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## New Species of *Oaxacacoris* Schwartz & Stonedahl and *Pseudopsallus* Van Duzee, and a New Genus, *Presidiomiris*, from Texas (Heteroptera: Miridae: Orthotylini)

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### ABSTRACT

The new genus *Presidiomiris* is diagnosed and described, including two new species, *infuscatus* and *knighti*, from Presidio County, Texas. Two new species each of *Pseudopsallus* (*badger*, *tulare*) and *Oaxacacoris* (*durango*, *guadalajara*) are described, and compared to known taxa. The monotypic genus *Ceratopidea* Knight is synonymized with *Pseudopsallus*, creating the new combination, *Pseudopsallus daleae* (Knight). Descriptions and

illustrations are provided for the male genitalic structures of all species, and scanning electron micrographs are presented for the scalelike setae and the pretarsus of representative species. Revised diagnoses are included for *Oaxacacoris* and *Pseudopsallus*, and the cladogram [*Oaxacacoris* + (*Presidiomiris* + *Pseudopsallus*)] is presented for the three genera. A dorsal habitus of the male of *Presidiomiris knighti* also is included.

### INTRODUCTION

This paper is an addendum to our recent studies of the western North American genera *Oaxacacoris* and *Pseudopsallus* (Stonedahl and Schwartz, 1986; Schwartz and Stonedahl, 1987). The examination of newly acquired/discovered material from the col-

lections of the American Museum of Natural History, California Academy of Sciences, Texas A&M University, and the University of California, Berkeley, revealed additional undescribed species of these genera, as well as two species from Presidio Co., Texas, that

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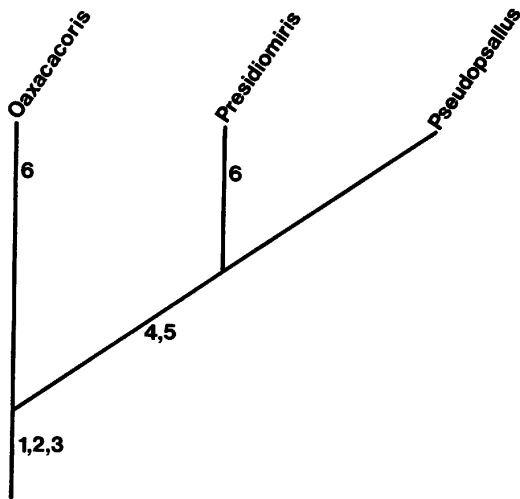


Fig. 1a. Phylogenetic relationships of genera. Numbers are derived characters as follows: (1) tergal processes on anterodorsal margin of male genital aperture located in the 10–11 o'clock and 1–2 o'clock positions; (2) right paramere subquadrate, bulky, usually modified distally or on inner-medial surface; (3) right (dorsally situated) spicula of vesica deeply bisected; (4) right paramere with strong medial flange on inner surface usually subtended by a troughlike, excavated region; (5) dorsal spicula of vesica large, usually broadened distally; (6) dorsal vestiture with narrow, golden brown to black, scalelike setae.

are here placed in the new genus *Presidiomiris*. In addition, the genus *Ceratopidea* Knight is proposed as a new junior synonym of *Pseudopsallus*.

The taxa in this paper are arranged alphabetically by genus and species. A diagnosis and complete description is provided for the new genus *Presidiomiris*, and revised diagnoses included for *Oaxacacoris* and *Pseudopsallus*. All species are provided with a comparative diagnosis, which allows for their placement in the existing works of Stonedahl and Schwartz (1986) and Schwartz and Stonedahl (1987). An attempt is made to place the new species of *Pseudopsallus* in the species phylogeny proposed by Stonedahl and Schwartz (1986). A detailed description is provided for each new species—the male genitalic structures are described and illustrated for all species. A complete list of the abbreviations of male genitalic structures is found in Stonedahl and Schwartz (1986: 6) and

Schwartz and Stonedahl (1987: 20–21). All measurements are in millimeters.

#### ACKNOWLEDGMENTS

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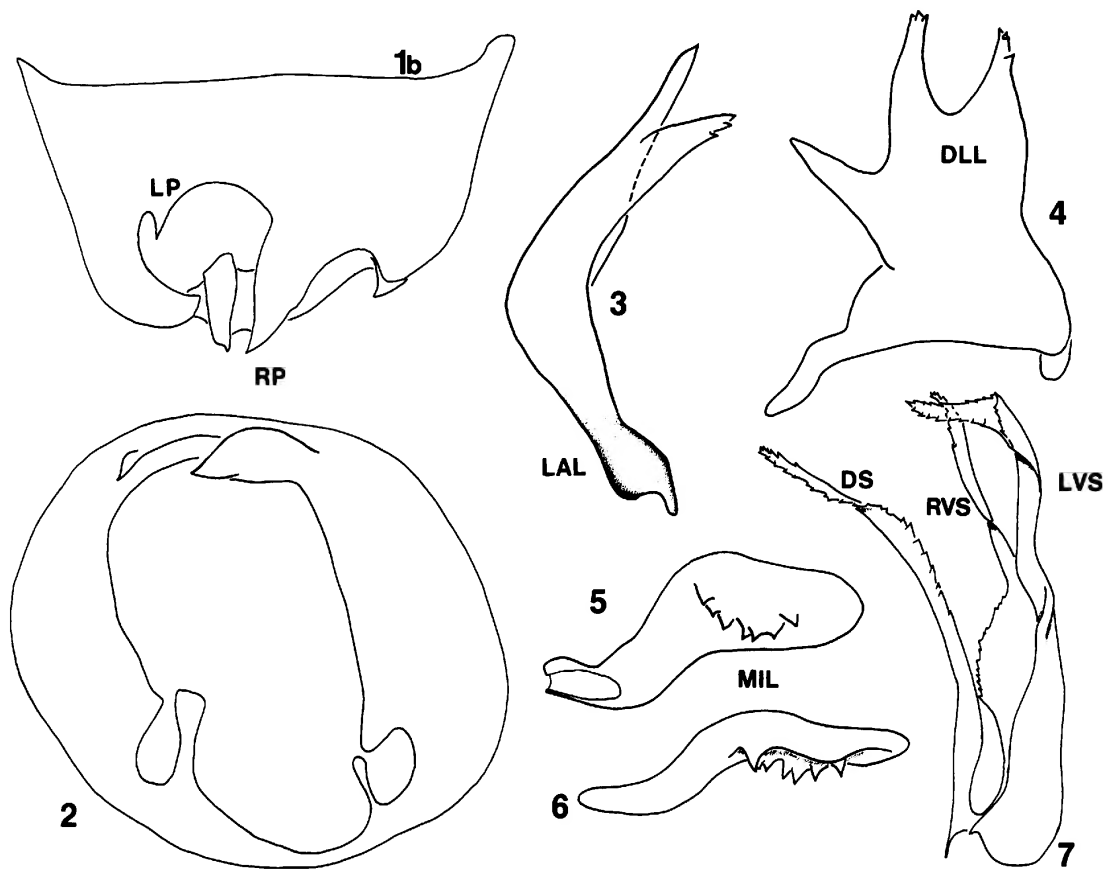
The authors acknowledge their equal contribution to all facets of this paper.

#### SYSTEMATICS

##### *OAXACACORIS* Schwartz and Stonedahl

*Oaxacacoris* Schwartz and Stonedahl, 1987: 15 (new genus). Type species—*Oaxacacoris cygnus* Schwartz and Stonedahl.

REVISED DIAGNOSIS: Recognized by the lateralmost pair of tergal processes (LP, left; RP, right), except *durango*, extending well beyond margins of genital aperture (fig. 8); dorsal lobe of left paramere greatly expanded distally, with 3–9 strong spines (figs. 4, 11); and right paramere with prominent, sometimes bifurcate, basal lobe (figs. 12, 13). Further distinguished by the subquadrate right paramere, tergal processes on the genital aperture in the 10–11 o'clock and 1–2 o'clock positions (figs. 2, 9), and deeply bifid right spicula of the



Figs. 1b-7. Male genitalic structures of *Oaxacacoris durango*. 1b, 2. Genital capsule. 1b. Dorsal view of tergal processes (LP, left; RP, right). 2. Posterior view of aperture. 3, 4. Left paramere. 3. Posterior view (LAL, lateral lobe). 4. Lateral view (DLL, dorsal lobe). 5, 6. Right paramere. 5. Interior lateral view (MIL, medial interior lobe). 6. Dorsal view. 7. Spiculae of vesica, (DS, dorsal; LVS, left ventral; RVS, right ventral).

vesica (figs. 7, 14), characters that are shared with *Presidiomiris* and *Pseudopsallus*. *Oaxacacoris* species possess dorsal vestiture with silvery white and golden brown to black, narrow, scalelike setae with converging ridges (see fig. 2a in Schwartz and Stonedahl, 1987), a feature which also occurs in the genus *Presidiomiris* (fig. 1a).

**DISCUSSION:** The description here of two new *Oaxacacoris* species brings the total number of described species in the genus to five. Characters distinguishing *durango* and *guadalajara* from other species of the genus are provided in the species diagnoses that follow. *Oaxacacoris guadalajara* and especially *durango*, are distributed well north of the previously established northern limit of the genus in Puebla, Mexico. No host plant

information was available for either *durango* or *guadalajara*.

