



# Biopesticides: industry perspective.

The way forward for biopesticides

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# Why Biopesticides?

- Increased food production will be needed to feed an ever increasing population.
- However, this must be done in the face of changing consumer demands.
- Crop protection methods must sustain the environment, preserve natural resources and support economies built on growing.
- Crop protection is costly, “it does not make sense to spend money on unnecessary treatments”





# Why Biopesticides?

- It is nonsensical to assume we can “go back to nature”
- The NFU Commissioned “Anderson report” reported restrictions on pesticides could lead to a 36% drop in UK farming profits...
- A drop in UK growing will lead to the UK outsourcing its environmental foot print.
- The pace of non-renewals is creating significant gaps in the crop protection toolkit.



## Background to increased IPM adoption

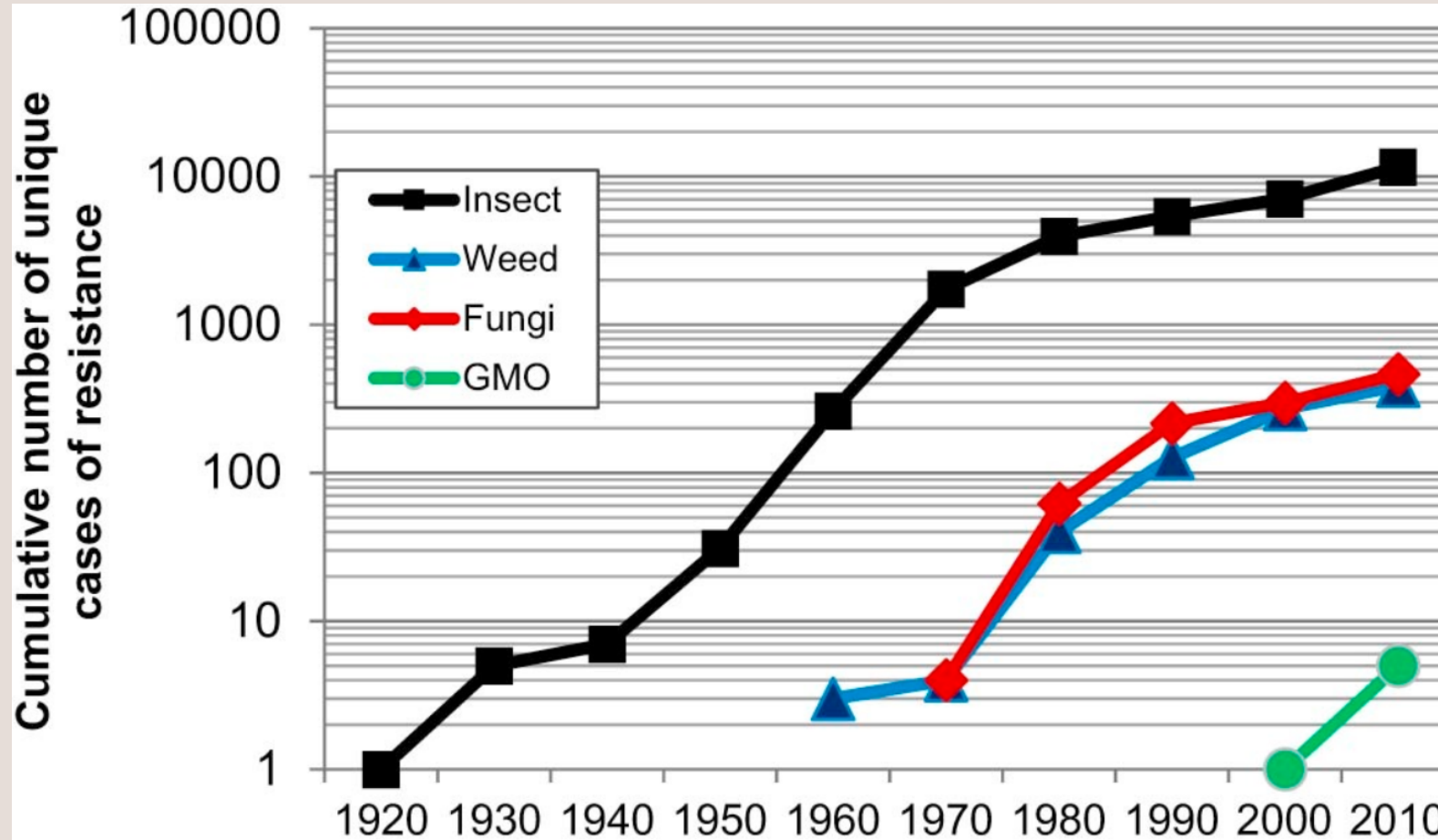
- ❖ Loss of synthetic chemistry
- ❖ Resistance to synthetic chemistry
- ❖ Legislation and societal pressure: e.g. SUD, Neonicotinoid restrictions, etc.
- ❖ Increased investment in development of alternative tech: biopesticides

Loss of Options:

Products with label  
restrictions or lost  
completely



# Increasing issues with resistance...





Page 11 of about 21,200 results (0.15 seconds)

Is an insecticide that harms **bees** bad for deer?

