

Ornamental Plant Production Guide

Your Guide to Healthy, Quality Plants



contents

1	Innovate. Collaborate. Grow.
2	Ornamental Plant Production Product Use Site Overview
7	Disease Management
7	Fungicide Use Sites
8	When to Use BASF Fungicides In The Ornamentals Production Cycle
9	The Plant Health Story Behind Intrinsic® Brand Fungicides
10	Disease Management Products
17	Fungicide Resistance Management Guide
25	Mite and Insect Management
25	Insecticide Use Sites
26	Mite and Insect Management Products
36	Insecticide Resistance Management Guide
43	Weed Management
43	Herbicide Use Sites
44	Weeds Controlled
45	Weed Management Products
53	Herbicide Resistance Management Guide
59	Total Release Fungicides and Insecticides
59	How to Use Total Release Products
61	Total Release Products Chart
67	Specialty Greenhouse Products
67	Specialty Greenhouse Product Use Sites
68	Iron Chelates
70	Disinfectant and Algicide
71	Insect Monitoring and Trapping Cards
72	Spray Pattern Indicator
73	Tank Cleaners
74	Wasp and Hornet Insecticide

Innovation that solves your toughest challenges

BASF is dedicated to investing in research that produces quality solutions. We develop innovations that help solve your most pressing challenges, backed by research and supported by an experienced sales and technical team. We create chemistry that leads to healthy, quality plants, greater efficiency and more sustainable solutions for greenhouse and nursery growers.

Innovate. Collaborate. Grow.

Greenhouse and nursery growers are innovators, always looking to improve operational efficiency, learn about the latest solutions, and implement advancements. BASF is at your side, listening to your challenges and working with you to deliver information and solutions as innovative as you are. Together, we will continue to find common ground and collaborate. Together, we will grow.

How to Use This Guide

This comprehensive reference guide includes all the BASF products and use guidelines needed to ensure healthy, high-quality plant performance. Divided into five sections, it organizes BASF solutions according to areas of plant protection: Disease Management; Mite and Insect Management; and Weed Management, with additional sections dedicated to Total Release Fungicides and Insecticides, and Specialty Greenhouse Products.

Within each section, you will find reference resources such as Use Site Recommendations, Spectrum of Control Overviews, Resistance Management Guides and summarized product information, complete with QR (Quick Response) code links to CDMS, the authoritative source for label information. The product label of any companies' products remains the definitive source for how a product is used and registered. Please read and follow specific label directions and restrictions.

Scan the QR code below, or visit betterplants.basf.us for more detailed technical information on every BASF product listed in this guide.



Ornamental Plant Production Product Use Site Overview

Fungicide Use Sites

Product	Greenhouse	Container Nursery	Field Production	Conifer Nursery Plantation	Retail Greenhouse / Nursery	Interiorscape	Landscape and Recreational Areas	Vegetable Transplants and Production
Intrinsic® Brand Fungicides								
Pageant® Intrinsic Brand Fungicide	■	■	■	■	■	■	■	■
Empress® Intrinsic Brand Fungicide	■	■	■	■	■	■		
Orkestra® Intrinsic Brand Fungicide	■	■	■	■	■	■	■	
Specialty Fungicides								
Trinity® Fungicide	■	■	■	■	■	■	■	
Orvego® Fungicide	■	■	■	■	■	■		
Stature SC® Fungicide	■	■	■	■	■	■		
Ultra Pure Oil® Horticultural Insecticide, Miticide and Fungicide	■	■	■	■	■	■	■	■
Total Release Fungicides								
Trinity® TR Total Release Fungicide	■							
Pageant® TR Intrinsic® Total Release Fungicide	■*							
Biological Fungicides								
Serifel® NG Biological Fungicide	■	■	■	■	■			■

* Pageant TR Intrinsic brand fungicide may also be used in trucks - cargo area only.

Insecticide Use Sites

Product	Greenhouse	Container Nursery	Field Production	Conifer Nursery Plantation	Retail Greenhouse / Nursery	Interiorscape	Landscape and Recreational Areas	Vegetable Transplants and Production
Specialty Insecticides								
Ventigra™ insecticide	■	■	■	■	■	■	■	■
Sultan® Miticide	■	■	■	■	■	■	■	
Pylon® Miticide/Insecticide	■							■
DuraGuard® ME Microencapsulated Insecticide	■	■	■				■	
Siesta® Fire Ant Bait		■	■	■	■		■	
Amdro® Pro Insect Fire Ant Bait	■	■	■	■	■		■	
Ultra Pure Oil® Horticultural Insecticide, Miticide and Fungicide	■	■	■	■	■	■	■	■
Biological Insect Controls								
Nemasys® Beneficial Nematodes	■	■	■	■	■	■		
Millenium® Beneficial Nematodes	■	■	■	■	■	■	■	
Velifer® Fungal Contact Insecticide	■							■
Total Release Insecticides								
Beethoven® TR Miticide/Insecticide	■							
Pylon TR Total Release Miticide/ Insecticide	■							
1300 Orthene® TR Total Release Insecticide	■							
Attain® TR Total Release Insecticide	■							
Duraplex® TR Total Release Insecticide	■							
Pyrethrum® TR Total Release Insecticide	■							

Herbicide Use Sites

Product	Bareground	Conifer Nursery Plantation	Container Nursery	Field Production	Retail Nursery	Landscape and Recreational Areas	Greenhouse and Shadehouse
Preemergent Herbicides							
FreeHand® 1.75G Herbicide	■	■	■	■	■	■	
Pendulum® AquaCap Herbicide	■	■	■	■	■	■	
Pendulum® 3.3 EC Herbicide	■	■	■	■	■	■	
Pendulum® 2G Herbicide	■	■	■	■	■	■	
Tower® Herbicide	■ ¹	■	■	■	■	■	■
Postemergent Herbicides							
Finale® Herbicide	■	■	■	■	■	■	■
Basagran® T&O Herbicide	■	■	■	■	■	■	
Segment® II Herbicide	■	■	■	■	■	■	

Specialty Greenhouse Product Use Site Recommendations

Product	Bareground	Conifer Nursery Plantation	Container Nursery	Field Production	Retail Nursery	Greenhouse	Interior	Landscape and Recreational Areas	Turf
Pest Control									
PT® Wasp Freeze® Wasp & Hornet Insecticide	■	■	■	■	■	■	■	■	■
Iron Chelates									
Sprint® 138 Iron Chelates		■	■	■	■	■	■	■	■
Sprint® 330 Iron Chelates		■	■	■	■	■	■	■	■
Disinfectant and Algicide									
Green-Shield® II Disinfectant and Algicide						■	■ ²		
Insect Monitoring									
Sensor® Insect Monitoring and Trapping Cards		■	■	■	■	■	■		
Spray Pattern Indicators									
Turf Mark® Spray Pattern Indicator	■	■	■	■		■		■	■
Tank Cleaners									
Nutra-Sol® Tank Cleaner	■	■	■	■	■	■	■	■	■
Neutralize® Tank Cleaner	■	■	■	■	■	■	■	■	■
Other									
Instant Soap 'N Water® Foaming Cleanser ³	■	■	■	■	■	■	■	■	■

¹ Tower herbicide label allows for use on gravel or ground floors of open-sided lathhouses (shadehouses) or other polyhouse structures that allow polycovers to be removed on a seasonal basis.

² Consult Green-Shield II label for interior uses.

³ Instant Soap 'N Water foaming cleanser is labeled for use on hands in all use sites listed.



Disease Management

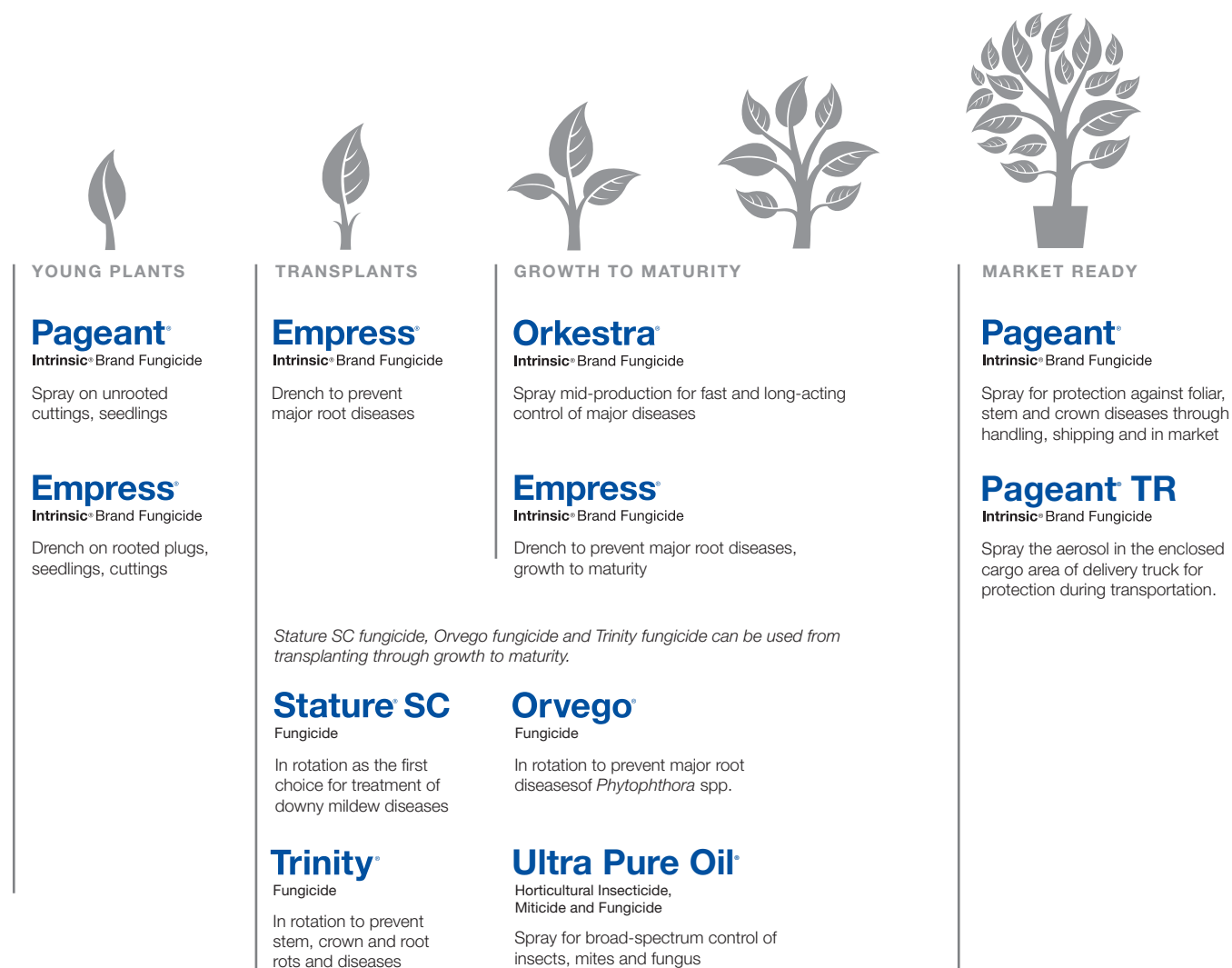
BASF provides broad-spectrum disease management solutions for every stage of the plant production cycle. **Intrinsic®** brand fungicides control the majority of ornamental diseases while delivering proven plant health benefits. The BASF disease management portfolio also includes specialist fungicides that control downy mildew, phytophthora, stem, crown and basal rot diseases.

Fungicide Use Sites

Product	Greenhouse	Container Nursery	Field Production	Conifer Nursery Plantation	Retail Greenhouse / Nursery	Interiorscape	Landscape and Recreational Areas	Vegetable Transplants and Production
Intrinsic® Brand Fungicides								
Pageant® Intrinsic Brand Fungicide	■	■	■	■	■	■	■	■
Empress® Intrinsic Brand Fungicide	■	■	■	■	■	■		
Orchestra® Intrinsic Brand Fungicide	■	■	■	■	■	■	■	
Specialty Fungicides								
Trinity® Fungicide	■	■	■	■	■	■	■	
Orvego® Fungicide	■	■	■	■	■	■		
Stature SC® Fungicide	■	■	■	■	■	■		
Ultra Pure Oil® Horticultural Insecticide, Miticide and Fungicide	■	■	■	■	■	■	■	■
Total Release Fungicides								
Trinity® TR Total Release Fungicide	■							
Pageant® TR Intrinsic® Total Release Fungicide	■*							
Biological Fungicides								
Serifel® NG Biological Fungicide	■	■	■	■	■			■

* Pageant TR Intrinsic brand fungicide may also be used in trucks - cargo area only.

When to Use BASF Fungicides in the Ornamentals Production Cycle*



* This is not a disease resistance management program recommendation.

Consult with your BASF sales representative for a comprehensive disease management program.



The Plant Health Story Behind Intrinsic® Brand Fungicides

At each stage of the production process, **Intrinsic** brand fungicides provide superior, broad-spectrum disease control that helps plants grow strong. This innovative line of fungicides also delivers plant health benefits, including greater tolerance to stress and increased growth efficiency for stronger, denser roots. Research shows that plants treated with **Intrinsic** brand fungicides display improved resilience to stress imparted by temperature extremes, drought, handling and transportation. The result is healthy, high-quality plants.

Start your production cycle on a strong foundation of broad spectrum disease control and resistance management. Incorporate **Pageant**® **Intrinsic** brand fungicide, **Empress**® **Intrinsic** brand fungicide and **Orchestra**® **Intrinsic** brand fungicide into your rotation to promote plant health throughout the growing cycle.





Pageant®

Intrinsic® Brand Fungicide

Pageant Intrinsic brand fungicide forms the foundation of your disease management program. It helps professional growers achieve exceptional disease control and plant health throughout propagation, production, finish operations and shipping.

