

MECHANICAL WEEDING



“ **COMB HARROWS & INTERROW CULTIVATORS** ”
for conventional & organic farming systems

HERITAGE



Thomas Hatzenbichler developed the first ever tine weeding harrow in 1952 to use on his own farm. It was then shortly followed by an early interrow cultivator.

The Hatzenbichler family farm is still used today to test and develop machinery. The farm became organic in 1995 and trials on the farm have been vital for building mechanical weeding knowledge and developing the product range.

Hatzenbichler is now run by Thomas Hazenbichler III, grandson of the founder. Recent years have seen a huge increase in mechanical weeding across Europe but also worldwide as farmers and growers reduce reliance on herbicides and Hatzenbichler have been at the forefront of this.

TILLET AND HAGUE

Tillet and Hague is a specialist agri-technology company in Bedfordshire has been developing camera guidance systems for mechanical weeders since 1995. The company was born out of the closure of Silsoe Research Institute and has evolved into a manufacturer of state-of-the-art vision guidance and control systems for the agricultural industry. An advantage to OPICO customers is that they'll have a UK-based company providing the back-up for this critical technology.

OPICO has been importing Hatzenbichler Comb harrows, grass harrows and seeders since 1994 and has developed a strong relationship with the Austrian company.

OPICO believes that given the current political and environmental agenda mechanical weeding provides a commercially-viable means of herbicide-free weed control. Resulting in big environmental benefits and reduced chemical costs as well as helping to overcome resistance issues. All whilst satisfying the requirements of supermarkets and government agencies to reduce pesticide usage.

Moreover, significant improvements in camera guidance technology mean it is now possible to cover decent acreages in a working day.



Traditionally, mechanical weeding has been the domain of organic farmers wanting to control weeds in broadacre combinable crops and vegetable producers looking to reduce herbicide usage. However over recent years, with cost pressures and herbicide resistance developing, more and more conventional growers are turning to mechanical weeding.

OPICO believes that the political and environmental agenda, along with supermarkets keen to supply food which has had less chemical exposure, will lead farmers and growers to reduce reliance on herbicides and will drive a mechanical weeding revolution.

“High speed, high output, mechanical weeding, not just for organic weed control.”

Slower work rates have previously discouraged large scale farmers from adopting a mechanical weeding regime, and mechanical weeding has been largely the domain of the organic farmer. However, technological advancements in steering and camera guidance have made it possible to weed accurately whilst travelling faster. This has significantly boosted work rates and increased acceptability.



Comb harrows are used prior to establishment and through the earlier stages of crop development. Comb harrows are most effective on broadleaf weeds, when weeds are very small and when soils are dry.

Interrow cultivators tend to be used later in the growing season and are better for grass weeds, weeds with a strong tap root and larger weeds. Camera guidance technology allows earlier and later weeding as well as weeding in damper soils.



With the correct row spacings, the combination of comb harrow and camera guided interrow cultivator can now provide a commercially viable means of herbicide-free mechanical weed control.

Farmers wishing to benefit from cost savings through mechanical weeding need a level of understanding so the machinery can be used in the most effective way to physically remove or inhibit unwanted weed growth. When mechanically weeding it is important to consider a number of factors:

① CROP SUITABILITY

- Winter and spring cereals
- Maize
- Sugar beet
- Other combinable crops
- Potatoes
- Vegetables

② ROW WIDTH AND SEED RATE

Drill width and interrow cultivator width need to be matched. Higher 'in-row' seed rates may also be required to increase crop competition.

③ CULTIVATIONS PRIOR TO ESTABLISHMENT

Stale seedbed 'combing' is often used to remove weeds prior to drilling in the same way cultivation and chemicals are used.

④ SOIL INFLUENCE

Mechanical weeding is more successful when the soil is in a reasonably dry, friable state i.e. when weeds can be more easily uprooted or buried with soil.

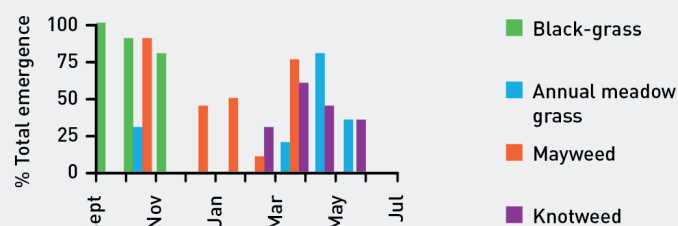
⑤ TO WEED OR NOT TO WEED

Ask yourself, is the density of weed likely to affect future yields? Is the cost of weeding likely to outweigh its benefits?

⑥ THE BEST TIME TO WEED IS INFLUENCED BY:

- Time of year: autumn and/or spring.
- Crop growth stage, ideally weeds should be targeted as young as possible either prior to or just after emergence.
- Soil and weather conditions e.g. sunny weather will maximise the desiccation effect of weeds.

