

ILLINOIS  
NATURAL  
HISTORY  
SURVEY

Revision of the Bees of the  
Genus *Tetraloniella* in the  
New World (Hymenoptera:  
Apidae)



Wallace E. LaBerge

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## Contents

Introduction	67
Acknowledgements	67
Genus <i>Tetraloniella</i> Ashmead	67
Keys to the Females of <i>Tetraloniella</i>	69
Keys to the Males of <i>Tetraloniella</i>	74
<i>Tetraloniella spissa</i> (Cresson), new combination	78
<i>Tetraloniella lippiae</i> (Cockerell), new combination	80
<i>Tetraloniella silacea</i> , new species	83
<i>Tetraloniella trabeata</i> , new species	85
<i>Tetraloniella ayala</i> , new species	87
<i>Tetraloniella eriocarpi</i> (Cockerell)	88
<i>Tetraloniella wilmattae</i> (Cockerell), new combination	93
<i>Tetraloniella fulvotecta</i> (Cockerell)	95
<i>Tetraloniella perconcinna</i> (Cockerell), new combination	96
<i>Tetraloniella incana</i> , new species	100
<i>Tetraloniella balluca</i> , new species	101
<i>Tetraloniella yanega</i> , new species	104
<i>Tetraloniella vandykei</i> , new species	105
<i>Tetraloniella albata</i> (Cresson), new combination	107
<i>Tetraloniella paenalbata</i> , new species	109
<i>Tetraloniella ochraea</i> , new species	110
<i>Tetraloniella cressoniana</i> (Cockerell)	112
<i>Tetraloniella crenulaticornis</i> (Cockerell)	114
<i>Tetraloniella donata</i> (Cresson)	115

<i>Tetraloniella fastigiata</i> , new species	118
<i>Tetraloniella minutilla</i> , new species	120
<i>Tetraloniella flagellicornis</i> (Smith)	121
<i>Tetraloniella noguera</i> , new species	123
<i>Tetraloniella michoacanensis</i> , new species	125
<i>Tetraloniella jaliscoensis</i> , new species	127
<i>Tetraloniella helianthorum</i> (Cockerell)	130
<i>Tetraloniella flavifasciata</i> (Cockerell)	132
<i>Tetraloniella cacuminis</i> , new species	133
<i>Tetraloniella pomonae</i> (Cockerell)	135
<i>Tetraloniella distata</i> , new species	137
<i>Tetraloniella davidsoni</i> (Cockerell)	139
<i>Tetraloniella imitatrix</i> (Cockerell and Porter)	141
<i>Tetraloniella sphaeralceae</i> , new species	143
<i>Tetraloniella pennata</i> , new species	145
<i>Tetraloniella arizonica</i> (Cockerell)	146
Literature Cited	149
Index of Scientific Names	152
Figures 10–175 ( <i>Tetraloniella</i> Morphology)	153

## Revision of the Bees of the Genus *Tetraloniella* in the New World (Hymenoptera: Apidae)

The genus *Tetraloniella* was proposed by Ashmead in 1899 (p. 61) to include a small Palearctic eucerine bee, *Macrocera graia* Eversmann, known to Ashmead only in the female sex. This specimen and several others of this species have been examined by the present author but no male specimen has come available, thus the critical characters of the terminalia have not been studied. Nonetheless, the author is convinced from the female characters that *Tetraloniella* of Europe and Asia is the same genus as *Xenoglossodes*, also named by Ashmead (p. 63) later in the same paper. Michener, McGinley, and Danforth (1994:158) refer to the genus under the name *Tetraloniella* but suggest that, “. . . the synonymy of *Xenoglossodes* and *Tetraloniella* is uncertain.” This author agrees that our current knowledge of this interesting genus is incomplete. The synonymy of *Xenoglossodes* and *Tetraloniella*, however, appears to be correct and this author will continue to use the latter name for the genus.

A total of 6,504 specimens were studied representing 35 species, of which 19 are new to science. A total of 14 names are listed as synonyms and 1 name is recognized as a junior homonym and renamed. Complete descriptions for all species and keys for the diagnoses of both sexes are included when possible.

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### Genus *Tetraloniella* Ashmead

*Tetraloniella* Ashmead, 1899, Trans. American Ent. Soc., 26:61; Michener, McGinley, Danforth, 1994, Smithsonian Inst. Press, p. 158. Type Species: *Tetraloniella graya* Eversmann, by original designation.

*Xenoglossodes* Ashmead, 1899, Trans. American Ent. Soc., 26:62; Cockerell, 1906, Tran. American Ent. Soc., 32:74–92; 1910, Univ. Colorado Studies, 7:184, 194; 1911, Proc. United States Nat. Mus., 43:262, 266; 1922, Ann Mag. N. H., ser. 9, 9:360; LaBerge, 1957, American Mus. Novs., No. 1837, p. 25; Michener, McGinley, and Danforth, 1994, Smithsonian Inst. Press, p. 158 (synonymy), Type Species:

*Xenoglossodes albata* Cresson, by original designation.

*Tetraloniella* are small- to moderate-sized bees. Most of them superficially resemble a small- to moderate-sized member of the genus *Melissodes* but can be distinguished in both sexes by having 5- or 6-segmented labial palpi and tegulae in which the outer margin is strongly convex in the anterior half, not straight or concave. Furthermore, the male gonostyli are not straight as in *Melissodes*, but strongly elbowed as in the genera *Peponapis*, *Loxoptilus*, *Xenoglossa*, and several other eucerines. A few species closely resemble certain smaller members of the genus *Synhalonia* Patton but can usually be recognized by the short malar space and often 5 maxillary palpus segments in either sex. One species (*T. arizonica*), here included in the genus *Tetraloniella*, has a strongly protuberant clypeus as in *Loxoptilus* or *Peponapis* and a few other eucerine genera. It is retained here as it does not fit well into any other existing genus, and this author does not wish to create a monotypic genus at this time.

**Common Characters.** Small- to medium-sized bees; facial quadrangle quadrate, rarely slightly elongate; eyes with inner margins parallel or slightly converging towards mandibles; vertex above lateral ocelli equals one to less than one ocellar diameter; genal area about as broad as eye in profile or narrower; malar area linear, minimum length usually less than one-fifth median length; oculoclypeal distance usually equal to half of minimum flagellar width or less; galea moderate, elongate, about as in *Melissodes*. Metasomal terga not metallic nor with metallic reflections.

**Female Characters.** Middle basitarsus subequal in length to tibia; tibial spurs normal, middle leg spur not hooked; arolia present; anterior coxae not spined; basitibial plate defined posteriorly; scopal hairs usually dense, simple to highly plumose, occasionally roughened. Metasomal terga often with distal pale pubescent bands and these usually situated apically, occasionally bands absent or not distinct. Gradulus of tergum 6 with lateral parts cariniform, not toothed; pygidial plate

about as broad at base as length or slightly narrower. Sternum 6 with apex usually emarginate.

**Male Characters.** Antennae long to very long; scape thicker than ocellar width; first flagellar segment usually half length of second and much shorter, second segment often longer than scape; last flagellar segment normal. Clypeus, labrum, and base of mandible often yellow to almost white, relatively rarely entirely black or brown. Mandiblar apex simple. Hind legs unmodified; middle and hind basitarsi often slender; claws symmetrical or nearly so. Tergum 6 occasionally with strong gradular teeth laterally; tergum 7 without teeth; pygidial plate truncate, with or without subapical lateral notches. Gonostylus long, thin, elbowed, with apex turned inward. See LaBerge (1957:25–27) for a more complete generic description under the name of *Xenoglossodes*.

**Key to the Females of  
*Tetraloniella***

1. Ultimate flagellar segment no longer than broad or only slightly so .....  
..... *davidsoni* (Cockerell)  
Ultimate flagellar segment distinctly longer than broad, usually about 1.3 to 2.0  
times as long as broad..... 2.
- 2(1). Scopal hairs plumose or simple, white to pale ochraceous; small to moderately  
large bees .....3.  
Scopal hairs plumose, brown; small bees no more than 10 mm in length.....  
..... *vandykei*, new species.
- 3(2). Pterostigma distinctly longer than prestigma (usually 1.2 to 1.5 times as long), *if*  
*about as long, then* scopal hairs roughened to weakly plumose or simple *and*  
tergum 2 apical pubescent band broadly interrupted medially ..... 4.  
Pterostigma no longer or shorter than prestigma; scopal hairs simple, smooth, or  
highly plumose with long branches; tergum 2 apical pale pubescent band usually  
well-formed.....8.
- 4(3). Metasomal tergum 2 without pale apical pubescent band (may be narrowly fringed  
with pale pubescence) .....*pomona*e Cockerell, in part.  
Metasomal tergum 2 apical area with abundant pale pubescence often arranged in an  
apical pale band or in short lateral fasciae .....5.
- 5(4). Metasomal tergum 2 apical pale band broadly interrupted medially; scopal hairs  
sparse, plumose, with short branches, not at all obscuring surface of tibia .....  
..... *distata*, new species.  
Metasomal tergum 2 apical pale band entire; scopal hairs plumose with moderately  
long branches, more or less obscuring surface of tibia.....6.
- 6(5). Flagellum red below; vestiture generally bright fox-red; scopal hairs ochraceous,  
branches of each hair long .....*pennata*, new species.  
Flagellum black below; vestiture generally pale ochraceous; scopal hairs white to  
pale ochraceous, branches usually short .....7.
- 7(6). Hind basitarsi inner surfaces with hairs dark brown to black .....  
.....*sphaeralceae*, new species, in part.  
Hind basitarsi with inner surface hairs yellow to red .....  
..... *imitatrix* (Cockerell and Porter), in part.
- 8(3). Scopal hairs simple but distinctly roughened, not highly plumose; terga 2 and 3 with  
distal pale bands absent or represented by narrow, complete, apical fringes of  
short pale pubescence, apical area basad of fringe with short, brown, relatively  
simple, subappressed hairs .....9.  
Scopal hairs highly plumose or simple and smooth; terga 2 and 3 with vestiture of  
apical areas not as above .....10.
- 9(8). Clypeus relatively flat especially posteriorly; vertex weakly depressed between  
compound eyes; vertex and thoracic dorsum with some dark brown hairs; pale  
metasomal hairs usually ochraceous ..... *pomona*e Cockerell, in part.

- Clypeus strongly bowed out; vertex deeply depressed between compound eyes;  
vertex and thoracic dorsum without dark hairs; pale metasomal hairs white  
.....*arizonica* (Cockerell)
- 10(8). Scopal hairs highly plumose ..... 11.  
Scopal hairs simple, smooth ..... 25.
- 11(10). Clypeus with yellow subapical band; labrum often with yellow mediobasal macula or  
entirely pale and mandibles with yellow maculae basally ..... 12.  
Clypeus without yellow subapical macula (may be somewhat rufescent apically);  
*if narrowly yellow, then* labrum and mandibles without yellow ..... 15.
- 12(11). Mesoscutum posteromedially with punctures separated by half to one puncture width  
or more, surface shiny; face below ocelli with punctures separated by half to two  
or more puncture widths, surface shiny ..... 13.  
Mesoscutum posteromedially with crowded punctures separated mostly by less than  
half a puncture width, surface somewhat dulled, finely shagreened; face below  
ocelli with crowded punctures separated mostly by less than half a puncture width  
.....*fulvotecta* (Cockerell).
- 13(12). Pygidial plate broadly V-shaped with pointed apex; tergum 1 with apical area  
almost impunctate, basal area in medial third with punctures separated mostly  
by two or more puncture widths; mesoscutum and scutellum with brown hairs  
.....*incana*, new species.  
Pygidial plate V-shaped with broadly rounded apex; tergum 1 with apical area densely  
punctate basally, in median third usually half apical area length punctate, basal  
area variously punctate; mesoscutum and scutellum usually without dark hairs  
..... 14.
- 14(13). Labrum usually entirely yellow or white; clypeal yellow macula often with small me-  
dian extension pointed towards vertex; terga 3 and 4 with interband zone vestiture  
relatively plumose, fused with apical bands .....*eriocarpi* (Cockerell).  
Labrum mostly black or at least margined with black; clypeal yellow macula narrow  
or reduced to lateral maculae, without median point as described above; terga 3  
and 4 often with interband zone vestiture relatively simple, usually pale but with  
apical bands not fused .....*wilmattae* (Cockerell).
- 15(11). Flagellar segments 2–8 or 9 as broad as long or broader, segment 2 as long as seg-  
ment 3 or shorter (antennae short) .....*balluca*, new species.  
Flagellar segments 2–8 or 9 distinctly longer than broad, segment 2 usually longer  
than 3 (antennae of normal length)..... 16.
- 16(15). Flagellar segment 2 distinctly longer than broad and usually about as long as seg-  
ment 3 or longer ..... 17.  
Flagellar segment 2 no longer than broad and usually slightly shorter, segment  
3 longer than 2 ..... 20.
- 17(16). Galeae opaque, densely and finely tessellate; mesoscutal surface dulled by fine  
dense reticular shagreening or tessellation, punctures variable .....  
.....*trabeata*, new species.  
Galeae shiny above or moderately dulled by extremely fine tessellation; mesoscutum  
shiny at least posteromedially, punctures distinct ..... 18.

- 18(17). Tergum 2 apical pubescent band broadly interrupted medially by one-third to one-half tergal width, resulting lateral fasciae not reaching margin of tergium except at extreme sides; *or* terga 3 and 4 basally with highly plumose pale hairs hiding surfaces, *or* both .....19.  
 Terga 2–4 distal pale pubescent bands apical and complete and terga 3 and 4 interband and basal zones with surfaces not hidden by plumose pale hairs.....*spissa* (Cresson).
- 19(18). Tergum 2 distal pale band white, broadly interrupted medially, subapical; terga 2–4 with interband zones with dark brown hairs; tergium 4 basal tomentum dark brown .....*lippiae* (Cockerell).  
 Tergum 2 distal pale band absent or apical, occasionally interrupted medially, usually ochraceous or yellow; terga 3 and 4 interband zones usually without dark hairs .....*sphaeralceae*, new species, in part.
- 20(16). Metasomal terga 2–4 with narrow, apical, pale, pubescent bands distinct from interband zone of largely erect hairs, tergium 2 band less than one-fourth median length of tergium .....21.  
 Metasomal terga 2–4 apical pale fasciae broad, more or less fused with highly plumose interband zone pubescence, *or* tergium 2 with apical band medially more than one-fourth median length of tergium .....22.
- 21(20). Metasomal terga 5 and 6 with ochraceous to dark ochraceous vestiture .....*silacea*, new species.  
 Metasomal terga 5 and 6 with dark brown vestiture .....*ayala*, new species.
- 22(20). Tergum 2 with apical pale band broadly interrupted medially; subapical pale vestiture white .....*lippiae* (Cockerell), in part.  
 Tergum 2 apical pale band complete; apical pale vestiture pale ochraceous to ochraceous ..... 23.
- 23(22). Metasomal terga 2–4 interband zones with dark hairs; tergium 5 with dark tomentum basally, tergium 6 often with dark brown hairs except laterally.....*perconcinna* (Cockerell).  
 Metasomal terga covered with pale pubescence, terga 4–6 without dark hairs (occasional narrow dark areas in interband zones of 2 and 3) .....24.
- 24(23). Mesepisternum with minute, relatively shallow punctures separated by half to one or more puncture widths (especially in lower half and posteriorly), interpunctural spaces dull, finely shagreened; mesoscutum posteromedially with deep punctures separated mostly by one or more puncture widths; flagellum dark brown below .....*imitatrix* (Cockerell), in part.  
 Mesepisternum with deep crowded punctures throughout, surfaces shiny; mesoscutum posteromedially with punctures separated by half or less than one puncture width; flagellar segments beyond 3 red on under surfaces .....*yanega*, new species.
- 25(10). Terga 2–4 (or at least terga 3 and 4) without distinct apical pale pubescent bands (bands fused with interband and basal area pale pubescence).....26.  
 Terga 2–4 with distinct apical pale bands (occasionally interrupted on tergium 4).....31.

- 26(25). Metasomal tergum 2 (and occasionally tergum 3 at sides) with apical pale band separated from basal pale tomentum by complete narrow zone of brown, relatively simple hairs; mesoscutum dull, with small, shallow, crowded, round punctures and fine tessellation .....*fastigiata*, new species, in part.  
Metasomal tergum 2 with apical pale band not separated from basal pale tomentum; mesoscutal sculpture usually not as above .....27.
- 27(26). Metasomal tergum 1 apical area largely free from punctures except at extreme sides and a few basomedially .....28.  
Metasomal tergum 1 apical area punctate except along narrow apical rim .....29.
- 28(27). Tergum 5 with vestiture entirely white or narrowly bordered with ochraceous; tergum 6 vestiture pale ochraceous to white; sterna 2–5 with golden or golden-brown hairs .....*paenalbata*, new species.  
Tergum 5 apical border with dark brown vestiture medially; tergum 6 with vestiture entirely or mostly dark brown; sternal hairs mostly dark brown.....  
.....*helianthorum* (Cockerell).
- 29(27). Flagellar segments 2–11 red below; tergal vestiture white; sternal vestiture moderate in length, brown to golden-brown, white apicolaterally .....30.  
Flagellar segments 2–11 dark brown to black below; tergal vestiture pale ochraceous; sternal vestiture short, pale golden, white apicolaterally.....  
.....*ochraea*, new species.
- 30(29). Small bees, mostly less than 10 mm in length; metasomal tergum 1 apical area completely covered by short, closely appressed, pale pubescence; mesoscutal punctures small, crowded, surface dull; vestiture ochraceous .....  
.....*minutilla*, new species.  
Moderate-sized bee, 10 mm or more in length; tergum 1 apical area not covered by dense pubescence; mesoscutal punctures less crowded, surface shiny, unshagreened; vestiture white .....*albata* (Cresson).
- 31(25). Pygidial plate narrow with acutely pointed apex; flagellum with ventral surface dark brown to black .....*cacuminis*, new species.  
Pygidial plate often broad, apex usually rounded; *if pointed, then* flagellar segments 3–11 orange to red below .....32.
- 32(31). Mesoscutum with large, round, shallow punctures separated by mere ridges less than half a puncture width, surface (and bottoms of punctures) slightly dulled by shagreening or fine tessellation .....*donata* (Cresson).  
Mesoscutum with smaller, often well-separated, deeper punctures, often separated by half to one puncture width or more, and often shiny posteromedially.....  
.....33.
- 33(32). Metasomal sterna 2–4 with hairs at least medially long, thin, reflexed, often with tips weakly hooked or wavy .....34.  
Metasomal sterna 2–4 with most or all hairs short, erect, stiff, not wavy or hooked .....36.

- 34(33). Vertex and mesoscutum without dark hairs; sternal hairs yellow to red, white along apical margins and laterally .....*cressoniana* (Cockerell).  
 Vertex and mesoscutum with abundant dark brown to black hairs; sternal hairs (except white lateral tufts) dark reddish brown to black .....35.
- 35(34). Thoracic dorsum with pale vestiture bright fox-red; mesoscutum and scutellum often with relatively small patches of red hairs with chocolate-brown tips; flagellar segments 4 or 5 to 10 dark red ventrolaterally .....*noguera*, new species.  
 Thoracic dorsum with pale vestiture white or pale ochraceous; mesoscutum and scutellum usually with large dark brown to black patches; flagellar segments all dark brown to black .....*flagellicornis* Smith, in part.
- 36(33). Mesoscutum with at least posteromedial area with surface between punctures shiny, without shagreening or tessellation .....37.  
 Mesoscutum surface between punctures moderately dull to dull, reticularly shagreened or densely tessellate .....39.
- 37(36). Metasomal tergum 1 with apical area abundantly punctate except along narrow impunctate rim (less than half of apical area); sterna 2–4 with long white hairs apicolaterally .....38.  
 Metasomal tergum 1 apical area impunctate except a few punctures apicomediaally and at extreme sides; sterna 2–4 with no or few white hairs apicolaterally.....  
 .....*jaliscoensis*, new species, in part.
- 38(37). Metasomal tergum 5 with distinct lateral white fasciae equal to one-fourth width of tergum or more; flagellum black to dark brown; sternum 5 with white hairs apicolaterally equal to one-third width of sternum.....  
 .....*crenulaticornis* (Cockerell).  
 Metasomal tergum 5 with no white hairs laterally or very few; flagellum dark reddish brown to red laterally; sternum 5 without white hairs apicolaterally.....  
 .....*jaliscoensis*, new species, in part.
- 39(36). Metasomal terga 2 and 3 with apical area with apical rims exposed, impunctate, moderately shiny, and narrow basal part of apical area impunctate, finely tessellate .....*michoacanensis*, new species.  
 Metasomal terga 2 and 3 with apical pale fasciae covering rims of each tergum, basal part of apical areas punctate, usually covered by pale pubescent fascia.....  
 ..... 40.
- 40(39). Mesoscutal punctures small, shallow, separated mostly by less than half a puncture width, bottoms of punctures dull, finely tessellate .....  
 .....*fastigiata*, new species, in part.  
 Mesoscutal punctures small, deep, separated by half to one puncture width or more (usually more in posteromedial area) ..... *flagellicornis* Smith.

**Key to the Males of  
*Tetraloniella***

1. Metasomal sternum 6 with apicolateral margin with lateral teeth or rounded angles directed apicolaterally and often slightly ventrally .....2.  
Metasomal sternum 6 with apicolateral margin without apicolateral teeth or angles (however, apicolateral carina may be toothed laterally) .....3.
- 2(1). Sternum 6 with apicolateral carina ending at median sulcus as a small ventrally directed tooth; apicolateral marginal tooth acute, directed laterally .....  
.....*dauidsoni* (Cockerell).  
Sternum 6 with apicolateral carina ending near median sulcus but not toothed; apicolateral marginal angle rounded, directed apicolaterally .....  
.....*sphaeralceae*, new species.
- 3(1). Metasomal sternum 6 with apicolateral carinae produced laterally to form two more or less blunt teeth directed apicolaterally and often somewhat ventrally, or at least with strong rounded apicolateral angles .....4.  
Metasomal sternum 6 with apicolateral carinae not at all produced laterally, without apicolateral teeth or angles .....9.
- 4(3). Clypeus broad, epistomal suture between subantennal sutures equals distinctly more than half width between compound eyes at that level; tergal apical areas usually dark, smoky to piceous .....*fulvotecta* (Cockerell).  
Clypeus less broad, epistomal suture between subantennal sutures no more than half width between compound eyes at that level; tergal apical areas usually hyaline, clear to yellow .....5.
- 5(4). Scutellum anterior third with punctures mostly separated by half a puncture width or less, surface usually weakly shagreened; first flagellar segment often longer, usually with minimum length equal to one-sixth or one-seventh of maximum length of second segment .....6.  
Scutellum anterior third with punctures minute, separated mostly by one to two puncture widths or more, surface shiny; first flagellar segment extremely short, one-eighth or less of maximum length of second segment .....8.
- 6(5). Mesoscutal punctures deep, dense, mostly separated by half puncture width or less; mesepisternal punctures deep, separated by half puncture width or less, denser below and posteriorly, interspaces usually shiny .....  
.....*yanega*, new species.  
Mesoscutal punctures moderately deep to shallow, posteromedially separated by half to one or two puncture widths or more; mesepisternal punctures shallow, many separated by more than half puncture width, especially sparse below and posteromedially, interspaces weakly shagreened .....7.
- 7(6). Metasomal terga 2 and 3 with interband and basal areas with erect hairs pale; labrum entirely white; mandibles with large pale basal maculae; clypeus pale, not infuscated along posterior border .....*balluca*, new species.  
Metasomal terga 2 and 3 with interband and basal hairs erect, at least in part dark brown; labrum at least bordered by dark brown or black, often entirely dark or almost so; mandibular basal macula absent or small; clypeus infuscated along posterior margin .....*perconcinna* (Cockerell).

- 8(5). Sternum 6 with apicolateral carina from tip of lateral tooth towards midline of sternum curving to form a concavity facing apically .....*eriocarpi* (Cockerell).  
 Sternum 6 with carina straight or slightly bowed outwards (convexity facing apically) .....*wilmattae* (Cockerell).
- 9(3). First flagellar segment minimum length equals one-fifth to one-fourth or more maximum length second segment .....10.  
 First flagellar segment distinctly shorter .....21.
- 10(9). First flagellar segment maximum length equals half maximum length second segment or almost so .....11.  
 First flagellar segment maximum length equal to one-fifth to one-third maximum length second segment .....14.
- 11(10). Clypeus black or mostly black; labrum black; mandible without basal pale macula; small bees .....*vandykei*, new species.  
 Clypeus and labrum pale colored; mandible often with small pale basal macula; often moderate-sized bees .....12.
- 12(11). Clypeus strongly bowed outwards, cream-colored; metasomal terga without apical pale pubescent fascia.....*arizonica* (Cockerell), in part.  
 Clypeus not strongly bowed outwards, yellow; terga 2–5 with pale apical pubescent bands more or less complete.....13.
- 13(12). Terga 2–5 and often 6 with distinct apical pale fasciae; hair in general white to pale ochraceous; flagellum black below .....*silacea*, new species.  
 Tergum 2 with distinct pale apical fascia, terga 3–5 with bands indistinct; hair dark to bright ochraceous; flagellum red below .....*pennata*, new species.
- 14(10). Flagellar segments yellow to reddish-orange below.....15.  
 Flagellar segments black below (a minute rufescent or dark brown spot may be present on each of segments 3–10).....18.
- 15(14). Mesoscutum and scutellum dull, moderately to densely tessellate.....  
 .....*ayala*, new species.  
 Mesoscutum and scutellum shiny, not at all tessellate .....16.
- 16(15). Metasomal terga 3–5 covered by white, highly plumose pubescence.....  
 .....*paenalbata*, new species.  
 Metasomal terga 3–5 with distinct apical pale pubescent fasciae, interband and basal areas with vestiture mostly erect and less plumose.....17.
- 17(16). Metasomal tergum 2 apical pale band complete; mandible with large basal yellow macula .....*spissa* (Cresson).  
 Metasomal tergum 2 apical pale band broadly interrupted medially; mandible with basal pale macula lacking or small .....*distata*, new species.
- 18(14). Metasomal tergum 2 distal pale pubescent band complete .....19.  
 Metasomal tergum 2 without distal pale band or band interrupted (usually broadly) medially .....20.

- 19(18). Metasomal terga 3–5 basal and interband zones covered with short, highly plumose, pale ochraceous to white pubescence; clypeus and mandibular pale maculae (when present) white or cream-colored .....*imitatrix* (Cockerell and Porter).  
Metasomal terga 3, 4, and 5 basal and interband zones covered with pale hairs, but erect, relatively simple, and not obscuring surfaces; clypeus and mandibular pale maculae yellow .....*silacea*, new species, in part.
- 20(18). Clypeus strongly protuberant, pale yellow, punctures minute, relatively sparse; forewing with vein 2<sup>nd</sup> r-m sharply angulate .....*arizonica* (Cockerell), in part.  
Clypeus gently bowed outwards, bright yellow, dulled by crowded punctures or fine tessellation or both; forewing with vein 2<sup>nd</sup> r-m not sharply angulate, with rounded outward angle .....*pomona*e (Cockerell).
- 21(9). Clypeus, labrum, and base of mandible black; tergum 2 with distal pale pubescent band often broadly interrupted medially by one-third or more tergal widths.....*donata* (Cresson).  
Clypeus with at least some yellow or cream-colored marking; tergum 2 with distal pale band complete or only narrowly interrupted medially .....31.
- 22(21). Mesoscutum with punctures large, shallow, surface and bottoms of punctures dulled throughout by fine tessellation, *if only moderately dulled by reticular shagreening, then* at least tergum 3 and often 4 with interband zones with distinct brown hairs separating distal and basal pale tomentum (the latter often dark brown on tergum 4) .....23.  
Mesoscutum with punctures small, well separated, surface shiny, not shagreened or tessellate, or *if* dulled by tessellation or reticular shagreening, *then* terga 3 and 4 without dark brown hairs in interband zones .....32.
- 23(22). Flagellum yellow to orange-red below .....24.  
Flagellum black or dark reddish brown below.....27.
- 24(23). Galeae dulled above by reticular shagreening or fine tessellation in at least apical halves .....*fastigiata*, new species, in part.  
Galeae shiny above, unshagreened except at extreme tips .....25.
- 25(24). Mesoscutum densely punctate posteromedially, punctures separated mostly by less than one puncture width; labrum entirely white; clypeus entirely cream-colored .....*fastigiata*, new species, in part.  
Mesoscutum with posteromedian area with punctures separated mostly by one to two puncture widths .....26.
- 26(25). Labrum entirely black; mandible with basal pale macula usually absent or small.....*noguera*, new species.  
Labrum white with dark apical border; mandible with basal macula usually present, small .....*cacuminis*, new species, in part.
- 27(23) Metasomal terga 2 and 3 with apical areas with distinct apical rims shiny, impunctate, glabrous .....*michoacanensis*, new species.  
Metasomal terga 2–3 with apical areas with apical rims (apical to distal pale band) with subappressed black or dark brown hairs and often minute punctures *or* pale pubescent fasciae apical and hiding rims .....28.

- 28(27). Tergum 2 with apical pale pubescent band more or less narrowly interrupted medially ..... 29.  
 Tergum 2 with apical pale pubescent band complete, apical.....30.
- 29(28). Mesoscutum posteromedially with punctures separated largely by one to two puncture widths; lower third to half of mesepisternum with punctures often separated by three or four puncture widths .....*flavifasciata* Cockerell.  
 Mesoscutum posteromedially with punctures separated by half a puncture width or less; lower part of mesepisternum with punctures separated by half to one puncture width .....*jaliscoensis*, new species, in part.
- 30(28). Metasomal tergum 1 with apical area with dark brown to black, relatively simple hairs across entire tergum ..... *flagellicornis* Smith.  
 Metasomal tergum 1 with apical area hairs pale.....*crenulaticornis* (Cockerell).
- 31(21). Metasomal terga without distinct apical pale bands or bands broadly interrupted medially if present; mesoscutum with punctures small, separated mostly by two or more puncture widths; surface opaque, finely tessellate; vestiture bright fox-red .....*trabeata*, new species.  
 Metasomal terga 2–4 with distinct apical pale bands, sometimes interrupted medially on tergum 2; mesoscutum with punctures of anterior half or more crowded, separated mostly by half a puncture width or less, surface tessellate or shiny; vestiture white to ochraceous .....32.
- 32(31). Metasomal tergum 2 with distal pale pubescent band absent or interrupted medially (by one-third or more width of tergum) and lateral fasciae subapical.....*lippiae* (Cockerell).  
 Metasomal tergum 2 with distal pale pubescent band complete, usually apical, rarely narrowly interrupted medially.....33.
- 33(32). Terga 3–5 with interband zones covered with pale appressed plumose pubescence fused with apical pale band and extending into basal areas; tergum 2 similar but apical band more distinct .....34.  
 Terga 2–5 with pubescence not as above, pale apical pubescent bands, if present, more distinct .....36.
- 34(33). Flagellum red to yellow below, dark red to brown above; clypeus yellow; mesepisterna shiny to moderately shiny, shagreening absent or weak.....*albata* (Cresson).  
 Flagellum dark brown to black below; clypeus white or cream-colored; mesepisterna dulled by fine shagreening .....35.
- 35(34). Mesoscutum with surface shiny, unshagreened; metasomal tergum 1 with complete apical pale pubescent band of moderately long hairs (unless worn).....*ochraea*, new species.  
 Mesoscutum with surface dull, finely tessellate or shagreened; metasomal tergum 1 without pale apical band except at extreme sides.....*jaliscoensis*, new species, in part.
- 36(33). Metasomal terga 2–4 with distal pale pubescent bands apical, usually without dark hairs apical to fascia usually, not interrupted medially.....*cressoniana* (Cockerell).

- Metasomal tergum 2 (and usually 3 and 4) with distal pale bands subapical (often with dark brown suberect hairs apical to each band), often narrowly interrupted medially on tergum 2 .....37.
- 37(36). Flagellum dark brown below .....*helianthorum* (Cockerell).  
Flagellum red to yellow below.....38.
- 38(37). Mesoscutum and scutellum dull, shagreened .....*minutilla*, new species.  
Mesoscutum and scutellum shiny, shagreened only peripherally or not at all.....  
.....*cacuminis*, new species.

***Tetraloniella spissa* (Cresson),  
new combination**

- Melissodes spissa* Cresson, 1872, Trans.  
American Ent. Soc., 4:280.  
*Xenoglossodes spissa*, LaBerge, 1956, Univ.  
Kansas Sci. Bul., 37:1,178.  
*Melissodes bishoppi* Cockerell, 1914, Cana-  
dian Ent., 46:414 (**new synonymy**);  
Lutz and Cockerell, 1920, Bul. Ameri-  
can Mus. Nat. Hist., 42:599.  
*Xenoglossodes bishoppi*, LaBerge, 1956,  
Univ. Kansas Sci. Bul., 37:1,179.

This moderate-sized bee from the southern plains region is an oligolege of plants of the genus *Helianthus* (Compositae). The female bee has a relatively flat, large clypeus, which often has a narrow yellow or red subapical macula occupying one-fifth or less of its median length. The female terga 2–4 are each marked by a narrow apical pale fascia and basal pale tomentum separated by interband zones of erect hairs. Each of the male terga 2–5 has a complete narrow apical pale fascia and sternum 6 is flat without lateral angles or teeth. Both sexes of *spissa* have five maxillary palpal segments, the last one being very small, and have tergum 1 with the apical area impunctate.

**FEMALE. Measurements and Ratios.**- N = 20; length, 10.0–12.5 mm; width, 3.5–4.5 mm; wing length, M = 2.90±0.076 mm; hooks in hamulus, M = 11.20±0.172; flagellar segment 1/2, M = 1.61±0.033.

**Integumental Color.**- Integument black except as follows: clypeus with apical fifth or slightly less red or reddish yellow; labrum of-

ten with small mediobasal yellow spot; mandibles often with bases red to orange; terga 2–5 with apical areas translucent especially apically; distitarsi red; wing membranes hyaline, veins brownish red to red.

**Structure.**- Clypeus relatively flat, oculoclypeal minimal distance equals slightly more than half narrowest width of first flagellar segment, with punctures regular, small, round, separated by half a puncture width, surface moderately shiny, weakly shagreened. Supraclypeal area with punctures as in clypeus or slightly larger. Face above antennal fossae punctate. Vertex with lateral flattened areas densely punctate, moderately shiny. Genal area laterally with dense, minute, deep punctures becoming somewhat larger and sparser below mandible. Galea above moderately dulled by reticular shagreening; maxillary palpal segments 5, ratio about as 0.8:1.0:1.0:0.5:0.3. Flagellar segment 2 slightly longer than broad, about as long as segment 3, remaining segments longer than broad. Mesoscutum with punctures moderate in size, deep, dense, separated mostly by half a puncture width or less, surface shiny; scutellum similar. Propodeum with dorsal surface punctate, punctures well separated especially near midline; posterior surface shiny. Mesepisternum sculptured as mesoscutum but punctures distinctly more shallow, surface moderately shiny. Metasomal tergum 1 with punctures in median third separated mostly by half to two puncture widths, becoming smaller and dense laterally; apical area impunctate except a narrow line across tergum near base of apical area; surface moderately dulled by

fine shagreening. Terga 2–4 with basal areas with small round punctures separated mostly by half a puncture width or less (tergum 2 medially slightly sparser), surfaces moderately shiny, shagreening extremely fine. Pygidial plate with apex broadly rounded, almost U-shaped.

**Vestiture.**— In general hair ochraceous; dorsum of thorax somewhat brighter and lateral margins of terga and lower surface of thorax paler. Metasomal tergum 1 without dark hairs apically; tergum 2 with narrow apical pale pubescent fascia, often slightly narrowed medially and extreme base with erect almost white pubescence but not dense. Terga 3 and 4 with narrow apical pale fasciae similar to tergum 1 and with dense pale fasciae at extreme bases; terga 2–4 with space between basal and apical fasciae with erect plumose hairs not hiding surfaces. Terga 5 and 6 with ochraceous to dark ochraceous hairs. Sternal hairs long, plumose, ochraceous. Scopal hairs highly plumose, dense but not completely hiding surface of tibia; inner hind basitarsal hairs yellow to red.

**MALE. Measurements and Ratios.**— N = 20; length, 9–11 mm; width, 3–4 mm; wing length,  $M = 2.92 \pm 0.150$  mm; hooks in hamulus,  $M = 11.45 \pm 0.153$ ; flagellar segment 2/1,  $M = 3.84 \pm 0.060$ .

**Integumental Color.**— Integument black except as follows: clypeus yellow except narrow apical margin and notches at posterior tentorial pits red; labrum yellow; mandible with base red to yellow; flagellum yellow to red below; tegula hyaline, reddish yellow; wing membranes hyaline, colorless, veins yellow to red; distitarsi and often apical tips of tibiae reddish yellow; terga with apical areas hyaline, colorless.

**Structure.**— Head with sculpturing as in female; maxillary palpus with 5 segments, in ratio about as 0.9:0.9:1.0:0.3:0.3, last segment rarely absent; antennae relatively short, barely reaching tergum 1 in repose; second flagellar segment one-fourth to one-third as long as second segment, segments round in cross-section, not strongly crenulate if at all. Sculpturing of thorax as in female except mesepisterna with punctures smaller, as deep and more crowded than those of mesoscutum. Sculpturing of metasomal terga much as in female;

pygidial plate with apex broadly rounded to slightly flattened at tip, without subapical notches laterally. Tergum 7 postgradulus with lateral arm carinate not toothed.

Terminalia (Figs. 10–14) similar to that of *T. cressoniana* (Figs. 82–86). Last exposed sternum (sternum 6 (Fig. 10) with strong lateral shoulders on posterior margin; median apical lobe large with strong subapical lateral carinae; hairs apical to carinae short, relatively weak, abundant. Mediobasal hairs longer, sparse. Sternum 7 with anterior margin between lateral attachment point forming a broad, shallow indentation; inner apical processes large, with extremely sparse, weak, short hairs; lateral plates of normal form. Sternum 8 with strong subapical median knob; apicolateral attachment points short.

**Vestiture.**— Pale ochraceous to ochraceous, darkest on vertex and dorsum of thorax, without dark hairs; terga 2–5 with narrow apical pubescent bands, without basal bands, basal hairs being more diffuse, sparser and erect, not hiding surfaces; tarsi with inner surfaces with hairs bright yellow to orange.

**Type Material.**— The lectotype female (PANS No. 2352) of *spissa* was collected by G.W. Belfrage in Bosque County, Texas. The holotype male (USNM No. 22,959) of *bishoppi* was collected by F.C. Bishopp in Paris, Texas.

**Distribution.**— *Tetraloniella spissa* is known to occur from Texas north to eastern Nebraska and west to Colorado (Fig. 1). It has been collected from June 4 through September 26, but chiefly during July and August. One female is labeled as collected on April 9, but the author believes it to be mislabeled. This species seems to be most abundant in Kansas and 65 females and 190 males from the following localities have been examined.

COLORADO: Chimney Gulch; La Junta; Ordway. KANSAS: Butler Co.; Clark Co.; Clay Co.; Dickinson Co.; Douglas Co.; Eureka; Hoisington; Kansas City; Kismet; Lakin; Lawrence and vicinity; Manhattan; Mead; Reece; Riley Co.; Sunflower, Douglas Co.; Topeka. NEBRASKA: Lincoln; West Point. TEXAS: Adrian (18 mi. N); Bexar Co.; Bosque Co.; Canadian; Carrizo Springs; Christoval; Dallas; Fort Davis (47 mi. NE);

Geronimo (4 mi. N); Kerrville (10 mi. S); Hale Co.; Panhandle; Paris; Randall Co. Canyon; Salado Creek, Bexar Co.; San Antonio; Sherman Co.; Taylor; Tex.

**Flower Records.**- *Tetraloniella spissa* appears to be an oligolege of composites of the genus *Helianthus*. Out of a total of 49 collections with flower data (32 females, 113 males), 34 collections (22 females, 110 males) were from some species of *Helianthus*. This bee has been collected from the following flowers:

*Amphiachyris* sp.; *Bidens* sp.; *Cassia* sp.; *Helianthus* sp., *H. annuus*, *H. petiolaris*; *Silphium laciniatum*, *S. perfoliatum*; *Solidago* sp.; *Verbena stricta*; *Vernonia* sp., *V. interior*.

***Tetraloniella lippiae* (Cockerell),  
new combination**

*Synhalonia crenulaticornis* subsp. *lippiae*  
Cockerell, 1904, Ann. Mag. Nat. Hist.,  
ser. 7, 14:25.

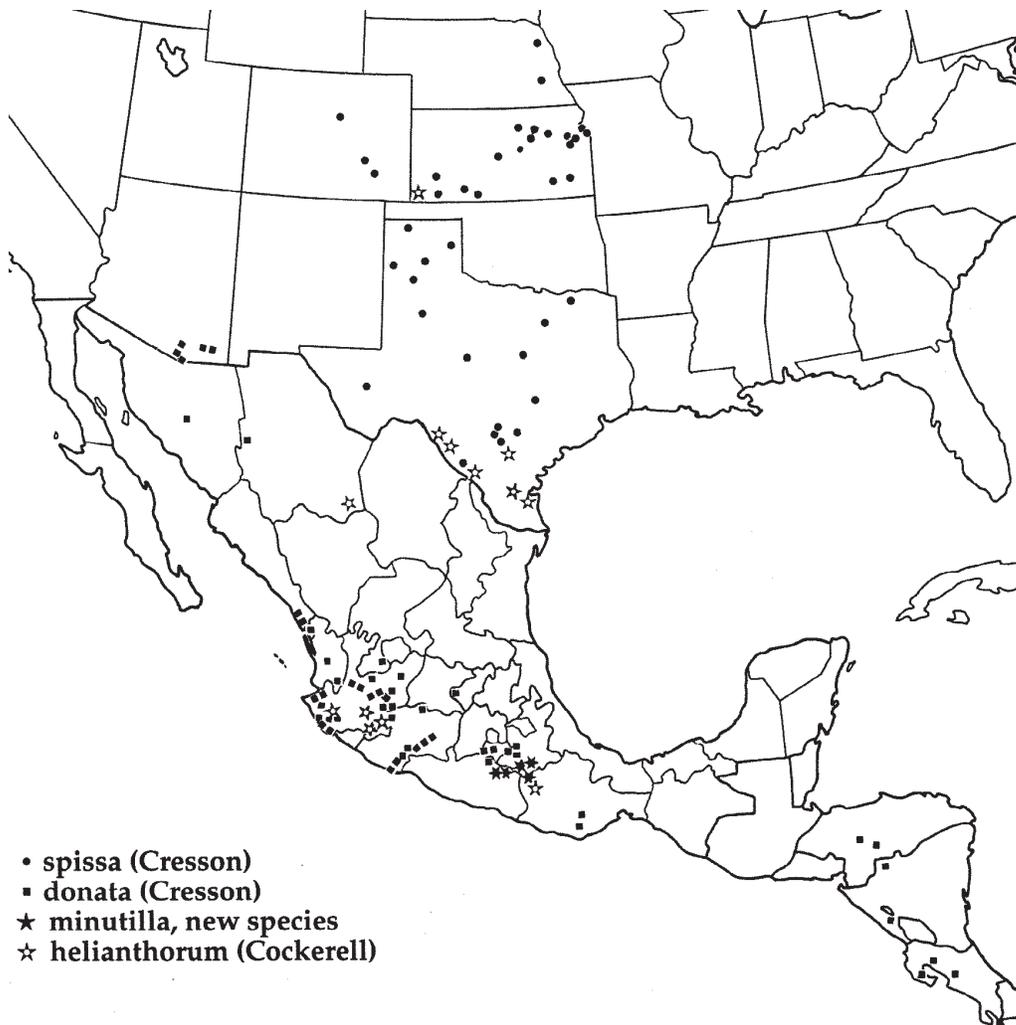


Figure 1. Map showing the known distributions of *Tetraloniella spissa* (Cresson); *donata* (Cresson); *minutilla*, new species; and *helianthorum* (Cockerell).

*Synhalonia lippiae* Cockerell, 1905, Ann. Mag. Nat. Hist., ser. 7, 16:224.

*Tetralonia lippiae* Cockerell, 1906, Tr. American Ent. Soc., 32:84, 97 (new combination).

*Xenoglossodes lippiae* Cockerell, 1906, Tr. American Ent. Soc., 32:310; 1910, Univ. Colorado Studies, 7:195.

*Synhalonia lippiae semilippiae* Cockerell, 1905, Pr. Biol. Soc., Washington, 18:179; Ann. Mag. Nat. Hist., ser. 7, 16:224 (**new synonymy**).

*Tetralonia lippiae* Cockerell, 1906, Tr. American Ent. Soc., 32:86 (new combination).

This is a moderate-sized, brightly banded species from the Southwest. The female of *lippiae* can be easily separated from that of *spissa* by the subapical pale bands of terga 2 and 3 (apical in *spissa*). Terga 2 and 3 of the female of *lippiae* have distinct white pubescent bands basally, whereas terga 4 and 5 do not. Tergum 5 has patches of white hair laterally. The apical pale band of tergum 2 is broadly interrupted medially in both sexes of *lippiae*. The male has long black antennae, the flagella of which are distinctly flattened from side to side and crenulate especially in the apical half. Both sexes of *lippiae* have 5-segmented maxillary palpi and the female has highly plumose scopal hairs as in *spissa*.

**FEMALE. Measurements and Ratios.**- N = 20; length, 12–15 mm; width, 4–5 mm; wing length, M = 3.33±0.146 mm; hooks in hamulus, M = 10.70±0.154; flagellar segment 1/2, M = 1.78±0.025.

**Color.**- Integument black except as follows: mandible with apical half reddened; flagellum dark below, often slightly reddened on last few segments; tegula at summit translucent, yellow; wing membranes hyaline, slightly infumate, veins dark reddish brown to black; metasomal terga with apices extremely narrowly hyaline, yellow; tibial spurs yellow.

**Structure.**- Clypeus moderately bowed; oculoclypeal minimal distance slightly more than half narrowest width first flagellar segment, with punctures coarse, regular, separated by half a puncture width or less, surface dull,

coarsely shagreened. Supraclypeal area with scattered small punctures, surface tessellate. Face above antennal fossae densely punctate, surface shiny especially near ocelli. Genal area densely punctate, surface shiny, with sparse minute punctures bearing short erect hairs; maxillary palpal segments 5, ratio of about 0.8:1.0:0.8:0.4:0.6. Flagellar segment 2 slightly longer than broad, about as long as segment 3, all segments longer than broad. Mesoscutum with punctures deep, separated by half a puncture width or less anteriorly and peripherally, sparser posteriorly, surface shiny, not at all or weakly shagreened. Propodeum with dorsal surface densely punctate, posterior surface largely impunctate, shiny to dull, usually finely shagreened. Mesepisternum sculptured as mesoscutum but punctures slightly shallower. Metasomal tergum 1 with basal area punctures small, crowded laterally, separated by one puncture width in median third; apical area impunctate except at extreme sides and in a small median area where basal area punctures extend into apical area, surface dulled by fine shagreening. Tergum 2 with basal area punctures small, separated by half to one puncture width, sparser medially; apical area, except narrow apical margin with small dense punctures. Terga 3 and 4 with sculpturing not usually visible because of dense vestiture but generally similar to tergum 2. Pygidial plate broadly V-shaped, almost as broad at extreme base as median length (about as 4:5), apex rounded.

