

A new species of *Eunice* (Polychaeta: Eunicidae) from Hainan Island, South China Sea*

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Abstract A taxonomic survey of benthic marine animals from coastal regions of Hainan Island, South China Sea, revealed specimens of a new species of *Eunice* (Polychaeta: Eunicidae), *Eunice uschakovi* n. sp., collected from the intertidal zone. The species belongs to the group of *Eunice* that has yellow tridentate subacicular hooks and branchiae scattered over an extensive region of the body. It resembles *E. miurai* and *E. havaica* in having both bidentate and tridentate falcigers, but can be readily distinguished by branchial features. Comparisons between *E. uschakovi* and the two related species are presented.

Keyword: Annelida; Eunicida; taxonomy; coastal regions; intertidal zone

1 INTRODUCTION

Eunice Cuvier, 1817 is the largest eunicid genus with around 220 species distributed worldwide (Zanol et al., 2007). Species of *Eunice* have been widely reported in all major marine areas (Hartman, 1944; Fauvel, 1953; Day, 1967; Fauchald, 1970, 1986; Miura, 1986; Winsnes, 1989). Chinese *Eunice* species have been reported and described by Wu et al. (1975), Wu and Chen (1985), Yang and Sun (1988), Meng et al. (1994) and Sun (1998). So far, there are 20 species of *Eunice* recorded from the China Sea (Sun et al., 2008).

Eunice was subdivided into four groups based on the color and dentition of subacicular hooks by Hartman (1944). Fauchald (1970) considered the four groups should be further subdivided, and added the branchial distribution patterns to Hartman's scheme (Fauchald, 1970). The branchial distribution was defined as the percentage of branchial chaetigers in relation to the total numbers of chaetigers in complete specimens, either more than 65% or less than 55% (Fauchald, 1992). This scheme has been widely accepted by subsequent authors. Although the subdivided groups are taxonomically informal, they provide a convenient method for the identification of *Eunice* species.

Eunice species are present in all marine benthic environments, being especially common in tropical shallow waters, and play significant roles in coral reef communities (Fauchald, 1992). Most species live in crevices of rocks and corals, and sand environments (Hutchings, 1981). In China, species of *Eunice* are common in samples collected from dead corals and sandy beaches of Hainan Island, northern South China Sea. In December 2007, a taxonomic survey of benthic marine animals was carried out in the coastal regions of Hainan Island. The material collected included hundreds of eunicid worms, among which three specimens appeared to be an as yet undescribed species. This species is herein described as new to science.

2 MATERIAL AND METHOD

All specimens examined are deposited in the Marine Biological Museum of the Chinese Academy of Sciences (MBMCAS) in the Institute of Oceanology (IOCAS), preserved in 70% ethanol solution.

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Microscopy observation was made using a Zeiss Stemi SV 11 Apo stereomicroscope and a Zeiss Axiostar plus compound microscope. The illustrations were made using a XSZ-H camera lucida and an AxioCam MRc5 digital camera. The following measurements and counts were made: total length, maximum width (including parapodia), numbers of chaetigers present.

3 TAXONOMY

Family Eunicidae Berthold, 1827

Genus *Eunice* Cuvier, 1817

Eunice uschakovi n. sp. (Figs.1–3)

Material examined HOLOTYPE: China, Hainan, Sanya, Xiaodonghai, MBM119813, coral reef from intertidal beach, coll. Yanli Lei, 25 Dec. 2007. PARATYPE: same locality as for holotype, MBM119814 ($n=1$), coll. Zhi Zhou, 24 Dec. 2007; MBM119815 ($n=1$), coll. Xianqiu Ren, 24 Dec. 2007.

Measurements The holotype is a mature female with eggs in the body cavity, consisting of a well-preserved anterior fragment, two median and one posterior fragments. The anterior part has 35 chaetigers, is about 24 mm long and 4.5 mm maximum width; two median parts have 18 and 55 chaetigers each, and the posterior part has 64 chaetigers. Paratype: both (MBM119814, MBM119815) consist of an anterior and posterior fragment.

Description Preserved animal pale, epithelium slightly iridescent. Anterior body cylindrical in cross-section, becoming slightly flattened dorsoventrally in median and posterior segments. The holotype is a mature female with eggs in the posterior body cavity. The eggs are scattered into the basal part of the parapodia (Fig.3d).

