

# North Carolina Flower Growers' Bulletin

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## SURVEY OF FLORICULTURE GREENHOUSES IN NORTH CAROLINA

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This spring we conducted a state-wide survey to compile a summary of floriculture greenhouses in North Carolina. Questionnaires were sent to county extension agents with floriculture responsibility in each of 100 counties in the state, and 82 counties responded. The questionnaire was designed to supply the total number as well as the acreage of production floriculture greenhouses in the state. Holding or resale only greenhouses were not included; only wholesale and retail growers were reported in the survey.

A total of 408 operations totaling just over 324 acres of production greenhouse area were reported in the survey (Table 1). The data collected is reported for firms selling wholesale only, wholesale and retail, and retail only. Of the 408 operations, 41% sell both wholesale and retail, 36% sell only retail, and 22% sell only wholesale. However, greenhouses selling only wholesale accounted for the majority of the acreage (63%) reported in the survey, and firms selling only retail represented just 8% (25 acres) of the acreage.

The number of operations selling wholesale reported in this survey (260) is greater than those reported in the USDA Floriculture Crops 1992 Survey. That summary listed a total of only 194 operations. The wholesale production acreage reported in the two surveys was much closer; 299 acres reported here and 261 acres reported in the USDA survey.

Major crop categories were listed on the survey, and the bedding plants column was the most common category checked (Table 1). Of the 408 firms tallied in the survey, 327 (80%) reportedly grow bedding plants. The next most commonly grown crop were hanging baskets (72% of the firms grow them), closely followed by flowering potted plants (70%). Ranking after flowering pot plants were perennials (45%), foliage (39%), and at a bottom of the list, herbs (12%) and cut flowers (grown by only 40 [10%] of the 408 operations).

There are "production centers" for floriculture in North Carolina (Figures 1 and 2). Over 28% (91.8 acres) of the total acreage lies in

**Table 1. Results from the 1993 North Carolina floriculture greenhouse survey.\***

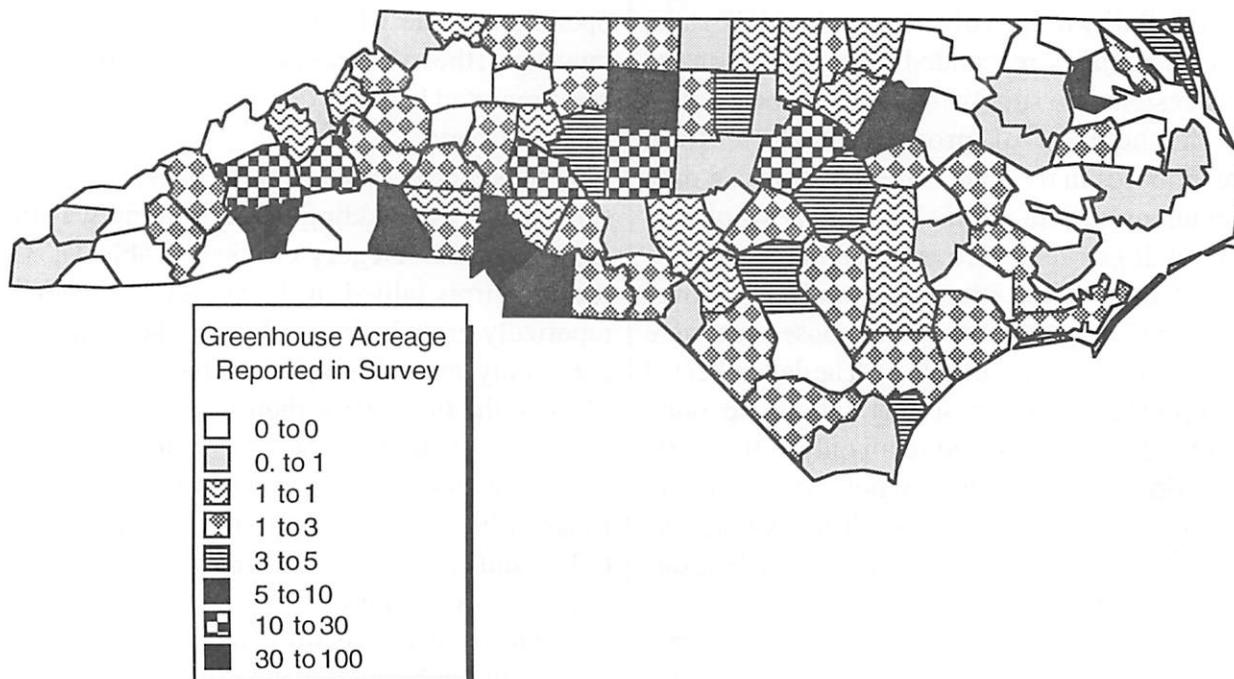
Sales category of firms	Number of firms reported	Acreage reported	Number of firms reportedly producing:						
			Bedding plants	Hanging baskets	Potted flowering plants	Perennials	Foliage	Herbs	Cut flowers
Wholesale only	91 (22.3%)	204.31 (63%)	66 (73%)	53 (58%)	56 (62)	24 (26%)	28 (31%)	7 (8%)	17 (19%)
Wholesale and retail	169 (41.4%)	94.88 (29%)	148 (88%)	140 (83%)	133 (79%)	99 (59%)	64 (38%)	31 (18%)	11 (7%)
Retail only	148 (36.3%)	24.95 (8%)	113 (76%)	102 (69%)	96 (65%)	60 (41%)	67 (45%)	12 (8%)	12 (8%)
Total of all firms reported	408	324.14	327 (80%)	295 (72%)	285 (70%)	183 (45%)	159 (39%)	50 (12%)	40 (10%)

\*Sales category percentage of total number of firms and total acreage reported are given parenthetically. Percentages reported parenthetically for crop categories are percent of firms in each sales category reportedly growing that crop.

Mecklenburg County alone. Another 24% (77.6 acres) is housed around Asheville in Buncombe, Henderson, and McDowell Counties. If these four counties are combined, they account for over 50% of all floriculture greenhouse acreage in North Carolina. Other smaller centers include Wake County (16.1 acres), Rowan County (13.7 acres), and Randolph County (10.5 acres). The

next tier (5 to 10 acres) includes Chowan (6.4), Cleveland (5.9), Nash (5.8), Union (5.8), and Guilford (5.0) Counties.

North Carolina greenhouse floriculture is dynamic. Over the past few years we have had several new operations start up in the state, and many operations have gone out of business; some of them large. Overall, the production and value



**Figure 1. Greenhouse acreage reported per county in the 1993 North Carolina floriculture survey.**

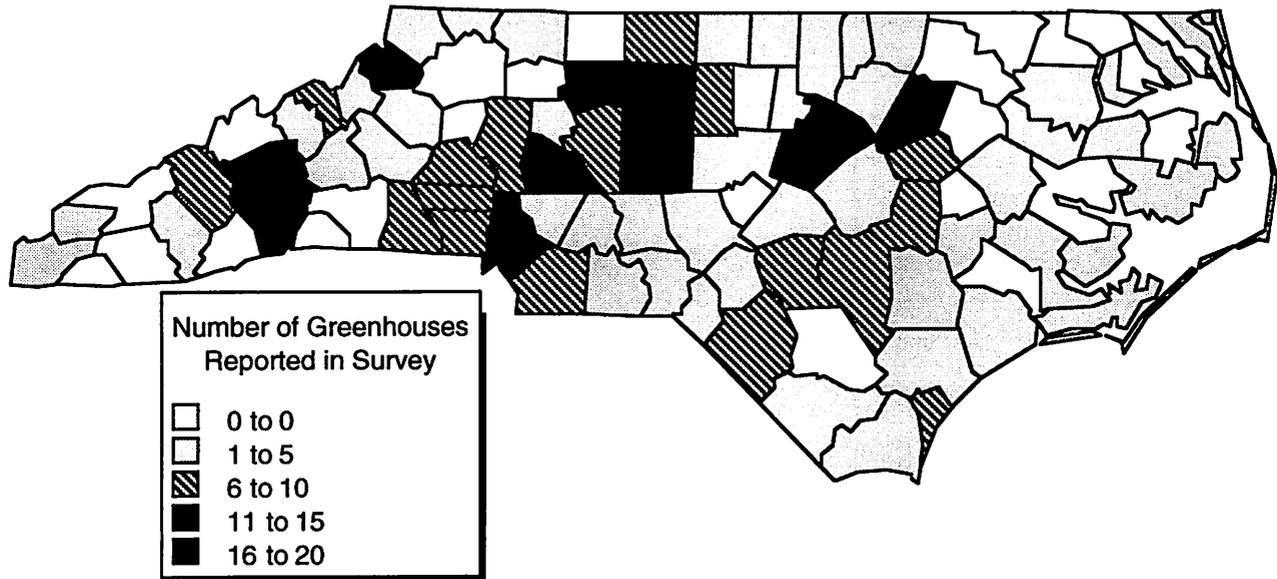


Figure 2. Number of greenhouses reported per county in the 1993 North Carolina floriculture survey.

of floriculture in North Carolina is steadily increasing. We rank 8th nationally in wholesale value, having moved up from 10th a few years ago. The next few years may prove to be tough on many greenhouses across the nation. Although sales and crop value is increasing, so are regulations and the “cost of doing business.” It will be interesting to conduct this survey once again in five years and compare those results with the current ones. Hopefully the trend will be as positive as our growth has been during the last five years.

