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AUTUMN 2016 ISSUE 4

THE AUSTRALIAN AGRONOMIST MAGAZINE

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WEED CONTROL BENEFITS REVEALED

EVEN WHEN CONDITIONS ARE DRY AND YIELDS ARE LOW, CONTROLLING IN-CROP GRASS WEEDS CAN MAKE AN $80/HA DIFFERENCE TO THE PROFITABILITY OF WHEAT CROPS IN THE MALLEE.

BCG research conducted north of Birchip at Jil Jil last year found that yield, test weight, grain weight and screenings were significantly better where weeds were controlled. This finding was clear despite the crop only receiving 129mm of growing season rainfall and the weed density being reasonably low (42 plants/m^2).

The research was undertaken as part of a GRDC initiative investigating the impact of an increasing reliance on agrochemicals, and a subsequent increase in herbicide resistant weed populations, in the Victorian Mallee.

As well as the influence of in-crop weeds on wheat crop performance, the trial also looked at the effect of sowing direction and crop row spacing to see if such practice changes might reduce the need for herbicides.

BCG researcher Kelly Angel said research carried out in other cropping regions suggested that narrow crop rows and sowing in an east-west direction improved weed suppression.

She said the aim of the experiment at Jil Jil in 2015 was to determine if these findings could be replicated in a Mallee environment and if there were any benefits from combining the two practices (adjusting row spacing and sowing direction).

“Crops sown on narrower row spacings (22.5cm or 30.5cm, as opposed to 38cm) produced more biomass and resulted in higher yields.”

Kelly Angel

While sowing direction was not found to have any influence on crop yield, possibly due to the seasonal conditions and the fact that much of the crop did not tiller posing any significant competition for light and nutrients, crop row spacing did impact crop performance.

“Crops sown on narrower row spacings, 22.5cm or 30.5cm, as opposed to 38cm, produced more biomass and resulted in higher yields,” Ms Angel said.

“In a weed-free situation crops sown at the widest spacing of 38cm suffered a 0.13t/ha yield penalty,” she added.

Ms Angel said this was because the more uniform pattern of crop present at narrower row spacings resulted in increased radiation inception, reducing evaporative losses and increasing dry matter production which leads to higher yields.

When weeds were present, the yield reduction was attributed to both a reduction in grain number as a result of fewer heads produced and lower grain weight.

“This illustrates well that competition for light and nutrient resources, particularly in a poor season, can have a dramatic effect on crop yields,” Ms Angel said.

A full report from this research is published in the 2015 BCG Seasons Research Results compendium.

GREEN EYES SEE THE LIGHT FOR COTTON INDUSTRY

Cotton Australia has welcomed reports that The Greens party is open to a change in its policy position on genetically modified crops.

"Cotton growers have been using biotechnology successfully in Australia for 19 years, with significant benefits to the environment, farmers and the communities they support," says Cotton Australia CEO, Adam Kay.

"Australia's cotton industry is the most water-efficient and highest-yielding in the world, and its success is reliant upon efficient farm management practices, including the benefits brought by biotechnology. A sound argument could be made that, without cotton biotechnology, Australia's cotton industry would be a fraction of its size, or even non-existent."

"The use of GM or biotech cotton in conjunction with integrated pest management enables our growers to use far less chemicals - in fact, cotton growers use 95% less pesticide than they did 12 years ago."

"Biotechnology, coupled with good farm management practices, has also assisted farmers in making enormous gains in water management. Australian cotton growers are now 40% more efficient than a decade ago."

Mr Kay says he invites The Greens leader Richard Di Natale to visit cotton farms to see the benefits of genetically modified cotton first-hand.

"We would welcome Mr Di Natale and his colleagues on-farm so they can see for themselves the enormous benefits biotechnology has brought to our industry and, by extension, could bring to other areas of agriculture," he says.

Cotton Australia is the peak representative body for Australia's cotton growing industry.

JAMES COOK UNIVERSITY WORKS ON SUGAR CROP PREDICTION

James Cook University (JCU) scientists are on their way to predicting sugarcane crop size long before harvest, a process that could save farmers money and deliver environmental benefits with better soil health.

JCU's Dr Yvette Everingham said researchers found there was triple the chance of an extremely low-yield crop in a La Nina year compared to an average year.

La Nina is a meteorological phenomenon featuring periods of below-average sea surface temperatures across the east-central Equatorial Pacific. La Nina years are associated with extremely wet years leading to restricted crop growth and increased run-off.

Dr Everingham said scientists could predict the effect La Nina had on a crop in September the year before harvest, which typically begins the following June.

"Normally there is a one in ten chance of a bad crop, but during La Nina this increases to a three in ten chance," Dr Everingham said.

She said the research, funded by Sugar Research Australia, was not a perfect planning tool, but it was much better than having no system at all, which was the current situation.

"Without crop forecasts, growers must assume climatic conditions will be favourable in the forthcoming season to grow a large crop, and have to apply fertiliser rates accordingly. If we can predict a small crop, then the opportunity exists to reduce fertiliser use, help the environment and increase profits," she explained.

On the strength of their work so far, Dr Everingham and her team of scientists have been granted more than half a million dollars by Sugar Research Australia and the Department of Environment and Heritage Protection to continue their research.

"If we can predict the crop will be small well before harvest time, it will mean a reduced need for applied fertiliser and more certainty for farmers, millers and marketers as they plan for staffing and even forward selling of the crop," said Dr Everingham.

The new project will begin this year.

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SUMMER CROP PROSPECTS START THE YEAR HIGHER

Summer crop prospects were boosted following the mid to late December and early January rainfall providing a good start to the year for many of the state's primary producers.

Department of Primary Industries (DPI) Seasonal Conditions Coordinator Ian McGowen said during December above average rainfall occurred in some areas of western NSW, the Hunter Valley, central coast and areas of the central and northern tablelands and mid-north coast.

Average rainfall during December occurred across 62 per cent of the state, and below average rainfall occurred in areas of the far south west, north west, northern central west, southern tableland and the south east of NSW," Mr McGowen said.

Relative to historical records, December pasture growth was below average to average across most of NSW with above average growth occurring in areas of the central and northern tablelands, Hunter Valley and mid-north to north coast.

DPI Leader Northern Dryland Systems, Loretta Serafin said summer crop growth and yield prospects are varied particularly for the early plantings of grain sorghum around Moree, but late plant crops were enhanced by the late December-early January rainfall in areas of the north west slopes and plains.

Harvest of the early planted sorghum has commenced around Moree, with higher yields expected from the areas east of Moree. However many crops struggled with the dry early December conditions, Ms Serafin said.

The rainfall in early January has been extremely variable across northern NSW and it was pleasing to hear of some good falls in the areas west of Moree and out to Rowena which has missed out for a very long time.

Unfortunately most of the rain events to date have been storm cells so isolated areas have received very intense, short bursts of rain while often neighbouring properties may have received little to none. It seems widespread, general rain events across the region has been hard to find.

Ms Serafin said prospects for late plant crops will be further enhanced by the recent rainfall, but further growing season rainfall is necessary in many areas for yield prospects to be maintained.

“It is expected that wetter than normal conditions are likely across far north eastern NSW, with drier than normal conditions likely for areas in the south east.”

Early January rainfall has improved topsoil moisture levels in the north west although more rain will be required in coming months to replenish soil water reserves to give growers confidence for winter crops in 2016,” Ms Serafin said.

The Bureau of Meteorology’s rainfall outlook for January to March indicates there is a near-neutral outlook for most of NSW.

It is expected that wetter than normal conditions are likely across far north eastern NSW, with drier than normal conditions likely for areas in the south east.

We can expect to experience warmer than normal daytime temperatures across much of most of eastern NSW including areas of the north west, central, south west slopes, tablelands and coast. Cooler than normal daytime temperatures are likely across areas of the far south west.

The El Niño event appears to have peaked, although most modelling continues to suggest it is likely to continue until late autumn or early winter 2016, followed by a return to neutral conditions. There is also a possibility of a La Niña event occurring in 2016.

Historically, the effects of an El Niño event on rainfall across NSW tend to decline during summer.

To prepare for dry seasons primary producers are encouraged to go through the process of setting plans, implementing them and then reviewing the results, to ensure they are in a position to manage the impacts of seasonal downturns.

HARD WATER IS FINE WHEN THE CHEMISTRY IS RIGHT

For robust results from summer knockdown herbicides – namely glyphosate – the right chemistry for the water hardness is a crucial factor in the tank. Hard water can affect the function of surfactants, leading to problems such as poor wetting, flocculation and nozzle blockage. If the right adjuvant chemistry is chosen for the level of water hardness, these problems are largely avoidable.

Peter Jones is Technical Services Manager with Australia's own Vicchem, an R&D based manufacturer. He has also been Director of Vicchem's adjuvant research program for more than 10 years.

Mr Jones said the main source of hard water ions came from limestone leaching which was common in Australian aquifers. Zinc and iron could also influence water hardness but were less common. He explained that many commercial laboratories offer water testing services which can quantify the range of minerals in a water sample, and that simple DIY test kits are also available which can provide a useful guide to water hardness within a few seconds.

Mr Jones then went into more detail. "Trials show Vicchem's Hot-Up is ideal when using soft to moderate water, such as town and most channel water - typically less than 300 ppm of hard water ions. Being oil-based, Hot-Up prevents droplet breakdown in the hot and dry conditions of Australian summers," he said.

"For moderate to hard water from dams, open channels and bores - up to 750 ppm - we recommend new spray adjuvant Outright 770, which delivers better adhesion and spread of glyphosate as well as water conditioning," he added.

And lastly, "For very hard bore water or channel water - harder than 750 ppm - glyphosate works best when tank mixed with Infiltrator and Assert," he said.

Mr Jones said hard water often contained calcium or magnesium ions which could interact with glyphosate to form insoluble complexes, rendering it inactive. "However, hard water can be managed with Vicchem's summer adjuvant range because the ammonium sulphate in Hot-Up, Outright 770 and Assert prevents this interaction, instead forming glyphosate-ammonium which is readily dissolved and absorbed," he explained.

Hard water, with the right chemical treatment may no longer pose a barrier to the proper application of surfactants, meaning more coverage and greater effectiveness from summer/ autumn knockdown herbicides. Therefore, test your water, get the chemical balance right and start reaping the rewards this coming season.

“The main source of hard water ions comes from limestone leaching, which is common in Australian aquifers.”

Peter Jones

ARARAT FARMER HARVESTS TOP CROP IN TOUGH SEASON

In what was Ararat's fourth driest year on record, farmer Tim Barr was surprised by the high canola yields he harvested in December at family property "Yallgatta", in the Western Districts of Victoria.

According to Mr Barr, the golden crop has grown in popularity due to its ability to slot into a cropping sequence and be beneficial for weed control, making consecutive wheat crops more profitable, and in some cases becoming a cash crop in its own right.

"For as long as I can remember we have grown canola. When I was a kid we only planted one or two paddocks, but as I've gotten older we've grown a lot more," said Mr Barr.

This past season his combine harvester showed an average reading of 1.5 tonnes per hectare across the 520 hectare oilseed crop, which consisted of two open pollinated triazine varieties (300 hectares and 212 hectares), and one hybrid triazine (8 hectares).

The hybrid – a trial area of Hyola 650TT – was the standout, hitting 2 tonnes per hectare.

Mr Barr runs the 2000 hectare mixed-farm with father Noel and brother Simon, cropping 1600 hectares of wheat, canola, barley, oats and beans, and running 1600 mixed-breed ewes and 50 Hereford-Angus breeders.

He said it was a welcome result given their winter crops received no spring rainfall, putting the results down to a mixture of soil type, geography and varietal choice.

"Some of our cereals didn't do too well but the canola still managed to produce the goods. Crops on the heavier black clay soils did a lot better than those on the lighter grey loam country," he said.

"Yields were very patchy throughout the west and the state as a whole. In one area you'd have decent crops and the neighbouring area would be struggling. The hybrids have been out-yielding OPs for some time now, so that's something we decided to look into. There's also been a swing to GM canola in parts of the state, so we're always keen to investigate new options, he added."

Ararat received 410 millimetres for the year. In contrast, the annual median average is 600 millilitres.

It has dropped below the 2015 measurement three times on record — in 1982 (302mm), 1994 (394mm) and 2006 (340mm) - according to the Bureau of Meteorology.

Mr Barr seeded the canola on April 21 with a John Deere 8410 tractor and Gason air seeder on 30 centimetre row spacings. The hybrid seed was sown at a lower rate of 2kg/ha, while the OPs were seeded at 4kg/ha. Using a Case 2388 header, he windrowed the crop in late November before finishing harvest on December 24.

Pictured Tim Barr

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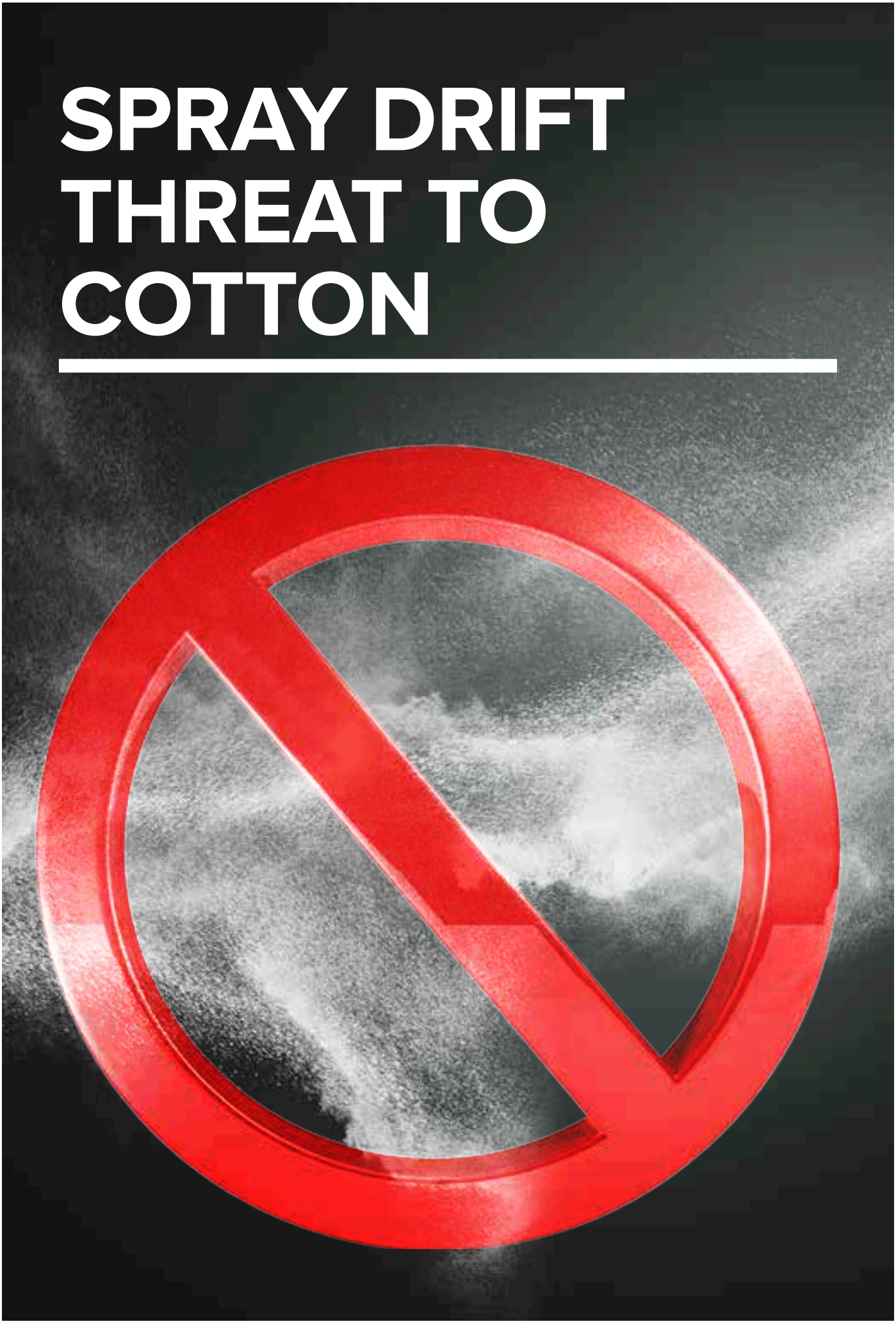
SPRAY DRIFT THREAT TO COTTON



AUSTRALIA'S GRAINS AND COTTON INDUSTRIES CALLED ON GROWERS IN BOTH SECTORS TO APPLY COMMON SENSE WHEN SPRAYING, FOLLOWING SIGNIFICANT DAMAGE TO THE NATIONAL COTTON CROP FROM OFF TARGET SPRAY DRIFT.

