

# Three new species of Anthomedusae (Hydrozoa: Hydroidomedusa) from the Guangdong coastal water, China

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## Abstract

The samples of Anthomedusae were collected from the Guangdong coastal water, China. Three new species of Anthomedusae, i.e. *Zhangiella condensum* Huang, Zhang et Sun, sp. nov., *Hydractinia leizhouensis* Huang, Zhang et Yang, sp. nov., and *Cladosarsia simplex* Huang, Zhang et Ke, sp. nov. are described. All type specimens are deposited in College of Ocean and Earth Sciences, Xiamen University.

**Key words:** Anthomedusae, Australomedusidae, Hydractiniidae, Corynidae, new species, China

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## 1 Introduction

The samples of Anthomedusae were collected at the Leizhou Bay of Zhanjiang and Shuidong Bay of Maoming, Guangdong Province in May and August 2013. The vertical trawl method is used for sampling zooplankton specimens by dropping a 505- $\mu$ m mesh-size plankton nets (net gape diameter, 50 cm) to the bottom of water and vertically lifted to the surface of water. The samples were stored in a solution of 5% formalin and classified and enumerated in the laboratory. All type specimens were stored at College of Ocean and Earth Sciences in Xiamen University.

## 2 The categorization of three new species in the classification system of Bouillon et al. (2006)

Superclass Hydrozoa Owen, 1843

Class Hydroidomedusa Claus, 1877 emend. (Bouillon and Boero, 2000)

Subclass Anthomedusae Haeckel, 1879

Order Filifera Kühn, 1913

Suborder Margelina Haeckel, 1879

Family Australomedusidae Russell, 1971

Genus *Zhangiella* Bouillon, Gravili, Pagès, Gili & Boero, 2006

*Zhangiella condensum* Huang, Zhang et Sun, sp. nov.

Family Hydractiniidae L. Agassiz, 1862

Genus *Hydractinia* van Beneden, 1841

*Hydractinia leizhouensis* Huang, Zhang et Yang, sp. nov.

Order Capitata Kühn, 1913

Suborder Tubulariida Fleming, 1828

Family Corynidae Johnston, 1836

Genus *Cladosarsia* Bouillon, 1978

*Cladosarsia simplex* Huang, Zhang et Ke, sp. nov.

### 2.1 *Zhangiella condensum* Huang, Zhang et Sun, sp. nov.

**Diagnosis:** Medusae pear-shaped, jelly thick; manubrium flat, without gastric peduncle, mouth cruciform; gonads perradial, shuttle shaped; four radial canals, one ring canal; four kidney-shaped tentacular bulbs with 5–6 hollow tentacles, one red brown ocellus at the base of each tentacle; velum narrow.

**Description:** Umbrella pyriform, 2.5–3.5 mm high, 2.2–3.0 mm wide; jelly thick; flat stomach without peduncle; cruciform mouth with four simple oral lips; gonad perradial, shuttle shaped; four radial canals, narrow and unbranched, a ring canal; four kidney-shaped tentacular bulbs with 5–6 hollow tentacles, one red brown ocellus at the base of each tentacle; velum narrow (Figs 1 and 2).

**Type specimen:** Holotype (GHU001), paratype (GHU002), two samples of *Zhangiella condensum* collected by Caixue Zhang, Jibiao Zhang, Guohuan Yang, and Sheng Ke from Sta. 03 (20°58'50.00"N, 110°11'55.00"E) in the coastal waters of the Leizhou Bay, Zhanjiang, Guangdong Province, China in May 2013.

**Etymology:** The species name "*condensum*" means thick umbrella in Latin, based on the thick umbrella character of the new species.

**Distribution:** The coastal waters of Guangdong Province in China.

**Discussion:** *Zhangiella condensum* has a flat stomach without oral tentacles; gonads on the stomach; umbrella margin with four perradial marginal tentacular bulbs. Therefore, the new species belongs to Subclass Anthomedusae Haeckel, 1879, Order Filifera Kühn, 1913, Family Australomedusidae Russell 1971 and Genus

