



Specialist information for soy producers and processors

Seeding technology for organic soybean cultivation - what is important?

He now reaps what he has sown. This simple insight is especially true in organic soybean cultivation. A fast, even field emergence makes mechanical weed control much easier. The soy wins valuable days in a race with pigeons, bean flies and the like. But above all: the faster the growth, the earlier the harvest.

A key to optimum sowing is found in the details of the technology. The challenge lies in the fact that in organic soybean cultivation large quantities of seed must be precisely placed. For some makes this is too much. Many farmers live with the fact that their soy stands are always jaggy. Yet, there is certainly optimal technology.

The choice of makes is huge for both drill and precision sowing. We provide an overview of which technology is suitable for soy and which details lead to success.



It does not have to be the latest technology. A few details and careful settings are decisive.



Goal achieved: More precision is not required. Small gaps can be compensated for by soybeans, but larger ones cost yield and are often colonized by weeds

Eight requirements for the perfect organic soybean sowing machine

Whether precision or drill seeding: The first three points are a prerequisite for successful organic soybean cultivation. Points four to eight make the sowing perfect:

1. Uniform application of 700,000 grains/ ha (175 kg)

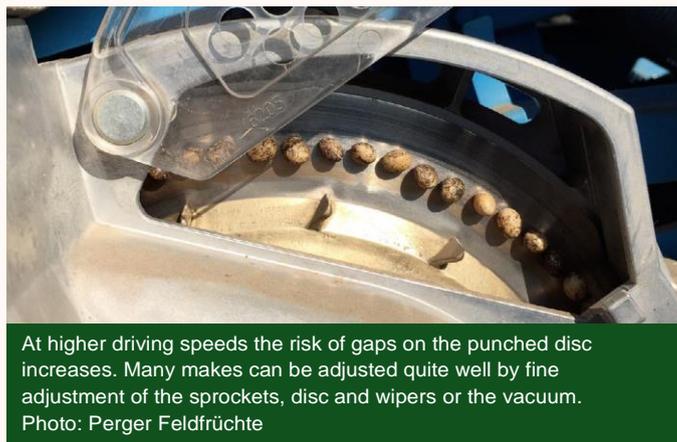
Standard seed rate is approx. 550,000 germinable grains, depending on the maturity group and location. With soy, however, there are often problems with the germination capacity. Already at 80% germination capacity, almost 700,000 grains must be sown per hectare. At 50 cm row spacing and 5 km/h, this is almost 50 grains per second per share!

In precision seeding, the seed rate of soy is the central challenge. In many cases, both the drivetrain as well as

the vacuum come to their limits. In the case of large grain seed lots, separation is also more difficult. Gaps and double grains are the result. Most of the common manufacturers now offer extra gears, punched discs and powerful blowers for soy. However, the local representatives are often not yet fully informed about the required equipment. The most important factor is that the high seed rate is not only achieved during a dry run, but also in the field and at normal driving speed (over 5 km/h). Under field conditions, the results are usually considerably worse than in the dry run due to slippage etc.



Here, weed control in the soy rows becomes a challenge. Even if everything runs perfectly until the harvest, good yields can no longer be expected.



At higher driving speeds the risk of gaps on the punched disc increases. Many makes can be adjusted quite well by fine adjustment of the sprockets, disc and wipers or the vacuum. Photo: Perger Feldfrüchte

2. Precise planting depth

Uneven planting depth leads to uneven emergence. An optimum use of hoe and harrow is then difficult. The decisive factor is that the shares run reliably even at driving speeds of over 5 km/h and do not bounce. This requires a sufficiently high share pressure paired with solid, large wheels for depth control. This is a particular problem with many seed drills, but also with light precision seed machines. For seed drilling, machines with parallelogram should be preferred, where the sowing depth is adjusted via the pressure roller independent of the share pressure.

3. Good recompression

The large soy seeds need sufficient water for germination. At the same time, they must not be buried too deep. Capillary water is raised by good recompression. For uneven seedbeds this also ensures that the water supply is evenly distributed and the seed germinates uniformly.

4. Row spacing

Standard row distance for organic soy is 45-50 cm. There are many maize seeders with a row distance of 75 cm available. However, this is very large for soy, depending on the location and variety. Weed control is easier the larger the row distance, but delayed canopy closure reduces yield significantly. Alternatively, there are farms that set their soy precision seeder to 37.5 cm and then empty every second shed for maize seeding. Depending on location, weed pressure and variety, this can also be an efficient option. With cereal drills, the row distance can be easily adjusted to the optimum range by closing seed rows. The decisive factor for all variants is of course that the sowing and hoeing technology are precisely coordinated regarding row width.



