



The how, where and when of biologicals

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 growing passion...

Outline

- Integrated pest management (IPM)
- Issues to address before you start
- Procedural plan
- Challenges and constraints
- Biologicals

Biologically speaking, if something bites you, it is more likely to be female.
 Desmond Morris

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Biological products = Integrated Pest Management



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Integrated Pest Management

- Integrated
 - many different ideas and techniques used in combination to understand and solve pest problems
- Pest
 - living organism causing significant damage to a crop
- Management
 - making controlled, rational pest control decisions preventing economic damage to a crop

“A system utilizing all suitable pest control techniques and methods in a compatible manner to keep pest populations below economically injurious levels”

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IPM is not

- IPM is not merely a biological control program
- IPM is not a pesticide free program
- IPM is not an organic pest control program
- IPM is not the least or most expensive method of pest management
- IPM is not the easy way out



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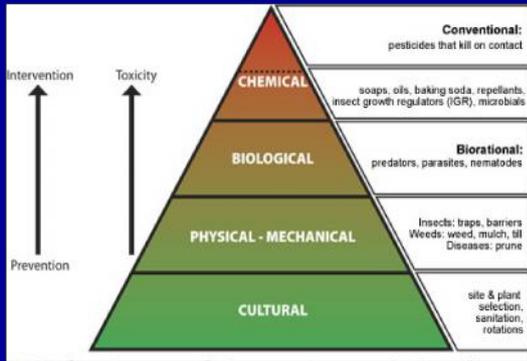
IPM is

- A sustainable approach to managing
- An aim to maximise the use of biological control products.
 - Chemicals – supportive not disruptive role
- A combination of tools
 - biological
 - cultural
 - physical
 - mechanical
 - chemical

in way to keep pests below their economic injury levels and minimizes economic, health and environmental risks

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IPM success



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Before starting

- Monitoring and identification of pests
- Be aware of potential problems & opportunities in your fields
- What pests can be expected?
- When can the pest be expected?
- What practices can be taken to avert the occurrences of pests?
- When and how to watch for them?
- What control methods are available if despite your best effort pests still attack the crop?
- What are the beneficial species that will help you out?
- What are the strengths and limitation of your operations
 - Chemical products
 - Labour
 - Equipment
 - Market requirement
 - Supply of control agent
 - Environment

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Procedural plan

1. Identify the problem correctly
 - The most important aspect of pest management.
 - Incorrect identification
 - Incorrect control tactics = wasted time & money
2. Understand the pest biology
 - Ecology – what it needs to thrive
 - Vulnerable developmental stage
 - Life cycle
 - Behavior and habits



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Procedural plan

3. Monitor changes
 - Pop size, developmental stage, distribution
 - Crop host status – maturity, health
 - Environmental and soil (or medium) conditions
4. Decision making
 - Thresholds are levels that a pest population must reach before treatment to control it can begin.
5. Take action - Integrate techniques
 - Review available tactics
 - cost and expected economic returns
 - social and environmental considerations
 - effects on beneficials and other pests.



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Procedural plan

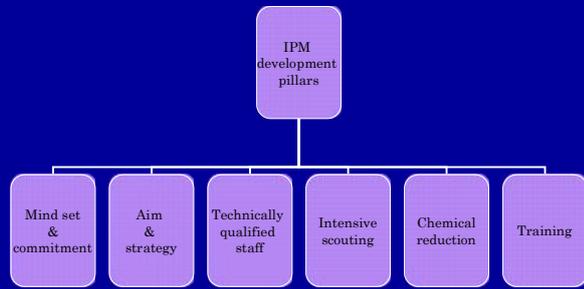
6. Evaluate results – Follow-up
 - Evaluate the effectiveness of the intervention implemented
 - Did it work?
 - Why not?
 - What is your next step?
7. Record keeping
 - Maintain records of problems and solutions
 - Such information is invaluable for future situations
8. Education



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What makes IPM a reality?



