

North American Harpacticoid Copepods, 8
The *Danielssenia sibirica* Group, with Description of
D. stefanssoni Willey from Alaska

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WILLEY'S REPORT (1920) on marine copepods of northern and northwestern coastal waters of North America included 12 species of Harpacticoida, mostly from Canadian inshore localities. Among these was a new species, *Danielssenia stefanssoni*, of particular interest because of its relationship to *D. sibirica* Sars from the northeastern Siberian coast. Lang (1944, 1948) divided the six species of the genus into two groups. One, called the *sibirica* group, includes only these two related species occurring in closely situated regions of neighboring continents. The present paper extends the known distribution of *stefanssoni* to the Chukchi Sea coast of Alaska, placing it not far distant from the nearest Asian occurrence of *sibirica* on Wrangell Island. Considering the scant knowledge of harpacticoid copepods of these two continental regions, it is not certain that the geographic separation is real, although it may be since such allopatry is suggested by other species-pairs and groups of freshwater, brackish-water, and marine copepods.

The possible existence of a species-pair on the two continents is of considerable zoogeographic interest and phylogenetic importance. Accurate determinations of the two species and of possible unknown species, recognition of variations, and phylogeny of the group and genus require detailed anatomical knowledge of *D. stefanssoni*. For these reasons, I have prepared this account of Alaskan specimens. A synopsis of literature, distribution, and comments on anatomy of *D. sibirica*, necessary for critical comparison with *stefanssoni*, are included.

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Family TACHIDIIDAE

Genus *Danielssenia* Boeck, 1872

typica group (emendation of Lang, 1948):

D. typica Boeck, *D. fusiformis* (Brady)

sibirica group (after Lang, 1948):

D. sibirica Sars, *D. stefanssoni* Willey
unassigned species (emendation of Lang,
1948):

D. robusta Sars, *D. perezi* Monard

COMMENTS ON LITERATURE: Lang assigned four of the six species of the genus to the *typica* group, of which only *D. typica* and *D. fusiformis* are known from both sexes. Since the modification of leg 2 of the male is an important character defining the two groups, the other two species (*robusta*, *perezi*) cannot be placed in any group at present, their relationship to all other species and to one another being considered indefinite. Even though they conform to the *typica* group in the number of setae on certain segments of the antennal exopod and of leg 4, they differ strikingly in forms of female leg 5 and in comparative lengths of endopod to exopod of legs 2-4. Although it may at times be true, it should not be considered incontrovertible that the number of setae of any given appendage is always a measure of degree of relationship of species in the Harpacticoida. An example of an undoubted species-pair that seemingly occurs allopatrically on the Eurasian and North American continents is that of *Bryocamptus cuspidatus* and *B. tikchikensis*. The latter, described from Alaska (Wilson, 1958) and since found in Greenland (Røen, 1962), differs principally from the Eurasian *cuspidatus* in having 1 instead of 2 inner setae on exopod segment 3 of leg 3.

The form of female leg 5 of the *D. sibirica*

group is very like that of the two species of the *typica* group and may indicate a closer relationship to that group than is true for *robusta* and *perezi* with their strikingly different structure of this appendage. In classification of all Copepoda, it seems to me that form of appendages must be considered along with numerical aspects, such as numbers of segments and setae.

Lang (1948) incorrectly ascribed authorship of *D. fusiformis* to Brady and Robertson, 1876, a nomen nudum. The species, listed by these authors as *Jonesiella fusiformis*, n. gen., n. sp., dates from the description by Brady (1880). Sars (1909:336) mentions a species *D. brucei*, supposedly described by T. Scott. So far as I have been able to ascertain, this is an erroneous reference to *Cyclops brucei* T. Scott.

THE *sibirica* GROUP

sibirica group: Lang, 1944, p. 9 (original definition); 1948, p. 298 (emended def.; inclusion *D. stefanssoni*).

Lang interprets the stout spinous projection of the inner margin of segment 1 of the endopod of male leg 2 as a transformed seta. Whether this process is a modified seta or an enlarged projection of the segment itself can be determined only by study of developmental copepodid stages. Until such information is available, it seems best to me to emend the definition of the group by referring to this as a process or a "projection" of the segment, as Sars (1898) has done.

Danielssenia sibirica Sars

Danielssenia sibirica Sars, 1898, p. 343, pl. 10, figs. 1–20.

