# Plant Disease Management


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## Resources

### Plant Disease Central

This UNL website at *pdc.unl.edu* includes characteristic symptoms to assist disease diagnosis and current disease management information, observations, and forecasts. The site also includes reports of the latest disease management field trials and contact information for UNL extension plant pathologists.

Plant Disease Central
*http://pdc.unl.edu*

### Extension Publications

The UNL Extension Publications website at *extension.unl.edu/publications* offers more than 60 publications on plant disease identification and management. Browse by topic or use the search engine to locate specific information.

NebGuide
*http://extension.unl.edu/publications*

### CropWatch

For research-based information directly tied to the current crop production season, visit *cropwatch.unl.edu*. Written by Extension specialists and educators from across the state, CropWatch provides scouting updates and timely information on disease management as well as more indepth information arranged by crop and special topic.

CROPWATCH
*http://cropwatch.unl.edu*

### Diagnostic Services

The Plant and Pest Diagnostic Clinic on UNL's East Campus in Lincoln was formally organized in 1994 and provides diagnostic services in plant pathology, entomology, horticulture, and weed science. In addition to accurate diagnosis of pest problems, it provides the most current information and recommendations. See *http://pdc.unl.edu/diagnosticclinics/plantandpest*

The Panhandle Plant Disease Diagnostic Lab at UNL's Panhandle Research and Extension Center at Scottsbluff was organized in 1999. This lab focuses its diagnostic service only on plant disease identification. While most samples are sugarbeets or soil samples from sugarbeet fields, diagnostic services are provided for any plant disease in the Panhandle. See *http://pdc.unl.edu/diagnosticclinics/panhandleplantdiseasediagnosticlab*

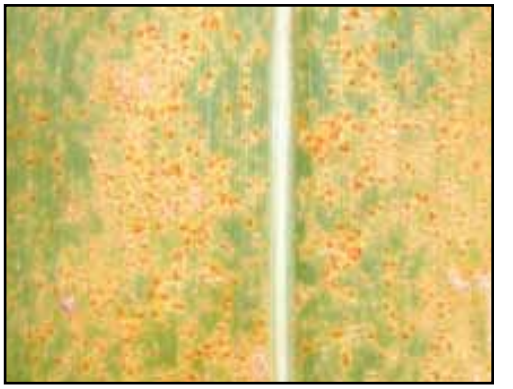
*http://pdc.unl.edu/diagnosticclinics*

# Symptoms of Common Foliar Diseases

## Corn


Goss's Bacterial Wilt and Blight


Gray Leaf Spot


Southern Rust

## Soybeans


Bacterial Blight


Frogeye Leaf Spot


Septoria Brown Spot

## Wheat


Leaf Rust


Stripe Rust


Tan Spot

Source for all photos: UNL Department of Plant Pathology

# Fungicides and Nematicides for Field Crops

Fungicides are an important component of the pesticide program for some Nebraska fields. While not all fields of corn, soybean, and wheat will require a fungicide application, it's critical that you know the correct product for the disease in your field when you do need it.

- **Identification.** The first step with any disease management program is to make sure you have correctly identified the problem. Identification is critical as there are many bacterial diseases with symptoms similar to fungal diseases and fungicides will have no activity on them.

  For help identifying corn, soybean, and wheat diseases, visit UNL's Plant Disease Central at *http://pdc.unl.edu* or UNL's CropWatch at *http://cropwatch.unl.edu.*

- **Timing.** The second step is to ensure accurate timing of the application. With some diseases it is critical to apply the fungicide before there is significant disease development.

Fungicides are plant protection compounds, but have some of the same restrictions as many other pesticides, such as preharvest intervals and post-application field reentry restrictions. Read and carefully follow all label directions.

## Fungicides for Corn, Soybean, and Wheat

### Resistance

The use of pesticides, including fungicides, may result in the development of organisms resistant to their effects. Fortunately, resistant fungal pathogens are not currently known to be a problem in field crops in the United States; however, misuse of products may result in the development of resistant populations and jeopardize the benefits that are provided by those products and other closely related fungicides.

Resistance can develop after the repeated use of products with the same modes of action, particularly with single-site modes of action. Also, organisms vary in their ability to become resistant and the frequency that they develop resistant strains. The Fungicide Resistance Action Committee (FRAC) is responsible for ranking the risk for resistance development in fungal pathogen populations. FRAC assigns codes to each fungicide class based on its mode of action (MOA) and likelihood that its use could lead to the development of resistant strains. Rotating the use of products with different or mixed modes of action and avoiding repeated applications can help prevent the development of resistant populations. It's important to carefully read and follow the directions described in the most recent version of the product label in an attempt to avoid the development of resistant populations.

### Using this Resource

When crop diseases become a problem, use the following section to assist with the decision-making process for fungicide applications.

## Fungicide Mode of Action Table

| FRAC Code | Code Number | Mode of Action | Site of Action | Common Name | Chemical Group |
|---|---|---|---|---|---|
| Group 1 | B1 | MBC (Methyl Benzimidazole Carbamates) | mitosis and cell division | thiabendazole | benzimidazoles |
| | | | | thiophanate-methyl | thiophanates |
| Group 3 | G1 | DMI (DeMethylation Inhibitors) | sterol biosynthesis in membranes | cyproconazole<br>metconazole<br>myclobutanil<br>propiconazole<br>prothioconazole<br>tebuconazole<br>tetraconazole | triazoles |
| Group 4 | A1 | PA (PhenylAmides) | nucleic acids synthesis | mefenoxam<br>metalaxyl | acylalanines |
| Group 7 | C2 | SDHI (Succinate dehydrogenase inhibitors) | respiration | fluxapyroxad | carboximides |
| Group 11 | C3 | QoI (Quinone outside Inhibitors) | respiration | azoxystrobin | methoxy-acrylates |
| | | | | fluoxastrobin | dihydro-dioxazines |
| | | | | pyraclostrobin | methoxy-carbamates |
| | | | | trifloxystrobin | oximino-acetates |
| Group 12 | E2 | PP (PhenylPyrroles) | signal transduction | fludioxonil | phenylpyrroles |
| Group 14 | F3 | AH (Aromatic Hydrocarbons) | lipids and membrane synthesis | chloroneb<br>PCNB | aromatic hydrocarbons |
| Group M1 | multi-site contact activity | inorganic | multi-site contact activity | copper | inorganic |
| Group M3 | multi-site contact activity | multi-site contact activity | multi-site contact activity | mancozeb | dithiocarbamates and relatives |

*Based on Fungicide Resistance Action Committee (FRAC) information on the Web at *http://www.frac.info/frac/index.htm.*

# Corn

## Foliar Fungicide Efficacy[1]

| Fungicide | Gray Leaf Spot | Common Rust | Northern Corn Leaf Blight | Eyespot |
|---|---|---|---|---|
| Domark | E | E | — | — |
| Headline AMP | E | E | VG | E |
| Headline EC | E | E | VG | E |
| Headline SC | E | E | VG | E |
| Quadris | E | E | G | E |
| Quilt | E | E | VG | E |
| Quilt Xcel | E | E | VG | E |
| Stratego YLD | E | E | — | — |
| Tilt | G | G | G | E |

Rating of product efficacy: E = Excellent; VG = Very Good; G = Good; F = Fair; P = Poor; — = Insufficient data; NS = Not Specified on product label; NR = Not Recommended; NL = Not Labeled for controlling the specific disease; U = Unknown efficacy.
[1]Ratings reflect data summarized from results of fungicide trials conducted nationwide whose results were published online in Plant Disease Management Reports (and formerly Fungicide and Nematicide Tests) by the American Phytopathological Society at *http://www.apsnet.org.*

