

Abstract

Intertidal regions along the Northeast harbor a wide range of crab species. Our project aimed to identify and verify different crab species in the salt marsh and rocky shore of Randall's Island Park. Sampling methods included deploying crab traps, seining, and transect collection. We hypothesized that an abundance of blue and fiddler crabs would be found. We also predicted that fiddler crabs would be concentrated in the salt marsh area relative to the shoreline. DNA analysis was conducted on collected specimens to identify the genus and species. Results revealed that the organisms collected were (*Callinectes sapidus*) and (*Minuca pugnax*). There was no correlation found between species and habitat preference.

Introduction

- Within intertidal areas of the Northeastern seaboard, there is an abundance of crabs
- Salt marshes and shorelines are common habitats for crabs
- Since 2006, Randall's Island Park Alliance has worked to restore its salt marsh
- Salt marshes are renowned for their biodiversity
- This project surveyed the abundance, biodiversity, and habitat preferences of crabs at Randall's Island Park's restored salt marsh and shoreline
- We predicted to find members of the fiddler crab genera *Leptuca* and *Minuca* and blue crabs (*Callinectes sapidus*)
- Blue crabs prefer underwater habitats
- Fiddler crabs are known to burrow in muddy regions

Materials and Methods

- Crab samples were collected from four sites: three from salt marsh sites M.1, M.2, and M.3, and one from shore site S.1
- DNA was isolated from the 12 crab samples and then amplified using PCR
- DNA Subway software used to analyze sequencing results



Figure 1. Image of Salt Marsh Mudflat (site M.3)

