

## March–April 2012

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## FRONT COVER



### Ganging up on a problem weed:

Extension officer, Darren Aisthorpe (far left) points out weed treatments to Callide and Dawson Valley (Qld) farmers.

See report Page 47 Grain Yearbook.

(Photo courtesy Maurie Conway, DEEDI, Emerald)

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# Grain YEARBOOK 2012

**Begins after page 44**

**I**N very appropriate cropping parlance – welcome to a 'bumper' issue of *Australian Grain*. Your feedback, along with ever-increasing postal and print charges, have lead to this special issue where the 2012 Grain Yearbook and our March-April edition have been combined.

Nothing has changed in content. You are still presented with the same quality and quantity of articles, facts, figures and reference information you've become used to from your bi-monthly and Yearbook publication over the past 20 years – we've just packaged and delivered them in a more efficient, convenient manner.

The March-April bi-monthly section presents a number of articles revealing ground-breaking Australian research. A new salt-tolerant durum variety has been developed with in-the-paddock yield advantages of up to 25 per cent (see page 4). Our most recent National Land & Water Resources Audit estimated that nearly 5.7 million hectares of our agricultural soils are considered at risk or are affected by dryland salinity – a figure that could rise to 17 million hectares within 50 years. And given that salinity already affects over 20 per cent of the world's agricultural soils, both the international and local potential benefits from a more salt-tolerant food staple are enormous.

Our world-class plant breeders are also zeroing-in on more frost tolerant wheat and barley varieties (see page 8). Research has established that all of our wheat varieties are equally and highly susceptible to severe frosts of less than  $-2^{\circ}$  while all of our barley varieties show the same high susceptibility to frosts of less than  $-6^{\circ}$ .

But thanks to the establishment of dedicated frost screening nurseries across the country, plant breeders are now able to more accurately measure the susceptibility of various varieties and have found very promising genetic variation for tolerance to less severe frosts. This material is now being injected into the wheat and barley breeding pipeline.

## 2012 Grain Yearbook

With the combined 2011–12 winter and summer crops tipping the scales at more than 46.5 million tonnes across 20 crop types, Australian farmers have nurtured and delivered the nation's highest ever tonnage. This means there's plenty of impressive numbers and statistics to chew on in the Grain Yearbook section with an easy to follow break-down of the relevant domestic and international numbers. The Yearbook also has regional reviews from across the grainbelt providing an in-the-paddock background to how this record season was achieved as well as what we can expect in the coming season.

Short and medium term production and market outlooks for our major grains are also presented as well as articles looking into the rapidly changing face of farming in Australia.

Please enjoy the new and improved format of your Yearbook.



## In this issue...

### World breakthrough on salt-tolerant wheat

A team of Australian scientists involving the University of Adelaide has bred salt tolerance into a variety of durum wheat that shows improved grain yield by 25 per cent on salty soils..

**See article . . . . . Page 4**



### Is the planet over-stocked?

Agriculture is basically the business of harvesting sunlight and converting it into a useful product. The industry is fully mature and requires no additional capital investment. For some reason, our society is fascinated by technology based on silicon which captures sunlight, and overlooks the carbon based system refined by millions of years of evolution that does the same thing.

**See article . . . . . Page 18**



### Recollections and frustrations

During the early 1960s, as a youthful sales manager employed by Lough Equipment Pty. Ltd. located on Sydney's North Shore, I suggested to my boss, Eric Lough, that we should produce a monthly promotional magazine extolling the virtues of our various lines of machinery. My boss agreed, but said I would be shouldered with the responsibility. Great, as if I hadn't enough to do!

**See article . . . . . Page 22**



### Intensive cropping and ryegrass seed dormancy

Western Australian research has shown there is a strong link between intensive cropping, annual ryegrass 'dormancy' and herbicide resistance in the state's grainbelt. Dormancy refers to the situation where viable seed does not germinate under ideal germination conditions.

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



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# World breakthrough on salt-tolerant wheat

**A** TEAM of Australian scientists involving the University of Adelaide has bred salt tolerance into a variety of durum wheat that shows improved grain yield by 25 per cent on salty soils.

Using 'non-GM' crop breeding techniques, scientists from CSIRO Plant Industry have introduced a salt-tolerant gene into a commercial durum wheat, with spectacular results shown in field tests. Researchers at the University of Adelaide's Waite Research Institute have led the effort to understand how the gene delivers salinity tolerance to the plants.

The research is the first of its kind in the world to fully describe the improvement in salt tolerance of an agricultural crop - from understanding the function of the salt-tolerant genes in the lab, to demonstrating increased grain yields in the field.

The results have been published in the journal *Nature Biotechnology*. The paper's senior author is Dr Matthew Gilliam

from the University's Waite Research Institute and the ARC Centre of Excellence in Plant Energy Biology. Lead authors are CSIRO Plant Industry scientists Dr Rana Munns and Dr Richard James and University of Adelaide student Bo Xu.

"This work is significant as salinity already affects over 20 per cent of the world's agricultural soils, and salinity poses an increasing threat to food production due to climate change," Rana says.

Matthew says: "Salinity is a particular issue in the prime wheat-growing areas of Australia, the world's second-largest



**This is the first study to confirm on farm that the salt tolerant gene increases yield in saline soils. (Photo: Carl Davies, CSIRO)**

**CSIRO researchers, Dr Richard James and Dr Rana Munns, at the salt tolerant wheat trial near Canberra. (Photo: Carl Davies, CSIRO)**

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wheat exporter after the United States. With global population estimated to reach nine billion by 2050 – and the demand for food expected to rise by 100 per cent in this time – salt-tolerant crops will be an important tool to ensure future food security.”

### Narrow gene pool

Domestication and breeding has narrowed the gene pool of modern wheat, leaving it susceptible to environmental stress. Durum wheat, used for making such food products as pasta and couscous, is particularly susceptible to soil salinity.

But the authors of this study realised that wild relatives of modern-day wheat remain a significant source of genes for a range of traits, including salinity tolerance. They discovered the new salt-tolerant gene in an ancestral cousin of modern-day wheat, *Triticum monococcum* (see box story).

“Salty soils are a major problem because if sodium starts to build up in the leaves it will affect important processes such as photosynthesis, which is critical to the plant’s success,” Matthew says.

“The salt-tolerant gene (known as TmHKT1;5-A) works by excluding sodium from the leaves. It produces a protein that removes the sodium from the cells lining the xylem, which are the ‘pipes’ plants use to move water from their roots to their leaves,” he says.

Richard James, who led the field trials, says: “While most studies only look at performance under controlled conditions in a laboratory or greenhouse, this is the first study to confirm that the salt-tolerant gene increases yields on a farm with saline soils.

### Up to 25 per cent yield increase

Field trials were conducted at a variety of sites across Australia, including a commercial farm in northern New South Wales.

“Importantly, there was no yield penalty with this gene,” Richard says.

“Under standard conditions, the wheat containing the salt-tolerance gene performed the same in the field as durum that did not have the gene. But under salty conditions, it outperformed its durum wheat parent, with increased yields of up to 25 per cent.

“This is very important for farmers, because it means they would only need to plant one type of seed in a paddock that may have some salty sections,” Richard says.

“The salt-tolerant wheat will now be used by the Australian Durum Wheat Improvement Program (ADWIP) to assess its impact by incorporating this into recently developed varieties as a breeding line.”

Rana Munns says new varieties of salt-tolerant durum wheat could be a commercial reality in the near future.

### Non-GM so no restrictions

“Although we have used molecular techniques to characterise and understand the salt-tolerant gene, the gene was introduced into the durum wheat through ‘non-GM’ breeding processes. This means we have produced a novel durum wheat that is not classified as transgenic, or GM, and can therefore be planted without restriction,” she says.

The researchers are taking their work a step further and have now crossed the salt-tolerance gene into bread wheat. This is currently being assessed under field conditions.

**This research is a collaborative project between CSIRO, NSW Department of Primary Industries, University of Adelaide, the Australian Centre for Plant Functional Genomics and the ARC Centre of Excellence in Plant Energy Biology. It is supported by the Grains Research and Development Corporation (GRDC) and Australian Research Council (ARC).** ■

## SALT TOLERANCE THANKS TO A WHEAT ANCESTOR

Around five years ago, researchers in this collaborative salt-tolerance project knew they were onto something very exciting. Papers published by the group in the journal *Plant Physiology* described how two genes they had discovered worked by excluding salt from different parts of the plant – one from the roots, the other from the leaves. This discovery became the subject of international patents.

“The two genes originally came from a wheat ancestor, *Triticum monococcum*,” says Dr Rana Munns. “They were unwittingly crossed into a durum wheat line about 35 years ago and are normally not present in any modern wheat.”

The project began when the CSIRO team used a highly accurate selection method – based on their understanding of how plants tolerate salt – to identify wheat varieties that could cope with higher salinity. They were particularly interested in the premium-priced durum wheat, which is much more salt-sensitive than bread wheat.

“We screened a hundred durum wheats from the Australian Winter Cereals Collection at Tamworth, which contains tens of thousands of wheat types,” Rana says. “Highlighting the fact that the science of plant breeding sometimes relies on an element of good fortune, we were lucky to find the durum variety with the ancient genes straight away, otherwise we might have been looking for years.”

The team used their knowledge of the two genes to construct molecular markers, which are now in use in CSIRO’s wheat breeding program.



**Salt tolerant durum wheat grown on a commercial farm in northern NSW as part of the research field trials. (Photo by CSIRO)**

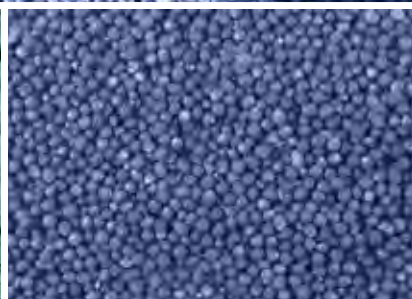
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# Frost nurseries identify tolerant grain varieties

**B**REEDING new wheat and barley varieties with improved frost tolerance is the ultimate solution to minimise economic losses due to frost.

Pre-breeding research funded by the GRDC has identified improved genetic sources of frost tolerance, and these genes are already part of barley breeding programs and under evaluation for wheat.

Department of Agriculture and Food (DAFWA) research officer Ben Biddulph presented the latest results on projects screening for varietal differences in frost tolerance at the 2012 Agribusiness Crop Updates in Perth in February.

Ben says it's tough to measure damage from frost events in the field.

"Because it's impossible to know in advance where a frost will occur, the equipment is not always set up to measure temperatures. Often, damage is not immediately visible, and there are many other factors which may influence ultimate yield.

"This has led to an assumption for many years that there was little variation amongst wheat and barley varieties in terms of frost tolerance," Ben said.

"But successive GRDC funded projects have enabled dedicated frost screening nurseries to be developed in South Australia, Western Australia and now New South Wales to measure frost tolerance with greater accuracy and repeatability.

"The research has shown that under severe frost (less than  $-2^{\circ}$  for wheat and less than  $-6^{\circ}\text{C}$  for barley) all varieties are equally susceptible. But genetic variation does exist for frost under milder conditions, with Keel, Sloop and Schooner having lower levels of damage than other barley varieties, for instance. Tolerance has also been identified in Japanese barley varieties, although this is still comparable to Keel.

"The tolerance genes from the Japanese material have been introduced into Australian barley breeding programs and in adapted backgrounds this tolerance has been validated in the field in WA and SA," Ben said.

## Multiple times of sowing

The frost nurseries are set up with multiple times of sowing at each site to increase the probability that the test lines are at the flowering stage when a natural frost event occurs.

On-site weather stations monitor the temperature at the crop canopy. Following a frost event, heads at flowering are tagged and then assessed later for frost induced sterility at mid grain fill.

This approach minimises confounding effects due to maturity and enables repeatable results over successive seasons and sites.

The research has found that reductions in the number of grains in the head start to occur in wheat and barley when temperatures are around  $0$  and  $-2^{\circ}\text{C}$  respectively with no visible signs of frost damage.

Temperatures below  $-2^{\circ}\text{C}$  in wheat and  $-6^{\circ}\text{C}$  in barley lead to substantial reductions in the number of grains in the head.

"Future work will continue refining screening methods, searching for sources of tolerance, work towards developing frost sensitivity ratings of new varieties and validate the impact of frost induced sterility from mild frosts on yield in wheat and barley," Ben said.

"This includes a new project working towards developing

frost susceptibility ratings for new varieties to assist growers in managing frost risk."

The Updates are supported by DAFWA and the GRDC, and convened by the Grains Industry Association of WA (GIWA). ■



Successive research projects have enabled dedicated frost screening nurseries to be developed to measure frost tolerance with greater accuracy and repeatability.



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# Move windrows annually to avoid big nutrient losses

**G**ROWERS who burn their windrows and have auto-steer should move their windrows by about one metre each year to avoid costly losses of nutrients from their paddocks, according to new research.

This was a key message from Department of Agriculture and Food (DAFWA) researcher Peter Newman at the Agribusiness Crop Updates, which are supported by DAFWA and the Grains Research and Development Corporation (GRDC).

Peter said the preliminary study by DAFWA investigating the cost of nutrient removal from harvest weed seed management systems was conducted as part of GRDC supported integrated weed management (IWM) research in the northern grainbelt of Western Australia.

The study also showed chaff carts to be a viable option for a range of farming systems, and that the new Harrington Seed Destructor (HSD) was suited to large areas of high yielding crop.

Peter said the conservative value of nutrients (potassium and nitrogen only) burnt in wheat windrows if an auto-steer harvester followed the same path each year was \$42.75 per hectare, and \$13.15 per hectare if the harvester moved across by one metre annually.

This compared with chaff carts which removed nutrients worth \$11 per hectare, and the HSD which retains all residue and nutrients, evenly spread across the paddock.

Peter said 75 to 80 per cent of Australian growers now had auto-steer on their harvester, and if a header making narrow windrows followed the same track each year, all the nutrients would repeatedly be placed in the same strip.

"This will quickly lead to the 'wave effect' with good crop growth over the windrows, but the loss of significant amounts of nutrients such as potassium and nitrogen from the rest of the paddock," he said.