Key Features and Benefits

- Broad-spectrum, superior disease control
- Faster, stronger rooting
- Helps produce consistent, high quality plant growth

Key Diseases Controlled

- | | |
|-------------------------------------|--------------------------------|
| ■ Anthracnose | ■ Powdery mildew |
| ■ Blossom blight | ■ Rot, blight |
| ■ Crown and basal rot | ■ Rust |
| ■ Downey mildew | ■ Scab |
| ■ Leaf spot | ■ Crown and soilborne diseases |
| ■ <i>Phytophthora</i> aerial blight | |

Use Sites

- | | |
|--|---|
| ■ Greenhouses | ■ Interiorscapes |
| ■ Lathhouses and shadehouses | ■ Golf courses |
| ■ Outdoor nurseries (field and container) | ■ Recreational landscapes |
| ■ Forest and conifer nurseries and plantations | ■ Residential and commercial landscapes |
| ■ Retail nurseries | |

Labeled for vegetable transplants for the home consumer market and vegetables grown in commercial greenhouses.

FRAC groups: 7 + 11

Active ingredients:

Boscalid
Pyraclostrobin

Signal word: CAUTION

Formulation:

WG (Wettable granule)

Use rates: 4-18 fl oz
per 100 gal

PPE: Coveralls,
chemical-resistant gloves
made of any waterproof
material, shoes, plus socks

REI: 12 hours

Packaging: 4 x 1 lb
case, 4 x 12 lb case



Empress®

Intrinsic® Brand Fungicide

Drench applications of **Empress Intrinsic** brand fungicide protect young, susceptible plants from root-infecting pathogens in plug, propagation and transplant stages of greenhouse and nursery production.

Key Features and Benefits

- Outstanding control of soil-borne diseases
- Enhanced root growth
- Consistent performance
- Readily fits disease resistance management programs

Key Diseases Controlled

Crown, root and soilborne diseases caused by:

- *Fusarium* spp.
- *Phytophthora* spp.
- *Pythium* spp.
- *Rhizoctonia* spp.

Use Sites

- Greenhouses
- Forest and conifer nurseries
- Lathhouses and shadehouses
- Interiorscapes
- Outdoor nurseries (field and container)
- Retail nurseries



FRAC group: 11

Active ingredient:

Pyraclostrobin

Signal word: WARNING

Formulation: SC (soluble concentrate)

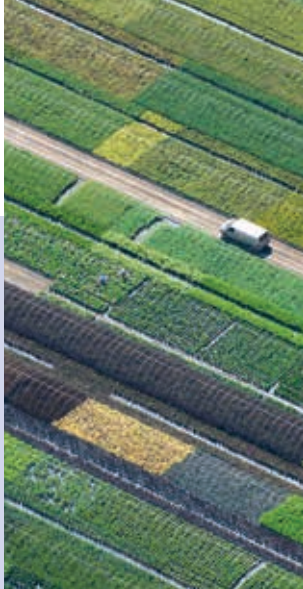
Use rates: 1.0 - 6.0 fl oz per 100 gal

PPE: Long-sleeved shirt and long pants; chemical-resistant gloves made of any waterproof material; shoes plus socks

REI: 12 hours

Packaging: 24 oz bottle
6 x 24 oz case





Orkestra®

Intrinsic® Brand Fungicide

For the nursery and greenhouse grower, **Orkestra Intrinsic** brand fungicide provides fast, long-lasting control of key diseases during the production cycle, resulting in healthier plants that exhibit the highest quality and consistency.

Key Features and Benefits

- Early curative and preventive plant protection
- Translaminar and systemic activity maximizes distribution within treated plants
- Lasting protection, even under the wettest conditions
- Extends the plant health benefits of **Intrinsic** brand fungicides throughout the plant production cycle

Key Diseases Controlled

- Anthracnose
- Crown and basal rots
- Downy mildews
- Flower and petal blights
- Leaf spots
- *Phytophthora* aerial blights
- Powdery mildews
- Rusts
- Scabs
- Stem and twig blights and dieback
- *Thielaviopsis* (suppression)
- Crown and soilborne diseases

Use Sites

- Greenhouses
- Lathhouses and shadehouses
- Outdoor nurseries (field and container)
- Forest and conifer nurseries and plantations
- Retail nurseries
- Interiorscapes
- Golf courses
- Recreational landscapes
- Residential and commercial landscapes

FRAC groups: 7 + 11

Active ingredients:

Fluxapyroxad
Pyraclostrobin

Signal word: WARNING

Formulation: SC (soluble concentrate)

Use rates: 4-11 fl oz per 100 gal

PPE: Chemical-resistant gloves, long-sleeved shirt, long pants, shoes plus socks

REI: 12 hours

Packaging: 4 x 16 fl oz case, 4 x 80 oz



Trinity®

Fungicide

Trinity fungicide provides growers and landscapers with confident control of powdery mildew, stem and crown blights, rots and other diseases in an innovative formulation that leaves no unsightly residue. **Trinity** fungicide is also available as **Trinity TR**, as shown in the Total Release section of this guide.

Key Features and Benefits

- An effective rotation partner with **Intrinsic®** brand fungicides
- Superior plant safety compared to other DMI fungicides
- Innovative formulation; leaves no unsightly residue

Key Diseases Controlled

- Anthracnose
- Crown and basal rots
- Leaf spots
- Powdery mildews
- Scabs
- Stem blight-diebacks

Use Sites

- Greenhouses
- Golf courses
- Lathhouses and shadehouses
- Outdoor nurseries (field and container)
- Christmas tree and conifer and/or hardwood tree nurseries
- Retail nurseries
- Residential and commercial landscapes
- Landscape beds
- Interiorscapes



FRAC group: 3

Active ingredient:

Triticonazole

Signal word: CAUTION

Formulation: SC

(Suspension Concentrate)

Use rates: 4 -12 fl oz
per 100 gal

PPE: Long-sleeved
shirt and long pants;
chemical-resistant
gloves made of
waterproof material;
shoes plus socks

REI: 12 hours

Packaging: 2 x 2.5 gal





FRAC groups: 40 + 45

Active ingredients:

Ametoctradin
Dimethomorph

Signal word: CAUTION

Formulation: Suspension

Use rates: 11- 14 fl oz
per 100 gal

PPE: Long sleeved shirt
and long pants, chemical-
resistant gloves made of
any waterproof material,
shoes plus socks

REI: 12 hours

Packaging: 6 x 28 fl oz
per case

Orvego®

Fungicide

Orvego fungicide meets the needs of growers who want fast knockdown to stop the spread of all major *Phytophthora* species and downy mildews in their greenhouse and nursery crops.

Key Features and Benefits

- An effective rotation partner with **Intrinsic®** brand fungicides
- A unique mode of action for control of oomycete fungi
- Knockdown of infectious zoospore stage within seconds, stopping disease spread
- Translaminar and locally systemic activity maximizes distribution within the treated area
- Flexible foliar and drench applications for control of leaf and root diseases

Key Diseases Controlled

- Downy mildew
- Aerial *Phytophthora*
- *Phytophthora* root, crown and stem rot

Use Sites

- Greenhouses
- Lathhouses and shadehouses
- Hardwood and conifer nurseries
or plantations
- Outdoor or field nurseries
- Interiorscapes



Stature® SC

Fungicide

Stature SC fungicide is the clear choice for the grower who wants the best preventive control over downy mildews and other oomycete diseases.

Key Features and Benefits

- An effective rotation partner with **Intrinsic®** brand fungicides for preventive control of downy mildews and *Phytophthora* diseases
- Translaminar and locally systemic activity maximizes distribution within the treated plant for more consistent control of downy mildew
- Anti-sporulant, stops disease progression
- Flexible foliar, drench and chemigation applications for control of foliar and root diseases

Key Diseases Controlled

- Downy mildews
- Aerial *Phytophthora*
- *Phytophthora* roots, crown and stem rots

Use Sites

- Greenhouses
- Outdoor nurseries (field and container)
- Shadehouses and lathhouses
- Conifer seedling nurseries
- Hydroponic, rockwool or artificial substrate systems



FRAC group: 40

Active ingredient:

Dimethomorph

Signal word: CAUTION

Formulation: SC

(Suspension Concentrate)

Use rates: 3.06 to 12.25
fl oz per 100 gal

PPE: Long-sleeved
shirt and long pants;
chemical-resistant
gloves made of
waterproof material;
shoes plus socks

REI: 12 hours

Packaging: 25 fl oz,
6 x 25 case





Serifel® NG

Biological Fungicide

Serifel NG biological fungicide controls a broad spectrum of diseases in nurseries and greenhouses by forming an invisible shield of protection on plant surfaces.

Key Features and Benefits

- Protects against phytophthora, rhizoctonia, fusarium and pythium root pathogens early in the production cycle
- Highly effective disease control through multiple modes of action
 - Physical barrier - creates a shield on plant surfaces
 - Nutrient competition - consumes limited nutrients on plant surfaces eliminating availability to pathogens
 - Fungicidal metabolites - prevents pathogen spore germination and hyphae development
- Most concentrated biological fungicide on the market due to its pure spore formulation

Key Pests Controlled

- Rhizoctonia spp.
- Pythium spp.
- Fusarium spp.
- Botrytis
- Powdery Mildew
 - *Podosphaera* spp.
 - *Oidiopsis* spp.
 - *Sphaerotheca* spp.
 - *Erysiphe* spp.

Use Sites

- Greenhouse
- Field/Container Nursery

FRAC groups: n/a

Active ingredients:

Bacillus amyloliquefaciens strain MBI 600

Signal word: CAUTION

Formulation: Disbursable Powder

Use rates: 0.2 - 0.4 oz per 100 gallons or 1-3 # per acre

Refer to Label

PPE: Coveralls, chemical-resistant gloves made of any waterproof material, shoes plus socks and protective eyewear

REI: 12 hours

Packaging: 5 lb bottle

Fungicide Resistance Management Guide

FRAC Group	Chemical Group(s)	Primary Target Disease(s)	Active Ingredient(s)	Fungicide Trade Name(s)	REI	Use Site(s)
1	Thiophanate	<i>Rhizoctonia</i> , <i>Thielaviopsis</i> , Fungal leaf spots	Thiophanate-methyl	AllBan®, Cleary's 3336®, OHP 6672®, T-Storm®	12	G,N,L
2	Dicarboximide	<i>Botrytis</i> , Powdery mildew, Fungal leaf spots, <i>Fusarium</i>	Iprodione	26GT®, Chipco® 26019	12	G,N,L
3	Imidazole	Scab, Powdery mildew, Fungal leaf spots, Rusts	Triflumizole	Terraguard®	12	G,N
	Triazole	Powdery mildews, Scab, Rusts, Blights, Fungal leaf spots	Metconazole	Tourney®	12	N,L
		Powdery mildew, Scab, Rusts, Blights, Fungal leaf spots	Myclobutanil	Eagle® 20 EW	24	G,N,L
			Propiconazole	Alamo®, Banner MAXX® II, Spectator™	24	N,L
		Powdery mildews, Scab, Rusts, Blights, Fungal leaf spots	Tebuconazole	Torque™	12	N,L
		Oak wilt, Dutch elm disease, Scab	Tebuconazole	Tebusject™	N/A	L
		Powdery mildew, Scab, Rusts, Blights, Fungal leaf spots	Triadimefon	Bayleton®	12	G,N,L
4	Acylalanine	Anthrachnose, Powdery mildew, Leaf spots, Stem and Crown rots	Triticonazole	Trinity® fungicide, Trinity® TR total release fungicide	12	G,N,L G
		<i>Pythium</i> , <i>Phytophthora</i>	Mefenoxam	Mefenoxam® 2, Subdue MAXX®	0	G,N,L
		Powdery mildew	Piperalin	Pipron®	12	G
		<i>Rhizoctonia</i> , Southern blight, Rusts	Flutolanil	ProStar® WG, Contrast®	12	G,N
		<i>Botrytis</i> , powdery mildew, fusarium	Isofetamid	Astun	12	GH/N

G = Greenhouse, N= Nursery, L=Landscape

1 Some products within the same chemical group may not control all pests listed, or there may be some products within the group that offer superior performance. Consult your local manufacturer's representative or your university/extension specialist if needed.

2 Specific use sites may vary by formulation and manufacturer; therefore, always read and consult product label directions.

Fungicide Resistance Management Guide – (continued)

FRAC Group	Chemical Group(s)	Primary Target Disease(s)	Active Ingredient(s)	Fungicide Trade Name(s)	REI	Use Site(s)
11	Strobilurin	Fungal leaf spots, Rusts, Powdery mildew, <i>Phytophthora</i> , <i>Rhizoctonia</i>	Azoxystrobin	Heritage®	4	G,N,L
		<i>Rhizoctonia</i> , Fungal leaf spots & blights, Scab, Rusts, Anthracnose, Downy mildew, Powdery mildew, <i>Fusarium</i> , <i>Phytophthora</i> , Southern blight	Fluoxastrobin	Fame®, Disarm O	12	G,N,L
		<i>Fusarium</i> , <i>Phytophthora</i> , <i>Pythium</i> , <i>Rhizoctonia</i>	Pyraclostrobin	Empress® Intrinsic® brand fungicide	12	G,N
		Fungal leaf spots, Rusts, Powdery mildew, <i>Rhizoctonia</i>	Trifloxystrobin	Compass®	12	G,N,L
	Imidazolinone	<i>Pythium</i> , <i>Phytophthora</i> , Downy mildew	Fenamidone	FenStop™	12	G
12	Phenylpyrrole	Fungal leaf spots, <i>Botrytis</i> , <i>Cylindrocladium</i> , <i>Fusarium</i> , <i>Rhizoctonia</i>	Fludioxonil	Medallion®, Emblem™	12	G,N,L
14	Aromatic Hydrocarbon	<i>Rhizoctonia</i>	PCNB	Revere®, Terraclor®	12	G,N, L
	1, 2, 4-thiadiazole	<i>Pythium</i> , <i>Phytophthora</i>	Etridiazole	Truban®, Terrazole®	12	G,N,L
17	Hydroxyanilide	<i>Botrytis</i>	Fenhexamid	Decree®	4	G,N
19	Peptidyl Pyrimidine Nucleoside	<i>Botrytis</i> , <i>Rhizoctonia</i> , <i>Alternaria</i> , Downy mildew, Powdery mildew, Anthracnose, Scab	Polyoxin-D	Affirm®	4	G,N,L
21	Cyano-imidazole	<i>Phytophthora</i> , <i>Pythium</i> , Downy mildew	Cyazofamid	Segway® Fungicide SC Segway® O	12	G,N,L
28	Carbamate	<i>Phytophthora</i> , <i>Pythium</i>	Propamocarb	Banol®	24	G,N,L
33 (Reclas- sified P07)	Ethyl-phosphonate	<i>Phytophthora</i> , <i>Pythium</i> , Downy mildew	Fosetyl-al (aluminum tris)	Aliette®, Areca	12	G,N,L
		<i>Phytophthora</i> , <i>Pythium</i> , Downy mildew	Phosphorous acid and salts	Agri FOS®, Alude®, Bio-phos®, Magellan®, Resyst®	4	G,N,L
40	Cinnamic Acid Amides	<i>Phytophthora</i> , Downy mildew	Dimethomorph	Stature® SC fungicide	12	G, N
	Mandelic Acid Amides	<i>Phytophthora</i> , Downy mildew	Mandipropamid	Micora®	4	G,N,L
41	Tetracycline Antibiotic	Bacterial diseases, Lethal yellows, Elm phloem necrosis	Oxytetracycline	Mycoject®, Tree Tech OTC®	NOL	L
43	Pyridinylmethyl Benzamide	<i>Phytophthora</i> , <i>Pythium</i> , Downy mildew	Fluopicolide	Adorn®	12	G,N,L
49	Piperidinyl-thiazole-isoxazoline	<i>Phytophthora</i> s, Downy mildew	Oxathiapiprolin	Segovis®	4	G,N,L

