Two *Diplostomum* species associated with eye damage in rainbow trout (*Oncorhynchus mykiss*) farms in Scotland

Scottish Government
Riaghaltas na h-Alba
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Introduction

- **In the summer of 2018, gross eye damage observed due to a significant eye fluke infection**
  - At a rainbow trout hatchery operated by Dawnfresh Seafoods Ltd. (Site A).
  - At a third-party suppling site (Site B; typically at lower infections levels)

- **Tissue material collected for histopathology examination and molecular screening**

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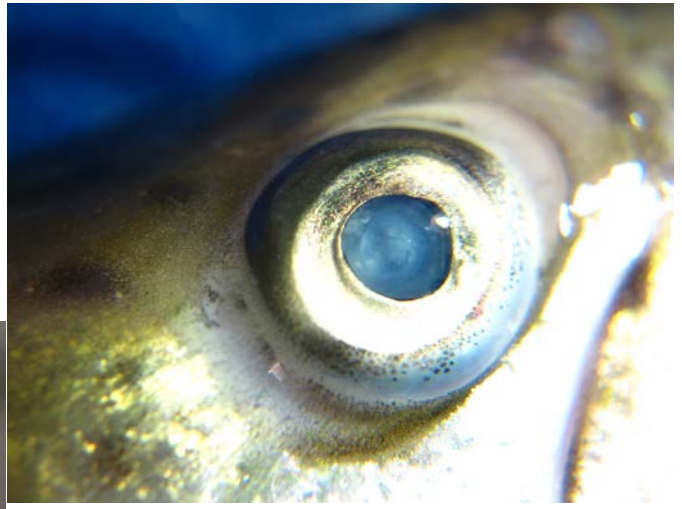
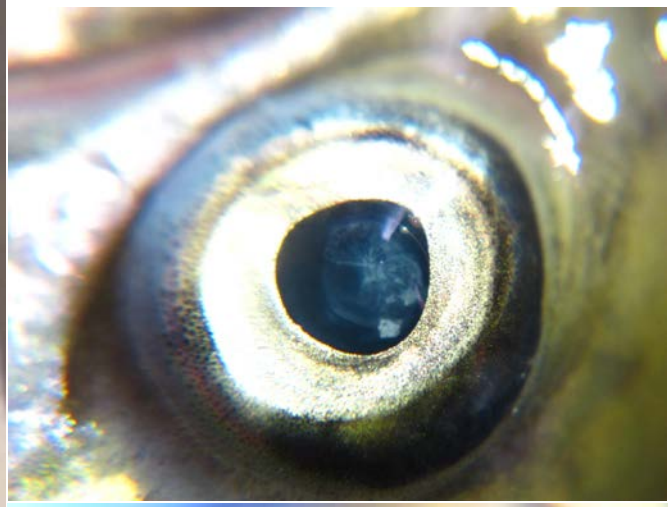
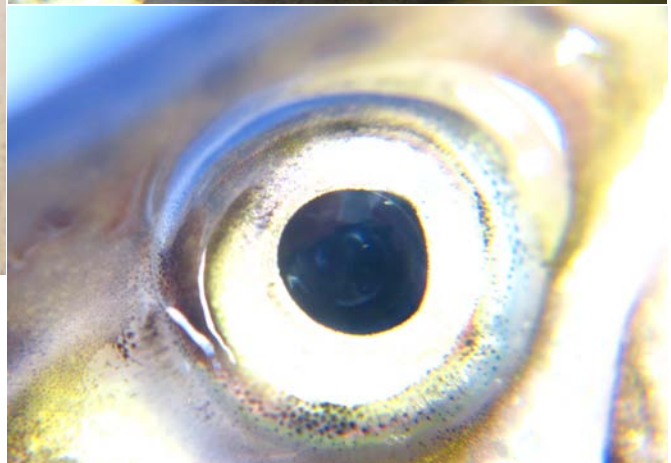
Gross eye damage varies significantly







