

## A new species of *Litarachna* Walter, 1925 (Acari, Hydrachnidia,) from the West Indian Coast, with a discussion on the biodiversity of the family Pontarachnidae Koenike, 1910

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**Abstract:** *Litarachna indica*, a new species of the marine water mite of family Pontarachnidae (Acari: Hydrachnidia) is described from the tropical West Indian coast. The total number of Pontarachnidae worldwide tallies exactly 41 species.

**Key words:** Aquatic mite, *Litarachna indica*, new species, Indian Ocean, biodiversity.

### Introduction

Water mites of the family Pontarachnidae Koenike, 1910, have been reported from tropical and temperate littoral habitats bordering the Mediterranean Sea, Aral Sea, Caspian Sea, Atlantic Ocean, Pacific Ocean, Red Sea and Indian Ocean (Smit, 2002; Pešić et al., 2008). Most species live in the marine littoral zone; a few species have been described from freshwaters, but these species were found to occur in estuaries or locations near the sea (Smit, 2009). Almost nothing is known of the life history of members of the family Pontarachnidae; the larva (if it exists as a free living stage) and its host (if any) are unknown (Cook, 1996) and its possible that parasitic larval stage is bypassed (Pešić et al., 2011).

The family is represented by two genera: *Pontarachna* Philippi, 1840 and *Litarachna* Walter, 1925. Two species are known from India (Pešić et al., 2008b, 2009), i.e. *Pontarachna australis* Smit, 2003 and *Litarachna denhami* (Lohmann 1909)

In the present paper, a new species of *Litarachna* Walter, is described from the tropical West Indian Shelf.

### Materials and methods

Material examined in the present study was collected among epiphytal algae from red mangrove roots during the lowtide. The collected algae were washed in filtered seawater over a 500µm and 63 µm sieve. All the material retained on a 63µm mesh sieve was examined under a dissecting microscope. All the specimens of pontarachnidae were preserved in 95% ethanol. The holotype and paratypes are deposited in the Museum of Natural History of Podgorica (MNHP).

In the Checklist of water mite species of the family Pontarachnidae (Table 1) the item of Distribution contains the information on the presence of a species in one or more of the biogeographical realms. For biogeographic divisions of coastal and shelf areas, we follow Marine Ecoregions of the World (MEOW), a system presented by Spalding et al. (2007).

All measurements are given in µm. The following abbreviations are used: L = length, %L = relative length, I/II/III/IV-Leg-1-6 = first to sixth segments of leg I/II/III/IV, P-1 to P-5 = palp segments 1 to 5, W = width.

### Systematics

#### Genus *Litarachna* Walter, 1925

#### *Litarachna indica* sp. nov.

(Figs. 1-2)

**Type series.** Holotype: female, dissected and slide mounted in Hoyer's fluid, India, Goa (North Goa), Virnoda Pernem (Lat.15°40'13.85"N; Long.73°43'22.19"E), mangrove root algal association from *Rhizophora* plants, 7.vii.2011, leg. Ingole & Velip. Paratypes: two females, same data as holotype, one female dissected and slide mounted; one male, dissected and slide mounted, same place as holotype, 21.x.2011, leg. Ingole & Velip.

**Diagnosis:** Idiosoma L < 300 µm; first coxal plates fused; glandularium-like structure posterior to fourth coxal plates not fused with adjoining coxoglandularia 4. Female: three pairs of wheel-like acetabula, posterior to the genital field, very large with many radiating spokes (maximum diameter L > 15 µm); pregenital sclerite strongly bowed, not arrow-shaped and fused with postgenital sclerite, genital field less elongated (L/W ratio 1.6). Male: two pairs of wheel-like acetabula, posterior to the genital field, very large with many radiating spokes (maximum diameter L 19 µm); genital field wider than long, three pairs of perigenital setae.

