Revista Mexicana de Biodiversidad

Revista Mexicana de Biodiversidad 96 (2025): e965584

Taxonomy and systematics

What is *Femuros* (Cynipidae: Cynipini)?

¿Qué es Femuros *(Cynipidae: Cynipini)?*

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Received: 14 November 2024; accepted: 21 January 2025

http://zoobank.org/urn:lsid:zoobank.org:pub:18CD0974-E73E-475C-AE8D-D0CA1D0164CE

Abstract

The North American oak gall wasp genus *Femuros* Kinsey is revised after its re-establishment in 2015. Morphological evidence suggests that only 3 species described by Kinsey belong to this genus: *F. repandae* Kinsey, *F. ocri* Kinsey, and *F. ruidum* Kinsey. The rest of the species are transferred to the genus *Andricus* Hartig: *A. geniale* (Kinsey) comb. rev., *A. integrum* (Kinsey) comb. rev., *A. lusum* (Kinsey) comb. rev., and *A. perfectum* (Kinsey) comb. rev. A new species with slightly swollen femora but without an apical lobe and without internal tibial carina is described: *A. calvoi* sp. nov. We provide descriptions, redescriptions, diagnoses, keys to species, and information on biology, phenology, and distribution.

Keywords: Hymenoptera; Gall wasp; Nearctic; Taxonomy

Resumen

Se revisa el género norteamericano *Femuros* Kinsey que fue restituido en 2015. Solo 3 especies descritas por Kinsey pertenecen a este género: *F. repandae* Kinsey, *F. ocri* Kinsey y *F. ruidum* Kinsey. El resto de las especies están incluidas en el género *Andricus* Hartig: *A. geniale* (Kinsey) comb. rev., *A. integrum* (Kinsey) comb. rev., *A. lusum* (Kinsey) comb. rev. y *A. perfectum* (Kinsey) comb. rev. Se describe una especie nueva con fémures ligeramente hinchados, pero sin lóbulo apical y sin carina tibial interna: *A. calvoi* sp. nov. Se proporcionan descripciones, redescripciones, diagnosis, una clave para las especies, información sobre biología, fenología y distribución.

Palabras clave: Hymenoptera; Avispas agalladoras; Neártico; Taxonomía

ISSN versión electrónica: 2007-8706; Universidad Nacional Autónoma de México, Instituto de Biología. https://doi.org/10.22201/ib.20078706e.2025.96.5584

Introduction

Kinsey (1937a, b) described several oak gall wasp genera from the Nearctic and Neotropics related to *Andricus*, some of which were synonymized under *Andricus* by Weld (1952): *Femuros* Kinsey, 1937, *Feron* Kinsey, 1937, *Druon* Kinsey, 1937, and *Conobius* Kinsey, 1938. Later, Melika and Abrahamson (2002) increased the number of synonymies: *Dros* Kinsey, 1937 and *Erythres* Kinsey, 1937. Recently morphological and phylogenetic studies have revalidated some of these genera: *Erythres* Kinsey, 1937 (Pujade-Villar & Melika, 2014), *Femuros* Kinsey, 1937 (Pujade-Villar & Ferrer-Suay, 2015), *Antron* Kinsey, 1930 (Melika et al., 2021), *Dros* Kinsey, 1937 (Pujade-Villar et al., 2017), *Druon* Kinsey, 1937 (Cuesta-Porta et al., 2022), and *Feron* (Cuesta-Porta et al., 2023).

Femuros was described by Kinsey (1937a) to include 2 species (*F. repandae* and *F. ruidum*) characterized as having …"*the hind femur peculiarly broadened on ventral margin near distal end, [...], although it is suddenly constricted where it joins the tibia*". Later, Kinsey (1937b) described the "geniale complex" to include several species with different gall morphologies and punctured metasoma (*F. lusum*, *F. perfectum*, *F. geniale*, and *F. integrum*), and a new species belonging to "repandae complex" (*F. ocri*). Recently, Pujade-Villar and Ferrer-Suay (2015) mentioned another character present in the genus *Femuros*, an internal carina on the hind tibia, thus re-establishing *Femuros* as valid.

In Kinsey's descriptions (both generic and specific), many diagnostic characters are not mentioned. The study of the type material and of the samples collected in Mexico show 2 distinct morphological models and some errors in the description of the species. The aim of this study is to redescribe the genus *Femuros* to adjust the diagnostic characters to the new proposed generic limits of *Femuros* and redescribe the species that Kinsey (1937a, b) included. We transfer and redescribe the species belonging to the "geniale complex" to the genus *Andricus*, and we describe a new species of *Andricus* with swollen femurs and internal tibial carina: *A. calvoi* sp. nov. Also, the species *Femuros bracteatus* comb. nov. is transferred from *Andricus*.

Materials and methods

Fresh material was obtained from galls collected in Mexico from multiple collecting events during 2009-2019. Site locations and other details are provided in the "Material examined" section for each species. Galls were reared at room temperature in plastic containers with mesh lids to ensure ventilation. Emerging adult wasps were preserved in 70% ethanol. Type materials of previously described species was also examined, both to confirm the identity of our recently collected specimens and to help define species limits.

Type specimens are deposited at the American Museum of Natural History (AMNH) in New York City, Hungarian Natural History Museum (HNHM) in Budapest, and JP-V collection of Barcelona University (UB).

Morphological descriptions

The terminology used to describe gall wasp morphology follows other recent cynipid studies (Liljeblad et al., 2008; Melika, 2006; Melika et al., 2010). Abbreviations for forewing venation follow Ronquist and Nordlander (1989), and cuticular surface terminology follows Harris (1979). Measurements and abbreviations used here include: F1-F12 for the 1st and subsequent flagellomeres; POL (post-ocellar distance) for the distance between the inner margins of the lateral ocelli; OOL (ocellar-ocular distance) for the distance from the outer edge of a lateral ocellus to the inner margin of the compound eye; and LOL (lateral-frontal ocelli distance) for 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.

The information contained in the material examined sections is a verbatim transcription of the pinned labels attached to the adult wasps including symbols and abbreviations. Alfred Kinsey included the symbol "⊕" to indicate the specimens naturally emerged from galls. Also, Kinsey designated most holotypes using a "Paratype" red label and crossing out the "Para-" to handwrite "Holo-" on top. We use the term "Holo~~Para~~type" to better reflect the verbatim transcription of Kinsey's holotype labels, and to follow the terms used in previous studies (Cuesta-Porta et al., 2022, 2023, 2024).

Bright-field images of adults were produced with a digital Leica DC500 camera attached to a Leica DM2700M compound microscope using the LAS Store&Recall software, followed by processing in Adobe Photoshop 6.0. SEM images of the new species were taken with the Stereoscan Leica-360 at low voltage (700V) and without coating, in order to preserve the specimens. For all species examined in this paper, descriptions are provided according to current morphological requirements as the original descriptions are often superficial.

Nomenclature of host plants

Denk et al. (2017) reorganized the classification of *Quercus*, dividing the genus into the subgenera *Cerris* and *Quercus*. Subgenus *Cerris* includes 3 sections: *Cyclobalanopsis* (previously considered a subgenus), and the sections *Ilex* and *Cerris* from Menitsky (1984). Subgenus *Quercus* includes 5 sections: *Lobatae* and *Protobalanus* as in Nixon (1993), with the old section *Quercus* divided into 3 new sections: *Quercus* '*sensu stricto*', *Virentes*, and *Ponticae*. The gall wasp species listed herein are associated with section *Quercus* subsection *Leucomexicanae*: *Q. arizonica* Sarg. (= *Q. sacame* Trel.), *Q. chihuahuensis* Trel., *Q. deserticola* Trel. (= *Q. texcocana* Trell.), *Q. glaucoides* Mart. & Gal., *Q. grisea* Liebm., *Q. laeta* Liebm., *Q. magnoliifolia* Née (= *Q. haemathophebia* Trel., = *Q. macrophylla* Née), *Q.obtusata* Humb. & Bonpl., *Q. potosina* Trel., *Q. repanda* Bonpl., *Q. rugosa* Née (= *conglomerata* Trel., = *reticulata* Bonpl., = *rhodophlebia* Trel.), *Q. repanda* Bonpl., and *Q. undata* Trel. There is only one record of an association to an oak in section *Lobatae*, *Q. crassifolia* Bonpl.

Results

Below we present the formal redescriptions of 4 valid species of *Femuros* (Cynipini), all from the Nearctic or Neotropics: *F. bracteatus* (Weld) comb. nov., *F. ocri* Kinsey, *F. repandae* Kinsey, and *F. ruidum* Kinsey. Also, 4 species currently in *Femuros* are placed in the genus *Andricus* Hartig 1840: *A. geniale* (Kinsey) comb. rev., *A. integrum* (Kinsey) comb. rev., *A. lusum* (Kinsey) comb. rev., and *A. perfectum* (Kinsey) comb. rev., along with a new *Andricus* species with swollen hind femurs and internal tibial carina described here: *A. calvoi* sp. nov.

The following identification key includes 8 Cynipini species characterized by a conspicuous transscutal articulation, toothed tarsal claws, fully-developed wings, without malar sulcus, antenna with 11-12 flagellomeres, the hind femur with a distinct lobe in posterior margin, hind tibia with a strong longitudinal carina, the second metasomal tergite with sparse setae on anterolateral area, the third and subsequent metasomal tergites micropunctured, and the ventral spine of hypopygium needle-like with its sides gradually converging into a tip.

Key to asexual *Andricus* and *Femuros* females with broadened femur and tibial carina

1. Body chestnut to black (Fig. 24a-d); lower head in frontal view sculptured, with radiating striae, carina reaching margin of the eye (Fig. 1a); occipital carina absent; all metasomal segments micropunctured posteriorly (Figs. 2c, 9b, 11b, 14b) ..... *Andricus* (2)
- Body red rufous (Fig. 25a-d); lower head in frontal view almost smooth, without striae radiating from clypeus or with very inconspicuous carinae only next to clypeus (Figs. 15a, 16a, 18a, 21a); occipital carina dorsally present (Figs. 18b, 21c); second metasomal tergum smooth, without micropunctures, subsequent terga micropunctured (Figs. 15d, 16e, 20a, 23b) ..... *Femuros* (6)

2. LOL subequal or shorter than diameter of lateral ocellus (Figs. 1b, 10b, 12c); hind coxae and femora swollen, sometimes hind femora with strong distal lobe (Figs. 2e-f, 11b, 14b); propodeal carinae bent outwards or converging posteriorly (Figs. 1e, 10f, 14c) 3
- LOL more than 1.2× diameter of lateral ocelli (Figs. 7c, 12c); hind coxae and femora not swollen (Fig. 9a); propodeal carinae subparallel (Figs. 6b, 8d) 5

3. Lower face rugose-reticulate, dull, with vertical carinae radiating from clypeus towards toruli (Fig. 12a, c); pronotum completely striate, with parallel curved striae (Fig. 13c); notaulus weakly impressed, incomplete, reaching slightly more than 1/2 of mesonotum length (Figs. 12f, 13a) ..... *A. perfectum*, comb. rev.
- Lower face faintly reticulate, shining, carinae radiating from clypeus not extending towards toruli (Figs. 1a-b, 10a, 10b); pronotum punctured with striae only on lateral margin (Figs. 1c, 10c); notaulus deep, complete or not (Figs. 1d, 10c) 4

4. Notauli incomplete not converging posteriorly, space between notauli subequal to space between notauli and parapsidal line (Fig. 10d-e), propodeal carinae subparallel slightly bent outwards (Fig. 10a) ..... *A. lusum*, comb. rev.
- Notauli complete strongly converging posteriorly, space between notauli subequal to width of notauli on posterior margin (Fig. 1d); propodeal carinae strongly converging towards posterior end (Fig. 1e) ..... *A. calvoi*, sp. nov.

5. Lower face reticulate, sometimes with some sparse striae (Fig. 4a); mesopleuron smooth with sparse striae across mid-height of mesopleuron (Fig. 5a) ..... *A. geniale*, comb. rev.
- Lower face rugose-reticulate, dull, with vertical carinae radiating from clypeus towards toruli (Fig. 7a); mesopleuron completely striated, except for smooth speculum (Fig. 8a) ..... *A. integrum,* comb. rev.

6. POL around 1.5× OOL, OOL 1.5× diameter of lateral ocellus (Fig. 18c); transfacial distance 1.3× as long as height of eye, and height of eye 2.0× as long as malar space (Figs. 15a, 18a)..... 7
- POL 2.0× OOL, OOL subequal to diameter of lateral ocellus (Figs. 16b, 21c); transfacial distance subequal to height of eye; and height of eye more than 2.4× as long as malar space (Figs. 16a, 21a)..... 8
7. Mesonotum with infuscate stripes along anterior parallel lines and parapsidal lines (Fig. 19b); mesoscutellar foveae divided by a thin carina (Fig. 19d).....*F. repandae*
- Mesoscutum uniformly colored (Fig. 15b); mesoscutellar foveae divided by a broad rugose elevated area.....
.....*F. bracteatus*
8. Mesopleuron densely pubescent with visible punctures and deep piliferous points, speculum mostly pubescent except for a small central glabrous smooth area (Fig. 22a); propodeal carinae bent outwards (Fig. 22c*)*.....*F. ruidum*
- Mesopleuron sparsely pubescent, mostly smooth with scattered delicate shallow piliferous points; speculum smooth and glabrous at least on median 1/2 length of speculum (Fig. 16c); propodeal carinae parallel (Fig. 17c)..... *F. ocri*

Andricus calvoi Pujade-Villar, Cuesta-Porta & Melika, sp. nov.
Figs. 1a-e, 2a-g, 3a-b
https://zoobank.org/urn:lsid:zoobank.org:act:9E41094E-4FFF-4488-9358-B7CFDC29E4E7

Diagnosis. Andricus calvoi sp. nov. differs from all *Andricus* species, except for the species here transferred to *Andricus*, by the hind femur swollen and by the presence of a tibial carina. This species differs from *Andricus geniale* comb. rev., *A. integrum* comb. rev., *A. perfectum* comb. rev., and *A. lusum*, comb. rev. by the parallel internal margins of the eyes and the body without dense pubescence, the mesopleuron only basally pubescent; the lower face is reticulate; differs from *A. geniale,* comb. rev. by the weakly reticulate mesopleuron, except for the smooth speculum; and the propodeal carinae strongly converging posteriorly.

Description. Asexual female (Figs. 1a-e, 2a-g, 3a). Head, mesosoma and metasoma black (with some brown areas in a specimen dissected from a gall); antenna light brown, last flagellomere darker; tegula yellowish; legs light brown, coxa, trochanter, femur brown to black, last tarsus darker than preceding (Fig 3a). Wing veins light brown.

Head (Fig. 1a-c) transversally ovate, broadest part below toruli, 1.4× as broad as high and narrower than mesosoma in frontal view, 1.5× as broad as long in dorsal view, uniformly coriaceous, lower face with short dense white setae; frons glabrous, without setae, 1.3× as broad as high in anterior view. Gena coriaceous to microreticulate, slightly broadened behind eye, 0.89× as broad as cross diameter of eye, measuring along transfacial line. Malar space coriaceous to microreticulate, with very few striae radiating from clypeus, malar sulcus absent; eye 1.7× as high as length of malar space. Inner margins of eyes parallel. POL 1.7× as long as OOL, OOL 1.7× as long as diameter of lateral ocellus and slightly longer than LOL, all ocelli rounded, of same size. Transfacial distance nearly equal to height of eye; torulus located above mid height of head, frons shorter than height of lower face, diameter of antennal torulus 2.8× as long as distance between them, distance between torulus and eye as long as diameter of torulus or very slightly shorter; lower face and slightly elevated median area delicately reticulate, pubescent. Clypeus impressed, coriaceous, rounded ventrally, medially not incised, anterior tentorial pits distinct; epistomal sulcus and clypeo-pleurostomal line distinctly impressed. Frons uniformly coriaceous to microreticulate, without striae, with few setae; interocellar area coriaceous. Vertex and occiput coriaceous, glabrous. Antenna (Fig. 2a) shorter than length of head + mesosoma, with 11 flagellomeres; pedicel subglobose, slightly longer than broad; flagellomeres subsequently broadening until apex; F1 slightly broader distally, subequal to F2 and 2.3× as long as pedicel; subsequent flagellomeres progressively shortened; F3 = F4, F5 = F6, F7 to F10 equal in length, F11 longer than F10, sometimes F11 with a very inconspicuous suture and thus antenna with 12 flagellomeres. Placodeal sensilla on F5-F11.

