



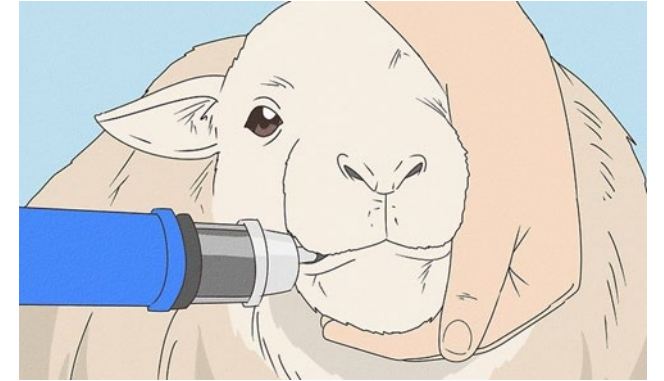
Jade Duncan | EAAP, Florence | 4<sup>th</sup> September 2024

# The use of Targeted Selective Treatment (TST) in lambs to reduce wormer resistance

Duncan, J. M., Gascoigne, E., Stubbings, L., Mitchell, G., Colston, M., Blyth, M., McLaren, A., Thomson, A., Morgan-Davies, C. and Kenyon, F

# What is Targeted Selective Treatment (TST)?

- Slow development of wormer resistance
- Treatment of individual lambs
- Dilute resistant worm genotypes by leaving some worms unexposed to wormer



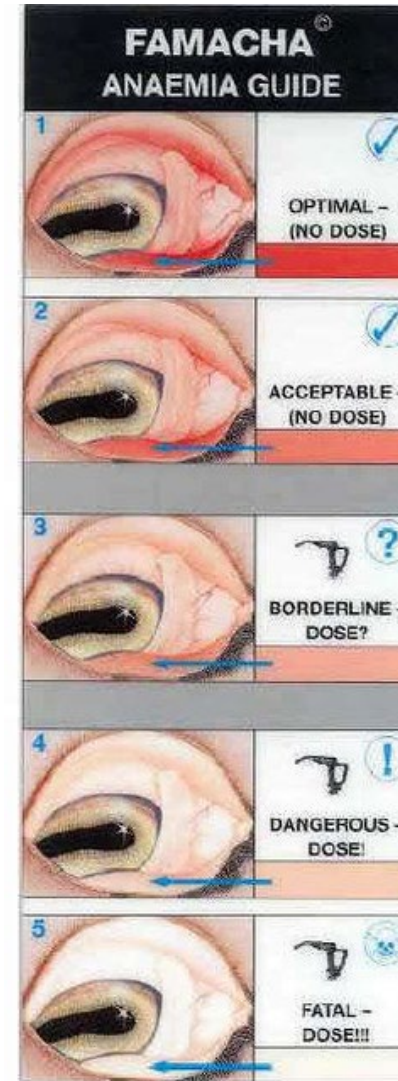
## Additional benefits

- Reducing treatment costs
- Reducing labour
- Reducing impact on biodiversity



# Methods of TST

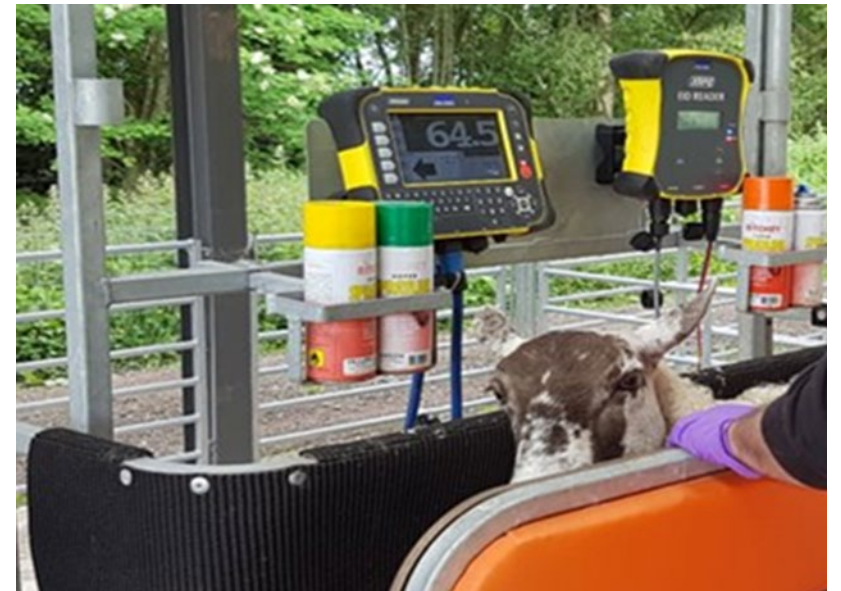
- FAMACHA (*Haemonchus contortus*)
- Body Condition Scoring (BCS)
- Dag score
- **Weight**





