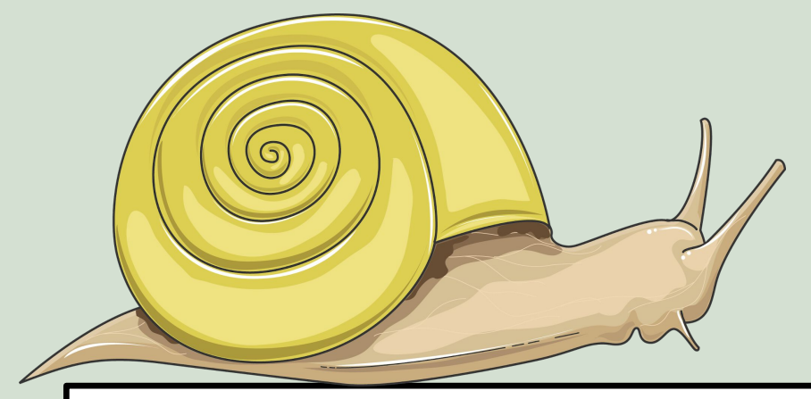
Analysis of Invertebrate Biodiversity in Upland vs. Wetland Environments



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Introduction

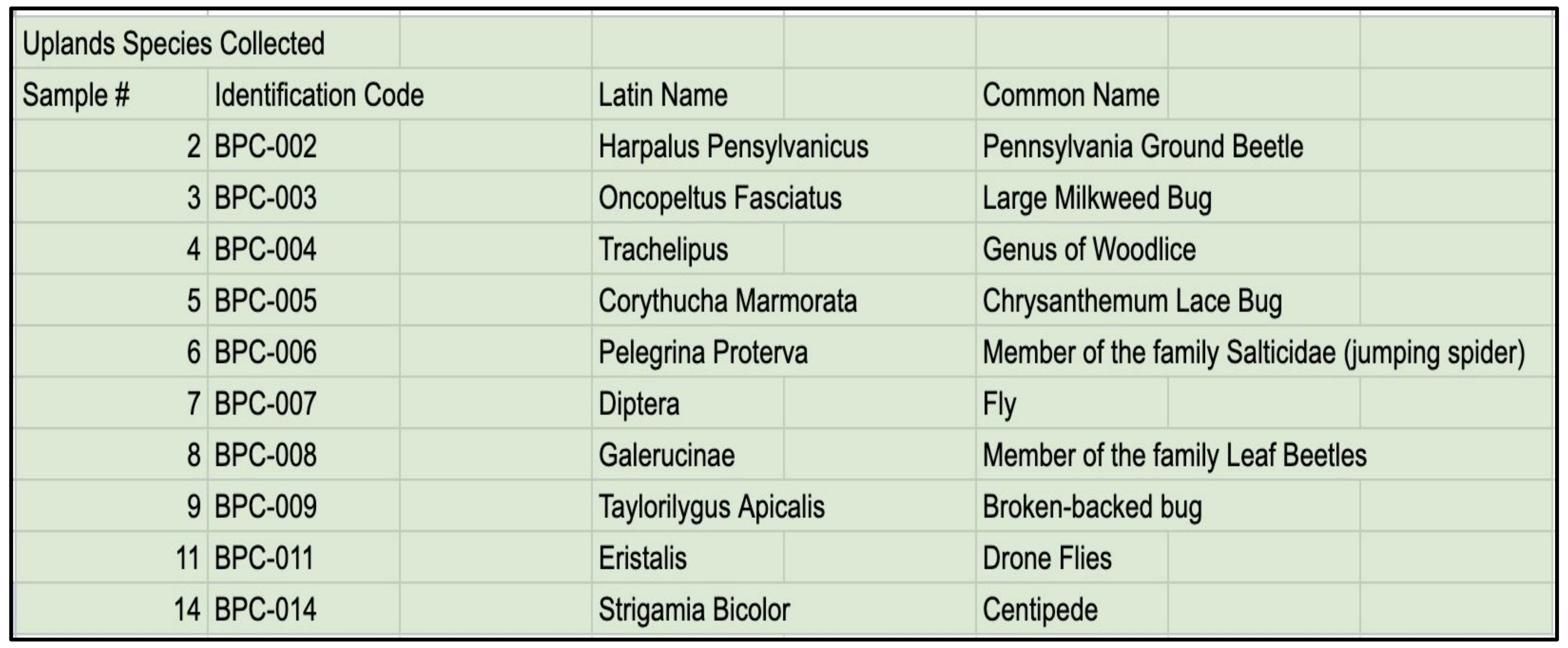
- Invertebrates do not have a vertebral column
  - They compose around 95% of animals
- Impact habitats through roles in pollination, improvement of soil structures, and support of the food chains
- Wetlands are a transitional area between dry land and permanent water
- The nutrients found in marshes work to sustain fish, birds, reptiles, mammals, and invertebrates
- One acre of salt marsh has the opportunity to absorb 1.5 million gallons of flood water
- Uplands are defined as elevated landforms with dry conditions
- Make up 41.3% of all land mass
- Upland soils commonly are found to be nutrient-poor and in some cases even acidic
- The hypothesis was that as we transition from the salt marshes to the meadows, there will be a decrease in invertebrate species diversity because more nutrients can be found in wetlands and marshes.

