



syngenta®

Optimal control of late
blight and downy mildews
on potatoes and vegetables



Orondis Opti fungicide

Orondis® Opti fungicide combines two products, Orondis and Bravo® fungicides, to aid growers in hitting an out-of-the-park home run against downy mildew in vegetables and late blight in potatoes. It protects the crop when it is most actively growing to help maximize marketable yields.

Combining our latest active ingredient, oxathiapiprolin, with the proven, trusted performance of chlorothalonil, Orondis Opti offers control you can rely on, even under heavy disease pressure. As the only active ingredient in FRAC Group 49, oxathiapiprolin is not cross-resistant to any other fungicide and offers built-in resistance management when included in a season-long Oomycete disease control program.

DISEASE DESCRIPTIONS

Late blight

Under favorable conditions, late blight can destroy a potato or tomato crop within a few days. The first symptoms of the disease are small, light to dark green, circular to irregular-shaped water-soaked spots. Lesions usually appear first on the lower leaves of potatoes, whereas infection is initially observed on younger leaves on tomatoes. A white cottony mildew develops on and around foliar lesions. Late blight thrives under cool, wet weather and the disease cycle may be interrupted during a dry spell, but will progress when damp weather returns. In addition to leaves, stems and petioles, potato tubers and tomato fruit are also susceptible to late blight.



Lower surface of a potato leaf showing symptoms of late blight

SPECTRUM OF OOMYCETE ACTIVITY

- Potato – Late blight (*Phytophthora infestans*)
- Tomato – Late blight (*Phytophthora infestans*)
- Cucurbits – Downy mildew (*Pseudoperonospora cubensis*)
- Brassica vegetables (head and stem) – Downy mildew (*Peronospora parasitica*)
- Bulb vegetables (green and dry) – Downy mildew (*Peronospora destructor*)

Other Diseases

- In addition to these Oomycete diseases, the chlorothalonil component in Orondis Opti will provide control or suppression of *Alternaria* and other leafspot pathogens.

Downy mildews

Downy mildews, which affect a wide range of vegetable crops, are caused by a group of Oomycete obligate parasites belonging to the family *Peronosporaceae*. The descriptor 'downy' refers to the characteristic fluffy appearance of areas of sporulation that are typically found on the underside of infected leaves as the pathogen completes its disease cycle. The vegetative spores can germinate either directly or indirectly via the release of motile zoospores, the resulting germings in either case continuing the spread of disease by infecting healthy plant tissues. Initial symptoms after penetration and infection, are chlorotic lesions, which later become brown and necrotic. Similar to late blight, disease development and ultimately sporulation are favored by cool, wet conditions, with an ideal night temperature of 55 to 75° F and a relative humidity greater than 90 percent.



Cucumber leaf showing symptoms of downy mildew

ORONDIS OPTI TECHNICAL PROFILE

Chemistry	Oxathiapiprolin [piperidinyl-thiazole-isoxazolines class (FRAC Code 49)] and chlorothalonil [chloronitriles class (FRAC Code M5)]
Mode of action	Oxysterol binding protein (OSBP) inhibition (oxathiapiprolin) and multi-site contact inhibition (chlorothalonil)
Formulation	Suspension concentrate (SC) premix containing oxathiapiprolin (0.05 lb a.i. per gal) and chlorothalonil (3.32 lb a.i. per gal)
Rainfastness	Rainfast within 30 minutes after application
Systemicity	Translaminar movement and acropetal redistribution in the xylem
Precautions	Signal word - danger; see product label for Personal Protective Equipment (PPE)
Re-entry interval (REI)	12 hour REI

RESISTANCE MANAGEMENT AND BEST USE GUIDELINES

Oxathiapiprolin has a novel mode of action and is the only fungicide active ingredient in FRAC Group 49. It shows no cross-resistance to other fungicides used in management of Oomycete diseases. However, with potent inhibitory activity at the biochemical level and a single site mode of action, there is the potential for development of reduced sensitivity or resistance in fungal populations. By contrast, chlorothalonil, the second active ingredient in Orondis Opti, acts as a multisite inhibitor with low resistance risk. Application of two effective active ingredients with different modes of action is an important part of the resistance management strategy. Other resistance management practices are included in the directions for use for Orondis Opti:

- Apply as part of a preventive disease control program
- Make no more than two consecutive foliar applications of Orondis Opti before alternating to another effective product with a different mode of action
- Do not include Orondis Opti in more than 33 percent of the total applications in a spray program
- Use products that contain oxathiapiprolin either via foliar application or soil application, but not both

ORONDIS OPTI LABEL AT A GLANCE*

	Brassica vegetables	Bulb vegetables	Cucurbit vegetables	Fruiting vegetables (except tomato)	Potato	Tomato
Rate	1.75 – 2.5 pt/A					
Maximum amount per year	10 pt/A					
Minimum gallons per acre	Ground: 15 GPA, increasing the spray volume as plants mature, to ensure thorough coverage of the foliage Aerial: 5 GPA					
Preharvest interval (PHI)	7 days	7 days (dry) 14 days (green)	0 days	3 days	7 days	0 days
Adjuvants	Do not combine with adjuvants, surfactants, or fertilizers, unless prior use has shown the combination physically compatible, effective and non-injurious under your conditions of use					
Crop rotation intervals	0 days to crops on label, leafy greens, peas (edible-podded and succulent shelled), strawberries, herbs and spices (Group 19), oilseed (Group 20), and tobacco 30 days to cereals, and grass animal feeds 180 days to all other crops					

*Always consult the product label for complete use directions and application information

Suggested timings for Orondis Opti in selected crops and diseases

POTATO LATE BLIGHT

Apply one third of the total number of applications in a program, the number used depending on factors including:

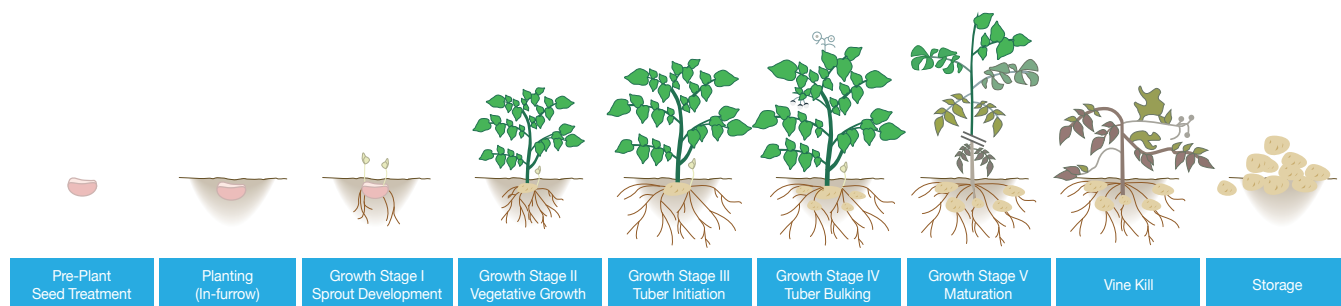
- Short or long season variety, disease pressure, weather conditions, geography

Timings

- Touching within rows when plants are 12 to 15 inches tall and actively growing
- At row closure, tuber initiation
- 3 to 4 weeks prior to harvest

Other Syngenta products to include in programs for control of late blight

- Revus Top®, Omega® fungicides



 **Orondis® Opti** Apply at given growth stages

CUCURBIT DOWNY MILDEW

Apply one third of the total number of applications in a program, the number depending on:

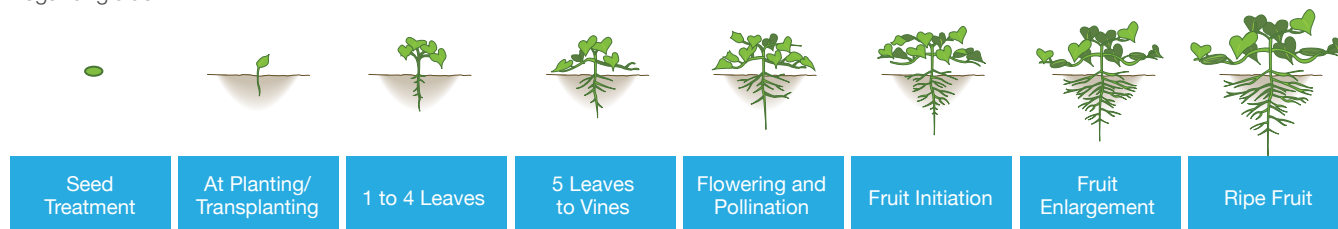
- Type of cucurbit, length of season, transplanted or direct seeded, disease pressure, weather conditions, geography

