In situ observation of sexual reproduction in *Stichopus chloronotus* at a fringing reef at Reunion Island (Indian Ocean)

Barrère A.[1] *and Bottin C.*[1]

Of the 17 sea cucumber species found to date in the reefs of Reunion Island (Conand and Mangion 2002) *Stichopus chloronotus* is one of the dominant ones. Population abundance varies depending on the reef. For example, this sea cucumber is rare at the Toboggan and Planch'Alizés sites (Saint Gilles/La Saline Reef) and at Saint Pierre and Saint Leu Reefs, but is abundant at Etang Salé Reef and very abundant at the Trou d'eau site (Saint Gilles/La Saline Reef). *S. chloronotus* is one of nine sea cucumber species capable of reproducing both sexually — through release of gametes — and asexually — through transverse fission (Conand 2002).

Conand, Uthicke and Hoareau (2002) showed that sexual reproduction in *Stichopus chloronotus* has distinct seasonal characteristics, with spawning during the hot season (November to February), in both Reunion Island and on the Great Barrier Reef in Australia.

We observed and photographed the release of genital matter by *Stichopus chloronotus in situ* at Etang Salé Reef after the full moon in December 2006. This was the first time that sexual reproduction in this species had been observed on site at Reunion Island.

Figure 1. ***S. chloronotus*** **in spawning posture** (photo Barrère)

The initial observations took place by accident at 6 p.m. on 7 December (i.e. two days after the full moon). The zone, which was explored using snorkelling gear (fins, mask and snorkel), was the southern half of the "Bassin pirogue" (the Etang Salé reef flat), which is used for anchorage by about 100 small vessels. The substrate there is sandy (mixed origin, coral and especially basalt), with a depth of about one meter. The current is almost always south–north towards the navigation channel. Other observations were made on 8 and 9 December, in the morning at about 9 a.m. and at the end of the day between 5:00 and 6:30 p.m. (sunset). *Stichopus chloronotus* is the most abundant sea cucumber species in this zone, with a density of about two specimens per metre. The Southern Hemisphere winter began several weeks late in 2006.

In the first instance, on 7 December, we observed the characteristic posture for sexual reproduction in sea cucumbers: the animals were stretched out towards the surface with the front part of their body up (2/3 of the body) and the back part lying on the bottom (Fig. 1). In one hour, we found four specimens with this posture in an area of about 150 m^2. We were able to observe two instances where gametes were released, without any forewarning, rapidly and massively, in the form of a white "cloud". On the morning of 8 December, no instances of sexual reproduction were observed. At the end of the day on 8 December, between 5:00 and 6:30 p.m., six specimens were observed in the process of reproducing. The sea cucumbers were isolated except for two that were side by side on a boat anchor block. Gamete release was observed in three specimens. The gametes were expulsed in a continuous flow in the form of a fine thread coming out of the genital orifice (Fig 2, probably a male). For one sea cucumber, the gametes, visible in macrophotography, are identifiable as oocytes (Fig. 3). On 9 December we did not observe any specimens in the reproductive posture or any spawning in either the morning or at the end of the day. Further exploration of the reef flat on 12, 17

1. Association Vie Océane - La Réunion. http://vieoceane.free.fr/index.html

and 19 December confirmed that the phenomenon had ended.

References

Conand C. 2002. La vie sexuelle des holothuries. Pour La Science 292:19–20.

Conand C. and Mangion P. 2002. Holothurians from La Réunion fringing reefs: Diversity, distribution, abundance and population structure. SPC Beche-de-mer Information Bulletin 17:27–33.

Conand C., Uthicke S. and Hoareau T. 2002. Sexual and asexual reproduction of the holothurian *Stichopus chloronotus* (Echinodermata) : a comparison between La Réunion (Indian Ocean) and east Australia (Pacific Ocean). Invertebrate Reproduction & Development 41(1–3):235–24.

Figure 2.
Release of sperm by a male *S. chloronotus*
(photo Barrère)

Figure 3.
Release of oocytes by a female *S. chloronotus*
(photo Barrère)