Öko-SIMPHYT

(= organic-SIMPHYT)

A forecasting system for specific scheduling

of copper fungicides against Late Blight

Workshop Euroblight
Arras, 5 May 2010

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Introduction

Preventive measures against Late Blight in organic farming

- Choice of location
- Choice of variety
- Pregermination
- Nutrient supply
- Plant resistance improvers

- <u>Use of copper</u>
  - EU Organic Regulation: max. 6 kg/ha
  - Grower's associations: No approval (Demeter) or max. 3 kg/ha with special approval (Bioland, Naturland)
  - Active ingredients : Copper hydroxide, Copper octanoate, Copper oxychloride

Aims

- Development of a fungicide strategy against Late Blight in organic potatoes based on the use of copper

- Copper reduction (number of treatments, application rate, treatment break) in years with low disease pressure

- Development of procedures to achieve best antifungal activity in years with high disease pressure based on the maximum allowable application rate

- Development of a forecasting system based on

  SIMPHYT1 (recommends first treatment)

  SIMPHYT3 (recommends treatment interval and application rate)

Project participants / Tasks

Bavarian State Research Centre for Agriculture

Julius Kühn-Institut, Federal Research Centre for Cultivated Plants

Central Institution for Decision Support Systems in Crop Protection

Information System for Integrated Plant Production

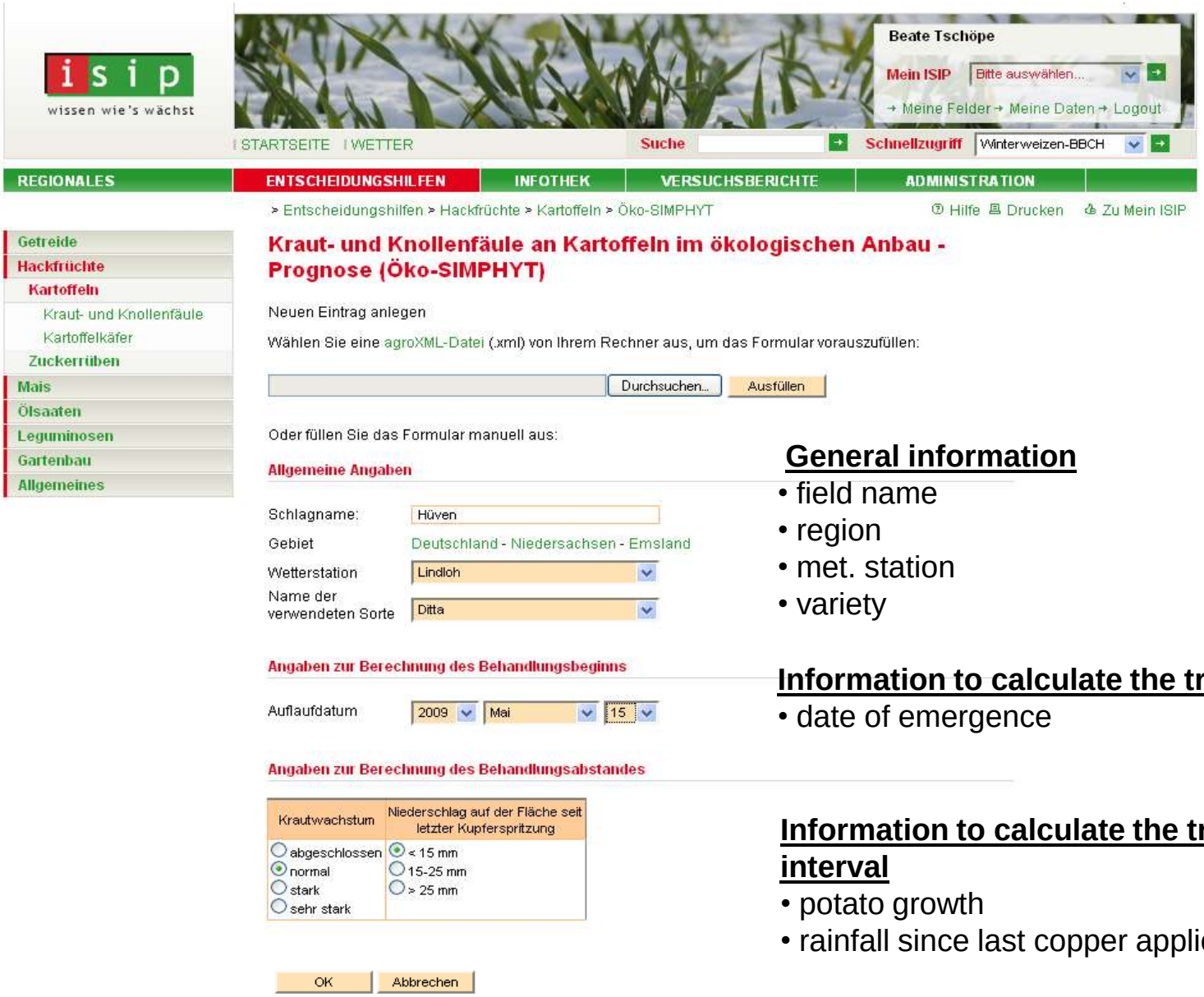
Plant protection services, Germany

sponsored by Bundesprogramm Ökologischer Landbau

Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz

