Cardisoma guanhumi (Blue Land Crab)

Order: Decapoda (Shrimps, Lobsters and Crabs)
Class: Malacostraca (Crustaceans: Shrimps, Sand-hoppers and Woodlice)
Phylum: Arthropoda (Arthropods)

Fig. 1. Blue land crab, *Cardisoma guanhum.*

[http://lalocom.blogspot.com/2009/08/protegen-en-veracruz-al-cangrejo-azul.html, downloaded 15 March 2014]

TRAITS. The blue land crab or giant land crab, *Cardisoma guanhumi*, grows to approximately 110mm wide and 102mm in length and can weigh 500g. It is known that some even expand to 127mm (Wedes, 2004). Males are usually slightly larger than females. This is considered sexual size dimorphism. In the infant or juvenile stage, blue land crabs usually possess a brown or tan colour with orange legs and develops over time to a range of blue and violet at the adult stage. This colour change usually occurs upon approaching a weight of 80-90g, however some may not show this adult pattern until they are 180g (Hill, 2001). Ovigerous females (with eggs) differ in colour from males and are mostly white or ashy grey. Its body consists of a cephalothorax and abdomen and is protected by a smooth carapace

(shell). There are five pairs of biramous (double) appendages that are connected to both sides of the cephalothorax and covered in tactile setae (hairs). Each appendage is sturdy and commonly longer than the diameter of the cephalothorax (Fig. 1). Its frontal eyes are stalked and quite widespread. Both sexes possess pincers or chelipeds. In males the larger cheliped can extend up to 300mm in length (Burggren and McMahon, 1988).

DISTRIBUTION. *Cardisoma guanhumi* is found largely in estuarine regions throughout the Caribbean and some countries in Central and South America such as Venezuela, Puerto Rico and Colombia. In the U.S. it is found in the Gulf of Mexico and Florida (Hill, 2001). Migrations occur, initiated by heavy rains.

HABITAT AND ACTIVITY. Can colonize habitats of various ecological circumstances. Rarely found more than 8km from the shore, but mainly along estuaries and river banks. Large populations form on low lying ground of mud that is dense and rubbery making it possible to create burrows that extend up to 18cm wide and 2m in depth with small pools of 1-2 liters of water at the bottom (Burggren et al., 1993). Some populations also survive in coastal sand above the tide line. Its habitat regions are typically terrestrial biomes like forests such as rainforests and aquatic biomes whether it be saltwater (coastal areas) or freshwater (rivers, streams, etc.). Adult *Cardisoma guanhumi* can survive in salinities from zero to hypersaline (more salty than the sea) because they can withstand any salt gain through the body surface. Population size and distribution is largely influenced by water temperature. Areas with temperatures that fall below 20ºC pose a threat to the survival of its larvae. Salinities of 20 to 40 ppt is crucial for larval development (Anonymous, 2003). *Cardisoma guanhumi* can be considered a nocturnal animal as activity heavily occurs during low light especially at dawn and dusk. At high daytime temperatures, activity is decreased.

FOOD AND FEEDING. *Cardisoma guanhumi* is an omnivore as its diet consists mainly of leaves, grasses and fruits as well as carrion (decaying animal flesh), insects and even faeces. Buttonwood trees and the red and white mangroves make up a substantial amount of their diet as its leaves are highly preferred. Feeding mainly occurs during the night and sometimes shady, low light areas (Wedes, 2004). As a means of foraging food, *Cardisoma guanhumi* catches, crushes and tears its food with its cheliped and then stores it in their burrows to feed on later. Falling fruits and large leaves at the surface create vibrations between 10-1500 Hz and 70 dB that are picked up by their sound detectors when in their burrows so they can carry out a search for food at the surface (Lloyd, 2001). During migrations, more food is consumed resulting in an increase in weight and size.

POPULATION ECOLOGY. Typically solitary; males more territorial than females. There is no data on the exact lifespan of *Cardisoma guanhumi*, however, biologists have hypothesized the lifespan of any land crap species is indirectly proportional to its growth rate. Therefore, a faster growth rate means a shorter lifespan, and vice versa. It can therefore be considered that the *Cardisoma guanhumi* species possess longer lifespans than other land crabs due to its slow growth rate. In captivity, its average lifespan goes up to 13 years. In the Indian River Lagoon and its nearby areas, the *Cardisoma guanhumi* is highly abundant. In some low lying areas, over 7,500 burrows were found.

