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Jensen, Tim Kåre

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TSE examination of small ruminants in Denmark 2001-2018

Tim K. Jensen, professor, veterinary pathologist, PhD, DVM

The aim of this report is to summarize information on the TSE testing of small ruminants performed in Denmark 2001 to 2018. DTU-VET is the national reference laboratory of TSE/Scrapie in Denmark. The Danish TSE surveillance program is carried out in accordance with the demands given by the EU Commission as well as OIE. Over the years the TSE surveillance program has changed and included during 2018 the following of the small ruminant categories:

- Small ruminants with a clinical suspicion of TSE without age limit.
- All cases examined at DTU-VET
- A random sample of fallen stock animals older than 18 months to fulfill the requirements of the TSE legislation, which with the Danish sheep and goat population in 2017 are annually 500 sheep tests and 100 goat tests. The tests are performed at a private, approved laboratory.

The number of animals tested within the categories clinical suspicions, fallen stock and healthy slaughter animals are listed in Table 1 together with the number of TSE positive cases. Table 2 summarizes the data concerning the PrP positive cases.

Table 1. Number of small ruminants tested for TSE annually within different categories

<table>
<thead>
<tr>
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<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>TSE positive</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
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<td>2</td>
<td>5</td>
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<td>1</td>
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<td>0</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical suspicions</td>
<td>8</td>
<td>11</td>
<td>8</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fallen stock</td>
<td>0</td>
<td>492</td>
<td>3000</td>
<td>7500</td>
<td>8000</td>
<td>8000</td>
<td>8000</td>
<td>8000</td>
<td>8000</td>
<td>8000</td>
<td>3800</td>
<td>637</td>
<td>703</td>
<td>771</td>
<td>812</td>
<td>609</td>
<td>300</td>
<td>75000</td>
<td></td>
</tr>
<tr>
<td>Healthy animals</td>
<td>82</td>
<td>641</td>
<td>664</td>
<td>98</td>
<td>310</td>
<td>436</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2500</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Summary of the 13 indigenous TSE cases in small ruminants 2001-2018.