G = Greenhouse, N= Nursery, L=Landscape

Fungicide Resistance Management Guide – (continued)

FRAC Group	Chemical Group(s)	Primary Target Disease(s)	Active Ingredient(s)	Fungicide Trade Name(s)	REI	Use Site(s)
M1	Copper, Complex	Fungal leaf spots, Bacterial diseases, Powdery mildew, Scab, Downy mildew	Copper sulfate	Camelot®	12	G,N,L
			Copper sulfate pentahydrate	Phyton® 27	24	G,N,L
	Copper, Fixed	Fungal leaf spots, Bacterial diseases, Powdery mildew, Scab, Downy mildew	Copper hydroxide	Kocide 2000®	24	G
M4	Phthalimide	Fungal leaf spots, <i>Botrytis</i> , Downy mildew, <i>Thielaviopsis</i>	Captan	Captan 50W	96	G,N,L
M5	Chloronitrile	Fungal leaf spots, <i>Botrytis</i> , Powdery mildew, Rusts, Scab, <i>Fusarium</i>	Chlorothalonil	Agrisel®, Chlorostar®, AllPro®, Concorde®, Echo®, Manicure®, Thaloni®, Daconil® Ultrex®, Legend®	12-48	G,N,L
M3	Dithio-carbamate	Fungal leaf spots, <i>Botrytis</i> , Rusts, Downy mildew, Scab	Mancozeb	Dithane®, Fore®, Formec®, Mancozeb®, Junction®, Pentathlon®, Protect®	24	G,N,L
		Fungal leaf spots, <i>Botrytis</i> , Rusts, Downy mildew	Ferbam	Ferbam Granuflo®	24	G, N
		Fungal leaf spots, <i>Botrytis</i> , Rusts	Ziram	Ziram Granuflo®	48	G, N
M3+3	Dithio-carbamate + Triazole	Fungal leaf spots, <i>Botrytis</i> , Rusts, Downy mildew, Powdery mildew	Mancozeb + Myclobutanil	Manhandle®	24	G,N,L
M5+3	Chloronitrile + Pyrimidine	Fungal leaf spots, <i>Botrytis</i> , Powdery mildew, Rusts, Scab	Chlorothalonil + Fenarimol	TwoSome™	NOEL*	L
	Chloronitrile + Triazole	Leaf spots and blights, Powdery mildew, Rusts, Scab, Flower blights	Chlorothalonil + Propiconazole	Concert® II	12	L
1+M3	Thiophanate + Dithio-carbamate	Fungal leaf spots, Powdery mildew, Downy mildew, <i>Botrytis</i>	Thiophanate-methyl + Dithiocarbamate	Zyban®	12	G,N,L
1+M5	Thiophanate + Chloronitrile	Fungal leaf spots, Powdery mildew, Downy mildew, <i>Botrytis</i>	Thiophanate-methyl + Chlorothalonil	ConSyst®, Spectro90®	12	G,N,L
1+2	Thiophanate + Dicarboxamide	Fungal leaf spots, <i>Botrytis</i> , <i>Rhizoctonia</i>	Thiophanate-methyl + iprodione	26/36®	24	G,N,L
1+14	Thiophanate + 1, 2, 4-thiadiazole	<i>Rhizoctonia</i> , <i>Thielaviopsis</i> , <i>Pythium</i> , <i>Fusarium</i>	Thiophanate-methyl + etridiazole	Banrot®	12	G,N,L
3+11	Triazole + Strobilurin	Rust, <i>Rhizoctonia</i> , <i>Botrytis</i> , Powdery mildew	Triadimefon + Trifloxystrobin	Trigo™	12	G,N,L

G = Greenhouse, N= Nursery, L=Landscape

1 Some products within the same chemical group may not control all pests listed, or there may be some products within the group that offer superior performance. Consult your local manufacturer's representative or your university/extension specialist if needed.

2 Specific use sites may vary by formulation and manufacturer; therefore, always read and consult product label directions.

Fungicide Resistance Management Guide – (continued)

FRAC Group	Chemical Group(s)	Primary Target Disease(s)	Active Ingredient(s)	Fungicide Trade Name(s)	REI	Use Site(s)
4+12	Acylalanine + Phenylpyrrole	<i>Phytophthora</i> , <i>Pythium</i> , <i>Fusarium</i> , Crown and Stem rots	Mefenoxam + Fludioxonil	Hurricane®	48	G
7+11	Pyrazole-4-Carboxamides + Strobilurin	Fungal leaf spots, Downy mildew, Powdery mildew, Anthracnose, <i>Fusarium</i> , <i>Rhizoctonia</i> , <i>Phytophthora</i> , <i>Pythium</i> , Scab and Rusts, <i>Botrytis</i> , Blights	Benzovindiflupyr + Azoxystrobin	Mural®	12	G,N,L
		Fungal leaf spots, Downy mildew, Powdery mildew, Anthracnose, <i>Fusarium</i> , <i>Rhizoctonia</i> , <i>Phytophthora</i> , <i>Pythium</i> , Scab and Rusts, <i>Botrytis</i> , Blights, <i>Thelaviopsis</i> spp.	Fluxapyroxad + Pyraclostrobin	Orkestra® Intrinsic® brand fungicide	12	G,N,L
	Pyridine-Carboxamide + Strobilurin	Fungal leaf spots, Downy mildew, Powdery mildew, Anthracnose, <i>Fusarium</i> , <i>Rhizoctonia</i> , <i>Phytophthora</i> , <i>Pythium</i> , Scab and Rusts, <i>Botrytis</i> , Blights	Boscalid + Pyraclostrobin	Pageant® Intrinsic® brand fungicide	12	G,N,L
	Pyridinyl-ethyl-benzamides + Strobilurin	Fungal leaf spots, Downy mildew, Powdery mildew, Anthracnose, <i>Fusarium</i> , <i>Rhizoctonia</i> , Scab and Rusts, <i>Botrytis</i> , Blights	Fluopyram + Trifloxystrobin	Broadform	12	G,N,L
9+12	Anilinopyrimidine + Phenylpyrrole	<i>Botrytis</i> , Powdery mildew, <i>Cercospora</i> , <i>Alternaria</i> , <i>Septoria</i> , <i>Myrothecium</i> , <i>Rhizoctonia</i> , <i>Fusarium</i>	Cyprodinil + Fludioxonil	Palladium	12	G,N
45+40	Triazolo-Pyrimidylamine + Cinnamic Acid Amides	Downy mildew, <i>Phytophthora</i>	Ametoctradin + Dimethomorph	Orvego® fungicide	12	G,N
FRAC Group	IRAC Group	Combination Fungicide / Insecticides Designated Within Fungicide Resistance Action Committee and Insecticide Resistance Action Committee Groups				
1	6	Benzimidazole + Glycocide	Vascular Pathogens: Wilts, Cankers, Dutch elm disease, <i>Fusarium</i>	Debacarb + Abamectin	Abasol®	NOL L
1	4A	Benzimidazole + Neonicotinoid	Vascular Pathogens: Wilts, Cankers, Dutch elm disease, <i>Fusarium</i>	Debacarb + Imidacloprid	Imisol®	NOL L

G = Greenhouse, N= Nursery, L=Landscape

Fungicide Resistance Management Guide – (continued)

FRAC Group	Chemical Group(s)	Primary Target Disease(s)	Active Ingredient(s)	Fungicide Trade Name(s)	REI	Use Site(s)
44	Biopesticide	Botrytis, Powdery and Downy mildews, <i>Rhizoctonia</i> , <i>Pythium</i> , <i>Fusarium</i>	<i>Bacillus amyloliquefaciens</i> MBI 600	Serifel® NG fungicide	4	G,N
			<i>B. amyloliquefaciens</i> strain D747	Triathion® BA	4	G,N
		<i>Pythium</i> , <i>Rhizoctonia</i> , <i>Fusarium</i>	<i>Bacillus subtilis</i> GB03	Cease®	4	G,N
			<i>Bacillus subtilis</i> QST713	Rhapsody® AS	4	G,N,L
NC	Botanical Extract	Powdery mildew	Jojoba oil	Permatrol®	4	G,N,L
		Powdery mildew, Fungal leaf spots, Rusts, Scab	Clarified hydrophobic neem oil	Triact 70®	4	G,N,L
		Powdery mildew, Fungal leaf spots,	Macheaya extract	Qwel®	12	G
		Powdery mildew	<i>Raynouria sachalinesis</i>	Milsana®	24	G
PO5	Botanical Extract	Fungal and Bacterial leaf spots, Powdery mildew, Botrytis Gray Mold, Stem blights and rots	Extract of <i>Reynouria sachalinesis</i>	Regalia®	4	G,N,L
PO7	Ethyl-phosphonate	<i>Phytophthora</i> , <i>Pythium</i> , Downy mildew	Fosetyl-al	Aliette®	12	G,N,L
			Phosphorous acid	Agri FOS®, Alude®, ArborFox®, Bio-phos®, Magellan®, Resyst®	4	G,N,L
BM01	Biopesticide	<i>Phytophthora</i> , <i>Pythium</i> , <i>Fusarium</i> , <i>Cylindrocladium</i> , <i>Thielaviopsis</i>	<i>Trichoderma harzianum</i> T-22 + <i>T. virens</i> G-41	Rootshield® Plus (BW240)	4	G,N,L
		<i>Pythium</i> , <i>Rhizoctonia</i> , <i>Cylindrocladium</i> , <i>Fusarium</i>	<i>Trichoderma harzianum</i> T22	PlantShield® HE, RootShield®	0	G,N,L
NC	Biopesticide	<i>Pythium</i> , <i>Rhizoctonia</i> , <i>Fusarium</i>	<i>Gliocadium virens</i> GL21	SoilGard® G	0	G,N,L
		<i>Pythium</i> , <i>Rhizoctonia</i> , <i>Fusarium</i> , <i>Verticillium</i>	<i>Streptomyces lydicus</i> WYEC108	Actinovate®, Actiono Iron	4	G,N,L
	Hydrogen Dioxide/Peroxide	Bacteria and Soilborne Fungi, Fungal leaf spots, Powdery mildew, Botrytis	Hydrogen Dioxide/Peroxide/Peroxyacetic Acid	ZeroTol®, TerraClean®, X3	0-2	G,N,L
	Bicarbonate	Powdery mildew, Rusts, Downy mildew	Potassium Bicarbonate	Armcarb® 100, Bi-Carb®, Firststop®, Kaligreen®, MilStop®	1-4	G,N,L
	Oil	Powdery mildew	Unsolfunated residue of petroleum oil	SuffOil-X®	4	G,N
		Powdery mildew and Rusts	Mineral oil	Ultra-Pure Oil®	0	G,N,L
	Quaternary Ammonium	Bacteria/Algae	Quaternary amines	Green-Shield II®	0	G
			Quaternary ammonium chloride	KleenGrow®	48	G
	Soap	Powdery mildew	Potassium salts of fatty acids	M-Pede®	12	G,N,L

G = Greenhouse, N= Nursery, L=Landscape

1 Some products within the same chemical group may not control all pests listed, or there may be some products within the group that offer superior performance. Consult your local manufacturer's representative or your university/extension specialist if needed.

2 Specific use sites may vary by formulation and manufacturer; therefore, always read and consult product label directions.

Fungicide Resistance Action Committee (FRAC) Mode of Action Classification List:

- 1 Inhibition of tubulin formation in mitosis
- 2 Affect cell division, DNA and RNA synthesis and metabolism
- 3 DMI (Demethylation Inhibitor): Inhibition of sterol synthesis
- 4 Phenylamides - Affect RNA synthesis
- 5 Inhibition of an isomerase in sterol biosynthesis - Piperadines, Morpholines
- 7 Complex II in the mitochondria: succinate-dehydrogenase enzyme inhibitor
- 9 Affects amino acids and protein synthesis
- 11 Complex III: cytochrome bc1 (ubiquinol oxidase) at Qo site- Quinone outside- (cyt b gene) affecting respiration
- 12 MAP protein kinase in osmotic signal transduction
- 14 Lipid peroxidation
- 17 3-keto reductase during C4 demethylation in sterol biosynthesis
- 19 Chitin synthase
- 21 Complex III: cytochrome bc1(ubiquinone reductase) at Qi- Quinone inside- site in the mitochondria affecting respiration
- 28 Affects cell membrane permeability (proposed)
- 33 (Reclassified PO7)
- 40 Affects cell wall biosynthesis - cellulose synthase specifically
- 41 Protein synthesis attachment of aminoacyl-tRNA to ribosomal acceptor (A) site
- 43 Affects spectrin-like proteins, believed to play a role in maintaining the membrane stability
- 45 Complex III: cytochrome bc1 (ubiquinone reductase) at Qo site, stigmatellin binding sub-site affecting respiration
- U15 Oxysterol binding protein (OSBP) inhibition (proposed)
- M Multi-site contact activity
- NC Not classified

Insecticide Resistance Action Committee (IRAC) Mode of Action Classification List:

- 4a Neonicotinoids
- 6 Chloride channel activators

The above lists are from the U.S. Environmental Protection Agency, in cooperation with the Fungicide Resistance Action Committee (FRAC) and the Insecticide Resistance Action Committee (IRAC) respectively.

