ISSN 1405-4094 (edición impresa)
ISSN 2007-9133 (edición online)

DUGESIANA

Julio 2014

Volumen 21 Número 1

Disponible en línea
http://dugesiana.cucba.udg.mx

DEPARTAMENTO DE BOTÁNICA Y ZOOLOGÍA

Dugesiana, Año 21, No. 1, Enero-Junio 2014, es una publicación Semestral, editada por la Universidad de Guadalajara, a través del Centro de Estudios en Zoología, por el Centro Universitario de Ciencias Biológicas y Agropecuarias. Camino Ramón Padilla Sánchez # 2100, Nextipac, Zapopan, Jalisco, Tel. 37771150 ext. 33218, http://dugesiana.cucba.udg.mx, glenusmx@gmail.com. Editor responsable: José Luis Navarrete Heredia. Reserva de Derechos al Uso Exclusivo 04-2009-062310115100-203, ISSN: 2007-9133, otorgados por el Instituto Nacional del Derecho de Autor. Responsable de la última actualización de este número: Coordinación de Tecnologías para el Aprendizaje, Unidad Multimedia Instruccional, M.B.A. Oscar Carbajal Mariscal. Fecha de la última modificación Agosto 2014, con un tiraje de un ejemplar.

Las opiniones expresadas por los autores no necesariamente reflejan la postura del editor de la publicación.

Dugesiana 21(1): 1-29
Fecha de publicación: 31 de julio de 2014

ISSN 1405-4094 (edición impresa)
ISSN 2007-9133 (edición online)

A new genus of oak gallwasp, *Melikaiella* Pujade-Villar Hymenoptera: Cynipidae: Cynipini), from the Nearctic region

Un Nuevo género de cinípido gallícola de encinos, Pujade-Villar (Hymenoptera: Cynipidae: Cynipini), para la región neártica

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ABSTRACT

A new genus of oak gallwasp, *Melikaiella* Pujade-Villar n. gen. is described, with four new species: *M. amphibolensis* Pujade-Villar n. sp., *M. bicolor* Pujade-Villar n. sp., *M. reticulata* Pujade-Villar n. sp. from Mexico and *M. ostensackeni* Pujade-Villar n. sp. from USA. *Callirhytis sonorae* Weld from Mexico, *C. corrugis* Bassett, *C. flora* Weld, *C. fructicola* Ashmead, *C. fructuosa* Weld, *C. lupana* Weld, *C. tumifica* (Osten-Sacken) and *Cynips papula* Bassett from USA, are transferred to *Melikaiella*. *Callirhytis petrosa* Weld is a new synonymy of *Melikaiella corrugis* n. comb. *Cynips quercusmodesta* (O. Sacken) has an uncertain status and it is considered here as a *nomina dubia*. Synonymy of *Cynips papula* and *Cynips quercusmodesta* is rejected. Data on biology and distribution of the new genus is commented. The diagnostic characters are illustrated. The variability of *C. flora* sexual and asexual forms is discussed. A key to twelve species of *Melikaiella* is given.

Key words: Cynipidae, gallwasp, *Melikaiella*, taxonomy, morphology, distribution, biology.

RESUMEN

Se describe un nuevo género de cinípido gallícola de encinos, *Melikaiella* Pujade-Villar n. gen., y cuatro especies nuevas: *M. amphibolensis* Pujade-Villar n. sp., *M. bicolor* Pujade-Villar n. sp., *M. reticulata* Pujade-Villar n. sp. de México y *M. ostensackeni* Pujade-Villar n. sp. de USA. *Callirhytis sonorae* Weld de México, *C. corrugis* Bassett, *C. flora* Weld, *C. fructicola* Ashmead, *C. fructuosa* Weld, *C. lupana* Weld, *C. tumifica* (Osten-Sacken) y *Cynips papula* Bassett de USA, son transferidas a *Melikaiella*. *Callirhytis petrosa* Weld es una nueva sinonimia de *Melikaiella corrugis* n. comb. *Cynips quercusmodesta* (O. Sacken) presenta status incierto y es considerada en este estudio como *nomina dubia*. Se rechaza la sinominia entre *Cynips papula* y *Cynips quercusmodesta.* Se proporcionan datos de la biología y distribución de éste nuevo género. Se comenta la variabilidad observada de la forma sexual y agámica de *C. flora* sexual. Se expone una clave de determinación que para las doce especies que incluye *Melikaiella*.

Key words: Cynipidae, gallícola, *Melikaiella*, taxonomía, morfología, distribución, biología.

The most important contributions to the knowledge of the Cynipidae fauna from Mexico were made by Kinsey (1936, 1937a, 1937b, 1938), based on several collecting expeditions to Mexico and Central America in 1931-32 and 1935-36, in which he described more than 130 species. Since Kinsey, very few works were published on Mexican cynipids (Pujade-Villar *et al.*, 2009a; 2009b; 2012b); some taxonomic modifications were proposed (Weld, 1952; Melika & Abrahamson, 2002) and a few new species were described (Weld, 1944, 1957; Dailey & Sprenger, 1977; 1983; Melika *et al*., 2009, 2011; Nieves-Aldrey *et al*., 2012 and Pujade-Villar *et al*., 2010, 2011a, 2011b, 2012d).

The species diversity of the Mexican gallwasps, especially oak gallwasps, is extraordinarily high, with around 154 known species, which are trophically associated with more than 30 oak species (Pujade-Villar *et al.*, 2009b), while approximately 150 *Quercus* species are known from Mexico (Govaerts & Frodin, 1998; Valencia, 2004). According to Pujade-Villar *et al.* (2009b), a total of ten gallwasp genera have been recorded from Mexico: however, the generic placement of some species is doubtful and must be revised. Recently, a new genus was described from this region, *Kinseyella* Pujade-Villar & Melika, 2010 (in Pujade-Villar *et al*., 2010). Several unknown galls are in process of identification (Pujade-Villar *et al*., 2012a, 2013), so the current knowledge of the Mexican Cynipidae is still poor. This study increases the knowledge of Mexican cynipids, with the description of a new genus, *Melikaiella* Pujade-Villar n. gen., with descriptions of several new gallwasp species from Mexico and transferring several Nearctic *Callirytis* species to the newly established genus and thus reduce the chaotic status of *Callirhytis* sensu Weld (1952) in the Nearctic.

Melikaiella Pujade-Villar n. gen. closely resembles *Callirhytis* 'sensu lato' (Weld, 1952). *Callirhytis* was erected by Förster (1869) to include several European species; later Weld (1922a, 1922b, 1926, 1952) included many species into *Callirhytis*, neglecting the diagnostic characters of *Callirhytis* given by Förster (1869). As a consequence, *Callirhytis* has become a chaotic genus, with many Nearctic species not being true *Callirhytis*. After examining around 70 Nearctic species of *Callirhytis*, we conclude that eight of them belong to *Melikaiella* Pujade-Villar n. gen.

MATERIAL AND METHODS

Cynipid galls were collected in the following Mexican states: Mexico D.F., Hidalgo and Tlaxcala, from *Quercus acherdophylla* Trel., *Q. crassipes* Bonpl., *Q. laurina* Bonpl., *Q. mexicana* Humboldt & Bonpland (Mexican endemics); *Q. crassifolia* Humb. & Bonpl. (present in Mexico and Guatemala) and *Q. rugosa* Née (present in Mexico and southern Arizona, USA); all of them belong to the *Lobatae* section of *Quercus*. The galls were kept in aerated receptacles for rearing adults. The obtained adults were preserved in 70% ethylalcohol until the morphological studies were carried out at the Barcelona University, Spain. We also examined holo- and syntypes of around 70 Nearctic *Callirhytis* species, nine of which are mentioned in this study: *C. corrugis* Bassett, *C. electreae* Weld, *C. flora* Weld sexual, *C. flora* (= *C. milleri* Weld) asexual, *C. fructicola* Ashmead, *C. fructuosa* Weld, *C. lupana* Weld, *C. quercuspomiformis* (Bassett), *C. sonorae* Weld, *C. tumifica* (Osten-Sacken) and *Cynips papula* Bassett, all are deposited at the United States National Museum (USNM, Washington, USA). We also studied specimens of several species from G. Melika collection (Plant Health and Molecular Biology Laboratory, Budapest, Hungary; PHMB) and from the collection of the Californian Academy of Sciences (CAS, California, USA).

We follow the current terminology of morphological structures (Liljeblad & Ronquist, 1998; Melika, 2006). Abbreviations for forewing venation follow Ronquist & Nordlander (1989), cuticular surface terminology follows Harris (1979). Measurements and abbreviations used include: F1–F12, first and subsequent flagellomeres; POL (post-ocellar distance) is the distance between the inner margins of the posterior ocelli; OOL (ocellar-ocular distance) is the distance from the outer edge of a posterior ocellus to the inner margin of the compound eye; LOL (lateral-frontal ocellar distance) is the distance between lateral and frontal ocelli. The width of the forewing radial cell is measured from the margin of the wing to the Rs vein.

Scanning electron microscope (SEM) images of some described new species were taken with the Leica Stereoscan-360 at high voltage (10 kV) with gold coating, in the "Serveis de Microscopia Electrònica" at Barcelona University (UB); SEM pictures of old type material and *Melikaiella reticulata* Pujade-Villar n. sp. were taken with the Stereoscan Leica-360 at low voltage (700V) and without coating, in order to preserve these specimens. The habitus and forewing of the adult were photographed with a digital camera-21C INFINITYX attached to a compound microscope Zeiss Discovery V8; the program DeltaPix View AZ-Pro was used to combine the series of images obtained in one single image.

The type material of the new species is deposited in the J. Pujade-Villar collection (UB, University of Barcelona, Spain) and in G. Melika collection (PHMB, Plant Health and Molecular Biology Laboratory, Budapest, Hungary). The abbreviatures used in the Type Material are:

AMNH, American Museum of Natural History, New York, USA (curator J.M. Carpenter).
CAS, California Academy of Sciences (curator R: Zuparko)
PHMB, Plant Health and Molecular Biology Laboratory, Budapest, Hungary (curator G. Melika).
UACH, Universidad Autónoma de Chapingo (David Cibrián collection).
UB, Universitat de Barcelona, España (curator J. Pujade-Villar).
USNM, U.S. National Museum of Natural History, Smithsonian Institution, Washington, DC, U.S.A. (curator M. Buffington).

RESULTS

Description of new genus

Melikaiella Pujade-Villar n. gen.

Diagnosis. *Melikaiella* belongs to a group of Cynipini genera which possess with the transscutal articulation and most closely resembles *Belonocnema*, *Biorhiza*, *Callirhytis*, *Loxaulus* and *Trigonaspis* in having the malar sulcus, however, differs from the mentioned genera by the presence of the circumscutellar carina and areolate surface sculpture on the metasomal tergites. Furthermore, *Melikaiella* differs from these genera by the coriaceous to rugose sculpture of the mesoscutum (smooth in *Belonocnema*, *Biorhiza*, *Trigonaspis*, transversally carinate in *Callirhytis*, net-like reticulate in *Loxaulus*); males of *Melikaiella* differ from *Belonocnema*, *Biorhiza*, *Callirhytis* and *Trigonaspis* also by the surface sculptured of the mesoscutum (see above) and from *Loxaulus* by the absence of the medial longitudinal carina in the central propodeal area. In *Melikaiella* females the forewing margin without cilia, a character shared with *Callirhytis*, while in *Belonocnema*, sexual *Biorhiza*, sexual *Trigonaspis*, sexual and some asexual forms of *Loxaulus* the forewing margin with cilia (asexual forms of *Biorhiza* and *Trigonaspis* are apterous). In *Melikaiella* carinae present only along the malar sulcus or they are absent, while in *Callirhytis* irradiating carinae from clypeus present in the entire malar area and going on the lower face up to toruli.

Description. Sexual and asexual forms. FEMALE. Malar sulcus present, usually with some carinae along side, carinae absent on lower face. Antenna 12 to 15-segmented . Mesoscutum rugose, dull coriaceous to coriaceous. Notauli present, complete or incomplete. Mesoscutellum with transverse impression anteriorly, scutellar foveae present but weakly delimited, sometimes separated by weak median carina, with carinate bottom; circumscutellar carina present. Mesopleuron sculptured, mesopleural triangle reduced to narrow band. Propodeum with lateral propodeal carinae weakly curved, central propodeal area with some longitudinal carinae or rugae, coriaceous. Forewing margin without cilia, with short surface pubescent, radial cell opened along margin. Tarsal claws simple, basally broadened. Metasomal tergites laterally glabrous, with aerolate sculptutre beginning from 1st, 2nd or 3rd metasomal tergite. Prominent part of ventral spine of hypopygium needle-like, short, with some subapical sparse setae not forming a tuft. MALE.

Similar to female, except antenna 15 to 16-segmented, F1 curved and forewing margin ciliate.

Etymology. The new genus is named in honour of George Melika, cynipidologist and friend.

Gender: female.

Type species: *Melikaiella amphibolensis* Pujade-Villar n. sp.

Description of new species

***Melikaiella amphibolensis* Pujade-Villar** n. sp.
(Figs. 1- 5)

Diagnosis. *Melikaiella amphibolensis* differs from other *Melikaella* species by the short notauli, the mesoscutum is strongly coriaceous, with some rugose sculpture in females, coriaceous with few rugae in males; the mesoscutum is not humped in lateral view; in females F1 longer than F2.

Description. Sexual form.

Length. Female 2.1-2.5 mm (n= 6); male: 1.6-1.7 mm (n= 2)

Colour. Female (Fig. 5e). Head and mesosoma brown, frons and genae brown to black, vertex black; teeth of mandibles black; compound eyes grey; antennae brown, darker distally; mesoscutum black, centrally brown, mesoscutellum black; mesonotum laterally black, central part of pronotum brown; legs black, with lighter tarsi and first tibia; metasoma black, lighter in anterior and basal areas. MALE: body uniformly black, antennae and legs brown.

Head. Female (Figs 1a-b, g). Strongly coriaceous, center coriaceous-rugose; slightly broader than mesosoma, 1.25 times as broad as high, transversally oval in front view; gena coriaceous, broadened behind eye, around 0.4 times as broad as cross diameter of eye, measured along transfacial line; malar space with sulcus, 0.3 times as long as eye height, with few striae, radiating from clypeus and nearly reaching eye margin; POL:OOL:LOL=5:5:2, diameter of lateral ocellus 2; head 2.5 times as broad as long in dorsal view; lower face and frons strongly coriaceous, without frontal carinae. Transfacial distance 1.3 times compound eye length; internal margin of compound eye slightly convergent. Distance from compound eye to toruli larger than diameter of torulus, distance between toruli less than torulus diameter. Clypeus impressed, quadrangular, delicately coriaceous, emarginate ventrally, medially incised, anterior tentorial pits small, differentiated; epistomal sulcus and clypeo-pleurostomal line distinct, broad, impressed. MALE (Figs 1c-d). Similar to female except: head strongly coriaceous in central part; genae less broadened behind eye; striae in malar area less impressed; transfacial distance 1.15 times length of compound eye. POL:OOL:LOL=7:5:3, diameter of lateral ocellus 3.

Antenna. Female (Fig. 1e): with 12 flagellomeres; F1 slightly longer than F2, F1 weakly curved, F1 and F2 broader distally, F2 broader than F1; subsequent flagellomeres progressively shorter, F11 longer than F10; antennal formula: 4: 2.5 (x1.75): 6(x1.25): 4.5(x1.75): 4: 4: 3.5: 3.25: 3: 3: 3: 3: 3: 3.5; F3 and subsequent flagellomeres with placodeal sensilla. MALE (Fig. 1f): with 13 flagellomeres; antennal formula: 4: 3(x2.5): 8(x2): 7(x3): 6: 6: 5: 5: 5: 5: 4.5: 4.5: 4.5: 4.5: 4; all flagellomeres with placodeal sensilla; F1 strongly curved; F2-F4 convex in external lateral part; F5-F12 barrel-shaped.

Mesosoma. Female (Figs. 2a, c, e-f). Longer than high, concave laterally. Sides of pronotum rugose with strong carinae postero-basally, antero-lateral rim of pronotum strongly carinate, with deep invagination along side. Mesoscutum slightly longer than broad in dorsal view; notauli incomplete extending most to 1/3 of mesoscutum length, parapsidal lines distinct, anterior parallel lines differentiated; median mesoscutal line absent or poorly defined basally. Mesoscutum rugose or rugoso-carinate, with strongly coriaceous interspaces. Mesopleuron alutaceous, weakly carinate in basal half; metapleural triangle reduced to a cross band. Mesoscutellum rounded and conspicuously marginate, as long as broad in dorsal view, uniformly rugoso-coriaceous; scutellar foveae weakly delimited, almost confluent, superficial, with few longitudinal rugae and coriaceous bottom; median carina absent or very inconspicuous. Propodeum weakly and uniformly coriaceous, with some rugae and pubescent; lateral propodeal carinae weakly arched, with some radiating weaker carinae on its inner side; central propodeal area coriaceous. Metamesoscutellum subrectangular, coriaceous. Ventral bar of metanotal trough coriaceous; metanotal trough with some longitudinal carina, glabrous. Nucha well-developed, carinate. Male (Figs. 2b, 2d): Similar to female except: mesoscutum and mesoscutellum with weak rugae; median mesoscutal line absent; carinae of propodeum better defined.

Forewing Female (Fig. 3a): As long as body, with micro-pubescent surface, not ciliate on margins; radial cell opened, around 4.1 times as long as broad; veins yellowish; R1 curved backward; areolet absent. Male (Fig. 3b): similar to female but with margin cilia and pubescent on surface.

Legs. Tarsal claws simple, broad basally (Fig. 2g).

Metasoma. Female (Fig. 4) shorter than head and mesosoma together, longer than high; first metasomal tergite with aerolate sculpture, sometimes weak, with few and sparse setae laterally, subsequent tergites without pubescence; second and subsequent tergites areolate, smooth in distal part; prominent part of ventral spine of hypopygium short, as long as wide, with long and sparse setae. MALE first metasomal tergite smooth without pubescence; second and subsequent tergites weakly areolate.

Type material. HOLOTYPE ♀ labeled as "Parque Nacional Bosque del Pedregal (Estado México D.F., México), [Tlalpan Forest (19° 17' 27.72''N, 99° 11' 59.31"W; 2440 m a.s.l.)], (21-vi-2010) vii-2010, M. Serrano col." (white label); "Holotype *Melikaiella amphibolensis*" (red label), "*Melikaiella amphibolensis* ♀ JP-V det. & desig., sexual gen." (white label). PARATYPES (2 ♂ and 8 ♀): with the same data as holotype except paralectotype label. Holotype and paratypes deposited in JP-V collection (UB).

Additional material. 4 ♀ and 1 ♂ cutted out from galls in October, 2011.

Gall (Fig. 5a)**.** A leaf gall, on the underside as a deformation of leaf veins (usually the main vein or main and secondary veins together). Plurilocular, elongated, 10-20 x 5-12 mm, yellowish, smooth surface with abundant stellate hairs on sides. Larval chambers (2.1x1.3 mm) disposed transversally, separated by a spongious tissue. The gall becomes hard after adults have emerged. Sometimes, marks of veins can be seen on the surface of the gall. Upper surface of leaf not deformed, sometimes the surface is undulated.

Host plant. *Quercus mexicana* Humb. & Bonpl. (subgen. *Quercus,* section *Lobatae)*, endemic of Mexico (Valencia, 2004).

Distribution. Mexico (D.F.).