- Copper application strategies (different copper formulations, different nozzle types, different application rates)
- Development of the decision support system Öko-SIMPHYT, programming of new web pages in www.isip.de, introduction to agricultural practices
- Nationwide demonstration experiments for the validation of Öko-SIMPHYT

Öko-SIMPHYT – Input



General information

- field name
- region
- met. station
- variety

Information to calculate the treatment start

- date of emergence

Information to calculate the treatment interval

- potato growth
- rainfall since last copper application

Öko-SIMPHYT – Output

Prognostizierter Phytophthora-Behandlungsbeginn (SIMPHYT1)

		Individuelle Einstellungen					Prognose erstellt für den	Behandlungs-beginn
		Schlagname	Sorte	Auflauf	Gefährdung	Wetterstation		
		Hüven	Ditta	15.05.09	hoch	Lindloh	18.06.09	22.06.09

Calculated treatment start, thereafter SIMPHYT3 starts

Prognostizierter Phytophthora-Infektionsdruck (SIMPHYT3)

		Individuelle Einstellungen					Prognose erstellt für den		Infektions-druck	Behandlungs-abstand	Aufwandmenge rein Cu (g/ha)	Spritzpause
		Schlagname	Sorte	Krautwachstum	Niederschlag	Wetterstation						
		Hüven	Ditta	normal	< 15 mm	Lindloh	18.06.09			10 Tage	250	Nicht möglich

Variable input + **Calculated infection pressure** ⇒

- **Treatment interval based on last application**
- **Recommended application rate**
- **Possibility of a treatment break**

Öko-SIMPHYT – Scheme-

Infection pressure	Treatment interval	Variable application rate
very low	12 days	250 g/ha
low	10 days	250 g/ha
medium	8 days	500 g/ha
high	6 days	750 g/ha
very high	4 days	750 g/ha

Potato growth	Addition/Reduction (days)
completed	1
normal	0
strong	-1
very strong	-2