FRAC and IRAC are technical working groups within the Global Crop Protection Federation (GCPF).

More information on the Fungicide Resistance Action Committee and the Mode of Action Classification is available from www.frac.info.

More information on the Insecticide Resistance Action Committee and the Mode of Action Classification is available from www.irac.info.



Mite and Insect Management

The BASF mite and insect management portfolio, which includes specialty insecticides, miticides and biological insect controls, provides solutions for both indoor and outdoor grower operations. Ask us about our innovative total release aerosol delivery system of insecticides that treats greenhouses of all sizes.

Insecticide Use Sites

Product	Greenhouse	Container Nursery	Field Production	Conifer Nursery Plantation	Retail Greenhouse / Nursery	Interiorscape	Landscape and Recreational Areas	Vegetable Transplants and Production
Specialty Insecticides								
Ventigra™ insecticide	■	■	■	■	■	■	■	■
Sultan® Miticide	■	■	■	■	■	■	■	
Pylon® Miticide/Insecticide	■							■
DuraGuard® ME Microencapsulated Insecticide	■	■	■				■	
Siesta® Fire Ant Bait		■	■	■	■		■	
Amdro® Pro Insect Fire Ant Bait	■	■	■	■	■		■	
Ultra Pure Oil® Horticultural Insecticide, Miticide and Fungicide	■	■	■	■	■	■	■	■
Biological Insect Controls								
Nemasys® Beneficial Nematodes	■	■	■	■	■	■		
Millenium® Beneficial Nematodes	■	■	■	■	■	■	■	
Velifer® Fungal Contact Insecticide	■							■
Total Release Insecticides								
Beethoven® TR Miticide/Insecticide	■							
Pylon TR Total Release Miticide/Insecticide	■							
1300 Orthene® TR Total Release Insecticide	■							
Attain® TR Total Release Insecticide	■							
Duraplex® TR Total Release Insecticide	■							
Pyrethrum® TR Total Release Insecticide	■							



IRAC group: 9D

Active ingredient:

Afidopyropen

Signal word: CAUTION

Formulation:

DC (Dispersible Concentrate)

Use rates: 1.4 - 7.0 fl oz
per 100 gal I

PPE: Long sleeved shirt and
long pants, chemical-resis-
tant gloves made of barrier
lamine or butyl rubber or
neoprene rubber, shoes and
socks

REI: 12 Hours

Packaging: 4 x 20 fl oz

Ventigra™

Insecticide

Ventigra insecticide provides effective control of piercing-sucking insect pests in production and landscape ornamentals and vegetable transplants for the home consumer market. Ventigra Insecticide is a unique mode of action subgroup with no known cross-resistance with key commercial insecticide classes. Ventigra Insecticide has minimal impact to beneficial insects including predatory mites, parasitoid wasps, and pollinators, and it's compatible with biological releases in a production program.

Key Features and Benefits

- Rapid onset of action to stop insect feeding and damage
- Long residual control
- Translaminar movement delivers optimal protection against actively feeding pests
- No negative impact on bee populations, including colony health and development
- Excellent rotational partner in IPM programs
- Unique MOA subgroup controls pests that have developed resistance to existing insecticides

Insects Controlled

- Aphids, whiteflies, and mealybug, and has suppression for certain species of scale.

Use Sites

- | | |
|---|---|
| ■ Commercial and retail nurseries, field and container | ■ Greenhouses, shadehouses, and lathhouses |
| ■ Commercial, public, and recreational gardens | ■ Vegetable transplants |
| ■ Commercial and residential landscapes, including golf courses, parks and recreation areas | ■ Interiorscapes |
| | ■ Forest tree and conifer nurseries and plantations |

Labeled for use on juvenile fruit and nut trees, vines, brambles and bushberries grown in commercial ornamental production nurseries.

Labeled for vegetable transplants for the home consumer market and vegetables grown in commercial greenhouses.

Sultan®

Miticide

Sultan miticide is for the grower who wants fast, powerful control and lasting protection against all life stages of spider mites in greenhouse and nursery crops.

Key Features and Benefits

- Fast knockdown—typically within three hours of contact
- Controls mite populations for up to 28 days
- Unique mode of action increases rotation options
- Compatible with Integrated Pest Management (IPM) programs using beneficial insects and predatory mites
- May be used in interiorscapes and outdoor landscape settings

Mites Controlled

- | | |
|---------------------------|----------------------|
| ■ Two-spotted spider mite | ■ Carmine mite |
| ■ Glover mite | ■ Citrus red mite |
| ■ Pacific spider mite | ■ Spruce spider mite |

Use Sites

- | | |
|--|--|
| ■ Greenhouses | ■ Landscape ornamentals |
| ■ Lathhouses and shadehouses | ■ Commercial and residential landscape maintenance areas |
| ■ Interiorscapes | ■ Tree and conifer nurseries or plantations |
| ■ Commercial and retail nurseries (field or container) | |
| ■ Commercial, public and recreational gardens | |



IRAC group: 25

Active ingredient:

Cyflumetofen

Signal word: CAUTION

Formulation:

Suspension

Use rates: 13.7 fl oz per 100 gal

PPE: Chemical-resistant gloves, long-sleeved shirt, long pants, shoes plus socks

REI: 12 Hours

Packaging: 4 x 16 fl oz per case





IRAC group: 13

Active ingredient:

Chlorfenapyr

Signal word: CAUTION

Formulation:

Suspension

Use rates: 2.6 -10.0 fl oz per 100 gal

PPE: Coveralls, chemical-resistant gloves, shoes plus socks

REI: 12 hours

Packaging: 4 x 16 fl oz per case; 2 x 0.5 gal per case

Pylon®

Miticide/Insecticide

Pylon miticide/insecticide is the greenhouse grower's most effective treatment for control of Western flower thrips, chilli thrips and mites.

Pylon miticide/insecticide is also available as **Pylon TR**, a total release formula, in the Total Release section of this guide.

Key Features and Benefits

- Broad-spectrum control of nymph and adult stages of mites
- The foundation for an effective thrips control program
- Translaminar activity maximizes distribution within the treated plants
- Excellent finish treatment to achieve the crop quality expectations of the most discerning customers

Key Insects Controlled

- | | |
|-------------------------|--------------------|
| ■ Western Flower Thrips | ■ Cyclamen Mite |
| ■ Chilli Thrips | ■ Citrus Budmite |
| ■ Spider Mites | ■ Fungus Gnats |
| ■ Broad Mite | ■ Caterpillars |
| ■ Rust Mite | ■ Foliar Nematodes |

Use Sites

- Commercial ornamental greenhouses
- Commercial production greenhouses for fruiting vegetables



DuraGuard® ME

Microencapsulated Insecticide

DuraGuard ME is for the production ornamental grower who wants long-lasting control of a wide range of pests.

Key Features and Benefits

- Highly versatile, long-lasting residual
- Micro-encapsulated technology
- Increased plant safety, even on many open blooms
- Little to no odor

Key Insects Controlled

- | | |
|----------------------|----------------|
| ■ Aphids | ■ Leafhoppers |
| ■ Fungus gnats | ■ Leaf miners |
| ■ Fungus gnat larvae | ■ Flea beetles |
| ■ Mealybugs | ■ Thrips |
| ■ Scale insects | ■ Ants |
| ■ Shore flies | ■ Crickets |
| ■ Spider mites | |

Use Sites

- Commercial ornamental greenhouses and nurseries
- Landscaped outdoor areas



IRAC group: 18

Restricted Use Pesticide

Active ingredient:

Chlorpyrifos

Signal word: CAUTION

Formulation:

ME (microencapsulated liquid concentrate)

Use rates:

Foliar Spray: 25 - 50 fl oz per 100 gal

Drench: 0.125 fl oz per gal

Outdoor Ornamentals:

0.5-1.75 fl oz per 1000 sq ft

PPE: Long-sleeved shirt and long pants, waterproof gloves, shoes plus socks

REI: 24 hours

Packaging: 4 x 1 gal





IRAC group: 22B

Active ingredient:
Metaflumizone

Signal word: CAUTION

Formulation:
Granular bait

Use rates:
Broadcast treatment:
1.0-1.5 lb per acre

Mound treatment:
2-4 level tablespoons

PPE: Long-sleeved shirt
and long pants,
waterproof gloves,
shoes plus socks

REI:
12 hours

Packaging: 15 lb bag

Siesta®

Insecticide Fire Ant Bait

Siesta insecticide fire ant bait is an improved baiting formulation that provides the professional horticulturist with fast, long-lasting control of native and red imported fire ants.

Key Features and Benefits

- Non-repellent, with a novel mode of action
- Eliminates the queen and the entire colony
- Rapid cessation of feeding leads to colony collapse in three days
- Listed on USDA APHIS for nursery stock RIFA quarantine certification

Insects Controlled

- Native and red imported fire ants

Use Sites

Ornamental sites:

- Outdoor nurseries (field and container)
- Soil around bearing and non-bearing fruit or nut trees

Non-cropland areas:

- Airports
- Cemeteries
- Parks
- School and picnic grounds
- Recreational areas
- Roadside areas

Turf sites:

- Athletic fields
- Commercial grounds
- Golf courses
- Lawns
- Landscaped areas
- Sod farms



Amdro® Pro

Insecticide Fire Ant Bait

Amdro Pro fire ant bait is a cost-effective mound baiting system for control of imported and native fire ants, and other nuisance ants

Key Features and Benefits

- Eliminates the queen and colony within seven days of mound treatment
- Rids entire area of fire ants within two weeks of broadcast application
- Approved for aerial applications
- Listed by USDA APHIS for RIFA quarantine certification of nursery stock

Key Insects Controlled

- Imported and native fire ants
- Little fire ants
- Harvester ants
- Bigheaded ants

Use Sites

Ornamentals sites:

- Outdoor container nurseries
- Outdoor field nurseries
- Soil around non-bearing fruit or nut trees

Non-cropland areas:

- Airports
- Cemeteries
- Parks
- School and picnic grounds
- Recreational areas
- Roadside areas
- Pasture and rangeland

Turf sites:

- Athletic fields
- Commercial grounds
- Golf courses
- Lawns
- Landscaped areas
- Sod farms



IRAC group: 20A

Active ingredient:

Hydramethylnon

Signal word: CAUTION

Formulation:

Granular bait

Use rates:

Broadcast treatment:

1-2 lb per acre depending on ant species

Mound treatment:

2 to 5 level tablespoons

PPE: Long-sleeved shirt and long pants, chemical-resistant gloves, such as rubber or waterproof gloves, shoes plus socks

REI: 12 hours (agricultural uses only)

Packaging: 25 lb bag





IRAC group: Horticultural oil

Active ingredient:

- 98% petroleum oil

Signal word: CAUTION

Formulation:

Liquid

Use rates: 0.5 gal to 2 gal per 100 gal

PPE: Long-sleeved shirt and long pants, chemical-resistant gloves, shoes plus socks

REI: 4 hours

Packaging:

2 x 2.5 gal, 30 gal drum

Ultra Pure Oil

Horticultural Insecticide, Miticide and Fungicide

A flexible, year-round, 99% pure spray oil, **Ultra-Pure Oil** meets the pest and disease resistance management needs of horticulturalists by providing highly effective contact activity with lower potential for plant phytotoxicity.

Key Features and Benefits

- Broad-spectrum control of insects, mites and fungi
- Use alone or in tank-mixes
- No odor and no post-harvest restrictions
- Excellent disease resistance management tool

Pests Controlled

- | | |
|------------------------|---------------------------------|
| ■ Adelgids | ■ Mites |
| ■ Aphids | ■ Scale insects |
| ■ Fungus gnats | ■ Thrips |
| ■ Lacebugs | ■ Whiteflies |
| ■ Leaf miners (larvae) | ■ Webworms |
| ■ Leafhoppers | ■ Powdery mildew on ornamentals |
| ■ Mealybugs | |

Use Sites

- | | |
|------------------------|--------------------------------|
| ■ Greenhouses | ■ Ornamental trees and shrubs |
| ■ Nurseries | ■ Flowering and foliage plants |
| ■ Container gardens | ■ Field crops |
| ■ Bedding plants | ■ Fruit and nut crops |
| ■ Christmas tree farms | ■ Vegetables and herbs |



Nemasys®

Beneficial Nematodes

Nemasys beneficial nematodes help the professional greenhouse grower achieve biocontrol of fungus gnats and Western flower thrips. No re-entry restrictions means fewer worker interruptions and optimizes production efficiencies.

Key Features and Benefits

- Compatible with other biologicals and many common chemistries including fertilizers, fungicides and insecticides
- Excellent resistance management tool
- Foundation of biological control programs

Key Insects Controlled

- Fungus Gnats
- Western flower thrips

Use Sites

- Commercial greenhouses
- Interiorscapes
- Field, container and retail nurseries



Active ingredient:
Steinernema feltiae

PPE: None required.

REI: Zero. No re-entry restrictions.

Packaging: 50 million nematode per tray, or 5 x 250 million nematodes per case





Active ingredient:

Steinernema carpocapsae

PPE: None required.

REI: Zero. No re-entry restrictions.

Packaging: 250 million nematodes per tray

Millenium®

Beneficial Nematodes

Millennium beneficial nematodes help the ornamental grower achieve effective biocontrol of shore fly pests in greenhouses, with zero re-entry level use restrictions.

Key Features and Benefits

- Compatible with other biologicals and many common chemistries including fertilizers, fungicide and insecticides
- Excellent resistance management tool
- Foundation of biological control programs

Key Insects Controlled

- Shore flies

Use Sites

- Commercial greenhouses
- Interiorscapes
- Field, container and retail nurseries
- Lawns and landscapes



Velifer®

Fungal Contact Insecticide/Miticide

Velifer fungal contact insecticide/miticide effectively controls major greenhouse pests, including whiteflies, and is an invaluable tool for growers to use alone or in rotation with chemicals to reduce resistance and extend the life of their chemicals.

