

Controlled Traffic Farming



A practical overview of
CTF systems
in southern NSW

Background...

The recent run of dry seasons in southern NSW has highlighted the ability of some farming systems to better adapt to the conditions. A combination of stubble retention, no-till and controlled traffic farming (CTF) has enabled more reliable crop yields to be produced from limited moisture, while also protecting the structure and health of soils.

Although the adoption of stubble retention and minimum tillage has rapidly increased over the past decade, CTF is still relatively uncommon in southern NSW, despite attracting significant interest in recent years. To encourage this interest, a CTF discussion group was formed through FarmLink Research and Grassroots Agronomy in 2010, providing a forum for growers throughout the region to share 'hands-on' information relating to CTF. This publication is the culmination of the discussion group meetings, aimed at increasing awareness of CTF principles and highlighting practical experiences with CTF systems in the region through case studies.

A survey of members of the CTF discussion group, which included growers from as far north as Greenethorpe and south to Lockhart, revealed that 'other farmers' were the most useful information source when establishing their CTF systems, highlighting the benefit of the informal group structure.

The survey also revealed five main reasons for the members wanting to move to a CTF system, including:

- reduced soil compaction for better water infiltration
- easier inter-row sowing for stubble retention
- improved paddock trafficability
- less overlap for more efficient use of inputs (eg. herbicide, fertiliser, fuel)
- improved timeliness and ease of operations

In other words, CTF is not about the ability to 'drive straight', but rather a system which is able to facilitate improved yields, efficiency and profitability.

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The first group meeting was held at Jason Coleman's farm at Temora. The Coleman family have been operating on a 12-metre CTF system since 2008.



The CTF group visited Phillip Kerr at Oaklands who operates on a 13.5-metre CTF system (excluding header). Phillip has been retaining stubbles for 25 years.

What is Controlled Traffic Farming (CTF)?

- ▶ **Permanent wheel tracks.** In a CTF system, machinery is driven along permanent wheel tracks to reduce the area affected by random wheel traffic from approximately 80% down to 10-15% of the paddock. Tracks are generally set out using autosteer with 2cm RTK guidance. If tracks are kept bare, machinery can be steered with relative accuracy, although most machines in CTF systems are now fitted with autosteer. Narrow tyre widths are recommended to reduce the track area.
- ▶ **Matching wheel bases.** In a controlled traffic system, the wheel base of each machine/implement is matched, typically to suit three metre track spacings as dictated by header axles in dryland cropping operations. Although most manufacturers now produce machinery with three metre axles, existing machinery can be modified with the use of 'cotton reel' spacers or similar axle extensions to extend the wheel base.
- ▶ **Matching working widths.** The working width of each implement in a CTF system is matched to multiple widths of the narrowest implement. In most cases this is the seeder, particularly if progressing from a tramlining system. For example, a '12-metre system' may include a 12-metre seeder, 24-metre spreader and 24-metre boomspray in a 2:1 ratio. A true CTF system would also include a 12-metre windrower and header front, although the capital outlay for these means they are often added to the system at a later stage. Other typical working widths are 9, 10.67 or 13.5 metres.
- ▶ **Farm zoning and layout.** On mixed farms, CTF systems can be established on dedicated cropping areas, identified through a process of farm zoning (ie. segregating cropping areas from grazing areas on the basis of elevation, tree cover, etc). Farm layout also needs to be adjusted for CTF systems to allow long, straight runs, usually requiring removal or realignment of some internal fences. In most situations, tracks should run up and down the slope to help manage water run-off and cold air drainage.



On a trip to western Victoria, the CTF group visited long-term CTF grower Rob Ruwoldt at Kewell. Rob has been operating on a 9-metre system since 2003.

A meeting was held at Mark and Steven Day's farm at Lockhart. The Day family have been operating on a 12-metre CTF system since 2008.

What is involved?

For most farmers a CTF system evolves gradually, often progressing from a tramlining system. In this situation, matching the boomspray to a multiple width of the seeder is usually the first step. Alternatively, some literature advocates that a true CTF system should start with the header as the base width, being the heaviest machine in the system, with implements matched accordingly. Although this approach is increasing in practice, it often requires purchase of a new header. Unless due for replacement, this is an outlay many prefer to avoid until the system has been in place for several years and the benefits become evident. Regardless of which approach is taken, it is important to remember that a CTF system can be developed over time, with a more complete system being adopted as machinery upgrades are required and finances allow.

