



Using DNA Barcoding to Identify Backyard Beetles

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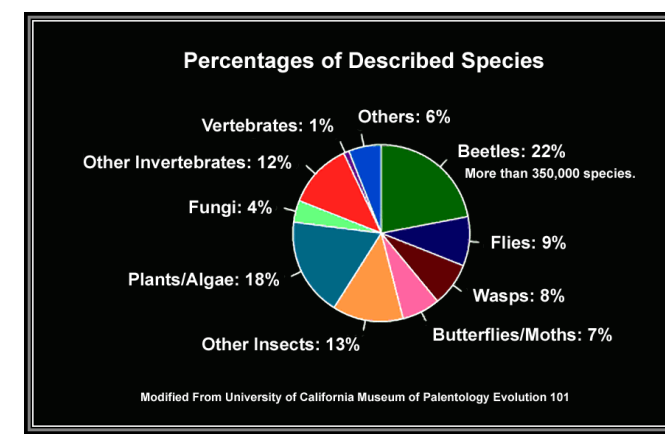
Connetquot High School

Abstract

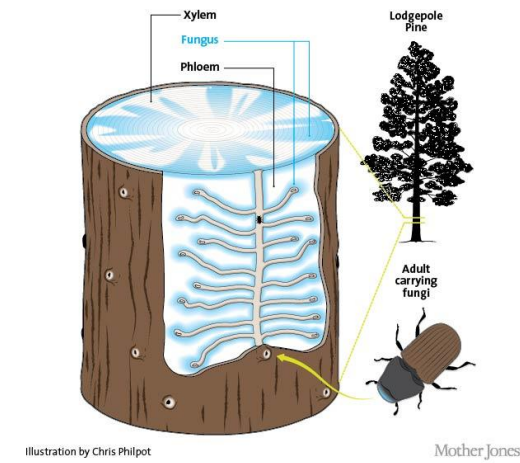
Beetles were collected from two collection sites, one from a non pesticide yard and another from a yard that uses pesticides. We used the process of DNA extraction and barcoding to identify the beetles as well as compare and make conclusions about the samples we collected.

Introduction

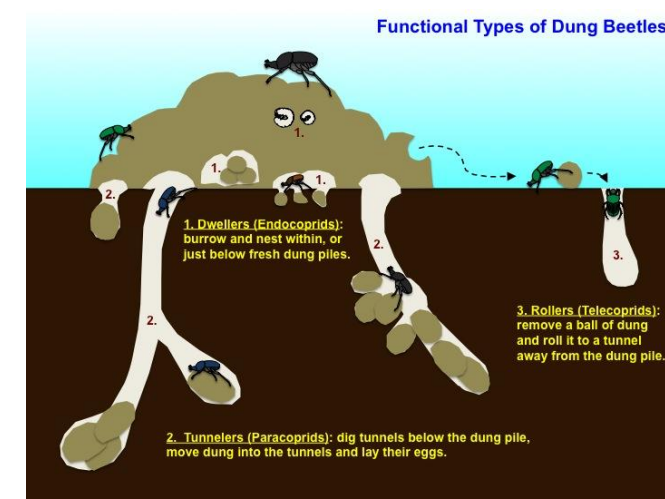
Barcoding of beetles is important because it allows us to know the biodiversity in an area. For example, if there's new modified species or invasive species in an area barcoding will help us identify it. Also, barcoding species allows for an identification of beetles that are harmful and/or helpful to the environment. An example of an invasive species that came to long island would be the southern pine beetle, thought to be brought up by hurricane sandy.