## COMING EVENTS

<u>Event</u>	<u>Date</u>	<u>Time</u>	<u>Location and Contacts</u>
1993 Southeast Greenhouse Conference and Trade Show	Thursday–Sunday June 17–20		Palmetto International Exposition Center, Greenville, S.C. Contact Doug Bailey or any NCCFGA Board Member for more information.
International Floriculture Industry Short Course	Saturday–Wednesday July 10–14		Cincinnati Convention Center, Cincinnati, Ohio. Contact Ohio Florists' Association at (614) 487-1117.
Mid-Atlantic Nurserymen's Trade Show	Sunday–Tuesday July 18–20		Baltimore, Maryland. Contact Carville Akehurst at (410) 256-6474 for further information.
North Carolina Bedding Plant Field Day	Wednesday July 28	9:30–4:00	University Research Unit 4, Raleigh, N.C. Contact Doug Bailey at (919) 515-3321 for further information.
Perennial Plant Association Annual Meeting	Sunday–Saturday August 1–7		Vancouver, British Columbia, Canada. Contact Steven Still at (614) 771-8431.
Integrated Pest Management for Poinsettias Symposium	Wednesday August 4	9:00–4:00	Real-time interactive video symposium with downlink sites in Asheville, Chapel Hill, Charlotte, Greenville, Raleigh, Wilmington, and Winston-Salem. Contact Doug Bailey at (919) 515-3321 for further information.
Plant Growth Control Study Tour and School	Wednesday–Thursday August 11–12		Cleveland, Ohio. Contact the Ohio Florists' Association at (614) 487-1117 for further information.

**GREENHOUSE ORNAMENTAL INSECT AND RELATED PEST CONTROL**

J.R. Baker, Department of Entomology

Insect, mite, or related pest	Insecticide, classification, and formulation†	Amount of formulation per gallon of spray	Amount of Formulation per 100 Gallons of Spray	Minimum interval between application and reentry and signal word‡	Precautions and remarks
Aphids	acephate -- OP 75 SP (Orthene) 3 A (PT 1300)	2/3 to 1 2/3 tsp NA -- Aerosol	1/3 to 2/3 lb NA -- Aerosol	When dry -- C After house is vented for 1 hour -- W	Apply total release aerosol product using a rate of 1 lb per 3,000 ft <sup>2</sup> . Treat as late in the day as possible. Ventilate the next morning. Apply directed spray aerosol using a release rate of 5 to 10 seconds per 100 ft <sup>2</sup> . Aerosol formulations of orthene are safe on open blooms and on bracts in color, but limit total release applications to once weekly on poinsettias with bract color.
	azadirachtin -- B 0.3 F (Margosan O) 3 EC (Azatin EC)	2 1/2 to 5 tsp 1/2 tsp	40 to 80 fl oz 8 fl oz	When dry -- C When dry -- W	
	bendiocarb (Dycarb, Ficam, Turcam) -- C 76 WP	1 Tbsp	12 to 20 oz	When dry -- W	For use on chrysanthemums only. Avoid excessive runoff.
	bifenthrin -- P 10 WP (Talstar) 7.9 F (Talstar) 0.5 A (PT 1800 Attain)	1 1/4 to 5 3/4 tsp 1/2 to 2 4/10 tsp NA -- Aerosol	6.4 to 32 oz 2 to 10 fl oz NA -- Aerosol	When dry -- W When dry -- C After house is vented for 1 hour -- C	Apply aerosol using a rate of 1 lb per 3,000 ft <sup>2</sup> . Treat as late in the day as possible. Ventilate the next morning.
	chlorpyrifos -- OP 50 WG (Pageant DF) 50 WP (Dursban WP)	1 tsp 1 to 2 tsp	1/2 lb 1/2 to 1 lb	When dry -- W When dry -- W	
	cyfluthrin -- P 24.3 EC (Tempo 2) 20 WP (Decathlon)	1/10 tsp 1/4 tsp	1 1/2 fl oz 1.9 oz	When dry -- W When dry -- W	
	d-phenothrin (Sumithrin) -- P 25 EC 0.5 A	1 tsp NA -- Aerosol	1 pt NA -- Aerosol	When dry -- C After house is vented for 1 hour -- C	Apply aerosol using a release rate of 5 to 10 seconds per 100 ft <sup>2</sup> .
	diazinon -- OP 23 EC (Knox-Out) 1 A (PT 1500 Knox-Out)	1 to 2 Tbsp NA -- Aerosol	3 to 6 pt NA -- Aerosol	When dry -- C After house is vented for 1 hour -- C	Diazinon should not be applied directly to open blooms or on bracts showing color. Apply aerosol using a release rate of 5 to 10 seconds per 100 ft <sup>2</sup> .
	dichlorvos (Vapona) -- OP 5 A	NA -- Smoke Generator	NA -- Smoke Generator	After house is vented for 1 hour -- D	Consult manufacturer's label for recommended rates.
	endosulfan (Thiodan) -- CH 24.2 EC 50 WP	2 tsp 1 Tbsp	2 pt 1 lb	24 hours -- D 24 hours -- D	Thiodan is phytotoxic to some varieties of geraniums and chrysanthemums.
	fenpropathrin (Tame) -- P 30 EC	2/3 tsp	10 2/3 fl oz	When dry -- W	
	fluvalinate (Mavrik) -- P 22.3 F	1/8 to 5/8 tsp	2 to 10 fl oz	When dry -- C	May cause respiratory allergic response. Ventilate thoroughly prior to reentry. Also labeled as a plant dip.
	horticultural oil (Sunspray Ultra-Fine Spray Oil) -- O 98.8 EC	2 1/2 to 5 Tbsp	1 to 2 gal	When dry -- C	Oil is a contact killer of pests; thorough coverage is required. May cause foliar injury if sprayed during extremely humid conditions.
	insecticidal soap (M-Pede) -- O 50.5 EC	4 fl oz	3 1/2 gal	When dry -- C	Do not apply more than two times consecutively; too frequent of applications can cause foliar discoloration.
	kinoprene -- IGR 72.5 EC (Enstar) 65.1 EC (Enstar II)	1/2 to 1 1/2 tsp 1/2 to 2/3 tsp	8 to 20 fl oz 5 to 10 fl oz	When dry -- C When dry -- C	Maidenhair fern, schefflera, and some rose and poinsettia varieties may be damaged at the highest rate of Enstar; Enstar II is less phytotoxic than Enstar.
	lindane (Lindane) -- CH 25 WP	1 Tbsp	1 lb	When dry -- W	
	malathion (Malathion) -- C 25 WP 57 EC	2 tsp 2 tsp	40 oz 2 pt	When dry -- C When dry -- C	Malathion may injure begonia, crassula, ferns, petunia, orchids, pansy, African violets, gloxinia, some red carnations, and some rose varieties.
methiocarb -- C 75 WP (Grandslam) 1 A (PT 1700)	2 tsp NA -- Aerosol	1 to 2 lb NA -- Aerosol	When dry -- W After house is vented for 1 hour -- W	Apply total release aerosol using a rate of 1 lb per 3,000 ft <sup>2</sup> . Treat as late in the day as possible. Ventilate the next morning.	

†Insecticide classifications: B - botanical, C - carbamate, CH - chlorinated hydrocarbon, IGR - insect growth regulator, M - microbial, O - other, OP - organophosphate, P - pyrethroid.

Insecticide formulations: A - aerosol (includes compressed total release products and smoke generator products), AS - aqueous suspension, D - dust, DF - dry flowable, EC - emulsifiable concentrate, F - flowable, G - granular, L - water-soluble liquid, P - pelleted, SP soluble powder, WG - water-dispersible granules, WP - wettable powder.

‡Signal word, human hazard description, and probable lethal dose for a 150-lb man, if swallowed: C - Caution, slightly dangerous, > 1 fl oz to a pint or > 1 oz to 1 lb;

W - Warning, moderately toxic, >1 tsp to 1 fl oz or 1 oz; D - Danger, highly toxic, a few drops to 1 tsp or < 1 oz.

