

Mejores prácticas para el control de enfermedades en papa

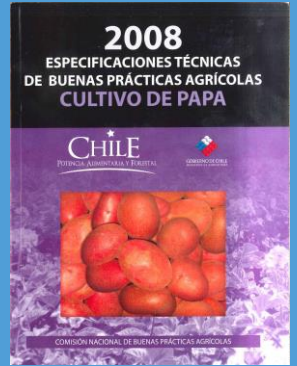
Huub Schepers



PRAKTIJKONDERZOEK
PLANT & OMGEVING
WAGENINGEN

Mejores prácticas (IPM)

Preventive measures & observations in the field must have been considered before intervention with direct plant protection measures takes place



PRAKTIJKONDERZOEK
PLANT & OMGEVING
WAGENINGEN

Mejores prácticas (IPM) principios

1. Preventive measures, e. g. crop rotation, resistant varieties
2. Usage of tools for monitoring
3. Usage of threshold values and decision-making systems
4. Non-chemical methods to be preferred
5. Agrochemicals applied as target-specific as possible and with least side effects
6. Reduction of use to necessary levels
7. Application of anti-resistance strategies
8. Check of success based on records and monitoring

PRAKTIJKONDERZOEK
PLANT & OMGEVING
WAGENINGEN

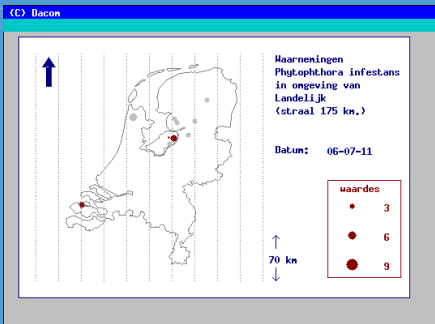
1. Resistant varieties



PRAKTIJKONDERZOEK
PLANT & OMGEVING
WAGENINGEN

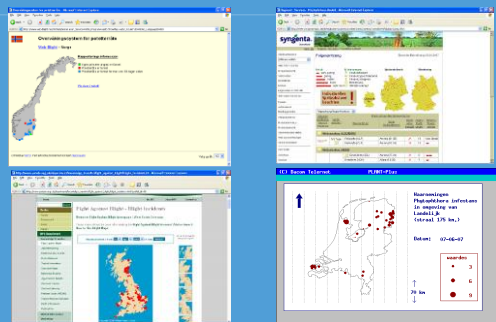
DuRPh

2. Usage for tools of monitoring



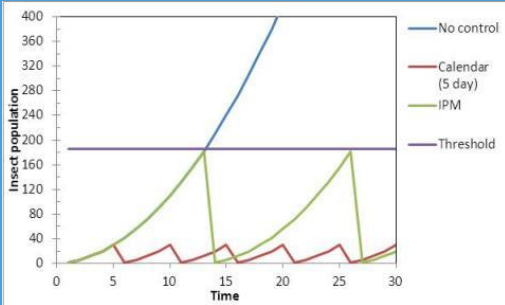
PRAKTIJKONDERZOEK
PLANT & OMGEVING
WAGENINGEN

2. Monitoring infected fields in Europe



PRAKTIJKONDERZOEK
PLANT & OMGEVING
WAGENINGEN

3. Usage of threshold values



4. Usage of non-chemical methods



5. Agrochemicals applied as target-specific as possible and with least side effects

EuroBlight Fungicide comparison - Updated 15 July 2010

The effectiveness of fungicide phytotoxicities for the control of *P. infestans* based on the highest rate registered in Europe. These ratings are the opinion of the Fungicides Sub-Group of the potato late blight control. 2012 and are based on field experiments and experience of the product performance when used in commercial conditions.

! Leaf blight over headers to get explanation

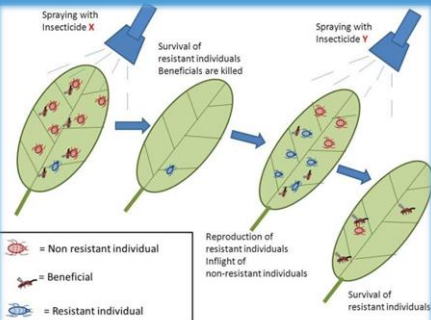
Product 1	Leaf blight 2	New growth	Stem blight	Taber blight	Protectant	Curative	Anti sporulant	Resistances	Mobility 1
chlorothalonil	2.0	2	2	2	0	0	0	0	0
cyprodinil	3.8	2	2	2	0	0	0	0	0
mancozeb	2.8	2	2	2	0	0	0	0	0
cyprodinil + mancozeb	3.8	2	2	2	0	0	0	0	0
mancozeb + cyprodinil	3.8	2	2	2	0	0	0	0	0
metalaxyl-M	2.0	2	2	2	0	0	0	0	0
metalaxyl-M + mancozeb	3.7	2	2	2	0	0	0	0	0
cyprodinil + mancozeb	3.8	2	2	2	0	0	0	0	0
cyprodinil + copper	3.8	2	2	2	0	0	0	0	0
cyprodinil + mancozeb	3.8	2	2	2	0	0	0	0	0
mancozeb + copper	3.8	2	2	2	0	0	0	0	0
metalaxyl-M + mancozeb	3.8	2	2	2	0	0	0	0	0
metalaxyl-M + mancozeb + mancozeb	3.8	2	2	2	0	0	0	0	0
metalaxyl-M + fluazinam	3.8	2	2	2	0	0	0	0	0
cyprodinil + mancozeb + chlorothalonil	3.8	2	2	2	0	0	0	0	0
cyprodinil + mancozeb + mancozeb	3.8	2	2	2	0	0	0	0	0
cyprodinil + mancozeb + mancozeb	3.8	2	2	2	0	0	0	0	0
cyprodinil + mancozeb + mancozeb	3.8	2	2	2	0	0	0	0	0
cyprodinil + mancozeb + mancozeb	3.8	2	2	2	0	0	0	0	0