**Vestiture.**- White except as follows: vertex and dorsum of thorax usually pale ochraceous, occasionally darker and rarely mesoscutum and scutellum with reddish brown hairs medially. Metasomal tergum 1 with basal hair pale, apical area with minute, closely appressed, dark brown hairs in punctate areas. Tergum 2 with basal white pubescent band, apical area with white band broadly interrupted medially by one-third or more width of tergum, interband zone and area apical to distal interrupted band with short erect to appressed black or dark brown hairs. Tergum 3 similar but basal and apical bands almost fused, and apical band completely or only narrowly interrupted medially. Tergum 4 with dark brown hairs basally, apical white pubes-

cent band broad, complete, separated from apical margin by narrow zone of short dark hairs at least medially. Terga 5 and 6 with dark brown to black hairs except white patches laterally on tergum 5. Sternal hairs normal, white to yellow. Tarsi with inner surface hairs yellow. Scopal hairs highly plumose.

**MALE. Measurements and Ratios.**- N = 20; length, 9–12 mm; width, 3–4 mm; wing length, M = 3.21±0.111 mm; hooks in hamulus, M = 10.55±0.153; flagellar segments 2/1, M = 8.49±0.185.

**Integumental Color.**- Head black except as follows: mandible often red apically; clypeus yellow except posteriorly, yellow macula often triangular in outline; labrum white with black margin; antennae entirely black. Integument of mesosoma and metasomal as in female.

**Structure.**- Head with sculpturing as in female; maxillary palpal segments 5, rarely 6, ratio about as 0.8:1.0:0.9:0.3:0.6; antennae long, reaching middle of tergum 1 in repose; first flagellar segment extremely short, minimum length equals one-eighth to one-ninth of maximum length of second segment, segments distinctly flattened from side to side and strongly crenulate in last several segments. Sculpturing of thorax similar to that of female but mesepisternum often opaque, dulled by shagreening. Metasomal terga sculptured as in female except as follows: tergum 1 with apical area punctate except in narrow apical rim; terga 2–5 with punctures small, dense except in impunctate narrow apical rims. Pygidial plate longer than broad, narrower at apex, without subapical lateral notches. Tergum 7 with lateral arm of postgradulus weak, not toothed. Terminalia (Figs. 15–19) similar to those of *T. spissa* (Figs. 10–14). Sternum 6 (last exposed sternum, Fig. 15) with apical margin on either side of apex undulant, forming a subapical (if attachment point is considered apical) depression; apical margin and subapical carinae similar to those of *T. spissa*. Sternum 8 similar to that of *spissa* but median knob weak and almost apical and apical margin strongly indented medially. Genital capsule and gonocoxite as in Figs. 18 and 19.

**Vestiture.**- White except as follows: dorsum of thorax often pale ochraceous; inner

surfaces tarsi yellow to red; terga with dark brown hairs and white banding. Terga 1–3 as in female terga but tergum 1 with short, appressed brown hairs across entire apical area except impunctate apical rim; tergum 2 with apical distal white pubescent band interrupted medially by one-fourth to three-fifths width of tergum or slightly more. Terga 4–7 as in terga 4–6 of female but tergum 5 similar to 4 and tergum 6 often entirely dark brown (occasionally with small lateral white patches).

**Type Material.**- The lectotype male (CAS Type No. 15,528) of *lippiae* was collected by C.H.T. Townsend from flowers of *Lippia wrightii* at LaCueva, Organ Mts., New Mexico. The holotype female (SECK) of *semilippiae* was collected by F.H. Snow (No. 1989) at Oak Creek Canyon, Arizona.

**Distribution.**- *Tetraloniella lippiae* is known to occur from Arizona east to Texas and south to northeastern Mexico (Fig. 2). It has been collected from August 11 through September 27. A total of 76 females and 97 males were examined from localities listed below.

**México.**- TAMAULIPAS: Ciudad Victoria (15 mi. SW at 5,000 ft. elev.).

**United States.**- ARIZONA: Cave Creek Canyon, Chiricahua Mts.; Flagstaff (Sweet Crater and Walnut Canyon); Geronimo (3 mi. W), Graham Co.; Graham Mt.; Mingus Mt. (near Jerome), Yavapai Co.; Morenci (10 mi. N), Greenlee Co.; Mount Lemon Road, Pima Co.; Oak Creek Canyon, Coconino Co.; Paradise Road, Cochise Co.; Portal (5 miles W at Southwest Research Station and 6 mi. W); Sedona (8 mi. N), Coconino Co.; Yaqui Canyon, Cochise Co. NEW MEXICO: Dripping Spring, Organ Mts.; La Cueva, Organ Mts.; Mountain Park (3 mi. W); Organ Mts. (back of San Augustine); Pinos Alto, Grant Co.; Ruidoso, Lincoln Co. TEXAS: Fort Davis (31 mi. NE), Jeff Davis Co.

**Flower Records.**- Few data are available as to the flower-visiting behavior of *Tetraloniella lippiae*, but it has been collected most frequently at flowers of *Sphaeralcea* and has been taken from flowers of the plants listed below (including records from the literature). As this list intimates, one female

was collected from a pine. This female has its scopae packed with what appears to be *Sphaeralcea* pollen and, in any case, it is certainly not pine pollen.

*Heterotheca subaxillaris*; *Lippia wrightii*; *Monarda austromontana*; *Pectis papposa*; *Phacelia congesta*; *Pinus chihuahuana*; *Sphaeralcea* sp., *S. emoryi*.

***Tetraloniella silacea*, new species**

This medium-sized bee is named *silacea* because of the yellow-ochre color of much of its vestiture, especially in the female. It is simi-

lar to *T. spissa* in the 5-segmented maxillary palpi, narrow apical tergal fasciae, and long first flagellar segment of the male. The female of *silacea* differs from that of *spissa* by lacking any yellow color on the clypeus, often having dark dorsal thoracic hairs, terga 5 and 6 with hairs entirely yellow-ochre in color, and the short last flagellar segment as described below. The male of *silacea* differs from that of *spissa* by the relatively short, entirely black antennae having the first flagellar segment more than one-third as long as segment 2 and slightly less than half as long.

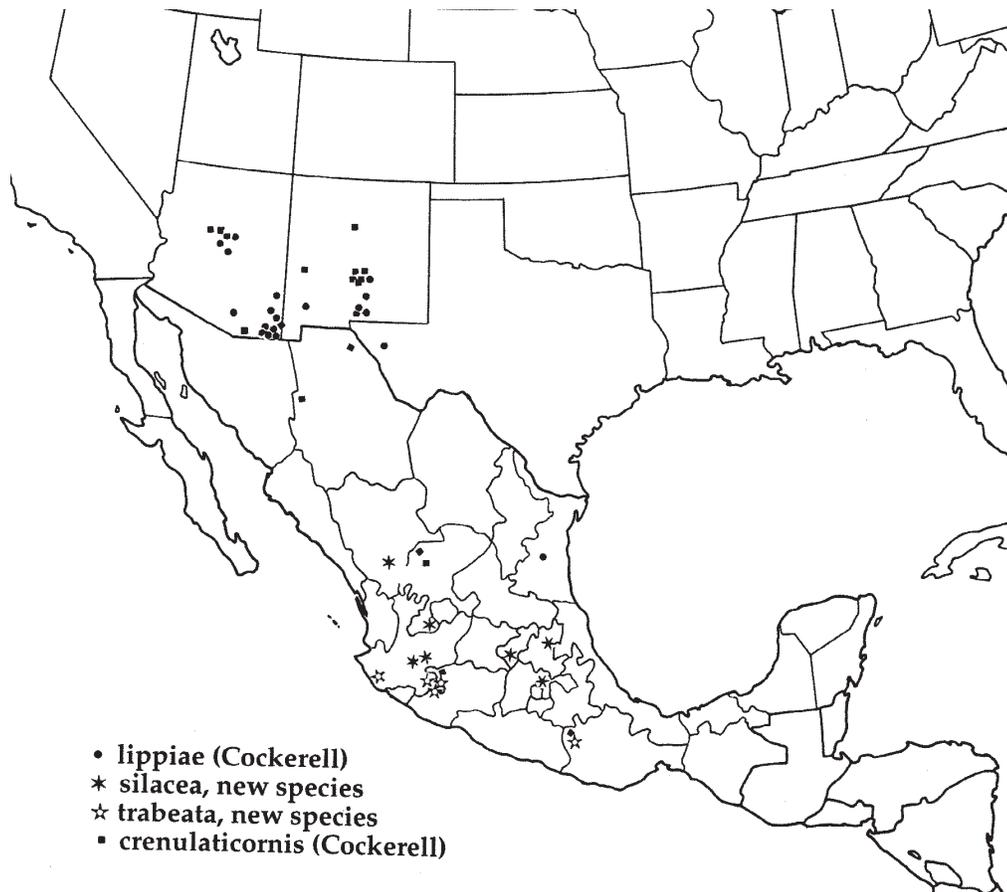


Figure 2. Map showing the known distributions of *Tetraloniella lippiae* (Cockerell); *silacea*, new species; *trabeata*, new species; and *crenulaticornis* (Cockerell).

**FEMALE. Measurements and Ratios.**- N = 7; length, 11–12 mm; width, 4.0–4.5 mm; wing length,  $M = 3.29 \pm 0.158$  mm; hooks in hamulus,  $M = 12.00 \pm 0.378$ ; flagellar segment 1/2,  $M = 1.87 \pm 0.022$ .

**Integumental Color.**- Black except as follows: mandible with distinct golden maculae in apical half, rufescent basad of macula; flagellar segments 10 and 11 and often 9 rufescent below, basal segments reddish brown to black; wing membranes hyaline, slightly infumate apically, veins dark brown to black; tegulae piceous; metasomal terga piceous with extremely narrow apical rims translucent; sterna piceous with almost half of apical area hyaline; distitarsi reddish brown; tibial spurs testaceous.

**Structure.**- Clypeus rounded from side to side, with coarse, elongate to round punctures separated by slightly more than half a puncture width, slightly larger and sparser in small apicomedian area, surfaces moderately shiny, smooth to weakly shagreened; supraclypeal area with sparse coarse punctures medially, small crowded punctures in lateral angles, surface moderately shiny to shiny, usually shagreened; face above antennal fossae with small crowded punctures, surface dulled by fine tessellation or weak shagreening; vertex with lateral surface with small round punctures mostly separated by one or more puncture widths, surfaces moderately shiny; genal area with small punctures separated by half to one puncture width, surface shiny to moderately dulled by shagreening. Maxillary galeae shiny, unshagreened; palpi 5-segmented, ratio about as 1.0:0.9:1.0:0.5:0.5. Second flagellar segment shorter than wide; last flagellar segment about one and one-fourth as long as greatest width (greatest width is near the blunt tip). Mesoscutum with deep round punctures crowded peripherally, posteromedially separated by one to two or three puncture widths, surface shiny, unshagreened. In the female from Queretaro the posteromedian area punctures are more crowded, separated mostly by half to one puncture width. Scutellum similar, punctures larger and sparser medially, surface shiny. Propodeum with dorsal surface punctures large, elongate, crowded, surface dulled by fine tessellation. Mesepisternum

with round, moderately shallow punctures, surface dulled by fine tessellation. Metasomal tergum 1 with basal area punctures sparse in median half, small and more crowded laterally, apical area largely without punctures, surface moderately dulled, shagreened. Tergum 2 with interband zone with small round punctures separated by half to one puncture width, slightly sparser medially than laterally; basal area with minute well-separated punctures; apical area with minute well-separated punctures except in narrow impunctate rim; surfaces dulled by fine reticular shagreening. Terga 3 and 4 similar. Pygidial plate flat, V-shaped with rounded apex. Sterna 2–5 with basal areas punctate, moderately dulled, apical areas narrow, impunctate. Sternum densely punctate throughout.

**Vestiture.**- Generally pale ochraceous except as follows: vertex and thoracic dorsum often with abundant dark brown to black hairs (in 4 of 5 specimens); metasomal terga 2–4 with basal areas with pale ochraceous tomentum, apical areas with narrow, more or less complete apical ochraceous fasciae (weak medially on tergum 2 in 4 specimens); terga 5 and 6 with vestiture yellow-ochre. Scopal hairs highly plumose, ochraceous.

**MALE. Measurements and Ratios.**- N = 20; length, 10–12 mm; width, 3–4 mm; wing length,  $M = 3.32 \pm 0.103$  mm; hooks in hamulus,  $M = 11.15 \pm 0.167$ ; flagellar segment 2/1,  $M = 2.39 \pm 0.021$ .

**Integumental Color.**- Black except as follows: clypeus yellow; labrum white, rarely slightly darkened peripherally; mandible with or without small basal yellow macula; flagella black below; otherwise color as in female.

**Structure.**- Sculpture of head much as in female but genal area punctures slightly larger. Maxillary palpus 5-segmented, ratio about as 1.0:0.9:1.0:0.6:0.4; galea shiny. Antennae relatively short, reaching first metasomal tergum in repose; flagellum with segment 1 half as long as segment 2 or almost so. Mesosoma as in female. Metasomal terga 2–5 sculptured as in female terga 1–4 but tergum 1 with apical impunctate area short; surfaces dulled by fine shagreening. Sterna 2–5 as in female but basal areas more sparsely punctate especially medially.

Terminalia (Figs. 20–24) similar to those of *T. paenalbata* (Figs. 72–76). Last exposed sternum (Fig. 20) without shoulders apicolaterally, with small apicomedial hairy area, with apicolateral carinae posterior to apex formed along margin of sternum on either side of apex, not strongly cariniform, apicomedial ends of carinae turn inwards and almost meet somewhat anterior to apex of sternum; apical area thus defined with short, abundant, relatively weak hairs. Sternum 7 (Fig. 21) with anterior margin between lateral-anterior attachment points forming a straight line or almost so, only slightly indented medially. Sternum 8 (Fig. 22) with weak median subapical knob and broad, shallow apicomedian emargination, hairs short and sparse. Genital capsule (Figs. 23 and 24) as drawn, note rounded elbow of gonocoxite.

**Vestiture.**—Generally pale ochraceous except as follows: vertex often with long dark hairs mixed with pale; mesoscutum with abundant long dark brown hairs; terga 2–5 with narrow, complete apical fasciae, medially shorter than one-fifth as long as median length of tergum or shorter.

**Type Material.**—Holotype female and allotype male, 3 female and 42 male paratypes of *Tetraloniella silacea* were collected 58 miles E of Guadalajara, Jalisco, México, September 28, 1957 nesting in the ground by H. A. Scullen. Three females and seven male paratypes from México (see map, Fig. 2) are as follows:

DISTRITO FEDERAL: Zapotitlán—5 males, October 3, 1986, G.E. and A.S. Bohart. DURANGO: Durango (32 mi. NE at 6,600 ft. elev.)—1 female October 19, 1957, H.A. Scullen. HIDALGO: Metzquititlán (25 km. SW at 1,860 m. elev.)—1 female, Nov. 11, 1991, C. Everaert. JALISCO: Tepotitlán—1 male from *Cosmos* sp., October 3, 1986, G.E. and A.S. Bohart; 2 males from yellow composite shrub, October 3, 1986, G.E. and A.S. Bohart; 1 male from *Tagetes* sp., September 17, 1970, G.E. and R.M. Bohart; 1 male, October 3, 1966, G.E. and A.S. Bohart. QUERETARO: Queretaro (9 miles N)—1 female, September 21, 1977, J.A. Chemsak and A. and M. Michelbacher. ZACATECAS: Nochistlán (at 6,500 ft. elev.)—1 male, Au-

gust 21, 1979, B. Villegas. The holotype and allotype are in the collection of Oregon State University. Paratypes are deposited in the following collections: OSU, UCB, INHS, UNAM, SECK

#### *Tetraloniella trabeata*, new species

This beautiful species from México has 5-segmented maxillary palpi, beautiful tawny vestiture (rarely with thorax washed with chocolate brown in female), lack of distinct tergal apical pale bands, galeae dulled by fine tessellation, and long black antennae in both sexes. The female has highly plumose scopal hairs as in *spissa*, *silacea*, and *lippiae*, the second flagellar segment distinctly longer than width at its apex, and relatively small, sparse punctures in mesoscutal posteromedial area. The male of *trabeata* has a completely yellow clypeus, white labrum without dark apical margin, large yellow mandibular maculae, and short first flagellar segments.

**FEMALE. Measurements and Ratios.**—N = 10; length 11–13 mm; width, 4.5–5.0 mm; wing length, M = 3.83±0.154 mm; hooks in hamulus, M = 15.13±0.268; flagellar segments 1/2, M = 1.62±0.025.

**Integumental Color.**—Black except as follows: mandible with apical half rufescent with large golden macula (mostly absent if worn); flagella dark below; tegula piceous except posterior half usually translucent, yellow to red; wing membranes hyaline, yellowish, veins dark brown to black; terga with apical areas usually translucent but dark reddish brown; sternal apical areas hyaline, yellow; distitarsi red; tibial spurs testaceous.

**Structure.**—Clypeus moderately protuberant, evenly curved from side to side, oculoclypeal minimum distance slightly less than minimum width of first flagellar segment; punctures moderate-sized and crowded near apical margin, becoming small, round, and separated by one or slightly more puncture widths posteriorly, surface dulled by dense tessellation. Supraclypeal area largely impunctate, several minute punctures and extreme lateral corners, dulled by dense tessellation. Face above antennal fossae with small, shallow, obscure, sparse punctures, surface

dull, tessellate. Vertex with lateral flattened area with minute round punctures separated by one to three puncture widths, surface moderately shiny to dull, reticularly shagreened. Genal area slightly narrower than eye in profile, with minute crowded punctures, surface moderately shiny, shagreened. Galeae dull above, finely tessellate; maxillary palpus 5-segmented in ratio of about 1.0:0.9:0.7:0.5:0.2. Flagellar segments 2–10 distinctly longer than broad. Mesoscutum with punctures small, round, peripherally separated by half to one puncture width, posteromedially by two to three puncture widths or more, and narrow declivous anterior margin impunctate, surface dulled by fine tessellation. Scutellum with small crowded punctures except in narrow anterior declivous area and along narrow midline, surface moderately dulled by fine tessellation. Propodeum with dorsal area finely and obscurely punctatorugose, surface dull, tessellate; posterior surface largely impunctate, with sparse punctures laterally, surface moderately shiny to dull, finely tessellate. Metasomal tergum 1 with basal area punctures small, sparse medially, becoming crowded at sides; apical area impunctate; surface moderately dull, finely, reticularly shagreened. Terga 2–4 with basal and interband zones with punctures small, round, separated by half to one puncture width (more crowded on tergum 4 than 2); apical areas impunctate; surfaces dulled by fine reticular shagreening. Pygidial plate V-shaped with rounded apex. Metasomal terga 2–5 with basal areas densely punctate, apical areas impunctate; surfaces moderately shiny, finely shagreened.

**Vestiture.**— Generally fulvous with vertex and dorsum of thorax somewhat reddish; three specimens have vertex, tegulae, and dorsum of thorax with abundant brown hairs mixed with fulvous, and three specimens are dark chocolate-brown except scopal hairs and last few metasomal terga. Metasomal terga 2–5 without distinct pale apical bands, hairs of apical areas same color and more or less same abundance as interband zones. Scopal hairs long, highly plumose.

**MALE. Measurements and Ratios.**—  $N = 20$ ; length 11–12 mm; width, 3–4 mm; wing length,  $M = 3.90 \pm 0.128$  mm; hooks in hamu-

lus,  $14.75 \pm 0.347$ ; flagellar segment 2/1,  $M = 8.53 \pm 0.185$ .

**Integumental Color.**— Black except as follows: labrum white or cream-colored; clypeus yellow except small posterior notches at tentorial pits; mandible with large basal yellow macula; otherwise as in female except tergal apical areas hyaline, yellow.

**Structure.**— Clypeus strongly protruding, oculoclypeal minimal distance short as in female; punctures as in female but more difficult to see because of color; sculpture of head as in female; antennae long, reaching third metasomal tergum in repose, flagellar segment 1 short, segment 2 seven and a half to 10 times as long as minimum length of segment 1. Thoracic sculpture as in female except punctures in general slightly sparser and dorsum of propodeum with more distinct elongate punctures. Metasomal terga 1–5 sculptured as in female terga 1–4 but basal area tergum 1 with punctures slightly more dense. Pygidial plate with blunt apex half as broad as base of plate or less, with subapical lateral notches weakly indicated, surface distinctly punctate, moderately shiny. Sterna 2–5 sculptured as in female; sternum 6 shiny, with distinct apicolateral carinae ending abruptly near median depression but not toothed.

Terminalia (Figs. 25–29) similar to that of *T. spissa* (Figs. 10–14). Sternum 6 (last exposed sternum) shouldered laterally as in *spissa* but shoulders smaller; subapical carinae and apical areas similar to those of *lippiae* (Fig. 15); anterolateral attachment areas as in *spissa*; apicomedian area larger than in either *spissa* or *lippiae*. Sternum 7 as in *spissa* but apicolateral plates with distal process larger and apicomedian plates without hairs (in specimens before me) and pointed inwards. Sternum 8 with apicomedian knob not at apex of sternum but distinct. Genitalia and gonocoxite (Figs. 28 and 29) as in *spissa* but gonocoxite weakly elbowed.

**Vestiture.**— Generally bright fulvous as in female, without distinct tergal apical fasciae; sterna 2–5 with long yellow hairs basally; inner surface tarsi yellow. None of the specimens before me with brown hairs on head and thorax as in a few females.

**Type Material.**— Holotype female (UNAM), allotype male (UNAM) and 1 fe-

male paratype of *Tetraloniella trabeata* were collected 10 km. SW of Mazamitla (El Terrero), Jalisco, October 30, 1990, by C.M. Estrada. Forty-nine additional paratypes from México (see map, Fig. 2) are listed below. Paratypes are deposited in the following collections: UNAM, INHS, SECK, USNM, UCB, USU.

**JALISCO:** Concepción de Buenos Aires—1 female, 2 males, October 10, 1990, C.M. Estrada. Las Manzanilla—7 males, October 23, 1990, C.M. Estrada. Mazamitla—1 female, 3 males, September 3, 1963, A.E. Michelbacher; 1 male, October 10, 1964, A.E. Michelbacher; 6 males, October 9, 1984, A.E. Michelbacher. Puertas Cuatas (15 km. SW)—17 females, September 2, 1990, C.M. Estrada. El Terrero (10 km. SW)—10 males, November 5, 1990, R. Ayala. **OAXACA:** Yanhuítlán (7 mi. NW)—1 male, September 17, 1974, G. Bohart and W. Hanson.

#### *Tetraloniella ayala*, new species

This species is another moderate-sized species from central México that has relatively narrow but complete apical pale fasciae similar to those of *T. silacea* LaBerge. It has been named in honor of Dr. Ricardo Ayala who contributed a great deal to the successful completion of the collection trips throughout México sponsored by the National Science Foundation grant (BSR 90-24723). As in *silacea*, the female has the apical pale band of tergum 2 medially no longer than one-fourth to one-fifth median length of tergum, but differs by terga 2–4 having abundant short dark brown hairs in interband zones and in basal depressed area. Also terga 4 and 5 have the vestiture almost entirely dark brown, whereas in *silacea* this vestiture is ochraceous or golden in color. The male of *alaya* is similar to *silacea* in the short metasomal apical pale fasciae relatively long first flagellar segments, but differs in having flagellar segments 2–11 red to orange on outer-lower surfaces and segment 2 is not quite as long as in *silacea*.

**FEMALE. Measurements and Ratios.**—N = 20; length, 11–13 mm; width, 4.0–4.5 mm; wing length, M = 2.93±0.104 mm; hooks in hamulus, M = 11.50±0.185; flagellar segment 1/2, M = 1.84±0.026.

**Integumental Color.**— Black except as follows: flagellar segments 3 or 4–10 more or less reddened on outer-lower surfaces; tegula piceous anteriorly, large posterior area hyaline, yellow; wing membranes hyaline, moderately infumate, veins black to dark brown; metasomal terga with apical areas translucent only in narrow apical rims; sterna 2–5 with apical areas hyaline, yellow; distitarsi dark brown; tibial spurs testaceous to ferruginous.

**Structure.**— Clypeus sculptured as in *silacea* but surface dull, shagreened. Supraclypeal area as in *silacea* but surface dull, finely tessellate. Face above antennal fossae, vertex lateral areas and genal area as in *silacea* but dull to moderately dull, shagreened. Galeae shiny above, unshagreened; maxillary palpus 5-segmented, ratio about as 1.0:0.9:0.9:0.4:0.3. Flagellar segments 2 and 10 as in *silacea*. Mesoscutum punctured as in *silacea* but posteromedial area with punctures separated largely by half to one puncture width, occasionally slightly sparser, surface dulled by distinct shagreening. Scutellum as in *silacea* but less shiny, usually moderately shagreened. Propodeum and mesepisternum sculptured as in *silacea*. Metasomal tergum 1 with apical area short, impunctate, basal area with apical third sparsely punctate except at extreme sides punctures more crowded than mediobasally, surface moderately dull, finely shagreened. Tergum 2–4 sculptured as in *silacea*. Pygidial plate as in *silacea*. Sterna 2–5 sculptured as in *silacea*.

**Vestiture.**— Generally ochraceous to pale ochraceous except as follows: vertex and dorsum of thorax with strongly ferruginous vestiture, this deep rust color almost becomes brown in some specimens, without dark brown patches on mesoscutum or scutellum; tergum 2 with basal tomentum pale ochraceous; terga 3 and 4 with basal tomentum entirely or mostly dark brown, terga 2–4 with interband zones with short, erect, dark brown hairs; terga 5 and 6 with vestiture brown; sterna 2–5 with long plumose hairs ochraceous to almost golden in color, not white laterally; scopal hairs highly plumose, ochraceous.

**MALE. Measurements and Ratios.**— N = 13; length, 10–12 mm; width, 3.0–3.5 mm; wing length, 2.95±0.174 mm; hooks in hamu-

lus,  $M = 10.4 \pm 0.183$ ; flagellar segment 2/1,  $M = 3.79 \pm 0.104$ .

**Integumental Color.**- Black except as follows: clypeus entirely yellow; labrum white; mandible usually with small basal yellow macula, occasionally absent; tegulae and wings as in female; flagellar segments 2–11 with outer-lower surface red to yellow; metasomal terga as in female but apical areas with translucent rim usually slightly broader; sterna as in female; distitarsi reddish brown; tibial spurs testaceous.

**Structure.**- Sculpture of head as in female but genal area punctures slightly larger. Galea shiny above, unshagreened; maxillary palpus 5-segmented, ratio about as 1.0:0.7:0.9:0.4:0.4. Antennae relatively short but reaching second metasomal segment in repose; flagellar segment 1 with minimum length equal to one-third to slightly more than one-fourth maximum length of segment 2; penultimate segment about one-third as broad as long. Mesosoma as in female but mesoscutum with posteromedial area punctures somewhat sparser. Terga sculptured as in female but interband punctures sparser, separated often by almost two puncture widths. Pygidial plate with rounded apex and base almost twice as broad as apex. Sterna 2–5 as in female but with more sparsely punctate basal areas. Sternum 6 (Fig. 30) with apicolateral carinae following apicolateral margins of sternum, not toothed apically, ending abruptly at base.

Terminalia (Figs. 30–34) similar to that of *T. spissa* (Figs. 10–14). Sternum 7 (Fig. 31) as in *spissa* but apicomedian plates smaller, a few hairs present and sternum 8 (Fig. 32) similar to *spissa* in having indented lateral margins but with only a few hairs apically. The gonocoxite (Figs. 33 and 34) is strongly elbowed as in *spissa*.

**Vestiture.**- Generally pale ochraceous except as follows: vertex with hairs usually golden; mesoscutum and scutellum with hairs golden to ferruginous (less rust-colored than female), never with dark brown hairs; terga 2–5 with apical pale bands complete, narrow (that of tergum 2 equals less than one-fourth median length of tergum), with interband zone hairs all short, erect, pale ochraceous; terga 6

and 7 with pale hairs; sternal hairs sparse, pale; inner surfaces hind basitarsi pale yellow.

**Type Material.**- The holotype female (UNAM), 23 female paratypes, and the allotype male of *Tetraloniella ayala* (UNAM) were collected 25 km. SW of Metzquititlán (1,860 m. elev.), Hidalgo, México, November 11, 1991, by Ricardo Ayala. Paratypes are in the collections of UNAM, INHS, USU, UCB, SECK, USNM. Data from an additional 13 female and 44 male paratypes, as well as the type material listed above, are listed below (see map, Fig. 3).

GUANAJUATO: San Gregorio (SW of Cueramero (1,700 km. elev.)—August 31, 1989, 2 miles, L. Godinez; September 17, 1989, 1 male, L. Godinez; October 6, 1989, 2 females, 4 males, L. Godinez. GUERRERO: Taxco (13 km. NE at 1,580 m. elev.)—1 female from yellow composite, October 29, 1991, R. Ayala. HIDALGO: Acayuca—1 female, March 16, 1954, R.R. Dreisbach. Atotonilco el Grande (4 km. NW)—1 male from *Eruca sativa*, September 14, 1992, L. Godinez. Metzquititlán (25 km. SW at 1,860 m. elev.)—3 females, 1 male, November 11, 1991, T. Griswold; (22 km. SW at 1,750 m. elev.) 6 females from *Simsia lagasceaformis*, November 11, 1991, T. Griswold. Zimapán (3 mi. E at 6,200 ft. elev.)—6 males, September 28, 1975, J.A. Chemsak, J.A. Powell, T. Eichlin and T. Friedlander. JALISCO—1 male, September, 1965, N.L.H. Krauss. OAXACA: Nochistlán (7 mi. SE at 7,000 ft. elev.)—4 males, J.A. Powell, J.A. Chemsak, T. Eichlin and T. Friedlander. Miahuatlan (1,100 km. elev.)—1 male, September 6–10, 19??, R. Ayala. Yanhuítlán (3 mi. SE)—1 male, September 7, 1974, G.E. Bohart and W. Hanson. QUERETARO: Teloloapán—1 male (no abdomen), November 3–6, 1991, R. Ayala.

#### *Tetraloniella eriocarpi* (Cockerell)

*Exomalopsis eriocarpi* Cockerell, 1898, Ann. Mag. Nat. Hist., ser. 7, 2:453.

*Xenoglossodes eriocarpi*, Cockerell and Porter, 1899, Ann. Mag. Nat. Hist., ser. 7, 4:407; Cockerell, 1903, Ann. Mag. Nat. Hist., ser. 7, 12:449; 1905, Canadian Ent., 37:335; 1906, Ann. Mag. Nat. Hist., ser. 7, 18:72; 1933, Pan-Pacific Ent., 9:159.

*Melissodes pimella* Cockerell, 1906, Ann. Mag. Nat. Hist., ser. 7, 17:363.

*Melissodes neotomae* Cockerell, 1906, Trans American Ent. Soc., 32:314; 1910, Univ. Colorado Studies, 7:195 (**new synonymy**).

*Melissodes albocincta* Cockerell, 1919, Ann. Mag. Nat. Hist., ser. 9, 2:119 (**new synonymy**).

*Melissodes pimela*: LaBerge, 1956, Univ. Kansas Sci. Bul., 37:1179 (new combination).

*Melissodes agilis* var. *parksi* Cockerell, 1935, American Mus. Nov. No. 766, p. 5. *Xenoglossodes parksi*: LaBerge, 1956, Univ. Kansas Sci. Bul., 37:1179 (new combination).

*Tetraloniella eriocarpi* is a small species from the American Southwest and México. The female can be recognized by the yellow maculae along the apical part of the clypeus and bases of the mandibles and the white or cream-colored clypeus as described below. In

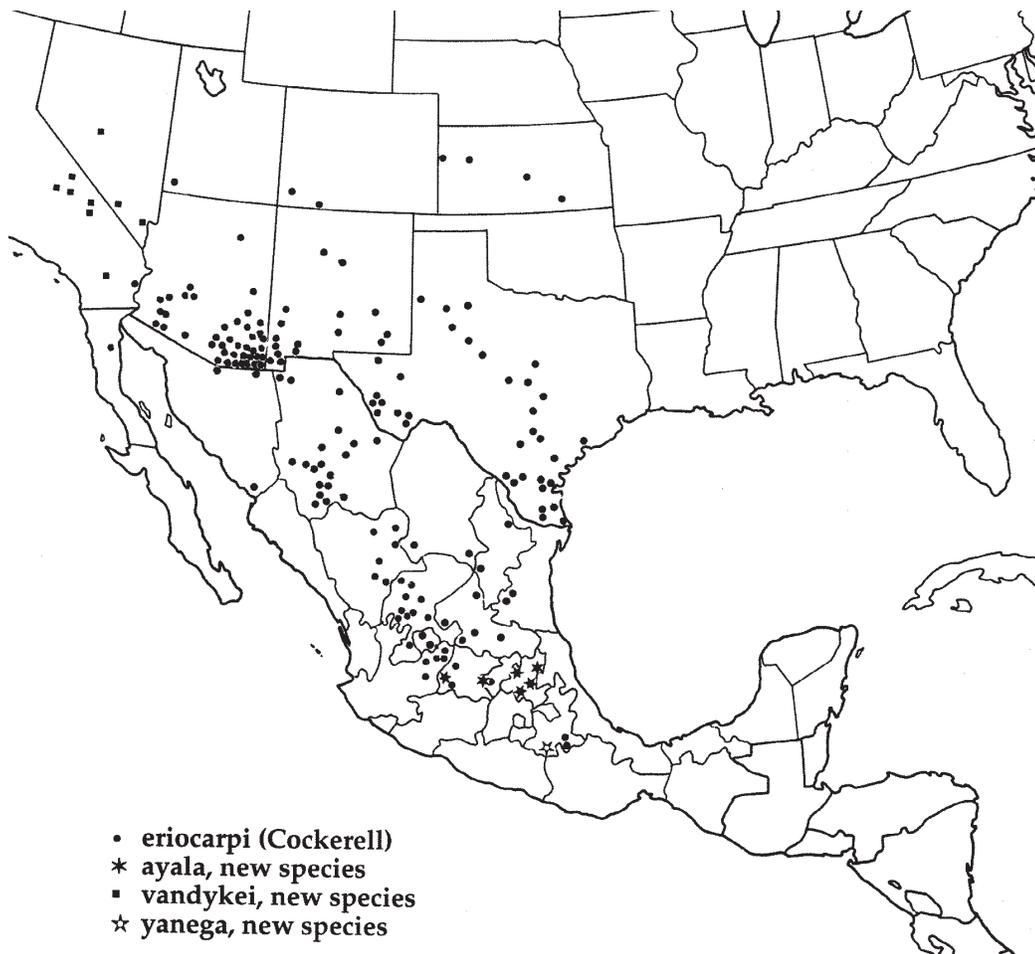


Figure 3. Map showing the known distributions of *Tetraloniella eriocarpi* (Cockerell); *ayala*, new species; *vandykei*, new species; and *yanega*, new species.

addition, the female has metasomal terga 3–6 covered with white to yellow pubescence and hair; apical pale fasciae are not clearly evident. Metasomal tergum 2 has a complete apical pale band separated from the basal pale pubescence by almost simple suberect pale hairs. The female mesoscutum has distinct punctures separated usually by one puncture width posteromedially and the surface shiny. The male of *eriocarpus* can be recognized by sternum 6 having lateral teeth and the carina leaving the apical end of each tooth proceeds towards the midline forming a distinct concavity facing apically. The flagellum is entirely yellow or orange below.

**FEMALE. Measurements and Ratios.**- N = 20; length, 7.5–9.0 mm; width, 2.5–3.5 mm; wing length,  $M = 2.02 \pm 0.113$  mm; hooks in hamulus,  $M = 10.00 \pm 0.218$ ; flagellar segment 1/2,  $M = 1.66 \pm 0.052$ .

**Integumental Color.**- Integument piceous except as follows: clypeus with apical band of yellow varying from one-fourth to three-fourths of clypeus, in almost all specimens posterior margin of this yellow band with median pointed extension directed posteriorly (at least 99% of females); mandible with yellow basal macula and reddened in apical half; labrum usually entirely white to cream-colored, occasionally margined by black and rarely mostly dark (only in a few specimens mostly from México); tegulae hyaline, yellow; terga 1–4 with apical areas all or mostly hyaline, colorless to yellow, rarely infuscated along basal margins; sterna mostly red with hyaline apical areas; distitarsi red; wing membranes hyaline, veins red to reddish brown.

**Structure.**- Clypeus gently curved from side to side; oculoclypeal distance minimal, less than half narrowest width first flagellar segment; punctures moderately coarse, crowded, surface moderately shiny. Supraclypeal area with punctures as in clypeus or slightly larger, surface shiny. Face above antennal fossae with small deep punctures separated by half a puncture width or more, surface shiny. Vertex with flattened lateral area with minute punctures separated mostly by half to one puncture width, surface shiny. Genal area narrow, minutely punctate, shiny. Galea above shiny, unshagreened; maxillary

palpal segments 5, ratio about as 1.0:1.0:0.8:0.4:0.5. Flagellar segment 2 slightly shorter than broad and as long as or slightly longer than segment 3, segments 3–9 about as long as broad or longer. Mesoscutum with small deep punctures, posteromedially usually separated by half to one puncture width, more crowded peripherally, surface shiny, unshagreened; scutellum similar. Propodeum with dorsal surface punctate except in narrow median area, punctures often elongate, surface slightly dulled by fine shagreening; posterior surface with large median area impunctate, shiny to dull, finely shagreened. Mesepisternum with large, round, deep punctures separated by half a puncture width or slightly more, surface shiny, unshagreened. Metasomal tergum 1 with punctures in median half separated mostly by half to one puncture width or slightly more, more crowded laterally and along base of apical area, surface shagreened, moderately shiny. Terga 2–4 with basal areas with small crowded punctures (slightly sparser medially on tergum 2), surfaces dull to moderately shiny, finely shagreened; apical areas with dense punctures but less visible because of hyaline nature of integument. Pygidial plate with apex rounded, otherwise V-shaped. Sterna 2–5 densely punctate except in narrow apical areas, surfaces shiny.

**Vestiture.**- In general vestiture white to ochraceous (a few females from western México bright yellowish or even fox-red dorsally); dorsum of thorax and vertex usually brighter. Metasomal tergum 2 with pale basal pubescent band separated from apical pale band by zone of relatively simple, erect to suberect, short hairs not hiding surface of integument; terga 3–6 completely covered by highly plumose pale pubescence. Sternal hairs red to pale ochraceous. Scopal hairs highly plumose, white to extremely pale ochraceous, inner surfaces tarsi red to orange.

**MALE. Measurements and Ratios.**- N = 20; length, 7–9 mm; width, 2–3 mm; wing length,  $M = 2.12 \pm 0.109$  mm; hooks in hamulus,  $M = 9.25 \pm 0.123$ ; flagellar segment 2/1,  $M = 9.02 \pm 0.305$ .

**Integumental Color.**- Integument black except as follows: clypeus, base of mandibles,

and labrum entirely yellow; flagella red to reddish brown below, yellow to orange above; tegula hyaline, yellow to orange; wing membranes hyaline, colorless, veins yellow to red; tarsi and often tibiae red to orange; terga with apical areas hyaline, colorless; sterna piceous but apical areas hyaline, yellow to colorless.

**Structure.**- Head sculptured much as in female; maxillary palpus with 5 segments in ratio of about 1.0:0.8:0.8:0.3:0.6; antennae long, reaching second segment of metasoma, second flagellar segment 6 to 10 times as long as first, segments round in cross-section, last five to six segments moderately crenulate. Mesoscutum with anterior third with punctures minute, separated mostly by one to two puncture widths or more (somewhat more densely punctate in some specimens, especially from western México), surface shiny, unshagreened, thorax elsewhere as in female. Metasomal terga sculptured much as in female, but terga 2–5 with apical areas largely impunctate. Tergum 7 with lateral arm of postgradulus carinate, without tooth. Pygidial plate usually one and one-half to two times as broad basally as at apex, with weak subapical lateral notches. Sternum 6 (Fig. 35) with lateral carina forming strong, blunt lateral teeth, each tooth directed somewhat downward and outward, apical end of tooth forming a carina ending short of midline of sternum distinctly curving from tooth to midline forming a concavity facing apically.

Terminalia as in Figs. 35–39. Note that sternum 7 (Fig. 36) has each apicomedian lobe somewhat bilobed and only a few hairs are present on the innermost of these. Sternum 8 (Fig. 37) is distinctly indented on sides and has sparse but distinct apical hairs. The gonocoxite (Figs. 38 and 39) is strongly elbowed with abundant hairs on basal portion.

**Vestiture.**- White to pale ochraceous, uncommonly yellow to dark ochraceous, brighter on thoracic dorsum and vertex; tergum 1 often with apical pale pubescent band complete or narrowly interrupted medially, less commonly restricted to lateral fourth of tergum; terga 2–5 with complete apical pale bands and basal pale pubescence with intermediate areas covered by highly plumose suberect to appressed pubescence; tergum 2

usually and often tergum 3 with apical and basal bands separated by a zone of relatively simple, suberect, pale hairs; rarely intermediate band of erect hairs present on tergum 4. Sterna 4 and 5 with basal area hairs long, stiff, relatively simple, often absent medially on sternum 5; sternum 6 with little or no vestiture.

**Type Material.**- The female holotype of *Tetraloniella eriocarpi* (USNM No. 4343) was collected by C.H.T. Townsend in Fillmore Canyon, Organ Mts., New Mexico (5,400 feet elev.), September 1, 1898 from flowers of *Eriocarpum gracile*. The holotype female of *albocincta* (USNM No. 23,218) was collected by C.F. Baker in México. The holotype male of *pimella* (PANS No. 10,132) was taken in Arizona. The holotype male of *parksi* (AMNH) was collected in Bexar County, Texas, May 17, 1934 by H.B. Parks. The name *albocincta* was synonymized with *Melissodes opuntiella* Cockerell by LaBerge (1956) but upon additional study of the type specimen in 1993, it has become evident that the author made an error at that time.

**Distribution.**- *Tetraloniella eriocarpi* is known from California and Baja California east to Texas and south to central México (Fig. 3). It was reported from Fort Hall, Idaho, but this author has not seen the specimen and this record seems out of range and probably a misidentification (Cockerell, 1933, p. 159). It has been collected from April 11 to November 20, but chiefly from July through October. The early season (April–early June) specimens are all from Texas or eastern México. In addition to the type material, a total of 484 females and 543 males were examined from localities listed below.

**México.**- AGUASCALIENTES: Aguascalientes (19 mi. S and 36 mi. N); Rincon de Romos (12 km. N). BAJA CALIFORNIA: Sierra San Pedro de Martír. CHIHUAHUA: Chihuahua (4 mi. SW, 74 km. NE, 153 km. NE, and 83 km. N); Ciudad Camargo (4 mi. W); Cuauhtemoc (16 km. S and 42 km. E); Ciudad Jiménez (3 mi. W, 10 mi. N); Escalon (5 mi. N); General Trias; Parral (9 mi. S and 5 mi. W); Janos (95 km. W, 35 km. NW); Ojinaga (31 km. W); El Sueco (30 mi. S); Villa Ahumada (60 km. S). COAHUILA: Saltillo (38 mi. NW); San Pedro de las Colonias (12

mi. SE); Zapata (9 km. W). DURANGO: Bermejillo (20 mi. N); Ceballos; Durango; Gomez Palacio (25 mi. NW); La Zarca (26 mi. S); Nombre de Dios; San Juan del Río (9 mi. S). GUANAJUATO: Guanajuato; Leon; San Gregorio. HIDALGO: Actopán (and 9 mi. NW); Animas (3 km. E); Ciudad del Maíz (40–50 mi. NW); Metzquititlán (11 km. SW). JALISCO: Encarnación de Díaz (12 mi. S); Lagos de Moreno (and 6 mi. SE, 13 mi. SW, 15 mi. NE); San Juan de los Lagos. NUEVO LEON: LaGloria (S of Monclova); Saltillo (41 mi. S). PUEBLA: Tehuacán (12 km. SW at 1,470 m. elev.); Zapotitlán Salinas (2 km. SW, 21 km. SW). QUERETARO: Queretaro (11 mi. W). SAN LUIS POTOSI: Entronque Huizache (9 mi. SE); Matehuala; Salinas (34 mi. S); San Luis Potosí (20 mi. SW). SINALOA: Esquinapa de Hidalgo. SONORA: Agua Prieta (52–54 km. SW); Navajoa, Nogales. TAMAULIPAS: Juamave (4 and 15 mi. NE). ZACATECAS: Fresnillo (and vicinity); Juan Aldama; Río Grande; Sain Alto; San Isidro; Tabasco (5 mi. N); Zacatecas (5 mi. N). **United States.**- ARIZONA: Ajo (29 mi. E and 32 mi. SE); Apache (and vicinity); Apache Pass (E. side), Cochise Co.; Aquila; Ashton Draw (18 mi. E of Douglas); Benson (11 mi. W); Bisbee (10 and 12 mi. W); Bowie; Box Canyon (4 mi. W), Pima Co.; Bridgeport; Camp Verde (9 mi. SE and 13 mi. E), Yavapai Co.; Carrizo; Chiricahua (2 mi. S); Claypool; Cochise (2 mi. N); Congress (4 and 17 mi. SW); Douglas (and vicinity); Elfrida (9 mi. N); Florence Junction (3 mi. S); Geronimo (3 mi. W); Globe (27 mi. NE); Hereford (5 mi. S); Hoteville (8 km. NW); Huachuca City (6 mi. NE); Huachuca Mts.; Kirkland Junction, Yavapai Co.; Madera Canyon, Pima Co.; Nogales (and vicinity); Onion Saddle, Chiricahua Mts., Cochise Co.; Oracle; Palominas (Greenbush Draw); Parker Canyon Lake, Santa Cruz Co.; Payson; Patagonia; Pearce (2 mi. S); Pena Blanca, Santa Cruz Co.; Pinery Canyon, Chiricahua Mts., Cochise Co.; Portal (and vicinity); Prescott (4 mi. N); Rucker Canyon, Chiricahua Mts., Cochise Co.; San Xavier Mission; Sells (16 mi. W); Shumway; Sierra Vista (16 mi. SE); Skeleton Canyon (6 mi. E of Apache), Cochise Co.; Sonoita (and vicinity); Tucson (and 17 mi. E);

Wilcox (and 4 mi. E). CALIFORNIA: Blythe (20 mi. W), Riverside Co. COLORADO: Cortez, Montezuma Co.; Tiffany, La Plata Co. KANSAS: Hudson (7 mi. NE), Stafford Co.; State Park, Scott Co.; Wallace Co.; Wellington. NEW MEXICO: Albuquerque (10 mi. E); Animas (and vicinity); Carlsbad (5 mi. N); Deming (12 km. SE and 23 km. S); Lordsburg; Playas Valley (2 mi. E of Stevens); Road Forks, Hidalgo Co.; Rodeo (and vicinity); Roswell (14 mi. S); Seneca (and 14 mi. NE); Silver City (25 mi. SW); Tornero; White Sands Nat. Mon., Otero Co. TEXAS: Alice (10 and 22 mi. S); Alpine (10 mi. S); Austin, Travis Co.; Benham; Bexar Co.; Bloy Camp, Jeff Davis Co.; Brewster Co.; Brownsville; Brownwood; Carrizo Springs; Catarina; Coleman (18 km N); Cotula; Cullison; Davis Mts., Jeff Davis Co.; Dickens (9 mi. SE), Dickens Co.; Doss, Gillespie Co.; Eastland Co.; Edna; Fedor, Lee Co.; Fort Davis (and vicinity), Jeff Davis Co.; Garza Co.; Goldthwaite (15 mi. W), Mills Co.; Goliad Co.; Lake Theo, Briscoe Co.; Kingsville; Lubbock; Marathon (1 mi. S); Marfa (8 mi. E); Morton; Pecos; Pine Springs (2 mi. NE), Culberson Co.; Rachal; Sabinal; San Antonio; San Manuel; Sarita (20 mi. S); Snyder (13 mi. E); Sonora; Southmost, Cameron Co.; Sweetwater; The Basin, Big Bend Nat. Park. UTAH: Veyo, Washington Co.

