Journal of the Marine Biological Association of the United Kingdom, 2009, 89(6), 1281–1287. ©2009 Marine Biological Association of the United Kingdom
doi:10.1017/S0025315409000484 Printed in the United Kingdom

A new *Parametopella* species (Crustacea: Amphipoda: Stenothoidae) from *Antholoba achates* (Anthozoa: Actiniaria) from Coquimbo, Chile (with remarks on *Parametopa alaskensis* (Holmes))

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This paper describes a new species in the genus Parametopella *(Amphipoda: Stenothoidae),* P. antholobae *sp. nov., collected among the tentacles of the sea anemone* Antholoba achates*, found in shallow water near Coquimbo, Chile. A key to all* Parametopella *species is provided. The type specimen of the superficially similar species* Parametopa alaskensis *(Holmes) was studied; that species remains in* Parametopa.

Keywords: new *Parametopella* species, sea anenome *Antholoba achates*, Coquimbo, Chile, *Parametopa alaskensis* (Holmes)

Submitted 12 December 2008; accepted 19 January 2009; first published online 2 June 2009

INTRODUCTION

Associations between amphipods and sea anemones are probably not all that rare, but few have been recorded hitherto. Specimens of a small amphipod found commonly among the tentacles and on the mouth-field of the sea anemone *Antholoba achates* near Coquimbo, Chile, by Professor Martin Thiel (Coquimbo) were forwarded by him to the authors and turned out to belong to a hitherto undescribed species of the genus *Parametopella* (Amphipoda: Stenothoidae), a genus hitherto only known from boreal and temperate waters on both coasts of North America. The new species is described here, and the authors have also taken this opportunity to provide a short survey of what is known about amphipod–sea anemone associations. As the present species lives in very shallow water and seems to be common, it will be probably easily accessible to future studies of its biology.

Abbreviations

A1, 2, antennae 1, 2; art, article; Cx, coxa; Gn1, 2, gnathopods 1, 2; Md, mandible; Mx1, 2, maxillae 1, 2; Mxp, maxilliped; P 3–7, peraeopods 3–7; U1–3, uropods 1–3.

SYSTEMATICS

Parametopella Gurjanova, 1938
(Figures 1–5)

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DIAGNOSTIC CHARACTERS

A1 with or without nasiform process on art1. Acc flag present or absent. Palp of Md lacking. Palp of Mx1 1-articulate. Inner plate of Mx2 ordinary (tandem-position). Inner plates of Mxp partially fused together. Gn1, 2 different in size and shape. Gn1 simple, merus more or less lobate, carpus elongate, propodus narrow. Gn2 enlarged, carpus triangular, short, palm oblique. P5–7 similar to P3, 4, with slender rectolinear basis. Cx4 ovoid, covering most peraeopods. Pereonites ordinary, free. Urosomite 2 + 3 can be fused. Telson horizontally thickened.

REMARKS

This genus shares the one-articulate palp of Mx1 and the simple Gn1 with *Metopa*, the lack of Md palp with *Stenothoe*. It belongs to the stenothoids with strongly broadened Cx4, hiding most of the peraeopods and developing nasiform antennal processes, having their main distribution in the Arctic region like *Hardametopa, Zaikometopa, Vonimetopa, Metopella* and *Metopelloides* (called 'mesometopids' in Krapp-Schickel & Koenemann, 2006, not belonging to the Thaumatelsonidae like *Raumahara, Prothaumatelson, Thaumatelson, Antatelson, Parathaumatelson* and *Pseudothaumatelson* etc., having their distribution in the Antarctic).

Parametopella antholobae sp. nov.

Holotype: male 3.0 mm, from sea anemone *Antholoba achates*, collected in seagrass bed *Heterozostera tasmanica.* Shallow subtidal, 1 m depth, Puerto Aldea (Bahia Tongoy), about 50 km south of Coquimbo, Chile. 14 December 2004 (collected by M. Thiel). Slide deposited at the Museo Civico di Storia Naturale Verona (Italy).