# Barriers to TST uptake

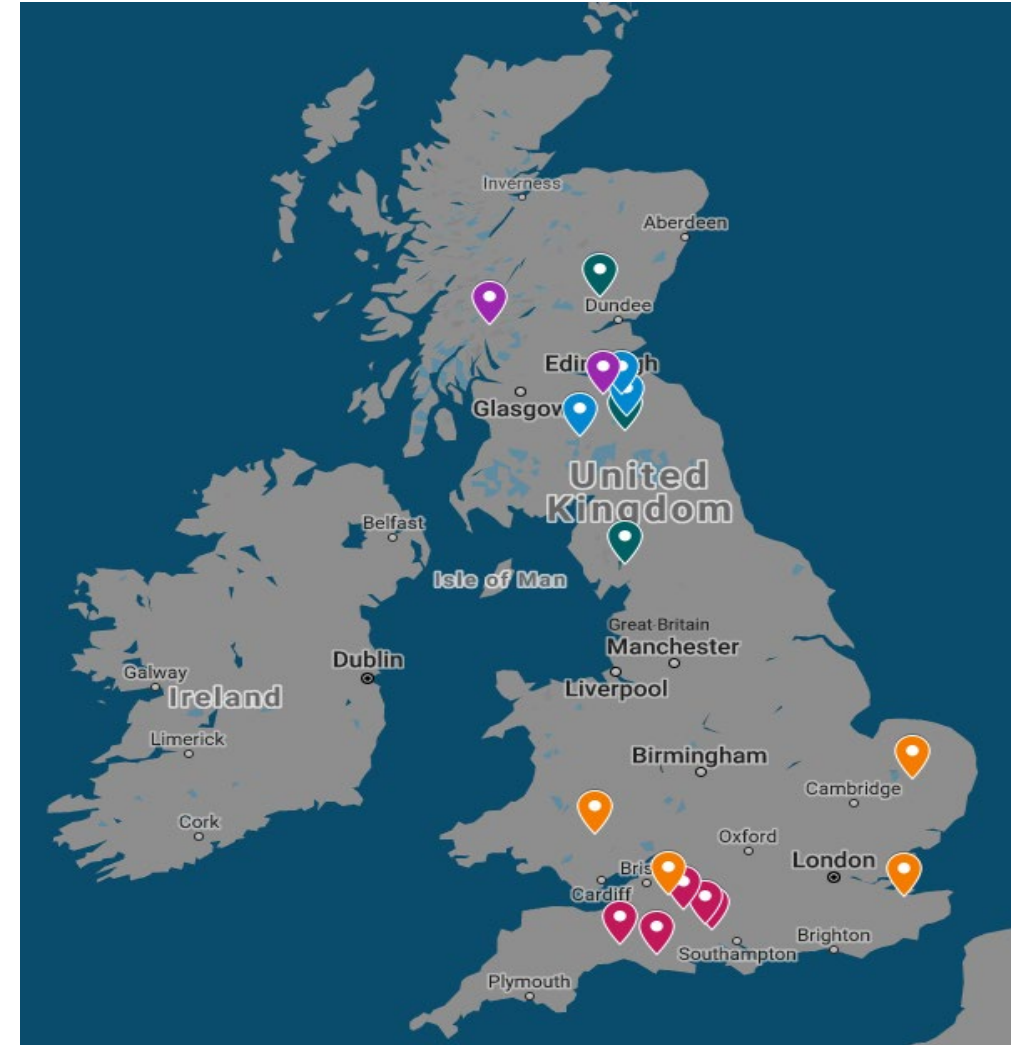
- Technology required can be expensive
- Lack of training/support available for farmers on using technology
- Requires further validation on commercial farms, in a range of farming systems
- Lack of evidence demonstrating how the system works at a practical level



# The Smartsheep Project

# Smartsheep Project

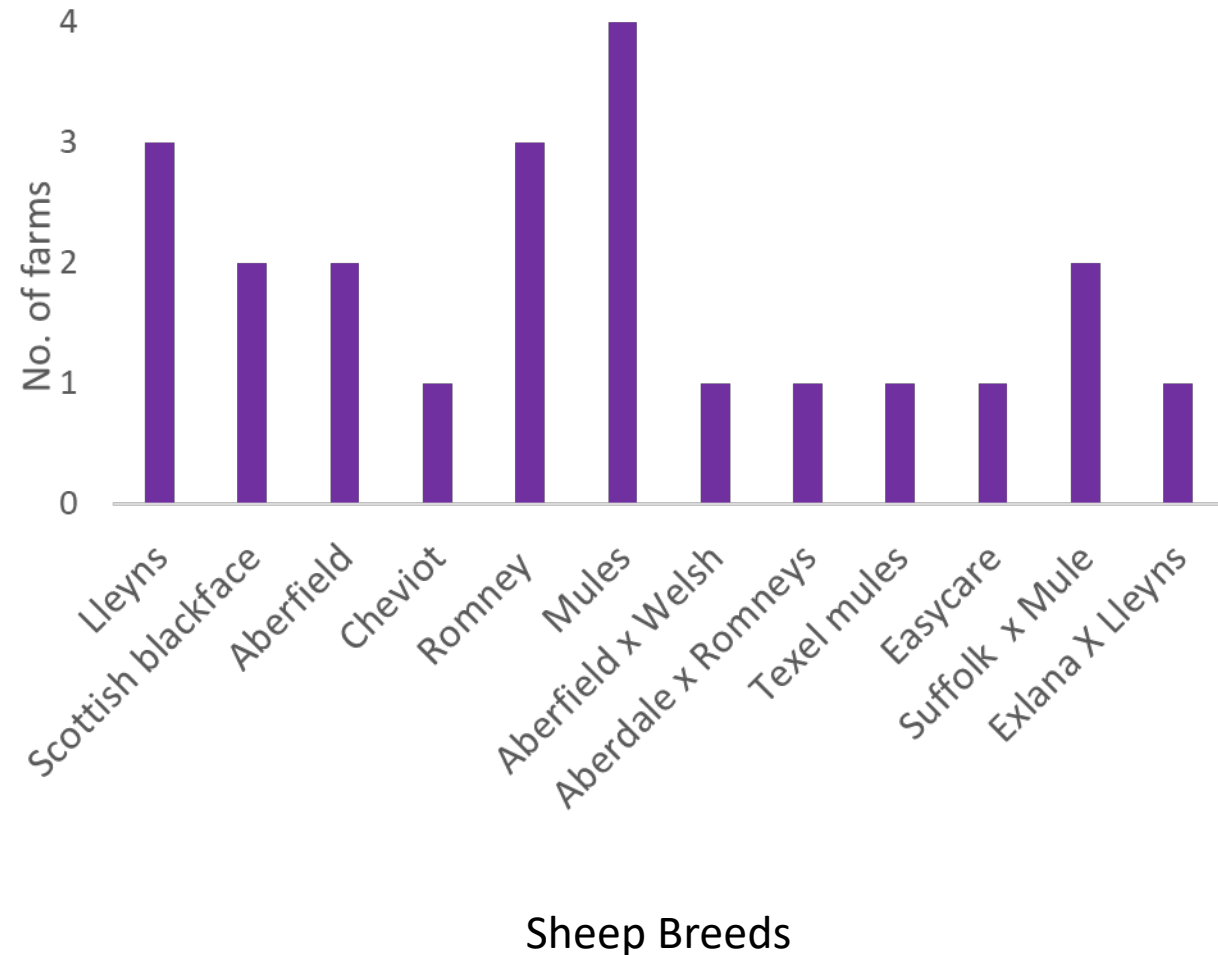
- 18-month project (ended March 2022) with 8 partners and 17 focus farms
- Aims:
  - To develop an internet-based pen-side decision support system for TST
  - To understand nematode species variation, anthelmintic treatments and efficacy
  - To understand the user-friendliness of the internet-based tool
  - Identify benefits/challenges of TST



