

Non-Native, Marine Invertebrates along Coastlines of the Southeastern United States

Dr. Linda Walters

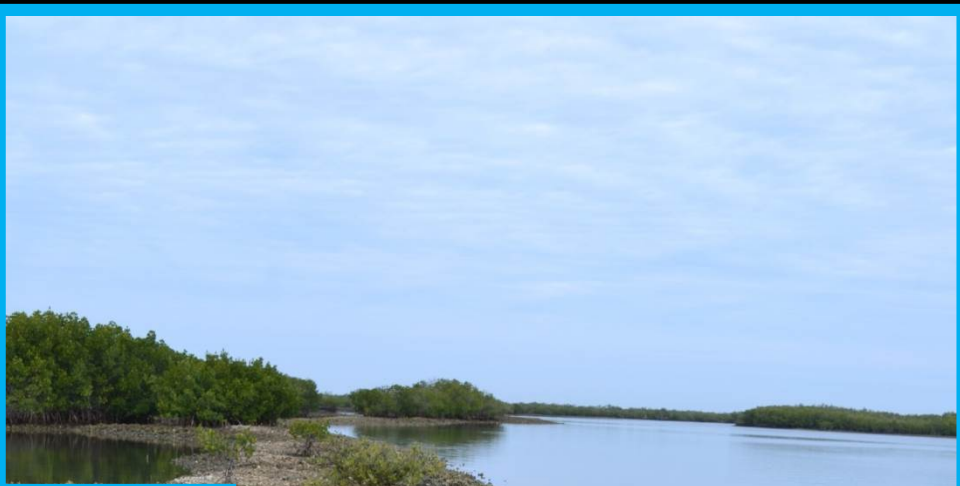
Professor of Biology

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Oyster Reef Research & Restoration Indian River Lagoon 2000 - present





Monitoring



Non-Natives Attached to Live Oysters in the Indian River Lagoon



Perna viridis
(2002)



Mytella charruana
(2004)



Megabalanus coccopoma (2006)



Maximum

Range:

82 locations
spanning 894 km
checked twice/yr
from
2006 – 2011

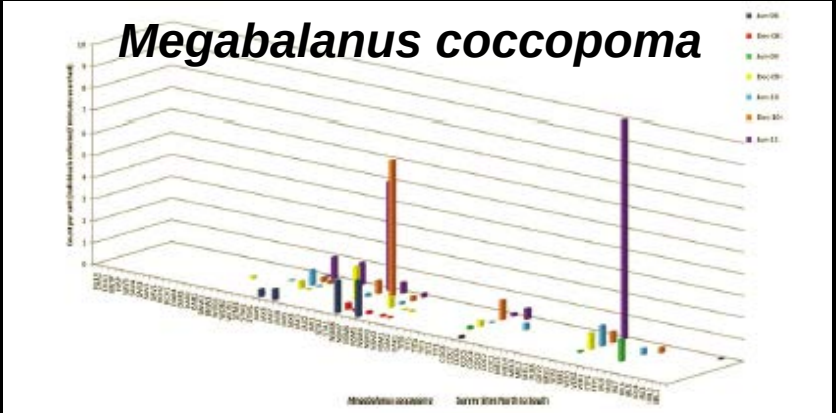
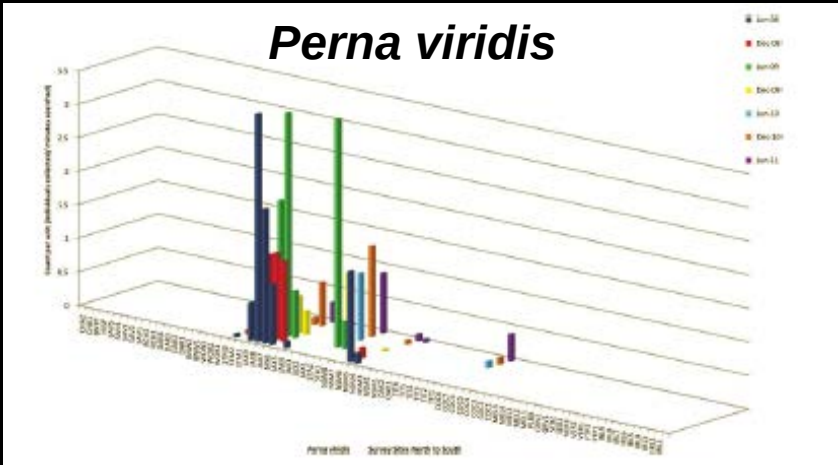
Spinuzzi, Schneider, Walters, Yuan &
Hoffman. 2013. *Marine Biodiversity
Records* 6:1-13



Legend

- Mytella charruana
- Perna viridis
- Megabalanus coccopoma

Jacksonville



Mytella charruana

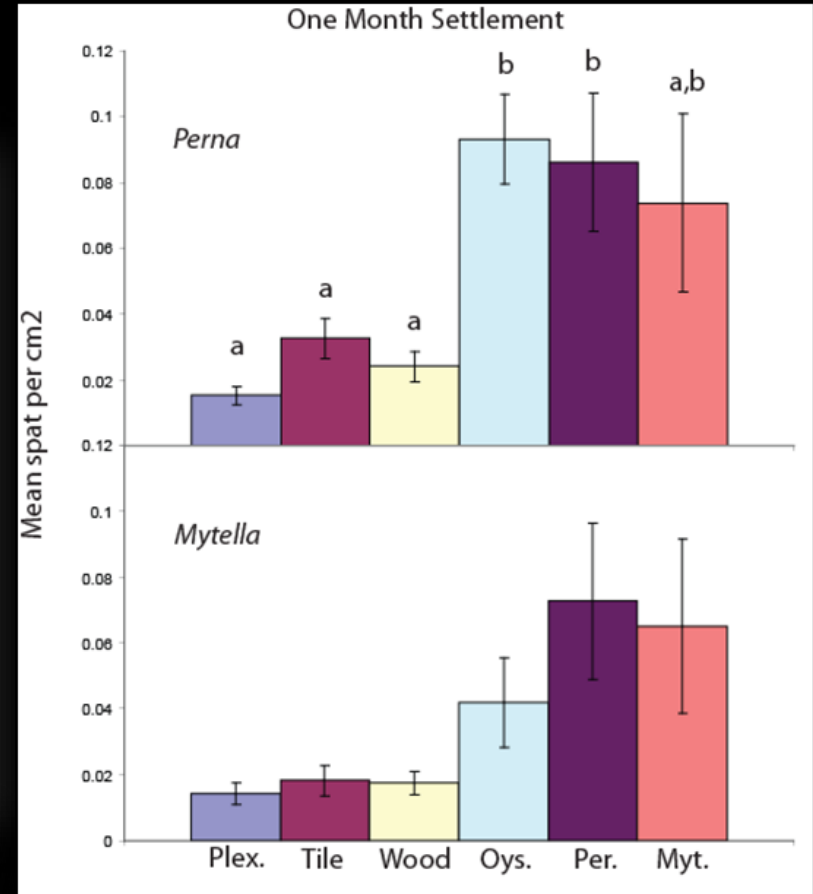
“Sururu”



