



Sustainable and resilient biological plant health

David Cary, Executive Director of IBMA
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What is wrong with the current agricultural system?

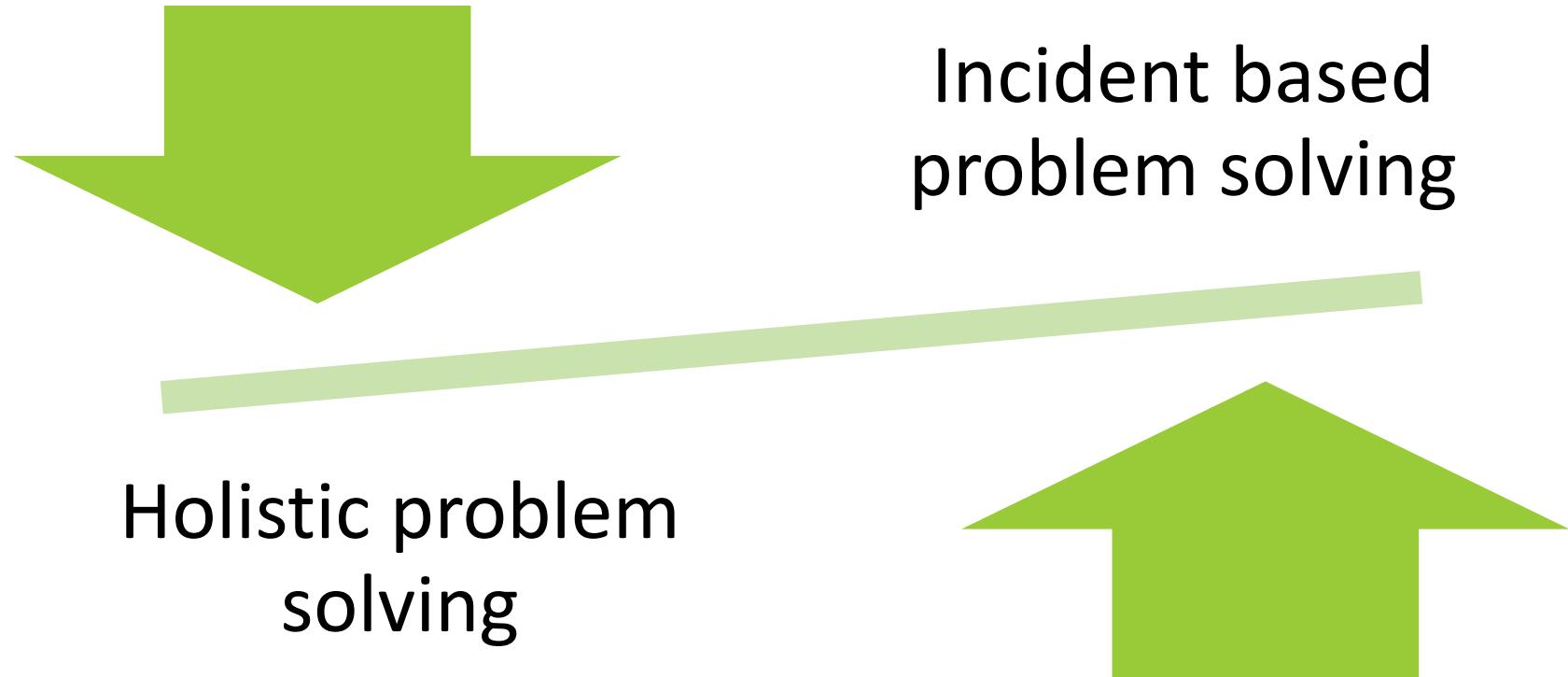
Surface look

- Availability of effective fertiliser & PPP tools
- More reliability of production
- Cheap food
- Good quality food
- Plentiful choice of food since 1st green revolution

