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Ammodytoides kanazawai, a New Species of Sand Lance (Perciformes: Ammodytidae) from the Ogasawara Islands, Japan

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Abstract A new sand lance *Ammodytoides kanazawai* is described based on a single specimen, collected by a sledge net at the depths of 95–99 m off the southern coast of Chichi-jima Island, Ogasawara Islands, Japan. It is distinguished from the congeners by having the following combination of characters: dorsal-fin rays 50; anal-fin rays 23; pectoral-fin rays 16; pored lateral-line scales ca. 107 or 108; gill rakers 5 + 21; vertebrae 34 + 26 = 60; head length 23.7% of SL; no scales on operculum; anterior interorbital pores opening at tip of a short branch of supraorbital canal; supratemporal commissure of lateral canal with 3 pores; numerous fine black dots on dorsal- and anal-fin membranes after the eighteenth and third rays, respectively. In the Ogasawara Islands, a congener *A. kimurai* was found in much shallower areas (10–15 m depth), and *A. kanazawai* is thus second known species of the genus around the islands; it represents the first case that a couple of species of *Ammodytoides* co-occur in a single geographic area.

Key words: *Ammodytoides kanazawai*, new species, Ammodytidae, Ogasawara Islands.

Sand lances of the genus *Ammodytoides* Duncker and Mohr, 1939 are small (＜170 mm SL), elongate and silvery marine fishes, found in temperate to tropical areas of the Indo-Pacific and eastern Pacific regions. The genus, redefined by Ida *et al.* (1994), is distinguished from the other ammodytid genera by having the following combination of characters (Ida and Randall, 1993; Ida *et al.*, 1994; Collette and Randall, 2000; Collette and Robertson, 2001; Randall and Earle, 2008): 45–53 dorsal-fin rays; 21–25 anal-fin rays; dorsal and anal-fin rays branched at least in adult, except for anterior 1–2 rays in each fin; pelvic fins absent; ventro-lateral skin fold on body absent; infraorbital canal interrupted below eye; lateralis system on head continuous with lateral line of body; lateral line ending high on caudal peduncle; no teeth on jaws; labial ossicles and supraneural bones present; haemal and neural spines of caudal vertebrae expanded distally; olfactory rosettes absent. The following 9 species were currently assigned to *Ammodytoides* (Ida and Randall, 1993; Ida *et al.*, 1994; Randall *et al.*, 1994; Winterbottom and Anderson, 1997; Collette and Randall, 2000; Randall and Earle, 2008; Randall and Heemstra, 2008): *A. vagus* (McCulloch and Waite, 1916) from Lord Howe Island and New South Wales; *A. gilli* (Bean, 1895) from the eastern tropical Pacific; *A. renniei* (Smith, 1957) from southeastern Africa; *A. kimurai* Ida and Randall, 1993 from the Ogasawara Islands; *A. pylei* Randall, Ida and Earle, 1994 from the Hawaiian Islands; *A. leptus* Collette and Randall, 2000 from Pitcairn Island; *A. idai* Randall and Earle, 2008 from Papua New Guinea; *A. praematura* Randall and Earle, 2008 from the Chagos Archipelago; *A. xanthops* Randall and Earle, 2008 from off Mozambique. A key to these 9 described species of *Ammodytoides* was provided by Randall and Heemstra (2008).

During a biological survey carried out in the Ogasawara Islands and the adjacent waters by *TR/V Seiyo-maru* [Tokyo University of Fisheries (now Tokyo University of Marine Science and Technology), Tokyo] in 1995, a single small specimen (63.2 mm SL) of *Ammodytoides* was collected by a sledge net from the sandy bottom at the depths of 95–99 m off the southern coast of Chichi-jima Island. The specimen was readily identified as a species of *Ammodytoides* by having all diagnostic characters of the genus listed above, except for branched dorsal- and anal-fin rays (it appears to be effected by its small body size; see "Remarks," below). In the Ogasawara Islands, a single species of the genus, *A. kimurai*, was previously reported from the shallower areas (10–15 m depth) by Ida and Randall (1993), but several morphological features of this newly-obtained specimen did not match with those of *A. kimurai*. Subsequent our research revealed that the species, herein described as new, is distinct from all described species of *Ammodytoides*.

Methods of measurements and counts follow Ida and Randall (1993) and Randall *et al.* (1994). Scales (except for predorsal scales), paired-fin rays, gill rakers, pseudobranchial filaments and branchiostegal rays were counted on both sides; the values are separated by a slash, the first value representing the left count. Notation of cephalic sensory canals and pores follows Takagi (1989). The specimen examined is deposited in the National Museum of Nature and Science, Tsukuba (NSMT).

