Grains Research
UPDATE
Research Information for Farm Advisers from the
Grains Research and Development Corporation (GRDC)
Northern Region

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Air Induction (AI) nozzles are different

Some recent designs have resulted in AI nozzles that can operate over a range of operating pressures with minimal change in droplet size. This makes them easier to use with pressure control systems while still achieving high levels of drift control.

Spray liquid properties also influences spray formation processes and, with conventional nozzles, drift increases when spraying pure solutions containing a surfactant.

Most pesticide formulations – either as ECs or SCs (emulsifiable or suspension concentrates) or similar types of formulation – include an oil component which influences the spray formation process to give break-up close to the nozzle and a relatively coarse spray.

Pure solutions with a surfactant, extend the break-up distance from the nozzle, producing a finer spray, and could increase the risk of drift by more than a factor of two.

Applications of glyphosate fall into the category of solutions with a surfactant and particular care is needed when there is a risk that such sprays might drift.

Toowoomba spray authority Bill Gordon says his recent trial work for the Grains and Cotton RDCs indicated that, when using translocated products such as Roundup® CT at 50L/ha to control summer weeds – notably barnyard grass and sowthistle – there was no significant impact on efficacy by moving from medium (M), to coarse (C) or even extremely coarse (XC) spray qualities.

Increasing the application volume from 50 L/ha did not increase efficacy; in fact it resulted in some reductions in efficacy with XC droplets for the lower rates of Roundup CT used.

However an increase in volume to 70L/ha or more would be appropriate for many contact products such as Spray.Seed®, particularly when using coarse droplets.

“This series of trials has highlighted that oils and AI nozzles don’t always work well together,” Mr Gordon said.

“The use of products with an ‘oily’ formulation, or the addition of oil based adjuvants, may impact on the performance of some AI nozzles, and can result in reduced efficacy, although it is hard to predict when this will occur.

“This is why some product labels state ‘do not use AI nozzles’ and there is also the risk of phytotoxicity to crops with products like some of the grass selectives.”

Mr Gordon said growers should consider having at least two types of nozzles in their toolbox. His choice was a low pressure (AI) nozzle and at least one other non-AI nozzle such as a TurboTeeJet® type nozzle for use with oily formulations, products that required the addition of an oil based adjuvant, or situations when medium droplets were preferred.

If the two sets of nozzles were carefully chosen, they should cover almost every spraying situation.

Most growers used two volume ranges, such as 50 L/ha and 70 L/ha; travelling at an average speed of 20 kph and wanted to operate at a maximum pressure of 5 – 5.5 Bar. Here an appropriate combination could be:

- TurboTeeJet 025 type nozzle to give coarse droplets up to 50L/ha and medium at 70 L/ha, and
- a TTI02 or 025 for 50-100 L/ha or other nozzles capable of producing an XC spray quality (range of volumes will depend on orifice size and pressure) for night spraying, pre-emergents and higher risk situations.

Between these two nozzle sets (for this speed and volume range), virtually all spraying jobs could be done with one type or the other.

“It really is worth spending time on selection to get the most versatile nozzles for your situation,” Mr Gordon said.

Speaking at this year’s Updates, British application expert Dr Paul Miller, says British research has identified a wide variation in performance between commercial (AI) nozzles with the same nominal specification: the difference having implications for both spray deposit and level of drift control.

That was prompting calls for a new classification for nozzles, with greater emphasis on the risk of drift and less emphasis on average droplet size alone.

Further information:

Bill Gordon, 0429 976 565 bill.gordon@bigpond.com

GRDC Project code CRD2

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Using satellite imagery to measure crop variance

"Remote sensing technology has been available for several decades, however with increased availability and affordability of high resolution satellite imagery from a number of commercial providers, a greater opportunity now exists to adopt this technology and improve existing management practices," says Dr Andrew Robson, DPI&F Kingaroy.

In a working example of this technology, Dr Robson has shown how Burnett/Queensland peanut farmers can boost their production and profit by using satellite imagery to identify poorer yielding regions of their paddocks.

Multispectral imagery from the American owned QuickBird satellite, has enabled variations in crop vigour to be accurately determined via the amount of infrared (IR) light a crop canopy reflects. Healthy vigorous plants have been shown to reflect more IR light compared to those affected by stress or disease. By being able to classify crops into regions of varying crop vigour; yield potential; maturity; water status; or to identify disease and pest 'hot spots', it can greatly assist the manager to identify serious yield limitations and take appropriate corrective management if deemed feasible.

"For example; by being able to predict spatial variations in pod maturity across a crop, a grower can optimise harvest timing and crop returns, by minimising downsides such as; harvest losses, poor grain filling and lower kernel grades and aflatoxin infection", says Dr Robson.

