over the past six years.

#### **The minus HWSC group:**

- 14 growers in this group who have used HWSC, on average, in 12 per cent of crop years.
- Average cropping intensity was 88 per cent over 13 years.
- Average ryegrass density of 6.5 plants/m<sup>2</sup> over the past six years. There were 8.8 ryegrass/m<sup>2</sup> in 2013 for the minus HWSC group compared to 0.5 ryegrass/m<sup>2</sup> for the plus HWSC group.

- This group includes one grower who towed a chaff cart for eight years but has not done so for the past three years and has seen an increase in ryegrass numbers.

Nine or 10 ryegrass per square metre may not sound like much, but if they are healthy plants with a lot of tillers they can make a big mess and set a lot of seed. The photograph is of a lupin paddock in 2013 with 11 ryegrass/m<sup>2</sup>. This paddock was harvested with a chaff cart from 2002 to 2009. There were zero ryegrass in this paddock from 2008 to 2010.

The grower purchased a new harvester for the 2010 harvest and did not attach the chaff cart due to the difficulties of performing this job. Three harvests without a chaff cart has seen the ryegrass numbers increase.

### **Wild radish**

Of the 27 paddocks counted in 2013, only five paddocks had surviving wild radish in spring. Four of these paddocks were from growers in the minus HWSC group and one was from a grower who practices HWSC who had some wild radish surviving in a lupin crop.

### **What else are they doing?**

The success that growers in this study have achieved is not only due to harvest weed seed control. The main factor is the change in attitude. Growers who are successfully managing resistant weeds have very high standards of weed control and simply do not accept survivors. If they have surviving weeds incrop they do something to minimise the number of seeds entering the seed bank. Some of the weed management tools that have been successful are:

- Changing crop rotation. Some of the growers in the focus paddock study were previously in a long term lupin–wheat rotation. Many changed their rotation such that lupins were grown less often (every four to six years instead of every second year).
- Crop topping has become a common practice in lupin crops. Paraquat is applied at or after 80 per cent leaf drop of the lupin when ryegrass is at the flowering to soft dough stage.
- Applying lime to correct sub-soil acidity is mentioned by many of the growers. They generally believe that if their soil is healthy they have a greater chance of killing weeds with herbicides and growing a competitive crop.
- High quality spray application is also a focus of many of these growers. They go 'killing weeds', they don't just go 'spraying'.
- The mouldboard plough has seen a resurgence in the area. None of the focus paddocks have been ploughed but some of these growers own a plough. The mouldboard plough is used to correct non-wetting soil, bury lime to correct sub-soil acidity, and bury weed seeds before returning to no-till.
- Chemical fallow has become an inclusion in the rotation for many growers, particularly in the lower rainfall areas. This has come about due to a reduction in the area of lupins and many livestock left the region after droughts in 2006 and 2007. Chemical fallow is a high risk situation for glyphosate resistance.
- Crop competition is a focus of many of the growers through increased seeding rates, and in some cases, narrow row spacing. Many growers are now using a paired row or ribbon seeding boot to effectively reduce their crop row spacing.
- Livestock (mainly sheep) in the rotation are still a key tool for a few of the focus paddock growers. These growers generally crop for several years and then drop the paddock into pasture for a year or two to get weed numbers down again.

**What is the key to weed control and reducing the weed seed bank? Answer Focus!** ■



# Spray spikes for winter weeds

**H**AVING a good strategy in place for the coming winter crop and making the most of each weed control opportunity will be key factors in achieving clean crops and, in particular, coping with the growing problem of annual ryegrass resistance.

Weeds are becoming harder to control and growers are increasingly adding herbicide spikes to their knockdown sprays, but there are other, more cost effective options.

Research across southern Australia has shown adding the pre-emergent herbicide Boxer Gold to Spray.Seed, Gramoxone or glyphosate products, can increase the knockdown effect on seedling annual ryegrass by up to 19 per cent (Figure 1).

It's a unique benefit of Boxer Gold not offered by any other pre-emergent products on the Australian market, including trifluralin, Avadex or Sakura, giving it an advantage for growers looking to extend the control of annual ryegrass.

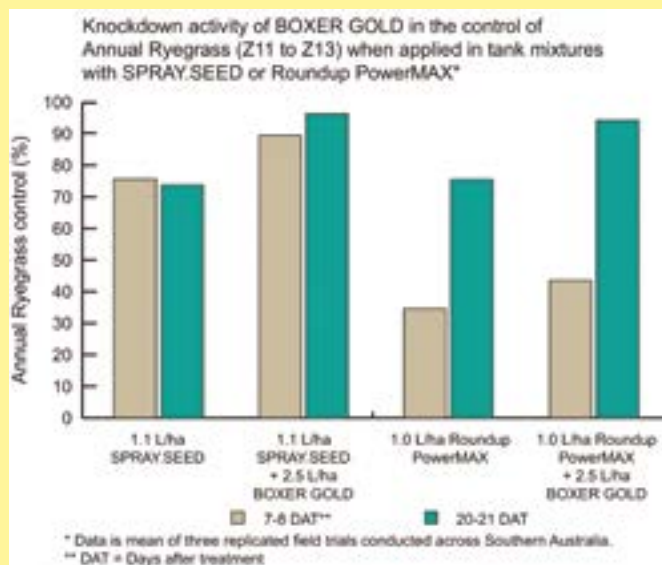
"Boxer Gold is a premium emulsifiable concentrate formulation that mixes readily in water and has shown to have excellent tank mixing compatibility with these knockdowns," said Paul Chatfield, Syngenta Technical Services Lead.

