

ACRENHYDROSOMA MACCALLI, A NEW SPECIES FROM AUKE BAY,
ALASKA (COPEPODA, HARPACTICOIDA)

BY

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ABSTRACT

A new species of *Acrenhydrosoma* (Harpacticoida, Cletodidae) is described and illustrated. Specimens were collected during a long term investigation of intertidal meiofaunal taxa in Auke Bay, Alaska. *Acrenhydrosoma maccalli* n.sp. was present in low densities at the 0 m tidal level from March to July 1992. It is distinguished from *A. perplexum* (T. Scott) by the number of setae on the terminal endopod segment of swimming leg 1 and from *A. karlingi* Lang by the ornamentation of swimming leg 5 and the length to width ratio of the caudal rami.

ZUSAMMENFASSUNG

Eine neue Art der Gattung *Acrenhydrosoma* (Cletodidae) wird beschrieben. Die Tiere wurden während einer Langzeitstudie der Meiofauna-Taxa im Gezeitenbereich der Auke Bay, Alaska, gesammelt. *A. maccalli* kam von März bis Juli 1992 in geringer Dichte am 0 m Gezeitenhorizont vor. Von *A. perplexum* (T. Scott) unterscheidet sich die neue Art durch die Zahl der Borsten am Terminalglied des Enp. P1 und von *A. karlingi* Lang durch die Bewehrung des P5 und durch das Längen-Breiten-Verhältnis der Furkaläste.

INTRODUCTION

During an investigation of a meiobenthic intertidal community in south-eastern Alaska, a new species of harpacticoid copepod was discovered. *Acrenhydrosoma maccalli* n.sp. was collected from a muddy beach in Auke Bay, Alaska.

The harpacticoid copepod fauna of Alaska is poorly known; however, a number of meiofaunal investigations have been conducted recently in Auke Bay (Gee, 1988; Fleeger et al., 1989; Fleeger & Shirley, 1990; Gee & Fleeger, 1990; McCall, 1992) and other remote areas such as Cape Krusenstern (Schizas & Shirley, 1994). An increased understanding of the role of harpacticoid copepods and meiofauna in general in marine benthic food webs will be possible only if the species are known.

Another species of *Acrenhydrosoma* has been reported previously from Auke Bay, as Cordell (1986) reported *A. perplexum* (T. Scott, 1899) from Spuhn Island. Unfortunately, specimens from this collection were not retained (J. Cordell,

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personal communication) and we could not verify the identification. With the present addition, the genus *Acrenhydrosoma* now has three species: *A. perplexum* (T. Scott, 1899), *A. karlingi* Lang, 1965, and the presently described *A. maccalli*. A key for the genus is provided.

All specimens examined were collected from the 0 m tidal level at a single location in Auke Bay (58°22'N 134°40'W), approximately 19 km north of Juneau, Alaska. The topography and hydrography of Auke Bay have been described by Coyle & Shirley (1990). An intertidal mudflat, approximately 60 m wide, was sampled from March to December 1992. The beach has a low gradient and is characterized by a *Mytilus trossulus* zone in the high intertidal which gradually changes to a barnacle-*Fucus* zone in the lower intertidal, and eventually to the mudflat which begins just above the mean low water level. The seagrass *Zostera marina* is present in the area. Long-term meiofaunal studies have been conducted in the same intertidal mudflat (Sturdevant, 1987; McGregor, 1991; McCall, 1992).

The copepods were stained with rose bengal and preserved in 10% buffered formalin. The phylogeny and descriptive terminology used in this paper are adapted from Huys & Boxshall (1991). All figures were drawn with a camera lucida. Abbreviations in the text and figures are P1-P5 for swimming legs 1-5; exopod and endopod -1, -2 and -3 to indicate the proximal, middle and distal segments of a ramus, respectively. Body length measurements do not include antennules, rostrum and caudal rami.

***Acrenhydrosoma maccalli* n. sp. (figs. 1-8)**

Material examined. — Holotype: ovigerous female (intact specimen on slide) USNM No. 259323. Paratypes: 3 dissected females, 2 dissected males. Other paratypes 9 females (including two ovigerous and two headless specimens), 11 males and 1 copepodite preserved in 70% alcohol, USNM No. 259324. Description is based on the holotype, dissected and intact paratypes.