Danielssenia sibirica: Yashnov, 1935, pp. 127, 134, fig. 6 (occurrence; notes on length; fig. leg 5 ♀).—Lang, 1948, p. 282, table 5 (leg setation); p. 298 (taxonomic group; key); p. 301, fig. 146.5 (figs., diagnosis from Sars).—Borutzky, 1952, p. 105, figs. 37, 38 (description, figs. from Sars).

COMMENTS ON LITERATURE: Sars has undoubtedly confused female legs 3 and 4. In the text, he states they have the same number

of setae (3) on the inner margin of the endopod, differing from the male with only 2 setae. His Figure 12 is labeled leg 4, but since the length of its endopod is similar to that of *D. stefanssoni* shown here (Fig. 2C), it seems logical that Sars's Figure 12 was drawn from leg 3, leg 4 being illustrated only for the male of *sibirica*. Lang (1948: Table 5; p. 298) has rightfully questioned this setation. Sars also found no setae on female exopod segment 1 of legs 2 and 3 (his leg 4), but illustrated them in male legs 3–4. The copy of Sars's paper used in my study is a reprint autographed by Sars as a presentation copy to G. S. Brady and now part of the library of the Division of Crustacea, U. S. National Museum. All of the figures of the legs, in which this seta is not clearly shown, have indistinct lines where the seta should be, if present, suggesting partial erasure or inadequate reproduction. Sars (p. 325) expressed dissatisfaction with the reproduction of his drawings, commenting that "the finer shadows in the figures have been to some extent lost." It is possible, therefore, that an inner seta is present in both sexes of *sibirica* on exopod segment 1 of legs 2–4, as in *stefanssoni*. (See also comments in description of *D. stefanssoni* below.)

An aesthete occurs on segment 4 of the female antennules of both *sibirica* and *stefanssoni*, and the 5-segmented antennule of *sibirica*, if correctly depicted, results from fusion of two segments of the apical part. This is clearly separated into two segments in my specimens of *D. stefanssoni*, resulting in the 6-segmented antennule also noted by Willey (see Fig. 1G herein). Other differences that may be real or not exist in the numbers of setae of parts of the other cephalic appendages, such as the apex of the antennal endopod. Sars, like Willey, has shown the seta of the end claw of the maxilliped arising near the apex, a probable error by both authors (see Fig. 1E herein).

It seems to me, in comparing Alaskan specimens of *D. stefanssoni* and the original descriptions of the two species, that they differ very little and may actually be separable by fewer differences than is apparent in the literature. The most reliable distinction seems to be that found in the reduced third segment of the

endopod of male leg 2 (the extended apical process of *D. stefanssoni*, absent not only in *sibirica* but also in other species of the genus).

DISTRIBUTION AND ECOLOGY: Type locality not designated. Sars records collections made in August–September, 1885–1886, from three localities of the coastal regions of Siberia and islands between the Laptev and East Siberian seas, including the lower part of the River Yana and the New Siberian Islands. Of these, only one collection was taken from the sea, the others having been made in what must have been brackish situations. Yashnov's record from Wrangell Island, overlooked by Lang (1948), was based on 1929 collections from brackish water. The range of distribution of *D. sibirica* as now known is therefore from about 72°–74° N and 135°–180° E, and it should be classified as a brackish water-marine species.

Danielssenia stefanssoni Willey, new description
Figs. 1–3

Danielssenia stefanssoni Willey, 1920, pp. 3*k* (reference to), 5*k*, 8*k*, 35*k* (occurrences); p. 39*k*, figs. 60–67 (original description).

Danielssenia stefanssoni: Jespersen, 1939*a*, pp. 78, 100: Table 7 (occurrence; identified K. Lang); 1939*b*, pp. 47, 57: Table 1; p. 58 (occurrence).—Lang, 1948, p. 282: Table 5 (leg setation); p. 298 (taxonomic group; key); p. 301, fig. 146.6 (figs., diagnosis from Willey); p. 1570 (zoogeography).

Danielssenia stepanssoni (incorrect spelling): Mohr et al., 1961, p. 221 (occurrence; identified M. S. Wilson).

Danielssenia: Wilson and Tash, 1966, p. 574 (occurrence).

