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Ammodytoides kimurai, a New Species of Sand Lance (Ammodytidae) from the Ogasawara Islands

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Abstract An ammodytid fish, *Ammodytoides kimurai*, is described from six specimens collected in 15 m in the Ogasawara Islands. It is distinctive in having 48-49 dorsal fin rays, 23-24 anal fin rays, 14-15 pectoral fin rays, 104-110 lateral-line scales, no small scales dorsally on opercle, 6+21-23 gill rakers, 59-61 vertebrae, the suborbital sensory canal interrupted, and dark pigment centrally on the caudal fin.

While conducting field work on fishes in the Ogasawara Islands in July 1991, the authors asked Johnson Kimura of the Ogasawara Fisheries Center on Chichi-jima if he knew a broad area of sand substratum exposed to current at a depth greater than 10 m where we might find ammodytid fishes (popularly called sand lances). He took us to such an area off Minami-shima, a small island to the south of Chichi-jima where the sea is 15 m deep, very clear, with an extensive area of clean white sand. After some intial searching, we discovered a very large school of an ammodytid fish, each individual about 130-140 mm in total length. The fish were first seen in an aggregation 2 m or more off the bottom, feeding on zooplankton. As we approached, they descended in the water column, formed a compact school, and swam rapidly away from us. With the assistance of two fellow divers, John L. Earle and Hiroaki Terashima, attempts were made to herd the school toward the junior author who then tried to spear the fish with a small multiprong Hawaiian sling spear. Unfortunately, the fish were always too far away for the range of the meter-long spear. Further attempts were made to collect the fish from directly above, knowing the spear would travel farther and with more speed if shot downward. After many unsuccessful shots, one fish was finally speared. It was transferred underwater to the senior author who placed it in a double plastic bag for transport to the vessel above. To our consternation, the fish punched its way through both bags escaped. Due to increasing current, further collecting effort ceased.

It was not until June of the following year that we were able to try again to collect the ammodytid off Minami-shima. This time we had prepared longer multiprong spears with more range, and our assistant divers were Richard Pyle and Hiromi Terashima. The senior author and Pyle succeded in spearing six specimens.

Examinations of the six specimens revealed an undescribed species of the genus *Ammodytoides* Duncker and Mohr (1939). The purpose of this paper is to describe this species. The basis for placement in the genus *Ammodytoides* is discussed below.

Materials and Methods

Type specimens of the new species have been deposited in the Bernice P. Bishop Museum, Honolulu (BPBM); School of Fisheries, Kitasato University, Iwate Prefecture (FSKU); National Science Museum of Tokyo (NSMT); and the U.S. National Museum of Natural History, Washington, D. C. (USNM).

The length record for the type specimen is standard length (SL), measured from the anteriormost margin of the upper lip to the midbase of the caudal fin (end of hypural plate). Body depth is the maximum depth from the base of the dorsal fin to the ventralmost edge of the abdomen. Body width is the greatest width. Head length is taken from the anteriormost margin of the upper lip to the posterior margin of the opercular membrane. Orbit diameter is the maximum fleshy diameter (measured to edges

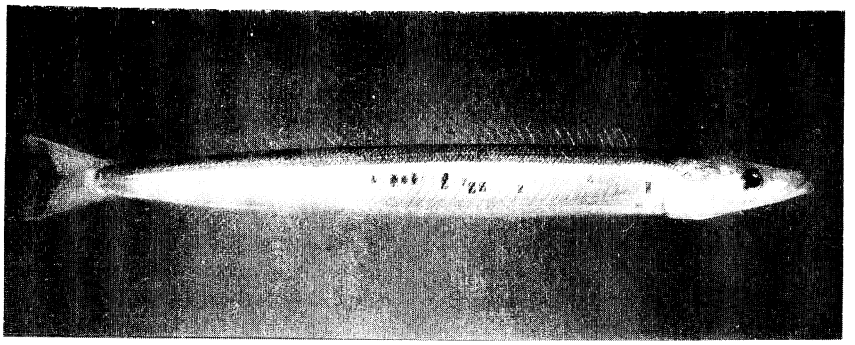

Fig. 1. Holotype of *Ammodytoides kimurai* sp. nov., NSMT-P 50708, 100.8 mm SL, Ogasawara Islands, off Minami-shima, sand, 15 m, speared.