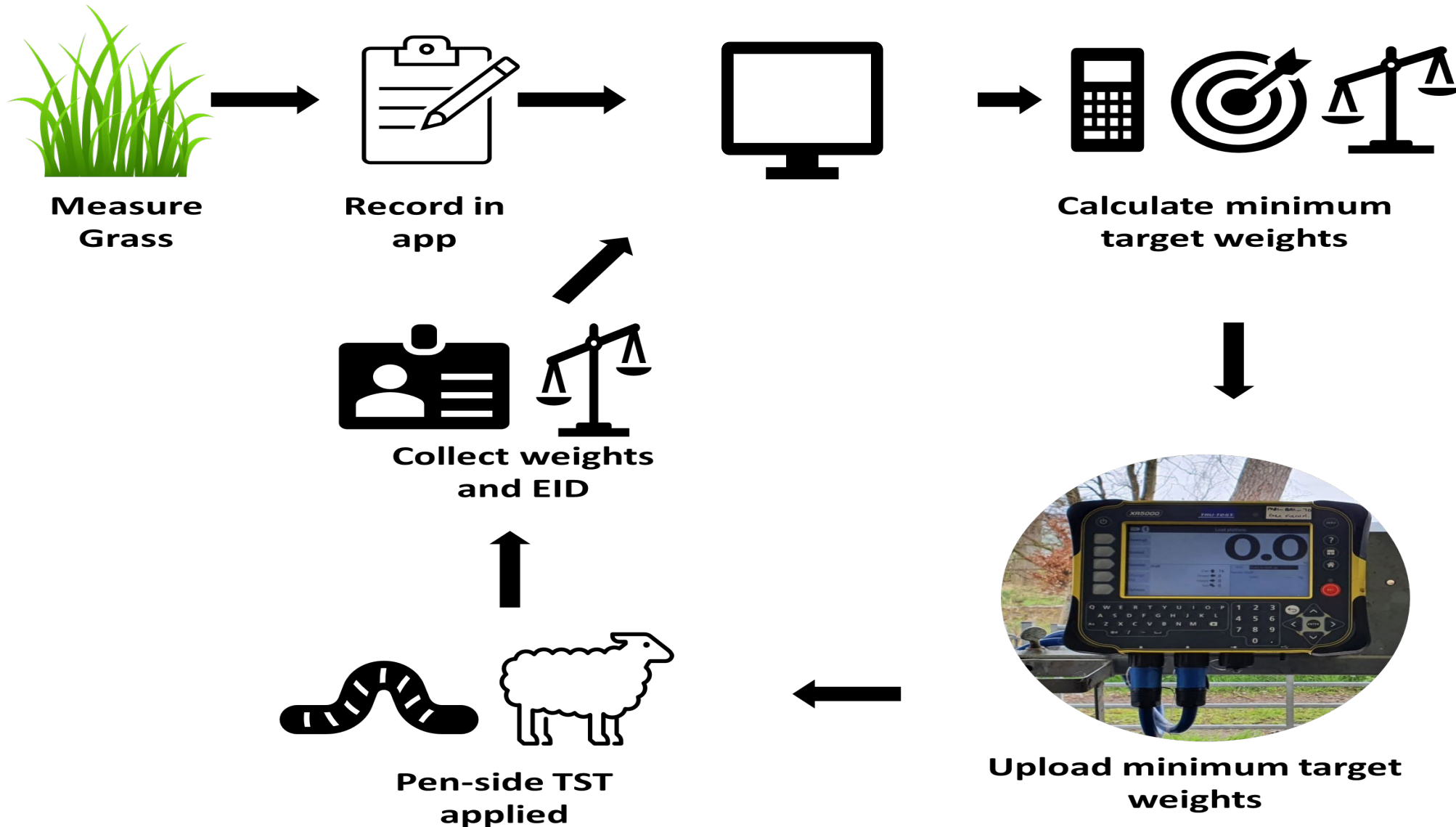
Range of geographical locations and farming systems covered