Minnesota Public Radio News - 19 Mar 2019

A popular, commonly used insecticide might be affecting the health of white-tailed deer, according to a new study. **Neonicotinoids** are widely ...**Bees** and other pollinating insects disappear from quarter of ...

The Independent - 26 Mar 2019

Around a third of **bee** and hoverfly species across the country have ..... restrictions on **neonicotinoids** to protect **bees** and other pollinators.Widespread losses of pollinating insects revealed across Britain  
In-Depth - The Guardian - 26 Mar 2019[View all](#)EU to ban Bayer's pesticide linked to harming **bees**

Euronews - 22 Oct 2019

EU to ban Bayer's pesticide linked to harming **bees** ... The EU prohibited the use of three so-called **neonicotinoids** everywhere except ...Scientists hail European ban on **bee**-harming pesticides

Nature.com - 29 Apr 2018

The European Union has voted to ban three **neonicotinoids** after scientific evidence showed their risk to **bees**.Some **neonicotinoid** pesticides are more toxic to **bees** than ...

EurekAlert (press release) - 22 Mar 2018

You've probably heard that the safety of **neonicotinoid** pesticides to **bees** is a matter of considerable controversy. However, **neonicotinoids** ...What does Brexit mean for British **bees**? It's complicated, honey

Wired.co.uk - 6 Mar 2018

Confirming the findings of numerous scientists, the EFSA concluded that: "most uses of **neonicotinoid** pesticides represent a risk to wild **bees** ...

Page 3 of about 72,100 results (0.19 seconds)

Couple awarded \$2 billion after claiming Roundup weed killer ...

Stock Daily Dish - 20 hours ago

The verdict is for **Monsanto**, Roundup's parent company, which ... its active ingredient, **glyphosate**, as the underlying cause of the cancer.**Monsanto** must pay couple \$2bn in largest verdict yet over ...

The Guardian - 13 May 2019

A California jury has ordered **Monsanto** to pay more than \$2bn to a ... defending the safety of **glyphosate**, the main ingredient in Roundup.

US jury awards \$2bn damages in Roundup weedkiller cancer ...

International - BBC News - 13 May 2019

[View all](#)

Pharmaceutical giant hit with multiple lawsuits claiming ...

The Lawyer's Daily - 2 Dec 2019

The main active ingredient in Roundup is **glyphosate**, a chemical ... class actions against Bayer and **Monsanto**, with Merchant Law Group also ...Safe Or Scary? The Shifting Reputation Of **Glyphosate**, AKA ...

NPR - 30 May 2019

It was a farming revolution built on **glyphosate**. **Monsanto** quickly became the world's biggest seed company. And farmers started spraying a lot ...