Mesosoma (Fig. 1c-e) 1.2× as long as high, concave in lateral view, with dense white setae. Sides of pronotum alutaceous, with denser white setae and weak, parallel carinae in upper lateroposterior part, anterolateral rim of pronotum inconspicuous. Mesoscutum as broad as long in dorsal view; coriaceous, without rugae, pubescent, with piliferous points denser in the posterior half. Notaulus complete, deep, straight, converging posteriorly, in most posterior part distance between notauli shorter than distance between notaulus and side of mesoscutum; median mesoscutal line absent; parapsidal and anterior parallel lines differentiated by delicate sculpture. Circumscutellar carina complete. Mesoscutellum as long

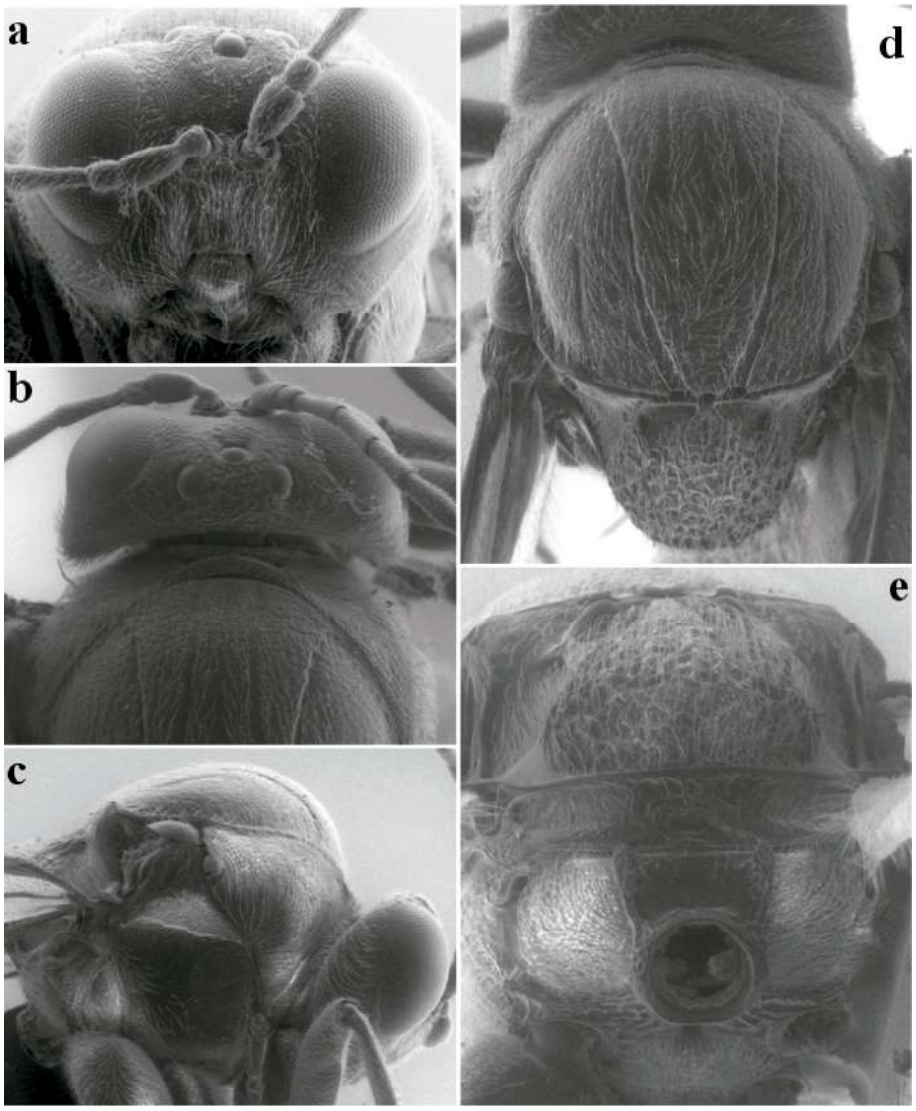

Figure 1a-e. *Andricus calvoi* sp. nov., asexual female. a) Head in frontal view; b) head in dorsal view; c) mesosoma in lateral view; d) mesosoma in dorsal view; e) propodeum.

as broad, uniformly rugose; overhanging metanotum, with sparse long setae. Mesoscutellar foveae differentiated, triangular, deep, with shining bottom, median carina short. Mesopleuron completely sculptured, coriaceous to weak reticulate with delicate carinae and sparse setae anteriorly, speculum smooth and shining; mesopleural triangle smooth, glabrous, with dense, long white setae, hiding the surface sculpture; dorsal and lateral axillar areas with delicate parallel longitudinal carinae, glabrous; axillula alutaceous, pubescent; subaxillular bar smooth, glabrous, triangular, short, posteriorly as high as height of metanotal trough; metapleural sulcus reaching mesopleuron in upper 2/3 of its height; upper part of sulcus distinct; lower part of sulcus delimiting broad area with dense long white setae. Metascutellum subrectangular, rugose, strongly incised ventrally; metanotal trough alutaceous, with dense setae; ventral bar of metanotal trough coriaceous-rugose; central propodeal area nearly smooth and glabrous; lateral propodeal carinae strongly converging toward posterior end; lateral parts of propodeum uniformly alutaceous, densely pubescent. Nucha almost smooth and shining dorsally, with parallel sulci laterally. Legs (Fig. 2e-g) with broad coxa, femur strongly broadened, without apical lobe, with some short teeth on the internal margin

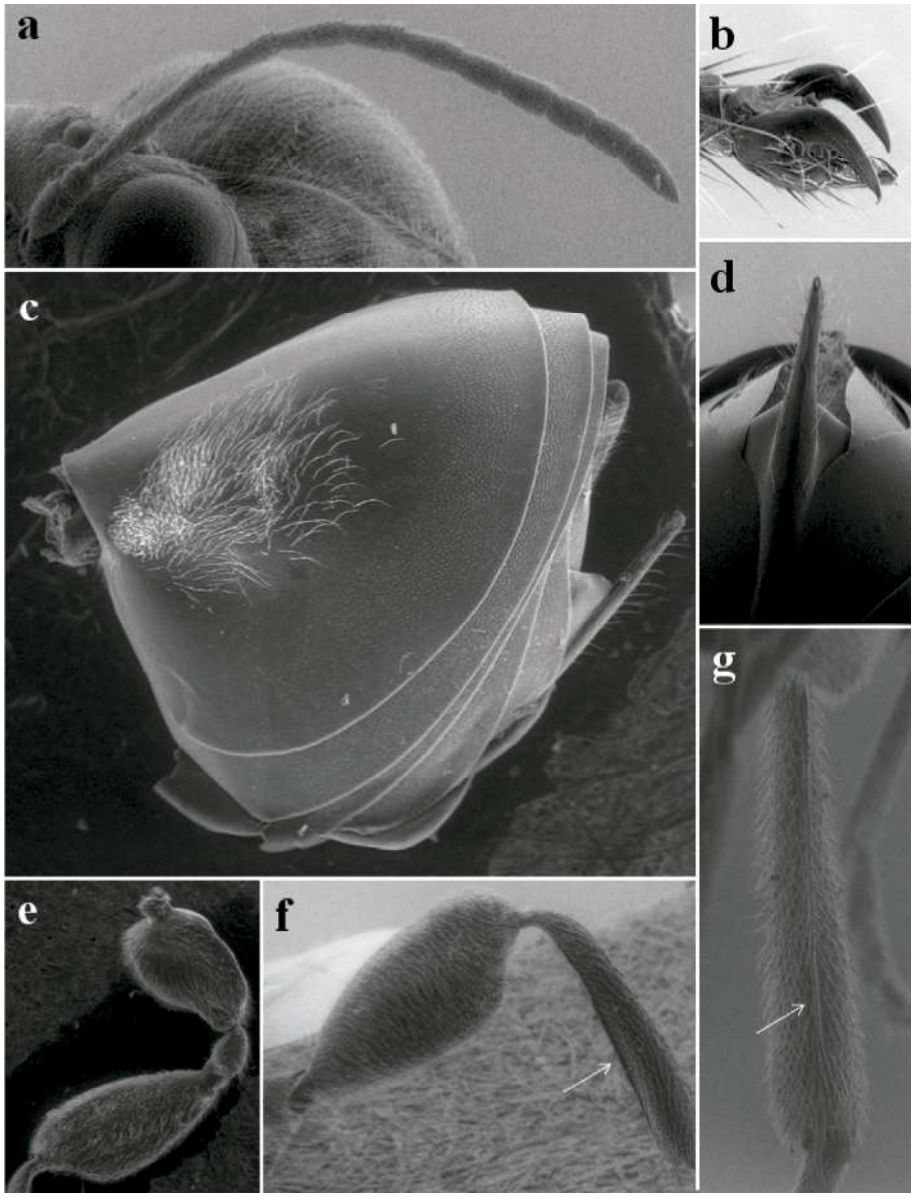

Figure 2a-g. *Andricus calvoi* sp. nov., asexual female. a) Antenna; b) tarsal claw; c) metasoma in lateral view; d) ventral spine of the hypopygium; e-g) hind leg, longitudinal carina of hind tibia marked with a white arrow.

produced by marginal sculpture; hind tibia with ventral carina reaching almost to the base of tibia; base of tarsal claws with strong tooth (Fig. 2b).

Forewing (Fig. 3c) hyaline, 1.1× as long as body, pubescent, with cilia on margins; radial cell opened, around 3.0× as long as broad; veins light brown; areolet absent or indistinct.

Metasoma (Fig 2c) shorter than head+mesosoma, longer than high. metasomal tergum 2 with lateral patch of white setae, punctate in posterior 1/2-1/3, all subsequent terga uniformly and entirely punctate. Prominent part of ventral spine of hypopygium needle-like, 4.5-5.0× as long as broad, with sparse setae laterally, without apical tuft of setae (Fig. 2d). Body length: 3.0-3.4 mm (n = 3).

Galls are developing in thin branches (Fig. 3b). It is a unilocular bud gall, woody, more or less cylindrical or globular, 8-18 mm in length and 7-15 mm in diameter, composed of 2 subunits; the upper and the lower third

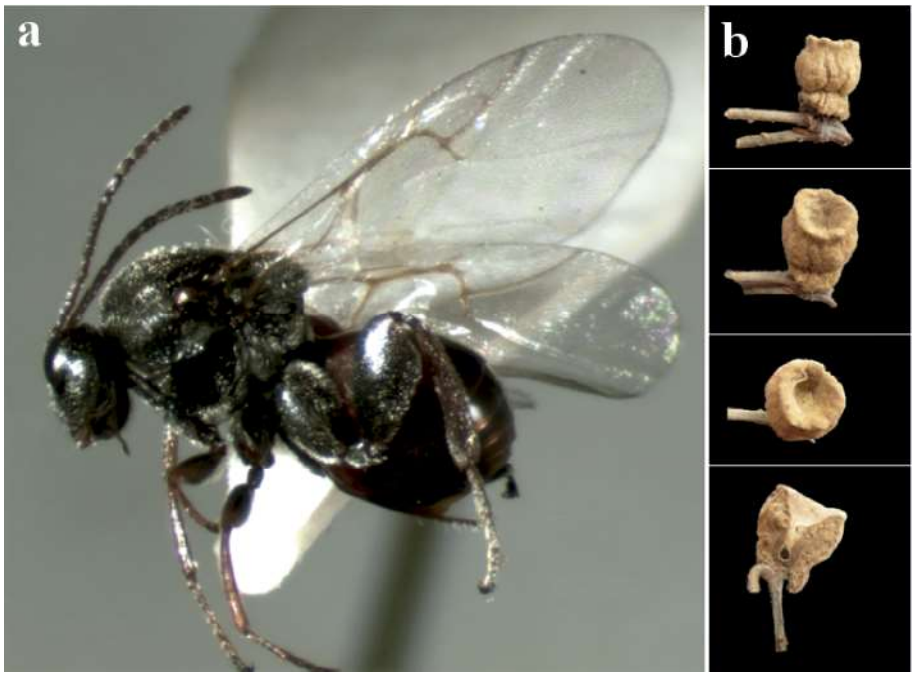

Figure 3a-c. *Andricus calvoi* sp. nov. a) Asexual female, habitus; b) galls, deposited in the JP-V col. (UB); c) asexual female, fore wing.

are constricted; the upper end is open with a depression, the edge is continuous. The gall is brown; the surface is covered by fine short brownish pubescence, which remains on the mature gall. The inner larval chamber is located in the constricted part of the gall. The single larval chamber is globular, with a hard woody wall, which is connected to the tissue of the gall. The emergence hole is located inside the upper depression.

Taxonomic summary

Type material. Holotype, asexual female deposited in JP-V collection (UB), labeled as "MEX, Parque Nacional Bosque del Pedregal, Ciudad de México, Mexico, M. Serrano col. 206A, 2,437 m asl, [19°17.283' N, 99°12.256' W]" (white label), "Ex. *Q. obtusata*, (24.vi.2012) 26. vi.2012" (white label); "Holotype *Korlevicandricus tlalpanus* desig. JP-V 2013" (red label), "*Andricus calvoi* Pujade-Villar, Cuesta-Porta & Melika, JP-V det., asexual gen." (white label). Paratypes (3 females): 1 female with the same data as the holotype; 2 females collected in the same place and host than the holotype, but with different collection dates (24.vi.2012) 27.vi.2012: 1 female; (3.x.2010) extr. vi.2011:1 female.

Additional material. Two females collected in the same place and from the same host plant as the holotype (20. vi.2011). Both females were dissected from the galls on 16.vii.2013 (damaged material). Eight females deposited in the JP-V col. (UB): 1 female "Parque Nacional bosque del Pedregal, Tlalpan, Ciudad de México, Mexico, (MEX096), Ex *Quercus* sp., (19.iv.12) 01.v.2012, M. Serrano leg."; 1 female "Santa Fe, Denominación de Coajomulco, Ciudad de México, Mexico, (MEX362), Ex *Quercus* sp., (23.iv.2017): 1 female , D. Cibrián-Tovar leg."; 5 females " Santa Fe, Coajomulco, Ciudad de México, Mexico, (MEX473), Ex *Q. laeta*, (22.iii.2019) 14.v.2019: 5 females, U. Barrera-Ruíz & D. Cibrián-Tovar leg."; 1 female "Sanctórum de Lázaro Cárdenas, Tlaxcala, Mexico, (MEX644), Ex *Quercus* sp., (22.vi.2022) 30.vi.2022: 1 female, JP-V, VC-P, A. Equihua & E. Estrada-Venegas leg."; 1 female "Peñón Blanco, Sierra Fría, San José de Gracia, Aguascalientes, Mexico (MEX772), Ex *Quercus* sp., (12.ii.2022) extracted: 1 female, R. Clark leg."; 1 female "Puente Roto, Santa Catarina Ixtepeji, Oaxaca, Mexico, (MEX834), Ex *Q. glabrescens*, (25.i.2023) extracted: 1 female, R. Clark leg."; 1 female "Carretera Maravatio-Morelia (Km. 177-178), Michoacán, Mexico, (MEX841), Ex *Q. obtusata* (SR-R det.), (18.vi.2023) 16-31.vii.2023: 1 female, A. Equihua & J. Pujade-Villar leg."; 1 female "Peñón Blanco, Sierra Fría, San José de Gracia, Aguascalientes, Mexico, (MEX973), Ex *Q. chihuahuensis,* (20.ii.2023) extracted: 1 female, R. Clark leg.".

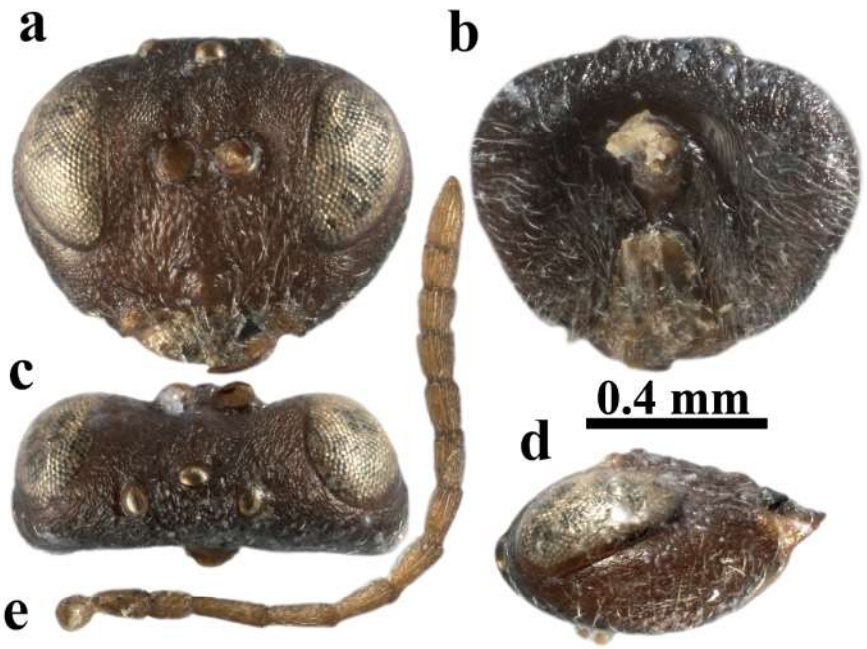

Figure 4a-e. *Andricus geniale* comb. rev., asexual female. a) Head in frontal view; b) head in posterior view; c) head in dorsal view; d) head in lateral view; e) antenna.

Etymology. Species is named after Mr. Oriol Calvo Verderes, accused in 2019, one month after the protests in Barcelona against the sentence of the Catalan political prisoners.

Biology. The asexual generation is only known to induce galls on *Q. obtusata* Humb. & Bonpl., and *Q. laeta* (section *Quercus*, subsection *Leucomexicanae*, white oaks). The galls were collected between March and June, adults emerged between May and June.

Distribution. Mexico: Ciudad de México, and Estado de México.

Andricus geniale (Kinsey, 1937), comb. rev.
Figs. 4a-e, 5a-d, 6a-d
Femuros geniale Kinsey, 1937; in Kinsey, 1937b: 466-467, female, gall; Pujade-Villar & Ferrer-Suay, 2015: 8.
Andricus geniale (Kinsey): Weld, 1952: 306.

Diagnosis. Andricus geniale differs from all the *Andricus* species, except for the species here transferred to *Andricus*, which have tibial carina and the last femur swollen. It differs from *A. lusum* comb. rev. by having the body scarcely pubescent with the glabrous mesopleuron on all its surface, the internal margin of eyes parallel, hind femur without distal lobe; differs from *A. calvoi* sp. nov., *A. lusum*, comb. rev., and *A. perfectum* comb. rev. for the LOL more than 1.2× as long as the diameter of lateral ocellus, the hind coxae and femora not swollen, and the propodeal carinae subparallel. Differs from *A. integrum*, comb. rev. by having the reticulated lower face, the mesopleuron is smooth with sparse striae across mid-height of mesopleuron.

Redescription. Asexual female (Figs. 4a-e, 5a-d, 6a-c). Head, mesosoma dark brown to black, antenna dark brown; legs chestnut brown, except dark brown to black coxae; metasoma chestnut brown.

