

# A new record of the rare alpheid shrimp *Coronalpheus natator* from Isla Coiba, Panama, with remarks on *Coronalpheus* and *Automate* (Crustacea: Decapoda)

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**Abstract:** The alpheid shrimp *Coronalpheus natator* Wicksten, 1999, originally described from the Galapagos Islands, is reported from waters of Isla Coiba National Park, Pacific coast of Panama. This is the first record of *C. natator* outside the type locality, and also the first record for near-continental waters of the eastern Pacific. The newly collected material from Panama is illustrated in detail. Relationships to some species of the closely related genus *Automate* De Man, 1888 are discussed. Rev. Biol. Trop. 56 (Suppl. 4): 297-304. Epub 2009 June 30.

**Key words:** Caridea, Alpheidae, *Coronalpheus*, *Automate*, eastern Pacific, Panama, Galapagos, new record.

The recently described alpheid shrimp *Coronalpheus natator* Wicksten, 1999 was believed to be endemic to Galapagos Islands (Hickman and Zimmerman 2000). This peculiar alpheid can be easily recognized by the open eystalks, shape of the chelipeds and live colour pattern (Wicksten 1999).

In March 2005, Peter W. Glynn (University of Miami, RSMAS/MBF, Miami, USA) and his collaborators collected crustaceans, including caridean shrimps, in waters of Isla Coiba National Park on the Pacific coast of Panama. Shrimps were collected from 25-30 liter bags of PVC sticks or pocilloporid rubble that were brought up and sorted on the ship. Among caridean specimens were four specimens of *Coronalpheus natator*. The newly collected material is illustrated (Figs. 1-5) and discussed below. Carapace length (CL) and total length (TL) were measured in mm along the mediodorsal line from the tip of the rostrum to the posterior margin of the carapace and telson, respectively. All specimens were deposited in

the collections of the Natural History Museum of Los Angeles County (LACM).

## TAXONOMY

### *Coronalpheus natator* Wicksten, 1999 (Figs. 1-5)

*Coronalpheus natator* Wicksten, 1999: 106, figs. 1-4; Hickman and Zimmerman 2000: 43; Anker and Komai 2004: 1909, fig. 8.

**Material examined.** – LACM CR 2005-011.2, 1 female (CL 5.9, TL 18.8), Panama, Pacific coast, Coiba National Park, off Isla Uva, site 5 PVC, Uva pocilloporid reef, mid-reef between north and south ends, 7°48'40" N, 81°45'40" W, scuba, depth: 5 m, coll. P. Glynn *et al.*, 10 Mar 2005 [specimen drawn]; LACM CR 2005-012.1, 1 female (CL 4.3, TL 12.8) + 1 juvenile, Panama, Pacific coast, Coiba National Park, off Isla Uva, Bag 1, Uva pocilloporid reef,