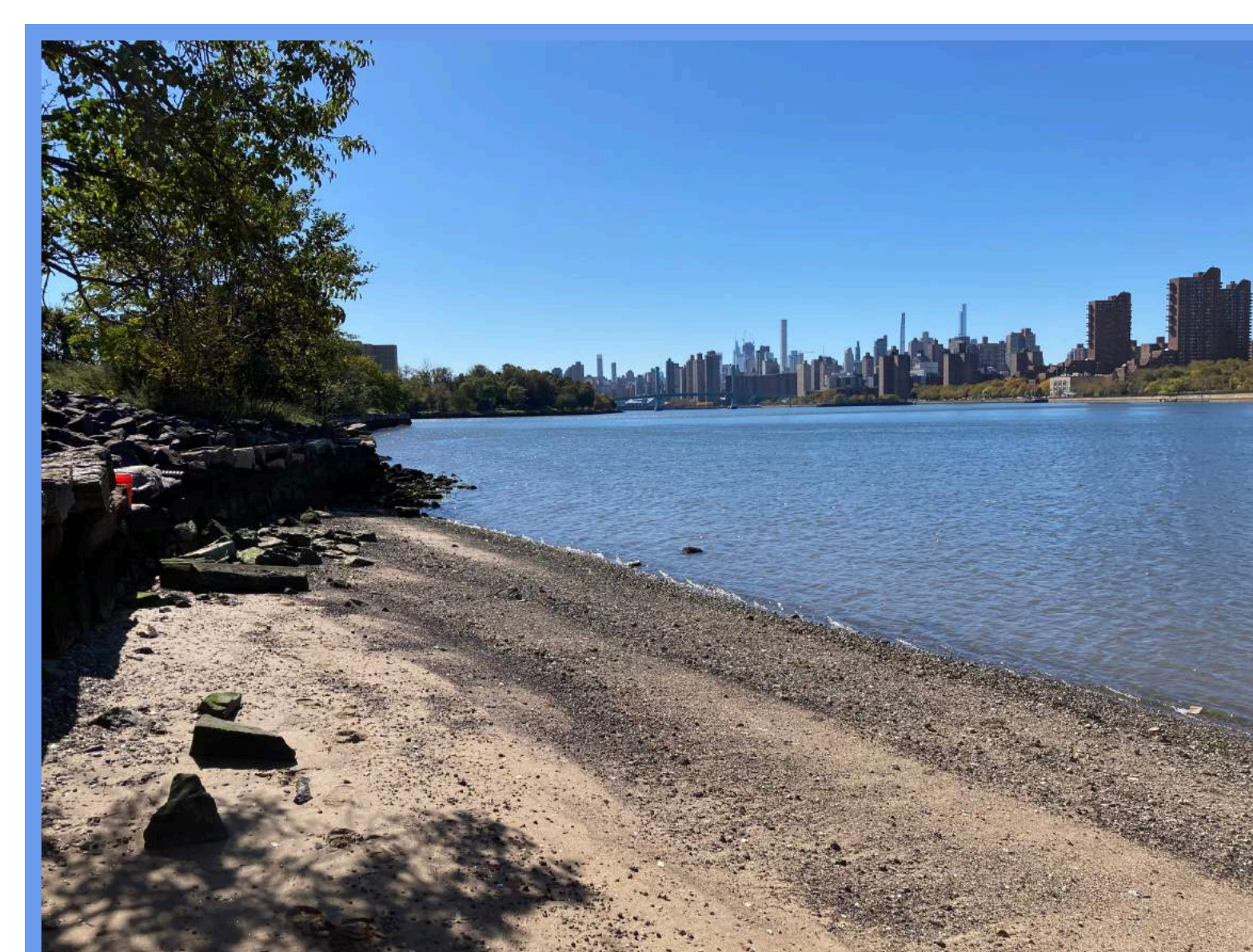


Figure 2. Image of Shoreline (site S.1)