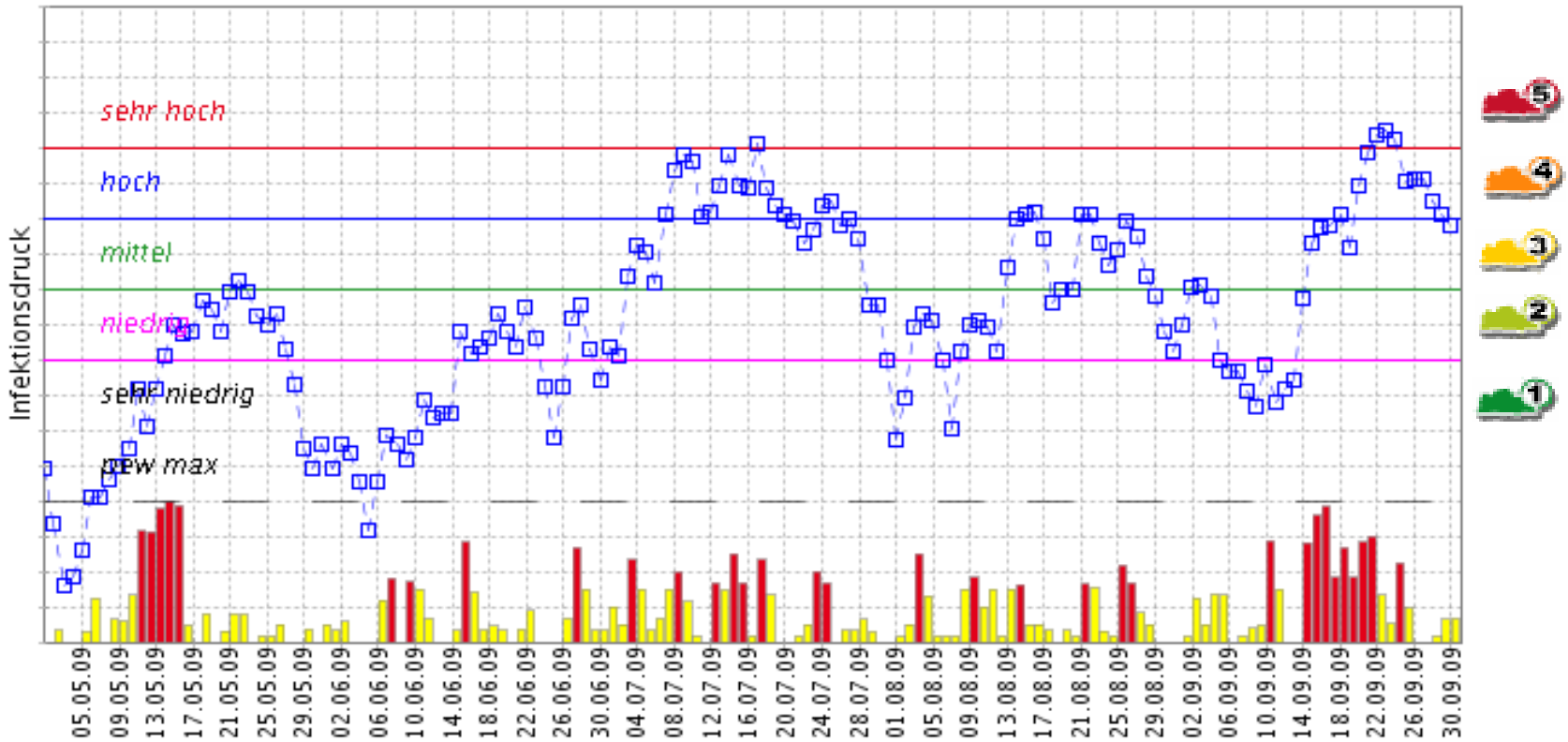
Rainfall (mm) since last application	**Reduction** (days)
< 15	1
15-25	0
> 25	-1

max. sum addition/reduction +1 day /-3 days
Minimal treatment interval 4 days

Öko-SIMPHYT – Diagram

Prognose

Witterungsbedingter Infektionsdruckverlauf und Phytophthora-Effizienzwert (pew) in unbefallenen Flächen
Wetterstation RP ÖKO-SIMPHYT 2009 - Meddersheim

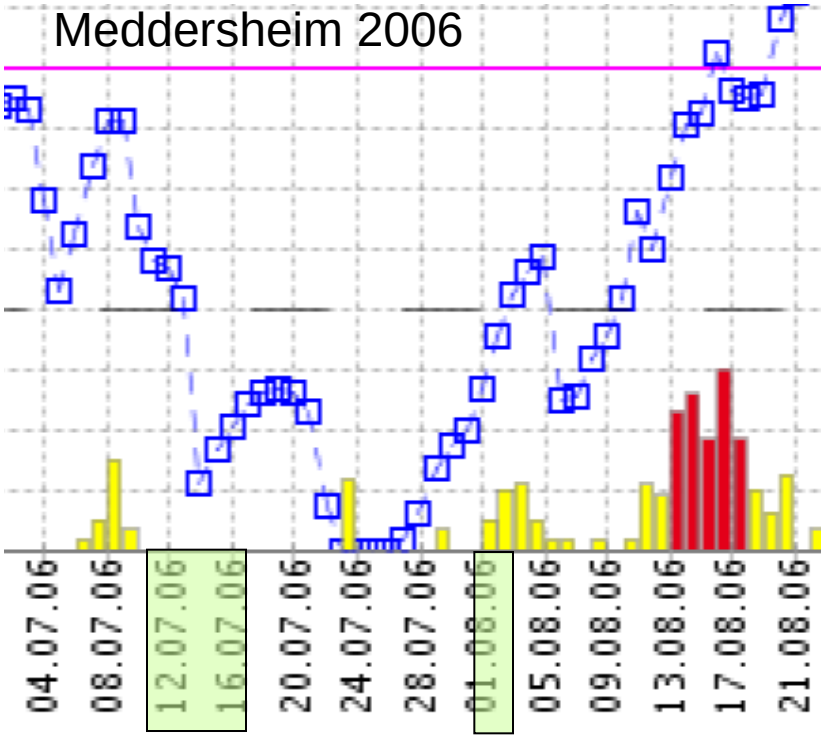


Slight increase of Late Blight disease in potato crop (pew < 0,4)

Favorable weather conditions with rapid spread of Late Blight (pew >0,4)