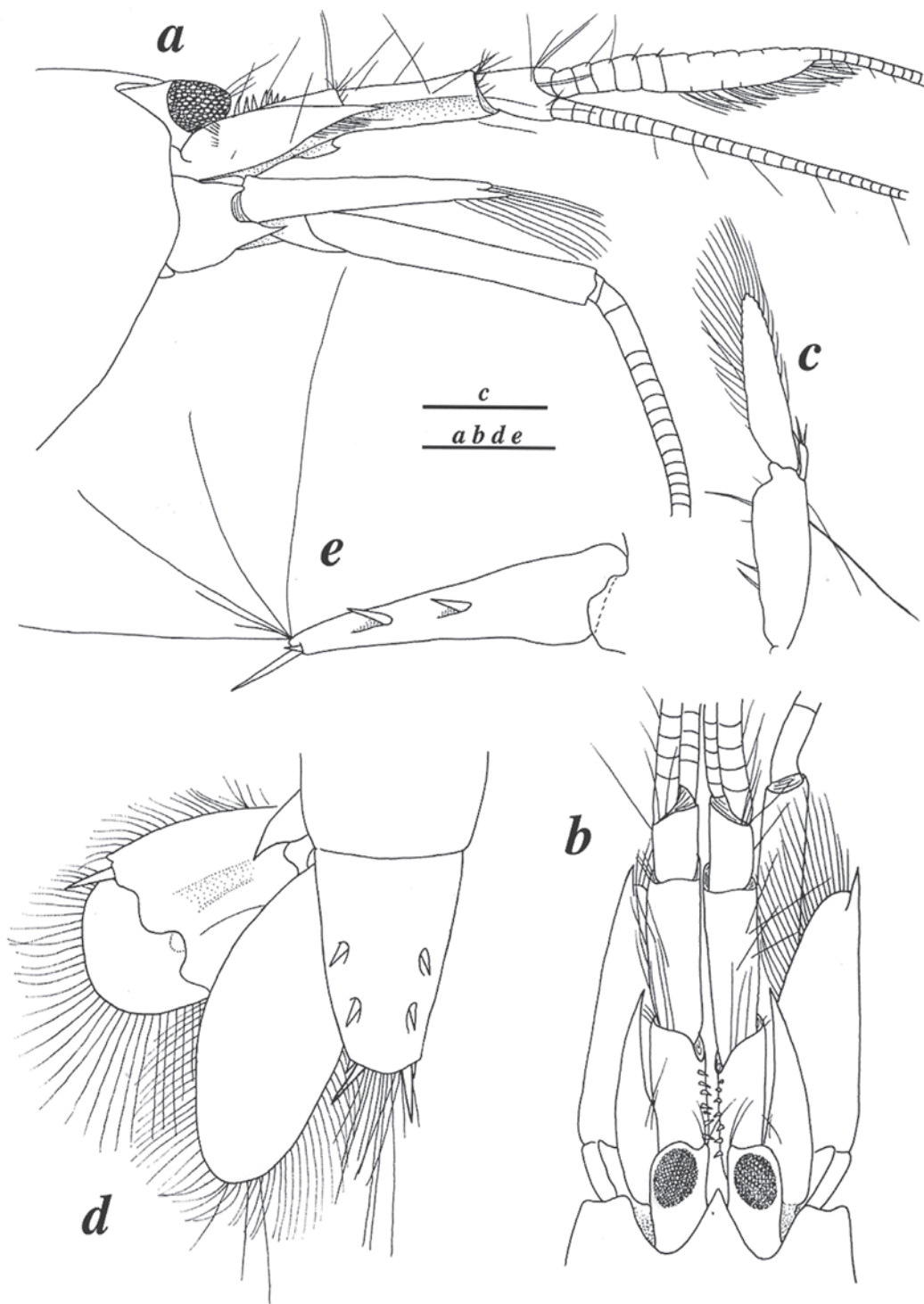


Fig. 1. *Coronalpheus natator* Wicksten, 1999, female from Coiba (LACM CR 2005-011.2). a. frontal region, lateral view; b. same, dorsal view; c. first pleopod; d. tail fan; e. telson, lateral view. Scales: 1 mm.