All of Willey's material was from the region of Bernard Harbour, Canada. No type material is deposited in the National Museum of Canada or the U. S. National Museum (personal correspondence, Dr. E. L. Bousfield and Dr. T. E. Bowman). Willey's description gives only a few figures and notes, some incomplete or differing from Alaskan specimens; many of the notes are written as comparisons with Sars's

nearly complete textual and illustrative account of *D. sibirica*, or of other species. Lang's brief diagnosis appears to be based on Willey's account without addition of any new information from the east Greenland specimens he identified for Jespersen. The few differences between Willey's account and mine are, I believe, logically regarded as errors or omissions rather than variations from the specimens of the type locality. Comments on these and Lang's interpretation, where different, are inserted in parentheses in the following descriptive text. Willey's eight figures illustrate these appendages: antenna (apical segment endopod ♂); maxilliped; leg 3 ♀ endopod; leg 5 ♀ (2 figs., normal and aberrant); leg 2 ♂ (2 figs. endopod, entire and enlarged segment 3); leg 3 ♂ endopod.

OCCURRENCE OF ALASKAN SPECIMENS: NUWUK LAKE (OR POND), Point Barrow Peninsula (71°23'N, 156°28'W); collectors, R. Lewis and J. Tibbs; in three samples taken during ice-free period, 1960: (1) bottom sample, station at 0.9–1.2 m depth, August 1: 12 ♀, 1 ♂; (2) horizontal plankton tow south to north, from 0.3 m to surface, August 11: 1 ovigerous ♀; (3) plankton tow, center of lake, from 3.7 m to surface, August 11: 3 ♀, 1 ♂.—COAST OF CHUKCHI SEA, south of Cape Thompson; plankton samples from two ice-free, landlocked, shallow lagoons (depth not more than 3 m); June 21, 1960; collector, J. Tash: (1) Mapsorak Lagoon (68°02'N, 165°21'W): 3 ♂; (2) Pusigrak Lagoon (68°01'N, 165°18'W): 1 ♂.

DESCRIPTION OF FEMALE: Habitus (Fig. 1*A*)—Length range Nuwuk Lake specimens, dorsal midline, base of rostrum to end of caudal rami, 1.25–1.4 mm. Anterior part of body a little shorter and broader than posterior. Distal margins of metasome segments armed with fine spinules. First urosome segment (somite of leg 5) with small lateral processes armed with spinules (Figs. 1*A*, 2*E*). Genital segment divided by cuticular sclerotization ventrally (Fig. 1*C*) and in part dorsally (Fig. 1*A*); ornamented by a few spinules dorsally but not ventrally. External genital area as in Figure 1*C*; genital pore prominent, set at top of