Jacksonville, FL: 1986
Indian River Lagoon: 2004

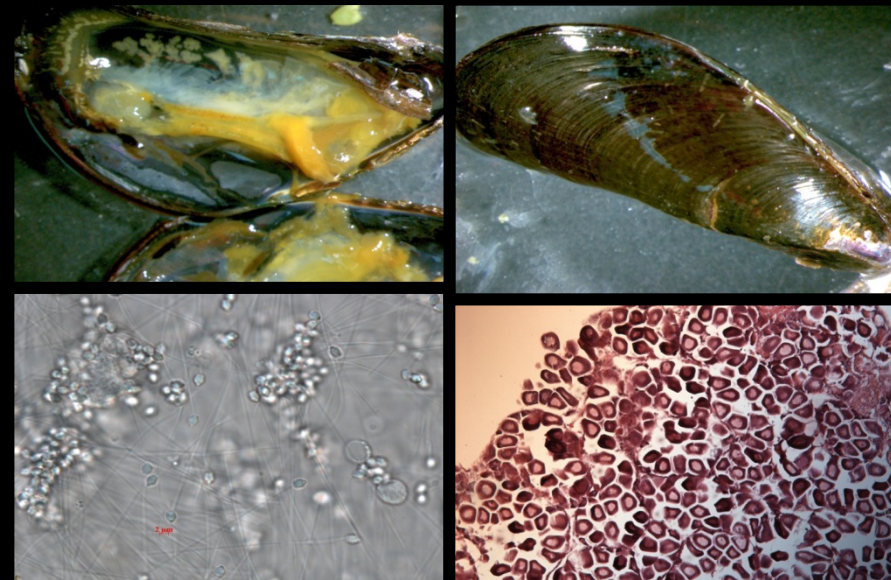


Substrate Preferences



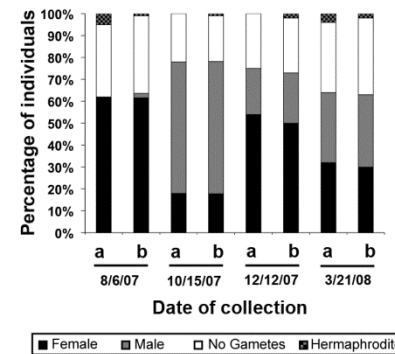
Gilg, Matthew R., Eric A. Hoffman, Kimberly R. Schneider, Josiah Ryabinov, Christine El-Khoury, and Linda J. Walters. *Journal of Molluscan Studies* 76:333-339

Food Availability – Starvation Triggers Sex Reversal



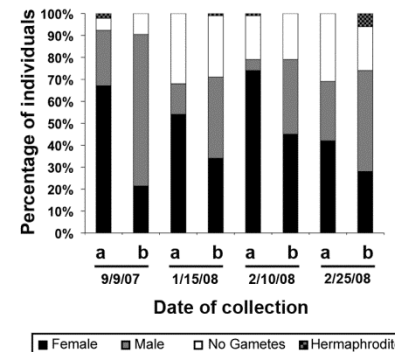
A

With food

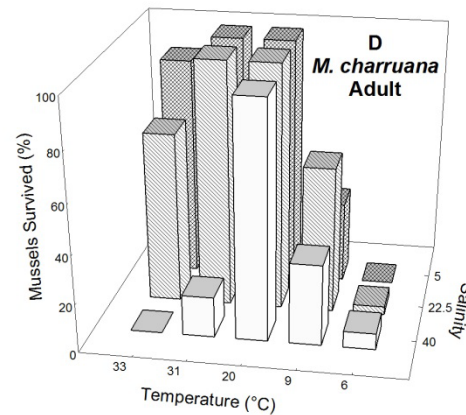
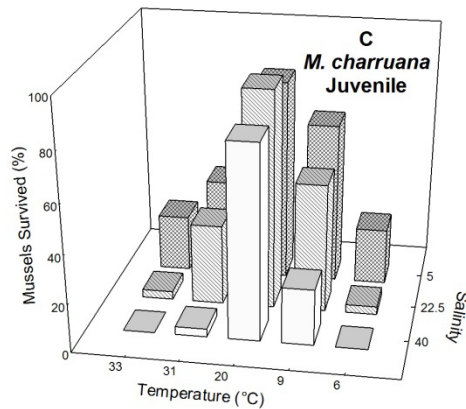


B

Without food



Salinity X Temperature Tolerances



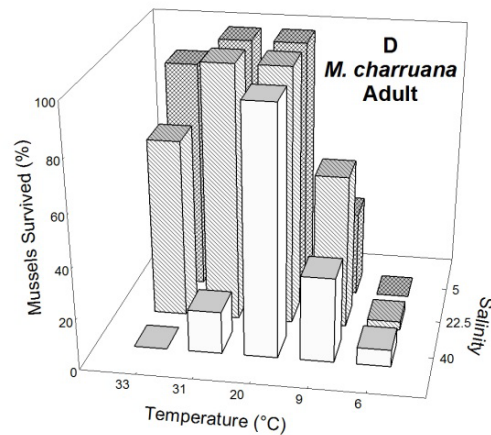
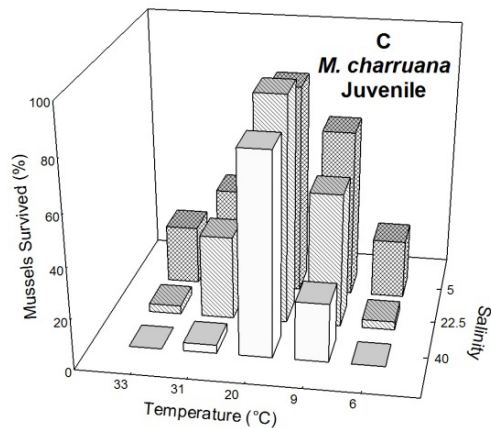
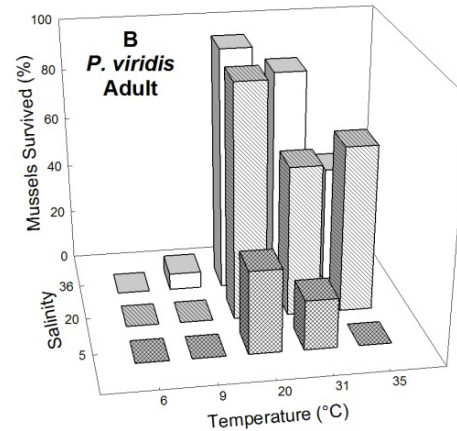
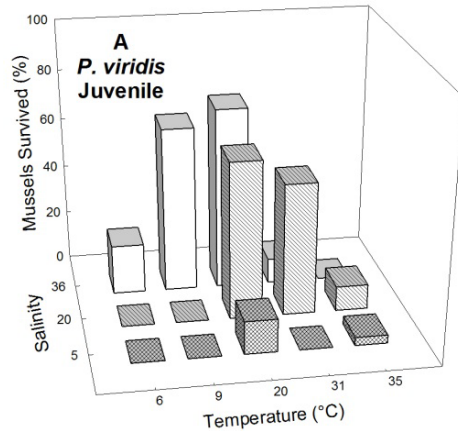
Salinity (ppt)

