



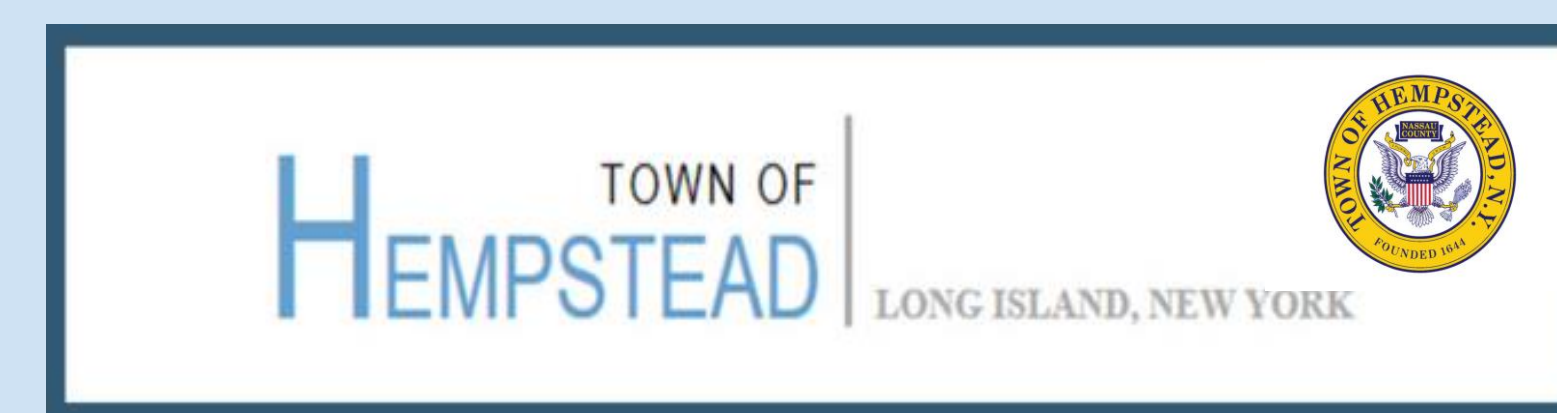
# The Biodiversity of Beetle Species in Forest City Community Park

