

Keeping the good years good

GRAEME JENNINGS

Farmer presentations were a feature of the World Congress on Conservation Agriculture, held in Brisbane last month. Gunnedah grower and GRDC Northern Panel member Richard Heath told participants there is a need to improve the performance of no-till systems in wet years.

Conservation agriculture, particularly no-till and controlled traffic, works in most years but research is needed to help growers understand the mechanisms at play in different conditions and ensure that responses in wet years are appropriate and sustainable in the longer term, according to NSW grain grower Richard Heath.

This research needs to include assessment of the economic and financial impact of different practices such as a pass with a prickle chain when there is an excessive stubble load in a no-till paddock.

“The perception of agriculture in Australia is that we deal more often with extremes; the dry years are very dry and the wet years are very wet,” Mr Heath said.

“Because of this variability the profitability of agricultural enterprises that rely on natural weather cycles tends to also be variable. There are years in which returns are large enough to cover the entire cost of buying a farm, but disastrous years in which several seasons of profit can be lost are just as likely.

“The development of conservation agriculture has been driven largely by the desire to eliminate these ‘disaster’ years, which in the past were usually associated with drought.”

A 2008 survey of no-till adoption in Australia found that, in many regions, around 90% of growers were using no-till and related conservation agriculture techniques; a remarkable figure given that the level of no-till adoption in the early 1990s was around 10%, he said.

He attributes this rapid uptake of conservation agriculture techniques to the results they produce in many Australian cropping environments.

“The adoption of no-till in combination with controlled traffic, in particular, is results driven.

“Looking over the fence from your dying or dead crop at a neighbour’s that is still alive can be a strong motivator for

practice change.

“Farmers tend to remember bad crop experiences more than good ones and a practice change that results in a good or better crop being produced in conditions that previously resulted in a bad crop experience is certain to be adopted.

“The question now is what new bad experiences could drive the next round of practice change.”

Historically, bad years were dry years, he said, with low rainfall often resulting in complete crop failures and no income, so it was no surprise that practices that made more water available to crops in low-rainfall years were rapidly adopted.

But, he mused, have adapting farming systems and changing practices to maximise water retention in now-moisture conditions turned previously good years into bad? Have the practices put in place to improve crop performance in low-moisture conditions turned historically ‘good’ high-rainfall years into ‘bad’ years with low profits despite high rainfall?

And are recent high-rainfall seasons impacting on practice change and conservation agriculture?

Last year was an example of a new ‘bad’ year in which profits were low despite plenty of moisture throughout the season.

Good rainfall right through the growing season meant crops of wheat, barley and chickpeas all grew magnificently, but the ‘good’ conditions meant disease pressure was high and despite frantic efforts many growers were unable to keep disease under control.



RICHARD HEATH

“In chickpeas and durum especially, but also in wheat, barley and canola, expensive battles were fought and lost against aschochyta blight, botrytis mould, fusarium head blight, and net blotch.

“Many growers spent hundreds of dollars a hectare trying to protect crops that ultimately failed and weren’t harvested because of disease. As a result, what should have been a good year turned into a very, very bad year even before the harvest-time rain that made the situation even worse.”

As a result of this experience and the challenges of seeding this season’s winter crops into paddocks with high levels of surface trash, many growers are re-thinking their attitudes to stubble, he said.

“The mantra of ‘retain stubble at all costs’ developed in response to bad experiences in dry years is being replaced in some growers’ thinking by an attitude that ‘perhaps stubble has to be more strategically managed’.

“This change in thinking is driving adoption of new practices such as chaining with a diamond-configuration prickle-chain harrow and a return to strategic use of stubble burning and



SOWING WINTER CROP INTO SORGHUM STUBBLE IN WET CONDITIONS.

aggressive cultivation, which are fundamentally at odds with the practices adopted to alleviate the effects of dry years.”

There is no doubt recent wet years have caused problems for many Australian growers, he said, but extra plant available water, the fundamental driver behind adoption of no-till and controlled traffic, is still the critical factor for successful cropping in Australia.

“Growers need to find ways to capitalise on ‘good’ years when there is a lot of moisture available while maintaining the benefits of conservation agriculture and continuing to minimise the risk of dry years becoming ‘bad’ years again.”

However, this is proving difficult because of a lack of good, robust data on the economic effects of various practices on farming systems, he cautions.

“There is not much more than gut feel to assess the soil moisture impact of a single pass with a prickle chain within a controlled traffic setup,” he said.

