**LAST UPDATED ON:**

**April 2024**

# Fungicide Schedule for Potatoes

*Developed by Extension Potato Pathologist I. Kutay Ozturk, Ph.D, University of Maine Cooperative Extension*

This list primarily focuses on foliar applications of fungicides. For seed treatments and soil treatments during planting, please refer to Seed and Soil Treatment Fungicide List.

## Late Blight:

The causal organism, *Phytophthora infestans*, overwinters in infected potato tubers. The main source for initial inoculum is cull piles or infected seed. High quality seed and conscientious growers see to that most years start with low levels of initial inoculum. In a normal year, the expectation is that there would be little or no initial inoculum from Maine seed and the initiation of protective materials should be made based on a predictive model. Importing seed from areas where late blight has occurred in the previous season changes the assumption of low initial inoculum. Growers need to pay very close attention to seed imported from a known late blight area. Seed treatments containing mancozeb and early applications to a crop grown from such seed may prove beneficial.

The potential for late blight to appear is predicted with severity values based on weather conditions. Severity values have long been used in the United States to initiate and schedule applications for control of late blight and are based on hours of relative humidity above 90 percent and the average temperature during this period. When 18 severity values (DSVs) have accumulated from 50 percent emergence, an initial spray application is recommended. After this point, a spray interval is recommended based on additional severity value accumulation during the previous seven days. The late blight predictive scheme used in Maine weighs relative humidity more importantly than rainfall in predicting the timing of the applications. Applications should be based on weather conditions, not on a calendar. Severity values are available from the University of Maine Cooperative Extension Potato Program. If weather conditions dictate a five-day spray schedule, a seven-day schedule well may be inadequate in the presence of inoculum. Strict adherence to a calendar-based spray schedule irrespective of weather conditions can yield plants with inadequate protection at times and unnecessary protection at other times. If the initial application for disease control is predicted to occur when the plants are actively growing, more frequent applications may need to be made to insure protection of the newly emerged foliage. When growing rapidly, potato plants can double their leaf area in five days or less. This could leave half of the leaf area unprotected. Potato late blight is a community disease and continues to pose a threat. All potato growers should be continually monitoring their fields for this disease. Coupled with the protectant spray program, growers should give careful attention to all sources of inoculum including cull piles, rock piles and other sources of volunteer potatoes.

## Fungicide Recommendations for Late Blight

| Trade name (rate/A) | Active ingredients | Preharvest interval | Reentry interval | FRAC # Resistance risk | Fungicide Activity | Comments |
|---|---|---|---|---|---|---|
| Agri Tin Flowable, Super Tin 4L (4-6 fl oz) | Triphenyltin hydroxide | 7 days | 48 hours | 30 – Low/medium risk | Protectant. Kills spores on contact | Restricted use fungicide. When tank-mixed with another fungicide, 3 fl oz can be used. |
| KPhite 7LP (1-4 qt in 40 gal water/A)<br><br>Fosphite, Rampart (1-3 qt in 20 gal water/A) | Mono- and dipotassium salts of phosphorous acid | 0 days | 4 hours | 33 – Low risk | Upregulates plant disease resistance | Under high disease pressure, apply higher rate until control is achieved. Do not apply when conditions favor wet tissue for prolonged periods (>4 hours). |
| Elixir (1.8-2.4 lbs) | Mancozeb + Chlorothalonil | 7 days | 24 hours | M3 + M5 – Low risk | Protectant | Begin application at 4–6-inch plant size, starting with low rate. As wine increase in size, use higher rate. Do not apply more than 18 lbs/A per crop. |
| Helena Prophyt (see label for rates) | Potassium phosphite | 0 days | 4 hours | 33 – Low risk | Upregulates plant disease resistance | Can be applied as seed piece spray, foliar post-emergence spray, or post-harvest spray. Provides additional silver scurf protection when applied post-harvest. |
| Badge SC (1-4 pt) | Copper oxychloride + Copper hydroxide | 0 days | 48 hours | M1 – Low risk | Protectant | Apply no more than 7-10 day intervals, starting when plants are 2-6 inches high. Also suppresses aerial stem rot caused by *Dickeya* and *Pectobacterium* spp. Entering through wounds on the stem. |
| Bravo Weather Stik, Bravo Zn, Initiate 720 (0.6, then 0.75-1.125 lbs ai/A)<br><br>Echo 720, Equus 720 SST (0.75, then 1-1.5 pints/A)<br><br>Echo 90DF (5/8, then 7/8 to 1.25 lbs)<br><br>Echo Zn (1 pt, then 1.5-2.125 pts) | Chlorothalonil | 7 days for potato. PHI differs for other crops. | 12 hours | M5 – Low risk | Protectant | Do not mix oil based or EC formulations with chlorothalonil products. Do not use surfactants. Do not exceed 11.25 lbs ai/A per year for all listed products except Equus. The limit is 15.0 pints ai/A for Equus 720 SST. |