Treatment break

Copper reduction by a treatment break



10.-16.07.06
7 consecutive days with pew = 0

17.07.06
Output („treatment break possible“)

Spritzpause
möglich

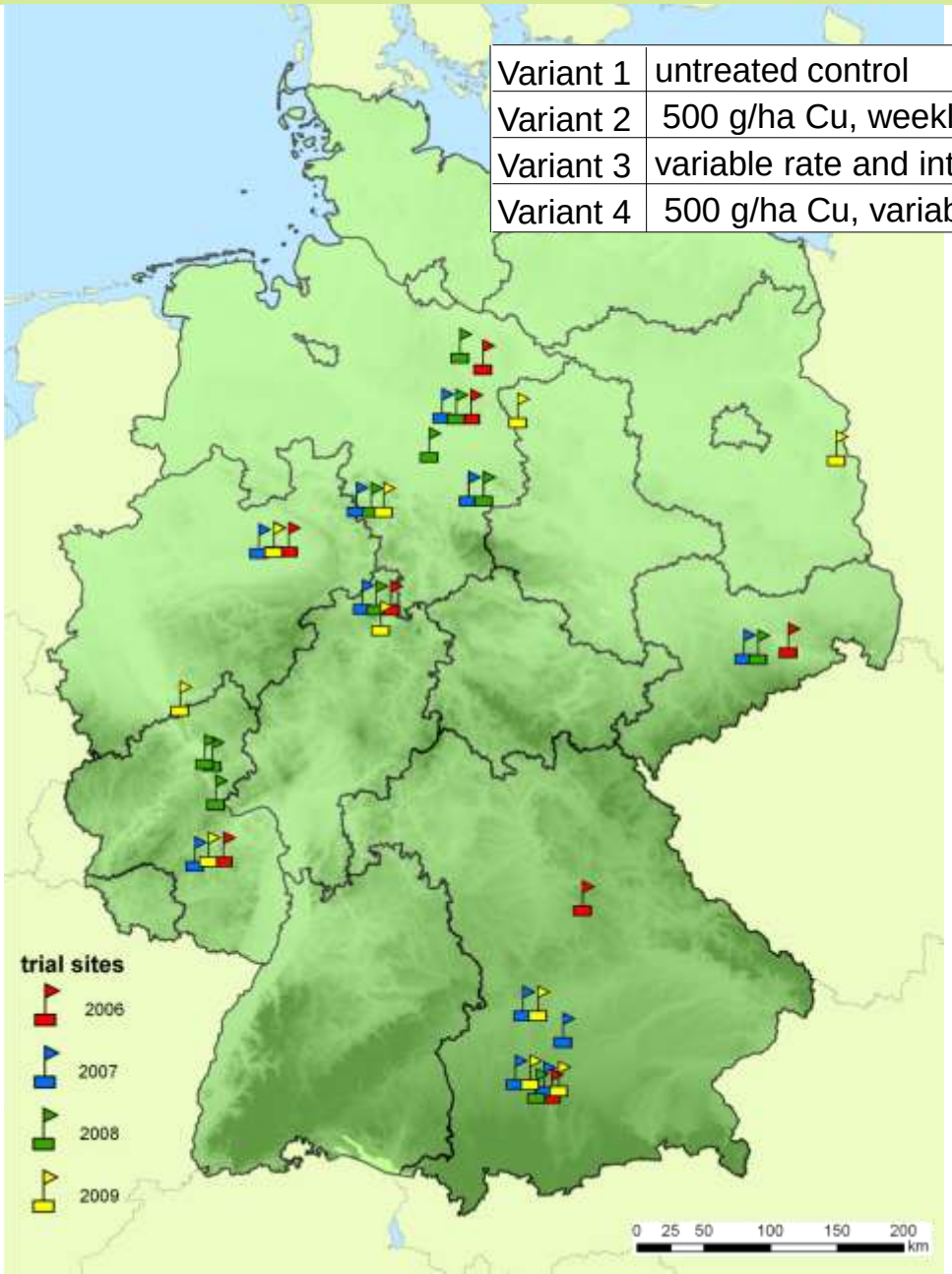
01. + 02.08.06
2 consecutive days with pew > 0

03.08.06
Output („end of treatment break since 05.08.“)

Spritzpause
am 05.08. beendet

Öko-SIMPHYT – trial sites-

Variant 1	untreated control
Variant 2	500 g/ha Cu, weekly
Variant 3	variable rate and interval (Öko-SIMPHYT)
Variant 4	500 g/ha Cu, variable interval (Öko-SIMPHYT)