"The trial compared Boxer Gold tank mixes with Spray.Seed and glyphosate products, finding weed control was fastest when Boxer Gold was tank mixed with Spray.Seed."

Research shows that the foliar activity of Boxer Gold is at its optimum when applied to one to two leaf annual ryegrass plants, so the weed growth stage when spraying is important to gain the full benefit.

"Larger weeds will intercept more of the Boxer Gold, meaning knockdown activity is maximised but at the expense of soil coverage, potentially compromising Boxer Gold's pre-emergent activity. This is an important management consideration for growers."

**FIGURE 1: Boxer Gold can increase the knockdown effect on seedling annual ryegrass by up to 19 per cent**



# Pythium risk up after canola

**C**SIRO research has underscored the lack of Pythium disease control arising from crop rotation and outlines that crops including canola and peas – traditionally worked into farming programs for their break crop effect – could actually make the Pythium problem worse.

With close to 2.5 million hectares of canola planted in 2013, the findings deliver a timely message for the coming winter crop – Pythium can take up to 38 per cent of canola yield, 35 per cent from pulse crops and up to 18 per cent from cereals.

Work led by Dr Paul Harvey measured Pythium spore numbers in soils at Clare and Paskeville in South Australia, with soil samples taken over four years from a rotation of wheat/canola/barley/peas revealing Pythium spore counts were at their highest after the canola and pea crops (Figure 1).

At the Clare trial site – with soil pH of 4.6 and a relatively high average annual rainfall of 630 mm – Pythium spore numbers more than doubled by the finish of the canola crop phase.

In the Paskeville trial where soil conditions were alkaline with pH of 7.5 and with much lower annual rainfall of 400 mm, the Pythium spore count rose by close to 75 per cent in the canola phase. Pythium spore levels dropped off in the following barley crop before rising sharply again in the pea phase.

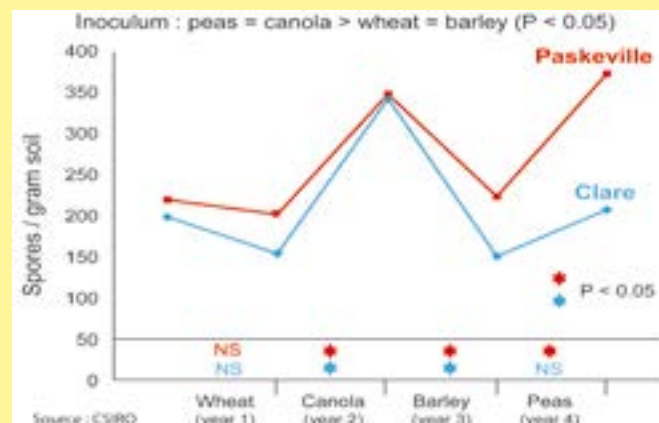
According to Syngenta Seedcare and Application Specialist, Lyndon May, Pythium is very similar to Rhizoctonia in that they both have an extremely wide host range.

"Pythium is classified as a root nibbler. It penetrates the roots in the zone of root hair formation and destroys root tips and root hairs," said Lyndon. "What the research tells us is that growers following crop rotation principles will need to find better ways of managing this disease."

Lyndon said following the impressive results from the introduction of Syngenta's seed treatment Dividend in Australia, the increased awareness of the impact of Pythium has led to the development of Syngenta's new seed treatment, Vibrance.

"Vibrance combines the proven performance of the previous industry benchmark, Dividend, with a completely new active ingredient and three different modes of action for broader spectrum protection."

**FIGURE 1: Rotation management: Pythium irregular**



# Spread summer knockdowns with the right chemistry

**W**HEN choosing spray adjuvants to enhance summer herbicide efficacy, it's a case of 'oils ain't oils' according to Victorian Chemicals, a pioneer of wetting agents, surfactants and adjuvant technology for 80 years.

While local manufacturing success stories may be thin on the ground, one worthy of wider recognition in rural Australia is Envoy spray adjuvant, made almost entirely from home-grown canola oil.

Launched in 2003 by Victorian Chemicals (Vicchem), Envoy was a bold move to acknowledge the quality and purity of Australian canola oil, giving growers a compelling reason to choose the premium brand over cheaper generics.

Vicchem's national sales manager, Chris Barry, said the local factor in this 'cause marketing' story had proved to be a winner.

"While there was mutual self-interest behind the Envoy initiative, canola growers appreciated the faith and confidence we put in their locally-grown produce," said Chris from the company's Coolaroo headquarters in Melbourne's north.

"Ten years on, Envoy is widely used in summer fallows and other knockdown weed control programs – not just by canola growers but cereal, grain legume and cotton producers around the country."

Chris said that combined with patented wetting and buffering agents, Envoy delivered several unique benefits to growers.