In one 16.8 ha irrigated peanut crop, Dr Robson was able to demonstrate how delayed harvest timing could have resulted in a financial gain of $20,000, while in another 21.9 ha crop, an estimated $50,000 monetary loss was identified as a result of less than optimum crop growth including areas attributed to an inefficient overhead irrigation system.

Within one cropping season this technology provides useful information for peanut growers, agronomists and agribusiness representatives, however with now a four year library of satellite and aerial IR imagery of intensive peanut growing regions in the South Burnett and the Bundaberg regions, an added benefit can be derived from the imagery.

"By having a firm understanding of a paddock's spatial variability over several seasons, it becomes relatively easy to identify any additional stress that may occur within a crop during a particular growing season. For example an area in a particular year was identified as having a significantly lower vigour than previous years. On further investigation it was discovered severe erosion brought on by heavy rain reduced plant numbers. Similar results have been identified as foliar disease outbreaks, pest invasion including a cane grub infestation in cane, salinity and even lightning strikes" said Dr Robson.

"Although these examples have concentrated on peanut crops, this technology can and has been applied to many agricultural crops as it not only provides a direct measurement of in season plant vigour, but also identifies the spatial variability in crop growth across an entire paddock. By understanding this variability, the opportunity exists for both growers and agronomists to concentrate their efforts on identifying the constraints effecting crop growth in poor areas, implement remedial action if feasible and even undertake cost analysis to determine the possible financial loss that such areas may be imposing on the farming system."

This research has been part of ongoing Grains Research and Development Corporation (GRDC) and Australian Centre for International Agricultural Research (ACIAR) projects.

Further information:

Dr Andrew Robson, DPI&F 07 4160 0735
andrew.robson@dpi.qld.gov.au

GRDC Project code DAQ00091

Chickpea mould false alarm

The Grains Research and Development Corporation (GRDC) and Pulse Australia are urging advisers and chickpea growers to test carefully for botrytis grey mould (BGM) to avoid unnecessary spray treatments.

Pulse Australia development officer, Gordon Cumming, said that "in most cases reported in Central Queensland in 2007, BGM was not actually present, with the observed leaflet and flower drop most likely due to waterlogging as a result of rainfall just prior to or after irrigation and the subsequent cool weather.

"Incorrect identification can lead to costly spray applications that are ineffective and not needed," Mr Cumming said.

"To test if BGM is present, collect flowering branches of the chickpea and place them in a sealed plastic bag with some damp paper towels. Place the bags in a warm position, but out of direct sun light. If BGM is present, mycelium (fungal growth) and spore clusters will become visually evident. They commonly take 36 to 48 hours to develop, but 3 to 4 days should be allowed as development can be slowed under cooler conditions.

"Vigilance for signs of ascochyta blight is also urged, especially if 2008 becomes a wet year, with sprays applied as per the variety management package (VMP) recommendations.

Further information:

Gordon Cumming, Pulse Australia, 0408 923 474, pulse.gordon@bigpond.com or visit www.grdc.com.au or www.pulseaus.com.au

GRDC Project code PAL00007

Go early on net blotch

Trials in 2007 by the Northern Grower Alliance (NGA) indicate earlier application of fungicide could help graingrowers better manage the spot form of net blotch (SFNB) disease in barley.

NGA chief executive officer Richard Daniel says the two replicated, small plot trials conducted on Skiff barley at North Star and Kaputar at Bellata, suggested early application could reduce the cost and frequency of regular monitoring, reduce the risk of missing the timing of disease buildup and possibly allow inclusion with a late herbicide application to eliminate additional application cost.

Both crops were planted into 2006 barley stubble with SFNB naturally present before any sprays were applied.

The earliest application occurred at jointing with additional timings at the 2nd node stage (~two weeks later) and at full flag leaf emergence (~four to five weeks after the initial timing).

"Our aims were to identify the impact of SFNB on the yield and grain quality of commercial varieties under regional conditions, to validate the economics of early vs later fungicide application and to provide additional data to support commercial management practices," Mr Daniel said.

The 2007 trials had shown:

- SFNB reduces both yield and grain quality in the two susceptible varieties;
- SFNB is not just a threat in wet seasons, as it developed rapidly following only one rain period of about three days at both sites, and
- currently recommended fungicides only suppress SFNB and limit its severity, so growers should not expect total control.

Although application at the 2nd node stage provided the most consistent benefit in these trials, (at least two weeks earlier than currently recommended) the clearest message was that even under 2007 growing conditions, the use of a range of fungicide timings averaged a net return benefit of $54 and $103/ha in the two susceptible varieties.

However, Mr Daniel said, the initial conclusions were drawn from one year's research only and the NGA planned more work this winter season (2008) to evaluate performance under varied conditions.

In the meantime growers should increase the rotation interval between barley crops while they wait for plant breeders to deliver more resistant varieties – the most effective method of long term SFNB management.