Peter said the research showed that windrow burning and chaff carts removed about double the amount of crop residue than was previously estimated, and therefore a greater proportion of nutrients.

"Chaff carts removed 11 to 37 per cent of crop residue from a paddock, while windrow burning concentrated 42 to 52 per cent of crop residue in the windrow," he said.

"Crop residues measured in 2011 contained on average 0.6 per cent potassium and 0.65 per cent total nitrogen, which are low compared with historical values."

## Economical viable

Peter said although the research showed that chaff carts removed significant amounts of nutrients from paddocks, they were still economically viable when factors such as capital costs and running expenses were taken into account.

"The estimated total cost of a chaff cart, including running costs and nutrient removal, when harvesting wheat in 2011 was \$16.15 per hectare," he said.

"This compares with \$12.20 per hectare for the HSD – including depreciation, interest, fuel and so on."

Peter said that while the HSD was more capital intensive and costly to run than a chaff cart or windrow burning, it had the advantage of retaining nutrients and growers should not discount it. "I believe the HSD is cost effective, especially across larger areas of high yielding crop where its higher upfront cost can be recovered more quickly," he said.

"The true cost of all systems should be considered when deciding which method of harvest weed seed management to adopt.

"These harvest weed seed management tools are essential for growers who would like to maintain a high percentage of crop for many years in the future.

"These tools come at a similar cost in this comparison, apart from windrows placed in the same strip each year, which is roughly triple the cost of other systems."

Peter said he regretted not measuring nutrient loss from harvest weed seed management tools earlier.

"But several years ago, potassium fertiliser was much cheaper and most headers did not have auto-steer," he said.

"Higher fertiliser prices and increased use of auto-steer are likely in the future, so it is essential that we get these systems right now so that we do not cost ourselves in the future."

**The HSD was developed by farmer and inventor Ray Harrington with support from the Australian Herbicide Resistance Initiative (AHRI), based at The University of Western Australia, and the GRDC. It results in the destruction of at least 95 per cent of weed seeds that exit the header in the chaff fraction during harvest.**



**Narrow windrow burning after the harvester has followed the same path each year can lead to significant nutrient losses.**



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## THE RESEARCH VIEW

# Harnessing the biological potential of our soils

■ By Associate Professor Pauline Mele<sup>1</sup>

**T**HE soil biology research, development and extension (RD&E) program, 'Harnessing the Biological Potential of Our Soils' (2009–14), is destined to enhance productivity growth in the cropping sector through proactive management of the soil biological resource.

National grower interest in soil management for sustained and enhanced grain productivity has provided the impetus for ongoing RD&E investment in soil biology and specifically for the much-needed knowledge of underlying biological processes and products that are critical for enhanced and sustained productivity.

Our soils are the engine room of grain production systems so it is essential that we have a greater appreciation of what soil biota they contain and how they provide functions that we can harness to improve crop yields.

Management options in grain production systems, such as the extent of cultivation, fertiliser and herbicide inputs, crop history and residue quality and quantity could modify the physical and chemical conditions of soil and hence influence the performance of the soil biology.

This means that maintaining and fine-tuning the soil engine

## Consultants' Corner

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

is vital in grain production. By not doing so, we are reducing the capacity of soils to turnover plant nutrients, to maintain good structure and to protect plants from disease.

Soil biology is largely hidden – in fact, most of the organisms present are not visible to the naked eye. For example, of the estimated one quintillion microbes on Earth, the vast majority are still unknown.

But the arrival and rapid development of new technologies

## IN BRIEF...

Scientists and researchers across Australia have embarked on a major grains industry research effort to explore the biological make-up of the nation's soils and their hidden potential to increase profitability and sustainability of grain production.

The GRDC Soil Biology Initiative II research, development and extension program is expected to lead to enhanced productivity growth in the cropping sector.



Pauline Mele coordinates the GRDC Soil Biology Initiative.

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now means we are finally in a position to delve deep into the soil biological communities and see not only who is there but what they are doing, not only as individual species but as highly interactive communities.

We can also give a regional context to this as well, as we know that communities vary with soil type, climate and crop management regimes.

The current soil biology program builds on the knowledge generated from the previous program (2002–06) and is investing in RD&E activities that deliver benefits to growers by:

- Improving regional knowledge and awareness of soil biological quality as it relates to grain production and profitability.
- Improving understanding of the mechanistic role of soil biological communities in crop nutrient availability, suppressive soils, and general soil health.
- Providing agronomic management solutions to enhance desirable biological processes (and/or suppress undesirable processes).
- Building research capacity in soil biology RD&E through national and international promotion of this initiative and through improved integration of science disciplines (informatics, modelling, geochemistry, agronomy, pathology).
- Communicating results from the above findings in various forums including the development of web-based resources that provide access to annual reports and related technical documents.

GRDC is the largest rural industry investor in soil biology RD&E and is investing in three theme areas. Education and training opportunities are incorporated into these themes:

## Theme 1

### Monitoring soil quality for better decisions

Linking soil biology to measurable economic benefits on-farm is perhaps the largest barrier to adoption by growers and advisers. Growers need monitoring tools that directly measure soil biology (or provide a reasonable surrogate measure) so they know they are heading in the right direction with their systems and practices. These measures need to be regionally relevant and able to be related to crop performance measures. Theme 1 is focused on delivering these tangible resources.

#### Theme 1 projects include:

- A national soil quality monitoring framework;
- Monitoring soil biology with high resolution genomic technologies;

- DNA tests for nematode community analysis; and,
- Molecular indicators for soil quality.

## Theme 2

### Nutrient management

Research projects under this theme are focused on addressing one or more of the following questions/issues:

- Can molecular tools provide the transformational knowledge required to identify the major and minor biological players in critical nutrient transfer processes?
- How can the plant-soil system be managed to enhance nitrogen immobilisation when plant demand is low and enhance N mineralisation when plant demand is high?
- How can soil biology be manipulated to either reduce phosphorus fixation or to enhance release from the soil matrix?
- Can nutrient capture and release processes that occur at the plant root soil interface be upscaled to the agro-ecological zone?

#### Theme 2 projects include:

- Harnessing the nitrogen cycle through novel solutions;
- Managing soil biology to improve nitrogen supply in grain production systems;
- Manipulating biological processes that improve nitrogen supply to cereal crops; and,



Linking soil biology research with tangible economic benefits is vital if growers are to adopt new technologies.

It's **Nifty**

It's **Thrifty**

It's...

- Assessing management options for enhanced soil phosphorus availability using rotations.

## Theme 3

### Disease suppressive soils

Soils that are able to withstand or reduce the extent of crop damage from a soil-borne disease incursion are referred to as disease suppressive soils. These soils have been identified in all grain production regions. Disease suppression has been attributed to a biological phenomenon because the effect can be removed with soil sterilisation or modified with management. All soils are therefore believed to have the potential to be suppressive and soil management can regulate this potential.

This theme is funding projects that address the significant knowledge gaps associated with the identification and transferability of biological traits associated with suppressive soils.

#### Theme 3 projects include:

- Biological suppression of root-lesion nematodes in grain-growing soils;
- A molecular approach to unravel the dynamics of disease suppressive microbial communities; and,
- Suppressive soils – can we find a microbial fingerprint using 'omics' technology?

### Better engagement and coordination

Overall, GRDC will support investment that achieves better engagement of the soil biology R&D community through greater structural and intellectual organisation.

The GRDC also supports the coordinated adoption of biotechnologies for improved measurement and interpretation of biological processes associated with nutrient availability, carbon storage, disease suppression and for enhanced discovery of novel microbial species functions.

Projects achieving a better integration with existing GRDC investments (for example, climate change, new plant products and nutrient management) and enhanced cross-sectoral investment where shared priorities can be identified are supported by the GRDC.

GRDC investment in previous soil biology research has built a solid foundation of scientific knowledge and a much increased understanding of the potential role of soil biology in farm management.

The soil biology initiative (2002–06) was successful in generating economic, environmental and social benefits. In summary, economic benefits were attained in investment areas related to inoculants, disease control and nutrient balance with an estimated net present value of \$32 million.

Environmental benefits were attributable to reduced applications of fertiliser and to reduced energy inputs whilst social benefits were associated with improved research capacity.

Going forward, a clear demonstration of measurable triple bottom line benefits, particularly economic benefits, is needed before the majority of growers will adopt new practices and products from soil biology research.

Adoption will also require provision of tools for measuring key biological indicators on-farm and a decision support framework relating soil biology to other components of farm management.

This is the over-arching objective of the 'Harnessing the Biological Potential of Our Soils' RD&E program.

### Target outputs

Some of the key target outputs expected from the initiative include:

#### A national web-based soil quality monitoring tool for the grains industry

This tool is being extended from its current Western Australian focus to the northern and southern grain production regions of Australia. It will incorporate new metrics for assessing soil biology in terms of community structure and function and will utilise advanced approaches to assist in the interpretation of this data for the benefit of landholders. The [www.soilquality.org.au](http://www.soilquality.org.au) website will provide a central resource for sourcing and recording soil biological information.

#### Enhanced grain crop nitrogen use efficiencies through reduced N loss

The rising costs of production inputs associated with higher fuel and fertiliser costs is driving farmers to adopt management practices that reduce loss of N from soil systems. This investment will develop crop management practices that will stimulate immobilisation of N when crop uptake is low and stimulate mineralisation when the crop N demand is high.

#### Improved phosphorus availability through biological release of P fixed in soil matrix

Rising input costs are also driving farmers to consider the ways to unlock the significant store of fixed P in soils. Applying crop management practices strategically to stimulate a component of the microbial community that mineralises P (for example) may assist in reducing P input costs in the short to medium term.



A national web based soil quality monitoring tool is being enhanced



## Reduced disease incidence through development of disease-suppressive soils

Crop losses due to a range of disease-causing soil biota, including nematodes, fungi, bacteria and viruses can be difficult to control, particularly under increasingly unpredictable climatic conditions.

A recent review concluded that crown and soil-borne diseases cost the cereal industry \$292 million per annum in the southern region alone. The disease suppressive soils phenomenon has been reported in a few grain production locations, particularly in association with stubble retention.

The capacity to measure the microbial community that contributes to this phenomenon is the first step in developing insight and ultimately a measurement tool to assess the impact of management. Establishing the link between crop management and the development of disease suppressiveness and the degree to which regional factors influence this, is the ultimate aim of this investment.

### Better informed stakeholders

There is an ongoing demand for information on soil biology, in terms of what it is, what it does and how it can be better managed. This initiative will provide new information to raise awareness and to assist decision making processes. New information will be provided in a range of formats to best meet the needs of the different stakeholder groups.

### In summary

At the conclusion of the current initiative, we expect that the biological make-up of soils from throughout the nation's cropping regions will have been quantified.

Outstanding progress has already been achieved, involving the processing of hundreds of soil samples and the identification of sites with disease-suppressive traits.

We already have a much clearer picture of the relationship between certain soil biota components and disease suppression, and the link between nitrogen and phosphorus release.

This information will be used to formulate recommendations to growers and advisers on soil management practices that help thwart disease and build nutrients in the soil.

Overall, the research we are undertaking will provide the global scientific community and the grains industry with ground-breaking insights and understanding.

<sup>1</sup>Pauline Mele is a principal research scientist and GRDC Soil Biology Initiative coordinator. ■

## THE AGRONOMIST'S VIEW HARNESSING THE BIOLOGICAL POTENTIAL OF OUR SOILS

■ By Dr Allan Mayfield<sup>1</sup>

Root diseases are a major concern for the nation's cropping industries, causing about \$500 million in losses annually in wheat and barley alone.

Diseases, such as rhizoctonia, can be unpredictable and difficult to control so any research being undertaken to investigate their cause and practices that can lead to their management is welcomed by growers and the wider industry.

Research into disease-suppressive soils, as part of the GRDC's Soil Biology Initiative, is particularly noteworthy.

We know that disease-suppressive soils exist across the Australian grain belt, but what we don't fully understand is how and which crop management practices enhance and encourage suppression of disease.

In terms of rhizoctonia, it has been shown that biological disease suppression can provide effective long-term control of disease. It is important, therefore, that we explore this complex phenomenon and determine what can be done in a practical sense to combat root diseases.

It is encouraging that the suppressive soils research aims to develop a measurement tool to assess the impact of soil and crop management on disease suppressiveness and thereby establish a link between the two.

A tangible outcome from this research will no doubt be widely embraced by growers, agronomists and industry at large.

<sup>1</sup>Allan Mayfield is a cropping consultant based in the Mid North of South Australia.



Dr Allan Mayfield.

# SPEEDY 250



# New look at summer stubble grazing

**N**EW GRDC-supported research shows careful management of sheep grazing stubble over summer need not impact on subsequent crops.

Dr Neil Fettell, University of New England (UNE) and NSW Department of Primary Industries (NSW DPI), and Ian Menz, NSW DPI have investigated the impact of grazing on soil properties, water dynamics and crop yield in a no-till, controlled-traffic system.

Neil and Ian found that stubble grazing can be sustained over summer, provided it does not reduce the ground cover to less than two tonnes a hectare of standing stubble or 70 per cent cover.

At Condobolin after the 2009 harvest, Neil established eight treatments on a paddock with almost three tonnes per hectare of wheat stubble. The soil is a clay loam and the site relatively flat. The eight treatments are each replicated four times and the variables are:

- Grazing intensity using adult sheep (nil, moderate or heavy);
- Stubble amount (as is, or added or removed depending on the season); and,
- Weed control (all herbicide or partly reliant on grazing).

Neil says the results from the two trials support earlier research and suggest that stubble is most beneficial where the summer rainfall intensity is high, unstable soil surface structure results in low infiltration rates and slopes are enough to encourage runoff.

He says stubble cover of about two tonnes per hectare or 70 per cent cover is enough to minimise runoff (and water erosion).

## GRAIN & GRAZE INCREASING PROFITS

GRDC's investment in mixed farming research includes more than 60 projects that make up *Grain & Graze 2*, which is partly funded by the GRDC and the Australian Government's Caring for our Country initiative.

Farmers who adopted or ceased practices based on recommendations from the original five-year *Grain & Graze* program increased their profits, on average, by nine per cent.

