University of Glasgow

School of Biodiversity, One Health & Veterinary Medicine

Investigating the Presence of Benzimidazole Resistance in Gastrointestinal Nematodes in Scottish Dairy Cattle

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Background

- Gastrointestinal Nematodes (GINs) are both a health and production concern for all grazing livestock.
- *Ostertagia ostertagi* and *Cooperia oncophora* are the most prevalent GINs in Scotland (Forbes, 2021).
- Both have an economic impact within the Scottish dairy industry.
- GINS are treated with three main classes of anthelmintics.

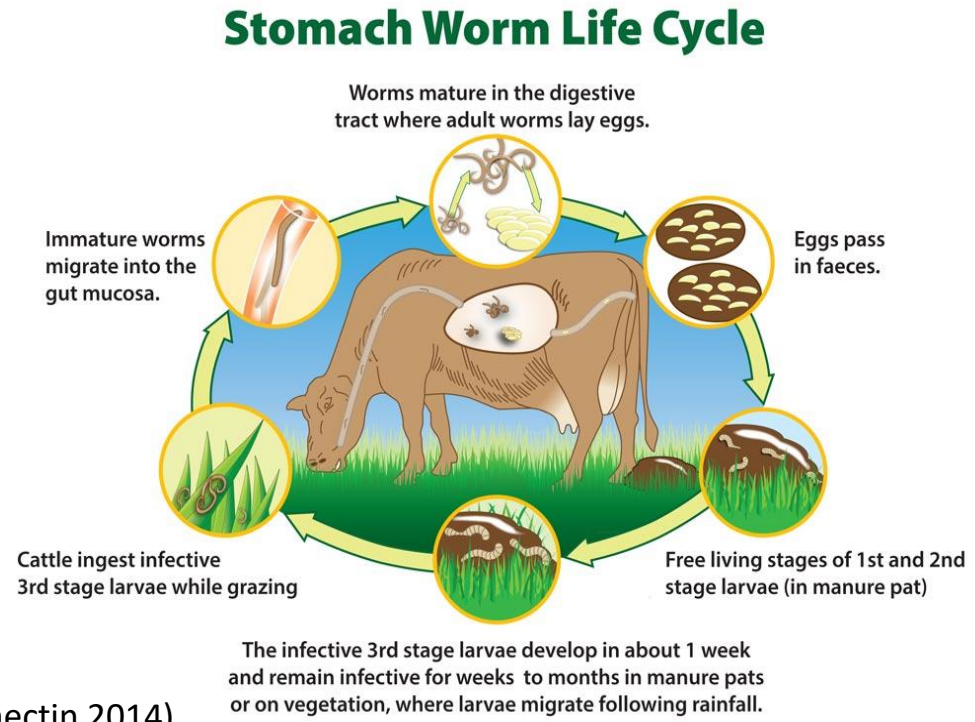


Image 1 *Ostertagi* Life cycle (Bimectin 2014)

Significance of Resistance

- Anthelmintic resistance has become a significant issue for the sheep industry with increasing reports of suspected resistance in Cattle.
- Faecal egg count reduction tests (FECRT) has low sensitivity so cannot detect emerging resistance.
- BZ resistance can be investigated by an Egg Hatch Test (EHT).
- Resistance is defined as larvae found above the sensitive effective dose 95 (EC95) 0.1µg/ml (von Samson-Himmelstjerna et al., 2009)

Image 2: 24 well plate (ThermoFisher, 2023)

Methods

- Four farms sampled in the greater Glasgow are during summer 2023.
- Part of wider study.