| Trade name (rate/A) | Active ingredients | Preharvest interval | Reentry interval | FRAC # Resistance risk | Fungicide Activity | Comments |
|---|---|---|---|---|---|---|
| Kocide 2000 (0.75- 3 lbs)<br><br>Kocide 3000 (0.5-1.75 lbs)<br><br>Nu-cop 30HB (0.5-2.5 lbs) | Copper hydroxide | 0 days | 48 hours | M1 – Low risk | Protectant | There are some incompatibilities with coppers. Under conditions of severe disease, consider using high rates and tank-mixing with other compatible fungicides. |
| C-O-C-S WDG (1.5- 4 lbs) | copper oxychloride + basic copper sulfate | 0 days | 48 hours | M1 – Low risk | Protectant | There are some incompatibilities with coppers. Under conditions of severe disease, consider using high rates and tank-mixing with other compatible fungicides. |
| Cuprofix-Ultra 40 Disperss (0.75-3.0 lbs) | Basic copper sulfate | 0 days | 48 hours | M1 – Low risk | Protectant | There are some incompatibilities with coppers. Under conditions of severe disease, consider using high rates and tank-mixing with other compatible fungicides. |
| Cueva (2 gallons in 30-100 gallons of water) | Copper Octanoate (Copper soap) | 0 days | 4 hours | M1 – Low risk | Protectant | There are some incompatibilities with coppers. Under conditions of severe disease, consider using high rates and tank-mixing with other compatible fungicides. |
| Curzate 60DF (3.2 oz) | Cymoxanil | 14 days | 12 hours | 27 – Low/medium risk. Resistance management required. | Locally systemic | Labeled only for late blight, locally systemic fungicide. Rainfast within 2 hours after application. Use ONLY in combination with a labeled rate of a protectant. Maximum 7 applications per year. |
| Koverall, Roper DF Rainshield, Fortuna 75WDG, Manzate Pro-stick (1-2.0 lb)<br><br>Manzate MAX (0.4 to 1.6 qts/A)<br><br>Penncozeb 80WP (0.5-2 lb), Penncozeb 75DF (1.0-2.0 lb) | Mancozeb | 3 days in ME (14 days in some other states) | 24 hours | M3 – Low risk | Protectant | Begin applications at low rates when plants are 4-6 inches, and increase the rate as the vines increase in size. Do not apply more than 11.2 lb a.i./A per year. Vine kill should occur 14 days before harvest. |

| Trade name (rate/A) | Active ingredients | Preharvest interval | Reentry interval | FRAC # Resistance risk | Fungicide Activity | Comments |
|---|---|---|---|---|---|---|
| Evito 480 SC (2.0-3.8 fl oz) | Fluoxastrobin | 7 days | 12 hours | 11 – High risk. Cross resistance is known between all group 11 fungicides | Locally systemic | Resistance management is critical with this group of compounds. Alternate with a compound NOT within this group (no two consecutive applications containing member compounds in this category). There are compound-specific limitations on number of applications as well as total amount of material which can be applied. The reentry interval ranges from 4 to 12 hours and the preharvest interval ranges from 3 to 14 days. Check the control material comparison table for details.<br><br>Use max rate for late blight prevention. Only labeled for suppression of late blight. If late blight symptoms develop, switch to a different group of fungicide.<br><br>Do not apply more than 0.72 lb ai/A per year. |
| Headline SC (6-12 fl oz/A) | Pyraclostrobin | 3 days | 12 hours | 11 – High risk. Cross resistance is known between all group 11 fungicides | Locally systemic | Resistance management is critical with this group of compounds. Use only tank mixed with a protectant. Follow label for resistance management. |
| Gavel 75 DF (1.5-2 lb) | Mancozeb + Zoxamide | 3 days in ME (14 days in some other states) | 48 hours | 22 + M3 – Low risk | Protectant | There is mancozeb in this formulation. One pound of Gavel 75 DF is composed of 0.08 lb. of zoxamide and 0.67 lb. of mancozeb. This needs to be included when considering per acre limitations of mancozeb. Do not make more than 6 applications per year. |

| Trade name (rate/A) | Active ingredients | Preharvest interval | Reentry interval | FRAC # Resistance risk | Fungicide Activity | Comments |
|---|---|---|---|---|---|---|
| Omega 500F (5.5-8 fl oz) | Fluazinam | 14 days | 12 hours | 29 – Low risk | Protectant | Do not apply more than 1.82 lb ai per A per year. Low rate is for late blight, high rate is for severe white mold pressure. Do not apply more than 7 applications at high rate, or 10 applications at low rate per year. |
| Orondis Opti (1.75-2.5 pt) | Chlorothalonil + Oxathiapiprolin | 7 days | 12 hours | M5 + 49 – Low/medium risk | Translaminar within leaf and systemic through xylem. Rainfast after 30 minutes. | Make no more than 2 sequential applications before rotating to a fungicide with a different mode of action. Do not follow soil applications of oxathiapiprolin-containing products with foliar applications of oxathiapiprolin-containing products. Use either soil applications or foliar applications but not both. Where three or more fungicide applications are made, use group 49 fungicides in no more than 33% of the applications, or a maximum of 4 applications, whichever is fewer. |
| Orondis Ultra (5.5 – 8 fl oz) | Oxathiapiprolin + Mandipropamid | 14 days | 4 hours | 40 + 49 – Medium risk | Translaminar within leaf and systemic through xylem. Rainfast after 30 minutes. | Make no more than 2 sequential applications before rotating to a fungicide with a different mode of action. Do not follow soil applications of oxathiapiprolin-containing products with foliar applications of oxathiapiprolin-containing products. Use either soil applications or foliar applications but not both. Where three or more fungicide applications are made, use group 49 fungicides in no more than 33% of the applications, or a maximum of 4 applications, whichever is fewer. |