***Oaxacacoris durango*, new species**  
Figures 1b-7

**DIAGNOSIS:** Recognized by the orange-red cuneus with pale margins and apex; dorsum of male with limited golden brown scalelike setae, female with more densely distributed, brown or golden brown scalelike setae; and male genitalia with the following characteristics: left tergal processes of genital capsule weakly developed (figs. 1b, 2); dorsal lobe of left paramere broadly produced, with three prominent processes, two of which are secondarily spinose distally (fig. 4); right paramere with series of spines on inner surface,

but lacking noticeably developed dorsal and basal lobes (figs. 5, 6); and spiculae of vesica as in figure 7.

**DESCRIPTION:** Male. Length 4.15; yellowish green general coloration; dorsal vestiture with golden simple setae and limited, narrow, golden brown scalelike setae. **Head:** Width across eyes 0.77, width of vertex 0.33; yellow with faint green tinge on frons and tylus; antennae pale brownish yellow, segment I tinged with green; length of segment I 0.34, segment II 1.28; labium reaching middle of metacoxae. **Pronotum:** Posterior width 1.14; dusky yellow ground color, margins of calli and posterior lobe of disk suffused with green; mesonotum and scutellum brownish yellow, apical third of scutellum pale with faint green mark anteromedially. **Hemelytra:** Clavus and corium mostly green; bases of clavus and corium, apex of clavus, embolium, and paracuneus more yellow or brownish yellow; cuneus orange-red, base and lateral margin narrowly pale, apex more broadly pale; membrane suffused with fuscous, veins pale. **Legs:** Yellow; femora and basal third of tibiae with scattered green markings or suffusion; tarsi yellowish brown, segment III and pretarsus dark brown; femora and tibiae with short, reclining, pale simple setae; tibial spines golden brown. **Genitalia:** *Genital capsule:* aperture slanted to left; RP of moderate length in comparison to other *Oaxacacoris* species, five times as long as LP, tapered distally, thickened basally, narrowing distally; LP very small, spinelike; left ventral process (LVP) obsolete. *Left paramere:* dorsal lobe (DLL) broad, with three large processes (two with secondarily spinose apices); lateral lobe (LAL) broad, with enlarged and cupped or notched apex. *Right paramere:* medial interior lobe (MIL) reduced to series of spines arranged in lunate fashion; dorsal lobe (DLR) and basal lobe (BLR) obsolete. *Vesica:* dorsal spicula (DS) elongate, slightly longer than right ventral spicula (RVS), sinuate, serrate marginally and apically; RVS broadly expanded and serrate medially, narrow distally; left ventral spicula (LVS) stouter than DS and RVS, sinuate, distal one-fifth, recurved, flattened and serrate marginally.

Female. Length 4.40; width across eyes 0.78, width of vertex 0.40; length of antennal segment I 0.38, segment II 1.48; posterior

width of pronotum 1.25. Similar to male in color, except vestiture more densely distributed, and structure slightly larger with broader vertex; pronotal disk and scutellum uniformly pale brownish yellow; and legs without green markings or suffusion.

**ETYMOLOGY:** Named for the state of Durango in Mexico; a noun in apposition.

**HOLOTYPE MALE:** MEX[ICO]., D[uran]go., 5 mi SW of Cuencame, VIII-12-65, H. Burke and J. Meyer; deposited in AMNH.

**PARATYPE:** 1♀, same data as holotype (TAM).

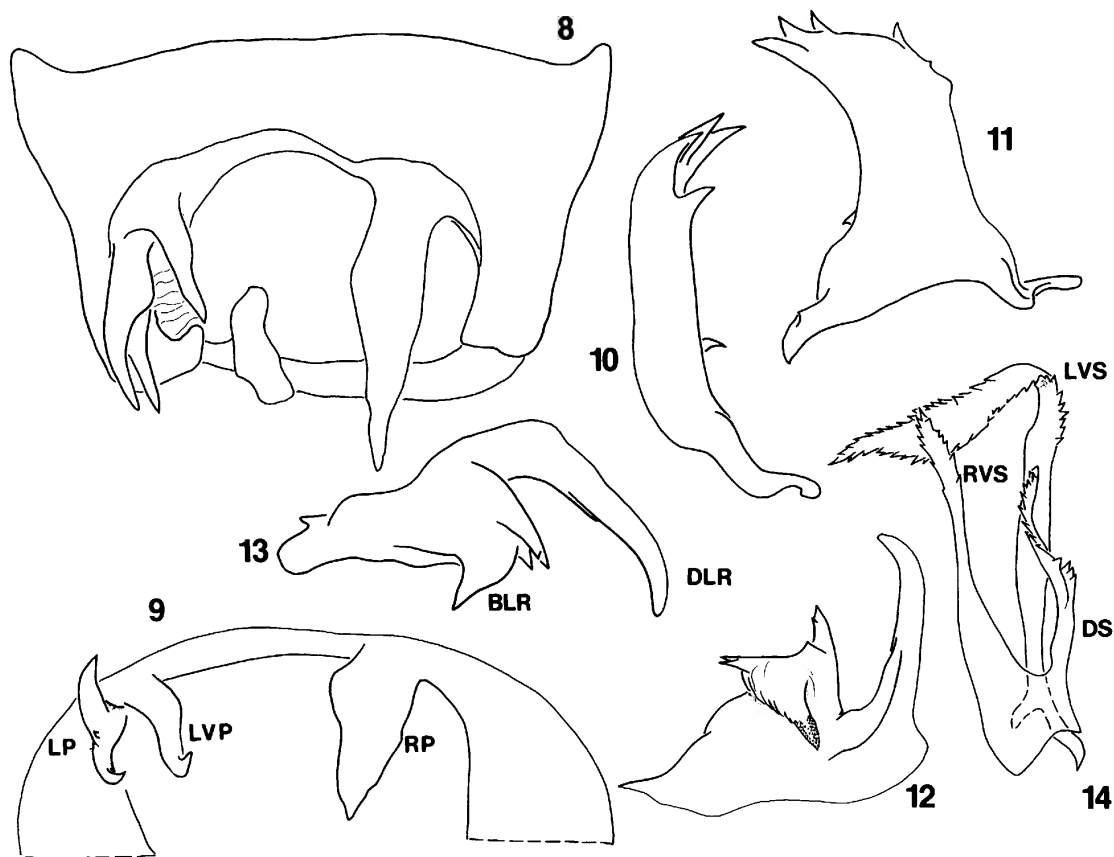
**DISCUSSION:** *Oaxacacoris durango* lacks two genitalic features which are diagnostic for the genus—right paramere with strongly developed basal lobe, and tergal processes of the genital aperture extending well beyond the margins of the aperture. However, all other external and genitalic characters are consistent with the type of the genus, *cygnus*. In particular, the greatly expanded dorsal lobe of the left paramere and the ground plan of the vesica are distinctive of *Oaxacacoris* species. Since it shares several additional synapomorphic features with the other species of *Oaxacacoris*, *durango* is here recognized as a congeneric species which possesses two apomorphic modifications of the male genitalia.

Secondarily reduced or obsolete tergal processes also occur in some *Pseudopsallus* species (see following treatment of *daleae*, and Stonedahl and Schwartz, 1986). We have not yet determined if the underdeveloped basal lobe of the right paramere of *durango* is plesiomorphic or the result of a reversal back to the plesiomorphic state, as in the case of the secondarily reduced tergal processes. A phylogenetic analysis of *Oaxacacoris* species is needed to address this question.

#### *Oaxacacoris guadalajara*, new species

Figures 8–14

**DIAGNOSIS:** Distinguished from other species of *Oaxacacoris* by the fuscous cast on the pronotal disk and hemelytra; uniformly fuscous antennae; and the following characteristics of the male genitalia: right tergal process elongate, strongly flattened throughout, without spines or serrations distally (figs. 8, 9); left tergal process deeply bifurcate (figs. 8,



Figs. 8–14. Male genitalic structures of *Oaxacacoris guadalajara*. 8, 9. Genital capsule. 8. Dorsal view of tergal processes. 9. Posterior view of aperture and processes (LP, left; LVP, left ventral; RP, right). 10, 11. Left paramere 10. Posterior view. 11. Lateral view. 12, 13. Right paramere. 12. Interior lateral view. 13. Dorsal view (BLR, basal lobe; DLR, dorsal lobe). 14. Spiculae of vesica (DS, dorsal; LVS, left ventral; RVS, right ventral).

9); dorsal lobe of right paramere elongate and projecting dorsad of basal lobe (figs. 12, 13); and distal third of left ventral spicula of vesica broadly expanded, flattened, abruptly tapered distally, and apex acute (fig. 14). The cuneus of the male is orange-red, but in the female the cuneus is concolorous with the hemelytra.