Further information:

Richard Daniel, 07 4698 7983
richard.daniel@nga.org.au

GRDC Project code NGA00002

Top ten tips for crop productivity

Tips on the ten biggest improvements to northern cropping systems over the past 20 years can be found in a new report, *'High profit farming in northern Australia'*. The report was authored by Peter Wylie on behalf of the Grains Research and Development Corporation (GRDC).

Copies are available to download from the GRDC website at www.grdc.com.au/highprofitfarming Free copies are available from Ground Cover Direct on freephone: 1800 11 00 44 or email: ground-cover-direct@canprint.com.au A postage and handling charge applies.

Further information:

Peter Wylie, 07 4669 6522 p.wylie@dbrl.com.au

GRDC Project code HOR00004

Safflower: unexploited potential and world adaptability

A unique opportunity to learn about an alternative broadleaved crop to add diversity to farming operations, that can also assist in the management of herbicide resistant weeds. 7th International Safflower Conference, 3rd-6th November Wagga Wagga. For more information go to www.australianoilseeds.com

WATERpak – for irrigated grains

With assistance from the Grains Research and Development Corporation (GRDC), specific grains information has been added to the WATERpak manual which has been available for some time for cotton growers.

WATERpak is designed to help irrigators improve irrigation practices, minimise environmental impacts and increase farm profits from irrigated crops. New chapters on grains information have been added to cover topics such as how canola, barley, soybeans and pulses fit into rotations in irrigated farming systems; and managing diseases in irrigated wheat.

Chair of GRDC's Northern Region Panel, James Clark, said that "many growers are planting grain this year instead of cotton. With limited water availability in many areas and strong prices for grain, it's a logical option".

The special grain chapters are being mailed to cotton growers who have a copy of WATERpak, and can also be found through the Cotton and Grains Irrigation Knowledge Management project at www.cottonandgrains.irrigationfutures.org.au

Diary Dates

July 08	
28-30	**Australian Grains Industry Conference 2008** Hilton on the Park, Melbourne http://www.ausgrainsconf.com/
August 08	
2	**Nyngan Ag Expo** http://www.nynexpo.com/
6	**Maximise Gain by Managing Subsoil Constraints Workshop**, Bellata, NSW Brooke Phelps, 02 6752 5888, cfimoree@cfi.org.au
7	**Maximise Gain by Managing Subsoil Constraints Workshop**, Walgett, NSW Myles Parker, 02 6828 0126 myles.parker@dpi.nsw.gov.au
11-14	**ACGRA Cotton Conference** http://www.acgra.net.au
12-14	**6th National Controlled Traffic Farming Conference**, Dubbo, NSW http://www.actfa.net
13	**Fertcare for Business**, Mackay, Qld Stephen Gardiner, 0409 893 368, SGardiner@nutrientms.com.au
14	**Fertcare Level C environmental assessment**, Mackay, Qld Stephen Gardiner, 0409 893 368, SGardiner@nutrientms.com.au
19-20	**Summer Crop Grains Research Update for Growers and Advisers**, Dalby RSL, Qld John Cameron or Erica McKay 02 9482 4930, updaten@tpg.com.au, http://www.icanrural.com.au
19-21	**AgQuip**, Gunnedah, NSW http://www.farmonline.com.au/
24-29	**IWGS 2008 - 11th International Wheat Genetics Symposium**, Brisbane, Qld http://www.iwgs.info
26	**Bellata Grains Research Update – Key issues – Local trials,** Bellata Memorial Hall, NSW John Cameron or Erica McKay 02 9482 4930, updaten@tpg.com.au, http://www.icanrural.com.au
27	**Goondiwindi Grains Research Update - Business management,** Royal Hotel, Goondiwindi, Qld John Cameron or Erica McKay 02 9482 4930, updaten@tpg.com.au http://www.icanrural.com.au
28	**Quirindi Grains Research Update - Business management,** Quirindi RSL, NSW John Cameron or Erica McKay 02 9482 4930, updaten@tpg.com.au, http://www.icanrural.com.au
Aug 31-Sep 4	**58th Australian Cereal Chemistry Conference,** Surfers Paradise, Queensland http://meeting.aa.ccnet.org/cerealchem08/
February 2009	
24-25	**Dubbo Grains Research Adviser Update,** Dubbo RSL, NSW John Cameron or Erica McKay 02 9482 4930 http://www.icanrural.com.au
March 2009	
3-4	**Goondiwindi Grains Research Adviser Update**, Goondiwindi Community Centre, QLD John Cameron or Erica McKay 02 9482 4930 http://www.icanrural.com.au

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Editor: John Cameron Ph: (02) 9482 4930,
PO Box 718, HORNSBY NSW 1630

Research writers: Bernie Reppel, John Cameron and Erica McKay

Layout and design: Lightning Designs Ph: (08) 8274 1648