

The Claydon TerraStar is fast and effective, with a minimum of wearing parts which makes it cheap to operate



Effective stubble management is key

Managing stubbles correctly is critical to optimise financial returns, minimise weed/pest pressures, keep agrochemical input costs in check and help to preserve the long-term viability of arable agriculture, emphasises Jeff Claydon

Effective stubble management is a cornerstone of any efficient, sustainable, profitable crop production system, regardless of which method of establishment is used. To achieve it, operations must be of the correct type, well-timed and carried out precisely to ensure they are effective and produce the full benefits.

Ignoring weeds, volunteers and slugs will not make them go away, so it is essential to make them grow, then kill them so that they cannot return. Doing nothing or just moving soil once or twice between harvest and drilling autumn-sown crops is not an option. If stubbles are left undisturbed slugs and weeds will quickly multiply, particularly where straw is poorly chopped and distributed, leading to thin or non-existent crop growth in those

areas.

A good example of this can be seen where a combine stops in the row. Here, there is a tendency for 'Skylark' patches to develop due to the extra straw and chaff that is left behind. The crop will lack vigour, allowing weeds to develop, while any seeds in the straw, and sometimes on the surface, will lay dormant only to reappear in the following crop.

On the other hand, it is important to resist the urge to over-cultivate soils during the weeks between harvest and drilling, because heavy rain could turn them into a sticky mess that will take much longer to dry out and ultimately be detrimental to crop performance. Despite this, I still see a lot of 'recreational' post-harvest tillage' where farmers cannot resist the urge to 'do something'!

We operate in an age where the farming industry's use of agrochemicals is coming under increasing public scrutiny, the number of products available is declining, while those that remain are becoming both more expensive and less effective. To help preserve access to critical chemistry we must all increase our use of mechanical and cultural methods to help control weeds, pests and diseases rather than relying solely on agrochemicals. The key is to identify the right combination of techniques to achieve optimum results, which will differ from season to season, farm to farm and field to field.

A holistic approach

On the Claydon family farm we have achieved huge cost savings, agronomic advantages and environmental benefits from

almost 20 years' use of the Opti-Till System, a holistic approach to crop establishment which combines effective stubble management and direct strip seeding. The cost of establishing combinable crops is now just £51/ha compared with £300/ha, where a traditional plough-based system is still used. In addition to substantial direct time and cost savings, yields have increased by more than 1t/ha in the case of wheat.

Some farmers enter the world of no-till establishment thinking that all you need to do is to spray stubbles with glyphosate and then direct seed. In a utopian world where Mother Nature is always kind and the farm is clean and slug-free you might get away with that, some of the time. But it is not like that for most of us, most of the time.

Back in 2002 when developing what is now known as the Claydon Opti-Till System we used to think that way too. Initially, we thought that if we did not disturb the soil surface weed seeds would degenerate and chemicals would be more effective, so their numbers would quickly diminish. In fact, the opposite was the case: we had more weeds and needed more chemicals, thereby negating some of the cost savings.

Over the years we evaluated various zero- and low-disturbance set-ups, but our trials showed that this approach can be fraught with risks if the conditions are not exactly right. On heavy soils in very dry weather the soil can bake as hard as bricks and roots cannot push through the compacted layers, while in wet 'plastic' soil conditions seeds rot because water cannot drain away. To see the impact of compaction you need only to look down wheelings and tramlines.

A key part of establishing crops successfully is to achieve an optimum tillth as soon as possible after harvest so that volunteers and weed seeds can germinate. The conventional min-till approach does not work because moving 100mm-125mm of soil will significantly slow germination or bury weed/volunteer seeds so deep that they do not germinate until after the crop emerges, creating major cost and control issues.

Deeper cultivations also present

a significant weather risk, as heavy rain will reduce the soil to a sticky mess with no structure or ability to support following machinery. The surface can also seal over and become anaerobic, creating issues with water 'ponding' or run-off. In extreme cases, full cultivations may initially be necessary to bury weed/volunteer seeds, making control impossible, as well as providing ideal conditions for slugs to survive and thrive.

