

**Advertising**

Michael Cook

(National Advertising Manager)

P: 07 4659 3555

F: 07 4638 4520

E: [advertising@greenmountpress.com.au](mailto:advertising@greenmountpress.com.au)
**Editor**

Lloyd O'Connell

**Associate Editor**

David Dowling

**Production and Design**

Mick Allan

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

Copyright 2014.

Published by Bereka Pty. Ltd.,

40 Creek Street, Brisbane

Registered by Australia Post Publication No.

PP100002295. ISSN 1449–2970.

Published bi-monthly.

Grain Yearbook published in April

**FRONT COVER**


The Bale Direct system has 'turned a quid' for one SA family farming operation in both better weed control and another income stream from their cereal crops. See article page 40.

# Contents

<b>Editorial</b>	<b>4</b>
<b>Risk-based approach best for frost management</b>	<b>5</b>
<b>What to do with a frosted crop</b>	<b>10</b>
<b>New imaging technique leads to better grasp of freezing in plants</b>	<b>12</b>
<b>Burning windrows from big cereal crops can be done</b>	<b>16</b>
<b>Windrow burning: It's got to be hot</b>	<b>20</b>
<b>Farming in Foreign Fields...</b>	
Canadian growers embrace prescription-driven planting	22
<b>Classic Tractor Tales...</b>	
Henry Ford's Fordson F	24
<b>Marketing...</b>	
Have futures found the bottom?	29
Support grows for science-based biotech decisions	31
National winter crop summary	32
<b>Focus on fundamentals key to farm business success</b>	<b>35</b>
<b>Modelling carbon sequestration and cropping systems</b>	<b>36</b>
<b>AHRI insight...</b>	
Mistakes or multiple resistance in one population	36
<b>Weed Smart...</b>	
'Ask an expert' – When is clean seed, clean enough?	38
<b>Biopesticides emerge as natural fit for integrated pest management</b>	<b>39</b>
<b>Bale Direct system 'turns a quid' in the right circumstances</b>	<b>40</b>
<b>Turning up the heat on canola</b>	<b>42</b>
<b>'Home-grown' algae could boost stockfeed productivity</b>	<b>43</b>
<b>Reducing fertiliser needs by accounting for soil microbes</b>	<b>44</b>
<b>Global grain intelligence providing strong marketing expertise</b>	<b>46</b>
<b>News &amp; New Products</b>	<b>47</b>
<b>District Reports</b>	<b>49</b>

## Focus Sections

### Southern Australia Focus

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

#### Consultants' Corner...

Break crop research digs beneath the surface	<b>i</b>
Summer sown serradellas deliver nitrogen benefits	<b>iv</b>
Versatile pulses in the high rainfall zone	<b>iv</b>
Charcoal rot affecting stressed lupins	<b>vi</b>
Crunch the numbers before investing in on-farm grain storage	<b>vii</b>
Selecting for fast maturing wild radish	<b>viii</b>

### Northern Focus

*Covering Northern NSW and Queensland*

#### Consultants' Corner...

New cultivars and narrow rows boost chickpea yields	<b>i</b>
Sorghum growers weigh up January heatwave risk	<b>iv</b>
Profit from clean grain storage	<b>v</b>
Watson family awarded 2014 Brownhill Cup	<b>vi</b>
Avoid the enemy with harvest weed seed testing	<b>vii</b>
Sorghum hybrid performs in dry year	<b>viii</b>

# Connecting data and people during harvest



Time, money, and productivity are wasted if your team isn't connected. As a farmer you need a reliable system to help manage and share your farming data. Your trusted agronomist is part of that team who can provide critical help with data including yield map analysis and fertility recommendations. Connected Farm™ makes it easy to connect you with your trusted advisors.

See it at [www.connectedfarm.com](http://www.connectedfarm.com).

ONLY AVAILABLE FROM YOUR LOCAL TRIMBLE RESELLER.

#### WA

Wellard Rural Services

0488919165  
[www.wellard.com.au](http://www.wellard.com.au)

#### Central/Southern NSW, VIC and SA

SST Development Group

03 58 860051  
[www.sstgps.com.au](http://www.sstgps.com.au)

#### North West NSW

NFS-Ag

02 67427771  
[www.nfsag.com](http://www.nfsag.com)

#### Northern NSW, QLD, NT and TAS

BMS Lasersat

1800 502 688  
[www.bmslasersat.com](http://www.bmslasersat.com)



**Connected  
Farm™**





**I** THINK it must have been a wise international trade negotiator who first said that it's way better to be sitting at the dinner table than to be part of the menu. It's also a good way to put some much needed perspective on the flurry of free trade agreements either signed or on the way between Australia and our major Asian trading partners.



There's always differing opinions about the worth of FTAs, particularly for the Australian agricultural sector – when concessions are often agreed to at the apparent expense of some of our primary industries – just to get the deal done. For example, on the face of it, the new FTA with China doesn't seem to do much for Australian grain growers. Existing tariffs on Australian wheat, rice and oilseed exports to China are unchanged while we have had a win with the removal of barley and sorghum tariffs. But before we all wring our hands in frustration, this is where we need to keep some real world perspective on the deal.

China is a centrally planned economy which, over the past several decades, has been incredibly successful at overcoming the enormous human, social and economic cost of recurring famines. Through government intervention, increased domestic production of staples such as rice, wheat, corn, canola and sugar have seen China attain 97 per cent self-sufficiency in food production. Tariffs on imports of these staples are a big part of this success story so from the very understandable Chinese perspective, they are usually in the 'not negotiable' basket when it comes to trade and FTA talks.

And it's also in the FTA fine print where Australian grain growers, particularly wheat producers, will find some more real world perspective. Under the deal, China will impose a 65 per cent tariff on wheat imports – but only when their total annual wheat imports from all global sources exceeds a quota of 9.6 million tonnes. Wheat imports up to 9.6 mt per year only attract a 1 per cent tariff. Given that China's wheat imports from all world suppliers has averaged around 3 mt for the past five years (with around a third of that tonnage coming from Australia) the 1 per cent tariff is the effective 'impost' on Australian wheat growers.

And some final comments on perspective: Across all farm and fishery sectors, Australian producers export on average around 65 per cent of their product. And around 70 per cent of those exported products find their home in an Asian destination. Asia will be the epicentre of global population and economic growth for decades to come. This economic growth is bringing with it increased per capita incomes and changing Asian consumer demand towards high quality and safe food.

It's simply a no-brainer that Australian farmers need to be continually strengthening business and trading relationships with Asia. FTAs are not menu items, they are an invitation to the dinner table.

It's been a very challenging spring in most regions but here's hoping the winter crop has been good in your patch. From all at *Australian Grain*, all the best for a rapidly approaching Christmas and festive season.



## AUSTRALIAN GRAIN

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

## In this issue...

### What to do with a frosted crop

Once frost damage has been confirmed, there are a number of options for dealing with a frosted crop, each with advantages and disadvantages. Two of the most popular options are hay and livestock.



**See article . . . . . Page 10**

### Burning windrows without the tears

Doug Smith crops 2500 hectares of wheat, barley and canola, field peas and lupins at Pingrup, Western Australia. Doug believes narrow windrow burning keeps the lid on weed populations and he and his neighbours have shown you can even burn successfully five tonnes per hectare plus crop windrows if you plan and pay attention to detail.



**See article . . . . . Page 16**

### Henry Ford's Fordson F

Henry Ford was born in 1863 into a Michigan farming family. As a consequence he spent many hours of his youth with nothing more inspiring to gaze upon than the steaming backsides of a pair of plodding mules. The nearest things to mechanisation on the farm were a scythe and a racoon trap!



**See article . . . . . Page 24**

### When is clean seed, clean enough?

Retaining seed on-farm for planting next season makes good economic sense – unless that seed is contaminated with weed seed. AHRI senior research officer, Mechelle Owen, surveyed grower-retained seed to assess the level of weed seed contamination and the effect of grain cleaning.



**See article . . . . . Page 38**

*"10 per cent loss every year through frost is better than 100 per cent loss one year in ten" – Jeff Braun, Agrilink*

# Risk-based approach best for frost management

● By Rebecca Barr

**F**ROST is estimated to cost the Australian grain industry several hundred million dollars each year. In south-east Australia alone, in excess of \$100 million a year in direct and indirect losses occur and for some growers, crops can be completely wiped-out in a night.

While frost is nothing new in the Australian landscape, many growers reported the frosts of 2014 were more widespread and more severe than others previously experienced. From the Mid North of South Australia through the Victorian Mallee and into

southern New South Wales, abnormally cold conditions resulted in multiple frosts in early August.

But it was the record cold temperatures and the fact they lasted for many hours that surprised growers. Some crops were damaged beyond repair and cut for hay while others were left for the tillers to re-shoot. And if that wasn't bad enough, there was a late frost in October which further damaged crops.

Agrilink Agricultural Consultants' Mick Faulkner, based near Clare in SA's Mid North, where growers experienced huge losses to frost this year, says frost is an emotive issue – which makes its successful management all the more difficult.

"With drought, it's a gradual thing, you know there hasn't been much rain, and there might be none in the forecast, and the situation develops slowly. With frost, it's sudden. A crop can go from healthy and growing well one night to dying the next morning. It's a very challenging situation for any grower to face," he said.

In response to the severe frosts in 2014, the GRDC held rapid response technical workshops at Clare, Kimba and Loxton in SA and West Wyalong and Finley in southern NSW, to help growers, advisers and consultants better identify and manage frost.

## Growth stages

Frost can occur during any stage of growth, but the susceptibility of plant material depends on the growth stage. Speaking at the West Wyalong GRDC workshops, crop physiologist Neil Fettell, who is also a member of the GRDC Southern Panel, says frost damage before growth stage 30 is rare in Australia.

"Up to GS30, plants can suffer from vegetative frost, which



Agrilink consultant Mick Faulkner inspects frost damage at the GRDC National Frost Initiative trial site at Loxton in South Australia. (Photo: Rebecca Barr)



A frost damaged wheat head at Balaklava in SA. (Photo: Rebecca Barr)





**Grain growers discuss frost identification and management options at a GRDC-supported field day at Finley, New South Wales in September. (Photo: Deanna Lush)**

mostly causes loss of photosynthetic area and slows growth, but in extreme cases can cause plant death. This kind of damage is uncommon in Australia because we rarely see temperatures low enough for the vegetative material to be seriously damaged," he said.

"From GS30 (stem elongation) to GS49 (beginning of ear emergence), there can be elongation or stem frost. This is not common, but is the type that caused large amounts of damage in 2014. This can directly damage the developing ear or 'ringbark' the stem below the ear, resulting in ear death. The symptoms are not immediately visible without dissection.

"After GS49, during ear emergence and flowering, is the time

where plants are most susceptible to frost, and this is the period growers are quite aware of as frost risk. The lesson learnt this year is that while GS59-70 is the most susceptible time, plants can suffer damage during other growth stages if the climatic conditions are severe enough," Neil said.

Frost after flowering is also possible. During early grain fill, frost can damage the kernels resulting in shrivelled and green-coloured grain at harvest. This occurred in south-eastern NSW in 2013 and in South Australia's Mid North in 2014, but is only occasionally a problem.

### Identifying frost damage

Since cold air is heavier than warm air, it sinks and flows to low areas in a similar way that water runs downslope until it ponds at the bottom. Growers should first inspect crops in low areas, where the flow of air might have ponded, for damage. Light coloured and light textured soils also produce lower temperatures in the air above them than heavier, darker soils if there is some soil water.

"Many growers used to rely on seeing frost on the ground early in the morning to indicate they had just had a frost. But the frost may have disappeared before you venture outside to see it," Mick said. "A more reliable method is to use paddock based weather stations or data loggers. But just knowing that freezing temperatures were reached does not guarantee that plant cells were frozen and damaged.

"Data from the Bureau of Meteorology can be somewhat useful but is measured in town locations at 1.2 metres above ground in a Stevenson Screen. Growers will invariably experience temperatures lower than the nearest weather station, so if the BOM data says the conditions for a frost were not quite reached, it's still worth checking crops."

**BOSS AGRICULTURE**

"the Boss planter has proven itself... its well-built & simple to set up and operate"  
Ken Waterford "Grandoon Park" Come-By-Chance NSW

## PLANTER SPECIALISTS

- TX Series** Parallelogram tyne (hydraulic or spring)
  - SX25** Single disc opener
  - SX25P** Parallelogram single disc opener
  - DX50** Parallelogram double disc opener
  - NX20** Parallelogram narrow row double disc opener
- SJ Series** Stump jump tyne planting & cultivating units (hydraulic or Spring)
- RX100** Strip till parallelogram row units

Phone **02 6721 2677** Dan Ryan **0488 512 677**  
Fax **02 6721 2760** Dave Herbert (Dalby QLD) **0439 286 277**

[www.bosseng.com.au](http://www.bosseng.com.au) • [www.bossagparts.com.au](http://www.bossagparts.com.au)

Boss Agriculture - A division of Boss Engineering Pty Ltd • 40 Taylor Avenue Inverell NSW 2360



## EZYFLO STAINLESS STEEL AIR DIFFUSERS

**Quality hard wearing air diffusers that will last!**



Shop online at [www.ezyflo.net.au](http://www.ezyflo.net.au)  
 Call **0490 046 168** for a **FREE** consultation  
 Like Us on Facebook

Some symptoms will appear within the first 24 hours, such as blistering of pea pods, but most impacts will take at least a few days to appear.

"Growers should consider tagging crops after a frost event to monitor any lack of growth – plants should be growing by about one centimetre per day, so after two days it should be easy to spot if a plant has grown by two cm or not. Impacts on grain should be apparent after three to four days, as grain should be growing at roughly 0.5 to 0.8 mm per day," Mick said.

Another method to identify damage to vegetative parts is to remove plants, with roots intact, and place in a bucket of dyed water for a couple of days. Dye will move to all parts except those that have been damaged.

The more time that has passed since the frost event, the easier it will be to observe symptoms, but fewer management options will be available. Regular inspection of crops, particularly in low-lying areas, is recommended to identify frost damage as early as possible.

### Influences on risk

Agrilink consultant Jeff Braun says after crops have been frosted, growers can improve the potential outcome by understanding the influences on frost risk.

"Cold air dams are a combination of topography and landscape. These allow a bank of cold air to accumulate which increases the risk of frost damage. Action can be taken where growers identify these dams, such as where a row of trees is blocking cold air drainage, some may be able to be removed to allow the air through, or where there is a valley between two rises, growers could choose to plant a more frost-tolerant crop or hay," he said.

Jeff recommends growers take a risk-based approach, considering potential yield, frost risk and heat stress.

"The time of sowing is critical for frost and heat stress – if the crop matures too early you may get frosted, too late and it may experience heat shock. Rather than aiming for the maximum yield for every paddock every year, a balance of sowing times will provide a broader range of maturity and spread the risk," he said. Models such as *Yield Prophet* can help identify optimal times

## GRDC NATIONAL FROST INITIATIVE

The GRDC has long acknowledged the severe implications of frost on crop production and since 1999 has invested about \$13.5 million in more than 60 frost-related projects.

In 2014, GRDC established the National Frost Initiative to further increase its frost research. The five-year, national initiative aims to deliver growers a combination of genetic and management solutions to be combined with tools and information to better predict frost events.

The three-pronged initiative will address:

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

More information: Francis Ogbonnaya, Senior manager crop genetics, GRDC, 02 6166 4500, [francis.ogbonnaya@grdc.com.au](mailto:francis.ogbonnaya@grdc.com.au)

# NEW SOIL TESTING PACKAGE

*Improvement in farm profitability begins with more frequent soil tests to determine optimum fertiliser input.*

*Just released, this trailer mounted fully hydraulic self contained unit does not need a specialised vehicle – all you need is a vehicle with a towbar.*

*It comes with 12HP Honda motor and pump, 1.5M probe, fitted with a jackhammer to get through those hard set soils, and sideshift to avoid stones or a crack in the soil.*

*The sturdy trailer comes registered and fitted with probe tool box and sample tray.*

*Ideal for large farms, large agronomy businesses, research stations and commercial soil testing of building sites etc.*

*Also available is a single tray mounted unit with 12v hydraulic motor for individual vehicles.*

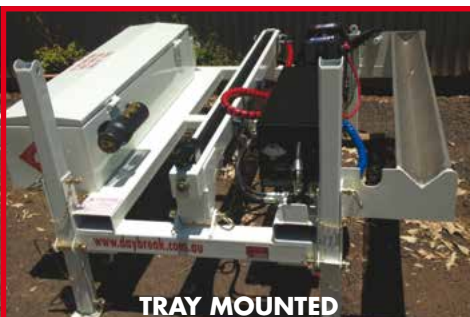
*Get correct fertiliser applications – get some regular soil tests with a Daybreak Soil Testing unit!*



TRAILER MOUNTED FRONT VIEW



TRAILER MOUNTED REAR VIEW



TRAY MOUNTED

- \* Improve farm profitability – begin with a soil test!
- \* This self contained unit doesn't need a ute – any car with a towbar can pull it.
- \* 1.5m probe, probe raised to vertical by hydraulic ram, Honda motor and hyd pump.
- \* Sideshift capable – avoid stones, cracks with moving vehicle.

- \* Probe has a jackhammer that cuts in when needed on hard soils.
- \* Trailer comes registered, toolbox for probes, oil, tray for sample display.
- \* Most suited for large end users-agronomy firms, consultants, researchers.
- \* Tray mounted units also available – 12v hyd drive, single vehicle use.
- \* Use the correct amount of fertiliser – start with a Daybreak Soil Probe Unit.

**Contact Ross Murray on 0427 360 325 or  
Milne Industries Dalby 07 4662 1374**



to sow varieties based on historical data, but as frost is a random occurrence, there are still no guarantees.

"Many growers think of early sowing as being negative for frost, but a later frost can mean those varieties sown earlier can escape the late event, so there's no way to completely remove frost risk, it can only be managed," Jeff said. "A thought to consider is that 10 per cent loss every year due to some frost damage or compromising yields is better than 100 per cent frost loss one year in ten from not diversifying."

Mick says where growers are sowing early, they should remember the risks.

### Using agronomy to reduce risk

"Work gentlemen's hours during early sowing," Mick said. "If you sow your entire wheat crop on the same day, it will all be at the same stage if there is a severe frost and it's possible to lose most of your crop."

A GRDC-funded, five-year research project led by Melissa Rebbeck at the South Australian Research and Development Institute (SARDI) tested various agronomic methods for reducing frost risk. The most successful were:

- Altering the soil texture through clay spreading or delving to allow the soil to store more moisture and hold more heat – reduced risk by up to 80 per cent.
  - Cross-sowing to improve the canopy density – reduced risk by 13 per cent.
  - Variety selection to promote later flowering – reduced risk by 12 per cent.
  - Rolling soils may have a small effect on reducing frost risk but in SARDI's trials, no statistically significant effect was identified.
- Removing stubble, wide row spacings and lower seeding rate were all trialled but were not found to reduce frost risk.

### Variety differences

Jeff Braun recommends sowing a wheat program with varieties that differ significantly from one another in the ways in which they develop.

"Currently, two commonly grown wheats in southern Australia are Mace and Cobra. Their developmental patterns are similar, which means if they're sown around the same time they can be very close in growth stage so they will have a similar susceptibility to a severe frost event," Jeff said.

## MANAGING FROST RISK IN A CHANGING CLIMATE

A change in climate is increasing the risk of frost events occurring in south-eastern Australia.

Climate & Agricultural Support director at SARDI, Melissa Rebbeck, says there has been a change in high pressure system movements in recent years.

"High pressure systems are usually centred over the Great Australian Bight during summer, and move up towards the centre of the country during autumn. This movement allows low pressure systems to take their place, influencing the development of cold fronts and rainfall. We're now seeing the high pressure systems moving north later in autumn and returning south earlier in spring" she said.

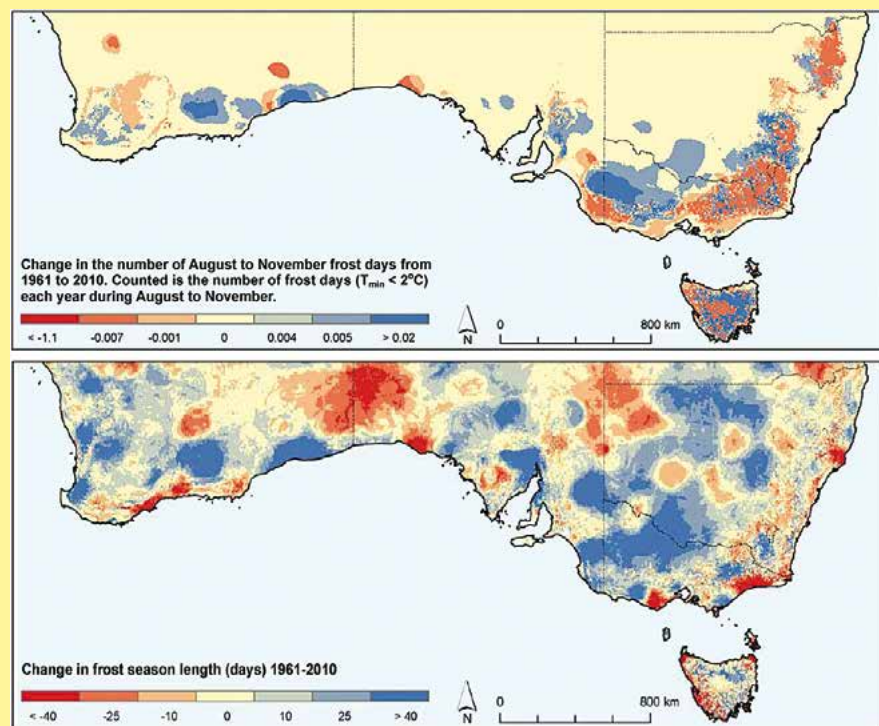
Furthermore the high pressure systems are becoming larger than normal and taking longer to cross the continent. The late moving high pressure systems not only block the rainfall, they can also drag cold air in from the Antarctic.

"The 2014 frost events occurred when a very large high pressure system was unusually low and large, and dragged cold air in from the Antarctic and dropped it over southern and eastern Australia. Because it was slow moving it caused six days of sub zero temperatures from almost dawn until dusk," Melissa said.

Work by Dr Steven Crimp from CSIRO shows that since 1980 the frequency of very cool months has declined, but at the same time, some grain-growing areas in the east have seen an increase in the number of frost days. More broadly across the entire wheat belt there has been an increase in the length of the frost season, which means frosts are occurring earlier and later in the year (Figure 1).

"This means that frosts are becoming more likely, and over

**FIGURE 1: The frost season is widening and the number of potential frost days is increasing despite an increase in average temperatures**



Source: Steve Crimp, CSIRO.

a wider timeframe. Growers need to consider this when setting up their grain program in terms of how to plan their year to avoid a wipe-out by frost. Completely avoiding frost is not possible but agronomic practices like clay spreading or delving can be considered along with spreading sowing dates and understanding new varieties and their maturation, so that the impact of a single severe frost may be reduced," Melissa said.

More Information: Melissa Rebbeck, 0427 273 727, [melissa.rebbeck@bigpond.com](mailto:melissa.rebbeck@bigpond.com)

# NEW

# TORNADO

## Parallelogram Disc Seeder



### About the **TORNADO**

- Independent opener for advanced contour following.
- Depth adjustment from the tractor cab.
- 8 inch wide parallelogram pins and bushes for lateral stability with long life.
- Low maintenance with non greasable parallelogram bushes and ground engaging bearings.
- 3 year warranty on ground engaging bearings and structural elements.
- 7 inches minimum spacing.
- Heavy stubble loads are dominated by the large Tobin discs.
- Gentle in rocks with large disc and hydraulic breakout minimising break-back force.
- Robust build to penetrate hard soils.
- Pneumatic or solid rubber gauge wheel.
- Proven components as used by the Tobin Bullet such as scrapers, boots, and press wheels.
- Retrofittable to most existing planters, unit kits available.

Minimum **30%** Discount on a **BULLET**



60ft - 12in  
60ft - 13in  
40ft - 10in

Limited to listed in-stock machines  
Deposit required to secure

 **TOBIN**<sup>NO-TILL</sup>  
Seeding Technology



- There are three main maturity drivers within wheat crops:
- Thermal time – crop development depends on the cumulative temperature the plant is exposed to from sowing.
  - Photoperiod – the plant requires a certain night-length and day-length balance before maturing,
  - Vernalisation – plants need to be exposed a certain amount of low temperature to mature.

“By growing a thermal time-driven variety and a photoperiod-driven variety, the risk of them being at similar growth stage is reduced, and so the chances of a significant loss may be reduced,” Jeff said.

Genetic traits for maturity in wheat can be sourced from breeding companies. Research by the University of Adelaide has shown significant variance in frost risk between wheat varieties. While the research is still underway, results-to-date demonstrate there are significant differences in susceptibility (Figure 3).

## Frost in 2014

A combination of a warm May and extremely cold conditions in August caused significant frost damage in parts of south-east Australia this year. Warm conditions in May put crop maturity

ahead of average for thermal-time varieties. This meant crops were more advanced than most years by the end of July, when the first frost events occurred.

“Unusual weather patterns brought a pool of very cold air from south-west of Tasmania into the grain-growing regions. This resulted in a series of frost events across August,” Mick said.

“There were 20 or more frost events in August in many parts of south-eastern Australia. In the middle of winter, the temperature was already starting from a low point, so this ingress of cold air resulted in extremely low temperatures, which persisted for a long time. One night at Meriden in the Mid North of SA, it was below zero for more than 15 hours with a minimum reached of about -5°C,” he said. “Reports of -6 to -10°C at crop height in the Upper North had been received.”

These sub-zero temperatures resulted in frost damage in plants after growth stage 30, and many areas saw 100 per cent crop damage. In cases of stem frost, some re-tillering occurred, but this recovery was limited by the dry finish this year.

Near the end of the growing season, a late frost occurred in the Mid North over three nights from October 14 to 16.

“As with the earlier frost, most of the plants damaged were

## WHAT TO DO WITH A FROSTED CROP

Once frost damage has been confirmed, there are a number of options for dealing with a frosted crop, each with advantages and disadvantages. Two of the most popular options are hay and livestock.

Agripartner Consulting livestock consultant Hamish Dickson says that whether cutting hay to use on farm or putting livestock on the crop, the key is aligning the feed quality to the class of stock. This means considering different metabolisable energy and protein requirements for different sheep and cattle classes (Table 1).

**TABLE 1: Feed requirements for classes of stock**

Animal requirements		Metabolisable energy (ME) MJ/kg DM	Crude Protein %
Ewe	Maintenance	8	7.6
	Early pregnancy	8	8.5
	Late pregnancy	10	10.5
	Early lactation	10	15.6
Weaner lambs		11	16.0
Cow	Maintenance	8	8
	Late pregnancy	9	10
	Early lactation	10.5	15
Calf	8 months	10.8	14
Steers/bulls	12 months	10.8	12

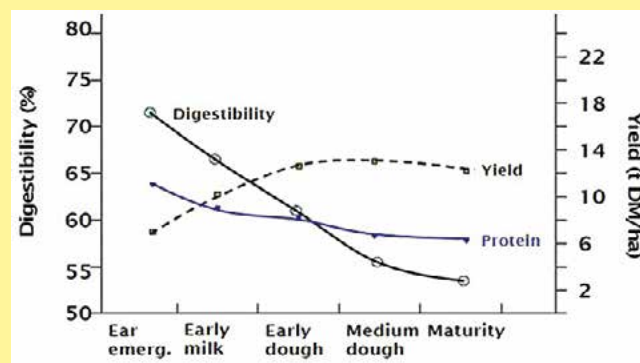
SOURCE: Hamish Dickson

“It’s critical to do a feed test when considering using a frosted crop for feed. Depending on the growth stage when the crop was damaged the protein and metabolisable energy (ME) can be very different to normal hay,” Hamish said.

“Once you’ve got feed test results, you can calculate for a target weight gain and the size of the crop, how many animals you can support and for how long.”

As digestibility, or energy, and protein levels decrease with plant maturity (Figure 2), growers should cut for hay as soon as possible after the frost is confirmed. If grazing, the decision to

**FIGURE 2: Digestibility and protein both decrease if the crop is not either cut for hay or spray topped**



Source: R.J. McLean.

spray-top to ‘hold’ the crop maturity will depend on the stocking plan.

“If you can graze heavily immediately you may not bother with spray topping. But if you can’t graze heavily, it will often make sense to spray-top. The class of stock is also important – cattle are unable to efficiently utilise any grain that may develop in the head of a ripened crop, so there is no benefit to allowing the plant to mature and spray topping will likely be the best decision. But sheep can utilise the grain well, so when grazing sheep, allowing the crop to ripen can provide a boost in nutrition,” Hamish said.

“If you’re feeding hay, use a hay feeder to get the best value out of a frosted crop. Trials have shown that up to 45 per cent of hay is wasted from paddock placement. If you’re grazing, cropping paddocks are often too big to get the highest efficiency. A high stocking rate and small paddock size will make the best use of the crop, so consider using electric fencing to create more, smaller paddocks.”