Type locality. — Auke Bay, Alaska (58°22'N 134°40'W) from a mudflat, tidal depth 0 m.

Female. — Females ranged from 0.62 to 0.71 mm; three had a single egg sac (one individual had seven eggs). Body is relatively robust and tapering behind (fig. 1A, B). Cephalothorax and rostrum about the length of the three succeeding somites. All somites except preanal bear small protuberances with sensilla. Genital double-somite is divided dorsally by the posterior edge of a cuticular ridge, which is furnished with two protuberances, and is laterally fused (fig. 1A, B); genital field with pinnate and simple setae on each side, simple seta medially; otherwise as shown in fig. 2B. Ventral surface of urosomites 4 and 5 bears two protuberances with sensilla (fig. 2A). Anal operculum is furnished with two protuberances with sensilla (fig. 1A). Caudal rami are as long as the last three segments and slender, with length to width ratio >11; seta I, II, and III slender on outer margin, terminal seta IV confluent to base with terminal

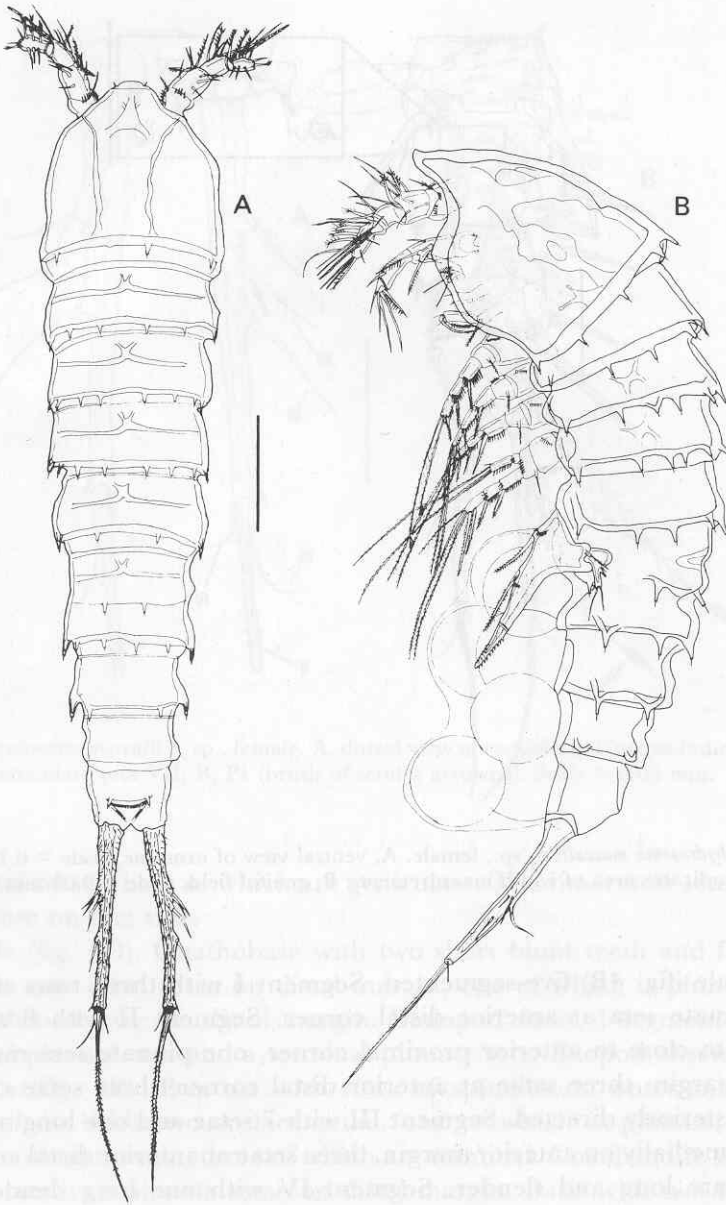


Fig. 1. *Acrenhydosoma maccalli* n. sp., female. A, dorsal view; B, lateral view of ovigerous female (holotype). Scale (vertical bar) = 0.1 mm.

seta V which is strong and pinnate on distal three-fourths, terminal seta VI slender, seta VII on dorsal surface tri-articulate (fig. 3A).

Rostrum (fig. 4A). Prominent with one short seta on each side and tip slightly emarginated.

