

## Redescription of *Ammodytoides gilli*, the tropical eastern Pacific sand lance (Perciformes: Ammodytidae)

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**Abstract:** *Ammodytoides gilli* (Bean, 1895) is the correct name for the tropical eastern Pacific sand lance. Its range is extended from Cabo San Lucas, Baja California south to Panama, Ecuador, and the Galapagos Islands. *Ammodytes lucasanus* Beebe and Tee-Van, 1938 is a junior synonym. Types of both nominal species were re-examined. The species is redescribed based on 50 specimens (42.3-115 mm SL) from 12 lots and is compared with other known species of *Ammodytoides*. Changes in ontogeny from the smallest known specimen (42.3 mm SL, illustrated) are detailed including reduction in the posterior dorsal fin lobe and development of branched dorsal and anal fin rays.

**Key words:** Ammodytidae, *Ammodytoides*, sand lance, eastern tropical Pacific.

While collecting fishes for a book on eastern tropical Pacific fishes (Allen and Robertson, 1994), Gerald R. Allen and D. Ross Robertson collected a small sand lance off the Panama laboratory of the Inter-American Tropical Tuna Commission in May 1990, well south of its known mainland range in Baja California. A recently collected series of sand lance by Robertson from Isla Montuosas, Panama stimulated completion of this project. The purpose of this paper is to redescribe this poorly-known sand lance from fresh material and assess its relationships to other members of the genus *Ammodytoides* as defined by Ida et al. (1994), including three additional species described by Ida and Randall (1993), Randall et al. (1994), and Collette and Randall (2000).

### MATERIALS AND METHODS

Institutional abbreviations follow Leviton et al. (1985). CAS includes material originally deposited at Stanford University, SU, and the New York Zoological Society, NYZS. Measurements follow Ida and Randall (1993) and Randall et al. (1994). Generic nomenclature follows Ida et al. (1994). A 42.3-mm specimen was illustrated (Fig. 1, 2) because it was the first fresh eastern Pacific specimen collected and it was in the best condition. It appears to be one of the smallest specimens of *Ammodytoides* known, providing information on ontogenetic changes.

*Ammodytoides gilli* (Bean, 1895)

Figs. 1, 2

*Bleekeria gilli* Bean, 1895: 629-630 (original description, "Dr. Stimpson's collection from the Pacific")

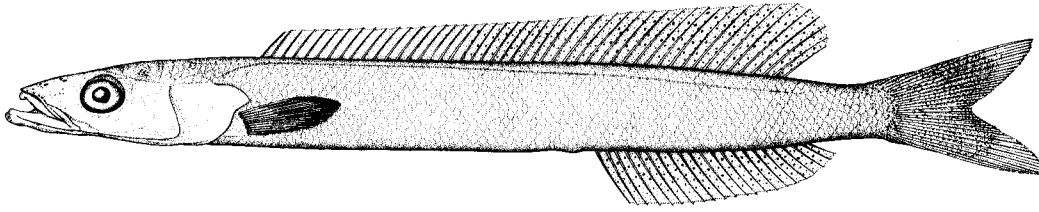


Fig. 1. *Ammodytoides gilli*. USNM 326833, juvenile, 42.3 mm SL, Panama, Azuero Peninsula, drawn by Keiko Hiratsuka Moore.

ic", USNM 45384). Seale, 1940: 36 (first record from Galapagos Is., [CAS 6881]). Ida, 1973: 71 (fig. 3, radiograph of head, extra ossicles in oral region). Winterbottom et al., 1989: 62 (range erroneously given as "California to Hawaii", *Bleekeria renniei* Smith possibly conspecific with *B. gilli*). Allen and Robertson, 1994: 256 (description, range extended to Panama [USNM 326833], color fig.).

*Ammodytes lucasanus* Beebe and Tee-Van, 1938: 306-308 (original description [NYZS 25249A = CAS SU 46501]; Cape San Lucas, Baja California, from stomachs of several species of fishes and a comorant).

*Ammodytoides gilli*. Ida and Randall, 1993:151 (eastern Pacific species). Ida et al. 1994:252 (ANSP specimens; generic placement). Randall et al., 1994:85 (eastern Pacific). Grove and Lavenberg, 1997:542-544 (description, Galapagos Islands CAS 6881, LACM 44139-1; *Ammodytes lucasanus* a junior synonym), fig. 304. Collette and Randall, 2000:398 (comparison with other known species of *Ammodytoides*).