More information: Hamish Dickson, 0427 446 499, hamish@agripartner.com.au

not at flowering but at grain fill," Mick said. "I've also observed some stem frost damage from the October frost, even in plants that were flowering. This second frost highlights that it is just not possible to move flowering to avoid frost damage. Frost is random in nature, so the only way to manage your risk is to understand frost, and adopt risk mitigation strategies."

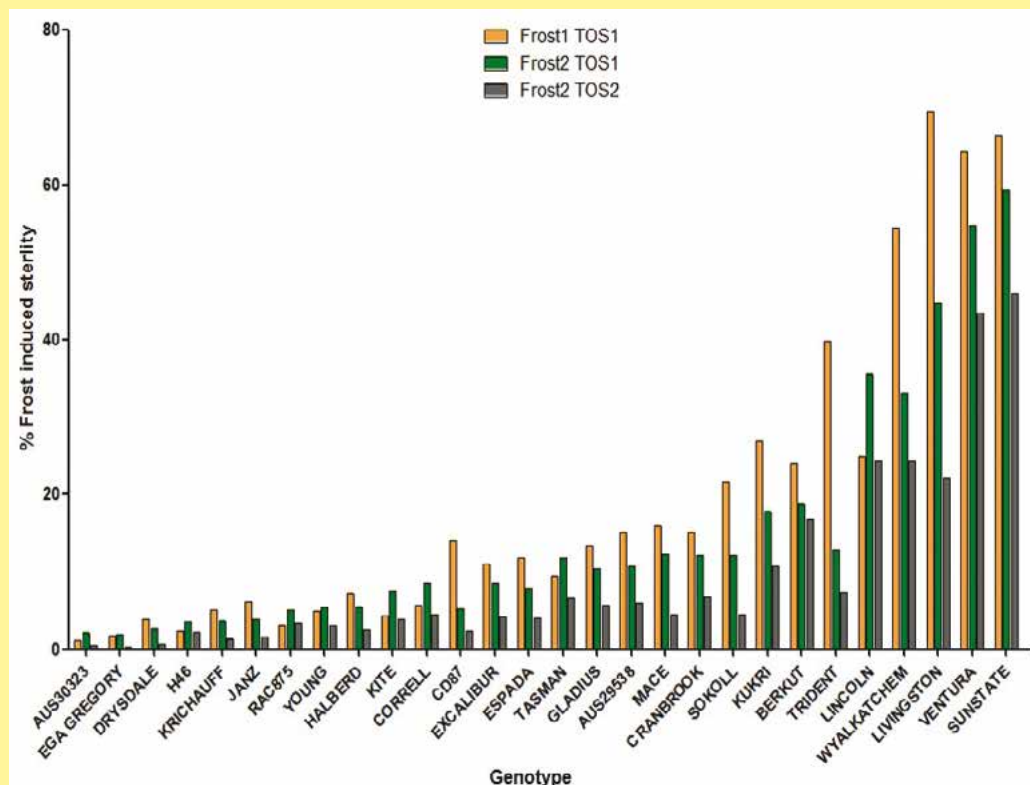
**More information:**

Neil Fettell, 0427 201 939,  
fettells@esat.net.au  
Mick Faulkner, 0428 857 378,  
mick.faulkner@bigpond.com  
Jeff Braun, 0409 094 936,  
jeffbraun@bigpond.com

**GRDC Resources:**

Managing Frost Risk: A Guide for Southern Australian Grains: [www.grdc.com.au/GRDC-Booklet-ManagingFrostRisk](http://www.grdc.com.au/GRDC-Booklet-ManagingFrostRisk)  
GRDC Frost Supplement: [www.grdc.com.au/Media-Centre/Ground-Cover-Supplements/GCS109](http://www.grdc.com.au/Media-Centre/Ground-Cover-Supplements/GCS109)  
GRDC Frost Fact Sheet: [www.grdc.com.au/GRDC-FS-FrostRisk](http://www.grdc.com.au/GRDC-FS-FrostRisk)  
GRDC Back Pockets Guide: <http://www.grdc.com.au/Resources/Bookshop/2012/01/Cereals-Frost-Identification-The-Back-Pocket-Guide-GRDC416>

**FIGURE 3: Adelaide University research has shown significant variability in frost susceptibility by variety.**



Source: Michael Laws.

## ROGATOR® - POWER, PERFORMANCE AND RELIABILITY



Free to customer with purchase of a RoGator RG1300

**2 YEAR SLINGSHOT DATA PACKAGE**

**2 YEAR EXTENDED WARRANTY**



**6300L TANK UPGRADE**



**2 YEAR SUPPLY OF FILTERS**

"When you look at productivity, the new RG series RoGator would have to be the most efficient bit of machinery for hectares covered per hour on the farm. This, combined with fuel consumption and performance returns a great \$/Ha figure in application costs. I was surprised at the low fuel data figures pulled from my machine and couldn't be happier."

**Brent Morrish, Cropping Producer, Ouyen, Vic**

**CONDITIONS**

- Customer must pay all labour and travel associated to servicing
- Filters will be supplied with the machine upon delivery
- Extended warranty is for 2 years or 2000hrs, whichever comes first
- Offer applicable while current stocks last

**PRODUCT MANAGER**  
**QLD**  
**SOUTH QLD/NORTH NSW**  
**NORTH NSW/TAS**  
**SOUTH NSW**

**Steve Norton** 0437 878 695  
**Rob Graham** 0409 597 462  
**Jeremy Jones** 0407 485 569  
**Dave Farmer** 0427 651 971  
**David Hamilton** 0427 975 072

**VIC**  
**SA**  
**WA**  
**WA**

**Matthew Plunkett** 0417 832 784  
**Luke Wormald** 0419 991 534  
**Gavin Merritt** 0448 022 172  
**John Griffiths** 0407 132 746

**CROPLANDS**



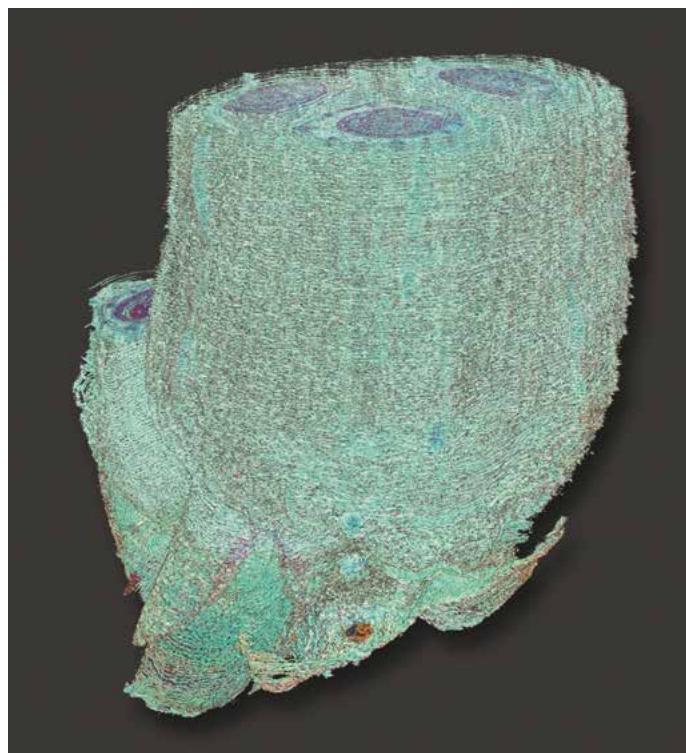
# New imaging technique leads to better grasp of freezing in plants

● By Dennis O'Brien, Agricultural Research Service – USDA

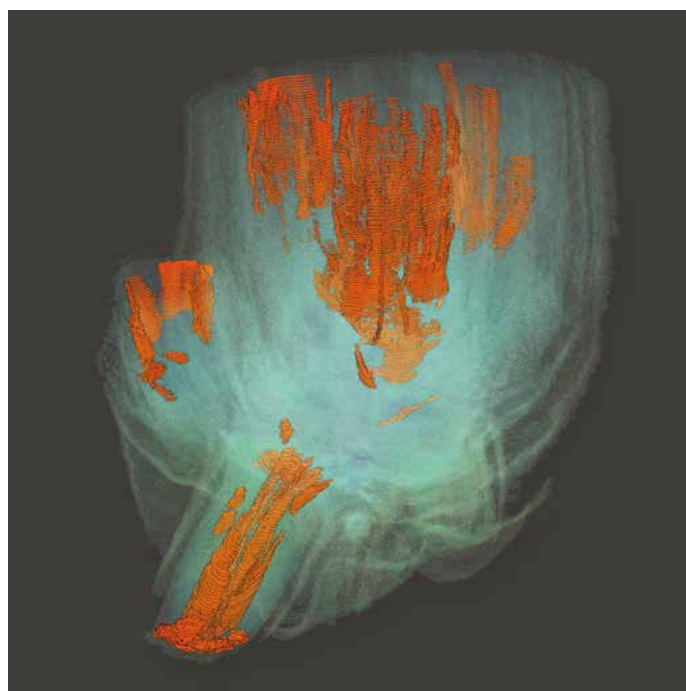
**U**SING a new technique to study an old problem, an Agricultural Research Service scientist in North Carolina has uncovered new details about what happens to a cereal plant when it freezes.

Agronomist David P. Livingston, in the Plant Science Research Unit in Raleigh, has developed an imaging technique and has used it to show that when an oat plant freezes, ice forms in its roots and in portions of its crown, which lies just below the soil surface and connects the roots to the stalk.

The results have implications for growers. In winter cereals like oats (*Avena sativa*), the crown is where the plant generates new tissue growth – if it survives the winter cold. Oats won't grow in many northern areas of the US because of cold temperatures. Understanding how ice forms in oats could help breeders develop harder varieties and expand their range, David says. Climate change has also made it more important to understand how



**Outside view of an oat crown reconstructed in 3D from 186 images taken through a light microscope.**  
(Photo by David Livingston)



**During freezing, ice crystals formed in an oat crown (orange colouring added to accentuate the crystals) as seen in this interior view.** (Photo by David Livingston)



**An oat plant. The white area at the base of the plant is the crown.** (Photo by David Livingston)

**BIG**  
TRACTORS  
**BIG**  
DEALS

**ON ALL NEW**

**7**  
SERIES

**8**  
SERIES

**9**  
SERIES



If you're looking for big savings on a big new tractor, look no further than your John Deere dealer. Right now, big deals are being done across Australia on all new John Deere 7, 8 and 9 Series Tractors. Get huge, cash-off discounts and low-rate financing on in-stock models or a great deal on forward orders. Either way, you'll save big. Hurry, these deals won't last long. **Nothing runs like Deere.**



**JOHN DEERE**

\*Offer ends 31 January 2015.

November–December 2014

[JohnDeere.com.au](http://JohnDeere.com.au)

*Australian Grain* — 13



cereal crops react to wide fluctuations of winter temperatures and other environmental stresses.

The process developed by David involves making high-resolution digital photos of standard histological slices of plant tissues and using commercially available software to create a three-dimensional perspective, which gives added depth to their structures, above and below ground.

The resulting images are similar to those produced by magnetic resonance imaging (MRI) and computed tomography (CT) scans. The advantages of David's images are that they can be created from much smaller tissue samples than what CT and MRI tests require and are less expensive to produce, because they require less expensive equipment and training.

### Technique works for other crops as well

David's studies have so far focused on oats because their production in the US is limited by their sensitivity to subfreezing temperatures. He has also used the technique to examine wheat, barley, rye, and corn, and he says it could be used to study other crop plants. The technique even works on mammalian systems

and has been used to produce three-dimensional reconstructions of tumors in liver biopsies.

David first described the technique in a paper in the *Journal of Microscopy* in 2010, which included images of oat tissue and lung tissue from a mouse.

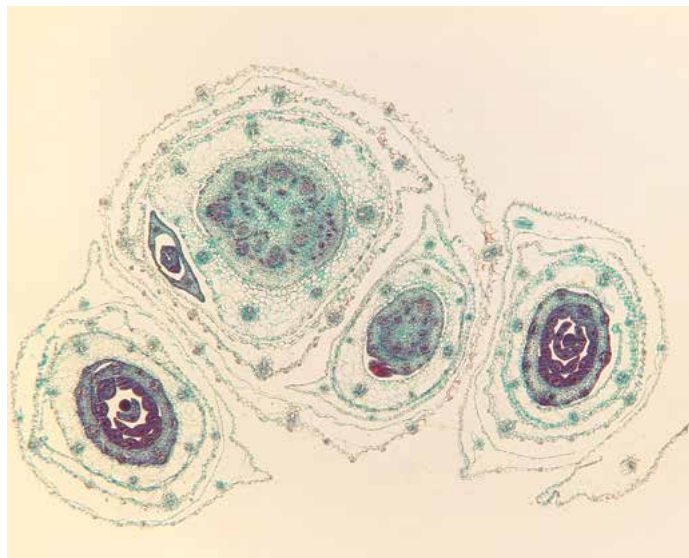
In the more recent study, he used it to examine how oat plants react to freezing temperatures in the soil. He stained frozen tissue samples and took 186 sequential images of them with a digital camera.

David then aligned the images and used imaging software to clear away the background colours so he could focus on cavities formed by ice crystals in the crown tissues of the oats. He compared the images from frozen plants with images from plants kept at normal temperatures.

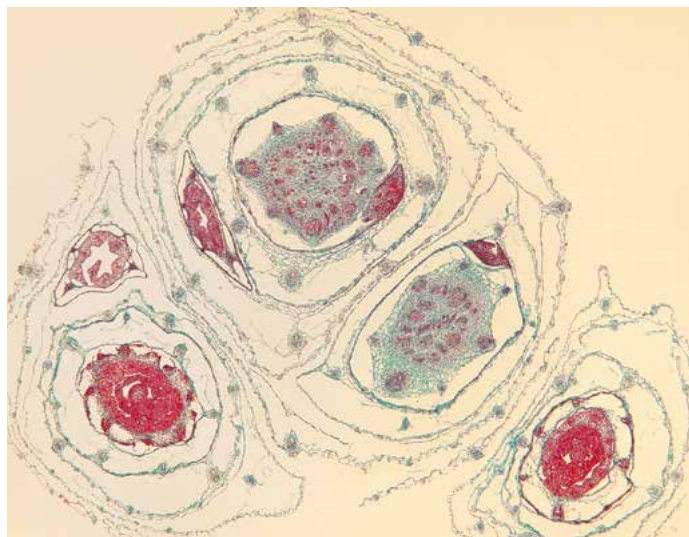
Along with showing how ice forms in the root, the images revealed that ice formation in the crown is limited to its lowest and uppermost parts, apparently leaving the middle free of ice – at least free from crystals big enough to visualize. The ice also didn't form in the shape of circular crystals, as portrayed in two-dimensional images. Instead, the crystals were shaped more like elongated curtains.

The results were published in 2014 in *Environmental and Experimental Botany*.

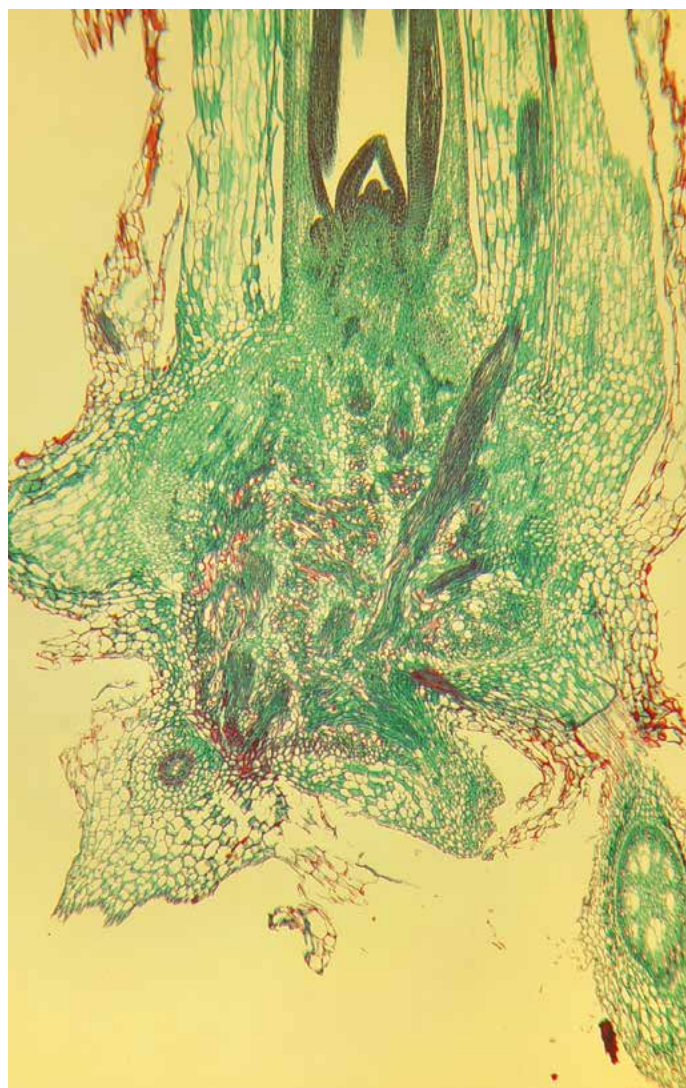
David Livingston is in the USDA-ARS Plant Science Research Unit, 3411 Gardner Hall, North Carolina State University, Raleigh, NC 27695; Ph: +1 (919) 515-4324.



Cross-section views of a plant crown before freezing.  
(Photo by David Livingston)



After the plant crown was frozen and thawed, some empty spaces that were not present before freezing exist within the tissue where ice had formed while the plant tissue was frozen. (Photo by David Livingston)



A longitudinal section of the crown area showing the complexity of tissue within it. (Photo by David Livingston)



**ZINCSTAR<sup>®</sup>**

# High performance in the field

This winter cropping season get high performance in your field with ZincStar, without walking a tightrope. ZincStar provides balanced nutrition with Nitrogen, Phosphorus, Sulphur and Zinc in every granule.

Listen to Australian farmers talk about their ZincStar experience at [www.impactfert.com.au](http://www.impactfert.com.au) and find out why it is superior to a dry blend.



Please contact your local distributor for more information.

**Local focus, global strength**

[www.impactfert.com.au](http://www.impactfert.com.au) | Customer Service 1800 88 44 88

ZincStar<sup>®</sup> is a trademark of Impact Fertilisers Pty Ltd

**impact**  
fertilisers



# Burning windrows from big cereal crops can be done

● By Andrew Storrie, Agronomo

**D**OUG Smith crops 2500 hectares of wheat (50 per cent), barley (20 per cent) and canola, field peas and lupins (30 per cent) at Pingrup, Western Australia with 250 to 275 mm growing season rainfall. All his crops are sown no-till with one-pass knife points and press wheels. He also has an on-farm agricultural supply business where he plans and supplies chemical and fertiliser programs for 60 clients.

Doug believes narrow windrow burning keeps the lid on weed populations and he and his neighbours have shown you can even burn successfully five tonnes per hectare plus crop windrows if you plan and pay attention to detail.

## How to set up windrows

- Aim to keep rows to about 500–600 mm wide;
- Make sure the modified harvester chutes capture all chaff and weed seeds into the windrow;
- Do not over thresh crops. This leads to rows with little or no airflow making rows smoulder rather than burn. Rows that smoulder do get hot enough to kill weed seeds;
- Make sure your chute does not restrict air flow from the cleaning fan of the harvester. Most chutes need to open back and front and closing the front leads to reduced harvest capacity in four tonnes per hectare plus crops;
- Try not to run over rows with headers/chaser bins etc as this crushes the rows giving the same result as over threshing;
- Slow the harvester ground speed at the end of the runs so you empty the sieves at the same time as the rotors. This prevents trails of seeds with no straw mixed in to burn;
- The use of stubble mats to protect the front tyres of the harvester can help in forming mini fire breaks along each side of the rows. The mats tend to lay down stubble at harvest when it is hot (generally it does not stand back up) so it is less prone to light up due to radiant heat coming from the rows when burning;
- Make sure the header knife is in good condition. This is very important if crops are lodged because blunt knives tend to pull and lay ryegrass down in cool conditions rather than cut;

- Harvest the same direction the crop is sown. This is very important in heavy crops because the fire will carry down the individual rows that run away from the windrows;
- The exception to the above rule is if using old stubble rows to guide seeder bar steering (ie. when using I-TILL), you need to harvest at about 15 degrees to the way the crop was seeded. This is so you don't end up with any rows left for the paddle to work with for a full run; and,
- Wider header fronts allow you to get better windrows in lighter crop years but can prove challenging when it comes to burning five tonnes per hectare crop windrows. But the results are worth the effort.

## Varieties and crop types

Wheat varieties vary greatly in the type of residue that comes out of headers.

- Yitpi produces excellent rows with good retained straw size.
- Gladius produces finer residue that requires careful harvesting to achieve a reasonable burn.
- Wyalkatchem produces very poor windrows of almost powder like residue making it unsuitable for windrowing.
- Mace if treated right with the harvester will produce good rows, but is susceptible to over-threshing in the heat of the day.
- Canola and lupins produce rows that will burn at the highest temperature for the longest period of time. Great results.
- While some types of barley produce good rows it can be tricky not to burn the whole paddock. The low fluffy flag can carry the fire between the rows.
- Doug Smith has learned that even four to five tonnes per hectare Scope and Buloke barley crops can be burnt very successfully, but you need to do everything right. With barley the conditions are the most important factor, with the humidity needed to be at 75 per cent, the wind less than 12 km per hour and temperature around 12°C. In our area of WA (Albany) these conditions generally occur between 9 pm and 3 am. One 120 hectare paddock on Doug's mate's place earlier this year took six hours to burn. There was a fair bit of stopping-starting waiting for the conditions to be right.



Doug Smith's modified harvester chute in operation during the 2013 harvest.



Windrows from a 5.5 tonne per hectare barley crop were successfully burned in March 2014.



# drumMUSTER

## ticks all the right boxes...



## Burning and burying your chemical containers is not the solution!

QUEENSLAND CHEMCLEAR COLLECTION  
- JUNE 2015 -

REGISTER NOW!!

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

or call

**1800 008 182**

Most QA programs require responsible waste management and the industry and consumers are demanding it. On our websites you can locate your nearest **drumMUSTER** collection site with an interactive map. You can also find out the status of the next ChemClear collection in each state. It's quick and simple.

**1800 008 707** [www.drummuster.com.au](http://www.drummuster.com.au)



**drumMUSTER**



## Best time to burn

We use the FESA McArthur Index, a scale used to calculate the fire danger in grassland using temperature, humidity and the wind speed to calculate an index. The scale gives us a guide to the best windrow-burning conditions.

There is also the PocketFire app which does the same thing for iPhones and iPads.

As a rule of thumb, a Fire Danger Index of:

- Less than 15 will give a reasonable burning result, but there is a risk of burning inter-row if windy.
- Eight to 10 is good and probably ideal.
- Two and lower will not give a good result as it is too cold and humid. At this level the rows smoulder and will flare up when conditions warm up the following day burning the paddock bare.
- Greater than 15 carries the risk of the fire getting out of control.
- There is no magic number – it changes every year depending on fuel load.

## Lighting technique

- Light windrows at 90 degrees across or diagonal to the windrow, rather than along the row as this prevents the fire developing a face which can carry between the rows. Ideally rows should burn to meet each other in 75 metre segments. In good conditions this only takes 25–30 minutes.
- Light up across the windrows every 75 metres in good conditions and plan to light much closer as conditions cool down. The fires will burn to meet each other.
- Best burning conditions in southern WA are in the second half of March.



- Plan to commence burning just on dark when it is cooler but also plan to be finished burning when the dew falls (this limits stubble smouldering and subsequent flare-ups during the next day). This time constraint means that only 200–300 hectares (per team) can be burnt each night.
- Invest in a good fire lighters. Doug Smith uses a gas/diesel powered unit mounted on a 650 cc quad bike with a lighting speed of 30–40 km per hour.

For further information:

Andrew Storrie, Agronomo. E: [andrew@agronomo.com.au](mailto:andrew@agronomo.com.au)

Doug Smith, Pingrup, WA, E: [dbkasmith@bigpond.com](mailto:dbkasmith@bigpond.com)

<http://www.ahri.uwa.edu.au/news/AHRI-insight/Spoiled-rotten>



The McArthur Grassland fire danger meter.

# ACCUFIRE

BROADCAST FIRELIGHTER

Australia's most affordable + efficient tool in the HERBICIDE RESISTANCE Fight!



Construct a narrow windrow behind the harvester



Light them in Autumn with the ACCUFIRE BROADCAST FIRELIGHTER



Collected weed seed GONE!

CHECK THE WEBSITE TO VIEW THE ACTION [www.accufire.com.au](http://www.accufire.com.au) | 0427 722 031





CLAAS LEXION 760



CLAAS LEXION 750



CLAAS LEXION 770 WITH TERRA TRAC

Order before 31 January 2015  
and receive a

**FREE**

**12 Day European Farming  
Innovation Study Tour**

\*Includes UK (Cereals Arable event, Lincolnshire) Germany & Poland.  
Full terms and conditions available from your local CLAAS Harvest Centre.



## The choice is yours

Order a CLAAS LEXION 700 series before 31 January 2015 and you can specify the world's most productive combine harvester just the way you want it. Your choice of four models, all with CLAAS' unique HYBRID threshing and separation technology, business class cabin and smart on-board operating systems and TELEMATICS as standard. Your choice of TERRA TRAC or wheels. Your choice of Tier 3 and Tier 4 engines from 300 hp to 550 hp. Your choice of VARIO variable cutter bars up to 13.5 metres. Your choice of crop residue management systems. **Contact your CLAAS Harvest Centre today and receive a great discount on all orders placed before 31 January 2015.**

**CLAAS Harvest Centre**

[www.claasharvestcentre.com](http://www.claasharvestcentre.com)

**CLAAS**



# Windrow burning: It's got to be hot

**G**ROWTH Farms Australia manager, Chris Bunny, knew that the company was buying a property with herbicide resistant weeds when they purchased Glaisnock near Young, on the south west slopes of NSW in 2008.

"The ryegrass on the property was known to be resistant to both Group A and Group B herbicides," he said. "Twenty-five years of continuous wheat-canola cropping had taken its toll and changes to the farming system were obviously required."

Over the past few years Chris has implemented drastic changes – reintroducing livestock into the system, changing herbicide application tactics, modifying the rotation and adopting narrow windrow burning – all to address the problem of herbicide resistance in weeds.

Glaisnock is 970 hectares of red earth country located between Young and Temora and is well suited to cropping but continuous cropping practice has generated an unsustainable level of weed pressure. Chris is in the process of fencing paddocks and installing stock waters as they move around the property planting lucerne for stock grazing.

"About 20 per cent of the property is under lucerne in any one year," he said. "Lucerne gives us the opportunity to earn income off these paddocks while also winter cleaning with heavy grazing and paraquat in at least three of the five years of pasture."

They run trade stock, either steers or prime lambs, so they are able to be flexible with the timing and stock density. The lucerne

is also breaking up the hard pan that had developed over so many years of continuous cropping.

Triazine tolerant canola and wheat are currently sown 50:50 across the remaining farming area. Chris said the triazine-tolerant canola had proven to be a useful way to introduce different modes of action to the assault on resistant weeds. He hopes eventually to reduce the area sown to canola but for now it is playing an important part in their integrated weed management program.

During the summer fallow Chris employs double knock herbicide applications at every ryegrass germination. "Generally there are two double knock applications in the fallow," he said. "The timing of the operations is determined by the weed size and the extent of the germination."

"The staggered germination pattern of ryegrass can make it difficult to know when to spray," he said. "It is also tempting to not do the second knock when the first spray appears to have worked well, but we have seen the benefits when a strip has been left unsprayed and it is clear that the second application is essential."

## Narrow windrow burning

To round off their integrated weed management strategy Chris has also implemented narrow windrow burning of canola chaff as a non-chemical harvest weed seed control measure. This year is the



Chris and Elise Bunny, 'Glaisnock', Young believe narrow windrow burning is an effective non-chemical tactic to add to their weed control strategy.

# Neil's Parts Australia

Rely on  
**ZIEGLER**  
Quality made in Germany

**Crop Lifters**  
Infinitely adjustable nylon  
finger with quick removal  
mechanism

**Vertical  
Canola  
Knife**

**Flexifinger** FXE

**Unloading Auger  
Extenders**

Simple add on kit for when your unloading auger is too short

JD NH  
CAT CIH CNH

**Work at night!**  
1400 to 7560 Lumens!

**1800 463 457** And a whole lot more ...  
[www.neils.com.au](http://www.neils.com.au)  
Corowa - Dubbo - Toowoomba - Gawler - Ayr - Northam



third year of narrow windrow burning on the property and Chris is convinced of its effectiveness in reducing the weed seed bank.

"The only real problem with narrow windrow burning is the chance of the windrows getting wet before you are allowed to burn," he said. "We try to start burning as soon as permits are available. So far we have had successful burns in two out of the three years."

Chris had previously used stubble burning as a weed control measure but had found that burning the whole paddock was ineffective and there was the associated loss of stubble.

"Burning the narrow windrows is a much safer operation and for negligible cost it is possible to modify the header and introduce another weapon against resistant weeds."

