

NOTES ON *NANORCHESTES*III. Four species from the Arctic Tundra  
(Acari: Endeostigmata: Nanorchestidae)<sup>1</sup>R. W. Strandtmann<sup>2</sup>

*Abstract.* Descriptions, illustrations and collection data are given for 4 species of *Nanorchestes* from the North American Arctic, viz, *N. collinus*; *N. gilli*, n. sp.; *N. jodiae*, n. sp.; and *N. llanoi*, n. sp.

This, the third of a proposed series of 7 papers on the polar forms of *Nanorchestes*, deals with the American Arctic species. The paper is based on specimens collected by the author in northern Alaska, the McKenzie River delta and on Bathurst Island in the Canadian Arctic Archipelago. The collection includes 4 species, 3 of which are new.

*Nanorchestes* has been previously reported from northern Alaska by Hurd (1958), and from the Canadian Arctic Archipelago by MacAlpine (1964, 1965). Both of these authors reported their material as being *Nanorchestes collinus* Hirst, 1918, without any descriptive notes. The 4 species represented in my collection include *N. collinus* Hirst plus the 3 new species, *N. gilli*, *N. jodiae*, and *N. llanoi*. Descriptions, illustrations and collection data for the 4 species follow.

All measurements given in the descriptions are in micrometres.

The holotypes of the new species are in the Bishop Museum, Honolulu, Hawaii. Paratypes of *Nanorchestes gilli* are in the National Museums of Canada, Ottawa; the Institute of Acarology, Ohio State University, Columbus, Ohio, USA; and the U.S. National Museum, Washington, D.C. Specimens of *N. collinus* used in this study are at the Bishop Museum. Others are in the author's collection.

The following symbols are used in the descriptions and/or illustrations: *acs*, anterior cheliceral seta; *cs*, cheliceral seta; *pcs2*, palp coxal seta 2; *na*, *nb*, *ne*, *nf*, *nm*, *nr*, setae and sensillae of the dorsal sensory quadrat.

***Nanorchestes collinus* Hirst, 1918**

Fig. 1-7

*Diagnosis.* Naso deeply and narrowly cleft. Seta *na* and *nb* both 40. Seta *nr* distinctly longer than *nm*. Cheliceral seta forked, the 2 arms similar. Tarsus III with 8 setae, femur IV with 2.

A medium-large species. Average lengths ♂ 230, ♀ 245, tritonymphs 210. *Dorsum.* Seta *na* 40, with short, close cilia on apical  $\frac{2}{3}$ . Sensillum *nb* 40, slender, mildly angulate, with moderate, branched cilia. Seta *nm* broad, about 15; *nr* more slender, 20; *ne* 10 and loosely plumose.

1. Aided in part by travel grants from Texas Tech University, Lubbock, Texas and provision of food, housing, and transportation from the Polar Continental Shelf Project of Canada.

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Distance between bases of *na*, 22; between *na* and *nb*, 10. Naso deeply cleft, the wings extending over bases of *na/nf* complex. Dorsal body setae branched treelike, about 7–9 long. *Gnathosoma*. Cheliceral seta forked, each arm about 20, with slender, branched cilia. Basal pair of palp coxal setae not forked. Outer dorsal seta of palp tibia thick, long, with sparse ciliation. Cheliceral shears short and heavy. *Legs*. Tarsus I with 3 serpentine lines, 1 begins at base of anterior aspect, curves across top of the segment, then turns anteriorly at the apical end. Famulus small and difficult to find. It is middorsal, at tip of middle (and shortest) sensory line. Tibia I with 3 parallel lines bending anteriorly at apical end. Genu I with 2 lines. Middorsal sensory line of tarsus II distinctly enlarged apically. Tibia II with 1 line, curving anteriorly. Genu III with 1 sensory line. Empodial claw with 5–6 rays each side. *Leg chaetotaxy*. I, 18-6-5-4+2; II, 11-5-4-3; III, 8-3-3-3; IV, 11-3-3-1+1.