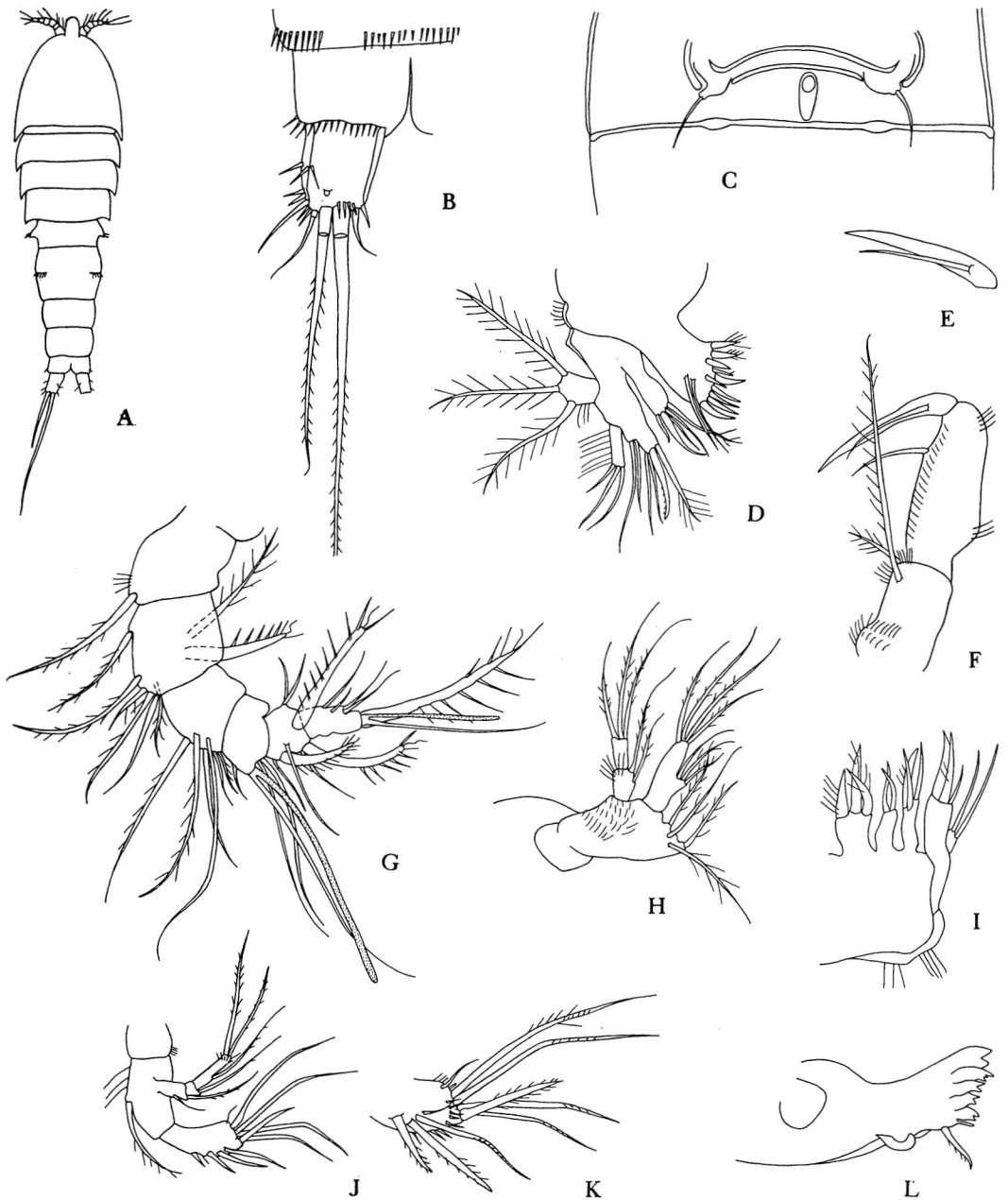


FIG. 1, A-L. *Danielssenia stefanssoni*, Female: A, Habitus, dorsal; B, detail distal segments urosome and caudal rami, ventral; C, external genital area and leg 6; D, maxillule; E-F, maxilliped (E, apical claw with seta, F, entire); G, antennule; H, mandible palp; I, maxilla; J-K, antenna (J, entire, K, detail apex); L, mandible, gnathal blade with outline of insertion point of palp. (B-C drawn to same scale; D-I, K-L enlarged to same scale as one another; J same scale as legs 1-5 shown in Fig. 2.)

elongate-oval structure centralized above cross-wise sclerotization; leg 6 a single seta arising from prominent lobe at each side of genital field. Other urosome segments ventrally with distal rows of spinules consisting of lateral groups of stout spinules and a more slender medial group irregular in length, as partially shown in Figure 1B; anal segment deeply cleft in middle; row of spinules overlying bases of caudal rami. Caudal ramus (Fig. 1B) a little longer than outer margin of anal segment (about 1:0.76) and its own greatest width at base (about 1:0.88); with lateral and apical groups of spinules; dorsal seta near middle; other caudal setae placed apically or subapically: the two outer marginal setae of similar length to one another and to ramus, the proximal sub-apical, the distal seta apical; two stout apical spinulose setae, jointed near bases, the middle about twice length of outer seta and less than that of urosome; innermost apical seta little shorter than lateral setae. Rostrum (Fig. 1A) nearly twice as long as wide, nearly equaling length of proximal three segments of antennule; apex truncate; base not demarcated from cephalosome. (Habitus characters agree with the few given by Willey, except that he describes the rostrum as "defined behind.")

Antennule (Fig. 1G). First 4 segments of similar width, proximal 3 subequal in length to one another, the fourth reduced to half their length; last 2 segments reduced in width, the sixth narrower and longer than fifth (Willey gives their length as identical). Aesthetes of segments 4 and 6 arise on common base with a slender seta. Number of setae and aesthetes:

Segment	1	2	3	4	5	6
Setae	1	8	6	4	8	6
Aesthetes				1		1

Segments 2 and 6 bear 1 seta, and segment 5 bears 3 stout, modified setae, armed with large spicules and tipped with hairlike setules. Other setae are plumose or naked as shown in figure.

