

Feather Mites of the Greater Sandhill Crane*

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ABSTRACT: New taxa are described from *Grus canadensis tabida*: *Brephosceles petersoni* sp. n. (Alloptidae); *Pseudogabucinia reticulata* sp. n. (Kramerellidae); *Geranolichus canadensis* sp. n., and *Gruolichus wodashae*, gen. et sp. n. (Pterolichidae). Observations on resource partitioning by these mites are given.

In his study on the feather mites of the African Gruiformes, Gaud (1968) noted that species of the genera *Brephosceles* Hull (Alloptidae), *Geranolichus* Gaud (Pterolichidae) and *Pseudogabucinia* Černý (Kramerellidae) created a distinct acarofauna for the crane family (Gruidae). Recent parasitological studies on the Greater Sandhill Crane (*Grus canadensis tabida*) in Wisconsin and Indiana have added for the first time information on the feather mites of cranes in the New World.

Observations by Windingstad and K. Wodas on mites in situ on Wild Sandhill Cranes captured with rocket nets indicate that there is a partitioning of the primaries by four species of feather mites. The most frequently encountered species, *Geranolichus canadensis*, sp. n., occurs on the ventral surface of the vane on both sides of the rachis near the feather apex. The second most frequent is *Gruolichus wodashae*, gen. et sp. n.; this species occurs along the rachis on both the dorsal and ventral surfaces. The rarer species, *Brephosceles petersoni*, sp. n., and *Pseudogabucinia reticulata*, sp. n., are to be found on the ventral surfaces of the vanes as indicated in Figure 1. As *P. reticulata* is rare, we have only limited observations on this species; however, when both *P. reticulata* and *G. canadensis* are on the same feather, they coexist with the latter species occupying more of the area.

ALLOPTIDAE

Brephosceles petersoni, sp. n.

(Figs. 2, 3)

This species is closely related to the African *Brephosceles geranoxenus* Peterson from *Balearica regulorum* (Bennet); the males of both species have

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coxal fields IV closed, hysterosomal lobes elongate, setae *sh* and *l 1* setiform and setae *d 4* and *pai* approximate. The males of the new species can be distinguished from *B. geranoxenus* by having setae *d 5* spiculiform rather than setiform and by the postlobar lamellae with smooth rather than dentate margins. The format of the description follows Peterson (1971). All measurements are in μm .

Male (holotype): Length, excluding gnathosoma and postlamellae, 501; width, 177. **Dorsal idiosoma:** Propodosomal shield 188 in length, 124 in width; without lacunae; without external vertical setae; distance between external scapular setae, 110. Scapular shields moderately developed. Setae *l 1* setiform, 16 in length, positioned on well-developed humeral shields; setae *sh* setiform, 24 in length, slightly posterior to setae *h*. Hysterosomal shield 206 in length, 108 in width; anterior margin concave. Hysterosomal lobes 163 in length; setae *d 3* positioned near cleft apex; setae *d 4* and *pai* approximate at posteromesal margins of lobes. Inter- and extralobar lamellae well developed; postlobar lamellae without dentations. All legs subequal. **Ventral idiosoma:** Epimerites I Y-shaped; surface fields moderately developed. Pre-genital apodeme small, free; coxal fields III, IV closed. Genital organ small, not extending to apices of genital arch; subgenital shield absent.

Female (paratype): Length, 486; width, 177. **Dorsal idiosoma:** Propodosomal shield 118 in length, 137 in width; without lacunae; without external vertical setae; distance between external scapular setae, 122. Setae *l 1* setiform, 14 in length, positioned on humeral shields; seta *sh* setiform, 18 in length, slightly posterior to setae *h*. Hysterosomal shield 337 in length, 108 in width; anterior margin straight; setae *d 3* and *d 4* in trapezoidal arrangement, rows separated by 86. Hysterosomal terminus distinctly bilobate; without terminal lamellae. **Ventral idiosoma:** Surface fields weakly developed. Preanal apodeme absent.

Type data: From *Grus canadensis tabida* (Peterson): δ holotype, 8 $\delta\delta$ paratypes, Colmstock Marsh, Marquette County, Wisconsin, August 21, 1977, R. M. Windingstad (UGA 9649); 1 δ , 1 φ , Mead Wildlife Area, Marathon County, Wisconsin, August 17, 1977, R. M. Windingstad. The holotype is deposited in the National Museum of Natural History; paratypes are deposited at the University of Georgia.

Remarks

The species is named for Paul C. Peterson, Youngstown State University, who was the original reviser of the genus *Brephosceles*.

KRAMERELLIDAE

***Pseudogabucinia reticulata*, sp. n.**
(Figs. 4–7)

These broad, quadrate mites are the only forms from *Grus* with legs III and IV of both sexes ventrally positioned. *Pseudogabucinia moucheti* Gaud, the only other species of this genus described from a crane, is similar, but both sexes have the dorsal shields smooth rather than reticulated.

Male (paratype): Length, including gnathosoma, 308; width, 200. **Dorsal idiosoma:** Propodosomal shield small, not extending to scapular setae; distance between external scapular setae, 61, between internal scapulars, 37; externals about two times longer than internals. Hysterosomal shield with faint reticulate pattern, with large unsclerotized supranal concavity; each triangular terminal lobe with 6 setae. **Ventral idiosoma:** Epimerites I not connected, short. Genital organ small, between coxae IV, flanked by genital disc. Adanal discs heavily sclerotized, each with large "tooth" on posterior margin.