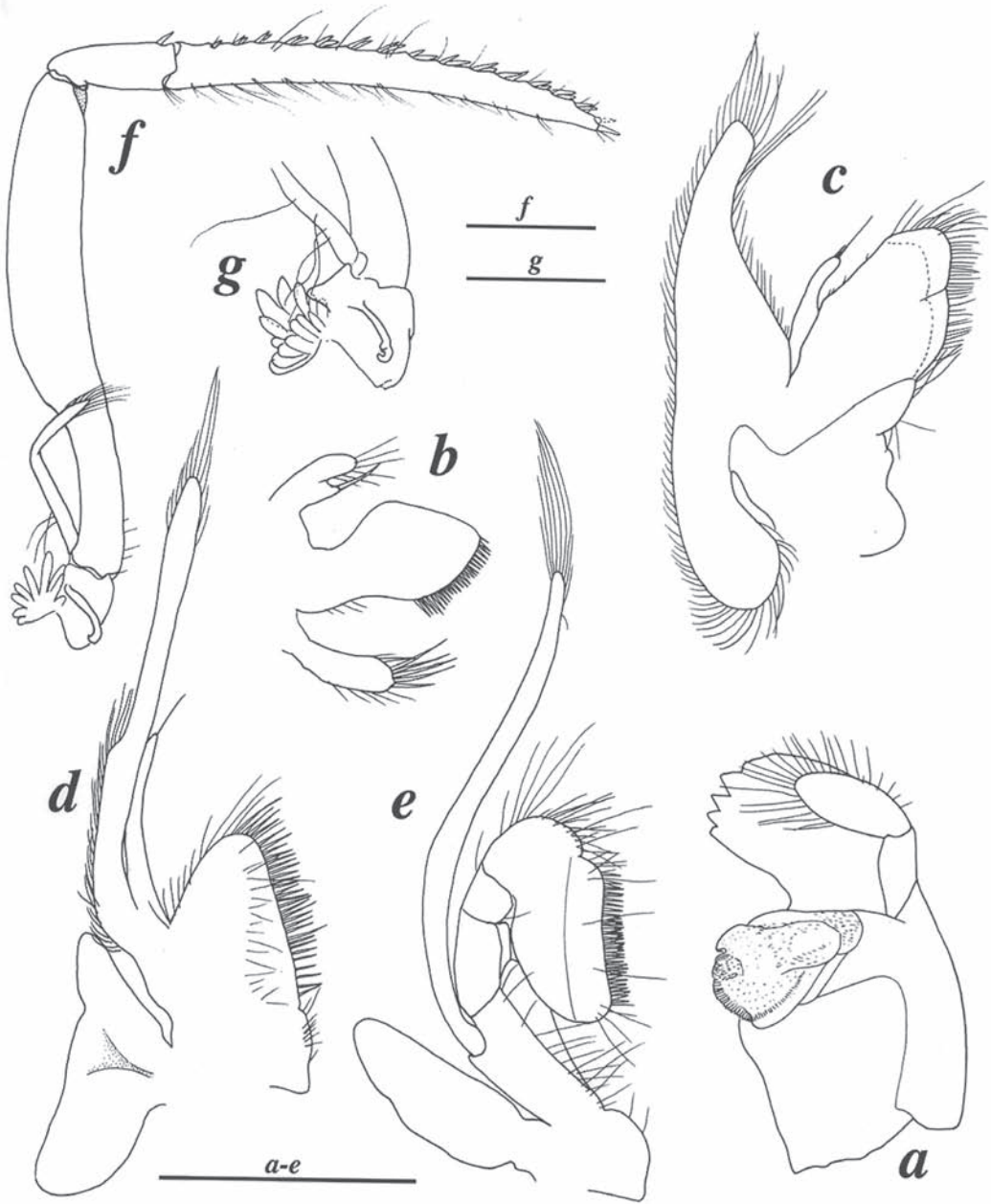


Fig. 2. *Coronalpheus natator* Wicksten, 1999, female from Coiba (LACM CR 2005-011.2): a. mandible; b. maxillule; c. maxilla; d. first maxilliped; e. second maxilliped; f. third maxilliped; g. same, detail of coxa and arthrobranch. Scales: 1 mm.