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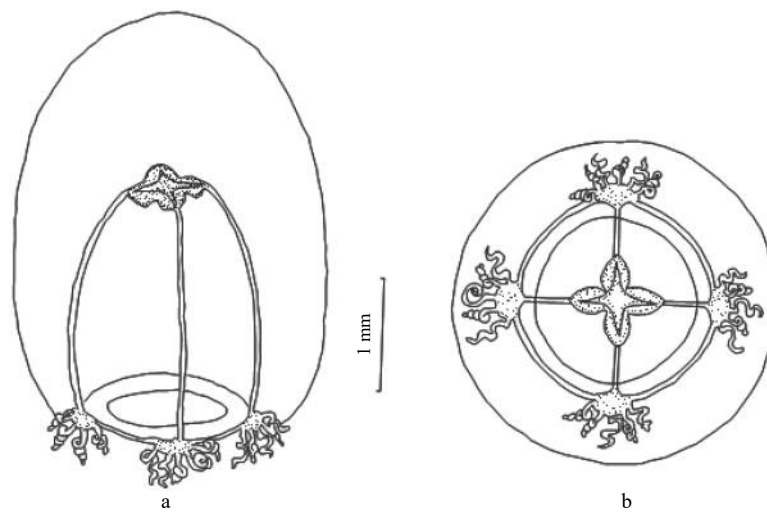


Fig. 1. The drawings of *Zhangielli condensum* Huang, Zhang et Sun, sp. nov. a. Lateral view and b. oral view.



Fig. 2. Photo images of *Zhangielli condensum* Huang, Zhang et Sun, sp. nov. a. Lateral view; b. oral view; and c. gonads, apical view.

*Zhangielli* Bouillon, Gravili, Pagès, Gili & Boero, 2006. Only three species are known, i.e., *Z. bitentaculata*, *Z. dongshanensis*, and *Z. nanhaiensis* (Zhang, 1982; Xu and Huang, 1994; Xu et al., 1991, 2014; Bouillon et al., 2006). *Zhangielli bitentaculata* umbrella thin, stomach with medusa buds, marginal tentacular bulbs with only two tentacles; *Z. dongshanensis* with interradial globular gonads on stomach; *Z. nanhaiensis* umbrella thin with a short peduncle, which differs from the new species, umbrella thick without peduncle, gonad periradial on the stomach and 4 marginal tentacular bulbs with 5 or 6 hollow tentacles.

**Key to the new species of the genus *Zhangielli***

1. With short cone-shape peduncle; flat stomach; cross-shaped mouth; gonads on the stomach wall; 4 marginal tentacular bulbs with 5–6 hollow tentacles; with ocelli.....  
 .....*Z. nanhaiensis* (Zhang, 1982)  
 Without peduncle .....2
2. Umbrella thin; with medusa buds; 4 marginal tentacular bulbs with two hollow tentacles; without ocelli.....  
 .....*Z. bitentaculata* (Xu et al., 1991)  
 Umbrella thick; without medusa buds; 4 marginal tentacular

- bulbs with 5–6 tentacles; with ocelli.....3
3. With interradial globular shaped gonads .....  
.....*Z. dongshanensis* (Xu and Huang, 1994)  
With perradial shuttle-shaped gonads.....  
..... *Z. condensum* Huang, Zhang et Sun, sp. nov.

## 2.2 *Hydractinia leizhouensis* Huang, Zhang et Yang, sp. nov.

Diagnosis: Umbrella almost hemispherical, flattened apex without apical projection; manubrium long, one-third of which extending beyond umbrellar margin, with a conical gastric peduncle; strip-shaped gonads interradial on manubrium; four well-developed oral arms, with terminal cnidocyst clusters; eight marginal tentacles in different size, the perradial tentacles longer than those interradial; marginal tentacular bulbs without ocelli, and each tentacle covered by numerous cnidocyst rings; four radial canals, one ring canal; velum narrow.

Description: Medusa 0.5 mm high and 0.7 mm wide, umbrella nearly hemispherical, flattened apex without apical projection; manubrium long, one-third of which extending beyond umbrellar margin, with a conical gastric peduncle; strip-shaped gonads interradial on manubrium, without medusa buds; four well-developed oral arms, with terminal cnidocyst clusters; eight marginal tentacle in different size, the perradial tentacles longer than those interradial; marginal tentacular bulbs without ocelli, and each tentacle covered by numerous cnidocyst rings; four radial canals, one ring canal; velum narrow (Figs 3 and 4).

Type specimen: Holotype (GHU003), the sample of *Hydractinia leizhouensis* collected by Caixue Zhang, Jibiao Zhang, Guo-

huan Yang, and Sheng Ke from Sta. 06 (20°55'25.00"N, 110°17'60.00"E) of the coastal water of Leizhou Bay, Zhanjiang, Guangdong Province, China in May 2013.

Etymology: This new species is named as *leizhouensis*, referring to the place of Leizhou Bay where the type specimen was collected.

Distribution: Coastal waters of Guangdong Province, China.

