

# Evaluation of soil microfungi as biological control agents against ascarid eggs

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## Introduction

- Thick-shelled ascarid eggs may remain infective in the environment for several years, thus posing a prolonged risk of transmission to animals or humans
- Aim:** to evaluate if microfungi (*Pochonia chlamydosporia* and *Paecilomyces lilacinus*) could reduce the viability of *Ascaridia galli*, *Toxocara canis* and *Ascaris suum* eggs under laboratory conditions

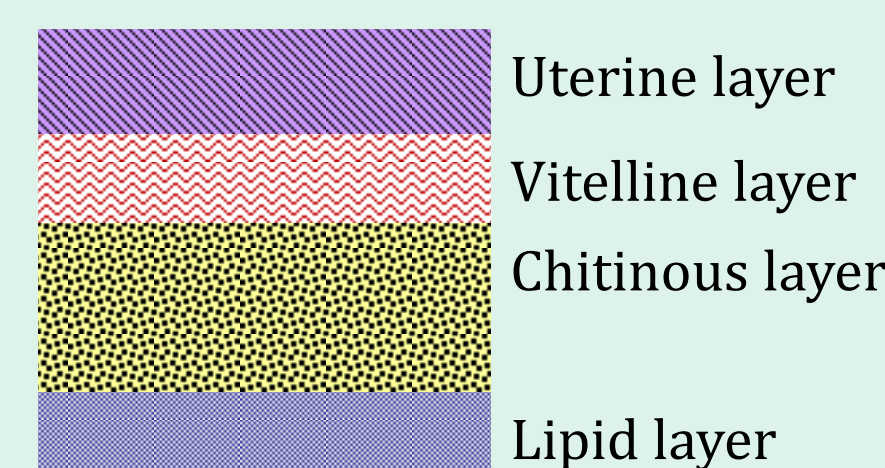
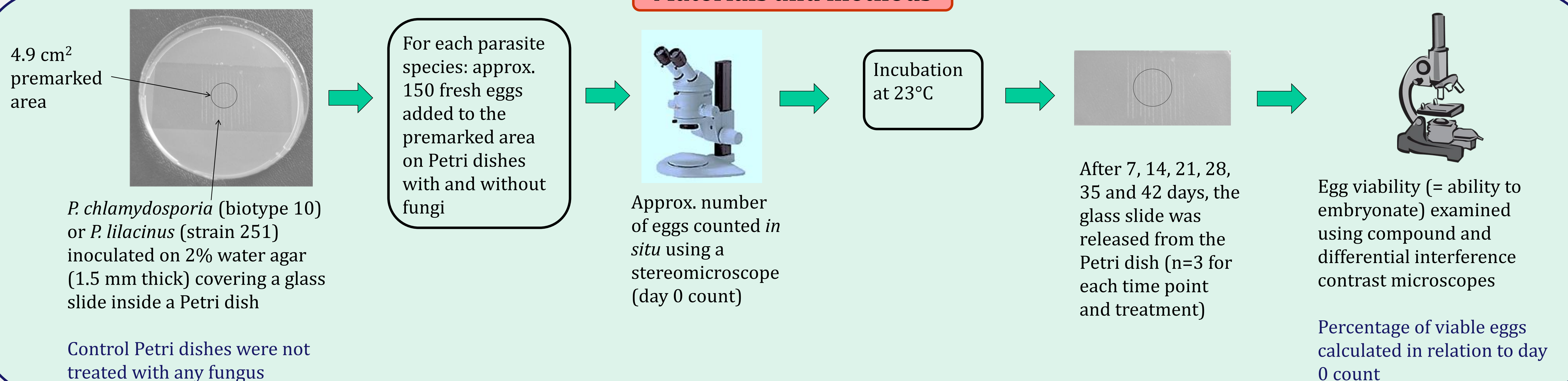


Fig. 1. Schematic diagram of ascarid egg shells.



Fig. 2. Embryonated ascarid eggs: A. *Ascaridia galli*, B. *Toxocara canis*, C. *Ascaris suum*.

