

ORIGINAL ARTICLE

# Taxonomical notes on the family Ptilocodiidae (Anthomedusae) from the central and southern of South China Sea, with a new genus and a new species

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**Abstract** This study reviews the Ptilocodiidae from South China Sea, including three species. The diagnoses of the family and each genus are provided. A new genus, *Tregouboviopsis* Guo, Xu & Huang, **gen. nov.** is erected, based on the monotypy, *Tregouboviopsis perradialis* (Xu, Huang & Du, 2012) **comb. nov.**, which is transferred from the genus *Tregoubovia*. A free eumedusoid of *Hydrichthella ocellata* Xu, Huang & Wang, **sp. nov.** is described in the present paper. A key to known genera of family Ptilocodiidae is presented. All type specimens are deposited in the South China Sea Fisheries Research Institute, Chinese Academy of Fishery Science.

**Key words** Hydroidomedusae, new genus, new species, new combination, South China Sea.

## 1 Introduction

The taxonomic research of medusae is well done in South China Sea, such as in the Hainan Island (Xu, 1965), coast of the east Guangdong (Xu & Zhang, 1978), coast waters of the northern part of the South China Sea (Xu & Zhang, 1981; Du *et al.*, 2009), Daya Bay (Du *et al.*, 2010, 2013) and Beibu Gulf (Huang, 1987; Xu, Huang & Guo, 2008; Du *et al.*, 2012). However, most works are focus on the northern South China Sea, while few data on the medusa fauna of the central and southern of South China Sea were published (Li & Chen, 1991).

Recent collections provide more medusa materials from the central and southern South China Sea. The present work is the update of the Ptilocodiidae in our previous monograph (Xu *et al.*, 2014).

## 2 Material and methods

Specimens of the new species were collected from stations (9°05'–11°26'N, 113°54'–114°36'E) in the central and southern South China Sea in May, 2014. All planktonic samples were collected using a large-type zooplankton net (80 cm diameter opening, 0.505 mm mesh pore size) by vertical towing from the bottom to the surface (GB/T 12763.6-2007). Specimens were fixed in 5% buffered formalin in seawater. Specimens were examined using stereoscopy and light microscopy, and taxonomic identifications were undertaken using the literatures as specified in the references section.

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Abbreviations are listed as follows:

BG—Beibu Gulf;

DCT—didermic centripetal track;

IG—interradial gonad;

M—mouth;

N—nematocyst;

NB—non-tentacular bulb;

O—ocellus;

OA—oral arm;

OT—oral tentacle;

PG—perradial gonad;

RC—radial canal;

st—station;

SFRI—South China Sea Fisheries Research Institute.

### 3 Results

Based on previous reports (Tang & Gao, 2008; Du *et al.*, 2012) and collections of the authors, 2 medusae and 1 hydroid species belonging to 2 genera are reported in the South China Sea under the family Ptilocodiidae as the following list, of which a new genus, a new species and a new combination are present.

#### List of species presented on the family Ptilocodiidae in South China Sea.

Class Hydroidomedusa Claus, 1877

Order Filifera Kühn, 1913

Family Ptilocodiidae Coward, 1909 **emend.**

Genus *Hydrichthella* Stechow, 1909

*Hydrichthella epigorgia* Stechow, 1909

*Hydrichthella ocellata* Xu, Huang & Wang **sp. nov.**

Genus *Tregoubiopsis* Guo, Xu & Huang **gen. nov.**

*Tregoubiopsis perradialis* (Xu, Huang & Du, 2012) **comb. nov.**

### 3.1 Taxonomy

#### Family Ptilocodiidae Coward, 1909 **emend.**

Ptilocodiidae Coward, 1909: 729; Bouillon *et al.*, 2006: 151–153; Schuchert, 2009: 470–471; Xu *et al.*, 2014: 264–265.

Diagnosis. Hydroid. Hydrorhiza stolonal, reticular, or encrusting, covered by naked coenosarc; hydranths sessile, naked and polymorphic; gastrozoid tubular, without tentacles; dactylozooids with 4 or more capitate tentacles, sometimes filiform; gonophores on gonozooids or gastro-gonozooids; developing into fixed sporosacs, eumedusoids or free medusae.