Female (holotype): Length, including gnathosoma, 355; width, 224. **Dorsal idiosoma:** Propodosoma similar to male; distance between external scapular setae, 71; between internal scapulars, 41. Hysterosomal shield with reticulate pattern; posterior margin with two large indentations. **Ventral idiosoma:** Pregenital apodeme as smooth arch, positioned at ends of short, unconnected epimerites I. Genital discs between small setae *c* 1, *c* 2; all flanking posterior terminal end of long oviporus. Other structures as figured.

Type data: From *Grus canadensis tabida*: ♀ holotype, 4 ♂♂, 11 ♀♀ paratypes, Jasper-Pulaski Wildlife Refuge, Jasper County, Indiana, October 19, 1977, R. M. Windingstad (UGA 9677); 1 ♀, same data as holotype except October 15, 1977 (UGA 9679); 2 ♀♀, same data as holotype except October 27, 1977 (RMW 613E). The holotype and paratypes are deposited in the National Museum of Natural History; paratypes are deposited at the University of Georgia and the collection of J. Gaud, Nice, France.

PTEROLICHIDAE

Considering only the mites on the sandhill crane, the two taxa assigned to the Pterolichidae have males with the terminal margins of the idiosomata either rounded or with a very indistinct indentation. The females are also rounded posteriorly and all have the anterior epimerites connected into a V or a Y. The two pterolichids are easily distinguished as *Geranolichus canadensis*, sp. n., has two internal vertical setae and setae *kT* on tibiae IV; the second new form, *Gruolichus wodashae*, gen. et sp. n., has one vertical seta and lacks *kT* IV.

***Geranolichus canadensis*, sp. n.**
(Figs. 8–11)

Three other species have been assigned to *Geranolichus* Gaud, two from species of *Balearica* from

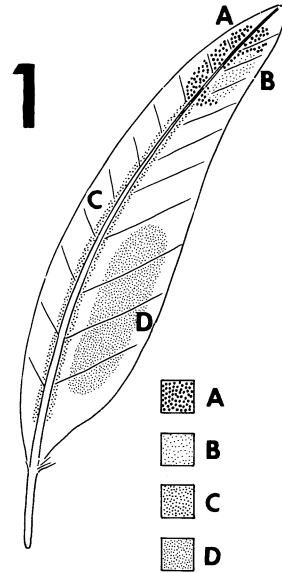


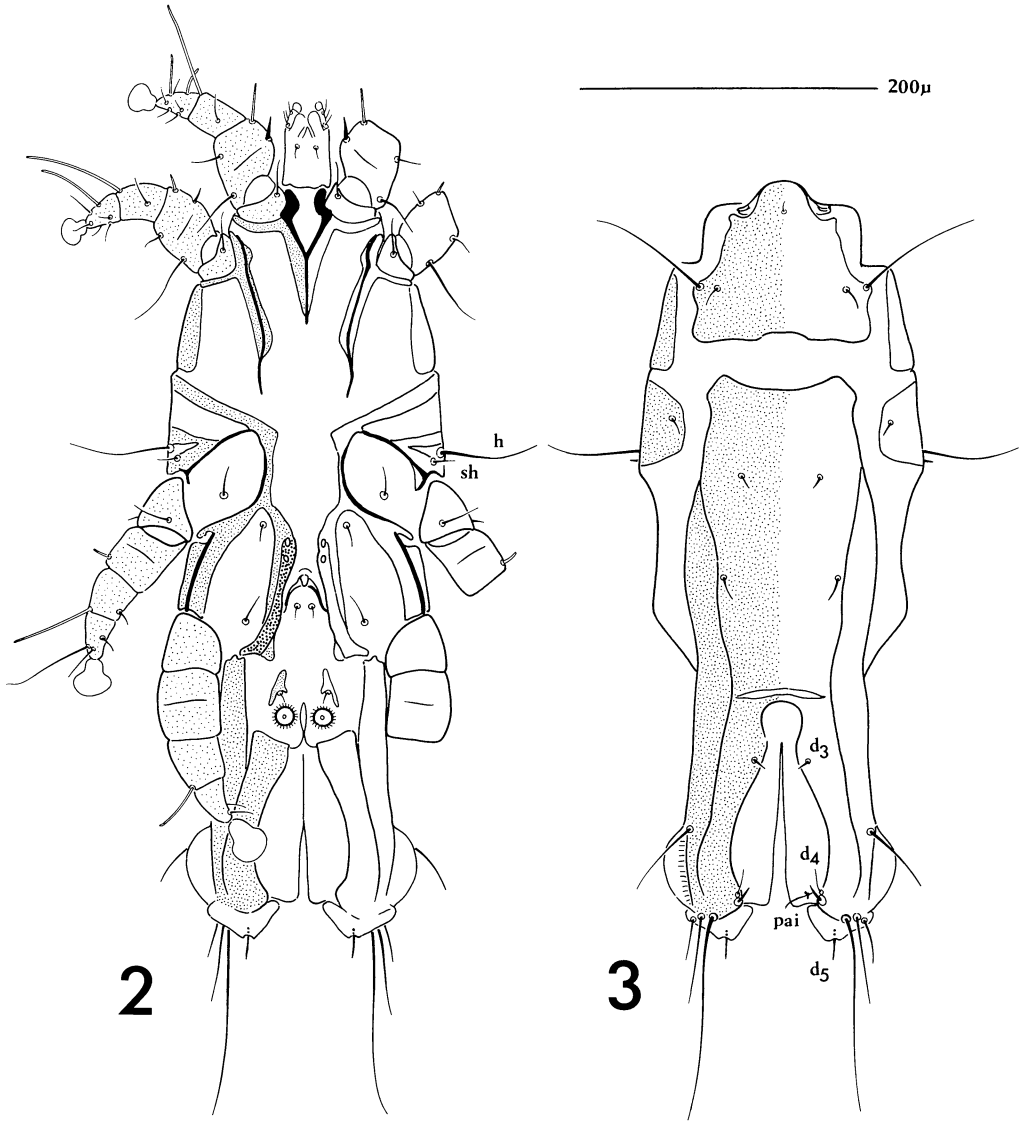
FIGURE 1. Site preferences on 6th and 7th primaries **A.** *Geranolichus canadensis*, sp. n. **B.** *Pseudogabucinia reticulata*, sp. n. **C.** *Gruolichus wodashae*, gen. et sp. n. **D.** *Brephosceles petersoni*, sp. n.