Much discussed: Which row distance gives the best yield?

5. Straight seed rows

Particularly on seed drills the sowing units often have lateral play in the suspension. The larger the distance between suspension and shed, the more the sheds are "flapping". A precise hoeing close to the rows is then no longer possible.

6. Clod Clearer

Many precision seeding machines come by default or optional with clod clearers. This allows for considerably improved work of the sheds in cloddy seedbeds. In dry conditions, planting depth can also be increased if the clod clearer first pushes the soil to the sides.



"Open road for ambitious beans!" In difficult sowing conditions, clod clearers enable accurate sowing.

7. Gentle conveying technology

Soybean seed is fragile. Even fine hairline cracks in the seed coat can impair emergence in cold, wet weather when fungi penetrate the swelling grain. Baffle plates etc. should be padded accordingly, snails for filling are only an option if they are designed to be very gentle on the grain.



A simple trick with a big effect: self-made rubber impact protection for the distributor in pneumatic drilling machines.

8. Large seed tanks

Precision seeding machines often have relatively small seed tanks. In the case of soy, this makes regular refilling of the tanks necessary. For larger areas the seed tanks should have a capacity of at least 50 liters, some manufacturers also offer 70 liters. On some machines with large fertilizer tanks a seed replenishment from the fertilizer tank can be retrofitted with some technical skill.



MaterMacc offers machines with a large fertilizer tank that can be converted into a central seed tank in addition to the 70 liter seed tank. Source: MaterMacc

Precision seed or drill seed?

Both methods can bring perfect results - if the above-mentioned requirements are fulfilled. The general opinion is that those who want to excel use precision seeding. However, some soy experts prove the opposite. In Taifun contract farming, even a harvest record has been achieved with drill seeding.

So, what are the characteristics of **drill seeding** and what do you need to pay attention to?

- **One machine for everything**

Good seed drills tend to be more expensive than precision seeders due to the considerably higher number of units and the integrated rotary harrow. However, it is often possible to dispense with a precision seeder if soy suitability is ensured for the grain drill.

- **No limit on the seed rates**

In contrast to many precision seeders, seed drills can easily cope with the high seed rates required for soy.

- **Separation not mandatory**

Due to the large seed quantity in soy, a relatively even seed row can be produced with good drilling technology and suitable seed wheels.

- **Large seed tank**

The large seed tank is a clear advantage of soybean drilling compared to most precision seeding machines.

- **Robust technology**

Seed drills tend to be less susceptible to faults, require less maintenance and are easier to handle.



Organic soybean drill seed: a simple solution that can work.

• **Seedbed preparation and sowing in one**

The integrated rotary harrow eliminates the last seedbed preparation before sowing.

• **Variable row spacing**

The row distance can be adjusted by closing the seed tubes. On pneumatic machines, however, ensure that the air volume is also reduced. Otherwise the air may disturb precise placement.

• **But: The sowing unit is what counts!**

In many cases, seed drills lack precision in planting depth and soil recompression - but this is not true for all makes! The basic requirements for organic soybean seeding are a large pressure roller and a functioning control of the planting depth. This should not be achieved by the share pressure, but by the ratio of pressure roller to share. On many sites disc shares additionally improve the depth control.



Optimum drill sowing unit from Lemken with parallelogram: The large pressure roller runs closely behind the shares. The planting depth is aligned with the pressure roller, which runs closely behind the share. The planting depth is maintained even on uneven ground. The whole sowing unit is firmly attached to the seed drill

Nevertheless, **precision seeding** is currently the standard for organic soy. What is the reason for this and how can the advantages of the technology be optimally exploited?

• **Perfection on the unit**

Due to the greater distance between the aggregates, it is possible to equip the individual aggregates with clod clearers and depth guide wheels. V- and intermediate pressure rollers are standard, so that the recompression can be finely adjusted according to the situation. These are advantages which are definitely useful under difficult conditions.



Standard design of many precision seeders: depth control wheels surround the double disc shares, followed by V-pressure rollers. Optionally, simple pressure roller in between and a clod clearer in front.