Spray drift incidents were reported across Australia's cotton industry from December to early January, and are estimated to have caused tens of millions of dollars in damage. In the vast majority of incidents, the damage was caused by Phenoxy (2,4-D-type) spray that travelled during temperature inversions – in some instances, moving tens of kilometres from the intended target fields.

"Even small amounts of herbicide can affect cotton crops which are currently flowering," Cotton Australia General Manager Michael Murray said.

"Unfortunately, environmental conditions over December-January have combined to produce a 'perfect storm' for off-target spray drift damage.

"Heavier-than-usual seasonal rainfall has also encouraged weed growth which, in turn, led to more spraying by farmers and applicators, and this has combined with temperature inversions to produce substantial off-target spray drift."

GrainGrowers' Chair, and Narrabri grain and cotton farmer, Andrew Carberry said reducing the risk of off-target spray was all about using common sense.

"Like many northern NSW farmers, our family produces both crops and I understand the balancing act between spraying summer weeds and protecting cotton crops," Mr Carberry said.

"Reading chemical label instructions, using buffer zones, and habitually checking wind speeds and directions and using tools such as SprayWise are all good practice."

"It's just all about being mindful of our neighbours and remembering that our actions, if careless, can have dire consequences for our fellow croppers."

SprayWise Decisions, developed by GrainGrowers and sponsored by Nufarm, allows farmers to review weather conditions for the last 14 days and predict weather patterns up to 14 days in advance. Growers can locate their property using GPS co-ordinates, physical address search or find their property using Google Maps satellite imagery. Data is updated every 12 hours and can be viewed in-field on the Spraywise web-based mobile phone app.

Mr Murray urged cotton growers to report any damage suspected to have been caused by off-target spray drift.

"Without reports of spray drift incidents, it is almost impossible for state or federal regulators to take further action, and so we urge all growers, agronomists and consultants to file a report as soon as spray drift damage is observed," Mr Murray said.

Cotton Australia is working with organisations like GrainGrowers to distribute a one-page guide for farmers on how to recognise inversion conditions. The document is available for download from the Cotton Australia and GrainGrowers websites.

Farmers should use this checklist when preparing to use herbicides, particularly Phenoxy (2,4-D-type) products:

- Read and follow label instructions – it is a legal requirement
- Monitor weather conditions before, during and after spray application
- Use a nozzle that produces coarse or larger droplets
- Check http://www.CottonMap.com.au for cotton fields that could be potentially impacted by your 2,4-D spray
- Notify your neighbours – even during reasonable conditions for spraying, some spray droplets could travel up to 20km or more if the spray equipment is not used correctly, and even further in some instances of unfavourable conditions, such as during surface temperature inversions or night-time spraying. Information on inversions is available at: http://www.grdc.com.au/GRDC-FS-SprayInversions
- Minimise boom height when spraying
- Ensure spray contractors are fully trained and accredited

Growers whose crops have been damaged by off-target spray drift should call the relevant authorities in their state to report it:

- NSW: EPA Environment Line: 131 555
- Qld: Biosecurity Queensland: 132 523

"It's just all about being mindful of our neighbours and remembering that our actions, if careless, can have dire consequences for our fellow croppers."

Andrew Carberry

MINISTER ENCOURAGES YOUNG AUSTRALIANS TO CHOOSE A CAREER IN A GROWING INDUSTRY

Minister for Agriculture and Water Resources, Barnaby Joyce, is encouraging young Australians to consider a rewarding career in agriculture.

Minister Joyce said the future food and fibre task will be a massive challenge for both Australia and the world, but it is one that will also create significant opportunities for those wanting to get involved.

"I would strongly encourage our next crop of young Australians to consider fields of study, both undergraduate and post-graduate, that will help them make a strong contribution to our primary industries," Minister Joyce said.

"Agriculture is an incredibly challenging and rewarding career, feeding and clothing people here and around the world, but it is important young people are aware of the tremendous opportunities available in agriculture, right across the supply chain from paddock to plate, or to the garment factory, as the case may be," he added.

Minister Joyce said that with Australian agriculture positioning itself as a reliable producer of clean and green food and fibre, students studying agriculture and related courses can look forward to a huge range of research, science, technology, and agribusiness careers.

"In fact, the Australian Council of Deans of Agriculture has found that for every graduate from an agriculture-related degree, there are five or six jobs available. This is proof that there are jobs waiting for graduates who are willing to give it a go," he continued.

Minister Joyce noted that, "We sit on the edge of the strongest growing region in the world, and have developed an agriculture sector with a positive outlook that has solid prospects for growth. The December 2015 release of the ABARES Agricultural Commodities report forecast that the gross value of farm production in Australia will increase by 8 per cent in 2015–16 to around $57.6 billion."

"The agriculture sector is well-placed to prosper, and I encourage young people weighing up their options to choose a field from which an agricultural career can grow," Minister Joyce said.

FOR MORE INFORMATION:

The Australian Government provides a range of support to both university and Vocational Education and Training students. Detailed information is available at www.studyassist.gov.au.

There are a large number of scholarships available to current and prospective students studying agriculture.

The Horizon Scholarship supports agriculture undergraduates through a bursary, professional development and mentoring and or annual work placements.

DIRECT DRILL DIVIDEND

This season's low water allocations have seen rice growers adopt new research which showed how direct drilling and delayed permanent water (DPW) can deliver water savings and increase gross margins by up to 59 per cent.

NSW Department of Primary Industries (DPI) research agronomist, Brian Dunn, said a recently completed five-year research project with the Ricegrowers' Association and Australian Centre for International Agricultural Research has given rice growers viable water solutions.

Local agribusiness advisers say up to 80 per cent of crops in the Coleambally Irrigation Area were drill sown this season – that's a huge turnaround from 10 years ago when just 20 per cent of crops were direct sown," Mr Dunn said.

Growers who delay permanent water application can save 2.5 megalitres per hectare compared with traditional drill sowing and 4.5 megalitres better than aerial sowing and can use that extra water to grow more rice and increase gross margins.

The direct drill-DPW approach means growers can avoid issues with ducks, wind and muddy water, there's often no need to spray broadleaf weeds and risk spray drift issues, they can sow on time and apply water and nitrogen once water availability is assured.

Traditionally rice crops are aerial sown or dry seeded and grown in ponded water for about 140 days.

Drill sowing shortens ponding to about 105 days and with DPW ponding can be reduced to 75 days, which reduces evaporation and water loss.

Mr Dunn said growers must have good layouts and drainage for early flush irrigation, where water is applied and then drained in less than 18 hours to ensure good plant establishment.

Longer intervals between flushes deliver greater water savings and we've seen that rice handles moisture stress very well and recovers quickly from drying events during the vegetative growth stage between germination and flowering.

We recommend that permanent water is applied 10 to 14 days before panicle initiation, anytime up to Christmas or earlier if weeds or other issues develop – clearly the later permanent water is applied the greater the water savings.

Grass weeds can be difficult to control and advise growers to choose paddocks with a good weed control history.

A new DPI research project in partnership with the Rural Industries Research and Development Corporation is assessing growth, yield, grain quality and timing of panicle initiation and harvest for current rice varieties for aerial and drill sowing and DPW.

FOREWARNED IS FOREARMED IN MANAGING CEREAL RUSTS

Rusts continue to be one of the most devastating diseases of cereal crops globally.

Spores are easily spread hundreds and even thousands of kilometres by wind, and on clothing or luggage. Under the right conditions they can produce huge epidemics. Knowing what pathotypes (races/strains) are out there helps plant breeders breed resistant material and helps growers to better manage the disease. The PBCRC research project Reforming an integrated Australasian cereal rust surveillance system aims to determine the pathotypes of rusts to help guide rust management in Australia and New Zealand.

The research is examining the changes that have occurred in New Zealand rust flora since the last pathotyping for New Zealand in 2001. Researchers are trying to reconstruct the changes in pathotypes in the Australasian region over the past decade by understanding the mutations and incursions of cereal rust pathogens that have occurred in both countries, as well as the exchanges in pathotypes that have occurred.

As the saying goes, forewarned is forearmed. Therefore, understanding the pathotypes of rust present in a cereal growing region is important in determining any rust management strategy, such as which varieties can be grown that will be resistant and when there may be a need to apply fungicides. Knowing the full gamut of pathotypes in Australasia enables plant breeders on both sides of the ditch to breed for durable rust resistance by selecting lines that are known to be resistant to the pathotypes in both countries.

Importantly, the project is also upskilling pathologists by training them in the science and art of pathotyping cereal rust diseases. Upskilling is critical to help protect all of Australasia from rust diseases. Leading the project is Dr William Cuddy from the New South Wales Department of Primary Industries.

"The project has been important for my development as a pathologist. Being exposed to diagnosing unfamiliar pathotypes in New Zealand has made me better at doing my job here in Australia," said Dr Cuddy.

Recently Professor Robert Park, a leading researcher in the project, presented research findings at the Foundation for Arable Research field day in New Zealand. Results presented focused on how long-term monitoring of rusts in Australia and New Zealand has clearly established how easily these pathogens move between the two countries and how genetic resistance remains the mainstay of rust control in cereals. Professor Park also stressed how ongoing changes in rust pathogens highlight the need for coordinated surveillance across the Australasian epidemiological zone.

The project has been made possible with significant in-kind funding from Plant and Food Research New Zealand and funds from the Foundation for Arable Research.

SCIENTISTS TARGET STAR TRAITS FOR FUTURE FOOD SECURITY

Victorian scientists are currently working to develop food crops that will be suited to higher carbon dioxide levels of the future.

Victorian Government and University of Melbourne scientists are testing wheats with different fertiliser needs and growth patterns in a bid to overcome future wheat quality problems linked to rising carbon dioxide (CO_2) levels.

Today the concentration of carbon dioxide in the atmosphere is 405 parts per million in air, but is expected to jump to 550 ppm by 2050. This will potentially result in lower protein wheat with less baking qualities.

In a bid to better understand this, scientists at Horsham are growing wheat in special outdoor laboratories exposed to likely 2050 CO_2 levels.

Over the past seven years this work, known as AGFACE - Australian Grains Free Air CO_2 Enrichment - has tested a range of different varieties of wheat under the elevated CO_2.

AGFACE leader, Glenn Fitzgerald, said scientists had identified that a transpiration efficiency trait implemented in one wheat variety, Drysdale, worked well under higher CO_2 levels.

"A dry seasons line, Drysdale has good transpiration use efficiency, or needs less water to grow, and actually performed better under the 2050 levels," Dr Fitzgerald said.

Now this same principle is being applied using experimental wheat lines which can make the most efficient use of nitrogen, a nutrient which influences both grain protein levels and bread quality.

"Higher CO_2 reduces grain protein in wheat, so finding a wheat that can reverse this decline would allow us to grow quality grain in the future," Dr Fitzgerald said.

Another issue being examined is tillering, or the shoots that grow from a plant stem, with the theory being that cutting the number of tillers could provide better grain yield results at harvest.

"Experimental lines, with less tillering that might allow more soil water to be available later in the season for grain filling, are being tested to see if they perform the same under future CO_2 conditions," Dr Fitzgerald said.

"We don't know whether these higher protein and reduced tillering test lines will actually perform better under higher CO_2 like Drysdale did, but we are hoping this work will help us unlock the secrets of adapting to the challenges of higher CO_2 levels," he added.

Work in the Australian Grains Free Air CO_2 Enrichment program is jointly run by the State Government of Victoria and the University of Melbourne, with funding from the Grains Research and Development Corporation, the Australian Commonwealth Department of Agriculture, and the Australian Research Council.

“Scientists at Horsham are growing wheat in special outdoor laboratories exposed to likely 2050 CO_2 levels.”

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This is excellent news for producers looking to fill their winter feed gap with a highly productive and nutritious grazing option.

When selecting forage varieties, producers should look for varieties with lowest NDF% (fibre) to enable livestock to eat more, and then highest ME (Metabolisable Energy) which carries more energy per kilogram of feed. These two combine to deliver greater livestock performance, as either liveweight gain or milk production.

SF RoyalQ-100 from Seed Force meets these selection criteria, and is the highest yielding forage tall fescue in recent trials, delivering exactly what producers need, exactly when they need it. It is also of higher quality than the leading commercial variety. And if that is not enough to get farmers excited, the seed sells at a lower price.

Michael Gout is Director, Australian Business Development at Seed Force. He said SF RoyalQ-100 is a unique variety and this gives it a distinct advantage over most other continental varieties.

Mike said, “It is a medium leaved continental variety, unlike any of the existing commercial varieties in that it has three summer-active (continental) parents and two winter-active (Mediterranean) parents.”

He went on to explain, “Bred by Gentos in Argentina, SF RoyalQ-100 has shown excellent establishment vigour and much improved autumn-winter growth without any loss of warm season production or persistence. It also has improved quality compared to similar continental types such as Quantum II MaxP, Demeter and SF Festival.”

SF RoyalQ-100 has been the highest yielding variety in three of the four trials in which it has been sown, and has the highest overall yield. It is now starting to become accepted as the new standard for sheep/beef grazing in summer rainfall environments or summer moist soils.

Gentos have spent the past 15 years developing varieties to progress tall fescue on farms in Argentina and Uruguay. In 2011 they launched the Royal Q brand, which has delivered some significant benefits over Advance and Quantum.

Mike said, “These benefits include increased feed quality over Quantum to enable greater daily intake, improved winter yields when feed is most valuable, increased persistence over standard nil endophyte varieties, and a safe grazing option for all livestock classes.”

And the outcome of these benefits has been a rapid adoption of the first release variety Royal Q-100 in South America and more recently in Australia, both with outstanding results.

Mike explained, “Royal Q-100 offers the benefits of a summer active continental tall fescue but with two significant benefits. Firstly, it has two Moroccan lines in its breeding which are highly winter active, resulting in much improved winter feed production. And secondly, the variety offers significant improvement in feed quality, resulting in increased intake and potentially higher meat or milk production. This can be seen as the yield and quality data is fed into the Seed Force Animal Performance Calculator, based on an assumption of 10 year pasture life.”

Producers need to manage tall fescue for best outcomes.

Feed quality results of mono-culture feed tests show the NDF% of tall fescue is well above the 35% level for optimum rumen function, but these results are from testing sole species trial sites under less than ideal grazing.

Tall fescue pastures should ideally be a good mix of grass, legume, and where possible forage herbs such as chicory and plantain. Legumes and herbs have higher ME (11-13 MJ/kg DM) and lower NDF% (18 25%).

