FLOCTER™
A biological nematicide for control of plant parasitic nematodes

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ABIM | Basel | October 2014
Today plant parasitic nematodes represent

- US$ ~ 100 billion worth of damages
  (low yield, emerging pest)
- US$ ~ 1 billion spent on pesticides
  (C. Newitt, 2B Monthly, August 2014)

The control of relevant nematodes is changing

- Some a.i. are withdrawn from the market due to:
  - Risk for the environment and humans
  - Biodegradation decreases efficacy

- Increased focus and awareness on soil fertility and microflora equilibrium
A.I. – Spores of Bacillus firmus strain I-1582
Selected for its nematicidal and plant health activities

Formulation – Wettable Powder (WP) 5%
(3.55 X 10^{12} CFU/Kg)

Soil application – 80 kg/ha before sowing/planting or 40+40 kg/ha
before and after sowing/planting

Exempt from residue tolerance

Strong fit with Integrated Pest Management (IPM) practices
  - No impact on beneficial insects when used as directed
  - No PHI intervals
Mode of Action

Complex mode-of-action with direct and indirect activity

**Direct**
- Production of enzymes that degrade the walls of eggs → action on eggs and the nematode larvae inside the eggs

**Indirect**
- Colonization of the root surface, forming a physical barrier
- Degradation of root exudates, disorients nematodes reducing root penetration
- Stimulation of the plant growth through production of phytohormones
Flocter is active against the main plant parasitic soil nematodes that attack both greenhouse and open field crops.

Flexibility to integrate Flocter into other nematode control strategies such as chemical products, fumigation*, solarization and plastic mulch systems.

* Apply Flocter at least 7 days after fumigation.
Proven efficacy in several crops

### Cucumber trial – Italy (2012)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Efficacy on <em>Meloidogyne incognita</em> (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxamyl 4x10 L/ha</td>
<td>67.6</td>
</tr>
<tr>
<td>Flocter 40+40 kg/ha</td>
<td>84.5</td>
</tr>
<tr>
<td>Flocter 80 kg/ha</td>
<td>69.4</td>
</tr>
</tbody>
</table>

### Carrot trial – *Heterodera carotae* – Italy (2012)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>% Not marketable roots (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxamyl 50 kg/ha</td>
<td>26</td>
</tr>
<tr>
<td>Flocter 80 kg/ha</td>
<td>27.2</td>
</tr>
<tr>
<td>Untreated</td>
<td>47.9</td>
</tr>
</tbody>
</table>

• B. Hitzberger et al. • Flocter • ABIM • Basel, October 21, 2014
Delivers better YIELD

Cucumber trial – Italy (2012)
Yield – dt/ha

- Oxamyl GR 4x10/ha: 94
- Flocter 40+40 kg/ha: 129
- Flocter 80 kg/ha: 88
- Untreated: 51

Yield; Tomato; 80 kg/ha & 2 x 40 kg/ha vs. Standard; n = 6

- Flocter® WP 5 kg/ha A: 132,0%
- Flocter® WP 5 kg/ha AB: 123,9%
- Flocter® WP 80 kg/ha A: 108,7%
- Standard: 100%

... benefitting the entire food chain
Beyond Efficacy

Provides better early stage growth

Tomato trial in Italy (2012-2013). In plots treated for two consecutive years with Flocter a better starter effect was observed.
Improves photosynthetic capacity

Tomato Trial – Italy (2013)
SPAD** Index

<table>
<thead>
<tr>
<th></th>
<th>Untreated</th>
<th>Flocter 40+40 kg</th>
<th>Oxamyl 4X*</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAD Index</td>
<td>19.3</td>
<td>21.5</td>
<td>20.7</td>
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</tbody>
</table>

3 months after transplant

* First application pre-planting followed by three applications post-planting
** Chlorophyll Content Index

Bayer CropScience
Provides better root growth, particularly in fine-root systems

Tomato Trial – Italy (2013)
Average weight of roots/plant (g)

- Untreated: 45
- Flocter 40+40 kg: 57
- Oxamyl 4X*: 45

* First application pre-planting followed by three applications post-planting
Flocter is/will be registered for carrots, tomatoes, melons, cucumber, pepper, tobacco and other vegetables in EMEA, as well as other relevant regions/countries.
Flocter, a new nematicide based on the bacteria *Bacillus firmus* I-1582, is another tool within the Bayer solutions portfolio which contributes to develop sustainable agriculture and addresses unmet customer needs. Among the product interesting features:

- **Proven efficacy**
- **IPM compatible**
- **No impact on humans or the environment**
- **Ability to positively stimulate the physiology of plants**
- **No PHI**
- **Exempt from tolerance**
- **Admitted in organic farming**

*Flocter®* is a new nematicide based on the bacteria *Bacillus firmus* I-1582, which contributes to develop sustainable agriculture and addresses unmet customer needs. Among its interesting features:

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