Timings

- In transplanted cucurbits first application at 7 to 14 days after transplant
- In direct seeded cucurbits first application at cotyledon – 2 true leaves
- Subsequent applications at 7 to 14 days

Other Syngenta products to include in programs for control of cucurbit downy mildew

- Omega fungicide



 **Orondis® Opti** Apply at given growth stages

Performance Results

OUTSTANDING CONTROL OF LATE BLIGHT ON POTATOES WITH YIELD PROTECTION



Untreated check

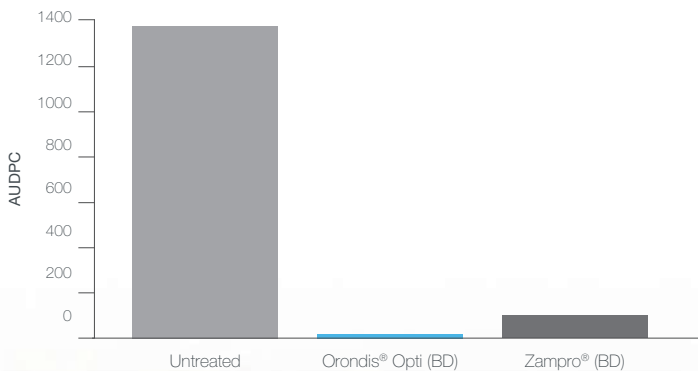


Orondis Opti (BD) alternated with
Bravo Weather Stik® (ACEF) fungicide

Syngenta trials, Pennsylvania, 2014 (Potato: cv. 'Atlantic')

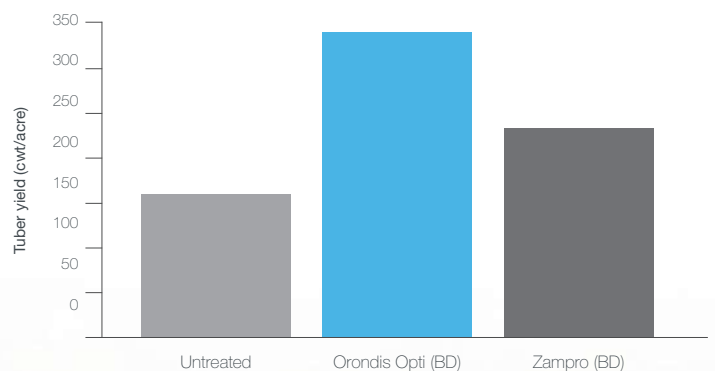
The letters in parenthesis (ABCDEF) indicate the order in which products were applied.

Area Under Disease Progress Curve (AUDPC)



Syngenta trials, Pennsylvania, 2014 (Potato: cv. 'Atlantic')

