Vesicular Stomatitis Virus
U.S. Outbreak

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2006 USAHA
Minneapolis, MN
VSV Agent, History, & Host Range

- Two serotypes – New Jersey and Indiana
- Periodically reported in the southeastern and southwestern U.S. since the early 1900’s
- Last outbreaks in the southwest were reported in the mid-1990’s
- Vesicular stomatitis usually occurs during the summer months and cases tend to cluster along river drainages (supporting the potential role of insect vectors)
- Primarily affects horses, cattle, and swine but other susceptible species include camelids, wildlife, sheep, goats, and humans
Gross Lesions and Clinical Signs

- Vesicles that rupture producing ulcers
- Vesicles typically occur in the oral cavity, on the lips or nose, on teats, and on the coronary bands
- Salivation, anorexia, and weight loss secondary to oral lesions
- Lameness with coronary band lesions
- Decreases in milk production and mastitis in dairy cattle
- Morbidity highly variable on premises (may see only one affected animal out of many or 100% affected)
- Mortality is usually low
Disease is typified by oral vesicles that rupture producing ulcers.
Outbreak in 2006
(Current Situation)

- Only one State involved: WY
- Index case was a horse from a premises in Natrona County, WY diagnosed on August 17.
- October 1, 2006 Situation

<table>
<thead>
<tr>
<th>Wyoming</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulative Premises</td>
<td>9</td>
</tr>
<tr>
<td>Cumulative Counties</td>
<td>2</td>
</tr>
</tbody>
</table>
Cumulative
2006 Vesicular Stomatitis
Outbreak Positive Premises

For Official Use Only

From: 08/13/06
Through: 10/08/06

Legend
Infects Species
- Equine
- Bovine
Cumulative Infection Status
- Infected States
- Non-Infected States

Major Cities
Waves
State Boundary

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## Outbreak in 2005
### Final Situation

<table>
<thead>
<tr>
<th>State</th>
<th>AZ</th>
<th>CO</th>
<th>ID</th>
<th>MT</th>
<th>NE</th>
<th>NM</th>
<th>TX</th>
<th>UT</th>
<th>WY</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cum Prem</td>
<td>27</td>
<td>100</td>
<td>2</td>
<td>46</td>
<td>3</td>
<td>23</td>
<td>1</td>
<td>104</td>
<td>139</td>
<td>445</td>
</tr>
<tr>
<td>Cum Counties</td>
<td>5</td>
<td>16</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>10</td>
<td>1</td>
<td>14</td>
<td>15</td>
<td>69</td>
</tr>
</tbody>
</table>
Outbreak in 2004
Final Situation

<table>
<thead>
<tr>
<th>State</th>
<th>CO</th>
<th>NM</th>
<th>TX</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulative Premises</td>
<td>199</td>
<td>80</td>
<td>15</td>
<td>294</td>
</tr>
<tr>
<td>Cumulative Counties</td>
<td>22</td>
<td>13</td>
<td>8</td>
<td>43</td>
</tr>
</tbody>
</table>
Cumulative 2004 Vesicular Stomatitis Outbreak Positive Premises

Legend
- Equine
- Bovine

Cumulative Infection Status
- Infected States
- Non-Infected States

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<table>
<thead>
<tr>
<th>Year</th>
<th>States</th>
<th>Counties</th>
<th>Positive Premises</th>
<th>Positive Equines</th>
<th>Positive Bovines</th>
<th>Susceptible Equines</th>
<th>Susceptible Bovines</th>
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<tbody>
<tr>
<td>2004</td>
<td>3</td>
<td>43</td>
<td>294</td>
<td>405</td>
<td>63</td>
<td>2495</td>
<td>6101</td>
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<tr>
<td>2005</td>
<td>9</td>
<td>69</td>
<td>445</td>
<td>584</td>
<td>202</td>
<td>3677</td>
<td>13,285</td>
</tr>
<tr>
<td>2006</td>
<td>1</td>
<td>2</td>
<td>9</td>
<td>12</td>
<td>10</td>
<td>255</td>
<td>485</td>
</tr>
</tbody>
</table>
Long Term Antibody Study in Horses

- **SeroLogic Tests**
  - CELISA
  - Complement fixation (CF)
  - Virus neutralization (VN)

- Photo by Dr. Greg Chavez
Long Term Antibody Study in Horses

- **Colorado**
  - Infected Nov 2004
  - Cinnamon/Hazel

- **Wyoming**
  - Infected Sept 2005
  - Red/King

Photo by Dr. Greg Chavez
Long Term Antibody Study

- CELISA & VN Tests
  - CO horses: still positive at 23 months
  - WY horses: still positive at 13 months
  - VN titers >1:1000 Nj
  - Impacts movement tests
Complement Fixation Antibody Responses

CF NJ Titer

King
Red
Cinnamon
Hazel

Time (months)

1 2 3 4 5 6 7

>40
Other Details....

- New Jersey serotype all three years – Phylogenetic analysis showed a close relationship between the viruses isolated each year
- After action review completed for 2004 and 2005
- VS Vesicular Stomatitis Working group revived
Questions????

Special Thanks to Bill Kelley, USDA, APHIS, VS, WRO Geographer, State and Federal VMOs of all of the affected States, ARS, and DHS