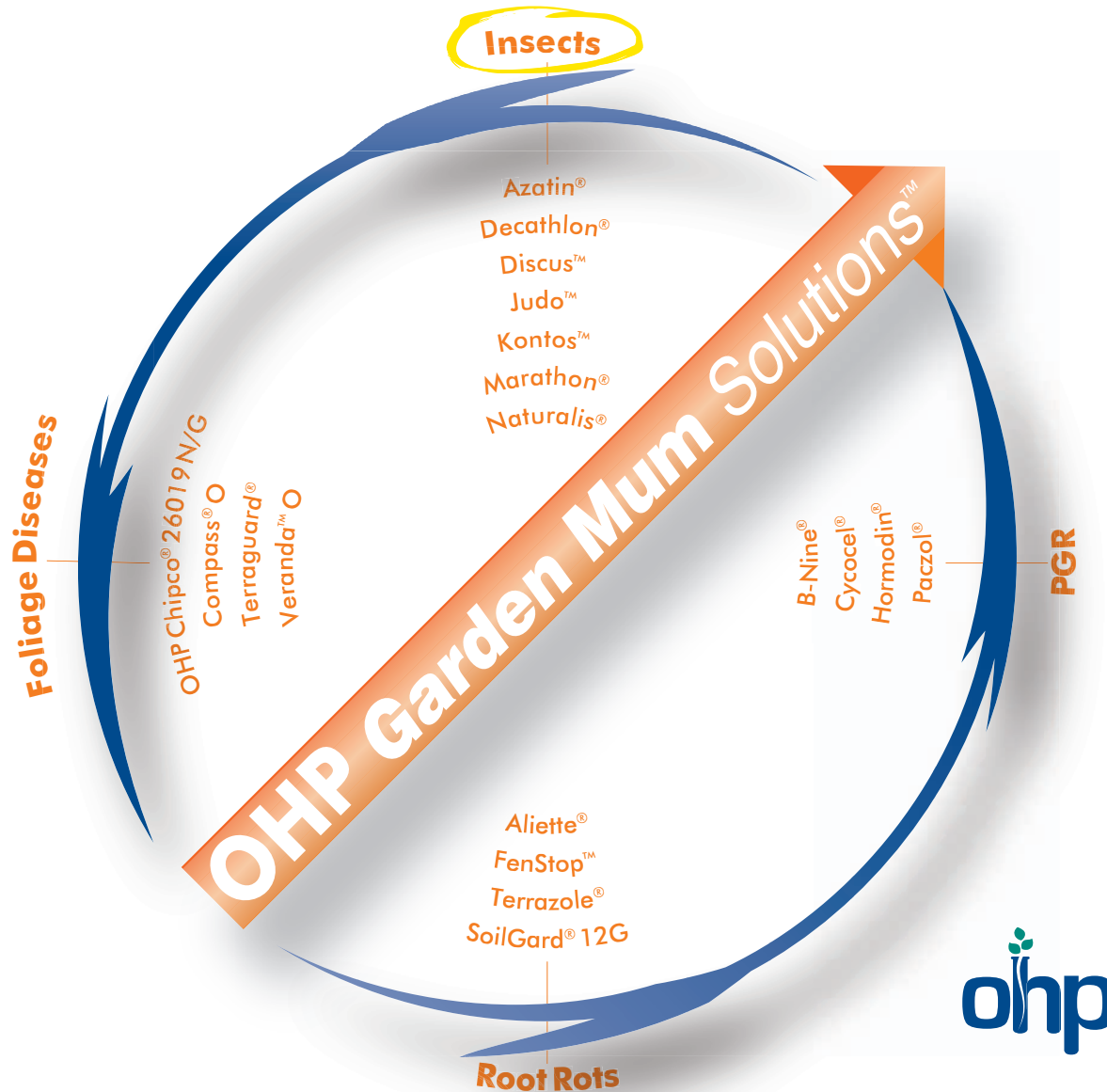


OHP Garden Mum Solutions™



Volume I



OHP Garden Mum Solutions™

The recent 2007 USDA survey estimated over 52,000,000 chrysanthemums (mums) were grown in 2006. While mums can be grown as florist quality and cut flowers, the majority are grown outdoors as Garden or Hardy Mums. This guide is primarily based on the culture of the garden mum in an outdoor setting, although many of the practices may also be used in the production of florist quality or cut flowers. The following information covering insect, mite, plant disease and growth regulation will help growers produce a quality garden mum crop. OHP, Inc. guidelines are based on current product and industry recommendations. Cultivar information, greenhouse conditions and past records combined with OHP guidelines will set the stage for a quality crop this season.

