

The Copepod Genus *Herrmannella* (Poecilostomatoida) Associated with Marine Bivalve Mollusks at Kodiak Island, Alaska¹

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ABSTRACT: The sabelliphilid copepods *Herrmannella kodiakensis* Humes, n. sp., and *H. saxidomi* (Illg, 1949) are reported from the marine bivalve *Saxidomus giganteus* (Deshayes). The new species may be differentiated from its congeners by the shape of the genital double-somite in the female (with “shoulders”). Copepodids of both species were found in *S. giganteus* and *Protothaca staminea* (Conrad). These are the first records of *Herrmannella* in Alaska.

THE GENUS *Herrmannella* currently contains 22 species living in the mantle cavity of marine intertidal or shallow-water Bivalvia. Several species occur in Europe: *H. pecteni* (Sowinski, 1884), *H. rostrata* Canu, 1891, *H. haploceras* (Bocquet & Stock, 1959), *H. barnae* (Pelseneer, 1929), and *H. duggani* Holmes & Minchin, 1991; one in West Africa: *H. inflatipes* (Humes & Cressey, 1958); two in the West Indies: *H. caribaea* Humes, 1970 and *H. dissidens* Humes, 1970; and two in Chile: *H. mesodesmatis* Humes, 1967 and *H. protothacae* Humes, 1967. The European species *Herrmannella parva* Norman & T. Scott, 1905, and *H. valida* G. O. Sars, 1918, are not known to be associated with a host (see Marine Biological Association 1957, Holmes and Gotto 1992).

Thirteen species of *Herrmannella* are associated with various shallow-water or intertidal bivalves in the Pacific Ocean north of the equator, as follows. California and Washington: *H. columbiae* (Thompson, 1897) (see Illg 1949), *H. panopeae* Illg, 1949 (see also Stout, 1949), *H. saxidomi* Illg, 1949, *H. tivelae* Illg, 1949, *H. perplexus* Illg, 1949, and *H. bullata* Humes & Stock, 1973; Peter the Great Bay, Sea of Japan: *H. dentata* Avdeev, 1987, *H. hiatellai* Avdeev, 1975, *H.*

longicaudata Avdeev, 1975, and *H. longichaeta* Avdeev, 1975; Korea: *H. soleni* Kim & Ho, 1991, *H. hoonsooi* Kim, 1992, and *H. exigua* Kim, 1993.

In this paper *Herrmannella kodiakensis* Humes, n. sp., and *H. saxidomi* Illg, 1949 are reported from the venerid bivalve *Saxidomus giganteus* (Deshayes) at Kodiak Island, southern Alaska. Copepodids of both species of *Herrmannella* are recorded from *S. giganteus* and the venerid *Protothaca staminea* (Conrad). These are the first records of *Herrmannella* from Alaska.

The copepods were cleared in lactic acid and the dissections prepared using the method of Humes and Gooding (1964). In the figure captions, the letter after the explanation of each figure refers to the scale at which it was drawn.

Order POEILOSTOMATOIDA Thorell, 1858

Family SABELLIPHILIDAE Gurney, 1927

Herrmannella kodiakensis Humes, n. sp.

Figures 1a–i, 2a–l, 3a–i

TYPE MATERIAL. 20 ♀♀, 7 ♂♂ from 13 *Saxidomus giganteus* (Deshayes), intertidal, mouth of Larsen Bay, Kodiak Island, Alaska, 57° 31.3' N, 153° 58.7' W, 1 September 1993, Thomas K. Duncan collector. Holotype ♀ (USNM 268329), allotype ♂ (USNM 268330), and 21 paratypes (16 ♀♀, 5 ♂♂) (USNM 268331) deposited in the National Museum

