

A REVISION OF THE SPECIES OF THE GENUS *NEUMANIA* sensu stricto IN NORTH AMERICA, WITH DESCRIPTIONS OF SEVEN NEW SPECIES (FIRST PART)

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WATER MITES
NEUMANIA
NORTH AMERICA

ABSTRACT : Thirteen of the fifteen previously described North American species of *Neumania* (s. str.) are redescribed. *N. kodiakica* Marshall, 1924 is synonymized with *N. longiseta* (Marshall, 1924) and *N. onondaga* Habeeb, 1966, with *N. fragilis* Marshall, 1922. Nine new species (*alisonae*, *brucei*, *imsi*, *latifemoris*, *libbyae*, *media*, *nova-scotiae*, *setosipalpa*, and *smithi*) are described.

ACARIENS D'EAU DOUCE
NEUMANIA
AMERIQUE DU NORD

RÉSUMÉ : On décrit treize des quinze espèces de *Neumania* (s. str.) trouvées en Amérique du Nord. L'espèce *N. kodiakica* Marshall, 1924, est synonyme de *N. longiseta* (Marshall, 1924) et *N. onondaga* Habeeb, 1966, est synonyme de *N. fragilis* Marshall, 1922. Neuf nouvelles espèces (*alisonae*, *brucei*, *imsi*, *latifemoris*, *libbyae*, *media*, *nova-scotiae*, *setosipalpa*, et *smithi*) sont décrites.

INTRODUCTION

COOK (1974) places the genus *Neumania* in the Family Unionicolidae, Sub-Family Pionatacinae. To date, some fifteen species, in the genus *Neumania* sensu stricto, have been described from America, north of Mexico. MARSHALL (1922) published the first comprehensive paper on North American species. In this paper, she described eight species (*armata*, *extendens*, *fragilis*, *ovata*, *papillator*, *punctata*, *semicircularis*, and *tenuipalpis*). Marshall (1924) added a further two species to the list — one of which she misdescribed as *Piona longiseta* and the second was *Neumania kodiakica*. MARSHALL (1929a) described an eleventh species (*pubescens*) and a twelfth (*hickmani*) some four years later (MARS-

HALL, 1933). HABEEB (1965) described *N. canoga* and HABEEB (1966) described two final species (*N. estellae* and *N. onondaga*). Almost without exception, these species have been described and illustrated in a manner that is almost totally useless to the modern systematist. It is the intent of this work to redescribe all known species, using, where possible, the holotypes and allotypes. While examining the MARSHALL Collection, it has been a challenge to determine which specimens are the designated types. For some of the species, this has not been possible and representative specimens from the collection were used.

While the present work redescribes all previously described species, it reduces the number to thirteen by synonymizing *N. longiseta* (Marshall, 1924) with *N. kodiakica* Marshall, 1924, and *N. onondaga*

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Habeeb, 1966, with *N. fragilis* Marshall, 1922. A further nine new species (*alisonae*, *brucei*, *imsi*, *latifemoris*, *libbyae*, *media*, *nova-scotiae*, *setosipalpa*, and *smithi*) are described to bring the total for North America to 22 species. A twenty-third species recorded from North America is *Neumania* (*Tetraneumania*) *distincta* Marshall, 1922. As its name implies, this is a very distinct species and will not be treated in this study. It has been well illustrated by COOK (1974).

In the descriptions, all measurements are given in micrometers (μm) with the mean first, followed by the range. The terminology used follows that of COOK (1974). Location of the types is indicated in each species description. Where series are long enough to permit it, specimens will be deposited at the first three of the locations listed below. Throughout the text, for convenience, the following acronyms have been used :

FMNH — Field Museum of Natural History, Chicago, Illinois. This is the depository of the MARSHALL Collection.

ROM — The Royal Ontario Museum, Queen's Park, Toronto, Ontario. This museum has major collections of water mites, mostly from Canada.

CNC — The Canadian National Collection, Biosystematics Research Centre, Carling Avenue, Ottawa, Ontario. This includes the major collections and types for Canada.

NBM — The HABEEB Collection of water mites collected by the late Dr. Herbert HABEEB has been deposited in the New Brunswick Museum, 277 Douglas Avenue, Saint John, New Brunswick.

The small bars on the figures represent 100 μm . Where possible, illustrations have been made from the holotype and allotype material. In some of the MARSHALL types, drawings were clarified using other material. The actual specimen used for each drawing is indicated in the legends.

***Neumania alisonae*, new species**

(Figs 1, 6, 13, 18, 22)

MALE : length between anterior end of CP-I and posterior end of CP-IV 423 (410-441); body soft ;

epidermis densely covered by a stubble of fine, long spines; coxae in four groups; tubercles at end of body of small size; dorsum with a pair of very small dorsalia. Ventral sclerites (fig. 1) : tips of coxae narrowed but not pointed; posterior projections of CP-IV somewhat hook-like; posterior apodemes of anterior CP-I/CP-II coxal group extending to middle of CP-IV; surface of coxae appearing strongly reticulate; genital field terminal; width of genital field 339 (326-357); width of gonopore 47 (42-63); numerous small genital acetabula; genital plate at the posterior end of the body. Palp (fig. 22) : dorsal lengths of the palpal segments : P-I, 26; P-II, 96 (91-99); P-III, 42 (38-47); P-IV, 83 (79-85); P-V, 37 (34-42); total palpal length 284 (280-290); note the long, distal seta on P-II, the two distal long feathered setae on P-III, and the two fine setae (spines) on the mid-dorsal aspect of P-IV. Capitulum, including anchoral process, 140 (137-147) in length, 93 (84-95) in width. Legs : dorsal lengths of segments of first leg : I-Leg-1, 60 (53-63); I-Leg-2, 106 (95-116); I-Leg-3, 115 (111-116); I-Leg-4, 166 (158-168); I-Leg-5, 174 (168-179); I-Leg-6, 254 (242-263); dorsal lengths of the distal segments of the fourth leg (fig. 6) : IV-Leg-4, 194 (189-200); IV-Leg-5, 216 (210-221); IV-Leg-6, 242 (231-252); distal end of IV-Leg-3 with 3 (2-4) swimming hairs; distal end of IV-Leg-4 with 6 (6-7) swimming hairs; distal end of IV-Leg-5 with 4 (2-4) swimming hairs; 4 pectinate hairs on the postero-ventral aspect of IV-Leg-4 and 5 pectinate spines on the postero-ventral aspect of IV-Leg-5.