This can enable the total sward to have NDF % closer to 35% for increased intake, and higher ME for greater energy available above maintenance requirements to drive greater meat or milk production.

"It is a medium leaved continental variety, unlike any of the existing commercial varieties in that it has three summer-active (continental) parents and two winter-active (Mediterranean) parents."

Michael Gout

Pictured Michael Gout

Mike went on to say, "Mixed sward trials have highlighted the fact that tall fescue/white clover based pastures managed well were able to maintain legume content of 35% compared to perennial ryegrass/white clover pastures with less than 15%."

"This is supported by cattle grazing these mixed sward pastures that are able to achieve live-weight gains of 1.0-1.5kg/hd/day when the pasture is well managed, but when feed gets away from stock live-weight gain declines as does clover content," he added.

If feed gets away, it is advisable to either mechanically top or cut for hay/silage and get the paddock short and open to maintain both fescue quality and clover/herb composition in the sward.

SF RoyalQ-100 tall fescue ticks a lot of boxes for producers looking to grow a better performing pasture leading to better performing livestock.

Mike concluded, "The key issue is to start with the best tall fescue variety as the base for the pasture selected. Then yield, quality and persistence will follow. SF RoyalQ-100 fills a gap in the Australian market. The trial results are indicating it's got a package of traits and benefits Australian producers are looking for."

AN IMPORTANT NEW ADDITION TO RICE GROWERS' RESISTANCE MANAGEMENT TOOL KIT.

Rice growers will soon have access to an effective new option for killing Dirty Dora and Arrowhead, as well as an important addition to their resistance management tool kit.

The new fast-acting herbicide for the control of broadleaf weeds has been specifically developed for use in rice as an early post-emergent application.

Anthony Ward, Regional Business Manager – Southern, for FMC Crop Protection, said the new product is called Gator H2O and that it was a FMC global formulation specially developed for broadleaf weed control in rice.

An application for registration for Gator H2O is currently being assessed by the APVMA and FMC anticipates registration for the forthcoming rice season.

"The product disperses across the water and settles to kill Dirty Dora and other small actively growing broadleaf weeds, allowing the rice to grow away unimpeded," explained Mr Ward.

"It can be applied from the 2 leaf stage in rice if used alone or from the 2.5 to 4 leaf stage with Londax DF (bensulfuron methyl) for effective control of Dirty Dora and Star Fruit," he added.

When Gator H2O is used alone, a follow-up spray of MCPA is recommended. Gator H2O is also compatible with Magister (clomazone). Mr Ward said current guidelines in rice recommended using two herbicides with different modes of action for each weed.

Gator H2O is based on carfentrazone ethyl, and will be the first Group G herbicide available to rice growers.

"Recommending Gator H2O in the herbicide program will help delay the development of resistance to important herbicides for the rice industry such as Taipan (benzofenap) and Saturn (thiobencarb)," he said.

Mr Ward said resellers and advisers had a critical role to play in helping growers to manage herbicide resistance and achieve effective weed control in rice this season.

"This means maximising the effectiveness of the herbicides that are used with good management practices, using two herbicides for each weed, rotating herbicides, rotating sowing methods to allow the use of different herbicides and considering knockdowns before emergence," he said.

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PROTECTING YOUR INVESTMENT IN LAND PREPARATION AND PLANTING

PROFITABLE CANE FARMING HINGES ON SETTING UP THE PLANT CROP AND LAYING THE FOUNDATION FOR SEVERAL PRODUCTIVE CROPPING CYCLES. THIS INCLUDES LAND PREPARATION FOR PLANTING AND PROTECTING AND MANAGING THAT PLANT CROP.

Hand-in-hand with growers' move towards precision farming – including GPS and laser land-forming, GPS machinery guidance and controlled traffic systems – is precision placement of inputs, for maximum return from investment and to retain inputs on the farm.

For several years, Crop Care technical consultant Glen Tucker has worked closely with SRA (formerly BSES) researchers, extending the period of canegrub control from a single application of controlled-release product to the plant crop.

"The latest advance registered this year, suSCon maxi Intel, is a perfect fit for today's precision farming systems," said Mr Tucker.

"One treatment with suSCon maxi Intel granules at either planting, first working or drill fill-in covers the crop against canegrub damage for several years protecting your investment in land preparation and planting Intelligent Technology – for three years against greyback, negatoria, consobrina and Bundaberg canegrub damage, and for four years against southern one-year and Childers canegrub damage," he added.

Mr Tucker explained that applied to the plant crop, suSCon maxi Intel gives growers the opportunity to reduce application time and labour, to maintain higher plant numbers, vigour and yield, to grow stronger ratoons and increase ratooning life, and to reduce potential off-farm loss compared with liquid alternatives.

He said Crop Care promoted careful and precise placement of the granules for each farming system and the target cane grubs.

“Growers have the opportunity to reduce application time and labour, to maintain higher plant numbers, vigour and yield, to grow stronger ratoons and increase ratooning life, and to reduce potential off-farm loss compared with liquid alternatives.”

Glen Tucker

“Canegrub species differ in their habit and feeding zone in the soil, so control products need different placement for different species. Planting depth also influences the ideal placement of suSCon maxi Intel granule band in relation to the cane sett. The aim is to have the product in the target grubs’ feeding zone, with sufficient soil cover (at least 10cm of consolidated soil) above the insecticide band,” Mr Tucker explained.

He also said that as well as careful placement for maximum canegrub control, there were important environmental considerations.

Traces of imidacloprid , the active ingredient in the majority of canegrub products, have been found in runoff water at some sites.

Mr Tucker said the advantage of suSCon maxi Intel was the controlled release of imidacloprid from the granules over a number of years, at a level toxic to canegrubs, but with minimum risk of being lost in runoff water.

“suSCon maxi Intel’s granular form also makes it easier to monitor and ensure that imidacloprid is placed where it is meant to be in the soil,” he said.

“A precision granule applicator is needed to apply an accurate dose of suSCon maxi Intel granules in an even 15-20cm-wide band directly to the plant row. Several applicators are now available, which can be driven from the planting mechanism, or by a land wheel for applications at first working or drill fill-in,” Mr Tucker added.

He said the land preparation stage was an ideal time for growers to plan ahead for applying suSCon maxi Intel.

“If you are set up to plant deep, 20cm or more, plan to put on suSCon maxi Intel at drill fill-in, particularly for greyback grubs. If you plant shallow, 15cm or less, plan to put it on in the planting operation. If planting depth is somewhere in between, there is some flexibility. For example, at planting for two year grubs, and at first working or fill-in for greyback,” Mr Tucker explained.

“Whatever the depth and time of application, always aim for a minimum of 10cm of consolidated cover above the granules when the row is finished and hilled up,” he added.

Always remember that laying the foundation for profitable crops starts before planting ever takes place.

PLANTS ALSO SUFFER FROM SALT STRESS

HIGH SALT IN SOIL DRAMATICALLY STRESSES PLANT BIOLOGY AND REDUCES THE GROWTH AND YIELD OF CROPS. NOW RESEARCHERS HAVE FOUND SPECIFIC PROTEINS THAT ALLOW PLANTS TO GROW BETTER UNDER SALT STRESS, AND MAY HELP BREED FUTURE GENERATIONS OF MORE SALT-TOLERANT CROP PLANTS.

Professor Staffan Persson led the study and said that unlike humans who can move away from the salty snacks or drink more water, a plant is stuck in high salt (or saline) soils and must use other tactics to cope.

“More and more of the world’ crops are facing salt stress with high salt in soils (also known as salinity) affecting 20% of the total, and 33% of irrigated, agricultural lands worldwide, “ said Professor Persson, from University of Melbourne, Australia, formerly at the Max Planck Institute of Molecular Plant Physiology.

“By 2050 it is estimated that we need to increase our production of food by 70% to feed an additional 2.3 billion people. Salinity is a major limiting factor for this goal as more than 50% of the arable land may be salt afflicted by the year 2050,’

“It is therefore of great agricultural importance to find genes and mechanisms that can improve plant growth under such conditions.

“The team has identified a protein family that helps plants to grow on salt, and outlined a mechanism for how these proteins aid the plants to produce their biomass under salt stress conditions. The work was published today in the journal Cell.

“Plants need to make bigger cells and more of them if they want to grow and develop,” added Prof Persson.

“Unlike animal cells, plant cells are surrounded by a cellular exoskeleton, called cell walls which direct plant growth and protect the plant against diseases. Importantly, most of the plants biomass is made up of the cell wall with cellulose being the major component.

“Hence, plant growth largely depend on the ability of plants to produce cell walls and cellulose, also under stress conditions, and it is therefore no surprise that research on cell wall biosynthesis is of high priority.”

Previous studies by Dr. Staffan Persson’s research group and others have shown that the cellulose producing protein complex, called cellulose synthase, interacts with, and is guided by, an intracellular polymer structure, called microtubules. This interaction is important for shape and stability of plant cells.

The current research revealed that a previously unknown family of proteins supports the cellulose synthase machinery under salt stress conditions, and was named “Companions of Cellulose synthase (CC). “We show that these proteins, which we called CC proteins, are part of the cellulose synthase complex during cellulose synthesis”, said Prof Persson.

The researchers discovered that the CC gene activity was increased when plants were exposed to high salt concentrations. Thus, the research team hypothesized an involvement of these proteins in salt tolerance of plants.

“To prove this hypothesis we deleted multiple genes of the CC gene family in the model plant Arabidopsis thaliana (thale cress), and grew the plants on salt-containing media. These mutated plants performed much worse than the wild-type plants”, explains Christopher Kesten, PhD student in Dr. Persson’s research group, and co-first author of this study.

“In an additional step, we made fluorescent versions of the CC proteins and observed, with the help of a special microscope, where and how they function. It was quite a surprise to see that they were able to maintain the organization of microtubules under salt stress. This function helped the plants to maintain cellulose synthesis during the stress“, adds Dr. Anne Endler, also co-first author of this study.

The research group demonstrated that while the control plants could maintain their microtubules intact, the plants lacking the CC activity were unable to do so. This loss in microtubule function led to a failure in maintaining cellulose synthesis, which explained the reduction in plant growth on salt. These results therefore provide a mechanism for how the CC proteins aid plant biomass production under salt stress.

“The team has identified a protein family that helps plants to grow on salt.”

Professor Staffan Persson

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NEW WHEAT VARIETY DELIVERS EARLY SOWING OPTION

Developed by AGT at its Narrabri breeding centre in north-west New South Wales, Suntime will give NSW and Queensland growers an earlier sowing option that offers higher yield potential and improved disease resistance.

Suntime was officially launched at the University of Sydney Plant Breeding Institute field day at Narrabri, on Wednesday 9th September 2015.

AGT marketing and seed production manager Kerrie Gleeson said Suntime has largely been developed as a replacement for the popular variety, Sunzell.

"Suntime is a little bit quicker than Sunzell. The advantage over Sunzell is it has an APH quality classification in the Northern Zone, whereas Sunzell is only AH, and Suntime has proven to be significantly higher yielding than Sunzell in late April planted trials", Mr Gleeson said.

"It is about delivering better yields and a better disease package. It has good stem, leaf and stripe rust resistance and moderate tolerance and resistance to root lesion nematode," he added.

In National Variety Trials (NVT) from 2010 to 2014, Suntime consistently outperformed Sunzell in grain yield and many disease resistance traits at sites from central Queensland to north west NSW.

Mr Gleeson said Suntime's optimum sowing window was from 25th April to mid-May, but is best suited to planting in the last week of April and first week of May in the north.

"We believe the excellent package of yield, maturity, disease resistance and APH quality classification should make Suntime a clear choice when picking a variety for the ANZAC day planting window", Mr Gleeson explained.

A 230 hectare seed increase block of the new variety planted this season on the Woods' family's Goondiwindi farm, 'Billa Billa', is up and growing well.

"We are watching it with interest. It looks magnificent", Tom Woods said.

"It appears to be a variety that the industry is looking for, that you can plant around the end of April/early May. There are a lot of mid-season varieties, but we are looking for a genuine ANZAC day planting option and Suntime looks like it will fit that space".

Commercial quantities of Suntime seed will be available for the 2016 through AGT affiliates and local retailers.

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NEXT LEVEL RYEGRASS CONTROL

Barry Haskins owns and runs a consulting agronomy and research business called Ag Grow Agronomy and Research in Griffith, New South Wales. He offers research-based recommendations to clients covering an area of over 200,000 hectares across the Riverina region.

Barry said that Annual Ryegrass is a leading issue for growers in the Riverina region.

“Ryegrass can mean the difference between harvesting a crop, or not. The stakes are high for these growers so they need to get weed control right,” he explained.

For this reason Barry Haskins has been putting Boxer Gold® from Syngenta through its paces for 10 years, and he continues to recommend it because it continues to deliver.

“I’ve been working with Boxer Gold since 2005, before it came to market, and our research has consistently shown solid results,” Barry said.

“It’s most suited to growers who want the next level of Ryegrass control above more conventional herbicides like Trifluralin,” he added.

Barry’s research has shown early post-emergence application of Boxer Gold as the most effective method to control the weed, especially when used following an application of Trifluralin at sowing.

“If you get to the Ryegrass very early on, before it gets one or two leaves, it works well.One of the advantages of using Boxer Gold is that unlike most other pre-emergent herbicides, it has knockdown properties. At the moment, we’re finding more Ryegrass that is resistant to glyphosate, so we’re using Boxer Gold in conjunction with Gramoxone® to deliver a robust knockdown prior to sowing,” he explained.

“Alternatively, using it as an early post-emergent application strategy allows paddocks to be patched out, where we are only spending money in the paddock where any problem areas are likely to arise,” he added.

Barry said the product makes good business for his clients, who commonly see two tothree times return on investment.

“Unlike some other products, Boxer Gold excels in a tight rotation regime on a wide range of soil types. In an economy where productivity and profitability are keys, having a product that you can use without impacting on your cropping rotation is highly beneficial,” Barry concluded.

Barry Haskin from Ag Grow Agronomy and Research in Griffith, NSW.

CARBON PROJECT DELIVERS FERTILE SOIL FOR HUNTER VALLEY FARMERS

Hunter Valley farmers are reaping the rewards of more fertile soils with increased carbon storage, thanks to a four year partnership between Bengalla mine, landholders, University of Newcastle, BDM Resources and Hunter Local Land Services.

Soil carbon is widely considered an important indicator of soil health, landscape resilience and productivity, while increased levels can help drought-proof properties.

17 landholders implemented carbon management practices, such as rotational grazing and improved cropping techniques as part of the project. Results from their properties show an average increase in the amount of carbon stored in the top 30cm of soil of close to 12%, or 7.6 tonnes per hectare.

Merriwa landholder Kim Fenley, who implemented the trial carbon management practices at his property, has noticed significant improvements in productivity.

“The difference between the lands I traditionally graze to the trial area is a two to three fold productivity increase, due to the carbon practices put in place,” said Mr Fenley.

“The carbon practices included using rotational grazing to allow better use of the paddocks, and using controlled improved grasses and crops to increase productivity while native grasses are allowed to come forward. Capturing carbon not only removes CO2 from the atmosphere but it comes with benefits such as helping to manage the impact of drought on the land.

Carbon in the soil means water holding potential and the ability to then see out a drought is increased,” Mr Fenley explained.

“We’ll continue on this process to look at what other people are doing. Everyone involved has a better understanding of soil carbon and the benefits of better management tools,” he added.

District Coordinator for the Upper Hunter Local Land Services Steve Eccles said the adoption of grazing rotations and innovative cropping as part of the carbon management practices during the project has resulted in an increase in carbon stored in the soils.

“This has led to increased ground cover and pasture production, with a reduction in weeds and land degradation issues. Farmers implementing these practices have benefited from improved soil health and resilience of the properties to adverse weather such as dry conditions,” Mr Eccles said.

