

Hoeing technology for ridge tillage

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Benefits of ridge tillage

Growing crops in ridges is gaining ground. This is due in no small part to the agricultural benefits. The ridge itself provides for good thermal capacity, and its slopes yield ideal conditions for oxygen exchange in the soil. This promotes soil life, humus formation and therefore root growth. In addition, the ridge provides a chimney effect, whereby in warm weather more carbon dioxide is carried from the soil bed up to the leaves of the plant. Erosion reduction and better water management are further advantages of this type of tillage. Ridging can be a double-edged sword, however. The larger surface area means more room for weeds. These have to be rigorously controlled so as not to lose the advantages of this type of cultivation.

Cultivation benefits when hoeing

This form of cultivation is not just used in potato and vegetable growing. Ridge tillage is becoming more widespread with maize and cereals as well. Many organic farms are turning to this growing method because ridge tillage can play an important role in mechanical weed control. Due to its elevated position, the crop is not adversely affected by weeding. This means that even emerging crops can be worked on very intensively. By using modern harrows with individually suspended tines, even blind harrowing can be carried out without permanently damaging the ridge. It is important to make sure that the ridges are regularly replenished by earthing up. Potatoes in particular require regular earthing-up so that the tubers are always covered enough. During heavy rainfall, as we are experiencing more and more, the ridge is eroded to some extent. If this erosion is not counteracted, the potato is exposed, begins to produce solanine and becomes unusable, at least as an edible potato.



The market

Given the many developments and rapid growth of the hoeing technology sector, it is somewhat surprising that until now, the portfolios of the major manufacturers have included very few products that can be used in ridge tillage easily and, above all, effectively. Often, the hoe has to be converted in a complex way, meaning that quickly changing from one form of cultivation to another is not easy. Anyone looking for something usually has to turn to a manufacturer of special ridge cultivators. These days, there are many suppliers and different types of machines. However, this technology is generally not universally suitable and therefore represents an additional cost factor.

Machine construction

When equipping a hoeing machine for ridge tillage, a few things should be borne in mind. Firstly, a hoeing share or narrow coulter mounted on an S-tine should move in the middle between the ridges. This loosens and crumbles the ridge bed and creates some additional loose soil that can later be used to build the ridge. This should be followed by the tools for the top of the ridge. For the surface of the ridges and the crops on top of them, various technology for working “in a row” already exists. The same systems are used here as are used in shallow cultivation: camera- or sonar-controlled row finding, finger wheels, pneumatically-operated sickle blades or tines that rotate depending on the driving speed. It is easy to work in a row without damaging the crop. Then come the tools for the ridge slopes. Doing it the other way round could lead to too much soil being removed during use, as the ridge slope would then already be loosened and lack its ability to support the top. Once the slopes have been tilled, the last step is to earth up the ridge. Either ridger-bodies, ridger-discs or metal ridge plates can be used for this. For an ideal result, avoid tilling in very dry weather as the soil cannot be formed into a ridge so well.



The ridger body heaps the earth from the middle back up into a ridge.



The stars are placed in pairs or in threes against the ridge slope and can break up, loosen and move the soil. However, no cutting takes place.



Concave discs can be used for cutting or as ridger discs.



Slope technology

A great advantage of ridge growing is the root growth. The tools should therefore work as level to the slope of the ridge as possible, so as not to damage the crop's root system and thus hinder plant growth. For example, there are roll-star cultivators that are positioned against the side of the ridge to open up and crumble the surface. However, these are heavy, significantly affect the weight of the machine and do not cut weeds. There are also concave discs that cut along the ridge in exactly the opposite way to a ridger-disc. Here, cutting is more effective, but it is often difficult to adjust the inclination and angle of the discs, so that here, too, it is often not possible to achieve sufficient precision. In most cases, a machine-customised holder must also be purchased. In addition, the disc as such significantly alters the flow of earth and moves a lot of earth into the middle between the ridges. Considerable effort is then required to earth up the slope again, resulting in unnecessary increases in fuel consumption.

Our pitch bracket
in action:



Explanatory video:



The pitch bracket is attached between L-blade and shank. Its angle is freely adjustable and can be fixed.

Our innovation

At Industriehof, we have been monitoring the development of this cultivation method for some time and believe that there is a need for something that can be fitted to any standard hoeing machine, irrespective of the manufacturer, for use in ridge tillage. A key advantage for us is that we can target the entire market and are not limited to one manufacturer or one system. Our development has been guided by the already existing and widespread technology. Ultimately, almost everything needed for this is already commercially available. The only thing missing was the option of adapting the tools to the individual angle of the ridge slopes. We have achieved this with our pitch bracket. It is simply installed between the shank and the L-blade and its angle is freely adjustable. This means that it can be quickly and easily adapted to different slope angles. A parallelogram assembly ensures exact depth control. The blade cuts level with the slope and removes weeds without damaging the roots of the crop in the ridge. Depending on the crop, the blade can be oriented from top to bottom and vice versa. This depends on which part of the ridge needs tilling.

The system was tested in action last season and won an innovation award at EIMA 2022 in Bologna. We hope that it will help promote sustainable agriculture and mechanical weed control, not just in organic farming.