Medusa. Mature medusa with more or less bell-shaped umbrella, with or without radial exumbrellar furrows; with marginal nematocyst ring from which usually arise several didermic centripetal nematocyst bands (tracks) or exumbrellar rows of refringent spots; with four marginal tentacles or tentacles absent; four radial canals and circular canal; manubrium with 4 perradial mouth arms ending in nematocyst clusters or 4 simple unbranched perradial oral tentacles arising above mouth rim unarmed terminal nematocyst clusters; gonads four interradian or eight adradial masses on manubrium, or completely perradial gonads; with or without ocelli.

Remarks. According to the original report (Du *et al.*, 2012) and by reexamining its shape, position and attachment of oral tentacles, *Tregubovia perradialis* Xu, Huang & Du, 2012 is obvious different from other species of *Tregubovia* Picard, 1958. In *T. perradialis*, the oral tentacles are arising above mouth rim with ring nematocysts, while the oral arms of *Tregubovia* are extending from the perradial corners of mouth margin, and armed with terminal nematocyst clusters. The position of gonads is on perradial position of manubrium in *T. perradialis*, and interradian in *Tregubovia*. According to these, *T. perradialis* should be removed from the genus *Tregubovia*, and a new genus *Tregoubiopsis* Guo, Xu & Huang, **gen.**

**nov.** is proposed to accommodate it. The diagnosis was therefore adapted to fit the new scope of the family.

Thus, the family Ptilocodiidae comprises six genera now: *Hydrichthella* Stechow, 1909, *Ptilocodium* Coward, 1909, *Thecocardium* Bouillon, 1967, *Hansiella* Bouillon, 1980, *Tregoubovia* Picard, 1958 and *Tregouboviopsis* Guo, Xu & Huang, **gen. nov.**

For a recent revision of the family Ptilocodiidae see Bouillon *et al.* (2006), Schuchert (2009), Du *et al.* (2012) and Xu *et al.* (2014).

From the Chinese waters, two genera, *Hydrichthella* as hydroid and free eumedusoid, and *Tregouboviopsis* as medusa, are known.

#### Key to the genera of Ptilocodiidae.

1. Hydroids..... 2  
Medusae ..... 4
2. Dactylozooids with two types ..... *Hydrichthella* Stechow, 1909  
Dactylozooids with one type ..... 3
3. Hydorrhiza crust-like, not covered by visible perisarc ..... *Ptilocodium* Coward, 1909  
Hydorrhiza a network of perisarc-protected tube-like stolons ..... *Thecocardium* Bouillon, 1967
4. Without marginal tentacles ..... 5  
With marginal tentacles ..... 6
5. Four perradial oral arms, ending swollen with nematocyst clusters; gonads interradial ..... *Tregoubovia* Picard, 1958  
Four perradial simple oral tentacles, arising above mouth rim, without terminal nematocyst clusters; gonads perradial ..... *Tregouboviopsis* Guo, Xu & Huang, **gen. nov.**
6. Four interradial gonads ..... *Thecocardium* Bouillon, 1967  
Eight adradial gonads ..... *Hansiella* Bouillon, 1980

#### Genus *Hydrichthella* Stechow, 1909

*Hydrichthella* Stechow, 1909: 31; Hirohito, 1988: 142, 144; Bouillon *et al.*, 2006: 153; Xu *et al.*, 2014: 265.

*Hydrichthelloides* Bouillon, 1978: 55; Bouillon, 1985: 59.

Type species: *Hydrichthella epigorgia* Stechow, 1905.

**Diagnosis.** Hydroid. Colony usually growing on sea fans, hydorrhiza encrusting, covered by naked coenosarc, or consisting of perisarc-covered reticular stolons pending substrate; gastrozooid tubular, without tentacles; hypostome studded by nematocysts; dactylozooids hollow, without mouth, with two types: one with many capitate tentacles and the other filiform, with capitate tip; gonozooids similar to gastrozooids in shape, bearing eumedusoids.

**Medusa.** Reduced to short-living eumedusoids, with 4 radial canals and subumbrellar cavity, with manubrium not eccentric; with 8 non-tentacular bulbs; gonads on manubrium; with or without ocelli.

**Remarks.** The genus *Hydrichthella* shares with *Hydrichthelloides* the hydroids colony polymorphic and dactylozooids of two types: one with many capitate tentacles and the other filiform with capitate tips. Type species of both genera show distinct from the structure of hydorrhiza: *Hydrichthelloides reticula* Bouillon, 1978 consists of perisarc, covered reticular stolons pending substrate; *Hydrichthella epigorgia* Stechow, 1909 is encrusting, covered by naked coenosarc. The systematic value of this distinguished character is questionable even at the generic level. Hirohito (1988) treated *Hydrichthelloides* as a synonym of *Hydrichthella*.

