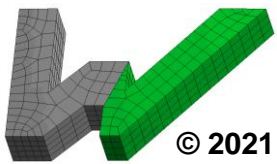


Soil Structure, Cultivations and Establishment.

Soil Structure and Cultivations AHDB Strategic Farm webinar January 2021

Philip Wright

Wright Resolutions Limited



Soil Structure, Cultivations and Establishment.

- Review of basic principles
- Application of principles to potatoes
- Some practical examples

GREATSOILS



Principles of soil management

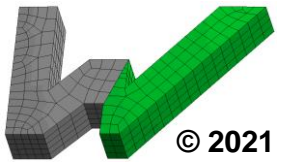


GREATSOILS



Arable soil management

Cultivation and crop establishment



© 2021

Soil Structure, Cultivations and Establishment.

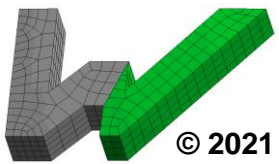
- Soil moisture is critical

Basic principles of soil-metal interactions: moisture



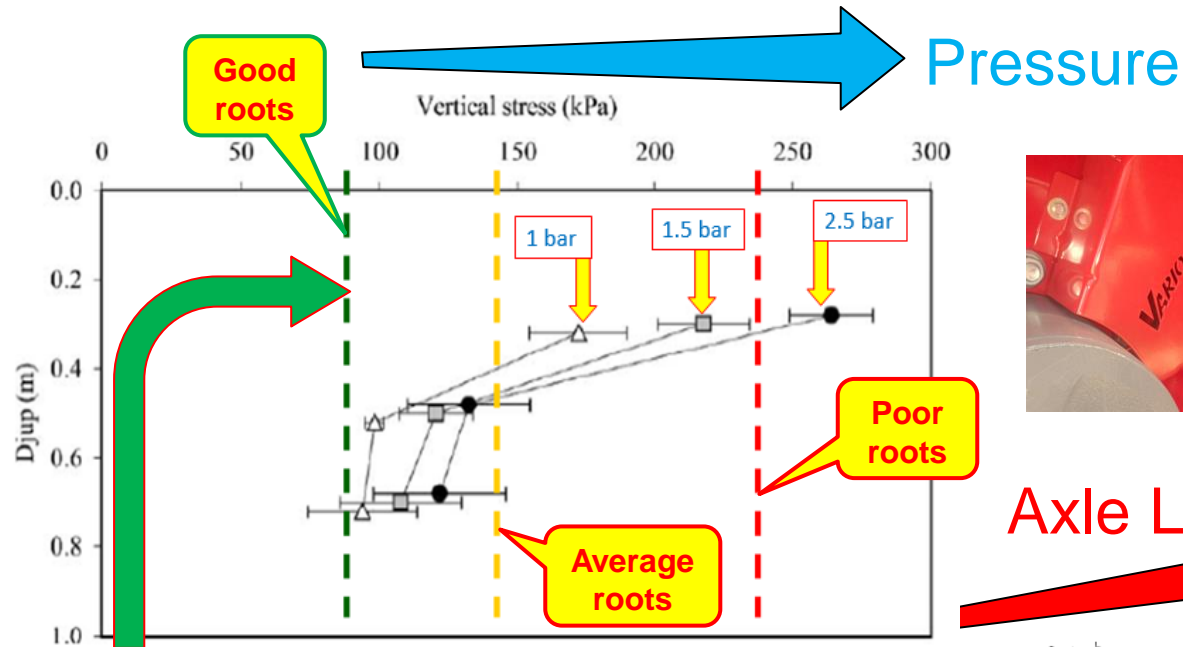
GREATSOILS

Arable soil management
Cultivation and crop establishment



© 2021

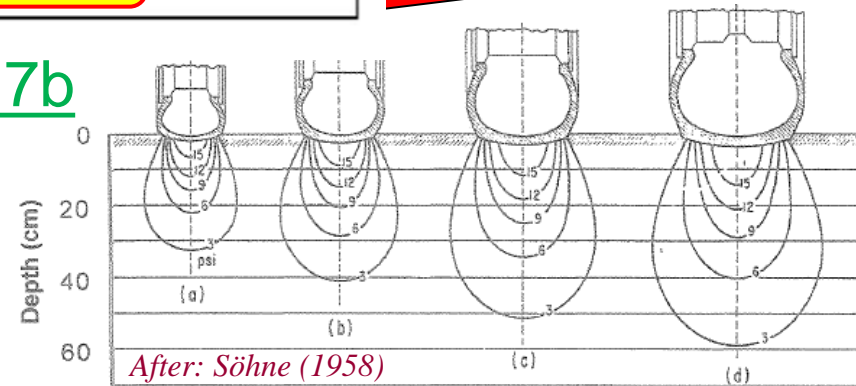
Prevention, Management and Roots



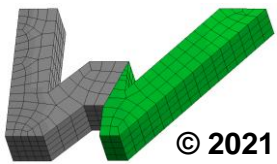
After: Keller & Arvidsson Soil & Tillage Research 79 (2004) 191-205