*Ammodytoides lucasanus*. Ida et al. 1994:252 (generic placement).

**Diagnosis:** A species of *Ammodytoides* with dorsal-fin rays 44-47 (mean 46.1); anal-fin rays 22-24 (mean 23.0); pectoral-fin rays 14 or 15; pelvic fins absent; lateral line incomplete, pored lateral-line scales 85-94 + 2-5 unpored scales = 88-98 (mean 94.4); gill rakers on first arch (5-7) + (21-25) = 26-31 (mean 28.7); vertebrae (31-33) + (23-26) = 55-58, including hypural plate (mean 56.5).

**Description:** Body elongate, body depth 9.5-11.2% SL, body width 5.9-7.8% SL; head length 25.4-27.8% SL; snout length 6.9-7.9% SL; orbit diameter 4.1-5.1% SL; fleshy interorbital distance 3.8-4.9% SL; upper jaw length 7.8-9.5% SL; least caudal peduncle depth 4.8-5.4% SL; caudal peduncle length 3.6-6.0% SL; predorsal distance 25.1-26.9% SL; preanal distance 62.5-65.3% SL; caudal

fin length 12.8-16.0% SL; caudal fin concavity 6.3-7.8% SL; pectoral fin length 9.9-11.1% SL.

Scales small, thin, and cycloid, arranged in straight diagonal rows; head naked, no row of small scales on upper part of opercle; scales extending anteriorly to supratemporal lateral line canal; about 10-12 rows of predorsal scales; fins naked except caudal fin with scales extending about three-fourths distance to posterior margin; lateral line high on body, ascending from gill opening to a point three scales below origin of dorsal fin, passing posteriorly parallel to upper margin of body, with pored scales ending above mid-lateral line, 2-5 scales from the caudal base. Suborbital lateral line canal interrupted, with four preorbital and four postorbital pores (as in *A. pylei*, Randall et al., 1994:fig. 2A).

Freshly collected fish translucent grey-white, belly silvery white; large fish with upper two-thirds of head and nape yellow; 1-5 small black dots evenly spaced along anterior half of outer margin of dorsal fin. Specimens brown in preservative. Dorsal, anal, and caudal fins with many tiny black spots (Fig. 1); 1-5 larger black blotches in dorsal fin of three larger specimens (69.5-84.4 mm SL), absent in smaller specimens (42.3-62.2 mm SL). Caudal fin with increased numbers of melanophores in small specimens, forming distinct V-shaped blotch when caudal fin is partially folded.

**Ontogenetic changes:** The 42.3-mm specimen (Fig. 1, 2) appears to be one of the

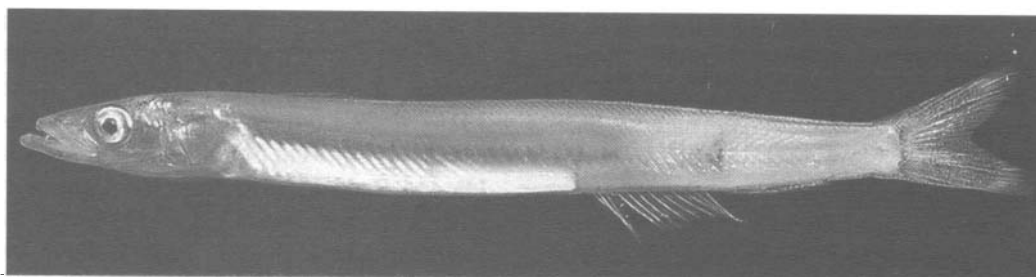


Fig. 2. *Ammodytoides gilli*. USNM 326833, juvenile, 42.3 mm SL, Panama, Azuero Peninsula, photograph by Gerald R. Allen.

smallest known specimens of any species of *Ammodytoides*, providing information on ontogenetic changes.

