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**NEOEPICRIUS, GEN. N., FROM WESTERN NORTH AMERICA (ACARI: MESOSTIGMATA: EPICRIIIDAE)**

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(Accepted March 2004)

**INTRODUCTION**

Previous knowledge of the family Epicriidae is summarized by **Evans (1955)**, **Athias-Henriot (1961)**, **Bregetova (1977)** and **Karg (1993)**. The new genus described here is apparently confined to western North America and was first illustrated by **Krantz (1970, Pl. 19)**. In the generic description, uniquely apomorphic characters are indicated with an asterisk (*). Types depository: Centre for Land and Biological Resources Research (CLBRR) and Ohio State University Acarology Laboratory (OSUAL). The system of sigla for designating dermal glands and lyrifissures is based on **Johnston & Moraza 1991**.

**Neoepicrius new genus**

(Figs. 4-7)

**TYPE SPECIES: Neoepicrius krantzi sp. n.**

Genus based on adult female and male representing four species.

**Diagnosis:** Chelicera (Fig. 9) with antiaxial hyaline apophysis; fixed digit with one paraxial, two antiaxial...
small teeth; movable digit with two teeth. Subcapitulum (Fig. 5) with hypostomal setae 2 greatly reduced*. Deutosternum with one row of denticles*. Palp (Figs. 7, 8) genu with all sinuate*; tibia with three pectinate setae*; tarsus with reduced chaetotaxy (14 setae); claw 2-tined*. Dorsal shield in females (Fig. 13, 23, 33, 38, 44) reduced, not covering entire dorsum*; lateropeltidial shields well developed*. Males (Figs. 27, 40) with entire and extensive dorsal shield; lateropeltidial shields separate or almost entirely fused with dorsal shield. Dorsal cuticular ornamentation with bi-, tri-, or tetrafurcate tubercles, forming dense polygonal network that extends to opisthonal soft cuticle. Dorsal chaetotaxy (Fig. 13) reduced: 16 pairs of heterogeneous setae* (j1, j3, j4, j5, j6, z1, z4, s4, s5, s6, Z3, Z4, Z5, S3, S4, S5). Podosnotum (Fig. 13) with three pairs of simple glands (gdj4, gdj6, gdz5) and five-six pairs of complex glands (gdj1, gdj3, gds4, gds5, gdz6, and gds6); gds6 complex (Figs. 13, 20) with one gland and two non-glandular organs or gland absent* (Fig. 25); gdz6 complex (Fig. 20) with one gland and one non-glandular organ* or complex absent* (Fig. 23). Podonotum with six-eight pairs of lyri fissures. Opisthonomotum (Fig. 13) with three pairs of glands* and three-four pairs of lyri fissures*. Lateropeltidial shields (Fig. 11) with one gland*, four lyri fissures. Sternapophysis (Fig. 21) with laciniae trifid, equal in length. Sternum (Fig. 14) with st2, st3 on sternal shield; st4 on soft cuticle; iv3 absent. Female genital shield (Figs. 14, 39) with parallel sides; genital setae g (= st5), iv5 on or off shield; Zv1 off shield*. Females (Fig. 14) with eight
pairs* and males (Fig. 15, 47) with four or six* pairs opisthogastric setae. Gland gv2 (Fig. 22) opening on protuberance (pustule)*. Female anal shield (Fig. 22) with three setae; gv3 anterior to anus*; gv4, ivp posterior to anus. Males with anal (Fig. 27) or ventrianal (Fig. 15) shield. Genu IV with eight setae (2-1/1, 3/0-1)*; tibia I with 12 setae (2-3/1, 3/1-2)*; tibia IV with nine setae (2-1/1, 2/1-2)*. Tarsus I (Fig. 45) with 45 setae; two long terminally spiculate setae (av3, pv4)*; md1, pv1 absent*. Pretarsus I entirely absent; without vestige*. Tarsus II-IV with mediadorsal lyri fissure free, not incorporated in circumpodal fissure (Fig. 12).

*Neoepicrius krantzi* sp. nov. (Figs. 1-22)

**Adult female** (based on eight specimens). Measurements (measurements are in micrometers as follows: mean ± standard error, range, n = sample size): Idiosoma length 582 ± 22, width 524-624, n=4.