Bengalla general manager Jo-Anne Scarini said “I am very proud of the partnerships and engagement with community members that has been a key to the success of this partnership.

“The project has delivered great results and the fact landholders can continue to benefit from the outcomes mean it was truly worthwhile,” she added.

The project area included approximately 1,100ha of Upper Hunter Valley land and resulted in an approximate 8,400 tonnes of additional soil carbon present in the project area.

The project was a commitment under Bengalla’s consent conditions.

BLAST WOODY WEEDS IN THREE STEPS

Blackberry and gorse are both classified as Weeds of National Significance. This is due to their invasive nature, potential to spread, economic and environmental impacts. On farms they reduce pasture production and thereby stocking rates, restrict access to water and land, and provide food and shelter for feral animals. Fire hazard is also increased due to the large amount of dead material within blackberry thickets, and the inherent flammability of gorse. All of these aspects dramatically reduce property values and directly impact the viability of your clients.

One berry from a blackberry plant may contain up to 80 seeds and plants may produce up to 13,000 seeds per square metre. A mature gorse infestation can produce six million seeds per hectare each year, and seeds may remain viable in the soil for up to 30 years. Ensuring these plants do not produce seeds is critical to the long-term capacity of affected areas.

Dow AgroSciences' three cycle plan offers a solution. Stinger™ is the most effective and economical herbicide to manage wall-to-wall weeds. The following year, clean up any regrowth or new seedlings with Grazon™ Extra. This ensures your first year investment is protected. The third step requires a thorough inspection to tidy up any weeds with Vigilant™.

One berry from a blackberry plant may contain up to 80 seeds and plants may produce up to 13,000 seeds per square metre.

CYCLE 1: SMASH UP

- Knockdown large infestations with the aim of reducing the weed infestation to a more manageable level.
- Stinger is an economical first strike for graziers and land managers with extensive infestations of blackberry. It is a new broad spectrum woody weed, pasture, winter cereal and fallow herbicide. The label covers an extensive list of weeds and a range of application techniques including high volume, boom spray, aerial (helicopter only), low volume high concentrate (gas gun) and use in tolerant grass pastures/pasture renovation. Stinger contains 375 g/kg aminopyralid and 300 g/kg of metsulfuron-methyl.
- Integrated Vegetation Management Specialist, Mr Geoff Messer, advises to "allow funds for a follow-up treatment in the next cycle. Protect areas which are most at risk of further infestation first. Consider treating invasion pathways first. Prioritise areas with increased threat of vermin."

CYCLE 2: CLEAN UP

- Follow up previously treated areas with Grazon Extra. Grazon Extra is primarily used for brushweed control plus difficult to control broadleaf weeds in fallow. The label also covers an extensive list of weeds and a range of application techniques. Grazon Extra contains the powerful combination of 300 g/L triclopyr, 100 g/L picloram and 8 g/L aminopyralid.
- Mr Messer's tips for this stage are to "prioritise follow up treatments to capitalise on Cycle 1. Follow up areas where re-infestation can quickly reoccur. Follow up areas where containment is important. Monitor regularly for possible regrowth."

CYCLE 3: TOUCH UP

- Check previously treated areas and re-treat as necessary with Vigilant II. Vigilant II is ready to use straight out of the pack with no mixing, no mess and no fuss. Vigilant II allows you to follow up your woody weed treatment without the need for spray rigs or heavy machinery. Vigilant II herbicide can be used all year round, meaning that problem regrowth can be treated at any time, not just when the plan is actively growing.

Mr Messer recommends at this stage to "continue to check over time to ensure no seedlings get away. Ensure pasture forms an effective competitor to regrowth or seedlings. Clean up small scattered areas first. Monitor regularly for possible regrowth."

Dow AgroSciences' sales and biology staff will be delivering this message at noxious weeds conferences and to council weeds offices, as well as offering training for staff in distribution to ensure rural stores can answer questions from clients looking for solutions to their weed problems.

Also refer to the Dow AgroSciences website www.woodyweedspecialists.com.au for further details of the three cycle program.

The Woody Weed Control Guide

The woody weed control guide is the essential handbook for controlling woody weeds on your property. It contains everything you need to know about what herbicide to use on what weed and is updated each year with the latest weed control knowledge to ensure that you can stay up to date with the most effective ways to manage weeds on your property.

The Woody Weed Tablet App

The Woody Weed Tablet App has brought the latest thinking in weed control into the digital age. Whether you are at home or in the middle of a paddock, the Woody Weed Tablet App allows you instant access to:

- What herbicide to use on what weed
- Weed identification
- Weed treatment timing
- Herbicide application videos
- What treatment method to use on each weed
- Herbicide labels and safety information

The Rate Finder Smartphone App

The Rate Finder App allows you to match any herbicide to any weed, at any time. Instantly accessible from your smartphone, the Rate Finder App will allow you to find the application rate of any herbicide that will get you the best results.

Whether you are:

- Trying to find out what herbicide to use on a weed in your paddock
- In the store trying to figure out how much herbicide you'll need
- Looking for information on what weeds a particular herbicide will treat
- Figuring out the best times to spray each weed
- Looking for mixing rates and spray volumes

RESEARCH SHOWS CANOLA'S ALLELOPATHIC POTENTIAL AGAINST ANNUAL RYEGRASS

Pictured Dr Hanwen Wu,Professor Deirdre Lemerle, Advanta Seeds canola manager Justin Kudnig, Dr David Luckett, Dr William Brown, Professor Jim Pratley and PhD student Md Asaduzzaman.

A recent study by Charles Sturt University (CSU) at Wagga Wagga has demonstrated the canola plant's potential to naturally suppress annual ryegrass growth through chemical interference, also known as allelopathy.

The research, headed by CSU research professor in agriculture Jim Pratley, and funded by Advanta Seeds, established allelopathy as a potential future supplement to synthetic herbicides.

"The introduction of herbicide tolerant canola varieties is a significant advance for the crop and the farmers who grow them, but the risk of herbicide resistance is enhanced as key herbicides, notably glyphosate, are transformed in use from the first herbicide in a cropping season to the last and perhaps the only herbicide," Professor Pratley said.

"The simplification of herbicide use therefore is a threat to the stability in availability of herbicides. The results found that most of the canola genotypes evaluated significantly reduced the root growth of ryegrass with increasing density," he added.

Professor Pratley said the background of the study centred on the fact that crop production in Australia is highly dependent on herbicides to provide effective weed control, however, numerous weed species have evolved resistance to several herbicide modes of action.

"The most notable is annual ryegrass (Lolium rigidum) where resistance is widespread geographically and the range of herbicides affected is extensive," Professor Pratley said.

Professor Pratley explained that plants have long had the capability to compete with other species in varying degrees, and one mechanism is for the plant to exude chemicals into the root environment to inhibit the competing plants.

"The competing species will be doing the same thing and the winner will be the one which has the most potency to its competitors while also being tolerant of the chemicals being exuded by those competitors," he said.

This process is known as allelopathy, and the chemicals involved are called allelochemicals.

Hyola hybrids were evaluated as part of the Equal Compartment Agar Method (ECAM) laboratory work, which is a simple and rapid evaluation of plant capability.

"The technique has been widely used and its correlation with field performance has been tested for both rice and canola. This provides a reasonable basis for identifying allelopathy which otherwise is challenging to distinguish from other interference mechanisms such as competitive ability under field conditions." Professor Pratley said.

Advanta Seeds canola business manager Justin Kudnig said the most suppressive genotype was Hyola 404RR, a popular Roundup Ready hybrid marketed by the company.

"Hyola 404RR resulted in 72 % root growth inhibition of annual ryegrass, followed by genotype Hyola 970CL, at 70%, slightly ahead of the high allelopathy control line at 68%. Hybrids such as Hyola 650TT, Hyola 559TT, Hyola 600RR, Hyola 577CL, Hyola 525RT and Hyola 725RT showed moderate to high allelopathic potential, which is a great result," said Mr Kudnig.

The weakest of the lines evaluated were the open pollinated canola varieties, such as Thumper TT and Crusher TT.

NEW LENTIL HERBICIDE OPTION TO DELIVER MULTIPLE BENEFITS FOR GROWERS

One of Australia's leading pre-emergent herbicides in wheat is now registered for use in lentil crops, offering growers improved weed control and management of resistant weeds, as well as helping to extend the life of other existing herbicides.

Sakura® 850 WG contains the active ingredient pyroxasulfone. The product was first registered in wheat (not durum wheat) and triticale in 2011. It provides long-lasting residual control of annual ryegrass, annual phalaris, barley grass, silver grass and toad rush, as well as suppression of brome grass and wild/black oats.

Prior to last season, the Group K herbicide achieved registration for use in field peas, lupins and chickpeas. Lentils have now added to the list of pulse crops on the label in time for the 2016 cropping season.

Bayer Technical Advisor Rob Griffith said one of the biggest challenges for lentil growers was managing weeds, so it was promising to have one of the most effective pre-emergent herbicides in cereals now available to growers as an option, which would also help alleviate the pressure on Group A post-emergent herbicides.

"With Group A herbicide resistance continuing to develop, reducing the grass weed numbers with Sakura will help provide better control," Mr Griffith said.

"Trials have shown that by getting on top of weed numbers with Sakura, it can help achieve better results from Group A post-emergent herbicides. It is now another option for growers and it can help make other herbicides last longer. They will need to use Sakura responsibly in their crop rotations, but it does provide the opportunity to reduce weed numbers. Growers should try to drive weed seed numbers down to close to zero if they can," he explained.

Large-scale trials coordinated by Bayer over two years showed Sakura was the most effective pre-emergent herbicide in lentils when compared with alternatives, while it also provided good levels of crop selectivity.

Bayer Broadacre Product Manager James Catherall said the new registration would add valuable flexibility in growers' crop rotations and, when used as part of effective integrated weed management (IWM) strategies, could help reduce weed seed banks.

"This helps growers to optimise profitability in the short and long term, as well as ensure more sustainable farming practices for the future," James said.

"Sakura is now a good fit in this high value crop rotation to help growers effectively tackle their grass weed populations and weed seed bank," he added.

LIKE BIOSECURITY? LIKE OUR NEW FACEBOOK PAGE

The Department of Agriculture and Water Resources has launched a new Facebook page, to highlight the importance of biosecurity for travellers and online shoppers.

First Assistant Secretary of the department's Compliance Division, Raelene Vivian, said biosecurity was a shared responsibility, and the Australian community was an important partner.

"Australia's biosecurity system protects our plant, animal and human health—which in turn underpins our agricultural industries and economy," Ms Vivian said.

"As an island nation, we're free from many of the pests and diseases that affect other countries around the world—for instance, if foot-and-mouth disease (FMD) established in Australia it would cost our economy upwards of $50 billion over the course of a decade.

"Our biosecurity system protects us from pests and diseases like FMD—and the public are an important partner in our mission to protect Australia.

"We rely on members of the public to report sightings of exotic pests and diseases, and also to do the right thing when travelling to Australia, sending items through the post and shopping online.

"The vast majority of people want to do the right thing—but not everyone understands the rules. That's why we want to help the public understand how they can work with us to protect our environment, agricultural industries and economy.

"Our new Facebook page will help the community understand the rules and why we need their help.

"It will also help showcase some of the interesting and incredible things our staff see at airports and mail centres every single day."

Like our new page at www.facebook.com/australianbiosec.

PRECISION AGRICULTURE IS PIT CRITICAL

BY SOILS SYSTEM SCIENTIST EDWARD SCOTT

FOR MANY, THE SUMMER IS A TIME FOR A BREAK AFTER A BUSY HARVEST BUT FOR THE LIFE OF A SOIL SYSTEMS SCIENTIST IN AGRICULTURE IT'S THE TIME WE KICK IN TO GEAR.

Since 2016 rolled around we have been well below ground in over 160 soil pits across southern and eastern Australia, capturing and recording all nature of soil attributes to engineer outcomes and solutions for farmers.

With the rapid advances in technology tools, at everyone's disposal now in the agricultural space, it is still hard to beat the predictive intelligence and actionable insight that an excavated soil pit can give you.

The characteristics and nature of soil in a profile provides a powerful insight into what the soil can provide in relation to management and seasonal variance. Soil profiles can be like layers on a cake, each one can operate differently and quite independently. With that in mind it can then be ascertained as to how crop performance can be so different, depending on rainfall distribution patterns over a growing season.

Where moisture is available in a soil profile, and how moisture actually moves through a soil profile, are key critical factors that govern crop performance. As moisture is a key component of overall nutrient uptake for a plant the nutrient distribution down through the soil profile is nearly as important as the amount of moisture in the soil profile. Yet, too often season based decisions are made on a 0-10cm soil test. It's like visiting a dentist to determine your blood type.

With the variation in soils types we have been involved with over the past couple of months, it's absolutely apparent that as there needs to be a much greater focus on accurate data collection across landscapes for precision agriculture to progress. It's critical to start focussing on how soil condition varies down through a soil profile, as well as across within a given landscape (Vertical Rate + Variable Rate).

Depending on the soil type, there are different approaches that need to be taken. There are certainly subsoil constraints limiting production in many areas including salinity, sodicity, chemical toxicities, nutrient deficiencies and compaction. Often, the management of these subsoil constraints come at a large cost. However, it is often seen that a number of these constraints are operating a lot closer to the soil surface than expected. Land managers need not be too concerned though as constraints closer to the surface are in closer proximity to current management techniques.

When managing soil condition, the best way to begin to approach the issue when looking at a soil profile is to assess what productivity we are getting from the soil currently. Some soils, when assessed to a 1.5 metre depth are only utilising less than 30% of the soil profile. Once we have a snapshot of field pit information we can begin to address where the soil productivity potential can be taken to.

If you think of a plant root system as a water balloon, then a small increase in diameter of the balloon results in a significant

Soil Pit Profile - Deep Sand over Sodic Clay - Yorke Peninsula S.A.

In Field Soil Assessment - Riverina N.S.W.

“Yet, too often season based decisions are made on a 0-10cm soil test. Its like visiting a dentist to determine your blood type.”

Edward Scott

increase in the actual volume of water in the balloon. The plant roots are similar. A small increase in the actual volume of roots both vertically and horizontally results in a significant increase in nutrient and water access.

Plant nutrient availabilities are typically expressed as mg/kg, however the uptake of mg/kg is dependent on the volume or root depth and density and can be expressed as litres of soil per plant. For example, you can have 30mg/kg of Colwell Phosphorus in a 0-15cm soil sample, but if there is a compacted layer at 9cm and the root volume of the plants is restricted then the overall accessibility of the Phosphorus is limited.

In many instances it can be just a tillage management strategy, not necessarily greater levels of inputs. Depth of soil disturbance, speed of sowing and disc or tine type can have marked effects on overall soil performance and the resultant root volume.

When you get your soil tests back over the summer/autumn period, don’t only think of the tests as the levels of plant available nutrients, but also start to think about how the plants are going to be able to actually access those nutrients. “Availability” and “Accessibility” values are a critical function of surface area to volume ratio of the roots.

Some soil constraints are often too big to tackle in just one season, and there is rarely a silver bullet to deal with any soil constraint. However, if there are limiting factors, especially in relation to nutrient availabilities and toxicities at depth, then these can still be managed.

If subsoils are low in overall fertility, and the crop is relying on subsoil moisture, then the critical factor of soil moisture being the key facilitator for nutrient uptake comes into effect. This can be the time when the opportunistic application of liquid nitrogen forms can be utilised effectively as a suite of other nutrients can be applied in the same tank mix to address the impending crop nutrient limitations. This strategy can be used as an adjunct to granular Urea which is reliant on soil moisture in the topsoil to get the nitrogen into the plant/soil system.