Insects

The main insect and mite pests of garden mums are aphids, caterpillars (leaf feeding worms), fungus gnats, thrips, leafminers and two-spotted spider mites.



Adult aphid and nymph



Fungus gnat adult female



Leafminer larva in leaf mine



Thrips



Two-spotted Spider Mites

Insect and Mite Management on Garden Mums

The following application program is designed to control all of the major and occasional insect and mite pests of garden mums. Information on pesticide mode of action can be found in the OHP Chemical Class Chart, available through an OHP Regional Sales Manager or on the OHP web site: www.ohp.com

OHP Products Labeled for Insect and Mite Control on Garden Mum Insects

OHP Garden Mum Solutions Product(s)	Chemical Class	MOA Group	Target Pest(s)	Residual Control	REI
Adept®*	Benzoyl Urea Insect Growth Regulator	15	Fungus gnats, thrips, caterpillars (armyworms)	10 to 14 days	12
Azatin® XL	Biological IGR	18	Aphids, fungus gnats, leafminers, thrips, caterpillars	5 to 7 days	4
Decathlon®	Pyrethroid	3	Fungus gnats (adults), leafminers (adults), thrips, caterpillars	3 to 7 days	12
Discus™*	Pyrethroid + Neonicotinoid	3 + 4A	Aphids, fungus gnats, leafhoppers, thrips (suppression)	30 days	12
Floramite®	Carbazate	25	Spider mites	21 to 28 days	12
Judo™	Tetronic Acid	23	Whiteflies, spider mites	30 days	12

OHP Products Labeled for Insect and Mite Control on Garden Mum Insects continued on next page

OHP Products Labeled for Insect and Mite Control on Garden Mum Insects continued from previous page

OHP Garden Mum Solutions Product(s)	Chemical Class	MOA Group	Target Pest(s)	Residual Control	REI
Kontos™	Tetramic acid	23	Aphids, leafhoppers, spittlebugs, psyllids, spider mites	6 to 8 weeks	24
Marathon®	Neonicotinoid	4A	Aphids, thrips (suppression)	6 to 8 weeks	12
Naturalis®	Microbial insecticide	M	Aphids, thrips, spider mites	3 to 5 days	4
Pedestal®	Benzoyl Urea Insect Growth Regulator	15	Thrips, caterpillars (armyworms), leafminers (suppression)	10 to 14 days	12
Pylon® *	Pyrrrole	13	Fungus gnats, spider mites, thrips, caterpillars	21 to 28 days	12
Shuttle™ 0	Napthoquinone	20B	Spider mites	14 to 28 days	12

* Adept and Pylon are labeled for use in greenhouses only; Discus is labeled for use in commercial nurseries only.

Suggested Insect and Mite Control Program for Garden Mums

Application *	Treatment	Rate/100 gallons	Target Pests	Remarks
Before potting	Q salt sanitizing agent	See label	For algae control, shore fly prevention on hard surfaces and cooling pads	
1	Azatin® + Decathlon®	12 fluid ounces + 1.9 ounces	Fungus gnats, shore flies	Two srench applications, 7 days apart
1	Adept®	Drench is 1 ounce. Coarse spray is 2 ounce rate.	Fungus gnats, shore flies	One drench
2	Marathon®	See label for appropriate rate.	Aphids, leafhoppers, leafminers, thrips (suppression)	Foliar spray if needed
2	Discus™	Foliar is 25 fluid ounces. See label for drench rate.	Aphids, leafhoppers, leafminers, thrips (suppression)	Foliar spray or drench
2	Kontos™	Foliar is 1.7 fluid ounces. See label for drench rate.	Aphids, leafhoppers, spider mites	Foliar spray or drench
3	Floramite®	4 to 8 fluid ounces	Spider mites	Foliar spray if needed
3	Pylon®	5.2 to 10 fluid ounces	Spider mites, thrips, caterpillars	Foliar spray if needed
3	Shuttle™ 0	6.4 fluid ounces	Spider mites	Foliar spray
3	Judo™	2 fluid ounces	Whiteflies, spider mites	Foliar spray
4	Pedestal™	6 to 8 fluid ounces	Thrips, leafminers (suppression), armyworms	Foliar spray

Suggested Insect and Mite Control Program for Garden Mums continued on next page

Suggested Insect and Mite Control Program for Garden Mums continued from previous page