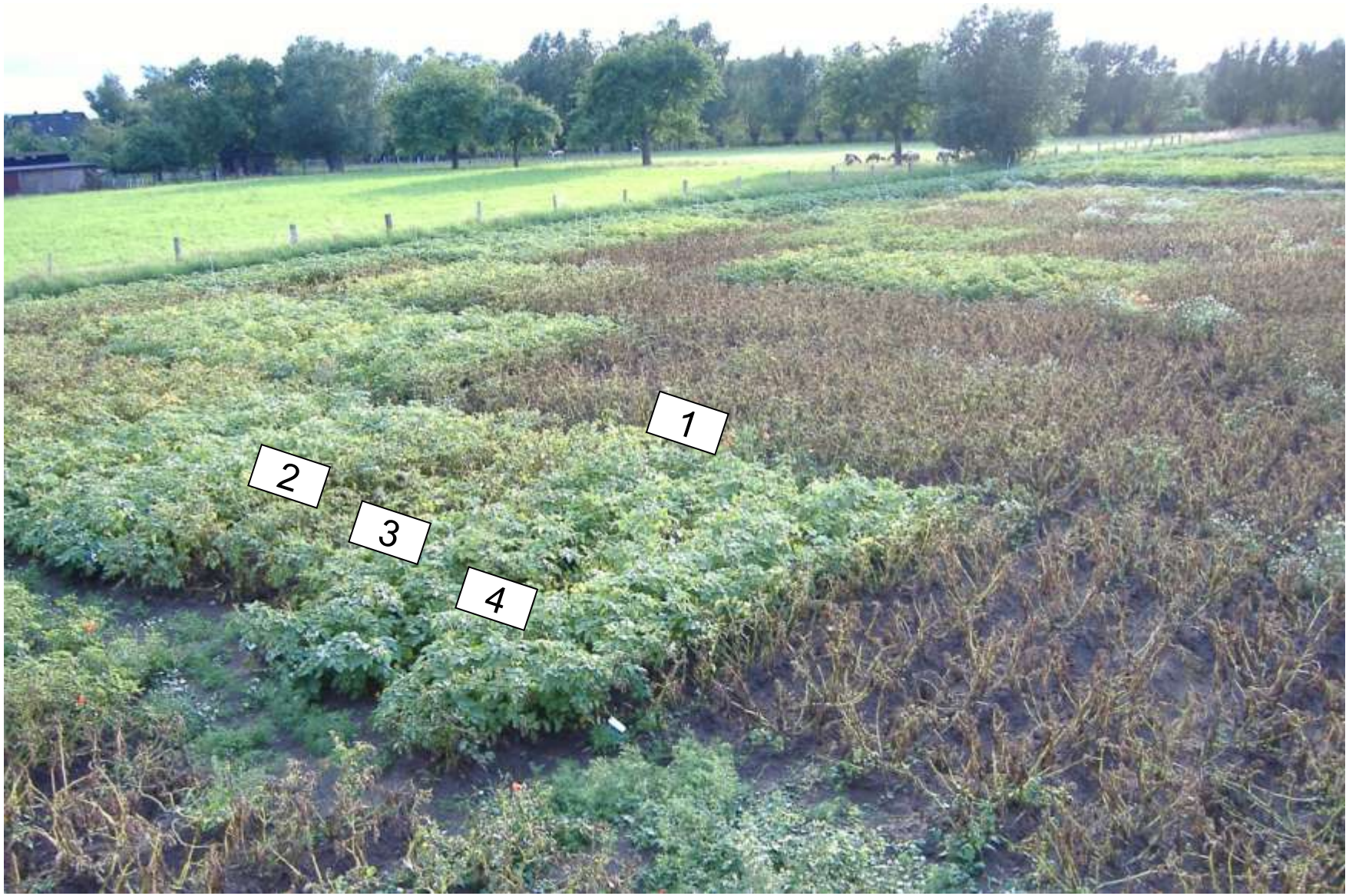
n= 49 trials

4 variants n= 17

3 variants n= 20

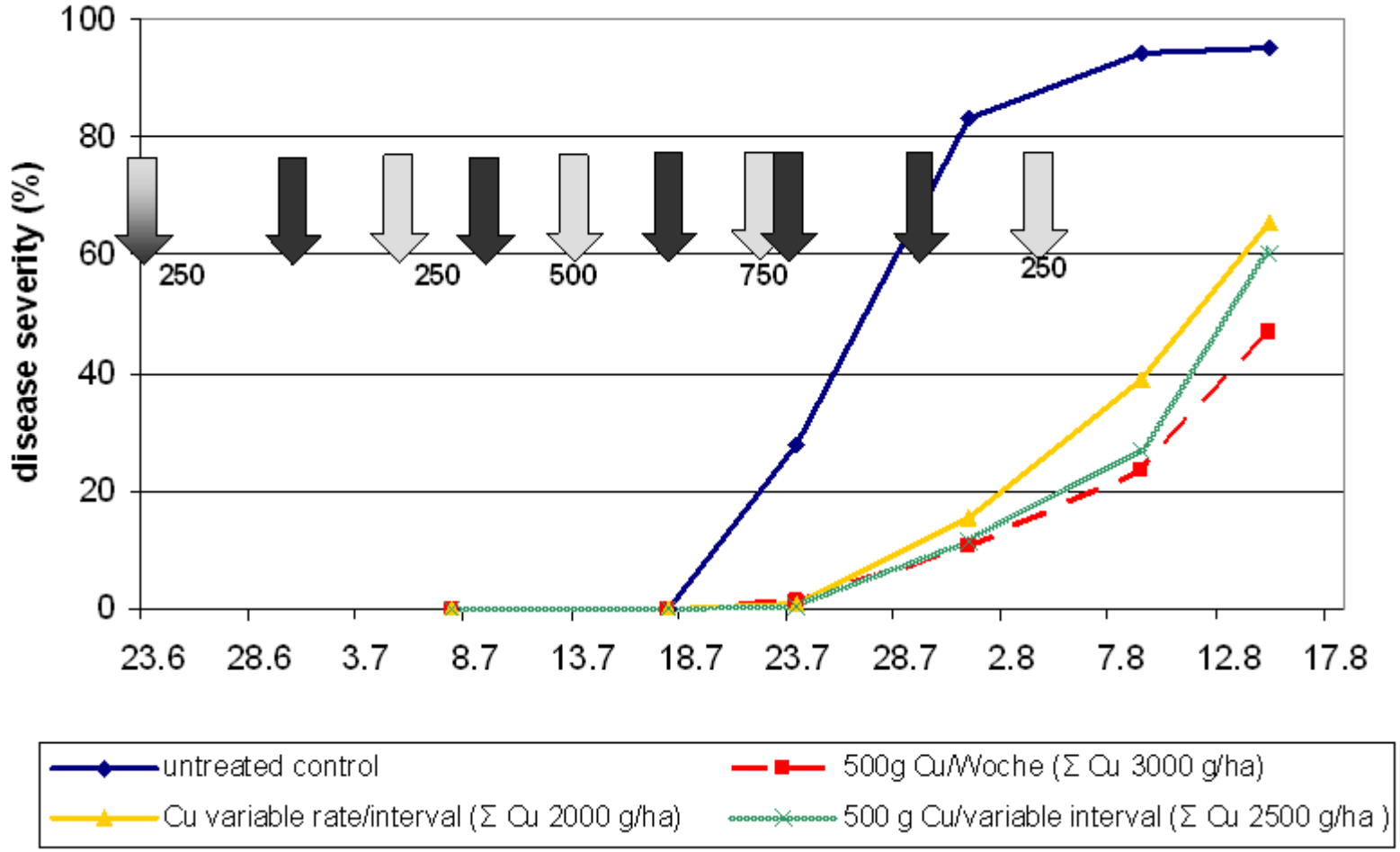
On-farm trials n= 12

Öko-SIMPHYT-trial (Rheda-Wiedenbrück 2009)



Öko-SIMPHYT-trial (Börry 2008)

