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Taifun Soy Info

Specialist information for soy producers and processors

Nurse crops in soy - trick or gimmick?

Introduction

Soybeans are sown late in spring and have a very slow youth development, especially in cool weather. In organic farming, intensive hoeing is also used. Accordingly, the soil is partly uncovered for a long time until canopy closure. The risk of capping and erosion is similarly high as for maize stands. This is only partly compensated by the good shading after canopy closure and the well rotting crop residues.

The great advantage of soybean in crop rotation is that it promotes soil structure and is completely self-sufficient in nitrogen. However, due to the strong nitrogen translocation into the grains, the high-yielding and protein-rich legume leaves little nitrogen for the subsequent crop. Most practitioners rate soybeans as good as field beans in terms of the preceding crop effect, but worse in terms of N supply.

Erosion after a thunderstorm in June: A young soy stand is hardly better for the soil than maize.

Frost-resistant nurse crops could help to increase the value of soybeans in crop rotation - when another summer crop is grown afterwards. In Germany, winter cereals are often grown after soy, resulting in a too narrow time window for catch crops. Sowing after threshing is not ideal because of the late harvest date at the end of September. Catch crops should be established before the soy harvest if possible. This also has the advantage that the nurse crop sometimes stabilizes the topsoil already at harvest time and contributes to better trafficability.

Manual work in the Taifun initial trial: Sprinkling a catch crop mixture into a soy stand. Rain is forecasted for next week!

An effective method is to sprinkle the nurse crop in the soy stand at the beginning of ripening. Another possibility is sowing shortly before canopy closure. Finally, experiments on the simultaneous sowing of soy and different nurse crops are presented.

Sowing of nurse crops at the beginning of ripening

This method is widely used in North America. It gives the nurse crop the decisive four-week advantage over post-harvest sowing - without allowing it to develop excessively before harvest. As with the other methods, however, the crucial point is the water supply. There must be sufficient rain after sowing, otherwise the germination will not be successful. Furthermore, the choice of species is limited to species with shallow planting depths. Above all, rye is excellently suited, but also vetches, oil radish and burps have proved successful. When using a broadcast seeding technique (airplane, spreader), fine seeds must be avoided because they segregate too much (if not pelleted). When using a pneumatic spreader, grasses and clover can also be used.

Even the best microclimate under the soy leaves is of no use to the nurse crops if no precipitation occurs.

In North America, nurse crops are often sown by airplane or with very large pneumatic spreaders (High Clearance Seeding). Due to the high area output, large areas can be sown immediately before rainfall at low cost and without damage to the crop. Spreading technology with small working width is only possible if tracks are available.

"Aerial Seeding: In North America, nurse crops in soybeans and maize are on the rise, often sown into the stand by airplane. Picture source: https://peoplescompany.com/

In general, this method does not allow for an even distribution and emergence as is the case of a drill seed after harvest. Furthermore, the seed is increasingly exposed to snails, mice etc. Nevertheless, the procedure can be the best in terms of economy - especially if alternatively, due to time constraints, nothing is sown at all. The nurse crop benefits from the favorable microclimate and the good soil structure under the falling soy leaves. At harvest, the green seedlings should already be visible under the soy. The thin layer of litter from the soy harvest usually poses no problem to the delicate seed.

In addition to rye, grasses and clover germinate.

Vetches can contribute to the N-supply of the succeeding crop.

In Taifun contract farming, this method is often used where soy is followed by a summer crop. Initial trials on several farms have clearly confirmed: The pivotal point is the weather conditions after seeding. It cannot work in dry conditions.

Under optimum conditions, the contrast between nurse crops and bare soil is clearly visible within weeks after harvesting.

In the case of broad-cast distribution, the soy litter from the combine harvester does not pose any danger to the nurse crops.

Establishment of nurse crops shortly before canopy closure

When sowing the nurse crop with the last hoeing pass before canopy closure as early as June, low species ("golf lawn" grasses) are an option, otherwise the very low cutter bar guidance required for soybeans will cause problems during harvesting. In this case, ridge cultivation offers an advantage if the nurse crop grows between the ridges and thus lower than the soybean plants.

Buckwheat in soybeans sown with the last hoeing pass (right in the picture): This experiment has not proved successful. Buckwheat is probably as harmful to the yield and as problematic during harvest as atriplex or amaranth...

Due to the sowing in summer, frequent failures are to be expected due to drought. However, if the nurse crop can be established, it might itself become a water competitor for the soybeans in August, if drought occurs. For these reasons, the method is only used by very few farms and on a small scale.

Simultaneous sowing of soy and catch crop

Trials have been carried out in Switzerland for this procedure. Among other things, various winter cereals and buckwheat were tested. Soy was sown with wide row distance, with the catch crop next to it on both sides at a distance of 4 cm. In this way a corridor for hoeing was maintained, and the catch crop was meant to suppress weeds in the soybean rows.

The advantage with winter cereals is that the lack of cold stimulus prevents shooting and thus the plants remain low. However, the desired weed suppression did not occur in the trials.

Strong weed growth despite winter rye as accompanying seed. Photo: FiBL Switzerland

Only for buckwheat a relevant weed suppression was achieved. The buckwheat matured mainly before the soybeans. As in the case of sowing before canopy closure, it can be assumed that buckwheat competes with soy, especially in dry phases.

In general, it can be said that soy does not appreciate strong company in its youth at all.

Conclusion

The last word has certainly not yet been spoken on the subject of nurse crops in soy. The procedure will not always be advisable in all situations. Rather, it is a further building block on the way to a versatile, yield-safe and complete crop rotation. With the right subsequent crop (summer crop!) and the right weather conditions for ripening, something can be achieved for the soil fertility and the preceding crop effect of soy at low cost and with minimal effort - as is currently being demonstrated in North America on huge areas. However, it must be considered that in the Midwest wind erosion in winter is a central argument for catch crops, and that soy is mainly grown there in summer. In addition, the issue of nitrate leaching and N fixation by catch crops is currently even more hotly debated in the Midwest than it is here. Some pioneers use nurse crops in winter as a cheap pasture for cattle, there are numerous experiments with different crops, application methods etc.

That's how it's supposed to look: This catch crop, sprinkled into the ripening soy stand, keeps the soil covered during winter and gains some biomass with the first warmth of spring before ploughing.
Photo: Perger Feldfrüchte

Links to the topic

THE website for all questions about nurse crops in North America with many articles especially about nurse crops in soybeans.
http://mccc.msu.edu/

Short video soy dam culture with nurse crops shortly before canopy closure
https://www.youtube.com/watch?v=FP2Ard-jefY)

FiBL test report on the simultaneous sowing of catch crop and soya
http://www.bioactualites.ch/cultures/grandes-cultures-bio/leguminous-seeds/sojarapports-en.html

For comprehensive information on all aspects of soy cultivation visit:

www.sojafoerderring.de

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