

Report of *Metasychis gotoi* (Maldanidae, Polychaetes), and a new related species from China Seas

[Ery Assis1] Comentário: I suggest remove Polychaeta. In several phylogenetic analysis it arise as paraphyletic. I would put ANNELIDA. If you want to leave it, please, use: Polychaeta

SUGGESTION:

Metasychis varicollares sp. nov., and report of *Metasychis gotoi* (Maldanidae, Annelida) from China Seas

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Abstract

The distribution of a widely ranged polychaete species from Indo-Pacific and European waters, *Metasychis gotoi* (Izuka, 1922), is reported and remarked, with the description of a new species, *Metasychis varicollaris* sp. n., based on the *Metasychis* specimens collected from China Seas.

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The analysis of geographic potential distributions of *M. gotoi* indicates it could occur in the most coastal areas of China. The new species *M. varicollaris* and *M. gotoi* have overlapping distribution in northern-Northern South China Sea. *Metasychis varicollaris* sp. n. is characterized by the presence of crenulated cephalic rim, complete collar on the first chaetiger, anal funnel packet-shaped anal plate, spirally-fringed notochaetae with spirally pectinate bands imbricated over the main shaft. A taxonomic key to distinguish all species of *Metasychis* is provided.

37

38 **Introduction**

39 The maldanids are easily recognized capitelliform polychaetes with cylindrical body. They
 40 Individuals have elongate segments in median to posterior region of the body, -with the
 41 parapodia at one end resembling slender bamboo-shoots (Fauchald, 1977). The maldanids are
 42 found in hard or soft substrates from the intertidal region to the deep sea (Paterson et al. 2009;
 43 De Assis and Christoffersen 2011). Malmgren erected the family Maldanidae in 1867.
 44 Arwidsson (1907) subsequently divided the family into five subfamilies: Euclymeninae,
 45 Lumbriclymeninae, Maldaninae, Nicomachinae, and Rhodininae. After that three additional
 46 subfamilies have been proposed: Clymenurinae by Imajima and Shiraki (1982a), Boguinae by
 47 Wolf (1983), and Notoproctinae by Detinova (1985), and Boguinae by Wolf (1983). De assis
 48 Assis and Christoffersen (2011) reviewed-proposed the phylogenetic relationships of
 49 Maldanidae subgroups based morphological data. The-In this proposal, the subfamilies
 50 Clymenurinae and Boguinae are not supported by the character-based phylogenetic tree
 51 estimated using maximum parsimony.

52 The Maldaninae genus *Metasychis* was erected by Light (1991) to including-include four
 53 species: They are *M. collariceps* (Augener, 1906), *M. disparidentatus* (Moore, 1904), *M.*
 54 *fimbriatus* (Treadwell, 1934), *M. gotoi* (Izuka, 1902). The members of Maldaninae They are can
 55 be distinguished from other members of Maldaninae by the combination of characters: well
 56 developed cephalic rim with crenulations or cirri, nuchal grooves J- or U- shaped, chaetiger 1
 57 with reduced or complete collar, notochaetae on the middle body with spirally fringed distal
 58 ends, funnel-like pocket anal plate. Only one *Metasychis* species was recorded from China Seas
 59 (Liu, 2008; Yang & Sun, 1988; recorded as *Asychis gotoi*). We examined the Maldaninae
 60 specimens deposited in the Marine Biological Museum of the Chinese Academy of Sciences
 61 (MBMCAS). In this study, a new species related to of *Metasychis* genus gotoi is described, and
 62 illustrated from the northern South China Sea. They-The species are overlapping distributed in
 63 this area.

64

65 **Materials & Methods**

66 All Maldaninae specimens deposited in the Marine Biological Museum of the Chinese Academy
 67 of Sciences (MBMCAS) in the Institute of Oceanology (IOCAS), collected during the “National
 68 Comprehensive Oceanography Survey” (NCOS, 1958–1960) and the Sino-Vietnam Joint
 69 Comprehensive Oceanographic Survey of Beibu Gulf (1959–1961), were examined. Specimens
 70 examined are preserved in 75% ethanol solution. Sampling sites are shown in Figure 1.