## Materials and methods



## Results

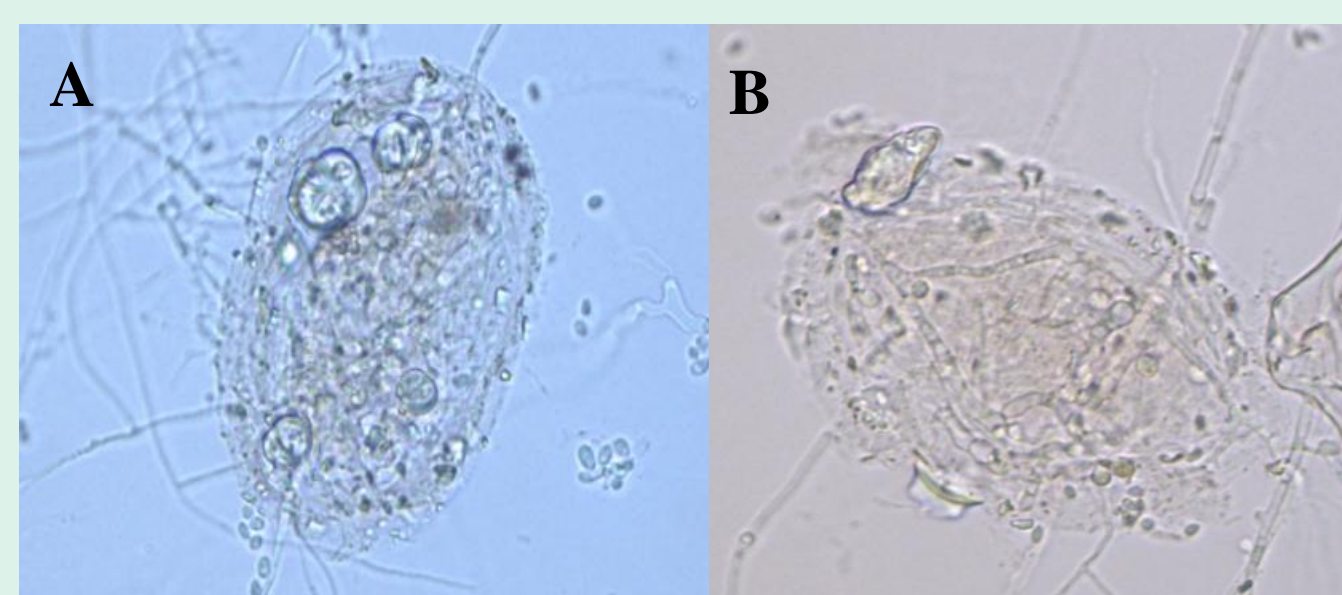
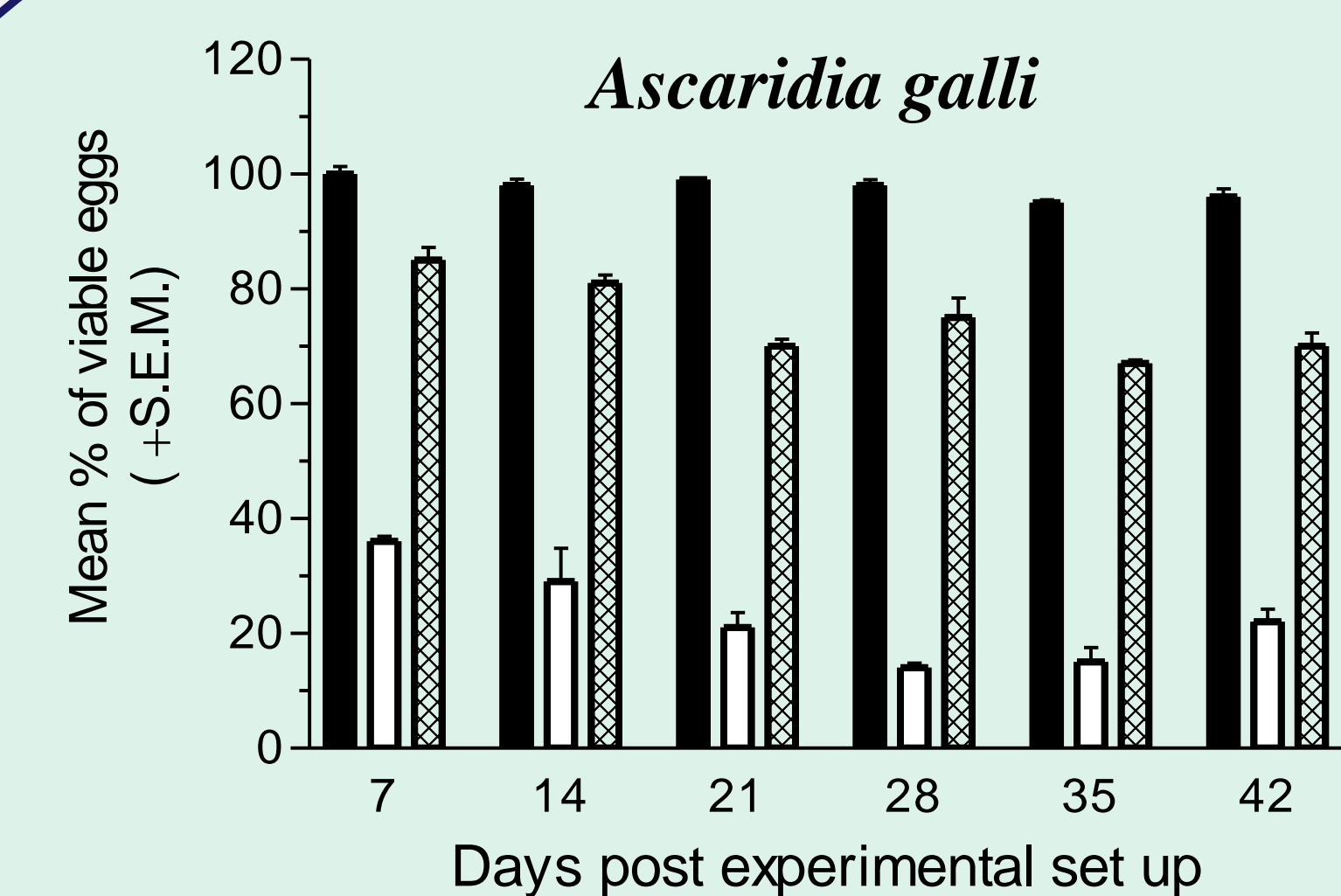