The canola chaff easily generates the required 400 degrees Celsius required to kill ryegrass seed. The next challenge for Chris is to implement the strategy in harvested wheat paddocks. The main difficulty with taking this step is the need to cut the wheat lower than usual and the timing of harvest compared to when the ryegrass seed begins to fall.

"We will be working on lowering the header, aiming for 'beer can height', and adjusting the chute to make the windrows as narrow as possible without causing blockages," he said.

Being able to effectively burn chaff in every paddock, every year is the aim and Chris is determined to solve any problems that stand in the way.

Chris said two people can easily burn 400 hectares of narrow windrows in one afternoon. Each windrow is lit every 400 metres or so, starting soon after midday. The windrows burn quite quickly and most are burnt out by late afternoon. Chris checks the paddocks again late in the afternoon and extinguishes any that are still alight.

"With the wheat we anticipate the need to burn off smaller areas at a time and that there will be more risk of the fires spreading across the paddock," he said.

Summer rains can cause problems with the wet windrows tending to only burn along the top where the chaff has dried off. Chris has found that even in years where the effectiveness of the burn is reduced there is still a benefit in concentrating the weed seed into narrow bands in the paddock where germinations can be more easily and cost-effectively targeted.

For more information on managing the risk of herbicide resistance, visit [www.weedsmart.org.au](http://www.weedsmart.org.au)



A hot fire is the key to effective narrow windrow burning to kill weed seeds.

**EXCEL**



## Stubble Warrior Planters ZERO & MINIMUM TILLAGE



Trailing, Lift Assist & Linkage Frames

### EI 853 Single Disc

#### — Single disc opener has excellent ground penetration

Ideal for seeding, fertilising and gassing into heavy trash cover and clayish, sticky soils. Frames to suit 9", 10", 12", 13" and 15" row spacings. Easy access to row units. Slotted gauge wheel.

- ✓ Precise ground following ability with a true parallelogram design
- ✓ SP 200 can be fitted with JD boxes
- ✓ CR 600 can be fitted Double Disc Shank
- ✓ Combination of winter and summer planting machinery
- ✓ Interchangeable disc opener and tyne tooling options
- ✓ Robust low maintenance design
- ✓ Slotted gauge wheel



SP 200 DOUBLE DISC



CR 600 TYNE

Brian Moran: 0427 722 925

Graeme Easey: 0427 700 779 (NSW)

74 – 92 Buckland St  
Toowoomba Qld 4350

Phone: (07) 4636 9100  
Facsimile: (07) 4636 9140  
[www.excelagr.com.au](http://www.excelagr.com.au)

A DIVISION OF  
GREAT WESTERN  
CORPORATION P.L.

**EXCEL**  
Agriculture



## Canadian growers embrace prescription-driven planting

**I**f energy and enthusiasm can increase yields, Canadian farmers Brian and Branden Domm might want to build some more bins. Brian and his son, Branden, approach the business of farming with a self-described passion for wanting to do things better. This extends from the land improvement services they offer to their landowners to charitable work they do in developing countries during the off-seasons.

In fact, they coined the phrase “Grower with a Difference” to define their intent to bring a unique perspective and approach to everything they do.

Their operations include about 5000 acres (2000 hectares) of corn, soybeans and wheat near Cambridge, Ontario. They farm more than 300 fields owned by over 70 landowners, some of whom Brian has worked with for more than 20 years.

**Brian and Branden Domm. They’ve developed the phrase “Grower with a Difference” to reflect their desire to farm using new technologies and practices, and to add value to their landowners through land improvements.**

Part of being a “Grower with a Difference,” Brian and Branden explain, is embracing new practices and technologies. Precision farming is part of their operations, as it has been from Brian’s first yield monitor back in 2001.

“When that first AFS yield monitor came out, I went at it full steam,” Brian says. “I made maps of everything.”

All those maps were informative, but not particularly helpful because Brian says they lacked the ability to respond with variable-rate technology for seed and fertiliser, and the agronomic insight to develop the prescriptions. “I ended up with lots of pages of fancy wallpaper.

### Fields that could be improved

So rather than continue mapping every field, he focused on those fields with obvious problem areas that could easily be improved.

Things changed several years ago, when three factors came into play that launched their precision farming practices to intensive prescription-based operations across all their fields.

- The Domms’ agronomy partner was able to develop detailed variable-rate prescriptions for seed and liquid fertiliser that could be delivered in a ‘plug and play’ manner;
- The new generation of planter controls, specifically their Case IH AFS Pro 700 display, were able to accept these prescriptions; and,
- Branden returned to the farm after a two-year production agriculture course at the University of Guelph.

“The equipment and the agronomy came together, and Branden came along with the knowledge from college and the passion to make a difference,” Brian says. “This lets us take our technology to the next level.

“I like looking at a field and seeing what I can do to optimise its potential,” Branden explains.



**The Domms enhanced the no-till capabilities of the Early Risers row units by adding no-till single disk openers and residue managers.**



"What we can do by controlling rates of seed and fertiliser is huge. That's 'being different,' and that's important to us."

Under Branden's guidance, the Domms went from applying variable-rate practices on about 10 per cent of their fields to more than 80 per cent.

The remaining fields, their analyses showed, are consistent enough that variable-rate management won't make a significant difference.

But where variable conditions exist, Branden says the upside is significant. He's seen corn yield gains averaging 8 bushels per acre (500 kg per hectare) just from variable-rate seeding. "Now as we add variable rate fertiliser, we know we can do better."

### **Pumping the good spots!**

Branden says his plan is to challenge the high-potential areas in the fields. "It's not about making the yield even across the entire field; it's about really pumping the good spots," he explains. Overall fertiliser use stays about the same, but it's used more effectively.

The Domms say their upgraded precision farming efforts are based on more detailed analyses of their soils, and matching specific corn varieties to field conditions as determined by their agronomy partner.

They plant to soil test every other year now, instead of every three, and test for more variables beyond the basic elements. Their agronomic partner combines this data, plus their yield maps and soil maps with biomass maps and other resources to develop the prescriptions.

"The prescriptions will constantly change over time as we overlap more data from the variables of each crop year," Branden explains.

The Domms say that once they commit to a new practice, they are in it all the way. Branden says this includes preparing themselves to overcome any unforeseen obstacles. For example, they say their move into this higher level of precision farming took time and effort to analyse and organise maps and fields. "It's a good thing we did this over winter," he says.

Among the results of that effort are notebooks organised by farm name and field name, with copies kept in the office and every tractor. This has helped take their overall farm organisation to the next level, and provides a platform for the prescriptions.

"We have everything planned out before we head to the field," Branden notes.

There, the Domms take the USB stick holding the prescriptions developed by their agronomic partner and insert it into the AFS Pro 700. It controls the seeding rate and two liquid fertilisers – a seed dressing and 28 per cent nitrogen – on their 1255 24-row planter.

"It works great," Branden says. "We select the farm and the field on the Pro 700 screen, the subscription shows up, and we go."

### **New planting strategies**

As part of their precision farming upgrade, the Domms took a fresh look at their planting capabilities. After several decades of trying various tillage practices, they concluded that no-till planting is the best choice, overall, for much of their land.

And, their past experience showed them the Early Riser planter performs well in no-till conditions. "It's those offset disk openers. I think it's the best planter for no-till," Brian says.

They replaced a 12-row 1250 planter with the 1255 Early Riser front-fold 24-row planter, and further enhanced its no-till capabilities by adding no-till single-disk openers and residue managers. A 400-gallon liquid fertiliser tank is mounted on the planter; a 1200-gallon liquid tank trails behind.

A Case IH 12/23 planter handles the balance of the corn, including min-till fields.

Another big change is the addition of a 40-foot Case IH Precision Disk 500 air drill matched with an ADX3430 430-bushel air cart.

It replaces a 30-foot SDX 30 drill and provides more accurate depth control and a better seed environment in no-till conditions.

The big benefit, they say, is having greater capacity to be able to plant beans at the same time as corn, and the expectation to seed them using variable-rate prescriptions.

"Our agronomy team told us we should be planting soys and corn at the same time. We're early adopters, so we want to make that happen."

We had some older equipment that was getting tired, so this was a good time to change the whole system," Brian says. "We can have all three planters planting at the same time now. Plus, we have a great experienced staff that makes it possible to do this intensive level of work."

The Domms say making this latest round of changes has confirmed their intent to work closely with only a few key partners. "Relationships are valuable to us," Brian says. "Having a level of trust makes all these things run more smoothly."

Case IH rates as one of their long-time trusted suppliers thanks to good dealer support.

Now with their upgraded precision farming practices and technologies in place, Brian and Branden expect to gain higher yields while holding the line on costs, and reducing time spent in the field.

"We're excited to keep these variable rate inputs going," Branden says. "We know it's the best thing for us." ■



**The Precision Disk 500 drill uses 18-inch singlebevel discs set at a 7-degree angle to cut through residues; double-edge closing wheels seal the trench.**





# Henry Ford's Fordson F

● By Ian M. Johnston

## The colourful landscape

Being an old bushy tailed sort of a bloke, I find it interesting driving through farming country, such as the rich black soil plains of north western NSW, and observing tractors busily going about the business of doing their thing. I note that in some districts there is a preponderance of green John Deeres, in others I observe blue New Hollands while elsewhere I might detect a majority of red tractors – perhaps Case IH or maybe McCormicks.

In the smaller farm areas I notice mainly orange Kubota tractors, plus a myriad of frequently unidentifiable lightweight units that appear to be descending upon us particularly from China, Korea and India. That is in addition to the more familiar American and European makes.

There is little doubt, the integrity of an enthusiastic local dealer can have a significant influence on the perception by farmers of the merits of a particular make of tractor. This often results in the dominance of one specific brand over others in certain rural districts.

Undoubtedly the ambition of every major tractor manufacturer is to obtain a supremacy of numbers wherever their tractors are sold. But this of course, in a world where all modern tractors are efficient technological marvels (well – nearly all) would simply be an unrealistic goal and purely a marketing director's pipe dream.

Yet back in the 1920s, there was a tractor that totally dominated the world's farming landscape! It was the Fordson Model F.

## The young Henry Ford

Henry Ford was born in 1863 into a Michigan farming family. As a consequence he spent many hours of his youth with nothing more inspiring to gaze upon than the steaming backsides of a pair of plodding mules. The nearest things to mechanisation on the farm were a scythe and a racoon trap!

But the young Henry was blessed with an agile mind and while he traipsed behind the clouds of dust, thrown up by the mules

and the crude wooden scarifier, he dreamed of an exciting future world of technology resulting in better ways of tilling the soil.

At age 16 he turned his back on the family farm and moved to Detroit in order to serve an apprenticeship with an engineering firm. This then was the catalyst that enabled him to go on to achieve unimagined wealth and illustriousness.

It is now well documented history that by 1908 Henry Ford had pioneered the world's first motor vehicle assembly line and was producing what was to become possibly the most legendary vehicle of all time – the Model T Ford.

While creating his automobile empire, Henry had never forgotten his experiences on the family farm and tilling the soil the backbreaking way. He harboured a burning desire to produce a reliable tractor at a price which would be within the reach of even peasant farmers throughout the world. He considered the hissing giant prairie monsters being produced by C.L. Best, J.I. Case, Hart-Parr and their contemporaries as simply too heavy, too inefficient and too expensive.

We believe that every FORDSON every day  
WILL DO ITS DUTY.

Henry Ford's present home on his father's old farm

Henry Ford's birthplace

The Farmer's boy who ploughed many a weary acre  
now gives the world the greatest labour saving  
Farm Machine of modern times

# THE Fordson Tractor

Equipment includes rear wheel mud guards, belt pulley attachment and canvas cover.

# £180

Easy Terms can be arranged.

See the Local FORDSON Dealer in your Home Town.

Sole Distributors for N.S.W.:  
**MOTOR TRACTORS LTD.**  
112-114 HUNTER STREET, SYDNEY.

A 1924 advertisement inserted by Motor Tractors Ltd. of Hunter Street Sydney in a 1924 edition of Power Farming in Australia, depicting Ford with the Model F.



A 1912 Model T Ford Speedster, restored and previously owned by the author.





**CenterPoint™ RTX™ Harvest Special**

**7 week trial for \$350\*\***

# YOU'RE FOCUSED ON THE FARM. WE'RE FOCUSED ON EVERY PASS.

## **CenterPoint™ RTX™ Correction Service**

Your farm is as much a part of your family as you are. While we can't break a sweat with you in the field, we can supply the tools to make your hard work more efficient, increasing your yield and profit. Think of us as the global solution that's right in your backyard.

- ▶ Industry leading correction solution
- ▶ Australia wide satellite coverage
- ▶ Horizontal accuracy better than 4 cm\*

**CONTACT US FOR A 7 WEEK TRIAL**

▶ [Trimble.com/positioning-services](http://Trimble.com/positioning-services) // 1800 062 221 // [au\\_corrections@trimble.com](mailto:au_corrections@trimble.com)

© 2014 Trimble Navigation Limited. All rights reserved. Trimble, the Globe & Triangle logo are trademarks of Trimble Navigation Limited, registered in the United States and in other countries. CenterPoint and RTX are trademarks of Trimble Navigation Limited. All other trademarks are the property of their respective owners.

\*Results vary based on conditions. \*\*Available for purchase from 1st September 2014 through 31st December 2014. Conditions apply.







A Fordson Model F, owned by Mal Brinkman, in action operating a mid mounted Athens disc plough.



The worm gear final drive was responsible for accidents created when the tractor drawn implement encountered an immovable object causing the tractor to rear backwards, as it endeavoured to wind itself around the differential.

## The dream takes shape

Joseph Galamb, a Bulgarian immigrant, had proved himself to be an innovative engineer who had contributed significantly to the development of the Model T. In 1905, despite his excellent progress with the Model T, Ford instructed him to switch his focus from the Model T and concentrate on the tractor concept.

In a very short space of time Galamb produced a prototype unit that included many of the components utilised in the Model T and the earlier Model K.

In the meantime Henry Ford kept mysteriously disappearing from

his executive office, much to the frustration of his senior staff. In actual fact his enthusiasm for Galamb's project determined that he could not refrain from slipping away to his farm to observe the progress of the tractor. But to his extreme frustration, despite numerous redesigned prototypes over no less than a 10 year period, Ford was not convinced his dream tractor had emerged. Accordingly Galamb was removed from the tractor project and replaced by another Bulgarian design engineer – Eugene Farkas.

Henry Ford had earned a reputation by his staff as being an impatient and demanding taskmaster. Farkas therefore was under

# the gate

## Short term, skilled labour available now



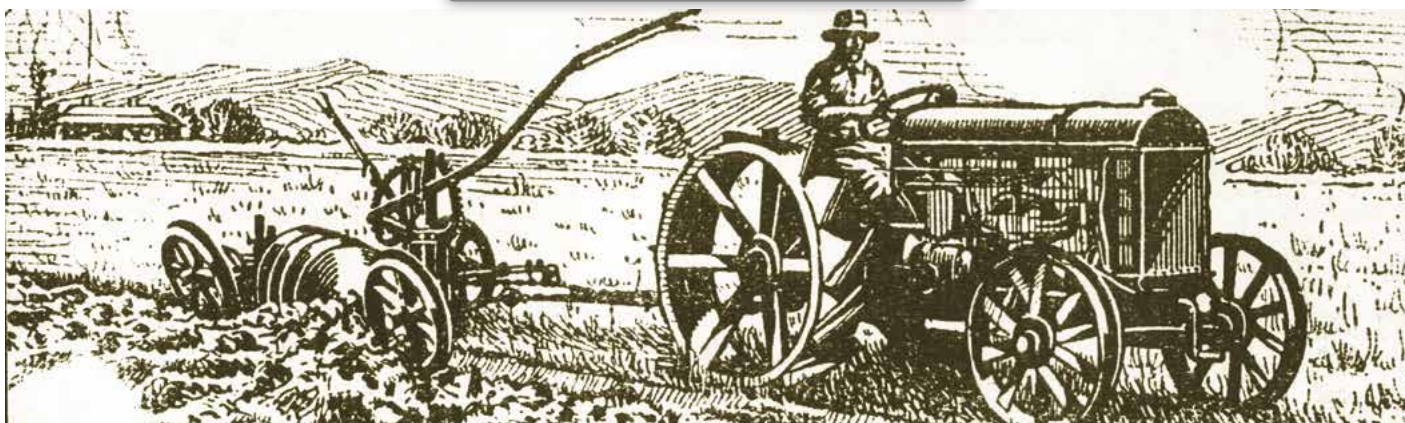
The **LABOUR PLACEMENT** division of The-Gate is essentially a service introducing Australian farmers needing short-term skilled labour, to keen and experienced young workers with farming backgrounds.

And The-Gate has a pool of skilled international farm workers with header and other large machinery experience  
**AVAILABLE NOW.**

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

[www.the-gate.com.au](http://www.the-gate.com.au) the  gate





**Pulling a four disc plough.**

pressure to produce a completely new design of tractor, in a short space of time. A tall order indeed!

Only a few months later in 1916, Farkas was able to enthusiastically present for Ford's approval an entirely new concept tractor. Instead of bolting the engine and transmission to chassis rails, which was the accepted method of tractor construction in that era, Farkas had built immense rigidity and strength into the engine and transmission housings, enabling them to be bolted together.

The result was an extremely rugged but lightweight tractor that could be produced for a fraction of the cost of any other tractor! A delighted Henry Ford extended his nod of approval. Plans were introduced to immediately put the Ford Model F into full scale production. The term 'F' was selected in recognition of the brilliance displayed by Farkas.

## **An unexpected problem**

In 1917 the tractor was ready to be presented to the world, when an unanticipated problem rocked the Ford senior management. One of the firm's legal representatives returned from the Federal Patents Office with the devastating news that the name 'Ford' could not be registered in connection with a tractor!

Upon investigation it was discovered that a personage of questionable character named W.B. Ewing had established a small tractor assembly plant in Minneapolis in 1915 and had rushed an ill designed three wheel apology for a tractor onto the market and had registered it with the Patent Office as a 'Ford'.

His intentions were obvious and dishonourable. The name 'Ford' was the most recognisable in the USA and the general public related it to quality vehicles designed with a considerable

# **FOSS Infratec™ Sofia**

## **On-farm grain analyser**

- ★ Measures: Wheat, barley, canola, chick peas, sorghum, corn, lupins, oats, field peas
- ★ The ONLY Trade Approved analyser of its kind
- ★ Results aligned with the FOSS Infratec 1241



FOSS Infratec 1241



FOSS Infratec Sofia

Take advantage of  
**2014/15**  
SPECIAL PRICES!

# **FOSS**



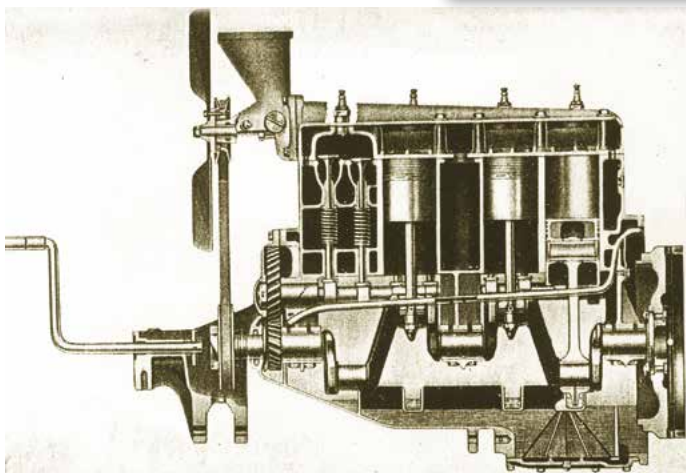
### **Why the FOSS Infratec Sofia?**

Infratec Sofia is a proven performer, used and trusted by Australian farmers for over 5 seasons. With Trade Approval and aligned with the FOSS Infratec 1241 used at receipt, Infratec Sofia offers unmatched accuracy and results you can trust.

- Stable calibrations – no adjustments required
- Compact & mobile: 240VAC/12VDC, 9kg
- Upgradeable with new crop calibrations
- Supplied in solid wooden carry case for secure storage & transport to protect your investment
- Australia-wide service support & back-up

[infratec@foss.com.au](mailto:infratec@foss.com.au)  
[www.foss.com.au/sofia](http://www.foss.com.au/sofia)  
phone: 1300 360 848





**A cut-away drawing of the innards of the Model F engine. The four cylinder unit developed 20 bhp at 1000 rpm. The ignition current was generated at the flywheel, on the front of which were a series of magnets in radial formation. The rotation of the flywheel caused the magnets to pass a ring of primary coils, which produced a current directed to four external trembler coils and thus on to the spark plugs.**

degree of engineering rectitude. Farmers therefore were likely to assume that Ewing's tractor was a Henry Ford product and would have no hesitation in placing an order for his subterfuge tractor.

When Henry Ford was acquainted with the problem he dismissed it with a wave of his hand as being of little consequence. "We shall name our tractor Fordson" he declared.

For the record, Ewing ended up bankrupt and as a direct result of the calamitous performance of his contraption, the Nebraska Tractor Testing facility was instigated. Accompanying legislation dictated that from 1920 all new tractor models had to be submitted for rigorous examination, prior to being offered for sale, in order to determine their design integrity.

## The Fordson Model F

So in late 1917 the first Fordson Model F 20 hp production tractor was trundled off the assembly line at a specially constructed factory at Dearborne, Michigan. Interestingly the first 6000 produced were exported to Britain as a special order placed by the Ministry of Munitions, (of all things!) to aid the production of farm crops during the dark days of The Great War.

Within 12 months a remarkable 34,000 tractors had been manufactured at the Dearborne plant!

In order to fulfil orders streaming in from all parts of the globe, including Australia, Europe, the USSR and South America, a second tractor factory was built at nearby Rouge. Incredibly, during its lifespan, between 1917 and 1928, approximately 750,000 Fordson Model F tractors were produced. In addition, an unspecified but large number were manufactured under license in Soviet Russia at the Putilowitz tractor plant near Leningrad. Further, in 1919 a factory was established in Cork, Ireland, where 4000 units were produced in the first 12 months.

The question often asked is how good was the Model F? How did it manage to achieve at its peak production, more than 50 per cent of the total world market for tractors with only one model, particularly when one considers the competition from such giants as International Harvester, John Deere, Case and others.

## Was the tractor that good?

There were numerous tractors produced during the life of the Model F that were comparable in size and technically more sophisticated. But the underlying factor of a substantially lower

price, when coupled to a highly innovative world wide distribution organisation with the capacity to manufacture huge volumes, set a sales pace that no other tractor organisation could hope to equal.

The Fordsons were reasonably reliable, often more so than their more expensive and refined competitors. But they were hot and rough to drive. The worm-drive differential rendered the tractor liable to rear over backwards, if an obstruction was encountered during heavy draft applications, such as ploughing or ripping. The single pedal which operated both the clutch and brakes was awkward and indeed dangerous if incorrectly adjusted.

Steering was direct and if a front wheel encountered a clod the steering wheel was inclined to spin violently, with the distinct possibility of breaking the operator's thumb. While hand cranking, it was essential to set the spark advance/retard lever correctly, or a vicious kick back could easily break a wrist.

Vigilance had to be exercised to ensure oil in the engine sump was maintained at the correct level, as lubrication was dependant on splash feed. Yet a Fordson owner knew that in the event of a breakdown, there would be a Ford dealer in a nearby town who carried a wide stock of spares. Every regional Ford Model T car dealer was also the local tractor agent.

While quite often, if a more sophisticated tractor broke down, it could be weeks before parts became available!

Today, a Fordson Model F in a collector's hands is a much treasured artefact and a living example of the world's most successful tractor.

## IAN'S CLASSIC TRACTOR QUIZ

1. Which British tractor of the late 1940s featured both a hand and foot operated clutch control?  
**Field Marshall, David Brown Cropmaster or Ota Monarch?**
2. Which of the following was the first ever Nuffield model?  
**10-60, 15-30 or Universal?**
3. The Yeoman of England was the model name given to which tractor of the 1940s?  
**Fowler, Garner or Turner?**
4. The orange colour used by Case was known as which of the following?  
**Flambeau Red, Sunset Orange or Tangerine?**
5. Vickers Vigor crawler tractors were powered by which make of engine?  
**Leyland, G.M. or Rolls Royce?**
6. Cockshutt tractors were imported into Australia in the late 1950s from where?  
**Canada, USA, or Scotland?**
7. Vaporising oil was a common name given to which tractor fuel?  
**Kerosene, Diesel or Crude oil?**
8. Which one of the following tractors was imported into Australia from France?  
**Sift, Fendt or Huber?**
9. Where did the 1951 Allis Chalmers Model G have its engine located?  
**Out front, at the rear or centre mounted?**
10. In what year was the giant Big Bud H-N 350 introduced to Australian broadacre farmers?  
**1963, 1973 or 1983?**

**A score of 8 or over indicates an excellent knowledge of classic tractors.**

**A score of 5 to 7 is not too bad.**

**A score of less than 5 is definitely ho hum!**

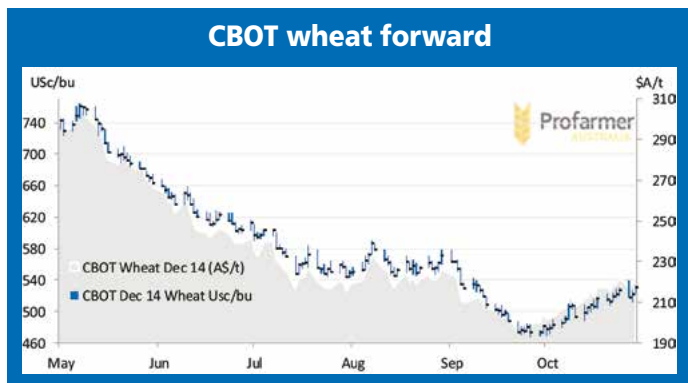
**Answers are on page 56.**

# Have futures found the bottom?

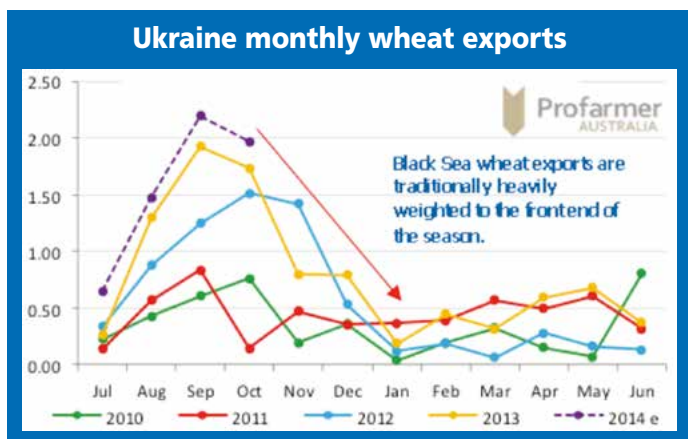
**C**BOT Dec14 wheat futures have made a resurgence over the past month, rallying 49.00 US\$/bu from lows of 474.00 US\$/bu at the end of September. In Aussie terms futures values are up A\$24 per tonne from the lows.



November 2, 2014



Internationally we have reached a point where there is far more certainty around the global crop. Northern hemisphere wheat harvests are complete, Black Sea exports have slowed and the northern corn and soybean harvests aren't far off wrapping up. So the biggest remaining unknown is the size and quality of the Southern Hemisphere crops.



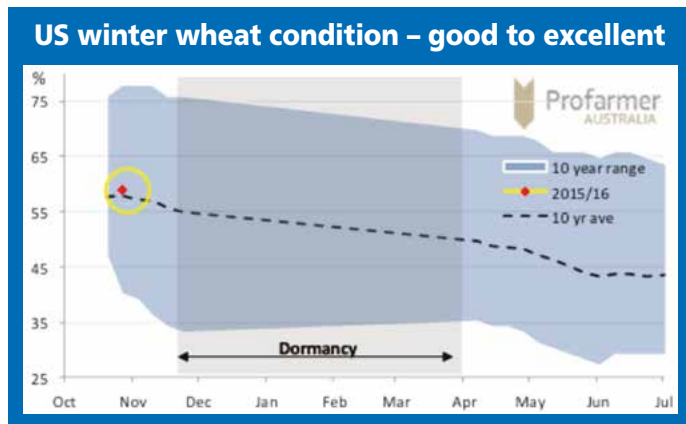
Domestically we're all too well aware of the condition of the Australian crop. South American growing regions have also experienced, and continue to experience, a warm dry growing season. So these factors bring an element of uncertainty to futures markets.

Because of these factors, combined with the large net sold position held by funds in the market, we feel that wheat futures values have done enough work to the downside for now.

That's not to say these lows won't be tested again. The US corn harvest is not yet 50 per cent complete and as harvest progress catches up it is likely some of the risk premiums priced in due to harvest delays, may come out of the market. Similarly, if the US grower turns seller this could bring harvest selling pressure to futures markets.

As the current crop quantities and quality become better known, the next northern hemisphere crop is the 2015-16 winter wheat. Planting progress appears to be on track in US, Black

Sea and EU regions, but dry conditions are becoming a concern. Russian and US crops alike are light on for moisture for establishment. Poor establishment increases the risk of winter kill as snow sets in before the crop is prepared for it. So this is working to bring some risk to the market. The first US winter crop condition estimate was released this week. It rated 59 per cent of the crop as good to excellent vs 61 per cent this time last year and the 10 year average of 58 per cent.



