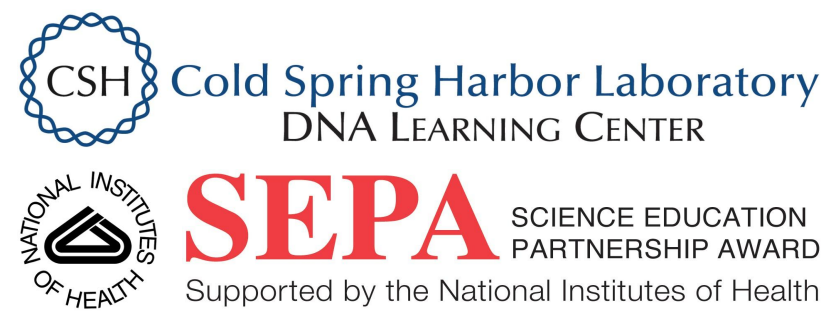
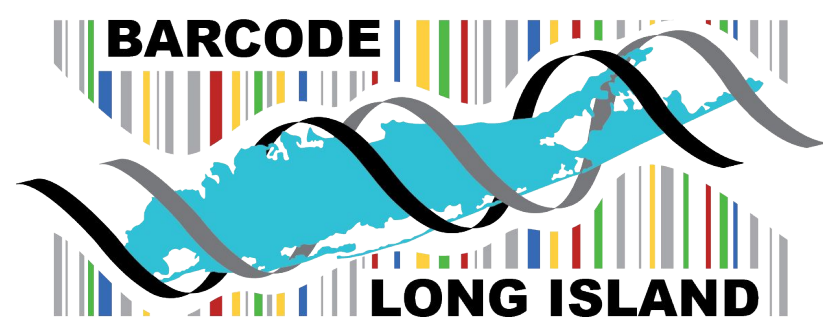




Arthropodic Fauna of Forested Suburban Field

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CONNETQUOT



SCIENCE RESEARCH

Abstract

Insects are the most diverse group of organisms on Earth. This study attempted to explore the prevalence of West Nile Virus (WNV) vector mosquitoes in areas with varying human presence using DNA barcoding. Specimens were collected, identified, and analyzed. Notable findings include a potential new species within the Brachypeplus genus and extended activity of Culex Restuans mosquitoes due to warm weather.

Materials & Methods

Insect samples were collected from October 3rd to 5th in Bohemia, New York, at Connetquot High School's back fields and senior parking lot using BG-Sentinel Biogents Mosquito Traps. Sampling targeted non-endangered species in locations not requiring special permissions. Specimens were identified with a digital USB microscope, soaked in 100% ethanol, and stored at -20°C to prevent decay.

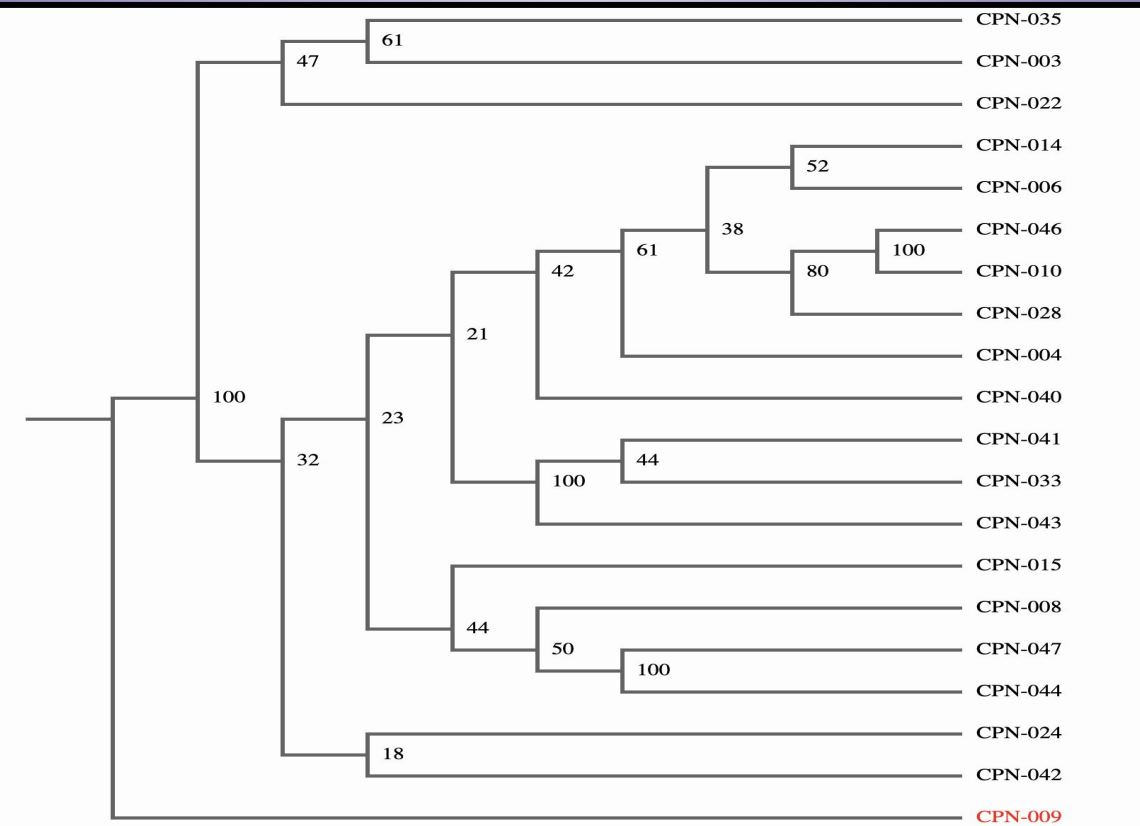
DNA extraction followed the chelex protocol from Barcode Long Island. The cytochrome oxidase subunit I (COI) gene region was amplified using PCR beads and an edvotek thermal cycler. PCR products were separated by 2% agarose gel electrophoresis at 150V. Sequencing results were compared using an NCBI DNA database, creating Phylip NJ and ML trees to illustrate taxonomic relationships and genetic similarities (Rogers K).