of the adipose eyelid); interorbital width is the least fleshy width. Caudal peduncle depth is the least depth, and caudal peduncle length is the horizontal distance between verticals at the rear base of the anal fin and the caudal-fin base. Length of fin rays are measured to their extreme bases. Caudal-fin length is measured horizontally from the caudal fin base to a vertical at the tip of the longest caudal-fin lobe; caudal concavity is the horizontal distance between verticals at the tips of the longest and shortest caudal-fin rays. Gill-raker counts include rudiments; the raker at the angle is contained in the lower-limb count. Vertebral counts include the hypural plate.

Data in parentheses in the description refer to paratypes. Proportional measurements of the holotype and the five paratypes are given in Table 1; the paratypes are arranged in ascending order according to their length. Proportions in the text are expressed as follows: body depth and head length are divided into the standard length, body width into the depth, and the remaining measurements into the head length. The ratios are rounded to the nearest 0.05.

Ammodytoides kimurai sp. nov.
(Figs. 1, 2; Table 1)
(New Japanese name: Minami-ikanago)

Holotype. NSMT-P 50708, 100.8 mm, Ogasawara Islands, off Minami-shima, sand, 15 m, spear, H. Ida and R. L. Pyle, 1 June 1992.

Paratypes. BPBM 35421, 114.0 mm; FSKU 920601, 3: 99.4–116.2 mm; USNM 324610, 120.6 mm, all collected with holotype.

Diagnosis. A species of *Ammodytoides* with dorsal-fin rays 48–49; anal-fin rays 23–24; pectoral-fin rays 14–15; lateral-line scales 104–109; no scale along upper edge of opercle; gill rakers 6+21–23; vertebrae 59–61; body depth 9.7–10 in SL; bluish gray dorsally, silvery white laterally and ventrally; dorsal part of head yellow in life; anterior two thirds of snout diffusely black in preservative; a series of small black spots at outer edge of dorsal fin; middle of caudal-fin lobes dusky, the rest whitish.

Description. Dorsal-fin rays 48 (48–49), the first two rays unbranched; anal-fin rays 23 (23–24), the first three rays unbranched; pectoral-fin rays 14 (15), the upper two and lowermost unbranched; no pelvic fins; principal caudal-fin rays 8+7, the upper and lower unbranched; upper and lower procurrent caudal-fin rays 13 (13–14), the posterior three segmented; lateral-line scales 107 (104–109); scales above lateral line to origin of dorsal fin 2 1/2; scales below lateral line to origin of anal fin 15 1/2; gill rakers 6+21 (6+21–23), the total gill rakers 27–29; branchiostegal rays 7; vertebrae 33+26 (33–34+25–27), the total vertebrae 59–61; predorsal vertebrae 4; postdorsal vertebrae 12 (12–13); vertebrae posterior to anal fin 10; supraneural (predorsal) bones 2 (barely visible in X-ray photographs at tip of second and third neural spines); first two dorsal pterygiophores in space between fourth and fifth neural spines; neural and haemal spines of vertebrae of caudal peduncle expanded; a broad gap in suborbital series between the first and remaining bones.