Key Features and Benefits

- Liquid oil dispersion formulation
- Biological product based on a naturally occurring beneficial fungus
- Active against all life stages of the target pest
- Works in a manner that complements chemical solutions
- Resistance development is highly unlikely
- No known adverse symptoms of phytotoxicity
- Does not affect beneficial insects

Key Insects Controlled

- Aphid
- Whitefly
- Mealybug
- Thrips
- Mites

Use Sites

- Commercial greenhouses



Active ingredient:

Beauveria bassiana strain
PPRI 5339

Signal word: CAUTION

Formulation:

Liquid oil dispersion

Use rates:

3 - 13 fl oz per 100 gal water

PPE: Long-sleeved shirt,
long pants, shoes and
socks, protective eyewear

REI: 4 hours

Packaging:



Insecticide Resistance Management Guide

IRAC Group	Chemical Sub Group(s)	Primary Target Insect(s)	Active Ingredient(s)	Insecticide Trade Name(s)	REI	Use Site(s)
1A	Carbamates	Caterpillars, Soft scale insects, Thrips*	Carbaryl Methiocarb	Sevin® Mesuro®	12 24	N,L G,N
1B	Organophosphates	Aphids, Caterpillars, Mealybugs*, Ants, Whiteflies (general and B-type), Fungus gnats, Shore flies, Glassy-winged sharpshooter	Acephate Chlorpyrifos Diazinon Naled Dimethoate Malathion Methidathion Oxydemeton-methyl Phosmet Trichlorfon	1300 Orthene® TR total release insecticide, Orthene® TT&O WSP insecticide, Pinpoint® PT 1300, Tame®/Orthene TR total release insecticide DuraGuard® ME microencapsulated insecticide, DuraPlex® TR total release insecticide, Dursban Diazinon® Diabrom® Dimethoate® 267, Cygon® 2E, Dimate® 4EC Malathion® 8F Supracide® MSR® Spray Concentrate Imidan® 70 W Dylox® 80	24 24 12 24 48 12 48 48-72 24 N/A	G,N,L G,N N G N N,L N N,L L
2A	Cyclodiene Organochlorides	Aphids, Mites, Borers, True bugs and Whiteflies	Endosulfan	Fulex Thiodan® insecticidal smoke, Thionex® EC	24	G
2	Phenylpyrazoles (Fiproles)	Imported fire ants, Nuisance ants, Fleas, Ticks, Mole crickets	Fipronil	Ceasefire®, Topchoice®	24	L
3	Pyrethroids	Aphids, Caterpillars, Glassy-winged sharpshooter, Mealybugs*, Thrips*, Scales*	Bifenthrin Cyfluthrin Fenpropathrin Fluvalinate Lambda-cyhalothrin Permethrin Deltamethrin	OnyxPro®, Talstar®, Attain TR® total release insecticide Decathlon®, Tempo® Tame® Mavrik® AF Scimitar® GC Astro®, Perm-Up®, Permethrin® 3.2 EC DeltaGard®	12 12 24 12 24 12 12	G,N,L G,N,L G,N,L G,N,L G,N,L L N,L
	Pyrethrins	Aphids, Caterpillars, Glassy-winged sharpshooter, Mealybugs*, Thrips*, Scales*	Pyrethrins	Pyrethrum® TR total release insecticide	12	G,N

G = Greenhouse, N= Nursery, L=Landscape

* Some, but not all, species of selected pests within the group are controlled. Read the product specimen label for additional information. Consult your local university/extension specialist if needed.

1 Some products within the same chemical group may not control all pests listed, or there may be some products within the group that offer superior performance.

2 Specific use sites may vary by formulation and manufacturer; therefore, always read and consult product label directions.

Insecticide Resistance Management Guide – (continued)

IRAC Group	Chemical Sub Group(s)	Primary Target Insect(s)	Active Ingredient(s)	Insecticide Trade Name(s)	REI	Use Site(s)
4A	Neonicotinoids	Aphids, Whiteflies (general, B- and Q-type), Grubs*, Scales*, Mealybugs & Scale, Caterpillars, Midges, Thrips	Acetamiprid	TriStar®	12	G,N,L
			Dinotefuran	Safari®	12	G,N,L
			Imidacloprid	Marathon®, Merit®, Discus® Tablets	0-12	G,N,L
			Imidacloprid + Cyfluthrin	Discus® NG	12	N
			Imidacloprid + Bifenthrin	Allectus® G	12	L
			Imidacloprid + Debacarb	Imisol®	NOL	L
			Imidacloprid + 12-9-4 fertilizer carrier	Coretect®	NOL	L
			Imidacloprid slow release	SusCon®	NOL	L
			Bifenthrin + Clothianidin	Allectus®, Aloft®	12	L
			Dinotefuran	Safari®	12	G,N,L
			Thiamethoxam	Flagship 25 WG®	12	G,N
4B	Nicotine	Whiteflies, Spider mites, Aphids, Mealybugs	Nicotine	Fulex® Nicotine® Fumigator,* Nicotine Smoke Generator		G
5	Spinosyns	Caterpillars, Mites*, Thrips	Spinosad	Conserve®	4	G,N,L
		Caterpillars, Leafminers, Red Imported Fire Ants	Spinosad	Entrust® SC	4	G,N
6	Avermectins, Milbemycins	Mites, Thrips	Abamectin	Avid®	12	G,N,L
			Abamectin + Debacarb	Abasol®	NOL	L
		Mites	Milemectin	Ultiflora Miticide®	12	N
	Glycoside	Caterpillars, Leafminers, Mites, Psylla	Emamectin Benzoate	Enfold®	12	N
7A		Whiteflies, Fungus gnats, Scales, Mealybugs, Aphids	s-Kinopronone	Enstar® AQ	4	G
	Juvenile Hormone Analogues	Imported fire ants	Methoprene	Extinguish®	4	N,L
7B	Fenoxycarb	Ants	Fenoxycarb	Award®	12	G
7C	Pyriproxyfen	Fungus gnats, Shore flies	Pyriproxyfen	Distance®, Fulcrum®	12	G,N
9B	Pyridine Azomethine Derivatives	Aphids, Mealybugs*, Whiteflies*	Pymetrozine	Endeavor®	12	G,N,L
10A	Clofentezine, Hexythiazox	Mites	Clofentezine	Ovation®, Applause™,	12	G,N
			Hexythiazox	Hexygon DF®	12	G,N,L

G = Greenhouse, N= Nursery, L=Landscape

Insecticide Resistance Management Guide – (continued)

IRAC Group	Chemical Sub Group(s)	Primary Target Insect(s)	Active Ingredient(s)	Insecticide Trade Name(s)	REI	Use Site(s)
10B	Etoxazole	Mites*	Etoxazole	TetraSan® Beethoven TR ® miticide/insecticide	4-24	G,N,L G
11A	Bacillus thuringiensis and the insecticidal proteins they produce	Fungus gnat larvae, Caterpillars	<i>Bacillus thuringiensis</i> sub <i>Israelensis</i>	Gnatrol®, Deliver®, Javelin® WG	4	G,N,L
12B	Organotin Miticides	Mites*	Fenbutatin-oxide	ProMITE® 50 WP	48	G,N,L
13	Pyrroles	Mites*, Thrips, Fungus gnats, Foliar nematodes, Caterpillars	Chlorfenapyr	Pylon ® Insecticide, Pylon ® TR Insecticide	12 4- 12	G G,N
15	Benzoylureas	Fungus gnats	Diflubenzuron	Adept®	12	G
		Fungus gnats	Diflubenzuron	Dimilin® SC	12	G,N
		Aphids, Mites, Thrips	Novaluron	Pedestal®	12	G,N
16	Buprofezin	Mealybugs*, Whiteflies*	Buprofezin	Talus®	12	G,N,L
17	Cyromazine	Fungus gnats, Leafminers	Cyromazine	Citation®	12	G,N,L
18	Diacylhydrazines	Caterpillars	Tebufofenozide	Confirm®	4	N
			Methoxyfenozide	Intrepid®	4	G,N
20A	Hydramethylnon	Imported fire ants	Hydramethylnon	Amdro Pro ® fire ant bait insecticide	12	N,L
20B	Acequinocyl	Mites	Acequinocyl	Shuttle® O	12	G,N,L
21A	Pyridazinones	Mites, Whiteflies* (general and Q-type)	Pyridaben	Sanmite®	12	G,N
			Fenazaquin	Magus®	12	G,N
	METI Acaricides and Insecticides	Spider mites	Fenpyroximate	Akari®	12	G
22A	Oxadizines	Caterpillars, European crane fly, Ants including fire ants	Indoxacarb	Advion®	N/A	L
22B	Semicarbazones	Fire ants	Metaflumizone	Siesta ® fire ant bait insecticide	12	N,L
23	Tetronic and Tetramic Acid Derivatives	Spider Mites*, Whiteflies*	Spiromesifen	Judo®, Forbid®, Savate™	12	G,N
		Aphids, Leafhoppers, Mealybugs, Psyllids, Whiteflies, Mites	Spirotetramat	Kontos®	24	G,N

G = Greenhouse, N= Nursery, L=Landscape

* Some, but not all, species of selected pests within the group are controlled. Read the product specimen label for additional information. Consult your local university/extension specialist if needed.

1 Some products within the same chemical group may not control all pests listed, or there may be some products within the group that offer superior performance.

2 Specific use sites may vary by formulation and manufacturer; therefore, always read and consult product label directions.

Insecticide Resistance Management Guide – (continued)

IRAC Group	Chemical Sub Group(s)	Primary Target Insect(s)	Active Ingredient(s)	Insecticide Trade Name(s)	REI	Use Site(s)
25	Beta-ketonitrile Derivatives	Spider mites	Cyflumetofen	Sultan® miticide	12	G,N,L
28	Diamides	Aphids, Whiteflies, Thrips	Cyanotraniliprole	Mainspring® Mainspring® GNL	4	G,N,L
29	Flonicamid	Aphids, Glassy-winged sharpshooter, Mealybugs, Thrips	Flonicamid	Aria®	12	G,N,L
NC	Oils	Mites, Mealybugs, Aphids, Thrips	Clarified hydrophobic extract of neem oil	Triact 70®	4	G,N,L
			Petroleum oil	Ultra-Pure Oil®, PureSpray®, Green Organic Horticultural Spray Oil	4	G,N,L
	Soaps	Mites*, Mealybugs*, Whiteflies*	Potassium salts of fatty acids	M-Pede®	12	G,N,L
	Inorganics	Slugs, Snails	Iron phosphate	Sluggo®	0	L
	Aldehydes	Slugs, Snails	Metaldehyde	Durham®, Trail's End®, Slug-It®	12	L
	Biological Agents	Nematodes*	Myrothecium verrucaria	DiTera®	4	N,L
		Fungus gnat	Steinernema feltiae	Nemasys® beneficial nematodes	0	G,I,N
		Grubs	Heterorhabditis bacteriophora	Nemasys G® beneficial nematodes	0	G,N
		Black vine weevil	Steinernema kraussei	Nemasys L® beneficial nematodes	0	G,N
		Weevils*, Borers*, Shore flies	Steinernema carpocapsae	Millenium® beneficial nematodes	0	G,N,L
		Weevils*	Steinernema carpocapsae	Nematac® C beneficial nematodes	0	G,N,L
		Aphids, Q-type Whitefly, Thrips	Beauveria bassiana	Naturalis® L, BotaniGard®	4	G,N,L
UN	Pyridalyl	Thrips, Caterpillars	Pyridalyl	Overture®	12	G
	Dicofol	Mites*	Dicofol	Dicofol 4-E	12-48	G,N,L
	Pyridine Azomethines	Whiteflies, Aphids, Mealybugs	Pyrafluquinazon	Rycar®	12	G
	Carbazates	Spider mites	Bifenazate	Floramite®	4	G,N,L
	Biopesticide Insect Growth Regulator	Aphids, Thrips, Whiteflies	Azadirachtin	Azatin O®	4	G,N
	Diacylhydrazines	Aphids, Thrips*, Whiteflies*	Azadirachtin	Azatin XL®, Ornazin®	4-12	G,N,L
				Captiva®	4	G,N
6+UN		Mites, Leaf Miners	Bifenazate + Abamectin	Sirocco™	12	G,N,L

G = Greenhouse, N= Nursery, L=Landscape

Insecticide Resistance Action Committee (IRAC) Mode of Action Classification List:

- 1 Acetylcholine esterase inhibitor
- 2 GABA-gated chloride channel antagonists
- 3 Sodium channel modulators
- 4 Nicotinic Acetylcholine receptor agonists/antagonists
- 5 Nicotinic Acetylcholine receptor agonists (allosteric) (not group 4)
- 6 Chloride channel activators
- 7 Juvenile hormone mimics
- 9 Compounds of unknown or non-specific mode of action (selective feeding blockers)
- 10 Compounds of unknown or non-specific mode of action (mite growth inhibitors)
- 11 Microbial disruptors of insect midgut membranes (includes transgenic crops expressing B.t. toxins)
- 12 Inhibitors of oxidative phosphorylation, disruptors of ATP formation (inhibitors of ATP synthase)
- 13 Uncouplers of oxidative phosphorylation via disruption of proton gradient
- 15 Inhibitors of chitin biosynthesis, type 0, Lepidopteran
- 16 Inhibitors of chitin biosynthesis, type 1, Homopteran
- 17 Ecdysone receptor agonists
- 18 Ecdysone agonists
- 20 Mitochondrial complex III electron transport inhibitors (Coupling site II)
- 21 Mitochondrial complex I electron transport inhibitors
- 22 Voltage-dependent sodium channel blocker
- 23 Inhibitors of lipid synthesis
- 25 Neuronal inhibitors (unknown mode of action)
- 28 Ryanodine receptor modulator
- 29 Chordotonal organ modulators – undefined target site
- NC Not classified by IRAC

The above list is from the U.S. Environmental Protection Agency, in cooperation with the Insecticide Resistance Action Committee (IRAC). IRAC is a technical working group within the Global Crop Protection Federation (GCPF).

More information on the Insecticide Resistance Action Committee and the Mode of Action Classification is available from www.irc.info.



Weed Management

Control weeds with BASF pre- and post-emergent herbicides in granular and liquid formulations. Designed with plant safety in mind, BASF pre-emergent herbicides provide broad-spectrum weed control with outstanding results. Flexible use rates and application methods result in reduced hand weeding costs, resulting in more efficient production of the highest quality ornamental nursery crops.

