DOI: https://doi.org/10.3897/arphapreprints.e94258

Three new genera and four new species of the New World treehopper tribe Acutalini (Hemiptera, Membracidae, Smiliinae) with a key to all genera

Stuart H. McKamey

ARPHA Preprints *Author-formatted, not peer-reviewed document posted on 01/09/2022* DOI: https://doi.org/10.3897/arphapreprints.e94258

Three new genera and four new species of the New World treehopper tribe Acutalini (Hemiptera, Membracidae, Smiliinae) with a key to all genera

Stuart H. McKamey

Systematic Entomology Laboratory, Agricultural Research Service, U.S. Department of Agriculture, c/o National Museum of Natural History, P.O. Box 37012, Washington, D.C. 20013, USA. E-mail: stuart.mckamey@usda.gov

Abstract.—Three new genera in Acutalini are described, all of which have two discoidal cells (R_{2+3} and M) in the forewing, as in *Euritea* Stål. *Osaria quadrilinea* **n. gen.** et **n. sp.** differs from other acutalines in having a pair of suprahumeral spines and a strongly convex pronotum in lateral view. It differs from *O. zacki*, **n. sp**., in having an evenly convex, rather than stepwise convex pronotum in lateral view, in addition to other details. *Quinquespinosa septamacula* **n. gen.** et **n. sp.** differs in having three posterior pronotal spines. *Tectiforma guayasensis* **n. gen.** et **n. sp.** has the pronotum strongly tectiform throughout. //add distro gf geera A key to all genera of Acutalini is provided.

Key words. New genus, Neotropical, Brazil, Costa Rica, Ecuador, French Guiana, Peru

Introduction

Acutalini belongs to the second most speciose treehopper subfamily, Smiliinae (Bartlett et al. 2018), with 750 species. Acutalini, however, is a species-poor tribe, with only 25 described species, but ranges from Canada to Brazil and Peru. At the time of Deitz's (1975) revised classification of the New World Membracidae, Acutalini contained only three genera: *Acutalis* Fairmaire (nine species), *Euritea* Stål (three species), and *Thrasymedes* Kirkaldy (six species). All of these species were listed by McKamey (1998) and are elongate with a low, dorsally convex pronotum that lacks suprahumeral spines. (McKamey 1998 also listed *Acutalis terminalis* Walker, which was designated as the type species of *Germariana* Sakakibara [1998]). Acutaline genera differ from each other by forewing venation patterns, and differ from other Smiliinae in the following combination of characters: having the pronotum not or only slightly overlapping the forewing in repose, having vcins R, M, and Cu separate near the wing base, vein R_{2+3} present as a distinct branch of R, vein R_{4+5} confluent with M distad of M fork, and crossveins s and m-cu present (Deitz 1975). Dietrich and Deitz (2001) also included, as another feature, a forked anal vein in the hind wing (as in Fig. 45), which is shared with non-smiliines but only two other tribes of Smiliinae (Ceresini and Micrutalini).

Sakakibara (1997) described another genus, *Bordonia* (preoccupied, replaced by *Bordoniana* Sakakibara 1999), with five species, and also the genus *Cornutalis*, with two species, both of which have a pair of short laterally directed suprahumeral spines. Flórez-V (2017) described another species of *Cornutalis* from Colombia that has a pitted pronotum with stout suprahumeral spines directed dorsoanteriorly.

In the present paper, three new genera and four new species are described. All three new genera would follow Sakakibara's (1997) key to *Euritea* because they have two discoidal cells in the forewing, except *O. quadrilinea*, which only has one. Nevertheless, they differ from *Euritea*

in important respects: they have suprahumeral spines or are strongly tectiform. A key is provided to all genera of Acutalini.

Material and methods

In quoting labels, quotation marks separate labels and a vertical line separates lines on a label. Terminology for general morphology, forewing venation, and leg chaetotaxy follows Deitz (1975). A Leica MZ12 stereomicroscope was used to examine structures. The body length was measured using a digital micrometer. A manual 5 mm micrometer was used and to determine ratios between other, shorter distances.

The abdomen was detached, macerated in a warmed 10% KOH solution for 24 hours at room temperature, bathed in water, then acetic acid to stop the reaction. After dissection, structures were stored in a glass microvial containing glycerin and pinned beneath the specimen.

Images were taken with a Canon 5Dsr camera with an adjustable 65mm lens using Capture One Pro version 10.1.2, 64 Bit, Build 10.1.2.23 imaging software, aided by CamLift version 2.9.7.1. The specimens were lit using two adjustable Dynalite MH2050 RoadMax flash heads, each attached to a Manfrotto 244 arm. The light was diffused using a simple, lampshade-style cone of translucent paper between the specimen and light sources. After individual "slices" were photographed, they were compiled into a single, composite image using Zerene Stacker - USDA SI-SEL Lab Bk imaging system, version 1.04, Build T201706041920. Stacked images were enhanced and edited in Adobe Photoshop CSS Extended version 12.0. The scale bars were generated through Photoshop directly from the metadata of the photo.

Specimens examined will be deposited in the following Institutions:

INPA	Brazil, Amazonas, Manaus, Instituto Nacional de Pesquisas da Amazonia, Colecão Sistemática da Entomologia
MNHN	France, Paris, Museum National d'Histoire Naturelle
EPNC	Ecuador, Pichincha, Quito, Museo de la Escuela Politécnica Nacional
MUSM	Peru, Lima, Universidad Nacional Mayor de San Marcos, Museo de Historia Natural
USNM	USA: U.S. National Museum of Natural History, Smithsonian Institution, Washington, DC.

The holotypes and other specimens designated to other institutions are deposited temporarily in the USNM due to the disruption of normal services caused by the prevalent COVID-19 world pandemic.

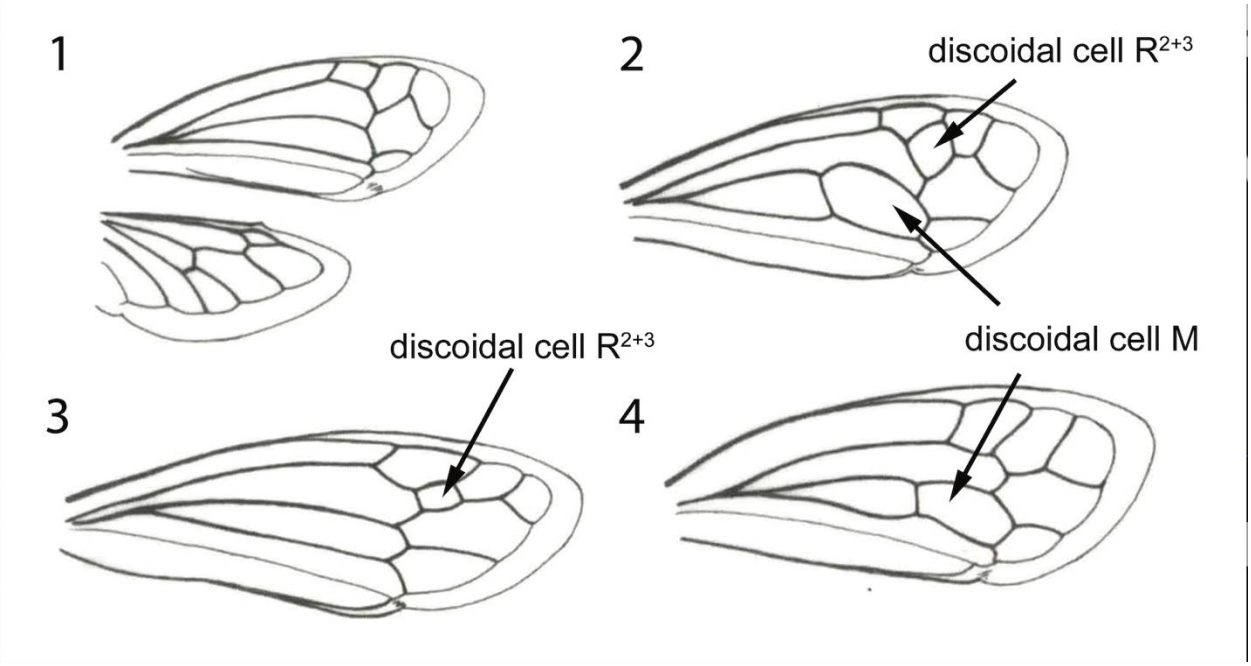
Results

Key to genera of Acutalini (modified from Sakakibara 1997)