5
↓
40

Temperature (°C)
33° ← 6°

Yuan,
Walters,
Schneider,
Hoffman.
Submitted.
*Journal of
Shellfish
Research.*

Mytella vs *Perna*: Salinity X Temperature Tolerances



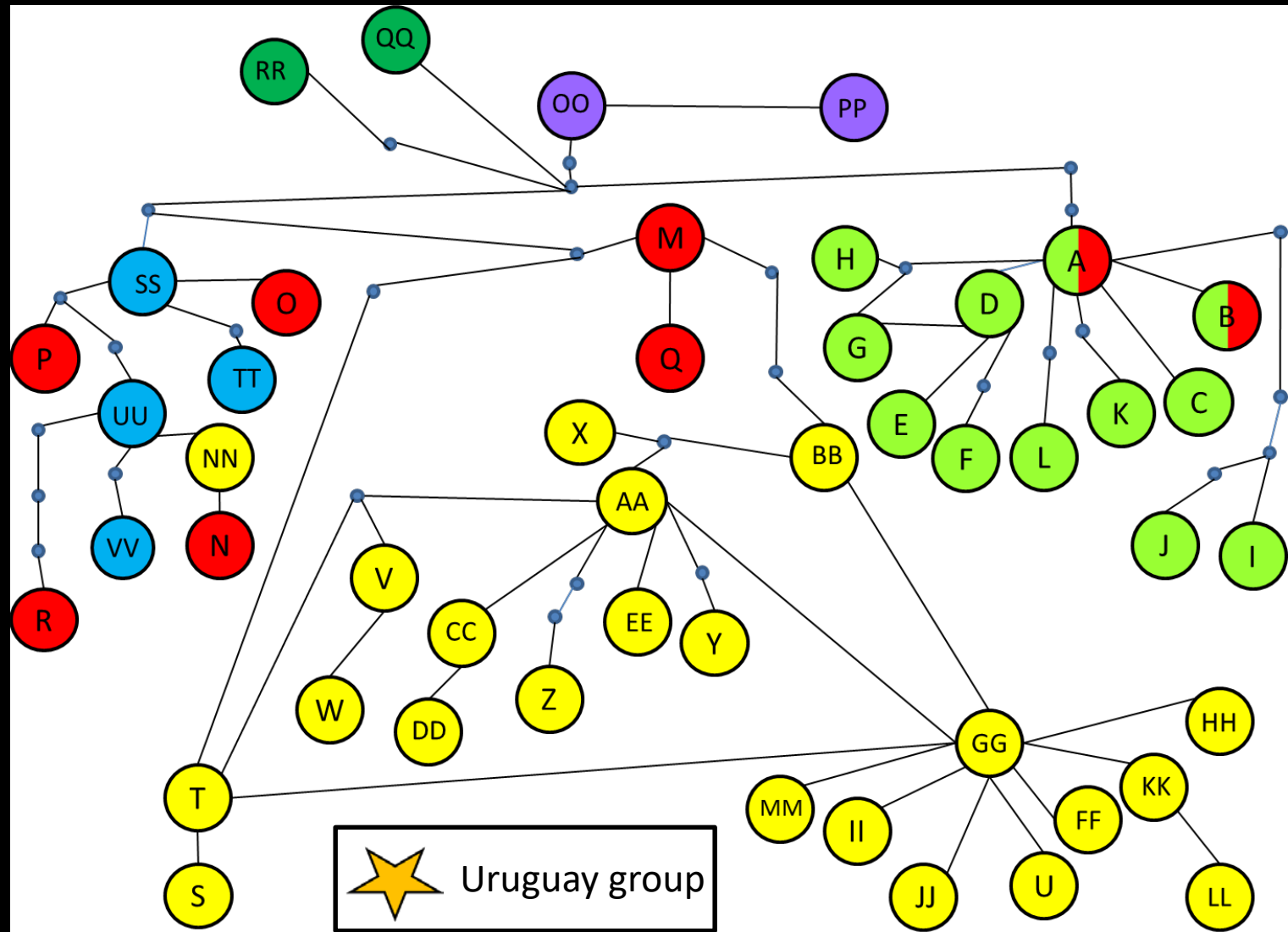
Mytella: Molecular Analysis

- 6 native; 4 non-native populations
- ~20 samples per locality
- Sequenced 722 bp mtDNA COI gene

