

FROM THE GROUND UP

NORTHERN REGION

**ANNUAL REPORT
GROWER SOLUTIONS GROUPS
2013–14**

From the ground up – Northern Region

Annual Report: Grower Solutions Groups, 2013–14

This report outlines some of the local research, development and extension (RD&E) priorities identified by the grain grower and adviser members of the GRDC Grower Solutions Groups operating across the northern grain-growing region of Australia.

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FOREWORD



The northern region of the Grains Research and Development Corporation (GRDC) encompasses some of the most diverse cropping environments in Australia. Stretching from Dubbo in central NSW to the top of Queensland, the climate ranges from temperate to tropical and the region has the greatest diversity of crops and farming systems of the three GRDC regions. To deliver a responsive and focused research agenda to grain growers in such a diverse region, the GRDC engages with growers and industry on a local basis through its Northern Regional Panel. The members of the GRDC Northern Regional Panel are introduced in Appendix A.

The panel's role is to strategically design the GRDC's research, development and extension (RD&E) investments in the GRDC northern region, and to ensure that the investments will deliver against the priorities identified by the panel through industry engagement. An essential part of issues identification and assessment is engagement with grain producers. Implemented, in part, to provide structured grower engagement, the Grower Solutions Groups (GSGs) have become an important component of the GRDC's investment process in the northern region. The GSGs also have the function of managing short-term projects, usually in a development and extension capacity. These address local issues of concern and deliver results that can be adopted straight away by farmers in their own paddocks.

Over the 2013–14 year, more than 450 growers and advisers were contacted directly through GSGs in the GRDC northern region to put forward their local issues. The GRDC Northern Regional Panel also received feedback from more than 1000 registrants at GRDC Updates, industry meetings and panel tours, and ongoing discussions and planning with researchers. The panel, working within the GRDC's strategic themes of investment, helps to set short, medium and long-term strategies for delivery of RD&E outcomes to growers of the northern region. This helps to ensure the results of GRDC investments in RD&E reflect the needs of growers and industry.

The GRDC Northern Regional Panel continues to be driven by the aim of putting dollars back in growers' pockets. The panel works to ensure that growers' R&D levy is the best investment they make each year and that the results of research are extended to farmers so that they can make the best decisions at a paddock level. This year saw the launch of the northern region initiative GrowNotes, which are designed to be a one-stop shop for the latest research findings.

On behalf of the GRDC Northern Regional Panel, I wish to thank the participants of the four GSGs in the northern region, and the management staff, boards and committees of the groups for their contribution to the GRDC RD&E investment process. I also want to thank our research partners for their co-investment in the current and future needs of the grains industry.

A handwritten signature in blue ink, appearing to read 'James Clark'. The signature is stylized and fluid.

James Clark
Chair, GRDC Northern Regional Panel



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1. INTRODUCTION



Issues identification and research prioritisation are core business for the Grains Research and Development Corporation (GRDC). Defining an issue at ground level, whether it is production or profitability focused, is the first step in finding a solution. Working from the ground up is the key philosophy of the GRDC to ensure that grain levies are invested as effectively as possible.

An example of an issue that may require RD&E is soil sodicity that is constraining grain yield in the Bellata area of NSW. 'Fleshing out' the issue requires asking questions such as: 'Is it affecting emergence in some crops more than others?' or 'Is it reducing production through inhibiting the exploration area of the plant roots?' or 'Is the effect nutritional or due to restricted water uptake or both?'

Then, to gauge the priority of the issue and its significance to the northern grain-growing region, the area affected needs to be identified, and the cost and future cost to production and profitability determined. Assessing what research work is already in the pipeline and what, if any, gaps are apparent is also critical.

The identification and prioritisation of issues then flows into identifying possible solutions or research questions. These may be longer-term genetic solutions, such as looking for germplasm with adaptive traits that increase tolerance to sodic soils; or they may be medium-term research questions, such as, 'Are there more effective crop rotations to increase water use efficiency under sodic soils?'. Alternatively, the issue may have a short-term solution, such as developmental work that builds on previous research to adapt it to the local farming system, for example, investigating adaption of current varieties in the local area. The solution may be extension-driven, such as ensuring adequate extension of the results of previous research into crop tolerance and the recommendations made. Most often an issue requires work at all levels.

Issues can be local, regional or national, and all are equally important. The issues identification and prioritisation process enables the scope of the issue to be clearly understood and the best type or types of responses to be determined. It is through this process of gathering and assessing issues locally that GRDC can make well-informed and strategic investments on a regional and national scale.

This report outlines the processes and events by which the GRDC sources and addresses local issues in the GRDC northern region and how these issues are addressed in the short term – specifically through the GRDC Northern Regional Panel, GRDC Regional Grower Services and the four GSGs across the northern region. The report also describes some of the activities of the GSGs during the 2013–14 year and highlights some positive outcomes of tackling grain grower issues from the ground up.

I hope this report also gives you an understanding of the processes in place to ensure that the GRDC delivers the best results to growers.

Sharon O'Keeffe MAgr BRurSc
Manager Regional Grower Services – North

2. GRDC OVERVIEW

The Grains Research and Development Corporation (GRDC) was established under an Act of Parliament in 1990. Its charter is to plan, facilitate and oversee the investment of funds in research, development and extension (RD&E) to improve the production, sustainability and, ultimately, profitability of the Australian grains industry. The GRDC manages more than \$150 million, which is the combined research investment of grain growers and the Australian Government.

The investment of funds into grains RD&E is a complex process that is driven by the needs of grain growers and the regional communities in which they live and work.

Recognising the variations in environment, conditions and issues across the nation, the GRDC established three advisory panels based on the northern, southern and western grain-growing regions of Australia (Figure 1). The regional panels ensure that different market and production realities are considered and reflected in the RD&E investment program.

Each region has distinctive features that warrant focused planning and research management of plant breeding, farming systems, soil, grain storage and handling, product development, market opportunities and technology marketing.

FIGURE 1 The GRDC organises its operations and functions based on three regions, reflecting the distinct grain-growing zones within Australia.



The regional panels comprise grain growers, agribusiness representatives, researchers and the GRDC's executive managers. Each panel:

- identifies and monitors regional and national grains industry issues that are relevant to the region;
- interacts with growers, researchers and other interested parties in the region to exchange information;
- identifies and develops priorities for RD&E investment and recommends these to the GRDC National Panel;
- keeps growers and advisers in the region informed about the GRDC's strategic direction, investment portfolio and research projects; and
- assists GRDC staff in monitoring the effectiveness of the investment portfolio.

Grower Solutions Groups (GSGs) and Regional Cropping Solutions Networks (RCSNs) provide information on priority issues to the GRDC's regional panels. The regional panels also consider information provided by less formal structures than the GSGs and RCSNs, such as direct communication with grower groups, government research and extension agencies, private research and extension organisations, and industry organisations.

The regional panels work with the GRDC National Panel, to ensure that GRDC investments are directed towards the interests of all grain industry stakeholders and to deliver relevant products and services in each grain-growing region.

The GRDC National Panel is made up of the chairs of the three regional panels, the managing director of GRDC and the GRDC's executive managers. The National Panel:

- addresses national RD&E priorities across the GRDC's investment portfolio and makes recommendations to the Board; and
- assists the Board of GRDC to maintain links with grain growers, the Australian Government, state and territory governments and research partners.

The GRDC is guided by constant two-way communication with growers through its panels and grower networks

Strategic research themes

To ensure that RD&E funds are used efficiently across the nation, bring optimal benefit to the grains industry and achieve the greatest return to growers the GRDC organises its RD&E across six strategic themes (Figure 2).

1. **Meeting market requirements** is about uncovering market opportunities and developing the crops, varieties and production methods to meet them.
2. **Improving crop yield** is about higher potential yields, better tolerance of drought, more of the right grain for a given area and seasonal conditions.
3. **Protecting your crop** is about defending the crop's yield and quality against losses from pests, weeds and disease, and doing it sustainably and efficiently.
4. **Advancing profitable farming systems** generates the knowledge and tools for farmers to plan strategically and respond tactically to markets, climate, seasons and risks.
5. **Improving your farm resource base** is about protecting, managing and enhancing the natural assets farmers use.
6. **Building skills and capacity** is about better leadership, research capability and adoption of research outcomes.

A group of GRDC regional panel members and staff members is assigned to each of the strategic themes to closely follow specific issues developed at ground level through to the investment phase. This ensures that the perspective of all grain-growing regions is taken into account at a regional and national scale throughout the process of making RD&E investments. Each panel member is assigned to two strategic themes, meaning there are two or three panel members from each region following each issue within a strategic theme.

FIGURE 2 GRDC focuses its RD&E investment on six strategic themes.



Northern region RD&E timeframes

In the GRDC northern region research priorities are classified according to the length of time that it will take RD&E actions to deliver practice change at the ground level.

Through the engagement process, the GRDC Northern Regional Panel identifies and develops an understanding of the issues concerning grain growers in the northern region. When the issues have been prioritised and the actions to address the issues defined at a national level, the group working on each strategic theme, which will include two or three members of the Northern Regional Panel, will consider the best way to make an investment to address the issue.

The Northern Regional Panel considers the proposed RD&E to address an issue in terms of three delivery timeframes. This structure allows the panel to look at its investments as part of an integrated portfolio of local, regional and national investments in RD&E. The timeframes assigned to research priorities are described as follows.

ONE-TO-THREE YEAR TIMEFRAME

The research priorities to deliver in the one-to-three-year timeframe are generally addressed by development and extension at a regional scale. Many one-to-three-year priorities will be addressed through investments and activities of the Grower Solutions Groups. These groups look at emerging production issues for grain growers that require an immediate response. This investment window also covers all of the region's investment in extension and communication, such

as the GRDC Updates, issue-based workshops and many other media and communication products such as *Ground Cover* and the new *GrowNotes*.

THREE-TO-EIGHT YEAR TIMEFRAME

The research priorities to deliver in the three-to-eight-year timeframe are generally addressed by research and development at a regional, and sometimes national, scale. Priorities in this timeframe are addressed by the many traditional ongoing areas of investment that the GRDC generally has with federal and state government departments and universities. The Northern Regional Panel has categorised its investments within this timeframe into 10 investment areas and has made a strategic budget allocation to each. The investment areas are: Cereal Agronomy, Pulse Agronomy, Oilseed Agronomy, Farming Systems, Entomology and Pests, Pathology, Weeds, Soils, Nutrition, and Environment and Climate.

EIGHT-YEAR-PLUS TIMEFRAME

The research priorities to deliver in the eight-year-plus timeframe are generally addressed by long-term and usually national-scale research. Such priorities are addressed by the GRDC's continuing investments in breeding and pre-breeding programs. The GRDC northern region has the greatest diversity of crops grown of the three GRDC regions. The benefits of this longer-term investment strategy can be seen in the recent improved varieties of crops such as chickpeas, mungbeans and soybeans. Another benefit of the strategy has been the rapid uptake by wheat-breeding companies of the germplasm developed by the Crown Rot Initiative.



Feedback from growers is invaluable in ensuring that the Grower Solutions Groups are responding to identifiable gaps in research, and that research undertaken has the potential to make a commercial difference.

PHOTO: RICHARD SEQUERA



FROM ISSUE
TO RESULTS

Entomologist Hugh Brier (right) accepts the 2014 GRDC Northern Region Seed of Light Award, for his outstanding commitment to furthering growers' knowledge and understanding of key crop pests, from Northern Regional Panel Chair James Clark.

