ATLANTIC
AQUA FARMS
PREMIUM SHELLFISH

AAF's Short-Term and Long-Term Approaches to Produce Disease Resistant Seed

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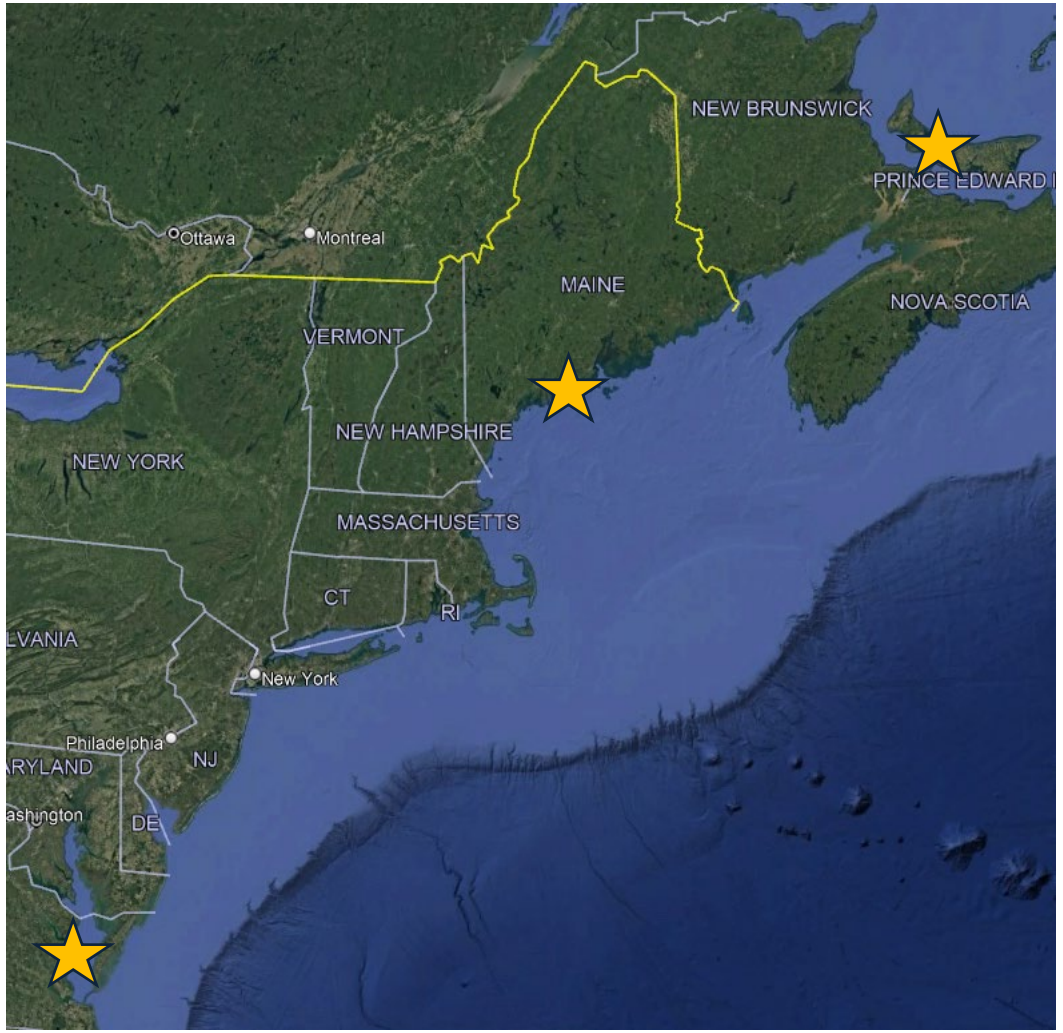
PREMIUM SHELLFISH



Disease Resistant Seed

- Long-Term :
  - Quantify existent MSX resistance in PEI
  - Establish a breeding program for disease resistance
  - Collaborate on external research projects

Disease Resistant Seed

- Short-term :
  - Import disease resistant broodstock or seed from the United States

Quantifying Existent MSX Resistance in PEI

Objectives:

- Estimate the susceptibility of oysters from different areas of PEI
- Establish population of candidate MSX-resistant broodstock
- Test viability of larvae from those broodstock

Funded by DFO

Quantifying Existent MSX Resistance in PEI

Bideford River
- 2022
- 2023
- 2024

Savage Harbour
- 2022
- 2023
- 2024

Two populations, three year classes

Funded by DFO

Quantifying Existent MSX Resistance in PEI

% Mortality

	Bideford River	Savage Harbour
2022	20.2 ± 1.4	1.8 ± 0.4
2023	21.1 ± 2.2	10.4 ± 1.0
2024	19.3 ± 0.6	37.6 ± 2.3