## BALDAN SB2013 ROW UNIT

- 20" single disc for deeper sowing and longer disc life
- Cover wheel and press wheel NOW non greaseable
- Fast depth wheel adjustment
- 6" spacing available for pasture crops, extremely robust



## SERAFIN ULTISOW



High quality, low maintenance, heavily constructed no-till seeder. Sizes ranging from 20ft – 66ft. Fitted with Baldan 20" single disc row units. Perfect seed placement for all crops. AUSTRALIAN designed, owned & manufactured.

## BALDAN CRI-A OFFSET DISC

IN STOCK READY TO GO

40, 44 & 48 plate, 28" discs, 5.3m up to 6.4m working width. Baldan oil bath bearings with 3 year warranty. Hydraulic folding wings with hydraulic locks to avoid uneven ploughing.



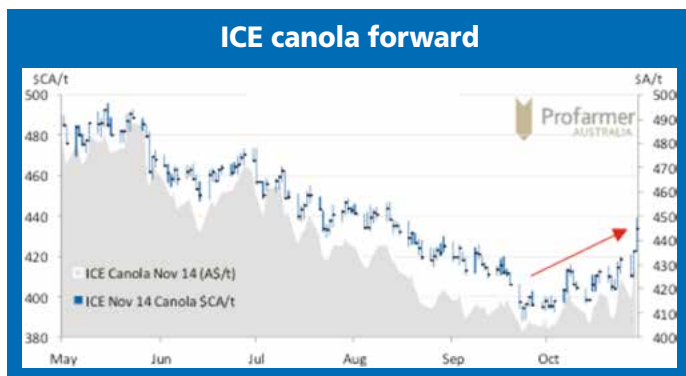
**Serafin MACHINERY**

**1300 737 586**  
www.serafinmachinery.com.au



## Rally for oilseeds too...

Recent support hasn't been isolated to wheat. ICE Nov14 canola futures have rallied C\$26 to C\$423 per tonne. In Aussie terms, values are up A\$35 per tonne from the lows. CBOT Nov14 soybeans have rallied 83.25USc/bu or 8.3 per cent to 1,006USc/bu.



The stronger oilseed complex is being driven by a number of factors.

- Inclement weather has meant US farmers haven't been able to get the crop off as quickly as they'd hoped. Heading into the year with record tight US soybeans stocks this has worked to delay the replenishment of soybean stocks expected this season.
- The delayed harvest has also meant delays for the US soybean crush, so creating a shortage of soybean meal. Stronger soybean meal prices, support crush margins and so are supportive of oilseed values. Shortages of available rail freight are also making it difficult to move what crop is around.
- Trouble in South America is pushing more business to the US. US export sales and commitments of soybeans are up 19.2 per cent year on year at 32.8 mt, whilst sales and commitments of soybean meal are up 61 per cent year on year at 6.25 mt.
- In Argentina, economic uncertainty has seen the black market exchange rate fall as much as 70 per cent below the official rate. So growers are reluctant to sell soybeans at official exchange rates, and instead, have been holding soybeans as a barter currency.
- Dry conditions across Brazil have delayed the new crop soybean plant. Ongoing drought in Brazil's key producing state of Mato Grosso has caused some uncertainty as to Brazilian production prospects. Even if rains increase from here, the delayed plant will likely delay harvest, which is also likely to see more export business pushed to the US.

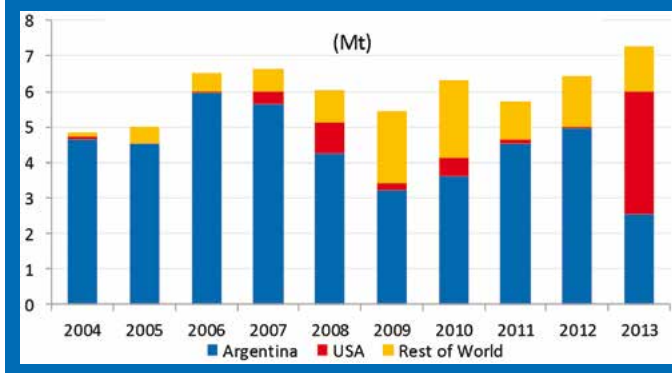
Although there is some production uncertainty around the Brazilian crop, the issues in soybean markets are largely about timing. In the immediate term the market is needing new crop soybeans and soybean meal, so bidding up the price to compete for any crop they can get their hands on. But longer term, the situation is expected to be alleviated once the new crop US soybean harvest and crush catches up.

## South America

Although South American nations are big producers of crops, they are also big consumers of the crops they produce. For example, Argentina is not an insignificant global producer of bread wheat, in a normal year they export 9–10 mt, approximately 50 per cent of which would be exported to Brazil. In these 'normal' years Brazil sources the majority of its wheat from Argentina.

But when Argentina can't meet Brazilian requirements, this pushes Brazilian demand to US origin, so supporting US wheat values.

## Brazilian wheat imports by origin



For soybeans, South America is a net exporter. But in years of tight production, or geo-political disruptions, this pushes additional demand back to the US and works to tighten the balance sheet and support US values. Hence, Brazilian production woes are garnering considerable attention at the moment.

Last season, Brazilian soybean exports came in at 46.7 mt, exceeding the US at 44.8 mt. But growing global demand for oilseeds – and US exports currently forecast at 46.2 mt, resulting in carry out stocks of 12.3 mt – there is little fat in the US balance sheet for a supply disruption in Brazil to push too much demand back to US origin.

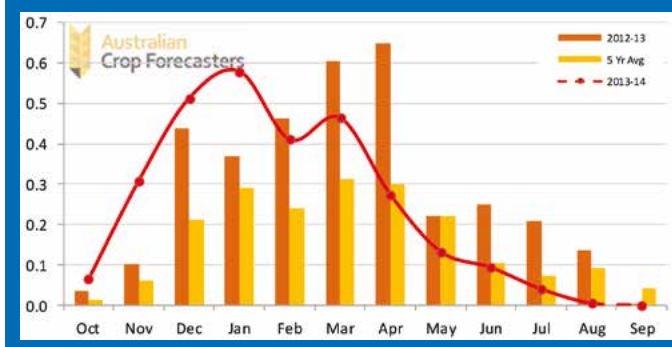
## Will last year's North American logistics debacle repeat itself?

Rail, road and river freight appears to be increasingly a point of contention in North American and Canadian markets.

Oil and other commodities continue to compete with record grain harvests for space on logistics networks, bidding up the price of rail cars. In some instances in the US the price of rail capacity has been bid up from US\$200–300 per 100 tonne rail car to \$5000. The outcome of this is US and Canadian product becomes less competitive in the international marketplace as merchants have to pay up in order to get grain to port.

Last year Aussie growers benefited when Canadian logistics came to a stand still leaving a gap in the international canola market for Aussie product to fill. Hence we saw strong exports over the Aussie summer and autumn which fell away sharply when Canada came back online.

## Monthly canola export volume (mt)



Last year's situation was exacerbated by the 'polar vortex' which brought extreme cold conditions to North America and Canada. But the reality is, the tighter the North American logistics situation becomes, the less 'fat' in the supply chain to cover for weather interruptions.

# Support grows for science-based biotech decisions

● By Elizabeth Westendorf, US Wheat Associates

THOSE engaged in monitoring the debate about the future of plant biotechnology have recently seen a rising tide of scientific support for ongoing research, even as opponents to the technology remain vocal. In early November 2014, a peer-reviewed statistical analysis of the effects of plant biotechnology and an open letter from scientists to European lawmakers have been published.

The first – *A Meta-Analysis of the Impacts of Genetically Modified Crops* – by Wilhelm Klümper and Matin Qaim, was published on “PLOS ONE,” a peer-reviewed, open-access, online science publication.

The work analysed past studies on the effects of biotech crop production and the results were striking and positive.

On average, the analysis indicated that biotechnology adoption reduced pesticide use by 37 per cent and increased crop yields by 22 per cent.

Studies for analysis were included when they build on primary data from farm surveys or field trials anywhere in the world, and when they report impacts of GM soybean, maize or cotton on crop yields, pesticide use, and/or farmer profits. In total, 147 original studies were included.

By reviewing these studies from around the world, the authors concluded that yield gains from biotech crops are even higher in developing countries than in developed countries.

## Higher seed costs offset by less inputs

The higher cost of the seeds with biotech traits is offset by lower input costs, leading the authors to the conclusion that no significant cost of production differences occur between crops with biotech and non-biotech traits.

This analysis is important because it not only reviews past studies of biotech crop effects but also statistically analyses them to look at average impacts. It pre-emptively addresses a number of key possible criticisms in biotechnology research and illustrates the overall positive effects of biotechnology in production agriculture.

Even in Europe, scientists are defending plant biotech research. In early November, 21 of the “30 most cited authors in plant science” in Europe – all of whom hold positions at publicly funded European research organisations – signed an open letter to European decision makers concerning plant science and biotech crops.

The scientists believe that Europe will have difficulty meeting its *Horizon 2020* goals of ensuring “Europe produces world-class science [and] removes barriers to innovation” unless significant changes are made in the industry.

The letter calls for maintaining or increasing funding for plant science research, the ability for plant scientists to perform field experiments for biotech crops without being blocked on political grounds or being at risk of systemic vandalism and calls for Europe to allow “prompt authorisation” of GM plant varieties that have already been found safe by regulatory authorities. The scientists added that the current de facto moratorium on approvals makes it impossible for publicly funded scientists or

small companies to compete with major corporations to address some of the big challenges facing society.

The scientists present a balanced viewpoint that merely calls for the enhanced ability of plant science to conduct relevant research and does not challenge the regulatory system. Instead, the authors called for the EU government to abide by the scientific regulatory practices already in place rather than allowing political motivations to influence decisions.

Because they believe the world will need more and better food, produced in ways that are better for the environment, US wheat farmers fully support the science-based call for research and development.

The published meta-analysis and open letter from European scientists both offer a positive outlook for future acceptance of biotechnology, both in regulation and public opinion. But for biotechnology to succeed, it is vital that governments use sound, science-based evidence in their policy-making decisions.

Source: US Wheat Associates, November 13, 2014. ■

## USDA CUTS GLOBAL WHEAT PRODUCTION FORECAST

In its November 10 World Agricultural Supply and Demand Estimates (WASDE) report, the USDA noted that late-season rain in the US and persistent dry weather in southeast Australia and Kazakhstan are cutting into 2014–15 world wheat production.

USDA also anticipates less consumption in Egypt because of a government plan to reduce bread subsidies.

Global 2014–15 wheat supplies of 905.6 mt are 1.1 mt lower in this forecast, even though EU’s production estimate increased by 1.4 mt.

Global wheat consumption of 712.7 mt for 2014–15 is lowered 1.4 mt due mainly to what USDA expects to be 0.8 mt less food and feed use in Egypt.

Global wheat trade for 2014–15 now stands at 153.4 mt, which is 1.3 mt lower compared to USDA’s October forecast. If realized, world trade in 2014–15 would be more than 7 per cent less than in 2013–14.

## Corn futures jumped

Corn futures prices jumped a bit after the USDA surprised traders by lowering its estimate for US corn yield in the report.

The agency slightly reduced its estimate of 2014–15 US corn ending stocks to just more than 51.0 mt.

That is a very large carryover and is likely to influence feed grain markets well into next year, affecting world wheat prices as well.



# National winter crop summary

● By Rural Bank

**V**ARIABLE seasonal conditions across Australia's cropping regions will mean patchy results for this year's winter crop harvest. Crops had an ideal start in most regions before below average and patchy rainfall between July and October impacted crops in the late growing season period.

The dry spring, combined with some frost events earlier in the season, has affected southern New South Wales and the Wimmera and Mallee in particular. In Western Australia, yields are expected to be average to above average in many areas, particularly the south.

Nationally, winter grain production this season is expected to be above average, but lower than last season (Figure 1). Rural Bank analysts are forecasting a national wheat crop of around 23.3 million tonnes (down 14 per cent on last season); barley at 7.3 mt (down 24 per cent); and, canola at 3.4 mt (down 9 per cent).

## Local grain prices have support

Australian grain prices are being supported by lower domestic supply this season, a lower Australian dollar and strong export demand particularly from China.

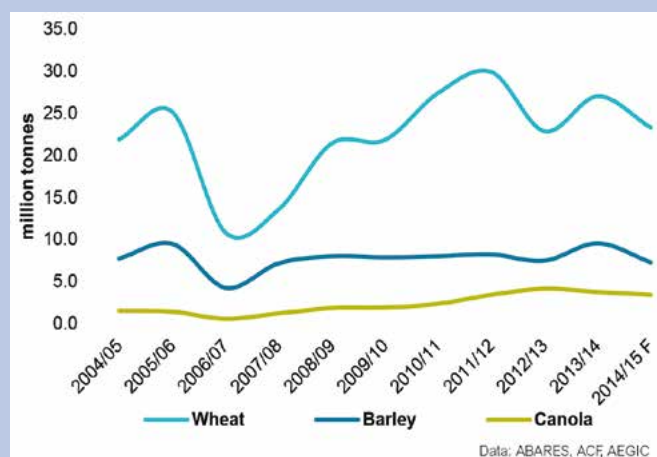
Feed grain prices are also getting support from a shortage of quality hay.

Patchy growing season conditions will impact on grain quality.

This may result in extra support for the price of higher quality grain.

On the other hand, large global crop production this year will keep a cap on grain prices. ■

**FIGURE 1: Australian grain production and forecast**



## WA – A SHINING LIGHT ON THE NATIONAL SCENE

Western Australia has had the most favourable growing season conditions of any state this year, with many regions expecting average to above average yield (Figure 2).

WA cereal production has grown to record levels in recent years and although the 2014–15 forecast is lower

than last year, wheat production is expected to be above the 5-year average of 8.28 mt.

In the past three years Indonesia has shown strong demand for wheat from WA. For the 2013–14 year, wheat exports to Indonesia were valued at over \$700 million. Exports of WA canola to Vietnam have also steadily grown. In 2013–14, canola exports to Indonesia were worth around \$290 million to the state's growers.

### From the WA field

*Lack of rainfall and a warm week in August will result in yields well below average in the northern tip of the WA wheatbelt. The Geraldton area should return average yields for cereals and canola – 1.5-1.8 t/ha and 0.8 t/ha respectively. Quality in the mid-west should be good.*

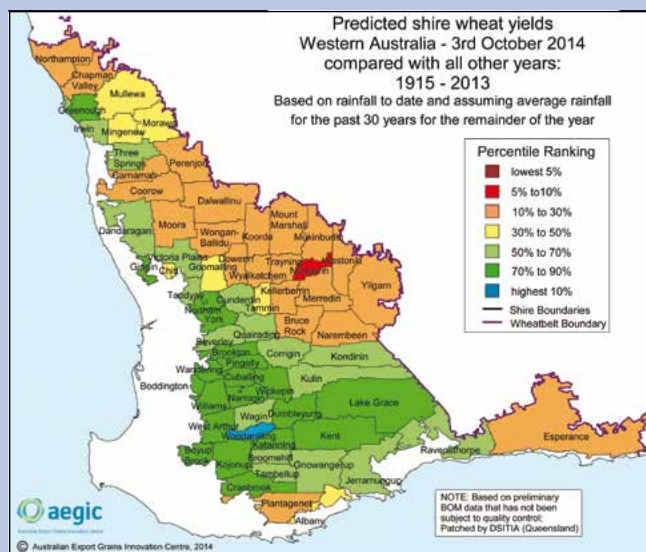
**Jeff Lycett – Rural Bank, WA**

*Central, south east and great southern areas of the WA wheatbelt should return average to above average yield. Some crops in the central district have been severely affected by hail after a large storm hit the south during October.*

*Growers have moved to lock in price for canola and should benefit from high oil content. In the east crops are patchy due to a lack of rainfall.*

**Tim Batger – Rural Bank, WA**

**FIGURE 2: Predicted shire wheat yields for WA**



# Focus on fundamentals key to farm business success

**U**NDERSTANDING then concentrating on 'what pays the bills' is the first step to achieving farm business success, according to Beaumont farmer and Nuffield scholar Matthew Hill.

"I also believe strongly in the value of key performance indicators (KPIs) and benchmarking against other farmers, as the best way to evaluate your position and track progress if you are attempting to make changes or improvements," he said.

Matthew recently addressed the Grains Research and Development Corporation (GRDC) Farm Business Update in Merredin, providing a grower's perspective on keys to successful farm business management.

His family runs a mixed farming operation north-east of Esperance, with about 80 per cent of the arable area cropped and livestock comprising the remaining area.

He said that risk management – including significant scale and active grain marketing – as well as communication, use of expert advice, formal employee management and use of technology were things he felt were done well on the farm.

## Increased scale meant less equity

Matthew and his wife Angela came to the farm in 2002 and in that year expanded the total farmed area from 4000 hectares to 13,000 hectares by leasing the neighbouring property.

"This constituted an increase in scale of 325 per cent," Matthew said. "This meant the business became highly leveraged, which came with associated volatility and risk.

"Leverage is a great tool but it works against you, just as well as it can work for you.

"Increasing equity is a primary goal of my business and needs to be achieved before I would consider it successful.

"Equity is the 'be all and end all' of farm business health and the KPI that I focus on most."

Matthew said benefits of increased scale on his farm included increased utilisation of capital and machinery; lower overheads and fixed costs; better spread of geographical risk, soil types

and rainfall; better utilisation of labour; and improved access to specialist services and advisers.

"The downsides of increased scale include greater volatility in farm performance, reduced flexibility and timeliness of farm operations and a much greater administrative burden," he said.

Matthew said he did everything he could to manage the risk of adverse commodity price movements and to maximise the benefits of positive price moves.

"After experiencing difficulty with price targeted forward selling of grain, we changed our philosophy to a time-based strategy that considers price," he said.

"We sell a little bit often; if the price is favourable we sell more and if it is not favourable we sell less.

"But we always sell – using forward, present and post sales."

## Early adopter of new technology, but be wary

Matthew said the use of technology had benefited his farm business and he had been an early adopter of auto-steering, EM38 and radiometrics for targeted lime and gypsum applications, and variable rate technology for fertiliser application.

"But it is important not to get overwhelmed by the sheer volumes of data involved with technology," he said.

"The fundamentals of farming remain unchanged and technology will only ever be there to service the fundamentals."

Matthew said good family and professional communication and relationships were also crucial to the success of any business.

**The GRDC Farm Business Update in Merredin was initiated by the GRDC after its Kwinana East Regional Cropping Solutions Network (RCSN) identified improved business skills, better knowledge of profit drivers and risk management as big priorities for growers in the eastern grainbelt.**

**Visit [www.grdc.com.au/WFBU2014](http://www.grdc.com.au/WFBU2014) to read speakers' papers contained in the GRDC Farm Business Update program, available online as a single PDF download (NB. file size is large).**

**To assist growers and advisers in understanding the capacity, strengths and weaknesses of the farm business enterprise, the GRDC has produced a comprehensive series of fact sheets available at [www.grdc.com.au/FBM-factsheets](http://www.grdc.com.au/FBM-factsheets)**



**At the GRDC Farm Business Update in Merredin are, from left, GRDC grower services manager Darren Hughes, Beaumont farmers Matthew and Angela Hill and GRDC western regional panel member and Goomalling farmer John Even.**



# Modeling carbon sequestration and cropping systems

● By Ann Perry, Agricultural Research Service – USDA

**A**SSESSING how global climate change might affect soil carbon levels is not a simple matter, in part because accurately measuring current soil carbon sequestration levels – the amount of carbon that is retained in the soil – has its challenges.

“When some people try to measure soil carbon changes, they’ll see an increase in total carbon levels and conclude that the carbon has been sequestered. But the carbon hasn’t been sequestered until, after decomposition, it becomes attached to soil mineral particles. This process can take several years, depending on the weather,” says Agricultural Research Service soil scientist Hero Gollany.

“Inaccurate soil carbon measurements can result in overestimates of how much carbon has been sequestered – and until sequestration actually occurs, the carbon can be emitted back into the atmosphere as carbon dioxide.”

Developing processes for accurately measuring soil carbon sequestration is a concern for producers, who want to be able to fine-tune agronomic practices and use them in a suite of approaches for mitigating carbon emissions that contribute to global climate change.

One tool for increasing soil carbon sequestration is to reduce fallow periods. Another tool is to use conservation tillage, which also recycles plant nutrients, moderates soil temperature, conserves soil water, controls soil erosion, and provides food and habitat for soil fauna.

## Making sense of the data

Hero wrestled with soil carbon measurement protocols when ARS agronomist Frank Young sent data to her from three Pacific US Northwest production systems and enlisted her expertise to

project how climate change would affect carbon sequestration levels in each practice. The data included carbon levels measured in soils from three crop-rotation systems:

- Winter wheat/reduced-tillage fallow;
- No-till spring wheat/spring barley; and,
- No-till spring barley/spring wheat.

Hero works at the ARS Columbia Plateau Conservation Research Center in Pendleton, Oregon, while Frank works at the ARS Land Management and Water Conservation Research Unit in Pullman, Washington.

Sequestering and keeping carbon in these dryland soils is particularly difficult because the weather restricts plant growth – conditions very similar to Australian broadacre cropping regions. As a result, there’s a limited supply of postharvest crop residue available to break down and replenish soil carbon levels – and a limited supply of moisture, which means decomposition is a slow process.

Hero used the computer program CQESTR to generate six 15-year cropping scenarios. CQESTR was developed to calculate how a range of agronomic and weather-related variables could affect crop residue decomposition and soil carbon sequestration levels.

The projections showed a wider range of sequestration levels than expected, depending on the timing of crop residue inputs. To Hero, these results indicated that the original total soil carbon data varied because it contained accrued – that is, accumulated – plant carbon and not sequestered carbon.

## Carbon: Stable or transitory?

Several methods are commonly used to determine whether carbon is bonded to soil mineral particles. This bonded fraction is considered sequestered and part of the stable soil carbon



ARS scientists at Pendleton, Oregon, developed a soil carbon model called CQESTR to estimate how climate change will affect soil organic carbon stocks in research plots like this one in Ralston, Washington. (Photo: Larry McGrew)



Marshall Samuel, a visiting scientist from Malaysia, performs an analysis for stable soil carbon at Washington State University. (Photo: Ann-Marie Fortuna)

pool that can remain relatively unchanged for decades, or even centuries.

One method is called 'light-fraction extraction', and it measures a transitory carbon pool that is somewhere between fresh plant residue and stable soil organic matter.

"Light-fraction carbon is found in plant matter that hasn't decomposed yet, so even though it has accrued on the soil, it isn't sequestered," says Hero. But this transitory carbon is still part of the total soil carbon pool and can improve soil properties for a short period of time, such as a single growing season.

Accrued carbon can readily be lost from the soil because it is not bound to or associated with soil particles. It does not provide the long-term improvements to soil chemical and physical properties that sequestered carbon provides. And inadvertently adding accrued carbon to measurements of sequestered carbon results in overestimates of how agronomic practices affect sequestration levels.

Hero and Washington State University soil microbiologist Ann-Marie Fortuna decided to reevaluate the field samples by looking for the light-fraction carbon.

Using this method, the scientists determined that carbon levels in the samples included the carbon from fine crop residue materials that passed through the sieves during sample processing – carbon that had accrued in the soil but was not yet sequestered via decomposition.

The light-fraction carbon (as a percentage of total carbon) was higher when measured in the spring than in the autumn. This, in turn, skewed attempts to use carbon data from the samples to model soil carbon sequestration levels.

When Hero adjusted the measured carbon values for these discrepancies, the CQESTR results indicated that as rainfall patterns change, existing winter wheat/fallow systems using current winter wheat varieties might not be feasible for future production in the Pacific Northwest. Even though more rain might fall in some regions, the projected changes would not be sufficient to support significantly greater amounts of wheat straw that could add carbon to the soil. The additional soil water and warmer soil temperature might also reduce carbon sequestration rates by increasing residue decomposition, which in turn would accelerate the release of carbon from the residue in the form of carbon dioxide.

"But our results showed that continuous no-till spring wheat and spring barley cropping would be a good production system for this region, since an increase in spring wheat yield is possible due to early planting if the predicted changes in precipitation patterns and temperatures occur," says Hero. "That system could benefit from the increased rainfall and produce more plant residue that could eventually boost soil carbon stocks."

Hero published her findings in 2013 in the *Soil Science Society of America Journal* and says this is the first time light-fraction carbon data has been used to generate CQESTR estimates of soil carbon sequestration.

### The key messages

"There are several key takeaways from this study," Hero says. "When and how we take soil samples is very important for future climate change studies, to make sure we don't overstate how much carbon we can sequester."

"We also need to continue to look to no-till production to manage the effects of climate change, and we need to calculate ways we will be able to take advantage of changes in precipitation."

Hero Gollany is in the USDA-ARS Soil Conservation Research Unit, Columbia Plateau Conservation Research Center, P.O. Box 370, Pendleton, OR 97801; Ph: +1 (541) 278-4410.



Winter wheat plots before harvest at Ralston, Washington.  
(Photo: Frank Young)

## Divine Dinner Plain...



*Bring the family,  
enjoy the  
wonderful  
snow that is  
still falling,  
it's perfect!  
Skiing, boarding,  
cross country  
skiing or just  
enjoy the  
fantastic  
atmosphere that  
is Dinner Plain*



Where you stroll the snow covered tree lined streets simply for the sights or to meet friends for a restaurant dinner or drinks at the bar. The village itself helps set the community atmosphere, cosy lights sparkle and entice you into their warmth. Snow lined, natural buildings and earthy tones blur the line between man made and alpine environment. Over 200 lodges and chalets with all the conveniences of a modern resort.

## What are you waiting for...



**Dinner Plain  
Visitor Information  
Centre**

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

1/24/0107270808



## Mistakes or multiple resistance in one population

You can't make the same mistake twice. The second time you make it, it's no longer a mistake. It's a choice.



**A**HRI PhD scholar Adam Jalaludin recently documented the first confirmed case of resistance to all three knockdown herbicides, glufosinate, glyphosate and paraquat, in a population of Crowsfoot grass (Indian goosegrass). And while we're at it, let's throw in the grass selective herbicides as well. Not only is this population from a palm nursery in Malaysia resistant to four groups of herbicide, it demonstrated the highest level of glyphosate resistance ever recorded!



Adam Jalaludin.

What mistake was made? It's the same story – no diversity. When one herbicide failed they simply switched to another.

What can Australian grain growers learn from this? As resistance to important herbicides such as glyphosate evolves, the answer is more than simply switching to paraquat.

Adam Jalaludin is an AHRI PhD scholar who originally hails from Malaysia. He was amongst the first in the world to report

on glufosinate (Basta, Liberty) resistance in 2010. Glufosinate is a globally significant herbicide as it is known as the third knockdown (non-selective) herbicide behind glyphosate and paraquat.

Although it is not commonly used by Australian grain growers, it is alarming, to say the least, to learn that a single weed can evolve resistance to our three main non-selective herbicide groups.

### The weed

*Eleusine indica* – common names, Crowsfoot grass, Indian goosegrass. Crowsfoot grass is a C4 plant that is 98 per cent self-pollinating.

### Resistance levels

Glufosinate (Basta, Liberty): The 14 fold resistance to glufosinate described in this study was similar to previous studies by Adam and others working in this field.

Glyphosate: This study revealed 144 fold resistance to glyphosate. This is the highest documented level of glyphosate resistance that has ever been documented in any weed species on the planet. There were 50 per cent survivors to over 47 L per hectare glyphosate 450. Huge!!! The mechanism of this resistance is currently under investigation. The only glimmer of good news is that the population appeared to show a fitness penalty. But the plants are spectacularly fit when susceptible plants are killed by the herbicide, thus reducing competition.

Paraquat: Low level (3 fold) paraquat resistance was demonstrated by this population of Crowsfoot grass. Paraquat was only used for a few years, hence lower resistance levels.

**TABLE 1: Resistance levels of *Eleusine indica* to common non-selective herbicides**

Herbicide	LD50 of known Susceptible	LD50 of Resistant population	Resistance level R/S ration of LD50
Glufosinate (eg. Basta, Liberty)	58 g/ha	820 g/ha	14 fold
Glyphosate (eg. Roundup)	148 g/ha	21,274 g/ha	144 fold
Paraquat (eg. Gramoxone)	98 g/ha	292 g/ha	3 fold
The LD50 is the herbicide rate required to kill 50 per cent of the population.			

**Resistance to group A (ACCase) herbicides** was also detected with approximately 50 per cent survival of the resistant population to field rates of the herbicides Fluazifop (Fusilade), Haloxyfop (Verdict) and Butroxydim (Falcon). Gene sequencing revealed that a single target site mutation 2027 was likely responsible for this resistance. The population was susceptible to Sethoxydim (Sertin) and Clethodim (Select).



Crowsfoot grass – *Eleusine indica*,

## How did they do it?

This population was found in a palm nursery in Malaysia where palm oil growers buy plants for their plantations. The palm plants are lined up in rows in polyethylene bags. Herbicides are sprayed around the bags by workers on foot at least once a month so the area is clean and clear for the buyers to inspect the plants.