Africa and one from *Grus grus*, Europe. The new species being described is similar to *G. gruis* Trouessart, from the European crane.

Male (holotype): Length, 324; width, 193. **Dorsal idiosoma:** Propodosomal shield extending between legs I, II; two vertical setae; internal scapular setae nearer to external scapulars than to each other; measurements: *sce* : *sce*, 73; *sci* : *sci*, 47. Hysterosoma with broadly triangular shield flanked by parahysterosomal shields; lacunae on posterior third as figured; postanal setae broadly spiculiform; measurements: setae *l* 1, 12; *d* 3, 5; *pai*, 10 × 3.7; *sh*, 24 × 3; hysterosomal shield, 220 × 165. **Ventral idiosoma:** Epimerites I V-shaped; genital organ anterior to anterior articulations of trochanters IV; area posterior to setae *c* 3 without striations; adanal discs weakly sclerotized.

Female (paratype): Length, 424; width, 231. **Dorsal idiosoma:** Similar to male; measurements: *sce* : *sce*, 80; *sci* : *sci*, 57. Hysterosomal shield with sparse lacunae; setae *d* 3, *d* 4, *l* 3 as dorsomesal cluster with *d* 3, *d* 4 spiculiform; measurements: setae *d* 3, 12; *d* 4, 14; *l* 4, 4; *pai*, 18; *pae*, 12; *sh* 29 × 3.9; hysterosomal shield, 294 × 192.

Type data: From *Grus canadensis tabida*: ♂ holotype, 10 ♂♂, 17 ♀♀ paratypes, Portage Co., Wisconsin, June 8, 1977, R. M. Windingstad (UGA 9645); 11 ♂♂, 7 ♀♀ paratypes, Jasper-Pulaski Wildlife Refuge, Jasper County, Indiana, R. M. Windingstad as follows: 4 ♂♂, 4 ♀♀, March 17, 1977 (UGA 9868), 3 ♂♂, October 19, 1977 (UGA 9869), 4 ♂♂, 3 ♀♀, October 19, 1977 (UGA 9870); 9 ♂♂, 7 ♀♀ paratypes, Germaine Wildlife Area, Mar-



FIGURES 2, 3. *Brephosceles petersoni*, sp. n.: ventral (2) and dorsal (3) aspects of male. Setae: *d* 3–5, dorsal hysterosomals; *h*, humeral; *pai*, internal postanal; *sh*, subhumeral.

quette County, Wisconsin, June 17, 1977, R. M. Windingstad (UGA 9646); 6 ♂♂, 7 ♀♀ paratypes, Navarino Wildlife Area, Shawno County, Wisconsin, June 30, 1977, R. M. Windingstad (UGA 9648). The holotype and paratypes are deposited in the National Museum of Natural History; paratypes are deposited in the collections of J. Gaud, Nice, France, and the University of Georgia.