Prostomium (Fig.1a, c) bilobed anteriorly, distinctly shorter than peristomium, about as wide as peristomium. Prostomial lobes frontally obliquely truncate, dorsally inflated; median sulcus deep, V-shaped. Antennae and palps (Fig.1c) arranged in a semicircle, evenly spaced, similar in thickness. All prostomial and peristomial appendages tapering, with distinct cylindrical articulations; median antenna, with up to 17 articulations, extending to chaetiger 6; lateral antennae with 11 articulations, to chaetiger 2; palps with 7 articulations, to anterior edge of posterior peristomial ring. Peristomium (Fig.1d) cylindrical. Separation between rings distinct dorsally and ventrally; anterior ring 4/5 of total peristomial length. Peristomial cirri (Fig.1e) reaching or exceeding

anterior edge of first peristomial ring, with about 6 articulations. Eyes (Fig.1c, d, e) behind bases of palps, black, overlapped by peristomial fold.

Maxillary formula: I=1+1, II=4+6, III=6+0, IV=6+9, and V=1+1. Mx III long and located behind left Mx II (Fig.2a). Mandibles shorter than maxillae, brown on the shafts, well calcified on the anterior end (Fig.2b).

Notopodial cirri (Fig.1d, e) digitiform, with up to 3–4 indistinct articulations limited to anterior chaetigers. First 4 ventral cirri (Fig.1b) thick, tapering. Ventral cirri with inflated bases from about chaetiger 5; inflated bases ovate, narrow tips tapering. Posterior ventral cirri gradually becoming slender and inflated bases disappearing at last 12 chaetigers.

Branchiae (Fig.3a–d) pectinate, longer than notopodial cirri. Branchiae from chaetiger 4–5, to posterior end, present on more than 65% of total number of chaetigers. Branchial filaments digitiform, distinctly shorter than notopodial cirri; first branchia with 2–4 small filaments; maximum 11–15 filaments at chaetiger 7–9.

Chaetae (Fig.3a–d) arranged in two fascicles separated by oblique row of aciculae. Superior fascicle with limbate and pectinate chaetae, inferior fascicle with compound falcigers. Aciculae (Fig.3e, f) yellow, paired in most chaetigers, but up to 3 aciculae in anterior chaetigers; acicula tapering with blunt tips, or distally expanded, apparently bifid; straight or slightly bent. Limbate chaetae (Fig.3g) slightly curved, tapering, with narrow wings. Pectinate chaetae (Fig.3m) flat, symmetrical, one marginal tooth slightly longer than other teeth, with 10–11 teeth. Shafts of compound falcigers (Fig.3i–l) slightly inflated, marginally serrated. Appendages short, bidentate or tridentate. Tridentate falcigers present from about chaetiger 20, with small third tooth distinctly separated from second tooth. Proximal tooth triangular, laterally directed, median tooth gently curved, directed obliquely distally. Guards marginally serrated. Subacicular hooks (Fig.3h) yellow, tridentate with teeth in a crest. Hooks first present from chaetiger 23–26, present in all chaetigers thereafter, single in most chaetigers. Proximal tooth much larger than distal tooth, triangular, directed laterally.

Pygidium bearing one pair of anal cirri, with 3 articulations, extending to the last 8th chaetiger.

Variation The chaetiger on which branchiae start varies from 4–5. The maximum number of branchial filaments varies from 11–15 depending on the size of