**GREENHOUSE ORNAMENTAL INSECT AND RELATED PEST CONTROL (continued)**

Insect, mite, or related pest	Insecticide, classification, and formulation†	Amount of formulation per gallon of spray	Amount of Formulation per 100 Gallons of Spray	Minimum interval between application and reentry and signal word‡	Precautions and remarks
Aphids (continued)	naled (Dibrom) -- OP 60 EC	NA -- Vaporized	NA -- Vaporized	After house is vented for 1 hour -- D	Apply on steam pipes or vaporize in a hot plate at rate of 1 fl oz per 10,000 ft <sup>2</sup> . Have pipes (or hot plate) at 160°F. Will corrode pipes with continued use.
	nicotine sulfate -- O 40 EC	1 1/2 tsp	1 1/2 pt	When dry -- D	
	oxamyl -- C 24 L (Vydate L) 10 G (Oxamyl)	2 to 4 tsp NA -- Granules	2 to 4 pt NA -- Granules	When dry -- D After granules are worked into the soil or watered in -- D	Ornamental uses of Vydate L are being phased out. Apply 22 to 30 oz of granules per 1,000 ft <sup>2</sup> . Equates into 1/8 tsp per 6" to 10" azalea-depth pot.
	pyrethrins -- B 6 EC (Pyrenone) 0.5 A (PT 1100 Pyrethrum)	1/8 to 1 1/2 tsp NA -- Aerosol	2 to 12 fl oz NA -- Aerosol	When dry -- C After house is vented for 1 hour -- C	Pyrethrins are not recommended for use directly on open blooms or on bracts showing color. Apply PT 1100 using a rate of 1 lb per 3,000 ft <sup>2</sup> . Treat as late in the day as possible. Ventilate the next morning. Apply PT 1600 using a release rate of 5 to 10 seconds per 100 ft <sup>2</sup> .
	0.3 A (PT 1600 X-clude)	NA -- Aerosol	NA -- Aerosol	After house is vented for 1 hour -- C	
	1.1 L (PT 170 X-clude)	1 Tbsp to 2 fl oz	50 to 100 fl oz	When dry -- C	
	resmethrin -- P 24.3 EC 1 A	1 tsp NA -- Aerosol	1 pt NA -- Aerosol	When dry -- W After house is vented for 1 hour -- W	Apply total release aerosol product using a rate of 1 lb per 3,000 ft <sup>2</sup> . Apply directed spray aerosol using a release rate of 5 to 10 seconds per 100 ft <sup>2</sup> .
sulfotepp (Dithiono, Plantfume 103) -- OP 15 A	NA -- Smoke Generator	NA -- Smoke Generator	After house is vented for 1 hour -- D	Consult manufacturer's label for recommended rates.	
Armyworms	acephate -- OP 75 SP (Orthene) 3 A (PT 1300)	2/3 to 1 2/3 tsp NA -- Aerosol	1/3 to 2/3 lb NA -- Aerosol	When dry -- C After house is vented for 1 hour -- W	See aphids section for comments.
	azadirachtin -- B 0.3 F (Margosan O) 3 EC (Azatin EC)	2 1/2 to 5 tsp 1/2 tsp	40 to 80 fl oz 8 fl oz	When dry -- C When dry -- W	
	<i>Bacillus thuringiensis</i> -- M 3.2 AS (Dipel) 15 AS (Victory)	1 to 2 tsp 2 1/2 to 5 tsp	1 to 2 pt 40 to 80 fl oz	When dry -- C When dry -- C	
	bifenthrin -- P 10 WP (Talstar) 7.9 F (Talstar) 0.4 A (PT 1800 Attain)	1 1/4 to 5 3/4 tsp 1/2 to 2 4/10 tsp NA -- Aerosol	6.4 to 32 oz 2 to 10 fl oz NA -- Aerosol	When dry -- W When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	chlorpyrifos -- OP 50 WG (Pageant DF) 50 WP (Dursban WP)	1 tsp 1 to 2 tsp	1/2 lb 1/2 to 1 lb	When dry -- W When dry -- W	
	cyfluthrin -- P 24.3 EC (Tempo 2) 20 WP (Decathion)	1/10 tsp 1/4 tsp	1 1/2 fl oz 1.9 oz	When dry -- W When dry -- W	
	diazinon -- OP 23 EC (Knox-Out) 1 A (PT 1500 Knox-Out)	1 to 2 Tbsp NA -- Aerosol	3 to 6 pt NA -- Aerosol	When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	fluralinate (Mavrik) -- P 22.3 F	1/8 to 5/8 tsp	2 to 10 fl oz	When dry -- C	See aphids section for comments.
	pyrethrins -- B 6 EC (Pyrenone) 0.5 A (PT 1100 Pyrethrum)	1/8 to 1 1/2 tsp NA -- Aerosol	2 to 12 fl oz NA -- Aerosol	When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	0.3 A (PT 1600 X-clude)	NA -- Aerosol	NA -- Aerosol	After house is vented for 1 hour -- C	
	1.1 L (PT 170 X-clude)	1 Tbsp to 2 fl oz	50 to 100 fl oz	When dry -- C	
resmethrin -- P 24.3 EC 1 A	1 tsp NA -- Aerosol	1 pt NA -- Aerosol	When dry -- W After house is vented for 1 hour -- W	See aphids section for comments.	

†Insecticide classifications: B - botanical, C - carbamate, CH - chlorinated hydrocarbon, IGR - insect growth regulator, M - microbial, O - other, OP - organophosphate, P - pyrethroid.

Insecticide formulations: A - aerosol (includes compressed total release products and smoke generator products), AS - aqueous suspension, D - dust, DF - dry flowable, EC - emulsifiable concentrate, F - flowable, G - granular, L - water-soluble liquid, P - pelleted, SP soluble powder, WG - water-dispersible granules, WP - wettable powder.

‡Signal word, human hazard description, and probable lethal dose for a 150-lb man, if swallowed: C - Caution, slightly dangerous, > 1 fl oz to a pint or > 1 oz to 1 lb; W - Warning, moderately toxic, >1 tsp to 1 fl oz or 1 oz; D - Danger, highly toxic, a few drops to 1 tsp or < 1 oz.

**GREENHOUSE ORNAMENTAL INSECT AND RELATED PEST CONTROL (continued)**

Insect, mite, or related pest	Insecticide, classification, and formulation†	Amount of formulation per gallon of spray	Amount of Formulation per 100 Gallons of Spray	Minimum interval between application and reentry and signal word‡	Precautions and remarks
Beet armyworm	fenpropathrin (Tame) – P 30 EC	2/3 tsp	10 2/3 fl oz	When dry -- W	
	permethrin (Pounce) – P 25 WP	1 1/2 Tbsp	2 lb	When dry -- W	For use on roses only. Restricted Use Pesticide due to high toxicity to fish and aquatic organisms.
Broad mite	bifenthrin -- P 10 WP (Talstar) 7.9 F (Talstar) 0.4 A (PT 1800 Attain)	1 1/4 to 5 3/4 tsp 1/2 to 2 4/10 tsp NA -- Aerosol	6.4 to 32 oz 2 to 10 fl oz NA -- Aerosol	When dry -- W When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	dienochlor (Pentac) – CH 50 WP 38 F	1 tsp 1/2 tsp	8 oz 8 fl oz	When dry -- C When dry -- W	Repeat pentac applications in 5 to 14 days for effective control.
Brown soft scale	bendiocarb (Dycarb, Ficam, Turcam) -- C 76 WP	3/4 tsp	5 1/2 oz	When dry -- W	
	bifenthrin -- P 10 WP (Talstar) 7.9 F (Talstar) 0.4 A (PT 1800 Attain)	1 1/4 to 5 3/4 tsp 1/2 to 2 4/10 tsp NA -- Aerosol	6.4 to 32 oz 2 to 10 fl oz NA -- Aerosol	When dry -- W When dry -- C After house is vented for 1 hour -- C	
	sulfotepp (Dithiono, Plantume 103) -- OP 15 A	NA -- Smoke Generator	NA -- Smoke Generator	After house is vented for 1 hour -- D	See aphids section for comments.
Cabbage looper	acephate -- OP 75 SP (Orthene) 3 A (PT 1300)	2/3 to 1 2/3 tsp NA -- Aerosol	1/3 to 2/3 lb NA -- Aerosol	When dry -- C After house is vented for 1 hour -- W	See aphids section for comments.
	azadirachtin -- B 0.3 F (Margosan O) 3 EC (Azatin EC)	2 1/2 to 5 tsp 1/2 tsp	40 to 80 fl oz 8 fl oz	When dry -- C When dry -- W	
	<i>Bacillus thuringiensis</i> -- M 3.2 AS (Dipel) 15 AS (Victory)	1 to 2 tsp 2 1/2 to 5 tsp	1 to 2 pt 40 to 80 fl oz	When dry -- C When dry -- C	
	chlorpyrifos -- OP 50 WG (Pageant DF) 50 WP (Dursban WP)	1 tsp 1 to 2 tsp	1/2 lb 1/2 to 1 lb	When dry -- W When dry -- W	
	cyfluthrin -- P 24.3 EC (Tempo 2) 20 WP (Decathlon)	1/10 tsp 1/4 tsp	1 1/2 fl oz 1.9 oz	When dry -- W When dry -- W	
	diazinon -- OP 23 EC (Knox-Out) 1 A (PT 1500 Knox-Out)	1 to 2 Tbsp NA -- Aerosol	3 to 6 pt NA -- Aerosol	When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	dichlorvos (Vapona) -- OP 5 A	NA -- Smoke Generator	NA -- Smoke Generator	After house is vented for 1 hour -- D	See aphids section for comments.
	fluvinate (Mavrik) -- P 22.3 F	1/8 to 5/8 tsp	2 to 10 fl oz	When dry -- C	See aphids section for comments.
	naled (Dibrom) -- OP 60 EC	1 1/2 tsp	24 fl oz	When dry -- D	Can cause burn on open flowers.
	permethrin (Pounce) -- P 25 WP	1 1/2 Tbsp	2 lb	When dry -- W	For use on roses only. Restricted Use Pesticide due to high toxicity to fish and aquatic organisms.
	pyrethrins -- B 8 EC (Pyrenone) 0.5 A (PT 1100 Pyrethrum)  0.3 A (PT 1600 X-clude)  1.1 L (PT 170 X-clude)	1/8 to 1 1/2 tsp NA -- Aerosol  NA -- Aerosol  1 Tbsp to 2 fl oz	2 to 12 fl oz NA -- Aerosol  NA -- Aerosol  50 to 100 fl oz	When dry -- C After house is vented for 1 hour -- C  After house is vented for 1 hour -- C When dry -- C	See aphids section for comments.
	resmethrin -- P 24.3 EC 1 A	1 tsp NA -- Aerosol	1 pt NA -- Aerosol	When dry -- W After house is vented for 1 hour -- W	See aphids section for comments.

†Insecticide classifications: B - botanical, C - carbamate, CH - chlorinated hydrocarbon, IGR - insect growth regulator, M - microbial, O - other, OP - organophosphate, P - pyrethroid.

Insecticide formulations: A - aerosol (includes compressed total release products and smoke generator products), AS - aqueous suspension, D - dust, DF - dry flowable, EC - emulsifiable concentrate, F - flowable, G - granular, L - water-soluble liquid, P - pelleted, SP soluble powder, WG - water-dispersible granules, WP - wettable powder.