Fig. 1. Preserved specimen of *Ammodytoides kanazawai* sp. nov. NSMT-P 48606, holotype, 63.2 mm SL, southern off Chichi-jima Island, Ogasawara Islands, Japan. Photographed by K. Shibukawa.

Ammodytoides kanazawai sp. nov.

[New Japanese name: Gomahire-minami-ikanago]

(Figs. 1–3)

Holotype. NSMT-P 48606, 63.2 mm SL, off southern Chichi-jima Island, Ogasawara Islands, Japan (27°1.74′N, 142°12.48′E to 27°1.78′N, 142° 12.62′E), 95–99 m depth, sledge net, TR/V Seiyo-maru, 19 June 1995, collected by T. Kanazawa.

Diagnosis. The new species *Ammodytoides kanazawai* differs from the congeners in having the following combination of characters: dorsal-fin rays 50; anal-fin rays 23; pectoral-fin rays 16; pored lateral-line scales ca. 107 or 108; gill rakers 5 + 21; vertebrae 34 + 26 = 60; head length 23.7% of SL; no scales on operculum; anterior interorbital pores opening at tip of a short branch of supraorbital canal; supratemporal commissure of lateral canal with 3 pores; numerous fine black dots on dorsal- and anal-fin membranes after the eighteenth and third rays, respectively.

Description. Dorsal-fin rays 50, all rays unbranched, except for the last ray branched to the base; anal-fin rays 23, all rays unbranched, except for the last ray branched to the base; pectoral-fin rays 16/16, at least lower 3/2 rays unbranched (dorsal part of pectoral fins damaged on both sides, but at least fourth to thirteenth rays

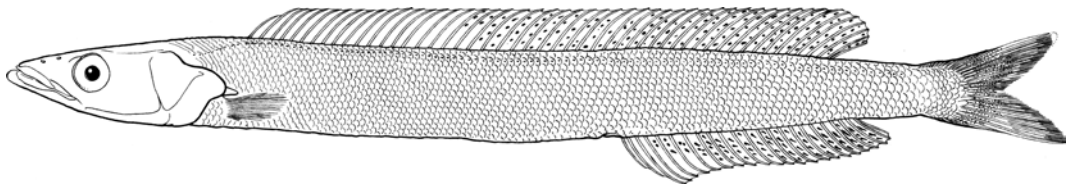

Fig. 2. Schematic illustration of *Ammodytoides kanazawai* sp. nov. (NSMT-P 48606, holotype, 63.2 mm SL). Note that many scales on body are missing in the specimen, but reproduced based on scale pockets in this illustration. Drawn by K. Shibukawa.

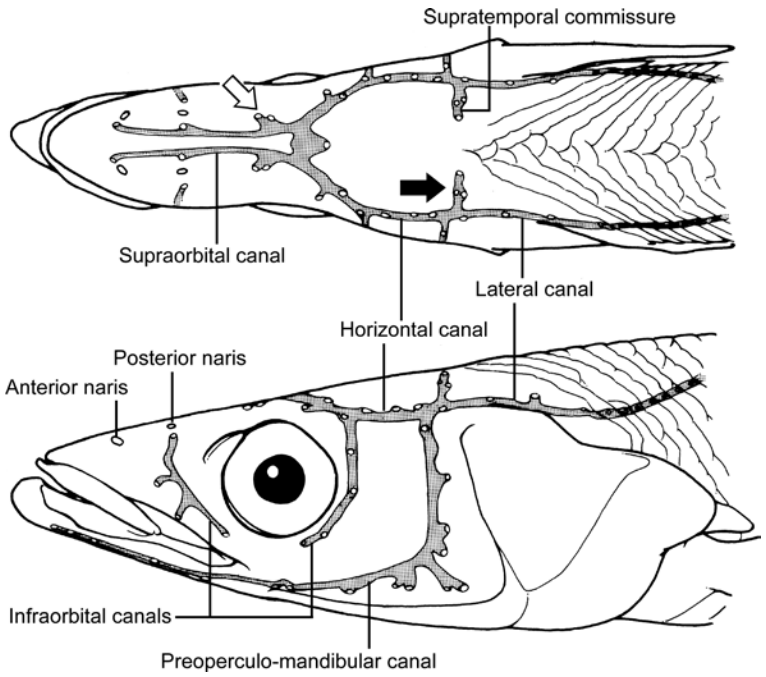

Fig. 3. Dorsal and lateral views of head of *Ammodytoides kanazawai* sp. nov. (NSMT-P 48606, holotype, 63.2 mm SL), showing the cephalic sensory canals and pores. Drawn by K. Shibukawa. Open and solid arrows indicate 2 anterior interorbital pores of supraorbital canal (opening at tip of short branch) and 3 pores of supratemporal commissure of lateral canal, respectively.