Body elongate, without a longitudinal ventrolateral fold, depth 9.7 (9.8–10) in SL; body slightly compressed anteriorly, body width 1.25 (1.2–1.25) in

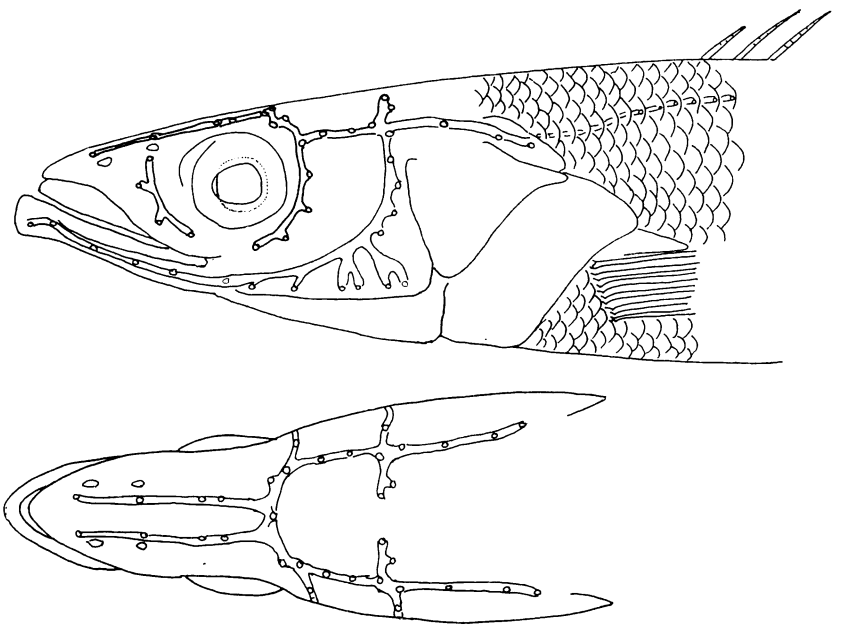

Fig. 2. Lateral and dorsal views of head of *Ammodytoides kimurai* sp. nov. Note the discontinuity in suborbital series of sensory canal and the absence of scales on the opercle.

Table 1. Proportional measurements of type specimens of *Ammodytoides kimurai* expressed in percent of the standard length

	Holotype	Paratypes				
	NSMT-P 50708	FSKU 920601	FSKU 920601	BPBM 35421	FSKU 920601	USNM 324610
Standard length (mm)	100.8	99.4	106.4	114.0	116.2	120.6
Body depth	10.3	10.0	10.1	10.1	10.2	10.1
Body width	8.1	8.4	8.4	8.1	8.1	8.4
Head length	22.8	22.2	22.6	23.1	23.6	23.3
Snout length	7.5	7.3	7.4	6.8	6.8	6.7
Orbit diameter	2.8	2.9	3.0	3.2	3.2	3.3
Interorbital space	4.5	4.6	4.6	4.4	4.6	4.1
Upper jaw length	7.9	7.8	7.6	7.6	7.8	7.6
Caudal peduncle depth	4.1	4.0	4.2	4.2	5.0	5.2
Caudal peduncle length	8.7	8.5	8.4	9.8	8.4	8.8
Predorsal length	23.7	24.2	23.6	23.1	23.3	23.5
Preanal length	63.4	62.6	61.3	63.2	64.6	65.3
First dorsal-fin ray	3.8	broken	3.3	3.0	3.3	3.4
Second dorsal-fin ray	4.0	4.3	4.0	4.5	4.4	5.1
Longest dorsal-fin ray	5.0	5.1	5.0	5.7	5.4	5.6
Last dorsal-fin ray	3.6	broken	3.9	3.6	4.0	3.2
First anal-fin ray	1.9	1.8	broken	2.0	2.1	2.5
Second anal-fin ray	5.0	broken	4.6	broken	broken	3.9
Third anal-fin ray	5.6	4.3	5.3	6.5	broken	6.5
Longest anal-fin ray	7.0	5.9	7.0	6.9	broken	6.6
Last anal-fin ray	2.9	broken	3.4	2.8	3.2	3.3
Caudal fin length	11.7	12.6	11.5	12.9	11.5	13.1
Caudal concavity	6.5	7.3	6.7	6.1	6.8	6.4
Pectoral fin length	9.4	9.1	9.1	9.5	9.2	9.2

