

Review and Present Status of Handline and Bottom Longline Fisheries for Alfonsin

MICHAEL P. SEKI
DARRYL T. TAGAMI

Southwest Fisheries Center Honolulu Laboratory
National Marine Fisheries Service, NOAA
Honolulu, Hawaii 96822-2396

ABSTRACT

The pelagic armorhead, *Pseudopentaceros wheeleri*, and the alfonsin, *Beryx splendens*, are the principal target species in the central North Pacific seamount groundfish fishery. The present fishery, executed predominantly by the Japanese, uses bottom trawls to harvest the resource, although in the past a hook-and-line fishery was also active at the seamounts primarily targeting the more valuable alfonsin.

The beginning of the Japanese hook-and-line fishery for alfonsin dates back to 1875, when vessels restricted operations to nearby fishing grounds off Chiba Prefecture and Shimoda. The fishery has since grown and now includes vessels over 100 tons which operate in waters near the Nansei Islands and the Zunan area. The fishing ground around Midway, which was also fished by hook-and-line boats, has been abandoned in recent years.

Since 1976, the Southwest Fisheries Center Honolulu Laboratory has conducted limited exploratory resource surveys at the seamounts of the southern Emperor-northern Hawaiian Ridge, with emphasis at Hancock Seamounts. Vertical handlines were used to assess the resources of the seamount slopes and other untrawlable areas. Pelagic armorhead dominated the handline catch, and alfonsin, dogfish, *Squalus* sp., and medai, *Hyperoglyphe japonica*, were the most abundant of the other species taken. The surveys indicated that the alfonsin caught on the slopes with handlines were larger than those taken on the summit by trawling. For pelagic armorhead, the sizes of handline- and trawl-caught fish were similar.

Test marketing of four species of frozen seamount groundfishes through the Honolulu fish auction and retail outlets indicated that product promotion would be necessary to develop a commercially feasible domestic fishery for the various species.

INTRODUCTION

The central North Pacific seamount groundfish fishery exploits a complex of species, principally the pelagic armorhead or kusakari tsubodai, *Pseudopentaceros wheeleri*, and the alfonsin or kinmedai, *Beryx splendens*. Since 1969, the major effort expended at the seamounts by the Japanese and the Soviets to exploit the resource has involved trawling. Although alfonsin represents the second species of importance in the seamount trawl fishery, it constitutes only a small percentage of the catch and is considered an incidental species (Humphreys et al. 1984). Furthermore, due to the rough and steep topography of the summits and slopes, many of the seamount areas inhabited by alfonsin are untrawlable even with modern techniques and gear. Vertical handlines and bottom longlines can fish in areas inaccessible to trawlers and have thus been the main fishing methods for alfonsin (Masuzawa et al. 1975; Sasaki 1978). This report reviews the available information, and presents the status of current research activity, on the hook-and-line fisheries for alfonsin.

TARGET SPECIES

Fishes of the genus *Beryx* (Fig. 1) are valued as food in Tokyo and neighboring prefectures. The most common and valued of the *Beryx* species is the alfonsin, *B. splendens*. This bright red fish which inhabits rocky bottom several hundred meters deep is the primary target species in the seamount bottom longline and handline fisheries (Abe 1969; Uchida and Tagami 1984). The Pacific distribution of this species includes the central North Pacific seamounts (from Koko Seamount to Seamount 11 within the southern Emperor-northern Hawaiian Ridge (SE-NHR)) and in the South Pacific along the Lau (South Fiji) Ridge (Sasaki 1978; Humphreys et al. 1984). In the western Pacific where the largest alfonsin fishery exists, its distribution includes Sagami Bay and Kashima Nada, the Izu Islands, the Kinan Seamounts, and the Kyushu-Palau Ridge (Chikuni 1971; Sasaki 1978). The optimum temperature range for alfonsin is reported to be 6° to 18°C (Onishi and Sato 1970).

