Potato: management, agronomic strategies, variety choice and research on protection from late blight in organic production

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Copper meeting,
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Late blight (*Phytophthora infestans*) is a severe problem of the potato crop ...
... but not the only one!
The Blight-MOP project

- **Blight-MOP:** Development of an integrated systems approach for blight management in organic potato production systems
- EU-funded project 2001 – 2005
- 13 partners from: UK, CH, FR, DE, DK, NO, NL

www.fibl.org
Blight-MOP project structure

Objective 1.
Inventory of EU blight management strategies
Economic impact assessment

Objective 2.
Resistance management and cultivar rotation

Objective 3.
Within field diversification strategies

Objective 4.
Agronomic strategies

Objective 5.
Alternative control treatments

Objective 6.
Application and formulation strategies

Objective 7.
Integration of strategies
Regional evaluation
Blight-MOP state-of-the-art survey

- 7 countries and approx. 20 researchers involved
- 118 farmers interviewed
- 131 questions asked (interviews only)
- 729 Variables processed and analysed
- Combined with background information on economy / epidemiology
- Download of full report (106 pages): http://orgprints.org/2936/
Late blight in Europe
Losses due to late blight

- **1996**
  - United Kingdom
  - Switzerland
  - Norway
  - Netherlands
  - Germany
  - France
  - Denmark

- **1997**
  - United Kingdom
  - Switzerland
  - Norway
  - Netherlands
  - Germany
  - France
  - Denmark

- **1998**
  - United Kingdom
  - Switzerland
  - Norway
  - Netherlands
  - Germany
  - France
  - Denmark

- **1999**
  - United Kingdom
  - Switzerland
  - Norway
  - Netherlands
  - Germany
  - France
  - Denmark

- **2000**
  - No loss
  - Loss

- **Legend**
  - No loss
  - Loss

- **Source**
  - www.fibl.org
Current practices of late blight control

- use of robust varieties (as far as possible; market!)
- early yielding varieties, pre-sprouting & early planting
- avoid inoculum (quality seed, waste covered, volunteers removed, long distance from other fields, infected plants removed)
- low planting density
- good ridges (to avoid tuber blight)

- copper fungicides
- diverse alternative treatments
Copper use in organic potatoes
118 farms, 1996 - 2000

- Denmark
- Germany
- Norway
- United Kingdom

Percent

Exceptional use in 1998

- no
- yes
If copper used: quantity (kg/ha) in 2000

- France: 0
- Germany: 0
- Switzerland: 0
- United Kingdom: 0
- Denmark: 0
- Norway: 0
- The Netherlands: 0
Field test of the systems approach

*P. infestans* infestation (%)  Marketable yield (t/ha)

![Graph showing *P. infestans* infestation and marketable yield for different treatments: Farm standard (Agria), Resistant variety (Naturella), Variety mixture stripwise, Added soil fertility input, Copper alternative, Alternative Spray T. The graph compares the infestation and yield for Agria and Naturella varieties.](image-url)
Copper minimization 1

- Improve timing of applications
- e.g. for Switzerland: [www.phytopre.ch](http://www.phytopre.ch)
Copper minimization 2

- Adapt quantity of copper applied
- e.g. the FiBL spraying recommendations for potatoes

- no infections: Cu: 0
- Infections in the region: Cu: 200 g/ha
- Infections in the field: Cu: 800 g/ha
Copper minimization 3

- Improve application technology
- e.g. underleaf spraying
Copper minimization 4

- Improve formulation
  - stickers
  - spreaders
  - rainfastness
  - ...

- Efforts of the industry
Blight-MOP trials with minimal copper

Copper replacement

- In the Blight-MOP project, a large number of microorganisms, plant extracts and other compounds were screened against late blight. None of the compounds tested had sufficient effectivity for practical application.*
- Copper replacements are also researched for other crops (e.g. REPCO project).

Outlook

- Reduction and replacement of copper fungicides remain a top priority!
- All available agronomic strategies (including variety choice) must be used to minimize copper use. Their potential varies from crop to crop, and from country to country.
- Alternative compounds are needed, but development of effective alternatives is very difficult. Efforts can only be successful:
  - with sufficient time and money
  - at the multi-national scale
  - with private – public partnerships
Thank you for your attention!