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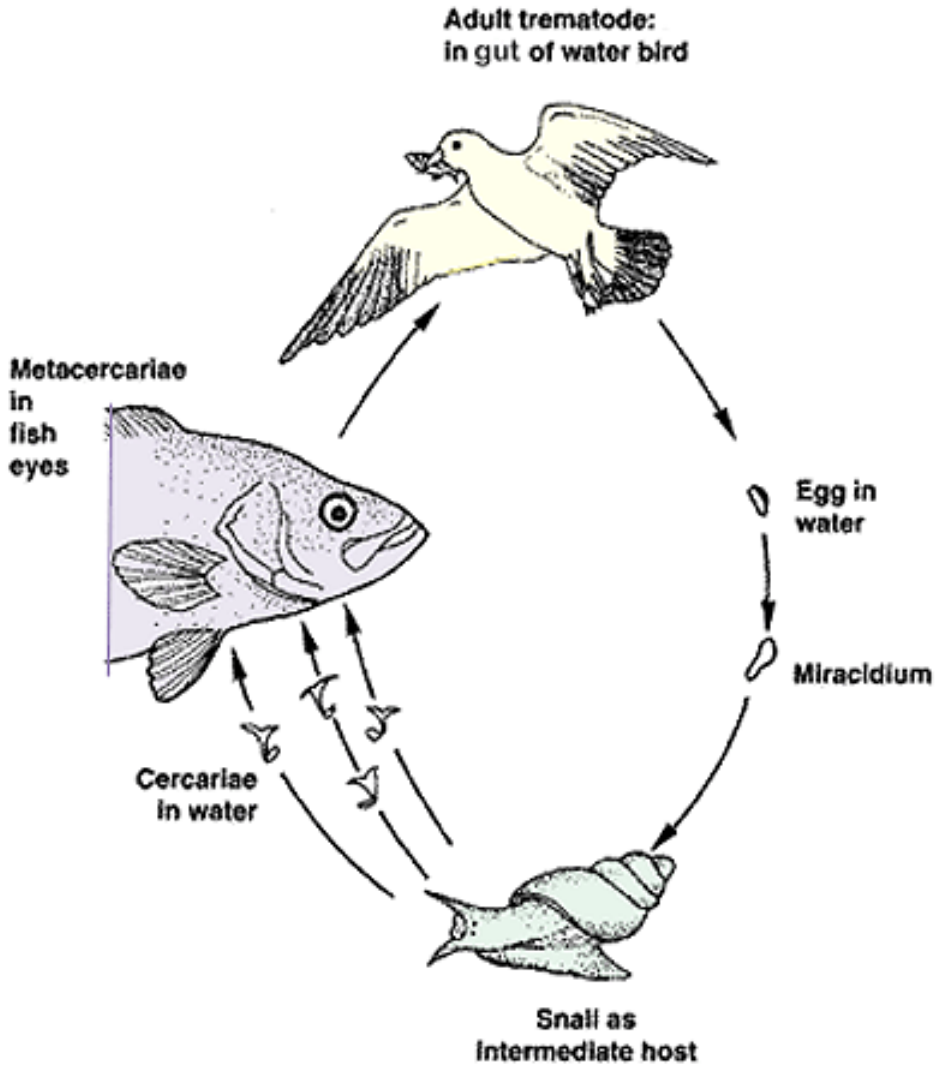