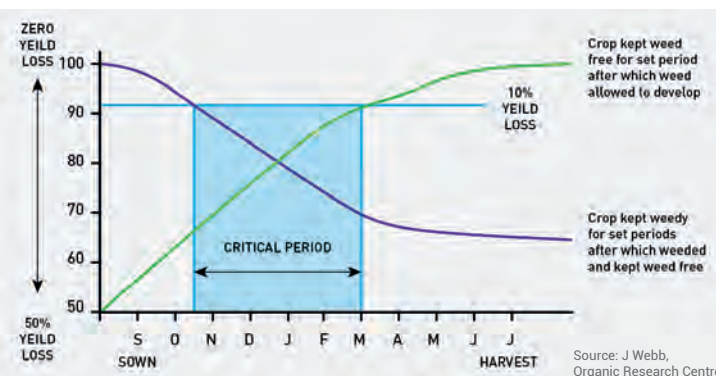
Weed emergence periods



Source: J Webb, Organic Research Centre

⑦ CRITICAL WEED FREE PERIOD

The stage in the crops life when being free from weeds will make a significant difference to crop yield.



COMB HARROW

A Comb harrow is indiscriminate - raking across its full working width. Two thickness's of tine are commonly used depending on the job the harrow is required to do.

The Comb harrow can be used to create a stale seedbed prior to establishment and also for mechanical weeding when plants are young.

12m OPICO Comb Harrow
with Air16 seeder



✓ USING A COMB HARROW

The set up of the harrow is critical for good weed removal and needs to be optimised to weed growth stage and soil conditions. A number of factors should be considered:

① GROWTH STAGE

The combing technique relies on crop roots being stronger than the weeds to withstand the raking action of the tines. As soon as the weed root is as big as the crop root it is too late so, multiple passes are required when weeds are small.

② DIRECTION OF WORK

Weeding in line with the drill will provide the minimum level of crop damage. If multiple passes are used, a second pass at 15 – 20 degrees to the drill can assist in removing in-row weeds.



③ FORWARD SPEED

The most effective weeding action comes from the tines vibrating vigorously from side to side as the harrow moves forward and therefore the fastest practicable speed should be used. Too slow and the tines may not vibrate sufficiently.

④ TINE ANGLE & PRESSURE

The headstock should be adjusted so that it is at right angles to the ground. The tine frames need to sit horizontally so that all tines apply equal pressure to the ground whilst moving forward.

The angle of the tine is adjusted as required to remove weeds without crop damage. Pressure on the tines is created by lowering the frame, using depth wheel adjustment or by tine angle adjustment.

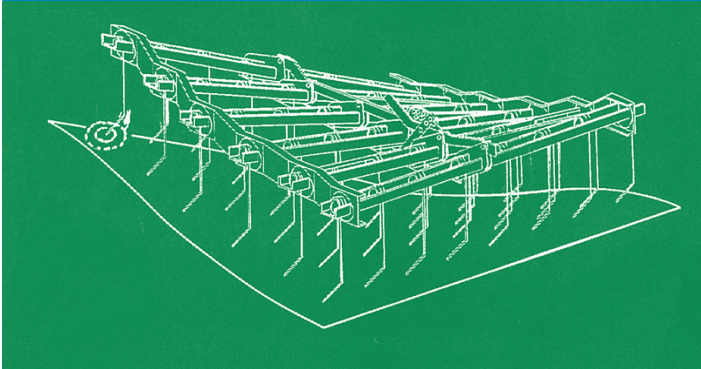


✓ ENGINEERED FOR RESULTS

CONTOUR FOLLOWING

The working harrow sections are fixed individually by chains to a specially moulded tubular frame.

Each flexible working section of spring tines can move and twist to give accurate contour following. The main frame, along which the sections are mounted, is also capable of flexing to accommodate undulating field surfaces.



ANGLE ADJUSTMENT

Each flexible working section of tines is equipped with six rows of adjustable spring tines which can be adjusted and set at the required inclination. With 10 clear tine angle settings, pressure can easily be adjusted, hydraulic model gives infinite options.

OIL HARDENED TRIPLE COIL TINE

The oil hardened sprung wire has three times the service life of normal sprung steel wire and comes with 2 year warranty.

PROTECTED COIL

Channel mounting of the spring tine coil prevents damage to the growing tip of the crop. Each tine is available as 6mm, 7mm or 8mm. The thinnest 6mm tine is selected for vegetables and salad crops; 7mm is usually chosen for broadacre arable crops and 8mm, which offers the most aggressive raking, tends to be used on grassland rather than crops.



RAKING ACTION

With 30mm tine spacing, the raking action and triple coil spring steel of the tines create oscillations which are necessary to cover the entire surface.