Biology. Only the sexual form is known. The galls develop in May and mature in June. Adults start to emerge in July (Fig. 5b-e). Parasitoids were not obtained.

Etymology. The species name refers to the sculpture of female mesoscutum, which somehow resembles the genus *Amphibolips*.

***Melikaiella bicolor* Pujade-Villar** n. sp.
(Figs. 6-7, 16a-b)

Diagnosis. *Melikaiella bicolor* differs from all other *Melikaiella* species by F1=F2 in males, F1 near 3.0 times longer than pedicel in females; notauli are complete but superficial, the mesoscutellum is not humped in lateral view, the mesoscutum is coriaceous, with some rugae.

Description. Sexual form.

Length. FEMALE 1.8-2.6 mm (n= 40); MALE: 1.6-1.9 mm (n= 20).

Colour. FEMALE (Fig. 16b): head and mesosoma amber to black; teeth of mandibles amber; compound eyes grey; antennae brown, darker distally; mesoscutum dorsally amber, mesoscutellum black; mesonotum laterally darker, central part of pronotum amber to black; legs darker, tarsi, femur and tibiae anteriorly lighter; metasoma black. MALE (Fig. 16a): body uniformly black, antennae and legs brown.

Head. FEMALE (Figs. 6a-c). Strongly coriaceous, coriaceous-rugose above toruli; slightly wider than mesosoma, around 1.4 times as broad as high, transversally oval in front view; gena coriaceous, broadened behind eye, around 0.3 times as broad as diameter of eye, measuring along transfacial line; malar space with sulcus, 0.5 times as long as eye height, with some few striae, radiating from clypeus and nearly reaching eye margin; POL:OOL:LOL=5:5:2.5, diameter of lateral ocellus 2; 2.2 times as broad as long in dorsal view; lower face and frons strongly coriaceous lacking frontal carinae. Transfacial distance 1.4 times the compound eye height; internal margin of compound eye slightly convergent. Distance from compound eye to torulus larger than diameter of torulus, distance between toruli less than diameter of torulus. Clypeus impressed, quadrangular, delicately coriaceous, emarginate ventrally, medially incised, anterior tentorial pit small, differentiated; epistomal sulcus and clypeo-pleurostomal line distinct, broad, impressed. MALE (Fig. 6e): similar to female except: head strongly coriaceous in central part, with some rugae; genae less broadened behind eye; striae from clypeus in malar area less impressed; around 1.3 times as broad as high in frontal view; transfacial distance 1.2 times length of compound eye; malar space around 0.3 times as long as eye height. POL:OOL:LOL=4.5:4:2.25, diameter of lateral ocellus 2.

Antenna. FEMALE: with 12 flagellomeres; F1 slightly longer than F2, F1 weakly curved, F1 and F2 slightly broader distally, F2 slightly broader than F1 (Figs. 6a-b); subsequent flagellomeres progressively shorter, F11 equal to F10; antennal formula: 5: 2.5 (x1.5): 7(x1.5): 6.5(x2): 6: 5.5: 5: 4: 3.5: 3.5: 3: 3: 3: 3.5; F3 and subsequent flagellomeres with few placodeal sensilla. MALE (Fig. 6h): antenna with 13 flagellomeres; antennal formula: 4: 2(x2): 7(x2.5): 7: 6.5: 6: 5.5: 5: 5: 5: 4.5: 4.5: 4.5: 4.5: 4.5: 4; all flagellomeres with placodeal sensilla; F1 strongly curved; F2-F4 convex in external lateral part; F5-F12 barrel-shaped.

Mesosoma. FEMALE (Figs. 6c, d, f). Longer than high, concave laterally. Sides of pronotum rugose, with strong carinae postero-basally, antero-lateral rim of pronotum carinate basally, with deep invagination along side. Mesoscutum slightly longer than broad in dorsal view; notauli complete, slightly impressed basally, median mesoscutal line absent; parapsidal lines distinct, anterior parallel lines differentiated. Mesoscutum coriaceous-reticulate, usually with some rugae between notauli. Mesopleuron coriaceous-carinate, smooth in antero-basal part; metapleural triangle reduced to cross band. Mesoscutellum rounded and marginate, as long as broad in dorsal view, uniformly rugoso-coriaceous; scutellar foveae weakly differentiated, almost confluent, superficial, with some carinae on coriaceous bottom; median carina inconspicuous. Propodeum weakly and uniformly coriaceous, pubescent with some rugae; lateral propodeal carinae defined, weakly arched, with few impressed carinae on its inner side; central propodeal area weakly coriaceous. Metascutellum subrectangular, coriaceous. Ventral bar of metanotal trough coriaceous; metanotal trough with some longitudinal carina, glabrous. Nucha developed, carinate. MALE (Figs. 6e, g): like female except: mesoscutum and mesoscutellum with very few linear elements; propodeal area longer than broad; carinae in central propodeal area better defined.

Forewing. FEMALE. As long as body, surface micro-pubescent, margin without cilia; radial cell opened, around 3.2 times as long as broad; veins yellowish; R1 curved backward; areolet absent. MALE: similar to female but wing margin with cilia and pubescent on surface.

Legs. Tarsal claws simple, with broad basal part.

Metasoma. FEMALE (Fig. 6i). Shorter than head and mesosoma together, longer than high; first metasomal tergite smooth, with few sparse setae laterally, subsequent tergites without pubescence; second tergite smooth or with very weak sculpture; third and subsequent tergites sculptured, alutaceous, smooth in distal part; prominent part of ventral spine of hypopygium short, as long as broad, with long and sparse setae.

Type material. HOLOTYPE ♀ labeled as "MEX (035), Fray Francisco, El Arenal (Hidalgo), Ex. *Q. crassifolia*, (10.vi.2010) vi-2010, JP-V leg." (white label); "Holotype *Melikaiella bicolor*" ♀ JP-V det. & desig., sexual gen." (red label). PARATYPES (38 ♂ and 53 ♀): with the same data as holotype except paratype label. 15 ♂ and 25 ♀ paratypes deposited in JP-V collection (UB); 10 ♂ and 15 ♀ paratypes deposited in PHMB; 5 ♂ and 5 ♀ paratypes deposited in USNM; 8 ♂ and 8 ♀ paratypes deposited in UACH.

Additional material. MEX (035), 19 ♂ and 94 ♀ with the same data as the type material (4 ♂ and 19 ♀ deposited in PHMB). MEX (036), Propiedad la Victoria, Barrio La Tlazintla, Municipio Acaxochitlan (Hidalgo), Ex. *Q. rugosa*, (8.vi.2010) vi-2010: 7♂ & 1♀ (2 ♂ deposited in PHMB). MEX (037), Fray Francisco, El Arenal, (Hidalgo), Ex. *Q. acherdophylla*, (10.vi.2010) vi-2010: 1♂, leg JP-V. MEX (038), San Marcos (Tlaxcala), Ex. *Q. crassipes*, (03. vi.2010) vi-2010: 2♂ & 2♀, leg JP-V (2 ♂ in PHMB). MEX (044), Fray Francisco, El Arenal (Hidalgo), Ex. *Q. laurina*, (10.vi.2010) vi-2010: 4♀, leg JP-V (2 ♀ in PHMB). MEX (049): Propiedad La Victoria, Barrio La Tlazintla, municipio Acaxochitlan (Hidalgo), Ex. *Q. laurina*, (7.vi.2010) vi.2010: 2 ♂& 8 ♀, leg JP-V (4 ♀ in PHMB).

Gall (Fig. 7)**.** Plurilocular. Distal part composed of strongly swollen young branches (20-30 x 30-40 mm). More or less circular or oval in cross-section; larval chambers (3x1.7 mm) are nested perpendicularly to the longitudinal axis of the branch, occupying radially the entire space of the gall in cross-section. Green, easily cuttable; brown after the adults emerged and hard interiorly; the external epidermis and the tissue between larval chambers are easy to cut. Surface smooth, verrucose where the leaf petioles are inserted.

Host plant. All hosts belong to section *Lobatae*: *Q. acherdophylla* Trel., *Q. crassipes* Bonpl. *Q. laurina* Bonpl. (Mexican endemics), *Q. crassifolia* Humb. & Bonpl. (present in Mexico and Guatemala), *Q. rugosa* Née (present in Mexico and southern Arizona, USA) (Valencia, 2004).

Adults variability. Specimens reared from galls on *Q. crassifolia* with stronger rugose sculpture of the mesoscutum, while adults obtained from other *Quercus* species have a weaker rugose mesoscutum. Some adults obtained from *Q. laurina* with a dark to black mesoscutum.

Distribution. Mexico (Hidalgo and Tlaxcala).

Biology. Only the sexual form is known. Galls develop in May and mature in June. Adults start to emerge in June. In August many parasitoids of Eulophidae, Eurytomidae, Eupelmidae Pteromalidae and Ormyridae (Chalcidoidea), and several *Synergus* (Cynipidae) inquilines were obtained.

Etymology. The specific name refers to the coloration of females: an amber light mesoscutum, while the rest of the body is much darker.

***Melikaiella ostensackeni* Pujade-Villar** n. sp.
(Figs. 8, 15c, 16k-l)

Diagnosis. *Melikaiella ostensackeni*, with the only known sexual form, closely resembles *Melikaiella tumifica* (see below). In *Melikaiella ostensackeni* the mesoscutum is not humped in lateral view, lateral propodeal carinae straight, the median propodeal carina present, while in *M. tumifica* the mesoscutum is humped medially in lateral view, lateral propodeal carinae bented outwards in the middle, the median propodeal carina is absent . The females also are similar to the sexual females of *M. flora* but in *M. ostensackeni* forewings are not smocked.

Description. Sexual form.

Length. FEMALE: 1.9-2.2 mm (n= 20);MALE: 1.2-1.4 mm (n= 10).

Colour. FEMALE (Fig. 16l): brown, head and legs ligther; mandibles, clypeus and lower face yellowish; antennae brown distally; mesoscutum dorsally amber, mesoscutellum darker; mesonotum laterally ligther. MALE (Fig. 16k): body chestnut; clypeus, lower face, antennae and legs yellowish.

Head. FEMALE (Figs 8a-b, j). Coriaceous, above toruli strongly coriaceous centrally; slightly wider than mesosoma, around 1.2-1.3 times as broad as high, transversally oval in front view; gena coriaceous, slightly broadened behind eye; malar space with sulcus, around 0.5 times as long as eye height, with few striae, radiating from clypeus and nearly reaching eye margin, almost smooth and shiny dorsally; POL:OOL:LOL=22:19:8, diameter of lateral ocellus 8; 2.7 times as broad as long in dorsal view; lower face and frons coriaceous, without frontal carinae. Transfacial distance 1.9 times compound eye height; internal margin of compound eye slightly diverge. Distance from compound eye to torulus larger than torulus diameter (17:10), distance between toruli less than diameter of torulus. Clypeus impressed, quadrangular, delicately coriaceous, emarginate ventrally, medially incised, anterior tentorial pit small, differentiated; epistomal sulcus and clypeo-pleurostomal line distinct, broad, impressed. MALE: similar to female except: genae less broadened behind eye; striae in malar area more impressed; transfacial distance 1.1 times length of compound eye; malar space around 0.3 times as long as eye height. POL:OOL:LOL=20:17:13, diameter of lateral ocellus 10.

Antenna. FEMALE (Fig. 8e): with 12 flagellomeres; F1 slightly longer than F2, F1 straigth, slightly broader distally, F2 as broad as F1; subsequent flagellomeres progressively shorter, F12 twice longer than F11, F6-F12 broadest; antenal formula: 13: 10 (x7): 22(x6): 18(x6): 14: 14: 12: 12: 11: 10: 10: 9: 9: 18; F3 and subsequent flagellomeres with few placodeal sensilla. MALE (Fig.8f): antenna with 13 flagellomeres; antennal formula: 8(x8): 8(x7): 19: 15: 14: 12: 10: 10: 10: 10: 10: 10: 9: 8: 13; all flagellomeres with placodeal sensilla; F1 strongly curved; F2-F4 convex in external lateral part; F5-F12 barrel-shaped.

Mesosoma. FEMALE (Figs. 8c, d, i). Longer than high, concave in lateral wiew. Sides of pronotum coriaceous, with strong carinae postero-basally, antero-lateral rim of pronotum carinate basally, with deep invagination along side. Mesoscutum slightly longer than broad; notauli deep and complete, median mesoscutal line inconspicous; anterior parallel lines differentiated, parallel; parapsidal lines distinct. Mesoscutum strongly coriaceous, with some rugae between notauli basally. Mesopleuron coriaceous-carinate, alutaceous in anterior basal part; metapleural triangle reduced to narrow band. Mesoscutellum rounded and marginate, as long as broad, uniformly rugoso-coriaceous; scutellar foveae differentiated, separated by carina, bottom with some carinae. Propodeum weakly and uniformly rugoso-coriaceous, glabrous; lateral propodeal carinae weakly defined, parallel anteriorly, bented basally, with median impressed carinae; central propodeal area alutaceous. Metascutellum subrectangular, coriaceous. Ventral bar of metanotal trough coriaceous; metanotal trough with few longitudinal carina, glabrous. Nucha developed, carinate. MALE (Figs. 8f-h, l): like female except: mesoscutum without rugae; mesoscutellum coriaceous centrally; propodeal area longer than broad; lateral propodeal carinae subparallel, carinae in central propodeal area better defined.

Forewing. FEMALE. Slightly shorter than body, with micro-pubescent surface, wing margin without cilia; radial cell opened, around 2.7 times as long as broad; veins yellowish; R1 stright; areolet present, spectral. MALE: similar to female but wing margin with cilia, wing surface pubescent.

Legs. Tarsal claws simple, with broad base.

Metasoma. FEMALE (Fig. 8k). As long as head and mesosoma together, as long as high; first metasomal tergite glabrous, distally alutaceous; second and subsequent tergites sculptured; prominent part of ventral spine of hypopygium short, as long as broad, with long and sparse setae.

Type material. HOLOTYPE ♀ (deposited in USNM) with the following labels: "13614 Hopk. U.S.", "Reared June 1-15

WMiddleton", "*Callirhytis q. modesta* (Os.)", "*Callirhytis quercusmodesta* (O. Sacken, 1861) det. Weld", "Holotype *Melikaiella ostensackeni* Pujade-Villar n. sp., design. J.P-V 2013" (red label). PARATYPES (25 ♂ & 31 ♀): 2♂ & 6♀: "13612 Hopk. U.S.", "Reared June 1-15 WMiddleton", "*Quercus rubra*", "Hyattsville Md.", "P. Boone Col." "*Callirhytis quercusmodesta* (O. Sacken, 1861) det Weld", "Holotype *Melikaiella ostensackeni* Pujade-Villar n. sp., design. J.P-V 2013" (red label); 10♂ & 1♀ (1♂ UB): "13614 Hopk. U.S.", "Reared June 1-15 WMiddleton", "Ex gall of *Callirhytis modesta*" "*Callirhytis quercusmodesta* (O. Sacken, 1861) det Weld", "Holotype *Melikaiella ostensackeni* Pujade-Villar n. sp., design. J.P-V 2013" (red label); 2♂ & 4♀ (2♀ UB): "13614 Hopk. U.S.", "Reared June 1-15 WMiddleton", "*Callirhytis quercusmodesta* (O. Sacken, 1861) det Weld", "Holotype *Melikaiella ostensackeni* Pujade-Villar n. sp., design. J.P-V 2013" (red label); 10♀ (1♀ UB): "13612 Hopk. U.S.", "Reared June 14-15 WMiddleton", "*Callirhytis quercusmodesta* (O. Sacken, 1861) det Weld", "Holotype *Melikaiella ostensackeni* Pujade-Villar n. sp., design. J.P-V 2013" (red label); 1♀: "13612 Hopk. U.S.", "Reared June 1-15 WMiddleton", "*Callirhytis q. modesta* (Os.)", "*Callirhytis quercusmodesta* (O. Sacken, 1861) det Weld", "Holotype *Melikaiella ostensackeni* Pujade-Villar n. sp., design. J.P-V 2013" (red label); 11♂ & 9♀ (1♂ UB): "13612 Hopk. U.S.", "Reared June 1-15", "*Callirhytis quercusmodesta* (O. Sacken, 1861) det Weld", "Holotype *Melikaiella ostensackeni* Pujade-Villar n. sp., design. J.P-V 2013" (red label).

Additional material. "Waterbury Ct.", "Collection Ashmead" "*Callirhytis modesta* Is": 1♀; "St. Louis, May-76", "*modesta* det. Weld.", "Type": 3♀.

Gall (Fig. 15c)**.** Similar to *M. papula*. The galls are hard small papillose or cone-like clusters on the upper side of leaves, projecting unequally and usually so crowded as to form a confluent mass of pustule-like elevations. Inferiorly the leaf is not deformed.

Host plant. *Q. rubra* L., according to the type series labels.

Distribution. USA (Wisconsin).

Biology. Only the sexual form is known. Galls develop in May-June and mature in June-July. Adults start to emerge in July.

Etymology. In honor of Baron Karl-Robert von Osten-Sacken (1828, St. Petersburg, Russia – 1906, Heidelberg, Germany) for his contrubution to the gallwasp studies of the United States where he lived in New York being the General Consul from 1856 till 1877.

Comments. This species described on the basis of the material, determined by Weld as *Callirhytis quercusmodesta*. See more detail comments in *Melikaiella papula* n. comb.

Melikaiella reticulata **Pujade-Villar** n. sp.

(Fig. 9, 16m)

Diagnosis*. Melikaiella reticulata* differs from the other three *Melikaiella* species described herein by the coriaceous-reticulate sculpture of the mesoscutum, mesoscutellum and lateral parts of the propodeum.

Description. Sexual form.

Length. FEMALE: 2.5 mm (n= 1);MALE: unknown.

Colour (Fig. 16m)**.** Head and mesosoma amber; teeth of mandibles amber; compound eyes grey; antennae brown, darker distally; mesoscutum dorsally amber, mesoscutellum black; mesonotum laterally darker, central part of pronotum black; mesopleura black; legs darker, tarsi I-IV lighter; metasoma brown, lighter ventrally.

Head (Figs. 9a-b). Strongly coriaceous-reticulate; strongly coriaceous centrally above toruli; as broad as mesosoma, around 1.3 times as broad as high, transversally oval in front view; gena coriaceus-reticulate, broadened behind eye, around 0.2 times as broad as diameter of eye, measured along transfacial line; malar space with sulcus, 0.4 times as long as eye height, with some few striae, radiating from clypeus and nearly reaching eye margin; weakly punctuate. Upper part of face and vertex reticulate with sparse punctuation; POL:OOL:LOL=4.5:4:2.5, diameter of lateral ocellus 2; 2.45 times as broad as long in dorsal view; lower face and frons reticulate, without frontal carinae. Transfacial distance 1.35 times compound eye length; internal margin of compound eye parallel. Distance from compound eye to torulus larger than torulus diameter, distance between toruli 1/3 of torulus diameter. Clypeus impressed, rectangular, delicately coriaceous, emarginate ventrally, medially incised, anterior tentorial pit small, differentiated; epistomal sulcus and clypeo-pleurostomal line distinct, broad, impressed.

Antenna (Fig. 9f). With 12 flagellomeres (F11 and F12 weakly separated); F1 slightly longer than F2, F1 weakly curved, F1 and F2 slightly broader distally, F2 as broad as F1; subsequent flagellomeres progressively shorter and broader, F11 equal to F10; antenal formula: 5: 2 (x2): 6.5(x1.75): 5.5(x1.75): 5: 5: 4: 4: 3: 3: 3: 3 (2.5): 6 (2.5+3.5); F4 and subsequent flagellomeres with few placodeal sensilla.