PHOTO: SARAH JEFFREY

BUILDING SKILLS AND CAPACITY

In 2012, one of the issues identified and prioritised by the GRDC Northern Regional Panel was that a lack of investment in capacity building and succession planning for northern region researchers would result in declining research outcomes and a loss of regional research knowledge and know-how in the future.

This resulted in the development of a clear plan for future RD&E skills and capacity requirements in the northern region over the next 20 years, and has enabled the GRDC and its partners to finalise some very significant capacity building investments. The development of this plan and a regional investment process has allowed the GRDC to co-invest with both the NSW Department of Primary Industries (NSW DPI) and the Queensland Department of Agriculture, Fisheries and Forestry (Queensland DAFF) in the building of a network of regional R&D nodes.

There are three nodes in each state: Emerald, Darling Downs and Goondiwindi in Queensland; and Narrabri, Tamworth and Trangie in NSW. Each node will have a combination of research agronomists, technical staff and equipment to allow detailed trials to be conducted in each area. This network will allow the region's key researchers to efficiently conduct trials across the region and hence will greatly improve researchers' ability to address regional issues.

The plan has also allowed the GRDC, NSW DPI and Queensland DAFF to contract the largest single investment in research capacity building in the northern region. There will be 18 new postdoctoral positions across the region that will be filled over the next three years. These positions will address key succession-planning issues that will arise in the years to come and will also aim to build research capacity in key areas where it is required. Part of this agreement between the partners is that these positions will have a clear career pathway to permanent employment within the region.



3. ENGAGING WITH GROWERS

There are three main avenues for the Grains Research and Development Corporation (GRDC) to interact with grain producers in the GRDC northern region, so that it can learn about the issues facing growers and better understand what research, development and extension (RD&E) is needed to address these issues. Engagement with growers occurs through the activities and functions of the:

- GRDC Northern Regional Panel;
- GRDC Regional Grower Services; and
- four Grower Solutions Groups (GSGs) throughout the northern region.

GRDC Northern Regional Panel

In its role to strategically design the GRDC's investments in the northern grain-growing region, and to ensure that the investments will deliver against regional priorities, the GRDC Northern Regional Panel engages with industry in many formal and informal ways.

As part of the engagement process, each year the GRDC Northern Regional Panel conducts autumn and spring tours of different parts of the northern region to engage with growers, agronomists and researchers in their own environments. The tours give the panel an opportunity to learn about grower issues and gain an understanding of these directly from the source, that is, the grower.

For the 2014 Spring Tour the panel split into two groups. The first group comprised panel members John Sheppard, Keith Harris and Jack Williamson, GRDC Board member Kim Halbert, GRDC senior manager products and services Kyle Thoms and GRDC Northern Regional Panel support David Lord. The group visited trial sites on 10 growers' properties throughout Central Queensland: Emerald, Capella, Clermont, Gindie, Orion, Theodore, Banana, Biloela, Jambin and Emerald Agricultural College.



Participants of the GRDC Northern Regional Panel 2014 Spring Tour and Central Queensland growers inspect the NVT trial site at Emerald Agricultural College.

PHOTO: JAMES TOLME



3. Engaging with growers

During the tour, participants had the opportunity to discuss grower issues while inspecting National Variety Trials (NVT) and nutrition, pulse agronomy and farming systems trials. The tour participants valued the interaction between growers, advisers and researchers, as well as the opportunity to compare differences in climate, farming systems, skills and capacity between Central Queensland and the rest of the GRDC northern region.

The second group for the 2014 Spring Tour comprised panel members James Clark, Rob Taylor and Will Martel, GRDC Board member Rob Lewis, GRDC manager extension and training Darren Hughes, GRDC manager farming systems Jan Edwards and GRDC manager online communities Pru Cook. The group visited a diverse range of agro-ecological zones from the north coast of NSW to the eastern Darling Downs and the inland Burnett region of Queensland.

The tour visited the Coastal Grower Solutions Group and participants valued meeting with growers involved in the north coast NSW and inland and coastal Burnett nodes of the group. Tour participants also visited the founding GSG for northern NSW and southern Queensland, the Northern Grower Alliance (NGA), which was a great opportunity to understand the potential such groups have in identifying and addressing short-term research problems locally. Tour participants also visited key research facilities at Kingaroy and Gatton and inspected a range of longer-term research projects conducted by the University of Queensland, the Queensland Alliance for Agriculture and Food Innovation, the Queensland Department of Agriculture, Fisheries and Forestry (Queensland DAFF) and CSIRO.

Other occasions when the GRDC Northern Regional Panel engaged with grain growers in the 2013–14 year included major events on the agricultural calendar, such as AgQuip field days at Gunnedah, where the GRDC operates a site, organises presentations and members of the panel are available to speak with attendees of the field days (approximately 100,000). Panel members also attended field days and farm walks organised by investment partners the NSW Department of Primary Industries (NSW DPI) and Queensland DAFF, which provided another opportunity to interact with growers.

Events organised by the GRDC, such as grower Updates and workshops, also provided an opportunity to learn about issues concerning grain growers.

The implementation of social media strategies has provided a further means of interacting with growers. In addition to the GRDC broadening its communication channels with growers through Facebook and Twitter, the Chair of the Northern Regional Panel and the Manager Regional Grower Services – North also have Twitter accounts.

GRDC ON SOCIAL MEDIA



GRDC Regional Grower Services

The GRDC has been investing in grains-related RD&E for more than 20 years. During this period the GRDC, with its partners, has generated a mass of information from research outputs and findings, much of which remains relevant today. This information needs to be packaged in easy-to-use products and services tailored to growers in their local region.

Leading these activities is the GRDC Regional Grower Services business group. This is an experienced and professional group, comprising a mixture of regional and Canberra-based staff, that lead the delivery of GRDC products, services and innovations in communication and extension.

There are three regionally based managers who bring the face of the GRDC to each of the three GRDC regions. Having a staff member in the region helps link the GRDC's Canberra staff to the region and supports the regional panel to focus on the bigger picture. Sharon O'Keeffe is the Manager Regional Grower Services – North and is based in Boggabri, in northern NSW.

The regional manager's role is to identify and oversee regional RD&E needs, as well as manage the regional delivery of information and promote the GRDC's products and services.

The regional manager is also responsible for the management of regional investments such as the Grower Solutions Groups projects, GRDC Updates and extension and training projects in the GRDC northern region.

Working closely with farmers, agronomists, researchers and the GRDC Northern Regional Panel, the regional manager strengthens linkages between the region and the GRDC.

DEVELOPMENT AND EXTENSION PRIORITIES FOR GROWER SERVICES

- GRDC Grower Solutions Groups projects
- GRDC Research Updates
- GRDC Farm Business Updates
- Coordinated extension of research outcomes through communications, training, workshops and field days for the region
- Continued integration of regional research into GrowNotes (www.grdc.com.au/GrowNotes) so that growers and advisers have a 'one-stop shop' for regional agronomic information



3. Engaging with growers

FROM ISSUE
TO RESULTS:



The production of GrowNotes demonstrates the GRDC's aim to raise the production bar and deliver meaningful, tangible research benefits to growers, in partnership with industry.

GrowNotes

GrowNotes are an excellent example of a RD&E priority that was delivered in a one-to-three-year timeframe by communication and extension. On the 2013 autumn and spring tours of the GRDC Northern Regional Panel, a key focus was questioning growers and agronomists on their extension requirements. While high value was placed on GRDC products and services such as *Ground Cover*, grower Updates and workshops, a need was identified for a 'one-stop shop' for agronomic information based on research on the major northern crops. From this identified need GrowNotes came about. GrowNotes are a compilation of the best research information available and they are a direct response to grower calls for more accessible and interpreted information.

GrowNotes are an entirely new initiative for the GRDC northern region. Presented as an online flip-book, each set of GrowNotes provides not only an overview of the crop and a range of farm practice reference notes, but also backs this up with northern region trial results and best-practice recommendations, so growers can make informed farm-management decisions. GrowNotes use the very best e-publishing technology available to make the information easy to find

and navigate. This means that in addition to the comprehensive, yet plain English, reference notes provided, GrowNotes includes links to additional research and trial information for further study. GrowNotes will be updated at least annually so that the most current research is integrated into the recommendations and growers can be sure that they are following the most up-to-date advice. GrowNotes are currently available for:

- wheat;
- barley;
- chickpeas;
- faba beans;
- sorghum;
- sunflowers;
- maize;
- mungbeans; and
- peanuts.

GrowNotes for canola, field peas and safflower are in final stages of production. More GrowNotes will be developed to provide easy-to-access information on all the important grain crops of the northern region.

GrowNotes can be found at www.grdc.com.au/GrowNotes



GRDC Grower Solutions Groups

The Grower Solutions Groups (GSGs) are a series of projects established by the GRDC to provide a link between regional research and localised development.

The GSGs involve representatives at a local level and are geographically spread across the northern grain-growing region. The GSGs projects are managed as a group by Sharon O’Keeffe, Manager Regional Grower Services – North, in consultation with the GRDC Northern Regional Panel.

GSGs have been implemented through established grower groups in the region or by instigating new groups. For the project period, the 2010–15 GRDC GSGs are:

- Grain Orana Alliance (GOA) – central west NSW (GRDC Northern Region component);
- Northern Grower Alliance (NGA) – northern NSW (including north-west NSW, north-east NSW and the Liverpool Plains) and south-east Queensland (including eastern and western Darling Downs);
- Central Queensland Grower Solutions Group – Central Queensland; and
- Coastal Grower Solutions Group – coastal/hinterland NSW/Queensland, broken up into four nodes.

The roles of the GSGs are to:

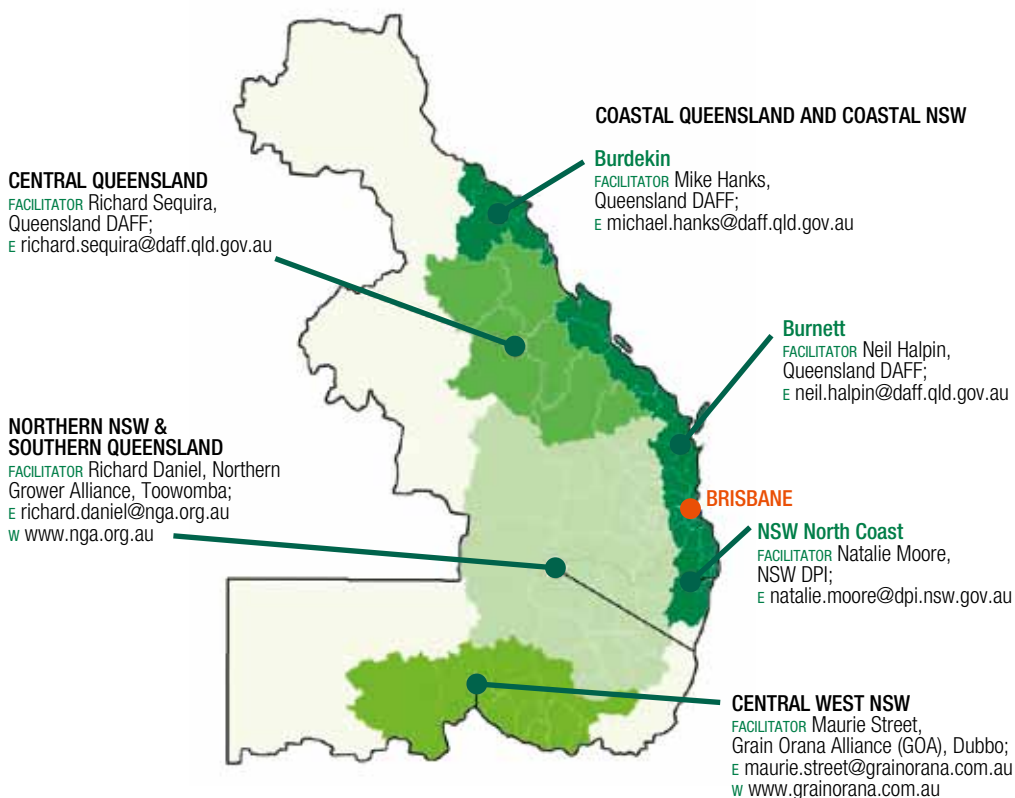
1. Gather locally specific issues and assess and prioritise these issues for research.
2. Fast-track delivery of research outcomes.
3. Conduct local development of regional research.
4. Package the results of the localised R&D within the region.
5. Drive practice change.