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## Abstract

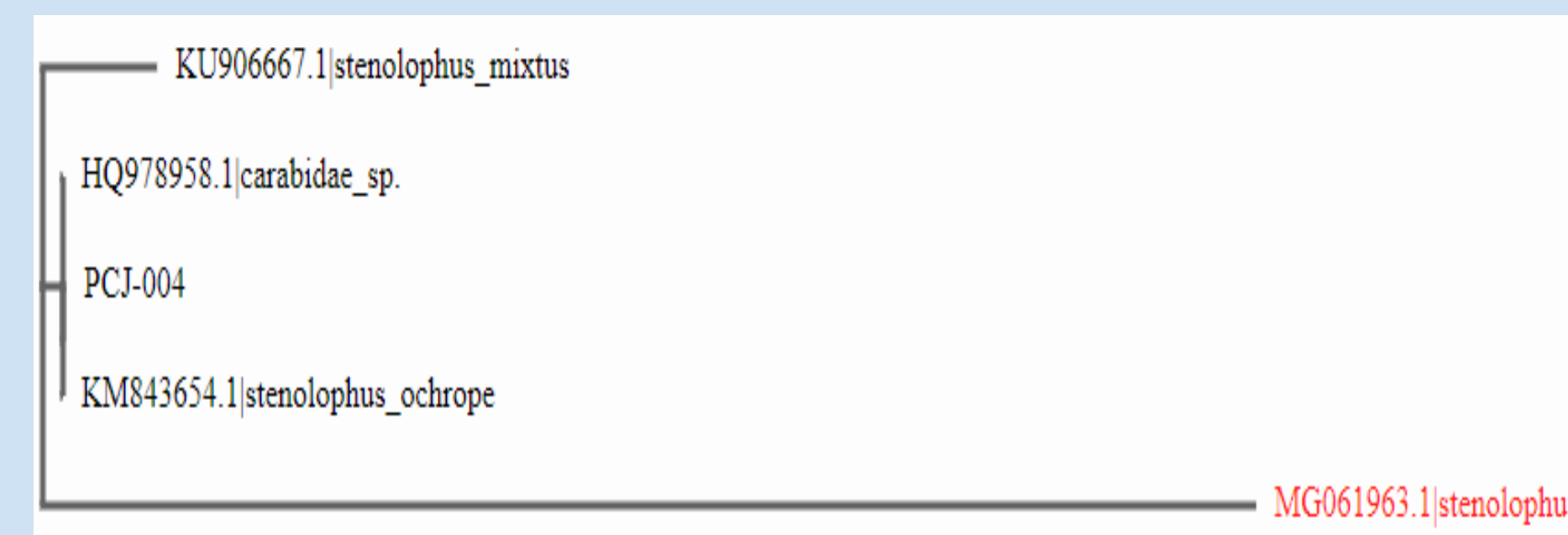
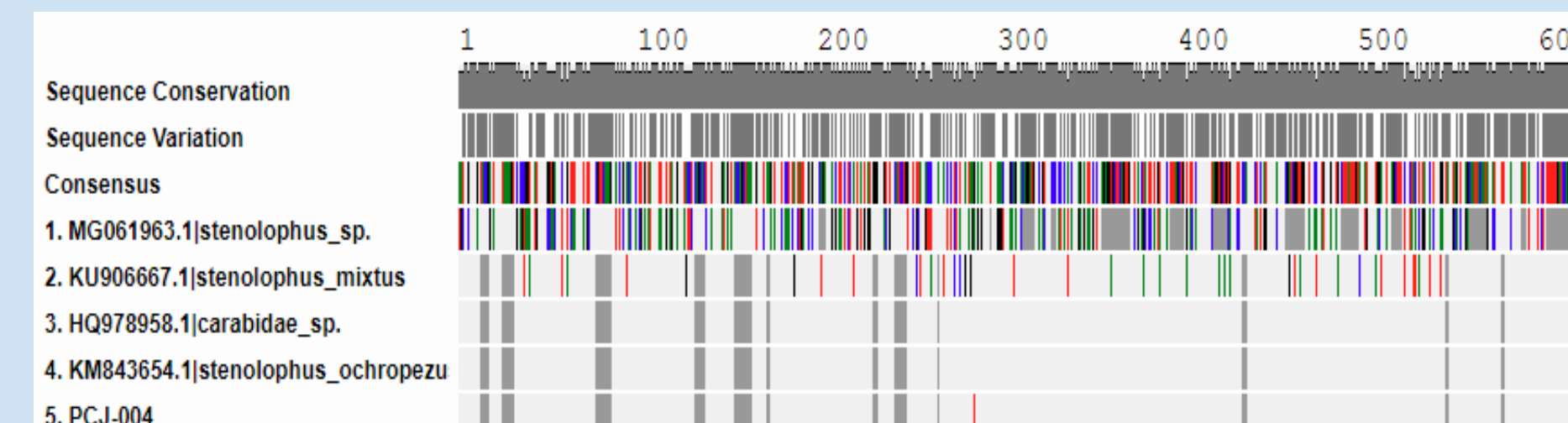
Forest City Community Park is located at Latitude 40-41'42" N and at Longitude 073-31'16", with an elevation of 10 meters. It has a pond that covers 6 acres, with a maximum depth of approximately 29 feet. The pond water tends to recede toward the south end at times. This receded area allows for ideal observation and collection of beetle species, as the detritus matter is abundant and rich. The purpose of this study was to investigate the biodiversity of beetle species in Forest City Community Park. Collection techniques included the use of a 3x3 quadrat made of PVC piping, a GPS smartphone app, collection vials and preservation of specimens in 99.5% ethanol. DNA Extraction and PCR were conducted during an open lab session at Cold Spring Harbor DNA Learning Center. DNA Subway was utilized to identify each species. 16 specimens were successfully barcoded. A total of 12 distinct species were found, 10 of which were beetles belonging to the order Coleoptera, and 2 were identified as Hemiptera, or true bugs. Specimen PCJ017 was taxonomically identified as *Platambus semivittatus*, has been submitted to GenBank, and is currently under review for publication. Specimens PCJ006 and PCJ008 are currently pending taxonomic identification.