Mesosoma (Figs. 9c-e). Longer than high, concave in later view. Sides of pronotum coriaceous-reticulate, without carinae. Mesoscutum longer than broad; notauli incomplete, impressed at least in basal 2/3, median mesoscutal line absent; parapsidal lines distinct, anterior parallel lines differentiated, diverge; median mesoscutal line present, short. Mesoscutum coriaceous-reticulate, without linear elements. Mesopleuron coriaceous-reticulate, without smooth areas; metapleural triangle reduced to narrow band. Mesoscutellum quadrangular and emarginate, broader than long, uniformly coriaceous-reticulate; scutellar foveae weakly differentiated, rich one another in one point only, almost confluent, superficial, narrow, with some carinae on bottom. Propodeum weakly and uniformly coriaceous, pubescent with few rugae; lateral propodeal carinae defined, weakly bented, with very few impressed carinae on inner sides; central propodeal area weakly reticulate. Metascutellum subrectangular, coriaceous. Ventral bar of metanotal trough coriaceous; metanotal trough with very few longitudinal carina, glabrous. Nucha developed and carinate.

Forewing. As long as body, with micro-pubescent surface, without cilia on wing margin; radial cell opened, 2.8 times as long as broad; veins yellowish; R1 curved backward; areolet absent.

Legs. Tarsal claws simple, with broad base.

Metasoma. Shorter than head and mesosoma together, longer than high; first metasomal tergite weakly alutaceous posteriorly, with sparse setae laterally, subsequent tergites without pubescence; second and subsequent tergites sculptured, alutaceous; prominent part of ventral spine of hypopygium short, as long as broad, with long and sparse setae.

Type material. HOLOTYPE ♀ labelled as "MEX (043), Fray Francisco (El Arenal, Hidalgo), [Sierra Baja; 98.861111 N and 20.252222 W; 2540 m a.s.l.], Ex. *Q. laurina*, (10.vi.2010) vii-2010,

J. Pujade-Villar col." (white label); "Holotype *Melikaiella reticulata* ♀ JP-V det. & design." (red label). PARATYPE (1 ♀): with the same data as holotype except paralectotype label. Holotype deposited in JP-V collection (UB); 1 ♀ paratype in PHMB.

Gall. Adults were obtained from galls similar to those of *M. bicolor*.

Host plant. *Quercus laurina* Humb. & Bonpl. This red oak is a Mexican endemic (Valencia, 2004).

Distribution. Mexico (Hidalgo).

Biology. Only the sexual form is known. Galls develop in May and mature in June. Adults start to emerge in July. Several parasitoid specimens from Pteromalidae, Eulophidae and Eurytomidae (Hymenoptera: Chalcidoidea) emerged in August.

Etymology. The species name refers to the sculpture of the female mesosoma.

Species transferred to *Melikaiella*

Eight Nearctic *Callirhytis* species possess with the same character set as the above described new species and thus, were transferred to *Melikaiella*.

Melikaiella corrugis (Bassett) comb. n.

(Figs. 10b, d, h, j, 16g)

Cynips corrugis Bassett, 1881 (female).
Callirhytis corrugis (Bassett) Weld, 1922.
Callirhytis defecta Kieffer, 1910. Synonymyzed by Weld (1931).
Callirhytis petrosa Weld, 1922 **n. syn.**

Type material of *Cynips corrugis* Bassett. Presumably lost (C. Lebeau, AMNH; M. Buffington, USNM). **Type material of *Callirhytis petrosa* Weld.** Lectotype: 1♀ (deposited in USNM) with the following labels: "Palestine Tex." (white label), "cut our Dec-14" (white label), "brevifolia" (white label), "1178" (white label), "*Callirhytis petrosa* Weld" (white label), "cotype" nº 6419" (red label), "lectotype of *Callirhytis petrosa* Weld, 1922 design. JP-V 2012" (red label), "*Melikaiella corrugis* ♀ (Bassett) det. JP-V 2012".

Additional material (det. by H. Weld as *Callirhytis corrugis* (Bassett). Dist. Columbia, 28.iv.1921: 1 ♀ (det Weld-1931), USNM collection.

Only the asexual generation is known. The description of the gall was not given in the original description of the species (Bassett, 1881). According to Weld (1922b) the peculiar surface sculpture of the mesoscutum suggests that it might be an acorn stone gall, probably on *Q. coccinea* Muench. or *Q. ilicifolia* Wangenh. Bassett (1881) captured one adult on *Q. prinoides* Willd, however, Q. *prinoides* belongs to black oaks (Section *Quercus* of *Quercus*, white oaks). Burks (1979) mentioned the species from *Q. velutina. Callirhytis petrosa* (new synonym herein) was reared from acorn galls on *Q. incana* Bartram (=*Q. brevifolia* Sargent) (red oak) which is distributed in USA (Weld, 1922; Burks, 1979). Adults of *C. corrugis* appeared in May (Bassett, 1881), while *C. petrosa* - in March (Weld, 1922b). According to Weld (1922b), *C. petrosa* induce a mass of confluent woody cells inside the acorn in place of the normal cotyledons, found in fall and affecting acorns of the current season crop and causing them to be more or less stunted in size.

Head and mesosoma reddish-brown or ambarine, metasoma darker distally (Fig. 16g); antennae with 11-12 flagellomeres; last flagellomere formed by incomplete fused segments; F1 nearly two times as long as pedicel (Fig. 10b); F2 short, less than twice as long as broad; frons reticulate; malar sulcus with irradiating carina; anterior admedian lines weakly defined, diverge; mesoscutum coarsely rugose (Fig. 10d); notauli complete, deep (Fig. 10d); median mesoscutal line usually absent; mesoscutellum coarsely rugose, humped in lateral view (Fig. 10h), emarginate, circumscutellar carina strongly convex distally (Fig. 10j); scutellar foveae (Fig. 10d) broad, not limited laterally, separated by a central carina, bottom shiny with some longitudinal carinae; propodeum rugose, lateral propodeal carinae curved outside, with some longitudinal carina between them; areolet absent; first metasomal tergite smooth or weakly areolate distally, second and subsequent tergites areolate; prominent part of ventral spine of hypopygium not longer than broad. Body length: around 3.0 mm.

Distribution. USA (Georgia, Connecticut, Florida, Texas, Virginia and Washington).

Comments. The type material, according to the original description, consists of a single female which Bassett took from the claws of a small spider just when the spider killed it (Bassett, 1881). Weld (1922b), without comparing with the holotype, concluded that several specimens taken at Great Falls (Virginia, USA), and others taken ovipositing in buds of *Q. coccinea* at Washington DC, belong to this species. No morphological differences are present between *C. corrugis* (Bassett) and *C. petrosa* Weld and thus we synonymised *C. petrosa* to *C. corrugis*.

Melikaiella flora (Weld) comb. n.

(Figs. 11b, d, g-h, j-k, n-o, 12a-f, m, n, 15g-i, 16e-f, m)

Callirhytis flora Weld, 1922 (female, galls) (male and cycle in Dailey *et al*., 1974).
Callirhytis milleri Weld, 1922 (female, galls).
Callirhytis essigi McCracken & Egbert, 1922 (female, galls). Synonymized by Weld (1951).

Type material of *C. flora* sex. Holotype not found. Paratypes: 1♀: "Mt. Tamalpais, Cal. 1918", "*Q. wislizeni*", "15631b", "Paratype 24726 USNM", "*Melikaiella flora* (Weld) ♀ sex, JP-V det-2012". 3♀: "Camp Baldy Cal.", "*wislizeni*", "15631b", "Paratype nº 24726 USNM", "*Melikaiella flora* (Weld) ♀, JP-V det-2012".

Additional material of *C. flora* sex. 1♂: "3 mi. E Lincoln, Placer Co. Cal., em. 13.iii.1969", "*Quercus wislizeni* A. DC", C. Dailey nº 1056", "*Callirhytis flora* ♂ Weld, det C. Dailey", "Pleistotype, Dailey *et al*., 1974" (yellow label), "*Melikaiella flora* (Weld) var-1, JP-V det-2012". 1♂: "5 mi. SW, Sonoma Cal., Sonoma Co., 23.vi.1969", "*Quercus agrifolia* Née", "C. Dailey mº 1128", "*Callirhytis flora* ♂ Weld, det C. Dailey", "Pleistotype, Dailey ET AL., 1974" (yellow label), "*Melikaiella flora* (Weld) var-2, JP-V det-2012". "F. Franc, 10.7 Cala", "EASchwarth collector", "claws simple", "*Callirytis flora* Weld, det. Weld-1939", "*Melikaiella flora* (Weld) ♀, JP-V det-2012".

Type material of of *C. milleri* asex. 3♀ (var-1): "San Gabriel Mts Cal.", "Cam Baldy Cal.", "*Quercus wislizeni*", "1575", "*Callirhytis milleri* Weld", "Paratype nº 21793 USNM" (red label), "*Melikaiella flora* (Weld) (=*milleri* Weld) var-1, JP-V det-2012". 1♀ (var-1): "Hopk. US, 13676E", "Reared Apr.15.120", "*Quercus californica*", "Los Gatos Calif.", "FRHerbert Colr", "*Callirhytis milleri* Weld",

"Paratype nº 21793 USNM" (red label), "*Melikaiella flora* (Weld) (=*milleri* Weld) var-1, JP-V det-2012". 15♀ (var-2): "10867b, Hopk US", "Reared 11.iii.15", "*Quercus agrifolia*", "Pacific Grv Cal", "JM Miller Collector", "*Callirhytis milleri* Weld", "paratype nº 21793 USNM" (red label), "*Melikaiella flora* (Weld) (=*milleri* Weld) var-2, JP-V det-2012". 1♀ (var-1) (Melika col.): "Hopk. US, 1376E", "Reared Sept.21.12", "*Quercus californica*", "Los Gatos Calif.", "FRHerbert Colr", Paratype (red label), "*Callirhytis milleri* Weld = *essigi* MaC+E", "*Melikaiella flora* (Weld) (=*milleri* Weld) var-1, JP-V det-2012".

Additional material of *C. milleri* asex. 15♀ (var-1): "13643C, Hopk, US", "Apr 2-17 Reared", "*Quercus kelloggii*", "Inion Valley Casl", "FRHerbert Colr", "*Callirhytis milleri* Weld"; 2♀ (var-1): "Grants Pass, Oreg. 4.25.44", "ex oak corn", "E2581a", "SM Dohanian Coll.", "*Callirhytis milleri* Weld, det Weld-48"; 4♀ (var-1): "Hopk. US, 13676E", "Reared Set 12.21", "*Q. californica*", "Los Gatos Calif.", "Fr Herbert Colr.", "*Q. milleri* Weld, Same lot as Types"; 2♀ (var-2): "Berkeley Cal.", LS Jr U, Lot 581, Sub 4", "Evans Col", "*Q. agrigolia*".

Both generations are known (Dailey *et al*., 1974). The sexual form induces midrib swelling galls on leaves of *Q. agrifolia* Nee and *Q. wislinzeni* A. de Candolle, and the asexual form induces acorn galls on *Q. agrifolia, Q. californica* Cooper, *Q. kelloggii* Newb. and *Q. wislinzeni*. Distributed in USA (Weld, 1922a, 1922b; Dailey *et al*., 1974; Burks, 1979).

The sexual gall (Figs. 15g, h-i) is a polythalamous abrupt smooth and polished formation on the midrib, at the base and underside of the leaf (10-30 x 6-9 mm). The gall occurs in spring and adults emerge from late March to June (Weld, 1922a; Dailey *et al*., 1974).

The asexual gall (Figs. 15j-k) is a compact stone-hard mass, containing 4-12 cells inside acorns more or less filling the interior of the acorn; the woody mass thus occupies the centre of the acorn instead of cotyledons. The gall occurs in late summer; larvae remain in the galls at least 1.5-2.5 years before pupation (Dailey *et al*., 1974; Weld, 1922b); adults emerge in late March and April (Dailey *et al*., 1974; Weld, 1922b).

ASEXUAL FEMALES from *Q. californica*, *Q. kelloggii* and *Q. wislinzeni* [named here as variety-1 (see the key), morphologically conspecific with the holotype and the original description] are reddish-brown, the mesoscutum mesoscutellum, propodeum and metasoma are nearly black (Fig. 16p); antennae are 13-15 segmented; F1 at most 2.0 times as long as pedicel, broader distally (Fig. 11d); the mesoscutum is rugoso-carinate, basally more pronounced (Fig. 11h); notauli are complete (Fig. 11h); the median mesoscutal line present; the mesoscutellum is coarsely rugose, emarginate (Fig. 11h); scutellar foveae are confluent, with several longitudinal ridges, median ridges are slightly more prominent (Fig. 11h); propodeal carinae are almost straight and parallel, the propodeal central area with longitudinal ridges (Fig. 11o); areolet present, large; second metasomal and subsequent tergites are areolate; the prominent part of the ventral spine of the hypopygium is very short, not projecting. Robust specimens (2.4-3.7 mm). The asexual females from *Q. agrifolia* [named here as variety-2 (see the key)] differ from the holotype, original description and variety-1 in: the body colour is yellowish-amber, antennae 14 or 15-segmented, the mesoscutum is coriaceous, without linear elements (rugae or carinae), scutellar foveae rugose or with very few linear elements (Fig. 12m), the central propodeal area (Fig. 12n) with strongly impressed median carinae (complete or incomplete).

SEXUAL FEMALES are reddish-brown, the mesoscutum, mesoscutellum, propodeum and metasoma are ambarine, dorsally darker (Fig. 16f); antennae are 14-segmented; F1 more than 2.0 times as long as the pedicel (Fig. 11b); F12 2.0 times F11, if 13th flagellomere is distinct than F13=F12; the mesoscutum and mesoscutellum in central area without rugose sculpture (Fig. 11g); notauli are complete (Fig. 11g); median mesoscutal line present; mesoscutellum rugose (Fig. 11g), weakly emarginate; scutellar foveae confluent, with several longitudinal ridges, median ridge slightly more prominent (Fig. 11g); lateral propodeal carinae bented slightly outward, central propodeal area with some incomplete carinae (Fig. 11k); areolet present, large; first metasomal tergite smooth, second and subsequent tergites are areolate; prominent part of the ventral spine of the hypopygium short, as long as broad. Delicate (not robust) specimens (♀: 1.5-2.3 mm).

MALE: Body reddish brown with some darker areas (Fig. 16e); antennae 16-segmented, if 15-segmented then F15 2.0 times F14; F1 excavate laterally (Fig. 12c); F11 2.0 times as long as broad; OOL similar in length to the major diameter of the lateral ocellus (Fig. 12e); the area between propodeal carinae rugoso-carinate (Fig. 12f); forewings pubescent, margins are ciliate, areolet present; first metasomal tergite smooth, second and subsequent segments are areolate. Length around 1.7 mm. Males from *Q. wislinzeni* [named here as variety-1, see the key] have parallel carinate elements on the mesoscutum (Fig. 12a) and F1 longer than F2, but males emerged from *Q. agrifolia* [named here as variety-2, see the key] have the mesoscutum coriaceus, without linear elements (Fig. 12b) and F1 equal in length to F2 (Fig. 12d).

Distribution. USA (California).

Comments. After the examination of long series of the asexual females, it is concluded that there are two varieties according to the mesoscutum sculpture [var-1: with rugose elements; var 2: without linear elements]. The var-1 induces galls on *Q. wislinzeni* and the var-2 on *Q. agrifolia*. Were examined two males from Dailey collection also, first with linear elements in the mesoscutum and with F1 longer than F2, collected from *Q. wislinzeni* and the second without linear elements in the mesoscutum and with F1 equal in length to F2, collected from *Q. agrifolia*. In this case we have a dilemma: *M. flora* is a variable species what depends on the oak host, or we have here two different species with similar galls. It is likely that the mentioned varieties correspond to different species. We do not define the variety-2 as a distinct species because we do not know the morphology of the sexual females obtained by Dailey and because we think it is necessary to review again the life cycle experimentally exchanging the mentioned oak host, that is, placing the females obtained from *Q. wislinzeni* onto *Q. agrifolia* and vice versa. Till than we treat *M. flora* as one species.

Melikaiella fructicola (Ashmead) comb. n.

(Figs. 10e, i, k, l, 16c)

Callirhytis fructicola Ashmead, 1897 (female, galls).
Callirhytis fruticola Ashmead, misspelling by Weld, 1922: 17.

Type material. Lectotype and paralectotypes, deposited in USNM,

are glued on the same cardboard with the same label. Lectotype ♀ (designated here, corresponding to the specimen situated to left) and paralectotypes (2 ♀) with the following labels: "105 to acorn stone gall" (white label, handwritten); "Type nº 3089 U.S.H.M." (red label); "*Callirhytis fructicola* Riley, ns" (white label, handwritten); "USNMENT 00802100" (white label); "Lectotype design. JP-V-2013 (left specimen) and Paralectotypes of *Melikaiella fructicola* (Ashmead) n. comb." (red label).

Only the asexual generation is known. Ashmead (1897) described this species after the examination of the Riley collection. The history of labels can be consulted in Weld (1922b). This species induces galls in red oak acorns, on *Q. ilicifolia* Wangenh., *Q. marilandica* (L.) and *Q. velutina* Lam. (= *tinctoria* W. Bartram) distributed in USA (Burks, 1979). The galls are similar to *M. flora* asexual galls. Galls occur in autumn and adults emerged in December under laboratory conditions, the natural emergence probably would be happening in spring (Weld, 1922b).

The body predominantly is brownish red; the half distal part of the metasoma is darker (Fig. 16c). Antennae with 11 flagellomeres; last flagellomere 2.0 times as long as F10; F1 nearly 2.0 times as long as the pedicel; F2 shorter, around 2.0 as long as broad; the frons coriaceous with some piliferous points between the compound eye and ocelli (Fig. 10l); the malar sulcus with very few radiating carinae; anterior admedian lines are inconspicuous, parallel (Fig. 10e); the mesoscutum rugose, anteriorly coriaceous; notauli are complete, but weakly impressed in the anterior third (Fig. 10e); the median mesoscutal line absent (Fig. 10e); the mesoscutellum emarginate posteriorly, weaker behind, coarsely rugose and coriaceous medially (Fig. 10k); scutellar foveae defined and limited laterally, separated by a point, the bottom is deep, shiny with some longitudinal carinae (Fig. 10e); the propodeum with many ridges radiating from nucha, the lateral propodeal carinae basally diverge, straight and converge below; the forewing veins are pale, the areolet absent; first metasomal tergite is smooth or weakly areolate distally, second and subsequent tergites aerolate; the prominent part of the ventral spine of the hypopygium not longer than broad. Robust specimens (3.0-3.6 mm).

Distribution. USA (Pensilvania, Virginia, South Carolina and Tennessee).

Comments. This species morphologically is similar to *M. corrugis* but differs in the mesoscutellum morphology (see the key below).

Melikaiella fructuosa (Weld) comb. n.

(Figs. 10a, c, f, g, 15f, Fig. 16d)

Callirhytis fructuosa Weld, 1922 (female, galls).

Type material. Holotype and 65 ♀ paratypes deposited in USNM (see comments of this species) and 1 ♀ paratype (Melika coll., PHMB). Holotype ♀ with the following labels: "Ironton, Mo", "cur out, Mar 29/19", "165", "*Callirhytis fuctuosa* Weld", "Type nº 6420 USNM" (red label), "USNMENT 00802080", "*Melikaiella fructuosa* (Weld, 1922) asex, JP-V 2012 det.". Paratypes with similar labels collected from Ironton (MO), Evenston (ILL) and Boerne (TEX).