"Envoy has the capacity to reduce spray drift and evaporation rates while improving rain-fastness and buffering against pH sensitivity, making it an ideal choice for summer use," he said.

## Hot-Up for knockdown efficacy

Technical development manager, Peter Jones, said Vicchem made two more premium adjuvants – Hot-Up and Infiltrator – specifically to cope with the typical hot, dry conditions of the Australian summer.

"Hot-Up is based on patented technology, blending mineral oil, surfactant and ammonium sulphate, making it ideal to mix with knockdowns when the water is hard and air temperatures high," he said.

"Last year's trials in Nungarin WA showed that Hot-Up at 0.25 per cent improved the efficacy of Roundup Attack plus Garlon Fallowmaster for control of melons and burr grass.

"Specifically, Hot-Up out-performed mixes of Empower plus

ammonium sulphate and LI-700 plus ammonium sulphate based on weed control levels achieved at 40 days after application.

"These latest results are consistent with those of previous trials in Trundle, New South Wales."

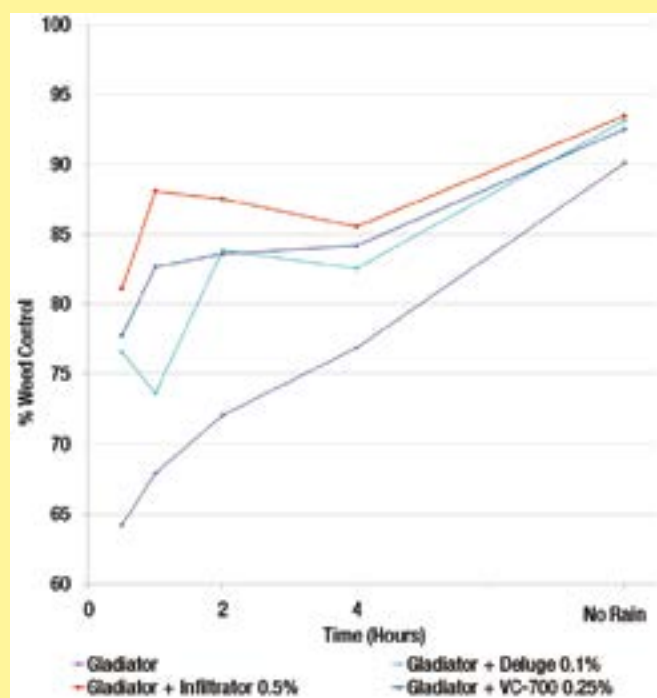
Peter said that Hot-Up was compatible with all major knockdown actives including glyphosate, paraquat, diquat, triclopyr, clopyralid, atrazine and diuron. It is typically used at generous water rates of 0.25–1.0 L per 100 L of spray volume.

## Infiltrator for waxy weeds

For those difficult-to-control summer weeds with waxy surfaces, Peter recommended Infiltrator, a reliable canola-based adjuvant designed for better adhesion and absorption in summer.

"Specifically designed for a wide range of summer

**FIGURE 1: Gladiator on oats**



## Getting the right chemistry for summer weed and disease control

Summer uses	Envoy	Hot-Up	Infiltrator	Deluge
Knockdown herbicides	✓	✓	✓	✓
In-crop herbicides			✓	✓
In-crop fungicides			✓	
Special Features	✓ Made with Australian canola oil	✓ Compatible with major summer herbicides	✓ Made with Australian canola oil ✓ Ideal for waxy weeds ✓ Compatible with major summer herbicides ✓ Compatible with ammonium sulphate	✓ Ideal for large-scale broadacre cropping



knockdowns, Infiltrator works best in hot, dry conditions where the oil promotes larger droplets and reduces evaporation.

"The penetrative power of the methylated vegetable oil increases the initial uptake of herbicide active, reducing the risk of wash-off caused by rain after spraying.

"Using hard water levels ranging from 50 up to 300 ppm, our trials show that Infiltrator plus Assert improves the efficacy of Roundup on oats compared with Assert alone."

According to Peter, results from the two glass house trials conducted in 2013 also validated claims that Infiltrator improved rain-fastness.

"Of the four treatments applied, Infiltrator was the most effective at maintaining glyphosate efficacy. When rain was applied half an hour after application, Infiltrator increased efficacy of Gladiator on oats from 64 to 81 per cent (Figure 1).

"Similarly, when rain was applied half an hour after application, Infiltrator increased the efficacy of Roundup Attack on variegated thistle from 63 to 77 per cent."

Peter said Infiltrator was also compatible with all major knockdowns and ammonium sulphate mixes used during summer.

## Deluge for fallows and crops

While technically not a spray adjuvant, Deluge 1000 is a highly concentrated wetting agent ideal for spreading knockdown and in-crop herbicides, without risk of crop damage.

According to Peter, Deluge can be used in acid and alkaline sprays and will mix easily with most types of water used for agricultural chemical spraying.

"Being highly concentrated, Deluge is ideal for large-scale broadacre cropping applications within the typical use range of 100–200 ml per 100 L of spray volume.

"Deluge was recently field tested in a couple of wild radish control trials where Hussar was applied to a Victorian triticale crop and Broadstrike applied to a South Australian wheat crop.

