

TRAINING MODULE 078

MITIGATING RISKS AND REDUCING COSTS FOR CROP ESTABLISHMENT

Volatile prices for agricultural commodities, rising input costs and uncertainties over Brexit make it essential to minimise the costs and risks of producing crops



Necessity is often the mother of invention – low commodity prices, timing and productivity issues drove Jeff Claydon to review his farming operation and develop the first one-pass drilling operation more than 16 years ago. The system has been an ongoing development driven by issues associated with chemical efficacy, pests, legislation and the environment.

The Claydon Opti-Till® system has evolved into a simple, three-part operation: manage stubble, drill, roll. A major benefit is a huge reduction in establishment costs. Establishing one hectare of crops with a typical plough-based system costs over £150 and uses up to 150 litres of fuel, £112/ha for min-till. Highly cultivated soils also lose their structure easily and are less able to retain nutrients, fertilisers, water and chemicals. These methods can cause compaction, which must be remedied by subsoiling or growing deep-rooting cover crops.

Opti-Till typically costs £51/ha, requires 15 litres/ha of fuel, is up to five times faster and one-

third of the cost of ploughing, and typically 50% less than a min-till system, yet produces sustainably high yields and optimises profitability. It also dramatically improves timeliness, reduces weather risk, brings major improvements in soil structure and worm populations, while enabling weed and slug issues to be targeted in an environmentally sensitive and sustainable way.

Assessing the potential

Due to the costs of establishing a crop, assessment of the field should be taken determining the history of the field regarding previous yield performance, soil structure, nutrient status, weed and pest issues and the condition of drainage, including ditches and dykes.

Drainage

Without good drainage, water will be slow to infiltrate the soil and impair the field's ability to retain it, with that lower limit being reached more quickly, particularly on clays. Poor drainage produces poor crop

performance, poor health and lower yields, even total loss. Crops develop shallow rooting structures and are much more susceptible to drought – any bare patches will allow weeds to fill the void.

The yield difference between a well-managed soil and one with excessive compaction averages 20% dependent on crop, so reducing field traffic is a priority. With conventional plough-based cultivations that's difficult, as 85-95% of land undergoes at least one wheeling during a typical season. Minimum tillage reduces this to 65% and direct drilling to 45%.

Soil optimisation

Heavy cultivations destroy soil structure and earthworm habitat, which are essential in maintaining air in the soil at a ratio of around 20%. There are three types of earthworm living in different areas of the soil. Each has its purpose but the one that has most influence on improving soil structure is the largest of the three, anecic. These are soil and litter feeders that create deep,

vertical burrows, which quite often remain permanent unless destroyed by cultivations. Its smaller cousin, endogeic, lives closer to the surface, excavating horizontal burrows and living in the topsoil feeding on the richer soil. Experience has shown that using Opti-Till increases earthworm populations dramatically in years two and three. A good indication of numbers is the middens they create (*see below*) as well as an increase in birds such as lapwings, thrushes, fieldfares and blackbirds.



A sign of healthy soil: these middens show worms taking down straw, even on a headland after prolonged wet weather

Effective stubble management

Effective stubble management is a cornerstone of a direct seeding crop establishment system. The early harvest in 2017, which was followed by generally warm, moist weather, provided textbook conditions for an extended stubble management programme.

Encouraging volunteers and weeds to germinate outside the crop is key, particularly if resistant weeds are present.

Residue management can be dealt with at the same time, removing lumps of straw, distributing residue evenly over the soil and moving concentrations of seedpods and husks. This helps eliminate the habitat that slugs thrive in, particularly if humidity is present. It all starts with the combine: a good chop and spread is crucial, attention should be paid to swinging and stationary knives and the tension on the drive

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belts. This ensures an optimum chop length and spread.

Stubble height of around 150mm is ideal.

The Straw Harrow is an ideal tool to encourage weeds and volunteers to germinate quickly from the same depth, at the same time. Optimum working depth is between 15 and 20mm – a friable tilth is created and residues disturbed.

