



# Mind The Gap

Managing pests with a decreasing choice of chemical options

5 December 2024

**Kindly Supported By:** 



















- Changing climate, new pests and new pest/crop interactions
- Loss of active ingredients and more regulation governing use of products
- Developing integrated systems

- Changing climate
- Requirement for increased sentinel monitoring, changing pests and beneficials, new pest/crop interactions
- Loss of active ingredients and more regulation governing use of products
- Developing integrated systems

## **Gaps for changing climate**

- Climate change will favour some insects and inhibit others, while impacting distribution, diversity, abundance, development, growth and phenology.
- Increased northward geographic distribution; increased overwintering survival rate and ability to develop more generations.
- Increase in the number of pest outbreaks involving a broader range of insect pests.
- More insect-transmitted plant diseases
- Invasive pest species likely to establish more readily in new areas
- Reduced effectiveness of biological control agent and loss of natural enemies.

## PEST MANAGEMENT IN CHANGING CLIMATE

Mitigation and adaptation strategies



## **MONITORING**

- pest population dynamics
- global information system for invasive species
- assesments of pest risk



## MODIFIED IPM PRACTICES

- · lower treatment tresholds
- · biodiversity conservation
- improvement of semiochemicals formulations



## MODEL DEVELOPMENT

- prediction of insect infestation
- ecological niche models

The Impact of Climate Change on Agricultural Insect Pests; Skendžić S. et al. (2021)

https://doi.org/10.3390/insects12050440

- Changing climate
- Loss of active ingredients and more regulation governing use of products
- Reducing PPP impacts and improving PPP efficiency or substituting it with other methods, including biological control, improving curative approaches
- Developing integrated systems

## Gaps for PPP, including biocontrol

#### MAJOR KNOWN TARGETS FOR INSECTICIDAL ACTIVITY



# Molecules disrupting insect's nervous system

- Organochlorines
- Pyrethroids
- Formamidines
- Organophosphates
- Carbamates
- Spinosyns
- Neonicotinoids
- Botanical preparations

#### Metabolic targets

- Organosulphur compounds
- Dinitrophenols
- Organotins
- Pyraziles
- Pyridazinones
- Fumigants
- Botanical preparations
- Inorganic compounds

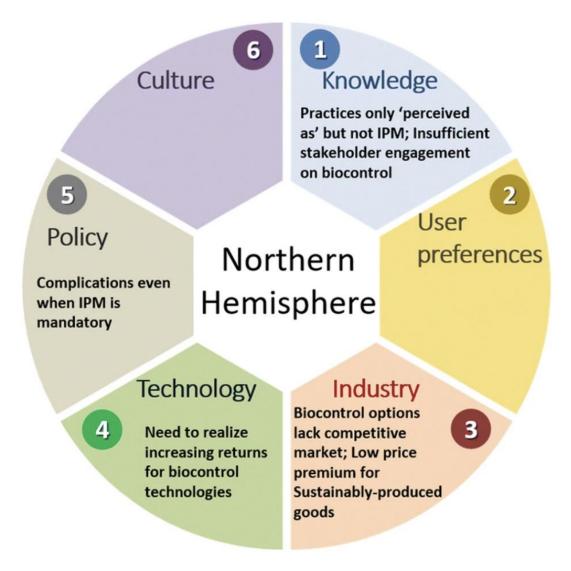
## Growth regulators and others

- Bensoylureas
- Piperonyl butoxide
- MGK-264
- Quinazolines

- Insecticides have impacts on target and non-target insects.
- An inexorable decline in the number of active substances has occurred since 2018, despite numerous biocontrol agents being approved
- Increase in observed resistant populations
- Efficacy and formulation approaches
- Plant protection mechanisms as breeding targets

- Changing climate
- Loss of active ingredients and more regulation governing use of products
- Developing integrated systems
- Implementation of approaches that work with functional biodiversity to enhance ecological function and the ecosystem services in practice with appropriate agricultural practices and active design of agroecological farming systems; combining soil and ecosystem biodiversity, cropping system design, varietal resistance/tolerance, phytosanitary control, cultural control with curative measures as a last resort.

## **Gaps for Integrated Systems**



Integrated pest management: good intentions, hard realities. A review; Deguine, JP., Aubertot, JN., Flor, R.J. et al. (2021). https://doi.org/10.1007/s13593-021-00689-w Limited knowledge on IPM, ecological illiteracy, Insufficient technical support, Farmers not empowered to make decisions Limited research, lack of inter-disciplinary research

2 IPM considered inflexible, difficult to implement, refuse to change habits
IPM seen as complex, has risks and uncertain benefits
Difficulty with or lack or economic thresholds
Attitudes towards pest, pest management, social barriers

Conflicts of interest, information from pesticide network
Pesticide industry paradigms, interference
Increasing returns for pesticides but barriers for
alternative options

Immature IPM options, need to adapt IPM to local conditions

Transgenic crops difficult to access, limited effect on reducing pesticide use

Different meanings, connotations for IPM
Unintended effects of legislation, vested interests
undermine IPM policy
Risk-averse, unwieldy regulatory environment for
biocontrol

6 IPM requires coordination, collective processes Cultural routines in research (work in silos)

## BCPC Mind The Gap

10.00: Welcome - Elizabeth Stockdale, Head of Farming Systems Research, NIAB

10.15: Development of a UK Pesticide Load Indicator – Dr Marc Kennedy, Fera Science

10.40: **EU and UK on pesticide availability** – Dr Jonathan Blackman, Hutchinsons ------Coffee break------

#### 11.40: Perspectives on managing pests with reduced synthetic chemical options

- Paul Cobb, Farm Environment Adviser, FWAG South East
- Georgie Bray, Hope Farm, Cambridgeshire, RSPB
- John Cherry, Weston Park Farms, Hertfordshire
- Marion Regan, Hugh Lowe Farms Ltd, Kent

12.35: **Poster Session and Short Talks** by early career researchers and PhD students 

14.00: Bring stakeholders together – Dr Una Fitzpatrick, National Biodiversity Data Centre, Ireland.

14.25: **Ecological innovations** - Dr Felix Wackers, Biobest Group.

14.50: **Discussion & Review summary** – Chair. 15.20: Close



















## **Poster Presentations**

- Paul Allison, Newcastle University
- <u>Sam Apori</u>, Newcastle University
- <u>Laura Martinez-Chavez</u> Harper Adams University
- John Owen, Harper Adams University
- <u>Aimee Tonks</u>, Harper Adams University
- Nikoletta Foskolou, Harper Adams University





















# Thank you

