**Flower Records.**- This species has been collected from a wide variety of flowers of the family Compositae and occasionally from flowers of several other families. Of 81 collections of bees (160 females and 208 males) with floral data, 65 were made from flowers of some composite. *Tetraloniella eriocarpi* has been collected from flowers of the plants listed below.

*Allionia incarnata*; *Amphiacharis dracunculoides*; *Aplopappus* sp.; *Asclepias* sp.; *Aster* sp., *A. tenacetifolius*; *Baccharis* sp., *B. glutinosa*; *Baeria* sp.; *Bahia absinthifolia dealbata*; *Baileya* sp., *B. multiradiata*, *B. pleniradiata*; *Bebbia* sp.; *Chrysopsis* sp.; *Dyssodia* sp., *D. aurea*; *Encelia* sp., *E. farinosa*; *Erigeron* sp., *E. coronaria*; *Eriogonum* sp., *E. annuum*, *E. abertianum neomexicana*, *E. concinnus*; *Gaillardia* sp., *G. suavis*; *Gutierrezia* sp., *G. longifolia*, *G.*

*microcephala*; *Haplopappus* sp., *H. gracilis*; *Helenium* sp.; *Helianthus* sp., *H. annuus*; *Heterotheca* sp., *H. subaxillaris*; *Hymenothrix wislizeni*; *Kallstroemia grandiflora*; *Lepidium thurberi*; *Machaeranthera tagetina*, *M. pinnatifida*; *Monarda punctata coryi*; *Pectis* sp., *P. papposa*; *Pithecolobium* sp.; *Prionopsis ciliata*; *Rudbeckia latifolia*; *Sidalcea* sp.; *Sphaeralcea* sp.; *Sphanostephus humilis*; *Solidago* sp.; *Tidestroma lanuginosa*; *Verbesina* sp., *V. encelioides*; *Verbena* sp.; *Xylotharnia triantha*.

***Tetraloniella wilmattae* (Cockerell),  
new combination**

*Xenoglossodes wilmattae* Cockerell, 1917, in Cockerell, W.P., 1917, Jour. New York Ent. Soc., 25:191.

*Xenoglossodes pallidicauda* Cockerell, 1934, American Mus. Nov. No. 697, p. 11. (new synonymy).

This small pale species is very similar to *T. eriocarpi*. The female of *wilmattae* differs from that of *eriocarpi* by having the labrum entirely or mostly black, the clypeal pale macula narrow (usually one-fourth of clypeus along midline) and without a pointed median extension posteromedially, and the metasomal terga 2–4 apical areas usually with relatively narrowly hyaline margins. The male of *wilmattae* can be immediately recognized by the form of the sixth metasomal sternum. In *wilmattae* the lateral teeth are somewhat smaller and the carina leaving the apical edge of each tooth proceeds medially forming a straight or convex line (the bulge facing apically). In addition, the males of *wilmattae* usually have the last three and one-half flagellar segments dark below and the vestiture is usually white instead of ochraceous.

**FEMALE. Measurements and Ratios.**- N = 20; length, 7.5–9.0 mm; width, 2.5–3.5 mm; wing length, M = 2.26±0.062 mm; hooks in hamulus, M = 10.35±0.167; flagellar segment 1/2, M = 1.42±0.029.

**Integumental Color.**- Integument piceous except as follows: clypeus with narrow apical band of yellow usually equaling one-fourth or less of clypeus, in all specimens pos-

terior margin slightly concave medially; mandible with basal yellow maculae (occasionally reduced); labrum dark with small mediobasal pale spot usually equal to one-third or less of labral area; tegulae hyaline, yellow to orange; terga 1–4 with apical areas hyaline, colorless to yellow in apical half, red to brown basally; distitarsi red; wing membranes hyaline, veins dark brown to reddish brown except costal vein usually yellow or orange.

**Structure.**- Clypeus, oculo-clypeal distance, supra-clypeal area as in *eriocarpi*. Face above antennal fossae as in *eriocarpi* but punctures usually separated by half a puncture width or less. Vertex and genal area as in *eriocarpi*. Galea as in *eriocarpi*, maxillary segmental ratio about as 1.0:0.7:0.7:0.5:0.3. Flagellar segments as in *eriocarpi*. Mesoscutum as in *eriocarpi* but anterior third with punctures separated mostly by half a puncture width. Propodeum sculptured as in *eriocarpi* but dorsal area punctures not elongate. Mesepisterna and metasomal terga sculptured as in *eriocarpi*. Pygidial plate and metasomal sterna as in *eriocarpi*.

**Vestiture.**- White to pale ochraceous, often darker or bright ochraceous on thoracic dorsum and vertex. Metasomal terga with vestiture as in *eriocarpi* but tergum 3 as well as tergum 2 with interband zone of short, suberect to erect hairs not hiding surface, a few highly plumose hairs may be scattered across the median fourth of tergum 3. Sternal hairs and scopal hairs as in *eriocarpi*.

**MALE. Measurements and Ratios.**- N = 20; length, 7–10 mm; width, 2.5–8.0; wing length, M = 2.39±0.098 mm; hooks in hamulus, M = 9.45±0.170; flagellar segment 2/1, M = 11.04±0.251.

**Integumental Color.**- Integument black except as follows: clypeus, base of mandibles, and labrum entirely yellow, flagellum red below and dark red above except last three and one half segments dark reddish brown below and dark brown above (in some individuals fewer than three and one half segments are darkened); wing membranes hyaline, colorless, veins dark brown to dark reddish brown except costal vein pale; terga with apical areas hyaline, often narrowly infuscated posteriorly; sterna piceous; distitarsi pale, tibial spurs pale ochraceous.

**Structure.**- Head sculptured as in female; maxillary palpus 5-segmented, in ratio of about 1.0:0.8:0.8:0.3:0.5; antennae long, flagellum round in cross-section, last five or six segments moderately crenulate. Mesoscutum with posteromedian area punctures sparse, separated mostly by two puncture widths or more, apical third with punctures separated by half a puncture width or slightly more, surface shiny. Metasomal terga sculptured as in *eriocarp*; pygidial plate narrow, base not broader or only slightly broader than apex (unless worn), with weak subapical lateral

notches. Tergum 7 with lateral arm of postgradulus carinate, without tooth. Sternum 7 with lateral carina forming small lateral teeth, end of each tooth with a carina extending mesally ending short of midline, carina straight from tooth to midline or forming a convex curve facing apically. Terminalia (Figs. 40-41) essentially as in *T. eriocarp*.

**Vestiture.**- White to pale ochraceous, occasionally brighter on thoracic dorsum and vertex; metasomal tergum 1 with apical pale pubescent band reduced to lateral fasciae each equal to one-fourth or less of width of tergum,



Figure 4. Map showing the distributions of *Tetralonia wilmattae* (Cockerell); *incana*, new species; *albata* (Cresson); and *flavifasciata* (Cockerell).

never complete or nearly complete; metasomal terga as in *eriocarpus* but terga 3 and 4 and often 5 with area between basal and apical pale bands often with simple hairs not hiding surface as in tergum 2. Sternal hairs as in *eriocarpus*.

**Type Material.**- The holotype female of *Tetraloniella wilmattae* (CAS No. 15,555) was collected at Point Isabel (near Brownsville), Texas, in April 1917, from flowers of a small composite, by W.P. Cockerell. The holotype female of *pallidicauda* (AMNH) was collected in Bexar Co., Texas, by H.B. Parks. The holotype female has the clypeal yellow, macula reduced to two small yellow apicolateral maculae.

**Distribution.**- *Tetraloniella wilmattae* ranges from Texas south into northeastern México (Fig. 4). It has been taken from March 27 through December 24 but chiefly in April and May. In addition to the type specimen mentioned above, 105 females and 98 males were collected from localities listed below (the type locality is included).

**México.**- COAHUILA: Piedras Negras (192 km. S). DURANGO: El Salto. NUEVO LEON: Linares (10 mi. S and 12 mi. W); Vallecillo. TAMAULIPAS: El Limon; San Fernando (at the Río Conchos and 63 mi. N); Santander Jiménez.

**United States.**- TEXAS: Austin, Travis Co.; Ben Bolt, Jim Wells Co.; Bentzen-Rio Grande St. Park; Bexar Co., Brackettville; Brownsville (Del Mar); Cotula; Eastland County; Edinburg; Eldorado (10 mi. S); Fedor, Lee Co.; Fort Stockton (25 and 31 mi. SE), Pecos Co.; Harper; Hidalgo; Johnson City; Kerrville; Kingsville; Laredo; Lee County; Lopeno; Ozona; Palmetto St. Park, Gonzales Co.; Pharr (10 mi. SW); Point Isabel (near Brownsville); Sabinal; San Benito; Sonora; Southmost, Cameron Co.; Starr Co.; Stonewall; Streeter, Mason Co.; West (3 mi. W), McLennan Co.

**Flower Records.**- *T. wilmattae* is probably an oligoecium of composites as is its close relative *T. eriocarpus*, and has been collected from flowers of the plants listed below.

*Actinea* sp.; *Agastache breviflora*; *Callirhoe* sp.; *Coreopsis* sp.; *Gaillardia* sp., *G. suavis*; *Helenium latifolium*, *H.*

*microcephalum*; *Medicago minima*; *Ratibida columnaris*; *Rudbeckia* sp.; *Tetragonotheca ludoviciana*.

#### *Tetraloniella fulvotecta* (Cockerell)

*Exomalopsis fulvotecta* Cockerell, 1949, Proc. United States Nat. Mus., 98:455–456.

This small species is similar to *T. eriocarpus* from which it can be distinguished by the dense punctation of the mesoscutum. The mesoscutum posteromedially has small round punctures separated chiefly by half a puncture width. In addition, the clypeal yellow macula occupies half or more of the clypeal surface and the body vestiture is chiefly dark ochraceous to almost orange. The male has sternum 6 with lateral teeth formed as described for *eriocarpus* but the lateral teeth are relatively sharp. The male flagellum is entirely yellow or orange below.

**FEMALE. Measurements and Ratios.**- N = 20; length, 9–11 mm; width, 3.5–4.5 mm; wing length, M = 2.34±0.096 mm; hooks in hamulus, M = 10.40±0.169; flagellar segment 1/2, M = 1.54±0.019.

**Integumental Color.**- Integument piceous except as follows: clypeus with apical band of yellow usually equal to about half of clypeus, rarely less, in most specimens posterior margin of yellow band with median pointed extension directed posteriorly (in all but one specimen); mandible with yellow sub-basal macula; labrum black except small median or mediobasal yellow macula; flagella dark brown to red below (usually first few segments darkest); tegulae hyaline, yellow; terga 1–4 with apical areas hyaline, usually yellow; sterna piceous with hyaline apical margins; wing membranes hyaline, veins reddish brown.

**Structure.**- Clypeus, supra-clypeal area, face, vertex, and genal area as in *eriocarpus*. Galea shiny, unshagreened except near tip; maxillary palpal segments 5, ratio about as 0.8:1.0:0.7:0.5:0.3. Flagellar segment 2 slightly shorter than broad and as long as or slightly longer than segment 3, segments 2–9 about as long as broad or broader than long. Mesoscutum with small deep punctures,

posteromedially crowded, mostly separated by half a puncture width or less, surface slightly dulled by weak shagreening; scutellum with smaller, crowded punctures. Propodeum, metasomal terga, pygidial plate, and sterna as in *eriocarpi*.

**Vestiture.**- In general vestiture dark ochraceous to yellow-ochraceous, often almost orange on thoracic dorsum, but face below vertex, genal areas, and thoracic pleurae white or almost white, otherwise as in *eriocarpi*.

**MALE. Measurements and Ratios.**- N = 20; length, 9–11 mm; width, 3–4 mm; wing length, M =  $2.52 \pm 0.098$  mm; hooks in hamulus, M =  $9.85 \pm 0.131$ ; flagellar segment 2/1, M =  $10.91 \pm 0.231$ .

**Integumental Color.**- Integument black except as follows: clypeus and basal half of mandibles yellow; labrum white or cream-colored; flagella reddish brown below, red to orange above; tegulae hyaline, yellow; wing membranes hyaline, veins red to reddish brown; tarsi orange to red except basitarsi piceous as are tibiae; terga as in *eriocarpi*.

**Structure.**- Head sculptured much as in female; maxillary palpus with 5 segments in ratio as 0.7:1.0:0.7:0.3:0.3; antennae long as in *eriocarpi*, second flagellar segment usually 9 or 10 times as long as minimal length of first, segments slightly flattened and weakly crenulate. Mesoscutum with anterior third with punctures small, separated mostly by half a puncture width (as much as one puncture width only near middle of scutum), surface shiny, unshagreened; posteromedially punctures crowded as in female; scutellum and propodeum sculptured as in female. Metasomal sculpture as in female but tergum 1 with basal area punctures slightly sparser in median half; pygidial plate as in *eriocarpi* lateral subapical notches often lacking (worn?). Terga 5, 6, and 7 with postgraduli as in *eriocarpi*. Sternum 6 (Fig. 42) with apicolateral teeth shaped as in *eriocarpi*; note concentration of hairs apicomediaally and sparseness of hairs posterior to this.

Terminalia (Figs. 42–46) as in *eriocarpi*; note lack of hairs apically on sterna 7 and sternum 8 (Figs. 43 and 44) (these may be present but sparse and inconspicuous). Genital capsule and gonocoxite as figured (Figs. 45 and 46), the latter strongly elbowed.

**Vestiture.**- Dark ochraceous to yellowish orange, darkest on thoracic dorsum; lower pleural surfaces, face below vertex, and lower genal areas with vestiture white or almost white. Metasomal terga and sterna with vestiture arranged as in *eriocarpi*.

**Type Material.**- The female holotype of *Tetraloniella fulvotecta* (USNM No. 58,517) was collected at Zamorano, Honduras, October 19, by G. Vidales.

**Distribution.**- This species is known from Panamá north to central México (Fig. 5). It has been collected from September 2 through December 4, but chiefly in September and October. In addition to the holotype, 30 females and 39 males were examined from the localities listed below.

**Honduras.**- FRANCISCO MORAZAN PROV.: Zamorano. **México.**- CHIAPAS: Las Cruces Junction. JALISCO: El Tuito (12 km. S); Guadalajara (15 mi. NE); Melaque (8 km. N); Plan de Barranca (945 m. elev.); Puente Baranquitas (1.8 mi. NW of Magdalena, 3,000 m. elev.); Magdalena. MICHOACAN: Buenavista (50 km. N of Playa Azul, 800 m. elev.); El Congrejo (20 km. N of La Huacana, 1,090 m. elev.); Los Sabinos (28 km. S of Ario de Rosales, 1,190 m. elev.); Playa Azul (54 km. N, 8 m. elev.). MORELOS: Amacuzac (6 km. W). NAYARIT: Ahuatlán; Chapalilla; Tepic (14 km. NW). OAXACA: Nopala (50 km. N of Puerto Escondido at 700 m. elev.); Tehuantepec (35 mi. W, 12 mi. W and 38 mi. E). PUEBLA: Petlalcingo (1 km. SW at 1,280 m. elev.); VERACRUZ: Papantla. **Nicaragua.**- GUANACASTE PROV.: Ocotol. **Panamá.**- PANAMA PROV.: El Valle (6 km. S).

**Floral Records.**- Little is known concerning the floral preferences of *fulvotecta* but it has been taken from flowers of the plants listed below.

*Convolvulus* sp.; *Coreopsis* sp.; *Cosmos sulphureus*; *Helianthus* sp.; *Sida* sp.

***Tetraloniella perconcinna* (Cockerell),  
new combination**

*Exomalopsis perconcinna* Cockerell, 1949,  
Proc. United States Nat. Mus., 98:455.

*Melissodes albomarginalis* Cockerell, 1949,  
Proc. United States Nat. Mus., 98:466–  
467, new synonymy.

This is a small species related to *T. eriocarpi* as the sixth sternum of the male indicates. However, both sexes can be readily distinguished from *eriocarpi* by the lateral ridges on the posterior surface of the propodeum as described below and the well-formed tergal apical pale fasciae which, for the most part, are separated from the basal area pale tomentum by an intermediate area of dark brown vestiture. The female superficially resembles that of *fastigiata* but has more dark hairs on the metasomal terga and plumose scopal hairs. The female also resembles that

of *donata* but has a shiny mesoscutum and scutellum, as well as shiny mesepisterna.

**FEMALE. Measurements and Ratios.**- N = 20; length, 9–10 mm; width, 3.5–4.0 mm; wing length, M = 2.48±0.134 mm; hooks in hamulus, M = 10.40±0.112; flagellar segment 2/1, M = 1.68±0.022.

**Integumental Color.**- Black except as follows: mandible with apical half or slightly more rufescent, usually with golden macula apically (absent in worn specimens); flagellar segments 3 or 4 to 10 dark red below, 1, 2 and often base of 3 below dark brown; wing mem-

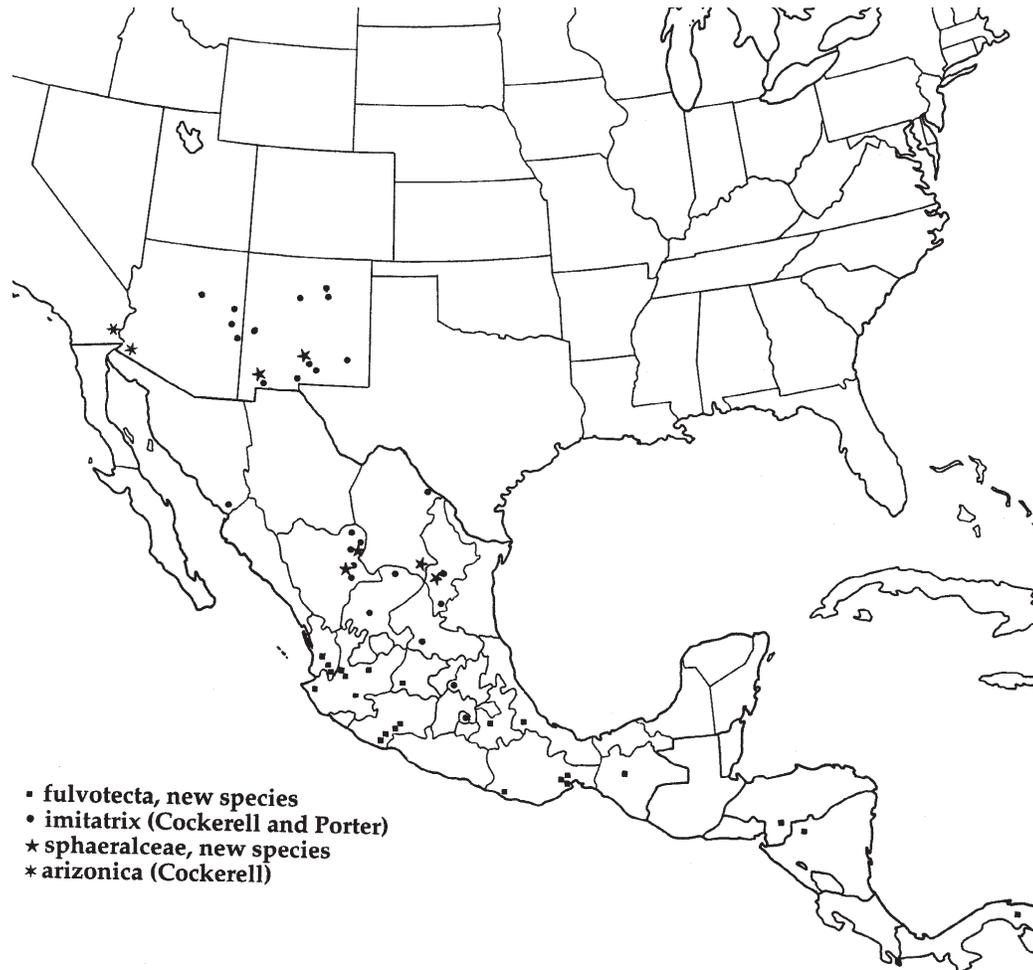


Figure 5. Map showing the known distributions of *Tetraloniella fulvotecta*, new species; *imitatrix* (Cockerell and Porter); *sphaeralceae*, new species; and *arizonica* (Cockerell).

branes hyaline, veins dark brown; metasomal terga 2–5 piceous with apical areas hyaline, usually yellow; sterna 2–5 with apical areas entirely hyaline or almost so, colorless to yellow; distitarsi dark reddish brown; tibial spurs testaceous.

**Structure.**—Clypeus gently rounded from side to side with minimal oculo-clypeal distance laterally; clypeal punctures large, elongate except along apical margin and basally, the latter smaller, surface moderately shiny, slightly shagreened; supra-clypeal area with coarse round punctures especially laterally, moderately shiny, shagreening weak if present; face above antennal fossae with crowded small punctures, surface shiny; vertex with lateral area with punctures minute, separated by one to two or more puncture widths, surface shiny; genal area similar to face above antennae. Galeae shiny above; maxillary palpus 5-segmented, segments in ratio about as 1.0:0.8:1.0:0.7:0.5. Flagellar segment 1 broader than long, following segments about as broad as long or longer. Metascutum with peripheral areas with dense small punctures, posteromedian area with punctures slightly larger, separated mostly by half to one puncture width or slightly more, surfaces shiny, unshagreened or weakly so. Scutellum similar but more densely punctate medially. Propodeum with large, crowded, elongate punctures, surface dull, finely tessellate. Mesepisternum with round moderate-sized punctures separated by half a puncture width or slightly more, surface shiny, weakly shagreened. Propodeum with dorsal surface with large crowded punctures, surface dull, shagreened; posterior surface with large median area impunctate, laterally with small punctures separated mostly by one puncture width or more, surface shiny, unshagreened or weakly so, posterior surface separated from lateral surface by a distinct dorsoventral ridge (occasionally weak dorsally). Metasomal terga sculptured as in *eriocarpi* but tergum 1 with apical area largely or entirely impunctate. Pygidial plate V-shaped with rounded but relatively pointed apex. Sternal sculpturing as in *eriocarpi*.

**Vestiture.**—Generally pale ochraceous except as follows: dorsum of thorax and vertex

with hairs usually bright ferruginous, pale ochraceous in presumably older, certainly worn, specimens. Tergum 1 with basal area with long, largely pale ochraceous hairs, but apically with short subappressed, dark brown hairs. Terga 2–4 with narrow apical pale fasciae, pale basal tomentum and a large interband zone of dark brown, relatively simple hairs. Tergum 2 with apical fascia indented anteromedially as in *donata*. Terga 5 and 6 with hairs largely ochraceous or pale ochraceous but often dark brown in basal area of tergum 5 and pale apical area often with a few brown hairs intermixed. Tergum 6 often with brown mixed with pale hairs. Terga 2–5 with long ochraceous hairs; sternum 6 with short dark brown hairs. Scopal hairs highly plumose, pale ochraceous.

**MALE. Measurements and Ratios.**—N = 20; length, 8.5–10.0 mm; width, 2.5–3.0 mm; wing length, M = 2.55±0.159 mm; hooks in hamulus, M = 9.70±0.164; flagellar segment 2/1, 7.36±0.241.

**Integumental Color.**—Black except as follows: clypeus yellow but narrowly infuscated along posterior margin; labrum yellow with distinct apical, dark brown margin; mandible without pale basal macula or extremely small if present; flagellar segments 2–11 dark red to orange-red below, segment 1 and base of segment 2 brown; wing membranes hyaline, veins dark reddish brown to dark brown; tegulae piceous; metasomal terga 1–5 similar to female terga 1–4; sterna 2–5 piceous with apical areas hyaline, colorless to yellow; distitarsi dark reddish brown; tibial spur testaceous.

**Structure.**—Head sculptured as in female but clypeal punctures less distinct; maxillary palpus 5-segmented, ratio about as 1.0:0.8:1.0:0.5:0.4; antennae long, reaching second metasomal tergum; flagellar segment 1 as long or slightly longer than pedicel, one-seventh to one-eighth as long as segment 2, last five or six segments not at all crenulate or extremely weakly so. Thoracic sculpturing much as in female (much more densely punctate than *eriocarpi*). Metasomal terga sculptured as in female but tergum 1 with apical area only narrowly impunctate apically; sterna 2–5 with basal areas relatively sparsely punc-

tate, punctures separated by one to three puncture widths. Sternum 6 (Fig. 47) shiny, impunctate, with apicolateral carinae forming a curve (concavity facing apically) and ending in a blunt apicolateral tooth, much as in *eriocarp*i.

Terminalia (Figs. 47–51) much as in *fulvotecta* (Figs. 42–46) but sternum 7 (Fig. 48) with apicomedian plates pointed apically; sternum 8 (Fig. 49) with sparse, longer apical hairs. Gonostylus and genital capsule as drawn (Figs. 50 and 51).

**Vestiture.**— Generally pale ochraceous except as follows: vertex and dorsum of thorax often darker ochraceous and rarely ferruginous

as in some females; metasomal tergum 1 with long pale hairs except in narrow zone just anterior to apical area where hairs are short, relatively simple, slightly darker; terga 2 and 3 with basal white tomentum and apical pale fasciae separated by a zone of dark brown, relatively simple, suberect, short hairs; terga 4–5 with apical pale fasciae and basal hairs entirely dark brown; tergum 6 with brown hairs; sterna 2–5 with relatively sparse, long, plumose, pale hairs (shorter, sparser, and darker medially); sternum 6 almost glabrous, hairs extremely small, simple, dark brown.

**Type Material.**— The holotype female of *Tetraloniella perconcinna* (USNM No. 58,

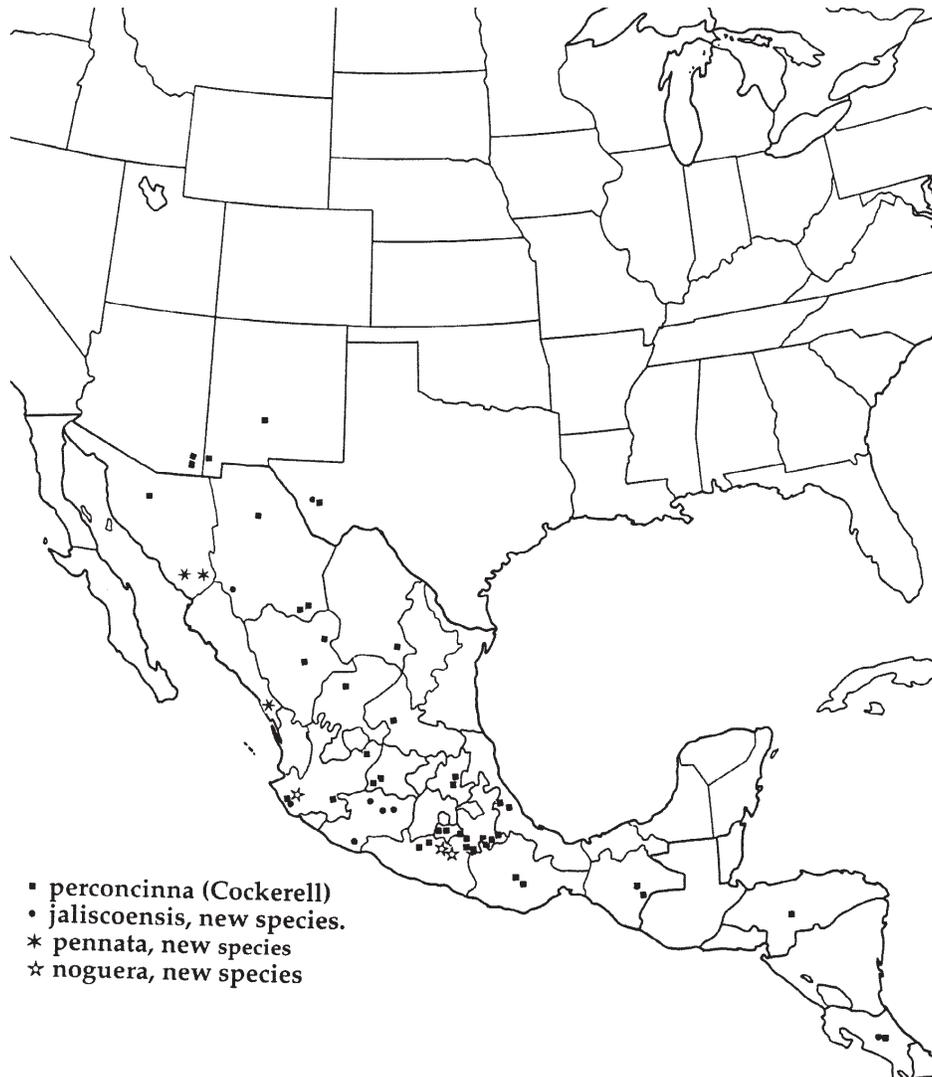


Figure 6. Map showing the known distributions of *Tetraloniella perconcinna* (Cockerell); *jaliscoensis*, new species; *pennata*, new species; and *noguera*, new species.

512) was collected at Agua Amarilla, Honduras, on December 15 by T.D.A. Cockerell. The holotype male of *albomarginalis* (USNM No. 58,552) was collected at Agua Amarilla, Honduras, by W.P. Cockerell.

**Distribution.**- This species is known to occur from Costa Rica north to the southern United States from Arizona to Texas (Fig. 6). It has been collected from August 22 through December 6, but chiefly from late September through October. In addition to the types listed above, a total of 1,445 females and 479 males were examined from localities listed below.

**Costa Rica.**- SAN JOSE: San José Escazu. **Honduras.**- Agua Amarilla. **México.**- CHIAPAS: Amatenago del Valle; Santa Ines (La Cienega). CHIHUAHUA: El Sueco (30 mi. S); Jimenez (10 mi. N); Salaices. COAHUILA: Saltillo (14 mi. N). DURANGO: Durango; Gomez Palacio (57 mi. SW). GUANAJUATO: Cuernavaca (1,700 m. elev.); San Gregorio (SW of Cuernavaca). GUERRERO: Teloloapan; Taxco (13 km. NE at 1,580 m. elev.). HIDALGO: Metzquitlán (22 km. SW at 1,750 m. elev., 25 km. SW at 1,860 m. elev., 4 km. N at 1,580 m. elev.). JALISCO: Chamela; Mazamitla (8 km. SE); Teocaltiche. MORELOS: Cuernavaca; Tepoztitlán (1,700 m. elev. and 6 km. S at 1,340 m. elev.). OAXACA: Mitla; Oaxaca. PUEBLA: Acatlán de Osorio (6 mi. SE, 8, 14, 15, and 20 km. NW); Chapulco (16 km. NE of Tehuacán; Izucar de Matamoros; Petlalcingo (1 km. SW at 1,280 m. elev.); Tehuacán (12 km. SW at 1,470 m. elev.); Tepexco (1 km. NW at 1,120 m. elev., 4 km. NW at 1,170 m. elev., 7 km. NW at 1,120 m. elev.); Zapotitlán Salinas (23 km. SW at 1,880 m. elev.). SAN LUIS POTOSI: San Luis Potosí (3 mi. W). SONORA: Magdalena. VERA CRUZ: Carrizal (3 km. S at 350 m. elev.); Jalapa (41 km. SE at 320 m. elev.). ZACATECAS: Río Grande (and 8 mi. NW). **United States.**- ARIZONA: Cave Creek Canyon, Cochise Co.; Paradise Road, Cochise Co.; Pearce; Texas Canyon, Cochise Co. NEW MEXICO: Gila National Forest (at Arizona state line), Grant Co.; Socorro (37 mi. S). TEXAS: Davis Mts. (High Lonesome Ridge), Jeff Davis Co.

**Floral Records.**- *Tetralonia perconcinna* specimens have floral records attached in only

a few cases, but most females were taken from some species of the family Compositae. This bee has been collected from *Bidens anthemoides*, (1 female), *Dyssodia tagetiflora* (1 female), *Ipomoea pallida* (3 females, 1 male), *Petalostemum* sp. (1 male), *Simsia lagasceaformis* (3 females), *Viguiera dentata* (14 females), *Tithonia tubaefloris* (2 females), *Verbesina encelioides* (1 male), and a *Helianthus*-like composite (3 females, 1 male).

#### *Tetraloniella incana*, new species

*Tetraloniella incana* is a small species of the *eriocarpi* group known only from females. These females have a yellow macula across the apical half or third of the clypeus and black mandibles and labrum. The female mesoscutum and scutellum have abundant dark brown hairs. The metasomal tergal vestiture is pale ochraceous to ochraceous and terga 3 and 4 do not have clearly defined apical pale fasciae but are covered by the pale pubescence. The metascutal and mesepisternal punctures are relatively shallow, round, separated by half to one or two puncture widths posteromedially on the mesoscutum and on lower and posterior areas of the mesepisterna.

**FEMALE. Measurements and Ratios.**- N = 16; length, 9–10 mm; width, 3.0–3.5 mm; wing length, M = 2.41±0.148 mm; hooks in hamulus, M = 10.56±0.203; flagellar segment 1/2, M = 1.57±0.024.

**Integumental Color.**- Black except as follows: mandible with apical half ferruginous with golden stripe unless worn; clypeus with short subapical yellow macula; flagellar segments 3 to 10 with lower, outer surfaces progressively reddened, 3 dark reddish brown, segment 10 dark brownish red; tegula piceous; wing membranes hyaline, slightly infumate, veins black to dark reddish brown; metasomal tergum 1 with narrow hyaline rim, yellowish; terga 2–4 with apical half or more of each apical area hyaline, yellow; sterna 2–5 with narrow apical areas hyaline, yellow; distitarsi ferruginous; tibial spurs testaceous.

**Structure.**- Clypeus as in *eriocarpi*. Supraclypeal area as in *eriocarpi* but impunctate medially and surface dull, finely tessellate. Face above antennal fossae, ver-

tex, and genal area sculptured as in *eriocarpi*. Galea above shiny, unshagreened; maxillary palpus 5-segmented, ratio about as 1.0:0.6:0.6:0.4:0.3. Flagellar segments as in *eriocarpi*. Mesoscutum with round punctures in anterior third and peripherally separated mostly by half a puncture width or less, posteromedially separated by half to one or two puncture widths, surface shiny, unshagreened or with weak reticular shagreening. Scutellum along anterior third with minute crowded punctures, posteriorly punctures larger, separated by half a puncture width or less, surface shiny. Mesepisternum with punctures shallow, separated by more than half a puncture width especially below and posteriorly, surface weakly shagreened. Propodeum with dorsal surface with elongate punctures, surface dulled by fine shagreening; posterior surface impunctate and shiny medially, laterally with small punctures separated by half to one puncture width, surface shiny, unshagreened or weakly so. Metasomal tergum 1 with apical area impunctate except a few punctures medially; basal area with small punctures medially separated mostly by two to three puncture widths, crowded laterally; surface dull, finely shagreened. Tergum 2–4 with basal areas with minute crowded punctures; interband zone with minute punctures separated mostly by one to two puncture widths; apical areas with punctures in basal halves or more, but minute and obscure; surfaces dulled by fine shagreening. Pygidial plate and sterna as in *eriocarpi*.

**Vestiture.**—Generally ochraceous except as follows: dorsum of thorax entirely or mostly with brown to black hairs; vertex with abundant dark hairs; metasomal tergum 1 with basal area hairs long, ochraceous; terga 2–3 with basal tomentum white, interband zone hairs short, erect, pale, not hiding surface, apical areas with complete apical pale fasciae; tergum 4, 5, and 6 with vestiture pale ochraceous to ochraceous and covering surfaces; occasionally interband zone of tergum 3 obliterated or nearly so; sterna 2–5 with long pale ochraceous hairs in basal areas. Scopal hairs highly plumose, pale ochraceous; inner surface hind basitarsi yellow.

**Type Material.**—The female holotype (UNAM) and two female paratypes of *incana*

were collected 1 km. NE of Tepexco, Puebla, México, at 1,280 m. elev. October 31, 1991, by R. Ayala. Paratypes are distributed in several collections in México and in the United States (UNAM, INHS, USU). In addition to the above, 13 female paratypes are as listed below (see map, Fig. 4).

**México.**—COAHUILA: La Muralla—2 females, September 12, 1976, J.A. Chemsak, J.A. Powell, A. and M. Michelbacher. Saltillo (41 mi. S in Estado de Nuevo Leon at 6,200 ft. elev.)—1 female on *Encelia farinosa*, September 7, 1962, Univ. Kansas Mexican Expedition. HIDALGO: Metzquitlán (11 km. SW at 1,420 m. elev.)—4 females, November 11, 1991, F. Noguera and C. Everaert. PUEBLA: Acatlán de Osorio (20 km. NW at 1,200 m. elev.)—1 female, November 1, 1991, T. Griswold. Petlalcingo (1 km. SW at 1,280 m. elev.)—2 females, November 1, 1991, F. Noguera, 1 female A. Rodriguez, and 1 female, T. Griswold. Tehuacán (12 km. SW at 1,470 m. elev.)—1 female, November 3, 1991, on *Viguiera dentata*, T. Griswold

#### *Tetraloniella balluca*, new species

This extremely small species from México is related to *eriocarpi* but the female differs from *eriocarpi* by lacking yellow markings on the mandibles, the clypeus being black or with a small median subapical spot, and by the short antennae. The female has flagellar segments 2–9 each slightly shorter than long, whereas *eriocarpi* females have at least some of the median flagellar segments (segments 3–7 or 8) at least as long as broad or longer. The male resembles *eriocarpi* in the laterally toothed sixth sternum and the yellow clypeus, labrum and mandibular bases but differs in the thoracic punctuation as described below and by the slightly longer first flagellar segment and shorter penultimate flagellar segment.

**FEMALE. Measurements and Ratios.**—N = 14; length, 8–9 mm; width, 2.5–3.0 mm; wing length, M = 2.18±0.100 mm; hooks in hamulus, M = 8.93±0.165; flagellar segment 1/2, M = 1.76±0.045.

**Integumental Color.**—Black except as follows: mandible with apical half or more

rufescent with golden stripe in apical half or less; flagellum with segments 3 or 4 to 11 dark red to reddish brown below; tegula translucent at summit, reddish brown, otherwise piceous; wing membrane hyaline, veins dark reddish brown to black; metasomal terga piceous but terga 2–4 with apical areas with narrow hyaline apical rims; metasomal sterna 2–5 with narrow apical areas hyaline; distitarsi red to reddish brown; tibial spurs testaceous.

**Structure.**—Clypeus and head sculpturing as in *eriocarpus*. Galeae shiny above, unshagreened or slightly shagreened near tips; maxillary palpus 5-segmented, segmental ratio about as 1.0:0.8:0.8:0.3:0.2. Flagellar segment 2 distinctly but slightly shorter than broad, segments 3–9 slightly shorter than broad, segment 10 longer than broad. Mesoscutal punctures round, deep, dense, posteromedially separated by half a puncture width to one or two puncture widths, surface often shiny, occasionally somewhat dulled by fine reticular shagreening, especially peripherally; scutellum similar but anterior half or two-thirds with punctures smaller than posteriorly. Propodeum and mesepisternum sculptured as in *eriocarpus*. Metasomal terga 1–4 sculptured as in *eriocarpus* but tergum 1 with median third or so of basal area with punctures separated mostly by two or more puncture widths. Pygidial plate and sterna as in *eriocarpus*.

**Vestiture.**—Generally ochraceous to yellow-ochraceous and much as in *eriocarpus* in form except as follows: dorsum of thorax not fox-red; metasomal tergum 1 with small, lateral, pale pubescent patches; tergum 2 with interband zone with hairs suberect, short, dark ochraceous, relatively simple; terga 2–4 with apical areas with more or less distinct bands but terga completely covered with yellow ochraceous pubescence; terga 5 and 6 with hairs ochraceous-yellow; sternal vestiture ochraceous, long; scopal hairs as in *eriocarpus* but yellow.

**MALE. Measurements and Ratios.**—N = 20; length, 7–9 mm; width, 2–3 mm; wing length, M = 2.32±0.091 mm; hooks in hamulus, M = 9.20±0.138; flagellar segment 2/1, M = 6.08±0.224.

**Integumental Color.**—Black except as follows: clypeus, labrum, and mandible base

yellow; flagellar segments 2 to 11 yellow to red below, segment 2 often with base brown below; tegulae piceous but somewhat translucent at summits; wing membranes colorless, hyaline, veins dark reddish brown to black; metasomal terga 1–5 with apical areas translucent in apical halves or less; sternal apical areas hyaline, colorless to yellow; distitarsi red; tibial spurs testaceous.

**Structure.**—Head sculptured as in female or as in *eriocarpus*; maxillary palpus 5-segmented, segmental ratio about as 1.0:0.8:0.8:0.4:0.3; antennae moderately long, barely reaching second metasomal tergum in repose, second flagellar segment usually five to seven times as long as minimum length of first segment, penultimate flagellar segment three times as long as minimum width or shorter, weakly crenulate. Mesoscutum sculptured as in female, anterior third with punctures separated mostly by half a puncture width or less, sparser posteromedially, surface shiny; thorax elsewhere as in female. Terga and sterna sculptured much as in female but terga 1–5 with apical areas impunctate in apical half or less. Sternum 6 (Fig. 52) with lateral carinal tooth broad, apical, margin forming concavity facing posteriorly, ending laterally in blunt tooth directed mostly laterally; hairs extremely short, sparse, confined to apicomedian area.

Terminalia (Figs. 52–56) with sternum 7 (Fig. 53) with inner apical plates without hairs, triangular but posterior angle not elongate as in *fulvotecta*. Sternum 8 (Fig. 54) with several short hairs near apical margin.

**Vestiture.**—Generally pale ochraceous to dark ochraceous or yellow, often darker on vertex and thoracic dorsum, never with dark brown hairs on vertex, thoracic dorsum, or terga; tergum 1 with apical area with distinct lateral patches of pale pubescence; terga 2–5 with distinct, complete apical pale pubescent fasciae; sterna 2–5 with vestiture sparse especially medially on each sternum; sternum 6 with little or no vestiture.

**Type Material.**—The holotype female of *balluca* (UNAM) was collected 4 km. NW of Tepexco, Puebla, México, at 1,170 m. elev., October 31, 1991 by F. Noguera. The allotype male (UNAM) was collected 1 km. NE of Tepexco, Puebla, at 1,170 m. elev., Octo-

ber 31, 1991 by F. Noguera. A total of 29 female and 62 male paratypes (USU, UNAM, SECK, INHS, OSU, UCD, UCB, AMNH, LACM) from México and the United States (see map, Fig. 7) are as follows:

**Mexico.**- CHIHUAHUA: Jiménez (10 mi. N.)—1 male, September 10, 1950, Ray F. Smith. El Sueco (30 mi. S)—1 male September 27, 1976, J.A. Chemsak, J.A. Powell, A. and M. Michelbacher. DURANGO: Ceballos—1 female, October 19, 1968 on Composite, G.E. Bohart; (10 mi. S); 2 males, September 20, 1970, G.E. and R.M. Bohart. GUANAJUATO: San Gregorio (SW of Cuernavaca, elev. 1,700 km.)—1 male, August 31, 1989; 8 males, September 7, 1989; 14 males, 8 females, September 6, 1989; 5 males September 14, 1989; 1 female, October 18, 1989, L. Godinez. San Luis de la Paz (9 mi. S)—1 male, September 22, 1977, J. Chemsak,

A. and M. Michelbacher. GUERRERO: Iquala—1 male, Nov. 27–30, 1991, R. Ayala. Taxco (13 km. NE at 1,580 m. elev.)— 2 females, October 29, 1991, T. Griswold. HIDALGO: Metzquititlán (22 km. SW)—1 female, November 11, 1991, T. Griswold. JALISCO: Chapala (5,300 ft. elev.)—1 male, September 30, 1957, H.A. Scullen. Guadalajara—3 males, October 2, 1966, from flowers of *Petalostemum* sp., G.E. and A.S. Bohart; 1 male, October 22, 1950, J.R. Alcorn. Magdalena—1 female, 3 males from *Tagetes* sp., October 14, 1968, G. E. Bohart. Paso de Guadalupe—1 female, 1 male, October 3, 1966, on flowers of *Tagetes* sp., G.E. and A.S. Bohart. Tequila (at 4,200 ft. elev.)—1 male, September 29, 1957, H.A. Scullen. MORELOS: Cuernavaca—2 males, November 8–December 6, 1987, F.D. Parker. Oaxtepec— 4 males, November 12, 1980,

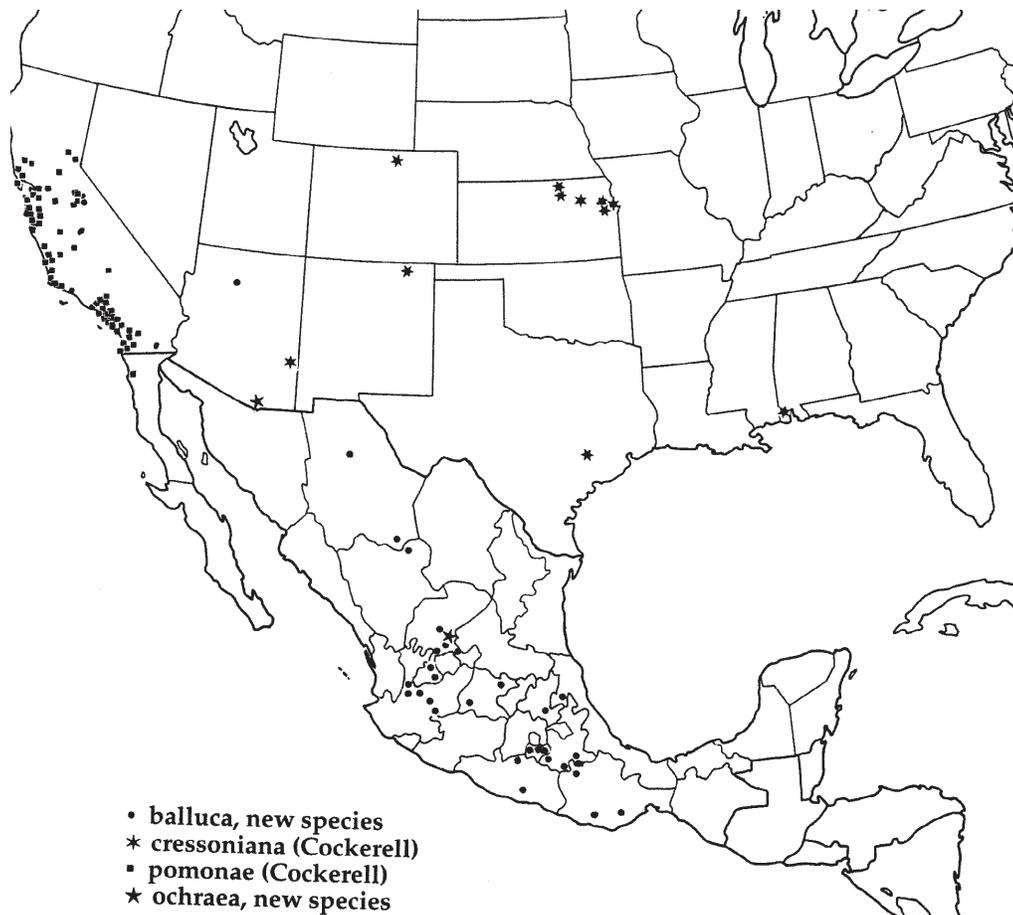


Figure 7. Map showing the known distributions of *Tetraloniella balluca*, new species; *cressoniana* (Cockerell); *pomonae* (Cockerell); and *ochraea*, new species.