Discussion: *Hydractinia leizhouensis* has 8 marginal tentacles; gonads on the stomach; mouth with 4 oral lips perradial on stomach elongated to form oral arms; 4 radial canals, 1 ring canal. Those features place the medusa in the genus belongs to Subclass Anthomedusae Haeckel, 1879, Order Filifera Kühn, 1913, Family Hydractiniidae L. Agassiz, 1862 and Genus *Hydractinia* van Beneden, 1841. At the present time, there are 101 kinds of *Hydractinia* van Beneden, 1941, including hydroids and medusae, 32 kinds of medusae are known (Boero et al., 1998; Schuchert, 1996; Stampar et al., 2006; Bouillon and Boero, 2000; Kramp, 1961; Edwards, 1972; Lin et al., 2010; Li et al., 2010; Mayor, 1910; Mills, 1976; Wang et al., 2015; Xu and Huang, 2006). The new species has eight marginal tentacles, and the valid adult medusae species in the same genus with 8 tentacles are *H. tenuis*, *H. moniliformis*, *H. uniformis*, *H. carnea*, and *H. australis*. The first two species have oral lips without oral arms, whereas *H. carnea* do not have peduncles. The oral arms of *H. uniformis* are divided into several branches, with ocelli on the tentacle bulbs. *Hydractinia australis* has tentacles covered by numerous ring cnidocysts, and a short manubrium that does not stretch out of the umbrella cavity. These characteristics are different from those of the new species which has 4 well-developed and unbranched oral arms, with peduncle, gonads without medusa buds; manubrium stretching out of the umbrella cavity; tentacle bulbs without ocelli and tentacles covered by numerous ring cnidocysts.

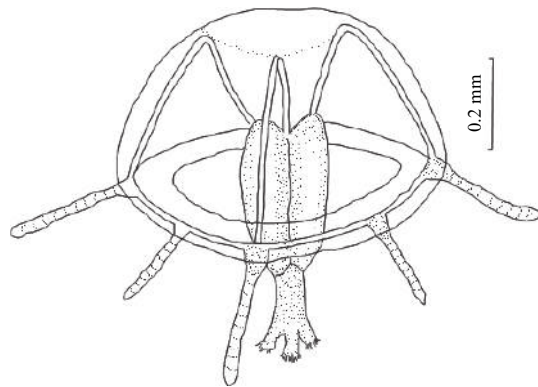


Fig. 3. The drawing of *Hydractinia leizhouensis* Huang, Zhang et Yang, sp. nov.



Fig. 4. Photo image of *H. leizhouensis* Huang, Zhang et Yang, sp. nov.

## Key to similar valid species of the genus *Hydractinia*

- Without oral arms, only four oral lips with terminal clusters of cnidocyst.....2  
With oral arms.....3
- With peduncle; without ocelli.....  
.....*H. tenuis* (Browne, 1902)  
Without peduncle; with ocelli.....  
.....*H. moniliformis* Huang, Zhong and Zhang Y J, 2010
- Oral arms grow into two branches; 8–12 marginal tentacles, with ocelli .....  
.....*H. uniformis* Stampar, Tronolone and Morandini, 2006  
Simple oral arms without branches.....4
- Without peduncle; 4–8 marginal tentacles.....  
..... *H. carnea* (M. Sars, 1846)  
With gastric peduncle.....5
- Manubrium short, about one-half to two-thirds the length of the inner umbrella cavity; spared nematocysts on tentacles .....  
.....*H. australis* (Schuchert, 1996)  
Manubrium long, one-third stretched out of umbrella cavity; ring-like nematocysts on tentacles .....  
.....*H. leizhouensis* Huang, Zhang et Yang, sp. nov.

## 2.3 *Cladosarsia simplex* Huang, Zhang et Ke, sp. nov.

Diagnosis: Umbrella bell-shaped; with long manubrium reaching slightly beyond velum; with simple mouth, ring-shape; gonads completely surrounding the manubrium; four perradial marginal tentacular bulbs presenting adaxial pads of cnidocyst and abaxial red ocelli; marginal tentacle short, with one short pedunculated cnidocyst knob and with a terminal cnidocyst knob; four radial canals, one ring canal; velum moderately broad.