## *Description*

*Female* (holotype, in parentheses measurements of the paratype): Idiosoma L/W 284 (292)/231 (243). First coxal plates fused medially. Suture lines of second and third coxal plates and suture lines of third and fourth coxal plates incomplete. Lateral posterior apodemes of the fourth coxal plates short and broad, medial posterior apodemes of moderate length, not extending to posterior margin of genital field (Fig. 1A). Genital field L/W 51 (51)/32 (32). Pregenital and postgenital sclerite strongly bowed and fused. Between the posterior apodemes of the fourth coxal plates a pair of glandularia-like structures and a pair of small platelets with (according to Wiles *et al.*, 2002) coxoglandularia 4 and associated setae. Posterior to the genital field a pair of platelets with three pores and four pairs of wheel-like acetabula (sensu Cook, 1996) or specialized glandularia (sensu Tuzovskij, 1978). Three of these wheel-like structures very large with many radiating spokes, the most posterior one small with relatively few radiating spokes, maximum diameter L of the most anterior pair of wheel-like acetabula 15-16, maximum diameter L of the second and third pairs of wheel-like acetabula 17-19. Excretory pore unsclerotized, near the posterior extremity. Palp (Fig. 1B) total L, dorsal L: P-1, 15 (15); P-2, 54 (54); P-3, 22 (25); P-4, 60 (60); P-5, 20 (20); P-2/P-4 ratio 0.9 (0.9); ventral margin of P-2 somewhat concave without extension; ventral margin of P-4 with a strongly developed setal tubercle. Lengths of I-Leg-4-6 (Fig. 1C): 35 (34), 49 (49), 58-59 (58); IV-Leg-4 and IV-Leg-5 with one and two swimming setae, respectively.

*Male*: Idiosoma L/W 278/234. First coxal plates fused medially. Suture lines of second and third coxal plates and suture lines of third and fourth coxal plates incomplete. Lateral posterior apodemes of the fourth coxal plates short and broad, medial posterior apodemes of moderate length, not extending to posterior margin of genital field (Fig. 2A). Genital field wider than long, L/W 20/22, consisting of a sclerotized ring with four pairs of setae; ejaculatory complex (Fig. 2D) L 36. Three pairs of perigenital setae free in integument around genital field, one pair anterior and two pairs posterior of genital field.. Between the posterior apodemes of the fourth coxal plates a pair of glandularia-like structures and a pair of small platelets with (according to Wiles *et al.*, 2002) coxoglandularia 4 and associated setae. Posterior to the genital field a pair of platelets with three pores and three pairs of wheel-like acetabula (sensu Cook, 1996) or specialized glandularia (sensu Tuzovskij, 1978). Two of these wheel-like structures very large with many radiating spokes, maximum diameter L 19  $\mu\text{m}$ , the most posterior one small with relatively few radiating spokes. Excretory pore unsclerotized, near the posterior extremity. Palp (Fig. 2B) total L, dorsal L: P-1, 15; P-2, 52; P-3, 23; P-4, 58; P-5, 18; P-2/P-4 ratio 0.9; palp as in female. Lengths of I-Leg-5-6 (Fig. 2C): 49, 59; IV-Leg-5 with two swimming setae.

**Etymology.** The species is named after the country where it was collected.

**Remarks.** *Litarachna indica* **sp. nov.** belongs to the “*duboscqi*”- species group characterized by the absence of a ventral tubercle on P-2 and presence of a ventral tubercle on P-4 (Pešić et al. 2008a). Four *Litarachna* species have their coxal plates fused, i.e., *L. degiustii* Cook, 1958 (Caribbean Sea; Cook 1958, Pešić et al. 2008a), *L. amnicola* Cook, 1986 (Tasmania; Cook 1986, Pešić & Smit 2009), *L. brasiliensis* Smit, 2007 (Brazil; Smit 2007) and *L. caribica* Pešić, Chatterjee & Schizas, 2008 (Caribbean Sea; Pešić et al. 2008a).

