

The effect of the selection environment on several traits of onion (*Allium cepa*).

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The organic sector is searching for the best strategies to obtain varieties that are optimally adapted to the organic environment. For most private breeding companies the organic sector is just a small (new) niche market. For economical reasons they prefer to select under conventional conditions, with some additional evaluation criteria, and test the new lines under organic conditions in the last few years of the breeding program. The subject of this study is to search whether selection under organic conditions gains better adapted varieties for the organic sector, than selection under conventional conditions. Together with a Dutch onion breeding company we investigated the effects of the two different selection environments from 2004-2007.

To compare the selection progress under conventional and organic conditions selection in the open pollinated variety Bastora and two broad, newly made, base populations of onion was conducted: Round Rijnsburger Group, and the Yellow Flat Rijnsburger Group, from 2004-2007. Standardized Selection Differential (S) was determined as a measure for selection effort. $S = (\text{mean new selection} - \text{mean original population}) / \text{sed}_{\text{or}}$ whereas sed_{or} is the standard deviation of the original population. Seeds were produced from the selected bulbs in isolation cages. The new selections (organic and conventional) were sown at two organic locations in three replicates together with the original populations to compare with each other in the field for plant traits as well as for bulb characteristics after storage. Response to selection (R) was determined ($R = \text{mean selection} - \text{mean original population}$).

2007: in an additional pilot experiment the potential rooting ability of the bulbs was evaluated by growing the bulbs in hydro-culture for 2½ weeks.

Most selection effort (S) was made for the traits bulb shape and bulb size, independently of the selection environment. Although, the selection criteria of the breeder were the same for both selection environments, S differed for some traits between the organic and the conventional selections. In the populations grown in the organic field S was zero for the position of maximum diameter, the number of dry skins, the shape of the base of the onion and the intensity of basic colour of dry skin. For the conventional selections no selection effort was found for skin retention. For the other traits S was more or less the same for the organic and the conventional selections. For the traits earliness and root potential the Response to selection (R) was affected by the selection environment. The conventional selection of Balstora was much earlier than the organic one. In the root experiment we found a striking difference between the organic and the conventional selection in the Yellow Flat Rijnsburger Group. The bulbs of the organic selection formed proximately 60% more roots (number and dry weight) than the conventional selection. In the other populations we did not find this phenomenon. For the other traits R was not affected by the selection environment, although S was found different for the respective characteristics.