Littoraria angulifera (Mangrove Periwinkle)

Superfamily: Littorinoidea (Winkles)
Class: Gastropoda (Snails and Slugs)
Phylum: Mollusca (Molluscs)

Fig. 1. Mangrove periwinkle, *Littoraria angulifera*.

[http://commons.wikimedia.org/wiki/File:Mangrove_Periwinkle_(Littorina_angulifera)_(8367330238).jpg, downloaded 8 April 2015]

TRAITS. The mangrove periwinkle has a small shell, about 3cm high and has 6 to 7 whorls with a pointed top (Fig. 1). The shell is sturdy and is engraved with tiny helical lines with the seams being somewhat channelled. There is a middle channel at the lower side of the external lip. Its operculum (cover) is dull brown. The shell colour can be reddish, grey or somewhat with dark slanted markings. On rare occasions it may be orange or yellow, and the inside is white (Abbot, 1968). *Littoraria angulifera* have fairly degenerate ctendia (gills) with a vascularised mantle epithelium, two features which support oxygen exchange in air.

DISTRIBUTION. *Littoraria angulifera* spans South Florida to Brazil, through the Caribbean Sea (Abbot, 1968). They are also found in Africa from Senegal to Angola (Merkt and Ellison, 1998). Morphometrics (the study of the external forms) and genetics shows that they are disconnected inhabitants of a single species that lie on different sides of the Atlantic instead of being classed as two cryptic species (Merkt and Ellison, 1998).

HABITAT AND ACTIVITY. The mangrove periwinkle, as its common name infers, lives in mangroves. It is located on trees and roots above the water line in mangrove areas and slightly salty (saline) shallow waters. Not much is known about the *Littoraria angulifera* thermal tolerance but the humid semitropical range of the species shows it favours warmer waters and air temperatures. It is found primarily over the tide mark on trunks and prop roots of the *Rhizophora mangle* (red mangrove) (Fig. 1), as well as leaves and branches up to around 7m above the high tide line. This species is observed to be mostly crepuscular.

FOOD AND FEEDING. *Littoraria angulifera* are herbivores, that primarily feeding on fungi and algae (Kohlmeyer and Bebout, 1986). The feeding complex, called a radula, differs in inhabitants from diverse areas (Andrade and Solferini, 2006). The radula is a binding of minute teeth that serves in scraping food from tough exteriors.

POPULATION ECOLOGY. The oldest that a mangrove periwinkle can get to is not yet known, but the life expectancy can differ with food supply and environmental influences. *L. angulifera* can be found solitary (Fig. 2) or in clusters (Fig. 3).

REPRODUCTION. Reproductive strategies are rather varied in periwinkles (Ruppert and Barnes, 1994). *Littoraria angulifera* is ovoviviparous i.e. there is internal insemination and the fertilised eggs are brooded within the body, nourished by egg yolk due to the absence of a placental connection. The eggs then hatch into veliger larvae which are released and become planktonic, living in open water (Merkt and Ellison, 1998, Tanaka and Maia, 2006). For 8-10 weeks the larvae stay in the water column until they get to the pediveliger stage, which has a foot, and then settle to the substrate and transform into infantile snails.

BEHAVIOUR. In *Littoraria angulifera* on the coast of Panama it was learnt that daily movement peaked between 1 and 1.5 hours previous to dawn when the tide was increasing. Subsequent to dawn although the tide continued to increase, movement declined until almost 90% of the snails were inactive near to high tide waterline. During the retreat of the tide in the afternoon, approximately 10% of the snails started back crawling. These snails moved underneath leaves or at the back of roots or stems and became immobile again. At sunset and throughout the initial night hours, some snails became momentarily lively as the tide started rising again, with action becoming common as dawn neared. Snails gathered near to the tideline at high tide. During the tide retreat snails spread. The smaller snails remained nearer to the tideline or required shelter inside the algal turfs growing on roots, whereas others relocated to cool places underneath leaves or behind stems in upper heights of the tree. Although adults travel over substantial vertical distances, juveniles stay near to the tideline, possibly because only large *Littoraria angulifera* make a self-lubricating seal, which assists in avoiding drying out.

APPLIED ECOLOGY. *Littoraria angulifera* has not yet been listed by the IUCN. In terms of human usage as it has been used as a biotherapeutic product for the treatment of rasping coughs along with breathing problems in traditional medicine in the northeast of Brazil.

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Fig. 3. Solitary *L. angulifera*.

[http://www.sms.si.edu/irlspec/Littor_anguli.htm, downloaded 8 April 2015]

Fig. 4. Cluster of mangrove periwinkles.

[http://www.sms.si.edu/irlspec/Littor_anguli.htm, downloaded 8 April 2015]