Raccoon roundworm prevalence in raccoons from ten townships of Clark and Greene Counties

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Introduction

Raccoons (*Procyon lotor*) are the final host for raccoon roundworms (*Baylisascaris procyonis*) (Page et al., 2005). Raccoon roundworm is the leading cause of a dangerous neurological disease, known as larva migrans encephalopathy (Blizzard et al., 2010). The primary way raccoons contract roundworms is through contact with infected raccoons that use the same latrine. Roundworms can also be contracted by the digestion of infected intermediate hosts, such as rabbits, rodents, or birds. Approximately 35 days after the raccoon ingests the larvae, the parasite can mature into adult male and female worms in the raccoon's intestine. Female worms have the ability to produce millions of eggs everyday, which are then excreted through the feces. Based on environmental conditions, after two to four weeks post-excretion, the eggs may become infective (Roussere et al., 2003).

Methods

We necropsied the intestines of 226 raccoons from ten townships of Clark and Green Counties. We collected and counted the roundworms from each raccoon intestine and stored them in 70% ethanol. We then calculated the prevalence of raccoon roundworm for each township and ran a Chi-squared test for equality of distributions to test the null hypothesis that all of the townships have the same prevalence.

Conclusion

Based on our results we were able to conclude that there is a significant statistical difference between Beavercreek and the following townships in terms of parasite abundance: Miami, Xenia, Greene, and Harmony. We used Beavercreek as the control group because it is significantly different from the others. We rejected our null hypothesis that the prevalence of all townships are the same, demonstrating significant statistical evidence to support that the townships do not have the same prevalence.

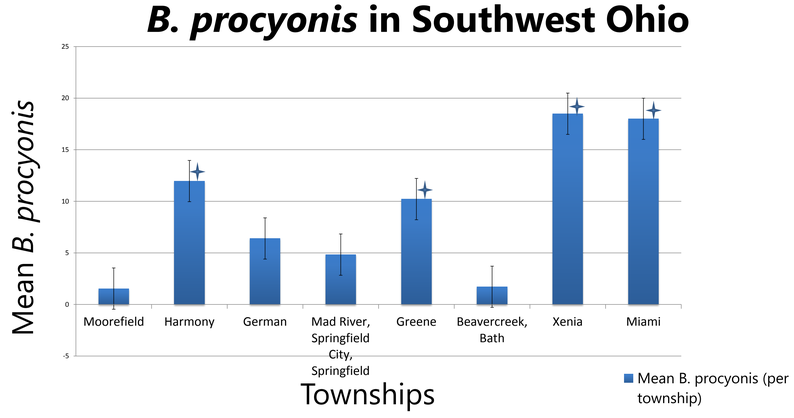

Figure 1: This figure includes the mean values of number of roundworms per raccoon for each township.

Results

Presence and Absence of *B. procyonis*

Area	B. procyonis present	B. procyonis not present
Miami Township	34	17
Greene Township	13	10
Bath and Beavercreek Township	12	37
German Township	7	8
Xenia Township	25	12
Harmony Township	18	8
Moorefield Township	6	7
Mad River Twp, Springfield Twp and Springfield City	7	5

Table 1: The table includes the observed values for the areas sampled. The numbers represent the number of raccoons with each condition.

Expected Rate of Infection

Area	B. procyonis present	B. procyonis not present
Miami Township	28	23
Greene Township	12	11
Bath and Beavercreek Township	26	23
German Township	8	7
Xenia Township	20	17
Harmony Township	14	12
Moorefield Township	7	6
Mad River Twp, Springfield Twp and Springfield City	6	6

Table 2: The table includes the expected values for the areas sampled.

Analysis of Table 1 and Table 2

|Observed – Expected|	$\|O-E\|^2$	$\|O-E\|^2$/Expected
6	36	1.29
1	1	0.08
14	196	7.54
1	1	0.13
5	25	1.25
4	16	1.14
1	1	0.14
1	1	0.17
6	36	1.57
1	1	0.09
14	196	8.52
1	1	0.14
5	25	1.47
4	16	1.33
1	1	0.17
1	1	0.17

Table 3: |O-E| is equal to the absolute value of the observed number from table 1 and the expected number from table 2. The Chi-squared value is equal to the sum of the values in the third column of the table. The Chi-squared value is 25.19, which with 7 degrees of freedom (calculated by multiplying one less than the number of rows by one less than the number of columns). Using these data, our p-value is equal to 0.0007.

References

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