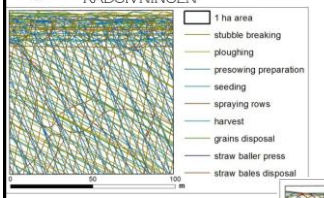
Ingredients for soil fertility in vegetable production

Richard de Visser
HortiAdvice Scandinavia A/S

Ingredients

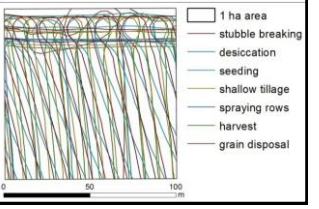
1. Organic matter management
2. Green manure strategy
3. Controlled traffic farming in vegetable production

Traffic in the field

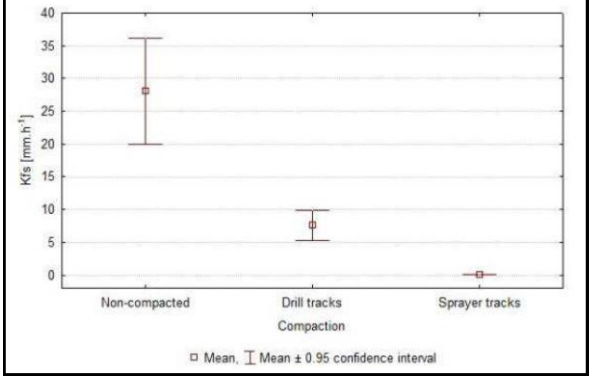


CTF

Traditional



Traffic in the field



What's the soil challenge for vegetable production?

- High level of traffical operations in vegetable production
- High demand on uniform quality, nutrient uptake, and growth
- High need for accuracy for sowing, transplanting, weeding and other operations
- Demand for flexibility in days in the field
  - Climatic changes
- Mechanical sub soil tillage can not recreate original soil structure
- Crop specific machinery with different size

CTF - benefits

- Higher yields
- More uniform and better quality products
- Higher water infiltration and water holding capacity
- Better soil structure and biological activity
- Reduction in clod load in root crops
- Greater spatial accuracy
- Opportunities for more plantes pr.hectare
- Tendency to a lower weed level
- Deeper and more abundant roots
- More working days in the field

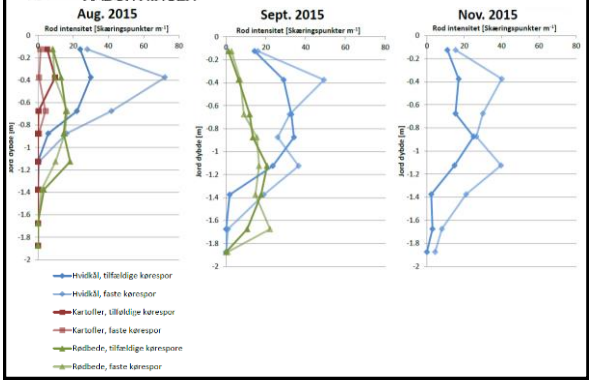
CTF and conventional

Soil structure and resistance

4-years project Wageningen University 2002-2005
Results in pea, spinach and onions on clay soil

	depth	traditional	CTF
Vol% air at pF2	2,5-7,5	16 (10-21)	20 (14-26)
	10-15	10 (6-14)	13 (10-17)
Cone index (Mpa)	3-8	1,3	1,1
	10-15	1,5	1,2

Root growth



CTF - challenges

- Practically all machinery needs adjustment
  - Same track width for all machines
- Harvesting celeriac, red beets, leeks, and many other crops are single row-harvesters – SCTF (Seasonal Controlled Traffic Farming)
- Potato harvester needs one wheel in the bed for stability

CTF - challenges

- In full CTF soil tillage is restricted to work between the tracks
  - Green manure incorporation
  - Grass weed management
- Risk for falling off the tracks in wet soil
- Limitation for destoning
- Investment in GPS is still high – but getting lower

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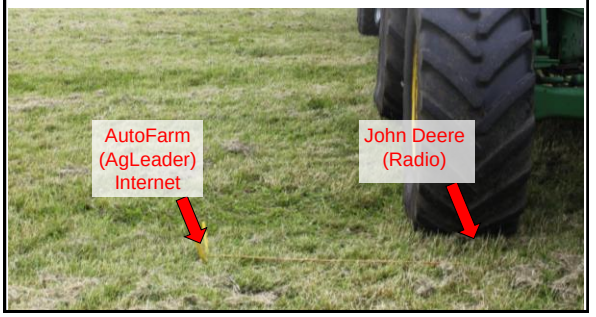
Autosteering

Do not consider second best choice

TWIN-steering

Different brands = different tracks?



CTF is measuring and fitting

Skiftekær, participant in Økologi i Sporet

Before CTF	With SBG-Guidance Twin
Different track sizes Row width 1,85 m. Potatoes 75 cm Redbeets, green beans, cabbage 45 cm Pumpkin 1 m. Onion 45 cm	Track size 2,15 m. Row width Potatoes 64,4 cm Redbeets, green beans, cabbage 46,6 cm Pumpkin 1 m. Onions 35 cm
Soil preparation	
Grimme Bed plow Lemken Plow Grimme Destoner Simon Bed former 180	Terrano and Tiger, Horsch Terra Dan, HE-VA Grimme bed plow customised Grimme destoner customized
Sowing/planting	
Stanhay Hortus	Monosem pneumatic CM Regero Transplanter Struktural Potatoe planter
Weed control	
Hatzenbichler Interrow Cultivor 1 bed	Hatzenbichler Interrow cultivator with disc GPS-steering, 3 beds, 4 rows Hatzenbichler Interrow cultivator with disc GPS-steering, 3 beds, 5 rows FP-Robovator Treffler
Fertilizing	
Contractor with different widths	Customized 4 tons row injector, 3 beds with flow-meter
Harvest	
	Grimme, customized 3 rows (1 wheel in bed) ASA-Lift, 1 row with wide tires ASA Onion lift Grimme onion harvester
Irrigation	
Standard Bording pull-inn machines	Customized Bording pull-inn machines
Transport	
Normal wagon	Kaalaas