

Catch Success of Blue Crab Bait: Synthetic Bait vs. Atlantic Menhaden

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History of Maryland Crabbing Industry

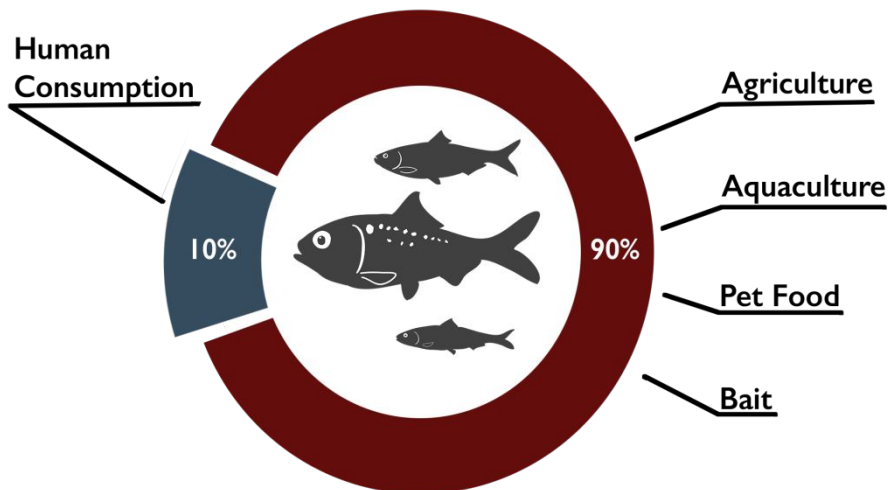
- Highest-valued commercial fishery in the Bay
- Largest supplier of crabs



Introduction

- Forage fish populations are declining due to increased demand as food, bait, etc.

Forage Fish Utilization





KEPLEY BIOSYSTEMS INC

OrganoBait

- Uses synthetic attractants that mimic those given off by decaying fish.



Objective

- Determine the catch success of synthetic OrganoBait versus bait fish (Atlantic Menhaden).
- Determine whether the synthetic bait acts as a suitable replacement for traditional forage fish.

Method

- Day 1: Pots are set in two locations on the Patuxent River. One location is baited with Menhaden, the other with synthetic bait.

