Association of Natural Biocontrol Producers

Status and Outlook for Beneficial Arthropods and Nematodes

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Association of Natural Biocontrol Producers

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Today's presentation:

- Overview of the macro beneficials market today

- Challenges and opportunities for the successful use of mass-produced macro natural enemies today and in the future

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Macro Beneficial Industry

Augmentation Biological Control: the supplemental release of natural enemies to increase their populations in the field, often including habitation modification to enhance beneficial numbers.

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Natural enemies of insects and mites…*snails*

Parasitic wasps

Predatory insects (beetles, flies, more)

Predatory mites

Entomopathogenic nematodes

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Macro natural enemies of insects and mites…*snails*

Parasi

Preda
(beetl

Preda

Entomopathogenic nematodes

Microbial products, biopesticides and pollinators (honeybees and bumble bees) are not included in ANBP.

Also, no mass produced weed biocontrol arthropods.

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ANBP…

is a professional association representing the industry that utilizes beneficial insects, mites and nematodes to manage agricultural and horticultural plant pests.

Mission is to address key issues of the augmentative biological control industry through advocacy, education, and quality assurance.

Membership includes…

- Producers
- Distributors
- users of natural enemies
- industry supporters
- university researchers
- consultants
- extension agents
- regulatory representatives.

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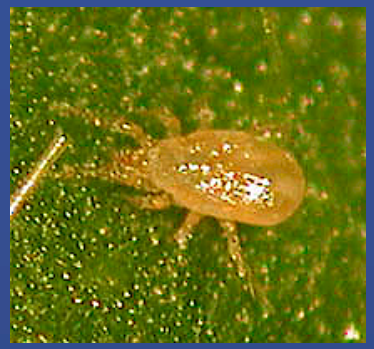
Predatory Mites (examples)



Amblyseius andersoni	Spider mites, eriophyid mites
Amblyseius degenerans	Spider mites, thrips
Amblyseius swirskii	Whitefly, thrips
Galendromus (Metaseiulus) occidentalis	Spider mites, eriophyid mites
Mesoseilus longipes	Spider mites
Neoseiulus californicus	Spider mites, Persea mite, eriophyid mites
Neoseiulus cucumeris	Thrips
Neoseiulus fallacis	Spider mites
Phytoseiulus persimilis	Spider mites

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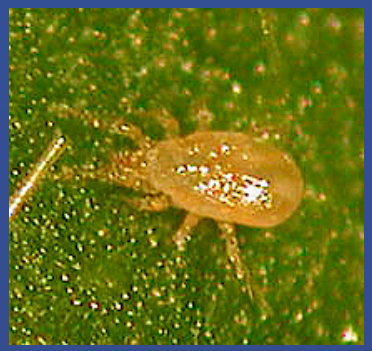
Predatory Mites



Approximately 40 species sold globally

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Parasitoids

Aphidius species	Aphids
Aphytis melinus	Scales
Encarsia formosa	Whiteflies
Eretmocerus eremicus	Whiteflies
Trichogramma spp.	Caterpillars
Dacnusa sibirica	Leafminers
Diglyphus isaea	Leafminers
Muscidifurax spp.	Filth flies
Nasonia spp.	Filth flies

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Parasitoids

Approximately 129 species sold globally
> 50% of all products are parasitic wasps

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Encarsia formosa	Whiteflies
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Predators

Aphidoletes aphidimyza Cecidomyiid (midge)	Aphids
Chrysoperla carnea Green lacewing	Aphids, mealybugs
Cryptolaemus montrouzieri Coccinellid beetle	Mealybugs
Delphastus catalinae Coccinellid beetle	Whiteflies
Dicyphus herperus Predatory bug	Whiteflies
Stethorus punctillium Coccinellid beetle	Spider mites

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Predators

Approximately 80 species sold globally

Aphidoletes aphidimyza Cecidomyiid (midge)	Aphids
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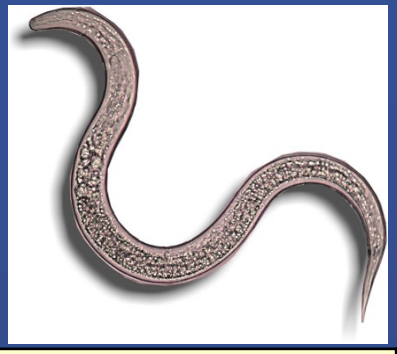
Entomopathogenic Nematodes (EPNs)