Sample ID #	Alignment Length	1 <sup>st</sup> Bit Score	±E Value	Identified Species	Order	Family
001	589	1036	0.0	<i>Platynus cincticollis</i>	Coleoptera	Carabidae, ground beetles
003	456	792	0.0	<i>Saldidae saltatoria</i>	Hemiptera (True Bugs)	Saldidae - Shore Bugs
004	604	1081	0.0	<i>Stenolophus ochropezus</i>	Coleoptera	Carabidae, ground beetles
006	?	?	?	Pending Taxonomic Identification	Coleoptera	Chrysomelidae, leaf beetle
007	603	1088	0.0	<i>Agonum decorum</i>	Coleoptera	Carabidae, ground beetles
008	655	976	0.0	<i>Pangaeus</i> , sp. Pending Taxonomic species identification	Hemiptera (True Bugs)	Cydnidae, Burrowing Bugs
009	595	1065	0.0	<i>Chlaenius pennsylvanicus</i>	Coleoptera	Carabidae, ground beetles
010	612	976	0.0	<i>Bembidion affine</i>	Coleoptera	Carabidae, ground beetles
011	589	1063	0.0	<i>Bembidion patrulele</i>	Coleoptera	Carabidae, ground beetles
012	581	1007	0.0	<i>Melanotus communis</i> or <i>Melanotus dietrichi</i>	Coleoptera	Elateridae, click beetles
013	621	1090	0.0	<i>Platynus cincticollis</i>	Coleoptera	Carabidae, ground beetles
014	584	1054	0.0	<i>Bembidion patrulele</i>	Coleoptera	Carabidae, ground beetles
015	594	1063	0.0	<i>Tropisternus natator</i>	Coleoptera	Hydrophilidae, water scavenger beetle
017	Submitted for Publication in GenBank			<i>Platambus semivittatus</i>	Coleoptera	Dytiscidae, predaceous water beetles
018	585	1023	0.0	<i>Platynus cincticollis</i>	Coleoptera	Carabidae, ground beetles
019	629	1083	0.0	<i>Platynus cincticollis</i>	Coleoptera	Carabidae, ground beetles