Paratypes: 9 males, females 3 mm, 2 juveniles, same locality, deposited at the same museum.

DIAGNOSIS

Antenna 1 peduncle without nasiform process. Gn2 powerful, male propodus palm with wide semicircular excavation.

DESCRIPTION

Length: 3.0 mm.

Head small, eyes rounded, lateral cephalic lobes rounded.

Antennae: A1 about 1/3 body length. A1 < A2; A1 peduncle art1 subequal art2, art3 subequal to first flagellar art; flagellum with 9 arts. Art1 of peduncle wider than art2. A2: peduncle much longer than that of A1, art4 > art5, flagellum with 3–4 arts.

Mouthparts: Md palp lacking but place of insertion indicated by a triangular hump; molar triturative. Mxp outer plate totally lacking.

Gnathopods: Cx1 small; Gn1 basis unexpanded, carpus longer and wider than propodus which has about 4/5 of carpus length, widest proximally, posterior margin straight, palmar corner absent. Cx2 deeper than wide, not covered by Cx4. Gn2 basis subequal to length of propodus + carpus; carpus triangular, cup-shaped; merus posterodistally rounded; propodus about 1.5 times as long as wide, palmar corner about rectangular, at about 1/2 length of propodus; palm deeply excavated; dactylus shorter than palm.

Peraeopods: Cx3 rhomboid shaped, partly covered by very enlarged, ovoid shaped Cx4. P3, 4 slender, basis similar to P5, 6. P5–7 merus posterodistally somewhat lengthened but not widened; P7 basis a bit wider than that of P5, 6, but distally narrowing; all other articles very similar.

Uropods: U1, 2 peduncle longer than rami; U1 peduncle and outer ramus with short robust setae. U1, 2 rami somewhat unequal. U3 ramus with two arts, together longer than length of peduncle, though each art shorter than peduncle.

Telson: naked, partly fused with urosome, distally U-shaped.

Ovigerous females 3.0 mm. Gn2 propodus without palmar excavation, palmar corner rounded.

ETYMOLOGY

Antholobae, a noun in genitive form, for the host sea anemone, *Antholoba achates*.

DISCUSSION

The genus is known as pan-North-American warm temperate. The first species described was *P. cypris* (Holmes, 1904–1905), which has been reported until now from Cape Cod to northern Florida. In 1948 Gurjanova described *P. stelleri* from the Bering Sea, in 1962 Barnard *P. ninis* from southern California, 1976 Watling *P. inquilinus* from Delaware Bay and finally 1978 McKinney *et al. P. texensis* from the Gulf of Mexico.

The known species are reported as found together with hydroids, ectoprocts, sponges and in oyster beds, furthermore their morphology is rather similar; most *Parametopella* species are reported as 'rare', which of course may be correlated with the difficulty of collecting.

The present species was sitting among the tentacles and on the mouthfield of the sea anemone (Figure 1). It shares the excavate palm on Gn2 with *P. inquilinus* and *P. texensis*, but these two species have half of the palm dentate and not excavate, while in the new species the excavation starts right after the dactylus insertion.

KEY TO ALL *PARAMETOPELLA* SPECIES

1. A1 art1 of peduncle with nasiform process. . . . . *P. stelleri* (Bering Sea)
   - A1 art1 of peduncle lacking nasiform process. 2
2. Telson marginally with robust setae. . . . . *P. ninis* (California)
   - Telson smooth 3
3. A2 peduncle art4, 5 about similar length of A1 peduncle art1. . . . . *P. cypris* (Atlantic Ocean from Cape Cod to Florida)
   - A2 peduncle art4, 5 clearly longer than length of A1 peduncle art1. 4
4. Gn2 propodus palm regularly semicircularly excavated. . . . . *P. antholobae* sp. nov. (Pacific Ocean, Chile)
   - Gn2 propodus palm distal half dentate, proximal half excavated. 5
5. Gn1 propodus palm straight, carpus with parallel margins; U3 ramus art1 = subequal art2. . . . . *P. inquilina* (Atlantic Ocean, Delaware)
   - Gn1 propodus palm, rounded, widened, carpus also posteriorly widened, rounded; U3 ramus art1 much shorter than art2. . . . . *P. texensis* (Gulf of Mexico)