If certain toxicities are present in the subsoil then nutrient strategies can be enacted to lessen the effect. Often sodium is a key element that accumulates in the subsoils. Sodium is still a more minor essential element for plant growth, however, in abundance plants struggle to regulate themselves (critically in relation to water loss). Sodium and Potassium work in an exchange process in the plants to open and close the stomata (the pores in the leaves where plants ‘breathe’ from). Often the high sodium levels in the soil limit the uptake of potassium, thereby limiting the plants capacity to regulate water loss and rapid ‘haying off’ can then result. Targeted Potassium foliar sprays at this time can be utilised strategically if plants are drawing on moisture from depths where Sodium is an issue.

The soil profiles and the analysis of the layers provide the accurate insights needed to move precision agriculture to the next level. The understanding of soils, not only across the landscape but vertically within the landscape, can link seamlessly with precision management for effective application of plant nutrients as governed by seasonal variability.

Assessing and tracking moisture in profile with soil dye

SAFETY AND STEWARDSHIP ON THE AGENDA FOR LEADERSHIP WORKSHOP

Syngenta recently hosted a two day leadership workshop for just under 20 agronomists and rural merchandisers in the Clare Valley, South Australia as part of its ongoing commitment to promote understanding and best practice of using Bipyridyl products, such as Gramoxone® 360 Pro and Spray.Seed®.

The workshop included essential information for growers and advisors on comprehensive paraquat technical training, safety and stewardship including both theory and practical elements.

The workshop was a good chance for up-and-coming agronomists and rural merchandisers to get hands on experience with chemistry that has been used by Australian growers for more than 50 years and plays an increasingly important role in sustainable farming.

Holly Hannaford, a rural merchandiser from Kerin Landmark Rural in Jamestown, South Australia, attended the workshop and was impressed with the knowledge she walked away with.

“I was looking to broaden my knowledge base and improve my confidence in the products that I advise to growers,” Ms Hannford said.

The workshop covered a range of topics, including the value Bipyridyls brings to growers and the industry, its chemistry and make up, resistance management, along with effective application and how to optimise performance through a practical demonstration.

“I learned the importance of considering a range of factors when spraying Bipyridyls, such as light and humidity. The practical trials really helped to demonstrate just how important these factors are. There was a big focus on safety at the workshop, especially on the required PPE, which can often be forgotten on farm. I will definitely be reinforcing the importance of PPE when speaking with my growers,” Ms Hannaford said.

“I would definitely advise other agronomists and people in rural merchandising to get along to one of these workshops, as it’s so important to be knowledgeable about the products you are advising, and the safety considerations,” she added.

Gramoxone 360 Pro is an efficient and flexible paraquat product delivering growers more value with every hectare sprayed, and is an example of the continued investment Syngenta is making to bring new solutions to Australian growers.

It has been formulated with an advanced 360 g/L active loading that delivers benefits including up to 30% less product to transport, store and handle.

Syngenta will roll out a number of Gramoxone 360 Pro Leadership workshops across the country, over the coming months, which is supported by Syngenta’s extensive online stewardship program, Quest Academy training modules.

Jason Sabeeney, Solutions Development Manager at Syngenta said “the workshop is a great way to educate people on the unique technical attributes as well as the safe and efficient use of Bipyridyls such as Gramoxone 360 Pro and Spray.Seed.”

“It’s easy to assume that everyone understands a 50 year old product very well. This is certainly not the case. A lot has changed over the years with regard to farming systems, tillage, resistance management and spraying practices. How Gramoxone and Spray.Seed were applied and handled 20 years ago are very different to the present. The Leadership workshop provides hands-on education tailored to these contemporary farming practices. In coming months, registration of Gramoxone 360 Pro in a new 20 litre container size is anticipated, adding to the existing 100 litre and 1,000 litre containers, which will add to its flexibility and wider adoption,” Mr Sabeeney explained.

"These products are essential tools for sustainable Australian farming. Syngenta is committed to ensuring they are used safely and effectively so growers can keep using them for another 50 years to come, and these workshops are fundamental to that objective," he concluded.

Jason Sabeeney, Solutions Development Manager at Syngenta, and workshop attendees inspecting the workshop trial trays.

Holly Hannaford, Kerin Landmark Rural and Jayne Marshall, Elders Wudinna, working together at the practical trial site.

BEST PRACTICE BRINGS REAL BENEFITS TO LOCKYER FARMS

The owner/managers of two successful farms in the Lockyer Valley say best practice is bringing real benefits to their businesses.

Growcom's Land & Water staff, have produced video case studies showing the farm systems implemented by the two growers, Troy Qualischefski of Qualipac Farms at Glenore Grove and Wayne Keller at Lowood, as part of Hort360, the Best Management Practice program for horticulture.

Troy Qualischefski said that the Qualipac business, which focuses on producing quality onions and broccoli, had been a part of Growcom's Water for Profit project for 10 years. The farm now has automated watering, including the use of a six span lateral move irrigator, and uniformity of water distribution to the crops has improved to an accuracy of 95 per cent.

"It's made a big difference. We're now producing the same tonnage of crops on 80 per cent less water," said Mr Qualischefski.

The farm has also switched to 'tram tracking' as part of a precision bed farming system utilising GPS technology.

"Our wheel marks are now in the one spot and our soil health is the best we've ever seen it, just by being more accurate about where our tractors are running and where we're placing our chemicals and fertilisers," he added.

Mr Qualischefski said that these improvements had also resulted in less sediment runoff into the Lockyer creek.

Wayne Keller grows a variety of vegetables at Lowood, where extremely undulating country makes managing water run-off and soil erosion a constant challenge.

Irrigation scheduling on the lateral move irrigator delivers scheduled water in small amounts. The Kellers have also put in contour banks, drains and sediment traps.

"When we work the soil we don't rip it too deeply. We work shallowly and retain the thrash from the previous crop to help with wind and rain water erosion. With our combined approach we have been able to reduce costs in the farm operation without sacrificing any yield," Mr Keller explained.

Hort360 is a step by step, facilitated risk assessment tool designed to give growers a 360 degree view of their farm business operations.

The first module is designed to help growers to adopt Best Management Practice to protect land from erosion, prevent sediment and fertiliser run-off from farmland and manage farm inputs.

Growers in the Lockyer, Bremer, mid-Brisbane or Pumicestone sub catchments, are invited to take up a free farm service to identify areas of high risk for sediment management.

Growcom acknowledges the Queensland Government for funding this module of Hort360 as part of the Healthy Catchments Program and Resilient Rivers Initiative.

The Hort360 video case studies can be viewed on the Growcom website http://www.growcom.com.au/land-water/hort360/

More video case studies are being prepared.

TIME FOR FINE LIME

Farmers in the eastern Wheatbelt are hoping trials investigating the application of ultra-fine lime on their acidic soils will provide them with a bigger bang for their buck.

With the major cost component of liming being transport, farmers are looking for a greater impact from every load of lime they cart, particularly to outer areas in the eastern Wheatbelt.

The Merredin and Districts Farm Improvement Group will run a large-scale trial, funded to the tune of $20,000 by the National Landcare Programme and managed by Wheatbelt Natural Resource Management, with one of the treatments being an ultra-fine lime.

Another of the treatments will be the so-called secondary carbonate, sourced locally.

Department of Agriculture and Food WA development officer Greg Shea said the trials were critical in determining the amelioration rates of different lime particle sizes, particularly in low rainfall zones.

Mr Shea said previous experiments had shown smaller lime particles dissolved more readily in soil water than larger particles, and had a quicker impact on pH levels.

"Time is money in the eastern Wheatbelt,and it is likely that the lack of soil moisture is slowing the dissolution of the commonly used limes in local soils," Mr Shea said.

"Most growers in the eastern Wheatbelt are recovery liming rather than maintenance liming and so they want a fast response because yields are compromised until the acidity is corrected," he added.

Agrarian Management consultant Craig Topham said he had held discussions with a New South Wales based company in regard to other lime products, such pelletised lime and fine chalk-based limed products used by growers on the east coast and in Europe.

"These products are made from a chalk-based calcium carbonate, but it appears that they are used predominantly in the more intensive cropping industries," Mr Topham said.

"Unfortunately, from my research, the economics don't stack up for growers in the northern and eastern Wheatbelt, but it does appear that a product like this is one of the most effective sources of lime because of its high neutralising value," he added.

Mr Topham said Western Australia had one of the cheapest sources of lime in the world.

“Time is money in the eastern Wheatbelt and it is likely that the lack of soil moisture is slowing the dissolution of the commonly used limes in local soils.”

Greg Shea

"Obviously the majority of the cost is freight, and there is a big difference in the lime quality between the various lime pits. But growers can access the lime analysis information from each pit if they are looking for finer lime particles,” Mr Topham added.

"The finer limes have been used in the past, but it all comes down to the economics, and those economics in the north are very different to the economics in the eastern Wheatbelt.

"The higher cost of a higher neutralising value lime can be offset in the eastern Wheatbelt with less freight costs, simply because you may be able to truck less lime and achieve the same results," he explained.

Mr Topham said anecdotal evidence was pointing towards lower grain screening issues for those growers who had paddocks with a long history with soil amelioration.

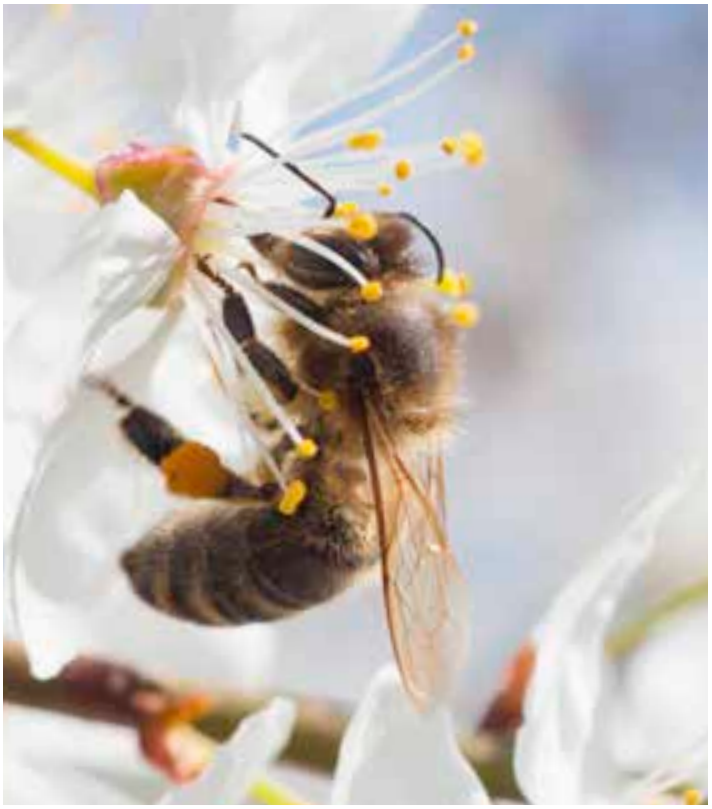
"A number of consultants are saying the same thing in this regard across the state. Cultivation combined with liming is critical to success. Just liming, without cultivation, is a very slow return on investment,” he said.

Mr Shea said the Wheatbelt NRM/ MADFIG trial results would provide critical information for growers, particularly those in low rainfall areas, to ensure they had a truck full of the most useful and economic lime. He said the use of cultivation in conjunction with the lime application was another treatment that would be included in the trial.

Wheatbelt NRM's project delivery officer Tracey Hobbs said soil acidity in Western Australia was estimated to erode potential crop yields by between nine and 12 per cent, at a cost of $500 million every year.

"The game-changer with respect to the ultra-fine lime use, which is very difficult to handle, is the new spreader technology that is now locally available," Mr Shea concluded.

BEES MAY NOT BE THE BE-ALL AND END-ALL FOR CROP POLLINATION



Farmers who use pesticides that spare bees but kill other insects might be ignoring important sources of crop pollination, according to an Australian-led international study.

University of Queensland plant ecologist Dr Margie Mayfield said many crops — including mangoes, custard apples, kiwi fruit, coffee and canola — depended on non-bee insect pollinators such as flies, butterflies, moths, beetles, wasps, ants and thrips.

“Scientists haven’t broadly explored the role of non-bee insects in crop pollination,” Dr Mayfield said.

The global reliance on honeybees for pollination is a risky strategy, given the threats to the health of managed honeybee populations due to pests and diseases such as Varroa mites and colony collapse disorder.

“Non-bee insects are an insurance against bee population declines. We are trying to get the message out there to use scientific findings such as these to promote a change in agricultural practices,” Dr Mayfield added.

Dr Mayfield, who is who is the Director of UQ’s School of Biological Sciences Ecology Centre, said the research was led by Dr Romina Rader from the University of New England, Armidale, and involved a team of international researchers who carried out 39 field studies on 17 crops in five continents.

The research discovered that non-bee pollinators performed the same number of flower visits as honey bees and more than other bee pollinators.

“Although non-bees were less effective pollinators than bees per flower visit, they provided slightly more visits. These two factors compensated for each other, resulting in pollination services similar to bees,” Dr Rader said.Dr Rader said non-bee insect pollinators had other advantages.

“Fruit set in crops increased with non-bee insect visits, independently of bee visitation rates, indicating that non-bee insects provide a unique benefit not provided by bees. We also found that non-bee pollinators were less sensitive to habitat fragmentation than bees,” Dr Radar explained.

The study, published in the Proceedings of the National Academy of Sciences, involved researchers from Australia, New Zealand, Spain, Argentina, Brazil, Portugal, Israel, the Republic of Ireland, Japan, Mexico, the UK, the USA, Sweden, The Netherlands, Italy, Switzerland, Germany, Poland, and Canada.

ACACIA PLATEAU KIKUYU COVERS MURWILLUMBAH DAIRY NEEDS

Dairy producer Corey Crosthwaite has been happy with the rapid coverage of the new SF Acacia Plateau forage kikuyu on his "Tweedside" property on the banks of the Tweed River just outside Murwillumbah.

With dairy margins being squeezed in recent years, Corey has opted to set his farm up with a simple feeding system for his 200-240 cow operation.

"Growing crops has been expensive when you take into account the time delays between start of preparation to start of grazing and then replanting," said Corey.

"We have opted to use the simple ki/rye grazing system but have modified it to increase the energy density of our feed. And the new Acacia Plateau kikuyu is providing two significant benefits to the system.

Firstly it is much more aggressive in its growth and coverage compared to Whittet and we have been able to plant it late summer/early autumn and have it covered over by the spring.

Secondly Acacia Plateau has better quality than Whittet when managed on a tight rotation – we graze it every 12-14 days and mechanically top every second grazing and follow with fertiliser. We apply Greentop K over the cool season and Gran Am over the warm, wet season.

The other change that we have made to the system is including SF Punter chicory into the system in the autumn. It is able to compete with the ryegrass over winter and spring and in summer goes nuts in with the kikuyu reducing overall NDF% of the feed on offer and increasing total ME enabling greater intake of higher energy feed to increase milk production.

The cows are averaging 21 litres/day on the kikuyu/chicory mix, being fed 3kg grain/cow/day. Since including Punter chicory in the mix, the herd improving by 1-2 litres/cow/day in those paddocks.

Corey first planted a 4ha block of Acacia Plateau in 2014. It had noticeably better seedling vigour than the Whittet sown in an adjoining block. The Acacia Plateau was sown at 2.5kg/ha with 1.5kg SF Punter chicory and 40kg/ha SF Speedyl ryegrass. When the ryegrass finished in late October the pasture was transitioned to the new kikuyu.