Bideford River MSX Prevalence

May 2025: 23% prevalence
August 2025: 87% prevalence

Funded by DFO

Establishing a Disease Resistant Broodstock Population

Percival River

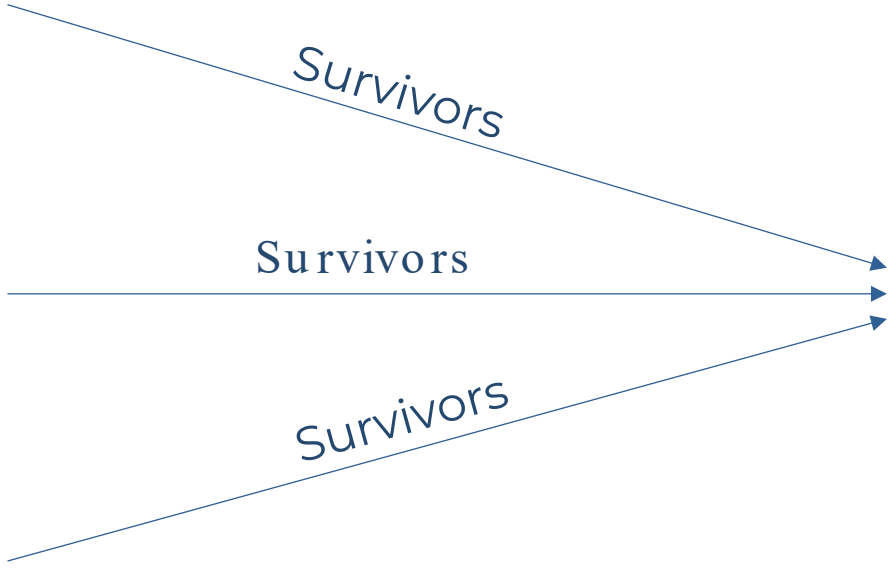
- 99.5% MSX Prevalence
- ~70-80% mortality

Enmore River

- 100% MSX Prevalence
- 72% Dermo Prevalence
- ~90% mortality

Bedeque Bay

- 50-92% MSX Prevalence
- ~95% mortality



Use as broodstock for new breeding program

6 years to disease resistant seed

Collaborative Projects: MSX Genome and eDNA Detection

MSX Genome

- The team at the University of Laval is finishing the optimization of the methods to enrich for MSX DNA. The next step will be sequencing.
- Funded by DFO

MSX eDNA Project

- eDNAtec is optimizing the development of primers that amplify conserved regions of MSX and Dermo using positive controls provided by VIMS and Martin Mallet.
- Preliminary sampling plans are completed, and sampling supplies have been ordered. Sampling will start in the spring.
- Funded by Genome Atlantic

Disease Resistant Seed

- Short-term :
  - Import disease resistant broodstock or seed from the United States

US Disease Resistant Broodstock

Rutgers Haskin NEH® Broodstock Line

- Selectively bred for MSX resistance since 1960s
- Selectively bred for Dermo resistance since 1990
- Selectively bred for growth and shell attributes since 1998
- Selected for high salinity (20-34 ppt) performance
- Patented products: licence fee on seed

Rutgers Haskin NEH® line

Oyster larvae

MSX and Dermo Resistance

Using US Broodstock: Two Strategies

Importing seed

- **Import biosecure disease resistant seed** from US hatcheries
- Requires capital investment in nursery capacity
- MSX and Dermo resistant seed
- More seed potentially available

Importing broodstock

- **Import disease resistant broodstock** from the US (Rutgers Haskin NEH® line)
- Requires major capital investment in hatchery capacity including a quarantine facility
- MSX, Dermo, and Malpeque Disease resistant seed
- Less seed potentially available