Herbicide Use Sites

Product	Bareground	Conifer Nursery Plantation	Container Nursery	Field Production	Retail Nursery	Landscape and Recreational Areas	Greenhouse and Shadehouse
Preemergent Herbicides							
FreeHand® 1.75G Herbicide	■	■	■	■	■	■	
Pendulum® AquaCap Herbicide	■	■	■	■	■	■	
Pendulum® 3.3 EC Herbicide	■	■	■	■	■	■	
Pendulum® 2G Herbicide	■	■	■	■	■	■	
Tower® Herbicide	■ ¹	■	■	■	■	■	■
Postemergent Herbicides							
Finale® Herbicide	■	■	■	■	■	■	■
Basagran® T&O Herbicide	■	■	■	■	■	■	
Segment® II Herbicide	■	■	■	■	■	■	

¹ Tower herbicide label allows for use on gravel or ground floors of open-sided lathhouses (shadehouses) or other polyhouse structures that allow poly

Weeds Controlled

Common name	Scientific name	Pendulum® herbicide products	FreeHand® 1.75G herbicide	Tower® herbicide	Finale® herbicide	Basagran® T&O herbicide	Segment® II herbicide
American burnweed	<i>Erechtites hieraciifolia</i>		■				
Barnyardgrass	<i>Echinochloa crus-galli</i>	■	■	■	■		■
Bittercress	<i>Cardamine</i> spp.	■	■	■			
Annual bluegrass	<i>Poa annua</i>	■	■	■	■		
Carpetweed	<i>Mollugo verticillata</i>	■	■	■			
Chamberbitter	<i>Pyllanthus urinaria</i>		■				
Common chickweed	<i>Stellaria media</i>	■	■		■		
Crabgrass	<i>Digitaria</i> spp.	■	■	■	■		■
Dogfennel	<i>Eupatorium capillifolium</i>		■				
Doveweed, Marsh dayflower	<i>Murdannia</i> spp.		■	■			
Eclipta	<i>Eclipta prostrata</i>		■	■			
Foxtail	<i>Setaria</i> spp.	■	■	■	■		■
Galinsoga	<i>Galinsoga</i> spp.		■	■		■	
Goosegrass	<i>Eleusine indica</i>	■	■	■	■		■
Common groundsel	<i>Senecio vulgaris</i>		■	■		■	
Henbit	<i>Lamium amplexicaule</i>	■	■				
Johnsongrass	<i>Sorghum halepense</i>	■		■	■		■
Common lambsquarters	<i>Chenopodium album</i>	■	■	■	■	■	
Liverwort	<i>Marchantia</i> sp.		■	■			
Longstalked phyllanthus	<i>Phyllanthus tenellus</i>		■				
Marsh parsley	<i>Apium leptophyllum</i>		■				
Mouse-ear chickweed	<i>Cerastium vulgatum</i>	■	■		■		
Mulberry weed	<i>Fatoua villosa</i>		■				
Panicum, various	<i>Panicum</i> spp.	■	■	■	■		■
Birdseye pearlwort	<i>Sagina procumbens</i>		■	■			
Pigweed	<i>Amaranthus</i> sp.	■	■	■	■		
Evening primrose	<i>Oenothera biennis</i>	■	■				
Common Purslane	<i>Portulaca oleracea</i>	■	■	■	■	■	
Florida pusley	<i>Richardia scabra</i>	■	■	■			
Sedges	<i>Cyperus</i> spp.		■	■	■	■	
Shepherd's purse	<i>Capsella bursa-pastoris</i>	■	■	■	■	■	
Pennsylvania smartweed	<i>Polygonum pensylvanicum</i>	■	■		■	■	
Sowthistle	<i>Sonchus</i> spp.		■				
Spurge, various	<i>Euphorbia</i> spp. (formerly <i>Chamaesyce</i> spp.)		■	■			
Willowherb	<i>Epilobium</i> spp.			■			
Yellow woodsorrel	<i>Oxalis</i> spp.	■	■		■	■	
Tassel-flower	<i>Emilia</i> spp.	■	■				
Thistle	<i>Cirsium</i> spp.					■	
Field sandbur	<i>Cencherus spinifex</i>	■	■	■	■		■
Wild sunflower	<i>Helianthus</i> spp.					■	
Wild mustard	<i>Sinapis arvensis</i>				■	■	

This is not a complete list of weeds controlled. Consult the product label for weeds controlled.

FreeHand® 1.75G

Herbicide

For the nursery grower who wants the convenience of granular applications, **FreeHand 1.75G** herbicide delivers unsurpassed preemergent control of the toughest summer weeds.

Key Features and Benefits

- Combines the power and efficacy of proven ingredients
- Effective control of annual grasses, sedges and small-seeded broadleaf weeds
- Unsurpassed performance on difficult to control weeds such as spurge, groundsel, yellow nutsedge, kyllinga and doveweed
- Controls more than 50 of the most troublesome weeds in nursery production

Weeds Controlled

Refer to the *Weeds Controlled* chart for common weeds controlled. For a complete listing, visit www.CDMS.net or find the product label using the convenient QR Code link below.

Use Sites

- Commercial nurseries (container, liner, and field)
- Residential and commercial landscapes
- General grounds maintenance (noncrop areas)
- Conifer, Christmas tree and hardwood liner nurseries and tree plantations
- Turfgrass

May be applied to juvenile fruit and nut trees, vines, brambles and bushberries grown in commercial ornamental production nurseries. Always read and consult product label directions.



WSSA group:

3 + 15

Active ingredients:

Dimethenamid-P
Pendimethalin

Signal word: CAUTION

Formulation: G (Granular)

Use rates:

Commercial ornamental production: 100, 150, and 200 lb per acre

PPE: Coverall, waterproof gloves, shoes plus socks, protective eyewear

REI: 12 hours

Packaging: 50 lb bags



WSSA group: 3

Active ingredient:

Pendimethalin

Signal word: CAUTION

Formulation:

Microencapsulated,
suspension

Use rates: 3.1 - 6.3 pints
per acre

PPE: Long-sleeved shirt,
long pants, chemical-
resistant gloves, shoes
plus socks

REI: 24 hours

Packaging: 2.5 gal jug,
1 x 15 gal keg, 110 gal
and 220 gal bulk totes

Pendulum® AquaCap

Herbicide

Pendulum AquaCap, a microencapsulated formulation of pendimethalin, provides nursery growers with highly effective preemergent control of the toughest grassy and broadleaf weeds, and the confidence of proven plant safety.

Key Features and Benefits

- Controls more than 40 of the most troublesome weeds in nursery production
- Virtually no odor
- Reduced potential for staining
- Ease and flexibility in handling, mixing and cleanup

Weeds Controlled

Refer to the *Weeds Controlled* chart in this guide for common weeds controlled.

For a complete listing, visit www.CDMS.net or find the product label using the convenient QR Code link below.

Use Sites

- Field-, liner-, and container-grown ornamental production
- Bare ground areas for container placement
- Bulb plantings
- Non-bearing fruit and nut tree nursery production
- Conifer and hardwood seedling nursery production
- Tree plantations for site preparation and maintenance
- Residential and commercial landscape
- Golf courses
- Recreational parks and athletic fields
- Sod farms
- General grounds maintenance (non-cropland areas)



Pendulum® 3.3 EC

Herbicide

Nursery growers count on **Pendulum 3.3 EC** herbicide to deliver highly effective and economical preemergent control of the most challenging grassy and broadleaf weeds found in outdoor ornamental production.

Key Features and Benefits

- May be used as a broadcast or directed spray, bare ground or over-the-top applications
- Extensively tested to provide excellent crop safety
- Controls more than 40 of the most challenging grassy and broadleaf weeds
- May be tank-mixed with preemergent **Tower®** herbicide for control of a broader range of weeds

Weeds Controlled

Refer to the *Weeds Controlled* chart in this guide for common weeds controlled. For a complete listing, visit www.CDMS.net or find the product label using the convenient QR Code link below.

Use Sites

- Field-, liner-, and container-grown ornamental production
- Bare ground areas for container placement
- Bulb plantings
- Non-bearing fruit and nut tree nursery production
- Conifer and hardwood seedling nursery production
- Tree plantations for site preparation and maintenance
- Residential and commercial landscape
- Golf courses
- Recreational parks and athletic fields
- Sod farms
- General grounds maintenance (non-cropland areas)



WSSA group: 3

Active ingredient:

Pendimethalin

Signal word: CAUTION

Formulation: EC

(Emulsifiable concentrate)

Use rates: 2.4-4.8 qt per acre

PPE: Coverall, chemical-resistant gloves, shoes plus socks

REI: 24 hours

Packaging: 2.5 gal jug, 1 x 15 gal keg



WSSA group: 3

Active ingredient:

Pendimethalin

Signal word: CAUTION

Formulation: G (Granular)

Use rates: 100-200 lb per acre in ornamentals

PPE: Coveralls, chemical-resistant gloves, shoes plus socks

REI: 24 hours

Packaging: 40 lb bag

Pendulum® 2G

Herbicide

Pendulum 2G is for the budget-conscious nursery grower and landscape manager who wants effective preemergent weed control in a spreadable granular formulation.

Key Features and Benefits

- Controls more than 40 grassy and broadleaf weeds
- Proven safety testing over more than 335 ornamental species in outdoor nursery production and landscape settings
- Specifically formulated for consistent spreadability and distribution

Weeds Controlled

Refer to the *Weeds Controlled* chart in this guide for common weeds controlled.

For a complete listing, visit www.CDMS.net or find the product label using the convenient QR Code link below.

Use Sites

- Field-, liner-, and container-grown ornamental production
- Bare ground areas for container placement
- Bulb plantings
- Non-bearing fruit and nut tree nursery production
- Conifer and hardwood seedling nursery production
- Tree plantations for site preparation and maintenance
- Residential and commercial landscape
- Golf courses
- Recreational parks and athletic fields
- Sod farms
- General grounds maintenance (non-cropland areas)



Tower®

Herbicide

Tower preemergent liquid herbicide hits the mark for nursery growers who want to optimize their investment in spray applications and modern equipment technology for control of the toughest summer weeds.

Key Features and Benefits

- Controls annual grasses, sedges and small-seeded broadleaf weeds
- Unsurpassed performance on difficult to control weeds such as sparges, groundsel, yellow nutsedge, kyllinga, doveweed
- More than 50 of the most challenging weeds listed on the label
- Excellent tank mix partner with **Pendulum® 3.3EC** or **Pendulum® AquaCap** to broaden the range of weeds controlled

Weeds Controlled

Refer to the *Weeds Controlled* chart in this guide for common weeds controlled. For a complete listing, visit www.CDMS.net or find the product label using the convenient QR Code link below.

Use Sites

Commercial ornamental production

- | | |
|---|--|
| ■ Container nurseries | ■ Residential and commercial lawn and landscapes |
| ■ Field grown nurseries | ■ Golf courses |
| ■ Conifer, Christmas tree and hardwood liner nurseries and tree plantations | ■ Turfgrass |



WSSA group: 15

Active ingredient:

Dimethenamid-P

Signal word: WARNING

Formulation: EC

(emulsifiable concentrate)

Use rates:

21-32 fl oz per acre

PPE: Coveralls, waterproof gloves, shoes plus socks, protective eyewear

REI: 12 hours

Packaging:

2 x 2.5 gal per case





WSSA group: 10 =
Inhibitor of glutamine
synthetase

Active ingredient:
Glufosinate-ammonium

Signal word: WARNING

Formulation: L (Liquid)

Use rates: 2-6 qts per
acre

PPE: Coveralls, chemical-
resistant gloves, shoes +
socks, protective eyewear

REI: 12 hours

Packaging: 2 x 2.5 gallon

Finale®

Herbicide

Finale herbicide gives you fast, effective control of a broad spectrum of emerged annual and perennial grasses, broadleaf weeds and woody species.

Key Features and Benefits

- Kills weeds fast with visible results in 2-4 days under many conditions
- Controls glyphosate-resistant weeds
- Rainfast in 4 hours

Weeds Controlled

Marestail, parthenium, pigweed, lambsquarter, ragweed, kochia, thistle, dandelion and poison ivy

For a complete listing, visit www.CDMS.net or find the product label using the convenient QR Code link below.

Use Sites

- In and around greenhouses
- Container nurseries
- Field nurseries
- Landscapes
- Bareground/non-crop areas
- Around Christmas trees

Basagran® T&O

Herbicide

Ornamental growers who want to keep non-production and other open areas free of broadleaf weeds and annual sedges confidently choose

Basagran T&O postemergent herbicide for reliable, cost-effective control of emerged weeds.

Key Features and Benefits

- Effective control of problematic weeds such as yellow nutsedge and kyllinga
- Controls thistles, wild mustard, lawn burweed and other difficult-to-control broadleaf weeds
- Tank-mix with **Tower®** herbicide to achieve preemergent control of a broader range of weeds
- May also be used in turf and landscape settings

Weeds Controlled

Refer to the *Weeds Controlled* chart in this guide for common weeds controlled. For a complete listing, visit www.CDMS.net or find the product label using the convenient QR Code link below.

Use Sites

- Established turfgrass
- Ornamentals
- Nurseries
- Non-cropland sites, roadsides and rights-of-way



WSSA group: 6

Active ingredient:

Sodium bentazon

Signal word: CAUTION

Formulation: L (Liquid)

Use rates: 24-32 fl oz per acre

PPE: Coveralls, chemical-resistant gloves, shoes plus socks

REI: 48 hours

Packaging: 1 gal jug
2 x 1.0 gal per case



Segment® II

Herbicide

Key Features and Benefits

- (safe) for all broadleaf plant species

Weeds Controlled

Crabgrass, foxtail, johnsongrass, field sandbur, shattercane

For a complete listing, visit www.CDMS.net or find the product label using the convenient QR Code link below.