71 Geographic potential distributions of *Metasychis gotoi* was predicted used MaxEnt program
 72 (Steven et al., 2019) with dismo packages (Robert et al., 2017) in R environment. Ten
 73 environmental variables (mean of Chlorophyll, Dissolved oxygen, Iron, Nitrate, Phosphate,
 74 Phytoplankton, Primary productivity, Salinity, Silicate, and Temperature at present benthic mean
 75 depth) downloaded from Bio-ORACLE (Assis et al., 2017; Tyberghein et al., 2012) and 115

[Ery Assis2] Comentário: I haven't seen this term in a long time. Please, when referred to Maldanidae, please, use: Capitellida or Maldanomorpha. See De Assis & Christoffersen, 2011. Tilic et al., 2015.

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[Ery Assis3] Comentário: The cited references are not standardized. Please, revise.

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presence localities was used in the analysis. Twenty-five percent of localities ~~was~~were selected randomly for model evaluating with evaluate function in dismo package.

Zeiss Stemi 2000-C stereo microscope and compound microscopes were used for morphology observations. Line drawings were made using a UGEE electronic drawing tablet in Adobe Photoshop environments. Samples for SEM (scanning electron microscopes) observations were rinsed with distilled waters (12 hours), in order to dissolve mineral crystals, run through a series of ethanol concentrations, and stored in absolute alcohol until observation.

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Results

Family Maldanidae Malmgren, 1867

Subfamily Maldaninae Malmgren, 1867

Genus *Metasychis* Light, 1991

Metasychis Light, 1991: 133–146; Wang & Li, 2016: 13.

Type species: *Metasychis disparidentatus* (Moore, 1904)

Diagnosis (emended from Light, 1991).

Body with 19 chaetigers, without neurochaetae on the first chaetigers. Lateral cephalic rim with crenulations or digitate cirri, fusing with expanded prostomial palpode or setting off from it by furrows. Nuchal groove J- or U-shaped. Collar on chaetiger 1 complete, or reduced to a thick ventral roll of tissue. Notochaetae ~~with~~including spirally fringed fimbriae. One preanal achaetigerous segments or none. No anal valve. Pygidium well developed, forming a deep, posterior, funnel-like pocket, with a pair of deep lateral notches. Dorsal lobe of the pygidium with or without cirri.

Remarks. In Light (1991) description, *Metasychis* species usually has type B notochaetae, in which the fimbriae are more delicate and expanded away from the shaft. However, notochaetae of *M. varicollaris* sp. n. and *M. gotoi* examined here are more close to type A notochaetae, in which the fimbriae are spinose and closely imbricated over the main shaft. When we sorted the *Metasychis* material in the Marine Biological Museum of Chinese Academy of Sciences, several specimens with distinct collar are checked out, they should belong to a new species, and is described as the following.

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[Ery Assis4] Comentário: I did not understand

[Ery Assis5] Comentário: What was different of description of Light 1991? Please, explain the main differences.

[Ery Assis6] Comentário: Pre-pygidial????

[Ery Assis7] Comentário: Light, 1991, "Typically, type B spirally fringed notosetae, sometimes type A"....p. 141.

116

117 *Metasychis varicollaris* sp. n.

118 (Fig. 2)??????? A. B. C?????

119 **Material examined.** Holotype. MBM 012597, South China Sea, st. 6052, 21.5°N, 114°E, 54.5 m
120 depth, 9 Apr. 1959. Complete specimen, length ca. 67 mm, width ca. 2.2 mm at first chaetiger,
121 with muddy tube encompassment. Paratypes. MBM 012647, South China Sea, st. 6045, 21.75°N,
122 114.5°E, 61 m depth, 20 Mar. 1959. Anterior fragment with 10 chaetigers. Chaetigers 11–12
123 was used to SEM examination. MBM 012658, South China Sea, st. 6045, 21.75°N, 114.5°E,
124 59.6 m, muddy sediment, 8 Apr. 1960. MBM 012676, South China Sea, st. 6116, 21°N, 111.5°E,
125 41 m depth, muddy sediment, 12 Apr. 1959. Other specimens examined. MBM 012576, South
126 China Sea, st. 6051, 21.75°N, 114°E, 44 m, muddy sediment, 9 Dec. 1959. MBM 012674, South
127 China Sea, st. 6131, 20°N, 111.25°E, 50 m, muddy sediment, 6 Apr. 1960. 46.4 mm. MBM
128 012645, South China Sea, st. 6131, 20°N, 111.25°E, 44 m, 29 Oct. 1959.

