

# MAIZE 2023 – KEYFACTORS FOR BETTER MAIZE DESPITE DROUGHT

Originally, you should read an essay regarding grain maize’s economic viability on this page. Concerning the volatile pricing of energy, raw materials, and goods, it would be like looking into a crystal ball. Therefore, this essay focuses on important opportunities for farmers to regulate maize yields and profitability through variety selection and cultivation techniques.

After a successful cereal harvest across the country, maize was severely drought-stressed in many areas in 2022. Cob formation was harmed. Expectations for yields of grain and silage maize were not met. The appropriate selection of varieties will consequently be even more important in 2023 than it was in previous years for the success of grain maize farming. Early maturity yield stability, and grain type are significant factors. A variety that has demonstrated excellent yield stability over many years and sites must be chosen, particularly in areas where grain maize can-

not be ensiled as an alternative to drying. In order to reduce drying expenses, the variety should also have a low water content at the time of harvest.

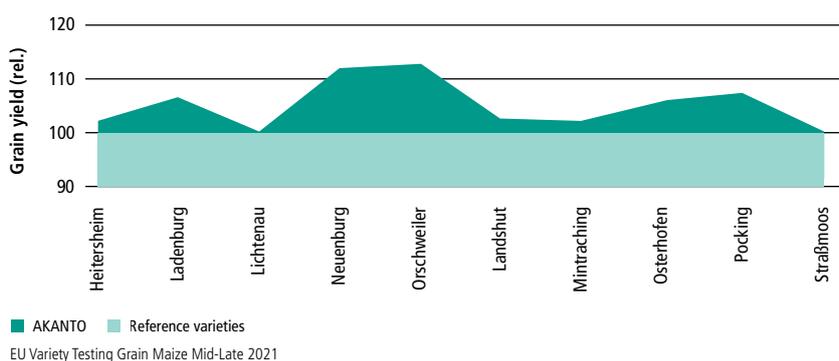
## Choosing whether to use flynt or dent maize

The choice between **dent and flynt maize** is greatly influenced by the area. Flynt maize often develops more quickly in the early stages and can withstand colder temperatures slightly better than dent maize. Compared to varieties of later maturity groups,

early varieties frequently have higher proportions of flynt maize genetics crossing. Therefore, these types are more typically found in growing regions of Northern Germany. Both types release water in different manners. Flynt maize initially has a grain moisture advantage over dent maize during the ripening process. Flynt maize is a preferable option if there are restrictions on a sufficient ripening at the location because it produces more DM than dent maize. Dent maize may, however, be a preferable option in locations where high temperatures can be reached in the autumn. Under those circumstances, dent maize can develop its high yield potential along with a quick cob water release. In terms of the kernels’ ability to dry out, it has an advantage over flynt maize. CROSBY K 210 and CLOONEY K 240 are two high-performance flynt maize hybrids in the DSV’s current grain maize portfolio. Dent maize varieties include PERLANT ca. K 200 and AKANTO K 260.

Austria’s VCU was outperformed by the variety AKANTO, which produced remarkable yields. It is also one of the earliest types in

FIG. 1: AKANTO – SUPERIOR ON EVERY LOCATION!



**i** In some cases, less is more. In Figure 2, 25% less plants were sown than in a typical planting. On the other hand, 25% more plants were sown in Figure 3. This clearly reduces the cob formation.



Figure 2: 25% lower sowing rate



Figure 3: 25% higher sowing rate

the range, and it threshed an above-average grain yield at all eight locations in the EU test in Germany, as shown in Figure 1 (see p. 4).

A financial surplus of 153 euros per ha compared to the reference varieties and 22 euros per ha compared to the best reference variety was realized by AKANTO in the profitability calculation from the previous year.

In other words, in comparison to the finest substitute variety, if nine hectares of AKANTO are grown, the seed for the tenth hectare is free.

### Optimised production

**Breeding:** The severe drought that hit the EU in 2022 has demonstrated the need to optimize maize cultivation. More drought-tolerant varieties might prove beneficial like the hybrid DANUBIO. Due to its endurance for drought, this cultivar, which is now ten years old, is an essential element of the affected farmers' agricultural strategies.

**Options for cultivation:** Choosing the right variety and stand density are both essential for optimizing production. The ideal stand density depends on the the variety. The ratio of cob to residual plant, root growth, leaf position and individual cob yield as well as parameters like fixed or flexible cob, number of grain rows, and TKG etc., have an effect on the optimal number of plants per square meter. An instance is shown in figures 2 and 3.

**Distribution of the stands:** On dry sites, large sowing rates quickly result in huge, ineffective water usage. A promotion of the individual plant on these sites is required.

Placing the plants into the best stand distribution is the goal. An inadequate stand distribution has a significant impact on the development of the single plant, according to recent experiments conducted on the Ihinger Hof in Renningen. Even two plants that are too close to one another will result in weak cob development, increased occurrence of corn smut, and a significant decrease in production and quality. You can see an example in figure 4.



Figure 4: In dry conditions, even two plants that are too close to one another cause stunted growth.

### Heat stress causes pollen sterility

Drought stress is often followed by heat stress. When maize is in the flowering stage, this is especially dangerous. Even a few days of temperatures above 35 °C, according to research by the scientist Prof. Dr. Thomas Dresselhaus (University of Regensburg), could result in insufficient pollen growth, which can result in pollen sterility and thus problems with cob fertilisation. In 2022, this was detectable in Northrhine-Westphalia (Western Germany) for varieties with maturities between 250 and 270. Exactly when the high daytime temperatures occurred, these cultivars bloomed. The results of a failed pollination are shown in Figure 5.

### Maize production in 2023: What comes next?

A combination of mixtures or row-by-row cultivation of diverse maize varieties with several flowering behaviors could be one strategy for successful maize farming in arid sites in the future. So, pollen dispersal can be postponed, and the crop's overall flowering can cope better with days of heat. On farms with extremely diverse soils and, thus, various responses to drought, varietal differentiation is a method of lowering risk.

Therefore, early or even ultra-early (S 110) maturing varieties still have water, but later maturing varieties suffer from drought in the early summer.

No matter which variety: The basis for high yields is a strong root development. Every farming method aims to develop extensive



Figure 5: This image shows varieties of maize that were part of a variety testing with a maturity of 210, 240, and 270, respectively. During their flowering, the later maturing varieties endured the heat stress in 2022.

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maize root systems. It starts already with the previous crop. Thus, diverse catch crop mixtures should be grown before maize. These mixtures create the required conditions for the maize root to penetrate the soil continuously. This ability to successfully colonize the soil with their roots has been proved, for example, in the "Catchy" project or at ZALF in Müncheberg.

It is extremely important to avoid soil compaction during sowing to ensure proper root development. Growing in compacted soil, maize roots are unable to access nutrient- and water-bearing layers, leading to a stressed maize crop stand. Soil compaction can already occur in the seed furrow, leading to an underdeveloped root system (Figure 6).

### Conclusion

Several maize varieties can often endure periods of drought. However, even these varieties are only successful if the farming practices can ensure their primary goal: the optimization of the individual plant.



**Figure 6: Roots restricted by soil compaction can no longer absorb enough water and nutrients for the plant.**

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