Lemon Grove to limit use of weed-killing chemicals in city parks

The San Diego Union-Tribune - 2 Dec 2019

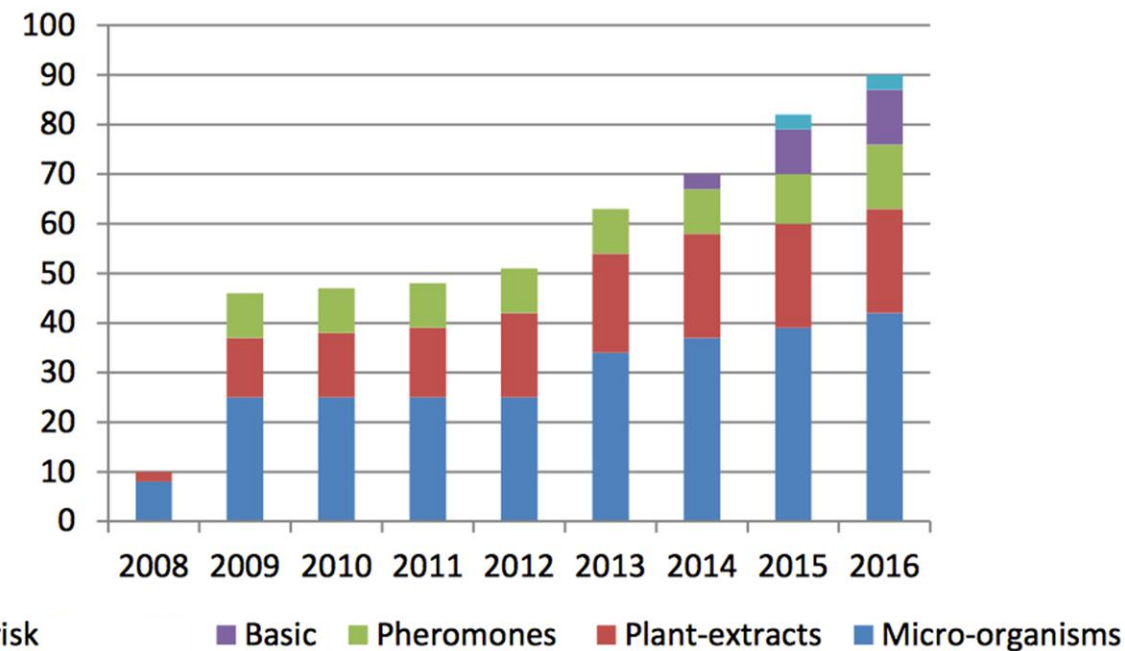
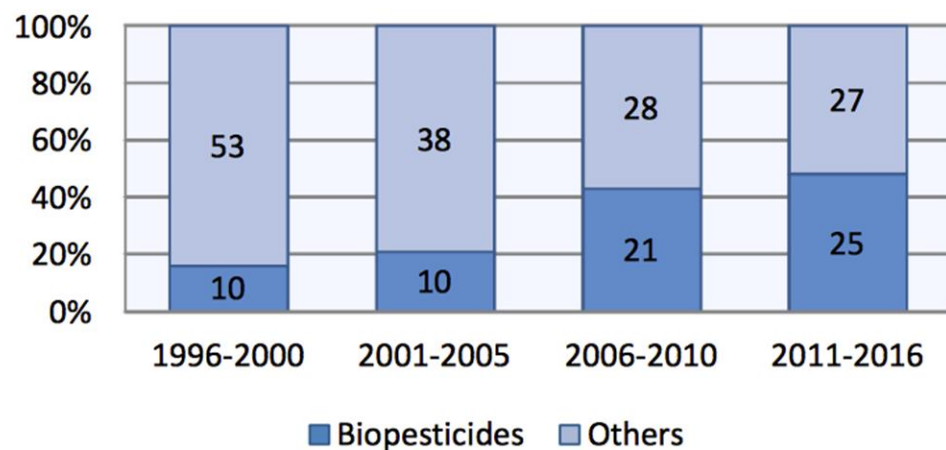
Developed by the **Monsanto** company in the mid-1970s, **glyphosate** is common in home and commercial weed killers. The chemical has been ...The EPA says a chemical in **Monsanto's** weed-killer doesn't ...

Business Insider Nordic - 1 Jun 2019

The weed-killing chemical **glyphosate**, which **Monsanto** uses in its Roundup herbicide, has been getting increased attention for its potential link ...