# Corn[1]

## Foliar Fungicides for Corn Grown for Grain[1]

| Fungicide Active Ingredient | Fungicide Class | Rate (per acre) | Application[2] | | | Re-entry Interval (REI) (hours) | Pre-Harvest Interval (PHI) (days) |
|---|---|---|---|---|---|---|---|
| | | | Aerial | Chemigation | Ground | | |
| Aftershock fluoxastrobin | strobilurin | 2.0-5.7 oz | 5 gpa minimum | Allowed | 10 gpa minimum | 12 | 30 |
| Bumper propiconazole | triazole | 2.0-4.0 oz | 2 gpa minimum | Allowed, 0.1-0.25″ application | 10 gpa minimum | 12 | 30 |
| Dithane F-45 Rainshield mancozeb | dithiocarbamate | 1.2 qt | 2-3 gpa | Allowed, <0.25″ application | Adequate for coverage and canopy penetration | 24 | 40 |
| Dithane M-45 mancozeb | dithiocarbamate | 1.5 lb | 2-3 gpa | Allowed, <0.25″ application | Adequate for coverage and canopy penetration | 24 | 40 |
| Domark 230 ME tetraconazole | triazole | 4.0-5.0 oz | 5 gpa | Allowed | 10 gpa minimum | 12 | 21 |
| Evito fluoxastrobin | strobilurin | 2.0-5.7 oz | 2 gpa minimum | Allowed | 10 gpa minimum | 12 | 30 |
| Evito T fluoxastrobin + tebuconazole | strobilurin + triazole | 4.0-9.0 oz | 3 gpa minimum | Allowed | 10 gpa minimum | 12 | 36 |
| Fitness propiconazole | triazole | 2.0-4.0 oz | 2 gpa minimum | Allowed, 0.1-0.25″ application | 10 gpa minimum | 12 | 30 |
| Folicur tebuconazole | triazole | 4.0-6.0 oz | 5 gpa minimum | Allowed | 10 gpa minimum | 12 | 36 |
| Headline AMP pyraclostrobin + metconazole | strobilurin + triazole | 10.0-14.4 oz | 2 gpa minimum | Allowed, <0.5″ application, <0.25″ recommended | 10 gpa minimum | 12 | 20 |
| Headline EC pyraclostrobin | strobilurin | 6.0-12.0 oz | 2 gpa minimum | Allowed, <0.5″ application, <0.25″ recommended | 15 gpa minimum | 12 | 7 |
| Headline SC pyraclostrobin | strobilurin | 6.0-12.0 oz | 2 gpa minimum | Allowed, <0.5″ application, <0.25″ recommended | 15 gpa minimum | 12 | 7 |
| Monsoon tebuconazole | triazole | 4.0-6.0 oz | 5 gpa minimum | Not allowed | 10 gpa minimum | 12 | 36 |
| Orius tebuconazole | triazole | 4.0-6.0 oz | 5 gpa minimum | Not allowed | 10 gpa minimum | 12 | 36 |
| Penncozeb 4FL mancozeb | dithiocarbamate | 0.8-1.2 qt | 2-3 gpa | Allowed | 20-100 gpa | 24 | 40 |
| Penncozeb 75DF mancozeb | dithiocarbamate | 1.0-1.5 lb | 2 gpa minimum | Allowed, 0.1-1.25″ application | 20 gpa minimum | 24 | 40 |
| Penncozeb 80WP mancozeb | dithiocarbamate | 1.0-1.5 lb | 2 gpa minimum | Allowed, 0.1-0.25″ application | 10 gpa minimum | 24 | 40 |
| PropiMax propiconazole | triazole | 4.0-6.0 oz | 5 gpa minimum | Allowed | 10 gpa minimum | 12 | 36 |
| Quadris azoxystrobin | strobilurin | 6.0-9.0 oz | Adequate for coverage and canopy penetration | Allowed, 0.1-0.25″ application | Adequate for coverage and canopy penetration | 4 | 7 |
| Quilt azoxystrobin + propiconazole | strobilurin + triazole | 10.5-14.0 oz | 2 gpa minimum | Allowed, 0.1-0.25″ application | 10 gpa minimum | 12 | 30 |
| Quilt Xcel azoxystrobin + propiconazole | strobilurin + triazole | 10.5-14.0 oz | 2 gpa minimum | Allowed, 0.125-0.25″ application | 10 gpa minimum | 12 | 30 |
| Stratego YLD trifloxistrobin + prothioconazole | strobilurin + triazole | 4.0-5.0 oz | 2 gpa minimum | Allowed | 10 gpa minimum | 12 | 14 |
| TebuStar tebuconazole | triazole | 4.0-6.0 oz | 5 gpa minimum | Allowed | 10 gpa minimum | 12 | 36 |
| Tebuzol tebuconazole | triazole | 4.0-6.0 oz | 5 gpa minimum | Allowed | 10 gpa minimum | 12 | 36 |
| Tilt propiconazole | triazole | 4.0 oz | 2 gpa minimum | Allowed, 0.1-0.25″ application | 10 gpa minimum | 12 | 30 |

[1]All data in table is based on information contained in the product label. Always read and follow label directions. All products in the table are fully registered for use on corn in Nebraska.
[2]Application rates apply to grain production and may differ for popcorn, sweetcorn, seed corn, or silage.

# Soybean

## Seed Treatment Fungicide Efficacy[1]

| Fungicide | Pythium | Phytophthora | Rhizoctonia | Fusarium | Phomopsis |
|---|---|---|---|---|---|
| Acceleron | E | E | E | G | G |
| Allegiance FL | E | E | NS | NS | NS |
| Allegiance LS | E | E | NS | NS | NS |
| Apron XL LS | E | E | NS | NS | NS |
| ApronMaxx RFC | E | P | G | G | G |
| ApronMaxx RTA | E | P | G | G | G |
| Catapult XL | E | P | E | P | P |
| CruiserMaxx | E | P | G | G | G |
| CruiserMaxx Plus | E | E | G | G | G |
| Dynasty | P | NS | E | G | G |
| Inovate System | E | P | G | G | G |
| Maxim 4FS | P | P | G | G | G |
| Prevail | G | G | G | U | G |
| Trilex 2000 | E | P | E | G | G |
| Warden CZ | E | E | G | G | G |
| Warden RTA | E | E | G | G | G |

Rating of product efficacy: E = Excellent; VG = Very Good; G = Good; F = Fair; P = Poor; NS = Not Specified on product label; U = Unknown efficacy.
[1]Ratings reflect data summarized from results of fungicide trials conducted nationwide whose results were published online in Plant Disease Management Reports (and formerly Fungicide and Nematicide Tests) by the American Phytopathological Society at *http://www.apsnet.org*.

## Foliar Treatment Fungicide Efficacy[1]

| Fungicide | Brown Spot | Cercospora Blight | Frogeye Leafspot | Soybean Rust |
|---|---|---|---|---|
| Domark 230 ME | G | — | VG | E |
| Evito | G | VG | E | VG |
| Folicur 3.6 F | F | G | G | VG |
| Headline | G | VG | E | VG |
| Laredo 2 EC | NR | F | F | E |
| Onset | NL | NL | NL | VG |
| Quadris 2 SC | G | VG | E | E |
| Quilt | G | G | VG | VG |
| Quilt Xcel | G | VG | E | VG |
| Stratego YLD | G | G | E | VG |
| Topguard | G | — | G | VG |

Rating of product efficacy: E = Excellent; VG = Very Good; G = Good; F = Fair; P = Poor; - = Insufficient data; NL = Product not labeled for this disease; NR = Not Recommended.
[1]Ratings reflect data summarized from results of fungicide trials conducted nationwide whose results were published online in Plant Disease Management Reports (and formerly Fungicide and Nematicide Tests) by the American Phytopathological Society at *http://www.apsnet.org*.