The following steps provide an example of how a typical CTF system can be developed in stages, starting with the seeder as the base width:

► **Decide on a working width:**

Select either a 9, 10.67, 12 or 13.5 metre system depending on the width of the seeder (or the header front if an upgrade is being planned).

A common first step is to upgrade the boomspray to match the selected working width (ie. 24-metre boom for a 12-metre seeder, 2:1) to allow tramlining on temporary wheel tracks. When purchasing machinery to match working widths, take a tape measure and make sure the actual width is as specified! Try to avoid confusion by working only in metric measurements.

► **Create permanent wheel tracks:**

Install 2cm RTK guidance to create permanent, three metre wheel tracks for improved trafficability (particularly in wet conditions and night spraying). Track management is often a process of trial and error, but many are choosing to leave tracks bare for several years until stable, then sowing them to control weed growth. Track renovation should be carried out as required.

► **Modify load bearing axle widths:**

Convert machinery to suit permanent, three metre wheel tracks by extending the axles of the tractor, spreader and boomspray.

► **Include the header:**

Match the header to the system, ie. a 12-metre centre-mounted header front to match a 12-metre seeder. This step is usually delayed until a header upgrade is required. An alternative approach is to modify an existing header front, provided the header has the required power capacity. Offset header fronts can be converted to centre-mounted for 9, 10.67 or 12-metre systems. The rear header wheels should also be extended to suit three metre tracks. There are now also a number of CTF contractors for windrowing and harvesting.

► **Match additional machinery:**

Complete the CTF system by matching additional machinery, eg. air cart and chaser bin, to three metre tracks. Note that chaser bins with three metre axles can run on both tracks in a 9 or 10.67-metre system using an auger extension on the header. However with wider systems, the chaser bin can only operate with one wheel on a track (using guidance) unless a side catcher is fitted.



Permanent wheel tracks: These permanent three-metre tracks were created using 2cm RTK guidance, which also allows crops to be inter-row sown into standing stubble.



Matching axle widths: The front axle of this spraying tractor was extended with factory fitted cotton reel spacers and a three metre axle made for the boomspray to suit permanent three-metre tracks.

What the research says...

► about CTF and soil compaction

Depending on soil type, the yield benefits of CTF in managing soil compaction can be variable. However there have been several research projects applicable to soil types in this region that have shown positive results. For example:

- A six-year project on a red-brown earth at Roseworthy in South Australia (Tim Ellis, CSIRO) showed a 12 to 17% yield increase in barley, wheat and faba beans as a result of controlled traffic. In areas without traffic, the previously compacted soil showed significant improvements in soil structure, with reduced bulk density and better porosity, water infiltration and aggregate stability. Over time, these structural improvements also increased the overall efficiency of the CTF system, with harder wheel tracks improving trafficability and softer soils increasing germination.
- A project on sodic clay soils at Grogan near Temora in NSW (2000 to 2001) showed an area which had been deep-ripped to remove a tillage hard pan was re-compacted by wheel traffic the following year. The wheel tracks had significantly higher soil strength and bulk density than the area between the tracks, as well as significantly reduced root growth of both wheat and canola. Canola yields on the tracks were only 34% of that between the tracks, although there were no differences in wheat yields. The results suggest that on these soil types, deep ripping may be necessary to remove compaction before CTF can be successfully implemented.

reference: Chan KY, Oates A, Swan AD, Hayes RC, Dear BS, Peoples MB, 2006. Agronomic consequences of tractor wheel compaction on a clay soil. *Soil Tillage Res.* 89, 13-21

► about CTF and power/fuel requirements

Research has shown that tractor and implement wheels normally dissipate more energy through the process of compacting and increasing the strength of the surface soil than most tillage or sowing implements. Consequently, the tractor needs to supply even more power to the trailing implement to till or sow through the compacted soil behind the wheels. In effect, **half the total power output of a tractor can be used up in creating and then undoing the effects of its own wheels.** Controlling wheel traffic means tractor size and fuel requirements can be typically reduced by 50%.