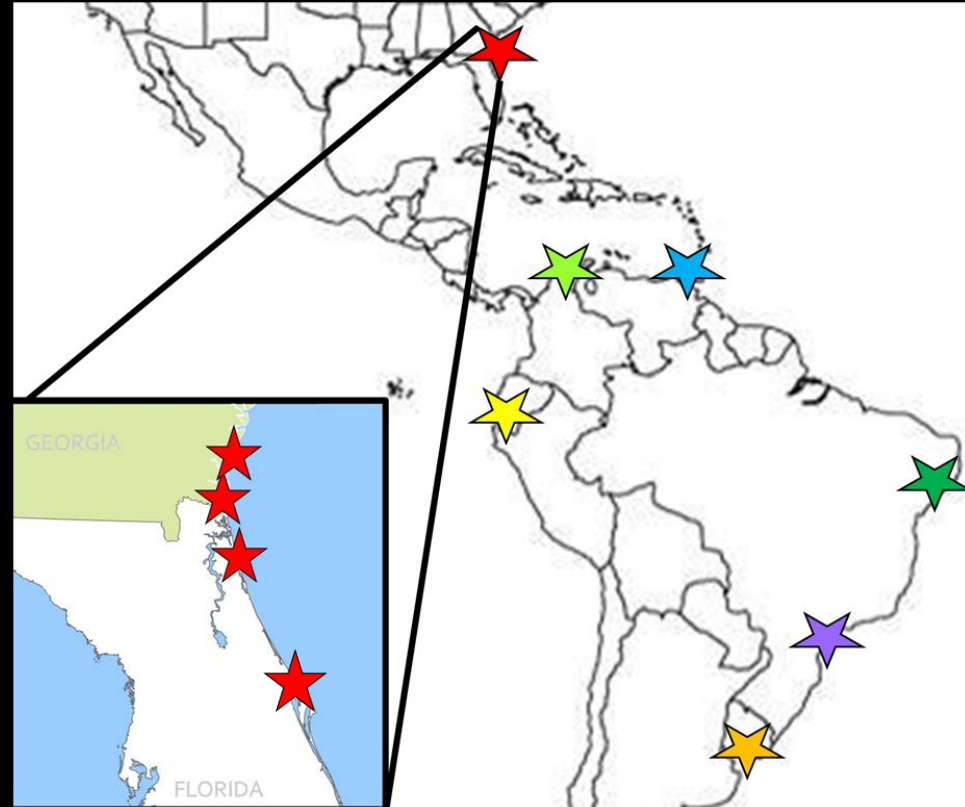
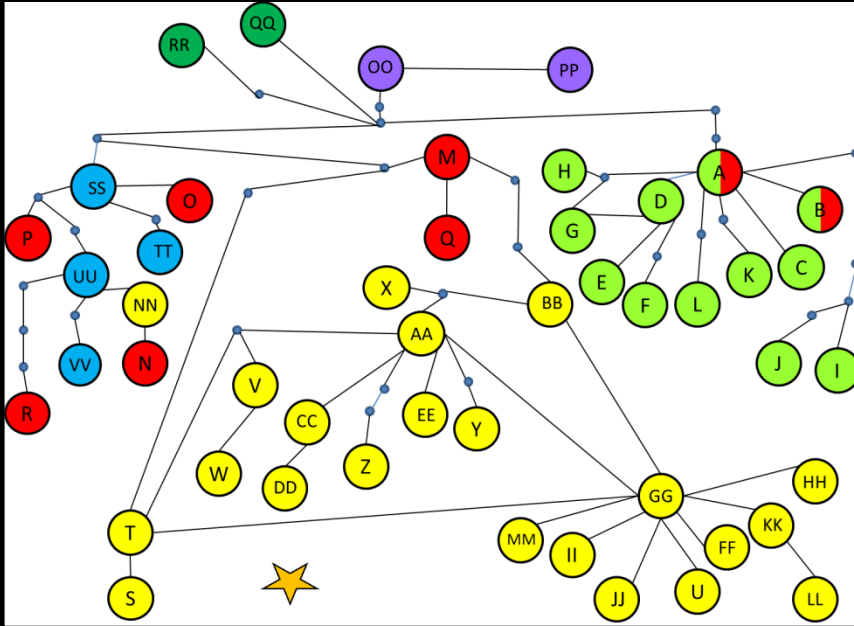


Where did the invading species originate?

Mytella charruana haplotype network

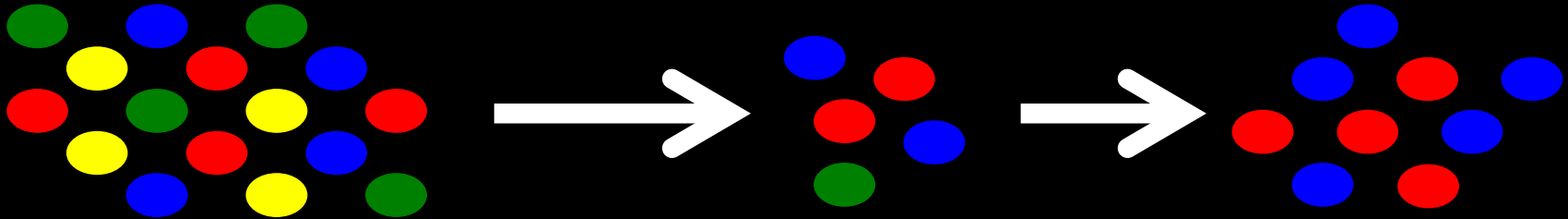


Where did the invading species originate?

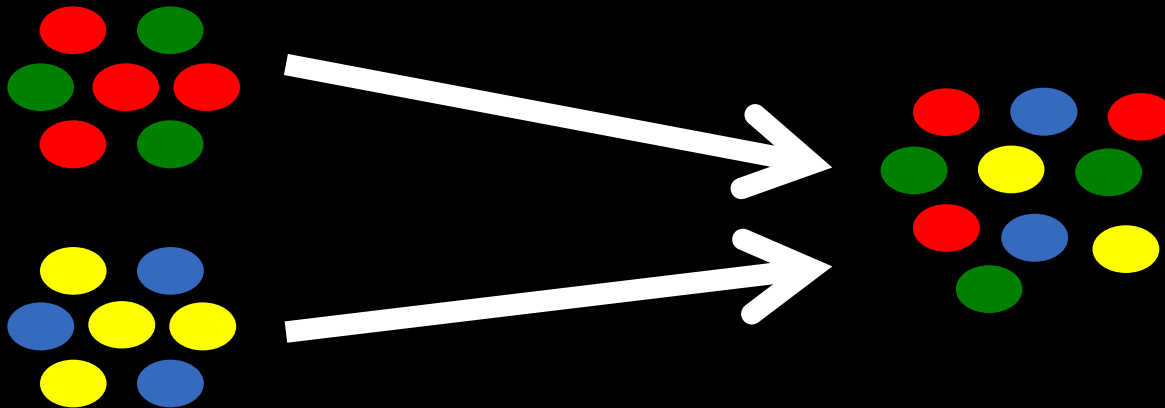


How do levels of genetic diversity compare between native and non-native populations?