We checked the holotype of *Parametopa alaskensis* (Holmes) (one half specimen, USNM 86805 from St Paul I., Pribilof Ids. = fur seal Ids. = Kotovi, south-western Alaska, under *Stenothoe alaskensis*), as a lot of striking similarities to the genus *Parametopella* are reported. The head is missing in this specimen, P3–6 are similarly slender, but P7 is much more rectangularly widened than illustrated by Gurjanova 1951 for her material (see Figure 5), while the urosome of the specimen of Holmes seems to match the drawings of Gurjanova. Gn2 of this male (only one is present) is similar

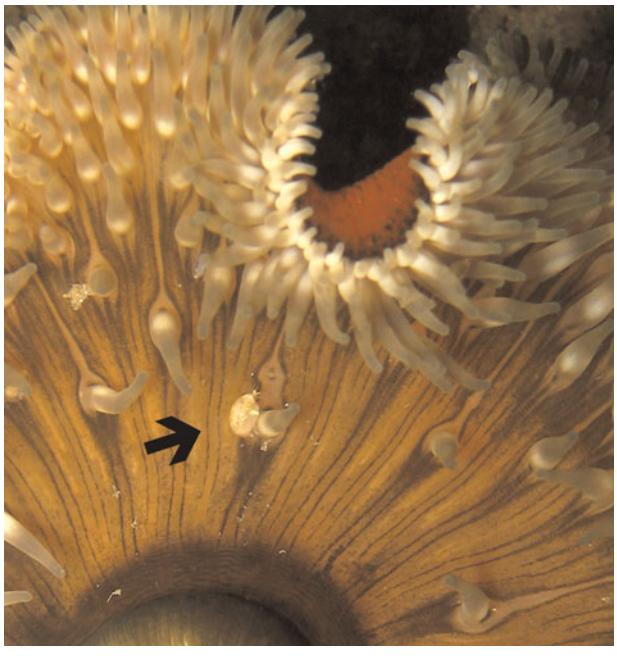

Fig. 1. *Parametopella antholobae* sitting inside the sea anemone *Antholoba achates.*