Only the asexual generation is known to induce acorn galls on red oaks (*Q. rubra* Linnaeus, *Q. coccinea* Muenchhausen and *Q. texana* Buckley). It is distributed in USA (Weld, 1922b; Burks, 1979). The galls are stony mass of cells inside the acorn, more or less filling the interior and encroaching upon or obliterating the cotyledons (Fig. 15f). Galls occur in autumn and adults emerge in late April and May (Weld, 1922b); galls from *Q. coccinea* have emerged in 1st and 3rd year after collecting (Weld, 1922b).

The head and partially legs are reddish-brown, the mesosoma black, the metasoma dark (Fig. 16d); antennae usually with 10 flagellomeres; last flagellomere is formed by 1-3 incompletely fused segments; F1 nearly 2.0 times as long as pedicel (Fig. 10a); F2 short, less than 2.0 times as long as broad; the frons rugose (Fig. 10f); the malar sulcus with radiating carinae; anterior admedian lines are conspicuous (Fig. 10c), converge proximally and weakly diverge distally (Fig. 10b); the mesoscutum rugose (Fig. 10c); notauli are incomplete, reaching 2/3 of the mesoscutum length; (Fig. 10c, g) the median mesoscutal line usually absent (Fig. 10c); the mesoscutellum emarginate posteriorly and weakly emarginate behind, coarsely rugose; scutellar foveae are narrow and not delimited laterally, confluent and deep, the bottom is shiny, with some longitudinal carinae (Fig. 10c); the propodeum with many ridges, radiating from nucha, the lateral propodeal carinae are strongly diverge above; the areolet in the forewing is small, spectral; first metasomal tergite is smooth or weakly areolate distally, second and subsequent tergites are aerolate; the prominent part of the ventral spine of the hypopygium not longer than broad. Robust specimens (3.4-3.5 mm).

Distribution. USA (New York, Maryland, Virginia, North and South Carolina, Georgia, Alabama, Illinois, Missouri, and Texas).

Comments. Weld (1922b) mentioned that the typical series has the number 6420; as well as the holotype and 39 paratypes are deposed in the USNM, and several paratypes in other institutions (Carnegie Museum, Pittsburgh, Pennsylvania, and with United States Biological Survey). In USNM we have found the holotype and 65 specimens labeled as paratype; 30 of them have the label 6420 mentioned in the original description.

Melikaiella lupana (Weld) comb. n.

(Fig. 13, 15d, e, 16i-j)

Callirhytis lupana Weld, 1944 (male, female, gall).

Type material. Holotype: 1♀ (deposited in USNM) with the following labels: "Prescott, Ariz., June 28" (handwritten), "*Q. emoryi*", "942", Type nº 56390 USHM" (red label), "*Callirhytis lupana* Weld, 1922" (handwritten), "Holotype of *Callirhytis lupana* ♀ Weld, 1944" (red label), "*Melikaiella lupana* (Weld) det JP-V 2012"; Paratypes (2♂ & 7♀) in CAS are with similar labels as the holype.

Only the sexual generation is known to induce leaf galls on red oaks (*Q. emoryi* Torr.). It is distributed in USA (Weld, 1944). The galls are very similar to sexual form of *M. flora*. They are in a form of an abrupt fusiform polythalamous enlargement on the underside of the midrib, stunting the development of the leaf (Fig. 15d). Galls were collected on June and adults emerged in the same month (Weld, 1944).

The head and mesosoma are brownish-red with some darker areas (Figs. 16j); antennae with 12 flagellomeres, last flagellomeres sometimes incompletely fused, but when separated they are subequal

in length; F1 2.0 times as long as the pedicel (fig. 13c); F2 equal in length to F1; the frons coriaceous; malar sulcus with very few irradiating carinae (Fig. 13b); anterior admedian lines are weakly impressed, diverge (Fig. 13d); the mesoscutum is strongly coriaceous, basally rugoso-carinate (Fig. 13d); notauli are incomplete and superficial anteriorly (Fig. 13d); the median mesoscutal line absent; the mesoscutellum coriaceous, emarginate, with some rugae laterally (Fig. 13d, f); scutellar foveae are broad, not delimited laterally, confluent and superficial, the bottom shiny, with some longitudinal carinae (Fig. 13d); lateral propodeal carinae slightly curved with some longitudinal carinae in the central propodeal area (Fig. 13f); areolet present; first metasomal tergite smooth, second and subsequent tergites are areolate (Figs.13 g, j); the prominent part of the ventral spine of the hypopygium only slightly projected. Length 1.4-1.9 mm. MALE (Fig. 16i) differs in antennae, which are with 13 flagellomeres, F1 curved and slightly longer than F2 (Fig. 13i); POL: OOL: LOL = 3:1.5.:1.5 diameter of lateral ocellus 2; the mesoscutum and mesoscutellum alutaceous to coriaceous, without linear elements (Fig. 13e), scutellar fovear are very superficial, without longitudinal carinae on the bottom (Fig. 13e).

Distribution. USA (Arizona).

Comments. The gall and adults morphology of *M. lupana* are closely related to sexual form of *M. flora*. As we have commented above, *M. flora* is a species complex or a highly variable species and thus, *M. lupana* could be well synonymic to *M. flora*. Further rearing and studies must be done in order to solve this problem. Herein we treat *M. lupana* as a distinct, valid species.

Melikaiella papula (Bassett) comb. n.

(Figs. 14, 16q)

Cynips papula Bassett, 1881 (female, gall)

Type material. Lectotype: 1♀ (deposited in USNM) with the following labels: "Waterbury, Ct, H.F. Bassett Coll." (white label), "Paratype" (red label), "Beut. Coll., rec'dl939" (white label), "*Dryophanta papula* W.B., Bassett" (white label), "Paratype nº 60104 USNM" (red label), "*Dryophanta papula* Type B." (handwritten), "Lectotype of *Cynips papula* ♀ Bassett, 1881, design. JP-V 2013" (red label), "*Melikaiella papula* (Bassett) det JP-V 2013". Paralectotype (1♀) deposited in USNM is not conspecific.

Additional material. "Ia", "Ac Cat" 498", "Gillette" "*Dryophanta papula*": 2♀ (1♀ UB); "Iowa Gillette", "*Dryophanta papula* (Bass.) Cr.": 2♀.

Only females of the sexual generation are known to induce leaf galls on red oaks (*Q. velutina* and *Q. rubra*), distributed in USA (Bassett, 1881; Burks, 1979). The galls are hard small papillose clusters or cone-like on the upper side of the oak leaves, projecting unequally and usually so crowded as to form a confluent mass of pustule-like elevations. On the under side of the leaf they appear simply as a scar, projecting a little if at all. Galls were collected on June and adults emerged in the same month or July (Weld, 1922).

The head and mesosoma are brownish-red, with some darker areas (Fig. 16q); antennae with 11 flagellomeres, last flagellomeres forming a rather heavy club (Fig. 14g); F1 more than 2 times shorter than pedicel (Fig. 14g); F2 as long as F1; frons coriaceous; malar sulcus weakly impressed (Fig. 14a); anterior admedian lines are weakly impressed, parallel (Fig. 14d); the pronotum with linear elements (Fig. 14h); the mesoscutum coriaceous, without linear elements (Fig. 14d); notauli are complete, weakly impressed anteriorly (Fig. 14d); the median mesoscutal line is absent; the mesoscutellum coriaceous, emarginate, without linear elements (Fig. 14f); scutellar foveae narrow, their bottom shiny, with some longitudinal carinae; the propodeum is narrow, with convergent lateral propodeal carinae, the central propodeal area with very few longitudinal carinae, the median carina absent (Fig. 14c); areolet present, small and ellongated; first metasomal tergite smooth, second and subsequent tergites are weakly areolate (Fig. 14i); the prominent part of the ventral spine of the hypopygium 2 times as long as broad; the ovipositor is very long (Fig. 14e). Body length 1.5 mm.

Distribution. USA (Connecticut and Massachusetts).

Comments. According to Weld (1922a), the type material of *Callirhytis quercusmodesta*, three females collected in Philadelphia (USA), is absent from the pins and only a fragment of a gall present which resembles *Cynips papula* gall. *Cynips papula* was described from few females and the galls collected from red oaks, *Q. tinctoria* and *Q. rubra*, in Connecticut (Bassett, 1991). Weld (1922a) synonymized the two species on the basis of the identical gall structure, the host oak and the biology (in both species the adults appear in July). Nevertheless, the original descriptions of *C. quercusmodesta* (Osten Sacken, 1861) and *C. papula* (Bassett, 1991) gave some important differences: antennae are 12- segmented in *C. quercusmodesta* (while 13-segmented in *C. papula*), the mesoscutum is densely punctuate in *C. quercusmodesta* (while it is not mentioned in *C. papula*, then presumably different) and forewings without areolet in *C. quercusmodesta* (while with small and elongated areolet in *C. papula*). Unfortunately the original description of *C. quercusmodesta* is very short and many important characters are missing. Moreover, in the Nearctic gallwasps, similar galls can be induced by species which belong to different genera. In this case, galls similar to *Melikaiella* species can be induced, for example, by *Andricus* sexual forms or *Loxaulus*. In addition, *Andricus cicatricula* Bassett, 1981 was described on the basis of a gall (as *C. quercusmodesta* after Weld, 1922a) but the reared adults belong to an inquiline (Kinsey, 1920). So, according to the original description, adults of *C. quercusmodesta* may well belong to *Ceroptres*, *Andricus* or *Melikaiella*. For all of this, we consider *Cynips quercusmodesta* as a *nomen dubius* and the synonymy of *Cynips papula* and *Cynips quercusmodesta* is rejected and thus all the material earlier determined by several authors as *Callirhytis modesta* 'sensu Weld' belongs to *Melikaiella ostensackeni* n. sp. (see above).

Melikaiella sonorae (Weld) comb. n.

(Figs 11c, f, i, 16h)

Callirhytis sonorae Weld, 1944 (female, gall).

Type material. HOLOTYPE 1♀ (deposited in USNM) with the following labels: "Santa Ana, Son. [ora] Mex [ico]. Ahn 339" (handwritten), "35-18581". Type nº 56392 USNM" (red label), "*Callirhytis sonorae* Weld, 1942" (handwritten), "Holotype of *Callirhytis sonorae* ♀ Weld, 1944" (red label), "*Melikaiella sonorae* (Weld) det JP-V 2012". PARATYPES 2 ♀ (Melika coll., PHMB) with the following labels: "Santa Anna, Son[ora]. Mex[ico]., 12 Apr. 41", "35-18581", "Paratype" (red label), "*Callirhytis sonorae*

Weld"; "Santa Anna, Son. Mex., Apr. 9-39", "35-18581", "Paratype" (red label), "*Callirhytis sonorae* Weld".

Only the asexual generation is known to induce acorn galls on red oaks (*Q. emoryi*), distributed in Mexico and USA (Weld, 1944). The galls are flattened masses of cells (3-10) inside the surface of the acorn, beside the much-reduced cotyledons. Galls occur in autumn and adults emerge in April to June (Weld, 1944).

The head and mesosoma are brownish-red, with some darker areas (Fig. 16h); antennae with 13-14 flagellomeres, last flagellomeres sometimes incompletely fused, but when separated they are subequal in length; F1 2.0 times as long as the pedicel or longer (Fig. 11c); F2 more than 2.0 as long as broad, shorter than F1; the frons is coriaceous; malar sulcus with irradiating carinae (Fig. 11c); anterior admedian lines weakly impressed, parallel (Fig. 11f); mesoscutum coriaceous to slightly reticulate, without linear elements, with some sparse piliferous points, sometimes with very weak rugae basally between notauli (Fig. 11f); notauli are complete superficial anteriorly (Fig. 11f); median mesoscutal line is absent or weakly impressed; mesoscutellum rugose, emarginate (Fig. 11f); scutellar foveae are broad, not delimited laterally, confluent and superficial, the bottom shiny, with some longitudinal carinae (Fig. 11f); propodeum with many ridges radiating from nucha, lateral propodeal carinae are parallel, more or less bented basally with some longitudinal carinae in the central propodeal area (Fig. 11i); areolet present, spectral; first metasomal tergite smooth, second and subsequent tergites are areolate; the prominent part of the ventral spine of the hypopygium only slightly projected. Body length 1.9-3.0 mm.

Distribution. Mexico (Sonora) and USA (Arizona and Texas).

Melikaiella tumifica (Osten Sacken) comb. n.

(Figs. 11a, e, l-m, 12g-l,15a-b, 16n-o)

Cynips tumifica Osten Sacken, 1865 (male, female, galls).
Andricus (*Callirhytis*) *tumificus* (Osten Sacken) Mayr, 1881.
Callirhytis tumifica (Osten Sacken) Dalla Torre & Kieffer, 1910.

Type material. Not found in USNM, CAS and AMNH (New York, USA).

Additional material. USA: Lewisburg (Pensilvania), *Q. rubra*, 28.v.1996: 2 ♂ & 2 ♀ (leg. G. Melika); Bedford Country (Virginia), *Q. rubra*, July-1920: 2♂ & 13♀ (CAS); Mattituck (Long Island, New York), *Q. velutina*: 3♂ & 3♀ (CAS); Moline (Illinois), ovopositing in old acorn, *Q. rubra*, 15.iv.1915: 1♀ (CAS); Evanston (Illinois), July-09: 6♀ (CAS); Evanston (Illinois), *Q. rubra* July-10: 1♀ (CAS).

Only the sexual generation is known to induce swelling-like galls on the midrib of the leaves on red oaks (*Q. rubra* and *Q. velutina*), distributed in several states of USA (Burks, 1979). Most of the galls are near the basis of the leaf, but sometime also on the petiole (Fig. 15a). Larval chambers are arranged in rows (Fig. 15b). Galls occur in spring, adults emerge in May and June (Melika, *pers. com.*).

The head and mesosoma are brownish-red in females (Fig. 16o), males are black (Figs 16n); female antennae with 12 flagellomeres, last flagellomere is formed by two incompletely fused segments; male antenna 15-segmented; F1 more than 2.0 times as long as the pedicel; F2 more than 2.0 times as long as broad, shorter than F1 in both sexes (Fig. 11a, 12g); the frons strongly coriaceous in females, reticulate in males (Fig. 12h); the malar sulcus without irradiating carinae (Fig. 11a); anterior admedian lines weakly impressed, converge proximally and weakly diverge distally (Fig. 11e); the mesoscutum strongly coriaceous, with some rugae basally between notauli in females (Fig. 11e), reticulate in males (Fig. 12k); the mesoscutum is humped medially in lateral view in both sexes (Fig. 11l, m); notauli are complete (Fig. 11e); the median mesoscutal line usually present but weakly impressed, absent in males; the mesoscutellum coarsely rugose, emarginate (Fig. 11e); scutellar foveae are broad (Fig. 11e), not delimited laterally, confluent and superficial, their bottom is alutaceous-reticulate, with some longitudinal carinae; the propodeum with many ridges radiating from nucha, lateral propodeal carinae more or less bented (subparallel in males), with some longitudinal carinae in the central propodeal area (Fig. 12j); forewings pubescent, margins are ciliate (in males), females with short pubescence, margins are not ciliate; the areolet absent; first metasomal tergite is smooth or weakly areolate distally, second and subsequent tergites areolate (Fig. 12l); the prominent part of the ventral spine of the hypopygium as long as broad. Small specimens (males around 1.4 mm, females 2.0 mm).

Distribution. USA (New York, Virginia, North Carolina, Illinois, and Iowa).

Key to *Melikaiella* species

1. Females 2
-- Males 15
2. Antenna 12-segmented, F10 sometimes with 1-3 incompletely fused segments; antenna short, reaching at most the level of tegula (Fig. 10a) ……..... ***M. fructuosa*** (Weld)
-- Antenna 13 -15-segmented, longer, exceeding the level of tegula (Fig. 10b) …..... 3
3- Notauli short, extend at most to half length of rugoso-coriaceous mesoscutum (Fig. 2a) ...… ***M. amphibolensis* Pujade-Villar n. sp.**
-- Notauli complete, if incomplete than extend more than to half length of mesoscutum anteriroly thin and weakly marked; mesoscutum rugose or reticulate …..... 4
4. Mesoscutum rugose (Fig. 10d-e); Rs transparent, inconspicuous; circumscutellar carinae strongly impressed ……..... 5
-- Mesoscutum reticulate, sometimes with some carinae or rugae; Rs pigmented; circumscutellar carina more or less defined, rarely strongly impressed …..... 6
5. Mesoscutellum humped in lateral view (Fig. 10h); circumscutellar carina strongly convex in posterior view (Fig. 10j) …..... ..... ***M. corrugis*** (Bassett)
-- Mesoscutellun not humped in lateral view (Fig. 10i); circumscutellar carina almost straight (Fig. 10k) …..... ***M. fructicola*** (Ashmead)
6. Malar sulcus without radiating carina, with small, shiny area below it (Fig. 11a); mesoscutum humped medially in lateral view (Fig. 11m); pronotum rugose laterally (Fig. 11m) …..... ..... ***M. tumifica*** (Osten Sacken)
-- Malar sulcus with radiating carina both sides, are below it coriaceous; mesoscutum not humped medially in lateral view; pronotum with more or less parallel carinae laterally ……..…… 7
7. Body black, sometimes face and mesoscutum ambarine; F1 near 3.0 times longer than pedicel (Fig. 6a-b); notauli superficial, basally broad and well defined (Figs. 6d, 9c); lateral propodeal carinae delimiting reticulate central area without carinae, or