1. Bottleneck

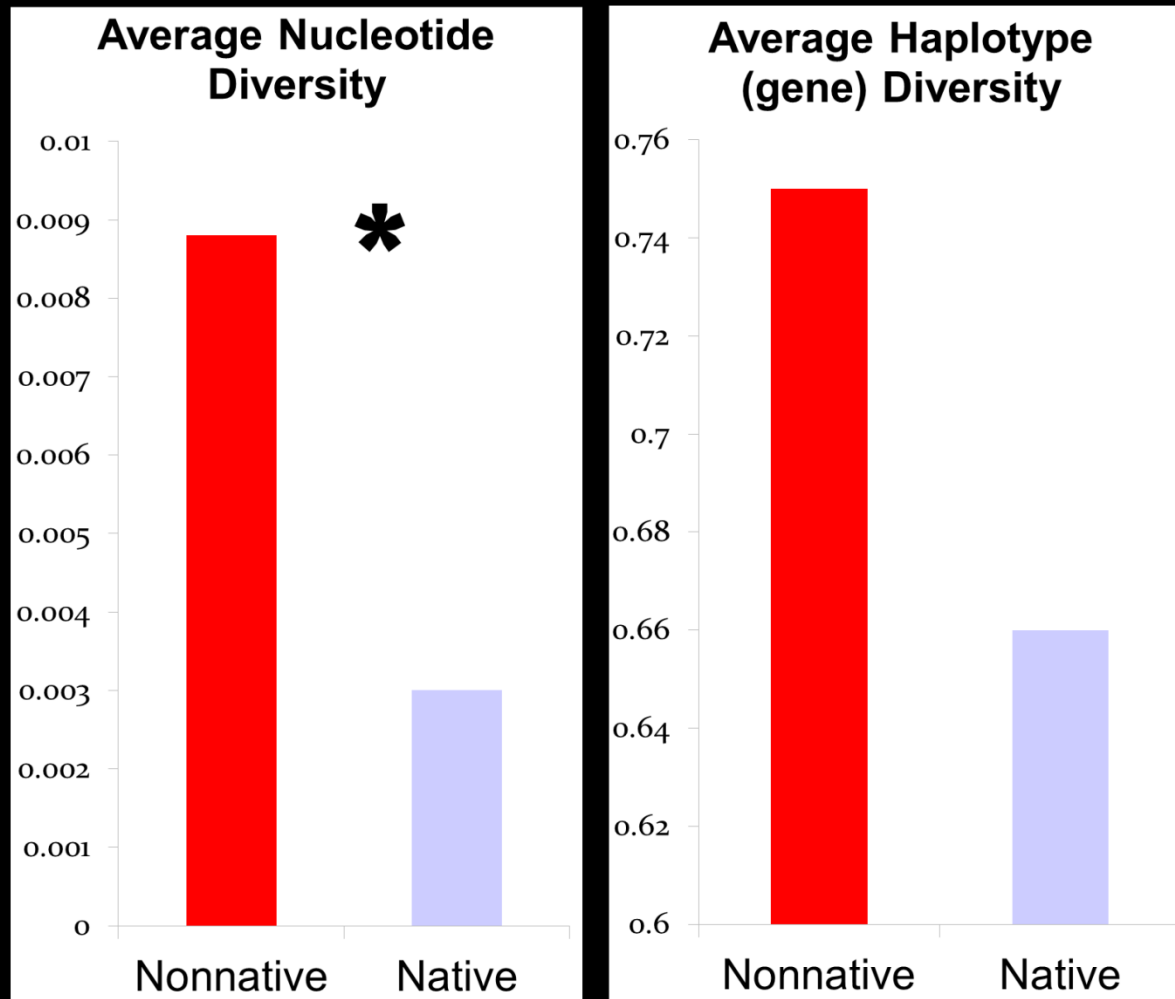


2. Admixture



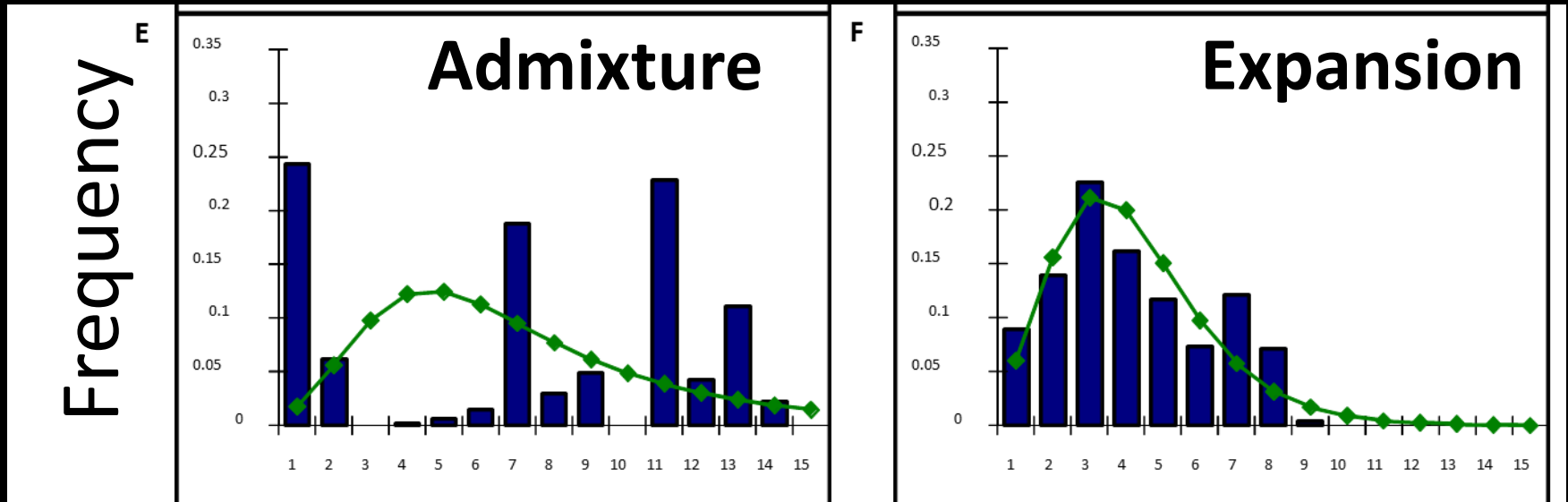
How do levels of genetic diversity compare between native and non-native populations?

Estimates of *Mytella charruana* COI genetic diversity



How do levels of genetic diversity compare between native and non-native populations?

