

Assessing Non-Inversion-Tillage with the Eco-dyn in terms of energy use, agronomic and ecological effects



The Background

Current tillage systems within the UK can be divided into two broad categories. Inversion tillage, using a plough, completely inverts the soil to bury or incorporate crop residue. It is followed by additional cultivation steps to create a fine seedbed. Inversion tillage offers many agronomic advantages (e.g. in terms of control of crop diseases and weeds).

However, it is also time consuming, relatively expensive and, most importantly, energy-demanding. In addition, ploughing leaves the soil surface exposed to the erosive forces of wind and water.

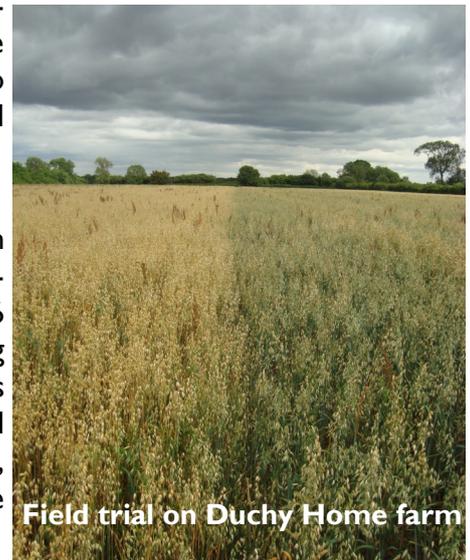
As part of a soil conservation strategy, Non-Inversion Tillage (NIT), on the other hand, incorporates crop residue only into the top-most layer of the soil whilst still leaving at least 30% of crop residue on the surface. This practice therefore contributes to reduced soil erosion. As it involves fewer passes than conventional tillage and uses less power for traction, it also is more energy-efficient. This project assesses the Eco-dyn cultivator as an example of a NIT system. The Eco-dyn was developed for organic systems as an alternative to the plough by Manfred and Friedrich Wenz in Germany. In contrast to the plough its working depth is very shallow (<5cm).

The Problem

Through using NIT conventional farms have shown that there is a significant reduction in CO₂ emissions and fuel usage, and an increase of beneficial invertebrates such as earthworms in the soil. In addition, reduced tillage tends to lead to a higher amounts of soil organic matter in the soil and better soil moisture retention. However, NIT has not previously been considered widely on organic farms due to an expectation of a relatively high weed burden, since organic farmers have so far relied on ploughing as one of the main tools to control weeds. With energy rising costs, the benefits of NIT are likely to become more pronounced. The challenge is to make these benefits available for organic systems without building up weed

The Approach

Using the Eco-dyn as an example, the project investigates whether NIT on organic farms is a viable alternative to the plough. The trials are being conducted at Duchy Home Farm, and are planned to run over 1 full rotation (6 years). Three fields have been split into two halves, with the plough being used on one side and the Eco-dyn on the other. Fuel consumption and times of cultivations are being monitored. Soil analysis will detect any chemical changes in the soil. In addition, weed and invertebrate samples will be taken, along with soil moisture and compaction tests. Crop emergence will be monitored, as well as over all crop yield.



The Ecodyn project is a collaborative project between Duchy Home Farm, the Organic Research Centre and the Institute of Organic Training and advice. For more information contact: Oliver Crowley, The Organic Research Centre - Elm Farm, Hamstead Marshall. RG20 0HR,

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