‡Signal word, human hazard description, and probable lethal dose for a 150-lb man, if swallowed: C - Caution, slightly dangerous, > 1 fl oz to a pint or > 1 oz to 1 lb; W - Warning, moderately toxic, > 1 tsp to 1 fl oz or 1 oz; D - Danger, highly toxic, a few drops to 1 tsp or < 1 oz.

**GREENHOUSE ORNAMENTAL INSECT AND RELATED PEST CONTROL (continued)**

Insect, mite, or related pest	Insecticide, classification, and formulation†	Amount of formulation per gallon of spray	Amount of Formulation per 100 Gallons of Spray	Minimum interval between application and reentry and signal word‡	Precautions and remarks
Chrysanthemum gall midge	lindane (Lindane) -- CH 25 WP	1 Tbsp	1 lb	When dry -- W	For use on chrysanthemums only. Weekly applications may be needed.
Corn earworm	carbaryl (Sevin) -- C 50 WP	2 Tbsp	2 lb	When dry -- W	For use on chrysanthemums only. Repeat as needed. Dusts are also effective.
Crickets	cyfluthrin -- P 24.3 EC (Tempo 2) 20 WP (Decathlon)	1/10 tsp 1/4 tsp	1 1/2 fl oz 1.9 oz	When dry -- W When dry -- W	
	insecticidal soap (M-Pede) -- O 50.5 EC	4 fl oz	3 1/2 gal	When dry -- C	
	pyrethrins -- B 6 EC (Pyrenone) 0.5 A (PT 1100 Pyrethrum)	1/8 to 1 1/2 tsp NA -- Aerosol	2 to 12 fl oz NA -- Aerosol	When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	0.3 A (PT 1600 X-clude) 1.1 L (PT 170 X-clude)	NA -- Aerosol 1 Tbsp to 2 fl oz	NA -- Aerosol 50 to 100 fl oz	After house is vented for 1 hour -- C When dry -- C	
Cucumber beetle	bifenthrin -- P 10 WP (Talstar) 7.9 F (Talstar) 0.4 A (PT 1800 Attain)	1 1/4 to 5 3/4 tsp 1/2 to 2 4/10 tsp NA -- Aerosol	6.4 to 32 oz 2 to 10 fl oz NA -- Aerosol	When dry -- W When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	fluvinate (Mavrik) -- P 22.3 F	1/8 to 5/8 tsp	2 to 10 fl oz	When dry -- C	See aphids section for comments.
	pyrethrins -- B 6 EC (Pyrenone) 0.5 A (PT 1100 Pyrethrum)	1/8 to 1 1/2 tsp NA -- Aerosol	2 to 12 fl oz NA -- Aerosol	When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	0.3 A (PT 1600 X-clude) 1.1 L (PT 170 X-clude)	NA -- Aerosol 1 Tbsp to 2 fl oz	NA -- Aerosol 50 to 100 fl oz	After house is vented for 1 hour -- C When dry -- C	
	resmethrin -- P 24.3 EC 1 A	1 tsp NA -- Aerosol	1 pt NA -- Aerosol	When dry -- W After house is vented for 1 hour -- W	See aphids section for comments.
Cutworms	acephate -- OP 75 SP (Orthene) 3 A (PT 1300)	2/3 to 1 2/3 tsp NA -- Aerosol	1/3 to 2/3 lb NA -- Aerosol	When dry -- C After house is vented for 1 hour -- W	See aphids section for comments.
	azadirachtin -- B 0.3 F (Margosan O) 3 EC (Azatin EC)	2 1/2 to 5 tsp 1/2 tsp	40 to 80 fl oz 8 fl oz	When dry -- C When dry -- W	
	<i>Bacillus thuringiensis</i> -- M 3.2 AS (Dipel) 15 AS (Victory)	1 to 2 tsp 2 1/2 to 5 tsp	1 to 2 pt 40 to 80 fl oz	When dry -- C When dry -- C	
	bifenthrin -- P 10 WP (Talstar) 7.9 F (Talstar) 0.4 A (PT 1800 Attain)	1 1/4 to 5 3/4 tsp 1/2 to 2 4/10 tsp NA -- Aerosol	6.4 to 32 oz 2 to 10 fl oz NA -- Aerosol	When dry -- W When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	carbaryl (Sevin) -- C 50 WP	2 Tbsp	2 lb	When dry -- C	Apply to soil surface beneath plants.
	cyfluthrin -- P 24.3 EC (Tempo 2) 20 WP (Decathlon)	1/10 tsp 1/4 tsp	1 1/2 fl oz 1.9 oz	When dry -- W When dry -- W	
	fluvinate (Mavrik) -- P 22.3 F	1/8 to 5/8 tsp	2 to 10 fl oz	When dry -- C	See aphids section for comments.
	pyrethrins -- B 6 EC (Pyrenone) 0.5 A (PT 1100 Pyrethrum)	1/8 to 1 1/2 tsp NA -- Aerosol	2 to 12 fl oz NA -- Aerosol	When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	0.3 A (PT 1600 X-clude) 1.1 L (PT 170 X-clude)	NA -- Aerosol 1 Tbsp to 2 fl oz	NA -- Aerosol 50 to 100 fl oz	After house is vented for 1 hour -- C When dry -- C	
	Cyclamen mites	endosulfan (Thiodan) -- CH 24.2 EC 50 WP	2 tsp 1 Tbsp	2 pt 1 lb	24 hours -- D 24 hours -- D
Hot water (110°F)		---	---	---	Submerge infested plants for 15 minutes.

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Insecticide formulations: A - aerosol (includes compressed total release products and smoke generator products), AS - aqueous suspension, D - dust, DF - dry flowable, EC - emulsifiable concentrate, F - flowable, G - granular, L - water-soluble liquid, P - pelleted, SP - soluble powder, WG - water-dispersible granules, WP - wettable powder.

‡Signal word, human hazard description, and probable lethal dose for a 150-lb man, if swallowed: C - Caution, slightly dangerous, > 1 fl oz to a pint or > 1 oz to 1 lb; W - Warning, moderately toxic, > 1 tsp to 1 fl oz or 1 oz; D - Danger, highly toxic, a few drops to 1 tsp or < 1 oz.

**GREENHOUSE ORNAMENTAL INSECT AND RELATED PEST CONTROL (continued)**

Insect, mite, or related pest	Insecticide, classification, and formulation†	Amount of formulation per gallon of spray	Amount of Formulation per 100 Gallons of Spray	Minimum Interval between application and reentry and signal word‡	Precautions and remarks
Earwigs	insecticidal soap (M-Pede) -- O 50.5 EC	4 fl oz	3 1/2 gal	When dry -- C	
Fungus gnats	azadirachtin -- B 0.3 F (Margosan O) 3 EC (Azatin EC)	2 1/2 to 5 tsp 1/2 tsp	40 to 80 fl oz 8 fl oz	When dry -- C When dry -- W	
	<i>Bacillus thuringiensis</i> H-14 (Gnatrol) -- M 6 AS 12 AS	1 to 8 tsp 1/2 to 4 tsp	1 to 8 pt 1/2 to 4 pt	When dry -- C When dry -- C	
	bifenthrin -- P 10 WP (Talstar) 7.9 F (Talstar) 0.4 A (PT 1800 Attain)	1 1/4 to 5 3/4 tsp 1/2 to 2 4/10 tsp NA -- Aerosol	6.4 to 32 oz 2 to 10 fl oz NA -- Aerosol	When dry -- W When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	cyfluthrin -- P 20 WP (Decathlon)	1/5 tsp	1.3 oz	When dry -- W	
	diazinon -- OP 23 EC (Knox-Out) 1 A (PT 1500 Knox-Out)	1 to 2 Tbsp NA -- Aerosol	3 to 6 pt NA -- Aerosol	When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	kinoprene -- IGR 72.5 EC (Enstar) 65.1 EC (Enstar II)	1/2 to 1 1/2 tsp 1/2 to 2/3 tsp	8 to 20 fl oz 5 to 10 fl oz	When dry -- C When dry -- C	See aphids section for comments. Enstar and Enstar II are for larvae control only.
	nematodes (Exhibit) -- O 17 AS	--	--	When dry -- C	Apply 1 gal per 10,000 ft <sup>2</sup> for larvae control. Make three applications, each 7 days apart for best results.
	oxamyl -- C 24 L (Vydate L) 10 G (Oxamyl)	2 to 4 tsp NA -- Granules	2 to 4 pt NA -- Granules	When dry -- D After granules are worked into the soil or watered in -- D	See aphids section for comments.
	pyrethrins -- B 6 EC (Pyrenone) 0.5 A (PT 1100 Pyrethrum) 0.3 A (PT 1600 X-clude) 1.1 L (PT 170 X-clude)	1/8 to 1 1/2 tsp NA -- Aerosol NA -- Aerosol 1 Tbsp to 2 fl oz	2 to 12 fl oz NA -- Aerosol NA -- Aerosol 50 to 100 fl oz	When dry -- C After house is vented for 1 hour -- C After house is vented for 1 hour -- C When dry -- C	See aphids section for comments.
	resmethrin -- P 24.3 EC 1 A	1 tsp NA -- Aerosol	1 pt NA -- Aerosol	When dry -- W After house is vented for 1 hour -- W	See aphids section for comments.
Hemispherical scale	bendiocarb (Dycarb, Ficam, Turcam) -- C 76 WP	3/4 tsp	5 1/2 oz	When dry -- W	
	chlorpyrifos -- OP 50 WG (Pageant DF) 50 WP (Dursban WP)	1 tsp 1 to 2 tsp	1/2 lb 1/2 to 1 lb	When dry -- W When dry -- W	
Leafhoppers	bifenthrin -- P 10 WP (Talstar) 7.9 F (Talstar)	1 1/4 to 5 3/4 tsp 1/2 to 2 4/10 tsp	6.4 to 32 oz 2 to 10 fl oz	When dry -- W When dry -- C	
	cyfluthrin -- P 20 WP (Decathlon)	1/4 tsp	1.9 oz	When dry -- W	
	fenpropathrin (Tame) -- P 30 EC	1/3 to 2/3 tsp	5 1/3 to 10 2/3 fl oz	When dry -- W	
	pyrethrins -- B 6 EC (Pyrenone) 0.5 A (PT 1100 Pyrethrum) 0.3 A (PT 1600 X-clude) 1.1 L (PT 170 X-clude)	1/8 to 1 1/2 tsp NA -- Aerosol NA -- Aerosol 1 Tbsp to 2 fl oz	2 to 12 fl oz NA -- Aerosol NA -- Aerosol 50 to 100 fl oz	When dry -- C After house is vented for 1 hour -- C After house is vented for 1 hour -- C When dry -- C	See aphids section for comments.
	resmethrin -- P 24.3 EC 1 A	1 tsp NA -- Aerosol	1 pt NA -- Aerosol	When dry -- W After house is vented for 1 hour -- W	See aphids section for comments.