Due to the glandularium-like structure posterior to fourth coxal plates not fused with adjoining coxoglandularia 4 (fused in *L. degiustii*) and not fused with fourth coxal plates (fused in *L. amnicola*), *L. indica* **sp. nov.** most resemble *L. caribica* and *L. brasiliensis*. From *Litarachna caribica* it can be easily distinguished by a much larger dimensions of the wheel-like acetabula posterior to the genital field in the both sexes and by the male genital field having only three pairs of perigenital setae (45-54 pairs in *L. caribica*, see Pešić et al. 2008a).

*Litarachna brasiliensis* has a reduced number of perigenital setae (2-3) pairs in male, as found in the new species. This species can be distinguished in the female in more elongated genital field (L/W ratio 1.7) with an arrow-shaped pregenital sclerite (see: Smit 2007), in the male in differently shaped genital field (see Smit 2007, Fig. 1) and in the both sexes in the larger dimensions of idiosoma and relatively less enlarged wheel-like acetabula posterior to the genital field.

**Distribution.** West coast of India.

## **Discussion**

The total number of Pontarachnidae species worldwide tallies exactly 41, including the new species described in this paper. The genus *Pontarachna* includes 21 species, while 19 species belong to the genus *Litarachna*. Most species (14) are known from the tropical Central Indo-Pacific. From the temperate Northern Atlantic 9 species have been found, 8 species (including the new one described in this paper) are described from the tropical Western Indo-Pacific, while 7 species and subspecies have been found in the temperate Northern Pacific (Table 1). However, there is no record of pontarachnid mites from many marine biogeographical provinces, e.g. major parts of temperate and tropical Atlantic Ocean. Most of the pontarachnid mites mentioned were extracted from the ‘bycatch’, mostly of halacarid mites by using the collecting methods not adopted for an efficient sampling of pontarachnid mites.

In conclusion the current knowledge of the diversity of pontarachnid mites is far from complete, and in the course of future investigations many more species will be found. Additional field work is highly needed for an appropriate evaluation of the extant diversity.