"This stubble cover is also thought sufficient to prevent wind erosion and is more effective if standing rather than flattened," Neil says.

"Stubble grazing needs to be managed to retain this level of cover and provide valuable feed to livestock while maintaining fallow efficiency and subsequent crop yields."

Going forward, the trial will also check the impact of a late burn on soil water and crop yields in comparison to the other treatments already under investigation.

For more information about GRDC's investment in HRZ research, visit [www.grdc.com.au/hrz](http://www.grdc.com.au/hrz)



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Dr Neil Fettell checks stored soil water with a neutron probe at Condobolin, NSW. (Photo: Nicole Baxter)



# Australian growers world-class

**C**ROPPING in a marginal environment in central New South Wales means Paul Adam has always been striving for cost efficiencies, but in being awarded a Nuffield scholarship last year, he took it one step further.

"I guess the reason I had such a focus on cost efficiencies was due to our risk profile for farming in such a marginal environment, and so reducing our costs was a way of reducing our exposure to poorer seasons and just taking a bit of the risk out of it."

The Tottenham graingrower started his scholarship by participating in the Global Focus Program, in which Australian scholars travel in groups on a set itinerary, learning how the powerhouses of world agriculture operate.

"My Global Focus Program focussed on South America, so we went through Brazil and Mexico, before continuing on to California, Canada, then back through the US and then through France and Scotland."

Following the group travel, scholars then drill down into their own research topics with individual travel, which for Paul started with identifying which parts of the world have similar farming systems to central NSW, to ensure any lessons learnt would be relevant.

"On my personal study I went back to Canada, the US, then on to the UK, then across through western Europe before returning back to Australia," said Paul.

"In particular the western areas of north America are probably very similar to our area of farming, and most of the machinery we use is manufactured in that area. I also had a keen interest in going to Europe as just about every other industry within Europe is highly efficient, so I guess I wanted to pursue that and see where it would take me."



Paul Adam.

But Paul quickly came to the realisation that he wasn't going to learn as much about cost efficiencies as he had hoped.

"The most startling point I realised early on was that everyone was telling me that we were already probably the most efficient farmers in the world anyway, and I was probably not going to see exactly what I was looking for in a lot of those areas," said Paul.

"I suppose my focus then changed slightly and instead of just going on to something else, I started to look at why hadn't farmers in these other countries progressed or moved their system to the same level we had. I tried to answer why their capitalisation in machinery was much higher than ours and why they hadn't changed their system to progress to the level we were while still looking for ways to progress our system."

## Risk exposure the driver

Paul says his study confirmed that what drives farmers is exposure to risk, whether that's climatic risk, financial risk or something else.

"I think what really forces people to change is what eats into their profit margin and in safer environments, where they've got reliable rainfall, the incentive to change is much less. It's the same in Europe, where more favourable government farm policies are reducing incentive to change, probably even to a greater degree."

So with the message that Australian graingrowers are at, or near, the top of the efficiency tree, for Paul the biggest impact from the Nuffield program has actually come in the day-to-day management of his farm.

"I think it's probably been pretty profound. I've actually had to change my whole management structure to spend the time away that I have, and really plan and get a lot more out of my time than what I previously had been. And when you get thrown a challenge like Nuffield, and those 16 weeks away, it is a big ask and to basically plan and get around that without any impact on the business was really good for me."

Paul's scholarship was supported by Macquarie Agricultural Funds Management.

**Nuffield Australia is an organisation which provides opportunities to Australian farmers between the ages of 28 and 40 to travel the globe investigating a research topic important to them and Australian agriculture. Applications for 2013 open on April 1st 2012. For more information please head to [www.nuffield.com.au](http://www.nuffield.com.au) and follow us on twitter @nuffieldaust** ■

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# Is the planet over-stocked?

## Food and fuel for thought

■ By Bill Gardner

**A**GRICULTURE is basically the business of harvesting sunlight and converting it into a useful product. The industry is fully mature and requires no additional capital investment. For some reason, our society is fascinated by technology based on silicon which captures sunlight, and overlooks the carbon based system refined by millions of years of evolution that does the same thing.

The winter cereal harvest just finished in Australia has produced a record tonnage – sufficient for exports of wheat to be in the order of 20 million tonnes. Current prices are low, in the order of \$150 per tonne on farm for ASW grade grain. Given a conversion of one tonne of grain to 200 litres of diesel/petrol replacement, some quick maths gives rise to some interesting results.

### Grain worth more as fuel

First, the grain is worth more as a fuel replacement than as food. It is worth repeating that sentence to make sure it is understood. The grain is worth more as a fuel replacement than as food. Economic forces will therefore drive this change and typically market driven solutions are the most likely to succeed

– some would argue that markets will solve all our ills, but the global financial crisis has cast some doubt on that idea.

Secondly, for Australia, the numbers are large – just in grain we could change from exporting 20 million tonnes of wheat to replacing four billion litres of diesel/petrol. Australia currently imports over 60 per cent of its liquid fuel needs, so such a change would not hurt our domestic petroleum industry, but would greatly improve our trade balance.

Thirdly, grain is a renewable fuel. The carbon is cycled each year from the atmosphere, so there is no net emission of CO<sub>2</sub> (this only works fully if you assume farm fuel needs are met by grain, not from fossil sources). My calculations suggest about 10 per cent of on-farm production would meet farmers fuel requirements.

And this is only grain, there are a myriad of agricultural products which can be used as fossil fuel replacement, most of which are in oversupply and low priced.

Why then, you might ask, has this idea not been taken up. In fact it has. Last year, America used more than 125 million tonnes of corn to produce ethanol and replace petrol. In Canada, two million tonnes of canola are used to produce bio-diesel, and the figure is even larger in Europe. Large R&D grants have been taken up aiming at supplying America's military with fuel derived from crops, and Australia has the objective of replacing aviation fuel with crop based alternatives.

### Confronting the ethical dilemmas

What is lacking is an honest analysis of the ethical dilemma of should we replace food with fuel production. Our current approach seems to be illogical. Every second day we read that food production must double by 2050 so that the projected population of nine billion can be fed. The issue that everyone skirts round is the required price of this food.

## CARBON AND SILICON...

For those interested in chemistry, carbon and silicon belong to the same group, meaning they have the same number of outer electrons available to form bonds with other elements, and therefore show similar chemical behaviour.

The difference lies in the additional inner shell electrons of silicon, which prevent the outer bonding electrons swivelling like those of carbon. The upshot is that silicon compounds tend to be more rigid (think sand or glass) whereas the equivalent carbon compounds can twist into all manner of shapes making it a much more versatile element.

Our society does not like stuff which oozes and squishes – most people react badly when confronted by the miracle of engineering that makes up our guts, but are quite comfortable with rigid glass vessels (silica) containing the same reactions. It may be that this instinctive aversion to 'squishiness' explains the popularity of silicon based photovoltaic cells while Mother Nature – doing the same thing everywhere – is overlooked.



This image shows rice terraces in the Philippines, with many now overgrown and disused due to prices making rice production unprofitable – an unintended consequence of making food affordable.



It needs to be cheap as many people can only just afford to buy a subsistence food supply, in fact many already face hunger on a daily basis. And yet basic economics teaches us that the best way to increase food supply is to increase the profitability of growing it.

It seems we have a contradiction which is not being addressed.

Low food price hurts farmers, and the most vulnerable are Third World subsistence communities. In the Philippines I have seen first hand how a policy of low rice prices has led to a decline in the number of farmers, with land going out of production, their youth opting for an easier city life, and a very high reliance on imported rice to meet the country's needs. It was obvious that the best way to correct this would be to increase farmers' returns.

On this basis, it could be argued that if developed countries

## DIESEL Vs DRY BIOMASS...

A general figure quoted for electricity generation, using the process gasification of biomass fuelling a gas engine driving a generator, is 1 MWhr electricity from 1 to 1.25 tonne of dry biomass.

By looking up the specification sheets for large diesel gensets, you derive figures of approximately 1MWhr electricity from 240 to 290 litres of diesel.

Thus you can equate one tonne dry biomass to 200 to 250 litres of diesel in terms of power generated.

If you value diesel at \$1.20 per litre, this means one tonne dry biomass is worth \$240 to \$300 if used to substitute for diesel. Seems a shame to sell grain at \$150 per tonne!



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**The experimental gasifier in action.**

diverted their exportable grain surplus into fuel production, it would result in higher grain prices and ultimately would benefit Third World farmers currently being put out of business.

### Is the planet over-stocked?

There is a much more extreme viewpoint which deserves airing. At its core, the global pollution issues are caused by the number of humans currently living on the planet.

The key issue here is making an estimate of a sustainable global population. This will be a function of the average amount of resource use per head. If a high figure is used (say Australia's average), a low sustainable stocking rate for the globe is inevitable. If a low figure is used, greater numbers can be accommodated.



**An experimental gasifier turning wheat into syngas which can be used in both diesel and petrol motors.**

The reluctance of developed countries to even contemplate a reduction in their average levels of resource use has a moral dimension to it. There seems little or no prospect of developed countries opting to reduce their per capita resource use in the near or medium term.

Given that we have just passed six billion, and are on track to reach nine billion by 2050, it is reasonable to conclude that the planet is overstocked. This is the underlying, ignored cause which

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## COAL IS CHEAP BIOMASS

Given a conversion of 1 to 1.25 tonnes of dry biomass (includes coal which has a similar energy content to grain and straw) into one megawatt hour (MWhr) of electricity, it is possible to gain some insights into electricity production in Australia.

The retail price of power is about 22c per KWhr or \$220 per MWhr. Of this charge, \$170 goes towards the line infrastructure in delivering the electricity to your home. The remaining \$50 goes to the electricity generator, usually coal.

Thus the implied value of the coal is \$40 to \$50 per tonne.

It therefore does not make economic sense to compete with coal fired power stations, which explains why alternative energy systems struggle in the market place.

Compare the \$50 per MWhr feed in rate for coal against domestic solar (\$600), wind (estimated \$140 for breakeven) and biomass (\$200), remembering that a renewable energy credit of \$45 can be added onto the latter two.

Interesting too to estimate the effect of the new carbon tax in Australia of some \$25 per tonne CO<sub>2</sub>. As a rough approximation, one tonne of coal will produce close enough to one tonne of CO<sub>2</sub>. Therefore this tax will increase the cost of power from coal fired generators by about \$25. In terms of your electricity account, a rise of 2.5c per KWhr, for example from 22c to 24.5c.

Given the uproar this increase has caused, it is unlikely consumers will wear an increase of 10c per KWhr required to make even the most competitive renewable energy source viable, and they definitely will not wear the required 15c per KWhr increase needed to make biomass reach breakeven as an electrical generation fuel.



produces symptoms such as global warming, land degradation, and ocean pollution.

Every farmer knows the consequences of overstocking. If the stocking rate is not reduced, all the stock in the paddock will be at risk of death, and the paddock may be so severely damaged that only low stocking rates are possible for many years. As a short term measure, surplus feed can be imported from other paddocks, but this places strains on those paddocks creating the surplus, and may threaten their long term outlook. Eventually, every paddock should only be stocked at a sustainable level.

No doubt readers can make the intellectual leap from paddock to country, and sheep to humans.

### Do we need to increase production?

This has far reaching implications for agriculture. It challenges the entrenched belief that agricultural production must be increased to feed the world. Increased production of cheap food will contribute to the underlying cause of the planet's ills (population) making it a seemingly illogical goal.

This is, of course, a rather unpalatable conclusion for agricultural professionals who have spent their careers improving food production.

## GRAIN Vs STRAW...

You might think it makes more sense to use 'waste' biomass for energy production. In fact there is no such thing, straw and crop residues are required to maintain soil organic matter and fertility. Crop residues are generally difficult to handle and cost much the same to collect and process as that part of the crop (grain) we have already harvested.

Remember the Nobel prize being awarded to the breeders who triggered the 'green' revolution in the 70s – by this argument they may have contributed significantly to the looming collapse of the planetary ecosystem.

There is another vexed question such as how to allocate resources between food production and environmental protection.

The Murray Darling Basin controversy is a case in point – should we produce more food or ensure the health of the ecosystem. The conclusion might be different if the choice was for the production of renewable fuel.

I often wonder if the dearth of young people applying for tertiary agriculture courses indicates they have already worked out that bulk food production is a poor use of their time.

### Economics to dictate

There are very few countries (perhaps six) which are significant exporters of food, and by and large they are developed countries. We should be honest enough to think through the implications of diverting the exportable global food surplus into fuel production.

- Greatly reduced fossil fuel use (good);
- Increased food production by marginal producers in the Third World (good); and,
- Reduced global population (good/bad depending on where you live).

Ultimately, individual farmers will only be concerned with selling their product to the highest bidder and cannot be held to account should this divert food into fuel. Economics will dictate that this shift will take place, and the argument will be about whether the nation as a whole wishes to intervene in the market place and make food production competitive with fuel production. ■

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# Frustrations and recollections

■ By Ian M. Johnston

## Poor me!

**I am in desperate need of sympathy and understanding. Why? Because over the past two weeks my nerves have been totally frazzled and my normal gung-ho cheerful countenance has completely evaporated! I have descended into the depths of despair.**

Caring and concerned readers, of which there are possibly one or two, may be wondering what on earth has happened to their favourite tractor scribe. Has his budgie died? Has he been given an assignment in Afghanistan? Has the taxman been pounding on his door?

But no, none of these things. Much worse! I updated my computer!

Certainly this would not have presented a problem to the 10 year old school boy, who lives on a neighbouring property. But to an ageing tractorman, reared in the era of fountain pens and kerosene refrigerators, and long before even the calculator was invented, a computer update can prove a formidable challenge.

The trusty computer I replaced had seen at least seven

summers and was therefore the equivalent of a steam driven tractor, in terms of being long past its use-by date. The persuasive young salesman had assured me, with a choir boy innocence, the change-over would be a breeze, "... even for a gentleman of your mature years." Hmm!

To enumerate here the problems encountered, would I fear be too distressing for me and possibly result in me having to take recourse to a treasured and yet unopened bottle of a rare 20 year old Highland malt, which I have been saving for Scottish Independence Day – should it ever occur.

