Best Before.....Yesterday

Presented in 2012

To Chill, or, not to Chill

- Most Beneficial Insects and Mites can be stored for anywhere from 3 weeks to 6 months without damage that would be detected by Industry Quality tests or visual inspection.
- "Quality" in ***my*** Industry is defined as "live mobiles" or "emergence"
- "Quality" in ***your*** Industry is defined as "performance" and "cost"
- Movement and Emergence are not indicative for ***your*** definition of "Quality"

Aphidoletes @ Rijnplant, DenHague
Anthurium 1995

Fresh Product

- 8 release points per hectare
- 3,000 midges per hectare weekly
- Effective prevention of Foxglove Aphid

Stored Product

- 16 release points per hectare
- 10,000 midges per hectare weekly
- Did not prevent damage due to Foxglove Aphid

Encarsia @ Canagro, Delta Tomato 1995 to 1998

"Non-stored" Product

- First year rate 0.5 to 2.0 wasps per square meter weekly
- Second and Third year rate 0.25 to 1.0 wasps per square meter weekly
- No other Whitefly control used
- Highest count (in first year) was 2 Whitefly per yellow card (once). Effectively, Complete Control

Competitive Product

@ Pacific Lagoons (sister company, same Tomato)

- 1 to 8 Encarsia per square meter weekly
- 2 to 4 Eretmocerus per square meter (summer) weekly
- 1 Dicyphus hesperus per square meter total (annual)
- Poor control requiring some chemical intervention

Encarsia @ Prism, Leamington
Tomato 2009

"Max" in South 12 acres

- 0.5 to 2.0 wasps per square meter weekly
- No other Whitefly controls
- No detectable Whitefly

Competitor in North 12 acres

- 1 to 12 wasps per square meter Encarsia weekly
- 4 to 8 Eretmocerus per square meter weekly (late Spring to end)
- Competitor asked to leave in July. House given to us. Chemical correction in August.

Searching Ability = Prevention

- Based on the Rijnplant trials we expanded the Preventative Program to Peppers the following year and then to all Ornamentals the subsequent years.
- Terra Nova, Oregon
- Nature Fresh, Leamington
- Doef' s, La Combe
- Sunselect, Delta

“Best Before”, or “Completely Useless After”

- Most Beneficials deteriorate on a straight line, over time
- Deterioration varies from Beneficial to Benefical
- Mites see a sex ratio shift, male to female
- Midges absorb their eggs
- Wasps lose their searching behavior and eggs
- The Industry has decided that 18 days is OK for Mite storage

Predatory Mites

- Lay eggs based on successful mating
- Females eat males when food runs out
- Storage negatively affects long term control of affected spot, but, short term effects are not seen
- Persimilis and swirskii control by “over-populating” the site, due to shorter life cycle than prey

Parasitic Wasps

- Lose Searching ability if stored below critical temperature (somewhere between 8 and 6 Celsius) for even very short periods (6 to 8 hours)
- Lose egg laying capacity over time

How to Improve "Grower" Quality

- Sell them "fresh" products
- Limit the amount of ice used in shipping
- Help them assess "fitness" (Quick and Dirty Quality Assessment, on Web Site)
- Help them understand the Biology of the Beneficials and the Pest (Technical Manual, on Web Site)
- Make strategies simple and effective (Recommendations on Web Site)
- www.appliedbio-nomics.com

Improving your Golf Score can have a Negative effect on your Biological Control

- Poinsettia at Meeslouwer in Stompwijk
- Years of excellent Whitefly control with Whitefly seldom seen
- Last year I visited in late November, and was surprised to see a couple of Whitefly
- Benfried, our distributor had not changed anything, so, what had changed to allow Whitefly to actually remain detectable in crop?
- Grower, over coffee, suddenly said; “Dad changed his tee off time”.
- The time was earlier, so, he put the Encarsia in the fridge so he could put them out a day later.

Conclusions

- The difference between “Fresh” product and “Stored” product is not subtle
- Significant reductions in successful application rates are common, some, up to 90%
- “Fresh” product actually allows us to use different strategies
- Everything you get, from anyone in the Industry, truly was “best before yesterday”

TOP 10 REASONS WHY YOUR PEST MANAGEMENT DIDN'T WORK

Presented in 2012

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#10;
You didn't get the pest right

- Being able to identify the insect or mite is critical.
- This slide is only Aphids; Adult, sexual, winged phase, and haploid asexual phase, and, exoskeletons of Aphids---Not Whitefly!

#9; You ignored the "Modus Operandi" of the Beneficial

- Encarsia works preventatively
- They have difficulty with Honeydew
- Predatory mites (except persimilis) work preventatively
- They can't tolerate webbing or Honeydew

#8;
Your Beneficials don't play well with others

- Barkeri eats persimilis
- Degenerans eats Aphidoletes
- Californicus eats persimilis
- Swirski eats Aphidoletes

#7
Your Bios were improperly applied

- Piles of cucumeris cannot be used if Atheta or any soil mite is also being used
- Spider mite predators being applied to damage, rather than pest density

#6
Temperature Range

- All Beneficials have an effective Temperature Range
- Fresh Encarsia can control Whitefly as low as 10C, while stored Encarsia is ineffective below 18.7C
- Mediterranean mites, such as swirski, need 26C

#5
Playing the Numbers Game

- If you have 10,000 plants, each with 10 leaves, and the average number of Aphids per leaf is 10, you are the proud owner of 1 million Aphids.
- Aphidoletes can handle 100 aphids per adult
- You need 10,000 Aa to handle the population in one generation

#4
Recognizing Success

- If I see 1 persimilis per leaf
- If I see 1 Aa larvae per 100 Aphids
- If I see 75% parasitism
- If I see clean new growth
- If I see an influx of Native Beneficials

#3
Poor Quality Beneficials

Stored Beneficials have reduced:

- Temperature Range
- Efficacy
- Searching ability

Additionally they have:

- Shifted sex ratios
- Increased mortality
- Higher likelihood for disease

#2
Chemical Interference

- All Chemicals have some effect
- Worst case is a early application to “start clean”
- Never use the “side effects” charts as permissive documents
- Always multiply the number of weeks by 3

#1 Timing

- You have to shoot **before** you see the "whites of their eyes"
- If you are growing plants that are susceptible to certain pests, start preventatively.
- 2 fallacis per square meter will prevent significant Spider Mites for the life of the plant
- 0.1 Aphidoletes per square meter per week will prevent Aphids from establishing
- 0.25 Encarsia per square meter per week will prevent Whitefly from establishing

Conclusions

- All of the 10 points are essential
- There are 10 other points for why your program is successful
- Users of Beneficial Insects and Mites have to become confident in the products that they use and the advice that they receive
- You have to embrace the true meaning of IPM, which is; Start early (preventatively), only use chemicals as a last resort, figure out the true costs of the chemical alternatives (reduced crop yield of 10 to 25%, equipment wear, re-entry, worker health), and be realistic (zero tolerance and eradication are not realistic concepts)