Use Sites

- Christmas tree and conifer nurseries and plantations
- Commercial and residential landscapes
- Container and field-grown nursery production
- Industrial landscapes
- Perennial peanuts (non food)
- Potting soil and top soil
- Forestry, reforestation and tree nurseries and plantations
- Turfgrass

WSSA group: 1

Active ingredient:

Sethoxydim

Signal word: WARNING

Formulation: EC

(Emulsifiable Concentrate)

Use rates: 1.5 - 2.5 pints per acre

PPE: Coveralls over short sleeve shirt and short pants, chemical-resistant gloves, chemical-resistant footwear + socks, protective eyewear, chemical-resistant headgear for overhead exposure

REI: 12 hours

Packaging:

Herbicide Resistance Management Guide – Preemergent Herbicides

WSSA Group	Chemical Group(s)	Primary Target Weed(s)	Active Ingredient(s)	Herbicide Trade Name(s)	REI	Use Site(s)
3	Benzamide	Selected annual and broadleaf weeds	Pronamide	Kerb	24	N
			Pendimethalin	Pendulum® 2G herbicide, Pendulum Aquacap herbicide, Pendulum 3.3 EC herbicide, Pre-M®, ProPendi®, Corral® 2.68G	24	N,L
	Dinitroaniline	Selected annual and broadleaf weeds	Prodiamine	Barricade®, Regalkade®, Stonewall®	12	N,L
			Oryzalin	Surflan®, Weed Impede®	12	N,L
			Trifluralin	Treflan®	12	N,L
	Pyridine		Dithiopyr	Dimension®, Lifeguard®	12	N,L
12	Pyridazinorle	Selected annual & broadleaf weeds	Norflurazon	Predict	12	N
14	N-Phenylphthalimide Oxadiazole	Selected annual grasses and broadleaf weeds	Flumioxazin	BroadStar® SureGuard®	12	N
		Selected annual grasses and broadleaf weeds	Oxadiazon	Ronstar®	12	N,L
15	Acetamide	Selected annual and broadleaf weeds	Napropamide	Devrinol®, Strawberry & Fruit Tree Weeder®	12	N,L
	Chloroacetamide	Yellow nutsedge and selected annual and broadleaf weeds	S-metolachlor	Pennant Magnum®	24	N,L
		Selected annual grasses, broadleaf weeds and annual sedges	Dimethenamid-P	Tower® herbicide	12	N,L
20	Nitrile	Selected annual and perennial weeds	Dichlobenil	Casoron®, Barrier®	12	N,L
21	Benzamide	Selected broadleaf weeds	Isoxaben	Gallery®	12	N,L
29	Alkylazine	Grasses, Annual sedge, Annual broadleaf weeds	Indaziflam	Marengo®, Marengo® G	12	G,N,L
3 + 3	Dinitroaniline	Selected annual and broadleaf weeds	Benefin + Oryzalin	XL 2G®	24	N,L
3 + 14	Dinitroaniline + Oxadiazole	Selected annual grasses and broadleaf weeds	Pendimethalin + Oxadiazon	Jewel®	12	N,L
3 + 15	Dinitroaniline + Chloroacetamide	Selected annual grasses, broadleaf weeds and annual sedges	Pendimethalin + Dimethenamid-P	FreeHand® 1.75G herbicide	12	N,L
21 + 3	Benzamide + Dinitroaniline	Selected annual and broadleaf weeds	Isoxaben + Trifluralin	Snapshot TG®, Gallery® Woodace Preen Plus®	12	N,L
			Isoxaben + Prodiamine	Gemini®, Gemini® G	12	N,L
	Benzamide + Pyridine	Selected annual and broadleaf weeds	Isoxaben + Dithiopyr	Fortress(R)	12	N
14 + 3	Diphenylether + Dinitroaniline Oxadiazole + Dinitroaniline	Selected annual and broadleaf weeds	Oxyfluorfen + pendimethalin	OH2®	24	N
			Oxyfluorfen + oryzalin	Rout®	24	N,L
			Oxyfluorfen + prodiamine	RegalStar®	12	N
			Oxyfluorfen + prodiamine	Biathalon®	24	N,L
14+ 14	Diphenylether + Oxadiazole	Selected annual grasses and broadleaf weeds	Oxyfluorfen + Oxadiazon	Regal 00®	24	N,L
21 + 14 + 3	Benzamide + Oxadiazole + Dinitroaniline	Selected annual and broadleaf weeds	Isoxaben + Oxyfluorfen + Trifluralin	Showcase®	24	N

G = Greenhouse, N= Nursery, L=Landscape

Herbicide Resistance Management Guide – Postemergent Herbicides

WSSA Group	Chemical Group(s)	Primary Target Weed(s)	Active Ingredient(s)	Herbicide Trade Name(s)	REI	Use Site(s)
1	Aryloxyphenoxy Propionate	Annual and perennial grasses	Fluazifop-P	Fusilade® II, Ornamec®	12	N,L
			Fenoxaprop-P	Acclaim® Extra	12	N,L
	Cyclohexanedione		Sethoxydim	Segment® II herbicide	12	N,L
			Clethodim	Envoy® Envoy® Plus	12 24	G,N,L
2	Sulfonylurea	Annual and perennial sedges	Halosulfuron-methyl	Sedge Hammer®	12	L
4	Pyridine carboxylic acid	Broadleaf weeds, including Canada thistle, Legumes, Aster and Nightshade family	Clopyralid	Lontrel®	12	N,L
5	Triazine	Annual grassy and broadleaf weeds	Simazine	Princep®	12	N,L
6	Benzothiadiazinone	Yellow nutsedge, annual sedges and selected broadleaf weeds	Bentazon	Basagran® T&O herbicide	48	N,L
9	Glycine	Annual and perennial weeds	Glyphosate	Gly-Flo®, GlyphoMate®, Gly Star® Pro, Prosecutor®, Roundup® Pro, Touchdown® Pro, Trail Blazer®	4	G,N,L
				Refuge	12	
10	Phosphinic Acid	Annual and perennial weeds	Glufosinate-ammonium	Finale® herbicide	12	N,L
14	Triazolinone	Selected annual and perennial broadleaf weeds	Carfentrazone-ethyl	Quicksilver®	NOL	L
			Sulfentrazone	Dismiss®	12	N,L
	N-phenylphthalimide		Flumioxazin	SureGuard®	12	G,N,L
20	Nitrile	Selected annual and perennial weeds	Dichlobenil	Casoron®, Barrier®	12	N,L
22	Bipyridylum	Annual and perennial weeds	Diquat	Reward®, Tribune®	24	G,N,L
			Paraquat	Gramoxone SL	12 - 24	N,L
26	Carboxylic acid	Annual and perennial weeds	Pelargonic acid	Scythe®	24	G,N,L
9 + 22	Glycine + Carboxylic acid	Annual and perennial weeds	Glyphosate + Diquat	QuickPro® Roundup QuikPro®	NOL	L
NC	Soaps, Fatty Acids	Selected annual and perennial weeds	Ammoniated soaps of fatty acids	Quik-Fire®	24	G,N,L

G = Greenhouse, N= Nursery, L=Landscape

1 Some products within the same chemical group may not control all weeds listed, or there may be some products within the group that offer superior performance. Consult your local university/extension specialist if needed.

2 Specific use sites may vary by formulation and manufacturer; therefore, always read and consult product label directions.

WSSA Classification List:

- 1 Inhibition of acetyl CoA carboxylase (ACCase)
- 2 Inhibition of acetolactate synthase (ALS) or acetohydroxyacid synthase (AHAS)
- 3 Inhibition of microtubule assembly
- 4 Synthetic auxin
- 5 Inhibition of photosynthesis at photosystem II (site A)
- 6 Inhibition of photosynthesis at photosystem II (site B)
- 9 Inhibition of enolpyruvyl shikimate-3-phosphate (EPSP) synthase
- 10 Inhibition of glutamine synthetase
- 12 Inhibitor of phytoene desaturase (PDS)
- 14 Inhibition of protoporphyrinogen oxidase (Protox, PPO)
- 15 Inhibition of mitosis via inhibition of very long chain fatty acids (VLCFAs)
- 20 Inhibition of cell wall synthesis (site A)
- 21 Inhibition of cell wall synthesis (site B)
- 22 Inhibition of photosystem I
- 26 Unknown site of action
- 29 Inhibition of cell wall synthesis (site C)
- NC Not classified

The above list was developed by the Weed Science Society of America (WSSA). WSSA is a non-profit professional society made up of scientists from academia and private industry that promote research, education and outreach in the field of Weed Science. More information on the Weed Science Society of America is available from www.wssa.net.



Total Release Fungicides and Insecticides

Total release is a unique pesticide application system that delivers ULV (Ultra Low Volume) insecticides and fungicides throughout a greenhouse for effective pest control. Its exclusive aerosol delivery system reduces pesticide applicator exposure through a three-step process: *Locate*, *Lock Down*, and *Leave*. Total release products are ready to use, so you never have to mix the chemicals or operate industrial application equipment, and they effectively control a wide variety of insects and diseases that are common issues in the greenhouse. Total release aerosol delivery systems make pesticide applications simple and easy.

Total Release Best Practices

How to Use the *Locate*, *Lock Down* and *Leave* application system:

Step 1: Locate

Determine appropriate areas to place the containers.

- They work best on benches or hanging from trusses.
- Do not place containers directly in front of fans, heaters or inlets to jet tubes.
- After finding the best location, create a plant-free zone by removing any plants within the recommended clearance area, up to 6 feet around the container.
- Elevate the container so the top is above the height of the plants you will treat.
 - Place the container on an inverted empty pot at the proper elevation on the benches.
 - Ensure a plant-free, obstacle-free clearance zone around each container.
- If using multiple containers, plan your application placements and greenhouse exit path in advance to avoid walking through the pesticide fog.

Step 2: Lock Down

Keep the area contained to create the best application environment for total release products.

- Close all vents and sources of outside air.
- Run horizontal air flow (HAF) fans or fan jets (no heat; air only) for at least 15 minutes prior to application to create air movement in the greenhouse.
- Shut down all HAF fans just before activating cans; HAF fans should remain off for at least three hours or, if possible, all night.
- Put on the required personal protection equipment (PPE) and hold the container at arm's length; position the tip so that the spray releases from the can at an angle away from the applicator.
- Depress the actuator until it locks down, and set the container back into the plant-free zone.
- If you are using multiple containers in the greenhouse, start at the farthest point and work your way toward the exit door, locking down containers as you proceed.

Step 3: Leave

Once all the containers are locked down, leave the greenhouse and shut the exit door.

- The containers will fog for approximately 2 to 3 minutes until empty.
- Allow the pesticide particles to circulate for at least 4 hours.
- Common practice is to leave the house closed overnight; if necessary, HAF fans may be returned to operation after the minimum 4-hour circulation period. Refer to label for REI guidelines and ventilation requirements. ALWAYS FOLLOW LABEL DIRECTIONS.
- Once the REI is complete, you may enter the greenhouse and resume normal operations.
- If you need to re-enter the greenhouse before the REI, you must wear PPE as required by the label.

Total Release Products

Total Release Insecticides

1300 Orthene® TR

Micro total release insecticide

Ultra-low volume fogger, broad range insecticide for use in commercial greenhouses. Use on bedding plants, cut flowers, flowering hanging baskets, foliage, potted flowering plants and ornamentals.

Key Insects Controlled: Spider mites, thrips, whiteflies, aphids, mealybugs, fungus gnats, scale.

For a complete list of insects controlled and product details, consult the product label at CDMS.net using the convenient QR Code link at right.



Active Ingredient	IRAC Group	Mode of Action	Signal Word	REI	PPE	Packaging
12% acephate	Group 1A,1B <i>Organophosphate</i>	Acetylcholinesterase inhibitor	CAUTION	24 hours	See label	12 x 6 oz aerosol cans

Attain® TR

Micro total release insecticide

Ultra-low volume fogger, broad range insecticide for use in commercial greenhouses. Use on bedding plants, cut flowers, flowering hanging baskets, foliage, potted flowering plants and ornamentals.

Key Insects Controlled: Mites, thrips, whiteflies, aphids, mealybugs, fungus gnats, scale.

For a complete list of insects controlled and product details, consult the product label at CDMS.net using the convenient QR Code link at right.



Active Ingredient	IRAC Group	Mode of Action	Signal Word	REI	PPE	Packaging
4% bifenthrin	Group 3 <i>Pyrethroid</i>	Sodium channel modulator	CAUTION	2-24 hours See label	See label	12 x 2 oz aerosol cans

Beethoven® TR

Miticide/insecticide

Ultra-low volume fogger, insecticide for use in commercial greenhouses. Use on bedding plants, cut flowers, flowering hanging baskets, foliage, potted flowering plants and ornamentals. An excellent space mix partner with **Pylon TR** for quick knockdown, added insect pest control and resistance management.

Key Insects Controlled: Spider mites, suppression of whiteflies.

For a complete list of insects controlled and product details, consult the product label at CDMS.net using the convenient QR Code link at right.



Active Ingredient	IRAC Group	Mode of Action	Signal Word	REI	PPE	Packaging
5% etoxazole	Group 10	Mite growth inhibitor	CAUTION	2-24 hours See label	See label	12 x 2 oz aerosol cans

Duraplex® TR

Micro total release insecticide

RESTRICTED USE PESTICIDE. Refer to label for specific use conditions. Ultra-low volume fogger, broad range insecticide for use in commercial greenhouses. Use on bedding plants, cut flowers, flowering hanging baskets, foliage, potted flowering plants and ornamentals.

Key Insects Controlled: Mites, thrips, whiteflies, aphids, mealybugs, fungus gnats, shore flies, scale.

For specific use conditions, a complete list of insects controlled and product details, consult the product label at CDMS.net using the convenient QR Code link at right.



Active Ingredient	IRAC Group	Mode of Action	Signal Word	REI	PPE	Packaging
8% chlorpyrifos 1.6% cyfluthrin	Group 3A, 1B	Sodium channel modulator, Acetylcholinesterase inhibitor	WARNING	24 hours	See label	12 x 2 oz aerosol cans

Total Release Products *(continued)*

Total Release Insecticides *(continued)*

Pylon® TR

Total release insecticide

Ultra-low volume fogger insecticide for use in commercial greenhouses and fully enclosed garden centers. Use on bedding plants, cut flowers, flowering hanging baskets, foliage, potted flowering plants, fruiting vegetables, and ornamentals. An excellent space mix partner with **Beethoven® TR** for quick knockdown, added insect pest control and resistance management.

Key Insects Controlled: Mites, spider mites, thrips, fungus gnats.

For a complete list of insects controlled and product details, consult the product label at CDMS.net using the convenient QR Code link at right.



Active Ingredient	IRAC Group	Mode of Action	Signal Word	REI	PPE	Packaging
4.5% chlorfenapyr	Group 13 Pyrrole	Interrupts energy production in cell mitochondria	WARNING	2-12 hours See label	See label	12 x 2 oz aerosol cans

Pyrethrum® TR

Micro total release insecticide

Ultra-low volume fogger, broad range insecticide for use in commercial greenhouses. Use on bedding plants, cut flowers, flowering hanging baskets, foliage, potted flowering plants, specified vegetables (root and leafy), fruiting vegetables, herbs, and ornamentals. An excellent space mix partner with **1300 Orthene® TR** or **Duraplex® TR** for added insect pest control and resistance management. When used with another Total Release insecticide, the most restrictive label applies. DO NOT combine with another Total Release product when applied to vegetables and herbs.

