

P2007349: Assessment and analysis at AHDB Strategic Cereal Farms

Strategic Cereal Farm East: Work Package 2 - Cover crops

2.1 Trial background

During the first year of the Strategic Cereal Farm East project, a comprehensive baselining assessment was completed. Included in this, was the sampling and analysis of water removed by the field drains under different crops, establishment systems and soil types. Two techniques of leaving land through the winter for spring crop establishment, namely over winter cover crop and over winter plough, were compared. The water analysis indicated that the use of cover crops could mitigate nitrate losses from soil. Overall, the loss of nutrients under the cover crop was reduced compared to the bare soil of the plough. It remained unclear, however, whether the nutrients taken up by the cover crop will be used by the subsequent cash crop or released and leached later on.

In 2018, the Strategic Cereal Farm East established a cover crop trial to assess if nitrogen (N) taken up by cover crops will be used by the subsequent cash crops or released and leached later on. The results demonstrated that a well-established cover crop is effective at taking up nitrogen and improving water quality by reducing nitrate concentrations in drainage water, however the impacts on the following spring crop (linseed) yields were variable. The results of the trial are available [online](#).

In 2019, a second cover crop trial was established to help assess the effects of cover cropping in a different season. This trial was established across two fields as detailed in the trial design below. To date, soil and crop assessments have been completed on this trial and these will conclude at harvest 2020. The Strategic Cereal Farm East would like to continue monitoring these three fields to determine the impact of the cover crop on nutrient availability across the rest of the rotation, starting with the autumn crop for harvest 2021.

Trial aim: To determine the role of cover crops in reducing nutrient leaching across the rotation.

2.2 Trial design – multiple fields

The trial layout provided in Figure 2.1 is provided as a guide does not represent the exact location or dimensions of the trial. The field and trial details are provided in Table 2.1.

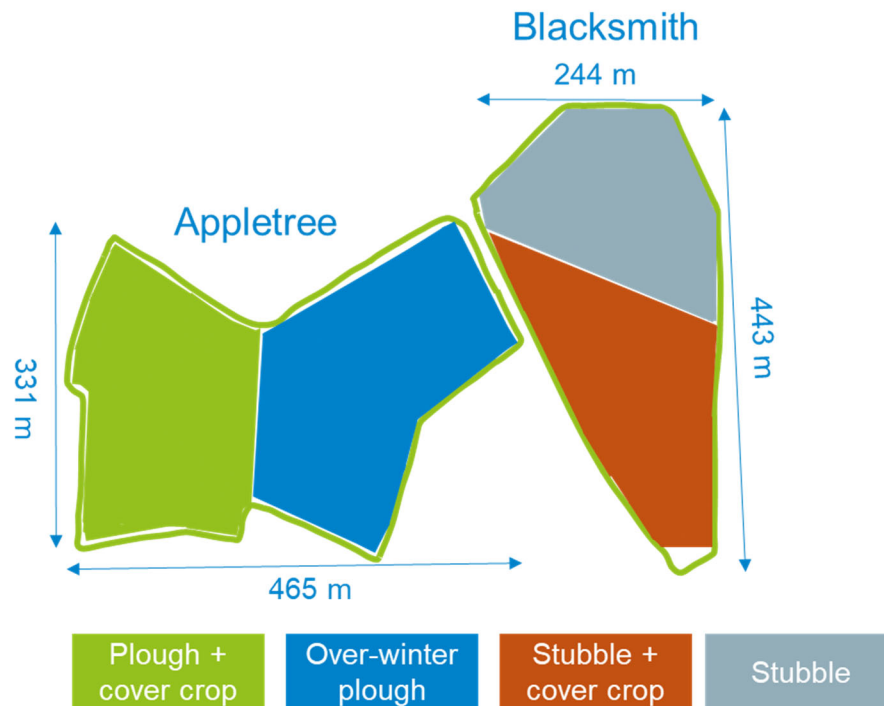


Figure 2.1 Cover crop trial layout at Strategic Cereal Farm East

Table 2.1 Trial design for Cover crop trial at Strategic Cereal Farm East

Field name:	Apple Tree	Blacksmith
Field size (hectares):	10.06	7.32
Soil type:	Sandy loam (78% sand, 12% silt, 10% clay)	Sandy loam (70% sand, 13% silt, 17% clay)
Number of treatments:	2 (plough + cover crop; plough)	1 (stubble + cover crop)
Cover crop mix:	Rye (32%), Buckwheat (40%), Phacelia (8%), Oil Radish (8%), Sunflowers (12%), drilled at 20 kg/ha	
Cover drop drill date:	28/08/2019	24/08/2019
Cover crop destruction date:	13/03/2020	13/03/2020
Autumn 2020 harvest crop:	Spring barley undersown with herbage grass	
Autumn 2020 harvest crop drill date:	28/03/2020	
Autumn 2021 harvest crop:	Herbage grass	
Number of replications:	1	1
Total number of plots:	2	2

2.3 Assessments

- Autumn 2020: soil mineral nitrogen

- Spring of winter crop (2021): soil mineral nitrogen, penetrometer resistance, gravimetric soil moisture, soil bulk density, VESS and VSA, earthworm count, topsoil analysis
- Harvest 2020: nitrogen uptake of winter crop assessed by cutting the crop at ground level from 1m² quadrats, prior to harvest. Weigh biomass and analyse samples for percentage dry matter and total N content. Analyse grain subsamples taken from the combine for nitrogen percentage.