

Cut Rose Biological Control Program

This program works best with a new planting or if started in fall or winter when pest levels are low

| PEST | PEST LEVEL | BIOLOGICAL | INTRODUCTION RATES |
|---|-----------------------------------|--|------------------------------------|
| Thrips | low (less than 5/card/week) | Cucumeris | 500 Cu.(Bulk)/m.sq./every 2 weeks |
| | | Cucumeris | 1 SR Bag/m.sq./every 4 weeks |
| <i>check flowers too, if more than 1thrips/flower continue cucumeris treatments</i> | | | |
| Fungus Gnat | low (less than 5/card/week) | Hypoaspis | 50/m.sq/once |
| | | <i>check cards weekly if gnat numbers, increasing treat with treat substrate with nematodes or Bti</i> | |
| Spider mite | low (1-5/mites/leaf/a few plants) | Stethorus | 100/infested spot/weekly/3 times |
| | | Persimilis | 2-3/m.sq./weekly/until established |
| | Also add: | Fallacis | 2/m.sq./weekly once |
| | high (+5/mites/leaf/many plants) | Stethorus | 100/infested spot/weekly/3 times |
| | | Also add: | Persimilis |
| Also add: | Fallacis | 4/m.sq./weekly/2 times | |
| Also add: | Feltiella | 250/infested spot/weekly/4 times | |
| Aphids | preventive (no aphids found) | Aphidius | 0.15/m.sq./week/every 2 weeks |
| | low (a few leaves with aphids) | Aphidius | 1/m.sq./weekly/3 times |
| | high (many leaves with aphids) | Aphidoletes | 5-10m.sq./weekly/3 times |
| | Also add: | Harmonia | 100/hot spot/3 times |
| Whitefly | low (less than 10/card/week) | Encarsia | 2/m.sq./weekly/until established |
| | High (more than 20/card/week) | Delphastus | 20/m.sq./hot spot/weekly/5 times |
| | High (temperatures 24C+) | Eretmocerus | 6/m.sq/hot spot/weekly/4 times |
| Cabbage Looper | as soon as moths are detected | Trichogramma | 10-20/m.sq./weekly |

Note: Biological control should not be attempted without a program of weekly monitoring to assess pest and beneficial status. This should include the use of yellow sticky traps (use a minimum of 20 traps/ha or 10 traps per greenhouse) and leaf sampling, flagging of hot spots and recording of results on a greenhouse map. A minimum of one hour a week per acre (2 hours/ha) should be spent on monitoring activities especially when first setting up a program.

Western Flower Thrips: Research in roses has determined that 25-50 thrips per yellow sticky card per week means that there is an average of one thrips per flower. Thrips numbers above this result in visible flower injury (Casey et al, 1999). As Cucumeris can only feed on the youngest stages of thrips it is important that a population of Cucumeris is present throughout the crop at all times. See rates on table above.

Two-spotted Spidermite: On bent cane rose plants most mites are found near the crown where the cane is bent and this can be used as a control strategy by spraying this area with a compatible spray if necessary while still allowing predators to build up on other plant parts without affecting the flowers. The predatory mite, Fallacis will establish on roses and can assist with mite control as it tolerates a wider temperature and humidity range than Persimilis. Fallacis is also resistant to most pesticides. The mite eating ladybeetle, Stethorus is also very effective at detecting individual mite colonies and can improve control of spider mite.

Aphids: The main species of aphid found in roses is the Green Peach Aphid but other species such as the Cotton Aphid and Potato Aphid can occur so these should be

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identified to select use the correct species of parasite. Aphidoletes and Harmonia will feed on all species of aphids.

Whitefly: As soon as whitefly are detected on monitoring cards or on the plants begin introductions of Encarsia and Delphastus. See rates above.

Fungus Gnats: To prevent fungus gnats from building up apply a preventive application of Hypoaspis early in the season. See rates above.

Nursery and Indicator Plants: The use of greenhouse pepper plants as indicator and nursery plants is highly recommended. Start with a few plants along the walkway trained up support posts. Greenhouse pepper or eggplants are available from propagators and are attractive to aphids and most pests and can be used to release and build-up populations of biological control agents which will migrate on to the main crop. Nursery plants also enable greenhouse staff to clearly observe and learn the life cycles of many parasites and predators and act as an early warning for pests as well as detecting any problems with beneficials establishing.

Pesticides: Check the compatibility list before using any pesticide as most are very harmful to beneficials. Remember that the pest is also the food source to multiply the number of biological control agents. A low level of pests is not necessarily a bad thing if biological control agents are also present. Fungicides usually cause less disruption than insecticides or miticides. Reduce the use of sulphur vaporizers (1Kg/ha) to 2 or 3 nights a week or sprinkle the sulphur along the main pathways to vaporize to minimize harm to predatory mites. Agral and most other spray adjuvants or spreader stickers are harmful to beneficials but 0.25% Magnesium Sulphate (2.5g/liter) works as well for this purpose and is harmless. If soap sprays are used, rinse plants with water 15-30 minutes after spraying and never apply soap on sunny days.

Pests and Chemicals Usually Safe for Biological Control Agents (call bio-supplier before use)

| <u>Pest</u> | <u>Chemical, Rate and method of use (follow label for greenhouse use and precautions)</u> |
|--------------|---|
| mildew | Sulphur (1Kg/ha/bi-weekly) vaporizers or sprinkle powder onto pathway to vaporize |
| spider mites | Vendex 50W (0.50g/L of water) spray with high volume sprayer |
| aphids | Insecticidal Soap (25ml/L of water), high volume sprayer |
| thrips | Insecticidal Soap (25ml/L of water), high volume sprayer |
| whitefly | Insecticidal Soap (25ml/L of water), high volume sprayer |
| caterpillars | Bt (follow label) |