Instead, please bear with me as I recount how things used to be when first I started scribing tractor articles for magazines. This of course was at a time before computers had even been thought of (what bliss!).

## How it all started

During the early 1960s, as a youthful sales manager employed by Lough Equipment Pty. Ltd. located on Sydney's North Shore, I suggested to my boss, Eric Lough, that we should produce a monthly promotional magazine extolling the virtues of our various lines of machinery. This would be sent out to earthmoving contractors and relevant local, state and federal government departments. My boss agreed, but said I would be shouldered with the responsibility. Great, as if I hadn't enough to do!

My camera was a 120 twin reflex Japanese Yashika – I couldn't afford a German Roliflex! Each month I would trot down to Douglas Baglin's studio at St.Leonards with a couple of rolls of Kodak Panchromatic film, where he would make glossy black and white prints from the negatives. The subject matter was of course our range of construction machinery, which included Whitlock loader/backhoes, Thwaites diesel dumpers, Hydor tractor compressors, Wylie portable asphalt plants and Greens rollers.

The much worked on text for *Equipment News* had been progressively and laboriously typed out at home on an ancient portable Smith Carona typewriter, that had once been owned by my grandfather back in Scotland. Due to my inaptitude, much of the time was taken up by making corrections using the dreaded white-out tape.

Then it was off to a house at Forrestville, where a backyard printer had installed an offset printing press in his garage, mainly for church work. He produced our little glossy magazine, complete with coloured cover, for a fraction of the cost quoted by 'legitimate' printers – providing he was remunerated in cash!

But it worked! I frequently received phone calls from contractors or government engineers, wishing to obtain more information about a machine they had seen in *Equipment News*. Sales flourished.

A few years later, in the position of Australasian Marketing Manager for Conquip Ltd, I edited a similar but more sophisticated publication, this time entitled *Equipment Digest*.

## The Earthmover

Fast forward a few years into the 1970s, and I was the proprietor of Ian M. Johnston Pty Ltd dealers in new and used earthmoving machinery, with premises located at Rydalmere, a Sydney industrial suburb. I was also an active member of The



**The Terex 72 11. Note the unusual single lift ram and massive lift arm. This provided excellent forward vision. Also note the articulated 4 wheel steer. (Photo IMJ)**



NSW Earthmovers and Contractors Association, an exalted body that also published an excellent technical magazine entitled *The Earthmover*.

Upon reflection, it must have been towards the end of one of the association's opprobrious hearty social events, or perhaps at one of the frequent aftermath educational visitations to a Kings Cross tavern where, in my benevolent and munificent state of mind, I humbly agreed to accepting the position of Technical Editor of *The Earthmover*.

In actual fact it proved to be a great decision. My priorities

were obviously aimed at the demanding task of managing Ian M. Johnston Pty Ltd. But I had surrounded myself with an enthusiastic and experienced staff who excelled when given responsibilities. Accordingly I enjoyed performing the tasks of a Technical Editor. It was a sort of escapism from my routine work schedule.

Each month I was presented with a newly introduced item of earthmoving plant for me to photograph and carry out a



The FL10 bonnet sidepanel, which gave access to the dipstick and could only be opened with the loader in the raised position. (Photo IMJ)



The Fiat FL10 proved a well balanced and highly manoeuvrable unit. (Photo IMJ)

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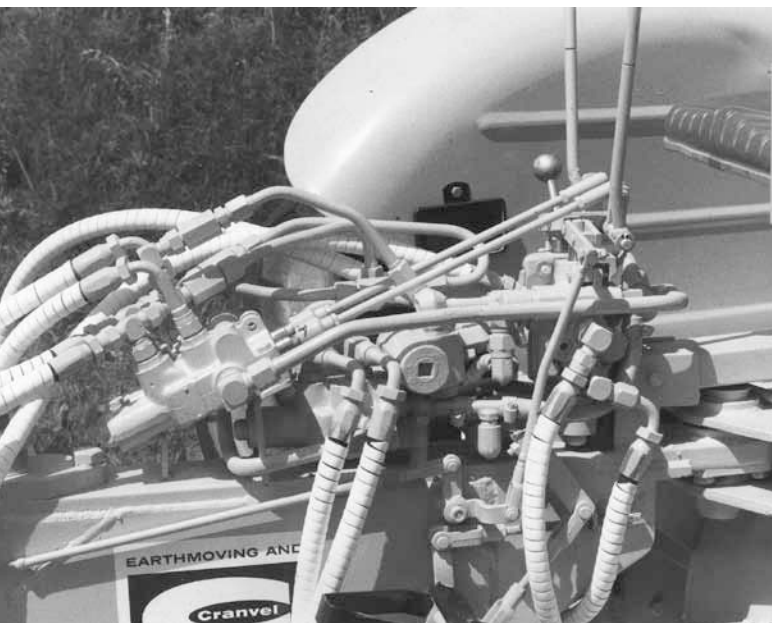
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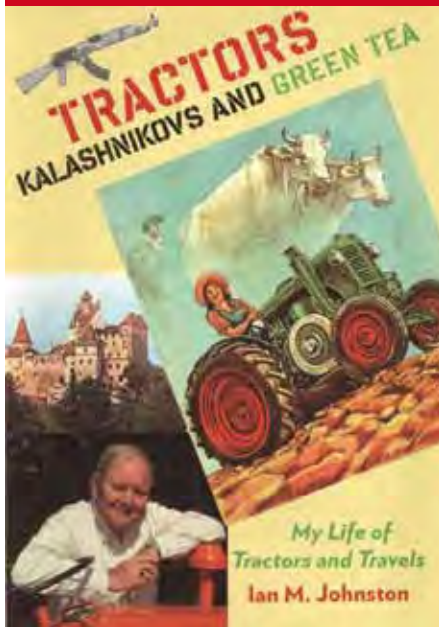
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The mess of hydraulic fittings on the Cranvel. (Photo IMJ)

## THE PERFECT GIFT – OR SIMPLY FOR YOURSELF



This is a book about tractors, places and people. Ian M. Johnston is an internationally recognised authority on the history of farm tractors. Beginning with his boyhood in Fife and Edinburgh, he tells of departing to Australia on his own at the age of 16 and the numerous adventures that unfolded.

His experiences as a jockey, truck driver, shearer, shed rouseabout, windmill amusements assistant and roving tractor driver are full of interest and humour.

It was tractors that first took him to Japan and green tea. It was tractors and a visit to the Farmhand factory in Romania that introduced him to Kalashnikovs. Of course, he did choose to drive there through what was then Yugoslavia and Bulgaria at a time when such visits from Westerners were regarded with great suspicion.

His passion for tractors extends to finding and restoring old and rare ones. Throughout the book he talks of the motor cycles and cars that he and his wife owned. He has possessed some rare and interesting tractors and an assortment of classic cars and motorcycles. The stories of these machines are told with love and humour.

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performance test of its capabilities – a sort of road test. The dealer was responsible for transporting the unit to a vacant work site, where it was handed over to me for a couple of days to do as I wished. The machinery ranged from track type excavators to wheel loaders, from bulldozers to dumpers and everything in between.

Usually a concerned marketing type would appear on the scene, anxious to determine if I would be giving the machine a thumbs-up review in the magazine.

### The Terex

I recollect with amusement the occasion I tested a Terex 72-11 wheel loader, one of the products offered by Blackwood Hodge Ltd. An area at the rear of the firm's premises had been set aside for me to put the big machine through its paces.

Towards lunch time I was astonished to see the Managing Director, whose name was Friar Tuck (yes really), picking his way through the sticky mud in order to shake my hand. This was followed by an invitation to join him and his senior staff for lunch in the formal executive dining room – no less!

Well, that was an experience! During the meal, served on fine Royal Dalton china, accompanied by rare vintage wines dancing in exquisite Stuart crystal goblets, I realised that some well planned persuasive psychology was in process. I was surrounded by highly paid executives who were willing me to write a glowing report about their new Terex loader.

But they need not have worried. A pie and tomato sauce would have resulted in the same outcome. The Terex could not be faulted. But I certainly had an insight into the grandiose life style enjoyed in a colonial outpost of a traditional British company.

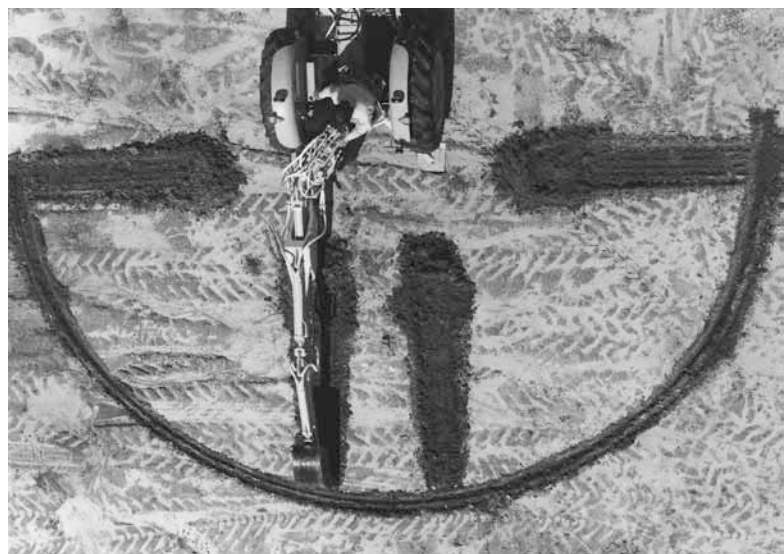
### The Fiat

Fiat Australia introduced the FL10 track loader into its range of earthmovers in the early 1970s. I donned my white overalls and proceeded with the test.

Being a conscientious sort of bloke, I first went to dip the oil prior to firing up the engine. This is of course a routine procedure, normally carried out by any plant operator worth his salt. I was shocked to discover that it was impossible to reach the dipstick without first having to start the engine in order to raise the loader arms to provide access to the dip stick!

I highlighted this appalling oversight in the ensuing article in *The Earthmover*.

And didn't that create a furore! Reverberations all the way



The Cranvel prototype had two slewposts. (Photo IMJ)



back to Italy. I later learned the backroom technical boffins had been severely chastised by management and a rapid redesign implemented.

## The bad and the good

I flew down to Melbourne to inspect and test the latest Cranvel backhoe. Never before or since have I ever struck a more complicated, indeed obscene, tangle of hydraulic valve spools, check valves, control valves and hoses. I got the impression that

some deranged simpleton had designed the system. The result resembled something which a Chinese noodle chef might have discarded out of his back door! (See photo)

The excuse for this monstrosity was that the designer had endeavoured to produce an off-set digger by incorporating not one but two slew posts, thus negating the necessity of a



The Atlas AB 1602 proved a competent aggressive excavator, but was blemished by oil pouring from numerous leaks in the air cooled six cylinder Deutz engine. (Photo IMJ)



The British made Bray loader lacked the integrity of design of its American and Asian counterparts. The Leyland engine was underpowered for a machine of this capacity and the hydraulics slow to respond. Note the short wheelbase and vulnerability of the lift rams.

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The BM Volvo dumper handled the mud with ease. (Photo IMJ)

side shift frame. Quite extraordinary, but I guess it is a case of whatever turns you on!

One of the most impressive machines I tested was a six-wheel drive Volvo dumper. This was the first of a long line of heavy duty articulated dumpers to emerge from the Swedish manufacturer.

The test site was an abandoned quarry where it had not stopped raining for several weeks. The bottom of the quarry resembled a vast cauldron of Auchtermuchty porridge! Certainly to my amazement, with 20 tonnes of dirt on board, the big dumper effortlessly waddled its way through the mire with its six wheels almost completely submerged.

## In conclusion

It is interesting to contemplate that my earlier journalistic activities were performed without the use of digital cameras, computers or even fax machines. Our Google was *World Book Encyclopedia*. Even word processors had not been invented. If we had an electric typewriter with a golf ball thingo, we thought we were made.

I have to confess there is no question that digital cameras and computers have advanced the technical aspects of journalism to heights never before imagined.

## So where do I fit in to all this?

Well, all this reminiscing during the writing of this epistle (using the new replacement computer) has obviously worked as a tonic. I am now out of my melancholy state and am wondering why I had sunk to such depths of despair. Must have been the haggis I had for dinner last night! ■

## IAN'S MYSTERY TRACTOR QUIZ

**Question:** Can you identify the tractor from this rear view?

**Clue:** It is not a Grey Fergy.

**Degree of difficulty:** It is even beyond the scope of our illustrious Editor!

**Answer:** See page 44.





# Short term outlook tight

**D**ELEGATES to Global Grain Asia 2012 held in Singapore in mid March were reminded that demand growth for grains is expected to remain strong. In China for example, consumption of meat has a 94 per cent correlation with growth in GDP and that has been growing at 8–10 per cent over the past 10 years. China also has 55 per cent of the world's pig herd.

That demand growth aside, 2012 is projected to be a year where grain prices will come under pressure assuming average weather until northern hemisphere crops are safely in the bin. This scenario sees ongoing strong grain supplies and stocks putting pressure on prices. Despite some issues to date, it is early days in the growing season yet, so the best bet remains for weak prices in 2012–13.

The delegates were also told that Australian grain is currently the cheapest grain in the world. That is particularly so for Asian customers. It is a function of our large stocks, particularly of feed grade wheats. One of the problems for our current stocks is that new season prices are not supportive.

With large stocks on hand, and growers selling down rapidly, the trade will have to carry stocks into the new marketing year.

With the forward market for December delivery valuing wheat at close to \$245 per tonne (APW port assuming a \$5 per tonne basis of December futures), and carrying costs averaging \$4 per month, a trader who has to hold wheat bought now until the end of the year can really only pay about \$210 per tonne port basis now.

That is right where old season APW wheat was priced on March 20 in export zones like Port Adelaide.

Eastern states port zones – with higher cost structures and probably where stocks will need to be held longer – were at a discount to these price levels.

## Warm Europe

Temperatures are forecast to remain above average across Europe until June. The UK, the Iberian Peninsula and southern



parts of the continent are likely to be exceptions in April according to Weather Services International.