Target Pressures $< 0.7b$

Up to 70% of the damage can be in the first pass

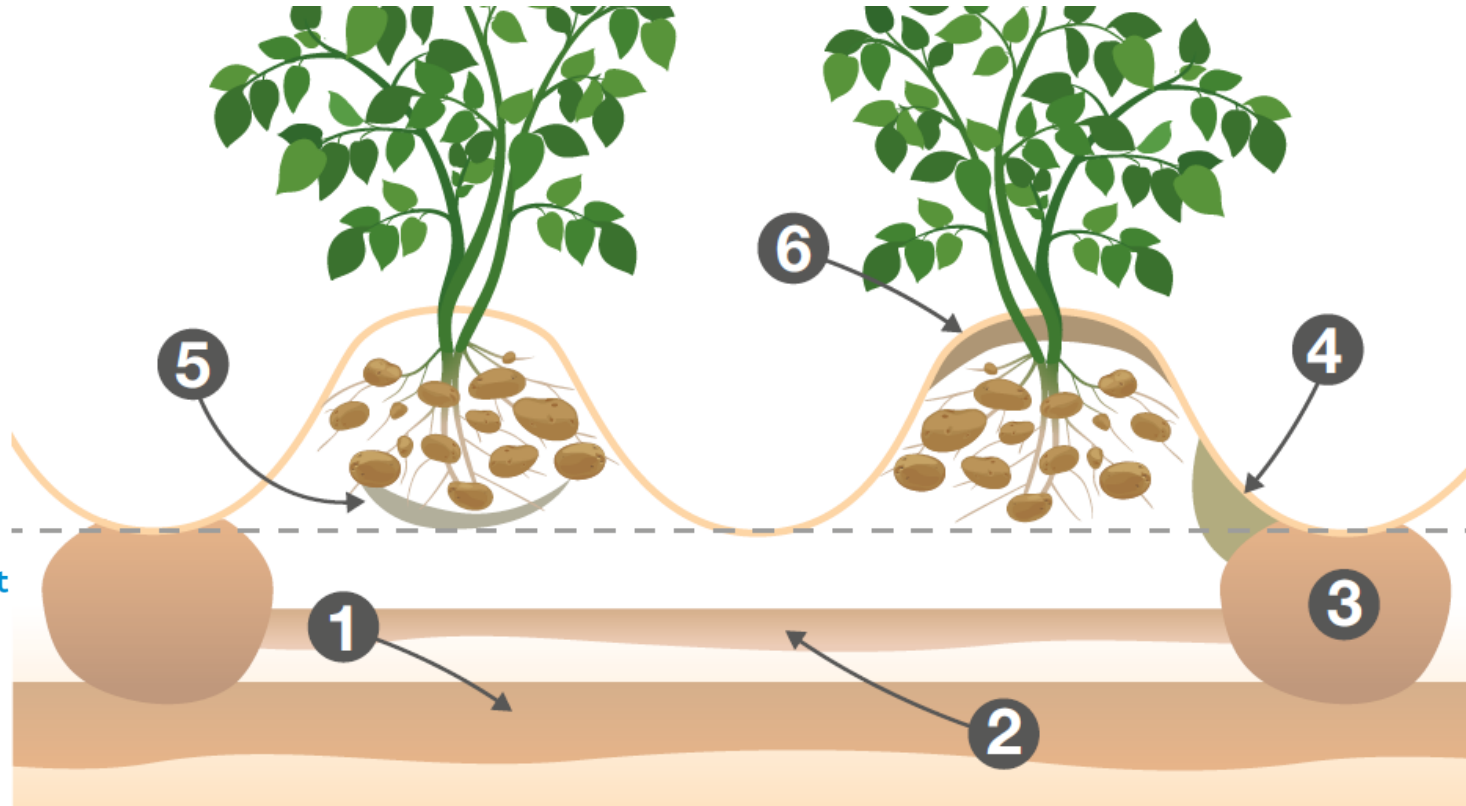


<u>CROP</u>	<u>YIELD (t/Ha)</u>	<u>% REDUCTION</u>	<u>LOSS (t)</u>	<u>£/tonne</u>	<u>LOSS £/Ha</u>
WHEAT	7.8	10%	0.78	£195.00	£152.10
BARLEY	5.8	23%	1.32	£150.00	£198.38
OSR	4.0	25%	1.00	£375.00	£375.00
POTATOES	45.0	30%	13.50	£150.00	£2,025.00



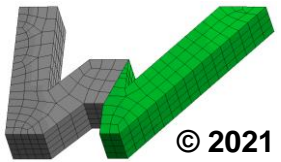
Soil structure: problem areas

1. Below plough depth – moisture critical
2. Bed-till/separation depth – minimise & avoid a constant depth
3. Wheelings – prevention (pressure) & cure (eradication)
4. Ridge base – as above
5. Below planting depth – moisture critical
6. Capping and too fine a structure.



