

## Check for denitrification loss

Widespread and often heavy rain in November and early December is likely to have led to substantial denitrification in many crop soils. In some soils, leaching of N will also have been significant. The impacts of this will need to be measured using deep profile soil tests when budgeting N requirements for the 2009 winter crop.

When a heavy clay soil is waterlogged denitrification can lead to nitrate–nitrogen losses. Losses are larger when temperatures are high, there is a lot of soil N and there is a source of crop residue to feed soil microbes. Under waterlogged conditions, denitrifying microbes convert soil nitrate to nitrous oxide (N<sub>2</sub>O) or nitrogen gas (N<sub>2</sub>) which are volatile and ‘gas –off’ to the atmosphere.

According to Incitec Pivot Limited agronomists David Hall and Jim Laycock, “denitrification losses can be very fast and can lead to losses of up to 40% of nitrate nitrogen from the top-soil. With the high cost of N, this can be very damaging to profit – but not as bad as sowing a crop with insufficient N to achieve targeted yield and grain protein! Greater emphasis should thus be placed on using stratified soil tests to measure and respond to soil N levels through the depth of the profile, especially in country that has been waterlogged in recent times.”

*Further information:*

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## Down or across the slope farming?

Downpours in early 2008 brought a lot of water to Central Queensland and also added a new dimension to a CQ Sustainable Farming Systems (CQSFS) comparison between “across the slope” (ATS) and “down the slope” (DTS) controlled traffic farming in the region.

As Emerald-based consultant agronomist Graham Spackman puts it: “in a nutshell, eight years of CQSFS research conducted by local Queensland DPI&F and DNRW staff showed that DTS farming resulted in slightly more run-off and erosion.

“But that was during a fairly low rainfall period, when levels of run-off and erosion in both systems were pretty small.

“When we got big falls of rain in early 2008, that trend was reversed, and ATS resulted in more damage and soil erosion,” Mr Spackman said.

The research began in 1999 in two paddocks on David and Alan Storey’s property *Moongoo*, 10km south of Capella, after the local CQSFS farming group identified the need to research the effect of traffic direction and cropping strategy on crop production.

‘Conservative’ cropping strategies were applied in one paddock and ‘aggressive’ cropping in another. Both paddocks had established contours and had DTS and ATS applied.

According to Department of Natural Resources and Water officer Stewart Neilsen, research between 1999 and 2007 generally showed DTS shed more runoff and lost more soil, nitrogen, phosphorous and atrazine.

But that didn’t mean ATS was better than DTS, Mr Neilsen said, merely that – on a zero tilled downs soil, with 1-2% slopes, under drier than “normal” conditions – ATS farming outperformed DTS in terms of retaining runoff and constituents.

However the differences in constituent loss between ATS and DTS were relatively minor when compared to other studies.

“Furthermore, under certain conditions – low cover, high soil moisture and heavy rainfall – ATS farming can result in greater runoff and soil loss, due to the concentration of flow and formation of rills,” Mr Neilsen said.

“Rills don’t just cause a short-term increase in runoff and constituent loss, if they become large enough their effects can last for decades.

“Properly oriented DTS might overcome the development of major rills by preventing the concentration of flow which, combined with its many other agronomic advantages, will

potentially outweigh any slightly increased constituent losses resulting from the system outside of large rainfall events.”

Mr Neilsen said all research on Moonggoo now would be focussed on DTS because enough data comparing the two systems had been collected and DTS was preferred by the Storeys.

While cropping strategy did not appear to have appreciably influenced total runoff and constituent losses between 1999 and 2007, that changed during the large runoff events of January and February 2008, when there were higher overall constituent losses from the conservatively cropped bays.

This period emphasised the highly episodic nature of paddock runoff in the Central Highlands and that, when heavy rain falls, runoff would be high, regardless of traffic direction or cropping strategy.

However, by making more aggressive planting decisions, the chances of having drier soil profiles and high levels of ground cover in place would be vastly improved, thereby minimising constituent loss.