"Our results show that Deluge reduces the surface tension of spray water and improves droplet retention on the target surface at initial impact, resulting in better droplet spread across the target surface."

Peter said all Vicchem products were manufactured using renewable, biodegradable materials according to a quality management system that ensures consistency and reliability of product performance.

For more details, go to [www.vicchem.com.au](http://www.vicchem.com.au)

## Liquid zinc

ULTRA-ZINC is a concentrated liquid formulation of zinc oxide that contains 100 per cent zinc. It can be applied to broadacre crops for improved crop quality and yield. Ultra-Zinc can be applied as a seed treatment – to improve root development after seed emergence – or a soil treatment to increase zinc levels. It can also be applied as a foliar later in the season to correct plant zinc levels.

As a seed treatment, Ultra-Zinc, is commonly applied at 1.5–2.5 litres per tonne of seed while applications for soil treatment should be applied at 2.5–5.0 litres per hectare. Foliar applications are recommended at 0.5–1.0 litre per hectare.

For technical advice please contact Ultimate Agri-Products on 1800 003 244 or by email at [info@ultimateagri.com.au](mailto:info@ultimateagri.com.au)  
Further information is also available on our website [www.ultimateagri.com.au](http://www.ultimateagri.com.au)



Concentrated liquid zinc can be applied as a seed or soil treatment as well as a foliar spray.



Chris Barry, national sales manager for agricultural products; Peter Jones, technical development manager; and Peter Wrigley, general manager of Vicchem's manufacturing operations.

## 2014 WA AGRIBUSINESS CROP UPDATES

- February 24 and 25, 2014, Crown Perth, Burswood, WA.
- A two day program showcasing the latest research, technology, market development and management innovations to help improve the productivity and profitability of the grains industry.
- Get the latest information from local, national and international researchers and industry experts.

To register visit [www.giwa.org.au/2014-crop-updates](http://www.giwa.org.au/2014-crop-updates)  
This event is hosted by DAFWA & GRDC

# District Reports...

January–February 2014

## Western region



### NORTH

Summer is well and truly upon us now with very warm weather across the landscape. Harvest has been completed for several weeks even for those who finished up late.

Holidaying is the top priority for most growers at the moment. Planning and budgeting are the main activities for those not at



Harvest scenes in WA's northern region.

the beach. Livestock owners are also busy keeping water up to their animals during the warm weather.

The harvest was generally OK but there were exceptions with most of the northern and eastern fringes enduring a very dry and tough season. Many areas had to spray weeds after the header had left the paddock and most of these areas have finished their spraying. Thunderstorms have been around at times and growers need to keep an eye across their farms for areas that had decent falls and now have summer weeds.

We are into 2014 and all we ask for is around average rain right across the landscape. Hopefully this year delivers.

**Peter Norris**

**Agronomy For Profit and Synergy Consulting, Geraldton**

**January 13, 2014**

### SOUTH COAST

Seasonal conditions on the South Coast during the past two months have been variable. Cool temperatures during late November and early December, coupled with small rainfall events, proved a real challenge in getting moisture levels down to complete harvest. This was particularly the case for those growers close to the coast.

Most growers completed harvest before Christmas. Even though the headers have stopped the trucks are still busy carting grain from grain bags and sheds to CBH. Many inland CBH sites are full due to the record harvest for the Esperance Port Zone. Most grain now has to be delivered directly to Esperance sites or the port.

Summer weeds are growing very well and most farmers have completed one summer spray – many are now starting on a second pass depending on the amount of rain received during or immediately after harvest.

The remnants of Cyclone Christine dumped up to 70 mm of rain on January 1 and 2 north of Beaumont – this will be beneficial in building stored soil moisture.

After a good season many growers are planning some substantial lime and gypsum programs. This will keep them well occupied during February and March. After a wet 2013, surface drainage is back on the agenda and will be another task to plan and complete during summer.

For most South Coast growers 2013 was a very good year – for some, their best ever.

**Quenten Knight,**

**Agronomist, Precision Agronomics Australia**

**January 2, 2014**



Summer weeds (blackberry nightshade) in wheat stubble East of Condingup – a common scene on the South Coast.



## Southern region



### WIMMERA

Harvest was all but complete by Christmas in the Wimmera following a good run of weather and not too many interruptions. Each year seems to compact the harvest into an ever shorter time period as machines and infrastructure get bigger and more efficient.

Following the driest start to a season in memory for many of us, the weather Gods smiled upon the Wimmera in May with a slightly late start. Opening rains brought most dry sown crops out of the ground, but cloddy soil conditions meant there was a staggered germination in many paddocks.

Volunteer canola in cereal crops was the first problem to be addressed as marginal moisture was quickly used up by the volunteers. Wheat plants were too small to be sprayed at first so

# District Reports...

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compromise treatments were made to get crops away. Many of these paddocks required a follow up treatment, but follow up rains saved the day.


It then became obvious that volunteer wheat in newly sown crops was going to be a problem. More of that later.

Winter rainfall in the Wimmera was generally above average which was good for crop growth but did make spraying activities hard to fit in between rain events. Good managers used the rain to their advantage by applying large amounts of nitrogen in the July/August period to maximise tiller production. Many paddocks received a follow up application of urea at mid to late tillering.

