

## **Insect and Mite Management Suggestions for Commercial, Field-grown Gypsophila Production <sup>1</sup>**

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Gypsophila flowers are the delicate white sprays that enhance corsages and other flower arrangements and are widely known as "bridal flowers." Gypsophila usually is grown in open fields on mulched beds from September through Mother's Day. Their most prominent insect pests are agromyzid leafminers and armyworms that feed on the narrow leaves and flower thrips that inhabit the blooms. Flower thrips not only damage flowers, but they can be annoying to field workers.

Chemical control measures available for use on commercial gypsophila in Florida include microbial insecticides that may be considered components of biological control; these are presented in Table 1. The arthropod pests most likely to damage gypsophila are presented alphabetically as section headings. Commercial products available for control of each listed arthropod are grouped by active ingredient. Usually, only one example of any particular formulation is given. However, additional examples may exist that are as effective as those mentioned. Notes taken from labels are provided to qualify some

uses and precautionary statements and re-entry intervals are given to aid in the safe use of the pesticides. Hyperlinks to product labels are provided in the electronic forms of a separate publication, *Insecticides, Miticides & Molluscicides Available to Florida's Floricultural Industry* (ENY-679). These hyperlinks connect to business or governmental Web sites and not to any source maintained by the University of Florida and may change without notice.

Many pesticides are broken-down (hydrolyzed) in the spray tank when mixed with water above pH 7. Growers should be aware of their water pH and when above 7, a buffering solution should be added to maintain pH in the 6.5 to 7 range.

This summary is only a guide to facilitate the user's selection of pesticides. Care has been given to provide accurate and up-to-date information, but it is possible that, through label changes, author error, etc., improper uses may be indicated. In all cases it is the applicator's responsibility to read and comply with the label that accompanies each pesticide container.

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The use of trade names in this publication is solely for the purpose of providing specific information. UF/IFAS does not guarantee or warranty the products named, and references to them in this publication does not signify our approval to the exclusion of other products of suitable composition. Use pesticides safely. Read and follow directions on the manufacturer's label.

Telephone number and address of the nearest County Poison Control Center should be kept in a convenient location in case of an accidental poisoning. Also, keep clean copies of labels of all pesticides that are on the premises. In the event of a poisoning, the label of the pesticide involved should be taken to the Poison Control Center or hospital.

**Table 1.** Pesticides available to control insects and mites on field-grown gypsophila in Florida.

Common Chemical Name	Trade Name/ Formulation <sup>1</sup>	Pre- Caution	REI (Hrs) <sup>2</sup>	Notes from Label <sup>3</sup>
<b>Aphids (Homoptera: Aphididae)</b>				
Abamectin	Avid 0.15EC	Warning	12	Suppression
Acephate	Orthene TT&O, S	Caution	24	
	Address T/O			
	Acephate Pro 75 WSP			
Acetamiprid	TriStar 70WSP	Caution	24	Do not make more than five applications per year. Do not reapply more than once every 7 days. Do not apply more than 22 water soluble packs per acre (0.55 lb. a.i./acre) per year. Resistance to other chloronicotinyls/neonicotinyls, such as Merit and Marathon, may result in resistance to TriStar. Therefore, to minimize resistance, rotate with other classes of insecticides.
Azadirachtin	Azatin XL	Caution	4	
	Ornazin 3EC	Warning	12	
Azinphos-Methyl	Guthion Solupak	Danger	Note	Nursery Stock; Variable REIs, See Label
<i>Beauveria bassiana</i>	Naturalis L	Caution	4	
	Botanigard 22WP	Warning	12	Nursery & Shade House
	Botanigard ES	Warning	12	Nursery
Bifenthrin	Talstar N	Caution	12	Nursery & Shade House. Do not apply more than 0.2 lbs. per acre per year.
Chlorpyrifos	Dursban 50W WSP	Danger	24	
	Duraguard ME	Caution	24	
	Chlorpyrifos Pro 2	Warning	24	Nursery Stock
	Chlorpyrifos Pro 4	Warning	24	Nursery
Clarified Hydrophobic Extract of Neem Oil	Triact 70	Caution	4	
Cyfluthrin	Decathlon 20WP, WSP	Caution	12	
Deltamethrin	Deltaguard GC 5SC	Caution	12	
Diazinon	KnoxOut NL	Caution	12	Nursery
Endosulfan	Thiodan 3EC	Danger	24	
	Endosulfan 50WPS			
Fenpropathrin	Tame 2.4EC	Warning	24	Nursery & Shade House
Imidacloprid	Marathon 60WP, 1G, II	Caution	12	
Lambda-Cyhalothrin	Scimitar GC	Caution	24	
Malathion	Gowan Malathion 8F	Caution	12	
	Atrapa 5E			
	Malathion 5, 5EC	Warning	12	