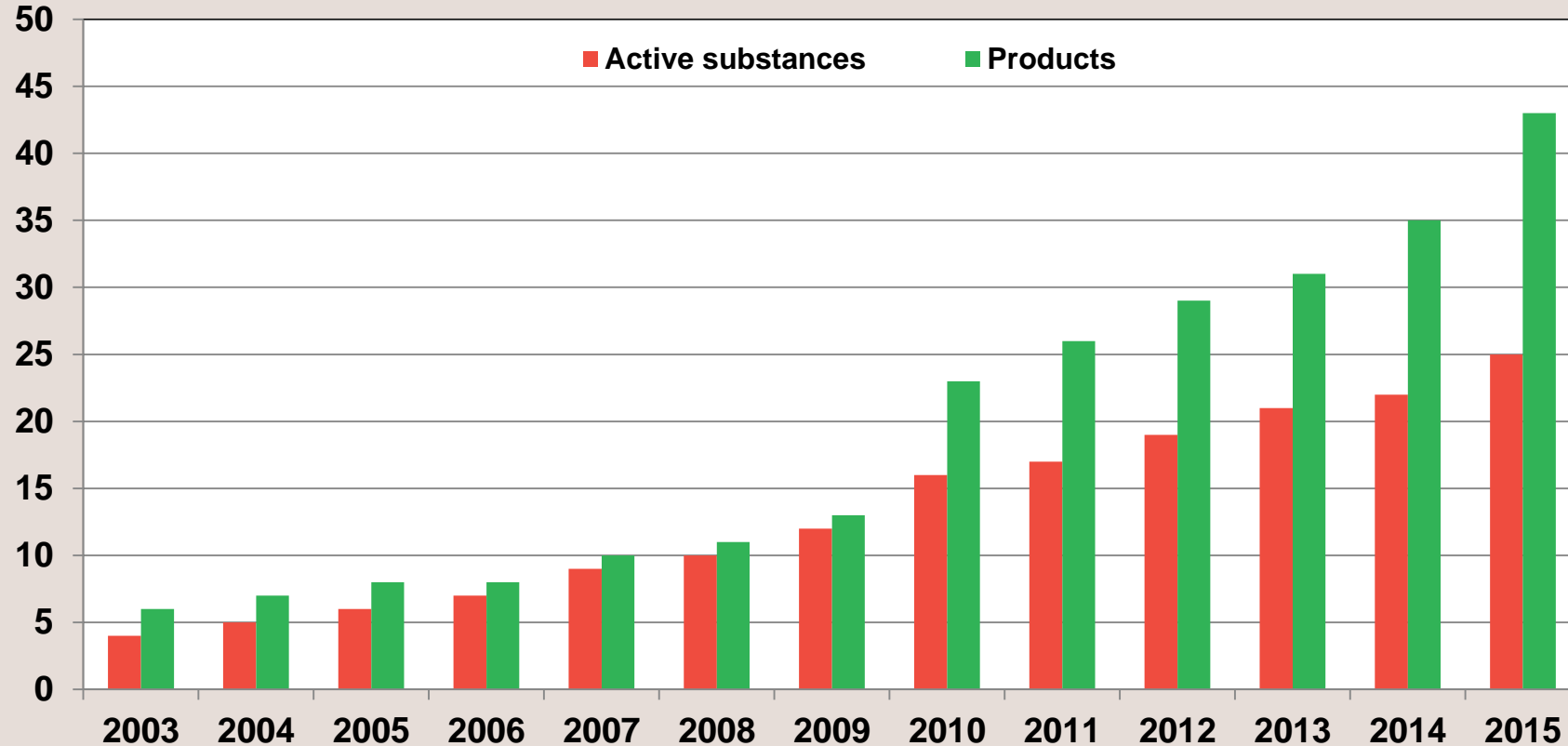
# Biopesticide Approvals in EU

## Applications for new active substances since 1996



Data from EU Commission

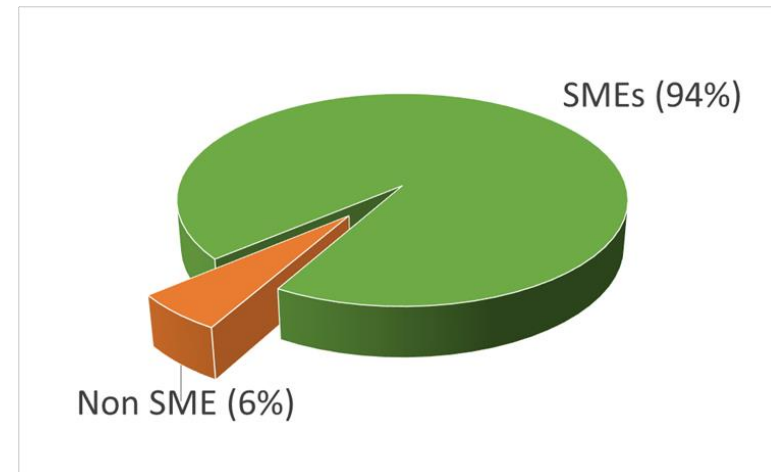
# Cumulative numbers of active substances and products approved as Biopesticides in UK (2003-2015)



# Introduction to IBMA

- IBMA (International Biocontrol Manufacturers Association) is the trade association representing manufacturers of biological products

