Night Bioblitz: Insects and Invertebrates

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Abstract

At Longwood High School our goal was to identify the species of insects and invertebrates present in our pine barrens. By doing so we can classify species that are hard to distinguish clearly by look, as well as identifying nocturnal bugs in contrast to previous collections during the day. We are also looking to check for invasive species that may be harming our ecosystem. Using traps set overnight we can collect bugs, then using DNA separation, amplification, and gel electrophoresis we can determine exactly what species we had.

Introduction:

Will the bugs we collected at night be different compared to 2022's bioblitz during the day, and will the species accurately reflect the expected species of the Long Island pine barrens habitat and whether or not they are invasive here? By identifying the specific biodiversity of our pine barrens not only can we detect harmful species for the environment, but we can also characterize the species which are difficult to identify simply by phenotype.

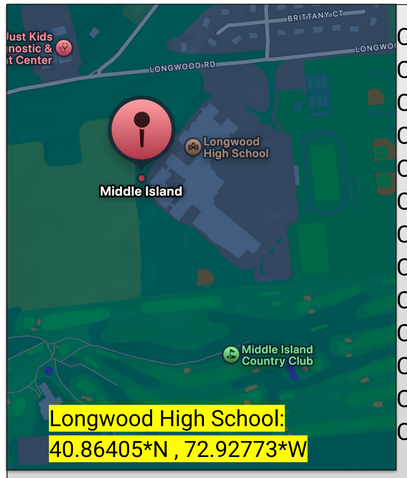
Materials & Methods

Traps were set up right after school (approximately 2pm to 3pm) and collected the next morning (approximately 7am to 9am).

- The trapping site was located on the nature trail directly behind the school.
- Traps consisted of plastic cups filled with about 3/4 inch of either honey or soap water.
- Holes were dug so that the rim of each cup was level with the ground when placed.
- Cups were spaced about a yard apart, alternating sides of the trail.
- A total of 16 cups were used:
- 8 filled with honey
- 8 filled with soap water
- Upon collection, any bugs found in the traps were placed into tubes and labeled by location.
- Bugs were preserved in ethanol and transported to an Open Lab supported by Brookhaven National Lab.
- In the lab:
- Insects were ground in a 10% Chelex solution to isolate DNA.
- The solution was placed into a centrifuge.
- PCR (Polymerase Chain Reaction) was used to amplify the DNA.
- Amplified DNA was separated using gel electrophoresis.
- A photo was taken of each gel electrophoresis result for documentation.

Results

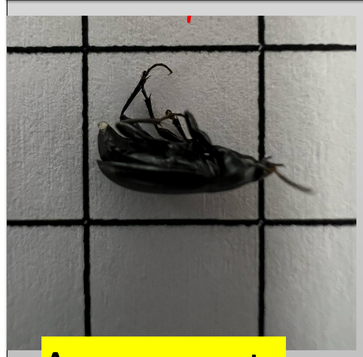
- CZA-001 was found to be an Amara ovata, a nocturnal species native to Europe.
- CZA-003 was found to be a Chlaenius tricolor, a nocturnal species native to Palearctic, Nearctic, and Afrotropical regions.
- CZA-005 was found to be a Philoscia muscorum, a nocturnal species native to Europe.
- CZA-020 was found to be Ceuthophilus meridionalis, a nocturnal species native here.
- Ceuthophilus meridionalis was determined to be an invasive species as it belongs to terrestrial deserts and tundras, and not our pine barrens. It also drives out other cricket species that are native to our pine barrens.
- All species found except for the Ceuthophilus meridionalis were determined to be non-native to our country.



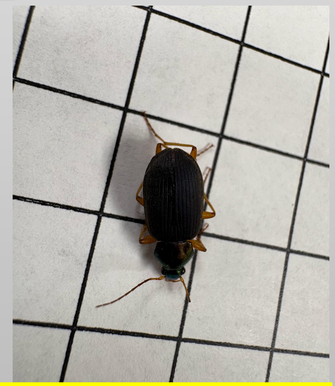
Longwood High School:
40.86405*N , 72.92773*W

CZA - 001: 40.86841 , -72.92782
CZA - 002: 40.86362 , -72.97712
CZA - 003: 40.86391 , -72.92449
CZA - 005: 40.86398 , -72.92772
CZA - 006: 40.86241, -72.92671
CZA - 008: 40.86251, -72.92465
CZA - 009: 40.86404, -72.92773
CZA - 011: 40.86408, -72.92773
CZA - 012: 40.86348, -72.92784
CZA - 013: 40.86227, -72.92530
CZA - 018: 40.86403, -72.92785
CZA - 019: 40.86421, -72.92440
CZA - 020: 40.86403, -72.92785

Sample gel electrophoresis bands.

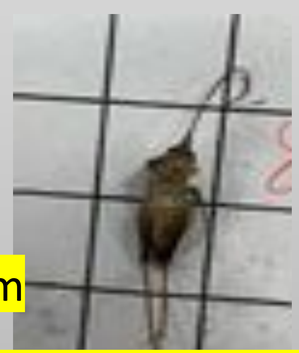


Amara ovata



Chlaenius tricolor

Philoscia muscorum



Ceuthophilus meridionalis

Discussion:

Our findings gave us more knowledge about the insects living on our campus. Through research on the different species, we were able to conclude whether or not the species are native, invasive, (Ex: Cuthophilus meridionalis is naturally found in deserts, making it invasive to the pine barrens). Obtaining this information allowed us to go further into our research, into discussions of adaptations these species may posses, and whether or not they are helpful to their current environment.

References:

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\https://pictureinsect.com/wiki/Amara_ovata.html

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