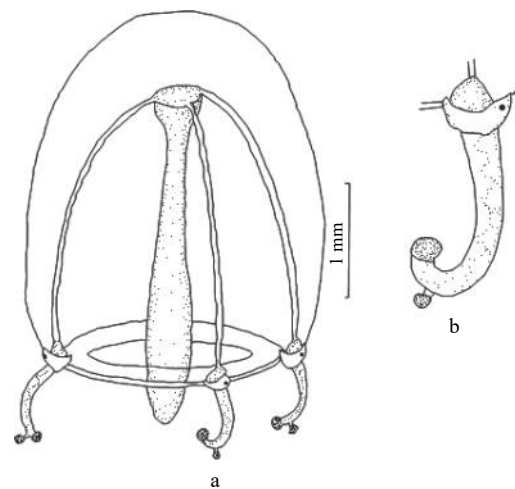
**Description:** Umbrella 2.5–3 mm in height, 1.6–2 mm in width, with bell-shaped umbrella, exumbrella smooth, apical mesoglea thick, lateral walls thin, without scattered nematocysts; with long and mallet-shaped manubrium reaching slightly beyond velum; with simple mouth, ring-shape; gonads completely surrounding the manubrium; four perradial marginal tentacles, with adaxial nematocyst pad at tentacular bulbs with abaxial red ocelli; short tentacles bend inward, about a quarter of the umbrella height, with one short pedunculated cnidocyst knob and with a terminal cnidocyst knob; four radial canals, one ring canal; the ends of each radial canal connected to the endoderm of the tentacular bulbs, velum medium width (Figs 5 and 6).

**Type specimen:** Holotype (GHU004), paratype (GHU005), two samples of *Cladosarsia simplex* collected by Caixue Zhang, Jibiao Zhang, Guohuan Yang and Sheng Ke from coastal water of Shuidong Bay (21°28'24.48"N, 111°05'0.14"E), Maoming, Guangdong Province, China in October 2013.

**Etymology:** This species is named after *simplex* in Latin, which means simple, and suggests that the tentacle structure is simple.

**Distribution:** Coastal waters of Guangdong Province, China.

**Discussion:** *Cladosarsia simplex* has adaxial pads of cnidocyst at the marginal tentacle bulbs with abaxial red ocelli; 4 equally long perradial marginal tentacles, one short pedunculated cnidocyst knob to form a branch with terminal cnidocyst knob; gonads completely surround the manubrium, so the species belongs to Anthomedusae Haeckel, 1879, Capitata Kühn, 1913, Corynidae Johnston, 1836, and *Cladosarsia* Bouillon, 1978. At the present time, there are 4 species of *Cladosarsia* Bouillon, 1978 (Bouillon, 1978; Xu and Huang, 2006; Huang et al., 2008), i.e., *C. minima* Bouillon, 1978, *C. capitata* Bouillon, 1978, *C. gulangensis* Xu et Huang, 2006 and *C. quanzhouensis* Huang, Xu, Li et Qiu, 2008. *Cladosarsia minima* has a short manubrium in a



**Fig. 5.** The drawings of *Cladosarsia simplex* Huang, Zhang et Ke, sp. nov. a. Lateral view and b. enlarged tentacle.

half height bell cavity and marginal tentacles with 3–4 short pedunculated cnidocyst knobs and with a terminal long branch. *Cladosarsia capitata* has a long manubrium more than twice the height of the umbrella; tentacles with 4–6 short pedunculated knobs. *Cladosarsia gulangensis* has a short manubrium less than the bell cavity and tentacles with long 5–10 pedunculated cnidocyst knobs. *Cladosarsia quanzhouensis* has a thin and long manubrium nearly sesqui height of the bell cavity and tentacles with 8–14 pedunculated knobs. These characteristics are different from those of the new species, which has a long manubrium and tentacles with one short pedunculated knob to form a branch with the terminal cnidocyst knob.



**Fig. 6.** Photo images of *Cladosarsia simplex* Huang, Zhang et Ke, sp. nov. a. Lateral view and b. enlarged marginal umbrella.

**Key features to the new species of the genus *Cladosarsia***

1. Two branches at the end of tentacles; tentacles with 8–14 long pedunculated knobs.....  
.....*C. quanzhouensis* Huang, Xu, Li and Qiu, 2008  
Only one branch at end of tentacles .....2
2. Short manubrium, not stretched out of cavity .....3  
Long manubrium, stretched out of cavity .....4
3. Tentacular bulbs with ocelli, short tentacles with 3–4 pedunculated knobs.....*C. minima* Bouillon, 1978  
Tentacular bulbs without ocelli, long tentacles curved at proximal, with 5–10 pedunculated cnidocyst knobs.....  
.....*C. gulangensis* Xu and Huang, 2006

4. Long manubrium, over two times the length of the umbrella, proximal thin and long, distal expanded; tentacles with 4–6 short pedunculated cnidocyst knobs.....  
.....*C. capitata* Bouillon, 1978  
Wooden-club-shape manubrium, long, stretched out cavity; tentacles with one short pedunculated cnidocyst knob forms a branch with terminal cnidocyst knob.....  
.....*C. simplex* Huang, Zhang et Ke, sp. nov.

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