

A close-up photograph of a honeycomb with many bees working on it. The bees are clustered around the hexagonal cells of the comb, which is made of a golden-brown wax. The background is blurred, focusing attention on the bees and the comb.

The Art of Releasing Biocontrols

And on-the-fly Quality
Assessments

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The Program

- Most commonly used bios, organized by target pest
- Quality assessment at point of receiving
- Storage conditions
- Release techniques
- Rates and frequency

General Rules



- DO NOT REFRIGERATE!
- Keep out of sunlight
- Check liveliness upon arrival (at room temperature)
- Release ASAP

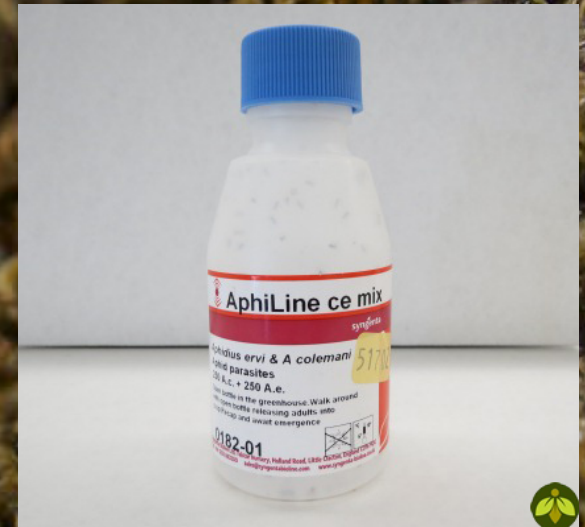
Aphid Bios

A close-up photograph of a honeycomb structure, showing the hexagonal cells and numerous bees (honeybees) working on it. The bees are densely packed, and their yellow and black striped bodies are clearly visible against the brownish-gold color of the wax.

- Aphid Parasites
 - Aphidius spp.
 - Aphelinus
- Aphidoletes
- Lacewings
- Ladybugs

Aphidius spp.

- Shipped as adults or mummies
 - Adult QC is easy
- Mummies QC is based on emergence, not # mummies
- Should be held in a warm, humid space until emergence 1-2 days



Aphidius, cont'd

- Release mummies as adults by opening container, fly out on own
- Adults will emerge over 2 days, so will likely leave remainder through crop
- 1 wasp/10ft², 3X



Aphidoletes

- Shipped as pupae in moist medium
- Will emerge and mate usu. w/in 3-4 days
- QC emergence



Aphidoletes

- One container per GH/HH
- Evening, fans off, vents shut
- Reconstitute with spreader/sticker
Cheaper to split shipment into multiple containers
- Release on pest pressure, not sq ft, wkly until control

Lacewings

- Shipped as eggs or larvae
- Larvae QC is easy
- Eggs evaluated on hatching
- Loose eggs held until hatching
- Hold one card in plastic bag



LW release

- Sprinkle larvae on infestations
- Loose eggs sprinkled after initial hatching, grey color
- Eggs on cards cut into sections, cut in half again



Ladybugs

- QC based on # dead
- Store in fridge, watch dehydration
- Sprinkle 2X on infestations
3 days apart at night

Thrips/FG bios

- Cucumeris, Swirskii and Stratiolaelaps (Hypoaspis)
- Dalotia (Atheta)
- Nematodes



Mites in Bran

- Cucumeris,
Swirskii,
Stratios
- All life stages
with bran and
bran mite prey
- Hold on their
sides



QC of loose mites

- Quick and dirty: look at carrier under dissecting scope.



Advanced QC

- 1 mL of carrier, mixed well, contains ~25 mites for 1L bottles of 25,000 or 50 for 1L bottle of 50,000



Releasing

- 1L bottle per 2,000 sq ft
–1,000 for cleanup with swirskii and stratios
- Cukes: every 2 wks
- Swirskii: every 2 wks
- Stratios: once at planting

Releasing

- Sprinkle:
hold on side
and roll
before
- Leafblower
attachment



Minisachets



Dalotia (Atheta)

A close-up photograph of a honeycomb with many bees working on it. The bees are clustered together, and the hexagonal cells of the honeycomb are clearly visible. The lighting is warm, highlighting the golden-brown tones of the bees and the honeycomb.

- All life stages shipped.
- Visual assessment
- Store chilly or room temp
- Sprinkle over large area
- 1-2/10 sq ft once at planting

Nematodes

- Should be white on arrival, not brown or darkening
- Store in fridge >6wks, 4 mo. for granular
- Look with backlight or under scope after hydration and again as spray solution
- Use everything in <1hr



Rates

- WFT: BASF recommends 12 mil/1100 sq ft
 - Seen others as low as 6 mil/1000 sq ft
 - Reconstitute with spreader/sticker
- FG: 50 mil/1100 sq ft

WFT Applications

- Air blast sprayer with filters removed
 - L or XL aperture nozzle
 - Agitation every 5 min
- Dosatron without filters
 - Ball valve partially open
- Spray to run-off, no more

FG Applications

- Dosatron or air blast sprinch to thoroughly wet soil, but not to point of leaching
 - Mostly in top 1" of soil
 - Damp (not wet) soil to start with
- Agitation still necessary as often as possible (Oxygen)

Whitefly Bios



- Parasites: Encarsia and Eretmocerus
- Swirskii
- Delphastus
- Lacewings

Encarsia/Eretmocerus

- Shipped as pupae in WF
- Hold in cool place until release <2 days
- QC: hold card in sealed jar in GH (shade) w/ yellow sticky



Releasing WFP

- Place bamboo poles in pots every 50 or 1000 sq ft
- Put one card on each pole with WFP facing DOWN
 - Death by sunlight
- 1WFP/1 sq ft. Less if prevention for GH WF

Delphastus

- Shipped as adults
- QC: #dead at bottom
- Get water ASAP; no droplets
- Store in cool place
- Release same day



Releasing Delph's

- They're going to go where they're going to go
- Release anytime, sprinkle and let fly
- Increase rate w severity, but not for quick cleanup
- Think about one bottle per house

Indicator Plants



Spider Mite Bios



- Predatory mites
 - Persimilis
 - Californicus,
Galendromus, Fallacis
- Stethorus
- Feltiella

Persimilis

- Shipped as adults (starved)
 - Vermiculite carrier
- QC upon arrival: assess # mites near/on lid
 - Pour out and sample 1g (1%)
- Store on side for uniform distribution
- Cool place until release



Persimilis release

- Store on side and roll before/during distributing
- Sprinkle onto foliage
 - If touching canopies, easy releases
- Usu. 1/1 sq ft weekly until established or TSSM gone

Californicus et al

- Shipped as starved adults
- QC upon arrival: under lid usu sufficient
- Store in cool place, after cracking lid to get some air in



Pred Mite Release

- Keep on their sides
- Remove sprinkle caps before distribution
 - Lots of mites on them
- Sprinkle onto plants
- 1/1 ft weekly until established or TSSM gone



Stethorus

- Similar to Delphastus



Whitney Cranshaw, Colorado State University, Bugwood.org

5509613

Feltiella



Whitney Cranshaw, Colorado State University, Bugwood.org

UGA5304053

Indicator Plants

