

Stolephorus pacificus, a New Species of Tropical Anchovy (Engraulidae) from the Western Pacific Ocean¹

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Abstract—A new species of tropical anchovy, *Stolephorus pacificus*, is described and figured from 44 specimens collected from Guam and Kosrae (Kusaie). Included is a list of the currently recognized species and their known distributions plus comments regarding the separation of this species from other *Stolephorus* anchovies.

Introduction

Tropical anchovies of the genus *Stolephorus* have been traditionally utilized as live bait in pole-and-line fishing for skipjack tuna. They are also of considerable importance as forage fish for many commercial, subsistence, and recreational fishes. During recent investigations on baitfishes it became apparent an undescribed species existed in the western Pacific. The correct identification of baitfishes and continuing studies on their biology will hopefully provide essential data for implementing improved strategies relating to resource management and commercial utilization. Specimens of *S. pacificus* were collected in Guam and Kosrae and it is likely this species occurs in other island areas of Micronesia.

Materials and Methods

The counts and measurements were made with the aid of a binocular microscope. Measurements are straight line measurements taken with dial calipers and are expressed as thousands of standard length (SL). The value for the holotype is given first in parenthesis followed by the range in values for the paratypes. The dorsal and anal fin ray counts include rudimentary rays and only the principal caudal rays were counted. Scale counts were taken from the longitudinal series immediately above the silvery lateral stripe. Because the scales are deciduous and usually lacking, scale pockets were counted in place of the missing scales. Maxillary length was measured from the snout tip to the posterior extremity of the maxillary. Preopercle and opercle widths were measured on a perpendicular to the anterior preopercular margin at the level of the lower border of the eye. The vertebral count included the urostyle and was taken from one alizarin stained specimen as was the branchiostegal ray count.

¹ HIMB Contribution No. 682.
Micronesica 19(1-2): 151-156, 1983 (December).

The holotype and 12 paratypes were deposited in the Bernice P. Bishop Museum (BPBM), Honolulu, Hawaii, and the remaining paratypes deposited in the fish collection of the University of Guam (UG), the British Museum (Natural History) (BMNH), and in the U. S. National Museum of Natural History (USNM).

Stolephorus pacificus new species

Fig. 1

HOLOTYPE: BPBM 28190, male, 56.5 mm SL, Acfayan Bay, Guam, January 14, 1970.

PARATYPES: BPBM 28191, 10(29.0–56.7), same data as the holotype; BPBM 25405, 1(76.7), Talofofu Bay, Guam, March 14, 1948; BPBM 28782, 1(29.9), Coquille Harbor, Kosrae (Kusaie), June 25, 1971; UG 6385, 10(49.9–60.0) and BMNH 1983.2.3:1–4, 4(51.0–55.1), Acfayan Bay, Guam, June 18, 1970; UG 6387, 7(25.7–56.1), Acfayan Bay, Guam, November 12, 1971; USNM 263476 10(50.2–62.7), Talofofu Bay, Guam, 13 March, 1948.

Body depth at dorsal-fin origin (212) 169–234; caudal peduncle depth (106) 088–117; body width (103) 078–103; head length (250) 229–268; postorbital head length (138) 117–164; snout length (055) 047–064; eye diameter (071) 063–078; snout tip to dorsal origin (540) 505–580; snout tip to anal origin (628) 564–654; interorbital width (062) 052–070; maxillary length (202) 143–208; pectoral-fin length (177) 152–188; pelvic-fin length (117) 104–140; dorsal fin base length (161) 149–189; anal-fin base length (241) 189–242; width of silvery lateral stripe (066) 040–066.

Number of predorsal scales (19) 17–20; longitudinal scale rows (37) 36–38; transverse scale rows (9) 8–9; ventral scutes (4) 0–4; gill rakers (24+36)

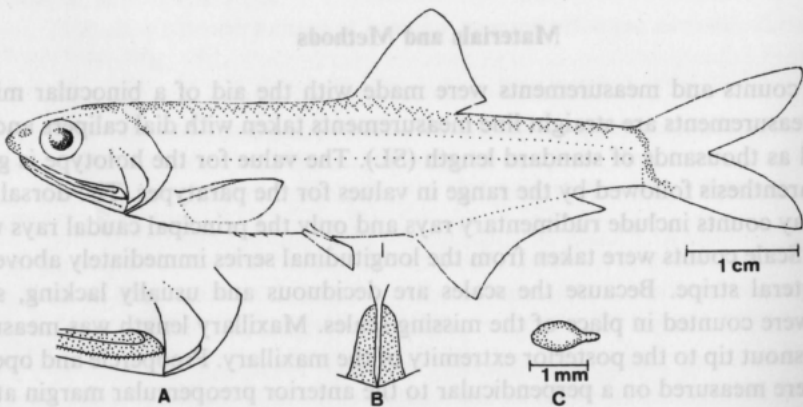


Fig. 1. *Stolephorus pacificus*, n. sp., holotype, BPBM 28190, 56.5 mm SL, collected from Acfayan Bay, Guam, January 14, 1970. A, posterior end of the maxillary (stippled) showing its relationship to the anterior preopercular margin. B, posterior frontal fontanelles. C, ovarian egg removed from a 67.7 mm SL gravid female.