Application*	Treatment	Rate/100 gallons	Target Pests	Remarks
Before potting	Q salt sanitizing agent	See label	For algae control, shore fly prevention on hard surfaces and cooling pads	
5	Kontos™	Foliar is 1.7 fluid ounces. See label for drench rates	Aphids, leafhoppers, spittlebugs, spider mites	Foliar spray or drench
5	Marathon® II Marathon® 60 WP	1.7 fluid ounces One 20 gram packet	Aphids, leafhoppers, leafminers, thrips (suppression)	Foliar spray
5	Discus™**	25 fluid ounces	Aphids, leafhoppers, leafminers, thrips (suppression)	Foliar spray
6	Naturalis® + Azatin®	32 to 64 fluid ounces + 12 fluid ounces	Aphids, thrips, spider mites	Two or three foliar spray applications at 5 to 7 day intervals

* It probably will not be necessary to make all of the above applications, but the products are listed in the suggested order in which they should be made. **NOTE:** Applications with the same number should be considered “either-or” products for the pests listed; i.e. use one of the products, depending on the pest infestation, not all of them.

** **Note:** Discus Nursery Insecticide can be used in place of Marathon on garden mums produced outside of greenhouses. As with Marathon, the drench rate depends on container size. Foliar spray application rate is 25 fluid ounces per 100 gallons.

Diseases

Plant Disease Management on Garden Mums

The most serious disease problems of garden mums are *Pythium* root rot, *Rhizoctonia* root and stem rot, *Botrytis*, Powdery Mildew and Fungal leaf spots.

The products listed in the table below will help to manage all of the major and occasional plant disease pathogens affecting garden mums. Information on pesticide mode of action can be found in the OHP Chemical Class Chart, available through an OHP Regional Sales Manager or on the OHP web site: www.ohp.com

OHP products labeled for Disease Control on Garden Mums

Product (s)	Chemical Class	MOA Group	Target Disease(s)	Application Rate/100 gallons	Residual	REI
Aliette®	Ethyl phosphonates	33	<i>Pythium</i> root rot	1.25 to 5 lbs as foliar spray, 6.4 to 12.8 oz as drench	30 days	12
Compass® O	Strobilurins	11	<i>Botrytis</i> , powdery mildew, <i>Rhizoctonia</i> root and stem rot, fungal leaf spots	1 to 4 oz as foliar spray, .5 to 2 oz as drench	7 to 14 days	12
FenStop™	Imidazolinones	11	<i>Pythium</i> root rot	7 to 14 fl oz as spray or drench	14 days	12
OHP Chipco® 26019 N/G or OHP 26 GT®-O	Dicarboxamides	2	<i>Botrytis</i> , <i>Rhizoctonia</i> root and stem rot, fungal leaf spots	26019: 1 to 2 lbs as foliar spray, 6.5 oz as drench; 26 GT-O: 1 to 2.5 quarts as foliar spray, 13 fl oz as drench	14 days	12
OHP 6672™ 4.5 F or OHP 6672™ 50 WP	Benzimidazoles	1	<i>Rhizoctonia</i> root and stem rot	OHP 6672 4.5 F: 10 to 20 fl oz as foliar spray, 20 fl oz as drench; OHP 6672 50 WP: 8 to 24 oz as foliar spray, 12 to 16 oz as drench	7 days	12
Strike® 50 WDG	Triazoles	3	Powdery mildew, fungal leaf spots	1 to 2 oz as foliar spray	21 to 30 days	12
SoilGard® 12G	Microbial	NC	<i>Pythium</i> and <i>Rhizoctonia</i> Damping off and root rots	.5 to 2 lbs	4 to 6 weeks	4
Terraclor®	Aromatic hydrocarbons	14	<i>Rhizoctonia</i> root and stem rot	6 to 12 oz as drench	28 days	12
Terraguard® SC	Imidazoles	3	<i>Botrytis</i> , powdery mildew, fungal leaf spots and <i>Rhizoctonia</i> root rot	4 to 16 fl oz as foliar spray, 4 to 8 fl oz as drench	30 days	12
Terrazole®	Etridiazole Thiadiazole	14	<i>Pythium</i> root rot	3.5 to 10 oz as drench; California rates 4 to 6 oz	28 days	12
Veranda™ O	Polyoxins	19	<i>Alternaria</i> , <i>Botrytis</i> , <i>Rhizoctonia</i> and others	4 to 8 oz foliar spray .25 to .5 lbs drench	7 to 10 days	4

It is not practical to suggest that a certain fungicide be applied during a specific week of production so the following listing will provide a rotation/alternation program for the major garden mums problems.

