

**DESCRIPTION OF *SCAPULEREMAEUS KOBAUENSIS* GEN.NOV., SP.NOV.
(ACARI: ORIBATIDA: CYMBAEREMAEIDAE) FROM WESTERN CANADA**

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Abstract

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Adults of *Scapuleremaeus kobauensis* gen.nov., sp.nov. are described from British Columbia. The systematic relationship of this genus to other genera in the Cymbaeremaeidae is discussed.

Résumé

Les adultes de *Scapuleremaeus kobauensis* gen.nov., sp.nov. de la Colombie britannique sont décrits. La relation systématique entre ce genre et les autres genres de Cymbaeremaeidae est discutée.

INTRODUCTION

Kobau Mountain, Forest Service Recreation Site (49°07'N, 119°40'W), in southern British Columbia is one of the most biotically diverse areas in the southern Okanagan Valley. The mountain rises to 1862 m from the surrounding grasslands. At low elevations (to 1000 m), the flora is that of the Ponderosa Pine – Bunchgrass zone of Krajina (1965), with *Agropyron spicatum* (Pursh) Scribn. and Smith, *Artemesia tridentata* Nutt., and *Purshia tridentata* (Pursh) DC. common, and weedy species, such as *Bromus tectorum* L. and *Centaurea* spp., present in heavily grazed areas (Nicholson *et al.* 1982). At elevations above 1000 m the interior Douglas Fir zone ranges to about 1350 m, where the Engelmann Spruce – Subalpine Fir zone begins (see Cannings *et al.* 1987, for a brief description and excellent photographs of this type of habitat). At higher elevations the forest zone is interspersed with an unusual mixed association of subalpine meadow and grassland dominated by *Artemesia tridentata*. At the summit of Kobau Mountain is a rocky knoll with areas of broken rock. The dry south-facing aspect of this outcrop has a complex oribatid fauna including species usually found in dry subalpine habitats together with those typically living in grassland. In addition to species of dry grasslands, such as *Exochopeus eremitus* Woolley and Higgins, *Ametroproctus canningsi* Behan-Pelletier, and *Passalozetes* sp., and subalpine species such as *Ametroproctus oresbios* Higgins and Woolley and *A. reticulatus* (Aoki and Fujikawa), I have discovered representatives of a new genus, closely related to *Ametroproctus*, which is described below.

Specific terminology used follows that of F. Grandjean (see Travé and Vachon [1975] for many references). Definitions of unfamiliar terms can be found in Hammen (1980). The following conventions of measurement and description are used in this study.

Body length: measured from tip of rostrum to posterior tip of notogaster on specimens from alcohol.

Notogastral width: refers to maximum notogastral width.

Notogastral length to width ratio: measured when viewed perpendicular to dorso-sejugal scissure.

Leg setal formula: famulus is included in tarsal setal count on leg I and solenidial counts are in parentheses.

***SCAPULEREMAEUS* GEN.NOV.**

(Figs. 1–8)

Type-species: *Scapuleremaeus kobauensis* sp.nov. Monobasic (described below).

DIAGNOSIS. Adults of this genus are unique among the Cymbaeremaeidae in having the following combination of character states: adults with well-developed lamellae and lamellar cusps; lamellar setae arising anteroventrally on cusps; notogaster with large pointed

