The impacts of parasite prevalence on the diet of the host

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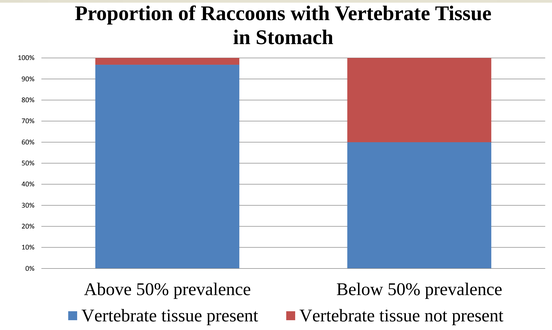
Introduction:

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). Raccoons are omnivorous animals, and rely on various food items. Page et al. (2011) found that raccoons eat whatever food resource is most convenient and abundant. Raccoons in similar habitats have similar diets, regardless of the geographical closeness of the habitats (Rulison et al., 2012).

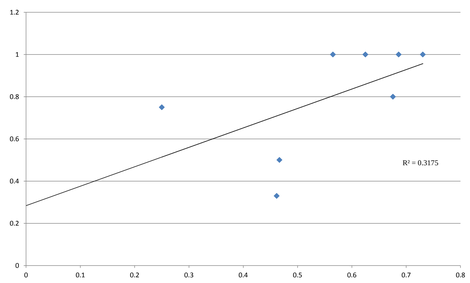
Methods:

We analyzed the diets of necropsied raccoons from ten townships of Clark and Greene Counties. We massed the stomachs, and removed their contents. We analyzed the contents to determine whether or not there were vertebrate, invertebrate and plant tissues in the stomach. We recorded these data and classified the material according to class, order and family, when possible. We ran a linear regression model to determine whether or not parasite prevalence is a valuable factor to predict raccoon diet.

Results:



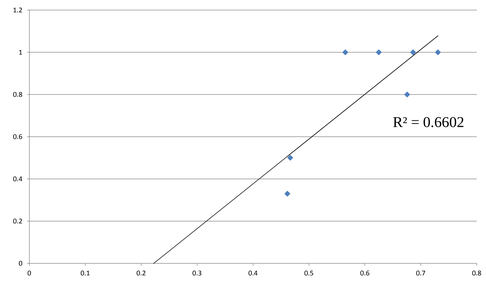
Bar graph displaying the percentage of trapped raccoons with vertebrate tissues in the stomach at necropsy. We placed the townships into two categories: those with parasite prevalence below 50%, and those with prevalence above 50%.



Scatterplot that uses parasite prevalence as the independent variable and prevalence of vertebrate tissue as the dependent variable.

SUMMARY OUTPUT						
Regression Statistics						
Multiple R	0.563479105					
R Square	0.317508701					
Adjusted R Square	0.203760151					
Standard Error	0.232040678					
Observations	8					
ANOVA						
	df	SS	MS	F	Significance F	
Regression	1	0.150292744	0.150292744	2.791320872	0.145811579	

Regression analysis using parasite prevalence as the independent variable and prevalence of vertebrate tissue as the dependent variable.



Scatterplot that uses parasite prevalence as the independent variable and prevalence of vertebrate tissue as the dependent variable. Beavercreek township has been removed.

SUMMARY OUTPUT					
Regression Statistics					
Multiple R	0.812539				
R Square	0.66022				
Adjusted R Square	0.592264				
Standard Error	0.178862				
Observations	7				
ANOVA					
	df	SS	MS	F	Significance F
Regression	1	0.310813	0.310813	9.715419	0.026343

Regression analysis using parasite prevalence as the independent variable and prevalence of vertebrate tissue as the dependent variable. We removed Beavercreek from the analysis.

Conclusions:

We found vertebrate tissues had higher prevalence in townships with higher parasite prevalence. We do not have enough data to run a Chi-squared test for equality of distributions yet, but the differences are noticeable. We also determined that some of the variation in prevalence of diet item was accounted for by the variation in parasite prevalence. This was clearly seen with respect to vertebrate tissues. Because, raccoons contract raccoon roundworm by consuming vertebrates that are intermediate hosts for the parasite, these data should help us understand the impacts of the parasite on its host better and to develop management strategies for the parasite.

References:

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