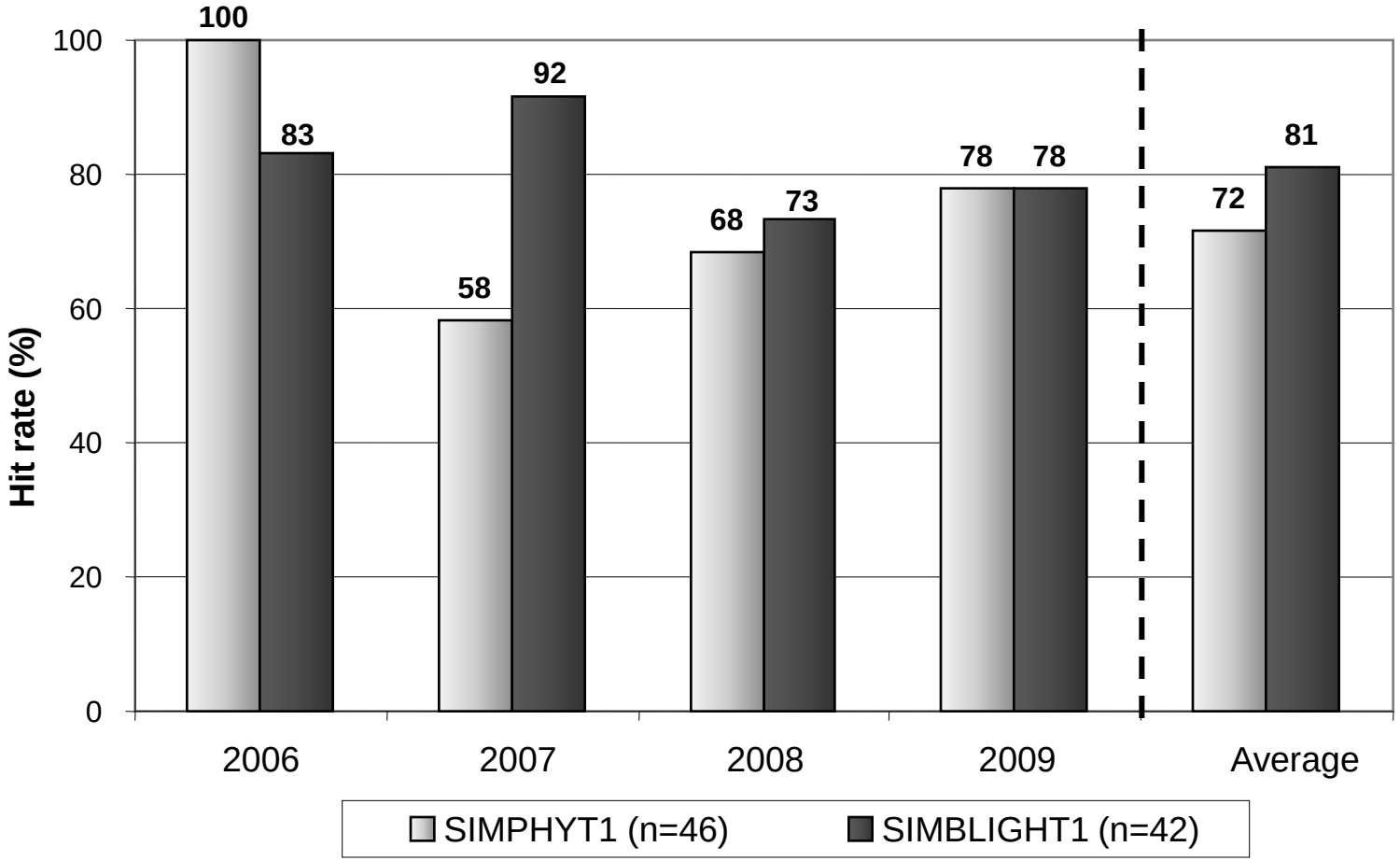
Disease severity (leaf), variety Princess