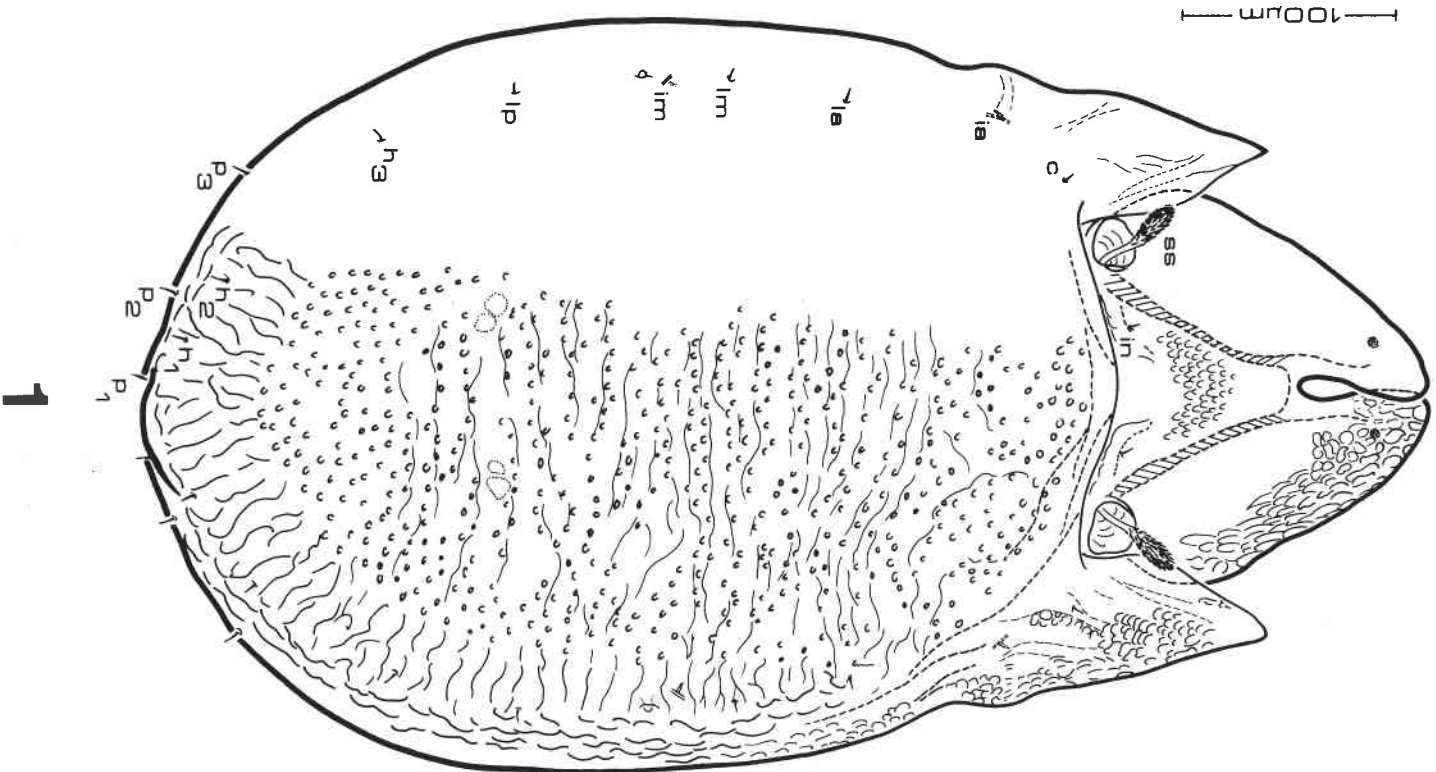
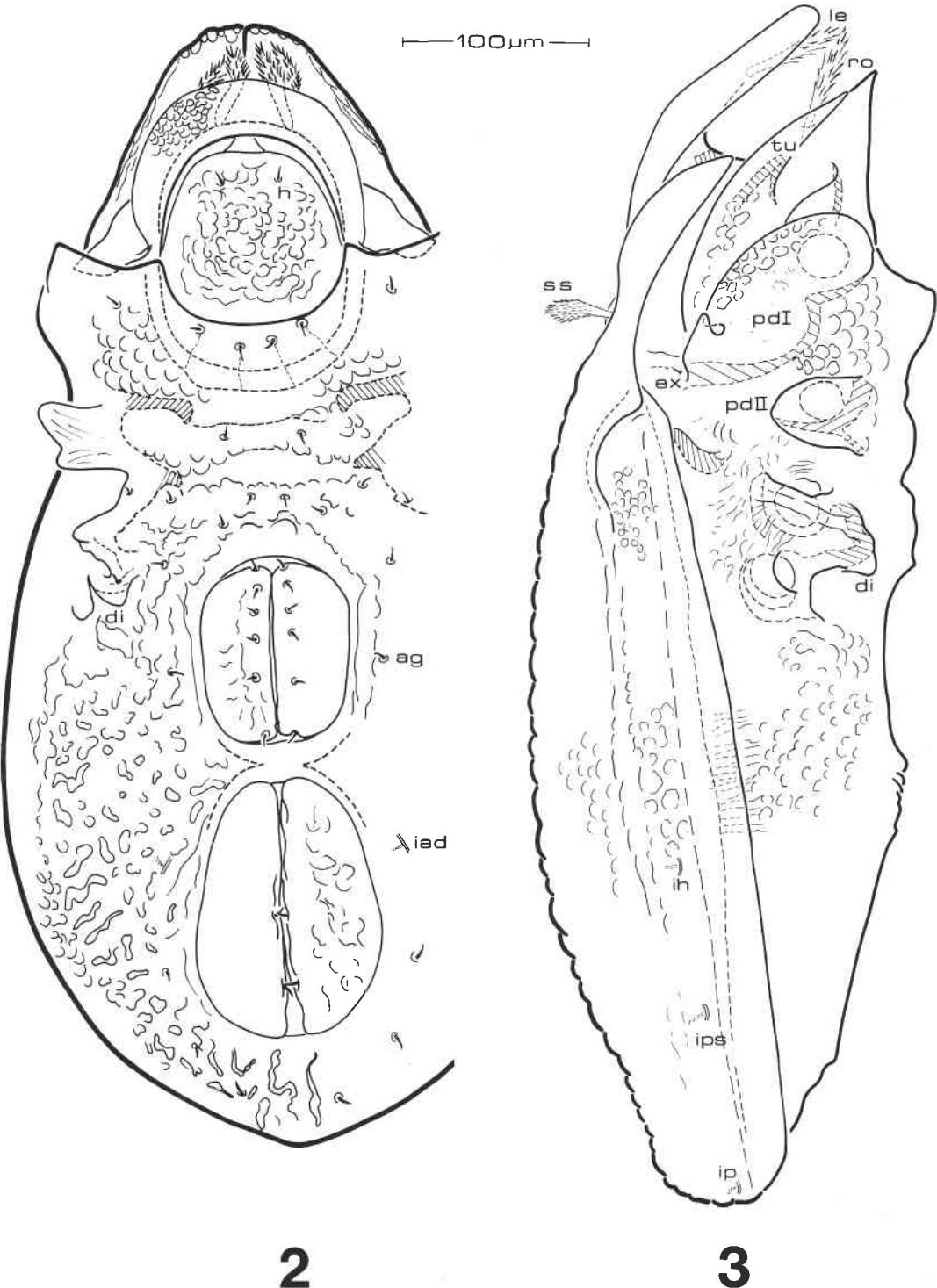