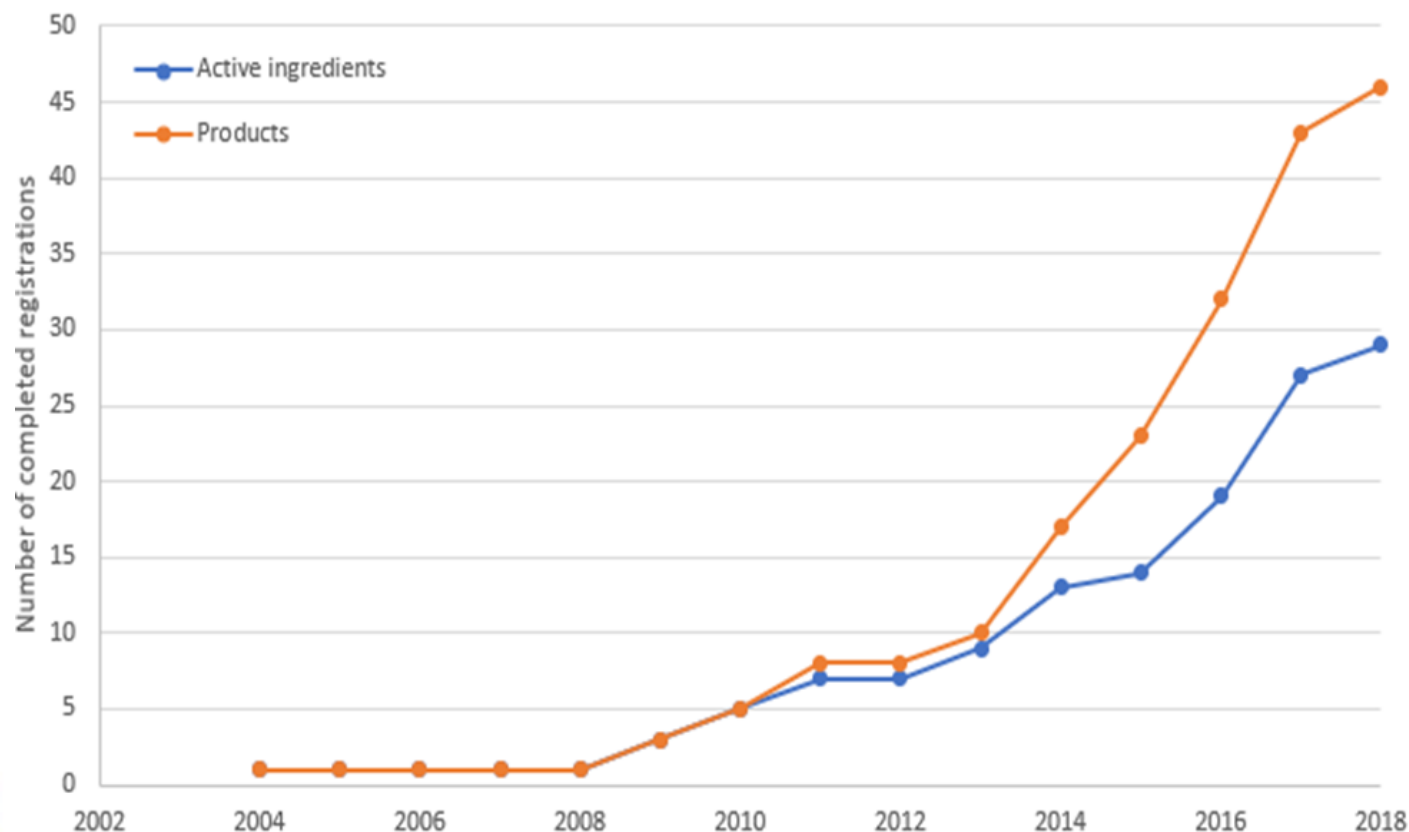
- An industry dominated by SMEs



Source:  
IBMA UK  
members  
data 2018

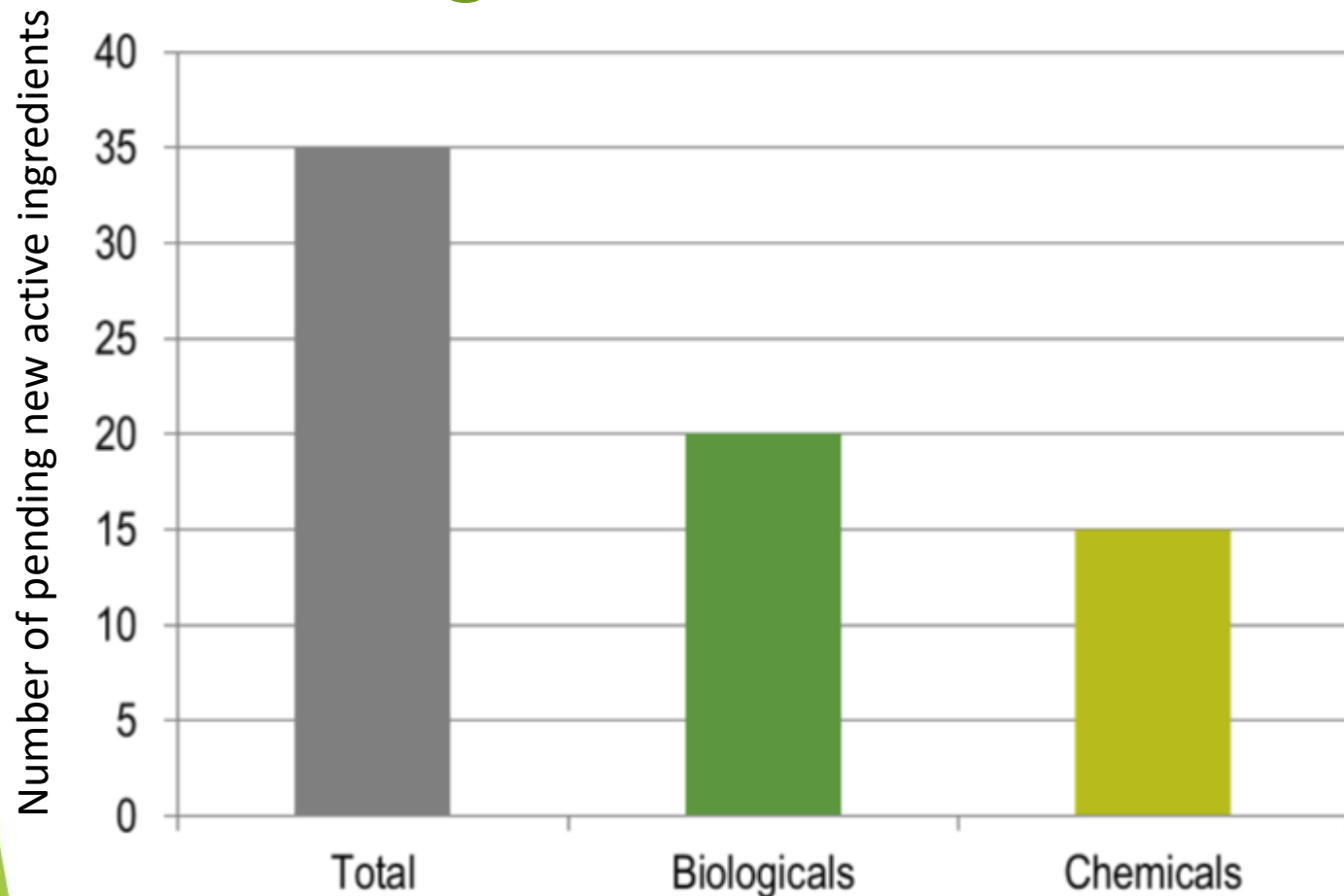
- Historically biocontrol was for organics, then high value protected horticulture but increasingly all areas of horticultural and agricultural production

