

SALGADO-CASTRO, L.R. (1993). Sea cucumber fisheries of the Pacific Coast (*Parastichopus parvimensis*) and *P. californicus* and *Isostichopus fuscus*, from the Gulf of California. National Fisheries Institute. Ministry of Fisheries. 114 p. (In Spanish).

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Observations on fission and spawning

Communicated by Ram Mohan, Tuticorin RC CMFRI, Tamil Nadu. India 628 001.

1. Spawning observations

1. Date: 24.03.1998
Time: 09:45
Species: *Holothuria atra*
Moon phase: NM-3
Remarks: Two male specimens spawned one after the other in laboratory holding tanks at 30°C, for about 15–20 minutes. No peculiar spawning behaviour was noticed.
2. Date: 22.07.1998
Time: 08:30
Species: *Holothuria atra*
Moon phase: NM-1
Remarks: One male specimen spawned during transit in the container by slightly lifting its anterior end, for 12 minutes. The water temperature recorded was 27.5°C.
3. Date: 27.08.1998
Time: 11:45
Species: *Holothuria atra*
Moon phase: 1/4-3
Remarks: Four male specimens spawned in holding tanks by lifting their anterior end, but showed no swaying action. The spawning duration was 15–40 minutes. Later, two more male specimens spawned, but for a shorter duration. A single female specimen spawned in the same tank intermittently for about 4 hrs. No peculiar behaviour was observed. The water temperature recorded was 29.5–31°C.
4. Date: 15.09.1998
Time: 17:50
Species: *Holothuria atra*
Moon phase: 3/4+2
Remarks: One male specimen spawned for 30 minutes during transportation

at 28°C water temperature. It erected its anterior end and showed swaying movements.

5. Date: 24.09.1998
Time: 09:30
Species: *Holothuria atra*
Moon phase: NM+3
Remarks: Two male specimens spawned in containers for 30 minutes to 1 hr. at 28°C by lifting their anterior end. One specimen had two gonopores; spawning time of 1 hour.
6. Date: 21.10.1998
Time: 14:10
Species: *Holothuria atra*
Moon phase: NM+1
Remarks: Three male specimens spawned in holding tanks, at about 29.0° to 29.5°C water temperature. The spawning duration extended from 45 minutes to 2 hrs. 15 min. One specimen had 3 gonopores. This particular animal lifted and swayed its anterior end.

2. Fission and regeneration observation

Species: *Holothuria atra*
Site: South Brezk Water, New Harbour, Tuticorin, Tamil Nadu, India.
Habit: Calm, loamy bay with beds of seagrass such as *Cymodicea* sp., and *Halophila* sp., along with some sea weeds and dead coral stones.
Date: November 1997 – October 1998.
State: Fissioned and regenerating anterior as well as posterior parts were observed. A maximum percentage of such specimens was noted during October, 1998 and minimum during April, 1998. The fission rate was higher at a temperature range of 25–27° C, at a steady salinity level of 34–45 ppt.
Behaviour variations: Not observed.