

## **Controlled Traffic Farming Alberta - The Start of a Journey**

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Controlled Traffic Farming Alberta <http://controlledtrafficfarming.org> is a project designed to evaluate the agronomic and economic viability of controlled traffic farming (CTF) in Alberta, Canada. It is also looking at improving on-farm research. Prior to 2011 there were only one or two Alberta farmers using full permanent CTF systems. As of the spring of 2015 it appears that perhaps about fifteen farmers are in CTF systems in Canada. Eight of those are part of the Alberta project. Donald Worner, John Deere Productions Systems Manager, Small Grains and Canola, estimates that there are less than fifty CTF farmers in North America. He does see many farmers, especially in the USA corn belt, that use seasonal CTF, likely in the hundreds. Census data does not track controlled traffic farming adoption in North America.

The Controlled Traffic Farming Alberta project began in 2010 due to interest created by Robert Ruwoldt, a prominent Australian no till and controlled traffic farmer. A trip to Australia by a small group of farmers grew into a three year project to evaluate the agronomic and economic potential of CTF in Alberta, Canada. Five farmers committed to the three year project. The farmers started making implement changes in 2011 and began field trials. Nearly all of their cropland is now farmed using CTF.

Funding for the 2011-2014 project came from the Agriculture and Food Council (Agriculture and Agri-Food Canada), Alberta Crop Industry Development Fund, the Alberta Canola Commission, Alberta Barley Commission, Alberta Wheat Commission, and Alberta Pulse Growers. Private funding and support came from Farmers Edge, Beyond Agronomy, Point Forward Solutions, AgViser Crop Management and Paradigm Precision. The Agricultural Research and Extension Council of Alberta provided management support.

A new round of funding was obtained for 2014-2017 to continue the project and field work with most of the funding from the Alberta Crop Industry Development Fund. The University of Alberta became a partner to do more intensive research on soil properties and root growth in the plots. There are eight cooperators spread out over 1250 kilometers, giving the project a wide range of soils and climatic conditions. Their cropped acres range from 270 to 3500 hectares. The University of Alberta has a graduate student, Kris Guenette, working on his MSc in controlled traffic and Adam Gurr from Manitoba is doing an MSc on controlled traffic through Iowa State.

Beginning in 2014 random traffic (RT) was simulated on field-scale plots on a controlled traffic field at each cooperator location. Random traffic was imposed on the CTF just prior to or just after seeding. A variety of equipment was used ranging from four-wheel drive tractors with duals to sprayers. The simulated random traffic

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resulted in approximately 35-50% of the soil surfaced being tracked versus the CTF check where about 15 to 20% of the soil surface is being tracked. The treatment plots match the harvester header or swather widths for each cooperator. The plots will be repeated for three years and will be the same treatments in the same locations. Growing season rainfall for 2014 ranged from very dry to above normal.

The time it takes to infiltrate 2.5 cm of water into the soil has been monitored for four years. The CTF plots have shown consistently greater (faster) average infiltration rates, but not always significantly different, than the random traffic plots in each of the last four years. The differences were not statistically significant at 10% on four of the six sites in 2014. The heavy clay soils at Trochu and Morrin showed significant differences in favor of the controlled traffic.

Agriculture and Agri-Food Canada is monitoring crop emergence and weed populations in the CTF and random traffic at six sites. Weed populations are counted each spring, prior to or just after in-crop spraying, with a view to determining if there are any shifts in populations between the CTF and random traffic. Crop emergence counts are taken at the same time. Weed counts for 2012 through 2014 do not reveal any population shifts. One site in 2014 showed a significant advantage for crop emergence favoring the random traffic, with no differences at the other sites.

The plots for 2014 are replicated field-scale plots. Replications ranged from two to five. The Lacombe site had four replications but one was lost due to herbicide damage. The data was collected from combine yield monitors and in the case of Dapp and Trochu grain carts with scales were also used to record yields. Yields were collected from random traffic plots and from the CTF immediately adjacent to the random traffic plots. Three of the sites had a slight yield advantage for CTF and three a slight advantage for random traffic. However none of the yields are significantly different at  $p=10\%$ . Our cooperators grew canola, wheat and corn in 2014. Other crops that will be in the rotation are barley, sunflowers, peas and fababeans.

The range of net benefits to CTF (Gross Revenue less Variable Costs) varies substantially, however caution should be used since the yield results are not significant at 10%. The incremental capital investment ranges from \$5.26 per hectare to \$530.66 per hectare, mostly as a factor of economies of scale and farm strategies.

The farmers are facing several challenges in implementing their systems. Getting all equipment to match widths is a work in progress. Most of the cooperators have axle widths of 3.048 meters (10 feet). Unfortunately some combines and swathers are now being manufactured with wider axle widths such as 3.40 meters and cannot be narrowed to match the existing tramlines. The rigidity of the CTF system means there will be some compromises when it comes to custom operators, baling and spreading of manure for example. Residue management continues to be an issue. All of our cooperators are no-tillers and usually do not remove straw.

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The CTF system is functioning well on each farm and is proving to be a resilient system. It has improved the timeliness and efficiency of operations. It does require a very high level of management, but in many ways is easier to manage once the system is in place. The precision of a CTF system opens up a whole new world of agronomic/economic opportunities such as in-crop nitrogen application, on-row fungicides and so on. Controlled traffic farming is proving to be an excellent system within which to do on-farm research. Yields have not improved – but we think they will given time.



60 foot 18.29 m JD disc drill

