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SECOND RECORD OF THE KAWAKAWA, *EUTHYNNUS AFFINIS*, FROM THE EASTERN PACIFIC OCEAN

Although the kawakawa, *Euthynnus affinis* (Cantor 1849), is widely distributed throughout the warm waters of the Indo-West Pacific (Yoshida 1979), it is replaced by the black skipjack, *E. lineatus* Kishinouye, in the eastern Pacific. There is only one previous record of *E. affinis* in the eastern Pacific. That specimen, 361 mm fork length (FL), was reported from Los Angeles Harbor, CA, in 1952 (Fitch 1953). The second documented occurrence of *E. affinis* from the waters of the eastern Pacific is recorded in this note.

The specimen, *E. affinis*, 920 mm FL and 13.15 kg, was caught by Ronald Nakamura using hook and line from the long-range San Diego-based sport-fishing boat, *Royal Polaris*, on 17 December 1986, off Clarion Island (lat. 18°22'N, long. 114°44'W) in the Revillagigedo group. The specimen has been deposited in the Scripps Institution of Oceanography fish collection (SIO 87-70).

The morphometric and meristic characters for the specimen are given in Table. 1. The measurements were taken according to the methods of Godsil and Byers (1944) and Gibbs and Collette (1967). The external characters of this specimen agree with Godsil's (1954a) description of the species. The wavy oblique markings on each side of the dorsal surface, no dip in the lateral line below the second dorsal fin, and the several black to gray spots scattered over a relatively wide area between the pectoral and pelvic fins are characteristic of most specimens of this species. Furthermore, the morphometrics for this specimen are within the ranges for those body proportions reported by Godsil (1954b) and are closer to the morphometrics for *E. affinis* from Hawaii, rather than from Japan.

The internal characters also appear to agree with Godsil's (1954a) description of the species. High-quality radiographs produced by computer-assisted tomography (C.A.T.) scanning equipment were utilized for examing skeletal characters. The vertebral count is 20 + 19 = 39, and the radiographs showed no bony protuberances on any of the caudal vertebrae. However, no vomerine teeth were present. Although there was no indication of their previous presence, their absence could be explained by wear in this presumably old specimen. Nevertheless, the primary characters distinctive of *E. affinis*, 39 vertebrae, the total gill raker count of 31, and the absence of bony protuberances on the caudal vertebrae, leave no doubt on the identity of this specimen.

The occurrence of *E. affinis*, as well as the first documented occurrence of this specimen in the eastern Pacific, should be considered extremely rare events. No specimens of *E. affinis* were noted, during 1980-82 while personally examining a few thousand specimens of *E. lineatus* landed by commercial tuna vessels operating in the eastern Pacific. One of the remarkable fea-

TABLE 1.—Summary of morphometric and meristic data. The measurements are in millimeters.

Character	Measurements (mm)
Fork length	920
Head length	263
Snout-first dorsal	301
Snout-second dorsal	552
Snout-anal	590
Snout-ventral	291
Max. body depth	232
Max. body width	156
First dorsal-ventral	225
First dorsal-anal	385
Ventral-vent	310
Base first dorsal	238
Base second dorsal	72
Base anal	61
Pectoral length	138
Anal length	65
Diameter of iris	29
Maxilla length	97
Snout-posterior of eye	106
	Counts
Dorsal spines	15
Second dorsal rays	13
Dorsal finlets	8
Anal rays	14
Anal finlets	7
Pectoral rays	26
Gill rakers	8 + 1 + 22 = 31

tures of *E. affinis* is its extremely large size, particularly its weight of 13.15 kg, as this specimen represents the heaviest *E. affinis* documented. The previous documented record of maximum size for *E. affinis* was 11.79 kg based upon a specimen captured in Merimbula, NSW, Australia in 1980 (Anonymous 1986).

It is interesting that the maximum size records established for the black skipjack, *E. lineatus*, and the yellowfin tuna, *Thunnus albacares*, are based upon sport-caught specimens from the Revillagigedo group of islands. The fact that many species tend to be longer lived and reach maximum sizes in the northern latitudinal ranges of their distributions, apparently pertains to the aforementioned species of tunas, as well. In the case of this record specimen of *E. affinis*, although found outside its normal geographical distribution, the maximum size was attained in this same region of the Pacific Ocean.

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CONTRIBUTION TO THE LIFE HISTORY AND REPRODUCTIVE BIOLOGY OF GAG, *MYCTEROPERCA MICROLEPIS* (SERRANIDAE), IN THE SOUTH ATLANTIC BIGHT[1]

The gag, *Myceteroperca microlepis*, is a demersal serranid found along the southeastern coast of the United States and in the Gulf of Mexico (Smith 1971; Fischer 1978). Throughout its range the gag is of both commercial and recreational importance. Because of its relatively slow growth rate (Manooch and Haimovici 1978) and desirability, overfishing is of wide concern.

The gag is a protogynous hermaphrodite, and McErlean and Smith (1964) suggested that sexual transformation occurs during the 10th or 11th year. Spawning occurs from January to March off the west coast of Florida (McErlean 1963), and the maximum reported age is 13 years in both the Gulf of Mexico (McErlean 1963) and the South Atlantic Bight (SAB) (Manooch and Haimovici 1978). Microscopic examination of the gonads is necessary for definite sexual identification, but gonad morphology has not been specifically described. The purpose of this study is to provide new information on the age, growth, and reproductive biology of this important species, including a description of the morphology of gag ovaries and testes.

Methods

Most samples were obtained from the commercial hook and line fishery, and others were collected on research cruises aboard the RV *Dolphin*, RV *Oregon*, and RV *Lady Lisa* from 1976 to 1982. Specimens were measured (total and standard lengths), weighed, and sagittae removed from the otic capsule through the branchial chamber. Otoliths were stored dry and later viewed in a dish of cedar wood oil with reflected light over a dark background using a binocular microscope. Since opaque bands in larger otoliths were thin and often too crowded near the edge to permit accurate counting, cross sections (approximately 0.5 mm thick) were made on the dorsoventral plane of the otoliths through the center with a diamond dicing wheel mounted on an ISOMET[2] low speed saw. Sectioned otoliths were viewed in

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[2]Reference to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.