The GSGs design and manage fast-tracked outcomes to provide answers to locally specific research questions. The process is designed to help growers and agronomists make decisions on-farm that will result in practice changes to increase farm production and profitability.

Local issues and research priorities for delivery in the one-to-three-year timeframe are primarily sourced by the GRDC through the GSGs. A member of the GRDC Northern Regional Panel sits on the committees for each of the GSGs to ensure that local issues and farming systems are taken into account when the GRDC Northern Regional Panel prioritises RD&E issues for investment, against the GRDC strategic themes (Figure 2, page 7).

Approximately 450 growers and advisers across the GRDC northern region are directly involved

FIGURE 3 The area of benefit of each Grower Solutions Group in the GRDC northern region and key contacts for each group (or node).



3. Engaging with growers

in identifying priority issues, twice a year, through the GSGs. Indirectly, the growers and advisers attending these meetings are representing their clients, neighbours and networks within the region.

The issues identified are then investigated and prioritised by the steering committees/boards of the GSGs and a work plan is developed. The groups also allow for consideration of emerging issues (which may only become apparent as the season develops) providing an opportunity for a fast response.

The trials and work carried out as a result of the issues raised ultimately deliver information on the best way to manage problems at local farm level. The groups provide essential on-ground linkages between growers and agronomists, and research priorities that can be further investigated by the GRDC's three-to-eight-year regional investments, such as Integrated Weed Management, Farming Systems and Crop Nutrition.

The GSGs communicate the results of trial work back to the local committees as well as to the region through presentations at GRDC Updates and in media articles, journal articles and published results. Two of the GSGs (Northern Grain Alliance and Grain Orana Alliance) have

websites where findings are collated and presented. Research findings from the GSGs are also incorporated into the GRDC's new extension product GrowNotes.

To maximise the benefits of research, the GSGs also interact with other GRDC research projects, through formal and informal mechanisms, to ensure that local issues are included in regional projects and that regional findings are extended back to local farmers.

All GSGs report on practice change measurements and defined outputs, and are monitored closely within the region by the GRDC Northern Regional Panel. The GSGs are a flagship investment for the panel.

The work undertaken by the GSGs aims to provide growers with answers or information that can be used in the paddock within one to three years. Much of the work of the GSGs is based on the National RD&E strategy and is validation of regional research (that is, development).

Issues that require detailed research or ongoing work after initial GSG work are passed onto the GRDC Northern Regional Panel for consideration in the standard investment process and, potentially, inclusion in the three-to-eight-year delivery timeframe.

Leaders and staff of the GRDC northern region Grower Solutions Groups, at the annual meeting of the combined groups in Brisbane, August 2013.



PHOTO: SHARON O'KEEFE



4. NORTHERN GROWER ALLIANCE

The Northern Grower Alliance (NGA) coordinates and conducts applied agronomic research in response to prioritised needs of growers in Australia's northern grain-growing regions. The NGA was established in 2005 to provide a regional capacity for industry-driven, applied agronomic research into the challenges of grain production.

The NGA currently participates in a Grower Solutions Groups project, implemented by the Grains Research and Development Corporation (GRDC), to validate and promote adoption of new agronomic practices for grain growers in northern NSW and southern Queensland, as well as to provide a forum to collate and address grower needs in terms of grains research, development and extension (RD&E).

The NGA has six regions or 'nodes' of focus:

- Darling Downs;
- Mungindi/Balonne;
- Goondiwindi;
- Moree/Narrabri;
- Walgett; and
- Liverpool Plains.

A local research group (LRG) comprising key local advisers, growers and agency extension officers has been established for each node. The LRGs' role is to identify and prioritise specific agronomic production issues, as well as facilitate communication or extension activity. At a higher level the NGA will rapidly develop and progress projects in response to key industry issues identified by the LRGs.

NORTHERN GROWER ALLIANCE

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2013–14 report

The focus of the NGA on delivering simple and cost-effective solutions to complicated problems is delivering major gains to growers in northern NSW and southern Queensland.

NGA chief executive Richard Daniel said the effectiveness of this approach was the result of the group's close understanding of on-the-ground challenges such as herbicide-resistant weeds, nutritional issues, and pests and diseases including nematodes, crown rot and stripe rust.

"Sometimes the most effective solutions to the challenges facing growers do not require a major research investment, it could be just a small change in timing of an existing practice that delivers the biggest and fastest gain," Mr Daniel said.

"This focus on a timely and cost-effective response is critical to the growers who are dealing with the impacts of these problems on their crops and their businesses."

Mr Daniel highlighted the NGA's research into the timing of stripe rust spray applications as an example: by spraying at a much earlier stage of disease development, producers are achieving better results in controlling the disease while using less chemical.

"About 70 per cent of producers embraced that change within 18 months, which resulted in a \$25 million benefit to the region in the following year alone," he said.

"Since then, the number of stripe-rust-resistant varieties has increased but at the time it was a major issue for growers that NGA, and pathologists from the NSW Department of Primary Industries and the Queensland Department of Agriculture, Fisheries and Forestry, were able to provide a response to the issue quite quickly."

As a GRDC-funded GSG, NGA works closely with producers, researchers and advisers to identify the most pressing local issues that are limiting the industry.



4. Northern Grower Alliance



Richard Daniel, CEO of the Northern Grower Alliance, said that the Grower Solutions Group approach enables timely and cost-effective responses to issues affecting grain growers' crops and their businesses.

The NGA has six LRGs made up of advisers, consultants and growers, covering the Darling Downs, Mungindi/Balonne, Goondiwindi, Moree/Narrabri, Walgett and the Liverpool Plains.

"The LRGs go through all the trial work we've done in the previous four to five months and then, as a group, they raise and prioritise the issues they believe need further attention," Mr Daniel said.

"We come out of these meetings with six sets of regional priorities. Sometimes there is work already underway on a topic; sometimes the feedback means we have to do more work or take a different approach to work underway; sometimes they raise brand new issues.

"We then have a project planning meeting two weeks later with two representatives from each LRG and we prioritise the issues that are common across multiple areas, but we also try to ensure that the top three to five issues from each group get some form of response.

"The end result is generally that we start work straight away on eight to 10 projects – we look at what has and hasn't been done in addressing these questions before and put together a research approach."

The GRDC Northern Regional Panel is represented in the NGA decision-making process by the panel's Chair James Clark.

"Some issues are too big for us to deal with – for example, volatilisation of nitrogen fertiliser – so James is able to ensure that the information is included in the list of research issues of the Northern Regional Panel and the GRDC," Mr Daniel said.

The NGA has also validated management approaches for growers in the area of summer fallow weed management, in particular how to treat herbicide-resistant feathertop Rhodes grass and flaxleaf fleabane.

"Through ongoing research, strategies have evolved to control these weeds, from knockdown to residual herbicides to changing the timing of treatment from summer to winter and even the use of strategic tillages," Mr Daniel said.

"One approach that has been successful for fleabane in particular has been the use of existing residual herbicides in the autumn and winter, rather than trying to clean up a mess in the summer fallow. By doing this we've changed the battle front."

Similarly, simple solutions like a change in cereal variety can deliver huge benefits to growers struggling with the impact of root lesion nematodes.

"Nematodes are found in up to 70 per cent of paddocks in northern NSW and at damaging levels in 30 per cent of paddocks," Mr Daniel said.

"The economic impact can be up to \$500 per hectare in yield losses plus the 'hidden cost' of leaving behind high numbers of nematodes for the following crop.

"There can be a massive difference in the build-up of nematodes in the soil depending on the variety of cereal grown. There can be a five to ten-fold difference between varieties in the number of nematodes left behind after a crop and this can be addressed simply by a change in variety, or at the very least by avoiding production of the 'sucker' varieties."

A tougher nut to crack for the NGA has been the issue of low protein levels in cereal crops, with research focused on whether growers can cost-effectively top up crop nutrition late in the season.

"Foliar applications of nitrogen can result in significant increases in protein but the benefits on offer haven't been big enough to pay for the product and application," Mr Daniel said.

"The results from a series of 11 trials, conducted in 2012 and 2013 under drier spring conditions, indicated a \$30 to \$40-per-tonne premium in grain price would have been necessary to make the approach really pay. Unfortunately, premiums of that level often only occur about two in every 10 years.

"In this case the clear message to date from our work has been a negative result. However, that information can also help teach us what practices growers should be careful with or avoid. Trial activity will continue in 2014, hoping for a more favourable spring, but also evaluating the benefits of slow release nitrogen in comparison to the late application approaches."



NGA WINTER PRIORITY ISSUES UNDER TRIAL 2014

- Residual herbicides – efficacy against grass weeds
- Residual herbicides – safety, plant back and accumulation
- Nitrogen management in wheat – early, split and late applications
- Root lesion nematodes
- Chickpea problem weeds – broadleaf and wild oats
- Canola insect thresholds for aphids and heliothis
- Milk thistle (*Sonchus oleraceus*) management
- Faba bean desiccation
- Canola nutrition
- Chickpea nutrition
- Powdery mildew in canola
- Plant growth regulators for barley
- Alternative weed-management strategies, including windrow burning
- Fallow water efficiency
- Phytophthora root rot in chickpeas
- Yellow spot in wheat
- Chickpea botrytis if occurring
- Faba bean diseases as occurring
- Botryosphaeria if occurring

NGA SUMMER PRIORITY ISSUES FOR TRIAL 2014

- Grass weed management using residual herbicides – feathertop Rhodes grass, awnless barnyard grass, windmill grass
- Grass weed management using knockdown herbicides – feathertop Rhodes grass, awnless barnyard grass, windmill grass
- Root lesion nematodes in sorghum, cotton, sunflowers, mungbeans, soybeans, corn, safflower and millets
- Mungbean herbicides
- Milk thistle control in fallow
- Group A herbicide plant backs
- Effect of rainfall on double-knock herbicide efficacy
- Control of volunteer canola in fallow
- Fleabane control
- Cotton cut-stump
- Scurvy weed
- Dual herbicide post-emergent



Sometimes the most effective solutions to growers' challenges do not require a major research investment. In response to grower concerns, this trial at Bellata showed that simply changing cereal variety delivered considerable benefits in paddocks affected by root lesion nematodes.