Head (Fig. 4a-d) trapezoid, broadest part on the toruli level, 1.2× as broad as high, or less, and slightly narrower than mesosoma in frontal view, with sparse setae, denser on lower face and postgena; 2.4× as broad as long in dorsal view. Gena alutaceous, broadened behind eye in frontal view, nearly as broad as cross diameter of eye in lateral view. Malar space alutaceous with distinct rugae radiating from clypeus and reaching eye; eye 1.7× as high as length of malar space. Inner margins of eyes parallel or only slightly converging ventrally. POL 2.0× as long as OOL, OOL 1.5× as long as diameter of lateral ocellus and 1.2× as long as LOL, all ocelli ovate, of same size. Transfacial distance 1.2× as long as height of eye; toruli located at

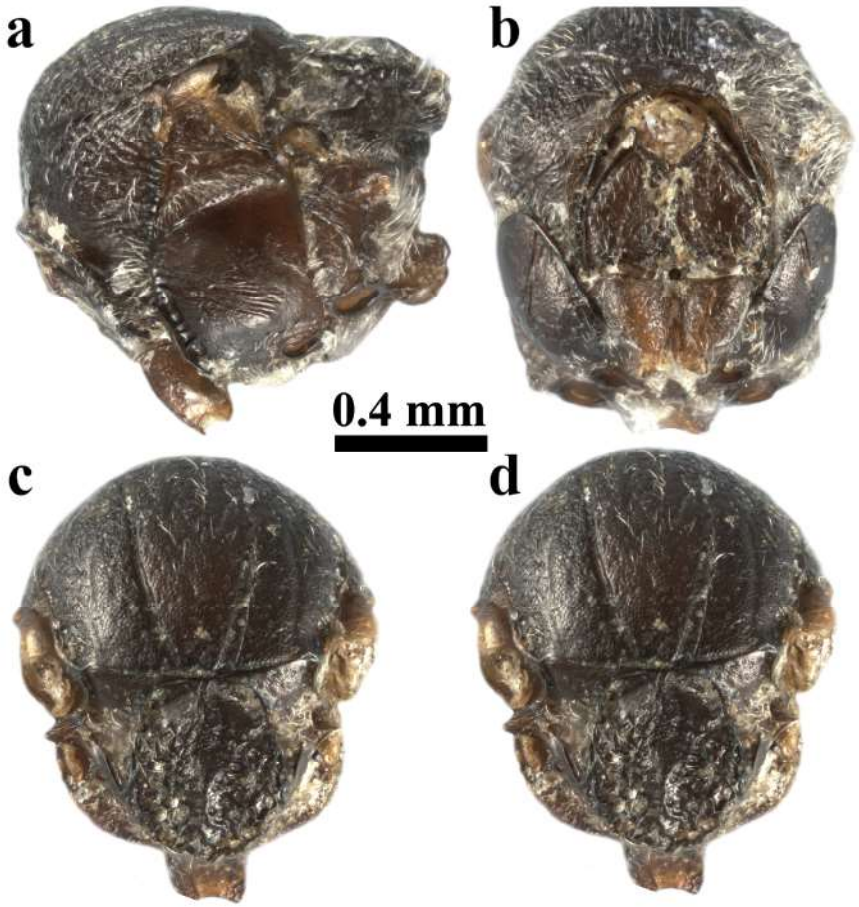

Figure 5a-d. *Andricus geniale* comb. rev., asexual female. a) Mesosoma in lateral view; b) mesosoma in frontal view; c) mesosoma in dorsal view; d) mesoscutellum.

mid height of eyes, frons shorter than height of lower face, diameter of antennal torulus 2.0× as long as distance between them, distance between torulus and eye 1.3× as long as diameter of torulus; lower face with sparse setae, rugoso-reticulate, rugae orientated mainly dorsoventrally and units of impressed areas slightly elongated, smooth; without setae; slightly elevated median area sculptured like rest of lower face. Clypeus impressed, flat, trapezoid, broader than high, smooth, glabrous, with few long setae along ventral edge; ventrally rounded, not emarginate and without median incision; anterior tentorial pit rounded, distinct, epistomal sulcus distinct, clypeo-pleurostomal line well impressed. Frons uniformly alutaceous, without striae and setae, area between toruli and eye alutaceous; interocellar area rugose. Vertex rugose, occiput alutaceous, glabrous, with white long setae; postocciput and postgena glabrous, alutaceous-reticulate, with concentric lines around occipital foramen and postgenal bridge; posterior tentorial pit large, elongated, area below impressed; occipital foramen as high as height of postgenal bridge; hypostomal carina emarginate, continuing into postgenal sulci, which diverge toward occipital foramen, postgenal bridge anteriorly slightly broader than occipital foramen. Antenna (Fig. 4e) as long as head+mesosoma, with 11 flagellomeres, scape 2.0× as long as pedicel, pedicel 1.4× as long as broad; flagellomeres subsequently broadening until apical end; all flagellomeres with sparse white short setae; F1 slightly longer than F2 and 1.8× as long as pedicel; F2 1.2× as long as F3; F3 slightly longer than F4, F5 = F6 = F7, F8 until F10 equal in length; F11 1.8× as long as F10; placodeal sensilla on F3-F11.

Mesosoma (Figs. 5a-d, 6b) longer than high, with few white setae, setae denser along propleuron and on lateral propodeal area. Pronotum smooth, sparsely

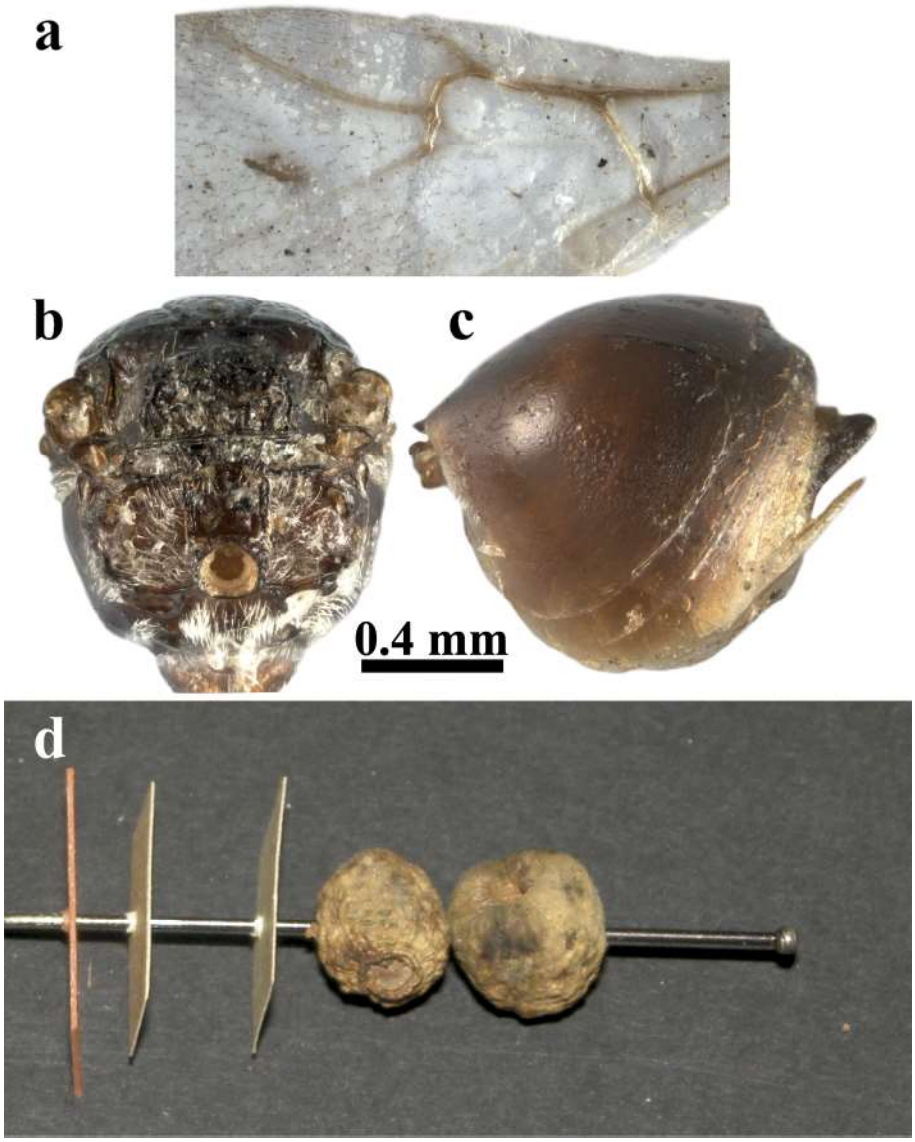

Figure 6a-d. *Andricus geniale* comb. rev., asexual female (a-c). a) Fore wing; b) propodeum; c) metasoma in lateral view; d) galls, deposited in the AMNH.

pubescent with delicate parallel striae; anterolateral impressed narrow area smooth, shining; propleuron coriaceous, smooth, shining in the dorsomedial part, with scattered white short setae. Mesoscutum uniformly alutaceous-reticulate, slightly broader than long (largest width measured across mesoscutum at level of base of tegulae), with white setae, denser along anterior parallel lines. Notaulus deep, distinct, complete, slightly obscured anteriorly; posteriorly converging; in most posterior part distance between notauli shorter than distance between notaulus and side of mesoscutum; anterior parallel line almost indistinct, slightly elevated, and finely alutaceous; parapsidal line impressed, extending well above tegula; median mesoscutal line absent or in a form of very short, impressed triangle; circumscutellar carina broad, reaching notaulus. Mesoscutellum elongated, longer than broad, trapezoid, broadest part in posterior 1/4 of its length; disk of mesoscutellum dull rugose laterally and posteriorly, coriaceous in anteromedian part, overhanging metanotum, with sparse setae. Mesoscutellar foveae transverse, with

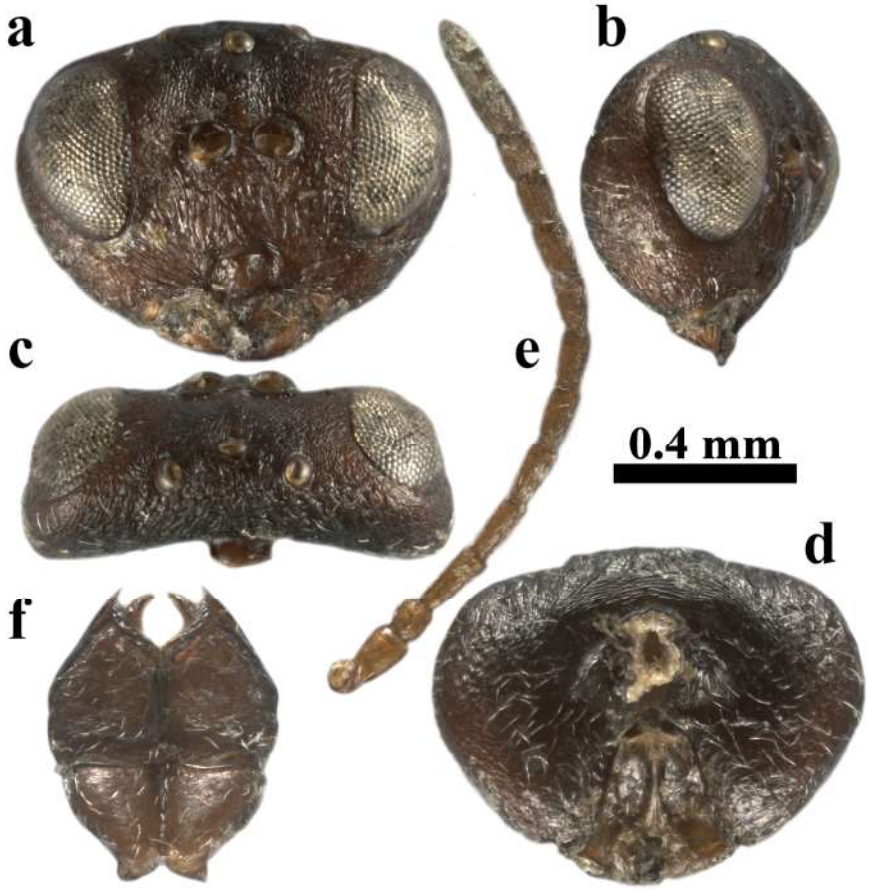

Figure 7a-f. *Andricus integrum* comb. rev., asexual female. a) Head in frontal view; b) head in lateral view; c) head in dorsal view; d) head in posterior view; e) antenna; f) propleuron and first coxae.

smooth, shining bottom, divided by narrow elevated coriaceous central area. Mesopleuron smooth, shining with delicate striae starting at ventrocentral part and going across mesopleuron to anterodorsal edge; lower half of anterior margin elevated into a strong carina, followed by impressed narrow furrow with striated bottom, speculum and posterior margin of mesopleuron smooth, glabrous, without longitudinal striae; mesopleural triangle smooth, glabrous, with dense, long white setae; dorsal and lateral axillar areas coriaceous, matt, with sparse white setae; axillula with delicate parallel longitudinal striae; subaxillular bar smooth, glabrous, with parallel sides, posteriorly as high as height of metanotal trough; metapleural sulcus reaching mesopleuron in upper 1/3 of its height, delimiting broad triangular smooth area with dense setae; upper part of sulcus distinct. Metascutellum coriaceous, higher than height of smooth, glabrous ventral impressed area; metanotal trough smooth, glabrous, with dense white setae; central propodeal area rectangular, smooth, shining, with irregular strong rugae; lateral propodeal carinae distinct, broad, blackish, subparallel; lateral propodeal area smooth, glabrous. Hind coxa and femora slightly swollen, without apical lobe; hind tibia with internal carinae. Tarsal claws toothed, with acute basal lobe.

Forewing (Fig. 6a) as long as body, hyaline, with very short cilia on margins, veins brown; radial cell opened, 3.1× as long as broad; Rs and R1 not reaching wing margin; areolet indistinct. Rs+M on all length indistinct, invisible.

Metasoma (Fig. 6c) as long as head+mesosoma, slightly longer than high in lateral view; 2nd metasomal tergum extending to 3/4 length of metasoma in dorsal view, with dense patch of white setae anterolaterally; all terga and hypopygium micropunctate posteriorly, prominent part

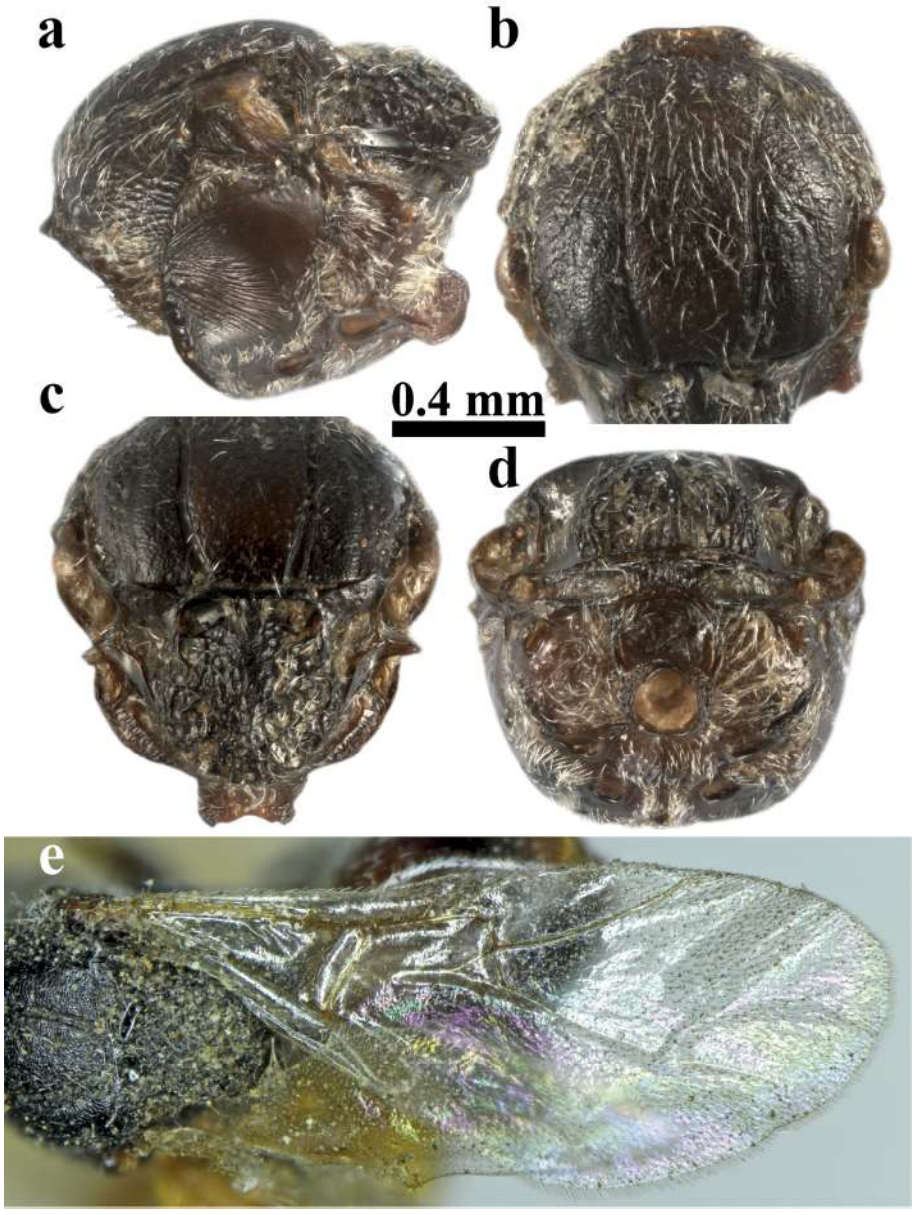

Figure 8a-e. *Andricus integrum* comb. rev., asexual female. a) Mesosoma in lateral view; b) mesosoma in dorsal view; c) mesoscutellum; d) propodeum; e) fore wing.

of ventral spine of hypopygium 5.2× as long as broad in ventral view. Body length 2.0-2.5 mm.

Gall (Fig. 6d) unilocular, located on the buds, easily separable, elongated-cylindrical, cup-shaped (sometimes globular), almost or totally closed at the top. External surface silvery to yellow-brown, often with a rough surface; darker when more mature, completely bare, densely scaly or purple. Base of galls enlarged but joined by a small central point to the branch. Internally, the base of the gall is quite solid and woody, containing a centrally located circular larval chamber which, although heavily encrusted, has a distinct cell wall; upper half hollow, cup-shaped, bounded by thin to fairly thick walls occupying more than one-third the diameter of the entire gall; the walls of the upper half of the gall are quite thick and often wrinkled. Diameter up to 8.0 mm and length up to 11.0 mm.