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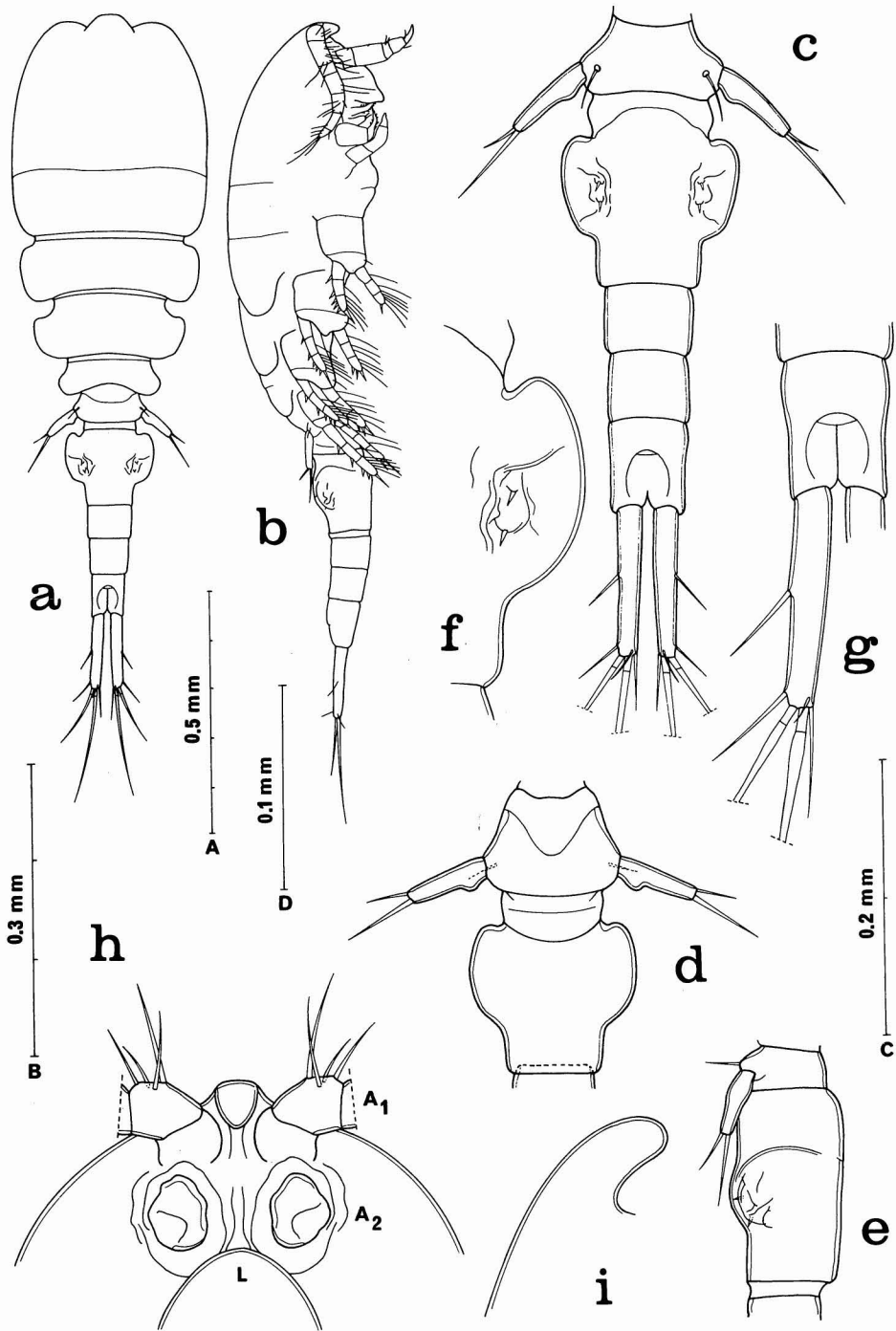


FIGURE 1. *Herrmannella kodiakensis*, n. sp. Female. a, dorsal (scale A); b, lateral (A); c, urosome, dorsal (B); d, somite bearing leg 5 and genital double-somite, ventral (B); e, somite bearing leg 5 and genital double-somite, lateral (B); f, genital area, dorsal (D); g, anal somite and caudal ramus, dorsal (C); h, rostrum, ventral (C); i, rostrum, lateral (D). A₁, antennule; A₂, antenna.

