

Sero-epidemiology of *Neospora caninum* in 114 cattle herds in SW England

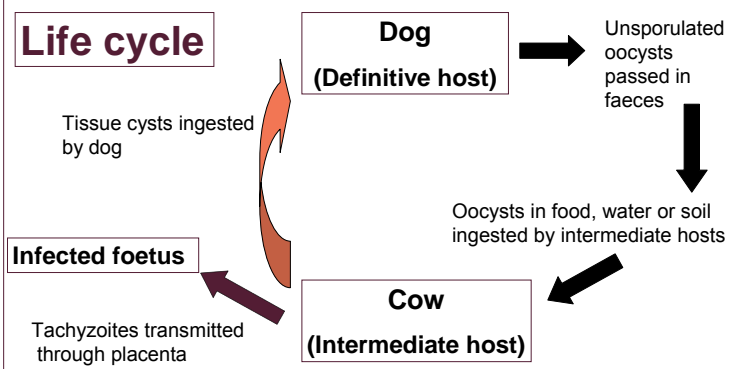


K.A. Woodbine*, G.F. Medley, A. Ramirez-Villaescusa, S. Mason, S.J. Moore, L.E. Green
Department of Biological Sciences, University of Warwick, Coventry, CV4 7AL. Email: K.A.Woodbine@warwick.ac.uk

Introduction

- *Neospora caninum* - an apicomplexan protozoan parasite
- First recognised in the 1980s & now worldwide
- Important cause of abortions, neonatal morbidity, low milk yield, reduced weight gain & premature culling.
- Affects both dairy & suckler cattle
- Cattle are infected by horizontal & vertical transmission

Life cycle



Objective

Present patterns of seroprevalence of *N. caninum* antibodies & their associations with cattle age, herd factors & dam-offspring pairs

Methods

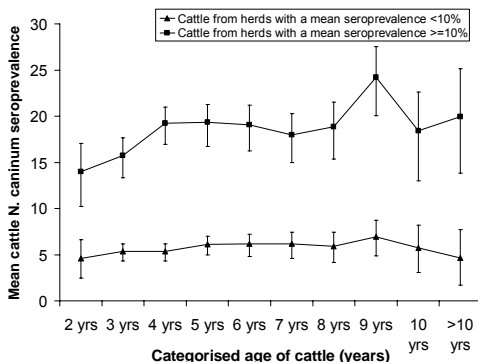
- 4-year study of cattle (dairy & suckler) herds in SW England
- Blood samples were collected from 15,736 cattle from 114 herds between Dec. 2002 & April 2006
- Herds situated in the Randomised Badger Culling Trial area & some herds were restocked after FMD in 2001
- Herds visited up to 3x, approx. 1 year apart
- All accessible breeding cattle >2 years of age blood sampled at each visit
- Samples tested with IDEXX ELISA for *N. caninum*
- Level of antibodies expressed as sample to positive control (seropositivity)
- 110 farmers completed interview questionnaire
- A multilevel model (level 1: herds, level 2: cattle, level 3: visits) was built using the continuous outcome antibody positivity

Results

- 94% (107) of herds had at least 1 seropositive cow on at least 1 occasion
- 87% (12,139) of cattle always tested neg., 8% always tested pos.

- Median herd seroprevalence was 10%
- 27% of herds had a seroprevalence between 5-10%
- Nearly 3% of herds had a seroprevalence >40%

Horizontal transmission



- In herds with mean seroprevalence ≥10% an increase in seroprevalence in 2-4 year olds was noted
- Horizontal transmission is greater in high prevalence herds

Multilevel model

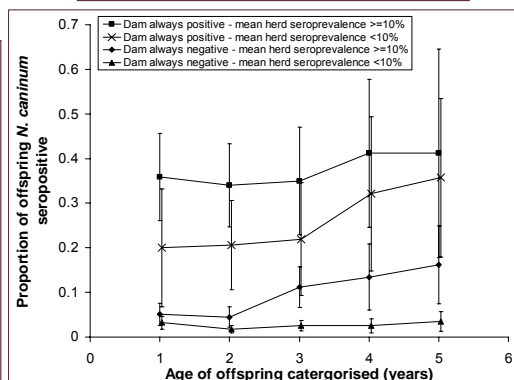
Decreased seropositivity

- Cattle in restocked herds had lower seropositivity than cattle in continuously stocked herds
- Purchased cattle had lower seropositivity than homebred cattle in herds with mean seroprevalence ≥10%

Increased seropositivity

- Seropositivity increased with cattle age in herds with mean seroprevalence ≥10%
- Purchased cattle had higher seropositivity than homebred cattle in herds with mean seroprevalence <10%

Vertical transmission



- Offspring from seropositive dams were more likely to be seropositive
- Proportion of seropositive offspring increased with offspring age
- Dam effect was greater than herd effect

Conclusions

- Vertical transmission from seropositive dams occurred in all herds
- Horizontal transmission occurred between adult cattle in herds with a seroprevalence ≥10%
- Herds with seroprevalence ≥10% had continuous exposure (increase in seroprevalence with age; seroconversion of purchased cattle)
- Lower seroprevalence in restocked herds suggests one source of infection
- Between-herd persistence enhanced by purchased cattle & within-herd persistence enhanced by horizontal transmission.

Acknowledgements

Funded by BBSRC & DEFRA. We are grateful for the active contribution of all the farmers & everyone who helped with data collection & serum testing