Aggressive and conservative planting options would be included in ongoing research on *Moonggoo*, as would the spacing of contour banks under DTS, because that also appeared to influence rates of runoff and constituent loss.

Wider spacings between contour banks seemed to result in lower runoff per unit area but greater sediment entrainment.

According to Graham Spackman every farm, paddock and contour bank layout is different, so growers shouldn't expect the one recipe to suit everybody.

Growers might need to look at their contour bank layouts, because many banks didn't have enough capacity to hold water and were too long to cope with water volumes.

“Many growers have realised they need more waterways and better maintained contour banks to cope with extreme rainfall events” he said.

*Further information:*

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**GRDC Project code: DAQ00116**

## Doza<sup>®</sup> faba bean for northern NSW and southern Qld

The expansion of faba beans in northern NSW has been limited by a lack of adapted varieties. However, the recent release of Cairo<sup>®</sup> has seen an expansion in area and the new variety Doza<sup>®</sup> is set to again boost the area sown to faba bean.

Key features of Doza<sup>®</sup>:

- Earlier flowering than Cairo<sup>®</sup>, Fiord and Barkool
- Yields up to 12% higher than Cairo<sup>®</sup>
- Superior rust resistance to all other current varieties
- Superior chocolate spot resistance than Fiord, Barkool and Fiesta

- Frost tolerance is at least equal to Cairo<sup>®</sup>.

Doza<sup>®</sup> (tested as SP01040) was selected by Dr Ian Rose (NSW DPI, Narrabri) as part of Pulse Breeding Australia's (PBA) faba bean breeding program. The GRDC, The University of Adelaide and the NSW DPI all invest in this national program.

According to Ian Rose; “selected for its adaptation to the subtropical environments of northern NSW and southern Queensland, Doza's<sup>®</sup> combination of early flowering, yield, seed size and disease resistance is a significant advance over the varieties currently available to growers in this region. Doza<sup>®</sup> is a possible replacement for all the current commercial varieties used in the northern grains belt, especially the warmer short-season areas of northern NSW that cover the large areas of the northwest Slopes and all of the northwest Plains.

“Doza<sup>®</sup> is significantly better adapted to the warmer spring temperatures in northern NSW and southern Queensland compared to existing varieties. The PBA breeding program has been selecting for earlier flowering to improve adaptation in the shorter season subtropical areas. In late April-early May plantings at Narrabri, Doza<sup>®</sup> flowers an average of 10 – 14 days earlier than Cairo<sup>®</sup>, allowing more time for grain filling before warm spring temperatures induce plant maturity.

“Doza<sup>®</sup> is resistant to rust and is far superior to Cairo<sup>®</sup>, which is only moderately resistant to this disease. No variety is immune to rust so pustules will be found, even in resistant varieties such as Doza<sup>®</sup>. Resistance acts to limit the spread of the disease when infection does occur. The combination of the resistance plus an early season spray with mancozeb should control rust throughout the season at non damaging levels. Susceptibility to chocolate spot is similar to Fiesta and better than Cairo<sup>®</sup>, Fiord and Barkool. The early season application of mancozeb at the 5-6 leaf stage is essential for both rust and chocolate spot control, through control of initial infection.

“Doza<sup>®</sup> has a slightly smaller (9%) seed size than Cairo<sup>®</sup>, but this is more than offset by greater uniformity in size and colour. With significantly fewer very large seeds this should help to alleviate problems with blockages in seeding equipment experienced by some Cairo<sup>®</sup> growers.

“Frost tolerance is considered to be at least equal to Cairo<sup>®</sup>.

“However, Doza<sup>®</sup> is susceptible to bean leaf roll virus and bean yellow mosaic virus (the major faba bean viruses in the north), but even so has yielded consistently well under pressure by these viruses under experimental conditions.

“The agronomic benefits of Doza<sup>®</sup> from earlier flowering and rust resistance open up new opportunities for reliable faba bean production in short season, high temperature environments.