# Soybean

## Seed Treatment Fungicides

| Fungicide<br>Active Ingredient | Fungicide<br>Class | Rate<br>(per 100 lbs) | Application | Comments |
|---|---|---|---|---|
| Acceleron<br>metalaxyl + pyraclostrobin | acylalanine + strobilurin | Product combination | Commercial applied, slurry | Insecticide and additional treatments can be added to base fungicides |
| Acquire<br>metalaxyl | acylalanine | 0.75-1.5 fl oz/ CWT | Commercial applied, slurry | Acquire comes with Charter seed treatment |
| Allegiance Dry<br>metalaxyl | acylalanine | 1.5-2.0 oz/CWT | On farm application, planter box | |
| Allegiance FL<br>metalaxyl | acylalanine | 0.75-1.5 fl oz/ CWT | Commercial applied, slurry | |
| Allegiance LS<br>metalaxyl | acylalanine | 1.2-2.4 fl oz/ CWT | Commercial or on farm application, slurry | Use higher rate for Phytophthora control |
| Apron XL<br>mefenoxam | acylalanine | 0.16-0.64 fl oz/ CWT | Commercial applied, slurry | Use higher rate for Phytophthora control |
| ApronMaxx RFC<br>fludioxonil + mefenoxam | phenylpyrrole + acylalanine | 1.5 fl oz/CWT | Commercial applied, slurry | Add Apron XL to improve Phytophthora control |
| ApronMaxx RTA<br>fludioxonil + mefenoxamm | phenylpyrrole + acylalanine | 5.0 fl oz/CWT | On farm application, RTA | Add Apron XL to improve Phytophthora control |
| Catapult XL<br>chloroneb + mefenoxam | aromatic hydrocarbon + acylalanine | 5.5-7.0 fl oz/ CWT | On farm application, RTA | |
| CruiserMaxx<br>fludioxonil + mefenoxam + thiamethoxam | phenylpyrrole + acylalanine + neonicotinoid | 3.0 fl oz/CWT | Commercial applied, slurry | Add Apron XL to improve Phytophthora control |
| CruiserMaxx Plus<br>fludioxonil + mefenoxam + thiamethoxam | phenylpyrrole + acylalanine + neonicotinoid | 3.2 fl oz/CWT | Commercial applied, slurry | Add Apron XL to improve Phytophthora control |
| Dynasty<br>azoxystrobin | strobilurin | 0.153-0.459 fl oz/CWT | Commercial applied, slurry | |
| Inovate System<br>metalaxyl + ipconazole + clothianidin | acylalanine + triazole + neonicotinoid | Product combination | Commercial applied, slurry | |
| Kickstart VP<br>carboxin + permethrin | oxathiin-carboxamide + pyrethrin | 3.0 oz/CWT | On farm application, planter box | |
| Maxim 4FS<br>fludioxonil | phenylpyrrole | 0.08-0.16 fl oz/ CWT | Commercial applied, slurry | |
| Mertect 340-F<br>thiabendazole | benzimidazole | 0.08-0.16 fl oz/ CWT | Commercial applied, slurry | |
| Prevail<br>carboxin + metalaxyl + PCNB | oxathiin-carboxamide + acylalanine + aromatic hydrocarbon | 2.0-4.0 oz/ bushel | On farm application, planter box | |
| Trilex 2000<br>metalaxyl + trifloxystrobin | acylalanine + strobilurin | 1.0 fl oz/CWT | Commercial applied, slurry | |
| Warden CZ<br>fludioxonil + mefenoxam + thiamethoxam | phenylpyrrole + acylalanine + neonicotinoid | 3.2 fl oz/CWT | Commercial applied, slurry | Add Apron XL to improve Phytophthora control |
| Warden RTA<br>fludioxonil + mefenoxam | phenylpyrrole + acylalanine | 5.0 fl oz/CWT | Commercial or on farm application, RTA | |

For further information on additional insecticide active ingredients, see the *Insect Management Section.*

# Soybean

## Foliar Fungicides[1]

| Fungicide Active Ingredient | Fungicide Class | Rate (per acre) | Application | | | Re-entry Interval (REI) (hours) | Pre-Harvest Interval (PHI) (days) |
|---|---|---|---|---|---|---|---|
| | | | Aerial | Chemigation | Ground | | |
| Alto cyproconazole | triazole | 2.75-5.5 fl oz | 2 gpa minimum | Allowed, <0.5" application | 10 gpa minimum | 12 | 30 |
| Bumper propiconazole | triazole | 4.0-6.0 fl oz | 5 gpa minimum | Not allowed | 10 gpa minimum recommended | 12 | Do not apply after R5 (pod fill) |
| Domark tetraconazole | triazole | 4.0-5.0 fl oz | 5 gpa | Not allowed | 10-25 gpa minimum | 12 | Do not apply after R5 (pod fill) |
| Evito fluoxastrobin | strobilurin | 2.0-5.7 fl oz | 2 gpa minimum | Allowed, consult label | 10 gpa minimum | 12 | Do not apply after R5 (pod fill) |
| Evito T fluoxastrobin + tebuconazole | triazole + strobilurin | 4.0-6.0 fl oz | 3 gpa minimum | Allowed, consult label | 10 gpa minimum | 12 | 30 |
| Folicur tebuconazole | triazole | 3.0-4.0 fl oz | 5 gpa minimum | Allowed, consult label | 10 gpa minimum | 12 | 21 |
| Headline pyraclostrobin | strobilurin | 6.0 fl oz | 2 gpa | Allowed, < or = to 0.25" application | 15 gpa minimum recommended | 12 | 21 |
| Laredo myclobutanil | triazole | 4.0-8.0 fl oz | 5 gpa minimum | Not allowed | Adequate for coverage and canopy penetration | 24 | 28 |
| Onset tebuconazole | triazole | 3.0-4.0 fl oz | 5 gpa minimum | Not allowed | 10 gpa minimum | 12 | 21 |
| Proline prothioconazole | triazole | 2.5-3.0 fl oz | 2 gpa minimum | Allowed, 0.125-0.5" application | 15 gpa minimum | 12 | 21 |
| Quadris azoxystrobin | strobilurin | 6.0-15.5 fl oz | 2 gpa | Allowed, 0.1-0.5" application | Adequate for coverage and canopy penetration | 4 | 14 |
| Quadris Xtra cyproconazole + azoxystrobin | triazole + strobilurin | 4-6.8.0 fl oz | 2 gpa minimum | Allowed, <0.5" application | 10 gpa minimum | 12 | 30 |
| Quilt propiconazole + azoxystrobin | triazole + strobilurin | 14-20.5 fl oz | 2 gpa minimum | Allowed, 0.1-0.25" application | 10 gpa minimum | 12 | 21 |
| Quilt Xcel propiconazole + azoxystrobin | triazole + strobilurin | 10.5-21.0 fl oz | 2 gpa minimum | Allowed, 0.125-0.5" application | 10 gpa minimum | 12 | Do not apply after R5 (pod fill) |
| Stratego YLD prothioconazole + trifloxystrobin | triazole + strobilurin | 4.0-4.65 fl oz | 2 gpa minimum | Allowed, 0.125-0.5" application | 10 gpa minimum | 12 | 21 |
| Tilt propiconazole | triazole | 4.0-6.0 fl oz | 2 gpa minimum | Not allowed | 15 gpa minimum recommended | 12 | Do not apply after R5 (pod fill) |
| Topguard flutriafol | triazole | 7.0-14.0 fl oz | 5 gpa minimum | Not allowed | 10 gpa minimum | 12 | 21 |
| Topsin M thiophanate-methyl | thiophanate | 0.5-1.0 lb | 5 gpa minimum | Not allowed | Adequate for coverage and canopy penetration | 24 | Data not available |

[1]All data in table is based on information contained in the product label. Always read and follow label directions. All products in the table are fully registered for use on soybeans in Nebraska.

# Wheat

## Foliar Fungicide Efficacy[1]

| Product | Head Scab | Leaf Rust | Powdery Mildew | Septoria Leaf Blotch | Stagonospora Leaf and Glume Blotch | Stem Rust | Stripe Rust | Tan Spot |
|---|---|---|---|---|---|---|---|---|
| Absolute | NL | E | G | —[2] | —[2] | —[2] | —[2] | —[2] |
| Alto | —[2] | —[2] | —[2] | —[2] | —[2] | —[2] | —[2] | —[2] |
| Caramba | G | E | —[2] | — | — | E | E | — |
| Evito | NL | VG | G | —[2] | —[2] | —[2] | —[2] | —[2] |
| Folicur, Embrace, Monsoon, Muscle, Orius, Tebustar, Tebuzol, Toledo | F | E | G | VG | VG | E | E | VG |
| Headline | NL | E | G | VG | VG | G | E | E |
| Proline | G | VG | —[2] | VG | VG | VG | — | VG |
| Prosaro | G | E | G | VG | VG | E | E | VG |
| Quadris | NL | E | F(G)[3] | VG | VG | VG | E[4] | E |
| Quilt | NL | E | VG | VG | VG | VG | E | VG |
| Quilt Xcel | NL | VG | —[2] | —[2] | VG | NL | —[2] | —[2] |
| Stratego | NL | VG | G | VG | VG | VG | VG | VG |
| Tilt, PropiMax, Bumber | P | VG | VG | VG | VG | VG | VG | VG |
| TwinLine | NL | E | G | VG | VG | VG | E | E |

Rating of product efficacy: E = Excellent; VG = Very Good; G = Good; F = Fair; P = Poor; - = Insufficient data; NS = Not Specified on product label; NR = Not Recommended; NL = Not Labeled for controlling the specific disease; U = Unknown efficacy.