1. Forewing without discoidal cells (Fig. 1) ..... *Acutalis*
1'. Forewing with 1 or 2 discoidal cells (Figs. 2-4) 2
2. Forewing with 2 discoidal cells (R_{2+3} and M; Fig. 2) 3
2'. Forewing with 1 discoidal cell (Figs. 3, 4) 6
3. Pronotum without suprahumeral spines 4
3'. Pronotum with suprahumeral spines *5*
4. Pronotum dorsally convex without distinct median carina ..... *Euritea*
4'. Pronotums strongly tectiform with distinct median carina. ..... *Tectiforma* **n. gen.**

ARPHA Preprints *Author-formatted, not peer-reviewed document posted on 01/09/2022* DOI: https://doi.org/10.3897/arphapreprints.e94258

5. Pronotum with acuminate posterior apex; forewing 2 m-cu crossveins .....*Osaria zacki* **n. sp.**
5'. Pronotum bearing 3 slender spines posteriorly; forewing 1 m-cu crossvein.....
.....*Qinquespinosa* **n. gen.**
6. Forewing with discoidal cell R_{2+3} (Fig. 4) *7*
6'. Forewing with discoidal cell M (Fig. 2) 8
7. Pronotum with pair of suprahumeral spines ..... *Osaria quadrilinea*, **n. sp.**
7'. Pronotum without pair of suprahumeral spines ..... *Thrasymedes*
8. Pronotum with pair of suprahumeral spines ..... *Cornutalis*
8'. Pronotum without pair of suprahumeral spines ..... *Bordoniana*



Figs. 1-4. Wings of Acutalini genera. 1, Forewing and hind wing of *Acutalis*. 2, Forewing of *Euritea*. 3, Forewing of *Thrasymedes*, 4, Forewing of *Bordoniana*. (Modified from Sakakibara 1997; .

***Osaria* n. gen.**

(Figs. 5-23)

Type species: *Osaria quadrilinea*, n. sp.
Diagnosis. Forewing with cells R_{2+3} and M, and 2 m-cu crossveins (Fig. 7); pronotum with suprahumeral spines directed laterally and slightly posteriorly (Figs. 5. 6), distally attenuate posteriorly (Figs. 6, 7). Pronotum in anterior view with 3 or 4 vertical stripes (Figs. 5, 8).
Description. HEAD. Vertex glabrous, without ridges, slightly concave especially at lateral margins and around ocelli; ocelli circular, equally distant from each other and from eye or slightly closer to eyes; dorsal margin weakly convex but not attaining dorsal margin of eye, which is elevated. PRONOTUM. Smooth, glabrous, elevated, strongly convex in lateral view, with acute suprahumeral spines. WINGS. Forewing with 1 or 2 discoidal cells (R_{2+3} and sometimes cell M), 1 or 2 m-cu crossveins. Hind wing with forked anal vein. LEGS. Metathoracic tibia with cucullate setae in row I double, row II single and row III single in basal half and double in distal half.

ARPHA Preprints Author-formatted, not peer-reviewed document posted on 01/09/2022 DOI: https://doi.org/10.3897/arphapreprints.e94258

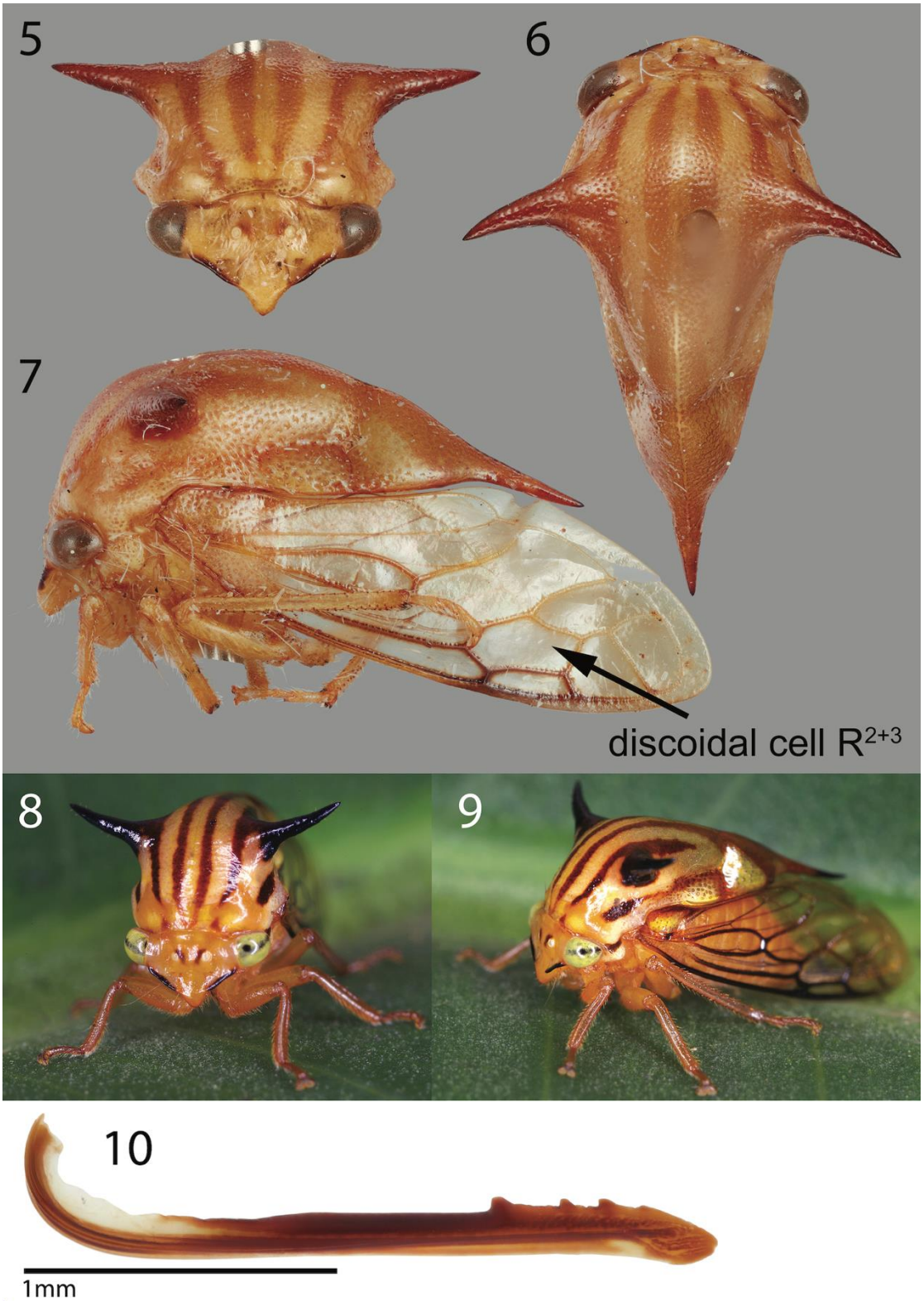
Distribution. Neotropical: Central America,
Etymology. The name, which is feminine, is based on the type locality of the type species, on the Osa Peninsula.

