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UNDERWATER STILL CAMERA WORKS IN THE HABITAT OF *NAUTILUS* OFF THE SOUTHEASTERN COAST OF PORT MORESBY, PAPUA NEW GUINEA

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Abstract

Photographing *Nautilus* and some other organisms gathering around the baits, and analyses of the species composition and their searching and feeding behaviors were carried out. *Nautilus* appeared at evening (16 : 00−17 : 00) and showed active feeding behavior until the early next morning (6 : 00). Seven species of Crustacea, one of Echinodermata and six of Pisces also appeared, and showed active searching for food and feeding behaviors.

Introduction

Late in November, 1990, the writers performed the photographic works with a baited underwater camera at the three stations on 250m deep sea bottom of the southeastern part

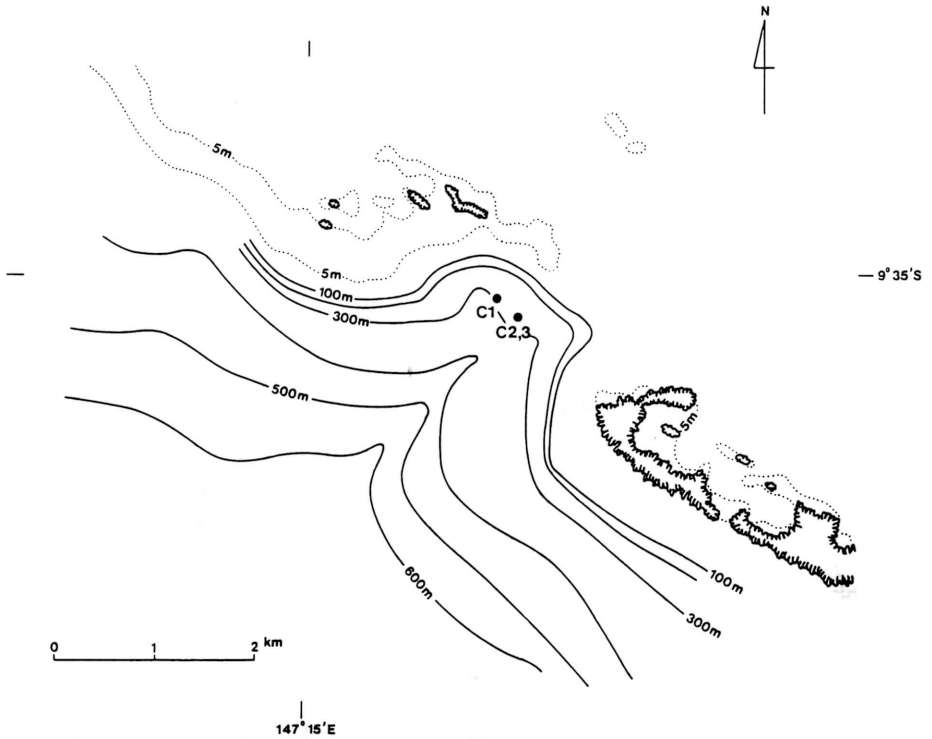

Fig. 1. The stations of underwater still camera works off the southeastern coast of Port Moresby.

of Port Moresby, Papua New Guinea (Fig. 1). Through the photographic works, rather good 101 pictures showing the bottom sediments and organisms were obtained, and based on them, combination of species and their searching for food and feeding behaviors were scrutinized.

For the present work, the writers used a small-sized handy underwater camera system, of which specification is described in the writers' previous papers (HATTORI *et al.*, 1985 ; SHINOMIYA *et al.*, 1988). Camera and strobe were fixed to an iron frame, and a bait-stand covered with wire netting was attached to the frontal part of the frame.

Field Operation

As the bait for *Nautilus* and associated arganisms, thirty to thirty five frozen sardines put into wire netting cage were used.

The photographing time interval was 30 minutes. The time range of a series of photography was shifted to be able to cumulate the record of organisms appearing for 24 hours in this area. The time range and data on photography are shown in Table 1.

Table 1. Time range of pictures and data of photographic stations off the southeastern coast of Port Moresby.
S : start, F : finish of photographing.

Operation number	Data and time (Time range of pictures)	Time interval (minutes)	Station number	Depth (m)	Hours 0 2 4 6 8 10 12 14 16 18 20 22 24
1	Nov. 21 (9 : 54-14 : 34)	10	C-1	250	S — F
2	Nov. 21-22 (15 : 59-9 : 29)	30	C-2	250	— F S —
3	Nov. 22-23 (11 : 59-5 : 29)	30	C-3	250	— F S —

Results and Discussion

Based on the information from the photographs and the data on the samples obtained by trapping, the organisms seen in photographs were identified. The time of appearance of each organism, and the number of individuals of each species identified in each picture are recorded. Based on these data, the maximum numbers of individuals of the species observed for every one hour in this area were summarized in Table 2.