“Nor is there information available on the effect a pass with a prickle chain will have on reducing the stubble-born disease load ahead of the following crop; which is one of the main reasons the practice is being adopted.”

Mr Heath spent an average of \$60/ha on buying and applying fungicides to his durum wheat last season.

“Despite this we still suffered downgrading due to fungal staining and the presence of fusarium head blight. The combination of control costs and loss from downgrading was between \$200 and \$300/ha depending on yield.

“That bad experience made me look very suspiciously at the level of inoculum carrying over in stubble and the management practices I have available to reduce that risk.

“A prickle chain will incorporate stubble and I have access to a machine that will fit into my controlled traffic operation.

“However, the best information I can find on the moisture and yield impacts of

stubble churning is a figure from Jeff Tulberg that zero tillage can have a 183kg/ha yield advantage over stubble mulching in a controlled traffic system.

“With a wheat price of \$220 a tonne that works out at a potential loss of \$40/ha due to lost soil moisture. On that basis a cultivation to reduce risk from carryover inoculum looks attractive in the context of \$60/ha to apply a fungicide and potential losses from downgrading.

“I consider myself a committed no-till farmer but I can’t afford to have another experience like that of last year, so controlling disease inoculum in stubble is a high priority for me at the moment.”

“The options available include crop choice, burning, light or heavy cultivation or doing nothing and relying on in-crop control. The most logistically and apparently economically attractive of these is a light cultivation, so this year I used a prickle chain on paddocks I hadn’t cultivated in the previous decade.”

But he is frustrated by the limited amount of hard information he could find to help in making this decision.

“There are loads of information about the economic impact of these practices in isolation but little about their impact within the context of a no-till or zero-till farming system with a four or five year cropping rotation.”

Assessing a practice change response to the bad experience of dry years is about as black and white as you will ever get in agriculture, with no-till and controlled traffic indisputably the practices needed to maximise the amount of moisture available to crops.

Assessing a practice change response to bad experiences caused by wet years is much more of a challenge, he said.

He sees a need for data on the ability of crop sequencing to alleviate disease issues emerging in long term no-till systems, with the persistence of inoculum on and within stubble and the effects of crop rotations on stubble breakdown requiring particular attention.

“Whether to grow a sorghum or sunflower crop following wheat may be easy enough to work out economically but the effect of that crop on inoculum carry over into the following wheat crop and the likely economic impact of that is not immediately obvious to a grower.

Ideally it should be.”

Another common conundrum for northern growers is the choice of sorghum or cotton following wheat.

“The dollar impact of the soil water loss from the ‘pupae busting’ cultivation required as part of the region-wide helicoverpa management program is well understood. It seems likely this tillage could provide a disease-control benefit in the following cereal crop but there are no data comparing the economic value of a reduction in inoculum with the loss of soil moisture. Farmers are left to rely on ‘gut feel’.”

The stubble management practices being adopted by many growers in the wake of recent ‘wet’ seasons raise the issue of what constitutes no-till system.

“Does one cultivation a conventional farmer make?,” he asked.

“There are plenty of long-term no-till farmers who now have a prickle chain as part of their equipment but still consider themselves to be no-till.”

“A prickle chain incorporates stubble, provides non-chemical weed control and minimises machinery maintenance costs by reducing the roughness of no-till country. Farmers who chain their country talk about how easy it is to sow into nice, level ground with the stubble incorporated.

“We’ve all had nightmarish planting

experiences in no-till ground. Prickle chaining can almost eliminate the possibility of that sort of negative experience, so again we have the removal of bad experiences driving practice change.

“The term ‘strategic tillage’ is being heard more and more. It is generally used to describe ‘one off’ tillage used in a system that is otherwise no-till. ‘Strategic tillage’ is generally performed reluctantly or with the knowledge that there is a negative side to the practice.”

However, there is a lack of knowledge about exactly when and how ‘strategic tillage’ should take place, he said.

“Should it be straight after harvest or immediately before sowing? When the weather is hot or cold? Should the working be shallow or deep? Should it be used to incorporate fertiliser?”

“I believe no-till growers will continue to use an occasional ‘strategic cultivation’ and we need to understand more about its value and impact, biologically and economically.”

He also sees a need for research to identify the economic ‘tipping point’ at which the cost of control in a strict no-till system becomes greater than the potential yield reduction from loss of soil moisture during a cultivation to reduce disease carry over.

Information is also needed on best management practice once this tipping point is reached, he said.

“Even die-hard no-till farmers will reach a point where the cost of controlling disease caused by stubble retention in no-till will be greater than the benefit of the moisture retained by not cultivating.”

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