PARASITIC COPEPOD INFESTATION ON SALMONID SPECIES REARING IN WILLAMETTE VALLEY RESERVOIRS

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Background

- *Salmincola californiensis* only infect *Oncorhyncus spp*.
- Can cause physical damage to gill structure
- Incidence of infestation tends to increase with fish size

**Life Cycle**

- **Eggs**: 28-32 d to hatch
- **Copepodid**: Infective free-swimming stage (~2 d)
- **Chalimus stages (1-4)**: Re-attaches to tissue (4 d – 2 wk)
- **Adult**: Can produce 2 broods
Objectives

- Compare susceptibility to parasitic copepods of different *Oncorhynchus* species in reservoirs

- Compare infestation between stream-rearing and reservoir-rearing Chinook

- Evaluate changes in infestation through time
  - Prevalence and intensity on gills
Methods

- All fish collected were examined macroscopically for copepods on gills and fins
  - subsample counted number of Copepods

- Screw traps, gill nets, electrofishing, seining
  - Detroit, Cougar, Lookout Pt.
Results

- Chinook were **more** susceptible to parasitic copepods (Kokanee were **least** susceptible)

### Proportion of Detroit Fish with Copepods Attached to Gills

<table>
<thead>
<tr>
<th>Species (rear type)</th>
<th>N</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinook (W)</td>
<td>115</td>
<td>0.43</td>
<td>0.59</td>
<td>0.86</td>
<td>0.93</td>
<td></td>
<td></td>
<td>0.71</td>
</tr>
<tr>
<td>Chinook (H)</td>
<td>791</td>
<td></td>
<td>0.53</td>
<td>0.82</td>
<td>0.95</td>
<td>0.99</td>
<td></td>
<td>0.67</td>
</tr>
<tr>
<td>Rainbow (W)</td>
<td>505</td>
<td>0.16</td>
<td>0.24</td>
<td>0.20</td>
<td>0.24</td>
<td>0.14</td>
<td></td>
<td>0.21</td>
</tr>
<tr>
<td>Rainbow (H)</td>
<td>249</td>
<td>0.50</td>
<td>0.31</td>
<td>0.40</td>
<td>0.18</td>
<td>0.33</td>
<td>0.17</td>
<td>0.34</td>
</tr>
<tr>
<td>Kokanee</td>
<td>597</td>
<td>0.02</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.01</td>
<td></td>
<td>0.01</td>
</tr>
</tbody>
</table>

**Possible Reasons for Differential Susceptibility?**

- Habitat species occupy
- Diet
- Adaptation
Results

- Prevalence on Chinook increased with time spent in reservoirs
- Copepods are rare for stream-rearing Chinook
Infestation Rate for Chinook

- Reservoir rate increases with time
- Copepods rare for stream-rearing (SF McK) Chinook
Intensity of Infestation

Copepods on Cougar Reservoir Chinook

Number of copepods on gills

Date

Copepods on Lookout Pt. Reservoir Chinook

Number of copepods on gills

Date
Intensity of Infestation

Copepods on Detroit Reservoir Chinook

Date
May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

Number of copepods on gills
0  2  4  6  8  10  12

WCHS  HCHS

HCHS release
Intensity of Infestation

Proportion of Chinook with $\geq 5$ Copepods on Gills
Conclusion

- Chinook in reservoirs are particularly susceptible to parasitic copepods

- Chinook can have high infestation rate and intensity, prevalence and intensity increase with duration in reservoirs
Future Direction

- What are the delayed effects of gill damage?
  - extent of damage
  - reduced respiratory function?
  - saltwater tolerance compromised?
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