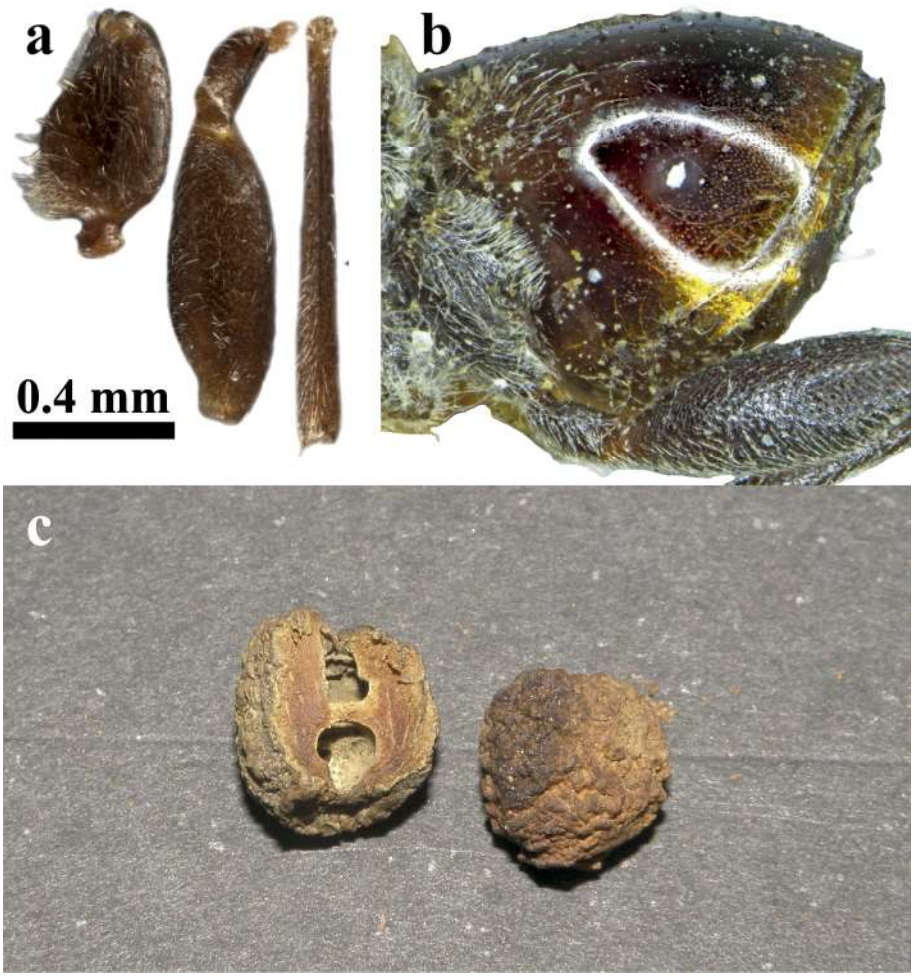

Figure 9a-c. *Andricus integrum* comb. rev., asexual female (a-b). a) Hind leg; b) metasoma in lateral view; c) galls, deposited in the AMNH.

Taxonomic summary

Type material examined. Holotype: female deposited in the AMNH "Durango, 2 N Dgo6500. Gall 11.8.31, female Spr.'32", "Q. undata Kinsey Coll." (white labels), "*F. geniale* Holo~~Para~~type" (red label), "AMNH_IZC 00322882" (white label with a QR code). Paratypes: 2 females deposited in the AMNH: "Durango, 2 N Dgo6500. Mex ⊕, 11.8.31, female Spr.'32", "Q. undata Kinsey Coll." (white labels), "F. geniale Paratype" (red label); a female with the same data at HMNH.

Additional material. Two females (AMNH): 1 female "Durango, 2 N, Dgo., 6500. Mex ⊕, 11.8.31, female Spr.'32", "Q. undata Kinsey Coll.", "*F. geniale* Kinsey coll. 37"; 1 female "Canatlan, 7N, Dgo., 7400', Mex. ⊕, 11.9.31, female", "*Q, undata* Kinsey coll.", "*F. geniale* Kinsey coll. 37".

Biology. Only the asexual generation is known; adults emerge in spring. Galls on *Q. undata* Trell. (section *Quercus*, subsection *Leucomexicanae*, white oaks) (Kinsey 1937b).

Distribution. Mexico: state of Durango (Kinsey, 1937b).

Andricus integrum (Kinsey, 1937), comb. rev.
Figs. 7a-f, 8a-e, 9a-c
Femuros integrum Kinsey, 1937; in Kinsey, 1937b: 467-468, female, gall; Pujade-Villar & Ferrer-Suay, 2015: 8.
Andricus integrum (Kinsey): Weld, 1952: 306.

Diagnosis. Differs from all the *Andricus* species, except for the species here transferred to *Andricus*, which have tibial carina and the last femur swollen. It differs from *A. lusum* comb. rev. by scarcely pubescent body, with

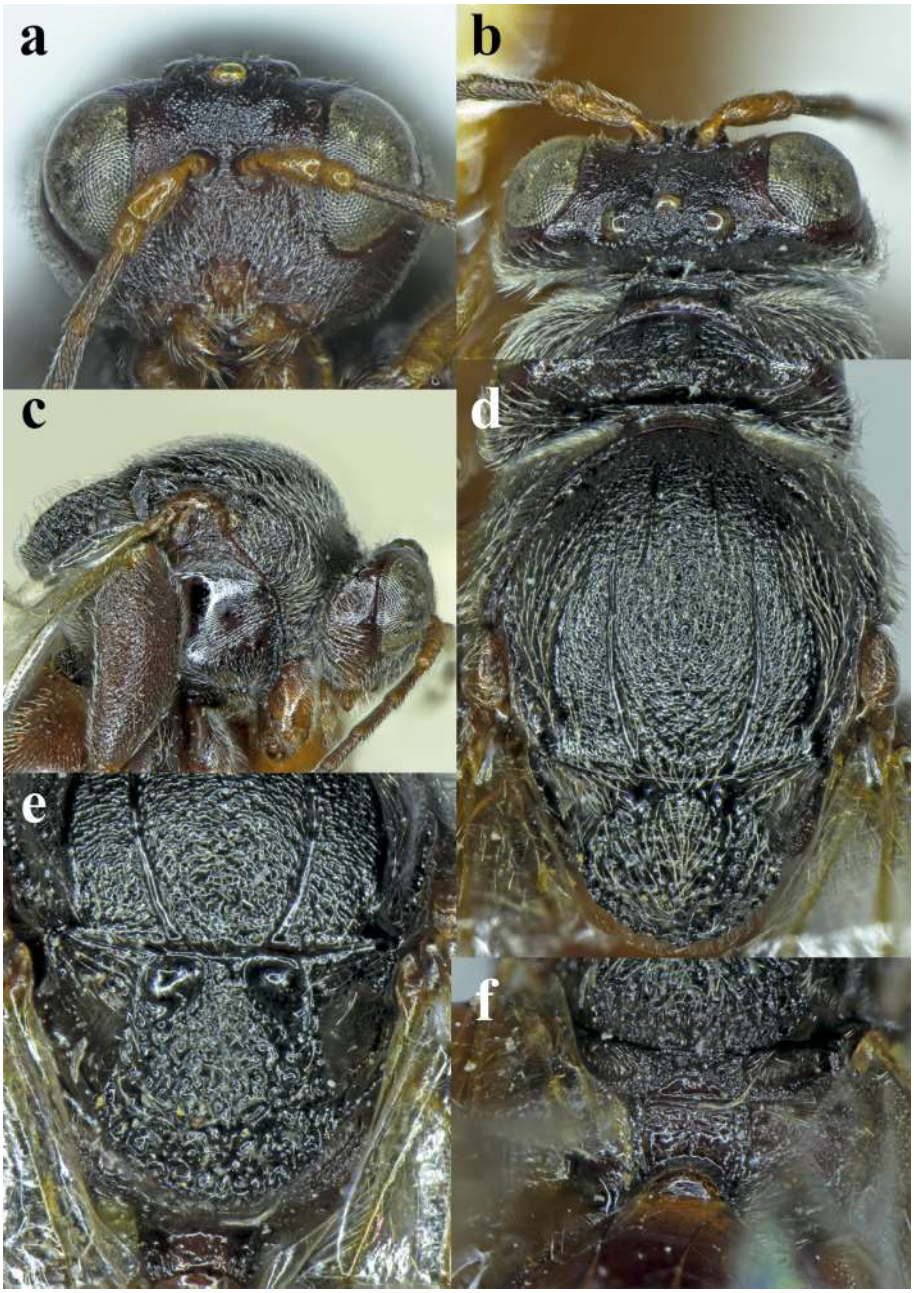

Figure 10a-f. *Andricus lusum* comb. rev., asexual female. a) Head in frontal view; b) head in dorsal view; c) mesosoma in lateral view; d) mesosoma in dorsal view; e) mesoscutellum; f) propodeum.

mesopleuron glabrous on its entire surface, the internal margin of eyes parallel, the hind femur without distal lobe; differs from *A. calvoi* sp. nov., *A. lusum* comb. rev., and *A. perfectum* comb. rev. by the LOL which is more than 1.2× as long as the diameter of lateral ocellus, the hind coxae and femora are not swollen, and the propodeal carinae subparallel. Differs from *A. geniale* comb. rev. by dull, rugose-reticulate lower face, with vertical carinae radiating from clypeus; the mesopleuron is completely striated, except for the smooth speculum.

Redescription. Asexual female (Figs. 7a-f, 8a-e, 9a-b). Head, mesosoma, antenna dark brown to black; legs

dark brown, except dark brown to black coxae; metasoma chestnut brown.

Head (Fig. 7a-d) trapezoid, broadest part on toruli level, 1.5× as broad as high and slightly narrower than mesosoma in frontal view, with sparse setae, denser on lower face and postgena; 2.2× as broad as long in dorsal view. Gena alutaceous, units of sculpture orientated dorsoventrally, elongated, giving striate aspect in lower part; gena broadened behind eye in frontal view, slightly narrower than cross diameter of eye in lateral view. Malar space with distinct rugae radiating from clypeus and reaching eye, area between rugae matte, alutaceous; eye 1.9× as high as length of malar space. Inner margins of eyes parallel or only slightly converging ventrally. POL 2.0× as long as OOL, OOL 1.5× as long as diameter of lateral ocellus and only slightly longer than LOL. Transfacial distance 1.2× as long as height of eye; toruli located at mid height of eyes, frons shorter than height of lower face, diameter of antennal torulus 2.0× as long as distance between them, distance between torulus and eye 1.5× as long as diameter of torulus; lower face with sparse setae, rugoso-reticulate, rugae radiating from clypeus and reaching toruli, slightly elevated median area sculptured like rest of lower face. Clypeus impressed, flat, rectangular, broader than high, smooth, glabrous; ventrally rounded, not emarginate and without median incision; anterior tentorial pit rounded, distinct, epistomal sulcus distinct, clypeo-pleurostomal line well impressed. Frons uniformly alutaceous, without striae and setae, area between toruli and torulus and eye alutaceous; interocellar area rugose. Vertex rugose, occiput alutaceous, glabrous, with white long setae; postocciput with delicate transverse striae, postgena glabrous, alutaceous-reticulate, around occipital foramen and postgenal bridge smooth, shining; posterior tentorial pit large, elongated, area below impressed; occipital foramen 2.0× as high as height of postgenal bridge; hypostomal carina emarginate, continuing into postgenal sulci, which diverge toward occipital foramen, postgenal bridge anteriorly broader than occipital foramen. Antenna (Fig. 7e) as long as head+mesosoma, with 11 flagellomeres, scape 2.0× as long as pedicel, pedicel subglobose, as long as broad; flagellomeres subsequently broadening until apical end; all flagellomeres with sparse white short setae; F1 slightly longer than F2 and 1.8× as long as pedicel; F2 1.2× as long as F3; F3 slightly longer than F4, F5 = F6 = F7, F8 until F10 equal in length; F11 1.8× as long as F10; placodeal sensilla on F3-F11.

Mesosoma (Figs. 7f, 8a-d) longer than high, with few white setae, setae denser along propleuron and on lateral propodeal area. Pronotum smooth, glabrous dorsally, with transverse striae laterally; anterolateral impressed narrow area smooth, shining; propleuron alutaceous, smooth shining, with scattered white short setae. Mesoscutum uniformly alutaceous-reticulate, slightly broader than long (largest width measured across mesoscutum at level of base of tegulae), with white setae, denser along anterior parallel lines. Notaulus deep, distinct, complete; posteriorly converging; in most posterior part distance between notauli shorter than distance between notaulus and side of mesoscutum; anterior parallel line, glabrous, indistinct; parapsidal line impressed, extending well above tegula; median mesoscutal line absent or in a form of a very short, impressed triangle; circumscutellar carina broad, reaching notaulus. Mesoscutellum elongated, longer than broad, trapezoid, with subparallel sides; broadest part in posterior 1/4 of its length; disk of mesoscutellum dull rugose laterally and posteriorly, reticulated in anteromedian part, overhanging metanotum, with sparse setae. Mesoscutellar foveae transverse, with smooth, shining bottom, divided by narrow elevated smooth central area. Mesopleuron shining in between striae going across mesopleuron, anteriorly mesopleuron with narrow foveolate stripe, lower half of anterior margin elevated into a strong carina, followed by an impressed narrow furrow with bottom striated, speculum smooth, glabrous, without transverse longitudinal striae; mesopleural triangle smooth, glabrous, with dense, long white setae; dorsal and lateral axillar areas alutaceous, matte, with sparse white setae; axillula with delicate parallel longitudinal striae; subaxillular bar smooth, glabrous, with parallel sides, posteriorly as high as height of metanotal trough; metapleural sulcus reaching mesopleuron in upper 1/3 of its height, delimiting broad triangular smooth area with dense setae; upper part of sulcus distinct. Metascutellum with longitudinal rugae, 2.0× as high as height of smooth, glabrous ventral impressed area; metanotal trough smooth, glabrous, with dense white setae. Central propodeal area rectangular, smooth, shining, without irregular rugae; lateral propodeal carinae slightly bent outwards (parallel in the holotype), distinct, broad, blackish; lateral propodeal area smooth, glabrous, with long dense white setae. Nucha dull rugose dorsally, with parallel sulci laterally. Hind coxa and femora swollen, femora without apical lobe (Fig. 9a). Tarsal claws toothed, with acute basal lobe.

Forewing (Fig. 8e) above as long as body, hyaline, with very short cilia on margin, veins brown; radial cell opened, 2.8× as long as broad; Rs and R1 not reaching wing margin; areolet indistinct. Rs+M on all length indistinct, invisible.

Metasoma (Fig. 9b) as long as head+mesosoma, slightly longer than high in lateral view; 2nd metasomal tergum extending to 3/4 length of metasoma in dorsal view, with dense patch of white setae anterolaterally; all terga and hypopygium micropunctured, prominent part

of ventral spine of hypopygium 7.2× as long as broad in ventral view. Body length 2.1-2.6 mm (according to Kinsey, 1937b).

Gall (Fig. 9c). Similar to *A. geniale* but a little smaller: diameter up to 7 mm, length up to 10 mm.

Taxonomic summary

Type material examined. Holotype: female deposited in the AMNH "S. Luis Potosí, S.L.P. 15W, 8000, Mex. ⊕, gall 11.30.31, female 1932", "Q. potosina Kinsey Coll." (white labels), "F. integrum Holo~~Para~~type" (red label), "AMNH_IZC 00322883" (white label with a QR code). Paratypes: 2 females deposited in the AMNH "S. Luis Potosí, S.L.P. 15W, 8000, Mex. ⊕, gall 10.30.31, female 1932", "Q. potosina Kinsey Coll." (white labels), "F. integrum Paratype" (red label); a female with the same data at HMNH.

Additional material. One female deposited in the AMNH "San Felipe, Gto., 20 SW, 3000', Mex. ⊕, 12.7.31, female, spr. 32", "*Q. chihuahuens* Kinsey coll.", "*F. integrum* Kinsey coll. 37".

Biology. The asexual generation is only known to induce galls on *Q. potosina* Trel., *Q. chihuahuensis* Trel., *Q. undata* Trel., and *Q. rugosa* Né (= *Q. reticulata* Née) (section *Quercus*, subsection *Leucomexicanae*, white oaks), according to Kinsey (1937b). Adults probably emerge in spring.

Distribution. México: Guanajuato and San Luis Potosí (Kinsey, 1937b).

Andricus lusum (Kinsey, 1937), comb. rev.
Figs. 10a-f, 11a-c
Femuros lusum Kinsey, 1937; in Kinsey, 1937b: 468-469, female, gall; Pujade-Villar & Ferrer-Suay, 2015: 8.
Andricus lusum (Kinsey): Weld, 1952: 307.

Diagnosis. Differs from all the *Andricus* species, except for the species here transferred to *Andricus*, which have tibial carina and the last femur swollen. This species belongs to the group of species that have the hind femur with a distal lobe and the LOL shorter than diameter of lateral ocelli, along with *A. calvoi* sp. nov. and *A. perfectum* comb. rev. It differs from *A. perfectum* comb. rev. by a faintly reticulate, shining lower face, carinae radiating from clypeus not extending towards toruli, the pronotum punctured with striae only on lateral margin, and the notaulus incomplete reaching more than 3/4 of length of mesonotum. Differs from *A.calvoi* sp. nov., by the space between notauli in the posterior margin on mesoscutum, which is subequal to the space between notauli and parapsidal lines, and parapsidal lines parallel or slightly bent outwards.

Redescription. Asexual female (Figs. 10a-f, 11a-b). Head, mesosoma dark brown to black, antenna dark brown; legs chestnut brown, except dark brown to black coxae; metasoma chestnut brown.

Head (Fig. 10a-c) trapezoid, broadest part below the toruli level, 1.5× as broad as high and slightly narrower than mesosoma in frontal view, with sparse setae, denser on lower face and postgena; 2.6× as broad as long in dorsal view. Gena finely reticulate, shining, broadened behind eye in frontal view, nearly as broad as cross diameter of eye in lateral view. Malar space alutaceous with distinct rugae radiating from clypeus and reaching eye; eye 2.1× as high as length of malar space. Inner margins of eyes parallel. POL 2.0× as long as OOL, OOL 1.5× as long as diameter of lateral ocellus and 1.3× as long as LOL, all ocelli ovate, of same size. Transfacial distance slightly longer than height of eye; toruli located at mid height of eyes, frons shorter than height of lower face, diameter of antennal torulus 2.0× as long as distance between them, distance between torulus and eye 1.2× as long as diameter of torulus; lower face with dense setae, shining, faintly reticulate-alutaceous, rugae orientated mainly dorsoventrally and units of impressed areas slightly elongated, smooth; slightly elevated median area sculptured like rest of lower face. Clypeus impressed, flat, rectangular, broader than high, smooth, glabrous, with few long setae along ventral edge; ventrally rounded, not emarginate and without median incision; anterior tentorial pit rounded, distinct, epistomal sulcus distinct, clypeo-pleurostomal line well impressed. Frons uniformly reticulated, without setae, area between toruli and torulus and eye alutaceous; interocellar area rugose. Vertex rugose, occiput alutaceous, glabrous, with white long setae; postocciput and postgena glabrous, alutaceous-reticulate, with concentric lines around occipital foramen and postgenal bridge. Antenna of the type material broken past F4, scape 1.5× as long as pedicel, pedicel 1.2× as long as broad; flagellomeres subsequently broadening until apical end; all flagellomeres with sparse white short setae; F1 slightly longer than F2 and 2.4× as long as pedicel; F2 slightly longer than F3; F3 slightly longer than F4, subsequent flagellomeres are missing.

