

Solving patchy problems

Issues such as shallow gravel ridges that damage seeding gear will be dealt with. There is one machine operating in WA (from South Australia) that is profile grinding these hard areas and 'rotary grinding' them down to a depth of around 250 mm. This solves machine damage issues and adds these usually productive areas to the arable hectares list.

'Voodoo' science

At the 2009 DAFWA/GRDC Crop Updates Dr Doug Edmeades (see www.agknowledge.co.nz) spoke about science being under threat because of the modern philosophy of political correctness which infers that all opinions are equal.

The problem here is that they are not.

The scientific methodology is the only way you can gain confidence about a theory or a product. If it is rigorously tested, in appropriately designed trials, with untreated checks and the results are published in a reputable peer reviewed journal – then you can have confidence in it.

Organic food, the man made climate change debate, the banning of herbicides, the GM crop debate and holistic medicine are a few areas where rigorous science is being pushed aside.

Over time there have been many questionable products that have hit the agricultural market and are a flat out rip-off. You need to push promoters of these products for the replicated trial results. Buyer beware.

Those of us with a vested interest in the value of evidence based sciences (which is everyone!) need to defend the scientific process with vigour and yell down those who erode the place of the discipline of science.

TO SUM UP

The no till, no sheep and 'knowledge' farming system has changed the landscape dramatically. The system is more robust financially, has stood up to resistant weed pressure and can better weather dry seasons. Growers need to look at the risk profile of their business and answer a few questions:

Do you put the blinkers on and rest on this knowledge and just seed everything from April 20 each year? Look at the long term annual rain for your area and see what your probability is of a profitable crop. If you are happy with the odds – why not just go seeding? And this is just what many are doing with great success.

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Dynamic crop sequence trial: An Australian first

By Paul Carmody, Future Systems Analyst, DAFWA

A Dynamic Crop Sequence (DCS) trial at Katanning in Western Australia's Great Southern region, is the first of its kind for the Australian grain industry. The trial tests up to 100 different crop sequences in a crisscross trial design to address the question of break crop effect (see photos opposite).

According to Raj Malik, Research Officer for the Department of Agriculture and Food, WA based in Katanning, the only trials in the past that came close to this concept were trials by CSIRO's John

Kirkegaard. John looked at the effect of biofumigation properties of mustard and canola on the following cereal crop in south central NSW.

Why do the DCS trial?

Now in its second year the DCS trial is investigating the reasons why farmers do or don't get a break crop effect from crops like canola, field peas, lupins or oats in dryland farming systems of southern Australia.

The trial site covers over four hectares. Crop treatments in 2008 (see Table 1) are crisscrossed with the same treatments in

TABLE 1: Treatments for the dynamic crop sequence trial at Katanning, WA

	Treatment 2008	Treatment 2009 – Cross sown on 2008 treatments	Treatment 2010 – Sown over entire site
1	Wyalktchem wheat with Jockey	Wheat plus Jockey	Wheat
2	Wyalktchem wheat without Jockey	Wheat minus Jockey	Wheat
3	Buloke barley	Barley	Wheat
4	Bravo canola	Canola	Wheat
5	Carrolup oat	Oat	Wheat
6	Carrolup oaten hay	Oaten hay	Wheat
7	Kaspa field pea	Field pea	Wheat
8	Jennabillup lupin	Lupin	Wheat
9	Green manure (Oat 50 kg/ha and Morava vetch 25 kg/ha)	Green manure	Wheat
10	Fallow	Fallow	Wheat



Raj Malik and Project Manager Peter White (DAFWA) at the Dynamic Crop Sequences trial site at Katanning.

2009 to establish 100 combinations of crop sequences for the final year of wheat to be sown across in 2010.

It is a large investment into understanding what the effects are of different crop sequences on wheat for – in the Katanning region – duplex soils of the southern wheatbelt. The trial is also unique because for the first time, it compares oaten hay and a manure crop in crop sequences. This ‘effect’ has been largely overlooked by past crop rotation studies.

The trial is part of a GRDC project co-funded by the DAFWA which will examine the place of break crops through bio-physical and whole-farm economic analysis. The work included a review of past research on break crops and factors that influence their use in rotations. This review has helped to formulate such an unusual trial.