Pythium root rot: SoilGard 12 G (applied as preventative), Aliette, FenStop, Terrazole

Rhizoctonia root and stem rot: OHP Chipco 26019, OHP 26 GT-O, OHP 6672, Compass O, Terraclor, Terraguard

Botrytis: Compass O, OHP Chipco 26019, OHP 26 GT-O, Terraguard, Veranda O

Powdery mildew: Compass O, Strike 50 WDG, Terraguard, Veranda O

Fungal leaf spots: Compass O, OHP Chipco 26019, OHP 26 GT-O, Strike 50 WDG, Terraguard, Veranda O

Regulating Plant Height of Garden Mums

Producing the best quality garden mum crop can be challenging due to growing conditions, plant varieties, timing & scheduling etc. One area of concern is the height of the finished crop.

Older and more traditional mum varieties have great plant vigor, large plant size and large bloom size whereas many of the newer varieties have a more compact plant size, lesser bloom size but many more blooms per stem. Despite all these varietal differences, mums will benefit from a good PGR program helping them finish off as a strong, compact shipable plant. Also, they benefit from other PGR traits such as, deeper green foliage, stronger “necks”, longer lasting blooms and better drought tolerances; these are traits of a high quality crop.

One of the best PGR's for mums is B-Nine WSG. It has been the standard for mum crops since the early 70's and continues to bring in mum crops with a proven track record. B-Nine is leaf absorbed and is used at fairly high PPM rates compared to other PGR's. Another and newer PGR for mum use is Paczol. This product is a strong growth inhibitor and is used at much lower PPM rates than B-Nine WSG. Paczol is stem and root absorbed.

Suggested PGR Programs for Garden Mums (Sprays or Drench)

B-Nine®

A typical PGR program for garden mums is to apply a foliar spray of B-Nine post pinch when the new shoots are about 1 to 2 inches long. Rates depend on your varieties and growing conditions but a good starting point is with 2500 PPM. Higher rates of 3750 to 5000 PPM may also be used but should be tested first for the level of activity for your situation. The higher rates of B-Nine give the grower a safety factor if too high a rate is mistakenly used.

Repeat spray applications of B-Nine at 2 to 3 weeks after the first application may be needed for further height control. Allow a few plants to be 'un-treated' so that you can judge how active the PGR is working for you. The use of a crop-stick having inch markings is another way to evaluate the crop height and growth.

Early morning or evening applications are best for B-Nine WSG. Avoid applying when plants are under heat stress. The longer B-Nine can stay on the leaves the better activity you will have. Do not overhead irrigate the crop for 24 hours as B-Nine is water soluble and would simply be washed off the plant. Lastly, do not mix or use a copper based fungicide with B-Nine as leaf burning can result. Read the B-Nine WSG label for this and other use recommendations.

Some growers have found using B-Nine on rooted or un-rooted cuttings to be a practical method for additional growth control on mums. This method might be needed on varieties with excess stretch after planting or as a method to hold cuttings for a period of time before cropping begins. Recommendations for this are on the label.

Paczol®


Paczol contains the active ingredient paclobutrazol, a very active PGR. It is best absorbed through plant stems or even better through plant roots. It is not taken in through leaves, so spray applications need to be focused on the crops branches & stems or as a drench to the soil. Paczol is used at much lower rates than B-Nine and for this reason growers must be accurate in the mixing and application of Paczol, especially as a drench.

Apply Paczol post-pinch when shoots are 1 to 2 inches long or if a non-pinched crop about 1 to 2 weeks after transplanting. Spray rates can vary from 30 to 50 PPM while making sure to direct the sprays towards the stems. Drench applications are timed similarly using 2 PPM. Use the correct amount of drench volume for a given pot size, i.e. a 4 inch pot would receive 2 fl oz of drench volume.

General PGR Rate Recommendations

Avoid making PGR sprays when flower buds have reached the size of a large pea as bloom delay may result. When flower buds exceed the size of a large pea, growers should consider Paczol drench applications.

Suggested PGR Program for Garden Mums

Chysanthemum General Rates	Plug 	Spray B-Nine® Spray Cycocel® Spray B-Nine + Cycocel Plug Soak Paczol®	1000 ppm 800 to 1000 ppm Not Tested 1/4 to 1/2 ppm 15 sec	Pre-Plant dip Apply as needed
	Finish 	Spray B-Nine Spray Cycocel Spray B-Nine + Cycocel Spray Paczol Drench Paczol	2500 to 3000 ppm 1000 to 1500 ppm Not Tested 30 to 50 ppm 1 to 2 ppm	Apply post pinch on 1" growth up to 1 week before disbud Use correct drench volume per pot

Note for emphasize: Avoid making PGR sprays when flower buds have reached the size of a large pea as bloom delay may result. When flower buds exceed the size of a large pea, growers should consider Paczol drench applications.