Rutgers Haskin NEH® oysters X PEI oysters

↓

MSX, Dermo, and Malpeque Disease resistant seed

Rutgers x Maine Seed

Producing Disease-Resistant Seed

NEH® Broodstock
MSX Resistant
Dermo Resistant

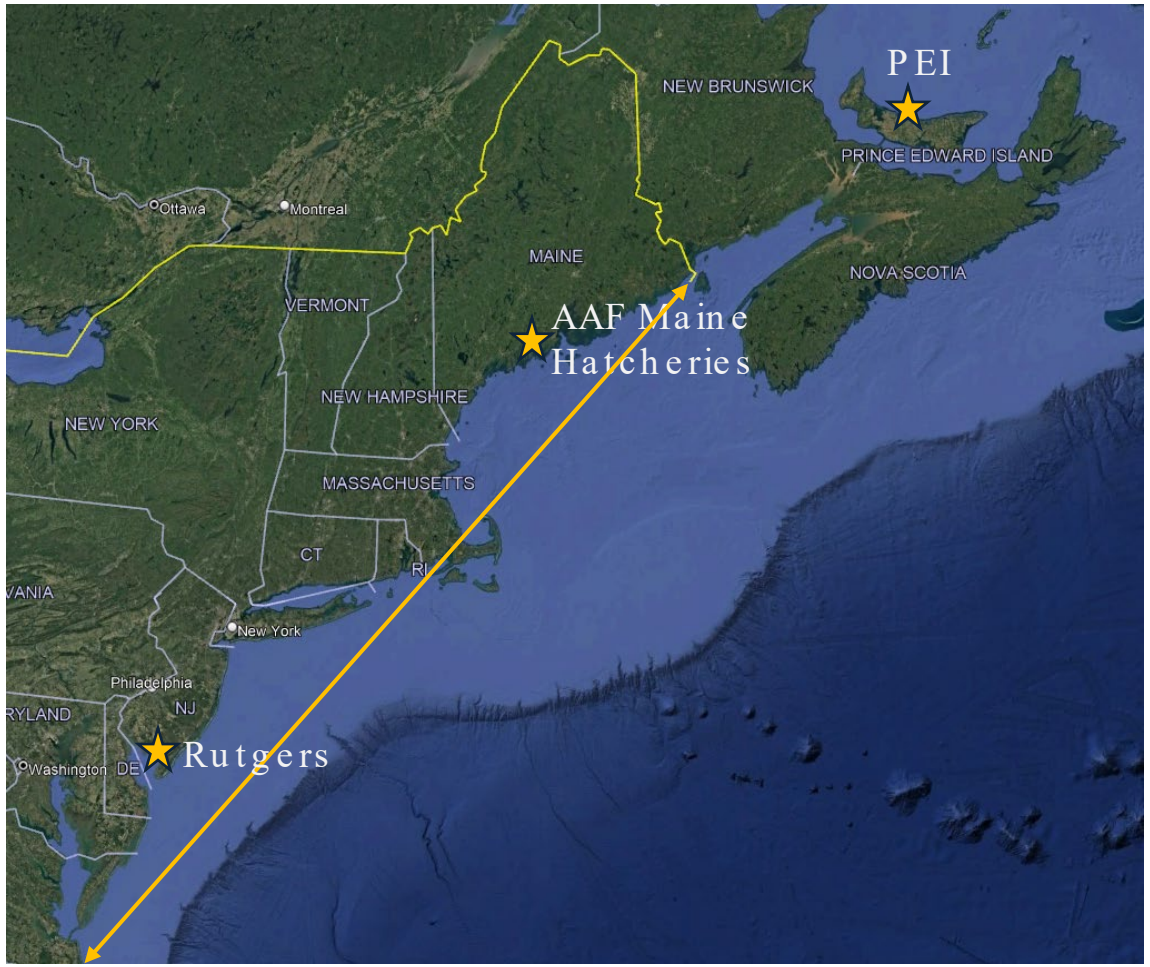
X

Maine Broodstock

Appropriate for broad geographic range

Biosecure disease resistant seed
Shipped to farms from Virginia to Maine

May be vulnerable to Malpeque Disease*



MOOK SEA FARM
Our world is your oyster!