with very few and incomplete carinae (Figs. 6c, 9d) ……... 8
-- Body ambarine, sometimes with some black areas; F1 at most 2.3 times longer than pedicel; notauli well-defined at least on ¾ of their length; lateral propodeal carinae less defined, delimiting a carinate-rugose central area 9
8. Mesoscutum and pronotum laterally with some linear elements (Figs. 6c-d); mesoscutellum rugose (Fig. 6d); metasomal tergite II without sculpture or very delicately reticulate (areolate) only in lateral area; metasomal tergite III reticulate ..…..... .....…… ***M. bicolor*** **Pujade-Villar n. sp.**
-- Mesoscutum, pronotum laterally and mesoscutellum reticulate, without linear elements (Figs. 9c, 9e); posterior region of metasomal tergite I and following tergites reticulate ……..... .....…… ***M. reticulata*** **Pujade-Villar n. sp.**
9. Mesoscutellum coriaceous, without rugae; antenna with 11 flagellomeres, F10 and F11 forming a rather heavy club (Fig. 14g); malar sulcus weakly impressed (Fig. 13a-b) .... ***M. papula*** (Bassett)
-- Mesoscutellum rugose or with linear elements; antennae different; malar sulcus stgrongly impressed. ……...…… 10
10. Mesoscutum coriaceous, without linear elements (Figs. 10f, 11m); bottom of scutellar foveae rugose or with few longitudinal ridges (Figs. 10f, 11m); central propodeal area usually with complete or incomplete median carina (Figs. 10i, 11n) ……..…... 11
-- Mesoscutum with linear elements (Fig. 10g-h); bottom of scutellar foveae with 10-15 longitudinal ridges (Fig. 10g-h); central propodeal area rugose or longitudinally carinate, without distinctly impressed median carina (Figs. 10j-k) …..... 12
11. Body reddish-brown; antenna 13-segmented, last flagellomeres longer than broad; F1 uniformly broad; mesoscutum with some piliferous points (Fig. 11f); notauli uniform in width and widely separated (Fig. 11f); forewing without areolet; metasomal tergite I smooth; prominent part of ventral spine of hypopigyum shortly projected … ……..... ***M. sonorae*** (Kinsey)
-- Body yellow to ambarine; antenna 14 or 15-segmented, last flagellomeres as long as broad or shorter; F1 broader distally; mesoscutum without piliferous points (Fig. 12m); notauli broader basally and weakly separated (Fig. 12m); forewing with areolet present; metasomal tergite I and subsequent tergites reticulate; prominent part of ventral spine of hypopigyum not projected …….... ***M. flora*** (Weld) (= ***milleri*** Weld) asex. gen. (Variety-2)
12. Antenna 13 - 15-segmented; F1 at most 2.0 times longer than pedicel (Figs. 11d, 13c), broader distally; mesoscutum and mesoscutellum posteriroly rugose (Fig. 10h) ……..…… 13
-- Antenna 14-segmented; F1 more than 2.0 times longer than pedicel (Fig. 10b), uniformly broad; mesoscutum not rugose in central area (Fig. 10g) .....….. 14
13. Lateral propodeal carinae almost straight and parallel, area between them rugose (Fig. 11j); metasoma almost black; metasomal tergite I reticulate distally; robust specimens (2.4-3.7 mm) ….....…. ***M. flora*** (Weld), asex. gen. (Variety-1)
-- Lateral propodeal carinae bented slightly outward or converge, area between them with few carinae (Fig. 13f); metasoma ambarine, dorsally darker; metasomal tergite I smooth (Fig. 13j); delicate specimens (1.5-2.3 mm) .....…. ***M. lupana*** (Weld) sex gen.
14. R1, R1-Sc, 2r and basal vein in forewing with smoky areas around; areolet present, speculate; malar sulcus with radiating carinae from both sides (Fig. 11b); lateral parts of pronotum with some weak carinae; mesoscutum without linear elements in lateral parts (Fig. 11o); lateral propodeal carinae bented slightly outward, central propodeal area with some incomplete carinae, median carina absent (Fig. 11k) ..... ***M. flora*** (Weld) sex. gen.
-- Forewing completely transparent, without smoky areas around veins; areolet absent; malar sulcus without radiating carinae (Fig. 8b, j); pronotum laterally with some rugae; lateral parts of mesoscutum with some rugae (Fig. 8d); lateral propodeal carinae converge, central propodeal area with median carina (Fig. 8i) ....……....….. ***M. ostensackeni*** **Pujade-Villar** n. sp.
15. F1 equal in length to F2 (Fig. 6h, 12d); F11 2.0 times as long as broad .....… 16
-- F1 longer than F2 (Figs. 1f, 12c, 12g, 13j); F11 variable, if 2.0 times longer than broad than mesoscutum reddish-brown, with some parallel carinae (Fig. 11a) .....… 17
16. Body black; antenna 15 segmented; scutellar foveae delimited medially (Fig. 6e); mesoscutum with linear elements (Fig. 2b); central propodeal area reticulate ....…… ***M. bicolor*** **Pujade-Villar n. sp.**
-- Body reddish-brown with some darker areas; antenna 16 segmented; scutellar foveae confluent (Fig. 12b); mesoscutum without linear elements (Fig. 12b); central propodeal area smooth, with some carinae …..... ***M. flora*** (Weld) sex. gen. (Variety-2)
17- Body reddish-brown with some darker areas; OOL equal to diameter of lateral ocellus (Fig. 12e, 131); F11 2.0 times longer than broad; areolet present or indicated .....… 18
-- Body black; OOL longer than diameter of lateral ocellus (Figs 1d, 12h); F11 less than 2.0 times longer than broad; areolet absent ….....… 19
18- Antennae with 16 segments, if 15 than F13 2.0 times longer than F12; mesoscutum with parallel carinae (Fig. 12a); central propodeal area carinate- rugose (Fig. 12f) ....…… ***M. flora*** (Weld) sex. gen. (Variety-1)
-- Antenna with 15 segments, F12 subequal in length to F13 (Fig. 13i); mesoscutum without parallel carinae (Figs. 13e); central propodeal area with very few carinae or without them ....…….. ***M. lupana*** (Weld) sex gen.
19- Mesoscutum with some rugae between reticulate sculpture (Fig. 2b); notauli very superficially impressed, except in basal part (Fig. 2b); head rounded in front view (Fig. 1c), lower face and mandibles black; central propodeal area and lateral sides of propodeum smooth (Fig. 2d); metasomal tergite I smooth laterally ……...…….. ***M. amphibolensis*** **Pujade-Villar n. sp.**
-- Mesoscutum without rugae (Fig. 12k), notauli well impressed (Fig. 12k); head transversally oval in front view (Fig. 12i), lower face and mandibles yellowish; central propodeal area with few carinae, lateral sides of propodeum rugose (Figs. 8h, 12j); distal part of metasomal tergite I sculptured distally (Fig. 12l) …. 20
20. Malar sulcus without radiating carinae, with coriaceous shiny area below it (Fig. 12i); mesoscutum medially humped in later view (Fig. 11l); lateral propodeal carinae and median propodeal carinae wandering, delimiting a square area (Fig. 12j). ……..…… ***M tumifica*** (Osten Sacken)
-- Malar sulcus with radiating carinae both sides of it, with smooth

and shiny area below it; mesoscutum medially not humped in lateral view; lateral propodeal carinae and median propodeal carina straight delimiting and area longer than broad (Fig. 8h). ……..…….. ***M. ostensackeni* Pujade-Villar n. sp.**

DISCUSSION

The species included in *Melikaiella* present several characters that make impossible their assignment to any previously known cynipid genus. These characters are: presence of the transscutal articulation, the mesoscutum is coriaceous to strongly rugose; claws are simple, mesopleural triangle reduced to a narrow band, circumscutellar carina present, metasoma sculptured, reticulate and malar sulcus present.

Excluding those genera which lack the transscutal articulation, only *Belonocnema*, *Biorhiza*, *Callirhytis*, *Loxaulus*, *Trigonaspis* and *Melikaiella* have a malar sulcus. The main characters to distinguish *Melikaiella* from these genera are mentioned in the diagnosis Also, *Melikaiella* differs from *Belonocnema* by acking the apex of foretibia extended, beyond base of foretarsomere I (extended in *Belonocnema*), and having a radial cell long (short in *Belonocnema*); more characters of this group of species group are detailed in Table 1.

Melikaiella closely resembles *Callirhytis* 'sensu lato' (Weld, 1952; Pujade-Villar *et al*., 2012c). *Callirhytis* was erected by Förster (1869) to include several European species, and the main generic diagnostic characters he proposed for this genus were the transversely striate mesoscutum and the presence of the malar sulcus. Weld (1922, 1926, 1952) included many Nearctic species into *Callirhytis*, neglecting the diagnostic characters of *Callirhytis* given by Förster (1869), and as a result *Callirhytis* became a very chaotic genus. Melika and Abrahamson (2002) stated that from 115 Nearctic *Callirhytis* species described (Burks, 1979), only 15 are true *Callirhytis* 'sensu stricto': *C. cedrosensis* Dailey & Sprenger, *C. corrugis* (Bassett) (= *defecta* Kinsey), *C. eldoradensis* (Beutenmueller), *C. electrea* Weld, *C. flora* Weld (= *C. milleri*, the asexual generation), *C. fructicola* Ashmead, *C. fructuosa* Weld, *C. intersita* Weld, *C. lapillula* Weld, *C. medularis* Weld, *C. morrisoni* (Ashmead), *C. perrugosa* Weld, *C. petrina* Weld, *C. petrosa* Weld, *C. quercusmedullae* (Ashmead). In the same work, Melika and Abrahamson (2002) transferred to *Callirhytis* seven species of *Andricus* known from North America north of Mexico that have the mesoscutum transversely sculptured: *C. albobalani* (Weld), *C. chrysobalani* (Weld), *C. coortus* (Weld), *C. coronus* (Beutenmueller), *C. montezuma* (Beutenmueller), *C. rhizoxenus* Ashmead, and *C. wheeleri* (Beutenmueller). Some of these species belong to *Melikaiella*, and the correct affiliation of other species of *Callirhytis* needs to be re-appraised. In consequence, many Nearctic species included in *Callirhytis* are not true *Callirhytis*.

After the examination of around 70 Nearctic species, we conclude that eight of them belong to *Melikaiella*: *M. corrugis* (Bassett), *M. flora* (Weld), *M. fructicola* (Ashmead), *C. fructuosa* Weld, *M. lupana* (Weld), *M. papula* (Bassett), *M. sonorae* Weld and *M. tumifica* (Osten Sacken). According to the host data, all species are

Table 1. Generic characters of *Melikaiella* and allied genera (exclusive characters of *Melikaiella* are in bold).

Genera Characters	***Belonocnema***	***Biorhiza* (B) and *Trigonaspis* (T)**	***Loxaulus***	***Callirhytis*** (sensu Förster)	***Melikaiella***
Mesoscutum sculpture	Smooth	Smooth	Net-like reticulate	Transversely and strongly carinate	**Strongly rugose to coriaceous**
Notauli	Complete	Complete	Short	Short	Variable
Carinae radiating from clypeus	Absent	Absent	Absent or delicate and short	Present	Delicate and short or absent
Sculpture of mesopleuron	Smooth	Smooth	Uniformly reticulate	Glabrous or coriaceous	Alutaceous weakly carinate
Scutellar foveae	Smooth	Sculptured	Sculptured	Smooth	Sculptured
Propodeal carinae	Subparallel	Curved	outward-bending	Parallel	Subparallel to curved
Central propodeal area	Carinate-rugae	Carinate-rugae	Variable	Smooth	Carinate-rugae
Median propodeal carina	Absent	Absent	Present	Absent	Absent or partially defined
Forewing margin ♀	Ciliate	Sexual ciliate, asexual apterous	Sexual ciliate, asexual variable	Not ciliate	Not ciliate
Mesopleural triangle	Present	Present	Present	Present or reduced to a band	Reduced to a band
Scutellar foveae	Present, posteriorly undefined	Defined	Undefined	Present, posteriorly undefined	Variable
1st and/or 2nd and/or subsequent metasomal tergites	Smooth	Smooth	Smooth	Smooth or with few points	**sculptured-areolate (reticulate)**
Ventral spine, length	<1.0	B: Short and broad T: 2.5-3	2.0-4.0	2.0-3.5	0.1-1.0
Ventral spine, setae	Long and long tuft	Long and long tuft	Long and sparce	Short and sparce	Short and sparce

galling Section Lobatae of *Quercus* (red oaks), sexual forms are developing on leaves or young branches while the asexual forms in acorns (Table 2).

Callirhytis electreae Weld, 1944 and *Callirhytis quercuspomiformis* (Bassett, 1881) partially resemble *Melikaiella* in their host plant associations, morphology of adults and/or galls they induce. However, after studing the type material and long series of these species, we concluded that they do not belong to *Melikaiella* because of the next characters: in *C. electreae* the metasoma is not sculptured, the propodeal carinae are straight without carinae in the central propodeal area, and the margin of the forewing is ciliate; in *C. quercuspomiformis* the second metasomal tergite is pubescent laterally, the metasoma is punctuate and not areaolate (reticulate), the prominent part of the ventral spine of the hypopygium is longer, the scutellar foveae are well-defined, the forewing margin is ciliate, and the mesoscutum is rugose.

Recently, another genus, *Zapatella* Pujade-Villar & Melika from the Holarctic and Neotropical areas has been established (Pujade-Villar *et al*., 2012c) to include six species of *Callirhytis*: *C. cryptica* (Weld), *C. herberti* (Weld), *C. oblata* (Weld), *C. quercusmedullae* (Ashmead), *C. quercusphellos* (Osten Sacken) and *C. quercussimilis* (Bassett). This work is the second contribution to differentiate the large polyphyletic *Callirhytis* 'sensu lato' group. Further research will surely establish other new genera within the Nearctic *Callirhytis* 'sensu lato'.

ACKNOWLEDGMENTS

We thank Palmira Ros-Farré (UB) for taking some of the SEM pictures and Mar Ferrer-Suay for some optical pictures that illustrate this study. M. Buffington (Smithsonian, USA), R. Zuparko (CAS, USA) and G. Melika (Pest Diagnostic Laboratory, Hungary) for the loan of the type material of *Callirhytis* species described by Weld, several not type specimens used in this study and some gall pictures. Also J. Carpenter (AMNH) for the information of some types.

Table 2. Species of *Melikaiella*, with some biological characteristics.

Sexual form	Asexual form	Gall	Host (sec. Lobatae)
***M. amphibolensis* n. sp.**		leaves	*Q. mexicana*
***M. bicolor* n. sp.**		young branches	*Q. acherdophylla, Q. crassifolia, Q. crassipes, Q. laurina, Q. rugosa*
	M. corrugis (Bassett)	acorns	*Q. coccinea, Q. ilicifolia, Q. incana Q. velutina*
M. flora (Weld)	***M. flora*** (= *milleri* Weld)	leaves	*Q. agrifolia, Q. wislinzeni*
		acorns	*Q. agrifolia, Q. kelloggii , Q. wislinzeni*
	M. fructuosa (Weld)	acorns	*Q. coccinea, Q. rubra, Q. texana*
	M. fructicola (Ashmead)	acorns	*Q. ilicifolia, Q. marilandica, Q. velutina*
M. lupana (Weld)		leaves	*Q. emoryi*
M. ostensackeni n. sp.		leaves	*Q. rubra*
M. papula (Bassett)		leaves	*Q. rubra, Q. tinctoria*
***M. reticulata* n. sp.**		young branches	*Q. laurina*
	M. sonorae (Kinsey)	acorns	*Q. emoryi*
M. tumifica (O. Saken)		leaves	*Q. rubra, Q. velutina*

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Recibido: 7 de febrero 2014
Aceptado: 7 de marzo 2014

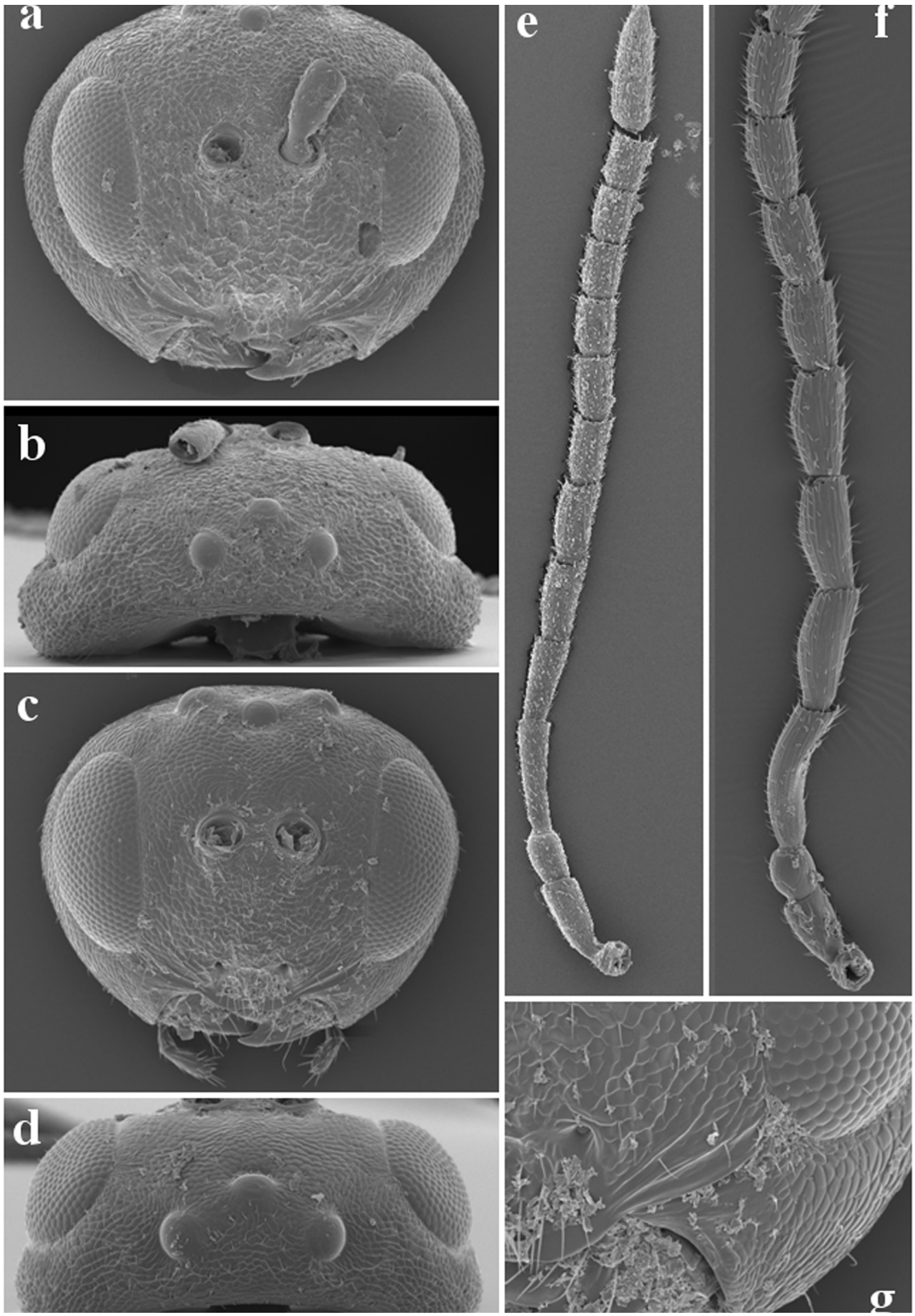

Figure 1.- *Melikaiella amphibolensis* n. sp: (a) female head, front view, (b) female head, dorsal view, (c) male head, front view, (d) male head, dorsal view, (e) female antenna, (f) male antenna, and (g) malar area.