PHOTO: RICHARD DANIEL



Local consultation

The Northern Grower Alliance would like to thank the following people for their involvement with local research groups (LRGs, formerly local consultative committees) in 2013–14:

Darling Downs LRG

John Adriaans
Mike Balzer
Patricia Balzer
Wade Bidstrup
Maryse Bourgault
Graham Burt
Paul Castor
Ben Coleman
Kylie Fourie
Nik Fritz
David Hall
Greg Hartwig
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Jordan McDonald
John McDonald
Paul McIntosh
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Steve Muller
Tim Neale
Greg Newton
Shaun Nolan
Nick Park
Hugh Reardon-Smith
Daniel Skerman
Jeff Stone
Rob Taylor
Bill Town
Russell Wood

Goondiwindi LRG

Andrew Arthur
Murray Aylwin
Adam Bensch
Michael Castor
Paul Castor
Jeremy Dawson
Cameron Derbridge
Dan Gall
Paul Gardoll
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Emma Twine
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Mungindi LRG

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Lindsay Ward
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Walgett LRG

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Charlie Buchanan
Brad Coleman
Stephen Gleeson
Sarah Groat
Danielle Kilby
Simon Logan
Neil Newton
Chris Radford
Pete Ricardo
Cameron Rowntree
Greg Rummery
Murray Smith
Tim Weaver

Liverpool Plains LRG

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Greg Giblett
Mark Goddard
Aaron Goddard
Derek Gunn
John Hosking
Jim Hunt
Peter McKenzie
Glen Pinn
Matt Roseby
Carol Sanson
Dwayne Schuebert
Sam Simons
Andrew Thomson
James Urquhart
Rob Weinthal

FROM ISSUE TO RESULTS

PRE-EMERGENT HERBICIDES: PART OF THE SOLUTION BUT STILL MUCH TO LEARN

Richard Daniel and Anthony Mitchell, Northern Grower Alliance

Take-home messages

- The use of a disc planter for incorporation by sowing (IBS) of residual herbicides resulted in significantly reduced wheat emergence for all four herbicides evaluated.
- The disc planter set-up actually increased the risk of crop damage.
- These results reinforce the need to only use narrow point tynes when using residual herbicides with IBS recommendations.

The issue

The widespread adoption of minimum tillage has provided many agronomic and sustainability benefits to our farming system. However minimum till has led to an over-reliance on knockdown herbicides to achieve effective weed management and growers now face management issues in two main 'herbicide-driven' scenarios:

- control of herbicide-resistant weeds, e.g. annual ryegrass; and
- selection of weed species with higher levels of natural herbicide tolerance, e.g. feathertop Rhodes grass.

Residual herbicides are a valuable tool to assist in the control of weeds in both these scenarios. However, it is important that we better understand and manage the issues that have always dogged residual products, such as consistency of efficacy, incorporation requirements and crop safety.

In response to concerns arising about the safety of residual herbicides at planting for annual ryegrass control, two trials were conducted in 2013 to evaluate the safety and efficacy of registered residual herbicides for the control of annual ryegrass in wheat.

What was done?

In adjoining paddocks at Mullaley, NSW, a grower intended to plant the same wheat variety (Crusader[®]) but with two different planters: a tined planter in one paddock and a single disc in the second. Both trials were sprayed and planted on 20 June 2013. Planting occurred immediately after herbicide application.

Results

Figure 1 shows the wheat emergence data for each treatment as a percentage of the untreated. The actual plant population of the untreated in the disc-sown



trial was about 108 plants per square metre and about 66 plants/m² when planted by tynes. Note that the two planters were not set up to plant an equivalent rate of seed.

Crop safety summary

- Wheat emergence was significantly reduced by all herbicide treatments when disc planting was used for incorporation by sowing (IBS).
- Sakura[®] or Stomp[®] alone were significantly safer than TriflurX[®] or Boxer Gold[®] alone or Boxer Gold[®] in mixture with either TriflurX[®] or Stomp when planted with discs
- Crop safety was dramatically improved when the tyned planter was used for IBS with only Boxer Gold[®] plus Stomp[®] or TriflurX[®] 1.5L/ha significantly reducing plant stand.
- Depth of sowing may have contributed to crop safety with the guess rows in the disc planted area appearing less affected although only marginally deeper (about 2mm).
- Soil type may also have contributed to the varied level of crop effect between the two sites.

A range of other factors were assessed but not presented in this summary.

Conclusions

These two trials highlighted some key points:

- Crop safety was significantly reduced when a disc planter was used for incorporation.
- The disc set-up appears to have exaggerated crop safety issues by planting seed in an area with increased herbicide concentration.
- Observation suggested that small differences in planting depth may have impacted on crop safety in this scenario.

Efficacy was also measured in this work but the results are not presented in this summary. Generally, high levels of annual ryegrass control were achieved by most IBS treatments and the most consistent product was Boxer Gold[®] or Sakura[®].

This work reinforces some of the difficulties growers and agronomists face with the use of residual herbicides. Crop safety and efficacy are influenced by a range of factors including planting equipment, planting depth, soil type and stubble load together with rainfall quantity and timing.

As an industry we need to have a more thorough understanding of the impacts of these (and perhaps other factors) to ensure we get the best from these important weed-management tools.

More information:

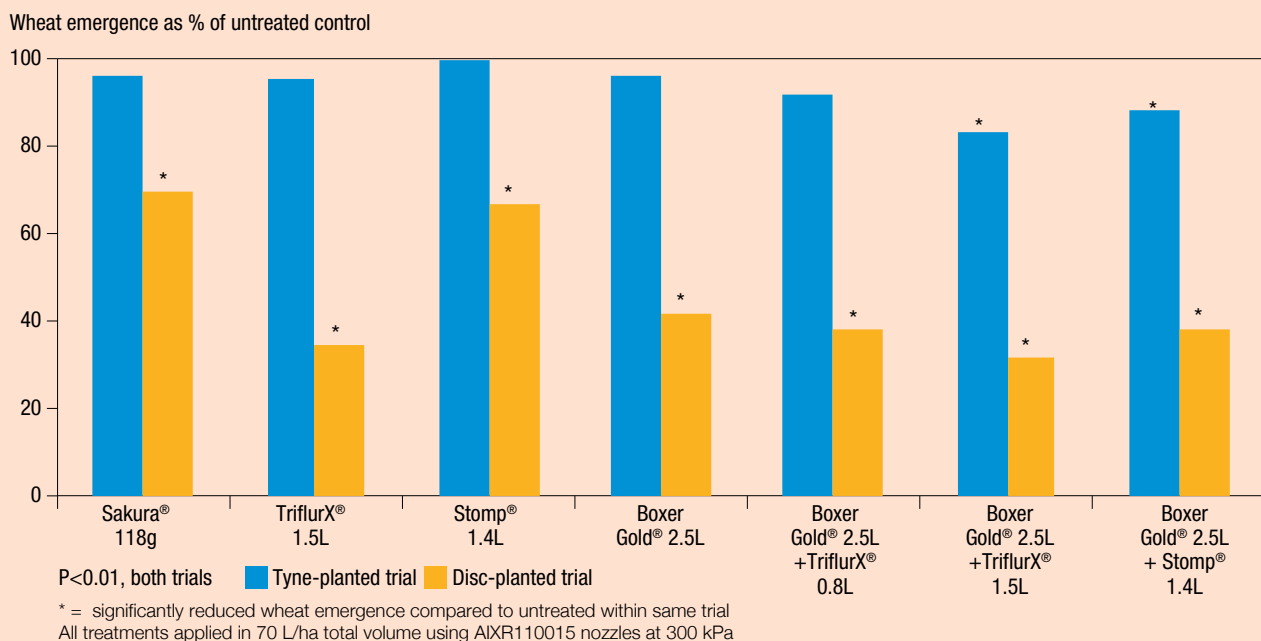
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GRDC Research Code NGA00003

This report is a summarised version of a paper presented at the GRDC Northern Region Grains Research Update in 2014. The full report is available at:

<http://www.grdc.com.au/Research-and-Development/GRDC-Update-Papers/2014/03/Pre-emergent-herbicides-part-of-the-solution-but-much-still-to-learn>

FIGURE 1 Wheat emergence as a percentage of untreated control 21 days after planting (11 July 2013).



FROM ISSUE TO RESULTS

THE EFFECTIVENESS OF NITROGEN APPLICATION FOR PROTEIN – 2012 AND 2013

Richard Daniel, Rachel Norton, Anthony Mitchell, Linda Bailey and Rob Duncan
Northern Grower Alliance

Take-home messages

- Foliar application of urea solution provided significant increases in grain protein compared to urea applied by streambar or spread in a series of 11 trials during 2012 and 2013.
- The level of protein benefit was NOT sufficient to generate a net benefit in any trial.
- Timing differences were less clear, with best results generally from application during late head emergence through to the early milk stage.
- Application of spread urea at planting provided the most consistent and highest level of grain protein across the dryland sites.
- Targeting nitrogen budgets to maximise yield for soil moisture availability is expected to be more profitable than trying to manipulate protein with late nitrogen application.

A frequent issue across the northern region in both 2010 and 2011 was wheat yields well above expectation but with low to very low grain protein levels, often under 10 per cent. This of course resulted in downgrading at receival and consequently reduced economic returns. Although low protein was evident in a wide range of varieties, EGA Gregory[®] was frequently of concern.

A large combination of factors was causing the low protein levels but a clear message from industry was the need to determine whether late application of nitrogen for protein manipulation was an effective management option under northern conditions.

Trials were conducted in 2012 and 2013 primarily to evaluate the impact of late nitrogen strategies on protein

accumulation and to indicate the likelihood of economic benefit.

What was done?

A series of 11 application method and timing trials were conducted in southern Queensland and northern NSW during the two seasons. All sites but two were under dryland conditions.

All sites evaluated a combination of application methods and timings with urea applied at a standard rate of 40 kilograms of nitrogen per hectare (about 87 kg urea/ha). Three application methods were used:

1. Spread – urea simply spread by hand.
2. Streambar – urea applied in an aqueous solution.
3. Foliar – urea applied in an aqueous solution.

All sites had a minimum of four ‘late’ application timings. These timings commenced at about full flag leaf emergence (GS39) and then at about 10 to 14-day intervals. The last timing was generally during dough development (about GS83-87). Multiple timings were conducted in an attempt to generate a timing response ‘curve’ for protein accumulation, with an expectation that applications about 7 to 10 days either side of flowering could result in the highest protein content. Yield responses to nitrogen applied at these timings were generally negligible.

EGA Gregory[®] was evaluated for nitrogen response at nine of the 11 sites, and Suntop[®] at the two irrigated sites in 2013.

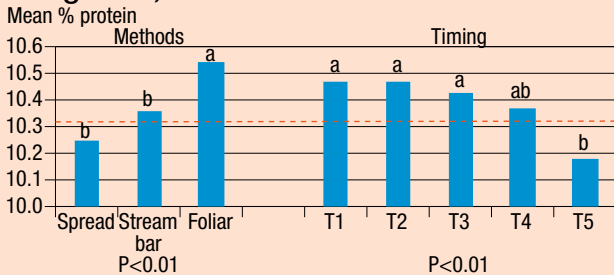
Low levels of rainfall were recorded at most sites during August to October in both years. Irrigations at the Brookstead site were well timed following nitrogen application.

Results

Yield

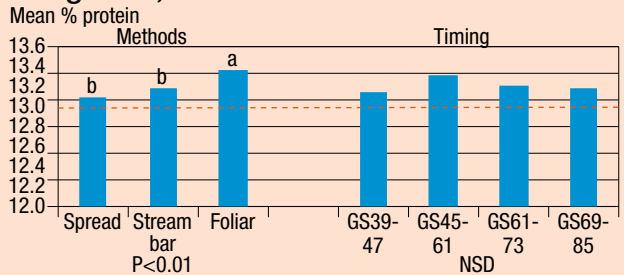
There was a significant impact on yield recorded in only one of the 11 trials. At Weemelah in 2013 the application at about GS60 resulted in a significant yield benefit

FIGURE 1 Mean % protein from addition of 40 kg N/ha, six sites in 2012.



Treatments that share the same letter within the groups of methods or timings are not significantly different at p=0.05. Broken line indicates the mean % protein of untreated control (no additional nitrogen).

FIGURE 2 Mean % protein from addition of 40 kg N/ha, five sites in 2013.