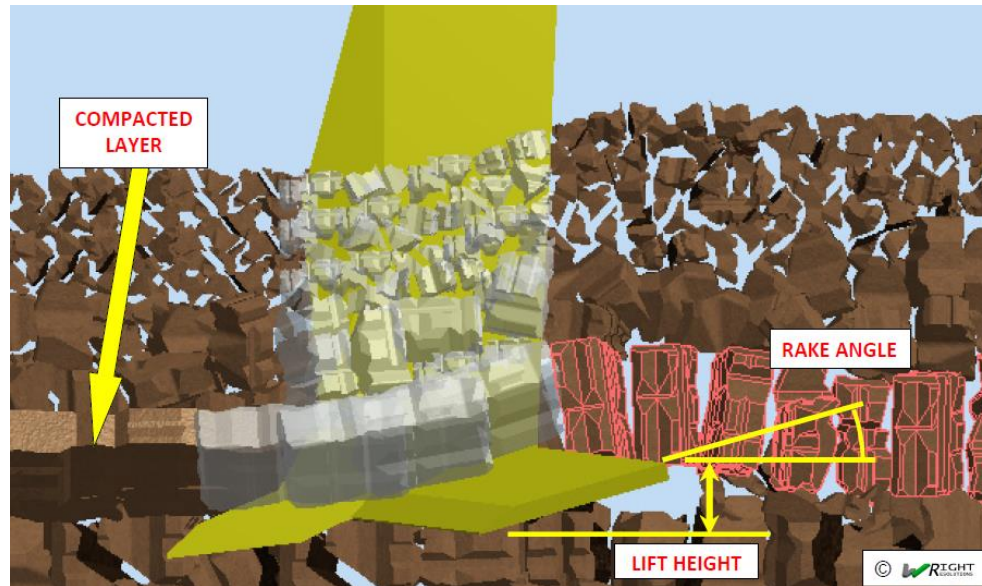
GREATSOILS

Arable soil management
Cultivation and crop establishment



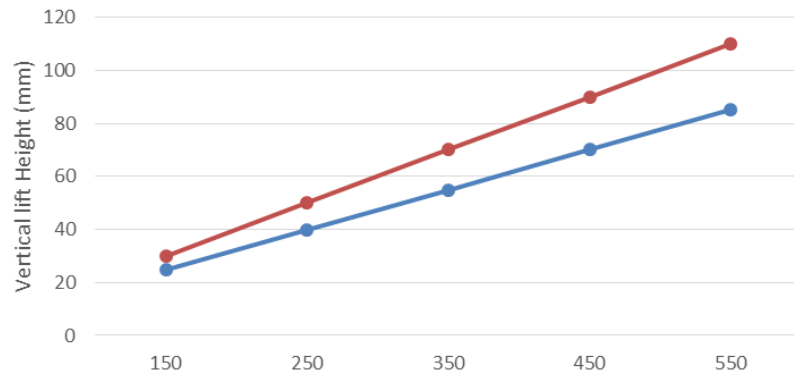
© 2021

Soil structure: less can be more



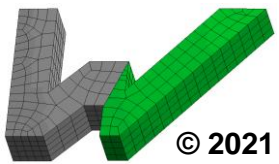
(Roots + metal) form a synergistic relationship!

Wing lift height : working depth relationship



Barley post covers & metal

Barley post covers no metal



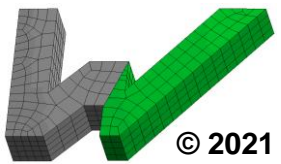
Effect of inappropriate cultivations



Effect of bed-tilling in soil
above its plastic limit



Effect of bed-tilling:
soil damp plus worn tines

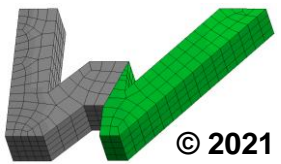


Effect of wear & geometry

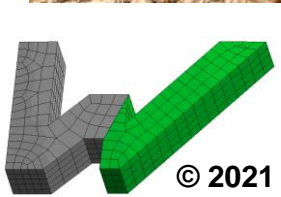
FIGURE 1
WORKING
STRAIGHT
RELATIVELY



Effect of pick tines in soil
above its plastic limit



Potential Solutions



Soil structure: less can be more

- Avoid too fine a tilth – barriers to infiltration
- Soil moisture will determine effectiveness of tillage
- Aim to work with roots/biology and metal – synergies exist!!
- Avoid operations at a common depth – default to shallower
- Prevention is preferable to cure.