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OHP QUICK REFERENCE Product Rate Guide

Products	Rate per 100 gallons	Rate per 1 gallon
Fungicides		
Aliette® WDG	1.25, 2.5, 5.0 pounds	1 1/4 tsp, 2 1/2 tsp, 5 tsp
Compass® O	1 to 4 ounces	1/10 tsp to 1/3 tsp
FenStop™	7 to 14 fluid ounces	4/10 tsp to 8/10 tsp
OHP 26 GT® - O	1 to 2.5 quarts	1 3/4 tsp to 4 1/2 tsp
OHP Chipco® 26019 N/G	1 to 2 pounds	1 1/3 tsp to 2 2/3 tsp
OHP 6672® 4.5 F	20 fluid ounces	1 1/5 tsp
OHP 6672® 50 WP	8 to 24 ounces	1 2/3 tsp to 5 tsp
SoilGard® 12G	.5 to 2 pounds	1/2 tsp to 2 tsp
Strike® 50 WDG	1 to 2 ounces	1/10 tsp to 1/5 tsp
Terraclor® 400 SC (Drench Rates)	6 to 12 fluid ounces	3/8 tsp to 3/4 tsp
Terraclor® 75% WP (Drench Rates)	2 to 8 ounces	1/5 tsp to 1 2/3 tsp
Terraguard® SC	2 to 8 to 16 fluid ounces	1/8 tsp, 1/2 tsp, 1 tsp
Terrazole® 35% WP	3.5 to 10 ounces	1/2 tsp to 1 1/2 tsp
Terrazole® CA	4 to 6 ounces	3/4 tsp to 1 tsp
Triact® 70	1/2 gallon, 1 gallon, 2 gallons	3 3/4 tsp to 7 1/2 tsp to 15 tsp (5 tablespoons)
Veranda™ O	4 to 8 ounces	1/2 tsp to 1 tsp
Insecticides / IGRs/ Miticides		
Adepi®	1 to 2 ounces (spray)	See label for more information
Azafin® XL	5 to 16 fluid ounces	1/3 tsp to 1 tsp
Decathlon® 20 WP	1.3 to 1.9 ounces	1/5 tsp to 1/4 tsp
Discus™	25 to 50 fluid ounces	1 1/2 tsp to 3 tsp
Floramite® SC	4 to 8 fluid ounces	1/4 tsp to 1/2 tsp
Judo™	2 to 4 fluid ounces	1/8 tsp to 1/4 tsp
Kontos™	1.7 to 3.4 fluid ounces (50 to 100 mL)	1/10 tsp to 1/5 tsp
Marathon® 1% G	see label	1/8 to 1 1/2 teaspoons per pot depending on size
Marathon® II	1.7 fluid ounces	1/10 tsp
Marathon® 60 WP	1 WSP treats 1000 6" pots	See label for more information
Naturalis® L	30 to 100 fluid ounces	.3 to 1 fluid ounce
Pedestal™	6 to 8 fluid ounces	3/8 tsp to 1/2 tsp
Pylon®	2.6 to 10 fluid ounces	1/5 tsp to 3/5 tsp
Shuttle™ O	6.4 to 12.8 fluid ounces	2/5 tsp to 4/5 tsp
Triact® 70	1/2 gallon, 1 gallon, 2 gallons	3 3/4 tsp to 7 1/2 tsp to 15 tsp (5 tablespoons)
Plant Growth Regulators*		
B-Nine® WSG - Spray	1000 to 2500 to 7500 PPM	4/5 TBS to 2 TBS to 6 TBS
Cycocel® - Spray	200 to 1250 to 4000 PPM	.22 to 1.36 to 4.34 fluid ounces
Hormodin®	— See label for more information. —	
Paczol® - Spray or Drench	1 to 30 Drench, 5 to 100 Spray	1 PPM = 1 mL/gl; 5 PPM = 4.7 mL/gl; 30 PPM = 1 fl oz/gl

* Users should read entire label for full information and application instructions.
TBS=Tablespoon tsp=teaspoon 1 mL=1 cc 1 fl oz=30 mL (29.6 mL exactly)

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