Treatments that share the same letter within the groups of methods or timings are not significantly different at p=0.05. Broken line indicates the mean % protein of untreated control (no additional nitrogen).



TABLE 1 Economic analysis of the highest net benefit treatments.

Site	Treatment	Receival grade	Gross benefit	Fertiliser and application cost	Net benefit
Croppa Creek 2012	Foliar GS45	No change ASW	\$69/ha	\$84/ha	-\$15/ha
Weemelah 2013	Foliar GS60	APW to H2 (+\$9/t)	\$77/ha	\$84/ha	-\$7/ha
Tullona 2013	Foliar GS71-73	No change HPS1	\$79/ha	\$84/ha	-\$5/ha
Narrabri 2013	Foliar GS69+	No change HPS1	\$27/ha	\$84/ha	-\$57/ha

Granular urea \$552/t (\$48/ha @ 40 kg N), Urea solution \$0.46/L (\$76/ha @ 40 kg N/ha); Application costs: spread \$25/ha, foliar \$8/ha; Grain prices: 2012 ASW (Australian Standard White) \$237, 2013 HPS1 (high protein, screenings, no.1) \$251, APW (Australian Premium White) \$256, H2 (Australian Hard, 11.5% minimum protein) \$265

compared to both the GS39 and GS77 timings. Although statistically significant, the absolute level of yield benefit was only about 100kg/ha. The GS60 application received a 19-millimetre rainfall, seven days after application.

Protein

All sites were analysed individually for protein, as well as an overall analysis conducted, for both years. Figures 1 and 2 show the comparison of the three application methods (across all timings) and the comparison of timings (across all application methods) over both years.

In both years, foliar application resulted in a significant increase in protein compared with spread or streambar for late season application timings. Foliar application resulted in significant benefits at two individual sites in both 2012 and 2013.

The largest protein benefit in 2012 was obtained at Tullona using foliar application at GS51 (1.2% but no significant difference). In 2013 the largest benefit was obtained at Weemelah using foliar application at GS71 (0.8%, significant).

Application of the equivalent amount of spread urea at planting or GS30 (or split between the two timings) was evaluated at six sites. The spread urea at planting was incorporated by sowing (IBS).

The early application of spread urea resulted in equivalent or higher protein levels than spread applications later in the season. Across all dryland sites, urea spread and incorporated by sowing resulted in either the highest or second highest protein level of all treatments.

Economics

Economic comparisons were conducted on all individual treatments where there was a significant difference in either yield or protein content compared to the untreated. Table 1 shows the highest net benefit treatments from the four sites where significant yield or protein differences occurred.

Although there was a small but significant increase in protein from foliar application, late nitrogen application did not provide a net economic benefit in any of these 11 trials.

Conclusions

This extensive set of trials was hampered by the low rainfall experienced during the springs of 2012 and 2013, however it clearly showed that:

1. significant increases in protein can be gained by late nitrogen application;
2. the level of increase was not sufficient to deliver economic benefits;
3. foliar was clearly the most effective method of application; and
4. timing differences were less clear but generally supported application between late head emergence and early milk stages when targeting protein accumulation.

These results suggest that trying to increase wheat protein with late nitrogen application is unlikely to be a very effective in areas where spring rainfall is highly erratic. Unless nitrogen in grain recovery levels can be increased dramatically, grain price differentials of about \$20 to \$40 per tonne are probably necessary before even considering this type of approach. Supply of nitrogen requirements either prior to or at planting, or as a top up during early crop growth stages, would appear a much more reliable and effective strategy. Economic benefits from nitrogen application targeting yield potential are likely to be far easier to achieve than when targeting protein increases.

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GRDC Research Code NGA00003

(b) Varieties displaying this symbol beside them are protected under the *Plant Breeders Rights Act 1994*.

This report is a summarised version of a paper presented at the GRDC Northern Region Grains Research Update in 2014. The full report is available at:

<http://www.grdc.com.au/Research-and-Development/GRDC-Update-Papers/2014/03/The-effectiveness-of-nitrogen-application-for-protein-2012-and-2013>



FROM ISSUE
TO RESULTS**WEEDS AND RESISTANCE – CONSIDERATIONS FOR AWNLESS BARNYARD GRASS, *CHLORIS* SPP AND FLEABANE MANAGEMENT***Richard Daniel, Northern Grower Alliance***Take-home messages**

- Glyphosate-resistant and tolerant weeds are a major threat to our reduced-tillage cropping systems.
- Although residual herbicides will limit re-cropping options and will not provide complete control, they are a key part of successful fallow management.
- Double-knock herbicide strategies (sequential application of two different weed-control tactics) are useful tools but the herbicide choices and optimal timings will vary by weed species.
- Incorporate other weed-management tactics e.g. crop competition to assist herbicide control.
- Cultivation may need to be considered as a salvage option to avoid seedbank replenishment.

The issue

Weed management, particularly in reduced-tillage fallows, has become an increasingly complex and expensive part of cropping in the northern grains region. Why?

Our heavy reliance on glyphosate has selected for species that were either naturally more glyphosate tolerant or selected for glyphosate-resistant populations. The four key weeds that are causing major cropping headaches are:

1. awnless barnyard grass;
2. flaxleaf fleabane;
3. feathertop Rhodes grass (*Chloris virgata*); and
4. windmill grass (*Chloris truncata*).

Although this research focused on chemical management of these weeds, it is clear we need to better understand and employ other weed management tactics to successfully and economically control these significant threats to cropping.

1. Awnless barnyard grass

Awnless barnyard grass has been a key summer grass issue for many years. It is a difficult weed to manage for at least three important reasons:

- multiple emergence flushes (cohorts) each season;
- easily moisture stressed, leading to inconsistent knockdown control; and
- glyphosate-resistant barnyard grass populations are more frequently found.

Key management considerations

- Glyphosate resistance is widespread. Tactics against this weed must change from glyphosate alone.
- Utilise residual chemistry wherever possible and aim to control 'escapes' with camera spray technology.
- Try to ensure that a double-knock of glyphosate followed by paraquat is used on one of the larger early summer barnyard grass flushes.
- Restrict Group A herbicides to awnless barnyard grass management in-crop and aim for strong crop competition.

2. Flaxleaf fleabane

For more than a decade, fleabane has been the major weed management issue in the northern cropping region, particularly in reduced-tillage systems. Fleabane is a wind-borne, surface-germinating weed that thrives in situations of low competition. Germination flushes typically occur in autumn and spring when surface soil moisture levels stay high for a few days. However, emergence can occur at nearly all times of the year.

One of the key issues with fleabane is that knock-down control of large plants in the summer fallow is variable and very expensive.

Key management considerations

- Utilise residual chemistry wherever possible and aim to control 'escapes' with camera spray technology.
- Thrives in situations of low competition so avoid wide-row cropping unless effective residual herbicides are included.
- 2,4-D is a critical tool for consistent double-knock control.
- Successful growers have increased their focus on fleabane management in winter (crop or fallow) to avoid expensive and variable salvage control in the summer.

3. Feathertop Rhodes grass

Feathertop Rhodes grass emerged as an important weed-management issue in southern Queensland and northern NSW in about 2008. It is another small-seeded weed species that germinates on, or close to, the soil surface. It has rapid early growth rates and can become moisture stressed quickly. Although feathertop Rhodes grass is well established in Central Queensland, it is still largely an 'emerging' threat further south. Try to aggressively treat the patches to avoid whole-of-paddock 'blow-outs'.



Key management considerations

- Glyphosate alone or glyphosate followed by paraquat generally poor.
- Utilise residual chemistry wherever possible and aim to control 'escapes' with camera spray technology,
- A double-knock of Verdict® followed by paraquat can be used in Queensland prior to planting mungbeans where large spring flushes of feathertop Rhodes grass occur. The permit is valid until 31 August 2016.
- Treat patches aggressively, even with cultivation, to avoid paddock blow-outs.

4. Windmill grass

While feathertop Rhodes grass has been a grass weed threat coming from Queensland and heading south, windmill grass is more of an issue in central NSW that is spreading north. Windmill grass is a perennial, native species found throughout northern NSW and southern Queensland. The key cropping threat appears to be from the selection of glyphosate-resistant populations, with control of the tussock stage posing most management challenges.

Key management considerations

- Glyphosate alone or glyphosate followed by paraquat is generally poor.
- Preliminary data suggests that residual chemistry may provide some benefit.
- A double-knock of quizalofop-p-ethyl (for example, Targa®) followed by paraquat can be used in NSW. The permit is valid until 31 March 2017.

Conclusions

Double-knock herbicide strategies are useful tools but there is no 'one-size-fits-all' treatment.

The interval between double-knock applications is a major management issue for growers and contractors. Shorter intervals can be consistently used for weeds where herbicides appear to be translocated rapidly (e.g. awnless barnyard grass) or when growing conditions are very favourable. Longer intervals are needed for weeds where translocation appears slower (for example, fleabane, feathertop Rhodes grass and windmill grass). Critical factors for successful double-knock approaches are to apply the first application on small weeds and ensure good coverage and adequate water volumes, particularly when using products containing paraquat. Double-knock strategies are certainly NOT 'bullet-proof' and rarely effective for salvage weed control situations unless environmental conditions are exceptionally favourable.

More information:

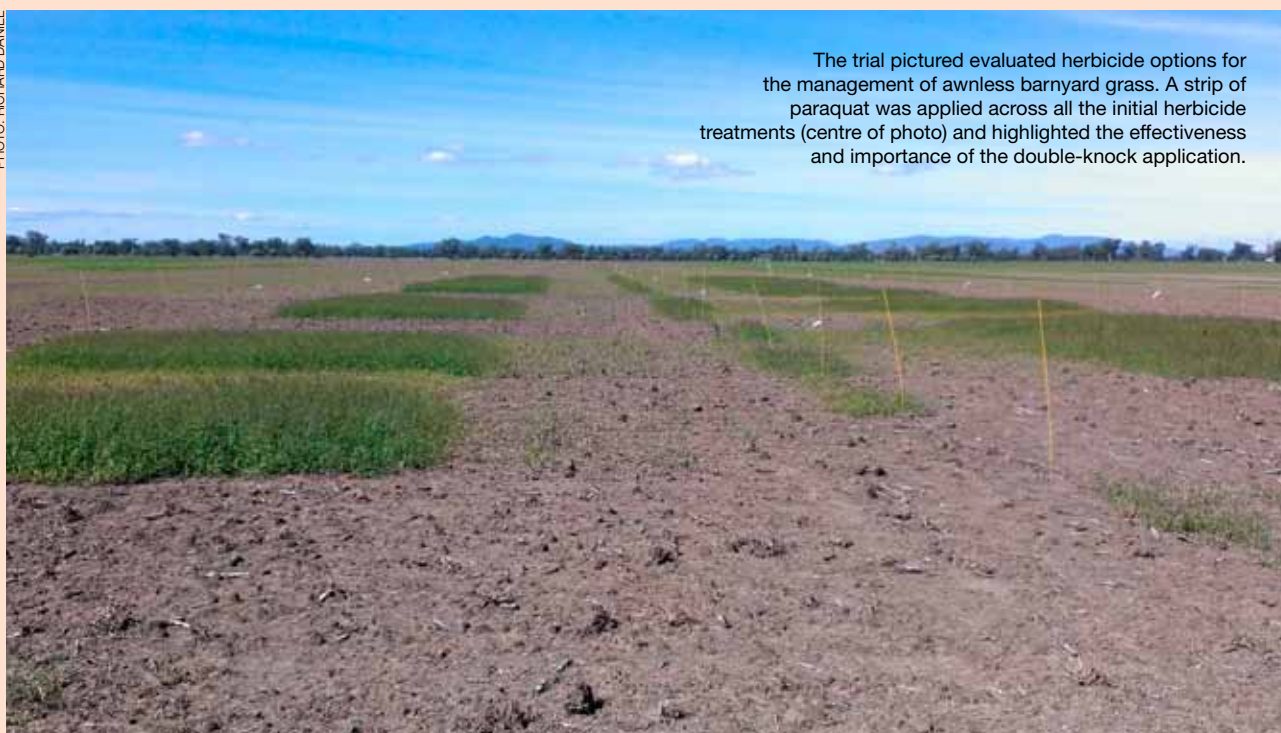
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GRDC Research Codes NGA00003, UQ00055, UQ00062, GOA00001

This report is a summarised version of a paper presented at the GRDC Northern Region Grains Research Update in 2014. The full report is available at:

<http://www.grdc.com.au/Research-and-Development/GRDC-Update-Papers/2014/03/Weeds-and-resistance-considerations-for-awnless-barnyard-grass-chloris-and-fleabane>

PHOTO: RICHARD DANIEL



The trial pictured evaluated herbicide options for the management of awnless barnyard grass. A strip of paraquat was applied across all the initial herbicide treatments (centre of photo) and highlighted the effectiveness and importance of the double-knock application.

