Biology A495A: Internship in Biological Sciences Kodiak College.
Biology Internship with the Alaska Fisheries Science Center, NMFS, NOAA Kodiak, AK.
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Figure 1. Seawater lab at the Alaska Fisheries Science Center at Kodiak. AK.

Figure 2. Adult golden king crab.

During the spring semester 2007, I participated in an internship with the National Marine Fisheries Service (NMFS) of the National Atmospheric and Oceanic Administration (NOAA) USDOC, located at the Alaska Fisheries Science Center's 2500 sq ft seawater lab facility (Fig. 1). I completed the 136 hours required on May 4, 2007. I worked under the guidance and direction of Scott Van Sant, who is the principal investigator of laboratory cultivation studies of golden king crab (GKC) (*Lithodes aequispinus)* (Fig. 2) (Van Sant, 2007a). During my internship I gained a great deal of knowledge and experience of the early life history and experimental cultivation of GKC and how to apply scientific techniques in the research process.

In Alaskan waters GKC are found along rocky habitats in deep waters of the Gulf of Alaska, the Bearing Sea and the Aleutian Islands (Donaldson and Byersdorfer, 2005). The females reproduce aseasonally or can reproduce anytime of the year, they carry their eggs for 12 months, and have asynchronous hatching or the eggs hatch at anytime of the year (Donaldson and Byersdorfer, 2005). Once the eggs hatch, they go through 5 larval stages including four zoea stages and ending with the glaucothoe stage (Fig. 3) Because GKC larvae are lecithotrophic, or self nourishing, they do not feed until they reach the first crab stage when they have consumed all of their yolk (Shirley and Zhou, 1997). GKC hatch with approximately 55% of their egg as yolk and are twice as large in contrast to blue king crab. Blue king crab are planktivorous or plankton eating, hatch with 12% off the egg as yolk, and are less than half of the size of GKC larvae (Van Sant, 2007b). The depth distribution of GKC larvae is unknown, since none have been reported from extension plankton sampling (Shirley and Zhou, 1997). The large GKC larvae are not active swimmers and are thought to be demersal living on or near the sea floor between 100 to 800 m (Donaldson and Byersdorfer, 2005). This mode of reproduction and nutrition during the larval stage is thought to be an adaptation to survival in the deep sea.

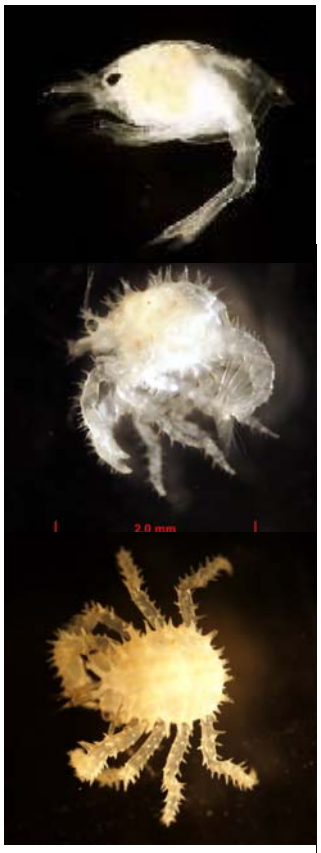

Figure 3. a. Zoea stage I.
b. Zoea stage IV.
c. Crab I stage.

One study focused on the laboratory cultivation of GKC to test the effects of temperature and density on growth and survival. GKC larvae were reared in filtered and UV sterilized sea water, in beakers with PVC pipe inserts with a 500µ mesh bottom, and in cold rooms at temperatures of 3^{o}C, 6^{o}C, and 9^{o}C (Fig. 4). Procedures follows Stevens,et al., 2004, with the exception that all

larvae were unfed and water was changed every other day. To test for maternal effects, larvae were reared at 6^{o}C and survival was compared for early, mid, and late hatching. Another experimental group of GKC larvae were reared in PVC pipes that were in a large flow-through tank to compare with the groups in the beakers in cold rooms. This group was assessed every other day for molts or dead larvae. Temperatures were checked daily to maintain the temperatures within 0.3^{o}C.

Other duties I preformed were filtration and UV sterilization of seawater, estimating daily hatch volumes (Fig. 5), and maintaining larvae in the Kreisel larviculture system used for mass cultivation of GKC (Fig. 6). Also I had some training in photo microscopy techniques of developing embryos (Fig. 7).

Figure 4. Cultivation experiments in cold rooms showing beakers with PVC inserts used to rear GKC larvae.

Figure 5. Hatchery system used to collect newly hatched larvae and to estimate hatch timing and daily hatch volumes.

Figure 6. Kreisel larviculture system used to mass culture golden king crab larvae.

Figure 7. Image of golden king crab eggs showing embryonic development after 171 days at 3°C. 4x magnification, stained with Bouin's solution.

Previous employment in a marine science center and marine lab prepared me for working in the lab setting with marine animals at NMFS/NOAA. As a result of this internship I was offered and accepted a laboratory technician position at NMFS/NOAA for the summer. I am looking forward to broadening my knowledge and experience in marine biology at this facility.

References

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