Reduction in the length of the expanded posterior dorsal fin lobe found in the smallest juvenile is indicated by the decrease in number of scales between the end of the depressed fin and the origin of the caudal fin. The tip of the last dorsal fin ray is separated from the upper origin of the caudal fin by 6-9 rows of scales in specimens 62-100 mm SL, 4-6 rows of scales in specimens 55-60 mm SL, 2-3 rows in specimens 51.2-51.6 mm, and by only a single scale in the smallest specimen examined (42.3 mm SL).

Adult *Ammodytoides* have branched dorsal and anal fin rays, starting with the third ray in each fin. However, smaller specimens of *A. gilli*, 42.3-57.6 mm SL, lack branched rays in the dorsal and anal fins. Between 58.0 and 58.8 mm, the fin rays are not branched but the tips of the fin rays are blunt, not pointed as in a simple soft ray. By 59.2 mm, the third to at least the tenth dorsal and anal fin rays are branched as in the largest specimens examined.

**Comparisons:** *Ammodytoides gilli* has fewer lateral-line scales (88-98) than other species of *Ammodytoides* or *Bleekeria* (99-123) and fewer dorsal-fin rays (45-47) than the other species of *Ammodytoides*. There is no row of small scales on upper part of opercle as is present in *A. pylei* (Randall et al., 1994). *Ammodytoides gilli* has a longer head than either *A. pylei* or *A. kimurai* (25.4-27.8% SL vs. 22.0-24.6%), larger eye (4.1-5.1% SL

vs. 2.8-3.7%), longer upper jaw (7.8-9.5% SL vs. 6.6-7.9%), shorter caudal peduncle (3.6-6.0% SL vs. 8.4-12.0%), longer predorsal distance (25.1-26.9% vs. 21.8-24.7%), longer caudal fin (12.8-16.9% SL vs. 10.5-12.9%), and a longer pectoral fin (9.9-11.1% SL vs. 8.4-9.5%).

**Material examined:** 50 specimens (42.3-115 mm SL) from 12 lots, arranged from north to south. USNM 45384 (88.5), lectotype of *Bleekeria gilli*, herein selected; probably "Dr. Stimpson's collections from the Pacific" (Bean, 1895); D 47, A 23, P<sub>1</sub> 14, lateral-line scales 90 + 4 = 94, gill rakers 6 + 22 = 28, vertebrae 33 + 24 = 57. USNM 357762 (8, 78.5-91.9) and MCZ 35968 (1, 115), paralectotypes; out of USNM 45384; in poor condition. CAS SU 46501 (1, 99.0), Baja California, Cape San Lucas; April 25, 1936; from stomach of *Euthynnus "alleterata"* (= *E. lineatus*), originally NYZS 25249-A; holotype of *Ammodytes lucasanus*. CAS SU 46502 (1, 100), Baja California, Cape San Lucas; May 6, 1936; from stomach of *Seriola colburni*; paratype of *A. lucasanus*. CAS SU 46266 (7, ca. 80-85), Cape San Lucas; originally NYZS 25541; stomach contents; in poor condition. CAS SU 46737 (9, ca. 50-54), Cape San Lucas; originally NYZS 25429, 25541; in poor condition. ZMH 18287 (2, 52.5-56.3), Cape San Lucas; April 25, 1936. USNM 377763 (13, 55.0-84.5) and USNM 377764 (3, 51.6-67.7), Panama, Isla Montuosa, 7° 50' N, 82° 25' W; 25 m on fine sand bottom; D. R. Robertson; Dec. 12, 1998. USNM 326833 (1, 42.3), Panama, Azuero Peninsula, Playa Venao, small lagoon near Tuna Commission Laboratory, approx. 7° 24.5' N, 80° 11' W; rock and sand bottom in 2-3 m; G. Allen and D. R. Robertson station 32; April 29, 1990. CAS 6881 (1, 59), Galapagos Is., Floreana I., Black Beach; Jan. 14, 1934. LACM 44139-1 (1, 63), Galapagos Is., Fernandina I., Punta Espinosa; dried. AMNH 16044 (1, 75.7), 10 mi off northwestern coast of Ecuador, 1° 07' N, 79° 55' W; Askoy Expedition; April 17, 1941.

Two additional specimens could not be located. SIO 59-209 (2, 47-60), Cabo San Lucas, 22° 52.38' N, 109° 53.6' W; C. Limbaugh and R. Rosenblatt; March 20-22, 1959.