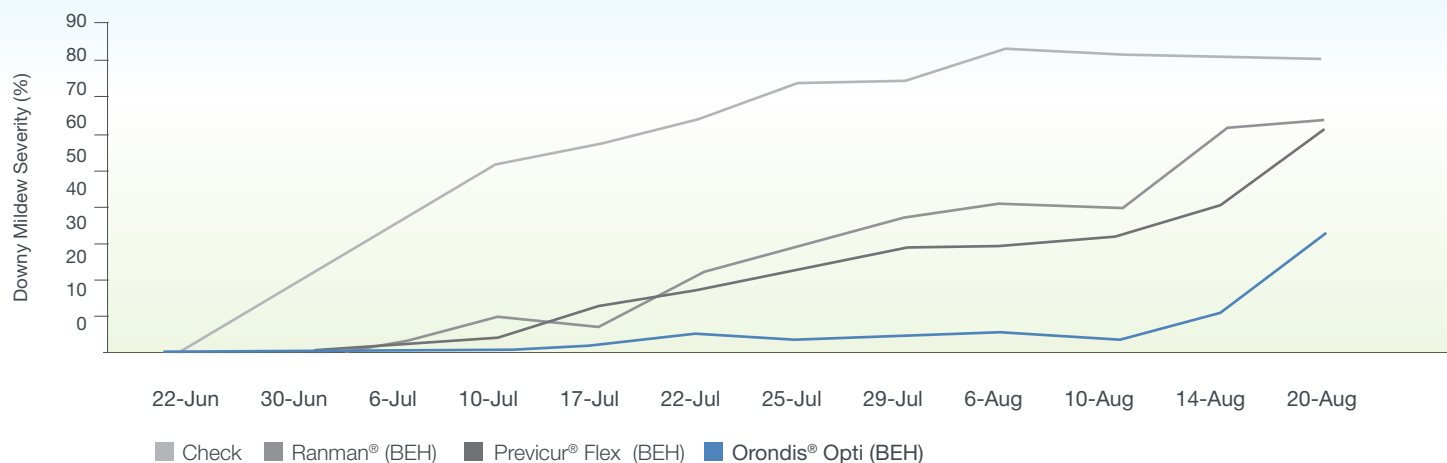
Tuber yield (cwt/acre)



Performance assessments are based upon results or analysis of public information, field observations and/or internal Syngenta evaluations. Trials reflect treatment rates and mixing partners commonly recommended in the marketplace.



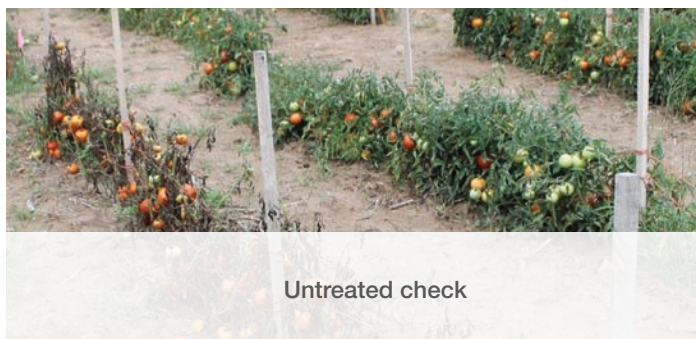
EXCEPTIONAL RESIDUAL CONTROL



Syngenta trials, Florida, 2015 (Cucumber: cv. 'Diomede')

The letters in parenthesis indicate the order in which products were applied. Bravo Weather Stik® applied at A, C, D, F, G and I timings. Transplanted 5/28 – Application Timing: 5 Days after transplant (A), 12 Days after transplant (B), 19 Days after transplant (C), 26 Days after transplant (D), 33 Days after transplant (E), 40 Days after transplant (F), 47 Days after transplant (G), 54 Days after transplant (H), 61 Days after transplant (I). Apps ABC (40 GPA), D-I (50 GPA).

HIGH LEVEL OF EFFICACY AGAINST LATE BLIGHT ON TOMATO



Syngenta trials, New York, 2014 (Tomato: cv. 'Mountain Fresh')

The letters in parenthesis (ABCDEF) indicate the order in which products were applied.

EXCELLENT PREVENTIVE CONTROL OF DOWNY MILDEW ON CUCURBITS



Syngenta trials, Florida, 2014 (Cucumber: cv. 'Diomede')

The letters in parenthesis (ABCDEF) indicate the order in which products were applied.

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EXCELLENT PROTECTION AGAINST DOWNY MILDEW
IN ONION TO MAXIMIZE YIELD AND QUALITY



Untreated check

Orondis Opti (AE) in a program with Bravo Weather Stik (BF), Revus (CG), and Quadris Top® (DH) fungicides

Syngenta trials, California, 2015.
The letters in parenthesis (ABCDEFGH) indicate the order in which products were applied.

	Untreated check	Orondis program
AUDPC*	3191	661
Yield	--	111% increase vs. UTC

*Area under the disease progress curve, a quantitative summary of disease intensity over time.
USWC0F0042015 / CA / IH / Bounds / Processing onion / 7 apps. at 7- to 14-d intervals

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GS 2520_8_3

SLC 7199D 06-2018