Biopesticides: Some Industry Perspectives on Research and Demonstration

Biopesticide Industry Alliance (BPIA)
Bill Stoneman, Executive Director
biopesticideindustryalliance.org
(202) 536-4602
Biopesticides: Some Industry Perspectives on Research and Demonstration

Today’s presentation:
✧ BPIA – who are we anyway?
✧ How we define biopesticides.
✧ Benefits of biopesticides in agriculture
✧ Growth in the biopesticide industry and why.
✧ Perspectives on research and demonstration.
✧ The “Oh, by-the-way” effect
✧ Questions?
Biopesticide Industry Alliance Inc.

Who are we anyway?

We are 84+ members

Companies and individuals involved in discovery, development, manufacturing, marketing and allied industries

Largest crop protection suppliers to the mom & pop companies

Research and Extension folks are always welcome to participate in our meetings and events
BPIA’s Goal

Our goal is to be the leading source of reliable information for regulated biopesticides and to improve product stewardship, performance and factual promotion.
So, how do we define Biopesticides?

As defined by the United States Environmental Protection Agency… Microbial Pesticides – bacteria, fungi, virus, protozoans, etc.
So, how do we define Biopesticides?

As defined by the United States Environmental Protection Agency… Biochemical Pesticides – plant extracts, fermentation products, biochemicals, etc… with a non-toxic mode of action.
So, how do we define Biopesticides?

The US EPA included PIPS (Plant Incorporated Pesticides) in their definition of biopesticides – we do not.

Why? At the time of our foundation in 2000 genetically modified crops were more controversial than today and our founding members were not involved. It was logical to limit our definition to regulated biological pesticides.
So, are biopesticides for organic growers?

The simple answer is yes – most biological pesticides are allowed in organic crop production and are OMRI (Organic Materials Research Institute) listed.

However, BPIA estimates that somewhere between 95-97% of biopesticides usage is in conventional cropping systems.
So, how do we define Biopesticides?

- Fungicides
- Herbicides
- Insecticides
- Plant Growth Regulators (PGRs)
- Insect Growth Regulators (IGRs)
- Nematicides
- Pheromones
- Minerals
- Barriers
- Smothering and/or abrasion
- Others…
Biopesticides can help with Resistance Management

Many have complex modes of action, they may include:

- Hyper-parasitism
- Competitive Exclusion
- Plant Growth Regulation
- Repellency
- Physical barriers
- Systemic Acquired Resistance
- Insect Growth Regulation
- Reduced reproduction
- Feeding inhibition
- Others…
Biopesticides Offer Significant Benefits to Growers

- No synthetic chemical residues
- Minimal impact on non-target organisms
- Are not prone to pest resistance
- Enhance crop quality and yields
- Assist in residue management
- Environmental safety
- Provide for flexibility – labor and harvest flexibility
Biopesticide products offer growers several valuable opportunities for growers including:

- Biopesticides fit with integrated pest management systems and contribute to environmentally responsible production systems – often see better yields and quality than chemical-only programs.

- Biopesticides help growers manage maximum residue levels (MRLs), creating more opportunities to export to markets where MRLs have been reduced significantly.
Biopesticide products offer growers several valuable opportunities for growers including:

- Growers may strengthen relationships with produce buyers as they improve the timing of harvest and shipping due to biopesticides.

- Biopesticides allow organic growers to control pests while maintaining their certified status.
Growth of Biopesticides

Source: BBC and AgroPages.

(1) Biopesticide Growth Outpaces Ag Chemical Growth (2009 – 2014E 15.6% vs. 2010 – 2014E 5.5% CAGR. 2014E figure extrapolated)
The Global Biopesticide Market by Region

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>408</td>
<td>494</td>
<td>921.1</td>
<td>13.3</td>
</tr>
<tr>
<td>Europe</td>
<td>288</td>
<td>425</td>
<td>970</td>
<td>17.9</td>
</tr>
<tr>
<td>Latin America</td>
<td>192</td>
<td>233.2</td>
<td>404.3</td>
<td>15.6</td>
</tr>
<tr>
<td>Asia</td>
<td>120</td>
<td>197.8</td>
<td>493</td>
<td>20</td>
</tr>
<tr>
<td>Rest of the world*</td>
<td>192</td>
<td>250</td>
<td>512</td>
<td>15.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,200</td>
<td>1,600</td>
<td>3,300.4</td>
<td>15.6</td>
</tr>
</tbody>
</table>

