



**Biological Control Agents (BCAs):  
Mums Insect Management**

BCA Insect Control					
Pest	BCA	Rate (Units/m <sup>2</sup> )	Rate (Units/ft <sup>2</sup> )	Release strategy	Application Notes
<b>Thrips</b> Western flower thrips ( <i>Frankliniella occidentalis</i> ); Chili thrips ( <i>Scirtothrips dorsalis</i> ); and other species	<i>Amblyseius cucumeris</i>	100	10	Release at crop propagation on a weekly basis. Apply sachets at transplanting.	Release evenly on the crop area. A battery-operated blower can be used for better coverage and to save time.
		1 stick sachet per tray or pot			Ensure the sachets are in contact with plant foliage for better results. Effective on Broad mite also.
	<i>Orius insidiosus</i>	5 - 10	0.5 – 1.0	Release in hot spots.	Utilize Pepper banker plants to allow an earlier and better establishment of <i>Orius</i> . Note: <i>Orius</i> in an established population will also support the control of TSSM and Lepidoptera (eggs).
	<i>Stratiolaelaps scimitus</i> (= <i>Hypoaspis miles</i> )	100	10	Release first on the organic substrate at propagation stage, then repeat after transplanting to other containers containing organic material.	Release full rate during propagation. Release half rate after planting if full rate is used during propagation. Both species can be mixed and applied together.
	<i>Dalotia coriaria</i> (= <i>Atheta coriaria</i> )	2	0.2		
<i>Steinernema feltiae</i> (NemaShield)	250K - 300K	25K - 30K	Apply during propagation.	Ensure a constant agitation/aeration of the suspension during application. Remove filters and keep a low pressure for best results. This product is also effective for control of fungus gnats.	
<b>Two-Spotted Spider Mite</b> ( <i>Tetranychus urticae</i> )	<i>Phytoseiulus persimilis</i>	6 - 8	0.6 – 0.8	Release when first spider mites are detected. Continue releasing for 4 weeks to establish population for better results.	Consider using indicator plants (bush beans) for Two Spotted Spider Mite monitoring. In many potted Chrysanthemum crops, TSSM is assumed to be present immediately. In this case, starting with <i>Phytoseiulus</i> introduction immediately after transplanting is recommended.
	<i>Amblyseius californicus</i>	6-8	0.6-0.8		Can be released preventatively or used in higher heat and lower humidity situations.
	<i>Amblyseius fallacis</i>	6-8	0.6-0.8		Can be used preventatively and in cooler climates.
<b>Fungus gnats</b> ( <i>Bradysia</i> spp.) and <b>Shore flies</b> ( <i>Scatella</i> spp.)	<i>Stratiolaelaps scimitus</i> (= <i>Hypoaspis miles</i> )	100	10	Release at propagation, then at transplanting.	Reduce release rate to half if introduced at full rate during propagation stage.
	<i>Dalotia coriaria</i> (= <i>Atheta coriaria</i> )	2	0.2		
	<i>Steinernema feltiae</i> (NemaShield)	250K – 300K	25K - 30K	Apply during propagation.	Ensure a constant agitation/aeration of the suspension during application. Remove filters and keep a low pressure for best results. This product is also effective for the control of thrips.
<b>Leafminers</b> ( <i>Liriomyza trifolii</i> )	<i>Diglyphus isaea</i>	0.25 - 1	0.025 – 0.1	Release every week for 3-4 weeks until	Release every week during 4 weeks for better results.



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				parasitism is established.	
<b>Aphids (small species)</b> Cotton/Melon aphid ( <i>Aphis gossypii</i> ); Green peach aphid ( <i>Myzus persicae</i> ); <i>M. nicotianae</i>	<i>Aphidius colemani</i>	0.25 – 1.0	0.025 – 0.1	Release every week for 3-4 weeks in combination with Aphid banker plants until observing parasitism.	Release at least once per week. Can be complemented with aphid banker plants.
	<i>Aphelinus abdominalis</i>	0.5-2	0.05-0.2	Alternate with <i>Aphidius</i> species.	Release this species when low parasitism is achieved with <i>A. ervi</i> or if Hyper-parasitism is confirmed on aphid populations.
	<i>Aphidoletes aphidimyza</i>	1	0.1	Weekly releases upon aphid detection.	Keep as part of the aphid biocontrol strategy until control is achieved.
	Aphid Banker plants ( <i>Rhopalosiphum padi</i> – <i>Aphidius colemani</i> )	2.5 plants/ha	1 plant/acre	Have banker plants established prior to mums arriving, then introduce every other week.	Place 2 units per acre at the beginning of the crop cycle, then introduce 1 per acre (2.5 ha) every other week.  Note: Best results are achieved when banker plants are on drip irrigation system or drip tape, same as the crop.
	<i>Chrysoperla</i> spp. larvae	10 – 20	1 - 2	Use mainly as a hot spot control strategy.	Best for a quick knock-down effect on hot spots.
<b>Aphids (large species)</b> Potato aphid ( <i>Macrosiphum euphorbiae</i> ); Fox Glove aphid ( <i>Aulacorthum solani</i> )	<i>Aphidius ervi</i>	0.25-1	0.025-0.1	Release on a weekly basis.	Use as a strategy when large aphid species are detected in the crop.
	<i>Aphelinus abdominalis</i>	0.5-2	0.05-0.2	Alternate with <i>Aphidius</i> species.	Release this species when low parasitism is achieved with <i>A. ervi</i> or if Hyper-parasitism is confirmed on aphid populations.
	<i>Aphidoletes aphidimyza</i>	1	0.1	Weekly releases upon aphid detection.	Keep as part of the aphid biocontrol strategy until control is achieved.
	<i>Chrysoperla</i> spp. larvae	10 – 20	1 - 2	Use mainly as a hot spot control strategy.	Best for a quick knock-down effect on hot spots.

Refer to our guide on [“Utilizing Dips: Clean up incoming plant material”](#) for more details on how to use other products to reduce the risks of ‘hitch hikers’ on your young plant material coming in through the door. Contact your Biological Control Advisor or Biological Solutions Advisor for additional information.