Materials and Methods

- Collected samples from two 3x3m plots at Randall's Island (wetlands and uplands)
- Spent 30 minutes per site collecting using nets and by hand
- The samples were put in labeled vials of 95% ethanol and then froze for transportation
- Isolated the DNA of each sample using the Silica method
- DNA amplified using COI primer and then running through PCR
- DNA was analyzed through gel electrophoresis
- 22 were sent to a lab for sequencing
- Data put into the DNA Subway

Results

Table 1-Total Upland Species Collected



Uplands Species Collected

Sample #	Identification Code	Latin Name	Common Name
2	BPC-002	Harpalus Pensylvanicus	Pennsylvania Ground Beetle
3	BPC-003	Oncopeltus Fasciatus	Large Milkweed Bug
4	BPC-004	Trachelipus	Genus of Woodlice
5	BPC-005	Corythucha Marmorata	Chrysanthemum Lace Bug
6	BPC-006	Pelegrina Proterva	Member of the family Salticidae (jumping spider)
7	BPC-007	Diptera	Fly
8	BPC-008	Galerucinae	Member of the family Leaf Beetles
9	BPC-009	Taylorilygus Apicalis	Broken-backed bug
11	BPC-011	Eristalis	Drone Flies
14	BPC-014	Strigamia Bicolor	Centipede

