

A new amphinomid polychaete (Annelida: Polychaeta) from Western Mexico

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Abstract: *Linopherus kristiani* n. sp. is described from 46 specimens collected sublitorally (8-80m) off Manzanillo, Colima and intertidally in Bahía Concepción, Gulf of California. It was two pairs of eyes, enlarged cirri at setiger 2, branchiae present from setiger 3 and continued through 23 segments (range 15-28, SD=3.9) with variable number of terminal filaments (at right setiger 16, \bar{x} =30, range 5-59, SD=12.2). A modified key to all the species of the genus, comments on morphological variation and associated species are also included.

During the time when the Law of Priority was not carried to its extreme, common usage was preferred over strict priority. Thus the genus *Linopherus* Quatrefages, 1865 was not recognized by Hartman in her classic catalogue (Hartman, 1959) and later she regarded it as irregular (Hartman, 1965). Instead she recognized *Pseudeurythoe* Fauvel, 1932 as the valid name for these amphinomids. Fauchald (1972) partly reviewed the genus *Pseudeurythoe* and, in describing a species from abyssal depths off Western Mexico, gave a key to the 12 species then known. Almost 10 years ago, Fauchald (1977) emended, recognized and defined *Linopherus* as a valid generic name.

There are four species of this genus in Mexico: *L. abyssalis* (Fauchald, 1972), *L. ambigua* (Monro, 1933), *L. tripunctata* (Kudenov, 1975) and *Linopherus* sp. (Kudenov, 1980). In this paper I describe the fifth species from Mexico, modify the former key to the species of the genus (Fauchald, 1972) and comment on morphological variation as well as on other species associated with it.

Apart from station 56, all the collecting stations are off Manzanillo, Colima: 3: 35 m depth (19°03'50" N, 104°19'50" W), 5-1: 60 m depth (19°02'10" N, 104°21'25" W), 6-1:

80 m depth (19°02'55" N, 104°22'25" W), 7CA1: 8 m depth (19°03'50" N, 104°18'40" W), 56: intertidal, rocky shore (26°52'00" N, 111°56'05" W) at the mouth of Bahía Concepción, Baja California Sur, west coast of the Gulf of California. The material from Manzanillo was collected by J.C. Chávez, Instituto Oceanográfico-Secretaría de Marina, on 16 February 1982. The sample from Bahía Concepción was collected by R. Ríos, Centro de Investigación Científica y de Educación Superior de Ensenada, on 15 June 1980.

Linopherus kristiani n. sp.
(Figs. 1, 2)

Material examined: 46 specimens as follows: 3 (11), 5-1 (6 including the holotype), 6-1 (22), 7CA1 (6), 56 (1). Holotype in the National Museum of Natural History, Smithsonian Institution (USNM 101607). Some paratypes remain in my personal collection, others have been deposited in the Allan Hancock Foundation, British Museum (Natural History), Museum National d'Histoire Naturelle, Paris, Instituto Oceanográfico-Secretaría de Marina, Manzanillo, and Zoological Museum and Institute, University of Hamburg.

