**Neospora Abortion in Cattle**

*Neospora caninum* is a protozoal parasite whose lifecycle includes both the dog (definitive host) and the cow (intermediate host).

**Lifecycle**

A suggested summary of the lifecycle of *Neospora* is shown in Figure 1 and is composed of definitive and intermediate hosts without both the lifecycle cannot complete, however vertical transmission (from infected dam to calf across the placenta) is thought to be a more significant route of propagation within a herd (Schares, Peters et al. 1998; Dubey 1999).

The fox has also been demonstrated as acting as a definitive host (Buxton, Maley et al. 1997a; Almeria, Ferrer et al. 2002), however shedding through infected faeces has yet to be conclusively demonstrated – therefore it remains unclear as to whether they can pass infection to cattle.

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**Figure 1 - Suggested lifecycle of Neospora caninum, adapted from (Conraths and Gottstein 2007)**
Effects of infection

On cattle...
Approximately 15% of cattle infected with Neospora will abort (Buxton, Maley et al. 1997b) and it is thought to be more common in cows in their 1st or 2nd lactation, however relatively few animals (<5%) go on to abort for a second time (due to Neospora) (Anderson, Palmer et al. 1995).
More significant than this however is that offspring born alive are 50-95% likely to be infected themselves (Reichel and Ellis 2002) and will go on to have a higher risk of abortion themselves, as a result familial lines of Neospora infected, aborting animals can be created.
27% of abortions diagnosed in 2008 were attributable to infection with Neospora (VLA 2008).

On dogs...
Infection with Neospora in dogs is usually asymptomatic, and farm dogs have been shown to be more likely to be infected than urban (Antony and Williamson 2003), however occasionally infection can cause neurological symptoms (Jubb, Kennedy et al. 2007).

Diagnosis

Abortion
Diagnosing abortion due to Neospora is relatively accurate (blood sampling at the time of abortion is relatively specific, therefore we can have confidence in a positive, but positive animals do not always abort). To obtain a definitive diagnosis examination of the brain of the aborted calf using special stains is required.

Surveillance/screening
Detecting the number of infected animals (prevalence) is harder to do due to the absence of a complete understanding of the lifecycle of Neospora and accuracy varies according to the time of sampling in the lactation cycle.
A better solution for determining the level of infection within a herd is through the sampling of calves aged <2wks. Infection across the placenta is ~90% effective; therefore a positive result from a calf indicates that the dam is infected (to a 90% confidence interval).
Bulk tank sampling can also be used, however the sensitivity of the test makes it only useful in herds with >10-20% of cows infected (Bjorkman and Lunden 1998; Schares, Barwald et al. 2003; Schares, Barwald et al. 2004).

References