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FEMALE: Body (Figure 1*a,b*) moderately elongate, prosome flattened, with rostral area projecting in dorsal view. Length (not including setae on caudal rami) 1.30 (1.13–1.43) mm and greatest width 0.41 (0.37–0.44) mm, based on 10 specimens in lactic acid. Greatest dorsoventral thickness 0.29 mm. Somite bearing leg 1 separated from cephalosome by dorsal transverse suture, and with epimera not expanded. Somites bearing legs 2–4 with epimera expanded and rounded. Ratio of length to width of prosome 1.95 : 1. Ratio of length of prosome to that of urosome 1.15 : 1. Somite bearing leg 5 (Figure 1*c*) 104 by 148 μm . Genital double-somite (Figure 1*d*) 156 μm long, 180 μm wide in laterally expanded anterior two-thirds, with rounded anterior “shoulders” and indented posteriorly, posterior third 104 μm wide with parallel sides. In lateral view (Figure 1*e*) this somite slightly expanded dorsally at mid-region. Genital areas located dorsolaterally in expanded anterior two-thirds. Each area (Figure 1*f*) with 2 small setae 13 μm . Three postgenital somites, from anterior to posterior, 70 by 88, 60 by 83, and 93 by 75 μm . Caudal ramus (Figure 1*g*) elongate, 152 by 26 μm (greatest width), ratio of length to width 5.85 : 1. Outer lateral seta, located at midlength, 42 μm ; dorsal seta minute, 8 μm ; outermost terminal seta 47 μm ; innermost terminal seta 50 μm ; and 2 median terminal setae, 121 μm (outer) and 242 μm (inner), both slightly swollen beyond articulation. All setae smooth. Body surface smooth, without visible sensilla. Egg sac not seen.

Rostrum (Figure 1*h*) projecting slightly and rounded posteriorly (Figure 1*i*). Antennule (Figure 2*a*) 286 μm long, its 7 segments armed with 4, 13, 6, 3, 4 + 1 aesthete, 2 + 1 aesthete, and 7 + 1 aesthete. Lengths of segments (measured along their posterior non-setiferous margins): 18 (55 μm along anterior margin), 78, 26, 36, 36, 27, and 21 μm , respectively. All setae smooth. Antenna (Figure 2*b*) 4-segmented, 190 μm long. Armature 1, 1, 3, and I + 3. Second segment with distal inner corner projecting. Fourth segment 47 μm along inner side, 29 μm along outer side,

and 35 μm at greatest width. Claw 50 μm . Seta near base of claw slightly jointed. Labrum (Figure 2*c*) with 2 widely diverging lobes. Mandible (Figure 2*d*), paragnath, and maxillule (Figure 2*e*) similar to those of congeners. Maxilla (Figure 2*f*) with lash bearing large, stout spines grading distally to small, slender spines. Maxilliped (Figure 2*g*) slender, third segment with 1 minute spinule. Ventral area between maxillipeds and first pair of legs (Figure 2*h*) projecting slightly in lateral view (Figure 1*b*).

Legs 1–4 (Figures 2*i,k,l*, 3*a*) segmented and armed as in congeners. Exopod of leg 1 with outer spines having prominent lateral spinules along proximal sides (Figure 2*j*). Inner coxal seta on leg 4 33 μm long. Leg 5 (Figure 3*b*) with unornamented free segment 86 by 31 μm , width taken at proximal inner expansion. Ratio 2.97 : 1. Two unequal terminal setae, 35 μm and 78 μm . Dorsal seta short, 20 μm . All setae smooth. Leg 6 probably represented by 2 setae on genital area (Figure 1*f*).

Color of living specimens slightly opaque gray to hyaline, eye red.