*Specimens examined*. 34 ♂, ♀, TN, as follows. CANADA: NWT: Bathurst I: 76°00'N–100°30'W, 5 ♂, 7 ♀, 3 TN, 11.IV.1974 to 11.VII.1974, extracted from tundra samples by Berlese funnel, R.W. Strandtmann; Banks I, 73°15'N–121°30'W, 1 ♂, 1 ♀, 2 TN, VII.1973, Klaus Bleich (tundra samples were collected in July and sent to the author at Texas Tech University in Lubbock, where mites were extracted in September); Tuktoyaktuk, 69°27'N–133°02'W, 2 TN, 2 of unknown sex or stage, 24.VII.1967 and VII.1973, R.W. Strandtmann. ALASKA: Barrow, 71°17'N–156°47'W, 1 ♂, 9 ♀, 22.VI.1967 to 7.VII.1967; Anaktuvuk Pass, 68°10'N–151°50'W, 1 ♂, 15.VI.1968, D.A. Pittard.

*Remarks*. As far as I am aware, there is no extant full description of *N. collinus*. The original description by Hirst (1918) was brief, without figures, and was based on 1 specimen. According to Hirst (1918), *N. collinus* is smaller than *N. amphibius* Hirst, the cheliceral seta slender, dividing at the base into 2 slender, plumose branches, whereas in *N. amphibius* the cheliceral seta is rather stout, rodlike and not divided. Length (of *N. collinus*) 240  $\mu\text{m}$ . From Mendip Hills, near Axebridge, England.

At the time *N. collinus* was described, in 1918, it was only the 4th known species, and the 1st to have a forked cheliceral seta. Consequently, any *Nanorchestes* found subsequently with a forked cheliceral seta was likely to be referred to as *collinus*, without further description. Willmann (1943) seems to be the only one to have given any descriptive notes. In his paper of 1943 he figures the propodosoma and cheliceral seta, showing the latter to branch from near the base into 2 subequal arms, each with rather short, uniform ciliation. In his figure, the naso is distinctly divided, seta *na* has short, close ciliation on the apical  $\frac{1}{2}$ , and sensillum *nb* has sparse ciliation throughout.

*N. collinus* has been reported from Swedish Lapland by Willmann (1943); from alpine regions of Poland and Czechoslovakia (at altitudes of 1200–1370 m) by Willmann (1956); from the barren lands of the northwestern Queen Elizabeth Islands, and from Ellef Ringnes Island (above 78°N) in the Canadian Arctic Archipelago by MacAlpine (1964, 1965); and from Barrow, Alaska (71°N) by Hurd (1958).

I have found 2 species of *Nanorchestes* with a forked cheliceral seta to be common in the nearctic. I have chosen to assign to *collinus* that form in which the cheliceral seta most nearly resembles the figure given by Willmann (1943). This, also, is the more abundant form and is, thus, more likely to represent the forms reported by Hurd (1958) and MacAlpine (1964, 1965).