Fig. 4. *A. galli* eggs destroyed by *P. chlamydosporia* (A, B). Both shell and contents are degenerated.

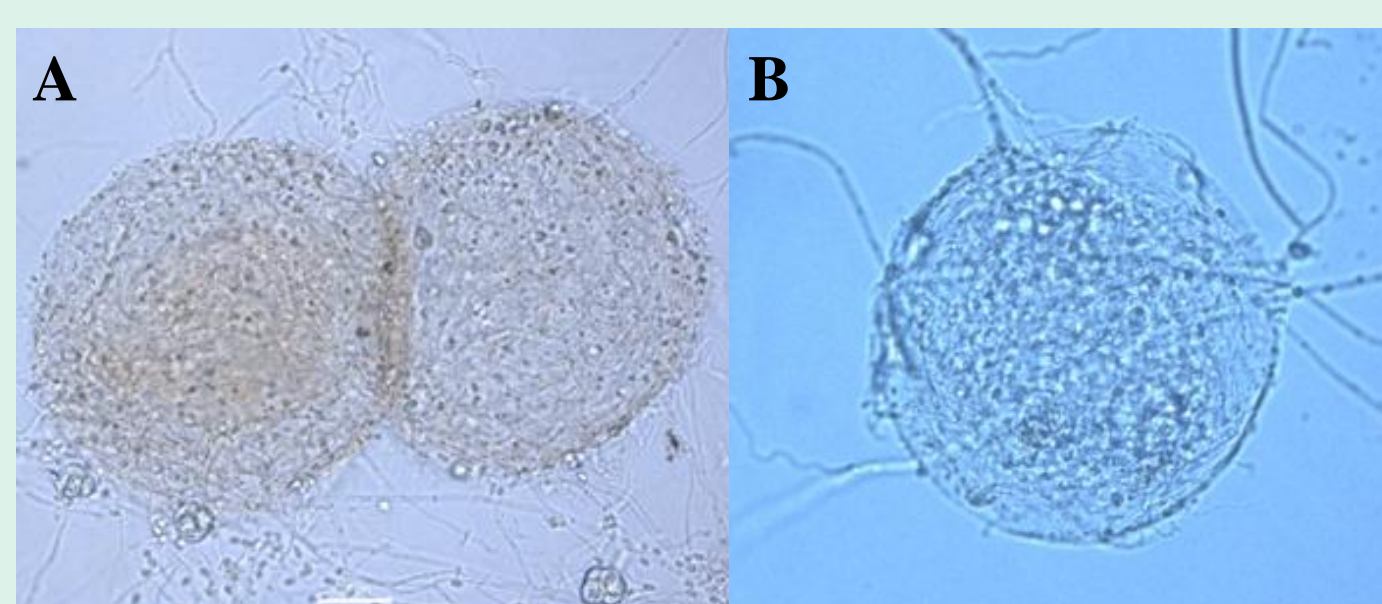
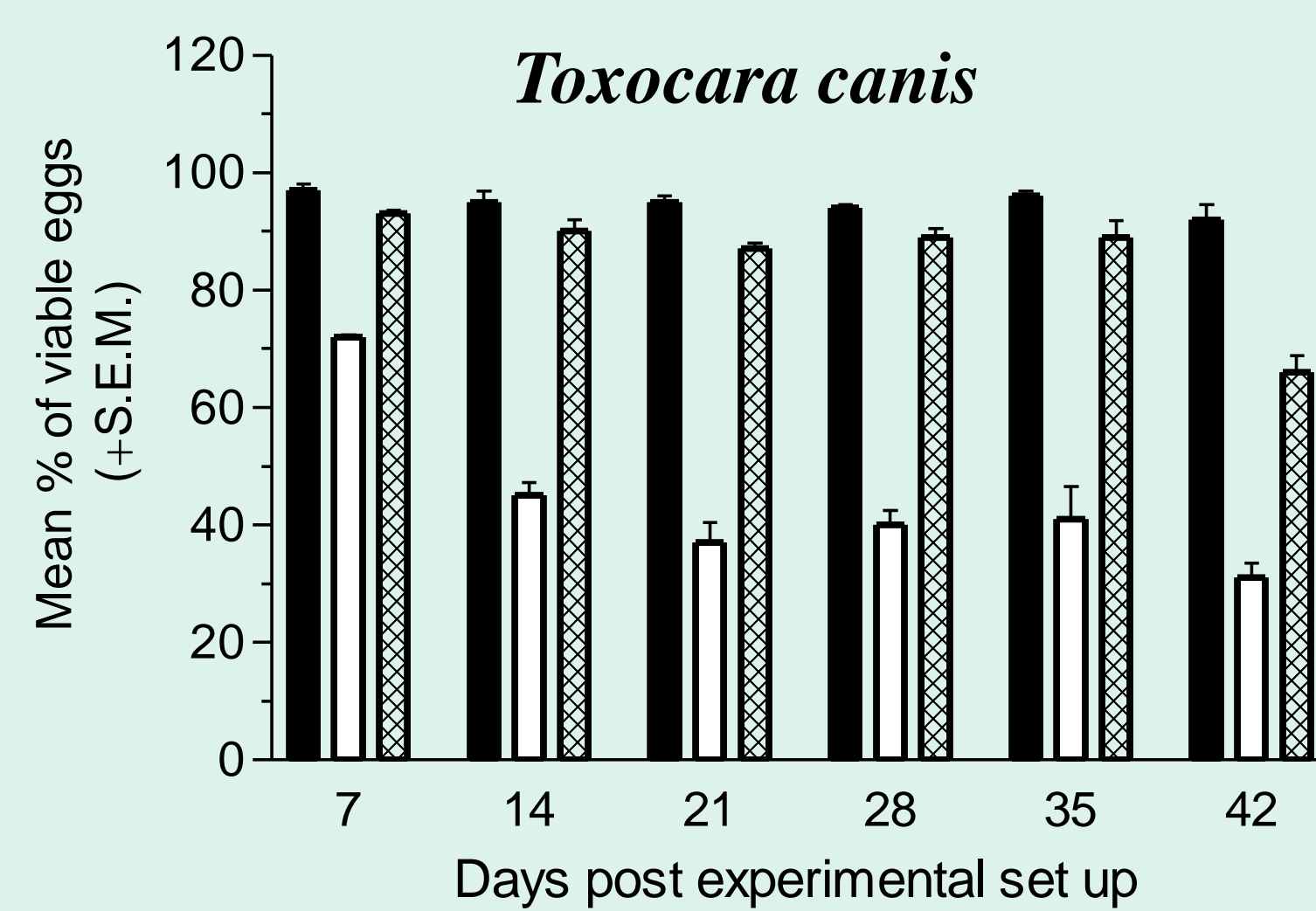