FEMALE : Length between anterior end of CP-I and posterior end of CP-IV 476 (452-494); dorsum and the venter, except for the genital field, as described for the male; genital field terminal; width of genital field 428 (399-462); width of gonopore 104 (84-116); genital acetabula numerous (more than 50); pregenital sclerite well-removed from acetabular plates and with no free setae between these sclerites (fig. 18). Palp. (fig. 13) dorsal lengths of the palpal segments : P-I, 31 (29-31); P-II, 114 (109-117); P-III, 48 (44-52); P-IV, 97 (91-101); P-V, 43 (39-47); total palpal length 334 (327-341); note the single, conspicuous spine and two fine setae on the mid-dorsal aspect of P-IV. Capitulum, including anchoral process, 172 (158-

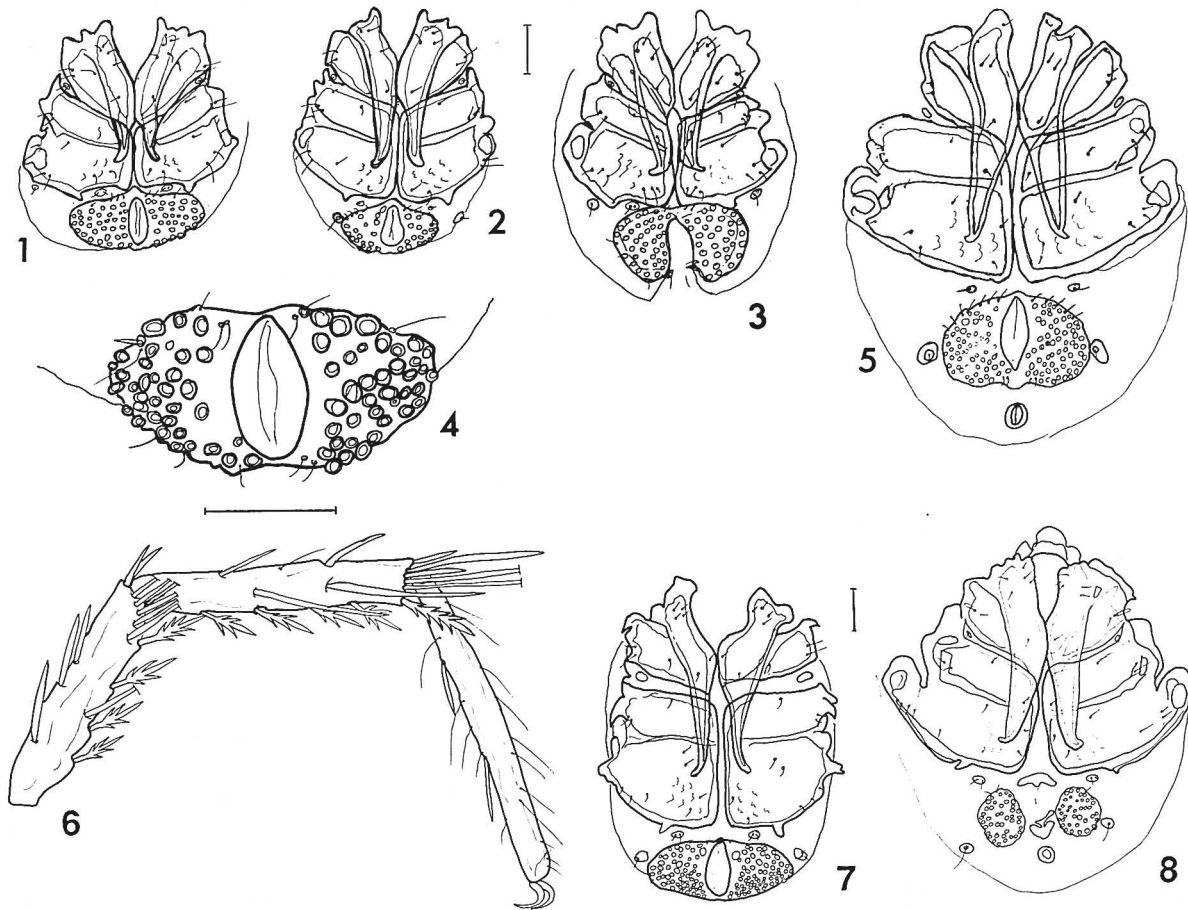


FIG. 1-8. — *Neumania* spp.

1. — *N. alisonae* n. sp., holotype male, ventral view. 2. — *N. brucei* n. sp., *idem, ibidem*. 3. — *N. canoga* Habeeb, 1965, male, mount NE.JC.79.ROM, ventral view. 4. — *N. estellae* Habeeb, 1966, posterior ventral view of male (after HABEEB, 1966). 5. — *N. extendens* Marshall, 1922, holotype male, ventral view. 6. — *N. alisonae* n. sp., holotype male, IV-leg. 7. — *N. armata* Marshall, 1922, holotype male, ventral view. 8. — *N. extendens* Marshall, 1922, female, mount NE.JC.35.ROM, ventral view.
(The small bar represents 100 μ m).

189) in length, 123 (116-138) in width. Legs : dorsal lengths of segments of first leg : I-Leg-1, 73 (63-74) ; I-Leg-2, 126 (116-137) ; I-Leg-3, 146 (137-158) I-Leg-4, 204 (200-221) ; I-Leg-5, 209 (200-221) ; I-Leg-6, 254 (237-263) ; dorsal lengths of the distal segments of the fourth leg : IV-Leg-4, 250 (242-263) ; IV-Leg-5, 283 (273-294) ; IV-Leg-6, 269 (250-284) ; distal end of IV-Leg-3 with 3 swimming hairs ; distal end of IV-Leg-4 with 5 (5-6) swimming hairs ; distal end of IV-Leg-5 with 3 (2-4) swimming hairs ; 4 pectinate spines on the postero-ventral aspect of IV-Leg-4 and 5 pectinate spines on the postero-ventral aspect of IV-Leg-5.

TYPE MATERIAL : holotype male (mount M81-0093-11) from a small stream crossing Highway 107, 15 km west of Road J-19 to Nashwaak Experimental Watershed, York Co., New Brunswick, on 1981.07.22 (I.M. SMITH, CNC, M81-0093), deposited in the CNC.

Allotype female (mount M81-0093-03) same locality and data as holotype, deposited in the CNC.

Paratypes : one male and one female paratypes (same locality and data as the types) deposited in each of the FMNH and the ROM. The remaining paratypes are either in the CNC or are retained in the author's collection.

Material Examined : Seven males and ten females.

Discussion : The specimens had a reddish tinge to the legs and coxal plates while preserved in Koenike's fluid. The small spine on the mid-dorsal aspect of P-IV is characteristic.