129

130 **Description.** Body cylindrical, ~~consisting of with~~ 19 chaetigers, and a funnel-shaped pygidium
131 (Fig. 2A–D). ~~Head~~ Anterior end obliquely truncate, with an elliptical cephalic plate (Fig. 2B, E).
132 Cephalic rim divided into three parts by a pair of deep lateral notches. Crenulations on cephalic
133 rim well-developed. Prostomial palpode broadly rounded. Nuchal groove curved, slightly J-
134 shaped (Fig. 2B, E), with many small curly cilia in it (Fig. 2F). Cephalic keel remarkable, high
135 and long, with posterior part widens (Fig. 2B, E).

136 First three chaetigers relatively short, about 1–2 times as long as wide, biannulate in lateral
137 view (Fig. 2A). ~~A-p~~ Prominent complete collar on the first chaetiger. Dorsal part well developed,
138 longer than ventral part, extending forward (Fig. 2A). Mid-body, and posterior chaetigers usually
139 with inflated neuropodial tori. Neurochaetae present from the second chaetiger, typically rostrate
140 uncini similar on all chaetigers, arranged in a row on neuropodial tori (Fig. 2G, H). Capitium of
141 uncinus with 5–6 transverse arcs of small teeth. First arc with about 12 small teeth larger than on
142 other arcs. A tuft of bristles under the main fang. Anterior chaetigers with simple capillary
143 notochaetae (Fig. 2I). Middle and posterior chaetigers with long spirally-fringed notochaetae and
144 geniculate notochaetae (Fig. 2J, K, N). Simple capillary notochaetae two kinds: limbate and
145 common capillary. Limbate capillary with narrow wing on one side (Fig. 2L), while common
146 capillary having no similar structures (Fig. 2M). Spirally-fringed notochaetae with two spirally
147 pectinate bands imbricated over the main shaft.

148 ~~Pre-pygidial anal~~ achaetigerous segment absent. Anal mound well-developed (Fig. 2C). Anal
149 pore without anal valve. Anal plate elliptical in end view, shallow funnel shaped. Deep lateral
150 notches separating anal plate into dorsal and ventral lobes. Dorsal lobe expanded, disc-shaped,
151 without marginal cirri observed. Ventral lobe forming shallow posterior pocket, with a widen
152 midventral notch.

153 **Etymology.** “vario”, Latin, different, various; “collare”, Latin, collar, neck. The specific name
154 *varicollaris* referres to the collar shape of this species different from that of congeneric members.

155 **Distribution.** Northern South China Sea.

[Ery Assis8] Comentário: How many? What is the form of these crenulations?

[Ery Assis9] Comentário: I did see this feature in figures.

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[Ery Assis10] Comentário: Is there any variation between the first three uncini from subsequent uncini?

[Ery Assis11] Comentário: It is deserve SEM in lateral view.

[Ery Assis12] Comentário: Compani on Chaetae?

[Ery Assis13] Comentário: You made SEM of the head, but you do not present of Pygidium. Is possible to make?

[Ery Assis14] Comentário: Why did not you make SEM from posterior end?

[Ery Assis15] Comentário: ???????

[Ery Assis16] Comentário: ???????