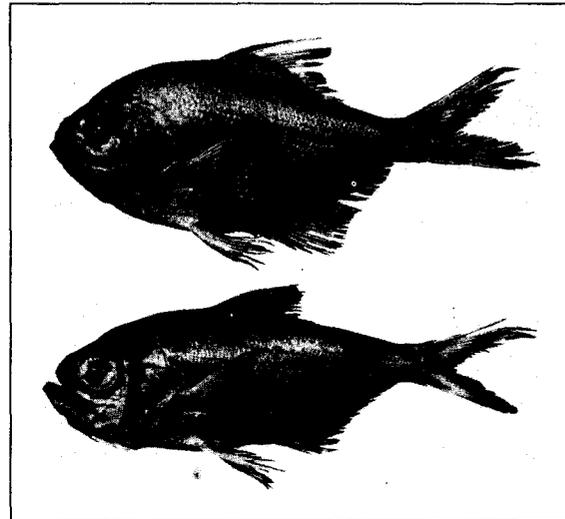


Figure 1.—Specimens of alfonsin, genus *Beryx*. Upper specimen is *B. decadactylus* and the lower specimen, *B. splendens*.

The broad alfonsin or nanyokinme, *B. decadactylus*, is also bright red and appears to inhabit areas similar to those inhabited by *B. splendens*. This species has often been taken with *B. splendens* but in much smaller numbers. *Beryx decadactylus* can be distinguished from *B. splendens* by its deeper body, larger, rougher scales, and prominent preorbital spine (Uchida and Uchiyama 1986). The Pacific distribution of this species also includes the seamounts within the SE-NHR; however, unlike *B. splendens*, *B. decadactylus* can also be found farther south throughout the Hawaiian Archipelago. In Japanese waters, the broad alfonsin has been captured from Sagami and Suruga Bays, the Sea of Japan from Wonsan to Pusan, and the Kyushu-Palau Ridge. In the South Pacific, the broad alfonsin is known from the Campbell (New Zealand) Plateau (Busakhin 1982; Okamura et al. 1982).

A third congener, *B. mollis*, was captured by hook-and-line fishermen in Sagami Bay. Known in Japan as fusenkinme, it is considered a rare species. At present, the distribution of *B. mollis* is apparently limited to the waters of Sagami Bay (Abe 1959; Busakhin 1982).

In addition to the alfonsin, other less valuable species caught in the bottom longline and handline fishery are *Hyperoglyphe japonica* (medai), *Paracaesio caeruleus* (aodai), *Erelepis zonifer* (abura-boozu), *Helicolenus hilgendorfi* (yumekasago), *Sebastes* sp. (akodai), and *Epinephelus* sp. (kue) (Masuzawa et al. 1975; Suisan Sekai 1976; Sasaki 1978).

THE FISHERY

The hook-and-line fishery for alfonsin, primarily in the area from Sagami Bay to the Izu Islands, has existed in Japan for many years. Although the history of the fishery is not well-known, it appears that around 1875, vessels from Misaki fished for alfonsin, medai, and mutsu, *Scombrops boops*, off Chiba Prefecture and Shimoda. Around 1915-16, the fishery expanded to the Izu Islands area as more of the vessels became powered by engines. By the 1970's, over 1,400 boats were participating to some degree in the ground-fish fishery, although not all the vessels targeted alfonsin (Masuzawa et al. 1975). Annual landings of alfonsin alone exceeded 1,000 metric tons (MT) in Tokyo and neighboring prefectures (Abe 1969).

The size of vessels in the Japanese fishery varies from under 5 tons to over 100 tons. The small vessels fish mainly just offshore from their home ports whereas the large vessels fish near the Nansei Islands and the Zunan area. Some of the large, 20- to 100-ton vessels have operated in the Midway area of the SE-NHR, usually targeting alfonsin (Masuzawa et al. 1975).

