

October 8, 1991

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CRUISE REPORT

VESSEL:

Townsend Cromwell, Cruise 91-07 (TC-165)

CRUISE

PERIOD:

29 August-11 September, 1991

AREA OF

OPERATION:

Southeast (SE) Hancock Seamount (Fig. 1)

TYPE OF

OPERATION:

Personnel from the Honolulu Laboratory (HL), Southwest Fisheries Science Center (SWFSC) of National Marine Fisheries Service (NMFS) conducted fishing and oceanographic operations on the summit, slopes, and in the water column with bottom longline droppers, vertical longline and, acoustic Doppler current profiler (ADCP).

ITINERARY:

- 29 August - Arrived Midway Island and embarked Robert L. Humphreys, Bert S. Kikkawa, Sean Kinane, Donald R. Kobayashi, Linda A. Koch, and Paul M. Shiota. Departed Midway at 1740 and proceeded to Southeast Hancock.
- 30 August - Arrived SE Hancock at 1400 and commenced field operations.
- 7 September - Departed SE Hancock at 1720 for medical assistance at Midway Island.
- 8 September - Arrived Midway Island at 1330. Disembarked Chief Engineer. Departed Midway at 1430 for SE Hancock.
- 9 September - Arrived SE Hancock at 1040 and resumed field operations.

- 10 September - Departed SE Hancock at 1215 and proceeded to Midway Island.
- 11 September - Arrived Midway Island and disembarked Humphreys, Kikkawa, Kinane, Kobayashi, Koch, and Shiota.
End of cruise.

MISSIONS AND RESULTS:

- A. Estimate the relative abundance of armorhead, Pseudopentaceros wheeleri.
1. A total of thirty-nine bottom longlines were set during the daylight hours over the summit flats and down the slopes of SE Hancock seamount for the annual stock assessment of armorhead. A set consisted of 30 each 2.8 m polyvinyl chloride (PVC) tubes spaced 18.3 m apart on a 604 m groundline and anchored with 25 kg weights at each terminal end. Each anchor was spaced 3.6 m from the adjacent dropper. There were five No. 20 circle hooks on alternating branch lines of each dropper. A digital hook timer was linked between hook leader and branch line so that hooked fish could trigger the timing mechanism. A hook timer is a resin-encased clock module, reed switch, and battery circuit, controlled by a magnet. The trigger device involved a screw-in stainless steel spring plunger that applies lateral frictional force on the cylinder magnet. Timers were individually calibrated to trigger at about 1 kg pull force. Additionally, maximum depth recorders to estimate fishing depth range of the gear were attached to both anchor lines. Bottom longlines usually soaked for about an hour and upon retrieval, each tripped timer was examined and elapsed time recorded. Fishing time for each fish can be determined by the difference between the retrieval time and the sum of each dropper's set and sinking time. From the fishing time frequency distribution, an estimate of relative density was then determined. Bottom longline sets were deployed equally into four sectors of the seamount covering all four principal depth strata < 265 m, ≥ 265 m to < 300 m, ≥ 300 m to < 400 m, and ≥ 400 m and < 500 m of SE Hancock seamount. Longlines were usually set from shallow to deep, and normal to the depth contours. A total of 125 armorhead were caught, an 83% drop from 1989 catches (also a non-recruitment year). Armorhead accounted for 48% of the total catch, followed by dogfish, Squalus mitsukurii, with 42%. Incidental catches included Polymixia japonicus, Helicolenus avius, Pseudanthias kelloggi, and Etmopterus pusillus.
 2. After arrival at the seamount, catch rates of armorhead were highest the first two days, averaging about 11

armorhead per set. However, as the cruise progressed catches subsequently declined to zero. This drop can be attributed to 12-20 aggressive sharks around the vessel during operations. These large sharks, from 2.4 to 3.6 m in length, were identified as Carcharhinus galapagensis and were attracted to the vessel upon our arrival at the seamount. These sharks remained until our departure and took catches off the droppers during retrieval, and were responsible for severed branch lines with missing timers and hooks.

- B. Investigate nocturnal distribution patterns of armorhead on the seamount.

A total of 12 sets of the bottom longline gear were conducted and centered around twilight; which is considered the transitional period for armorhead behavior. Armorhead regularly inhabit the deeper slope depths during the day and vertically migrate to the summit flats at night, returning to the deeper slopes at dawn. Nocturnal operations were similar to those in the daylight hours except hook timers were not used. A total of 14 armorhead were caught, about 30% of the total catch. The rest of the catch consisted primarily of 26 dogfish, 20 S. mitsukurii and 6 Etmopterus pusilus.