MALE: Body (Figure 3*c,d*) resembling that of female. Length (excluding setae on caudal rami) 1.15 (1.07–1.29) mm and greatest width 0.30 (0.26–0.32) mm, based on 6 specimens in lactic acid. Greatest dorsoventral thickness 0.23 mm. Ratio of length to width of prosome 2.08 : 1. Ratio of length of prosome to that of urosome 1.18 : 1. Somite bearing leg 5 (Figure 3*e*) 44 by 83 μm . Genital somite subspherical in dorsal view, 138 by 130 μm . Four postgenital somites, from anterior to posterior, 57 by 78, 57 by 65, 57 by 59, and 68 by 58 μm . Caudal ramus resembling that of female. Body surface as in female.

Rostrum like that of female. Antennule similar to that of female but 3 aesthetes added (at points indicated by dots in Figure 2*a*). Antenna like that of female. Labrum, mandible, paragnath, maxillule, and maxilla as in female. Maxilliped (Figure 3*f*) slender, elongate, 4-segmented, proximal part of claw assumed to represent fourth segment. First segment unarmed. Second segment with 2 inner setae, 1 slender, 1 stout, and numerous small spines. Small third segment unarmed.

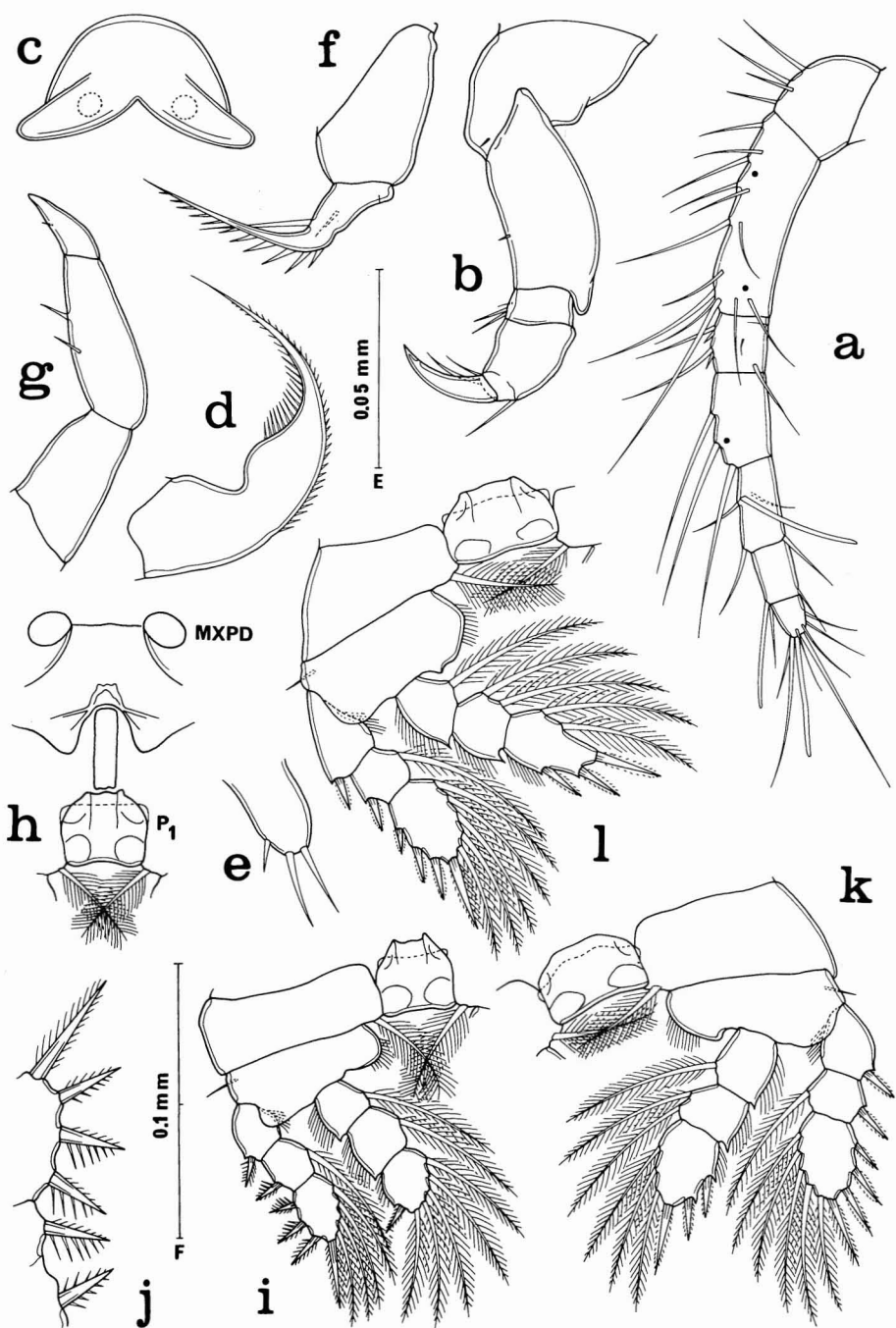


FIGURE 2. *Herrmannella kodiakensis*, n. sp. Female. *a*, antennule, dorsal (scale D); *b*, antenna, anterior (inner) (D); *c*, labrum, with positions of paragnaths indicated by broken lines, ventral (D); *d*, mandible, anterior (E); *e*, maxillule, anterior (E); *f*, maxilla, anterior (F); *g*, maxilliped, antero-inner (F); *h*, area between maxillipeds (MXP) and first pair of legs (P_1), ventral (C); *i*, leg 1 and intercoxal plate, anterior (C); *j*, spines on exopod of leg 1, anterior (F); *k*, leg 2 and intercoxal plate, anterior (C).