# Farmer recruitment criteria

- Based in the UK
- Minimum of 100 lambs
- Used a commercial sheep breed
- Worked with one of the vets/farm advisors
- Owned an EID reader (automatic or stick) and an electronic weigh crate and head



# Internet Based Tool Concept

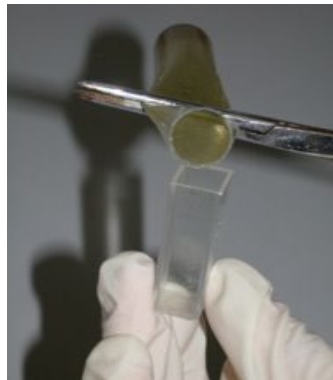


**Figure 1:** Flow chart of the Agri Ignite platform, which uses lamb previous weight and grass availability to predict individual minimum target weights which can be used as a pen-side test to treat underperforming lambs.



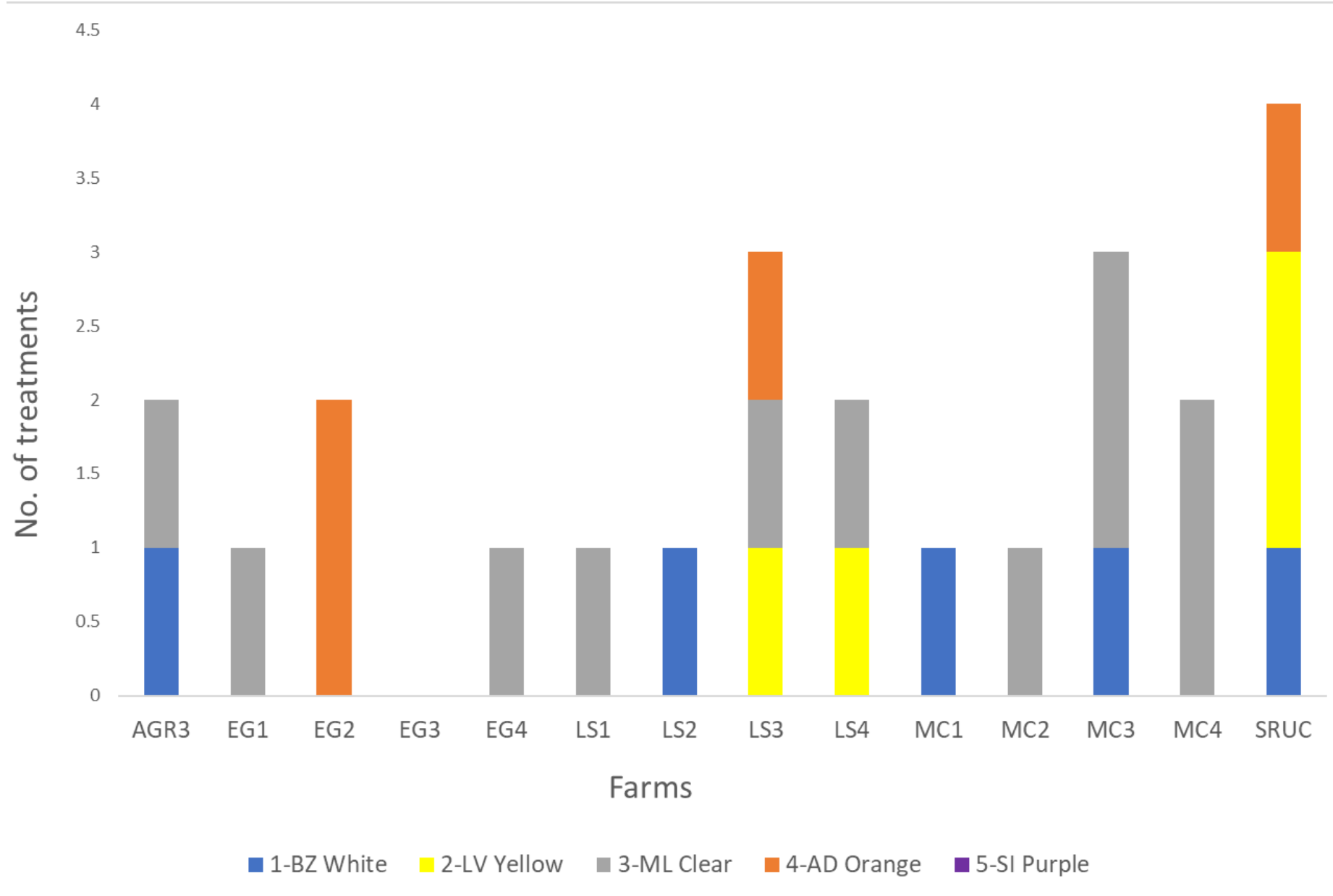
# Faecal samples and egg counts

- Farmers posted faecal samples on day of treatment and post treatment samples 7-14 days later (Jun-Dec 2021)
- 1545 samples sent in and processed from 14 farms
  - Modified salt-flotation technique
  - Sensitivity 1 egg per gram (EPG)
- Eggs counted- ***Strongyles***, ***Nematodirus spp.***, *Trichuris*, *Capillaria*, *Strongyloides*, *Monezia*, *Coccidia*



Recorded at bench  
onto database

# Anthelmintic use and efficacy



Mean pre-treatment = 368epg

| <b>Anthelmintic group</b>          | <b>Efficacy-<br/>Strongyle</b> | <b>Efficacy-<br/><i>Nematodrius</i></b> |
|------------------------------------|--------------------------------|-----------------------------------------|
| 1- BZ White (n= 3 treatment times) | 60-100%                        | 94-100%                                 |
| 2-LV Yellow (n= 2 treatment times) | 71-94%                         | 72-99%                                  |
| 3-ML Clear (n= 5 treatment times)  | 78-99%                         | 95-100%                                 |
| 4-AD Orange (n= 1 treatment time)  | 94%                            | 100%                                    |

5/9 farms had wormer resistance to at least 1 class!

