

# Does canopy management pay in the north?

Canopy management is emerging as a hot topic for northern region grain growers as pressure intensifies to maximise dollar returns on inputs.

Peter McKenzie, Quirindi, NSW-based AgVance Farming agronomist says canopy management is generally viewed as a tool to maximise plant water use and ensure adequate soil moisture reserves for grain fill.

“It means many different things to different people, but by far the most popular view of canopy management in Australia is manipulation of nitrogen application to alter plant biomass throughout the growing season,” Peter says.

“With fertiliser, particularly nitrogen, being one of the largest input costs in growing a crop on the Liverpool Plains, it stands to reason that we should be pushing the boundaries of maximising the grain produced, per unit of nitrogen applied.”

The Grains Research and Development Corporation (GRDC) is funding research into canopy management via a Northern Grower Alliance (NGA) collaboration with AgVance, NSW Department of Primary Industries (NSW DPI) and Foundation for Arable Research, New Zealand.

Guy McMullen, NSW DPI says the main difference between canopy management and previous nitrogen top-dressing research is that all or part of the nitrogen inputs are tactically delayed until later in the growing season.

“This delay tends to reduce early crop canopy size but this canopy is maintained for longer, as measured by green leaf retention, during the grain filling period,” Guy says.

“Much of the research has been done in the United Kingdom and New Zealand but the question is whether it can work under Australian conditions – especially the shorter growing season of northern NSW.

“Results from the southern region have certainly showed some potential, especially in areas with high yield potential and higher nitrogen inputs, but further research was required to test and validate the principles in northern NSW.”

Results from three years of supplementary irrigated research have provided important pointers for the use of canopy management principles in northern NSW.



**To date, the best results with delayed nitrogen application have been with early-sown, long-season varieties.**

Tactically delaying nitrogen is a management system that allows flexibility to respond to seasonal conditions and manage climate variability, Guy says.

“Research has shown that nitrogen fertiliser has been able to be delayed until stem elongation (GS31) without yield loss and usually with increased grain protein when conditions are suitable,” he says.

“This means that growers are able to apply a portion of the expected nitrogen requirement and then assess yield potential, as influenced by soil water and seasonal forecasts, later in the season and respond accordingly.

## Encouraging results

“To date the best results with this approach have been seen in early-sown, long-season varieties with high yield potential which are very nitrogen responsive with high nitrogen fertiliser inputs.”

Further research in 2009 is looking at repeating these impressive responses and the use of tactically delayed nitrogen in durum crops to improve yield and protein.

The GRDC-funded research is also looking at using crop reflectance to assist in making nitrogen fertiliser decisions.

To date crop reflectance at key growth stages has shown strong relationships to crop structure and yield.

Peter says the results still need to be proven over a number of years.

“Based on the past three season’s research, my current management approach is to establish a target yield level we believe we can achieve based on some ‘back-of-the-envelope’ water use efficiency calculations, using available moisture and predicted rainfall for the upcoming season,” he says.

Generally a full profile of moisture receives sufficient nitrogen up front to provide the entire crop requirement to the predicted yield level.

If in the event yield potential is higher due to favourable seasonal conditions, there is generally opportunity to apply small amounts of nitrogen later to increase yield as the season progresses but this usually isn’t necessary.

“In a lower moisture profile situation, my approach is to apply nitrogen at a rate less than the target yield level requirement and top the nitrogen up later in front of rainfall, as opportunities present themselves,” he says.

“This requires careful planning and preparation on the grower’s behalf, in order to take advantage of impending rainfall, sometimes in short timeframes.”

Peter says the 50:50 split application of nitrogen extends the period that nitrogen can be applied through the season without the ‘cliff face’ drop in yield if nitrogen isn’t applied at precisely Z30–31.

Effectively it improves the margin of error available to the grower if rainfall isn’t forthcoming at Z30–31, he says.

“Where growers are set up for and using precision agriculture, I apply a 70:30 approach when there is a full soil moisture profile and a 50:50 approach where soil moisture is likely to be limiting.”

Peter says the main limitation to the practice in the north is the ability to reliably apply nitrogen in front of a rain event, to enable roots to access soluble nitrogen in the root zone.

**For more information, visit [www.grdc.com.au/director/events/grdcpublications/canopymanagement](http://www.grdc.com.au/director/events/grdcpublications/canopymanagement).** ■