<table>
<thead>
<tr>
<th>No</th>
<th>Year</th>
<th>Category</th>
<th>Breed</th>
<th>Age (years)</th>
<th>Rapid test private lab.</th>
<th>Histopathology</th>
<th>Additional results regarding TSE</th>
<th>TSE genotype</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2005</td>
<td>Fallen sheep</td>
<td>IDEXX</td>
<td>7</td>
<td>Not done due to autolysis.</td>
<td>PrP positive</td>
<td>WB positive, BioRad WB* positive</td>
<td>AHQ/ARQ</td>
<td>Alographical scrapie, no signs of BSE</td>
</tr>
<tr>
<td>2</td>
<td>2005</td>
<td>Fallen sheep</td>
<td>IDEXX</td>
<td>10</td>
<td>Not done due to autolysis.</td>
<td>PrP positive</td>
<td>WB negative, OIE-SAF WB positive, BioRad WB positive</td>
<td>AHQ/ARQ</td>
<td>Alographical scrapie, no signs of BSE</td>
</tr>
<tr>
<td>3</td>
<td>2006</td>
<td>Fleece sheep</td>
<td>IDEXX</td>
<td>9</td>
<td>Not done due to autolysis.</td>
<td>PrP positive</td>
<td>Cerebellum positive, Prionics WB positive</td>
<td>AHQ/ARQ</td>
<td>Alographical scrapie, no signs of BSE</td>
</tr>
<tr>
<td>4</td>
<td>2006</td>
<td>Fleece sheep</td>
<td>IDEXX</td>
<td>8</td>
<td>Not done due to autolysis.</td>
<td>PrP positive</td>
<td>Cerebellum positive, Prionics WB positive</td>
<td>AHQ/ARQ</td>
<td>Alographical scrapie, no signs of BSE</td>
</tr>
<tr>
<td>5</td>
<td>2006</td>
<td>Fleece sheep</td>
<td>IDEXX</td>
<td>7</td>
<td>Not done due to autolysis.</td>
<td>Positive for PrP by IDEXX HerdCheck.</td>
<td>Prionics WB positive</td>
<td>AHQ/ARQ</td>
<td>Alographical scrapie, no signs of BSE</td>
</tr>
<tr>
<td>6</td>
<td>2010</td>
<td>Fleece sheep</td>
<td>IDEXX</td>
<td>12</td>
<td>Not done due to autolysis.</td>
<td>Positive for PrP by IDEXX HerdCheck.</td>
<td>Prionics WB positive</td>
<td>AHQ/ARQ</td>
<td>Alographical scrapie, no signs of BSE</td>
</tr>
<tr>
<td>7</td>
<td>2010</td>
<td>Fleece sheep</td>
<td>IDEXX</td>
<td>10</td>
<td>Not done due to autolysis.</td>
<td>Positive for PrP by IDEXX HerdCheck.</td>
<td>Prionics WB positive</td>
<td>AHQ/ARQ</td>
<td>Alographical scrapie, no signs of BSE</td>
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<tr>
<td>8</td>
<td>2011</td>
<td>Fleece sheep</td>
<td>IDEXX</td>
<td>15</td>
<td>Not done due to autolysis.</td>
<td>Positive for PrP by IDEXX HerdCheck.</td>
<td>Prionics WB positive</td>
<td>AHQ/ARQ</td>
<td>Alographical scrapie, no signs of BSE</td>
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<tr>
<td>9</td>
<td>2011</td>
<td>Fleece sheep</td>
<td>IDEXX</td>
<td>13</td>
<td>Not done due to autolysis.</td>
<td>Positive for PrP by IDEXX HerdCheck.</td>
<td>Prionics WB positive</td>
<td>AHQ/ARQ</td>
<td>Alographical scrapie, no signs of BSE</td>
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<tr>
<td>10</td>
<td>2011</td>
<td>Fleece sheep</td>
<td>IDEXX</td>
<td>9</td>
<td>Not done due to autolysis.</td>
<td>Positive for PrP by IDEXX HerdCheck.</td>
<td>Prionics WB positive</td>
<td>AHQ/ARQ</td>
<td>Alographical scrapie, no signs of BSE</td>
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<tr>
<td>11</td>
<td>2011</td>
<td>Fleece sheep</td>
<td>IDEXX</td>
<td>8</td>
<td>Not done due to autolysis.</td>
<td>Positive for PrP by IDEXX HerdCheck.</td>
<td>Prionics WB positive</td>
<td>AHQ/ARQ</td>
<td>Alographical scrapie, no signs of BSE</td>
</tr>
<tr>
<td>12</td>
<td>2011</td>
<td>Fleece sheep</td>
<td>IDEXX</td>
<td>13</td>
<td>Not done due to autolysis.</td>
<td>Positive for PrP by IDEXX HerdCheck.</td>
<td>Prionics WB positive</td>
<td>AHQ/ARQ</td>
<td>Alographical scrapie, no signs of BSE</td>
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<tr>
<td>13</td>
<td>2016</td>
<td>Fleece sheep</td>
<td>IDEXX</td>
<td>16</td>
<td>Not done due to autolysis.</td>
<td>Positive for PrP by IDEXX HerdCheck.</td>
<td>Prionics WB positive</td>
<td>AHQ/ARQ</td>
<td>Alographical scrapie, no signs of BSE</td>
</tr>
</tbody>
</table>

Table 2. Summary of the 13 indigenous TSE cases in small ruminants 2001-2018.

During 2001 to 2018 app. 77,000 small ruminants were tested for TSE. All together 13 TSE cases were confirmed (12 fallen stock sheep and 1 slaughter sheep)! All 13 cases were diagnosed atypical scrapie. The most common differential diagnosis among the 50 clinical scrapie suspicions was listeriosis - found in 28% of the cases. Listeriosis was characterized by multifocal, necrotizing, non-suppurative encephalitis confined to the brainstem region.

Classic scrapie has so far never been reported from Denmark.

Did you know that: The annual average Danish sheep population 2001 to 2018 was 150,000 animals. The number of sheep herds in 2018 is ca. 2500 and 84% of the herds have less than 100 sheep. The Danish goat population is ca. 12,000 animals.