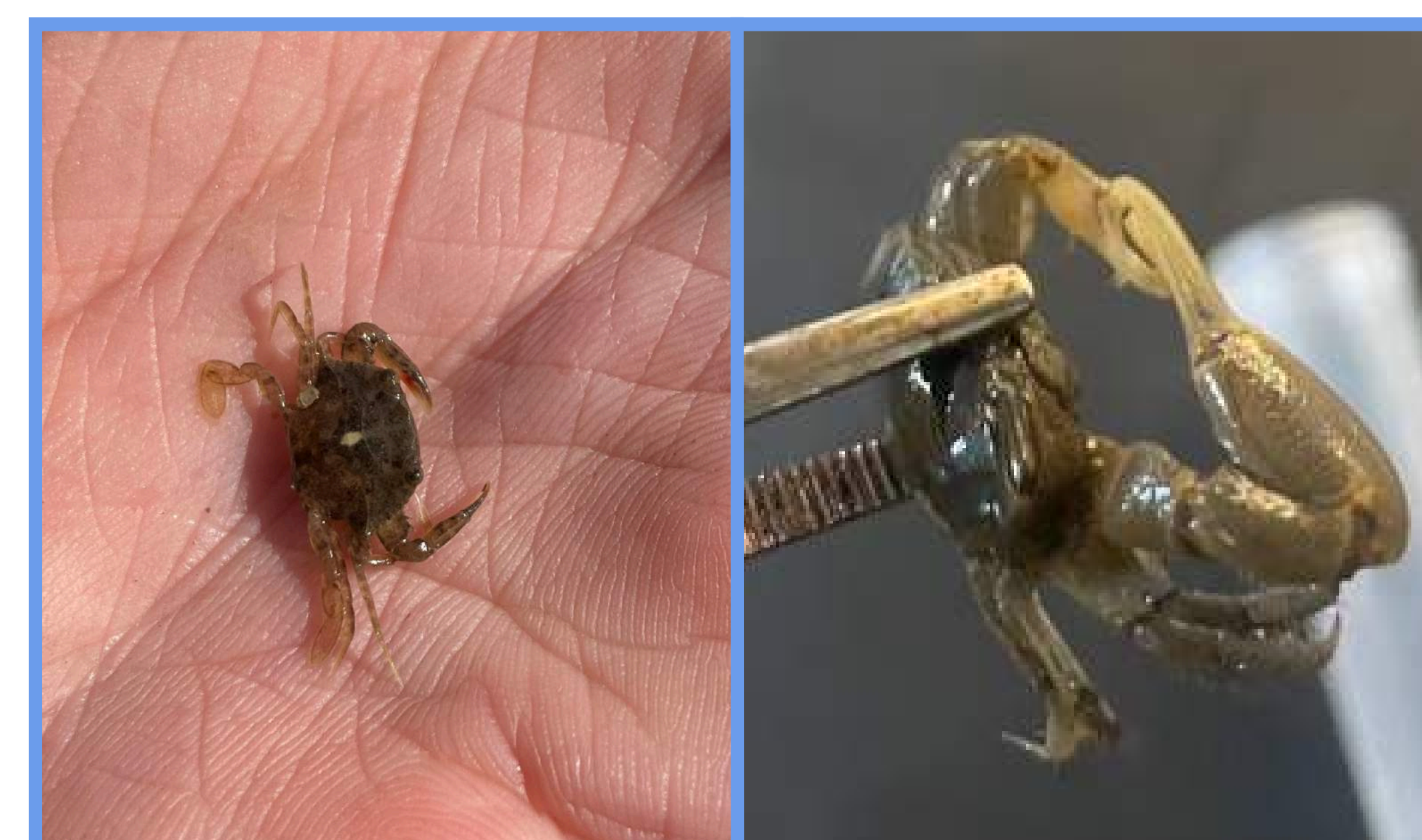


Figure 3. Side-by-Side Comparison of *Callinectes sapidus* (left) and *Minuca pugnax* (right)

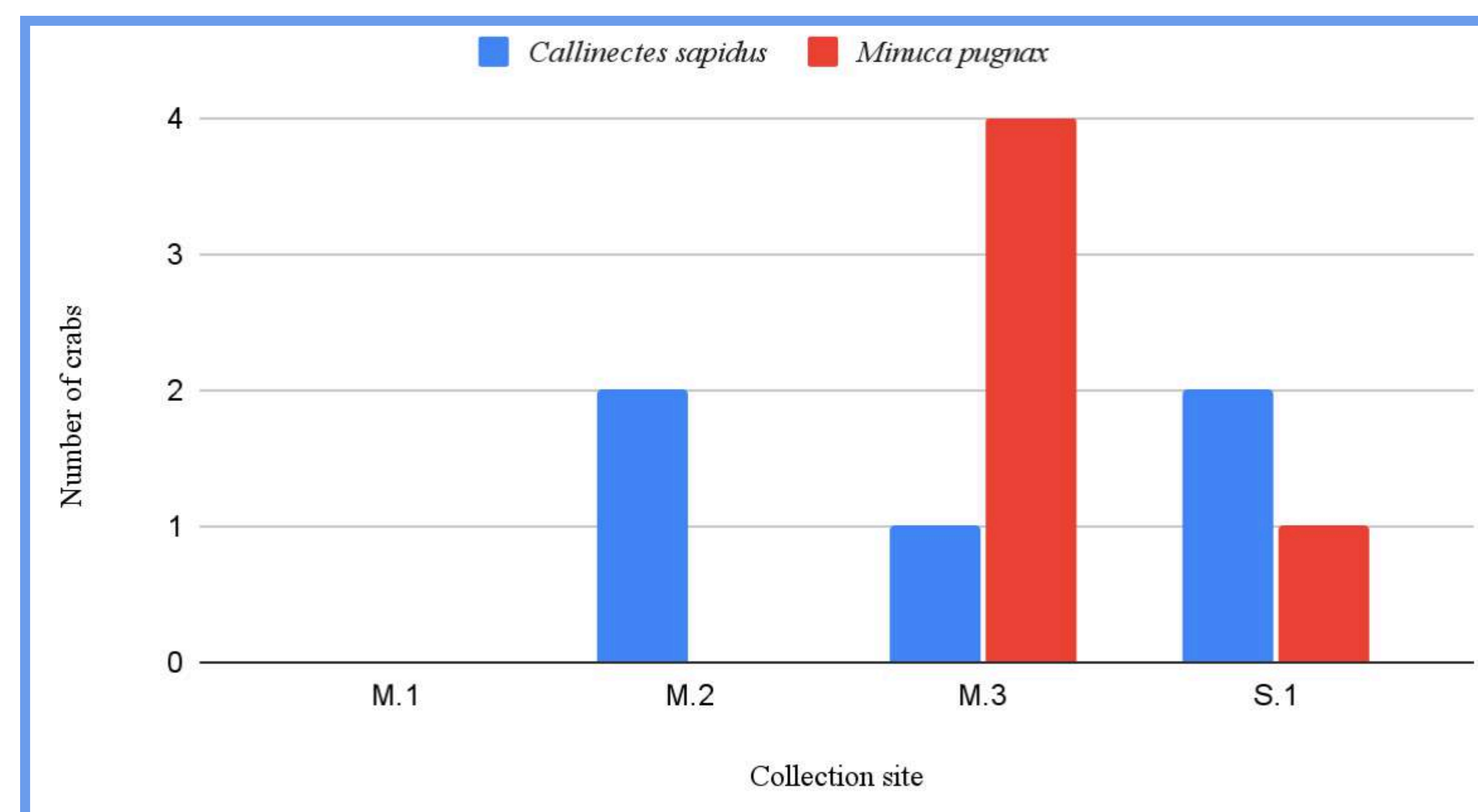


Figure 4. Comparing the Number and Species of Crabs collected from Each Site. Blue crabs were present at three out of four sites and both habitats. Fiddler crabs were present in two out of four sites and in both habitats.

