

Breeding activities for organic agriculture in Austria



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Organic agriculture in Austria

16.3% of agric. area is organic (383.756 ha → 157.530 ha arable land)

13.7% of farms are organic (20.102)

Source: Lebensministerium (2008)



Market share of organic food

Bread, flour, noodles	20%
Milk	19%
Fresh fruits	15%
Fresh vegetables	13%
Cheese	9%
Eggs	8%
Meat	8%

Source: Lebensministerium (2008)

Background

1995: organic variety trials

2001: organic VCU trials winter wheat

2002: organic VCU trials spring barley

VCU trials 2011/12

crop	no sites			no sites	
	org	con		org	con
winter barley	3	12	spring oats	4	7
spring barley	-*/ 4	10	winter spelt	3	2
winter rye	3	7	potato	1-2	5
winter triticale	4	7	clover	1	4
winter wheat	5* / 2	22	fodder grasses	1	4
spring wheat	1	5			

* sites within the organic VCU trial

Wheat breeding at Saatzucht Donau

Löschenberger et al. (2008) Breeding for organic agriculture: the example of winter wheat in Austria. *Euphytica* 163:469-480.

→ 50–73% selection carried out on organic fields

Goal Europe's wheat breeder No 1 for organic agriculture

→ Austria, 2010: 26.564 ha organic wheat (9.6%)

No organic plots in the SZD wheat breeding programme

2002: 200	2005: 1500	2008: 850
2003: 400	2006: 1200	2009: 850
2004: 550	2007: 1400	2010: 500
		2011: 1200
		2012: 1600

Wheat breeding at Saatzucht Donau

- Traits**
- protein content / protein yield
 - weed competitiveness

Released organic varieties:	2004: Pireneo	Specialty varieties tested in organic VCU trials:
	2005: Stefanus	
	2006: Bitop	
	2007: Blasius	2006: Indigo
	2008: Peppino	2011: Rosso
	2011: Tobias	2011: Skorpion

→ specific crosses for organic programme

Projects Solibam

Alternatives Composite cross populations (within Probstdorf genepool)

Cereal breeding at Saatzucht LFS Edelhof

winter wheat, spring barley, spring oats, winter rye

→ selection on organic fields from F6 or F7 onwards at 2-4 sites

→ specific traits (e.g. plant height, plant growth type, early crop development) also considered before in the conventional trials

Winter rye, 2010: 15.324 ha organic (33.5%)

→ only open pollinated (OP) varieties are bred

→ specific crosses for OA in winter wheat

Released organic varieties: 2006: Eriwan
2011: Ekolog

Issue seed producer & seller is not interested in organic varieties

Potato breeding at NÖS



→ selection in organic trials from 4th breeding year onwards on 3 sites (1 irrigated)

→ specific crosses

→ 10% of NÖS multiplication area is organic

Traits disease resistance
marketable yield

Bio-dynamic breeding activities

Ebnerhof (J. Gahleitner)

Spelt wheat (cv Ebners Rotkorn) & faba bean (cv. Bioro)



Demeterhof Loosdorf (A. Piatti)

Winter wheat (cv Donnato)

Article in German available at:

http://www.bio-austria.at/biobauern/beratung/pflanzliche_erzeugung/pflanzenzucht/biobauern_als_pflanzenzuechter

Vegetables, spices & ornamentals

Reinsaat

**Breeding and multiplication under organic agriculture (partly bio-dynamic);
no hybrids**

Broad range of vegetables (see www.reinsaat.at)



Initiatives at Arche Noah & others

- **Tomato** → farmers varieties

cooperation between Arche Noah, BioAustria & HBLFA Schönbrunn

- **Conservation varieties**



- **Maintenance breeding of Schlägler winter rye**

cooperation between Biokompetenzzentrum Schlägl & Stift Schlägl

- **Carrot** → OP variety adapted to low-irrigation system

cooperation between FiBL, BOKU, HBLFA Schönbrunn & Adamah Hof



Soybean breeding at BOKU

Project

N₂-fixaton

- methodology
- G×E interaction
- crop rotation effects
- isotope analysis delta N¹⁵

4 cultivars & NILs *Nod+*/*Nod-*

Add. traits

weed competitiveness



MAS at BOKU – IFA Tulln



2005-2007: Screening for common (*Tilletia caries*) and dwarf bunt (*T. controversa*) resistance

DNA Marker assisted selection (MAS) strategy

Issue: dwarf bunt is a soil-borne disease → no artificial infection possible since otherwise the respective field can not be used for wheat cultivation over more than 10 years

→ DNA diagnostic methods necessary to combine (pyramidise) as much resistance genes as possible without artificial infection of plants and soils with bunt inoculum

Photographs & References

Title page: H. Grausgruber – Tomato multiplication at Austro Saat; tomato crosses at HBLFA Schönbrunn

Potato breeding: H. Grausgruber – Potato crosses and field trials at NÖS, Windigsteig

Soybean breeding: J. Vollmann – field trials incl. testing for weed competitiveness

Vegetables (Reinsaat): H. Grausgruber (2006)

Initiatives: www.janaturlich.at

MAS: H. Bürstmayr & H. Huss (2011)

Saatzucht Donau: <http://www.saatzucht-donau.at>

Saatzucht Edelhof: <http://saatzucht.edelhof.at>

Niederösterreichische Saatbaugenossenschaft: <http://www.noes.at>

Saatzucht Ebnerhof: <http://www.amebnerhof.at>

Demeterhof Loosdorf: <http://www.piatti.at> ; <http://www.bio-agrikultur-loosdorf.at>

Reinsaat: <http://www.reinsaat.at>

BOKU University: <http://www.boku.ac.at>