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# Why changing steel alone won't fix soil



*“We’re still cultivating. But we’re not asking cultivations to rebuild the soil every year.”*

TOBY HOGSBJERG

Cultivation decisions are often treated as a machinery choice, but their impact runs far deeper. *CPM* explores how one farm’s shift in soil and cropping management has changed what steel is asked to do – and why that matters for establishment.

By Charlotte Cunningham

**T**here are plenty of reasons why cultivations creep deeper, heavier and more frequent over time. A tight planting window, a wet harvest, a patch that didn’t drain, a crop that struggled last season. Each pass makes sense in isolation, until suddenly the cultivator is being asked to correct problems it didn’t create.

At Wicken Estate in north Norfolk, farm manager Toby Hogsbjerg can point to fields where that pattern once felt unavoidable. Potatoes, onions and sugar beet don’t forgive poor seedbeds, and on light, stony soils there’s little room for compromise. He said for years, multiple cultivation passes were simply part of the cost of getting a crop established.

In a seminar session at last month’s LAMMA event, Toby explained that

what changed wasn’t the machinery, but the expectation of what cultivations should be responsible for.

Rather than asking steel to rebuild structure every spring, Toby began focusing on what was happening in the soil for the other nine months of the year. Gradually, as rotations diversified, cover crops were introduced and grazing brought back into the system, the workload placed on cultivations began to ease.

“The soil has to be capable of carrying what you’re asking of it,” said Toby. “Otherwise you’re just chasing your tail.”

That shift in thinking – from cultivations as the driver of soil condition to cultivations as a response to it – underpins how Wicken Estate now approaches establishment

across its 900ha of mixed cropping.

The estate runs a demanding rotation with cereals sitting alongside potatoes, onions and sugar beet, and around 200ha of spring cropping in total. The soils are predominantly sand to sandy clay loams with flints a constant constraint, while organic matter levels are never going to be high, and irrigation is a necessity rather than a safety net. “This isn’t a farm where you can afford to get soil management wrong,” explained Toby. “Root crops expose weaknesses very quickly.”

Historically, those weaknesses were managed mechanically. Ahead of potatoes in particular, three or four cultivation passes were commonplace, driven by the need to remove stones, create tilth and correct compaction caused during harvest.

Fuel use and metal wear were obvious costs – less obvious was the cumulative impact on soil structure. Land lifted late and left bare over winter was prone to slumping, surface sealing and poor infiltration, raised Toby. Come spring, cultivations were required not just for seedbed creation, but to repair

▶ damage already done. “You end up in a cycle where every year you’re fixing the same problems,” he admitted. “And each year it takes more effort.”

That realisation is the result of years of trial and error, rather than a single turning point. Earlier in his career, Toby worked on farms where cultivations were expected to solve almost everything. When he later moved to shallow soils in Oxfordshire with severe blackgrass pressure, those assumptions were tested. “On that ground, we had no choice but to rethink the rotation,” he said. “Spring cropping came in, and with it, cover crops and grazing.”

The effect was gradual but clear – soils that had been tight and lifeless began to show better aggregation. Rooting improved and cultivations became easier, not because the machinery had changed, but because the soil had. “It wasn’t a lightbulb moment,” commented Toby. “It was more a slow realisation that steel can only do so much.”

Those experiences shaped how he approached Wicken Estate. From the outset, the aim was not to eliminate cultivations – unrealistic in a root crop system – but to reduce how much correction they were expected to deliver.

At the heart of that approach was an understanding that soil health isn’t a single metric. Physical structure, chemical balance and biological activity are interdependent, and changes to one inevitably affect the others, raised Toby.

Physically, soils require stable aggregation, pore space and continuity at depth. Chemically, nutrients must be available in balance, not locked up or excessive. While biologically, soils must support the organisms responsible for aggregation, nutrient cycling and recovery after disturbance.



## A holistic strategy

For years, multiple cultivation passes were simply part of the cost of getting a crop established at Wicken Estates. Now, cover crops, livestock and feeding the soil is all part of the strategy.

Soil carbon sits at the centre of that interaction, not as an abstract sustainability target, but as the fuel that supports structure and biology. “If you don’t have roots feeding the system, you don’t rebuild what cultivations break,” said Toby. “And then you’re relying on steel again next year.”

From a cultivation perspective, that distinction matters. Reducing depth or passes without improving soil function simply shifts the problem elsewhere, often into compaction layers or restricted rooting.

The first practical change at The Wicken was the introduction of cover crops, initially on a trial basis. Full-field cover cropping wasn’t always possible due to harvest timing and traffic, so early work focused on strip tillage ahead of spring crops.

“The contrast was obvious,” said Toby. “Where the strips had cover crops, the soil was easier to work, better structured and full of worms.”

That visual evidence then drove wider adoption. In fact today, more than 160ha of spring cropping is cover cropped annually, with mixes tailored to crop requirements rather than a one-size-fits-all approach.

Ahead of potatoes, diversity is prioritised. Multi-species mixes include vetches, clovers, tillage radish and buckwheat. Legumes provide nitrogen and continuous rooting, radishes create vertical porosity and improve drainage, while buckwheat is used to mobilise phosphate.

“On these soils, phosphate availability is more of a limitation than absolute levels,” explained Toby. “Buckwheat has been very effective at unlocking what’s already there.”

