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 cereals 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) from cover crop approaches. Maintaining a clover bi-crop within an arable rotation has proven the challenges of integrating fertility-building elements whilst maintaining crop productivity.

Research findings, up until 2014, have indicated improved yield and margin over nitrogen responses from specific cover crop approaches. We plan to update these findings once a further period of cover cropping iterations have been completed. Publications include:

- European Society of Agronomy (2012) Farming systems research; evaluation of current practice and the development of novel approaches within UK systems
- Aspects of Applied Biology (2013) Approaches to cover cropping and the impact on soils and 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

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-based cover crop (radish/radish+oats) – 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.