"One thing that I noticed was its stronger autumn growth. Whilst this may be a benefit to those beef producers who do not over-sow with ryegrass, for us we need to ensure that we give it a good hard mulching back before planting as we certainly noticed retardation of the ryegrass where we grazed without mulching.

We sowed another 14ha this autumn and have planted the Acacia Plateau with 1.5kg/ha SF Punter chicory, 1.5kg/ha SF Pacer leafy turnip and 25kg/ha oats in March to boost winter feed. After the first grazing in April when it was cool enough, we then spread 40kg/ha Winterhawk ryegrass.

We are now drilling more Acacia Plateau into Punter chicory after the ryegrass finished rather than turn the ground over for forage sorghum as we have done in the past.

By using Acacia Plateau kikuyu and ryegrass with the winter feed benefit of SF Pacer leafy turnip and the summer quality benefit of SF Punter chicory, our system is much simpler and more profitable.

Pictured Corey Crosthwaite

GLYPHOSATE RESISTANT BROME – GENE AMPLIFICATION

Two years ago, a meeting was held in Australia to gather researchers who study weed, pest and disease resistance to see what they could learn from each other. There was a mind-blowing moment when an entomologist realised that the P450 enzymes he had been studying that gave resistance to an insecticide were the same as those that a weed researcher was studying that caused resistance to a herbicide (well... we thought it was mind-blowing. But then again, we're weeds geeks!).

Some new research by Jenna Malone, Chris Preston and others from the University of Adelaide weed research team have found that glyphosate resistant brome grass in Australia has the same resistance mechanism as glyphosate resistant Pigweed in the USA.

We'll admit it's not quite as mind-blowing as insects and weeds sharing the resistance mechanism. BUT it's still pretty amazing that very different weeds (on opposite sides of the globe) have evolved the same resistance mechanism.

Glyphosate kills plants by 'knocking out' the EPSPS enzyme. These glyphosate resistant brome grass have about 20-fold the number of copies of the EPSPS gene as a normal plant resulting in 5-fold glyphosate resistance. Glyphosate can still knock out some of this enzyme, but the plant has produced so much of the enzyme that there's plenty leftover for normal plant growth and the plant survives normal field rates of glyphosate. This mechanism is called gene amplification.

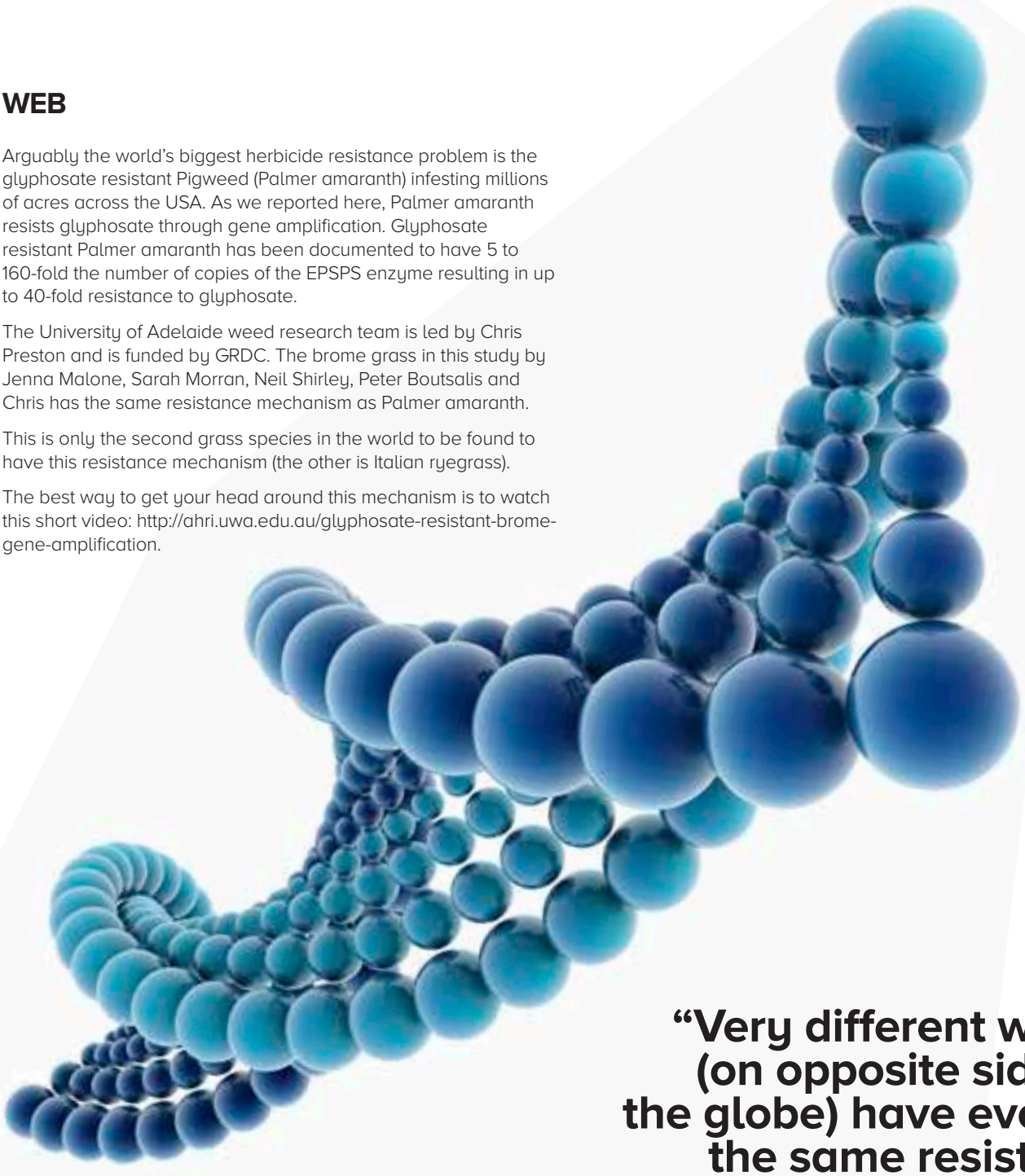
WEB

Arguably the world's biggest herbicide resistance problem is the glyphosate resistant Pigweed (Palmer amaranth) infesting millions of acres across the USA. As we reported here, Palmer amaranth resists glyphosate through gene amplification. Glyphosate resistant Palmer amaranth has been documented to have 5 to 160-fold the number of copies of the EPSPS enzyme resulting in up to 40-fold resistance to glyphosate.

The University of Adelaide weed research team is led by Chris Preston and is funded by GRDC. The brome grass in this study by Jenna Malone, Sarah Morran, Neil Shirley, Peter Boutsalis and Chris has the same resistance mechanism as Palmer amaranth.

This is only the second grass species in the world to be found to have this resistance mechanism (the other is Italian ryegrass).

The best way to get your head around this mechanism is to watch this short video: http://ahri.uwa.edu.au/glyphosate-resistant-brome-gene-amplification.



"Very different weeds (on opposite sides of the globe) have evolved the same resistance mechanism."

THE RESEARCH

Two populations of glyphosate resistant brome grass (Bromus diandrus) were studied, one from Arthurton, South Australia and the other from Ouyen, Victoria. Given that these populations are over 400km apart it is highly likely that they evolved resistance independently from one another.

What it's not....

The research team looked at a number of known resistance mechanisms.

They determined that glyphosate resistance was not due to reduced glyphosate absorption, translocation, or root extrusion.

They also did some gene sequencing to see if the brome grass had the proline106 mutation, a common cause of glyphosate resistance in other weeds. This mutation was not present and could be ruled out also.

What it is...

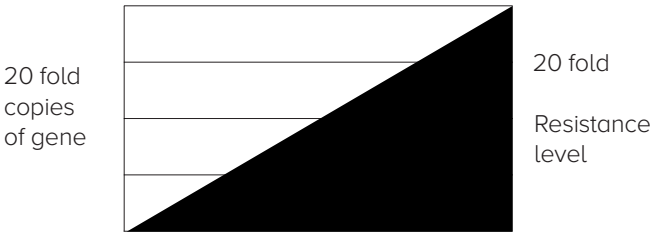
Gene amplification. The resistant individuals had about 20-fold the number of copies of the EPSPS gene.

More copies of the gene results in more EPSPS enzyme produced right?

Yes, but...

The resistant plants had 20-fold copies of the gene but only 5-fold resistance. Perhaps not all copies of the gene are being expressed (some are a little lazy). Regardless, the plants with the gene amplification mechanism produced too much of EPSPS enzyme for glyphosate to overcome.

PIGWEED (USA)



BROME (B. DIANDRUS)

GENE AMPLIFICATION / EXPRESSION EXPLAINED

If a farmer wants to increase wheat production he can either increase crop area, or increase yield per hectare, or both.

If a plant wants to increase enzyme production it can either increase the number of genes for the enzyme (crop area), or increase gene expression (crop yield), or both.

The brome grass in this study is like a low rainfall farmer with a huge crop area (extra copies of the gene), but low yield (low gene expression), producing a lot of grain (enzyme).

THE FUTURE – HIGHER LEVEL RESISTANCE?

In other species with the gene amplification resistance mechanism, further selection with glyphosate led to greater amplification of the EPSPS gene and resistance levels increased. The brome grass in this study has only low-level resistance (5-fold), but this could change for the worse if glyphosate selection continues to occur.

SUMMARY

It's mind-blowing that insects and weeds contain the same resistance mechanism and that very different weeds on opposite sides of the globe have independently evolved the same resistance mechanism. We're all more closely related than we think we are!

CONSULTANT CONFERENCE LOOKS TO THE NEXT GENERATION

The coming together of many minds yields greater results and this was the thinking behind a recent gathering of prominent agronomists. Close to 40 Western Australian agronomists and farm advisers came together towards the end of 2015 for Syngenta's Annual Consultant Conference held just outside Perth at Joondalup. Now in its fifth year, the conference continues to go from strength to strength with the agenda covering a diverse range of topics that affect Western Australian growers.

It provides a great opportunity for agronomists to come together to discuss issues affecting local growers such as disease resistance, variable seasonal rainfall and sustaining yield gains, then working together on finding solutions to these.

The Conference focused on the next generation of Syngenta products and how they will help growers to combat current issues and those on the horizon. Agronomist, David Cameron from Farmanco Management Consultants in Moora WA attended the two day conference.

"I enjoy catching up with Syngenta staff from across the country and other WA based consultants.

"It is good to see what is in the product pipeline and discuss with the other agronomists how this will fit into our farming systems.

"This year I found the root disease research presented by Alan McKay, SARDI Soil Biology & Molecular Diagnostics, particularly interesting. The agronomy around Nematodes and Rhizoctonia and the way they interact was insightful.

"It was good to see data on the seed and soil applied fungicides as well, especially split treatments of Uniform," David said.

Syngenta will soon launch its 2016 AgriClime offer. Rachel Carson, Syngenta Product Lead, introduced the offer, while David Stead from Anasazi Agronomy provided a consultants view of the AgriClime offer.

AgriClime is an initiative developed by Syngenta designed to help share with growers the risk of low rainfall seasons. Eligible cereal growers receive a portion of their investment in Syngenta technology as cash-back if rainfall does not meet a threshold level over an elected period of offer during the season.

"I believe AgriClime is a very smart way to reward customers if they have a below average end to the season, something that is all too common in the Northern part of the wheat belt in WA. I could see lots of growers in the Mingenew area signing up," said Laura Dorman, a research and development officer for the Mingenew-Irwin Group.

David Stead, from Anasazi Agronomy, presenting on AgriClime at Syngenta's Annual Western Australian Consultant Conference

RESEARCH FOCUS LEADS TO COMPANY NAME CHANGE

Leading seed company Seed Distributors has changed its name to Pasture Genetics to better reflect its commitment to researching and developing the best pasture varieties for the Australian market place.

General Manager, Rob Damin, said the company had evolved from its inception in 1997 where it was primarily a seed distribution business to one that is now at the cutting edge of research and technology.

“The Pasture Genetics name is more in line with where we are as a company and where we are heading to in the future,” Mr Damin said.

“Pasture Genetics is focused on sourcing the best germplasm from local and international sources and breeding pasture species for the Australian market place. In Australia, we have relationships with the New South Wales and South Australian governments in terms of accessing some of the leading genetic lines for a number of different crops. Pasture Genetics also developed strong affiliations with breeding houses in New Zealand, Europe and the United States,” he explained.

Mr Damin said the agreement with the NSW DPI was already providing a new generation of highly productive lucerne varieties for Australian farmers.

“GTL® 60 is one example of a NSW DPI bred variety which was tested through the Pasture Genetics program and made available to the industry,” Mr Damin said.

“It demonstrated superior grazing tolerance when pitted against a range of commercial lucerne varieties and is an ideal option for Australian grazing systems,” he added.

Pasture Genetics also market the excellent range of DLF Seeds products from New Zealand, with an emphasis on high yielding quality grasses ideal for intensive pasture operations and other uses.

Mr Damin said any new material was extensively tested prior to release.

He said the Penfield Research Station, located at Penfield in South Australia, played a key role in determining the suitability of new products for Australian farmers.

“Penfield is an irrigated and dryland site in which numerous trials are conducted across the seasons,” he said.

“While yield trials are important, an emphasis of the facility is to look at a range of traits that are important for Australian livestock producers. Our grazing tolerance trials are an example of looking at different varieties and seeing how they perform under real life conditions,” Mr Damin explained.

He said trials could be grazed by either sheep or cattle with different treatments designed to emulate what happens every day on farms.

“A recent dryland lucerne trial was grazed thirty two times across three years and helped determine the regrowth and persistence of individual varieties to that type of stocking regime. Our goal is to ensure farmers have confidence in any Pasture Genetics product because it has been rigorously tested and proved to be an ideal option for Australian conditions,” he added.

Pasture Genetics have also put a great deal of research in developing blends suited to different farming operations and conditions.

The SOWsmart® range of products are available in autumn, spring and sub-tropical blends and have been thoroughly tested so farmers can utilise them on their farm with confidence. The company has more than 30 products available through the SowSmart blends and can also customise blends for individual farmers or regions.

Pasture Genetics will also continue to offer the innovative Establishment Guarantee program in which proprietary seed that fails to establish satisfactorily is replaced at half the original purchase price.

“We are confident about our seed genetics and seed quality and so have had the Establishment Guarantee operating for many years,” Mr Damin said.

The research and development focus of Pasture Genetics is backed up by a leading sales team with area representatives located in the majority of key pasture regions of Australia.

“Our greatest accomplishment is when farmers are able to use the Pasture Genetics products to produce more milk, meat or forage, and ultimately more profit,” he concluded.

“Our goal is to ensure farmers have confidence in any Pasture Genetics product because it has been rigorously tested and proved to be an ideal option for Australian conditions.”

Rob Damon

A focus on research and innovation has prompted Rob Damin to change the company name from Seed Distributors to Pasture Genetics.

VEG FARMS COULD BE FULLY AUTOMATED BY 2025

Australia could see fully automated vegetable farms by 2025, according to top robotics researchers, with the ability to automate the entire production process for some crop commodities emerging through targeted research and development in the industry.

The latest edition of the InfoVeg Radio R&D podcast, developed specifically for Australian vegetable producers, features the developer of the Ladybird automated vegetable farm robot, Professor Salah Sukkarieh from the Australian Centre for Field Robotics, University of Sydney. In the podcast he provided his insights into the vegetable farm of the future.

“With the work being done on robotics and mechanisation across a wide range of on-farm applications, from seeding to spraying to harvesting, the leading minds in the industry believe there will be fully automated solutions for certain crops by 2025,” said AUSVEG Deputy CEO Mr Andrew White.