**DESCRIPTION:** Male. Length 4.50; greenish fuscous general coloration; dorsal vestiture with recumbent, narrow, black scalelike setae and golden simple setae. **Head:** Width across eyes 0.80, width of vertex 0.35; yellow with fuscous mark on tylus; antennae fuscous; length of segment I 0.38, segment II 1.38; labium reaching apices of metacoxae. **Pronotum:** Posterior width 1.28; anterior and lateral margins of pronotum, and propleura,

dusky yellow; calli and disk narrowly adjoining calli, fuscous; remainder of disk green with fuscous cast; mesonotum fuscous medially, yellow sublaterally; scutellum dusky yellow. **Hemelytra:** Embolium, corium bordering embolium, paracuneus, commissure of hemelytra, apex of clavus, and basolateral angle of cuneus, dark green; remainder of clavus and corium green with extensive fuscous cast; cuneus orange-red with dark greenish fuscous laterally; membrane deeply suffused with fuscous; veins orange-red. **Legs:** Yellow; tarsi fuscous; femora and tibiae with short, reclining, golden simple setae; tibial spines light fuscous. **Genitalia:** *Genital capsule:* RP long, flattened, distal one-third tapering to pointed apex, without marginal spines; LP cylindrical, shorter than RP, bifurcate, junc-

tion of bifurcation with small spine; LVP cylindrical, sinuate, with pointed apex. *Left paramere*: DLL broad, with solitary basal spine, tapered to recurved apex, and with four spines; LAL narrow, cylindrical, sinuate, and with round blunt apex. *Right paramere*: MIL obsolete; DLR elongate, narrow, with pointed apex, without spines, and projecting dorsad of BLR; BLR with large ventrally recurved spine (with fine shingled texture distally), and three smaller spines, two with bifurcate apices. *Vesica*: DS sinuate and serrate, shorter than RVS; RVS wide basally, narrow, elongate, serrate, and tapered distally; LVS large with distal one-third very broad, flattened, tapered, and with sinuate and serrate margins.

Female. Length 4.40; width across eyes 0.83; width of vertex 0.43; length of antennal segment I 0.43, segment II 1.33; posterior width of pronotum 1.28. Similar to male in color, vestiture, and structure except as follows: general coloration yellow; pronotal disk, clavus, and adjoining portion of corium, green; and cuneus uniformly yellowish green.

ETYMOLOGY: Named for the type locality; a noun in apposition.

HOLOTYPE MALE: [MEXICO, Jalisco], Guadalajara, Crawford; 7886; California Academy of Sciences Collection, 1980 gift from Pomona College. Deposited in CAS.

PARATYPE: 1♀, without "7886 label", otherwise same data as holotype (CAS).

### *PRESIDIOMIRIS*, NEW GENUS

DIAGNOSIS: Readily distinguished from *Oaxacacoris* and *Pseudopsallus* by its small size; orangish yellow general coloration, sometimes with green markings, or variably suffused with green (fig. 15a); and male genitalia with the following characters: (1) anterodorsal margin of genital aperture with two tergal processes—one slightly right of midline of aperture and one originating well left of midline (figs. 16, 24); right process small, flattened, with marginal serrations; left process larger, gently curved, flattened distally; (2) dorsal lobe of left paramere with single tuberculate or spinelike process basally (figs. 18, 26); (3) dorsal opening of phallotheca with convoluted margins, left dorsodistal margin with strongly upturned knoblike edge

(figs. 31–33); (4) right spicula deeply bifurcate, ventral portion simple, spinelike, much shorter than dorsodistal portion (figs. 21, 22, 29, 30).

DESCRIPTION: Male. Small, subovate body form; macropterous, length from apex of tylus to apices of hemelytra 3.18–3.80; width across humeral angles of pronotum 1.16–1.38; surface texture smooth; yellow or orange-yellow general coloration, sometimes with head, antennal segments I and II, anterior portion of pronotum, and scutellum orange; posterior border of pronotum, commissure of hemelytra, apices of clavus, and posteromedial portion of corium variably suffused with green; dorsal vestiture with recumbent, narrow, silvery scalelike setae and long, suberect, silvery simple setae, also with recumbent, narrow, golden to black scalelike setae (fig. 15b). **Head**: Subtriangular, length anterior of eye subequal to length posterior of anterior margin of eye in dorsal or lateral view; posterior margin without carina; frons and vertex convex, steeply sloping anteriorly, meeting tylus with suture; temporal area obsolete; eyes very large, ovate, projecting very slightly beyond anterolateral angles of pronotum in dorsal view, occupying eight-ninths of head height in lateral view, posterior margin sublinear, contiguous with anterior margin of pronotum, anterior margin emarginate; antennal fossa small, contiguous with anterior margin of eye, ventral margin of fossa dorsad of ventral margin of eye in lateral view; basal margin of clypeus perpendicular to ventral margin of head; juga triangular, flattened; lora rectangular, slightly swollen; gena present, width subequal to diameter of antennal segment I; gula very small, obscured by anterior margin of xyphus; length of buccular flange and cavity equal; labium reaching apices of metacoxae; antennal segment I with length equal to width of vertex, tapered basally, with one erect, light, bristlelike seta on subdistal, dorsal surface; segments II–IV cylindrical, linear, diameter less than segment I, with densely distributed, reclining, light, simple setae. **Pronotum**: Trapezoidal, broader than long, slightly sloping transversely and longitudinally; lateral margins slightly concave, smoothly curved at junction with propleura; posterior margin straight; anterior and posterior angles large and broadly round; ante-

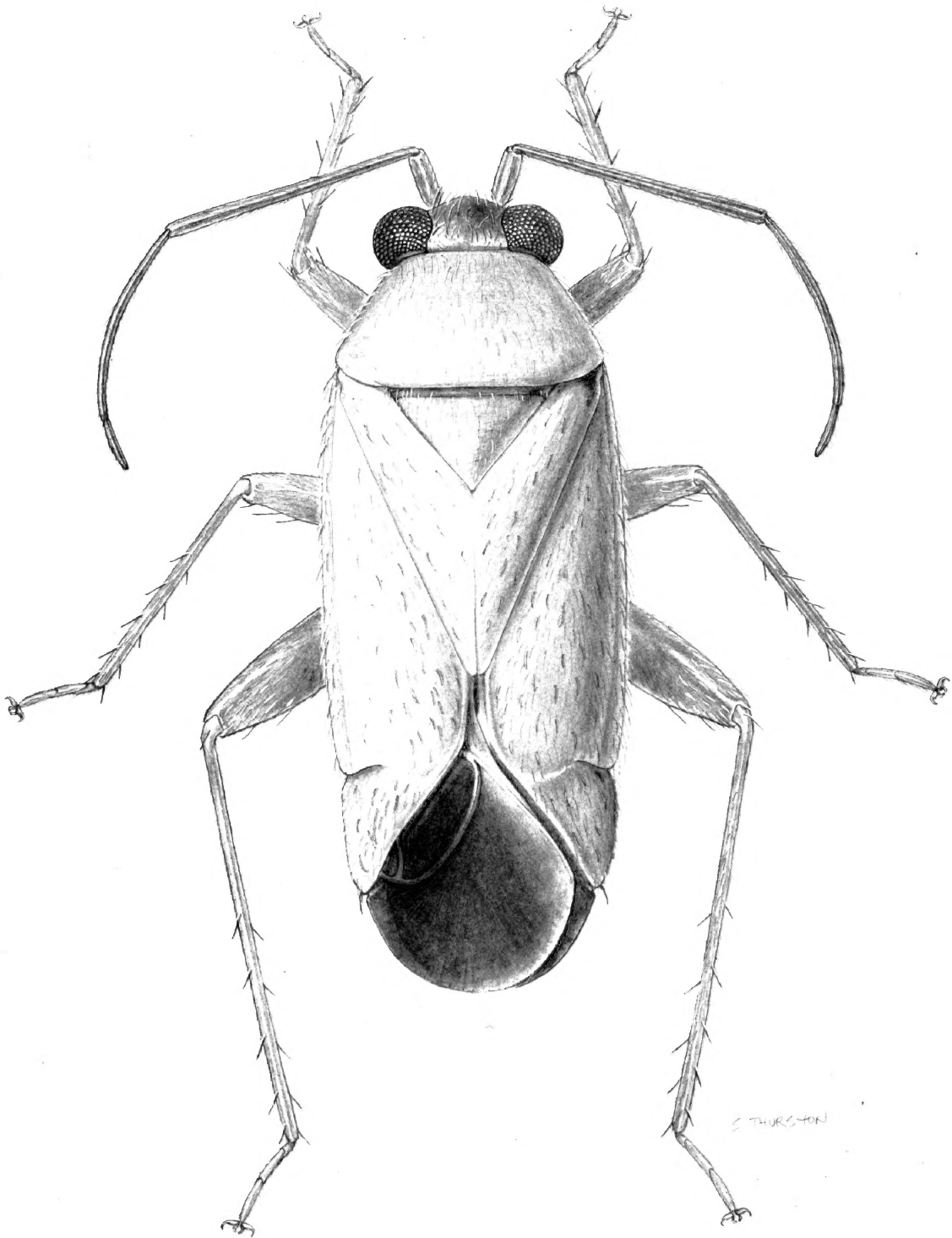
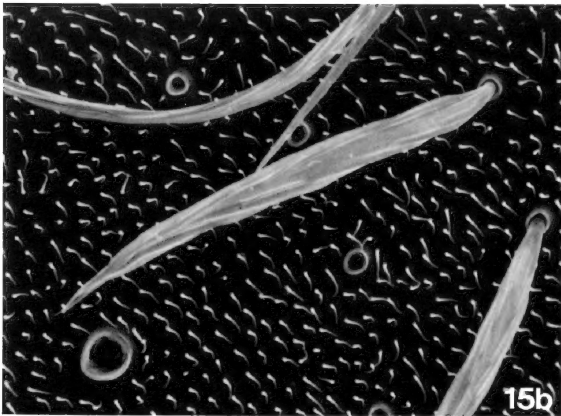


Fig. 15a. *Presidiomiris knighti*, dorsal habitus, male.



