Claydon Drills has developed its TerraBlade inter-row hoe to tackle grass weeds in cereal crops that have not been controlled by herbicides.

Claydon TerraBlade mechanical weeder:

Hoe showdown for blackgrass

Mechanical weeding is coming under the spotlight once again as grass weed control gets more tricky. Keep it simple, suggests Claydon Drills, which recently launched the TerraBlade hoe

Jane Carley

In the battle against blackgrass, a range of controls may be needed to reinforce the effects of herbicides, or, as active ingredients become less effective or are taken off the market, to replace farmer reliance on chemicals entirely. Mechanical removal of weeds by hoeing has long been the stand-by for organic farmers who cannot rely on chemicals, and it is now attracting interest in conventional systems, too.

Claydon Drills has developed the TerraBlade inter-row hoe over the past three years, testing tools and configurations on the family's own 320ha farm in Suffolk.

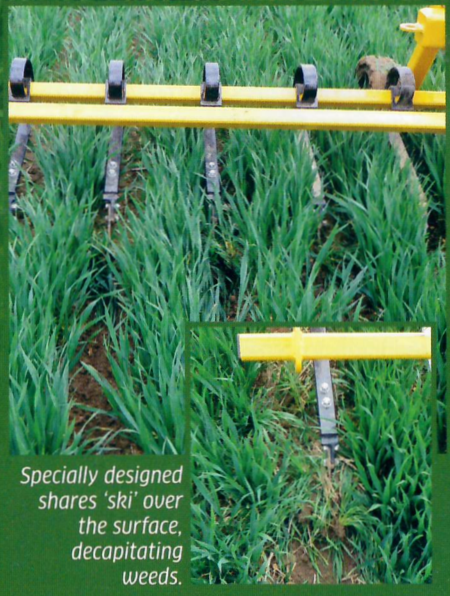
"Sprays are very important and still needed but are getting less effective," Jeff Claydon comments. "The hoe provides good back-up, especially where chemicals have not worked in the preceding spring."

However, Mr Claydon suggests that hoeing is most effective as part of a system that tackles weeds at every opportunity during the crop growing season.

"We tried zero disturbance establishment, but the seed remained in the soil and could germinate in the crop, often to the extent that we needed to spray off the crop in some circumstances."

The goal, he suggests, is to kill off weeds between crops and ahead of planting without losing moisture, which Claydon Drills has targeted with its low-cost, strip-till system.

"The financial benefits of low-cost establishment systems can be eroded by slugs and grass weeds – the two go hand in hand, as slug damage makes



Specially designed shares 'ski' over the surface, decapitating weeds.

holes in the crop canopy for weeds to grow into, quickly making a once-clean field relatively dirty," he explains.

"We start post-harvest by only moving the top 3cm of soil using the straw harrow or TerraStar rotary cultivator. The star points pluck holes in the soil, allowing any water to penetrate and also encouraging weeds to germinate. As soil structure is retained, following machinery can still travel in a wet autumn.

"This allows the seedbed to green up, and we can then use the straw harrow to take out weeds and volunteers and expose slug eggs," says Mr Claydon. "We aim to 'do little and often' with up to six passes in the autumn in any areas where there are high weed levels, with each pass removing a flush of weeds and volunteers before spraying off with glyphosate ahead of spring drilling."

He comments that this 'busy road' method, going in every 7-10 days with the harrow, reduces the need for slug pellets and repeated glyphosate applications.

"It's low cost, too – a 15m wide straw harrow can cover 25ha/hr, quicker than a 24m sprayer, and uses less than 2l/ha of diesel. But conditions need to be right, not too wet, and you need to hit weeds when they're small."

The final pass with the straw harrow should be two weeks before drilling allowing time to spray, but still giving the benefit of producing a 'mini tilth' to drill into. Costs are lower than multiple spraying operations, and harrow use is more environmentally friendly.

Developing the TerraBlade

The Claydon inter-roe hoe consists of a series of shares mounted on spring-tine legs that are bolted onto a folding toolbar.

Data sheet

Claydon TerraBlade M6	
Working width	6.00m
Road transport width	2.65m
Maximum hoeing depth	30mm
Power requirement	10-12hp/m
Blades	20
Maximum forward speed	7km/hr
Options	Front- or rear-mounted versions available
Price	£7,700

With soil scraped off and away, here you can see the share's position in the row.

When steering manually the operator lines up the outside tine with the tramline or space between the band of crop. Timing is key – hoeing can take place until GS31, as the crop starts to grow over the rows, but it should also take account of the size of the weeds.

The shares are arranged along a toolbar which can be front-mounted and manually steered as shown, or rear-mounted and RTK-guided.

In fields where weed control is failing, blackgrass can quickly take hold.

Damage to the crop is minimal if hoed at the right time – three days later the impact is barely visible.

"We looked at using a standard 'A' share mounted on a spring tine to remove weeds from between the crop rows, but found that it lifted too much soil," explains Mr Claydon. "The share was then modified to 'ski' over the surface, which decapitates the blackgrass at the growing point above the rooting zone and kills it. This avoids going too deep and pulling the root ball out of the ground, allowing it to recover and reroot itself in wet conditions."