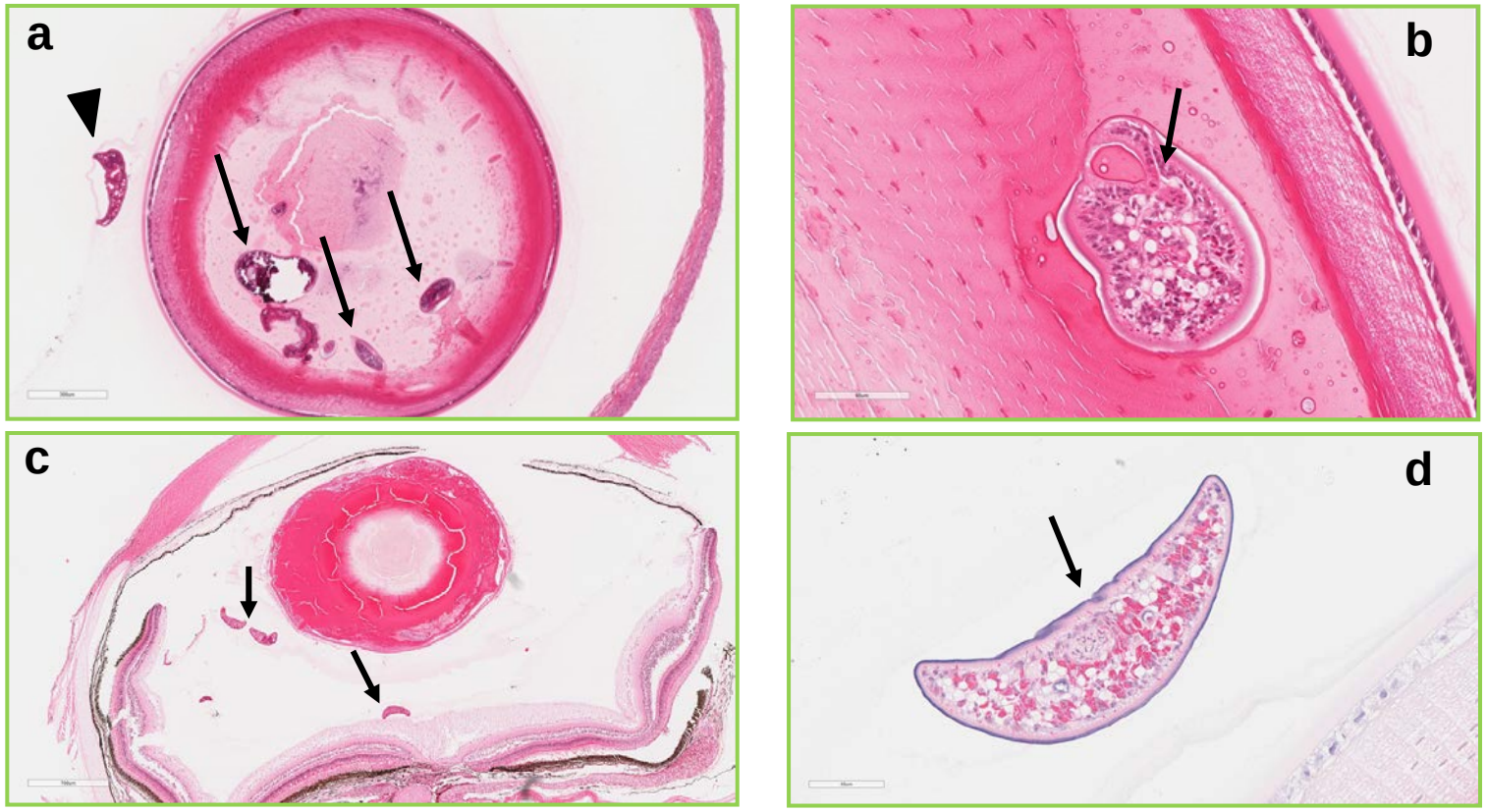
Lifecycle of *Diplostomum* spp.