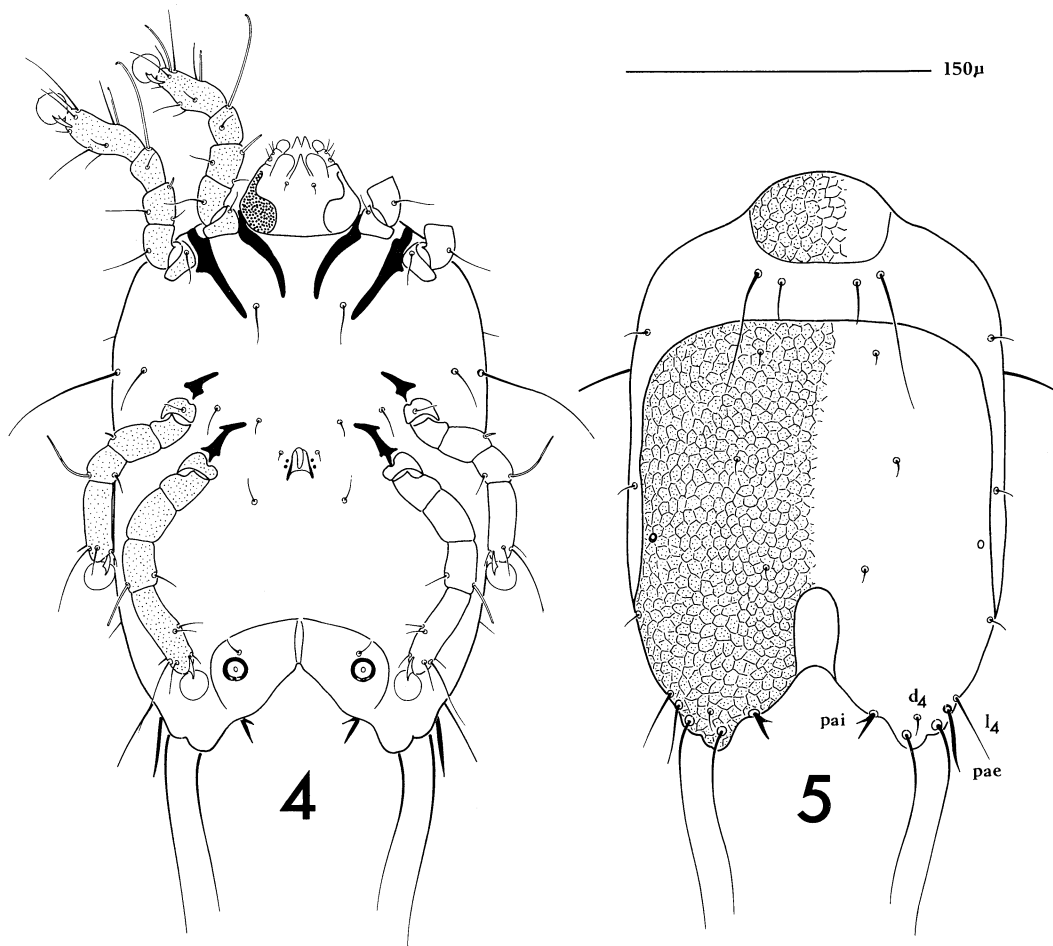
Remarks

Geranolichus canadensis was not only the species with the highest rate of infestation,

but also the species with the greatest number of individuals on the primaries—as many as 500 individuals have been collected from one feather.

***Grulichus*, gen. n.**

Diagnosis: Pterolichid mites with both sexes having weak coxosternal skeleton, epimerites I Y-shaped, dorsum differentially sclerotized to form 3–5 broad striae between propodosomal and hysterosomal shields, one vertical seta, legs subequal,



FIGURES 4, 5. *Pseudogabucinia reticulata*, sp. n.: ventral (4) and dorsal (5) aspects of male. Setae: *d* 4, *l* 4, dorsal and lateral hysterosomals; *pae*, *pai*, external and internal postanals.

seta *ba* distal to solenidion ω 1 on legs, I, II, seta *kT* absent from tibia IV.

Type species: Gruolichus wodashae, sp. n.

***Gruolichus wodashae*, sp. n.**

(Figs. 12–15)

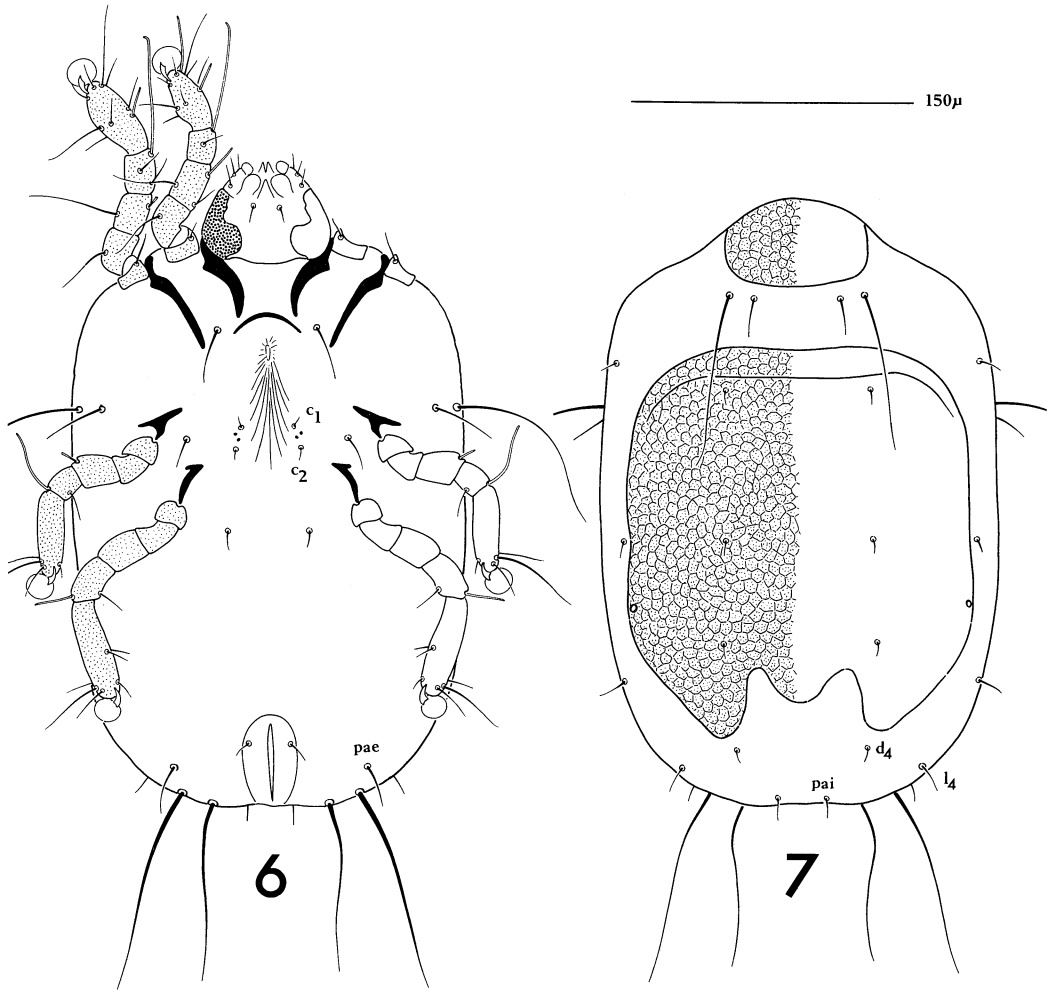
The broad dorsal striae, single vertical setae and absence of tibial setae on legs IV distinguish this species from other taxa occurring on the Gruidae.

