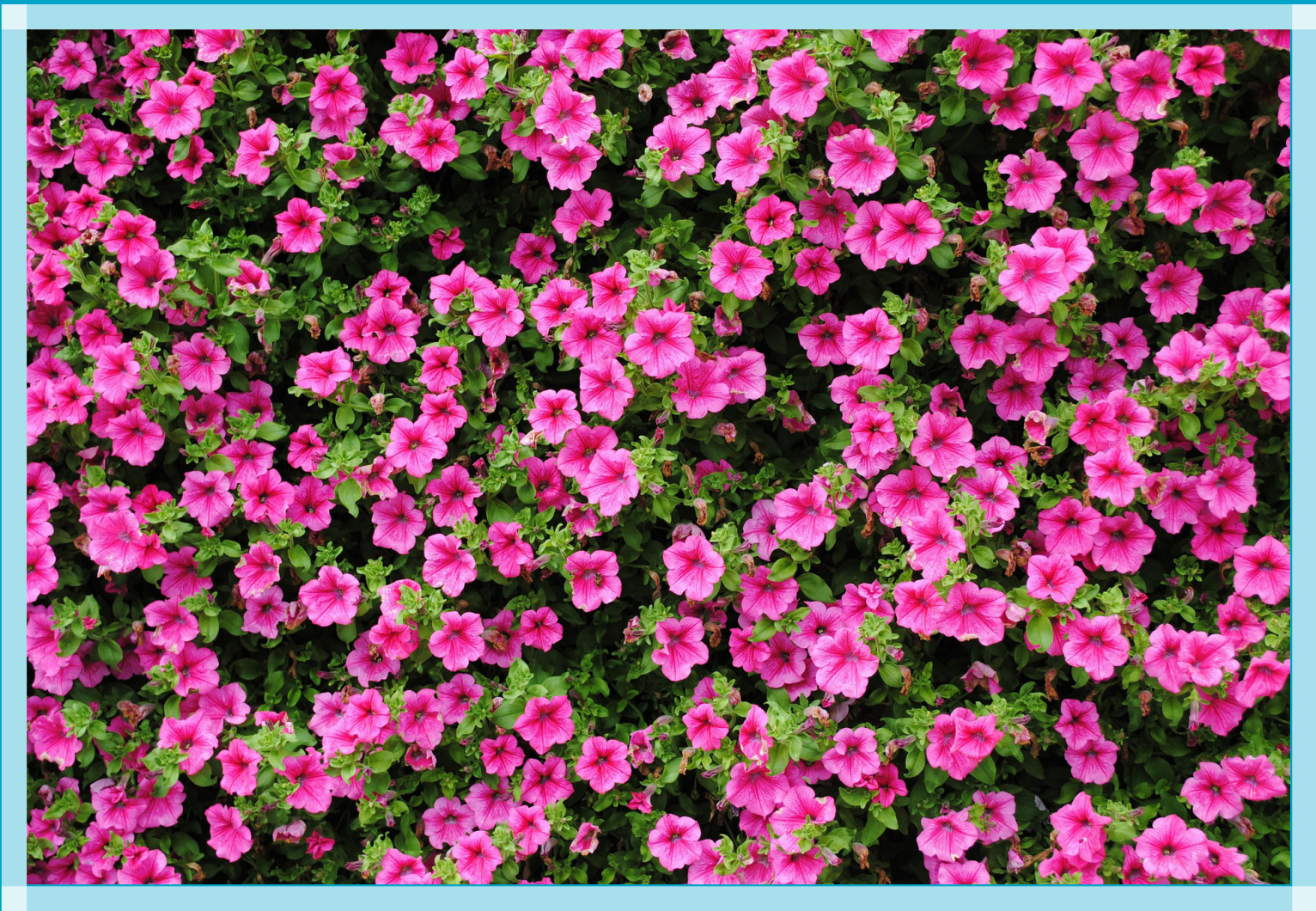


# BIOLOGICAL CONTROL STRATEGIES FOR SPRING ORNAMENTALS & HANGING BASKET PRODUCTION



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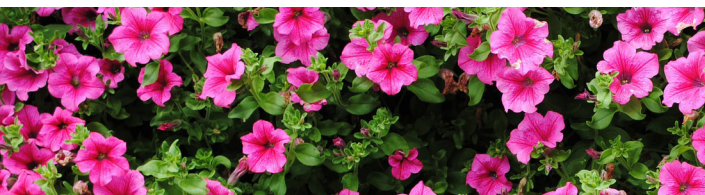
BIOLOGICAL CONTROL STRATEGY FOR SPRING ORNAMENTALS & HANGING BASKET PRODUCTION

## GROWERS NOTES:



# BIOLOGICAL CONTROL STRATEGIES FOR SPRING ORNAMENTALS & HANGING BASKET PRODUCTION

The use of biological control agents (BCAs) in ornamental crops has been of interest to growers, as it has become increasingly difficult to control thrips, with traditional pesticides alone. BCAs are excellent resistance management tools, and since they can be distributed very early in the crop cycle during propagation, they are excellent for preventing pest populations from establishing.







