

## First records of sponge-dwelling shrimp *Synalpheus coutierei* Banner, 1953 (Crustacea: Decapoda) from the west coast of India

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### Abstract

The occurrence of the two pairs of mature sponge dwelling shrimp *Synalpheus coutierei* Banner, 1953 is reported first time from the west coast in Gujarat, India. This species is previously reported from the east coast of India. The detailed morphological characteristic and distribution of the species are given in the paper.

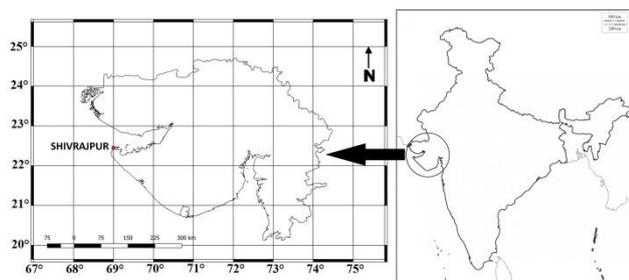
**Keywords:** Alpheidae; new record; *Synalpheus coutierei*; sponge-dwelling shrimp; west coast of India

## 1 | INTRODUCTION

*Synalpheus* Spence Bate, 1888, is the second largest diverse genus of family Alpheidae inhabitant in shallow tropical marine ecosystem worldwide (Duffy 1992; De Grave and Fransen 2011). Species of the genus *Synalpheus* mostly observed in crevices inside coral rubble, internal space of sponges, hard and soft corals, crinoids and ascidians (Pearse 1950; Banner and Banner 1975; Bruce 1976; Duffy 1992; Santos *et al.* 2012). *Synalpheus coutierei* Banner, 1953 is well known throughout the tropical shallow waters of Indo-West Pacific as an obligate symbiotic species living inside the internal space of sponges (Banner and Banner 1975; Wicksten and McClure 2007; MacDonald III *et al.* 2009). In India, this species is previously reported from the east coast of India (Banner and Banner 1979). In this paper we report the occurrence of *S. coutierei* for the first time from the west coast of India.

## 2 | METHODOLOGY

Two pairs of live shrimp specimens were collected from the internal canals of the intertidal region of rocky and coral reef habitat in Shivrajpur, Saurashtra Coast of Gujarat state, India (Figure 1). They were retrieved from an unidentified sponge by handpicking method during the low tide. Collected shrimp specimens were preserved in 4% formalin solution and transferred to 70% ethanol solution in the laboratory. Total length (TL, from the tip of the rostrum to the posterior end of the telson) and carapace length (CL, the posterior orbital margin to the posterior margin of the carapace) was measured using a digital vernier caliper (0.01 mm accuracy). Specimens were identified following Banner and Banner (1975) and Wang and Sha (2015). Specimens were deposited at the Zoology Museum, Department of Zoology, The Maharaja Sayajirao University of Baroda, Vadodara (code ZL-AR-PR-48).



**FIGURE 1** Location of the sampling site in the west coast of Gujarat, India.

### 3 | RESULTS

#### 3.1 Systematics

Order Decapoda Latreille, 1802

Infraorder Caridea Dana, 1852

Superfamily Alpheoidea Rafinesque, 1815

Family Alpheidae Rafinesque, 1815

Genus *Synalpheus* Spence Bate, 1888

*Synalpheus coutierei* Banner, 1953 (Figures 2 and 3)

*Synalpheus coutierei* Banner, 1953: 36; Banner and Banner, 1966: 62, Fig. 20; Banner and Banner, 1975: 343, Fig. 18a-i; Banner and Banner, 1978: 241; Banner and Banner, 1985: 41; Chace, 1988: 77.

*Alpheus biunguiculatus* de Man, 1888: 502, pl. 21, Fig. 6; Spence Bate, 1888: 562, pl. 101, Fig. 4.

*Synalpheus biunguiculatus* Coutière, 1898: 232, Figs 1–4; 1905: 873, pl. 71, Fig. 8.