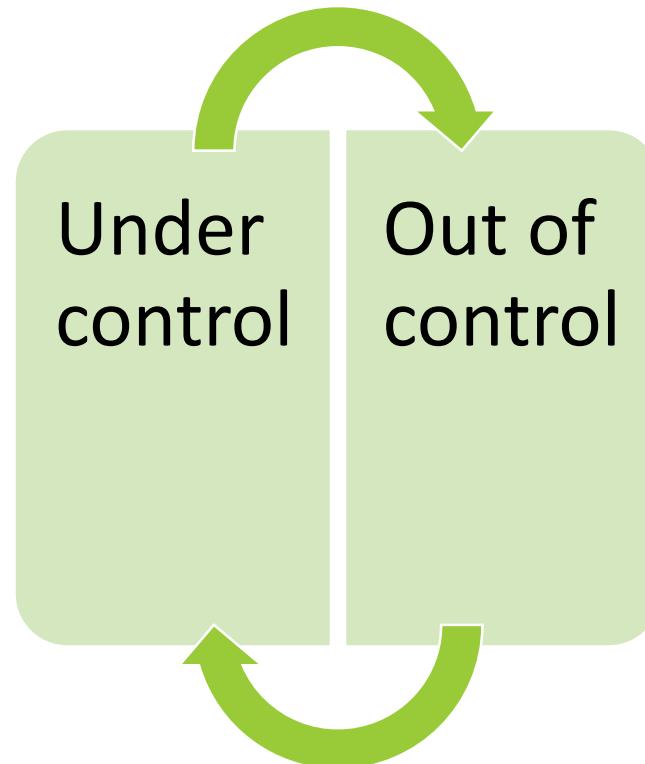
In depth look

- Resistance development
- Increase of invasive pests and diseases
- Pendulum of pest and disease occurrence
- Overreliance on engineered inputs
- Imposed quality standards
- Direct costs only accounted for

Problem solving needs to change



Consequences of problem thinking



External costs and benefits

- Direct costs are helpful for cost of production when inputs have only positive effects
- However farmers do more than act as a food factory
- If we look at agriculture as produce from our environment we have to account for the benefits to us as a society and also account for the costs to society of our methods of production.
- As custodians of the environment we need to account for environmental costs and benefits
- In order to be complete also account for human health costs and benefits

Change of consumer quality perceptions

- What makes produce of good or higher quality?
- Is size a good measure of quality?
- Is shape a good measure of quality?
- Is blemish free a sign of quality?
- Is absence of insects a sign of quality?
- Do some or all of these quality measures happen to assist multiple retailers in having standardised produce for buyers and customers?
- Are such measures of quality of use to farmers and consumers?

Holistic Agriculture

- Understanding of crop and place in the environment
- Maintaining a healthy soil
- Maintaining healthy plants
- Keeping in balance with minor corrections
- Thinking ahead
- Working with nature not fighting it
- Remaining part of the environment

Holistic Agriculture



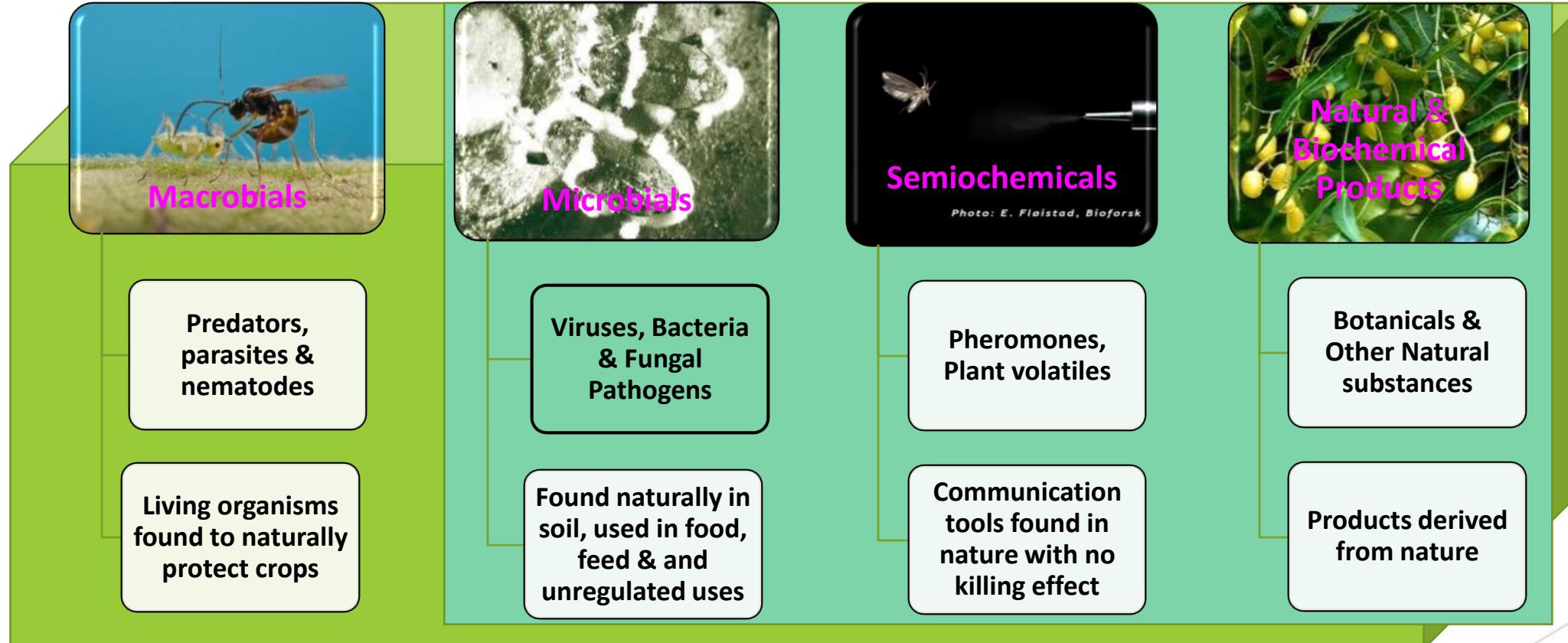
- Prevention of pest & disease explosion
- Use of all available tools
- Minimise risk to human health and the environment