| Trade name (rate/A) | Active ingredients | Preharvest interval | Reentry interval | FRAC # Resistance risk | Fungicide Activity | Comments |
|---|---|---|---|---|---|---|
| Oxidate 2.0, Oxidate 5.0 (See labels for preventative, curative and rescue rates) | Hydrogen peroxide + peroxyacetic acid | 0 days | 1 hour | Not classified | Eradicates pathogens on contact, no residual activity | At higher rates, test first for phytotoxicity. Frequent applications (5-day intervals) can limit late blight sporulation. |
| Phostrol (2.5-10 pt) | Mono- and dibasic sodium, potassium, and ammonium phosphites | 0 days | 4 hours | 33 – Low risk | Upregulates plant disease resistance | Foliar applications can be used against late blight, pink rot and pythium leak. Can also be applied post-harvest for protection against late blight, pink rot and silver scurf. See label for post-harvest application instructions. |
| Previcur flex (0.7 – 1.2 pt + tank mix partner) | Propamocarb hydrochloride | 14 days | 12 hours | 28 – Low/medium risk | Systemic antisporulant | Recommended to be tank mixed with chlorothionil, maneb or mancozeb. Do not apply more than 4.5 lbs. total a.i./A per year. |
| Priaxor (see label for rates) | Fluxapyroxad + pyraclostrobin | 7 days | 12 hours | 7 + 11 – Medium/high risk | Protectant and locally systemic | See label for adjuvant recommendations and cautions. |
| Quadris, Aframe (6 - 15.5 fl oz)<br><br>Satori (6 - 20 fl oz) | Azoxystrobin | 14 days | 4 hours | 11 – High risk. Cross resistance is known between all group 11 fungicides | Locally systemic | Resistance management is critical with this group of compounds. Follow label for resistance management. |
| Quadris Opti (1.6 pt) | Azoxystrobin + Chlorothalonil | 14 days | 12 hours | 11 + M5 – Medium risk | Locally systemic and protectant | Alternate away from group 11 fungicides to reduce resistance risk. |
| Ranman (1.4 - 2.75 fl oz) | Cyazofamid | 7 days | 12 hours | 21 – Resistance risk unknown but assumed medium/high | Protectant | Do not apply more than 10 sprays per year. Spray with at least three different fungicide applications before returning to Ranman. Do not apply more than 27.5 fl oz/year. |
| Revus Top (5.5 – 7 fl oz) | Mandipropamid + difenoconazole | 14 days | 12 hours | 3 + 40 – Low/medium risk | Locally systemic and contact | Do not make more than 4 applications per year. Make no more than 2 consecutive applications. Adjuvants recommended. |
| Ridomil Gold MZ WG (2.5 lb) | Mefenoxam + mancozeb | 3 days in ME (14 days in some other states) | 48 hours | 4 + M3 – Medium risk | Systemic and protectant | Vine-kill should occur 14 days before harvest. See label for resistance management. |

| Trade name (rate/A) | Active ingredients | Preharvest interval | Reentry interval | FRAC # Resistance risk | Fungicide Activity | Comments |
|---|---|---|---|---|---|---|
| Zampro (11 - 14 fl oz) | Ametoctradin + dimethomorph | 4 days | 12 hours | 45+40 – Medium risk | Systemic and protectant | Maximum 42 fl oz/year, and maximum 2 sequential applications. May be applied after vine kill. |
| Zing (24-34 fl oz) | Zoxamide + chlorothalonil | 7 days | 12 hours | 22 + M5 – Low/medium risk | Protectant | Use higher rate for late blight prevention. Do not make more than 2 sequential applications. |
| Veltyma (see label for rates) | Mefentrifluconazole + pyraclostrobin | 7 days | 12 hours | 3 + 11 – Medium/high risk | Protectant | Only suppresses late blight. See label for resistance management. |
| Tepera Plus HD (5.7 fl oz) | Fluoxastrobin + Bifenthrin (insecticide) | 21 days | 12 hours | 11 (fungicide) + 3A (insecticide) – High risk. Cross resistance is known between all group 11 fungicides | Locally systemic | Can also be used at planting for control of black dot, black scurf and silver scurf. Also have insecticidal properties. Late blight control is for suppression only. |
| Catamaran (4 – 5.5 pt) | Potassium phosphite + chlorothalonil | 7 days | 12 hours | M5 + P7 – Low risk | Protectant and locally systemic | Do not apply more than 40 pt/A per season. |
| OSO 5% SC (6.5 – 13 fl oz) | Polyoxin D zinc salt | 0 days | 4 hours | 19 – Medium risk | Protectant | Late blight control is suppression only. Do not apply more than 6 times at max rate per season. Can also be applied in furrow for *Rhizoctonia* control. |
| Serenade ASO (2 – 4 qt, 1-4 qt if tank mixed) | *Bacillus subtilis* strain QST 713 | 0 days | 4 hours | BM 02 – Resistance not known | Protectant | Biological control agent that can be applied both foliar and in furrow. |
| LifeGard WG (see label) | *Bacillus mycoides* isolate J | 0 days | 4 hours | P6 – Resistance not known | Protectant | Boosts plant defense. Apply in an alternating or tank mix program with labeled fungicides as part of a disease management program. |