This will hit wheat crops already suffering from dry conditions, and from the recent winterkill episode. Dry warm conditions in wheat areas of Spain, France and the UK are causing concern.

Dry weather in the Iberian peninsula (Andorra, Portugal, Spain and Gibraltar), and nearby North African countries is also being watched carefully.

At this stage farmers are replanting failed winter crops in Europe with spring weather conditions confirming widespread damage in France. Total losses across Europe could get as high as 5–6 million tonnes according to some estimates.

But there were good rains in France over the weekend, with showers expected this week in Spain as well. Across to North Africa, and rain potential is still seen as limited for Morocco.

Longer term, a drier summer is expected in the UK and Nordic regions, with some parts of the UK already officially in drought. Rainfall to date has been enough to get crops going, but low rainfall over the past 18 months has depleted subsoil moisture levels. A belt running from Norway, through eastern UK, France, Spain and Portugal received less than 25 per cent of normal rainfall last month. Rainfall in Germany was 50 per cent below normal.



The Global Grain Asia 2012 Conference was recently told that Australia has the cheapest grain in the world.

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## Ukraine wheat down

A private estimate has put this year's Ukrainian wheat crop at 13.8 mt, down from 22 mt last year. Exports are likely to be cut from 13.44 mt to 7 mt.

This should at least ease some of the competitive pressure we see from the Black Sea in world wheat markets during 2012–13. The shortfall from the Black Sea will be made up with increased exports from the EU, and possibly the US. The impact for us is that world wheat prices might hold up above the low levels set by the Black Sea exporters.

## New option contracts

The CBOT is floating the idea of making short dated options available on deferred futures. What does that mean? Well it is an option on December futures, which has the life of one month. Normally a put option against December futures would begin trading, say, 12 months out, and would expire at the end of November, effectively converting to Dec futures at that time.

A short dated option might start trading on January 1, expire on January 30, and in the money options convert to December futures contracts at that time.

But their use for growers might be a little limited. What they will do is provide insurance cover around market moving events like USDA reports, or sudden weather events. Rather than committing to a forward sale for example, or to a put option for the whole year, we could just purchase a put option for a short period of time around such an event to protect against unexpected sharp market moves against us.

For example in recent times we have seen limit moves in futures after USDA reports. A put option would compensate for a limit move down, but leave us open to capture a limit up move. For example, if futures having been rising into a report, and prices are looking attractive, rather than risk selling pre-report and then finding the report triggers a further gain, we could purchase a short dated put option. It would protect us against a sharp fall, but leave us able to capture the higher price.

For those with swaps in place, call options could be used in the same way. Instead of buying back a swap ahead of a USDA report, we could buy a call option. If the market rallies the call option works for us, but if the market falls we are not locked out of being able to buy back the swap at the now lower price.

These options should be priced with little time value in their premiums. That means they will add or lose value pretty much in line with moves in the December futures contract. Just how much they will cost though – and therefore how big the market move needs to be to cover that cost – is a little hard to guess at this stage.

Would growers use them? Maybe they would, given the number of phone calls we get from growers just prior to USDA reports asking us to 'guess' what might happen. ■



# Focus on the farm

**T**HE increasing commercial focus required in farming today means farmers need to adopt a more strategic approach in running their businesses, which is the emphasis of a leading farm business management program designed by Rabobank.

Now in its 13th year, the prestigious Rabobank Executive Development Program gives leading Australian and New Zealand farmers from a range of agricultural sectors the opportunity to develop and enhance their business management skills.



Angus Taylor,  
Rabobank.

Announcing the opening of applications for the 2012 intake of the Executive Development Program, Rabobank group executive Neil Dobbin said the essence of the program has always been to focus more on the increasingly important commercial and strategic issues that are relevant to farmers today.

The program introduces participants to the latest practices in business management; leadership, strategy and planning, finance, human resources, value chain management and marketing, and how these can be directly applied to their farm businesses.

"We need to invest in those capabilities to manage an inevitably difficult and volatile business – that's what successful agribusiness management is about," Neil said. "When thinking seriously about the future success of farm businesses, it's important to invest in the most important resource of the business – the management itself."

## New program director

Rabobank has appointed Angus Taylor as program director of the bank's Executive Development Program. Angus said the reality is that farming has been changing to take on a much more commercial focus than ever before, requiring today's farmers to think more strategically about how they run their businesses.

"Farm operations are getting bigger, more commercial and business-focused, with more employees and contractors working for them than ever before. The focus is moving beyond just land and water, to people skills and business capabilities and this changes the nature of the game."

What has always defined the program from the start, Angus said, is the way in which Rabobank brings together a group of farm business leaders and helps them think through how to lead their businesses into the next decade and beyond.

Originating from a sheep and cattle property near Nimmitabel, in southern NSW, Angus is a respected business strategist in the resources, infrastructure and agricultural industries. He continues to work closely with his family farming business.

**Applications for Rabobank's 2012 Executive Development Program are open until Friday June 1, 2012 – only 36 applicants will be accepted from across a range of commodities and geographical locations in Australia and New Zealand. Held in Sydney, the first module runs from 19–24 August, 2012 with the second module taking place in July of next year.**

**Producers interested in the Rabobank Executive Development Program should visit [www.rabobank.com.au](http://www.rabobank.com.au) or contact Rabobank business programs manager Nerida Sweetapple on 02 8115 4139 or email [bmp@rabobank.com](mailto:bmp@rabobank.com)** ■



# Domestic grain market outlook

## ■ New season wheat

The first few months of the year are often good forward selling times, as issues (or perceived issues) with the developing northern hemisphere wheat crop see risk premiums built into both spot and forward prices. This year has been no exception, with several price rallies so far.

The market is settling into a weather market, so any sign of improving crop conditions should see prices slip, while adverse conditions will see risk premiums send prices up again.

At this stage the Australian exporters have little appetite to take on new season contracts. Apart from one brief dip in mid December, forward prices have been locked in a range of \$227 to \$241 per tonne (\$247 to \$261 per tonne FIS in WA). At the same time the A\$ value of December futures has gone from \$233 per tonne to \$262 per tonne.

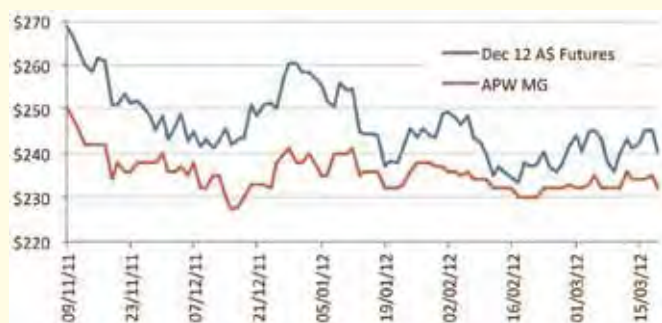
Quite clearly, the Australian market is not following US futures higher to the full extent, allowing basis levels to blow out. For anyone who is forward selling, that tips the balance in favour of using swaps instead of multigrade contracts. A swap will lock in the A\$ futures price, but not lock in the unfavourable basis.

Should we be selling at current prices though? Probably not. They remain too low relative to the prices most growers need to be fully profitable. When we forward price when prices are marginal, we greatly increase the risks of being involved in forward selling.

This year we are being confronted with a range of weather issues in the US, Europe, North Africa, and the Black Sea. Global production is tipped to fall, and could go below consumption.

If global conditions really turn for the worse we could begin unravelling the current high global stocks quite rapidly, and fast enough to trigger higher prices by our harvest.

**FIGURE 1: New season wheat pricing**



## ■ Sorghum old crop selling continues

Old crop sorghum, F1 and APW are off a couple of dollars with steady grower selling continuing. With expected carry into next harvest of 9.6 million tonnes of wheat, 2.4 mt barley and 845,000 tonnes of sorghum reduces the likelihood for any major rally. And in lieu of what is shaping up as ideal winter cropping prospects, more growers are coming to the market to quit stocks, before another month's storage fees are charged.

2012-13 APW prices are unchanged week on week, but prices



have retreated \$3 from late last week. And although prices have bottomed out at \$230 a couple of times over the last few months, they haven't been below current levels. Feed barley values (\$198) are within the last three-month average.

With domestic consumers still having a strong preference for wheat and barley over sorghum, exports are slowly gaining a bit of momentum in moving the record crop.

## ■ Canola slowly rising to attractive levels

New season canola prices are slowly clawing their way upwards, but as with wheat, new season prices are not keeping up with the lift in canola futures. This week basis levels have eased again as the A\$ value of futures rises by \$16.25 per tonne against gains of \$7 to \$15 per tonne in forward prices. Only Adelaide prices kept in touch with the rally in futures.

Since February 8, futures prices have lifted by A\$54.50 per tonne, while our cash forward prices have lifted by \$35 per tonne at best. That is a \$20 per tonne drop in basis levels.

As basis levels ease, it tips the balance in favour of using swaps to forward price canola, rather than fixed contracts. At harvest, as long as basis levels are better than they are today, swaps will outperform cash contracts. Most years there is a small advantage in favour of swaps, but often there is not a lot in it unless we have drought conditions in eastern Australia, keeping supplies short for domestic crushers, or if exports into premium markets in Europe are strong.

We are not expecting either to be the outcome this year, so even though we might suggest that current basis levels are weak, it might be close to what we get at harvest anyway.

The main reason for using swaps rather than fixed price contracts for canola is to manage the risk of forward sales. Swaps can be easily reversed if we have a crop failure, and swaps easily outperform cash contracts if we have a drought.

**FIGURE 2: New season canola prices rising**



# Fungicide on planting fertiliser meant no foliar spraying

**G**OOD grain quality, very clean crops, and no need for foliar fungicide sprays in the 2011 cropping season were the rewards for applying the fungicide, Intake Combi, to planting fertiliser over the past three years on Richard and Julie Rackham's "Gum Park" at Red Hill in South Australia's mid north.

On 2800 hectares of arable clay soils in a 417 mm-rainfall area, the Rackhams grow a rotation of wheat, feed barley, export oaten hay, peas, plus a fallow crop of vetch which is sprayed out.

In the exceptionally good 2009 and 2010 seasons, they had the fungicide applied to all of their planting fertiliser order, primarily to protect Keel barley which suffers badly from net blotch.

On the basis of these results, plus the now lower cost, they have continued to request that Intake Combi be applied to all planting fertiliser for their entire crop planting.

While the majority of South Australian growers sprayed for rusts on wheat and net blotch on barley, the Rackham's 2011 crops required no fungicide sprays.

"A run of wet summers has led to a buildup of rust spores in the region. In the 2011 season there was constant risk of leaf rust and stripe rust in wheat, and some threat of stem rust. In barley, the main concern was net blotch," said Richard.

He said many growers managed these risks initially with seed dressings, followed by foliar fungicide sprays. These seed

treatments tended to protect the young crop for eight to 10 weeks, after which foliar spraying would commence.

On the Gum Park 2011 crops, the risk of these major fungal diseases was managed by having the fungicide applied to their planting fertiliser.

"Applying Intake to the fertiliser gave our crops an extended period of cover from fungal diseases – so much so, that we got through the whole season without having to use any foliar fungicide sprays," said Richard.

## The farm becoming cleaner

"I also believe that we are seeing a cumulative effect from three years of applying the fungicide in this protective way. The farm is becoming cleaner with reduced disease levels in stubble, which in turn reduces potential infection in the next crop.

"The crop is staying clean and greener for longer. The plants are healthier as a result and use the soil water more efficiently for quality grain production.

"I believe the technique helped to increase our yields in 2009 and 2010, and last year I believe it contributed to our very high grain quality."

The Rackhams try to take advantage of lower out-of-season fertiliser prices, usually picking up their order through January/February/March (but sometimes as early as September) – ahead of the late-April planting season. They also like to buy ahead and

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store their fertiliser supplies on the property to guarantee their annual requirements.

Richard said he wouldn't consider applying the fungicide to the fertiliser on-farm.

"Both the fertiliser and fungicide are of great value to the crop, so we want them both to be applied properly, at the correct rate across the whole farm."

He said they would continue to purchase their fertiliser requirements with the fungicide already applied professionally by their supplier.

"I know some growers may have been put off by the expense in the past, but now that it's cheaper – \$8 per hectare – there is definitely an economic benefit from it."

"When grain was \$300 per tonne, we only had to increase yield by 0.026 of a tonne for the application to pay for itself. At today's price of around \$250 per tonne, the break-even yield increase is still only 0.032 of a tonne."

### Other advantages

"Apart from reducing the likely rate of fungal infection across the farm, other advantages of applying an effective fungicide this way include reduced workload and lower cost – with only one pass for both fertiliser and fungicide application. It also buys us peace of mind."

The Rackhams organise the fungicide treatment of their fertiliser order through Kerin Agencies in Crystal Brook.

Crop Care technical sales representative for the region Andre Sabeeney said that in a moderate to high disease-pressure season, growers of wheat and barley who had Intake Combi professionally applied to fertiliser by their supplier had been able to delay spraying susceptible varieties with foliar fungicides, and reduce the overall number of fungicide applications.

"The fungicide applied to fertiliser and placed near the seed can protect the wheat and barley crop up to and beyond flag-leaf development – an important stage for grain development. It has also proved its worth in protecting the young canola crop from blackleg."

"Many growers are now adopting higher application rates to extend the period of protection for their crop."



While the majority of South Australian growers sprayed for rusts on wheat and net blotch on barley, these crops on Richard (pictured) and Julie Rackham's Gum Park at Red Hill in South Australia's mid north required no fungicide sprays.



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# Farming in Foreign Fields...

*a focus on the successful endeavours of innovative farmers around the world*

## One new tractor (and a partridge) for better productivity

ONE of the latest Case IH Magnum tractors has been hard at work at Percy Farms in Alnwick, Northumberland, England. The new machine is the principal drilling tractor for the farm, which covers more than 1200 hectares.

Managed by Velcourt Ltd, Percy Farms is the in-house farming business for the 12th Duke of Northumberland in partnership with Percy Farming Co Ltd. Richard McAllister, farm manager, describes the farm's arable operation.