Over 360,000 species of beetles that inhabit North America. (FIG 1)³



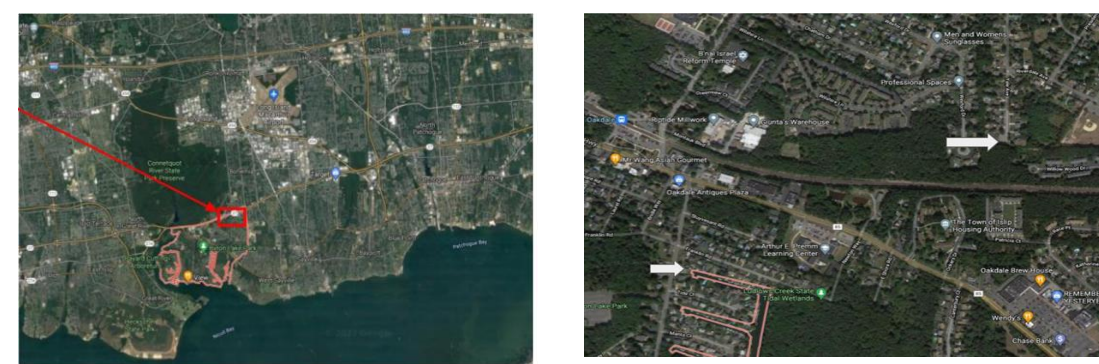
Harmful beetles that feeds on trees that decimates forests (FIG 2)¹



Helpful dung beetle which lays its carrion and fertilizes soil (FIG 3)²

Materials & Methods

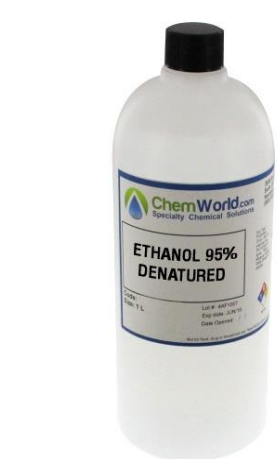
Collection sites



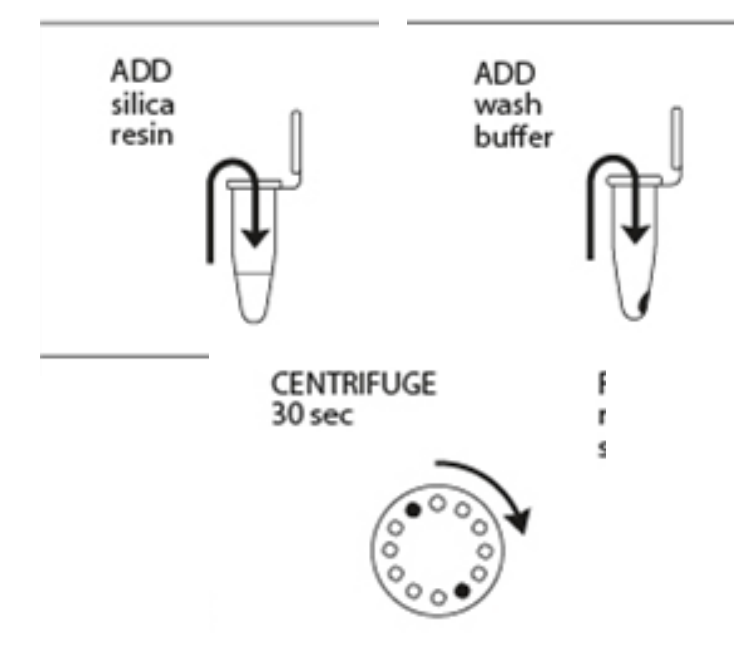
Collection process



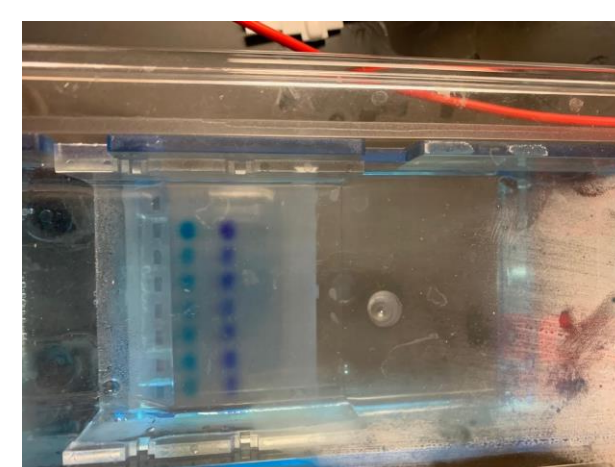
Photographed Samples



Frozen Samples in 95% ethanol (FIG 4)



Used silica based extraction to extract DNA using dna barcoding to identify and classify living things CSD (FIG 5)