depth, more compressed posteriorly, width at least depth of caudal peduncle about 2.0 in depth; head pointed (the protruding lower jaw forming the apex of the angle of the head); head length 4.4 (4.25–4.5) in SL; snout length 3.05 (3.05–3.5) in head; posterior part of adipose eyelid covering about two-third of iris; orbit diameter (to edges of adipose eyelid) 8.15 (7.1–7.7) in head; interorbital width 5.05 (4.8–5.7) in head; caudal peduncle depth 5.6 (4.5–5.6) in head; caudal peduncle length 2.6 (2.35–2.8) in head.

Lower jaw projecting, sharply pointed when viewed from above and slightly rounded from the side; maxilla narrowing posteriorly, reaching to below front edge of eye, the upper jaw length 2.9 (2.85–3.05) in head; premaxilla protrusible; mouth slightly oblique, forming an angle of about 20 to horizontal axis of body; no teeth in jaws or on palate; labial ossicles present (see Ida, 1973); lips thin, the upper continuous around front of snout, but the lower not, ending slightly posterior to tip of upper jaw; tongue short and broadly rounded; gill rakers long and slender, the longest at angle about equal to longest filament on first gill arch and nearly equal to diameter of eye measured from edges of adipose eyelid; pseudobranchial filaments of largest paratype 25.

Nostrils on upper side of snout anterior to dorsal third of eye half way between orbit and front of snout; both nostrils with a slight rim, the anterior slightly larger than posterior; internarial space about half diameter of eye to edges of adipose eyelid.

Gill opening broad, the dorsal end at level of upper edge of eye, the anterior end nearly reaching at vertical through center of eye; gill membranes free from isthmus; no spines on opercle; opercular flap broadly rounded, extending well postrerior to upper edge of pectoral-fin base; membranous free edge of preopercle forming an angle of about 80, the upper end in line with upper edge of eye, the ventral end to below center of eye.

Scales small, thin, cycloid and arranged in forming diagonal straight lines of anterodorsal-posteroventral direction (see Pietsh and Zabetian, 1990); head naked (no small scales along upper edge of opercle); scales on nape forming V-shaped pattern, the angle of the V increasingly acute anteriorly; predorsal scales about 12 (including the most anterior two that do not meet medially); lateral line with a short horizontal part anteriorly, then angling upward to below origin of dorsal fin, continuing along upper side parallel to dorsal contour of body, the tubed scales ending on caudal peduncle 6–8 scales before base of caudal fin; fins naked except for small pointed scales on caudal fin; lateralis system shown in Figure 2 (note the discontinuity in the suborbital series); pores of supratemporal canal 2; pores of supraorbital canal 2.

Origin of dorsal fin above thirteenth lateral-line scale and seventh vertebra; first dorsal-fin ray 6.0 (6.6–7.0) in head; dorsal-fin rays progressively longer to about the thirtieth, which is 4.55 (4.05–4.5) in head; last dorsal-fin ray 6.3 (5.9–7.3) in head, the base ending above the fiftieth vertebra; origin of anal fin below base of thirty-first or thirty-second dorsal-fin ray and second to third caudal vertebra; first anal-fin ray short, 12 (9.3–11.5) in head; fourth or fifth anal-fin ray longest, 3.25 (3.2–3.75) in head; last anal-fin ray 7.85 (6.7–8.25) in head, ending beneath eighteenth to nineteenth caudal vertebra; caudal fin forked, its length 1.95 (1.8–2.05) in head, the caudal concavity 3.5 (3.0–3.75) in head; pectoral fins low on body, their upper base at level of lower edge of orbit, the fourth or fifth rays longest, 2.45 (2.45–2.5) in head.