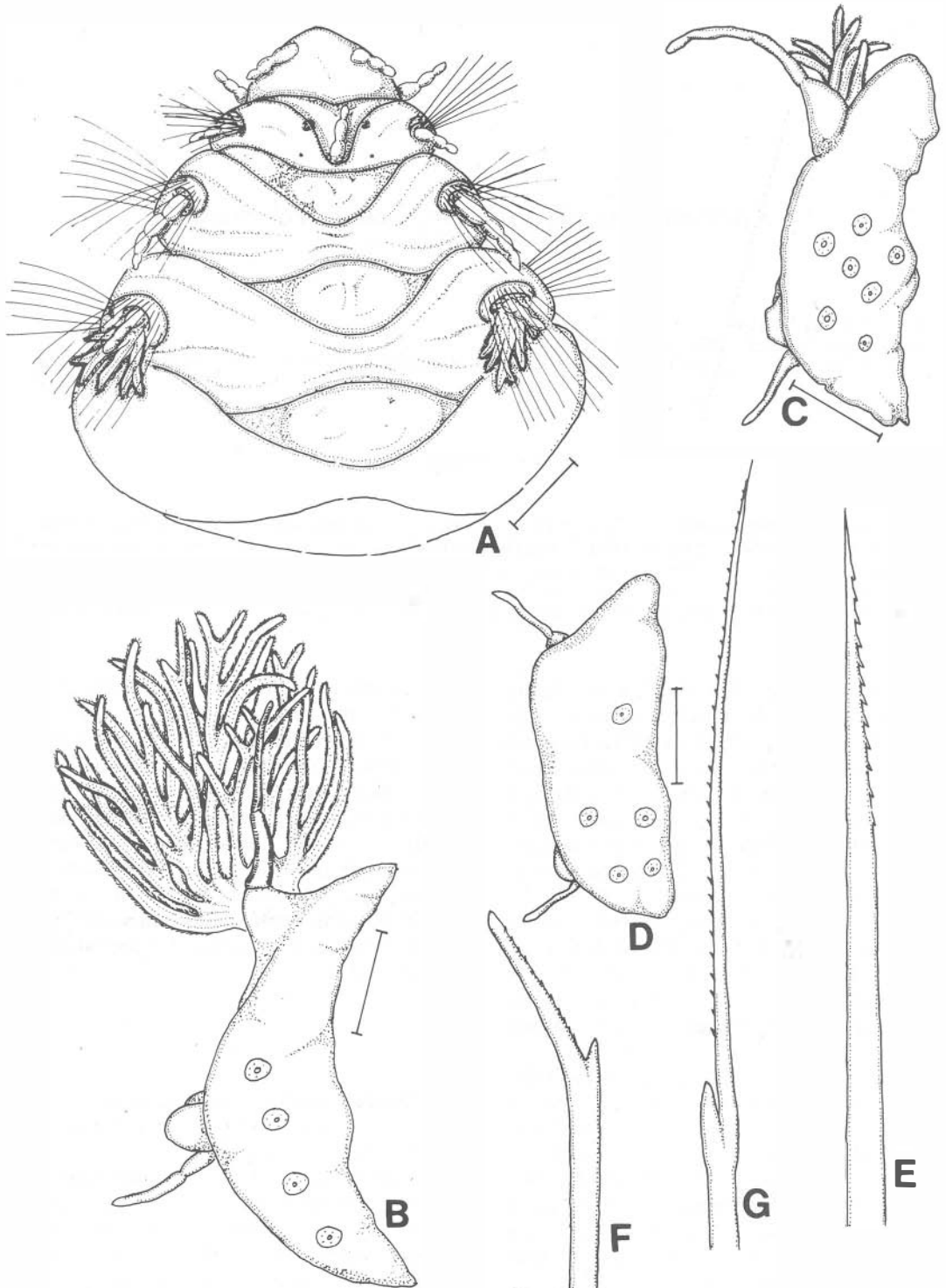


Fig. 1. *Linopherus kristiani* n. sp. A. Anterior end in dorsal view; B. Right parapodium 12 in frontal view; C. Right parapodium 27 in frontal view; D. Right parapodium 73 in frontal view; E. Harpoon-like seta of parapodium 27; F. Forked denticulated neuroseta from same parapodium; G. Large subdistally swollen forked seta of the same (scales are 0.5 mm).

Description: The holotype is a twisted, gravid female with 110 setigers that lacks pygidium; it is 54 mm long and 4 mm wide including setae. It is colorless in alcohol. The body is anteriorly swollen, incurved downwards; anterior segments with integument shiny, posteriorly tapering with less shiny integument.

The prostomium (Fig. 1A) is a short lobe, anteriorly rounded, partly concealed by the first setiger; it has an anterior transverse groove that divides it in two lobes. The anterior lobe is slightly conical and larger than the posterior one that remains partly concealed by the first setiger. Five antennae are present, the anterolateral ones are located subdistally on the prostomium, the lateral antennae are located slightly ventrally and just before the transverse groove, and the median antenna is located posteriorly between the posterior eyes. All antennae slender with three distinct articulations of approximately the same length. Two pairs of eyes, the anterior pair is located at the middle of the prostomial posterior lobe, they are larger and closer to each other than the posterior pair which is concealed by the contraction of the first setiger. The caruncle is a small rounded lobe, concealed by the first setiger.