[1]Ratings reflect data summarized from results of fungicide trials conducted by the NCERA-184 Regional Committee for Management of Small Grain Diseases.

[2]Insufficient data to make statement about efficacy of this product.

[3]Efficacy designation with a second rating in parenthesis indicates greater efficacy at higher application rates.

[4]Efficacy may be significantly reduced if solo strobilurin products are applied after stripe rust infection has occurred.

# Wheat

## Seed Treatment Fungicides[1]

| Fungicide | Active Ingredient | Fungicide Class | Rate (per 100 lb) |
|---|---|---|---|
| Allegiance FL | metalaxyl | acylalanine | 0.10-0.375 fl oz |
| Apron XL LS | mefenoxam | acylalanine | 0.32-0.64 fl oz |
| Captan 400 | captan | phthalimide | 1.5-4.0 fl oz |
| Captan 400-C | captan | phthalimide | 1.5-4.0 fl oz |
| Charter | triticonazole | triazole | 3.1 fl oz |
| Charter PB | Triticonazole + thiram | triazole + dithiocarbamate | 5.5 fl oz |
| CruiserMaxx Cereals | thiamethoxam + mefenoxam + difenoconazole | neonicotinoid + acylalanine + triazole | 5.0 fl oz |
| Dithane DF Rainshield | mancozeb | dithiocarbamate | 2.3-3.5 fl oz |
| Dithane M45 | mancozeb | dithiocarbamate | 2.2-3.3 fl oz |
| Dividend Extreme | difenoconazole + mefenoxam | triazole + acylalanine | 1.5-2.0 fl oz |
| Dividend XL RTA | difenoconazole + mefenoxam | triazole + acylalanine | 5.0 fl oz |
| Grain Guard | mancozeb | dithiocarbamate | 2.0 oz per bushel |
| Dynasty | azoxystrobin | strobilurin | 0.153-0.382 fl oz |
| Incentive RTA | difeconazole + mefenoxam | triazole + acylalanine | 2.5-10.0 fl oz |
| LSP | thiabendazole | benzimidazole | 2.0-4.0 fl oz |
| Mankocide | mancozeb + copper hydroxide | dithiocarbamate + inorganic | 4.0 fl oz |
| Maxim XL | fludioxonil + mefenoxam | phenylpyrrole + acylalanine | 0.167-0.334 fl oz |
| Maxim 4FS | fludioxonil | phenylpyrrole | 0.08-0.16 fl oz |
| Penncozeb | mancozeb | dithiocarbamate | 2.3-3.5 fl oz |
| Prevail | carboxin + PCNB + metaxyl | carboxamide + aromatic hydrocarbon + acylalanine | 1.5-3.0 fl oz |
| Proceed | prothioconazole + tebuconazole + metalaxyl | triazole + triazole + acylalanine | 5.0-7.5 fl oz |
| Raxil MD | tebuconazole + metalaxyl | triazole + acylalanine | 5.0-6.5 fl oz |
| Raxil MD Extra | tebuconazole + metalaxyl + imazalil | triazole + acylalanine + azole | 5.0 fl oz |
| Raxil MD W | imidacloprid + tebuconazole + metalaxyl | neonicotinoid + triazole + acylalanine | 5.0 fl oz |
| Raxil MD Extra W | imidacloprid + tebuconazole + metalaxyl + imazalil | neonicotinoid + triazole + acylalanine + azole | 3.5-4.6 fl oz |
| Maxim 4FS | fludioxonil | phenylpyrrole | 0.08-0.16 fl oz |
| Penncozeb | mancozeb | dithiocarbamate | 2.3-3.5 fl oz |
| Prevail | carboxin + PCNB + metalaxyl | carboxamide + aromatic hydrocarbon + acylalanine | 1.5-3.0 fl oz |
| Proceed | prothioconazole + tebuconazole + metalaxyl | triazole + triazole + acylalanine | 5.0-7.5 fl oz |
| Raxil MD | tebuconazole + metalaxyl | triazole + acylalanine | 5.0-6.5 fl oz |
| Raxil MD Extra | tebuconazole + metalaxyl + imazalil | triazole + acylalanine + azole | 5.0 fl oz |
| Raxil MD W | imidacloprid + tebuconazole + metalaxyl | neonicotinoid + triazole + acylalanine | 5.0 fl oz |
| Raxil Thiram | tebuconazole + thiram | triazole + dithiocarbamate | 3.5-4.6 fl oz |
| Raxil XT Wettable Powder | tebuconazole + metalaxyl | triazole + acylalanine | 0.16-0.20 oz |
| RTU-Vitavax-Thiram | carboxin + thiram | carboxamide + dithiocarbamate | 5.0-6.8 fl oz |
| Vitavax-34 | carboxin | carboxamide | 2.0-3.0 oz |
| Vitavax-200 | carboxin | carboxamide | 3.0-4.0 fl oz |

[1]For further information on additional insecticide active ingredients, see the *Insect Management Section.*

# Wheat

## Foliar Treatment Fungicides[1]

| Fungicide Active Ingredient | Fungicide Class | Rate (per acre) | Application | | | Re-entry Interval (REI) (hours) | Pre-Harvest Interval (PHI) (days) |
|---|---|---|---|---|---|---|---|
| | | | Aerial | Chemigation | Ground | | |
| Absolute tebuconazole + trifloxystrobin | triazole + strobilurin | 5.0 fl oz | 5 gpa minimum | Not allowed | 10 gpa minimum | 24 | 35 |
| Alto cyproconazole | triazole | 3.0-5.5 fl oz | Local recommen-dations | Allowed, <0.5″ application | Adequate for coverage and canopy penetration | 12 | 30 |
| Bumper propiconazole | triazole | 4.0 fl oz | 2 gpa minimum | Not allowed | 10 gpa minimum recommended | 24 | 40 |
| Caramba metconazole | triazole | 10.0-14.0 fl oz | 2 gpa minimum | Not allowed | Adequate for coverage and canopy penetration | 12 | 30 |
| Evito fluoxastrobin | strobilurin | 2.0-4.0 fl oz | 5 gpa minimum | Allowed, <0.4″ application | 10 gpa minimum | 12 | Apply no later than Feekes 10.5 |
| Folicur tebuconazole | triazole | 4.0 fl oz | 5 gpa minimum | Not allowed | 10 gpa minimum | 12 | 30 |
| Headline pyraclostrobin | strobilurin | 6.0 fl oz | 2 gpa minimum | Allowed, <0.25″ application | 15 gpa minimum | 12 | Apply no later than Feekes 10.5 |
| Muscle tebuconazole | triazole | 4.0 fl oz | 5 gpa minimum | Not allowed | 10 gpa minimum | 12 | 30 |
| Orius tebuconazole | triazole | 4.0 fl oz | 5 gpa minimum | Not allowed | 10 gpa minimum | 12 | 30 |
| Proline prothioconazole | triazole | 4.3-5.7 fl oz | 5 gpa minimum | Not allowed | 10 gpa minimum | 12 | 30 |
| PropiMax propiconazole | triazole | 2.0-4.0 fl oz | 2 gpa minimum | Allowed, <0.1-0.25″ application | 15 gpa minimum | 24 | 40 |
| Prosaro prothioconazole + tebuconazole | triazole + triazole | 6.5-8.2 fl oz | 5 gpa minimum | Not allowed | 10 gpa minimum | 12 | 30 |
| Quadris azoxystrobin | strobilurin | 6.0-15.5 fl oz | 5 gpa minimum | Allowed, <0.5″ application | 10 gpa minimum | 4 | Apply no later than Feekes 10.5 |
| Quilt propiconazole + azoxystrobin | triazole + strobilurin | 10.5-14.0 fl oz | 2 gpa minimum | Allowed, <0.1-0.25″ application | 10 gpa minimum (15 gpa recommended) | 12 | Apply no later than Feekes 10.5 |
| Quilt Xcel azoxystrobin + propiconazole | strobilurin + triazole | 10.5-14.0 fl oz | 2 gpa minimum | Allowed 0.125-0.25″ application | 10 gpa minimum | 12 | Apply no later than Feekes 10.5 |
| Stratego propiconazole + trifloxystrobin | triazole + strobilurin | 10.0 fl oz | 2.5 gpa minimum | Allowed, <0.5″ application | 10 gpa minimum recommended | 12 | Apply no later than Feekes 10.5 |
| Tebuzol tebuconazole | triazole | 4.0 fl oz | 5 gpa minimum | Allowed, <0.5″ application | 10 gpa minimum | 12 | 30 |
| Tilt propiconazole | triazole | 2.0-4.0 fl oz | 2 gpa minimum | Not allowed | 10 gpa minimum | 12 | 30 |
| Toledo tebuconazole | triazole | 4.0 fl oz | 5 gpa minimum | Allowed, <0.5″ application | 10 gpa minimum | 12 | 30 |
| TwinLine pyraclostrobin + metconazole | strobilurin + triazole | 7.0-9.0 fl oz | 2 gpa minimum | Allowed, <0.5″ application | Adequate for coverage and canopy penetration | 12 | Apply no later than Feekes 10.5 |

[1]All data in table is based on information contained in the product label. Always read and follow label directions. All products in the table are fully registered for use on wheat in Nebraska.

