



Animal &
Plant Health
Agency

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Sheep scab - developing resistance

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Sheep scab- developing resistance

- Clinical signs of sheep scab
 - Treatments available
 - Clinical case details winter 2016/17
 - The *in-vitro* test developed at University of Bristol
 - Further work
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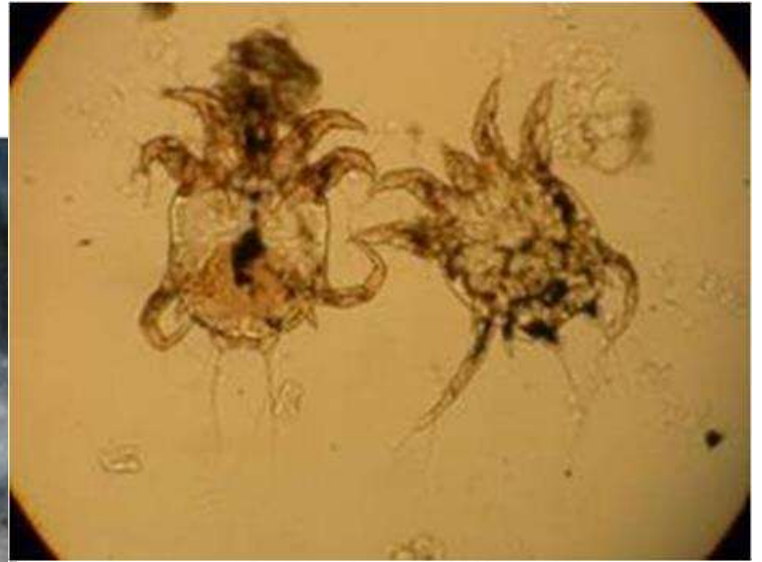
Clinical signs- pruritic (itchy) sheep