All parapodia biramous provided with slender cirri. First two parapodia with dorsal cirrostyles with up to five ill-defined articulations; second dorsal cirrus larger than the first and reaches the next segment. First two ventral cirri slightly articulated, second ventral cirri larger than the first. Posterior parapodia with slender tapering cirri. All parapodia with blunt setal lobes, dorsal lobe larger and conical in anterior segments (Fig. 1B). Posterior segments (Fig. 1D) with setal lobes reduced to small protuberances.

Branchiae present from setiger 3 to setiger 28 (Fig. 1C), dendritically branched throughout. First branchia with six terminal filaments, where best developed each branchia has over 40 terminal filaments; last branchia with nine terminal filaments. Each branchia is preceded by a slender dorsal cirrus with an elongated cirrophore, shorter in anterior segments; in posterior branchial segments the cirri are larger than the branchiae.

Many setae broken; notosetae numerous slender capillaries with about 12 harpoon-like setae (Fig. 1E) per bundle in anterior setigers, each seta provided with small denticles, posterior notopodia with about seven per ramus. Notopodial aciculae slender, pointed, four per ra-

mus anteriorly, posterior notopodia with only two. Neurosetae of two kinds, slender capillaries and fewer denticulated forked setae. Inferior setae short and thick (Fig. 1F), superior ones larger subdistally swollen (Fig. 1G). Anterior neuropodia with about nine short and thick setae, posterior segments with larger setae but reduced to about five per bundle. Neuracaculae indiscernible.

Remarks: There were two exceptions to the eye arrangement and size relations described above: one was an eyeless specimen, the other was a mature female with the anterior eyes four times larger than the anterior eyes from most specimens. Most specimens had a poorly developed caruncle but one had it so swollen as to reach the height of the dorsal junction of the first setiger. The degree of contraction of the first setiger is also variable, although most specimens had the prostomium partly concealed by the first setiger, 15 had the prostomium exposed and 10 out of these had their proboscis everted. So this feature also varies and in some instances is related to the eversion of the proboscis.

The proboscis is barrel-shaped (in a 35 mm long specimen, it was 1.5 mm in length) divided in a proximal region with a hyaline outer layer, a turgid muscular region and two prominent distal lateral lips with nine transverse crests. Pygidium with dorsal anus provided distally with a small rounded papilla in most specimens, some others had the anus expanded with two conspicuous lateral mounds in addition to the distal papilla.

On the basis of the 46 specimens examined, the variability of several morphological features is shown in Table 1. The number of branchial pairs, ranging from 15 to 28, is roughly dependent on body size (Fig. 2 solid dots), but the number of terminal filaments, ranging from 5 to 59 in the right setiger 16, is more directly related to body size (Fig. 2 empty dots). Branchiae were always restricted to the first quarter of the body.

Etymology: This species is named as a modest homage to the work of Kristian Fauchald, who has made many important contributions to clarify Mexican Polychaetology, and is still producing fine taxonomic works. Doubtless, these will help to ease taxonomic procedures in a particularly elusive taxon, the polychaetes.