5. GRAIN ORANA ALLIANCE

The Grain Orana Alliance (GOA) provides effective solutions to current and emerging issues that are challenging grain producers of central NSW. The alliance was established in 2009 to provide a regional capacity for industry-driven, applied agronomic research into the challenges of grain production.

GOA currently participates in the Grower Solutions Groups (GSG) project, implemented by the Grains Research and Development Corporation (GRDC), engaging with the local grains industry to address important issues affecting grain growers and working to bring about research that is relevant to local farming systems. GOA may also undertake research, development and extension (RD&E) activities itself, or work with the GRDC and the GRDC Northern Regional Panel on issues that affect broader areas.

Twice a year the local industry determines the key issues challenging grain growers in a series of focus group meetings across the region. The issues raised at these meetings form the basis for planning the group's future activities.

The region covered by GOA takes in the central-north region of the NSW cropping belt, from Peak Hill in the south to Coonamble in the north, to the Coolah/Merriwa area in the east and the extremes of the cropping belt in the west, around Nyngan.

GRAIN ORANA ALLIANCE

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2013–14 report

The approach of GOA to work the “full circle” with growers, researchers and advisers, is delivering quick and tangible improvements to the grains industry in northern NSW.

Since its inception in 2009, GOA has delivered significant research solutions in the areas of canola

nutrition and windrow management, as well as non-chemical control of herbicide-resistant weeds.

To achieve these outcomes, GOA, through the GSG project, works closely with the people of the northern NSW grains industry when identifying new research projects and conducts twice-yearly local agronomy updates at four different locations in the GOA region.

GOA chief executive officer Maurie Street said the meetings were rotated throughout the GOA region, so that as many growers and agronomists as possible have the opportunity to participate.

“We use the meetings to go to growers to ask, ‘What are your issues?’” Mr Street said.

“We have a brainstorming session to identify the research needs for each area of the GOA region, by discussing the barriers to increasing production and the threats to farm sustainability.

“Sometimes what is required is an extension program to improve grower knowledge and adoption of best practice through the use of training, media or fact sheets.

“But if it's a new issue that requires research, we try to work that discussion down to a specific research question. We then ask growers, researchers and advisers to rank the importance of these issues and we use that feedback to refine our list of priorities and develop research trials or extension programs.”

Mr Street said GOA sought to develop projects that would have the biggest impact for the greatest number of growers. However, it was important to balance this with research into localised production challenges in different parts of northern NSW.

The GOA board, made up equally of growers and advisers, also meets twice a year to assess the research proposals and determine whether they are realistically achievable within the group's budget and capabilities.

Some of the research required may be beyond GOA's capabilities, such as plant breeding. These issues are passed onto the GRDC Northern Regional Panel, which is represented on the GOA board by Warren-



based agronomist Penny Heuston, to consider as part of its engagement with larger research institutions.

Mr Street said the model has delivered some major breakthroughs for northern NSW growers. Highlights including identifying glyphosate resistance in windmill grass and developing strategies to control the weed in fallows. This included a successful application for a Minor Use Permit from the Australian Pesticides and Veterinary Medicines Authority (APVMA) for the use of the herbicide Targa® as part of a well-timed double knockdown strategy.

The group has also promoted the use of windrow burning as a non-chemical method of controlling herbicide-resistant weeds, with the practice now taking hold among growers in the area.

Canola growers have also benefited from GOA's three-year research trials which have identified the optimal timing for windrowing. The research highlighted how time-sensitive the activity is – windrowing too early can cost growers up to 30 per cent of their crop yield – prompting GOA to also investigate alternative harvest methods including direct heading.

GOA's work in the area of canola nutrition is already delivering significant savings to growers, after research identified that the established practice of applying 20 kilograms per hectare per year of sulfur was delivering no yield benefit. The money saved was instead invested in additional nitrogen, which was found to boost canola returns by up to \$2.50 for every additional dollar invested.

In closing the loop on GOA's process, Mr Street reports back to growers, researchers and advisers on the organisation's research findings at the twice-yearly round of local agronomy updates meetings, where the process of identifying new challenges begins again.



Maurie Street, CEO of Grain Orana Alliance, said that the Grower Solutions Group approach enables as many growers and agronomists as possible to participate in the process of identifying issues and solutions to the challenges of grain production.

GOA WINTER PRIORITY ISSUES UNDER TRIAL 2014

- Canola nutrition – sulfur response: yield and oil content
- Canola nutrition – nitrogen response: yield and oil content
- Canola – clethodim damage and parameters
- Canola – desiccation
- Canola – yield impacts direct heading
- Pre-emergent herbicide systems – canola and pulses
- Windrow burning for weed control
- In-crop herbicides for fleabane and sowthistle
- Lontrel®/Tordon® 75D as a residual treatment for fleabane – timing and efficacy
- Windmill grass management

GOA SUMMER PRIORITIES FOR TRIAL 2014

- Grass-weed management using residual herbicides – feathertop Rhodes grass, awnless barnyard grass and windmill grass

FROM ISSUE
TO RESULTS

TO WINDROW OR NOT TO WINDROW, AND WHEN?

Maurie Street, CEO Grain Orana Alliance

Take-home messages

- The timing of windrowing, within an acceptable window, has no impact on oil content in canola.
- The timing of windrowing can have a significant positive impact on the yield and profitability of canola.
- Yield increases of up to 0.5t/ha have been seen with relatively short delays in windrowing – of only eight days.
- Yield loss due to shattering with later windrowing has not been shown to be as bad as first thought, particularly in contrast to negative yield impacts for windrowing too early.
- Direct heading is a viable option for harvesting canola and in many cases could maximise profitability.
- An economic benefit of more than \$200/ha can be gained from choosing the best method and timing of canola harvesting.

The issue

Local focus group meetings in winter 2009 highlighted an interest in validating current recommendations for ideal windrowing times in canola, particularly in central west NSW. Common understanding about the impact of timing was simply that windrowing too early might only reduce oil content, while windrowing later might lead to yield loss through excessive pod shelling and shattering. Fear of the more tangle and costly loss due to pod shattering saw many paddocks windrowed much earlier than recommended.

GOA ran multiple trials in 2009, 2010 and 2011 to examine the impact of windrowing timing on oil, yield and profitability, as well as investigate the alternate option of direct heading. One of the first trials undertaken at Coonamble in 2009 also investigated the impact on yield and oil when the crop was direct headed using pre-harvest treatment with Pod Ceal™ and desiccation with Reglone™.

Methods

All trial sites were large-scale replicated trials applied to commercial-scale, farmer-sown paddocks of canola. All windrowing and harvesting was carried out by commercial windrowers (25 to 40-foot swathe) and headers (25 to 40 foot (7.6 to 12.2-metre) swathe). Potential for pod shattering during the windrowing operation is a key influence over final yield and could not be duplicated in small-scale trial work.

Pod shattering was assessed quantitatively through catch trays at a number of the sites. However, the method used for this needs further refinement and as a result have not been included in this report. It should be noted that any yield loss through shattering is accounted for by a reduction of the final harvested yield. It is harvested yield that drives profitability regardless of shattering at any level.

The timings for windrowing are aligned with the percentage of colour change (CC) of the seed, which refers to the percentage of seeds in the middle third of the main stem of the canola plant that have started to change colour. To determine CC, 30 pods were sampled from the treatment areas, shelled out and visually assessed for colour change. This was completed three times for each replicate/plot. Once the level of CC was established the relevant treatment area was windrowed.

All windrow and direct headed treatments were harvested at the same time when all treatments were considered to be ripe enough to harvest. Yields of the whole treatment area were measured with mobile weigh bins, with the exception of the Nyngan trials, which were weighed over a weighbridge. Grain quality was assessed by commercial service providers using standard testing procedures.

Conclusion

From these trials it could be concluded that windrowing timing has a limited effect on oil percentage in canola.

Windrowing earlier than the current recommended timings has always resulted in a significant reduction in yield, which could seriously challenge profitability of crops in some situations.

The findings from these trials suggested that striving to meet the upper end of the current recommended windrow timings (40 to 60 per cent CC) is important, and should be targeted as a minimum timing, as significant yield penalties have been demonstrated consistently if cutting earlier than these levels. However, trials such as Coonamble in 2010 and Gilgandra in 2011 clearly demonstrated that delaying past these times further increased yield. In all of GOA's trials, there has been a trend for yields to increase up to and beyond 90 per cent CC.

One major concern with delayed windrowing is the risk of shattering before or during windrowing. These trials have demonstrated no yield penalty from delays in windrowing except in an extreme case. Therefore this fact infers that the magnitude of the shattering is small and statistically insignificant against any potential yield gains over the same period.



When making the decision to delay windrowing later than 60 per cent CC, growers and advisers should consider that each season, or indeed each paddock may be different. First, growers and advisers should consider the crop's current growing conditions. If the crop is experiencing terminal moisture stress, delays beyond 60 per cent CC may not be warranted. However, if moisture is still available, even if limited, growers and advisers should consider the findings of this work, that:

- windrowing later than current recommendations may or may not result in increased yields, but in some cases it has; and
- windrowing up to 90 per cent CC has not demonstrated any significant yield decline.

So if there is a potential for improved yields by delaying until later with little downside risk, why not?

Remember that direct heading is an option if you cannot get the windrowing done when you need to.

Selection of varieties with greater shattering tolerance through breeding programs, changes in plant populations and farming systems, and better machinery may mean that pod shatter is not as big an issue as it was when the original windrowing timings were determined. These developments have contributed to a drift in an 'ideal' timing recommendation, which is now more than 30 years old.

Direct heading has also been shown to be a suitable management option for canola, often matching the performance of a well-timed windrowing in terms of yield, but not so compared with ill-timed windrowing.

The choice to direct head canola therefore is better based upon the other pros and cons, which are well detailed in the GRDC's recently published Direct Heading Fact Sheet that can be accessed at:

<http://www.grdc.com.au/grdc-fs-direct-heading-canola>

What these windrowing trials demonstrate is the potential economic benefit of getting the timing of windrowing right. The availability of windrowers at the required time and the other advantages offered through windrowing should also be considered.

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GRDC Research Code GOA00001

This report is a summarised version of a paper presented at the GRDC Northern Region Grains Research Update in 2014. The full report is available at:

<http://www.grdc.com.au/Research-and-Development/GRDC-Update-Papers/2014/02/To-windrow-or-not-to-windrow-in-2014--This-is-the-question-but-if-so-when>

PHOTO: MAURIE STREET



To validate current recommendations, particularly for central west NSW, GOA ran trials over several seasons to examine the impact of windrowing timing on oil, yield and profitability, as well as investigate the alternative option of direct heading.