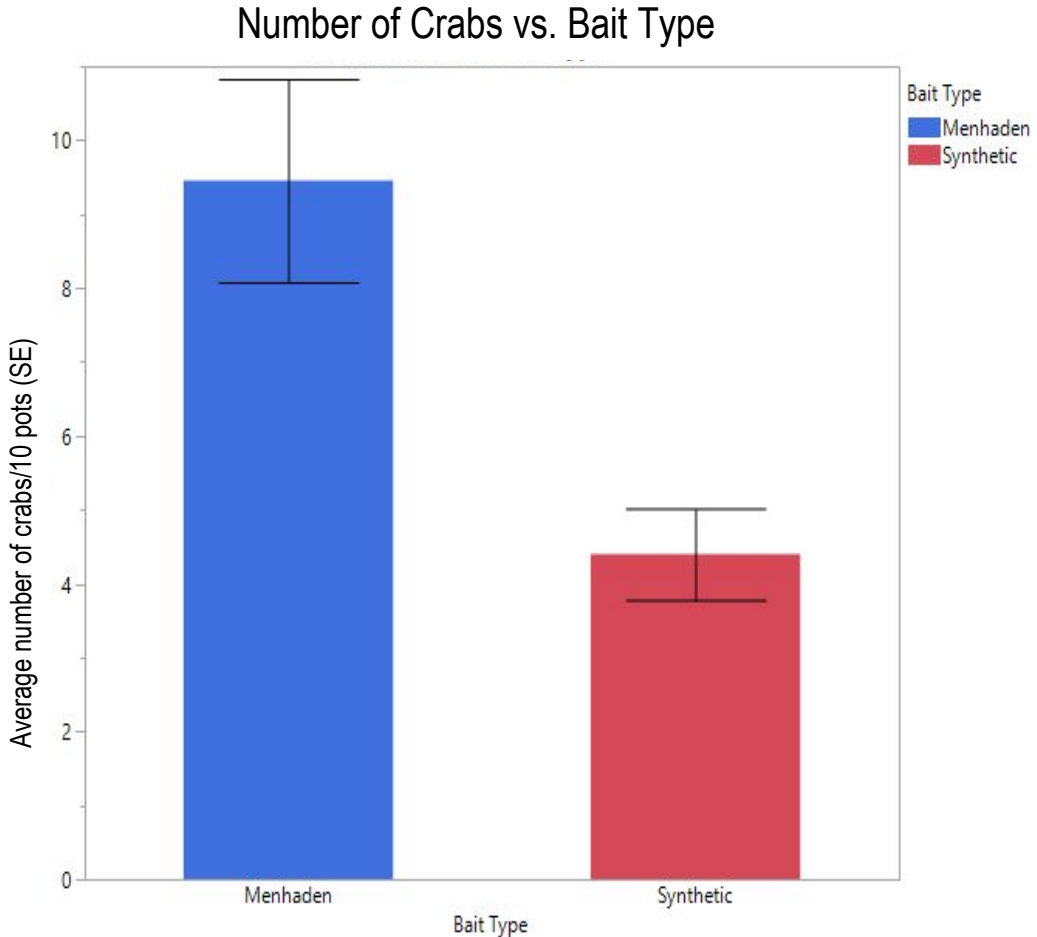


Method (cont'd)

- Day 2: Pots are pulled. Quantity, size, and sex of crabs are recorded. Pots are rebaited and set in opposite locations.
- Day 3: Pots are pulled. Quantity, size, and sex of crabs are recorded.
- Additionally recorded abiotic factors at each location, such as salinity, temperature, & dissolved oxygen content.

Menhaden caught significantly more crabs than OrganoBait

2 factor ANOVA test (site and bait type as main effects)



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	3	515.2571	171.752	4.5572
Error	59	2223.6000	37.688	Prob > F
C. Total	62	2738.8571		0.0061*

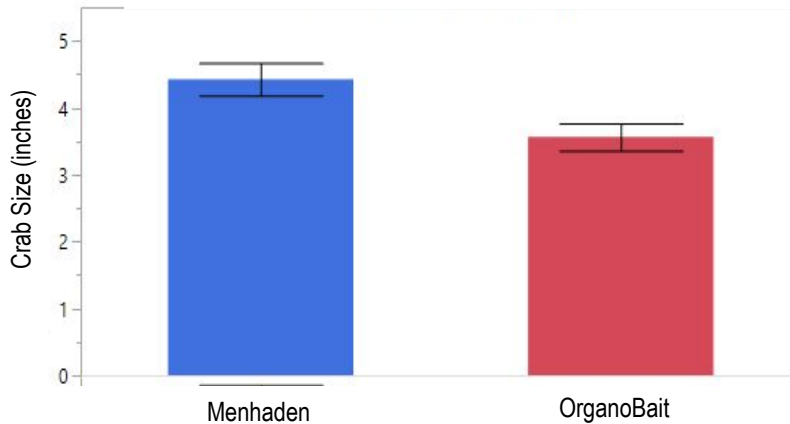
Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Site	1	1	105.80870	2.8075	0.0991
Bait Type	1	1	423.23478	11.2299	0.0014*
Bait Type*Site	1	1	5.63478	0.1495	0.7004

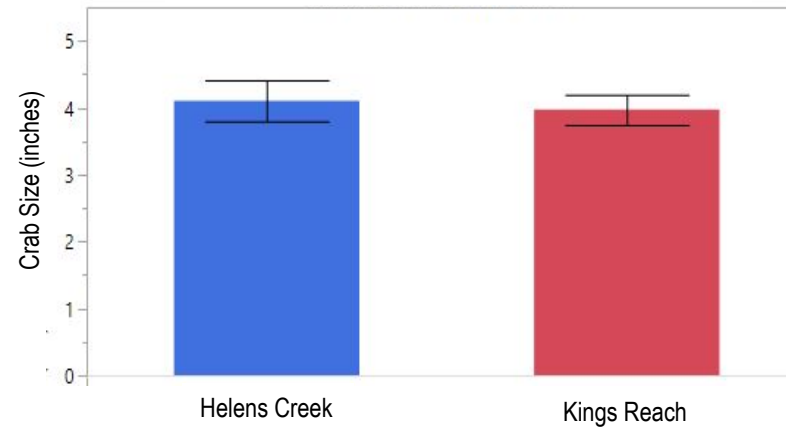
No significant effect of Bait Type or Site on Female Crab Size