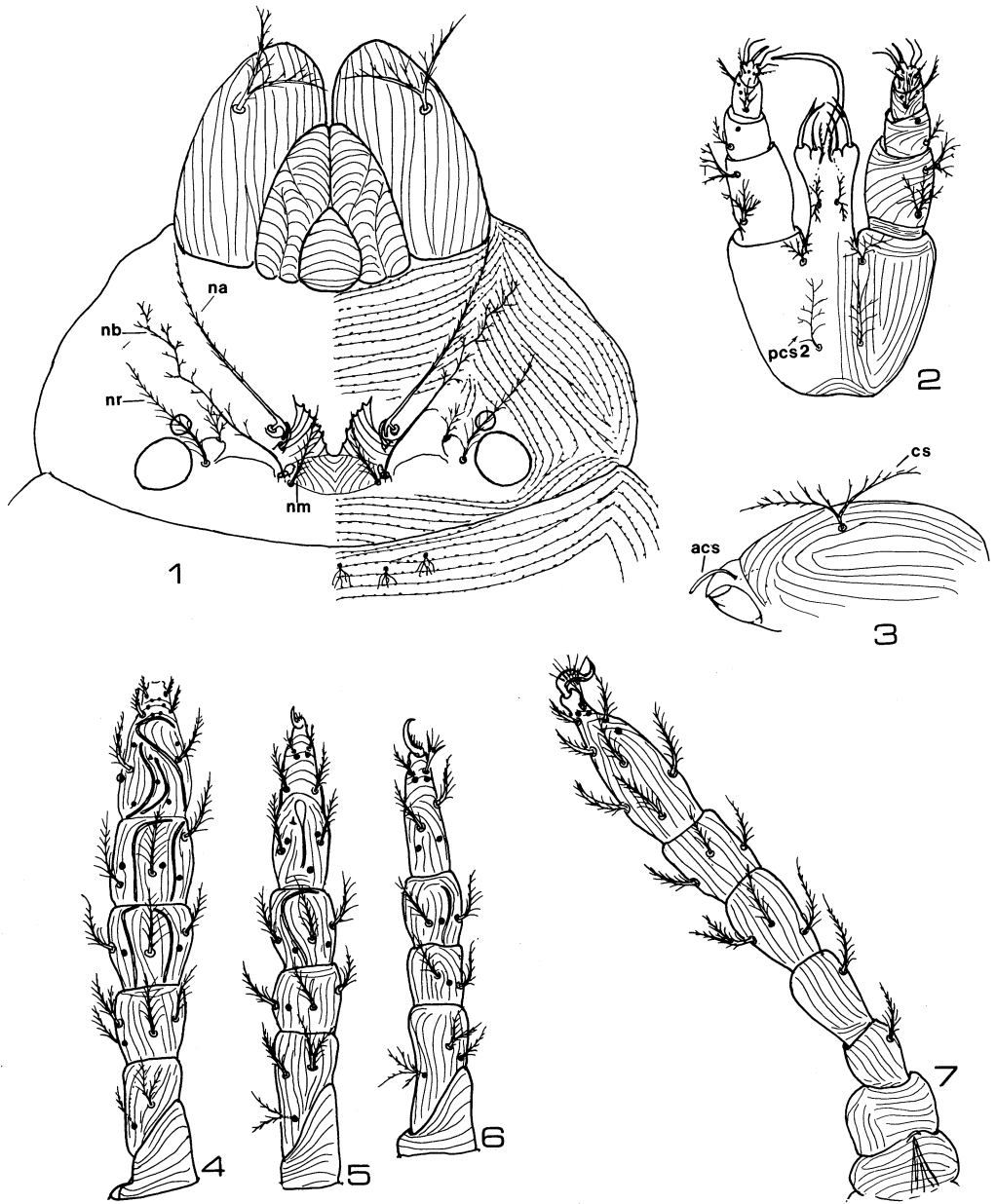


FIG. 1-7. *Nanorchestes collinus*: 1, prodorsum; 2, gnathosoma, ventral view; 3, chelicera, lateral view; 4, leg I, dorsal view; 5, leg II, dorsal view; 6, leg III, dorsal view; 7, leg IV, lateral view.

