Modern weeding

As more growers look to reduce their dependence on chemicals, Opico has launched Hatzenbichler's inter-row cultivator to the UK to complement the comb harrows already on offer. *FMJ* went to find out more

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While organic farmers have relied on mechanical weeding for years, conventional farmers are now turning to the non-chemical methods and more manufacturers are investing in the machinery as they prepare for a potential restriction on the use of glyphosate. And while the big names look to enter the market, one company that has quietly been perfecting the craft of mechanical weeding is Austrian firm Hatzenbichler, which started making machinery in 1952.

Like many machinery manufacturers, Hatzenbichler's roots lie in the family farm in the Carinthia region in Austria, where they have been since 1930. The farm around the factory is now a test bed for innovations and has been organic since 1995. Now Austria has announced a complete ban on glyphosate use, experts predicting this will be the first of many countries to take this stance, as consumers and supermarkets pressure growers into what is considered to be a more ethical method of producing crops.

For some, the use of chemicals has reached its peak and, as chemical costs rise, using less can contribute to savings. There is also increasing resistance to consider and the use of weeders will actually be a benefit to farms using integrated pest management techniques in what is widely becoming known as hybrid farming, which combines the best techniques from organic and conventional farming.

Hatzenbichler machines were first demonstrated in the UK by Opico in 1994, and the company's comb harrows, grass harrows and seeders have been sold to British farmers ever since, and a strong relationship has formed between the two companies. At a demonstration on Opico's own test farm, owned by the family of managing director James Woolway, the latest iterations of the comb harrow and inter-row cultivator were shown, brandishing considerable updates to the company's earliest examples.

Above: This Air 16 seeder and platform fit comb harrows, as seen on a 12m model

Below: Hatzenbichler is an Austrian manufacturer with experience of mechanical weeding dating back to the 1950s. Opico is the UK importer

Comb harrow

Named 'Das Original', the comb harrow was the start of mechanical weeding for Hatzenbichler back in 1952. Today the range consists of machines from 3m to 27m wide, mounted or semi-mounted. The idea is to cover the entire area of crop with the tines, which are made up of 1.5m beds consisting of 6, 7 or 8mm tines with optional hydraulic adjustment. The size of tine depends on crop: with 6mm is recommended for salad and vegetables, 7mm for non-permanent pasture and 8mm for permanent pasture.

The concept of using the comb harrow is relatively simple and exploits the difference between the weed root and the crop root. Timing is key and if the weed roots become bigger than the crop roots it won't work, the idea being to harrow over plants rather than avoid them. The crop roots survive the harrow by being more established than the weeds. A few passes are needed, as weeds will continue to germinate and need weeding again.

The inter-row cultivator is a new machine to the UK, introduced to meet rising demand for non-chemical weed control

The key, says Thomas Hatzenbichler, is bravery. You have to be on the point of pulling the crop out to get the best effect from the harrow. As well as getting rid of the weeds, the harrow also breaks the crust to allow water infiltration and get air into the soil, while also stimulating tillering and mineralising nitrogen, which is then available to the crop.

The harrow relies on the tine angle and pressure on the ground and the design sees the spring tines made of the same material as engine valves so they don't distort or bend. Instead they vibrate and oscillate as the harrow is pulled, working the area between the crops, with tines set at 23mm spacings. The harrow itself is flexible, with pivot points so it can follow contours without digging out soil, and place even pressure on the tines. As 12m harrows are the most popular, a 120hp tractor can work at six to 10kph.

"We've traditionally sold most of our comb harrows to organic producers wanting to control weeds in broad-acre combinable crops, and to vegetable producers looking to reduce herbicide usage," explains James Woolway. "However over recent years, with cost pressures and herbicide resistance developing, more and more conventional growers are showing an interest."

Inter-row cultivator

New to the UK for 2020 is the company's inter-row cultivator, which Opico will launch at LAMMA in January. Hatzenbichler isn't new to the implements though, having built the first model in the mid-1950s for maize, but as more farms have looked to move to combined weed control systems and away from a sole reliance on chemicals, the inter-row cultivator has seen a rise in demand.