*Synalpheus biunguiculatus* var. *exilipes* Coutière, 1905: 874, Fig. 10; Balss, 1921: 9.

*Synalpheus exilipes* Johnson, 1962: 51; Johnson, 1979 1921: 43.

#### 3.2 Material examined

One male (TL 11.7 mm, CL 4.75 mm), 1 ovigerous female (TL 13.52 mm, CL 4.92 mm), Shivrajpur (23°36'14"N 69°57'30"E), attached to sponge, 14 April 2017, collector Jignesh Trivedi. One male (TL 13.38 mm, CL 5.42 mm), 1 ovigerous female (TL 13.66 mm, CL 5.61 mm), Shivrajpur (23°36'14" N 69°57'30" E), associated with sponge, 23 May 2017, collector Barkha Purohit.

#### 3.3 Diagnosis

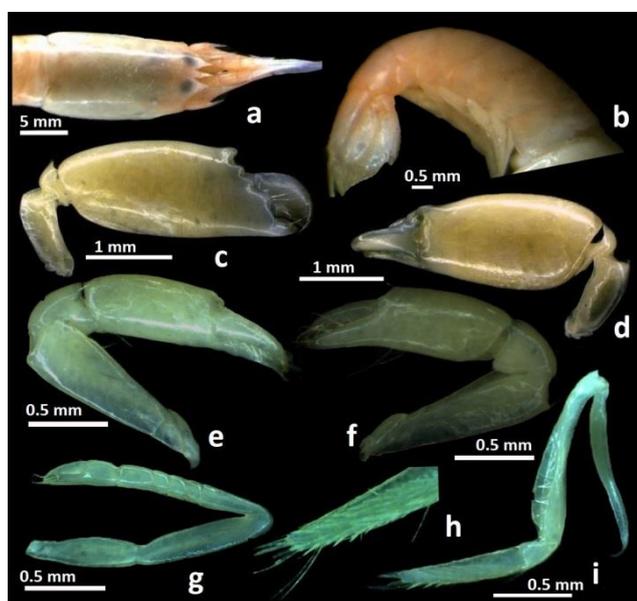
Body smooth, glabrous; rostrum 2.3 times longer than width at base, lateral margin slightly convex, reaching middle of visible part of first antennular segment; orbital hoods 2.2 times wider than rostrum at base, length subequal to rostrum; tips of rostrum and orbital teeth rounded with bearing two short setae; V-shaped notches formed between orbital hoods and rostrum; pterygostomial corner produced into blunt acute angle; cardiac notch well developed; antennular peduncle with distally

acute stylocerite, reaching middle of second antennular segment; visible part of first antennular segment 1.5 times longer than second antennular segment; second antennular segment 1.7 times longer than width; slightly longer than third antennular segment; scaphocerite blade narrow, overreaching to second antennular segment, lateral margin of lateral spine slightly concave posteriorly, reaching to end of third antennular segment; carpoplite reaching past end of antennular peduncle; inferior spine of basiscerite subequal to stylocerite, superior spine acute and prominent, reaching up to end of rostrum; stylocerite with narrow lateral spine reaching middle of second antennular segment; abdominal segment smooth, glabrous; major chela 2.5 times longer than width, fingers occupying distal 0.3; ischium stout; merus 2.3 times longer than width; carpus cup-shaped, with long setae distodorsally; superior margin of palm terminating in subacute tubercle above dactylar articulation; inferior margin inermous; palm about 2.4 times longer than dactylus; dactylus heavy, longer than fixed finger; minor chela 2.8 times longer than width; inferior margin of ischium with long setae; merus about 3.2 times longer than width, superodistal margin rounded, without any projecting, inferior margin bearing short setae; carpus cup-shaped proportionally longer than that of major chela; palm about 1.8 times longer than fingers, lateral face near dactylus bearing patch of stiff setae; dactylus tapering, with inferior margin concave, distal single tooth, lateral margin with row of long setae; fixed finger tapering, with inferior surface obliquely convex, distal single tooth, lateral margin bearing row of long setae; ischium of second pereopod distinctly shorter than merus; second pereopod slender, ischium shorter than merus; carpus subdivided into five segments, first segment shorter than sum of other four segments, ratio of carpal segment (from proximal to distal) approximately equal to 10 : 2 : 2 : 2 : 4; finger 1.1 times longer than palm; merus of third pereopod longer than propodus, about four times longer than width at base, without spines on ventral margin; carpus shorter than merus, dorsal margin extended into obtuse tooth, ventral margin with one distal spine; propodus almost as long as merus, bearing seven spines on ventral margin and a pair of distal spines near dactylus; dactylus 0.14 times shorter than propodus length, biunguiculate, moderately slender, superior tooth subequal to inferior tooth; superior tooth as wide as flexor at base; U-shaped notch between superior and inferior tooth; third maxilliped reaching far beyond antennular peduncle; antepenultimate segment longest, about 5.5 times longer than width; penultimate segment about 1.6 times longer than width at base; tip of ultimate segment with 5 – 6 spine-like setae, with 7 – 8 transverse rows of setae along inferior margin; telson about 1.3 times longer than width at base; lateral margin slightly concave posteriorly; dorsal surface with two pairs of large spines, median groove present;

