

BIOLOGICAL CONTROL STRATEGY FOR SPRING ORNAMENTALS AND HANGING BASKET PRODUCTION



GLOBAL HORTICULTURAL INC. CONTROL AGENTS FOR SPRING ORNAMENTALS AND HANGING BASKETS

PEST	BCA	PRODUCT	RATE		TIMING	COMMENTS
			m ²	ft ²		
Thrips, Western Flower Thrips (<i>Frankliniella occidentalis</i>) & others	<i>Amblyseius cucumeris</i>	<i>Cucumeris</i> stick sachets	1 sachet per propagation tray, shuttle tray or pot.		Place sachet at sticking / seeding and again during transplanting into pots or hanging baskets.	Place a minimum of 1 <i>Cucumeris</i> stick sachet per 4, 5 or 6-inch shuttle tray. Larger pots that are individually placed need 1 sachet per pot.
		<i>Cucumeris</i> loose	100-150	10-15	Apply weekly during propagation. Curative --> 200-250 / m ² every week in case of high thrips numbers.	Distribute evenly over the crop.
	<i>Orius insidiosus</i>	<i>Orius</i> adults	5-10	0.5-1	Release in hotspots.	Consider using pepper banker plants. Consult with a Global technical specialist. Be aware of diapause from Mid-October till beginning of March.
	<i>Stratiolaelaps scimitus</i> (<i>Hypoaspis miles</i>)	<i>Stratiolaelaps</i> loose	100	10	Apply at sticking / seeding and transplanting.	If applied at rooting stage, a second application should be half rate at transplanting.
	<i>Dalotia coriaria</i> (<i>Atheta coriaria</i>)	<i>Dalotia</i> adults / larvae	2	0.2	Apply at sticking / seeding and transplanting.	If applied at rooting stage, a second application should be half rate at transplanting.
Note: <i>Amblyseius cucumeris</i> will also help in controlling spider mites and broad mites. <i>A. cucumeris</i> can be used year round.						
Fungus gnats & shore flies (<i>Bradysia</i> spp. & <i>Scatella</i> spp.)	<i>Stratiolaelaps scimitus</i> (<i>Hypoaspis miles</i>)	<i>Stratiolaelaps</i> loose	100	10	Apply at sticking / seeding and transplanting.	If applied at rooting stage, a second application should be half rate at transplanting.
	<i>Dalotia coriaria</i> (<i>Atheta coriaria</i>)	<i>Dalotia</i> adults / larvae	2	0.2	Apply at sticking / seeding and transplanting.	If applied at rooting stage, a second application should be half rate at transplanting.
	<i>Steinernema feltiae</i> & <i>Steinernema carpocapsae</i>	<i>Steinernema feltiae</i> / <i>carpocapsae</i> sponge	20,000	2,000	Apply at sticking and repeat twice during rooting stage. Re-apply after transplanting.	Correct application is critical for efficacy. Make sure solution is agitated, fine filters are removed and pressure is kept low.