**Distribution:** *Ammodytoides gilli* is presently known from the tropical eastern Pacific from Cabo San Lucas, Baja California, south to Panama, Ecuador, and the Galapagos Islands. Previous records from the Hawaiian Islands apply to the recently-described *A. pylei* (Randall et al., 1994).

**Type Locality:** In the original description, Bean (1895) wrote only that the specimens were from "Dr. Stimpson's collection from the Pacific." After examining all available material from the eastern Pacific and material of all other described and known undescribed species of *Ammodytoides*, it seems clear that the name *gilli* is the first name applied to the sand lance found in the tropical eastern Pacific Ocean. Direct comparison with the types of *Ammodytes lucasanus* shows this name to be a junior synonym of *Ammodytoides gilli*.

**Ecology:** Like other members of the family, *A. gilli* is usually found over sand bottoms at moderate depths, 2-25 m. A school of about 500 were seen group-spawning at 4 PM on Dec. 13, 1998 in 7 m of water over sand in the lagoon on the south side of Isla Montuosa in the Gulf of Chiriqui by the second author. This sand lance is preyed upon by a variety of fishes such as the tuna *Euthynnus lineatus* and the amberjack *Seriola colburni* as well as sea birds such as comorants.

**Discussion:** *Ammodytoides gilli* and the three additional species described by Ida and Randall (1993), Randall et al. (1994), and Collette and Randall (2000) fit the definition of the genus as given by Ida et al. (1994). Species of this genus differ from species of *Bleekeria* in the following characters: no teeth in jaws; infraorbital canal interrupted; pored lateral-line scales ending high on caudal peduncle instead of curving downward and continuing onto base of caudal fin; two predorsal bones present; olfactory rosettes absent; neural and haemal spines on four posterior caudal vertebrae expanded and flattened; dorsal-fin rays 44-50 (one fewer than the previously recorded range), and anal-fin rays 21-25.

In addition to *Ammodytoides gilli*, known species of the genus include the type-species, *A. vagus* (McCulloch and Waite, 1916) from Lord Howe Island, *A. rennei* (Smith, 1957) from South Africa, *A. kimurai* Ida and Randall, 1993 from the Ogasawara Islands, *A. pylei* Randall et al. 1994 from the Hawaiian Islands, and *A. leptus* Collette and Randall, 2000 from Pitcairn Island.

**Comparative material examined:** Complete data for the comparative material is presented in Collette and Randall (2000). *Ammodytoides kimurai* Ida and Randall, 1993: paratype, USNM 324610 (1, 121). *A. leptus* Collette and Randall, 2000: holotype, USNM 360076 (1, 96.2), paratypes, BPBM 16949, MCZ 157036, AMS 1.39856-001, USNM 360077-78 (8, 75.8-89.8). *A. pylei* Randall, Ida, and Earle, 1994: paratype, USNM 316514 (1, 137). *A. rennei* (Smith, 1957): RUSI 8440 (1, 56.4); ROM 41487 (1, 60.7). *A. vagus* (McCulloch and Waite, 1916): holotype, AMS 1-9272 (143 mm SL). *Bleekeria mitsukurii* Jordan and Evermann, 1902: USNM 59599 (2, 78.5-151); UW 21253 (2, 91.6-107). *B. viridianguilla* (Fowler, 1931): paratypes, ANSP 53462-5 (4, 116-137). *Protammodytes sarisa* (Robins and Böhlke, 1970): holotype, ANSP 113091 (115 mm SL); paratype, ANSP 113092 (99.2).

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## RESUMEN

*Ammodytoides gilli* (Bean, 1895) es el nombre correcto para la "lanceta arenera" del Pacífico tropical oriental que habita desde Baja California sur a Panamá, Ecuador, y las islas Galápagos. *Ammodytes lucasanus* Beche and Tee-Van, 1938 es un sinónimo. Se describe la especie con base en 50 ejemplares y se le compara con otras especies de *Ammodytoides*. Se indican los cambios ontogénicos a partir de un ejemplar de 42 mm de longi-

tud, incluyendo reducción del lóbulo de la aleta dorsal posterior y el desarrollo de rayos ramificados en las aletas anal y dorsal.

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