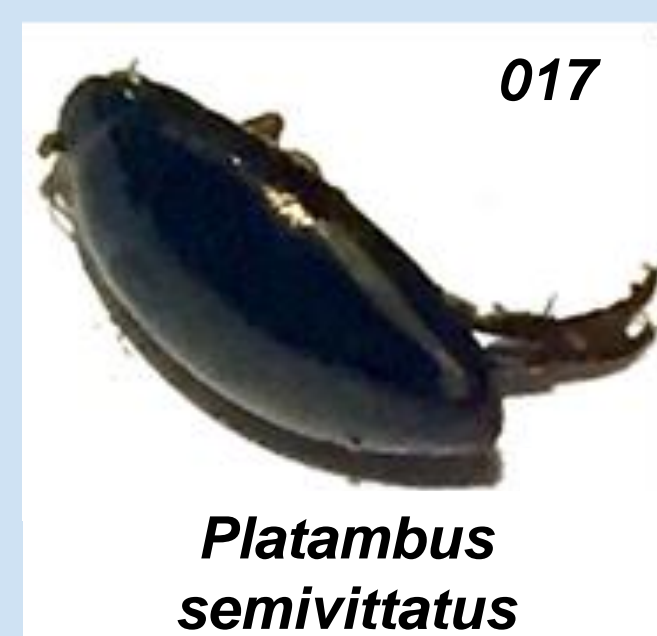
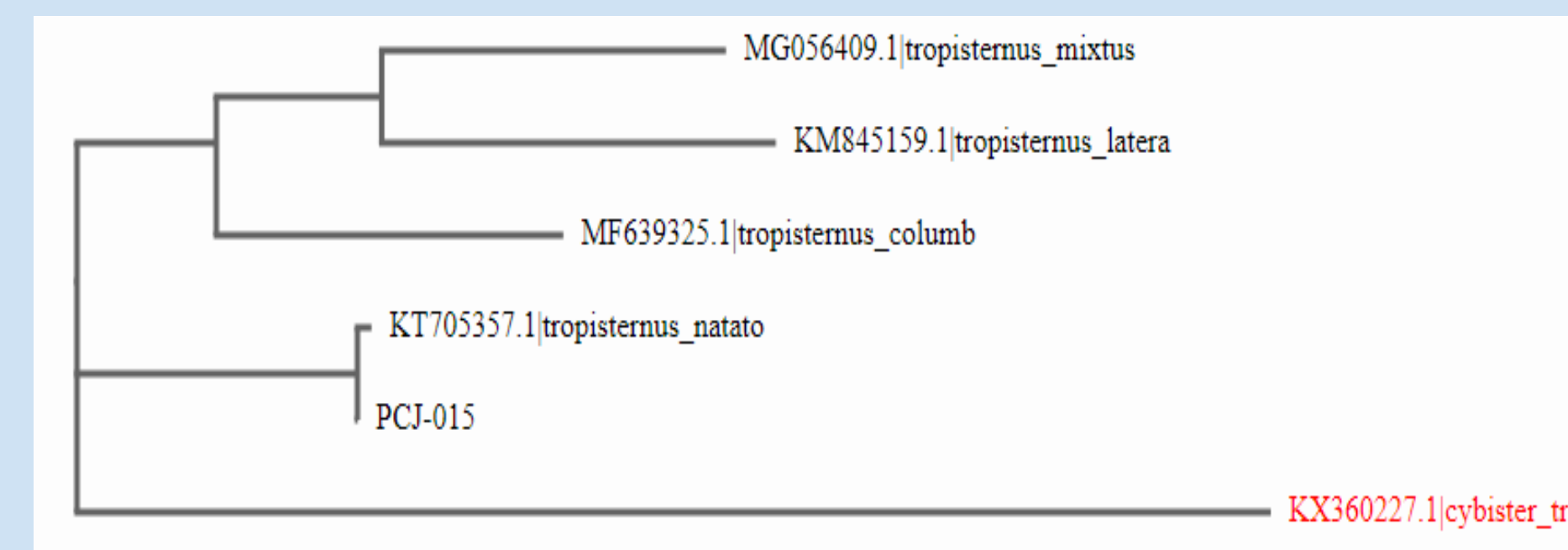
