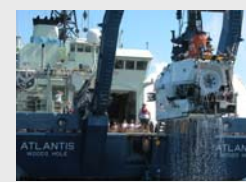


Determining Growth Potential Utilizing Hormone Levels in the Deep Sea Crab, *Macroregonia macrochira*

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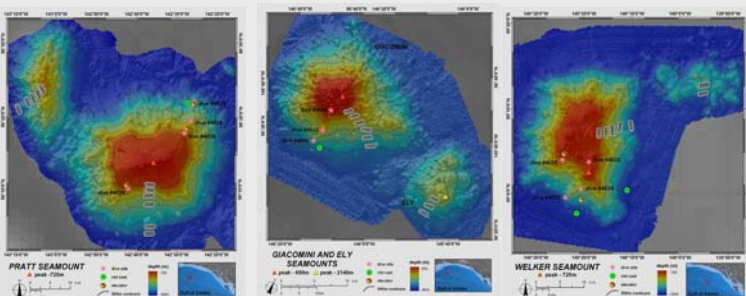
EXPLORE

Introduction

- Sakai first described *Macroregonia macrochira* in 1978.
- *M. macrochira* is a (Majidae) spider crab and like many studied majid crabs may undergo a terminal molt.
- The deep-sea spider crab lives on seamounts from 800 to 3000+ meters underwater.
- Cold temperatures, low oxygen and darkness are variables affecting *M. macrochira*.
- The growth potential of *M. macrochira* may be better understood by measuring circulating molting hormones (ecdysteroid). Ecdysteroids circulate in the hemolymph and may indicate the probability of molting.

Materials and Methods

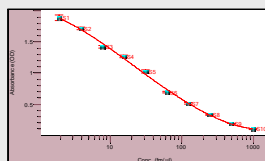
•We deployed crab traps stationed on an elevator (an autonomous platform) to a desired depth (500-2900 meters) via the R/V Atlantis crane.



- The next morning we remotely released weights from the elevator allowing the traps to float toward the surface at 30m/sec.
- The crabs were photographed, measured and bled for hemolymph. We used morphometrics to determine maturity and hemolymph to determine growth patterns.

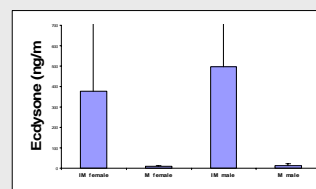
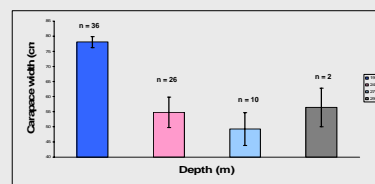


- The ELISA (Enzyme-Linked Immunosorbent Assay) allowed us to measure molting hormones (ecdysteroids) in trace amounts (ng/ml).



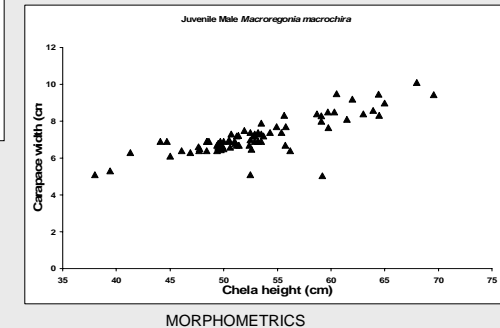
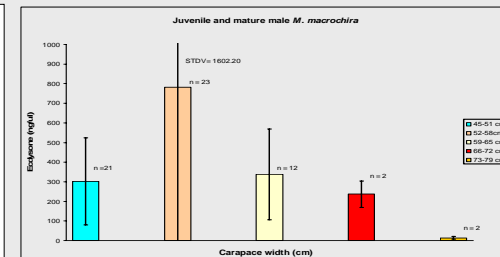
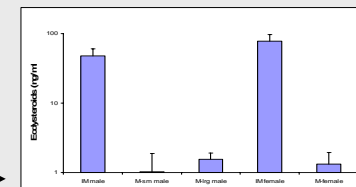
Major Results

- Molting hormone levels are highest in smaller individuals with carapace widths from 52 to 58 mm.
- Molting hormone levels are lower in mature crabs.
- Mature crabs tended to occur from 900 to 1700m.
- Juveniles were predominant at depths below 1700m.
- M. macrochira* had much higher hormone levels in all categories of maturity compare *Chionoecetes bairdi* another Majid crab.



Ecdysteroids in *Macroregonia macrochira*

Ecdysteroids in *Chionoecetes bairdi* (Tanner crab)



Discussion

Little is known about the deep-sea crab *Macroregonia macrochira*. *M. macrochira* has a similar carapace width vs. chela height relationship as other majid crabs. Interestingly mature *M. macrochira* are found at shallower depths than juveniles. The distribution may result from differences in oxygen saturation with depth. To explain this mature crabs may have adaptation over their lifespan to handle lower oxygen levels allowing them to cover a greater depth range. A greater depth range *M. macrochira* will allow them to encounter prey more readily.

Juvenile molting hormone levels were high in *M. macrochira*. Hormone levels are highest at depths below 1700 meters were juvenile were found. This is surprising because food availability is low at these depths and crab need food to produce these hormones. Crabs cannot produce sterols, they require food containing cholesterol to obtain then convert sterols into molting hormones required for growth.

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