

Petrochirus diogenes (Giant Hermit Crab)

Order: Decapoda (Shrimps, Lobsters and Crabs)

Class: Malacostraca (Crustaceans: Shrimps, Sand-hoppers and Woodlice)

Phylum: Arthropoda (Arthropods)



Fig. 1. Giant hermit crab, *Petrochirus diogenes*.

[<https://www.google.tt/#tbm=isch&q=+Petrochirus+diogenes&imgc=CBacQIJTL1g4XM%3A>, downloaded 10 March 2016]

TRAITS. In the Caribbean *P. diogenes* (commonly referred to as the giant hermit crab) happens to be the largest of the hermit crabs discovered (Wood and Wood, 2000), with a body up to 30 cm long. According to the Smithsonian Marine Station at Fort Pierce (2010), this species has blue or greenish eyes with red and white-banded antennae (Fig. 1). The anterior shield is the flattened part of the body located behind the eyes and has a square shape. Setae (tufts of hairs) are distributed across the anterior shield (Williams, 1984). Its claws are large and reddish in colour with the right one slightly bigger than the left (Ruppert and Fox, 1988). In both male and female the right claw is the principle claw, however it is significantly bigger in males (Bertini and Fransozo, 1999).

DISTRIBUTION. The giant hermit crab is distributed from the east coast of the United States from North Carolina and southern Florida south to Brazil, the Caribbean and the Gulf of Mexico (Williams, 1984).

HABITAT AND ACTIVITY. Ruppert and Fox (1988) noted that *P. diogenes* can be discovered either offshore or in estuaries in their juvenile stage. Adults can be seen in reefs. It is seen

occasionally throughout the region, from shallow water to depths of about 30m (Wood and Wood, 2000). A hermit crab's shell serves various functions (Weiss, 2012). All hermit crabs depend on a properly fitting shell for protection from predators (Fig. 2). The crab's tail clamps onto the shell and it supports the shell using a few of its walking legs. Shells also store water, which enables them to colonize relatively dry areas. The shell that a crab occupies usually affects its survival, growth and reproduction. When the hermit crab has outgrown its shell, it looks for a bigger one in nearby areas (Fig. 3). Factors such as scent assist in finding a new home. The crab, to help it locate the shell, uses the smell of either a decaying previous owner, or calcium in snail shell. They do not generally kill snails to find new shells, however, they may fight one another for possession of a vacant one. Upon finding a new shell, the hermit crab investigates it both external and internal by rolling it over and exploring it with its claws and walking legs, measuring the size. The transfer from one shell to the other is done so quickly and can be difficult to see since it is at this time that a hermit crab is most vulnerable to be attacked by a predator or lose one or both shells to another hermit crab.

FOOD AND FEEDING. *P. diogenes* is relatively opportunistic, preying on a range of invertebrates as well as scavenging and feeding on macroalgae. Additionally shelled invertebrates are consumed such as the queen conch, whose shell it also inhabits (Fig. 4).

POPULATION ECOLOGY. The population organisation of the giant hermit crab depends on sex ratio, morphometric relationships, and reproductive period. Males may outnumber females, and also account for the presence of sexual dimorphism in *P. diogenes* as they benefit from being larger than females. Males are capable of fertilizing many females at a time (ICC, 2016). Population size for *P. diogenes* is seasonal and life span varies due to harsh conditions, mass mortalities, migrations and food availability in some parts of the year. High density of *P. diogenes* can be observed during June to August. Being the warmer months the temperature around this period is 25-26⁰C when compared to winter months 19-23⁰C (Turra et al., 2016). Warm temperatures account for adequate reproduction, hence abundance of ovigerous females (with eggs).

REPRODUCTION. Reproduction in *P. diogenes* occurs sexually by copulation where the spermatophore is transferred from male to female. Following a successful fertilization, the eggs are clutched on the female's abdomen during development. In order for metamorphosis into juvenile crabs to occur the hatched larvae has to be dispersed in the water column, then undergo several zoeal stages (Willams, 1984).

BEHAVIOUR. Juvenile behaviour: To grow, crabs must shed their outer shell in a process called moulting or ecdysis. Initial growth in this stage is rapid, where individuals moulted about 5 or 6 times in the first month (Weis, 2012). When reached adulthood, the crab searches for a shell in which they stay until it's time to move.

Antipredator behaviour: Strong claws are useful not only for capturing prey but also for defending itself. Hermit crabs are well armoured by their shell and can contract the muscles in their abdomen to help them go deeper inside the shell. Crabs have an ability known as autotomy, a reflex action in response to injury that separates an injured limb from the body. Hermit crabs readily autotomize and regenerate limbs (Weis, 2012). Communication amongst crabs is generally about mating or aggression.

APPLIED ECOLOGY. *P. diogenes* has no significant threats or hunting rules since it is mainly a pet. This species can be captured and reared as a pet but owners have to provide natural environment and suitable shells for the species to survive and grow.

REFERENCES

- Bertini, G and Fransozo, A. (1999). Relative growth of *Petrochirus diogenes* (Linnaeus, 1758) (Crustacea, Anomura, Diogenidae) in the Ubatuba region, São Paulo, Brazil. *Rev. Brasil. Biol.* **59**: 617-625.
- Ruppert, EE and Fox, R.S. (1988). *Seashore Animals of the Southeast: A guide to common shallow-water invertebrates of the southeastern Atlantic coast*. Univ. South Carolina Press. Columbia, SC. 429 pp.
- Smithsonian Marine Station at Fort Pierce (2010) *Petrochirus diogenes*.
http://www.sms.si.edu/irlspec/Petroc_diogen.htm: Accessed March 8, 2016.
- ICC (2016). The Biodiversity Crisis And Crustacea. Proceedings Of The Fourth International Crustacean Congress.
- Turra, A., Souto, F.X. and Branco, J.O. (2016). Population Biology Of The Hermit Crab *Petrochirus Diogenes*.
<http://www.scielo.br/pdf/rbzool/v19n4/v19n4a08.pdf>.
- Weis, J.S. (2012). *Walking Sideways: The Remarkable World of Crabs*: Ithaca: Comstock Pub. Associates. 2012.
- Williams, A.B. (1984). *Shrimps, Lobsters and Crabs of the Atlantic Coast of the Eastern United States, Maine to Florida*. Smithsonian Institution Press. Washington, DC. USA. 550 pp.
- Wood, E and Wood, L (2000). *Reef Fishes, Corals and Invertebrates of the Caribbean*: New Holland Publishers (UK) Ltd. 56 pp.

Author: Abigail Alessandra Baker

Posted online: 2016



Fig. 2. Giant hermit crab in a symbiotic relationship with a sea anemone to gain protection from predators.

[<http://www.agefotostock.com/age/en/Stock-Images/Royalty-Free/CD211002>, downloaded 10 March 2016]



Fig. 3. Giant hermit crab, *Petrochirus diogenes*, switching shells.

[<http://marinelife.about.com/od/invertebrates/ss/Fun-Facts-About-Hermit-Crabs.htm#step4>, downloaded 10 March 2016]



Fig. 4. Giant hermit crab inhabits a queen conch shell.

[<http://chemistry.csudh.edu/faculty/jim/cozoc2010webpics/gianthermitcrab.jpg>, downloaded 10 March 2016]