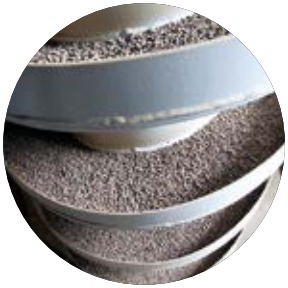
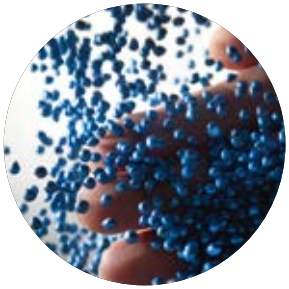
strube

The Seed. Est. 1877


Production

of sugar beet seed

About us

Strube is a successful international seed breeder and producer of commercial seed. As plant growers and seed specialists, we supply our customers in the agricultural and manufacturing sectors with outstandingly high-quality seed for premium plant varieties.

Our company is driven by innovation and new challenges, whilst always remembering the importance of quality. We cultivate new varieties that are adapted to the needs of their respective growing regions.

The undeniable success of our product development programme results from our policy of continuous investment in innovative methods for cultivation and seed quality research.

Our mission now and in the future is to ensure that our agricultural clients can run their businesses independently, sustainably and successfully.

From pollen to pellet

For a sugar beet grower, the ‘beet year’ starts with soil preparation and cultivation of the fields in the spring. However, the seed required for this crop has already undergone a lengthy process beforehand. Propagating and producing sugar beet seed is a complex and time-consuming business that needs plenty of careful planning.

In this brochure, we show you how pollen is used to produce new sugar beet seed – supplied in a coated form known as a ‘pellet’.

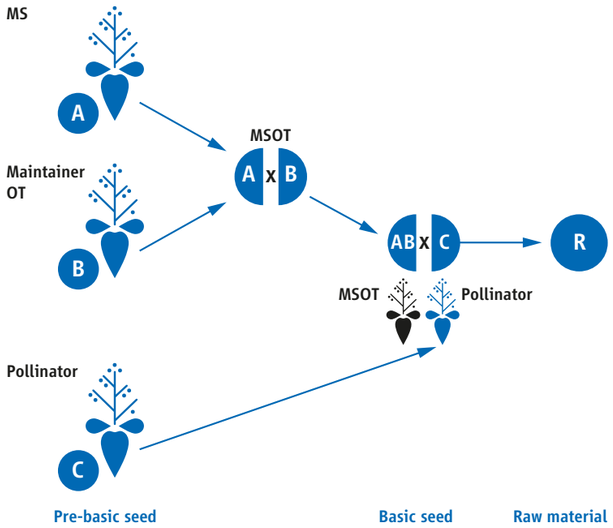
A place for propagation: a single sugar beet plant can produce many thousands of flowers.

How commercial seed is made

Once a sugar beet variety has been approved for cultivation, its commercial success depends on it being made available as soon as possible. Yet commercial seed production is not something that happens overnight. Accordingly, small-scale propagation starts in parallel to the official variety application process, to ensure that enough seed is ready when the variety goes to market.

To understand the complex process involved in sugar beet production, we need to take a step backwards and look at the physiological properties of the beet itself. These properties also explain why planning and propagation start two to three years before the final sugar beet seed is actually sown.

The sugar beet is a biennial plant. During the first year, the beet develops its tuberous root mass (used to store sug ar). After overwintering (vernalisation), the sugar beet produces flowers and seeds in the second year. The speed of seed production is therefore determined by the plant's natural biological cycle.



Sugar beet seed is a hybrid seed. This seed is produced in three stages: from pre-basic (PB) seed to basic seed (B) and then to the raw seed material (R), which is used to produce the certified seed (CS).

This procedure has a clear schedule, which starts with the propagation of the basic seed. This is achieved by crossing the mother male-sterile plants (MS) with the fertile maintainers (OT) from the pre-basic seed stock. The result of this crossing step is the male-sterile basic seed (MSOT). This combination constitutes the female parent of the later hybrid seed. Basic seed is also propagated from the pollen source (pollinator, male parent) in this same year.

In the following year, both parents are then sown out in August in our seedling production facility in the mild climate of Brittany. This environment gives them the cold exposure needed for bolting and later seed production.

Following this, the resulting seedlings are then planted out in February and March in western France, southern France and Italy by our specialist partner companies. This planting stage is the last step in the growing process, namely the step to produce the hybrid seed.

In the seed production fields, the female parent male-sterile plants are planted next to the male parent pollinators for targeted pollination.

Hybrid seed production – producing the raw material

Growing hybrid seed is the last step needed to produce the raw seed material. The reason seedlings are planted out in February and March in France and Italy is that, climatically speaking, these regions are especially suited to achieving very high quality seed and guaranteed completion of seed maturation. For the production of hybrid seed, fields from one to ten hectares in size are used to cultivate the various seedlings from the pollinator (male parent) and the male-sterile seedlings (MSOT) from the female parent in rows next to one another, so as to ensure that cross-pollination will occur (MSOT + pollinator). The biggest challenge in this process is ensuring that both plants flower at the same time: this is essential for successful hybridisation. Plant growth and seed maturation is strongly dependent on the climate, the soil and cultivation methods.