156 **Remarks.** *Metasychis varicollaris* sp. n. is anatomically similar to *M. gotoi*, especially in body
157 size and cephalic plate. However, the new species has a fully developed collar in chaetiger 1, as
158 opposed to a ventral collar in *M. gotoi*. *Metasychis collariceps* (Augener, 1906) and *M.*
159 *fimbriatus* (Treadwell, 1934) also has a complete collar on chaetiger 1. The new species can be
160 distinguished from the two species by the form of collar and cephalic rim. Collar is laterally
161 notched in *M. collariceps*, but that is entire in the new species. Margin of the posterior cephalic
162 rim is entire in *M. fimbriatus*, but that is crenulated in the new species.

163
164 ***Metasychis gotoi* (Izuka, 1902)**

165 (Fig. 3)

166 *Maldane gotoi* Izuka, 1902, p.109, Pl. 28, figs. 1–8

167 *Asychis gotoi* (Izuka, 1902) - Imajima, 1982b, p.75, fig. 36a–l; Yang and Sun, 1988, pp.264–265,
168 fig. 125F–K

169 *Maldane coronata* - Moor, 1903, p. 483–485, Pl. 28, figs. 94–96

170 *Metasychis gotoi* (Izuka, 1902)–Light, 1991, fig. 1L–M

171 **Material examined.** MBM 006305–006307; 006310–006312; 006317; 006320; 006347;
172 006355; 006412; 007966; 007967; 008113; 008119; 008138; 012498; 012518; 012564–012566;
173 012569; 012571; 012573–012574; 012577–012580; 012582; 012586; 012588–012591;
174 012593; 012603–012607; 012611; 012615–012619; 012621–012626; 012628; 012630; 012633;
175 012636; 012640–012643; 012646; 012648; 012650–012652; 012654–012655; 012657; 012660;
176 012664–012665; 012668–012670; 012675; 012677; 012679; 012681; 012685–012687; 012708;
177 012715; 012730; 201449–201455; 201457–201461; 201463; 201466; 201475–201492.

178 **Diagnosis.** Cylindrical body with nineteen chaetigers. First chaetiger with a short ventral collar
179 (Fig. 3B, C). The first four chaetigers biannulate in dorsal view, and usually with epidermal
180 glands. The following 5–6 chaetigers only with ventral epidermal glands (Fig. 3D).

181 The cephalic plate elliptical (Fig. 3A). Prostomial palpode broadly rounded, mushroom-
182 shaped. Cephalic rim developed, divided into three parts by two lateral notches. Lateral cephalic
183 rim with 5–7 digitate cirri (Fig. 3A–C). The posterior rim with irregular crenulations, sometimes
184 with several digitate cirri. Cephalic keel short and broad. Nuchal groove curved, slightly J-
185 shaped, extending outwards and forwards and forming a faint notch separating lateral cephalic
186 rims from prostomial palpode.

187 Anal plate well developed, divided into a flaring dorsal lobe and a deep funnel-shaped ventral
188 lobe (Fig. 3E, F). Margin of the dorsal lobe usually with six slender cirri.

189 Notochaetae approximately arranged in two rows. Anterior chaetigers with simple capillary
190 notochaetae including stout notochaetae and short companion chaetae (Fig. 3G, J). Middle and
191 posterior chaetigers with geniculate companion chaetae and spirally fringed notochaetae, spinose
192 spiral bands closely imbricated over main shaft (Fig. 3H, I, N, O). The first chaetiger without
193 neurochaetae. The neurochaetae, presenting from the second chaetiger, rostrate uncini with
194 several transversal rows of small teeth on main fang (Fig. 3K–M).

195 Tube encrusted with mud.

[Ery Assis17] Comentário: If possible, I would like to see SEM from anterior and posterior end.

[Ery Assis18] Comentário: I do not see this form in Figure. I see a set of irregular serrations or small cirri.

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[Ery Assis19] Comentário: In the specimens illustrated by Imajima & Shiraki, 1982, the ventral edge has a margin undulating. It is not appear in your specimens. Please, explain.