C.D. Michener, R. Murillo, J.M. Labougle. Tlayacapán (4 km. N at 1,780 m. elev.)—1 male, October 28, 1991, F. Noguera. OAXACA: Coyula (2 mi. S)—1 female, November 2, 1963, McDiramid. Huajuapán de León (2.4 km. N at 1,737 m. elev.)—1 male, September 17, 1976, C.D. George and R.R. Snelling. Miahuatlán—2 males, September 6–10, 19??, R. Ayala. PUEBLA: Petlalcingo (1 km. SW at 1,280 m. elev.)—1 male, November 1, 1991, R. Ayala. Tehuacán (2 mi. SW at 5,300 ft. alt.)—1 male, October 4, 1977 J. Powell. Tepexco (1 km. NE at 1,120 m. elev.)—1 female, October 31, 1991, R. Ayala; (4 km. NW at 1,170 m. elev.); 2 females, October 31, 1991, R. Ayala; and 4 females from flowers of *Dyssodia tagetiflora*, October 31, 1991, T. Griswold. Zapotitlán (2 mi. S)—1 male, November 3, 1991, R. Ayala; (6 km SW at 1,580 M. elev.) 1 male, November 3, 1991, T. Griswold. VERACRUZ: Papantla—1 male, October 12, 1947, R. Ayala. ZACATECAS: Jalpa (10 mi. S.)—1 male, September 17, 1970, G.E. and R.M. Bohart. Juchipila—1 male, October 17, 1968, G.E. Bohart. Ojocaliente—1 male, August 25, 1970, B.L. Villegas. San Isidro—1 male, October 17, 1968, G.E. Bohart. Tabasco (5 mi. N)—3 males, September 18, 1970, G.E. and R.M. Bohart. **United States.**- ARIZONA: Peña Blanca Lake, Santa Cruz County—1 male, September 9, 1986, F. Parker and T. Griswold.

#### *Tetraloniella yanega*, new species

This small species was first recognized by Dr. Douglas Yanega and is named in his honor. Both sexes of *yanega* can be separated from other members of the *eriocarpi* group by the more densely punctate mesoscutum, scutellum, and mesepisterna. In *yanega* the mesoscutal posteromedial area punctures are deep, separated by half a puncture width or less, and the interspaces are shiny. The scutellar anterior third has crowded punctures as well. The mesepisternum has deep punctures separated largely by half a puncture width or less with shiny interspaces.

**FEMALE. Measurements and Ratios.**- N = 6; length, 9.0–9.5 mm; width, 3.5–4.0 mm;

wing length,  $M = 2.12 \pm 0.101$  mm; hooks in hamulus,  $M = 9.67 \pm 0.333$ ; flagellar segment 1/2,  $M = 1.64 \pm 0.041$ .

**Integumental Color.**- Black except as follows: mandible with apical half or at least median fourth rufescent; clypeus with small apicomedian yellow spot as wide as half width of clypeus to minute in specimens before me; flagellar segments 3 to 10 red to orange below; wing membranes hyaline, slightly yellowed, veins dark reddish brown; tegulae translucent at summits, otherwise piceous; metasomal tergal apical areas piceous, slightly paler than basal area; tibial spurs testaceous.

**Structure.**- Clypeus as in *eriocarpi*. Face above antennae as in *eriocarpi* but punctures deep, large, round, separated mostly by half a puncture width or less, surface shiny, shagreening slight or absent. Genal area with small crowded punctures, surface shiny. Vertex with flattened lateral areas with crowded small punctures separated by half a puncture width or less, surface shiny. Galea above shiny, unshagreened; maxillary palpal segments 5, in ratio of about 1.0:1.0:0.9:0.3:0.3. Flagellar segment 2 slightly shorter than broad, slightly longer than segment 3; segments 3 to 8 slightly longer than broad. Mesoscutum with punctures round, deep, crowded, posteromedially separated mostly by less than half a puncture width, surface shiny, only slightly shagreened, if at all; scutellum similar but punctures smaller. Propodeum sculptured as in *eriocarpi* but posterior surface shiny, unshagreened. Mesepisternum with round deep punctures separated by half a puncture width or less, crowded especially posteriorly and in lower half, surface shiny. Metasomal tergum 1 with basal area punctures as in *eriocarpi* but more crowded and larger; apical area with more abundant smaller punctures in basal half or more; surfaces dulled by fine shagreening. Terga 2–4 sculptured as in *eriocarpi* but punctures more distinct. Pygidial plate V-shaped with rounded apex. Sterna 2–5 as in *eriocarpi*.

**Vestiture.**- Vestiture as in *eriocarpi* except as follows: generally more yellow or orange than in most specimens of *eriocarpi*; tergum 3 in some specimens with basal and apical fasciae separated by relatively simple hairs as in tergum 2.

**MALE. Measurements and Ratios.**- N = 12; length, 8–9 mm; width, 2.5–3.0 mm; wing length, M = 9.88±0.122 mm; hooks in hamulus, M = 9.33±0.188; flagellar segment 2/1, M = 7.46±0.257.

**Integumental Color.**- Black except as follows: clypeus yellow but usually narrowly infuscated along posterior margin between tentorial pits; mandible without yellow basal maculae or these are small; labrum white with distinct marginal brown to black rim; flagellar segment 1 brown, segments 2–11 red to brownish red on outer-lower surfaces; tegula piceous to slightly translucent on summit; wing membranes hyaline, veins dark red to reddish brown; metasomal terga piceous but with apical areas translucent yellowish brown apically and piceous basally; sterna 2–5 with apical areas hyaline, yellow especially basally, basal areas piceous; distitarsi red; tibial spurs testaceous.

**Structure.**- Head sculptured as in female. Maxillary palpus 5-segmented, ratio about as 1.0:0.6:0.7:0.4:0.4. Antenna moderately long, barely reaching second metasomal segment, second segment 7 to 10 times as long as first; penultimate segment one-third as long as broad or longer; last several segments crenulate. Mesoscutum as in female but postermedian area punctures larger and more crowded, surface shiny to moderately dulled by shagreening; scutellum with punctures uniformly coarse and crowded, shiny to moderately dull; propodeum as in female but dorsal area punctures less elongate and sparse; mesepisternal punctures large and crowded as in female. Metasomal tergum 1 with basal area punctures large, separated by half to one puncture width, apical area with small crowded punctures in basal half, apical rim impunctate; surface dulled by fine shagreening. Terga 2–5 similar to female terga 2–4 but interband zone punctures slightly larger and more distinct. Sterna 2–5 sculptured as in female. Sternum 6 (Fig. 57) with distinct apicolateral teeth blunt, directed posteriorly, carina from apex of tooth to near midline forming an apical concave line; surface shiny; hairs sparse, restricted to apical area between lateral teeth.

Terminalia (Figs. 57–61) as in *eriocarpis*; sternum 7 (Fig. 58) with apicomedian plates

simple, without hairs; sternum 8 (Fig. 59) with sparse apical hairs; genital capsule and gonocoxite as figured (Figs. 60 and 61).

**Vestiture.**- Generally pale ochraceous except as follows: metasomal terga 2–5 with distinct, complete, apical, pale fasciae; interband zones mostly erect, relatively simple, pale; basal tomentum white; terga 6 and 7 with pale vestiture; sternal vestiture sparse, pale; inner surfaces hind tarsi pale yellow.

**Type Material.**- The holotype female (UNAM), allotype male (UNAM), 1 female and 2 male paratypes of *Tetraloniella yanega* were collected 8 km. NW of Acatlán del Asorio, Puebla, México, at 1,170 m. elevation, November 1, 1991 by A. Rodriguez (Fig. 3). An additional 4 female and 9 male paratypes were collected at the same time and place as follows: 1 female by F. Noguera, 1 female and 6 males by R. Ayala, 2 females and 3 males by T. Griswold. Paratypes will be placed in collections of UNAM, INHS, and USU.

#### *Tetraloniella vandykei*, new species

*Tetraloniella vandykei* is an extremely small species from California and Nevada, which superficially resembles a *Melissodes* of the subgenus *Tachymelissodes*. However, the 5-segmented maxillary palpus, the lack of lateral teeth on the male tergum 7, and the type of gonostylus present in the male terminalia mark this species as a highly distinctive member of *Tetraloniella*. The female is also distinctive in the brown, highly plumose scopal hairs and the relatively sparse punctation as described below. The male is distinctive among *Tetraloniella* by the short antennae with a long first flagellar segment as compared to the second segment and a short penultimate flagellar segment. The male is further marked by the clypeus, mandibles, and labrum lacking yellow maculae.

**FEMALE. Measurements and Ratios.**- N = 8; length, 7.5–8.0 mm; width, about 3.0 mm; wing length, M = 2.33±0.091 mm; hooks in hamulus, M = 10.88±0.411; flagellar segment 1/2, M = 1.78±0.037.

**Integumental Color.**- Black except as follows: mandible with apical half rufescent; flagellar segments 2–10 red below; tegula red-

dish brown, translucent at summit; wing membranes hyaline, veins dark reddish brown; metasomal terga 1–4 with apical areas hyaline, colorless at apices and becoming reddish brown at base; distitarsi reddish brown; tibial spurs testaceous to brown, especially near tips.

**Structure.**—Clypeus relative flat, with large round punctures separated by half to almost one puncture width, more crowded near apical margin, surface shiny, unshagreened. Supraclypeal area impunctate medially, with small round punctures laterally, surface shiny, unshagreened. Face above antennal fossae with small sparse punctures separated by half to two puncture widths, surface shiny, unshagreened. Vertex lateral to ocelli with minute widely spaced punctures, surface shiny, unshagreened. Genal area almost as broad medially as eye, with minute punctures separated by three or four puncture widths or more, surface shiny, unshagreened. Galea shiny, unshagreened; maxillary palpus 5-segmented, segmental ratio about as 0.9:1.0:1.0:0.5:0.3. Mesoscutum with small round punctures, postero-medially punctures separated mostly by three to four puncture widths, peripherally by one to two puncture widths, surface shiny, unshagreened. Scutellum similar to mesoscutum peripherally but punctures more closely spaced. Mesepisternum with coarse punctures separated mostly by half to one puncture width, surface shiny, unshagreened. Propodeum with dorsal surface with large, shallow, somewhat elongate punctures except in relatively broad median area, surface dull, finely shagreened; posterior surface impunctate in large median area, sparsely punctate laterally, shiny, unshagreened or weakly so. Forewing with large pterostigma, at least as long as prestigma and usually slightly longer. Metasomal tergum 1 with basal area punctate, median half of basal area with punctures irregular in size and spacing, separated by half to three or four puncture widths, more crowded laterally to dense at extreme sides, apical area largely impunctate, shiny; terga 2–3 with basal depressed area densely punctate, interband zone with small round punctures irregularly spaced by half to two puncture widths or slightly more, apical areas punctate in basal halves, surfaces shiny,

unshagreened. Pygidial plate extremely sharply pointed, narrow, lateral margins concave. Sterna 2–5 with basal areas with small punctures separated by half to one puncture width, apical areas impunctate, surfaces shiny, unshagreened; sternum 6 punctate throughout.

**Vestiture.**—White to pale ochraceous except: mesoscutum postero-medially and scutellum with sparse brown hairs; metasomal tergum 1 with apical area without pubescence; terga 2–4 with basal areas with pale tomentum, apical areas with with pale pubescent fasciae complete except tergum 2 usually with fascia narrowly interrupted medially, interband zones with sparse, largely simple hairs scarcely hiding surface; terga 5 and 6 with pale brown hairs; sterna 2–5 with long pale hairs, especially long along base of apical area; sternum 6 with reddish brown hairs. Scopal hairs plumose, brown.

**MALE. Measurements and Ratios.**— $N = 20$ ; length, 7.0–8.5 mm; width, 2.5–3.0 mm; wing length,  $M = 2.72 \pm 0.086$  mm; hooks in hamulus,  $M = 10.00 \pm 0.178$ ; flagellar segment 2/1,  $M = 2.16 \pm 0.011$ .

**Integumental Color.**—Generally black except as follows: clypeus, labrum, and mandibles without yellow maculae; antennae dark brown to dark reddish brown below; wing membranes hyaline, veins dark reddish brown; metasomal terga and sterna as in female; distitarsi dark reddish brown; tibial spurs testaceous.

**Structure.**—Head sculptured as in female but clypeus and genal area with punctures slightly more dense; antennae short, barely reaching first metasomal tergum in repose; flagellar segment 1 half as long as segment 2 or slightly longer; penultimate flagellum not much more than twice as long as broad. Thoracic sculpture as in female. Metasomal tergum 1 sculptured as in female; terga 2–5 as in female but apical areas slightly narrower and less than half of each apical area impunctate; pygidial plate narrow, sides concave, subapical lateral notches usually present, tip less than half as broad as base; tergum 6 with lateral arm of postgradulus toothed, terga 5 and 7 without lateral teeth; sterna 2–5 sparsely punctate or impunctate medially, more densely punctate laterally, apical areas impunctate;

sternum 6 (Fig. 62) without apicolateral teeth, with weak subapical carinae, largely impunctate, shiny; with short hairs apical to each subapical carina and lateral patches of short hairs posterior to basal carina.

Terminalia (Figs. 62–66) as drawn. Note depth of median emarginations of sterna 7 and 8 and weakly elbowed gonocoxite.

**Vestiture.**— Generally white to pale ochraceous but inner surfaces hind tarsi yellow; metasomal terga 2–5 with narrow apical pubescent fasciae but often interrupted medially on tergum 2 and occasionally on tergum 3, fasciae weak; basal area vestiture sparse.

**Type Material.**— The holotype female (CAS) of *Tetraloniella vandykei* was collected in the Panamint Mts., Inyo Co., California, May 30, 1937 by E.C. Van Dyke. The allotype male (CAS) was collected in the Inyo Mts., Inyo Co., June 1, 1937, by E.C. Van Dyke. Paratypes (7 female and 23 male) of *vandykei* (CAS, USU, UCB, INHS, LACM, AMNH, SECK) are as follows (see map Fig. 3):

**United States.**— CALIFORNIA: Big Pine (4 mi. E), Inyo Co.—20 males, May 16, 1969, on *Aster canescens*, P. Welles. Darwin, Inyo Co.—1 female, April 28, 1958, R.P. Allen; 1 female, May 13, 1969, J.A. Powell. Twenty-nine Palms (5 mi. S), San Bernardino Co.—1 male, May 5, 1973, R.B. Roberts. Westgard Pass Plateau, Inyo Co.—1 male, May 27, 1937, E.C. Van Dyke; 1 male, May 16, 1979, R.M. Bohart. NEVADA: Boulder City, Clark Co.—1 female, April 30, 1988, on *Sphaeralcea* sp., P.F. Torchio. Crystal Bay, Washoe Co.—2 females, May 11, 1961, on *Malacothrix* sp., G.E. Bohart. Pahrump, Nye Co.—1 female, May 5, 1963, on *Astragalus* sp., G.E. Bohart. Tonopah, Nye Co.—1 female, May 1941, on *Encelia* sp., I. McCracken.

***Tetraloniella albata* (Cresson),  
new combination**

*Melissodes albata* Cresson, 1872. Trans. American Ent. Soc., 4:281.

*Synhalonia albata* Patton, 1879, Bull.

United States Geol. Surv., 5:474;  
Birkmann, 1899, Ent. News, 10:245.

*Eucera albata* Dalla Torre, 1895, Cat. Hymen., 10:224.

*Xenoglossodes albata* Ashmead, 1899, Trans. American Ent. Soc., 26:63; Cockerell and Porter, 1899, Ann. Mag. Nat. Hist., ser. 7, 4:407; Cockerell, 1903, Ann. Mag. Nat. Hist., ser. 7, 12:449; Cockerell, 1905, Canadian Ent., 37:335; Cockerell, 1906, Trans. American Ent. Soc., 32:80, 83; Cockerell, 1934, American Mus. Nov., No. 697, p. 10; Mitchell, 1962, North Carolina St. Agric. Sta. Bio. Bul. No.14, p. 30; MacGown and Schiefer, 1992, Ent. News, 103:81–82.

This small bee known chiefly from prairie areas of central United States differs from any of the foregoing species in the female sex by having simple scopal hairs. The male lacks the lateral teeth on the sixth sternum, has pale yellow to cream-colored clypeus, labrum, and mandibular bases and long antennae that are usually red or yellow below. Both sexes are marked by the white, densely plumose pubescence covering metasomal terga 3–5 in the female and 3–6 in the male. Tergum 2 in both sexes is also covered by white pubescence but less densely so.

**FEMALE. Measurements and Ratios.**— N = 20; length, 8.5–10.0 mm; width, 3–4 mm; wing length, M = 2.12±0.114 mm; hooks in hamulus, M = 10.25±0.204; flagellar segment 1/2, M = 7.96±0.180.

**Integumental Color.**— Black except as follows: mandibles rufescent mediobasally; flagellum dark reddish brown to red below except first segment and rarely second often dark brown; tegulae hyaline, yellow; wing membranes hyaline, clear, veins dark reddish brown to red; metasomal tergum 1 with apical area translucent brown shaded to yellow or pale brown apically; terga 2–5 with apical areas translucent, brown or yellowish brown but largely hidden by dense white pubescence; distitarsi red; tibial spurs pale yellow.

**Structure.**— Clypeus and oculo-clypeal area as in *eriocarpi* but surface shiny; supra-clypeal area, face, vertex, and genal area as in *eriocarpi*. Maxillary palpal segments 6, ratio about as 1.0:0.9:0.9:0.6:0.1:0.1; galeae dulled by fine shagreening at least in apical

half or more. Flagellar segment 2 slightly shorter than broad, about half as long as segment 1 and subequal to segment 3, segments 3–9 slightly longer than broad. Mesoscutum sculptured as in *eriocarp*i but posteromedian area with punctures crowded as in *fulvotecta*, surface occasionally finely shagreened at least peripherally; scutellum similar but usually slightly dulled by shagreening; mesepisterna densely punctate, surface moderately shiny. Propodeum as in *fulvotecta*. Metasomal tergum 1 with punctures in median half separated largely by one puncture width or slightly more, laterally and along base of apical area more crowded; apical area minutely punctate except narrow impunctate margin; surfaces moderately dulled by fine shagreening. Terga 2–4 similar but basal areas more densely punctate medially. Pygidial plate with apex rounded, almost U-shaped. Sterna 2–5 punctate except in narrow apical areas, surfaces finely shagreened, moderately shiny.

**Vestiture.**- In general vestiture white, often dorsum of thorax and vertex of head pale ochraceous to ochraceous; sterna yellowish brown to brown but white apicolaterally on each sternum. Scopal hairs long, simple, dense, white.

**MALE. Measurements and Ratios.**- N = 20; length, 8–10 mm; width, 2.5–3.0 mm; wing length, M = 2.07±0.094 mm; hooks in hamulus, M = 9.75±0.143; flagellar segment 2/1, M = 7.96±0.180.

**Integumental Color.**- Integument black except as follows: clypeus, base of mandibles, labrum cream-colored to yellow, clypeal base often narrowly infuscated; flagellar segments 2–11 red to dark red below, dark red to reddish brown above; tegula hyaline, colorless to yellow; wing membranes hyaline, colorless, veins reddish brown to red; terga with apical areas translucent, red to reddish brown, narrow apical rims hyaline, yellow; sterna piceous with narrow apical areas yellow to almost colorless; distitarsi red; tibial spurs pale yellow.

**Structure.**- Head sculptured as in female; maxillary palpus with 6 segments, as in female; antennae long, segments not much flattened, weakly crenulate, second flagellar segment about eight times as long as first. Mesoscutum sculptured as in female but pos-

teromedial area often with punctures separated by half a puncture width or slightly more, surface usually shiny; mesepisternum and scutellum as in female. Metasomal terga and sterna sculptured much as in female, surfaces moderately shiny. Sternum 6 (Fig. 67) flat, without apicolateral teeth; vestiture more abundant than in *vandykei* and forming a pattern as figured.

Terminalia (Figs. 67–71) similar to *vandykei*. Sternum 7 (Fig. 68) with blunt, relatively narrow apical plates, strong V-shaped carina anterior to plates, sparse hairs. Sternum 8 (Fig. 69) with few apical hairs, shallow apicomedian emargination. Genital capsule and gonocoxite as drawn (Figs. 70 and 71).

**Vestiture.**- White to extremely pale ochraceous, darkest on thoracic dorsum and vertex. Sternal vestiture weak, scarcely hiding surfaces, especially medially, often yellow, sternum 6 with little or no vestiture; inner surfaces tarsi pale yellow. Tergal vestiture highly plumose, hiding surface except on tergum 1 and medially on tergum 2.

**Type Material.**- The female (PANS No. 2352) lectotype of *Tetraloniella albata* was collected in Texas.

**Distribution.**- *Tetraloniella albata* is known from Arizona east to Mississippi and north to Montana and North Dakota (Fig. 4). It has been collected from May 31 to September 13, but chiefly from late June into August. In addition to the lectotype, 107 females and 102 males from the localities listed below were examined (localities recorded in the literature are included).

ARIZONA: Eagar; Nogales (7 mi. E); Peña Blanca Park, Santa Cruz Co.; Wilcox (and 4 mi. E). COLORADO: Poudre River. ILLINOIS: Carlinville, Macoupin Co. IOWA: Sioux City. KANSAS: Baldwin; Bourbon Co.; Deep Creek, Riley Co.; Kiowa Co.; Lawrence; Lecompton (2 mi. SW); Onaga; Reece; Reno; Riley Co.; Trego Co. MISSISSIPPI: Black Belt Prairie, Oktibbeha Co. MONTANA: Fallon, Prairie Co. NEBRASKA: Carns; Harrison. NEW MEXICO: Deming; Isleta. NORTH DAKOTA: Marmarth; Valley City; Washburn; Williston. OKLAHOMA: Ardmore; Caddo; Lake Texoma (2 mi. E of Willis). SOUTH DAKOTA: Fort Pierre. TEXAS: Carrizo Springs; College Station,

Bexar Co.; Dallas; Davis Mts. State Park, Jeff Davis Co.; Glen Rose (9 mi. SW); Fedor; Hamilton (8 mi. N); Hillsboro (5 mi. NE); Lake Theo (N of Quitaque), Briscoe Co.; Lee Co.; Old Dime Box, Lee Co.

**Floral Records.**- This species has been collected most frequently from flowers of species of leguminous plants and most often from species of *Petalostemum* or prairie clover. It has been collected from flowers of the plants listed below.

*Amorpha fruticosa*; *Dalea* sp., *D. multiflora*; *Echinacea pallida*; *Petalostemum* sp., *P. flavescens*, *P. oligophyllum*, *P. purpureum*, *P. violaceum*.

#### ***Tetraloniella paenalbata*, new species**

This small pale species from the southern prairies is similar to and perhaps closely related to *albata* (Cresson), as its name implies. Both sexes have the terga covered with closely decumbent, highly plumose, white pubescence. The female of *paenalbata* can be told from that of *albata* by the first tergum having the apical area largely impunctate and the lower surfaces of the flagellum orange. The male of *paenalbata* has a longer first flagellar segment and darker flagellar segments as described below.

**FEMALE. Measurements and Ratios.**-  $N = 20$ ; length, 10–12 mm; width, 3.5–4.5 mm; wing length,  $M = 2.54 \pm 0.087$  mm; hooks in hamulus,  $M = 11.55 \pm 0.223$ ; flagellar segment 1/2,  $M = 2.06 \pm 0.033$ .

**Integumental Color.**- Black with exceptions as in *albata* but mandible usually rufescent in median half, flagellum usually yellow or orange below except segment 1 dark brown.

**Structure.**- Head sculpture as in *albata* except vertex with flattened lateral area with punctures extremely minute, separated by 2 to 3 puncture widths or more, shiny. Maxillary palpal segments 6, ratio about as 1.0:1.0:1.0:0.5:0.3:0.3; galeae dulled by fine shagreening at tips or in apical half, shiny basally. Flagellar segment 2 about as long as broad or slightly shorter, about half as long as segment 1 and subequal to segment 3, segments 3–9 slightly longer than broad.

Mesoscutum sculptured as in *eriocarpi* and *albata* but punctures small, posteromedian area punctures crowded, surface shiny, finely shagreened only peripherally. Scutellum similar; mesepisternum densely punctate, surface moderately shiny, finely shagreened. Metasomal tergum 1 sculptured as in *albata* but apical area largely impunctate, punctures restricted to narrow basal area and more broadly at extreme sides, surface dulled by fine shagreening. Terga 2–4 similar but basal area punctures more dense. Pygidial plate with rounded apex, otherwise V-shaped. Sterna 2–4 with basal areas densely punctate, narrow apical areas similarly punctate except impunctate rims.

**Vestiture.**- Vestiture white except as follows: vertex and dorsum of thorax often pale ochraceous, rarely darker; inner surfaces tarsi golden; tergum 6 golden; sterna golden brown with small white apicolateral patches on terga 2–4. Scopal hairs long, dense, simple, white.

**MALE. Measurements and Ratios.**-  $N = 16$ ; length, 9.5–10.5 mm; width, 3.0–3.5 mm; wing length,  $M = 2.55 \pm 0.165$  mm; hooks in hamulus,  $M = 10.44 \pm 0.223$ ; flagellar segment 2/1,  $M = 5.03 \pm 0.092$ .

**Integumental Color.**- Integument black except as follows: clypeus, base of mandible, and labrum white to pale yellow; clypeus never infuscated near posterior margin; flagellar segments 2–11 yellow to red below, dark red to reddish brown above; tegulae hyaline, colorless to yellow; wing membranes hyaline, colorless, veins red to reddish brown; terga with apical areas translucent, almost colorless to reddish brown with narrow rims colorless; sterna piceous with apical areas red to reddish brown with colorless rims; distitarsi red; tibial spurs pale yellow.

**Structure.**- Head sculptured as in female; maxillary palpal segments 6, in ratio as 1.0:0.9:0.9:0.6:0.3:0.3; antennae as in *albata* but first segment longer, second segment about five times as long as first. Mesosoma sculptured as in female but mesonotum often shinier. Metasomal terga as in female but terga 2–5 with apical areas finely punctate except in narrow apical rims; tergum 1 with apical area impunctate as in female. Metasomal sterna as in female. Pygidial plate with apex

truncate, or somewhat rounded, apicolateral notches evident unless worn, sides tapering towards truncate apex. Sternum 6 flat, without apicolateral teeth (Fig. 72); pattern of vestiture as drawn.

Terminalia (Figs. 72–76) similar to *albata*. Note sternum 7 (Fig. 73) with apicomedian plates broad, weakly pointed apicomediaally, vestiture abundant. Gonostylus and genital capsule as drawn (Figs. 75 and 76).

**Vestiture.**— Color as in *albata*. Tergal vestiture as in *albata* but tergum 1 with apical area glabrous. Sternal vestiture weak but more abundant than in *albata*, especially on sterna 4 and 5; sternum 6 with short relatively sparse vestiture.

**Type Material.**— The holotype female (SECK), allotype male (SECK), 4 female and 6 male paratypes of *Tetraloniella paenalbata* were collected 4 mi. S of Aetna, Barber Co., Kansas, July 12, 1955 by W.E. LaBerge. An additional 42 female and 34 male paratypes from Kansas, Colorado, Texas, and Nebraska (see map, Fig. 8) are listed below (SECK, INHS, NSM, AMNH, UCB, KSU).

COLORADO: Bent Co., Hasty (2 mi. S)—2 males, June 25, 1975 on *Dalea* sp., U.N. Lanham; 14 males, June 26, 1975 on *Dalea* sp., U.N. Lanham. J. Martin Reservoir; 22 females, 4 males, July 6, 1978, G.E. Bohart. KANSAS: Barber Co.—4 females, 1 male, 1916, R.H. Beamer. Clark Co.—1 female, 1 male, August 26, 1911, F.X. Williams. Comanche Co.—3 females, 1916, R.H. Beamer; 1 male, July 15. Ellsworth Co., Ellsworth—1 female, 1 male, July 12, 1923, R.H. Beamer. Gray Co.—1 female, 1914. Kansas—1 female, 1 male, Snow, Kearny Co., Lakin—1 male, July 23, 1950, C.D. Michener. Meade Co.—2 females, July 12, 1911, F.X. Williams. Ness Co.—1 male, July 7, 1912, F.X. Williams. Rawlins Co.—1 male, F.X. Williams. Russell Co.—1 female, August 26, 1912, F.X. Williams. Sheridan Co.—1 male, F.X. Williams. NEBRASKA: Haigler—1 female, August 18, 1909, C.H. Gable. TEXAS: Eagle Pass (6 mi. SE)—1 female, April 11, 1950, C.D. Michener, R.H. and L.D. Beamer, J.G. and B. Rozen, W.P. Stephen, on *Dalea lasianthera*; 1 male, April 25, 1952, M. Cazier, W. Gertsch, R. Schrammel. Falcon (4 mi.

N)—2 females, April 12, 1950, C.D. Michener, R.H. and L.D. Beamer, J.G. and B. Rozen, W.P. Stephen, on *Dalea lasianthera*. Hamilton (8 mi. N)—1 male, May 31, 1951, P.D. Hurd. Quemado—1 male, May 25, 1952, M. Cazier, W. Gertsch, R. Schrammel. Texas City—2 females, 2 males.

#### *Tetraloniella ochraea*, new species

This species known only from México and Arizona is similar to *albata* and *paenalbata* and is probably closely related to these species. It is similar to the latter two species in having the metasomal terga covered by dense plumose pubescence but in this case the tergal vestiture is pale ochraceous, rather than white. Both sexes are similar to *albata* but differ from *paenalbata* by having the first tergum (as well as terga 2–4) with the apical area densely and finely punctate except a narrow rim. The male of *ochraea* differs from that of either *albata* or *paenalbata* by the flagella, which are black beneath as well as above and by the cream-colored, never yellow, clypeus.

**FEMALE. Measurements and Ratios.**— N = 20; length, 10–12 mm; width, 3.5–4.0 mm; wing length, M = 2.43±0.095 mm; hooks in hamulus, M = 10.50±0.154; flagellar segment, 1/2, M = 2.12±0.033.

**Integumental Color.**— Head as in *albata* except mandible dark rufescent only in small median area and flagellum entirely or almost entirely black. Thoracic color as in *albata* but wing membranes slightly yellowish. Metasomal terga and sterna as in dark specimens of *albata*.

**Structure.**— Head sculptured as in *albata*. Thoracic sculpture as in *albata* but mesepisterna with surfaces dulled by fine dense shagreening. Metasomal tergum 1 with apical area punctate except narrow apical rim (as in *albata*). Terga 2–4 and sterna sculptured as in *albata*. Pygidial plate as in *albata* but slightly more pointed apically.

**Vestiture.**— Generally pale ochraceous but dark ochraceous to yellow on vertex and thoracic dorsum. Metasomal terga covered by dense, decumbent, plumose vestiture; terga 4 and 5 with vestiture slightly darker. Sternal

vestiture golden except sterna 2–5 with apicolateral white patches. Scopal hairs long, simple, dense, pale ochraceous to golden.

**MALE. Measurements and Ratios.**— N = 16; length, 9.0–10.0 mm; width, 2.5–3.0 mm; wing length, 2.43±0.129 mm; hooks in hamulus, M = 10.06±0.170; flagellar segment 2/1, M = 8.22±0.207.

**Integumental Color.**— Head as in *albata* except as follows: clypeus and base of mandible white to cream-colored, never yellow; flagella entirely black. Thorax, metasomal terga, sterna, tarsi, and tibial spurs as in *albata*.

**Structure.**— Head sculptured much as in female; flagellum long, reaching second metasomal tergum, first flagellar segment short, second segment about eight times as long; galeae usually shiny, unshagreened. Thoracic sculpturing as in *albata* but mesepisterna with surfaces moderately dull to dull, finely shagreened. Metasomal terga with apical areas punctate except rims as in *albata*. Pygidial plate as in *albata* but slightly narrower basally. Sterna as in *albata*.

Terminalia (Figs. 77–81) similar to *albata*. Note sternum 6 hair pattern (Fig. 77);



Figure 8. Map showing the known distributions of *Tetraloniella paenalbata*, new species; *fastigiata*, new species; *flagellicornis* (Smith); and *distata*, new species.

sternum 7 (Fig. 78) apicomedian plates, and gonostylus relatively gently elbowed (Figs. 80 and 81). Genital capsule as drawn (Fig. 80).

**Type Material.**- Holotype female and allotype male (UCB), and 22 female paratypes of *Tetraloniella ochraea* were collected 9 mi. S of Fresnillo, Zacatecas, México, on flowers of *Phacelia* sp., August 20, 1956 by J.W. MacSwain. An additional 38 female and 12 male paratypes were collected (Fig. 7) as follows:

**United States.**- ARIZONA: Flagstaff (20 mi. N)—1 male, July 3, 1953, on *Cleome* sp., R.H. and L.D. Beamer, W.E. LaBerge, and C. Liang. **México.**- ZACATECAS: Fresnillo (9 mi. S)—39 females, 12 males, August 7–14, 1954, E.G. Linsley and R.F. Smith. An additional four specimens (3 males and 1 female) without locality data but collected in August and September, 1973, probably in Arizona were examined.

***Tetraloniella cressoniana* (Cockerell)**

*Synhalonia cressoniana* Cockerell, 1905, Proc. Biol. Soc. Washington, 18:177; 1906, Trans. American Ent. Soc., 32:84, 91, 114; 1909, Ann. Mag. Nat. Hist., ser. 8, 4:26; Lutz and Cockerell, 1920, Bull. American Mus. N. H., 42:617; Cresson, 1928, Mem. American Ent. Soc., 5(67); Timberlake, 1969 Univ. California Pub. Ent., 57:30.

This species is similar to *albata* in having 6-segmented maxillary palpi but differs in the discrete apical pale pubescent fasciae on terga 2–4 in the female and 2–5 in the male. It is very similar and readily confused with certain small species of *Synhalonia*, such as *S. actuosa* Cresson, especially in the female sex. The females of *cressoniana* can be told from those of *actuosa* by the shiny integument of the mesoscutum and terga and the short malar space. The male has very long antennae, the apical half of the clypeus cream-colored as well as basal mandibular maculae, but has the labrum entirely black. Sternum 6 of the male does not have the subapical carinae forming apicolateral teeth nor the apical margin forming lateral teeth.

**FEMALE. Measurements and Ratios.**- N = 20; length, 10–13 mm; width, 4–5 mm; wing length, M = 2.87±0.084 mm; hooks in hamulus, M = 11.05±0.153; flagellar segment 2/1, M = 1.90±0.023.

**Integumental Color.**- Black except as follows: flagellar segments 3–10 dark blackish brown to dark reddish brown; wing membranes hyaline, colorless, veins dark brown to reddish brown; metasomal terga with apical areas piceous except narrow apical margin, hyaline, sternal apical areas similar; distitarsi dark reddish brown; tibial spurs testaceous.

**Structure.**- Clypeus gently curved from side to side; oculoclypeal distance distinct, about equal to minimum width first flagellar segment or less; punctures coarse, deep, largely round, surface only slightly dulled by weak shagreening. Supraclypeal area sculpture as in clypeus, moderately shiny. Face above antennal fossae with small, deep, crowded punctures separated by half a puncture width or less, surface shiny. Vertex flattened lateral areas with punctures minute, separated by more than half to one puncture width, surface shiny, unshagreened. Genal area narrow, sculptured as in facial area. Galea shiny above or weakly shagreened; maxillary palpal segments 6, in ratio about as 1.0:1.0:0.9:0.4:0.3:0.3. Flagellar segment 2 as broad as long or shorter; segments 3–9 about as broad as long or slightly longer. Mesoscutum with small deep punctures separated mostly by half a puncture width or less, surface shiny, weakly or not at all shagreened; scutellum similar but punctures often smaller and more crowded. Propodeum sculptured as in *eriocarpi* but surface dulled by regular fine shagreening. Mesepisternum with round, shallow punctures separated by half a puncture width or more, surface moderately dulled by fine shagreening. Metasomal tergum 1 with basal area with small round punctures, in median half or less separated mostly by one or more puncture widths, becoming crowded laterally, surface moderately dulled by fine shagreening; apical area with apical half or less impunctate. Terga 2–4 with basal area punctures small, round, separated mostly by half a puncture width or slightly more; apical area punctures smaller, more crowded, narrow rim

impunctate; surfaces slightly dulled by fine shagreening. Pygidial plate with rounded apex. Sterna 2–4 densely punctate except in apical half of relatively narrow apical areas, surfaces dulled by shagreening.

**Vestiture.**—Head and thorax with white vestiture except vertex and dorsum of thorax ochraceous. Legs with vestiture white except inner surfaces of tarsi golden. Metasomal tergum 1 with basal half with vestiture long, plumose, white, apical half with short, relatively simple, brown to black hairs. Tergum 2 with extreme base with white tomentum, apical area with complete white pubescent fascia, intermediate area with some suberect, relatively simple brown hairs grading into white basal tomentum; terga 3 and 4 similar but extreme bases with tomentum entirely or partly dark brown; tergum 5 with vestiture dark brown to black with apicolateral fasciae of white hairs. Sterna 2–5 with hairs generally red to reddish brown except apical areas laterally with white hairs; sterna 3–5 with median hairs long, weakly plumose, bent or wavy at tips. Scopal hairs simple, white.

**MALE. Measurements and Ratios.**— $N = 20$ ; length, 9–12 mm; width, 2.5–4.0 mm; wing length,  $M = 2.78 \pm 0.110$  mm; hooks in hamulus,  $10.50 \pm 0.185$ ; flagellar segment 2/1,  $M = 7.94 \pm 0.129$ .

**Integumental Color.**—Black except as follows: clypeus with apical half cream-colored; mandible with basal cream-colored macula; labrum dark brown to black; flagellum black or dark brown below; tegulae reddish brown; wings as in female; terga and sterna colored as in female; distitarsi reddish brown; tibial spurs testaceous.

**Structure.**—Head sculptured as in female but punctures usually slightly smaller; maxillary palpus 6-segmented, ratio about as 0.9:0.9:1.0:0.6:0.4:0.3; antennae long, second segment about eight times as long as first, segments oval in cross-section, weakly crenulate. Thoracic sculpture much as in female but mesepisterna with surfaces dull, shagreened. Metasomal terga sculptured as in female but tergal apical areas with slightly broader impunctate rims; sterna as in female but sterna 3–5 with mediobasal areas with punctures small sparse, separated by three to five punc-

ture widths. Pygidial plate U-shaped or truncate at tip, less than twice as long as broad, with subapical notches on each side (unless worn). Sternum 6 (Fig. 82) with subapical carinae not at all lamellate, unmodified; broadly shouldered laterally

Terminalia (Figs. 82–86) much as in *paenalbata* but note the following: sternum 7 (Fig. 83) with apicomedian plates moderately broad with two apical points; sternum 8 (Fig. 84) with hairs apically; gonostylus and genital capsule as drawn (Figs. 85 and 86).

**Vestiture.**—Head and thorax with vestiture white except vertex and dorsum of thorax often pale ochraceous to ochraceous. Metasomal tergum 1 with vestiture white, apical area hairs short subappressed, relatively simple; terga 2 and 3 with basal tomentum usually white (rarely brown on tergum 3), apical fasciae complete, interband zone hairs erect, plumose, white. Terga 4 and 5 with some brown hairs at extreme bases, otherwise as in terga 2 and 3. Tergum 6 with brown vestiture. Sterna 2–5 with hairs largely golden, white apicolaterally; sternum 6 with short brown hairs; sterna 3–5 with median area hairs sparse, weakly plumose, appressed.

**Type Material.**—The holotype female (USNM No. 10,264) of *Tetraloniella cressoniana* was collected in Texas.

**Distribution.**—*Tetraloniella cressoniana* is known from Arizona east to Alabama and north to Kansas (Fig. 7) and has been collected from July 17 into November. A total of 29 females and 88 males from localities listed and the holotype have been studied.

ALABAMA: Mobile. ARIZONA: Clifton, Greenlee Co. (30 mi. N). COLORADO: Saguache (5 mi. E at 7,900 ft. elev.), Saguache Co. KANSAS: DeSoto, Johnson Co.; Lawrence, Douglas Co.; Manhattan, Riley Co.; Olathe, Johnson Co.; Riley Co.; Sunflower, Douglas Co.; Topeka, Shawnee Co. NEW MEXICO: Raton. TEXAS: “Tex.”

**Floral Records.**—*Tetraloniella cressoniana* has been collected most frequently from various species of *Salvia* and is probably an oligolege of that genus, but the evidence is sparse at this time. It has been collected from flowers of plants listed below. *Cleome serrulata*; *Helianthus petiolaris*;

*Salvia* sp., *S. azurea grandiflora*, *S. pitcheri*,  
*S. reflexa*; *Verbena* sp.

***Tetraloniella crenulaticornis* (Cockerell)**

*Melissodes crenulaticornis* Cockerell, 1898,  
Ann. Mag. Nat. Hist., ser. 7, 2:454.

*Synhalonia crenulaticornis*, Cockerell and  
Porter, 1899, Ann. Mag. Nat. Hist.,  
ser. 7, 4:410; Cockerell, 1902, American  
Nat., 36:810; 1903, Ann. Mag. Nat.  
Hist., ser. 7, 12:449; 1906, Trans.  
American Ent. Soc., 32:97; 1906, Trans.  
American Ent. Soc., 32:310; Viereck,  
1906, Trans. American Ent. Soc.,  
32:242; Lutz and Cockerell,  
1920, Bul. American Ent. Soc., 42:617.

*Melissodes crenulaticornis* form *maculata*  
Cockerell, 1898, Ann. Mag. Nat. Hist. Ser.  
7, 2:455; 1899, Entomol., 32:156–157.

*Synhalonia maculata*, Krombein, Hurd, Smith  
and Burks, 1979, Cat. Hymen. in America  
North of Mexico, Smithsonian Inst. Press,  
Washington, D. C., p. 2, 126 (synonymy).

*Synhalonia fuscotincta* Cockerell, 1905, Proc.  
Biol. Soc. Washington, 18:178 (**new syn-  
onymy**); Snow, 1906, Tr. Kansas Acad.  
Sci., 20:137; Lutz and Cockerell, 1920,  
Bull. American Mus. Nat. Hist., 42:619;  
Timberlake, 1969, Univ. California Pub.  
Ent., 57:41.

*Tetraloniella crenulaticornis* is a small western species closely related to *T. cressoniana*. The female of *crenulaticornis* can be separated readily from that of *cressoniana* by the dark hairs on the mesoscutum and the scutellum. In addition, the females of *crenulaticornis* have the metasomal sterna 2–5 with abundant, short, stiffly erect dark brown hairs and metasomal terga 2–5 have abundant dark brown hair in the interband zones, whereas the female of *cressoniana* has the sternal hairs paler and medially long, curved downwards, and with the tips very finely curved posteriorly or wavy and the metasomal terga have more white pubescence in the interband zones. The male of *crenulaticornis* can be told from that of *cressoniana* only with difficulty. In all but a

few of the males (less than five) the scutellum has at least a few brown hairs medially and in the darker males (mostly from México) the scutellar hair is mostly dark brown and the mesoscutum has a large patch of dark hair. In addition, terga 3 or 4–6 have hairs basal to the white apical fasciae brown in *crenulaticornis* males and entirely pale in most of the *cressoniana* males (a few have tergum 6 with brown basal hairs).

**FEMALE. Measurements and Ratios.**- N = 20; length, 10–12 mm; width, 3.5–4.0 mm; wing length, M = 2.69±0.099 mm; hooks in hamulus, M = 11.20±0.213; flagellar segment 1/2, M = 1.86±0.028.

**Integumental Color.**- Black except as follows: mandible rufescent medially; flagellar segments 3–10 dark brownish black to dark reddish brown below; wing membranes hyaline, slightly infumate, veins dark blackish brown; tegulae translucent, reddish brown; metasomal terga translucent reddish brown to piceous with narrow apical margins hyaline, sterna similar; distitarsi reddish brown; tibial spurs testaceous.