Points to note regarding soil damage from wheel traffic include:

- Most of the damage caused by wheel traffic occurs on the first pass.
- Tyre pressure is the most significant factor in surface damage.
- Axle load is more significant in subsurface damage and the depth to which it penetrates.
- Major symptoms of damaged soil include reduced numbers of pores and pore connectivity. In practical terms, this leads to greater runoff, less rainfall infiltration and ultimately poorer water use efficiency.

references: Tullberg JN, 2001. Controlled traffic for sustainable cropping. Proc. 10th Australian Agronomy Conference, Hobart, Tas.
Tullberg JN, 2005. CTF: What's known, what's next. Proc. 3rd Australian Controlled Traffic Farming Association Conference, Gatton, Qld.



Matching additional machinery: An auger extension on this header in a 9-metre CTF system means the tractor and chaser bin are able to stay on the tracks during loading.



Power requirements: Controlling wheel traffic to permanent tracks has meant this lower horsepower tractor can now be used for all operations (sowing, spraying, spreading and chaser bin).

CTF Case Study...

9-metre system

- 9-metre CTF system on three metre tracks
- Inter-row sowing on 333mm row spacing
- 2cm RTK Trimble guidance
- 1600 hectares continuous cropping (no stock since 2008)
- 100 hectare farming blocks
- Uniform red loam soils



Photo: K. Condon

McKinleys operate on a 9-metre CTF system with three-metre bare wheel tracks using Trimble 2cm RTK guidance. They are considering using disc openers to sow wheel tracks for weed management.



Photo: G. Condon

The inside wheels were removed from the duals on the sowing tractor to run on three metre wheel tracks. The seeder was reduced from 11 metres to 9 metres and row spacing widened to 333mm.

Reduced compaction, improved trafficability and the ability to enhance their existing no-till system were the driving factors behind the McKinleys move to CTF. Having initially set up a tramlining system in 2003 with an 11 metre seeder matched to a 22 metre boom, they decided to remove stock from their operation in 2008 and progress to a CTF system. They commenced CTF in 2009, operating on a 9-metre system with 2cm RTK guidance.

Matching to a 9-metre header front

The McKinleys decided to base their CTF system around their existing 9-metre header front so the header could be included in the system from the outset. Extensive modifications were then undertaken to match other machinery to the system, costing an estimated \$25 000. These included:

- reducing the existing tyne seeder from 11 metres to 9 metres (and increasing row spacing to 333mm to allow inter-row sowing into standing stubble)
- extending the axles of a 27 metre boomspray (purchased second-hand) and 18 metre spreader to three metres
- removing the inner wheels from the duals on the sowing tractor to allow three metre axle width

Prior to 2011, the windrower remained the only machine not matched to the 9-metre system. However the McKinleys have since purchased a second-hand cotton picker on three metre axles which they have converted to a windrower for the 2011 season. The windrower shares a 9 metre front with the new John Deere 9670 header, which was recently purchased for better straw handling and chaff spreading ability to complement their no-till system.

Farm layout

Farm layout has been carefully planned to accommodate an efficient CTF system. The McKinleys have created 100 hectare farming blocks where possible, allowing long run lengths, north/south aspect and adequate drainage.

McKinley family, Rannock

They have also identified frost prone blocks to manage accordingly, including the use of later sown winter wheat and barley.

Wheel tracks

Wheel track management has been an evolving process for the McKinleys, having experimented with both bare and sown tracks. Although bare tracks have the advantage of better aesthetics and moisture conservation for adjacent crop rows, lack of competition means they can become infested with weeds.

To control weed growth on the tracks, the McKinleys added additional nozzles to their boomspray located over each wheel track. These are plumbed into a separate line and run through a foam marker tank. However they are now considering returning to sown tracks using a disc implement to better manage grass weed infestations.

Impacts to date

Improved trafficability has been one of the major outcomes for the McKinley's CTF system, particularly for summer spraying and logistics during a wet harvest. Permanent tracks have also allowed them to spread composted manure during winter, providing a low cost soil conditioner with slow release nutrients and reducing paddock variability.

As a result of their stubble retained/CTF system, the McKinleys have also noticed improvements to soil structure and water holding capacity, particularly important on their lighter granite soils. As a consequence, they are now able to sow crops by the calendar into marginal moisture conditions.

Although 9-metre systems can be limiting in terms of the area covered, the McKinleys have compensated by minimising downtime when operating machinery. Block farming, calendar sowing and organised management have all helped optimise field efficiency.