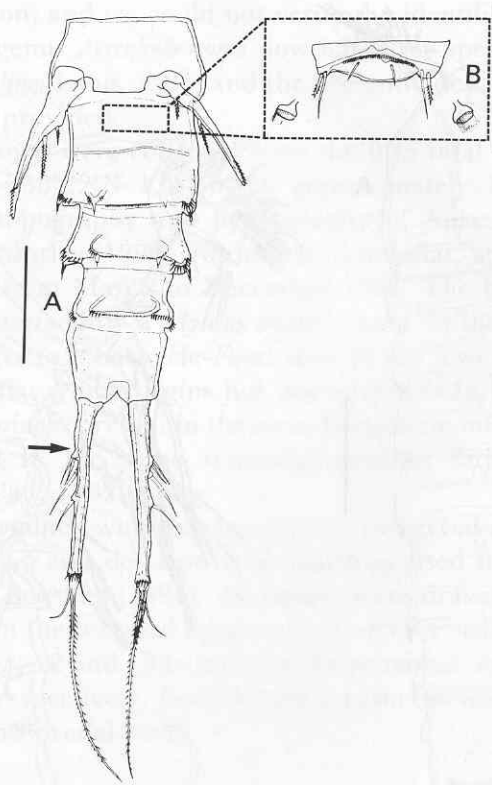


Fig. 2. *Acrenhydrosoma maccalli* n. sp., female. A, ventral view of urosome, scale = 0.1 mm (arrow indicates area of width measurement); B, genital field, scale = 0.05 mm.

Antennule (fig. 4B) five-segmented. Segment I with three rows of spinules and a pinnate seta at anterior distal corner. Segment II with 8 setae; one pinnate seta close to anterior proximal corner, one pinnate seta medially on anterior margin, three setae at anterior distal corner, three setae on ventral surface posteriorly directed. Segment III with 7 setae and one long aesthetasc; four setae medially on anterior margin, three setae at anterior distal corner, two of which are long and slender. Segment IV with one long slender seta at anterior margin. Segment V with eleven setae and an aesthetasc; three strong spinulose setae and a long simple seta on anterior margin, two setae and an aesthetasc at distal margin, five setae on ventral surface posteriorly directed.

Antenna (fig. 4C). Antenna with well-developed coxa. Allobasis with rows of setules at proximal anterior margin and at base of a short pinnate seta medially on anterior margin. Exopod 1-segmented with a lateral and a terminal pinnate seta; a row of setules near the base of terminal seta. Endopod with rows of spinules medially and two setae on the spinulose anterior edge. Segment bears

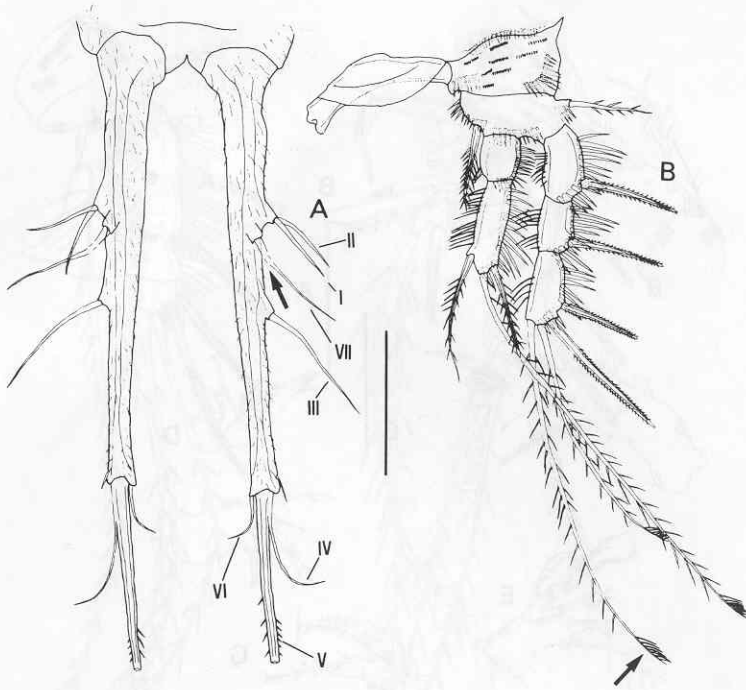


Fig. 3. *Acrenhydrosoma maccalli* n. sp., female. A, dorsal view of caudal rami (arrow indicates the tri-articulate seta VII; B, P1 (brush of setules arrowed). Scale = 0.05 mm.

five terminal setae, three of which are geniculate. The innermost seta is strong and spinulose on one side.