http://www.fao.org/fishery/static/FAO_Training/FAO_Training/General/x6709e/x6709e15.htm

Histopathology images



Metacercariae of *Diplostomum* spp. :

- a) Present in lens (arrow) and in the eye chamber (triangle)
- b) Higher magnification of metacercariae on the eye lens
- c) Present in the vitreous body (arrow)
- d) Higher magnification of metacercariae in the eye chamber (arrow)

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Molecular findings

Pooled (n = 10) eye lenses

Pooled (n + 10) aqueous eye material

- **Partial sequencing of the cytochrome *c* oxidase subunit I mitochondrial gene.**
  - **Eye flukes associated with the lens:-**
  - ***Diplostomum mergi* - linage 3**

  - **Eye flukes associated with the aqueous eye material**
  - ***Diplostomum baeri* - complex sp. 2**

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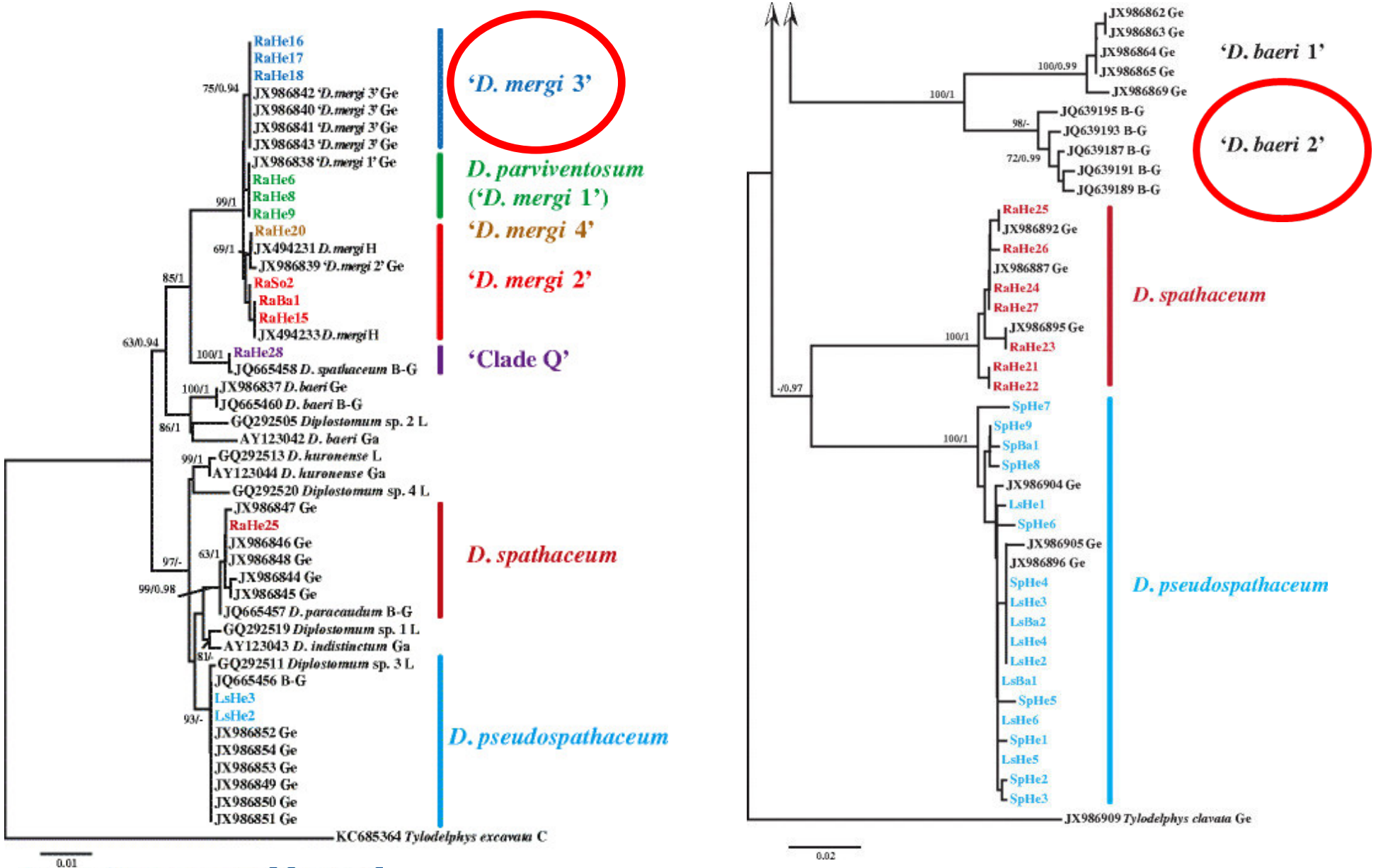
Moszczynska et al. (2009). Development of primers for the mitochondrial cytochrome *c* oxidase I gene in digenetic trematodes (*Platyhelminthes*) illustrates the challenge of barcoding parasitic helminths. *Molecular Ecology Resources*, 9 (Suppl.1), 75-82.