Seed rate: Often a shortcoming

However, precision seeding machines often suffer from the seed rate: either the perforated discs have too few holes, or the holes are too close for large soybeans, so that the beans displace each other. Sometimes the vacuum is also too weak to hold the quantity of large beans securely at the holes. However, some manufacturers have adapted to soy. If you pay attention to the critical points when buying and adjusting, you will not have any problems with the seed rate even with precision seeding.



Which perforated disc is the right one? A dry exercise in winter prevents surprises during the first sowing! The interaction of grain size, transmission, perforated disc and vacuum must be right.

• Lower seed requirements

With good precision seeders the seed quantity can be somewhat reduced due to the optimum seed distribution.

• Attention for light models

Models for sugar beets or similar are often much lighter, regardless of the manufacturer. Accordingly, they react more sensitively to higher driving speeds or unevenness and stones. In many cases, optimum soybean sowing is possible with these machines - if the machine is driven very slowly. Additionally, these machines usually come with smaller seed tanks.



With this light, simple Gaspardo machine, 50 hectares of soy for Taifun are sown in Breisgau every year. With careful adjustment, thorough seedbed preparation and low driving speed good results are achieved.

• Maintenance brings performance

Precision seeders are precision tools. Especially when they are working at the performance limit, as with soy, thorough maintenance and care is required. Especially the drive chains are often neglected.



Several manufacturers offer cardan driven aggregates - a safe solution for "maintenance grouches".

Which brand should it be?

For seeding technology the choice of makes is enormous. However, many of them hardly differ in the technical design. In Europe, for example, Monosem set early standards in the field of precision seeding technology, which has now been successfully copied by several manufacturers. Individual brands make their mark with details such as telescopic frames, cardan drives or larger seed tanks. At present, several suppliers are entering the market with electric drives; another interesting detail, but certainly not a must-have for organic soybean cultivation. Kverneland has made a name for itself with a particularly high seed rate of up to 1 million soybeans per hectare. John Deere is currently trying to set a new standard in America with the exact-emerge technology. The very elaborately built, expensive machines are distinguished above all by the fact that the seed is guided with a brush in real time through the seed tube in the soil. In this way an even placement without rolling away of the seed is achieved even at high driving speeds. In Europe, however, the units are currently only available for maize.



Joker at very fast speed: The seed tube of the "Exact Emerge" technology is replaced by a brush channel in order to control the seeds all the way to the ground.

Einböck is brand new on the market with the pneumatic seed drill "Chopstar Seeder". All components from the large front tank to the grain-protecting distributor heads and the robust, parallelogram-guided shares have been designed for the efficient and successful sowing of organic soy and other crops with high seed rates where separation of the seed is not the decisive requirement.



Einböck Chopstar Seeder: The front tank can also be used for nurse crops etc.; the robust shares are attached to a normal hoeing frame. Source: Einböck

Conclusion

The quality of sowing is a key to successful organic soybean cultivation. Whether drilling or precision seeding: a range of suitable seeders is available. However, anyone who does not want to do without quality for regular driving speeds and under difficult conditions must inform himself thoroughly. In many cases the local representatives are not yet well informed about the necessary adjustments to their equipment for soy.



Technology does not make agriculture! Most of the potential of soybean sowing is not wasted through poor technology, but through lack of know-how and too little control and adaptation to the respective conditions.

Links

Websites of some common manufacturers:

- Product description and video of the Einböck Chopstar Seeder: www.einboeck.at/index.php?option=com_content&view=article&id=2269&Itemid=1020&lang=en
- Good explanation of the Exact Emerge technique by John Deere: www.deere.com/en_US/products/equipment/planting_and_seeding_equipment/planters/row_units/exact_emerge_row_unit/exactemerge_row_unit.page#
- www.kuhn.de/de/range/saat/pneumatische-einzelkornsmachines.html
- www.kverneland.de/Aussaat/Einzelkornsaemaschinen
- www.matermacc.it/de/seminatrici.html
- www.monosem.de

Further Taifun Soy Info and comprehensive information on all aspects of soybean cultivation can be found at: www.sojafoerderring.de

Funded by the Federal Ministry of Food and Agriculture on the basis of a resolution of the German Bundestag within the framework of the BMEL Protein Crop Strategy.

Gefördert durch:



aufgrund eines Beschlusses des Deutschen Bundestages

Imprint

Author: Fabian van Beesten
Editorial assistance: Martin Miersch
Publisher: Taifun-Tofu GmbH
Bebelstraße 8 | 79108 Freiburg |
Tel. 0761 152 10 13
soja@taifun-tofu.de



Taifun
Zentrum für
Sojaanbau