

PATENTED

GrindStar®

→ THE SUSTAINABILITY (R)EVOLUTION



GrindStar® - AGRITECHNICA 2023
Innovation Award silver medallist

GrindStar®

New equipment system for better field hygiene



Saphir Maschinenbau GmbH, seed2Soil GmbH & Co. KG and the Institute for Construction and Agricultural Machinery Technology at the Cologne University of Applied Sciences are currently working on a joint project to develop an innovative tillage equipment system for energy-saving straw conditioning and ultra-shallow tillage (**GrindStar®**). The project is being funded by Landwirtschaftliche Rentenbank - Germany's development agency for agribusiness and rural areas - for a period of three years.

The increasing demands in arable farming - for example due to chemical crop spraying restrictions - plus the various political and social requirements call for new cultivation and technical solutions. Targeted tillage can contribute to improved field hygiene. To reduce the negative effects associated with intensive tillage, the project participants are developing an equipment system for ultra-shallow post-harvest management.

The new **GrindStar®** tillage implement consists of two rows of passively driven rotors. The front rotors rotate in the opposite direction to the rear rotors. This arrangement and the symmetrical design of the rotors result in a full-surface

working pattern. The rotors are driven solely by the forward speed. The tools cultivate the soil and crop residues to a working depth of 0 to 2 cm over the entire surface, which prepares the area for active surface rotting. The parallelogram-guided suspension of the tools ensures uniformly shallow processing. The spring-loaded blade tools and the specially developed pressure relief system in the rotor ensure good horizontal and vertical tool guidance. Only then will significantly improved ground adaptation be possible than with previous designs. The main developments in the design were carried out by engineering firm seed2soil GmbH & Co. KG and Saphir Maschinenbau GmbH. Saphir adapted the design for later series production and used it for an



initial pre-series. The team from the Institute for Construction and Agricultural Machinery Technology at the Cologne University of Applied Sciences is supporting the project partners in the design and optimisation of the tools (including their attachment) with student projects and theses. The team is also carrying out extensive field tests throughout the entire project using the newly developed equipment and other popular models. The findings from use in the field are fed directly back into the ongoing development process. Regular meetings facilitate the continuous exchange of information between everyone involved, and ensure that the equipment is optimised at a fast pace. The novelty of this equipment was examined intensively by the patent office

and recognised by a corresponding patent grant. Many existing systems combine several different tools, making them comparatively large and heavy and resulting in higher tractor power requirements. On the other hand, the **GrindStar®** consists of newly developed, multifunction tools that can cut and shred at the same time. As a result, the equipment not only works faster (12 - 18 km/h), but fuel consumption per hectare is also significantly reduced thanks to the low tractive power requirement of approx. 20 hp per metre of working width.

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The new **GrindStar®** equipment system for ultra-shallow post-harvest management

The tools are installed on two rows of passively driven rotors. The front rotors rotate in the opposite direction to the rear rotors. This arrangement and the symmetrical design of the rotors result in a full-surface working pattern.



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Info video
via **Youtube**



TOP FACTS

Features of the GrindStar® during ultra-shallow, full-surface processing of crop residues