Depth wheels on the front of the toolbar are used to adjust the working and blade angle depth, while altering the angle of the toolbar on the mounting frame via a pin sets the share pressure to work in harder ground.

"It's important to get the depth just right, as if you go in too shallow, it won't kill the weed; it will simply mow the leaves off the top."

The TerraBlade has been designed to work alongside the firm's drill which places seed in 150mm wide bands at 150mm spacings. Hoes are then matched to drill widths so blades are set at 300mm centres, with a 6.0m hoe having 20 blades including one that acts as an 'overlapper' to account for any shift in the drill as it works; having RTK-drilled crops are the ideal, points out Mr Claydon. However, the legs can be rearranged along the toolbar to suit other band-sown row widths from 250-300mm.

Small blackgrass plants between the rows can easily be tackled by hoeing.

The TerraBlade's flexible leg allows the share to ride over the surface at up to 7km/hr.

"It's not ideal for crops that have been established with a disc or standard tine drill, as it is easy to wipe out crop in those row formations," he adds.

The hoe can be front- or rear-mounted, using RTK steering to follow the crop rows in the latter format. As an aside, the company is currently looking at technology to fine-tune RTK-steered operations.

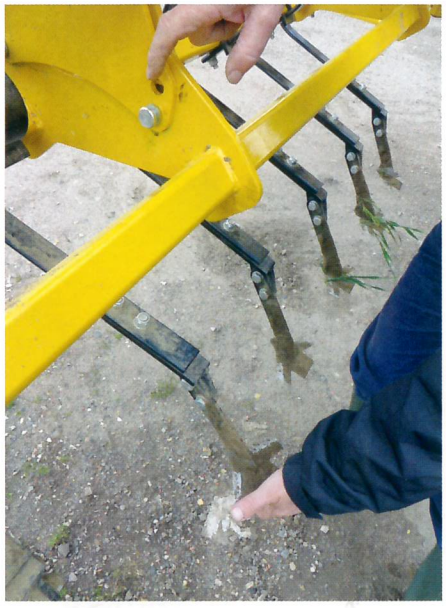
"It's quite easy to manually steer on a front linkage, by taking time to line up the end share with the space between the rows. I like to have good tyres on the tractor – we have used 710 R42s and find the crop stands up again quickly, provided the crop is not beyond GS31. You can use row crop wheels to reduce crop damage at later growth stages."

A 6.0m hoe working at 7km/hr can cover 4ha/hr in a good field, Mr Claydon suggests.

Trials undertaken in partnership with Agrii in 2017 showed that, in a crop established without stubble management or chemicals, there were 900 heads/m² of blackgrass. Using Avadex and two pre-ems, the count was still 90 heads/m², but hoeing with the TerraBlade took this down to 13 heads/m².

"The more we can reduce the seed bank returns, the clearer and less challenging the fields will become," comments Mr Claydon.

Here's a dead blackgrass plant that has been decapitated at the growing point above the rooting zone.



Altering the angle of the toolbar on the mounting frame via a pin adjusts the pressure on the shares to work in harder ground.

Hoeing can take place until GS31, as the crop starts to grow over the rows but should also take account of the size of the weeds.

"The crop recovers rapidly at this stage – after five days there is barely a mark from the tractor wheels or tines. Much later and you can lose crop, and it might also be worth avoiding thick areas such as overlaps next to the headland," he advises. "This year, crops have been more variable so it is worth going into the field to have a look at the weed growth – you should aim to go in around the T0-T1 spray, and you can always hoe on a windy day that is not suitable for spraying."

Mr Claydon comments that, while it is possible to hoe in autumn where crops are sufficiently advanced, the job would need to be repeated after winter regrowth.

"Price-wise, purchasing the hoe is similar to the cost of spraying a couple of hundred acres of crop, yet you will have the hoe to use in future years," he asserts.

Field trials have shown that the blades have a lifespan of around 80ha, so wearing part costs are 40 to 80 pence per hectare.

Experiences at Wickhambrook 2017-18

The heavy soils in Suffolk were instrumental in the development of the drill. On much of the Claydon farm, blackgrass has been tackled successfully, but taking on new parcels of land and the limited armoury of chemicals mean that some fields are still affected.

Spring crops: "We began post-harvest, using the TerraStar cultivator to work the top 3cm of soil and the straw harrow to take out small weeds and volunteers and expose the slug eggs," says Mr Claydon.

Having reduced the weed-burden ahead of spring drilling, he adds that the wet weather brought another blackgrass flush that could be sprayed off before sowing the spring oats. "The beans were drilled in early April and there was some blackgrass in this crop, so it also needed hoeing in combination with harrowing."

The 6m TerraBlade folds to 2.65m for transport.

Winter wheat: "The TerraStar and straw harrow were used in a similar way, but we found they were also particularly useful for slug control, avoiding the need for slug pellets," Mr Claydon recalls. "We drilled at 150kg/ha and used two pre-ems plus Avadex, but blackgrass still came up in the crop in some fields, so this was hoed out in late April".