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Oxydemeton-Methyl	Metasystox-R	Warning	48	Field-grown nursery stock; Variable REIs, See Label
Potassium Salts of Fatty Acids	Insecticidal Soap 49.52 CF	Warning	12	
	M-Pede	Warning	12	Combine with other pesticides
Pymetrozine	Endeavor	Caution	12	
Pyrethrins & Piperonyl Butoxide	Diatect Multipurpose	Caution	12	
	Pyreth-It			
	Pyrenone Crop Spray			
Pyrethrins & Rotenone & Other Cube Resins	Pyrellin EC	Caution	12	
Pyriproxyfen	Distance IGR	Caution	12	Suppression
Refined Petroleum Distillate	Ultra-Fine Oil	Caution	4	
	Saf-T-Side Spray Oil			
Tau-Fluvalinate	Mavrik Aquaflow	Caution	12	
Thiamethoxam	Flagship 25WG	Caution	12	Container, nursery or shade house grown. Do not exceed 8 oz. per acre per crop or year, whichever is
<b>Armyworms (Lepidoptera: Noctuidae) See also: Caterpillars</b>				
Acephate	Orthene TT&O, S	Caution	24	Fall, southern & yellowstriped armyworm
	Address T/O			
	Acephate Pro 75 WSP			
<i>Bacillus thuringiensis aizawai</i>	XenTari, DF	Caution	4	
<i>Bacillus thuringiensis kurstaki</i>	Javelin WG	Caution	4	
	Dipel Pro DF, 2X			
	Troy-BT 2WP			
	Biobit HP			
<i>Bacillus thuringiensis kurstaki</i> EG7841	Crymax WP	Caution	4	
<i>Beauveria bassiana</i>	Naturalis L	Caution	4	
Bifenthrin	Talstar N	Caution	12	Nursery & Shade House. Do not apply more than 0.2 lbs. a.i. per acre per year.
Chlorpyrifos	Dursban 50W WSP	Danger	24	
	Chlorpyrifos Pro 2	Warning	24	Nursery Stock
	Chlorpyrifos Pro 4	Warning	24	Nursery
Diflubenzuron	Adept	Caution	12	Shade House
	Dimilin SC			
	Dimilin 25W (EPA-400-469)	Caution	12	Beet Armyworm; Shade House
Fenpropathrin	Tame 2.4EC	Warning	24	Beet Armyworm; Nursery & Shade House
<i>Heterorhabditis indica</i>	Grubstake 100	Caution	0	

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Novaluron	Pedestal	Caution	12	Container grown in shade house or nursery; do not apply more than once every 30 days. Do not make more than two applications per crop year. Do not apply more than 52 fl. oz. per acre per year per crop. Resistance management: Do not apply in successive applications, use only one application before rotation with other classes of insecticides with different modes of action. Use at least two alternative products between applications of Pedestal. Do not use more than once within each generation cycle.
Permethrin	Pounce 25WP, WSB	Warning	12	Beet Armyworm; Field-Grown Nursery Stock
	Ambush			
	Pounce 3.2EC	Caution	12	Beet Armyworm; Field-Grown Nursery Stock
POBs of the Nuclear Polyhedrosis Virus of <i>Spodoptera exigua</i>	Spod-X LC	Caution	4	Beet Armyworm
<i>Steinernema carpocapsae</i>	Millenium	Caution	0	Nursery
Tebufenozide	Confirm T/O	Caution	4	Nursery
<b>Caterpillars (Lepidoptera)</b> <b>(See Also: Armyworms and Loopers)</b>				
Acephate	Orthene TT&O, S	Caution	24	Cutworms
	Address T/O			
	Acephate Pro 75 WSP			
Azadirachtin	Ornazin 3EC	Warning	12	
	Azatin XL	Caution	4	
<i>Bacillus thuringiensis</i> <i>kurstaki</i>	Javelin WG	Caution	4	
	Dipel Pro DF, 2X			
	Troy-BT 2 WP			
	Biobit HP			
<i>Bacillus thuringiensis</i> <i>aizawai</i>	XenTari, DF	Caution	4	
<i>Bacillus thuringiensis</i> <i>kurstaki</i> EG7841	Crymax WP	Caution	4	
<i>Beauveria bassiana</i>	Naturalis L	Caution	4	
Bifenthrin	Talstar N	Caution	12	Shade House & Nursery; Leaf-feeding caterpillars
Cyfluthrin	Decathlon 20WP, WSP	Caution	12	Leaf-feeding caterpillars
Deltamethrin	Deltaguard GC 5SC	Caution	12	Nursery; Leaf-feeding caterpillars
Lambda-Cyhalothrin	Scimitar GC	Caution	24	Leaf-feeding caterpillars