†Insecticide classifications: B - botanical, C - carbamate, CH - chlorinated hydrocarbon, IGR - insect growth regulator, M - microbial, O - other, OP - organophosphate, P - pyrethroid.  
 Insecticide formulations: A - aerosol (includes compressed total release products and smoke generator products), AS - aqueous suspension, D - dust, DF - dry flowable, EC - emulsifiable concentrate, F - flowable, G - granular, L - water-soluble liquid, P - pelleted, SP soluble powder, WG - water-dispersible granules, WP - wettable powder.  
 ‡Signal word, human hazard description, and probable lethal dose for a 150-lb man, if swallowed: C - Caution, slightly dangerous, > 1 fl oz to a pint or > 1 oz to 1 lb; W - Warning, moderately toxic, > 1 tsp to 1 fl oz or 1 oz; D - Danger, highly toxic, a few drops to 1 tsp or < 1 oz.

**GREENHOUSE ORNAMENTAL INSECT AND RELATED PEST CONTROL (continued)**

Insect, mite, or related pest	Insecticide, classification, and formulation†	Amount of formulation per gallon of spray	Amount of Formulation per 100 Gallons of Spray	Minimum interval between application and reentry and signal word‡	Precautions and remarks
Leaf miners	abamectin B1 (Avid) -- O 2 EC	1/2 tsp	8 fl oz	When dry -- C	
	acephate -- OP 75 SP (Orthene) 3 A (PT 1300)	2/3 to 1 2/3 tsp NA -- Aerosol	1/3 to 2/3 lb NA -- Aerosol	When dry -- C After house is vented for 1 hour -- W	See aphids section for comments.
	azadirachtin -- B 0.3 F (Margosan O) 3 EC (Azatin EC)	2 1/2 to 5 tsp 1/2 tsp	40 to 80 fl oz 8 fl oz	When dry -- C When dry -- W	
	bendiocarb (Dycarb, Ficam, Turcam) -- C 76 WP	7 tsp	42 oz	When dry -- W	For use on azaleas only for control of azalea leafminer. Avoid excessive runoff.
	bifenthrin -- P 10 WP (Talstar) 7.9 F (Talstar)	1 1/4 to 5 3/4 tsp 1/2 to 2 4/10 tsp	6.4 to 32 oz 2 to 10 fl oz	When dry -- W When dry -- C	
	chlorpyrifos -- OP 50 WG (Pageant DF) 50 WP (Dursban WP)	1 tsp 1 to 2 tsp	1/2 lb 1/2 to 1 lb	When dry -- W When dry -- W	
	cyfluthrin -- P 20 WP (Decathlon)	1/4 tsp	1.9 oz	When dry -- W	
	cyromazine (Citation) -- IGR 75 WP	---	2.66 oz	When dry -- C	For use on chrysanthemum only.
	diazinon -- OP 23 EC (Knox-Out) 1 A (PT 1500 Knox-Out)	1 to 2 Tbsp NA -- Aerosol	3 to 6 pt NA -- Aerosol	When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	dichlorvos (Vapona) -- OP 5 A 81 EC	NA -- Smoke Generator NA -- Vaporized	NA -- Smoke Generator NA -- Vaporize	After house is vented for 1 hour -- D After house is vented for 1 hour -- D	See aphids section for comments on use of the 5 A smoke generator product. The 81 EC product is for use on azaleas only. Vaporize 1 fl oz per 10,000 ft <sup>3</sup> . Ventilate thoroughly after two hours post-application.
	malathion (Malathion) -- OP 25 WP 57 EC	2 tsp 2 tsp	40 oz 2 pt	When dry -- C When dry -- C	See aphids section for comments.
	oxamyl -- C 24 L (Vydate) 10 G (Oxamyl)	2 to 4 tsp NA -- Granules	2 to 4 pt NA -- Granules	When dry -- D After granules are worked into the soil or watered in -- D	See aphids section for comments.
	permethrin (Pounce) -- P 25 WP	1 1/2 Tbsp	2 lb	When dry -- W	For use on chrysanthemums only. Restricted Use Pesticide due to high toxicity to fish and aquatic organisms. Some mum cultivars may show phytotoxicity to Pounce; treat a small number to determine plant safety prior to large-scale application. Do not spray open blooms.
Leaf rollers	acephate -- OP 75 SP (Orthene) 3 A (PT 1300)	2/3 to 1 2/3 tsp NA -- Aerosol	1/3 to 2/3 lb NA -- Aerosol	When dry -- C After house is vented for 1 hour -- W	See aphids section for comments.
	azadirachtin -- B 0.3 F (Margosan O) 3 EC (Azatin EC)	2 1/2 to 5 tsp 1/2 tsp	40 to 80 fl oz 8 fl oz	When dry -- C When dry -- W	
	bifenthrin -- P 10 WP (Talstar) 7.9 F (Talstar) 0.5 A (PT 1800 Attain)	1 1/4 to 5 3/4 tsp 1/2 to 2 4/10 tsp NA -- Aerosol	6.4 to 32 oz 2 to 10 fl oz NA -- Aerosol	When dry -- W When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	cyfluthrin -- P 24.3 EC (Tempo 2) 20 WP (Decathlon)	1/10 tsp 1/4 tsp	1 1/2 fl oz 1.9 oz	When dry -- W When dry -- W	
	diazinon -- OP 1 A (PT 1500 Knox-Out)	NA -- Aerosol	NA -- Aerosol	After house is vented for 1 hour -- C	See aphids section for comments.
	naled (Dibrom) -- OP 60 EC	NA -- Vaporized	NA -- Vaporized	After house is vented for 1 hour -- D	See aphids section for comments.
	pyrethrins (Pyrenone) -- B 6 EC	1/8 to 1 1/2 tsp	2 to 12 fl oz	When dry -- C	See aphids section for comments.
	resmethrin -- P 24.3 EC 1 A	1 tsp NA -- Aerosol	1 pt NA -- Aerosol	When dry -- W After house is vented for 1 hour -- W	See aphids section for comments.

†Insecticide classifications: B - botanical, C - carbamate, CH - chlorinated hydrocarbon, IGR - insect growth regulator, M - microbial, O - other, OP - organophosphate, P - pyrethroid.

Insecticide formulations: A - aerosol (includes compressed total release products and smoke generator products), AS - aqueous suspension, D - dust, DF - dry flowable, EC - emulsifiable concentrate, F - flowable, G - granular, L - water-soluble liquid, P - pelleted, SP soluble powder, WG - water-dispersible granules, WP - wettable powder.

‡Signal word, human hazard description, and probable lethal dose for a 150-lb man, if swallowed: C - Caution, slightly dangerous, > 1 fl oz to a pint or > 1 oz to 1 lb; W - Warning, moderately toxic, > 1 tsp to 1 fl oz or 1 oz; D - Danger, highly toxic, a few drops to 1 tsp or < 1 oz.