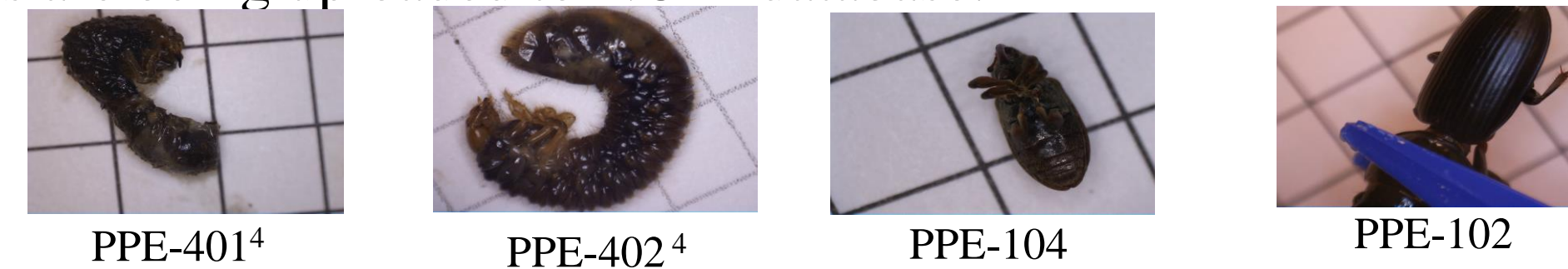
Used electrophoresis to extract DNA (FIG 5)



Used dna subway to aid in the identification of the species (FIG 7)

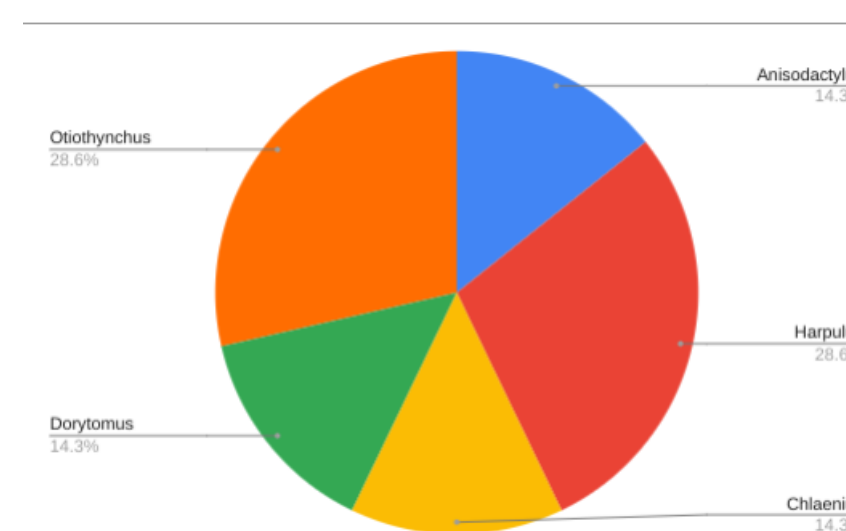
Results

We collected a total of 15 beetles within this experiment, however we added one beetle from the BCLI Database to expand our data for better conclusions. Two of the sample collected were grubs. The grubs we identified were PPE-401 as *Exomala pallidipennis* while PPE-402 was an *Exomala orientalis*. This beetle was originally native to Japan but traveled to the United States and other parts of the world. Two other interesting beetles were PPE-102 which was identified as *Harpalus fanus* and PPE-104 which was identified as *Dorytomus parvicollis*. All four of these species are being uploaded to NCBI database.