# Species Identification



- Ethanol fixed 88 samples of pooled parasite material from different time points/farms
- DNA extractions and MT-PCR (AusDiagnostics) used for nematode species analysis
  - Identifies 6 known species
  - Pre-treatment, species present on farm
  - Post-treatment, worm species that have survived on farm



*Teladorsagia*



*Haemonchus*



*Trichostrongylus*



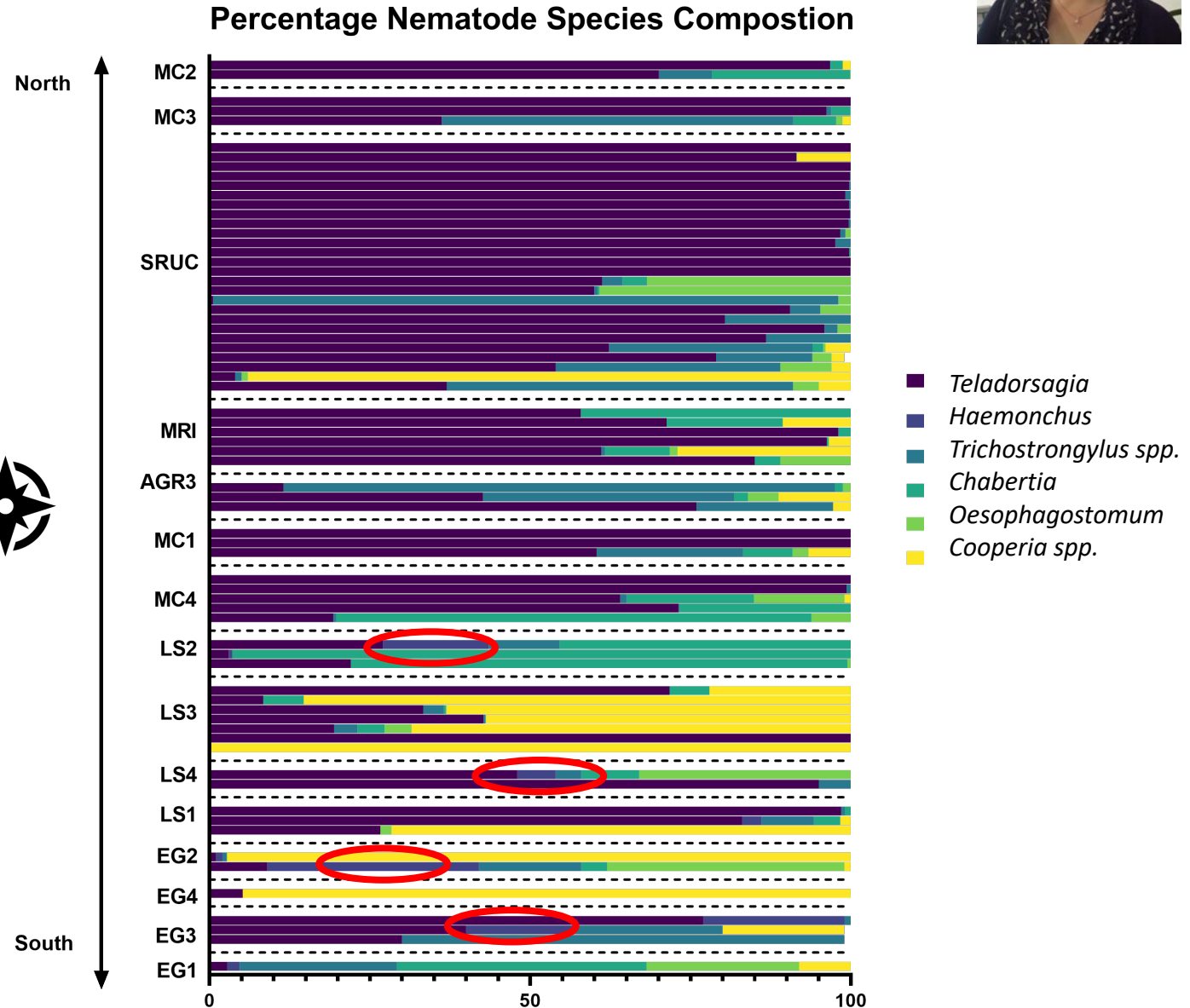
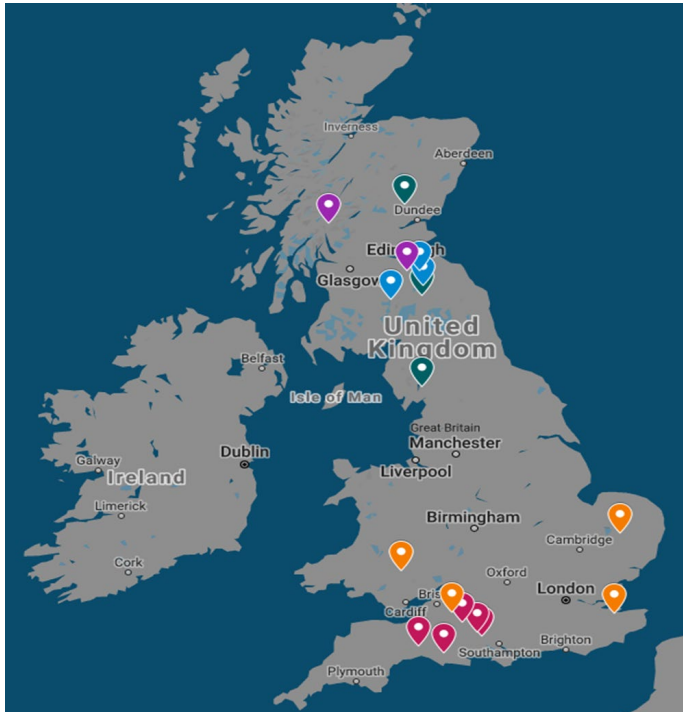
*Chabertia*