Neumania armata Marshall, 1922

(Figs 7, 14, 19, 23, 28)

MALE : length between anterior end of CP-I and posterior end of CP-IV 626 (578-704) ; body soft ; epidermis smooth, without spines ; coxae in four groups ; tubercles at end of body of small size ; dorsum with a pair of very small dorsalia. Ventral sclerites (fig. 7) : tips of coxae I, II and IV narrowed but not pointed ; tips of coxae III pointed and bent posteriorly ; posterior projections of CP-

IV somewhat hook-like ; posterior apodemes of anterior CP-I/CP-II coxal group extending to middle of CP-IV ; surface of coxae appearing lightly reticulate ; genital field terminal ; width of genital field 317 (273-431) ; width of gonopore 55 (38-74) ; 45-55 genital acetabula on each side. Palps (fig. 23) : dorsal lengths of the palpal segments : P-I, 37 (29-44) ; P-II, 120 (107-130) ; P-III, 70 (57-78) ; P-IV, 124 (104-135) ; P-V, 44 (36-49) ; total palpal length 397 (346-431) ; the ventral distal peg on P-IV is prominent and there are from 3 to 5 fine setae carried dorsally on P-IV. Capitulum, including anchoral process, 175 (143-200) in length, 112 (81-131) in width. Legs : dorsal lengths of segments of first leg : I-Leg-1, 82 (63-95) ; I-Leg-2, 160 (137-179) ; I-Leg-3, 204 (179-231) ; I-Leg-4, 306 (273-336) ; I-leg-5, 346 (305-399) ; I-Leg-6, 302 (231-341) ; dorsal lengths of the distal segments of the fourth leg (fig. 28) : IV-Leg-4, 321 (281-357) ; IV-

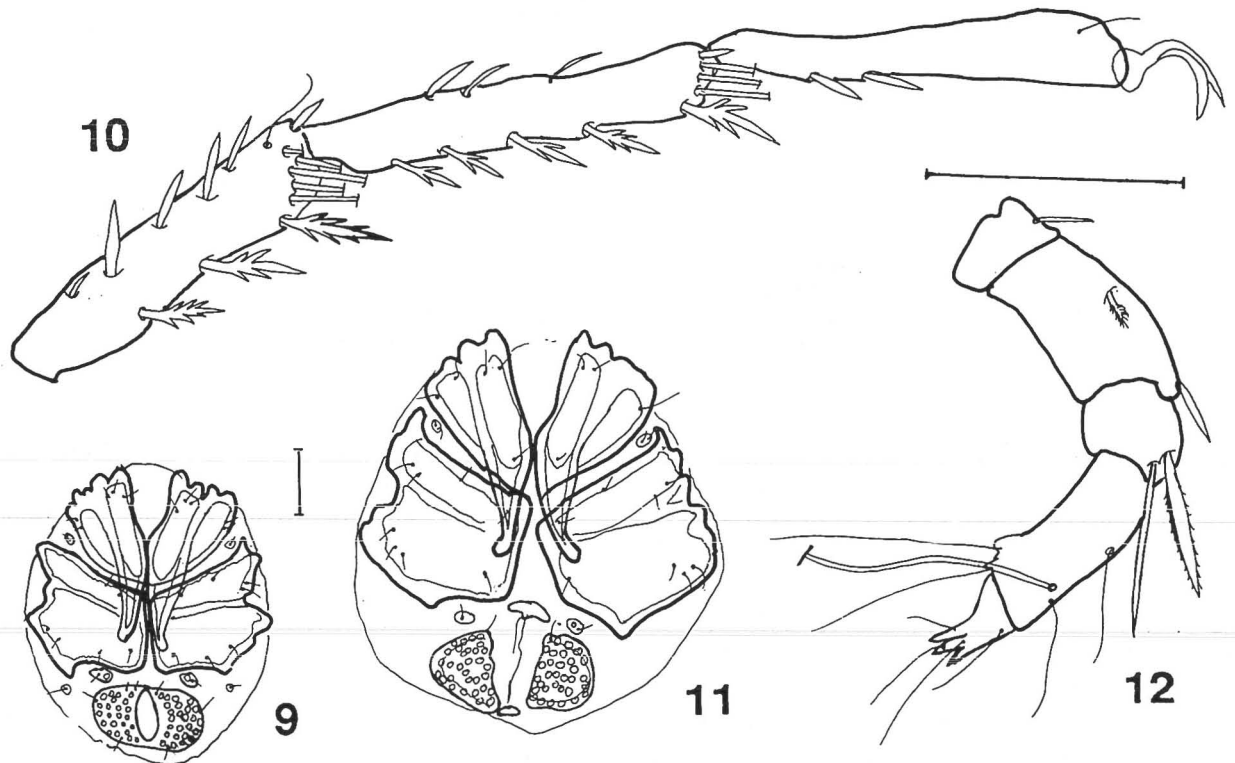


FIG. 9-12. — *Neumania estellae* Habeeb, 1966.

9. — Holotype male, ventral view. 10. — *Idem*, IV-leg, terminal segments. 11. — Allotype female, ventral view. 12. — *Idem*, palp. (The small bar represents 100 μ m).

Leg-5, 340 (305-376); IV-Leg-6, 320 (294-357); distal end of IV-Leg-3 with 2 (2-4) swimming hairs; distal end of IV-Leg-4 (2-7) swimming hairs; distal end of IV-Leg-5 with 5 (3-8) swimming hairs; five small and one large (distal) pectinate spine on the postero-ventral aspect of IV-Leg-4 and five small and one large (distal) pectinate spine on the postero-ventral aspect of IV-Leg-5.

FEMALE : length between anterior end of CP-I and posterior end of CP-IV 677 (651-704); dorsum and the venter, except for the genital field, as described for the male; genital field terminal; width of genital field 374 (336-399); width of gonopore 100 (74-126); numerous genital acetabula; pregenital sclerite well-removed from acetabular plates and with two free setae on each side between these sclerites (fig. 19). Palp (fig. 14) : dorsal lengths of the palpal segments : P-I, 40 (34-44); P-II, 129 (122-135); P-III, 62 (42-78); P-IV, 131 (112-146); P-V, 46 (39-52); total palpal length 407 (375-450); prominent distal, ventral peg on P-IV. Capitulum, including anchoral process, 185 (158-198) in length, 127 (115-137) in width; dorsal lengths of segments of first leg : I-Leg-1, 90 (74-95); I-Leg-2, 172 (168-179); I-Leg-3, 211 (200-221); I-Leg-4, 311 (286-336); I-Leg-5, 330 (305-357); I-Leg-6, 265 (244-284); dorsal lengths of the distal segments of the fourth leg : IV-Leg-4, 327 (305-347); IV-Leg-5, 346 (305-378); IV-Leg-6, 346 (311-368); distal end of IV-Leg-3, with 2 (1-3) swimming hairs; distal end of IV-Leg-4 with 5 (4-6) swimming hairs; distal end of IV-Leg-5 with 4 (3-5) swimming hairs; six small and one large (distal) pectinate spines on the postero-ventral aspect of IV-Leg-4 and eight pectinate spines on the postero-ventral aspect of IV-Leg-5.

