

BIOLOGICAL CONTROL STRATEGY FOR GREENHOUSE POTCHRYSANTHEMUM PRODUCTION



GLOBAL HORTICULTURAL INC. CONTROL AGENTS FOR GREENHOUSE POTCHRYSANTHEMUMS

PEST	BCA	PRODUCT	RATE		TIMING	COMMENTS
			m ²	ft ²		
Thrips, Western Flower Thrips (<i>Frankliniella occidentalis</i>) & others Note: <i>Amblyseius cucumeris</i> will also help in controlling spider mites and broad mites. <i>A. cucumeris</i> can be used year round.	<i>Amblyseius cucumeris</i>	<i>Cucumeris</i> loose	100	10	Apply weekly during propagation. Apply weekly after spacing in case no sachets are used. Curative --> 400 / m ² every week in areas with high thrips numbers.	Distribute evenly over leaf canopy. Use a battery-operated blower for distribution.
		<i>Cucumeris</i> stick sachets	1 sachet per plant		Place stick sachet at transplanting into pots or hanging baskets and again just before spacing.	Place the stick sachet close to the plant, so that mites can easily move into the plants. Sachets typically release mites between 4-6 weeks, but it's recommended to re-introduce every 4 weeks.
	<i>Orius insidiosus</i>	<i>Orius</i> adults	5-10	0.5-1	Release in hotspots.	Consider using pepper (purple flash) banker plants. NOTE: <i>Orius</i> egg laying capacity in the banker plants can be boosted by introducing <i>Ephestia</i> eggs weekly during the first 4-6 weeks of establishment.
	<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			
Two-spotted spider mites (<i>Tetranychus urticae</i>)	<i>Amblyseius andersoni</i> / <i>Amblyseius californicus</i>	<i>Andersoni</i> / <i>Californicus</i> loose	6-10	0.6-1	Release together mixed with <i>Amblyseius cucumeris</i> in propagation	
	<i>Phytoseiulus persimilis</i>	<i>Phytoseiulus</i> loose	8-10	0.8-1	Start when first 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.

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Fungus gnats & shore flies (<i>Bradysia spp.</i> & <i>Scatella spp.</i>)	<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		
	<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 immediately after transplanting.	Correct application is critical for efficacy. Make sure solution is agitated, fine filters are removed and pressure is kept low.
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.	Introduce <i>Diglyphus</i> early morning or later in evening to avoid stress.
Aphids - smaller species: Cotton melon aphid ,Green peach aphid, Black bean aphid (<i>Aphis gossypii</i>, <i>Myzus persicae</i>, <i>Aphis fabae</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.	
Caterpillars / loopers (<i>Trichoplusia ni</i> and other species)	<i>Orius insidiosus</i>	<i>Orius</i> adults	As thrips strategy		An established <i>Orius</i> population can be a significant contributor to looper control as they prey on moth eggs. Avoid interference from systemic crop protection products that harm <i>Orius</i> by focusing on aphid control using BCAs.	
	<i>Bacillus thuringiensis</i>	N/A	Follow label instructions		Little to no negative effect on other BCAs.	