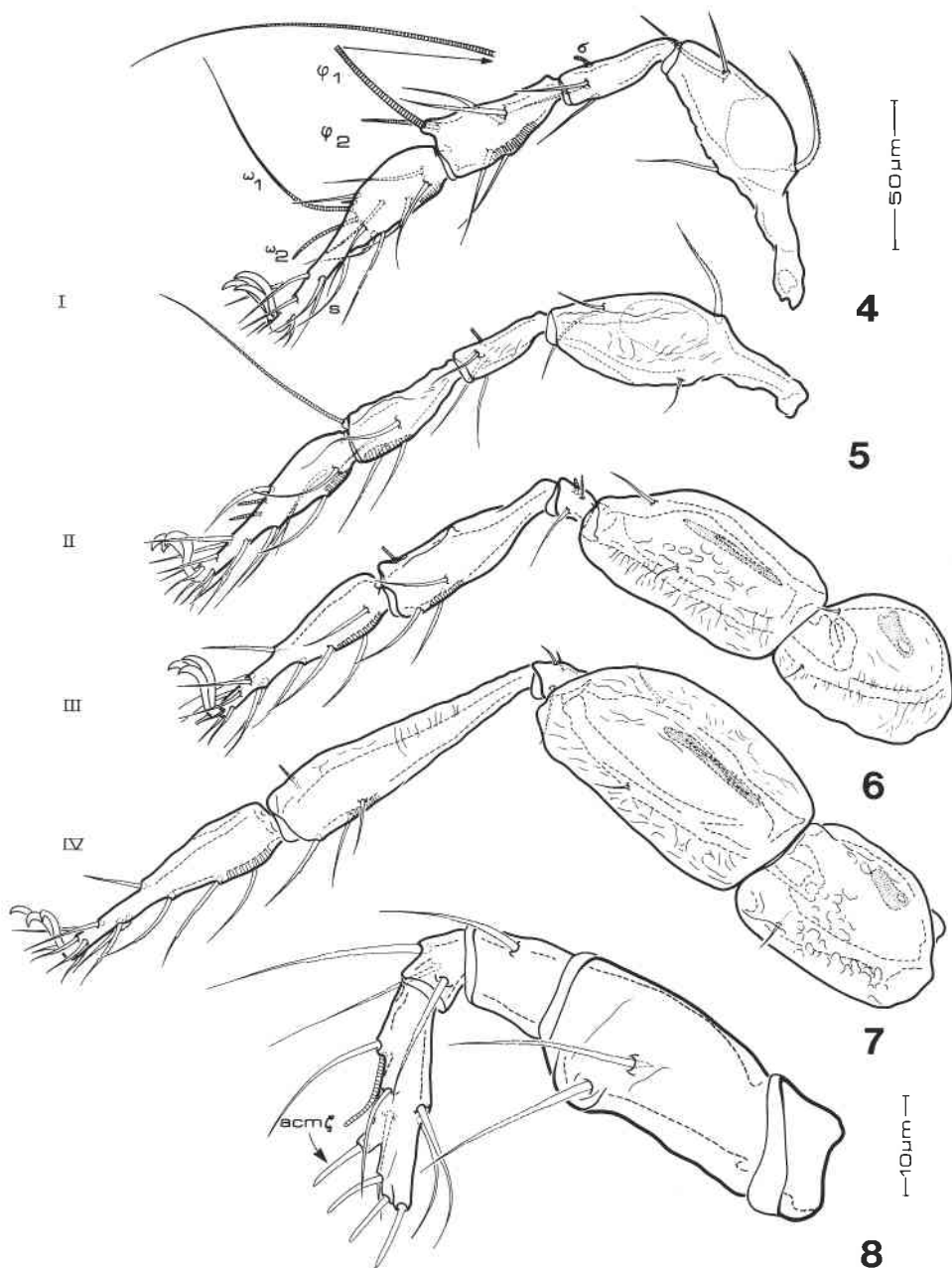
FIG. 1. *Scapuleremaeus kobuensis* gen.nov., sp.nov., adult female, idiosoma, dorsal aspect.