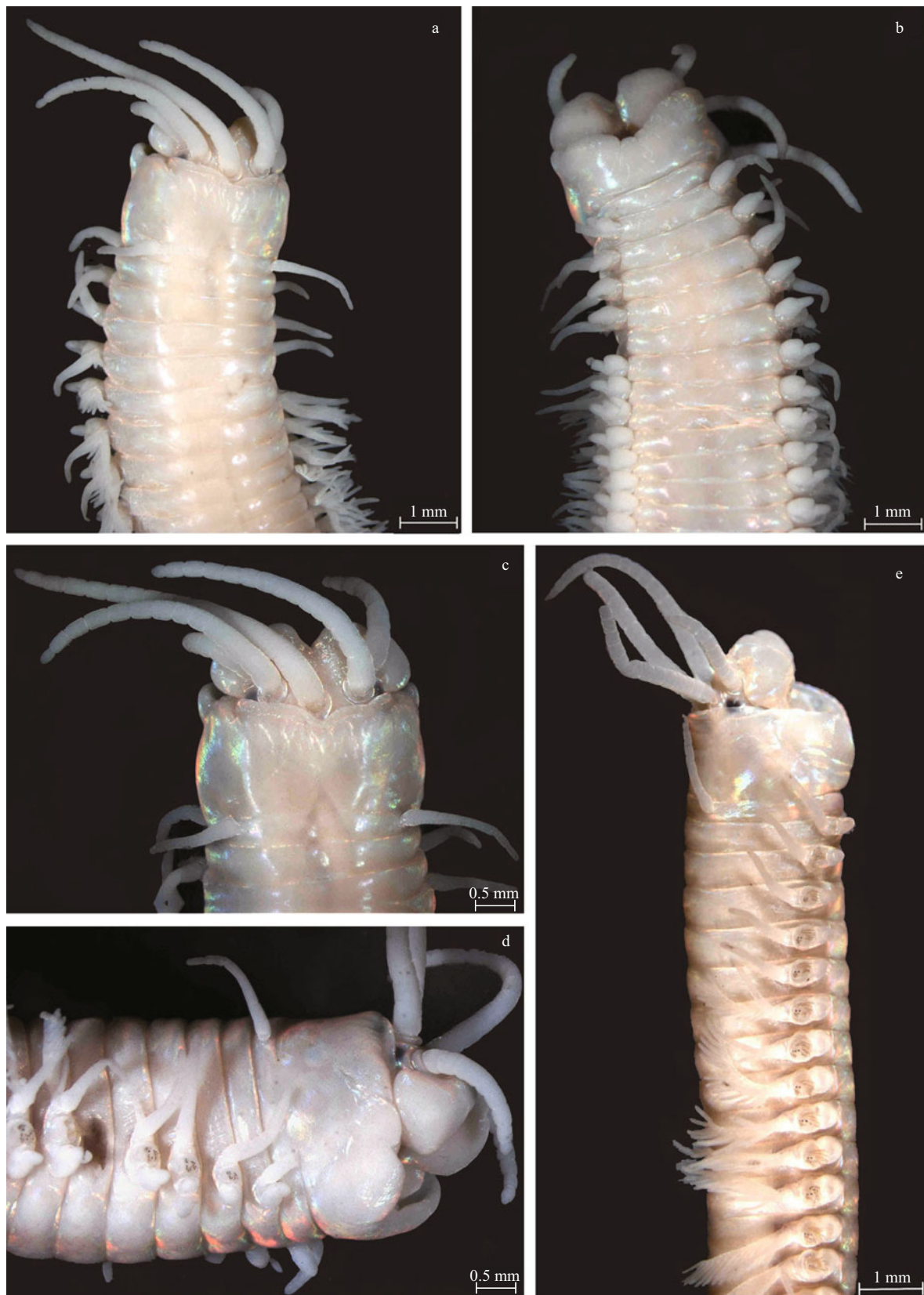
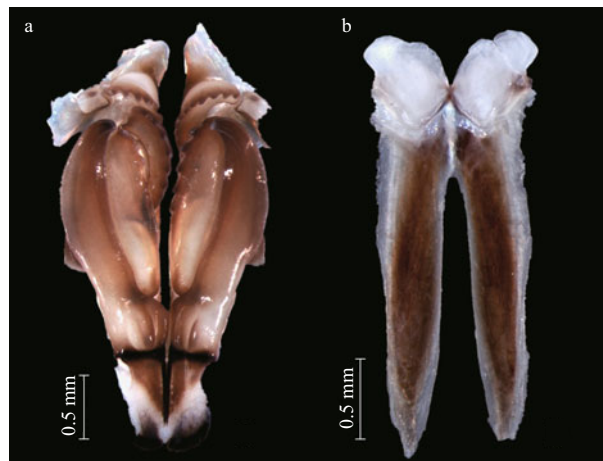


Fig.1 *Eunice uschakovi* n. sp.

a. Holotype (MBM119813), anterior segments, dorsal view; b. Holotype, anterior segments, ventral view; c. Holotype, anterior end, enlarged dorsal view; d. Holotype, anterior end, lateral view; e. Paratype (MBM119815), anterior segments, lateral view.

