

Echinometra lucunter (Rock-boring Urchin)

Order: Camarodonta (Globular Sea Urchins)

Class: Echinoidea (Sea Urchins)

Phylum: Echinodermata (Starfish, Sea Urchins and Sea Cucumbers)



Fig. 1. Rock-boring urchin, *Echinometra lucunter*.

[<http://echinoderms.lifedesks.org/pages/1270>, downloaded 27 March 2015]

TRAITS. *Echinometra lucunter* (rock-boring urchin) has an elliptical shape with 100-150 spines (Johnsen et al., 2004) and reaches sexual maturity at a diameter of 20mm (Lima et al., 2009). The size and the thickness of the tests (shells) differs depending on its habitat. In high wave-energy sites, the tests are smaller and thicker than in low wave-energy sites (Lewis and Storey, 1984). The colour of *Echinometra lucunter* varies from a bright red to blackish, with black spines (Fig. 1). It has a specialised feeding apparatus (Aristotle's lantern) with five teeth (McPherson, 1969).

DISTRIBUTION. *Echinometra lucunter* is geographically located from North Carolina and Bermuda through the Caribbean to Brazil and West Africa (Ebert et al., 2008).

HABITAT AND ACTIVITY. Found abundantly in shallow waters in a variety of habitats such as tropical, marine intertidal or littoral. It lives in cavities in wave-exposed areas such as tidal terraces, beachrock as well as in less energetic habitats (non-wave-exposed areas) which include other areas of rocky shore from just below the low tide level to depths of 45m (Grunbaum et al., 1978). It may even be found under rock slabs (Ebert, et al. 2008). *Echinometra lucunter* seldom moves out of its burrow, but when it does, movement is primarily seen during the night, and as such this species of urchin can be said to be nocturnal. It is believed that its low level of activity may be related to its burrowing habit (McClintock et al., 1982).

FOOD AND FEEDING. *Echinometra lucunter* graze on the non-living reef structure as well as on live coral surfaces (Bak, 1994). 95% of *E. lucunter*'s diet consists of algae such as *Laurencia papillosa* and the other 2% are invertebrates that were probably ingested accidentally, such as the sponge *Darwinella* (Calderon et al., 2007). It is also known to consume some seagrasses (Ogden, 2003).

POPULATION ECOLOGY. *Echinometra lucunter* may occur in population densities of up to 240 individuals per m² but with clearly defined boundaries between each burrow (Grunbaum et al., 1978). Growth rate is slow with a life expectancy of over 10 years (Ebert et al., 2008). Mature *E. lucunther* do not usually move out of their burrows, however, at Pigeon Key it was noted that rarely during the summer, *E. lucunther* would settle on the rubble of the outer, dead French or Long Reefs. The summer of 1965 had a large settlement, but few survived through to the fall. Hurricanes and other storms on the outer reefs make survival difficult, as most of the rocks on these areas are small and unstable (McPherson, 1969). *Echinometra lucunter* and *E. viridis* have been observed occupying the same ecological niche along with a number of other echinoids and appear together under the same rocks. They also show no significant differences in their food or habits, however many echinoids are omnivorous, and generally have a large food supply, which means interspecific competition for food may be low and thus are able to live in the same habitat when other conditions are suitable (Grunbaum et al., 1978).

REPRODUCTION: *E. lucunter* males reach maturity from 18mm and females from 21mm in diameter (Lima et al., 2009), and spawned generally once a year, although there have been reported instances where *E. lucunter* spawned twice a year. At Muro Alto, spawning was observed once a year during the dry season (October- February). However, in the Caribbean, the *E. lucunter* of Barbados are able to spawn once a year in in high wave-energy habitats and twice a year in low wave-energy habitats (Lima et al., 2009). Mating is polygamous, in that a single female is able to mate with several males, since eggs and sperms are both released into the water column. The male *E. lucunter* releases his spermatocytes first into the column. This in turn stimulates the female to release her oocytes from the gonad (Bolton and Thomas, 2002).

BEHAVIOUR. *Echinometra lucunter* is highly territorial, and may even resort to aggression as its primary line of defence to protect its access to food and living space. During the day all individuals of *E. lucunter* remain under rocks or in crevices or holes and can be difficult to remove from these borrows, as they firmly anchor themselves using their tube feet and spines whenever they are disturbed. At night a small percent of *E. lucunter* have been observed moving

only partially out of their holes whereas others moved onto the open surfaces of the rocks. Many however remained almost as they were during the day (McPherson, 1969).

APPLIED ECOLOGY. An overabundance of *Echinometra lucunter* occurs in areas with few predators; this can be used as an indicator species for environmentally stressed or overfished reefs (McClanahan and Muthigab, 2001). There are no documented conservation acts in place for *Echinometra lucunter* at this time, as it is not on the endangered species or at risk species list.

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Posted online: 2015