# EU regulation: The Past



- All biological control products have to be registered for use in UK
  - EU 1007/2009 or
  - Wildlife and Countryside Act
- Growth in number of biological control products (excl. macro-biologicals) approved for use in UK
- Will this trend continue?...

# EU regulation: The Future



- Since 2016, there have been more new biological control active ingredients under review by Europe than synthetic chemistry

# Biopesticides and Biocontrols



## Microbials

Viruses, Bacteria  
& Fungal  
pathogens



## Macrobials

Predatory mites,  
Insects &  
Nematodes



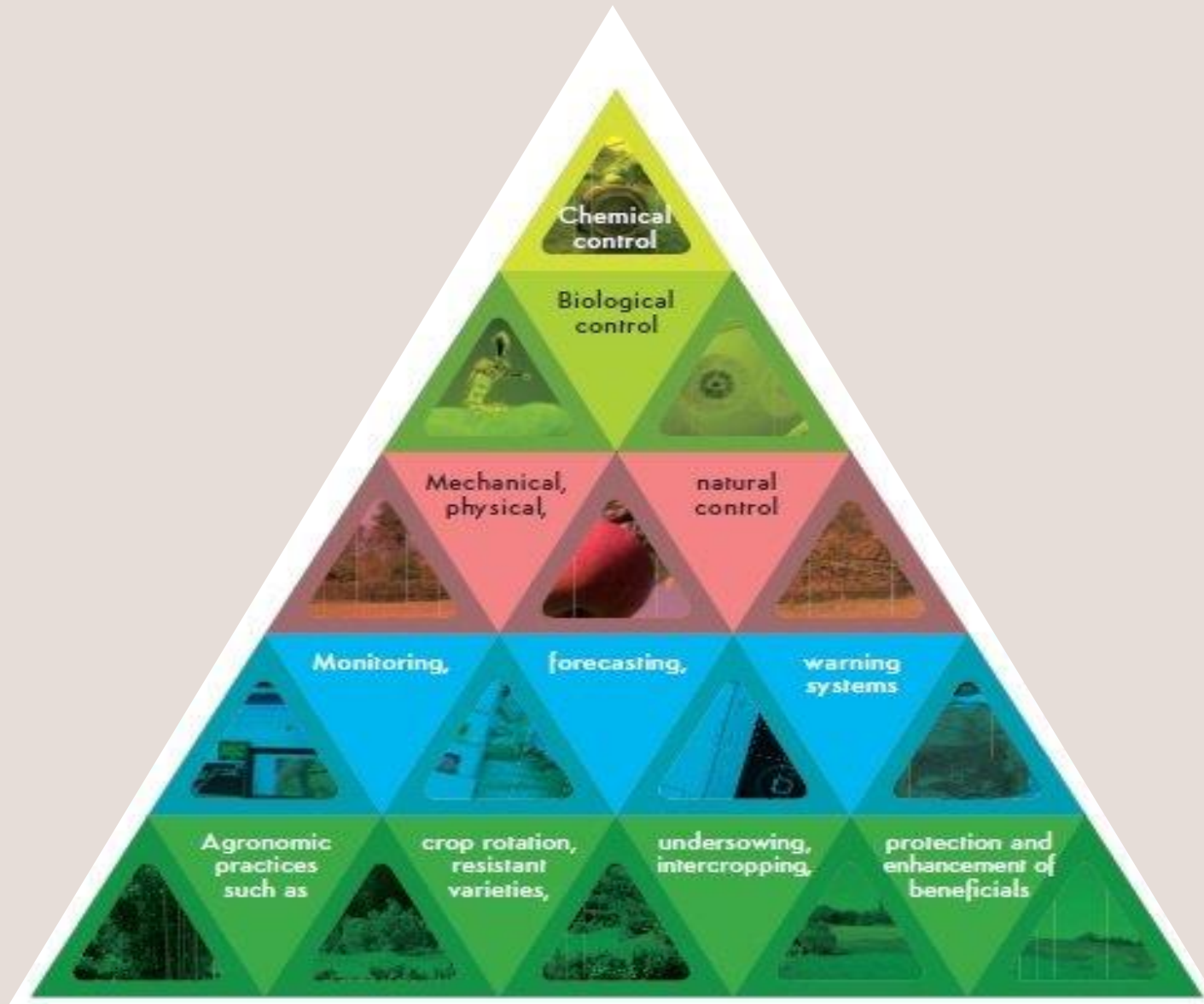
## Semiochemicals

Pheromones &  
Plant volatiles



## Natural Products

Plant extracts,  
Seaweed  
products & Basic  
substances



## Barriers to IPM adoption?

- ❖ Efficacy
- ❖ Predictability
- ❖ Complexity



# Application is a key to success

- ❖ Where is the target?
  - ❖ Spray volume / concentration
  - ❖ Nozzle (type, size, angle)
  - ❖ Water pressure
  - ❖ In-line filters
  - ❖ Water treatments – avoid chlorine or residual disinfectants
- ❖ For granular material in growing media ensure thorough mixing