The climate in Malaysia is hot and wet! Tropical rain falls on a daily basis with warm humid conditions – perfect for a C4 plant to thrive. Consequently there are germinations of Crowsfoot grass all year round.

There are poor spray records for this population, but discussions with workers at the nursery has enabled us to 'approximate' the following sequence of events:

- 1970s – Fop herbicides (Group A, ACCase) applied roughly once a month until resistance evolved.
- Early 1980s – Paraquat applied once a month. This practice was only used for a few years.
- 1980s and 1990s – It is likely that glyphosate was applied at least once a month for approximately 15 years until resistance evolved. But there are no records of this. The very high level of glyphosate resistance implies that there must have been a significant period of glyphosate usage.
- Mid 1990s–2010 – glufosinate applied at least once a month until resistance evolved.

They had to work pretty hard at it to evolve these levels of resistance. At least 12 sprays per year for 15 years with no other form of weed control. It is highly likely that the herbicides lasted as long as they did because Crowsfoot grass mostly self-pollinates. If we exposed annual ryegrass (must cross-pollinate) to that much selection pressure it is very likely that resistance would have evolved much sooner.

## What can we learn?

Australia is a lot different to Malaysia, but the same principles apply.

Glyphosate resistance is rearing its ugly head in Australia. If our only strategy to manage this is to switch to paraquat then paraquat resistance will soon follow. But if we add diversity to the system as we rotate to new herbicide groups, we give ourselves a fighting chance.

When growers first discover resistance to important herbicides such as glyphosate on their farm, yes they should rotate to alternatives such as paraquat. At the same time, they should declare war on the weed seed bank by using tactics such as crop competition, pre-emergent herbicides, seed set control and harvest weed seed control.

## Take no prisoners

In the words of Esperance grain grower Chris Reichstein:

"I bought a farm and later discovered that it came with glyphosate resistant ryegrass. Six years on I am no longer worried about this problem as I have managed the seed bank. Ryegrass numbers are now very low on that farm. I have recently purchased more land with confirmed glyphosate resistant ryegrass and I am confident that I can manage it."

How did Chris achieve this? He tows a chaff cart at harvest and uses a range of tactics to target the ryegrass seed bank.

You can't make the same mistake twice. The second time you make it, it's no longer a mistake. It's a choice. Growers have the choice to add diversity to their weed management as resistance evolves. ■

# THE BEST OPTICAL SPRAYING SOLUTION ON THE MARKET



**"The unit has more than paid for itself and the surplus has been ploughed into extra fertiliser to further boost the next crop's potential."**

**WEEDit Owner,  
Cereal and canola producer, S.A.**

Purpose built contour following boom.  
The latest in weed detection technology.  
WEEDit cameras are the newest optical solution to hit the market.

Nothing else compares to WEEDit.



**PRODUCT MANAGER**  
**QLD**  
**SOUTH QLD/NORTH NSW**  
**NORTH NSW/TAS**  
**SOUTH NSW**

**Steve Norton** 0437 878 695  
**Rob Graham** 0409 597 462  
**Jeremy Jones** 0407 485 569  
**Dave Farmer** 0427 651 971  
**David Hamilton** 0427 975 072

**VIC**  
**SA**  
**WA**  
**WA**

**Matthew Plunkett** 0417 832 784  
**Luke Wormald** 0419 991 534  
**Gavin Merritt** 0448 022 172  
**John Griffiths** 0407 132 746

**CROPLANDS**



## ASK AN EXPERT – WHEN IS CLEAN SEED, CLEAN ENOUGH?

● With Mechelle Owen, Senior Research Officer with AHRI

**R**ETAINING seed on-farm for planting next season makes good economic sense – unless that seed is contaminated with weed seed.

AHRI senior research officer, Mechelle Owen, surveyed grower-retained seed to assess the level of weed seed contamination and the effect of grain cleaning. What she found alarmed the growers involved and pointed to the importance of sowing clean seed into clean paddocks.

“The first finding was that the vast majority of the surveyed growers retained seed for planting and were conscious of the need to remove weed seed contaminants,” she says. “Unfortunately, over 70 per cent of the seed samples we analysed were still contaminated with weed seed, even after cleaning.”

The remaining samples were weed-free, proving that attention to detail can produce a clean sample suitable for planting.

The other finding was that much of the weed seed collected at harvest time is herbicide resistant. “Growers would never deliberately plant herbicide resistant weed seed along with their crop,” says Mechelle. “But that is what happens if the retained seed is not thoroughly cleaned. Many weeds present at harvest are there because they are herbicide resistant.”

### How much contamination is too much?

**Short answer:** Every weed sown has the potential to return seed to the seed bank.

**Longer answer:** 100 weed seeds per kg of cereal or pulse seed sampled equals around one weed per square metre when the crop is sown.

### Does the type of cleaning system used make a difference?

**Short answer:** Yes, gravity tables are best.

**Longer answer:** The growers surveyed used a range of cleaning methods including gravity tables, sieves, combination



**Planting crop seed contaminated with potentially herbicide resistant weed seeds will increase the in-crop weed pressure.**

and rotary screen cleaners. Combination and rotary screen cleaners produced a similar level of decontamination, sieves provided the poorest result and grading tables gave the best results. Crop type also influenced the level of weed seed contamination, with greater weed seed contamination in cereal samples compared to lupin samples.

Any cleaning is beneficial but the more professional the better as independent contractors consistently achieved cleaner seed.

### How do I measure the level of contamination?

**Short answer:** Check a 1 kg sample.

**Longer answer:** Collect a 1 kg sample of the retained seed and separate the crop seed from all other material.

### What's the best way to reduce or avoid weed seed contamination?

**Short answer:** Harvest seed from paddocks with minimal weeds.

**Longer answer:** Plan ahead. Clean grain harvesting and handling gear thoroughly between paddocks. Harvest seed from low-weed-burden paddocks and use a gravity table to clean the seed. Check the level of contamination after grading. ■



**AHRI researcher, Mechelle Owen, says many growers are unaware of the level of weed seed contamination that can occur in crop seed retained for planting, even after cleaning.**

## 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.

# Biopesticides emerge as natural fit for integrated pest management

**G**RAIN growers are being urged to think about how an alternative to synthetic chemical pest control could benefit their farming systems in the long-term as part of an integrated pest management strategy.

Researchers are finding more and more potential benefits from biopesticides, which use naturally occurring bacteria and fungi to protect crops. Charles Sturt University (Wagga Wagga, NSW) plant pathologist Prof Gavin Ash said that, as knowledge and technology progresses, growers will have access to more widely-available and cost-effective biopesticide options.

"Biopesticides that have been successfully commercialised are competitive on a cost basis with normal, synthetic pesticides. The challenge is to extend the range of available biopesticides and get new products into the market at a reasonable cost," Gavin said.

"In a biopesticide there's a whole range of different organisms – it's basically a disease. It's a disease of an insect or a snail, or a disease of a disease.

"The difference between a synthetic and a biopesticide is that you put a synthetic on, and that's all you're going to get. But a lot of the biopesticides, they kill, and then they can kill again – not forever, but for a little bit longer than a traditional pesticide.

"For example, with the nematodes that kill snails, they kill from the inside out. And a fungus that we're using to control aphids grows on the outside, and that kills the insect by penetrating it and turning it into lunch."

Research into biopesticide efficacy has been conducted with Grains Research and Development Corporation (GRDC) support, with results so far demonstrating benefits like control of pests already resistant to chemical pesticides, reduced likelihood of developing resistance, precise targeting of pest species and reduced chemical residue.

While grain growers have access to some commercially available pesticides – and there are Australian registrations for products based on various naturally occurring fungi and bacteria – it is hoped results from ongoing research programs will lead to a wave of commercially available biopesticides that will aid farmers in tackling priority pest and disease issues.



**Charles Sturt University plant pathologist Gavin Ash says grain growers in Australia can look forward to long-term benefits from non-chemical pesticides now under the microscope.**

## A bacteria to help fight blackleg

One GRDC-funded project has been working to identify possible widespread use of a bacteria found in southern region soils that has been known to help plants resist the fungus that causes blackleg disease in canola.

A team at Charles Sturt University has been compiling comprehensive rankings of these bacteria in their effectiveness in preventing blackleg to help inform further work in developing a viable biopesticide. If successful, a bacteria-based product developed from this program could not only tackle blackleg, but combat other canola health issues and act as a growth-promoting agent.

Another GRDC-funded research project has been gathering pre-commercialisation and registration data for a fungus aimed at controlling aphids in cereals and canola. The project has helped identify strains of the fungus *M. anisopilae* that is effective against aphids. These strains are now being tested under laboratory conditions, and any native Australian strains will be potential candidates for the manufacture of an effective biopesticide.

Root lesion nematodes are also in the sights of future biopesticides, with field trials being undertaken to help identify bacteria and fungus strains that have the potential for development into commercially available biopesticides.

The long-term goal of these research projects is to develop proven, cost-effective and sustainable pest control measures, which Ash said growers should be able to incorporate seamlessly within their cropping systems.

"Biopesticides can be applied any way a normal pesticide can be applied. So they can be applied as a bait, they can be applied as a spray or they could be applied on seed, depending on the different types of biopesticide," he said. "These can be used with traditional equipment, or slightly modified versions of equipment a farmer would have."

Further information Gavin Ash, Charles Sturt University, Ph: 02 6933 2765. ■



Boss Ag Parts is online now and our spare parts listings are growing everyday.  
With competitive prices and regular Specials its worth checking in to see what's new.

online now!  
**[www.bossagparts.com.au](http://www.bossagparts.com.au)**  
Phone Boss Ag Parts 02 6721 5188



**Boss Agriculture**  
P 02 6721 2677 • F 02 6721 2760  
Dan Ryan 0488 512 677  
Dave Herbert (Dalby QLD) 0439 286 277

**Boss Agriculture** - A division of Boss Engineering Pty Ltd  
40 Taylor Avenue Inverell NSW 2360

**[www.bosseng.com.au](http://www.bosseng.com.au) • [www.bossagparts.com.au](http://www.bossagparts.com.au)**



# Bale Direct system 'turns a quid' in the right circumstances

**T**HE Bale Direct system is an effective harvest weed seed control method that has also turned a quid for David Heinjus on his family's mixed farm – Pareta Farms – near Freeling on the edge of South Australia's Barossa Valley.

Herbicide resistant ryegrass has been a challenge on their 3500 hectare farm for several years and wild radish is also showing signs of developing resistance. For around 20 years oaten hay production has been part of the rotation on the farms and this has helped manage the annual ryegrass problem.

In 2007 the family leased a farm at Kapunda and reintroduced livestock to their farming operation. They are currently running 2000 ewes for wool and prime lamb production and have included a vetch and balansa clover pasture phase to the rotation of bread and durum wheat, faba bean, canola and oaten hay.

David invested in the Bale Direct system in 2009, when he saw the opportunity to reliably collect weed seed at harvest and produce a saleable commodity in the process.

"Livestock and hay production helped contain the problem we had with annual ryegrass but we could see that it was not going to be the whole answer," said David. "We didn't want to burn chaff rows or heaps because our farms are surrounded by many neighbours. The Bale Direct system is a great way to collect and remove weed seed from all our crops and we have been very pleased with the results."

## Some minor modifications

To operate efficiently the Bale Direct system requires a large harvester but once the adaptation is made the baling operation does not slow harvesting down. Since having the unit installed David has modified it slightly, adding a small water tank and pump to spray water into the baling chamber to help maximise bale weight in hot conditions.

The bales are sold to a livestock feed pellet mill less than 10 km from the Heinjus' farms, making the sale of 8000 plus bales a year a profitable income stream for the business. David identifies availability of markets and freight as the greatest barriers to the adoption of the Bale Direct technology.

## The numbers stack up

He also employs some additional casual labour at harvest time to stack the bales but overall the system has provided a



**David Heinjus is well into a seven year campaign against herbicide resistant weeds using the Bale Direct technology.**

good return on investment. David has a professional background in financial management and planning and so was in a good position to thoroughly test the profitability as well as the practical benefit of his investment in this harvest weed seed control method.

"We have the advantage of a nearby market and we take care of the delivery ourselves," he said. "We also sell directly to some customers who use the straw for bedding in piggeries and chicken sheds. Once the straw has been used for bedding it is generally composted and that is the final step in destroying the weed seeds."

To maximise profitability with the Bale Direct system David has kept their harvester a few years longer than he would normally keep a new harvester. He plans to sell the harvester – complete with the Bale Direct module – in 2015–16 at the conclusion of a seven-year dedicated campaign to drive down the weed seed bank.

The only downside to the system in David's view is the continual removal of the crop residue from their paddocks.

But now that the baling program has removed a significant amount of weed seed from the farms, David is planning to revert back to weed control methods that retain more crop residue in the paddocks.

He is confident that the hay production and livestock and pasture phase will be able to provide reliable control once the weed seed bank has been significantly run down during the seven year harvest weed seed control plan using the Bale Direct system.

## Low risk break crop

"The pasture phase is a low risk break crop and weed control option for us," he said. "We can sow vetch and balansa clover early and not be concerned about frost-prone paddocks. The high bulk pasture competes well with weeds and the sheep clean up any rogues that do appear."

David uses the ewes and lambs in a controlled grazing program to take advantage of the high bulk of feed. At weaning the ewes are removed, leaving the lambs to finish on the pasture and to clean up any weeds before they set seed.



**The Bale Direct system captures over 95 per cent of weed seeds present at harvest at a cost of just under \$50 per hectare over 1000 harvested hectares.**



**The large bales produced have many uses in intensive agriculture, construction and energy industries, making the Bale Direct system profitable if the farm has buyers nearby.**

"In addition to the weed control advantages, the pasture also provides additional soil nitrogen and is a disease break for the cereal crops," he said. "Once the Bale Direct phase is complete we will reintroduce stubble grazing to clean up cropping paddocks after harvest."

After some initial testing to establish that herbicide resistant weeds were present on the farms, David now treats all weeds as if they were resistant and has built as much diversity as possible into his weed management plan.

"There are weeds resistant to group A and B herbicides and I expect there would be some glyphosate resistant weeds too," he said. "We have found that we are still using similar amounts of herbicide but the sprays are more effective than they were before we started our campaign to bring crop weeds under control." ■

## COSTING IT OUT

Wongan Hills (WA) grower, Graham Shields, developed the Glenvar Bale Direct system, which captures all of the residue leaving the back of the harvester, including 95 to 98 per cent of weed seeds.

Peter Newman from the AHRI communications team, said the end uses for the bales include stockfeed pellets, animal bedding, ethanol fuel and straw logs for power generation or the manufacture of strawboard.

"Overall the Bale Direct system is a great way to remove weed seeds at harvest while increasing profitability," he said. "But this is a costly option if you don't have a suitable market for the bales nearby because the system has high finance, fuel, maintenance, bale handling and residue removal costs."

- The estimated cost, based on one harvester and including nutrient removal costs for a 2.0 tonnes per hectare wheat crop, is around \$50 per hectare for 1000 harvested hectares.
- This cost reduces to \$32 per hectare for 4000 harvested hectares averaging 2.0 tonnes per hectare.

With access to a suitable market these costs can easily be recovered through the additional income, as David Heinjus has found (see main article).

Research supported by AHRI and the Grains Research and Development Corporation (GRDC) shows seedbanks of annual weeds can be rapidly depleted when harvest weed seed control systems are used to capture and destroy weed seeds at harvest.

For more information on planning a strategy to manage the risk of herbicide resistance, visit [www.weedsmart.org.au](http://www.weedsmart.org.au)



**InsectTech™**

# HELICOVEX®

**High Potency & Highly selective  
Heliothis NPV Insecticide**



- Contributes to resistance management of traditional insecticides
- High quality formulation
- Excellent shelf life and spray tank stability.

## INTRODUCTORY OFFER

**2 FREE Heliothis moth monitoring traps  
supplied with every 1L sold.**



**20% off MyTraps pest monitoring  
software packages with  
every purchase.**

Use coupon code **OCP**.



NSW/WA	James	0408 025 139
SA	Plamen	0488 583 333
VIC/TAS	Scott	0488 717 515
QLD	Andrew	0448 016 551

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





# Turning up the heat on canola

**U**NSEASONAL hot weather reduced the yield potential of many Western Australian canola crops this year, but research could help deliver varieties with better heat tolerance in the future.

Recognising that canola is vulnerable to heat stress, particularly at flowering time, the Grains Research and Development Corporation (GRDC) is supporting canola heat tolerance research at The University of Western Australia (UWA).

The research started in 2013 and is part of the National Brassica Germplasm Improvement Program which aims to provide canola breeders with advanced genetic material, incorporating new or improved traits, so Australian growers have access to cultivars that allow them to compete effectively on world markets.

"WA canola crops – particularly in the northern and eastern grainbelt – suffered from heat stress this season, and this is likely to happen again in future seasons," UWA Institute of Agriculture and School of Plant Biology researcher Dr Sheng Chen said.

"The damaging heat stress occurred when the canola crops were at the early flowering stage.

"Severe heat stress during flowering reduces canola seed yield and affects seed quality, and next year we should have sufficient data to quantify the effect of heat stress on canola seed yield and quality."

Sheng and his colleagues are in the early stages of screening more than 100 internationally-sourced canola lines – from places including Europe, China and India – in a bid to identify lines with good heat tolerance.



**UWA researcher Sheng Chen with heat-treated canola plants in a Controlled Environment Room.**

"We hope to isolate lines that are more heat tolerant than existing Australian commercial lines and which can be used in Australian canola breeding programs in coming years," he said.

The heat tolerance trials are taking place in Controlled Environment Rooms (CERs) and in the field.

In the CERs, the canola lines are being subjected to five different temperature combinations at flowering time, including high temperatures of 25°C, 32°C and 35°C.

Sheng said it was too early to determine which canola lines had superior heat tolerance, but independent research led by Prof Wallace Cowling at the UWA Institute of Agriculture had identified some heat tolerant lines of *Brassica rapa*, an ancestor of canola grown as an oilseed or vegetable crop in some countries.

Wallace said the research involving *Brassica rapa* had been conducted at UWA since 2008, and had been supported by the Australian Research Council (ARC) Linkage Project scheme and industry partners since 2011.

"The goal has been to find heat tolerance genes in *Brassica rapa*, as these could easily be transferred into canola lines by plant breeders," he said.

**More information: Sheng Chen, UWA, Ph: 08 6488 5928, 0423 238 218, E: sheng.chen@uwa.edu.au**



- Continuous Flow Grain Driers from 8 Tph upto 150 Tph
- Conveying and Elevating Equipment upto 600 Tph



*Distributed & Serviced in Australia by:*

**Aust-Mech**  
AUSTRALIAN CONVEYOR SYSTEMS Pty Ltd



**E: sales@austmech.com Ph: (07) 4662 4200**

**Rob Coleman Ph: 0439 362 693 E: Rob.coleman@perryengineering.com**



*The UK's Most Experienced Manufacturer of Grain Drying & Handling Equipment*

## HEAT TOLERANCE RESEARCH COULD SEE MORE CANOLA IN THE NORTHERN REGION

In coming years, this UWA heat tolerance research will take on a more national focus with trials also planned for Australia's northern cropping region.

Many northern region grain growers are very keen to have another winter crop rotation option up their sleeves – particularly one with the soil health, weed control and economic benefits canola can often deliver for their southern and Western Australian counterparts. But rapidly rising daytime temperatures, typical of a northern region spring, makes profitable canola production, with currently available varieties, difficult.

Dr Sheng Chen is confident that within about five years, northern region growers will have more heat tolerant canola varieties to choose from.

# 'Home-grown' algae could boost stockfeed productivity

**B**EEF producers could soon benefit from a protein-rich and sustainable livestock feed supplement in the form of microalgae. The University of Queensland has established an Algae Energy Farm to cultivate and harvest microalgae for a range of uses, including as a feed supplement for beef cattle.

The Algae Energy Farm, established by UQ's School of Agriculture and Food Sciences with assistance from Meat and Livestock Australia, is an off-grid 250,000-litre demonstration farm at UQ's Pinjarra Hills campus.

Lead researcher Professor Peer Schenk said the farm showed that algae could be grown easily in Australian conditions, leveraging feed and fuel, and without competing for arable land needed for food production.

"We are working closely with Australian primary producers to produce protein-rich feed to meet the nutritional needs of cattle and other livestock," Peer said.

Such a feed source would help mitigate large seasonal variations in pasture nutritive value and boost cattle growth.

The UQ Algae Energy Farm was officially opened on August 19 by Qld Minister for Agriculture, John McVeigh.

"UQ, including the Queensland Alliance for Agriculture and Food Innovation, has worked closely with Meat and Livestock Australia and Xstrata Technology to establish this pilot algae farm," the minister said.

"Agriculture is one of the four pillars of our Queensland economy and it is pleasing to see collaboration between different groups to establish technologies which will assist the beef industry grow."

## Broad-based benefits

UQ Vice-Chancellor and President Professor Peter Høj said the University was delighted to target its research excellence to a project with prospective benefits for individual farmers, the industry and the economy.

"Being able to work with Meat and Livestock Australia and use Xstrata technology enabled the researchers to work towards a farm-ready solution suitable for the tough conditions faced by so many Australian producers," Peter said.

"Such industry partnerships help turn excellent research into high-quality outcomes for society, the economy and the environment – a process of translation that we call excellence-plus."

Prof Peer Schenk said the fact that dry season pasture in northern Australia was typically low in protein and energy acted as a constraint on beef production.

"Microalgae would help with management of prolonged dry conditions, such as those affecting much of Queensland," he said.

"The challenge is to develop technology that can be readily and cost-effectively applied on beef properties as a 'home-grown' source of high-quality protein feed."

The technology used by UQ is farm-ready and can use virtually any type of water, which means that cultivation of microalgae offers a cost-effective way of producing feed and fuel all year round with minimal use of land and water.

The Pinjarra Hills farm can produce about 50 tonnes of algal biomass and 60 barrels (about 12,480 litres) of biodiesel per hectare a year.

Xstrata Technology provided UQ with mining industry flotation technology – an XT Jameson Cell – for a nine-month trial. Early results show it has significantly increased algae production. ■



Home-grown microalgae could provide a high quality stockfeed supplement.

GET MORE THAN WATER SAVINGS

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

Get even more than water and labor savings with your new pivot or lateral. For a limited time, when you buy a new machine you will receive a FREE Valley® Jacket.

**VALLEY**   
The Leader in Precision Irrigation

[www.valley-au.com](http://www.valley-au.com)

Ph: 07-3457-8830

Email: [vaus@valmont.com](mailto:vaus@valmont.com)



# Reducing fertiliser needs by accounting for soil microbes

● By Dennis O'Brien, Agricultural Research Service – USDA

**F**ARMERS face a balancing act when deciding how much fertiliser to apply. Applying too much wastes money and adds to nutrient runoff problems. Applying too little reduces yields.

Agricultural Research Service scientists in Temple, Texas, have found a way to help get it just right, maximising profits, minimising costs, and saving water bodies from unwanted nutrient runoff. They have developed a test that accurately portrays soil health by determining the levels of naturally occurring nitrogen and other nutrients.



An ARS technician applies an organic fertiliser source on plots in a study to optimise application rates of organic and inorganic fertilisers. The study is part of efforts to evaluate a new ARS-developed tool for soil testing that can be used to help growers reduce fertiliser use without decreasing yields. (Photo: Daren Harmel)

## Microbes play a key role in nitrogen cycle

Traditional methods for determining fertiliser needs are based on soil tests developed in the 1960s, which measure the amount of nitrate in the soil. But these tests don't account for the contributions of soil microbes. The microbes play a key role because they mineralise organic nitrogen and phosphate and make them more available to the crop. As a result, farmers often apply more fertiliser than the plants actually need, adding to their costs and causing unnecessary nutrient runoff.

"The problem is that most conventional tools are not measuring the right soil characteristics. They test for inorganic nitrogen in the form of nitrate, but that's just one form of nitrogen available to the plant," says Richard Haney, a soil scientist with the ARS Grassland, Soil, and Water Research Laboratory in Temple.

Richard has developed a more integrated approach. Known as the 'Soil Health Tool' or 'Haney Test' in commercial laboratories – it involves drying and rewetting soil and analysing it in ways that account for microbial activity and measure both nitrate and ammonium, plus an organic form of nitrogen. It also measures organic carbon and other nutrients, in part by replicating some of the natural processes that occur in a field.

The drying and rewetting mimics what happens in the field before and after a rain. Nutrients and other compounds are extracted from the soil samples with both a water-based solution and a solution known as 'H3A', which has the organic acids that plant roots use to acquire nutrients from the soil. Growers who use the process receive a spreadsheet that shows the amounts of nitrogen, phosphorus, and potassium available to plants, based on results extracted by both the water and H3A-based solutions.

Results also include measurements of water-soluble organic carbon, water-soluble organic nitrogen, and soil microbial

# Charlton's

## FISHING

TACKLE • BAIT • ICE



MAIL  
ORDER  
WELCOME

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

Minnkota  
Daiwa

Humminbird

Shimano

Abu Garcia

G-loomis

Penn  
Jackall

18 Kerwick Street Redbank Q 4301 Ph: 3818 1677 [www.charltonsfishing.com.au](http://www.charltonsfishing.com.au)

activity, and they provide a calculation of soil health and the ratio of carbon to nitrogen (a key in how much organic nitrogen is released). Organic carbon and organic nitrogen are natural byproducts of microorganisms breaking down the soil. Growers can use the results to determine fertiliser needs.

### Savings for farmers

The Soil Health Tool works for any crop produced with nitrogen or other nutrient fertilisers. Richard has made it available to commercial and university soil-testing laboratories, worked with farmers to promote it, and published several papers detailing its mechanics. The research is funded in part by the Texas State Soil and Water Conservation Board and the US Department of Agriculture's Natural Resources Conservation Service. This enhanced soil-testing process is now offered by laboratories in Maine, Nebraska, and Ohio. It adds to the time and costs for a soil test, but farmers have learned that in the long run it saves on fertiliser costs.

David Brandt, who farms 500 hectares in Carroll, Ohio, started using Richard's system three years ago to estimate the amounts of nitrogen he needed to apply to his corn, soybeans, and wheat fields. He also used it to estimate his phosphorus and potash fertiliser needs.

"I estimate that it's saved us at least 25 per cent in nutrient costs," he says. "The readings were more accurate than other soil tests we had run, and we either maintained or increased our yields."

On average, fertiliser costs are reduced by about \$10 to \$15 per acre (\$25 to \$37 per hectare) by adopting the system, Richard says. With less fertiliser being applied, there is also less nutrient runoff into rivers and bays.

"This means that less of the nutrients are going into the Gulf of Mexico, Chesapeake Bay, and other waterways, where they have been contributing to algae blooms year after year," Richard says.

### Works well with no-till, cover crops

Another problem with conventional soil tests is that they are based on tilled systems used from the 1940s through the 1960s, so they often fall short in providing estimates in cover-crop and no-till systems, which create entirely different soil profiles. Richard's system is able to measure the effects of cover crops and no-till practices. "We can develop a soil health calculation and suggest a cover crop mix," Richard says.

David found that the results helped him understand the contributions made by his cover crops. "We knew they were helping, but we never understood why. This new information gave us a better understanding of what was going on in terms of nutrients in the soil," David says.

He used the information to adjust his mix of cover crops and get a better ratio of carbon and nitrogen – a critical factor in soil health. "It's helped us to pick the right cover crops to utilise in the field," he says.

In a four-year field study conducted with Daren Harmel, research leader of the laboratory in Temple, Richard evaluated the enhanced soil-testing method in fields of wheat, corn, oats, and grain sorghum at nine sites in Texas. They applied fertiliser at traditional rates or at the amounts dictated by the Haney soil tests, and they left some plots unfertilised. They planted and harvested on the same dates at each site and kept track of fertiliser costs, crop prices, and overall profits.

They found that the enhanced method reduced fertiliser use by 30 to 50 per cent and reduced fertiliser costs by up to 39 per cent. The enhanced method had little effect on corn production profits, but increased profits 7 to 18 per cent in wheat, oat, and sorghum fields. The results were published in the *Open Journal of Soil Science* in June 2013.

"We're asking farmers to think about what they're putting on the soil and whether it is necessary. It involves a new way of thinking, but fertiliser costs are rising, so the idea is attracting more interest," Richard says.

Richard L. Haney is with the USDA-ARS Grassland, Soil, and Water Research Laboratory, 808 East Blackland Rd., Temple, TX 76502; Ph: +1 (254) 770-6503. ■



ARS scientists have developed a testing process that accurately measures naturally occurring nitrogen and other nutrients in soil. (Photo: Peggy Greb)



*Farming for the Future...*

**"Two well known companies united"**



**GYRAL HAS A NEW MANUFACTURING FACILITY UNDER NEW OWNERSHIP**

- AIR SEEDER BINS
- AG BOSS DIRECT DRILL
- PENETRATOR DIRECT DRILL
- LEUCAENA PLANTER

- BELT SPREADERS
- MANURE SPREADERS
- SILAGE FEED OUT WAGON
- LARGE RANGE OF SPARE PARTS

74-92 Buckland St Toowoomba QLD 4350  
 Ph: (07) 4634 3388 Fax: (07) 4633 1634  
[www.gyral.com.au](http://www.gyral.com.au)  
**Australian Made & Australian Owned**

**A DIVISION OF**



**GREAT WESTERN CORPORATION P.L.**



# Global grain intelligence providing strong marketing expertise

**A**Gfarm works with growers to manage the marketing and sales of their grain by providing global grain intelligence, strong marketing expertise and an innovative range of products and services to keep growers in farming for generations to come. The range of Agfarm products incorporates dynamic and flexible options – from financing crop inputs through to attaining the best grain prices.