After flowering, the pollinators are removed and the raw seed material is harvested in July and August. During harvesting, the plant rows from the female parent, male-sterile plants are swathed and then combined once drying is complete. The harvest is then transported to our Seed Technology Centre (STC) in Söllingen, where the raw seed must pass through several other processing steps to ensure that the future seed meets our high quality standards.

The rows of male parent plants are removed after flowering.

In the production facility, gravity separators and screens are used to separate seed into size and weight fractions.

From raw seed to commercial seed

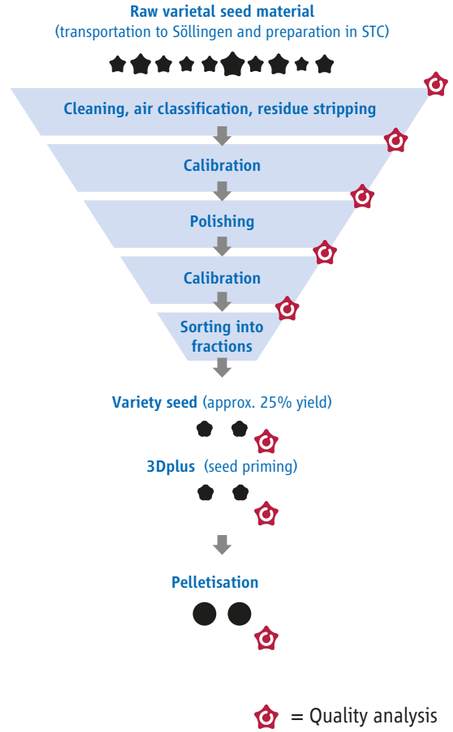
Every year in autumn, several thousand tonnes of sugar beet seed are transported from the growing regions in France and Italy to the Seed Technology Centre (STC) in Söllingen, Germany. Since the seed has been grown in many different fields, the raw seed material differs in terms of its volume and quality.

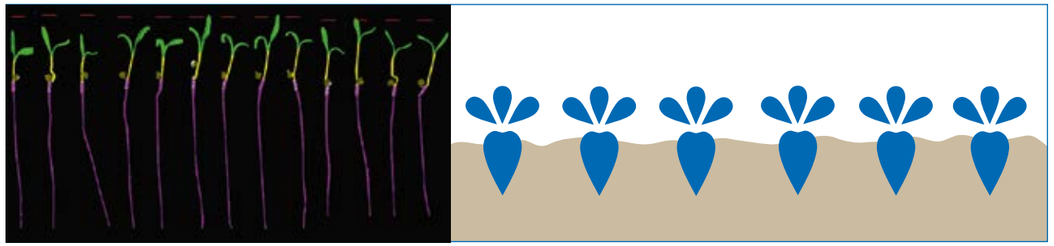
The varieties themselves vary in terms of their seed quality. The goal of commercial seed preparation is to ensure all of the sources contributing to seed from the growing regions achieve the same, constant level of high quality, year after year. This means only a small proportion of raw material can be used, and this valuable portion is carefully selected by the production process.

In the processing facilities at the STC, the raw material is processed step by step into a homogeneous quality seed product. These processes are monitored as part of continuous quality controls.

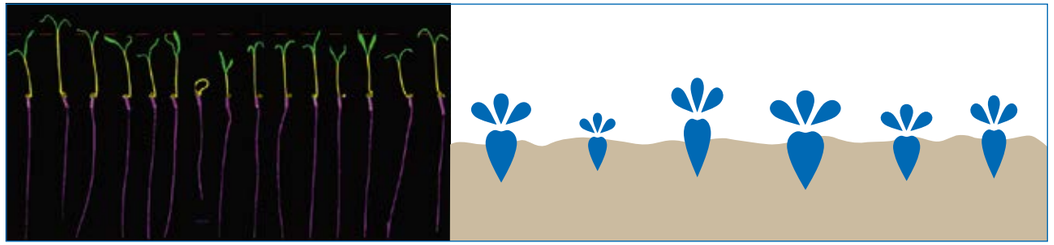
The raw material is stripped to remove residues and foreign objects before being calibrated and polished. These cleaning steps remove excess parts of the plant from the seed, while calibration ensures that seeds have the same shape and form.

The seed is then sorted into weight fractions. Seeds that are too light are rejected as they do not meet our quality criteria. This process optimises seed quality, ensuring that emergence in the field is rapid and homogeneous.