By September most crops were looking fantastic and only needed a finishing rain in October to realise their potential. As usual that rain did not come, but the crops had enough in reserve to make average or better. As October progressed, a series of small frosts had growers worrying if all their good work and dollars invested might end up as hay.

On Friday October 18 Donald district growers attended the annual Emerald Grain pre-harvest breakfast meeting at the

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

<div><div><div>Brought to you in association with</div><div></div><div>JOHN DEERE</div></div></div>			Summer		Autumn		Winter		Spring	
	25yr Annual Average (mm)	2014 rainfall to date (mm)	25yr Annual Average (mm)	2013–14 to date	25yr Annual Average (mm)	2013	25yr Annual Average (mm)	2013	25yr Annual Average (mm)	2013
Emerald Qld	554	25	250	41	118	136	61	34	120	141
Toowoomba Qld	673	3	281	43	134	205	82	94	179	140
Roma Qld	590	3	248	11	135	107	73	12	137	120
Goondiwindi Qld	619	0	251	21	133	182	97	49	139	135
Narrabri NSW	642	0	228	14	125	169	128	97	162	124
Gunnedah NSW	665	0	242	19	122	83	130	142	178	75
Dubbo NSW	611	25	200	73	136	108	127	155	153	91
West Wyalong NSW	446	6	117	24	90	93	117	153	126	104
Wagga Wagga NSW	545	0	133	22	121	99	152	181	144	52
Swan Hill Vic	327	6	73	43	66	30	92	90	96	64
Bendigo Vic	524	2	110	48	105	69	171	229	138	116
Horsham Vic	392	11	77	18	71	41	135	200	110	123
Lake Bolac Vic	537	14	119	36	101	71	163	215	153	147
Murray Bridge SA	370	4	64	24	77	56	130	202	101	54
Kadina SA	345	1	55	26	77	106	123	184	90	54
Cummins SA	394	4	46	21	86	100	177	269	84	94
Esperance WA	623	5	80	35	145	301	255	275	143	161
Wagin WA	405	0	49	2	96	163	171	116	89	103
Northam WA	402	0	45	3	84	132	190	131	84	100
Mingenew WA	368	0	32	1	92	170	176	119	65	75
Moora WA	389	0	45	0	89	110	183	140	73	39
Mullewa WA	320	0	50	15	90	85	134	69	47	41
Last rainfall reading January 14, 2014.										

Last rainfall reading January 14, 2014.

# District Reports...

**January–February 2014**

Donald Football Club. All will clearly remember the Donald football oval as white as snow at 7.30 am that morning. The frost knocked flowers from chickpea and lentil crops over a large area and also damaged some canola and cereal crops.

Harvest approached in mid November when the header would decide how much damage was done that October morning. Early indications were that barley quantity was almost unaffected while quality seemed to be a consistent Feed 1. Perhaps this was caused by the early finish to the season rather than the frost. Most barley had escaped serious damage.

Wheat crops were less fortunate. While quality was generally good and protein a little above average, yields were knocked back by as much as 30 per cent by the frosts in October. Growers reported driving the header into slight hollows in the paddock and seeing grain stop flowing into the tank.

That illustrates how close Wimmera farmers were to a complete wipe out due to frost.

Pulse crops were variable with faba beans being the standout success. Good yield and good prices made beans the best legume for most growers. Chickpeas and lentils varied depending on maturity and topography. Those in low lying paddocks suffered considerably from frost. Most did flower again but not like the first time.

Canola yielded very well as new varieties proved their value to Wimmera growers. As with pulses, some low lying plains were badly hit by frost but most fared well.

Growers who followed wheat with barley were concerned all spring by the contamination causing large dockages at harvest. The term 'wharley' was used to describe this grain!

Emerald Grain at Donald opened a segregation for 'wharley' concerned there might be more than 10,000 tonnes in the district. Fortunately most samples fell into the F1 grade and only about 4000 tonnes was F1W. Astute buyers could see value in this grade and were keen to buy it as growers delivered.

In summary, the 2013–14 season was a good one for most Wimmera farmers. Generally above average yields and reasonable prices were the order of the day and most agreed they would take another 2013 every year.

**Mike Laidlaw**  
**Harberger Farm Supplies, Donald**  
**January 10, 2014**

## VICTORIAN MALLEE

Following a season generally viewed as a break even or water trading exercise, many farmers are positively thinking about the year ahead. Harvest was 98 per cent completed by the end of November due to poor yields and very efficient harvest management. The capacity of today's harvesters and the use of chaser bins have really sped up the harvest. Finding labour is the ever increasing problem during this peak period.

Many areas only had around 175 mm of growing season rainfall and little either side of this or through last summer. As a result, yields have been down by about 30 per cent on average. It has remained dry with farmers only needing to spray canola and legume stubbles with the exception of a few cereal stubbles and fallow paddocks.

Wheat and barley yields were down by one to two tonnes per hectare. There was just too much variability to call it an 'average'. Disease was not an issue in cereals apart from some spot form of net blotch in Scope barley. The biggest issue was contamination caused by volunteers from last year's crop.