**Structure.**- Head as in *cressoniana* but maxillary palpal segments 6 with ratio as 0.8:0.9:1.0:0.6:0.4:0.4. Thoracic sculpture as in *cressoniana* but usually mesoscutum with anterior fourth or so with punctures crowded and surface appearing reticularly shagreened. Metasomal tergum 1 sculptured as in *cressoniana* but apical area usually largely impunctate; terga 2–5 sculptured as in *cressoniana*. Pygidial plate and sterna much as in *cressoniana*.

**Vestiture.**- Head and thorax with vestiture pale ochraceous to ochraceous except large dark brown patches posteromedially on mesoscutum and medially on scutellum. Metasomal terga as in *cressoniana* but terga 2–5 with interband zones basad of apical pale pubescent fasciae with dark brown hairs. Metasomal sterna with hair dark brown except laterally on sterna 2–5 with small white patches; sterna 3–5 with median hairs short, stiffly erect, without weak apical wavy or bent tips present in *cressoniana*. Scopal hairs simple, white.

**MALE. Measurements and Ratios.**- N = 20; length, 9–11 mm; width, 3.0–3.5 mm;

wing length,  $M = 2.69 \pm 0.116$  mm; hooks in hamulus,  $M = 11.0 \pm 0.32$ ; flagellar segment 2/1,  $M = 7.53 \pm 0.223$ .

**Integumental Color.**- Black except as follows: clypeus with apical half to two-thirds cream-colored; mandible usually with small cream-colored macula (absent in about 12% of specimens); labrum black; flagellum dark below as in *cressoniana*; tegulae and wings as in *cressoniana*; terga and sterna as in female; distitarsi reddish brown, tibial spurs testaceous.

**Structure.**- Head sculptured as in female but punctures smaller; maxillary palpus 6-segmented, ratio about as 0.9:1.0:0.9:0.6:0.3:0.3; antennae long, second segment about eight times as long as first, segments oval in cross-section, crenulate in last five or six segments when viewed from below. Thoracic sculpture much as in female but mesoscutum rarely weakly shagreened throughout, mesepisterna usually moderately dull, shagreened. Metasomal terga sculptured as in female but terga 2–5 often with slightly broader impunctate rims; sterna as in female but sterna 3–5 with apicomedian areas with punctures sparse, much as in *cressoniana*. Pygidial plate truncate at tip, with subapical notches on each side (unless worn), about twice as long as broad at base or shorter. Sternum 6 (Fig. 87) with subapical carinae not at all lamellate, nor toothed; note hair pattern.

Terminalia (Figs. 87–91) much as in *cressoniana* but note the following: sternum 7 (Fig. 88) with large, elongate, pointed, hairy apicomedian plates; sternum 8 (Fig. 89) abundantly hairy along apical margin that is weakly indented; gonostylus and genital capsule as drawn (Figs. 90 and 91).

**Vestiture.**- Head and thoracic hairs pale ochraceous to ochraceous, scutellum with at least a few dark brown hairs, darkest specimens with scutellar hairs mostly dark and mesoscutum with large posteromedian dark brown patch; vertex with hairs pale. Metasomal terga with hairs as in *cressoniana* but terga 3–5 with areas basad of apical pale fasciae with at least some dark brown hairs to entirely dark brown. Metasomal sterna as in *cressoniana* but hairs usually slightly shorter and darker; sterna 3–5 with median hairs sparse but slightly denser than in *cressoniana*.

**Type Material.**- The holotype male (USNM 58,517) of *Tetraloniella crenulaticornis* was collected at Prued's Summit, New Mexico, August 30, 1898 by C.M. Barber. The holotype male of *maculata* was collected at Big Rock, Ruidoso, New Mexico, July 27, 1898 from flowers of *Vicia* sp. by C.H.T. Townsend. The type specimen of *maculata* was not located. The holotype female (SECK) of *fuscotincta* was collected in Oak Creek Canyon, Arizona, in August by F. H. Snow.

**Distribution.**- *Tetraloniella crenulaticornis* is known from Arizona and New Mexico south to northwestern Mexico (Fig. 2). It has been collected from June 13 through October 29, but chiefly in late July and August. In addition to the type material, a total of 47 females and 60 males were examined from localities listed below.

**México.**- CHIHUAHUA: Yecora-Cuauhtemoc (km. No. 91 at 1,650 m elev.). MICHOACAN: Santa Clara (15 km. S at 2,200 m. elev.). OAXACA: Yanhuitlán (3 mi. SE). ZACATECAS: Juan Aldama; Río Grande. **United States.**- ARIZONA: Chiricahua Mts.; Coconino Co.; Flagstaff; Ramsey Canyon, Huachuca Mts. NEW MEXICO: Big Rock, Ruidoso; Nogal; Prued's Summit; Quemado; Rio Ruidoso; Rock Crossing, Ruidoso; Ruidoso Creek Forks; Sandia Mts.; Sapello.

**Floral Records.**- *Tetraloniella crenulaticornis* has been collected from a variety of flowers but the records are too few to attempt characterizing this species as oligolectic or polylectic. It has been collected from flowers of the plants listed below.

*Arabis* sp.; *Geraneum atropurpureum*; *Melilotus* sp., *M. officinalis*; *Monarda* sp.; *Petalostemum* sp., *P. occidentalis*; *Ratibida columnaris*; *Verbena stricta*; *Vicia* sp.

#### *Tetraloniella donata* (Cresson)

*Melissodes donata* Cresson, 1878, Proc. Acad. Nat. Sci. Philadelphia, 30:208.

*Melissodes galerensis* Cockerell, 1949, Proc. United States Nat. Mus., 98:465 (**new synonymy**).

*Xenoglossodes galerensis*, LaBerge, 1956, Univ. Kansas Sci. Bul., 37:1179.

*Exomalopsis wilmattae* Cockerell, 1949, Proc. United States Nat. Mus., 98:454 (**new synonymy**).

*Tetralonia tropicana* LaBerge, **new name** for *T. wilmattae* (Cockerell), 1949, *nec T. wilmattae* (Cockerell), 1917.

This small species occurs from Costa Rica north to southern Arizona. The male is distinctive in having an entirely black clypeus, black mandibles, and black labrum. Both sexes have the mesoscutum with extremely shallow, large, round punctures separated by less than half a puncture width, with bottoms of the punctures dulled by fine shagreening and have the maxillary palpus 5-segmented. The female has simple scopal hairs and distinctly banded terga as described below.

**FEMALE. Measurements and Ratios.**- N = 20; length, 8–10 mm; width, 3.0–3.5 mm; wing length, M = 9.16±2.05 mm; hooks in hamulus, M = 9.75±0.143; flagellar segment 1/2, M = 1.85±0.031.

**Integumental Color.**- Black except as follows: mandible with reddened median band or apical half reddened; flagellar segments 3 or 4–10 red to dark reddish brown below; tegulae piceous; wing membranes hyaline, veins dark brown, almost black; metasomal terga with apical areas piceous, rims dark or slightly and narrowly translucent; sterna similar; distitarsi dark brown; tibial spurs yellow to dark ochraceous.

**Structure.**- Clypeus gently curved from side to side, densely punctate, punctures round, separated by less than half a puncture width, surface dulled by shagreening. Supraclypeal area similar but punctures half as large as clypeal punctures. Face above antennal fossae sculptured as in clypeus. Vertex with flattened lateral area with minute punctures separated by half a puncture width or slightly more, surface dull, shagreened. Genal area sculptured as in lateral vertex area but slightly shinier. Galea above shiny to weakly shagreened; maxillary palpal segments 5, ratio about as 1.0:1.0:0.7:0.5:0.3. Flagellar segment 2 distinctly shorter than broad, segments 3–9 as broad as long or broader. Mesoscutum with anterior half with relatively large, round, shallow punctures separated by less than half

a puncture width (usually only a narrow sharp ridge separating punctures), surface dull, shagreened or finely tessellate, posterior half similar but occasionally small median area with punctures more separated and punctures becoming smaller near posterior margin. Scutellum with minute, round, crowded punctures, surface dull, shagreened. Propodeum with dorsal area with round, deep punctures with shiny bottoms except in narrow median area, surface dull, shagreened. Mesepisternum with round punctures smaller than mesothoracic punctures, separated by ridges, surface shiny, weakly shagreened. Pterostigma distinctly shorter than prestigma. Metasomal tergum 1 with basal area with small round punctures separated mostly by one puncture width in median half, crowded laterally, surface dull, shagreened; apical area with punctures similar to basal area but crowded across entire tergum and surface slightly shinier; apical rim impunctate. Metasomal terga 2–4 similarly punctate but punctures not sparser medially; apical impunctate rims extremely short; surfaces moderately dulled by shagreening. Pygidial plate V-shaped with rounded apex. Sterna 3–5 with small, crowded, deep punctures in basal and apical areas; surfaces moderately shiny; apical areas with impunctate rims extremely short; sternum 6 entirely punctate.

**Vestiture.**- White or pale ochraceous except as follows: vertex with abundant dark brown hairs, or at least a few; mesoscutum and scutellum with abundant dark brown hairs dorsally; metasomal tergum 1 with apical area and apical half of basal area with short, subappressed, relatively simple, dark brown hairs; terga 2–4 with interband zones with dark brown hairs, basal areas with white pubescence except tergum 4 and apical areas with complete white pubescent fasciae; pale apical fascia of tergum 2 notched anteromedially and shaped so that apical margin of dark-haired interband area is brace-shaped; terga 5 and 6 with dark brown hairs except laterally on tergum 5 and occasionally tergum 6. Metasomal sterna 2–5 medially with hairs dark brown and white apicolaterally. Sternum 6 entirely dark brown. Scopal hairs simple (a few weakly plumose hairs may occur along anterior margin); inner surfaces tarsi yellow to orange.

**MALE. Measurements and Ratios.**- N = 20; length 7–9 mm; width, 2–3 mm; wing length, M = 2.11±0.104 mm; hooks in hamulus, M = 9.65±0.150; flagellar segment 2/1, M = 7.74±0.190.

**Integumental Color.**- Black except as follows: mandible as in female; flagellar segments 2–11 red to orange below; wing membranes hyaline, veins dark brown; tegula piceous; metasomal terga as in female but apical rims more broadly translucent, brown; sterna piceous with apical areas with rims translucent; distitarsi dark brown to reddish brown; tibial spurs pale ochraceous to yellow.

**Structure.**- Head sculptured as in female but clypeal punctures slightly smaller; maxillary palpus 5-segmented, ratio about as 1.0:1.0:0.8:0.4:0.3; antennae long, second flagellar segment almost eight times as long as first, segments slightly flattened in cross-section, last five or six segments distinctly crenulate. Thoracic sculpture as in female. Metasomal terga sculptured as in female but apical areas with apical impunctate rims distinctly longer; tergum 6 with lateral arm of gradulus lamellate, forming tooth; terga 5 and 7 without lateral teeth. Sterna 2–5 as in female but basal areas with punctures much sparser, especially medially. Sternum 6 (Fig. 92) without lateral teeth, subapical carinae not at all laminate. Pygidial plate with lateral margins diverging anteriorly, blunt apically with or without subapical lateral notches.

Terminalia (Fig. 92–96) as in *crenulaticornis* but sternum 7 (Fig. 93) with apicolateral plates much shorter with sparse hairs along apical margins and sternum 8 (Fig. 94) with sparse apical hairs. Gonostylus and genital capsule as drawn (Figs. 95 and 96).

**Vestiture.**- Head white to pale ochraceous but often vertex with brown hairs present. Thoracic vestiture white to ochraceous, often mesoscutum and usually scutellum with long dark brown hairs. Metasomal tergum 1 as in female; terga 2 and 3 usually with basal tomentum white, apical pale pubescent fasciae subapical and intermediate band hairs dark brown; tergum 2 notched as in female and often apical band interrupted medially; terga 4 and 5 with basal tomentum dark brown as well as intermediate band hairs, with complete apical or subapical white bands; terga 6 and 7

with vestiture dark brown. Metasomal sternal vestiture dark brown, relatively sparse.

**Type Material.**- The holotype female of *Tetraloniella donata* (PANS) from México was collected by Sumichrast. The holotype male of *galerensis* (USNM No. 58,549) was collected at Galeras, Honduras, on October 19 by G. Vidales. The holotype female of *wilmattae* (USNM 58, 513) was collected at Zamorano, Honduras, October 29 by W.P. Cockerell.

**Distribution.**- *Tetraloniella donata* is known to occur from Costa Rica north to southern Arizona (see map, Fig. 1). It has been collected from July 19 through January 22, but chiefly from mid-August through December. A total of 277 females and 153 males were examined from localities listed below.

**Costa Rica.**- GUANACASTE PROV.: Las Cañas (14 km. S and 24 km. NW); Playa del Coco. ALAJUELA PROV.: San Mateo-Orotina. **Honduras.**- Galeras; Zamorano. **México.**- CHIHUAHUA: Yepachic (11 km NW). GUERRERO: Axixintla. JALISCO: Chamela (Arroyo Maderas, Estación Biología, Playa Careyes); Chapala; Chapalilla; Cuiztmala Playa (5.6 km. S of Careyes); El Tuito (12 km. S, 12 km ENE and 12 km. S); Guadalajara (and 15 mi. NE and 25 mi. W); Jalosotitlán (6 mi. NE); Magdalena; Plan de Barranca (5.6 km. E); Tequila; Villa de Purificación (1 km. E); Zapotlanejo. MICHOACAN: Buenavista (N of Playa Azul); Cotija de la Pas; Miguel Silva Macías (9 km. S of Ario de Rosales); El Cangrejo (20 km. N. of La Huacana); La Huacana (6 km. S); La Mira (4 km. N of Playa Azul); La Piedad de Cavadas (10 km W); Las Cañas (21 km. S of Ario Rosales); Los Amates (26 km. N of Playa Azul); Los Sabinos (28 km. S of Ario Rosales); Playa Azul (11 and 40 km. N). MORELOS: Amacuzac (and 6 km W); Tequesquitengo (3 mi. NW). NAYARIT: Ahúacatlán; Ciudad Peñitas (29 km. N). OAXACA: El Cantil (30 km. N of Puerto Escondido); Totolapán (38 mi. E). PUEBLA: Izucar (9 mi. W, 14 km. NW); Tepexco (14 km. NW). QUERETARO: Hidalgo Buenavista (6 mi. S); Tuloloapán. SINALOA: Esquinapa; Rosario. SONORA: Alamos; Mazocahui (16 km. NE). ZACATECAS: Jalpa (10 mi. S). **Nicaragua.**- Managua; Ocotal. **United States.**- ARIZONA:

Harshaw (N of); Nogales; Patagonia; Peña Blanca Park; Tumcacori.

**Floral Records.**- Data from only 22 collections (40 females and 43 males) are available at this time and *Tetraloniella donata* seems to be a polylectic bee. It has been collected from flowers of the plants listed below in addition to a long series of females from an unknown species of Leguminosae.

*Antigonon leptopus*; *Calopogonium* sp.; *Dalea vernicia*; *Halictes quazumifolia*; *Eriogeron arisoliu*; *Helianthus* sp.; *Kallstroemia grandiflora*; *Petalostemum* sp.; *Salvia* sp., *S. leptostachys*, *S. riparia*, *Stylosanthes guyanensis*.

***Tetraloniella fastigiata*, new species**

This is a small pale species related to *T. donata* Cresson but both sexes have the dull thoracic dorsum with much smaller, close-set punctures and have the galeae opaque above, dulled by dense fine tessellation, with lateral surfaces more or less shiny. The female of *fastigiata* is much paler than that of *donata* and has no dark brown hairs on vertex or thoracic dorsum. The male of *fastigiata* has the clypeus, labrum, and base of mandibles pale cream-colored to white, unlike the black-faced *donata* male.

**FEMALE. Measurements and Ratios.**- N = 20; length, 8–10 mm; width, 3–4 mm; wing length, M = 2.19±0.065 mm; hooks in hamulus, M = 10.7±0.193; flagellar segment 1/2, M = 1.94±0.035.

**Integumental Color.**- Black except as follows: mandible rufescent medially, often with gold macula near apex; flagellar segments 3–II orange to red below, segments 1 and 2 dark reddish brown; tegulae testaceous; wing membranes hyaline, veins reddish brown to red; terga piceous, apical areas with extremely narrow rims translucent; sterna 2–5 with apical areas with narrow hyaline margins, rufescent basally, basal areas rufescent to piceous; distitarsi rufescent; tibial spurs testaceous.

**Structure.**- Clypeus sculptured as in *donata* but often with short apicomedial elevated line or small boss. Supraclypeal area with crowded punctures about as large as on clypeus or slightly smaller. Face above antennal fossae with crowded punctures slightly

smaller than clypeal punctures, surface moderately shiny. Vertex with lateral flattened area with minute, deep punctures separated by about half a puncture width, moderately shiny. Genal area punctured as in vertex lateral area, moderately shiny. Galea above opaque, with dense, fine tessellation on entire length, lateral surfaces shiny to moderately shiny; maxillary palpal segments 5, ratio about as 1.0:0.8:0.8:0.5:0.4. Flagellar segment 2 distinctly shorter than broad, segments 3–9 mostly about as broad as long. Mesoscutum with anterior half or more with small, round, dense, shallow punctures separated by mere ridges, posteromedial area slightly more sparsely punctate, surfaces dulled by fine shagreening. Scutellum similar but punctures generally smaller. Propodeum with dorsal area punctures relatively small, round, dense except in narrow median area, surface dull, shagreened; posterior surface with upper triangle punctate laterally, leaving a small median impunctate area. Mesepisternum with small, round, crowded punctures similar to mesoscutal punctures, surface moderately shiny, bottoms of punctures shinier than mesoscutal punctures. Pterostigma slightly shorter than prestigma. Metasomal terga 1–5 sculptured as in *donata*. Pygidial plate V-shaped with rather pointed apex. Sterna 2–6 sculptured as in *donata*.

**Vestiture.**- Pale ochraceous except as follows: vertex and dorsum of thorax usually dark ochraceous, never dark brown as in *donata*, metasomal terga similar to *donata* but tergum 2 with posterior margin of apical fascia not brace-shaped, evenly curved from side to side; terga 3 and 4 with interband zones with abundant pale pubescence, although dark brown at least laterally on tergum 3; tergum 2 usually with interband zone entirely dark or with relatively few pale hairs in median half; terga 5 and 6 entirely ochraceous to brown with large lateral patches of ochraceous hairs and often tergum 5 with a small median pale patch; sterna with basal hairs dark brown to red-brown, apical margins with pale ochraceous hairs. Tibial scopal hairs simple, white; inner surface tarsi with yellow to red hairs.

**MALE. Measurements and Ratios.**- N = 20; length, 2.5–3.0 mm; width, 7.5–9.0 mm; wing length, M = 2.17±0.110 mm; hooks in

hamulus,  $M = 10.25 \pm 0.123$ ; flagellar segment 2/1,  $M = 8.82 \pm 0.182$ .

**Integumental Color.**- Black except as follows: clypeus white to cream-colored, often with posterior margin narrowly infuscated; mandibles with basal white maculae; labrum white or pale cream-colored; flagellar segments 2–11 orange to red below, reddish brown above, segment 1 brown; tegulae testaceous, yellow; wing membranes hyaline, veins red to reddish brown; metasomal terga 1–6 piceous as in female but apical translucent rims slightly wider; sterna 2–6 as in female but apical areas hyaline, colorless to slightly reddened at base; distitarsi red-brown; tibial spurs testaceous.

**Structure.**- Head sculpture much as in female but clypeal punctures less distinct; galeae dulled above as in female; mesoscutal sculpturing as in female but posteromedial area occasionally moderately shiny; scutellum, propodeum, and mesepisterna sculptured as in female; pterostigma shorter than prestigma; metasomal terga 1–5 sculptured as in female; pygidial plate similar to that of *donata*; sterna 2–5 sculptured as in female. Sternum 6 (Fig. 97) as in *donata*, note apicolateral shoulders, unlike *donata*, and hair pattern.

Terminalia (Figs. 97–100) much as in *cressoniana* but sternum 7 (Fig. 98) with apicomedian plates lack sharp points apically, with few apical hairs and sternum 8 (Fig. 99) deeply emarginate apicomediaally with extremely sparse hairs. Genital capsule as drawn (Fig. 100).

**Vestiture.**- Generally white to pale ochraceous with exceptions as follows: vertex and thoracic dorsum often dark ochraceous never dark brown; metasomal tergum 1 with apical half with short subappressed dark brown hairs, long pale hairs basally; terga 2–4 with basal pale tomentum, interband zone with brown hairs but occasionally some white pubescence mixed medially to mostly ochraceous; tergum 2 with apical pale band often narrowly interrupted medially; terga 5 and 6 usually with brown hairs basally and ochraceous laterally (usually across apex in tergum 5) but may be entirely ochraceous; tergum 7 pale to dark brown or mixed. Metasomal sterna 1–5 usually entirely pale but

sparser median hairs often reddish brown, sternum 6 with short sparse hairs usually brown; inner surfaces hind basitarsi with pale hairs.

**Type Material.**- The holotype female (SECK), allotype male (SECK), and 2 female and 25 male paratypes of *Tetraloniella fastigiata* were collected 6 miles NE of Jalastotitlán, Jalisco, México, July 19, 1954 by the University of Kansas Mexican Expedition. An additional 32 paratypes (USU, INHS, OSU, CAS, UCB) from México are as follows: JALISCO: El Tuito (12 km. NE)—2 females, F. Parker and T. Griswold. Guadalajara—10 females, October 2, 1964 on *Petalostemum* sp., G.E. and A.S. Bohart. Plan de Barranca (5.6 km. E)—female, 3 males, September 25, 1976 on *Dalea vernicia*, C.D. George and R.R. Snelling; 1 female and 1 male, September 26, 1976 on *D. vernicia*, C.D. George and R.R. Snelling. Playa Cuiztmalá (8 km. S of Careyes)—2 female and 1 male, October 4, 1985, F. Parker and T. Griswold; 1 male, October 4, 1985, R. Ayala. Playa Teopa (S. of Careyes)—October 4, 1985, J.G. Rozen. Puente Barranquitas (18 mi. NW of Magdalena)—1 female, October 10, 1975, J.A. Powell and J.A. Chemsak. Tequila—3 females and 4 males, September 29, 1951, H.A. Scullen; 1 male, October 29, 1987, L. Godinez. Paratypes have been left in the following collections: SECK, INHS, UNAM, USU, LACM, UCB, USNM.

**Distribution.**- This species is known only from México (Fig. 8) and has been collected from July 19 through October 30 but chiefly in August and September. In addition to the type specimens listed above, a total of 81 females and 66 males were examined from collections listed below. Note that the type localities in the state of Jalisco are not repeated.

**México.**- CHIHUAHUA: El Cangrejo (20 km. N of La Huacana at 1,090 m. elev.); Temoris (3 mi. SE and 5 mi. S). COLIMA: Colima (5 mi. SW). GUANAJUATA: San Gregorio. GUERRERO: Acapulco; Iguala (32 Km. W); Tixtla (10 km. E). JALISCO: See type material above. MICHOACAN: Caleta de Campos (54 km. W of Playa Azul); Chuquiapan (32 km. W of Playa Azul); Miguel Silva Macías (S of Ario Rosales); El Congrejo (20 km. N of La Huacana); Las Cañas (21 km. S of Ario de Rosales); Los Amates (26 km. N

of Playa Azul at 250 m. elev.); Los Sabinos (9 and 28 km. S of Ario de Rosales at 1,190 and 1,700 m. elev.); Pátzcuaro (7.7 km. NE). MORELOS: Cuautla (17 km. SE at 1,170 m. elev.); Tequesquitengo. NAYARIT: Acaponeta; Santa Isabel (4 mi. S). OAXACA: Huajuapán (2.4 km. N). PUEBLA: Izucar de Matamoros (7 mi. N; 18 km. SE at 1,270 m. elev.), SAN LUIS POTOSI: San Luis Potosí (18 mi. SW). SINALOA: Mazatlán. ZACATECAS: Jalpa (10 mi. S); Juchipila; Tabasco (5 mi. N).

**Floral Records.**- Very little is known concerning the flower preferences of *T. fastigiata* but a large number of females and males were collected from an undetermined species of *Petalostemum* in Sinaloa, Nayarit, and Jalisco, and both sexes were collected from flowers of *Dalea vernicia* in Jalisco.

#### *Tetraloniella minutilla*, new species

This, the smallest species of *Tetraloniella*, is in several regards similar to *fastigiata* especially in the male sex. The female can be distinguished from that of *fastigiata* by having the clypeus with the apical half or slightly less cream-colored, a white labrum, and cream-colored mandibular bases. The clypeal pale macula has its posterior border bow-shaped with the median point directed into the macula. In addition, the female first metasomal tergum has the apical area completely covered by extremely short, plumose, closely appressed, pale ochraceous pubescence, as is the entire metasomal dorsum. The male of *minutilla* differs from that of *fastigiata* primarily by lacking the interband zone of dark hairs on terga 2 through 5 and by the apical area of tergum 2 having short, plumose pubescence similar to that of the female but less dense. Both sexes have the thoracic dorsum with small close-set punctures and the surface and bottoms of the punctures dulled by shagreening as in *fastigiata*.

**FEMALE. Measurements and Ratios.**- N = 8; length, 8–9 mm; width, 3.0–3.5 mm; wing length, M = 2.01±0.087 mm; hooks in hamulus, M = 10.63±0.324; flagellar segment 1/2, M = 1.89±0.047.

**Integumental Color.**- Black except as follows: labrum, base of mandibles, and api-

cal half of clypeus or slightly less, cream-colored to white (clypeal macula with posterior margin bow-shaped); flagellar segments 3–10 red below; wing membranes hyaline, slightly infumate, veins dark reddish brown; tegulae hyaline, yellow; metasomal terga with narrow apical rims hyaline; sterna with narrow apical areas hyaline, colorless; distitarsi red; tibial spurs testaceous.

**Structure.**- Clypeus with small round punctures separated mostly by half a puncture width, surface dulled by fine shagreening. Supraclypeal area with dense punctures slightly smaller than clypeal punctures, separated mostly by less than half a puncture width, surface dull, shagreened. Face above antennal fossae with crowded small punctures, surface dull. Vertex laterally and genal area with minute crowded punctures, surface moderately shiny. Galeae above shiny, not shagreened except at tips; maxillary palpal segments 6, ratio about as 1.0:0.8:0.8:0.6:0.3:0.3. Flagellar segment 2 shorter than broad, segments 3–9 mostly as broad as long or shorter. Mesoscutum and scutellum sculptured as in *fastigiata*. Propodeum with dorsal surface with crowded oval punctures with bottoms shiny; posterior surface densely punctate except medially. Mesepisternum sculptured as in anterior third of mesoscutum but bottoms of punctures slightly shinier. Pterostigma distinctly shorter than prestigma. Metasomal terga 1–5 sculptured as in *fastigiata* and *donata* but punctures generally smaller and more crowded. Pygidial plate V-shaped with rounded apex. Sterna sculptured as in *donata* and *fastigiata* but apical area narrower.

**Vestiture.**- Pale ochraceous except as follows: metasomal sterna 2–5 with apical area hairs white, basal area hairs golden to golden brown; tarsi with inner surfaces with yellow hairs. Scopal hairs simple, shiny. Metasomal terga 1–5 covered with short, appressed, pale ochraceous hairs.

**MALE. Measurements and Ratios.**- N = 4; length, 8–9 mm; width, 2.5–3.0 mm; wing length, 1.96±0.026 mm; hooks in hamulus, M = 10±0; flagellar segment 2/1, M = 9.11±0.126.

**Integumental Color.**- Black except as follows: clypeus white to cream-colored with

narrowly infuscated posterior border; mandible with large basal cream-colored macula; labrum white; flagellar segments 2–11 orange to red below, reddish brown above; tegulae testaceous, yellow; wing membranes hyaline, veins red to reddish brown; metasomal terga piceous with apical translucent rims; sterna 2–6 with apical areas hyaline, colorless; distitarsi red; tibial spurs testaceous.

**Structure.**—Head sculpture much as in female but clypeal punctures smaller and slightly sparser; galeae shiny above; mesoscutal sculpturing as in female but mesoscutal posteromedial area with punctures slightly more separated, dull; scutellum, propodeum, and mesepisterna as in female; pygidial plate almost as broad at extreme base as median length, apex rounded with small subapical notches on each side; sterna sculptured as in female. Sternum 6 (Fig. 101) relatively flat, without lateral angles; apicolateral carinae not toothed laterally or near midline, carinate but not laminate; note hair pattern.

Terminalia (Figs. 101–105) similar to *donata* (Figs. 92–96). Note sternum 7 (Fig. 102) with apicomedian plate not strongly pointed, with sparse, short hairs and sternum 8 (Fig. 103) strongly emarginate apicomediaally with several apical hairs on either side. Gonostylus and gonocoxite as drawn (Figs. 104 and 105).

**Vestiture.**—Generally pale ochraceous to ochraceous; metasomal terga 1–5 with complete pale apical pubescent fasciae, that on tergum 2 narrower than those following, terga 2 and usually 3 with a few reddish brown hairs along edge apical of fasciae; terga 2–4 without brown hairs in interband or basal areas; metasomal sterna 2–5 with basal hairs golden, apical hairs longer and white; tarsi with inner surfaces with pale yellow hairs.

**Type Material.**—The holotype female (SECK) and allotype male (SECK) of *minutilla* were collected 16 mi. N of Chilpancingo, Guerrero, México. Eight female and 3 male paratypes from México (see map, Fig. 1) (SECK, UNAM, INHS, LACM, UCB) are as follows:

GUERRERO: Chilpancingo (17 mi. N at 2,550 ft. elev.)—1 female, August 7, 1962, University of Kansas Mexican Expedition; 1 male, August 13, 1962, University of Kansas

Mexican Expedition; 1 female, September 1, 1983, Clifton V. Dixon. OAXACA: Huajuapán de León (2.4 km. N at 1,737 m. elev.)—1 male, September 17, 1976, C.D. George and R.R. Snelling. PUEBLA: Acatlán de Osorio (6 mi. SE at 4,700 ft. elev.)—3 females, 1 male, October 8, 1975, J.A. Chemsak, J.A. Powell, T. Eichlin, T. Friedlander; (8 km. NW at 1170 m. elev.)—3 females, November 1, 1991, A. Rodriguez.

### *Tetraloniella flagellicornis* (Smith)

*Tetralonia flagellicornis* Smith, 1879, Description of new species of Hymenoptera in the collection of the British Museum, p. 111.

This is a moderate-sized species from México. The female is similar to that of *T. donata* and *fastigiata* but the antennae are black or dark reddish brown below. The female has shiny galeae, the mesoscutum dulled by shagreening but often moderately shiny posteromedially and terga 2–4 with apical pale bands complete and covering apical margin. The male of *flagellicornis* also has the long antennae dark reddish brown to black below, the mandibles each with a basal pale spot, the labrum mostly pale, and the clypeus with the apical half pale.

**FEMALE. Measurements and Ratios.**— $N = 20$ ; length, 10.0–11.5 mm; width, 3.5–4.5 mm; wing length,  $M = 3.17 \pm 0.090$  mm; hooks in hamulus,  $M = 12.00 \pm 0.218$ ; flagellar segment 1/2,  $M = 2.00 \pm 0.029$ .

**Integumental Color.**—Black except as follows: mandible with apical half rufescent, usually with golden macula; flagellar segments below black to dark blackish brown; tegulae piceous, occasionally slightly translucent at summit; wing veins dark brown to black, membranes hyaline, colorless, or slightly infumate; metasomal terga and sterna, distitarsi, and tibial spurs as in *ressoniana*.

**Structure.**—Clypeus gently curved from side to side; oculoclypeal distance distinct, less than minimum width first flagellar segment; punctures coarse, deep, separated mostly by half a puncture width, surface shiny except peripherally. Supraclypeal area with smaller punctures, dense laterally, sparse medially,

surface dull, finely shagreened. Face above antennal fossae with relatively small, deep punctures, surface dulled at least in median third by fine shagreening. Vertex laterally with minute punctures separated mostly by one puncture width or more, surface shiny. Genal area narrow, minutely punctate, and dull. Galea shiny above; maxillary palpal segments 6, ratio about as 1.0:1.0:1.0:0.7:0.3:0.3. Flagellar segment 2 usually slightly shorter than broad or not longer; segments 3–9 as broad as long or slightly longer. Mesoscutum in anterior third and peripherally with minute obscure punctures, surface dulled by dense reticular shagreening; posteromedian area with punctures larger, separated mostly by half a puncture width or slightly more, surface shiny to slightly dulled by weak shagreening. Scutellum with small round punctures, surface moderately shiny to dull, shagreening often absent medially. Propodeum densely punctate except medially, surface dulled by fine tessellation. Mesepisternum with round punctures separated mostly by half to one or more puncture widths, surface dulled by distinct tessellation. Metasomal terga sculptured as in *cressoniana* except as follows: tergum 1 with median third punctures separated largely by two puncture widths. Pygidial plate broadly V-shaped with rounded apex. Terga 2–4 with interband zone punctures well separated in median third and crowded laterally; sterna sculptured as in *cressoniana*.

**Vestiture.**—Pale ochraceous to almost white except as follows: vertex with abundant long dark brown to black hairs; mesoscutal hairs dark brown to black except peripherally; scutellum with hairs mostly dark brown to black; mesoscutum and scutellum often with fox-red hairs with reddish brown posteromedian or median patches; metasomal tergum 1 with apical area hairs short dark brown; terga 2–4 with interband zones with brown hairs or at least some dark erect hairs mixed with pale, with basal area tomentum pale, apical pale fasciae complete and reaching apical margin of each tergum; tergum 5 with hairs dark brown except small lateral pale patches; tergum 6 dark brown; sterna 2–5 with median hairs short, erect, weakly plu-

mose, reddish brown, apicolaterally hairs becoming longer, more plumose, less erect, and pale; sternum 6 with hairs dark brown; hind tibia with tibial plate and below covered with short dark brown hairs. Scopal hairs long, simple, white, or pale ochraceous.

**MALE. Measurements and Ratios.**—N = 16; length, 9–11 mm; width, 2.5–3.5 mm; wing length,  $2.45 \pm 0.298$  mm; hooks in hamulus, M =  $11.00 \pm 0.204$ ; flagellar segment 2/1, M =  $6.72 \pm 0.117$ .

**Integumental Color.**—Black except as follows: labrum often with white macula equal to more than one-third of labrum margin black, but often entirely black; mandible usually with basal cream-colored macula; clypeus with apical half cream-colored; flagellar segments dark reddish brown to black below; tegulae and wings as in female; metasomal terga and sterna as in female; distitarsi dark reddish brown to red especially apically.

**Structure.**—Head sculpture much as in female but facial area above antennal fossae and vertex with punctures smaller and more dense. Antennae long, reaching second or third metasomal terga in repose, first flagellar segment one-sixth to one-eighth as long as second. Galea shiny above, unshagreened except near apex; maxillary palpus 6-segmented, ratio about as 1.0:1.0:1.0:0.5:0.3:0.3. Thoracic sculpture as in female but mesoscutum often somewhat dulled posteromedially by fine shagreening. Metasomal tergum 1 with basal area with punctures separated mostly by 2 puncture widths in median half, more crowded laterally; apical area with basal half densely punctate, apical half impunctate, moderately shiny, finely shagreened. Terga 2 and 3 with interband zones with dense round punctures, surface moderately shiny; apical areas with basal halves finely punctate, apically impunctate. Terga 4 and 5 similar to 2 and 3 but punctures in interband zones slightly more dense. Pygidial plate blunt, trapezoidal, slightly broader at base than at apex, without subapical notches, margins near apex curved upwards. Sterna 2–5 with basal areas punctate, punctures separated mostly by one puncture width or slightly more, surface moderately shiny, finely shagreened; apical areas impunctate, moderately shiny. Sternum 6 (Fig.

106) flat, with weak subapical carinae, sparsely punctate, with strong apicolateral shoulders; note hair pattern. Terminalia (Figs. 106–110) similar to *fastigiata* (Figs. 97–100).

**Vestiture.**— Generally ochraceous to pale ochraceous except as follows: vertex, mesoscutum, and scutellum often with dark brown hairs but occasionally entirely pale, occasionally fox-red with or without brown patches; metasomal tergum 1 with basal area hairs long, pale ochraceous, apical area hairs short, dark brown; terga 2 and 3 with basal tomentum white, apical areas with white apical fasciae complete, covering apical margins, interband zones with erect dark brown hairs; terga 4 and 5 similar but basal tomentum dark brown; terga 6 and 7 with vestiture dark brown; sterna 2–5 with median hairs relatively short, reddish brown, laterally becoming longer and white; sternum 6 with hairs sparse, extremely short, dark; inner surfaces tarsi golden.

**Type Material.**— The holotype male of *Tetraloniella flagellicornis* (BMNH No. 17 B 829) was collected at Oaxaca, México.

**Distribution.**— *Tetraloniella flagellicornis* is known from relatively few specimens scattered throughout central México and the southern United States (Fig. 8). It has been collected from July 4 through November 11, but chiefly in late August and September. In addition to the holotype, 36 females and 38 males were examined from localities listed below.

**México.**— CHIHUAHUA: Matachic (5 mi. W). DURANGO: El Salto (3–4 mi. S at 8,000 ft. elev.). DISTRITO FEDERAL: No specific locality. HIDALGO: Actopán (9 mi. NW at 6,450 ft. elev.); Ciudad Bernardino de Sahagún (2 km. SE); Jacala (6 and 7 mi. NE at 5,000 ft. elev.); Los Nogales (10 mi. S at 2,200 m. elev.); Metzquititlán (4 km. N at 1,580 m. elev. and 25 km. SW at 1,300 m. elev.); Tulancingo (6 mi. E at 6,900 ft. elev.). JALISCO: Guadalajara (14 mi. NW); La Manzanilla. MEXICO: Toluca (24 mi. NW). MICH-OACAN: Jiquilpán de Juarez (9 mi. W at 6,500 ft. elev.); Pátzcuaro (7.7 km. NE at 2,088 m. elev.); Zamora; Zurumutaro (2,000 m. elev. N of Patzcuaro). NAYARIT: Ixtlán del Río. OAXACA: Asunción; Nochixtlán (7 mi. SE at 7,000 ft. elev.); Oaxaca (28 mi. NW); Yanhuitlán (7 mi. NW). PUEBLA: Acatlán

de Osorio (6 m. SE at 4,700 ft. elev., 15 km. NW at 1,300 m. elev.); Morelos Cañada (7 km. SE); Izucar de Matamoros (14 km. NW at 1,220 m. elev.); San Martín Texmelucan (11.4 mi. NW). TLAXCALA: Apizaco (8 mi. WNW). ZACATECAS: Juan Aldama; Nochistlán; Río Grande (and 10 mi. S); Zacatecas (5 mi. N). **United States.**— ARIZONA: Chiricahua Mts., Cochise Co.; Rustler's Pass, Chiricahua Mts.

**Floral Records.**— Almost nothing is known concerning the floral preferences of this species as only four females have data. One female and 5 males were collected at flowers of *Salvia polystachya* near Pátzcuaro, Michoacán, by C.D. George and R.R. Snelling, 3 females from flowers of *Petalostemum* sp. at Río Grande, Zacatecas, by G.E. and A.S. Bohart and 1 male was collected, by K.V. Krombein from flowers of *Helianthella* sp. at Rustler's Pass, Cochise Co., Arizona.

#### *Tetraloniella noguera*, new species

This moderate-sized bee from central Mexico is closely related both to *flavifasciata* and *flagellicornis*. It is being named in honor of Dr. Felipe Noguera, director of the Estacion de Biología, Chamela, Jalisco, México. The female is similar to *flavifasciata* in that metasomal terga 2 and 3 have apical areas each with a narrow basal zone which is sparsely punctate or impunctate, especially in the lateral third of the tergum (not medially or at extreme sides) but differs from the latter by the apical margins of these terga not being bare and shiny. In both sexes of *noguera* the apical margins of terga 2–4 are covered by the apical pale pubescent fasciae. In addition, both sexes of *noguera* have the dorsal thoracic pale hairs bright fox-red rather than pale ochraceous or white as in *flagellicornis* or *flavifasciata*, and the male has the lower outer surface of antennal segments 4 or 5 to 10 or 11 dark red rather than black as in *flavifasciata* and *flagellicornis*.

**FEMALE. Measurements and Ratios.**— N = 18; 10–11 mm; width, 3.5–4.0 mm; wing length, M = 2.83±0.079 mm; hooks in hamulus, M = 11.61±0.250; flagellar segment 1/2, M = 1.96±0.031.

**Integumental Color.**- Black except as follows: mandible with apical half or less rufescent with golden stripe (unless worn); flagellar segments 4 or 5 to 10 reddish brown to brownish red on outer-lower surface, otherwise black; wing membranes slightly infumate, veins black to dark brown; tegulae dark brown, slightly translucent on summits; metasomal terga with extremely narrow rims translucent, brown; sterna 2-5 with apical areas translucent, reddish brown; distitarsi dark brown; tibial spurs dark testaceous.

**Structure.**- Clypeus and oculoclypeal space as in *flagellicornis*, clypeal punctures coarse, interpunctural spaces dulled by fine shagreening, punctures and interpunctural spaces forming rugosopunctate areas medially and laterally. Supraclypeal area punctures slightly smaller and sparser, surface dull, finely tessellate. Face above antennal fossae with deep crowded punctures, surface shiny or moderately so. Vertex laterally with small crowded punctures, surface shiny to moderately shiny. Genal area narrow, punctures small, crowded, surface dulled by fine shagreening. Galea shiny above, unshagreened; maxillary palpal segments 6, in ratio about as 1.0:0.8:0.9:0.4:0.4:0.3. Flagellar segment 2 with minimum length less than maximum width or about equal, segments 3-5 or 6 and 10 longer than broad, 7-9 as long as broad or shorter. Mesoscutum with small round punctures separated largely by half a puncture width or less, surface moderately dull to dull, shagreened. Scutellum with punctures slightly smaller than mesoscutal, sparser anteriorly and crowded in posterior half, surface moderately dull, shagreened. Mesepisternum with small shallow punctures separated largely by half a puncture width, surface dull, shagreened. Propodeum with dorsal surface with small round or slightly elongate, crowded punctures except in narrow median area, surface dull, finely tessellate; posterior surface similarly sculptured but punctures slightly larger and sparser. Metasomal tergum 1 with basal area with round punctures medially separated by half to one and one-half puncture widths, crowded laterally; apical area impunctate except often with scattered small punctures in narrow area along base of apical

area; surfaces dulled by fine transversely reticular shagreening. Tergum 2 with basal and interband zones with small round punctures separated by half to one puncture width, surface dull, shagreened; apical area with minute punctures except in impunctate narrow rim and along base of apical area, especially in lateral third to fourth, punctures separated by 2 to 4 puncture widths near base of area, becoming crowded near apical rim; tergum 3 similar but slightly more densely punctate; tergum 4 with dense minute punctures except on apical rim; surfaces moderately dull, shagreened. Pygidial plate V-shaped with rounded apex. Sterna 2-5 with basal areas densely punctate, apical areas narrow, impunctate; surfaces moderately shiny, shagreening weak.

**Vestiture.**- Head with pale ochraceous hairs except vertex with long, dark brown to black hairs. Thoracic pale hairs bright fox-red dorsally becoming ochraceous laterally; mesoscutum and scutellum often with moderately large patches of hairs tipped with chocolate-brown; tegulae usually with brown hairs on summits. Metasomal terga 1 with long ochraceous hairs basally and on anterior surface; apical half of basal area and along basal part of apical area with short, relatively simple, subappressed black or dark brown hairs. Metasomal tergum 2 with basal tomentum white; interband zone with suberect, relatively simple black hairs; apical area with white fascia that covers apical rim but is relatively ragged along posterior margin and does not cover extreme basal impunctate part of apical area. Tergum 3 similar but basal tomentum usually entirely or partly dark brown. Tergum 4 similar but basal area tomentum dark brown and apical white fascia not ragged along posterior margin filling apical area. Tergum 5 with large white apical patches, otherwise dark brown. Tergum 6 dark brown. Sterna 2-5 with dark brown, relatively short, stiffly erect hairs except white patches apicolaterally. Scopal hairs simple, shiny, golden in color; inner surfaces hind basitarsi bright orange.

**MALE. Measurements and Ratios.**-  $N = 4$ ; length, about 10 mm; width, about 3.5 mm; wing length,  $M = 2.87 \pm 0.132$  mm; hooks in hamulus,  $M = 11.25 \pm 0.250$ ; flagellar segment 2/1,  $M = 7.17 \pm 0.308$ .

**Integumental Color.**- Black except as follows: mandible as in female but with minute pale macula basally; clypeus with slightly more than apical half cream-colored; flagellar segments 2–11 red below; tegulae piceous, slightly translucent and reddened on summits; wings as in female; metasomal terga with narrow rims hyaline, colorless, or slightly yellowed; sternal apical areas hyaline, yellow; distitarsi dark brown; tibial spurs testaceous.

**Structure.**- Head sculptured much as in female but genal area slightly broader with punctures larger and sparser, surface shiny. Antenna long, segments 1 and 2 as in *flagellicornis*. Galea shiny above, unshagreened; maxillary palpal segments 6, in ratio about as 1.0:0.8:0.8:0.5:0.4:0.3. Thoracic sculpture as in female. Metasomal tergum 1 with basal area punctures sparse, separated by two or more puncture widths in median half, more crowded laterally, dull, shagreened; apical area with crowded punctures along posterior margin, apical half or slightly more impunctate, moderately shiny. Terga 2 and 3 with basal zones with white tomentum; interband zones with suberect, relatively simple black hairs, apical areas with complete white fasciae with a few black hairs medially along apical rim (absent in one specimen and not conspicuous in any available specimens). Terga 4 and 5 with basal and interband zones with black hairs; apical white bands complete. Terga 6 and 7 with vestiture dark brown to black.

Sterna 2–5 with median half or slightly more with sparse hairs reddish brown to red, white laterally. Sternum 6 (Fig. 111) with short sparse brown hairs, pattern similar to *cressoniana* (Fig. 82). Terminalia (Figs. 111–115) much as in *fastigiata* (Figs. 97–100).

**Type Material.**- The holotype female and 6 paratype females of *Tetraloniella noguera* were collected at Taxco, Guerrero, México (7 km. E at 1,560 m. elev.), October 29, 1991, by Felipe Noguera. The allotype male and 4 female paratypes were collected at Taxco (7 km. E at 1,560 m. elev.), October 29, 1991, by R. Ayala. The female holotype and male allotype of *noguera* are in the collection of UNAM. Paratypes are in the collections of UNAM, INHS, USU.