Only through use of true IPM

A new true green revolution

What “tools” are currently available from the Biocontrol industry?

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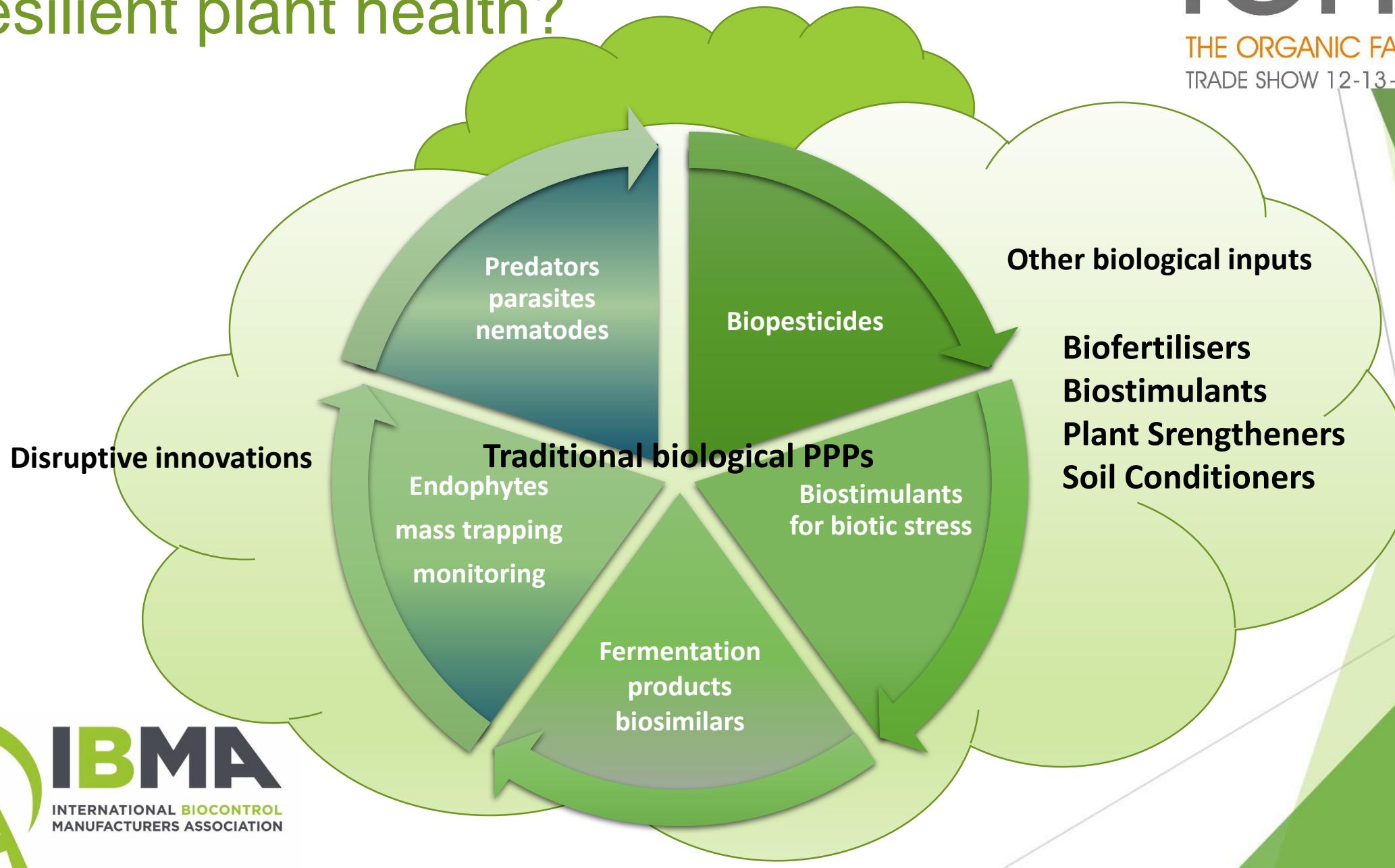


