

# N-uptake in winter wheat pure line varieties and winter wheat composite cross populations in the F<sub>11</sub>

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## **Introduction**

In order to be able to adapt to changing environmental conditions, crop plants need a certain degree of diversity (Stevens 1942, Finckh 2008). The development of genetically diverse populations (composite cross populations, CCPs) instead of breeding entirely homogeneous pure line varieties by standard pedigree breeding methods is a strategy that aims at creating flexible varieties.

## **Material and Methods**

Three winter wheat CCPs from the UK based on 20 modern wheat varieties (A) or a subset of either 12 high quality varieties (Q) or 9 high yielding parents (Y) were used. Since the F<sub>5</sub>, the CCPs have been grown under organic (O) and conventional (C) conditions in two parallel sets at the University of Kassel without artificial selection applied. In addition, since the F<sub>8</sub>, two A populations have been maintained as broadcast sown populations without mechanical weed control.

In 2011/12 the F<sub>11</sub> of all 14 populations were compared in a replicated field trial to the mixture of the 20 parents and the three commercial wheat cultivars Achat, Akteur, and Capo.

N-uptake of the plants was measured at the beginning of stem elongation, at the flowering stage and in the ripe seeds and straw.

Samples of fresh plants were cut and dried for 72 hours at 60 °C. Seeds and straw were dried after harvesting and all samples were milled and analyzed for N-content using a CHN analyzer.

Nmin in the soil was measured in early spring, at the flowering stage and after harvest.

## **Results and Discussion**

Overall, the differences among the populations in N-uptake appeared small. However, when comparing the conventionally and organically grown populations as two groups, in 2011, at flowering O- populations had taken up approximately 6% more N than the C-populations. These differences were not visible in early cut samples or in seeds and straw.

Comparing N-uptake and the amount of available Nmin in the soil, no strong relationship appears.

Sufficient seeds of the F<sub>10</sub> were saved and a second year of field trials is on-going with the same populations in 2012/13. Detailed data including the second years data will be presented.

## **References**

- Finckh MR (2008) Integration of breeding and technology into diversification strategies for disease control in modern agriculture. *European Journal of Plant Pathology* **121**: 399-409.  
Stevens NE (1942) How plant breeding programs complicate plant disease problems. *Science* **95**: 313-316.