
Short Report of the Results of the International Workshop on Organic Plant Breeding Techniques (Driebergen-NL, 17th and 18th October 2001)

By Edith Lammerts van Bueren (Louis Bolk Institute and ECO-PB/NL), Klaus Peter Wilbois (FiBl Germany and ECO-PB/D), Louise Lutikholt (Platform Biologica/NL), Eric Wyss (FiBl/CH), Lawrence Woodward (Elm Farm Research Centre and ECO-PB/UK)

1. Introduction

Organisation of the workshop

After two days of intensive discussion in an atmosphere of openness we have agreed on several important issues concerning the 'do' and 'do-nots' in organic plant breeding. 31 participants from 11 European countries and 1 guest from Canada were present. They were invited by the organisation on behalf of their commitment and expertise on organic seed production: organic, conventional, biodynamic farmers, breeders, researchers, and policy makers.

This international workshop was part of a project on request of the Dutch Ministry of Agriculture, organised by Platform Biologica (Louise Lutikholt) and Louis Bolk Institute (Edith Lammerts van Bueren) in close cooperation with the European Consortium for Organic Plant Breeding/ECO-PB (Klaus Peter Wilbois). The results of this workshop will be sent as an advice from an expert group to IFOAM Standards Committee and the Dutch Ministry of Agriculture. The results of the workshop are considered to form a basis for decision making on organic plant breeding issues.

2. Results

Criteria

To judge the breeding techniques there were 3 criteria to keep in mind:

1. organic agricultural principles translated into organic breeding principles
2. controllability/traceability
3. practicability

Ad 1. Principles

Organically bred varieties shall be

- fertile, and able to be propagated under organic (soil) conditions,
- adapted to organic farm conditions, which means: efficient uptake and use of nutrients, good rooting system, broad durable tolerance to diseases and pests, weed suppressive ability.
- and breeders should respect (functional) genetic diversity and species authenticity (natural crossing barriers). See below: Integrity of plants

Ad 2. Controllability/Traceability

Breeding techniques are usually not controllable but traits are. It is not easy to say when a variety 'starts', which parents and techniques have been used in past generations.

GMO, cms-hybrids without restorer genes, sterile and F1-hybrids are traceable. Protoplast fusion and artificially caused mutations are not traceable. It is supposed that according to EG 2001/18 protoplast fusion (that can not occur naturally) is regarded as well as genetic engineering

Ad 3. Practicability and future developments

"Yes" and "no" groupement should be for a long term valuable. (Breeding is a long term activity; producing a variety takes about 10 years.)

Guidance of seed companies to meet the needs of the organic sector through close interaction with the organic movement (farmers, organic traders, etc) is welcomed.

Groupement

To be clear to farmers, consumers and breeders the techniques should be grouped into two groups (a formerly used group labelled as 'not suitable but provisionally permitted' is considered to be unclear for communication and is hence left out):

- a) permitted
- b) not permitted. Within the permitted group two categories are to be distinguished
 - organic seeds
 - organic variety.

Definition of the Concept behind Organic Plant Breeding: The aim of organic plant breeding is to develop plants which enhance the potential of organic farming and bio-diversity. Organic plant breeding is a holistic approach which respects natural crossing barriers and is based on fertile plants that can establish a viable relationship with the living soil.

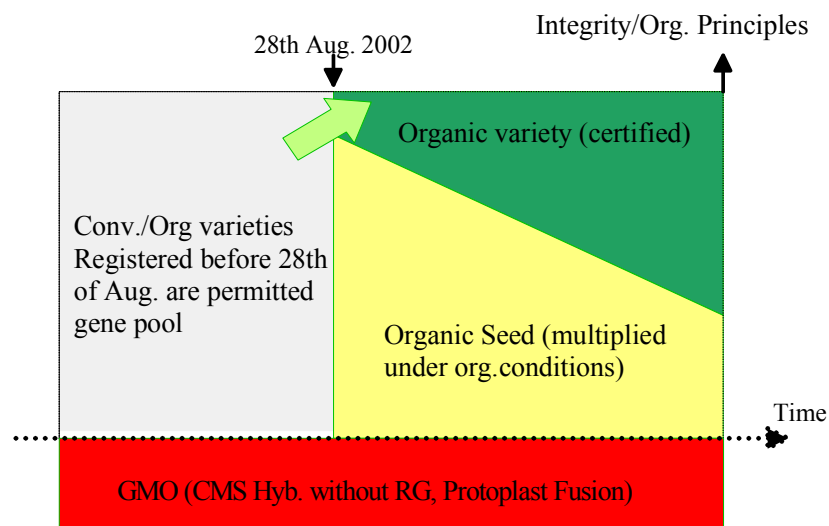
Definition of Organic Variety: An organic variety is a variety obtained by breeding methods that are in compliance with the above concept and is the result of a certified organic plant breeding programme.

Definition of Organic Seeds and planting material: Organic seed and planting material are multiplied or propagated for at least one generation under organic management. They origin from varieties that are a result of (conventional) breeding programmes with the possible help of all kinds of permitted breeding techniques for organic agriculture, including the field and some in vitro techniques (in the workshop also named as: 'lab-techniques', 'non-organic-detour-techniques' or 'cell biological techniques').

