

Opportunities and obstacles in building up new breeding programs for organic agriculture in collaboration with the formal breeding industry in The Netherlands

Edwin Nuijten¹, Marjolein Tiemens-Hulscher¹, Edith T. Lammerts van Bueren¹

Because of the limited scale of organic agriculture in The Netherlands, not many plant breeding companies have programs to develop varieties well adapted to organic farming conditions. In the past five - ten years, the Louis Bolk Institute (LBI) has tried to stimulate, at different levels, the development of cooperative breeding programs for organic culture, with varied success. The aim of the cooperative breeding programs is to make the development of varieties more suited for organic agriculture and economically feasible. Currently a successful program is running for potato, whereas experiences in wheat are less promising, and prospects for programs for vegetable crops, such as cucumber, are limited. A few initiatives by farmers, at a more individual level, are about to deliver new varieties for several crops, such as carrots.

The success of the potato program depends on several factors. 1. There was an urgent, commonly shared problem (serious late blight disasters) which created commitment in the organic sector. 2. The long tradition in which Dutch potato breeding companies and conventional farmer breeders work together. We used this existing network to include organic farmer breeders. The general approach is for the breeding companies to make crosses of which seed tubers are given to the farmer breeders to select in for 3 to 5 generations. The selected tubers are then returned to the breeding company for further testing at multiple sites. 3. A successful potato selection course set up by LBI to stimulate organic farmers to become involved in potato selection. 4. Farmer breeders do not need to invest in sophisticated equipment for planting, harvesting and selection for quality related traits. Evaluation for disease resistance and yield is conducted by the company breeders in the following selection stages. 5. Potato is vegetatively propagated so farmer breeders do not need to worry about segregation in the next years of selection which makes selection relatively easy.

The past five years LBI has been involved in setting up breeding programs for spring wheat to develop varieties with good baking quality. Spring wheat is a small crop in the Netherlands and Dutch breeding companies have not invested much in its improvement because of the limited profit margins. Seed production is relatively easily done by farmers. However, selection of breeding lines is more complicated due to segregation in the next generations (contrary to potato). Besides, a farmer would need to invest heavily in special equipment for harvesting small plots, processing and assessing traits related to baking quality. Hence, a collaborative approach was set-up in which several breeding companies, farmers, traders and bakeries were involved. A complicating factor is that the various stakeholders have diverse interests. Without a (neutral) facilitator to keep common commitment, the initial collaboration came to a stand-still.

A different approach is illustrated by a case in which a single Dutch farmer breeder, supported by the KulturSaat Foundation in Germany, has been making selections in existing populations of carrot under bio-dynamic conditions. His cooperation with Bingenheimer Saatgut AG ensures that his new selections, when evaluated positively, will be included in the catalogue. Without too much investment he is able to select for taste and cooking properties.

For other crops that are currently developed as F1-hybrids, like cucumber, yet different strategies need to be looked for. Cucumber requires more sophisticated breeding tools. Findings so far suggest it will be a challenge for breeding companies to find out how to adjust their programs to develop varieties more suitable for organic agriculture. Other stakeholders in the market chain are willing to support the breeding companies. We have analysed, through a comparative approach, the main factors that contribute to the success and failure of various initiatives. Crucial factors are the historical context and institutional organisation of breeding, the complexity of the market chain, and a shared sense of urgency for cooperation. Intertwined with these factors are crop traits and crop multiplication. Although each crop has specific plant traits and a specific farming context, general lessons can be drawn from these comparisons for future initiatives for other crops.

¹ Louis Bolk Instituut (LBI), Hoofdstraat 24, 3972 LA Driebergen, The Netherlands, e-mail: e.nuijten@louisbolk.nl