

Safety of *Phasmarhabditis*
hermaphrodita

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Phasmarhabditis & Moraxella

- *P. hermaphrodita* can grow on many bacteria
- Slow kill of host slugs
- No rigid cuticle to maintain monoculture
- *Moraxella* cells alone do not kill slugs when injected fresh

Parwinder & Tan

- Axenic nematodes are very poor at everything
- 5 day old cultures are not introduced into slugs
- It is no surprise that endotoxin (LPS) is toxic

Conclusions

- There is no evidence whatsoever that *Moraxella* is naturally associated with *P. hermaphrodita*
- There is an urgent need to investigate which bacteria associate with *P. hermaphrodita* in nature

Phasmarhabditis hermaphrodita



The grey field slug
Deroceras reticulatum



Phasmarhabditis
hermaphrodita
(Nemaslug)

Nemaslug®

*Kills Slugs and
nothing else!*

Slug Killer



Treats up to 40 m² (100 sq yards)

Control for up to 6 weeks

Store in refrigerator

Nemaslug®

- Store in refrigerator and under cover
- Do not leave in direct sunlight
- Use before expiry date
- Read instructions before use

Concerns

- Most hedgerows contain a diverse range of snail species, many of which serve as food for vertebrate wildlife.
- Slug indicators of ancient woodland, e.g. *Limax cinereoniger*
- Earthworms ? (Zaborski *et al.*, 2001)

Snails

- Laboratory tests
- Field tests
- Both investigated common hedgerow species

Laboratory studies

- Seven common species of snails used
- Confined on soil with 1 or 5 x the recommended application rate of *P. hermaphrodita*
- Mortality assessed after 3 weeks