Photo: K. Condon

The wheels on the spreader were moved out to three metres to match the tractor. Although currently spreading to 18 metres (2:1), McKinleys plan to fit a new vane to allow urea to be spread to 27 metres (3:1).



Photo: K. Condon

McKinleys recently converted a second-hand cotton picker into a 9-metre self-propelled windrower. Prior to 2011, the windrower was the only machine not matched to the system.



Photo: K. Condon

The new 9-metre centre mounted front is able to be used for both the header and self propelled windrower.

CTF Case Study...

10.67-metre system (disc)

- 10.67-metre CTF system on three metre tracks
- Inter-row sowing with **disc seeder** on 308mm row spacing
- 2cm RTK Greenstar guidance
- 2300 hectares **mixed farming** - 70% crop, 30% pasture
- Red loam soils (predominant), some grey granite



Photo: G. Condon

Farm zoning has allowed a CTF system to be successfully integrated into the mixed farming operation.



Photo: K. Condon

The John Deere single disc opener was widened to 10.67 metres and row spacing increased to 308mm for inter-row sowing. Aricks wheels were fitted to minimise hair pinning.

The Lehmann family began no-till farming using knife points in the early 1990s. They later incorporated a tramlining system, using a 10 metre Flexi-Coil tyne seeder with marker arm matched to a 20 metre boomspray on bare tracks. Guidance was upgraded to 10cm GPS, then 2cm RTK with autosteer in 2004.

To maximise water use efficiency, the Lehmanns moved to a zero-till system in 2006 with the purchase of a John Deere single disc opener. The tyne seeder is still used for contracting and direct sowing into fallowed lucerne paddocks.

From tramlining to CTF

The ability to simplify the farming system, facilitate inter-row sowing for stubble retention and reduce compaction were the primary drivers behind the Lehmanns' progression to a CTF system. A header upgrade in 2009 provided the initial impetus, with the purchase of a John Deere 9770 with a 10.67-metre centre-mounted header front. The header is also an important component of the zero-till system, with the integrated PowerCast™ tailboard able to spread chaff and straw evenly across the width of the comb. Even straw distribution, in combination with Aricks wheels fitted ahead of the single disc openers, have been critical to minimise hair pinning and improve seed/soil contact when disc seeding.

Matching to a 10.67 metre header front

The decision to select a 10.67-metre CTF system was based on the ability to easily modify existing machinery to match working widths. For this reason, the Lehmanns estimate the cost of setting up the system was only approximately \$5000, with other costs attributed to routine machinery upgrades.

The modifications made in preparation for the first CTF year in 2010 included:

- widening the John Deere disc seeder to 10.67 metres (and increasing row spacing to 308mm for inter-row sowing)
- extending the boomspray from 30 metres to 32 metres (3:1 ratio)
- extending the axles of the boomspray and tractors to three metres

Lehmann family, Illabo

Further modifications for the 2011 season included:

- extending the front axle of the air cart
- widening the Flexi-Coil tyne seeder to 10.67 metres
- extending the axles on the chaser bin (although it still has to be driven off the tracks during pick-up due to the length of the header auger)

To complete the system, the Lehmanns have recently purchased a Kuhn spreader with the ability to spread fertiliser to 32 metres (3:1 ratio), as well as a Macdon M150 self-propelled windrower on three metre axles. The windrower has a 10.67 metre front with vertical knives and a cross auger to allow even feeding of large windrows.

Balancing CTF with livestock

The Lehmanns operate a unique CTF farming system in that they have retained their sheep enterprise, running a self-replacing flock of 2000 merino ewes. The mixed farming system offers effective income diversification which is integral to whole farm profit.

Grazing during the cropping phase is minimal, with stubbles only grazed lightly after harvest when soils are dry to avoid damage. Dual purpose crops are not grown. The pasture phase is predominantly lucerne and clover, providing nitrogen for the cropping phase and allowing grass weeds to be managed cost effectively.

Zero till in CTF

With water use efficiency a key driver of the system, the combination of CTF and zero till (disc seeding) has been critical in the ability to retain moisture for crop establishment and grain fill. This has been particularly evident in drier seasons, resulting in improved yields and less variability. Despite the benefits, disc seeding adds another element to the whole farm system which requires careful agronomic management, particularly in relation to residue management, pre-emergent herbicide use and lime incorporation.



Photo: G. Condon

The boomspray was widened to 32 metres to match the 10.67-metre system (3:1), and the axles of both the boomspray and tractor were extended to three metres.