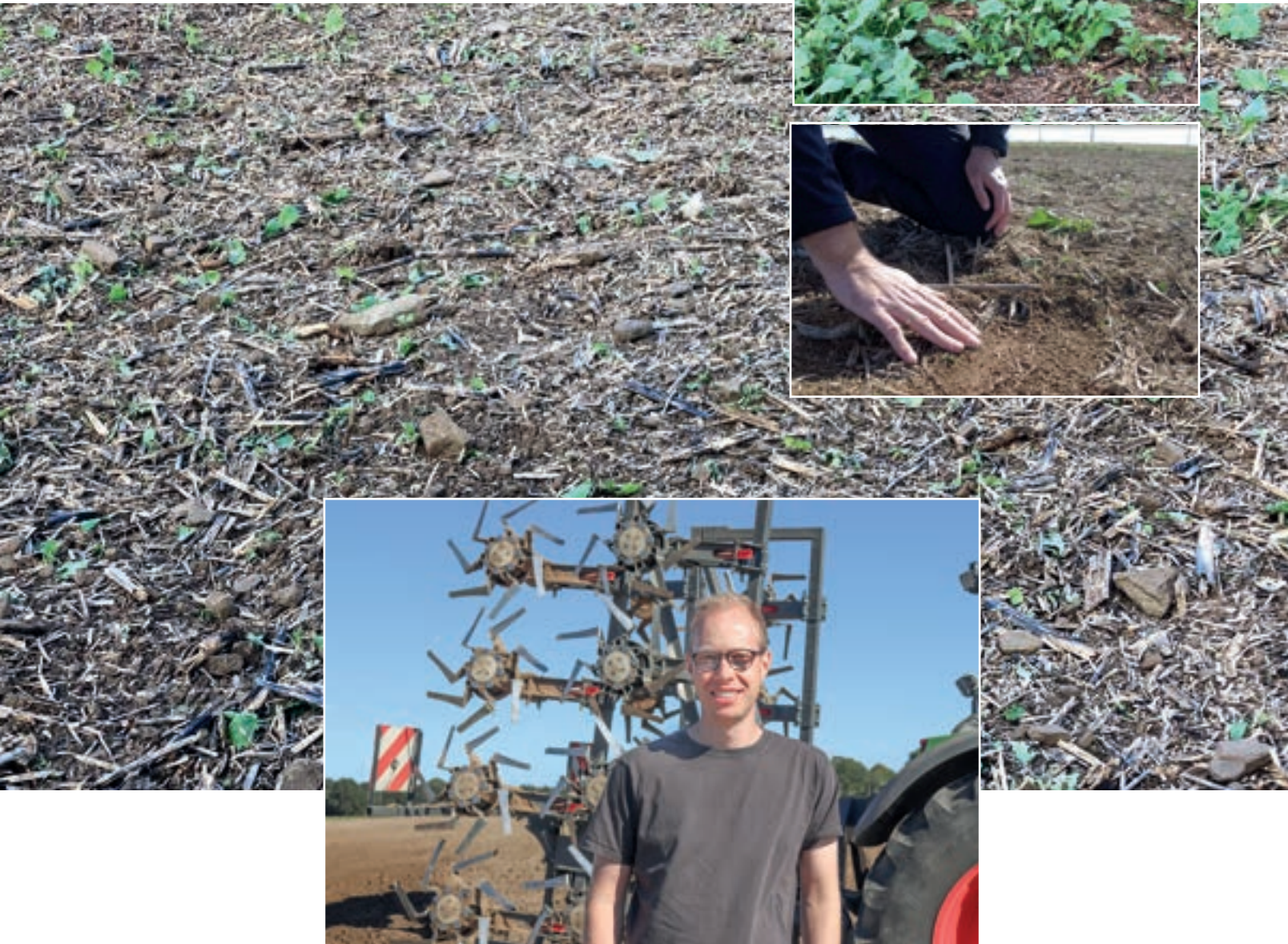
- Ultra-shallow, full-surface cultivation of the soil and crop residues to a working depth of 0 to 2 cm, which stimulates active surface rotting
- The crumb structure of the soil is disturbed as little as possible by this gentle tillage method
- Smear layers or smearing of water-bearing pores/earthworm burrows are largely avoided
- Ultra-shallow tillage maintains soil cover; organic material is deposited on the soil surface

The unique features of the GrindStar®

- Easy to use
- Cost saving thanks to reduction of herbicides
- Above-ground material is processed and frayed, but not completely shredded as with actively driven equipment (mulchers, tillers)
- Crop and plant residues are distributed evenly over the soil surface
- Volunteer seeds (volunteer cereals, volunteer rape and weed seeds) are encouraged to germinate and are not buried
- Root balls and coarse components are broken up, meaning that no coarse components remain on the soil surface -> seedbeds can be prepared much (!) more extensively
- The number of passes determines the cultivation intensity, meaning that the effects are regulated
- The smooth operating principle and the lightweight design mean that small, lightweight tractors can be used for optimum soil protection
- Cost savings as the low tractive power requirement results in low fuel consumption – only 20 hp per metre of working width
- High driving speeds of 12 - 18 km/h ensure high area outputs
- Combined catch crop sowing possible



GrindStar® rape



Phillip Müller

Project Manager, Cologne University of Applied Sciences

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Characteristic of the **GrindStar®** in the extensive crop cultivation field tests so far is the high area output combined with low fuel consumption.

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In rape stubble cultivation, the use of the **GrindStar®** led to a high rate of volunteer rape germination, as well as good rape stubble conditioning.

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All the stalks in the rape stubble were shredded and finely frayed, and the stalks have rotted well.

Maize stubble was shredded down to the root neck right after the chopper.

Clusters of weeds such as knotweed, thistle and dock were satisfactorily shredded with the **GrindStar®** instead of the mulcher. Where a second **GrindStar®** cultivation operation took place, the number of slugs present was significantly lower.

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Martin Krist
Vogelsang Estate Manager
(Max Planck Institute)



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→ Agriculture needs a future



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