Color in alcohol.—Brown dorsally, shading to silvery white laterally and ventrally; anterior two-thirds of snout irregularly black (this pigment extending to posterior nostrils), the rest of snout and anterior interorbital space pale; fins pale except for a series of black spots at edge of dorsal fin, the first between third and fourth or fourth to fifth rays and streaky black zone in base and middle of lobes of caudal fin.

Color of holotype when fresh.—Bluish gray on back, shading to silvery white laterally and ventrally, with some blue iridescence; top of head yellow; fins pale except for a series of eight small black spots at outer edge of the dorsal and a black area at base and middle of caudal lobes.

Remarks. We name this species in honor of Johnson Kimura who assisted us in many ways in collecting and photographing fishes in the Ogasawara Islands.

We follow Ida et al. (MS) in classifying this species in the genus *Ammodytoides* Duncker and Mohr, 1939. The genus is characterized as follows: no pelvic fins; no skin fold along ventral side of body; no teeth; subocular canal interrupted below eye; caudal peduncle slender, its depth less than one-fourth head length; dorsal-fin rays 46–52; anal-fin rays 21–25; neural and haemal spines of posterior

caudal vertebrae expanded; suborbital bones 6; labial ossicles present; lateral-line ending on upper part of caudal peduncle.

The type species of *Ammodytoides* is *A. vagus* (McCulloch and Waite, 1916) from Lord Howe Island. Other species of the genus are *A. gilli* (Bean, 1895), believed to be restricted to the eastern Pacific; *A. renniei* (Smith, 1957) from South Africa, an undescribed species from the Hawaiian Islands (Randall et al., in press), and an undescribed species from Pitcairn Island (to be named by Bruce B. Collette and the junior author).

Ammodytoides kimurai is most similar to the undescribed species from the Hawaiian Islands. It differs in having 14–15 instead of 15–17 pectoral fin-rays, 104–109 instead of 109–116 lateral-line scales, 27–29 instead of 29–33 gill rakers, black pigment centrally on the caudal fin, and in lacking a series of small scales dorsally on the opercle.

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Literature Cited

Bean, T. H. 1895. Description of a new fish, *Bleekeria gilli*. Proc. U.S. Natn. Mus., 178(1028): 629–630.

Duncker, G. and E. Mohr. 1939. Revision der Ammodytidae. Mitt. zool. Berlin, 24(1): 8–31.

Ida, H. 1973. Extra ossicles in the oral region on three species of *Bleekeria* (Ammodytidae). Japan. J. Ichthyol., 20: 67–72.

McCulloch, A. R. and E. R. Waite. 1916. Additions to the fish-fauna of Lord Howe Island. No. 5. Adelaide Trans. Roy. Soc. So. Aust., 40: 437–451.

Pietsch, T. W. and C. P. Zabetian. 1990. Osteology and interrelationships of the sand lances (Teleostei; Ammodytidae). Copeia, 1990: 78–100.

Randall, J. E., H. Ida and J. L. Earle. In press. *Ammodytoides pylei*, a new species of sand lance (Ammodytidae) from the Hawaiian Islands. Pacif. Sci.

Smith, J. L. B. 1957. Four interesting new fishes from South Africa. S. Afr. J. Sci., 53: 219–222.

小笠原諸島から採集されたミナミイカナゴ属（新称）の1新種

井田　齊・J. E. Randall

小笠原諸島父島の沿岸から採集されたイカナゴ科の1新種ミナミイカナゴ *Ammodytoides kimurai* を記載した．本種は腹鰭が無いこと，一連の口唇骨があること，頭部眼下感覚管は目の直下で中断することでミナミイカナゴ属（新称）*Ammodytoides* に含まれるが，既知種の *A. vagus*（ロードハウ島），*A. gilli*（東部太平洋），*A. renniei*（南アフリカ），*A. pylei*（ハワイ諸島）とは，主鰓蓋骨上後縁に鱗が無いこと，背鰭軟条数が23–24本であること，尻鰭軟条が14–15本であること，側線鱗数は104–110枚であること，脊椎骨数は59–61個であることなどで区別できる．

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