# Species Identification



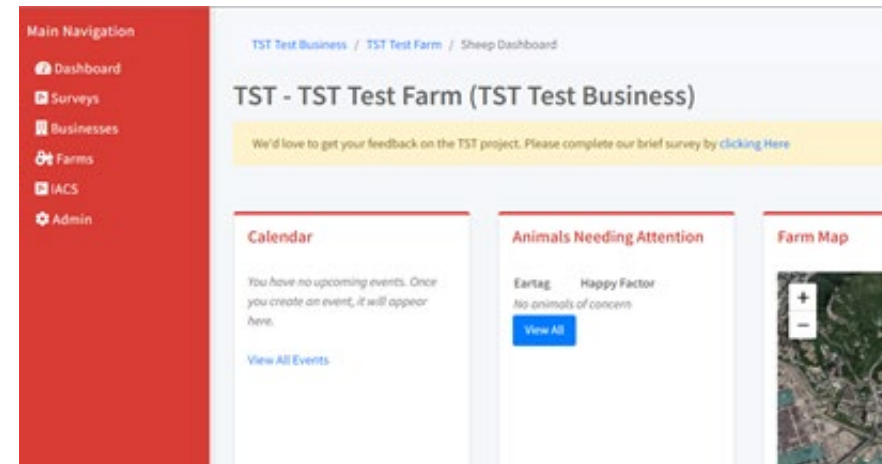
- *T. circumcincta* more prevalent in the North (UK)
- *Cooperia* and *Haemonchus* more prevalent in the South (UK)



# Feedback questionnaire

# Feedback Questionnaire

- Questionnaire disseminated to all focus farms via internet-based tool platform
- Questionnaire had 43 questions split into 5 sections
  1. Background
  2. Ease of use
  3. Future use
  4. Benefits/Challenges
  5. Overall experience



- 9 out of 17 (53%) participants responded to the questionnaire

# General feedback

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Majority agreed that more training is needed for farmers on how to use the basic kit e.g. weigh crate

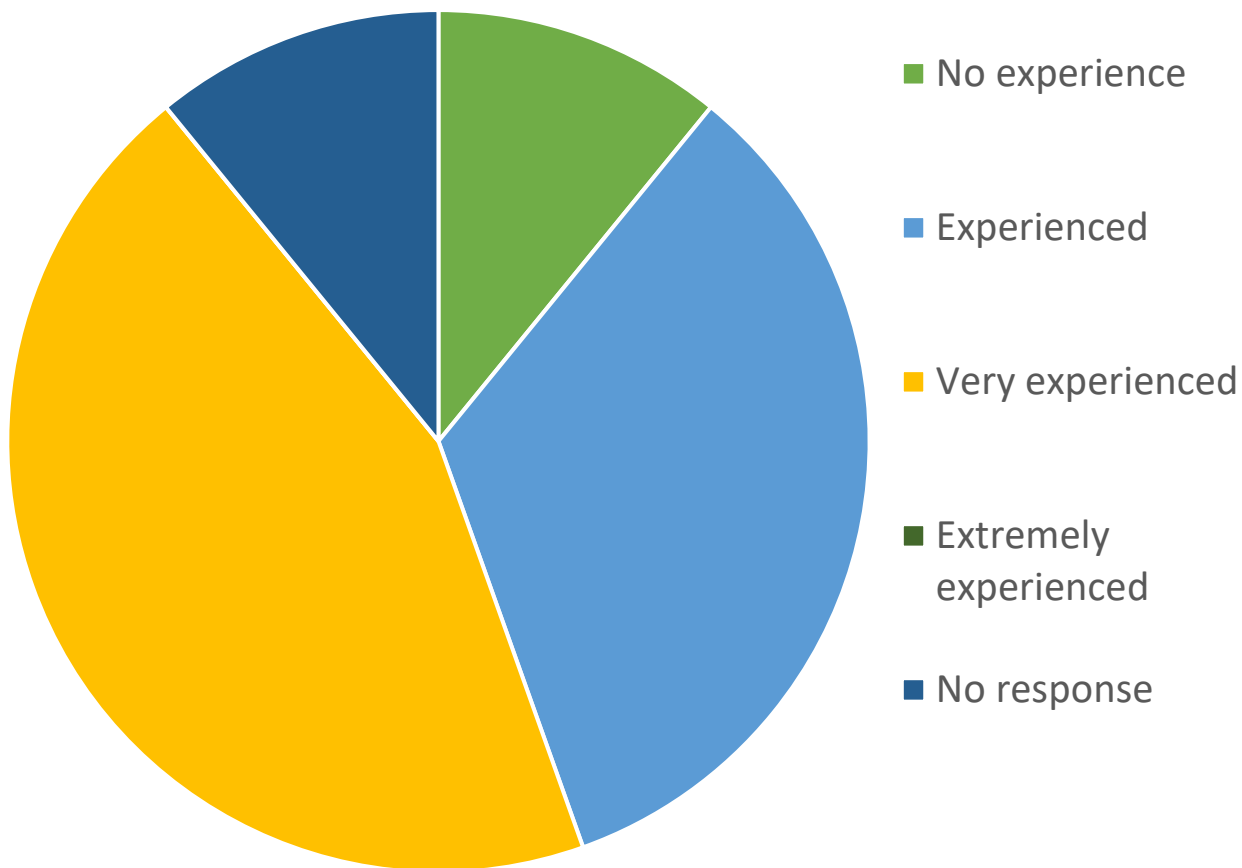
72% ran the system 3 times but only 1 farmer successful all 3 times

