Effect of diet and water source on red king crab *Paralithodes camtschaticus* larvae in culture

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Introduction

Background: King crab larval culture in Alaska has expanded from small-scale research to hatchery and stock enhancement feasibility studies.

Objective: Improve red king crab larval survival by assessing the effect of two diets and water sources on larval survival and duration.
Experiments

Diet treatments
Conducted in Kodiak and Seward
1) Newly hatched *Artemia* nauplii
2) Newly hatched *Artemia* nauplii and the diatom *Thalassiosira nordenskioeldii*

Water source treatments
Conducted in Seward
1) seawater from Resurrection Bay
2) seawater made with artificial sea salt (Instant Ocean®)
King crab larval development

Zoea 1  Zoea 2  Zoea 3
Zoea 4  Glaucothoe  Crab Instar 1
Methods

• Broodstock: 18 ovigerous crab collected in Bristol Bay. 12 crabs to Seward, 6 to Kodiak.

• Larvae: Hatched March/April 2008.

• Design: 1-liter glass beakers 5 replicates/treatment 12 larvae/beaker 7°C

• Seward projects terminated when all zoeae in a treatment molted to glaucothoe.

• Kodiak projects terminated when all zoeae in a treatment molted to C1 or by the termination of the experiment on day 102, whichever came first.
Results of diet study - Kodiak

**Artemia**: mean survival to G
29.8% (SE=6.8)

**Thal/Art**: mean survival to G
93.8% (SE=4.1)

Significant difference p<0.001

**Artemia**: mean duration to G
63.2 days (SE=2.0)

**Thal/Art**: mean duration to G
45.6 days (SE=0.3)

Significant difference p<0.001

**Artemia**: only 2 molts to C1

**Thal/Art**: mean survival to C1 62.5% (SE=15.4)

**Artemia**: 1 molt on day 77, 1 molt on day 79

**Thal/Art**: mean duration to C1 75.8 days (SE=1.8)
Results of diet study - Seward

**Artemia:** mean survival to G
31.7% (SE=10.3)

**Thal/Art:** mean survival to G
75.0% (SE=7.0)

Significant difference
p=0.008

**Artemia:** mean duration to G
56.8 days (SE=2.3)

**Thal/Art:** mean duration to G
48.4 days (SE=1.5)

Significant difference
p=0.016
Results of diet study - Kodiak & Seward
Results of seawater source study

**NSW:** mean survival to **G**
31.7% (SE=10.3)

**ASW:** mean survival to **G**
31.7% (SE=6.7)
No significant difference
\( p=1.00 \)

**NSW:** mean duration to **G**
56.8 days (SE=2.3)

**ASW:** mean duration to **G**
50.8 days (SE=2.0)
No significant difference
\( p=0.83 \)

NSW=natural seawater from Resurrection Bay
ASW=artificial seawater from Instant Ocean®
Conclusions

• *Artemia* nauplii alone do not provide a diet adequate for producing high survival or timely development to the glaucothoe or C1 stage.

• The addition of *T. nordenskioeldii* increases survival and shortens larval duration.

• Artificial seawater does not increase larval survival in comparison to natural seawater.

• Inter-site variability between Kodiak and Seward is not significant in larval survival and duration.
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