Oxychilus helveticus



Cepaea nemoralis



Cepaea hortensis

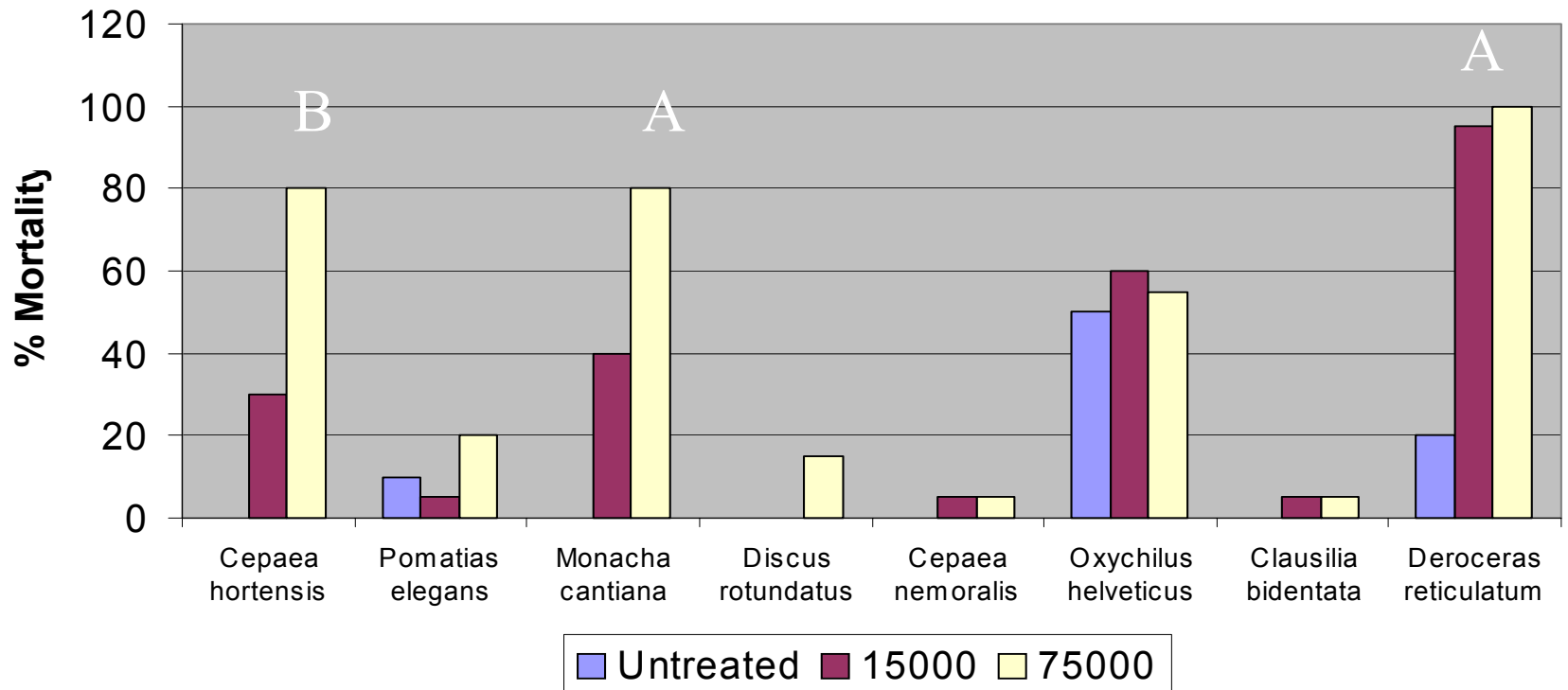


Discus rotundatus
Clausilia bidentata



Results

Fig. 3. Percent snail mortality in laboratory experiments. Snails were either untreated, treated with field dose, or five times the field dose.

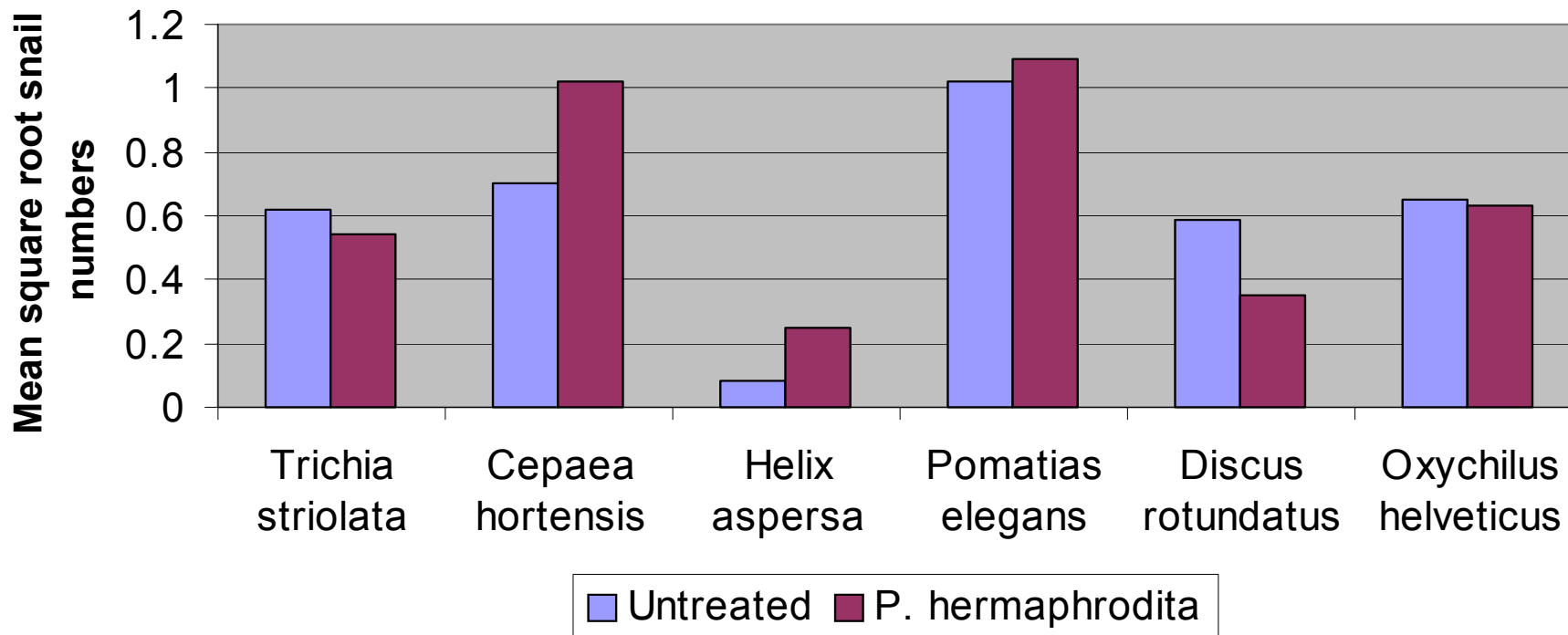


Field Experiment

- Two experiments done 1 Autumn sown rape, one Spring sown rape
- Untreated and Treated (standard rate) 12 x 12 m plots (six or nine replicates)
- Snails numbers assessed by timed search, 6 weeks after application