79% of respondents would recommend the approach to other farmers

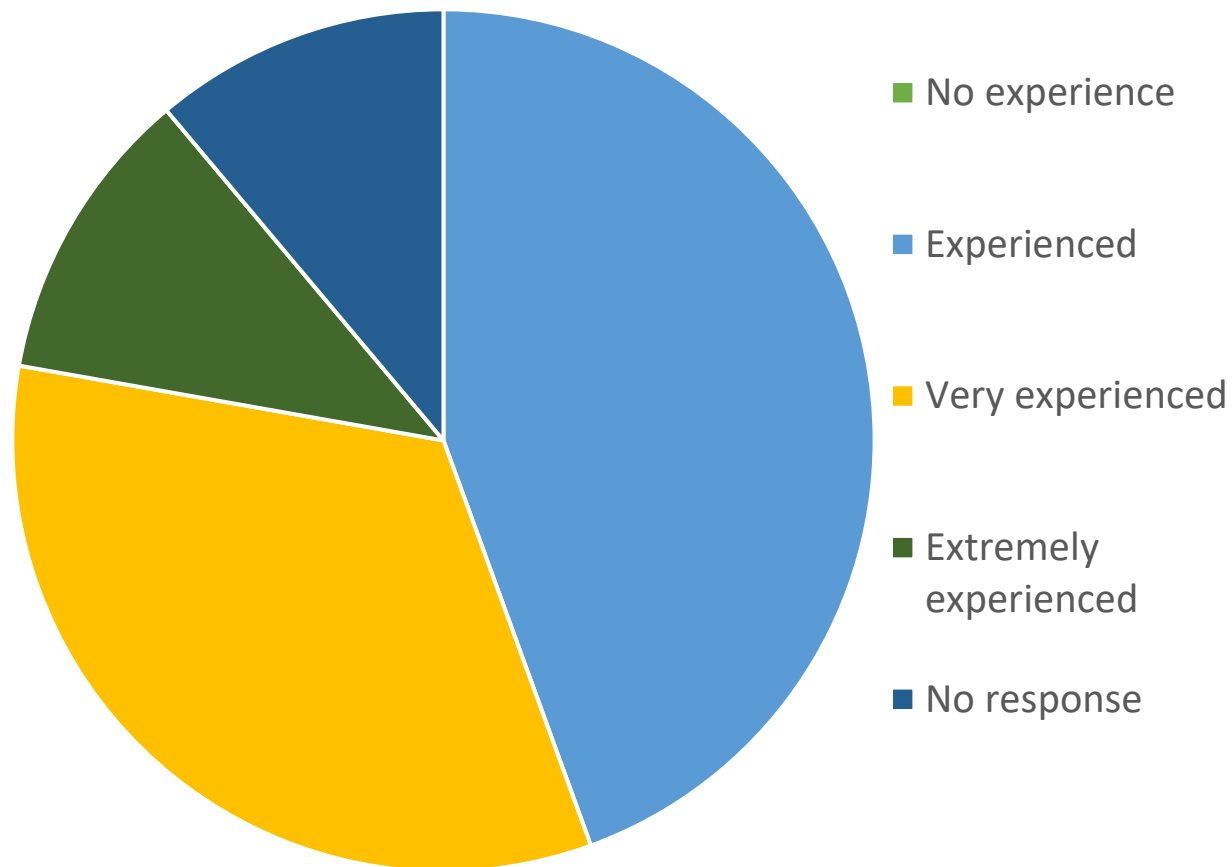
87% felt they had enough support throughout the project

