Are Blacklegged Ticks the Upcoming Infestation?
(Analysis on the Recent Rise in Black Legged Tick sightings in Toronto, Canada)

Introduction

In recent years, you might have been noticing more news coverage and concern about ticks and the dangers they pose. This is not just your imagination, Black Legged Ticks (BLTs) have indeed been increasing substantially in population, especially in the past decade or so. This is not a good sign and a sobering fact because BLT bites can cause Lyme Disease which is also on the rise as a result. Lyme Disease can be very debilitating and long lasting if it is not properly treated and turns chronic. Some people take years or even decades to recover from chronic Lyme Disease.

The reasons that BLT populations are rising are unclear but climate change and deer population fluctuations are usually to blame. This is due to ticks thriving in warmer weather and that deers are the primary hosts of these ticks.

Dataset

The data set I chose was from Toronto's tick surveillance program. The data contains information on the number of blacklegged ticks, their locations and the number of them that carry the bacteria that causes Lyme disease (Borrelia burgdorferi). The data is for years 2013 through 2019 and the sample size is 191 which means this dataset contains 191 seperate data points with each displaying information on different locations in Toronto that were searched for ticks. There isn't any specific sampling technique used but it seems to be closest to Cluster Sampling because ticks are searched in various locations around the city so that there is the same chance of finding ticks in each location.

I chose this data set because I am interested in finding out more information about the status of Black Legged Ticks in Toronto. This is due to my concern about the rise of lyme disease cases in the past decade in the Eastern USA and Canada, chronic lyme is possibly one of the most disabling diseases one can be afflicted by.

This data set also seems thorough which will make it good for analysis as it contains information about number of ticks in the different stages of their life cycle and whether they tested positive for the bacteria. On the other hand, there are issues with the amount of data. It seems that there were not a lot of BlackLegged Ticks collected for most of the locations. This can be an issue because small outliers might skew any correlation that we try to make.

zModel

I will be conducting a logistic regression to find out if it is really true that even in parts of canada the populations are increasing and...

Weaknesses

Some weaknesses include limitations due to data like sample size and data collection methods or analysis. The next step would be to find more datasets containing BLT information. Issues with analysis include improper fitting of the data with logistic regression.

BLTs are also known as deer ticks so they show up in larger numbers in places where deer also frequent, this could be a big confounding variable that is unrelated to longitude that we have analyzed. The next steps for this would be to also look at datasets with Toronto park deer population information and maybe try to find a correlation between deer and BLT population in order to understand BLT habitat locations more thoroughly.

Going even further, since the cases of BLTs have been increasing according to the CDC in the past few decades, there is definitely more data to explore and analyze relating to climate change, deer population migration and the effect all those have together on ecosystems which include BLTs.

Sources:

(will organize sources in final draft)

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