In little more than 20 years Agfarm has gone from basic grain acquisition to a dynamic national sales and marketing role. More importantly it is continuing to increase the options and the markets for Australian grain, oilseed and cotton growers.

And it all began in 1992 with Bob McKay in his hometown of Warren, NSW. From there a combination of aggressive growth and strategic mergers has seen Agfarm emerge as one of the country's leading grain brokers. One of its most significant steps was its connection with Ruralco in 2009 and last year welcomed the global farmer-owned co-op CHS Inc (CHS) on board as a 50 per cent investor and partner.

Targeting the broadacre cropper, Agfarm has maintained its market-leading position through the introduction of innovative and cutting-edge products.

## New finance offer aims to reduce grain grower's cash flow problems

Its latest release is *Agfarm Accelerate* – a finance facility linked to the grower's input costs, such as fertiliser, chemical and seed.

South Australian Ruralco agronomist Ben Hook agreed that the product offered a range of benefits to his Crystal Brook store's clients. "Importantly, growers are offered an extremely competitive interest rate, often well below rates with commercial banks," he said.

"This allows them to make sizeable interest savings but also free up their regular bank overdraft – just about everyone who has had a look at *Accelerate* has dipped their toes in and some have taken full advantage with the majority of their inputs."

Enabling growers to convert future grain production into a line of credit with *Agfarm Accelerate* frees up cash flow and still lets growers finance cropping inputs.

That means access to cash from pre-sowing through to harvest. Agfarm general manager Felicity Hennessy says Agfarm listens when growers talk – and because she and many of the Agfarm team come from farming backgrounds they understand what clients really need.

"Instead of facing the increasing costs of cropping inputs and funding with traditional banks, we have developed *Agfarm Accelerate* as a flexible and simple way to finance your cropping inputs," Felicity says.

"Agfarm provides funding to your *Agfarm Accelerate* account, which you use to purchase all your cropping inputs from your nearest participating store.

"You receive monthly statements detailing funds spent, credit

available and interest accrued as you can access your account at any time. At harvest time, your account is repaid in grain plus interest."

Applications opened on November 1 so growers can find their nearest participating store or apply online at [agfarmaccelerate.com.au](http://agfarmaccelerate.com.au).

In parallel with *Accelerate*, the *Agfarm Advantage* program – which has been running for six years – still continues as the original indexed sales program. *Advantage* takes similar quality grain parcels from multiple growers and sells them in an indexed manner.

"*Advantage* was the pioneer of indexed grain sales in the deregulated grain market and today we are still providing growers with a flexible solution to support their cashflow needs and minimise the risk of market volatility.

"*Advantage* is now in its sixth year and growers continue to return to it each year as we take the volatility out of a portion of their crop and offer the fastest and most flexible payment terms," says Felicity.

Agfarm Broking, another division of the business, is a grower-focused, personalised cash broking service. It operates on behalf of growers across the full range of grains, oilseeds and pulses.

Backed by Agfarm's experienced and industry-aware staff, the broking division offers dedicated account management and is always willing to go the extra mile to improve the outcome for clients.

## CHS grain accumulation

Through its strong partnership with CHS, Agfarm accumulates grain, further strengthening the company's service to Australian growers for both domestic and global grain markets.

As a marketer of more than 50 million tonnes of grain and oilseed annually, CHS provides Agfarm and its clients with a balanced mix of global grain intelligence, strong marketing expertise and broader opportunities.

CHS Asia-Pacific Ag Business senior vice president Rick Browne says his company is committed to investing long term in the Australian market. Rick says through that commitment Agfarm growers benefit from even stronger connections to the growing global demand for high-quality grains and oilseeds.

Felicity Hennessy says the key objective for Agfarm is to match products with grower demand – and keep ahead of the competition.

"It will be interesting to see what comes next," Felicity says. "But right now our troops are out in the field and going flat out, joining crop walks and industry events and building awareness around the benefits of CHS Australia and everything it brings to the table," she says.

## Cotton accumulation

Agfarm also has an exclusive accumulation agreement with China National Cotton Group Corporation to buy cotton lint from growers on an ex-gin basis. "It is an exciting addition to the significant range of products and services we offer. And CNCGC is the largest importer of Australian cotton into China, taking up to 700,000 bales of cotton lint each year.

Contact Agfarm: 1300 243 276

CHS pricing desk: 1300 247 287 [CHSAusGrainPrices@CHSInc.com](mailto:CHSAusGrainPrices@CHSInc.com)



Felicity Hennessy.

# New soil testing unit

**A**T a time when farmers, agronomists, managers, consultants and investors are looking to improve profitability on the farm, the availability of local and up to date soil test data is often lacking. Incitec Pivot Fertilisers Regional Manager, Bede O'Mara, said recently that only a small percentage of farms had up to date soil analysis to help determine optimum fertiliser use in summer and winter crops.

Milne Industries of Dalby has now released a soil testing unit which will help overcome the problem of dated soil nutrition information leading to sub-optimal fertiliser use.

This 950 kg self contained unit is fitted within a sturdy purpose built box trailer which can be towed by any vehicle. This does away with the need for that 'dedicated ute' with a rear or side mounted probe unit for soil testing.

A feature of the 2.5 inch hydraulic probe cylinder is the Atlas Copco Jackhammer, which cuts in automatically if harder than normal soil types are encountered. In most soils, the probe powered by a 12 hp Honda motor, will penetrate to 1.2 metres under normal hydraulic pressure. Full probe length is 1.5 metres.

The mast is operated by two separate levers. One raises the mast into working position. The other lever activates the probe and is adjacent to the mast which gives accurate control of the vertical movement of the probe cylinder.

## Unique mast pivot capability

One unique feature of the system is the ability of the mast unit to pivot on its sub frame from its central position. Around 300 mm in side shift each way is possible. This is particularly useful when another test is needed in the same location, or the test site is directly over a crack in the ground – time is saved by not having to move the vehicle.

Other features include:

- Testing can be done from either the front or rear of the trailer.
- A lockable tool box to house test buckets, probes, probe lubricant and probe cleaners;
- Five circular retainers for holding sample buckets;
- A 'V' shaped depth-calibrated stainless tray for emptying the soil sample from the probe.
- The units are currently available and are expected to sell for less than \$25,000

Contact Ross Murray on 0427 360 325 or Milne Industries Dalby 07 4662 1374. ■



The new soil testing unit is trailer-mounted.

# Pythium root rot a costly sleeper

**B**EFORE the 2013–14 winter cropping season, Dandaragan, Western Australia grain grower, Peter Negus had never had a reason to worry about Pythium root rot in his wheat. Peter said Pythium only became an issue when he changed his cereal seed treatment from Dividend to Evergol Prime.

"We had been using Dividend to protect against smuts and bunts in wheat but hadn't placed any importance on its Pythium registration," Peter said.

Pythium root rot is widespread in cropping regions across Australia, is distributed evenly in soils and regularly contributes to production losses in crops and pastures.

But because almost all plants are affected to some degree by Pythium, it often goes undetected, as there are few plants unaffected by Pythium with which to make comparisons.

## Pythium is hard to detect

Making a diagnosis of Pythium root rot that is based on above-ground symptoms is also particularly difficult unless the disease is moderate to severe, and even then it is often mistaken as Rhizoctonia damage.

Positive identification of Pythium in Peter's wheat last year meant he had to reassess how he approached his 2014 seed treatment program with broadacre crops planned for the same paddocks.

On his wheat seed, Peter decided to apply the seed treatment Vibrance, which is registered for Pythium, Rhizoctonia, Seed-Borne Net Blotch and a range of smuts and bunts in wheat, barley, oats and triticale.

"The wheat crops emerged well and thrived in 2014 without any sign of Pythium," Peter said. "It was a pleasing result after significant patches of the root disease developed last year."

Syngenta Solutions Development Lead, Trevor Klein, said that Vibrance combines metalaxyl-M from the previous industry benchmark, Dividend, with a completely new active (sedaxane) for Rhizoctonia management.

"Sedaxane is the first Syngenta molecule developed specifically for the seed treatment market," Trevor said. ■



Western Australian grain grower, Peter Negus (right), pictured with Syngenta Territory Sales Manager, Ian Cook, said Pythium changed his approach to his seed treatment program.



# World record set for wheat harvesting

**N**EW Holland Agriculture has reclaimed the Guinness World Records title by harvesting an impressive 798 tonnes of wheat in eight hours with the world's most powerful combine – the 653 hp CR10.90.

"We are extremely proud to have recaptured the Guinness World Records title for harvesting almost 800 tonnes of wheat in eight hours, shattering the previous record by more than 120 tonnes," said Hedley Cooper, Head of Harvesting Product Management.

The record was set on August 15 this year at the HR Bourn and Sons' farm near Wragby, Lincolnshire (UK). The field was sown with Santiago wheat in the autumn of 2013 before it was chosen in May 2014 for the record breaking attempt – which meant that it represented real world growing conditions.

The record breaking day's harvesting was characterised by changing weather conditions, with the ambient temperature ranging from 18 to 21°C and light showers occurring from 5:30 pm onwards. The CR10.90's average throughput was 99.7 tonnes per hour and peaked at 135 tonnes an hour. The crop averaged a yield of 9.95 tonnes per hectare and an average moisture content of 16.2 per cent.

## Advanced harvesting technology

- The record-breaking CR10.90 is equipped with New Holland's unique Twin Pitch High Performance rotors combined with the Dynamic Feed Roll system (DFR). This technology proved indispensable in breaking the record especially as the weather conditions deteriorated in the late afternoon.
- Excellent traction, in the changeable conditions, was gained via the SmartTrax rubber track system with Terraglide suspension.
- The extra-long 10 metre unloading auger and super-fast 142 litres per minute unloading speed made quick work of the constantly filling grain tank.
- The CR10.90 was also equipped with IntelliSteer fully integrated auto guidance (giving 1–2 cm accuracy) which optimised the full width benefits of the 13.7 metre draper-front.



The CR10.90's average throughput was 99.7 tonnes per hour over eight hours to reclaim the Guinness World Records wheat harvesting title.

# Open The-Gate early to catch the worm

**T**HE old adage that "the early bird catches the worm" proves true in many spheres of life – and so it is at The-Gate labour placement service. The-Gate has been operating for just over 12 months and many keen young workers have proven their worth on a wide range of farms right across Australia. But farmers wanting the more highly skilled workers for short-term peak labour periods need to get in as early as possible because the best workers get snapped up quickly.

The focus of The-Gate is to source workers who have a background and interest in farming – so even if they are young international travellers who come to Australia on 417 Working Holiday Visas, they are here to experience Australian farming as well as to see the sights. The-Gate also has registrations from young Australians with agricultural backgrounds. The end result is a pool of people who have the necessary skills and experience to operate large farm machinery and the ability and enthusiasm to learn any new skills required.

And the feedback from farmers has been very positive with many commenting on the precision and great work ethic of The-Gate workers and their interest in our farming systems. Many of these young people want to pursue future careers in agriculture and are very keen to find out first hand about our agricultural systems. So it can be a great win/win for both parties – the farmers have keen, interested workers who can get the job done very well in the busy times and it's a rewarding experience for The-Gate workers who want to experience a slice of Australian farming life.

For further information go to [www.the-gate.com.au](http://www.the-gate.com.au) where you can register your interest for short-term labour on your farm now or in the future (see the Farm Labour button on the site). You will then be sent profiles of available workers fitting your requirements.

## Some profiles of typical workers from The-Gate

- Markus (24 years) is an industrial mechanic and throughout his studies worked part-time on farms in Germany. Has excellent machinery and mechanical skills and also has a truck licence and experience with John Deere, New Holland and Fendt machinery. Markus has been in Australia since March. He has worked on a cotton and grain farm in Queensland over the cotton picking and winter crop sowing period and then on a large grain farm in Victoria and has become familiar with many aspects of Australian farming.
- Gabriel (26 years) grew up on a farm in Sweden and has gained further qualifications in Agriculture. He worked on the wheat harvest in Queensland in 2013 and has returned to Australia this year to work on a grain farm in Victoria. He has experience with Claas and New Holland combine harvesters and John Deere, New Holland, Case, Fendt and Steiger tractors.
- Lars (22 years) has completed a degree in Agriculture and also has plenty of practical experience in farming in Germany. He has operated John Deere, New Holland, and Case tractors and New Holland combine harvesters and has recently worked on the wheat harvest in Western Australia.

More information contact Catherine O'Connell on 0408 717 459

## Western region



### STATE WIDE SUMMARY

In early November, the Grain Industry Association of WA (GIWA) estimated the total WA winter grain crop at 13.8 million tonnes.

This estimate has declined by 230,000 tonnes since the last estimate made by GIWA at the beginning of October due to a combination of the losses from storms in October, and lower estimated yields for the districts from Dalwallinu north to Mullewa and east of Merredin.

The hot weather in August, combined with limited spring rainfall, appears to have been more damaging to yield potential than previously realised.

Storms producing heavy rain and hail in the Kwinana, Albany and Esperance port zones in October delivered localised damage

# District Reports...

November–December 2014

ranging from total destruction of individual crops to widespread lodging. For individual farmers the losses will be high, but from a state harvest perspective the losses are minimal.

In total, GIWA estimates these storms have only reduced the expected WA grain harvest by 150,000 to 200,000 tonnes.


### Quality concerns

Of more significance is the risk of quality downgrades from sprouting and low falling numbers in wheat, poor colour in barley and sprouting and yield loss in canola.

Regions at risk of weather-damaged grain include the Moora district, the central grainbelt, the Lakes region and the wider Esperance region.

The Geraldton port zone did not receive significant October rainfall while the lower Albany port zone crops were mostly green enough to not suffer quality problems. But some hail damage and lodging is apparent in crops in the Frankland district. In the Esperance port zone, despite the rainfall events in October, barley deliveries are currently meeting the colour grade specifications much to the relief of local growers.

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

<div><div>Brought to you in association with</div><div></div><div>JOHN DEERE</div></div>			Summer		Autumn		Winter		Spring	
	25yr Annual Average (mm)	2014 rainfall to date (mm)	25yr Annual Average (mm)	2013–14	25yr Annual Average (mm)	2014	25yr Annual Average (mm)	2014	25yr Annual Average (mm)	2014 to date
Emerald Qld	554	361	250	126	118	95	61	36	120	120
Toowoomba Qld	673	403	281	64	134	233	82	69	179	77
Roma Qld	590	321	248	96	135	121	73	87	137	25
Goondiwindi Qld	619	321	251	79	133	164	97	72	139	27
Narrabri NSW	642	378	228	57	125	200	128	110	162	24
Gunnedah NSW	665	458	242	66	122	205	130	140	178	66
Dubbo NSW	611	489	200	148	136	227	127	129	153	33
West Wyalong NSW	446	380	117	66	90	173	117	108	126	52
Wagga Wagga NSW	545	432	133	83	121	164	152	123	144	84
Swan Hill Vic	327	253	73	70	66	133	92	46	96	42
Bendigo Vic	524	440	110	59	105	177	171	155	138	96
Horsham Vic	392	240	77	27	71	98	135	90	110	32
Lake Bolac Vic	537	331	119	51	101	101	163	144	153	57
Murray Bridge SA	370	326	64	109	77	89	130	111	101	36
Kadina SA	345	301	55	74	77	132	123	94	90	26
Cummins SA	394	400	48	93	86	96	177	209	84	18
Esperance WA	623	529	80	42	145	121	255	242	143	154
Wagin WA	405	311	49	2	96	96	171	136	89	79
Northam WA	402	396	45	7	84	127	190	173	84	93
Mingenew WA	368	306	32	12	92	102	176	79	65	79
Moora WA	389	213	45	0	89	36	183	140	73	37
Mullewa WA	320	266	50	28	90	136	134	56	47	62

Last rainfall reading November 21, 2014.



# District Reports...

**November–December 2014**

Receivals during November will provide a good picture of the extent of the impact of rainfall on grain quality, including the level of protein from the predicted very high yields of cereals in the Albany zone.

Early grain quality reports indicate that – for most of the crops in the grainbelt – wheat protein levels and screenings are meeting expectations.

Canola crops are averaging 46 to 48 per cent oil.

The harvest is well advanced in the Geraldton and east Kwinana zones – and well ahead of previous years – due to the early end to the season in the north of the grainbelt, below average yields and continuing fine weather.

**Grain Industry Association of WA (GIWA)  
November 6, 2014**

## NORTH

Warm conditions in 2014 delivered fast crop development and a record early start to harvest. The first grain deliveries to CBH were in mid September! As usual in September there were a couple of warm days followed by cool damp weather resulting in slow harvest progress early on. Since then there many growers close to completing their harvest over the next week. Coastal areas will take much longer due to very mild and damp weather.

Crop yields have generally been disappointing and more so on sand soils. The hot dry August conditions did much more damage than hoped and many growers are disappointed.

Wheat yields are generally below average. Grain quality is mixed with some wheat growers having screenings problems. Sprouting is also a problem in some varieties, particularly in early sown crops. Although sprouting is widespread it does not appear to be downgrading a large proportion of the crop. Ryegrass ergot contamination is also a problem for many coastal growers. This requires cleaning the grain to allow delivery into the CBH system.

Canola crop yields were very mixed with some growers very happy and others very disappointed. Good loam soils (and an extra shower of rain) dominate where yields were good. Roundup Ready crops generally out-performed Triazine Tolerant crops. Weed control is becoming more difficult in TT canola due to herbicide resistance issues.

Lupins are just starting to be harvested. The late rain resulted



**Matt Freeman harvesting lupins at Eradu. On the deeper sands, lupins often outperformed nearby wheat crops.**

in many crops greening up again and are only now getting close to a point where they could be harvested. Some growers have been impressed with their lupin performance on deeper sand soils when compared to disappointing wheat crops close by.

Barley crops are mostly harvested and late green heads have been a challenge for many. Not much barley is grown in our region and any on sand soils yielded below expectations.

Harvest will finish early in most areas giving growers a good opportunity for a holiday. Many are disappointed in the 2014 outcome given the very promising start. Roll on 2015.

**Peter Norris**

**Agronomy For Profit and Synergy Consulting, Geraldton  
November 9, 2014**

## SOUTH COAST

Seasonal conditions on the South Coast over the past two months have been variable. September remained reasonably dry, as did the start of October, but between October 18 and 20 the region received 50 to 120 mm of rain.

This rain coincided with the start of harvest – some growers had already started on canola. The rain delayed harvest for over a week and many were very anxious about what the effect would be on grain quality.

When harvest recommenced growers were pleasantly surprised that grain quality had held up. One of the biggest issues caused by the rain was sand contaminating canola windrows. With the heavier falls, sand was splashed onto windrows. In some cases, growers had to clean canola to meet receival standards.

Given the very dry year, yields have been better than most growers were expecting. This is largely a result of soil moisture carried over from the very wet 2013.

The rain in October this year has already boosted stored soil moisture levels for the 2015 season.

This October rain has also resulted in germinations of summer weeds with boom sprays already active on many farms.

If we have some good weather for the remainder of November, harvest should be wrapped up by the end of the month. This will give us time leading up to Christmas to reflect on a season that was not as bad as we all thought it might be.



**Our farming future keeping a watchful eye on Dad's crop inspecting skills.**

**Quenten Knight,  
Agronomist, Precision Agronomics Australia  
November 11, 2014**



### SOUTH AUSTRALIA

#### Weather summary

Rainfall for September was below to very much below average across most of the state. Only parts of the Upper North and Northern Mallee received average rainfall.

October rainfall was also very much below average across the whole agricultural area with some areas on Lower Eyre Peninsula, Upper North and Northern Murray Mallee receiving their lowest October rainfall totals on record.

Mean maximum temperatures for September were above average in the Upper and Mid North and Northern Murray Mallee. In the rest of the agricultural areas, temperatures were very much above average.

Temperatures were again very much above average during October. Areas of Eyre Peninsula, Kangaroo Island and Southern Yorke Peninsula observed their highest maximum mean October temperatures on record.

Frosts occurred in the eastern part of the Upper and Mid North and in a few locations in the Mallee on October 8, 14, 15 and 16.

October also brought with it several days of hot northerly winds.

#### The winter crops

Despite having one of the warmest and driest springs on record, total SA crop production is still estimated to be above the long term average. This is mainly due to the stored soil moisture from above average rainfall earlier in the season.

Harvest commenced in the Far West Coast and Upper North at the end of September. Most districts have started or are likely to start two to three weeks earlier than normal. Farmers on Western Eyre Peninsula had harvested more than 50 per cent of its crop by the end of October while later districts will not commence until late November.

- Winter crop production is estimated at 7.48 million tonnes from a crop area of 4.05 million hectares.
- Canola yields and quality have been highly variable across the state with above average yields on Upper Eyre Peninsula but well below average on Lower Eyre Peninsula, Upper North, Yorke Peninsula, Mallee districts and the South East. Lower canola yields are due to a combination of Beet Western Yellow virus, waterlogging, frost damage and dry spring conditions.
- Barley yields and quality have been above expectations in all districts where harvest has commenced, with average to above average yields reported. On Eyre Peninsula a high percentage of malting varieties have been classified as Malt 1 while in other districts most has been classified as Feed 1.
- Frost significantly reduced the yields of peas in some districts but unaffected crops have returned average to above average yields. Frost in early to mid-October caused severe damage to crops in low-lying areas in the eastern part of the Upper and Mid North. Wheat, canola and peas were the worst affected and some farmers have cut a large proportion of their wheat for hay.

# District Reports...

November–December 2014

- Wheat yields are likely to be variable across the state with above average yields on Upper Eyre Peninsula and the northern part of the Upper North but average to below average in other districts. Early-sown wheat crops in early districts have produced medium to high protein levels with low proportions of small or pinched grain but there is concern that quality may be poorer in later districts or crops due to the extremely dry finish to the season.
- Bean crops have been severely affected by waterlogging, frost and hot, dry windy conditions with yields likely to be well below average in all districts.

#### Pests and disease

- Leaf diseases have generally been at low levels in most of the state due to proactive fungicide application and the dry spring.
- Diamond Back Moth larvae built up early in the season and caused damage to canola crops. Many crops were sprayed to reduce crop damage.
- Green peach aphids did not build up in spring as earlier feared but many other pests were present in higher numbers than usual.
- Hay yields varied from above average in the Lower and Mid North and Yorke Peninsula to well below average in most other districts. Quality has also been highly variable.

#### Pastures

Pastures dried off quickly during September and October with the warm dry conditions. Most of the state has adequate supplies of dry pasture feed but the Central Hills and Kangaroo Island only have marginal levels and the South East has poor pasture growth.

The area of pasture cut for hay has been well down in most districts, particularly the Central Hills and South East. But there has been an increased area of cereals cut for hay due to frost and the dry finish to the season.

Producers in the South East are looking at selling off excess stock to reduce the pressure on available feed supplies.

**PIRSA Crop and Pasture Report  
November 6, 2014**

### WIMMERA

Harvest has started early in the Wimmera and will most likely be complete by the time this report is read. The Emerald site at Donald received barley a week earlier than ever before as the dry finish bit into the hopes of farmers.

As reported earlier in the year, 2014 opened early and rains during April, May and June ensured a great establishment of winter crops and a good opportunity to use knockdown herbicides to take care of expensive to control weed problems.

July continued to send small but timely rains and farmers were becoming excited that the dry finished forecast for the season would not eventuate. Rain at the beginning of August has ended up being the last substantial rain for the growing season for most Wimmera growers. As a result, a large part of the Wimmera has almost died as crops attempt to set seed.

A series of frosts in spring caused major damage to early cereals by killing the head as it moved up the stem. Later frosts damaged some canola and pulse crops as they were podding.



# District Reports...

**November–December 2014**

Early harvest results are coming in which will show barley receivals at about 60 per cent F1 grade with the remainder F2 and F3. Very few loads have made malting this year.

Wheat results are showing good quality but with a very low yield. Some canola has performed reasonably well where sown onto fallow paddocks with some stored moisture to finish the crop.

Lentil prices are sky high and this was to be the crop to save the day. The frosts in October reduced yields and spoilt quality, but the final result may still be a profit for this crop. Most lentils will need to be cleaned to make a Grade 1 product.

Looking back on the growing season, other problems were also encountered. Insect pressure as a result of favourable autumn and winter temperatures saw large amounts of insecticide being used in crops and pastures. Green peach aphid showed up in the Wimmera for the first time as a serious threat. Some canola crops were sprayed but just as the aphids appeared, they disappeared, thanks to Mother Nature. Later, diamond back moth moved into flowering canola in numbers. At the end of the season etiology and heliothis needed to be controlled in pulse crops.

The dry finish has left most crops free of late germinating winter weeds which is one good thing to be salvaged from an otherwise disappointing season in the Wimmera.

**Mike Laidlaw**  
**Harberger Farm Supplies, Donald**  
**November 11, 2014**

## WESTERN MURRAY VALLEY

### Winter crops

The winter cropping season can only be described as fantastic. We actually had an autumn break and follow-up rain during winter with most of the WMV farmers receiving 250–300 mm growing season rainfall. Typically though we missed out on the essential spring rain in October, but yields are still above average and farmers are enjoying 2014.

Harvest started late October with canola being windrowed and drying down rapidly with some hot weather.

Winter crop yields to date:

- Dryland canola: 1.5–2 tonnes per hectare (oil 42–47 per cent) – standout performers, Stingray, Hyola 559TT and 44Y84.
- Irrigated canola: 2.3–2.8 tonnes per hectare (oil 38–44 per cent). There were the odd exceptional irrigated canola yield results of 3 to 3.2 tonnes per hectare. Standout performers, Crusher, Bonito, Hyola 559TT, 44Y24 RR.
- Dryland barley: 3.5–4 tonnes per hectare (odd exceptional five tonnes per hectare of Hindmarsh/Latrobe). Standout performers, Hindmarsh, Latrobe, (Gairdner and Baudin screening up to 20 per cent!), Scope / Buloke a bit disappointing in comparison.
- No wheat, lupins or field peas have been harvested yet.

Grain prices are on the increase and with good yields, most growers are now able to reflect on their in-crop nitrogen decisions. Local anecdotal evidence from header drivers has been nearly a 50 per cent yield difference where the spreader missed a nitrogen application! That's big dollars of lost opportunity. There

will be greater emphasis next year in our region on risk vs reward for nitrogen inputs.

### Summer crops

#### Rice

Water... Water...Water! Summer cropping programs have been severely hindered this year with the lack of water allocation and extreme temporary water trading prices. Currently, the Murray Irrigation Limited (MIL) system has a water allocation of 39 per cent with the last increase being 0 per cent. Temporary water is being traded from \$110–130 per megalitre. With both the lack of allocation water and high trading prices, growers have reduced rice area planting by 40–50 per cent.

The reduction in rice area is disappointing with rice prices estimated at \$340 per tonne and potentially higher. "We just need some water to grow our crops!" is the common lament from most rice growers.

Rice that has been planted has established this year with few issues. Warm weather at planting had rice reaching secondary root stage by eight days (four to six days faster than previous years). The only establishment issue we have encountered has been extreme winds causing water to move off bays and blow rice seedlings into side ditches.

Little to no duck pressure or bloodworm issues are present, but there have been some instances of aquatic snails in rice on rice sowings.

As we get into November the window for rice planting is reduced due to varietal maturity constraints. So even if water allocation increases, the rice area is unlikely to increase.

An interesting trial has been recently conducted by Hardi in conjunction with Case Echuca CIH. There was a demonstration at Wakool with two self propelled sprayers driving into a permanently flooded rice bay. The machines drove straight through the bay without any issues. Growers are cautiously optimistic as this may help with operational timeliness, increased water application volumes with post emergent herbicides and a reduced application cost.

Most rice growers pay approximately \$18–\$20 per hectare for an aerial application of herbicide/insecticide, Sowing is \$25–\$30 per hectare, topdressing urea \$25–\$30 and post emergent products – with water rates 40–60 L per hectare – cost up to \$35–\$40 per hectare. The average aerial application cost to a rice grower is \$100–\$120 per hectare for the season. This may sound expensive, but to put some perspective on it rice growers



**Rice emerging eight days post sowing at Glen Turner's farm, Bunnaloo.**

# District Reports...

November–December 2014

should be yielding nine tonnes per hectare x \$340 per tonne = \$3060 per hectare! The cost of aerial applications are a relatively minor portion of the cost for growing rice and more importantly, they are very efficient and can sow or spray large areas in a short period of time.

Most self propelled sprayers cost \$9 per hectare and this could potentially reduce a portion of the season's application costs if this is proven to be a practical option. Step 1. Will an SP drive in a cultivated rice bay full of water? Check!... Step 2,3,4,5,6,7,8,9. ... Many other implications to consider? But it's exciting to see some new technology introduced into rice growing.