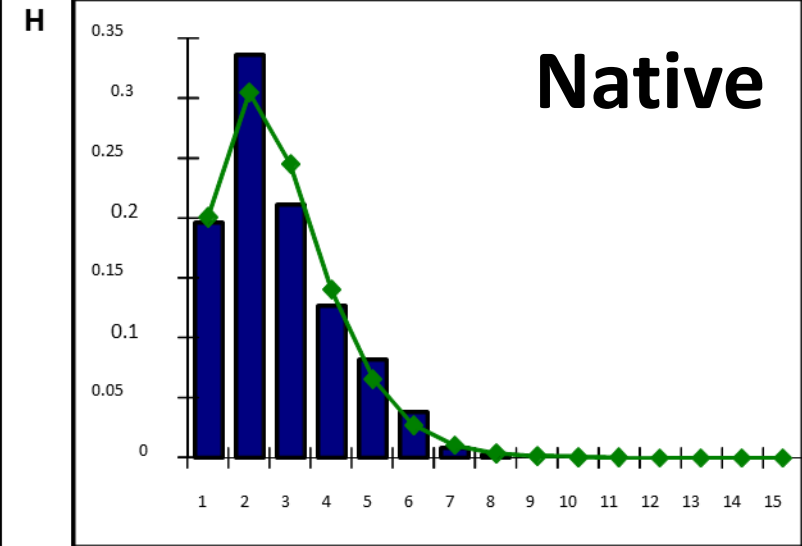
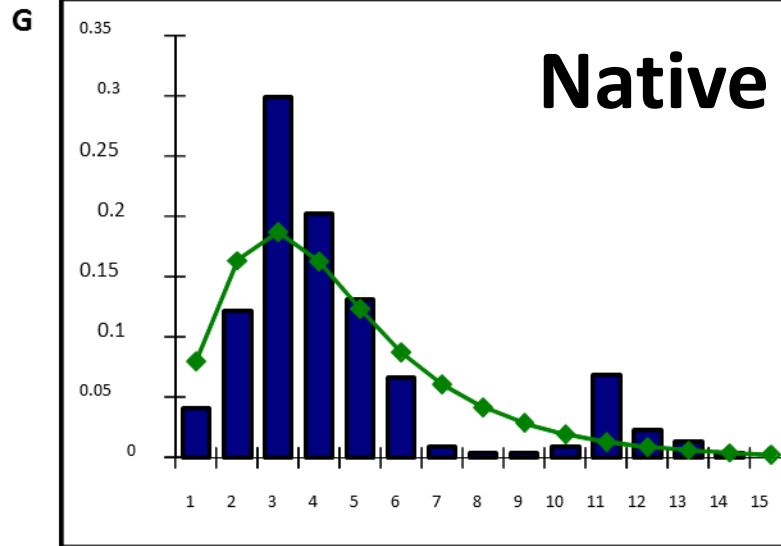
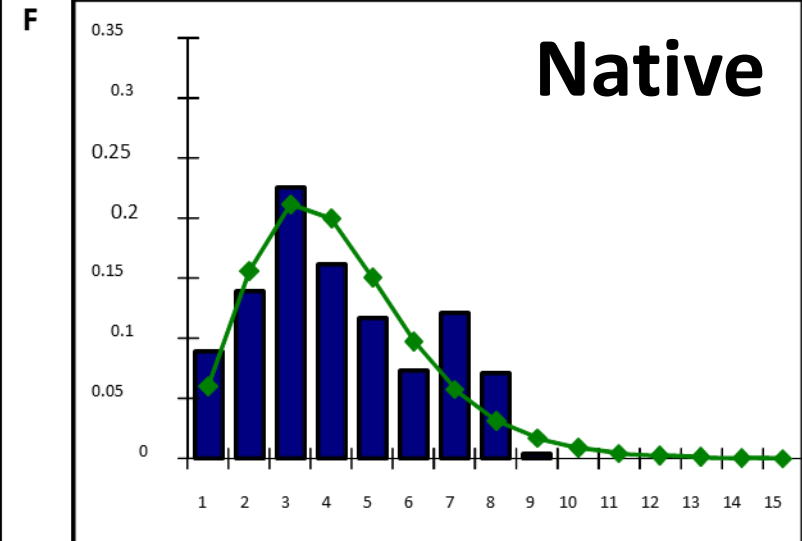
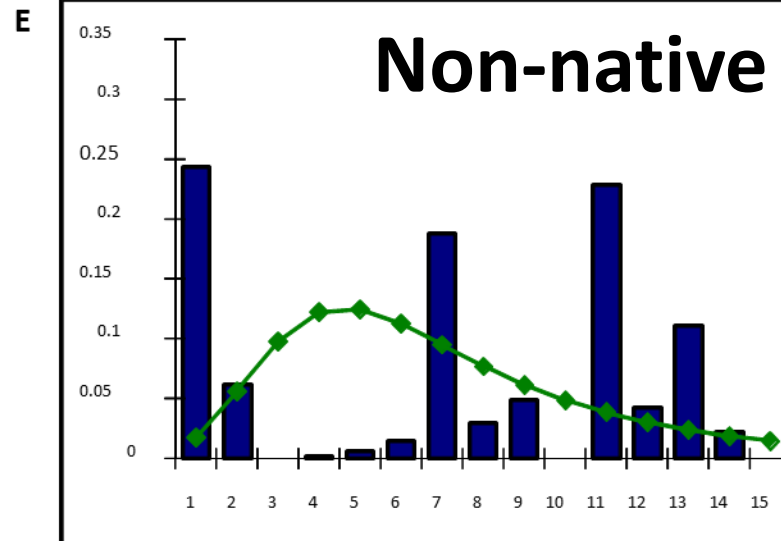
Sample mismatch distribution analysis data



Pairwise Differences

Mismatch distribution analysis for *Mytella*

Frequency



Pairwise Differences

Pink Barnacle: *Megabalanus coccopoma*



Native region:

Mazatlán, Mexico south
to Gulf of Guayaquil in
Ecuador

Non-native region:

Japan, Brazil, Australia,
US, Europe



Sample Locations

N. Florida ●

C. Florida ●

S. Florida ●

Texas Pier ●

Texas Rig ●

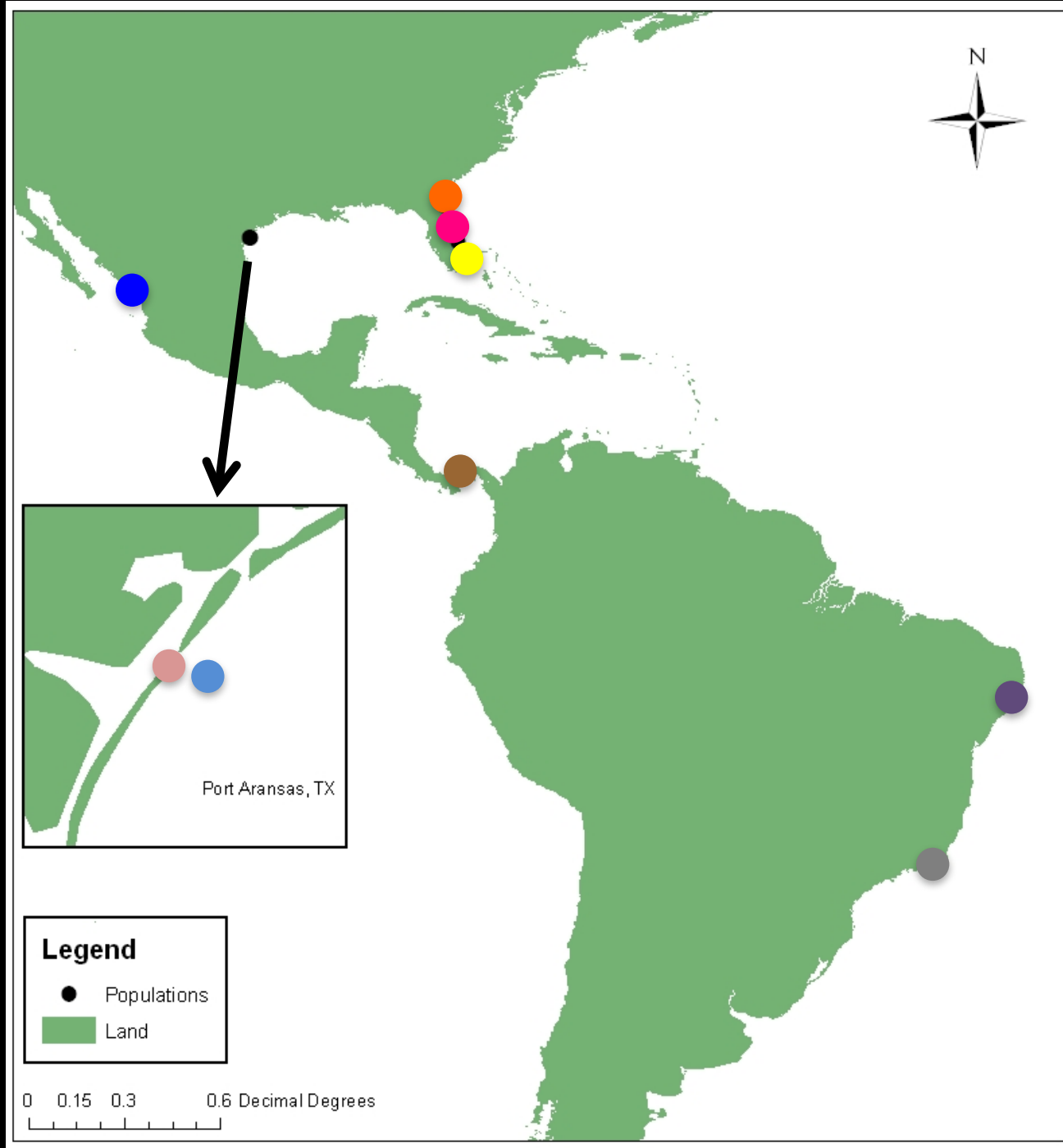
N. Brazil ●

S. Brazil ●

N. Mexico ●

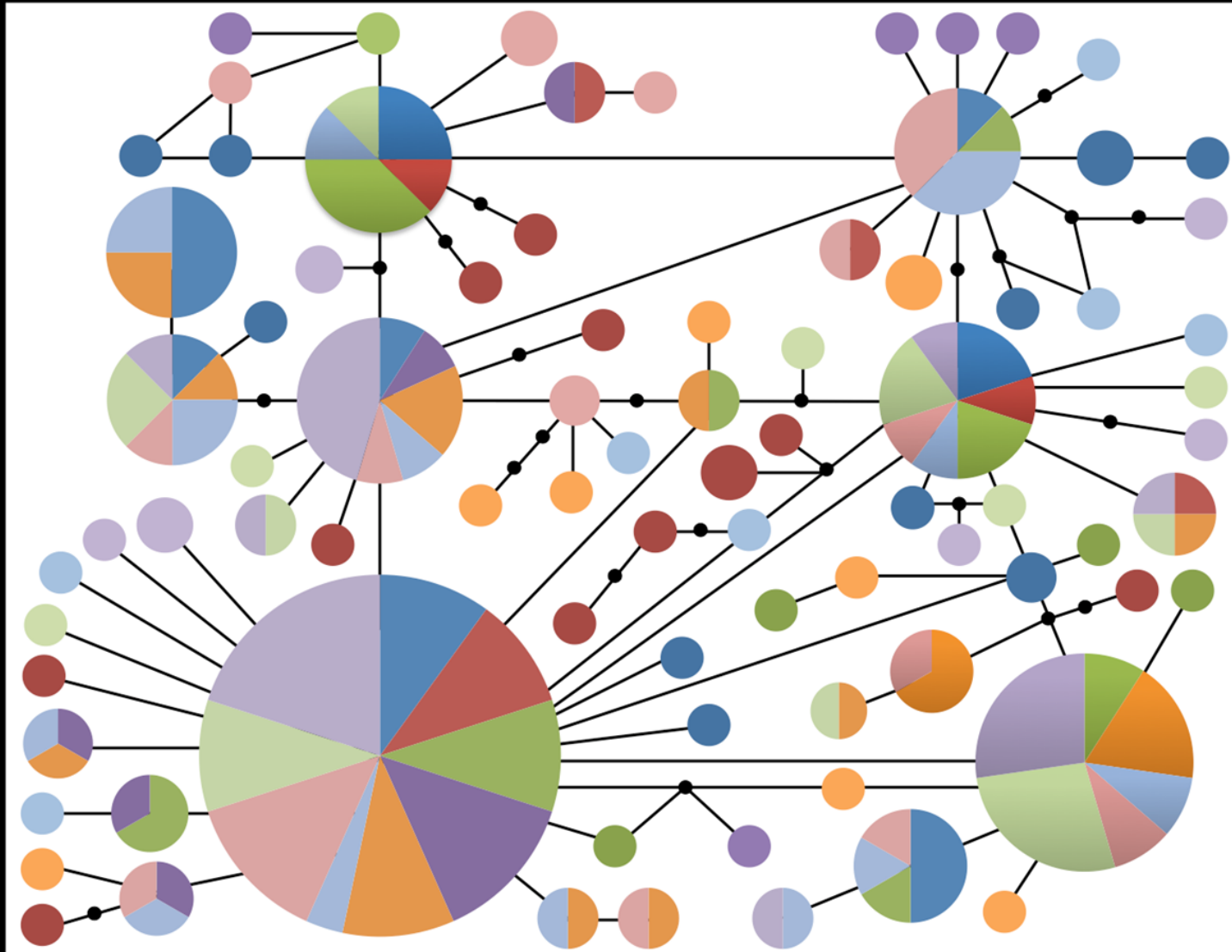
Panama ●

+ Genbank samples



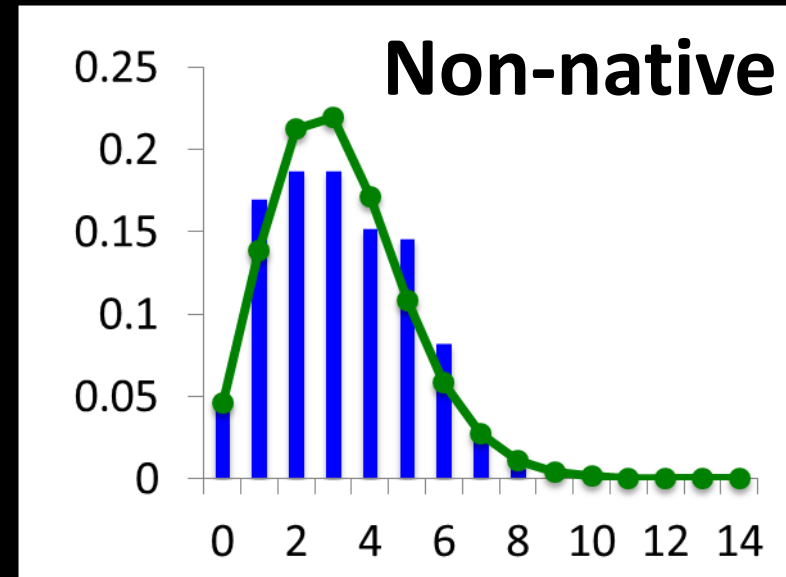
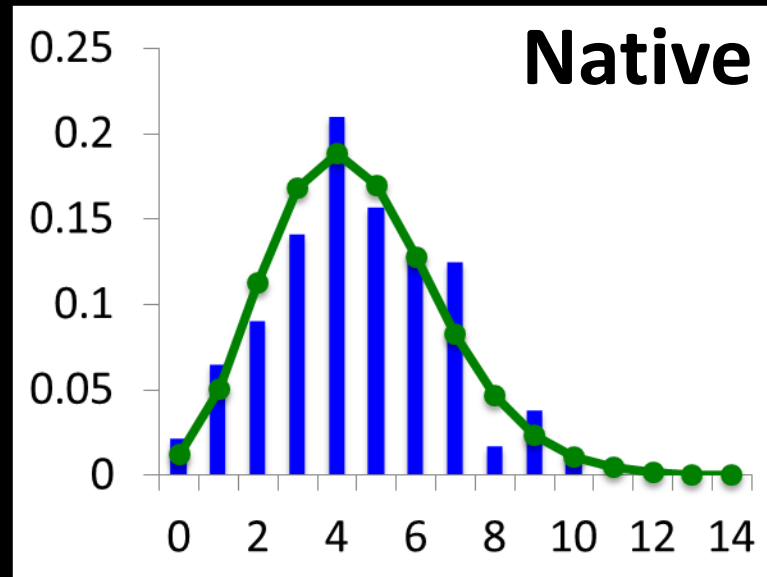
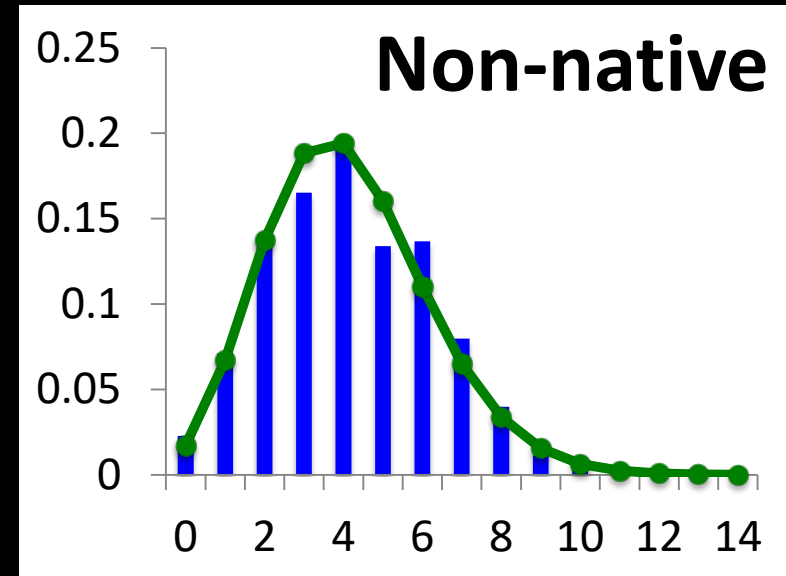