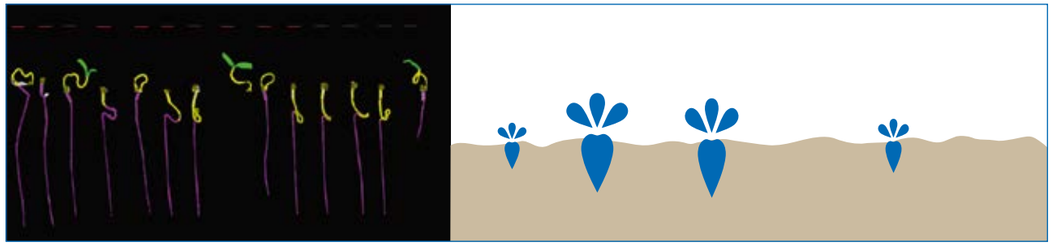




Homogeneous seed selection optimises seed yield



Heterogeneous seed results in highly variable yield



Substandard seed actively reduces yield

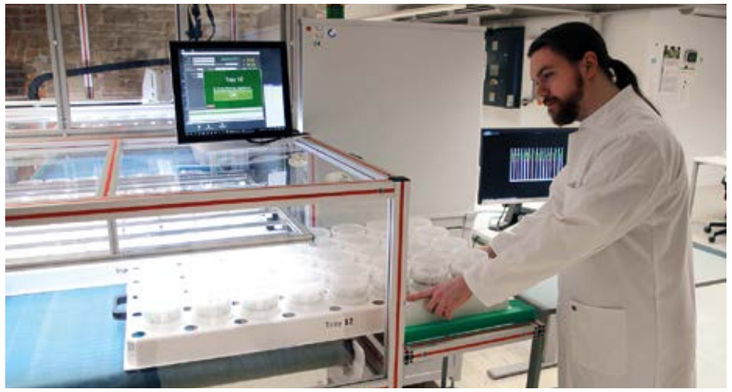
CT measurement: the phenoTest automatically detects and measures the cotyledons, hypocotyl and roots, which are then dyed to make imaging easier before being analysed to confirm their homogeneous development.

Quality assurance with seed quality research

To ensure that the preparation process is guaranteed to select the best seed grains, our seed quality research unit has developed a wide range of technical innovations and analytical methods. These include the **Seed Inspector**, which utilises computer tomography (X-ray scan) to check and verify seed quality.

The **phenoTest** is an important quality control step: developed internally here at Strube, this is a standard test that analyses seedlings to verify the germination and sprouting capabilities of the sugar beet seed. While conventional seed analysis only verifies germination capability, our **phenoTest** lets us perform advanced testing of parameters such as sprouting speed or the growth of cotyledons and roots. The seedlings to be investigated can grow vertically in the specially adapted containers and form roots unhindered. Using computer tomography (X-ray scan), the **phenoTest** documents the development of the sprouting seed: at several points in time, the seedlings are non-destructively scanned, enabling us to optimise the seed to maximise the growth of strong and healthy plants.

To better assess the characteristics of plant germination and growth in the field, we worked with Fraunhofer EZRT to develop a robot for phenotyping. This robot analyses the dynamics of field emergence, as well as the traits of seedling and young plant development.



Each individual plant is detected photographically and geolocated using RTK GPS. This enables each plant to be identified on each robot tour, in order to objectively determine and evaluate its growth profile.

The robot also provides us with an opportunity to assess the effects of applying new treatment methods.

This multi-stage quality management process is how we ensure our high product quality.

Watch the video to learn more about our testing procedure. Use your phone camera to scan the QR code.

Primed seed has been brought close to germination during the production process and so sprouts faster once sown.

Seed priming – for faster field emergence

Our 3Dplus seed priming is an optional step after preparation and before seed pelleting. Developed in-house at Strube, this technique prepares the sugar beet seed to give it the best possible start out in the field.
Seed treated by the 3Dplus technique achieves considerably faster emergence than seed that has not been primed.

At the six- to eight-leaf stage, leaf surface area is increased by up to 20 percent. This accelerated plant growth is able to increase sugar yield by up to two percent.

aktiviert 3D plus primed

After the pelleting process is complete, the seed is dyed blue – clearly identifying the seed as a quality product from Strube.

Pelleting – the final and decisive step in seed production

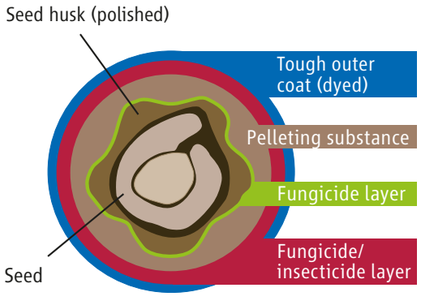
After preparation and (optional) priming, the seed is pelleted and calibrated for optimum seed drilling. The pellet is not only a delivery system for plant protection products but also gives the seed a uniform shape: this ensures the seed is deposited quickly and precisely during sowing by single-seed drilling machines.

Pelleting is a multi-step process that begins with the application of fungicides to the sugar beet seed to protect it against seed-borne pathogens. The pelleting substance itself is then applied and moulded into a uniformly spherical shape, calibrated to the required size. Before the raw pellet receives its tough, coloured outer coat, another protective (insecticide) layer may be applied.

As a final step, the blue sugar beet seed pellet is packed securely and prepared for shipping to growers, who can look forward once again to high-quality premium seed with consistently outstanding germination capabilities in the next sowing season.

This processing stage is the last step in the complex and time-consuming production of sugar beet seed.

The sugar beet seed pellet



Pelleting makes the seed ideal to handle for sowing. Depending on requirements, various kinds of treatments can be applied to protect the young sugar beet plant.

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