The genus *Hydrichthella* comprised two species: the hydroid *H. epigorgia* Stechow, 1909 from the East China Sea, Japan, Indonesia, Papua New Guinea and Seychelles Island (Hirohito, 1988; Tang & Gao, 2008; Xu *et al.*, 2014) and *H. reticulata* (Bouillon, 1978) from Papua New Guinea (Bouillon, 1978). In the present work, a new medusa species, *H. ocellata* Xu, Huang & Wang, **sp. nov.**, collected from the South China Sea with red ocelli on the 8 non-tentacular bulbs which suggests it should be a new species of the genus.

#### *Hydrichthella ocellata* Xu, Huang & Wang, **sp. nov.** (Figs 1–4)

**Material examined.** Holotype SFI 001, southern of South China Sea, st. B4 (10°16'N, 114°13'E), depth 2000 m, sampling depth 20–0 m, 22 May 2014, colls. Shen Chen & Jie Li (SFRI).

**Diagnosis.** Free eumedusoid, umbrella nearly spherical; with short and wide gastric peduncle, with 4 large mass-like gonads, interradial on manubrium; bell margin with 8 non-tentacular bulbs, 4 perradial larger than 4 interradial bulbs, each with a distinct red ocellus at the extreme tip.

**Description.** Medusa reduced to short-living eumedusoid; umbrella up to 1 mm high, nearly as wide as high in preserved

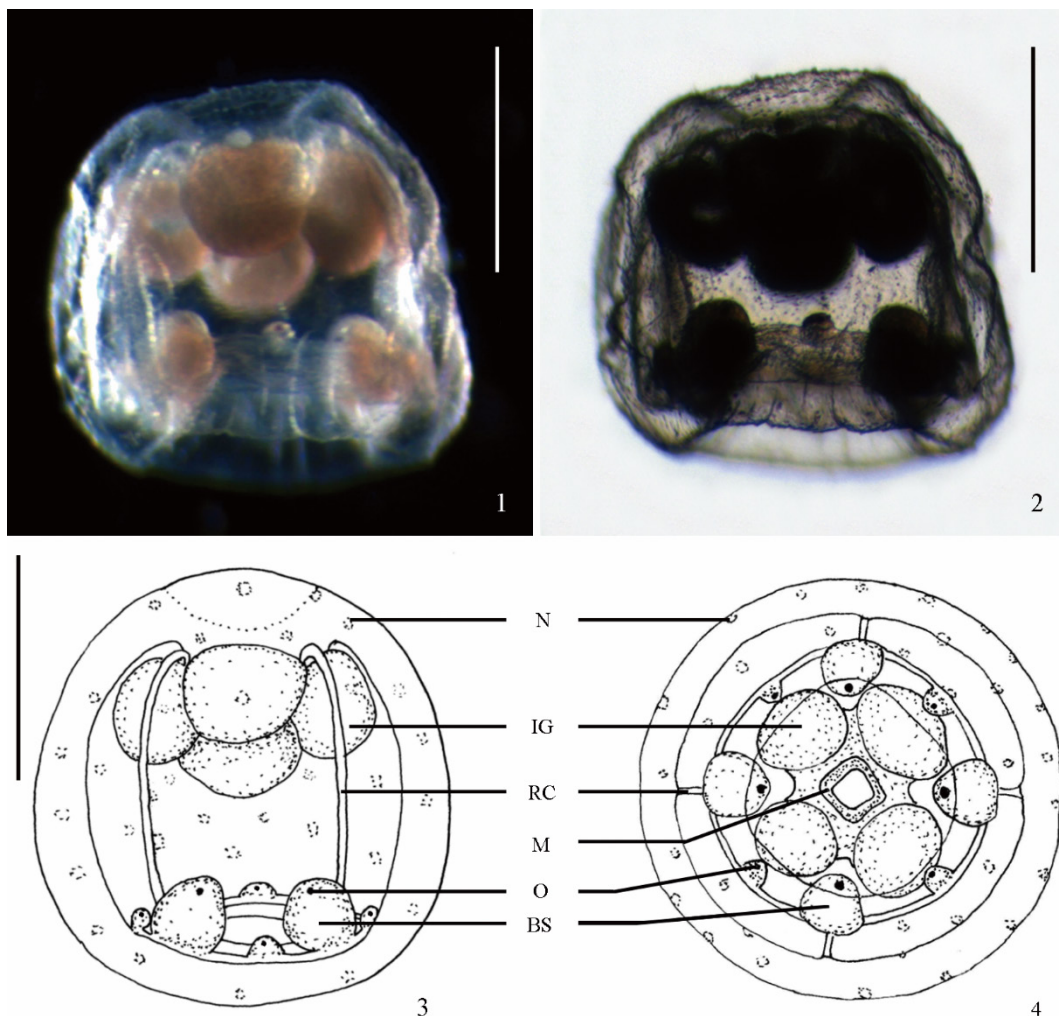
specimen; mesoglea about  $1/3$ – $1/4$  diameter of exumbrella; exumbrella covered with nematocysts, without exumbrellar furrows and didermic centripetal tracks; manubrium hanging from short and wide peduncle, mouth more or less quadratic in shape with simple mouth lips; 4 gonads interradial, extending to adradial on manubrium, smooth without folded; with 4 radial canals and circular canal; umbrella margin with 8 non-tentacular bulbs, 4 perradial larger than 4 interradial bulbs, each with a distinct red ocellus at the extreme tip; velum middle broad.