Table 1 Comparison of *Eunice uschakovi* and two similar species with both bidentate and tridentate falcigers

	<i>E. uschakovi</i> n. sp.	<i>E. miurai</i>	<i>E. havaica</i>
Data source	Type description	Type description (Carrera-Parra and Salazar-Vallejo, 1998)	Type description (Fauchald, 1992)
Maximal width	4.5 mm	3 mm	1 mm
Prostomium–median sulcus	Deep, V-shaped	Shallow	Shallow
Dorsal cirri–articulations No.	At most 3	?	At least 6
Branchiae–first chaetiger	4–5	5–6	6
Branchiae–end	Posterior end	24	Near posterior end
Branchiae–max. No. Filaments	11–15	3–5	5
Subacicular hooks–first chaetiger	23–26	18–23	19–23
Distally bifid aciculae	Present	Present	Absent
Maxillary formula	1+1, 4+6, 6+0, 6+9, 1+1	1+1, 6+7, 7+0, 7+11, 1+1	1+1, 7+7, 7+0, (6-8)+8, 1+1

**Fig.2 Jaw apparatus of *Eunice uschakovi* n. sp.**

a. Paratype (MBM119815), maxillae; b. Paratype (MBM119815), mandibles.

the specimen. The chaetiger on which subacicular hooks start varies from 23–26.

Remarks According to the definition given by Fauchald (1992), *E. uschakovi* n. sp. belongs to group C-2 of *Eunice*, in which subacicular hooks are yellow tridentate and branchiae are present on more than 65% of the body. The new species can be easily distinguished from the other species of group C-2 by the combination of the following characters: compound falcigers bidentate or tridentate, tridentate falcigers present from about chaetiger 20; acicula tapering with blunt tips or distally expanded, apparently bifid; notopodial cirri with up to 3 articulations limited to anterior chaetigers; branchiae present from chaetiger 4–5 to near posterior end, with up to 11–15 filaments.

Of species in group C-2, *E. aequabilis* Grube, 1878, *E. elseyi* Baird, 1869, *E. havaica* Kinberg, 1865, *E. margaritacea* Fischli, 1900 and *E. martensi* Grube, 1878 have tridentate compound falcigers (Fauchald, 1992). However, only one species, *E. havaica* Kinberg, 1865, has both bidentate and tridentate falcigers.

The new species resembles *E. havaica* in many morphological characters. The main difference is that *E. havaica* has branchiae present from chaetiger 6 to near posterior end, with up to 5 filaments, while branchiae of the new species are present from chaetiger 4–5, with up to 11–15 filaments. Further, *E. havaica* has notopodial cirri with at least 6 articulations, and aciculae have bluntly conical tips. However, the notopodial cirri of *E. uschakovi* have at most 4 articulations, and aciculae have blunt or apparently bifid tips (Table 1).

Eunice uschakovi n. sp. resembles *E. miurai* Carrera-Parra and Salazar-Vallejo, 1998 from the Caribbean Sea in having two kinds of falcigers and distally bifid aciculae. They can also be distinguished by the branchial features, because *E. miurai* has less than 20 branchial segments, i.e., less than 55% of the total chaetigers (Table 1).

Etymology *Eunice uschakovi* is named to recognize the work and efforts of P. V. Uschakov, a pioneer of taxonomical and ecological research of polychaetes from China.

Distribution Hainan Island, China.

4 DISCUSSION

Chinese *Eunice* species are mostly distributed in the South China Sea. Sun et al. (2008) recorded 11