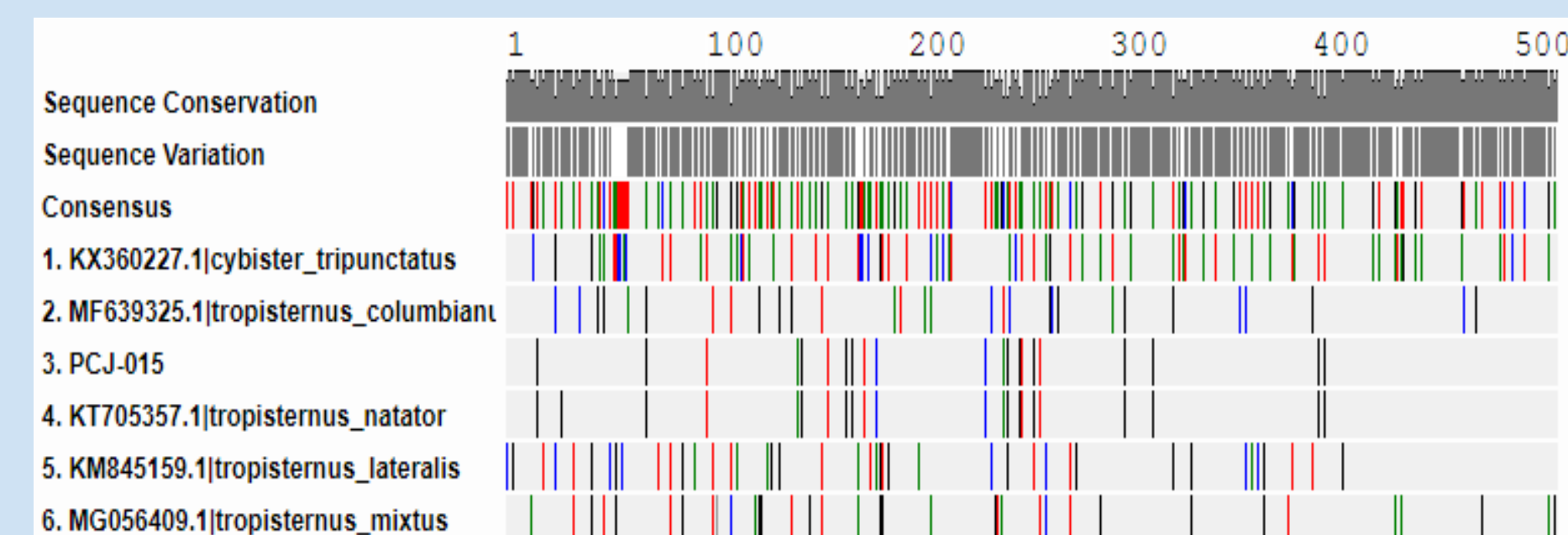
004 *Stenolophus ochropezus*