Antenna (Figs. 1J–K). Allobasis with 1 long marginal seta reaching to about middle of apical segment (endopod). Exopod segment 1 with 2, segment 2 with 1 and segment 3 with 1 lateral and 2 apical setae (presence of 2 setae on segment 1 distinguishes *sibirica* group in part

from other species of the genus). Distal endopod segment (Fig. 1K) with marginal group of 2 stout spines and longer modified seta similar to apical "geniculate" setae (this seta is the one referred to by Willey as "long curved claw"); apically, 6 elements consisting of 1 stout spine, 3 modified "geniculate" setae, a longer sparsely plumose seta, and a short, slender seta placed subapically (this latter seta omitted by Willey).

Mandible. Gnathal blade (Fig. 1L) with 5 bifurcate denticles, a single denticle, and a stout subapical spiniform seta. *Palp* (Fig. 1H): Basis with 4 setae; endopod unsegmented with 3 lateral and 4 apical setae; exopod 2-segmented, bearing 2 and 3 setae respectively.

Maxillule (Fig. 1D; "maxilla" of Willey of which only exopod setae were mentioned in text). Gnathal lobe prominently produced, bearing 2 surface setae and 10 stout apical spines. Coxa and basis not separated, bearing 2 elongated laciniae, the first with 5 apical setae, the second (representing the basis) with 2 lateral and 4 apical setae, one a stout spine. Endopod and exopod unsegmented, each with 3 setae; those of exopod the longest of entire appendage.

Maxilla (Fig. 1I; not described by Willey). With 4 stout, well-defined endites; number of setae and modified spines from proximal to distal endite: 3,2,3,3. Endopod distinct with 2 long slender setae.

Maxilliped (Figs. 1E–F). Essentially as figured by Willey, except that accessory seta of claw arises near base rather than near apex (Fig. 1E). (Willey's figure, copied by Lang (1948), shows only the apex of the seta which makes it appear very short and as arising beyond the middle of the claw, as Sars (1898) has also, probably incorrectly, shown it for *D. sibirica*.)

Legs 1–4 (Figs. 2A–D). Endopod of leg 1 reaching to end of or little beyond exopod; that of leg 2 reaching end of exopod, progressively shorter in legs 3 and 4, so that in leg 4 it reaches to only a little beyond exopod segment 2. Outer distal edge of endopod segments 1 and 2 produced in legs 2–4, most pronounced in segment 2 of leg 3 (as noted and figured by Willey). Apical setae of exopods and endopods of legs 2–4 somewhat spiniform, inner setae

very slender. Setation of legs summarized in Table 1. (Willey has illustrated only the endopod of leg 3, and given only the setation of segment 3 of both rami in the text. These agree with my Alaskan specimens. Lang (1948:282) has included setation for segments 1 and 2 of the female exopods and endopods in his Table V, although such information is available from Willey's account for only the endopod of leg 3. As shown here in Table 1 and in Figure 2, the first segment of the exopods of both sexes bears a seta, unlike the other species of the genus, although *D. robusta* may have a rudimentary seta on exopod 1 in leg 4, if the figure given by Sars (1920:Pl. 64) is correct. See also comments above under *D. sibirica*.)

Leg 5 (Fig. 2E). Exopod broader than long, with 5 setae, depressed gap between setae 4 and 5. Basal expansion elongate, reaching beyond exopod (longer than in Willey's Figure 63); with 5 setae arranged as in figure.

DESCRIPTION OF MALE: Length range—NUWUK LAKE, 0.94–1.0 mm; CHUKCHI SEA COAST lagoons, 1.0–1.2 mm. Habitus as in female except that segment bearing leg 5 lacks lateral processes, and genital segment is completely divided.

