The Role of Biocontrol in the Transition of Agriculture

1 October 2021
International Biocontrol Manufacturers Association

Part of the Federation of Biocontrol industries Bioprotection Global

Small Association
- Local associations around Europe – members represent us where no local Association

SMEs dominate
- In Europe 71 SMEs and 76 micro SMEs

Global with European Focus
- 236 member companies globally of which 160 in Europe Global members join to access Europe.

25 years old
- Established in 1995

Global reach
- Part of Bioprotection Global IBMA Keny and 35% of members from outside Europe
- Annual Biocontrol Industry Meeting October in Basel
Biocontrol products: 4 categories

- **MACROBIALS**
  - INVERTEBRATE BIOCONTROL AGENTS

- **MICROBIALS**
  - Micro-organisms that outcompete or control pests and diseases

- **NATURAL SUBSTANCES**
  - Botanical extracts and minerals

- **SEMIOCHEMICALS**
  - Insect pheromones and plant kairomones that affect the behaviour of specific insects or plants

Beneficial Insects, mites and nematodes that control other insects and mites

Subject to PPP regulation
## Market Statistics

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<th>Biocontrol market</th>
<th>Annual growth</th>
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<tr>
<td>Europe’s biocontrol market</td>
<td>~ 1.0 Bio €</td>
<td>23 %</td>
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<tr>
<td>IBMA members biocontrol market (survey)</td>
<td>~ 1.0 Bio €</td>
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<td>Europe’s total crop protection market</td>
<td>~ 10 Bio €</td>
<td>Flat</td>
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### And what they tell us

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<th>Bioprotection reached significant critical mass</th>
<th>IBMA highly representative</th>
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<td>Bioprotection has strong momentum</td>
<td>There is a lot to do by 2030</td>
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Ready for the challenge: innovation pipeline & ecosystem

140 Products awaiting Authorisation across EU

120 Products pre-development not yet submitted

Can UK take advantage of this wealth of innovation through enabling regulation for biocontrol?
DEFRA Consultation on NAP – Goals
December 2020

• **Ensure Robust Regulation to protect health and the environment**
  • We will review operation of regulation of biopesticides to encourage greater uptake of IPM approaches

• **Supporting the development and Uptake of IPM**
  • We will support the development of IPM approaches which provide maximum opportunity to protect or enhance the environment whilst maintaining crop protection

**UK Environment Bill – Goals**

• **30 by 30**
  • Protect 30% of England’s land for biodiversity by 2030
Exploring the benefits of biocontrol for sustainable agriculture

A literature review in the light of the European Green Deal

Jean-François HULOT & Nora HILLER (IEEP)
Biocontrol enhances soil life and soil health
- It reduces risks of chemical contamination

Biocontrol respects non-targeted fauna and flora
- Example of organic farming

Proven efficacy of biocontrol
- Response to chemical pesticide ban/restrictions
- High benefit/cost ratio

Potentially less emissions
- Enabler for sustainable farming

Less exposure to pesticides for farm workers
- No chemical residues in food

Biocontrol goes together with ecosystem knowledge and holistic approach
How to enable IPM and biocontrol through UK regulation

01 Definition of biocontrol
The 4 categories, invertebrates, microbials, semiochemicals and natural substances

02 Set positive target for biocontrol
75% of all PPP use is biocontrol by 2030

03 Simplify and Differentiate
Consider fast track for biocontrol and provisional registration

04 Biocontrol Experts
Dedicated biocontrol experts in evaluation and risk assessment of biocontrol
Case Studies for Biocontrol
The Challenge
Rice in Albufera of Valencia
Project Background

Location: Albufera de Valencia
15,3000 ha of rice surrounding 3,000 ha of freshwater lagoon.

Site of international importance for birds
Migratory bird special site.

Problem
Use of organophosphates by aerial application to control rice stem borer (*Chilo suppressalis*).
Detrimental effect on birds, fish, insects and aquatic ecosystems.