✓ CROP BENEFITS

Comb harrowing is very effective through cereals, OSR, beans, sugar beet as well as a host of vegetable crops. Not only providing weed control but also aerating the soil. The combing action stimulates tillering in the main crop as well as releasing surface nitrogen. So, rather than damaging the crop the raking action can improve yields.

✓ OPTIONS

MECHANICAL OR HYDRAULIC

Comb harrows can be supplied with either mechanical or hydraulic tine adjustment and to obtain best results are typically adjusted several times per day as the soil dries out or to suit different soil types.

AIR SEEDER

Easily mounted onto a comb harrow or interrow cultivator, to apply fertiliser, seed or micro-granules in bands or broadcast full width.

E.g. a seeder can be attached to an interrow cultivator for under-sowing maize to enhance soil health, reduce soil erosion and promote organic matter levels.

Seed rate can be varied from 1kg to 80kg* per ha according to the type of seed being sown. Made from high-density polyethylene plastic, the hopper is durable, water and air tight.

Two 12v electric fans provide the air flow on the Air 8 seeder to accurately deliver the seed down the pipes to the outlets. A hydraulic fan is supplied as standard on the Air 16 (optional on the Air 8).

*Depending on seeder and working width.



Mechanical Air 8 Seeder

FOUR METERING ROLLERS

Both the fine and standard interchangeable rollers are supplied with the machine. Dimple and Micro rollers can be purchased as extras.



STANDARD ROLLER



FINE ROLLER



DIMPLE ROLLER



MICRO ROLLER

INTERROW CULTIVATION

OPICO interrow cultivators are designed to accurately hoe between rows of growing crops to cut off the weeds just below the surface.

Almost any crop with adequate space between the rows can be tackled. Interrow cultivators are fully adjustable and configured to suit any row width or combination of row widths. Front or rear-mounted versions are available, along with trailed semi-mounted versions.



✓ BESPOKE TUBE PROFILE

Hatzenbichler's bespoke tube profile and locking mechanism ensures machines can be configured as required and all components are locked in position.



✓ HEAVY DUTY PARALLELOGRAMS

Parallelogram mounting frames for the hoe carriers maintain pre-set working angles and pressure whilst allowing accurate ground contour following.

Different numbers of shares are fitted to the hoe carriers depending on row widths and crop types, for example in cereal crops 3 rows are hoed per carrier with a minimum row spacing of 12.5cm.



- Box section parallelograms
- No twisting in work
- Bushed pivots
- Greased adjustable depth wheel

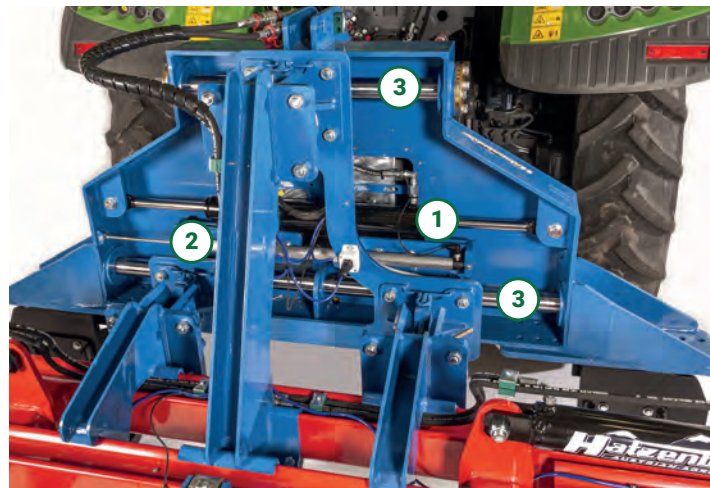
✓ CONFIGURATIONS ARE ENDLESS!

- Suitable for combinable, root, salad and specialist crops
- 2.5m to 18m working widths
- 4 to 72 rows
- Front or rear mounted
- Fully or semi-mounted
- Manual, mechanical or camera guided steering
- Available with seed or fertiliser application equipment



✓ GUIDANCE HEADSTOCK

The objective of camera steering is for mechanical weeding to be more accurate, efficient and easier for the operator. It requires a precisely engineered headstock for exact movement control, allowing the operator to work more effectively at higher working speeds. Camera guided machines can be operated much closer to the plant rows and hence provide improved weed control.



The versatile Hatzenbichler headstock has an integrated hydraulic ram (1) to provide up to 250mm of side-shift in either direction, allowing accurate compensation for deviations caused by side-slopes, as well as errors due to drilling or driving accuracy.

A potentiometer (2) monitors movement to ensure precise positioning. Oil is sent to either left or right by the camera controller, ensuring the hoe shares run as close to the crop rows as possible without damaging the crop. As you would expect parallel side shift rails (3) are greased and bushed.

