

## Project overview

The NFS evaluating cultivation approaches study explores the interaction between cultivation intensity and cover/companion crop use. This research uses a single rotation – based on winter cereals with winter and spring sown break crops – in a fully replicated experiment on large plots using commercial machinery.

The study compares four levels of cultivation intensity; plough, shallow non-inversion (ca.  $\leq 10$  cm), deep non-inversion (ca. 20 cm) and a managed regime (decision decided annually based on prevailing conditions and soil measurements). Each of these approaches is repeated with and without the presence of a cover/companion crop in the break crop seasons.

Relative yield return indicates that the plough tillage approach results in increased yields compared to other cultivation approaches, whilst the highest margins are associated with the shallow and deep tillage approaches. Across the rotation, the inclusion of cover crops gave no significant yield advantage overall compared to not growing a cover crop, regardless of cultivation approach used. In addition, differences in the performance of the crops in the rotation are being seen as the study progresses, for example, findings show a reduction in oilseed rape yield associated with short (alternate) rotations of brassica cover crops.

Publications include:

- British Society of Soil Science (2019) *Interactions of soil electrical conductivity, crop performance and soil measurements in a long-term cultivation trial*
- Aspects of Applied Biology (2021) *Assessment of spring bean companion cropping in oilseed rape on cabbage stem flea beetle pressure, nitrogen interactions and yield in East Anglia, UK*



## New Farming Systems

### Further information

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### The New Farming Systems Project

is managed by NIAB TAG in conjunction with an independent advisory group and supported by The Morley Agricultural Foundation and The JC Mann Trust. The NFS project also contributes to a range of other research programmes.



# NEW FARMING SYSTEMS

## Evaluating cultivation approaches

The New Farming Systems (NFS) project is a series of experiments and system demonstrations. The project aims to explore ways of improving the sustainability, stability and output of conventional arable farming systems. The research takes place on a sandy loam soil at Morley in Norfolk and started in 2007.



## New Farming Systems

# Evaluating cultivation approaches

This study is undertaken on large plots (12 m x 36 m), using farm scale equipment and techniques, and employs a fully replicated factorial design. The main plot areas are 12 m x 36 m, with further details of the treatments and the design presented in the table; in total the experiment has eight treatments.

### Treatment and rotational progression details

Cropping and harvest year														
Rotation	2008 (Year 1)	2009 (Year 2)	2010 (Year 3)	2011 (Year 4)	2012 (Year 5)	2013 (Year 6)	2014 (Year 7)	2015 (Year 8)	2016 (Year 9)	2017 (Year 10)	2018 (Year 11)	2019 (Year 12)	2020 (Year 13)	2021 (Year 14)
Cropping	wwt	sosr	wwt	sbns	wwt	sbly	wosr	wwt	soat	wwt	wbly	wosr	wwt	sbly
Cover/Companion Cropping		✓		✓		✓			✓			✓		✓

#### Cropping key:

wwt (winter wheat), sosr (spring oilseed rape), sbns (spring beans), sbly (spring barley), wosr (winter oilseed rape), soat (spring oat), wbly (winter barley)

## Two management approaches

1. Current
2. Cover/companion crops – as 'current' but with autumn cover crop before spring breaks or companion crop\* within winter breaks

\*companion crop in 2019

## Cultivation approaches

1. Plough;
2. Shallow non-inversion (ca. ≤10 cm);
3. Deep non-inversion (ca. 20 cm);
4. Managed regime – decision on cultivation regime is based around prevailing conditions and soil measurements.