Rutgers x PEI Seed

Producing Disease-Resistant Seed Specifically for PEI

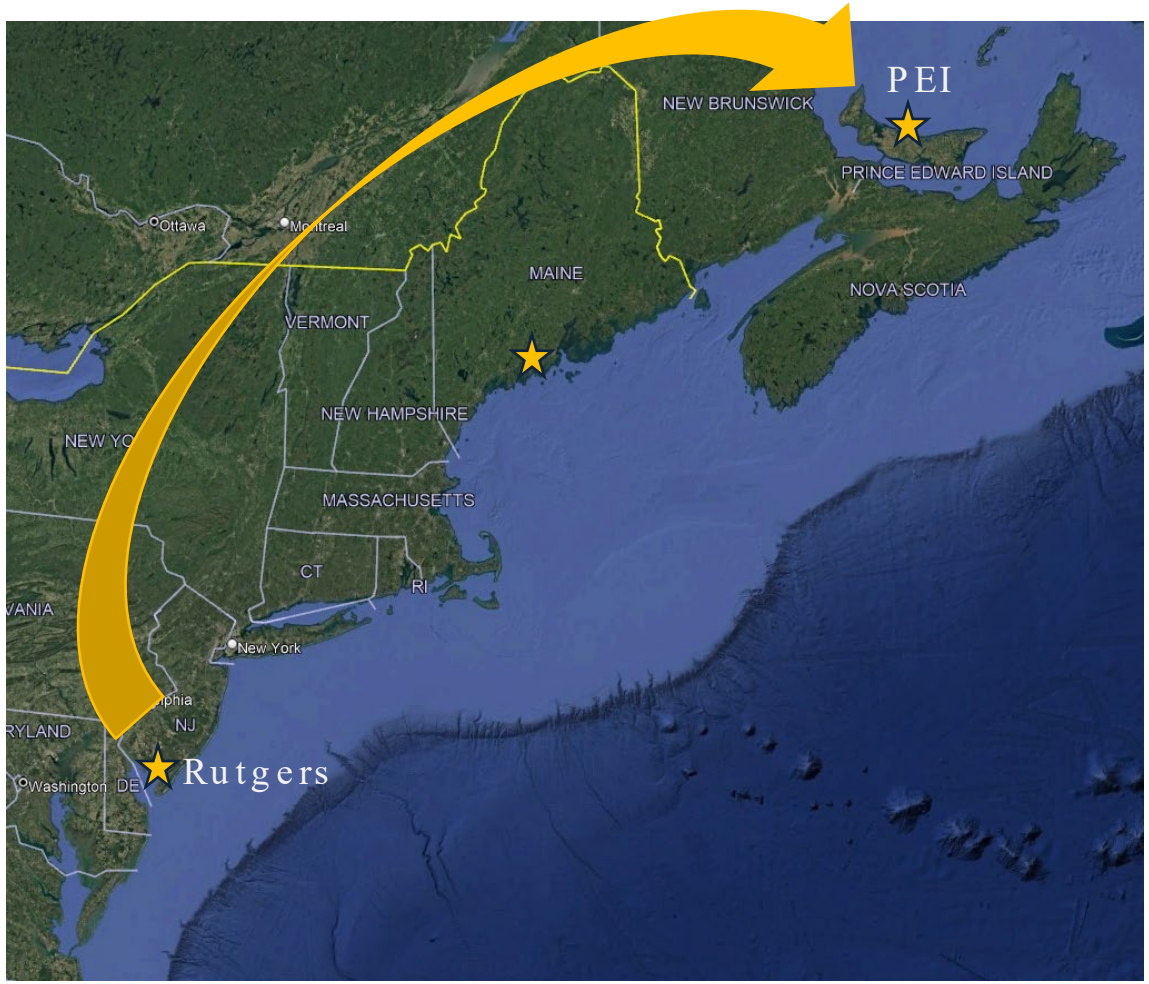
NEH® Broodstock
MSX Resistant
Dermo Resistant

X

PEI Broodstock
Malpeque Disease Resistant

Biosecure disease resistant seed

Custom seed for PEI:
- MSX resistant
- Dermo resistant
- Malpeque Disease resistant



Diploids or Triploids?

NEH® Broodstock
Diploid (2n)

X

Maine or PEI Broodstock
Diploid (2n)

Diploid seed (2n)

Diploids reproduce

Triploid seed has a very low likelihood of reproducing

NEH® Broodstock
Tetraploid (4n)

X

Maine or PEI Broodstock
Diploid (2n)

Triploid seed (3n)

Triploids are virtually sterile [1,2]

[1]Ritter K. 2019. Dissertations, Theses, and Masters Projects. Paper 1582642221
[2]Guo & Allen. 1994. Biol. Bull. 187: 309-318.

Hatchery-Produced Seed

Logistics

- Biosecure hatchery seed is small: 1-2 mm
- Typically must be grown in a nursery before it can go to a farm
- AAF's nursery on Rustico Bay can provide some nursery capacity
- PEI will need expanded nursery capacity to take advantage of hatchery-produced seed

The government should consider helping growers purchase hatchery seed

Rustico Bay Nursery

Importing Seed or Broodstock from the US

Regulatory Process

- Seed and/or broodstock imports must be approved by:
  - CFIA
  - DFO

- AAF has applied to both CFIA and DFO to import seed and broodstock

Despite significant industry support, no line of sight on approval yet

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