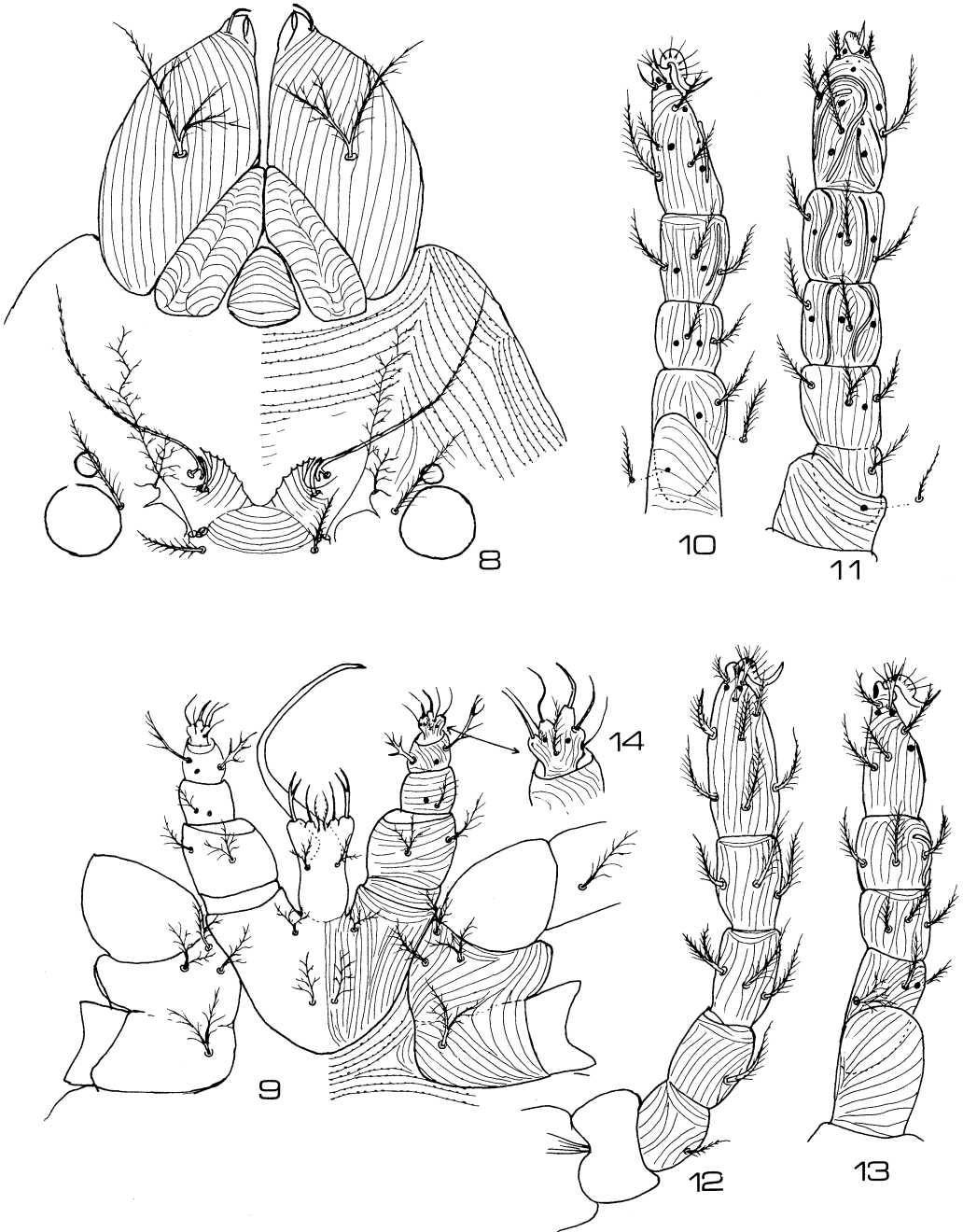


FIG. 8-14. *Nanorchestes gilli*: 8, prodorsum; 9, gnathosoma and coxae I and II, ventral view; 10, leg II, ventral view; 11, leg I, dorsal view; 12, leg IV, lateral view; 13, leg III, lateral view; 14, palp tarsus, enlarged.

Womersley (1944) reported *N. collinus* from Australia. His figure of the prodorsum is nondiagnostic, but his setal measurements are, and according to them, the Australian species is not *N. collinus*; e.g., seta *na* 70  $\mu\text{m}$ , *nb* 52  $\mu\text{m}$ , both much longer than the same organ in *N. collinus*.

What I have here called *collinus* differs from the other arctic form with the forked cheliceral seta, *N. gilli*, n. sp., as follows: *N. collinus* has both branches of the cheliceral seta with rather short, uniform ciliations and seta *na* circa 40  $\mu\text{m}$ ; *N. gilli* has cheliceral seta with at least 1 arm secondarily branched, the ciliation of both arms long and irregular and seta *na* circa 50  $\mu\text{m}$ .

### ***Nanorchestes gilli* Strandtmann, new species**

Fig. 8–14

*Diagnosis.* Naso cleft. *Na* 50, *nb* 40 and slender. Cheliceral seta forked, the arms unequal and secondarily branched.