2 factor ANOVA (site and bait type as main effects)

Average Female Crab Size vs. Bait Type



Average Female Crab Size vs. Site

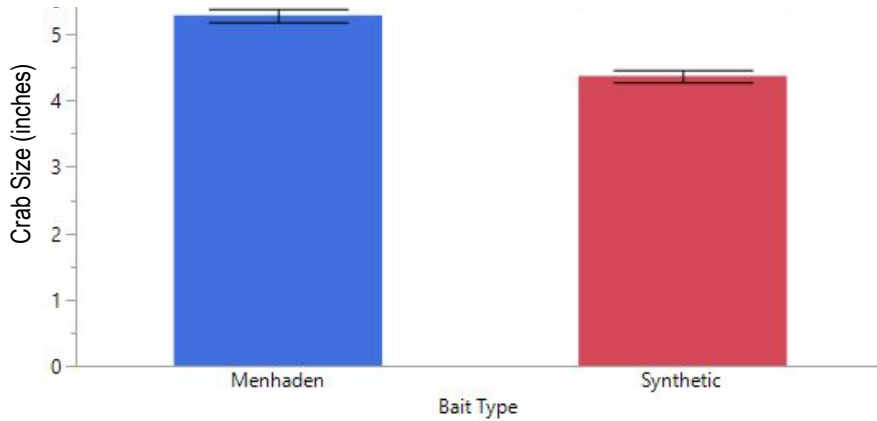


Source	DF	Sum of Squares	Mean Square	F Ratio
Model	3	5.285581	1.76186	2.4693
Error	22	15.696966	0.71350	Prob > F
C. Total	25	20.982546		0.0887

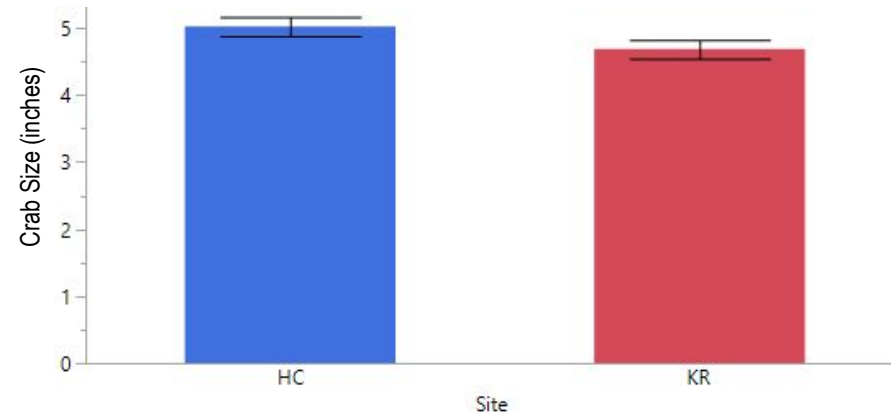
Bait Type and Site Both Significantly Influenced Male Crab Size

2 factor ANOVA (site and bait type as main effects)

Average Male Crab Size vs. Bait Type



Average Male Crab Size vs. Site



Source	DF	Sum of Squares	Mean Square	F Ratio
Model	3	8.251932	2.75064	17.9709
Error	32	4.897955	0.15306	Prob > F
C. Total	35	13.149887		<.0001*

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Bait Type	1	1	7.2083251	47.0944	<.0001*
Bait Type*Site	1	1	0.0105870	0.0692	0.7942
Site	1	1	0.7394043	4.8308	0.0353*

Discussion

- Menhaden catches significantly higher numbers of crabs than OrganoBait
- Menhaden catches significantly larger male crabs than OrganoBait
- Future Research

Economic Influence

- OrganoBait is projected to sell commercially for less than current Menhaden prices, as well as several other bait types.
- Trade-off

References

- <http://kepleybiosystems.com/organobait/>
- A Synthetic Crustacean Bait To Stem Forage Fish Depletion (July 2016), *A. Dellingera, J. Plotkina, B. Duncana, L. Robertson, T. Brady, C. Kepley*
- <http://www.cbf.org/about-the-bay/more-than-just-the-bay/chesapeake-wildlife/menhaden/>
- http://www.chesapeakebay.net/issues/blue_crabs

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Questions