TYPE MATERIAL : holotype male from Mirror Lake, Delton, Sauk Co., Wisconsin, on 1910.08.27 (YOUNG, FMNH, MARSHALL Collection).

Material Examined : Eleven males and five females : WISCONSIN : one male from Mud Creek, Lake Spooner, Washburn Co., on 1909.07.27 (as *N. extendens*, Ruth MARSHALL, FMNH, MARSHALL Collection); a male and two females from Mirror Lake, Delton, Sauk Co., — one male, one female on 1910.08.27 (YOUNG, FMNH, MAR-

HALL Collection), and a female on 1917.05.30 (Ruth MARSHALL, FMNH, MARSHALL Collection), one male from Nelson Lake, Tanning Point Road, Hayward, Sawyer Co., Wisconsin on 1983.07.21 (J.C. CONROY); ONTARIO : four males and one female from Chaffey's Locks, Lake Opinicon, Leeds Co., (one male from Station IV on 1975.07.11; one male, one female from Station IV and two males from Station XII on 1975.07.15; — all by N.L. GERRISH, ROM); NOVA SCOTIA : one male from a small lake, at the junction of Highway 316 and 276, near Goshen, Guysborough Co., on 1984.09.22 (by I.M. and S.C. SMITH, CNC, M84-0094); three males and two females from Cameron Lake, South Brookfield, Queen's Co., on 1984.09.26 (by I.M. and S.C. SMITH, CNC, M84-0109).

Discussion : This species previously was known from ponds and lakes in Wisconsin, Iowa and Illinois (MARSHALL, 1933), Michigan (MARSHALL, 1940 and Alberta (CONROY, 1968). The illustration of the male in Marshall, 1922 is really of *N. extendens*. It is correct in MARSHALL 1933.

***Neumania brucei*, new species**

(Figs. 2, 15, 20, 24, 29)

MALE : length between anterior end of CP-I and posterior end of CP-IV 390 (378-399); body soft; epidermis moderately covered by a stubble of fine, small spines; coxae in four groups; tubercles at end body of small size; dorsum with a pair of very small dorsalia. Ventral sclerites (fig. 2) : tips of coxae narrowed but not pointed; posterior projections of CP-IV somewhat hook-like; posterior apodemes of anterior CP-I/CP-II coxal group extending to middle of CP-IV; surface of coxae appearing heavily reticulate; genital field terminal; width of genital field 217 (210-231); width of gonopore 35 (21-42); few (17-26) genital acetabula per plate. Palps (fig. 24) : dorsal length of the palpal segments : P-I, 23 (21-23); P-II, 78 (70-90); P-III, 43 (39-47); P-IV, 69 (60-75); P-V, 31 (29-34); total palpal length 243 (224-264). Capitulum, including anchoral process, 114 (105-126) in length, 68 (65-84) in width. Legs : dorsal length of segments of first leg : I-Leg-1, 57 (53-63); I-Leg-2,

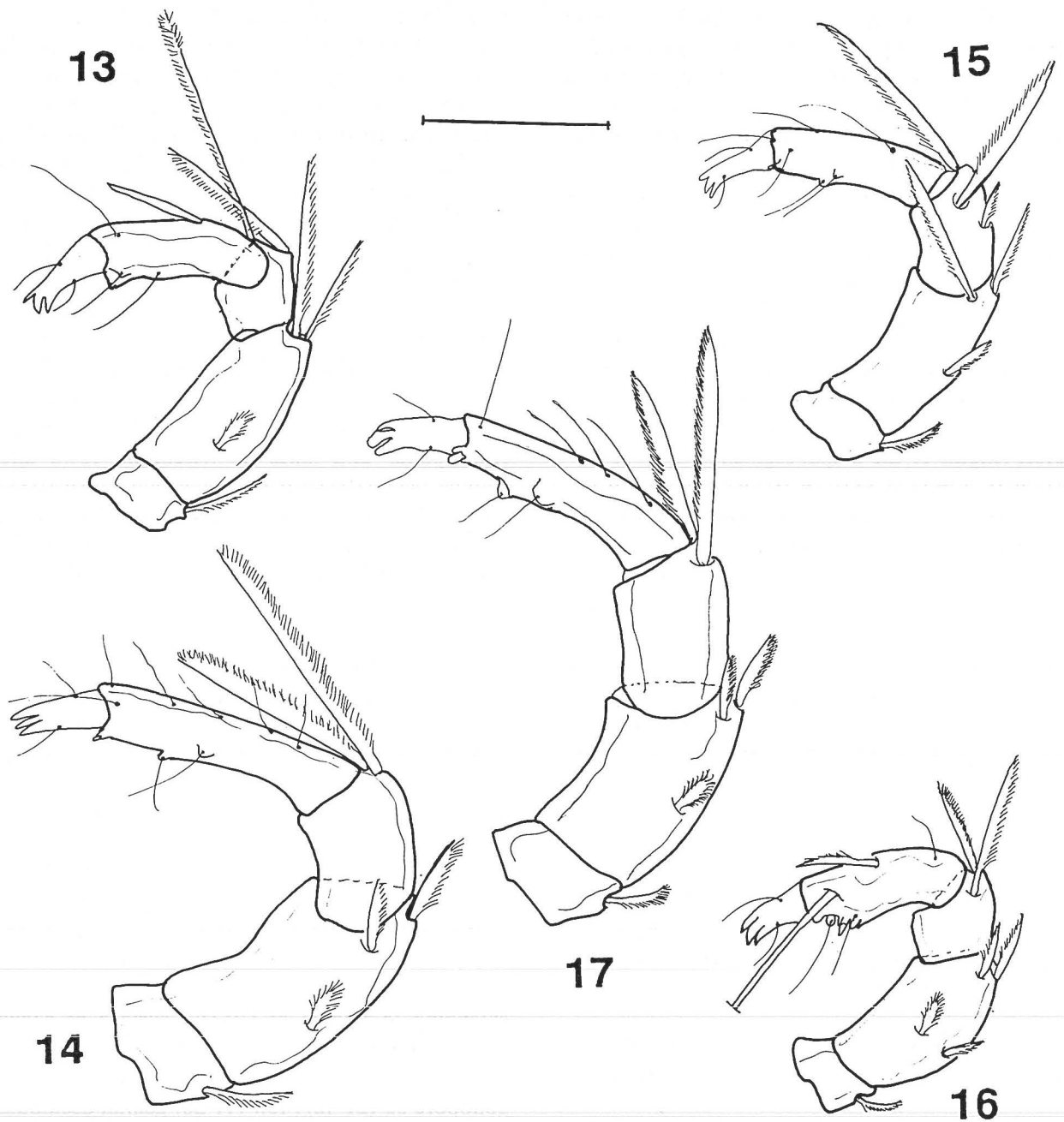


FIG. 13-17. — *Neumania* spp., female palps.