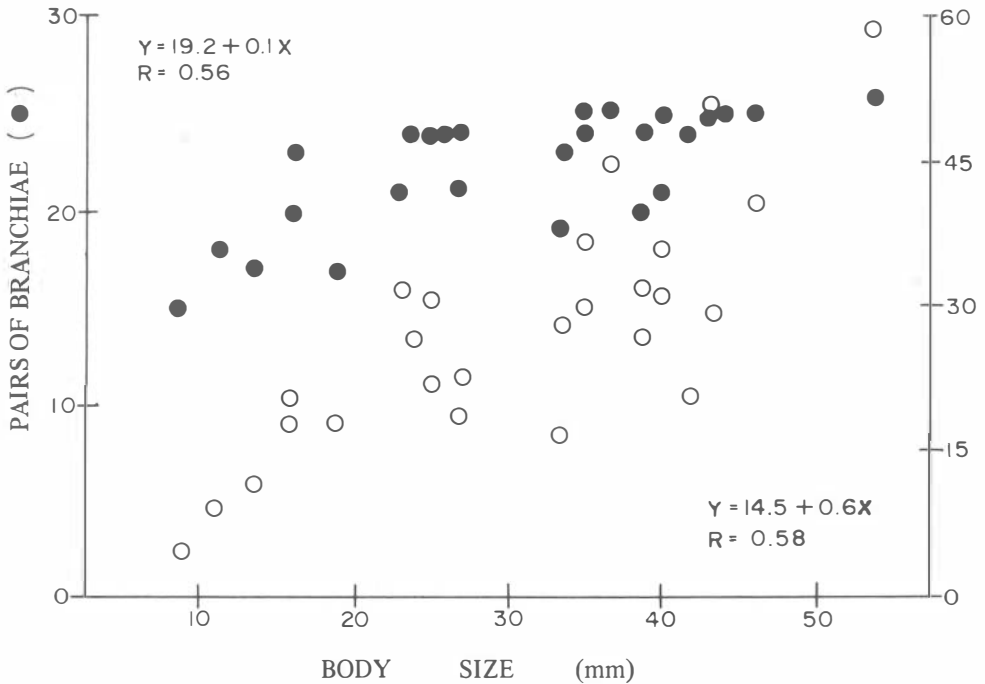


Fig. 2. Relation between body size, pairs of branchiae, and branchial filaments of *Linopherus kristiani* n. sp.

TABLE 1

Variability of some morphological features of *Linopherus kristiani* n. sp.

Feature	n	\bar{X}	range	SD
Setigers*	26	94	54-117	15.1
Length* (mm)	26	30.6	13-54	11.9
Width (mm)	46	3.7	2.5-5.0	0.5
Pairs of branchiae	46	22.8	15-28	3.9
Segments of body (%) with branchiae*	26	26	22-31	2.4
Branchial filaments (right setiger 16)	46	30	5-59	12.2

* Only complete animals included.

Associated species: Off Manzanillo, some abundant species were *Aglaophamus dicirris* Hartman (4 in 3), *Nephtys panamensis* Monro (3 in 3), *Ninoe gemmea* Moore (6 in 6-1), and *Pista* sp. (12 in 3). However, the most abundant species was the sipunculan *Aspidosiphon ca. albus* Murina that had abundancies per station of 3:49, 5-1:41 and 6-1:1.

Distribution: *Linopherus kristiani* extends from the central Gulf of California to Manzanillo, Colima in Western Mexico. It is mainly a subtidal soft-bottom species though it may occur at intertidal mixed shores.

Discussion: *Linopherus kristiani* is closely allied to *L. paucibranchiata* as stated in the key below. The later species was described by Fauvel (1932) from Ain Musa, Gulf of Suez, Red Sea (Fauvel, 1953) but has been reported from widely spread localities: Solomon Islands (Gibbs, 1971), Gulf of Mexico (Perkins & Savage, 1975) and the eastern north Atlantic Ocean (Amoreux, 1972). The main differences are the number of eyes, the shape of the anterior prostomial lobe, and the development of the second dorsal cirri. Thus, *L. kristiani* has four eyes while *L. paucibranchiata* has only two; *L. kristiani* has a conical anterior lobe while *L. paucibranchiata* has an expanded, rounded anterior lobe; and *L. kristiani* has long dorsal cirri in the second setiger while *L. paucibranchiata* has short dorsal cirri on the same setiger.