Many simply move too much soil, causing it to dry out and producing entirely the wrong conditions for effective stubble management. Weed seeds and volunteers are buried deep in dry soil and take much longer to germinate, so many farms are forced to delay drilling. The results are there for all to see in the form of patchy, uneven establishment with weeds/volunteers emerging in the growing crops.

A new approach

To overcome the shortfalls of both these approaches I began developing the Claydon Straw Harrow in 2007. Where it was used crops were much better and more even, with far fewer slug and weed issues, so we continued to develop the Straw Harrow, getting the weight and balance exactly right to achieve the best results. Launched in 2010, it is now a key part of the stubble management process on the Claydon farm and critical to growing clean, high-quality, high-yielding crops.

Our system encourages weeds and volunteers to germinate quickly after harvest so that they can be taken out using a combination of mechanical and chemical methods. Even if you cannot see any green shoots on the surface, weeds and volunteers will be growing under the straw.



The Claydon Farm's 15m Straw Harrow was used to encourage weed seeds and volunteers

Using the Straw Harrow when they are less than 20mm tall will kill 70% of them, so repeating this several times will dramatically reduce weed and slug populations, often to the point where we need less chemicals and there is no need to apply slug pellets.

The Straw Harrow distributes chopped straw evenly and creates a fine, level, 2cm-3cm-deep tilth, providing the high-humidity conditions necessary for weeds and volunteers to germinate rapidly. Straw Harrowing also halts the soil's natural capillary action, preventing water from being drawn up to the surface and the surface from drying out, with the action of wind and sun, to form a hard, impermeable layer.

When it comes to stubble management the 'little and often'

approach works best. When combining, we aim to leave a maximum 150mm-long stubble, chop the straw short and spread it evenly, because slugs will proliferate where it lies thick or in piles. Immediately after combining we use a 15m Claydon Straw Harrow across the entire farm to help manage trash and crop residues, control slugs and encourage weeds and volunteers to germinate.

Our 15m Straw Harrow's 120 pairs of 16mm flexible steel tines shatter the top 10-30mm of soil, just enough to create a fine tilth. Operating at 15 - 25kmh behind a 300hp tractor, it will cover 20ha per hour, using just 2.5 l/ha of diesel. We repeat this operation every 7 to 14 days when conditions are favourable. So little soil is moved that even if the weather does turn wet the mini tilth which is created will quickly dry out and allow subsequent operations.

Farmers sometimes comment that we carry out more passes with the Straw Harrow than they do with a conventional establishment system, but we can cover the farm four times with the Straw Harrow for roughly the same cost as one application of glyphosate. This approach is vital to help preserve this valuable chemistry. Where we must use a product such as glyphosate, we will only do so under conditions which allow it to

work most efficiently and apply it at full rate to reduce the risk of resistance developing.

The Straw Harrow works well on most farms, but harder clay-based soils may require something a little more aggressive, such as the Claydon TerraStar a low cost 6m shallow cultivator fitted with 68 cross-blade rotors.

The soil structure is left intact as the TerraStar plucks 80x80mm divots from the top layer of soil leaving the profile undisturbed. These divots are created by rotating "star" points fitted in a 200mm grid pattern to two knife bars on each side of the machine. This fine tilth contains a high level of humidity which encourages volunteers and grass weeds to germinate very quickly, the field is levelled and the soil surface is left largely intact to carry machines, while water will drain away quickly from the surface layer.

The shallow tilth can then be moved by the Claydon Straw Harrow, breaking off germinating plants at the one-leaf stage and eliminating the need to spray while ground conditions allow harrowing.

Stubble management is often secondary to the long list of other priorities in the autumn. However, in my opinion, it should be considered of the utmost importance in achieving optimum crop performance.



It is essential to make weeds and volunteers grow and then kill them says Jeff Claydon