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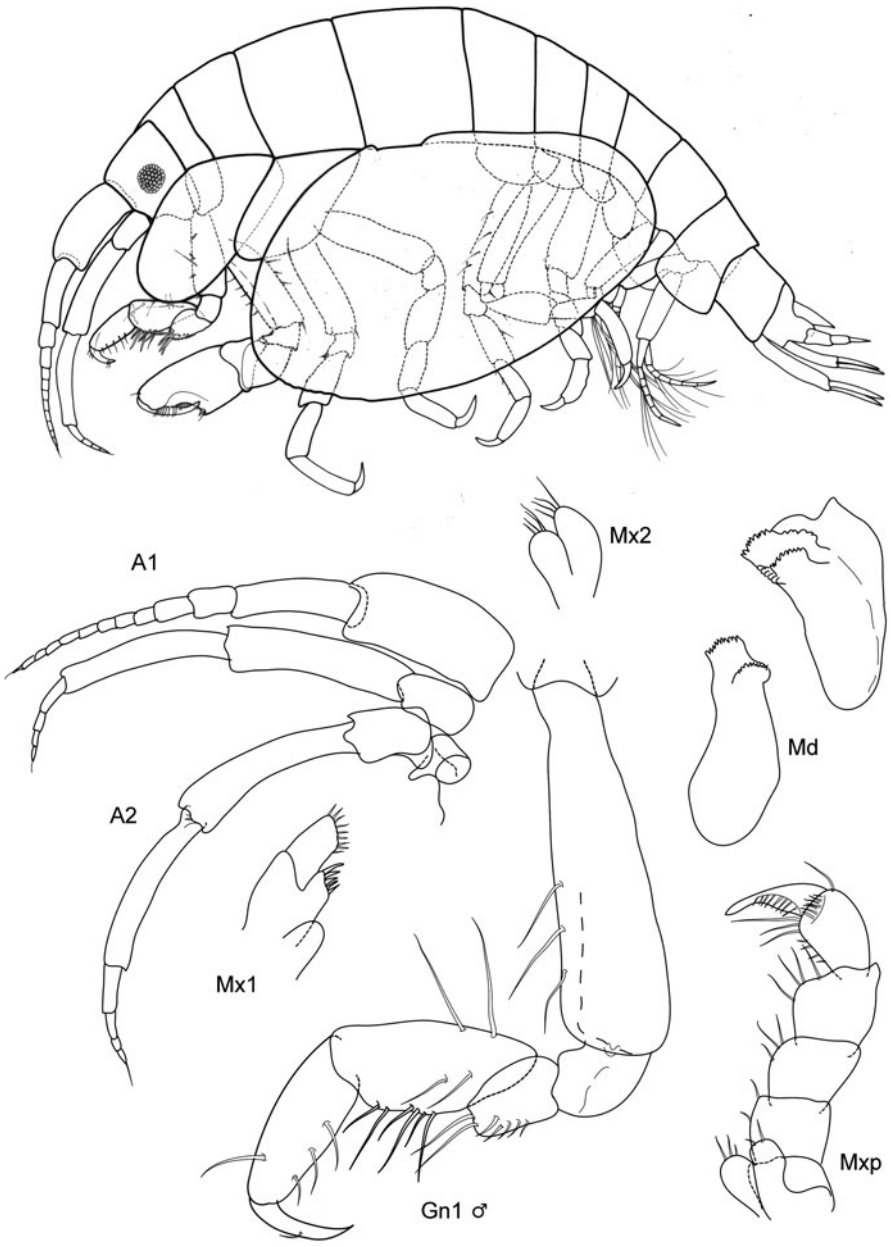

Fig. 2. *Parametopella antholobae*: habitus male, antennae, mouthparts and Gn1 female.

to *Parametopa alaskensis* figured by Gurjanova 1951 and to *Parametopella inquilina* Watling 1976, but has a second hump in the middle of the palm (see Figure 5).

As Gurjanova shows a rather bottle-shaped slender basis of P7, we hesitated if this species should not better belong to *Parametopella* (see also the similarly slender but rounded basis of P7 in the new species), and in fact be *Parametopella inquilinus*. But Holmes's type definitely does not belong to *Parametopella*, but fits very well *Parametopa* (thus the question mark in Barnard & Karaman, 1991: 694 can be removed).

Associations between amphipods and sea anemones

Most stenothoid amphipods live among hydroids or similar epizoic growths, a few are also regularly found on sponges. Few associations with large individual invertebrates have hitherto been described, although it is probable that many have been overlooked. A few *Metopa* species live inside bivalve molluscs (see Tandberg *et al.*, in preparation), while various stenothoids have been found on and even inside ascidians (Stebbing, 1920; Pirlot, 1933; Stephensen & Thorson, 1936). A few species, especially *Metopelloides micropalpa* (Shoemaker, 1930) and *Stenula rubrovittata* (G.O. Sars, 1883) have been found in association with hermit crabs (cf Besner, 1976; McGrath, 1978), while *Stenothoe symbiotica* Shoemaker, 1956 lives on spider crabs (Shoemaker, 1956; Thomas & Cairns, 1984).