One to nineteen individuals of *Nautilus* ranging from 14-17 cm in shell diameter appeared in the pictures taken at the stations C2 and C3. It always appeared within the time-range 16 : 00−5 : 00, and rather abundantly appeared from 20 : 00 to 3 : 00. Among the organisms gathering around the bait-stand, *Nautilus* predominates and stayed for longest time.

Nautilus showed rapid response to the descovered foods, and kept sticking to the bait-stand until the food is entirely consumed. The longest record of stay on the bottom around the bait-stand was 6.5 hours (22 : 29−4 : 59) and the next one was 4.5 hours (23 : 29−3 : 59).

Comparing the time-range of appearance and individual numbers of *Nautilus* with those reported in the preceding studies (SAUNDERS, 1984; SHINOMIYA *et al.*, 1988), it is noticeable that there were no appearance of *Nautilus* in the day time during the present operation, and the maximum number of individuals (19) appeared in a single shot was higher than those in the preceding reports.

Table 2. List of species and hourly maximum number of occurrence off the southeastern coast of Port Moresby.

Scientific name	Hours																						
	6	8	10	12	14	16	18	20	22	24	2	4	6										
MOLLUSCA																							
Nautilus pompilius Linnaeus							1	4	4	8	17	17	19	18	16	16	13	16	13	11			
CRUSTACEA																							
Aega sp.									1	1			1			2	5	2					
Plesionika sp.								8	10	1	1	1	2		1			1					
Heterocarpus sp.											1												
Munida sp.					1	1		1															
Pagurid hermit crab							1			1													
Dorippid or Majid crab				1																			
Ovalipes sp.						1	1	1	1	1		1	1				1						
ECHINODERMATA																							
Ophiolepidid sea star	1	1	1	1				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PISCES																							
Synaphobranchus sp.									1		1												
Epinephelus cometae Tanaka							1					1											
Upeneus vittatus (Forsskal)								1															
Tropidinius amoenus (Snyder)				1	1	1	2	5	6														
Etelis carbunculus Cuvier					1		1	2	1	1	1	1						1					
E. coruscans Valenciennes							2	2															

During the photographing at three stations, seven species of Crustacea appeared. Among them, *Plesionika* sp. and *Aega* sp. and *Ovalipes* sp. were rather common.

The time-range of appearance of *Plesionika* sp. and *Aega* sp. was 18:00 to 6:00, and *Plesionika* sp. showed the peak of gathering in twilight (18:00−19:00), while *Aega* sp. in the early morning (3:00−5:00).

Not only the number of species, but also the amount of shrimp were rather low as compared with the record off Suva, Fuji (SHINOMIYA *et al.*, 1988).

Seven spcies of fishes appeared. Among them, the species showing rather abundant occurrence are *Tropidinius amoenus* and *Etelis carbunculus,* and next to these species *Etelis coruscans, Synaphobranchus* sp. and *Epinephelus commetae* occurred.

Two eggs of Scyliorhinid shark were photographed, which clinging to the stem of horny coral (Gorgonacea) on the sea bottom.

Reference

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SAUNDERS, W. B., 1984. Paleobiology, 10: 169-486.

SHINOMIYA, A., HATTORI, M., HAYASAKA, S., TANABE, K., ŌKI, K., and SUZUKI, K., 1988.

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Explanation of Plate 1

Station C-3 (Depth 250 m)

Fig. 1. 16 : 29 A snapper *(Etelis coruscans)* at the upper left corner, four flower flute porgy *(Tropidinius amoenus)* at the background.

Fig. 2. 17 : 59 Four *Nautilus,* first appeared 6 hours after landing of the camera system on the bottom, immediately started to feed.

Fig. 3. 20 : 29 Seventeen *Nautilus* clinging to the bait-stand.

Fig. 4. 4 : 29 Five to six large carnivorous Isopods (*Aega* sp.) crawling in the empty bait-stand.

Station C-2 (Depth 250 m)

Fig. 5. 15 : 59 A snapper *(Etelis carbunculus)* at the left corner, two flower flute porgy *(T. amoenus)* at the background, two eggs of Scyliorhinid shark clinging to the stem of horny coral (Gorgonacea).

Fig. 6. 18 : 59 A snapper *(E. carbunculus)* at the upper side, four *Nautilus* and eight shrimps (*Plesionika* sp.) around the bait-stand.

Plate 1