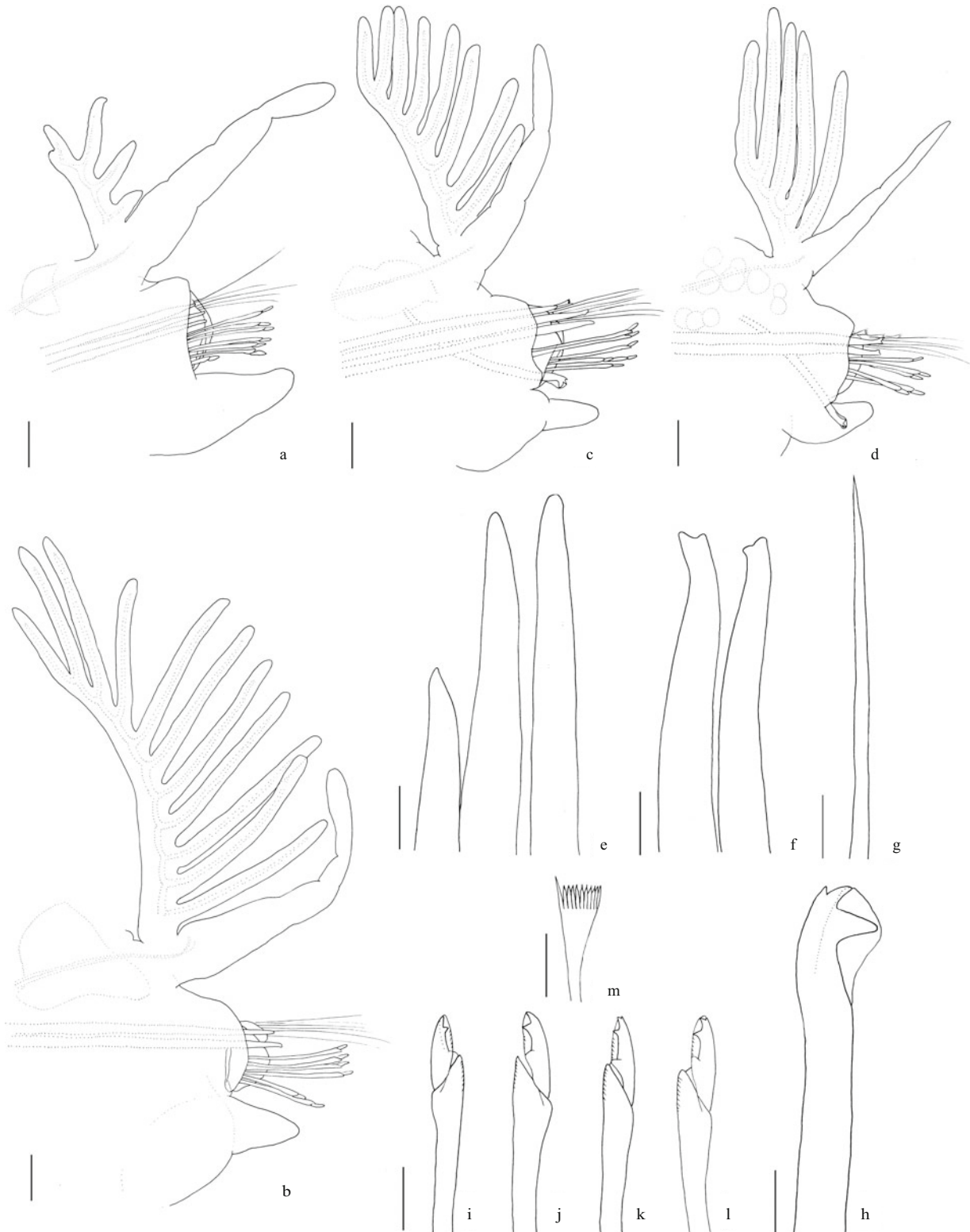


Fig.3 Illustrations of *Eunice uschakovi* n. sp.

a. Parapodium 5, anterior view; b. Parapodium 10, anterior view; c. Parapodium 30, anterior view; d. Posterior parapodium, anterior view; e. Aciculae from chaetiger 30; f. Aciculae from posterior chaetiger; g. Limbate chaeta from chaetiger 10; h. Subacicular hook from chaetiger 30; i. Compound falciger from chaetiger 10; j. Compound falciger from posterior chaetiger; k. Compound falciger from chaetiger 21; l. Compound falciger from chaetiger 26; m. Pectinate chaeta from median chaetiger. Holotype (b–j, m), Paratype (MBM119814, a, k–l). Scale=0.2 mm (a–d); 0.05 mm (e–m).

species from the region. Paxton and Chou (2000) provided a checklist of polychaete annelids from the South China Sea, and recorded 14 species of *Eunice*. New species or new record species are expected to be discovered in the future. This study not only enriches our knowledge about the eunicid diversity in the region, but also provides bases for more taxonomical research of polychaetes from the South China Sea.

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