Mesosoma (Fig. 10c-f) longer than high, with dense white setae, setae denser along propleuron and on lateral propodeal area. Pronotum with delicate parallel striae and impressed setose pits; anterolateral impressed narrow area smooth, shining; propleuron coriaceous, smooth shining in the dorsomedial part, with scattered white short setae. Mesoscutum uniformly alutaceous-reticulate, units transversally oriented on anterior half, posterior half alutaceous-reticulate with impressed setal

points; slightly broader than long (largest width measured across mesoscutum at level of base of tegulae), with white setae. Notaulus deep, distinct, incomplete, absent in anterior 1/4-1/5 of mesoscutum length, anterior insertion into parascutal carina visible, posteriorly converging; in most posterior part distance between notauli shorter than distance between notaulus and side of mesoscutum; anterior parallel line distinct, slightly elevated, extending to 1/2 of mesoscutum length; parapsidal line impressed, extending until shortly passed the tegula; median mesoscutal line absent; circumscutellar carina broad, reaching notaulus. Mesoscutellum elongated, longer than broad, trapezoid, broadest part in posterior 1/4 of its length; disk of mesoscutellum uniformly dull rugose, overhanging metanotum, with sparse setae. Mesoscutellar foveae transversally ovate, with smooth, shining bottom, divided by broad elevated rugose central area, half as wide as mesoscutellar fovea. Mesopleuron smooth, shining with delicate striae going across mesopleuron; anteriorly with narrow foveolate stripe, speculum and posterior margin smooth, glabrous, without transverse longitudinal striae; mesopleural triangle coriaceous, glabrous, with dense, long white setae; dorsal and lateral axillar areas alutaceous with faint rugae, dull, with sparse white setae; axillula with delicate parallel longitudinal striae; subaxillular bar smooth, glabrous, triangular, posteriorly as high as height of metanotal trough. Metapleural sulcus reaching mesopleuron in upper 1/3 of its height, delimiting broad triangular smooth area with dense setae; upper part of sulcus distinct. Metascutellum rugose, as high as the smooth, glabrous ventral impressed area; metanotal trough smooth, glabrous, with dense white setae; central propodeal area rectangular, smooth, shining, with irregular strong rugae. Lateral propodeal carinae distinct, broad, slightly bent outwards; central propodeal area smooth with faint rugae; lateral propodeal area punctured-smooth, uniformly pubescent. Nucha dull rugose dorsally, with parallel sulci laterally. Hind legs (Fig. 11b) with coxa broad, femur strongly broadened, with apical lobe; hind tibia with ventral carina reaching almost to the base of the tibia; tarsal claws toothed, with acute basal lobe.

Forewing (Fig. 11a) above as long as body, hyaline, with very short cilia on margins, veins brown; radial cell opened, 3.2× as long as broad; Rs and R1 not reaching wing margin; areolet indistinct. Rs+M on all length indistinct, invisible.

Metasoma (Fig. 11b) as long as head+mesosoma, slightly longer than high in lateral view; 2nd metasomal tergum extending to 3/4 length of metasoma in dorsal view, with dense patch of white setae anterolaterally, with micropunctures; all subsequent terga and hypopygium with dense micropunctures, prominent part of ventral spine broken. Body length 3.0 mm (according to Kinsey, 1937b).

Gall (Fig. 11c). According to Kinsey (1937b): galls are cylindric, with the thin-walled top half of the gall widely open or flaring, making the gall wide open cup-shaped with a thick and solid base, the open cavity almost as wide as the whole gall. The gall silvery to yellowish-brown; young galls quite scurfy, older galls naked. The diameter of the body of the gall up to 15.0 mm, averaging nearer 11.0 mm; the flared top up to 19.0 mm in diameter; length up to 19.0 mm, averaging near 15.0 mm.

Taxonomic summary

Type material examined. Holotype asexual female deposited in the AMNH: "Morelia, 14E; Mich 7000; Mex gall 12.27.31", "Q. conglomerata, Kinsey Coll." (white labels), "Femuros lusum Holo~~Para~~type" (red label), "AMNH_IZC 00267205" (white label with a QR code). Paratypes: only galls with the same data as the holotype.

Biology. The asexual generation is known for inducing galls on a single species of white oaks: *Q. rugosa* Née (= *conglomerata* Trell.; section *Quercus*, subsection *Leucomexicanae*, white oaks). The single adult of this species (holotype) probably obtained after gall cut; galls were collected on December 27, 1931 (Kinsey, 1937b).

Distribution. México: Michoacán (Kinsey 1937b).

Andricus perfectum (Kinsey, 1937), comb. rev.
Figs. 12a-f, 13a-c, 14a-d
Femuros perfectum Kinsey, 1937; in Kinsey, 1937b: 469-470, female, gall; Pujade-Villar & Ferrer-Suay, 2015: 8.
Andricus perfecum (Kinsey): Weld, 1952: 306.

Diagnosis. Differs from all the *Andricus* species, except for the species here transferred to *Andricus*, with tibial carina and the last femur swollen. This species belongs to the group of species that have the hind femur with a distal lobe and the LOL shorter than the diameter of lateral ocellus, *A. calvoi* sp. nov., and *A. lusum* comb. rev. Differs from those 2 species by dull rugose-reticulate lower face, with vertical carinae radiating from the clypeus towards the toruli; the pronotum completely striate with parallel curved striae; and the notaulus incomplete reaching slightly more than half-length of mesonotum.

Redescription. Asexual female (Figs. 12a-f, 13a-c, 14a-c). Head, antenna dark brown; mesosoma blackish; legs chestnut brown, except dark brown to black coxae; metasoma chestnut brown.

Head (Figs. 12a-d, 13c) trapezoid, broadest part on the toruli level, 1.4× as broad as high and as broad as mesosoma in frontal view, with sparse setae, denser on postgena; 2.4× as broad as long in dorsal view. Gena

alutaceous, units of sculpture orientated dorsoventrally, elongated, giving striate aspect of gena in its lower part; gena slightly broadened behind eye in frontal view, slightly broader than cross diameter of eye in lateral view. Malar space with distinct rugae radiating from clypeus and reaching eye, area between rugae smooth, shining; eye 2.2× as high as length of malar space. Inner margins of eyes parallel. POL 2.1× as long as OOL, OOL 1.7× as long as diameter of lateral ocellus and only slightly longer than LOL, lateral ocelli bigger than median ocellus. Transfacial distance subequal to height of eye; toruli located slightly above height of eyes, frons at least 2.0× shorter than height of lower face, diameter of antennal torulus 2.4× as long as distance between them, distance between torulus and eye 1.4× as long as diameter of torulus; lower face with sparse setae, delicately coriaceous, striae radiating from clypeus extending to 1/3 of lower face height; slightly elevated median area delicately coriaceous, on both sides with delicate striae radiating from clypeus and extending to 1/3 of lower face height. Clypeus convex, rectangular, broader than high, delicately coriaceous; ventrally rounded, not emarginate and without median incision; anterior tentorial pit rounded, distinct, epistomal sulcus distinct, clypeo-pleurostomal line well impressed. Frons dull rugose, without striae and setae, area between toruli and torulus and eye smooth, shining; interocellar area rugose. Vertex rugose, occiput alutaceous, glabrous, with white long setae; postocciput and postgena glabrous, alutaceous-reticulate, around occipital foramen and postgenal bridge smooth, shining; posterior tentorial pit large, elongated, area below impressed; occipital foramen as high as height of postgenal bridge; hypostomal carina emarginate, continuing into postgenal sulci which diverge toward occipital foramen, postgenal bridge anteriorly broader than occipital foramen. Antenna (Fig. 12e) slightly longer than head+mesosoma, with 11 flagellomeres, scape 2.7× as long as pedicel, pedicel subglobose, as long as broad; flagellomeres; flagellomeres from F1 until F7 of same width, with sparse white short setae; F1 = F2 and 2.4× as long as pedicel; F2 1.65× as long as F3; F3 slightly shorter than F4, F5 = F6 = F7, from F8 flagellomeres subsequently broadening until apical end, F8 until F10 equal in length; F11 1.8× as long as F10; placodeal sensilla on F2-F11.

Mesosoma (Figs. 12f, 13a-c, 14c) longer than high, with few white setae, setae denser along propleuron and on lateral propodeal area. Pronotum smooth, glabrous dorsally, laterally delicately uniformly coriaceous, without transverse striae; anterolateral impressed narrow area smooth, shining; propleuron alutaceous, smooth shining, with scattered white short setae. Mesoscutum uniformly alutaceous-reticulate, with distinct piliferous points scattered all over the mesoscutum, slightly broader than long (largest width measured across mesoscutum at level of base of tegulae), with white setae, denser along anterior parallel lines. Notaulus weakly impressed, narrow, incomplete, reaching to 3/4 of mesoscutum length; posteriorly converging; in most posterior part distance between notauli shorter than distance between notaulus and side of mesoscutum; anterior parallel line indistinct; parapsidal line impressed, extending to the level of tegula; median mesoscutal absent; circumscutellar carina broad, reaching notaulus. Mesoscutellum elongated, longer than broad, trapezoid, with subparallel sides; broadest part in posterior 1/4 of its length; disk of mesoscutellum uniformly dull rugose, overhanging metanotum, with sparse setae. Mesoscutellar foveae transverse, with smooth, shining bottom, divided by narrow elevated coriaceous central area. Mesopleuron alutaceous, delicate short transverse striae ventrally only in the anterolateral part, anteriorly mesopleuron with narrow foveolate stripe, speculum smooth, glabrous, without transverse longitudinal striae; mesopleural triangle delicately coriaceous, with dense, long white setae; dorsal and lateral axillar areas delicately coriaceous, matte, with sparse white setae; axillula with delicate parallel longitudinal striae; subaxillular bar smooth, glabrous, triangular, in the highest posterior part as high as height of metanotal trough; metapleural sulcus indistinct, reaching mesopleuron in upper 1/3 of its height, delimiting broad triangular smooth area with dense setae; upper part of sulcus indistinct. Metascutellum with longitudinal rugae, as high as height of smooth, glabrous ventral impressed area; metanotal trough smooth, glabrous, with dense white setae; central propodeal area rectangular, smooth, shining, without irregular rugae; lateral propodeal carinae slightly bent outwards, distinct, broad, blackish; lateral propodeal area smooth, glabrous, with long dense white setae. Nucha dull rugose dorsally, with parallel sulci laterally. Hind femora (Fig. 14b) strongly broadened, hind tibia with ventral carina reaching almost to the base of the tibia. Tarsal claws toothed, with acute basal lobe.

Forewing (Fig. 14a) above as long as body, hyaline, with dense cilia on margins, veins whitish, hardly traceable; radial cell opened, 2.8-3.2× as long as broad; Rs and R1 not reaching wing margin; areolet indistinct and Rs+M, indistinct invisible.

Metasoma (Fig. 14b) as long as head+mesosoma, longer than high in lateral view; 2nd metasomal tergum extending to 3/4 length of metasoma in dorsal view, with numerous white setae anterolaterally, smooth, shining; all subsequent terga and hypopygium with micropunctures,

prominent part of ventral spine of hypopygium 4.5× as long as broad in ventral view. Body length 2.4-3.5 mm (according to Kinsey, 1937b).

Gall (Fig. 14d). Similar to *A. geniale* and *A. perfectum*, but larger (diameter up to 16 mm, never more than 13 mm in length), nearly globular or slightly elongated or flattened. In section, the upper cavity is exceedingly small occupying the upper half of the gall, never wider than larval chamber (often narrower), almost completely closed by very thick and solid walls, although a central pucker at the apex of the gall still indicates the opening to the cavity; outside of the gall silvery grey to purplish brown, conspicuously covered with a purplish-white bloom.

Taxonomic summary

Type material examined. Holotype: female deposited in the AMNH "Chilpancingo, Gro 6S, 4000', Mex; gall 1.8.32, 56 females 5.10.32", "*Q. macrophylla* Kinsey Coll." (white labels), "*F. perfectum* Holo~~Para~~type" (red labels), "AMNH_IZC 00322886" (white label with a QR code). Paratypes: 33 females deposited in the AMNH "Chilpancingo, Gro 6S, 4000, Mex; gall 1.8.32, 56 females 5.10.32", "*Q. macrophylla* Kinsey Coll." (white labels), "*F. perfectum* Paratype" (red label).

Biology. The asexual generation is only known to induce galls on *Q. magnoliifolia* Née (= *Q. macrophylla* Née; section *Quercus*, subsection *Leucomexicanae*, white oaks). Adults emerge from May to July (Kinsey, 1937b).

Distribution. México: Guerrero (Kinsey, 1937b).

Femuros Kinsey, 1937

Type species: *Femuros repandae* Kinsey, 1937.

Diagnosis. Only asexual females known. *Femuros* is characterized as having a lower head smooth or almost smooth, without radiating carina from clypeus or very short, neither malar sulcus, occipital carina visible behind the ocelli, with transscutal articulation, winged forms, hind femur broadened on ventral margin near distal end, and an internal carina on the hind tibia. Some species of *Andricus*, *Amphibolips*, and *Odontocynips* can have broadened hind femur but in these cases the lower face is always sculptured (rugose and/or with radiating carina from clypeus). Very few Cynipini genera with transscutellar articulation lack facial striae and a malar groove: *Dros*, *Cynips*, *Eumayriella*, *Heteroecus*, and *Kokkocynips*. *Eumayriella*, unlike *Femuros*, is brachypterous, lacks scutellar pits and has a dorso-ventrally flat mesosoma. *Heteroecus* and *Kokkocynips* have sculptured face and simple tarsal claws, unlike *Femuros*; furthermore, the metanotum is sculptured in *Kokkocynips* (without sculpture in *Femuros*). *Cynips* have the head sculptured and, the mesoscutum and mesopleuron smooth or practically smooth (head smooth and sculptured mesoscutum and mesopleuron in *Femuros*); also, agamic forms of *Cynips* have a wide forming ventral spine provided with a dense truncated tuft in agamic forms (long spine without the apical tuft in *Femuros*). *Dros* has the head in frontal view smooth and mesoscutum also smooth but in *Femuros* the fronts and mesoscutum are sculptured. Finally, *Sphaeroteras* and some *Neuroterus* species have the lower face smooth, as *Femuros*, but have also malar sulcus (absent in *Femuros*); besides, in *Neuroterus* the transscutal articulation is absent (present in *Femuros*).

Redescription. Asexual female. Head, mesosoma dark brown, chestnut brown to black, rusty brown or yellowish to yellow amber; antenna of the same color or paler than head; metasoma dark brown to reddish brown; mouthparts, legs yellowish-brown, light brown to dark brown, with coxae always darker.

Head alutaceous, with sparse setae, denser on lower face, rounded, trapezoid or transverse, 1.2-1.4× as broad as high and slightly broader than mesosoma in frontal view; 2.0-2.2× as broad as long in dorsal view. Gena alutaceous, either not or broadened behind eye in frontal view, narrower than transverse diameter of eye in lateral view. Malar space alutaceous, with striae radiating from clypeus and reaching eye, malar sulcus absent (Figs. 15a, 16a, 18a, 21a); eye 2.8-4.0× as high as length of malar space. Eyes parallel or slightly converging ventrally. POL 1.8-3.6× as long as OOL, OOL slightly shorter or 1.3-1.6× as long as diameter of lateral ocellus and nearly equal to LOL, all ocelli ovate, of same size (Figs. 16b, 18c, 21c). Transfacial distance slightly shorter or equal to height of eye; toruli located at mid-height or level with the lower half of eye; frons higher than lower face, diameter of antennal torulus 1.3-2.0× as long as distance between them, distance between torulus and eye slightly shorter or 1.2-1.5× as long as diameter of torulus; lower face smooth, glabrous, alutaceous to delicately coriaceous, with white setae, with or without short delicate striae; slightly elevated median area alutaceous to delicately coriaceous, with few setae. Clypeus rounded, quadrangular or rectangular, nearly 2.0× as broad as high, smooth, glabrous, with few setae; ventrally rounded, not emarginate and without median incision; anterior tentorial pit large, rounded, distinct, epistomal sulcus distinct, clypeo-pleurostomal line well impressed. Frons uniformly alutaceous, without striae and setae, interocellar area alutaceous. Vertex, occiput and postocciput alutaceous; postgena smooth or alutaceous, with or without setae; posterior tentorial pit large, elongated, area below impressed; occipital foramen slightly shorter or as high as height of postgenal bridge; hypostomal carina emarginate, continuing into postgenal

sulci which strongly diverge toward occipital foramen, postgenal bridge anteriorly slightly broader than occipital foramen. Antenna longer than head+mesosoma, with 11-12 flagellomeres (in some specimens the suture between F12 and F11 hardly visible), pedicel longer than broad; flagellomeres subsequently broadening towards apical end; F1 1.6× as long as pedicel and 1.3× as long as F2; F2 1.1× as long as F3; F3 = F4 = F5, F5 1.1× as long as F6, F6 to F10 nearly equal in length; F11 2.1× as long as F10; placodeal sensilla on F3-F11(F12).

Mesosoma slightly longer than high, with a few white setae, denser along propleuron and laterally. Pronotum smooth, glabrous, with parallel striae and sparse setae laterally; propleuron smooth, glabrous. Mesoscutum uniformly and entirely reticulate, with a few white setae along notauli (Fig. 17a), slightly longer than broad (greatest width measured across mesoscutum level with base of tegulae). Notaulus complete, in some species indistinct in anterior 1/3, impressed in posterior 2/3 of mesoscutum length, notaular furrow alutaceous or smooth; posteriorly strongly converging; anterior parallel line invisible or indistinctly impressed and extending to 1/3 of mesoscutum length; parapsidal line marked with broad impressed area; median mesoscutal line absent or short and impressed only posteriorly; parascutal carina broad, reaching pronotum. Mesoscutellum ovate, slightly longer than broad; disk of mesoscutellum, rugose, reticulated or dull rugose only laterally and posteriorly, overhanging metanotum, glabrous or with sparse long setae; circumscutellar carina complete. Mesoscutellar foveae transverse, about 2.0× as broad as high, with smooth glabrous bottom, divided by narrow rugose elevated central carina. Mesopleuron entirely covered with delicate interrupted parallel striae, without setae or only setose ventrally (Figs. 19a, 22a); mesopleural triangle smooth, glabrous, with a few strong irregular striae and long white setae; dorsal and lateral axillar areas smooth, glabrous, without setae; axillula with delicate parallel longitudinal striae; subaxillular bar smooth, glabrous, triangular, posteriorly as high as height of metanotal trough; metapleural sulcus reaching mesopleuron at mid-height or slightly above, upper part of sulcus also distinct, sulcus separating smooth, glabrous area, with some setae in lower part. Metascutellum smooth, glabrous or coriaceous, as high as height of smooth, glabrous ventral impressed area; metanotal trough smooth, glabrous, without setae; central propodeal area smooth, glabrous, with or without delicate rugae in posterolateral part; several parallel indistinct, interrupted, incomplete lateral propodeal carinae bent outwards in mid-height or posterior 1/3 (Figs. 19c-22c); in some cases lateral carinae absent; lateral propodeal area smooth, with long white setae and piliferous points. Nucha with strong longitudinal sulci dorsally and laterally. Tarsal claws with basal lobe.