Mandible (fig. 4D). Gnathobase with two short blunt teeth and four short sharp teeth; two short setae on distal margin, one of which is pinnate. Basis slender with two setae on distal margin. Endopod short, 1-segmented with a subterminal pinnate seta and a terminal pinnate seta. Exopod absent.

Maxillula (fig. 4E). Precoxa with rows of spinules on outer margin and surface; arthrite with two surface setae, one of which is pinnate, and five elements on distal margin, three of which are terminal. Coxal endite with a row of spinules and two pinnate setae on distal margin. Basis with two transverse rows of spinules, one near the base of endopod and another one on distal margin, and three pinnate setae on distal margin. Endopod minute with a pinnate seta. Exopod 1-segmented with two pinnate setae.

Maxilla (fig. 4F). Syncoxa with rows of spinules on proximal and distal outer margin; inner margin with two endites, proximal endite with a pinnate spine, a seta and a simple seta; distal endite with a pinnate spine and seta. Allobasal endite with a sub-apical seta and two apical setae. Endopod 1-segmented with a row of spinules on lateral margin and two terminal setae.

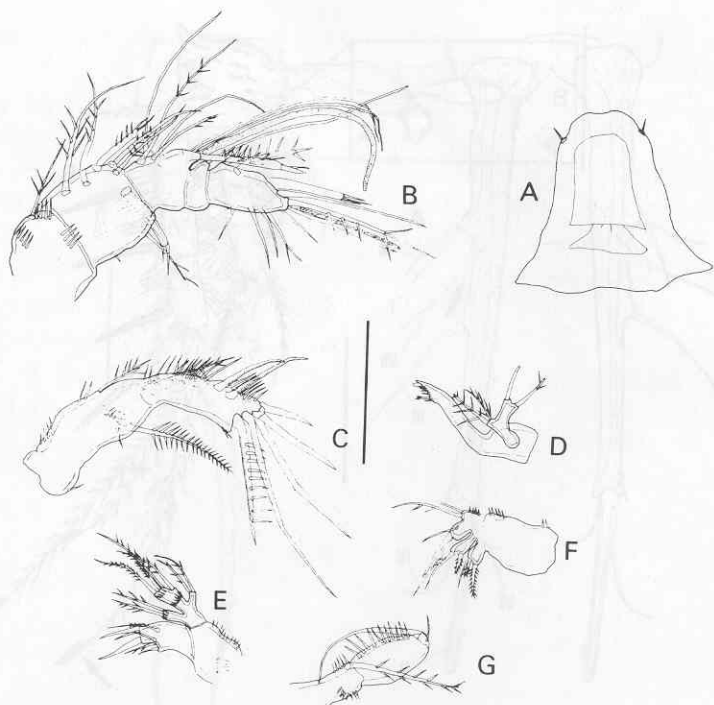


Fig. 4. *Acrenhydrosoma maccalli* n. sp., female. A, rostrum; B, antennule; C, antenna; D, mandible; E, maxillula; F, maxilla; G, maxilliped. Scale = 0.05 mm.

Maxilliped (fig. 4G). Prehensile. Syncoxa with a distal row of spinules on outer margin and on inner margin; a large seta apically. Basis ovoid, with row of stout spinules on palmar margin. Endopod claw without teeth, as long as basis and syncoxa together; one short accessory seta.

P1 (fig. 3B) non-prehensile. Intercoxal sclerite well developed with no ornamentation. Precoxa with row of spinules on distal margin. Coxa with two rows of spinules near outer and inner distal corner and eight rows of minute spinules on anterior face. Basis with a row of spinules at base of bipinnate inner seta, a row of spinules on distal margin and a row of spinules at base of outer seta on anterior face; outer seta long and weakly pinnate. Exopod 3-segmented, each segment with a row of spinules on outer and distal margin; outer spines minutely spinulose; terminal setae of exopod 3 are furnished with a comb of setules at distal end. Endopod 2-segmented, shorter than exopod, distal segment about 3 times longer than wide, a sparsely plumose seta in subterminal position; terminal seta of endopod 2 furnished with a comb of setules at distal end.