branched on left side); no pelvic fins; principal caudal-fin rays 8 + 7, the uppermost and lowermost rays unbranched; upper procurrent rays of caudal fin 17, all unsegmented except for posterior 4 rays; lower procurrent rays of caudal fin 14, all unsegmented except for posterior 4 rays; tubed (pored) lateral-line scales ca. 107 or 108; scales above lateral line to origin of dorsal fin 3/3; ca.15 or 16 scales below lateral line to origin of anal fin; predorsal scales 13; gill rakers 5 + 21/5 + 21; pseudobranchial filaments 16/15; branchiostegal rays 7/7; vertebrae 34 + 26 = 60; predorsal vertebrae 4; postdorsal vertebrae 12; vertebrae posterior to anal fin 10; supraneural (predorsal) bones 2; first 2 dorsal pterygiophores in space between fourth and fifth neural spines; neural and haemal spines of vertebrae of caudal peduncle expanded distally; a broad gap in suborbital series between the first and remaining suborbitals.

The following measurements are % of SL: head length 23.7; snout length 6.7; orbit diameter 4.3; interorbital width 3.9; upper jaw length 7.9; body depth 9.3; body width 6.6; caudal-peduncle depth 5.5; caudal-peduncle length 10.2; predorsal length 25.1; preanal length 65.4; length of first dorsal-fin ray 3.7; length of second dorsal-fin ray 5.0; length of longest dorsal-fin ray 7.9; length of last dorsal-fin ray 4.9; length of first anal-fin ray 4.0; length of second anal-fin ray 5.7; length of longest anal-fin ray 7.1; length of last anal-fin ray 3.8; caudal-fin length 13.5; length of caudal concavity 6.3; pectoral-fin length 8.1.

Body elongate and slightly compressed; a longitudinal ventro-lateral fold not developed. Head pointed (the protruding lower jaw forming the apex of the angle of the head) and compressed. Snout longer than eye diameter, its length 28.2 % of head length. Interorbotal width 90.0 % of eye diameter. Lower jaw projecting, sharply pointed when viewed from above, or slightly rounded from the side; jaws extending slightly posterior

to a vertical line through anterior margin of eye, but not reaching below pupil; premaxilla protrusible; gape slightly oblique, forming an angle of about 25 degrees to body axis; no teeth on jaws, vomer and palatines; labial ossicles present. Lips thin; upper lips continuous around front of snout; lower lips not continuous, attached to lower jaw slightly posterior to a vertical line through anterior tip of upper jaw. Tongue short and broad, the tip rounded. Gill rakers long and slender, the longest at angle about equal in length to longest gill filament on first gill arch and slightly longer than pupil diameter. Nares on middle of upper side of snout, slightly above an oblique line from upper edge of eye to tip of snout; anterior naris with a fleshy rim, its opening slightly larger than that of posterior naris; posterior naris a pore; anterior and posterior nares broadly separated, the internarial space subequal to pupil diameter. Gill opening broad, extending anteriorly to a vertical through center of eye; gill membranes free from isthmus; no spines on opercle; opercular flap long, broadly rounded, extending posteriorly to upper edge of pectoral-fin base; free membranous ventral margin of preopercle nearly extending to a vertical line through anterior edge of pupil.

Scales small, thin and cycloid and forming diagonal straight lines of anterodorsal-posteroventral direction; head naked; scales on nape extending anteriorly a little beyond a vertical line through upper end of free margin of preopercle; scales on nape forming V-shaped pattern when viewed from dorsal, the angle of the V increasingly acute anteriorly; 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; tubed (pored) lateral-line scales ending about midlength of caudal peduncle (5–7 scales before base of caudal fin); lateral-line tubes simple, without branches above or below; fins naked except caudal fin covered by small scales basally.

Origin of dorsal fin above lateral-line scale 11 or precaudal vertebra 7; dorsal-fin rays progressively longer to about ray 45; base of last dorsal-fin ray above caudal vertebra 17; origin of anal-fin below base of dorsal-fin ray 31 or second caudal vertebra; third anal-fin ray longest; base of last anal-fin ray below caudal vertebra 19; caudal fin forked, its length 56.8% of head length; pectoral fin low on body, the upper base at level of lower edge of orbit; fourth or fifth pectoral-fin ray longest; pelvic fin absent.