# BIOLOGICAL CONTROL STRATEGY FOR SPRING ORNAMENTALS & HANGING BASKET PRODUCTION

## BIOLINE’S BIOLOGICAL CONTROL AGENTS FOR SPRING ORNAMENTALS & HANGING BASKETS

PEST	BCA	PRODUCT	RATE		TIMING	COMMENTS
			m2	ft2		
<b>Western Flower Thrips, Chili Thrips and other species</b>  <i>(Frankliniella occidentalis, Scirtothrips dorsalis)</i>  In areas where temperatures are consistently >75°F/24°C, replace <i>Amblyseius cucumeris</i> with <i>Amblyseius swirskii</i> .	<i>Amblyseius cucumeris</i>	<b>Amblyline Loose</b>	100	10	Apply weekly during propagation.	Broadcast evenly or use battery-operated blower.
		<b>Amblyline Stick - Mini Sachet</b>	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 Amblyline Stick per 4, 5 or 6-inch shuttle tray. Larger pots that are individually placed need 1 sachet per pot.
	<i>Orius insidiosus</i>	<b>Oriline i</b>	5 - 10	0.5 - 1	Release in hot spots.	Consider using pepper banker plants. Consult with a Bioline specialist. Be aware of diapause until March 1st.
	<i>Stratiolaelaps scimitus (Hypoaspis miles)</i>	<b>Hypoline</b>	100	10	Apply at sticking and tranplanting.	If applied at rooting stage, second application should be half rate at transplanting.
	<i>Dalotia coriaria (Atheta coriaria)</i>	<b>Staphyline</b>	2	0.2		
<b>Fungus gnats &amp; Shore flies (Bradysia spp)</b>	<i>Stratiolaelaps scimitus (Hypoaspis miles)</i>	<b>Hypoline</b>	100	10	Apply at sticking and tranplanting.	If applied at rooting stage, second application should be half rate at transplanting.
	<i>Dalotia coriaria (Atheta coriaria)</i>	<b>Staphyline</b>	2	0.2		
	<i>Steinernema feltiae</i>	<b>Exhibitline sf</b> <b>Exhibitline sc</b>	250K	25K	Apply at sticking and repeat twice during rooting stage. Reapply immediately after transplanting.	Correct application is critical for efficacy. Make sure solution is agitated, fine filters are removed and pressure is kept low..
<b>Aphids (small spp.): Green peach, black melon, tobacco aphid</b>  <i>(Aphis gossypii, Myzus persicae, Myzus nicotianae)</i>	<i>Aphidius colemani</i>	<b>Aphiline</b>	0.25 - 1	0.025 - 0.1	Release weekly and/or use in combination with aphid banker plants.	<i>Aphidius matricariae</i> is more aggressive towards Myzus nicotianae ('red' aphid).
	<i>Rhopalosiphum padi</i>	<b>Aphid banker plant</b>	1/acre (2.5/ha) minimum		Introduce weekly. Initial intrduction is 2 banker plants per acre.	
	<i>Aphidoletes aphidimyza</i>	<b>Aphidoline</b>	1	0.1	Release at first signs of aphids. Continue weekly releases until control has been achieved.	
	<i>Chrysoperla spp.</i>	<b>Chrysoline</b>	10 - 50	1 - 5	Use as hot spot treatment only. Works for quick knock down.	
<b>Aphids (larger spp.): Potato, foxglove aphid</b>  <i>(Macrosiphum euphorbiae, Aulacorthum solani)</i>	<i>Aphidius ervi</i>	<b>Erviline</b>	0.25 -1	0.025-0.1	Release weekly before aphids become a problem.	
