MONITORING (*COENOBITA CLYPEATUS*) POPULATIONS AND THE USE OF TOUCH TANKS IN CONSERVATION INITIATIVES

Melanie DeVore, Georgia College and State University
Deborah Freile, New Jersey City University
Hermit Crabs Prove A Low-Maintenance Pet

By Angelo Fichera
The Philadelphia Inquirer
Sunday, August 24, 2014
(Published in print: Sunday, August 24, 2014)

Import an estimated 200,000 Caribbean hermit crabs.
Land Hermit Crabs

Because these marine crustaceans spend much of their time on land, they are ideal additions to any sand-based terrarium. Even though their claws give them an ominous appearance, they are docile animals and do not often pinch. In addition to specially formulated dry food, your crabs will enjoy an occasional meal of pieces of earthworm or any dead fish from your aquarium. Includes care and feeding instructions. *Carcinosoma craveni.*

### ORDER

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>Unit</th>
<th>Price</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>6715503</td>
<td>Hermit Crab, Terrestrial, Pack of 3</td>
<td>Kit of 3</td>
<td>$20.19</td>
<td>0</td>
</tr>
<tr>
<td>877589</td>
<td>Hermit Crab, Terrestrial, Pack of 5</td>
<td>Pack of 1</td>
<td>$30.19</td>
<td>0</td>
</tr>
<tr>
<td>67220100</td>
<td>Hermit Crab Food</td>
<td>Pack of 1</td>
<td>$9.69</td>
<td>0</td>
</tr>
</tbody>
</table>

Click to enlarge

---

**Zoo Med Hermit Crab Salt Water Conditioner**

- **Price:** $3.00 - $2.99

**Lee's Hermit Crab Hideaway**

- **Price:** $24.00 - $14.99

**Zoo Med Hermit Crab Heater**

- **Price:** $40.00 - $11.99

---

**Imagitarium Ramp Bowl for Hermit Crabs**
- **Price:** $5.00 - $2.39

**Petco Glow in the Dark Calcium Hermit Crab Sand**
- **Price:** $4.00 - $2.99

**Zoo Med Starter Hermit Crab Kit**
- **Price:** $24.00 - $14.99

---

[Links to purchase options]
Inquiry for Live land hermit crabs

Hello,

I collected the Purple Pincher and Ecuadorian land hermit crabs in the Florida Keys and am looking to expand my client base. If you are interested in purchasing any, I'd love to talk with you.

Cell: (305) 300-6500 or email: ocean512reach@yahoo.com

I have found that 1,000 crabs minimum @ $5.00 per crab plus box charge of $14. FOB Miami is equitable for an initial shipment.

I have photos to demonstrate their condition and size.

I'd love to send this initial shipment out to you for your future consideration. Regards, [Name]

Cell: [Contact Information]
It is illegal to export soldier crabs in the Bahamas.