Fingers crossed for a water allocation increase and temporary water price reductions to make this years crop more profitable.

## Corn

Water... Water...Water! (is this starting to sound familiar?)



**Hardi Presidio self propelled sprayer in a flooded rice bay at the Wakool demonstration organised by Hardi and Case Echuca CIH.**



**Laurence and Audrey Pearce inspecting corn emergence at Moama.**

Water – and a lack thereof – is the same issue corn growers are sharing with rice farmers. In fact many growers are now reviewing gross margin returns of all summer crops, from corn vs rice vs cotton and lucerne.

No longer can growers simply grow what they have traditionally done. With water being such a valuable commodity, growers are striving to get the best economic return from their finite resource. The most disappointing facet to this is it maybe more feasible in certain years or situations to sell water temporarily rather than to grow agricultural produce. This cannot be a long term positive option for rural communities.

Corn prices have slipped from last year's \$300 per tonne on farm to \$260–\$270. With the same water pricing pressure many growers have either reduced area or saved their water for the 2015 winter crop.

In summary for 2014 we have plenty of grass and feed for our livestock, lambs prices have been great, the winter crop harvest is going well above average, canola and wheat prices have increased, summer crops have emerged well and farming is looking good in the WMV. Let's hope for a dry harvest. Good luck!

**Laurence Pearce**

**Agronomist – IK Caldwell**

**Deniliquin NSW**

**November 12, 2013**



### Introducing self managed grain trading.



**NEW SERVICE**

## ClearFORWARD

### Clear Forward Market Exchange

You now have the ability to trade forward contracts. You can create a forward offer at the price you want and we'll check the daily bids to find a competitive buyer.

**Create a forward offer instantly**

The Clear Grain Exchange Forward Marketplace allows sellers to secure a target price today for grain they are going to deliver into an approved Bulk Handler at a future date.

Offers in the market are viewable by the approved buyers on the Clear Grain Exchange, giving you the market depth you require.

Clear will also provide you free daily SMS market alerts, so you're always up to date with the relevant market activity.



**Go online to see just how easy it is to take control of selling your grain.**

**cleargrain.com.au**



# District Reports...

November–December 2014

## Northern region



### CENTRAL WEST

The 2014 winter crop season will go down as the Year of the Confused Agronomist.

Magazine and newspaper headlines could easily read *"Where did my chickpea yield go?"*; *"Farmer delivers seven different grades of wheat off one farm"*; *"Protein and screenings all over the place"*; and, *"Canola at Nyngan yields higher than irrigated canola at Trangie"*.

Harvest is rapidly drawing to a close after a dream harvest – weather-wise – with contractors actually after the respite of a rain shower or two to catch up on some much needed sleep. It has been a mixed bag of results related of course to rainfall and starting moisture, but also soil type and sowing dates.

Coonamble has suffered the worst of the sub-districts of the Central West, but this area has also had both good and bad. With its heavy soil types and little to no sub-soil moisture in the north and west of the town, wheat yields were low, averaging around two tonnes per hectare. Some crops to the east of Coonamble were up to the five tonne mark on long fallow



This crop of Gregory wheat at Nyngan, went on to yield 3.6 tonnes per hectare.



This three tonnes per hectare crop of Celine field peas was another excellent harvest result from the Nyngan district.

paddocks while the Quambone area also enjoyed some solid wheat yields.

Wheat harvest results elsewhere have been all over the place:

- Dubbo has had a range of 2.0 to 4.0 tonnes per hectare, for an average of 2.5 tonnes;
- Trangie 2.0–5.0 tonnes, averaging closer to 3.0 tonnes; and,
- Warren 1.5 to 5.0 tonnes with about 2.6 tonnes per hectare being the middle mark.

Nyngan has enjoyed a dream run this year, in particular those farms closer to town. Rainfall up to the end of October was 460 mm versus the long term average of 397 mm – but it was the 88 mm in August that really made it a stellar season. Wheat yields ranged from 2.2 to 3.6 tonnes per hectare.

The wheat quality was erratic not only within farms, but also within paddocks. The protein spread I have heard so far ranges from 7.0 through to 17 per cent. But the bulk of the grain has been low in protein, even on the back of pulse crops. Screenings have also been erratic with high screenings often the result of the increased levels of crown rot. No surprise here considering the season's dry finish. The crown rot damage was far more evident in the heavy clay soils or crops sown late – a double whammy if both occurred.

There were some terrific barley yields around the place – up to six tonnes at Armatree. Barley yields were generally above the wheat across the Central West, no doubt a result of the dry finish with barley coming in just that little bit quicker than its bread-making cousin!

With a kind autumn break the area sown to canola was up on previous years. Results were as per usual with variable canola yields but not to the same extent we have come to expect with this crop. Yields were above the norm across the region and oil contents also followed this pattern. Average canola yields were around the 1.5 to 1.7 tonnes per hectare mark.

Across the region, there was an increase in the area of canola direct headed. This is on the back of the excellent extension work that GOA (Grain Orana Alliance) has put into this space.

Pulse crops are a mixed bag. Chickpeas have been the most disappointing crop of the lot with yields way below the average. This has been a consequence of low temperatures leading up to the end of September that aborted flowers, and then crops ran out of moisture in October during pod filling. Chickpea yields ranged from 0.8 to 1.8 tonnes per hectare, with an average closer to one tonne.

# District Reports...

**November–December 2014**

Lupins are currently being stripped but were badly frosted over the winter. Field peas were a real winner in some parts of the region but frosted in many others. Nyngan pulled off a 3.0 tonne crop, but probably averaged closer to the 2.5 tonnes to the hectare mark, which is amazing. Back to the east, yields were less impressive ranging from 1.0 to 1.5 tonnes. The price premium for the blue/green pea for human consumption was again in place this harvest.

Overall we are smiling in the Central West with some outstanding yields in a moisture-challenged year!

**Penny Heuston**  
**Delta Agribusiness, Warren**  
**November 13, 2014**

## DARLING DOWNS

### Winter crops

It has been a very tough winter weather wise with just two significant falls of rain. The first in early June allowed planting of barley, chickpeas and some wheat but the second was not until late August. In between were plenty of frosts in runs of four to eight consecutive mornings which kept holding the crops back, and then a final frost on October 15 caused some damage to the late crops, with fusarium gaining a hold.

But the saviour was the soaking rain back in March which gave all the paddocks, both long and short fallow, a good profile of soil moisture, and this has enabled the crops to perform. Barley has been the star performer with yields from 2.5 to 6.0 tonnes per hectare and most crops reaching the Feed 1 standard.

The early sown wheat crops have also done well with yields from 2.0 to 5.5 tonnes per hectare with mostly good quality. But those crops on double cropped ground west of Dalby have suffered some screening issues.

The chickpeas have suffered from the frosts, and although most crops are shorter than desired, the yields range from 0.5 to 2.5 tonnes per hectare. There were only isolated outbreaks of ascochyta, and heliothis pressure was low to medium. The Eastern Downs is still at early harvest, whilst the Western and Central Downs are mostly finished.

This has been an excellent crop performance in a difficult winter, but it is easy to see by the cracking of the soil that these paddocks will now need a lot of good rain to build up a moisture profile again.

### Summer crops

There have been very limited summer crop planting opportunities, and only 40–50 per cent of the expected area has been sown. To add to this, many crops have only achieved a marginal established plant population, but with the very dry and hot conditions, even sorghum populations as low as 20,000 per hectare are being left in.

The irrigators have had to use more water than expected to establish crops, with water infiltration being very difficult, but the irrigated corn is looking fairly good. The dryland corn blocks have suffered from the lack of rain and the heatwave conditions – 40°C on eight-leaf corn – is not a recommended recipe.

The sorghum crops are mostly gappy, but where they have managed to get secondary roots down into the moisture, the crops have tillered out and are between the four-leaf and early boot stage.

The August rain did provide better conditions for planting sunflowers in the traditional Eastern Downs areas, and these crops are just starting to flower, and although below ideal populations, they may be just right for the season we are having.

There have been a few spring sown mungbean crops, which have had to struggle through either thrip damage in the western areas or frost damage in the east. The cotton area is well down again with only a couple of dryland crops able to be sown, and the irrigated area reduced due to the lack of water.

At this time the rainfall outlook is not good, but we are all hoping there will soon be one good fall to enable a summer planting to take advantage of the subsoil moisture that is there.

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



**These two photos pretty much sum up the state of the season on Queensland's Darling Downs: Top – paddocks being baled for straw to meet the increasing demand for stockfeed (and a good return to growers); and, Bottom – struggling sorghum beside ripening wheat.**



# District Reports...

November–December 2014

## SOUTH BURNETT

### Key issues

- Dry, very dry and very, very dry.
- Some good winter crops planted early on fallowed ground.
- Not enough rain to bring up weeds.
- Summer prospects not very good at this stage.

2014 is continuing to be a year to forget for most South Burnett farmers.

There are no dryland summer crops planted yet.

Some wheat and barley crops were planted in late April and early May on fallowed ground and have gone on to harvest quite well. Some yields have reached three to four tonnes per hectare with parts of paddocks close to five tonnes.

Any later planted crops on double cropped ground either failed or are yielding less than one tonne per hectare.

Farmer mood at the moment is very pessimistic as we will need close to 75 mm to start planting crops. Finding cash or credit to plant has been a real problem for a number of farmers.

Summer crop planting options are still uncertain for many growers. Cash is very short and growers are looking to grow low cost crops this season. At this stage there will be a switch from corn to sorghum with a number of growers considering millet.

With the continuing dry conditions, it is very difficult to find any good news stories and grower optimism is at an all time low.

**Ian Crosthwaite**  
Agronomist

**BGA AgriServices, Kingaroy**  
November 11, 2014

## WESTERN DOWNS

Harvest has all but drawn to a close, with mixed results occurring across the district. Overall, yields across the area were probably close to average with some paddocks doing better than expected and others not performing at all.

Some isolated patches that received extra rain and were planted into long fallow, recorded some excellent results with wheat yielding over four tonnes per hectare. But this was only in a minor number of paddocks.

The late rain in August showed us that timing is everything. The rain helped grain fill leading to low screenings and good grain size. Again the low wheat protein was noted in the varieties Gregory and Suntop, but yields were up compared to other varieties.

Chickpeas gave average results even after having endured a few nasty frost events.

Faba beans proved to be a steady performer and I expect to see a few more crops around next year.

As for summer crops, very few have been planted due to the lack of moisture. Sorghum that has been planted is patchy and uneven and is looking for a good drink. There is some irrigated cotton in and some millet due to the appealing current price.

A good fall of 30 mm plus is required to get the planters out and sorghum growers will be faced with the tough issue of deciding whether to plant or not if it falls in November – which is not the ideal time. If this occurs, dryland cotton may be planted instead.

**Nikolaus Fritz**  
Agronomy – Landmark, Miles  
November 10, 2014

## IAN'S CLASSIC TRACTOR QUIZ ANSWERS

- |                             |                  |
|-----------------------------|------------------|
| 1 – David Brown Cropmaster. | 6 – Canada.      |
| 2 – Universal.              | 7 – Kerosene.    |
| 3 – Turner.                 | 8 – Sift.        |
| 4 – Flambeau Red.           | 9 – At the rear. |
| 5 – Rolls Royce.            | 10 – 1973.       |

## ADVERTISERS' DIRECTORY

Accufire.....	18	Gyral.....	45
Agfarm.....	IFC	Impact Fertilisers .....	15
Agsafe.....	17	John Deere .....	13
Boss Agriculture .....	6, 39	Landpower Claas..	19, Insert
Bourgault.....	N, S	Neil's Parts .....	20
Case IH .....	OBC	Organic Crop Protectants	41
Charlton's Fishing.....	44	Perry Engineering .....	42
ChemCert.....	S	Ross Murray Rural .....	7
Clear Grain Exchange .....	53	Serafin.....	29
Croplands.....	11, 37	Study Tours .....	IBC
C-Qual .....	S	Syngenta.....	1
Dinner Plain.....	35	The-Gate .....	N, 26
Excel Agriculture .....	21	Tobin No-till.....	9
Ezyflo .....	6	Trimble.....	3, 25
Foss Pacific.....	27	Valmont .....	43



Winter crops on the Western Downs were a 'panorama' of mixed results. (Photo: Nik Fritz)



## THE RESEARCH VIEW

# New cultivars and narrow rows boost chickpea yields

### AT A GLANCE...

- Narrow row spacings delivered significantly higher yields than wide rows in chickpea trials on the Darling Downs.
- The results were consistent across varieties, although new cultivars outperformed current commercial lines.
- Narrow row spacings also improved water use efficiency and nitrogen fixation, but plant populations did not influence the results.

**N**EW cultivars and a switch to narrower row spacings could dramatically bolster the place of chickpeas in northern cropping rotations.

The legume crop traditionally only yields an average of 1.2 tonnes per hectare in dryland broadacre conditions, but small-plot trials on the Darling Downs using an advanced breeding line have achieved 4.7 tonnes per hectare when planted at 0.25 and 0.5 metre row spacings.

And yields of 4.5 and 4.4 tonnes per hectare were achieved using the commercially available varieties PBA HatTrick and PBA Boundary respectively, both on 0.25 m spacings.

Queensland Department of Agriculture Fisheries and Forestry



Queensland Department of Agriculture Fisheries and Forestry (DAFF) senior extension agronomist Kerry McKenzie.

## 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.

(DAFF) senior extension agronomist Kerry McKenzie said the 2013 trial results were encouraging, but were still to be validated through a second year of field testing currently underway.

"It won't be until after harvest of the 2014 trials and analysis of results that a firm recommendation can be made in relation to current varieties and management strategies," Kerry said.

"In general though, the trials so far have shown that changes in agronomy can significantly affect yield of chickpeas, and more specifically, increasing row spacing may decrease yields even in a dry season."

### Narrow rows better even in a dry year

"Last year was a dry year and industry thoughts had been that in those dry years wider row spacings should improve yields because you're storing that soil moisture for later in the season – but we don't seem to be seeing that in pulse crops.

"Whether it's a different root structure or physiology than cereals, the narrow row spacings still provided the better yields in a reasonably tough year last year." (see Figure 1 for trial results)

The research is funded through the Grains Research and Development Corporation's Qld Pulse Agronomy Initiative, which involves collaboration between DAFF and the Queensland Alliance for Agriculture and Food Innovation (QAAFI).

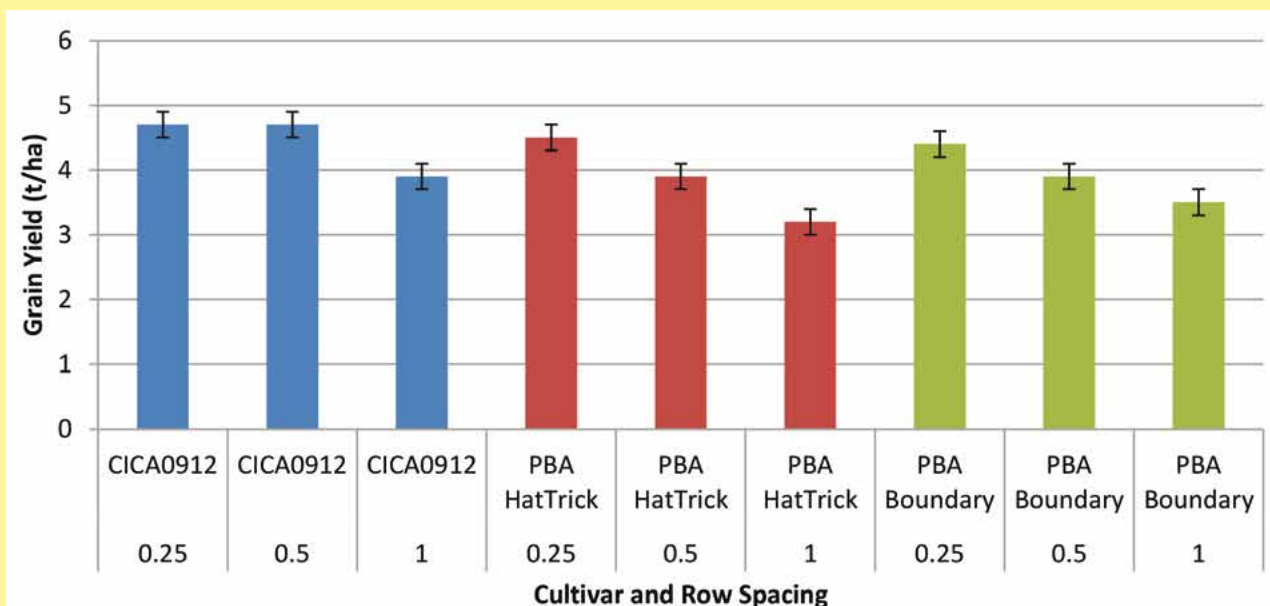
The program is seeking to improve adoption of legumes within crop rotations by identifying measures which can both boost yields and improve the reliability of pulse crop performance.

Kerry said industry consultation was undertaken at the outset of the project to understand why farmers aren't planting pulses in larger areas, with the responses forming the basis for the initial trial focus on row spacings and plant populations in chickpeas.

The project is also assessing agronomic factors for faba beans, including time of planting and row spacing, and the summer pulses of mung beans, soybean and peanuts.



**FIGURE 1: Dalby chickpea trials 2013 – yield at three row spacings across three varieties**



“Despite the potential environmental and economic benefits they offer, the adoption of winter and summer pulse crops in Queensland is just eight per cent and four per cent of total cropping area respectively – much less than what is required to keep grain cropping systems profitable in the long term,” Kerry said.

“To increase the share of pulses in the total cropping area, strategies are required to enable growers to more consistently realise the potential productivity and profitability of pulse cultivars in their farming systems.”

### Aiming for higher chickpea yields

Chickpea is the most popular of the winter pulse crop options in the northern region, with yields ranging from 0.5 to 2.0 tonnes per hectare depending on the season.

The research team estimates that a modest 10 per cent increase in yield would result in a \$20 to \$25 increase in gross margin (based on a \$200 per hectare gross margin). Over a winter pulse area of 125,000 hectares in Queensland, such an increase in production would be valued at \$2.5 to \$3 million per annum.

The trials conducted at Dalby and Goondiwindi last year measured the performance of three varieties – PBA HatTrick, PBA Boundary and the advanced breeding line CICA0912 – when planted on three row spacings (0.25, 0.50 and 1.00 metre) and at three plant densities (20, 30 and 40 plants per m<sup>2</sup>).

**TABLE 1: Row spacing effect on water use efficiency on grain yield**

Row spacing (m)	Cultivar	WUE grain yield (kg/mm/ha)
0.25	CICA0912	17.74
0.50	CICA0912	17.55
0.25	PBA HatTrick	17.21
0.25	PBA Boundary	15.46
1.00	CICA0912	15.20
0.50	PBA HatTrick	15.04
0.50	PBA Boundary	14.75
1.00	PBA Boundary	13.28
1.00	PBA HatTrick	12.52

Kerry said the most consistently significant response was to row spacing and cultivar.

“There was no significant difference in yield between any of the cultivars at the 0.25 m spacing,” he said. “There were also no significant yield differences due to plant populations.”

The trials have also been overlaid with a number of other research programs to maximise the information gleaned about a range of agronomic influences, including nitrogen fixation, water use efficiency and varieties.

And the inclusion of the advanced cultivar CICA0912 will ensure growers have a package of information available when it is released commercially, expected to be in 2016.

Water use efficiency was measured as an indicator of the potential suitability of the crop in a farming system (Table 1) – very high water use efficiencies were recorded, with figures approaching those generally accepted as satisfactory for cereal crops.

“Narrow row-spacing again produced the highest WUE and CICA0912 produced significantly greater WUE than the other cultivars,” Kerry said.

Although the figures for each measure were higher at the Dalby plots under better growing conditions, the findings were consistent with those at the Goondiwindi trial site.

“In general, the yields obtained at this site were higher than the surrounding commercial yields,” Kerry said. “Narrow row

**TABLE 2: Reduction in N fixation and total amount of N fixed in chickpea (mean across three genotypes) as row spacing in the field increases**

Row spacing (m)	per cent Nd <sub>f</sub> a (nitrogen derived from the atmosphere)		Total crop N fixed (kg/ha)	
	Dalby	Goondiwindi	Dalby	Goondiwindi
0.25	61.0	39.2	187.3	62.8
0.5	55.8	36.1	161.9	48.0
1.0	47.6	36.3	122.5	42.0



**Narrow row spacing chickpea trials on the Darling Downs show significant yield improvements. A promising new chickpea variety is also planned for 2016 release.**

spacing again increased the yield components, and again there was no significant difference between any of the cultivars across the treatments.

### Better nitrogen fixing

Although there were no differences in nitrogen fixation between the three varieties on trial, the narrow row spacings also delivered significantly better results for nitrogen derived from the atmosphere and total amount of N fixed, particularly at the Dalby site (Table 2).

"Up to 59 kg N per hectare remained at the Dalby site when chickpeas were grown on 0.25 m rows but only 23 kg N per hectare from the 1.0 m row spacing," Kerry said. "At Goondiwindi, the net N balance ranged from an increase of 6 kg N per hectare to a net removal of 6.4 kg N per hectare as row spacing increased from 0.25 to 1.0 metre."

Previous research has shown that as a legume crop's demand for N increases, so does the N fixation by that crop, but Kerry said the row spacing effect on N fixation could not simply be explained by higher plant N demand as all crops were at the same plant population density of 30 plants per m<sup>2</sup>.

"In the narrow rows we observed that total N on a hectare basis was higher due to higher plant biomass, but also the proportion of the N derived from the atmosphere was higher in the narrow rows," he said.

### Questions raised

"This has raised a number of questions as to why this may be – one possibility is that it could be due to a temperature difference in the narrow rows versus the wider rows so we have included temperature loggers in this year's plots to measure temperatures both at soil and canopy levels."

The 2014 trial work also include a fourth row spacing of 75 cm, as well as plots with lower populations of just 10 plants per square metre (the industry standard is between 20 and 30 plants per m<sup>2</sup>).

"There's also still questions over what effect narrow row spacings may have on disease control and insects because we did have a dry season last year with very low disease pressure, and this season is proving the same again," Kerry said.

"So while the results to date have certainly got farmers thinking about the potential yield benefits of shifting to narrower rows, there are still some questions that we are trying to answer over whether narrow row spacings will always be better."

The Queensland Pulse Agronomy trials will continue until June 2018.

More information is available at [www.grdc.com.au](http://www.grdc.com.au)

## A GROWER'S VIEW

### NARROW ROWS A WINNER FOR GLENN MILNE

Dalby grain grower Glenn Milne has already made the switch to narrower row spacings for his chickpea crop based on last year's trial results on his property.

Glenn has been hosting a series of Pulse Agronomy trials, from which early data indicates that a move to 25 cm row spacings could deliver an extra one tonne per hectare compared to one metre rows.

"Last year our average yield on that country where that trial was held was 3.1 tonnes per hectare – the trial maximum yield was up over 4 tonnes per hectare so an extra tonne to the hectare is pure profit," Glenn said.

"We were growing chickpeas on 30 inch – or roughly 75 cm – row spacings but because the trial showed there was a significantly higher yield on offer we have already halved our row spacings to 15" (37 cm) – all we did was double planted them with our 30" planter to get our 15" row spacing."

Glenn owns and leases a total of 600 hectares of highly fertile black soil country on the Jimbour Plain just north of Dalby. He is growing dryland sorghum, chickpeas, faba beans, mung beans, barley and wheat, as well as some irrigated cotton and corn.

As a former agronomist, he has been keen to host industry trials on his property to further improve his knowledge and compare his farm practices with new approaches.

The trials on his block are funded through the Grains Research and Development Corporation's Qld Pulse Agronomy Initiative, which involves collaboration between Department of Agriculture Fisheries and Forestry (DAFF) and the Queensland Alliance for Agriculture and Food Innovation (QAAFI).

### Small plot yields dwarf commercial average

Chickpeas traditionally only yield an average of 1.2 tonnes per hectare in dryland broadacre conditions, but the small plot trials on Glenn's property achieved 4.7 tonnes per hectare using an advanced breeding line planted at 0.25 and 0.5 metre row spacings. Yields of 4.5 tonnes per hectare and 4.4 tonnes per hectare were also achieved using the commercially available varieties PBA HatTrick and PBA Boundary, both on 0.25 m spacings.

"Our aim is to get up to that yield that the trial achieved and this year we're hoping to get closer to that yield potential through narrowing up our row spacings," he said. "Although we haven't yet got access to the new variety which was the highest yielding variety, the ones we've got available to us at the moment aren't that far behind."

Contact Glenn Milne, grain grower, Mob: Dalby, 0408 487 989, E: [glenn-milne@bigpond.com](mailto:glenn-milne@bigpond.com)



**Dalby grain grower Glenn Milne has already made the switch to narrower row spacings for his chickpea crops.**



# Sorghum growers weigh up January heatwave risk

**H**OT weather in January is virtually a given in northern Australia but the question on growers' lips is: How hot? Sorghum growers looking to plant in November are being urged to weigh up the risk of excessively high temperatures occurring in January and coinciding with critical development phases of crops.

Recent research backed by the Federal and Queensland Governments and the Grains Research and Development Corporation (GRDC) has highlighted the implications of heat stress for pollen viability, even in crops that are not moisture stressed.

The research found the most severe impacts on yield occurred when high temperatures around flowering reduced the viability of sorghum pollen causing reduced seed set and yield loss, according to Professor Graeme Hammer, Director of the University of Queensland's Centre for Plant Science at the Queensland Alliance for Agriculture and Food Innovation (QAAFI).

"In recent controlled environment experiments, where plants

were exposed to high maximum temperature conditions for five day periods, high temperatures coinciding with flowering gave the greatest reduction in seed set. The sorghum was sensitive for a period of 10–12 days over flowering," Graeme said.

"The research work has given us a much better understanding of the interaction between variety and temperature.

"We have incorporated this effect into the APSIM sorghum crop model and are conducting simulations for sites and sowing dates across the sorghum growing region using the last 50 years of climate data to examine yield and temperature stress risks.

"While individual years vary significantly in sowing date effects on grain yield, there is not a large effect of sowing date on average sorghum yield and yield likelihood across all years."

The modelling suggests that in northern NSW and southern Queensland, average yield isn't impacted until sowings in mid-January however the modelling doesn't take into account other issues such as disease and harvesting problems which can be encountered with late sowing.

## Seed set reduced

"Seed set in sorghum is reduced by high temperature effects on pollen and that effect is most prevalent for October and November sowings which flower during the peak risk time of year," Graeme said.

Simulations for Gunnedah that assessed the relative effects of high temperature on yield simulated on a year-by-year basis with an annual sowing date of October 15, found that there were very few years when the most tolerant genotype was affected, but the least tolerant genotype was affected often.

"This demonstrates the potential for introducing tolerance into elite sorghum hybrids by breeding. We are continuing our pre-breeding research to identify physiological mechanisms and genomic regions/genes responsible for conferring this tolerance," Graeme said.

"We are also looking at consequences on these risks of trends in climate that indicate heatwave conditions are likely to increase in frequency."

Further information: Graeme Hammer, UQ Centre for Plant Science, QAAFI  
Ph: 07 3346 9463, Email: g.hammer@uq.edu.au



Professor Graeme Hammer says research indicates that seed set in sorghum is reduced by high temperature effects on pollen and that effect is most prevalent for October and November sowings, which flower during the peak risk time of year. (Photo: QAAFI)

## the gate Short term, skilled labour available now

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

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

**AVAILABLE NOW.**

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

[www.the-gate.com.au](http://www.the-gate.com.au)

the gate

# Profit from clean grain storage

● By Rob Taylor, GRDC Northern Panellist

**T**HE prospect of ongoing dry weather and the current low prices for crops like chickpeas have many northern grain growers storing grain on-farm from this year's harvest in the hope of cashing in on higher prices in the future.

On-farm storage provides farmers with this additional marketing flexibility and it has been encouraging to see more and more producers investing in recent years in the infrastructure required.

But for the strategy to be effective, good equipment and hygienic farm practices are essential to protect the grain from damage from insect pests and loss of quality.

At the start of harvest be sure to remove any grain residues and clean thoroughly all empty storages and grain handling equipment which may have provided a breeding habitat for pests. Growers should consider treating machinery and storages with dryacide prior to the commencement of harvest.

Freshly-harvested grain is usually around 30°C, which is also an ideal breeding temperature for pests – to overcome this an aerated storage system is needed that can maintain temperatures of less than 23°C during summer and less than 15°C during winter, which will account for 85 per cent of pest problems.

When placing grain into storage, first run the aeration fans continuously for two to three days to create even moisture conditions. Growers should then push a second 'cold front'

through to cool the grain by running the fans for the coolest 9–12 hours of each day for the next three to five days.

Stored grain should be monitored monthly for the incursion of insects, preferably by positioning insect traps and sampling at the top and bottom of storages.

If insect pressures do arise, the only option is to fumigate with phosphine (no alternative knock-down is available). For this to be effective, the storage must be gas tight so that the phosphine can be maintained at a level high enough to kill grain pests at all stages of their life cycle (egg, larva, pupa and adult).