Forewing longer than body, hyaline, with distinct dense cilia on margin, veins dark brown, radial cell open, 3.2-4.5× as long as broad; Rs not reaching wing margin, R1 indistinct, less pigmented, not reaching wing margin; areolet small, triangular, closed and distinct. Rs+M inconspicuous, its projection reaching basalis slightly below or in lower half of its height.

Metasoma as long as or longer than head+mesosoma, slightly longer or shorter than high in lateral view; 2nd metasomal tergum extending to half-length of metasoma in dorsal view, with few white setae anterolaterally, without micropunctures; third and fourth terga smooth, glabrous, without micropunctures; subsequent terga without or with rare delicate micropunctures (Figs. 15d, 20b). Hypopygium with or without micropunctures, prominent part of ventral spine of hypopygium 2.3-5.1× as long as broad in ventral view, with a few white setae ventrally. Body length 1.5-2.5 mm.

Femuros bracteatus (Weld, 1944), comb. nov.
Fig. 15a-d
Andricus bracteatus Weld, 1944: 8.

Diagnosis. Femuros bracteatus is most closely related to *F. repandae* and both differ from *F. ruidum* and *F. ocri* in having the POL around 1.5× as long as OOL, OOL 1.5× longer than diameter of lateral ocellus, the height of eye 2.0× longer than malar space, and the transfacial distance 1.3× as long as height of eye. *Femuros bracteatus* differs from *F. repandae* by the anterior parallel lines and parapsidal lines of the same color as the rest of the mesoscutum; mesoscutellar foveae are divided by a wide rugose elevated area, while in *F. bracteatus* the mesoscutum with the anterior parallel lines and parapsidal lines are darkened, chestnut colored; the mesoscutellar foveae are divided by a thin and sharp carina.

Redescription. Asexual female (Figs. 15a-b, 15d). Head, mesosoma, metasoma and legs reddish-brown, without darker areas in anterior parallel lines and parapsidal lines; antenna dark brown, last flagellomere darker; tegula yellowish. Wing veins brown.

Head (Fig. 15a-c) transversally oval, broadest part below toruli, broader than high and narrower than mesosoma in frontal view, with short dense white setae; 1.3× as broad as high in anterior view and head 2.0× as broad as long in dorsal view. Gena alutaceous to smooth, slightly broadened behind eye, as broad as cross diameter of eye, measuring along transfacial line. Malar space weak alutaceous, without striae radiating from clypeus, malar sulcus absent; eye 2.1× as high as length of malar space. Inner margins of eyes parallel. POL 2.6× as long as

OOL, OOL as long as diameter of lateral ocellus and as long as LOL, all ocelli rounded, of same size. Transfacial distance 1.1× as long as height of eye; toruli located above mid height of head, frons shorter than height of lower face, diameter of antennal torulus 2.0× as long as distance between them, distance between torulus and eye almost as long as diameter of torulus. The lower face almost smooth, raised central part below the toruli alutaceous, pubescent. Clypeus impressed, coriaceous, rounded ventrally, medially not incised, anterior tentorial pits distinct; epistomal sulcus and clypeo-pleurostomal line distinctly impressed. Frons uniformly coriaceous, without striae, with few setae, piliferous points visible; interocellar area coriaceous with piliferous points; space between lateral ocellus to compound eye almost smooth and shining. Vertex and occiput coriaceous; postocciput and postgena glabrous, alutaceous-reticulate, with concentric lines around occipital foramen and postgenal bridge; posterior tentorial pit large, elongated, area below impressed; occipital foramen as high as height of postgenal bridge; hypostomal carina emarginate, continuing into postgenal sulci which strongly diverge toward occipital foramen, postgenal bridge anteriorly slightly broader than occipital foramen. Antenna (Fig. 15a-c) shorter than length of head + mesosoma, with 11 flagellomeres; pedicel 1.5× as long as broad; flagellomeres not broadening until apical end; F1 1.2× as long as F2 and 3.6× as long as pedicel; subsequent flagellomeres progressively shortened; F3 = F4, F5 = F6, F7 to F10 equal in length F11 longer than F10, sometimes F11 with a very inconspicuous suture and thus antenna with 12 flagellomeres; placodeal sensilla on F5-F11.

Mesosoma (Fig. 15b-c) 1.2× as long as high, concave in lateral view, pubescent. Sides of pronotum alutaceous, with white setae and weak and parallel carinae in upper lateroposterior part, anterolateral rim of pronotum inconspicuous. Mesoscutum 1.2× as broad as long in dorsal view; punctured, without rugae, pubescent, with dense piliferous points. Notaulus complete, deep, straight, converging posteriorly, in most posterior part distance between notauli shorter than distance between notaulus and side of mesoscutum; median mesoscutal line present; parapsidal lines and anterior parallel lines differentiated by alutaceous sculpture. circumscutellar carina absent. Mesoscutellum as long as broad, uniformly rugose; overhanging metanotum, with sparse long setae. Mesoscutellar foveae differentiated, delimited posteriorly by a broad rugose area, triangular, deep, with smooth bottom, separated by a median carina. Mesopleuron completely pubescent, weakly reticulate with delicate carinae and sparse setae anteriorly, speculum smooth and shining; mesopleural triangle alutaceous, with dense white setae, hiding the surface sculpture; dorsal and lateral axillar areas with delicate parallel longitudinal carinae, glabrous; axillula alutaceous, pubescent; subaxillular bar smooth, glabrous, triangular, posteriorly as high slightly shorter than high of metanotal trough; metapleural sulcus reaching mesopleuron in upper 1/2 of its height; upper part of sulcus distinct; lower part of sulcus delimiting big area with dense long white setae. Metascutellum subrectangular, coriaceous with some weak longitudinal carina, curved ventrally; metanotal trough alutaceous, with dense setae; ventral bar of metanotal trough coriaceous dorsally and smooth ventrally; central propodeal area nearly smooth and glabrous; lateral propodeal carinae parallel by converging toward posterior end; lateral parts of propodeum uniformly alutaceous, densely pubescent. Nucha almost smooth and shining dorsally, with parallel sulci laterally. Legs (Fig. 15d) with hind coxa broad, hind femur strongly broadened, with apical lobe; hind tibia with ventral carina on the ventral part extending to half the length of the tibia; base of tarsal claws with strong tooth.

Forewing (Fig. 15b) hyaline, 1.1× as long as body, pubescent, with cilia on margins; radial cell opened, around 2.6× as long as broad; veins light brown; areolet present. Rs+M vein obsolete heading towards the middle of the basal vein.

Metasoma (Fig. 15d) shorter than head+mesosoma, longer than high. 2nd metasomal tergum occupying 3/4 parts on the metasoma, with lateral patch of white setae, without micropunctures or micropunctures obsolete, all subsequent terga uniformly and entirely smooth or with obsolete micropunctures. Prominent part of ventral spine of hypopygium needle-like, around 2.6× as long as broad, with sparse setae laterally, without apical tuft of setae. Body length: 2.9 mm (Weld 1944).

Gall (Fig. 15c). Globular, bud gall up to 8.4 mm in diameter, more or less with short bracts usually on apical half. The internal parenchyma is cavernous with numerous lamellae connecting the outer shell and the larval chamber.

Taxonomic summary

Type material examined. Holotype, asexual female deposited in the USMN with the following labels "Young, Ariz." (white label), "Type No. 56377, U.S.N.M." (red label), "*Andricus bracteatus* 1942 Weld" (white label), "USNMENT 00779931" (white label with a QR code). Holotype examined through the images available at the website of the Entomology Department in the USNM: http://n2t.net/ark:/65665/3e449e73d-2c5a-49ee-8f2b-94f3ac9f237c

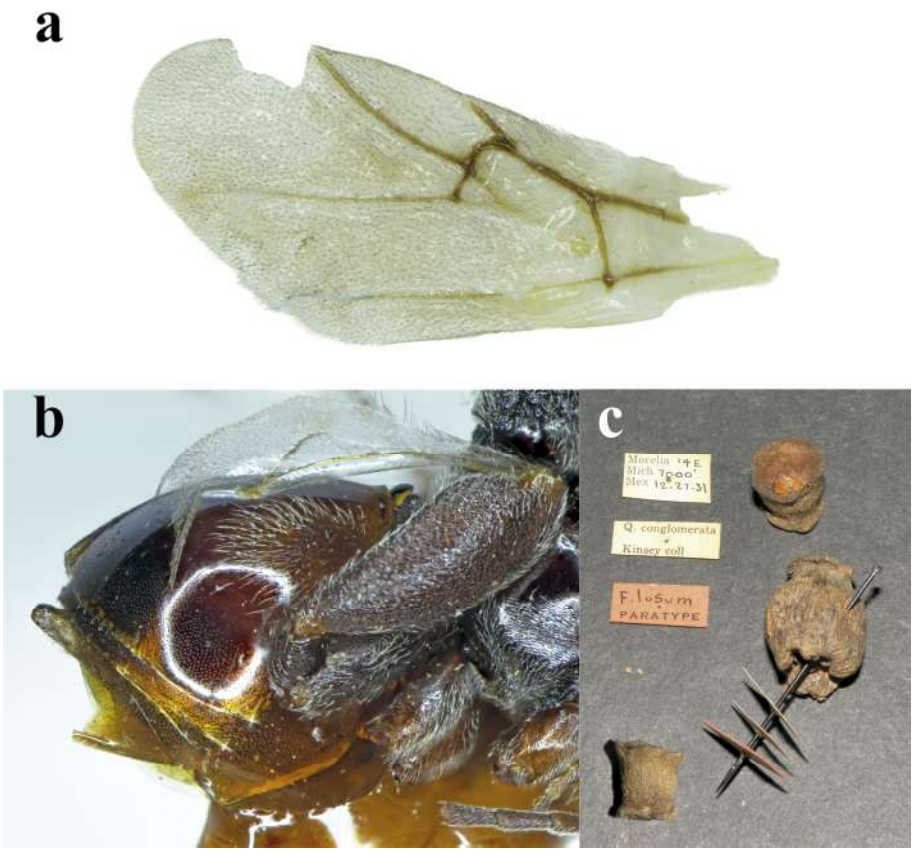

Figure 11a-c. *Andricus lusum* comb. rev., asexual female (a-b). a) Fore wing; b) metasoma in lateral view; c) galls, deposited in the AMNH.

Biology. Only the asexual generation is known. The holotype was collected from an unknown *Quercus*, but the paratypes are reported as inducing galls on *Q. oblongifolia* Torr. and *Q. rugosa* (= *diversicolor* Trel.). According to Weld (1944) similar galls are also reported in *Q. arizonica* Sarg., and *Q. toumeyi* Sarg. (section *Quercus*, subsection *Leucomexicanae*, white oaks). The galls were collected between December and February, and the adults emerge in late March (Weld, 1944).

Distribution. USA: Arizona (Weld, 1944).

Femuros ocri Kinsey, 1937
Figs. 16a-e, 17a-d
Femuros ocri Kinsey, 1937; in Kinsey, 1937b: 470-471, female, gall; Pujade-Villar & Ferrer-Suay, 2015: 8.
Andricus ocri (Kinsey): Weld, 1952: 307.

Diagnosis. Differs from *F. repandae* by the POL 2.0× as long as OOL, OOL similar in length to the diameter of lateral ocellus, height of eye 2.5× as long as malar space, and the transfacial distance subequal to the height of the eye. Differs from *F. ruidum* by the sparsely pubescent mesopleuron, which is smooth, with scattered piliferous points, the speculum smooth and glabrous at least on half of its length, and the propodeal carinae are parallel.

Redescription. Asexual female (Figs. 16a-e, 17a-c). Head, mesosoma, metasoma and legs reddish-brown (with some darker areas in anterior parallel lines and parapsidal lines); antenna light brown, last flagellomere darker; tegula yellowish. Wing veins brown.

Head (Fig. 16a-c) transversally ovate, broadest part below toruli, broader than high and narrower than mesosoma in frontal view, with short dense white setae; 1.3× as broad as high in anterior view and head 2.0× as broad as long in dorsal view. Gena alutaceous to smooth, slightly broadened behind eye, as broad as cross diameter of eye, measuring along transfacial line. Malar space weak alutaceous, without striae radiating from clypeus, malar sulcus absent; eye 2.1× as high as length of malar space. Inner margins of eyes parallel. POL 2.6× as long as OOL, OOL as long as diameter of lateral

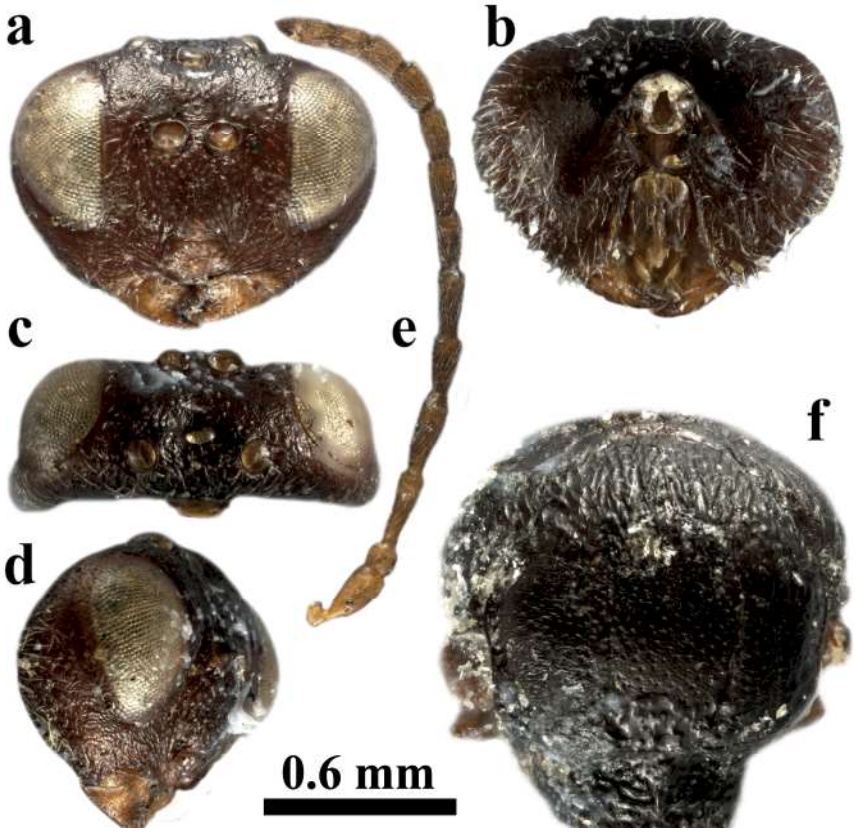

Figure 12a-f. *Andricus perfectum* comb. rev., asexual female. a) Head in frontal view; b) head in posterior view; c) head in dorsal view; d) head in lateral view; e) antenna; f) mesosoma in dorsal view.

ocellus and as long as LOL, all ocelli rounded, of same size. Transfacial distance 1.1× as long as height of eye; toruli located above mid height of head, frons shorter than height of lower face, diameter of antennal torulus 2.0× as long as distance between them, distance between torulus and eye slightly longer than diameter of torulus. Lower face almost smooth raised central part below the toruli alutaceous, pubescent. Clypeus impressed, coriaceous, rounded ventrally, medially not incised, anterior tentorial pits distinct; epistomal sulcus and clypeo-pleurostomal line distinctly impressed. Frons uniformly coriaceous, without striae, with few setae, piliferous points visible; interocellar area coriaceous with piliferous points; space between lateral ocellus to compound eye almost smooth and shining. Vertex and occiput coriaceous. Antenna (Fig. 16d) shorter than length of head + mesosoma, with 11 flagellomeres; pedicel 1.5× longer than broad; flagellomeres not broadening until apical end; F1 1.2× as long as F2 and 3.6× as long as pedicel; subsequent flagellomeres progressively shortened; F3 = F4, F5 = F6, F7 to F10 equal in length F11 longer than F10, sometimes F11 with a very inconspicuous suture and thus antenna with 12 flagellomeres. Placodeal sensilla on F5-F11.