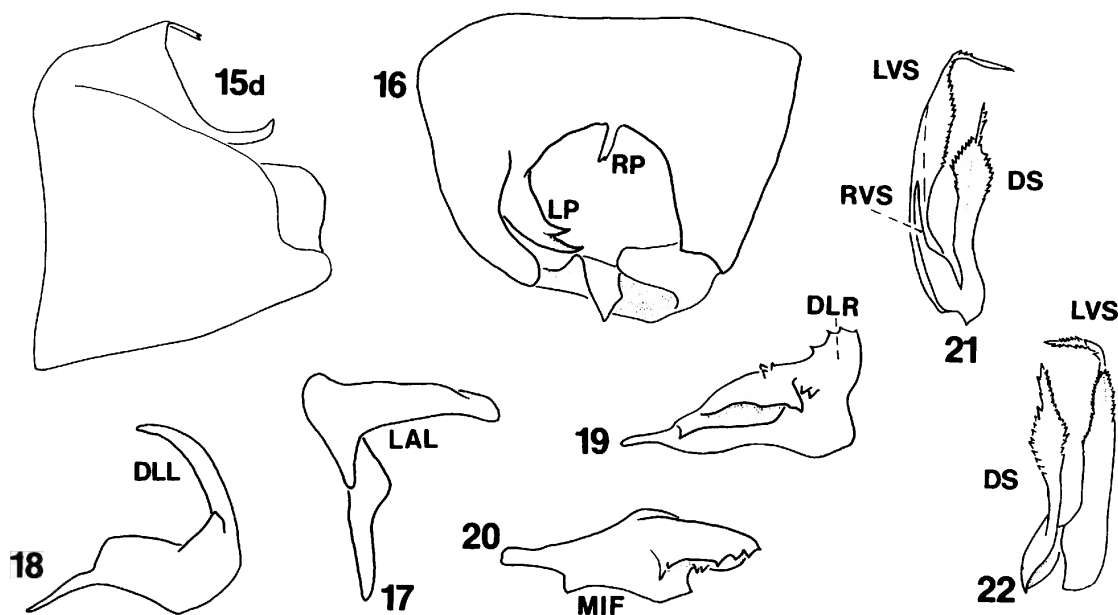
Figs. 15b, c. *Presidiomiris* species. **15b.** *knighti*, scalelike setae on dorsum (830 $\times$ ). **15c.** *infuscatus*, pretarsal structures (480 $\times$ ).

rior margin very slightly arcuate medially; calli very weakly convex, reaching anterior and lateral margins of pronotum, confluent anteromedially, bordered posteriorly by faint depression; mesoscutum narrowly exposed; scutellum weakly convex. **Hemelytra:** Subparallel-sided, broadest medially; claval vein weakly elevated; radial vein very faint; cuneal incisure small; cuneal fracture angled slightly anteriorly; cuneus longer than broad; membrane strongly suffused with uniform fuscous; inner cell longer than cuneus, narrowed distally; outer cell triangular. **Legs:** Coloration uniformly yellow, femora slightly flattened, tapered distally and basally, with short, reclining, light, simple setae; metatibiae with several rows of minute dark spinulae; tibiae with suberect, light, simple setae; tibial spines light; apices of tibiae and tarsal segment III dark fuscous to black; tarsal segment I half as long as segments II and III; claws black, curved, pulvilli minute, connate to inner surface (at angle) of claw (fig. 15c). **Genitalia:** *Genital capsule:* Moderate size (smaller than *Oaxacacoris*), subtriangular in ventral view, length four-fifths of width; anterodorsal margin with two posteriorly directed sclerotized tergal processes, not supporting rectal opening; LP large, originating left of midline and curving along left side of genital aperture, simple, rounded in cross section, with pointed or bifurcate apex; RP small, originating slightly right of midline of aperture, flattened with truncate and serrate apex; posteroven- tral margin of capsule with deep paramere

and phallosome sockets, and without posteriorly directed processes; aperture of moderate size (smaller than *Oaxacacoris* and *Pseudopsallus*), oval. *Left paramere:* DLL large, long, and tapering, recurved distally with pointed apex, base with single dorsal spine or tubercle; LAL long, tapering, and sinuate, apex blunt and unnotched. *Right paramere:* Subrectangular in lateral view; interior surface with prominent medial interior flange (MIF), and one or two spines distad of flange; DLR projecting dorsad of flange, but not curving laterally in dorsal view (weak distal portion), with several spines. *Phallosome:* Laterally compressed, open on dorsal and distal surfaces, opening sinuate, left side of dorsal surface with small upturned edge; without secondary ventrobasal opening. *Vesica:* Ductus seminis simple, cylindrical, flexible with ribs; secondary gonopore horse-shoe-shaped, base short and weakly sclerotized; two long posteriorly directed vesical spiculae broadly adjoining dorsal surface of gonopore right and left of midline of ductus; right spicula bifurcate; DS large, broad, and flattened dorsoventrally, twisted medially, abruptly tapering distally, marginally serrate; RVS short and simple, thickened basally, tapering medially, narrow distally with pointed apex; LVS solitary, large, and long; medial portion of shaft thick with deeply concave surface and serrate margins; recurved, distal fifth finely serrate and narrow, apex pointed.

Female. Macropterous. Length 3.25–3.68;





Figs. 15d–22. Male genital structures of *Presidiomiris infuscatus*. 15d, 16. Genital capsule. 15d. Lateral view. 16. Dorsal view of tergal process (LP, left; RP, right). 17, 18. Left paramere. 17. Ventral view (LAL, lateral lobe). 18. Lateral view (DLL, dorsal lobe). 19, 20. Right paramere. 19. Interior lateral view (DLR, dorsal lobe). 20. Dorsal view. (MIF, medial interior flange). 21, 22. Spiculae of vesica, (DS, dorsal; LVS, left ventral; RVS, right ventral). 21. Right lateral view. 22. Left lateral view.

width 1.25–1.45. Similar to male in color, vestiture, and structure except eyes slightly smaller resulting in relatively greater height of head below eyes and greater width of vertex. **Genitalia:** Following terminology of Slater, 1950. *Sclerotized rings:* Moderate size, oval-elongate, widely separated; lateral margin of ring strongly folded dorsomesad extending across ring to near mesal margin. *Posterior wall:* K structures of moderate size, well separated medially, apex bifurcate with large, quadrate lateral lobe and smaller, spinelike medial lobe; structure small, quadrate, clearly visible in notch of K structure and slightly produced ventrad of its apex in anterior view; L structure visible between K structures in anterior view.

**TYPE SPECIES:** *Presidiomiris infuscatus*, new species.

**DISTRIBUTION:** Presidio County, Texas.

**DISCUSSION:** Although *Presidiomiris* is presently known only from Presidio County, Texas, we suspect that the actual distribution of the genus is more widespread in the arid Chihuahuan Desert region of southwestern Texas and northern Mexico. Specimens of

the genus have been collected on *Nama* (Hydrophyllaceae) and *Senna* (Fabaceae).

***Presidiomiris infuscatus*, new species**

Figures 15c, 15d–22

**DIAGNOSIS:** Distinguished from *knighti* by the smaller body size and structure of the male genitalia, especially the shape of the tergal processes (figs. 15d, 16); weak tuberculate process on base of dorsal lobe of left paramere (fig. 18) and smaller, angulate medial interior flange of right paramere (figs. 19, 20).

**DESCRIPTION:** Male. Color, vestiture, and structure as given in generic description except pronotum and hemelytra not or only lightly suffused with green, and claval commissure sometimes without dark green border as in *knighti*. **Measurements:** Length 3.18–3.40; width 1.16–1.22; width of head across eyes 0.71–0.73, width of vertex 0.31; length of antennal segment I 0.27–1.05, segment II 1.10–1.20. **Genitalia:** *Genital capsule:* LP with bifurcate apex; RP small, elongate with three apical serrations. *Left paramere:* DLL with small, tuberculate process basally. *Right par-*

*amere*: dorsomedial surface with prominent spinate tubercle; MIF angulate in dorsal view; DLR with four strong spines distally. *Vesica*: Figures 21 and 22.

Female. Length 3.25–3.45; width 1.25–1.28; width of head across eyes 0.68–0.72; width of vertex 0.36–0.38; length of antennal segment I 0.26–0.31, segment II 1.15–1.31; posterior width of pronotum 1.00–1.04. Similar to male in color, vestiture, and structure except as noted in generic description.

ETYMOLOGY: From the Latin, *infuscatus* (darkened), referring to the infuscate hemelytral membrane.

HOLOTYPE MALE: USA, Texas, *Presidio Co.*, 3 mi N of Presidio, September 1, 1966, C. L. Cole (TAM), ex *Senna pilosior* (MacBride) Irwin and Barneby (Fabaceae); deposited in AMNH.

PARATYPES: 5♂, 3♀, same data as holotype (AMNH, TAM).

***Presidiomiris knighti*, new species**

Figures 15a, 15b, 23–33

DIAGNOSIS: Differs from *infuscatus* by its larger size; broad, rounded medial interior flange of right paramere (figs. 27, 28); strong spinelike process on base of dorsal lobe of left paramere (fig. 26); and nonfurcate left tergal process with finely serrate mid-dorsal margin (figs. 23, 24).