Antennule (Fig. 3). 5-segmented plus a reduced apical part divided into 3 or 4 portions, the last clawlike and armed with tuft of 3 or more hairlike setae; segments 1–2 usually incompletely separated. (Willey states that the antennule is as figured by Sars (1909) for *D. typica*, shown as having the same number of segments as in my specimens.) Segment 3 subequal to length of 1 + 2, with 10 well-devel-

oped setae, half of which are plumose; 2 setae near outer margin spinelike, set on raised papillae, armed with spiculate setules. Segment 4 presumably with considerable flexibility of outer margin permitting contraction or expansion that controls, at least in part, movement of expanded apical area and its claw; the partial line drawn inwards from the margin in Figure 3 is not an incomplete segment but a surface line resulting from contraction; in less expanded appendages, several of these lines may be seen. Segment 5 greatly enlarged and ornamented (since Figure 3 has been drawn from dissections studied at high magnifications with both dry and oil immersion objectives, it probably shows details common in the genus but not previously illustrated in literature); inner margin broken into 3 processes, the first dentate, the second ridged, the last two produced at their distal ends; surface adjacent to these processes a hollowed area from which arise 4 short, plumose setae; this area defined by stout, sclerotized ridge beginning near proximal part of segment, running nearly its entire length and ending in stout papilla from which an aesthete and 2 setae arise, aesthete jointed near distal third; 3 slender, closely set setae at base of ridge and a similar seta near apex. Number of setae and aesthetes:

Segment	1	2	3	4	5
Setae	1	1	10	4	10
Aesthetes					1

Other cephalic appendages like those of female.

Legs 1–4 (Figs., 2A, G–L). Inner spine of basal segment 2 of leg 1 more slender than that of female (Fig. 2A). Form and setation of

TABLE 1
SUMMARY OF SETATION LEGS 1–4 OF *Danielssenia stefanssoni* ♀ ♂*

SEGMENT	EXOPOD			TOTAL SEG. 3	ENDOPOD			TOTAL APICAL SEG.
	1	2	3		1	2	3	
Leg 1 ♀ ♂	sp-O	sp-s	3sp-2s-O	5	O-s	O-sp,2s-s		4
Leg 2 ♀	sp-s	sp-s	3sp-2s-2s	7	O-s	O-s	sp-2s-2s	5
Leg 2 ♂	sp-s	sp-s	3sp-2s-2s	7	O-pr	pr-O	O-pr-4s	4
Leg 3 ♀ ♂	sp-s	sp-s	3sp-2s-3s	8	O-s	O-s	sp-2s-3s	6
Leg 4 ♀ ♂	sp-s	sp-s	3sp-2s-3s	8	O-s	O-s	sp-2s-2s	5

* Explanation of symbols: Seg. = segment; sp = spine; s = seta, including long, spiniform setae; pr = process. Arrangement of armature for each segment from outer to inner margin. Position on apical segment shown by the symbol "'-' indicating outer, apical, and inner margins respectively; or by "'-' dividing distinct spines and setae of apex.

