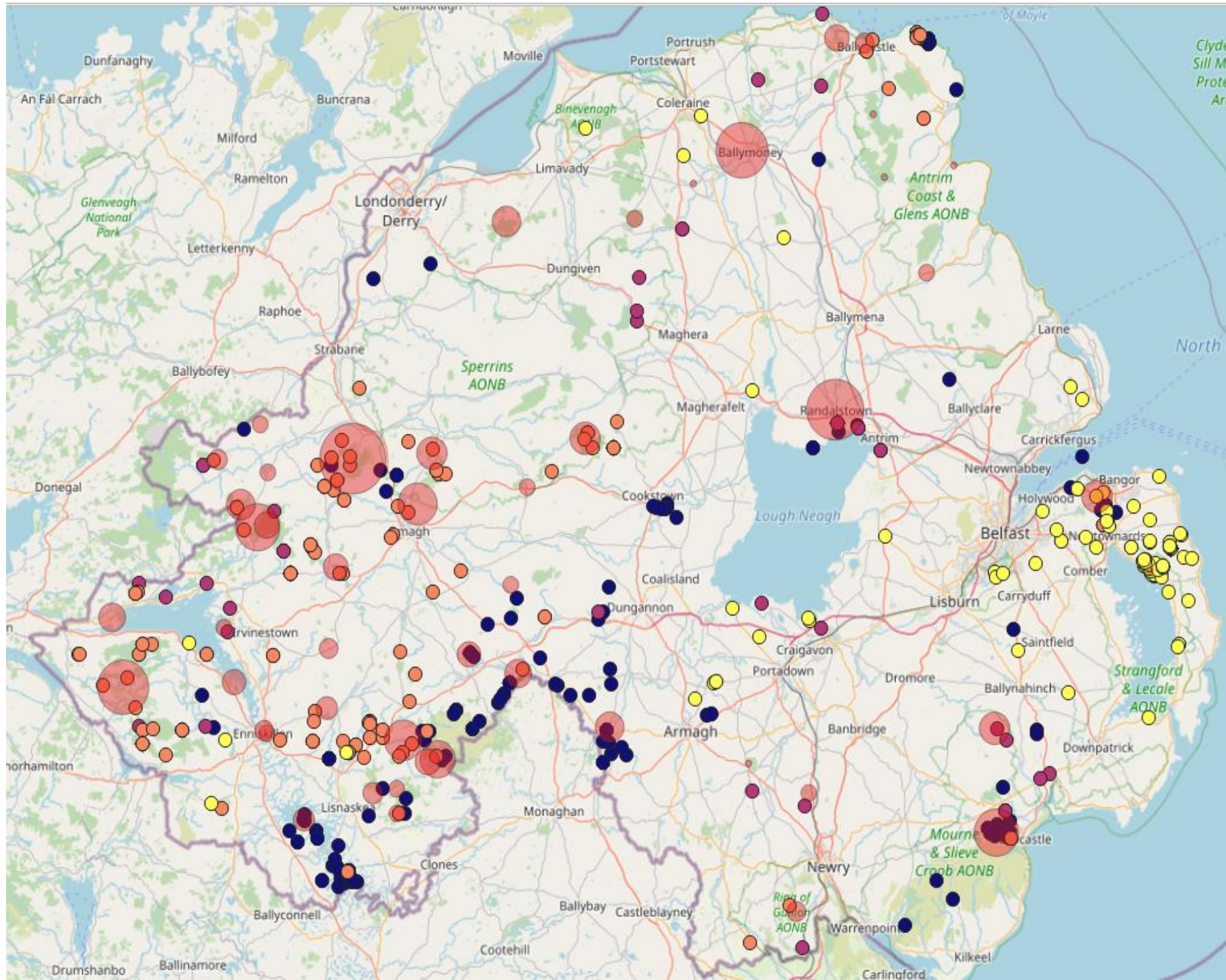




# A Study of Wild Deer Pathogens Relevant to Livestock in Northern Ireland

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Deer in Northern Ireland



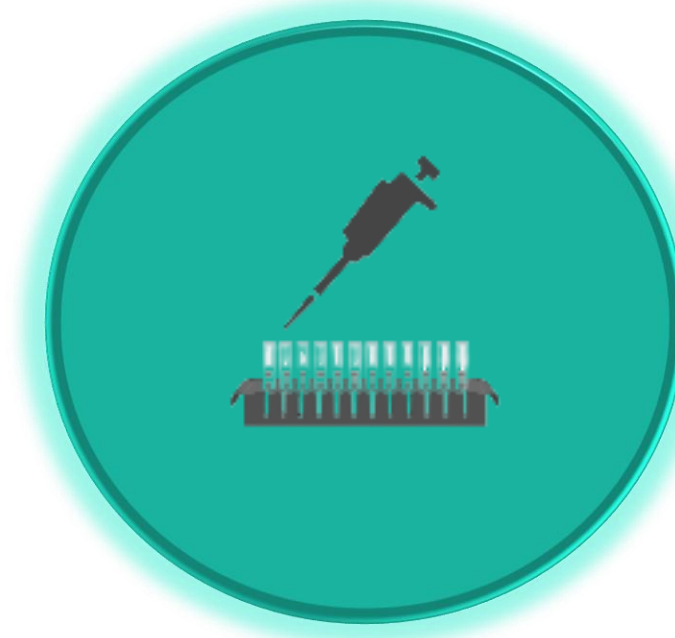
● Fallow ● Sika ● Red ● Muntjac ● Weighted All

Fig.1. Map of estimated deer abundance/locations across NI. Data from DAERA Forestry Service FOI request 2019/20, (red, weighted points), & National Biodiversity Network/British Deer Society Annual deer census (points coloured by species)

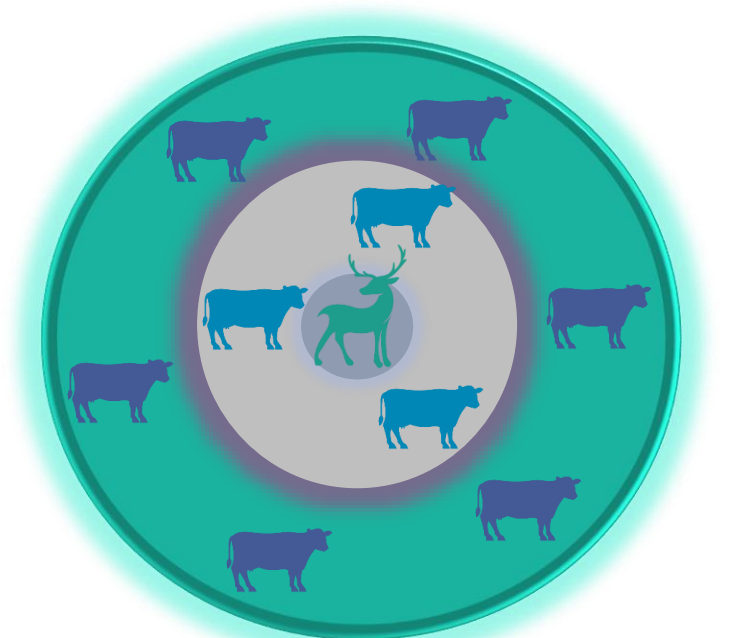
Aims



Assess the potential role of wild deer in the presence/persistence of various pathogens in cattle in Northern Ireland



Investigate Meat Juice Serology (MJS) as a novel disease surveillance tool for wild deer



Develop a risk assessment model to assess the risk of disease transmission under projected circumstances



## Introduction to Meat Juice Serology

- Meat Juice (MJ) is fluid released from tissue *post-mortem*
- Contains intracellular & extracellular material including antibodies

- Lower biosecurity risk than exsanguination or on-farm visits
- Easy, cost effective and safe alternative to serum in ELISA

## Extraction Yield by Temperature Analysis

- 3cm<sup>3</sup> tissue from diaphragm, masseter & neck frozen at either -20°C or -80 °C, then thawed at room temperature, overnight to collect Meat Juice
- Yield measured to nearest mm and effect of temperature analysed
- Welch's t-Test significant difference between temperature extractions (p=0.004, CI - 1.29 - 0.26), due to effects of Masseter (p=0.007) (Fig. 2)