An additional 7 female and 5 male paratypes (see map, Fig. 6) were collected as follows: JALISCO: Chamela (Est. Biología UNAM)—September 29, 1982, S.H. Bullock. GUERRERO: Taxco (5 km. E at 1,600 m. elev.)—October 29, 1991; 4 females from *Dalea leptostachys*, T. Griswold; 1 male, T. Griswold; 1 male, R. Ayala; 2 females, A. Rodriguez; (7 km. E at 1,560 m. elev.), October 9, 1991; 1 female, A. Rodriguez; 1 male, T. Griswold.

***Tetraloniella michoacanensis*,  
new species**

This moderately large species from México and the southernmost United States is similar to *cressoniana* and *flagellicornis* in the simple scopal hairs, the usually 6-segmented maxillary palpi, and the well-defined tergal apical pale fasciae. The female of *michoacanensis* differs from that of either *cressoniana* or *flagellicornis* by metasomal terga 2 and 3 having the apical pale fasciae distinctly separated from the apical edge of each tergum by a narrow, shiny, impunctate rim and by a narrow basal zone of each apical area being impunctate (this is especially distinct on tergum 3). The male of *michoacanensis* has the apical half of the clypeus, base of mandibles, and labrum with pale (cream-colored) maculae much as in *flagellicornis* (rarely the labrum or the mandibles have the pale maculae reduced or absent). The male of *michoacanensis* has metasomal terga 2, 3, and 4 with apical margins narrowly exposed as in terga 2 and 3 of the female.

**FEMALE. Measurements and Ratios.**- N = 20; length, 10–12 mm; width, 4.0–4.5 mm; wing length, M = 2.97±0.104 mm; hooks in hamulus, M = 13.60±0.210; flagellar segment 1/2, M = 2.11±0.018.

**Integumental Color.**- Black except as follows: mandible with median third or less rufescent, often with apicomedian golden stripe (absent when worn); flagellum dark reddish brown to black below; tegulae piceous; wing membranes hyaline, moderately infumate, veins dark blackish brown; metasomal terga with apical rims piceous, of-

ten slightly translucent, never hyaline; sterna with apical areas hyaline to translucent; distitarsi dark reddish brown to black; tibial spurs testaceous.

**Structure.**- Clypeus evenly rounded from side to side, coarsely punctate with small median ridge or apicomedian boss, surface moderately shiny, finely shagreened. Supraclypeal area with deep round punctures separated by half a puncture width laterally, slightly sparser medially, surface dull, finely tessellate. Face above antennal fossae with small round punctures separated largely by half a puncture width or less, surface moderately shiny. Vertex with lateral flattened areas with minute round punctures separated largely by half to one puncture width, surface shiny. Genal area narrow, minutely punctate, moderately shiny. Galeae without shagreening except near tips, shiny; maxillary palpus 6-segmented, segmental ratio about as 1.0:0.8:1.0:0.5:0.4:0.2. Second flagellar segment about as long as broad, half as long as first segment. Mesoscutum with peripheral area with crowded punctures separated mostly by less than half a puncture width, posteromedially punctures separated by half to one puncture width, surfaces dull to moderately dull, finely tessellate; scutellum similar but punctures smaller, surface moderately shiny. Propodeum with dorsal surface punctatorugose, dulled by fine shagreening; posterior surface with crowded punctures laterally, impunctate dorsomedially, surface dull, shagreened. Mesepisternum with round punctures separated by half a puncture width or slightly more, surface dull, finely tessellate. Metasomal tergum 1 with basal area punctures small, round, in median half separated largely by one to two puncture widths, more crowded laterally; apical area largely impunctate, surface moderately dulled by fine shagreening. Tergum 2 and 3 with extreme basal depressed area with minute crowded punctures, surface moderately shiny, interband zone (disc) with punctures large, separated by half to one puncture width medially, more crowded laterally, surface dulled by fine shagreening; apical area with apical rim impunctate, basal fourth or fifth impunctate, median third to half with small round crowded punctures, surface dull, shagreened but apical impunctate rim moder-

ately shiny; tergum 4 similar but apical rim not exposed. Pygidial plate V-shaped with broadly rounded apex. Sterna 2-4 as in *cressoniana*.

**Vestiture.**- Pale ochraceous to white except as follows: vertex and thoracic dorsum often with pale hairs ferruginous but usually with abundant dark brown hairs; tegulae often with some dark hairs; tergum 1 with basal area with long pale hairs, apical area with hairs, if present along basal margin, short, dark brown; terga 2 and 3 with basal tomentum white or mostly white, interband zone hairs short, dark brown, apical pale fascia complete, not covering shiny apical rims of terga, with basal margin irregular and not reaching bases of apical areas; tergum 4 similar but apical fascia narrow and completely hiding apical rim; tergum 5 dark brown except small lateral white patches; tergum 6 dark brown. Sterna 2-5 as in *cressoniana*.

**MALE. Measurements and Ratios.**- N = 20; length 9-12 mm; width, 2.5-3.5 mm; wing length, M = 2.90±0.098 mm; hooks in hamulus, M = 12.35±0.209; flagellar segment 2/1, M = 7.00±0.120.

**Integumental Color.**- Black except as follows: mandible usually with small pale basal macula; labrum usually white with dark brown apical border, often pale spot is one-third or less of labrum and rarely labrum entirely dark; clypeus with subapical half or less cream-colored; flagellar segments black to dark reddish brown below; wing membranes and veins as in female; terga, sterna, distitarsi, and tibial spurs as in female but terga with apical rims often translucent, brown to yellow.

**Structure.**- Head with sculpturing as in female except as follows: clypeus often shiny, especially apicomediaally; vertex with lateral flattened areas with punctures often minute and widely separated. Galeae shiny above; maxillary palpal segments 6, in ratio of about 1.0:0.9:1.0:0.4:0.4:0.3. Thoracic sculpturing as in female but mesepisternum often with punctures sparser, especially below. Metasomal tergum 1 as in female but apical area shorter; terga 2-4 as similar to female terga 2 and 3 but apical exposed rims typically progressively narrower posteriorly. Sternum 6 (Fig. 116) with apical rim completely

covered by fascia or almost so. Pygidial plate and sterna as in *cressoniana*.

Terminalia (Figs. 116–120) similar to those of *cressoniana* or *noguera* but hairs somewhat longer and coarser and hair pattern of sternum 6 slightly denser medially, otherwise as figured.

**Vestiture.**—Vestiture ochraceous except as follows: vertex and thoracic dorsum often ferruginous; vertex, mesoscutum, and scutellum usually with dark brown hairs, occasionally absent or reduced in number. Metasomal terga 2–5 with vestiture as in *cressoniana* except tergum 2 with apical fascia often narrowly interrupted medially and terga 2–4 and often 5 with apical pale fasciae not reaching apices of terga, exposing an impunctate, hairless, shiny rim. Sterna as in *cressoniana*.

**Type Material.**—The holotype female (UNAM), allotype male (UNAM), and 2 female and 3 male paratypes (USNM, INHS) of *Tetraloniella michoacensis* were collected at San Juan Nuevo, Michoacán, México, October 31, 1987 at 1,800 m. elev. by L. Godinez. Additional paratypes (42 females and 37 males) listed below are in the following collections (see map, Fig. 9): UNAM, INHS, SECK, OSU, USU, UCB, UCD, LACM, TAM.

**México.**—BAJA CALIFORNIA SUR: La Laguna (Sierra de La Laguna)—1 male, August 28–September 1, 1977, R.R. Snelling. CHIHUAHUA: Yecora-Cuauhtemoc (91 km, 1,630 m. elev.)—1 male, August 18, 1991, R. Ayala. GUERRERO: Tixtla de Guerrero (10 km. E at 1,770 m. elev.)—1 male, September 18–22, 1982, J.A. Chemsak and J.A. Powell. JALISCO: Teocaltiche—1 male, September 13, 1977, on *Salvia* sp., R.W. Brooks. MICHOACAN: Ario de Rosales (1,800 m. elev.)—3 males, October 28, 1987, T. Griswold and L. Godinez. Santa Clara (15 km. S at 2,200 m. elev.)—3 males, 6 females, October 26, 1989, T. Griswold. San Juan Nuevo (1,800 m. elev.)—3 females, 7 males, October 31, 1987, L. Godinez. Tzintzuntzan (9 km. S at 2,100 m. elev.)—3 females, October 26, 1987, T. Griswold. NUEVO LEON: Chipinque Mesa (4,300 ft. elev.)—1 male, September 20, 1975, J.A. Chemsak. Galeana Junction (5 mi. E)—9 males, 1 female, September

16–17, 1976, J.A. Chemsak, J.A. Powell, A. and M. Michelbacher. Itebide (4 mi. W)—1 male, September 13–14, 1976, J.A. Powell, J.A. Chemsak, A. and M. Michelbacher. OAXACA: Tamazulapán (4 mi. SE at 2,200 m. elev.)—2 males, July 5, 1953, K. U. Mexican Expedition. Yanhuitlán (3 mi. SE)—5 females, September 17, 1974, G.E. Bohart and W. Hanson. PUEBLA: Morelos (7 km. SE)—1 male, July 4–5, 1974, J.A. Chemsak and J.A. Powell. Acatlán de Osorio (6 mi. SE at 4,700 ft. elev.)—2 females, October 8, 1975, J. Chemsak, J. Powell, T. Eichlin, T. Friedlander. SAN LUIS POTOSI: San Luis Potosí (18 mi. SW at 7,300 ft. elev.)—2 females October 1, 1957; 12 females, October 12, 1957, H.A. Scullen. SINALOA: Ocurahui (2 mi. S at 6,500 ft. elev.)—1 female, October 1, 1970, D.E. Breedlove. TLAXCALA: Tlaxcala—1 male, 1 female, July 29, 1981, C. Gold. ZACATECAS: Río Grande—1 female, October 4, 1966, G.E. and A.S. Bohart; 1 male, October 18, 1968, G.E. Bohart.

**United States.**—ARIZONA: Nogales (15 mi. E)—5 females, September 22, 1963, V.L. Vesterby. Ramsey Canyon, Huachuca Mts.—3 males, W.H. Mann. TEXAS: Jeff Davis County—1 male, August 16, 1965, J.C. Schaffner.

**Floral Records.**—Of the 76 specimens before me, only a single male bears a label indicating that it was collected on *Salvia* sp.

#### *Tetraloniella jaliscoensis*, new species

*Tetraloniella jaliscoensis* is similar to *T. crenulaticornis* from which it differs in the female sex by tergum 5 lacking or almost lacking lateral white hair patches and sternum 5 lacking white hairs laterally. The male of *jaliscoensis* differs from that of *crenulaticornis* by having the antennal flagella black to dark brownish red on lower-outer surfaces, flagellar segment 1 extremely short, brown hairs on margins of terga 2–5 apical to the apical pale pubescent fasciae, and often brown hairs on mesoscutum, scutellum, and/or mesepisterna. Both sexes of *jaliscoensis* can be recognised also by having especially short galeae. The galea measured from the base of the first



Figure 9. Map showing the distributions of *Tetraloniella michoacensis*, new species; *cacuminis*, new species; and *davidsoni* (Cockerell).

maxillary palpal segment to the tip of the galea is distinctly shorter than the narrowest facial width between the two compound eyes.

**FEMALE. Measurements and Ratios.**- N = 20; length, 9.5–11.0 mm; width, 3.5–4.5 mm; wing length,  $2.72 \pm 0.132$  mm; hooks in hamulus,  $M = 11.30 \pm 0.164$ ; flagellar segment 1/2,  $M = 2.03 \pm 0.022$ .

**Integumental Color.**- Black except as follows: flagellar segments 1 and 2 black below, 3–10 black to dark reddish brown laterally; mandible as in *crenulaticornis*; wing membranes hyaline, slightly infumate, especially apically, veins dark brownish black;

terga black, apical areas piceous except narrow rims translucent; sterna black but apical areas hyaline, yellow; distitarsi red to reddish brown; tibial spurs testaceous, yellow.

**Structure.**- Clypeus relatively flat, punctures large, separated largely by half a puncture width or less, surface moderately shiny; oculoclypeal minimal distance less than minimum width of first flagellar segment. Supraclypeal area with punctures round, crowded except slightly sparser medially, surface dull, tessellate. Face above antennal fossae, vertex, genal area as in *ressoniana*. Galeae shiny above, shorter than narrowest

width of face between compound eyes; maxillary palpus 6-segmented, ratio about as 1.0:0.7:0.8:0.4:0.3:0.3. Flagellar segment 2 no broader than long and usually slightly shorter, segments 3–9 longer than broad or quadrate, segment 10 one and one-third times as long as broad. Mesoscutum with round crowded punctures in apical third and peripherally, punctures larger and slightly sparser posteromedially, surface moderately shiny to dull peripherally, shiny to moderately so posteromedially. Scutellum with minute punctures peripherally, slightly larger medially, dull peripherally to moderately shiny medially. Propodeum with dorsal surface punctato-rugose except in narrow medially impunctate area, surface dulled by fine tessellation; posterior surface with upper triangle impunctate, laterally with small round punctures more crowded towards lateral margin, surface dulled by fine tessellation. Mesoscutum 1 with apical area impunctate or largely so; basal area with small round punctures more crowded laterally and near base, often narrowly impunctate just basad of apical area, surface moderately dull, shagreened. Tergum 2 with basal and interband zone with small round punctures separated largely by one puncture width or less, apical area punctate but punctures slightly sparser except narrow impunctate rim. Terga 3 and 4 similar to 2 but punctures slightly more crowded. Pygidial plate V-shaped with rounded apex. Sterna 2–5 with narrow apical areas impunctate, basal areas densely punctate, moderately shiny.

**Vestiture.**—Color generally as in *cressoniana* or *crenulaticornis* but vertex with black hairs; mesoscutum and scutellum usually with large patches of dark hairs and occasionally almost entirely black, pale hairs often rufescent; mesepisterna with dark brown to black hairs mixed with ochraceous dorsally, entirely pale ventrally to almost entirely dark brown to black. Metasomal terga 2–4 with complete pale apical fasciae as in *cressoniana* or *crenulaticornis* but basal areas usually dark brown or dark in part, especially on terga 3 and 4; tergum 5 with little or no white hairs at extreme sides; tergum 6 entirely dark brown; sterna with hairs uniformly short, erect, dark brown, without long pale apical or apicolateral hairs as in *crenulaticornis*; basitarsi with in-

ner hairs yellow. Scopal hairs long, simple, white to pale ochraceous.

**MALE. Measurements and Ratios.**— $N = 20$ ; length, 9–10 mm; width, 3.0–3.5 mm; wing length,  $M = 2.76 \pm 0.072$  mm; hooks in hamulus,  $10.30 \pm 0.193$ ; flagellar segment 2/1,  $M = 11.53 \pm 0.184$ .

**Integumental Color.**—Black except as follows: clypeus with yellow subapical band equal to half or less length of clypeus; mandible as in female; flagellar segments 3–11 black to dark reddish brown on lower outer surface; wing membranes hyaline, slightly infumate, veins dark reddish brown to black; metasomal terga and sterna much as in female.

**Structure.**—Head sculptured much as in female; galeae shiny above, short as in female; maxillary palpus 6-segmented, ratio about as 0.8:1.0:0.8:0.5:0.4:0.3. Antennae long, second flagellar segment 10 to 13 times as long as minimum length of first segment, segments strongly flattened (especially last 5 or 6 segments), weakly crenulate. Thoracic sculpture much as in female but mesoscutum usually distinctly dulled by shagreening. Metasomal terga sculptured as in female but tergum 1 with apical area punctate in basal half or more and terga 2–5 with apical impunctate rims of apical areas slightly broader. Pygidial plate blunt-tipped, weak subapical notches often indicated, surface punctate. Metasomal sterna with narrow apical areas impunctate, basal areas with small rounded punctures crowded mediobasally, becoming slightly larger and sparser approaching apical areas. Sternum 6 (Fig. 121) shiny, punctate in oval basal area, apicolateral carinae weak but present, hair pattern similar to *cressoniana* (Fig. 82). Terminalia (Figs. 121–125) much as in *noquera* (Figs. 111–115).

**Vestiture.**—Head hairs white to pale ochraceous below to fulvous on face between upper ends of compound eyes and vertex; vertex with at least a few reddish brown to black hairs. Thorax dorsally ochraceous to fulvous with small patches of dark hairs on mesoscutum and scutellum; dark hairs occasionally covering most of mesoscutum and extending down to upper areas of mesepisterna, otherwise mesepisterna pale ochraceous. Metasomal tergum 1 with long

basal hairs pale, apical hairs, if present, short and dark brown; tergum 2 with basal tomentum white, interband zone hairs short, dark brown to black, apical area with subapical white pubescent fascia complete or narrowly interrupted medially, narrow apical rims with short dark brown to black hairs; terga 3–4 similar to 2 but basal tomentum often dark (especially tergum 4); tergum 5 like tergum 4 but without dark hairs on apical rim and basal tomentum dark; tergum 6 with dark brown to black hairs. Sterna 2–4 with brown hairs medially and with pale hairs apicolaterally; sterna 5 and 6 and vestiture dark brown.

**Type Material.**— The holotype female (UNAM) and 7 female paratypes of *Tetraloniella jaliscoensis* (UNAM, INHS) were collected at the UNAM Estación Biología near Chamela, Jalisco, México, November 2, 1981, by S.H. Bullock. The allotype male (UNAM) and 4 male paratypes (UNAM, INHS) were also collected at the UNAM Estación Biología, Chamela, Jalisco, México, September 9, 1982, by S.H. Bullock. An additional 31 male and 16 female paratypes from México (see map, Fig. 6) (INHS, LACM, UNAM, UCB, UCD, USU) are as follows.

**México.**— CHIHUAHUA: Temoris—1 female August 22, 1968, T.A. Sears, R.C. Gardner, C.S. Glaser; 1 female August 25, 1969, R.C. Gardner, C.S. Glaser, T.A. Sears. JALISCO: Chamela (UNAM Estación Biológica)—1 female, October 15, 1968, G.E. Bohart; 8 males, October 1–8, 1985, F.D. Parker and T. Griswold; 1 male, September 26–30, F.D. Parker and T. Griswold; 1 male, October 11, 1985, R. Ayala; 9 males, June 10, 1982, S.H. Bullock. MICHOACAN: Buena Vista (N of Playa Azul, 700 m. elev.)—1 female, September 2, 1987, T. Griswold. Morelia (1.6 km E at 2,042 m. elev.)—8 females, September 13, 1976, on *Leonotis nepetifolia*, C.D. George and R.R. Snelling. Zamora—2 females, August 28, 1954, E.G. Linsley, J.W. MacSwain, and R.F. Smith. Zintzuntzan (N of Patzcuaro)—1 male, October 26, 1987, T.L. Griswold. **United States.**— TEXAS: Jeff Davis Co.—1 male, August 16, 1965, J.C. Schaffner.

An Additional 9 specimens were collected in Costa Rica as follows: San José Escazu—

9 males, November 5, 1969, F.D. Parker, and are placed in this species provisionally.

***Tetraloniella helianthorum***  
(Cockerell)

*Xenoglossodes helianthorum* Cockerell,  
1914, Canadian Ent., 46:415.

*Xenoglossodes habrocoma* Cockerell, 1935,  
American Mus. Nov. No., 766, p. 7.

This small species is known from Texas and Mexico. The female is similar to *T. wilmattae* or *T. eriocarpi* but the scopal hairs are simple, the plumosity of the basal areas of terga 2–4 is sparse, although it effectively hides the surface unless worn and terga 5 and 6 have considerable brown to black pubescence at least medially (tergum 6 pubescence is usually entirely dark) and sternal hairs are reddish brown to black. The female, despite looking much like an *eriocarpi* female, is more closely related to *T. albata* (Cresson), which it resembles in the scopal hairs being entirely simple. The male of *helianthorum* is unlike the males of *eriocarpi* and *wilmattae* in that sternum 6 (last exposed sternum) does not have lateral teeth on the apicolateral carinae and thus also resembles the male of *albata*. The female also is marked by a black clypeus, labrum, and usually dark basal areas of the mandibles. The male, on the other hand, usually has the labrum entirely cream-colored, the clypeus with an apical band of cream-color equal to about half length of clypeus, and the base of the mandible with a large cream-colored spot. The antennal flagellum below is dark reddish brown to almost black in both sexes.

**FEMALE. Measurements and Ratios.**— N = 6; length, 9–10 mm; width 3–4 mm; wing length, M = 2.41±0.095 mm; hooks in hamulus, M = 11.83±0.167; flagellar segment 1/2, M = 1.94±0.092.

**Integumental Color.**— Black except as follows: mandible rufescent mediobasally, with golden stripe in apical third or less; eyes greenish blue; flagellar segments except first two red below, first two dark brown to reddish brown; wing membranes clear, veins brown to reddish brown; metasomal terga 2–4

with apical areas hyaline (difficult to see because of dense, appressed pubescence).

**Structure.**- Maxillary palpal segments 6, ratio about as in 0.9:1.0:0.9:0.3:0.4:0.3; galea finely dulled by extremely fine shagreening. Flagellar segment 2 about as long as broad or slightly longer, slightly less than half as long as segment 1 and about equal in length to segment 3; segments 4–9 about as long as broad. Mesoscutum with punctures uniformly separated by half to one puncture width, posteromedian area not markedly less crowded, interpunctural surface shiny, not dulled by shagreening; scutellum sculptured similarly; mesepisternum with punctures separated by half a puncture width or less, surface shiny, unshagreened. Propodeum with punctures somewhat elongate, crowded, surface shiny or moderately so. Metasomal tergum 1 with basal area punctures separated by one puncture width or less, surface moderately shiny; apical area with crowded punctured along base, impunctate apically, dulled by fine shagreening. Terga 2–4 similar but basal areas more densely punctate; apical areas with extremely narrow impunctate margins; surfaces moderately dulled by extremely fine shagreening. Sterna 2–5 sculpturing and pygidial plate as in *albata* female.

**Vestiture.**- In general white or nearly so except as follows: dorsum of thorax occasionally extremely pale ochraceous; sterna with brown to almost black hairs except sterna 2–5 with lateral patches of white hairs; tergal hairs white except tergum 5 with white lateral patches each as much as a third width of tergum or less, medially with dark brown hairs apically and basal hairs white; tergum 6 with entirely brown vestiture. Scopal hairs long, simple, dense, white.

**MALE. Measurements and Ratios.**-  $N = 3$ ; length 8–9.5 mm; width 2.5–3.0 mm; wing length,  $M = 2.55 \pm 0.321$  mm; hooks in hamulus,  $M = 11.33 \pm 0.333$ ; flagellar segment 2/1,  $M = 7.42 \pm 0.707$ .

**Integumental Color.**- Integument black except as follows: clypeus pale yellow but blackened in basal third or more, base of mandible with large basal yellow macula; labrum entirely cream-colored; flagellar segments 2–11 dark red to reddish brown below and red-

dish brown above; tegula hyaline, yellow to red; wing membranes hyaline, colorless, veins mostly yellow, subcosta brown.

**Structure.**- Head sculpture similar to female; maxillary palpus 6-segmented, as in female; antennae long, segments not much flattened, second flagellar segment about eight times longer than minimum length segment 1; galea sparsely punctate, surface slightly dulled by fine shagreening. Mesoscutum sculptured as in female but surface is usually shiny, rarely extremely finely shagreened, posteromedian punctures dense, separated by one puncture width or less. Metasomal terga and sterna sculpture much as in female, surfaces shiny to moderately so. Sternum 6 (Fig. 126) flat, without apicolateral teeth associated with apicolateral carinae; strongly shouldered laterally.

Terminalia (Figs. 126–130) similar to *jaliscoensis* but sternum 7 (Fig. 127) with apicomedial plates drawn out into long slender apical points, hairs abundant; sternum 8 (Fig. 128) with four to six hairs on each side of medial emargination. Gonostylus and genital capsule as drawn (Figs. 129 and 130).

**Vestiture.**- White to extremely pale ochraceous. Sternal vestiture short, weak, especially medially, often yellow; sternum 6 with little or no vestiture; inner surfaces tarsi yellow. Tergal vestiture highly plumose, hiding surfaces but not as dense as in *albata*.

**Type Material.**- The holotype male (USNM No. 22,960) of *Xenoglossodes helianthorum* Cockerell was collected at Falfurias, Texas, May 18, 1907 on *Helianthus* sp. by A.C. Morgan. The holotype male (AMNH) of *Xenoglossodes habrocoma* Cockerell was taken in Bexar County, Texas, May 20, 1934, by H.B. Parks.

**Distribution.**- *Tetraloniella helianthorum* is known from northern México, Texas, and Nebraska (Fig. 1). Collection data are sparse and, therefore, with the exception of the type materials given above, are given below in full.

**Mexico.**- CHIHUAHUA: Hidalgo del Parral (35 km. E)—1 female, August 21, 1991, T.L. Griswold. **United States.**- NEBRASKA: Haigler—1 male, July 9, 1911, from *Kuhnistera purpurea*, J.T. Zimmer. TEXAS: Bracketville, Kinney Co.—1 female, May 21,

1969, 1 female, Brothers, Krueger, and C.D. Michener. Corrizo Springs, Dimmit Co.—1 female, April 30, 1966, A.E. Michelbacher. Cotula, La Salle Co.—2 males, April 18, 1906, from *Pithacolchium* sp., P.C. Pratt. Kerrville, Kerr Co.—1 female, April 24, 1953, R.R. Beamer. Sarita (20 mi. S), Kenedy Co.—1 female, April 14, 1950, Michener, Rozen, Beamer, Stephens.

***Tetraloniella flavifasciata* (Cockerell)**

*Melissodes flavifasciatus* Cockerell, 1949, Proc. United States Nat. Mus., 98:464.  
*Xenoglossodes flavifasciata*, LaBerge, 1956, Univ. Kansas Sci. Bull., 37:1179.

This is a small species known only in the male sex from Honduras (the holotype), Costa Rica, and México. It is similar to *T. jaliscoensis* but is distinctly smaller and has smaller and less crowded punctures on the mesoscutum, scutellum, and upper half of the mesepisterna.

**MALE. Measurements and Ratios.**—N = 9; length, 8–9 mm; width, 2.5–3.5 mm; wing length, 2.77±0.225 mm; hooks in hamulus, M = 11.11±0.261; flagellar segment 1/flagellar segment 2, 11.16±0.209.

**Integumental Color.**—Black except as follows: mandible with apical half or less slightly reddened with small golden macula, base dark except one specimen with minute yellowish maculae; labrum dark brown to black; wing membranes infumate, yellowish brown, veins black to dark brown; tegulae dark brown; metasomal terga with apical rims dark brown to reddish brown; sterna 2–5 with apical areas yellowish brown, hyaline.

**Structure.**—Galeae shiny, unshagreened except at tips, sparsely punctate; maxillary palpal segments in ratio of about 0.8:0.9:1.0:0.2:0.3:0.2; clypeus coarsely punctate, punctures separated by half a puncture width or less except small to minute mediobasal impunctate area, surface moderately dull, finely shagreened; supraclypeal area with small punctures crowded laterally, surface dulled by dense shagreening; face above antennal fossae with crowded moderately large punctures separated by mere ridges, moderately shiny to shiny. Mesoscutum with punc-

tures in anterior third or less and peripherally small indistinct, surface dulled by fine tessellation, posteromedially punctures larger, separated by half to one and one-half or more puncture widths, surface moderately shiny, weakly tessellate; scutellum with punctures small, separated by half to one puncture width, sparser medially, surface moderately shiny to shiny, weakly shagreened; propodeum with dorsal area dull, punctatorugose, surface shagreened. Metasomal tergum 1 with basal area with moderately large, round punctures separated by half to two puncture widths, surface dull, shagreened, apical area with crowded minute punctures along basal margin, impunctate apical rim, surface shiny, weakly shagreened; terga 2–5 similar but basal area and disc with punctures small, separated by half to one puncture width, surfaces shiny to moderately so, shagreening weak; pygidial plate broad apically with margins slightly upturned; sterna 2–5 with basal area punctures small, separated mostly by one to three puncture widths, apical areas impunctate, surfaces dulled by reticular shagreening. Sternum 6 (Fig. 131) without lateral teeth, subapical carina relatively short, weakly laminate, or not at all, with minute crowded punctures basally and shiny depressions anterior to carinae.

Terminalia (Figs. 131–135) as in *jaliscoensis* (Figs. 121–125) but sternum 7 (Fig. 132) with apicomедial plates smaller, simple, with long hairs; sternum 8 (Fig. 133) shallowly emarginate apically, with sparse hairs. Gonostylus and genital capsule as drawn (Figs. 134 and 135).

**Vestiture.**—Head with hairs largely white but vertex with abundant long black hairs; upper face along inner eye margins and clypeus with long dark hairs mixed with white. Thoracic hair mostly dark brown to black but mesoscutum with narrow peripheral margin with ochraceous to white hair and mesepisternum and metepisternum with lower halves or less with white hair. Metasomal tergum 1 with long white hairs basally but a few long dark hairs mixed with pale near apical area, apical area with short black appressed hairs. Terga 2 and 3 with basal white bands of short plumose hairs, median area with short black hairs, apical area with white fascia and

apical rims with short black hairs (fascia of tergum 2 usually interrupted medially by dark hairs). Terga 4 and 5 as in tergum 3 but basal area hairs black. Terga 6 and 7 with hairs black; sterna 2–5 with black hairs basally and small areas of white hairs apicolaterally; sternum 6 with short dark brown hairs mediobasally and apical to carinae.

**Type Material.**—The holotype male of *Tetraloniella flavifasciata* (USNM No. 58545) was collected at Zamorano, Honduras, October 19 by M.R. Palacios.

**Distribution.**—This species is known from Honduras, Costa Rica, and México (Fig. 4). Collection data are given in full below.

**Costa Rica.**—San José Escazu—9 males, November 5, 1989, F.D. Parker. **Honduras.**—Zamorano—October 19, M.R. Palacio. **México.**—San Juan Nuevo, Michoacán—1 male, October 31, 1987, L. Godinez.

#### *Tetralonia cacuminis*, new species

This species is related to *crenulaticornis* and *ressoniana*. The female is distinctive in having shiny galeae, usually shiny mesoscutum and scutellum, well-formed apical tergal fasciae, and a sharply pointed, V-shaped pygidial plate. The male usually has dark hairs on the thorax, shiny galeae, mesoscutum, and scutellum; flagellum with extremely short first segment and red coloration; well-formed tergal apical fasciae but usually with narrow apical margins with short brown to black hairs, especially on terga 2–4. Both sexes have 6-segmented maxillary palpi and the female has simple scopal hairs.

**FEMALE. Measurements and Ratios.**—N = 20; length, 8–10 mm; width, 3.5–4.0 mm; wing length, M = 2.31±0.156 mm; hooks in hamulus, M = 11.05±0.170; flagellar segment 1/2, M = 1.98±0.034.

**Integumental Color.**—Black except as follows: mandible with apical half rufescent, with golden macula in apical half unless worn; flagellum with segments 1 and 2 dark brown below, remaining segments dark reddish brown to red below; tegulae piceous; wing membranes hyaline, colorless, veins dark brownish black; metasomal terga 1–4 with apical areas piceous except extremely narrow

translucent rims; sterna 2–5 with apical areas narrow, hyaline, yellow; distitarsi dark brown, distitarsi testaceous to yellow.

**Structure.**—Clypeus relatively flat, marginal area finely, densely punctate, basal area coarsely punctate, interpunctural spaces equal about half a puncture width, becoming somewhat broader and thickened along posterior margin of apical marginal area, surface moderately shiny. Supraclypeus area with small round dense punctures, dulled by fine shagreening. Face above antennal fossae with dense small round punctures, surface moderately shiny. Vertex with lateral area with minute round punctures separated by half to one puncture width, surface shiny; genal area finely, densely punctate, moderately shiny; galeae shiny, unshagreened, or dulled only near tips. Galeae shiny above; maxillary palpal segments 6, in ratio about as 1.0:1.0:0.8:0.5:0.3:0.4. Flagellar segment 2 broader near apex than minimum length. Mesoscutum with small round crowded punctures in apical half and peripherally, punctures separated mostly by half a puncture width or less, posteromedian area with punctures separated by half to one puncture width, surface moderately shiny, with weak, fine reticular shagreening. Scutellum with posterior half with punctures as large as mesoscutal punctures, separated by half a puncture width or less, anterior half with minute crowded punctures, moderately shiny. Propodeum with dorsal area with coarse, elongate, crowded punctures, dulled by fine shagreening; mesepisternum with large punctures separated by half or slightly more punctures, surface moderately dulled by reticular shagreening. Pterostigma much shorter than prestigma. Metasomal tergum 1 with basal area with shallow punctures in median half separated mostly by one to two or more puncture widths, laterally crowded, apical area punctate in basal half to three-fourths or more, punctures small, crowded, surfaces dulled by fine reticular shagreening; terga 2–4 sculptured as in *ressoniana*. Pygidial plate V-shaped, apex acute, lateral margins often slightly concave. Sternal 2–5 sculptured much as in *ressoniana*.

**Vestiture.**—Generally pale ochraceous to ochraceous except as follows: vertex usually

with abundant dark brown hairs; mesoscutal hairs mostly dark brown or with large postero-medial dark patch; scutellum with vestiture dark brown except along posterior margin; mesepisterna often with small patch of dark brown hairs anterodorsally (present in holotype). Metasomal tergum 1 with long basal hairs pale, apical half or almost so with short suberect, dark brown, relatively simple hairs; tergum 2 with basal tomentum pale; apical area pale ochraceous, interband zone dark brown, posterior margin of apical fascia often forms a flattened bracket shape; tergum 3 with extreme base with dark brown tomentum, a narrow zone of pale tomentum along anterior margin of basal zone, apical area with pale ochraceous fascia, interband zone with dark brown hairs; tergum 4 with apical pale fasciae, dark brown basally; tergum 5 dark brown with small lateral white tufts; tergum 6 dark brown. Sterna 2–5 with erect brown to reddish brown hairs, white apicolaterally; sternum 6 dark brown. Scopal hairs white or pale ochraceous, hairs long, simple.

**MALE. Measurements and Ratios.**- N = 20; length, 8.5–11.0 mm; width, 2.5–3.0 mm; wing length, M = 2.33±0.095 mm; hooks in hamulus, M = 10.55±0.135; flagellar segment 2/1, M = 9.40±0.387.

**Integumental Color.**- Black except as follows: clypeus pale yellow but infuscated along posterior margin to basal half piceous (allotype); labrum entirely white to white with apical margin darkened (allotype); mandibles usually with basal pale maculae (absent in allotype); flagellar segments 2 or 3—11 red to reddish brown below (allotype with 3–11 reddish brown); terga 1–5 with apical areas piceous except extremely narrow apical rims; terga 2–5 with apical areas hyaline, yellow to red; distitarsi brown; wing membranes hyaline, veins reddish brown to dark brown; tibial spurs testaceous.

**Structure.**- Head sculptured as in female; galeae shiny; maxillary palpal segments 6, in ratio as 1.0:1.0:0.9:0.4:0.3:0.3; second flagellar segment 7 to 10 times as long as first segment or slightly more. Thorax sculptured as in female but mesoscutum often slightly duller; pterostigma short as in female. Metasomal terga sculptured as in female but terga 2–5 with

apical areas with slightly broader apical impunctate rims. Pygidial plate with basal width about twice apical width, with subapical lateral notches but often worn and not apparent. Sterna 2–5 sculptured as in *cressoniana*. Sternum 6 (Fig. 136) without lateral teeth, largely impunctate medially.

Terminalia (Figs. 136–140) much as in *jaliscoensis* (Figs. 121–125) but note sternum 7 (Fig. 137) with apicomedial plates large, simple, with few apical hairs and sternum 8 (Fig. 138) with abundant short apical hairs. Gonostylus and genital capsule as drawn (Figs. 139 and 140).

**Vestiture.**- Head with vestiture pale ochraceous to white except vertex often with abundant long dark brown hairs (allotype); thoracic vestiture pale ochraceous to almost white except mesoscutum and scutellum often with abundant dark brown hairs (allotype) and mesepisternum occasionally with several dark hairs anterodorsally (allotype); some specimens (Arizona, Costa Rica, and México) without dark hairs on vertex and thoracic dorsum, occasionally thoracic dorsum with ferruginous hairs. Metasomal tergum 1 as in female; terga 2 and 3 with basal area tomentum white, apical fasciae white to ochraceous, interband zone with short dark brown hairs but zone narrower in tergum 3 than 2 and often obliterated by white basal hairs; terga 4 and 5 with ochraceous to white apical fasciae and dark brown basal hairs; tergum 6 with dark hairs; sterna 2 and 3 with pale hairs; sterna 4 and 5 with reddish brown to red hairs medially and white laterally; sternum 6 with short sparse hairs brown.

**Type Material.**- Holotype female (UNAM) and allotype male of *Tetraloniella cacuminis* (UNAM) were collected 21 km. SW of Zapotitlán Salinas, Puebla, México, at 1,420 m. elevation, November 3, 1991, by F. Noguera. An additional 32 female and 36 male paratypes (UNAM, SECK, INHS, UCB, UCD, OSU, USU, KSU, CAS, AMNH) are as follows (see map, Fig. 9):

**México.**- BAJA CALIFORNIA SUR: Las Barrancas—1 male, November 5–7, 1982, E. Schlinger, M.E. Irwin, T. Griswold. CHIHUAHUA: Chihuahua (24 mi. SW at 5,900 ft. elev.)—1 male, September 6, 1962, R.H. and

E.M. Painter. Temoris—1 male, September 1, 1969 and 1 male, September 4, 1969, T.A. Sears, R.C. Gardner, C.S. Glaser. GUERRERO: Taxco (7 km. E at 1,560 m. elev.)—2 males, October 29, 1991, F. Noguera and T. Griswold. HIDALGO: Ixmiquilpán—(19 mi. W), 1 female, July 29, 1954, Univ. Kansas Mex. Exped. Metzquitlán (4 km. N at 1,580 m. elev.)—1 male, November 11, 1991, F. Noguera. Xoxofi—1 female on *Salvia* sp., September 17, 1992, L. Godínez. Zimapán—4 females, September 1954, W.L.H. Krauss. MORELOS: Cuernavaca—3 females, September 8–December 6, 1987, F.D. Parker. PUEBLA: Acatlán de Osorio (8 km. NW at 1,170 m. elev.)—1 female, November 1, 1991, A. Rodríguez; (14 km. NW at 1,240 m. elev.), 2 females, 5 males, November 1, 1991, A. Rodríguez and F. Noguera; (15 km. NW at 1,300 m. elev.), 1 male, November 1, 1991, R. Ayala; 1 male from *Dalea leptostachys*, November 1, 1991, T. Griswold; 4 females from *Dalea leptostachys*, T. Griswold. (6 mi. SE); 1 female, October 8, 1975, J. Powell, J. Chemsak, T. Eichlin, T. Friedlander; (8 km. NW at 1,170 m. elev.), 1 male. Izucar de Matamoros (14 km. NW at 1220 m. elev.)—2 males, T. Griswold. Tepexco (1 km. NE at 1,120 m. elev.)—1 female, October 31, 1991, T. Griswold. Zapotitlán Salinas (2 km. SW at 1,410 m. elev.)—1 female and 2 males, November 3, 1991, R. Ayala. SINALOA: Escuinapa—1 male, September 29, 1966, on *Bidens* sp., G.E. and A.S. Bohart. SONORA: Aduana—10 males, March 15, 1962, F.D. Parker; 2 females, March 15, 1962, L.A. Stange. Alamos—4 males, September 27, 1966, on *Malva* sp., G.E. and A.S. Bohart. ZACATECAS: Juan Aldama—5 females, October 4, 1966, G.E. and A.S. Bohart. Río Grande—2 females on *Petalostemum* sp., October 4, 1966, G.E. and A.S. Bohart; (10 mi. S), 2 females on *Petalostemum* sp., G.E. and A.S. Bohart. Salinas (19 mi. E)—1 female, September 10, 1973, W.J. Hanson and B.A. Haws.

**United States.**- ARIZONA: Kirkland, Yavapai Co.—1 male, on *Heterothesca subaustralis*, August 31, 1964, C.D. and D.R. Michener. Willcox Dry Lake, Cochise Co.—1 male, September 17, 1969, B.A. Tilden.

NEW MEXICO: Alamillo (2 mi. N), Socorro Co.—1 male, August 17, 1962, J.G. and B.L. Rozen.

In addition to the paratypes listed above, a total of 13 specimens from Costa Rica were examined. These females are paler than any of the females from México and were, therefore, excluded from the paratypic series. These females are as follows:

**Costa Rica.**- GUANACASTE PROVINCE: Las Cañas (24 km. NW at Hacienda Comelco)—9 females, January 21, 1972, 2 females January 23, 1972, 2 females February 7, 1972, E.R. Heithaus.

#### *Tetraloniella pomonae* (Cockerell)

*Tetralonia pomonae* Cockerell, 1915, Pomona J. Ent. Zool., 7:230; Bray, 1917, Pomona J. Ent. Zool., 9:94; Lutz and Cockerell, 1920, Bul. American Mus. Nat. Hist., 42:621; Cockerell, 1926, Ann. Mag. Nat. Hist., ser. 9, 8:625.

*Tetralonia pomona* (sic) Cockerell, 1930, Ann. Mag. Nat. Hist., ser. 10, 5:410.

*Xenoglossodes pomonae*, Michener, 1951, in Muesebeck et al., p. 1230 (new combination).

This moderate-sized bee from California and Baja California is very distinctive. The female has plumose scopal hairs but the branches of each hair are extremely short and the hairs appear roughened, rather than plumose. Both sexes have black flagella, large pterostigma, metasomal tergum 2 without an apical pale pubescent fascia (males may have some remnant of this fascia laterally and the females often have an extremely narrow band of golden pubescence on rim of tergum). Both sexes often completely lack the apical fascia on tergum 3, but more often this band is present but broadly interrupted medially. The males of *pomonae* have relatively long first flagellar segments as described below and the females have the second flagellar segments slightly longer than broad.

**FEMALE. Measurements and Ratios.**- N = 20; length, 10–13 mm; width, 3.5–4.5 mm; wing length, M = 2.96±0.221 mm; hooks in hamulus, M = 12.00±0.162; flagellar segment 1/2, M = 1.61±0.012.

**Integumental Color.**- Integument black except as follows: mandible with large golden macula in apical half or more (barely visible in worn specimens); flagellar segments 3–10 dark blackish brown below; tegula reddish brown; wing membranes hyaline, veins dark brown to black; metasomal terga piceous, narrowly hyaline apically; sterna similar; distitarsi reddish brown; tibial spurs ochraceous.

**Structure.**- Clypeus with rounded transverse ridge just posterior to apical margin, flattened posterior to this ridge; coarsely punctate, punctures separated by half a puncture width, surface moderately shiny, weakly shagreened. Supraclypeal area impunctate medially, with small, crowded punctures in lateral corners, surface shiny to moderately shiny, weakly shagreened. Face above antennal fossae with small round punctures separated by half to one puncture width, surface moderately shiny. Vertex lateral to ocelli flattened, with minute punctures separated by one or more puncture widths, surface shiny. Genal area sculptured as in facial area. Galea shiny; maxillary palpal segments 6, ratio about as 0.9:0.9:1.0:0.7:0.4:0.3. Flagellar segment 2 slightly longer than broad, all segments longer than broad. Mesoscutum with small round punctures crowded in anterior third and peripherally, separated mostly by one to three puncture widths posteromedially, surface shiny. Scutellum similar but punctures more crowded. Propodeum with moderate-sized, elongated punctures except along midline, surface dulled by fine tessellation. Mesepisternum with crowded round punctures much as on anterior third of mesoscutum, surface moderately shiny to shiny, shagreening weak. Pterostigma usually as long as prestigma or shorter, rarely slightly longer. Metasomal tergum 1 with basal area punctures relatively sparse in median third, crowded laterally, apical area impunctate except along a single line at base and in small lateral areas, surface dulled by fine reticular shagreening. Metasomal tergum 2 with basal area punctures small, round, separated by one or more punctures widths in apicomedian third, becoming crowded basad and laterad, apical area with similar-sized punctures separated by half to one puncture width in median half, more

crowded laterally, surface moderately dulled by fine shagreening. Terga 3 and 4 similar but moderately densely punctate. Pygidial plate V-shaped, apex sharply pointed. Sterna 2–4 with basal areas punctate, punctures becoming sparse basad, most crowded along margin of apical area, which is impunctate, surface moderately shiny, weakly or not at all shagreened.

**Vestiture.**- Ochraceous to dark ochraceous except as follows: vertex and face along inner margins of eyes, mesoscutum posteromedially, scutellum medially, terga 2 and 3 interband areas and basomedially in apical areas with dark brown hairs. Terga 2 and 3 usually lacking apical pale pubescent fasciae or with small patches of pale pubescence laterally on tergum 3, usually with narrow band of short golden hairs on rims. Scopal hairs plumose, with extremely short branches, appearing roughened rather than plumose, ochraceous. Inner surfaces hind basitarsi with hairs golden.

**MALE. Measurement and Ratios.**- N = 20; length, 10–12 mm; width, 3–4 mm; wing length,  $M = 2.87 \pm 0.145$  mm; hooks in hamulus,  $12.00 \pm 0.251$ ; flagellar segment 2/1,  $M = 3.74 \pm 0.063$ .

**Integumental Color.**- Integumental color black except as follows: clypeus yellow but often infuscate narrowly posteriorly; labrum yellow with dark apical margin; mandible with subapical golden stripe usually present (not in worn specimens); flagellum black below; tegulae usually dark brown with translucent summit. Wing membranes and veins as in female; hind tibial spurs pale yellow; distitarsi dark red. Terga piceous becoming reddened apically to narrowly hyaline along margins; sterna 2–5 similar to female.

**Structure.**- Head sculptured as in female but clypeal punctures not as distinct and clypeus not with subapical, transverse, rounded ridge, evenly rounded, relatively flat; maxillary segments 6, ratio about as in female; flagellar segment 2 three and one-third to four and one-fourth times as long as segment 1; antennae moderately long, reaching first metasomal tergum, segments rounded to slightly flattened, not crenulate. Sculpturing of thorax as in female but punctures larger and

more crowded (especially on mesoscutum), propodeum with punctures not elongate, round or almost so. Pterostigma usually equal to or slightly shorter than prestigma, rarely longer. Sculpturing of terga and sterna as in female but punctures slightly larger. Pygidial plate strongly narrowed from base to apex, so that apical area at level of lateral subapical notches about half as broad as base. Sternum 6 (Fig. 141) flat, without lateral teeth, subapical carina concave along outer margin, becoming sublaminar near apical termination.

Terminalia (Figs. 141–145) much as in *helianthorum* (Figs. 126–130) but note sternum 7 (Fig. 142) with apicomedial plates much extended, hairs abundant; sternum 8 (Fig. 143) with apical margin deeply excavated medially, hairs sparse. Gonostylus and genital capsule as drawn (Figs. 144 and 145).