“Doza<sup>®</sup> has been extensively evaluated in replicated yield trials in northern NSW from 2003 to 2007. In 2007 there were 12 replicated trial comparisons of Doza<sup>®</sup> with other varieties in the northern region. In all 12 trials the yield of Doza<sup>®</sup> exceeded that of Cairo<sup>®</sup>. Average yields over the 12 sites were 1.88 and 2.02 t/ha for Cairo<sup>®</sup> and Doza<sup>®</sup> respectively, a 7.7% advantage. In 2008 data is complete for six sites. Doza<sup>®</sup> out-yielded Cairo<sup>®</sup> at five of these sites

and averaged 3.29t/ha versus 2.88t/ha for Cairo<sup>®</sup>, a 14.1% advantage,” said Ian Rose.

Doza<sup>®</sup> is being commercialised by ABB Seeds. Although good supplies of seed have been produced for sale in 2009 strong interest in the variety is resulting in substantial early orders for seed.

Doza<sup>®</sup> is protected by Plant Breeders Rights (PBR) and has an end-point royalty of \$3.30/t ex GST payable on delivery. Grain may be kept for feed or kept as own planting seed, but under the PBR Act, it is an offence to knowingly sell or give grain to others for use as seed.

The development of Doza<sup>®</sup> is due to the efforts of NSW DPI technical staff at Narrabri and Tamworth. In addition, Joop van Leur (Plant Pathologist) and Jenny Wood (Chemist) have contributed greatly through disease and quality assessment. Yield trial results include data collected from NVT.

The development of new varieties involves many people and organisations. In this case the NSW DPI technical staff at Narrabri and Tamworth played a key role.

*Further information:*

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**GRDC Project code: UA00097**

## New barley varieties for 2009

Increasing yield and achieving grain quality standards such as test weight and grain size, are important issues for barley growers to maintain profitability. New varieties coming onto the market are a definite step forward in addressing these issues.

Several new barley varieties are targeted for the southern and western regions which have a strong export malt market, while in the northern region we are much more influenced by the domestic malt and feed markets.

While growers are able to rely on the established varieties, there are four new varieties suited to the northern region which can also be considered for sowing in 2009.

Hindmarsh<sup>®</sup> (AWB seeds), Fleet Australia<sup>®</sup> (ABB Seeds), Commander<sup>®</sup> (ABB Seeds) and Shepherd (AWB Seeds).

All offer good yield potential and improvements in grain quality which will result in fewer problems achieving trading standards. However, each also has some issues to consider.

All four varieties have better potential yields than current varieties. As seen with the success of Grout<sup>®</sup> in the North, reliability of yield is more critical to profit than yield potential.

While varieties such as Grout<sup>®</sup> and Fitzroy<sup>®</sup> have better grain size than Mackay<sup>®</sup> and Tallon<sup>®</sup>, these new varieties are a further improvement in both grain size and higher hectolitre weights – both issues of concern in the past few seasons.

It is hard to say which are going to be the best of these varieties as they all have positive and negative traits.

Hindmarsh<sup>®</sup> is generally a quick to medium maturity in the northern region (it can be quicker when grown further south). It has very large grain size and generally consistent good yields over a wide range of environments. As a semi dwarf variety it has good standability and a very erect growth habit, but it does ripen quickly and if left too long between ripening and harvest straw breakage has been noted. It is susceptible to spot form of net blotch and may require spraying. It is under evaluation for malting but if it passes will not be accredited until at least 2010. It is suitable for trial in most parts of the northern region.

Fleet Australia<sup>®</sup> is a very quick- medium maturing tall line (similar maturity to Grout<sup>®</sup>) with excellent grain size and great yield potential. It probably has the best disease resistance package of the new lines (and any other commercial variety in the north). Its main concern is straw strength which can be quite weak in high yield situations. It appears that the further north this variety goes, the more the straw strength becomes an issue. It is worth trying in the western areas of NNSW but avoid the higher yielding lush areas (eg Tamworth, Liverpool Plains, east coast, irrigation) where tall growth may result in lodging. Fleet Australia<sup>®</sup> is a feed variety.