Local consultation

Grain Orana Alliance would like to thank the following people for their involvement with local group meetings in 2013–14:

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David Alker
Angus Andrews
Andrew Austen
A Bates
Jim Bell
Paul Bell
Jim Bible
Ed Blackburn
Dave Blackburn
Brenden Booth
Craig Bradley
Chris Brennen
Greg Brooke
Matthew Burkitt
Daniel Cain
Graeme Callaghan
Mark Campbell
Andrew Caulding
Matt Ceeney
Mark Conn
Jason Conn
Brad Cook
Andrew Cooper
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Henry Killen
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Richard McKay
Mal McKay
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Lindsay Meers
Phil Miles
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Garry Weston
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Tim Whiteley
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Claire Williams
Jim Winter
Luke Wood
Tony Wright
Stephen Yeo
Brett Yeo
Andrew Young
Megan Young



6. CENTRAL QUEENSLAND GROWER SOLUTIONS GROUP

The Central Queensland Grower Solutions Group aims to develop solutions to local cropping issues and address major production constraints in the current Central Queensland farming system. It strives to provide solutions to issues within a one-to-three-year timeframe, addressing systems issues and responding to emerging issues. It also focuses on adoption of practices that improve the management of 'difficult' weeds, soil fertility and crop nutrients, and efficient use of rainfall.

The Grower Solutions Group (GSG) approach, implemented by the Grains Research and Development Corporation (GRDC), also provides an opportunity for Central Queensland issues to be considered on a wider scale in the context of other issues in the GRDC northern region.

The Central Queensland grains industry, consisting of some 350 grain-producing enterprises and about 450,000 hectares of cropping land, produces almost 12 per cent of Queensland's grain.

CENTRAL QUEENSLAND GROWER SOLUTIONS GROUP
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The Central Queensland GSG encompasses a region that includes the cropping districts of Kilcummin, Clermont, Capella, Gindie, Rolleston, Duinga, Jambin and Moura.

Since January 2011, the Central Queensland GSG has been coordinating research efforts aimed at improving the productivity and profitability of cropping operations in the region.



PHOTO: RICHARD SEQUEIRA

Extension activities, such as this farm walk, are an important part of the process to promote practice change.



2013–14 report

Co-investment by the Queensland Department of Agriculture, Fisheries and Forestry (Queensland DAFF) and the GRDC over a five-year period has enabled the Central Queensland GSG team to work closely with local agronomists and farmers to deliver timely and targeted solutions to on-farm and in-crop issues, within a one-to-three year timeframe.

Led by Richard Sequeira, principal research scientist with Queensland DAFF at Emerald, the five-member Central Queensland GSG team is responsible for activities that are aimed at solving the most significant short-term plant and soil-related constraints to grain production in the region. The outputs of the project are aimed at promoting practice change that will underpin the long-term profitability, stewardship of natural resources and environmental sustainability of grain production in Central Queensland. A steering committee with agronomist and/or grower representatives from across the region provides oversight of the group's activities and outputs/deliverables.

Like many across the northern grain-growing region, Central Queensland growers and advisers have identified soil and crop nutrition as a priority platform for ongoing research, particularly in the areas of subsoil fertility decline and the placement and management of non-mobile nutrients such as phosphorus and potassium.

Residual herbicide trials have also been a focus in recent years, although research work during the 2012–13 and 2013–14 seasons has been significantly impacted by below-average sowing and in-crop rainfall, and heatwave conditions.

The group's development and extension activities employ a number of different approaches including white-peg trials to develop new solutions or validate findings from other regions, and extension of locally generated results and information from other sources.

Activities are developed and implemented in accordance with research, development and extension priorities gathered from growers, agronomists and other industry personnel across the group's operating region, which consists of eight cropping districts – Kilcummin, Clermont, Capella, Gindie, Rolleston, Duaringa, Jambin and Moura.

Facilitator Richard Sequeira said a key part of the group's charter was communicating with growers and advisers in the region's eight cropping districts.

"Twice a year Central Queensland GSG participates in the Central Queensland Roadshow, hosting local information meetings in each of the cropping districts, which enables us to discuss planned trials, completed and interim trial results, and ascertain what research priorities the local industry would like us to focus on going forward," Mr Sequeira said.

"The feedback from these meetings is invaluable in ensuring that we are responding to identifiable gaps in research and that any research has the potential to make a real difference in a commercial sense.

"At the end of the day, that's what our research has to deliver – tangible benefits to the bottom line of grain-growing operations in the Central Queensland region."

CENTRAL QUEENSLAND PRIORITIES FOLLOWING 2013 SUMMER CROP

- Macronutrient (N, P, K, S) deficiencies and economic management
- Integrated weed management – feathertop Rhodes grass, sweet summer grass and other summer grasses
- Paraquat/glyphosate double-knock and alternatives

CENTRAL QUEENSLAND PRIORITIES FOLLOWING 2013 WINTER CROP

- Integrated weed management in broadleaf crops, particularly fleabane, and African turnip weed in chickpeas
- Best practice for extending herbicide life and resistance management in Central Queensland
- Impact of fertiliser (nutrient) type and placement (shallow and deep) on yield and profitability for various crops



FROM ISSUE TO RESULTS

NEW FEATHERTOP RHODES GRASS MANUAL

Feathertop Rhodes grass (*Chloris virgata* Sw.) has been consistently identified by the Central Queensland Grower Solutions Group as a key issue constraining production in Central Queensland.

The weed presents a significant challenge to current zero-till farming systems. It became an issue in the mid to late 1990s, in particular in the Dawson Callide, and since then it has spread across most farming areas in Queensland and northern NSW.

The current predominance of zero-till cropping systems, which are highly dependent on post-emergence (knockdown) herbicides, may inevitably result in feathertop Rhodes grass becoming a Group M (for example, glyphosate) and Group A (for example, Verdict®) resistant species.

Feathertop Rhodes grass is a well-adapted weed, however it does have attributes that can be targeted as part of an integrated weed management (IWM) strategy. These include:

- most seed will generally only germinate from a depth of 0 to 2 centimetres;
- the seed is relatively short-lived; and
- if seed production can be stopped for 12 months, the seedbank can be exhausted relatively quickly.

Work on integrated management, conducted by the group in conjunction with the three-to-eight-year GRDC investment timeframe, has resulted in a management

guide to feathertop Rhodes grass that was published in late 2014.

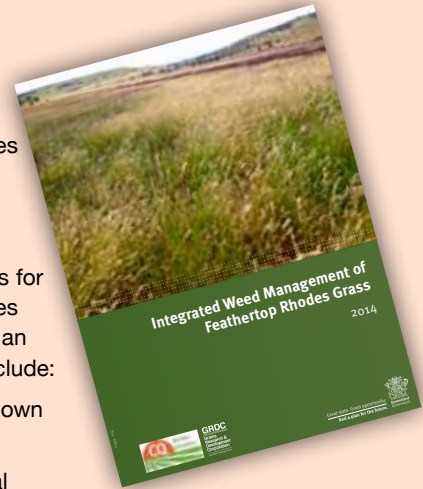
The key practices for feathertop Rhodes grass, as part of an IWM strategy, include:

- use of knockdown herbicides;
- use of residual herbicides;
- crop rotation;
- spot spraying/WeedSeeker®/chip hoe;
- strategic tillage; and
- burning.

The comprehensive manual will be available online and will be a 'one-stop-shop' for the integrated weed management of feathertop Rhodes grass.

Integrated Weed Management of Feathertop Rhodes Grass is available online at:

<http://www.grdc.com.au/IWM-FTR-2014>



Central Queensland growers and advisers have identified soil and crop nutrition as a priority platform for ongoing research, particularly subsoil fertility decline and management of phosphorus and potassium.



PHOTO: RICHARD SEQUEIRA



Local consultation

The Central Queensland Grower Solutions Group would like to thank the attendees of their local roadshow meetings in 2013–14:

Ross Armstrong
Zanda Armstrong
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Andrew Bate
Ross Bate
Ian Becker
Kelly Becker
Norman Becker
Scott Becker
Jim Bishop
Tony Bongers
Lisa Bradburn
Luke Bradley
Peter Bradley
Geoff Braun
David Brimblecombe
Jeff Brosnan
Tim Brosnan
Stuart Brotherton
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Jack Buffington
Greg Campbell
Grattan Chambers
Ian Clancy
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Brad Conway
Chris Conway
Katrina Conway
Bruce Cook
Dave Cowan
David Daniels
Katherine Daniels
Phil Daniels

Rhy Daniels
Richard Daniels
Steve Daniels
Terry Daniels
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Neil Dunbar
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Colin Dunne
Mark Dunne
David Durkin
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Brian Gregg
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Lee Griffiths
Victor Hartin
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Paul Heit
Rob Henshall
Col Hibbard
Gus Hodgkinson
Vicki Horstman
Aaron Hughes
Ian Hutchings
David Hutchinson
Ross Hutchinson

John Jago
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Darren Jensen
Joe Johnstone
David Jones
Jason Jones
Lee Jones
Steve Kajewski
Patrick Kelly
Trevor Kucks
Phil Lamb
Larry Lawrence
Matt Lawrence
Ben Lawrie
Anthony Lee
Gavin Lotz
Todd Luck
Fiona MacDiarmid
James Macrae
Michael Mactaggart
Damon Mathies
Alex Mathieson
Mick Matthews
Kurt Mayne
Susan McDonnell
Ashton McQuade
Col Messer
Justin Moore
Alex Mortimer
Peter Mulder
Simon Mulder
Gordon Muller
Scott Muller
Hancko Naude
Melinda Nicholas
Fred Noffke
Stuart Olsson

Phil Otto
Nigel Parker
Tim Patterson
Dwayne Pukullas
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David Reid
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Greg Saal
Steve Saal
Dion Sampson
Cameron Schmidt
Selwyn Schmidt
Aaron Schwarz
Andrew Schwarz
John Sheppard
Graham Spackman
Gordon Staal
Justin Staier
Alan Storey
David Storey
Simon Struss
Adam Sullivan
Brendon Swaffer
Jim Tighe
Syd Torrisi
Matt Travers
Craig Wade
Lex Webb
Peter Wilkie
Raymond Wilkie
Will Woolcock
Jeff York
Darren Young



7. COASTAL GROWER SOLUTIONS GROUP

The Coastal Grower Solutions Group (GSG) has a broad objective of improving crop productivity, agronomic practices and farm profitability across the diverse geography and farming systems of coastal Queensland and northern NSW.

Established in 2013, the GSG encompasses three target regions:

- the coastal Burnett region of Queensland;
- the inland Burnett region of Queensland; and
- the north coast of NSW.

Implemented by the Grains Research and Development Corporation (GRDC), the Coastal GSG strives to improve the knowledge base of growers on issues such as fertiliser strategies, weed control, fungicide application strategies, soil preparation, sowing practices, soil nutrient availability and grain moisture assessment techniques, with the aim of improving yields and input cost efficiencies for coastal cropping systems.

COASTAL GROWER SOLUTIONS GROUP
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2013–14 report

The GRDC-funded Coastal GSG may cover a geographically diverse region but project leader Neil Halpin, senior agronomist with the Queensland Department of Agriculture, Fisheries and Forestry (Queensland DAFF) at Bundaberg, said the targeted regions had some key similarities including a subtropical climate, relatively small land holdings necessitating cropping flexibility and income diversity, and a high number of landholders in each region. The overarching objectives of the Coastal GSG of improving crop productivity, agronomic practices and farm profitability are relevant to all growers in the region.