DESCRIPTION: Male. Color, vestiture, and structure as given in generic description but with posterior lobe of pronotum and hemelytra more strongly suffused with green than for *infuscatus*, and claval commissure always darker green. **Measurements:** Length 3.60–3.80; width 1.28–1.38; width of head across eyes 0.79–0.84, width of vertex 0.30–0.32; length of antennal segment I 0.31–0.32, segment II 1.10–1.26; posterior width of pronotum 1.12–1.22. **Genitalia:** *Genital capsule*: LP flattened distally, mid-dorsal margin finely serrate, apex pointed; RP with 6–8 marginal serrations. *Left paramere*: DLL with strong, spinelike basal process. *Right paramere*: MIF prominent, rounded in dorsal view with finely serrate margin; DLR with four strong spines distally. *Vesica*: Figures 29, 30.

Female. Length 3.65–3.68; width 1.40–1.45; width of head across eyes 0.78–0.79, width of vertex 0.38–0.39; length of antennal

segment I 0.31–0.35, segment II 1.25–1.30; posterior width of pronotum 1.16–1.21. Similar to male in color, vestiture, and structure except as noted in generic description.

ETYMOLOGY: Named in honor of Ray Knight, third baseman and World Series MVP of the 1986 Champion New York Mets.

HOLOTYPE MALE: USA, Texas, *Presidio Co.*, 13 mi N of Presidio, July 14, 1966, C. L. Cole, ex *Nama* sp. (Hydrophyllaceae); deposited in AMNH.

PARATYPES: 3♂, 2♀, same data as holotype (AMNH, TAM).

***PSEUDOPSALLUS* VAN DUZEE**

*Pseudopsallus* Van Duzee, 1916: 224 (new genus).

Type species—*Macrotylus angularis* Uhler.

*Bifidungulus* Knight, 1930: 1 (new genus). Type species—*Bifidungulus viridicans* Knight. Synonymy by Stonedahl and Schwartz, 1986: 7.

*Hesperocapsus* Knight, 1968: 103 (new genus).

Type species—*Pseudopsallus artemisicola* Knight. Synonymy by Stonedahl and Schwartz, 1986: 7.

*Ceratopidea* Knight, 1968: 100 (new genus). Type species—*Ceratopidea daleae* Knight. NEW SYNONYMY.

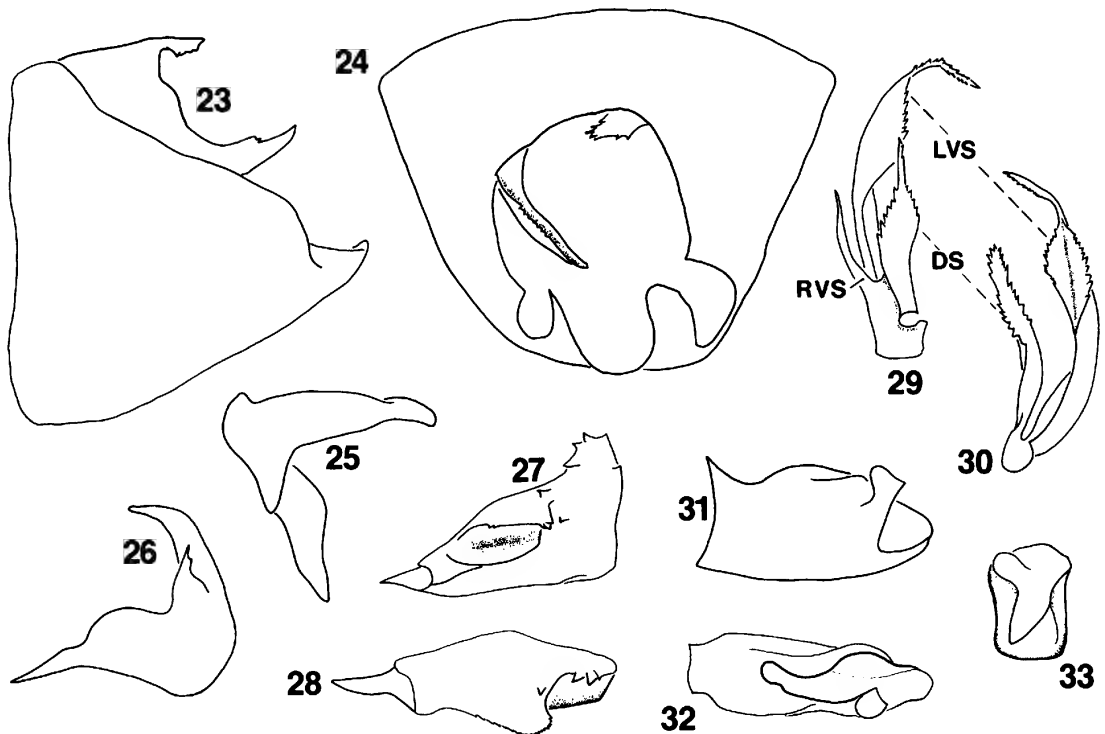
REVISED DIAGNOSIS: Similar to *Oaxacacoris* and *Presidiomiris*, sharing with these genera a subquadrate right paramere, deeply bifid right spicula of the vesica, and tergal processes (but see *daleae*, fig. 44) on the genital aperture in the 10–11 o'clock and 1–2 o'clock positions (see figs. 34d, 38, 50)—distinguished by the broader scalelike setae (figs. 34a–c); tergal processes originating from a skirtlike sclerotized plate on the anterodorsal margin of the genital aperture; and tergal processes strongly flattened for entire length, not projecting beyond margins of genital aperture.

DISCUSSION: The justification for the newly proposed synonymy of *Ceratopidea* with *Pseudopsallus* is presented in the Discussion for the species *daleae*.

***Pseudopsallus badger*, new species**

Figures 34a, 34d–43

DIAGNOSIS: External structure and male genitalia similar to *anograe* Knight and *occidentalis* Stonedahl and Schwartz but distinguished from them by the dark brown general

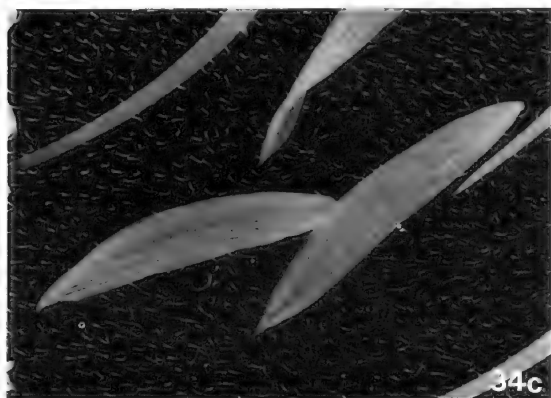
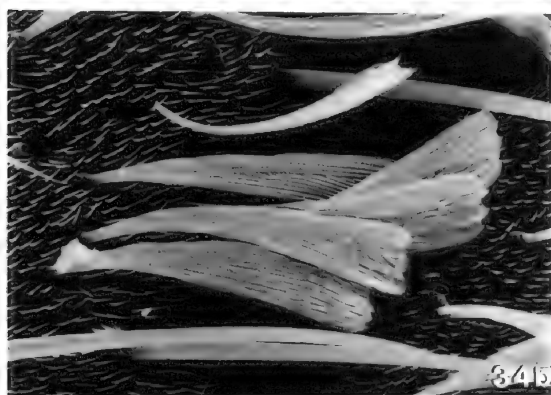
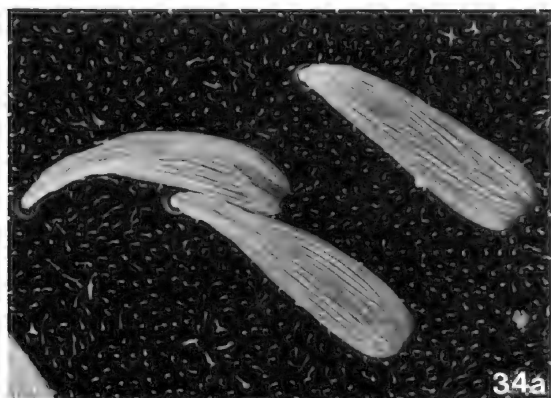


Figs. 23–33. Male genitalic structures of *Presidiomiris knighti*. 23, 24. Genital capsule. 23. Lateral view. 24. Dorsal view of tergal process. 25, 26. Left paramere. 25. Ventral view. 26. Lateral view. 27, 28. Right paramere. 27. Interior lateral view. 28. Dorsal view. 29, 30. Spiculae of vesica, (DS, dorsal; LVS, left ventral; RVS, right ventral). 29. Right lateral view. 30. Left lateral view. 31–33. Phallosome. 31. Left lateral view. 32. Dorsal view. 33. Posterior view.

coloration, longer labium and antennae, and left paramere with short dorsal lobe terminating in two prominent, widely separated spines (fig. 40). Further distinguished from *anograe* by the spatulate left medial tergal process of the genital aperture (figs. 34d, 35), and from *occidentalis* by the small basal process of the dorsal spicula, with only one secondary spine (fig. 43).