1 The scores of individual products are based on the label recommendation and are NOT additive for mixtures of active ingredients. Inclusion of a product in the list is NOT evidence of its registration status either in the EU or elsewhere in Europe. 2 Based on fungicide field test in 2006-2009. 3 Includes mancozeb, mancozeb, cyprodinil and mancozeb. 4 See proceedings for comments on phthalimide resistance. 5 Based on limited data. 6 In some trials there were indications that the rating was 1%. 7 Ratings for leaf blight are based on results from fungicide field trials during 2008-2009. 8 All data completely included in these trials are used for leaf blight. The scale for leaf blight is a 2-5 scale (see technical report). All other ratings are 1-3 scale indicated by a combination of full (1) and half (1/2) orange colored dots.

Key to ratings: 0 = no effect; 1 = reasonable effect; 2 = good effect; 3 = very good effect; 4 = excellent; 5 = not recommended for control of tuber blight; ? = no experience in trials under field conditions.

While every effort has been made to ensure that the information is accurate, no liability can be accepted for any error or omission in the content of this table or for any loss, damage or other accident arising from the use of the fungicides listed herein. Consensus of a fungicide does not necessarily mean that it is not approved for use within one or more EU countries.

7. Anti-resistance strategies



8. Check of success & monitoring

Potato-Vietnam (Dec-Jan-Feb)

- 18 mancozeb
- 20 chlorothalonil
- 21 mancozeb + cymoxanil
- 24 copperOH
- 25 mancozeb
- 28 chlorothalonil
- 30 mancozeb + cymoxanil
- 31 chlorothalonil
- 37 copperOH
- 48 mancozeb
- 56 chlorothalonil
- 62 mancozeb
- 67 mancozeb + cymoxanil



Most important potato diseases



Phytophthora infestans
(late blight)



Alternaria spp.
(early blight)



Rhizoctonia solani
(black scurf)

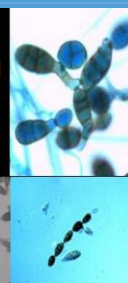


Helminthosporium solani
(silver scurf)

P. infestans (late blight)

Mejores prácticas (IPM) de tizón tardío

- Crop Rotation
- Primary inoculum sources
- Resistant Varieties
- Fungicides
 - First spray, spray frequency, product choice
- Decision Support Systems
 - Historical weather and forecast
 - Monitoring of disease in region/field
 - Details on pathogen, fungicides, variety

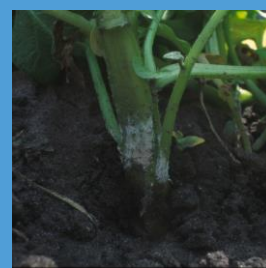
*Alternaria solani**A. alternata*

Photos: Plant Research International

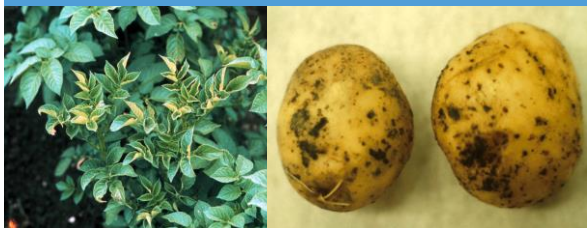
Mejores prácticas (IPM) de tizón temprano

- Prevent stress: fertilisation, virus
- Resistant varieties?
- Fungicides
 - Side effect of LB fungicides
 - Specific *Alternaria* fungicides
 - Timing
 - Resistance management (QoI's)
- Harvest: very dry harvesting conditions cause small wounds → *Alternaria* in tubers

Rhizoctonia: stem canker & black scurf



Rhizoctonia: stem canker & black scurf



PRAKTIJKONDERZOEK
PLANT & OMGEVING
WAGENINGEN

Mejores prácticas (IPM) of Rhizoctonia

- Tuber treatment in ware & starch potatoes
- Furrow treatment in seed potatoes
- Risk analysis
 - Growing frequency of potato low (1:4-5)
 - Planting later (rel. warm soil)
 - Big seed tuber
 - Planting tubers without black scurf
 - Ridging later (around emergence)
 - Haulm pulling or green harvesting
 - Harvest early after haulm destruction
 - Applying Carvon inhibits sprout growth & Rhizoctonia

PRAKTIJKONDERZOEK
PLANT & OMGEVING
WAGENINGEN

Helminthosporium solani (silver scurf)

- Quality problem for table potatoes and seed potatoes
- Loss of water
 - Financial loss
 - Loss of viability
→ late emergence & reduced crop vigour
 - Less stems



PRAKTIJKONDERZOEK
PLANT & OMGEVING
WAGENINGEN

Mejores prácticas (IPM) of silver scurf

- Quick drying and no condensation of water during storage
- Planting disease free seed potatoes
- Fungicide against Rhizoctonia in furrow for seed and table potatoes has side effect on silver scurf
- Applying fungicides before storage of seed potatoes
 - Harvest early
 - Harvest in two fases for fast drying tubers

PRAKTIJKONDERZOEK
PLANT & OMGEVING
WAGENINGEN

Gracias por
su atención