- C. Investigate nocturnal distribution patterns of armorhead in the water column over the seamount.

1. A total of 55 vertical longline drops were conducted over the slopes and summit flat of SE Hancock and 8 drops over NW Hancock seamounts. The primary objective was to determine nocturnal presence of armorhead in the water column and examine the effect of the gear on luring armorhead in the water column. Fishing was conducted from the hydraulic handline gurdies. Forty No. 5 circle hooks were spaced 4.6 m apart on a 183-m monofilament leader attached to the gurdie main line. Each 0.6 m hook leader was snapped onto the main leader as the line went down. The vertical longline was anchored on the summit with a 4.5 kg weight and an attached surface float. The line was set to fish as near the vertical position as possible but still connect to the ship. Soak time was about 10 to 15 min. Mackerel, Scomber australasicus, was the predominant catch in the upper water column. On the first night of fishing, as the line was slowly lowered, hooks were rapidly taken by mackerel. Shortly afterward large segments of the line were lost to shark attack. On the next night, the main leader was reduced to 3.7 m with four equally spaced hooks. Retrieving the catch with hordes of sharks around the vessel was another problem. The catch has to be brought up as fast as possible but fish were still lost.

2. A total of four armorhead and one alfonsin, Beryx splendens, were caught at about the 242 m depth, and four gempylids, Promethichthys prometheus, were caught at about 20-30 m off the bottom at SE Hancock.
 3. One night of vertical longlining was conducted at Northwest (NW) Hancock to prevent shark attack and to account for the low catch rates at SE Hancock. A total of two alfonsins, were caught while fishing the summit flats. Although there were no sharks visible at the surface, some of the catches were lost to what appear to be shark attacks.
- D. Exploratory night-lighting for surface schooling armorhead.
- Three hours were devoted to nightlight fishing on the seamount. In addition to the usual population of sharks and schooling mackerel, a pod of porpoise was observed swimming around at the edge of the light. No armorhead were seen or caught at the surface.
- E. Conduct hydro-acoustic survey over the seamount.
- Three surveys were completed in one operation at twilight. Each survey consisted of four predefined tracks over the summit and extended to about 550 m depth. Vertical longlining was conducted over the summit between surveys.
- F. Miscellaneous observations and activities.
1. Occurrence of Birds, Aquatic Mammals, and Fish Log was maintained by ship's officers and crew during the cruise.
 2. Standard weather observations were made every hour and synoptic weather at 000, 0600, 1200, and 1800 (GMT) by the ship's officers and crew.
 3. While in transit, XBT casts were made at 0000, 0600, 1200, and 1800 (GMT) as part of the Shipboard Environmental (Data) Acquisition System (SEAS), project.
 4. A total of 10 pairs of armorhead otoliths were removed from the most recent recruits which were in the intermediate body condition phase. Twenty-three pairs of eyeballs were removed and preserved in Bouin's solution for later laboratory analysis on differential retina development relative to body condition. Examination of previous catch data has indicated that armorhead are visual feeders, and leaner armorhead tend to occur at deeper depths. Consequently, adaptive physiological changes in the eyes could be occurring relative to body fat.

5. No new armorhead recruits appeared at SE Hancock. Population was comprised of intermediate and lean body types. In contrast to last year's high catches of pelagic sub-adults in drifting gillnet fishery in the North Pacific, high recruitment of armorhead at the Hancock seamounts did not occur.

6. Three derelict fish nets and other marine litter were recovered during the cruise. Monofilament net and tangled polypropylene ropes were taken on board for land disposal. Record of shipboard observations of derelict fish nets and disablement of vessels by marine litter was in compliance with Pacific Marine Center Operations Order 1.2.2 and will be forwarded to Platforms of Opportunity Program, Seattle, Washington by the ship's field operations officer.

7. The current structure in the upper 200 m of the water column was continuously monitored and recorded. During the cruise, concurrent evaluation of the current structure from the ADCP video output showed weak water flow (less than 20 cm/s) in the southwestern direction over SE Hancock.

8. Surface temperature at SE Hancock was very high with an average of about 27.4°C. Summit depth temperature during the first week was normal at about 15.5°C; however, temperature increased to 16.4°C by the second week.

**SCIENTIFIC
PERSONNEL:**

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Attachment