P2-P4 (figs. 5A, B, 6A). Precoxa and coxa as in P1 except for presence of at least 3 rows of minute spinules on anterior face of coxa. No rows of minute

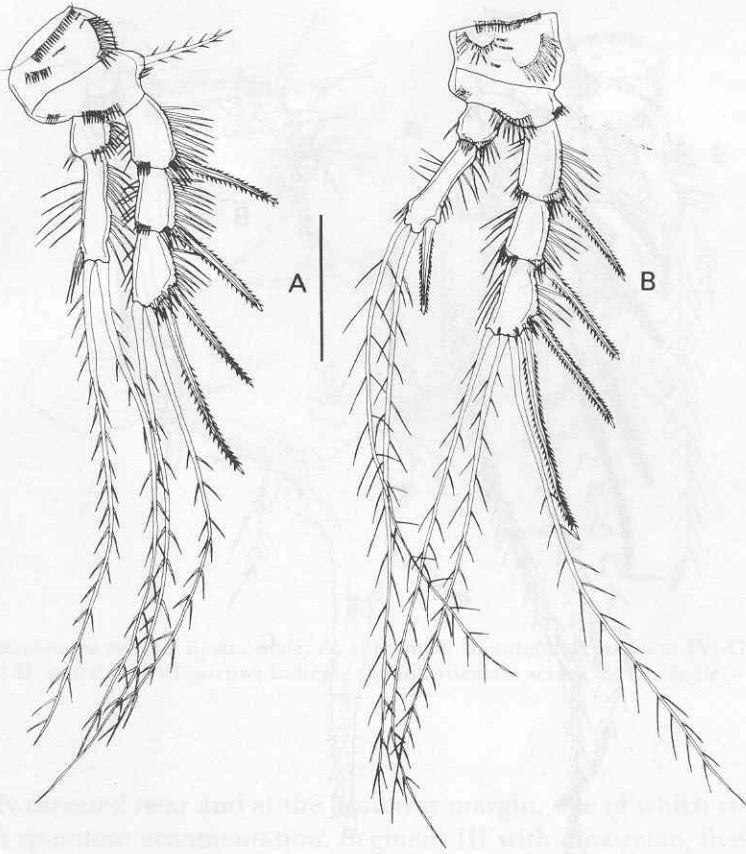


Fig. 5. *Acrenhydrosoma maccalli* n. sp., female: A, P2; B, P3. Scale = 0.05 mm.

spinules were detected on P4 coxa. Basis with spinules near the base of outer, sparsely plumose seta and a row of spinules on distal margin; inner seta absent. Basis of P3 with an additional row of spinules at inner distal corner. Exopod 3-segmented, each with a row of spinules on outer and distal margins; outer spines minutely spinulose. Endopod 2-segmented, shorter than exopod, distal segment three to four times longer than wide. Setal formula is as follows:

	Exopod	Endopod
Leg 1	0.0.022	0.120
Leg 2	0.0.022	0.020
Leg 3	0.0.122	0.021
Leg 4	0.0.122	0.111

P5 (fig. 6B) covered with hair-like setae. Exopod small, not fused to basis, a short spine and a minute seta or spinule on outer edge; two sparsely plumose

