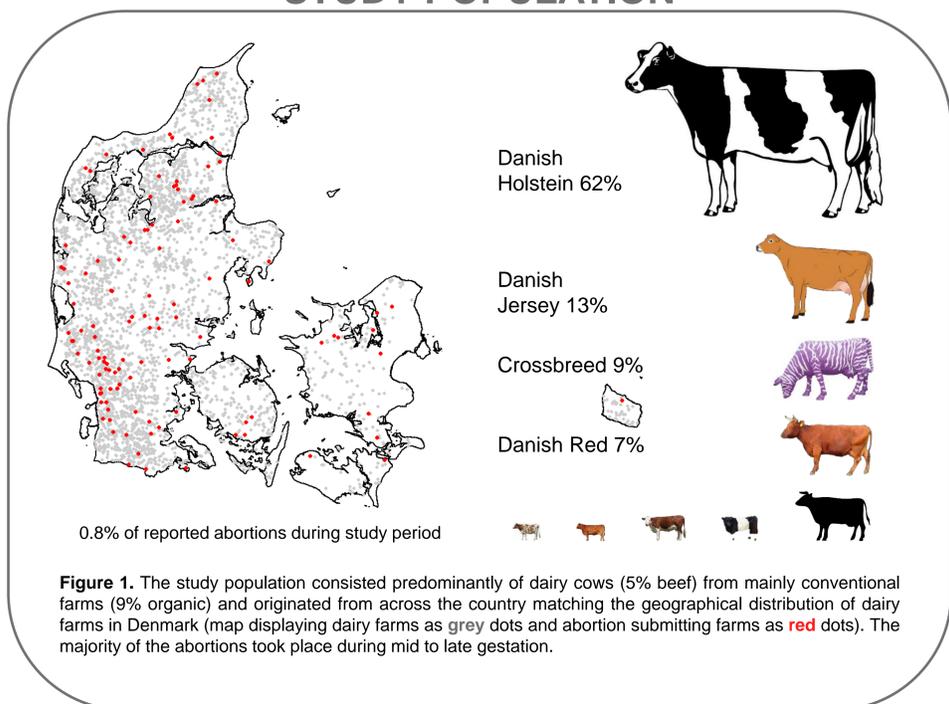


# Bovine Abortions and Stillbirths in Denmark 2015 to 2017

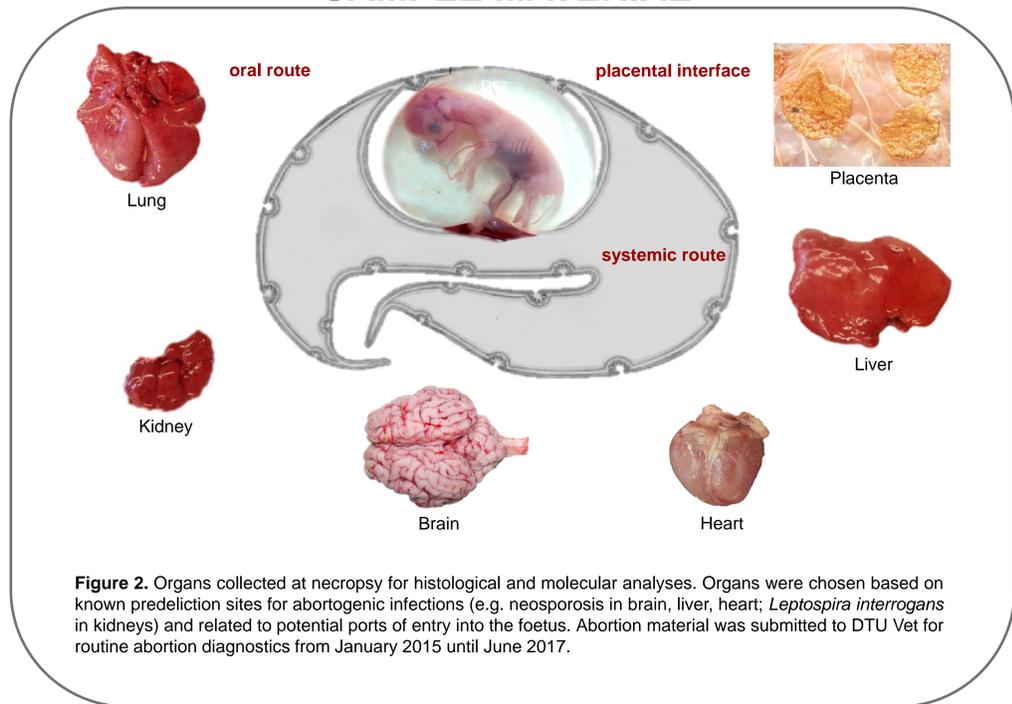
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**Infections** are the most common cause of bovine abortion. Here we report recent diagnostic findings in bovine abortion material from Denmark, a country with a large dairy sector and high animal health standards. This study was conducted in order to gain in-depth knowledge on infectious causes of abortions i.e. to identify and localize infectious agents in placental and foetal tissues. The cultivation-independent methods **Fluorescence *in situ* hybridization (FISH)** and **second generation sequencing** were applied additionally to routine histopathology and bacterial cultivation.