Male (holotype): Length, 250; width, 127. *Dorsal idiosoma*: Propodosomal shield extending between legs I, II; internal scapular setae nearer their homologs than to each other; measurements: *sce* : *sce*, 56; *sci* : *sci*, 34. Areas surrounding propodosomal and hysterosomal shields sclerotized, without striae except for broad bands between shields. Hysterosomal shield with sinuous lateral margins, sparse lacunae; all setae setiform; measurements: setae *sh*, 16; hysterosomal shield, 143 × 92. *Ventral idiosoma*:

ma: Epimerites very narrow, associated surface shields lightly sclerotized; genital organ between legs III, IV with genital discs posterior to organ; area posterior to setae *c* 3 without striations; adanal discs weakly sclerotized.

Female (paratype): Length, 362; width, 131. *Dorsal idiosoma*: Similar to male; measurements: *sce* : *sce*, 76; *sci* : *sci*, 40. Hysterosomal shield with lateral margins straight, without lacunae, with all setae setiform; measurements: *d* 3, *d* 4, *l* 4, *pai*, *pae*—all approximately 10, hysterosomal shield, 245 × 98.

Type data: From *Grus canadensis tabida*: δ holotype, 1 δ , 4 ♀♀ paratypes, Colmstock Marsh, Marquette County, Wisconsin, August 21, 1977, R. M. Windingstad (UGA 9649); 1 δ paratype same data as holotype except August 18, 1977; 6 ♂♂ , 6 ♀♀ paratypes, Jasper-Pulaski Wildlife Refuge, Jasper County, Indiana, R. M. Windingstad as follows: 1 δ 4 ♀♀ , October 27, 1977 (UGA 9680), 4 ♂♂ , 2 ♀♀ , October 15, 1977 (UGA 9678), 1 δ , October 19,



