

Estimation of the sensitivity of environmental samples for detection of *Salmonella* in turkey flocks

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Introduction

Little is known about the best way to sample and test turkey flocks for *Salmonella*. Environmental sampling of pooled faeces is regarded as more cost effective to detect *Salmonella* infection in flocks than the collection and testing of individual faeces (Aho, 1992). Therefore the objective of this study was to investigate the effectiveness of pooled sampling of both faecal and dust samples for detection of *Salmonella* in turkey flocks.

Methods

Data collection

- 60 individual droppings from each of 43 turkey flocks
- Half of each sample cultured as an individual sample
- Half of each sample used in a pool of 5 droppings (12 pools of 5 per flock)
- 2x100g dust samples into sterile plastic honey jars
- One pair of boot swabs for each flock



Boot swab

Factors that influence isolation of salmonella in a faecal sample

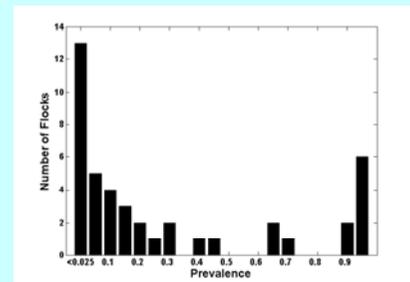
$$1 - \exp\left(-C \rho w\right) \left(1 - e^{-\frac{\rho}{w}}\right)$$

Number of salmonella clusters/g (C), Effectiveness of diagnostic test (ρ), Prevalence (Cρw), Sample weight (w)

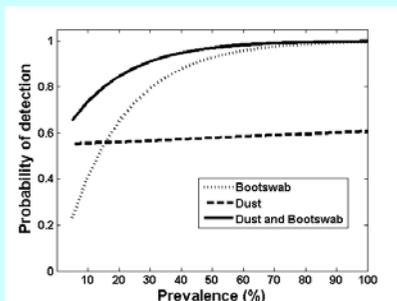
Estimation of parameters (C, ρ), and sensitivities of testing dust and boot swabs by Bayesian methods using WinBUGS

Results

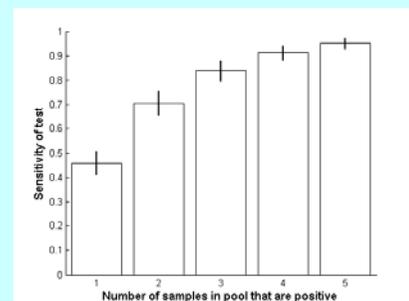
- 27 farms positive by testing 12 pools of 5 faecal droppings
- 20 farms positive by testing 1 pair of boot swabs
- 26 farms positive by testing 2 dust samples
- 27 farms positive by testing 60 individual faecal droppings
- Significant dependence on likelihood of positive flock on the within flock prevalence of both boot swabs and dust samples



Distribution of flock-level *Salmonella* prevalence in the turkey flocks



The sensitivity of a single pair of boot swabs (▲), a single dust sample (●), and both a pair of boot swabs and a dust sample (■) to detect *Salmonella* in a turkey flock relative to the within-flock prevalence.



Results show a small dilution effect, with reducing sensitivity of detection as the no. of positive droppings in a pool decreases

Conclusions

- Pooling of faecal droppings is an efficient method of *Salmonella* detection, and the more droppings in the pool the more sensitive the pooled sample.
- At low prevalence, dust is more sensitive than pooled faecal sampling, and a combination of both dust sampling and pooled faecal sampling is recommended for the most efficient *Salmonella* detection.

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