Hydroid. Unknown.

Distribution. Southern South China Sea.

Etymology. The specific name refers to the Latin *ocellata*, meaning ocellus. The eumedusoid name refers to the marginal bulbs each with a red ocellus at the extreme tip.

Remarks. Although only one specimen was found, its good preservation of morphological characters suggests that a new eumedusoid is present. The eumedusoid of *Hydrichthella ocellata* Xu, Huang & Wang, **sp. nov.** is very similar to the eumedusoid of *H. epigorgia* Stechow, 1909 (redescribed by Hirohito (1988)), by the bearing eumedusoids with four radial canals, 8 marginal bulbs, 4 large, mass-like gonads, interradial positions on manubrium, with velum. But the eumedusoid of *H. ocellata* Xu, Huang & Wang, **sp. nov.** is clearly different from *H. epigorgia* by free swimming eumedusoid with exumbrellar scattered nematocysts, with a short and wide gastric peduncle, 8 marginal bulbs, 4 perradial bulbs larger than 4 interradial bulbs, each with a red ocellus at the extreme tip (Figs 1–4).



Figures 1–4. *Hydrichthella ocellata* Xu, Huang & Wang, **sp. nov.** 1–3. Lateral view. 4. Oral view. Scale bars=0.5 mm.

**Genus *Tregouboviopsis* Guo, Xu & Huang, gen. nov.**

Type species: *Tregoubovia perradialis* Xu, Huang & Du, 2012.

Diagnosis. Ptilocodiidae medusae spherical; without tentacles; bell margin with nematocyst ring from which originate

didermic centripetal tracks running meridionally on exumbrella; manubrium large, mouth quadratic with simple and long, unbranched oral tentacles, arising above mouth rim, unarmed terminal nematocyst clusters, and with ring nematocysts along the whole length of the oral tentacles; gonads very large, covering perradial on manubrium well, with mesenteries; without ocelli.

Hydroid. Unknown.

Remarks. The species *Tregoubovia perradialis* Xu, Huang & Du, 2012 is originally described under the genus *Tregoubovia* by the distinctness of simple unbranched oral tentacles, without marginal tentacles and exumbrella with didermic centripetal tracks. By reexamining the type specimens, its positions of oral tentacles and gonads are different from *Tregoubovia atentaculata* Picard, 1958, the type species of the genus. *T. atentaculata* has 4 oral arms extending directly from the perradial corners of mouth margin, with one terminal nematocyst clusters; gonads on interradian manubrium (Fig. 5), while *T. perradialis* has 4 oral tentacles arising above mouth rim, unarmed terminal nematocyst clusters, and with ring nematocysts along the whole oral tentacles; gonads on perradial manubrium (Figs 6–7). Therefore, the species *T. perradialis* is removed from the genus *Tregoubovia* and a new genus *Tregoubiopsis* Guo, Xu & Huang, **gen. nov.** is erected to accommodate it.

Etymology. The genus name is derived from the Latin *tregoubiopsis*, meaning Tregoubi-opsis, referring to external characters of both genera are nearly resemble.