A typical case of sheep scab

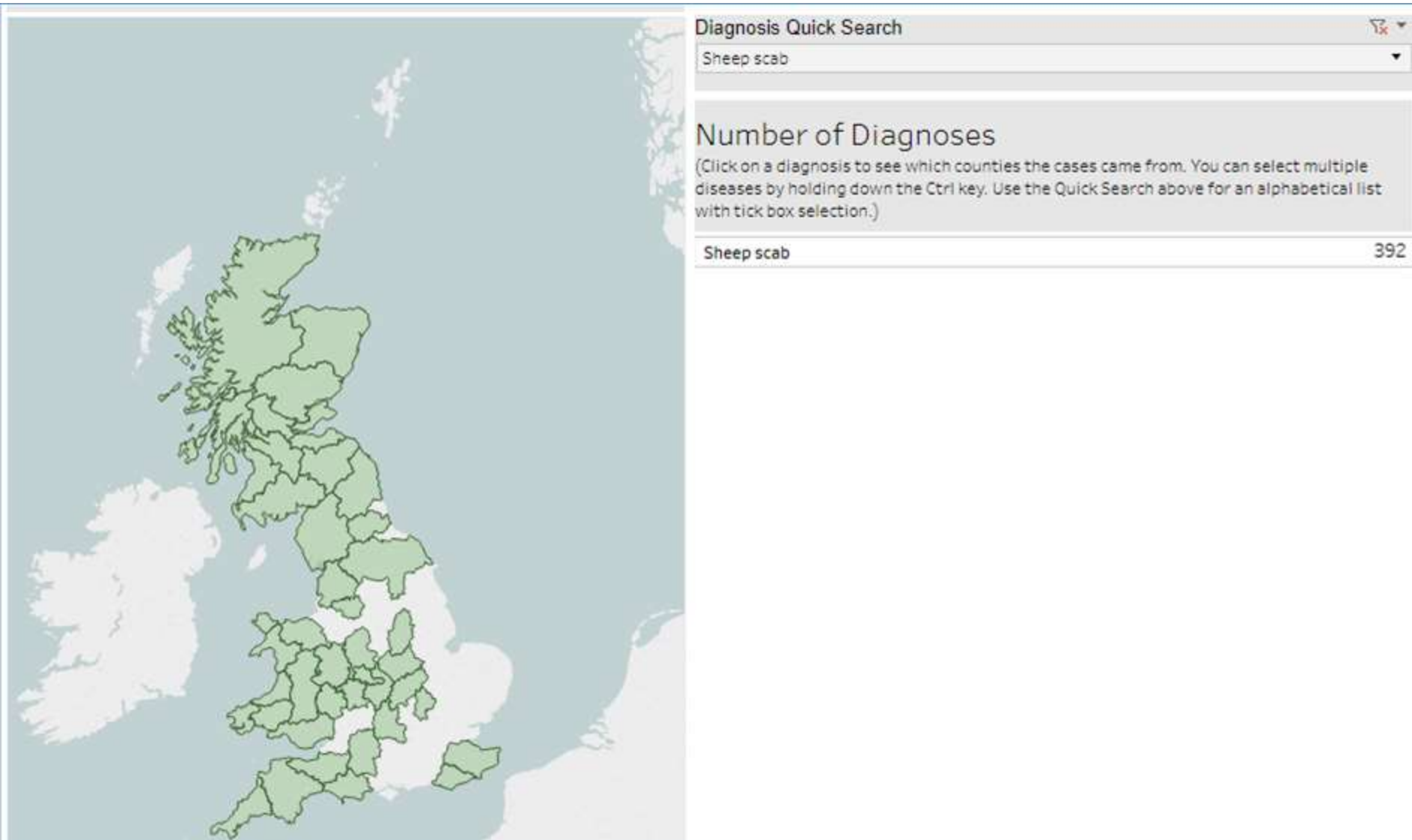


Skin lesions and the mites



Sheep disease surveillance dashboard

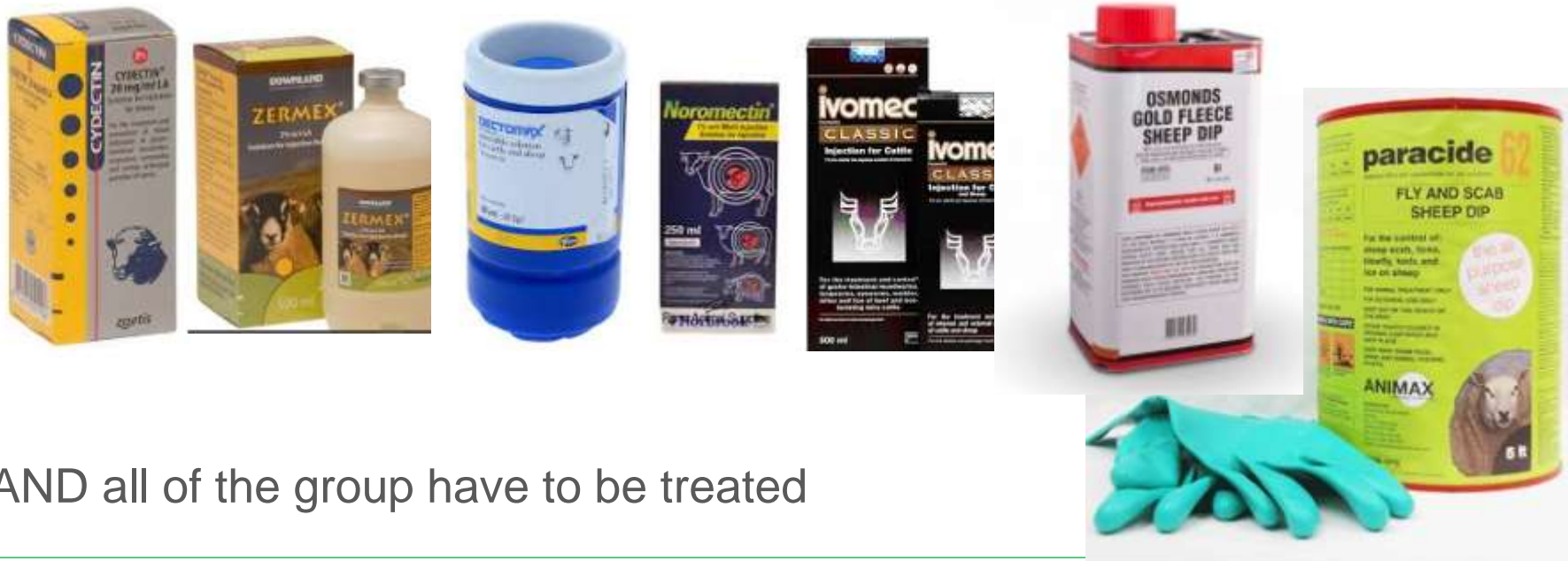
https://public.tableau.com/profile/siu.apha#!/vizhome/SheepDashboard_/SheepDashboard