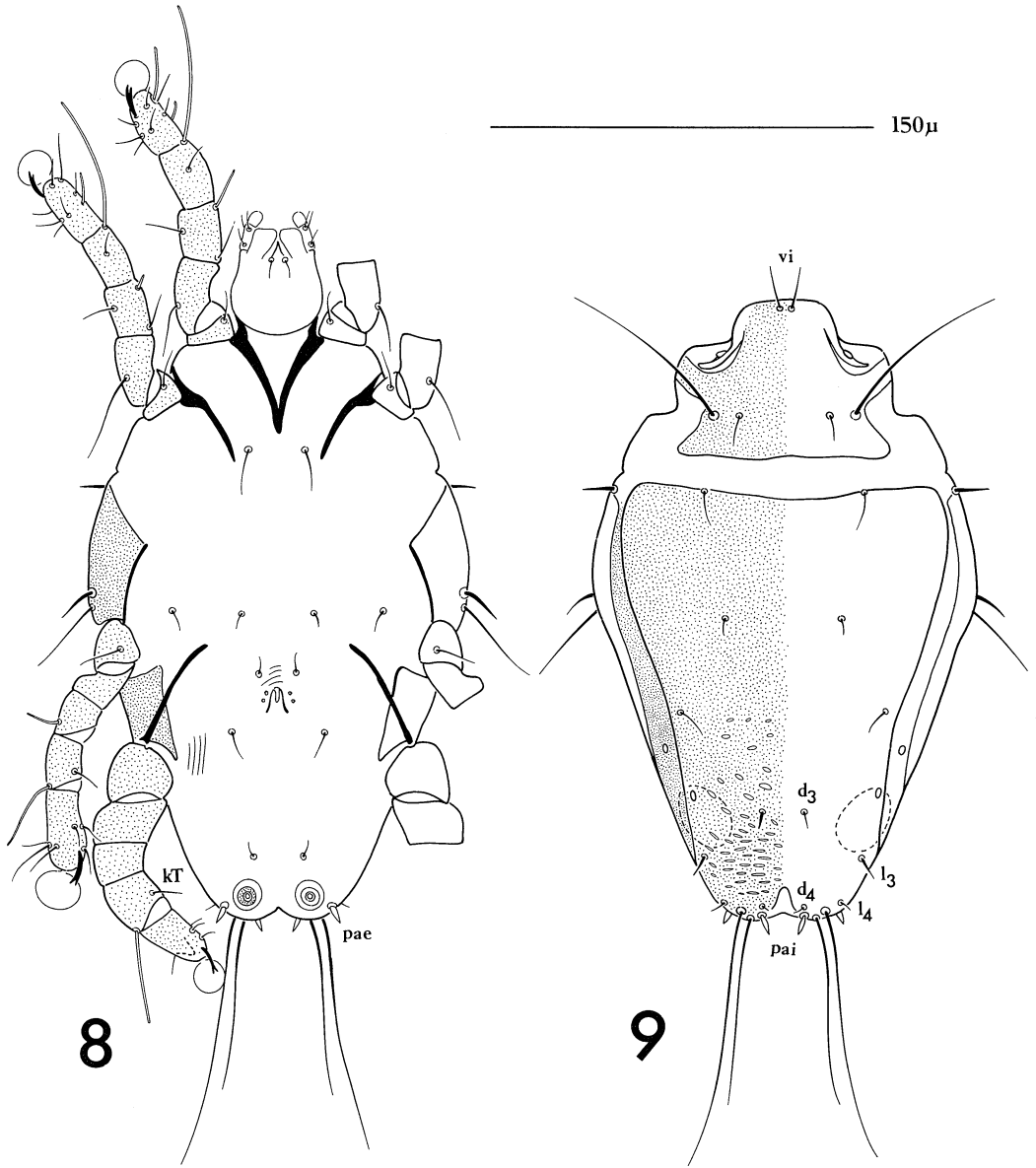
FIGURES 6, 7. *Pseudogabucinia reticulata*, sp. n.: ventral (6) and dorsal (7) aspects of female. Setae: *c* 1-2, centrals; *d* 4, *l* 4, dorsal and lateral hysterosomals; *pae*, *pai*, external and internal postanals.

1977 (UGA 9677). The holotype and paratypes are deposited in the National Museum of Natural History; paratypes are deposited in the collections of J. Gaud, Nice, France, and the University of Georgia.