Canola yield was poor at 0.5 to 1.0 tonnes per hectare. The wind was a nuisance and blew windrowed crops around. They were too light to hold. Canola has mainly been a break-even result and will leave paddocks with no stored moisture.

Legumes were variable and there were a lot of field peas in this season. Many crops were able to yield 0.8 to 1.2 tonnes per hectare which is acceptable given the yields of non legume crops and the current prices of legumes.

I expect as cash flow becomes restricted, many will look at a fallow or brown manure option for 2014. Risk needs to be reduced and as planning takes place there will be a priority to save where possible. The key is knowing where to cut and where not to and this varies between farms. We all need to be aware of the law of diminishing returns. Careful attention will be given to rotation, variety selection, nutrition, weed, disease and insect strategy.

Currently, the Mallee is looking a bit vacated as farmers and their families pack up and find a holiday destination. Many head for a coastal town and often find they have the same neighbours even when holidaying. The farm runs on skeleton staff – if any – to feed the animals and take care of spraying if need be.

Then it's back to the farm to spin the giant wheel again.

**Simon Severin**  
**Dodgshun Medlin Agricultural Management, Swan Hill**  
**January 11, 2014**

## MURRAY VALLEY RICE REPORT

Many Murray Valley rice growers have rated the 2013–14 rice season as one of their most difficult, mainly due to cold night temperatures and constant windy conditions in October and November. But crops that did manage to achieve good plant establishment are now looking quite good and growers at this stage are hopeful of at least average yield potentials, though there are some significant hurdles still remaining before harvest.

Most crops are about 7–10 days later getting to panicle initiation than they were last season. This is not necessarily a bad thing as many crops were too early last year. Also, crops that are about 7–10 days late have a lower probability of cold weather damage than those that are 7–10 days too early. The main risk with late crops is the greater potential for encountering wet harvest conditions, but this has not been an issue for many years (unfortunately).

Panicle initiation (PI) nitrogen top dressing is currently underway. Some growers, particularly those with Reiziq variety, have reduced urea top-dressing rates as they are fearful of cold nights during microspore. But the majority of growers seem to be staying with traditional rates and will rely on the temperature buffering effect of deep water.

January is when peak flow rates are required for rice. However, as the crop is about 20 per cent smaller than last year, it is unlikely that flow rate restrictions will be imposed on the majority of growers. Those who may encounter restrictions have been warned in advance by the irrigation supply company.

Most growers are hoping they have sufficient water to finish crops though many may need to source small quantities to do so. The price of temporary water continues to be excessively high and is currently trading for around \$85 per megalitre (plus MIL charges for delivery).



# District Reports...

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Summer weed control over the past 10 years has been vitally important for storing moisture. This summer so far has been sporadic, with lighter soils requiring weed control and growers generally grazing heavy irrigated clay soils off. With hot weather predicted, summer weed control may become an issue without follow-up rain.

## Winter crops – summing up 2013

Dryland wheat averaged 2.0–2.5 tonnes per hectare, highly dependent on rainfall events and nitrogen inputs. Standout varieties were Mace, Ventura and some Corak. Many growers have bulked up with Suntop for 2014 due to outstanding NVT data the year prior.

Dryland barley averaged 2.2–3.0 tonnes per hectare. Again nitrogen inputs had a major bearing and if you were lucky enough to get a big rain, N made all the difference. Growers are becoming more accepting of the requirement for higher N inputs as our soil status continues to stay down at 30–50 kg N in



**TOP: A bay of Opus rice at Deniliquin, taken in mid December. BOTTOM: The same bay two weeks later.**

The practice of mid-season draining rice (that is, removing water for about 10–14 days in mid December) continues to slowly gain popularity in the central and western Murray Valley. It is most common with Opus growers, though other varieties are also drained.

There seems to have been a slight increase in the proportion of crops that received a clean-up spray with a contact herbicide for broadleaf and sedge weed control. This is good news for reducing the onset of resistance to the main aquatic weed herbicides currently being used.

Snails remain the main pest of rice, mainly in stubble crops. There have been some reports of rice on fresh country requiring snail treatments, which is highly unusual. Growers are keen to find an alternative to bluestone which is the only currently registered rice aquatic snail control treatment.

**John Fowler**  
Senior Land Services Officer (Mixed Farming)  
Murray Local Land Services  
January 10, 2014

## WESTERN MURRAY VALLEY

Winter grain producers have been happy to see a dry harvest and a pleasant Christmas break. We received a 40–50 mm rainfall event on December 6, but due to the poor spring, the harvest was 90 per cent done. As dryland farmers groaned about summer weed control, irrigated corn and forage sorghum growers were pleased to have some assistance with germination and a reprieve from watering



**Stewart Smith from Mathoura in a paddock of BMR Revolution forage sorghum, 4.5 weeks post sowing and ready for grazing.**



**Leigh Hepner, agronomist from IK Caldwell, and David Eddy from Mathoura, inspect Pacific BMR Rocket forage sorghum.**

# District Reports...

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the 0–60 cm zone. Hindmarsh barley was exceptional (0.7–1.0 tonnes per hectare better than most other varieties!). Buloke and Scope CL were OK with Baudin suffering with the tough spring. Gairdner, being nearly gone as a preferred malt variety, generally had high screenings of 15–20 per cent plus but similar yield to Buloke and Baudin.