Treatments

Only two types of treatment

- Injectable macrocyclic lactones (MLs) - ivermectin, doramectin, moxidectin
- Organophosphate (OP) dips



AND all of the group have to be treated

Injectable MLs

- Do not kill all mite stages immediately
 - Site, method and ease of injection varies
 - Varying persistency, so vary in need to move post treatment and time allowed before mixing with untreated sheep
 - All are anthelmintics – use has implications on anthelmintic resistance development
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OP dips

- Needs to be done correctly – immersion times, replenishment

Advantages

- Wash effect
- Broad spectrum ectoparasiticide (i.e. lice and mites)

Disadvantages

- Dip disposal
 - Not licensed for use in showers
 - Human health concerns
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Clinical case 1

Large sheep flock in Ceredigion

October 2016 -Treatment with moxidectin 2% all ewes in different groups

November 2016. Number showing pruritis, one group 400 particularly badly affected. Repeated moxidectin 2%, no improvement

Mite samples to University of Bristol for *in-vitro* test development

OP dip - instant improvement

Clinical case 2

Sheep flock in Carmarthenshire

End October 2016 -Treatment of all animals with doramectin. Ewe lambs sent away 'on tack'. No contact with other sheep, double fenced from neighbours

December 2016. Number showing pruritis, (particularly store lambs). PVS detected live *Psoroptes ovis* mites. Two injections of ivermectin given (meat withdrawal).

January 2017 Pruritis in number of animals, samples to APHA. Live mites in samples from two separate groups

Mite samples to University of Bristol

OP dip - all improved

Other cases, no *in-vitro* tests carried out

Sheep flock in mid Wales. **Doramectin given twice** to whole flock. **Clinical signs persisted** in animals in various groups. Samples to APHA. Live mites in all groups. OP dipping advised

Sheep flock Cheshire. **Treated twice with doramectin** October and November 2016. December, live mites seen in samples to veterinary practice. **Weighed and treated moxidectin 2%. Little improvement.** APHA samples, live mites seen. Dipped- all improved

Small sheep flock Shropshire. October 2016 all flock given **doramectin**, some clinical improvement. December 2016 **Moxidectin 2%** given, slight improvement. Jan 2017 **doramectin** used, **no improvement.** APHA samples Feb 2017 live mites seen- OP dip advised