Not usually regulated as PPPs
Regulated as PPPs

What biological inputs contribute to sustainable and resilient plant health?



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Safety of inputs sourced from nature

- It is natural therefore it is safe
- Just because it is natural does not mean it is safe
- Proportionate assessment of the risks of introducing something into the environment needs to be assessed for human and environmental effects
- However coming from nature means we already possess some relevant historical knowledge and this is better than any models and should be used
- A level of confidence in those observed compartments can be established
- Problematic natural substances can be avoided

Learning from successful agricultural systems

Organic

- Holistic Systems based
- Use of IPM principles
- In harmony
- Trust
- Certification

Conventional

- Yield focus
- Redefinition of IPM
- Constant correction
- Silver bullets
- Resistance

Future Crop protection led by Organic Agriculture

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- Founded on prevention and monitoring
- Intervention only when needed
- New tools all nature-based solutions
- Biopesticides, biostimulants, biofertilisers
- Resilient soils and resilient plants (microorganisms, seed treatments)
- Automation, ICT tools and intelligent equipment minimise use of products and exposure
- Holistic natural scientific approach
- Interventions upon a licensed PCA written recommendation



Threats to Organic use of Biocontrol

- Flow of information
 - General principles
 - Local tailoring to be fit for purpose
- Lack of Harmonisation of regulations
 - Global and Regional harmonisation required
 - Cross sector harmonisation
 - Agricultural input harmonisation
 - Smart integration of regulations eg 1107/2009 & 834/2007

Responsibilities of Biocontrol industry

Ensure product quality and performance

Disseminate information

Engage with the entire food chain

Satisfy farmer needs

Role of Biocontrol Products

Modern Agriculture

- Satisfy food security issues
- Reduced impact on the environment
- Reduced risk for human health

Biocontrol Products

- Increasing role in modern agriculture
- Regulation should not preclude these products from being available to growers
- Regulation should be proportionate to the risks posed
- Take into account a history of safe use and target assessment on needs
- Are needed to allow IPM to be implemented
- Are needed to prevent development of resistance
- Satisfy increasing societal scrutiny of inputs

What significant issues exist in moving towards biocontrol based IPM?

Holistic versus incident based control

Moving to a range of biological inputs

Aiming for little or no impact on human health or environment



Understanding and maintaining healthy soils & plants

Niche uses and highly specific localised solutions

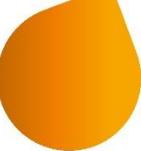
Concluding remarks

Growth of bioprotection market as part of a range of biological inputs of use for organic agriculture:

- **Microbials**
 - Bacteria, for disease control, for nematode control
 - Antagonistic fungi, for disease control
 - Entomopathogenic fungi: slow growth
 - Baculoviruses: increased use in orchards and vegetables
- **Macrobiotics**
 - EPNs: orchard, vegetables, amenity areas
 - Improved application techniques
- **Semiochemicals & Natural Products**
 - More specific niche solutions
 - Fermented products including naturally produced metabolites
 - Mixtures
- Annual growth will continue with 15-20%
- Bioprotection will become a major part of crop protection means: > 50% in 2030



learn to live with nature not against it

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*Production of food has to be as a part of the ecosystem
and the environment through using green tools first*

*Healthy soils and plants give us the food we want
our children to eat and an environment in which we
are happy and proud for them to live in*



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Many thanks!

