

OWC 2011

Proposal for a plenary keynote speech.

The talk is intended to give an overview of the most important aspects of organic plant breeding to colleagues from all fields of work and many areas of the world. Most examples will deal with crops of wide distribution. I will address diversity between organic production systems (low – high input / fertility, no – complete market orientation) to get good contact with the audience. I want to address current problems and inspire discussions about common actions for the future.

Are you planning a contribution addressing the concentration process in the conventional seed sector and the thread put to organics by the spread of genetically manipulated varieties?

Achievements, chances, and challenges of organic plant breeding

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Until about 25 years ago organic seed was hardly available. A number of organizations were founded around 1990 to i) safeguard genetic resources on farm and in garden, ii) produce and distribute organic seeds, and iii) start organic breeding programs. Organizations include f. ex. Masipag / Philippines, Seeds of Change / USA, De Bolster / Netherlands, Arche Noah / Austria, Pro Specie Rara / Switzerland, Kultursaat and Dreschflegel / Germany, and Garden Organic / England.

Aims that many of us agreed upon were

- the adaptation of varieties to organic growing conditions,
- to establish farmers and gardeners as breeders,
- create a cooperation between growers, breeders, and consumers,
- increased varietal diversity, and
- better food quality.

Some organic breeding projects have yielded encouraging results and some academic working groups have investigated and improved organic breeding methods. The first academic textbook on organic breeding is to be published soon.

Essential traits for many crops in organic systems are **weed competition**, **nutrient use efficiency**, and **nutrient dynamics**, particularly in times with little mineralization. Breeding for **field resistance against pests and diseases** has been successful for e.g. barley (Lorenz et al. 2006) and for late blight in tomato. In the Central European organic outdoor tomato project the importance of **genetic resources from organic seed savers** could also be demonstrated (Horneburg and Becker 2008a). In paired organic / conventional selection experiments with wheat (Murphy et al. 2007) and maize (Burger et al. 2008) it has been demonstrated that the best genotypes for organic cropping are **selected within the organic system**.

Other crucial aspects do not depend on the production system, but awareness is much higher in organics than in conventional agriculture.

Participation in the breeding process was developed by Masipag with rice since 1987 (Vicente et al. 2009). Selection and evaluation are done by farmers in their

fields all over the Philippines. More than 35,000 farmers use regionally adapted selections. **Site specific adaptation**, i.e. superior performance in the selection environment, was demonstrated for *Phaseolus* beans by Almekinders et al. (2007) and for lentils by Horneburg and Becker (2008b). In a small organic breeding program with parsnip, a neglected root crop, Horneburg et al. (2009) succeeded to develop an organoleptic **quality** assay and the best variety on the market.

Organic breeding has the potential to create spin-off effects for other forms of agriculture, too!

A **controversial issue** is the use of hybrid breeding and special techniques involved for organic systems. The IFOAM General Assembly 2008 at Vignola / Italy carried motion 15.3 “to encourage the use of seeds within organic systems that are bred and maintained using open pollination and natural pollination techniques”.

Important open questions need to be answered. How do we choose the **optimal selection environment**? Despite some successful approaches more **funds** need to be raised to cover the need. In some crops closing the **gap in performance between recent hybrids and traditional varieties** is a demanding task.

As **outlook to the OWC 2014** I want to propose

- combined keynotes organic plant and animal breeding,
- sessions for the exchange between organic plant breeders, and the
- creation of new cooperative projects.

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