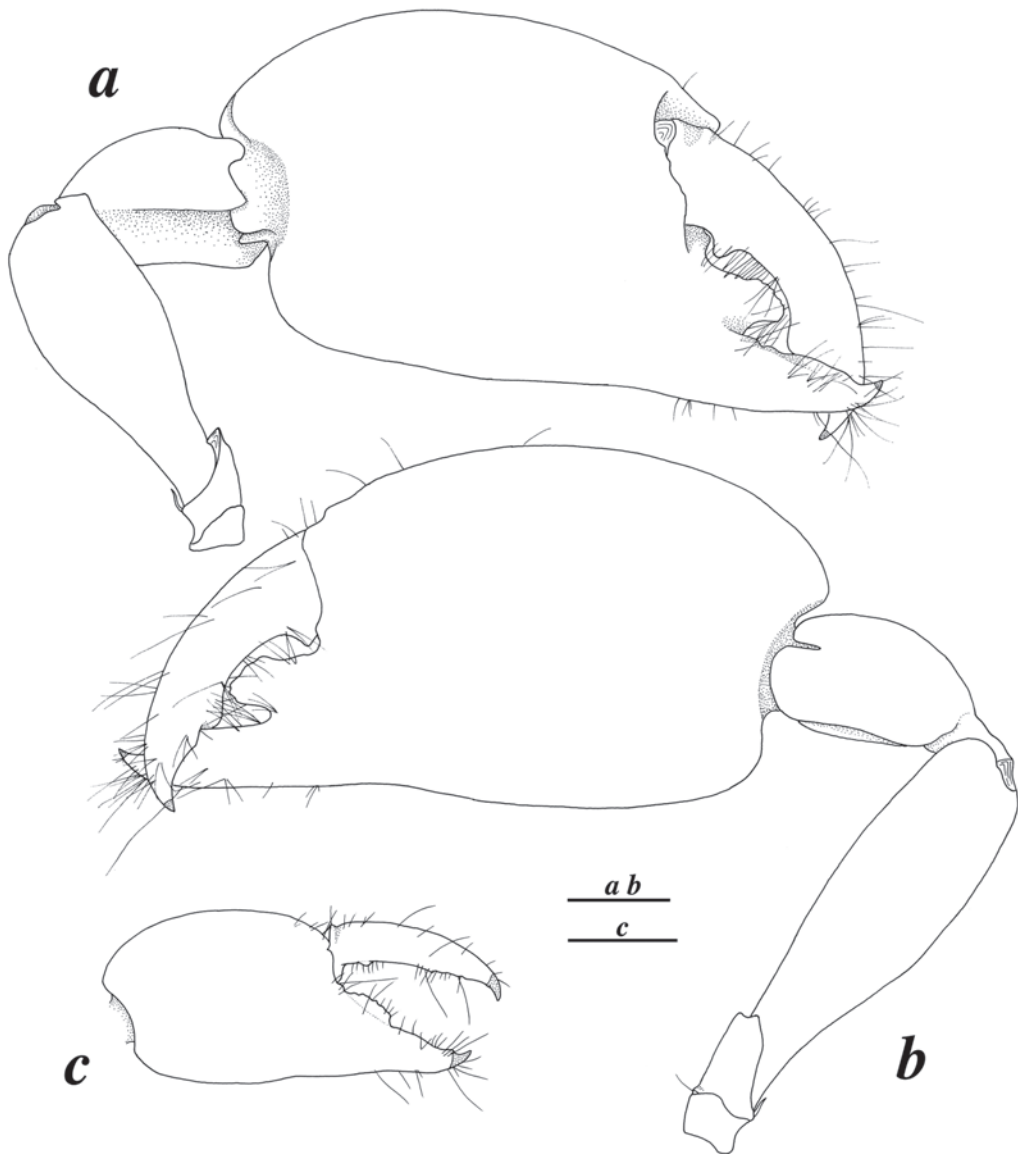


Fig. 3. *Coronalpheus natator* Wicksten, 1999, two females from Coiba (a, b: LACM CR 2005-011.2, c: LACM CR 2005-012.1): a. major cheliped, lateral view; b. same, mesial view; c. major chela of different specimen. Scales: 1 mm.