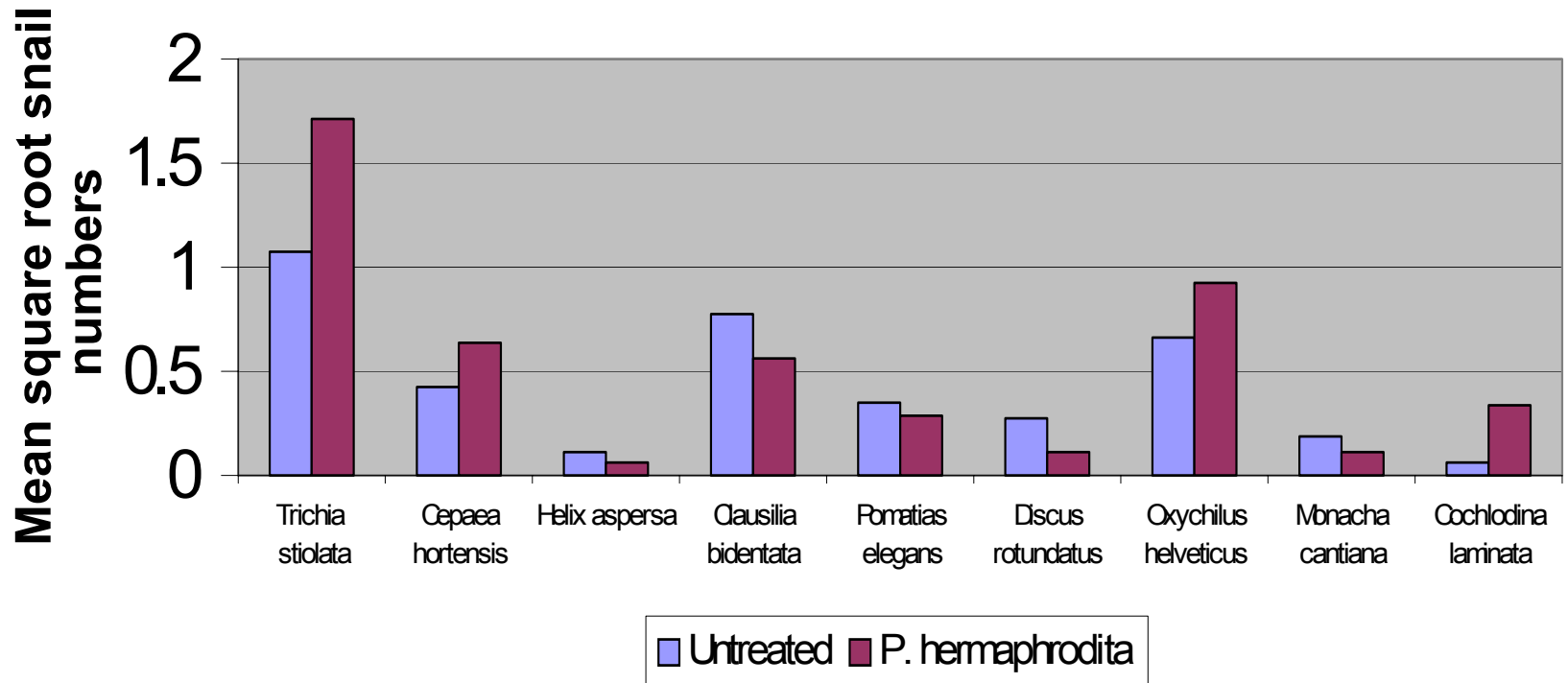
Spring Sown Experiment

Fig 1. Mean square root snail numbers found in the spring-sown rape field experiment



Autumn Sown Experiment

Fig 2. Mean square root snail numbers found in the autumn-sown rape field experiment



Earthworms

- Highly beneficial
- Zaborski *et al.*, had a “*Phamarhabditis*-like” nematode that killed earthworms
- Potentially very dangerous

But

- Wilson *et al.*, 1993 - *L. terrestris* not susceptible
- Grewal & Grewal 2002 *L. terrestris* not susceptible
- DeNardo *et al.*, 2003 – *Eisni foetida* not susceptible.

What other potential problems

- Insects ?
- Wilson *et al.*, 1993 found the beneficial beetle *Pterostichus melanarius* was not susceptible

Do we need to worry

- *P. hermaphrodita* lives in soil
- *P. hermaphrodita* is native to many European countries
- It is not particularly mobile