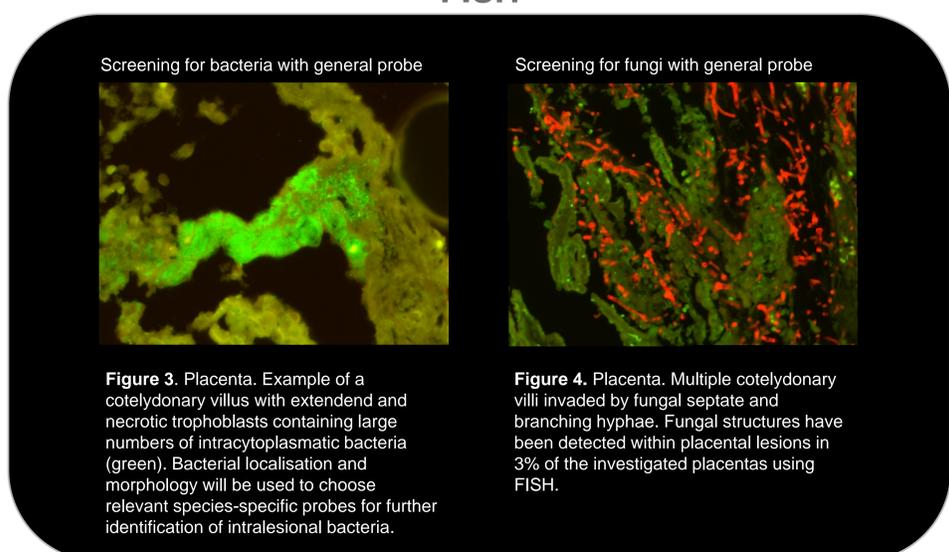
## STUDY POPULATION



## SAMPLE MATERIAL



## FISH



## RESULTS

### BRUCELLA ABORTUS CULTIVATION

All foetal organ pools were negative for *Brucella abortus*.

### HISTOPATHOLOGICAL SCREENING FOR NEOSPORA CANINUM

Neosporosis was diagnosed in 30 out of 162 abortions (19%) based on findings in HE stained tissue sections of brain, heart, and liver.