AUSVEG is the leading horticultural body representing more than 9,000 Australian vegetable and potato growers, and publishes the InfoVeg Radio podcast to communicate R&D results to growers.

“There’s potential to have a fleet of robots and automated vehicles working in conjunction with each other. For example, cutting-edge growers could use drones for low-resolution, rapid information gathering across a wide area and combine that information with results from stationary sensors on the ground, as well as data gathered by ground robots,” said Mr White.

“As more and more automated information gathering options come into play, growers will also need new systems or technology to bring the information together in a useable format and automate, to some degree, the whole decision-making process as well as the tasks themselves,” Mr White added.

The podcast also interviewed Mr John McPhee, Farming Systems Researcher at the Tasmanian Institute of Agriculture, and Ms Sue Heisswolf, Senior Horticulturist at the Department of Agriculture and Fisheries, Queensland.

“Australia has been an innovator in the robotics space for industries like mining, and with targeted research and development applying our field robotics expertise to the agriculture industry, we’re now world-leaders in farm mechanisation. Levy funded research and development, as well as projects funded from other sources, are identifying priority crops for mechanisation, the benefits it can have for the industry, and areas where there is the most potential for innovation in this area,” Mr White explained.

“The interviews in this edition of InfoVeg Radio provide great insights into how all these factors are going to play into the future of vegetable growing, and we recommend that all growers listen in,” he concluded.

The podcast is available to stream online or download via the AUSVEG website (www.ausveg.com.au/infovegradio) or via iTunes. Growers with tractors equipped with a USB input in the cab stereo, such as those in the John Deere range, can listen to the program while out in the field.

STNB BARLEY RISK INCREASE PROMPTS MANAGEMENT WARNING

BARLEY GROWERS HAVE BEEN URGED TO INCLUDE STRATEGIES TO MINIMISE THE IMPACT OF SPOT TYPE NET BLOTCH (STNB) ON THEIR CROPS, AS OCCURRENCES OF THE FUNGAL DISEASE CONTINUES TO RISE.

Data illustrating the impact of the disease was presented to the 2016 GRDC Grains Research Update, Perth in February this year.

Department of Agriculture and Food research officer Andrea Hills said Cooperative Bulk Handling's (CBH) figures showed that more than 98% of the Western Australian barley crop was rated as susceptible or worse to STNB.

Ms Hills said the increase was consistent with the widespread adoption of Hindmarsh and other susceptible varieties, and a trend in the central region towards cropping barley on barley.

"Crop vulnerability to STNB is a function of variety, paddock rotation and rainfall zone," she said.

"Varieties such as Hindmarsh and La Trobe are at the highest risk, while crops grown on barley residues or downwind of infected stubble are likely to suffer an ongoing barrage of infectious spores. Spot type net blotch increases and spreads with rainfall so medium to high rainfall areas are generally at most risk of significant yield impacts, Ms Hills explained.

Although new lines with improved STNB resistance are being developed, they are not expected to be available for another three to five years.

Ms Hills said until then, integrated management strategies were imperative to maximise barley yields and quality.

"Selecting a variety with disease resistance is normally the best way to combat any disease, however, the feed variety Fathom is the only current line with effective levels of resistance," she said.

"STNB is carried by stubble, so growers should be mindful of crop rotations and avoid barley-on-barley rotations where possible," she added.

While a number of fungicides are available at a range of prices to control STNB, Ms Hills warned growers to evaluate their risk carefully and to budget accordingly.

"The risk of yield losses from STNB and management responses will depend on a grower's location, their crop's yield potential and the forecast for spring rainfall," she said.

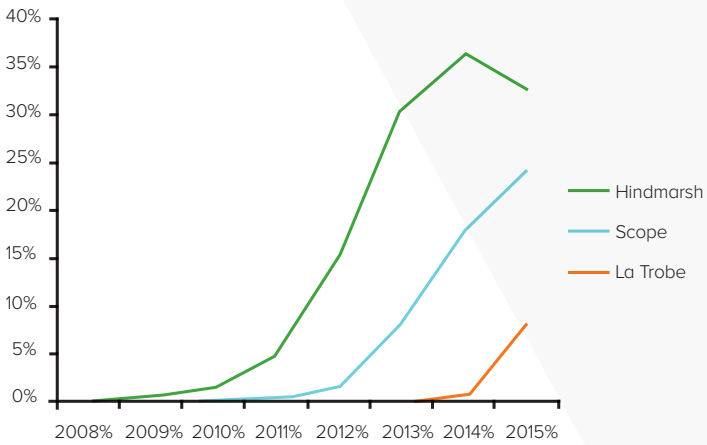
"In low rainfall areas with a low risk of STNB facing a dry spring, growers may choose to apply a single, low cost fungicide treatment from stem elongation up to head emergence (growth stage Z31-Z55) on infected susceptible or very susceptible varieties. If spring rainfall, particularly September, is average or better there is likely to be an additional benefit from applying a second fungicide around three to four weeks after the first treatment. Growers in high disease scenarios in medium to high rainfall areas should consider two applications of a fungicide to infected crops, with the first at stem extension growth stage and the second between flag and head emergence – especially if their crop has good yield potential. In those environments it's important to consider what other foliar diseases may be present when selecting which fungicide to apply," Ms Hills explained.

Although STNB typically causes yield losses of up to 30%, grain quality can also be significantly affected by reduced grain plumpness, which can result in malting varieties being downgraded.

Fungicide treatments have shown to decrease screenings by more than a third.

Ms Hills said growers should weigh up the cost of treatment against potential crop profits.

"Growers with malting varieties or food varieties, like La Trobe and Hindmarsh, should also consider the benefits of treating to protect the crop's premium," she said.



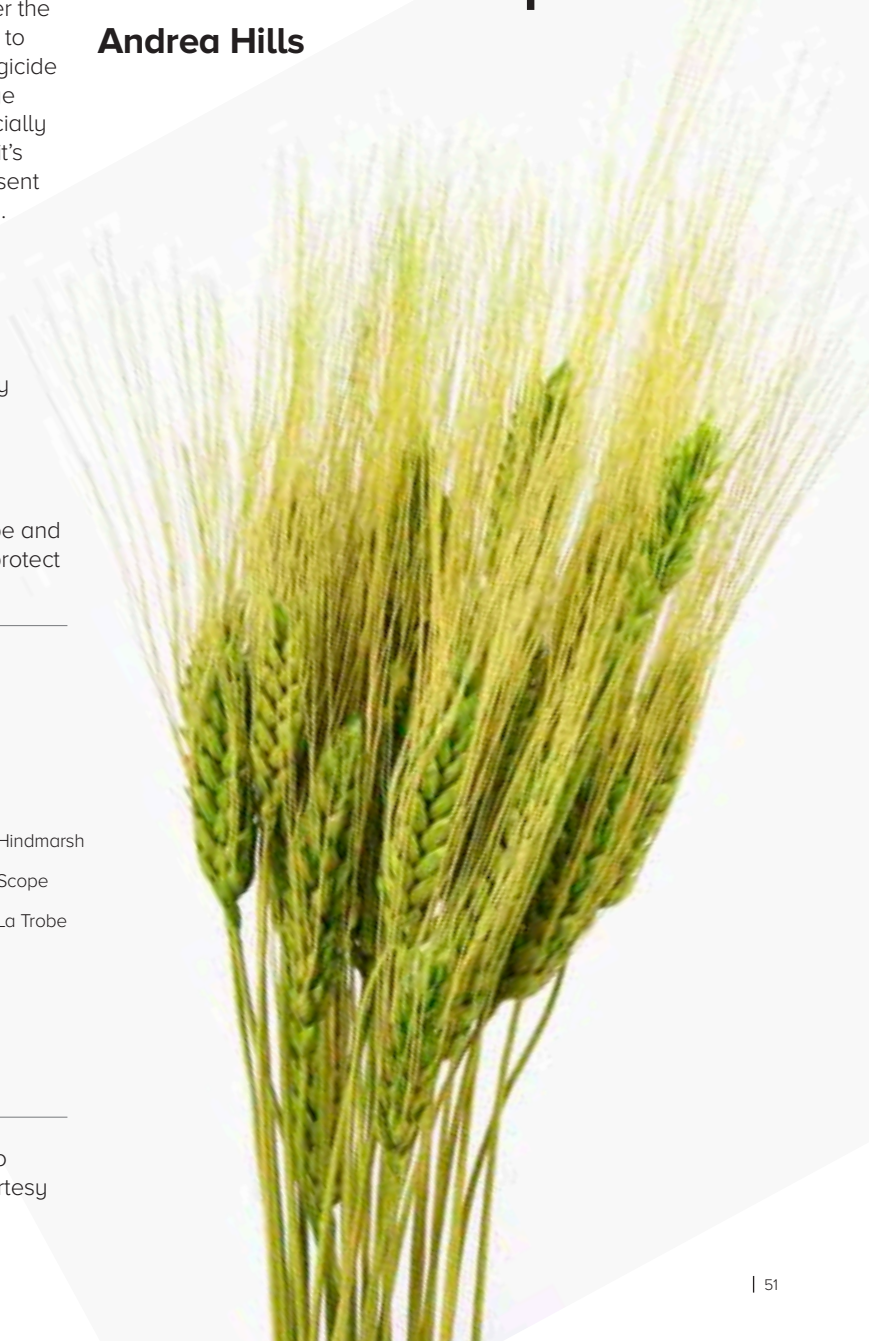
Recent barley variety adoption in WA (% barley area sown to Hindmarsh, Scobe and La Trobe). Source: DAFWA. Data courtesy CBH Group.

The department's research was undertaken with the support of the GRDC's Improving grower surveillance, management, epidemiology, knowledge and tools to manage crop disease project.

To view the paper visit giwa.org.au and more information about treating for STNB is available at the department website by searching for 'spot type net blotch'.

"STNB is carried by stubble, so growers should be mindful of crop rotations and avoid barley-on-barley rotations where possible."

Andrea Hills



WEDDERBURN FAMILY FINDS ANSWER TO BIG FARMING QUESTION

When Wedderburn grower Cameron Turnbull noticed some annual ryegrass survivors in a paddock and recognised reduced effectiveness from Group B and many Group A herbicides, it raised a big question in the family's farming operation – what do we do?

Cameron and Kathy Turnbull have two children, Ella (15) and Finn (11), and with Cameron's parents, Graham and Maureen, operate a 1000 hectare cropping program and one of Australia's oldest Corriedale sheep studs, 'Woodhall'. They also use Dorset Down terminal sires over their sheep for prime lamb production. The sheep play an important role for weed management.

A wheat-barley-canola rotation is employed and varied according to soil types or production areas, with a significant portion of their land continuously cropped.

Cameron said following the reduced effectiveness of some herbicides, he initially turned to paraquat and diquat, trifluralin, higher rates of clethodim and already growing canola as a break crop. Hay would have been another option to help control grasses, but they were not set up for hay production on a large scale.

"With a couple of paddocks we were hitting the wall," Mr Turnbull said.

"We have had some weed management issues and we will test for resistance for confirmation. We know that we have applied sub lethal doses on ryegrass due to the rates of fop herbicides applied for wild oats," he added.

Working closely with local Agronomist Hayden Coombes, Rodwells, in recent seasons, the Turnbulls have introduced the Group K pre-emergent herbicide, Sakura® 850 WG, after viewing its performance in a trial near Elmore.

Containing the active ingredient, pyroxasulfone, Sakura controls annual ryegrass, barley grass, silver grass, annual phalaris and toad rush. It also suppresses wild oats and brome grass in wheat (not durum wheat), triticale, chickpeas, field peas, lentils and lupins.

"We started using it in a glyphosate tank mix in a paddock of wheat to chase silver grass and it absolutely obliterated it," Mr Turnbull said.

"The population was wild in that paddock – there was that much there. We went back through the paddock and there was a teardrop area we missed where we turned and the silver grass was thick," he explained.

The Turnbulls have since used Sakura with Spray.Seed®, Roundup and Logran® B-Power in select wheat paddocks, also to control annual ryegrass, with good results.

"We used it in a fresh paddock for ryegrass and silver grass on a block we bought and it turned out to be one of our better paddocks," Mr Turnbull said.

"We have got an old, rundown pasture paddock that will go into wheat this year and it should clean it up really well," he added.

The Turnbulls have incorporated Sakura into moisture following April rains and while they don't normally dry sow, they did last year.

Bayer Territory Sales Manager Wes Amor said in early moisture conditions, some growers use Treflan® with Sakura to help control early ryegrass germinations before further rainfall activates the Sakura herbicide.

Mr Amor said Sakura moved well laterally in soils with moisture and it binds to clay particles, contributing to its long residual protection.

Mr Turnbull said he had experienced difficulty getting Treflan onto the soil in heavy stubble situations because it adhered to the stubble, whereas Sakura herbicide seemed to be less affected by stubble load.

Being largely a sole operator, he also valued the incorporation flexibility with Sakura compared with Treflan.

"After using Treflan, any amount of flexibility is good," he said.

Mr Turnbull said the use of Sakura in wheat, Boxer Gold® herbicide in barley and growing triazine-tolerant canola had meant some paddocks were "as clean as a whistle", and he was now focused on rotating chemicals and using other methods to help extend their benefits.

"We have got a good product that works well, so let's not stuff it up," he said.

"We are also looking at some sporadic tillage around the place to help with weed control, as well as hay and maybe silage in the future," he added

Cameron Turnbull and Wes Amor check crop development during the dry finish to the season last year in a clean wheat paddock showing the benefits of using Sakura pre-emergent herbicide at seeding.

The control of grasses in wheat from the use of Sakura pre-emergent herbicide (on the right) on the Turnbull family's property at Wedderburn, compared with the untreated (on the left).

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THE BEST OF BOTH WORLDS: GRAZE AND GRAIN CANOLA

Dual-purpose graze and grain canola has come a long way in Australia since initial experiments in the 1970s.

Now, after almost a decade of GRDC-funded research by Dr John Kirkegaard and CSIRO, it has been widely adopted on mixed farms in higher rainfall and irrigated zones of central and southern NSW, Victoria and South Australia, and more recently in Western Australia.

The latest varieties on the market - winter hybrid types for grazing with high yield potential - can be sown in spring or autumn, providing a grazing period of two to four months through the summer or autumn/winter periods or across both periods in the longer season, cooler winter cropping growing areas.

In terms of DSE (dry sheep equivalents) grazing days and grain yield, a CSIRO national assessment at 13 high-rainfall sites suggested winter types sown early could produce more than 2000 DSE grazing days and grain yield of 3 to 5 tonnes/ha, while later-sown spring varieties produced only 300 to 700 DSE grazing days/ha, with similar grain yield.

“Our system experiments, simulation and grower case studies suggested that whole-farm profit on livestock-only farms could be increased by more than $100 per hectare by including up to 10 to 20 per cent area of dual-purpose wheat and canola,” Dr Kirkegaard says.

Additionally, growers have now incorporated winter types into wet hostile soil systems through summer in an attempt to improve soil aeration and structure for subsequent crop root penetration.

Whole-of-farm benefits from grazing wheat and canola on mixed farms includes pasture spelling, widened operational windows, weed and disease control in wheat and greater flexibility for mixed farms.

Despite living outside the typical area for canola grazing, Inverell mixed-farmers John and Sarah Thompson have seen productivity gains since first growing graze and grain canola in 2014.

The pair, who run 6000 sheep and 250 cattle at home block “Lindale” and two leased blocks, wanted to add more value, feed quality and weed control into the program, which includes growing native grass pastures, Lucerne, oats and dual-purpose winter wheat.

Last year they planted 95 hectares of long season winter hybrid canola Hyola 970CL as an autumn sown crop.