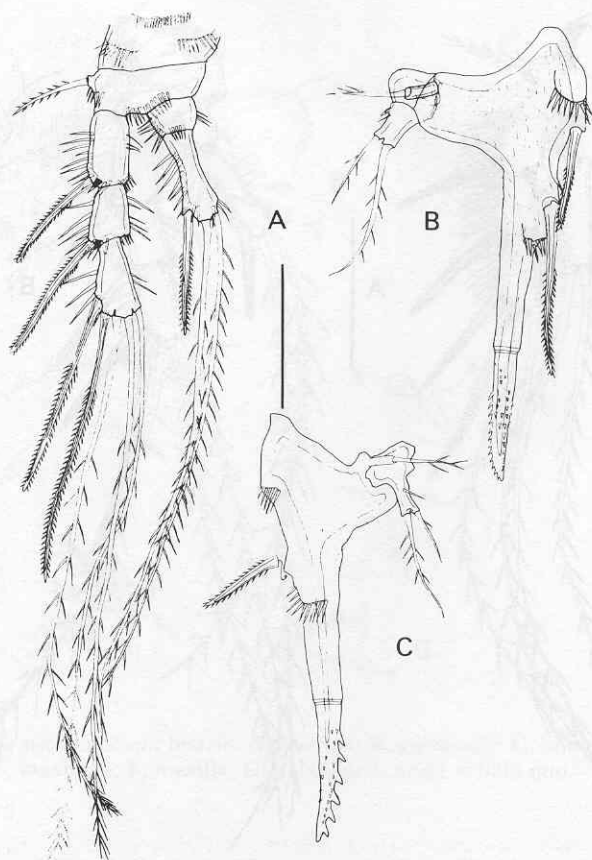


Fig. 6. *Acrenhydrosoma maccalli* n. sp., A, B, female: A, P4; B, P5. C, male, P5. Scale = 0.05 mm.

terminal setae. Baseoendopod with proximal part broad, distal part attenuated into a long mucronated process with two strong minutely spinulose spines on distal inner margin, a lobe near base of proximal spine furnished with row of spinules, a spinulose row on inner margin near distal spine. End of mucronated process with short tooth-like spines on outer distal margin and shorter spines on inner distal margin and surface. Three concentric rings occur at approximate midpoint of mucronated process. From a dorsal view, P5 is pointing backwards and outwards at a 45° angle.

Male. — Similar to female except for the following characteristics:

Body. Length ranges from 0.60 to 0.67 mm. Urosomites 2 and 3 not fused.

Antennule (fig. 7A) six-segmented, sub-chirocer with fourth segment inflated. Segment I with rows of spinules on surface and on base or sparsely pinnate seta at posterior distal corner; a ventral row of short stout spinules. Segment II with eight setae, two of which anteriorly directed on ventral surface; six setae

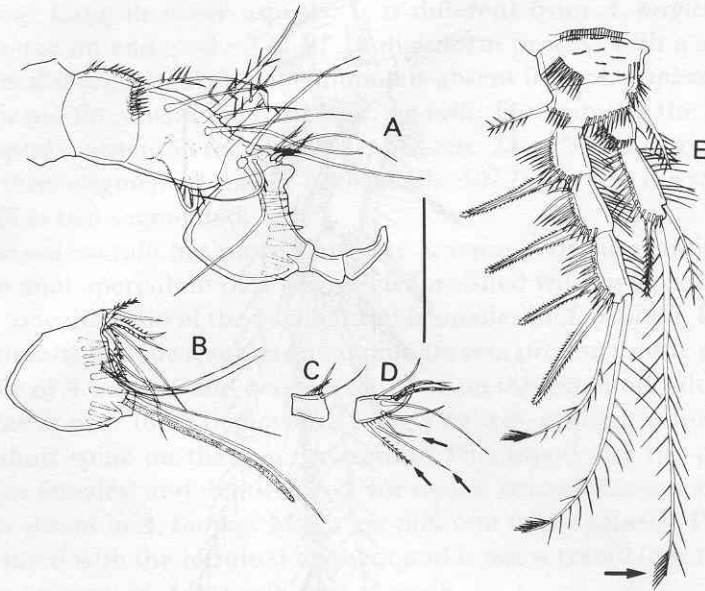


Fig. 7. *Acrenhydrosoma maccalli* n. sp., male. A, antennule; B, antennule segment IV; C, antennule segment V; D, antennule VI (arrows indicate the bi-articulate setae); E, P1. Scale = 0.05 mm.

posteriorly directed near and at the posterior margin, one of which is thick and stout with spinulose ornamentation. Segment III with nine setae, five of which on posterior distal corner. Segment IV with thirteen setae and a long aesthetasc; four short pinnate setae and four simple setae on posterior margin, two long slender simple setae on dorsal surface, a simple long seta near base of aesthetasc and a simple long seta originating from same lobe as aesthetasc; a row of long stout spinules across ventral surface (fig. 7B). Segment V with four simple setae on posterior margin (fig. 7C). Segment VI with nine setae and a short aesthetasc; five setae on anterior margin, three of which are biarticulate (one is pinnate); three setae on posterior margin and a long simple surface seta (fig. 7D).

P1 (fig. 7E) as in female except coxa which has nine rows of minute spinules (however, the rows of minute spinules are difficult to detect); brushes of setules on the same setae of exopod 3 and endopod 2 as in female.