### Marine Life - Invertebrates

<table>
<thead>
<tr>
<th>Species</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anemones (Orders Actiniaria, Zoanthidea, Corallimorpharia, and Ceriantharia)</td>
<td>Giant anemone (<em>Condylactis gigantea</em>) prohibited. Corallimorphs and Zoanthids: No more than 5 single polyps of each may be landed per person per day, must be harvested with a flexible blade no wider than 2&quot; such as a putty knife, razor blade, or paint scraper.</td>
</tr>
<tr>
<td>Conch, Queen (<em>Strombus gigas</em>)</td>
<td>Harvest prohibited</td>
</tr>
<tr>
<td>Corals, Hard (Stony) (Order Scleractinia)</td>
<td>Harvest prohibited, including black coral.</td>
</tr>
<tr>
<td>Corals, Soft (Subclass Octocoralia)</td>
<td>No more than 6 octocoral colonies per person per day or 70,000 colonies annually; harvest of attached substrate within 1&quot; of base is permitted; harvest closes in response to federal octocoral closures; Harvest of Venus Sea Fan (<em>Gorgonia flabellum</em>) and Common (Purple) Sea Fan (<em>Gorgonia ventailina</em>) prohibited. Areas closed to octocoral harvest in Atlantic federal waters off Florida: Atlantic federal waters north of Cape Canaveral, Stetson-Miami Terrace Coral Habitat Area of Particular Concern (CHAPC) and Pourtalès Terrace CHAPC.</td>
</tr>
<tr>
<td>Crab, Horseshoe (<em>Limulus polyphemus</em>)</td>
<td>Recreational harvest prohibited</td>
</tr>
<tr>
<td>Live Rock</td>
<td>Recreational harvest prohibited (includes rock made by sabelland tube worms)</td>
</tr>
<tr>
<td>Octopods (Order Octopoda)</td>
<td>Except Common Octopus (<em>Octopus vulgaris</em>)</td>
</tr>
<tr>
<td>Siphonophores/Hyroids (Class Hydrozoa)</td>
<td>Harvest of Fire Coral (Family Millepndae) prohibited</td>
</tr>
<tr>
<td>Sponges (Class Demospongiae, Order Dictyoceratida)</td>
<td>Except Sheepswool, Yellow, Grass, Glove, Finger, Wire, Reef, and Velvet Sponges; 5 sponges per person per day in any combination; harvest of substrate within 1&quot; of base permitted north and west of the southernmost point of Egmont Key, no substrate allowed south of Egmont Key</td>
</tr>
<tr>
<td>Starfish (Order Asteroidea)</td>
<td>Harvest of Bahama Starfish (<em>Oreaster reticulatus</em>) prohibited</td>
</tr>
<tr>
<td>Urchins (Class Echinoidea)</td>
<td>Except Sand Dollars &amp; Sea Biscuits (Order Clypeasteroida); harvest of Longspine Urchin (<em>Diadema antillarum</em>) prohibited</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Species</th>
<th>Remarks/Bag Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anemones</td>
<td>Giant Caribbean anemone (<em>Condylactis spp.</em>); Prohibited. Corallimorphs: 100 per day/200 per vessel**; Zoanthids: 1 gallon per day/2 gallons per vessel**; Corallimorphs and Zoanthids: Must be harvested with a flexible blade no wider than 2&quot;. Corallimorphs must be harvested as single polyps only.</td>
</tr>
<tr>
<td>Corals, Hard (Stony)</td>
<td>Harvest prohibited, including black coral.</td>
</tr>
<tr>
<td>Corals, Soft (Octocorals)</td>
<td>Harvest of attached substrate within 1&quot; of octocoral base is permitted; harvest closes in response to federal octocoral closures.</td>
</tr>
<tr>
<td>Crab, Emerald (Green Clinging)</td>
<td>400 per person or per vessel per day, whichever is less</td>
</tr>
<tr>
<td>Crab, Hermit</td>
<td>Except Land Hermit Crabs; Scarlet reef hermit (<em>Paguristes cadenati</em>): 1 quart per day/2 quarts per vessel**; Blue-legged/tricolor hermit crabs (<em>Clibanarius tricolor</em>): 1 quart per day/per vessel, whichever is less</td>
</tr>
<tr>
<td>Live Rock</td>
<td>Aquaculture only; live rock lease and/or state and/or federal permit required; includes live rock created by Sabelland tube worms.</td>
</tr>
<tr>
<td>Octopods</td>
<td>Except Common Octopus</td>
</tr>
<tr>
<td>Sea Cucumbers</td>
<td>Trip Limit: None NEW: A 200 daily trip and vessel limit was approved at the April 2014 Commission meeting and will go into effect June 11, 2014.</td>
</tr>
<tr>
<td>Sea Fans</td>
<td>Harvest of Venus Sea Fan and Common (Purple) Sea Fan prohibited</td>
</tr>
<tr>
<td>Siphonophores/Hyroids</td>
<td>Harvest of Fire Coral prohibited</td>
</tr>
<tr>
<td>Sponges</td>
<td>Except Sheepswool, Yellow, Grass, Glove, Finger, Wire, Reef and Velvet Sponges; harvest of substrate within 1&quot; of base permitted north and west of the southernmost point of Egmont Key, no substrate allowed south of Egmont Key</td>
</tr>
<tr>
<td>Starfish</td>
<td>Harvest of the Bahama Starfish (Cushion Sea Star) prohibited</td>
</tr>
<tr>
<td>Starsnails (<em>Lithopoma americanum</em>, <em>Lithompona</em>)</td>
<td>One gallon per day/2 gallons per vessel**</td>
</tr>
</tbody>
</table>
Surveyed 200 m length of beach
Large size class occupying a considerable range inland
Estimating Health of Population
**Larvae**
The eggs are laid in the open ocean, and burst as soon as they come in contact with the salt water. The larvae float along the ocean currents, eating plankton and metamorphosing several times before looking like a hermit crab crossed with a lobster. This stage is called the megalopa.

**Eggs**
Female hermit crabs lay their fertilized eggs, up to several thousands, on the left side of their abdomens. They are carried until the yolk sack is fully depleted, when they turn a dark-gray color.