Heterorhabditis bacteriophora	Beetle grubs
Heterorhabditis megidis	Weevil and scarab grubs
Steinernema carpocapsae	Weevil and scarab grubs; others
Steinernema feltiae	Fungus gnats
Steinernema kraussei	Beetle grubs
Steinernema riobrave	*Diaprepes* root weevil, others

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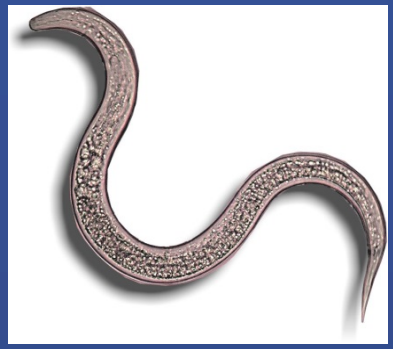
Entomopathogenic Nematodes (EPN)



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Species Mixes (*Steinernema and Heterorhabditis*)	Soil pests

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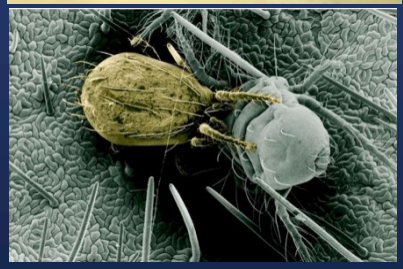
A few industry factoids…

- While there have been many successes in classical biocontrol in field crops (orchards, vineyards, sugar cane…), most *augmentative* biocontrol on commercial crops today is in greenhouse agriculture.

- Approximately 230+ natural enemies are available (worldwide) today; < 60 species in North America. [van Lenteren 2012]; still for N. A., slightly more projected worldwide today.

- Parasitic wasps (very specific), predatory mites (easily mass reared, dispersed mechanically, small, and do not spread) are the most widely used. EPNs as well because they have many of the same characteristics.



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A few industry factoids…

- Approximately 25 species >90% of the total **world** market at the end-user level. …roughly $384 million in 2012…estimates to exceed $400 million by now.
- In sale volume, the most important commercial markets are greenhouse crops in The Netherlands, UK, France, Spain and the US. These countries account for 2/3 of the total market.
- Africa, Asia, Latin America represent growing markets

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A few industry factoids…2012

- Worldwide approx. 30 “large” commercial producers
- Large = more than 10 people are employed
- Fewer than 5 employ more than 50
- 20 “large” companies are located in Europe
- Some estimates: worldwide, about 500 small commercial producers
- 2016 figures might show more consolidation

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Challenges to industry growth still…

- ✓ Availability
- ✓ Cost
- ✓ Quality
- ✓ Efficacy

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New Products to Implementation

New Products	**New species; release systems; patents**
Developing cost effective rearing techniques	**Companies are always working on this – not often disclosed; unless developed with public $**
Quality Assurance	**ANBP worked on "standards" that could be used by producer and end user; supported Canadian website**
Packaging & Shipping	**Shipping; Regulatory issues – Federal, State, International**
Release Strategies	**New methods, patents**
Education/Implementation	**Education is essential, as well as feedback**

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Marketing & Education

Products are becoming much easier to find. The Internet continues to provide easy access to companies and information on how to use natural enemies. Almost all commercial insectaries now have a website and many provide information on:

- Biology
- Pest/beneficial interactions
- Release and other use techniques
- Compatibility with pesticides (or how to integrate them)

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Regulatory Challenges to Commercial Biological Control

★ USDA, APHIS, Plant Pest Quarantine (PPQ)

Detection, Inspection, Import/Export, Permits, Crop biosecurity

- USDA, APHIS, Veterinary Service

★ US Fish and Wildlife Service

Conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people.

- Transportation companies

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Industry growth due to…

- Pesticide resistance issues are still (and will be) playing a factor in adopting biocontrol strategies

- Organic production still increasing; awareness and valued by some large food chains and retailers.

- Patenting products / delivery systems might encourage more investment.

- More educational material – easier to access on the web and sites like YouTube!