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FIGS. 2-3. *Scapuleremaeus kobauensis* gen.nov., sp.nov., adult female. 2, ventral aspect of body; 3, lateral aspect after removal of legs and infracapitulum.



FIGS. 4-8. *Scapuleremaeus kobauensis* gen.nov., sp.nov., adult female. 4-7, legs I-IV, antiaxial view: 4, leg I (trochanter removed); 5, leg II (trochanter removed); 6, leg III; 7, leg IV. 8, pedipalp, antiaxial view.

scapular processes; 10 pairs of notogastral setae, c_1 , c_3 , and d series absent; well-developed tutorium present, with cusp; genital and anal apertures close together; coxisternal setal formula 3-1-3-3; 6 pairs of genital setae; tibiae and tarsi I-IV and femora I, II with porose areas; trochanters and femora III, IV with sacculi.

DESCRIPTION. Adult. Brachypylinae oribatid mites with character states of the Cymbaeremaeidae (Behan-Pelletier 1989). Integument heavily sculptured; with layer of cerotegument covering all body surfaces. Lamellae wide, converging; lamellar cusps long, broad, separated by small translamella; lamellar setae (*le*) arising anteroventrally on lamellar cusps (Figs. 1, 3). Interlamellar setae (*in*) present (Fig. 1). Bothridium cup-shaped (Fig. 1). Sensillus (*ss*) profusely barbed, clavate (Fig. 1). Tutorium broad, lamelliform, with long, pointed cusp (Fig. 3). Pedotecta I and II (pdI, pdII) strongly developed; pedotectum I covering acetabulum I, extending dorsally to base of exobothridial seta (*ex*); pedotectum II triangular in lateral aspect (Fig. 3). Carina present anteriorly of acetabulum I, partially covered by pedotectum I (Fig. 3). Discidium strongly developed between acetabulum III, IV. Opening of acetabulum IV directed ventrad (Fig. 3). Notogaster longer than wide, with pair of large, long, pointed scapular processes (Figs. 1, 3). Ten pairs of notogastral setae present, *c*₁, *c*₃, and *d* series absent. Genital and anal plates closely adjacent (Fig. 2). Coxisternal setation 3-1-3-3. Six pairs of genital setae. Two pairs of anal setae arising along medial margin of anal plates. Aggenital setae arising laterad of genital plates (Fig. 2). Lyrifissure *iad* present. Palpal eupathidium *acm* on tubercle, solenidion arising slightly distad of seta *cm* (Fig. 8). Mentum with tectum (Fig. 2). Tibiae and tarsi I-IV and femora I and II with porose areas; trochanters and femora III and IV with sacculi. Setae *d* absent from all tibiae and genua I-III; *s* non-eupathidial on tarsus I; tarsi heterotridactylous.

