Swimmer’s Itch (Avian Schistosomes): Expanded Range to Lake Aleknagik, Alaska

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Abstract

Swimmer’s Itch (cercarial dermatitis) is caused by a common parasitic flatworms (schistosomes) that has two hosts in their lifecycle. Migratory waterfowl and snails (gastropods) are important in the transmission of schistosomes. In the water, the cercariae can cause skin irritation to humans and aquatic birds. In this study, we searched Lake Aleknagik, a large freshwater lake in Southwestern Alaska where the conditions for parasite is likely, but has not been isolated. In the Late July 2019 5 sites were surveyed for the parasite indicators was isolated from snails on the shoreline of the lake. Segments of shoreline of Lake Aleknagik were surveyed for the schistosome using indicators of this parasite (i.e. snails and aquatic vegetation). At the boat landing we crush snails to isolate and was able to isolate the schistosome. This suggests the other waters bodies near this lake may also be susceptible to cercarial dermatitis.

Introduction

In the 1950s researchers surveyed 76 shallow bodies of water in the interior of Alaska to identify the distribution of the parasite that causes Swimmer’s Itch (cercarial dermatitis) and they found it occurred in only 16 interior lakes (Gabrielson 1952). The lake has been in Alaska, but can we also find it in the larger and cooler lakes found in southwest Alaska (Fig 1)? The parasite that causes swimmer’s itch has two hosts, waterfowl and aquatic snails. The adult flat worm parasite (schistosomes) live in the blood vessels of infected birds, who then deposit their eggs in bird habitats. The eggs are encased into a larva that can be eaten by snails, where they grow into a free-swimming cercarial stage (Fig 2). That passes to an intermediate host (snail) where they swim to find the final waterfowl host (Fig 3). This lifecycle should allow distribution of schistosomes to reach lakes in southwest Alaska if the water temperature is high enough. The itch rash associated with swimmer’s itch looks like reddish pimples or blisters (Fig 4). It may appear after swimming in infected water. Swimmer’s itch usually affects only exposed skin, as the cercarium is trying burrow into the skin of humans but they are the wrong host.

Methods

We searched each site for snails and algae (Fig 2). We searched each site for snails and algae (Fig 2). For cercarial dermatitis to be present both snails and their main food, Potamogeton sp., are needed (Fig 4). We also found that temperature and water depth is important. Table 1 and 2 shows that the coolest site, icy creek, was the only location that did not have the necessary conditions in that it was cooler and there were few snails not aquatic vegetation. All other sites had the conditions necessary for the presence of cercarial dermatitis.

Study Site

We searched for snails at 5 shoreline location in Lake Aleknagik in southwest Alaska. Shoreline locations include Bear Creek, Icy Creek, eastern boat launch Hanson Creek, and Camp Polaris (Fig 1). Table 1. Site names and coordinates of each study site on the shores of Lake Aleknagik, Alaska.

<table>
<thead>
<tr>
<th>Site</th>
<th>Abundance of Biota</th>
<th>Abundance of Snails</th>
<th>Snail Morphology</th>
<th>Chirocephalus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bear Creek</td>
<td>Abundant</td>
<td>Abundant</td>
<td>Possible</td>
<td></td>
</tr>
<tr>
<td>Boat Landing</td>
<td>Abundant</td>
<td>Abundant</td>
<td>Possible</td>
<td></td>
</tr>
<tr>
<td>Camp Polaris</td>
<td>Abundant</td>
<td>Abundant</td>
<td>Possible</td>
<td></td>
</tr>
<tr>
<td>Icy Creek</td>
<td>Rare</td>
<td>None</td>
<td>Not Found</td>
<td></td>
</tr>
<tr>
<td>Hanson Creek</td>
<td>Abundant</td>
<td>Abundant</td>
<td>Possible</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Water temperatures at the study sites.

<table>
<thead>
<tr>
<th>Site</th>
<th>Shore Water Temp during daylight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bear Creek</td>
<td>18°C</td>
</tr>
<tr>
<td>Boat Landing</td>
<td>20°C</td>
</tr>
<tr>
<td>Camp Polaris</td>
<td>18°C</td>
</tr>
<tr>
<td>Icy Creek</td>
<td>15°C</td>
</tr>
<tr>
<td>Hanson Creek</td>
<td>20°C</td>
</tr>
</tbody>
</table>

Results

For cercarial dermatitis to be present both snails and their main food, Potamogeton sp., are needed (Fig 4). We also found that temperature and water depth is also important. Table 1 and 2 shows that the coolest site, icy creek, was the only location that did not have the necessary conditions in that it was cooler and there were few snails not aquatic vegetation. All other sites had the conditions necessary for the presence of cercarial dermatitis.

Conclusions

Swimmer’s Itch (cercarial dermatitis) has probably has been in Alaska for a long time, but restricted to the summer and the small ponds and shallow lakes of the interior. Reports of swimmer’s itch have been on the increase. This study confirms that cercarial can live on the warmer shores of a deep glacially formed lake in southwest Alaska. Shoreline temperatures have warmed enough to allow for the completion of the life cycle of these flatworms. But is climate change having an influence on the distribution of schistosomes with warming shore waters? Warmer temperatures increase the number size and their main food macroleaf, this with more lake developments, and adding more nutrients may be increasing the eutrophic processes of once clean and deep SW lakes causing more parasites in along the shoreline.

With warning temperatures and growing urban areas, cercarial may allow expanding on Alaska watersheds. Future studies should need to identify how schistosome range is expanding in lakes as snails and migratory birds continue to use the resources of Alaska watersheds. An important question now become “What will happen when to our society temperatures continue to increase.”

Acknowledgements

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