## Rotate chemical groups

Just like any pesticide, it is important to rotate chemical groups when treating grain in storages to minimise the risk of resistance developing among insect populations.

When doing this be sure to check the labels for the suitability to different crops and correct application rates. For example, two of the newer products on the market are Conserve On-Farm and K-Obiol – the former is not yet registered and is still on-permit for use only on cereals and not on maize, pulses, malting barley or rice. K-Obiol can be used on all cereals, including malting barley and sorghum but again, not on pulses.

Growers should be aware of the protocols and documentation required for these products.

For more detailed information visit [www.storedgrain.com.au](http://www.storedgrain.com.au)



Bourgault maintains a relentless focus on designing seeding systems that maximise productivity and enhance convenience.

**Our job is to make your job as efficient and effortless as possible.**

Visit our website to find your local professional dealer and full details of the Bourgault products that are right for you.

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



# Watson family awarded 2014 Brownhill Cup

**T**HE 2014 Brownhill Cup has been awarded to the Watson family of Kilmarnock Farming at Boggabri, NSW. Andrew Watson and his wife, Heike, have been recognised for their outstanding efforts in trialing and implementing new on-farm innovations designed to improve sustainability while maximising productivity and profit.

The business has been in the family since Andrew's father, John Watson, bought Kilmarnock in 1965. In 1998, Andrew became actively involved with the management and running of the business and in 2007 took over ownership. Since the start of the operation, the family has had a philosophy of trialing new methods before making changes to confirm any potential business advantages.

Kilmarnock Farming is spread over 3000 hectares and includes a mix of dryland and irrigated crops, particularly cotton. Andrew has been widely acknowledged for his contribution to the cotton industry, receiving the UNCGA *Cotton Grower of the Year* title four times.

Andrew has run a wide range of trials over the years, including seed treatment, marginal nitrogen, liquid nitrogen, potassium form, organic/manure fertiliser and slow release nitrogen trials.

This trial work and a focus on water use efficiency have allowed the Watsons to increase average cotton yields while reducing water use.

Other innovative on-farm practices include creating environments that are welcoming to beneficial insects, and dramatically reducing spraying. Over the past eight years, the Watsons have completed the equivalent of only one full spray of their cotton crop.

Crops are grown in zero-till and tram-tracked configuration in areas originally considered unsuitable for planting, including flood-prone parts of the property. A major benefit of zero-till farming in these areas is far less erosion resulting from flooding.

Tools such as moisture and crop canopy heat sensors are

utilised by Andrew and his family. Through his association with the Climate Champions program, Andrew is working with weather forecasters to develop new tools that will be of value to farmers in the future. ■

## ABOUT THE BROWNHILL CUP

The Brownhill Cup was donated by the Brownhill family of Merrilong at Spring Ridge, NSW as a perpetual trophy to encourage landholders to apply conservation farming and efficient management practices on their properties.

It was first awarded in 1984 as the Livestock and Grain Producers' Association 'Soil Conservation Farmer of the Year' award. The Brownhill Cup today recognises both resource conservation and management innovation in the northern farming zone.

The objectives of the award are:

- To stimulate the adoption of conservation farming practices;
- To encourage the development of farming practices that will achieve sustainable long-term productivity from the land;
- To demonstrate the economic viability of land management practices that are applied to various land capability classes, and;
- To develop within the community a land stewardship ethic to secure the future welfare of the district and its people.

The Brownhill Cup is sponsored by Commonwealth Bank Regional and Agribusiness Banking and the Brownhill Family and supported by NSW Department of Primary Industries and the NSW Farmers Association.

In 2014, the prize includes a \$2000 contribution from Commonwealth Bank and the Brownhill family to allow the recipient to attend an industry event that aligns with the goals of the Brownhill Cup.



CommBank's Geoff Wearne, Executive General Manager Regional and Agribusiness Banking and Tim Harvey NSW General Manager Regional and Agribusiness Banking present the Brownhill Cup to Andrew Watson of Kilmarnock Farming.

# Avoid the enemy with harvest weed seed testing

**C**OLLECTING weed seed samples at harvest helps to map out an effective weed management strategy for the following season. An accurate picture of the resistance status of weeds across individual paddocks and farms is critical if growers are to manage hard-to-kill weeds and avoid costly, ineffective control tactics according to Grain Orana Alliance (GOA) chief executive officer Maurie Street.

"Growers need to know their enemy. Taking seed samples from survivor weeds at harvest and sending them off for testing will allow growers to assess their control options for next year," Maurie said.

"Herbicide resistance costs the northern grains industry tens of millions of dollars each year and unless growers understand the resistance status of the weeds on their farm, they can't have full confidence that their normal control measures will continue to work in the future."

## Weeds present at harvest last year

GOA, a Grains Research and Development Corporation (GRDC) funded grower solution group, recently coordinated a survey of weeds present at harvest last year which showed an alarming level of herbicide resistance across the Central Western New South Wales cropping belt.

The testing found that an unprecedented 87 per cent of ryegrass samples were resistant to two or more mode of action (MOA) groups and half of these were resistant to four or more MOAs.

"These results suggest that single resistance is rare and also confirmed a number of cases of ryegrass populations resistant to herbicides that had never been applied on the paddocks where they were collected," Maurie said.

"This highlights that hygiene is extremely important to prevent introducing resistant weeds by accident and that resistance to an MOA can occur as a result of resistance developed to an alternate MOA.

"While the results certainly give significant cause for concern, they aren't entirely surprising in that the survey wasn't random. The samples were from weeds present at last year's harvest so were therefore most likely to have survived herbicide application and have some herbicide resistance – it really defines the worst case scenario."

## Concern over the number of samples resistant to glyphosate

With at least half of the herbicide options lost to growers, Maurie was particularly concerned over the number of samples that tested resistant to glyphosate.

He said that although the percentage of samples resistant to Group M products was very low – about six per cent – these products were an essential component of zero-till farming and losing them would have far-reaching consequences.

"What this survey proves is that we have to employ new tactics to control our weeds. The first step is for growers to determine the extent and nature of herbicide resistance in weeds on their properties and once that is clear, an effective control program incorporating chemical and non-chemical control options can be developed," he said.

"There has been strong interest in harvest weed seed control

measures, like narrow windrow burning, to start the campaign against resistant weeds and I expect wide adoption of non-herbicide tactics over the next few years."

For more information on weed seed control and integrated weed management strategies, visit [www.weedsmart.org.au/wp-content/uploads/2013/01/WeedSmart\\_SustainabilityGuide\\_V14-Northern\\_LR.pdf](http://www.weedsmart.org.au/wp-content/uploads/2013/01/WeedSmart_SustainabilityGuide_V14-Northern_LR.pdf)



Grain Orana Alliance (GOA) chief executive officer Maurie Street is urging growers to take seed samples from survivor weeds at harvest time.



# Sorghum hybrid performs in dry year

**F**OR southern Queensland farmer Robert Woods, last year was the toughest season on record, but his Pioneer brand G33 hybrid sorghum still performed.

"We had quite a good start and our crops looked great, but then 47-degree heat at mid-flowering/head emergence changed things dramatically.

"But the G33 was still able to yield around 2.5 tonnes per hectare, which ordinarily would be a poor result, but for this year it turned out to be outstanding and the quality was reasonable too given the season," Robert says.

The Woods chose the G33 to both maintain variety in their cropping program, as well as its good yield potential.

"I like to maintain a cross section of varieties as it gives us diversity against heat stress and various other risks that we've got in the planting window.

"The G33 showed good potential in the field trials, and that encouraged us to try the variety – on a small scale ourselves at first – and we had successful results.

"It's a good clean variety and it's well suited for our

topographical area and soil type. We were very happy with it the first year and so we've continued to use it," he says.

With last season's dry conditions, Robert believes the results could have been worse if they hadn't grown the G33 hybrid.

"When you have a tough season, the big yielders are normally the ones that suffer the most, but we didn't see that happen – the G33 held up against the tougher varieties and out-yielded some of those – in fact it ended up being the highest-yielder this year.

"It was a good story on both sides – in the favourable year it yielded high yields and in the poor year it still maintained its yield," Robert says.

He says they'll continue to use the G33 sorghum over the next couple of seasons.

"We're always searching for new varieties and I think Pioneer have a couple of promising varieties coming through their trials. But the G33 will still remain in there for a number of years yet – it ticks all the current boxes we look for in a variety." ■



Robert Woods has been happy with the performance of the G33 sorghum hybrid in both good and tough seasons.



## THE RESEARCH VIEW

# Break crop research digs beneath the surface

**A** WESTERN Australian research project has found that a high proportion of the state's grain paddocks have soil acidity at levels that will limit the productivity of break crops. Although the research is being carried out in WA, some of the project's findings may be relevant to other grain growing regions in Australia.

Information generated from the Putting the Focus on Profitable Break Crops and Pasture Sequences in WA project has highlighted the importance of growers measuring subsurface pH levels, to prevent break crops being seeded into unsuitable soils.

The Grains Research and Development Corporation (GRDC) supported project, also known as *Focus Paddocks*, is being conducted by the Department of Agriculture and Food (DAFWA) with assistance from WA grower groups.

"Now in its final year, the project aims to deepen knowledge about the effects of crop and pasture rotations on the farming system," DAFWA researcher Wayne Parker said.



DAFWA researcher Wayne Parker assessing a canola trial measuring biomass growth from nutrient application.

## 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.

## ChemCert Accreditation

*Industry's Choice for Chemical Accreditation*

### Stored Grain Pest Management - A Holistic Approach

*Come along to your local ChemCert course to find out more*



**Call Now For Your Local Course**  
**Freecall 1800 444 228**

enrol@ChemCert.com.au | www.ChemCert.com.au



"Under the project, field data has been collected from the same 184 paddocks, for five consecutive years.

Wayne said testing in 2013 showed that potentially one in five WA canola paddocks with adequate surface pH levels would nevertheless have yields limited by poor subsurface pH.

"Many WA paddocks sown to other break crops, such as lupins and chickpeas, are also likely to have subsurface pH levels that limit crop yields," he said.

"Our data shows that 15 per cent of the paddocks tested have an adequate surface pH of 5.5 or greater, but a pH less than 4.8 at 10 to 30 cm below the soil surface.

"Our concern is that break crops are being unwittingly sown in paddocks with an unmeasured subsurface pH that is below critical levels, limiting the yield potential of these crops."

Wayne said incorrect decisions could be made if growers did not have full knowledge of soil pH at depth.

"This is particularly true when the crop is susceptible to low

pH or aluminium toxicity (which is exacerbated by soil acidity), as are the break crops chickpea, field pea and canola," he said.

"Poor yields of these rotation crops may be the result of low pH at depth, even if there is good pH at the soil surface."

### Soil pH targets

Wayne said soil pH targets, as established by DAFWA and industry, were set at a minimum of 5.5 in the topsoil and a minimum of 4.8 in the subsurface soil.

"At a pH of 4.8 or lower, levels of aluminium in the soil increase to toxic levels," he said.

"Free aluminium has a big impact on crop yield as it reduces root growth, which in turn reduces the depth of soil the plant has access to."

Wayne said a pH level of at least 5.5 was required in the top 0–10 cm of the soil before lime could influence soil below this level.

"Lime applied to the surface will be worked in with the traffic of the seeding implement," he said. "This creates a layer where the pH is ameliorated to the depth of the seeding point, but no further.

"Lime must be in contact with the soil of low pH in order to react.

"This 'layering' effect has an impact on the yield potential of rotation crops and pastures.

"Where there is an ameliorated surface, with a pH above 5.5, but a subsurface with a pH below 4.8, the yield potential of rotation crops is reduced, as is the efficacy of nitrogen fixation.

"Despite lime having been applied, the subsurface pH remains unchanged until the lime is able to leach through the profile."

### Current recommendations

Wayne said current recommendations for field pea and chickpea in particular might be leading growers to sow them onto unsuitable soils.

Recommendations are for field pea to be grown on soils with a pH of at least 5, and chickpea to be seeded on soils with a surface pH of a minimum of 5 if the subsoil rises to above 5.5 within 10 to 15 cm of the surface.

The optimum pH range recommended for canola is between



Canola plants showing symptoms of manganese toxicity where the subsurface pH is below 4.8.



Assessing and comparing the subsurface pH of healthy and unhealthy canola plants.



pH 5 and 8, with significant yield loss being incurred below a pH of 4.6.

"But if the subsurface has not been tested, growers adhering to these recommendations may grow break crops with disappointing yields," Wayne said.

"If growers follow the recommendations and plant field pea or chickpea crops into soils with a pH minimum of 5 on the soil surface, then 42 per cent of these paddocks will in fact be unsuitable for chickpea, field pea, legume pasture and, to a lesser extent, barley and canola, due to a declining pH in the subsurface."

### Break crop decline

Wayne said that since the late 1990s, the area sown in WA to break crops, particularly chickpea and field pea, had steadily declined.

"Disease, weeds and crop architecture have often been blamed for this decline in the break crop area," he said.

"But despite these issues being addressed by breeding and improved agronomic practices, the area sown to break crops has not increased.

"Subsurface acidity may be a significant factor contributing to the reduced popularity of some break crops, as poor soil pH is known to decrease a crop's competitive ability against weeds, increase disease susceptibility and decrease yield," he said.

"An improvement of subsurface pH could help mitigate these issues and improve the break crop's yield potential, potentially leading to an increased area being sown to break crops in future seasons."

More information: Wayne Parker, DAFWA, 08 9956 8555,  
E: [wayne.parker@agric.wa.gov.au](mailto:wayne.parker@agric.wa.gov.au)

## THE COMMERCIAL VIEW DIG BENEATH THE SURFACE

● By Peter Elliott-Lockhart, Planfarm

With Planfarm, I have been involved in GRDC supported paddock testing work which complements the *Focus Paddocks* project.

While *Focus Paddocks* has surveyed paddocks mainly in Western Australia's medium rainfall areas, the project I've been working on has focused on the state's high and low rainfall cropping zones.

Results from both projects highlight the importance of checking soil quality at depth.

It is not unusual for growers to report that the performance of a break crop has been disappointing, despite a good season and data suggesting paddock conditions were suitable.

To find out what is the issue, it is worth digging a few holes to check for possible constraints, and to soil test at depth.

Soil compaction and acidity – which limit root growth and reduce the size of the soil's water holding capacity – or 'bucket' – will often be the culprits.

Anything we can do to increase the size of the bucket will definitely increase water use efficiency (WUE) – conversion of rainfall into grain – and crop yields.



Peter Elliott-Lockhart.



Bourgault maintains a relentless focus on designing seeding systems that maximise productivity and enhance convenience.

**Our job is to make your job as efficient and effortless as possible.**

Visit our website to find your local professional dealer and full details of the Bourgault products that are right for you.

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



# Summer sown serradellas deliver nitrogen benefits

**O**PPORTUNITIES exist for Western Australian growers to sow hard seeded French serradellas in summer, providing nitrogen for crops and valuable autumn feed for livestock.

Developed by the Department of Agriculture and Food (DAFWA) for their suitability to the state's acid soils, the self-regenerating, hard seeded serradellas are now being used in a low-cost summer sowing system.

The system involves sowing unprocessed pods from the serradella varieties Margurita and Erica – in a sowing window from January to mid-March – and its benefits include establishing pastures earlier and more cheaply and reliably than traditional annual pasture legumes.

The GRDC funded the research into the novel summer serradella pod sowing technique through the *Focus Paddocks* project.

DAFWA research officer Brad Nutt, who developed the serradellas with fellow DAFWA researcher Angelo Loi, said the ideal rotation for the hard seeded serradellas was pasture-crop-pasture, and research was revealing good pasture regeneration in the third year, post-crop phase.

He said Margurita and Erica were showing potential as key legume inclusions to crop rotations in WA's medium and high rainfall zones.

"DAFWA trials have shown that these pastures can produce more than 20 kilograms of nitrogen per tonne of dry matter plant biomass during the growing season," Brad said.

At a Brookton property last year, a trial of Mace wheat sown after French serradella – with no added nitrogen – yielded five tonnes per hectare, had 10 per cent grain protein and returned \$1360 per hectare.

"The grower estimates using serradella is saving his cropping enterprise about \$100 per hectare in nitrogen input and labour costs, while producing the same crop yields as those from the farm's traditional subclover/lupin legume system – thus driving up profits," Brad said. ■



Growers at a spring field day at Colin and Anna Butcher's Brookton property this year inspect a regenerating stand of Margurita serradella that was harvested for seed in 2012 and cropped in 2013. (Photo: DAFWA)

# Versatile pulses in the high rainfall zone

● By Cindy Benjamin

**F**IELD peas and faba beans are performing well for Richard Morgan on the edge of the high rainfall zone, near Ararat in Victoria's south-west.

This season has presented a few challenges but the Morgans are still expecting their crops to finish well. "All our crops are struggling given the lack of rainfall this year, – only 13 inches so far this year instead of around 20 inches," says Richard. "The frosts in mid October also gave us a scare but it looks like the crops will survive with minimal losses."

"We have been growing faba beans for a long time and they



Ararat farmer, Richard Morgan, inspecting field peas for frost damage. Field peas provide more weed control options and income from grain and baled pea straw.

often generate the best net income for our business," he says. "More recently we have added field peas and want to increase the total area sown to pulses."

Richard and his wife Shan farm a total 1500 hectares of wheat, barley, canola, faba beans, field peas and oaten hay with their two married sons, Michael and David. They have grown faba beans for the local stockfeed market for many years and have found the new varieties and improved management advice have made a big difference to the reliability of growing pulses successfully.

The Morgans have established markets with prime lamb producers in their district who buy their faba beans at, or soon after, harvest. "When mixed with oats, faba beans are the best fattening feed available and we never have any trouble selling all we produce," says Richard.

This is only the second season that the Morgans have grown field peas. Last year was an excellent season for peas and although this year has been more challenging Richard is expecting a good crop again. The grain goes to dairy farms and the Morgans have established local markets for baled pea stubble, which earns almost as much for their business as the grain.

Part of the reason for baling stubble is to manage slugs prior to planting canola. If they don't bale the stubble it must be burnt instead.

"One down-side of baling stubble is that we have to store the bales on-farm until the following spring when gardeners are ready to mulch their gardens," says Richard. "David supplies an outlet in Melbourne and we have some local outlets."

### More weed control options

Including pulses in their rotation gives the Morgans more weed control options, especially early in the season. "Field peas are a particularly good option for weed control because they are planted quite late, which gives us an opportunity to use knockdown herbicides on early weed germinations before planting," says Richard.

"Brome grass is probably our main weed concern at the moment," he says. "We are using the field peas, oaten haymaking and herbicide resistant cereal and canola varieties to keep it under control."

Chocolate spot and ascochyta blight require control during the season in faba beans but so far there has been no disease pressure in the field peas. Richard says the improved disease resistance in the new varieties – and spraying fungicide ahead of a rain event when diseases are present – provides excellent protection for the crops. "If more farmers start growing field peas in the area we might experience more disease pressure but up till now, it has not been a problem," he says.

In recent years the Morgans have used granular inoculants when planting their pulse crops. They find the granules are easy to apply using a small seeds box on the planter to place the granules in the furrow with the seed.

"The start of the season is often dry and using the granules means we can plant on time and then wait for the rain to activate the granules and germinate the crop," says Richard. "We have achieved excellent nodulation in faba beans and although I have not checked nodulation in the peas there is no indication that there is any problem."

Most years the Morgans expect yields of around 4.5 tonnes per hectare from the faba beans and over 3 tonnes per hectare from field peas. Yield has been steadily increasing over time with improved varieties and management. Richard was concerned that the recent frosts might have damaged the current crops but

the faba bean pods appear to have survived and Richard is fairly confident that the crop will maintain its yield potential.

"The field peas might lose their first flowers and later flowering will depend on rain," he says.

### Some remarkable crops

Mary Raynes, Pulse Australia southern industry development manager, said considering the difficult seasonal conditions this year across Victoria, there are some remarkable crops with good quality grain being produced in the south western and north eastern districts.

"Faba beans crops continue to provide agronomic benefits to the farming rotations in these areas predominately for soil biology, disease pressure and nitrogen fixation," she said.



Mary Raynes.



## PERSUASION SKILLS WORKSHOP

LEARN HOW TO MOTIVATE GROWERS TO CHANGE THEIR PRACTICES

It's one thing to help growers *understand* the value of new products and technologies.

**It's another thing to motivate them to *use* them on farm.**

Join C-Qual's proven workshops for consultants, agronomists, researchers and extension officers and help more growers make the leap from knowledge to action.

**Workshops coming soon to:**

Perth: 17th & 18th February

Horsham: 26th & 27th February

Adelaide: 5th & 6th March

SAVE WITH EARLYBIRD REGISTRATION ONLINE NOW [www.c-qual.com](http://www.c-qual.com)



**GRDC** Grains Research & Development Corporation  
Your GRDC working with you



# Charcoal rot affecting stressed lupins

● By Cindy Benjamin

**E**XTREME heat in August is the likely cause of an unusually widespread incidence of charcoal rot in lupin crops across the northern and eastern districts of Western Australia this year. The industry is mostly unaware of charcoal rot as it rarely has a noticeable impact on lupin yields.

Pulse Australia industry development manager (western), Alan Meldrum says there were patches in crops in these regions that have dried off and died prematurely, showing signs of charcoal rot infection.

"Charcoal rot is a widespread endemic soil-borne fungus that is only a problem in highly stressed crops," he says. "The patches that had been dying were on very dry and shallow soils where the plants have very limited root systems and few deep roots. The high temperatures in August added to the drought stress in the plants."

Department of Agriculture and Food plant pathologists Geoff Thomas and Ravjit Khangura inspected affected crops and confirmed charcoal rot as the problem.

"Plants infected with charcoal rot develop very distinctive stem symptoms," says Geoff. "The stem and taproot near the soil surface become infected and when split open the distinctive ash-grey discolouration can be seen, partly caused by masses of tiny black microsclerotia embedded in the tissue."



Alan Meldrum.

Alan says that the area of infected plants can range from a small patch to most of a paddock, depending on soil conditions.

"Charcoal rot is an opportunistic disease that attacks plants in poor health and usually appears at the end of the season when plants are beginning to senesce normally," he says. "The extreme weather this season gave charcoal rot a rare opportunity to infect plants much earlier than usual."

*Macrophomina phaseolina* – the fungus that causes charcoal rot is present in most areas and can infect a wide variety of plants. The disease can not be prevented but is only ever a problem in moisture-stressed crops when soil temperatures are warm.

## Minor yield effect in most seasons

"In most seasons charcoal rot has only a minor effect on yield because pod set is complete and the crop is approaching maturity before infection takes place," says Geoff. "This season the early infection had affected plants during pod set and pod ripening, bringing on premature senescence similar to the effects of drought conditions."

Alan expects overall yield losses to charcoal rot to only account for around 10 per cent of the total production of lupins. But charcoal rot will affect 80 to 90 per cent of plants in affected patches and paddocks, and individual yield losses will be high.

"The good news is that charcoal rot is unlikely to be seen affecting lupins to this extent in the future and growers should take heart that this is likely to be one-off event," he says.

For more information contact Geoff Thomas, Ph: 08 9368 3262 or 0428 947 287 [Geoff.thomas@agric.wa.gov.au](mailto:Geoff.thomas@agric.wa.gov.au) or check the Pulse Australia website [www.pulseaus.com.au](http://www.pulseaus.com.au)



Farm manager, Scott Treloar (left), with Jon Clements, DAFWA lupin plant breeder, investigating black lupins in September, south of Arrino in WA's Mid West farming region.

# Crunch the numbers before investing in on-farm grain storage

**S**OUTHERN region grain growers considering investing in new on-farm storage are being encouraged to make well-informed financial decisions. Grain storage consultant Chris Warrick says that unlike a machinery purchase, grain storage is a long-term investment that cannot be easily changed or sold.

"It's worth taking the time to do the numbers, consider the options and make informed decisions," said Chris, who heads up the Grains Research and Development Corporation's Grain Storage Extension Project.

Chris and the Grain Storage Extension Project team conduct about 100 grower workshops every year across Australia and from that experience it is evident that no two growers use on-farm storage in the exact same way.

"Like many economic comparisons in farming, the viability of grain storage is different for each grower.

"Depending on the business' operating style, location, resources and the most limiting factor – the ability to increase profit – grain storage may or may not be the next best investment," said Chris, who has been speaking about the economics of grain storage at GRDC grains research Updates in the southern cropping region.

"For this reason, everyone needs to do a simple cost benefit analysis for their own operation."

To make a sound financial decision, Chris said growers needed to compare the expected returns from grain storage versus expected returns from other farm business investments, for example more land, a chaser bin, a wider boomspray, a second truck or paying off debt.

"The other comparison is to determine if you can store grain on-farm cheaper than paying a bulk handler to store it.

"Calculating the costs and benefits of on-farm storage will enable a return on investment figure, which can be compared with other investment choices and a total cost of storage to compare the bulk handlers."

## Key to a useful analysis

The key to a useful cost-benefit analysis is identifying which financial benefits to plan for and costing an appropriate storage to suit that plan, according to Chris.

"People often ask, 'what's the cheapest form of storage?'. The answer is the storage that suits the planned benefits.

"Short-term storage for harvest logistics or freight advantages can be suited to grain bags or bunkers. If flexibility is required for longer term storage, gas-tight, sealable silos with aeration cooling allow quality control and insect control," Chris said.

He said that while it was difficult to put an exact dollar value on each of the potential benefits and costs, a calculated estimate would determine if an investment in on-farm grain storage was worth more thorough investigation.

"If we compare the investment of on-farm grain storage to other investments and the result is similar, then we can revisit the numbers and work on increasing their accuracy.

"If the return is not even in the ball-park, we've potentially avoided a costly mistake. On the contrary, if after checking our numbers the return is favourable, we can confidently proceed with the investment."

Based on the observations of the Grain Storage Extension Project team, growers across Australia who are taking a planned approach to on-farm grain storage and doing it well are being rewarded for it.

"Grain buyers are seeking out growers who have a well-designed storage system that can deliver insect-free, quality grain without delay," Chris said.

**More information on the economics of grain storage is available via the GRDC Stored Grain Information Hub at [www.storedgrain.com.au](http://www.storedgrain.com.au).**

**A GRDC Economics of On-farm Grain Storage guide, which includes a cost-benefit analysis template, is available via [www.storedgrain.com.au/category/information-hub/economics-of-grain-storage/](http://www.storedgrain.com.au/category/information-hub/economics-of-grain-storage/)** ■



**Unlike a machinery purchase, grain storage is a long-term investment that cannot be easily changed or sold.**



# Selecting for fast maturing wild radish

**W**ILD radish has all the attributes of a 'super' weed, quickly responding to selection pressure and finding ways to evade control measures.

Collecting weed seed at harvest and crushing, composting or burning them has proved to be a very effective method of reducing the number of seeds that enter the seed bank each year. In Western Australia growers have achieved excellent results with chaff carts, baling, narrow windrow burning and the Harrington Seed Destructor, but research shows the efficacy of harvest weed seed control also applies selection pressure favouring early flowering.

The University of Western Australia PhD scholar Michael Ashworth reported his findings at the Australasian Weeds Conference in Hobart in early September, showing that wild radish populations have sufficient genetic diversity to rapidly adapt their flowering time in response to selection pressure.

Starting with wild radish plants that had not been subjected to harvest weed seed control, Michael systematically collected seed heads from early flowering individuals and planted these seeds to grow the next generation of the selected population.

"Within five generations the population had shifted the time to flowering from 60 days to 29 days," he says.

"As a result these plants will be carrying well-matured pods at harvest, many of which will have dropped their seed, effectively evading seed capture at harvest. This is even more likely in years where there are periods of water deficit, high temperature or high wind."

## Not all bad news

The rapid reduction in time required for the wild radish plants to flower is alarming but does not mean that the reduction can continue indefinitely. There are biological limits and these early flowering biotypes will be susceptible to other forms of control.

The good news is that the early flowering wild radish produced less biomass prior to flowering than the later flowering

individuals, making them more susceptible to crop competition. The early flowering plants also had poor structural integrity and set fewer pods below the harvest cutting height.

"There is a level of creativity required and a constant need for researchers and growers to think 'outside the square' to identify and test new weed control options," says Michael.

AHRI communications leader Peter Newman says these findings underline the need for growers to use a spectrum of control tactics when combatting weeds in their crops.

"Weeds have an amazing ability to adapt to selection pressures, including the actions of farmers endeavouring to remove them. Herbicides, crop competition, strategic cultivation and harvest weed seed control can all be used to suppress weed numbers," he says. "Growers using a combination of these techniques have very low wild radish numbers and are winning the war."

Peter recommends the WeedSmart 10 Point Plan as a good place for growers to start planning an integrated weed management course of action.

**For more information on planning a strategy to manage the risk of herbicide resistance, visit [www.weedsmart.org.au](http://www.weedsmart.org.au)** ■



Within five generations the population had shifted the time to flowering from 60 days to 29 days, effectively evading seed capture at crop harvest time.



AHRI researcher Michael Ashworth systematically collected seed heads from early flowering individuals and planted these seeds to grow the next generation of the selected population.