

The Checkerboard Approach – Identifying synergies for physically acting bioinsecticides



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**Harper Adams
University**

Oilseed rape (*Brassica napus*) in the UK



Grown commercially for:

Oil-rich seeds → edible oil, biodiesel, and animal feed.

Agronomic benefits → break crop in cereal rotations.



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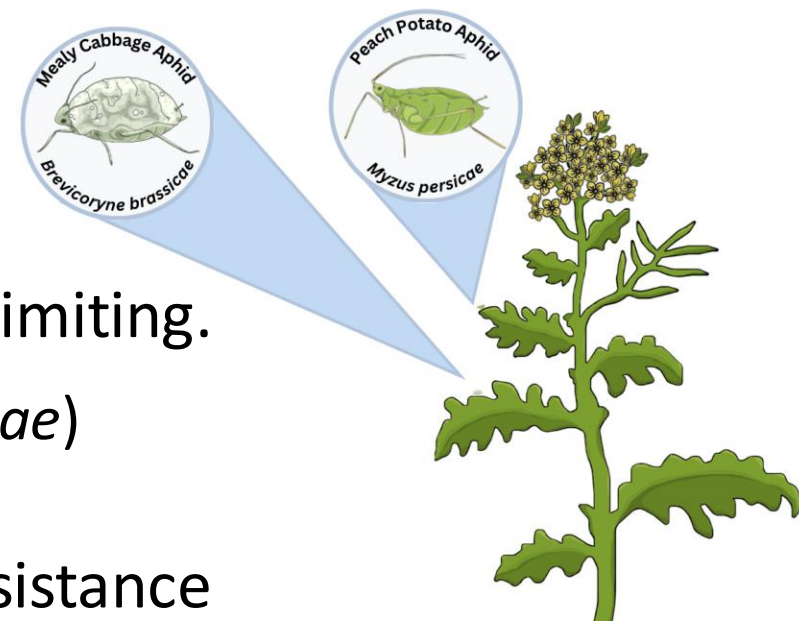
- ☑ Grown commercially for:
 - Oil-rich seeds → edible oil, biodiesel, and animal feed.
 - Agronomic benefits → break crop in cereal rotations.

- ☒ Annual market value of oilseed rape is volatile.

- ☒ Susceptible to numerous pests and diseases – yield limiting.

Peach Potato Aphid (*Myzus persicae*)

- ☒ Synthetic chemical controls → Withdrawals & resistance



Potential Solution - Bioinsecticides

- Mass produced agents originating from natural sources for the control of plant pests.¹



Naturally derived



Less susceptible to resistance



Perceived increased environmental & human safety



Compatible with IPM programmes

Example: protected horticulture

¹Chandler D., *et al.* (2011) The development, regulation and use of biopesticides for integrated pest management. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 366.

²Lowenberg-deboer J., Pope T.W., Roberts J.M. (2020) The Economic Feasibility of Autonomous Equipment for Biopesticide Application, In *INFER Symposium on Agri-Tech Economics for Sustainable Futures*.



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Expensive: £100 - £300 p/ha²



Perceived increased environmental & human safety



Poor residual effects



High water requirements: 1500 L/ha²



Compatible with IPM programmes

Example: protected horticulture



Environmental sensitivity



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Identifying Synergy

- Understanding interactions between concentration and repeat exposure:

- Potential to exploit synergies
- Improve efficacy of bioinsecticide products



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Adapt methods from pharmacology? → The Checkerboard Approach



Results

200

0.00

-0.11

-0.20

0.22

0.13

0.19

**What is the interaction between concentration
and repeat exposure?**

Stop by my poster to find out!



A special thanks to...

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For more information, please get in touch!