Summary of cases

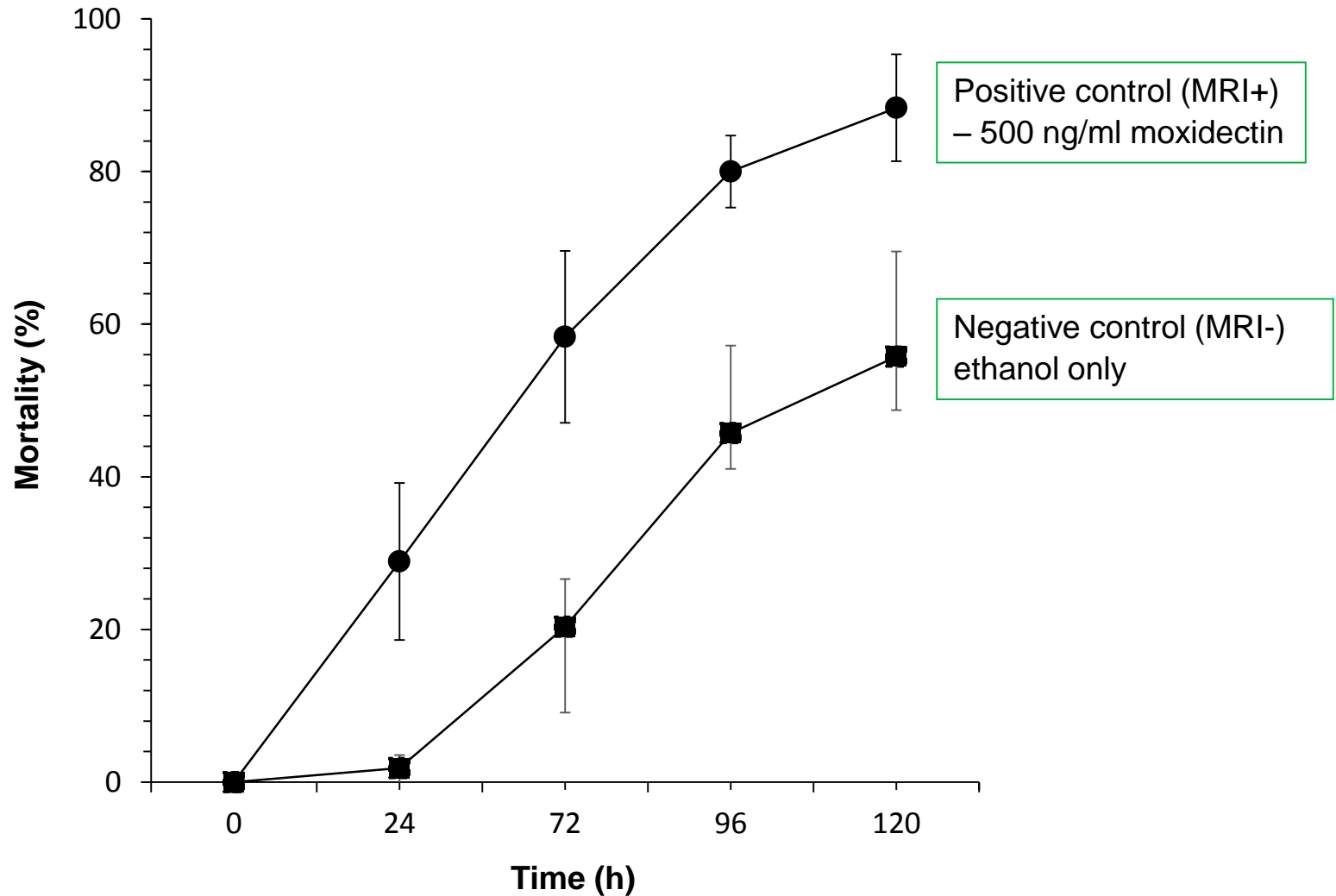
- Use of multiple ML treatments in each flock
 - Often no diagnosis before first treatments
 - Some cases showed slight clinical improvement post treatment, others no cessation of clinical signs
 - Appeared that treatments had been done correctly
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In-vitro test at University of Bristol