Three options of headstock are available from lightweight 450kg to heavyweight 1300kg for cultivators over 12m (see back page for headstock details).

STEEL FLANGE WHEEL

Moving the hoe shares sideways to follow plant rows creates powerful lateral forces.

If side forces exceed grip from the tractor's rear wheels, then the tractor could be moved sideways leaving the hoe position unchanged resulting in damage to the crop.

To prevent this, the headstock has a pair of large diameter flanged steel wheels which anchor the guidance headstock in line behind the tractor wheels. Thereby withstanding the side forces for perfect row following.



This is particularly the case with wider working widths, or when the hoe shares are working deep.

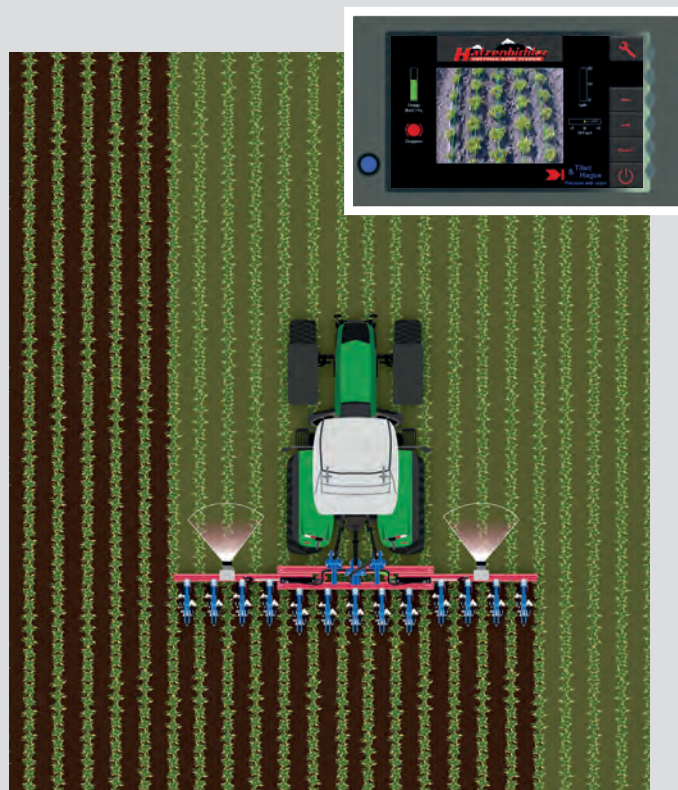
✓ GUIDANCE SYSTEM

Camera controlled guidance is attached and integrated with the headstock, the system developed by UK specialists Tillet and Hague is the most accurate camera guidance on the market.

The Tillet and Hague guidance system has three distinct advantages that set it apart from other systems:

- It is able to take a feed from two or more cameras which means it is able to provide a higher level of accuracy, particularly at row ends and where there are drill misses or overlaps.
- The software is able to derive a speed measurement from the cameras, called visual odometry, so that it is not dependent on a GPS or radar feed.
- Optional lights for night working.
- Tillet and Hague technical specialists are UK based for unrivalled support.

“Camera guidance on interrow cultivators means it's now possible to cover decent acreages in a working day.”



✓ SPOT SPRAYING

The camera software developed by Tillet and Hague allows for the addition of spot spraying technology to be attached to the cultivator if required.

Tillet and Hague are world leaders in the development of vision guidance and control technology for field scale precision crop protection, whether mechanical, chemical or biological.