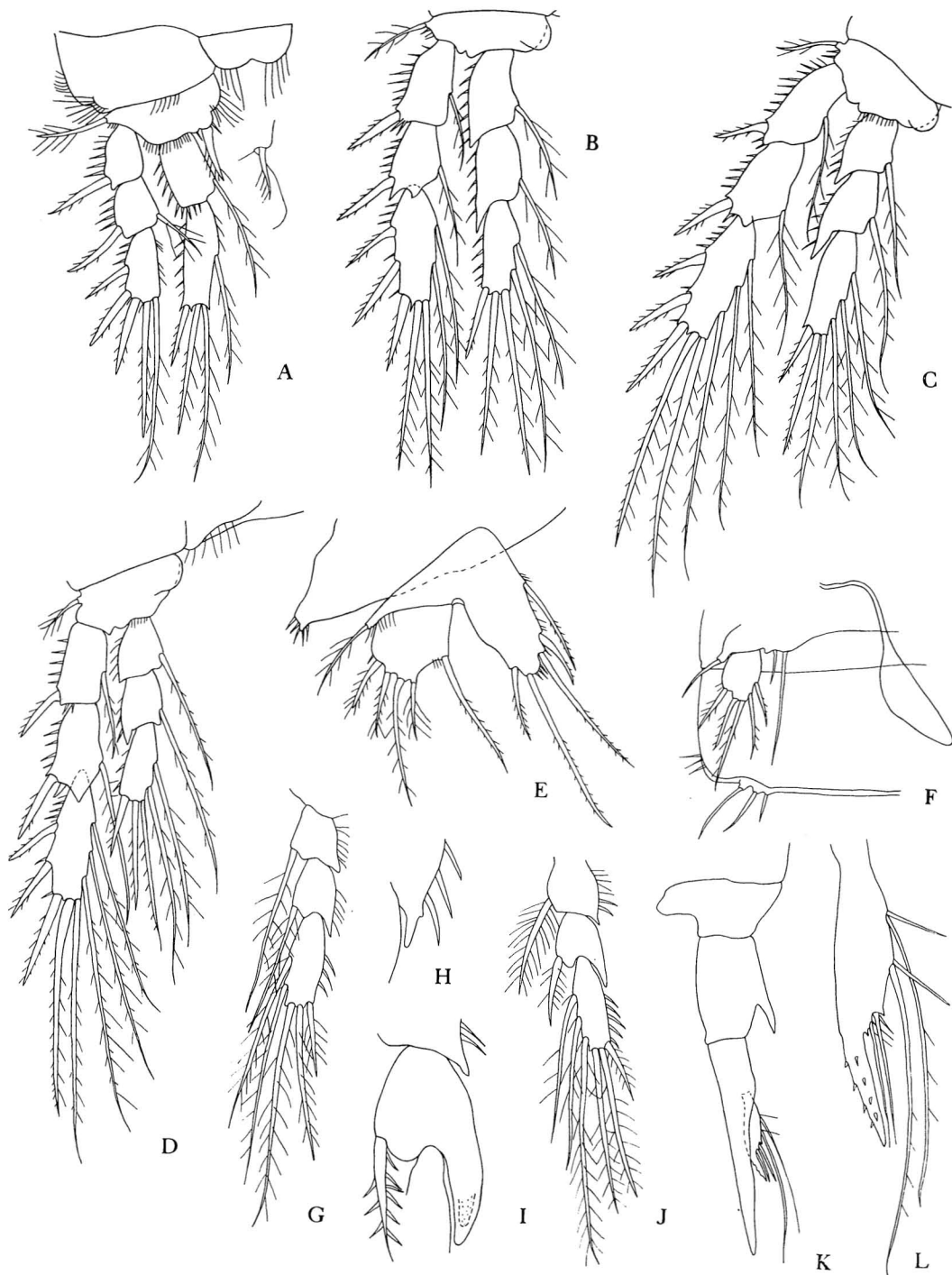


FIG. 2, A-L. *Danielssenia stefanssoni*. A-E, Female: A, Leg 1 and detail inner spine basal segment 2 of male; B, leg 2; C, leg 3; D, leg 4; E, leg 5 and produced edge of body segment. F-L, Male: F, Legs 5-6, in situ, with outline of spermatophore in body; G-H, endopod leg 4 (G, entire, H, enlarged distal outer margin segment 2); I-J, endopod leg 3 (I, enlarged segment 2, J, entire); K-L, endopod leg 2 (K, entire, L, enlarged segment 3). (All drawn to same scale as one another except those indicated as enlarged.)

exopods as in female (Figs. 2A-D; Table 1). Endopods of legs 2-4 more or less modified, all except that of leg 2 similar in length and setation to female (Table 1). That of leg 2 (Figs. 2K-L) of general form found in genus; segment 1 with inner spurlike process and lacking seta; outer margin of segment 2 produced distally as long process reaching beyond apex of exopod by nearly half the length of entire segment. Segment 3 reduced, about one-third length of segment 2, inserted deeply into inner part of proximal third of segment 2; inner apex produced as stout process nearly one-third total length of its segment, armed with raised surface spinules; inner margin with 4 slender setae, the proximal two reaching beyond apex of segmental process, each set sparsely with fine hairs and having a long spinule at its base; the distal two set closely together in recess at base of segmental process, reaching to its apex or a little beyond (Fig. 2L). (Willey has shown only 1 distal seta in his figure, which is undoubtedly incorrect since the setae are closely set and difficult to distinguish from one another, and illustrations of other species of the genus show 2 distal setae.) Modification of leg 3 largely affecting segment 2 (Figs. 2I-J), which is enlarged both inwardly and outwardly; apex of outer enlargement produced distally, blunt, of thickened cuticle into which inner tissue does

not penetrate (Fig. 2I) (neither stained nor unstained material studied in different views at various magnifications with both dry and oil immersion objectives showed any incision such as illustrated by Willey; where this exists it is probably an insignificant, individual variation); inner part of segment enlarged, with distal lobe and stout, short seta (Fig. 2I); segment 3 constricted basally, bearing 6 spines and setae as in female. Leg 4 endopod (Figs. 2G-H) very similar to that of female; segments 1 and 2 with slightly more acuminate margins.

