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PRESSEMITTEILUNG

Ancient grains: Variety selection and manual dexterity are the recipe for success

The University of Hohenheim has completed what is probably the world's largest ancient grain trial / Large variety differences for einkorn too / Tips for agriculture, mills, and bakeries

The cultivation and processing of ancient grains necessitate a certain know-how. This has now also been confirmed definitively for einkorn in what was probably the world's largest ancient grain trial with spelt, emmer, and einkorn. Prof. Dr. Friedrich Longin from the State Plant Breeding Institute of the University of Hohenheim in Stuttgart, together with his team, tested the traits of 148 einkorn varieties in the field, mill and bakery at several cultivation locations. "We observed enormous differences across the individual varieties in terms of field performance, milling, and baking. If you want to use einkorn successfully, you should go for a variety that delivers a reliable yield and exercise manual dexterity when baking," said the expert when summarizing his findings. They can be accessed in detail here: https://www.uni-hohenheim.de/uploads/media/GrossesEinkornProjekt_engl.pdf

Einkorn (*Triticum monococcum ssp. monococcum*) is one of the oldest grains and, like emmer and spelt, it belongs botanically to the large wheat family. Einkorn comes originally from the Fertile Crescent, the area between the Euphrates and Tigris rivers in present-day Syria and Iran. It was already part of the human diet when we were still hunters and gatherers. For example, the glacier mummy Ötzi was found to have einkorn amongst his provisions.

Over the course of time, the grain became less and less important, and is now only cultivated on a very limited scale worldwide. But the demand for rustic products and alternatives to wheat is once again on the rise, almost faster amongst hobby bakers than amongst professionals. But as demand waned, so did knowledge about the best way to cultivate and process einkorn.

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That is why the State Plant Breeding Institute of the University of Hohenheim, together with Strube Research GmbH & Co. KG and the Detmold Institute for Cereal and Fat Analysis

(DIGeFa), launched a unique large-scale research project on einkorn. The researchers collected the available varieties from various gene banks. With several dozen new einkorn varieties available on the market, a total of 148 einkorn varieties were selected for testing at up to five different locations in the field and in the quality laboratory. Two wheat varieties were used as the reference for comparison.

More than 100 traits of each variety were examined. A special focus was placed on traits that were of the most importance for all partners along the entire value chain. Farmers, for example, attach importance to aspects such as yield, resistance to lodging, and winter hardiness whereas traits such as grain size and kernel yield are essential for millers, and water absorption, dough stability, and baked volume for bakeries and consumers.

Major differences

In summary, the yield of einkorn was significantly lower than that of wheat. The gross yield was between 38 and 61 dt/ha, depending on the variety. At the same time, einkorn had significantly larger growth height and toppled over easily, especially during heavy rainfall. Experts use the term lodging. The frost hardiness of einkorn, on the other hand, was significantly better than that of the tested frost-hardy winter wheat varieties Julius and Genius.

In addition, the researchers observed a wide margin of variation among the individual varieties for all the traits tested. "We found varieties with very different traits in the gene banks," said Prof. Dr. Longin. "Selection and breeding can improve the cultivation risk and yield reliability with relatively little effort, and this makes einkorn more competitive."

Already now, the right choice of variety could increase the yield of einkorn by more than 30 percent, and halve the cultivation risk. The expert went on to say that the Monomax and LDPhi einkorn varieties, which were important in cultivation, did significantly better in terms of these traits than most of the other einkorn varieties tested.

These two varieties also performed slightly above average in milling. "Overall, the clear differences across the 148 einkorn varieties show that it makes sense for farmers and millers to select the right einkorn varieties," concluded Prof. Dr. Longin.

Preferably

DIGeFa initially developed a standard milling and baking trial specifically tailored to the traits of einkorn to test and compare the baking traits of einkorn flour. "We also found a large variation in baking quality across the einkorn varieties," specified Prof. Dr. Longin. "Only a few varieties present very good dough and baking traits. Unfortunately, they perform poorly in terms of both yield and lodging resistance in the field." Improved agronomy was currently more important in the value chain than baking quality, because even the best quality of einkorn was still significantly different from that of wheat or spelt.

However, important findings for baking practice could be derived from the trials: "We can confirm initial practical experience that the recipe has to be adapted if you want to make bread or rolls with a high einkorn content," said Prof. Dr. Longin. "These doughs are even more fragile than spelt-based doughs if they are kneaded too hard and for too long. Better to only mix and knead just a little," concluded the expert:

"In addition, a long dough process with numerous rest periods, reduced yeast, the use of cold- or hot-soaked grains and working with pre-doughs or sourdoughs significantly enhance baking quality," the researcher continued. "If you bear this in mind, you can make great pastries with delicious flavor and long-lasting freshness." For this purpose, bread types such as rustic rootbreads or classic whole-grain breads in box form were ideal. Alternatively, einkorn was highly suitable for wafers, cookies, fruit slices and other sweet pastries because of its yellow-colored flour and attractive nutty flavor.

Completion

These results marked the completion of what was probably the world's largest ancient grain study, in which three almost identical trials were conducted – one for spelt, one for emmer, and now one for einkorn. Prof. Dr. Longin's working group started the planning and seed propagation phases for all these projects exactly ten years ago.

"In total, we recorded more than 30,000 data points for spelt, more than 45,000 for einkorn and just under 50,000 for emmer during this period. In addition, we had about 10,000 genetic markers for each variety to elucidate the heritability of the tested traits," reported Prof. Dr. Longin. In the end, one finding was confirmed in all the trials: Establishing an (ancient) type was by no means a foregone conclusion; it required knowledge of the most important traits along the value chain.

Einfach ba

Two bakery books by Prof. Dr. Longin look at baking but also at ancient grains and their health effects. They can be downloaded free-of-charge:

"Mein Brot. Einfach. Gut." (in German) teaches anyone interested how to easily bake good bread and rolls: <https://weizen.uni-hohenheim.de/backbuch>

"Gesund & Lecker – Brot. Selber. Backen. Keine Angst vor Weizen, Brot & Vollkorn" (in German) wants to take away the fear of wheat and bread. At the same time, it provides an undogmatic but delicious introduction to more whole grains: <https://weizen.uni-hohenheim.de/vollkornbackbuch>

Additional

- [Detailed results einkorn](#)
- [Detailed results spelt \(2017\)](#)
- [Press information and results emmer \(2022\)](#)

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