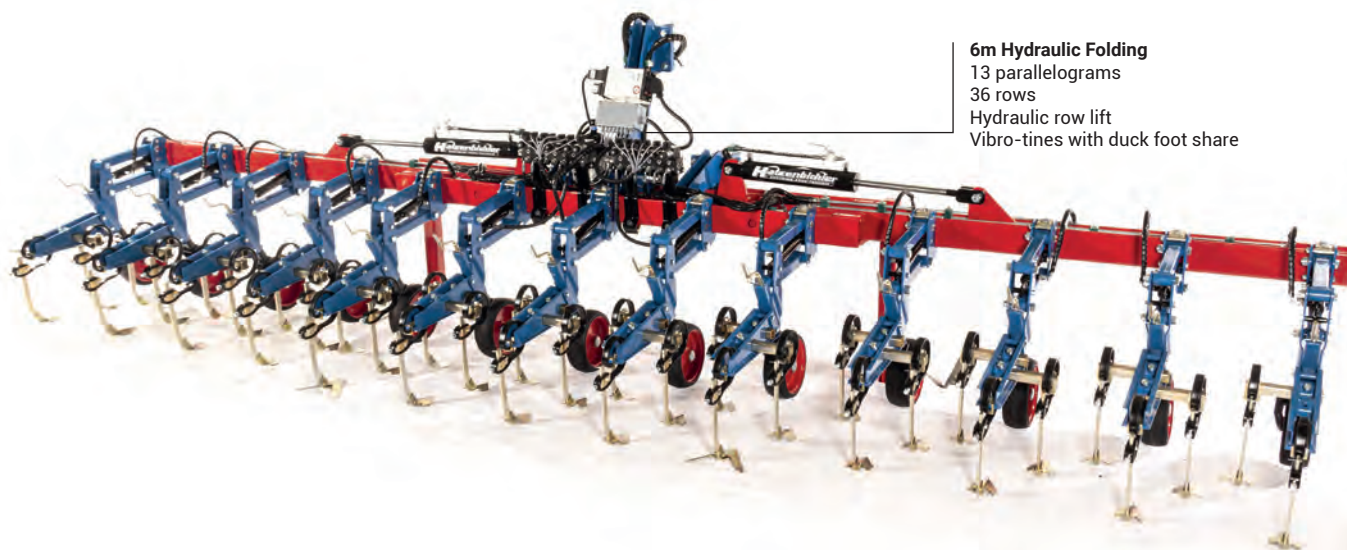
INTERROW CULTIVATOR

✓ COMBINABLE CROPS

The Hatzenbichler range of rigid and hydraulic folding combinable crop interrow cultivators are available in 3 – 18m working widths. Row widths down to 12.5cm can be cultivated.

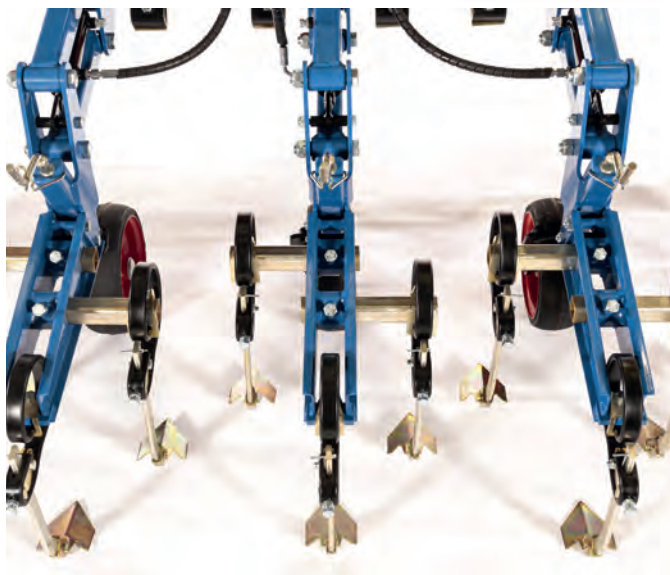
The machines can be mounted to the front or rear of the tractor. The hoe carrier is fitted as standard with Vibro-tines and duck foot shares.

- 3m to 18m
- Front or rear mounted
- 1, 3 or 5 section frame
- 1 or 3 tines/parallelogram
- 12.5cm row spacing upwards
- Vibro-tine with duck foot share



6m Hydraulic Folding
13 parallelograms
36 rows
Hydraulic row lift
Vibro-tines with duck foot share

Vibro-tine with duck foot share



Optional extras include:

- Hydraulic section control
- Pneumatic applicator for seed, fertiliser or micro granules
- Camera guidance



✓ SUGAR BEET

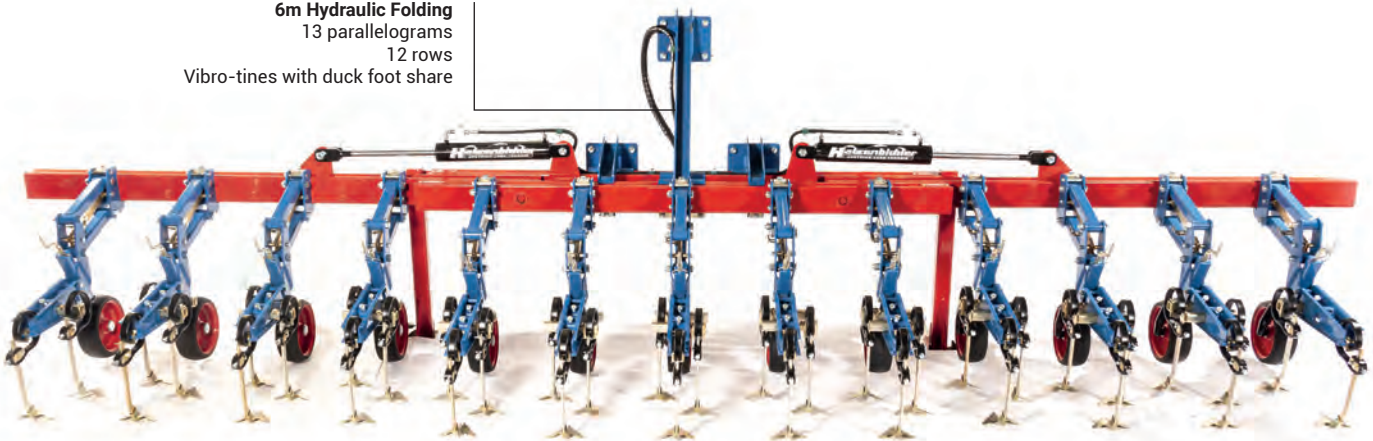
The Hatzenbichler range of rigid or hydraulic folding sugar-beet interrow cultivators are available in 3 – 12m working widths. Row widths can be set between 35cm and 50cm.