Osaria quadrilinea **n. sp.**

(Figs. 5-10)

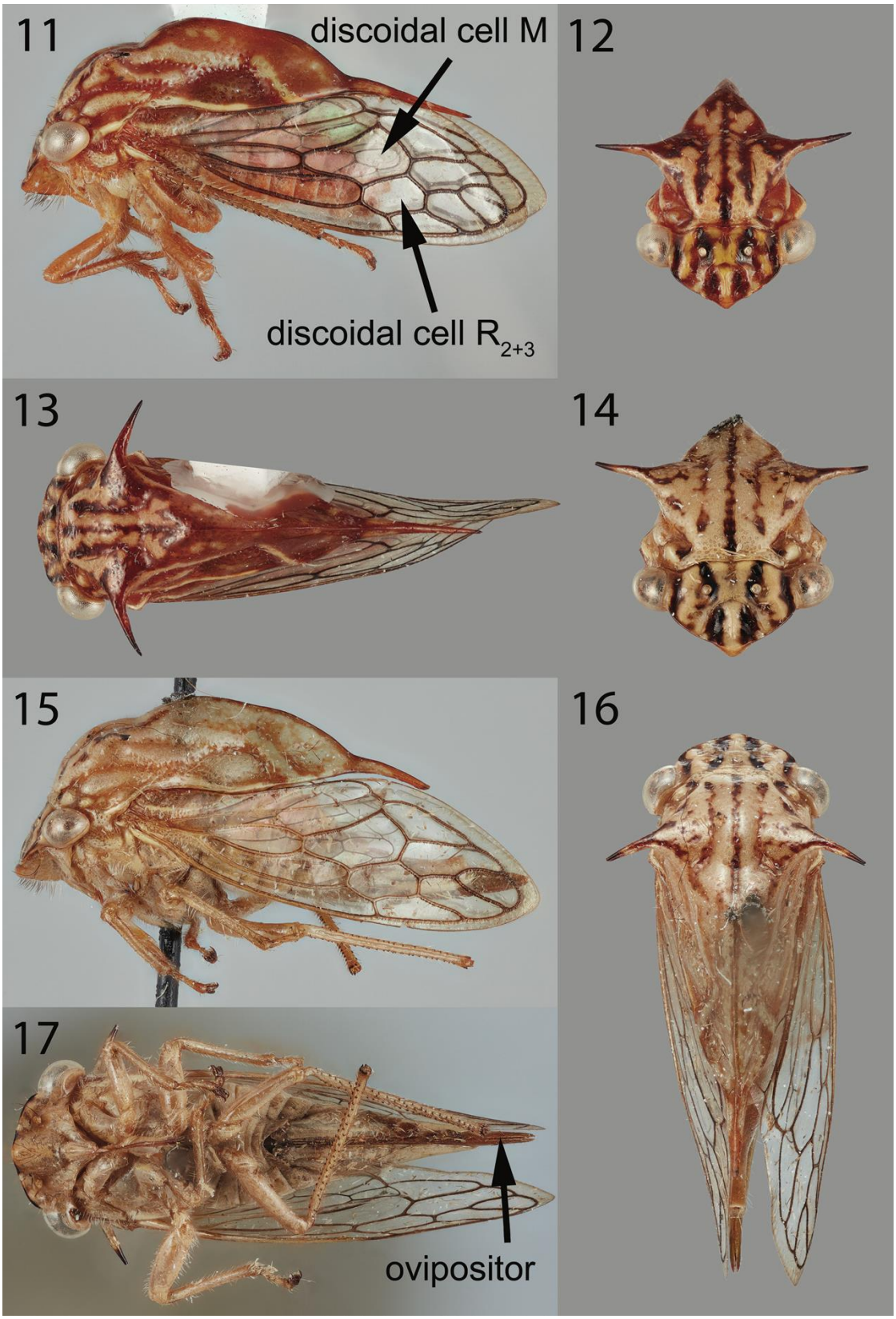
Diagnosis. Pronotum elevated, smoothly convex in lateral view, with 4 conspicuous, orange longitudinal stripes on pale yellow ground color (stripes red in life).
Description of female. Measurements (mm). Length with forewing in repose 9.0; width across suprahumeral spines 5.3; height in anterior view 4.2. HEAD. Dorsal margin weakly convex; vertex flat and glabrous, lacking setae and rugae; ocelli circular, equidistant from eyes and between each other (Fig. 5); margins from eyes to frontoclypeus straight; frontoclypeus acute Fig. 5), lateral margin slightly upturned (Fig. 7); frontoclypeal sutures vertical then arched centrally. FOREWING. with 1 m-cu crossvein so lacking discoidal cell M (Fig. 7). FRONOTUM. suprahumeral spines with base robust, their sides all rounded, projecting horizontally and slightly curved posteriorly (Figs. 5, 6, 8); pronotum pinched laterally at mid length (Figs. 6. 7), distally attenuate (Fig. 6), apex surpasses anal veins of forewing, does not attain vein M_{3+4} (Fig. 7). TERMINALIA. Female valvula II with three large dentae preapically (Fig. 10). COLOR. Head lateral margins dark; pronotum pale yellow with 4 broad, longitudinal, orange stripes extending posteriorly, central stripes gradually fusing and extending to apex (Fig.s 6, 9), lateral stripes encompassing suprahumeral spines and terminating at laterally constricted mid-point; forewing veins pale except Costal, Radial, darker, and bases of Medial and Cubital veins medium. Male unknown.
Material Examined. Holotype ♀ (USNM) with labels “Ranch Quemado, 200m | Peninsula de Osa, Prov. Puntarenas. Costa Rica | K. Flores, Abr 1992 | L-S 292500, 511000”, and a red “HOLOTYPE | Osaria | quadrilinea | S.H. McKamey”. Slightly broken: mesothoracic tarsi and right foreleg except coxa missing. Live specimen (Figs. 8, 9, not examined) from Tropical Field Station La Gamba, La Gamba (near Osa Peninsula), Puntarenas Province, 18-V-2006.
Distribution. Costa Rica.
Etymology. The specific epithet is a feminine adjective referring to the four (*quadri*-) conspicuous longitudinal stripes (-*linea*) on the pronotum.
Note. The two specimens (1 preserved and 1 live photographed) were observed spatially and temporally close to each other (April and May) eight years apart, suggesting a good time to collect more adults and, in March or April, a time to search for and rear its nymphs.

ARPHA Preprints *Author-formatted, not peer-reviewed document posted on 01/09/2022* DOI: https://doi.org/10.3897/arphapreprints.e94258



Figs. 5-10, *Osaria quadrilinea*, n. sp.. 5-7, Habitus in anterior, dorsal and lateral views, respectively. Figs8, 8, Live shots (courtesy of Gernot Kunz). Fig 10, Second valvula, lateral view.

ARPHA Preprints *Author-formatted, not peer-reviewed document posted on 01/09/2022* DOI: https://doi.org/10.3897/arphapreprints.e94258



Figs. 11-17. *Osaria zacki*, n. sp. 11-13, Male habitus in lateral, anteruior, and dorsal views, respectively.14-17, Female habitus in anterior, lateral, dorsal, and ventral views, respectively.

***Osaria zacki* n. sp.**

(Figs. 11-23)

Diagnosis. Pronotum elevated, stepwise convex just behind suprahumeral spines in lateral view (Figs. 11, 15), posteriorly strongly tectiform and compressed laterally.