196 |
197 | **Distribution.** *Metasychis gotoi* is widely distributed in Indo-Pacific ocean (Fauvel, 1932; Liu,
198 | 2008; Yang & Sun, 1988) and introduced into Mediterranean Sea (Zenetos et al., 2010).
199 | Predicted potential distribution show that *M. gotoi* could occur in the most coastal areas in China
200 | (Fig. 1).

201 | **Remarks.** To date, members of *Metasychis* reported having limited geographical distribution
202 | except *M. gotoi*. *Metasychis collariceps* distributed in Caribbean Sea, *M. disparidentatus* from
203 | western Canada south-South to southern-Southern California and Japan, *M. fimbriatus* distributed
204 | in Puerto Rico. *Metasychis gotoi* is distinguishable from other species of *Metasychis* by having
205 | developed crenulated cephalic rim, ventral collar on the first chaetiger and anal cirri. This
206 | combination of characters is closest to *M. disparidentatus*. However, there is no cirrus on anal
207 | plate of *M. disparidentatus*. The five species may be distinguished by the following key:

208 |
209 | **Key to species of *Metasychis* Light, 1991**

- 210 | 1. Fully developed collar on the first chaetiger 2
211 | Collar limited to ventral side of the first chaetiger 4
212 | 2. Collar entire without lateral notches 3
213 | Collar with lateral notches *M. collariceps*
214 | 3. Posterior part of cephalic rim crenulated *M. varicollaris* sp. nov.
215 | Posterior part of cephalic rim entire *M. fimbriatus* (Treadwell, 1943)
216 | 4. Cephalic rim with faint crenulations; anal plate without cirri *M. disparidentatus*
217 | Lateral lobes of cephalic rim usually with digitate cirri; dorsal lobe of the anal plate with slender cirri
218 | *M. gotoi*

219 |
220 | **DISCUSSION**

222 | I RECOMMEND TO THE AUTHORS THAT THEY PROVIDE A DISCUSSION BASED ON
223 | SYSTEMATICS OF THE *METASYCHIS* SPECIES. FOR EXAMPLE, IN WORM SITE THE
224 | SPECIES *M. COLLARICEPS* IS ACCEPTED AS *ASYCHIS COLLARICEPS*
225 | [Shttp://www.marinespecies.org/aphia.php?p=taxdetails&id=333054](http://www.marinespecies.org/aphia.php?p=taxdetails&id=333054)

227 | **Acknowledgements**

228 | The authors are grateful to VLIZ Library for providing important references. We also thank the
229 | managers of the Marine Biological Museum of the Chinese Academy of Sciences for their help
230 | in sorting the material.

234 | **References**

[Ery Assis20] Comentário:
Please, you can be consistent in citation: Yang & Sun, 1988.....or De Assis and Christoffersen 2011.

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[Ery Assis21] Comentário:

[Ery Assis22] Comentário: Please, add authority of the species

This species is accepted as *Asychis collariceps*. Please, see WoRMS. It is need to read the original paper Augener, 1906, and make a decision.

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[Ery Assis23] Comentário: In WoRMS is *M. disparidentata*. Please, check!

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[Ery Assis24] Comentário: Please, review the all reference in detail.