Although the alfonsin resource on the central North Pacific seamounts had been discovered by Soviet trawlers in 1967 (Sakiura 1972), it was not until around 1973 that the Japanese initiated fishing for alfonsin with hook and line at Milwaukee Seamounts (Masuzawa et al. 1975). Since that time, vessels from Korea and Taiwan have joined the fishery (Suisan Sekai 1976; [Hawaii.] Department of Land and Natural Resources 1979). In 1975, the Japanese hook-and-line fishery in the SE-NHR took about 4,000 MT of groundfish, of which about 500 MT were caught within the 200-mile U.S. Fishery Conservation Zone (FCZ) and also harvested about 500-600 MT of alfonsin and other groundfishes off Guam and the Northern Mariana Islands (Federal Register 1977). Little else, however, is known about the activity of vessels in this "open fishery" which does not require permits or licenses (Sasaki 1978).

In 1977, the National Oceanic and Atmospheric Administration (NOAA), Department of Commerce, put into effect a Preliminary

Fishery Management Plan to regulate foreign fishing for groundfishes at the seamounts, specifically the Hancock Seamounts within the FCZ. Since then, foreign fishing for seamount groundfishes has been exclusively conducted by trawling, and hook-and-line operations for alfonsin around Midway have ceased.

UNITED STATES RESEARCH

From 1976 to 1981, the Southwest Fisheries Center (SWFC) Honolulu Laboratory, National Marine Fisheries Service (NMFS), participated in a cooperative investigation of the marine resources of the Northwestern Hawaiian Islands (NWHI) (Fig. 2). Within the scope of the NWHI studies, limited surveys of the fishery resources of the seamounts within the Hawaiian Archipelago, particularly at Hancock Seamounts, were conducted. The SWFC has since initiated a program to further survey the seamount resources of the SE-NHR, including Koko, Kammu, Colahan, Hancock, and Seamount 11.

Methods

One of the principal fishing methods employed by the SWFC to assess the distribution and abundance of seamount species was the vertical handline which in general was similar to the Hawaiian deep-sea handline gear described by Uchida and Uchiyama (1986). Usually, hydraulic powered gurdies were employed to haul in the line, but in some early cruises hand retrieval or electric reels (gurdies) were used. The gurdies spooled approximately 1,100 m of 118-kg test, hard-braided nylon line attached to a terminal rig consisting of a drop line (about 1.5 m long, 113-kg test monofilament leader) separated by three-way swivels, hook lines (about 0.5 m long, 13.6-kg test monofilament leader), recurved "circle" hooks, and a 1.4- to 2.3-kg lead weight (Fig. 3). The size of hook varied depending on the target species. For alfonsin, we normally used No. 18 to 22 hooks, although some large fish were taken on No. 28 to 30 hooks. The number of hooks per line varied from 5 to 20 but was normally 10 to 12, each usually baited with stripped squid. Fishing was done day and night while the vessel drifted over banks 146-640 m (80-350 fathoms) deep.

Results and discussion

The major effort to sample groundfishes with handlines was concentrated at Southeast (SE) and Northwest (NW) Hancock Seamounts and Seamount 11. At SE and NW Hancock (total effort was 1,059.0 and 1,278.6 hook-h, respectively) pelagic armorhead dominated the catch, constituting 59.2% of the total fishes caught at SE Hancock and 75.4% taken at NW Hancock (Table 1). Alfonsin comprised 5.8 and 12.2% of the fishes taken at SE and NW Hancock, respectively. The greatest depth of capture was about 640 m for alfonsin and about 510 m for pelagic armorhead. Major incidental species of commercial value were *Hozukius guyotensis* and *Helicolenus avius*, which are fishes closely related to the akodai and the yumekasago, dogfish, *Squalus* sp., and medai.

At Seamount 11, 437.0 hook-h of handlining were conducted; dogfish (48.2%), alfonsin (21.1%), and pelagic armorhead (12.3%) comprised the majority of the catch. The grouper, *Epinephelus quernus*, was also taken here which reflects a transition of ichthyofauna from the armorhead-alfonsin complex characteristic of the SE-NHR seamounts to the tropical snapper-grouper complex that characterizes