13. — *N. alisonae* n. sp., mount M81-0093-95. 14. — *N. armata* Marshall, 1922, allotype. 15. — *N. brucei* n. sp., mount M76-003-01. 16. — *N. canoga* Habeeb, 1965, mount NE.JC.97.ROM. 17. — *N. extendens* Marshall, 1922, mount NE.JC.35.ROM.

(The small bar represents 100 μ m).

83 (73-100); I-Leg-3, 103 (95-116); I-Leg-4, 156 (147-162); I-Leg-5, 176 (168-189); I-Leg-6, 200 (168-221); dorsal lengths of the distal segments of the fourth leg (fig. 29) : IV-Leg-4, 175 (168-185); IV-Leg-5, 203 (179-221) ; IV-Leg-6, 200 (168-221); distal end of IV-Leg-3 with 3, (2-3) swimming hairs; distal end of IV-Leg-4 with 5 (4-5) swimming hairs; distal end of IV-Leg-5 with 3 (2-4) swimming hairs; seven pectinate spines on the postero-ventral aspect of IV-Leg-4 and seven pectinate spines on the postero-ventral aspect of IV-Leg-5.

FEMALE : Length between anterior end of CP-I and posterior end of CP-IV 500 (462-546); dorsum and the venter, except for the genital field, as described for the male; genital field terminal; width of genital field 282 (252-315); width of gonopore 116 (85-147); 22-28 genital acetabula/plate; pregenital sclerite well-removed from acetabular plates and with 3 free setae on each side between these sclerites; figure 20 shows the ventral sclerites. Palp (fig. 15) : dorsal length of the palpal segments : P-I, 30 (27-36); P-II, 98 (91-109); P-III, 52 (49-57); P-IV, 95 (88-114); P-V, 36 (29-43); total palpal length 312 (292-337). Capitulum, including anchoral process, 146 (137-168) in length, 104 (95-116) in width; dorsal lengths of segments of first leg : I-Leg-1, 67 (61-74); I-Leg-2, 127 (115-143); I-Leg-3, 146 (126-158); I-Leg-4, 203 (185-221); I-Leg-5, 227 (200-257); I-Leg-6, 217 (198-237); dorsal lengths of the distal segments of the fourth leg : IV-Leg-4, 222 (200-252); IV-Leg-5, 251 (231-294); IV-Leg-6, 230 (210-263); distal end of IV-Leg-3 with 3 (2-3) swimming hairs; distal end of IV-Leg-4 with 5 (3-6) swimming hairs; distal end of IV-Leg-5 with 3 (3-4) swimming hairs; seven pectinate spines on the postero-ventral aspect of IV-Leg-5.

TYPE MATERIAL : holotype male (mount M84-0100-13) from Lake Charlotte, at the highway, Halifax Co., Nova Scotia, on 1984-09-23 (I.M. and s.c. SMITH, CNC, M84-0100), deposited in the CNC.

Allotype female (mount NE-JC-249-ROM) from Station VI, Chaffey's Locks, Lake Opinicon, Leeds Co., Ontario, on 1975.08.07 (N.L. GERRISH, ROM), deposited in the CNC.

Paratypes : one male and one female paratypes deposited in each of the FMNH and the ROM. The remaining paratypes are either in the CNC or are retained in the author's collection.

Material Examined : Four males and eight females : MANITOBA : West Blues Lake, Duck Mountains Provincial Park, one male at 5.0m, on 1968.08.21. (J.C. CONROY); ONTARIO : Chaffey's Locks, Lake Opinicon, Leeds Co. — one female, Station VI, on 1975.05.09; one male, Station XII, on 1975.07.15; and one female, Station VI, on 1975.08.07 (all by N.L. GERRISH, ROM); FLORIDA : one female from a pool just at the junction of Routes 714 and 609, Indiantown, Martin Co., on 1976.02.08 (I.M. SMITH, CNC, M76-0003); three females from an irrigation ditch, Indiantown, Martin Co., on 1976.02.13. (I.M. SMITH, CNC, M76-0009); one male, two females, from an irrigation ditch at Route 609, Indiantown, Martin Co., on 1976.02.17 (I.M. SMITH, CNC, M76-0017); NOVA SCOTIA : Lake Charlotte at the highway, Halifax Co., on 1984.09.23 (I.M. and S.C. SMITH, CNC, M84-0100).

Discussion : There is a blue-green tinge to the legs and coxal plates in specimens preserved in Koenike's fluid.

Neumania canoga Habeeb, 1965

(Fig. 3, 16, 21, 25, 30)

MALE ; length between anterior end of CP-I and posterior end of CP-IV 478 (462-488); body soft; epidermis moderately covered by a stubble of fine spines; coxae in four groups; tubercles at end of body of small size; dorsum with a pair of very small dorsalia. Ventral sclerites (fig. 3) : tips of coxae narrowed but not pointed; posterior projections of CP-IV somewhat hook-like; posterior apodemes of anterior CP-I/CP-II coxal group extending to middle of CP-IV; surface of coxae appearing punctate; genital field terminal; width of genital field 291 (273-315); width of gonopore 50 (47-53); about 60 genital acetabula/plate. Palp (fig. 25) : dorsal lengths of the palpal segments : P-I, 24 (21-26); P-II, 90 (88-91); P-III, 39 (36-42); P-IV, 74 (73-75); P-V, 35 (31-39); total palpal length 262

(260-265); palp with a characteristic, ventral, distal long seta on P-IV. Capitulum, including anchoral process, 175 (173-179) in length, 95 in width; legs: dorsal lengths of segments of first leg: I-Leg-1, 63; I-Leg-2, 123 (116-126); I-Leg-3, 119 (116-126); I-Leg-4, 182 (179-189); I-Leg-5, 192 (183-200); I-Leg-6, 231 (221-242); dorsal lengths of the distal segments of the fourth leg (fig. 30): IV-Leg-4, 215 (210-221); IV-Leg-5, 257 (247-273); IV-Leg-6, 221 (210-231); note the six unusual, hook-like spines on the ventral margin of IV-Leg-6; distal end of IV-Leg-3 with 2 swimming hairs; distal end of IV-Leg-4 with 6 swimming hairs; distal end of IV-Leg-5 with 3 swimming hairs; five pectinate spines on the postero-ventral aspect of IV-Leg-4 and six pectinate spines on the postero-ventral aspect of IV-Leg-5.