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Aphids - smaller species: Cotton melon aphid, Green peach aphid, Tobacco aphid (<i>Aphis gossypii</i>, <i>Myzus persicae</i>, <i>Myzus nicotianae</i>)	<i>Aphidius colemani</i>	<i>Colemani</i> adults / mummies	0.25-1	0.025-0.1	Release weekly. Curative --> 1 / m ² weekly until control of aphids has been achieved.	Use in combination with banker plants.
	<i>Rhopalosiphum padi</i>	Aphid banker plants	Minimum 1 / acre (2.5 / ha)		Initial introduction is 2 banker plants per acre followed by 1 per acre every 2 weeks.	Consistent releases and maintaining the banker plants are key to success.
	<i>Aphidoletes aphidimyza</i>	<i>Aphidoletes</i> pupae	1	0.1	Release at first signs of aphids. Release weekly until control of aphids has been achieved.	Be aware of diapause between Mid-October and beginning of March.
	<i>Chrysoperla spp.</i>	<i>Chrysoperla</i> larvae	10-20	1-2	Release in hotspots of aphids. Works as a quick knock down.	
	<i>Hippodamia convergens</i>	<i>Hippodamia</i> adults	10-20	1-2	Release in hotspots of aphids. Works as a quick knock down.	
Aphids - larger species: Potato aphid, Foxglove aphid (<i>Macrosiphum euphorbiae</i>, <i>Aulacorthum solani</i>)	<i>Aphidius ervi</i>	<i>Ervi</i> adults / mummies	0.25-1	0.025-0.1	Release weekly. Curative --> 1 / m ² weekly until control of aphids has been achieved.	
	<i>Aphidoletes aphidimyza</i>	<i>Aphidoletes</i> pupae	1	0.1	Release at first signs of aphids. Release weekly until control of aphids has been achieved.	Be aware of diapause between Mid-October and beginning of March.
	<i>Chrysoperla spp.</i>	<i>Chrysoperla</i> larvae	10-20	1-2	Release in hotspots of aphids. Works as a quick knock down.	
	<i>Hippodamia convergens</i>	<i>Hippodamia</i> adults	10-20	1-2	Release in hotspots of aphids. Works as a quick knock down.	
Two-spotted spider mites (<i>Tetranychus urticae</i>)	<i>Amblyseius andersoni</i> or <i>Amblyseius californicus</i>	<i>Andersoni / californicus</i> loose	6-10	0.6-1	Release in propagation. Repeat introduction with heavy infestations.	Distribute evenly over leaf canopy. Use the larger leaves.
	<i>Phytoseiulus persimilis</i>	<i>Phytoseiulus</i> loose	8-10	0.8-1	Start when first spider mites are detected. Repeat weekly for 3-4 weeks until <i>P. persimilis</i> is established and mites are controlled. Curative --> 100-150 / m ² in and around hotspots.	Turn the bottle slowly during use for a more even distribution of the mites. Sprinkle material on the larger leaves in the center of the plant and avoid introduction in bright sunlight.
	<i>Stethorus punctillum</i>	<i>Stethorus</i> adults	In hotspots		Release in hotspots of spider mites.	<i>Delphastus</i> requires high numbers of spider mites.
Leafminers (<i>Liriomyza trifolii</i>)	<i>Diglyphus isaea</i>	<i>Diglyphus</i> adults	0.25-1	0.025-0.1	Start releasing at first signs of leafminer (feeding and ovoposition spots). Release weekly for 3-4 weeks until sufficient parasitism has been established. Curative --> 1 / m ² weekly until control of leafminer has been achieved.	Introduce <i>Diglyphus</i> early morning or later in evening to avoid stress.

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Broad mites (<i>Polyphagotarsonemus latus</i>) <i>Amblyseius cucumeris</i> and other <i>Amblyseius spp.</i> are excellent in controlling broad mites.	<i>Amblyseius cucumeris</i>	<i>Cucumeris</i> stick sachets	1 sachet per propagation tray, shuttle tray or pot.		Place sachet at sticking / seeding and again during transplanting into pots or hanging baskets.	Place a minimum of 1 <i>Cucumeris</i> stick sachet per 4, 5 or 6-inch shuttle tray. Larger pots that are individually placed need 1 sachet per pot.
		<i>Cucumeris</i> loose	200	20	Release every 1-2 weeks in and around the hotspots. Curative --> 300-400 / m ² .	Distribute evenly over leaf canopy. Use the larger leaves.
Whitefly Greenhouse whitefly (<i>Trialeurodes vaporariorum</i>) Silverleaf whitefly (<i>Bemisia tabaci</i>) Note: If <i>Amblyseius swirskii</i> is released for whitefly it will also help in controlling thrips. <i>A. swirskii</i> requires minimum temperatures of 20°C (68°F).	<i>Amblyseius swirskii</i>	<i>Swirskii</i> stick sachets	1 sachet per propagation tray, shuttle tray or pot.		Place sachet at sticking / seeding and again during transplanting into pots or hanging baskets.	Place a minimum of 1 <i>Swirskii</i> stick sachet per 4, 5 or 6-inch shuttle tray. Larger pots that are individually placed need 1 sachet per pot.
		<i>Swirskii</i> loose	100-150	10-15	Apply weekly during propagation. Curative --> 300-400 / m ² . Introduce every 2 weeks in and around hotspots until whitefly is controlled.	Distribute evenly over leaf canopy. Use the larger leaves.
	<i>Encarsia formosa</i> & <i>Eretmocerus eremicus</i>	<i>Encarsia</i> / <i>Eretmocerus</i> mix	3-5	0.3-0.5	Start at first signs of whitefly. Release every week until whitefly is controlled. Curative --> min. 10 / m ² every week until whitefly is controlled.	Optimal introduction method for wasps are blister packs. Keep blister packs (cards) out of direct sunlight and open release flap on the back.
	<i>Delphastus catalinae</i>	<i>Delphastus</i> adults	In hotspots		Release in hotspots of whitefly.	<i>Delphastus</i> requires high numbers of whitefly.
Caterpillars / loopers (<i>Trichoplusia ni</i> and other species)	<i>Bacillus thuringiensis</i>	N/A	Follow label instructions		Apply at first signs of pest. Little to no negative effect on other BCAs.	
	<i>Podisus</i>	<i>Podisus</i> nymphs	0.05	0.005	Release weekly a few containers starting early in the crop until establishment.	If hotspots with loopers occur, focus releases on hotspots. The nymphs develop better in the presence of prey.