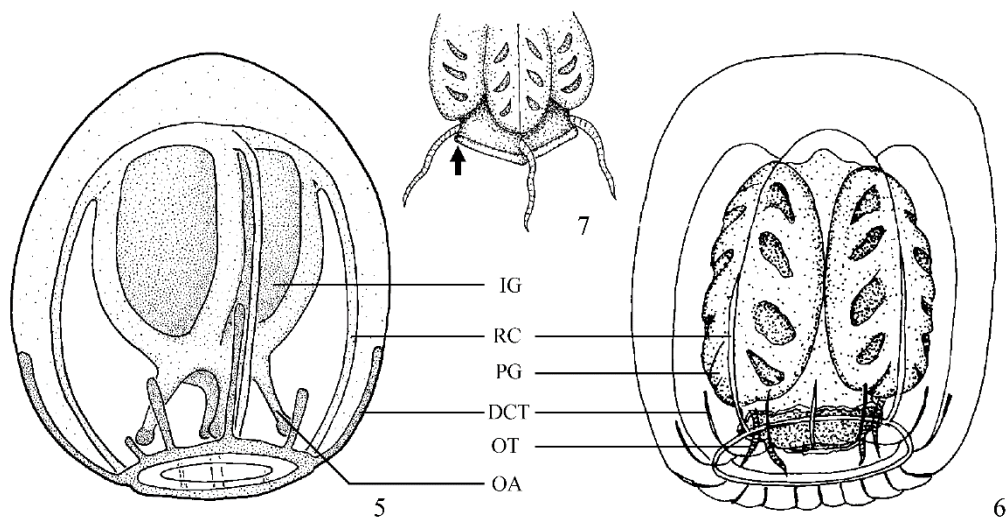
***Tregoubiopsis perradialis* (Xu, Huang & Du, 2012), comb. nov.** (Figs 6–12)

*Tregoubovia perradialis* Xu, Huang & Du, 2012 in Du *et al.*, 2012: 507, figs 2–4; Xu *et al.*, 2014: 266–267, figs 127A–C.

Material examined. Holotype. 1 male, BG 001, Beibu Gulf, st. S30 (17°30'N, 107°30'E), depth 70 m, 6 July 2008, coll. Xin Liang (SFRI). Other material. 1 female, SFI 002, central of South China Sea, st. ZI8 (16°31'N, 113°21'E), depth 1395 m, sampling depth 240–0 m, 31 July 2014, coll. Lianggen Wang (SFRI).

Diagnosis. Umbrella globular, mesoglea fairly thick; with 16 exumbrellar didermic centripetal tracks; mouth with 4 simple, long oral tentacles, arising above mouth rim, without terminal clusters and with ring nematocysts; 4 gonads very large, long and mass-like, almost covering perradial part along the whole length of manubrium; without marginal bulbs and tentacles.

Description. Umbrella 6 mm high, 5.0–5.5 mm wide, globular, mesoglea fairly thick, marginal portion near as thick as apical portion; without free tentacles; along bell margin a ring of thickened tissue with nematocysts from which originate 16 didermic centripetal tracks (4 perradial, 4 interradian, 8 adradial) running meridionally on the surface of the exumbrella towards aboral pole, reaching maximally to mid umbrella; manubrium large and voluminous, reaching to level of velum, base square to cross-shaped, about 4/5 as long as subumbrella cavity, with 4 interradian subumbrella projections upper the