**DESCRIPTION:** Male. Length 4.80–5.10; width 1.72–1.85; dark brown general coloration; head, pronotum, and underparts sometimes dark yellowish brown; surface texture shining, slightly shagreened; dorsal vestiture with silvery white scalelike setae and long, brown, bristlelike setae. **Head:** Width across eyes 0.86–0.87, width of vertex 0.42; subovate, frons weakly convex; tylus prominent, junction with frons narrowly depressed; eyes occupying approximately three-fifths of head height, weakly emarginate above antennal insertion; posterior margin of eye slightly

rounded, narrowly removed from pronotal disk; antennal fossa nearly contiguous with anterior margin of eye, lower margin of fossa at level of lower margin of eye; juga and lora weakly convex; gena slightly broader than diameter of antennal segment I; gula narrow, bucculae reaching near posterior margin of head; length of antennal segment I 0.41–0.47, segment II 1.16–1.34; antennae dark brown; labium reaching between mesocoxae. **Pronotum:** Posterior width 1.36–1.43; lateral and posterior margins nearly straight; posterior angles broadly rounded; anterior margin weakly concave; mesoscutum moderately exposed; scutellum weakly convex. **Hemelytra:** Weakly rounded laterally, membrane smoky. **Legs:** Brown or brownish yellow; tibiae with dark spots at spine bases; tibial spines dark brown; tarsi and pretarsus dark brown to nearly black. **Genitalia:** *Genital capsule:* Two pairs of tergal processes; right processes confluent basally; RL flattened, long, without



Figs. 34a–c. Scalelike setae of *Pseudopsallus* species. 34a. *badger* (700×). 34b. *daleae* (580×). 34c. *tulare* (580×).

serrations, tapered distally to pointed apex; RM flattened, shorter than RL, with strong serrations on interior margin and apex; LL rounded, narrow, without serrations, tapered distally to pointed apex; LM very large, flattened, broadest medially, margin strongly serrate, apex pointed, ventral surface with

short serrate flange near basal margin (fig. 37). *Left paramere*: DLL broad basally, tapering to large pointed apical spine, and with large medial spine; LAL narrow, tapering to rounded apex, distal margin with serrations. *Right paramere*: MIF broad, not notched, ragged and strongly serrate; DLR slightly projecting above MIF; distal portion (DP) strongly produced, with patch of strong apical spines. *Vesica*: DS flattened, serrate marginally, distal third narrow, basal process (BP) pointed with one spine on margin; RVS tapering to narrow, serrate, pointed apex; LVS with serrate, recurved distal portion.

Female. Macropterous. Length 4.43–5.23; width 1.77–2.13; width across eyes 0.87–0.93, width of vertex 0.47–0.48; length of antennal segment I 0.41–0.45, segment II 1.23–1.46; posterior width of pronotum 1.36–1.65. Similar to male in color, vestiture, and structure except with lateral margins of hemelytra slightly more rounded.

ETYMOLOGY: Named for the type locality; a noun in apposition.

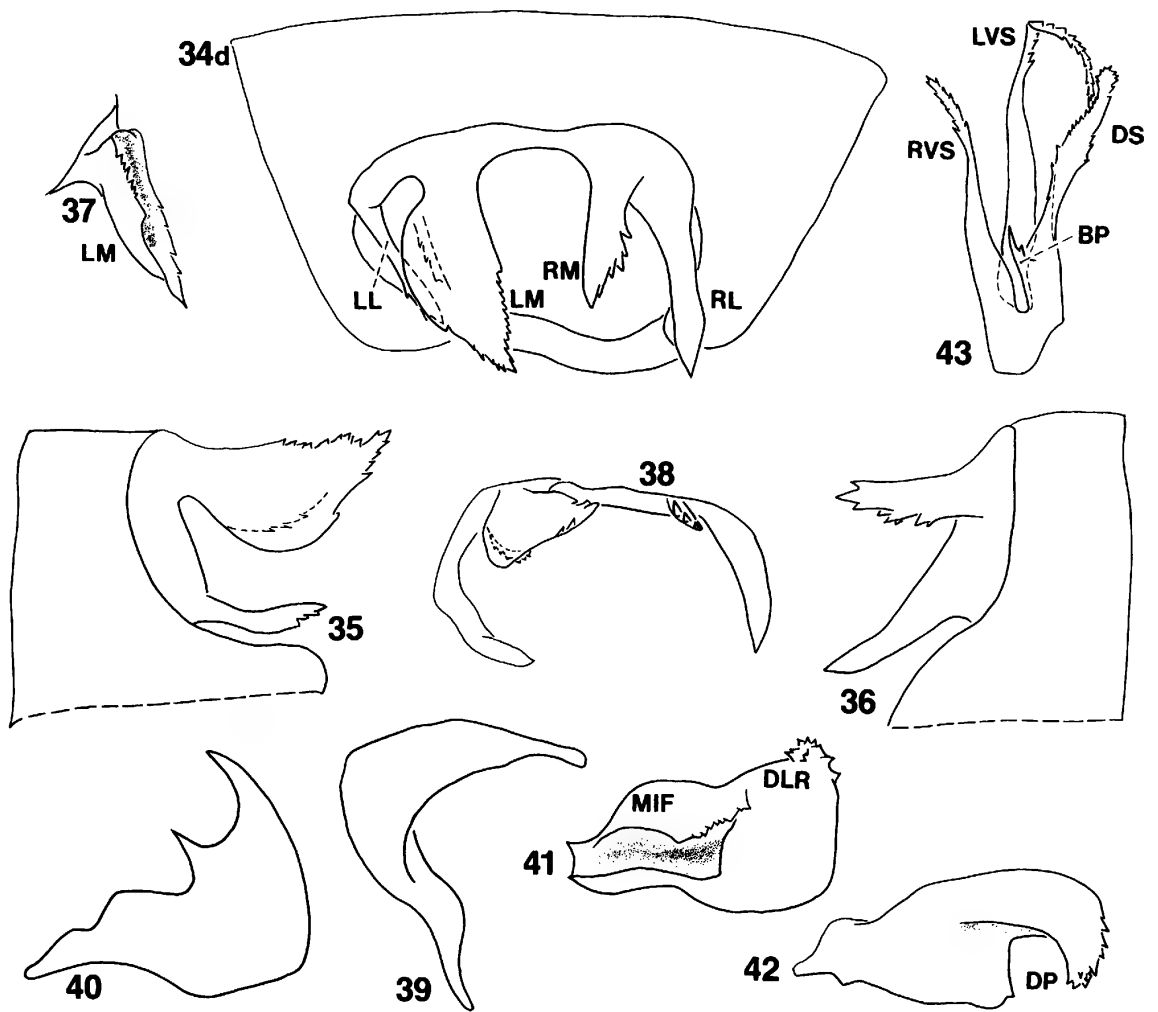
HOLOTYPE MALE: USA, California, Tulare Co., Badger, May 28, 1961, Brunson P. Bliven; deposited at CAS.

PARATYPES: 4♂, 11♀ same data as holotype (AMNH, CAS).

DISCUSSION: This species is known only from the type locality just west of the Sierra Nevada Mountains in Tulare County, California. The host plant association is not known—the related species *anograe* is associated with plants belonging to the family Onagraceae.

In the key to *Pseudopsallus* species by Stonedahl and Schwartz (1986), *badger* will key to couplet 14 with *abroniae* Knight and *stitti* Knight. It is distinguished from those species by the dark brown general coloration and the structure of the male genitalia, especially the number and form of the tergal processes of the genital aperture. Based on the structure of male genitalia, *badger* is most closely related to *anograe* Knight and *occidentalis* Stonedahl and Schwartz, but will not key with these species in Stonedahl and Schwartz (1986) because of its long labium.

In the phylogenetic analysis of *Pseudopsallus* species presented by Stonedahl and Schwartz (1986), the most parsimonious



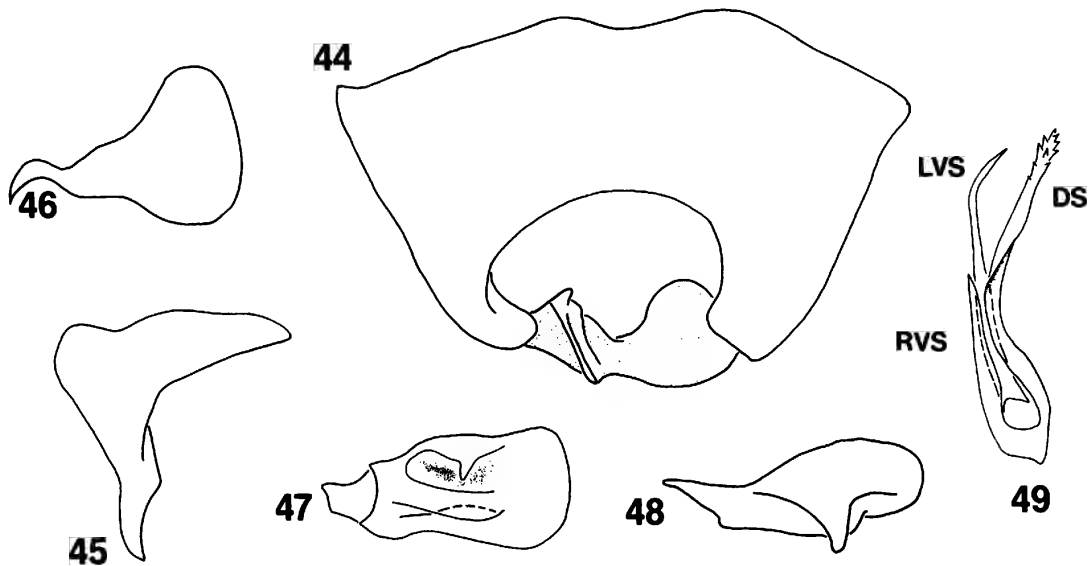
Figs. 34d–43. Male genitalic structures of *Pseudopsallus badger*. 34d–38. Tergal process of genital capsule. 34d. Dorsal view (LL, left lateral; LM, left medial; RL, right lateral; RM, right medial). 35. Left lateral view. 36. Right lateral view. 37. LM, ventral view. 38. Posterior view. 39, 40. Left paramere. 39. Ventral view. 40. Lateral view. 41, 42. Right paramere. 41. Interior lateral view (MIF, medial interior flange; DLR, dorsal lobe). 42. Dorsal view (DP, dorsal portion). 43. Spiculae of vesica (DS, dorsal; LVS, left ventral; RVS, right ventral).

placement of *badger* would be as the sister-species of *occidentalis*. The clade containing *badger* and *occidentalis* is the sister-group to *anograe* (at node 22 of Stonedahl and Schwartz, 1986) and is defined by the serrate flange on the ventral surface of the left medial tergal process. In addition, *badger* is uniquely defined by the short dorsal lobe of the left paramere with two large spines distally (character 5<sup>2</sup>) and the long labium (character 15).

