

Report from the

**ECO-PB Breeding Conference 2011:
Organic Plant Breeding: What makes the
difference?**

**10 years' Anniversary Conference, 3-4 Nov 2011,
Frankfurt, Germany**

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ECO-PB (European Consortium for Organic Plant Breeding)

2001: Foundation → **Organic Research Centre, Elm Farm (UK)**
Forschungsinstitut für biologischen Landbau (CH, DE)
Institut Technique de l'Agriculture Biologique (FR)
Louis Bolk Institute (NL)
Arbeitsgemeinschaft Ökologischer Landbau (DE)
Danish Research Centre for Organic Farming (DK)
Vitalis Organic Seeds (NL)

Aims:

- (a) initiate, establish, support and maintain organic plant breeding programmes in compliance with the principles of organic agriculture**
- (b) develop and investigate the concepts and scientific basis of organic plant breeding**
- (c) develop and promote appropriate standards and practices as well as an appropriate legal framework for organic plant breeding**
- (d) to facilitate exchange of knowledge and ideas among its members, transfer of information to the public, and lobbying for best parliamentary and administrative policy making**

ECO-PB (European Consortium for Organic Plant Breeding)

(1) Exchange of knowledge & Lobbying

→ 2003-2011: 6 meetings on organic seed (production, databade, certification etc.)

(2) Guidelines for organic plant breeding

→ IFOAM standards

The IFOAM Standard for Organic Production and Processing, Draft Version 0.2.

Version for membership motions: deadline January 8, 2012

4.7. Breeding of organic varieties

ECO-PB (European Consortium for Organic Plant Breeding)

4.7.3 Organic plant breeders shall disclose the applied breeding techniques. To produce an organic variety, genetic engineering and irradiation is prohibited and only the following methods of breeding shall be used:

	VARIATION INDUCTION TECHNIQUES	SELECTION TECHNIQUES	MAINTENANCE AND MULTIPLICATION
SUITABLE AND PERMITTED FOR ORGANIC PLANT BREEDING	<ul style="list-style-type: none"> • Combination breeding • Crossing varieties • Bridge crossing • Backcrossing • Hybrids with fertile F1 • Temperature treating • Grafting style • Cutting style • Untreated mentor pollen 	<ul style="list-style-type: none"> • Mass selection • Pedigree selection • Site-determined selection • Change in surroundings • Change in sowing time • Ear bed method • Test crossing • Indirect selections • DNA diagnostic methods 	<ul style="list-style-type: none"> • Generative propagation • Vegetative propagation <ul style="list-style-type: none"> - partitioned tubers - scales, husks, - partitioned bulbs, brood bulbs, bulbils, offset bulbs etc. - layer, cut and graft shoots - rhizomes • Meristem culture

ECO-PB (European Consortium for Organic Plant Breeding)

Board members: Monika Messmer (FiBL, CH) - President
Karl-Josef Müller (ABDP, DE)
Maaïke Raaijmakers (Stichting Zaadgoed, NL)
Frederic Rey (ITAB, FR)
Klaus-Peter Wilbois (FiBL, DE) - Secretary
Thomas Döring (ORCEF, UK)

ECO-PB (European Consortium for Organic Plant Breeding)

Full members: Assoziation Biologisch-Dynamischer Pflanzenzüchter (DE)
Bingenheim Saatgut AG (DE)
Elm Farm Research Center (UK)
Forschungsinstitut für biologischen Landbau (CH, DE)
Institut Technique de l'Agriculture Biologique (FR)
Louis Bolk Instituut (NL)
Nafferton Ecol. Farming Group, Univ. Newcastle (UK)
Stichting Zaadgoed (NL)
Vitalis Biologische Zaden B.V. (NL)

Associate members: B. Vosselmann, de Bolster (NL)
Reseau Smences Paysannes (FR)
B. Boller, Agroscope FAL (CH)
D. Reheul, Univ. Gent (BE)
W. Bram, Bejo (NL)
F. Löschenberger, Saatzucht Donau (AT)
M. Finckh, Univ. Kassel (DE)
A. Kokare, Priekuli Plant Breed. Inst. (LV)

Programme of Conference, 1st day

- **Edith Lammerts van Bueren (NL)** - Highlights of ECO-PB of last 10 years and future challenges
- **Bertille Gieu-Arbaret (NL)** - Family inter-crossing: a useful new breeding concept?
- **Géza Kovács (HU)** - Development of organic maintenance breeding methods of evolutionary populations in cereals
- **Ute Kirchgaesser (DE)** - Experiments on the influence of tone intervals on plant growth
- **Edwin Nuijten (NL)** - Opportunities and obstacles in building up new breeding programs for organic agriculture in collaboration with the formal breeding industry in The Netherlands
- **Jan Velema (NL)** - Corporation and synergy between organic and conventional breeders at Vitalis Organic Seeds
- **Michael Fleck (DE) & Rene Groenen (NL)** - The biodynamic breeding association Kultursaat e.V. and its breeding programs on partnership basis
- **Karl-Joseph Müller (DE)** - New hullless spring barley 'Pirona' and how it was developed under organic farming
- **Friedemann Ebner (CH)** - Dehybridizing hybrids - A low-tech breeding approach for farmer-breeders of vegetables
- **Ulrich Quendt (DE)** - Winter pea breeding in intercropping and mixtures with cereals
- **Niklaus Bolliger (CH)** - Biodynamic apple breeding
- **Monika Messmer (CH)** - Epigenetics and organic plant breeding
- **Florianne Köchlin (CH)** - Dignity of the lima bean and consequences for plant breeding: what makes the difference?