P3 (fig. 8) as in female except coxa which has four rows of minute spinules; endopod 2 with outer seta transformed into a strong curved spine furnished with two minute spinules on each side.

P5 (fig. 6C) as in female but only single seta on outer margin of exopod; short spine absent. Inner margin of baseoendopod with less pronounced lobe furnished with spinules near the base of proximal seta; distal spine absent. Distal

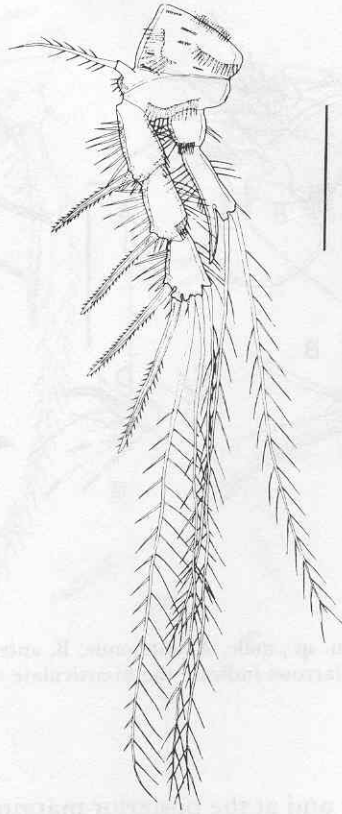


Fig. 8. *Acrenhydrosoma maccalli* n. sp., male, P3. Scale = 0.05 mm.

part of mucronated process of baseoendopod denticulated on outer surface, minute surface spinules present.

Etymology. — We are pleased to name the species in honor of Dr. John McCall who assisted us with copepod taxonomy and has previously conducted research of intertidal harpacticoid copepods in Auke Bay, Alaska.

DISCUSSION

Acrenhydrosoma maccalli was present in samples from March to July, 1992, and comprised 0.5% of the harpacticoid community in quantitative samples during that time period. One ovigerous female was collected in March and two in July. Given the low density of this copepod, few inferences can be made concerning their reproductive biology. Salinity varied from 22 to 37 ppt and sea surface temperature varied from 2.3 to 12.1°C.

The genus *Acrenhydrosoma* is characterized by the prominent mucronated process of the fifth leg. *Acrenhydrosoma maccalli* differs from *A. perplexum* (T. Scott)

and *A. karlingi* Lang in many aspects. It is different from *A. perplexum* in the number of setae on endopod -2 of P1. A digitiform process with a seta on the outer proximal margin of P5 baseoendopod is absent from *A. perplexum* and the P5 exopod is not fused with the basis in *A. maccalli*. The spine on the outer edge of same exopod is absent in females of *A. perplexum*. The P3 endopod, in male *A. perplexum* is three-segmented (Lang, 1948; Wells, 1977) whereas the same ramus of *A. maccalli* is two-segmented.

Acrenhydrosoma maccalli has more elaborate antennule ornamentation than *A. karlingi*. The anal operculum of *A. maccalli* is furnished with two protuberances. The length to width ratio of the caudal rami is smaller in *A. maccalli*. Differences in the mouthparts include a subterminal pinnate seta present on the endopod of the mandible of *A. maccalli* and two surface setae on the maxillula (although two possible setae appear to be depicted in Lang's figures, nothing is mentioned in text). The short spine on the outer margin of P5 exopod and the presence of spinulose (for females) and denticulated (for males) ornamentation at the distal part of P5 is absent in *A. karlingi*. Males are different in the spine of P3 endopod 2, which is fused with the terminal segment and is not serrated (but two minute spinules are present) in *A. maccalli*.

Key to the females of *Acrenhydrosoma*:

- 1a. P1 endopod -2 with 2 terminal setae, P5 baseoendopod and exopod fused;
P3 endopod of male 3-segmented *A. perplexum* (T.Scott)
- 1b. P1 endopod -2 with 3 terminal setae, P5 baseoendopod and exopod fused;
P3 endopod of male 2-segmented 2
- 2a. Length to width ratio of caudal rami measured just proximally to seta I is 11
to 12, distal part of P5 mucronated process with hairs and spinules
A. karlingi Lang
- 2b. Length to width ratio of caudal rami 4 to 5, distal part of P5 mucronated
process strongly spinulose in females and denticulated in males
A. maccalli n. sp.

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