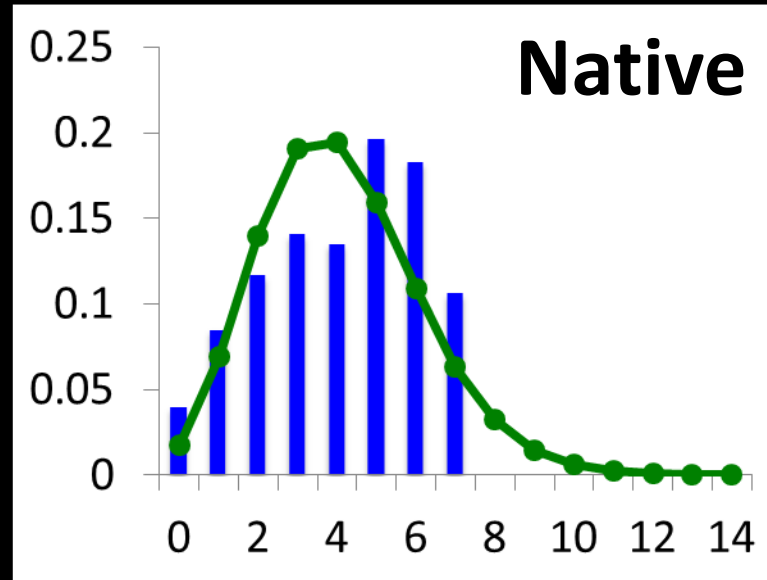
Where did the invading species originate?

M. coccopoma haplotype network (COI)



Mismatch distribution analysis for *M. coccopoma*

Frequency



Pairwise Differences

More to come...

natives vs invasives

- Predation
- Oyster recruitment
- Oyster spat growth & survival

Acknowledgments

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