The machines can be mounted to the front or rear of the tractor. The hoe carrier is fitted as standard with Vibro-tines and duck foot shares.

- 3m to 12m
- Front or rear mounted
- 1, 3 or 5 section frame
- 3 tines/parallelogram
- 35cm to 50cm spacing
- Vibro-tine with duck foot share



6m Hydraulic Folding
13 parallelograms
12 rows
Vibro-tines with duck foot share



Vibro-tine with duck foot share



Optional extras include:

- Plant protection discs
- Finger weeder
- Earthing up share
- Hydraulic section control
- Pneumatic applicator for seed, fertiliser or micro granules
- Camera guidance

Earthing up share (option)



✓ DUCK FOOT SHARE OPTIONS

Duck foot share with hollow pin



80mm - 300mm wide



Front mounted

INTERROW CULTIVATOR

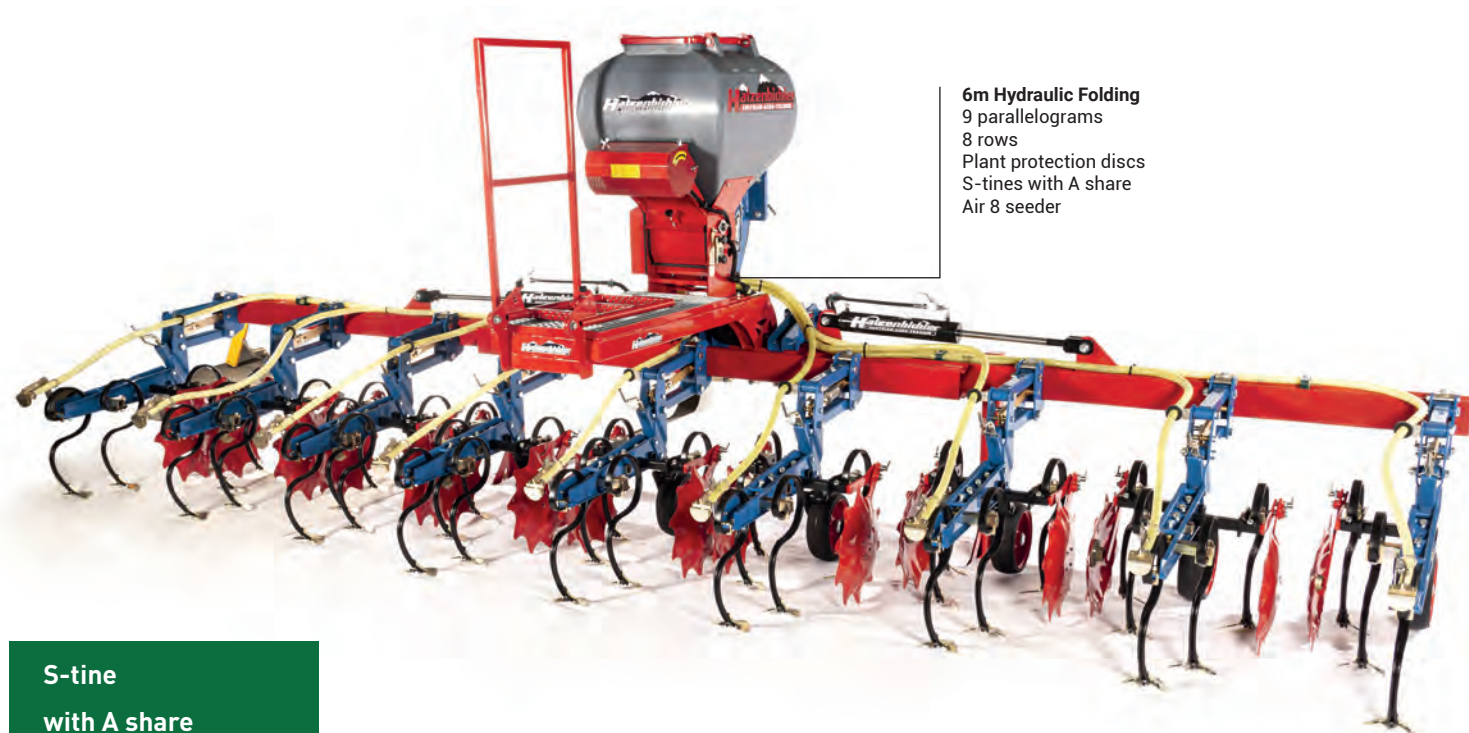
✓ MAIZE

The Hatzenbichler range of rigid or hydraulic folding maize interrow cultivators are available in 3m to 12m working widths. Row widths can be set from 50cm upwards.

