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 second generation sequencing were applied additionally to routine histopathology and bacterial cultivation.

**STUDY POPULATION**

Danish Holstein 62%

Danish Jersey 13%

Crossbred 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 (95% 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**

**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.

**SECOND GENERATION SEQUENCING**

<table>
<thead>
<tr>
<th>Species</th>
<th>n</th>
<th>Genus/Species</th>
<th>n</th>
<th>Genus/Species</th>
<th>n</th>
<th>Genus/Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Escherichia coli</td>
<td>37</td>
<td>Listeria monocytogenes</td>
<td>3</td>
<td>Modenera wiscensensis</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Acinetobacter spp.</td>
<td>15</td>
<td>Vibrio spp.</td>
<td>6</td>
<td>Morganella morganii</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Aerococcus spp.</td>
<td>13</td>
<td>Veigazzo spp.</td>
<td>5</td>
<td>Pantoea agglomerans</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Proteus</td>
<td>13</td>
<td>Strепteococcus spp.</td>
<td>5</td>
<td>Lactobacillus spp.</td>
<td>2</td>
<td>Pasteurella spp.</td>
</tr>
<tr>
<td>Lactococcus spp.</td>
<td>9</td>
<td>Bactillus hackeniformis</td>
<td>5</td>
<td>Klebsiella spp.</td>
<td>2</td>
<td>Senatai folicula</td>
</tr>
<tr>
<td>Enterococcus spp.</td>
<td>8</td>
<td>Hafnia alvus</td>
<td>5</td>
<td>Citrobacter spp.</td>
<td>1</td>
<td>no bacteria isolated</td>
</tr>
</tbody>
</table>

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

**CONCLUSIONS**

- **Neosporosis** was the most frequently diagnosed infection.
- **No epizootic abortificients** 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.