- Bioassay based on published method for resistance in *Sarcoptes scabiei* mites (Brimer et al, Vet Parasitol (1995) 59, 249-255)
 - Agar plates containing various concentrations of moxidectin and negative control plates. Mite mortality measured over time
 - *Psoroptes ovis* mites from Moredun Research Institute (fully susceptible) used as controls
 - Mortality from four field samples (two from Wales and two from Herefordshire) differed significantly from controls
 - First demonstration of resistance in *Psoroptes ovis* mites to MLs in UK
 - Likely cross resistance to other ML treatments
 - Published Veterinary Record Jan 2018, 182 (4) 106
 - Anecdotal evidence of other cases during winter 2016/17 and 17/18
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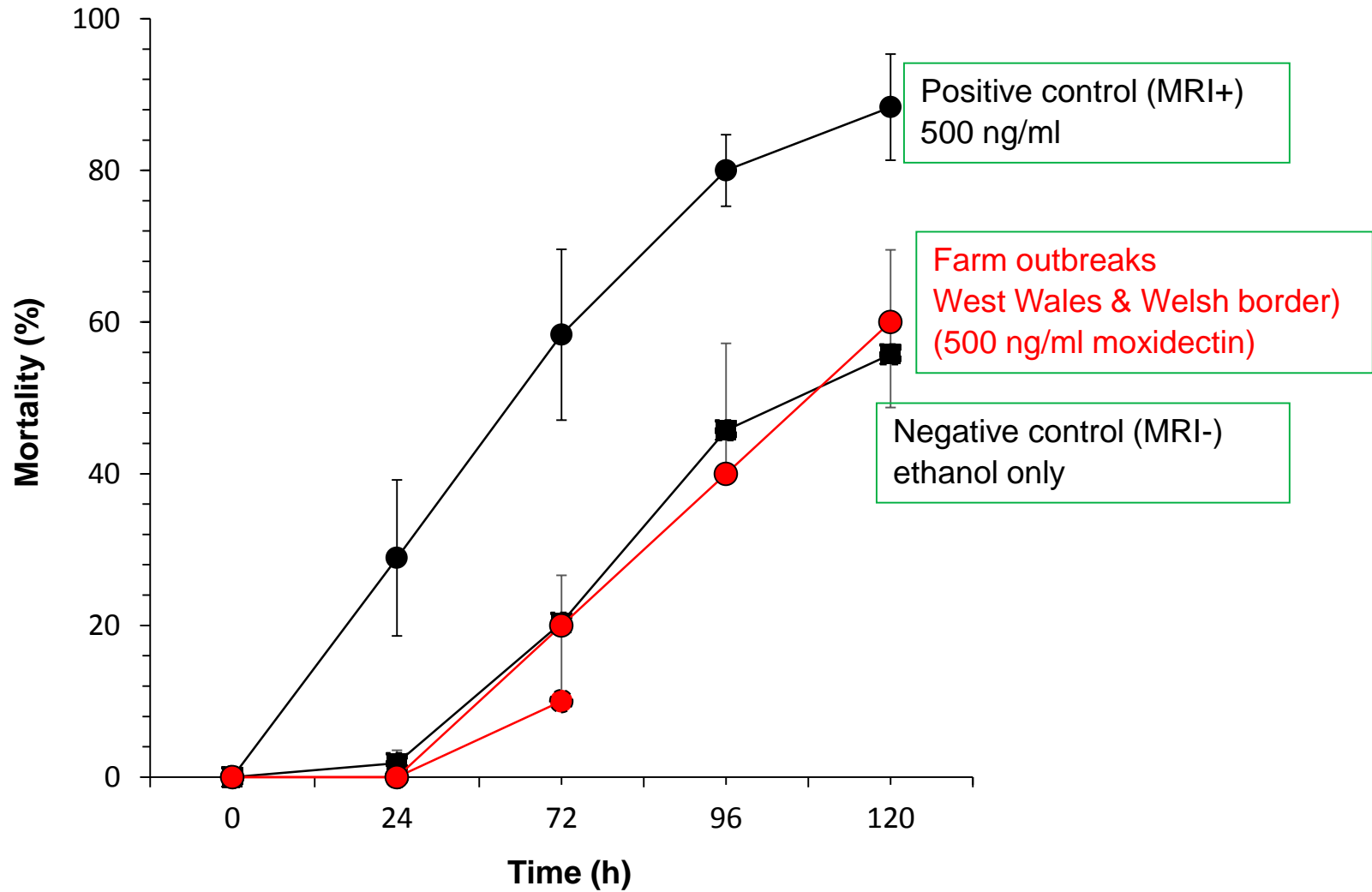
In-vitro bioassay 500 ng/ml moxidectin and ethanol control