Most growers are eagerly awaiting the malt approval of Intergrains LaTrobe barley due to its Hindmarsh background and adaptability to seasonal variation.

Canola yields were lower than anticipated. Dryland canola averaged 700 kg–1.2 tonnes per hectare with oils varying greatly (36–47 per cent). Some frosting accounted for this. Irrigated crops unaffected by frost were generally 2.3–2.5 tonnes per hectare with Crusher TT consistent and Stingray TT performance positively surprising us in most situations. The standout variety was Hyola 50 with high yields – 2.8 tonnes per hectare and high oil of around 46 per cent.

But with herbicide resistant ryegrass / wild oats and weed spectrums of wild radish, mustards, turnips and Patterson's curse it makes conventional canola a difficult choice. Triazine tolerant canola is essential to our longevity in continuous cropping situations.

Lupins were poor with a late start and quick finish, averaging 0.6 tonnes per hectare. Field peas performed better averaging 1.0–1.3 tonnes per hectare.

The hay market remains strong. Many growers are still receiving \$140–160 per tonne on farm for good quality cereal hay. Most irrigated crops yielded 8–10 tonnes per hectare and this was an excellent herbicide resistance management tool with 'hay freezing' incorporated to assist with minimising seed set.

This will become more common as herbicide resistance increases and our options are reduced.

## Summer crops

### Rice

Rice crops on average are looking better than last year with less duck damage and more uniform plant stands. Some wind damage thinned areas out, but plant populations are acceptable



Steve Fasham checking for panicle initiation in his rice crop.



Our district reporter Laurence Pearce, agronomist from IK Caldwell, inspecting for stalk rot in Pioneer P1070 corn. This area is fine, 6.5 weeks post sowing.

for high yields. Weed control is finished after some late clean-ups of barnyard grass and the broadleaf weeds Dirty Dora/star fruit.

Rice has just come into panicle initiation (PI). This is a critical period for rice prior to pollination. Rice growers have to assess the additional requirement for nitrogen and yield potential using NIR tissue samples. With warm weather predicted, confidence is high and urea is being top dressed (100–150 kg/ha) to push crops from a conservative 8–9 to 10–11 tonnes per hectare.

### Forage sorghum

Forage sorghum crops are nearly growing out of control with warm weather. Many paddocks sown to super sweet sudan, BMR Rocket, Lush and BMR Revolution were ready to be grazed within five weeks.

### Corn

Corn has become increasingly popular with high commodity prices (\$260–300 per tonne on farm) and opportunities to double crop.

Many growers are assessing the corn option with water values consistently increasing making planning for rice more difficult. Temporary water on the Murray Irrigation Limited (MIL) scheme is currently trading at \$87 per ML. This price is too high to grow profitable rice crops if growers haven't hedged water volumes and pricing earlier. Rice water budgets usually begin at 12–13 ML per hectare versus corn at 7–8 ML per hectare.

Irrigation layouts and soil types are the major factors to crop choice and, in time, with growers seeking higher dollar returns per ML, there may be a trend for rice growers to put a portion of the area sown into corn to spread risk.

High 30s to low 40 degree temperatures predicted over the next three weeks could cause issues to corn tassling and silking by disrupting pollen formation and hence kernel development.

As with all agricultural endeavours challenges are always present – if it's good for the rice, it's bad for the corn – if it rains the lucerne grows, but so do the burrs.

Looking forward to a prosperous and successful 2014!

Laurence Pearce  
Agronomist, IK Caldwell, Deniliquin NSW  
January 10, 2014



## Northern region



### DARLING DOWNS

This summer is not turning out to be very pretty at all with a severe lack of rain and an extreme heatwave. December rainfall was under half the normal average – and that is in the areas that were lucky enough to receive some rain – and there has been no January rain to date. There are some growers who have not been able to plant an acre of summer crop this season.

The over 40°C heat and hot winds coupled with hot nights around New Year, have halted pasture growth and affected all grain crops. The only crop enjoying these conditions has been irrigated cotton.

The sorghum area is only 70 per cent of the expected planting. The very early plantings are approaching the dessication and harvest stages, but yields are expected to be below average. Some crops did require heliothis control and south east of Dalby mice are becoming an issue for the ripening grain. The later plant is growing reasonably where the secondary roots are in good soil moisture. But some crops have secondary roots failing to reach any moisture, leading to some lodging at the mid tillering stage.

Where possible growers are inter-row cultivating to throw soil over the roots and prop the plants up.

Irrigated corn has suffered more, especially with the hot nights cutting back its recovery from day-time water loss, and even with extra irrigations, yields are unlikely to be much above 7.5 tonnes per hectare.



**Mike Jones' liquid injection fertiliser bar. This is the first one built in Australia, from an American design, and fits on the front of his Miller spray rig. It uses precision farming software to allow variable rate application, and applies the fertiliser into the soil covering the slot with soil.**

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Soybeans were planted before mungbeans and at this early stage are growing well, although the most advanced crops have had heavy leaf feeding from heliothis. The lack of December rain and planting opportunity has reduced the mungbean area significantly.