Cephalic lateralis system shown in Fig. 3; infraorbital canal broadly interrupted at midway; 2 anterior interorbital pores, opening at tip of a short branch of supraorbital canal; supratmporal canal with 3 pores; lateralis system on head continuous with lateral line of body.

Color in alcohol. Head and body pale brown, slightly darker dorsally; dorsal- and anal-fin membranes after the eighteenth and third rays with numerous fine black dots; caudal fin with numerous fine melanophores (not forming dots or spots), excluding posterior half of dorsal and ventral lobes, upper procurrent-rays region, and anterior half of lower procurrent-rays region; the remaining parts of fins pale.

Distribution. *Ammodytoides kanazawai* is presently known only from the holotype collected from sandy bottom at the depths of 95–99 m off the southern coast of Chichi-jima Island, Ogasawara Islands, Japan.

Etymology. The new species is named for Takeshi Kanazawa, who provided the opportunity to examine the holotype of the species to us.

Remarks. The new species *Ammodytoides kanazawai* is known only from the small holotype (63.2 mm SL); it appears to be immature, and its sex is hard to determine. The holotype of *A. kanazawai* has the unbranched dorsal and anal-fin rays (except for the ultimate one in each fin), but the condition might be effected by its small body size. Collette and Robertson (2001) reported that smaller specimens of *A. gilli* (42.3–57.6 mm SL) lack branched rays in the dorsal and anal fins.

In addition to *Ammodytoides kanazawai*, the following 3 congeners are known to have numerous black dots on dorsal and anal fins (Smith, 1957; Winterbottom *et al.*, 1989; Collette and

Robertson, 2001; Randall and Earle, 2008): *A. gilli* (Eastern Pacific), *A. renniei* (southeastern Africa) and *A. praematura* (Chagos Archipelago, Indian Ocean). The other 6 congeners lack any black markings on anal fins, and have a series of prominent blackish spots at outer edge of dorsal fin (*A. idai*, *A. kimurai*, *A. pylei* and *A. xanthops*) or no dark markings on dorsal fin (*A. leptus* and *A. vagus*) (Ida and Randall, 1993; Randall *et al.*, 2004; Randall and Earle, 2008; Randall and Heemstra, 2008). *Ammodytoides gilli* has 44–47 dorsal-fin rays (vs. 50 in *A. kanazawai*), 85–94 pored lateral-line scales (vs. ca. 107 or 108), 55–58 vertebrae (vs. 60) and head length 25.4–27.8% SL (vs. 23.7% SL), *A. renniei* has 56–58 vertebrae (vs. 60) and some small scales on operculum (vs. absent), and *A. praematura* has 48 dorsal-fin rays (vs. 50 in *A. kanazawai*), 24 anal-fin rays (vs. 23), 14 pectoral-fin rays (vs. 16), 103–106 pored lateral-line scales (vs. ca. 107 or 108), 5 + 23 gill rakers (vs. 5 + 21), 58 vertebrae (vs. 60), 6 predorsal vertebrae (vs. 4), 10 postdorsal vertebrae (vs. 12), 8 vertebrae posterior to anal fin (vs. 10) and some small scales on operculum (vs. absent). Morphological data for *A. gilli*, *A. renniei* and *A. praematura* are referred from those in Smith (1957), Collete and Robertson (2001), Randall and Earle (2008) and Randall and Heemstra (2008).

In the shallow coastal waters around the Ogasawara Islands, the other species of *Ammodytoides*, i.e., *A. kimurai*, was found (Ida and Randall, 1993). The discovery of the present new species represents the first case that a couple of species of *Ammodytoides* are found in a single geographic area, although their preferred water depths appear to be different; namely, the holotype of *A. kanazawai* was collected at the depths of 95–99 m, whereas 10–15 m in *A. kimurai* (Ida and Randall, 1993). *Ammodytoides kimurai* differs from *A. kanazawai* in having: 48–49 dorsal-fin rays (vs. 50 in *A. kanazawai*); 14–15 pectoral-fin rays (vs. 16); total 27–29 gill rakers (vs. 26); anterior interorbital pores opening at main body of supraorbital canal (vs. opening at tip of a short branch of supraorbital canal); supratemporal commissure of lateral canal with 2 pores (vs. 3); dorsal- and anal-fin membranes after the eighteenth and third rays, respectively, with numerous fine black dots (vs. dorsal fin with a series of black spots at the outer edge, and anal fin pale).

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