REMARKS. 1. The development of large scapular (humeral) processes on the notogaster has been independently derived many times within families of the Brachypylina, e.g. Cepheidae, Eutegaeidae, Microzetidae, and Tenuialidae. The expression of scapular processes in *Scapuleremaeus* is unique among members of the Cymbaeremaeoidea, and the closely related superfamilies Ameronothroidea and Licneremaeoidea, and is considered apomorphic for this genus.

2. *Scapuleremaeus* is unique in the Cymbaeremaeoidea in expressing coxisternal setae 3*c* and 4*c*. However, these setae are present in adults of genera in the Licneremaeoidea and the majority of Brachypylina taxa, and, therefore, their presence in this genus is considered plesiomorphic.

3. Leg tracheal/secretory organs in the form of sacculi is an important apomorphy of the Cymbaeremaeidae, though independently derived in other Oribatida (Grandjean 1934, 1940; Piffi 1971; Behan-Pelletier 1989). In adults of any one species of *Ametropoctus* or *Cymbaeremaeus* these organs are either expressed as sacculi or porose areas on all leg segments. In *Scapuleremaeus kobauensis* both sacculi and porose areas are expressed, even on the same leg (Figs. 6, 7), as in *Scapheremaeus fimbriatus* (Michael) (Grandjean 1934). In other species of *Scapheremaeus*, however, only porose areas are expressed on the leg segments of the adult. This suggests that the particular arrangement of leg tracheal/secretory organs in *S. kobauensis* may prove not to be diagnostic at the generic level.

4. Within the Cymbaeremaeidae, *Scapuleremaeus* is considered most closely related to *Ametropoctus* on the basis of the following synapomorphies (Behan-Pelletier 1989): presence of well-developed lamellae and lamellar cusps; seta *le* arising anteroventrally on lamellar cusp; notogaster with 10 pairs of setae, lacking *c*₁, *c*₃, and *d* series; presence of tutorium; presence of setae *l'* and *v'* on tarsus I. *Scapuleremaeus* shares with *Ametropoctus* and *Cymbaeremaeus* the apomorphy of anal setae positioned medially on the anal plates. Unfortunately, despite repeated sampling, no immatures of this genus have been found and thus it is not known whether *Scapuleremaeus* shares with *Ametropoctus* and *Cymbaeremaeus* the apomorphy of presence of subunguinal pulvilli on the tarsi of immatures.

Members of *Scapuleremaeus* have greatest similarities with those of *Ametropoctus* (*Coropoculia*) in having (1) lamellar cusps approximately equal in length to the fixed

portion of the lamella, (2) a flattened notogaster, (3) pedotectum I extending to seta *ex*, and (4) the presence of 6 pairs of genital setae.

4. The prefix "*Scapul*" in the generic name is from the Latin and refers to the large scapular processes on the notogaster in this genus.

Scapuleremaeus kobauensis sp.nov.

(Figs. 1–8)

ADULT. Measurements. Mean length: females ($n = 2$) 628 μm (616, 640); male ($n = 1$) 560 μm . Mean notogastral width: females 354 μm (352, 356); male 336 μm .

Integument. All body surfaces with integument sculptured: reticulate on prodorsum, lamellae (other than lateral margins), on tutoria, pedotecta I, carinae anterior of acetabula I, and on scapular processes; tuberculate on lateral margins of notogaster, coxisterna, mental tectum; irregularly pitted on notogaster and ventral plate; striate on lateral margins of lamellae and ventral plate (Figs. 1–3). Irregular sculpturing on leg segments, particularly well developed on trochanters and femora III, IV (Figs. 4–7). Cerotegument covering all body surfaces, leg segments, and proximal portion of all setae; excrescences granular, 1–2 μm thick.