FEMALE: length between anterior end of CP-I and posterior end of CP-IV 560 (525-599); dorsum and the venter, except for the genital field, as described for the male. Ventral sclerites (fig. 21): genital field terminal; width of genital field 362 (336-399); width of gonopore 124 (63-168); some 60-70 genital acetabula/plate; pregenital sclerite well-removed from acetabular plates and with no free setae between these sclerites. Palp (fig. 16): dorsal lengths of the palpal segments: P-I, 32 (29-36); P-II, 105 (99-114); P-III, 45 (42-52); P-IV, 91 (83-99); P-V, 40 (36-43); total palpal length 313 (298-324); very long {282 (255-317)} hair on distal ventral side of P-IV. Capitulum, including anchoral process, 196 (167-210) in length, 110 (95-137) in width; dorsal lengths of segments of first leg: I-

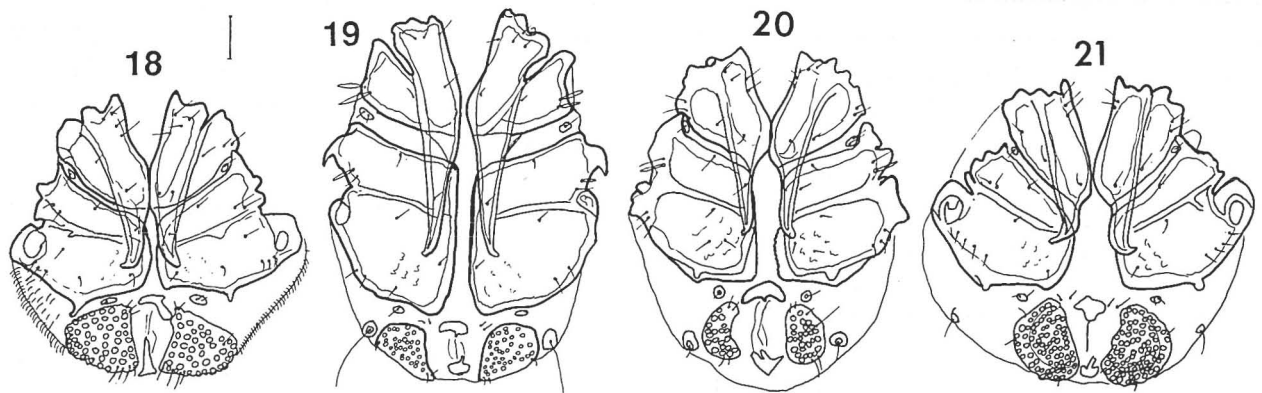


FIG. 18-21. — *Neumania* spp., female ventral views.

18. — *N. alisonae* n. sp., allotype. 19. — *N. armata* Marshall, 1922, allotype. 20. — *N. brucei* n. sp., mount M76-003-01. 21. — *N. canoga* Habeeb, 1965, mount NE.JC.97.ROM.
(The small bar represents 100 μ m).

Leg-1, 73 (63-84); I-Leg-2, 144 (126-158); I-Leg-3, 146 (137-158); I-Leg-4, 232 (210-252); I-Leg-5, 235 (221-252); I-Leg-6, 238 (231-263); dorsal lengths of the distal segments of the fourth leg: IV-Leg-4, 268 (252-294); IV-Leg-5, 312 (299-326); IV-Leg-6, 277 (259-294); distal end of IV-leg-3 with 2 (1-2) swimming hairs; distal end of IV-Leg-4 with 6 (5-6) swimming hairs; distal end of IV-Leg-5 with 3 (3-4) swimming hairs; five pectinate spines on the postero-ventral aspect of IV-Leg-4 and six pectinate spines on the postero-ventral aspect of IV-leg-5.

TYPE MATERIAL: holotype male from Cayuga Lake, at State Park, near Canoga, Seneca Co., New York on 1960.11.12 (H. HABBE, deposited in the NBM).

Material Examined: Three males and sixteen females: ONTARIO: from Chaffey's Locks, Lake Opinicon, Leeds Country — four females from Station IV, 1975.05.26; one female from Station VI, 1975.06.08; one female from Station XII, 1975.06.21; two females from Station IIId, one male from Station IV and one male and five

females from Station XII, all on 1975.07.15; and two females from Station IV, 1975.07.26 (all by N.L. GERRISH, ROM); QUEBEC : one female from Lac Phillipe, Gatineau Park, on 1976.08.17 (I.M. SMITH, D. SPANER, and P. PEHTLA, CNC, M76-0302); and holotype, collected by H. HABEEB.

Discussion : For the female, HABEEB (1965) gives the length of the epimera (= coxal plates) as 610-720 and the width as 475-560; HABEEB notes that the female is "except for the genital area, similar and same size as male or larger". He also notes that *N. canoga* is a "small, active, red and black *Neumania*" (op. cit., p. 1). The species previously was known only from Cayuga Lake, Seneca Co., New York.

Neumania estellae Habeeb, 1966
(Fig. 4, 9, 10, 11, 12, 26)

MALE : length between anterior end of CP-I and posterior end of CP-IV 347; body soft; epidermis covered with many fine spines or denticles; tubercles at the end of the body of small size; dorsum with a pair of very small dorsalia; tips of coxal plates narrowed, but not pointed; posterior projections of the CP-IV somewhat hook-like; posterior apodemes of CP-I/CP-II coxal group extending to the middle of CP-IV; surface of the coxae appearing punctate; genital field (fig. 4) terminal; width of genital field 208; width of gonopore 39; many, small genital acetabula; pregenital sclerite well-removed from acetabular plates and with no free setae between these sclerites (fig. 9). Palp (fig. 26) : dorsal lengths of the palpal segments : P-I, 18; P-II, 65; P-III, 26; P-IV, 57; P-V, 23; total palpal length 189; note the long outer seta (130 long), the two long ventral hairs on P-IV and the pair of long hairs dorsally on P-IV; the shape of P-IV is characteristic. Capitulum, including anchoral process, 130 in length. Legs : dorsal lengths of segments of first leg : I-Leg-1, 39; I-Leg-2, 78; I-Leg-3, 70; I-Leg-4, 114; I-Leg-5, 122; I-Leg-6, 169; dorsal lengths of the distal segments of the fourth leg : IV-Leg-4, 137; IV-Leg-5, 161; IV-Leg-6, 150; distal end of IV-Leg-3 with 2 swimming hairs; distal end of IV-Leg-4 with 4 swimming

hairs; distal end of IV-Leg-5 with 4 swimming hairs; three short and one large pectinate spines on the postero-ventral aspect of IV-Leg-4 and four short and one large pectinate spines on the postero-ventral aspect of IV-Leg-5.