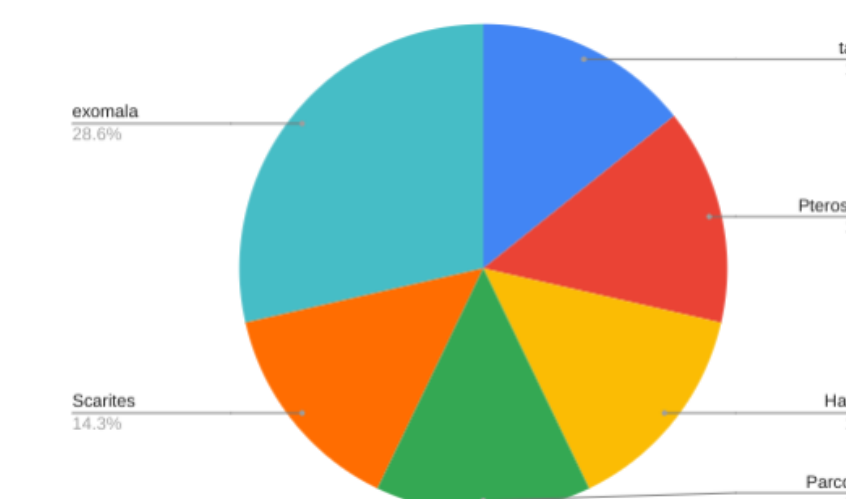


Discussion

Overall pesticide biodiversity breakdown



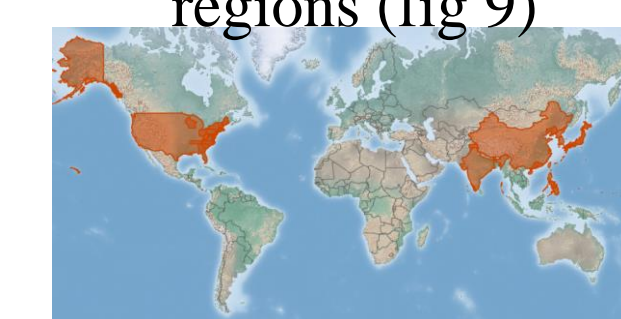
Overall non-pesticide biodiversity breakdown



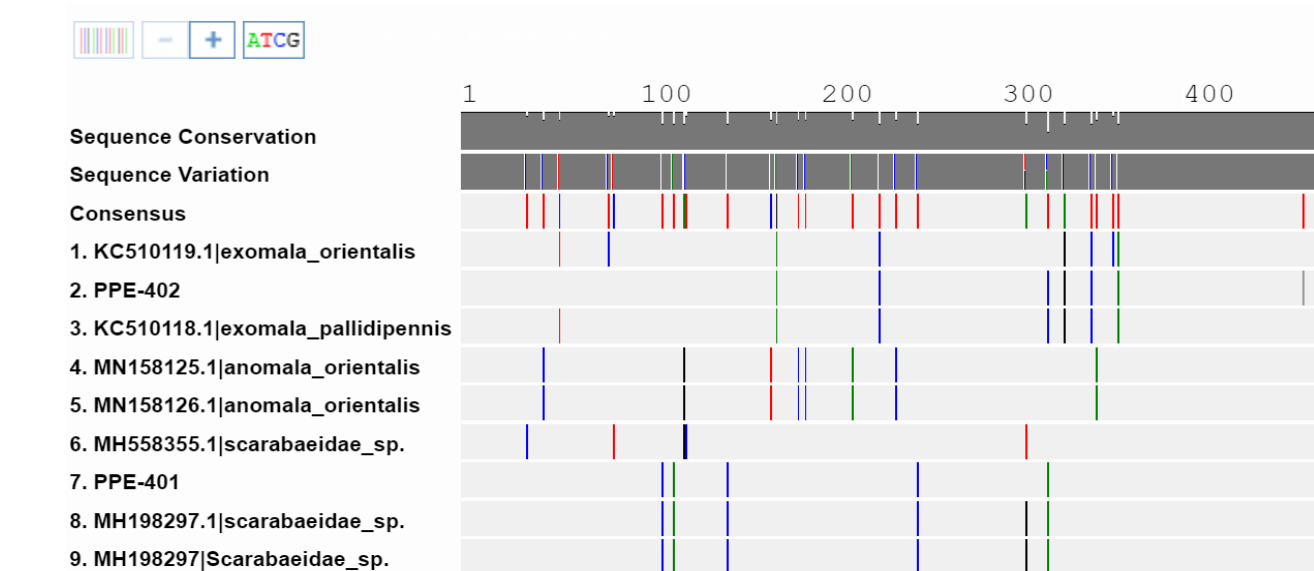
native region (fig 8)



invasive in these regions (fig 9)



PPE-401, PPE-402 and the sample from BCLI are all native to Japan but invasive in many regions throughout the USA. ⁵



This table shows us the clear similarities and difference between similar grubs in Japan and on Long Island. (fig 10)

Acknowledgements

Acknowledgements to this experiment go to Barcode Long Island and Cold Spring Harbor laboratory for supplying us with necessary equipment to complete this experiment, as well as Mr. Halloran who guided us through the process of our experiment.

References

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