Photo: G. Condon

The self-propelled windrower is matched to the system and has vertical knives and a cross auger to allow even feeding of large windrows.



Photo: G. Condon

The header is fitted with a PowerCast™ tailboard for even straw distribution across the working width, essential to minimise hair pinning when disc seeding.

CTF Case Study...

12-metre system

- 12-metre CTF system on three metre tracks
- Inter-row sowing on 305mm row spacing
- 2cm RTK Trimble guidance
- 2500 hectares continuous cropping (stock being phased out)
- 300 to 400 hectare farming blocks
- Variable soil types ranging from red brown loam to heavy clay



Photo: G. Condon

Colemans operate on a 12 metre CTF system with three-metre bare wheel tracks using Trimble 2cm RTK guidance.



Photo: K. Condon

A Case front-wheel assist tractor on three-metre axles was purchased in 2009. The boomspray was widened to 24 metres in 2008, but they have since purchased a 36 metre boom (photo opposite).

The Colemans began no-till farming using press wheels and knife points in 2002. Their progression to CTF was motivated by a desire to reduce compaction, increase paddock trafficability and reduce inputs through less overlap.

The Colemans decided on a 12-metre CTF system, which best suited their existing 12.5 metre airseeder and also allowed for future scale, with 12-metre systems becoming the benchmark within the industry. Although a significant investment in machinery was made to accommodate their CTF system, much of the cost was attributed to routine upgrades. They estimate an additional \$18 000 was spent on CTF specific costs, \$12 000 of which was spent on converting the header front.

Matching to a 12-metre seeder

The first step to developing a CTF system was taken in 2008, when the Colemans upgraded their guidance to 2cm RTK and began matching their implement working width to a 12 metre system, including:

- reducing the seeder to 12 metres
- widening the boomspray to 24 metres (they have since purchased a 36 metre boom)
- conversion of the header front from 11.8 metres to 12 metres by TPOS Fabrications in Victoria

Farm layout

Whole farm planning then commenced to achieve larger blocks for longer run lengths and improved time and labour efficiencies, each covering 300 to 400 hectares. Permanent tracks were set out to run up and down slopes for runoff, while also achieving the longest runs practical. The tracks have not only improved trafficability, but also reduced fuel consumption and in-crop weeds. However weed burdens on the unsown tracks have been an issue, so the Colemans are now considering sowing tracks with a disc opener to provide competition.

Farm planning has also incorporated sowing and harvest logistics, utilising shire roads or existing farm lanes and ensuring a minimum number of A-B lines (for guidance), preferably one to two per farm. With continuous cropping now the dominant enterprise, fences have been removed to accommodate these changes.

Coleman family, Temora

Matching three-metre wheel bases

In 2009 the next step was made to start matching wheel bases to suit three-metre tracks, including:

- extending the axle width of the existing sowing tractor, spreader and boomspray
- purchasing a Case MX245 front-wheel assist tractor with three metres axles for spraying and spreading
- reducing the back axle on the Concord air cart

The Colemans have also recently purchased a new chaser bin on three metre axles, so the windrower is the only machine that remains unmatched to the system. Until it is upgraded, they have successfully compromised by windrowing using a 9 metre draper front with three deck belts and a three metre offset, so that the windrow is placed in the centre of the tracks.

Benefits to date

As a result of the changes to their system, the Colemans can now sow 115 to 130 hectares per day, up to 160 hectares per day on the larger blocks with longer run length. Permanent wheel tracks mean sowing dates can be set by the calendar, commencing 26th April and concluding by 20th May across 2400 hectares. Labour efficiencies have also improved, with two full-time and one part-time employee(s) for sowing and four full-time employees at harvest.

The Colemans have also observed improvements in soil structure since adopting their CTF system, particularly on the heavy clay soils. Wheel tracks have compacted faster than expected and they have noticed fewer weeds as a result of reduced traffic across the paddock.

It is important to note that these changes have evolved not from CTF alone, but from a system which also includes stubble retention and no-till farming. The Coleman's system is constantly being fine-tuned, with consideration now being given to 'the next step', assessing options such as variable rate technology, disc seeding, band spraying (matching nozzles to row spacing) and weedseeker technology.



Photo: K. Condon

The axle was extended on the Marshall spreader in 2009 to suit three-metre wheel tracks.