The machine can be mounted to the front or rear of the tractor. The hoe carrier is fitted as standard with S-tines and A shares at 150mm wide and half shares at 85mm wide.

The maize interrow cultivator is designed to hoe the weeds and/or bury them depending on growth stage.

- 3m to 12m
- Front or rear mounted
- 1, 3 or 5 section frame
- 3 or 5 tines/parallelogram
- 50cm row spacing upwards
- S-tine with A share



6m Hydraulic Folding
9 parallelograms
8 rows
Plant protection discs
S-tines with A share
Air 8 seeder

S-tine with A share



Optional extras include:

- Plant protection discs
- Finger weeder
- Earthing up share
- Hydraulic section control
- Pneumatic applicator for seed, fertiliser or micro granules
- Camera guidance



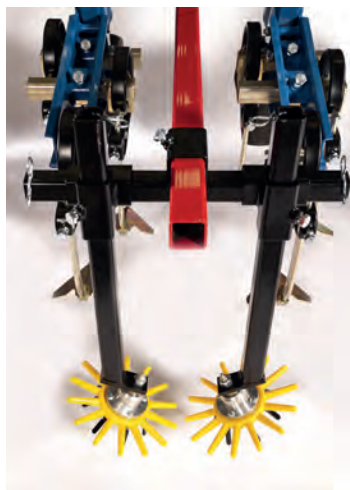
Left & right half share (option)



✓ KRESS FINGER WEEDERS

Optional rubber Kress finger weeders can be attached to the hoe carrier and are used to weed in between the plants. Rubber fingers grip and pull out the weed from the side and can reach the weeds where the hoe cannot.

For maximum effect, finger weeders should be used as the weeds emerge. They have a working depth of between 2cm and 4cm and are suitable for rows of 25cm upwards. There are different sizes of rubber fingers to choose from depending on row width.



✓ ROW HARROW

A tined harrow can be fitted to weed along the row and level soil.



✓ CROP PROTECTORS

Optional plant protector discs or crop guards can be attached to the hoe carrier to shield the young plant from smothering.

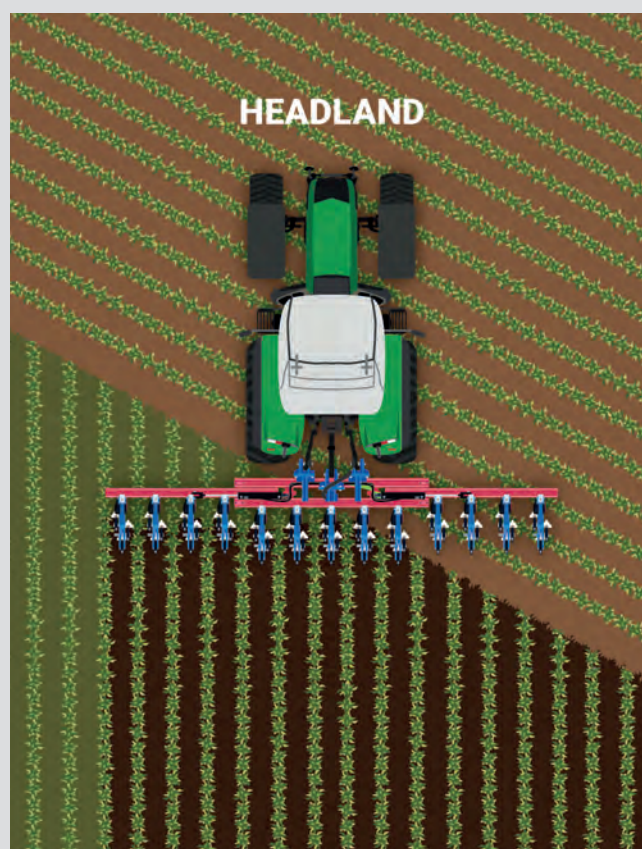


✓ ISOBUS SECTION CONTROL

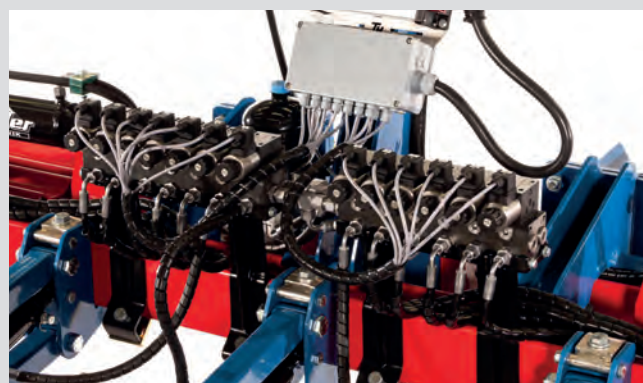
To bring an extra level of precision there's also the option of ISOBUS controlled sprayer-style GPS section control.