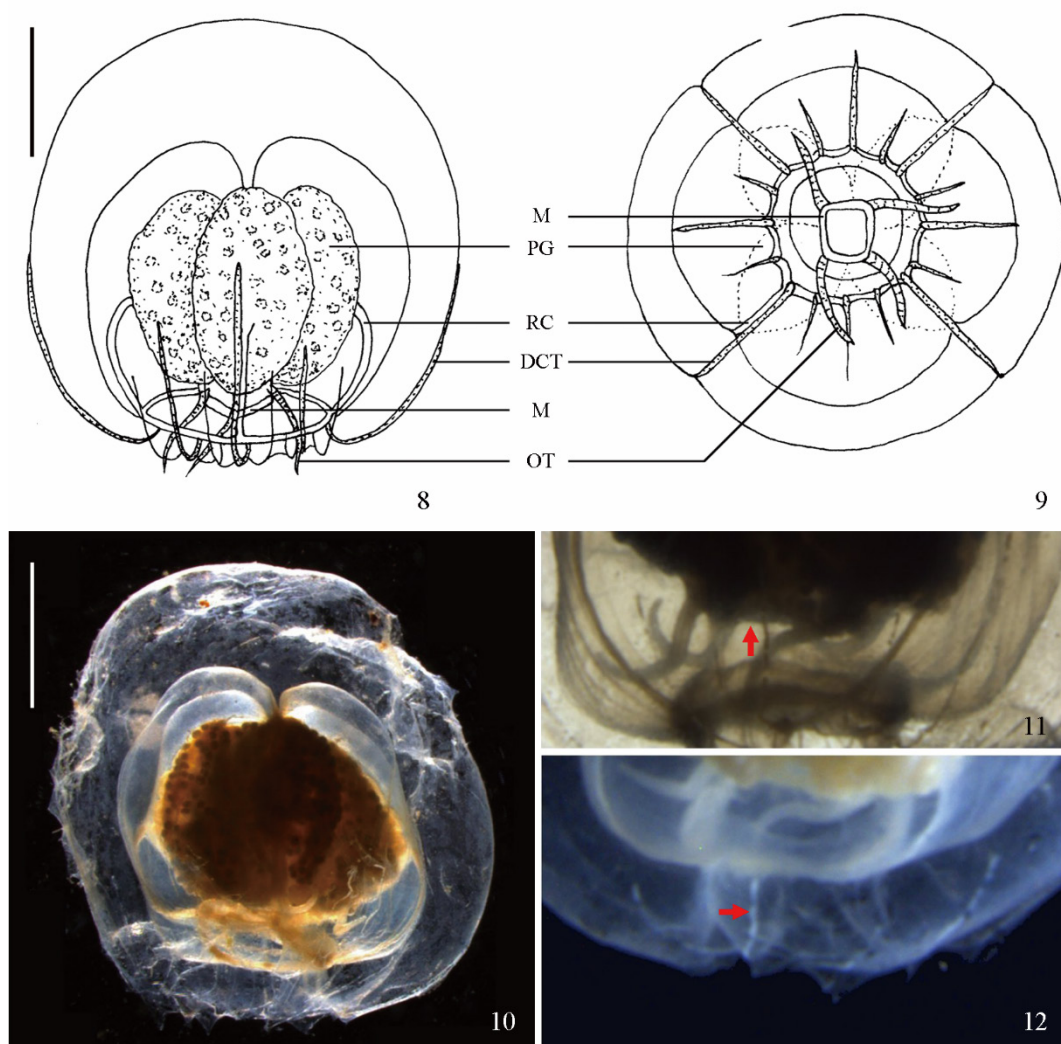
Figures 5–7. Male of *Tregoubovia atentaculata* Picard, 1958 and *Tregoubiopsis perradialis* (Xu, Huang & Du, 2012) **comb. nov.** 5. *Tregoubovia atentaculata*, mouth with 4 oral arms, gonads interradian on manubrium, bell size about 1.5 mm, lateral view (after Schuchert, 2009). 6. *Tregoubiopsis perradialis*, lateral view. 7. *Tregoubiopsis perradialis*, mouth with 4 oral tentacles arising above mouth rim (arrow), gonads perradial on manubrium. Scale bar: 6 = 2.0 mm.



manubrium; mouth quadratic with 4 simple, long oral tentacles, arising above mouth rim, unarmed terminal nematocyst clusters, but with ring nematocysts; four relatively thick radial canals and circular canal wide; mesenteries long, about 1/2 the length of manubrium connected to the radial canals by mesenteries; four gonads very large, long and mass-like, almost covering perradial part along the whole length of manubrium, well separated interradially, female with numerous very large eggs, without isolated pits of adradial series, but male with isolated pits of adradial series; without ocelli; velum wide.

**Distribution.** Central and northern of South China Sea.

**Remarks.** The species is rare as only two specimens were collected so far. The holotype male, collected from the northern South China Sea (Beibu Gulf), has following characters: 16 exumbrella didermic centripetal tracks present; mouth with 4 perradial oral tentacles arising above mouth rim, without terminal clusters and with ring nematocysts; 4 gonads in perradial position of manubrium, each with 2 adradial series of 4–5 isolated pits (male specimen) and no marginal tentacles (Figs 6–7). The female, another specimen collected from the central of South China Sea, has similar structures as the holotype but has 4 large, smooth gonads without isolated pits in longitudinal series (Figs 8–12) (see genus remarks).



Figures 8–12. Female of *Tregouboviopsis perradialis* (Xu, Huang & Du, 2012) **comb. nov.** 8, 10. Lateral view. 9. Oral view. 11. Mouth with 4 oral tentacles arising above mouth rim, arrow indicates mouth rim. 12. Part of exumbrella, arrow indicates exumbrellar didermic centripetal track. Scale bars: 8–10=2.0mm.

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