**Life Cycle of Hermit Crab**

**Megalopa to Adult**
After becoming a megalopa (hermit crab/lobster), it begins searching for a discarded shell from another mollusk and begins to transition to a life on land. After a short period of time, the megalopa buries itself in the sand and metamorphoses again into a hermit crab.

**Mating**
Male hermit crabs transfer a capsule of concentrated reproductive material to the female after both emerge slightly from their shells.

**Life Expectancy**
Hermit crabs can live up to 40 years.

**Lesson Time!**
Spring Tide the largest female crabs move from the inland towards the shore.

Only female crabs are entering the surf and depositing eggs. Not a spawning system.
They mostly come out at night....mostly
15 July 1 pair
16 July 1 pair
17 July 7 pair (New Moon)
18 July 4 pair
19 July 1 pair and 1 pair conch

Cockburn Town beach adjacent to cemetery
11 pairs     4 conch pairs (17 July)

East Beach 7 pairs (18 July)
Data from trackways are valuable for census of crab populations
All pairs of tracks represent the breeding female population.

No big shells means no big breeding females.

Is there a population structure?

Have to develop a model and determine cohorts
Land hermit crab (*Coenobita clypeatus*) densities and patterns of gastropod shell use on small Bahamian islands


Pitfall traps were used
Land hermit crab (*Coenobita clypeatus*) densities and patterns of gastropod shell use on small Bahamian islands

Cohort could either be based on size of claw OR by shell usage.

What is the flow of shells?

Fig 1. Natural shell-exchange, multi-crab interaction (drawn by Laura Waltz based on a photograph by R. Torres). The crab withdrawn into its shell (center) is ‘the defender’. Crabs holding the defender’s shell are ‘attackers’. A decreasing size order of crabs.

José-Luis Osorno, Laura Fernández-Casillas, Cristina Rodríguez-Juárez

Are hermit crabs looking for light and large shells?: evidence from natural and field induced shell exchanges


http://dx.doi.org/10.1016/S0022-0981(97)00155-X
Larvae in tide pools obtain their first shell
Subpopulations from areas adjacent to rocky tide pools
To nearshore areas with freshwater lenses and well developed coastal vegetation zone
### Table 1

<table>
<thead>
<tr>
<th>Shell Taxa</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerion</td>
<td>70.8</td>
</tr>
<tr>
<td><em>Echininus nodulosus</em></td>
<td>9.7</td>
</tr>
<tr>
<td><em>Tectarius muricatus</em></td>
<td>9.7</td>
</tr>
<tr>
<td><em>Nerita versicolor</em></td>
<td>4.6</td>
</tr>
</tbody>
</table>

*N = 245; > 1.0 cm; < 2.5 cm  Shell exchange observed*

### Table 2

<table>
<thead>
<tr>
<th>Shell Taxa</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerion</td>
<td>54.5</td>
</tr>
<tr>
<td><em>Cittarium pica</em></td>
<td>12.7</td>
</tr>
<tr>
<td><em>Tectarius muricatus</em></td>
<td>9.1</td>
</tr>
<tr>
<td>Nerita</td>
<td>7.3</td>
</tr>
</tbody>
</table>

*N = 55; > 2.5 cm; < 3.5 cm  Shell exchange observed*
What happens if there is a shortage of West Indian Top shells?
Harvested for bait, food, and marine curios.
No shells, no crabs, so what?

Fig. 3. (A) Proportion of baits occupied and (B) number of individuals at baits, for *C. clypeatus* and *B. obscurior* over time on islands where only these two species occurred (error bars indicate 1 S.E.).
A HORROR HORDE OF CRAWL-AND-CRUSH GIANTS
CLAWING OUT OF THE EARTH
FROM MILE-DEEP CATACOMBS!

THIS CITY IS UNDER MARTIAL LAW
UNTIL WE ANNIHILATE THEM!

KILL ONE AND TWO TAKE ITS PLACE!

H.G. WELLS' EMPIRE OF THE ANTS

MGM MOTION PICTURE SOUNDTRACK

Music Composed by Dana Kaproff
Ethics of using soldier crabs as educational tools and as sources of entertainment
Soldier crabs are not raised in captivity.

NIMBY as it applies to marine curios.

Using touch tanks to downplay the “cute pet” image.
AKNOWLEDGEMENTS: We would like to thank both of our respective departments for resources supporting this study; The GCSU International Education Center for support for both our courses and research in the Bahamas; The Gerace Research Centre for field and instructional support (MD & DF); GCSU Honor’s Program (AA).