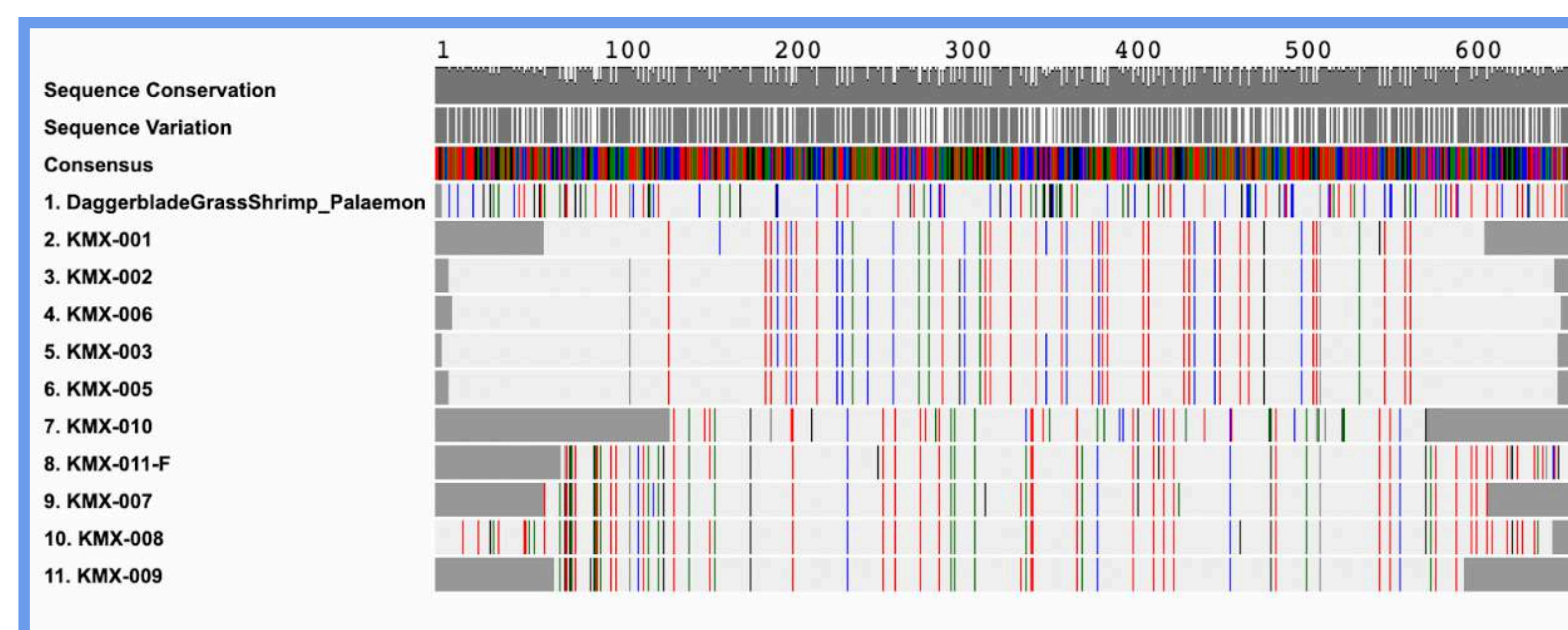


Figure 3. Untrimmed Multiple Alignment Created By MUSCLE. Sequencing results shown in the MUSCLE program. Different nucleotides are in different colors.