Photo: G. Condon

A 36 metre Hayes boomspray with 7000L tank was recently purchased to improve time efficiency and match the system at a 3:1 ratio.



Photo: J. Coleman

Although the windrower is not matched to the system, canola is windrowed using a 9 metre draper front with three metre offset so windrows are placed in the centre of the tracks.

CTF Case Study...

12-metre system

- 12-metre CTF system on three metre tracks
- Inter-row sowing on 308mm row spacing
- 2cm RTK Greenstar guidance
- 3300 hectares continuous cropping (no stock since 2008)
- Variable soil types ranging from red loam to heavy clay with sodic subsoil



The 12-metre Alfarm airseeder is on 308mm row spacing with press wheels. Disc openers have been added for sowing wheel tracks, while disc coulters are used to cut through green manure residue.



The John Deere 7730 spray tractor was adapted for 3 metre wheel tracks using cotton reel spacers in 2008.

The Days run a family business consisting of 3300ha of winter crop using 2.5 labour units. They have developed a 12-metre CTF system, wanting to minimise compaction for improved soil health and better crop emergence.

From tramlining to CTF

The Day's progression towards their current farming system, which is a combination of CTF, no-till and stubble retention, has been a gradual process. They commenced with a tramlining system using 10cm free-to-air guidance in 2004, having purchased a 24 metre boomspray to match their 12 metre airseeder.

Guidance was upgraded to 2cm RTK with universal autosteer in 2007, which then allowed them to inter-row sow on 308mm row spacing. They took the first step toward a CTF system in 2008 by extending the axles of the spraying tractor with cotton reel spacers to suit three-metre wheel tracks.

Matching three-metre wheel bases

In 2009, the Days made major machinery upgrades to suit their CTF system, with purchases including:

- John Deere 8530 sowing tractor with three-metre axles
- John Deere 9770 header with 12 metre Macdon front and PowerCast™ tailboard for better chaff distribution
- Oztec chaser bin on three-metre, steerable axles

In 2010, the Days added a variable rate controller to the seeder for varying fertiliser rates (particularly phosphorus) and conducting their own on-farm trials. Recent purchases include a 36 metre boomspray to increase spraying efficiency (3:1) and a 12 metre Macdon windrower. A track tractor is being considered for the 2012 season for sowing, towing the chaser bin and spraying in wet conditions.

The system is now at the point where all machinery (except the chaser bin during loading) run on a full 12-metre CTF system with three-metre wheel tracks. The estimated cost for parts and labour has been approximately \$20 000, with major machinery purchases attributed to routine upgrades.

Photo: K. Condon

Photo: K. Condon

Day family, Lockhart

Agronomic changes

The Days have also implemented agronomic changes to their system, particularly in relation to managing the potential for herbicide resistance. Minimising the weed seedbank, understanding changes in the weed spectrum and developing a better understanding of chemical rotations have been particularly important as the CTF, no-till system has evolved.

A significant change to the Day's rotation has been the adoption of green manure crops for weed management. Field peas are sown early and spray fallowed in spring before weeds are able to set seed. This is followed by canola the following year to provide a two-year grass break. The benefits of additional nitrogen and moisture from the early legume fallow have also proven to be beneficial for the higher risk canola crop.

Wheel track management is also critical to managing weed infestations. The Days have added disc openers to the airseeder to allow wheel tracks to be sown, creating competition for weeds growing on the tracks.

Benefits of the system

The Days emphasise that CTF is an important part of their whole farm system, rather than just the ability to drive in a straight line.

Removing sheep from the system has meant there are no compromises to the cropping operation. Paddocks are no longer powdery or crusted at the surface and ungrazed stubbles have allowed better conditions for inter-row sowing. Stubble retention has also reduced moisture loss from evaporation and nutrient loss from wind erosion, while less dust has meant better conditions for spraying.

Moisture probes have been installed to provide 'real time' data on soil moisture content within the profile and help make management decisions, particularly in relation to nitrogen. There are plans to install more probes in the future, with moisture management the key to the Day's CTF, no-till system.



Photo: K. Condon

The Oztec chaser bin is on 3 metre, steerable axles. It is the only machine that runs off tracks during pick-up.



Photo: K. Condon

Green manure crops have been introduced into the rotation for grass weed management and to provide nitrogen and moisture benefits to the following canola crop.