## Early Blight:

Early blight of potatoes is caused by *Alternaria solani*, a fungus which overwinters as viable mycelium and as viable spores in infected crop refuse. *Alternaria solani* was historically considered as a weak pathogen, however, the disease is becoming a bigger problem among Maine potato growers in the recent years, probably due to longer growing seasons. Plants that lack vigor or are maturing are predisposed to the pathogen. Early blight is often a disease of senescence, where the older leaves are infected first. The disease can progress upward; attacking newer tissue as the older leaves droop and dry up. Under severe epidemics, leaves may be killed prematurely. High temperatures and high humidity favor the development of this disease, while rain is not a necessity. This disease can cause losses in the field as well as in storage by tuber infections, however tuber infections by early blight are uncommon in Maine. Proper fertilization and mineral balance in the growing and senescing plants will reduce the susceptibility of the

plants to the pathogen. Control of early blight can be greatly aided by crop rotation as this will help reduce potato refuse. Proper fertility levels will delay the onset and reduce the severity of the disease.

The prediction of the onset of early blight is based on the potato plants being driven by temperature. Daily minimum and maximum temperatures are used to calculate physiological days (p-days). P-days measure the physiological development of the potato plant and are a better measure of the development of the potato plant than are calendar days. Early blight risk is elevated after 300 p-days, and management actions are recommended beyond that point. P-day values are available from the University of Maine Cooperative Extension Potato Program.

## Fungicide Recommendations for Early Blight

| Trade name (rate/A) | Active ingredients | Preharvest interval | Reentry interval | FRAC # Resistance risk | Fungicide Activity | Comments |
|---|---|---|---|---|---|---|
| Quadris Top (8-14 fl oz) | Azoxystrobin + Difenoconazole | 14 days | 12 hours | 11 + 3 – Medium/high risk | Locally systemic and protectant | See label for resistance management. Do not apply more than 3 max rate applications per year. Max application interval is 7 days. |
| Endura (see label for rates) | Boscalid | 10 days | 12 hours | 7 – Medium/high risk | Locally systemic and protectant | Maximum application limits vary depending on the targeted diseases and rates. Do not use more than 20 oz/year. |
| Provysol (3 – 5 fl oz) | Mefentrifluconazole | 7 days | 12 hours | 3 – Medium risk | Systemic | Do not apply more than 15 fl oz/year. |
| Quash (2.5 – 4 fl oz) | Metconazole | 1 day | 12 hours | 3 – Medium risk | Systemic | Do not make more than 2 sequential applications. Does not prevent spore germination but prevents spore formation and inhibits mycelial growth. |
| Luna Tranquility (8 – 11 fl oz) | Fluopyram + pyrimethanil | 7 days | 12 hours | 7 + 9 – Medium risk | Protectant and systemic | Do not apply more than 54.7 fl oz. Do not make more than 2 sequential applications of group 7 and 9 compounds. |

| Trade name (rate/A) | Active ingredients | Preharvest interval | Reentry interval | FRAC # Resistance risk | Fungicide Activity | Comments |
|---|---|---|---|---|---|---|
| Luna Pro (10 fl oz) | Fluopyram + Prothioconazole | 14 days | 12 hours | 3 + 7 – Medium risk | Protectant and systemic | Regardless of formulation or method of application, do not apply more than 0.446 lbs fluopyram or 0.267 lbs prothioconazole per acre per year from all uses, including seed treatment, soil and foliar applications. Do not make more than 2 sequential applications of any Group 7 or Group 3 containing fungicide before rotating with a fungicide from a different Group. |
| Scala (7 fl oz) | Pyrimethanil | 7 days | 12 hours | 9 – Medium risk | Protectant | Do not make more than 2 sequential applications. Increase the rate of tank mix partners in short spray intervals. Do not apply more than 35 fl oz/A in a year. |
| Delaro 325 SC (8 – 11.4 fl oz) | Prothioconazole + Trifloxystrobin | 14 days | 12 hours | 3 + 11 – Medium/high risk | Systemic | Do not make more than 2 applications per year (22.8 fl oz). |
| Miravis Prime (9.2 – 11.4 fl oz) | Pydiflumetofen + Fludioxonil | 14 days | 12 hours | 12 + 7 – Medium risk | Contact and systemic | Do not make more than two consecutive applications of Group 7 and 12 fungicides before alternation with a fungicide that is not in Group 7 or 12. Use high rates for white mold and *Botrytis* management. Do not harvest tops of potatoes for feed or food. |
| Rovral 4F (1 – 2 pt) | Iprodione | 14 days | 24 hours | 2 – Medium/high risk | Protectant | Do not make more than 4 applications per season. Use max rate for white mold management. See label for application method instructions. |
| Agri Tin Flowable, Super Tin 4L (4-6 fl oz) | Triphenyltin hydroxide | 7 days | 48 hours | 30 – Low/medium risk | Protectant. Kills spores on contact | Restricted use fungicide. When tank-mixed with another fungicide, 3 fl oz can be used. |