**Vestiture.**— Generally ochraceous to pale ochraceous except as follows: vertex, mesoscutum posteromedially, and scutellar median area often with long dark brown hairs; terga 2 and 3 with apical area bands similar to female but apical rims usually without short golden hairs and interband zone hairs sparser and often pale brown to dark ochraceous; inner surfaces basitarsi pale yellow.

**Type Material.**— The holotype male (CAS Type No. 15,548) of *Tetraloniella pomonae* was collected at Laguna, California by R. LaFollette. This locality (Cockerell, 1915) may apply to Laguna, Imperial Co. or to Laguna Beach in Los Angeles Co. Considering that Pomona College is much closer to the Los Angeles Co. locality than to the Imperial Co. locality, this author prefers to consider the type locality to be Laguna Beach.

**Distribution.**— *Tetraloniella pomonae* occurs from northern Baja California north to central California (Fig. 7). It has been collected from April 8 through October 6 but chiefly from mid-July until mid-September. In addition to the type, a total of 119 females and 276 males were examined from localities listed below.

**México.**— BAJA CALIFORNIA DEL NORTE: Ensenada. **United States.**— CALIFORNIA: Altadena; Anderson Spring, Lake Co.; Anselmo; Antioch; Ash Mt. Power Sta., Tuolumne Co.; Auburn; Avon; Big Oak Flat,

Tuolumne Co.; Black Lake Canyon, San Luis Obispo Co.; Brawley; Calistoga; Calpine; Carmel; Carpinteria; Cazadero; Charmlee County Park, Los Angeles Co.; Clear Lake, Lake Co.; Coalinga; Corona; Del Mar (1 mi. S and 2 mi. E); Eagle Rock, Los Angeles Co.; Fallbrook; Felton Sta., Santa Cruz Co.; Hemet; Holy City; Huntington Lake; Laguna Beach; LaJolla; Laurel; Lodi; Lompoc; Los Angeles; Los Angeles Co.; Los Baños; Lucia; Marin Co.; Monterey; Monticello (11 mi. S); Morgan Hill; Murphys; Nipinnawasee; Oceano (4 mi. S); Oxalis; Pacific Grove; Palo Alto; Palmdale; Point Lobos, Monterey Co.; Ramona (10 mi. NE); Rawhill; Redondo Beach, Los Angeles Co.; Redwood City; Riverside; Sacramento; Salt Marshes, San Francisco Bay; San Antonio Valley; San Diego; San Jose; San Luis Obispo; San Lucas (10 mi. SW); San Simeon (10 mi. SE); Santa Barbara; Santa Cruz Mts., Santa Cruz Co.; Santa Margarita (5 mi. NE); Santa Monica; Santa Rosa Island, Santa Barbara Co.; Seal Beach, Contra Costa Co.; Sierraville; South Sonoma Co.; Squaw Valley, Fresno Co.; Sunset Valley, Santa Barbara Co.; Tanbark Flat, Los Angeles Co.; Temecula; Tesla; Tuckers Grove; Twain Harte; Westley; Westwood Hills, Los Angeles Co.

**Floral Records.**— This species has been collected from a variety of flowers but chiefly from species of Compositae. However, too few floral records are available to express an opinion of floral preferences. It has been collected from flowers of the plants listed below.

*Baccharis pillularis*; *Centromadia pungens*, *C. parryi*; *Erigeron* sp.; *Eriogonum* sp.; *Grindelia* sp., *G. camporum*; *Hemizonia* sp., *H. fasciculata*; *Maddia* sp.; *Mentha* sp.; *Solidago* sp.; *Trichostema* sp.

#### *Tetraloniella distata*, new species

This small species is similar to *pomonae* in the modified scopal hairs as described below, the large pterostigma, the interrupted apical pale band of tergum 2 of both sexes, the relatively long first flagellar segment and short antennae of the male, and the six maxillary palpal segments. Both sexes are distinctly smaller than *pomonae* and usually have more

complete apical pale bands on terga 3 and 4. The female has paler antennae, less flattened clypeus, and more obviously plumose scopal hairs as described below. The male of *distata* has a yellow clypeus, pale labrum, but dark mandibular bases and antennae. The female has slightly reddened flagella and the vestiture of tergum 5 mostly pale.

**FEMALE. Measurements and Ratios.**- N = 18; length, 9–11 mm; width, 3.5–4.5 mm; wing length, M = 2.94±0.089 mm; hooks in hamulus, M = 11.33±0.162; flagellar segment 1/2, M = 1.89±0.027.

**Integumental Color.**- Black except as follows: mandible with apical half rufescent with large golden macula unless worn; flagellar segments 3–11 below red to dark brownish red, darkest specimen with flagella dark blackish brown except last three segments dark reddish brown below (holotype); tegulae translucent reddish; wing membranes hyaline, colorless or slightly smoky, veins dark reddish brown to black. Metasomal terga 2–4 with apical areas piceous with about apical fourth hyaline, yellow; sterna 2–5 with apical areas hyaline, yellow; distitarsi reddish brown; tibial spurs testaceous.

**Structure.**- Clypeus evenly rounded from side to side near apical margin but relatively abruptly declivous along posterior margin, punctures moderate-sized, crowded, without apical ridge or apicomedian boss, surface shiny. Supraclypeal area with small round punctures separated by one to two or three puncture widths, sparser medially, surface dulled by dense coarse tessellation. Face above antennal fossae with deep punctures slightly larger than in supraclypeal area, separated by half to one puncture width, surface moderately dulled by fine shagreening. Vertex with flattened lateral areas with minute punctures separated mostly by two or more puncture widths, surface shiny, unshagreened. Genal area narrow, with minute crowded punctures, surface shiny, weakly shagreened. Mesoscutum with deep round punctures peripherally separated by half a puncture width or less, surface moderately dulled by fine shagreening, posteromedially punctures larger, separated by half to one puncture width, surface shiny, unshagreened. Scutellum with

smaller crowded punctures, surface shiny. Propodeum with dorsal surface irregularly rugose, surface dull to moderately shiny, weakly tessellate; posterior surface sparsely punctate, tessellate. Mesepisternum with small shallow punctures separated by half to one puncture width, surface dull, finely tessellate. Metasomal tergum 1 with small round punctures crowded along base of basal area and laterally, sparse approaching apical area, apical area impunctate, surface finely transversely reticulately shagreened. Terga 2 and 3 with basal area (under dense tomentum) with dense small round punctures, surface shiny, interband zone (disc) with punctures slightly larger, separated by half to one or more puncture widths, surface moderately dull, shagreened, apical area with punctures separated by half or slightly more puncture widths except narrow hyaline apical rim impunctate, surface as in interband zone. Tergum 4 slightly more densely punctate in interband and apical areas. Pygidial plate V-shaped with rounded apex. Metasomal sterna 2–5 with basal areas sparsely punctate near base, punctures crowded near apical areas, which are impunctate, surfaces shiny, shagreening weak or absent.

**Vestiture.**- Pale ochraceous except as follows: vertex, thoracic dorsum, metasomal tergum 1 apically, terga 2 and 3 and often 4 interband zones, tergum 5 apicomediaally and tergum 6 near pygidial plate pale to dark brown; metasomal sterna with hairs pale but reddish or yellow mediobasally on each tergum; inner surfaces tarsi reddish or golden. Scopal hairs each long, weakly plumose, branches restricted or mostly on one side of rachis and no more than six or seven branches per rachis and often less, rachis appears roughened.

**MALE. Measurements and Ratios.**- N = 20; length, 8–11 mm; width, 2.5–3.5 mm; length, M = 2.79±0.110 mm; hooks in hamulus, 10.70±0.179; flagellar segment 2/1, M = 4.10±0.099.

**Integumental Color.**- Black except as follows: mandible without basal pale macula; labrum white with black or dark brown border; clypeus entirely yellow except posterolateral notches at tentorial pits or yellow with

narrow blackened posterior border; flagellar segments dark reddish brown to black below; tegulae and wings as in female; metasomal terga, sterna, distitarsi, and tibial spurs as in female.

**Structure.**—Head sculptured as in female but clypeal punctures less distinct. Maxillary palpal segments 6, ratio about as 0.1:0.1:0.4:0.9:0.9:1.0. Antennae relatively short, barely reaching tergum 1 in repose; flagellar segment 2 three and one-third to four and one-half times as long as first segment, penultimate segment about three times as long as broad. Sculpture of thorax as in female but punctures often slightly larger and more crowded. Pterostigma usually slightly longer than prestigma and no shorter. Sculpturing of terga and sterna as in female. Pygidial plate with weak subapical lateral notches, extreme base slightly less than median length. Sternum 6 (Fig. 146) without lateral teeth, apicolateral carinae low, straight, not laminate; less hairy.

Terminalia (Figs. 146–150) much as in *pomona* (Figs. 141–145) but sternum 7 (Fig. 147) with apicomedial plates shorter, with sparse hairs; sternum 8 (Fig. 148) as in *pomona* but shorter and apical emargination smaller. Gonostylus and genital capsule as drawn (Figs. 149 and 150).

**Vestiture.**—Generally white to pale ochraceous except as follows: vertex, mesoscutum, and scutellum often with some brown hairs (white in holotype); metasomal tergum 1 with basal hairs long, pale, apical hairs short, brown; tergum 2 with apical pale fascia lacking or broadly interrupted medially (one-third or more of tergum) basal tomentum white, most of interband and all of apical area with hairs short, suberect, relatively simple, brown; tergum 3 similar but narrow subapical fascia complete or almost so; terga 4 and 5 covered with pale hairs except a few short brown hairs apicomediaally on tergum 4; terga 6 and 7 ochraceous (holotype) to pale brown; sterna 2–5 with hairs pale brown to ochraceous medially to white apicolaterally; sternum 6 with sparse short dark brown hairs; distitarsi with inner surfaces yellow.

**Type Material.**—The holotype female (SECK) and allotype male (SECK) of *Tetraloniella distata* were collected at 20 km.

N of Highway 15 and S on Highway 24, Sonora, México, March 12, 1990, by R.L. Minckley, J. Gelhaus, and M. Calhoun. An additional 21 female and 75 male paratypes (UCB, INHS, SECK, USNM, USU, OSU) were collected as follows (see map, Fig. 8).

**México.**—SINALOA: Guaymachil—3 females, 2 males on small yellow mallow, September 27, 1966, G.E. and A.S. Bohart. Los Mochis (20 mi. N)—4 females and 13 males on blue Malvaceae, October 9, 1968, G.E. Bohart. SONORA: Alamos—1 female, September 27, 1966, G.E. and A.S. Bohart; 1 female, October 8, 1968, G.E. Bohart. Guaymas (15 mi. S at 30 m. elev.)—1 male January 10, 1964, D. Bolinger; (25 mi. N), 3 females on tall small-flowered, yellow mallow, September 26, 1966, G.E. and A.S. Bohart; 2 males on yellow composite, September 27, 1966, G.E. and A.S. Bohart. Navajoa—1 female on *Stenolobium* sp., October 9, 1968, G.E. Bohart; 2 males on yellow composite, September 27, 1966, G.E. and A.S. Bohart. Obregon—2 females and 3 males on tall, small flowered, yellow mallow, September 26, 1966, G.E. and A.S. Bohart; (38 mi. NW at 100 ft. elev.), 5 males, September 23, 1963, H.A. Scullen and D. Bolinger. José de Guaymas—3 females, April 10, L.O. Howard. **United States.**—CALIFORNIA: Kane Springs (1.6 mi. N), Imperial Co.—1 female and 49 males on *Sphaeralcea orcuttii*, February 2, 1952, P.D. Hurd. TEXAS: Fort Sam Houston, Bexar Co.—1 female, August 25, 1952, B.J. Adelson. San Ygnacio, Zapata Co.—1 female on *Lindheimera texana*, April 15, 1952, C.D. Michener, R.H. and L.D. Beamer, A. Wille, and W.E. LaBerge.

#### *Tetraloniella davidsoni* (Cockerell)

- Xenoglossa davidsoni* Cockerell, 1905, Bul. S. California Acad. Sci., 4:28.  
*Xenoglossodes davidsoni* Cockerell, 1935, Pan-Pacific Ent., 11:53.  
*Synhalonia hirsutior* Cockerell, 1905, Bul. S. California Acad. Sci., 4:29; 1935, *supra cit.*, 11:53 (synonymy).

This beautiful large species from California and Baja California del Norte is related to *T. pomona* and *T. distata* but can be readily

recognized in both sexes by several characters. The female has no apical pale fascia on tergum 2 and very small lateral remnants of the apical fascia on tergum 3 or none, the scopal hairs are simple but roughened or the branches if present are few and extremely short, and the last flagellar segment is about as long as broad. The male has long black flagella with the first segment about one fourth as long as the second, lacks apical pale tergal fasciae and has a modified sixth sternum as described below.

**FEMALE. Measurements and Ratios.**- N = 20; length, 11–13 mm; width, 4–5 mm; wing length,  $3.25 \pm 0.100$  mm; hooks in hamulus, M =  $13.5 \pm 0.100$ ; flagellar segment 1/2, M =  $1.80 \pm 0.018$ .

**Integumental Color.**- Black except as follows: mandible with large golden macula in apical half unless worn, usually ferruginous beneath macula; flagellar segments black to blackish brown below; tegula translucent at summits, reddish brown to yellow; wing membranes hyaline, slightly infumate, veins dark reddish brown to black; metasomal terga piceous but apical areas reddened and narrow rims hyaline, yellow; sterna piceous except apical areas hyaline, yellow; distitarsi reddish brown; tibial spurs testaceous to ferruginous.

**Structure.**- Clypeus evenly rounded from side to side, with or without poorly formed subapical boss, coarsely punctate, punctures separated mostly by half a puncture width or less, surface dull, moderately shagreened. Supraclypeal area punctate as in *pomona* but surface dulled by fine tessellation. Face above antennal fossae sculptured as in *pomona*. Vertex with lateral flattened areas with minute round punctures separated by half to one or more puncture widths, surface moderately dull, shagreened. Genal area in lateral view slightly broader than eye, minutely punctate, punctures separated by half to one puncture width, moderately dulled by fine shagreening. Galeae shiny above; maxillary palpal segments 6, in ratio about as 1.0:0.9:0.8:0.6:0.4:0.4. Flagellar segment 2 about as long as broad, segment 10 (ultimate) short, about as long as broad. Mesoscutum with punctures extremely shallow, peripherally and in anterior third to two-fifths punctures separated by half a puncture width or less, posteromedially separated

largely by one puncture width, surface and bottoms of punctures dulled by fine tessellation. Scutellum with small round punctures separated mostly by half a puncture width, surface dulled by fine tessellation. Mesepisternum with moderate-sized, shallow punctures separated by half a puncture width, sparser below and anteriorly, surface dulled by fine tessellation. Propodeum impunctate medially, irregularly and weakly rugulose laterally, surface dulled by tessellation; posterior surface impunctate medially, relatively sparsely punctate laterally, moderately shiny. Metasomal tergum 1 with basal area with small round punctures separate mostly by two to three puncture widths in median half, crowded laterally; apical area impunctate; surface dull, reticularly shagreened. Terga 2–4 with basal area and interband zone with small round indistinct punctures, apical area with sparse barely perceptible punctures, surface dulled by distinct tessellation; apical rims often shiny. Pygidial plate large, V-shaped with rounded apex. Sterna 2–5 with basal areas with punctures separated by one to two or more puncture widths, apical areas impunctate, surfaces moderately shiny to shiny, shagreening weak.

**Vestiture.**- Metasomal terga 2 and 3 without apical fasciae, tergum 4 with apical fascia but hairs sparse so fascia barely hiding surface, terga 5 and 6 at least medially with hairs yellow to ferruginous. Scopal hairs long, largely simple, some hairs along posterior margin with one row of short branches, all hairs with rachises roughened, not smooth. Sternal hairs yellow to white laterally, sterna 5 and 6 often deeper yellow to ferruginous.

**MALE. Measurements and Ratios.**- N = 20; length, 10–13 mm; width, 3–4 mm; wing length, M =  $3.28 \pm 0.130$  mm; hooks in hamulus, M =  $12.8 \pm 0.156$ ; flagellar segment 2/1, M =  $4.14 \pm 0.040$ .

**Integumental Color.**- Black except as follows: mandible as in female; clypeus usually with small subapical yellow macula half or less length of clypeus and not attaining lateral margins, often only half width of clypeus; mandible base, labrum, and flagellum black; tegulae and wings as in female; metasomal terga piceous with apical areas reddened and apical rims often translucent and dark red;

sterna piceous except apical areas translucent red; distitarsi dark brown to black; tibial spurs testaceous.

**Structure.**- Head sculptured as in female; maxillary palpus 6-segmented, segmental ratio about as 0.9:1.0:0.8:0.6:0.4:0.4. Thoracic sculpture as in female but mesocutum with posteromedian area with punctures often sparse, separated by two or more puncture widths and scutellum apicomediaally with punctures often separated by one to two puncture widths. Metasomal tergum I as in female but apical area with weak sparse punctures; terga 2–5 similar to female terga 2–4. Pygidial plate narrow, twice as long as broad at base, without subapical lateral notches, apex rounded. Sterna 2–5 similar to female but basal area punctures separated largely by two to three or four puncture widths and surface often dull, tessellate. Sternum 6 (Fig. 151) distinctive, with subapical lateral carinae lamellate, ending apicomediaally in a small but distinct tooth; lateral margin of sternum at level of base of carina extended laterally in a long narrow tooth.

Terminalia (Figs. 151–155) as illustrated, not resembling previously described species.

**Vestiture.**- Generally pale ochraceous to ochraceous, darker on vertex and thoracic dorsum; metasomal terga without apical or basal fasciae; sternal hairs long, sparse; sternum 6 almost glabrous, with extremely short pale hairs at extreme base.

**Type Material.**- The holotype female (CAS Type No. 15,551) of *Tetraloniella davidsoni* was collected in Los Angeles, California, by Dr. A. Davidson. The holotype male (AMNH) of *hirsutior* was collected at Banning, Riverside Co., by Dr. A. Davidson.

**Distribution.**- *Tetraloniella davidsoni* is known only from Baja California del Norte and California north to Sonoma County (Fig. 9). It has been taken from March 10 through May 29 but chiefly from mid-March to mid-April. In addition to the type material, 23 females and 45 males were examined from localities listed below.

**México.**- BAJA CALIFORNIA DEL NORTE: Rosario de Arriba (and vicinity); Ensenada; Meling Ranch (8 mi. W); Rosarito Beach (and 5 mi. S); San Quintin.

**United States.**- CALIFORNIA: Banning, Riverside Co.; Berkeley Hills, Alameda Co.;

Coalinga (12 mi. W), Fresno Co.; El Verano, Sonoma Co.; Los Angeles, Los Angeles Co.; Puente Hills; Redondo Beach, Los Angeles Co.; San Diego Co.; Whittier, Los Angeles Co.

**Floral Records.**- The floral visits of this species are too poorly recorded to be able to assess its floral preferences. It has been collected from flowers of the species listed below.

*Argemone* sp.; *Convolvulus occidentalis*; *Encelia* sp., *E. californica*; *Layia* sp.; *Ranunculus californicus*.

***Tetraloniella imitatrix***  
**(Cockerell and Porter)**

*Xenoglossodes imitatrix* Cockerell and Porter, 1899, Ann. Mag. Nat. Hist., Ser. 7, 4:407–408; Cockerell, 1903, Ann. Mag. Nat. Hist., ser. 7, 12:449; 1904, Ann. Mag. Nat. Hist., ser. 7, 14:24; 1910, Univ. Colorado Stud., 7:195.

*Tetraloniella imitatrix* is a medium-sized bee, the female of which has metasomal terga 3–6 covered by pale pubescence (as in *ericarpi* and *wilmattae*) but lacks the pale markings on the mandibular bases, labrum, and clypeus. Both sexes have a large pterostigma as described below and the antennae are of moderate length and dark brownish red to black beneath. The female scopal hairs are highly plumose but the branches are short and the general appearance is of less plumosity. The male has white or cream-colored clypeus, labrum, and mandibular bases; dark antennae with a long first flagellar segment and sternum 6 without lateral teeth.

**FEMALE. Measurements and Ratios.**- N = 20; length, 9–12 mm; width, 3.5–5.0 mm; wing length, M = 3.16±0.253 mm; hooks in hamulus, M = 12.15±0.167; flagellar segment 1/2, M = 1.85±0.027.

**Integumental Color.**- Integument piceous except as follows: mandible with apical half dark red smeared with gold; flagellum below dark reddish brown near tip, mostly black; tegulae hyaline, red to yellow; wing membranes hyaline, colorless, veins dark reddish brown to black; terga 1–5 with apical areas with at least apical half of each hyaline,

colorless to slightly yellow; sterna with narrow apical areas hyaline, colorless; disitarsi dark red to reddish brown; tibial spurs ochraceous.

**Structure.**- Clypeus as in *eriocarpi* but surface often moderately shagreened at least posteriorly. Supraclypeal area with punctures smaller, often sparser, surface usually shagreened. Face above antennal fossae as in *eriocarpi*. Vertex laterally as in *eriocarpi* but minute punctures often separated by one to two puncture widths, surface shiny or slightly dulled by fine shagreening. Genal area and galea as in *eriocarpi*. Maxillary palpal segments usually 5, occasionally with a short sixth segment, ratio of about 1.0:0.9:0.8:0.3:0.2 or with a 0.1 to 0.2 sixth segment added. Flagellar segment 2 almost always distinctly longer than maximum width, rarely about as wide as long, all segments longer than broad. Mesoscutum sculptured as in *eriocarpi* but posteromedian punctures usually slightly more crowded; scutellum similar but punctures smaller and usually more crowded. Propodeum as in *eriocarpi*. Mesepisterna with punctures usually crowded, small, shallow, surface dulled by fine shagreening; a few specimens from New Mexico with punctures deeper and shagreening present but finer. Forewing with pterostigma large, usually distinctly longer than prestigma. Terga 2–4 sculptured as in *eriocarpi*, tergum 1 usually with apical area with basal half or slightly less punctate. Pygidial plate and sterna as in *eriocarpi*.

**Vestiture.**- Generally pale ochraceous to ochraceous, dorsum of thorax and vertex slightly darker. Metasomal tergum 2 with pale basal pubescent band usually separated from apical pale band by a zone of relatively simple, erect to suberect, short hairs not hiding surface of integument (reduced to about half width of tergum in two specimens); terga 3–6 completely covered by highly plumose pale pubescence. Sternal hairs red to white or pale ochraceous. Scopal hairs highly plumose, branches of hairs short, white to extremely pale ochraceous, inner surfaces tarsi red to orange.

**MALE. Measurements and Ratios.**- N = 17; length, 8–11 mm; width, 2.5–3.5 mm; wing length, M = 2.95±0.248 mm; hooks in hamulus, M = 11.18±0.176; flagellar segment 2/1, M = 3.46±0.57.

**Integumental Color.**- Integument black except as follows: clypeus, base of mandible, and labrum entirely pale cream-colored to white, not yellow; supraclypeal area occasionally with small white macula; flagella dark brownish red to black below, dark above; tegula hyaline, yellow; tarsi brownish red to red; tibiae dark brown; terga with apical areas hyaline, colorless to slightly yellow.

**Structure.**- Head sculptured much as in female but clypeus and supraclypeal area usually not shagreened; maxillary palpus with five segments in ratio of about 1.0:0.8:0.8:0.5:0.3; antennae of moderate length, barely reaching metasomal tergum 1, second flagellar segment equals three to four times length of first segment, segments round in cross-section, not at all crenulate. Mesoscutum with posteromedian area with deep punctures separated mostly by half to one puncture width, peripherally and anterior third or so with punctures slightly smaller and separated mostly by half a puncture width or less, surface shiny; scutellum similar but punctures small. Mesepisternum with punctures small, shallow (but not as shallow as in most females), surface moderately dulled by fine shagreening. Propodeum much as in female. Pterostigma large as in female. Metasomal terga with discs and basal area punctures small, crowded, surfaces moderately dulled by fine shagreening; apical areas similar but punctures only in basal half. Tergum 7 with lateral arm of postgradulus carinate, without tooth. Pygidial plate about one and one-half times as broad at base as median length, usually with weak subapical lateral notches. Sternum 6 (Fig. 156) relatively flat, without lateral teeth, with oblique carinae on each side following apical margin and turned anteriorly near base (a little more than half their length).

Terminalia (Figs 156–160) similar to *jaliscoensis* (Figs. 121–125) but sternum 7 (Fig. 157) with apicomedian plates pointed apically, with sparse hairs and sternum 8 (Fig. 158) with moderately abundant, short hairs on apical margin. Gonostylus and genital capsule as drawn (Figs. 159 and 160).

**Vestiture.**- White to pale ochraceous, slightly darker on thoracic dorsum and vertex; tergum 1 usually with apical pale pubescent fascia complete, although weak medially; tergum 2 usually with basal and apical pale

bands separated by disc with short, suberect, relatively simple hairs not hiding surface, but occasionally with plumose pubescence virtually over entire tergum; terga 3–6 covered with pale plumose pubescence, but apical fasciae often recognizable by longer hairs; sterna with relatively sparser, suberect long hairs, more plumose and much longer laterally; sternum 6 with little or no vestiture.

**Type Material.**— The holotype female (USNM No. 20,232) of *Tetraloniella imitatrix* (Cockerell and Porter) was collected by A. Gorlick at Las Vegas, New Mexico, August 9, from flowers of *Sphaeralcea lobata*.

**Remarks.**— Cockerell (1904, p. 24) reports a female from Glorietta, New Mexico, which has a red stripe on the mandibles. The author has not seen this specimen, but the red mandibular stripe indicates to the author some other species, perhaps *eriocarpi* or *spissa*, or a female in which the mandibular golden maculae is worn away revealing the ferruginous apical half of the mandible.

**Distribution.**— *Tetraloniella imitatrix* is known from Arizona, New Mexico, and México as far south as the Distrito Federal (Fig. 5). It has been collected from July 8 through October 18. In addition to the holotype, a total of 54 females and 245 males were examined from localities listed below.

**México.**— COAHUILA: Jiménez (16 km. N.); Saltillo. DISTRITO FEDERAL: Chapingo (3 km. S). DURANGO: Bermajillo; Pedriceña; Yerbani (Cuencame District); Reserva de Biosfera Mapimi (62–65 km. E of Ceballos). HIDALGO: Huichipán (7 mi. SW). NUEVO LEON: Galeana Junction (5 mi. E); Saltillo (41 mi. S). SAN LUIS POTOSÍ: San Luis Potosí (12.5 mi. NW). SONORA: Navajoa (5 mi. E). VERACRUZ: Jalapa. ZACATECAS: Fresnillo (9 mi. S).

**United States.**— ARIZONA: Flagstaff (Walnut Canyon); Sanders (22.7 mi. S), Apache Co.; Springerville, Apache Co.; St. Johns (14.5 mi. N), Apache Co. NEW MEXICO: Albuquerque; High Rolls, Otero Co.; Las Vegas (and 7 mi. S); Omega; Roswell (5 mi. S); Three Rivers (7 mi. S), Otero Co.

**Floral Records.**— *Tetraloniella imitatrix* has been collected from flowers of the plants listed below. It has been collected most fre-

quently from malvaceous plants and may be an oligolege of mallows, but not enough data are available to be confident of this.

*Arabis* sp.; *Chamaesaracha* sp.; *Dyssodia* sp.; *Malvella leprosa*; *Sphaeralcea* sp., *S. angustifolia*, *S. lobata*.

### *Tetraloniella sphaeralceae*, new species

This species, known from only 14 specimens, is similar to *imitatrix* in the long pterostigma and long first flagellar segment. The female of *sphaeralceae* differs from that of *imitatrix* by the pale ochraceous vestiture of the metasoma and the coarse black or dark brown hairs of the inner surfaces of the hind basitarsi. The male can be recognized by the white clypeus, labrum, and mandibular maculae, the triangular white mark on the supraclypeal area and sternum 6 having a distinct rounded tooth on the lateral margin (not on the apicolateral carina as in *eriocarpi*).

**FEMALE. Measurements and Ratios.**— N = 7; length, 12–13 mm; wing length, 4.0–4.5 mm; wing length, M = 3.42±0.321 mm; hooks in hamulus, M = 13.00±0.297; flagellar segment 1/2, M = 1.84±0.039.

**Integumental Color.**— Black except as follows: mandible with apical half with golden macula (unless worn); flagella dark blackish brown to black below; wing membranes slightly infumate, veins dark brown to black; tegula with apical half or more hyaline, yellow; metasomal terga piceous with apical rims hyaline, yellow; sterna 2–5 with apical areas hyaline, piceous basally; distitarsi dark brown; tibial spurs testaceous.

**Structure.**— Clypeus with large deep punctures separated mostly by less than half a puncture width, slightly sparser postero-medially, surface shiny, slightly shagreened only posteriorly. Supraclypeal area with smaller punctures, sparse medially, crowded laterally, surface dull, densely shagreened. Face above antennal fossae with small deep crowded punctures, surface shiny. Vertex laterally and genal area with minute punctures separated largely by one to two or more puncture widths, surfaces shiny, unshagreened. Galea shiny, unshagreened above; maxillary

palpal segments 6, ratio about as 1.0:0.9:0.6:0.4:0.2:0.2. Flagellar segment 2 distinctly longer than broad, all flagellar segments longer than broad. Mesoscutum with round deep punctures separated mostly by half a puncture width, sometimes slightly sparser in posteromedial area, surface shiny, unshagreened. Scutellum similar but punctures slightly smaller and more crowded. Propodeum with dorsal area with elongated punctures, surface dull, tessellate. Mesepisternum with small shallow punctures separated by half to one puncture width, surface dull, shagreened. Forewing with pterostigma large, usually distinctly longer than prestigma. Terga 2–4 sculptured much as in *eriocarpus*; tergum 1 with apical area with distinct small punctures and fine shagreening, narrow apical rim impunctate. Pygidial plate V-shaped with rounded apex. Sterna much as in *eriocarpus*.

**Vestiture.**— Generally pale ochraceous (not as yellow as in most *imitatrix* females), dorsum of thorax slightly darker. Metasomal tergum 2 with pale basal tomentum separated from apical pale band by interband zone of relatively sparse and simple, appressed to subappressed, pale hairs. Terga 3–6 completely covered by highly plumose pale, slightly yellowish pubescence. Sternal hairs pale ochraceous except sterna 2–5 along apical margin with long plumose hairs white. Scopal hairs highly plumose, branches short, white to pale ochraceous; inner surfaces basitarsi dark brown to black.

**MALE: Measurements and Ratios.**— N = 7; length, 10–12 mm; width, 3.0–3.5 mm; wing length, M = 3.12±0.356 mm; hooks in hamulus, M = 11.43±0.297; flagellar segment 2/1, M (N=6) = 3.64±0.223.

**Integumental Color.**— Black except as follows: clypeus, base of mandible, and entire labrum white; supraclypeal area with triangular white macula; flagella black below; tegulae, wing membranes, and veins as in female; metasomal terga with apical areas hyaline, colorless to pale yellow; distitarsi reddish brown to brown; tibial spurs testaceous.

**Structure.**— Head sculptured as in female but clypeal punctures smaller; maxillary palpal segments 6 in ratio about as

1.0:0.9:0.6:0.4:0.3:0.2. Antennae of moderate length, barely or not reaching first metasomal tergum, round in cross-section, not crenulate, penultimate segment about four times as long as minimum width, second flagellar segment about four times as long as minimum length of first or slightly less. Thoracic sculpturing as in female but mesoscutum with posteromedian area sometimes with punctures separated by one or more puncture widths. Metasomal terga 2–5 with small round punctures separated mostly by less than one puncture width, apical areas punctate except in narrow rims; sterna 2–5 with apical areas impunctate; basal areas relatively sparsely punctate. Sternum 6 (Fig. 161) with apicolateral carina not toothed apically but distinctly laminate; margin of tergum forming rounded angle laterally at level of anterior ends of carinae.

Terminalia (Figs. 161–165) similar to *imitatrix* (Figs. 156–160) but note that sternum 7 (Fig. 162) with apicomedial plates large but not as apically pointed and sternum 8 (Fig. 163) almost hairless apically. Gonostylus and genital capsule as drawn (Figs. 164 and 165).

**Vestiture.**— Pale ochraceous to white, slightly darker on thoracic dorsum and vertex; tergum 1 with thin, complete pale apical fascia; terga 2–6 with broader, complete fasciae, hairs basal to fasciae pale ochraceous but sparser and fasciae distinct; sterna with relatively sparse long, suberect hairs, more plumose and longer laterally; sternum 6 nearly glabrous.

**Type Material.**— The female holotype (SECK), male allotype (SECK), and 3 female and 2 male paratypes of *sphaeralceae* were collected 20 km. W of Bisbee, Cochise Co., Arizona, from flowers of *Sphaeralcea* sp. An additional (see map, Fig. 5) male paratype was taken with this series but has no floral data attached. In addition, 3 female and 3 male paratypes were collected as follows:

**United States.**— NEW MEXICO: Three Rivers, Otero Co. (7.5 mi. S)—1 female from *Sphaeralcea* sp., September 9, 1961, P.D. Hurd. White Sands Proving Grounds, Otero Co. (4000 ft. elev.)—1 male, September 23, 1950, W. Gertsch and M. Cazier.

**México.**- COAHUILA: Saltillo—1 female, August 18, 1979, R. Villegas. DURANGO: Pedricena—1 female from *Sphaeralcea* sp., October 18, 1968, G.E. Bohart. Bermejillo—1 male (from a *Helenium*like composite), October 5, 1966, G.E. and A.S. Bohart. NUEVO LEON: Galeana Junction (5 mi. E)—1 male, September 16–17, 1976, J.A. Chemsak, J.A. Powell, A. and M. Michelbacher.

***Tetraloniella pennata*, new species**

This moderate-sized species is related to *T. imitatrix*, which it resembles closely. The female of *pennata* can be distinguished from that of *imitatrix* by its much more plumose scopal hairs, the branches of which are two or three times as long as in *imitatrix*, and by the lower surfaces of flagellar segments 3–10 being red to yellowish red rather than dark brown to black. The male of *pennata* is distinctive in the short antennae and long first flagellar segment as described below and the pale lower surface of the flagellum. This species superficially resembles *T. trabeata*, described above, because of its general rust-colored vestiture

**FEMALE. Measurements and Ratios.**- N = 5; length, 10–12 mm; width, 4.0–4.5 mm; wing length, M = 3.41±0.308 mm; hooks in hamulus, 12–13; flagellar segment 1/2, M = 1.92±0.044.

**Integumental Color.**- Black except as follows: mandible as in *imitatrix*; flagellar segments 1 and 2 blackish brown below, remainder red to yellow below; tegulae hyaline, red; wing membranes hyaline, veins red to reddish brown; metasomal terga with apical areas translucent to hyaline, yellow to red; sterna 2–5 with basal areas more or less red; apical areas hyaline, yellow; hind legs with distitarsi, often basitarsi tibiae and femora ferruginous; middle and forelegs with less ferruginous integument.

**Structure.**- Clypeus relatively flat, evenly rounded from side to side, punctures coarse, separated mostly by half a puncture width throughout, surface shiny; oculoclypeal minimum distance extremely short. Supraclypeal area with moderately large, round punctures throughout, separated mostly by half to one

puncture width, surface moderately dulled by fine shagreening. Face above antennal fossae sculptured similar to supraclypeal area but shinier, shagreening weak to absent. Vertex with lateral flattened areas minutely punctate, shiny. Genal area in profile with minute sparse punctures, surface shiny, unshagreened, below mandibles more coarsely punctate. Galea shiny, unshagreened above; maxillary palpal segments 5, ratio about as 1.0:0.9:0.7:0.4:0.4. Mesoscutum with relatively small, round, close-set punctures separated largely by half a puncture width or less except slightly sparser in small posteromedian area, surface shiny, unshagreened; scutellum similar. Propodeum with dorsal surface punctatorugose, surface dulled by fine shagreening; posterior surface impunctate medially to closely punctate laterally, surface dulled by reticular shagreening; posterior surface delimited from lateral by a blunt, low ridge most of height of propodeum and a change in intensity of punctation. Mesepisterna with small round crowded punctures, surface dulled by fine shagreening. Metasomal terga punctate as in *imitatrix*. Pygidial plate V-shaped with rounded apex. Sterna 2–5 sculptured as in *imitatrix*.

**Vestiture.**- Generally golden fulvaceous except metasomal tergum 1 has apical area with minute brown hairs and tergum 2 has interband zone with short, relatively simply dark brown hairs at least medially. Vestiture arranged as in *imitatrix* except scopal hairs each with long branches giving the hairs a more distinctly feathery appearance.

**MALE. Measurements and Ratios.**- N = 1; length, about 10 mm; width, about 3 mm; wing length, 3.00 mm; hooks in hamulus, 12; flagellar segment 2/1, 2.36.

**Integumental Color.**- Black except as follows: labrum white; clypeus yellow except notches at tentorial pits; mandible with small basal pale macula, otherwise as in female; flagellar segments 2–11 yellowish red below, dark reddish brown above, segment 1 dark brown; tegulae, wings, metasoma as in female; distitarsi red.

**Structure.**- Sculpture of head as in female, clypeus with coarse punctures more evident than usual in males; flagellar segment 1 with minimum length equal to almost half

maximum length of segment 2, penultimate segment less than three times as long as wide, antennae short, barely reaching metasomal tergum 1 in repose. Sculpture of thorax much as in female but punctures usually slightly sparser in mesoscutal posteromedial area and on mesepisterna. Metasomal tergum 1 with basal area with small round punctures separated largely by one to two puncture widths and apical area with smaller dense punctures, surface dulled by fine shagreening; terga 2–5 similar but interband and basal area punctures more crowded, mostly separated by slightly more than one puncture width, surface moderately shiny, finely shagreened. Pygidial plate with blunt tip about half as broad as extreme base, sides convex, without clearly marked apicolateral notches, surface hidden by plumose hairs, but punctate. Metasomal sterna 2–5 with basal areas with punctures separated by half (apically) to two or three (mediobasally and basally) puncture widths, apical areas impunctate, surfaces shiny, weakly shagreened. Sternum 6 (Fig. 166) with apicolateral carinae distinct, straight, not toothed, surface shiny, weakly punctate at extreme base.

Terminalia (Figs. 166–170) similar to *distata* (Figs. 146–150) but sternum 7 (Fig. 167) with apicomedial plates simple, rectangular, hairless; sternum 8 (Fig. 168) with sparse hairs apically. Gonostylus and genital capsule as drawn (Figs. 169 and 170).

**Vestiture.**—Color generally fuscous as in female; metasomal tergum 2 with complete apical pale fascia distinct from erect, less plumose vestiture of interband zone; terga 3–5 with apical pale fasciae scarcely distinguishable from appressed, plumose hairs of interband and basal areas; sternal hairs pale; hind basitarsi with inner surface yellow.

**Type Material.**—The holotype female (LACM) and 1 paratype female of *Tetraloniella pennata* were taken 31 km. N of Matzatlán, Sinaloa (at 76 m. elev.), México, from flowers of *Antigonon leptopus*, September 29, 1976 by C.D. George and R.R. Snelling. The allotype male (LACM) and 1 paratype female were taken at the same time and place but lack floral information. Two additional female paratypes from México are

as follows: SONORA: Minas Nuevas (3 mi. W at 450 m. elev., near Alamos)—1 female, September 17, 1977, E. Schlinger (malaise trap). Navajoa (5 mi. E)—1 female September 9, 1970, R.M. Bohart (see map, Fig. 6).

***Tetraloniella arizonica* (Cockerell)**

*Xenoglossodes arizonica* Cockerell, 1937,  
American Mus. Novs. No. 948, p. 7.

This moderately large species is related to *pomona*, *distata*, and *davidsoni* but differs in the strongly bowed out, shiny clypeus with a minimal oculoclypeal space in both sexes. In addition, the maxillary palpi are 5-segmented in both sexes, which is unusual for this group of species. In general it is most like *pomona* but the shiny clypeus and other areas of the integument and the paler vestiture as described below will distinguish *arizonica*. The female has not been previously described.

**FEMALE. Measurements and Ratios.**—N = 1; length, about 13 mm; width, about 4.5 mm; wing length, about 3.26 mm; hooks in hamulus, 15; flagellar segment 1/2, 2.45.

**Integumental Color.**—Black except as follows: mandible with apical half ferruginous with golden stripe unless worn; tegulae piceous except summits translucent brown; wing membranes hyaline, colorless, veins dark blackish brown; metasomal terga piceous; sterna 2–5 piceous except apical areas hyaline, yellow; distitarsi ferruginous; tibial spurs testaceous.

**Structure.**—Clypeus strongly protuberant, oculoclypeal minimum space distinctly less than minimum width of first flagellar segment; with coarse elongate punctures, sparser near base, surface shiny, unshagreened. Galeae long, upper surface shiny, unshagreened, hairs sparse; maxillary palpa not visible. Flagellar segments elongate, last segment about one and one-half times as long as broad; segments 3–9 one and one-third to one and one-half times as long as broad; segment 2 as long as broad and segment 1 about one and one-half times as long as segment 2. Supraclypeal area with small round crowded punctures, surface shiny. Vertex with flattened lateral areas with minute round punctures separated mostly by half to one puncture width, surface moderately

dulled by fine shagreening. Genal area narrower than eye in profile, with minute crowded punctures, surface shiny, unshagreened or weakly so. Mesoscutum with small round punctures separated mostly by half a puncture width or slightly less except in small postero-median area where some spaces equal one puncture width, surface shiny, unshagreened. Scutellum similar but punctures sparse only near apical margin. Propodeum with dorsal surface with small obscure punctures separated by one puncture width or more except in impunctate midline, surface dulled by fine tessellation, posterior surface impunctate medially, with small punctures laterally, surface moderately shiny, finely shagreened. Mesepisternum with round punctures separated by half to one puncture width, surface moderately dulled by reticular shagreening. Metasomal tergum 1 with basal area with minute punctures separated by 2 to 3 puncture widths medially, crowded laterally, surface dulled by fine shagreening, apical area impunctate, moderately shiny. Terga 2–4 with basal, interband, and apical areas with minute punctures separated by 2 to 3 puncture widths, surfaces moderately dulled by fine shagreening basally, shiny in apical areas. Pygidial plate V-shaped with acute apex, surface shiny. Sterna 2–5 with basal areas with small punctures crowded laterally and sparse basomedially; apical areas narrow, impunctate, moderately dulled by fine shagreening.

**Vestiture.**—White to ochraceous except as follows: metasomal tergum 1 with apical area with short dark brown hairs apicolaterally; terga 2–4 with white tomentum at extreme bases, interband zones largely with erect to suberect black to dark brown hairs; apical areas with short dark brown, relatively simple hairs except narrow apical fringe of short, plumose white hairs, the last becoming progressively broader posteriorly; tergum 5 with chocolate-brown hairs except large white lateral patches; tergum 6 with hairs dark brown. Sterna 2–3 with apical long hairs white, basal hairs ochraceous; sterna 4–5 with basal hairs reddish brown; entire sternum 6 dark brown; scopal hairs long, largely simple but roughened, a few weakly plumose hairs along posterior margin as in  *davidsoni* ; inner surfaces tarsi yellow.

**MALE. Measurements and Ratios.**— $N = 2$ ; length, about 13 mm; width, about 4 mm; wing length, 3.40–3.42 mm; hooks in hamulus, 14–15 mm; flagellar segment 2/1, 3.07–3.38.

**Integumental Color.**—Black except as follows: mandible as in female; labrum entirely white; clypeus entirely cream-colored; flagellum black below; wing membranes, veins, and tegulae as in female; metasomal terga black basally, apical areas piceous or dark reddish brown; sterna as in female; distitarsi dark reddish brown to ferruginous.

**Structure.**—Clypeus strongly protuberant, with sparse small punctures, surface shiny, unshagreened; oculoclypeal minimum space short (shorter than in female). Galea shiny above, sparsely punctate; maxillary palpal segments 5, in ratio of about 0.9:1.0:1.0:0.6:0.6. Supraclypeal area impunctate medially, minutely punctate laterally, surface shiny. Sculpture of head otherwise as in female. Antennae very long, reaching metasomal tergum 3 in repose; flagellar segment 2 at least three times as long as minimum length of segment 1; segments 3 or 4 to 10 weakly nodose. Mesoscutum as in female but moderately dulled by reticular shagreening; scutellum as in female but shiny only anteriorly; mesepisterna as in female; propodeum as in female but dorsal surface obscurely rugulose laterally as well as minutely punctate. Metasomal terga 1–6 sculptured much as in female terga 1–5 but interband zone with punctures slightly sparser. Pygidial plate about one and one-half times as long as broad, blunt-tipped, with distinct apicolateral notches, surface with crowded punctures but moderately shiny. Sterna 2–5 with basal areas sparsely punctate, apical areas impunctate, surfaces shiny, weakly shagreened. Sternum 6 (Fig. 171) with apicolateral carinae ending abruptly near midline sulcus but not toothed; lateral margins of sternum not strongly toothed as in  *davidsoni* , but with weakly formed, rounded teeth; strongly shouldered laterally along apical margin.

Terminalia (Figs. 171–175) similar to  *helianthorum*  (Figs 126–130) but sternum 7 (Fig. 172) with apicomedian plates extremely extended into long narrow fingerlike projections with few apical hairs; sternum 8 (Fig.

173) with sparse hairs. Gonostylus and genital capsule as drawn (Figs. 174 and 175).

**Vestiture.**- Generally white except as follows: metasomal tergum 1 with long white hairs; terga 2-4 similar to female terga 2-4 but without apical white fringes and interband zones with sparse white tomentum; sternum 5 sparsely covered by white tomentum; sternum 6 with long white hairs. Sterna 2-3 with long, sparse, white hairs; sterna 4-5 with long white hairs except apicomediaally becoming reddish brown; sternum 6 with abundant short white hairs basally and minute pale hairs along apical margin (apical to apicolateral carinae).

**Type Material.**- The holotype male of *Tetraloniella arizonica* (AMNH) with 3 paratypes were collected west of Dome, Yuma Co., Arizona, from flowers of *Lycium* sp., by Cockerell, Hobart, and Dingess.

**Distribution.**- This species has been collected only twice since the type material was taken, as indicated below (see map, Fig. 5):

ARIZONA: Buckeye, Maricopa Co.—11 females on *Lycium torreyi*. CALIFORNIA: Palo Verde, Imperial Co.—1 female and 2 males from flowers of *Lycium* sp., March 7, 1947, E.G. Linsley.