Even if green shoots are not visible on the surface, weeds and volunteers will be growing under the straw. Using the Straw Harrow in dry conditions when they are less than 20mm tall will kill 70%, so repeating the process a number of times will dramatically reduce weed populations and slug numbers by destroying adults, juveniles and eggs.

The 14mm-diameter flexible steel tines shatter the soil, creating a fine, 10-30mm-deep tilth. Operating at 15-25km/h, the Straw Harrow covers ground

very quickly, using 1-2 l/ha of diesel, making it fast and cheap. Repeat every seven to 14 days when conditions are favourable. So little soil is moved at depth that if the weather does turn wet this mini-tilth will dry out quickly. During dry periods, this same mini-tilth provides a humid growing environment for weed germination.

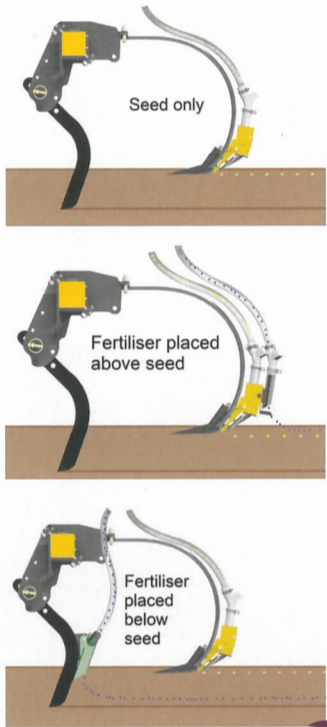
The TerraStar® assists with slug control and dealing with very high trash levels. It's also effective at incorporating farmyard manure (FYM). The blades pluck out the soil, leaving a divot at approximately 5cm deep.

The divots increase the surface area of the soil allowing the soil to dry out that bit quicker during a wet period.

If heavy rainfall is experienced the divots help arrest soil and water movement by holding the water, particularly on side hills. It also encourages volunteers and grass weeds to chit.

Drilling

Key to Claydon Opti-Till is the patented drill design. A leading tine is used that zonal cultivates down to 150mm, breaking up any compaction and creating the ideal environment for good root development. The seeding tine follows directly behind, placing the seed in a band on firm soil either side of the leading tine while the point is designed to sweep trash away so seed is placed in an ideal clean-soil environment. Fertiliser can be placed with two different options.



The Opti-Till System has been proven by independent research and 16 years of on-farm experience to increase average yields by 10% compared to full cultivations

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SELF-ASSESSMENT

Use the questions below to check your understanding, or that of people who work on farm with you. Readers can claim ONE BASIS point if the questions are answered correctly.

BASIS REFERENCE NUMBER: CP/65567/1718/g – Circle the correct answer (more than one may apply)

1. How much faster and cheaper is the Claydon Opti-Till System compared with a plough-based system?

- A. Five times faster and three times cheaper
- B. Three times faster and three times cheaper
- C. Twice as fast and half the cost

2. How much fuel does Opti-Till typically use compared with plough-based establishment?

- A. 10% (15l/ha)
- B. 30% (45l/ha)
- C. 60% (90l/ha)

3. What is the percentage difference of one-wheel trafficking per season between min till and direct drilling?

- A. 15%
- B. 20%
- C. 75%

4. How many types of earthworms live in UK soils?

- A. 1
- B. 2
- C. 3

5. What is the diameter of the Straw Harrow tines?

- A. 8mm
- B. 14mm
- C. 26mm

6. What is it key to undertake in a direct seeding crop establishment system?

- A. FYM application
- B. Sub soiling
- C. Stubble management

Name:.....

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Photocopy this form to avoid having to cut this page out of the training module. Once you have completed this section, please post your answers to: Freepost RSHC-BCCH-BCZG, Marketing Responses, The Barn, Abbey Mews, Robertsbridge TN32 5AD. Or email your responses to cpd@c-cms.com Don't forget to include your CPD reference number and/or your BASIS account number.



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