| Trade name (rate/A) | Active ingredients | Preharvest interval | Reentry interval | FRAC # Resistance risk | Fungicide Activity | Comments |
|---|---|---|---|---|---|---|
| Elixir (1.8-2.4 lbs) | Mancozeb + Chlorothalonil | 7 days | 24 hours | M3 + M5 – Low risk | Protectant | Begin application at 4–6-inch plant size, starting with low rate. As wine increase in size, use higher rate. Do not apply more than 18 lbs/A per crop. |
| Badge SC (1-4 pt) | Copper oxychloride + Copper hydroxide | 0 days | 48 hours | M1 – Low risk | Protectant | Apply no more than 7-10 day intervals, starting when plants are 2-6 inches high. Also suppresses aerial stem rot caused by *Dickeya* and *Pectobacterium* spp. Entering through wounds on the stem. |
| Bravo Weather Stik, Bravo Zn, Initiate 720 (0.6, then 0.75-1.125 lbs ai/A)<br><br>Echo 720, Equus 720 SST (0.75, then 1-1.5 pints/A)<br><br>Echo 90DF (5/8, then 7/8 to 1.25 lbs)<br><br>Echo Zn (1 pt, then 1.5-2.125 pts) | Chlorothalonil | 7 days for potato. PHI differs for other crops. | 12 hours | M5 – Low risk | Protectant | Do not mix oil based or EC formulations with chlorothalonil products. Do not use surfactants. Do not exceed 11.25 lbs ai/A per year for all listed products except Equus. The limit is 15.0 pints ai/A for Equus 720 SST. |
| Kocide 2000 (0.75- 3 lbs)<br><br>Kocide 3000 (0.5-1.75 lbs)<br><br>Nu-cop 30HB (0.5-2.5 lbs) | Copper hydroxide | 0 days | 48 hours | M1 – Low risk | Protectant | There are some incompatibilities with coppers. Under conditions of severe disease, consider using high rates and tank-mixing with other compatible fungicides. |
| C-O-C-S WDG (1.5- 4 lbs) | copper oxychloride + basic copper sulfate | 0 days | 48 hours | M1 – Low risk | Protectant | There are some incompatibilities with coppers. Under conditions of severe disease, consider using high rates and tank-mixing with other compatible fungicides. |
| Cuprofix-Ultra 40 Disperss (0.75-3.0 lbs) | Basic copper sulfate | 0 days | 48 hours | M1 – Low risk | Protectant | There are some incompatibilities with coppers. Under conditions of severe disease, consider using high rates and tank-mixing with other compatible fungicides. |

| Trade name (rate/A) | Active ingredients | Preharvest interval | Reentry interval | FRAC # Resistance risk | Fungicide Activity | Comments |
|---|---|---|---|---|---|---|
| Cueva (2 gallons in 30-100 gallons of water) | Copper Octanoate (Copper soap) | 0 days | 4 hours | M1 – Low risk | Protectant | There are some incompatibilities with coppers. Under conditions of severe disease, consider using high rates and tank-mixing with other compatible fungicides. |
| Koverall, Roper DF Rainshield, Fortuna 75WDG, Manzate Pro-stick (1-2.0 lb)<br><br>Manzate MAX (0.4 to 1.6 qts/A)<br><br>Penncozeb 80WP (0.5-2 lb), Penncozeb 75DF (1.0-2.0 lb) | Mancozeb | 3 days in ME (14 days in some other states) | 24 hours | M3 – Low risk | Protectant | Begin applications at low rates when plants are 4-6 inches, and increase the rate as the vines increase in size. Do not apply more than 11.2 lb a.i./A per year. Vine kill should occur 14 days before harvest. |
| Evito 480 SC (2.0-3.8 fl oz) | Fluoxastrobin | 7 days | 12 hours | 11 – High risk. Cross resistance is known between all group 11 fungicides | Locally systemic | Resistance management is critical with this group of compounds. Alternate with a compound NOT within this group (no two consecutive applications containing member compounds in this category). There are compound-specific limitations on number of applications as well as total amount of material which can be applied.<br><br>Use max rate for late blight prevention. Only labeled for suppression of late blight. If late blight symptoms develop, switch to a different group of fungicide.<br><br>Do not apply more than 0.72 lb ai/A per year. |