FEMALE : length between anterior end of CP-I and posterior end of CP-IV 441; dorsum and venter, except for the genital field, as described for the male. Ventral sclerites (fig. 11) : genital field terminal; width of genital field 257; width of gonopore 53; many, small genital acetabula; pregenital sclerite well-removed from acetabular plates and with no free setae between these sclerites. Palp (fig. 12) : dorsal lengths of the palpal segments : P-I, 29; P-II, 86; P-III, 29; P-IV, 81; P-V, 27; total palpal length 252; note the long outer seta (134 long), the two long ventral hairs on P-IV and the three long hairs dorsally on P-IV. Capitulum, including anchoral process, 166 in length. Legs : dorsal lengths of segments of first leg : I-Leg-1, 63; I-Leg-2, 105; I-Leg-3, 105; I-Leg-4, 158; I-Leg-5, 164; I-Leg-6, 168; dorsal lengths of the distal segments of the fourth leg : IV-Leg-4, 210; IV-Leg-5, 231; IV-Leg-6, 189; distal end of IV-Leg-3 with 2 swimming hairs; distal end of IV-Leg-4 with 5 swimming hairs; distal end of IV-Leg-5 with 3 swimming hairs; four short, pectinate spines on the postero-ventral aspect of IV-Leg-4 and four short and one large pectinate spine on the postero-ventral aspect of IV-Leg-5.

TYPE MATERIAL : holotype male from the West Branch, Onondaga River, Onondaga Co., New York, on 1962.05.12 (H. HABEEB, deposited NBM); allotype female, same location and data as holotype.

Material Examined : One male and one female.

Neumania extendens Marshall, 1922
(Fig. 5, 8, 17, 27, 31)

MALE : length between anterior end of CP-I and posterior end of CP-IV, 613 (534-695); body soft; epidermis smooth; coxae in four groups; tubercles at end of body of small size; dorsum with a pair of very small dorsalia. Ventral sclerites (fig. 5) : tips of

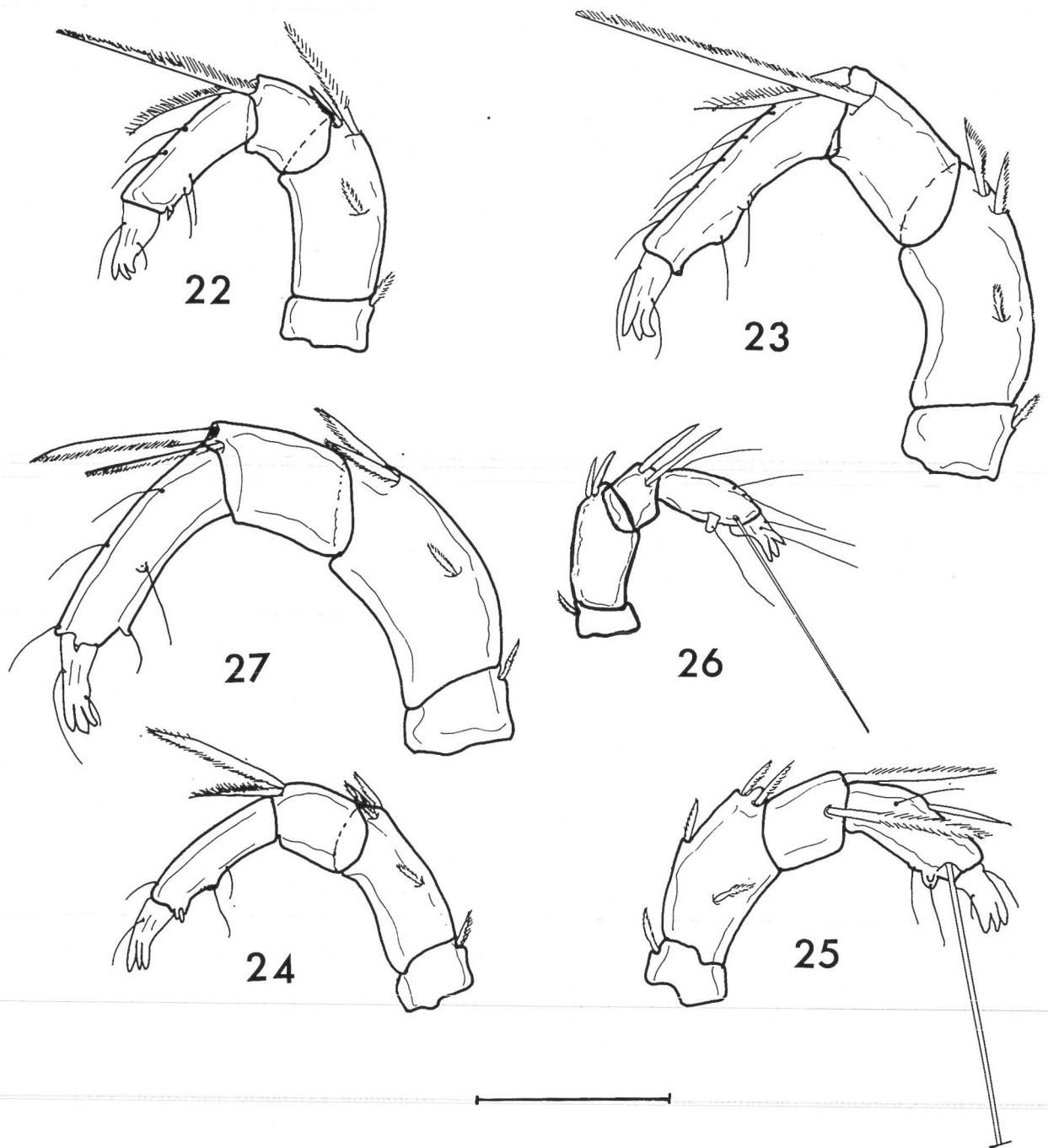


FIG. 22-27. — *Neumania* spp., male palps.

22. — *N. alisonae* n. sp., holotype. 23. — *N. armata* Marshall, 1922, mount M84-0109-12. 24. — *N. brucei* n. sp., mount M76-0017-01. 25. — *N. canoga* Habeeb, 1965, mount NE.JC.79.ROM. 26. — *N. estellae* Habeeb, 1966, holotype. 27. — *N. extendens* Marshall, 1922, mount NE.JC.04.ROM.

(The small bar represents 100 μ m).