- ❖ Ensure application equipment is clean and free from residues
- ❖ Is a tank mix appropriate?
- ❖ Frequency of application



# Application is the key to success

## Environmental conditions

Check the label & guidelines

Temperature

Humidity

Time of day – UV sensitivity (many micro-organisms)

Is an adjuvant recommended (or to be avoided?)



# What are the key advantages

- ❖ Sustainable sources
- ❖ Compatible within IPM programmes
- ❖ Reduce risk of resistance
- ❖ No harvest intervals
- ❖ No residues



# NEMGUARD®

- ❖ Polysulphides from Garlic
- ❖ Control of free living and root knot nematodes
- ❖ Carrots and parsnips
- ❖ Slow release granule delivers control over 4-6 weeks

# Met52 OD

- ❖ Liquid formulation
- ❖ Foliar pest control
- ❖ Usable in a variety of protected edibles, ornamentals and outdoor alliums
- ❖ Available 2020

# Other new products

## Isonet<sup>®</sup> T

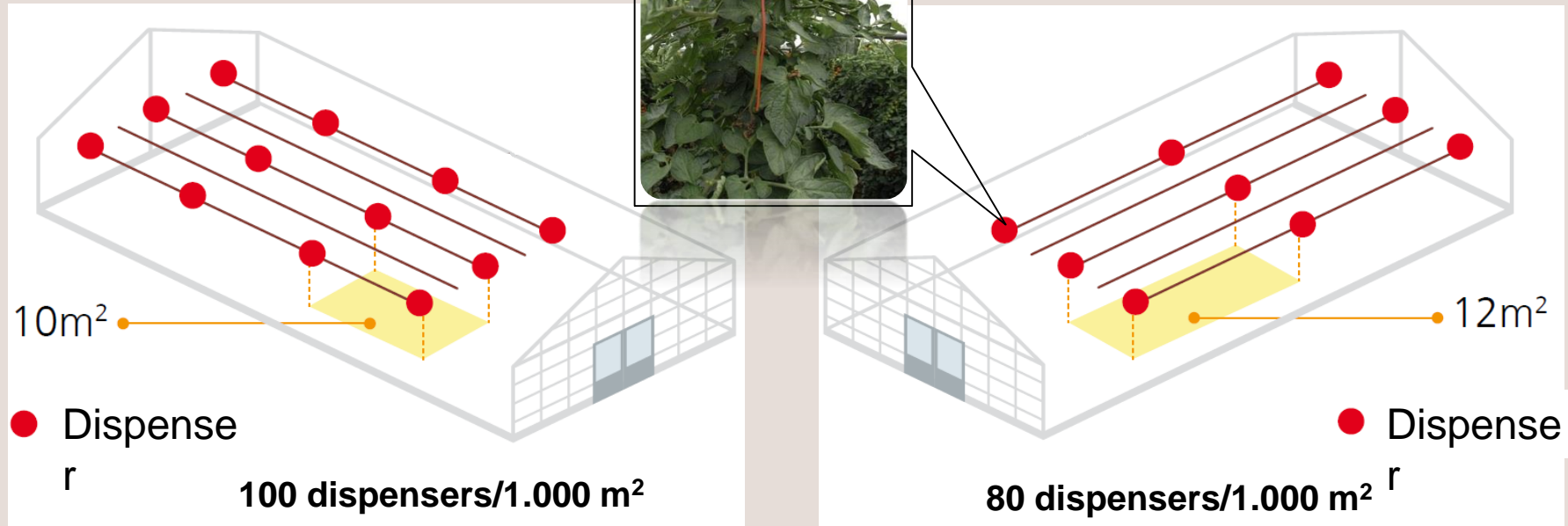
- ❖ Tuta absoluta mating disruption
- ❖ Fully registered PPP
- ❖ Polymer capillary tube



The pheromone molecules evaporate from the outer dispenser surface after permeating through the tube walls.