Model SIMPHYT1 - Validation 2006-2009

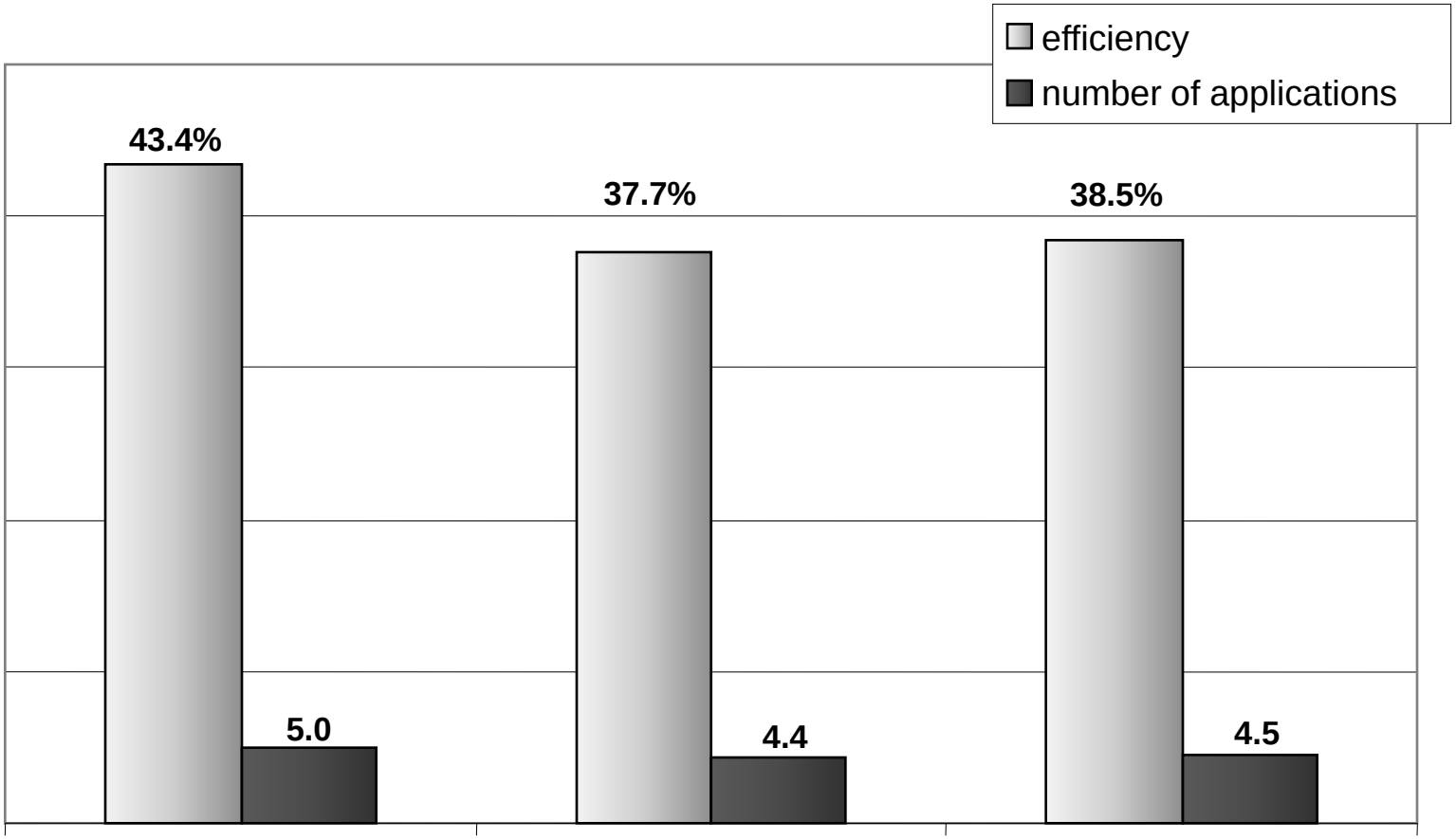
Hit rate of correct forecasts:

Evaluated by the difference between recommendation and first outbreak of Late Blight



Model SIMPHYT3 - Validation 2006-2009

Efficiency (%) of copper strategies compared to the untreated control (n=10)



www.isip.de

10. Juli 2009, 12:00 Uhr

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Harry Schmidt

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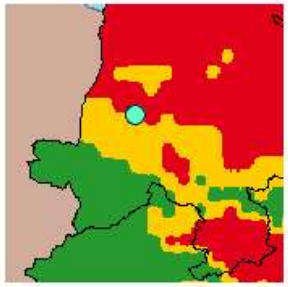
Kraut- und Knollenfäule an Kartoffeln - Prognose (Öko-SIMPHYT)



Neuen Prognosestandort mit Klick in die Karte auswählen

Landwirtschaftskammer Niedersachsen – Niedersachsen / Emsland

Für weitere Informationen wenden Sie sich bitte an Ihren zuständigen Berater für den ökologischen Landbau

Comment of extension officer

Risk map of treatment start

Prognosis for different emergence dates and for the two risk levels

Prognose

Ort	Prognose erstellt für den	Auflauftermin 21.04. - 30.04.		Auflauftermin 01.05. - 10.05.		Auflauftermin 11.05. - 20.05.	
		Gefährdungsgrp. 1	2	Gefährdungsgrp. 1	2	Gefährdungsgrp. 1	2
Hüven	10.07.09	12.06.09	21.06.09	18.06.09	24.06.09	22.06.09	24.06.09

Auswahl Karte

Ausgewählter Prognosestandort

Prognose für früh aufgelaufene, anfällige Sorten

- z.Z. keine aktuellen Daten
- Behandlungsbeginn noch nicht erreicht
- Behandlungsbeginn in den kommenden Tagen
- Behandlungsbeginn erreicht

- Treatment start not predicted
- Treatment start in the next days
- Treatment start

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Summary

- By timing the treatment interval and adjusting the application rate with the help of the decision support system Öko-SIMPHYT it was possible to get results comparable to standardized weekly applications, applying less copper. In certain cases it was possible to save up to 1000g/ha of copper.

- On average 0.6 applications were saved and the reduction of copper was 535g/ha.

- The prognosis model is available for farmers and extension officers via the internet on the homepage www.isip.de.

Thank you for your attention!