



Milling oats: the right cultivation strategy for more quality

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The text below is a translation of the original German article (figures have not been reproduced here):

Schälhafer: Die richtige Anbaustrategie für mehr Qualität

<https://www.saaten-union.de/index.cfm/article/9636&longversion&1.html>

“After years of decline, the acreage of oats grown in Germany increased again last year. This is mainly because of the increased demand for oats for milling. How can this growing market for oats be exploited locally?”

The “Alleskörner” consumer campaign estimates that the quantity of milling oats in Germany increased by 45% between 2008 and 2015, and has doubled since the turn of the millennium! However, a significant part of the required quantity comes from abroad, because the quality of oats produced there is better. In order to be able to exploit the market potential increasingly with domestic oats, a targeted cultivation strategy is required in addition to the selection of a high-quality oat variety. However, in the practice of local oat farming, this has played a rather minor role so far. Among other things, this is in part because there is lack of relevant information from field experiments and practical experience.

The genetic potential is present ...

Plant breeding in Germany has developed the hull quality of oats very positively (see Fig. 1*). The hull content of the officially nationally tested oat varieties fell, on average, from 31% to 26% over the last 32 years. Since 1993, kernel size > 2.0 mm (about 0.29% absolute per year) and proportion of dehulled grains (about -0.23% absolute per year) have also been greatly improved. Last, but not least, the hectolitre weight (measured only since 2005) has increased by about 0.24 kg per year. At the same time, the level achieved in kernel size > 2.0 mm in breeding seems barely able to be increased. The differences can be attributed to environmental effects; e.g., in 2010, a long-lasting drought during the grain filling phase led to a very weak oat dehulling quality. Therefore, it is very important to take all appropriate measures to exploit the potential high grain quality that may exist in an oat variety.

... and can be better used with a targeted cultivation strategy!

Does an increase in cultivation intensity have a positive effect on grain quality? There have been promising results abroad. Over the past five years, in official Swedish oat trials and using the variety “Symphony”, fungicides have been used to measure an average increase in hectolitre



weight of 0.5 kg and of thousand kernel weight of 0.7 g. However, the maturity date of the variety was delayed by about 2 days. Symphony is currently the second most popular European oat variety, and is widely cultivated, especially in the countries of the Baltic Sea region. Baltic oat farmers also report that, in the rainy season in 2017, with high disease pressure, early fungicide measures taken before flowering would have had a positive effect on hectolitre weight.

Results from Germany

The long-tested and well-known high quality variety “Ivory” was tested to determine the influence of cultivation intensity on oat quality under German conditions. This was a good time to reanalyze data from the variety trials conducted by the German federal plant variety office, since there was a second treatment level introduced in 2007 with respect to the local use of growth regulators and fungicides. For Ivory, quality data are available from a total of 157 tests performed in Germany between 2001 and 2014 (see Table 1*).

In fact, the use of fungicides and growth regulators improved the hull content (-0.8% absolute) and the hectoliter weight (+1.3 kg). However, it had no effect on the kernel size or hullability of the variety.

Still, increasing the cultivation intensity of modern oat varieties is often associated with comparatively small increases in grain yield. The healthier and more stable a variety is, the less it reacts to an increase in cultivation intensity.

A balancing of the economic value of this measure should be evaluated on a case-by-case basis, and should always include assessment of the current cultivation situation and the oat variety. Especially strong lodging or early and severe disease need to be avoided in milling oat cultivation, as they regularly lead to loss of yield and quality.

Because of the increasing interest in the production and processing of milling oats worldwide, guidelines and production guidelines for oat farming have been published again and again abroad, especially recently. For Finnish milling oats, for example, the cultivation guidelines issued by the Finnish Grain Committee play a major role. More than 40 companies, organizations, and state institutions from the upstream and downstream areas of oat production have joined forces. The same is to be reported from the USA, where the processor General Mills has published its own guidelines.

Influence of sowing density depends on variety type

The cultivation guidelines of General Mills explicitly refer to the role of sowing density. In our own field trials at two locations in Northern Germany, we determined the influence of sowing density on the quality of the varieties “Scorpion” (2005-2014) and Symphony (2009-2016) (Table 2*). Sowing densities of 350 seeds/m² and 450 seeds/m² led to significant differences. The two varieties are very large-grained milling oats, which realize grain yields of high to very high thousand kernel weights at medium (Scorpion) to slightly below average (Symphony) crop densities.



In these experiments, the varieties with greater sowing density for both varieties had a higher hectoliter weight and a lower thousand kernel weight. However, the latter can easily be explained by the increased number of panicles per area as a compensation strategy of the crop.

In the case of these types of varieties - very large-grained and, moreover, with above-average standing power - increasing the sowing density is a possible method to improve the market-relevant quality characteristics of an oat lot. However, for less stable and small grained oat varieties such as “Max”, increasing sowing density as a strategy to improve quality does not seem to be suitable, as the risk of a possible drop in quality because of lodging and poor grading in this variety is significantly increased.

Timing also plays a role

The point is made in cultivation recommendations again and again that sowing at the earliest possible time for optimum utilization of growth conditions is important. That this does not have to be the case in general is suggested by an interesting East Swedish experiment from 2017 (Table 3*). There, wintery weather in April interrupted the sowing of several oat trials, which could be finished only about three weeks later. Subsequently, growth conditions were nearly optimal, until they were replaced by a longer-lasting dry phase from the end of June to the grain filling phase. From the end of July there was again rainfall, from which the later sown variants benefited: their yield was about 10 dt/ha above that of the ones sown mid-April.

Nevertheless, the plots sown at the normal time achieved a higher level of grain quality than the later seeded trials. Only the grain size fell slightly in comparison, which also explains the lower yield under normal seeding conditions. The yield and quality level of oats grown at this test site is usually very high, because the cool, moist Scandinavian climate, the heavy soils, and the professional handling of oat cultivation are ideal production conditions.

Conclusion

With targeted exploitation of the site conditions, the correct choice of varieties, and an experienced, site-adapted stand management, there is still a lot of potential for German oat production in terms of yield and quality. Further variety-specific field trials concerning cropping strategy and quality assurance can help to answer open questions concerning milling oat cultivation. Thus, in the future, a larger part of domestic milling oat needs can be covered locally.”

*in original article.