Commander<sup>®</sup> is a medium maturity line and the only new variety evaluated for malt and should be accepted as a malting variety in 2009. It has very good yield potential in both high and low yielding situations and reliable grain size and hectolitre weights. Disease resistance is reasonable, but not quite as good as Fleet<sup>®</sup>. Straw strength can be an issue at yields above 4t/ha but it tends to be stronger than Fleet<sup>®</sup>. It is similar to Grimmer for straw strength except that it has a higher yield potential so will probably lodge more than Grimmer. As with Fleet<sup>®</sup> it tends to be impacted more as it is moved north. Avoid situations where this variety can grow tall such as early planting dates and very high rainfall situations. It is not a good choice for irrigation.

Shepherd is a medium quick variety that can grow quite tall and has large grain with good hectolitre weights. It has moderate resistance to most foliar diseases and very good reliable high yield while maintaining grain size and test weight across a wide range of conditions. In higher yield situations it is likely to out-yield Grout<sup>®</sup>. In tougher conditions, Grout<sup>®</sup> will probably be more reliable. Straw strength is better than Fleet<sup>®</sup> and Commander<sup>®</sup>, but it can lodge in some situations. Shepherd has good levels of leaf rust resistance which has been an issue for Grout<sup>®</sup> in some regions during 2008. Shepherd is recommended for trialling across most of the region, but avoid very lush conditions where it may grow tall and lodge. Shepherd produces plenty of dry matter and could be a good choice for silage.

Performance of these new varieties and associated agronomy and research into seed treatments will be discussed in more detail at the Dubbo and Goondiwindi Updates in February / March 2009.

*Further information:*

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**GRDC Project code: DAQ00109**

# Go slow with new malting barleys

Graingrowers have been asked to note that any new malting barley variety – no matter how agronomically spectacular – will need time to win market share, with maltsters and brewers both risk averse in their input purchases.

And that may mean a new malting barley variety could initially bring a lower price than established varieties while the malting market decides where it sits in relation to other varieties for quality demand and value.

Growers need to be careful when they decide how much of a new malting barley variety to include in their rotations, keeping in mind that market share of any variety takes time to grow.

These are the messages from Barley Australia executive manager, Linda Price, who says growers need to engage with their marketers, regional barley councils and maltsters in a co-ordinated approach to successfully grow new varieties to meet market demand.

“Understanding the nature of the malting and brewing market helps explain the need for moderate introduction and adoption of new varieties of barley, and careful industry stewardship from the relevant industry groups helps manage this function.

“The quality parameters of malt – derived from a specific variety of malting barley – are vital to the brewer from a production and profitability perspective.

“Over time a brewer will have become used to certain malt blends made from specific varieties and will seek to use them again as they deliver the result required.

Any brewing company looks to product consistency as a primary requirement from their raw materials, but improvements on extract (‘yield’ from a brewer’s perspective) and other quality characteristics also appeal to brewers.

“However any impetus for varietal change will usually come from either the maltster or the grain marketer.”

*Further information:*

**Linda Price, 08 9237 9737**

## Diary Dates

February 2009	
10-11	<b>Wagga Wagga Grains Research Update</b> Contact: Jon Lamb, 08 8362 5417, jlcom@chariot.net.au
24-25	<b>Dubbo Grains Research Update</b> (RSL) Contact: (see # below)
24-26	<b>Pioneer Technology Show</b> , Wyreema Research Station, Wyreema Qld Contact: Craig Choice on 0418 717 448 or Craig.Choice@pioneer.com
26	<b>Gulgambone Grains Research Update</b> (Bowling Club) Contact: (see # below)
27	<b>Narrabri Grains Research Update</b> (RSL) Contact: (see # below)
March 2009	
3-4	<b>Goondiwindi Grains Research Update</b> (Community Centre) Contact: (see # below)
5	<b>Miles Grains Research Update</b> (Memorial Club) Contact: (see # below)

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