A medium-large species, 220–270 long, including chelicera. *Dorsum.* Seta *na* circa 50, with short, close cilia on apical  $\frac{1}{2}$  to  $\frac{1}{3}$ . Sensillum *nb* 40, slender, with sparse, moderately long, branched cilia. Seta *nm* 12–15, *nr* 18–25 with *nm* broader than *nr*. Distance between bases of *na* 2 $\times$  that of distance between *na* and *nb* (about 18 and 9). Naso divided into 2 large wings, 1 over each *na/nf* complex. *Gnathosoma.* Cheliceral seta forked, with 1 arm longer, about 25/18. One arm, and sometimes both, secondarily forked. Cheliceral shears short and heavy. Basal palp coxal seta (*pcs*2) not forked. Rutella 2-tined. *Legs.* Sensory line of tarsus II moderately enlarged apically. A small famulus on tarsi I and II. *Leg chaetotaxy.* I, 18-6-5-4+2; II, 11-5-3-3; III, 8-3-3-3; IV, 11-3-3-1+1.

*Holotype* ♀, ALASKA: Barrow, shores of Lake Ikroavik, 71°17'N–156°47'W, from moss and lichens, 21.VI.1967, R.W. Strandtmann (BISHOP 12,379). On the same slide with the holotype are a ♂ and a ♀ of the same species; the one with both legs I and II and 1 leg III fully extended is the holotype. *Paratypes.* 18♂, ♀, TN, as follows. ALASKA: 1♂, 6♀, 2TN, Barrow, 11–22.VI.1967, R.W. Strandtmann; 3♂, 4♀, 2TN, Wainwright, 70°38'N–160°01'W, 29.VI.1968 to 2.VII.1968, R.W. Strandtmann. All extracted from tundra samples by berlese funnel.

*Remarks.* *N. gilli* differs from *N. collinus* by the longer seta *na* and the different structure and form of the cheliceral seta. The arrangement of the serpentine lines on tarsus I seems to differ also, but it is difficult to decipher these lines unless the tarsus is perfectly aligned and well cleared.

The species is named for Dave Gill of the National Museums of Canada, Ottawa, who is doing such fine work on the lemmings of Bathurst I, Northwest Territories, Canada.

### ***Nanorchestes jodiae* Strandtmann, new species**

Fig. 15–24

*Diagnosis.* Naso entire, more or less emarginate. Cheliceral seta not forked. Femur I with 5 setae.

Length, 210–290. *Dorsum.* Naso entire, truncate or slightly emarginate. Seta *na* about 45, with close, short cilia. Sensillum *nb* averages 45, straight, about as thick as *na* with long, branched cilia. A striated, cuticular flap at the base of *nb*. Setae *nm* 12, *nr* 24, *ne* 9. Dorsal body setae branched treelike, 5–7 long. *Gnathosoma.* Cheliceral seta not forked, the single arm about