posterior margin strongly convex, fringed with long setae, each posterolateral angle with two pairs of spines, lateral 1/2 length of mesial, posterolateral corner right angle.

### 3.4 Colouration

The whole body is semi-transparent. Green-yellowish chromatophore present on cephalothorax and abdomen. Eggs are yellow-greenish (Figure 2).



**FIGURE 2** *Synalpheus coutierei* Banner, 1953. *a*, dorsal view of carapace; *b*, lateral view of abdomen; *c*, dorsal superior view of a large chela; *d*, ventral view of a large chela; *e*, dorsal superior view of a small chela; *f*, ventral view of a small chela; *g*, second pereopod; *h*, third maxilliped tip; *i*, third maxilliped.



**FIGURE 3** *Synalpheus coutierei* Banner, 1953, dorsal view, collected from Shivrajpur of Gujarat.

### 3.5 Distribution

This species is known from Indo-West Pacific. Previously reported from Gilbert Islands (Banner 1958); Suez Canal, Red Sea (Banner and Banner 1981); Persian Gulf (Nobili 1905); Thailand (Banner and Banner 1966); Philippines (Chace 1988); Indonesia (Banner 1953); Australia (Banner and Banner 1975); Singapore (Johnson 1962); China (Yang and Sha 2015); Fiji, Tonga, Samoa (Banner and Banner

1966). In India, the species is reported from Gulf of Mannar (Banner and Banner 1979) and Gujarat (present study).

### 3.6 Remarks

The present specimens resemble the description and illustration provide by Banner and Banner (1975) and Wang and Sha (2015) except for some morphological measurements. The second antennular segment was 1.7 times longer than width whereas it was 1.5 times longer than width in Australian and Chinese specimens (Duffy 1992; Wang and Sha 2015); antepenultimate segment was about 1.5 times longer than width whereas this was six times longer than width in Chinese specimens (Wang and Sha 2015); merus of minor chela 3.2 times longer than width and it was 3.5 times longer than width in Chinese specimens (Wang and Sha 2015).

## 4 | DISCUSSION

The recent checklist of shrimp fauna of India contains 24 species of family Alpheidae (Radhakrishnan *et al.* 2012; Samuel *et al.* 2016). Of these, four species belonging to genus *Synalpheus* are known from Indian water that includes *Synalpheus herdmaniae* Lebour, 1938, *S. paraneomeris* Coutiere, 1905, *S. paulsoni rameswarensis* Coutiere, 1908 and *S. tumidomanus* Paulson, 1875. Banner (1953) examined one specimen of *S. coutierei* collected from the Gulf of Mannar but they did not mention any information of the specimen in the original description of the species (Banner and Banner 1979). The first record of this species from Gujarat coast indicates the range extension of this species from the west coast of India.

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### CONFLICT OF INTEREST

The authors declare no conflict of interest.

### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author.

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