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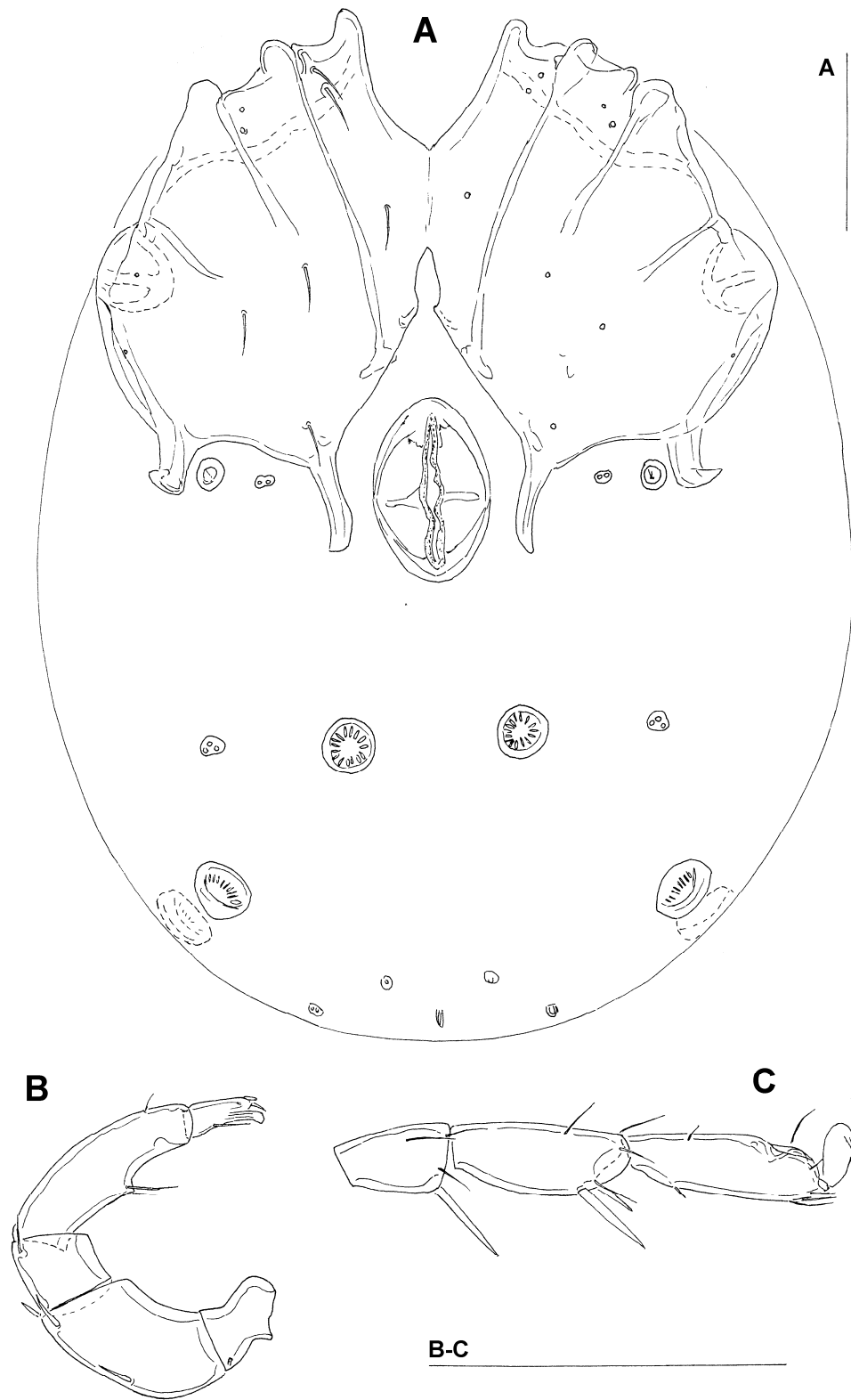
Table 1. Checklist of known water mite species of the family Pontarachnidae Koenike, 1910, with their distribution per marine biogeographic realms (abbreviated into a capital two- or three-letter combination) and provinces (in parentheses). Biogeographic realms abbreviation are as follows: CIP, Central Indo-Pacific; TA, Tropical Atlantic; TAA, Temperate Australasia; TNA, Temperate Northern Atlantic; TNP, Temperate Northern Pacific; TSA, Temperate Southern Africa; TAS, Temperate South America; WIP, Western Indo-Pacific.