REPRODUCTION. Mating system is polygynandrous (females can mate with males who can mate with other females). Breeding usually occurs once a year and is considered seasonal breeding as it is highly reliant on the lunar cycle and weather patterns. The breeding season

is usually during the July-August period when females seek out males during migrations to the shore. These migrations occur during full moon periods (Lloyd, 2001). The breeding season, however, varies by latitude and although males are able to copulate numerous times between moults, females can only do so a limited amount of times and reaches reproductive maturity at approximately four years. The males court females who release pheromones and tactile signals. Copulation occurs outside of the burrows where fertilization occurs internally. *Cardisoma guanhumi* is an egg-laying organism and produces an average of 52,000 offspring each time. The eggs are carried by the mother on her back for the average gestation time of two weeks before being released. Its parental investment is pre-fertilization and pre-hatching (Burggren and McMahon, 1988).

BEHAVIOUR. Juvenile behaviour – newly hatched eggs are released from the mothers back as free swimming larvae into the sea as salt water is necessary for survival. There are five zoeal stages in a crab's life and one post-larval stage. A juvenile crab will take approximately 42 days to reach its first stage.

Antipredator behaviour – They are extremely territorial with respect to defending its burrows in competition from other crabs or burrowers. Upon encountering small moving objects, their predatory behaviour is displayed. The cheliped is its main weapon and defense mechanism. Upon stimulation or attack, pressure is applied to the cheliped and the force created is so powerful, other crustaceans can be a victim.

Communication – occurs through visual, tactile, chemical as well as acoustic channels. Females also release pheromones during mating. It is not a social species as it resides in their respective burrows for majority of their time. Polarized light is required for these crabs to orient itself. On its appendages, setae are present and is used for tactile purposes.

APPLIED ECOLOGY. Populations can be so large that in the United States and Puerto Rico, it is considered a pest. On crop and agriculture lands near estuaries and rivers, burrows are being dug in plenty. These crabs are also affected by the chemicals used on these agriculture fields and is known to cause lesions and ulcers to its consumers. Similar effects have occurred when these crabs have consumed poisoned fruit. Also, the pools of water at the base of the burrows support breeding grounds for mosquitoes and pose a great threat for vector diseases such as malaria. In other countries like the Bahamas, Central and South America and most importantly the Caribbean, it is heavily exploited for food and is of great economic importance. In Venezuela, there is a market for blue land crabs where harvesters can catch up to 400 crabs a night and is sold at US$30.00 per dozen (Burggren et al., 1993). *Cardisoma guanhumi* is not endangered but strict legislations have been put in place in Puerto Rico to prevent its over-exploitation. Florida is also taking into consideration of such legislations (Florida Fish and Wildlife Conservation Commission, 2002).

REFERENCES

Anonymous, 2003. "Great Land Crab". eNature.com, Accessed March 15, 2015. http://www.enature.com/fieldguide/showSpeciesSH.sp?curGroupID=8&shapeID=1063&curPageNum=6&recnum=SC0010.

Burggren, W., B. McMahon. 1988. *Biology of the Land Crabs*. New York: Cambridge University Press.

Burggren, W., G. Moreira, and M. Santos. 1993. Specific Dynamic action and the metabolism of the brachyuran land crabs Ocypode quadrata (Fabricius, 1787), Goniosis cruentata (Latreille, 1803) and Cardisoma guanhumi (Latreille, 1825). *Journal of Experimental Marine Biology and Ecology*, 169: 117-130.

Florida Fish and Wildlife Conservation Commission. 2002. *Blue Land Crabs Draft Rule Review.* Tallahassee, FL: Division of Marine Fisheries. Accessed March 15, 2015. http://www.floridaconservation.org/commission/2002/com/LANDCRABDRAFTRULEREVIEW.pdf.

Hill, K. 2001. "*Cardisoma guanhumi*". Smithsonian Marine Station. Accessed March 16, 2004. http://www.sms.si.edu/IRLSpec/Cardis_guanhu.htm.

Lloyd, R. 2001. "The Illusive Great Land Crab". Accessed March 15, 2004. http://www.mhhe.com/biosci/pae/marinebiology/casestudies/case_01.mhtml.

Wedes, Samuel. 2004. "*Cardisoma guanhumi* blue land crab" Accessed March 15, 2015. http://animaldiversity.org/accounts/Cardisoma_guanhumi/#behavior.

Author: Narisha Ramnarine
Posted online: 2015