A peanut variety trial being discussed with growers from the inland Burnett and coastal Burnett nodes of the Coastal Grower Solutions Group, at a field day at Kingaroy, in 2013.

PHOTO: SHARON O'KEEFE



Operational since January 2013, the Coastal GSG incorporates three target regions or nodes: the coastal Burnett region of Queensland, managed by Neil Halpin from Queensland DAFF; the inland Burnett region of Queensland, managed by Ian Crosthwaite from BGA AgriServices, Kingaroy; and the north coast of NSW, overseen by Dr Natalie Moore from the NSW Department of Primary Industries (NSW DPI).

“There is also commonality across the three regions with the need to improve summer legume performance to provide short-term cash income from grain and to contribute nitrogen into the farming system,” Mr Halpin said.

He said the Coastal GSG was committed to improving the knowledge base of growers on issues such as fertiliser strategies, weed control, fungicide application strategies, soil preparation, sowing practices, soil nutrient availability and grain moisture assessment techniques in a bid to improve yields and generate input cost efficiencies.

“The first 18 months of the project have been extremely successful with nearly 600 growers and agronomists across the three regions attending field trips, workshops and meetings,” he said.

The coastal Burnett region is primarily sugarcane-focused, with summer grain legumes, typically peanuts and soybeans, grown as a rotation break crop.

The Coastal Burnett Regional Committee set a yield goal of five tonnes per hectare for soybeans and 8t/ha for peanuts and, by developing a list of extension priorities for the Coastal GSG project, current fertiliser strategies and weed-control programs were identified as the biggest barrier to attaining these yield targets.

The first season of soybean trial results demonstrated that significant productivity gains can be made through the implementation of fertiliser application strategies based on soil testing.

“Applying fertiliser based on soil tests improved the productivity of soybean variety A6785 by 12 per cent to 4.3t/ha compared to the 3.8t/ha attained by fertilising by the industry tradition of only ensuring enough potassium is supplied,” Mr Halpin said.

“The peanut nutrition trial demonstrated that the peanut industry is currently using best practice for correcting soil pH and applying nutrients based on soil tests for the peanut crop. The addition of extra fertiliser in-crop had no effect on productivity or on peanut grades (quality).

“The weed-control experiments demonstrated that the current method of using broadcast over-the-crop herbicides produced the best yields and also significantly reduced the amount of volunteer sugarcane present in the soybean crop.”

The farming system of the inland Burnett region is more diverse than the coastal Burnett, with peanuts and maize predominantly grown on the red soils in rotation with sorghum, wheat, barley, millet, soybeans, mungbeans and navy beans, and mixed cropping/ grazing undertaken in response to seasonal variability.

The inland Burnett growers identified the need to have more information on fungicide application strategies to manage the leaf disease net blotch in peanuts, the timing of nitrogen application in dryland maize and assessing calcium and boron levels in peanut kernels.

The importance of fungicide application timing was demonstrated in the net blotch trials, with fungicide programs that were initiated early netting a profit advantage of between \$800 and \$1285 per hectare.

Although impacted by wet weather, the maize–nitrogen trial found that when planting maize with 20 kilograms of nitrogen per hectare following a peanut crop, adding at least 40kg N/ha pre-plant or at least 20kg N/ha post-emergence increased yields significantly above the control of 20kg N at planting.

Testing of peanut kernels across 31 fields as part of the Coastal GSG project found that levels of both calcium and boron met acceptable levels, with the exception of two samples for calcium.

The NSW north coast region has a similar farming system to that of the coastal Burnett, with a rotational cropping program focused on sugarcane and soybeans in the near-coastal strip.

To the west, farming systems increase in diversity to encompass grain production as a component of beef and dairy systems, as well as double-cropping of winter and summer grains including wheat, barley, triticale, maize, sorghum and soybeans.

The NSW North Coast Regional Committee of the Coastal GSG nominated three areas that required investigation in the first season of the project:

- greater understanding of grain moisture assessment;
- reduced ground preparation techniques to reduce input costs; and
- reduced sowing rate/improved seed placement.

A field trip to Toowoomba was arranged to visit grain storage design specialists and Graintec Scientific to discuss current grain-testing equipment, calibration, sampling issues and national standards and bodies governing grain testing in Australia.

The trip also assessed maize production on raised beds and the challenges and efficiencies associated with cropping in a permanent bed system.



Improving seed placement was addressed during two workshops on precision planting. Workshops topics included how metering mechanisms are designed and how they should be maintained to maximise planter performance and obtain uniform seed placement and crop stands.

The project also provided significant technical assistance to the unexpected soybean stem fly outbreaks in the Casino and Grafton areas, assisting with district surveys to determine the extent of the outbreak and identification of the pest, and assessing crop damage.

The Coastal GSG project operates in conjunction with a north-Queensland-based project, *Cropping Solutions of the Burdekin*, which aims to develop locally relevant agronomic packages for grain crops to make them more appealing and easier to grow successfully in the tropical northern climate.

Overseen by Mike Hanks, the Burdekin project will incorporate a number of field trials in 2014 including two insecticide trials, an irrigation timing trial and mungbean variety trials.

The insecticide trials will assess the impact of spray application timing on bean pod borer (*Maruca vitrata*) populations and therefore grain yield and quality, as well as compare the efficacy of Steward® and Altacor® in a fully replicated trial with five treatments and five replicates.

As the growth of irrigated mungbeans crops in the tropics is vigorous, assessing when to apply the final irrigation can be problematic. If applied too soon valuable yield is lost because seeds and pods fail to adequately fill; if applied too late, the crop has difficulty reaching timely harvest maturity and has a tendency to produce additional floral flushes and pod sets.

A replicated trial examining different time periods of the final irrigation will be undertaken this year in an August/September-planted mungbean crop.

Communicating with growers and the wider industry is a high priority for the Burdekin project, with field walks, presentations at coastal Burnett field days, mungbean and soybean pre-season meetings, and fact sheet preparation and distribution being undertaken.

Local consultation

The Coastal Grower Solutions Group would like to thank the following growers from across the three nodes of the project for their involvement in the group's activities and meetings:

Simon Andreoli	David Gooley
Mark Carter	Pat Harden
Dean Cayley	Lianne Hart
Tony Chapman	Tony Hart
Lisa Clark	Peter Hatfield
Seve Clark	Dom Hogg
Ben Clift	Jules Keller
Terry Cunningham	John Kingston
Allan Dingle	Angus Legoe
Andrew Dougall	Mathew Leighton
Janelle Dowley	Neville Loeskow
Alan Dowley	Kate Luly
Kendall Dowley	Elton Peterson
Geoff Feuerherdt	Andrew Pirlo
Jan Feuerherdt	Jeffery Plath
Mark Feuerherdt	Bill Rehbein
Joe Fleming	Peter Russo
Nicole Fleming	Robert Winterton
Paul Fleming	Neil Yates

APPENDIX

2013–15 GRDC Northern Regional Panel

PANEL CHAIR JAMES CLARK

► Hunter Valley grower James brings extensive knowledge and experience in dryland and irrigated farming systems to the Northern Panel. He has been a member of the panel since 2005 and chairman since 2008. James says the panel's role is to capture and invest in growers' priorities and empower them to adopt new production gain opportunities. He strongly believes the grains industry needs to continue building research, development and extension capacity to ensure growers remain competitive.

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DEPUTY CHAIR LORETTA SERAFIN

► Loretta has more than 12 years' experience as an agronomist in north-west NSW and currently works with the NSW DPI in Tamworth. She is a technical specialist for northern farming systems and provides expertise and support to growers, industry and agronomists in the production of summer crops. She has a passion for helping growers improve farm efficiency and sees her role as a conduit between advisers, growers and the GRDC to ensure that growers' needs are being met.

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JOHN SHEPPARD

► John, a panel member since 2006, has a wealth of practical farming experience and brings a wheat breeder's perspective to the panel. He views the panel as an opportunity for growers and professionals to work together to shape the future of the industry, and develop best management practices, as well as new varieties and products. He is particularly interested in genotype-by-environment interaction and the preservation of genetic resources.

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JACK WILLIAMSON

► Jack, a private agricultural consultant, runs a broadacre commodity production farm in Goondiwindi. Previous roles as a territory sales manager for Nufarm and as a commercial agronomist for McGregor Gourlay Agricultural Services have given Jack extensive farming systems knowledge, and diverse crop management and field work experience. Jack is a member of the Northern Grower Alliance (NGA) local consultative committee and Crop Consultants Australia, and was previously president of the MacIntyre Valley Cotton Field Day Committee.

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JULIANNE DIXON

► Jules is manager of AMPS Research and a passionate agronomy consultant, communicator and industry advocate. Her role involves the development and expansion of self-funded, privatised RD&E. Her experience in project management and strategic development extends across all facets of an integrated grains business. She has an established network in eastern Australia and Western Australia, including researchers, leading growers, agronomy consultants and commercial industry.

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KEITH HARRIS

► Keith has served on the Northern Panel since 2011 and brings more than 30 years' experience in property management. Keith, based on the Liverpool Plains, NSW, consults to Romani Pastoral Company on the management of its historic holdings 'Windy Station' and 'Warrah', near Quirindi. He sees the main aim of the panel as representing growers and conducting research that provides growers with the tools they need to maximise property performance and minimise risk.

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KELLY BECKER

Based at Theodore, Queensland, Kelly is a certified mungbean and chickpea agronomist and also advises growers on wheat, corn and sorghum crop production. She has been involved with variety trials on a commercial basis and industry farm practice trials as an agronomist. She strives to be proactive within the industry and aims to assist growers to improve farming operations by ensuring that they are up to date with new practices and technology.



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PENNY HEUSTON

Penny brings extensive experience to her second term on the Northern Panel. She is committed to maximising the profitability of grain production in a low-rainfall environment through increased productivity and good risk-management practices. She was principal in a farm advisory business in central west NSW and worked with growers across north-west NSW before joining Delta Agribusiness, where her main focus was the Warren, Nyngan, Tottenham and Gilgandra areas.



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ROB TAYLOR

Rob is a grain grower at Macalister on Queensland's Darling Downs and farms 2300 hectares of maize, sorghum, wheat, barley and chickpeas on the Jimbour Plain. Rob is currently chair of the Agrifood Skills Initiative for the Western Downs Regional Council area. Rob views his role on the panel as taking information and feedback from growers, advisers and researchers to the GRDC to ensure research is targeted.



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WILL MARTEL

Central NSW grower Will has served on the Northern Panel since 2011. Previously he worked in a Quirindi grain trading company and with Brisbane-based Resource Consulting Services (RCS) where he benchmarked more than 400 growers across Australia on their performance, focusing on whole-farm profitability rather than individual enterprise gross margins. His main role on the panel is identifying investment areas that will enable growers to remain economic and environmentally sustainable.



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STEPHEN THOMAS

Before joining the GRDC Steve held a senior position with the NSW Department of Primary Industries at Orange. In early 2009 he was appointed executive manager practices at the GRDC and in 2011 was appointed executive manager research programs. Currently Steve holds the position of executive manager commercial. He sees the GRDC's role as to interact with growers regularly to determine their needs and focus on the big picture across entire farming systems.



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PANEL SUPPORT OFFICER**DAVID LORD**

David operates agricultural consultancy Lord Ag Consulting. For the past four years he has worked as a project officer for Independent Consultants Australia Network (ICAN), which has given him a good understanding of the issues growers are facing in the northern grains region. David is Northern Panel and Regional Grower Services support officer.



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