# Nematicides for Field Crops[1]

| Nematicides<br>Active Ingredient | Registered Nebraska Crops | Application | Rate |
|---|---|---|---|
| Acceleron HX-209<br>harpin alpha beta protein | Corn (field, popcorn, silage, sweet), dry bean, soybean | Seed treatment | Corn (0.75 oz per 100.0 lb seed)<br>Soybean (0.25 oz per 100.0 lb seed) |
| Avicta Complete Corn[2]<br>abamectin | Corn (field, popcorn, seed, sweet) | Seed treatment | Commercially applied |
| Avicta Complete Beans[2]<br>abamectin | Soybean | Seed treatment | Commercially applied |
| AzaGuard<br>azadirachtin | Corn (field, popcorn), sorghum (grain), soybean, wheat | Ground, aerial, chemigation | 15 fl oz per acre |
| Counter 15G Smartbox, Counter 15G Lock N Load<br>terbufos | Corn (field, popcorn, seed, sweet), sorghum (grain), sugarbeet | Soil-applied granule (banded or in-furrow) | Corn (≤8.7 lb per acre)<br>Sorghum (grain) (≤11.3 lb per acre)<br>Sugarbeet (≤13.1 lb per acre) |
| Counter 20G SmartBox, Counter 20G Lock N Load<br>terbufos | Corn (field, popcorn, seed, sweet), sorghum (grain), sugarbeet | Soil-applied granule (banded or in-furrow) | Corn (≤6.5 lb per acre)<br>Sorghum (grain) (≤8.4 lb per acre)<br>Sugarbeet (≤9.8 lb per acre) |
| Ecozin Plus 1.2% ME<br>azadirachtin | Corn, sorghum, soybean, wheat | Ground, aerial, chemigation, soil drench | 25.0-56.0 fl oz per acre |
| N-Hibit Gold CST<br>harpin alpha beta protein | Corn (field, popcorn, silage, sweet), soybean | Seed treatment | Corn (0.75 oz per 100.0 lb seed)<br>Soybean (0.25 oz per 100.0 lb seed) |
| Poncho VOTiVO[4]<br>*bacillus firmus* I-1582 | Corn (field, popcorn, sweet), soybean | Seed treatment | Commercially applied |
| Telone C-17<br>1,3-dichloropropene + chloropicrin | All field crops | Soil fumigation | 10.8-17.1 gal per acre |
| Telone C-35<br>1,3-dichloropropene + chloropicrin | All field crops | Soil fumigation | 13.0-20.5 gal per acre |
| Telone II Soil Fumigant<br>1,3-dichloropropene | All field crops | Soil fumigation | 9.0-12.0 gal per acre |
| Temik 15G, Temik 15G Lock N Load<br>aldicarb | Sugarbeet | Soil-applied granule (banded or in-furrow) | 27-33 lb per acre |
| VOTiVO FS[4]<br>*bacillus firmus* I-1582 | Corn (field, popcorn, sweet), soybean | Seed treatment | Commercially applied |

[1]For further information on additional insecticide active ingredients, see the *Insect Management Section.*
[2]Avicta Complete Corn is a promotional combination of separately registered products containing Avicta Duo Corn nematicide/insecticide and one or more additional seed treatment insecticides and fungicides. For further information on additional insecticide active ingredients, see the *Insect Management Section.*
[3]An Avicta Complete Beans brand is a combination of separately registered products containing Avicta 500 FS , plus one or more additional seed treatment insecticides and fungicides.
[4]Poncho VOTiVO and VOTiVO FS are seed treatment nematicides sold in combination with one or more seed treatment fungicides and insecticides.

# 2012 Approximate Retail Price ($) per Unit of Selected Fungicides for Field Crops

*Survey price estimates in September 2011*

| Product | 2012 Average Price ($) per Unit |
|---|---|
| Allegiance Dry | 52.00/lb |
| Allegiance FL | 470.00/gal |
| Allegiance FS | 470.00/gal |
| Alto l00SL | 370.00/gal |
| Apron XL | 920.00/gal |
| ApronMaxx RFC | 280.00/gal |
| ApronMaxx RTA | 110.00/gal |
| Bumper 41.8 EC | 140.00/gal |
| Captan 50WP | 6.70/lb |
| Captan 80WDG | 8.70/lb |
| Caramba | 190.00/gal |
| Charter | 80.00/gal |
| Charter PB | 60.00/gal |
| CruiserMaxx | 600.00/gal |
| Dithane DF Rainshield | 4.00/lb |
| Dividend Extreme | 140.00/gal |
| Dividend XL RTA | 70.00/gal |
| Domark 230 ME | 410.00/gal |
| Evito | 7.50/oz |
| Headline | 410.00/gal |
| Incentive RTA | 54.00/gal |
| Kickstart VP | 54.00/lb |
| Mankocide | 9.00/lb |
| Manzate Flowable | 42.00/gal |
| Manzate Pro-Stick | 4.40/lb |
| Maxim 4FS | 625.00/qt |
| Mertect | 380.00/gal |

| Product | 2012 Average Price ($) per Unit |
|---|---|
| Orius 3.6F | 70.00/gal |
| Penncozeb 75DF | 4.50/lb |
| Prevail | 6.50/lb |
| Proceed MD FS | 88.00/gal |
| Proline 480SC | 680.00/gal |
| PropiMax EC | 150.00/gal |
| Prosaro SC | 360.00/gal |
| Quadris | 425.00/gal |
| Quadris Xtra | 590.00/gal |
| Quilt | 210.00/gal |
| Quilt Xcel | 280.00/gal |
| Raxil MD | 62.00/gal |
| Raxil MD Extra | 83.00/gal |
| Raxil MD W | 120.00/gal |
| Raxil Thiram | 70.00/gal |
| Stamina | 470.00/gal |
| Stratego YLD | 610.00/gal |
| Stratego | 225.00/gal |
| Tebuzol 3.6F | 70.00/gal |
| Tilt | 150.00/gal |
| Toledo | 70.00/gal |
| Trilex 2000 | 375.00/gal |
| Twinline | 250.00/gal |
| Warden RTA | 77.00/gal |

# Fungicide Dictionary

See page 186 for a guide to reading dictionary entries. Number/letters in brackets in the Fungicide Dictionary correspond to the product Mode(s) of Action listed on page 213 and are provided by the Fungicide Resistance Action Committee (FRAC).

**Absolute®** [tebuconazole (2.18 lb ai/gal) + trifloxystrobin (2.18 lb ai/gal)]. For control of certain diseases on wheat. Bayer CropScience. EPA Reg. No. 264-849. 11/2010. {3+11}.

**Acceleron™ DC-309** [metalaxyl (2.6 lb/gal)]. For control of Pythium and Phytophthora damping off in corn. Monsanto. EPA Reg. No. 264-935-524. 2009. {4}.

**Acceleron™ DC-509** [ipconazole (3.77 lb/gal)]. For control of Rhizoctonia, Fusarium, and Phomopsis seedling diseases in corn. Monsanto. EPA Reg. No. 264-988-524. 2009. {3}.

