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Comparing Common Techniques for Calculating Parasite Prevalence

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Comparing common techniques for calculating parasite prevalence

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Introduction

Raccoons (*Procyon lotor*) are the final host for raccoon roundworms (*Baylisascaris procyonis*). Raccoon roundworm is the leading cause of a dangerous neurological disease, known as larva migrans encephalopathy. Diagnostic tools for detecting the presence of *B. procyonis* within a raccoon population include necropsy, fecal flotation, and latrine analysis. Necropsies yield the highest measure of prevalence, with fecal flotation and latrine analysis often underestimating infection rates.

Hypothesis

Raccoons from townships with high prevalence (higher than 50%) are more to have a false positive fecal test.

Methods

We necropsied 225 raccoons collected from 9 townships of Clark and Greene Counties in Ohio. We collected fecal samples from 95 raccoons negative for *B. procyonis* at necropsy. We suspended the feces in Sheather's solution to float any eggs, and prepared slides from this solution by mounting a cover slip onto the slide. After preparing the slides, we analyzed them for the presence of *B. procyonis* eggs. Our team recorded the presence of *B. procyonis* in the slide. We used a χ^2 test for equality of distributions to test the null hypothesis that raccoons from high prevalence townships (>50%) have the same proportions of false positives as raccoons from townships with low prevalence (<50%)

Results

County	Township	Raccooons trapped	+ Necropsy	- Necropsy	+ Fecal sample	- Fecal sample	Percentage positive
Clark		89	52	37	4	30	8.1%
	German	15	7	8	0	6	0%
	Green	23	13	10	2	8	20%
	Harmony	26	19	7	2	4	28.6%
	Mad River	8	5	3	0	3	0%
	Moorefield	13	6	7	0	7	0%
	Springfield	4	2	2	0	2	0%
Greene		136	71	58	9	52	17.2%
	Beavercreek	49	12	37	3	26	8.1%
	Miami	51	35	16	5	15	31.3%
	Xenia	37	25	12	1	11	8.3%
<50% prevalence**		77	25	52	3	39	5.8%
>50% prevalence***		149	99	50	10	43	20%

Table 1.1- Raccoon roundworm presence in raccoons from Clark and Greene counties, Ohio

	With eggs	Without eggs
Prevalence below 50%	3	39
Prevalence above 50%	10	43

Table 1.2-Observed fecal analysis results between populations with prevalence above 50% and populations with prevalence below 50%

	With eggs	Without eggs
Prevalence below 50%	5.75	36.25
Prevalence above 50%	7.25	45.75

Table 1.3-Expected fecal analysis results between populations with prevalence above 50% and populations with prevalence below 50%

Conclusions

Our team found that nearly 14% of raccoons negative at necropsy for *B. procyonis* possessed eggs in their feces. In the townships with <50% prevalence, populations were less likely to have a false positive *B. procyonis* fecal test. The townships with >50% prevalence were more likely to have a false positive fecal test.

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