| Trade name (rate/A) | Active ingredients | Preharvest interval | Reentry interval | FRAC # Resistance risk | Fungicide Activity | Comments |
|---|---|---|---|---|---|---|
| Headline SC (6-12 fl oz/A) | Pyraclostrobin | 3 days | 12 hours | 11 – High risk. Cross resistance is known between all group 11 fungicides | Locally systemic | Resistance management is critical with this group of compounds. Use only tank mixed with a protectant. Follow label for resistance management. |
| Gavel 75 DF (1.5-2 lb) | Mancozeb + Zoxamide | 3 days in ME (14 days in some other states) | 48 hours | 22 + M3 – Low risk | Protectant | There is mancozeb in this formulation. One pound of Gavel 75 DF is composed of 0.08 lb. of zoxamide and 0.67 lb. of mancozeb. This needs to be included when considering per acre limitations of mancozeb. Do not make more than 6 applications per year. |
| Orondis Opti (1.75-2.5 pt) | Chlorothalonil + Oxathiapiprolin | 7 days | 12 hours | M5 + 49 – Low/medium risk | Translaminar within leaf and systemic through xylem. Rainfast after 30 minutes. | Make no more than 2 sequential applications before rotating to a fungicide with a different mode of action. Do not follow soil applications of oxathiapiprolin-containing products with foliar applications of oxathiapiprolin-containing products. Use either soil applications or foliar applications but not both. Where three or more fungicide applications are made, use group 49 fungicides in no more than 33% of the applications, or a maximum of 4 applications, whichever is fewer. |
| Oxidate 2.0, Oxidate 5.0 (See labels for preventative, curative and rescue rates) | Hydrogen peroxide + peroxyacetic acid | 0 days | 1 hour | Not classified | Eradicates pathogens on contact, no residual activity | At higher rates, test first for phytotoxicity. Frequent applications (5-day intervals) can limit late blight sporulation. |
| Previcur flex (0.7 – 1.2 pt + tank mix partner) | Propamocarb hydrochloride | 14 days | 12 hours | 28 – Low/medium risk | Systemic antisporulant | Recommended to be tank mixed with chlorothionil, maneb or mancozeb. Do not apply more than 4.5 lbs. total a.i./A per year. |
| Priaxor (see label for rates) | Fluxapyroxad + pyraclostrobin | 7 days | 12 hours | 7 + 11 – Medium/high risk | Protectant and locally systemic | See label for adjuvant recommendations and cautions. |

| Trade name (rate/A) | Active ingredients | Preharvest interval | Reentry interval | FRAC # Resistance risk | Fungicide Activity | Comments |
|---|---|---|---|---|---|---|
| Quadris, Aframe (6 - 15.5 fl oz)<br><br>Satori (6 - 20 fl oz) | Azoxystrobin | 14 days | 4 hours | 11 – High risk. Cross resistance is known between all group 11 fungicides | Locally systemic | Resistance management is critical with this group of compounds. Follow label for resistance management. |
| Quadris Opti (1.6 pt) | Azoxystrobin + Chlorothalonil | 14 days | 12 hours | 11 + M5 – Medium risk | Locally systemic and protectant | Alternate away from group 11 fungicides to reduce resistance risk. |
| Revus Top (5.5 – 7 fl oz) | Mandipropamid + difenoconazole | 14 days | 12 hours | 3 + 40 – Low/medium risk | Locally systemic and contact | Do not make more than 4 applications per year. Make no more than 2 consecutive applications. Adjuvants recommended. |
| Ridomil Gold MZ WG (2.5 lb) | Mefenoxam + mancozeb | 3 days in ME (14 days in some other states) | 48 hours | 4 + M3 – Medium risk | Systemic and protectant | Vine-kill should occur 14 days before harvest. See label for resistance management. |
| Zing (24-34 fl oz) | Zoxamide + chlorothalonil | 7 days | 12 hours | 22 + M5 – Low/medium risk | Protectant | Use higher rate for late blight prevention. Do not make more than 2 sequential applications. |
| Veltyma (see label for rates) | Mefentrifluconazole + pyraclostrobin | 7 days | 12 hours | 3 + 11 – Medium/high risk | Protectant | Only suppresses late blight. See label for resistance management. |
| Flint Extra (3.8 fl oz) | Trifloxystrobin | 7 days | 12 hours | 11 – High risk. Cross resistance is known between all group 11 fungicides | Locally systemic | Alternate (every other application) with a protectant fungicide for use against late blight. This product should *always* be applied in tank mixture with a registered protectant fungicide labeled for use on late blight (use 75% of the protectant fungicide labeled rate) and applied on a 7- to 10-day spray interval as needed. |
| Tepera Plus HD (5.7 fl oz) | Fluoxastrobin + Bifenthrin (insecticide) | 21 days | 12 hours | 11 (fungicide) + 3A (insecticide) – High risk. Cross resistance is known between all group 11 fungicides | Locally systemic | Can also be used at planting for control of black dot, black scurf and silver scurf. Also have insecticidal properties. Late blight control is for suppression only. |

