

Observations on the Reproductive Biology of the Hairy Crab *Hapalogaster mertensii*, on Kodiak Island, Alaska

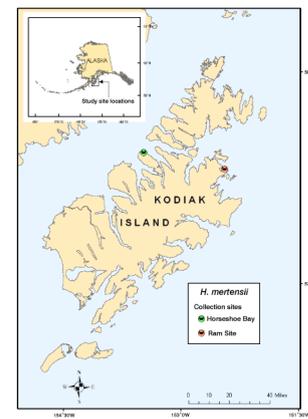


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BACKGROUND

Aspects of the reproductive biology of female *Hapalogaster mertensii* from Kodiak Island were observed and described from both laboratory and field studies from 2000-2004. Little is known of this intertidal species in the family Lithodidae, subfamily Hapalogastrinae from the northern extent of its range. Because of their small size, adaptability to the laboratory environment and repeated handling, and their accessibility at low tide, they are an ideal species for field collections and laboratory observations, and may serve as a proxy for studies of commercially exploited lithodid species.

Hapalogaster mertensii were collected by hand from beneath rocks in the low intertidal zone. Field collections were made at the "Ram site" beach at Fort Abercrombie State Historical Park and from Horseshoe Bay. Only crabs from the "Ram site" beach were brought to the AFSC Kodiak laboratory at the Kodiak Fisheries Research Center for study.



The hairy crab, *Hapalogaster mertensii*, is a relatively common species found in rocky, intertidal habitats around Kodiak Island. Ranging from Atka in the Aleutian Islands to Puget Sound, Washington. A small crab, carapace length to 35 mm (1.4 in), it normally occurs under small, loose algae-covered rocks or cobble from low intertidal to 55 m (Jensen 1995, Barr 1983, Hart 1982).



Table 1: Individual female data showing egg incubation, number of larvae hatched, egg extrusion dates, molting occurrences, and start and end hatch dates.

Crab	Start of Hatch Date	End of Hatch date	2003 Molt Date	Larvae Hatched	2nd 2003 Molt	Extrusion Date	Days of Incubation	Start of Hatch Date	End of Hatch date	2004 Molt Date
Silver	2/4/2003	3/5/2003	4/25/2003	123	y	8/10/2003	244	4/14/04	4/21/2004	5/3/2004
Red/Or	3/20/2003	2/22/2003	5/20/2003	78	y	8/10/2003	died			
Lav/Purple			N/R		n	11/10/2003	187	5/17/04	5/17/2004	5/27/2004
Blue	2/25/2003	3/20/2003	5/6/2003	304	y	8/10/2003	243	4/13/04	4/14/2004	
Yellow/Orange	2/24/2003	3/20/2003	5/16/2003	94	?	8/15/2003	224	3/29/04	4/7/2004	6/7/2004
Purple/Yellow	3/20/2003	4/15/2003	5/24/2003	55	?	11/10/2003	died			
Purple/Silver	2/7/2003	2/22/2003	3/30/2003	5	6/27/2003	died				
DkBlue/LtBlue	3/9/2003	3/30/2003	5/8/2003	254	8/3/2003	died				
DkBlue/Orange	4/17/2003	4/25/2003	4/30/2003	143	y	8/15/2003	224	3/29/04	4/6/2004	5/19/2004
Blue/Silver	2/24/2003	3/15/2003	5/6/2003	44	y	8/15/2003	226	3/31/04	4/6/2004	5/10/2004

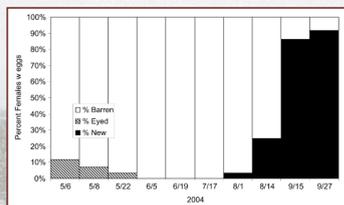
N/R Not recorded

*Extrude date not exact; within week prior.

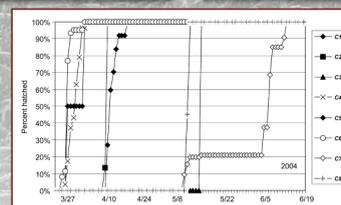
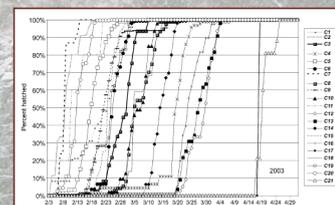
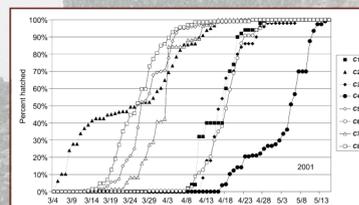


The lab studies to monitor hatching and molting started early January of 2001, 2003, and 2004 when individual females were placed in small floating plastic containers set within the 10 L containers. Each female crab was identified with unique color combinations of nail polish. Since the larvae mostly hatched at night, larvae were counted daily in the morning.

H. mertensii larval hatching trajectories for 2001, 2003, and 2004 showing percent daily hatched and hatch duration.



Field Collection data from the RAM Site showing percent females with eggs in 2004 and the lapse between larval release and extrusion of new eggs.



RESULTS

- There was no significant difference in timing of larval release between years in the laboratory, which occurred from February-June.
- Hatch duration in the individual crabs varied significantly between years and pairwise comparisons showed the following significant differences between years: 2001 (32.38 ± 3.37 days) > 2003 (22.62 ± 2.08 days) > 2004 (6.50 ± 3.37 days).
- The average number of larvae hatched was 214.75 ± 37.66 in 2001 and 157.38 ± 23.24 in 2003, and were not significantly different between years.
- Laboratory observations show that molting occurs twice in some females between hatching and extrusion.
- Possible mating behavior was observed twice, and occurred after the first molt, but was not associated with the molt or extrusion of new eggs.
- Egg extrusion in the lab was only observed in 2003 and occurred between 10 August (the week prior) and 10 November, and in the field in 2002 as early as July.
- Egg incubation between the crabs was significantly different ranging from 187 to 244 days (224.67 ± 8.43 , $P=0.00$).
- The molt occurred after the median hatch date on average 73.0 ± 3.37 (n=18) days in 2003, 43.5 ± 10.10 (n=2) days in 2001, and 7.20 ± 6.39 (n=5) days in 2004 where n is the number of crab with documented molting in the laboratory, and was significantly different between years: 2003>2001>2004.

CONCLUSIONS

- Molting, mating, and the extrusion of a new clutch of eggs are not contiguous as in most other lithodid crabs, but occur over a period of 2-6 months.
- Lab conditions appeared to mimic field observations for the timing of larval release and egg extrusion despite prolonged captivity of lab animals.