	<i>Aphidoletes aphidimyza</i>	<b>Aphidoline</b>	1	0.1	Release at first signs of aphids. Continue weekly releases until control has been achieved.	Be aware of diapause between October 15th and March 1st.
	<i>Chrysoperla sp.</i>	<b>Chrysoline</b>	10 - 20	1 - 2	Use hot spot treatment only for a quick knock down.	
<b>Two -spotted spider mites (Tetranychus urticae)</b>	<i>Amblyseius andersoni</i>	<b>Anderline</b>	4 - 6	0.4 - 0.6	Release in propagation.	Can be a mixed application with Amblyseius cucumeris in propagation.
	<i>Phytoseiulus persimilis</i>	<b>Phytoline</b>	6 - 8	0.6 - 0.8	Start when first mites are detected. Repeat weekly for 3 to 4 weeks until Phytoseiulus is established and mites are controlled.	
<b>Leafminers (Liriomyza trifolii)</b>	<i>Diglyphus isaea</i>	<b>Digline</b>	0.25 - 1	0.025 - 0.1	Release weekly for 3 to 4 weeks until sufficient parasitism has been established.	Start releasing at first signs of leafminer (feeding and oviposition spots).
<b>Broad mites (Polyphagotarsonemus latus)</b>	<i>Amblyseius cucumeris</i>	<b>Amblyline Stick - mini sachet</b>	1 sachet per propagation tray, shuttle tray or hanging basket.		Place sachet at sticking/seeding and again during transplanting into pots or hanging baskets.	Place a minimum of 1 Swirskiline Stick per 4, 5 or 6-inch shuttle tray. Larger pots that are individually placed need. 1 sachet per pot.
<b>Sweetpotato, greenhouse whiteflies (Trialeurodes vaporariorum and/or Bemisia tabaci)</b>  If <i>A. swirskii</i> is released for whitefly, it will also control thrips larva, eliminating the need to release <i>A. cucumeris</i> . <i>A. swirskii</i> requires temperatures >68°F/20°C for good performance.	<i>Amblyseius swirskii</i>	<b>Swirskiline Loose</b>	100	10	Apply weekly during propagation.	Broadcast evenly or use a battery-operated blower.
		<b>Swirskiline Stick - mini sachet</b>	1 sachet per propagation tray, shuttle tray or hanging basket.		Place sachet at sticking/seeding and again during transplanting into pots or hanging baskets.	Place a minimum of 1 Swirskiline Stick per 4, 5 or 6-inch shuttle tray. Larger pots that are individually placed need 1 sachet per pot.
	<i>Encarsia formosa</i> and <i>Eretmocerus eremicus</i>	<b>Encarline Mix</b>	3 - 6	0.3 - 0.6	Start at first signs of whitefly. Continue weekly releases until control has been achieved.	Optimal introduction method for wasps is blister packs. Keep blister packs (cards) out of direct sunlight. Open release flap on the back.
<b>Caterpillars/loopers</b>	<i>Bacillus thuringiensis</i>	<b>For example, DiPel WP biological insecticide.</b>	Follow Label.		Apply at first signs of pest.	