**GREENHOUSE ORNAMENTAL INSECT AND RELATED PEST CONTROL (continued)**

Insect, mite, or related pest	Insecticide, classification, and formulation†	Amount of formulation per gallon of spray	Amount of Formulation per 100 Gallons of Spray	Minimum interval between application and reentry and signal word‡	Precautions and remarks
Mealybugs	acephate -- OP 75 SP (Orthene) 3 A (PT 1300)	2/3 to 1 2/3 tsp NA -- Aerosol	1/3 to 2/3 lb NA -- Aerosol	When dry --C After house is vented for 1 hour -- W	See aphids section for comments.
	azadirachtin -- B 0.3 F (Margosan O) 3 EC (Azatin EC)	2 1/2 to 5 tsp 1/2 tsp	40 to 80 fl oz 8 fl oz	When dry -- C When dry -- W	
	bendiocarb (Dycarb, Ficam, Turcam) -- C 76 WP	3/4 tsp	5 1/2 oz	When dry -- W	
	bifenthrin -- P 10 WP (Talstar) 7.9 F (Talstar) 0.4 A (PT 1800 Attain)	1 1/4 to 5 3/4 tsp 1/2 to 2 4/10 tsp NA -- Aerosol	6.4 to 32 oz 2 to 10 fl oz NA -- Aerosol	When dry -- W When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	chlorpyrifos -- OP 50 WG (Pageant DF) 50 WP (Dursban WP)	1 tsp 1 to 2 tsp	1/2 lb 1/2 to 1 lb	When dry -- W When dry -- W	
	cyfluthrin -- P 24.3 EC (Tempo 2) 20 WP (Decathlon)	1/10 tsp 1/4 tsp	1 1/2 fl oz 1.9 oz	When dry -- W When dry -- W	
	d-phenothrin (Sumithrin) -- P 25 EC 0.5 A	1 tsp NA -- Aerosol	1 pt NA -- Aerosol	When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	diazinon -- OP 23 EC (Knox-Out) 1 A (PT 1500 Knox-Out)	1 to 2 Tbsp NA -- Aerosol	3 to 6 pt NA -- Aerosol	When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	dichlorvos (Vapona) -- OP 5 A 81 EC	NA -- Smoke Generator NA -- Vaporized	NA -- Smoke Generator NA -- Vaporized	After house is vented for 1 hour -- D After house is vented for 1 hour -- D	See aphids section for comments on use of the 5 A smoke generator product. The 81 EC product is for use on African violets and begonias only. Vaporize 1 fl oz per 10,000 ft <sup>3</sup> . Ventilate thoroughly after two hours post-application.
	fenpropathrin (Tame) -- P 30 EC	1 tsp	16 fl oz	When dry -- W	
	fluvialinate (Mavrik) -- P 22.3 F	1/8 to 5/8 tsp	2 to 10 fl oz	When dry -- C	See aphids section for comments.
	horticultural oil (Sunspray Ultra-Fine Spray Oil) -- O 98.8 EC	2 1/2 to 5 Tbsp	1 to 2 gal	When dry -- C	See aphids section for comments.
	insecticidal soap (M-Pede) -- O 50.5 EC	4 fl oz	3 1/2 gal	When dry -- C	See aphids section for comments.
	kinoprene -- IGR 72.5 EC (Enstar) 65.1 EC (Enstar II)	1/2 to 1 1/2 tsp 1/2 to 2/3 tsp	8 to 20 fl oz 5 to 10 fl oz	When dry -- C When dry -- C	See aphids section for comments.
	malathion (Malathion) -- OP 25 WP 57 EC	2 tsp 2 tsp	40 oz 2 pt	When dry -- C When dry -- C	See aphids section for comments.
	naled (Dibrom) -- OP 60 EC	NA -- Vaporized	NA -- Vaporized	After house is vented for 1 hour -- D	See aphids section for comments.
	oxamyl -- C 24 L (Vydate) 10 G (Oxamyl)	2 to 4 tsp NA -- Granules	2 to 4 pt NA -- Granules	When dry -- D After granules are worked into the soil or watered in -- D	See aphids section for comments.
	pyrethrins -- B 6 EC (Pyrenone) 0.5 A (PT 1100 Pyrethrum) 0.3 A (PT 1600 X-clude) 1.1 L (PT 170 X-clude)	1/8 to 1 1/2 tsp NA -- Aerosol NA -- Aerosol 1 Tbsp to 2 fl oz	2 to 12 fl oz NA -- Aerosol NA -- Aerosol 50 to 100 fl oz	When dry -- C After house is vented for 1 hour -- C After house is vented for 1 hour -- C When dry -- C	See aphids section for comments.
	resmethrin -- P 24.3 EC 1 A	1 tsp NA -- Aerosol	1 pt NA -- Aerosol	When dry -- W After house is vented for 1 hour -- W	See aphids section for comments.
	sulfotepp (Dithion, Planifume 103) -- OP 15 A	NA -- Smoke Generator	NA -- Smoke Generator	After house is vented for 1 hour -- D	See aphids section for comments.

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**GREENHOUSE ORNAMENTAL INSECT AND RELATED PEST CONTROL (continued)**

Insect, mite, or related pest	Insecticide, classification, and formulation†	Amount of formulation per gallon of spray	Amount of Formulation per 100 Gallons of Spray	Minimum Interval between application and reentry and signal word‡	Precautions and remarks
Millipedes	malathion (Malathion) -- OP 25 WP 57 EC	2 tsp 2 tsp	40 oz 2 pt	When dry -- C When dry -- C	See aphids section for comments.
Mites	diazinon -- OP 23 EC (Knox-Out)	1 to 2 Tbsp	3 to 6 pt	When dry -- C	See aphids section for comments.
	fluvalinate (Mavrik) -- P 22.3 F	1/8 to 5/8 tsp	2 to 10 fl oz	When dry -- C	See aphids section for comments.
	methiocarb -- C 75 WP (Grandslam)	2 tsp	1 to 2 lb	When dry -- W	See aphids section for comments.
Moths	methiocarb -- C 1 A (PT 1700)	NA -- Aerosol	NA -- Aerosol	After house is vented for 1 hour -- W	See aphids section for comments.
Omnivorous leafroller	bifenthrin -- P 0.4 A (PT 1800 Attain)	NA -- Aerosol	NA -- Aerosol	After house is vented for 1 hour -- C	See aphids section for comments.
	permethrin (Pounce) -- P 25 WP	1 1/2 Tbsp	2 lb	When dry -- W	For use on roses only. Restricted Use Pesticide due to high toxicity to fish and aquatic organisms.
Plant bugs	bifenthrin -- P 10 WP (Talstar) 7.9 F (Talstar) 0.4 A (PT 1800 Attain)	1 1/4 to 5 3/4 tsp 1/2 to 2 4/10 tsp NA -- Aerosol	6.4 to 32 oz 2 to 10 fl oz NA -- Aerosol	When dry -- W When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	cyfluthrin -- P 24.3 EC (Tempo 2) 20 WP (Decathlon)	1/10 tsp 1/4 tsp	1 1/2 fl oz 1.9 oz	When dry -- W When dry -- W	
	fluvalinate (Mavrik) -- P 22.3 F	1/8 to 5/8 tsp	2 to 10 fl oz	When dry -- C	See aphids section for comments.
	resmethrin -- P 24.3 EC 1 A	1 tsp NA -- Aerosol	1 pt NA -- Aerosol	When dry -- W After house is vented for 1 hour -- W	See aphids section for comments.
Rose chafer	endosulfan (Thiodan) -- CH 24.2 EC 50 WP	2 tsp 1 Tbsp	2 pt 1 lb	24 hours -- D 24 hours -- D	See aphids section for comments.
	pyrethrins -- B 0.5 A (PT 1100 Pyrethrum)	NA -- Aerosol	NA -- Aerosol	After house is vented for 1 hour -- C When dry -- C	See aphids section for comments.
	1.1 L (PT 170 X-clude)	1 Tbsp to 2 fl oz	50 to 100 fl oz		
Scale insects	acephate -- OP 75 SP (Orthene) 3 A (PT 1300)	2/3 to 1 2/3 tsp NA -- Aerosol	1/3 to 2/3 lb NA -- Aerosol	When dry -- C After house is vented for 1 hour -- W	See aphids section for comments.
	azadirachtin -- B 3 EC (Azatin EC)	1/2 tsp	8 fl oz	When dry -- W	
	bifenthrin -- P 0.4 A (PT 1800 Attain)	NA -- Aerosol	NA -- Aerosol	After house is vented for 1 hour -- C	See aphids section for comments.
	cyfluthrin -- P 20 WP (Decathlon)	1/4 tsp	1.9 oz	When dry -- W When dry -- W	
	diazinon -- OP 23 EC (Knox-Out) 1 A (PT 1500 Knox-Out)	1 to 2 Tbsp NA -- Aerosol	3 to 6 pt NA -- Aerosol	When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	fenoxycarb (PT 2100 Preclude) -- IGR 0.6 A	NA -- Aerosol	NA -- Aerosol	After house is vented for 1 hour -- C	Apply total release aerosol product using a rate of 1 lb per 3,000 ft <sup>2</sup> . Treat as late in the day as possible. Ventilate the next morning. Do not use on bracts showing color.
	horticultural oil (Sunspray Ultra-Fine Spray Oil) -- O 98.8 EC	2 1/2 to 5 Tbsp	1 to 2 gal	When dry -- C	See aphids section for comments.
	insecticidal soap (M-Pede) -- O 50.5 EC	4 fl oz	3 1/2 gal	When dry -- C	See aphids section for comments.
	kinoprene -- IGR 72.5 EC (Enstar) 65.1 EC (Enstar II)	1/2 to 1 1/2 tsp 1/2 to 2/3 tsp	8 to 20 fl oz 5 to 10 fl oz	When dry -- C When dry -- C	See aphids section for comments.

†Insecticide classifications: B - botanical, C - carbamate, CH - chlorinated hydrocarbon, IGR - insect growth regulator, M - microbial, O - other, OP - organophosphate, P - pyrethroid.

Insecticide formulations: A - aerosol (includes compressed total release products and smoke generator products), AS - aqueous suspension, D - dust, DF - dry flowable, EC - emulsifiable concentrate, F - flowable, G - granular, L - water-soluble liquid, P - pelleted, SP soluble powder, WG - water-dispersible granules, WP - wettable powder.