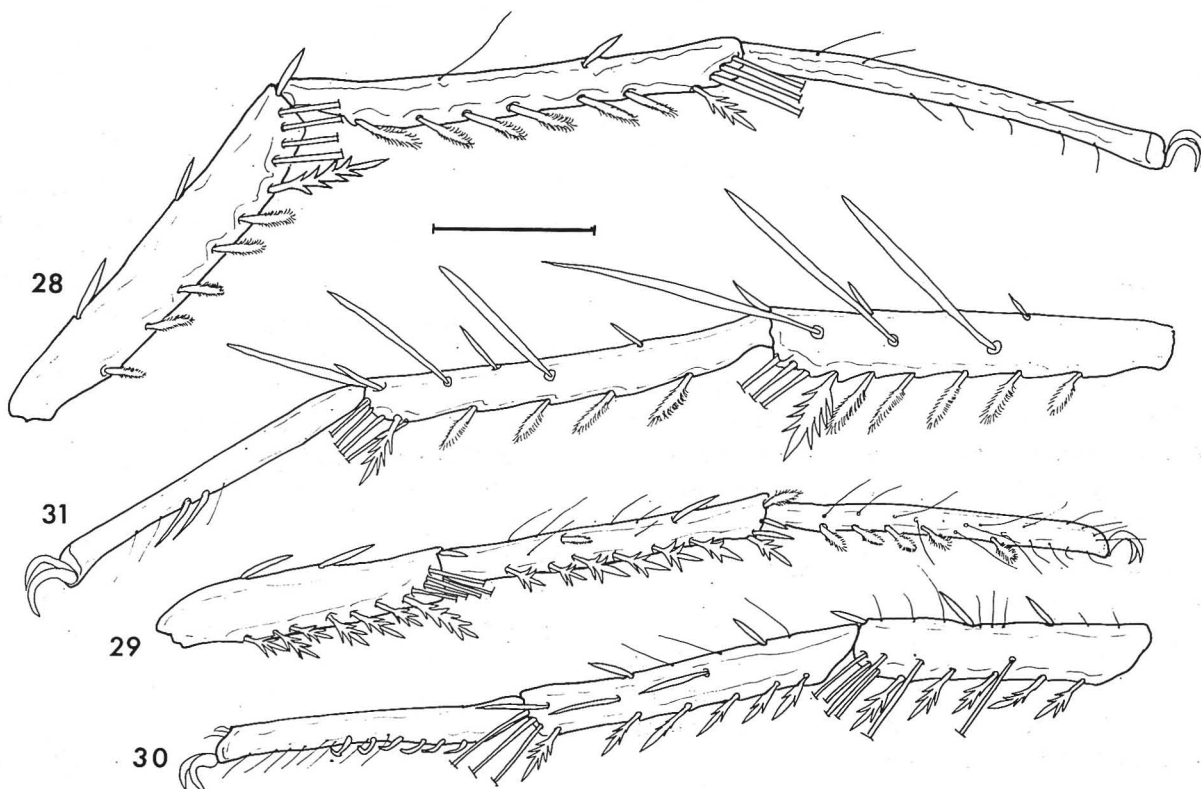


FIG. 28-31. — *Neumania* spp., distal segments of male IV-leg.

28. — *N. armata* Marshall, 1922, holotype. 29. — *N. brucei* n. sp., holotype. 30. — *N. canoga* Habeeb, 1965, mount NE.JC.79.ROM. 31. — *N. extendens* Marshall, 1922, holotype.
(The small bar represents 100 μ m).

coxae narrowed but not pointed; posterior projections of CP-IV somewhat hook-like; posterior apodemes of anterior CP-I/CP-II coxal group extending to middle of CP-IV; surface of coxae appearing weakly reticulate; genital field terminal; width of genital field 307 (273-336); width of gonopore 52 (36-71); shape of the genital plate is characteristic; numerous small genital acetabula on each plate. Palp (fig. 27): dorsal lengths of the palpal segments: P-I, 34 (31-42); P-II, 120 (101-135); P-III, 63 (39-91); P-IV, 118 (96-159); P-V, 45 (41-52); total palpal length 376 (329-479). Capitulum, including anchoral process, 166 (137-189) in length, 107 (95-117) in width. Legs: dorsal lengths of segments of first leg: I-Leg-1, 66 (63-74); I-Leg-2, 154 (137-189); I-Leg-3, 195 (154-252); I-Leg-4, 279 (227-347); I-Leg-5, 316 (267-357); I-Leg-6, 286 (260-315); dorsal lengths of the distal segments of

the fourth leg (fig. 31): IV-Leg-4, 309 (273-376); IV-Leg-5, 313 (273-357); IV-Leg-6, 274 (247-326); distal end of IV-Leg-3 with 4 (3-8) swimming hairs; distal end of IV-Leg-4 with 7 (3-13) swimming hairs; distal end of IV-Leg-5 with 9 (3-14) swimming hairs; four small and one large (distal) pectinate spines on the postero-ventral aspect of IV-Leg-4 and five small and one large (distal) pectinate spines on the postero-ventral aspect of IV-Leg-5.

FEMALE: length between anterior end of CP-1 and posterior end of CP-IV 667 (662-672); dorsum and the venter, except for the genital field, as described for the male. Ventral sclerites (fig. 8): genital field terminal; width of genital field 399 (378-420); width of gonopore 147; about 60 small genital acetabula/plate; pregenital sclerite well-removed from acetabular plates and with 2 free setae on each side between these sclerites. Palp (fig. 17):

dorsal lengths of the palpal segments, P-I, 38 (31-44); P-II, 125; P-III, 77 (75-78); P-IV, 128 (112-143); P-V, 41 (39-42); total palpal length 408 (382-432). Capitulum, including anchoral process, 216 (189-242) in length, 126 in width. Legs : dorsal lengths of segments of first leg : I-Leg-1, 90 (84-95); I-Leg-2, 168; I-Leg-3, 211 (200-221); I-Leg-4, 310 (294-326); I-Leg-5, 300 (294-305); I-Leg-6, 273 (231-315); dorsal lengths of the distal segments of the fourth leg : IV-Leg-4, 331 (315-347); IV-Leg-5, 352 (347-357); IV-Leg-6, 329 (315-343); distal end of IV-Leg-3 with 3 swimming hairs; distal end of IV-Leg-4 with 4 (2-6) swimming hairs; distal end of IV-Leg-5 with 5 (4-6) swimming hairs; six small and one large (distal) pectinate spines on the postero-ventral of IV-Leg-4 and six small and two large (distal) pectinate spines on the postero-ventral aspect of IV-Leg-5.

TYPE MATERIAL : holotype male from Lake Mendota, Madison, Dane Co., Wisconsin, on 1915.05.21 (R.A. MUTTKOWSKI, FMNH, Marsall Collection), deposited in the FMNH.

MATERIAL EXAMINED : Five males and two females; WISCONSIN : one male from Lower Pond, Delton, Sauk Co., on 1910.08.22 (as *N. armata*, Ruth Marshall, FMNH, Marshall Collection); one holotype male; MANITOBA : one male, Pond 2, Fort Whyte Nature Reserve, Winnipeg, Manitoba on 1976.07.19 (J. C. CONROY); one male, Sturgeon Creek, at Saskatchewan Avenue, Winnipeg, on 1975.07.23 (J. C. CONROY); ONTARIO : two females from Chaffey's Locks, Lake Opinicon, Leeds Co. — one from Station XII on 1975.05.13, and the other Station I on 1975.08.07 (both by N.L. GERRISH, ROM); one male from Lake 382, Experimental Lakes Area, Kenora, on 1979.07.02. (J. C. CONROY).

DISCUSSION : This species previously was known from Michigan and Wisconsin (MARSHALL, 1922, 1933) and Illinois (HOFF, 1942). The males are readily recognized by the shape of the genital plate.

(To be continued)

Paru en Septembre 1991.