	C	1	2	3	4	5
C	-	64.32	92.81	100.00	100.00	99.44
1	64.32	-	56.82	58.55	58.55	59.32
2	92.81	56.82	-	92.81	92.81	92.64
3	100.00	58.55	92.81	-	100.00	99.67
4	100.00	58.55	92.81	100.00	-	99.67
5	99.44	59.32	92.64	99.67	99.67	-



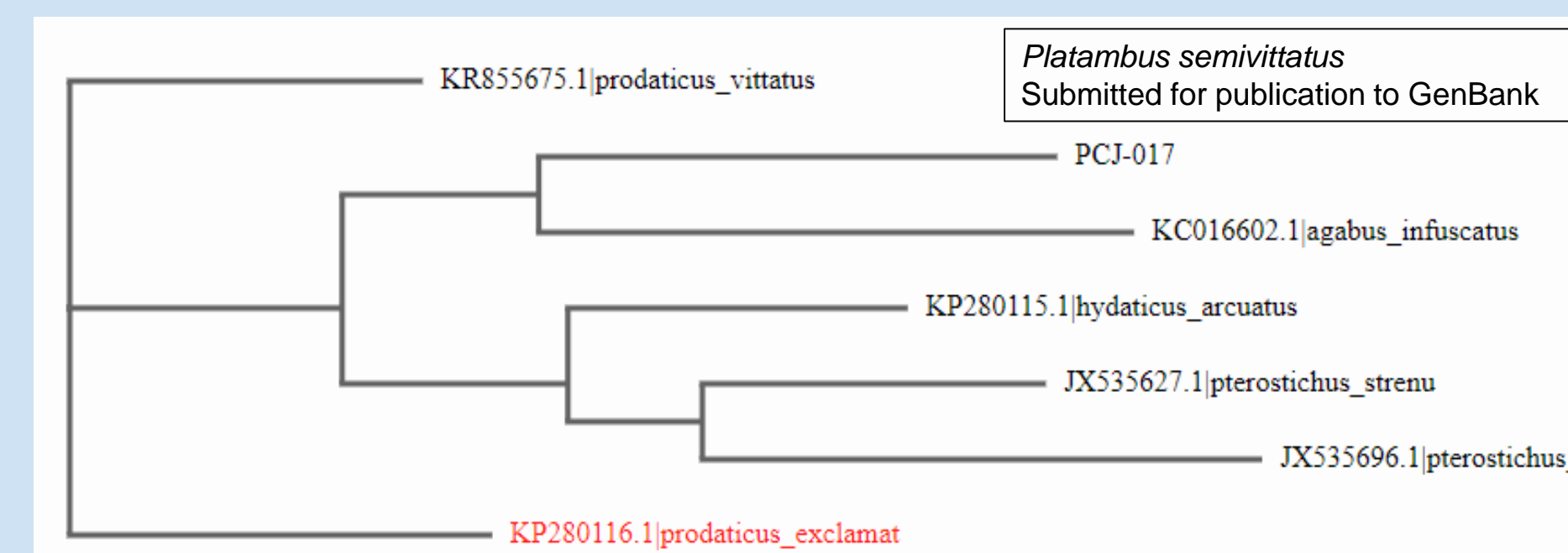
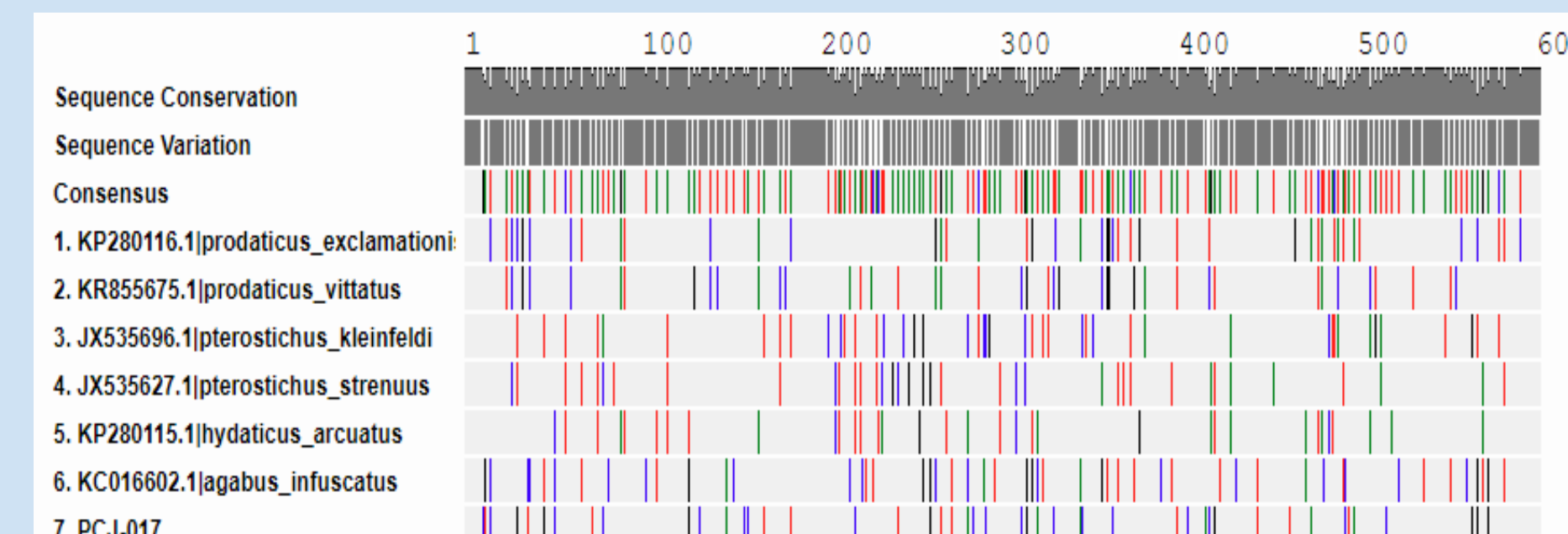
015 *Tropisternus natator*

