










## Quality Starts Early

Success with BioControl Agents starts with early introductions in the crop cycle. Begin immediately after misting is off and before pest sightings and any pest pressure.

## Get Guidance from a BioWorks Technical Resource



| PEST  | BCA   | RATE<br>Units/m <sup>2</sup>   | RATE<br>Units/ft <sup>2</sup> | RELEASE STRATEGY  | APPLICATION NOTES  |  |
|---|---|--|-------------------------------|---|--|--|
|  <p><b>Aphids (small species):</b><br/>Green peach aphid (<i>Myzus persicae</i>);<br/>Cotton/Melon aphid (<i>Aphis gossypii</i>);<br/>Bean aphid (<i>Aphis fabae</i>)</p> <p><b>Aphids (large species):</b><br/>Cannabis aphid (<i>Phorodon cannabis</i>);<br/>Dandelion aphid (<i>Abstrusomyzus phloxae</i>);<br/>Potato aphid, (<i>Macrosiphum euphorbiae</i>);<br/>Foxglove aphid (<i>Aulacorthum solani</i>)</p> | <i>Aphidius colemani</i><br>(for small aphid species): parasitic wasp | 0.25 - 1.0   | 0.025 - 0.1                   | Release weekly or minimum of 4-5 weekly releases in combination with aphid banker plants. | Adults can be sensitive to foliar treatments, wait at least 1-2 days to release them if a product has been applied.<br><br>Use <i>A. ervi</i> as a complementary strategy when large aphid species are detected in the crop. |  |
|   | <i>Aphidius ervi</i><br>(for large aphid species)                     |  |                               |   |  |  |
|   | <i>A. matricariae</i>   | 0.5 - 2.0  | 0.05 - 0.2                    |   |  |  |
|   |   | <i>Aphelinus abdominalis</i> : parasitic wasp                                | 0.5 - 2.0                     | 0.05 - 0.2  | Alternate releases with <i>Aphidius</i> spp.   | Release when low parasitism is achieved with <i>Aphidius</i> spp., or if hyperparasitism is confirmed on aphid populations.  |
|   |   | <i>Aphidoletes aphidimyza</i> : predatory midge                              | 1.0                           | 0.1   | Weekly releases upon aphid detection; continue until control is achieved   | Start at first sign of aphid presence. Keep carrier lightly humid to ensure emergence. Diapause occurs between October and early March. Highly susceptible to sulfur products; avoid using sulfur. |
|   |   | <i>Chrysoperla</i> spp.: predatory lacewing                                  | 10-50                         | 1-5   | Release weekly during high aphid pressure  | Best for quick knock-down effect in hot spots.   |
|   |   | Aphid Banker Plants ( <i>Aphidius colemani</i> – <i>Rhopalosiphum padi</i> ) | 2.5 plants / ha               | 1 plant / acre  | Start banker plant strategy as early as possible, before aphids are detected in the crop.  | Start with 2 plants/acre. Add 1 new plant/acre on a bi-weekly basis.   |
|  <p><b>Two-spotted spider mite (TSSM) (<i>Tetranychus urticae</i>)</b></p>   | <i>Phytoseiulus persimilis</i> predatory mite                         | 8 - 10   | 0.8 - 1.0                     | Release upon detection of first spider mite spots   | Repeat every week until achieving control. The use of indicator plants (bush beans) provides a good idea of pest control.  |  |
|   | <i>Amblyseius californicus</i> predatory mite                         | 1 sachet per tray, then 1 sachet per plant.                                  |                               | Release every 4 weeks for better results. Start in propagation stage.                     | This species is not compatible with the other spider mite predator <i>P. persimilis</i> .<br><br>Hang sachet 6 – 8 inches from the top of the plant.   |  |
|   | <i>Amblyseius andersoni</i>   | 4 - 6  | 0.4 - 0.6                     |   |  |  |
|  <p><b>Broad Mite (<i>Polyphagotarsonemus latus</i>)</b></p>   | <i>Amblyseius cucumeris</i> predatory mite                            | 1 sachet per tray, then 1 sachet per plant                                   |                               | Introduce sachets at sticking and transplanting. Hang sachets on plants afterwards.       | Renew sachets preferably every 4 weeks   |  |