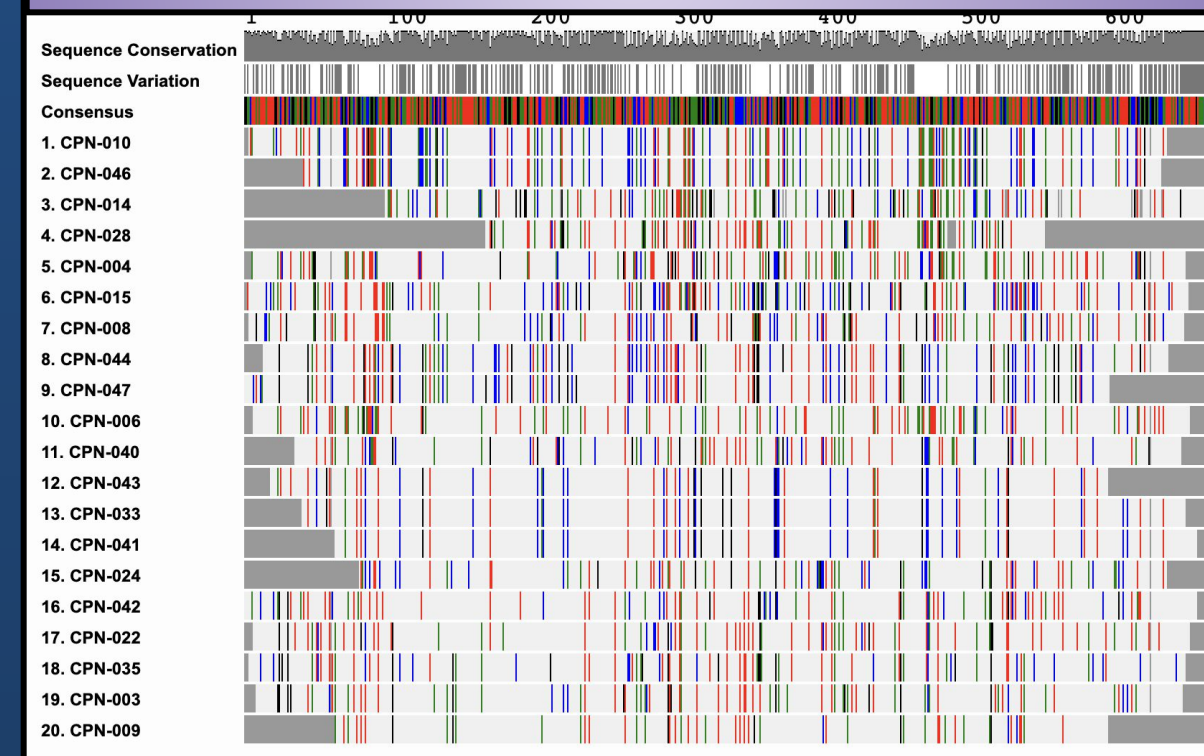
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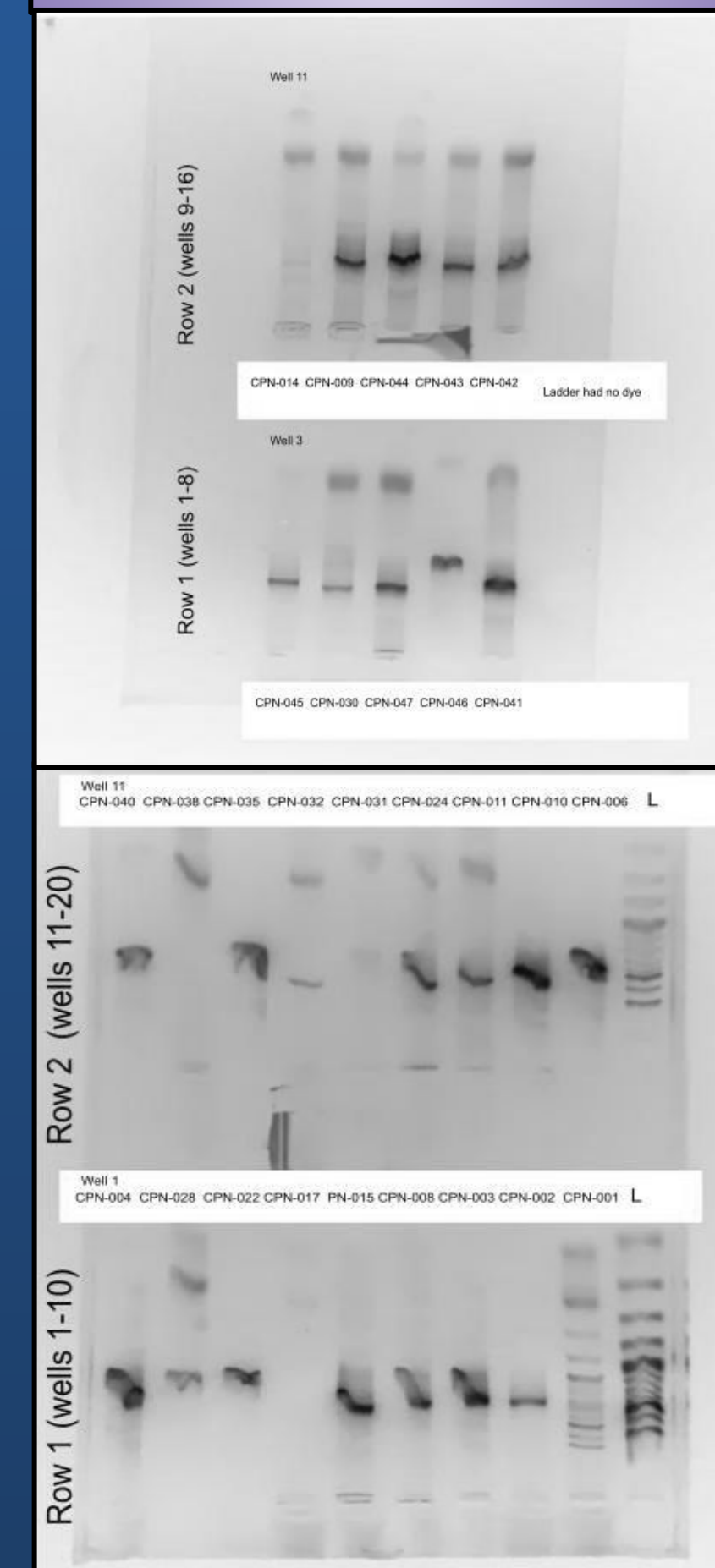
Gene Tree-1



Gene Tree 2



Gel Results



Culex Restuans



B. Glaber



Results

After the data was processed, the identity of each specimen was narrowed down to either a species or genus. There was a significant amount of gnats or midges within our group of samples, as well as some other species of insects.

Discussion

One of the more notable samples was a sample from the Brachypeplus genus. The specimen exhibited a sizable genetic difference from the closest species match, Brachypeplus Glaber, a common sap beetle, having 55 base pair mismatches in the COI gene sequence. This level of variation suggests the specimen is a previously unknown species within the Brachypeplus genus, as there are currently only two known species within the genus, so that level of genetic variation could be a hallmark of a new taxonomic species.

Another notable sample was a Culex Restuans mosquito that was caught within the BG-Sentinel Biogents traps. This is noteworthy since it aligns with observations of unseasonably warm weather prolonging mosquito activity, particularly those who are disease vectors. In 2013, Culex Restuans collections made during October were noted for having a significant increase in the period of West Nile transmission due to the unusually warm weather. West Nile has been present within Suffolk County since 1999, and the persistence of these mosquitoes and West Nile further into the year highlights the impact of climate change on mosquito-borne disease within the American Northeast.