Taxa	Distribution
<i>Pontarachna</i> Phillippi, 1840	
<i>P. adriatica</i> Morselli, 1980	TNA (Mediterranean Sea)
<i>P. aenariensis</i> Mari & Morselli, 1984	TNA (Mediterranean Sea)
<i>P. africana</i> Smit, 2002	TSA (Agulhas)
<i>P. anellata</i> Sokolow, 1936	TNP (Cold Temperate Northwest Pacific)
<i>P. arabica</i> Pešić, Chatterjee & Ahmed Abada, 2008	WIP (Red Sea and Gulf of Aden)
<i>P. australis</i> Smit, 2003	CIP (Northwest Australian Shelf, Warm Temperate Northwest Pacific, Western Coral Triangle); WIP (Andaman).
<i>P. capensis</i> Lohmann, 1907	TSA (Agulhas)
<i>P. cruciata</i> Hall, 1912	TNP (Warm Temperate Northeast Pacific)
<i>P. dampierensis</i> Smit, 2003	CIP (Northwest Australian Shelf)
<i>P. erythraea</i> K.O. Viets, 1966	WIP (Red Sea and Gulf of Aden)
<i>P. episce</i> Smit, 2008	TNA (Mediterranean Sea)
<i>P. formosae</i> Lohmann, 1909	CIP (Warm Temperate Northwest Pacific)
<i>P. halei</i> Womersley, 1937	TAA (Southeast Australia Shelf)
<i>P. hoffmannae</i> Cook, 1996	TSA (Agulhas)
<i>P. longipes</i> Smit, 2008	CIP (Sunda Shelf)
<i>P. minuta</i> Smit, 2003	CIP (Northwest Australian Shelf)
<i>P. otto</i> Harvey, 1998	CIP (Northeast Australian Shelf)
<i>P. pacifica pacifica</i> Uchida, 1935	TNP (Cold Temperate Northwest Pacific)
<i>P. pacifica pilosa</i> Sokolow, 1936	TNP (Cold Temperate Northwest Pacific)
<i>P. pontica</i> Viets, 1928	TNA (Black Sea)
<i>P. punctulum</i> Phillippi, 1840	TNA (Mediterranean Sea; Black Sea); WIP (Red Sea and Gulf of Aden)
<i>P. valkanovi</i> Petrova, 1978	TNA (Black Sea)
<i>Litarachna</i> Walter, 1925	
<i>L. amnicola</i> Cook, 1986	TAA (Southeast Australia Shelf)
<i>L. bartschae</i> Smit, 2003	CIP (Northwest Australian Shelf)
<i>L. brasiliensis</i> Smit, 2007	TAS (Warm Temperate Southwestern Atlantic)
<i>L. bruneiensis</i> Pešić, Chatterjee, Marshall & Pavićević, 2011	CIP (Western Coral Triangle)
<i>L. caribica</i> Pešić, Chatterjee & Schizas, 2008	TA (Tropical Northwestern Atlantic)
<i>L. cawthorni</i> Wiles, Chatterjee & De Troch, 2002	WIP (Western Indian Ocean)
<i>L. communis</i> Walter, 1925	TNA (Mediterranean Sea)
<i>L. curtialpis</i> Smit, 2003	CIP (Northwest Australian Shelf, Sunda Shelf)