With individual hydraulic rams on each parallelogram linkage, the Muller ISOBUS controller is able to lift individual row units as they reach previously cultivated ground.

This is a particular benefit when working in fields with angled headlands – the system is able to detect when the hoe shares are reaching the end of the run and automatically lift them out of work to avoid hooking out plants on the cross-drilled headland bouts.



"Automatically lift individual row units out of work with ISOBUS controlled GPS section control."



COMB HARROW SPECIFICATIONS

Working Width	Weight*	Transport Height	Transport Width	HP Req	Harrow Sections	Number of Tines	Depth Wheels
NON-FOLDING							
1.5m	145kg	1.45m	1.5m	20	1x1.5m	48	2x (16x6.5-8)
2.0m	165kg	1.45m	2.0m	23	1x2.0m	60	2x (16x6.5-8)
3.0m	260kg	1.45m	3.0m	25	2x1.5m	96	2x (16x6.5-8)
HYDRAULIC FOLDING							
4.5m	390kg	2.25m	2.5m	35	3x1.5m	144	2x (16x6.5-8)
5.0m	440kg	2.25m	2.5m	40	2x1.5m + 1x2.0m	156	2x (16x6.5-8)
6.0m	520kg	2.85m	2.5m	60	3x2.0m	180	2x (16x6.5-8)
6.0m	530kg	2.85m	3.0m	60	4x1.5m	192	2x (16x6.5-8)
6.4m	550kg	2.6m	3.0m	60	2x1.5m + 2x1.7m	204	2x (16x6.5-8)
7.5m	710kg	3.15m	2.8m	65	5x1.5m	240	2x (16x6.5-8)
8.0m	740kg	3.25m	2.8m	70	4x1.5m + 1x2.0m	252	2x (16x6.5-8)
SCISSOR FOLDING							
9.0m	1010kg	2.75m	2.8m	85	6x1.5m	288	2x (16x6.5-8)
10.5m	1050kg	3.5m	3.0m	90	7x1.5m	336	2x (18x8.5-8) + 2x (16x6.5-8)
12.0m	1170kg	3.4m	3.0m	110	8x1.5m	384	2x (18x8.5-8) + 2x (16x6.5-8)
12.4m	1270kg	3.4m	3.0m	110	6x1.5m + 2x1.7m	396	2x (18x8.5-8) + 2x (16x6.5-8)

*Weights with 7mm tine. OPTIONS: 7mm or 8mm tine, front levelling board, front mount kit, fence protectors.

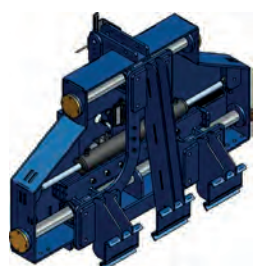
INTERROW CULTIVATOR SPECIFICATIONS

When specifying an interrow cultivator there are many things to consider. Working width, row width and crop type determine the basic configuration but there are multiple options to look at after that. Please speak to your local dealer and request a visit from an OPICO Territory Manager.

CAMERA GUIDANCE HEADSTOCK

'Light' model

- For interrow cultivators with simple tube frame
- Up to 6 row machines
- Side shift with hardened chrome tube 60mm
- Dual hydraulic cylinder
- Optional stabiliser wheels
- Weight approx: 450 kg
- CAT II linkage



'Standard' model

- For interrow cultivators with double tube frame
- Up to 8 row machines
- Side shift with hardened chrome tube 60mm
- Dual hydraulic cylinder
- Stabiliser wheels
- Weight approx: 1,150 kg
- Wheel centres 1,400mm up to max 2,100mm
- CAT III linkage



'Heavy XL' model

- For interrow cultivators with double tube frame with XL-distance
- From 8 rows upwards
- Side shift with hardened chrome tube 80mm
- Dual hydraulic cylinder
- Stabiliser wheels
- Weight approx: 1,300 kg
- Wheel centres 1,400mm up to max 2,100mm
- CAT III linkage



OPICO have been bringing grassland Harrows, Interrow cultivators and Seeders, manufactured by Hatzenbichler in Austria, to farmers and contractors in the UK for over 25 years.

YOUR LOCAL OPICO DEALER



Profit from our knowledge

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