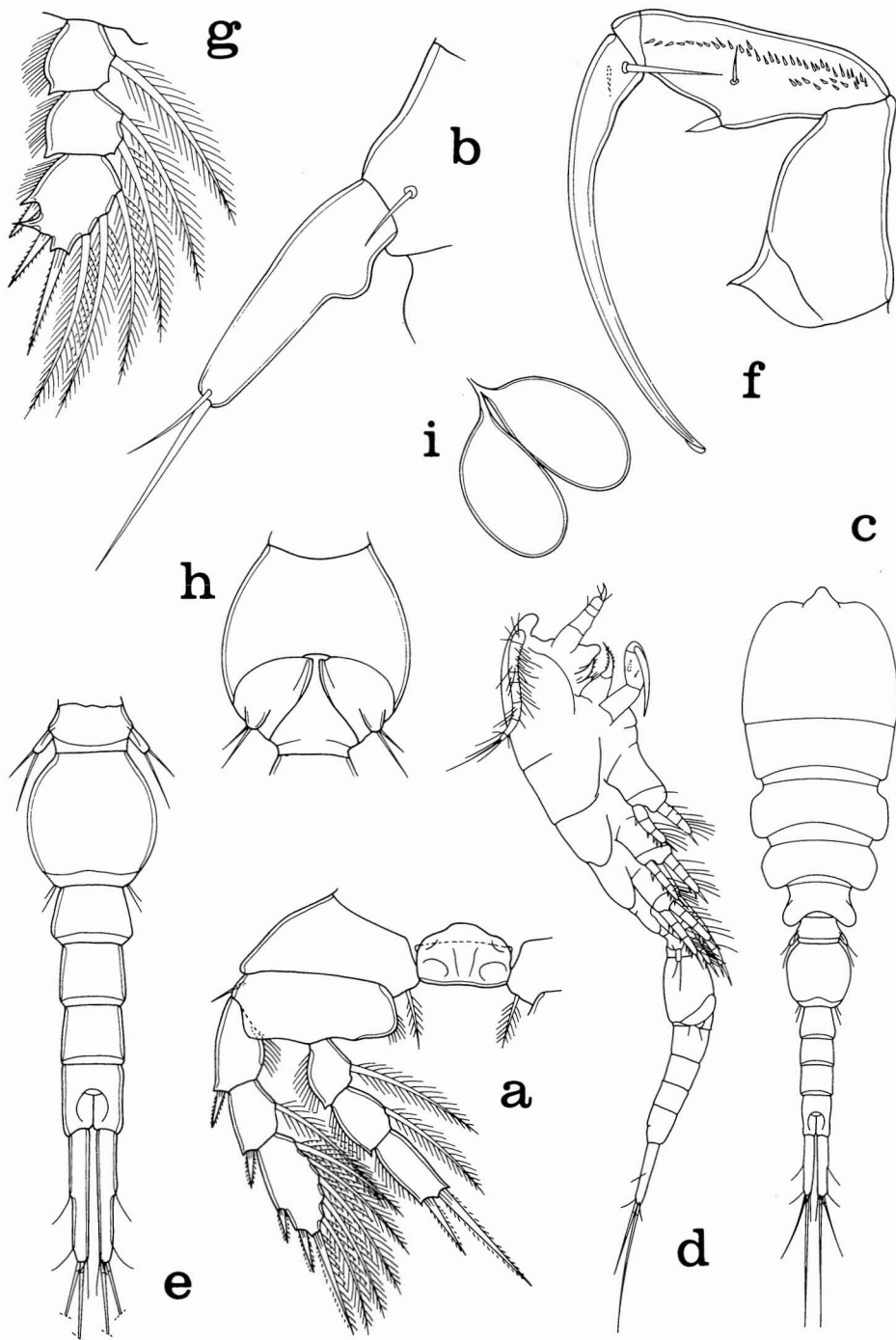


FIGURE 3. *Herrmannella kodiakensis*, n. sp. Female. *a*, leg 4 and intercoxal plate, anterior (scale C); *b*, leg 5, dorsal (F). Male. *c*, dorsal (scale A); *d*, lateral (A); *e*, urosome, dorsal (D); *f*, maxilliped, inner (F); *g*, endopod of leg 2, anterior (D); *h*, genital somite showing leg 6, ventral (C); *i*, spermatophores, attached to female, ventral (D).

Claw 150 μm , with 2 very unequal proximal setae. Ventral area between maxillipeds and first pair of legs as in female.

Legs 1, 3, and 4 similar to those of female. Exopod of leg 2 like that of female, but endopod showing slight sexual dimorphism in spiniform processes on third segment (Figure 3g). Leg 5 (Figure 3e) with small rectangular free segment 13 by 4 μm . Leg 6 (Figure 3h) posteroventral flap on genital somite bearing 2 setae, 21 μm and 34 μm .

Spermatophore (Figure 3i) oval, ca. 70 by 39 μm not including neck.

Color of living specimens as in female.

ETYMOLOGY: The specific name *kodiakensis* refers to the island where the copepods were found.

REMARKS: One feature of the new species serves to distinguish it from all congeners: the shape of the genital double-somite in the female, with anterior "shoulders." In addition, the free segment of leg 5 in the female, with a distinct proximal inner expansion, differs from all congeners except *Herrmannella longicaudata* Avdeev, 1975. The female of that Asian species, however, has an elongate genital double-somite with subparallel sides.

Herrmannella saxidomi Illg, 1949

MATERIAL EXAMINED: 4 ♀♀, 1 ♂ from 13 *Saxidomus giganteus* (Deshayes), intertidal, mouth of Larsen Bay, Kodiak Island, Alaska, 57° 31.3' N, 153° 58.7' W, 1 September 1993, Thomas K. Duncan collector.

REMARKS: This species is known from *Saxidomus nuttallii* Conrad in California (Illg 1949).

Several hundred copepodids of *H. saxidomi* were recovered from the 13 specimens of *Saxidomus giganteus* and a much smaller number from six *Protothaca staminea* (Conrad) at Kodiak Island.

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