Mesosoma (Figs. 16e, 17a-c) 1.2× as long as high, concave in lateral view, pubescent. Sides of pronotum alutaceous, with white setae and weak, parallel carinae in upper lateroposterior part, anterolateral rim of pronotum inconspicuous. Mesoscutum 1.2× as broad as long in dorsal view; weak coriaceous, without rugae, pubescent, with piliferous points more visible in the posterior half between notauli. Notaulus complete, deep, straight, converging posteriorly, in most posterior part distance between notauli shorter than distance between notaulus and side of mesoscutum; median mesoscutal line present; parapsidal lines and anterior parallel lines differentiated by alutaceous sculpture. circumscutellar carina absent. Mesoscutellum as long as broad, uniformly rugose; overhanging metanotum, with sparse long setae. Mesoscutellar foveae differentiated, delimited posteriorly by a weak carinae, triangular, deep, with weak alutaceous to smooth bottom,

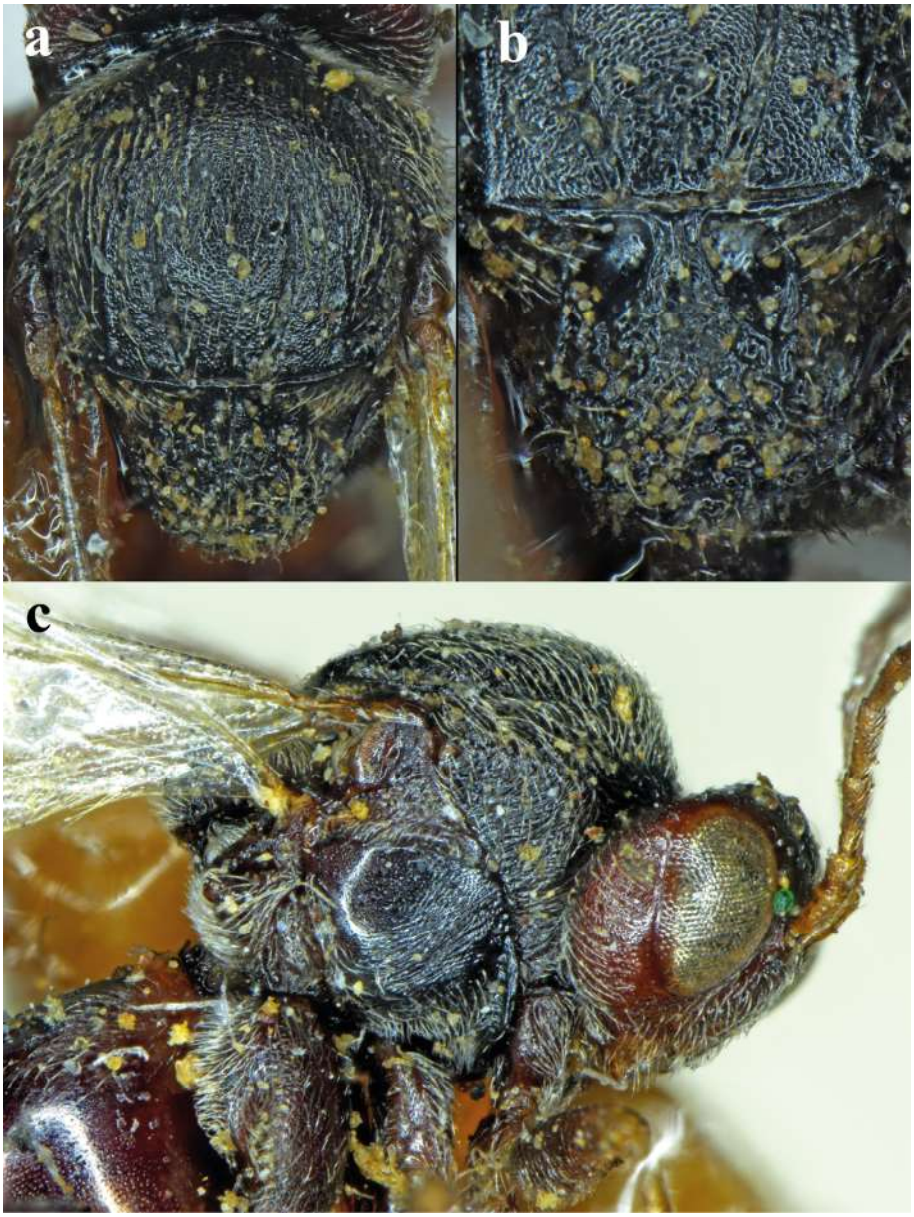

Figure 13a-c. *Andricus perfectum* comb. rev., asexual female. (a) Mesosoma in dorsal view; b) mesoscutellum; c) mesosoma in lateral view.

separated by a median carina. Mesopleuron sculptured, coriaceous to weak reticulate with delicate carinae and sparse setae anteriorly, speculum smooth and shining; mesopleural triangle alutaceous, with dense white setae, hiding the surface sculpture; dorsal and lateral axillar areas with delicate parallel longitudinal carinae, glabrous; axillula alutaceous, pubescent; subaxillular bar smooth, glabrous, triangular, posteriorly as high slightly shorter than high of metanotal trough; metapleural sulcus reaching mesopleuron in upper 1/2 of its height; upper part of sulcus distinct; lower part of sulcus delimiting big area with dense long white setae. Metascutellum subrectangular, coriaceous with some weak longitudinal carina, curved ventrally; metanotal trough alutaceous, with dense setae; ventral bar of metanotal trough coriaceous dorsally and smooth ventrally; central propodeal area nearly smooth and glabrous; lateral propodeal carinae parallel by converging toward posterior end; lateral parts

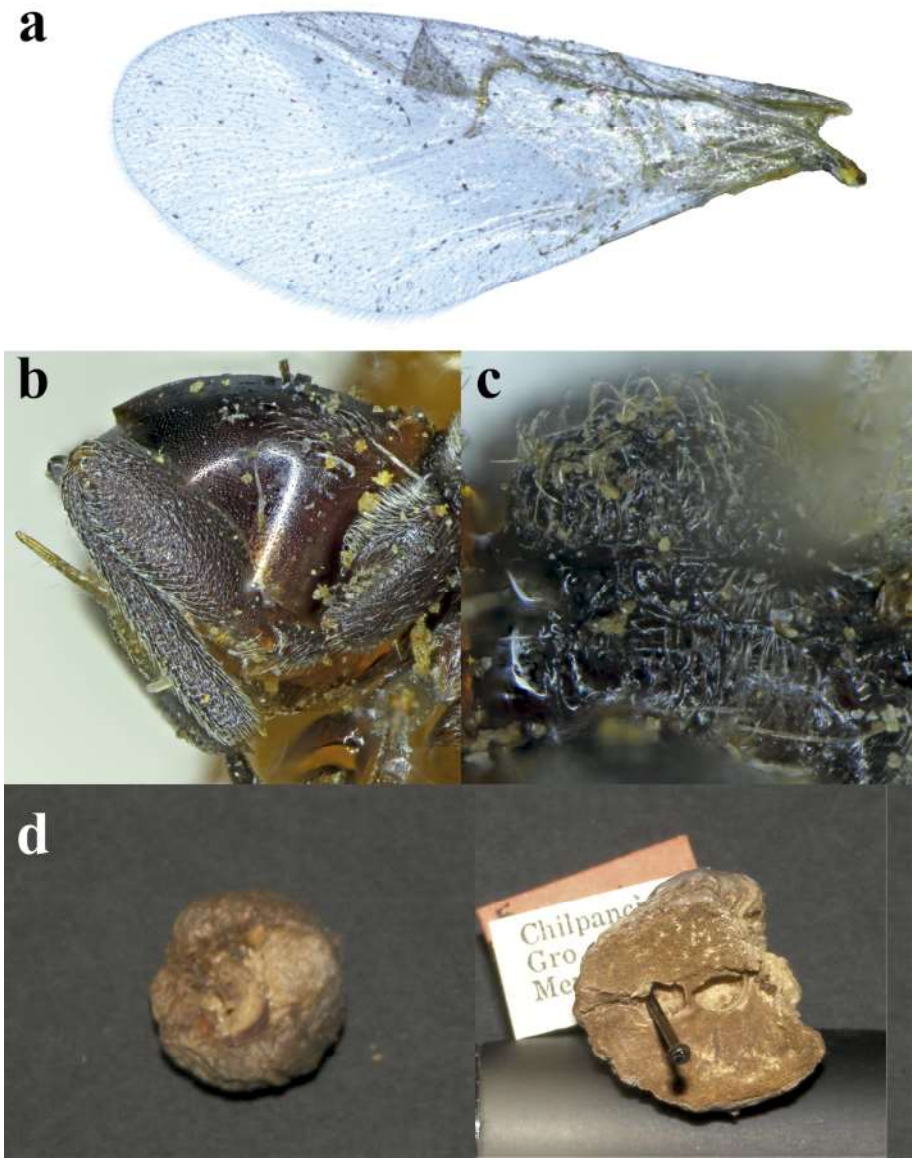

Figure 14a-d. *Andricus perfectum* comb. rev., asexual female (a-c). a) Fore wing; b) metasoma in lateral view; c) propodeum; d) galls, deposited in the AMNH.

of propodeum uniformly alutaceous, densely pubescent. Nucha almost smooth and shining dorsally, with parallel sulci laterally. Legs (Fig. 16e) with hind coxa broad, hind femur strongly broadened, with apical lobe; hind tibia with ventral carina on the ventral part extending to half the length of the tibia; base of tarsal claws with strong tooth.

Forewing hyaline, 1.1× as long as body, pubescent, with cilia on margins; radial cell opened, around 2.6× as long as broad; veins light brown; areolet present. Rs+M vein obsolete heading towards the middle of the basal vein.

Metasoma (Fig. 16e) shorter than head+mesosoma, longer than high. 2nd metasomal tergum occupying 3/4 of metasoma, with lateral patch of white setae, without or with obsolete micropunctures, all subsequent terga uniformly and entirely smooth or with obsolete micropunctures. Prominent part of ventral spine of hypopygium needle-

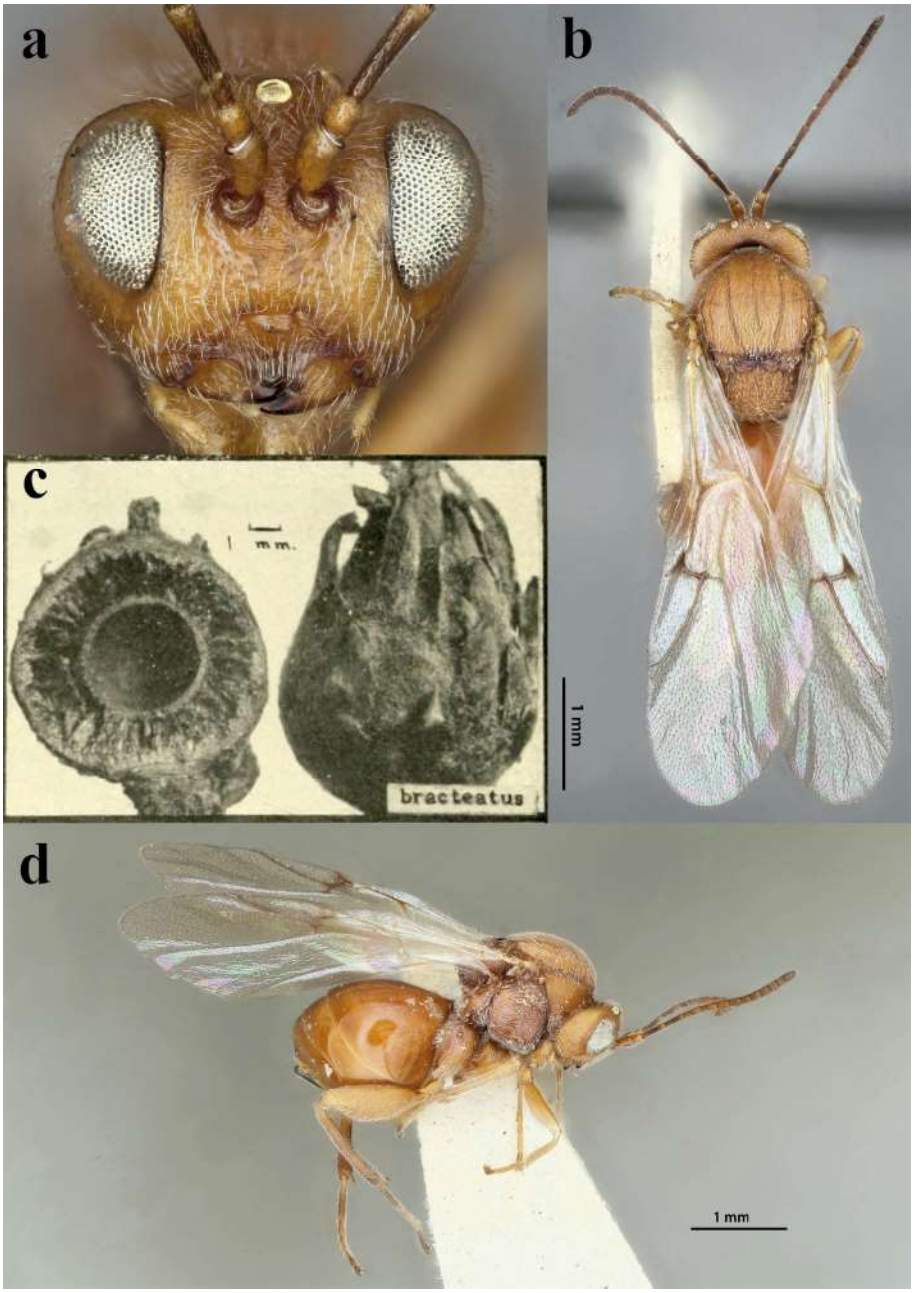

Figure 15a-d. *Femuros bracteatus* comb. nov., asexual female (a-b, d). a) Head in frontal view; b) mesosoma in dorsal view; d) habitus; pictures extracted from the entomology collection website of the Smithsonian Institution [https://collections.nmnh.si.edu/search/ento/], pictures taken by Matthew Buffington; c) galls extracted from Weld, 1944.

like, around 3.5-4.0× as long as broad, with sparse setae laterally, without apical tuft of setae. Body length: 3.0-4.5 mm (Kinsey, 1937b).

Gall (Fig. 17d). Similar to *F. repandae* but smaller, diameter up to 12 mm.

Taxonomic summary

Type material examined. Holotype: female, deposited in the AMNH "Pabellon, 20W, Ags 7000, Mex; gall 11.26.31, female Spr. '32", "Q. sacame Kinsey Coll." (white labels), "F. ocri Holo~~Para~~type" (red label), "AMNH_IZC

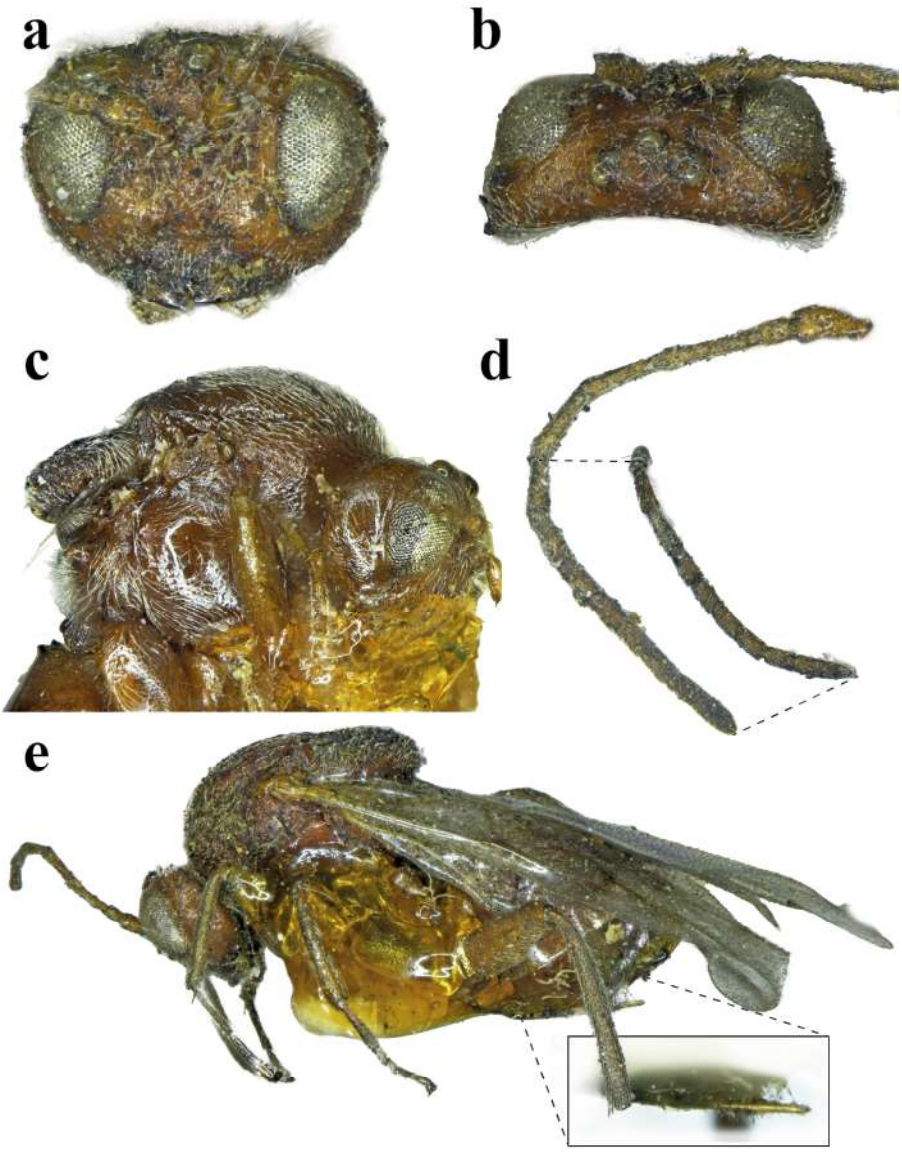

Figure 16a-e. *Femuros ocri*, asexual female. a) Head in frontal view; b) head in dorsal view; c) mesosoma and head in lateral view; d) antenna; e) lateral habitus, with detail of the ventral spine of the hypopygium.

00267206" (white label with a QR code). Paratypes (4 females): 3 females with same data as holotype (AMNH); 1 female, "Sayula, 13S W, Jal 7700', Mex, gall 12.21.31, female 2.10.32", "*Q. rhodophleb* Kinsey Coll.", "F. ocri Kinsey coll 37" (white labels), "F. ocri paratype, in type box" (red label), (JP-V col).