Fig. 5. *T. canis* eggs destroyed by *P. chlamydosporia* (A) and *P. lilacinus* (B). Both shell and contents are degenerated.

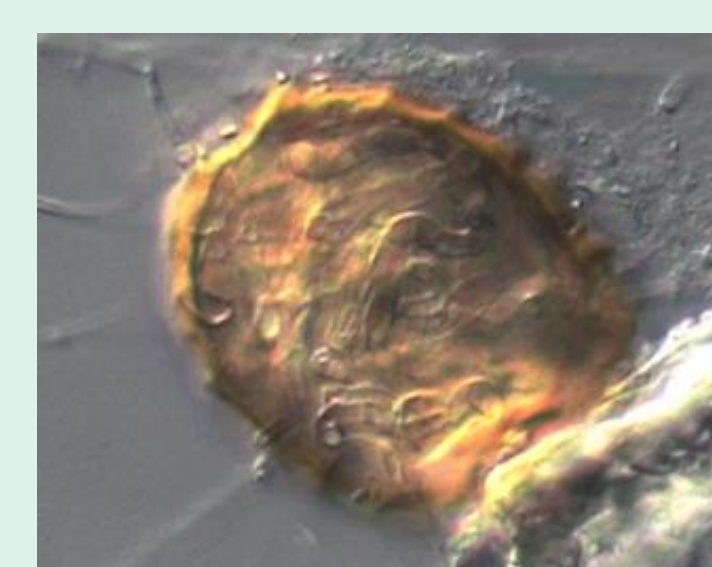
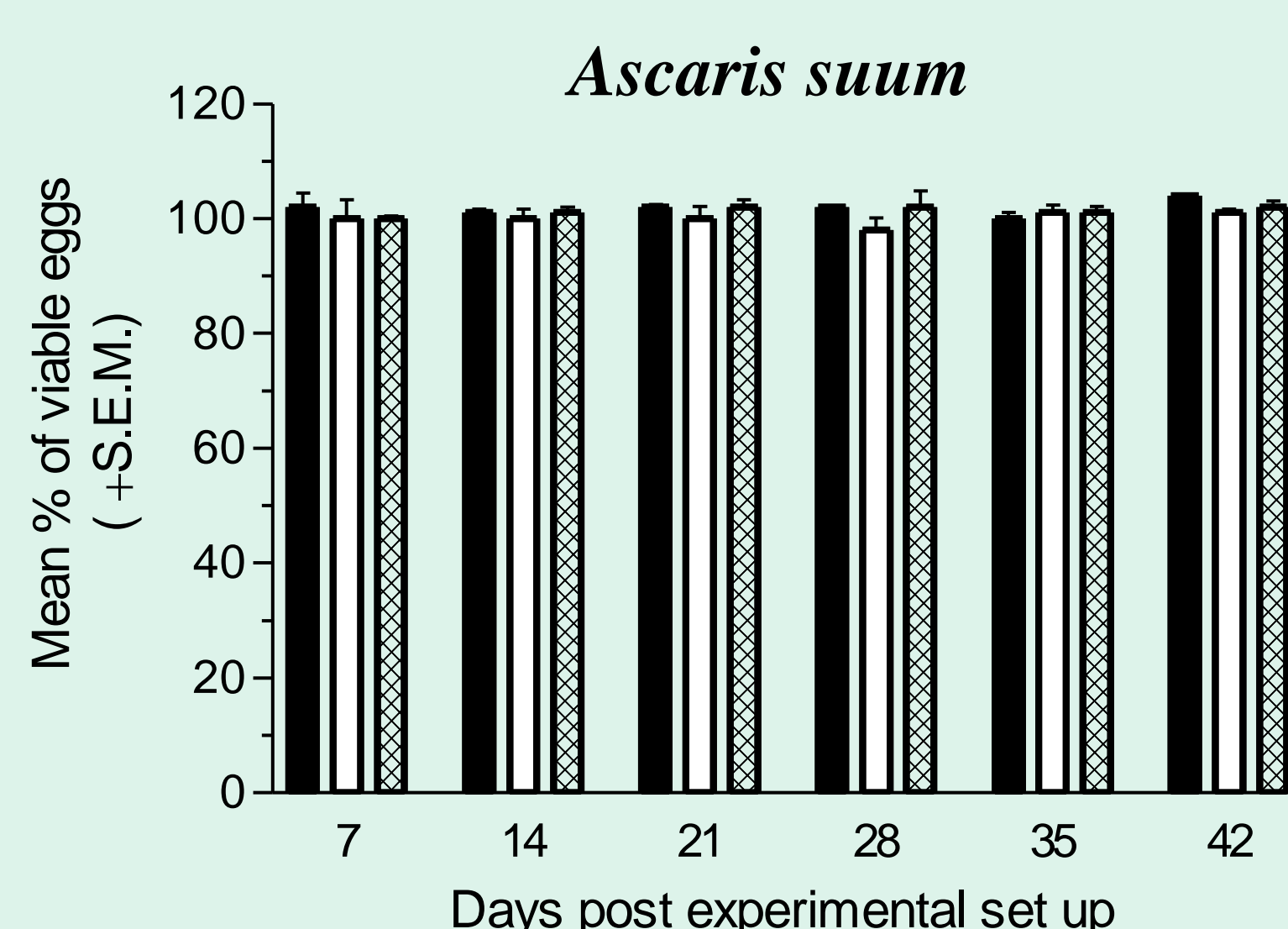