Irrigated cotton is looking good and is about two weeks ahead of normal development. Crops are in the early boll fill stage with good fruit levels, and although growing well and enjoying the heat, many crops will run short of irrigation water unless there is good rain to top up. It is expected crops will be one to two irrigations short of requirements.

Insect pressure across all crops has been light. Some heliothis needed control earlier and sucking pests have only started to increase over the past 10 days.

The big question facing growers is how late can they plant if they receive rain. The next week appears to be definitely dry, but if there is a late January rain, we may see some short season crops planted into early February.

**Hugh Reardon-Smith**  
Agronomist, Landmark Pittsworth  
January 10, 2014

### SOUTH BURNETT

#### Key issues

- Significant areas still not planted to summer crops.
- Many crops showing drought stress.
- Main crops planted are corn and peanuts.
- Price prospects for late beans look good.
- Very dry conditions with some mid-September rain.
- Double cropped cereals are drought stressed.
- Still repairing paddocks after previous wet season floods.
- Summer grain prices are high.

Most of the South Burnett is suffering from the dry weather. Patchy storms have given some growers hope, but many have missed out and crops are just hanging on.

There are plenty of bare paddocks that have not been planted and growers are changing options as time goes on without planting rains.

Of the intended peanut plantings about 90 per cent is in the ground. But the majority of crops are showing a lack of moisture and many are looking quite stressed. Peanut mites are starting to show up. This is a good sign of drought stressed crops.

Many sorghum and corn crops are starting to resemble pineapple plants. Some soybean crops are getting close to the point where they will be a write-off.

We may end up with a bigger mung and navy bean crop than planned for at the start of the season.

Hopefully it will rain shortly, but not like the drought breaking rain of Australia Day weekend, 2013.

July, August and early September were dry and very mild with only one period of heavy frosts in late August.

Some winter crops were damaged by the frost. Generally, damage was partial head sterility of wheat, and some patches in low lying areas. A couple of crops were cut for silage that had bad frost damage. Overall, the dry weather did a lot more

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damage than the frosts. Chickpeas had some vegetative frost damage.

Good rain back in mid-September was well received. Falls ranged from 15 to 50 mm. This was very good moisture for filling out crops and starting land preparation for summer crops.

Ian Crosthwaite  
Agronomist

BGA AgriServices, Kingaroy  
January 10, 2014

## CENTRAL QUEENSLAND

### Weather

The start of the 2013–14 summer season was wet in November – especially the southern half of the Callide – and also patches of the Dawson. But it was extremely dry in all districts in December with record high temperatures of above 40°C across CQ. The longer term forecast is not encouraging. But there is hope as most districts in CQ were dry in November 2012, very dry in December 2012 and then we had well above average rainfall in January 2013 especially in the Dawson/Callide. This resulted in a late planted sorghum crop with much of it yielding above average.

### Rainfall

During November above average rainfall fell in the area bounded by a north/south line with Emerald in the west and Duaringa in the east. Drought conditions have continued west and east of this line. On the Central Highlands, Springsure (133 mm) and Emerald (88 mm) were the wettest. An extreme rainfall event occurred in the Callide with much of the valley receiving well above the monthly average. Jambin received 219 mm in one day and 550 mm for the month (71 mm long term average).

The Dawson was patchy with Bauhinia Downs (174 mm) and Banana (195 mm) – well above average compared with Theodore

(13 mm) and Moura (56 mm) which was well below monthly average.

No effective rainfall fell in December.

For many, extreme drought conditions continue. One grazier said that his property east of Capella is the driest he has seen it in 50 years whereas his neighbour, literally across the grid, has reasonable grass.

All areas west of Emerald are still desperately dry.

### Summer crop

**Sorghum and mungbeans:** Half the Callide is wet and 80 per cent of the expected summer crop area has been planted whereas the other half around Wowan is still dry. The wetter patches of the Dawson, especially around Bauhinia Downs, have been planted. Currently on the Central Highlands there is only half a dozen farms in the Gindie district that have planted summer crop.

Scattered storms have wet a few paddocks but most farms are still too dry to plant. The sorghum planting window for CQ still has more than a month to run and farmers are keen to plant given current good sorghum prices. Should only moderate summer rainfall occur, then only those paddocks that were cropped to sorghum and mungbeans last summer and fallowed through winter in readiness for a summer crop, will be planted.

A big wet will be required to re-water winter crop stubbles to allow summer crop planting into winter crop stubble.

At this stage how much, and when, rain falls will dictate what area is planted to sorghum – and price and rainfall will dictate how much mungbean is planted.

**Livestock and pastures:** Surprisingly, in the area east of Emerald and west of Duaringa many paddocks have moderate levels of grass and cattle are in good condition. Outside this area extreme drought conditions exist although there has been some storm rain in patches.

**Water:** Stock water continues to be a major issue to many where run-off water is a distant memory.

Maurie Conway

Department of Agriculture, Fisheries & Forestry.  
Emerald, Queensland.  
January 10, 2014

## ANSWER TO IAN'S MYSTERY TRACTOR QUIZ

The tractor is a 4 wheel drive 1936 Massey Harris. Photographed at a display by the Ashburton Railway and Preservation Society of New Zealand. (Photo IMJ)



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