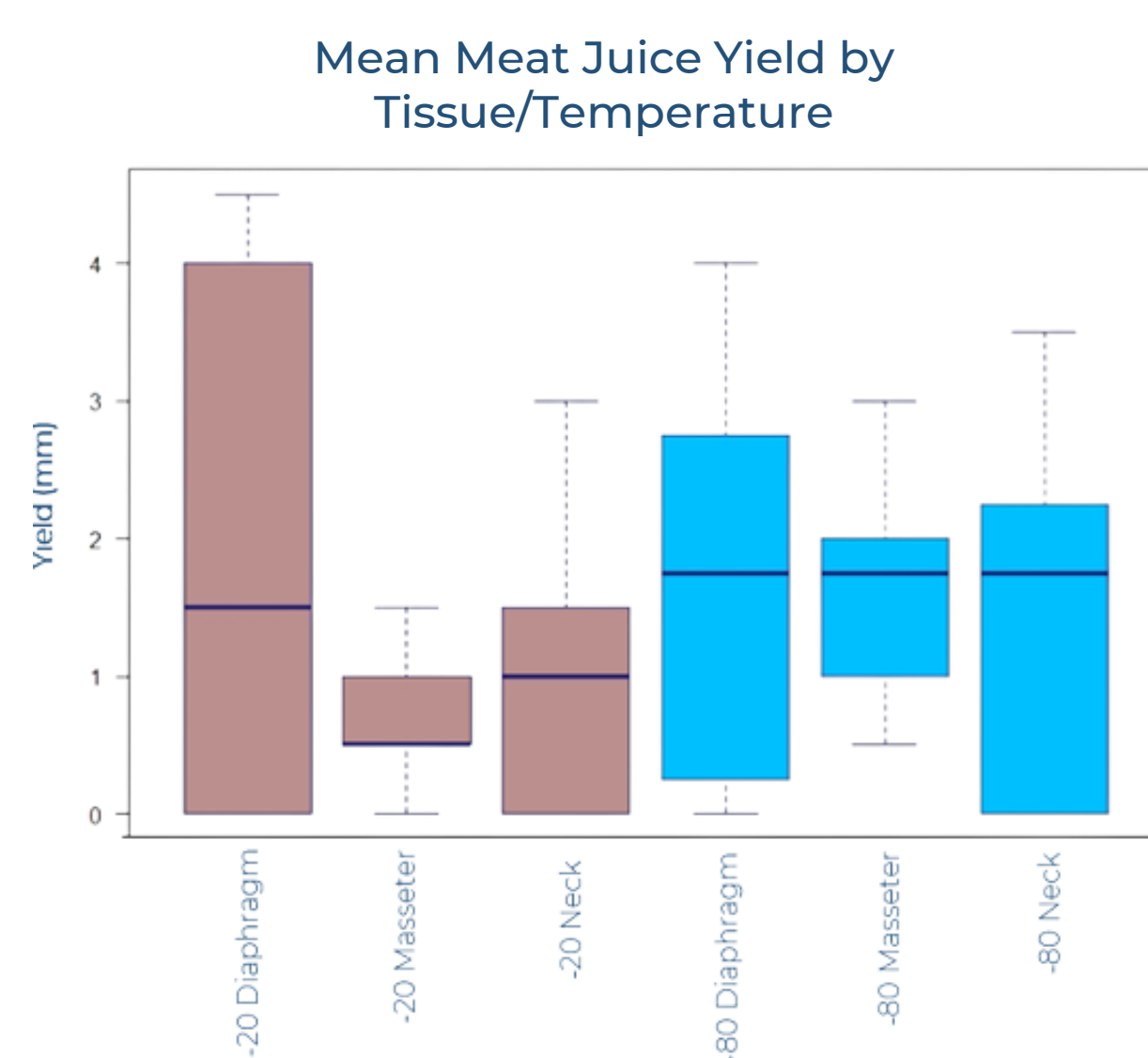


Fig.2 Mean yield of meat juice from experimental freeze temperatures, -20°C & -80°C, by sample type. Difference between freezing mean yields at both temperatures significant (p=0.004), masseter tissue yields significant (p=0.007).

- Extraction from -20°C may provide higher Meat Juice yield volume
- Bio banked deer samples: poor extraction success (11%) & low yields, all stored and thawed from -80°C

## Dilution Factor Analysis

Cattle

- Initial testing at 1:10: No statistically significant between tissue mean %INH (p=0.31)
- Seventeen cases retested at 1:2 dilution; 9 x positive, 8 x negative (n=57): No statistically significant between tissue mean (p=0.20)
- Paired t-test of dilution factors: No statistically significant differences between dilutions (p>1)(Fig. 3)