# Experience required

Level of experience required for uploading/downloading



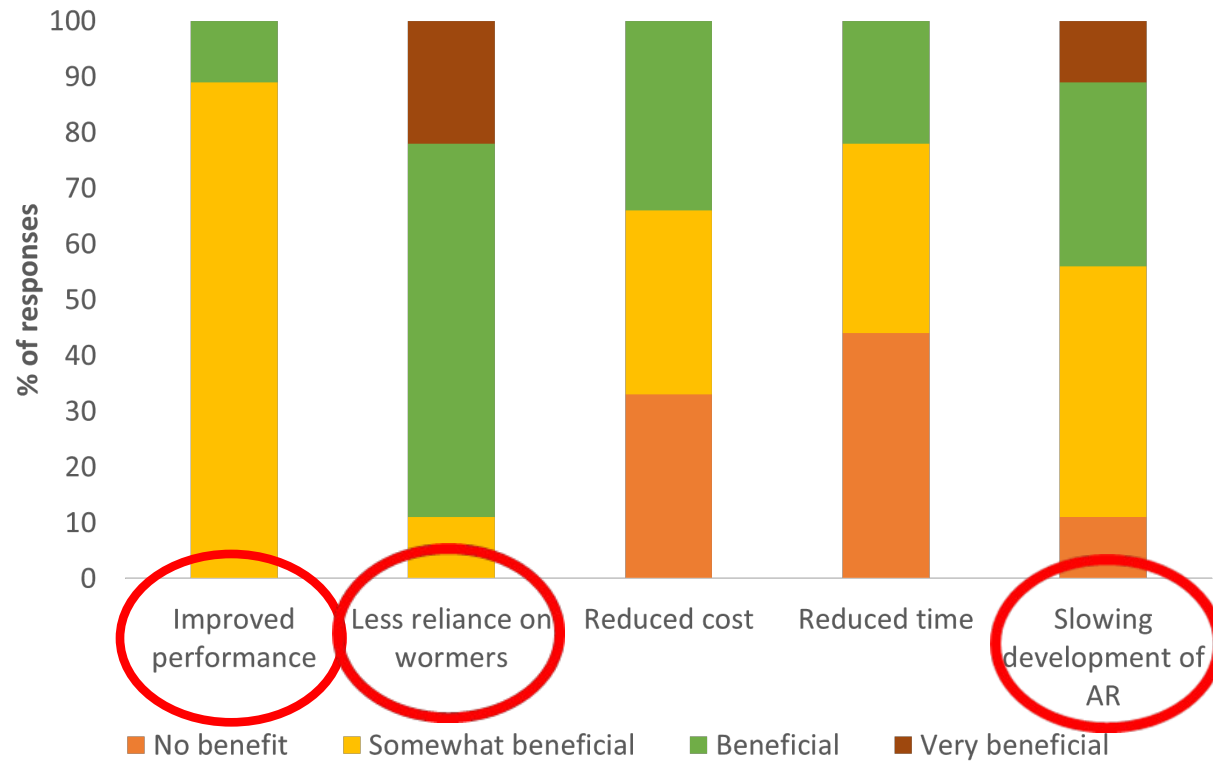
Level of experience required to use EID, weigh heads etc.



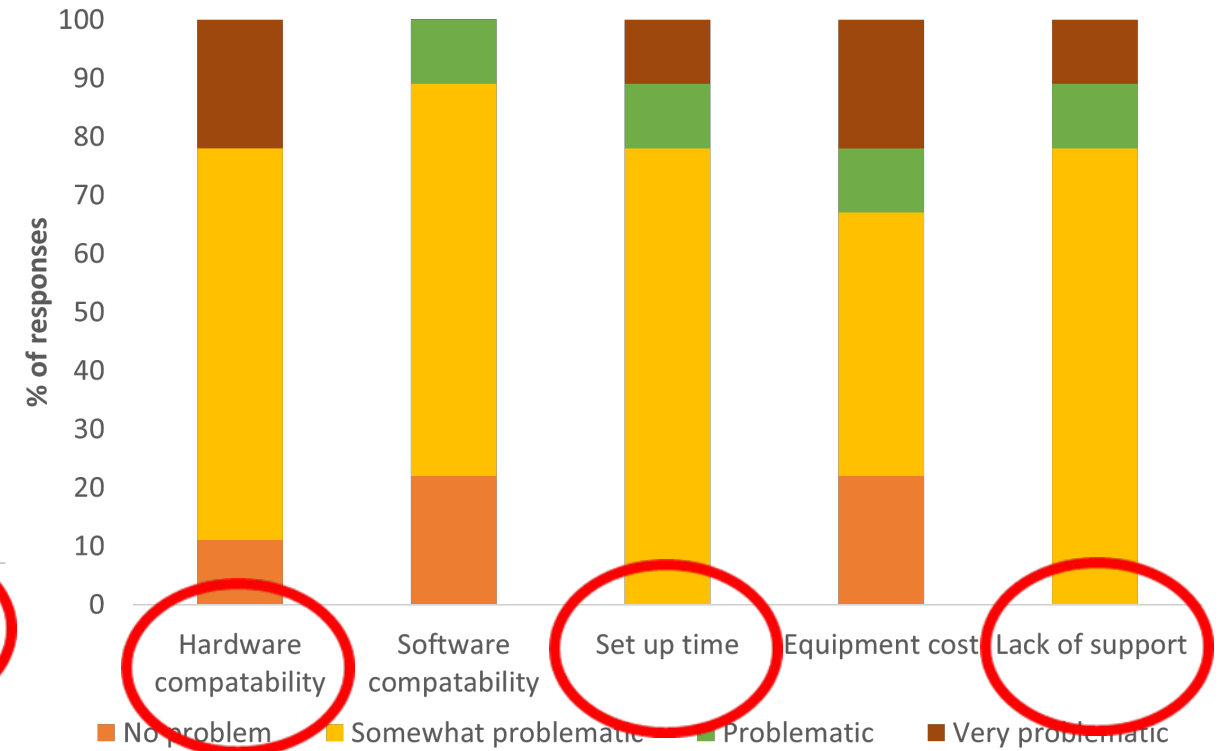


# Benefits & Challenges of TST online platform

## Potential Benefits



## Potential Challenges



# Summary

- Pen-side tool developed for weight-based TST
- Tested on 15 commercial farmers throughout the UK
- Poor engagement from farmers
- FECRT showed strongyle resistance (ML, BZ, LV) on 5/9 farms
- Species data highlighted *Cooperia* as prevalent in Southern places rather than *Haemonchus*
- Feedback showed:
  - Key benefits: performance, less reliance on wormers and slowing development of resistance
  - Key challenges: hardware compatibility, set up time and lack of support



# Thanks to.....



## FOCUS FARMERS



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Georgina Cox



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Matt Blyth



Matt Colston



Alison Fergus



Fiona Kenyon  
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Gillian Mitchell  
Leigh Andrews  
Dave McBean  
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