The current situation for oat breeding in Europe - opportunities and challenges
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There is strong economic advice for an upcoming higher competition between different food value chains. In the future, competition between companies or firms inside an individual food value chain (such as oat food) will be of minor importance. In Europe, there are many limits for private financed oat variety breeding as part of the oat value chain. On a national level, domestic oat breeding only can be economically sound if the oat seed market has a sufficient size. Additionally, in too many European countries the use of certified oat seed is limited. Consequently, the refinancing of breeding new oat varieties cannot be guaranteed and resulted in a reduced oat breeding input during the last 20 years.

Despite the decreased breeding activities an annual increase of the oat grain yield of 1.00 % has been detected in German official oat variety trials between 1983 and 2012. Varietal impact was the main significant factor for this increase of the grain yield potential in the trials, whereas agronomic issues have been of minor importance. During the same time the oat grain yield at farming increased by 16 kg*ha\(^{-1}\)*year\(^{-1}\) (resp. 0.37 %) only. The yield gap between official trial and farm yield is still significant increasing by 0.71 % per year.

Yield and grain quality remain key factors for successful oat production. Strong variation over environments (locations, years) affects breeding for a higher and more stable oat grain yield. Consequently, a safe assessment of the oat yield potential needs a quite high number of field trials. However, mainly due to financial reasons many European oat breeders as well as National Plant Variety Boards do not reach this number. Furthermore, specific weight still dominates the quality discussion in European oats but has no significant interaction with more relevant grain quality characters.

The introduction of innovative plant breeding techniques offers the possibility to bring oats "state of the art" compared to other arable crops. Oat breeders have to consider the potential of these biotech tools with care. With the view to the European cereal breeding (wheat, barley, triticale etc.) tissue culture techniques offer the possibility to create a faster breeding progress also in oats. In contrast, up to now marker assisted selection is only useful for breeding traits where single genes have greater impact.

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