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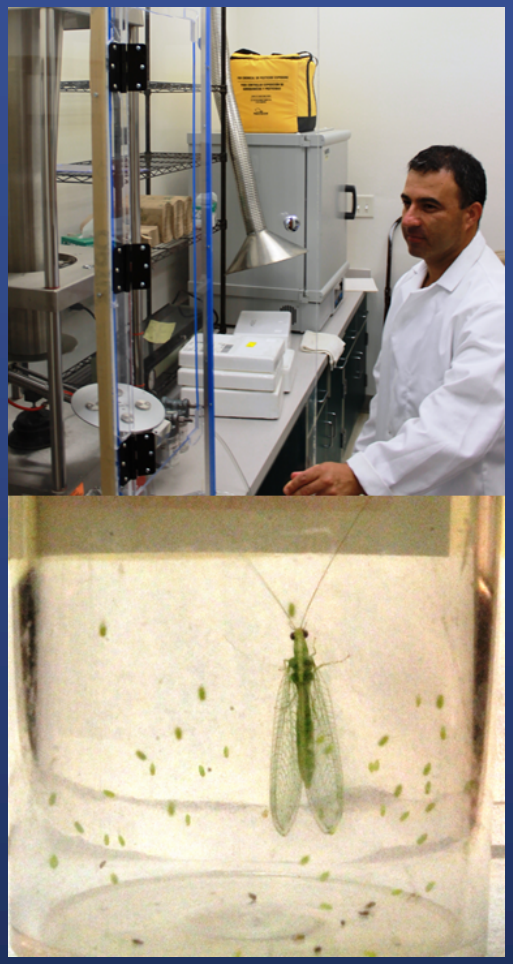
Industry growth due to…

- Globalization of augmentative biological control industry is leading to advances in logistics and quality control. Growth in the US has been due to European companies expanding into the US and that interactions and collaborations, in general, have led to strengthening the industry internationally.

- More compatible pesticides! Difficult to say. Data is needed on residues potentially impacting beneficials that might be released well after recommendations for their release. The industry encourages this research.



Pesticide residue testing, Univ. Florida

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BioControl
DOI 10.1007/s10526-011-9395-1

FORUM PAPER

The state of commercial augmentative biological control: plenty of natural enemies, but a frustrating lack of uptake

Joop C. van Lenteren

July 2012

A wealth of information about commercial biological control *globally*

Reasons for Limited Use

- Attitude of pesticide industry
- Attitude of farmers
- Attitude of government inst.'s
- Guidelines and regulations

Factors Stimulating Use

- Resistance to pesticides
- Residue demands by food retailers
- Attitude of customers
- Government support, and more

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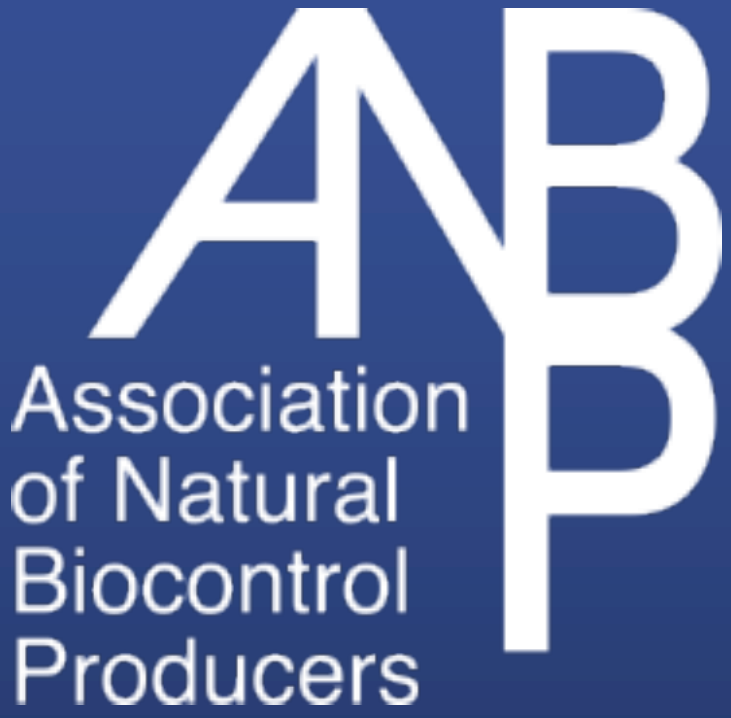

Thank you!