Leg 5 (Fig. 2F). With 5 setae on exopod, variable in length from one specimen to another but seta 3 (from outer margin) always the longest; basal part hardly produced, with 2 (or sometimes 3) setae, seta 2 the longer. Leg 6 with 3 setae, the outer the longest.

DISTRIBUTION AND ECOLOGY: The type locality was not designated and must be considered to be generalized in the Bernard Harbour region of Dolphin and Union Strait. Bernard Harbour (about 69°09'N, 114°40'W) is on the mainland of Canada near the eastern end of the strait which separates the mainland from Victoria Island, one of the island group marking the eastern limits of the Beaufort Sea. The number of specimens and sex are listed for some of Willey's records, but none include both sexes. The specimens occurred in plankton tows, mostly surface, with copepods of the three major free-living orders. References to depth of water at stations are not always given or are indefinite; greatest depth of water recorded is 3 fms (5.5 m). Salinity is not given. Collections were presumably made in ice-free water between August 9 and September 30, 1915.

Greenland records are from the eastern coast of the Denmark Strait separating Greenland from Iceland. Collections were made July 14-September 8, 1932, at Barclay Bugt, 69°15'N, 24°50'W (Jespersen, 1939a), and at Kangerdlugssuaq, about 68°18'N, 32°20'W (Jespersen, 1939b). The reference of Mohr et al. (1961) is to Nuwuk Lake, Point Barrow, Alaska, and that of Wilson and Tash (1966) to the Cape Thompson region of the Alaskan Chukchi Sea coast, for both of which detailed records are given above under the section, "Occurrence of Alaskan Specimens." All



FIG. 3. *Danielsenia stefanssoni*, Male: Antennule (same scale as Fig. 1G).

known records are north of the Arctic Circle. The range of distribution is from the east central coast of Greenland to the Chukchi Sea coast of Alaska, from about 68°–71° N and 24°–165° W.

All collections of Willey and Jespersen were from coastal plankton tows. Those of Willey were probably made in brackish waters. The Alaskan records are from landlocked coastal bodies of water. Nuwuk Lake has been described by Mohr et al. (1961) and Holmquist (1963), and features relative to its copepod fauna are given in Wilson (1965). Significant features are: surface area about 2.5 ha; maximum depth 5.2–5.6 m; slightly brackish surface waters (about 5–8 o/oo); bottom salinity about 60 o/oo; ice-free period 2 months or less (July–August). Copepod associates of *D. stefanssoni* were species of marine and brackish waters having varying degrees of euryhalinity within genus or species.

Lagoons of the Cape Thompson region have been studied with respect to their copepod fauna by Johnson (1961) and Wilson and Tash (1966). Collections were made only as plankton tows and harpacticoids were rare in the samples examined by me from eight lagoons, reflecting the method of sampling rather than the actual presence or absence of the group. Although *D. stefanssoni* was found in only two lagoons, it may well be a habitant of most of the lagoons along the coast.

Physical features of the lagoons are relatively low salinity, shallow depth (maximum, 3 m), and freedom from ice cover for about 2½–3 months. Salinity recorded on several dates in 1959–1961 for Pusigrak Lagoon was always very low (0.08–0.35 o/oo). Mapsorak Lagoon likewise had very low salinity (0.4–0.87 o/oo) in 1960–1961 when *D. stefanssoni* was collected, but Johnson recorded salinity of 14.31–15.96 o/oo in August 1959, at which time a large number of neritic calanoid species were present. Since these were not collected in 1960–1961, it has been assumed that the lagoon had been flooded with sea water during a storm and at least part of the copepod community was temporal (Wilson and Tash, 1966).

In the literature and new records given herein, collections have all been made by plankton tows, and *D. stefanssoni* occurred only

in small numbers, mostly as adults in middle-late summer. Presence of adults in late June in Cape Thompson lagoons, as contrasted with later dates in the Barrow region, may be due to earlier development resulting from higher temperatures earlier in the season with a longer period of ice-free water. Most records seem to indicate that maturity of the summer generation is attained late in the season and that the adults have some degree of planktonic motility. Knowledge of the life history of the species, through occurrence of its developmental stages, apparently can be acquired only by methods directed specifically at collection of harpacticoids during what represents early summer for any given region.

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