

SEM and Histological Evidence of Enlarged Nephridial Papillae in *Loandalia* Monro (Polychaeta: Pilargidae)

Sergio I. Salazar-Vallejo

Depto. Ecología Acuática, ECOSUR, Apdo. Postal 424
Chetumal QR 77000 MEXICO

Loandalia Monro and *Parandalia* Emerson & Fauchald are two closely allied pilargid genera. Both have a rather cylindrical body with reduced parapodia anteriorly and enlarged parapodia posteriorly. The prostomial appendages are also similar since they both lack antennae and have bifid, often biarticulated palps. Setae are also similar; notosetae are simple spines sometimes with one or two smaller companion setae dorsally and neurosetae are spinulous capillaries.

When establishing *Parandalia*, Emerson and Fauchald (1971) set the differences between both genera. *Loandalia* was restricted to the type-species (*L. aberrans* Monro), described from one specimen collected off Angola which lacks notopodial spines and has unusually well-developed branchiae in posterior setigers. *Parandalia* was separated from *Loandalia* by possessing notospines and lacking branchiae in posterior setigers. These authors noted, however, that Monro (1936) had described notospines though they did not find any when the type specimen was examined. The branchiae on Monro's specimen are unusual since they are directed ventrolaterally and free from neuropodial lobes. The original designation of these structures as branchiae has been retained by other authors.

The second species of *Loandalia* (*L. maculata*) was described by Intes and le Loeuff (1975) from several specimens collected off the Ivory Coast. They noticed the species was intermediate between both genera since it had emergent notospines and branchiae in posterior setigers. It also had an emergent ventral spine in setiger 1. These authors noted that the branchiae of *L. maculata* were smaller and started more posteriorly (setiger 50; body length 50 mm) than in *L. aberrans* (setiger 33; body length 35 mm). Salazar-Vallejo (1987) described the third species, *L. riojai*, from several specimens collected off Western Mexico. It has notospines from setiger 7 and branchiae from about setiger 22 (body length 59 mm), but it lacks emergent ventral spines in setiger 1. The fourth species, *L. salazar-vallejoi*, was described by de León-González (1991), from three specimens collected off Western Baja California. It has notospines from setigers 10–13 and branchiae from setigers 31–40 (body length 67 mm); this species also lacks any emergent ventral spines in setiger 1.

Thus, in the above species the presence of emergent spines in anterior neuropodia cannot be used to set apart *Loandalia* Monro from *Parandalia* Emerson & Fauchald. Therefore, the only distinguishing feature is the presence of ventrolateral branchiae in *Loandalia* (Salazar-Vallejo 1990).

Branchiae have been employed in polychaete taxonomy to set apart closely allied genera. Although there are some arguments against branchiae as a generic character (Orensanz 1990; Fauchald 1992), its utility still has some support. However, if these enlarged ventrolateral structures were nephridial papillae instead of