# Other new products

## Isonet<sup>®</sup> T



110-120 days activity in spring/summer

150-160 days activity in autumn/winter

# In the future

## Botanicals



- \* Orange oil product
- \* Insecticidal activity
- \* Damages bacterial and fungal cell wall membranes
- \* Approved elsewhere in

Europe



- \* Extract of Giant Knotweed
- \* Induced systemic resistance
- \* Available in US since 2008

# In the future



- \* Spear range of biopesticides
- \* Based on tech developed at University of Connecticut
- \* Broad spectrum insecticidal activity
- \* Peptides from spider venom
- \* Safe to non-targets and the environment
- \* Already approved in the US
- \* This technology demonstrates that we are just scratching the surface of what is possible

# Pathways and potholes

- The best pathway to commercialisation is unclear for R&D companies.
- Furthermore broad uptake of said product is also unclear.
- Marketing/distribution companies not fully accustomed to working with biologically based products often will not have a sufficient depth of knowledge.

\* Pathways and potholes for commercialisation of new biological technologies, Dr Megan Quinlan (Imperial College London UK)



# Legislation

- Environmental safety constitutes one of the most significant aspects of the registration packages.
- Data requirements addressed by guidelines published by the OECD & IOBC/WPRS.
- No equivalent guidelines exist for testing of microbial pesticides.
- Differences in chemical and microbial modes of action often make the methodology unsuitable.



# Three keys issues –

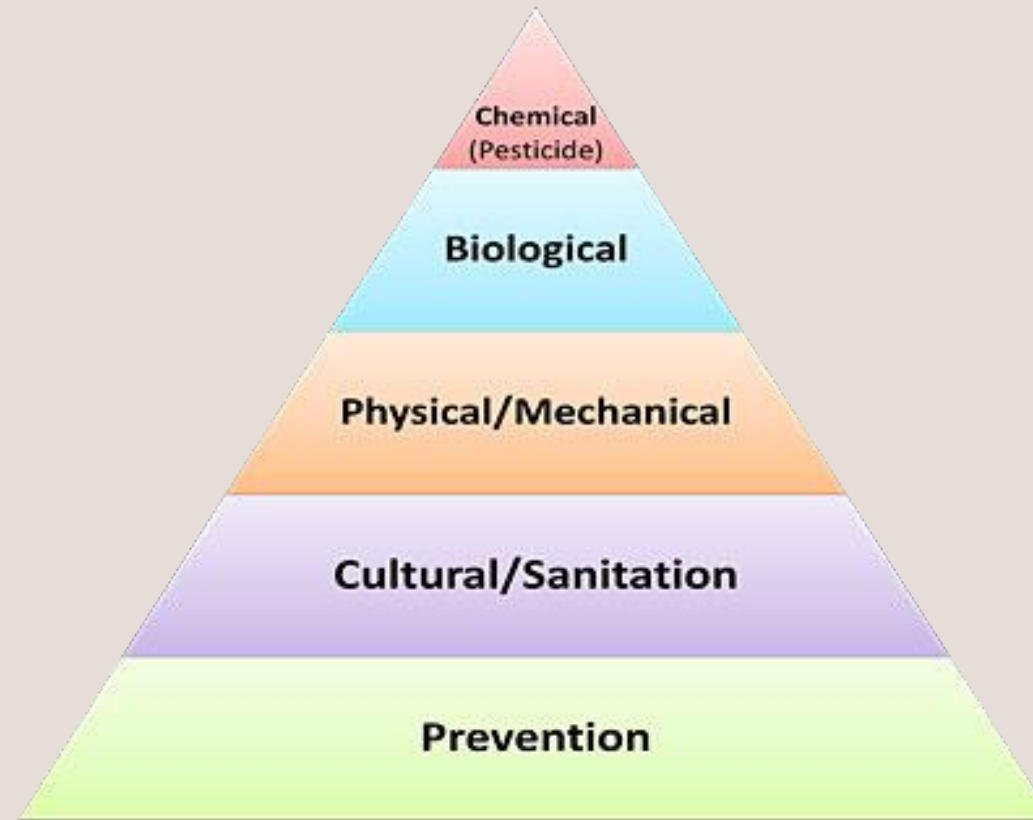
- Lack of clarity in the guidelines leads to a lack of consistency across laboratories.
- OCSP requirement the pesticides need to be tested at 10 -100 times the max application leads to data that is of little value.
- Thirdly some of the test organisms may give a false sense of environmental safety



# Biopesticides coming of age

- ❖ Availability and adoption of biopesticides in the UK is increasing
- ❖ Growers and advisors are becoming more confident and more successful
- ❖ We will see an increase in resistance elicitors and plant extracts
- ❖ Novel technologies will move the goalposts far beyond what we can currently imagine

# Robust Dynamic IPM programming



# Thank you

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Continue the conversation



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