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Potassium Salts of Fatty Acids	M-Pede	Warning	12	Cutworm
Pyrethrins & Piperonyl Butoxide	Diatect Multipurpose	Caution	12	
	Pyreth-It			
	Pyrenone Crop Spray			
Pyrethrins & Rotenone & Other Cube Resins	Pyrellin EC	Caution	12	
Spinosad	Conserve SC T&O	Caution	4	Lepidopterous larvae
Tau-Fluvalinate	Mavrik Aquaflo	Caution	12	Leaf-feeding caterpillars
<b>Dipterous Leafminers (Diptera: Agromyzidae)</b>				
Abamectin	Avid 0.15EC	Warning	12	
Azadirachtin	Ornazin 3EC	Warning	12	
	Azatin XL	Caution	4	
Bifenthrin	Talstar N	Caution	12	Nursery & Shade House
Cyromazine	Citation	Caution	12	
Deltamethrin	Deltaguard GC 5SC	Caution	12	
Fenpropathrin	Tame 2.4EC	Warning	24	Nursery
Imidacloprid	Marathon 60WP, 1G, II	Caution	12	Field Nursery, Flats, Beds, Benches & Containers
Lambda-Cyhalothrin	Scimitar GC	Caution	24	Adults
Novaluron	Pedestal	Caution	12	Suppression; Container grown in shade house or nursery; do not apply more than once every 30 days. Do not make more than two applications per crop year. Do not apply more than 52 fl. oz. per acre per year per crop. Resistance management: Do not apply in successive applications, use only one application before rotation with other classes of insecticides with different modes of action. Use at least two alternative products between applications of Pedestal. Do not use more than once within each generation cycle.
Permethrin	Ambush	Warning	12	Field-Grown Nursery Stock
	Pounce 25WP, WSB		12	
	Pounce 3.2EC	Caution	12	Field-Grown Nursery Stock
Potassium Salts of Fatty Acids	M-Pede	Warning	12	Must combine with other pesticides
Pyrethrins & Piperonyl Butoxide	Diatect Multipurpose	Caution	12	
	Pyrenone Crop Spray			
Pyrethrins & Rotenone & Other Cube Resins	Pyrellin EC	Caution	12	

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Refined Petroleum Distillate	Ultra-Fine Oil	Caution	4	
	Saf-T-Side Spray Oil			
Spinosad	Conserve SC T&O	Caution	4	
Loopers (Lepidoptera: Noctuidae) See also: Caterpillars				
<i>Bacillus thuringiensis kurstaki</i>	Javelin WG	Caution	4	
	Dipel Pro DF, 2X			
	Troy-BT 2WP			
	Crymax WP			
	Biobit HP			
<i>Bacillus thuringiensis aizawai</i>	XenTari, DF	Caution	4	
Permethrin	Pounce 3.2EC	Caution	12	Cabbage looper; Field-grown nursery stock
	Ambush	Warning	12	Cabbage looper; Field-grown nursery stock
	Pounce 25 WP, WSB			
Shore Flies (Diptera: Ephydriidae)				
Azadirachtin	Ornazin 3EC	Warning	12	
	Azatin XL	Caution	4	
<i>Beauveria bassiana</i>	Naturalis L	Caution	4	
Chlorpyrifos	Duraguard ME	Caution	24	
Diazinon	KnoxOut NL	Caution	12	Larvae, Nursery
Diflubenzuron	Adept	Caution	12	Bed, Bench & Container Grown; Shade House
Fenoxycarb	Precision	Caution	12	Container-Grown & Shade House
Potassium Salts of Fatty Acids	M-Pede	Warning	12	
Pyriproxyfen	Distance IGR	Caution	12	
<i>Steinernema carpocapsae</i>	Millenium	Caution	0	Nursery
Thrips (Thysanoptera: Thripidae)				
Abamectin	Avid 0.15EC	Warning	12	Suppression
Acephate	Orthene TT&O, S	Caution	24	
	Address T/O			
	Acephate Pro 75 WSP			