Proceedings

http://www.eco-pb.org/fileadmin/ecopb/documents/ECOPB_Proceedings_2011.pdf

<http://www.eco-pb.org/> → Publications

! FAIR-BREEDING®

→ Naturata Int. & Kultursaat e.V.

! Dehybridising of hybrids

→ use of (positive) genetics of F₁-hybrid varieties to improve open pollinated varieties

Country reports

- Great Britain:**
- no commercial organic breeding program
 - participation in SOLIBAM (*Strategies for Organic and Low-input Integrated Breeding and Management* (FP7, 2010-2015)
<http://www.solibam.eu>
 - experiments with composite cross populations (wheat, barley)
 - Garden Organic: maintenance of vegetable varieties

Reporter: Thomas Döring (Organic Research Centre, Elm Farm)

Country reports

- Netherlands:**
- **Farmer breeder** (↑ 12 in potato)
 - **organic seed:** De Bolster, Vitalis, Carel Bouma, Bejo, Rijk Zwaan, Agrico, Fleuren
 - **Groene Veredelung (Green Breeding) 2010-2020**
1 Mio € per year → conventional plant breeding; 33% industry

Potato: → *Phytophthora infestans* resistance

Tomato: → rootstocks with improved nutrient use efficiency (NUE)

Leek: → Resistance vs *Thrips tabaci*

Spinach: → Resistance vs *Peronospora farinose*; better NUE

Lupin: → Tolerance vs Ca²⁺ rich soils

- Conservation varieties, composite cross populations - cereals (Louis Bolk Inst.)
- Conservation varieties - vegetables (Foundation Zaadgoed)

Reporter: Maaike Raaijmakers (Stichtung Zaadgoed)

Country reports

- France:
- Wheat → organic breeding program **INRA Rennes**
2011: release of HENDRIX & SKERZZO
→ additional organic VCU tests
 - fodder crops → organic program **Michel Obtention**
2011: CARIGAN (*Dactylis glomerata*)
LARDEO (*Onobrychis viciifolia*)
CONSTELLATION (*Trifolium hybridum*)
NORTON (*Lotus corniculatus*)

Participative programs: INRA: wheat, durum, fodder crops
Inter Bio Bretagne: cabbage, cauliflower, broccoli
Camargue: durum
AgroBio Périgord: maize

Conservation varieties: Réseau Semences Paysannes

SOLIBAM → coordinated by INRA (<http://www.solibam.eu>)

Reporter: Frederic Rey (ITAB)

Country reports

- Germany:**
- Lack of well performing varieties under organic farming conditions esp. in arable crops → only a few from organic programs
→ legal restriction especially VCU and its implementation in DE
→ higher fees for additional organic trials (double costs)
 - hybrid varieties are dominating in vegetables
→ problem: cell fusion technique – kohlrabi, broccoli, cauliflower
 - problem: new techniques, e.g. cisgenesis

- Breeding activities:**
- **Kultursaat** → 42 vegetable varieties
 - **ABDP–Cereals** → 15 varieties (wheat, barley, rye, einkorn)
 - winter pea → conservation varieties
 - maize (→ project University Göttingen, KWS, P. Kunz, FiBL)
 - soybean

SOLIBAM partner: TU München

Reporter: Klaus Peter Wilbois (FiBL)

Country reports

Denmark: • **Biobreed** → project between KU Life & Agrologica

→ Molecular markers in wheat for common bunt and baking quality

→ Studying dynamics in composite cross populations with markers

• **Aroma Wheat**

→ Genetic markers for aroma traits in bread wheat; comparing old and new varieties

• **Eco-Prot**

→ Finding resilient varieties of protein crops without any regard to their content of nutritionally harmful substances

→ Removing nutritionally harmful substances and increasing digestibility and amino acid accessibility in legumes for monogastrics via different, eco-friendly treatments

Sejet Planteformædling: → organic variety trials (barley, oats, wheat, triticale)

Agrologica: → organic breeding program (wheat, spelt, millet)

Reporter: Anke Stubsgaard (Videncentret for Landbrug)

Country reports

- Estonia:**
- **Jõgeva Plant Breed. Inst.**
 - organic variety trials (incl. old varieties)
 - experiments with organic fertilizer in vegetables
 - **Estonian Univ. Life Sci.**
 - crop rotation experiments; conventional vs organic
 - agronomic experiments: vegetables, fruits and berries
 - **Estonian Agric. Res. Ctr. & Estonian Res. Inst. Agric**
 - conventional vs organic experiments: yield, quality, soil fertility, economic return, biodiversity
- Latvia:**
- **Univ. Agric. Vecauce**
 - organic variety trials: potato, barley, wheat, triticale, rye, grasses
 - **State Stende Cereal Breed. Inst.**
 - organic variety trials & organic seed production
 - **State Priekuli Plant Breed. Inst.**
 - selection on organic: barley, triticale, potato & variety mixtures
 - 2011: release of barley variety RUBIOLA (tested conventional and organic)

Reporter: Aina Kokare (State Priekuli Plant Breeding Institute, LV)

Country reports

Switzerland:

Getreidezüchtung Peter Kunz

→ organic breeding (wheat, spelt, triticale, maize, sunflower, grain legumes)

Sativa Rheinau AG

→ organic breeding (eggplant, Brussels sprouts, kohlrabi, carrot, courgette, celery, onion, sweet corn, broccoli, fennel, Chinese cabbage, tomato)

Poma Culta: organic apple breeding

E. Niederer: organic strawberry breeding

Pro Specie Rara: conservation varieties (fruits, vegetables, spices and ornamentals, potato, berries)

Agroscope: organic variety trials (wheat, triticale, soybean, apple, pea, apricot, medicinal plants, fodder crops)

FiBL: organic trials (grapes, apple, strawberry, vegetables, wheat)

Reporter: Monika Messmer (FiBL)