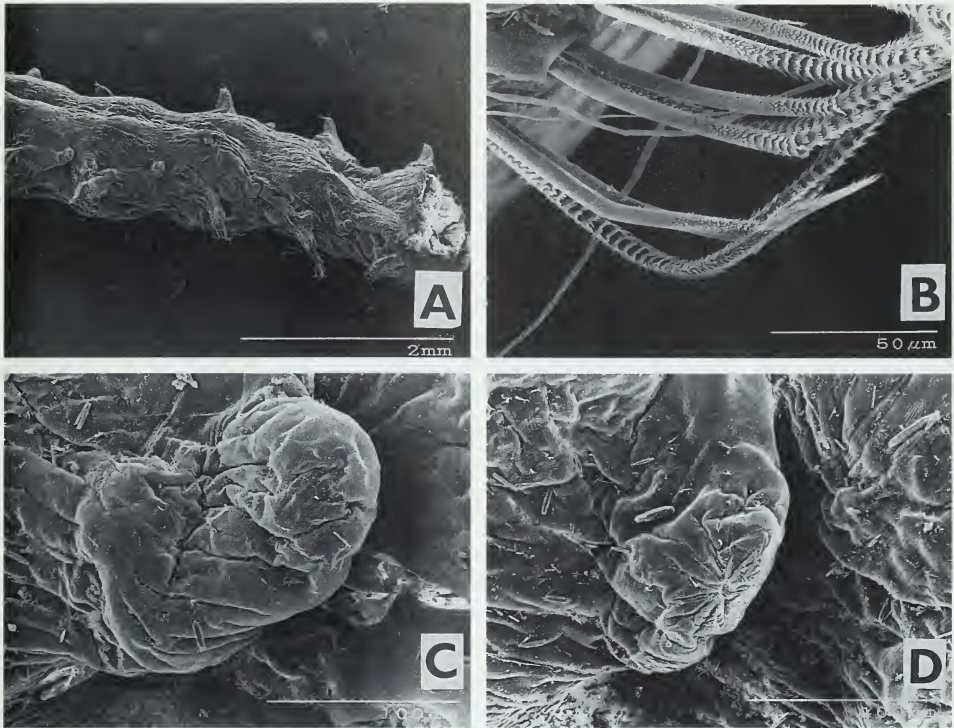


Fig. 1. SEM of a posterior fragment of *Loandalia riojai*. A. Panoramic view of the ventral portion; B. Close-up of neurosetae (the oblique thread is cotton); C. Close-up of closed nephridial papillae; D. Close-up of open nephridial papillae (scale in D is the same as in C).

branchiae, then they could not be used to separate these two genera. Since some nephridial hypertrophy is associated with reproductive activity or with sexual maturity (Schroeder & Hermans 1975), nephridial development cannot be relied upon as a discriminating feature. An early description of enlarged nephridial papillae was provided by Moore (1910:369; Pl. 31, Fig. 60) when he described *Polynoe* (?) *renotubulata*. This species was later moved to a new genus, *Bathymoorea*, by Pettibone (1967) due in part to its extended nephridial papillae. This Research Note presents SEM and histological evidence that the ventrolateral structures in *Loandalia* Monro are nephridial papillae and not branchiae.

Posterior fragments of *Loandalia riojai* Salazar-Vallejo were prepared according to standard methods for SEM and for histological analysis; some modifications were employed (Sosa-Rodríguez, 1993) from standard Hematoxylin and Eosin techniques. SEM analysis was performed in the Electronic Microscopy Unit of the Instituto de Biología, UNAM. The histological process was performed in the Laboratory of Invertebrates, Facultad de Ciencias, UNAM. All photographs were processed in the Photography Lab. of ECOSUR.

In ventral view, nephridial papillae can be seen clearly set off from neuropodium (Fig. 1A); each neuropodium is larger than the papillae and clearly distinguished by the presence of neurosetae which arise from setal bundles containing 2–3 setae each (Fig. 1B). If seen from their tip, nephridial papillae appear either