Only two stenothoid amphipods, *Metopa solsbergi* and *Stenothoe brevicornis*, have hitherto been found as regular associates of sea anemones, but a number of such associations has been reported where the specific identity of the amphipod partner has not yet been determined (see Table 1). Both

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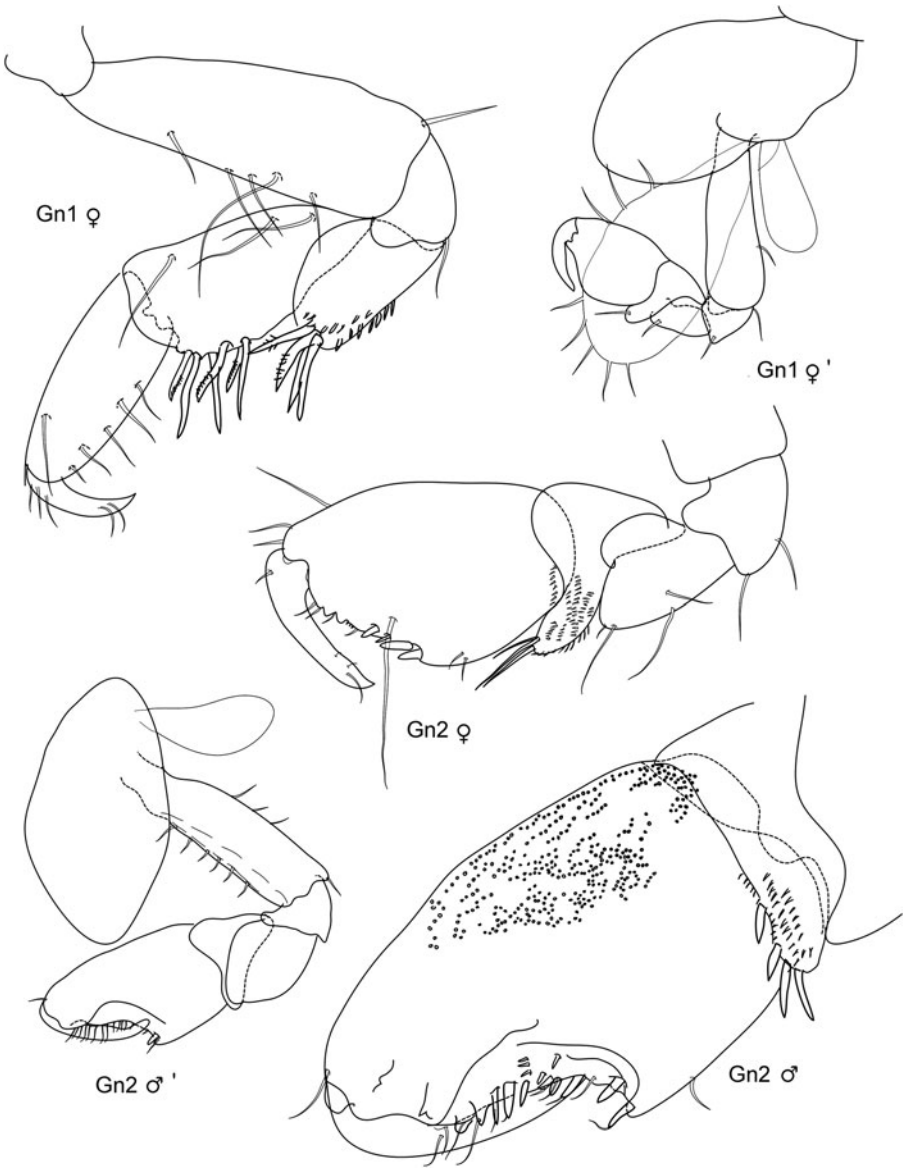

Fig. 3. *Parametopella antholobae* Gn1 male, Gn2 male and female.

species live among the tentacles of their host, where apparently they may spend their entire life cycle (Vader & Krapp-Schickel, 1996), and at least *S. brevicornis* feeds on its host's tissues (Moore *et al.*, 1994); in addition, the amphipods may feed commensally on the prey captured by the host sea anemone.

