

Strategic Farm East

Year in Review 2017 - 2018

Drawing a line in the soil

The first year of the Strategic Farm project, known as the baselining year, aims to determine the starting point of a number of indicators within the farmed environment before any changes are investigated and evaluated. You can find the full list of baselining assessments completed at the Strategic Farm East in the “Strategic Farm East Baselining 2017-2018”

The summer open day showcased three of these assessments. Use the information contained in this review to try these techniques on your own farm.

Earthworm survey

This survey has been developed to monitor the number of earthworms within fields. Using the results it is possible to compare different establishment methods, cropping in the rotation or make comparisons between years.

Strategic Farm method

- 2 earthworm surveys completed 16 – 20 October 2017 and 9 – 20 April 2018 across nine fields

Results

- Excellent distribution of earthworms: 99% of soil pits contained at least one earthworm
- Total earthworm numbers were typical of arable fields (148 – 364 individuals per m³ in the autumn; 118 – 276 individuals per m³ in the spring)
- Juvenile earthworms dominated (61 – 84% of the population in the autumn; 62 – 85% of the population in the spring)
- Community structure, biomass and earthworm maturity were consistent between the seasons
- Community structure and biomass significantly varied under different establishment practices. Fields established using direct drilling were associated with 1 million (0.5 tonne) more earthworms per hectare compared to any of the fields established using ploughing or strip till.



Soil structure survey

Looking at the structure of your soil allows timely decision making on cultivation practices and can inform long-term practices, such as enhanced rotations, building of organic matter, reduced cultivations and more, to improve the structure of your soil.

Strategic Farm method

- Electrical conductivity scanning was used to map variability and identify within field variations in soil texture. Areas of contrasting soil texture were identified as separate sampling areas
- Soil structure survey focused on topsoil condition to a depth of 30 cm
- A penetrometer identified the range and depth of maximum penetration resistance at 20 points across each sampling area
- Within each sampling area, a [Visual Soil Assessment \(VSA\)](#) and [Visual Evaluation of Soil Structure \(VESS\)](#) were completed in the areas where the highest, middle and lowest penetration resistances were recorded

Results

Visual Soil Assessment

The best VSA scores were found in winter wheat fields established using a strip-till system

The worst VSA scores fields were winter wheat fields cultivated to depth in 2016 and established in wet conditions in 2017



14% of field areas were in a "good" condition –topsoil was mostly friable with small to moderately sized manmade clods



86% of field areas were in a "moderate" condition –topsoil contained larger, angular clods with low porosity

Visual Evaluation of Soil Structure

The best VESS scores were found in fields under reduced tillage, although ploughed fields also indicated good scores – cultivations had been carried out in fairly dry conditions and had therefore been successful in creating good seedbeds



Four fields out of the nine surveyed were "intact" – aggregates were easy to break with one hand



81% of fields had a "firm" or "compact" layer in the top 15-20 cm of the topsoil.

Drain water assessments

Knowing what is coming off your land means that you are able to manage this to reduce nitrate leaching over winter, ensure effective uptake of agro-chemicals, reduce soil erosion and improve catchment water quality.

Strategic Farm method

- Samples were taken every fortnight when land drains were running and sent to Essex & Suffolk Water for analysis

Results

- The cover crop field leached 4mg/l of nitrate compared to the over-winter plough field 99mg/l of nitrate
- Well established winter barley field saw less nitrate loss than a poorly established second winter wheat field
- Differences in suspended solids noticed between:
 - time sample taken following heavy rainfall events
 - drains types
 - cropping
 - establishment system



To measure nitrate leaching from your farm, try using nitrate testing strips, available online

From left to right: strip-till, cover crop, grass, plough. From top to bottom: samples taken 24 hours apart

“Soil is my primary asset. Worms are farmers’ friends: in the dark, damp world where chemistry, physics and biology interact the magnificent earthworm is king.

Farmers can access more soil per hectare by having our soils in a better condition. I believe that soil condition is one of our biggest limiting factors, and everything that the crop does has a direct correlation to soil condition.”

Brian Barker, AHDB Strategic Farm East host farmer

Over to you...

Try these techniques on your own farm. Download these leaflets and baseline your farm/fields:

Earthworms

- [How to count earthworms factsheet](#)
- [Earthworm recording sheet](#)

Soil structure

- [AHDB's four quick steps to assess soil structure](#)
- [Visual Soil Assessment \(VSA\)](#)
- [Visual Evaluation of Soil Structure \(VESS\)](#)

Looking ahead: Strategic Farm East demonstrations 2018-2019

The project will bridge the gap between research and practical farming and provide a programme of demonstrations, subject to full net-margin cost benefit analysis, which are relevant to the current situation facing UK farming. The project will allow farmers to make informed decisions and increase farmer to farmer engagement.

The strategic farm is the industry's programme, and to develop resilient farm businesses we need to work together. The input at the launch event in November 2017 has been invaluable in developing the future direction of the programme.

The ideas generated at the launch event have been developed into on-farm demonstrations under the following themes:

1. Managed lower inputs
2. Maximising availability of applications to the crop to increase yield
3. Unlocking the soil potential
4. Drainage
5. The importance of nutrition in the end product

2018-2019 will focus on the first two themes, specifically harnessing varietal resistance to manage fungicide spend and the role of cover crops in reducing leaching.

Harnessing varietal resistance

To determine the effect of reduced fungicide applications and cost of production on varieties with different resistance ratings for disease control under high, medium and low fungicide strategies, to promote fungicide stewardship and raise awareness of practical anti-resistance measures.

**1 field, 4 varieties of winter wheat,
3 fungicide programmes,
disease assessments, crop assessments,
full cost benefit analysis**

Cover crops to reduce leaching

Baseline water analysis indicated that the use of cover crops could mitigate nitrate losses from soil. The loss of nutrients under the cover crop was reduced compared to the bare soil of the plough. It remains unclear whether the nutrients taken up by the cover crop will be used by the subsequent cash crop or released and leached later on.

2 fields, 4 treatments: plough, cover crop into plough; stubble, cover crop into stubble, water, soil and crop assessments, full cost benefit analysis

For more information on this work please contact Emily Smith, Knowledge Transfer Manager Arable, T: 07790 948 248
E: emily.smith@ahdb.org.uk

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