Molecular findings – (*cox*1) gene sequencing



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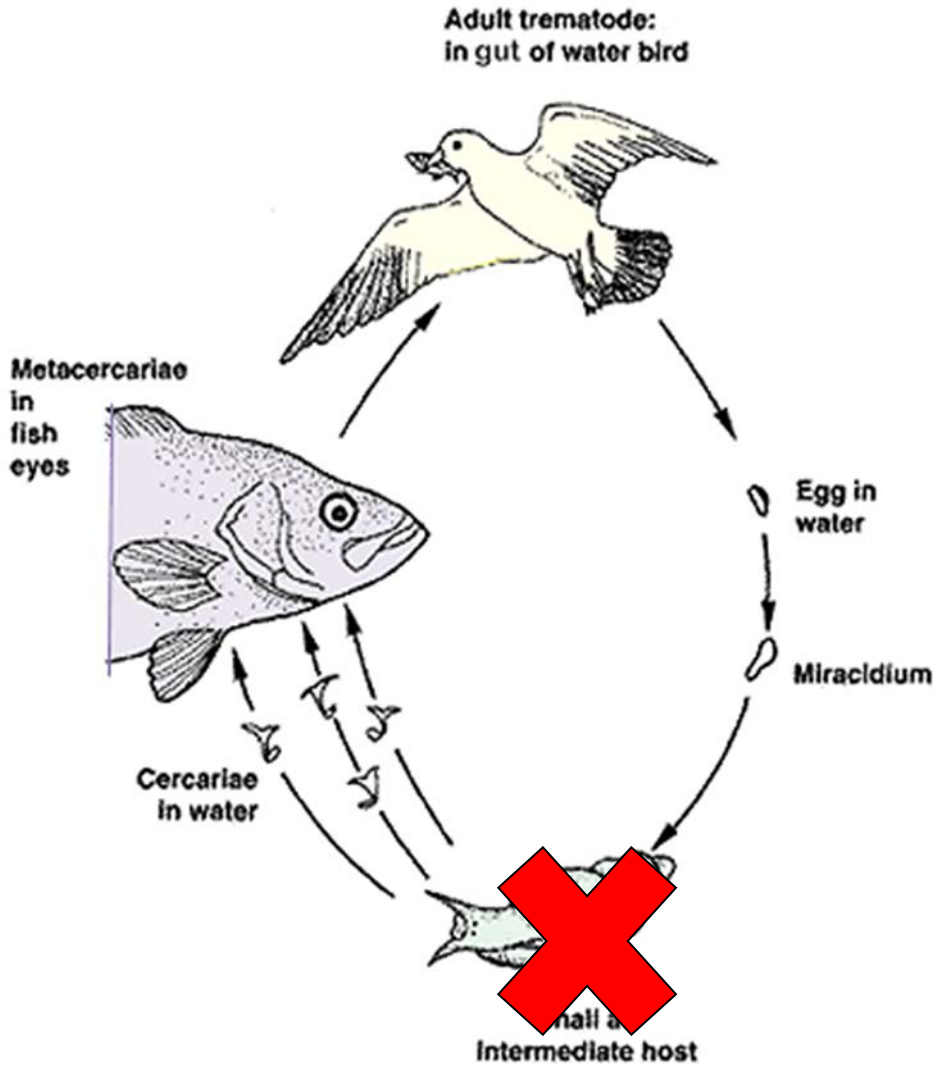
C. Selbach, M. Soldánová, S. Georgieva, A. Kostadinova & B. Sures (2015). Integrative taxonomic approach to the cryptic diversity of *Diplostomum* spp. in lymnaeid snails from Europe with a focus on the '*Diplostomum mergi*' species complex. *Parasites and Vectors*, 8(1):300

Control measures



http://www.fao.org/fishery/static/FAO_Training/FAO_Training/General/x6709e/x6709e15.htm

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Control measures

- **Covering inlet channel with plastic sheeting**
  - Inhibit plant growth – minimising habitat for *Lymnaea* snails
- **Paddle wheels installed in the inlet channel**
  - Disrupt water flow and infective metacercariae
- **Standard drainage and disinfection procedures between production cycles**
- **This has not prevented outbreaks of eye fluke infection.**

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Control measures – recent strategy

Installation of a 30-micron disc filter

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Conclusions

- Two *Diplostomum* species associated with eye damage in rainbow trout (*Oncorhynchus mykiss*).
- *Diplostomum mergi* associated with eye lenses, resulting in significant eye damage.
- High infection pressure observed in *Lymnaea* snails.
- Steps to reduce the risk have been taken and will be assessed throughout summer 2019.

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