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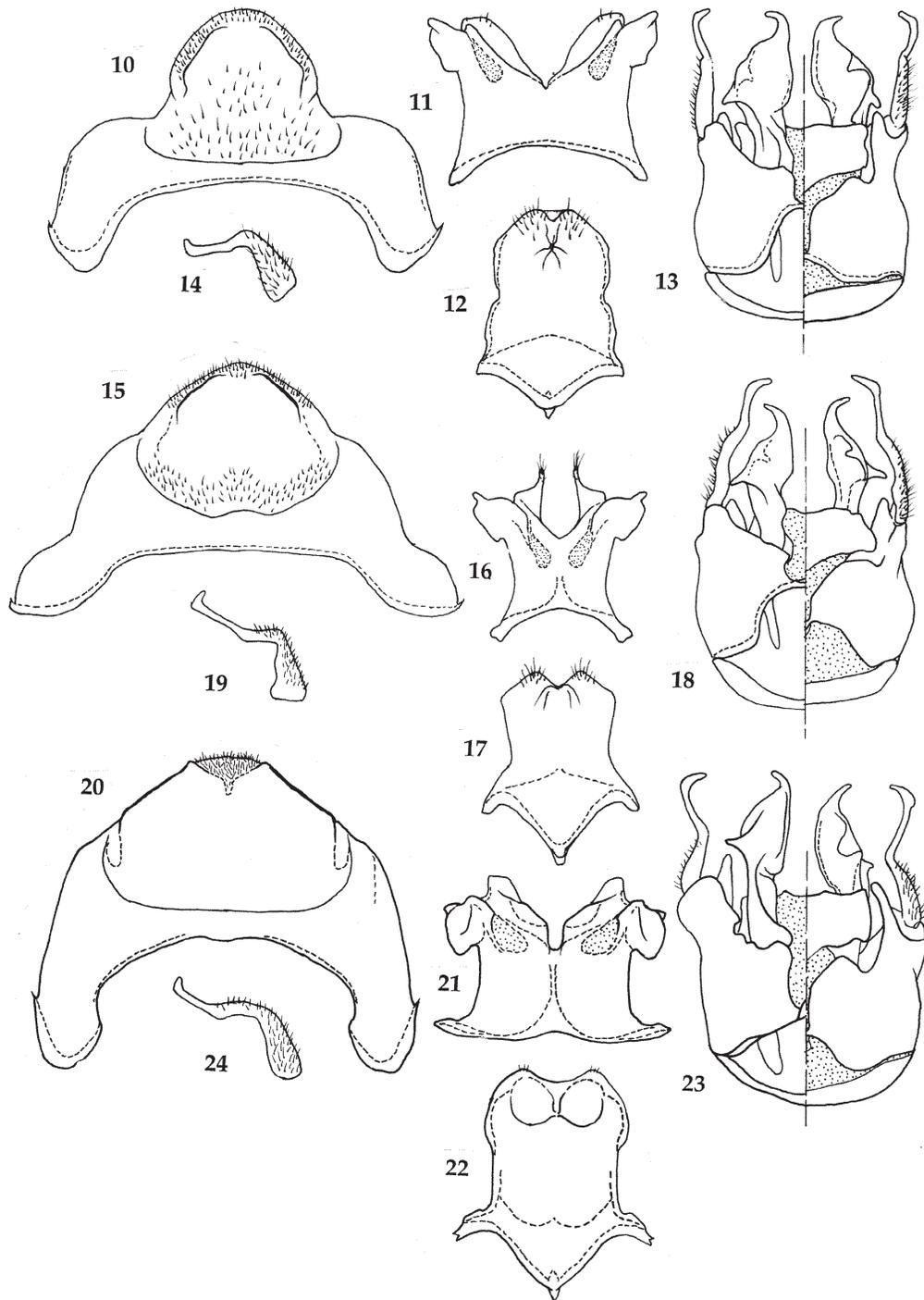
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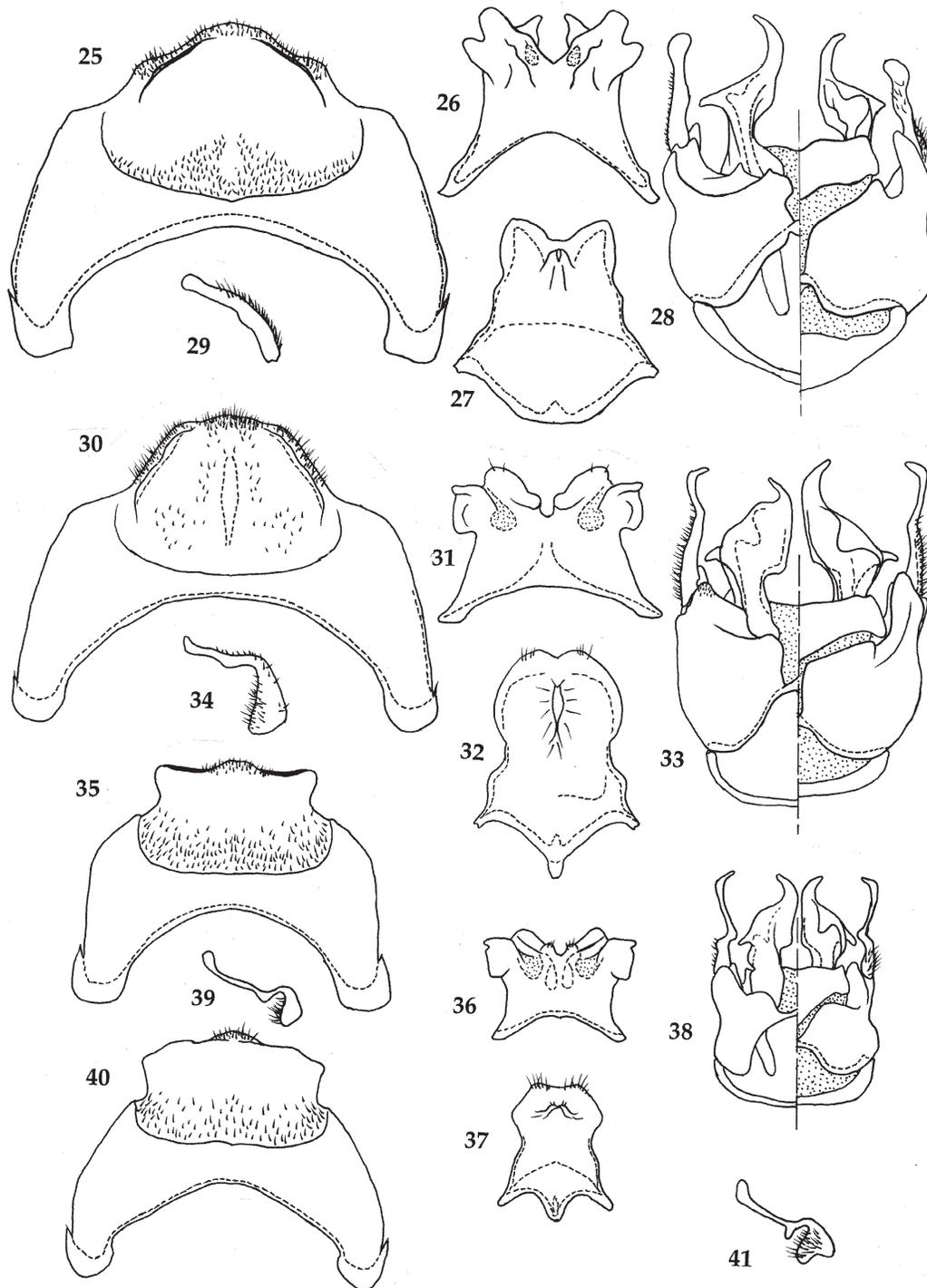
### Index of Scientific Names

This index consists of a list of all significant Latin names of generic or specific standing currently being used, placed in synonymy, and listed in alphabetical order so that the reader can readily find each name. Specific epithets in italics are currently recognized names, those in standard letters are here considered to be synonyms. The numbers in bold face refer the reader to the page where the name appears before the description of the species or in the synonymy listed on that page. The numbers in plain text refer to the pages of the keys to species or to the page where the name appears on a map.

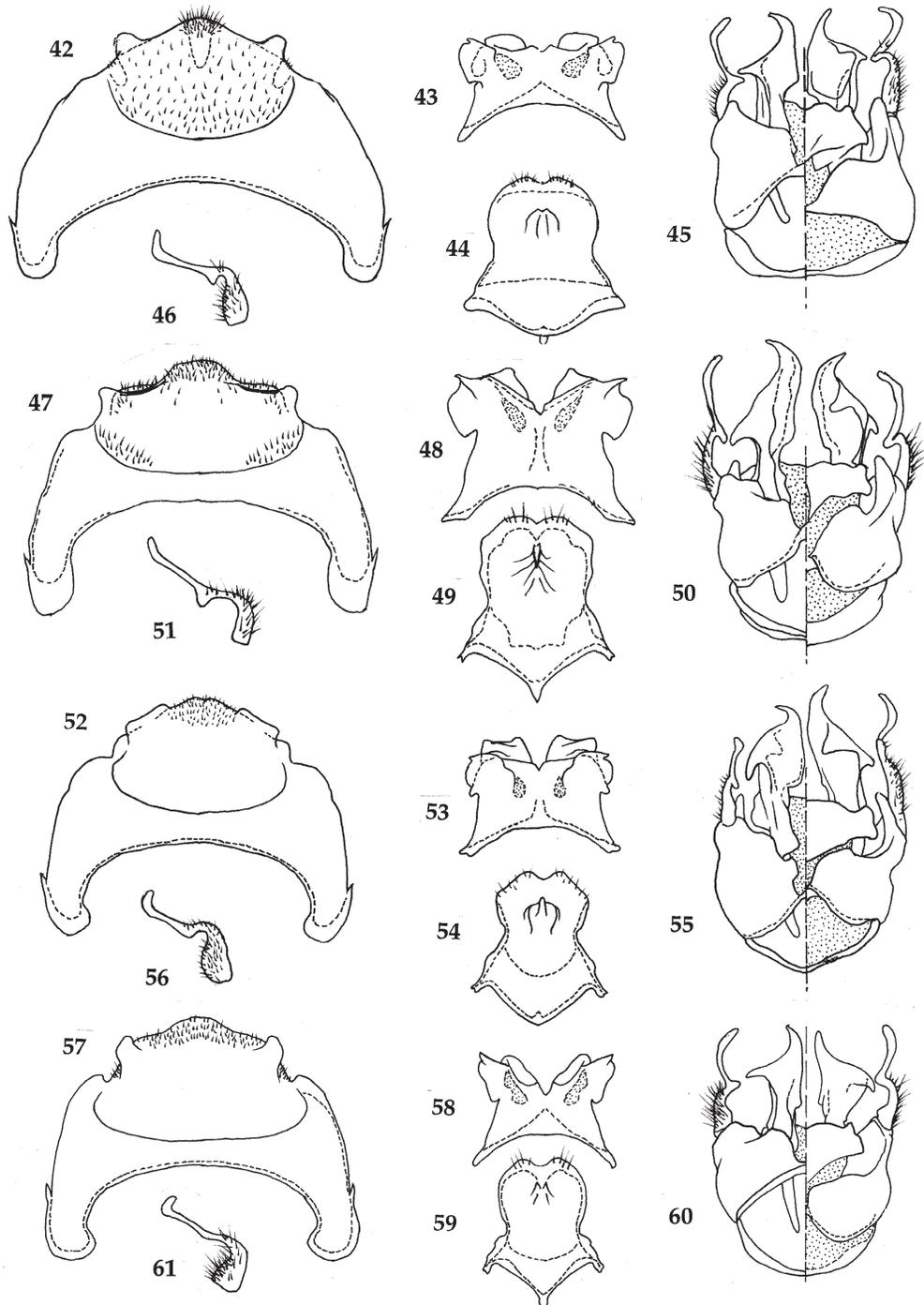
- albata*, new species—pp. 68, 72, 77, 94, **107**.  
*albomarginalis* Cockerell—p. 96.  
*arizonica* (Cockerell)—pp. 70, 75, 97, **146**.  
*ayala*, new species—pp. 71, 75, **87**, 89.  
*balluca*, new species—pp. 70, 74, **101**, 103.  
*bishoppi* Cockerell—p. 78.  
*cacuminis*, new species—pp. 72, 76, 128, **133**.  
*crenulaticornis* (Cockerell)—pp. 73, 77, 83, **114**.  
*cressoniana* (Cockerell)—pp. 73, 77, 103, **112**.  
*davidsoni* (Cockerell)—pp. 69, 74, 128, **139**.  
*distata*, new species—pp. 69, 75, 111, **137**.  
*donata*, new species—pp. 72, 76, 80, **115**.  
*eriocarpi*, (Cockerell)—pp. 70, 75, **88**, 89.  
*fastigiata*, new species—pp. 72, 73, 76, 111, **118**.  
*flagellicornis* (Smith)—pp. 73, 77, 111, **121**.  
*flavifasciata* (Cockerell)—pp. 77, 94, **132**.  
*fulvotecta* (Cockerell)—pp. 70, 74, **95**, 97.  
*fuscotincta* Cockerell—p. 114.  
*galerensis* Cockerell—p. 115.  
*habrocoma* Cockerell—p. 130.  
*helianthorum* (Cockerell)—pp. 72, 78, 80, **130**.  
*hirsutior* Cockerell—p. 139.  
*imitatrix* (Cockerell and Porter)—pp. 69, 71, 76, 97, **141**.  
*incana*, new species—pp. 70, 94, **100**.  
*jaliscoensis*, new species—pp. 73, 77, 99, **127**.  
*lippiae* (Cockerell)—pp. 71, 77, **80**, 83.  
*maculata* Cockerell—p. 114.  
*michoacanensis*, new species—pp. 73, 76, **125**, 128.  
*minutilla*, new species—pp. 72, 78, 80, **120**.  
*neotomae* Cockerell—p. 89.  
*noguera*, new species—pp. 73, 76, 99, **123**.  
*ochraea*—pp. 72, 77, 103, **110**.  
*paenalbata*, new species—pp. 72, 75, **109**, 111.  
*pallidicauda* Cockerell—p. 93.  
*parksii* Cockerell—p. 89.  
*pennata*, new species—pp. 69, 75, 99, **145**.  
*perconcinna*, new species—pp. 71, 74, **96**, 99.  
*pimella* Cockerell—p. 89.  
*pomona* Cockerell—pp. 69, 76, 103, **135**.  
*semilippiae* Cockerell—p. 81.  
*silacea*, new species—pp. 71, 75, **83**.  
*sphaeralceae*, new species—pp. 69, 71, 74, 97, **143**.  
*spissa* (Cresson)—pp. 71, 75, **78**, 80.  
*Tetraloniella* Ashmead—p. **67**.  
*trabeata*, new species—pp. 70, 77, 83, **85**.  
*tropicana* LaBerge—p. 116.  
*vandykei*, new species—pp. 69, 75, 89, **105**.  
*wilmattae* (Cockerell)—pp. 70, 75, **93**, 94, 116.  
*Xenoglossodes* Ashmead—p. **67**.  
*yanega*, new species—pp. 71, 74, 89, **104**.



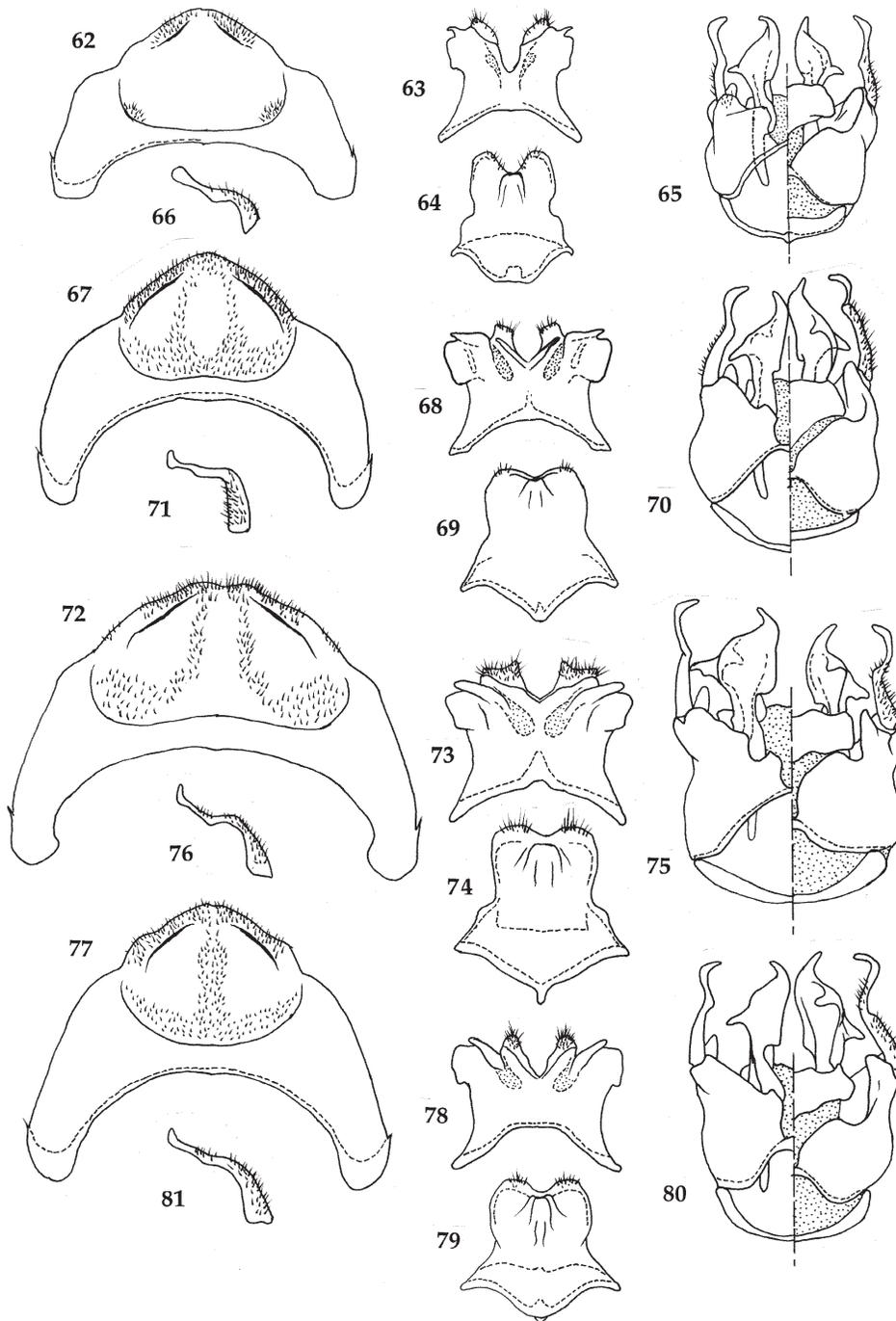
**Figures 10–14.** *Tetraloniella spissa* (Cresson): 10. Sternum 6. 11. Sternum 7. 12. Sternum 8. 13. Genital capsule dorsal (right and ventral (left). 14. Gonostylus lateral view. **Figures 15–19.** *Tetraloniella lippiae* (Cockerell): 15. Sternum 6. 16. Sternum 7. 17. Sternum 8. 18. Genital capsule dorsal (right) and ventral (left). 19. Gonostylus lateral view. **Figures 20–24.** *Tetraloniella silacea*, new species: 20. Sternum 6. 21. Sternum 7. 22. Sternum 8. 23. Genital capsule dorsal (right) and ventral (left). 24. Gonostylus lateral view.



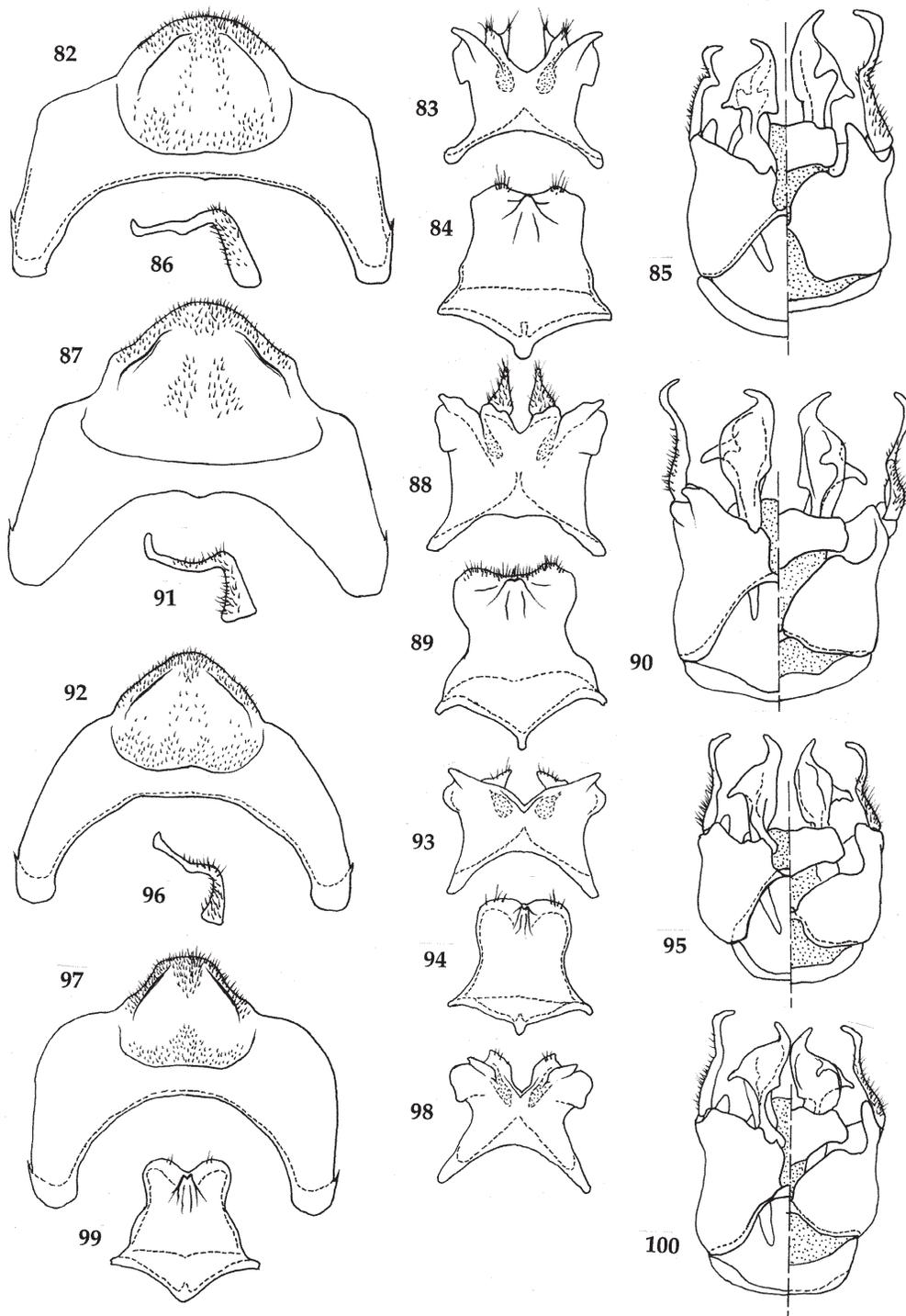
**Figures 25–29.** *Tetraloniella trabeata*, new species: 25. Sternum 6. 26. Sternum 7. 27. Sternum 8. 28. Genital capsule dorsal (right) and ventral (left). 29. Gonostylus lateral view. **Figures 30–34.** *Tetraloniella ayala*, new species: 30. Sternum 6. 31. Sternum 7. 32. Sternum 8. 33. Genital capsule dorsal (right) and ventral (left). 34. Gonostylus lateral view. **Figures 35–39.** *Tetraloniella eriocarpi* (Cockerell): 35. Sternum 6. 36. Sternum 7. 37. Sternum 8. 38. Genital capsule dorsal (right) and ventral (left). 39. Gonostylus lateral view. **Figures 40–41.** *Tetraloniella wilmattae* (Cockerell): 40. Sternum 6. 41. Gonocoxite lateral view.



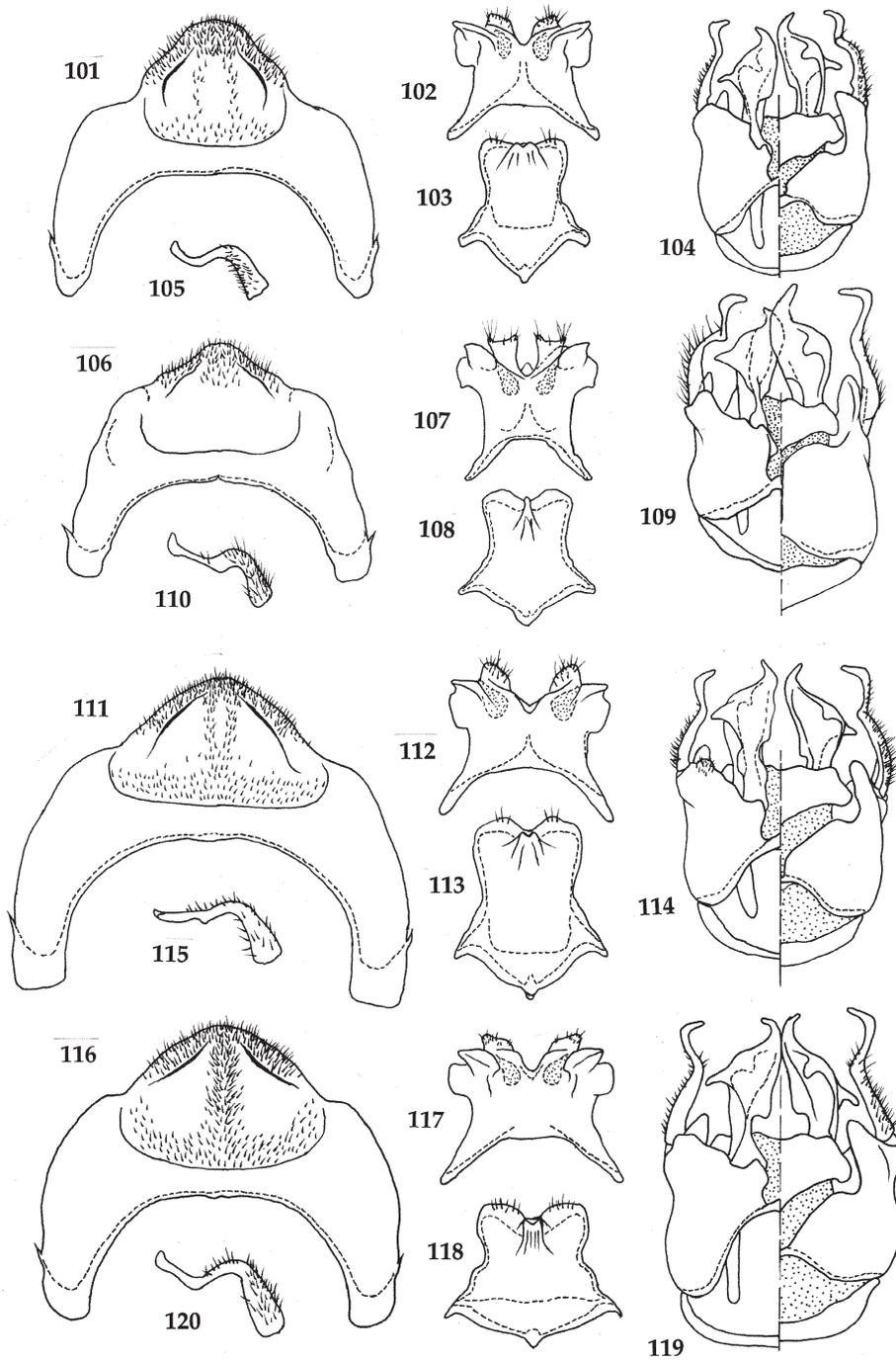
**Figures 42–46.** *Tetraloniella fulvotecta*, new species: 42. Sternum 6. 43. Sternum 7. 44. Sternum 8. 45. Genital capsule dorsal (right) and ventral (left). 46. Gonocoxite, lateral view. **Figures 47–51.** *Tetraloniella perconcinna*, new species: 47. Sternum 6. 48. Sternum 7. 49. Sternum 8. 50. Genital capsule dorsal (right) and ventral (left). 51. Gonocoxite lateral view. **Figures 52–56.** *Tetraloniella balluca*, new species: 52. Sternum 6. 53. Sternum 7. 54. Sternum 8. 55. Genital capsule dorsal (Right) ventral (left). 56. Gonocoxite lateral view. **Figures 57–61.** *Tetraloniella yanaga*, new species: 57. Sternum 6. 58. Sternum 7. 59. Sternum 8. 60. Genital capsule dorsal (right) and ventral (left). 61. Gonocoxite lateral view.



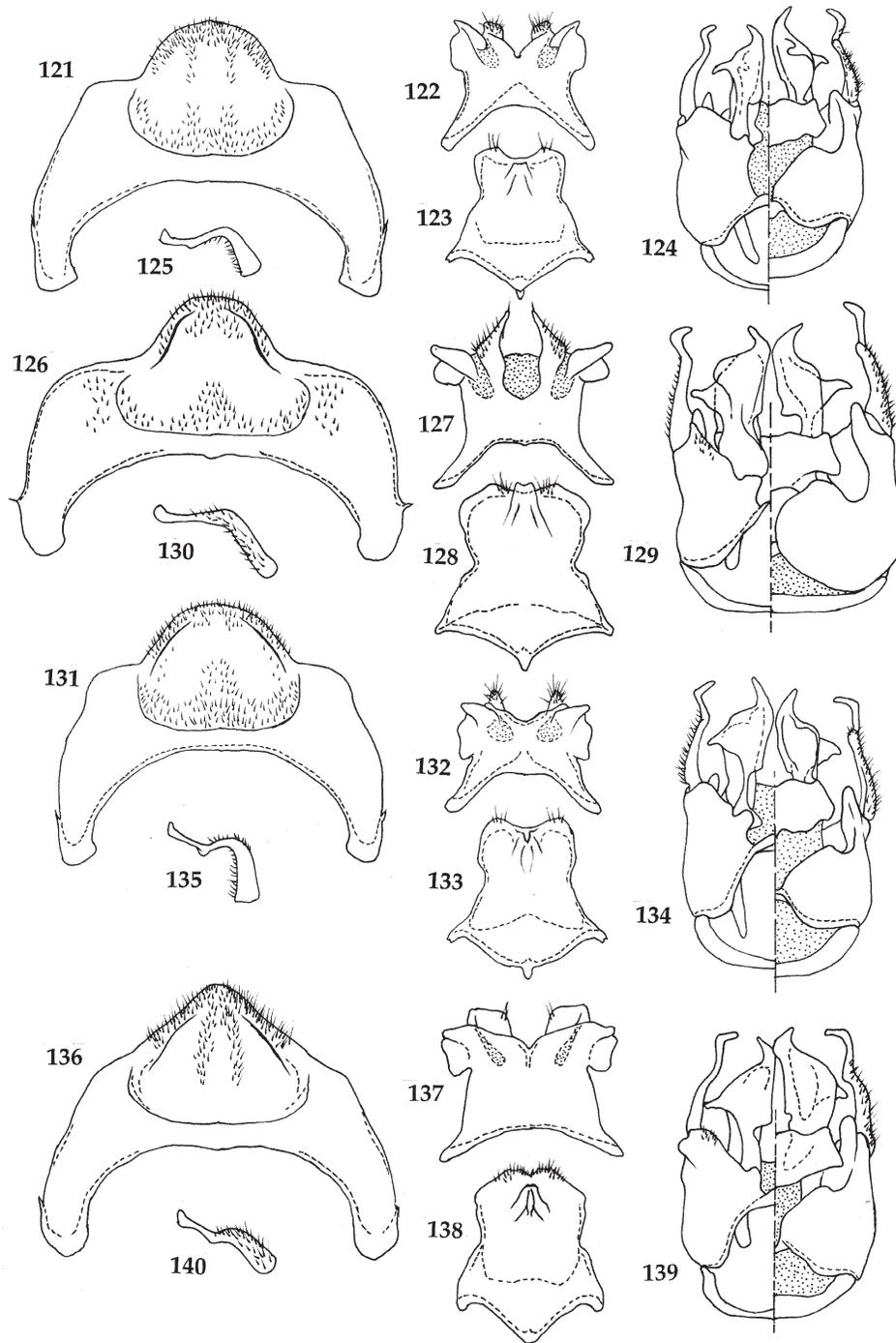
**Figures 62–66.** *Tetraloniella vandykei*, new species: 62. Sternum 6. 63. Sternum 7. 64. Sternum 8. 65. Genital capsule dorsal (right) and ventral (left). 66. Gonocoxite lateral view. **Figures 67–71.** *Tetraloniella albata* (Cresson): 67. Sternum 6. 68. Sternum 7. 69. Sternum 8. 70. Genital capsule dorsal (right) and ventral (left). 71. Gonocoxite lateral view. **Figures 72–76.** *Tetraloniella paenalbata*, new species: 72. Sternum 6. 73. Sternum 7. 74. Sternum 8. 75. Genital capsule dorsal (right) and ventral (left). 76. Gonocoxite lateral view. **Figures 77–81.** *Tetraloniella ochraea*, new species: 77. Sternum 6. 78. Sternum 7. 79. Sternum 8. 80. Genital capsule dorsal (right) and ventral (left). 81. Gonocoxite lateral view.



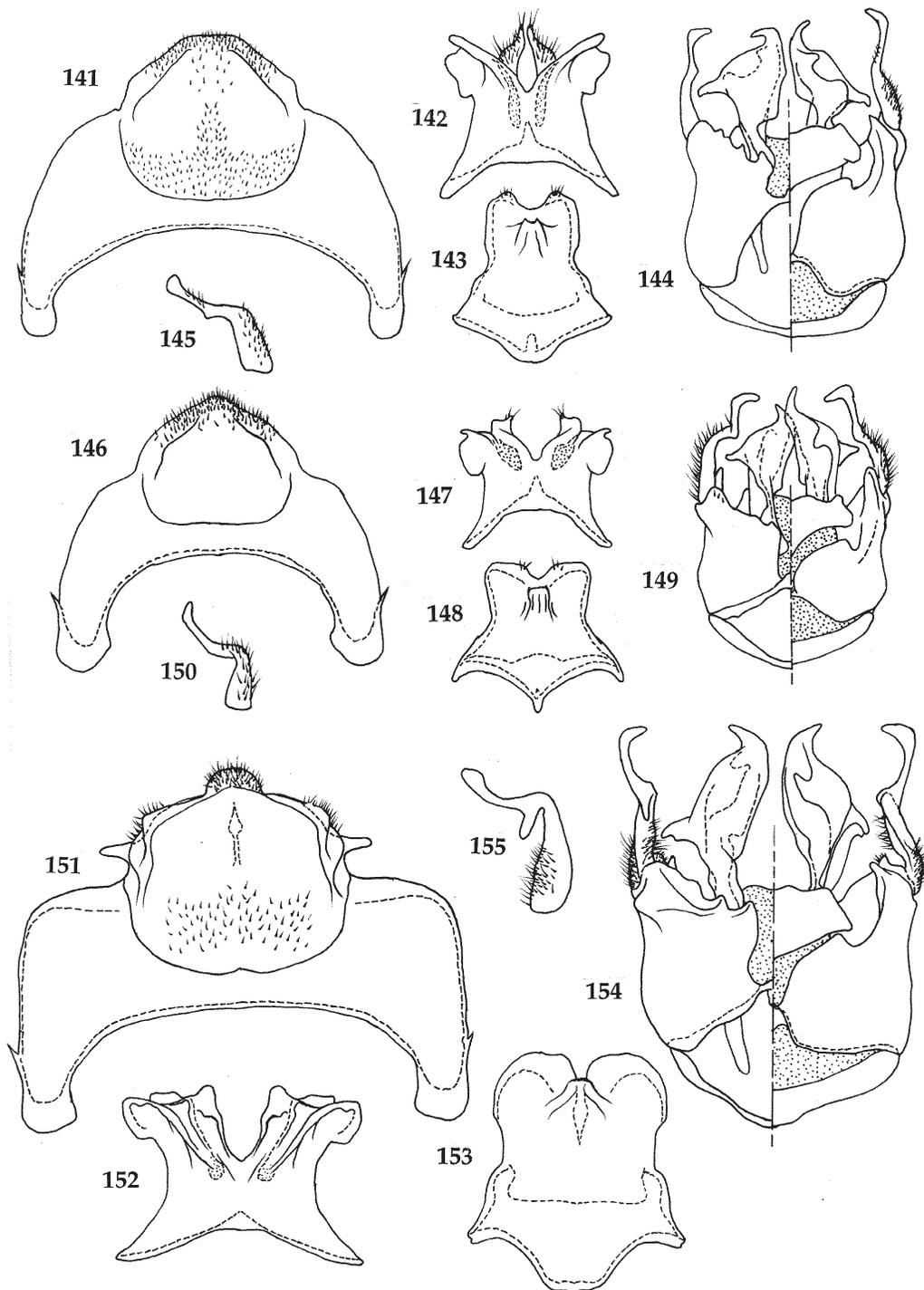
**Figures 82–86.** *Tetraloniella cressoniana* (Cockerell): 82. Sternum 6. 83. Sternum 7. 84. Sternum 8. 85. Genital capsule dorsal (right) and ventral (left). 86. Gonocoxite lateral view. **Figures 87–91.** *Tetraloniella crenulaticornis* (Cockerell): 87. Sternum 6. 88. Sternum 7. 89. Sternum 8. 90. Genital capsule dorsal (right) and ventral (left). 91. Gonocoxite lateral view. **Figures 92–96.** *Tetraloniella donata*, new species: 92. Sternum 6. 93. Sternum 7. 94. Sternum 8. 95. Genital capsule dorsal (right) and ventral (left). 96. Gonocoxite lateral view. **Figures 97–100.** *Tetraloniella fastigiata*, new species: 97. Sternum 6. 98. Sternum 7. 99. Sternum 8. 100. Genital capsule dorsal (right) and ventral (left).



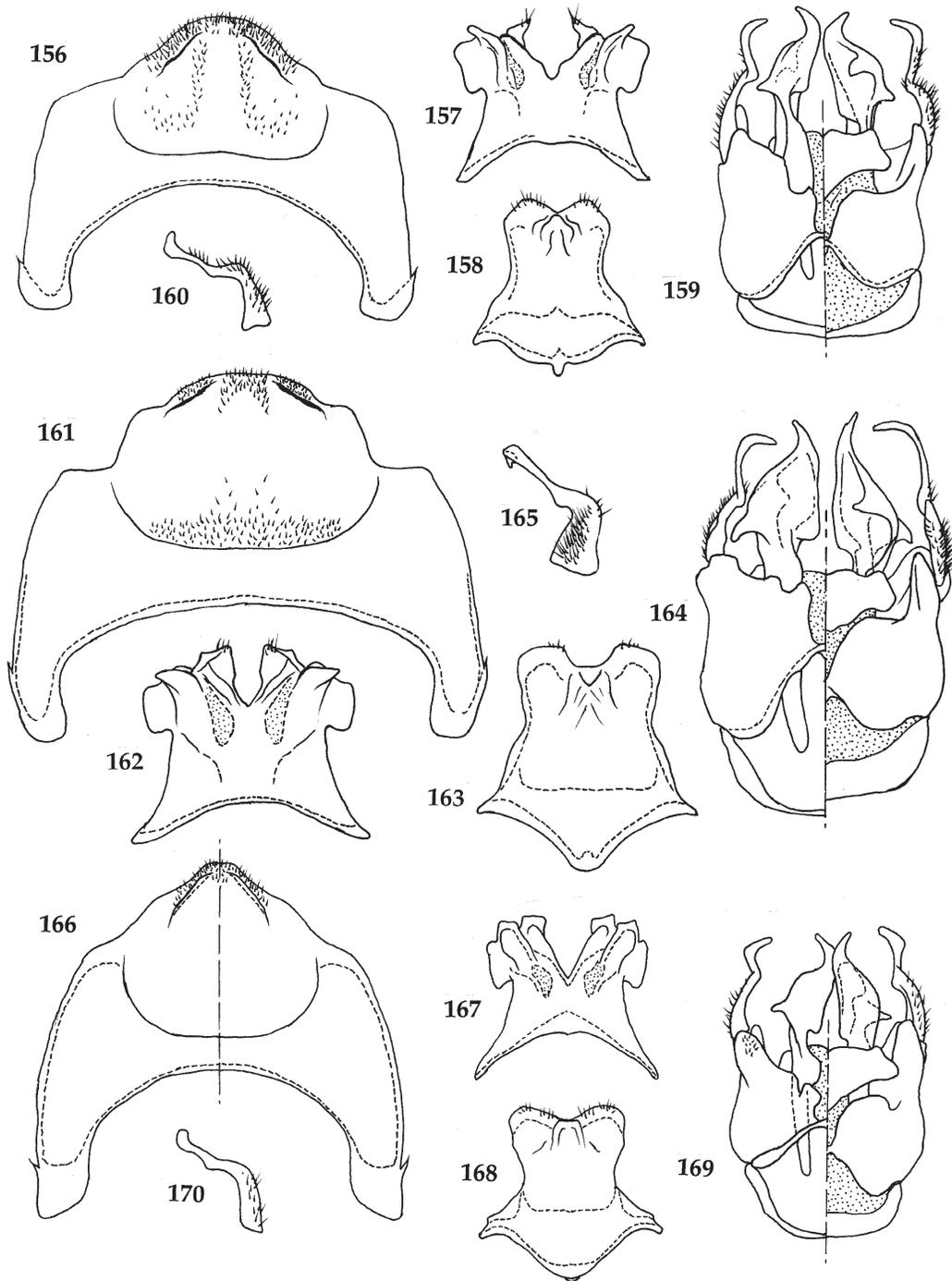
**Figures 101–105.** *Tetraloniella minutilla*, new species: 101. Sternum 6. 102. Sternum 7. 103. Sternum 8. 104. Genital capsule dorsal (right) and ventral (left). 105. Gonocoxite lateral view. **Figures 106–110.** *Tetraloniella flagellicornis* (Smith): 106. Sternum 6. 107. Sternum 7. 108. Sternum 8. 109. Genital capsule dorsal (right) and ventral (left). 110. Gonocoxite lateral view. **Figures 111–115.** *Tetraloniella noguera*, new species: 111. Sternum 6. 112. Sternum 7. 113. Sternum 8. 114. Genital capsule dorsal (right) and ventral (left). 115. Gonocoxite lateral view. **Figures 116–120.** *Tetraloniella michoacanensis*, new species: 116. Sternum 6. 117. Sternum 7. 118. Sternum 8. 119. Genital capsule dorsal (right) and ventral (left). 120. Gonocoxite lateral view.



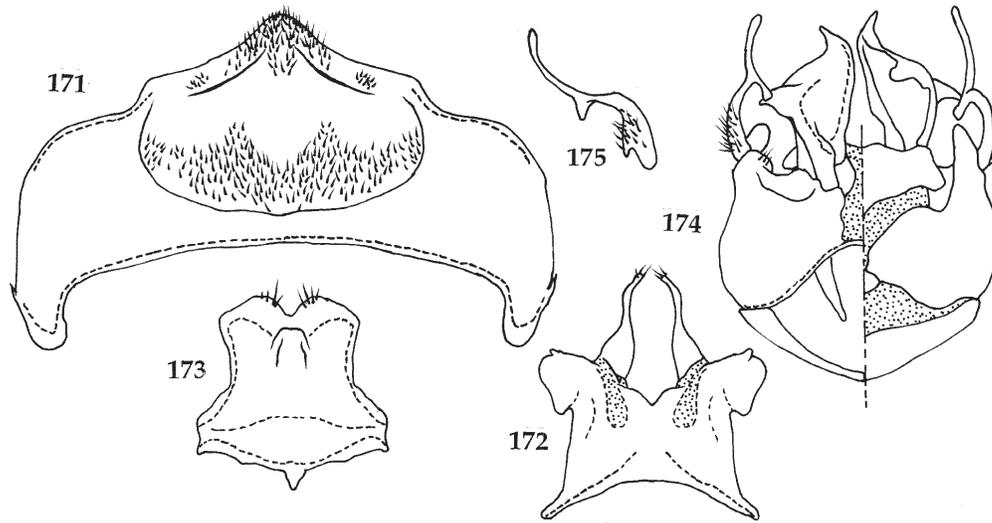
**Figures 121–125.** *Tetraloniella jaliscoensis*, new species: 121. Sternum 6. 122. Sternum 7. 123. Sternum 8. 124. Genital capsule dorsal (right) and ventral (left). 125. Gonocoxite lateral view. **Figures 126–130.** *Tetraloniella helianthorum* (Cockerell): 126. Sternum 6. 127. Sternum 7. 128. Sternum 8. 129. Genital capsule dorsal (right) and ventral (left). 130. Gonocoxite lateral view. **Figures 131–135.** *Tetraloniella flavifasciata* (Cockerell): 131. Sternum 6. 132. Sternum 7. 133. Sternum 8. 134. Genital capsule dorsal (right) and ventral (left). 135. Gonocoxite lateral view. **Figures 136–140.** *Tetraloniella cacuminis*, new species: 136. Sternum 6. 137. Sternum 7. 138. Sternum 8. 139. Genital capsule dorsal (right) and ventral (left). 140. Gonocoxite lateral view.



**Figures 141–145.** *Tetrioniella pomonae* (Cockerell): 141. Sternum 6. 142. Sternum 7. 143. Sternum 8. 144. Genital capsule dorsal (right) and ventral (left). 145. Gonocoxite lateral view. **Figures 146–150.** *Tetrioniella distata*, new species: 146. Sternum 6. 147. Sternum 7. 148. Sternum 8. 149. Genital capsule dorsal (right) and ventral (left). 150. Gonocoxite lateral view. **Figures 151–155.** *Tetrioniella davidsoni* (Cockerell): 151. Sternum 6., 152. Sternum 7. 153. Sternum 8. 154. Genital capsule dorsal (right) and ventral (left). 155. Gonocoxite lateral view.



**Figures 156–160.** *Tetraloniella imitatrix* (Cockerell and Porter): 156. Sternum 6. 157. Sternum 7. 158. Sternum 8. 159. Genital capsule dorsal (right) and ventral (left). 160. Gonocoxite lateral view. **Figures 161–165.** *Tetraloniella sphaeralcea*, new species: 161. Sternum 6. 162. Sternum 7. 163. Sternum 8. 164. Genital Capsule dorsal (right) and ventral (left). 165. Gonocoxite lateral view. **Figures 166–170.** *Tetraloniella pennata*, new species: 166. Sternum 6. 167. Sternum 7. 168. Sternum 8. 169. Genital capsule dorsal (right) and ventral (left). 170. Gonocoxite lateral view.



**Figures 171–175.** *Tetraloniella arizonica* (Cockerell): 171. Sternum 6. 172. Sternum 7. 173. Sternum 8. 174. Genital capsule dorsal (right) and ventral (left). 175. Gonocoxite lateral view.