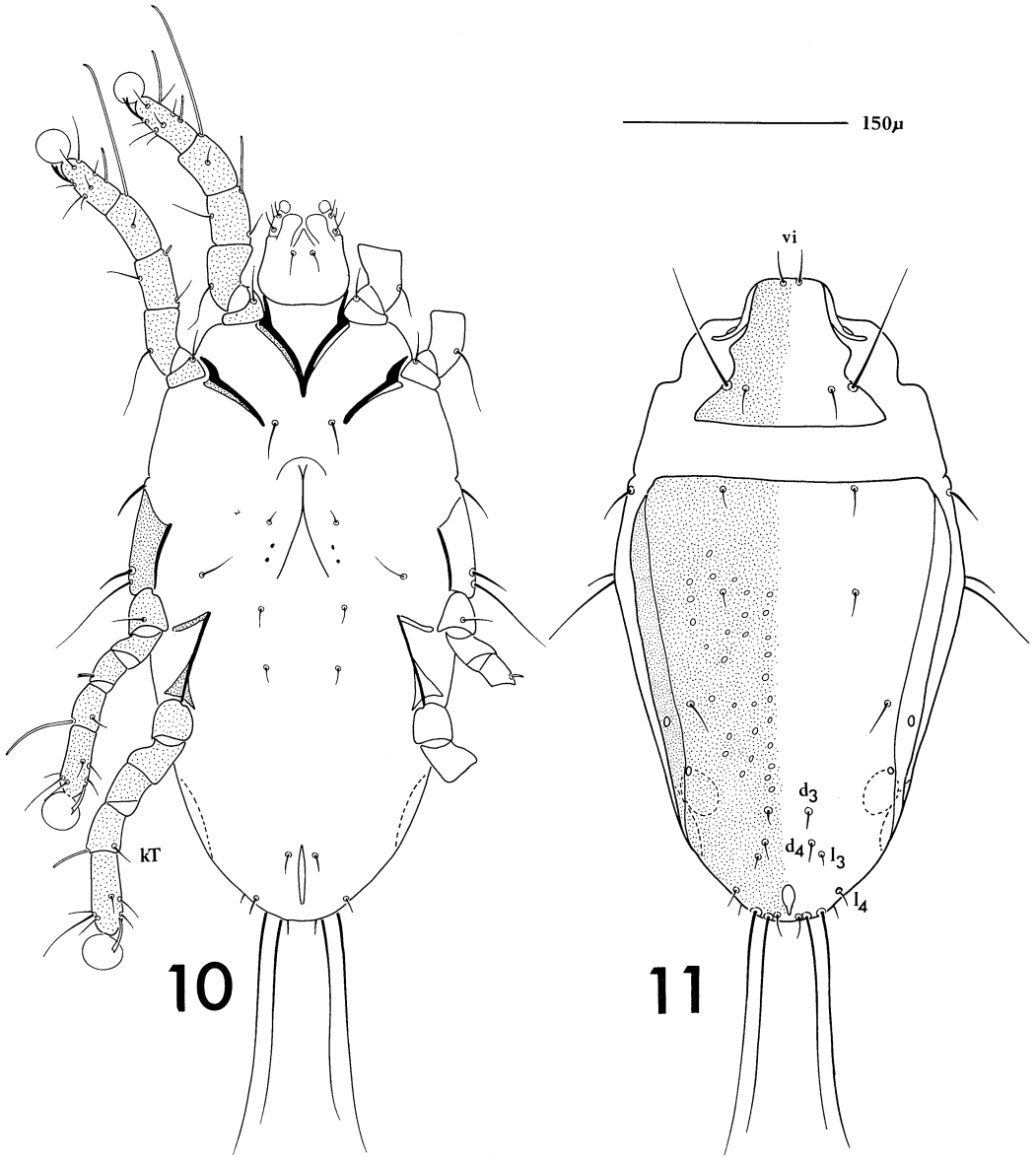
Remarks

The genital discs may not be posterior to the genital organ as figured; the material

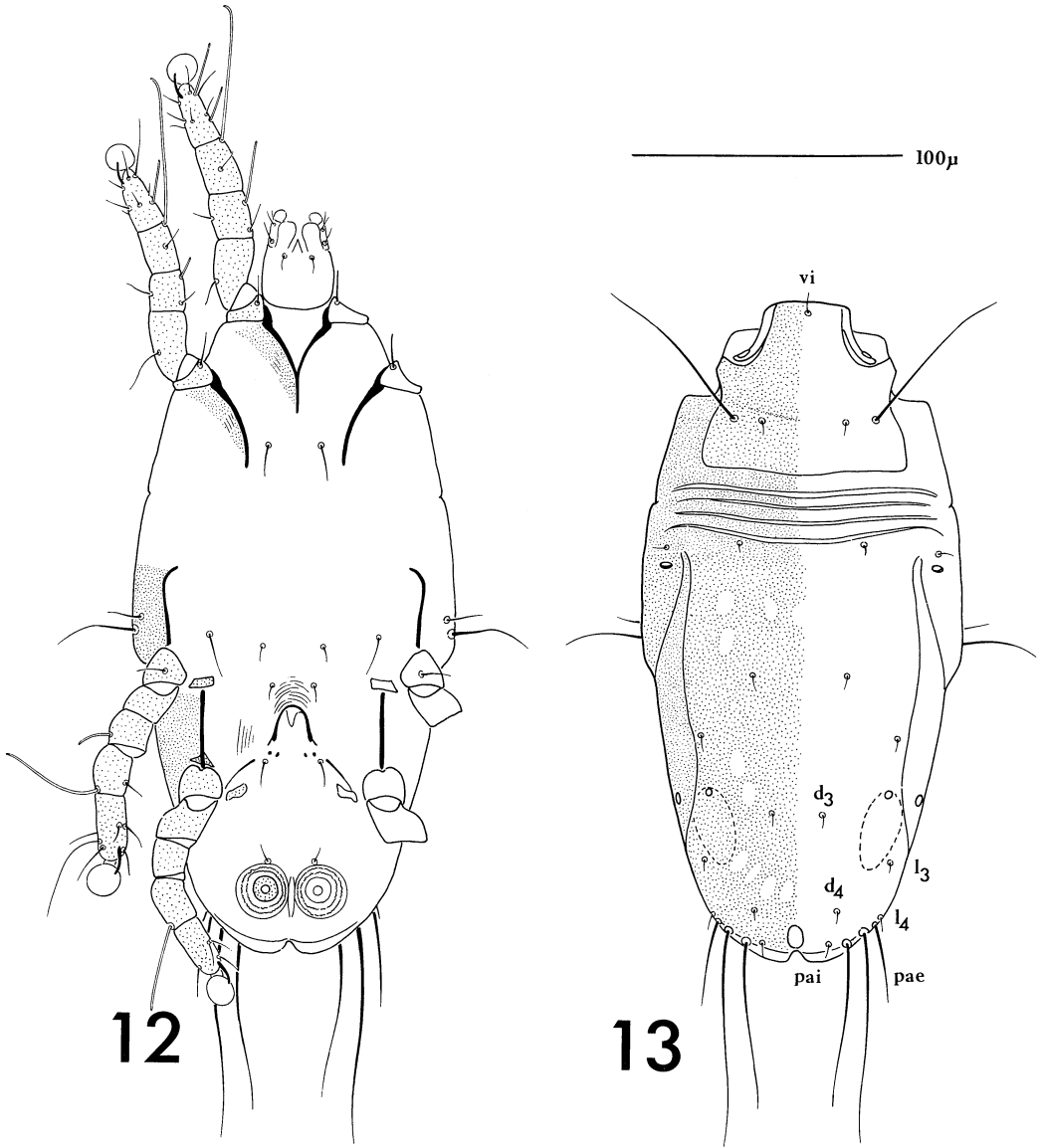
available for study either had the genital organ and associated region deformed by preparation or the discs were not visible. The species is named for Ms. K. Wodash, College of Natural Resources, University of Wisconsin-Stevens Point, in recognition of her invaluable assistance in the field and in the laboratory studies.