Moredun Research Institute mites- controls



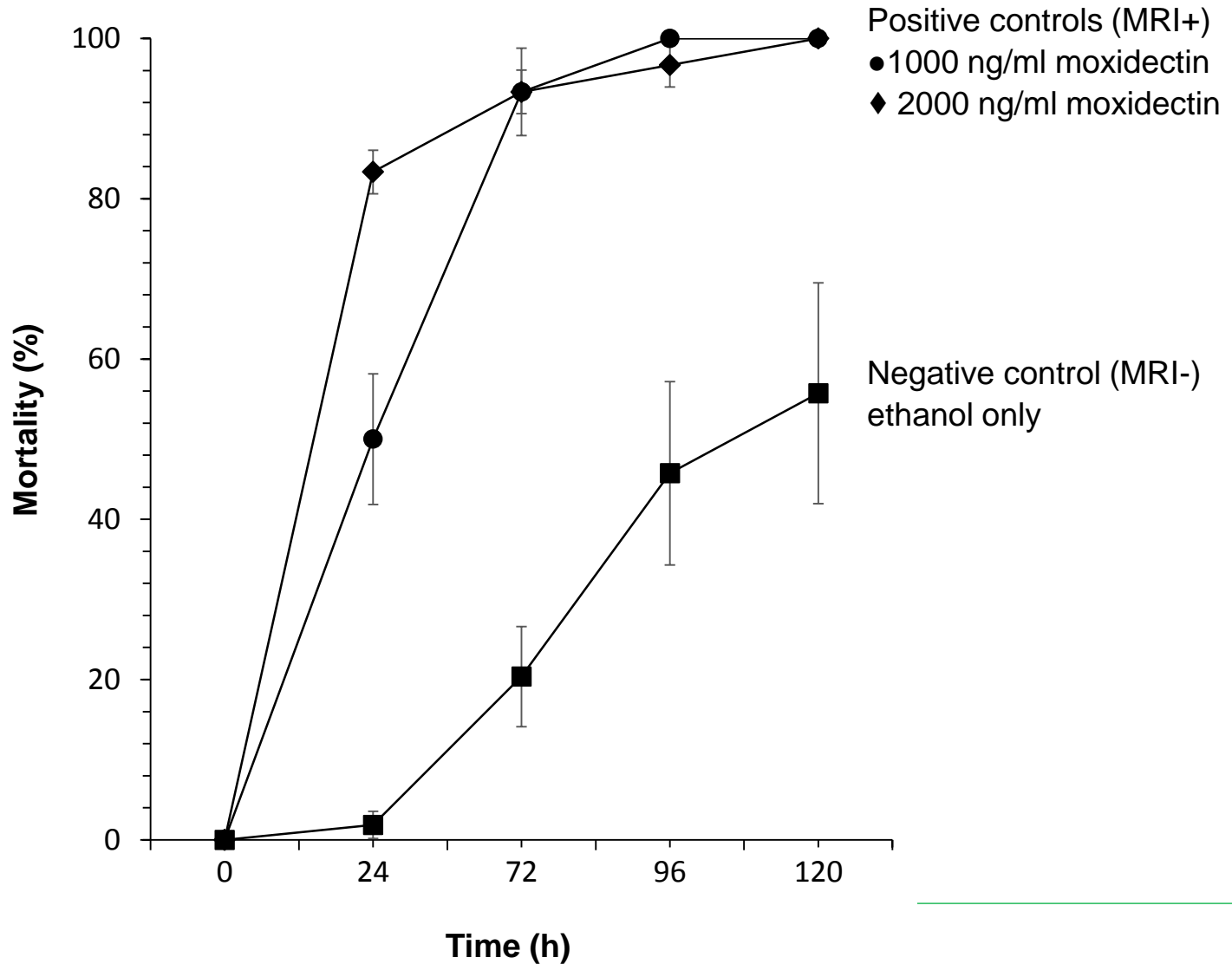
In-vitro bioassay results - 3 farms

500 ng/ml moxidectin and controls



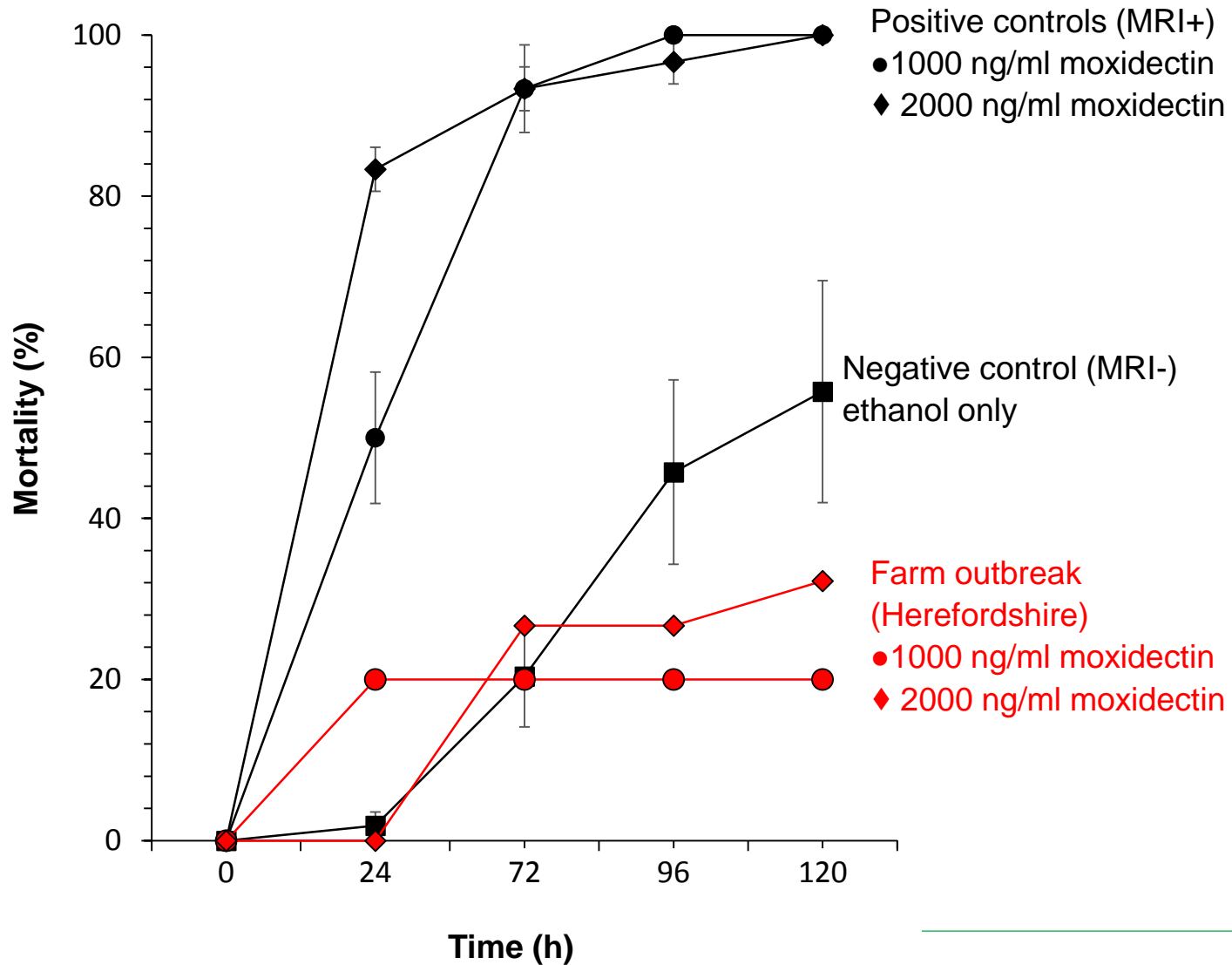
In-vitro bioassay 1000 and 2000ng/ml moxidectin and ethanol control

Moredun Research Institute control mites



In-vitro bioassay results - one farm

1000 and 2000 ng/ml moxidectin and controls



Further work at University of Bristol 2017/18

- Testing more field samples
- Extending *in vitro* tests to using ivermectin and doramectin



Summary

- Diagnose, treat correctly and investigate poor clinical efficacy
- Free ectoparasite examination in Wales (ended 31st March 2018)
- Sheep scab is a severe welfare issue and causes production loss
- ML resistance will make sheep scab more difficult to control



Acknowledgements

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