Fig. 6. *A. suum* egg destroyed by *P. chlamydosporia*. Most of the shell is intact whereas the content is degenerated and colonized by hyphae.

■ Control □ Pc ▨ Pi

Fig. 3. Mean percentages (n=3, +S.E.M.) of viable *A. galli*, *T. canis* and *A. suum* eggs on control, or a fungus (*P. chlamydosporia* (Pc) or *P. lilacinus* (Pi)) treated plates.

## Discussion and conclusion

- P. chlamydosporia* had a large negative impact on viability of *A. galli* and *T. canis* eggs whereas *P. lilacinus* had only a limited effect → interspecies differences in the ability of fungi to destroy eggs
  - A. suum* eggs more resistant than *A. galli* and *T. canis* eggs to both fungi → the thick uterine layer in *A. suum* eggs is perhaps important in protecting against the microfungi
  - Shells and contents of *A. galli* and *T. canis* eggs were completely degraded → enzymatic degradation of egg shell protein and chitin (Khan et al., 2004; Zhang et al., 2009) probably the primary mechanism of both fungi
- *P. chlamydosporia* may be a potential biological control agent against *A. galli* and *T. canis* eggs in the environment**

## Acknowledgements

Rothamsted Research (UK) and Prophyta (Germany) are thanked for kindly providing the fungal isolates *Pochonia chlamydosporia* biotype 10 and *Paecilomyces lilacinus* strain 251, respectively. The study was funded by the Green Development and Demonstration Programme (GUDP), the Danish AgriFish Agency, Danish Ministry for Food, Agriculture and Fisheries.

## References

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