Photo: K. Condon

Moisture probes have been installed to monitor soil water levels to a depth of one metre during the season.

CTF Case Study...

12-metre system

- 12-metre CTF system on three metre tracks
- Inter-row sowing with track tractor on 308mm row spacing
- 2cm RTK Autofarm guidance
- 1720 hectares continuous cropping, with additional 800 hectares contract farming
- Variable soil types ranging from red loam to grey clay



An aerial view showing the Holding's CTF paddocks, with old fencelines still visible (October 2008).

Photo: D. Holding



A John Deere track tractor was purchased in 2011, with accurate steering making it ideal for inter-row sowing. Better traction means it will also be used for spraying/spreading in wet conditions.

Photo: D. Holding

The Holdings completed their first season using a 12-metre CTF system in 2006, although they had been developing the system since 2002 after experiencing significant yield penalties during the drought. The ability to sow in dry and marginal conditions and achieve better crop establishment were important factors in their decision to engage in CTF.

From tramlining to CTF

The Holdings commenced with a tramlining system in 2003 after purchasing a new airseeder. By removing one tyne on the seeder, they were able to establish wheel tracks with two sowing passes. At 11.3 metres wide, two widths of the seeder matched their 23 metre boomspray, allowing slight overlap as a margin of error for manual steering. 10cm GPS guidance was added the following year.

In 2005, the seeder was widened to 11.75 metres to better match the width of the boomspray, which actually sprayed to 24 metres. However this also changed the position of the tramlines. Sowing the original tramlines resulted in cloddy soils and poor emergence, highlighting the need for permanent wheel tracks.

Matching three-metre wheel bases

A 2cm RTK guidance system with auto-steer was purchased in 2006 to create permanent three-metre tracks. Modifications were then made to match the wheel bases of existing machinery, including:

- extending the front axle of the spraying and spreading tractor with cotton reels and widening the wheel spacing on the back axle
- making a three metre axle for the boomspray

Harvest logistics

Believing it is critical to have the header matching the system, the Holdings bought a 12 metre centre-mounted draper front for the 2007 harvest. In 2009 they converted a 10.7 metre offset front to a 12 metre centre-mount for a new header which was purchased for additional contracting work.

Holding family, Yerong Creek

One header has recently been upgraded for the 2011 harvest, fitted with a PowerCast™ tailboard spreader to allow better straw distribution across the working width. It also has a longer auger which now reaches the centre of the chaser bin when unloading, allowing one wheel to remain on the track.

The 9 metre windrower is not currently matched to the system, however there are plans to upgrade to a new 12 metre front for both windrowing and harvesting.

Completing the system

A John Deere track tractor on a three metre wheel base has recently been added to the Holding's system. They had trialled one during the wet 2010 season when trafficability was difficult, finding it was better able to stay on the tracks without slipping off compared with the wheeled tractor. Accurate steering makes the track tractor ideal for inter-row sowing and its narrow track width imposes far less compaction. The Holdings now use the tractor for sowing, with the option of spraying, spreading and towing the chaser bin in wet years.

The wet 2010 season also resulted in damage to wheel tracks, caused by severe rutting when spraying. In syndication with three local CTF farmers, the Holdings purchased a Grizzly Wheel Track Renovator to smooth out the tracks prior to sowing in 2011. The renovator's discs are able to break down the raised track edges and slice open the compacted base. The loose soil is funnelled into rolling harrows which fill the track area to the same level as the paddock.

A Landaco belt spreader on a three metre wheel base has also recently been purchased, with a 24 metre spreading width for urea and 12 metres for lime and gypsum.

Now in their fifth season of CTF, the Holdings have noticed many benefits of the system, including improved soil structure and water infiltration, better crop establishment, reduced fuel costs, less driver fatigue and input savings from decreased overlap.



Photo: D. Holding

The Holdings have two headers with 12 metre centre-mounted fronts, one which was purchased new and the other they modified from their existing 10.7 metre offset front.



Photo: W. Holding

A Landaco belt spreader with three metre wheel base was recently purchased for lime, gypsum and urea applications. The inner wheels were removed from the Case tractor to match three metre tracks.



Photo: W. Holding

A Grizzly Wheel Track Renovator was purchased to smooth out wheel tracks which became severely rutted after the wet 2010 season.



GRASSROOTS AGRONOMY



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