Prodorsum. Rostrum broadly rounded (Fig. 2). Rostral setae (*ro*) 52–56 μm long, with many long barbs, almost penicillate (2 rostral setae on one side in one specimen). Narrow lamella extending between setae *ro*. Anterior margin of lamellar cusp curved slightly ventrally; ratio of length of cusp to that of fixed portion of lamella about 1:1 when viewed in lateral aspect (Fig. 3). Seta *le* 48–55 μm long, the same shape as seta *ro* (Fig. 3). Exobothridial seta (*ex*) small, 4–6 μm long, smooth. Sensillus 48–54 μm long, head clavate and profusely barbed, stalk sparsely barbed.

Lateral aspect of podosoma. Tutorium about 130 μm long, lying parallel to dorsal contour of lamella in lateral aspect; tutorial cusp long, tapering to a point, extending anterior of insertion of seta *ro*; ratio of length of fused portion of tutorium to cusp about 1.2:1. Anterior margin of pedotectum I with incision about one-fifth of distance from dorsal insertion of pedotectum (Fig. 3). Pedotectum II covering acetabulum II. Discidium with posteriorly directed carina (Figs. 2, 3).

Notogaster. Length to width ratio about 1.35:1, subrectangular, slightly tapering posteriorly, flattened dorsally. Dorsosejugal scissure complete, slightly convex. Scapular process triangular, 92–132 μm long, 60–66 μm wide, with "ribs" of more heavily sclerotized integument (Fig. 1). Notogastral setae smooth, small, same shape as setae *in* and *ex*, 6–8 μm long. Lyrifissure *im* anterior of opisthosomal gland opening; *ia* ventrad of base of scapular process; *ip*, *ips*, *ih* only visible in lateral or ventral aspects (Figs. 1, 3).

Ventral region. Apodemes partially obscured by heavy sculpturing on coxisterna. All ventral setae smooth, short, same shape as notogastral setae, 3–6 μm long.

Gnathosoma. Normal for family. Tectum of mentum extending anterior of base of seta *a*. Seta *h* of mentum subequal in size and shape to interlamellar seta *in*. Setae on palpfemur on slight enlargement of the segment (Fig. 8). Solenidion lying closely appressed to tarsal surface between its insertion and tubercle bearing eupathidium *acm* (Fig. 8).

Legs. Setation (I–IV): trochanters, 1-1-2-1; femora, 4-4-2-2; genua, 3(1)-3(1)-2(1)-3; tibiae, 4(2)-4(1)-3(1)-3(1); tarsi, 20(2)-16(2)-15-12. Well-developed laminate carinae ventrally on trochanters and femora III, IV. Narrow carinae dorsally on tibiae II–IV and anteroventrally on femur II. Femora I, II and tibiae and tarsi I–IV with paraxial porose areas, positioned ventrally on tibiae and tarsi, and laterally on femora (Figs. 4–7). Trochanters and femora III, IV with sacculi positioned laterally or dorsolaterally (Figs. 6, 7). Solenidion σ on genua I–III, ϕ on tibiae III, IV, and ω on tarsus II, short, blunt, shorter than setae on these segments; setae (*p*) eupathidial on tarsus I. Relative leg lengths (I–IV) 1.00:0.90:1.11:1.30.

IMMATURES. Unknown.

MATERIAL EXAMINED. *Holotype*: adult female, CANADA: BRITISH COLUMBIA, Osoyoos, Kobau Mt., 1862 m, 11 July 1986 (V.M. Behan-Pelletier) from sifted litter under *Artemesia*, *Sedum*, *Penstamon*, *Juniperus*; deposited in the Canadian National Collection (CNC), Biosystematics Research Centre, Ottawa (Type No. 20349). *Paratypes*: 2 females, 1 male, with same data as holotype, except from soil and litter under *Sedum*, grasses, *Lewisia rediviva* Pursh, *Castilleja*. Paratypes deposited in the collections of R.A. Norton and the CNC.

REMARKS. 1. The presence of an incision on pedotectum I is shared with *Ametroproctus* (C.) *reticulatus* (Aoki and Fujikawa) and *A. (C.) canningsi* Behan-Pelletier (Behan-Pelletier 1987). Whether this character state is plesiomorphic or independently derived in both *Ametroproctus* and *Scapuleremaeus* is unclear.

2. The specific name "*kobauensis*" refers to the type locality of this species in southern British Columbia.

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