

Project overview

The NFS fertility building and cover crops study is a long-term rotational systems experiment examining how novel approaches to cover cropping might contribute to fertility building in arable systems.

This fully replicated experiment contains three crop rotation approaches, based around winter wheat with differing break crop approaches, three nitrogen (N) regimes and four cover crop management systems.

The cover crop management approaches specifically explore the use of long term clover bi-crops, as well as brassica and legume mix based cover crops, sown ahead of spring sown crops in the rotations.

Recent findings have demonstrated improvements in soil structure (e.g. reduced bulk density and improved water infiltration rates) and improved yield and margin over nitrogen responses from cover crop approaches. Based on spot prices in the years of harvest, mean margin over N improvements of around £65/ha have been recorded for specific approaches.



New Farming Systems

Further information

For further information on the New Farming Systems Project please go to the NIAB website (www.niab.com) or email info@niab.com.

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

Fertility building and cover crops

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 is being undertaken on a sandy loam soil at Morley in Norfolk.



New Farming Systems

Fertility building and cover crops

This study uses a fully replicated factorial design and is undertaken on large plots (12 m x 36 m) using farm scale equipment and techniques.

The main plot areas are 12 m x 36 m, with each plot subdivided into three 12 m x 12 m areas to examine nitrogen dose interactions; in total the experiment has 10 treatments. The experiment uses a shallow non-inversion establishment technique. The specific method varies according to season and crop but typically targets 15 cm depth using disc and/or tine based approaches.

Four management systems

1. Current – rotations 1-3 run as standard for inputs and husbandry;
2. Legume (clover bi-crop) – rotations 1-3 using clover as a legume bi-crop to augment fertiliser;
3. Current plus a brassica cover crop (radish) – rotations 2 and 3 only, with autumn cover crops prior to a spring sown crop;
4. Current plus a legume cover crop (legume species mixture) – rotations 2 and 3 only, with autumn cover crops prior to a spring sown crop.

Three nitrogen (N) management

N doses are applied across treatments as a banded 12 m x 12 m sub-sections and each sub-section receives one of the following N doses:

1. Untreated (0% of standard dose) for the crop being grown.
2. Half dose (50% of standard) for the crop being grown.
3. Full dose (100% of standard) for the crop being grown.



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)	Comments
1 Winter break	wwt	wosr	wwt	wbns	wwt	wbly	wosr	wwt	woat	wwt	Conventional approach (benchmark for current systems)
2 Spring break	wwt	sosr	wwt	sbns	wwt	sbly	wosr	wwt	soat	wwt	Maximising spring crops for cover crop use in the systems
3 Mixed cropping	swt	sosr	wwt	wbns	wwt	sbly	wosr	wwt	soat	wwt	A mixed rotation with spring and winter cropping

Cropping key: wwt (winter wheat), swt (spring wheat), sosr (spring oilseed rape), sbly (spring barley), wbns (winter beans), sbns (spring beans), wosr (winter oilseed rape), woat (winter oat), soat (spring oat)