| Trade name (rate/A) | Active ingredients | Preharvest interval | Reentry interval | FRAC # Resistance risk | Fungicide Activity | Comments |
|---|---|---|---|---|---|---|
| Catamaran (4 – 5.5 pt) | Potassium phosphite + chlorothalonil | 7 days | 12 hours | M5 + P7 – Low risk | Protectant and locally systemic | Do not apply more than 40 pt/A per season. |
| OSO 5% SC (6.5 – 13 fl oz) | Polyoxin D zinc salt | 0 days | 4 hours | 19 – Medium risk | Protectant | Late blight control is suppression only. Do not apply more than 6 times at max rate per season. Can also be applied in furrow for *Rhizoctonia* control. |
| Serenade ASO (2 – 4 qt, 1-4 qt if tank mixed) | *Bacillus subtilis* strain QST 713 | 0 days | 4 hours | BM 02 – Resistance not known | Protectant | Biological control agent that can be applied both foliar and in furrow. |
| LifeGard WG (see label) | *Bacillus mycoides* isolate J | 0 days | 4 hours | P6 – Resistance not known | Protectant | Boosts plant defense. Apply in an alternating or tank mix program with labeled fungicides as part of a disease management program. |

## Fungicide Recommendations for White Mold

| Trade name (rate/A) | Active ingredients | Preharvest interval | Reentry interval | FRAC # Resistance risk | Fungicide Activity | Comments |
|---|---|---|---|---|---|---|
| Topsin 4.5FL (20-30 fl oz)<br><br>Topsin M WSB (1-1.5 lb) | Thiophanate-methyl | 21 days | 2 days | 1 – High risk | Locally systemic | Thorough coverage of the flowers, stems, and branches is essential for disease control. Can be tank mixed with mancozeb for early and late blight control. |
| Serenade OPTI (14-20 fl oz) | *Bacillus subtilis* strain QST 713 | 0 days | 4 hours | BM 02 – Resistance not known | Protectant | Biological control material. For suppression of white mold, begin application soon after emergence or transplant and when conditions are conducive to disease development. |
| Headline SC (6-12 fl oz/A) | Pyraclostrobin | 3 days | 12 hours | 11 – High risk. Cross resistance is known between all group 11 fungicides | Locally systemic | Resistance management is critical with this group of compounds. Use only tank mixed with a protectant. Follow label for resistance management. |

| Trade name (rate/A) | Active ingredients | Preharvest interval | Reentry interval | FRAC # Resistance risk | Fungicide Activity | Comments |
|---|---|---|---|---|---|---|
| Omega 500F (5.5-8 fl oz) | Fluazinam | 14 days | 12 hours | 29 – Low risk | Protectant | Do not apply more than 1.82 lb ai per A per year. Low rate is for late blight, high rate is for severe white mold pressure. Do not apply more than 7 applications at high rate, or 10 applications at low rate per year. |
| Oxidate 5.0 (See labels for preventative, curative and rescue rates) | Hydrogen peroxide + peroxyacetic acid | 0 days | 1 hour | Not classified | Eradicates pathogens on contact, no residual activity | At higher rates, test first for phytotoxicity. Frequent applications (5-day intervals) can limit late blight sporulation. |
| Priaxor (see label for rates) | Fluxapyroxad + pyraclostrobin | 7 days | 12 hours | 7 + 11 – Medium/high risk | Protectant and locally systemic | Suppressant of white mold. See label for adjuvant recommendations and cautions. |
| Serenade ASO (2 – 4 qt, 1-4 qt if tank mixed) | *Bacillus subtilis* strain QST 713 | 0 days | 4 hours | BM 02 – Resistance not known | Protectant | Biological control agent that can be applied both foliar and in furrow. |
| LifeGard WG (see label) | *Bacillus mycoides* isolate J | 0 days | 4 hours | P6 – Resistance not known | Protectant | Boosts plant defense. Apply in an alternating or tank mix program with labeled fungicides as part of a disease management program. Mix only with fungicides having label instructions that do not prohibit such mixtures. Can also reduce potato virus Y infection rates, see label for instructions. |
| Quash (2.5 – 4 fl oz) | Metconazole | 1 day | 12 hours | 3 – Medium risk | Systemic | Do not make more than 2 sequential applications. Does not prevent spore germination but prevents spore formation and inhibits mycelial growth. |

| Trade name (rate/A) | Active ingredients | Preharvest interval | Reentry interval | FRAC # Resistance risk | Fungicide Activity | Comments |
|---|---|---|---|---|---|---|
| Luna Tranquility (8 – 11 fl oz) | Fluopyram + pyrimethanil | 7 days | 12 hours | 7 + 9 – Medium risk | Protectant and systemic | Do not apply more than 54.7 fl oz. Do not make more than 2 sequential applications of group 7 and 9 compounds. |
| Luna Pro (10 fl oz) | Fluopyram + Prothioconazole | 14 days | 12 hours | 3 + 7 – Medium risk | Protectant and systemic | Regardless of formulation or method of application, do not apply more than 0.446 lbs fluopyram or 0.267 lbs prothioconazole per acre per year from all uses, including seed treatment, soil and foliar applications. Do not make more than 2 sequential applications of any Group 7 or Group 3 containing fungicide before rotating with a fungicide from a different Group. |
| Delaro 325 SC (8 – 11.4 fl oz) | Prothioconazole + Trifloxystrobin | 14 days | 12 hours | 3 + 11 – Medium/high risk | Systemic | Do not make more than 2 applications per year (22.8 fl oz). |
| Miravis Prime (9.2 – 11.4 fl oz) | Pydiflumetofen + Fludioxonil | 14 days | 12 hours | 12 + 7 – Medium risk | Contact and systemic | Do not make more than two consecutive applications of Group 7 and 12 fungicides before alternation with a fungicide that is not in Group 7 or 12. Use high rates for white mold and *Botrytis* management. Do not harvest tops of potatoes for feed or food. |
| Rovral 4F (1 – 2 pt) | Iprodione | 14 days | 24 hours | 2 – Medium/high risk | Protectant | Do not make more than 4 applications per season. Use max rate for white mold management. See label for application method instructions. |