Description. Measurements (mm). Length with forewing in repose ♀ 8.6, ♂ 6.4; width across suprahumeral spines ♀ 3.7, ♂ 3.0; height in anterior view ♀ 3.0, ♂ 2.7. HEAD. Vertex (Fig) flat except weakly concave lateral to ocelli, and glabrous, lacking setae and rugae, lateral margin below eyes weakly convex in anterior view, but not upturned; ocelli circular, slightly closer to eyes than to each other; margins from eyes to frontoclypeus weakly convex in anterior view; frontoclypeus apically rounded, its sutures arched to mid-point. FOREWING. with 2 m-cu crossveins, so cell R_{2+3} and cell M both present (Fig. 11). PRONOTUM. Dorsal margin abruptly elevated behind suprahumeral spines, convex in stepwise fashion (Figs. 11, 15); suprahumeral spines narrow, directed laterally and slightly posteriorly, apices acute (Figs. 12-14, 16); strongly tectiform posteriorly (Figs. 13, 16). TERMINALIA. Male lateral plates unarmed (Figs. 18, 19); subgenital plate triangular in ventral view, fused basally (Fig. 19); style recurved with short acute apex (Fig. 20); aedeagal shaft in lateral view thickest at mid length, serrate along swollen anterodistal margin (Fig. 20). Female pygofer long, ovipositor extending even further (Fig. 17), together accounting for more than half of body length; valvulae II simple, without dentae preapically (Fig. Figs. 22, 23). COLOR. Female coloration (Figs. 14-17): overall pale, vertex lateral margins black with two vertical black stripes passing over ocelli onto to frontoclypeus; pronotum very pale brown with a darker brown central stripe terminating just behind suprahumeral spine, continuing as even paler stripe that arches ventrally to lateral margin, which is also very pale, two indistinct stripes on metopidium, and mottling from base to apex of suprahumeral spines. Wing veins and body pale brown. Male coloration (Figs. 11-13) similar to female but all stripes darker, and areas except for stripes orange.

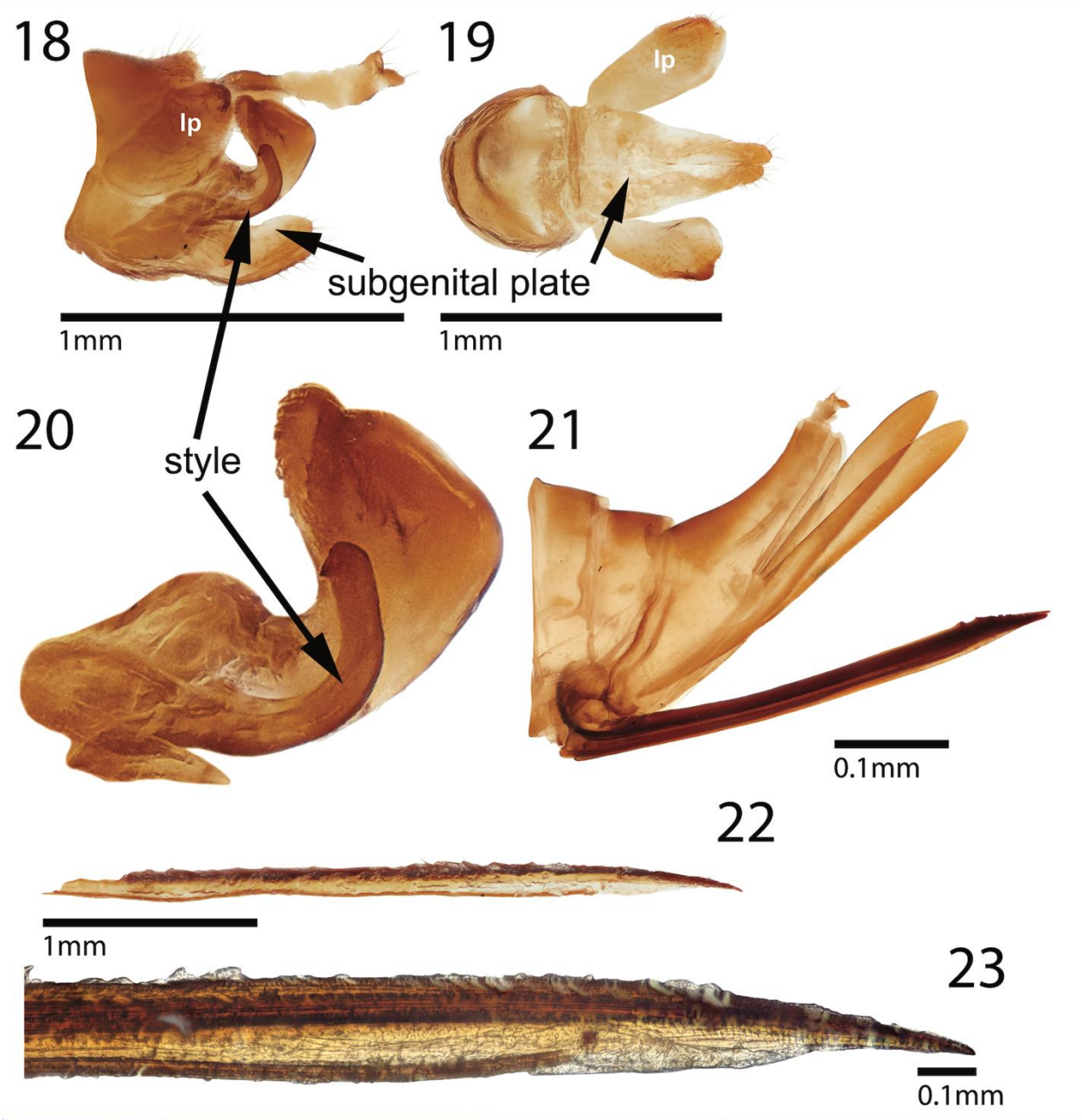
Material Examined. Holotype ♂ (USNM) with labels “GUATEMALA: Peten Dept. Rio | Machaquila, ca. 8 km W of | Machaquila. 15-16 Aug 2015. | N16.39957º W89.48642º 413m, | light traps. R. S. Zack collector” and a red “HOLOTYPE | Osaria | zacki | S.H. McKamey. Slightly broken: right metathoracic leg missing,. Paratype ♀ (USNM) with labels “GUATEMALA: Izabal Dept | Finca Firmeza, Reserva de | Anfibios, SE of Morales, 540m | N15.40689º, W88.69603º 3-4 | June 2016. R. S. Zack, light traps” and a blue paratype label. Both metathoracic tarsi missing, otherwise intact.

Distribution. Guatemala.

Etymology. The specific epithet is a patronym for Dr. Richard Zack, who collected the holotype and paratype.

Note. The holotype and paratype were collected at light traps, indicating a good method to discover more specimens. Among membracids, females are usually only slightly larger than males; in this species the female is significantly larger.

ARPHA Preprints *Author-formatted, not peer-reviewed document posted on 01/09/2022* DOI: https://doi.org/10.3897/arphapreprints.e94258



Figs. 18-23. Terminalia of *Osaria zacki*, n. sp. 18, Undissected terminalia of male. 19, ventral view of subgenital plate and unarmed lateral plates. 20, Aedeagus and style, lateral view. 21, Undissected female terminalia. 22, 23, Second valvula (base broken) and distal portion, lateral view. *lp*, lateral plate.

***Quinquespinosa* n. gen.**

(Figs. 24-36)

Type species: *Qinquespinosa septamacula*, n. sp**.**

Diagnosis. Forewing with cells R_{2+3} and M, 1 m-cu crossvein; pronotum with 2 suprahumeral and 3 apical, slender spines.

