Introduction

• Moving past the study of parasite-host interactions alone to within-host parasite-parasite interactions to understand disease.

• Raccoons live in human-occupied habitats and are infected by many species of parasites, some cause severe disease in humans and other animals.

• Parasite-parasite interactions may stifle disease control efforts.

• Therefore understanding how co-infection in raccoons affects parasite dynamics is of public health importance.

Objective of Study

To investigate:

• If there is parasite aggregation in certain demographic groups.

• If parasite species are found more or less often together than expected.

• The shape of the relationship between gastrointestinal nematode burden and egg count.

Methods

• Cross-sectional sampling using trap-and-release of wild raccoons in the Burlington, VT area headed by the USDA.

• Nearly 400 raccoons sampled over 10 days.

• Fecal and blood samples taken; body measurements and estimated age noted.

• McMaster fecal floats performed in laboratory; DNA sequencing of fecal samples in progress.

Results

• 390 raccoons sampled.

• Significant proportion of animals sampled were juveniles, due to season.

• Blood and serum collected from nearly all animals.

• Fecal samples for microscopy collected from 254 animals.

<table>
<thead>
<tr>
<th>Parasite Type</th>
<th># Samples Infected</th>
<th>% Samples Infected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coccidia</td>
<td>206</td>
<td>81.1</td>
</tr>
<tr>
<td><em>B. procyonis</em></td>
<td>54</td>
<td>9.45</td>
</tr>
<tr>
<td>Strongyle-type</td>
<td>73</td>
<td>28.7</td>
</tr>
<tr>
<td>Capillarid-type</td>
<td>52</td>
<td>20.6</td>
</tr>
</tbody>
</table>

Table 1: Number of samples and percentage of fecal samples examined via McMaster protocol infected with the four most commonly seen parasitic species/types.

• Parasites revealed by McMaster protocol include: coccidia, *Baylisascaris procyonis*, strongyle-type, capillarid-type, strongyloides, as well as eggs and larvae of unidentified type; not all live in GI tract.

• McMaster protocol allows for calculation of coccidial, egg, and larval burden per gram of fecal matter; low burdens are seen in many individuals while high burdens are found in few.

Discussion

• Initial results from McMaster suggest parasitic population aggregation (most animals have a few parasites; few have the most parasites).

• *Baylisascaris procyonis* infection less common than expected, may be due to large proportion of juveniles.

Questions

• What remains to be said from DNA sequencing?

• How does this data differ from similar data collected in 2018?

• What statistical analysis of this data is best to answer the study questions?

Final Thoughts

• Research has only begun; substantial further efforts will be required throughout the coming year to complete this study.

Acknowledgements

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PCR has been recently completed on fecal samples and DNA analysis of these products is currently in progress.

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B. procyonis egg; Retrieved from cdc.gov