# Comparison of Fungicides *According to Labels*

| Product | Late Blight | Early Blight | Black dot | Pink rot/ Pythium leak | White mold | *Botrytis* |
|---|---|---|---|---|---|---|
| Agri Tin | + | + | - | - | - | - |
| Super Tin 4L | + | + | - | - | - | - |
| KPhite | + | - | - | + | - | - |
| Fosphite | + | - | - | + | - | - |
| Rampart | + | - | - | + | - | - |
| Elixir | + | + | + | - | - | + |
| Helena Prophyt | + | - | - | + | - | - |
| Badge SC | + | + | - | - | - | - |
| Bravo Weather Stik | + | + | + | - | - | + |
| Bravo Zn | + | + | + | - | - | + |
| Initiate 720 | + | + | + | - | - | + |
| Echo 720 | + | + | + | - | - | + |
| Echo 90 DF | + | + | - | - | - | + |
| Equus 720 SST | + | + | + | - | - | + |
| Echo Zn | + | + | + | - | - | + |
| Kocide 2000 | + | + | - | - | - | - |
| Kocide 3000 | + | + | - | - | - | - |
| Nu-Cop 30HB | + | + | - | - | - | - |
| C-O-C-S WDG | + | + | - | - | - | - |
| Cuprofix-Ultra 40 Disperss | + | + | - | - | - | - |
| Cueva | + | + | - | - | - | - |
| Curzate 60DF | + | - | - | - | - | - |
| Koverall | + | + | - | - | - | - |
| Roper DF Rainshield | + | + | - | - | - | - |
| Fortuna 75 WDG | + | + | + | - | - | + |
| Manzate Max | + | + | - | - | - | - |
| Manzate Pro-Stick | + | + | + | - | - | + |
| Penncozeb 80WP | + | + | - | - | - | - |
| Penncozeb 75DF | + | + | + | - | - | + (S) |
| Evito 480 SC | + (S) | + | - | - | - | - |
| Headline SC | + | + | + | - | + (S) | - |
| Gavel 75 DF | + | + | - | - | - | - |
| Omega 500F | + | - | - | - | + | - |
| Orondis Opti | + | + | + | - | - | + |
| Orondis Ultra | + | - | - | - | - | - |
| Oxidate 2.0 | + | + | - | - | - | - |
| Oxidate 5.0 | + | + | + | - | + | + |
| Phostrol | + | - | - | + | - | - |
| Previcur flex | + | + | - | - | - | - |
| Priaxor | + (S) | + | + | - | + (S) | + (S) |
| Quadris | + | + | + | - | - | - |
| Aframe | + | + | + | - | - | - |
| Satori | + | + | + | - | - | - |
| Quadris Opti | + | + | + | - | - | - |
| Ranman | + | - | - | + | - | - |
| Revus Top | + | + | + | - | - | - |
| Ridomil Gold MZ WG | + | + | - | + | - | - |

| Product | Late Blight | Early Blight | Black dot | Pink rot/ Pythium leak | White mold | *Botrytis* |
|---|---|---|---|---|---|---|
| Zampro | + | - | - | - | - | - |
| Zing | + | + | + | - | - | + |
| Veltyma | + (S) | + | + | - | - | - |
| Flint Extra | - | + | - | - | - | - |
| Tepera Plus HD | + (S) | + | - | - | - | - |
| Catamaran | + | + | + | - | - | + |
| OSO 5% SC | + (S) | + | - | - | - | - |
| Serenade ASO | + | + | + | - | + | + |
| LifeGard WG | + | + | - | - | + | - |
| Quadris Top | - | + | + | - | - | - |
| Endura | - | + | - | - | - | + (S) |
| Provysol | - | + | + | - | - | - |
| Quash | - | + | + | - | + | + |
| Luna Tranquility | - | + | + | - | + | + |
| Luna Pro | - | + | - | - | + | + |
| Scala | - | + | + | - | - | + |
| Delaro 325 SC | - | + | + | - | + | + |
| Miravis Prime | - | + | + (S) | - | + | + (S) |
| Rovral 4F | - | + | - | - | + | - |
| Topsin 4.5FL | - | - | - | - | + | - |
| Topsin M WSB | - | - | - | - | + | - |

+ : Labeled. – : Not Labeled (S): Suppression only



**Call 800.287.0274 (in Maine), or 207.581.3188, for information on publications and program offerings from University of Maine Cooperative Extension, or visit extension.umaine.edu.**