**Acceleron™ DX-109** [pyraclostrobin (1.67 lb/gal)]. Registered for control of Rhizoctonia damping off and suppression of *Pythium* spp. and *Fusarium* spp. in soybeans. Monsanto. EPA Reg. No. 7969-266-524. 2010. {11}.

**Acceleron™ DX-309** [metalaxyl (2.6 lb/gal)]. Registered for control of Pythium and Phytophthora damping-off in soybeans. Monsanto. EPA Reg. No. 264-935-524. 2010. {4}.

**Acceleron™ DX-709** [trifloxystrobin (22%)]. Protects corn seedlings against Rhizoctonia solani and *Fusarium* spp. Monsanto. EPA Reg. No. 264-989-524. 2010. {11}.

**Acquire®** [metalaxyl (2.65 lb/gal)]. Seed treatment controlling Pythium and Phytophthora damping off in soybean, sorghum, sunflower, small grains, turfgrass, canola, corn, and millet. BASF. EPA Reg. No. 71532-22-7969. 2010. {4}.

**Aftershock™** (fluoxastrobin (4.0 lb ai/gal)]. Broad spectrum fungicide for the control of certain plant diseases in various crops including corn, soybean, and wheat. Loveland Products, Inc. EPA Reg. No. 66330-64-34704. 2010. {11}.

**Allegiance® Dry** [metalaxyl (12.5%)]. For control of Pythium and Phytophthora damping-off in soybean, sorghum, sunflower, small grains, turfgrass, and corn. Chemtura. EPA Reg. No. 264-1014-400. {4}.

**Allegiance® FL** [metalaxyl (2.6 lb/gal)]. For control of Pythium and Phytophthora damping-off in soybean, sorghum, sunflower, small grains, turfgrass, canola, corn, and millet. Bayer CropScience. EPA Reg. No. 264-935. 09/2007. {4}.

**Alto®** [cyproconazole (0.83 lb ai/gal)]. Broad spectrum fungicide for control of plant diseases in soybean. Syngenta. EPA Reg. No. 100-1226. 2008. {3}.

**Apron XL®** [mefenoxam (3.0 lb/gal)]. For control of Pythium and Phytophthora damping-off in small grains, field corn, sweet corn, popcorn, forage grasses, millet, sorghum, soybean, sunflower, and turfgrass. Syngenta. EPA Reg. No. 100-799. 08/2009. {4}.

**ApronMaxx® RFC** [fludioxonil (0.21 lb/gal) + mefenoxam (0.31 lb/gal)]. Registered for control of Pythium, Phytophthora, Fusarium, and Rhizoctonia seedling diseases in soybean and dry edible beans. Syngenta. EPA Reg. No. 100-1195. 10/2009. {12 + 4}.

**ApronMaxx® RTA [**fludioxonil (0.064 lb/gal) + mefenoxam (0.096 lb/gal)]. Ready to apply formulation of ApronMaxx. Registered for control of Pythium, Phytophthora, Fusarium, and Rhizoctonia seedling diseases in soybean and dry edible beans. Syngenta. EPA Reg. No. 100-946. 08/2009. {12 + 4}.

**Azoxystrobin**. An active ingredient in Dynasty, Quadris, Quadris Xtra, Quilt, and Quilt Xcel. [11].

**Bumper®** [propiconazole (41.8%)]. A foliar fungicide for the control of certain diseases in corn, soybean, and wheat. Makhteshim Agan of North America, Inc. EPA Reg. No. 66222-42. 04/2009. {3}.

**Caramba™** [metconazole (0.75 lb ai/gal)]. For use in disease control in wheat. BASF. EPA Reg. No. 7969-246. 2008. {3}.

**Carboxin.** Active ingredient in Kickstart VP, Prevail, Vitavax-34 and Vitavax CT. {7}.

**Catapult™ XL** [chloroneb (2.9 lb/gal) + mefenoxam (0.19 lb/gal)]. Registered for control of Phytophthora, Pythium, and Rhizoctonia seedling diseases in soybean and dry edible beans. Winfield Solutions, LLC. EPA Reg. No. 1381-183. {14 + 4}.

**Charter®** [triticonazole (0.213 lb/gal)]. Registered for control of seed-borne diseases in wheat and barley. BASF. EPA Reg. No. 7969-386. 02/2010. {3}.

**Charter® PB** [triticonazole (0.12 lb/gal) + thiram (1.2 lb/gal)]. For control of seed-borne diseases in wheat and barley with the addition of thiram fungicide. BASF. EPA Reg. No. 7969-387. 02/2010. {3 + M3}.

**Cloroneb.** Active ingredient in Catapult XL. {14}.

**Copper Hydroxide.** Active ingredient in Mankocide. {M1}.

**CruiserMaxx™ Beans** [thiamethoxam (2.15 lb/gal) + mefenoxam (0.16 lb/gal) + fludioxonil (0.11 lb/gal)]. ApronMaxx product with the addition of an insecticide for control of early season insect pests on soybean and dry edible beans. Syngenta. EPA Reg. No. 100-1247. 12/2009. {Insecticide 4A + 4 + 12}.

**CruiserMaxx™ Cereals** [thiamethoxam (0.26 lb/gal) + mefenoxam (0.05 lb/gal) + difenoconazole (0.31 lb/gal)]. Registered for control of Fusarium, Pythium, and Rhizoctonia damping-off diseases on winter wheat, spring wheat, barley, and triticale. Also contains an insecticide for wireworm, aphid, and Hessian fly control. Syngenta. EPA Reg. No. 100-1305. 2009. {Insecticide 4A + 4 + 3}.

**CruiserMaxx™ Plus** [thiamethoxam (2.06 lb/gal) + mefenoxam (0.31 lb/gal) + fludioxonil (0.10 lb/gal)]. CruiserMaxx Beans product with additional mefenoxam for enhanced phytophthora control. Syngenta. EPA Reg. No. 100-1283. {Insecticide 4A + 4 + 12}.

**Cyproconazole**. An active ingredient in Alto and Quadris Xtra. {3}.

**Difeconazole.** Active ingredient in CruiserMaxx Cereals, Dividend Extreme, Dividend XL RTA, and Incentive RTA. {3}.

# Fungicide Dictionary *(continued)*

**Dithane® F-45 Rainshield** [mancozeb (4.0 lb ai/gal)]. A foliar fungicide used for the control of certain diseases in corn and wheat. Dow AgroSciences. EPA Reg. No. 62719-396. 01/2007. {M3}.

**Dithane® M-45** [mancozeb (80%)]. A foliar fungicide used for the control of certain diseases in corn and wheat. Dow AgroSciences. EPA Reg. No. 62719-387. 01/2007. {M3}.

**Dividend Extreme®** [difenoconazole (0.77 lb/gal) + mefenoxam (0.19 lb/gal)]. Used for control of many seed-borne diseases in barley, sweet corn, wheat, and triticale. Syngenta. EPA Reg. No. 100-1141. 07/2010. {3 + 4}.

**Dividend® XL RTA® [**difenoconazole (0.31 lb/gal) + mefenoxam (0.025 lb/gal)]. RTA formulation of Dividend Extreme for use on barley and wheat. Syngenta. EPA Reg. No. 100-826. 09/2009. {3 + 4}.

**Domark®** [tetraconazole (1.9 lb ai/gal)]. For control and/or suppression of certain diseases in soybean. Valent. EPA Reg. No. 80289-7. 04/2007. {3}.

**Dynasty®** [azoxystrobin (0.83 lb/gal)]. For control of seed- and soil-borne seedling diseases on corn, sunflower, barley, canola, dry edible beans, sorghum, soybeans, wheat, and triticale. Syngenta. EPA Reg. No. 100-1159. 08/2010. {11}.

**Evito®** [fluoxastrobin (1.67 lb ai/gal) + tebuconazole (2.32 lb ai/gal)]. A foliar fungicide for the control of certain diseases in corn, soybean, and wheat. Arysta LifeScience. EPA Reg. No. 66330-64. 2010. {11}.

**Evito® T** [fluoxastrobin (1.67 lb ai/gal) + tebuconazole (2.32 lb ai/gal)]. A broad spectrum fungicide for the control of certain diseases in various crops including corn and soybean. Arysta LifeScience. EPA Reg. No. 66330-383. 2010. {11+3}.