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Acetamiprid	TriStar 70WSP	Caution	24	Citrus thrips; do not make more than five applications per year. Do not reapply more than once every 7 days. Do not apply more than 22 water soluble packs per acre (0.55 lb. a.i./acre) per year. Resistance to other chloronicotinyls/neonicotinyls, such as Merit and Marathon, may result in resistance to TriStar. Therefore, to minimize resistance, rotate with other classes of insecticides.
Azadirachtin	Azatin XL	Caution	4	
Azinphos-Methyl	Guthion Solupak	Danger	48	Nursery Stock; Variable REIs See Label
<i>Beauveria bassiana</i>	Naturalis L	Caution	4	
	Botanigard 22WP	Warning	12	Nursery & Shade House
	Botanigard ES	Warning	12	Nursery
Bifenthrin	Talstar N	Caution	12	Shade House & Nursery. Do not apply more than 0.2 lbs a.i. per acre per year.
Carbaryl	Sevin SL	Caution	12	Exposed Thrips
Chlorpyrifos	Dursban 50W WSP	Danger	24	Nursery; Exposed Thrips
	Duraguard ME	Caution	24	
Cyfluthrin	Decathlon 20WP, WSP	Caution	12	
Diazinon	KnoxOut NL	Caution	12	Nursery
Fenoxycarb	Precision	Caution	12	Container-Grown & Shade House
Fenpropathrin	Tame 2.4EC	Warning	24	Nursery & Shade House
Imidacloprid	Marathon 60WP, 1G	Caution	12	Suppression; Field Nurseries, Container Stock & Plants in Flats, Benches or Beds
	Marathon II	Caution	12	Suppression on Foliage Only; Field Nurseries, Container Stock & Plants in Flats, Benches or Beds
Lambda-Cyhalothrin	Scimitar GC	Caution	24	Shade House & Nursery
Malathion	Gowan Malathion 8F	Caution	12	
	Atrapa 5E			
	Malathion 5, 5EC	Warning	12	
Methiocarb	Mesuroi 75W	Warning	24	Nursery; Western Flower Thrips

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Novaluron	Pedestal	Caution	12	Container grown in shade house or nursery; do not apply more than once every 30 days. Do not make more than two applications per crop year. Do not apply more than 52 fl. oz. per acre per year per crop. Resistance management: Do not apply in successive applications, use only one application before rotation with other classes of insecticides with different modes of action. Use at least two alternative products between applications of Pedestal. Do not use more than once within each generation cycle.
Permethrin	Pounce 3.2EC	Caution	12	Citrus Thrips; Field-Grown Nursery Stock
	Ambush	Warning	12	Citrus Thrips; Field-Grown Nursery Stock
	Pounce 25 WP, WSB			
Potassium Salts of Fatty Acids	Insecticidal Soap 49.52 CF	Warning	12	
	M-Pede	Warning	12	Exposed Thrips
Pyrethrins & Piperonyl Butoxide	Diatect Multipurpose	Caution	12	
	Pyreth-It			
	Pyrenone Crop Spray			
Pyrethrins & Rotenone & Other Cube Resins	Pyrellin EC	Caution	12	
Spinosad	Conserve SC T&O	Caution	4	Exposed Thrips
Tau-Fluvalinate	Mavrik Aquaflow	Caution	12	
<b>Twospotted Spider Mites (<i>Tetranychus urticae</i>)</b>				
Abamectin	Avid 0.15EC	Warning	12	
<i>Beauveria bassiana</i>	Naturalis L	Caution	4	
Binfenazate	Floramite	Caution	4	
Bifenthrin	Talstar N	Caution	12	Shade House & Nursery
Clarified Extract of Neem Oil	Triact 70	Caution	4	
Clofentizine	Ovation SC	Caution	12	
Deltamethrin	Deltaguard GC 5SC	Caution	12	Suppression
Dicofol	Kelthane 50WSP	Danger	48	Nursery

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Etoxazole	Tetrasan 5 WDG	Caution	12	Controls in egg and nymph stages of growth. Resistance management: Apply no more than two times per cropping cycle (start to finish for one ornamental crop) or no more than two times per 6 months. Apply second application no sooner than 14 days after the first application. If rapid control (less than 7 days) is required, apply in combination with a contact adulticide.
Fenbutatin-Oxide	Vendex 50WP	Danger	48	
Fenpropathrin	Tame 2.4EC	Warning	24	Nursery & Shade House
Hexythiazox	Hexygon	Caution	12	
	Hexygon DF	Caution	12	Nursery
Lambda-Cyhalothrin	Scimitar GC	Caution	24	Shade House & Nursery
Methiocarb	Mesuroi 75W	Warning	24	Nursery
Potassium Salts of Fatty Acids	Insecticidal Soap 49.52CF	Warning	12	
	M-Pede			
Propargite	Ornamite	Danger	7 days	
Pyrethrins & Piperonyl Butoxide	Diatect Multipurpose	Caution	12	
Pyrethrins & Rotenone & Other Cube Resins	Pyrellin EC	Caution	12	
Pyridaben	Sanmite	Warning	12	
Refined Petroleum Distillate	Ultra-Fine Oil	Caution	4	
	Saf-T-Side Spray Oil			
Spinosad	Conserve SC T&O	Caution	4	
Tau-Fluvalinate	Mavrik Aquaflow	Caution	12	
<sup>1</sup> Usually only one example of each formulation is given. There may be other products available that are as effective as those listed. <sup>2</sup> REI = Re-entry Interval or period between application and earliest normal entry into treated area. <sup>3</sup> Notes are taken from product labels and restrict use to the condition indicated (suppression, beet armyworm, exposed thrips, etc.), limit number or patterns of applications, provide phytotoxicity precautions, etc.				