Late Blight Management in Potatoes, Israel

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MA-Industries
MAI - Who we are

- More than 4,000 workers
- 120 active ingredients
- $2.69 billion in sales
- More than 50 subsidiaries across the globe
- The world leading manufacturer and distributor of branded off-patent crop protection products
- The seventh largest agrochemicals company in the world
The Seventh Largest Company in the Overall Industry

2011 Agrochemical sales, $ billion (excluding seeds and traits)

- Large Scale RBC
- Off patent

*0.2 billion of non-agro sales
**2010 results, ** Non-Agro Sales
Source: MAI Analysis
One of the Broadest Product Portfolios in the Industry

RBC’s Active Ingredient:
By Phillips McDougal
Potato Late Blight Management, Israel
The potato is considered one of the major crops for consumption.

Consumption of potatoes in Israel, has been increasing steadily.

Along with the consumption, the production of potatoes has also been increasing.

**Potato Production in Israel**

![Bar chart showing potato production in Israel from 1970 to 2012. The production increased from 100,000 T in 1970 to 650,000 T in 2012.]
Production Areas in Israel

Total of 18,000 ha (2012)

1. Hula valley - peat soil
2. Sharon - sandy red soil
3-5. Negev region – sandy to medium heavy soil (>80% of total production)
6. Arava desert - medium heavy soil with saline water (winter crop only)
## Growing Seasons

<table>
<thead>
<tr>
<th></th>
<th>Autumn</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Origin of tubers</strong></td>
<td>Israel (local)</td>
<td>UK, NL, FR, DE</td>
</tr>
<tr>
<td><strong>Planting</strong></td>
<td>September - November</td>
<td>December - April</td>
</tr>
<tr>
<td><strong>Harvest</strong></td>
<td>December - February</td>
<td>May - June</td>
</tr>
<tr>
<td><strong>Growth areas</strong></td>
<td>North – 5%</td>
<td>Negev – 94%</td>
</tr>
<tr>
<td></td>
<td>Negev – 70%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Central – 25%</td>
<td>Central – 6%</td>
</tr>
<tr>
<td><strong>Consumption</strong></td>
<td>Export</td>
<td>Seeds (for following season)</td>
</tr>
<tr>
<td></td>
<td>Local market</td>
<td>Local market</td>
</tr>
<tr>
<td></td>
<td>Industry</td>
<td>Industry</td>
</tr>
</tbody>
</table>
Growing Seasons

**Autumn**
- Days getting shorter
- Slow growth rate
- Longer season
- Lower plant vigor
- Senescence leave

**Spring**
- Days getting longer
- High growth rate
- Shorter season
- Strong plant vigor
- Young canopy

Environmental trigger (autumn and spring): Rains + fog + irrigation + dew

Early Blight + Late Blight

Late Blight
Fungicide Used to Control Late Blight

- **Protectants**
  - Mancozeb
  - Chlorothalonil

- **“Super protectants” – translaminar**
  - Dimethomorph
  - Bentiavalicarb Isopropil
  - Mandipropamid
  - Propamocarb -HCL

- **Curative - systemic**
  - Mefenoxam (Metalaxyl)
  - Cymoxanil
Late Blight Monitoring and Control

Monitoring is done on daily basis – searching for new late blight spots

- At ~70% emergence: protectants (Mz, Chlorothalonil) every 3-4 days (after each irrigation).
- At favorable conditions (foggy days, rain) – “super protectants” (+ Mz)
- At infection – Metalaxyl (+Mz)
  - A sample is sent to Prof. Yigal Cohen (Bar-Ilan university) for resistance monitoring
  - Results are reported to “Yacham” (potato growers cooperative) and delivered back to the growers (2-3 days).

✓ In case of infection with Metalaxyl resistance - super protectants.
Late Blight Control

Protectants (3-4 days intervals)

Super protectants

Favorable conditions

Infection

systemic
2012 Potato Disease Control
Data from 15,000 ha

Protectants: ~15 sprays

Translaminar ("super protectants"): 2 - 4 sprays

Systemic fungicides: 1 spray

Fungicide value (early + late blight)

\[ 328 \text{ $} / \text{ha} \]
Banjo Forte 400 SC

(Fluazinam 200 g/L + Dimethomorph 200 g/L)
Banjo Forte activity on zoospores:

- Banjo Forte paralyses zoospore flagella, preventing movement down to tubers.
- Banjo Forte has good activity on blight zoospores to prevent tuber infection.
- Banjo Forte prevents zoospores penetrating the leaf.

Diagram showing the life cycle of a potato blight pathogen, with arrows indicating the stages of sporangiophore on leaf, germination, zoosporangium release, and encysted zoospores infecting the leaf and tuber.
Technical information

- Trade Name: Banjo Forte, Hubble
- Registered: UK, Belgium, Germany, Netherlands, Sweden, Poland
- Ratio: 200:200 g/L – Fluazinam : Dimethomorph
- Disease spectrum: Late blight, Sclerotinia, Alternaria (side affect)
- Labelled Crop: Potato
- Max Individual Dose: 0.75-1L/ha
- Maximum 4 applications per season
- Application timing: As soon as conditions favour the disease (7-10 day intervals – high pressure)
- Harvest interval: 7 days before harvest