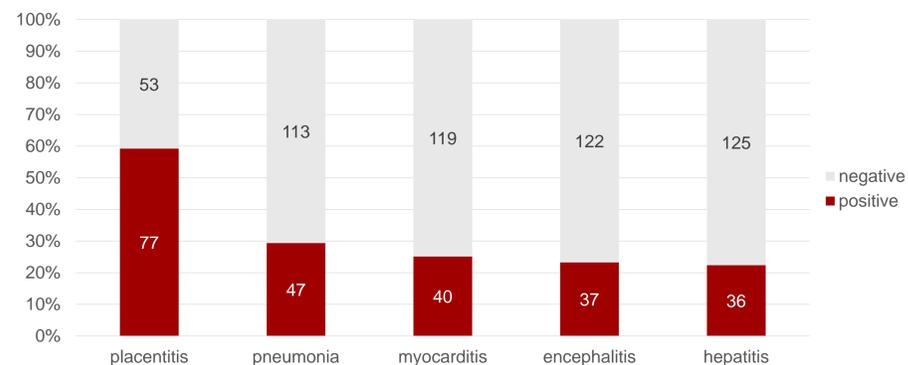
### ELISA

In 90% of the cases, a blood sample of the dam was submitted. All samples were negative for maternal BVDV antibodies.

**Table 1.** Bacterial genres/species isolated using routine aerobic cultivation.

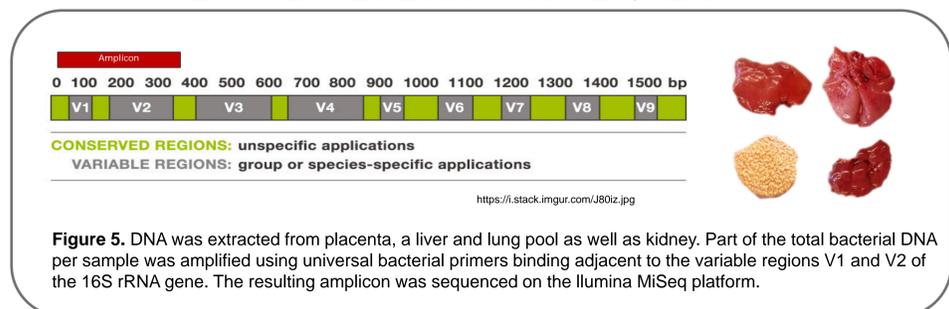
Species	n	Genus/Species	n	Genus/Species	n	Genus/Species	n
<i>Escherichia coli</i>	37	<i>Aeromonas</i> spp.	7	<i>Listeria monocytogenes</i>	3	<i>Moellerella wisconsensis</i>	1
<i>Acinetobacter</i> spp.	15	<i>Staphylococcus</i> spp.	6	<i>Vibrio</i> spp.	3	<i>Morganella morganii</i>	1
<i>Aerococcus</i> spp.	13	<i>Trueperella pyogenes</i>	5	<i>Vagococcus</i> spp.	3	<i>Pantoea agglomerans</i>	1
<i>Proteus</i>	13	<i>Streptococcus</i> spp.	5	<i>Lactobacillus</i> spp.	2	<i>Pasteurella</i> spp.	1
<i>Lactococcus</i> spp.	9	<i>Bacillus licheniformis</i>	5	<i>Klebsiella</i> spp.	2	<i>Serratia fonticola</i>	1
<i>Enterococcus</i> spp.	8	<i>Hafnia alvei</i>	5	<i>Citrobacter</i> spp.	1	no bacteria isolated	30

n = number of abortions from which genus/species was isolated



**Figure 6.** Distribution of organ lesions diagnosed in HE tissue sections shown as number and percentage of abortions.

## SECOND GENERATION SEQUENCING



## CONCLUSIONS

- **Neosporosis** was the most frequently diagnosed infection.
- **No epizootic abortifacients** were found on study population level, however, due to very few abortions submitted per herd, no conclusions can be drawn on herd level.
- **Fungi** seem to play a minor role as abortogenic agent in Denmark.

### SECOND GENERATION SEQUENCING

All abortion samples were **negative** for DNA from the following known abortifacients:

- *Chlamydia/Parachlamydia* spp.
- *Brucella abortus*
- *Campylobacter fetus*
- *Pajaroellobacter abortibovis* (epizootic bovine abortion)
- *Listeria ivanovii*

*Leptospira interrogans* DNA was detected in one liver sample.  
*Coxiella burnetii* DNA was detected in samples from four abortions.