"We have recently adopted a four-year rotation with fallow, rape (canola), wheat then second wheat, which is drilled in a mosaic pattern over nine of the 12 farms that make up the business. The removal of 'block cropping' and the high percentage of fallow land in the rotation are measures taken to assist in the continued success of a sustainable grey partridge shoot."

While the grey partridge project is a main driver, Richard points to a number of other advantages of leaving the land fallow.

"There are short weather windows in this part of the country (far northern England) and this means that we can get an early entry to rape. In addition, we can use the fallow year to give a fresh start to the land, to act as a reset, particularly if there's been a bad year."

The farm's 160 hectares of grass margins and game cover combine with the rotational fallow land to form part of a large Higher Level Stewardship scheme – an agreement that lasts for 10 years.

With 800 hectares of rape and wheat to be drilled each year, and short working windows, productive and reliable machinery is essential. The farm already operated one Magnum 310 that was supplied under a Velcourt/ CNH full maintenance lease agreement. The 15-month agreements are staggered to create a three-month crossover during harvest and planting with one machine then available for the rest of the year.

"We took delivery of the new Magnum 340 at the beginning of August 2011 and it was clear that the new tractor had much more power and the ability to remain in the power band even in heavier conditions without reducing speed.

"The increased hydraulic capacity of the new Magnum was also evident. When drilling, the tractor has to permanently power two hydraulic fans, one for fertiliser and one for seed, as well as lifting the front and rear linkages when turning on the headlands. This is an area where the old tractor struggled but the new 340 manages to do everything comfortably.

"The factory fitted front linkage is also a big improvement with no requirement now to continually swap the farm's own linkage from unit to unit leaving more spools available on the tractor."

### For increased productivity autosteer is essential

The farm is covered by an RTK network and the new Magnum was specified with full guidance and autosteer.

Richard believes that "to maintain operational quality, reduce driver fatigue, and as a result, increase productivity, then autosteer technology is essential. Generally, most work is being carried out behind the tractor so that is where the operator should be looking 80 per cent of the time, not concentrating on going in a straight line or keeping parallel to the previous pass. Autosteer takes care of that for them."

Autoguidance is often synonymous with large-field operations but Richard highlights the benefits in smaller fields too.

"Our average field size is just seven hectares so that means many headlands and a lot of turns. The headland management system and full autosteer are particularly effective at increasing productivity and – with the extra engine power and improved hydraulics – there has been an increase in output of between 15 to 20 per cent."



# Up in the air about remote sensing

**I**n a joint German project between Agrarhof Neetzow GmbH and the University of Bundeswehr in Munich, a prototype unmanned aeroplane has been developed for the effective management of crops.

The drone-like plane is unique and is packed with hi-tech features. The project from which it was born has already clocked up EUR377,000 (\$475,000) in development costs.

"We are constantly developing processes in our business that lower costs, increase crop yield and make production more reliable," says Wilfried Littmann, manager of Neetzower Agrarhof farm in northern Germany.

## Relies on precision farming

"Over the past four years all processes in the field – from drilling through fertilisation to harvesting – have been recorded electronically," says Wilfried.

Wilfried is looking for a technical system that is reliable in effectively managing crops and saving resources. As part of the project, the Neetzower Agrarhof farm together with the Mecklenburg-Vorpommern Research Institute for Agriculture and Fisheries, is investigating fertilising specific areas with base fertiliser. A special management system has been developed with a software developer in Rostock.

"If we want to move forward in crop protection, we need additional information on biomass distribution within each field," explains Wilfried. "The pendulum sensor for measuring biomass only provides information on the tramline. We want details about the whole field.

"Using aerial photos to obtain the information we need for optimum crop management is an idea that we have had for some time. But this has proved difficult in practice."

## Easy to fly

"The plane we are looking for to monitor our crops has to be able to fly smoothly, be stable, take-off from your hand and weigh less than five kilograms. It has to be easy to fly and be able to land without a runway," is how Wilfried describes his specifications.

The right partners for the farmer's project turned out to be Patrick Reidelstürz, initially at Hohenheim University and then University of Bundeswehr in Munich, and Prof Axel Schulte.

Patrick, who studied forestry, has a doctorate in remote sensing and is an expert in evaluating aerial photos and precision farming. He was also fascinated with the idea of developing an aeroplane to help farmers perfect their work.

## From Formula 1

The heart of the electric motor glider – which weighs 4.2 kg with its payload and has a wingspan of 3.45 m – is a longeron made of carbon fibre, a material that is also used in Formula 1 racing. The 'skin' of the plane is attached to the longeron.

Inside the tiny space is an autopilot system – made in the US and at EUR12,000 (\$15,000) not exactly cheap – with three gyro elements and sensors for acceleration, velocity and flying height. The velocity is established by measuring air pressure.

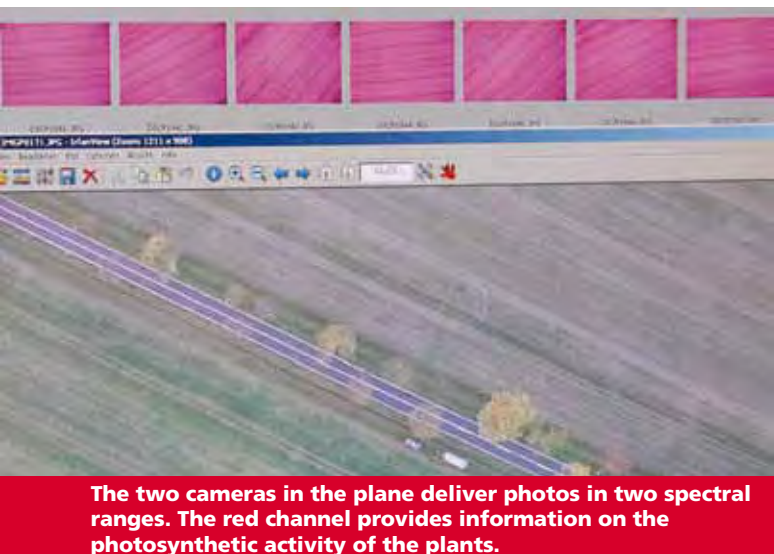
Two digital cameras are fitted with GPS loggers and can also be manually triggered, taking between two and 30 photos per minute. The plane reaches a flying altitude of no more than 300 metres and can stay in the air for at least 30 minutes.

"That's enough time to cover an area of 100 hectares. When each field is evaluated it is set in relation to the whole area, the biomass index is calculated and a biomass distribution map is compiled," explains pilot officer Julius Dreesbach, student at the University of Bundeswehr and one of the scientists on the team.

The plane lands safely later on with loads of photos to provide information on biomass distribution in the field. ■



**Just like the checks pilots go through before taking off in a jet, Wilfried Littmann (left) and Patrick Reidelstürz check the functions of the unmanned aeroplane before take off on another information gathering mission. The project is hoping to deliver two per cent higher yield and five per cent savings on fertiliser and plant protection.**



**The two cameras in the plane deliver photos in two spectral ranges. The red channel provides information on the photosynthetic activity of the plants.**

## CORPORATE INVESTMENT IN FARMS AROUND THE GLOBE: WILL THE BUSINESS MODELS WORK IN AUSTRALIA?

IT'S an underlying issue for many farming businesses around Australia – how best to access finance into the future, whether for expansion or just continued operation of the farm. Corporate investment in agriculture has been on the agenda for some time in Australia, and WA Nuffield scholar and Bruce Rock graingrower Michael Foss decided to tackle the issue during his scholarship.

"I set out to look at alternative forms of investment into agriculture, rather than just the traditional way of bank financing," Michael explains.

"In particular I wanted to see what the future holds today for 25 year old farmers who come home from university and want to expand their operations. I wanted to compare the opportunities I had back in 1994 – taking on board where land values were back then relative to what we could produce per hectare – to where they are now."

He decided to head to eastern Europe – an area he understood to have great agricultural potential – and visited Hungary, Serbia, Romania and the Ukraine to have a look at what opportunities there were and why investment was being driven into those areas.

### Decisions based on land value and potential

"In a lot of the places I travelled, investment decisions were based on entering into land that was undervalued and could be converted into highly productive agricultural land with modern technology. A lot of the money that was being invested into those areas was coming out of the UK," Michael says.

Michael also spent time in Canada and the US where he saw some big players in the corporate agriculture world.

"The two main companies in the US are Hancock and Westchester TIAA-CREF. Between them they have acquired over two billion dollars worth of land around the globe, including Brazil, the US and Australia. Having spent time with Westchester, it was evident that their aggressive strategic global land acquisitions will continue," he says.

Michael believes that government policy has a big impact on company investment decisions, noting that "one of the main reasons corporates invest in Australia is because they actually can – even though our production is a long way below a lot of other countries, our costs in relation to that production are quite reasonable."

"Looking at many of the corporate models I studied, most of



During the Global Focus section of the Nuffield Scholarship, there was even time during the busy schedule to cool down a bit. Trekking in Yosemite National Park, California, are some of the 2011 Australian Nuffield Scholars (L to R) Paul Adam NSW, Shannon Mayfield SA, Michael Foss WA, Craig Duffield SA and Dave Campbell NZ.



the assistance of the GRDC, investigates recent advances in international grains R&D.

them were based on capital growth, but there were several that I analysed that were more involved in the production side of things, which was where I have the most interest."

## Corporate investment not for everyone

Michael, whose scholarship was supported by the Grains Research and Development Corporation, says he understands corporate investment may not be for all farmers.

"Definitely – there are different ways farmers can look forward to the future and obviously bank financing will continue to be one of the main forms," he explains.

"Also, with an aging agricultural population, a lot of growers are now looking at what their alternatives will be in the future, but they don't necessarily want to divest out of agricultural ownership – perhaps they can form alliances with young growers to benefit both parties."

But Michael also believes there are corporate models with value to farmers.

"Just looking at recent trends, and the number of corporates being involved in agriculture, there will be more models coming out that will favour the family farming operation."

**Nuffield Australia is an organisation which provides opportunities to Australian farmers between the ages of 28 and 40 to travel the globe investigating a research topic important to them and Australian agriculture. Applications for 2013 open on April 1st 2012. For more information please head to [www.nuffield.com.au](http://www.nuffield.com.au) and follow us on [twitter@nuffieldaust](https://twitter.com/nuffieldaust)**



Michael Foss inspecting wheat trials at CIMMYT, Mexico

## A PROUD CORPORATE FARMING HISTORY

The Velcourt farm Michael visited in the UK is part of a European network of farms managed by the company. Formed in 1967, Velcourt is retained by landowners, tenants, working farmers and institutional investors.

Velcourt started its farming operations by working land which belonged to other landowners.

The driving principle being that land ownership and the farming operation on that land were two distinct activities with totally different objectives.

It was at a time when many landowners were beginning to realise that profitable farming required specialist skills and expertise. Velcourt set out to supply the skills and the necessary expertise to people and institutions who wished to own land without taking the farming risks themselves.

Velcourt took its reward from a share of the profit it generated, creating a genuine partnership.

By the early 1970s it became very obvious that a revolution was taking place in agricultural practice and technology. The 'green revolution' based on genetic crop improvements took potential grain yields to heights that were previously unattainable. To unlock this new potential, Velcourt decided that its future would be dependant on sourcing, developing and applying the best emerging new crop growing technologies.

By the mid 1970s Velcourt had established its own technical department capable of disseminating information and turning them into practical crop growing programs.

A 4.2 tonnes per hectare average wheat yield in 1974 was transformed into a 10 tonne average within four years. The key

lay in disciplined and very carefully thought out crop growing programs for every crop grown, combined with attention to the detail of every part of the crop growing operation.

The Velcourt R&D department is widely recognised and respected. The company was a pioneer in the development of crop growing programs in Europe which brought together plant nutrition, disease control and plant growth regulation. The company also lays claim to the introduction of tramlining of crops to the UK.



Michael inspecting a very healthy crop of sugarbeet on a Velcourt farm in the UK. Velcourt enlists leading edge technology in the management of farming businesses throughout Europe.

# It takes a satellite to feed the world

■ By Charles Walthall, Agricultural Research Service – USDA

IT'S ironic that just when Earth-monitoring satellites are needed more than ever to address the food and freshwater demands of a burgeoning global human population, we face an impending gap in coverage by the Landsat program. A series of Landsat satellites has been continuously in orbit since 1972, collecting an invaluable time sequence of global imagery that records decades of land-use and land-cover changes.

The recent decision by the US Geological Survey (USGS) to provide Landsat imagery free of charge has led to an explosion in applications, enabling unprecedented study of global deforestation, changes in cropping systems and irrigation practices, and conversion of land from its natural state to managed or urban use.

Addition of a thermal infrared channel to the Landsat series in 1982, with Landsat 4, enabled monitoring of not just land use but also water use. Evaporation of water from the soil and transpiration by plants cool the land surface and generate a detectable thermal signal.

Using thermal band satellite imagery, scientists have developed techniques for mapping evapotranspiration that are used throughout the world to monitor consumptive water use by irrigated and rain-fed crops. The collective archive of Landsat thermal data provides a nearly 30-year record of global water-use patterns, with enough detail to resolve individual agricultural fields.

Today, the continuity of this valuable historical record is under threat. At present, only Landsat 7 is still collecting data, but at degraded capacity due to a component failure in 2003. (Landsat 5 data collection was suspended on November 18, 2011, after a remarkable 27 years of operation.)

Landsat 8 is scheduled for launch by the National Aeronautics and Space Administration (NASA) no earlier than January, 2013.

This means much of the 2012 growing season worldwide will have limited coverage by Landsat imagery – a first since the early 1970s.

Support at the US Government level for continuing thermal imaging capabilities within the Landsat program, has also been tenuous. As a cost-saving measure, a thermal sensor was initially omitted from the original Landsat 8 mission scope. An outcry from water managers and governors in the western US, who rely on Landsat thermal imagery for operational water management efforts, persuaded the US Congress to request that NASA add the Thermal InfraRed Sensor (TIRS) to the Landsat 8 instrument suite already under construction.

But due to time constraints related to the late addition, TIRS has a more limited design life and less internal component redundancy than previous thermal Landsat sensors have had.