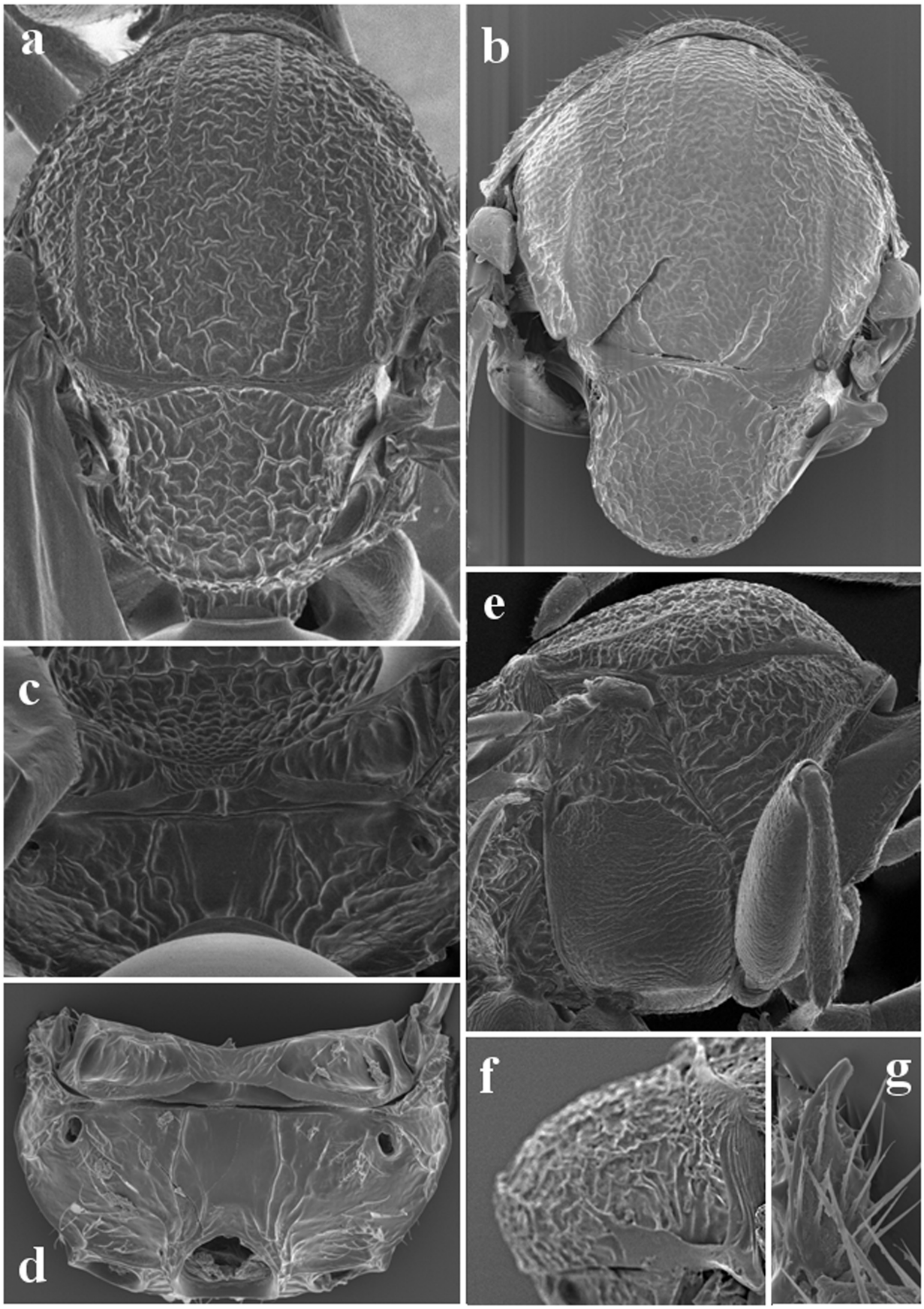

Figure 2.- *Melikaiella amphibolensis* n. sp: (a) female mesosoma, dorsal view, (b) male mesosoma, dorsal view, (c) female propodeal area, (d) male propodeal area, (e) detail of female mesosoma in lateral view, (f) mesoscutellum female in lateral view, and (g) tarsal claws.

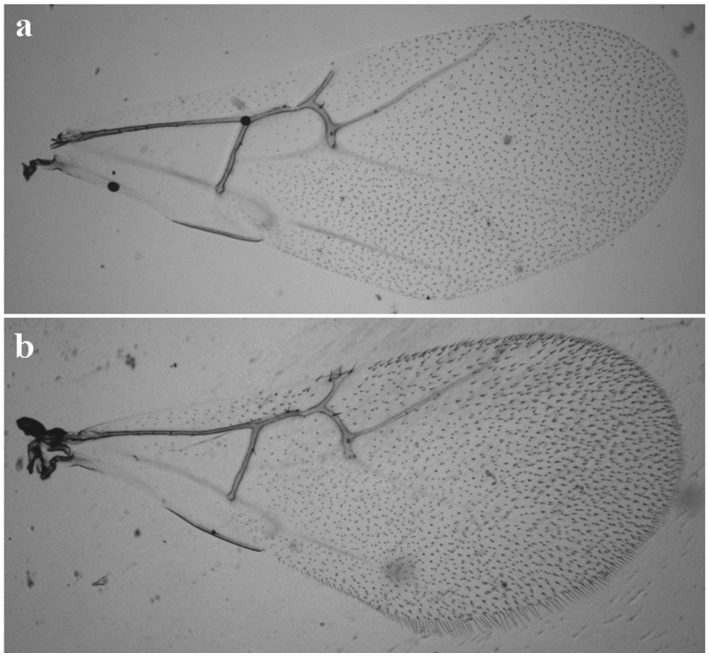

Figure 3.- *Melikaiella amphibolensis* n. sp., forewing: (a) female, (b) male.

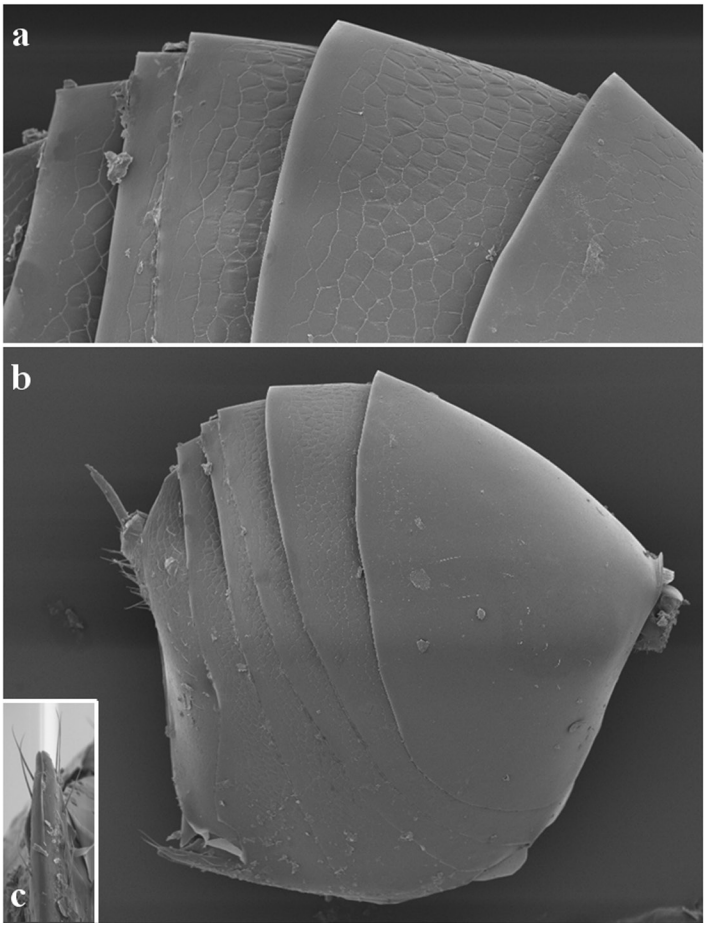

Figure 4.- *Melikaiella amphibolensis* n. sp.: (a) detail of sculpture of female metasoma, (b) female metasoma, (c) ventral spine of hypopygium.

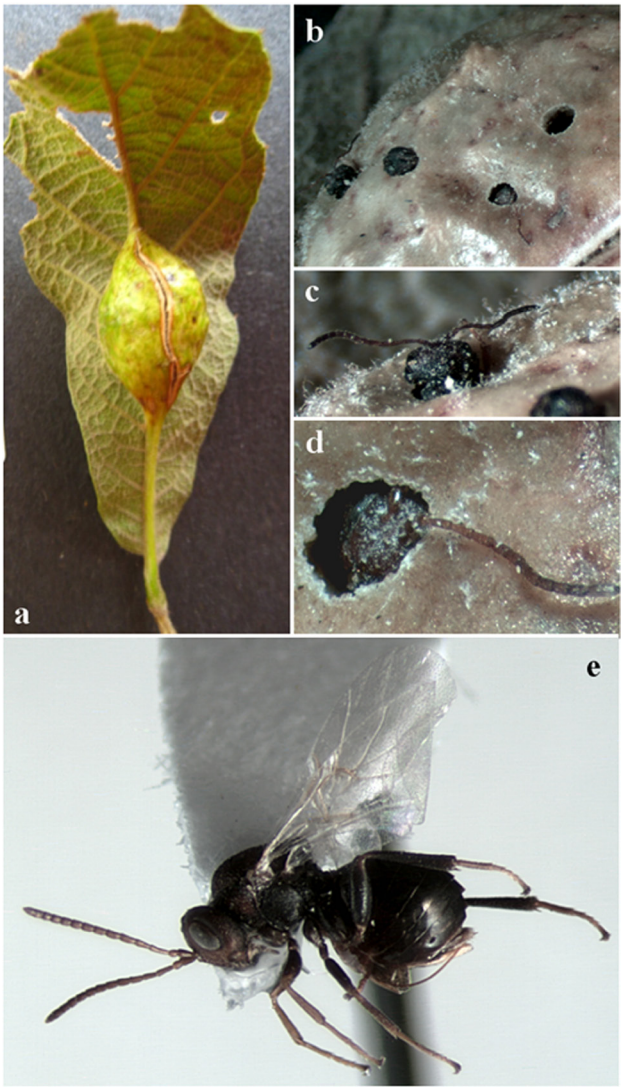

Figure 5.- *Melikaiella amphibolensis* n. sp: (a) gall, (b-d) adults emerging, (e) holotype ♀ habitus.

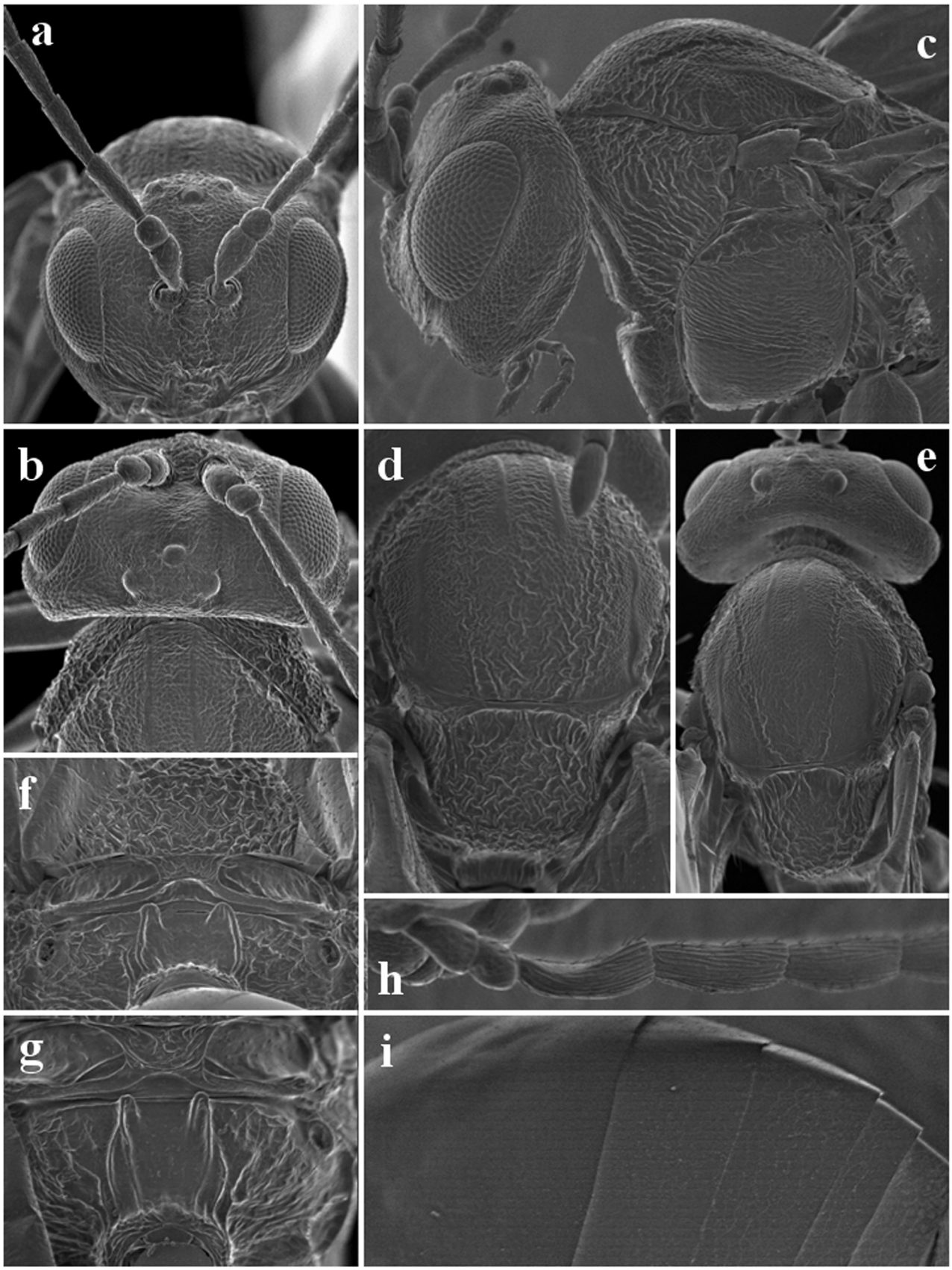

Figure 6.- *Melikaiella bicolor* n. sp: (a) female head and first antennal segments in front view, (b) female head in dorsal view, (c) detail of female head and mesosoma in lateral view, (d) female mesosoma in dorsal view, (e) male head and mesosoma in dorsal view, (f) female propodeal area, (g) male propodeal area, (h) first antenommere segments of male antenna, (i) metasoma detail.

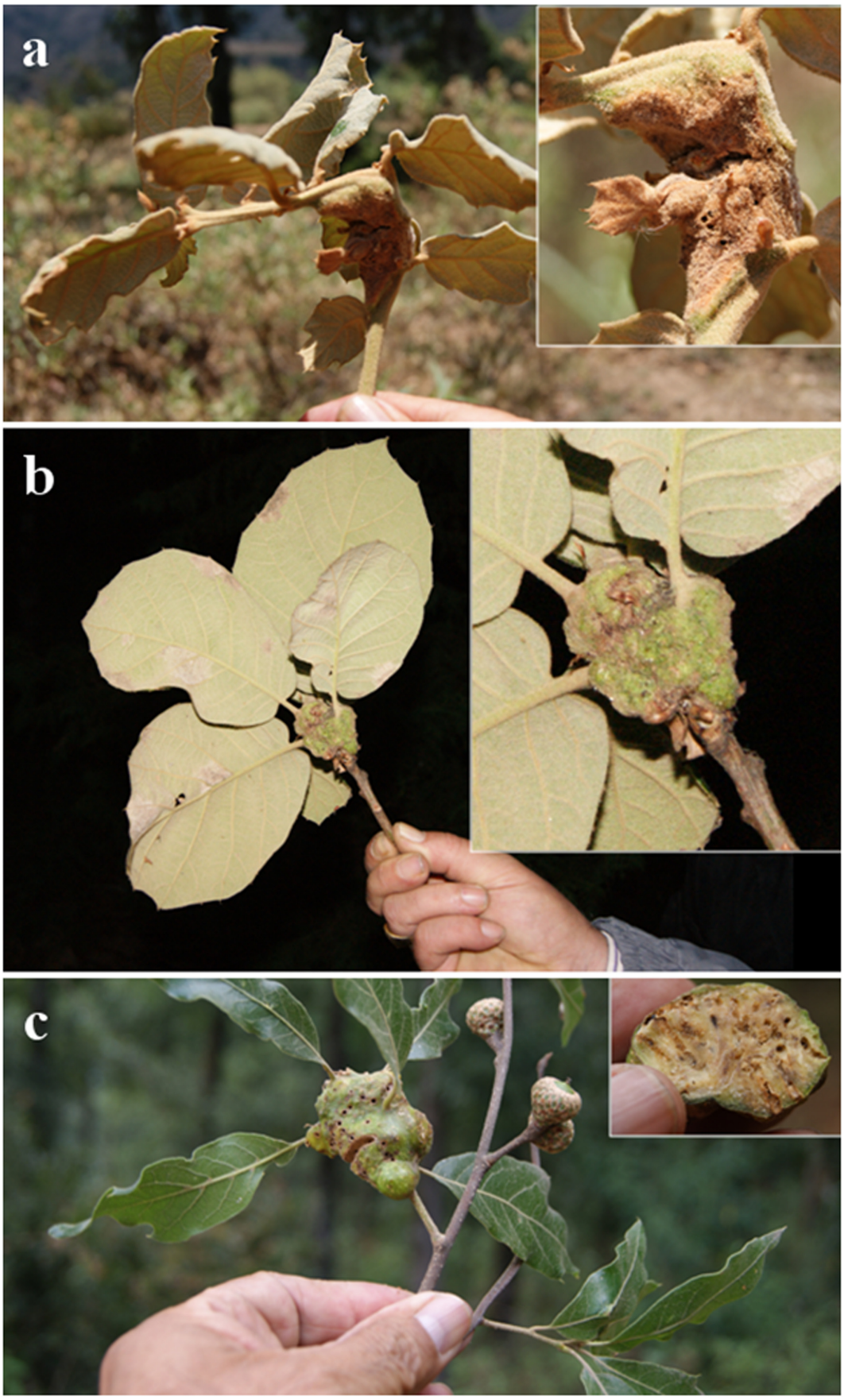

Fig. 7.- Galls of *Melikaiella bicolor* n. sp: (a) in *Q. crassifolia*, (b) *Q. rugosa*, (c) *Q. laurina*.

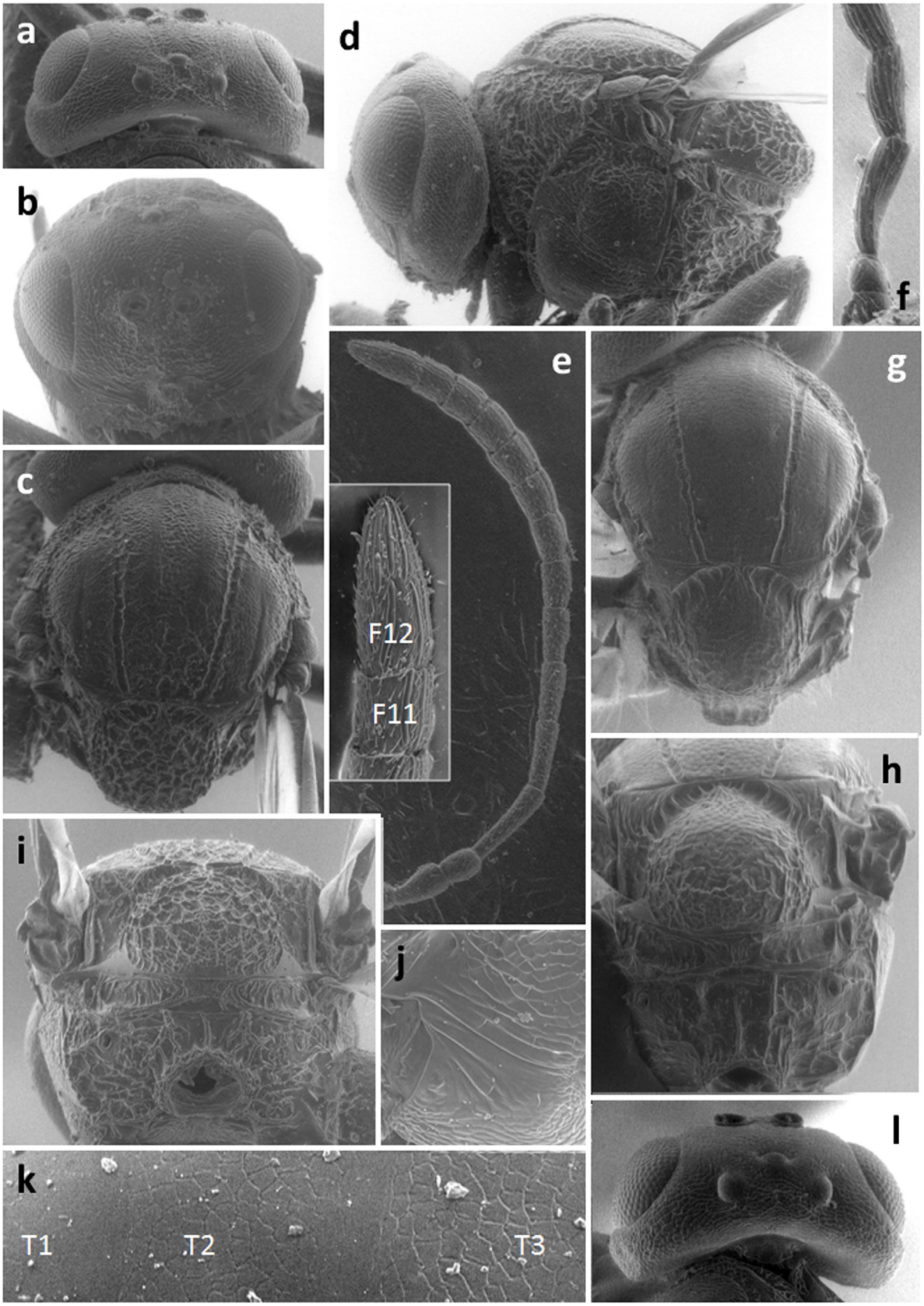

Fig. 8.- *Melikaiella ostensackeni* n. sp (sexual form): (a) female head in dorsal view, (b) female head in frontal view, (c) female mesosoma in dorsal view, (d) female mesosoma in lateral, (e) female antenna with detail of last flagellomeres, (f) first antenomeres of male, (g) male mesosoma in dorsal view, (h) male mesoscutellum and propodeum, (i) female mesoscutellum and propodeum, (j) malar space in female, (k) sculture in first metasomal segments, (l) male head in dorsal view.