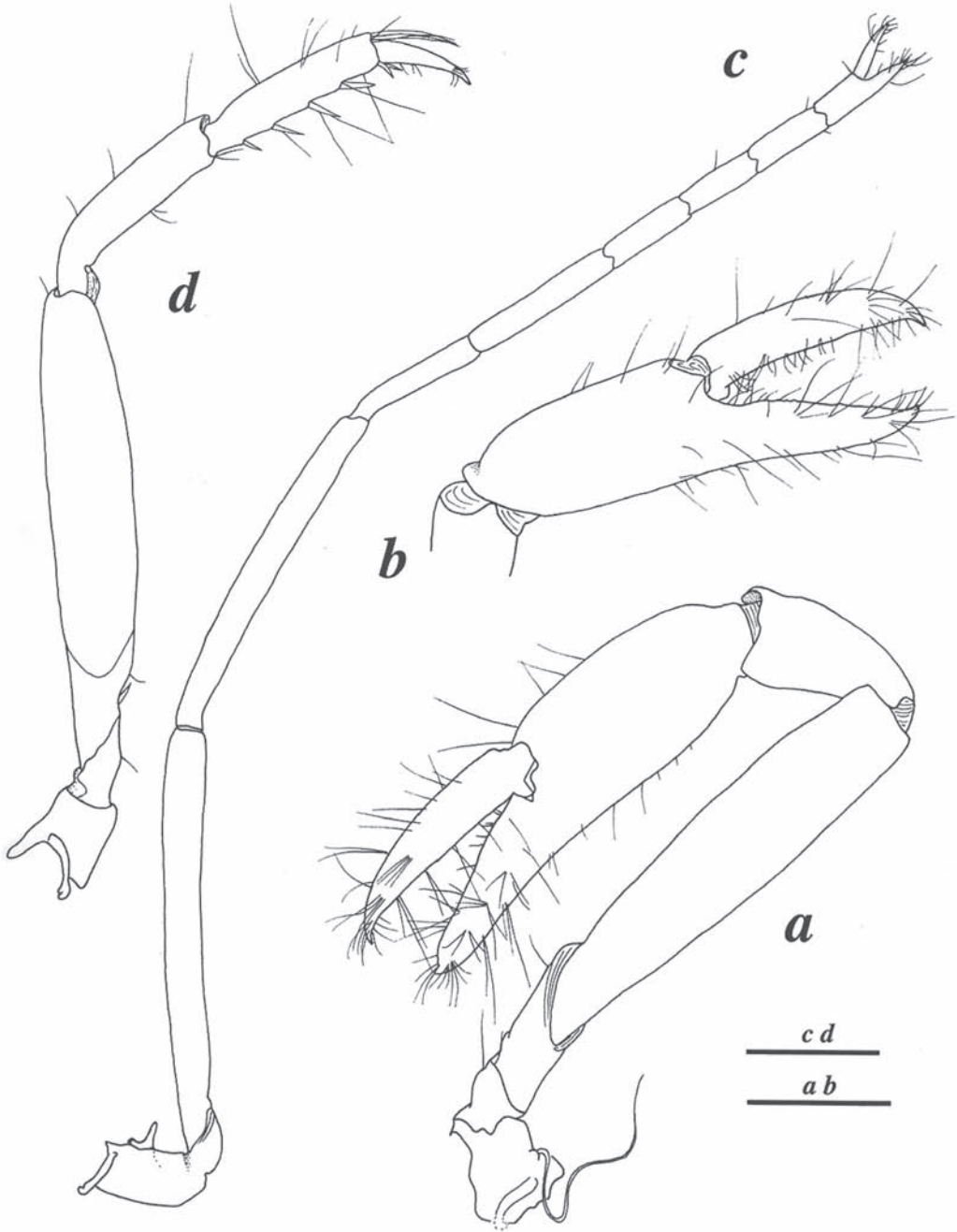


Fig. 4. *Coronalpheus natator* Wicksten, 1999, female from Coiba (LACM CR 2005-011.2): a. minor cheliped, lateral view; b. same, chela, mesial view; c. second pereopod; d. third pereopod. Scales: 1 mm.



Fig. 5. *Coronalpheus natator* Wicksten, 1999, live colour pattern of Coiba specimens (all females): a. LACM CR 2005-011.2; b. LACM CR 2005-012.1 (specimens photographed shortly after death); c, d. MZUCR 4015-01 (specimen photographed alive).

north end, 7°48'40" N, 81°45'40" W, scuba, depth: 5 m, coll. P. Glynn *et al.*, 9 Mar 2005 [specimen drawn]; LACM CR 2005-011.1, 1 female (CL 5.4, TL 18.9), same data as for LACM CR 2005-011.2.

**Description.** – For complete description see Wicksten (1999). Detailed figures of Coiba material are provided herein (Figs. 1-5).

**Size.** – The carapace length of Coiba specimens ranges from 4.3 to 5.9 mm; the maximum total length is approximately 18.9 mm. The maximum total length of Galapagos specimens according to Hickman and Zimmerman (2000) is 23 mm.

**Coloration.** – The colour pattern of *C. natator* is very characteristic and consists of a broad, bright red mediodorsal band running from the rostrum to the posterior margin of the telson (Fig. 5); the band widens posteriorly, resulting in an almost entirely red sixth abdominal somite and tail fan; the antennules are also bright red; the remaining body and appendages

are whitish except for amber-yellow areas on the chelipeds and third maxillipeds.

**Ecology.** – The Coiba specimens were collected at depth of about 5 m (relative to mean low water), on pocilloporid coral reef. The Galapagos specimens were collected under subtidal rocks in slightly deeper water, 9-15 m (Wicksten, 1999).

**Distribution.** – Galapagos Islands (Isla Onslow – type locality, Isla Santa Cruz) (Wicksten, 1999) and Isla Uva in the Isla Coiba National Park, Panama (present study). The present record is the first finding of *C. natator* outside the type locality (extending its range by more than 1200 km), and also the first record of this species and the genus *Coronalpheus* in the near-continental waters of the eastern Pacific.

**Remarks.** – The morphology of the Coiba specimens (Fig. 1-4) agrees well with the description provided by Wicksten (1999). The eyestalks are almost perfectly parallel and have a small anteromesial tubercle (Fig. 1b), thus



being very similar to those of the holotype (cf. Wicksten, 1999), in contrast to the slightly divergent eyes of the paratype (cf. Anker and Komai 2004). The slightly divergent position of the eyestalks in the paratype may be due to the relative mobility of eyes (e.g., spreading during ethanol fixation). Therefore, the statement “the eyestalks clearly separated and divergent (not parallel and not mesially touching)” in Anker and Komai (2004, p. 1911) should be changed to “the eyestalks clearly separated (not mesially touching)” (see below).

