Benefits of the Fouling Community: A Context for Understanding Invasions
Context from Background Data

- **Focus on East & West Coasts of USA**
- **Panel Data Mostly from Non-Port Sites**
- **Historical Information & Data**
- **Biogeographic Patterns**
  - Large-scale Patterns
  - Local Patterns
  - Individual Species Distributions
- **Invader – Native Similarities & Differences?**

- 1903-1907
- Buzzards Bay & Vineyard Sound
- > 460 Dredge Samples
- All Taxa from Protozoa to Fish
- Data on Other Fauna & Flora
Cancer irroratus—Continued.

(1 small), 46 (1 small), 45 (1 small), 46 (several), 38 (2), 49 (2 small), 52 (many small), 53 (many small), 56 (6, many young), 60 (few small), 61 (1 small), 63 (1 small), 64 (few small), 65 (2 small), 67 (3), 68 (1 small), 71 (few small), 72 (several small), 73 (2), 74 (2 small), 75 (7), 76 (few), 77 (few), 79 (1), 81 (1 small), 82, 84, 85, 90, 92 (4 young), 104 (1 young), 105 (7), 142 (young), 153, 174 (young), 222 (1 young), 247 (1 small).

Smith reports the zooec and megalops stages as being abundant in June and July. This crab is important as a food of fishes. Smith reports it from the stomachs of the striped bass, sea bass, tautog, kingfish, sea robin, gorsefish, summer flounder, toadfish, dogfish, dusky shark, sand shark, common skate, Raja leonis (L.), Dasyatis centroura, and Myliobatis ferox nombikoi. This and the following species are on the market as food, though little or no fishery exists locally.

Cancer borealis (Stimpson). Jonah crab. [Chart 116.]


Along the sandy beach of Martha’s Vineyard, from Menemsha Bight to Gay Head; Cuttyhunk; No Mans Land. Smith. According to this writer there is a very pronounced difference in habit between C. borealis and C. irroratus; the latter concealing itself beneath rocks, the former remaining exposed. Fairly common at the western end of Vineyard Sound, a few scattered stations elsewhere.—Survey. Dredged in 2 to 4 fathoms, more commonly at depths of 12 or more fathoms, on various bottoms.


Ovalipes ocellatus (Herbst). Lady crab. [Chart 131.]

Verrill and Smith, 1873, p. 547-548, etc. (Platynotus ocellatus); S. I. Smith, 1879, p. 33 (Platynotus ocellatus); M. J. Rathbun, 1905, p. 9.

Western half of Vineyard Sound, common; dredged at a few points elsewhere, including a few stations in the Bay; 3 to 4 fathoms, almost exclusively on sandy bottoms.—Survey. Common on the Bay shore, at the local bathing beach; recorded from Menemsha and Vineyard Haven. In general this species frequents sandy shores and bottoms, burrowing...
Mytilus edulis

Rock

Gravel

Stones

Mytilus edulis
Bryozoans
Ascidians

Botryllus schlosseri
Broad Regional Patterns

- **Historical Studies from the NW Atlantic**
  - Karlson & Osman 2012
- **Longterm Recruitment Studies**
  - Latitudinal Variation in Recruitment Rates
  - Variation in Community Development
Species composition of fouling communities along the NW Atlantic coast
Recruits (No/wk)

Regional Diversity

- So California
- Chesapeake Bay
- Woods Hole, MA
- Long Island Sound, CT
- Indian River Lagoon, FL
- Carrie Bow Cay, Belize
% Open Space

Days

So California

Long Island Sound
LIS Communities on Panels of 1-4 Weeks
Local Patterns
Kelp Forest – 12-14 m, Rock, Reef, Cobble and Sand
San Mateo Kelp
Ficopomatus

Diverse Ascidians

Typical Barnacle Dominance
Habitats

Inlet Source

Model Output

Larvae

Recruits
Individual Species Patterns

- *Environmental Effects on Invasives*
- *Local Recruitment*
**Bugula neritina**

*Fig. 9. Number of *Bugula neritina* larvae that settled per tile (3 by 6 inches) per week. April, 1941 to January, 1942.*
Summary & Conclusions

• **Historical Data Provide Context of Native Community**

• **Biogeographic Patterns**
  – Similarity of Native and Invasive Species Responses
  – Local Patterns may determine vulnerable sites
  – Non-harbor vs. Harbor

• **Invader Differences**
  – Environmental differences influence invasions
  – Operate on large and small scale
  – Life History Differences with Local Environment
  – Ascidians
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Ecology is NOT Rocket Science.
I Wish It Was That Easy!