21–27 + 33–38, total (60) 54–64; dorsal-fin rays (16) 15–17; anal-fin rays (22) 19–22; pectoral-fin rays (13) 12–15; pelvic-fin rays (7) 6–7; caudal-fin rays (19) 19–20; branchiostegal rays 11, vertebrae 39.

Body laterally compressed, slender, its greatest width twice in depth of body at dorsal-fin origin, and about equal to depth of caudal peduncle. The dorsal and ventral profile of body anterior to pectoral fin evenly convex with the ventral curvature somewhat more convex. Head moderately long, length one eye diameter greater than body depth and 3.6–4.1 in SL. Preopercle narrow, its width about 1/2 to 2/3 opercle width. Interorbital convex, its width equal to snout length, with a prominent, median bony ridge from snout to occiput. Posterior frontal fontanelles narrowly sigmoid in shape with the central portion of the lateral border relatively straight (Fig. 1B). Snout short, evenly rounded and moderately pointed, its length equal to or slightly less than diameter of eye, 4.5–5.2 into head length. In juvenile specimens less than 30.0 mm SL the snout is slightly shorter and more bluntly pointed than larger specimens. Mouth inferior with the lower jaw extending forward to a point midway between anterior margin of eye and tip of snout. Maxillary moderately long and slender, reaching posteriorly to the anterior margin of the preopercle (Fig. 1A). The posterior tip convex above, bluntly pointed, with ventral margin curved upward near tip. Tip of maxillary becoming more truncate in specimens 30.0 mm SL or less, not reaching anterior preopercular margin. Maxillary length 4.9–5.0 in SL, about equal to body depth. Teeth on maxillary small, evenly spaced, mostly uniform in size but smaller anteriorly. Gill rakers long, slender, flattened, and with a row of 10–20 fine spinules along interior margin. Length of longest raker at angle of first gill arch equal to or slightly less than snout length and 0.5–0.8 in eye diameter. Pseudobranch well developed with about 15 gill filaments. Muscular portion of isthmus extending forward to margin of branchiostegal membrane, without a ventral expansion on urohyal. Branchiostegal membrane free from isthmus. Eye round, diameter 3.2–3.8 into head length and slightly less than width of body. Dorsal-fin origin one eye diameter closer to upper base of caudal fin than to snout tip. Dorsal-fin base length 5.9–6.4 in SL, with length of longest ray slightly greater than fin base. Anal fin origin below middle third of dorsal-fin base distance from snout tip to anal origin 1.5–1.7 in SL. Anal fin base length slightly greater than body depth. Longest anal rays slightly less than longest dorsal rays and equal in length to longest pectoral-fin ray. Base of pelvic fin one eye diameter anterior to dorsal fin and with its length 0.8 into post-orbital length of head. Axillary scale at base of pelvic fin extending back nearly to tip of fin. Base of pectoral fin midway between snout tip and anus. Pectoral fin length 3.4 in distance from snout tip to dorsal origin and 1.3–1.7 into head length. Axillary scale at upper pectoral base not reaching fin tip by 0.5 eye diameter. Distance from tip of pectoral fin to pelvic-fin base about 0.5 eye diameter. Caudal fin deeply forked, its longest rays equal to head length. Scales thin, cycloid, deciduous, with 4–5 dorsoventral grooves. Scale margins smooth, not crenulate. Eggs removed from ovary of a 67.7 mm SL female (BPBM 25405) are elliptical in shape with a prominent elongate knob at one end (Fig. 1C). Major axis of egg 1.1 mm.

Body straw colored in preserved material with a faint silvery lateral stripe running along upper side of body from head to caudal peduncle. Dorsal and ventral margins of lateral stripe not sharply demarcated and lacking dark pigmentation. An imbricate pattern of pigmentation on upper body from head to base of caudal fin with some scattered pigment on nape extending about four scales posteriorly from occiput. Scattered dark pigment on snout tip and lower jaw tip. Bases of dorsal and anal fins each with a row of small pigment spots running length of fin base. A narrow dark line of pigment on underside of caudal peduncle from anal fin to caudal-fin base. Caudal fin light dusky with a vertically elongate band of pigment at base of fin. Pectoral, pelvic, and anal fins without pigmentation. Scattered dark pigment frequently present on inside of upper pectoral rays in larger specimens. Peritoneum light dusky with at most widely scattered dark pigment.