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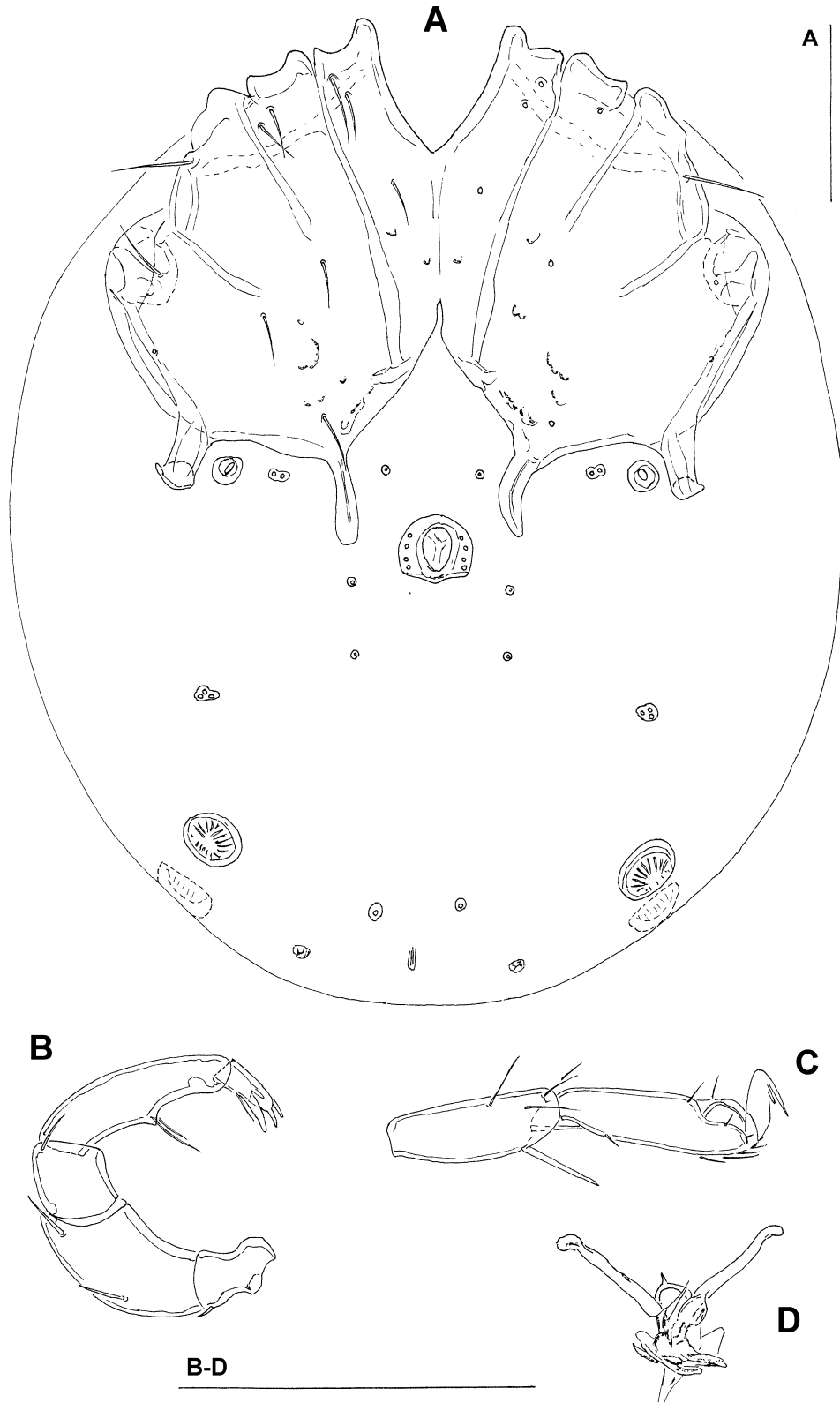
<i>L. denhami</i> (Lohmann, 1909)	CIP (Northwest Australian Shelf), TAA (Southeast Australia Shelf), TNP (Cold Temperate Northwest Pacific), TSA (Agulhas); WIP (West and South Indian Shelf, Andaman, Red Sea and Gulf of Aden)
<i>L. degiustii</i> Cook, 1958	TA (Tropical Northwestern Atlantic)
<i>L. divergens</i> Walter, 1925	TNA (Mediterranean Sea; Black Sea); TNP (Cold Temperate Northwest Pacific)
<i>L. duboscqi</i> Walter, 1925	TNA (Mediterranean Sea)
<i>L. hongkongensis</i> Smit, 2002	CIP (Sunda Shelf)
<i>L. indica</i> sp. nov.	WIP (West and South Indian Shelf)
<i>L. kamui</i> Uchida, 1935	TNP (Cold Temperate Northwest Pacific)
<i>L. marshalli</i> Wiles, Chatterjee & De Troch, 2002	TSA (Agulhas)
<i>L. muelleri</i> Smit, 2008	CIP (Sunda Shelf)
<i>L. sabangensis</i> Viets, 1984	CIP (Western Coral Triangle)
<i>L. smiti</i> Pešić, Chatterjee & Abada, 2008	WIP (Red Sea and Gulf of Aden)
<i>L. triangularis</i> Smit, 2009	CIP (Sunda Shelf)

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**Figure 1.** *Litarachna indica* sp. nov., female: **A** = idiosoma, ventral view; **B** = palp; **C** = I-Leg-4-6. Scale bars = 100  $\mu$ m.





**Figure 2.** *Litarachna indica* sp. nov., female: **A** = idiosoma, ventral view; **B** = palp; **C** = I-Leg-4-6; **D** = ejaculatory complex. Scale bars = 100  $\mu$ m.