	C	1	2	3	4	5	6
C	-	86.57	93.94	98.14	96.13	90.73	93.41
1	86.57	-	81.44	84.30	83.67	82.12	83.62
2	93.94	81.44	-	90.91	90.72	89.02	89.66
3	98.14	84.30	90.91	-	99.66	87.69	89.83
4	96.13	83.67	90.72	99.66	-	87.52	89.64
5	90.73	82.12	89.02	87.69	87.52	-	90.77
6	93.41	83.62	89.66	89.83	89.64	90.77	-



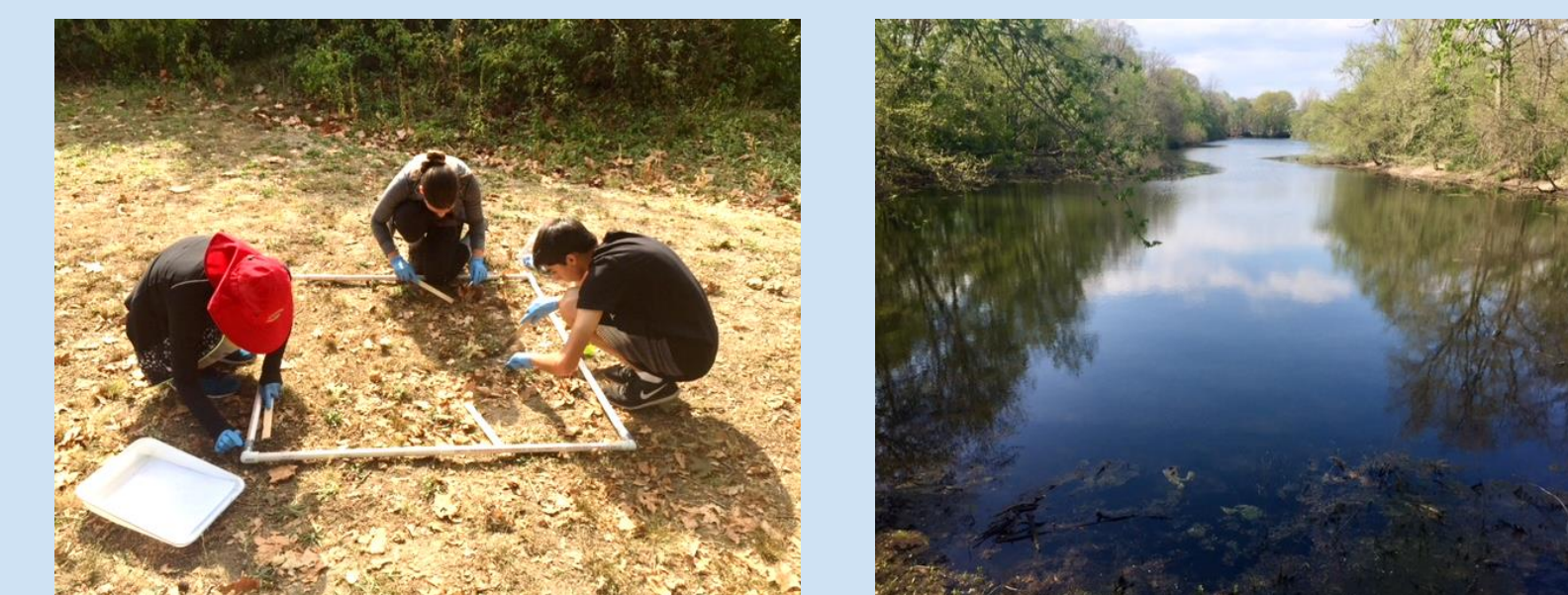
017 *Platambus semivittatus*

	C	1	2	3	4	5	6	7
C	-	93.02	93.48	92.59	93.54	94.02	91.72	96.44
1	93.02	-	92.37	87.62	88.89	89.37	87.89	88.57
2	93.48	92.37	-	87.60	88.55	89.83	86.73	88.39
3	92.59	87.62	87.60	-	91.01	89.59	86.24	87.54
4	93.54	88.89	88.55	91.01	-	91.81	88.25	87.56
5	94.02	89.37	89.83	89.59	91.81	-	87.91	87.87
6	91.72	87.89	86.73	86.24	88.25	87.91	-	88.91
7	96.44	88.57	88.39	87.54	87.56	87.87	88.91	-



## Methodology

- A 3x3 quadrat made of PVC piping, and a GPS smartphone app was utilized.
- Detritus matter was uplifted, and small branches, logs and rocks were rolled over to capture beetles in collection vials.



- Each collection vial was numbered.
- Specimens were placed in a freezer for 15 minutes, photographed then preserved in 99.5% ethanol.
- DNA Extraction and PCR were conducted.
- CO1 gene was used to compare sequence similarities with known species.



- The DNA Subway platform was then utilized to identify each species.

## Discussion

The goal of this project was to investigate the biodiversity of beetle species in Forest City Community Park. 16 specimens were successfully barcoded. A total of 12 distinct species were found, 10 of which were beetles in the order Coleoptera, and 2 were identified as Hemiptera. Specimen PCJ017 was taxonomically identified as *Platambus semivittatus*, has been submitted to GenBank, and is currently under review for publication. Specimens PCJ006 and PCJ008 are currently pending taxonomic identification. PCJ006 is a member of the family Chrysomelidae, and is currently under taxonomic review in an attempt to identify the genus and species. PCJ008 is a member of family Cydnidae and genus *Pangaeus*, and is currently under taxonomic review to be identified at the species level.