DIAGNOSIS: A *Stolephorus* having the anal-fin origin below the central third of the dorsal-fin base; dorsal-fin origin one eye diameter closer to upper base of caudal fin than to snout tip; maxillary extending back to, but not beyond, anterior margin of preoperculum, without enlarged recurved teeth near tip (Fig. 1A); ventral scutes four or less; silvery lateral stripe without a sharp demarcation of the dorsal and ventral margins; posterior frontal fontanelles narrowly sigmoid (Fig. 1B); 33 or more gill rakers on lower limb of first gill arch; muscular portion of isthmus extending forward to margin of branchiostegal membrane and without a shield-like expansion on the urohyal; eggs elliptical with an elongate knob at one end (Fig. 1C).

Discussion

Six of the 43 *S. pacificus* paratypes, BPBM 28191, 1(29.0) and UG 6387, 5(25.7–30.1), are smaller and have a shorter maxillary approaching a more truncate shape than the remaining 37 paratypes (34.5–67.7) and the holotype. The length of the maxillary of these six juveniles ranged in thousands from 143–176 as opposed to 180–208 in the larger specimens. Although this morphological difference was noted between the two size groups the meristics remained quite constant in all sizes. Frequently specimens of *Stolephorus* 30 mm SL or less are often difficult or impossible to identify with any degree of accuracy without comparative material on hand. Juvenile *S. pacificus* can be separated from other juvenile *Stolephorus* spp. by the number of ventral scutes plus the high number of gill rakers on the lower limb of the first gill arch.

With the addition of *S. pacificus* and five new species described by Wongratana (1983) there are now 20 recognized forms of *Stolephorus* anchovies. The currently accepted name for each species is listed below along with the eastern and western limits of their known range.

- A. Species not recorded from the tropical Pacific Ocean
 - S. andhraensis* Rao. Singapore—east coast of India
 - S. chinensis* Günther. Amoy, China—Singapore

- S. dubiosus* Wongratana. Gulf of Thailand—Bay of Bengal
S. holodon (Boulenger). South Africa.
- B. Species recorded from the tropical Pacific Ocean
1. Species having the anal-fin origin below or posterior to the last dorsal fin ray and with a short muscular portion of the isthmus not extending forward to the margin of the branchiostegal membrane.
 - S. devisi* (Whitley). Fiji—Gulf of Aden
 - S. heterolobus* (Rüppell). American Samoa—East Africa
 - S. oligobranchus* Wongratana. Fiji—Philippines
 - S. punctifer* (Fowler). Hawaii—East Africa
 - S. purpureus* Fowler. Hawaii
 2. Species having the anal-fin origin below or anterior to the central third of the dorsal fin base and with a longer muscular portion of the isthmus extending forward to the branchiostegal membrane.
 - S. apiensis* (Jordan & Seale). Western Samoa—Ponape
 - S. brachycephalus* Wongratana. Papua New Guinea
 - S. commersonii* Lacépède. Solomon Islands—East Africa
 - S. indicus* (Van Hasslet). Samoa—East Africa
 - S. insularis* Hardenberg. Fiji—east coast of India
 - S. macrops* Hardenberg. Hong Kong—Gulf of Aden?
 - S. pacificus* n. sp. Kosrae—Guam
 - S. ronquilloi* Wongratana. Philippines
 - S. tri* (Bleeker). Papua New Guinea—India
 - S. tysoni* Wongratana. Papua New Guinea
 - S. waitei* Jordan & Seale. North Australia

In existing *Stolephorus* keys (Weber & DeBeaufort, 1913; Hardenberg, 1934; Rao, 1966; Whitehead, 1967; Ronquillo, 1968; Lewis *et al.*, 1974; Dalzell & Wankowski, 1980) *S. pacificus* will invariably key out to *S. indicus* which it closely resembles. *S. indicus* differs from *S. pacificus* by having 19–20 anal rays, 20–26 gill rakers on the lower limb, 20–24 predorsal scales on the midline of the back, and with the posterior frontal fontanelles more narrow with relatively straight margins.

The prime characters that separate *S. pacificus* from all known species of *Stolephorus* anchovies are the high number of gill rakers plus the short, bluntly pointed maxillary reaching posteriorly to, but not beyond, the anterior margin of the preoperculum. Other useful characters are given in the diagnosis.

ACKNOWLEDGMENTS

I would like to thank the following individuals for the loan of specimens: Robert Myers, Division of Aquatic & Wildlife Resources, and University of Guam; Arnold Suzumoto, B. P. Bishop Museum; and Richard Shomura, National Marine Fisheries Service. I would like to acknowledge the generous help of Dr. P. J. P. Whitehead, British Museum (Natural History), for his advice regarding this

new species.

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