

Maintenance breeding of conservation cereal varieties for organic farming in Denmark

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Introduction

The current area of organic farming is small compared with the cost for a conventional breeding program, and the organic plant production suffers from a lack of diversity in the varieties offered on the organic seed market. Moreover, organic farming is more diverse than conventional agriculture in terms of growing conditions. Therefore, organic farming has a high need for a wider range of varieties suited for different niches.

Conservation or heritage varieties, and especially landraces often has high diversity between varieties and may therefore satisfy the lack of diversity in varieties offered on the organic seed market. Heritage varieties also often has a high variability within varieties, which allows for a relatively cheap maintenance breeding based on positive selection.

Organic products are often sold at a surplus price on a market for quality products. In such a market, it is becoming increasingly important not only to provide a product and information about the physical content, but also to offer information about the background the product, eg. who, where it was produced and by who. For the organic market, heritage varieties offers a unique storytelling about the product, where the history of the varieties, and the effort to conserve plant genetic resources adds value to produce in line with modern marketing principles. Therefore, the heritage varieties need a thorough evaluation for growth habit in organic farming and for quality traits including backing and malting quality.

Materials and methods

Varieties of Danish origin and other varieties grown in Denmark before 1950 are requested from genbanks and other sources. The history of the varieties are being described based on historic literature, and the varieties are grown in the field for assessment of agronomic performance and quality traits. In the first year, only few seed are available, and these are grown for multiplication under organic conditions at The Swedish Agricultural University in Alnarp. Homogeneous lines are in the second year grown in 15 m² plots under organic conditions in loamy soil at Mørdrupgård in Denmark. In the third year, the lines are grown in 15 m² plots in 4 replications at Mørdrupgård in Denmark and under organic conditions in sandy soil at The Danish Agricultural Museum. Positive selection in the material is made at SLU, Alnarp, and the selected material is grown in head rows for development of lines suitable for organic conditions. In addition to the Danish heritage varieties, Swedish heritage varieties which has already been selected and multiplied at SLU in previous projects, are grown at Mørdrupgård and at The Danish Agricultural Museum.

The requested material include 82 barley varieties, 194 wheat varieties including *Triticum aestivum*, *T. spelta*, *T. monococcum*, *T. sinskajae*, *T. dicoccon*, *T. turgidum*, *T. durum*, 84 oat varieties and 23 varieties of common rye (*Secale cereale*) and midsummer rye (*S. cereale* var. *multicaule*).

Results and discussion

The experiments shows that within the heritage material, varieties are identified with unique quality traits, including taste, colour and backing quality, which are not found in high yielding modern varieties available for organic farming. The paper presents the second year result of field evaluation of 212 Scandinavian heritage varieties grown on two sites in Denmark in 2007.