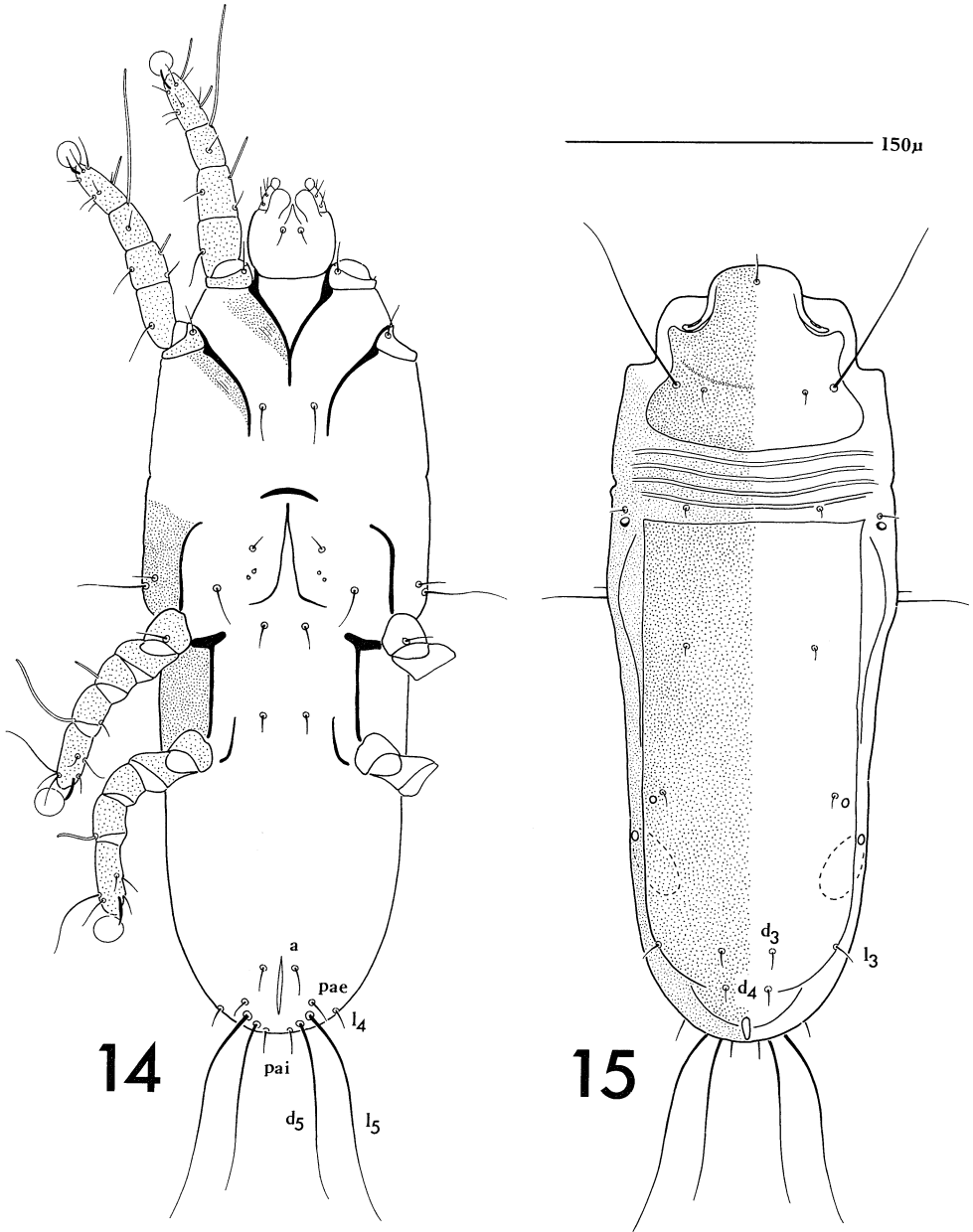
FIGURES 8, 9. *Geranolichus canadensis*, sp. n.: ventral (8) and dorsal (9) aspects of male. Setae: *d* 3-4, *l* 3-4, dorsal and lateral hysterosomals; *kT*, tibial IV; *pae*, *pai*, external and internal postanals; *vi*, internal vertical.



FIGURES 10, 11. *Geranolichus canadensis*, sp. n.: ventral (10) and dorsal (11) aspects of female. Setae: *d* 3-4, *l* 3-4, dorsal and lateral hysterosomals; *kt*, tibial IV; *vi*, internal vertical.



FIGURES 12, 13. *Gruolichus wodashae*, gen. et sp. n.: ventral (12) and dorsal (13) aspects of male. Setae: *d* 3-4, *l* 3-4, dorsal and lateral hysterosomals; *pae*, *pai*, external and internal postanals; *vi*, internal vertical.



FIGURES 14, 15. *Gruulichus wodashae*, gen. et sp. n.: ventral (14) and dorsal (15) aspects of female. Setae: *a*, anal; *d* 3-5, *l* 3-5, dorsal and lateral hysterosomals; *pae*, *pai*, external and internal postanals.

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