Key Insects Controlled: Mites, thrips, whiteflies, aphids, mealybugs, fungus gnats, shore flies, scale.

For a complete list of insects controlled and product details, consult the product label at CDMS.net using the convenient QR Code link at right.



Active Ingredient	IRAC Group	Mode of Action	Signal Word	REI	PPE	Packaging
4% pyrethrin 16% piperonyl butoxide	Group 3a Pyrethroid	Botanical, sodium channel modulator	Caution	4-12 hours	See label	12 x 2 oz aerosol cans

Total Release Products *(continued)*

Total Release Fungicides

Pageant® TR Total release fungicide

Ultra-low volume fogger for broad spectrum disease control in commercial greenhouses and transportation equipment (trucks-cargo areas only). Use on bedding plants, cut flowers, flowering hanging baskets, foliage plants, potted flowering plants and perennials.



Diseases Controlled: *Alternaria* spp., *Botrytis* spp., *Cercospora*, *Cylindrocladium* spp., *Myrothecium* spp., Powdery Mildew, and Rust (*Uromyces*)

For a complete list of diseases controlled and product details, consult the product label at CDMS.net using the convenient QR Code link at right.

Active Ingredient	FRAC Group	Mode of Action	Signal Word	REI	PPE	Packaging
3.50% Boscalid	7	Succinate-dehydrogenase enzyme inhibitor (SDHI)	Caution	4-12 hours	See Label	12 x 3 oz aerosol can
1.75% Pyraclostrobin	11	Quinone outside Inhibitor (QoI)				

Trinity® TR Total release fungicide

Ultra-low volume fogger, broad-spectrum foliar disease control for use in commercial greenhouses. Use on bedding plants, cut flowers, flowering hanging baskets, foliage, potted flowering plants, perennials and other ornamentals.



Diseases Controlled: *Alternaria* spp., *Botrytis* spp., *Cercospora*, *Cylindrocladium* spp., *Fusarium* spp., *Myrothecium* spp., Powdery mildew and *Rhizoctonia* spp.

For a complete list of diseases controlled and product details, consult the product label at CDMS.net using the convenient QR Code link at right.

Active Ingredient	FRAC Group	Mode of Action	Signal Word	REI	PPE	Packaging
10.5% triticonazole	Group 3 Triazoles	Demethylation inhibitor, (DMI)	CAUTION	4-12 hours See label	See label	12 x 3 oz aerosol cans



Specialty Greenhouse Products

Rely on the BASF portfolio of specialty products to address a variety of production needs in greenhouse operations, from identifying and monitoring pest populations to safely sanitizing equipment and facilities. These products offer additional layers of pest, disease and application control to help improve quality, plant health and product performance.

Specialty Greenhouse Product Use Site Recommendations

Product	Bareground	Conifer Nursery Plantation	Container Nursery	Field Production	Retail Nursery	Greenhouse	Interior	Landscape and Recreational Areas	Turf
Pest Control									
PT® Wasp Freeze® Wasp & Hornet Insecticide	■	■	■	■	■	■	■	■	■
Iron Chelates									
Sprint® 138 Iron Chelates		■	■	■	■	■	■	■	■
Sprint® 330 Iron Chelates		■	■	■	■	■	■	■	■
Disinfectant and Algicide									
Green-Shield® II Disinfectant and Algicide						■	■ ¹		
Insect Monitoring									
Sensor® Insect Monitoring and Trapping Cards		■	■	■	■	■	■		
Spray Pattern Indicators									
Turf Mark® Spray Pattern Indicator	■	■	■	■		■		■	■
Tank Cleaners									
Nutra-Sol® Tank Cleaner	■	■	■	■	■	■	■	■	■
Neutralize® Tank Cleaner	■	■	■	■	■	■	■	■	■
Other									
Instant Soap 'N Water® Foaming Cleanser ²	■	■	■	■	■	■	■	■	■

covers to be removed on a seasonal basis.

² Consult Green-Shield II label for interior uses.

³ Instant Soap 'N Water foaming cleanser is labeled for use on hands in all use sites listed.



Active ingredient:
Chelated Iron

Formulation:
Dry powder

Use rates:
Ornamentals: Refer to product package label for specific applications to ornamental plants, trees, shrubs, vegetables, and/or application table for mechanical injection rates

Turf: 2 - 4 oz per 1000 sq ft in sufficient water to achieve uniform coverage

Packaging: 6 x 5 lb bags

Sprint® 138

Iron Chelate

A strongly chelated iron micronutrient that produces superior results regardless of soil pH, **Sprint 138** iron chelates help horticultural professionals solve plant health issues related to iron chlorosis.

Key Features and Benefits

- Prevents and corrects iron deficiency
- Strongest chelate available for the most challenging alkaline or calcareous soils
- Works across a wide range of ornamental plant varieties in horticulture production settings
- Formulated to maintain and protect iron availability across all pH soils
- Flexible use as either foliar or soil applications

Keys to Success

- Optimize efficacy with good foliar spray coverage or directed placements at the root zone, or dry incorporation into soil media
- Follow with irrigation or time applications to precede rainfall events
- Ensure thorough mixing and compatibility in spray solution combinations with other crop protection products and fertilizers

Use Sites

- | | |
|--------------------------------|--------------------|
| ■ Production greenhouses | ■ Flower beds |
| ■ Nursery horticulture | ■ Shrubs |
| ■ Professional turf management | ■ Fruit trees |
| ■ Commercial landscapes | ■ Ornamental trees |
| ■ Residential landscapes | ■ Vegetables |



Sprint® 330

Iron Chelate

Sprint 330 iron chelate corrects iron micronutrient deficiency in plants to achieve better color and plant quality. Unlike non-chelated or weakly-chelated iron products, **Sprint 330** iron chelate provides for more efficient plant uptake, producing long-lasting vibrant color.

Key Features and Benefits

- Maintains and protects iron availability in slightly acidic to slightly alkaline soils
- Long-proven professional performance in production horticulture
- Corrects iron deficiency across a wide range of ornamental varieties
- Flexible, economical use as either foliar or soil applications

Keys to Success

- Performs best in soils where pH is 6.0 - 7.5
- Optimize efficacy with good foliar spray coverage or directed placements at the root zone, or dry incorporation into soil media
- Follow with irrigation or time applications to precede rainfall
- Ensure thorough mixing and compatibility in spray solution combinations with other crop protection products and fertilizers – if necessary, conduct jar test

Use Sites

- | | |
|--------------------------------|--------------------|
| ■ Production greenhouses | ■ Flower beds |
| ■ Nursery horticulture | ■ Shrubs |
| ■ Professional turf management | ■ Fruit trees |
| ■ Commercial landscapes | ■ Ornamental trees |
| ■ Residential landscapes | ■ Vegetables |



Active ingredient:

Chelated iron

Formulation:

Dry powder

Use rates:

Ornamentals: Refer to product package label for specific applications to ornamental plants, trees, shrubs, vegetables, and/or application table for mechanical injection rates

Turf: 1 - 4 oz per 1000 sq ft in sufficient water to achieve uniform coverage

Packaging: 6 x 5 lb bags, 1 x 50 lb box



**Group:**

Quaternary ammonium

Active ingredient:

Quaternary amines

Signal word: DANGER**Formulation:**

Liquid

Use rates: Various—refer to product label for specific treatments and applications.

PPE: Coveralls worn over long-sleeved shirt and long pants; waterproof gloves; chemical-resistant footwear plus socks; protective eyewear (goggles or face shield); chemical-resistant headgear. When using this product for algae control in overhead watering systems, wear a chemical-resistant apron when mixing, loading or cleaning equipment.

REI: None

Packaging: 4 x 1 gal, 30 gal drums

Green-Shield® II

Disinfectant and Algicide

Recognized for its consistently high quality, **Green-Shield II** disinfectant and algicide provides growers with a biodegradable, cost-effective treatment for the control of unwanted pathogens and algae in greenhouse operations.

Key Features and Benefits

- Effectively disinfects and sanitizes against bacteria and fungus on walkways, greenhouse coverings and evaporative cooling pads
- Broad-spectrum control of pathogens and algae found on floors, benches and walls in and around greenhouses
- Less irritating to use with no odor, unlike bleach solutions

Keys to Success

- Use to disinfect work areas, hand tools and containers to prevent transfer of pathogens
- Use every other week to control algae and odor in evaporative cooling pools
- Use during the cropping cycle for routine disinfection and algae control on benches and walkways
- Use in production areas in cleanup program during transition periods

Use Sites

- | | |
|---|--------------------------------------|
| ■ Greenhouses | ■ Tools |
| ■ Nurseries | ■ Containers |
| ■ Landscapes and interiorscapes on work areas | ■ Walkways |
| ■ Benches | ■ Floors |
| | ■ Evaporative cooling pools and pads |



Sensor®

Insect Monitoring and Trapping Cards

Sensor insect monitoring and trapping cards are an important component of effective IPM strategies to help growers achieve effective pest population monitoring and identification in production operations.

Key Features and Benefits

- Use to monitor changing insect populations
- Easy-to-remove covers
- Gridded for easy reading
- Durable, long-lasting

Keys to Success

- Begin with positioning one card per 500 sq ft
- Use additional cards to monitor entry points such as doors and vents
- Monitor “hot spots” within susceptible ornamental varieties
- Record insect catch data on a routine basis during the growing season
- Replace cards at regular intervals and always after spraying insecticides

Use Sites

- Greenhouses
- Nurseries
- Laboratories

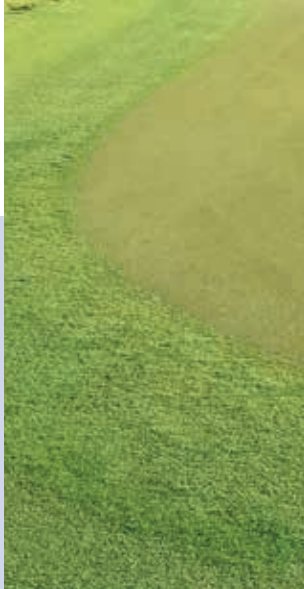


Formulation:

Glue card

Use rates: Start with one card per 500 sq ft. Use additional cards to monitor entry points (doors and vents), to determine “hot” spots within susceptible varieties, and to monitor low-level populations. Change cards at routine intervals and always after spraying insecticides. Record insect catch data on a routine basis.

Packaging: 750 cards per case (50 cards per pack, 15 packs per case)



Active ingredient:
Dye Colorant

Formulation:
Liquid or dry powder

Use rates: 1-2 qt
per 100 gal

Packaging: 12 x 1 qt,
4 x 1 gal, 2 x 2.5 gal,
1 x 30 gal drums,
40 x1 WSP

Turf Mark®

Spray Pattern Indicator

Turf Mark brand colorants are used by professional spray applicators who want to make visible and precise pesticide and fertilizer applications in production horticulture, turf management, and landscape maintenance.

Key Features and Benefits

- Helps prevent application skips and overlaps
- Shows application pattern for increased accuracy and coverage, improving service quality and product performance
- Colorant biodegrades quickly under sunlight and moisture

Keys to Success

- Use in horticulture production stock tank solutions as a color indicator in irrigation water delivered to plant containers
- Choose Turf Mark Green colorant to achieve more discrete applications in turf and landscape
- Avoid overspray onto building walls, decorative hardscapes, driveways, sidewalks and on other hard porous materials where residual discoloration is undesirable

Use Sites

- | | |
|--------------------------|-------------------|
| ■ Greenhouses | ■ Commercial turf |
| ■ Nurseries | ■ Bare ground |
| ■ Residential landscapes | ■ Fence lines |
| ■ Commercial landscapes | ■ Roadsides |
| ■ Residential turf | |



Nutra-Sol™

Tank Cleaner

Neutralize™

Tank Cleaner

Nutra-Sol and **Neutralize** tank cleaners allow professional applicators to safely and effectively remove fertilizer and pesticide residues from spray equipment. Use with confidence to clean all working parts, including tanks, pumps, hoses, valves and nozzles.

Key Features and Benefits

- Cleans and removes residues left by 2,4-D, sulfonylureas, and other hard-to-remove residues that are active at low rates
- Non-corrosive formulations are safe to use on spraying systems, inside and out
- Prevents damage to rubber, plastic and other soft sprayer parts

Keys to Success

- An end-of-work-day thorough rinsing and cleaning helps maintain integrity of spray equipment
- Removal of aggressive chemical residues helps prevent damage to rubber, plastic, and other soft sprayer parts
- Practice “finish clean, start clean”

Use Sites

All spray application equipment used in greenhouses, nurseries, residential and commercial turf and landscape maintenance



Active ingredient:

Surfactants

DHS Signal word:

DANGER

Formulation:

Dry powder, liquid

Use rates:

1 - 2 lb per 100 gals

1 quart per 100 gals

Precautionary State-ments (Prevention):

Wear protective gloves, protective clothing, eye protection, face protection. Do not breathe dust or mist.

Refer to product label for complete information.

Packaging: 12 x 2 lb jars, 4 x 1 gal





IRAC group: 3A

Active ingredients:

Prallethrin

Signal word: CAUTION

Formulation:

Aerosol

Use rates:

Directed spray-to-wet
for immediate knockdown,
as needed

PPE: None required

REI: None

Packaging:

12 x 17.5 oz cans

PT Wasp-Freeze® II

Wasp & Hornet Insecticide

For protection of outdoor workers who need powerful knockdown and control of stinging insects, **PT Wasp Freeze II** wasp and hornet insecticide is conveniently applied to reach nests in even the toughest locations.

Key Features and Benefits

- Contact activity for instant knockdown
- Works from up to 15 feet away
- Can be used around electrical equipment
- Contains no ozone-depleting substances

Key Insects Controlled

- | | |
|-----------------|-----------|
| ■ Wasps | ■ Bees |
| ■ Hornets | ■ Spiders |
| ■ Yellowjackets | |

Use Site

- Outdoors



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PSS 19-30-449 r07/19