236 Arwidsson I. 1907. Studien über die Skandinavischen und Arktischen Maldaniden nebst
 237 | zusammenstellung der übrigen bisher bekannten Arten dieser Familie. *Zoologische Jahrbcher* 9
 238 | *Supplement*(*Suppl.*): 9:1–308.
 239 Assis J, Tyberghein L, Bosh S, Verbruggen H, Serrão E, De Clerck O. 2017. Bio-ORACLE v2.0:
 240 | Extending marine data layers for bioclimatic modelling. *Global Ecology and Biogeography*; 00:1–8.
 241 | <https://doi.org/10.1111/geb.12693>
 242 De Assis JE, Christoffersen ML. 2011. Phylogenetic relationships within Maldanidae (Capitellida:
 243 | Annelida), based on morphological characters. *Systematics and Biodiversity* 9:41–55. doi:
 244 | 10.1080/14772000.2011.604358
 245 Detinova NN. 1985. Taxonomy, composition and distribution of polychaetes of subfamily
 246 | Lumbriclymeninae (Maldanidae). *Issledovaniya Fauny Morei* 34:25–29.
 247 Fauchald K-. 1977. The polychaete worms, definitions and keys to the orders, families and genera.
 248 | *Natural History Museum of Los Angeles County, Science Series* 28:1–188.
 249 Imajima M, Shiraki Y. 1982a. Maldanidae (Annelida: Polychaeta) from Japan. (Part 1). *Bulletin of the*
 250 | *National Science Museum, series A (Zoology)* 8(1):7–46.
 251 Imajima M, Shiraki Y. 1982b. Maldanidae (Annelida: Polychaeta) from Japan. (Part 2). *Bulletin of the*
 252 | *National Science Museum, series A (Zoology)* 8(2): 47–88.
 253 Izuka A. 1902. On two new species of the family Maldanidae from the Sagami Bay. *Annotationes*
 254 | *zoologicae Zoologicae japonenses Japonenses* 4(4): 109–114.
 255 Light WHJ. 1991. Systematic revision of the genera of the Polychaeta subfamily Maldaninae Arwidsson.
 256 | *Ophelia Supplement* 5:133–146.
 257 Liu R. 2008. *Checklist of Marine Biota of China Seas* (in Chinese). Beijing: Science Press, 446.
 258 Malmgren AJ. 1867. *Annulata Polychaeta Spetsbergiae, Gröenlandiae, Islandiae et Scandinaviae*
 259 | *hactenus cognita*. Ex Officina Frenckelliana, Helsingforslae. doi: 10.5962/bhl.title.13358
 260 Moore JP. 1903. Polychaeta from the coastal slope of Japan and from Kamchatka and Bering Sea.
 261 | *Proceedings of the Academy of Natural Sciences of Philadelphia*: 55:401–490.
 262 Paterson GL, Glover AG, Froján CB, Whitaker A, Budaeva N, Chimonides J, Doner S. 2009. A census of
 263 | abyssal polychaetes. *Deep Sea Research Part II: Topical Studies in Oceanography* 56(19): 1739–
 264 | 1746. doi: 10.1016/j.dsr2.2009.05.018
 265 Hijmans RJ, Phillips S, Leathwick J, Elith J. 2017. dismo: Species Distribution Modeling. R package
 266 | version 1.1-4. <https://CRAN.R-project.org/package=dismo>
 267 Steven J. Phillips, Miroslav Dudík, Robert E. Schapire. [Internet] Maxent software for modeling species
 268 | niches and distributions (Version 3.4.1). Available at
 269 | http://biodiversityinformatics.amnh.org/open_source/maxent/ (Accessed on 16 April 2019)
 270 Tyberghein L, Verbruggen H, Pauly K, Troupin C, Mineur F, De Clerck O. 2012. Bio-ORACLE: A
 271 | global environmental dataset for marine species distribution modelling. *Global Ecology and*
 272 | *Biogeography* 21: 272–281.
 273 Wolf PS. 1983. A revision of the Bogueidae Hartman and Fauchald, 1971, and its reduction to Bogueinae,
 274 | a subfamily of Maldanidae (Polychaeta). *Proceedings of the Biological Society of Washington* 96(2):
 275 | 238–249.
 276 Wang Y, Li X. 2016. A new *Maldane* species and a new Maldaninae genus and species (Maldanidae,
 277 | Annelida) from coastal waters of China. *ZooKeys* 603: 1-16. doi: 10.3897/zookeys.603.9125
 278 Yang D, Sun R. 1988. *Polychaetous Annelids Commonly Seen from China Coastal Waters* (in Chinese).
 279 | Beijing: China Agriculture Press: 257–267.

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Formatado: Fonte: Não Itálico

280 Zenetos A, Verlaque M, Gofas S, et al. 2010. Alien species in the Mediterranean Sea by 2010. A
281 contribution to the application of European Union's Marine Strategy Framework Directive (MSFD).
282 Part I. Spatial distribution. *Mediterranean Marine Science* 11: 381–493.