Quite a number of associations between representatives of other families of amphipods and sea anemones have been reported, although the literature is very scattered (cf Vader, 1983; Vader & Krapp-Schickel, 1996). In some cases, amphipods are specialized feeders on sea anemones; examples are *Andaniexis lupus* Berge & Vader, 1997 (Moore *et al.*, 1994), *Maxilliphimedia longipes* (Walker, 1906) (Coleman, 1989), and *Parandania boecki* (Stebbing, 1888) (Coleman, 1990). *Acidostoma* species live as 'lice' on the outside of the column of sea anemones and suck food with their specialized mouthparts (Dahl, 1964; Vader, 1967; Ansell, 1969). Other amphipods live more or less permanently inside the coelenteron of their host, where they seem to be immune to the digestive enzymes of the sea anemone (Vader & Lønning, 1973), and feed at least in part on host tissue (Moore *et al.*, 1994). *Onisimus* species leave their host sea anemone as adults (Vader, 1970), but the Pacific littoral species *Orchomenella recondita* (Stasek, 1958) spends its entire life-cycle inside its host, *Anthopleura elegantissima* (Brandt, 1835) (Stasek, 1958; De Broyer & Vader, 1990).

In a number of other amphipod species the association with sea anemones seems to be a less permanent one, and more directly comparable with decapod–sea anemone associations, where the primary advantage for the crustacean partner seems to be the protection afforded by the nematocysts of the sea anemone, but none of the associations have been properly investigated as yet. Examples are the occurrence of *Melita obtusata* (Montagu, 1813) (partly cited under *Abludomelita*) (Hartnoll, 1971), *Caprella acanthifera* Leach, 1814 (Stroobants, 1969), and *Phtisica marina* Slabber, 1769 (Vadon, 1984) on *Anemonia sulcata* (Pennant, 1766), and possibly also that of the little known *Elasmopus calliactis*

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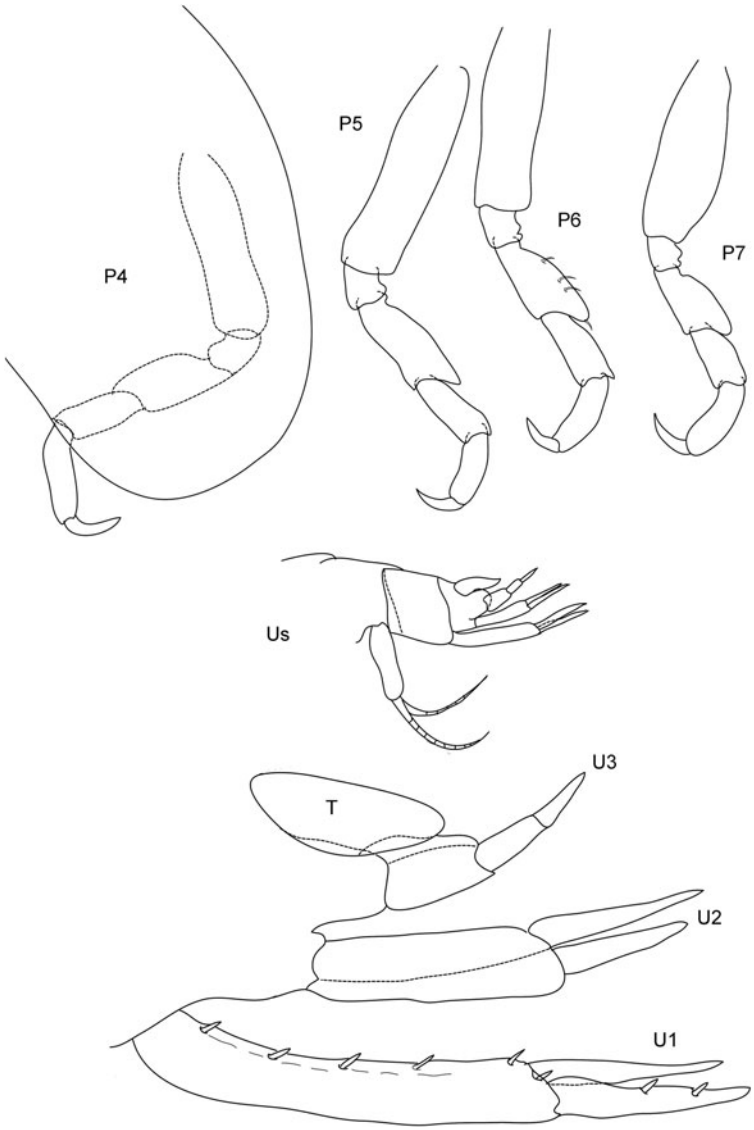

