

Implementation of populations (CCPs) in the Netherlands



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SUMMARY *As efforts in spring wheat breeding for organic farming are limited, organic farmers rely on varieties developed by conventional breeding. Evolutionary breeding may be an alternative approach to diminish this dependence. In the Netherlands, two spring wheat CCPs were grown by several farmers in 2014 and 2015. Lessons were learned on cultivation, baking and regulations aspects.*

Background

Up to today little effort is being made in breeding spring wheat for organic farming. Hence, organic farmers rely on varieties developed by conventional breeding. To diminish this dependence an alternative approach is evolutionary breeding. It is a cost effective breeding method aimed to create high levels of genetic diversity in so-called composite cross populations (CCPs). This diversity results in improved yield stability. Farmers can propagate the seed of populations developed by breeders. In doing so, the populations can adapt to local conditions. Various aspects need to be better understood for successful implementation.

Observations of two spring wheat CCP's

In the Netherlands, two spring wheat CCPs were grown by several farmers in 2014 and 2015. These two CCPs were developed by Hartmut Spiess (organic breeder at Dottenfelderhof in Germany). In both years various traits were observed, such as yield, disease resistance and baking quality. The involved farmers like the idea of growing CCPs, amongst others, because they look nice in the field and they fit well to the concept of organic farming. An involved baker (Consequente Biobacker) did the baking tests. With the NAK (Dutch seed regulations authorities) aspects related to seed law were looked into, in the context of the EU experiment on heterogeneous materials. See page 8.

Lessons learned on cultivation and baking quality

- The populations appeared to have advantages on sandy soils because of their taller plant height and hence better weed suppression. On clayey soils in the western part of the Netherlands, where yellow rust pressure is very high, their resistance to yellow rust requires improvement.
- A short chain is successful if farmers and bakers share ideas and vision on agriculture. For example, if scores for baking quality are considered relative. In 2014



there appeared to be little relationship between protein content and baking quality (Figure 1).

- For farmers it is important to work with bakeries who want to work with wheat that can vary in quality. A baker needs to be prepared to adapt the baking process to the quality of the wheat, as differences in baking quality between the produce of different fields can occur.

Lessons learned on regulations

- Rethinking is required by authorities: they are used to work with uniform material. Working with heterogeneous material requires a different approach.
- A different approach is needed to describe CCPs: can agronomic and baking quality traits be used instead of morphological traits? However, in farmers' fields the differences found between the two CCPs appeared to be relatively small.

Morphological traits appeared to be rather unstable.

- Guidelines are developed to reduce the risk of mixture of the CCPs. In case of accidental mixture farmers can buy seed from fellow farmers, for which special regulations for seed replacement apply. For that adjusted rules for seed production apply. It is also useful if the seed testing authority has samples of the CCPs available for comparison.

Future perspectives for CCP's

It seems that for now the concept of CCPs fits well to farmers working on sandy soils in the eastern part of the Netherlands. They have different variety requirements compared to the large scale farmers in the 'optimal' clayey soils in the western part of the Netherlands. Measures to distinguish populations need to be further studied.

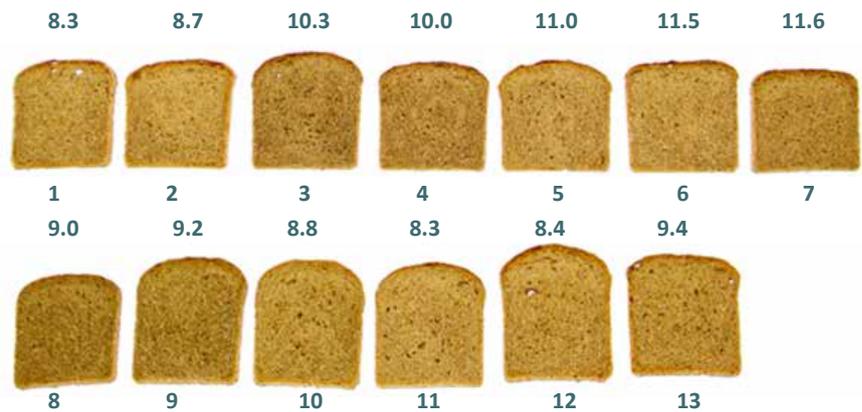


Fig. 1: Slices of the baked breads of the populations with the pure line varieties Lavett (nr 5) and Heliaro (nr 10) for comparison. Protein contents are printed on top.



Bottom photo: Population (left) and a pure line (right) of spring wheat.