The Institution of

Agricultural Engineers

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## The Environmental Engineer Team Award

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**Overview**

The Soil Health Improvement Project 2020-2025 is funded by Severn Trent. It set out to trial if soil health can be improved sufficiently to reduce PPPs (plant protection products e.g. pesticides), and if this reduction could be quantified and correlated with the trial actions which resulted in that improvement.

Severn Trent funded the trials as Top Barn Farm is in a pesticide-priority catchment, that is that the main problem at local treatment works is pesticides in the raw water. Severn Trent is also keen to increase biodiversity, even soil fauna; as well as gain a greater understanding of how to improve soil health so that healthy plants are grown and then farmers can reduce PPPs. There is also a known connection between increased soil organic matter and water holding capacity

of soils. A 1% increase in SOM will increase water holding capacity by around 35 m³/ha (to a depth of 30cm). Any improvements in soil that could lead to increased water holding capacity or a reduction in PPPs would need to be proved or quantified to be part of our catchment management schemes.

The SHIP uses two fields of approximately 10ha each, these have been separated into 4 trial blocks. One field has cultivation trials, the other has amendment trials.

The cultivation field trialled different drills and establishment methods to see if mechanical workings could improve the soil texture so that plants could access nutrients better and then fewer PPPs needed to be applied.

The amendment field trialled different fertiliser products (including farmyard manure, biosolids, pellet and liquid fertilisers) to see if there could be a reduction in the amount of fertiliser required to grow healthy crops.

**Achieved to date**

• In 2020 a fungicide-resistant winter wheat was grown, the T3 fungicide was not applied, this resulted in no loss of yield.

• Earthworms were used as an indicator of soil health. Cultivation techniques, cropping and soil structure influence soil fauna. It was found that direct drilling benefits soil fauna populations; however, spring sown crops had the greatest increase in earthworm populations. Despite this, land that was heavily compacted (even with a spring crop) had fewer earthworms.

• A 24m cover crop was drilled into the headlands on the trial plot to improve soil structure biologically. The following year this plot yielded 1.35t more than the control plot, which could have been due to the improvements in soil structure from the deep rooting cover crop.

Impact it will have:

Research supports action, by being clear about what worked for in the SHIP, we hope that farmers will choose to use more innovative options on their land and reduce the amount of PPPs they apply. This will make a positive difference to the environment by reducing chemical applications, but will also make their farm business more profitable by reducing their dependence on expensive products.

The SHIP will provide data to clarify which measures result in improved soil health which will better inform water companies who want to develop soil improvement catchment schemes.

Marion & Simon worked together on a number of Severn Trent grant schemes, including the installation of a weather station at Top Barn Farm to improve spray timings to reduce spray drift. Other farmers locally check this app to accurately ensure that they have low risk spray ‘windows’. These trials are the first that either of us have been a part of and every day is a learning experience. We are both passionate about farming and the environment and want others to be able to replicate our successes, which will improve soil health, water quality and the river environment.