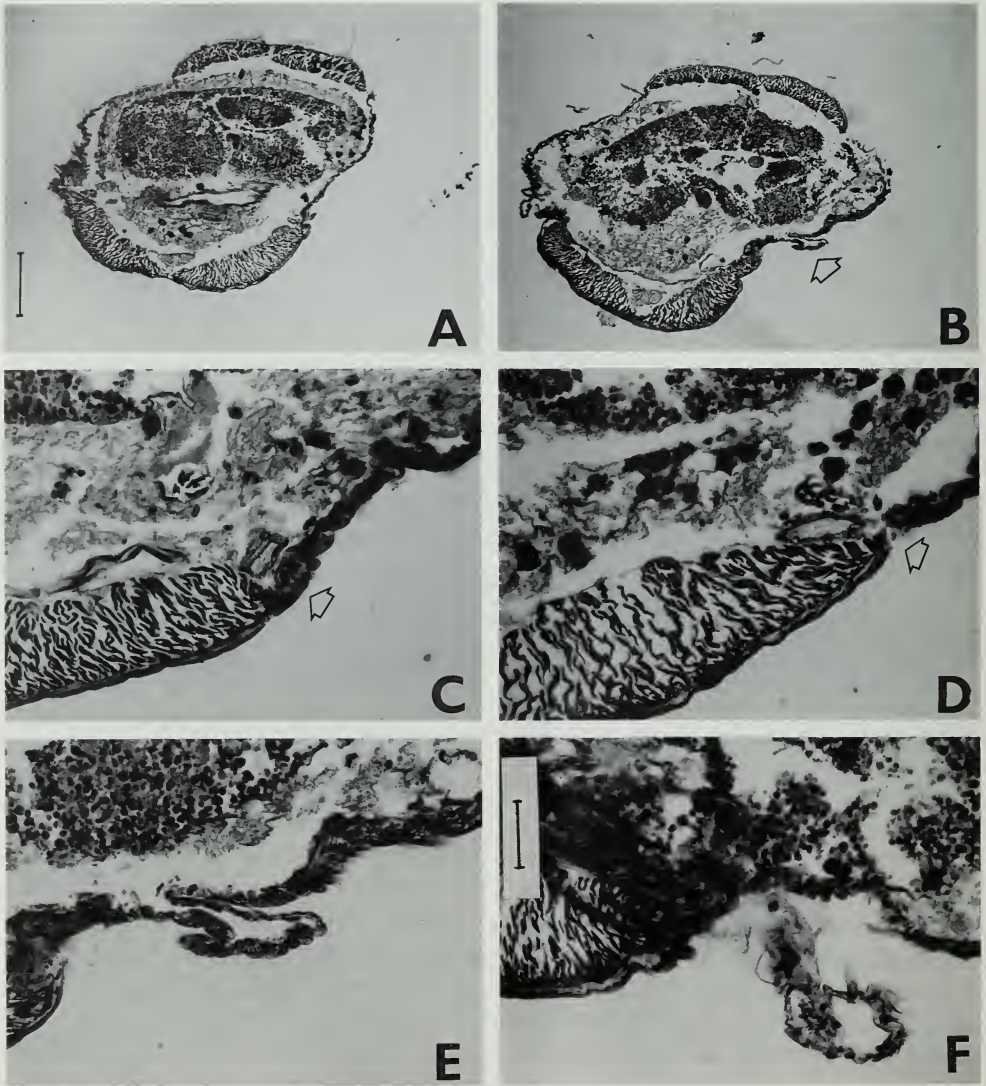


Fig. 2. Cross sections of posterior segments of *Loandalia rojai*. A. Anterior section without nephridial papillae; B. More posterior setiger with enlarged nephridial papilla (indicated by an arrow); C. Close-up of sections with nephridial ciliated funnel; D. Same, in another section; E. Close-up of a section of the enlarged nephridial papilla; F. Same, in another section (Scales: A 150 μm ; F 25 μm ; A and B are at the same scale; C–F are at the same scale).

closed (Fig. 1C), or have a distal nephridiopore opening (Fig. 1D). Since the distal pore might be an artifact of the dehydration process, histological inspection of the internal structure was employed to reveal whether these were branchiae or nephridial papillae.

The papillae are not seen in cross section (Fig. 2A) of anterior segments but in more posterior setigers, a clearly digitate process emerges separate from the neuropodium (Fig. 2B). Throughout the slide series, some tissue sections show a circular ciliated structure that corresponds with the nephridial funnel and is exactly

at the end of the lateral muscular bundles (Figs. 2C, D). More posterior slides show that the enlarged papillae are hollow (Figs. 2E, F). Some major blood vessels can be seen in the tissue but there are no blood vessels associated with the papillae so they cannot be branchiae.

Without true branchiae, the presence of enlarged nephridial papillae cannot be employed to separate *Loandalia* from *Parandalia*. Thus the genus *Parandalia* is a junior synonym of *Loandalia*. Since there is one species with gravid females that lacks enlarged papillae (*P. vivianneae* Salazar-Vallejo & Reyes-Barragán, 1990), these papillae might be associated only with mature males. If some mature males lack these papillae, it might represent an alternative to sperm release. Further study will be necessary on these worms' reproductive biology.

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