

# Nocturnal Insect and Climate Change

Using Machine Learning to Examine and Predict the  
Effects of Changing Temperatures on Nocturnal  
Insects





# Purpose and Tools

Purpose - to examine insect light trap data gathered over 17 years at the University of Copenhagen in relation to temperature data covering the same time frame, looking for correlation between temperature and numbers of insects counted and building a machine learning model to predict future relations between the two variables.

The subject was chosen to see if there is a relationship between changing temperatures caused by climate change and the number of insects counted alive that were attracted to the light trap.

Tools -



# The Question

Is there a relation between temperature and sightings of different insect orders and families that were attracted to a light trap in Copenhagen?

If there is a relation, can it be predicted by a machine learning model into the future?

Do certain families of insects fair better over the course of time?

# Light Traps



Researchers use “light traps” to humanely attract and record the visits of nocturnal insects. This is most often done with a light source and a sheet. “Like a moth to a flame”, as the saying goes, many flying insects are attracted to the light source, and can then land on the surface provided. This method is especially effective for cataloguing members of the Lepidoptera (moth) and Coleoptera (beetle) orders of insects.



# The Data

The insect dataset was gathered from a study done between 1992 and 2009 at the University of Copenhagen that utilized a light trap to track the numbers of insects over this time period

Original publication:

*Thomsen PF, Jørgensen PS, Bruun HH, Pedersen J, Riis-Nielsen T, Jonko K, Słowińska I, Rahbek C, Karsholt O* (2016) Resource specialists lead local insect community turnover associated with temperature – analysis of an 18-year full-seasonal record of moths and beetles. *Journal of Animal Ecology* 85(1): 251–261. <http://dx.doi.org/10.1111/1365-2656.12452>



# Database and Sources



# Data Exploration



# Analysis





# Machine Learning Model



# Results



## Effects By Order



## **Effects By Family**