The cultivators work by placing tines mounted on parallelograms between crop rows to slice weeds off just below the surface, a number of passes taking place until the crops become too tall for the machine, by which point the weeds' effect on the crop is negligible.

The cultivators are suitable for combinable, root, salad and specialist crops, with working widths from 3m up to 18m. These can be front- or rear-mounted, however a rise in guidance technology has seen front-mounted options less popular, and although manual steering is possible, a camera-guided option offers impressive results. The only stipulation is that systems are compatible: a 6m cultivator required to follow a 6m drill at the same row spacings, with 12.5 to 30cm possible.

The cultivators are made up of parallelograms that house the tines, the number of which depends on row spacing. The Vibro-tine is fitted with a duck foot share, the depth of which is manually adjustable to avoid damaging the crop roots. These shares are held in place using a roll pin, which can be quickly removed using an air tool developed by Hatzenbichler.

Above left: This 12m comb harrow folds neatly to 3m for transport

Left inset: The Tillett and Hague camera guidance system is displayed on this in-cab terminal

Below: These Kress finger weeders are made of rubber and are driven by the black spikes seen underneath

Bottom: This air tool makes it easy to remove the pins in the shares, speeding up replacement

"We've traditionally sold most of our comb harrows to organic producers"

In sugar beet, where there is a much wider area to weed between the crop, the row spacing can be set up to 50cm, while for maize this can increase to 75cm, with up to five tines on each parallelogram. A crop protection disc can also be specified to stop soil being thrown. A different S-tine and A-share are also used, and a Kress finger weeder can be specified, with rubber fingers driven by black spikes. Hydraulic row lift can also be fitted, with ISObus control, using the same Muller system as used for section control on sprayers. This lifts individual row units out of the soil and is a popular option for irregular shaped fields where operators don't want to disturb crops on cross-drilled headland bouts.

"Inter-row cultivators provide the best means of chemical-free weed control in well-established row crops"

Camera guidance

For those looking for more precision, Opico will also be offering a Hatzenbichler guidance headstock and camera technology from Bedfordshire-based firm Tillett and Hague for the inter-row cultivator.

A Muller section control system, similar to that on sprayers, can lift parallelograms out of work as required

Above right: The camera guidance system has been developed by UK-based Tillett and Hague and is said to be one of the most advanced systems in the world

Above inset: Tines on each bed of the comb harrow can be manually adjusted to suit the crop and conditions

Above: This bespoke steel tube ensures tools can be securely clamped on to the cultivator

Below: Duck foot shares are mounted on the Vibro-Tine, developed by Hatzenbichler

Three headstocks are available – light, standard or XL – depending on the size of machine, all with flange wheels to anchor the headstock in the ground so only the cultivator moves when the double-acting ram shifts from side to side. A standard headstock will suit a 6m cultivator.

The cameras on the cultivator identify the crop and keep the tines away from the crop, shifting side to side as necessary. Multiple cameras ensure a view of the crop at all times and a high level of accuracy. Compared to GPS navigation the cameras are much safer and rule out satellite drift, with speeds of 4 to 12kph giving the best accuracy.

"While inter-row cultivators provide the best means of chemical-free weed control in well-established row crops, comb harrows are essential tool in battling weeds where the crop is not as well developed and where row spacings don't allow," says James.

"With the right drill row spacings, the combination of tine weeders and camera-guided inter-row hoes can now provide a commercially-viable means of herbicide-free weed control, giving environmental benefits, reducing chemical costs as well as helping to overcome resistance issues and satisfying requirements of supermarkets and government agencies to reduce pesticide usage."

Prices for the inter-row cultivators for cereals start at £20,251 for a 6m, 24-row machine with 25cm spacing, climbing to £24,375 for a 36-row version with 16.6cm spacing. Section control adds £10,756. A 6m, 12-row, 50cm spacing machine for beet is £19,851, while a maize set-up with eight rows at 75cm spacings is £21,458. A 12m comb harrow with 7mm tines is £10,738, a seeder adding a further £10,322 to the price. The headstock in standard size is £28,405, but works with multiple cultivators. FMJ

The comb harrow has been available in the UK for 25 years, proving popular with organic farms

Crop protection discs shield delicate plants from soil throw