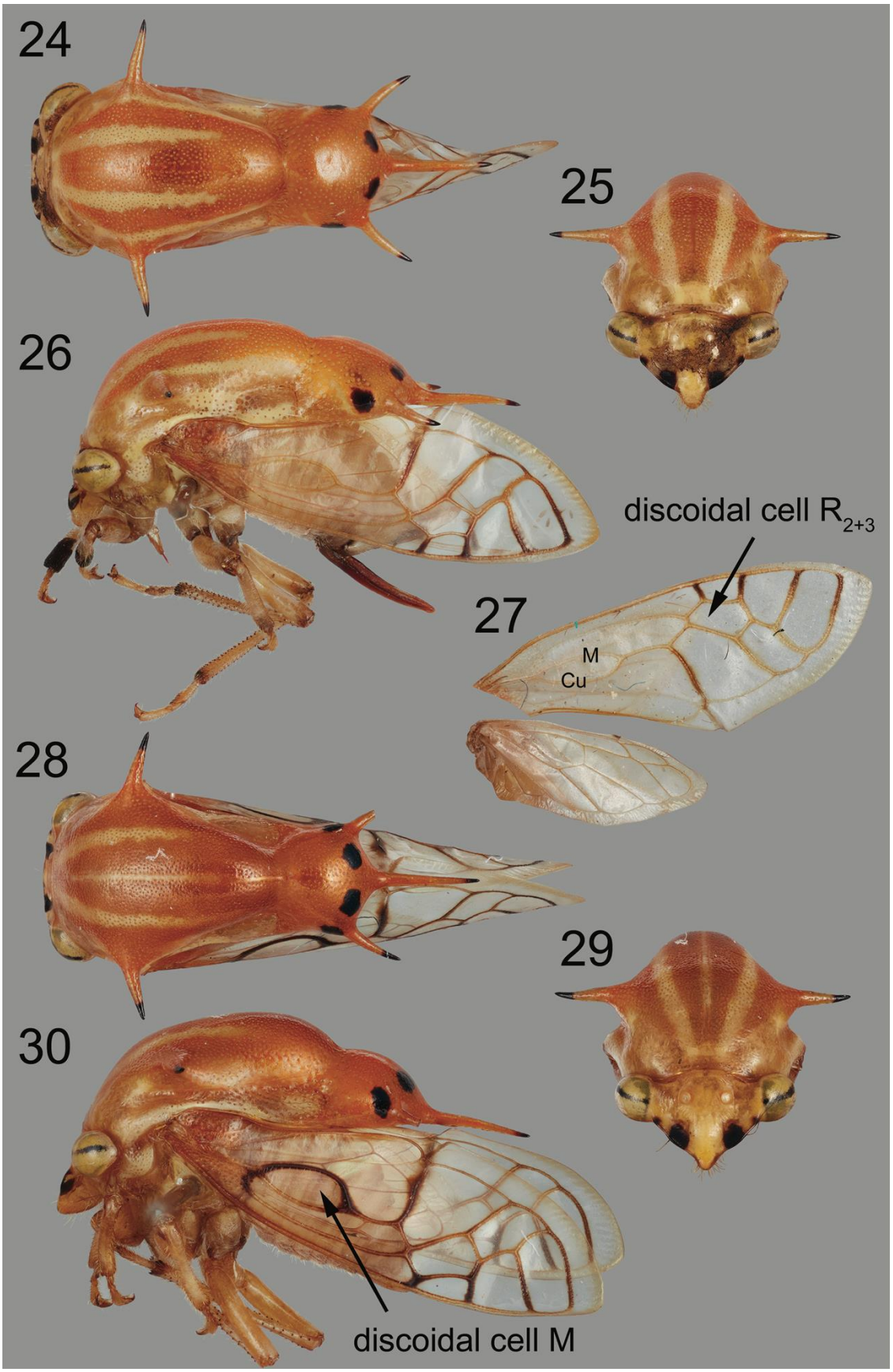
Description of female. HEAD. Vertex glabrous, without ridges, slightly concave with linear furrow between ocellus and eye; ocelli slightly oblong, divergent dorsally, slightly closer to each other than to the eye; dorsal margin weakly convex but not attaining dorsal margin of eye, which is elevated (Figs. 25, 29); lateral margin below eyes straight, slightly upturned; frontoclypeus acute, sutures vertical, joining horizontally (truncate dorsally). PRONOTUM. Longitudinally divided into 2 parts by strong dorsal constriction (Figs. 24, 26, 28, 29), anterior part elevated, evenly convex with pair of slender suprahumeral spines directed laterally (Figs. 24, 28), posterior part swollen and bearing 3 apical, slender spines. WINGS. Forewing with 2 discoidal cells (R_{2+3} and M), M and Cu divergent at base, then convergent and completely fused into single vein, then separate again distally (1st m-cu crossvein absent). Hind wing with forked anal vein (as in Fig. 45). LEGS. Metathoracic tibia with cucullate setal row I double, row II and row III complete and single. Male similar to female.

Distribution. Neotropical: South America.

Etymology. The name is feminine and refers to the five (*quinque*-) spines (-*spinosa*) on the pronotum.

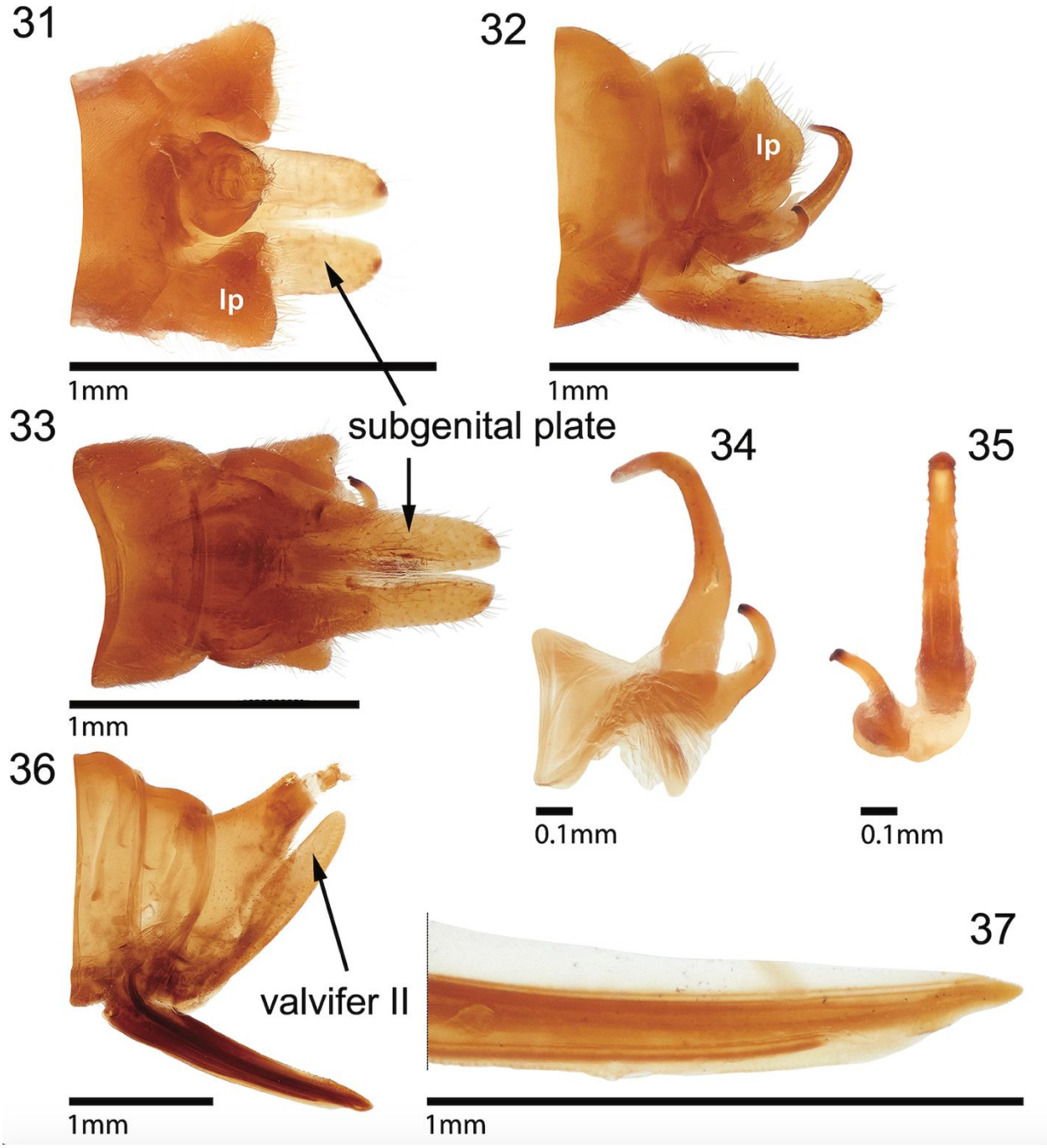
Notes. Whereas *Euritea* has two m-cu crossveins, this new genus has only one. Its veins M and Cu separate and diverge at base, then instead of being bridged with an m-cu crossvein as in *Euritea* and *Osaria*, its veins M and Cu completely fused into a single vein (enclosing cell M; Figs. 27, 30), then separate again distally as in all other Smiliinae. This unusual venation at the wing base is the same on all wings of all 17 specimens, so is not an aberration.