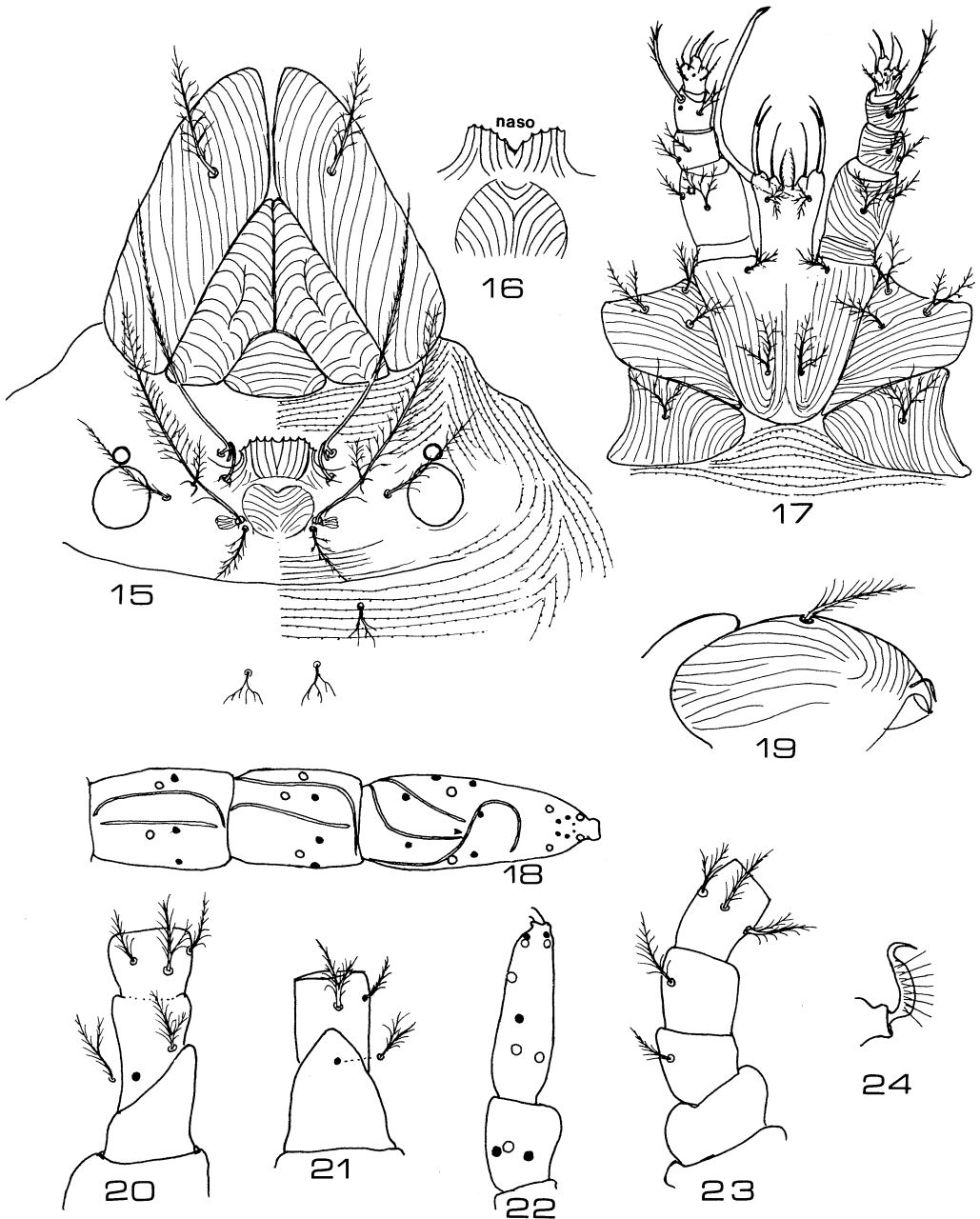


FIG. 15-24. *Nanorchestes jodiae*: 15, prodorsum; 16, naso, showing variant shape; 17, gnathosoma and coxae I and II, ventral view; 18, leg I, dorsal view (setae omitted); 19, chelicera, lateral view; 20, trochanter and femur I, showing partial division of femur; 21, trochanter and femur II; 22, tibia and tarsus III, lateral view (setae omitted); 23, leg IV showing apical  $\frac{1}{2}$  of trochanter, basi- and telopodite, genu; 24, tarsal clawlike empodium of legs.