Legal force of guidelines

Techniques considered to be not permitted for organic breeding are forbidden to be used in organic breeding programmes from the date of implementation of the draft IFOAM Basic Standards for organic plant breeding onwards. Hence the expert group proposed to choose the date of the IFOAM General Assembly 28th of August 2002, Victoria-Canada.

Model



Not permitted techniques

There was a clear agreement on not permitting

- apart from GMO's that are already forbidden
- CMS Hybridisation without restorer genes
- Protoplast fusion.

Argument: organic agriculture strives for a living farm system and therefore uses production methods that respects the living organisms as living entities. In biology the cell can be seen as the smallest structural and functional living entity. Organic breeding will not allow techniques that operate below cell level.

- patenting

Patents prohibit free exchange of varieties as input/geniteurs for future breeding programmes among breeders of other companies (breeders privilege), and therefore threaten genetic diversity as a general principle of organic farming and breeding. Patents are not to be used in organic agriculture.

- Radiation

Radiation is already not permitted in organic processing, but should also be prohibited for the development and production of organic seeds or varieties to induce variation.

Some details on permitted techniques

Hybrids ([click here for technical details on Hybridisation of some vegetable crops](#))

From the definition of the concept behind organic breeding hybridisation as such can be permitted, provided that the F1-offspring is fertile and the parent lines (are vital enough that they) can be propagated under organic conditions (in soil).

Biodynamic colleagues agreed on above statement as common base for organic breeding principles, but have a different opinion for specific development within the biodynamic agriculture regarding also aspects as nutritional quality which is considered not to be satisfyingly produced by hybrids. Within the biodynamic movement it is under discussion to stimulate open pollinated varieties instead of hybrids.

DNA marker assisted selection

DNA marker assisted selection can be permitted in an organic breeding programme provided DNA screening is performed without enzymes originating from GMOs and without radiation.

Meristem culture

Meristem culture can be used in certified organic breeding programmes because it is considered as being close to classical breeding techniques using the very top parts of plants for in vitro cultivation. It is as yet still the only way of gaining virus free propagation material of vegetative propagated plants, and in most countries also legally demanded for exporting propagation materials.

Undecided implementations

There was discussion in the group which could not be settled because of time pressure about keeping the possibility open to have exchange between the so called yellow block of organic seeds and the green block with organic varieties.

The organisers think it would be good (and clear) to give the organic breeding programmes the chance to prove themselves for some time in their pure form. Evaluation of progression can be done after about 10 years.

Undecided was also if a deadline is to be set for permitting the yellow block of organic seeds and only permitting the green, organic varieties.

The organisers advice is to not set such a deadline because the organic breeding programmes are in an experimental stage and cannot guarantee positive results and enough varieties within anticipated time limitation.

There was a concern from the conventional seed companies with respect to fair competition between organic varieties and organic seeds. The organisers think that that will be no problem in practice, because varieties from organic or conventional breeding programs (organic seed category) have to prove themselves not only by their technical breeding background, but also by good performance in the field and by their taste and other qualities.

From the Swiss delegates came the suggestion for crop by crop evaluation. Most participants of the expert group were not in favour of that because it makes controllability and communication too complicated. But we did not decide on it.

The board meeting of ECO-PB on the 19th of October 2001 raised the possibility of stimulating the ongoing development by demanding that the organic seeds will have to be bred for maintenance at least for 3 generations for annuals and 2 generations for perennials before they are multiplied under organic conditions. This requirement should be applied after a period of 10 years from now on. In the meanwhile it is important to gain more research and practical experience and possibilities in dealing with organic seed production and seed borne diseases before we have stricter demands with respect to maintenance breeding.

The ECO-PB board meeting of 19th October 2001 suggests that ECO-PB offers to be of help designing a proposal for a certification system for organic breeding programmes together with a legal seed control agency, like NAK or NAK tuinbouw in the Netherlands.

Text suggestions for the IFOAM draft Basic Standards

Anther culture and microspores culture in Appendix 6

The expert group thinks that anther culture and microspores culture are selection techniques rather than techniques for maintenance and multiplication. They shall not be allowed for organic plant breeding but will be for the category of organic seeds.

Mutation induction and radiated mentor pollen

In Appendix 6 of the IFOAM Basic Standards untreated mentor pollen is presented as suitable and permitted, radiated mentor pollen are not suitable. Mutation induction is presented as well as not suitable.

In the meeting was agreed that 'untreated mentor pollen' are treated as well, for instance with heat. Therefore the meeting proposes not to forbid treatments, but to be critical on the process and substances (including the 'substance radiation') with which these treatments take place.

As mentioned above: radiation is already not permitted in organic processing, but should also be prohibited for the production of organic seeds or varieties.

Chapter 4.1.4.

4.1.4 refers to chapter 2.3. The title of this chapter is Genetic Engineering and not (as stated under 4.1.4) GMO.

Chapter 4.7.2

According the proposed model there will be no category of material labelled organic maintained varieties; so this chapter can be deleted.

FiBL Berlin**[Klaus-Peter Wilbois](#)****fon: ++49 (0)30-27581750****fax: ++49 (0)30-27581759****e-mail: FiBL@Berlin.de****[ECO-PB](#)****fon: ++49 (0)6257-505489****fax: ++49 (0)6257-505489****e-mail: mail@eco-pb.org****FiBL Frick****[Christine Arncken](#)****fon: ++41 (0)62-8657272****fax: ++49 (0) 62-8657273****e-mail: admin@fibl.de**