**Fitness™** [propiconazole (3.6 lb ai/gal)]. A foliar fungicide for the control of certain diseases in various crops including corn and wheat. Loveland Products, Inc. EPA Reg. No. 34704-1031. 2011. {3}.

**Flutriafol.** Active ingredient found in Topguard fungicide. {3}.

**Fluoxastrobin**. An active ingredient in Aftershock, Evito, and Evito T. {11}.

**Fludioxonil.** Active ingredient in ApronMaxx RFC, ApronMaxx RTA, CruiserMaxx Beans, Maxim 4FS, Maxim XL, Warden CZ, and Warden RTA. {12}.

**Fluxapyroxad.** An active ingredient in Priaxor. {7}.

**Folicur®** [tebuconazole (3.6 lb ai/gal)]. For control of specified diseases on various crops, including corn, soybean, and wheat. Bayer CropScience. EPA Reg. No. 264-752. 07/2008. {3}.

**Grain Guard®** [mancozeb (50%)]. For control of seed-borne bunts and smuts of wheat, oats, barley, rye, and sorghum. Chemtura. EPA Reg. No. 400-558. {M3}.

**Headline® EC** [pyraclostrobin (2.09 lb ai/gal)]. For use in disease control and plant health in corn, soybean, and wheat. BASF. EPA Reg. No. 7969-186. 2009. {11}.

**Headline® SC** [pyraclostrobin (2.08 lb ai/gal)]. For use in disease control and plant health in corn, soybean, and wheat. BASF. EPA Reg. No. 7969-289. 2009. {11}.

**Headline AMP™** [pyraclostrobin (1.22 lb ai/gal) + Metconazole (0.46 lb ai/gal)]. For disease control and plant health in corn. BASF. EPA Reg. No. 7969-291. 2009. {11 + 3}.

**Imazalil.** Active ingredient in Raxil MD Extra. {3}.

**Incentive® RTA® [**difenoconazole (0.31 lb/gal) + mefenoxam (0.025 lb/gal)]. Used for controlling seedborne diseases in barley and wheat. Winfield Solutions, LLC. EPA Reg. No. 100-826-1381. 09/2007. {3 + 4}.

**Imidaclopid.** Active ingredient in Raxil MD-W. {Insecticide 4A}.

**Inovate™ System** [Rancona™ Xxtra = ipconazole (0.0916 lb/gal) + metalaxyl (0.147 lb/gal) NipsIt Inside® = clothianidin (5 lb/gal)]. For control of seedborne and soilborne seedling diseases in soybean. Also contains an insecticide for control of early season insects. Chemtura and Valent. EPA Reg. Nos. 400-571 (2009) and 59639-151 (2010). {3 + 4 + Insecticide 4A}.

**Ipconazole.** Active ingredient in Acceleron DC-509, Innovate System, and Rancona Xxtra. {3}.

**Kickstart® VP** [carboxin (10.4%) + permethrin (14%)]. Planter box seed treatment for corn and soybeans for control of various seedling diseases and insects. Helena. EPA Reg. No. 42056-21-5905. {7 + Insecticide 3A}.

**Laredo®** [myclobutanil (2.0 lb ai/gal)]. A foliar fungicide for the control of soybean rust in soybean. Dow AgroSciences. EPA Reg. No. 62719-412. 03/2007. {3}.

**Mankocide®** [mancozeb (15%) + copper hydroxide (46.1%)]. For control of some seed-borne bacterial diseases in wheat and barley. DuPont. EPA Reg. No. 352-690. {M3 + M1}.

**Mancozeb**. An active incredient in Dithane F-45, Rainshield, Dithane M-45, Penncozeb 4L, Penncozeb 75DF, and Penncozeb 80WP. {M3}.

**Maxim® 4FS** [fludioxonil (4 lb/gal)]. Registered for controlling seedborne and soilborne fungal diseases in barley, corn, millet, oats, rye, sorghum, triticale, wheat, canola, sunflower, dry edible beans, and soybean. Syngenta. EPA Reg. No. 100-758. 2010. {12}.

**Maxim® XL** [fludioxonil (1.9 lb/gal) + mefenoxam (0.8 lb/gal)]. For control of seedborne and soilborne diseases in soybean, wheat, barley, rye, oats, triticale, millet, corn, alfalfa, edible beans, sorghum, sunflower, and turfgrass. Syngenta. EPA Reg. No. 100-916. 2010. {12 + 4}.

**Mefenoxam.** Active ingredient in Apron XL, ApronMaxx RFC, ApronMaxx RTA, Catapult XL, CruiserMaxx Beans, CruiserMaxx Cereals, CruiserMaxx Plus, Dividend Extreme, Dividend RTA, Incentive RTA, Maxim XL, Warden CZ, and Warden RTA. {4}.

**Mertect 340-F.** [thiabendazole (4.1 lb ai/gal)]. Soybean seed treatment for the control of Phomopsis. Syngenta. EPA Reg. No. 100-889. {1}.

**Metalaxyl.** Active ingredient in Acceleron DC-309, Acceleron DX-309, Acquire, Allegiance Dry, Allegiance FL, Innovate System, Prevail, Procedd MD, Raxil MD, Raxil MD Extra, Raxil MD-W, Raxil XT, and Trilex 2000. {4}.

**Metconazole**. An active ingredient in Caramba, Headline AMP, and Twinline. {3}.

# Fungicide Dictionary *(continued)*

**Monsoon®** [tebucanoazole (3.6 lb ai/gal)]. A foliar fungicide for control of specified diseases on various crops including corn, soybean, and wheat. Loveland Products, Inc. EPA Reg. No. 34704-900. 2009. {3}

**Muscle™** [tebuconazole (3.6 lb ai/gal)]. For control of specified diseases on soybean and wheat. Sipcam Agro USA, Inc. EPA Reg. No. 60063-29. 06/2009. {3}.

**Myclobutanil**. An active ingredient in Laredo. {3}.

**Onset®** [tebuconazole (3.6 lb ai/gal)]. For control of specified diseases on various crops including corn, soybean, and wheat. Winfield Solutions, LLC. EPA Reg. No. 1381-203. 09/03/2009. {3}.

**Orius®** [tebuconazole (3.6 lb ai/gal)]. A foliar fungicide for control of certain diseases in corn, soybean, and wheat. Makhteshim Agan of North America, Inc. EPA Reg No. 66222-117. {3}.

**PCNB.** Active ingredient in Prevail seed treatment. {14}.

**Penncozeb® 4FL** [mancozeb (4.0 lb ai/gal)]. A foliar fungicide used for the control of certain diseases in corn and wheat. Cerxagri-Nisso, LLC. EPA Reg. No. 4581-394-82695. 2006. {M3}.

**Penncozeb® 75DF** [mancozeb (75%)]. A foliar fungicide used for the control of certain diseases in corn and wheat. Cerexagri-Nisso, LLC. EPA Reg. No. 4581-370-82695. {M3}.

**Penncozeb® 80WP** [mancozeb (80%)]. A foliar fungicide used for the control of certain diseases in corn and wheat. Cerexagri-Nisso, LLC. EPA Reg. No. 4581-358-82695. {M3}.

**Prevail®** [carboxin (15%) + PCNB (15%) + metalaxyl (3.12%)]. Registered for control of damping off caused by Pythium and Rhizoctonia fungi in barley, oats, edible beans, corn, wheat, and soybeans. Chemtura. EPA Reg. No. 264-1015-400. 2007. {7 + 14 + 4}.

**Priaxor™** [fluxapyroxad]. BASF. Registration pending. {7}.

**Proceed™ MD** [prothioconazole (0.128 lb/gal) + tebuconazole (0.025 lb/gal) + metalaxyl (0.052 lb/gal)]. Registered for control of smuts, Pythium damping off, root rots, and seedborne Fusarium scab in barley, wheat, and triticale. Bayer CropScience. EPA Reg. No. 264-1072. 09/2009. {3 + 3 + 4}.

**Proline®** [prothioconazole (4.0 lb ai/gal)]. For control of specific diseases in soybean and wheat. Bayer CropScience. EPA Reg. No. 264-825. 2010. {3}.

**Propiconazole**. An active ingredient in Bumper, Fitness, PropiMax EC, Quilt, Quilt Xcel, Stratego, and Tilt. {3}.

**PropiMax® EC** [propiconazole (3.6 lb ai/gal)]. For control of certain diseases in corn and wheat. Dow AgroSciences. EPA Reg. No. 62719-346. 08/14/2008. {3}.