Landsat's thermal and optical sensors provide invaluable high-resolution (30 to 120 metres) information for monitoring global production of food and fibre, crop health, available soil moisture, and early warning of drought.

But the temporal coverage provided by a single Landsat system – one snapshot every 16 days or longer, depending on cloud cover – is inadequate to meet the real-time needs of agricultural monitoring. Future agricultural satellite systems would ideally provide one to four day revisit intervals, achieved either by widening the swath of the imaging instruments or flying multiple platforms in staggered orbits.

## Global interest exploding

Global interest in satellite-based crop and water-use mapping has exploded in recent years as demand for food and fresh water expands and increased climate variability imposes new challenges to agricultural communities worldwide. With crop and water-use information at sufficiently high resolution and with dependable, satellite-derived flood/drought early-warning products, the climate resilience of these communities may be significantly improved.

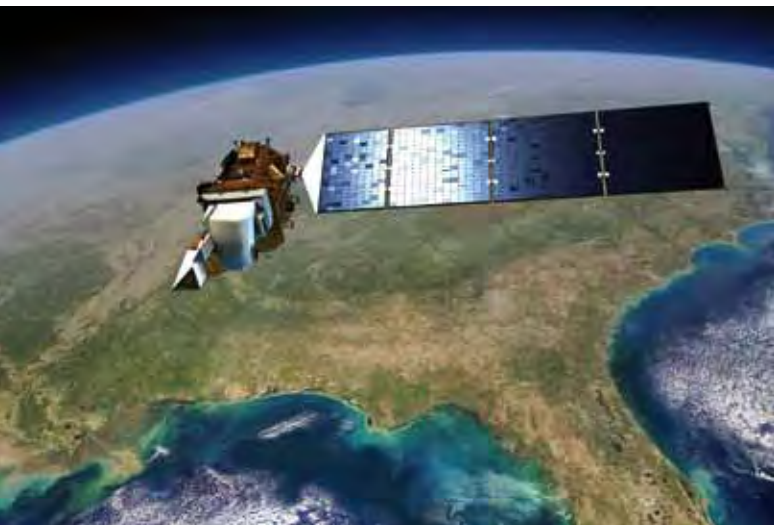
Timely information of this type may have enabled earlier and better-targeted mobilisation of relief efforts as the 2011 famine unfolded in the Horn of Africa.

Satellites are vital to our pursuit of new ways to use science and technology to improve agricultural productivity to help feed the world.

Beyond Landsat 8, the future of the Landsat program and operational land imaging under the auspices of the USGS is uncertain. Initiation of satellite development during fiscal year 2012 appears doubtful, and so we may not be able to launch the next satellite until sometime after the design life of Landsat 8 expires.

We risk yet another gap in Landsat coverage.

The well-being of nations greatly depends on their having ample food and fresh water for the general population. The cost of satellites, their launches, and sensor development is high, but that has to be balanced against the global low-cost data they provide for years once in orbit – and against the value of their role in protecting the world's food and water supply. ■



**Artist's rendition of the Landsat Data Continuity Mission satellite, scheduled for launch in January 2013. This satellite provides thermal infrared images at the high spatial resolutions critical for many agricultural applications.**  
(Photo by NASA)



# Synthetic spider venom could add bite to crop protection

**S**PIDER venom could hold the key to protecting Australia's grain crops from insect pests in the future. Researchers at The University of Queensland's Institute for Molecular Bioscience are looking at whether it is possible to mimic the insecticidal peptides found in spider venom compounds for use in controlling insects that threaten crops.

If these peptides can be replicated, the GRDC will pursue production of a biodegradable pesticide based on synthetic toxins.

GRDC Manager for Commercial Farm Technologies, Paul Meibusch, says spiders are the 'quintessential insect predator' so it makes sense to explore the reasons why their venom remains so effectively potent.

"It's about looking at what nature has developed and perfected over many millions of years, and determining whether we can use that to develop a new class of insecticide to protect our important grain crops," Paul said.

"We know that products from spiders have a wide range of insect-

killing abilities that prevent insects becoming resistant to spider bites, so researchers are investigating whether we can mimic those peptide compounds to specifically target insect pests."

Speaking at recent GRDC grains research Updates in the southern cropping region, Paul said a four-year project at the Institute for Molecular Bioscience, supported by the GRDC, was focusing on the toxic short-chain peptides within spider venom for potential artificial reproduction.

He said the Institute had created the world's largest 'venom library' which catalogues the venom components of almost 300 spider and scorpion species.

"Researchers are isolating peptides from these venoms and running them through a screening mechanism to assess their potential for replication and use in the grains industry.

"The project is still in its infancy but we are hopeful that the outcomes will be of enormous long-term benefit to the cropping industry in Australia and around the world," Paul said.

The development of significant insect pest resistance to groups of agricultural chemicals is driving the exploration of alternative forms of crop protection.

"There are not a lot of insecticide products in the pipeline of commercialisation due to the prohibitive cost of bringing such products to market and the length of time to achieve registration, so it is imperative that we look at other options that are environmentally-friendly and sustainable," Paul said. ■



GRDC Manager for Commercial Farm Technologies, Paul Meibusch.

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# Intensive cropping may select for greater ryegrass seed dormancy

**W**ESTERN Australian research has shown there is a strong link between intensive cropping, annual ryegrass 'dormancy' and herbicide resistance in the state's grainbelt.

The research was conducted by the Australian Herbicide Resistance Initiative (AHRI), based at The University of WA (UWA), and funded by the GRDC.

Dormancy refers to the situation where viable seed does not germinate under ideal germination conditions.

The research findings suggest growers should, where possible, delay seeding crop paddocks where there is dormant ryegrass, so they can kill the maximum number of weeds using knockdown herbicides.

This is because dormant ryegrass is more likely to be resistant to selective in-crop herbicides, and therefore more difficult to control when it emerges later in the crop.

AHRI researcher Mechelle Owen said that although other studies had already found evidence of a correlation between dormancy and resistance in annual ryegrass, the AHRI research was the first large scale study to demonstrate the link.

She said the initial correlation was established by studying ryegrass seeds collected from 406 populations across the WA grainbelt.

"For each population, initial dormancy and change in dormancy over a six-month period were measured, and the resistance status of seedlings to four herbicides was assessed," Mechelle said.

"Herbicides used were Hoegrass, Sertin, Select and Oust, which are Group A and B herbicides.

"Greater seed dormancy correlated with higher levels of herbicide resistance for all four herbicides tested."

Mechelle stressed that ryegrass resistance did not itself cause dormancy, and that crop management factors may be selecting for both traits independently.

"Further research we conducted examined the causes of the relationship between resistance and dormancy, and found that higher dormancy levels were associated with more intensive cropping," she said.

"This research used seed from populations collected in 2009 from fields across the WA grainbelt, including paddocks with long-term cropping programs and those which had never been cropped.

"The study considered a number of factors including cropping history, dormancy level and resistance data.

"Generally, ryegrass from paddocks with a longer and more frequent cropping history was slower to germinate and had a lower proportion of seeds that were able to germinate."

Mechelle said resistant, dormant ryegrass seeds posed a significant problem to growers.

"Intensive cropping programs are likely to select for increased dormancy when knockdown herbicides kill off the proportion of seed which is able to germinate with the opening rains, leaving the more dormant proportion of the population to germinate later in the season, usually in the crop," she said.

"There are limited opportunities to achieve a knockdown of weeds before seeding, as many seeds have not yet germinated.

"And because later germinating seeds then have increased exposure to selective herbicides, this leads to greater resistance and a seedbank dominated by dormant, resistant ryegrass."

Mechelle said the research provided more evidence of the need to consider the implications of applying the same crop management practices year-after-year.



AHRI researcher Mechelle Owen inspects petri dishes containing dormant ryegrass seeds, left, and ryegrass seeds which are germinating normally. Ryegrass seeds outside the petri dishes have not been exposed to moisture.

## GLOBAL RESISTANCE CHALLENGE COMES TO PERTH

Herbicides are the principal tool for crop weed control yet their sustainability is threatened by the evolution of herbicide resistant weed populations in many parts of the world. The Global Resistance Challenge 2013 conference offers a multidisciplinary forum focused on all aspects of herbicide resistance in crops and weeds and their impact on global food production.

The ARHI, based at The University of Western Australia will host this conference. We welcome everyone who wishes to discover the latest advances in herbicide resistance to Perth in February 2013.

### KEY DATES

|                                  |                      |
|----------------------------------|----------------------|
| ■ Conference being held          | February 18–22, 2013 |
| ■ Early Bird Registration Opens  | March 1, 2012        |
| ■ Call for Abstract Submission   | March 1, 2012        |
| ■ Abstract Submission Closes     | September 30, 2012   |
| ■ Early Bird Registration Closes | September 30, 2012   |
| ■ Standard Registration Opens    | October 1, 2012      |

To register your interest go to: [www.herbicideresistanceconference.com.au](http://www.herbicideresistanceconference.com.au)



# New milling oat varieties go well

**A** NUMBER of new milling oat varieties will be available over the next two years which have been providing outstanding yield results and better disease resistance over existing commercial varieties in breeding trials over the past few seasons.

The varieties have been bred jointly by the WA Department of Agriculture and Food, and the South Australian Research and Development Institute and will be commercialised by Seedmark.

One of the new varieties is WA2332, a high yielding, more disease resistant and early maturing oat. It was developed and tested in WA and will complement Carrolup and Kojonup varieties. Improved agronomic traits and disease resistance performance make this variety a true dual purpose oat. While it offers great milling potential, it is also suitable for both the domestic and export hay markets.

In the export hay market WA2332 will be an alternative to Brusher, Kangaroo, Wintaroo and Tungoo varieties.

Research & Development Manager for Seedmark, Richard Prusa said that WA2332 is a mid-tall crop that flowers slightly earlier than Carrolup and about a week earlier than Kojonup.

"It is moderately resistant to stem rust and resistant to leaf rust in WA. It also has improved septoria resistance compared to Carrolup and Wandering.

"Bulking up will occur this year with limited availability in WA planned for 2013. The seed will be more widely available in 2014," he added.

SARDI oat improvement manager, Peter McCormack, said the variety had been developed for WA growers, but it had also performed exceptionally well right across the country. "In the eastern states WA2332 will be a great alternative to Echidna and Mitika varieties, and is likely to be available for sowing in autumn 2014. In WA this new variety will move into the grower distribution scheme three years after its commercial release."

Richard also said the new pipeline agreement for the milling varieties was very exciting for farmers. "It means that the release of new varieties is likely to be more considered and based more on merit than was the case under previous agreements."



There will be limited availability of WA2332 in 2013 with wider release in 2014.

# Forage oats window opens

**F**ORAGE oats is a major winter forage option for many northern NSW and southern Queensland growers, and according to Pacific Seeds northern region sales manager Brad Jamieson, early autumn is the ideal time to introduce oats to the paddock.

"We've got good ground moisture now, ground soil temperature is 28 degrees and dropping, and the cattle market prices are good, so we're at the start of an optimum planting window," he said.

Brad pointed to economies of scale, geography and the crop's ability to fatten animals due to high quality protein and energy as the major drawcards as to why farmers should consider planting forage oats.

"Oats are fairly commonly grown in the western areas of the northern region as it is a lower input crop which offers a good body of feed and higher protein and energy levels. When native pastures are not at their best, this particular plant comes into its own in the colder months."

Looking back to 2011, leaf rust affected many oat crops throughout the region. Brad said this is largely avoidable this season if the right variety is chosen and good grazing or cutting management is employed.

"Last season saw rust present in a lot of areas. With that in mind, Pacific seeds markets one of the few rust resistant oat varieties on the market – Drover."

He said Drover is a good fit for grazing land in western areas because it is resistant to the current races of leaf rust and it produces large quantities of winter feed when needed the most.

Another variety well suited to the area is Taipan, which although is rust susceptible, is an erect plant with exceptionally quick early growth and high dry matter yields.

"Both oat varieties can handle the harsh western climate and can help fill the feed gaps that may occur between May and September."



Forage oats produces good quality feed when native pastures are not at their best.

# Eclipse shines through downpours and droughts

**A** SWITCH in canola varieties has pleasantly surprised Ray Fulwood and his partner Wendy Porter, with the new variety showing its capacity to produce high yields and good returns over two years on their property north-east of Northam, WA.

Despite drought conditions in 2010, their crop of CB Eclipse RR canola achieved yields of 1.2 tonnes per hectare, considerably higher than any other canola crop they grew that year.

"We had two other canola varieties that year and they averaged around a third of a tonne to the hectare," said Ray.

It was a good start to their Roundup Ready canola program.

Ray said they started growing Eclipse to assist with ryegrass control in their continuous cropping program.

"We were also expecting it to be high yielding, and so far it has delivered in both of these areas," he said.

Ray and Wendy have been continuous cropping for four seasons, prompting an increase in canola in their rotations. Before Eclipse was available, they mainly grew triazine tolerant varieties, but are now gradually phasing them out.

"We grew a little bit of TT canola last season, but it was an earlier maturing crop and the rain in early November affected it quite a bit," Ray said.

"Canola is becoming our second biggest crop after wheat, and we also grow lupins, barley and peas."

Last season, they planted 200 hectares of Eclipse on wheat and lupin stubble in early May.

Ray said the crop was sown dry with no herbicides, and due to a dry early winter, fertiliser use was lower than budgeted.

Two glyphosate applications were made prior to the six leaf stage, but a wet July set off a late germination of ryegrass, which battled to compete with the vigorous canola.

After a wet spring, the heavy canola canopy shaded any weeds. There was even some green ryegrass at harvest, which was sprayed with paraquat after harvest to reduce seed set.

## New 'chaff tracking' practice

Last harvest, they also started a new practice they call 'chaff tracking' to prevent weed-seed spread, where the chaff is separated from the straw and left in rows on the paddock's tram tracks using two augers. The remaining straw is chopped and spread well.

The 2011 crop was direct harvested and averaged 1.85 tonnes per hectare. The best performing paddock achieved 2.5 tonnes per hectare with 44.5 per cent oil.

Ray said the Eclipse was earlier to mature on sandier soils and later on good soil types. Yields were best where it was grown after lupins rather than after wheat.