*Pseudopsallus daleae* (Knight),  
new combination  
Figures 34b, 44–49

*Ceratopidea daleae* Knight, 1968: 100.

DIAGNOSIS: Recognized by the brownish gray general coloration, sometimes with faint greenish tinge especially on head and cuneus; base of tylus, vertex, and calli marked with fuscous or black, scutellum of male mostly



Figs. 44–49. Male genitalic structures of *Pseudopsallus daleae*. 44. Genital capsule. 45, 46. Left paramere. 45. Ventral view. 46. Lateral view. 47, 48. Right paramere. 47. Interior lateral view. 48. Dorsal view. 49. Spiculae of vesica (DS, dorsal; LVS, left ventral; RVS, right ventral).

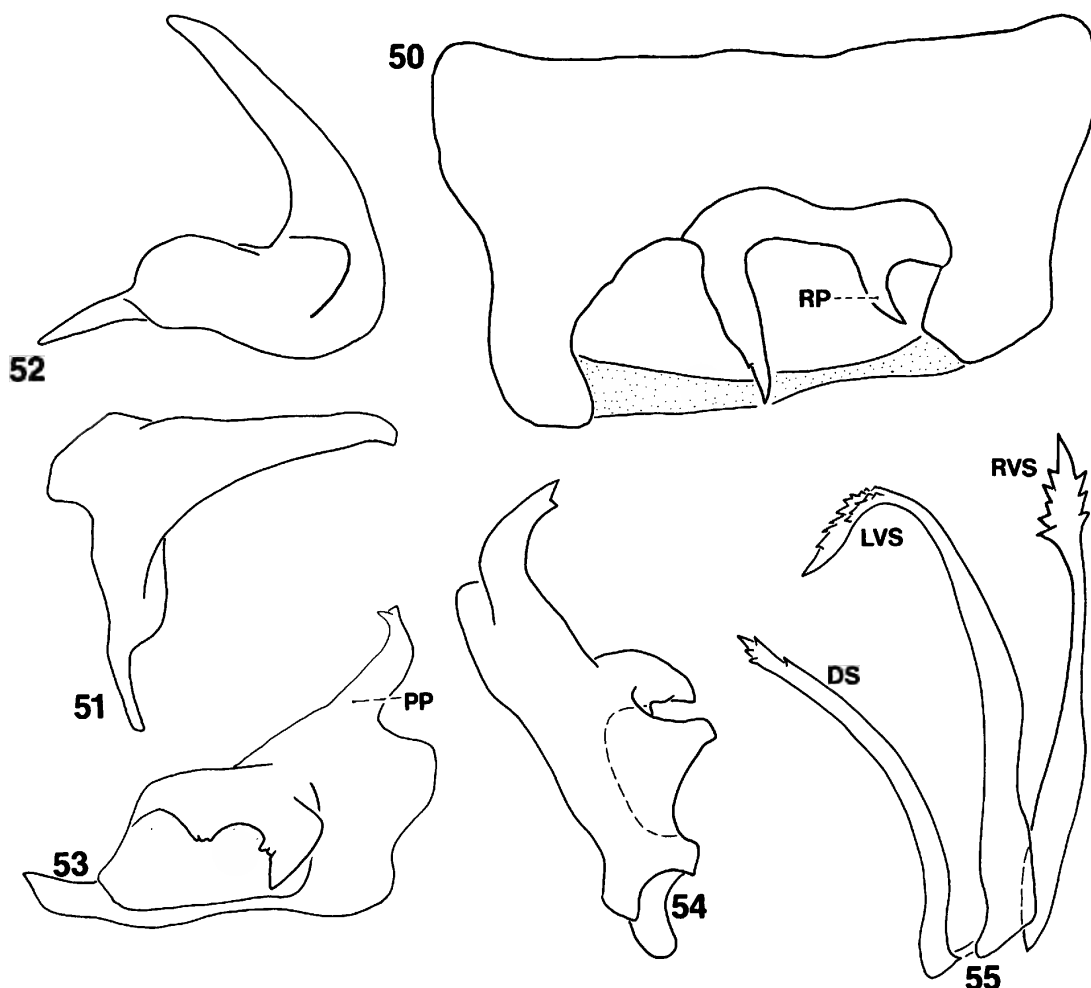
darkened, and distal third to one-half of femora black; hemelytral membrane pale with bright green veins; and structure of the male genitalia, particularly the large spinelike hump on medial interior flange of right paramere (figs. 47, 48), short dorsal lobe of left paramere without spines (fig. 46), and anterodorsal margin of genital aperture without tergal processes (fig. 44). The dorsal vestiture of *daleae* consists of moderately broad, silvery white, scalelike setae intermixed with pale to golden brown simple setae—hemelytra often with faint brownish spots at bases of simple setae.

**DESCRIPTION OF MALE GENITALIA:** *Genital capsule:* Anterodorsal margin of genital aperture without tergal processes. *Left paramere:* DLL short, blunt, without spines; LAL broad basally, abruptly constricted distally, apex narrow and blunt. *Right paramere:* MIF with single large spinelike hump; DLR very slightly produced above MIF, and with two minute spiculae distad of MIF; DP obsolete. *Vesica:* DS narrow over entire length, flattened, apex serrate; RVS extremely short; LVS very thin, rounded, apex pointed.

**HOLOTYPE MALE:** USA, Nevada, Nye Co., Nevada Atomic Test Site, Area 401M, June 18, 1965, H. H. Knight and J. M. Merino (USNM).

**DISCUSSION:** Knight (1968) considered this species to be related to *Daleapidea* Knight and *Lopidea* Uhler but gave no character information supporting this placement. The striking superficial resemblance of *daleae* to *Daleapidea* (e.g., general coloration, thick antennae) and the occurrence of these taxa on the same host plant, *Psorothamnus* (reported as *Dalea* by Knight, 1968), may have lead Knight to this erroneous conclusion. Further, Knight (1968: 100) considered the species to have “no close relative,” and placed it in the new genus *Ceratopidea*, which he diagnosed as having thick first and second antennal segments and dorsal vestiture composed of “white, flat, scalelike pubescence, intermixed with suberect, simple pubescent hairs.” As discussed in our revision of *Pseudopsallus* Van Duzee (Stonedahl and Schwartz, 1986), such vestiture itself is not diagnostic for Knight’s *Ceratopidea*. Thick antennae are seen in a variety of unrelated orthotyline taxa, as well as some species of *Pseudopsallus*, and this character does not define a monophyletic group based on our observations.

Although Knight’s treatment suggests that *daleae* has no close relatives, our examination revealed that features of the head, dorsal vestiture (e.g., setal fine structure), and male genitalia (except for the obsolete tergal pro-



Figs. 50–55. Male genitalic structures of *Pseudopsallus tulare*. 50. Genital capsule (RP, right tergal process). 51, 52. Left paramere. 51. Ventral view. 52. Lateral view. 53, 54. Right paramere. 53. Interior lateral view, (PP, proximal portion). 54. Dorsal view. 55. Spiculae of vesica (DS, dorsal; LVS, left ventral; RVS, right ventral).

cesses) are diagnostic for *Pseudopsallus* and thus we propose *Ceratopidea* as a new synonym of *Pseudopsallus*.

In the key to *Pseudopsallus* species (Stonedahl and Schwartz, 1986), *daleae* keys to *angularis* (Uhler) at couplet 3, as does *tulare*, new species. *Pseudopsallus daleae* is distinguished from these species by its smaller size, less extensive fuscous markings on the head, bright green veins of the hemelytral membrane, and structure of the male genitalia (see Diagnosis).

*Pseudopsallus daleae* is difficult to place in the phylogeny of species proposed by Stonedahl and Schwartz (1986), because the ab-

sence of tergal processes cannot be accommodated by the coding method employed. However, based on other characters, the most parsimonious placement of *daleae* appears to be as the sister-species of *angularis* + *tulare*. Collectively, the three species appear to represent a clade (species-group) that can be defined by the dark markings on the head (a character not employed in Stonedahl and Schwartz, 1986), and the dorsal spicula of the vesica with surface serrations apically (character 8 on cladogram of Stonedahl and Schwartz, 1986). This clade would originate from node 36, which is the position originally occupied solely by *angularis*. *Pseudopsallus*

*daleae* is further defined in this group by the short dorsal lobe of the left paramere (character 5).

