

IMET Thesis Defense

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11:00 AM

Investigating morphometric and physiological maturity in the male jonah crab, *Cancer borealis*

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Fisheries management requires a thorough understanding of the processes involved in reproduction, including the ability to distinguish sexually mature individuals; understanding the physiological processes driving an individual to become sexually mature is equally as important. The Jonah Crab, *Cancer borealis*, contributes to a significant and growing male-driven fishery along the Atlantic coast of North America primarily from Newfoundland, Canada to Florida; however, little is known about their life history. This study focuses on investigating the relationship between morphometric and physiological maturity, and the size at which these life changes occur in the Southern New England stock. We also aim to understand better how the male sex differentiation hormone, insulin-like androgenic gland hormone, IAG, and its transcript levels relate to size in male *C. borealis*. The size at 50% sexual maturity (SM50) in male *C. borealis* was estimated morphometrically to be at 105.9 mm carapace width (CW). This is larger than the estimate of 98.3 mm CW for Jonah crabs in the Mid-Atlantic Bight, but lower than the estimate of 127.6 for *C. borealis* on the Scotian Shelf, consistent with a poleward gradient in size at maturity. Gonadosomatic index (GSI) differed significantly between CW size groups, maturity status, and season. Isolation of cDNA encoding *C. borealis* (Cab-IAG cDNA) was obtained from initial screening of AG transcriptome data and traditional cloning using 5', 3', Rapid Amplification of cDNA Ends (RACE). The partial IAG sequence obtained was 351 bps in length and 117 amino acids long; the putative amino acid sequence was structured similarly to other crustacean IAGs. Transcript levels were determined by qRT-PCR assays and compared to size and maturity status. The AGs originating from the ablated animals contain IAG transcripts at much higher levels than the intact animals using both transcriptome data and qRT-PCR assay. IAG transcript levels (copies/ug AG total RNA) of the animals with various CWs do show a significant difference, indicating IAG protein levels in the hemolymph could be a potential candidate of the physiological biomarkers for sexual maturity. Fisheries managers should use multiple measures of sexual maturity and consider factors including geographical distribution when establishing and assessing guidelines for this economically important species.

Host:
Sook Chung, Ph.D.