Long-season dual-purpose winter wheat Naparoo was also seeded to 100ha.

“Canola is a superior feed source to wheat and oats, and the success of the 2014 season encouraged us to go there again,” Mr Thompson said."

“We planted the canola in mid-March and continually grazed it down to the stump until the end of July. Then we locked it up and took the grain off in mid-November.

“We’ve seen a lot of DSE grazing days off it.

“It also provides a very good tool for crop rotation and weed control with the Clearfield system.”

The former agronomist said while the system worked for them, growers needed to be wary of their local climate.

“The graze and grain canola requires a six week vernalisation period where minimum temperatures need to be below four degrees for the reproductive stage to kick in, so it may not be suitable where these conditions are less likely to occur.”

He said growers should also check with their local consultant about the impacts of grazing brassicas on animal health.

A SOLID COMBINATION FOR CONTROLLING CEREAL DISEASES

Neil Kupsch from north of Geraldton, Western Australia crops lupins, barley, oats and planted 1,900 hectares of wheat during the 2015 season.

Neil was fed up with not reaching the expected yields for his soil type of red river loam country, and so consulted his Agronomist, Grant Thompson from Crop Circle Consulting, to see what the issue was and how he could tackle it.

"For our soil type, we should be hitting four to five tonnes per hectare, but poor disease control was letting us down. We found it especially difficult to get on top of Rhizoctonia," Neil said.

Rhizoctonia causes crop damage by pruning the root system, which results in water and nutrient stress to the plant.

Grant was concerned about Neil's wheat-on-wheat rotation and advised looking for an extra option to control cereal diseases and Rhizoctonia. He advised Neil to apply Uniform® from Syngenta to his fertiliser. So in an attempt to increase yields through the control of Rhizoctonia in his wheat crop, Neil applied Uniform® to his fertiliser last season with great results.

Uniform is an in-furrow treatment that provides the only control of Rhizoctonia in Australian wheat and barley crops, a disease of significant economic consequence to growers. It also controls pythium root rot and provides control of Stripe Rust in wheat and suppresses yellow spot.

"Before, we found our wheat crop was having difficulty tillering out properly," Neil said.

"In 2015, we tried rotating with lupins which gave the wheat a healthy start, and then for the first time we also applied Uniform to the fertiliser. We were amazed at the protection it provided early, as well as the quality of emergence," he added.

Neil found Uniform very good for controlling stripe rust, with a couple of dry spells throughout the season also helping.

"With the yields we are now able to achieve, the return on investment is excellent. We are reaching five tonnes per hectare, which is where we want to be," Neil said.

"We will be using Uniform throughout our whole cropping program this season."

Trevor Klein, Syngenta's Solutions Development Lead added "further benefit would be gained by the addition of Vibrance® to the program."

"Vibrance provides immediate protection of cereal seedlings to Rhizoctonia, protecting roots until they reach the Uniform treated fertiliser. It also gives control of smuts and bunts, this is particularly important given the widespread development of loose smut in barley in recent years," Trevor said.

OPPORTUNITIES FOR FARMERS WITH NEW RABBIT RHD STRAIN

Victorian landowners are encouraged to begin preparing for the arrival of the new calicivirus strain called Rabbit Haemorrhagic Disease Virus K5 (referred to as RHDV K5 or simply 'K5'), in spring 2016 or autumn 2017.

Department of Economic Development, Jobs, Transport and Resources (DEDJTR) rabbit specialist John Matthews, said the new strain was a great opportunity for farmers but warned them not to stop their annual conventional control programs targeting rabbits and their warrens.

"K5 is a strain of the existing RHD virus already established and widespread in Australia and is predicted to yield better results in cooler/wetter regions, such as Victoria, where the current strain hasn't been so successful," Mr Matthews said.

"The combination of an improved biological control agent in K5, community-led rabbit management and using best practice rabbit management principles, should provide an opportunity to manage and maintain rabbit numbers at low levels," he added.

"For some, K5 will be seen as a once in a generation opportunity to improve biological control options for rabbits in Australia. However, it's important landholders don't become complacent or hold off on control efforts with the expectation that they will only need to rely on K5 to do the job. Landowners should continue with annual rabbit management activities to enable them to take advantage of any effect K5 or the existing biocontrol agents can provide," Mr Matthews explained.

Mr Matthews said Victoria has four release and monitoring sites specifically established to investigate the impact of K5 on Victorian rabbit populations in support of the national release strategy.

"These paired sites are located around Avalon, Sunbury, Kerang and Pyramid Hill, and communities can also become involved in becoming a release site," Mr Matthews said.

These specific sites complement Victoria's long-term rabbit population monitoring sites, which provide more than 20 years of critical data and analysis of rabbit numbers.

The release of K5 and recent occurrence of RHDV2 in Victoria offer a new opportunity for landowners to begin a conversation with neighbours, with the aim of coordinating integrated rabbit control at a landscape scale and for Landcare groups to get their community involved in rabbit management and monitoring for the disease.

NEW METHOD FOR TESTING SALINITY TOLERANCE IN CEREALS

Researchers from the University of Adelaide and the South Australian Research and Development Institute (SARDI), a division of Primary Industries and Regions SA, have discovered a new and more accurate way to screen cereal varieties for tolerance to salinity and high sodium (sodicity).

The new method is expected to benefit plant breeders aiming to breed salt tolerant cereals, as well as farmers who are affected by these less productive soils.

The team of researchers including Dr Yusuf Genc, Dr Julian Taylor, Dr Klaus Oldach and Dr Graham Lyons were able to develop a method that allows the effects of salinity (sodium chloride) and sodicity (high sodium) on cereal species to be measured separately, providing more accurate results.

“One problem with breeding salinity tolerant plants has been the inability to successfully separate the effects of sodium and sodium chloride, and to determine their relevance to breeding,” said Dr Graham Lyons, Research Fellow in the University’s School of Agriculture, Food and Wine.

“For the past three decades, research in improving salinity tolerance in cereals has focused on sodium exclusion at the expense of other mechanisms, and no new salinity tolerant cereal varieties have been bred. Our study has shown that sodium exclusion is of little use in an environment characterised by ‘osmotic stress’. This is when a plant has difficulty removing water from the soil and is one of the main factors of both salinity and drought stress,” Dr Lyons explained.

With global food needs expected to grow by 90 per cent by 2050, and as land degradation, urban sprawl and seawater intrusion increases, agricultural production will need to come from more inhospitable land, including saline soils.

“We believe breeding salinity tolerant cereals will be the most promising and cost effective solution to this increase in demand,” says fellow researcher Dr Yusef Genc, SARDI Research Scientist and Visiting Research Fellow in the School of Agriculture, Food and Wine.

Saline soils impose a heavy burden on Australian agriculture. It is estimated the six million hectares of Australian agricultural land affected by salinity may increase to 17 million hectares by 2050.

“Our understanding of plant biology under salinity stress has improved significantly but progress in breeding salinity-tolerant cereal varieties has been slow,” Dr Genc said.

“We think this work will lead to a new, more fruitful model for producing salinity tolerant cereals. This will result in a higher yield for farmers and hence a higher income from salty paddocks,” he added.

BROADEN THE SPECTRUM OF PESTS CONTROLLED

Mixtures of organophosphate (OP) and synthetic pyrethroid (SP) insecticides are often used in broadacre to broaden the spectrum of pests controlled by either an OP or an SP used alone, and can on occasion, mitigate the impact of insect resistance to either mode of action (MoA). The downside, however, is the increased likelihood of spillages, contamination and measuring inaccuracies as well as the lack of defined protocols (e.g WHP, MRL etc).

Dow AgroSciences launched CobaltTM Advanced Insecticide for the control of establishment pests last year to address these issues. Cobalt is a dual mode of action insecticide containing lambda cyhalothrin, a synthetic pyrethroid, and chlorpyrifos, an orgnaophosphate.

The resultant ‘in-can’ mix is an insecticide with broader spectrum activity and double the killing activity on some pests. In addition, the dual mode of action means any pests which have developed resistance to one of the ingredients can often be controlled by the other.

The EW formulation of Cobalt Advanced offers farmers a lowering of risk on two fronts. The smooth flowing EW formulation is less prone to splashing than a traditional emulsifiable concentrate (EC) formulation and with only one product to measure and pour, the exposure risk is further mitigated. Operator exposure to concentrated insecticides is a major concern and Cobalt represents a real step forward in this regard.

Horticulture business manager John Gilmour says that in fact Cobalt is such an advanced formulation it is more like a capsule suspension (CS) than it is to any other type of formulation.

“Although it is an EW, an oil in water emulsion, Cobalt uses latex encapsulation technology to hold the active ingredients out of the water phase. Under the electron microscope you can see that the formulation is very similar to a CS,” Mr Gilmour explained.

The upshot of all this is that it’s easy to handle, easy to pour, premixed and overall a safer and easier to use option for growers. The other great advantage of Cobalt for us is that it’s already road tested and proven in other international markets (NZ and USA).

“What we know from those markets is that Cobalt has a great fit early post emergent as an alternative to bare earth sprays. Growers who are concerned about the high active ingredient loading in the environment that can result from using bare earth treatments and the unnecessary spraying if pests don’t appear have Cobalt as their ‘go-to’ option” for early pest control,” Mr Gilmour added.

Cobalt controls Red-legged earth mite (RLEM), Lucerne flea, Blue oat mite, Cutworm, Aphids, Native webworm and can be used pre-seeding (i.e., it can be mixed with knock down herbicides) or post emergence for the control of pasture webworm. Cobalt is approved for use in all winter pulses, winter cereals, canola and pastures and can be applied by aircraft.

STRONG START FOR MANGO CROP

AUSTRALIA'S ONLY PRODUCER OF SPECIALTY HONEY GOLD MANGOES HAS BEGUN PICKING THE FIRST OF THIS SEASON'S CROP IN THE NORTHERN TERRITORY AMID EARLY PREDICTIONS OF A BUMPER CROP.

Managing director, Gavin Scurr, said all indications pointed to a crop volume consistent with last season's record output, up more than 30% on previous average production years. This was despite very different lead-in conditions for Australian mango production.

Piñata Farms and some 40 third-party growers produce Honey Gold mangoes exclusively in five states between November and March. In total, approximately 150,000 Honey Gold mango trees are under cultivation on some 700 hectares.

Night picking, introduced last season as a trial to keep fruit fresh and blemish-free, is underway at Katherine in the Northern Territory, having proved a success. The first fruit of the season has already arrived on some supermarket shelves and will be available nationally from November 25.

Harvesting will next move to Mataranka in the Top End before progressing southwards into Queensland, New South Wales, Victoria and west to Western Australia by the end of March.

Mr Scurr, who is also chairman of the Australian Mango Industry Association (AMIA), said as a consistent crop, Honey Gold mangoes were largely unaffected by flowering issues which had hampered other varieties, such as Kensington Pride, this season.

"Kensington Pride can be an inconsistent variety and this season, is expected to produce about a third less than usual due to reduced flowering," he said.

"A small percentage of the Honey Gold crop, from Bundaberg, Queensland to Coffs Harbour, New South Wales will produce about half of its usual volume, also due to poor flowering. However, the bulk of the crop in other regions is steady and expected to make up for any shortfall in that region," Mr Scurr added.

He said lead-in conditions to this year's Australian mango season had varied markedly from the previous season.

"Winter in the growing regions was colder than usual. Southern Queensland had a cold snap, with snowing at Stanthorpe and none of the regions experienced a spring as hot as last season's. There was also some early flowering in some varieties, resulting in early fruit," he explained.

Mr Scurr said the bulk of Australia's Honey Gold crop would again come from Queensland, the largest growing region. Picking begins at third-party farms in Bowen and Mareeba in mid-December and continues for about six weeks. The Wamuran home farm in south-east Queensland will produce fruit for about four weeks from early January.

A small volume of Honey Gold mangoes would be exported to the United States for the first time, following the establishment of the Australian mango protocol. Fruit would be shipped to Los Angeles for national distribution. Other export markets included New Zealand and Singapore.

About 5000 trees have been planted on third-party farms in the Mareeba, north Queensland area, since last season for production in about three years.

Piñata Farms positioned its distinctly sweet Honey Gold mangoes among Australia's top four premium mango lines after achieving a record crop last season.

Honey Gold mangoes are available at leading supermarkets and independent retail outlets nationally.

AUSTRALIAN GROWERS ARE PLANTING ONE MONTH EARLIER THAN 30 YEARS AGO

Australian grain growers are planting their winter crops a month earlier than three decades ago, according to survey results released by the Australian Export Grains Innovation Centre (AEGIC).

The results are being presented for the first time in a book chapter entitled "Innovations in dryland agriculture in Australia" co-authored by Doctors David Stephens, Wal Anderson and Kadambot Siddique which will appear soon in an overview book on agricultural innovation.

"Between 1978 and 2014 the mean midpoint of national wheat sowing shifted from around 10 June in the late 1970s and early 1980s to 10 May in 2014, the earliest recorded midpoint," AEGIC Agro-Meteorologist Dr David Stephens said.

The findings came from an analysis of 168 sowing date survey forms of growers spread across Australia between 1978 and 1990 in a GRDC funded PhD project, and the mean midpoint of 233-613 paddocks monitored by the Birchip Cropping Group (BCG) Yield Prophet programme.

"The combination of zero tillage technology, which includes chemical spraying of weeds and faster seeding equipment, and grain varieties that perform better with early sowing, has enabled this major shift in farming practice," Dr Stephens said.

"Formerly farmers would plough the ground, wait for the weeds to germinate, then plough the soil again before seeding with a third pass, using a lot more fuel in the process. In the last two years excellent opening rains in April and May meant many farmers were sowing wheat in a single pass from as early as mid-April and had their seeding programmes finished in early May. This early sowing, in combination with more nitrogen fertiliser, meant yields in many regions turned out much better than expected given the dry El Niño spring finishes to the two seasons," he explained.

Dr Stephens said this innovation was a major contributor to growers increasing their profitability and doubling their crop water use efficiency over that time.

"This is because early sowing enables the crop growing window to shift to a period with a lower evaporative demand compared to late spring when evaporation rises rapidly and hot temperatures can reduce yields in grain filling," he said.

"In addition, early sowing enables better plant germination in warmer soils, better plant absorption of solar radiation, a reduced tendency for small plants to be affected by waterlogging, and better weed management options. With earlier sowing and warmer temperatures hurrying crop growth, grain receival points are now opening much earlier, and as an example, the CBH bin at Merredin in Western Australia has moved its opening date from around 22 November in the early 1970s to an average around 18 October over the last four years," Dr Stephens added.

"This innovation in farming systems has been a lifesaver for growers battling a 5-30% decrease in growing season rainfall since the 2000s and it is fortunate that we don't have such a fixed window to plant growth like in Canada where the growing season is more determined by snow cover," he added.

Dr Stephens said the analysis also highlighted that simple yield forecasting models based on rainfall summations could become inaccurate without taking into account the changed growing season, and that proper water balance models – like those used in AEGIC and in the Yield Prophet programme – should be utilised.

"The GRDC has continued to invest significantly to assist growers to increase yield and maximise WUE," he said.

Key findings lately have emphasised that further gains in yield can be made in certain districts by planting even earlier with long-season varieties with long coleoptile length, so the trend to earlier sowing at a regional scale has not finished yet.

"The two challenges to these changes is the marked decline in May rainfall which is putting real pressure on early sowing opportunities and plant survival, and the continued irregular occurrence of frosts in southern districts which can affect early sown crops more. Overall, this major change in crop practice is helping build resilience to climate variability and is a key strategy in mitigating the effects of climate change," Dr Stephens concluded.

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