ARPHA Preprints *Author-formatted, not peer-reviewed document posted on 01/09/2022* DOI: https://doi.org/10.3897/arphapreprints.e94258



ARPHA Preprints Author-formatted, not peer-reviewed document posted on 01/09/2022 DOI: https://doi.org/10.3897/arphapreprints.e94258

Figs. 24-30. *Quinquespinosa septqmacula*, n. sp. 24-26, Female habitus in dorsal, anterior, and lateral views, respectively. 27, Forewing and hind wing. 28-30, Male habitus in dorsal, anterior, and lateral views, respectively.



Figs. 31-37. Terminalia of *Quinquespinosa septqmacula*, n. sp. 31, Male pygofer and subgenital plate in dorsal view. 32, Undissected male terminalia. 33, Male pygofer and subgenital plate in ventral view. 34, 35, Aedeagus and left style in lateral and posterior views, resspectively. 36, Undissected female terminalia. 37, Distal half of second valvula, lateral view. *lp*, lateral plate/

.

***Quinquespinosa septamacula* n. sp.**

(Figs. 24-36)

Diagnosis. Frontoclypeal sutures bordered by conspicuous black spots; pronotum with pair of dorsal pale longitudinal stripes dorsally and another pair more laterally, at level of suprahumeral spines; posterior portion of pronotum with 7 ditsinct dark marks: 2 pairs, one pair straddling the apical middle spine and the second pair more laterally, behind the bases of apical lateral spines, and one on each of the 3 posterior spines (Fig. 24, 28).
Description. Measurements (mm). Length with forewing in repose ♂ 7.0-7.5, ♀ 8.0-8.5; width across suprahumeral spines ♂ 3.6-4.0, ♀ 4.1-4.3; height in anterior view ♂ 3.1-3.2, ♀ 3.2-3.4. PRONOTUM. With apical lateral spine extending to Cu vein, middle spine attaining mid-point of Cu and M_{3+4} (Fig. 26). TERMINALIA. Male. Pygofer with lateral plate large, subquadrate in dorsal view (Fig. 31); subgenital plates subtriangular, tips rounded (Fig. 33); style recurved with acute apex (Figs. 33-35); aedeagus narrow throughout, gradually recurved, its sides bearing short sharp points along outer margin (Figs. 34, 35). Female valvifer I gradually narrowed, dorsal margin smooth in basal 3/4ths, weakly crenulate in distal ¼ (Fig. Fig. 36); valvula II dorsally smooth throughout (Fig. 37). COLOR (female Figs. 24-26, male 28-30). Yellow orange throughout except with 2 black marks along head lateral margin and pair straddling frontoclypeus larger than pair just below eyes, and in traverse narrow band on eyes (Figs. 25, 29). Pronotum surprahumeral spine apex black, 4-5 pale longitudinal stripes (along lateral margins and laterally in both genders (Figs. 24, 2, 28, 30), and in male [Fig. 28] also on medial carina), and 7 black marks posteriorly: 1 pair straddling base of middle apical spine, 1 pair lateral behind base of each lateral spine, and one on apex of each apical spines.
Material Examined. HOLOTYPE ♂ (EPNC/USNM) with labels “ECUADOR: NAPO: Reserva Ethnica | Waorani, 1 km. S Onkone Gare | Camp Trans. Ent 9. Feb 1995 | 220m | 11-Feb-1995 00 º39’10”S 076 º26’W | T.L Erwin: et al “, “Insecticidal fogging of mostly bare | green leaves, some with covering | of lichenous or bryophytic plants in | terre firme forest At Trans 1, | Sta. 2 Project MAXUS Lot 1021.” and red “HOLOTYPE | Quinquespinosa | septamacula | S.H. McKamey.” NON-TYPES: 16 specimens. Two (USNM) have the same data as the holotype except as noted: 1♀ 8-Feb-1996 Lot 971; 1♀ 29-Jun-1994 lot 755. The other specimens have the same data as the holotype except coordinates 00 º39’25.7”S 076 º27’10.8”W and otherwise noted: 1♀ 8-Feb-1996 lot#1470 (EPNC/USNM); 1♂, 1♀, 8-Feb-95 Lot 952 (USNM); 1♂ 6-Oct-1994 Lot 873 (EPNC/USNM); 1♀ 15-Jan-1994 Lot 579 (USNM); 2♂ 6-Jul-1995 Lot 1114 (EPNC/USNM); 1♀ 7 Oct-1995 Lot 1239 (EPNC/USNM); 1♀, 8-Feb-1996 Lot 1469 (USNM); 1♀ 3-Oct-1996 Lot 1729 (USNM). There are three non-Ecuadorian specimens: 1♂, (INPA/USNM) “BRAZIL: AMAZONAS | Rio Januaca, 40 | km sw Manaus | 10 Mar 1979 | 03 º20’ S. 060 º17’W”, “Montgomery, Erwin, | Sucharaov, Scxhimmel. | Kirischik, Date, | Bacon, Collectors”, “White water inun- | dation forest canopy | fogged with Pyrethrum | Sample #62. 1♀ (MNHN) “CAMOPI-OYAPOCK | GUYANE 19.Nov-1969, “GUYANE MISSION | BALACHOWSKY-GRUNER | OCT-NOV.1969”, “Piege | lumineux”, “Muséum Paris | 1095-5”. 2♀ (1 MUSM, 1 USNM) with labels “PERU: MADRE DE DIOS | Rio Manu, BIOLAT Biol. Sta., | Pakitza, 356m 26 Sep 1991 | 11º56’47”S 071º17’00”W” | T.L. Erwin”, “Insecticidal fog of bamboo at 4m | green, scattered dry leaves, stems | Tr. Zungaro /3.5 Lot 121.”
Distribution. Brazil, Ecuador, French Guiana, Peru.
Etymology. The specific epithet is feminine, based on the seven (*septa*-) black marks (-*macula*) on the posterior portion of the pronotum: four on the unified pronotum and one on the apex of each apical spine.

Notes. There is variability in the length of the suprahumeral spines and the size of the four preapical black spots; neither is correlated to body size or gender. The pronotum of the specimen from French Guiana (MNHN) is unique in being black only on the tips of the five spines, lacking the four other black marks altogether and is considered to be a variety, possibly geographical, of the same species.

The 13 specimens from Ecuador fogging samples in the Reserva Etnica Waorani were collected in January, February, June, July, and October, from 1994-1996. The Peruvian and French Guiana specimens were collected in September (1991) and November (1969), and the Brazilian specimen in March (1979). Considered together, the only gaps are April, May, August, and December. The April-May gap possibly represents the growth of a second generation but the one-month gaps are probably too short to indicate other generations. Other explanations are sampling error, annual or seasonal fluctuations in climate, or that the adults are present throughout the year.

