

Establishing Trap crops for the control of PCN

Ivan Grove

(Curious Raven)

Innovative Farmers Trials 2020



Introduction: Innovative Farmers

- Set up by the Soil Association to stimulate on farm research based on farmers innovative ideas to solve problems
- Since 2012 there have been over 100 farmer-led projects launched across the UK
 - Multi-sector within agriculture
- Ideas are developed by farmers who come together in a 'group' to host the research/trials on their holdings
- Application for funding is considered by Soil Association IF group.
 - If successful: coordinators and research partners chosen
- Shropshire Growers Discussion Group were successful



Project Background



- PCN are minute wormlike organisms which can survive in soil, within cysts, for over 20 years between host crops
 - Present in 48% of samples taken from potato growing land (Dybal, 2019)
 - Two species: *Globodera rostochiensis* and *G. pallida*
 - Their only field grown host in the UK is potatoes
 - Planting potatoes stimulates hatch
 - Invading into the roots they reduce water and nutrient uptake and can substantially reduce yields
 - PCN control is a significant cost for growers especially when *G. pallida* is the main/sole incumbent
- Control historically based on nematicides, resistant cultivars, long rotations (> 7 years) and biofumigation
 - Loss of Vydate 10G is a significant additional problem
- Trap crops are an alternative control option

The Trap Crops



Solanum sisymbriifolium

PCN Trap crops are crops which can stimulate PCN to hatch, attract them into the roots but are fully resistant to the nematode.

Once inside the plant roots PCN cannot set up a feeding site and therefore cannot reproduce.

Result is substantial reduction of PCN soil population, 70-80% possible and reported.

Optimum sowing is mid-May to early June in UK which does not fit most rotations.



Solanum scabrum

Trial: Aims and Methods

1. Can *S. sisymbriifolium* and *S. scabrum* be grown effectively when sown '**late**' in late June or '**very-late**' in late July?
2. Do *S. sisymbriifolium* or *S. scabrum* need to be sown deeper than the recommended depth?
3. Does *S. scabrum* show growth potential in Shropshire & Ormskirk?
 - Randomised 3 replicate trials sown with commercial Eqpt.
 - Trap crop seed mixed with Lentils (seed rate alone \approx 2-3kg/ha)
 - Sowing dates: 'Late' end June and 'V Late' end of July
 - Nitrogen at 50 kg/ha within 2 weeks post planting