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**GREENHOUSE ORNAMENTAL INSECT AND RELATED PEST CONTROL (continued)**

Insect, mite, or related pest	Insecticide, classification, and formulation†	Amount of formulation per gallon of spray	Amount of Formulation per 100 Gallons of Spray	Minimum Interval between application and reentry and signal word‡	Precautions and remarks
Scale insects (continued)	methiocarb -- C 1 A (PT 1700)	NA -- Aerosol	NA -- Aerosol	After house is vented for 1 hour -- W	
	oxamyi -- C 24 L (Vydate) 10 G (Oxamy)	2 to 4 tsp NA -- Granules	2 to 4 pt NA -- Granules	When dry -- D After granules are worked into the soil or watered in -- D	See aphids section for comments.
	pyrethrins -- B 0.5 A (PT 1100 Pyrethrum) 0.3 A (PT 1600 X-clude)	NA -- Aerosol NA -- Aerosol	NA -- Aerosol NA -- Aerosol	After house is vented for 1 hour -- C After house is vented for 1 hour -- C	See aphids section for comments.
	resmethrin -- P 1 A	NA -- Aerosol	NA -- Aerosol	After house is vented for 1 hour -- W	See aphids section for comments.
Slugs and snails	metaldehyde (Snarol) -- O 5 P	NA -- Pelleted Bait	NA -- Pelleted Bait	None given-- W	More than one application is usually necessary. Follow label directions for application of bait.
	methiocarb -- C 75 WP (Grandslam) 1 A (PT 1700)	2 tsp NA -- Aerosol	1 to 2 lb NA -- Aerosol	When dry -- W After house is vented for 1 hour -- W	See aphids section for comments.
Sowbugs	cyfluthrin -- P 24.3 EC (Tempo 2) 20 WP (Decathlon)	1/10 tsp 1/4 tsp	1 1/2 fl oz 1.9 oz	When dry -- W When dry -- W	
	lindane (Lindane) -- CH 25 WP	1 Tbsp	1 lb	When dry -- W	
	malathion (Malathion) -- OP 25 WP 57 EC	2 tsp 2 tsp	40 oz 2 pt	When dry -- C When dry -- C	See aphids section for comments.
Spider mites	abamectin B1 (Avid) -- O 2 EC	1/2 tsp	8 fl oz	When dry -- C	
	azadirachtin -- B 3 EC (Azatin EC)	1/2 tsp	8 fl oz	When dry -- W	
	bifenthrin -- P 10 WP (Talstar) 7.9 F (Talstar) 0.4 A (PT 1800 Attain)	1 1/4 to 5 3/4 tsp 1/2 to 2 4/10 tsp NA -- Aerosol	6.4 to 32 oz 2 to 10 fl oz NA -- Aerosol	When dry -- W When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	d-phenothrin (Sumithrin) -- P 25 EC 0.5 A	1 tsp NA -- Aerosol	1 pt NA -- Aerosol	When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	diazinon -- OP 1 A (PT 1500 Knox-Out)	NA -- Aerosol	NA -- Aerosol	After house is vented for 1 hour -- C	See aphids section for comments.
	dichlorvos (Vapona) -- OP 5 A	NA -- Smoke Generator	NA -- Smoke Generator	After house is vented for 1 hour -- D	See aphids section for comments.
	dienochlor (Pentac) -- CH 50 WP 38 F	1 tsp 1/2 tsp	8 oz 8 fl oz	When dry -- C When dry -- W	Pentac 50 WP can also be applied as a slurry on steam pipes at a rate of one pound active ingredient per 450,000 ft <sup>2</sup> ; apply every 5 days until control is obtained.
	fluvalinate (Mavrik) -- P 22.3 F	1/8 to 5/8 tsp	2 to 10 fl oz	When dry -- C	See aphids section for comments.
	horticultural oil (Sunspray Ultra-Fine Spray Oil) -- O 98.8 EC	2 1/2 to 5 Tbsp	1 to 2 gal	When dry -- C	See aphids section for comments.
	insecticidal soap (M-Pede) -- O 50.5 EC	4 fl oz	3 1/2 gal	When dry -- C	See aphids section for comments.
	methiocarb -- C 1 A (PT 1700)	NA -- Aerosol	NA -- Aerosol	After house is vented for 1 hour -- W	
	naled (Dibrom) -- OP 60 EC	NA -- Vaporized	NA -- Vaporized	After house is vented for 1 hour -- D	See aphids section for comments.

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**GREENHOUSE ORNAMENTAL INSECT AND RELATED PEST CONTROL (continued)**

Insect, mite, or related pest	Insecticide, classification, and formulation†	Amount of formulation per gallon of spray	Amount of Formulation per 100 Gallons of Spray	Minimum Interval between application and reentry and signal word‡	Precautions and remarks
Spider mites (continued)	oxamyl -- C 24 L (Vydate) 10 G (Oxamyl)	2 to 4 tsp NA -- Granules	2 to 4 pt NA -- Granules	When dry -- D After granules are worked into the soil or watered in -- D	See aphids section for comments.
	pyrethrins -- B 6 EC (Pyrenone) 0.5 A (PT 1100 Pyrethrum)  0.3 A (PT 1600 X-clude)  1.1 L (PT 170 X-clude)	1/8 to 1 1/2 tsp NA -- Aerosol  NA -- Aerosol  1 Tbsp to 2 fl oz	2 to 12 fl oz NA -- Aerosol  NA -- Aerosol  50 to 100 fl oz	When dry -- C After house is vented for 1 hour -- C After house is vented for 1 hour -- C When dry -- C	See aphids section for comments.
	resmethrin -- P 24.3 EC 1 A	1 tsp NA -- Aerosol	1 pt NA -- Aerosol	When dry -- W After house is vented for 1 hour -- W	See aphids section for comments.
	sulfotepp (Dithiono, Plantfume 103) -- OP 15 A	NA -- Smoke Generator	NA -- Smoke Generator	After house is vented for 1 hour -- D	See aphids section for comments.
	tetradifon (Tedion) -- O 25 WP	NA -- Vaporized	NA -- Vaporized	After house is vented for 1 hour -- C	Apply Tedion as a slurry on steam pipes at a rate of 1 pound active ingredient per 200,000 ft <sup>3</sup> .
Spittlebugs	cyfluthrin -- P 24.3 EC (Tempo 2) 20 WP (Decathlon)	1/10 tsp 1/4 tsp	1 1/2 fl oz 1.9 oz	When dry -- W When dry -- W	
	insecticidal soap (M-Pede) -- O 50.5 EC	4 fl oz	3 1/2 gal	When dry -- C	See aphids section for comments.
	resmethrin -- P 24.3 EC 1 A	1 tsp NA -- Aerosol	1 pt NA -- Aerosol	When dry -- W After house is vented for 1 hour -- W	See aphids section for comments.
Sweetpotato whitefly	azadirachtin -- B 0.3 F (Margosan O) 3 EC (Azatin EC)	5 tsp 1/2 tsp	5 pt 8 fl oz	When dry -- C When dry -- W	
	fenproprathrin (Tame) -- P 30 EC	2/3 tsp	10 2/3 fl oz	When dry -- W	Use as a tank mix with acephate (Orthene).
Thrips	abamectin B1 (Avid) -- O 2 EC	1/2 tsp	8 fl oz	When dry -- C	
	acephate -- OP 75 SP (Orthene) 3 A (PT 1300)	2/3 to 1 2/3 tsp NA -- Aerosol	1/3 to 2/3 lb NA -- Aerosol	When dry -- C After house is vented for 1 hour -- W	See aphids section for comments.
	azadirachtin -- B 0.3 F (Margosan O) 3 EC (Azatin EC)	2 1/2 to 5 tsp 1/2 tsp	40 to 80 fl oz 8 fl oz	When dry -- C When dry -- W	
	bendiocarb (Dycarb, Ficam, Turcam) -- C 76 WP	3/4 tsp	5 1/2 oz	When dry -- W	
	bifenthrin -- P 10 WP (Talstar) 7.9 F (Talstar)	1 1/4 to 5 3/4 tsp 1/2 to 2 4/10 tsp	6.4 to 32 oz 2 to 10 fl oz	When dry -- W When dry -- C	
	chlorpyrifos -- OP 50 WG (Pageant DF) 50 WP (Dursban WP)	2 tsp 2 tsp	1 lb 1 lb	When dry -- W When dry -- W	
	cyfluthrin -- P 24.3 EC (Tempo 2) 20 WP (Decathlon)	1/10 tsp 1/4 tsp	1 1/2 fl oz 1.9 oz	When dry -- W When dry -- W	
	diazinon -- OP 23 EC (Knox-Out) 1 A (PT 1500 Knox-Out)	1 to 2 Tbsp NA -- Aerosol	3 to 6 pt NA -- Aerosol	When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	fluvalinate (Mavrik) -- P 22.3 F	1/8 to 5/8 tsp	2 to 10 fl oz	When dry -- C	See aphids section for comments.
	horticultural oil (Sunspray Ultra-Fine Spray Oil) -- O 98.8 EC	2 1/2 to 5 Tbsp	1 to 2 gal	When dry -- C	See aphids section for comments.
	lindane (Lindane) -- CH 25 WP	1 Tbsp	1 lb	When dry -- W	

†Insecticide classifications: B - botanical, C - carbamate, CH - chlorinated hydrocarbon, IGR - insect growth regulator, M - microbial, O - other, OP - organophosphate, P - pyrethroid.

Insecticide formulations: A - aerosol (includes compressed total release products and smoke generator products), AS - aqueous suspension, D - dust, DF - dry flowable, EC - emulsifiable concentrate, F - flowable, G - granular, L - water-soluble liquid, P - pelleted, SP - soluble powder, WG - water-dispersible granules, WP - wattle powder.

‡Signal word, human hazard description, and probable lethal dose for a 150-lb man, if swallowed: C - Caution, slightly dangerous, > 1 fl oz to a pint or > 1 oz to 1 lb;

W - Warning, moderately toxic, > 1 tsp to 1 fl oz or 1 oz; D - Danger, highly toxic, a few drops to 1 tsp or < 1 oz.