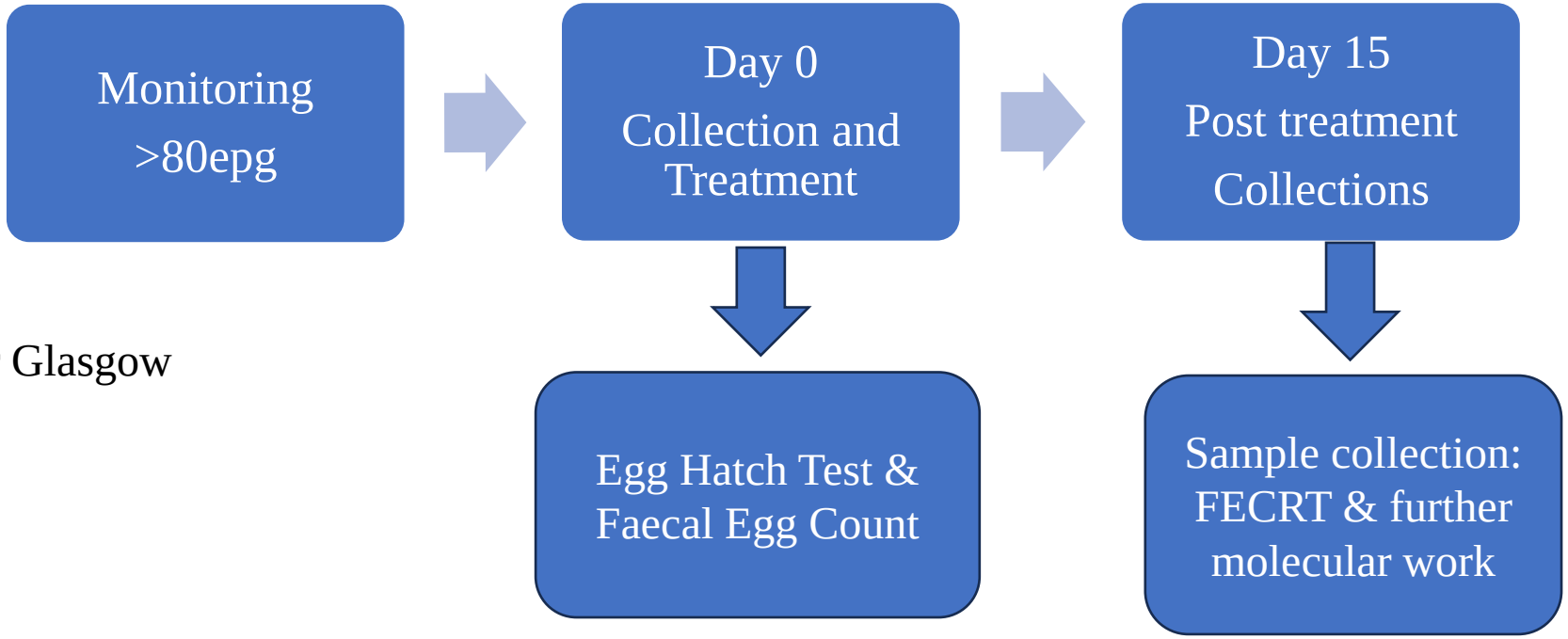
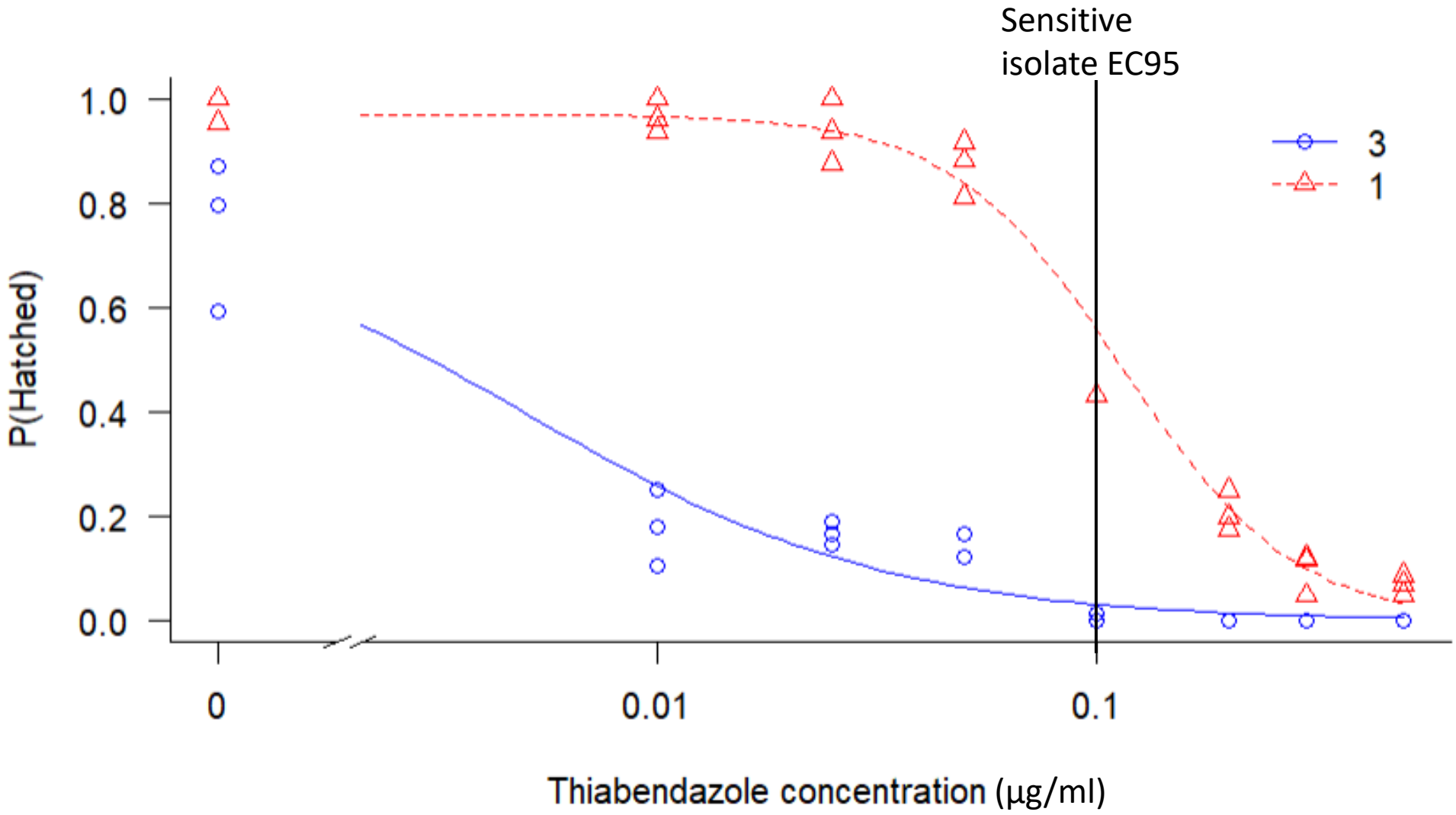


Table 1 Final Thiabendazole concentration (µg/ml)

	1	2	3	4	5	6
A	**0.01**	**0.01**	**0.01**	**0.2**	**0.2**	**0.2**
B	**0.025**	**0.025**	**0.025**	**0.3**	**0.3**	**0.3**
C	**0.05**	**0.05**	**0.05**	**0.5**	**0.5**	**0.5**
D	**0.1**	**0.1**	**0.1**	**CTRL**	**CTRL**	**CTRL**

- 100 Eggs, DMSO, water and TBZ per well.
- 48 h incubation at 25^{o}C.
- Lugol's iodine and Tween solution added for collection and counting.

Results


Sensitive
isolate EC95
1.0
0.8
0.6
0.4
0.2
0.0
P(Hatched)
3
1
0
0.01
0.1
Thiabendazole concentration (µg/ml)

Discussion

- Historic BZ use on farms indicate that resistance is not reversible.
- Hard to interpret significance as only one farm.
- Continued surveillance for resistance required to determine the threat to industry.
- Communication is needed to ensure farmers and vets approach parasite control sustainably

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