Fig. 4. *Parametopella antholobae* P4–7 and urosome with U1–3.

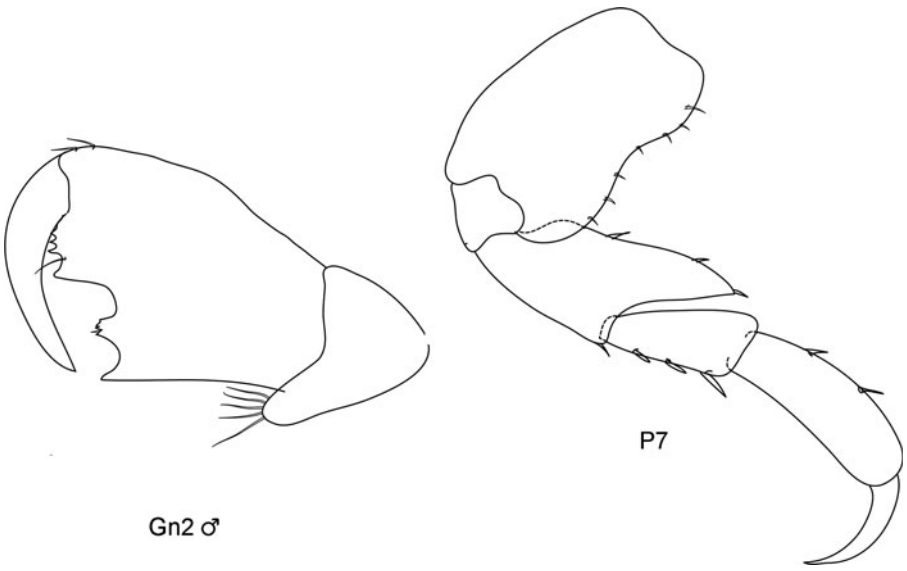

Fig. 5. *Parametopa alaskensis* (Holmes) Gn2 male and P7.

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Table 1. A survey of published data on associations between stenothoid amphipods and sea anemones.

Amphipod associate	Sea anemone host	Locality	Reference
Metopa solsbergi sp. Schneider, 1884	*Metridium senile* (L., 1767)	Scotland and Newfoundland	Elmhirst, 1925; Fenwick & Steele, 1983
Parametopella antholobae	*Antholoba achates* (Dana, 1849)	Coquimbo, Chile	This paper
Stenothoe barrowensis Shoemaker, 1955	Unidentified	Port Barrow, Alaska	cf. Vader, 1983
Stenothoe brevicornis G.O. Sars, 1883	*Actinostola Callosa* (Verrill, 1882)	Northern Norway	Vader & Krapp-Schickel, 1996
Stenothoe sp.	*Bartholomea annulata* (Leseur, 1817)	Florida Keys	cf. Vader, 1983
Stenothoe sp.	*Haliactis arctica* Carlgren, 1921	Port Barrow, Alaska	cf. Vader, 1983
Stenothoe sp.	*Boloceropsis* sp.	Chile	Häussermann, personal communication, 2007
Stenula arctica Gurjanova, 1951	*Gersemia* sp. (Octocorallia)	Newfoundland	Fenwick & Steele, 1983

(Edmondsson, 1951) on *Calliactis armillatus* Verrill, 1928 (Edmondsson, 1951).

ACKNOWLEDGEMENT

The authors are very grateful to Professor Martin Thiel for the opportunity to study this very interesting material.

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