Source: BCC Research
Fewer New Chemicals – Higher Cost

- **Cost to Discover & Develop a Synthetic Chemical ($Mil)**
  - 1.2 (1956)
  - 4.1 (1964)
  - 20 (1969)
  - 45 (1977)
  - 85 (1984)
  - 105 (1998)
  - 185 (2000)
  - 256 (2007)

  *(Source: CropLife)*

- **# of Chemicals Screened to Find One Product (‘000)**
  - 1990: 10
  - 1995: 30
  - 2000: 200
  - 2009: 150

- **# of New Chemical Leads vs. Product Launches**

  *(Source: Ag Chem New Compound Review (Vol 28) 2010)*
Biopesticides: A Growing Industry

✧ The global market for biopesticide was valued at $1.3 billion in 2011 and is expected to reach $3.2 billion by 2017, growing at a CAGR of 15.8% from 2012 to 2017.

✧ North America dominated the global biopesticide market, accounting for around 40% of the global biopesticide demand in 2011.
What’s really driving that growth?

- Product development – products that are comparable in performance with chemical pesticides
- Applied research and on-farm demonstrations
- Refinement of applications and understanding of the mode of action and how best how to use biologicals in pest management and crop production programs
- Dedicated and well funded companies and individuals with a strong drive to succeed.
Big Companies Jump Into Ag Biologicals (2012-2013)

- Bayer CropScience
  - $425+ million

- BASF
  - $1 billion

- Syngenta
  - $523 million
  - Acquires Multiple RNAi Providers
  - $300 million

- Novozymes
  - $123 million
  - ... becomes exclusive distributor of Polyversum biofungicide

- Gowan
  - Acquires Multiple RNAi Providers
  - + $300 million into Novozymes

- Natural Industries

Syngenta, Novozymes Ink Deal To Commercialize Taegro

American Vanguard Corporation

TyraTech
The Shift to Bio-based Pest Management

Chemically Intensive

“Sustainable”
Biopesticides + Chemicals + IPM
(*bio-based products as base of the program*)

Organic

TIME

CROP PROTECTION METHOD
Biopesticide: Perspectives on Testing and Demonstration

Some myths related to successful testing and demonstration of biopesticides.

✧ They have to fit the conventional practices or systems the grower currently uses for pest control/suppression. This includes time of day, spray equipment, tank mixing, etc…

✧ They are meant for organic systems, so that’s where we test them.

✧ They are a good idea – for the future, “That’s the way we see crop production going, but not for now.”
Biopesticide: Perspectives on Testing and Demonstration

We must overcome these myths – with a change in our own mindset.

✧ Growers I have met will innovate as necessary to make a product work.

Yes, they will spray late in the day

Yes, they will modify the systems/equipment they own
Biopesticide: Perspectives on Testing and Demonstration

We must overcome these myths – with a change in our own mindset.

✧ Growers I have met will innovate as necessary to make a product work.

Yes, they are willing to alternate between chemical and biological approaches

Yes, they will choose biological control over chemical for all the reasons stated earlier in this discussion
Biopesticide: Perspectives on Testing and Demonstration

The “Oh, by-the-way” effect.

✧ Research and demonstration studies of chemical control products are extensive.

✧ Extension bulletins or other publications (print and electronic) will suggest all the applicable control measures whether for weed control, disease control or insect control.

✧ Biological control methods often appear in these publications as “oh, by the way” or alternatives to the implied “best” control methods or chemistries.
Biopesticide: Perspectives on Testing and Demonstration

Suggestions for proper testing and demonstration.

✧ Read and **follow** the product label and company suggested protocol.

✧ Explore with the growers what adaptations they are willing to make to their practices to utilize biological control/biopesticides.

✧ Biopesticides are now “mainstream”, avoid the “Oh, by-the-way” approach in extension publications. Comparisons are fair game, of course.

✧ Biopesticide companies do not have the resources, necessarily that some of the larger ag-chem companies spend on studies. Help the growers and you help the end consumer.
Biopesticide: Perspectives on Testing and Demonstration

Suggestions for proper testing and demonstration.

 الإسلامي case study – weed control with a mycoherbicide
Questions?
For more information, contact:
Bill Stoneman
Executive Director
(202) 536-4602
bstoneman@biopesticideindustryalliance.org
http://biopesticideindustryalliance.org