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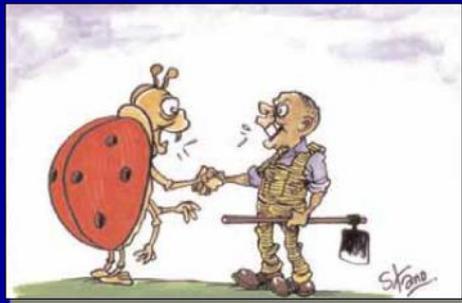
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Challenges and constraints

- Education
- Method of application
 - Placement and application critical to cost and product efficacy
 - Timing
- Developmental stage being targeted
 - According to the pest species
- Scouting & monitoring
 - Correct identification = Correct selection of bio pesticide
- Integration of chemistry
 - Choice of pesticides and fungicides to limit impact on bio pesticide
 - Withholding period & mortality
 - Floramite vs. Milbenock

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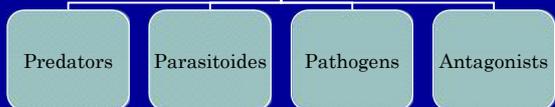
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Biological products



Rules of engagement

- Environmental impact and restrictions
- Chemical impact
- Working action
- Other control measures
 - Cultural, mechanical, physical

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Predators

- Free-living organisms which must kill and consume many prey for their survival
 - Require a number of prey organisms for complete development
 - Usually as large or larger and faster compared with their prey
- Either
 - arthropods – insects, spiders, mites
 - vertebrates – birds, small mammals, frogs, fish and reptiles
- May be
 - extreme specialists – Monophagous – *Phytoseiulus Persimilis*
 - generalists – Polyphagous – *Amblyseius* spp
 - Advantageous – predator can survive when the preferred prey is absent by feeding on other prey, water, pollen etc.

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Parasitoides

- The organism lives (during its development) in or on the body of a single host individual, eventually killing the host



Diadegma semiclausum



Trichogramma spp.



Encarsia formosa



Cotesia plutellae



Diglyphus isaea



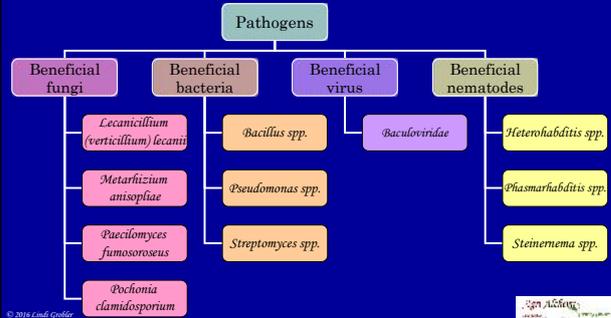
Diadromus collaris

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Pathogens

- A pathogen or infectious agent causes disease or illness to its host
- Beneficial fungi cause disease or harm insects, nematodes or other fungi

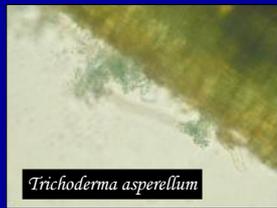


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Antagonists

- An agent acting in physiological opposition
 - Trichoderma asperellum* & *Trichoderma harzianum*



Trichoderma asperellum

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Finally

- Only fools rush in...
 - Start with your biggest problem first
 - Know what chemicals you have and what their effect will be
 - Plan
 - Manage actively
 - Evaluate
- Educate
 - Gewasbescherming nieuwe stijl (Theo Grent)*
 - www.bio-collection.com
- Don't give up – it will not always go smoothly



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"Cowardice asks the question, 'Is it safe?' Expediency asks the question, 'Is it politic?' But conscience asks the question, 'Is it right?' There comes a time when one must take a position that is neither safe, nor political, nor popular, but one must take it because one's conscience tells one it is right."

Rev. Martin Luther King, Jr.



Thank you for your attention