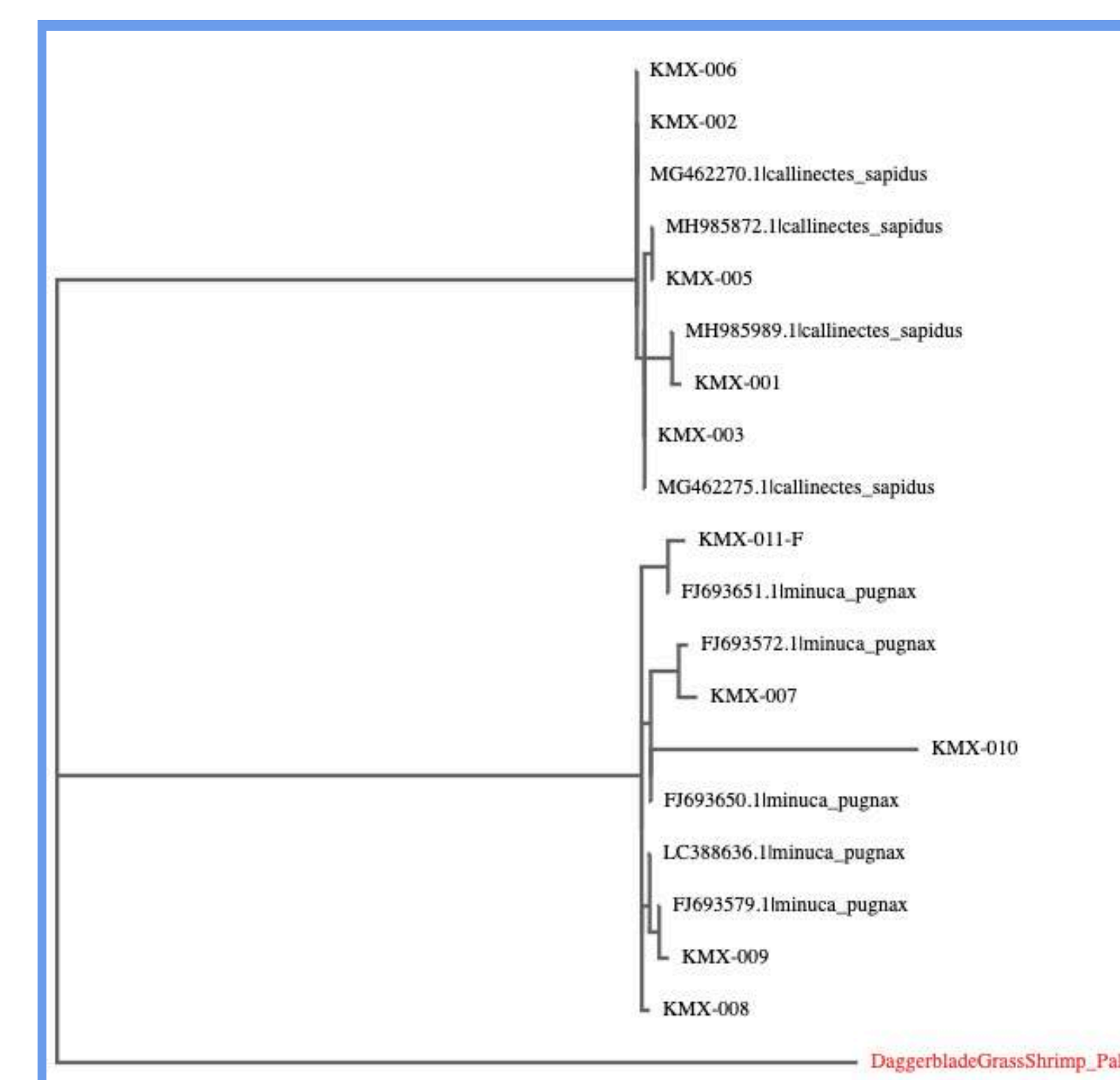


Figure 5. Phylogenetic Tree. The close evolutionary proximity of the species illustrated by the phylogenetic tree. The species highlighted in red is the out-group.

Results

- Crab species were collected the blue crab (*Callinectes sapidus*) and the Atlantic mud fiddler crab (*Minuca pugnax*)
- Tissues from the crabs were extracted and amplified via PCR
- The DNA was sequenced and it was compared to known aquatic invertebrate data
- Two samples (KMX-004) and (KMX-012) were excluded from the analysis due to procedural error

Discussion

- Field identifications were supported by DNA sequences
- No clear correlation between species type and preferred area
- Biodiversity and abundance show that the salt marsh has become a suitable habitat for crab populations.
- An error was that the mesh size of the seining net was too large to catch smaller aquatic crabs
- In future experiments, field collection could survey a larger area

References

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Acknowledgments

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