Solution
Pest control by sex pheromone for rice stem borer integrated into farming practice thanks to the collaboration of different entities.
Evolution of the pest control in the area

Traditional agriculture – 30’ to 50’

The ‘Era of synthetic insecticides’ – 50’ to 90’

The switch to biocontrol – 2000 until today

1933-1950
CULTURAL PRACTICES

1950-1965
ORGANOCHLORINATED & ORGANOPHOSPHATES INSECTICIDES

1965-1988
COLLECTIVE AERIAL SPRAYING (OP)

1988-2005
AERIAL SPRAYING + MATING DISRUPTION

2006-2009
HIGH DENSITY MATING DISRUPTION (100 units/ha)

2009-2013
LOW DENSITY MATING DISRUPTION (31 units/ha)

2014-Present
LOW DENSITY & BIODEGRADABLE MD (31 units/ha)
What has been the impact so far?

01 TECHNICAL RESULT
Since 2006 the pest is fully controlled by mating disruption avoiding the use of approx. 50,000 L of synthetic insecticides each year.
Close to 100% effectiveness, insignificant damage, lower than conventional spraying.

02 ECONOMIC RESULT
Lower cost than conventional spraying.
The use of mating disruptions allows the coexistence of an important economic activity (such as the rice cultivation) in an area which as been declared a natural reserve and that is, additionally, a touristic site in the region.

03 ENVIRONMENTAL RESULT
The switch to biocontrol allowed to significantly decrease pollution and operators, farmers, bystanders and environmental exposure to chemical pesticides, increasing biodiversity enabling resilient rice cropping systems.

Evolution of insecticide use
- Reduction of the use of insecticides up to 97% compared with conventional control.

Evolution of nesting aquatic birds
- Total number pairs species in UICN Red List
- Total number pairs 10 species of special interest
The future...

- Reduce the number of dispensers/ha (reduce the placing costs: 10 dispensers per ha)
- Reduce the winter populations and spraying only pest refuges or foci
Biological technology for disease and pest control: a farmer led study

(EIP-AGRI funded)

With thanks to Dr Roma Gwynn – Director Biorationale and Vice President IBMA
The **EIP-AGRI** Project 3 year project

Project aims:

- Exchange knowledge with, and provide training and education for farmers.
- Be driven by the practical needs of the farmers re: removal from the market of current conventional pesticide disease control agents.
- Encourage new thinking on using biological technologies in integrated pest and disease management systems
- Gain empirical evidence from field trials and monitoring.
The EIP-AGRI Project 3 year project

Can we reduce our dependence on conventional chemical fungicides and insecticides in wheat production using biological technologies?
GEP-standard trials at 3 sites in NE England

Nafferton

Cockle Park

Stockbridge Technology Centre
Trials year 1

Spring wheat
Strip plots
Conventional chemicals vs IPM vs Biological

Results: No difference in yield between the treatments, at any of the 3 sites
Trials year 2

Winter wheat – 2 varieties (good and poor disease resistance)
Replicated plots – 6 replicates, randomised
Conventional chemicals vs IPM vs Biological

Stockbridge Technology Centre

Cockle Park

Nafferton

Varieties: Left = Leeds Right = Skyfall

Results: No significant differences between any managements regimes, varieties or sites
Trials year 3

Winter wheat
Replicated plots, 0.5 ha plots
Conventional chemicals vs IPM vs Biological (plus low N & high N)

Results: indicating some differences between management regimes for yield and there are indications of differences for some quality parameters (biologicals = higher protein)
Are biological technologies for wheat realistic?

**YES**

This EIP-AGRI funded project points us to the possibility that using biocontrol technologies to manage wheat pests and diseases is realistic.

**BUT**

We used already-approved UK biological technology products (from horticulture) - not ones developed specifically for wheat pest and diseases. What would results have been if we had product especially designed for wheat?

Would the results have been better if we used biocontrol technology adapted application timings and methods?

Potential uplift in protein content, interaction with N inputs?

Costs of biological technologies?
What the case studies tell us

• Biocontrol provides effective pest and disease control in arable crops in UK and beyond

• But
  • It takes time
  • All stakeholders need to be involved
  • Biocontrol interacts with nature – these interactions need to be understood to maximise effectiveness
  • It costs time and money – farmers need rewarding for the environmental measures put in place to support a more agroecological approach

• The benefit – enhanced biodiversity and more resilient cropping systems
Conclusion

• Biocontrol provides effective and sustainable pest and disease control in arable crops
• Biocontrol enhances biodiversity and soil health creating more resilient cropping systems
• Biocontrol enables IPM
• Biocontrol industry has a strong pipeline
• There is an opportunity in UK to enable IPM and biocontrol through a simplified, robust and fast track regulatory process