**Gnathosoma** (Figs. 1-4). Fixed digit with one internal tooth, one paraxial tooth and a reduced antiaxial ventral apophysis. Pilus dentilus absent. Dorsal seta long, situated basal of antiaxial lyri fissure. Movable digit with two teeth. Arthrodial processes absent. Subcapitulum moderately sclerotized, with normal setation, and one row of denticles. Corniculi short, relatively narrow. Hypostomal processes (Fig. 4) large; hypostomal laciniae long, densely spiculate. Labrum (Fig. 1, 3) relatively short; lightly spiculate dorsally. Paralabra (Fig. 1, 2) long, densely barbed. Hypostomal gutter (Fig. 2) with transverse rows of minute denticles. Tectum strongly dentate.

**Idiosomal dorsum** (Fig. 13). Dorsal shield reduced in extent (length 458 ± 5, 439-458, n=8) and ornamented with trifurcate tubercles. Podonotal setae, except j1 and s6, very reduced in length; other dorsal setae long, stout, weakly barbed and with widened, spiculate tips; j6 = ca 1/6x s6, Z4 = ca 3x Z4-Z5, S3 = ca 1/2 x Z3, Z4 longer than Z3. Soft cuticle with
**Fig. 13.** N. krantzi, sp. n., female, idiosoma, dorsal. Scale = 100 μm.

**Fig. 14.** N. krantzi, sp. nov., female, idiosoma, ventral. Scale = 100 μm.
Figs. 15-22: *N. krantzii* sp. nov. 15. — Male, idiosoma, ventral. 16. — Female, coxa I, right, dorsal. 17. — Female, tibia I, right, dorsal. 18. — Female, femur II, right, dorsal. 19. — Female, tectum, dorsal. 20. — Female, setae 86, gland complex *gds*6, *gdz*6, dorsal. 21. — Female, sternapophysis, ventral. 22. — Female, anal sclerite, ventral. Scale (15) = 100 µm, (16) = 20 µm, (17, 18, 22) = 50 µm, (19) = 10 µm, (21) = 10 µm.
similar ornamentation with rounded tubercles but not extending to anal shield. Dorsal adenotaxy complete for the genus: *gds6* complex and *gdz6* complex present. Dorsal poroidotaxy lacks *idz6* and *ids1*. Sigillotaxy as in Fig. 13.

**Idiosomal venter** (Fig. 14). Sternapophysis (Fig. 21) with long base; laciniae short, trifid. Sternum weakly sclerotized; *st1* on jugulars, *st2* and *st3* on shield, *st4* on soft cuticle. Genital shield with *st5* (g) and *iv5*; four pairs of sigilla present. Opisthogaster with eight pairs of cuticular setae and four pairs of sigilla.

Legs. Chaetotaxy, adenotaxy and poroidotaxy normal for genus. Tarsus I length 169 ± 3, 158-169, n=8, with two long ventral setae with an aciculate head; tarsus II length 231 ± 3, 219-244, n=8; tarsus III length 215 ± 3, 201-230, n=8 and tarsus IV (Fig. 12) length 299 ± 5, 282-232, n=8. Tibia I length 347 ± 4, 334-347, n=8; tibia II length 86 ± 3, 78-93, n=8; tibia III length 84 ± 1, 81-87, n=8: tibia IV length 121 ± 4, 97-132, n=8; genu I length 150 ± 2, 142-150, n=8 and femur I length 324 ± 4, 310-340, n=8. Ratio of body length/tibia I = 1.6. Coxae I with eight anterolateral glands and eight posteroverentral glands.

**Adult male** (based on three specimens). Idiosoma length 475 ± 14, 455-503, n=3, width 354 ± 8, 345-360. Chelicerae, subcapitulum and palps similar to female.

**Idiosomal dorsum.** Dorsal shield well sclerotized and ornamented as female except posterolateral areas. Dorsal chaetotaxy, adenotaxy and poroidotaxy similar to female.

**Idiosomal venter** (Fig. 15). Sternigenital shield weakly ornamented; with four pairs of setae; *st1* on jugulars. Genital opening between coxae III; with two valves, the anterior larger and with two internal (eugenital) setae; *iv5* posterior to *st5* (g) seta. Endopodal III present. Opisthogaster with six pairs of setae: *Zv1* on soft cuticle. Ventrianal shield well sclerotized with three pairs of preanal setae; with ornamentation similar to dorsal shield; *Jv5* on dorsal shield.

