



Periodic movement, recruitment and size-related distribution of the sea cucumber *Holothuria scabra* in Solomon Islands

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Abstract

Field studies of the sea cucumber *Holothuria scabra* conducted in Kogu Veke, Solomon Islands, showed monthly recruitment of newly-settled juveniles on seagrass and indicated that size distribution was a function of substratum type and depth. Adults >250 mm body length were found mainly on sand, with <5% organic matter (OM), at depths of >1–3 m. Individuals >10–250 mm were found mostly in 30–120 cm of water, on mud and muddy sand with OM content between 5 and 10%. Specimens >40–150 mm were also found in the intertidal zone, sometimes burrowed on exposed sandflats at low tide. *Holothuria scabra* avoided substrata of fine silt or shell and coral pebbles, and sediment with an organic content $\geq 30\%$. Juveniles ≤ 100 mm burrowed at sunrise and surfaced at sunset, whereas individuals >100 mm burrowed and surfaced a few hours earlier. *Holothuria scabra* tended to burrow when salinity decreased, whereas increased water temperatures reduced normal burrowing behaviour. Spatial distribution, observed during tank experiments, suggested that adult *H. scabra* aggregated prior to spawning and in response to the lunar cycle. The formation of pairs, trios or larger groups increased during the new moon and was most common just before the full moon. Newly-settled juveniles up to ca. 9 mm were found on seagrass leaves. Typically, maximum densities and smallest recruits were observed a couple of weeks after the full moon, lower densities and slightly larger recruits were found a few days later. Juveniles with a mean length around 65 mm released on sand moved less and grew faster than juveniles released in seagrass beds or on substrata of shells and crushed coral.

Introduction

Holothuria scabra Jaeger is a deposit feeding holothurian that occurs mainly in sandy environments throughout the tropical Indo-Pacific. In recent years, *H. scabra* populations have been depleted severely by over harvesting (Preston, 1990; Holland, 1994; Lokani et al., 1996) and stock enhancement programmes have been initiated in a few countries (Battaglene & Bell, 1999). To date, biological studies on *H. scabra* have focused mainly on the population structure of adults, the reproductive cycle, spawning, juvenile growth (Krishnan, 1968; Ong Che & Gomez, 1985; Shelley,

1985; Baskar, 1994; James et al., 1994; Conand & Tuwo, 1996; Long & Skewes, 1997; Battaglene et al., 1999; Tuwo, 1999) and daily activity cycles (Mercier et al., 1999). Some reports discuss small specimens found in shallow waters or mention that the young and the adults may have different habitat preferences, but observations of juveniles are rare and their recruitment has not been investigated (Shelley, 1985; James & James, 1994; James et al., 1994; Lokani et al., 1996).

One reason why so little information exists on young holothurians in general is that they are rarely found in the wild (Seeto, 1994; Hamel & Mer-