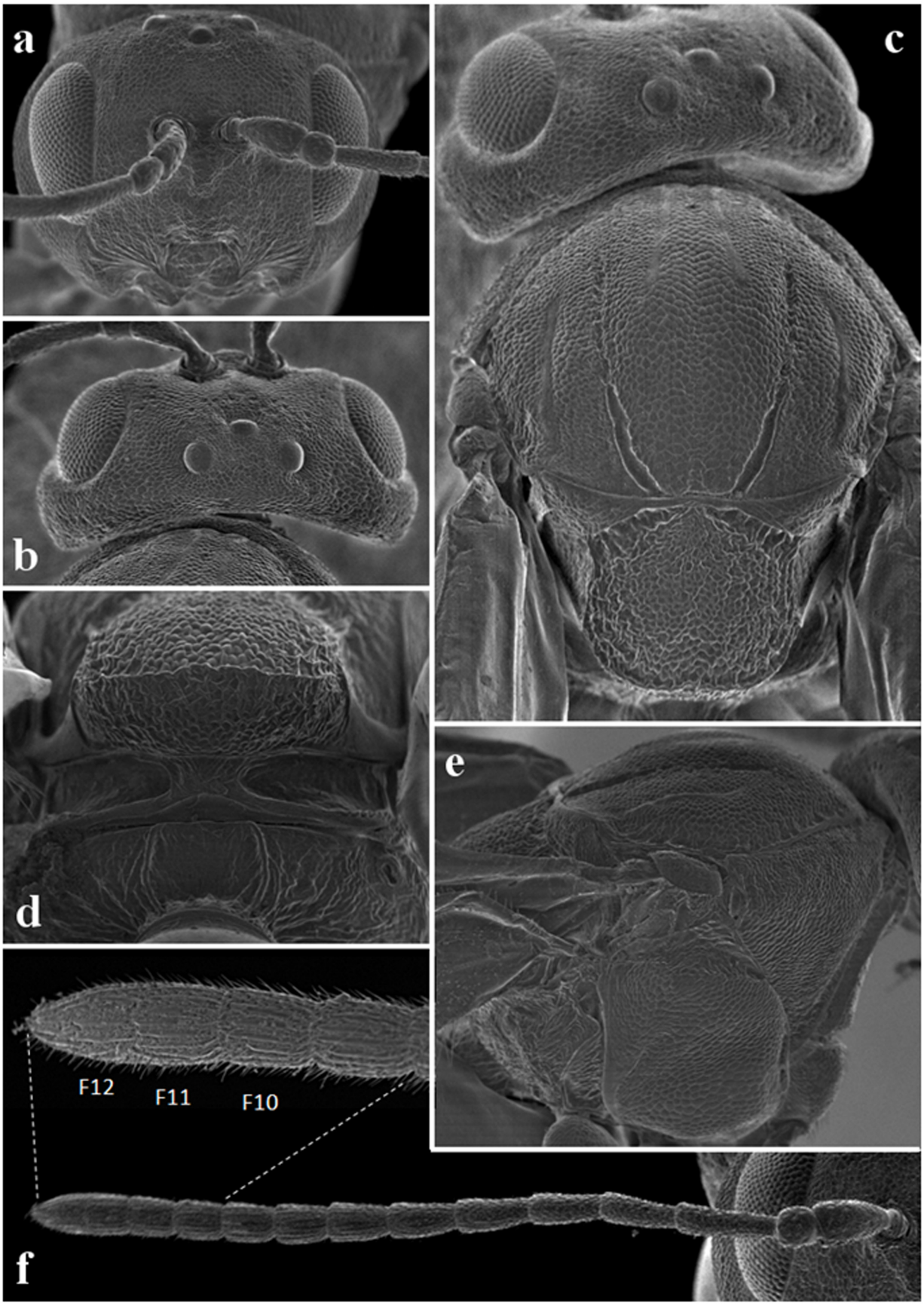

Fig. 9.- *Melikaiella reticulata* n. sp (female sexual form): (a) head and first antennal segments in front view, (b) head in dorsal view, (c) mesosoma in dorsal view, (d) propodeal area, (e) mesosoma in lateral view, (f) antenna.

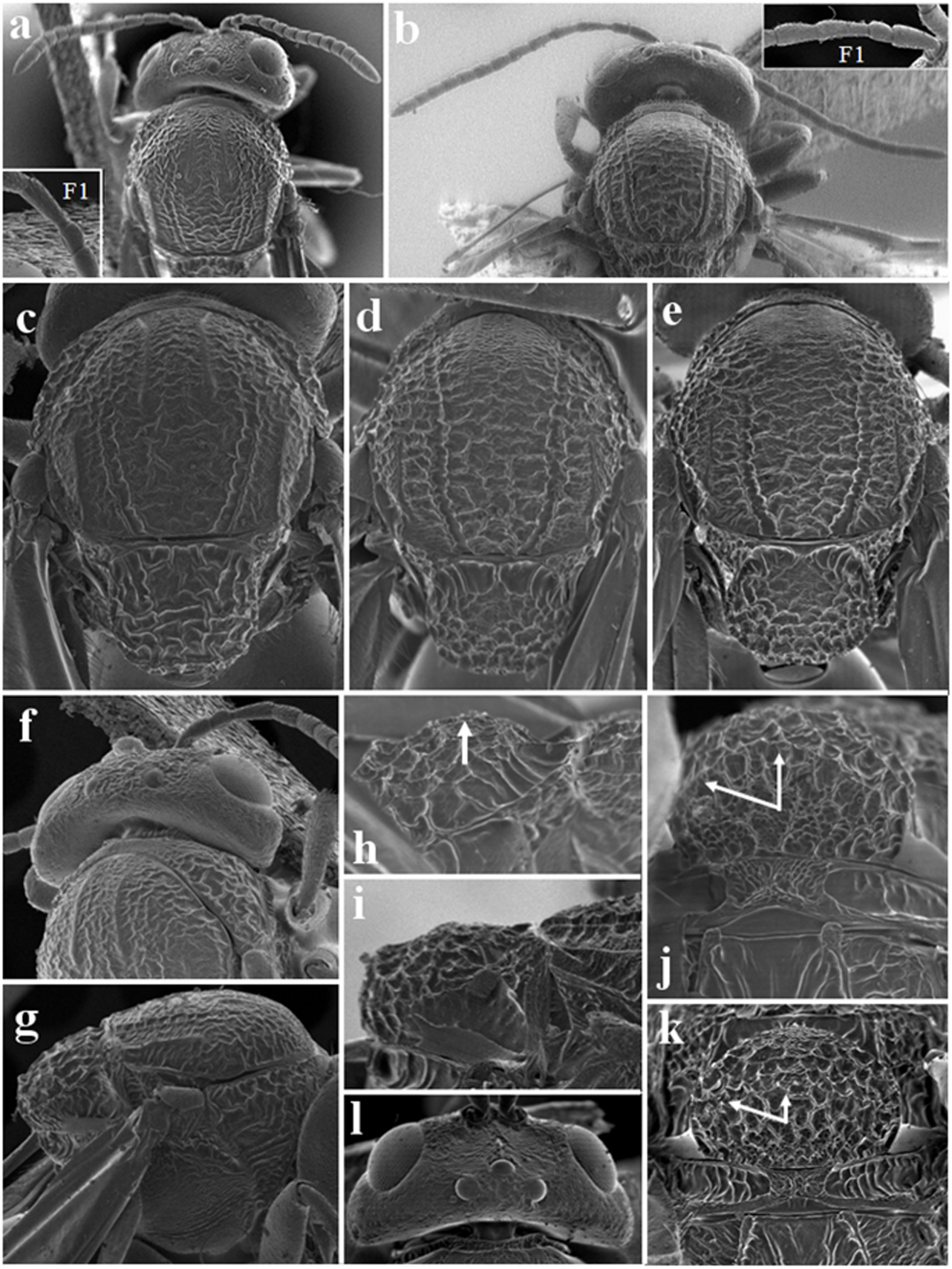

Fig. 10.- *Melikaiella fructuosa* (a, c, f, g), *M. corrugis* (b, d, h, j) and *M. fructicola* (e, i, k, l). (a-b) Relation antenna vs body and detail for first antennomeres, (c-e) mesosoma in dorsal view, (f) head and mesosoma in dorso lateral view, (g) mesosoma in lateral view, (h-i) mesoscutellum in lateral view, (j-k) mesoscutellum in posterior view, (l) head in dorsal view.

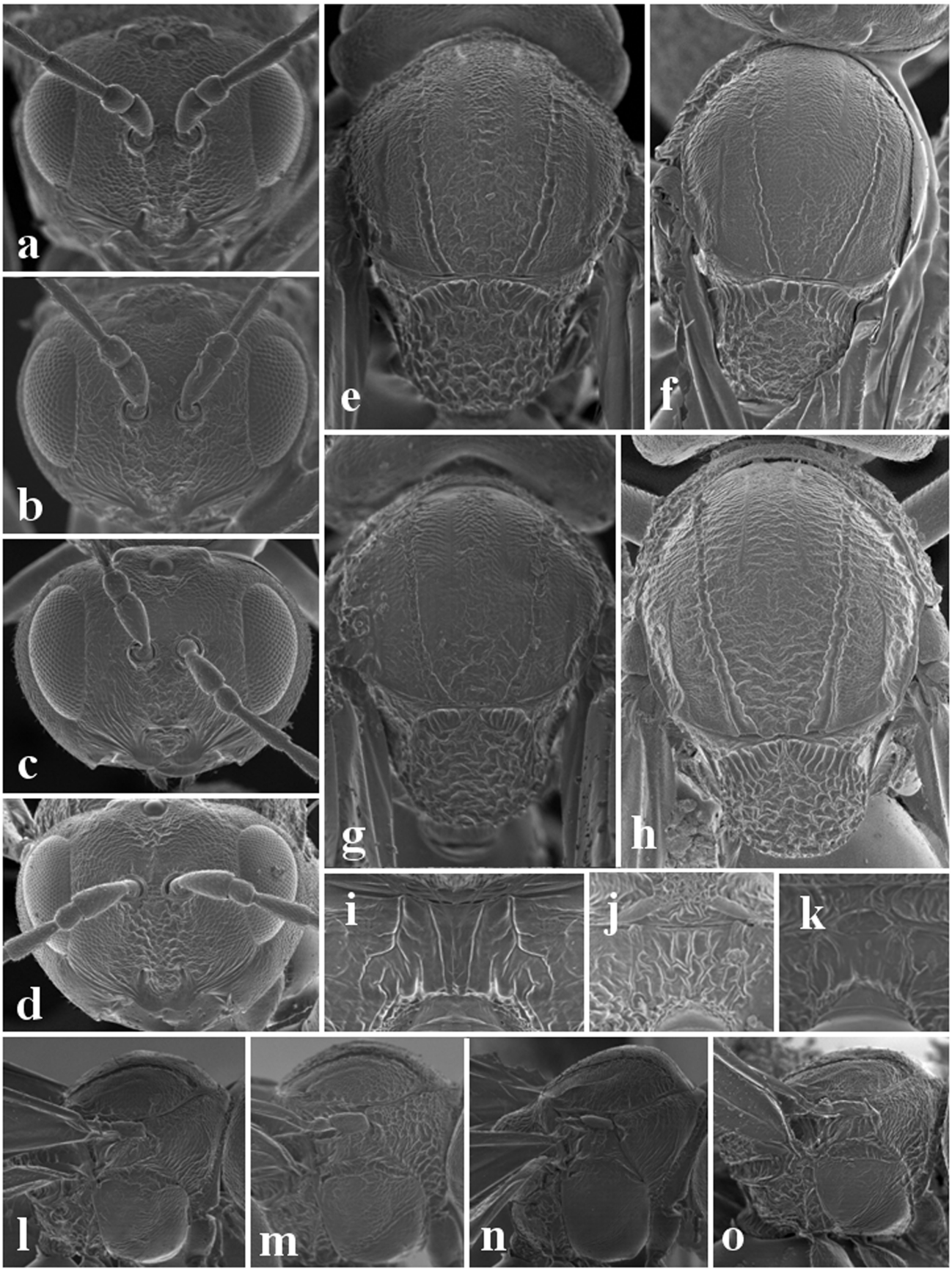

Figure 11.- *Melikaiella tumifica* (a, e, l, m), *M. flora* female sexual form (b, g, k, n, o), *M. sonorae* (c, f, i) and *M. flora* female asex (var-1) (d, h, j). (a-d) Head in frontal view, (e-h) mesosoma in dorsal vision, (i-k) propodeal area, (l, n) male mesosoma in lateral view, (m, o) male mesosoma in lateral view.

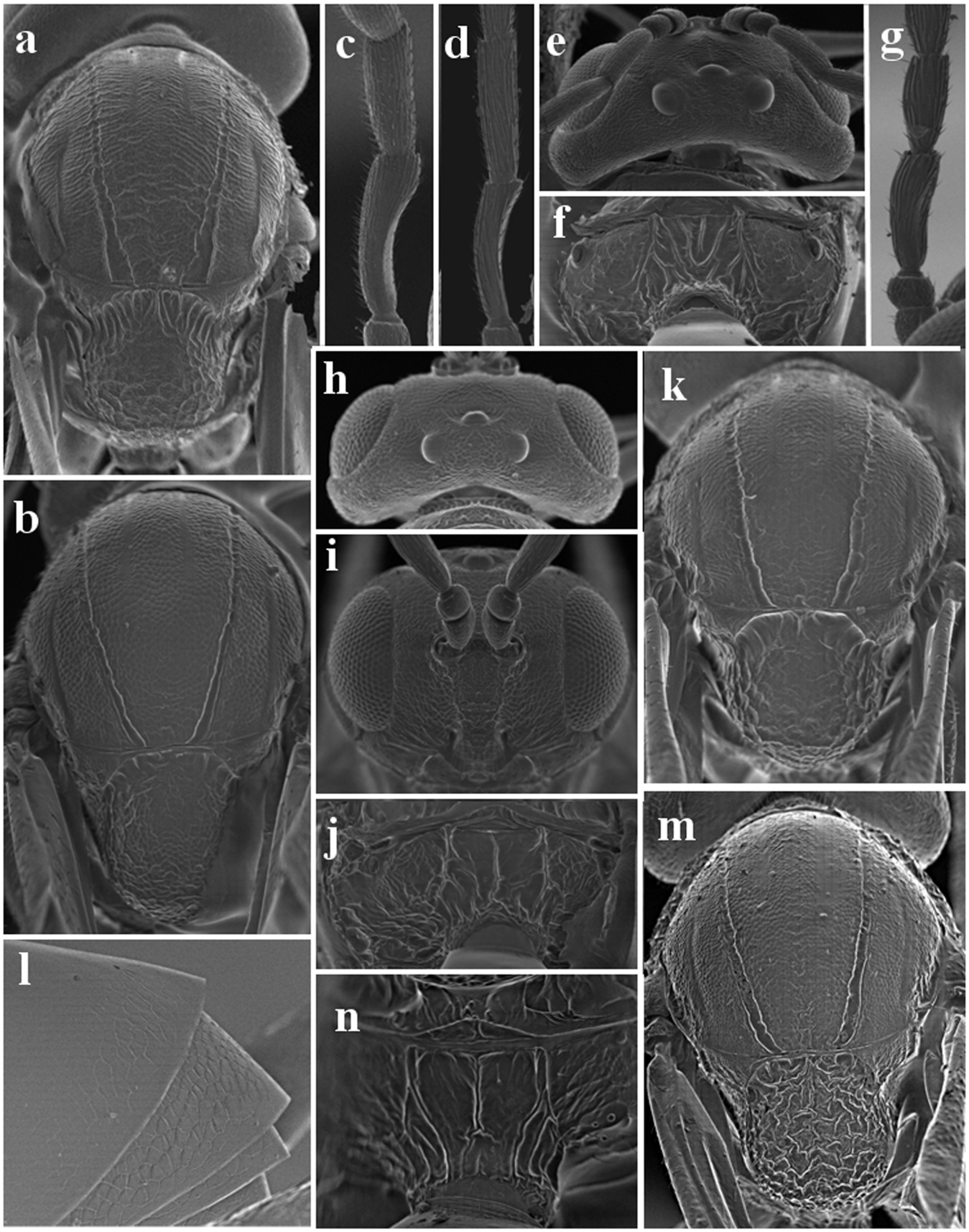

Figure 12.- *Melikaiella flora* male var-1 (a, c, e-f), *Melikaiella flora* male var-2 (b, d), *M. tumifica* male (g-l) and *M. flora* female asexual form var-2 (m-n). (a-b) Mesosoma in dorsal view, (c-d) first antenal segments, (e) head in dorsal vision, (f) propodeum, (g) first antenal segments, (h) head in dorsal view, (i) head in frontal view, (j) propodeum, (k) mesosoma in dorsal view, (l) metasomal detail, (m) mesosoma in dorsal view, (n) propodeal area.