"Rain in November caused some pre-harvest grain loss, but the Eclipse was generally late enough maturing on our good soil types to escape heavy losses," he said.

"We were very pleased with the dollar returns achieved from Eclipse.

"The returns per hectare exceeded our 3.3 tonnes per hectare wheat crop and at the same time, it allowed us to clean ryegrass from paddocks where resistance to clethodim is a problem."

Ray said the \$50 per tonne discount for Roundup Ready canola varieties last season was disappointing.

"It looks likely that the gap between Roundup Ready and other canola varieties will close again, rather than widen, so it's not too much of a concern," he said.

## Lower sowing rates

He said the cost of sowing was an important consideration when choosing canola varieties and they pay close attention to seeding rates to achieve efficiencies.

"Thickly sown crops don't deliver higher yields, so we're looking to sow canola at rates of two kg per hectare or less," he said.

"If we're using good quality hybrid seed, lower rates don't seem to be a problem."

They also use low nitrogen rates and minimal herbicides at seeding to reduce investment up front when growing Roundup Ready canola, which has higher up front seed costs. ■



**CB Eclipse RR has performed well for Northam growers Ray Fulwood and partner Wendy Porter over two very different seasons.**



# Growing canola on canola can cause disease risk and crop losses

**C**ANOLA growers are being urged to implement pre-sowing management strategies to prevent significant disease-inflicted crop losses this coming season and to avoid risking the canola industry's long-term future. The risk of blackleg infection in crops and potential for yield losses this year is severe due to the increased area sown to canola in 2011 and the prediction of another large planting in 2012 due to favourable oilseed prices.

Blackleg is the most severe disease of canola in Australia. Because it survives on canola stubble, last year's expansive crop has heightened the risk this season.

Blackleg experts, with support from the Grains Research and Development Corporation (GRDC), are urging growers to put in place management strategies now, before the 2012 crop is sown.

## Serious risk of crop failure

The National Brassica Pathology Working Group, comprising pathologists, agronomists, chemical companies and canola breeders from across Australia, unilaterally shared concern at a recent meeting in Melbourne that growers would potentially face serious risk of crop failure due to blackleg if attempting to grow canola on canola.

The working group says if growers increase canola intensity to the point where canola is sown onto last year's canola paddocks, disease severity will be extreme, resulting in major crop losses and in some instances complete crop failure.

Working group spokesperson and blackleg authority, Steve Marcroft, of Marcroft Grains Pathology, says that an even worse scenario is that the fungal pathogen will overcome cultivar resistance genes, resulting in many cultivars being destroyed.

"Growers are urged not to risk the long-term viability of the canola industry by sowing canola on canola," said Steve, on behalf of the National Brassica Pathology Working Group.

Growers should consult the most recent Blackleg Ratings (<http://www.grdc.com.au/director/events/grdcpublications>) to choose a resistant cultivar, separate this year's canola crop from last year's stubble, and use either a fungicide seed dressing or fungicide-amended fertiliser as effective strategies for managing blackleg.

"Blackleg is managed by breeding disease resistance into canola cultivars and by crop management practices," Steve said. "But the blackleg fungus is adept at overcoming cultivar resistance, leaving many crops vulnerable to significant yield loss."

Steve says growers and farm advisers need to be aware that blackleg was becoming more prevalent in areas where it had previously not been detected, and that being aware of neighbours' cropping programs was also vital.

Growers and advisers should therefore refer to a number of sources of information to frame their management strategies this year.

## The Blackleg Risk Assessor

The GRDC and Steve recommend that growers consult the 'Blackleg Risk Assessor' fact sheet ([http://www.grdc.com.au/GRDC\\_Blackleg\\_FS.pdf](http://www.grdc.com.au/GRDC_Blackleg_FS.pdf)) for advice on all blackleg control practices.

The Blackleg Risk Assessor was developed by the GRDC and

industry partners to help farmers make the right choices before sowing canola.

Steve says growers can use the Risk Assessor to determine if their paddocks are in a high risk situation, and what practices could be changed to reduce yield loss from blackleg.

"It lists all the factors that will influence blackleg severity on a grower's property," he said.

The regional performance of commercial canola cultivars and blackleg resistance ratings are available via the National Variety Trials online resource at [www.nvtonline.com.au](http://www.nvtonline.com.au).

In the future, information on the rotation of canola cultivars and resistance grouping of cultivars will also be made available.

"The recommended canola rotation groups will be released to industry in spring 2012 after extensive feedback from industry to ensure a proposed new blackleg management system is both effective and easily adopted by growers," said Steve, who is the national blackleg ratings coordinator.

"In the meantime, growers and advisers should be aware that control of disease is an integral component of canola production and has to be considered at all points of crop management," he said.

**For further information: Dr Steve Marcroft, Marcroft Grains Pathology, Mob: 0409 978 941.**



**Canola stalks (on the right) infected with blackleg.**  
(Photo: Ray Colwey)

# Feeding hungry northern region soils in the wetter seasons

**S**OIL scientists continue to see stronger responses in northern grain crops to combined nutrients placed deep in the soil profile than individual nutrients alone. Dr Mike Bell, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland and David Lester, Department of Employment, Economic Development and Innovation (DEEDI) say this is especially the case where sufficient nitrogen is available.

They are working with funding from the Grains Research and Development Corporation (GRDC).

"Combinations of nutrients including phosphorus, sulfur and potassium are proving effective, especially when enough nitrogen is available to allow higher yield targets to be reached," Mike said. "Improving the ability of root systems to explore large areas of soil can greatly boost yield responses."

"In the recent wet summer and winter crop seasons, the reliance on deep placement of phosphorus or potassium has generally been reduced in favour of overall profile (0–25 centimetre) enrichment, but residual effects of deep phosphorus applications are still being recorded six crop seasons after application."

Mike told advisers at the GRDC Update at Goondiwindi to base strategies for phosphorus and potassium fertiliser around periodic deep (15–20 cm) applications in bands 50 cm apart (or closer) for best results.

This proposal is in addition to the current use of starter phosphorus applications in the seeding row when Colwell P tests in the 0–10 cm layer indicate a deficiency.

"Application rates should be high enough to at least meet likely crop removal in grain until the next fertiliser application,



**Nutrient combinations placed at depth, especially when sufficient nitrogen is available will pay dividends.**

while redistribution of deep applied nutrient in crop residue will enrich the topsoil layers," he said.

"Applications of the more mobile nitrogen and sulfur can be made to target individual crops and yield targets, as is currently practiced."

Researchers continue to see evidence of declining soil organic matter and inorganic and organic nutrient reserves in northern cropping systems, although the rates of decline and the amount of reserves vary greatly between regions, soil types within regions and even between paddocks.

"Nutrient budgeting has been clouded by uncertainty about the size of plant available nutrient reserves in different soils, the rate of release to meet crop demands and climate-related uncertainty about crop yield targets," Mike said.

"In recent years we have seen that a number of our longer term cropping soils are showing signs of severe depletion of these plant available reserves, so significant yield and water use efficiency constraints have increased the urgency to adopt new methods of soil fertility monitoring and nutrient application."

"This has been accentuated to some extent by a string of potentially wetter seasons with higher yield potentials."

Such seasons also result in greater risks of off-site losses of mobile nutrients like nitrogen and sulfur due to leaching (both nutrients) or denitrification (nitrogen)."

## The main points

- Deeper testing for phosphorus and potassium is only suitable every five years as changes will be slow.
- Colwell P and PBI analysis are needed when testing at 0–10 cm and 10–30 cm, with BSES-P optional in the 0–10 cm but essential in the 10–30 cm layer.
- Nutrient application strategies will vary with nutrient and the objective of the application.
- Occasional applications of deeper phosphorus and potassium when stubble levels and soil moisture stores are low will ensure future crops can achieve the water and nitrogen-limited yield potential.
- Residual value of applied phosphorus and potassium is excellent, so the rates applied should be sufficient to meet removal until the next application.

For more information and to download Mike Bell's and David Lester's GRDC Update paper, visit [www.grdc.com.au/updates](http://www.grdc.com.au/updates).



Dr Mike Bell.



# Integrated Stock Feeds deliver customised livestock nutrition

**L**IVESTOCK producers from across Australia now have access to a new range of nutritional supplements available through the Landmark network following the recent launch of Integrated Stock Feeds in Moree, NSW.

The opening of ISF's processing operation follows more than three years of planning and an \$8 million investment in land, equipment, research and development.

In a key strategic alliance supporting the new brand, ISF has an exclusive sales contract with Landmark for the distribution of its range of pre-packaged products, each designed to match the needs of the majority of livestock producers located in different parts of Australia.

The factory converts cotton seed meal, a high-protein by-product of vegetable oil production, into the feed supplements, which can also be customised to match the specific nutritional needs of different livestock species living in different seasonal and environmental conditions across Australia.

"The official opening of the ISF plant represents a major opportunity for livestock producers from around Australia to improve their on-farm productivity by precisely responding to the nutritional needs of their animals with the different formulations we can produce," ISF Chairman Dominic Devine said.

"The ISF range of livestock supplements has been nutritionally designed to replace the deficiencies in pastures, helping livestock to hit target weights faster, as well as improve their reproductive performance."

To assist producers in identifying the most suitable product for their needs, ISF has deployed nutritional and product guides on their website, [www.integratedstockfeeds.com.au](http://www.integratedstockfeeds.com.au), and has undertaken extensive training with the Landmark sales team to assist them in providing advice on nutritional supplementation.

## Capitalise on expected boom

Dominic said global population growth meant the Australian agricultural sector needed to improve its productivity to capitalise on the expected boom in demand for meat protein sources, such as beef and lamb.

"It has been forecast that by 2050 the world's population will rise by a third, but demand for meat will double – the livestock sector in Australia needs to increase the kilograms of meat it can



**The Integrated Stock Feeds products can be customised to meet the specific nutritional needs of livestock in different parts of Australia.**

produce per hectare of available land, but do so in an economically and environmentally sustainable fashion," Dominic said.

"Effective protein and mineral supplementation programs are proven to significantly improve the profitability of beef and lamb production, while dairy production is increasingly reliant on concentrated protein and energy supplementation."

The Moree feed mill is licensed to process 100,000 tonnes of cotton seed each year to meet this growing market.

Strategically located close to the broadacre cropping zones of northern NSW, product from the plant at Moree can be quickly trucked north to outlets in Queensland's cattle country, or south through NSW and into Victoria and South Australia.

## Second phase expansion

The company is now planning a second phase of development, in which the plant will be expanded to enable on-site processing of cotton and oil seeds into the protein meal base, which is the core ingredient in the livestock feed supplements.

It will use a mechanical process to extract the cotton seed meal, which is cleaner than the more common process of chemical extraction, and results in a base protein with higher energy content, improved palatability and a more valuable as a stock feed than conventional solvent meal.

"When stage two is completed, ISF will be the only fully vertically integrated livestock nutrition company, from the production of essential protein meal through to sale via Landmark's national network," Dominic said.

"As we work through this process we will be investigating opportunities for strategic alliances with other companies to maximise supply chain efficiencies, so that we can supply our products at attractive prices."

Co-products from stage two will include vegetable oils which are currently in short supply in the domestic market, while the OECD expects global trade in vegetable oil to increase by 45 per cent by 2017.

For more information visit [www.integratedstockfeeds.com.au](http://www.integratedstockfeeds.com.au)



**The new Integrated Stock Feeds processing plant at Moree, NSW.**

# Outback AC110 spray and section control

**T**HE team at Hemisphere GPS continues to expand their already impressive Outback Guidance product range with the release of the Outback AC110 Spray & Section Controller. The new AC110 Application Control ECU, combined with Outback S3, provides rate control for one product and section control for up to 10 sections.

The S3 with AC110 provides an onscreen display of sections with section override, support for eDriveTC and eDriveX, an external report viewer, and plug-n-play interface kits for Raven (440/450/460), Raven (4400/4600), and TeeJet (854/844E) models.

As the first offering in what is expected to be a series of rate/section control products, the S3 with AC110 provides the perfect compliment to existing Outback Guidance farming systems allowing full rate and section control via the S3 colour terminal.

"Our Outback line of products is designed to provide farmers affordable and simple solutions that improve productivity," said Paul Turner, General Manager for Hemisphere GPS (Aus). "These

new features provide farm operations of all sizes the ability to be more precise and get the most out of their activities."

The AC110 retails for \$2,950 +GST and is available from your local Outback Guidance Centre or online at [www.OutbackGuidance.com](http://www.OutbackGuidance.com)



## New HRZ GM

**H**RZ Wheats Pty Ltd has appointed one of Australia's leading agribusiness managers, Neil Comben, to the role of General Manager as the company gets set for the first commercial release of its new wheat variety, Forrest.

Forrest, which was launched in 2011 and is widely available in 2012, has been developed to assist growers in high rainfall zones maximise yields and overcome their historical challenges with disease.

"With over four million hectares of land currently cropped in Australia's greater-than-500 mm high rainfall zone, the introduction of varieties such as Forrest developed specifically for these regions, is much anticipated," said Neil.

"Forrest has already proven itself to be a high yielding variety with good disease resistance characteristics following trials in southern Victoria last year. We are experiencing a lot of enquiries from growers who saw Forrest in trials last year and are expecting a lot more interest as the seed hits the market."

Neil comes to the position after spending 12 years as the National Sales Manager for Dow AgroSciences, a role that ranged from managing the accounts of all Australian customers to overseeing the national sales team and tracking the agronomic trends of Australia's cropping regions.

"As General Manager, a key focus will be reviewing our strategic direction as we take the company to new heights and continue to develop Forrest and the future pipeline of varieties to ensure they delivers greater benefits to growers."

Neil's appointment follows two recent key appointments, including Allan Rattey, who has taken on the role of Principal Wheat Breeder and Bruce Cairns as Chairman.



Neil Comben.

## ANSWER TO IAN'S MYSTERY TRACTOR QUIZ

It is a super rare 1925 Lanz Feldank powered by a two cylinder engine. The single cylinder Bulldogs had arrived in 1921. Their popularity was such that the Felbank was phased out.

(Photos courtesy Herb Voigt)