The inclusion of buckwheat makes the mix ungrazable, but that trade-off is accepted for the benefit it brings to the following potato crop.

On onion ground, disease risk dictates a different approach – fusarium pressure means cover crops must be simple and short-lived. As such, mustard, radish and vetch mix is drilled early, grazed off quickly and destroyed in time to allow planting in mid-February.

Sugar beet sits somewhere between the two, explained Toby. A diverse mix similar to potatoes is used, minus the buckwheat, and grazed carefully to retain surface residue and root channels.

Livestock integration has also become central to how cover crops function within the cultivation system.



## More than just steel

**Toby Hogsbjerg of Wicken Estates believes if roots aren’t feeding the system, they don’t rebuild what cultivations break – which means relying on steel again next year.**

Sheep graze covers from November through to March, managed to avoid over-compaction while maintaining soil cover. On light soils prone to slumping, that living cover is critical, highlighted Toby. He said fields left bare over winter are far more likely to seal and lose structure, increasing the need for remedial cultivations in spring.

As soil structure has improved, the role of cultivations has changed. Passes have reduced, depth has become more consistent and the demand for aggressive correction has declined. “We’re still cultivating,” stressed Toby. “But we’re not asking cultivations to rebuild the soil every year.”

Subsequently, fuel use has fallen, metal wear has reduced, and timeliness has improved. While agronomically, crop performance has become more consistent, particularly in seasons where moisture availability has been limiting.

To underpin those observations, Wicken Estate has invested heavily in soil assessment. The entire farm has been TerraMapped, allowing variable-rate applications of lime, gypsum and potash based on soil type and nutrient availability. Physical soil assessments are routine, with digging and visual evaluation used to guide cultivation decisions before machinery is deployed.

The experience at Wicken Estate underlines a simple point – cultivation change isn’t a shortcut to soil improvement. Reducing passes or depth only delivers benefits when soils are biologically active, chemically balanced and structurally resilient enough to cope. Cultivations still matter, concluded Toby – they just shouldn’t be doing all the work. ●

# Innovation in cultivations

While system changes increasingly shape cultivation strategies, machinery design continues to evolve to support more precise, targeted soil movement. Recent launches reflect a clear trend toward improved depth accuracy, higher tool density at shallow working depths, and greater flexibility to match cultivation intensity to soil condition. Here's a look at some of the latest options



Kuhn.

## KUHN

Debuted at LAMMA 2026, the Kuhn Highlander 6000 extends the manufacturer's shallow tine cultivator range with a specification designed for precise 3-20cm stubble cultivation, scalping and seedbed preparation. The 6m machine features four rows of non-stop mechanical safety tines with a 350kg release force, allowing consistent soil engagement while protecting the frame and wearing parts when encountering stones or compaction layers.

A choice of carbide or forged points enables operators to tailor aggressiveness and wear resistance depending on soil type, residue load and working depth. Depth control is managed via up to eight gauge wheels working in conjunction with a floating drawbar, helping maintain uniform shallow depth even on undulating ground.

Front pre-cutting discs are available to slice residue ahead of the tines, improving flow and reducing hair-pinning in high-trash situations. At the rear, operators can choose between levelling blades, levelling discs or a range of consolidation options, supporting use in both dry and wetter conditions where consolidation may need to be reduced.

## VÄDERSTAD

Väderstad has expanded the ultra-shallow capability of its Carrier XT and Carrier XL disc cultivators with



Horsch.

the introduction of a third-axle front tool. The configuration increases disc density by 50%, tightening spacing to just 8.3cm and placing significantly more tools in the ground at shallow working depths.

The higher disc concentration increases mixing and crumbling intensity, improving residue incorporation and mechanical weed control at depths typically below 5cm. Field testing suggests the configuration encourages faster and more even weed germination ahead of a second pass, supporting the creation of effective stale seedbeds and reducing reliance on chemical controls.

The third axle uses standard Carrier disc arms and can be specified with CrossCutter Disc, CrossCutter Disc Aggressive, 450mm discs or 470mm TrueCut discs, allowing the machine to be matched to soil type and cultivation objective. Väderstad says the approach also helps preserve soil moisture while maintaining low fuel consumption,



Väderstad.

making it suitable for both conventional and organic systems.

## HORSCH

Horsch has updated its cultivator portfolio across shallow, medium and deep tillage applications, with a focus on depth accuracy, residue handling and operational flexibility. At the shallow end, the new 12m Cruiser 12 XL joins the existing 7 XL and 9 XL models, targeting post-harvest stubble cultivation. Equipped with FlexGrip tines pre-tensioned to a 180kg release force, the machine is designed to maintain consistent working depth across varying soil conditions.

Further updates include revisions to the Joker HD, featuring a new folding mechanism and frame design to improve transport behaviour and ease of operation. Horsch has also introduced a trailed Finer XL spring-tine cultivator, offering greater working widths for higher-output systems while retaining shallow, precise soil movement.

At the deeper end of the spectrum, the Fortis 8 AS expands the universal cultivator range with an 8.2m working width and depths of up to 30cm, using the TerraGrip tine system to offer a wide choice of points and wings. More compact Fortis LT models and the mounted Tiger 3 SL complete the range, reflecting continued demand for flexible cultivation tools capable of working across mixed systems.