NEW FORMULATION!
THE ULTIMATE IN
LATE BLIGHT PROTECTION
Two active ingredients, unsurpassed late blight protection

Orondis™ Ultra fungicide brings two highly effective modes of action together for powerful residual control. Orondis Ultra combines mandipropamid (FRAC Group 40) with oxathiapiprolin (FRAC Group 49), a unique active ingredient that delivers highly effective residual protection against all known strains of late blight (*Phytophthora infestans*).
How does Orondis Ultra work?

Orondis Ultra provides translaminar and acropetal activity, meaning that it moves across the leaf surface as well as upwards into new growth via the plant’s xylem, or water-conducting vessels. Both modes of action work in tandem to protect the plant – even while it is actively growing.

Because Orondis Ultra is taken up in the plant, it will not wash off in the event of a rainfall. This rainfastness, combined with the length of control, provides excellent application flexibility when less-than-ideal weather is an issue.

What type of protection does each active ingredient provide?

Applied preventatively, oxathiapiprolin outperforms Revus® fungicide, the current standard for late blight control in potatoes.

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Crop</th>
<th>Study</th>
<th>Oxathiapiprolin</th>
<th>Revus®</th>
</tr>
</thead>
<tbody>
<tr>
<td>P. infestans (Late blight)</td>
<td>Potato</td>
<td>7d preventative</td>
<td>++++</td>
<td>+++</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2d preventative</td>
<td>++++</td>
<td>+++</td>
</tr>
</tbody>
</table>

Greenhouse tests, Syngenta research
Stein, 2010

++++: Excellent activity
-=: No control

1. 2. 3. 4.

Translaminar movement
Mandipropamid and oxathiapiprolin both bind tightly to the waxy layer of the leaf surface (1) and flow steadily into the leaf tissue (2), where they provide disease protection on the upper and lower leaf surfaces.

Xylem-systemic movement
Oxathiapiprolin moves through the xylem (3) – the plant’s water conducting vessels – and moves upward and outward (4) to protect the plant as it grows.
Control through the disease cycle

Orondis Ultra prevents the release and germination of zoospores and sporangia. It inhibits late blight infection by targeting a binding protein that’s essential to fungal development.

The diagram shows where oxathiapiprolin (purple) and mandipropamid (blue) work on preventing late blight infection.

Legend
- oxathiapiprolin
- mandipropamid

Evaluation of resistance risk – FRAC

To manage resistance, growers should apply a maximum of one Orondis Ultra treatment for every three applications targeting late blight in potatoes. Do not apply back-to-back sprays of Orondis Ultra or follow an Orondis Ultra application with an application of Revus or any other Group 40 fungicide.

Orondis Ultra must be applied preventively. If late blight is present DO NOT apply Orondis Ultra; use an alternate solution.

<table>
<thead>
<tr>
<th>Fungicide Risk</th>
<th>Pathogen Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Rhizoctonia Ruts Soil-borne pathogens Smuts and Bunts</td>
<td>Low Mycosphaerella graminicola Rhynchosporium</td>
</tr>
<tr>
<td>Medium Eyespot</td>
<td>Medium Magnaporthe Venturia Plasmopara Penicillium M.fijiensis Phytophthora infestans**</td>
</tr>
<tr>
<td>High Botrytis Blumeria</td>
<td>High P. infestans</td>
</tr>
</tbody>
</table>

Combined risk: 0.5–1.5 = Low, 2–6 = Medium, 9 = High

- High Benzimidazoles, Qols, Phenylamides, Dicarboximides: 3
  - Oxathiapiprolin: 6
  - Medium Carboxanilides, DMIs, Phenylpyrrols, Phosphorothiolates, Anilinopyrimidines, MBI-Ds: 2
  - Mandipropamid: 4
  - Low Coppers, Sulphur, Chlorothalonil, Dithiocarbarnates, Phthalimides, MBI-Rs, Probenazole: 0.5*

* This low score reflects the long-standing record of ‘no resistance’ in this low-risk group.
** P. infestans is considered medium risk by some as the high-risk classification is based largely on the reaction to phenylamides.
Late blight

Late blight attacks all parts of the potato plant and can be extremely destructive. The disease generally prefers cooler temperatures and high humidity.

Temperature affects the spread of late blight

- **In warmer temperatures** – between 21 and 26 degrees Celsius – each sporangium forms a germ “tube” that penetrates the plant tissue resulting in a single infection site. Consequently, the late blight infection will progress slowly.

- **In cooler temperatures** – below 18 degrees Celsius – each individual sporangium releases 8–12 zoospores. Zoospores swim freely within water or moisture on the leaf surface. Each zoospore settles down, germinates and penetrates the plant tissue. This results in 8–12 infection sites (versus one under higher temperatures).

- **Late blight symptoms can appear three to four days after infection.**


Application information

Orondis Ultra must be applied preventatively, prior to late blight infection in the field, for highly effective protection at low use rates. If you see disease, do not use Orondis Ultra.

- Begin applications prior to disease development and continue on a 7 to 14 day spray schedule - remember to rotate your fungicide groups

- For every application of Orondis Ultra you make for late blight protection, you need to make two sprays of other fungicides with different modes of action (i.e. not Group 49 for two sprays and not Group 40 for the spray immediately following)

- Apply 400-600 mL/ha (162-243 mL/ac). At the mid-rate (200 mL/ac), Orondis Ultra treats 75 acres per case

- Use higher rate and shorter interval when disease pressure is high.

- Orondis Ultra has a 14-day pre-harvest application interval (14 day PHI)

Proven late blight performance

**UNTREATED**

Two foliar applications with Orondis Ultra

- Planted June 7, 2016
- Foliar applications of Orondis Ultra July 15 and August 5, 2016
- Photos taken August 26, 2016

Photos by GAIA Consulting.

Applications should be made prior to disease development and continue on a 7 to 14 day interval.

What are growers saying?

“A big advantage is that we were able to get a lot more work done around the farm. There were some weeks where it would be hard to go over the crop when the winds would be high or we were getting rains, but we knew we were protected because we had Orondis Ultra.”

Chris Smallman
Smallman Farms
Knutsford, Prince Edward Island