Legs chaetotaxy, adenotaxy, poroidotaxy similar to female. Tarsus I length 155 ± 1, 153-157, n=3; tarsus II length 202; tarsus III length 186 ± 2, 182-189, n=3; tarsus IV length 241 ± 23, 195-265, n=3; tibia I length 292 ± 4, 284-297, n=3; tibia II length 77 ± 1, 75-79, n=3; tibia III length 77 ± 3, 72-81, n=3; tibia IV length 109 ± 1, 108-111, n=3; genu I length 131 ± 2, 129-134, n=3; and femur I length 275 ± 2, 272-279, n=3.

**Types.** Holotype, adult female, The Ohio State University, OSUAL. Type locality. OREGON, about 5 miles NW Corvallis, McDonald State Forest, Benton Co., from litter at base of dead tree, 31. III. 1982, D. E. Johnston & W. C. Welbourn colls. Para-types: OSUAL, two males at same locality and date; five females from mixed litter at same locality, 3. IV. 1982, same colls.; two females and one male from oak litter, 3. IV. 1982, at same locality and same colls.

**Etymology.** This species is named for Prof. G. W. Krantz, Oregon State University, Corvallis, who first illustrated a representative of *Neoepicrius* (Krantz, 1970, as *Epicrius*) and who generously provided laboratory facilities for W. C. Welbourn and the junior author during a field trip to Oregon in 1982.

**Neoepicrius californicus** sp. nov. (Figs. 23-32)

**Adult female** (based on 13 specimens). Idiosoma length 467 ± 12, 419-499, n=6.

**Gnathosoma.** Chelicerae normal for the genus but with the antiaxial ventral apophysis strongly developed. Hypostomal seta 2 reduced, *hyp 3* is 2x *hyp 1*, and cs 3/4x *hyp 3* (Fig. 5). Tectum (Fig. 29) triangular and strongly dentate.

**Idiosomal dorsum** (Figs. 23-25). Dorsal shield length 346 ± 7, 310-375, n=8; ornamented with rounded tubercules. Soft cuticle of dorsum with weak ornamentation that extends to opisthogastric region. Podonotal setae *j3*, *j4*, *j5* and *z1* reduced in length, other setae long, heterogeneous in length (*s4* somewhat shorter than *s5*, *j6 = s5*, *j6 = 0. 7x *s6*, *Z4* longer than *Z3*, *Z4* = 3x *Z4-Z5*, *S3* = 0. 7x *Z3*, *S3 = s6*); weakly barbed and with spiculate forked tips. Dorsal adenotaxy, poroidotaxy and sigillotaxy as figured; *gds6* complex with the gland missing; *gdz6* complex absent.

Figs 26-32: *N. californicus* sp. nov. 26. — Male, idiosoma, ventral. 27. — Male, idiosoma, dorsal. 28. — Female, idiosoma, ventral. 29. — Female, tectum, dorsal. 30. — Male, tectum, dorsal. 31. — Deutonymph, coxa I, left, ventral. 32. — Female, anal sclerite, ventral. Scale (26–28) = 100 µm, (29–30) = 10 µm, (31) = 25 µm, (32) = 50 µm.
Idiosomal venter (Fig. 28). Venter normal; with metapodal shields absent or poorly sclerotized. Opisthogastric ornamented with rounded tubercles and with eight pairs of smooth setae. Anal shield normal (Fig. 22).

Legs. Chaetotaxy, adenotaxy and poroidotaxy normal for genus. Tarsus I (Fig. 6) normal, length 133, 3 ± 1, 7, 127-189, 8; tarsus II length 182 ± 2, 175-190, n=8; tarsus III length 170 ± 2, 160-176, n=8; tarsus IV length 241 ± 3, 232-250, n=8; tibia I length 234 ± 3, 222-243; tibia II length 72 ± 1, 68-77, n=8; tibia III length 70 ± 2, 62-75, n=8; tibia IV length 100 ± 1, 95-106, n=8; genu I length 102 ± 1, 99-106, n=8 and femur I length 230 ± 2.4, 221-239, n=8. Ratio of body length/tibia I=1.9. Coxa I with six anteroventral glands and four posteroventral glands.

Adult male (based on two specimens). Idiosoma length 374, 389; width 280, 300.

Gnathosoma. Chelicerae, subcapitulum and palps similar to female.

Idiosomal dorsum (Fig. 27). Dorsal shield well sclerotized except in two posterolateral areas where the soft cuticle is ornamented. Dorsal chaetotaxy, adenotaxy and poroidotaxy similar to female.