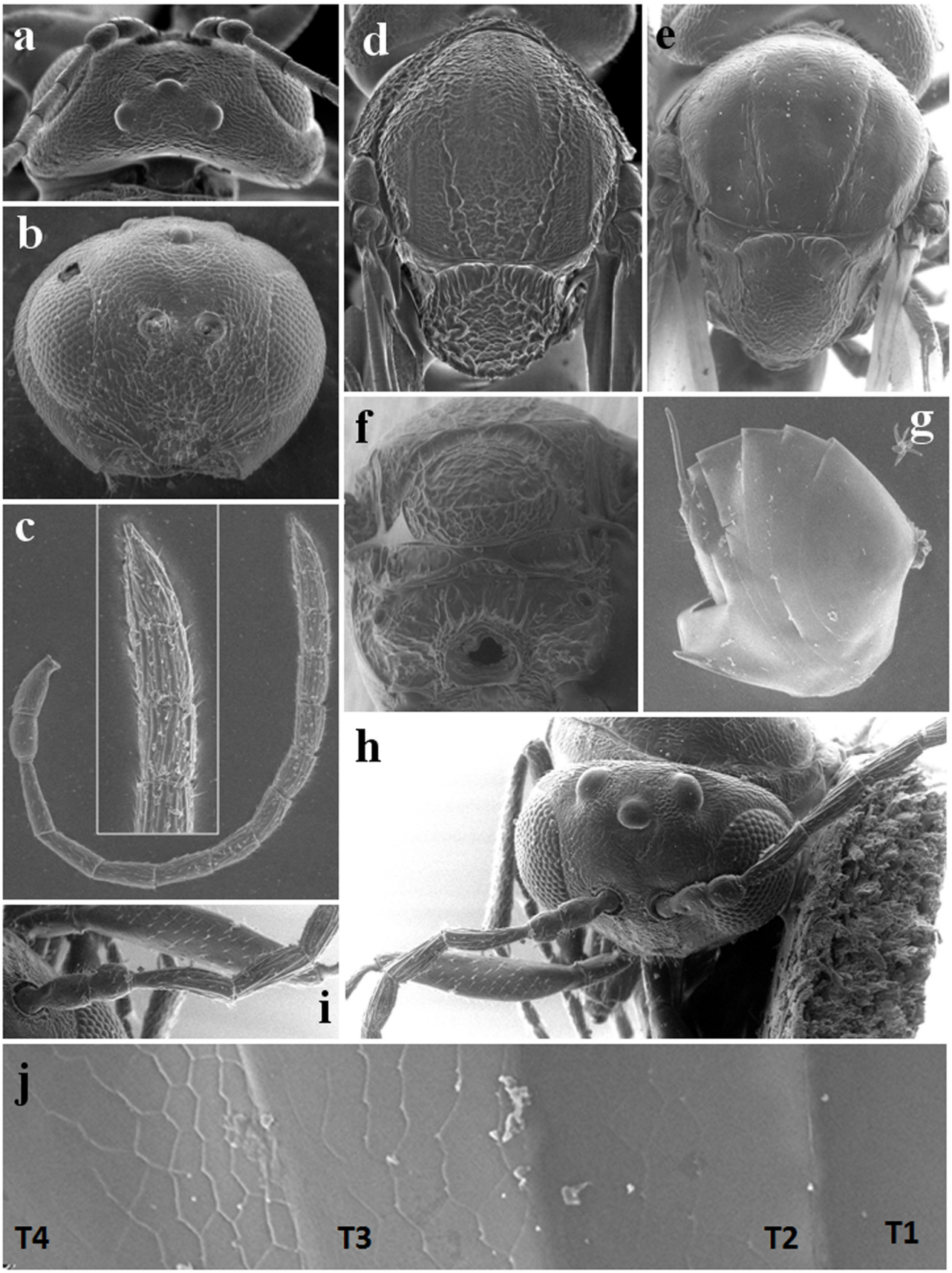

Figure 13.- *Melikaiella lupana* (a) female head in dorsal view, (b) female head in dorsal view, (c) female antennae and detail of last flagellomeres, (d) female mesosoma in dorsal view, (e) male mesosoma in dorsal view, (f) female propodeum, (g) metasoma female, (h) male head in dorso-frontal view, (i) first antenomeres of male, (j) detail of sculpture of first female metasomal segments.

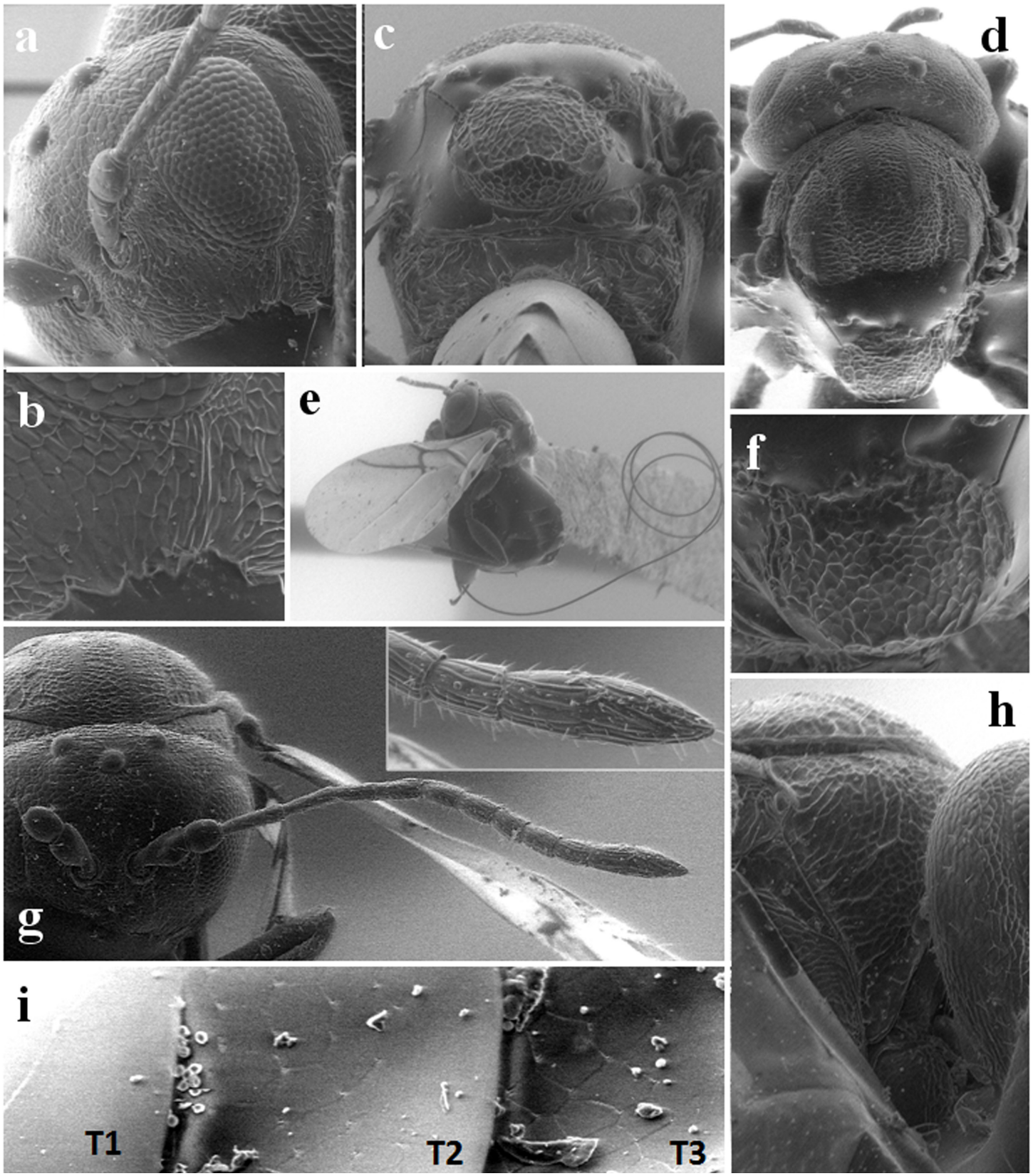

Figure 14.- *Melikaiella papula* female: (a) head fronto-lateral view, (b) malar space, (c) mesomesoscutellum and propodeum, (d) head and mesoscutum in dorsal view, (e) habitus, (f) mesoscutellum in dorsal view, (g) antenna and detail of last segments, (h) pronotum in lateral view, (i) detail of sculpture of first female metasomal segments.

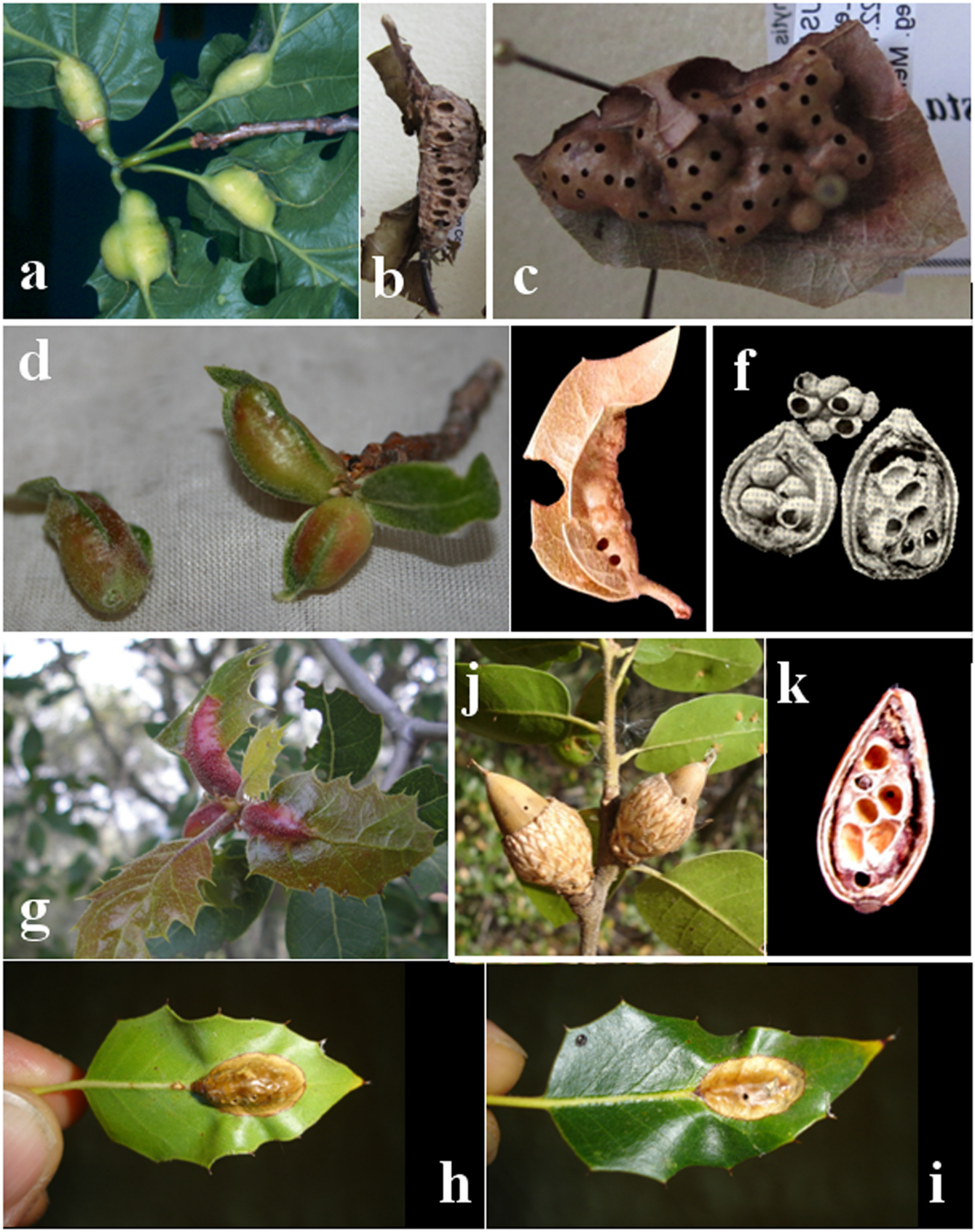

Figure 15.- Some *Melikaiella* galls: (a) *M. tumifica* (Melika picture), (b) transversal section of *M. tumifica*, (c) *M. ostensackeni* n. sp., (d) *M. lupana* (Melika picture), (e) *M. lupana* (type material), (f) *M. fructuosa* (from Weld, 1922b), (g) *M. flora* (sexual form, Melika picture), (h) lower leaf surface with *M. flora* (Melika picture), (i) upper leaf surface with *M. flora* (Melika picture), (j) acorn attacked by *M. flora* (asexual form, Melika picture), (h) longitudinal section of this acorn (type material).

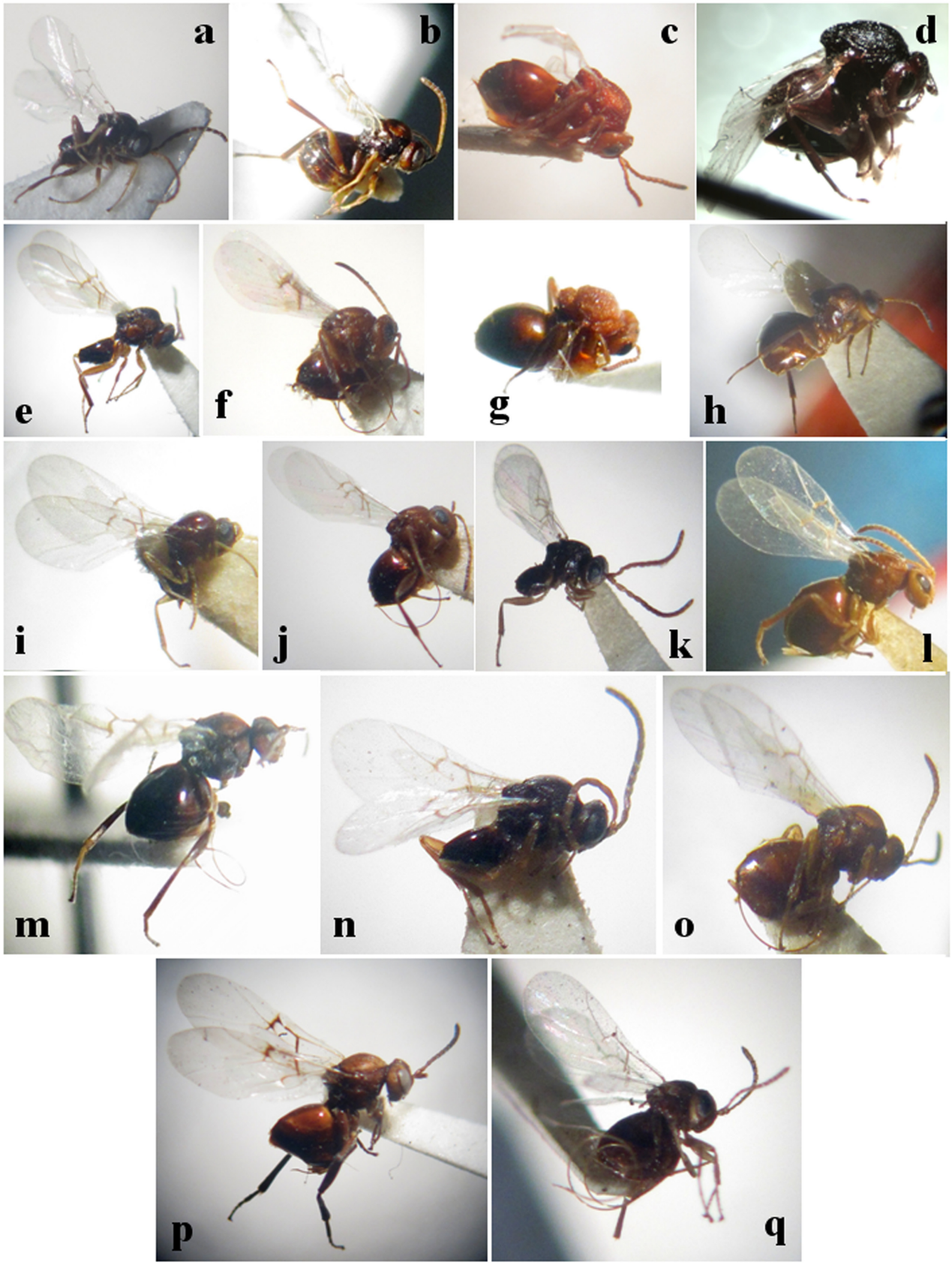

Figure 16.- Habitus de especies de *Melikaiella*: (a) *M. bicolor* male, (b) *M. bicolor* sex. female, (c) *M. fructicola* asex., (d) *M. fructuosa* asex. female, (e) *M. flora* male, (f) *M. flora* sex. female, (g) *M. corrugis* asex. female, (h) *M. sonora* asex. female, (i) *M. lupana* male, (j) *M. lupana* sex. female, (k) *M. ostensackeni* male, (l) *M. ostensackeni* sex. female, (m) *M. reticulata* sex. female, (n) *M. tumifica* male, (o) *M. tumifica* sex. female, (p) *M. flora* asex. female, (q) *M. papula* sex. female.

Dugesiana 21(1): 30
Fecha de publicación: 31 de julio de 2014

ISSN 1405-4094 (Edición impresa)
ISSN 2007-9133 (Edición online)

FE DE ERRATAS

El artículo publicado en *Dugesiana* 20(2) con título "Review of *Andricus* species (Hymenoptera, Cynipidae) producing woody tuberous oak galls in México and bordering areas of United States of America" presenta los pies de figura 10, 11 y 12 intercambiados (el pie del 10 es el del 11, el del 11 es el 12 y el del 12 es el 10).

En la figura 10 DICE

Figure 10. *Andricus santafe*. (a) Head in frontal view, (b) mesosoma in dorsal view (c) mesosoma in lateral view, (d) propodeum, (e) metasomal in lateral view, (f) antenna.

DEBE DECIR

Figure 10. *Andricus tumeralis*. (a) Head in dorsal view, (b) head in frontal view, (c) antenna, (d) mesosoma in dorsal view, (e) head and mesosoma in lateral view, (f) propodeum.

En la figura 11 DICE

Figure 11. *Andricus tumeralis*. (a) Head in dorsal view, (b) head in frontal view, (c) antenna, (d) mesosoma in dorsal view, (e) head and mesosoma in lateral view, (f) propodeum.

DEBE DECIR

Figure 11. Radial cell of: (a) *A. tumeralis*, (b) *A. dugesi*, (c) *A. montezumus*; femur III of : (d) *A. tumeralis*, (e) *A. dugesi*, (f) *A. montezumus*, (g) *A. furnaceus*; anterior margin of forewing of: (h) *A. wheeleri*, (i) *A. tumefaciens*, (j) *A. furnaceus*, (k) *A. lebeaue* n. sp.

En la figura 12 DICE

Figure 12. Radial cell of: (a) *A. tumeralis*, (b) *A. dugesi*, (c) *A. montezumus*; femur III of : (d) *A. tumeralis*, (e) *A. dugesi*, (f) *A. montezumus*, (g) *A. furnaceus*; anterior margin of forewing of: (h) *A. wheeleri*, (i) *A. tumefaciens*, (j) *A. furnaceus*, (k) *A. lebeaue* n. sp.

DEBE DECIR

Figure 12. *Andricus santafe*. (a) Head in frontal view, (b) mesosoma in dorsal view (c) mesosoma in lateral view, (d) propodeum, (e) metasomal in lateral view, (f) antenna.

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Dugesiana 21(1): 30
Fecha de publicación: 31 de julio de 2014
©Universidad de Guadalajara
ISSN 1405-4094 (Edición impresa)
ISSN 2007-9133 (Edición online)

FE DE ERRATAS

El artículo publicado en *Dugesiana* 20(2) con título "Listado preliminar de los odonatos (Insecta: Odonata) del estado de Guanajuato, México" presenta datos incorrectos en el cuadro 1 como se señala a continuación.

En el Cuadro 1 dice:		**DEBE DECIR**	
*Erythrodiplax basifusca** (Calvert, 1895)	8,11	*Erythrodiplax basifusca** (Calvert, 1895)	8,9,11
*E. connata** (Burmeister, 1839)	9		
Se elimina el registro de *E. connata.*		Se incrementan un registro municipal de *E. basifusca.*	

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