**GREENHOUSE ORNAMENTAL INSECT AND RELATED PEST CONTROL (continued)**

Insect, mite, or related pest	Insecticide, classification, and formulation†	Amount of formulation per gallon of spray	Amount of Formulation per 100 Gallons of Spray	Minimum Interval between application and reentry and signal word‡	Precautions and remarks
Thrips (continued)	malathion (Malathion) -- OP 25 WP 57 EC	2 tsp 2 tsp	40 oz 2 pt	When dry -- C When dry -- C	See aphids section for comments.
	oxamyl -- C 24 L (Vydate) 10 G (Oxamyl)	2 to 4 tsp NA -- Granules	2 to 4 pt NA -- Granules	When dry -- D After granules are worked into the soil or watered in -- D	See aphids section for comments.
	pyrethrins -- B 6 EC (Pyronone)	1/8 to 1 1/2 tsp	2 to 12 fl oz	When dry -- C	
	resmethrin -- P 24.3 EC 1 A	1 tsp NA -- Aerosol	1 pt NA -- Aerosol	When dry -- W After house is vented for 1 hour -- W	See aphids section for comments.
	sulfotepp (Dithiono, Plantfume 103) -- OP 15 A	NA -- Smoke Generator	NA -- Smoke Generator	After house is vented for 1 hour -- D	See aphids section for comments.
Twospotted spider mite	fenbutatin oxide (Vendex) -- O 50 WP 42 L	1 1/2 to 3 tsp 1/2 to 1 tsp	1/2 to 1 lb 8 to 16 fl oz	When dry -- D When dry -- D	Ornamental uses of Vendex are being phased out by the manufacturer.
	fenpropathrin (Tame) -- P 30 EC	2/3 tsp	10 2/3 fl oz	When dry -- W	Low to moderate mite pressure.
	fluvinate (Mavrik) -- P 22.3 F	1/8 to 5/8 tsp	2 to 10 fl oz	When dry -- C	See aphids section for comments.
Western flower thrips	fometanate hydrochloride (Carzol) -- O 92 SP	1 tsp	8 oz	When dry -- D	Local use registration in North Carolina.
Whiteflies	acephate -- OP 75 SP (Orthene) 3 A (PT 1300)	2/3 to 1 2/3 tsp NA -- Aerosol	1/3 to 2/3 lb NA -- Aerosol	When dry -- C After house is vented for 1 hour -- W	See aphids section for comments.
	azadirachtin -- B 0.3 F (Margosan O) 3 EC (Azatin EC)	2 1/2 to 5 tsp 1/2 tsp	40 to 80 fl oz 8 fl oz	When dry -- C When dry -- W	
	bendiocarb (Dycarb, Ficam, Turcam) -- C 76 WP	3/4 tsp	5 1/2 oz	When dry -- W	
	bifenthrin -- P 10 WP (Talstar) 7.9 F (Talstar) 0.4 A (PT 1800 Attain)	1 1/4 to 5 3/4 tsp 1/2 to 2 4/10 tsp NA -- Aerosol	6.4 to 32 oz 2 to 10 fl oz NA -- Aerosol	When dry -- W When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	chlorpyrifos -- OP 50 WG (Pageant DF) 50 WP (Dursban WP)	1 tsp 1 to 2 tsp	1/2 lb 1/2 to 1 lb	When dry -- W When dry -- W	
	cyfluthrin -- P 24.3 EC (Tempo 2) 20 WP (Decathlon)	1/10 tsp 1/4 tsp	1 1/2 fl oz 1.9 oz	When dry -- W When dry -- W	
	d-phenothrin (Sumithrin) -- P 25 EC 0.5 A	1 tsp NA -- Aerosol	1 pt NA -- Aerosol	When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	diazinon -- OP 23 EC (Knox-Out) 1 A (PT 1500 Knox-Out)	1 to 2 Tbsp NA -- Aerosol	3 to 6 pt NA -- Aerosol	When dry -- C After house is vented for 1 hour -- C	See aphids section for comments.
	dichlorvos (Vapona) -- OP 5 A	NA -- Smoke Generator	NA -- Smoke Generator	After house is vented for 1 hour -- D	See aphids section for comments.
	endosulfan (Thiodan) -- CH 24.2 EC 50 WP	2 tsp 1 Tbsp	2 pt 1 lb	24 hours -- D 24 hours -- D	See aphids section for comments.
	fenoxycarb (PT 2100 Preclude) -- IGR 0.6 A	NA -- Aerosol	NA -- Aerosol	After house is vented for 1 hour -- C	Apply total release aerosol product using a rate of 1 lb per 3,000 ft <sup>2</sup> . Treat as late in the day as possible. Ventilate the next morning. Do not use on bracts showing color.
	fenpropathrin (Tame) -- P 30 EC	2/3 tsp	10 2/3 fl oz	When dry -- W	

†Insecticide classifications: B - botanical, C - carbamate, CH - chlorinated hydrocarbon, IGR - insect growth regulator, M - microbial, O - other, OP - organophosphate, P - pyrethroid.

Insecticide formulations: A - aerosol (includes compressed total release products and smoke generator products), AS - aqueous suspension, D - dust, DF - dry flowable, EC - emulsifiable concentrate, F - flowable, G - granular, L - water-soluble liquid, P - pelleted, SP soluble powder, WG - water-dispersible granules, WP - wettable powder.

‡Signal word, human hazard description, and probable lethal dose for a 150-lb man, if swallowed: C - Caution, slightly dangerous, > 1 fl oz to a pint or > 1 oz to 1 lb; W - Warning, moderately toxic, >1 tsp to 1 fl oz or 1 oz; D - Danger, highly toxic, a few drops to 1 tsp or < 1 oz.

## GREENHOUSE ORNAMENTAL INSECT AND RELATED PEST CONTROL (continued)

Insect, mite, or related pest	Insecticide, classification, and formulation†	Amount of formulation per gallon of spray	Amount of Formulation per 100 Gallons of Spray	Minimum Interval between application and reentry and signal word‡	Precautions and remarks
Whiteflies (continued)	fluvalinate (Mavrik) -- P 22.3 F	1/8 to 5/8 tsp	2 to 10 fl oz	When dry -- C	See aphids section for comments.
	horticultural oil (Sunspray Ultra-Fine Spray Oil) -- O 98.8 EC	2 1/2 to 5 Tbsp	1 to 2 gal	When dry -- C	See aphids section for comments.
	insecticidal soap (M-Pede) -- O 50.5 EC	4 fl oz	3 1/2 gal	When dry -- C	See aphids section for comments.
	kinoprene -- IGR 72.5 EC (Enstar) 65.1 EC (Enstar II)	1/2 to 1 1/2 tsp 1/2 to 2/3 tsp	8 to 20 fl oz 5 to 10 fl oz	When dry -- C When dry -- C	See aphids section for comments.
	methiocarb -- C 1 A (PT 1700)	NA -- Aerosol	NA -- Aerosol	After house is vented for 1 hour -- W	See aphids section for comments.
	naled (Dibrom) -- OP 60 EC	NA -- Vaporized	NA -- Vaporized	After house is vented for 1 hour -- D	See aphids section for comments.
	oxamyl -- C 24 L (Vydate) 10 G (Oxamyl)	2 to 4 tsp NA -- Granules	2 to 4 pt NA -- Granules	When dry -- D After granules are worked into the soil or watered in -- D	See aphids section for comments.
	pyrethrins -- B 6 EC (Pyrethone) 0.5 A (PT 1100 Pyrethrum) 0.3 A (PT 1600 X-clude) 1.1 L (PT 170 X-clude)	1/8 to 1 1/2 tsp NA -- Aerosol NA -- Aerosol 1 Tbsp to 2 fl oz	2 to 12 fl oz NA -- Aerosol NA -- Aerosol 50 to 100 fl oz	When dry -- C After house is vented for 1 hour -- C After house is vented for 1 hour -- C When dry -- C	See aphids section for comments.
	resmethrin -- P 24.3 EC 1 A	1 tsp NA -- Aerosol	1 pt NA -- Aerosol	When dry -- W After house is vented for 1 hour -- W	See aphids section for comments.
	sulfotepp (Dithiono, Plantfume 103) -- OP 15 A	NA -- Smoke Generator	NA -- Smoke Generator	After house is vented for 1 hour -- D	See aphids section for comments.

†Insecticide classifications: B - botanical, C - carbamate, CH - chlorinated hydrocarbon, IGR - insect growth regulator, M - microbial, O - other, OP - organophosphate, P - pyrethroid.

Insecticide formulations: A - aerosol (includes compressed total release products and smoke generator products), AS - aqueous suspension, D - dust, DF - dry flowable, EC - emulsifiable concentrate, F - flowable, G - granular, L - water-soluble liquid, P - pelleted, SP - soluble powder, WG - water-dispersible granules, WP - wettable powder.

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**Additional notes for the Greenhouse Ornamental Insect and Related Pest Control Table:** Unless noted in the precautions and remarks column, the pesticide listed is labeled for any greenhouse flower or foliage plant. Read individual product labels for any restrictions on use prior to application. The abbreviation "NA" stands for not applicable; used when a column is not applicable for a product. Do not confuse volume rates (given in fluid ounces [fl oz]) with weight rates (given in ounces [oz]). Other volume and weight abbreviations used include: Tablespoon (Tbsp), teaspoon (tsp), pint (pt), gallon (gal), and pound (lb). Do not equate 1 fl oz with 1 oz; many dry products such as wettable powders should be weighed out for precise concentrations. Aerosol product and vaporized product application rates are based on either greenhouse area (ft<sup>2</sup>) or greenhouse volume (ft<sup>3</sup>). The minimum intervals between application and reentry (restricted-entry interval [REI]) given in this table are based on current labels. As companies comply with new worker protection safety standards, the REI's will change during 1993 (see "Updated worker safety regulations: Are you ready?" in the April 1993 Bulletin), and by 15 April 1994, all products must be in compliance with the new REI's; you must follow the REI instructions on products.



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