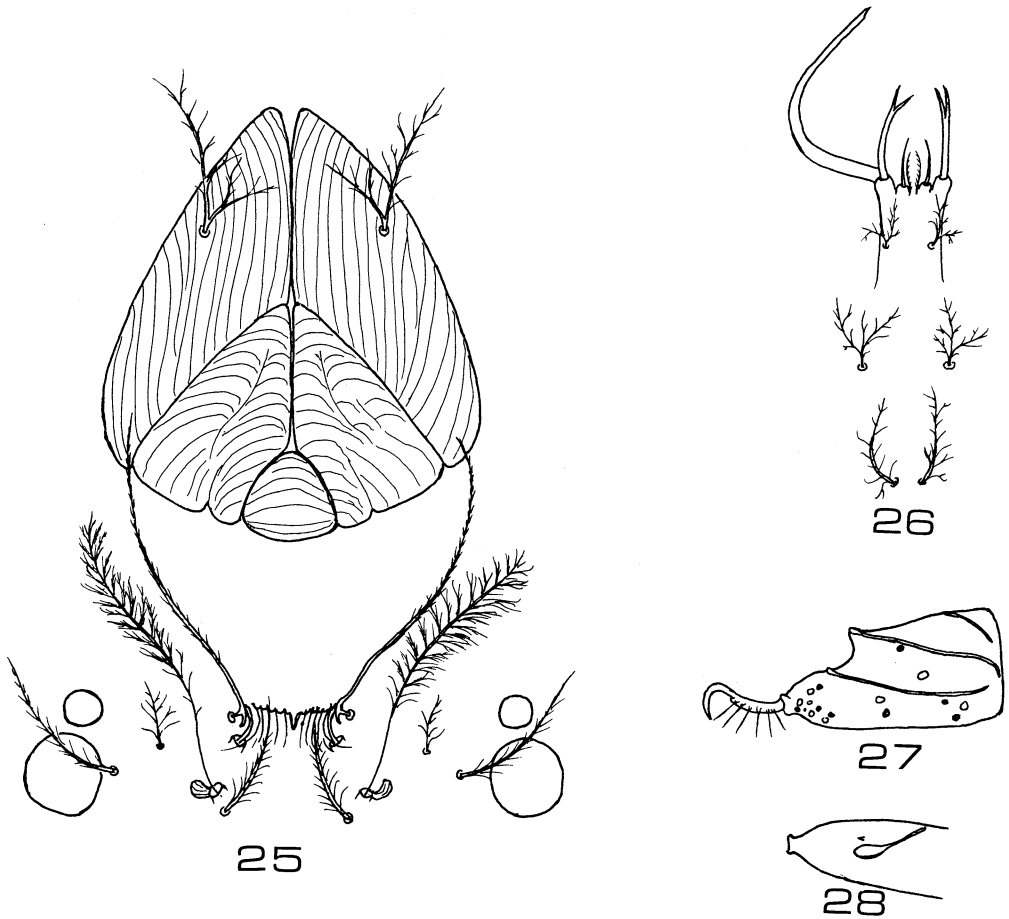


FIG. 25–28. *Nanorchestes llanoi*: **25**, sensory setae and ocelli of prodorsum and dorsal view of the chelicerae and epistome; **26**, ventral view of hypostomal region, showing labrum, rutellae, inner and outer adoral setae, hypostomal setae, and 1st and 2nd palp-coxal setae; **27**, tarsus I, lateral view with setae omitted; **28**, tarsus II, dorsal view, showing only the famulus and sensory line (setae omitted).

25, with fairly uniform, moderately long, branched cilia. Basal coxal seta (*pcs*2) furcate, with sparse, long, branched cilia. *Legs*. Relatively long and slender. Tarsus I more than 2× as long as broad. The sensory line of tarsus II moderately enlarged apically. Empodial claws with 7–8 rays each side. Femur I with only 5 setae (3+2). *Leg chaetotaxy*. I, 18-6-5-3+2; II, 11-5-4-3; III, 8-3-3-3; IV, 11-3-3-1+1.

*Holotype* ♀, ALASKA: Umiat, on the Colville Riv, 69°22'N–158°02'W, 2.VII.1967, R.W. Strandtmann (BISHOP 12,380). Mounted on the same slide with the holotype are a ♂ and a ♀ paratype; the holotype is a dorsoventral mount, 290 long, and designated as “a” on the slide. *Paratypes*. ALASKA: 1♂, 1♀, 1 slide, Anaktuvuk Pass, Brooks Range, 68°30'N–152°30'W, VI.1968, Don Pittard.

*Comments.* Two ♀ specimens collected at Umiat, Alaska on 30.VI.1967 by R.W. Strandtmann are smaller (180) than the specimens in the type-series and have the naso deeply emarginate (Fig. 16). The sensory setae are correspondingly shorter than in the type-series but otherwise there are no differences.

