Infinito: Protection of new growth from infection with *Phytophthora infestans*

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Infinito: Objectives of 2009 new growth trials

The objective was to evaluate the performance of Infinito in the protection of new growth of potatoes against late blight, in comparison with other leading late blight fungicides

Trials implemented in 2009

- Two tests on detached shoots, leaf and leaflets from field grown potatoes (BCS, France, 2009)
- One test with assessments both in field and in laboratory (PPO, Netherlands, 2009)
Definitions

New growth is defined as:

« growth and development of leaves present at the time of the last fungicide application and/or newly formed leaflets and leaves that were not present »

Bradshaw (2006)

Expanding leaves: leaves present at the time of application without having reached their actual development

Newly formed leaves / completely new leaves: leaves which were not present at the time of application having developed later

Cut shoot: one stem separated from the plant, with several leaves.

Cut leaf: one leaf separated from its stem, with its leaflets

Detached leaflet: leaflet separated from its leaf

Top (plant top): upper part of the one plant which consists in the terminal bud + one or several unfolded leaves.
<table>
<thead>
<tr>
<th>Mode of action</th>
<th>Fungicide (dose rate)</th>
<th>Active ingredient (dose rate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>contact</td>
<td>Shirlan (0.4 L/ha)</td>
<td>fluazinam (200 g ai/ha)</td>
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<td></td>
<td>Dithane neotech (2.0 kg/ha)</td>
<td>mancozeb (1500 g ai/ha)</td>
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<td></td>
<td>Ranman (0.2 L/ha + 0.15 L/ha adj)</td>
<td>cyazofamid (80 g ai/ha)</td>
</tr>
<tr>
<td>contact + translaminar</td>
<td>Revus (0.6 L/ha)</td>
<td>mandipropamid (150 g ai/ha)</td>
</tr>
<tr>
<td></td>
<td>Valbon (2.0 Kg/ha)</td>
<td>bentiavalicarb + mancozeb (25+1400 g ai/ha)</td>
</tr>
<tr>
<td>translaminar + systemic</td>
<td>Infinito (1.6 L/ha)</td>
<td>fluopicolide + propamocarb-HCl (100+1000 g ai/ha)</td>
</tr>
</tbody>
</table>
Methodology
Field & Lab trials in France, 2009

Potato crop implemented with 2 dates of planting in order to represent 2 different growth rates

- «typical growth rate» representative of active growing phase in North Europe (3-4 new leaves within 12 days)
- «high growth rate» more than 5 new leaves within 10 days

Fungicide applications done in the field at BBCH 31-32, in absence of natural infection
Potato shoots and leaves collected and transferred to the laboratory 0 to 12 days after fungicide applications

Artificial inoculations of *P. infestans* done in the laboratory the day of sampling

Disease assessments, 6 days after treatment:

- On cut shoots in climatic chambers
- On detached leaves
Protection of expanding leaves
Typical growth rate conditions

Efficacy results on cut shoots, France, 2009

Infinito offered excellent protection of expanding leaves
Infinito = Revus = Ranman > mancozeb

(97-100 % disease severity in untreated control)
**Comparison of testing methods**

**Typical growth rate conditions**

Protection of new growth on cut shoots vs detached leaves, France, 2009

Both methods provided comparable efficacy results

(97-100 % disease severity in untreated control)
Protection of newly formed leaves
High growth rate conditions

Efficacy results on cut shoots, France, 2009

None of the treatments was able to provide sufficient protection in a weekly interval
Infinito had an advantage over contact fungicides

(68-100 % disease severity in untreated control)
Potato crop implemented according to local good agricultural practice

- planting on 29 April
- cover treatment with Dithane prior to specific fungicide applications

2 applications of test fungicides in the field within 7 days interval

- first spray: 17 June
- second spray: 24 June

Growth rate = 2 new leaf layers within 6 days
Methodology
Field & Lab tests in the Netherlands, 2009

One artificial inoculation done in the field under humid conditions on June 23.

- 6 days after the first fungicide spray (= 1 day before the second application)

Bioassay on detached leaves

- Sampling 6 days after first fungicide application
- Detached leaves placed in climatic chambers after artificial inoculation
- Disease assessments 1 week after inoculation
Protection of new growth and tops

Field results on new growth and tops (Netherlands, 2009)

Infinito offered new growth protection at the level of other new growth references.

Infinito showed excellent protection of growing points (newly formed leaves).

(Disease levels untreated plots: 60% severity on leaves / 46% on tops)
Protection of newly formed leaves

Bioassay results on detached leaves from Layer 1
(Netherlands, 2009)

Infinito provided very good protection of newly formed leaves
(96% disease infection on untreated leaves)
Discussion & Conclusions

- Consistent results were achieved with all testing methods
- Growth rates recorded in practice are often too low to make differences between observations on newly formed leaves and expanding leaves
- Infinito demonstrated good protection of new growth in comparison to the best market standards
- Results from 2009 trials confirm previous data and support the Infinito rating (+++) for new growth effectiveness in the EuroBlight table
- During the active growing phase of the crop, practical recommendations to growers based on EuroBlight new growth ratings should be related to a minimum growth rate
Acknowledgments

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