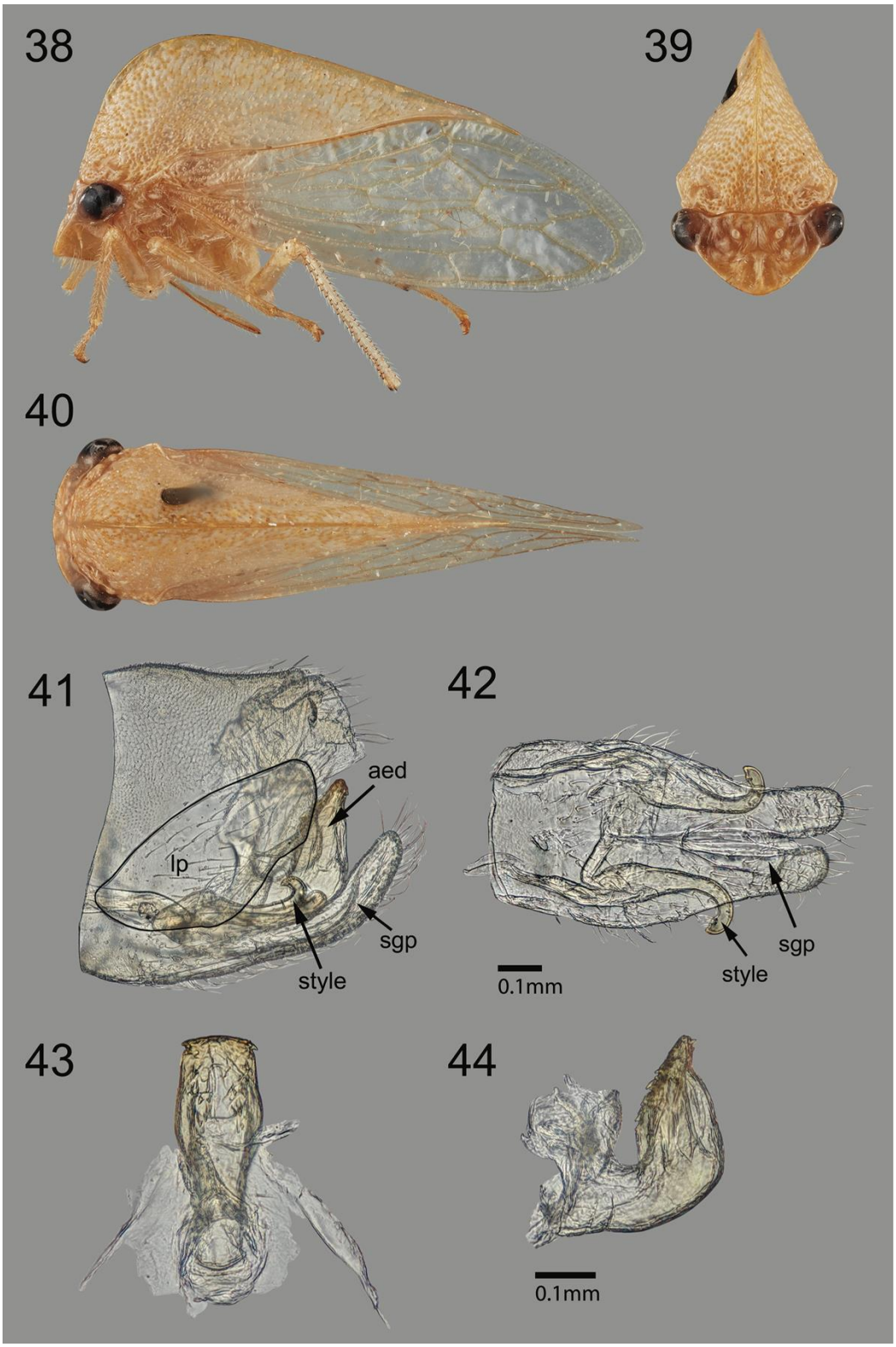
All specimens were collected by insecticidal fogging of the tree canopy (1 from inundation forest and the others from terre firme forest) except the specimen from French Guiana, which was collected at a light trap. Although various leafhoppers feed on bamboo, no treehoppers have been found feeding on it, so the bamboo record for the Peruvian specimen is probably not its host plant.

***Tectiforma* n. gen.**

(Figs. 38-45)

Type species: *Tectiforma guayasensis*, n. sp.
Diagnosis. This is the only acutaline genus with the pronotum tectiform throughout.

ARPHA Preprints *Author-formatted, not peer-reviewed document posted on 01/09/2022* DOI: https://doi.org/10.3897/arphapreprints.e94258



Figs. 38-44. *Tectiforma guayasensis*, n. sp. holotype. 38-49, Habitus view in lateral, anterior, and dorsal views, respectively. 41, Undissected pygofer and genitalia. 21, Subgenital plate and styles, ventral view. 43-44, Aedeagus in anterior and lateral views, respectively. *aed*, aedeagus; *lp*, lateral plate; *sgp*, subgenital plate.

ARPHA Preprints *Author-formatted, not peer-reviewed document posted on 01/09/2022* DOI: https://doi.org/10.3897/arphapreprints.e94258

Description. Overall body slender (Fig. 40). Head. Vertex inclined slightly forward, aligned with steep pronotal metopidium (Fig. 38); head vertex uneven, slightly swollen just ventrolateral of ocellus, glabrous, dorsal margin weakly sinuate, not attaining dorsal margin of eye, which is elevated (Fig. 39), ventral margin including frontoclypeus evenly convex ventrally with and convex, narrow vertical carina, its sutures evenly arched to middle; ocelli slightly oblong, divergent dorsally, slightly closer to each other than from eye (Fig. 39). Pronotum elevated anteriorly (Fig. 38), lacking suprahumeral spines (Fig. 39-40), laterally compressed and strongly tectiform from top of metopidium and posteriorly (Figs. 38, 40); metopidium in lateral view steeply inclined, gradually convex, then descending in straight line to apex; apex extends to mid-point between veins Cu and M_{3+4} (Fig. 38). Forewing with 2 discoidal cells (R_{2+3} and M), 2 m-cu crossveins (Fig. 45, top). Hind wing with forked anal vein (Fig. 45, bottom). Metathoracic tibia with cucullate setae row I double, row II and row III complete and single.
Distribution. Neotropical.
Etymology. The name is feminine and based on the strongly tectiform pronotum.
Notes. The forewing venation, with two discoidal cells, is identical to that of *Euritea*. The dorsomedial carina of *Cornutalis andinum* Flórez-V (2017) and *Osaria zacki* are tectiform, but in the new genus *Tectiforma* the entire pronotum is tectiform, attaining a much greater height above the humeral angle. so these cannot be confused for one another even without considering differences in forewing venation.

