



**Grains
Research &
Development
Corporation**



Eureka
A FINAL REPORT SUMMARY

Benefits from establishing controlled traffic systems on sandy cropping soils in WA

Project Title:

Controlled Traffic –
farm scale evaluation
and demonstration

Project Number:

DAW505

Research

Organisation:

Department of
Agriculture,
Western Australia

Researcher

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Region - West

Research summary

- Following initial deep ripping, cost/benefit analysis for a Controlled Traffic System (CTS) (also referred to as Controlled Traffic Farming) using farm-scale equipment was evaluated over a four-year rotation on a sandplain soil using no-till methods.
- A computer spreadsheet model was developed to calculate yield and gross margin benefits for different combinations of machinery used in CTS compared to current machinery systems.
- Gross margin improvements were estimated to be \$30-\$40/ha (at current prices and for seasonal conditions typical of 1997-2001) in the medium rainfall, sandplains of the northern agricultural region of WA. This was mainly attributed to superior control of soil compaction and weeds.
- One initial deep ripping in the CTS was as profitable as a normal traffic system ripped on every alternate wheat crop. Costs associated with repeated deep ripping were avoided (a saving of \$30 /ha every 2 years).
- Yield improvements were 8-13% for wheat, 10% for lupins and 11% for canola.
- Other benefits included lower screenings in wheat and greater oil content in harvested canola (which attracted premium prices).
Costs for seed, fertiliser and herbicides were reduced by 3-4%, due to reduced overlapping in paddock operations.
A small reduction in fuel use from running on firm tramlines occurred compared to fuel used in normal operations.
- In a lupin/wheat rotation, average gross margin was improved \$50/ha using inter-row knockdown herbicide compared to green manuring for control of herbicide-resistant weeds. The inter-row spraying used shielded nozzles between wide rows of lupins in the Tramline system.
- A new, more practical tramline design, called 'Fuzzy Tramlines' was developed to improve control of erosion and weed problems in tramlines. These are a broad band of crop the width of spraying and spreading wheels. Fuzzy tramlines are formed by top dressing crop seed (but not fertiliser) over the tramline, which is then planted by a following tyre or track.



*This summary can also be found at www.grdc.com.au
in 'For Growers' under Research Summaries*

- At Mullewa, sustainability benefits for alley farming were demonstrated by the compatibility between the layout of the tree alleys and the CTS between them being in a “round and round” pattern rather than an “up and down” pattern.

Background

Subsoil compaction is an insidious restriction to grain production grown on Western Australian sands. These losses have been increasing as the weight of machinery used to grow grain crops has steadily increased.

Previous research showed the yield of crops and pastures can be restricted by subsoil compaction in the Geraldton region. Deep ripping to at least 30 cm can rectify subsoil compaction with yield increases up to 30 % being achieved on WA sandplain soils.

However, these positive effects may only last one year following wheel compaction induced by crop machinery operations; in a typical season, random wheel tracks can cover about 50% of the ripped paddock.

This project evaluated the benefits from Controlled Traffic Farming in a no-till cropping system. The compatibility for 'round and round' systems of operating CTF in regularly spaced rows of trees in an alley farming system was also evaluated. The benefits from inter-row weed control were also assessed for these systems.

Project aims

1. Evaluate and demonstrate the economic benefits and farm scale feasibility of Controlled Traffic Farming for rain fed grain production in WA.
2. Evaluate and demonstrate the sustainability benefits of Controlled Traffic Farming, especially with alley farming and no-till systems, to minimise compaction problems on sandy soils.
3. Develop and test new ideas for inter-row operations and precision steering, in collaboration with other research projects.

Other information

Blackwell, P.S., Webb, B., Lemon, J. and Riethmuller, G. 2003. Tramline Farming: pushing Controlled Traffic further for Mediterranean farming Systems in Australia. Proceedings of the 16th Triennial Conference of the International Soil and Tillage Research Organisation; University of Queensland, Brisbane, Australia, 14-18 July 2003.

Blackwell, P.S., Webb, B., Lemon, J. and Riethmuller, G. 2004. Tramline Farming Systems Technical Manual. Bulletin 4607, Department of Agriculture Western Australia.

Please remember it is the reader's responsibility to check chemical registrations before making any recommendations based on information contained in the Eureka files.

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