Eastern Equine Encephalitis Virus in Massachusetts

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East Middlesex Mosquito Control Project
Eastern Equine Encephalitis

1831 Epidemic of brain disease in horses in Massachusetts
1931 Differentiated from other equine encephalitides
1933 Virus isolated from a horse in New Jersey
1933-36 Birds implicated as reservoir of virus
1938 Outbreak of brain disease in horses in Massachusetts (ca. 300 cases)
1938-39 Outbreak of human EEE in Massachusetts (35 cases)
1947 Louisiana and Texas outbreaks
1955-56 Second Massachusetts outbreak (16 cases), aerial spraying, DDT
1957 Taunton Field Station of the USPHS
1969 Taunton Field Station closed, State Laboratory continues surveillance
1973 Equine vaccine
Eastern Equine Encephalitis

Clinical Course

- Abrupt onset fever, chills, headache, muscle aches, nausea and vomiting
- Progressive disorientation, discoordination
- Seizures, coma
- ca. 30-50% mortality
- ca. 80% residual neurological deficits
Distribution of Atlantic White Cedar

Map adapted from: (Little, 1971)
Passerine Birds serve as reservoirs for the virus. Examples include: Wood thrushes, American robins, and Song sparrows.

Humans serve as dead-end host and are unable to pass the virus on.

Horses serve as dead-end host and are unable to pass the virus on.

Main amplification vector in the EEE cycle

Adapted from: PC Matton, W Andrews, Bristol County Mosquito Control Project
Montoring EEE

- DPH maintains network of traps located in sites with historic EEE activity.
- MCP’s maintain own network of traps.
- All testing is done at DPH’s lab.
Monitoring EEE (continued)

- Mosquitoes are submitted once a week from the MCPs to DPH.
- Results within 48hrs of submission.
- DPH calls BOH with positive results.
- Results posted on DPH’s web page http://mass.gov/dph/wnv/wnv1.htm
Atlantic White Cedar Swamp Acreage

Greater than 25% Cedar Cover (Motzkin 1991)
Atlantic White Cedar Swamp Acreage

- Bristol: 4 acres
- Plymouth: 1,781 acres
- Norfolk: 10 acres
- Middlesex: 1 acre
- Essex: 1 acre

Human EEE Cases

- Bristol: 6 cases
- Plymouth: 177 cases
- Norfolk: 27 cases
- Middlesex: 8 cases
- Essex: 24 cases

Species

- Cs. melanura
- Cq. perturbans
Mosquito Species Composition

<table>
<thead>
<tr>
<th>Plymouth MCP</th>
<th>Species</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Oc. canadensis</td>
<td>34.2%</td>
</tr>
<tr>
<td>#2</td>
<td>Cq. perturbans</td>
<td>27.7%</td>
</tr>
<tr>
<td>#3</td>
<td>Cs. melanura</td>
<td>18.3%</td>
</tr>
<tr>
<td>#5</td>
<td>Ae. vexans</td>
<td>3.6%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Middlesex MCP</th>
<th>Species</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>#3</td>
<td>Oc. canadensis</td>
<td>12.4%</td>
</tr>
<tr>
<td>#1</td>
<td>Cq. perturbans</td>
<td>37.2%</td>
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<tr>
<td>#11</td>
<td>Cs. melanura</td>
<td>1.4%</td>
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<tr>
<td>#2</td>
<td>Ae. vexans</td>
<td>24.5%</td>
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</tbody>
</table>
Adults/trap/night vs Epi Week

Cq. perturbans

2007-11

2012
Temperature
1995-2012

Deviation from Normal (°F)

Year

95 96 97 98 99 0 1 2 3 4 5 6 7 8 9 10 11 12
Precipitation 1995-2012

Deviation from Normal (Inches)

Year

Precipitation

1995-2012

Deviation from Normal (Inches)

Year

95 96 97 98 99 0 1 2 3 4 5 6 7 8 9 10 11 12
2 1 3 8

-15 -10 -5 0 5 10 15 20 25

-15 -10 -5 0 5 10 15 20 25
How does EEE persist in the North?

Overwinters in local foci

Brought in via northward bird migration in Spring