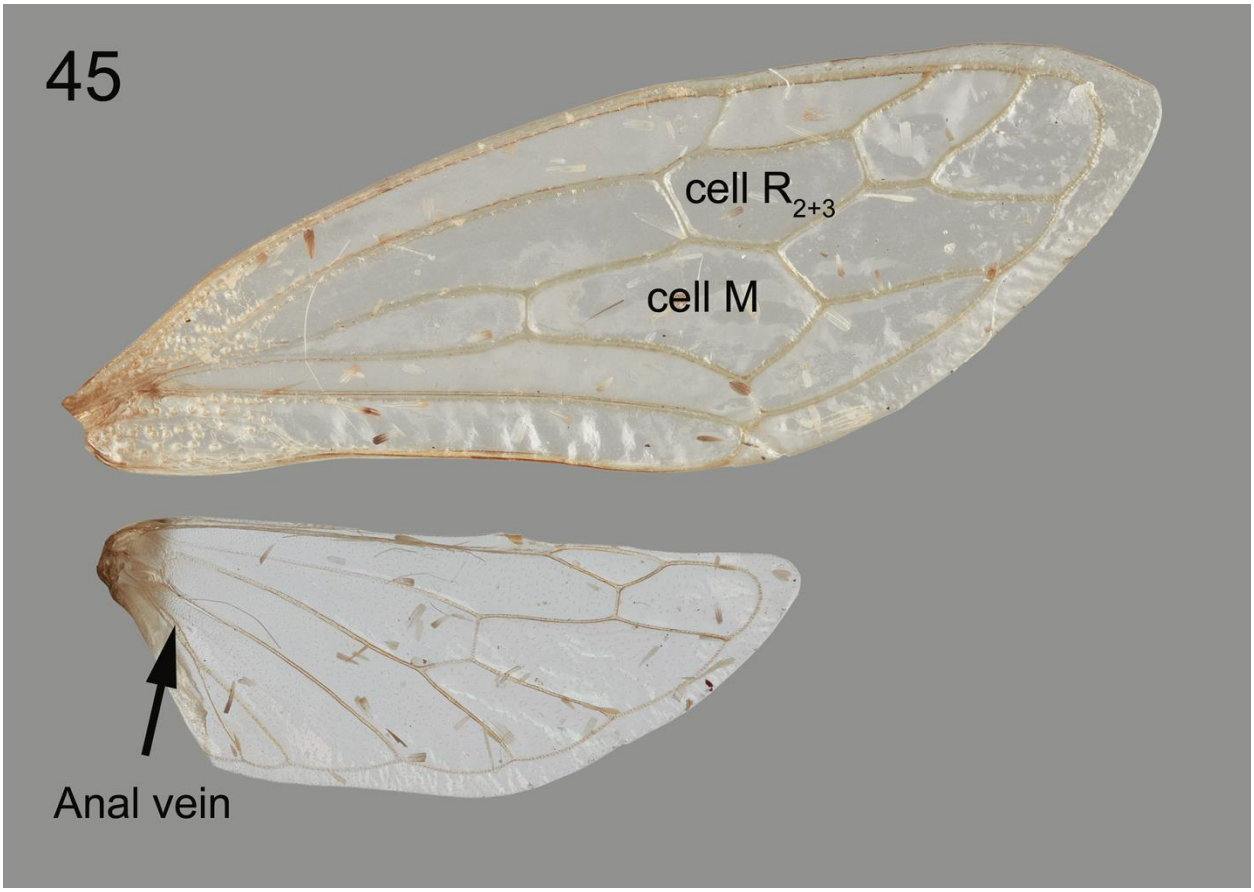


Fig 45. *Tectiforma guayasensis*, n. sp. holotype, wings, showing the two discoidal cells in the forewing and the forked anal vein in the hind wing.

***Tectiforma guayasensis* n. sp.**
(Figs. 38-45)

Diagnosis. Same as for genus: slender, pale green, with pronotum strongly tectiform.
Description of male. Measurements (mm). Length with forewing in repose 6.7; width across humeral angles 2.2; height in anterior view 2.9. Pronotum pale green throughout. Terminalia. Pygofer including lateral plate subquadrate in lateral view (Fig. 41); lateral plate large, ovoid, unarmed, bearing setae; styles (Fig. 42) simple, distally recurved and acute; aedeagus U-shaped in lateral view (Fig. 44), shaft apex with two small posterior spines (Figs. 43, 44), anterior surface with 2 columns of 5 larger spines each, inset from swollen lateral margins (most visible in lateral view, Fig. 44).
Female unknown.
Material Examined. Holotype ♂ (USNM) with labels "ECUADOR: Guayas. | Hac. San Joaquin, | 4 rd km SW Bucay | 1-4 May 1986 250m.", "S.H. McKamey lot | #86-0501-UV", and a red "HOLOTYPE | Tectiforma | guayasensis | S.H. McKamey".
Distribution. Ecuador.
Etymology. The specific epithet is based on Guayas, the province in which the holotype was collected.
Note. Collected at an ultraviolet light.

Discussion

Some of the above new species, most notably *Osaria zacki* and *Quinquespinosa septamacula*, are superficially similar to members of the tribe Ceresini. The distinctly tectiform posterior pronotom of *O. zacki* resembles some inornate Ceresini. In contrast, most inornate ceresine males have a slender lateral plate that bears a short to long protruding process, or "lateral tooth" (Kopp and Yonke 1979). *Quinquespinosa septamacula* resembles some ornate Ceresini. Most ornate ceresine males have lateral plates unarmed, as in *Q. septamacula*. However, all the above new species (with the possible exception of *O. quadrilinea*, whose males ate unknown) have the two sides of the male subgenital plate deeply divided (Figs. 19, 33, 42), in contrast to Ceresini (Kopp and Yonke 1979). Additionally, all the new taxa described here have forewing venation consistent with Acutalini, not Ceresini*:* basally separated R, M, and Cu veins, as opposed to Ceresini species, which have the R and M veins fused until the mid wing.

Acknowledgements

I thank Alyssa Seemann and Ben Proshek (USDA Systematic Entomology Laboratory) for taking and processing photographs, Dawn Flynn (Schiele Museum of Natural History, NC) for alerting me to the specimens of *Osaria zacki*, Richard Zack (Washington State University, WA) for allowing me to deposit the *O. zacki* specimens in the USNM, and Lewis Deitz (North Carolina State University, NC) for comments on an earlier draft of the manuscript. Mention of trade names or commercial products in this publication is solely for the purpose of providing specific information and does not imply endorsement by the USDA. The USDA is an equal opportunity provider and employer.

References

Bartlett CR, Deitz, LL, Dmitriev DA., Sanborn, AF, Soulier-Perkins, A, Wallace MS (2018) The diversity ot he true hoppers (Hemiptera: Auchenorrhyncha). pp. 501-590; color plates 11.3-11.5. *In* Foottit RG., Adler, PH (eds.). Insect Biodiversity: Science and Society, Vol 2. (1st edit.). John Wiley & Sons, Hoboken, New Jersey. xxxv + 987 pp.

Deitz LL (1975) Classification of the higher categories of the New World treehoppers (Homoptera, Membracidae). North Carolina Agricultural Experiment Station Technical Bulletin 225: 1–177.

Dietrich CH, McKamey SH, Deitz LL (2001) Morphology-based phylogeny of the treehopper family Membracidae (Hemiptera: Cicadomorpha: Membracoidea). Systematic Entomology 26: 213–239. https://doi.org/10.1046/j.1365-3113.2001.00140.x

Flórez-V C (2017) A new species of *Cornutalis* Sakakibara (Membracidae: Smiliinae: Acutalini) from Colombia. Zootaxa 4272(3): 439–445. https://doi.org/10.11646/zootaxa.4272.3.9

Kopp DD, Yonke TR (1979). A taxonomic review of the tribe Ceresini (Homoptera: Membracidae). Miscellaneous Publications of the Entomological Society of America 11(2): [ii] –97.

McKamey SH (1998) Taxonomic Catalogue of the Membracoidea (exclusive of leafhoppers): second supplement to Fascicle 1 — Membracidae of the General Catalogue of the Hemiptera. Memoirs of the American Entomological Institute 60: 1–377.

Sakakibara AM (1997) The tribe Acutalini Fowler (Homoptera, Membracidae, Smiliinae): new genera, new species and some nomenclatural changes. Revista Brasileira de Zoologia 14(3): 659–674. http://dx.doi.org/10.1590/S0101-81751997000300015

Sakakibara AM (1998) Taxonomic notes on *Darnoides* Fairmaire (Heteronotinae), with description of a new species and other new taxa in Darninae, Cymbomorphini (Homoptera, Membracidae). Revista Brasileira de Entomologia 42 (3-4): 141-146.

Sakakibara AM (1999) Nomenclatural notes in Membracidae (Homoptera): a new name for *Bordonia* Sakakibara. Revista Brasileira de Zoologia 16(4): 1227–1228. https://www.scielo.br/pdf/rbzool/v16n4/v16n4a31.pdf