The large tooth on the pollex of the major chela present in the holotype and one of Coiba specimens appears to develop gradually, from a broad, truncate process (Fig. 3c) to a strong and distinct tooth, as illustrated (Fig. 3a, b). The chelipeds of *C. natator* appear to be anti-symmetrical, i.e., the major cheliped is situated randomly on left or right side, as in most if not all alpheid shrimps (A. Anker, pers. obs.). The minor cheliped (Fig. 4a, b), tail fan (Fig. 1d,

e) and second and third pereopods (Fig. 4c, d) agree well with those of the Galapagos specimens (cf. Wicksten 1999; Anker and Komai 2004). The pleopods of ovigerous specimens bears very stiff, straight setae on the protopod (Fig. 1c), a previously unnoticed feature. The mouthparts (Fig. 2a-e) appear to be generally fairly typical for the Alpheidae. However, the third maxilliped is rather untypical in proportions of segments and especially in the armature of the ultimate segment (Fig. 2f, g, see also illustrations in Anker and Komai 2004). This type of third maxilliped is known only in *Coronalpheus*, *Automate* De Man, 1888 and *Bermudacaris* Anker and Iliffe 2000, indicating along with other characters (e.g., frontal margin, eyestalks etc.) a close relationship between these three genera (see discussion in Anker and Komai 2004).

*Coronalpheus natator* may be confused with two species of *Automate* present in the eastern Pacific, viz. *A. rugosa* Coutière, 1902

TABLE 1  
Comparison of some features between *Automate* and *Coronalpheus*

Features	<i>A. hayashii</i>	<i>A. salomoni</i>	<i>Automate</i> s. str. (other species)	<i>Coronalpheus</i>
Rostrum	broad, rounded	long, triangular	small, triangular or reduced	long, triangular
Eyestalks	adjacent	adjacent	adjacent	separated
Eyestalks, anteromesial tubercle	absent	present	absent	present
Eyestalks, setae	absent	present	absent	present
Appendix masculina	absent ? (only 1 specimen known)	? (2 <sup>nd</sup> pleopod missing)	absent	present
Major cheliped carried	extended ?	? (missing)	extended	flexed
Major cheliped, merus	robust	? (missing)	robust	slender
Major cheliped, carpus	cup-shaped, ventrally not excavated	? (missing)	cup-shaped, ventrally not excavated	vase-shaped, ventrally excavated
Antennule, number of mesiodorsal spines	2-3	5	1-2 or absent	5-7
Antennule, mesioventral tooth	present	present	absent	present
Stylocerite	exceeding distal margin of first segment	exceeding distal margin of first segment	not exceeding distal margin of first segment	exceeding distal margin of first segment

and *A. cf. dolichognatha* De Man, 1888 (= *A. haightae* Boone 1931) (Wicksten 1981). However, *Coronalpheus* differs from all species of *Automate* by the shape and position of eyestalks, the number of mesiodorsal spines of the antennule, the presence of appendix masculina in males, and the ventrally excavated carpus and more slender merus of the major cheliped (Table 1; see also Anker and Komai 2004). Further, the major cheliped is carried flexed in *Coronalpheus* (see photograph of a living specimen in Hickman and Zimmerman 2000), whereas it is carried extended in *Automate*. However, *A. hayashii* Anker and Komai 2004 and *A. salomoni* Coutière, 1908, differ in some aspects from the other species of *Automate*, and share a number of features with *Coronalpheus*. In particular, *A. salomoni*, known from an incomplete specimen from Chagos Islands in the Indian Ocean (Coutière 1908, 1921), appears to be very closely related to *Coronalpheus* (Anker and Komai 2004; see also Table 1). These features suggest that *A. salomoni* may belong to *Coronalpheus*, however, due to the missing major cheliped and pleopods in *A. salomoni*, its true identity remains unresolved.

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#### RESUMEN

El camarón alfeido *Coronalpheus natator* Wicksten, 1999, originalmente descrito de las Islas Galápagos, se reporta para las aguas del Parque nacional Isla Coiba, costa Pacífica de Panamá. Este es el primer registro de *C. natator* fuera de la localidad tipo y además el primer registro para aguas continentales del Pacífico oriental. El material, recientemente colectado en Panamá, se ilustra en detalle. *Coronalpheus* parece estar cercanamente relacionado con algunas especies del género *Automate* De Man, especialmente de *A. salomoni* Coutière. Eso sugiere que *Automate*, bajo su definición actual, podría no ser monofilético.

**Palabras clave:** Caridea, Alpheidae, *Coronalpheus*, *Automate*, Pacífico oriental, Panamá, Islas Galápagos, registro nuevo.

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