**Prosaro®** [prothioconazole (1.76 lb ai/gal) + tebuconazole (1.76 lb ai/gal)]. For control of specified diseases in wheat. Bayer CropScience. EPA Reg. No. 264-862. 2010. {3 + 3}.

**Prothioconazole**. An active ingredient in Proline, Prosaro, Proceed MD, and Stratego YLD. {3}.

**Pyraclostrobin**. An active ingredient in Acceleron DX-109, Headline AMP, Headline EC, Headline SC, Stamina, and Twinline. {11}.

**Quadris®** [azoxystrobin (2.08 lb ai/gal)]. Broad spectrum fungicide control of plant diseases in corn, soybean, and wheat. Syngenta. EPA Reg. No. 100-1098. 2009. {11}.

**Quadris® Xtra** [azoxystrobin (1.67 lb ai/gal) + cyproconazole (0.67 lb ai/gal)]. Broad spectrum fungicide for control of plant diseases in soybean. Syngenta. EPA Reg. No. 100-1225. 2008. {11 + 3}.

**Quilt®** [propiconazole (1.04 lb ai/gal) + azoxystrobin (0.62 lb ai/gal)]. Broad spectrum fungicide for control of plant diseases in corn, soybean, and wheat. Syngenta. EPA Reg. No. 100-1178. 2009. {3 + 11}.

**Quilt Xcel®** [propiconazole (1.02 lb ai/gal) + azoxystrobin (1.18 lb ai/gal)]. Broad spectrum fungicide control of plant diseases in corn, soybean, and wheat. Syngenta. EPA Reg. No. 100-1324. 2009. {3 + 11}.

**Raxil® MD** [tebuconazole (0.039 lb/gal) + metalaxyl (0.051 lb/gal)]. Registered for use on wheat, barley, oats, and triticale for control of certain smuts, root rots, and damping-off. Bayer CropScience. EPA Reg. No. 264-967. 9/21/05. {3 + 4}.

**Raxil® MD Extra** [tebuconazole (0.04 lb/gal) + metalaxyl (0.05 lb/gal) + imazalil (0.09 lb/gal)]. Controls various smuts, root rots, and damping-off on wheat, barley, and triticale. Bayer CropScience. EPA Reg. No. 264-976. 9/21/05. {3 + 4 + 3}.

**Raxil® MD-W** [imidacloprid (1.54%) + tebuconazole (0.46%) + metalaxyl (0.62%)]. Raxil MD product with the addition of an insecticide for control of early season insects on wheat, barley, and triticale. Bayer CropScience. EPA Reg. No. 264-996. 6/22/05. {Insecticide 4A + 3 + 4}.

**Raxil®-Thiram** [tebuconazole (0.055 lb/gal) + thiram (1.84 lb/gal)]. Controls various Septoria, Pythium, Rhizoctonia, and Fusarium seedling diseases in barley, oats, triticale, and wheat. Bayer CropScience. EPA Reg. No. 264-955. 9/21/05. {3 + M3}.

**Raxil® XT** [tebuconazole (15%) + metalaxyl (20%)]. Controls early season root rots and smuts on wheat, triticale, barley, and oats. Bayer CropScience. EPA Reg. No. 264-966. 9/23/05. {3 + 4}.

**Stamina®** [pyraclostrobin (1.67 lb/gal)]. Registered for control of various seedling diseases on barley, corn, edible beans, rye, and wheat. BASF. EPA Reg. No. 7969-266. 2010. {11}.

**Stratego®** [propiconazole (1.04 lb ai/gal) + trifloxystrobin (1.04 lb ai/gal)]. For control of certain diseases and plant health in corn, soybean, and wheat. Bayer CropScience. EPA Reg. No. 264-779. 11/20/2008. {3 + 11}.

**Stratego® YLD** [prothioconazole (1.05 lb ai/gal) + trifloxystrobin (3.13 lb ai/gal)]. For control of certain diseases and plant health in corn and soybean. Bayer CropScience. EPA Reg. No. 264-1093. 5/28/2010. {3 + 11}.

**Tebuconazole**. An active ingredient in Absolute, Evito T, Folicur, Monsoon, Muscle, Onset, Orius, Proceed MD, Prosaro, Raxil MD, Raxil MD-W, Raxil-Thiram, Raxil XT, TebuStar, Tebuzol, and Toledo. {3}.

# Fungicide Dictionary *(continued)*

**TebuStar®** [tebuconazole (3.6 lb ai/gal)]. Fungicide for control of specified diseases on corn, soybean, and wheat. Albaugh, Inc. EPA Reg. No. 42750-99. {3}.

**Tebuzol™** [tebuconazole (3.6 lb ai/gal)]. For control of specific diseases in corn, soybean, and wheat. United Phosphorus, Inc. EPA Reg. No. 70506-114. 03/04/2009. {3}.

**Tetraconazole**. An active ingredient in Domark. {3}.

**Thiabendazole.** Active ingredient in Mertect. {1}.

**Thiophanate-methyl.** The active ingredient in Topsin M. {1}.

**Thiram.** Active ingredient in Charter PB, Raxil-Thiram and Vitavax CT. {M3}.

**Tilt®** [propiconazole (3.6 lb ai/gal)]. Broad spectrum fungicide control of plant diseases in corn, soybean, and wheat. Syngenta. EPA Reg. No. 100-617. 2009. {3}.

**Toledo®** [tebuconazole (3.6 lb ai/gal)]. For control of specific diseases in corn, soybean, and wheat. Rotam North America, Inc. EPA Reg. No. 83100-1-83979. 05/05/2009. {3}.

**Topguard®** [flutriafol (1.04 lb ai/gal)]. For control of various foliar diseases in soybean. Cheminova. EPA Reg. No. 67760-75. {3}.

**Topsin® M** [thiophanate-methyl (70% ai)]. For broad spectrum disease control in various crops including soybean and wheat. United Phosphorus, Inc. EPA Reg. No. 73545-11-70506. {1}.

**Trifloxystrobin**. An active ingredient in Absolute, Acceleron DX-709, Stratego, Stratego YLD, Trilex, and Trilex 2000. {11}.

**Trilex®** [trifloxystrobin (22%)]. Controls Rhizoctonia and Fusarium seedling diseases in corn, soybean, and edible beans. Bayer CropScience. EPA Reg. No. 264-989. 06/22/2007. {11}.

**Trilex® 2000** [trifloxystrobin (0.64 lb/gal) + metalaxyl (0.51 lb/gal)]. Controls Rhizoctonia, Fusarium, and Pythium damping-off diseases in corn, soybean, and edible beans. Bayer CropScience. EPA Reg. No. 264-1068. 06/12/2008. {11 + 4}.

**Triticonazole.** Active ingredient in Charter and Charter PB. {3}.

**Twinline™** [pyraclostrobin (1.083 lb ai/gal) + metconazole (0.67 lb ai/gal)]. For use in disease control and plant health in wheat. BASF. EPA Reg. No. 7969-247. 2008. {11+3}.

**Vitavax®-34** [carboxin (34%)]. Registered to control certain smuts and bunts and other seedling diseases on barley, oats, wheat, triticale, corn, and soybeans. Chemtura. EPA Reg. No. 400-107. 2010. {7}.

**Vitavax® CT** [carboxin (5.7%) + thiram (5.7%)]. Ready to use formulation that controls various smuts, bunts, seed decays, and damping off on soybeans, barley, oats, wheat, and triticale. Helena. EPA Reg. No. 400-156-5905. 2002. {7 + M3}.

**Warden CZ** [thiamethoxam (2.04 lb/gal) + mefenoxam (0.3 lb/gal) + fludioxonil (0.1 lb/gal)]. Seed treatment to protect soybeans from Pythium, Phytophthora, Fusarium, and Rhizoctonia seedling diseases and early season insects. Winfield Solutions, LLC. EPA Reg. No. 100-1283-1381. {Insecticide 4A + 4 + 12}.

**Warden RTA** [mefenoxam (2.21%) + fludioxonil (0.72%)]. Registered for control of Pythium, Phytophthora, Fusarium, and Rhizoctonia seedling diseases in soybeans. Winfield Solutions, LLC. EPA Reg. No. 100-1146-1381. 09/2007. {4 + 12}.

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