Idiosomal venter (Fig. 26). Sterngenital shield finely ornamented, bearing four pairs of setae. Genital opening normal. Opisthogaster with four pairs of ventral setae on the ornamented cuticle. Anal shield similar to female.

Legs. Similar to female. Tarsus I length 111, 114; tarsus II length 156, 161; tarsus III length 146, 147; tarsus IV length 208, 209; tibia I length 192, 194; tibia II length 64, 66; tibia III length 56, 59; tibia IV length 85 ± 3, 82-87, n=2; genua I length 86, 87 and femur I length 202, 207.


Neoepicrius intermedius sp. nov.
(Figs. 33-37)

Adult female (based on two specimens). Idiosoma length 505, width 360.

Gnathosoma. Chelicerae (Fig. 36), palps and subcapitulum similar to N. californicus except hyp 2 almost as long as hyp 1 (Fig. 34). Tectum strongly dentate.

Idiosomal dorsum (Fig. 33). Dorsal shield length 390; ornamented with bi- and trifurcate tubercles; soft cuticle ornamented with smaller, rounded tubercles. Dorsal seta z1 very reduced, almost vestigial; j3, j4 and j5 very short; s4 = 2 1/2x z4, s4 = 1/2x s5, s5 = j6, s6 = 2 1/2x j6. Posterior setae long, weakly barbed, with forked tips. Dorsal adenotaxy, poroidotaxy as in Fig. 33; gds6 complex with gland absent; gdz6 complex present.

Idiosomal venter (Fig. 37). Similar to N. californicus, opisthogastic cuticle ornamented.


Male unknown.

Types. Holotype, adult female. CLBRR. Type locality, BRITISH COLUMBIA, Shuswap R., 1 mi. N Sugar Lake, from cedar litter, 23 VII. 1966, E. E. Lindquist coll. Paratypes, CLBRR, one female at same locality and date.

Neoepicrius titanuss p. nov.
(Figs. 38, 39)

Adult female (based on one specimen). Idiosoma length 755.

Gnathosoma. Chelicerae, palps, subcapitulum normal for genus.
N. intermedius sp. nov., female. 33. — Idiosoma, dorsal. 34. — Subcapitulum, ventral. 35. — Tectum, dorsal. 36. — Chelicera, paraxial. 37. — Idiosoma, ventral. Scale (33, 37) = 100 µm, (34, 36) = 25 µm, (35) = 10 µm.
**Idiosomal dorsum** (Fig. 38). Dorsal shield length 478; lateropeltidial shields ornamented with bi- and trifurcate tubercles; soft cuticle with rounded weak tubercles, extending to anal shield. Dorsal chaetotaxy normal, setae \( j_3, j_4, z_1 \) and \( z_4 \) very reduced in length; \( j_6, s_4 \) and \( s_5 \) short; \( S \) series of medium size and \( Z \) series relatively long; \( j_6 = 1/5x_s_6, S_3 = 1/4x Z_3, s_6 = ca \ 0.6x Z_3, Z_4 = ca \ 1.4x Z_4-Z_5 \). Longer setae stout, weakly barbed, with wide spiculate tips. Dorsal adnotaxy, poroidotaxy and sigillotaxy as in Fig. 38; \( gds_6 \) complex and \( gdS_6 \) complex present and complete; lyrifissures \( idz_6 \) and \( idS_3 \) present.

**Idiosomal venter** (Fig. 39). Sternal region normal, sternal setae simple. Lyrifissure \( iv5 \) off genital shield. Opisthogaster with eight ventral setae on unornamented soft cuticle. Anal shield normal, fused with dorsal shield.

**Legs.** Normal for genus. Tarsus I length 185, tarsus II length 251, tarsus III length 242, tarsus IV length 336, tibia I length 415, genu I length 170, and femur I length 382. Ratio of body length/tibia I = 1.8. Coxa I with seven anterolateral glands and nine posteroventral glands.

**Types.** Holotype, adult female. CLBRR. Type locality, BRITISH COLUMBIA, Vancouver Is., Cowichan Lk. Exp. Sta., Mesachie Lk., from mixed Doug. fir-red alder-fern litter, 24. VII. 1975, E. E. Lindquist coll.

