

Biological Control of Aphids

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Rule #1; Don't Panic!



- Aphids have a very high “Gross out” factor
- When conditions are perfect, their lifecycle is extremely short
- It needs to be short, because everybody out there loves them

Rule #2; Don't Spray Chemicals

- Aphids really don't mind the chemicals
- All of the Beneficials do
- Residual effects are typically 3 times what the "Side Effect" charts list
- "Side Effects" lists don't consider repellency



Rule #3: Get rid of any Ants



- Many Aphids are “Ant tended”, meaning that the Ants manage and farm the colony
- They will remove and kill Aphid predators and parasites
- They will relocate the Aphids if things get too hot

Predators; amazing *Aphidoletes*

- This predator was first discovered in Germany when a researcher was selecting *Aphidius* species
- The entire Aphid culture crashed
- At first, he couldn't believe that the delicate Midge, *Aphidoletes aphidimyza*, could cause such mayhem



Aphidoletes aphidimyza



- Trials at Rijnplant in the Netherlands, about 15 years ago showed that, despite previous expectations and recommendations, *Aphidoletes* was a superior searcher than *Aphidius* species, with a much larger range, provided that the Midges were not cold stored.
- Effect release was as low as one release point per Hectare

Aphidoletes aphidimyza

- Aa doesn't care what species is available
- Aa can find a single Aphid 50 feet away in less than 5 minutes
- If no Aphids are present, Aa will move to other sucking insects such as Whitefly or Psyllid, or simply go outside, into the surrounding landscape, returning again, in the Spring



Aphid Prevention using *Aa*



- Because of the trials at Rijnplant, and subsequent trials at Doef's Greenhouses, Terra Nova, Iwasaki, and more, Applied completely reversed our Aphid strategy about 12 years ago, making us unique in the industry. We now use *Aa* preventatively and *Aphidius matricariae* for Hot Spots

Rules for Aphid prevention using *Aa*

- Release from same neutral point, weekly or bi-weekly
- Do not use “Banker” systems
- Treat Hot Spots separately with *Aphidius* or more *Aa*
- Start program exactly 1 week before the first Aphid appears
- Supplement with light from late fall to early Spring
- Avoid the use of any chemical pesticides



Limitations of *Aa*



- *Aa* will easily handle Foxglove aphids, but only after they have cleaned up the Green Peach
- *Aa* doesn't work on Kalanchoe or Maiden Hair Ferns
- *Aa* doesn't perform well below 65F, needing higher release rates
- *Aa* is extremely sensitive to chemical residue

Hot Spot management

- Directly release either *Aphidius matricariae*, other *Aphidius* species, and/or *Aa*
- Aggressively spray plants with water, to remove the Honeydew buildup and physically knock off the Aphids
- Move plants outside to attract native parasites and predators



Aphidius matricariae



- Best suited parasitoid for Green Peach Aphid
- Low Temperature performer
- Applied's *A. matricariae*;
- Not cold stored
- Excellent searching ability
- Collected after emergence, allowing wasps to feed immediately after emergence
- Individually selected to ensure no hyper-parasites
- Reared on Green Peach Aphid

Other predators and parasitoids

- Volunteer, native, Ladybugs, Syrphids and lacewings are effective for drastic knock-down
- Never purchase collected Ladybugs, for ethical and performance reasons
- Honeydew is a “beacon” to almost all generalists



Pests as a symptom



- This is my new, pet concept
- Aphids love Ammonium nitrate, switch to calcium nitrate
- Aphids love soft new growth, check EC levels, and over-watering

Managing your own Bio-controls



- The customer was going to spray this plant, and about 6 more, just like it
- The plants held more than 1,000 native *Aphidius*
- For \$8 worth of plants, the grower was going to kill about \$100 worth of *Aphidius*
- We got him to put these plants aside

The Foxglove Aphid

- Quite easy to identify by damage caused or by the “moving finger” test
- Extremely dangerous for ornamental growers, as damage occurs within hours of infestation
- Is expanding its’ list of susceptible plants every year
- Is occurring earlier every year



Foxglove



- *Aa* is best predator because:
- It will act preventatively
- It doesn't "startle" the Aphid, like *Aphidius* species do
- It completely removes the entire population

Foxglove and *Aa*

- But, there are some issues:
- The Foxglove is shifting to earlier timing, resulting in lower temperatures, which is not efficient for *Aa*
- Most propagated material has residual chemical pesticide residue, often systemic



Foxglove and *Aphidius*



- *Aphidius* generally are too aggressive to successfully parasitize the Foxglove
- But, that aggression can lead to disruption, especially in cage trials, especially *A. ervi*
- Subtle parasitoids, such as the *Praeon unicum*, do parasitize, but too slowly to prevent damage

Foxglove Strategy

- Start early
- Turn walkway lights on, overnight for *Aa*
- Release *Aa* every week, from the same location at average rate of 3,000 per acre (3 release points per acre of 1,000 tray)
- Don't release *Aa* until 24 hours after complete emergence
- Can use *Beauveria* for Hot Spots



Aphid Conclusions



- Aphids suck
- They are very complex, many have alter-egos such as root aphids or phylloxera type pests
- Many over-Winter on specific host plants ie. Hop Aphid and Prunus
- Winged stage is usually sexual
- Infestation stage is usually asexual (clones)
- Many species are Ant tended
- They can transfer virus
- They can significantly reduce the growth rate of the plant
- Customers don't like them