Other DAFWA research staff assisting in managing the trial are Mark Seymour, Senior Research Officer and Pam Burgess, Technical Officer both based in Esperance.

The Katanning trial was established in 2008 with 10 different treatments (see Table 1) being sown in 10 m wide x 100 m long strips which have now been criss-crossed with the same mix of crops in 2009 before a final treatment of cereals in 2010.

A second GRDC and DAFWA supported trial has been established at Wongan Hills in the central wheatbelt to help our understanding of break crops in future farming systems in that type of environment.

What are we measuring?

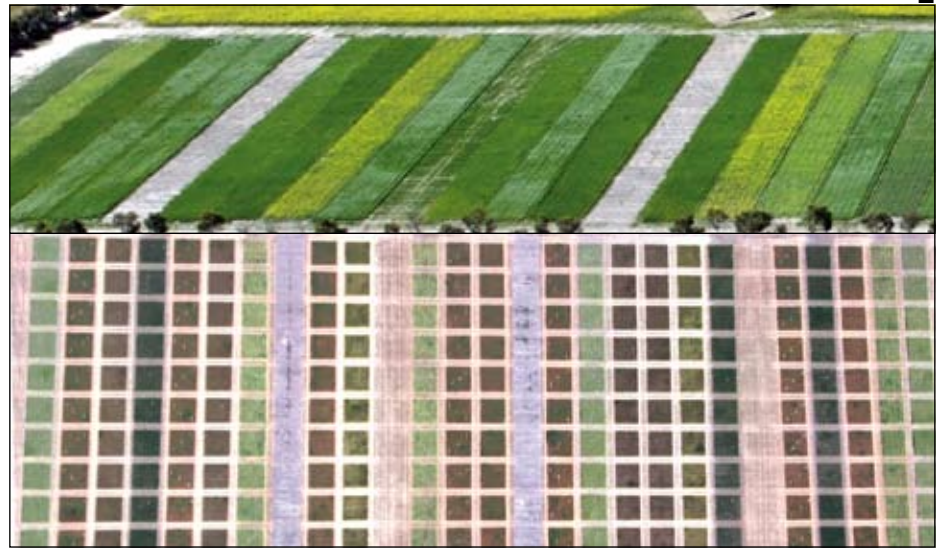
Some of the elements being measured in the DCS trials to quantify the effect of one crop on the performance of the following crop include:

- Water use;
- Disease flow,

- Yield stability;
- Weed carryover;
- Residue impact,
- Economics; and,
- Soil health.

The trial design allows for many combinations of crops to be followed by wheat in the one environment. This provides a fair comparison of the various crop sequences.

See *Southern Focus* for the second article in a DAFWA series detailing break crop case studies.



Aerial photographs of the DCS trial site.

BREAK CROP BENEFITS INCREASING OVER TIME

According to Mark Seymour, Research Officer for DAFWA, there has been research in the past throughout WA to determine the break crop effect of lupin on sandy soils, field peas on heavy soils and canola on a range of soil types.

“Over 150 experiments have been conducted across the wheatbelt since the 1960s to determine the rotation effects of

leguminous or oilseed crops in a cereal based rotation,” says Mark.

“Most of this work has been reported in the context of a yield improvement to following wheat crop compared to a continuous cereal rotation. This can range from no effect to a 20 per cent benefit depending on the situation.

“But with the advent of no-till and the availability of more effective grass herbicides, the actual magnitude of the yield advantage has increased. For example, since 1990 wheat after lupin yields are actually larger than in trials conducted before 1990 (see Figure 1),” Mark points out.

“Nowadays farmers also have access to more effective fungicides to control both leaf and root diseases in cereals, and they routinely apply fertilisers throughout the growing season at generally higher rates (in total) than 10 years ago. Under these circumstances you might expect the yield benefit from a break crop to now be lower.

“This is one of the reasons for revisiting the crop sequence trial – to help answer the question farmers ask: “What is the best crop to sow after the last one or two?”

“The DCS trial approaches this question in a different way. In the third year we can look at the effect of 100 different crop sequence combinations leading up to the third year wheat crop,” Mark said.

FIGURE 1: The yield response of lupin-wheat (LW) versus wheat-wheat (WW) at a range of applied nitrogen rates in the wheat year. Shown are results from numerous DAFWA rotation trial sites across the WA wheatbelt in both the period prior to, and after, 1990