**SPECIMENS EXAMINED:** USA. **California:** *Inyo Co.:* Antelope Springs, June 14, 1961, C. A. Toschi, 1♂ (UCB); 21.7 mi E of Rt. 395 on Westgard Pass Rd., 1560 m, July 2, 1980, R. T. Schuh, ex *Psorothamnus polydenius* (Torr.) Rydb. (Fabaceae), 8♂, 19♀ (AMNH). **Nevada:** *Washoe Co.:* S shore of Pyramid Lake, June 17, 1966, W. Gagne, ex *Dalea* sp. (paratypes 1♂, 3♀). *Mono Co.:* Benton Hot Springs, June 8, 1966, W. Gagne, 2♂, 4♀ (UCB).

*Pseudopsallus tulare*, new species

Figures 34c, 50–55

**DIAGNOSIS:** Similar to *angularis* but distinguished by its smaller size; lighter greenish yellow general coloration, with limited suffusion on pronotal disk and hemelytra; head more strongly produced anteriorly of antennal fossa; and structure of the male genitalia, particularly the strongly produced and nonfurcate left tergal process (fig. 50); medial interior flange of right paramere with large, distal hump (figs. 53, 54); proximal portion of dorsal lobe of right paramere with long, curved, and apically pointed projection (figs. 53, 54); and dorsal spicula of vesica narrow and cylindrical (fig. 55). Distinguished from all other species of *Pseudopsallus* by the shiny, fuscous markings on the head and calli, and the unique right paramere.

**DESCRIPTION:** Male. Length 4.66–5.03; width 1.46–1.69; greenish yellow general coloration; head and anterior lobe of pronotum more purely yellow; vertex, frons, tylus, apices of lora, and calli with shining fuscous markings; posterior lobe of pronotal disk, clavus, and inner margin of corium lightly to moderately suffused with fuscous; dorsal surface slightly shagreened, shining; dorsal vestiture with narrow silvery white scalelike setae and long black bristlelike setae. **Head:** Width across eyes 0.84–0.92, width of vertex 0.43–0.47; subovate, strongly produced anteriorly of antennal fossa; frons weakly rounded, meeting tylus along broad shallow depression; tylus moderately produced; eyes occupying approximately three-fifths height of head, broadly emarginate above antennal insertion, posterior margin of eye weakly

rounded, narrowly removed from anterior margin of pronotum; antennae inserted near ventral margin of eye, fossa narrowly removed from anterior margin of eye; juga weakly convex; lora elongate, flattened, ventral margin carinate; gena broader than diameter of antennal segment I; gula narrow; bucculae broad, tapered distally; length of antennal segment I 0.38–0.39, segment II 1.42–1.74; antennae brown or dark brown, segment I usually lighter brownish yellow apically; labium reaching base of genital capsule. **Pronotum:** Posterior width 1.24–1.40; lateral margins slightly arcuate, posterior margin nearly straight; anterior and posterior angles broadly rounded; calli with strongly contrasting, shiny fuscous markings, especially posteriorly and medially; mesoscutum narrowly exposed; scutellum weakly convex, usually paler medially; mesosternum fuscous. **Hemelytra:** Weakly rounded laterally; membrane moderately suffused with fuscous, veins pale. **Legs:** Femora pale yellow, or greenish yellow with fuscous spots and scattered bristlelike setae; tibiae pale yellow, sometimes more brownish yellow; tibial spines black; tarsi brown or dark brown. **Genitalia:** *Genital capsule:* Single RP, small, broadest basally, tapering to pointed apex; single left tergal process, flattened and parallel-sided submedially, tapering distally, and with a single serration, pointed apically. *Left paramere:* DLL long, narrow, and tapering to pointed apex, base of dorsal lobe with small, blunt prominence; LAL long, narrow, and tapering to point. *Right paramere:* MIF with very prominent, smooth and pointed distal hump, proximal hump prominent, truncate and serrate apically; DLR projecting above MIF, DP obsolete and without spines; proximal portion of dorsal lobe (PP) with long, curved and apically pointed projection. *Vesica:* DS very narrow, and cylindrical over entire length, with small serrations distally, apex pointed; RVS long, thickest basally, tapering to broadly clavottruncate and pointed apex; LVS long, very thick, tapering to recurved and serrate distal fourth, apex pointed.

Female. Macropterous. Length 5.02–5.60; width 1.59–1.83; width across eyes 0.90–0.95, width of vertex 0.48–0.51; length of antennal segment I 0.36–0.43, segment II 1.67–1.82; posterior width of pronotum 1.39–1.53. Similar to male in color, vestiture, and structure.



ETYMOLOGY: Named for the county in California where all specimens were collected.

HOLOTYPE MALE: USA, California, Tulare Co., 2.6 mi W of county line nr. Chimney Peak R[anger]. S[tation]., 2000 m, July 1, 1980, ex *Nama rothrockii* Gray (Hydrophyllaceae), R. T. Schuh; deposited in AMNH.

PARATYPES: 44♂, 56♀ same data as holotype (AMNH); 7♂, 18♀ same data as holotype, except with "ex Solanaceae" (AMNH).

DISCUSSION: The type locality of *tulare* is within a typical eastern Sierran pinyon-juniper community type. Considering the distribution of its host plant, we suspect that *tulare* is more broadly distributed on *Nama* east of the Sierra Nevada Mountains.

In the key to *Pseudopsallus* species (Stonedahl and Schwartz, 1986), *tulare* keys to *angularis* (Uhler). The two species are distinguished by the characters given in the preceding species diagnosis.

The most parsimonious placement of *tulare* in the species cladogram presented by Stonedahl and Schwartz (1986) is as the sister-species of *angularis*. This species pair is defined by dark, bristlelike, simple setae on the dorsum (character 18 of Stonedahl and Schwartz, 1986), and the genital aperture with two tergal processes, one left and one right of midline (character 3). Further, *angularis* + *tulare* would be recognized as the sister-group of *daleae*. The characters defining *daleae* + (*angularis* + *tulare*), and the position of this clade on the original cladogram of Stonedahl and Schwartz (1986) are discussed in species treatment for *daleae*. Within this clade, *tulare* is further defined by the enlarged distal portion of the dorsal lobe of the right paramere (character 4), and the distal portion of the dorsal spicula of the vesica with marginal serrations only (character 8°).

#### PHYLOGENETIC DISCUSSION

The relationship of *Pseudopsallus* to other orthotyline genera was first investigated by Stonedahl and Schwartz (1986). Although this investigation was restricted to Nearctic taxa, we concluded that *Pseudopsallus* belonged to a complex of genera which included *Oaxacacoris*, and were united by similarities in type and fine structure of the dorsal setae, and the structure of the male genitalia. Herein, we suggest that *Presidiomiris* is part of that

complex, and further that the three genera form a monophyletic group. Our analysis was performed without computer assistance using a character addition tree-building procedure. Character polarities were established by outgroup comparison to all other Nearctic Orthotylini possessing dorsal vestiture composed of scalelike setae (see Stonedahl and Schwartz, 1986: 3–4 for discussion of examined taxa and characters).

The cladistic analysis produced one minimal length tree of seven steps. The hypothesis of phylogenetic relationships of the three genera is illustrated in figure 1a. These taxa may be distinguished from all other North American Orthotylini by these characters: (1) 10–11 o'clock and 1–2 o'clock positions of the tergal processes on the anterodorsal margin of the genital aperture; (2) the subquadrate right paramere; and (3) the deeply bisected right spicula of the vesica. A sister-group relationship for *Presidiomiris* and *Pseudopsallus* is indicated by the well-developed medial flange on the inner surface of the right paramere, usually subtended by a troughlike excavated region, and the large, broadened dorsal spicula of the vesica. One character shared by *Oaxacacoris* and *Presidiomiris* is hypothesized to be homoplasious in our analysis—dorsal vestiture with narrow, golden brown to black, scalelike setae. The autapomorphies of each genus are provided in the respective generic diagnosis, and are not indicated on the cladogram.

In the phylogenetic analysis of *Pseudopsallus* species presented by Stonedahl and Schwartz (1986), *Oaxacacoris* was used as the sole outgroup for the determination of character polarities. Since *Presidiomiris* is here established as the closest relative of *Pseudopsallus*, we point out that the inclusion of this genus in an exhaustive computer reanalysis which included all the species of each of the three genera could alter character polarities, and produce a cladogram different from that of Stonedahl and Schwartz (1986).

#### REFERENCES

- Knight, H. H.  
1930. New species of *Pseudopsallus* Van D. with an allied new genus described (Hemiptera, Miridae). Bull. Brooklyn Entomol. Soc. 25: 1–8.  
1968. Taxonomic review: Miridae of the Ne-

- vada test site and the western United States. Brigham Young Univ. Sci. Bull., Biol. Ser. 9(3): 1-282.
- Schwartz, M. D., and G. M. Stonedahl  
1987. *Oaxacacoris*, a new plant bug genus and three new species of Orthotylini from Mexico (Heteroptera: Miridae). Proc. Entomol. Soc. Washington 89(1): 15-23.
- Slater, J. A.  
1950. An investigation of the female genitalia as taxonomic characters in the Miridae. Iowa St. J. Sci. 25: 1-81.
- Stonedahl, G. M., and M. D. Schwartz  
1986. Revision of the plant bug genus *Pseudopsallus* Van Duzee (Heteroptera: Miridae). Am. Mus. Novitates 2842: 58 pp.
- Van Duzee, E. P.  
1916. New or little known genera and species of Orthotylini (Hemiptera). Univ. California Publ. Entomol., Tech. Bull. 1: 217-227.

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