The extensive variability of some diagnostic morphological features such as the contraction of the first setiger, the number of branchiae,

Key to species of *Linopherus* (modified from Fauchald, 1972)

1	Branchiae present from setiger 4	2
—	Branchiae present from setiger 3	4
2 (1)	More than 40 pairs of branchiae; eyes distinct	<i>L. acarunculata</i> (Monro, 1937)
—	Less than 10 pairs of branchiae; eyes absent	3
3 (2)	Seven pairs of branchiae with up to 12 filaments; subdistally swollen setae absent	<i>L. minuta</i> (Knox, 1960)
—	Five pairs of branchiae with up to 18 filaments; subdistally swollen setae present	<i>L. abyssalis</i> (Fauchald, 1972)
4 (1)	More than 20 pairs of branchiae	5
—	Maximally 15 pairs of branchiae	11
5 (4)	Dorsal cirri long in setiger 1	<i>Linopherus</i> sp (Kudenov, 1980)
—	Dorsal and ventral cirri long in either setiger 1 or 2	6
6 (5)	Both cirri long in setiger 1	15
—	Both cirri short in setiger 1	7
7 (6)	Eyes well developed	8
—	Eyes indistinct or absent	9
8 (7)	Long setae with basal spur	<i>L. incarunculata</i> (Peters, 1854)
—	Long setae without spur	<i>L. microcephala</i> (Fauvel, 1932)
9 (7)	Eyes absent; forked setae smooth	<i>L. tripunctata</i> (Kudenov, 1975)
—	Eyes present; forked setae denticulated	10
10 (9)	Second dorsal cirri short; prostomium anteriorly expanded; two eyes present	<i>L. paucibranchiata</i> (Fauvel, 1932)
—	Second dorsal cirri long; prostomium not expanded anteriorly; four eyes present	<i>L. kristiani</i> n. sp.
11 (4)	Thirteen to 15 pairs of branchiae present	12
—	Maximally nine pairs of branchiae present	13
12 (11)	Caruncle present; cirri of second setiger short	<i>L. annulata</i> (Hartmann-Schröder, 1965)
—	Caruncle absent; cirri of second setiger long	<i>L. hirsuta</i> (Wesenberg-Lund, 1949)
13 (11)	Antennae and cirri of first setiger smooth; nine pairs of branchiae present	<i>L. oculifera</i> (Augener, 1913)
—	Antennae and cirri of first setiger articulated	14
14 (13)	Seven pairs of branchiae; anterior eyes rounded	<i>L. canariensis</i> Langerhans, 1881
—	Six pairs of branchiae; anterior eyes half-moon shaped	<i>L. fauchaldi</i> San Martín, 1987
15 (6)	Eyes large; branchiae present in all but the last few segments	<i>L. oculata</i> (Treadwell, 1941)
—	Eyes indistinct; branchiae limited to an anterior region	16
16 (15)	Caruncle present; antennae smooth	<i>L. ambigua</i> (Monro, 1933)
—	Caruncle absent; antennae articulated	<i>L. spiralis</i> (Wesenberg-Lund, 1949)

and the number of branchial filaments observed in *L. kristiani* poses an interesting problem if this variability is also present in other species of the genus. At least, some variable features have been noted, though not quantified, in *L. paucibranchiata* from the Solomon Islands (Gibbs, 1971). Although the intensity of the

contraction of the anterior end may depend on the physiological state of the animal, Fauvel (1932, 1953) included this as an important feature in his keys, though the reference is rather indirect; *i. e.* prostomium covered versus prostomium uncovered. In any case, the genus should be reviewed on the basis of type and additional materials.

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RESUMEN

Un nuevo poliqueto anfinómico (Annelida: Polychaeta) de las costas occidentales de México. Se describe *Linopherus kristiani* sp. n. sobre la base de 46 ejemplares colectados sublitoralmente (8-80 m) frente a Manzanillo, Colima, y en la zona litoral en Bahía Concepción, Golfo de California. Tiene dos pares de ojos, cirros alargados en el sétigero 2, branquias desde el sétigero 3 y continuadas por 23 segmentos (ámbito: 15-28, SD=3.9) con número variable de filamentos terminales (en el sétigero 16 derecho, \bar{x} =30, ámbito: 5-59, SD=12.2). Se incluye una clave modificada a todas las especies del género, comentarios sobre la variación morfológica y especies asociadas.

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