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|--|---|---|---|--|--|
|  <b>THRIPS</b><br><b>Western Flower Thrips (<i>Frankliniella occidentalis</i>);</b><br><b>Chili Thrips (<i>Scirtothrips dorsalis</i>)</b>  | <i>Amblyseius cucumeris</i>   | 1 sachet per tray, then<br>1 sachet per plant |   | Sachets are preferred, providing consistently more mites per plant. For loose material broadcasting, start at propagation and repeat weekly. | Stick sachet at base of plant or hang sachet 6 – 8” from top of plant. Re-introduce every 4 weeks. Replace with <i>A. swirskii</i> in areas where temperatures are consistently over 75 °F (24 °C).                            |
|  |   | 100 when loose                                | 10 when loose                                   |  |  |
|  | <i>Orius insidiosus</i><br>predatory bug                                    | 0.25 - 0.5                                    | 0.025 - 0.05                                    | Release preferably in hot spots  | Introduce 4 weeks in a row at the end of February to avoid diapause.   |
|  | <i>Stratiolaelaps scimitus</i> ( <i>Hypoaspis miles</i> )<br>predatory mite | 100   | 10  | Release first on the substrate during propagation and repeat when transplanting to other containers.   | Release full rate during propagation. Release half rate after transplanting if full rate is used during propagation. It may require several introductions in hydroponic crops. Both species can be mixed and applied together. |
|  | <i>Dalotia coriaria</i> (= <i>Atheta coriaria</i> )<br>predatory beetle     | 2   | 0.2   |  |  |
| <i>Steinernema feltiae</i> ( <i>NemaShield</i> )<br>entomopathogenic nematode  | 250K - 300K   | 25K - 30K                                     | Apply bi-weekly from the beginning of the crop. | Initiate treatments during propagation. Keep suspension under constant agitation, remove filters and keep low pressure for better results.   |  |
|  <b>Whiteflies:</b><br><b>Sweet potato whitefly (<i>Bemisia tabaci</i>);</b><br><b>Greenhouse whitefly (<i>Trialeurodes vaporariorum</i>)</b>   | <i>Amblyseius swirskii</i><br>predatory mite                                | 1 sachet per tray, then<br>1 sachet per plant |   | For loose material, start releasing at propagation and repeat when transplanting.  | Release evenly in the area or apply with a battery-operated blower.  |
|  |   | 100 when loose                                | 10 when loose                                   |  |  |
|  | <i>Encarsia formosa</i><br>parasitic wasp                                   | 3 - 6   | 0.3 - 0.6                                       | Start releasing after first whiteflies are detected and continue weekly.   | Maintain releases every week until achieving control. A combination of both species can be used for better results.  |
| <i>Eretmocerus eremicus</i><br>parasitic wasp  |   |   |   |  |  |
| <br> <b>Fungus gnats (<i>Bradysia spp.</i>)</b><br><b>and</b><br><b>Shore flies (<i>Scatella spp.</i>)</b> | <i>Stratiolaelaps scimitus</i>  | 100   | 10  | Release on top of growing mix at propagation and repeat when transplanting to other containers   | Release full rate during propagation. Release half rate after transplanting if full rate is used during propagation. It may require several introductions in hydroponic crops. Both species can be mixed and applied together. |
|  | <i>Dalotia coriaria</i>   | 2   | 0.2   |  |  |
|  | <i>Steinernema feltiae</i> ( <i>NemaShield</i> )                            | 250K - 300K                                   | 25K - 30K                                       | Apply bi-weekly from the beginning of the crop.  | For fungus gnat control only. Initiate treatments during the seedling stage. Keep suspension under constant agitation, remove filters and keep low pressure for better results.  |