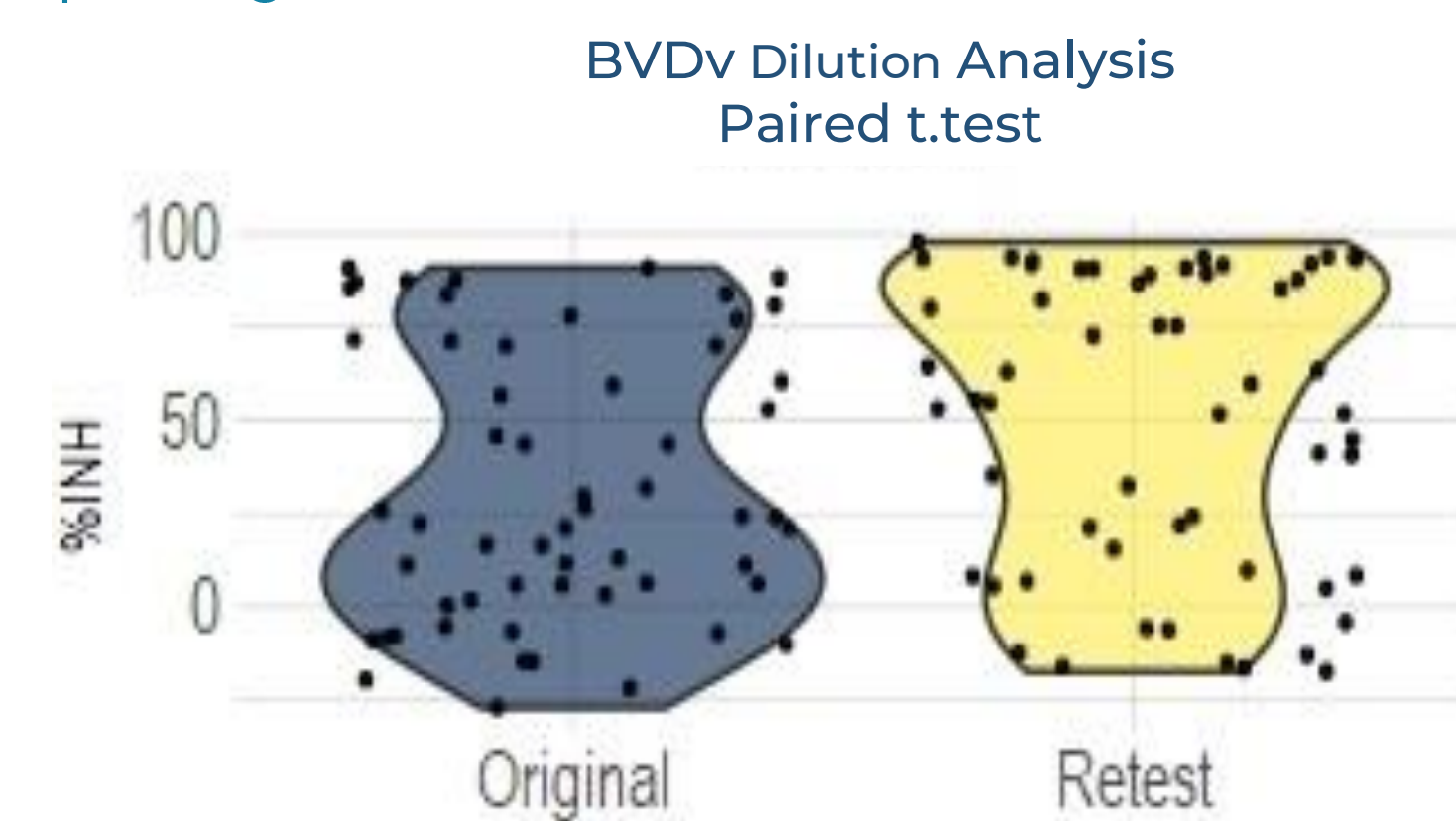


Fig.3. No statistical significance between mean %INH values at manufacturer's recommended 1:10 dilution and 1:2 dilution (to account for #10x fewer antibodies in meat juice compared to serum), on paired t.test

Deer

- Deer 2019/20: No statistically significant between tissue mean %INH differences p=0.52 (tissue only, no serum)
- Deer samples 2022/23 include serum for comparison

Ascertain:

- ➔ The prevalence, range and locations of wild deer in NI against a backdrop of increasing population and lack of all-island approach to management
- ➔ Whether deer act as a reservoir or spillover/spillback host for pathogens relevant to livestock
- ➔ Which diseases are of most need for surveillance in wild deer with respect to livestock welfare and economic impact
- ➔ If wild deer should be considered for surveillance of diseases with welfare and economic impact
- ➔ If there is sufficient contact or shared environment to facilitate interspecies disease transmission
- ➔ If MJS can offer an alternative to serum for wild deer surveillance

Future Goals

Other Analyses

- DEER EARS: Pestivirus RT-PCR 100% negative (n=383)
- PASSIVELY COLLECTED FAECES: non-thermophilic *Campylobacter* spp. 0% (n=40), *Salmonella* 0% (n=93), *E. coli* 68% (n=94). MIC & WGS of *E. coli* AMR genes, high antimicrobial sensitivity
- ACTIVELY COLLECTED FAECES: For modelling; AMR in *E. coli*, Nematode Egg Burden (FEC) & Nemiome, genetic analysis for BZ resistance