Soil responses to CTF at FB Parrish & Sons
- a project in progress!
What is CTF?

- CTF confines all tracks to least possible area of permanent traffic lanes
  - CTF is a traffic management system
  - it’s not prescriptive about tillage
Crop responses to CTF

% loss in yield compared with controlled traffic by crop type

<table>
<thead>
<tr>
<th>Crops</th>
<th>% Yield Loss with CTF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barley</td>
<td>20</td>
</tr>
<tr>
<td>Oats</td>
<td>22</td>
</tr>
<tr>
<td>Peas</td>
<td>18</td>
</tr>
<tr>
<td>Potatoes</td>
<td>15</td>
</tr>
<tr>
<td>Sugar beet</td>
<td>12</td>
</tr>
<tr>
<td>Wheat</td>
<td>10</td>
</tr>
<tr>
<td>Onions</td>
<td>8</td>
</tr>
</tbody>
</table>
“Excessive traffic necessitates excessive tillage”
The more you run on it!
the more fuel and time you waste!
Conventional vs CTF
Tasmania, 2009

Conventional traffic
Conventional vs CTF
Tasmania, 2009
This is what CTF is trying to avoid!
This bit looks good on top – but!

Zone of wetness above compact layer

Compact layer
Constituents of a soil

Soil with good natural structure

Acts like a sponge: Can hold up to 40% water by volume

With acknowledgement to R.C. Palmer, Independent Soil Assessment Specialist
rc.palmer@btinternet.com
Practical demonstrations
Extracting undisturbed sample at trafficked site
Extracting undisturbed sample at site in CTF since 2009
2.1 g/cc wet BD

2.3 g/cc wet BD
Infiltration and drainage test

1 litre of water added to CTF, no ponding, most drained in 150 s

1 litre of water added to RTF, 30 mm ponding, most water away from surface in 300 s
Danish work
P. Schjønning et al, Aarhus University

Trafficked plots – pores > 0.3 mm
Danish work

P. Schjønning et al, Aarhus University

Non-trafficked plots – pores > 0.3 mm
SOIL COMPACCTION STUDY

Research funded by:
The Morley Foundation
Douglas Bomford Trust
The Chadacre Trust
Existing systems – impossible to avoid damage
Soil repair - subsoiling
Benefits of subsoiling can be short-lived! Sandy loam

Penetration resistance, MPa

Depth, cm

"As found"
1, CTF
11, WDT
2, WCT
4, TCT
3, WCT +WDT
10, TCT +WDT
Clay soil

even tracking in dry conditions can have a big effect!
Subsoiling
Benefits on heavy soils – but!

Large cavities can reduce root access to water
Winter wheat yields (continuous)
Sandy loam soil, 2010
Winter wheat yields
Clay soil, 2010

Equivalent field yield, t ha\(^{-1}\)

- 1, CTF
- 2, Wcomb+WCT
- 3, Wcomb+WCT+WDT
- 4, TCT+TCT
- 5, TCT
- 6, Wcomb
- 7, TCT+sub
- 8, Wcomb+sub
- 9, WT&T
- 11, WDT
Recommendations

Subsoiling

• Fissure rather than massively disrupt
  – closer spaced less aggressive tines
    • but make sure not below critical depth
• Adopt CTF after subsoiling
  – ensure subsequent tillage operations fill wheel tracks
• Deal with grain harvester as and when necessary
Onions and potatoes
- some ideas, TwinTrac

Max 6 m wide implements
Implement width = Track 1 + Track 2
Practitioners TwinTrac system

5.79 m TwinTrac CTF system

76% of area not tracked

Cereals harvester 5.79 m

Grain auger

Trailer

Cultivator/drill 5.79 m

Sown tracks

Tramlines

28.95 m chemical application

Harvester 3.86 m

Tractor etc. 1.93 m

76% of area not tracked
Andrew Manfield, UK
200 ha Hessleskew

• CTF a way of thinking
• A lot of learning
  – machine widths not true!
• 50% less fuel with CTF & No-till
  – 5 tractors down to 3.5
  – No no-till without CTF
    • still some cults
    • ploughing 2 gears up on CTF
• Potatoes being integrated
Another TwinTrac option

1.8 m + 3.0 m track widths = 4.8 m implements

<table>
<thead>
<tr>
<th>Data</th>
<th>Tracked</th>
<th>Uncropped</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>26%</td>
<td>5%</td>
</tr>
</tbody>
</table>
The challenge – getting from this
to this or better
Your thoughts and ideas

16:00 – after next session and refreshments
Farming the future with machines from the past!

Tim Chamen

CTF Europe Ltd
1855 “Guideway agriculture”

• Alexander Halkett:
  – “the implements and their operation are always kept at a regulated height”
  – “it enables ploughing, cultivating, sowing, hoeing, watering and reaping all capable of being performed”
  – “as the seeds are sown with mechanical precision in lines, hoeing, trimming or watering can be carried out in between”
“Guideway agriculture”
Research gantries: USDA

Cotton Research Station, CA
Research gantries: SRI

12 m cultivation with 100 hp
Research gantries: SRI

Offset loads
Research gantries: SRI

Mounted lightweight rolls
Research gantries: SRI

Twin ploughs with LH and RH bodies
Research gantries: SRI

4 m harvester
Dowler production m/c
Less than 10% tracked area
Dowler – next generation
New moves are afoot!

- Many advantages compared with tractor systems
- Enhanced flexibility of operations and cropping
- Don’t dismiss out of hand – they can be engineered to deliver!
- Register your interest on the “Wide Span” page at www.ctfeurope.eu