Bovine Abortions and Stillbirths in Denmark 2015 to 2017

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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

Danish Holstein 62%
Danish Jersey 13%
Crossbreed 9%
Danish Red 7%

0.8% of reported abortions during study period

Figure 1. The study population consisted predominantly of dairy cows (5% beef) from mainly conventional farms (9% organic) and originated from across the country matching the geographical distribution of dairy farms in Denmark (map displaying dairy farms as grey dots and abortion submitting farms as red dots). The majority of the abortions took place during mid to late gestation.

SAMPLE MATERIAL

Table 1. Bacterial genuses/species isolated using routine aerobic cultivation.

<table>
<thead>
<tr>
<th>Specie n</th>
<th>Genus/Species n</th>
<th>Genus/Species n</th>
<th>Genus/Species n</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>Escherichia coli</td>
<td>Listeria monocytogenes</td>
<td>34.4</td>
</tr>
<tr>
<td>15</td>
<td>Acinetobacter spp.</td>
<td>6</td>
<td>Vibrio spp.</td>
</tr>
<tr>
<td>13</td>
<td>Aerococcus spp.</td>
<td>5</td>
<td>Veccapucca spp.</td>
</tr>
<tr>
<td>13</td>
<td>Proteus spp.</td>
<td>5</td>
<td>Pantoea agglomerans</td>
</tr>
<tr>
<td>9</td>
<td>Lactococcus spp.</td>
<td>5</td>
<td>Klebsiella spp.</td>
</tr>
<tr>
<td>8</td>
<td>Enterococcus spp.</td>
<td>5</td>
<td>Citrobacter spp.</td>
</tr>
</tbody>
</table>

Results

- 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.

- All abortion samples were negative for Brucella abortus.
- Neosporosis was diagnosed in 30 out of 162 abortions (19%) based on findings in HE stained tissue sections of brain, heart, and liver.
- ELISA

RESULTS

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.

Table 1. Distribution of organ lesions diagnosed in HE tissue sections shown as number and percentage of abortions.

<table>
<thead>
<tr>
<th>Species</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>placentia</td>
<td>53</td>
</tr>
<tr>
<td>pneumonia</td>
<td>113</td>
</tr>
<tr>
<td>myocardia</td>
<td>47</td>
</tr>
<tr>
<td>encephalitis</td>
<td>40</td>
</tr>
<tr>
<td>hepatia</td>
<td>119</td>
</tr>
<tr>
<td>122</td>
<td></td>
</tr>
<tr>
<td>125</td>
<td></td>
</tr>
</tbody>
</table>

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

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.

- All abortion samples were negative for DNA from the following known abortifacients: 
  - Chlamydia/Panochlamydia spp.
  - Brucella abortus
  - Campylobacter fetus
  - Pajaroellobacter abortibacile (epizootic bovine abortion)
  - Listeria ivanovii
  - Leptospira intermedia DNA was detected in one liver sample.
  - Coxiella burnetii DNA was detected in samples from four abortions.

SECOND GENERATION SEQUENCING

All abortion samples were negative for DNA from the following known abortifacients: 
- Chlamydia/Panochlamydia spp.
- Brucella abortus
- Campylobacter fetus
- Pajaroellobacter abortibacile (epizootic bovine abortion)
- Listeria ivanovii

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