**Neoepicrius orphanus** sp. nov.  
(Figs. 44-47)

**ADULT FEMALE** (based on one specimen). Idiosoma length 500, dorsal shield length 411.
Gnathosoma. Chelicerae, palps, subcapitulum normal for genus. Tectum as in Fig. 45.

Idiosomal dorsum (Fig. 44). Dorsal shield ornamented with bi- and trifurcate tubercles; soft cuticle with rounded smaller tubercles. Dorsal setae j3, j4, j5, z1 and s4 very reduced; j6, s4 and s5 short; other dorsal setae long or of medium size; j6 = ca 0. 16x s6, S3 = 1/3x Z3, Z3 slightly longer than Z4, Z4 = 2x Z4-Z5. Dorsal adenotaxy and poridotaxy as in Fig. 44. gds6 complex with gland absent; gdz6 complex present.

Idiosomal venter (Fig. 47). Normal, with sternal setae simple and relatively long. Genital shield with iv5 apparently absent. Opisthogaster with eight pairs of setae. Anal shield normal. 


Key to species of Neoepicrius (based on adult females)

1. — Complex gds6 with one gland and two non-glandular organs; gdz6 present (one gland and one non-glandular structure) (Figs. 13, 20, 38). Seta j6 = ca 0. 16x s6 ...... 2
   — Complex gdz6 with gland absent; gdz6 complex present or absent............................................. 3
2. — Lyrii; idS1 present; s6 = 0. 57 Z3; Z4 = 1 1/3 Z4-Z5; S3 = 1/4x Z3; (Fig. 38). Well sclerotized mites; ornamentation of the soft opisthonotal cuticle extends to anal shield. Lyrii iv5 off genital shield (Fig. 39). Coxa I with seven anterolateral and 9 posteroventral glands. N. tita
3. — Gland complex gdz6 present (Figs 33, 44). 4
   — Gland complex gdz6 absent (Fig. 23); j6, s4 and s5 long: j6=s5; s4 slightly shorter; j6 = 0. 7x s6; s6 = 0. 7x Z3; Z4 = 3x Z4-Z5. Coxa I with six anterolateral and four posteroventral glands...................................... N. krantzi
4. — Dorsal setae (Fig. 33) j6, s4 and s5 medium size, s6 long, other podonotal setae short; j6 = 0. 4x s6; s6 = 0. 7x Z3; Z4 = 2x Z4-Z5; S3 = 1/2x Z3. ......... N. intermedius
   — Dorsal setae (Figs. 44, 46) j6, s4 and s5 reduced in length; j6 = 0. 2x s6; s6 = 1/2x Z3; Z4 = 2x Z4-Z5; S3 = 1/3x Z3 ............................................. N. orphana

Discussion

Among the apomorphies that characterize Neoepicrius are several features that can be attributed to paedomorphism. These characters include the dorsal sclerotization and chaetotaxy, the leg setae, and the coxal glands.

The sclerotization of the dorsum in adult females of the new genus is reduced in extent; the dorsal shield does not cover the entire dorsum and is not fused entirely with the lateropeltidial shields. This-
Figs. 40-47. — *Neoepicrius* sp., 44-47. *N. orphanus* sp. nov. 40. — Male, idiosoma, dorsal. 41. — Male, tectum, dorsal. 42. — Male, setae $j_3$, $z_1$. 43. — Male, idiosoma, ventral. 44. — Female, idiosoma, dorsal. 45. — Female, tectum, dorsal. 46. — Female, setae $j_6$, $z_1$. 47. — Female, idiosoma, ventral. Scale = 100 µm, (41, 45) = 10 µm.
condition is similar to that of the larva and protonymph (where known) of the other genera of Epicriidae. Likewise, the absence of dorsal setae \( z6 \) (deutonymphal), the J series \( (J3-J5) \) protonymphal in \textit{Epicrius}, larval in other Mesostigmata), and \( Z3 \) is paedomorphic. Ventral setae \( av2 \) and \( pv2 \) (both deutonymphal) on tibia I are absent. In the complex chaetotaxy of tarsus I the seta \( ma1 \) is absent in \textit{Neoepicrius}. There are six anterolateral glands on coxa I in \textit{N. californicus} and this is the same number as occurs in the deutonymph. Apparently, the usual condition is that the number of anterolateral glands in adults is reduced from the number in the deutonymph (see \textit{Fain}, 1966, \textit{Dermanyssus}). In \textit{Epicrius}, the deutonymphal number is seven and that of the adult is four.

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**References**