Sowing Equipment

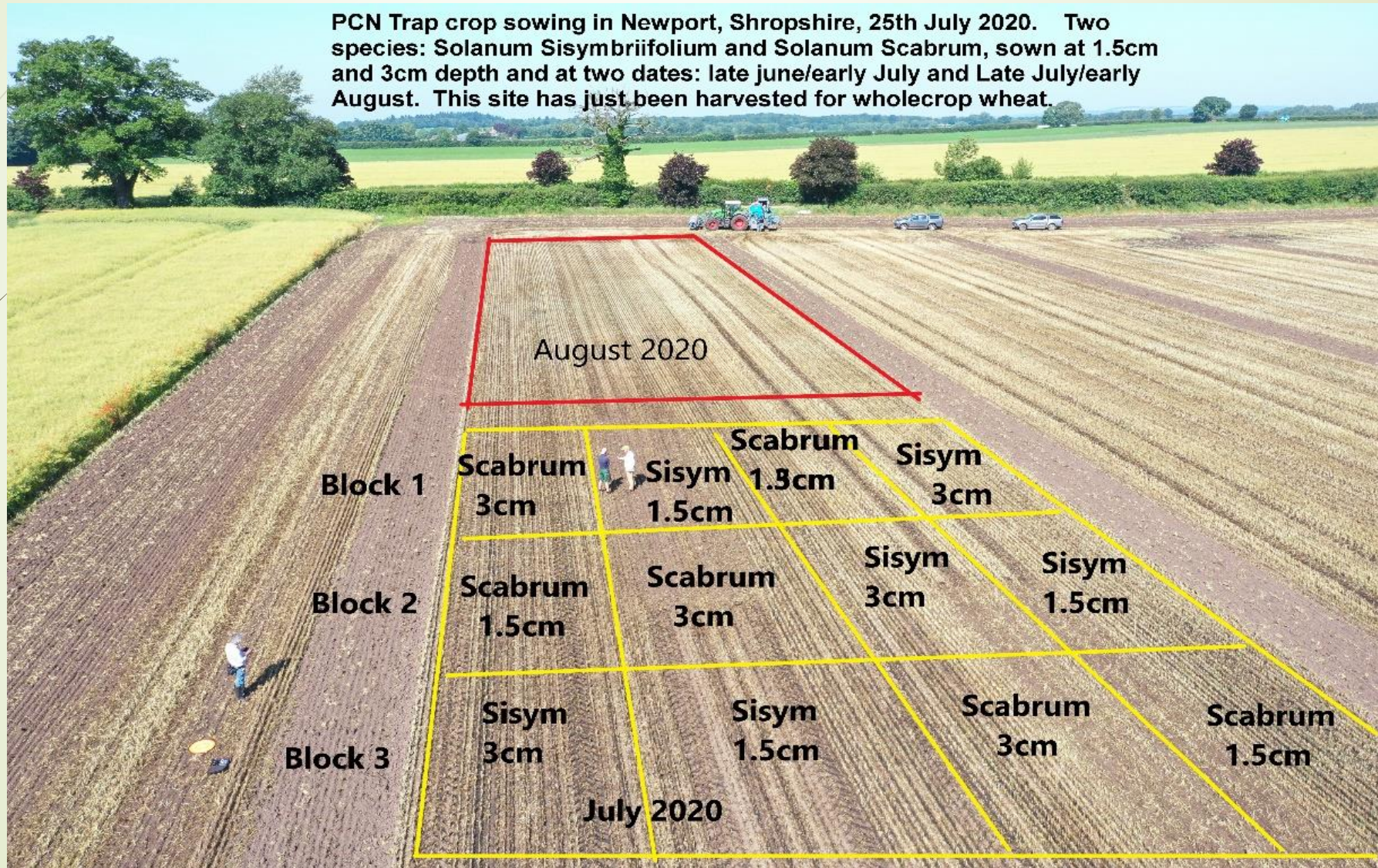


Lemken Solitaire
All 3 Shropshire sites

Vaderstad Rapid
Ormskirk



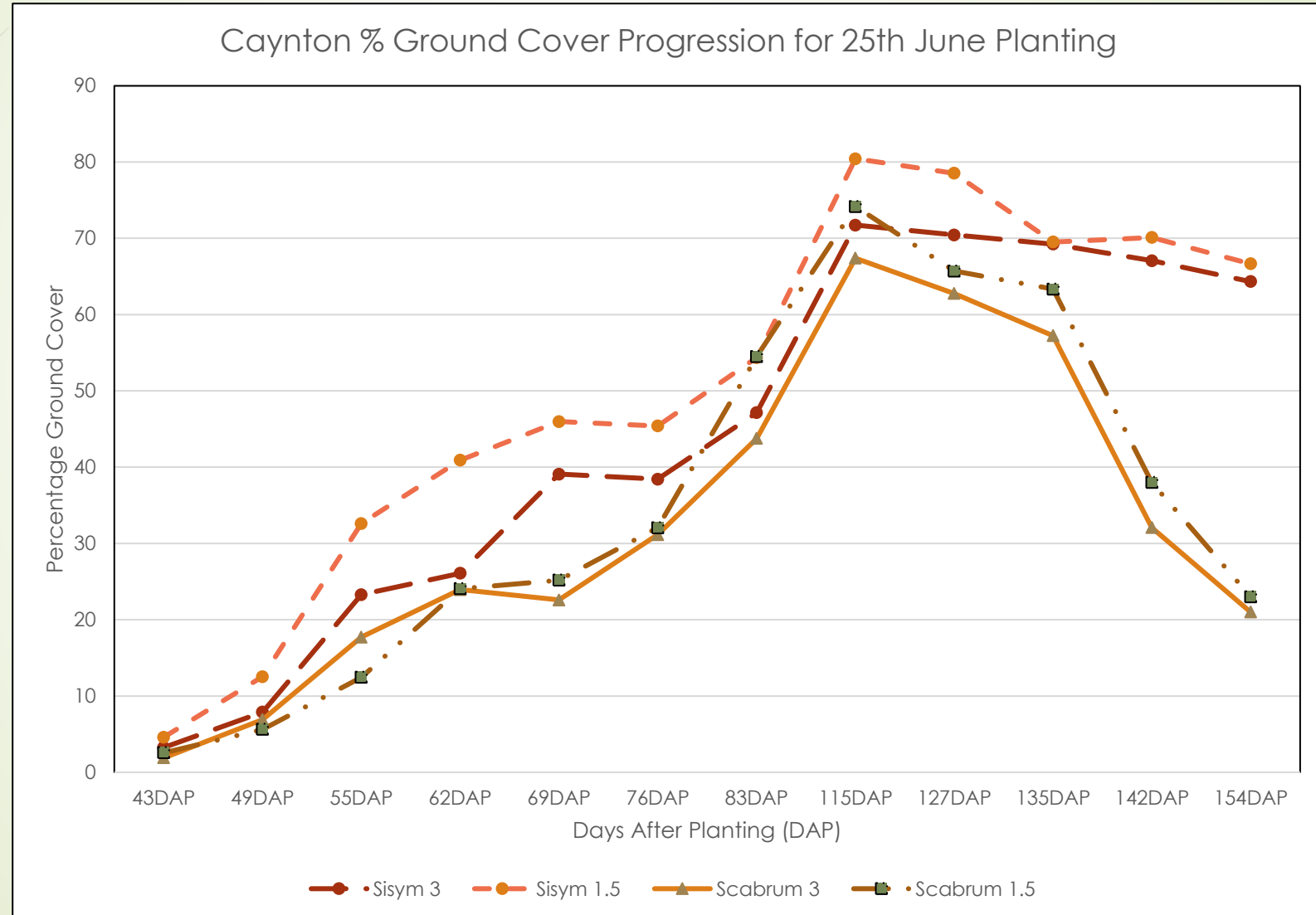
Trial Layout used for all trials



18th October Caynton (Date 1 planting: 115DAP)



Ground cover (%) Progression



Plant and root growth



Caynton 7th November 2020 (Date 1: 135DAP)



Conclusions

- ▶ Planting in North Shropshire at the 'late' (end of June) timing, shows potential on sandy loam soils but establishment slow
- ▶ Weed control and excessive soil moisture can be problematic.
- ▶ 'Very late' planting in North Shropshire was unsuccessful
- ▶ Planting at Ormskirk at the late or very late timings did not appear to be viable especially with the rainfall patterns experienced.
- ▶ Planting deeper than the recommended planting depth shows no benefit at the 'late' timing but some benefit for the 'very late' timing'.
- ▶ *Solanum scabrum* shows good growth potential in North Shropshire but could not be established at Ormskirk.
- ▶ In 2021 further work is required on establishment and agronomy



Acknowledgements

- Anne Stone (AHDB)
- Andrew Wade (Optigro)
- Matthew Back (Harper Adams University)
- **The farmers:**
 - Andrew Webster
 - Neil Furniss
 - Robert Belcher
 - Tim and Nick Belcher
- Sponsored by: Innovative Farmers (Rebecca Swinn)
- Seed supplier: Produce Solutions

Temperature Graph

Average Air and 10cm soil Temperature (°C)
Shropshire: HAU weather station and Ormskirk: Grower weather station