This table shows the invertebrate species collected from two 3x3m upland sites

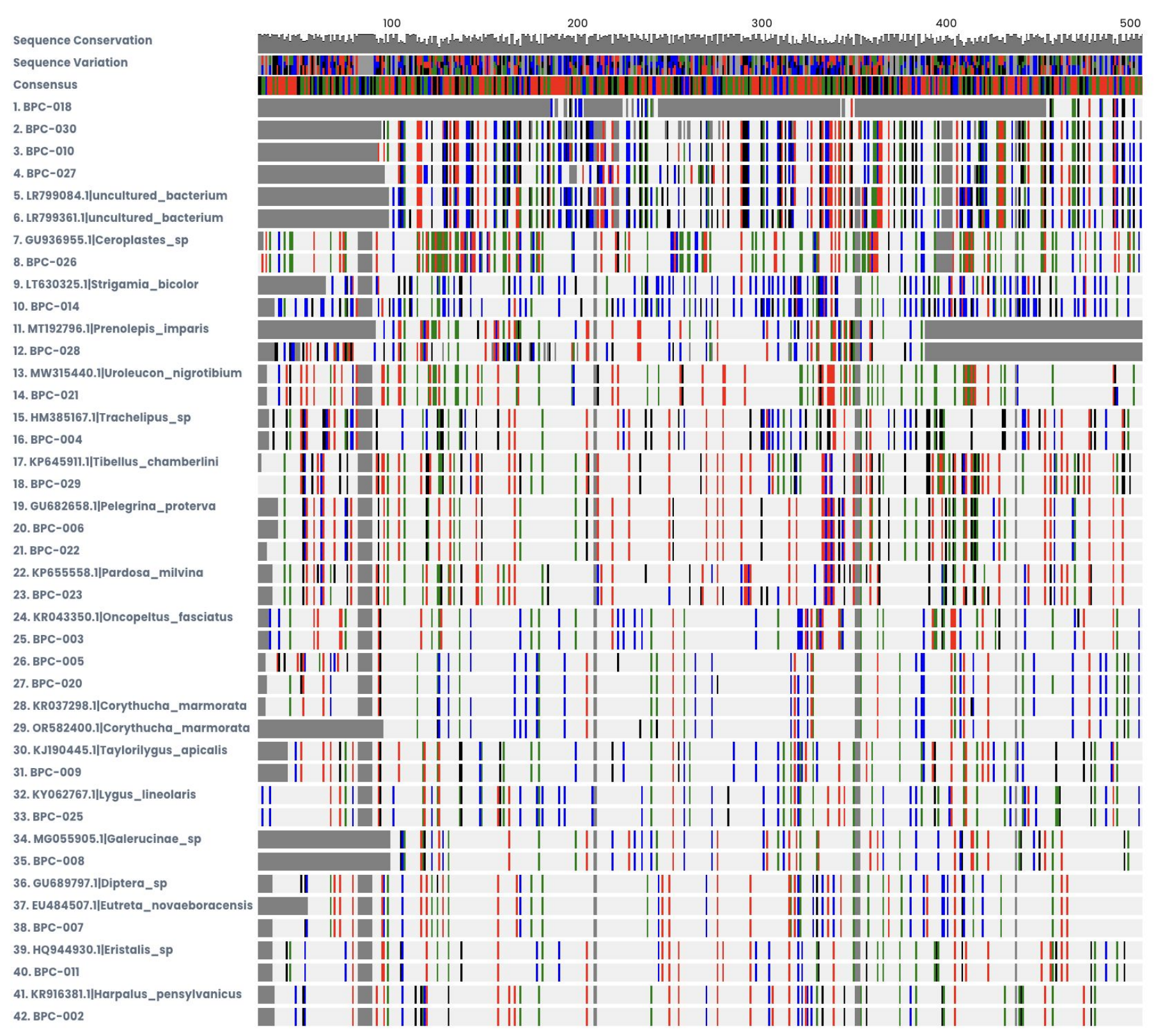
Table 2-Total Wetland Species Collected

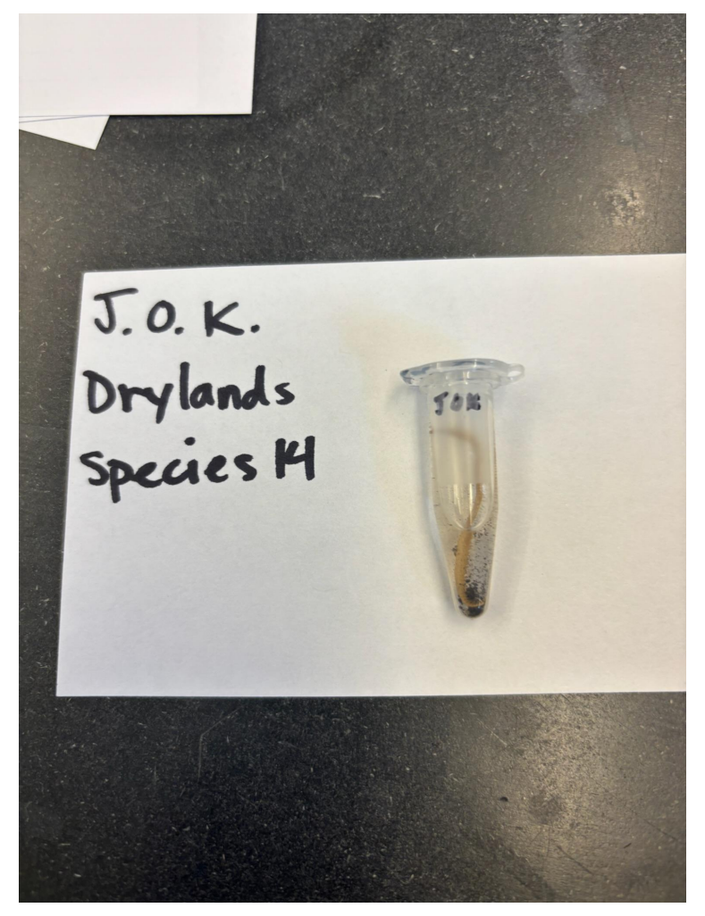
Wetlands Species Collected

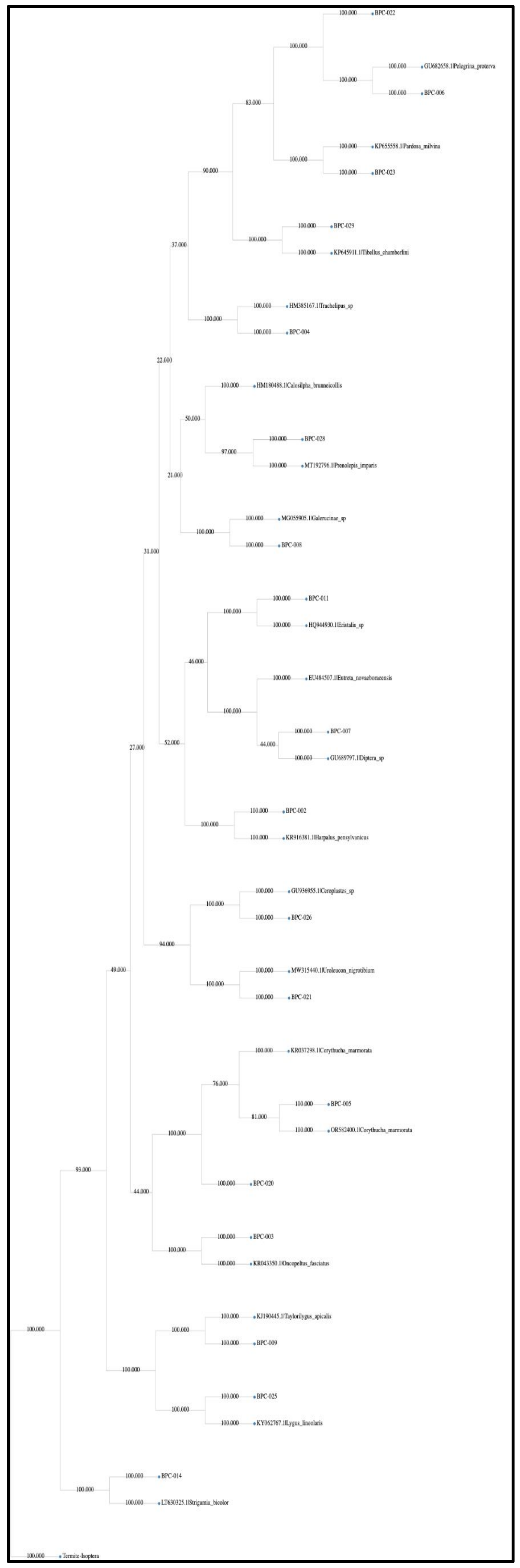
Sample #	Identification Code	Latin Name	Common Name
20	BPC-020	Corythucha Marmorata	Chrysanthemum Lace Bug
21	BPC-021	Uroleucon nigrotibium	Member of the family Aphididae
22	BPC-022	Pelegrina Proterva	Member of the family Salticidae (jumping spider)
23	BPC-023	Pardosa Milvina	Shore Spider
25	BPC-025	Lygus Lineolaris	Tarnished Plant Bug
26	BPC-026	Ceroplastes	Wax Scales
28	BPC-028	Prenolepis Imparis	Winter Ant
29	BPC-029	Tibellus Chamberlini	Running Crab Spider

This table shows the invertebrate species collected from two 3x3m wetland sites

Muscle Alignment Chart







This phylogenetic tree uses a termite outgroup to determine the bootstrap value of the branches

Discussion

- Hypothesized that salt marshes have greater invertebrate diversity than wetlands
- Hypothesis was rejected; meadows had 10 species, wetlands had 8
- Meadow's higher diversity may be due to greater plant diversity – meadows likely have a more complex habitat structure
- Wetlands are nutrient rich but may have more variability
- Both sites contain unique species
- Shared species suggest no strong barriers and movement between ecosystems
- Future studies could look at soil moisture, salinity, and temperature, to help explain why more species are found in one area than another

Errors

- Many samples were unidentified, limiting the data set
- Some that did have identifications were incorrect
  - Not enough contamination to realistically have uncultured bacterium

References

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Acknowledgements

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