The species is named for Jody Peebles Eimers, an enthusiastic naturalist, who has collected many fine arctic tundra mites.

### **Nanorchestes llanoi** Strandtmann, new species

Fig. 25–28

*Diagnosis.* Naso entire, emarginate. Cheliceral seta with 2 unequal arms. Sensillum *nb* with a dense brush of long, branched cilia.

Length, ♂ 245, ♀ 255, deutonymph 170, protonymph 150. *Dorsum.* Naso entire, anterior margin truncate or slightly emarginate. Seta *na* 30, with short, appressed cilia. Sensillum *nb* almost as thick-stemmed as *na*, the apical  $\frac{2}{3}$  to  $\frac{3}{4}$  brushlike, with long, branched cilia. A flap of cuticle at base of *nb*. Seta *nm* 10, much heavier than *nr*, which is 16 long; *ne* 7.5. *Gnathosoma.* Cheliceral seta furcate, the longer arm 17, the shorter 10, both arms with branched cilia of uneven lengths. Cheliceral shears short, heavy. Basal palp coxal seta (*pcs2*) nonfurcate. Rutellum 2-tined. *Legs.* Moderately thick, moderately short. Empodial claw with 6–7 rays each side. Sensory line of tarsus II noticeably swollen apically. *Leg chaetotaxy.* I, 17(?)–6–5–4+2; II, 11–5–4–3; III, 8–3–3–3; IV, 11–3–3–1+1.

*Deutonymph.* 170. *Na* 25, *nb* 25, *nm* 9, *nr* 14, *ne* 6. Genital covers each with 4 setae. *Leg chaetotaxy.* I, 16(?)–6–5–4+2; II, 11–5–4–3; III, 8–3–3–3; IV, 11–3–3–1+1.

*Protonymph.* 150. *Na* 24, *nb* 20, *nr* 13. Cheliceral seta 12/7. Genitalia with 1 pair of setae and 1 pair of genital knobs. *Leg chaetotaxy.* II, 11–5–4–3; III, 8–3–3–3; IV, 7–3–1–0. (Leg I obscured.)

*Holotype* ♀, ALASKA: Barrow, 1.6 km E of Arctic Research Laboratory, ex dry moss & yellow lichens, 13.VI.1967, R.W. Strandtmann (BISHOP 12,381). *Paratypes.* ALASKA: 5♂, 1♀, same data as holotype; 3♂, Lake Ikroavik, 14.5 km S of Barrow, ex grass turf, 21.VI.1967, R.W. Strandtmann; 1DN, 1PN, Barrow, Family Lagoon, 7.VII.1967, R.W. Strandtmann.

The species is named in honor of Dr George Llano, formerly of the National Science Foundation, who has done so much for polar biology.

*Acknowledgments.* The following individuals made it possible for me to make trips to the Arctic tundra, and their help is deeply appreciated: J. Linsley Gressitt of the Bishop Museum, Honolulu, Hawaii, who enabled me to get to Point Barrow, Alaska; Fred Roots of the Polar Continental Shelf Project, Ottawa, who provided access to Tuktoyaktuk, NWT; Stewart McDonald, National Museums of Canada, Ottawa, who invited me to the High Arctic Research Station on Bathurst I, NWT; and J. Knox Jones, Vice-President for Research, Texas Tech University, Lubbock, Texas for funds to defray most of my travel costs. Many other individuals helped to make this study pleasant and successful. Among them, I wish especially to mention Richard Hill, Director, and John Ostrick, Assistant Director of the Canadian Research Lab, Inuvik, NWT; Frank Hunt, P.C.S.P. Manager at Tuk; and Fred Alt, P.C.S.P. manager at Resolute Bay. These individuals graciously provided meals, lodging and transportation for me while in Canada.

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## NOTE TO PROSPECTIVE AUTHORS

While the emphasis of *Pacific Insects* is on the Pacific Basin and western source areas, we also have published and will continue to consider papers on arthropods from other parts of the world.