Additional material examined. Three females, deposited in the AMNH "Sayula, 13S W, Jal 7700', Mex. ⊕, gall 12.21.31, female 2.10.32", "Q. rhodophleb Kinsey Coll.", "F. ocri Kinsey coll 37"; 1 female "Guadalajara, Jal., 25W, 6000', Mex. ⊕, 12.23.31", "Q. haematophleb Kinsey coll.", "F. ocri Kinsey coll 37" white labels. New material deposited in the JP-V col. (UB): 11 asexual females: 3 females "Santa Fe, Delegación de Cuajimalpa, Ciudad de México, México, (MEX181), Ex *Q. laeta*, (28.ii.2014) iii.2014: 3 females, D. Cibrián-Tovar leg.; 3 females "Fracción de Bosques de Santa Fe, Delegación de Cuajimalpa, Ciudad de México, México, (MEX336), Ex *Q. laeta*, (10.xii.2015) 15-24.ii.2016: 3 females, D. Cibrián-Tovar"; 1 female "Nativitas, Texcoco, Estado de

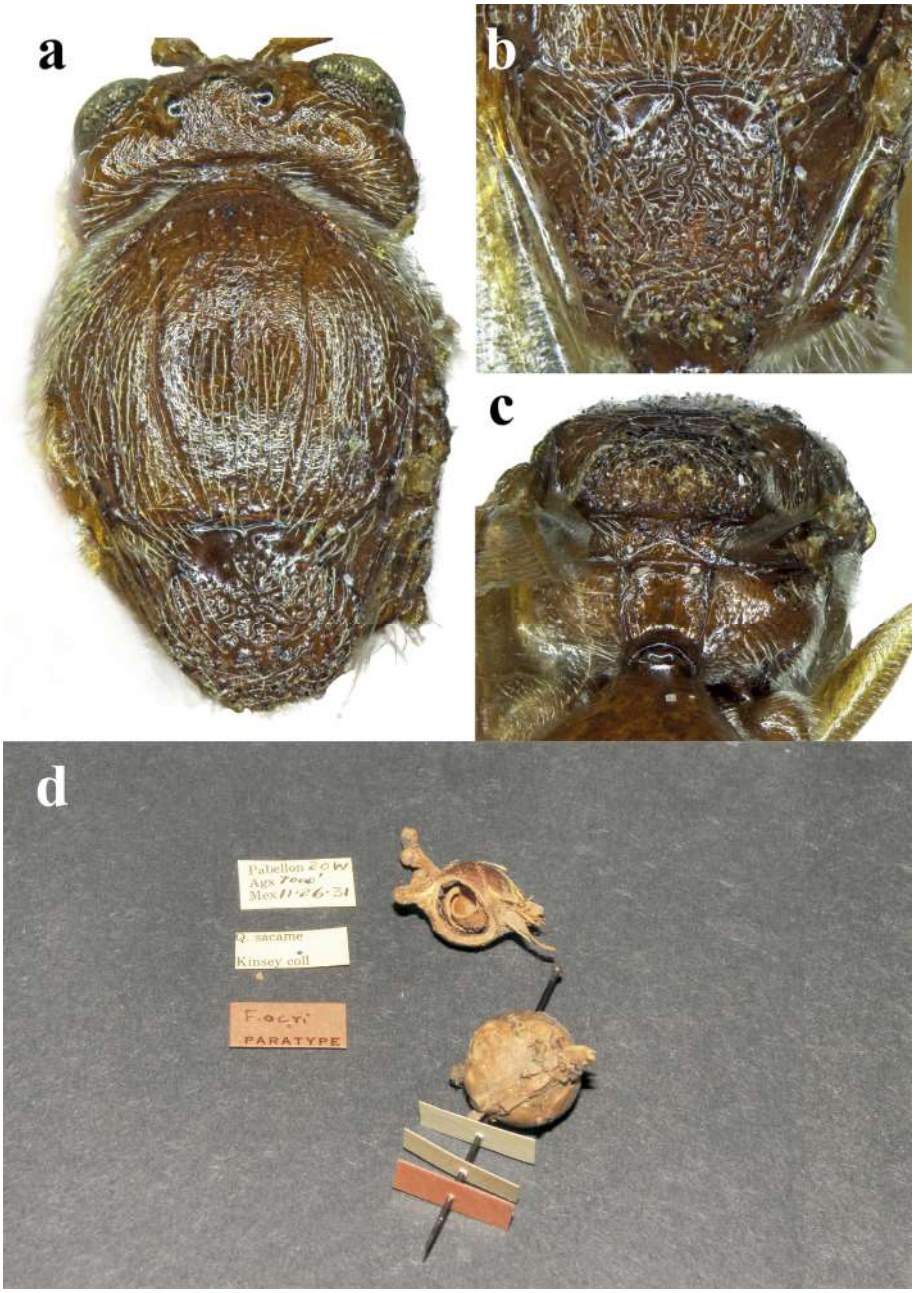

Figure 17a-d. *Femuros ocri*, sexual female (a-c). a) Mesosoma in dorsal view; b) mesoscutellum; c) propodeum; d) galls, deposited in the AMNH.

México, (MEX400), Ex *Quercus* sp., (13.i.2015) 19.i.2015: 1 female, A. Equihua-Martinez & E. Estrada-Venegas leg."; 1 female "Nativitas, Texcoco, Estado de México, (MEX401), Ex *Quercus* sp., (13.i.2015) 19.i.2015: 1 female, A. Equihua-Martinez & E. Estrada-Venegas leg."; 3 females "Peñon Blanco, 22°10'12.6" N, 102°31'14.8" W, San José de Grácia, Aguascalientes, México, (MEX645), Ex *Q. grisea*, (10.i.2021) 15.ii.21-20.iii.21: 3 females, R. Clark leg.", "*Femuros ocri* Kinsey, 1937, JP-V det. 2022".

Biology. The asexual generation is only known to induce galls on *Q. arizonica* Sargent (= *Q. sacame* Trel.), *Q. grisea* Liebm, *Q. laeta* Liebm., *Q. magnoliifolia*

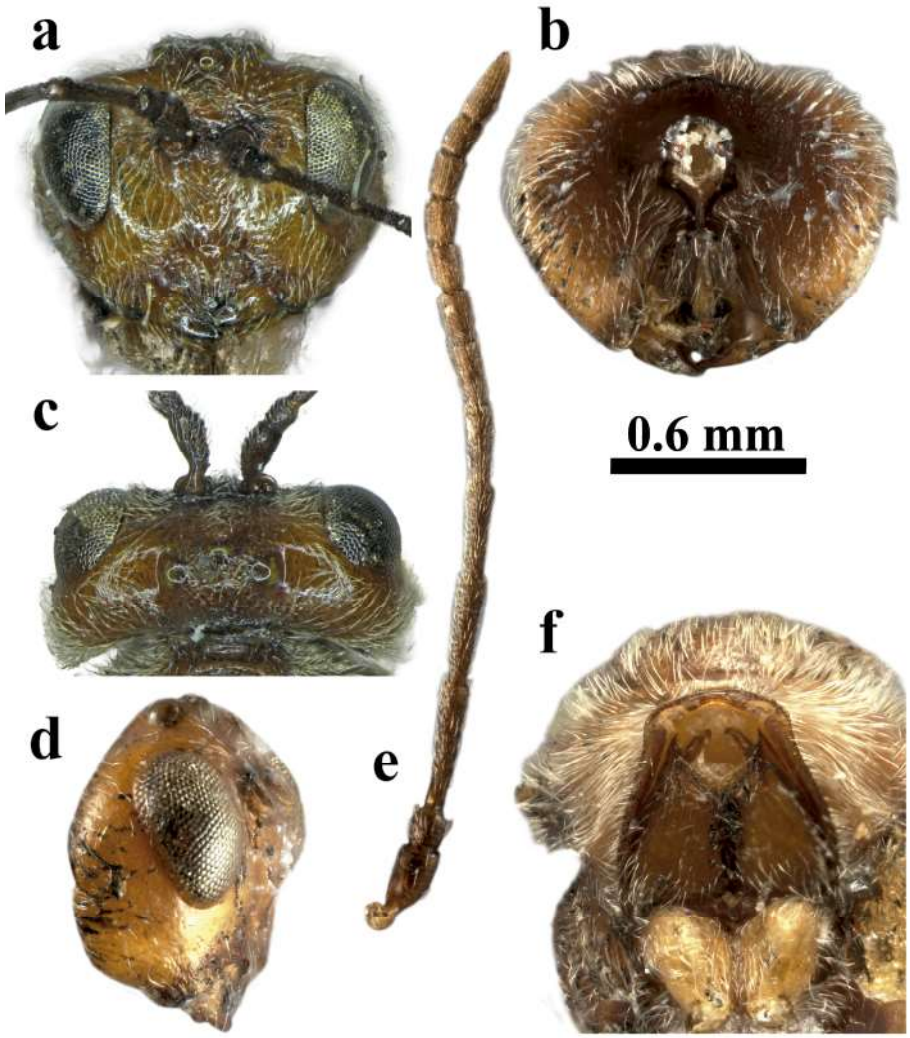

Figure 18a-f. *Femuros repandae*, asexual female. a) Head in frontal view; b) head in posterior view; c) head in dorsal view; d) head in lateral view; e) antenna; f) mesosoma in frontal view.

Née (= *Q. haemathophlebia* Trel.), and *Q. rugosa* Née (= *Q. rhodophebia* Trel.) (section *Quercus*, subsection *Leucomexicanae*, white oaks). The galls were collected between November and January; adults emerge between January and March (Kinsey, 1937b).

Distribution. México: Aguascalientes and Jalisco (Kinsey, 1937b).

Femuros repandae Kinsey, 1937
Figs. 18a-f, 19a-d, 20a-c
Femuros repandae Kinsey, 1937; in Kinsey, 1937a: 66-67, female, gall; Pujade-Villar & Ferrer-Suay, 2015: 8.
Andricus repandae (Kinsey): Weld, 1952: 309.

Diagnosis. *Femuros repandae* is most closely related to *F. bracteatus* and both differ from *F. ruidum* and *F. ocri* by the POL which is around 1.5× as long as OOL, OOL 1.5× as long as diameter of lateral ocellus, the height of eye is 2.0× as long as the malar space, and the transfacial distance 1.3× as long as the height of the eye. *Femuros repandae* differs from *F. bracteatus* by the mesoscutum with the anterior parallel lines and parapsidal lines darkened, chestnut colored; mesoscutellar foveae divided by a thin and sharp carina, while in *F. bracteatus* the anterior parallel lines and parapsidal lines are of the same color as the rest of the mesoscutum; and the mesoscutellar foveae are divided by a wide rugose elevated area.

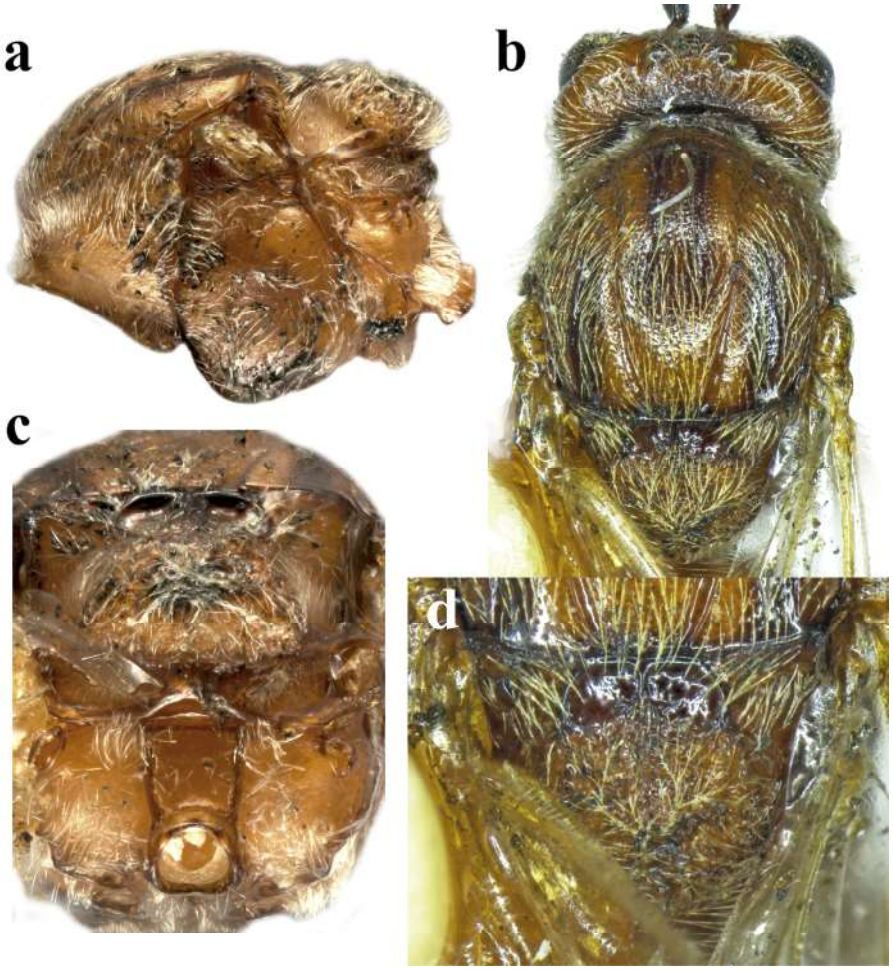

Figure 19a-d. *Femuros repandae*, asexual female. a) Mesosoma in lateral view; b) mesosoma in dorsal view; c) propodeum; d) mesoscutellum.

Redescription. Asexual female (Figs. 18a-f, 19a-d, 20a-b). Head, mesosoma, metasoma and legs reddish-brown (with some darker areas in anterior parallel lines and parapsidal lines); antenna light brown, last flagellomere darker; tegula yellowish. Wing veins brown.

Head (Fig. 18a-d) transversally ovate, broadest part below toruli, broader than high and narrower than mesosoma in frontal view, with short dense white setae; 1.3× as broad as high in anterior view and head 2.0× as broad as long in dorsal view. Gena alutaceous to smooth, slightly broadened behind eye, as broad as cross diameter of eye, measuring along transfacial line. Malar space weak alutaceous, without striae radiating from clypeus, malar sulcus absent; eye 2.1× as high as length of malar space. Inner margins of eyes parallel. POL 2.6× as long as OOL, OOL as long as diameter of lateral ocellus and as long as LOL, all ocelli rounded, of same size. Transfacial distance 1.1× as long as height of eye; toruli located above mid height of head, frons shorter than height of lower face, diameter of antennal torulus 2.0× as long as distance between them, distance between torulus and eye slightly longer than diameter of torulus. Lower face almost smooth raised central part below the toruli alutaceous, pubescent. Clypeus impressed, coriaceous, rounded ventrally, medially not incised, anterior tentorial pits distinct; epistomal sulcus and clypeo-pleurostomal line distinctly impressed. Frons uniformly coriaceous, without striae, with few setae, piliferous points visible; interocellar area coriaceous with piliferous points; space between lateral ocellus to compound eye almost smooth and shining. Vertex and occiput coriaceous; postocciput and postgena glabrous, alutaceous-reticulate, with concentric lines

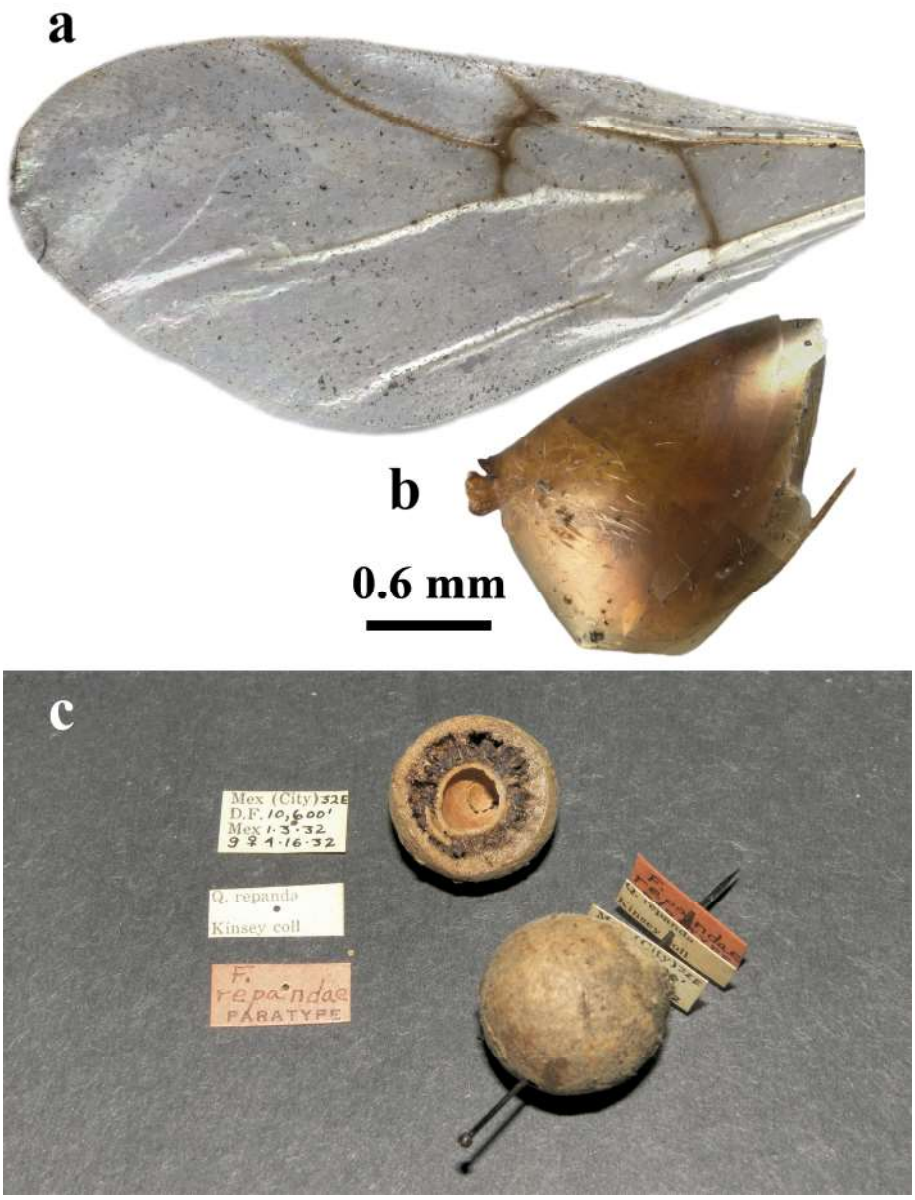

Figure 20a-c. *Femuros repandae*, asexual female (a-b). a) Fore wing; b) metasoma in lateral view; c) galls, deposited in the AMNH.

around occipital foramen and postgenal bridge; posterior tentorial pit large, elongated, area below impressed; occipital foramen as high as height of postgenal bridge; hypostomal carina emarginate, continuing into postgenal sulci which strongly diverge toward occipital foramen, postgenal bridge anteriorly slightly broader than occipital foramen. Antenna (Fig. 18e) shorter than length of head + mesosoma, with 11 flagellomeres; pedicel 1.5× longer than broad; flagellomeres not broadening until apical end; F1 1.2× as long as F2 and 3.6× as long as pedicel; subsequent flagellomeres progressively shortened; F3 = F4, F5 = F6, F7 to F10 equal in length F11 longer than F10, sometimes F11 with a very inconspicuous suture and thus antenna with 12 flagellomeres. Placodeal sensilla on F5-F11.

Mesosoma (Figs. 18f, 19a-d) 1.2× as long as high, concave in lateral view, pubescent. Sides of pronotum alutaceous, with white setae and weak and parallel carinae in upper lateroposterior part, anterolateral rim

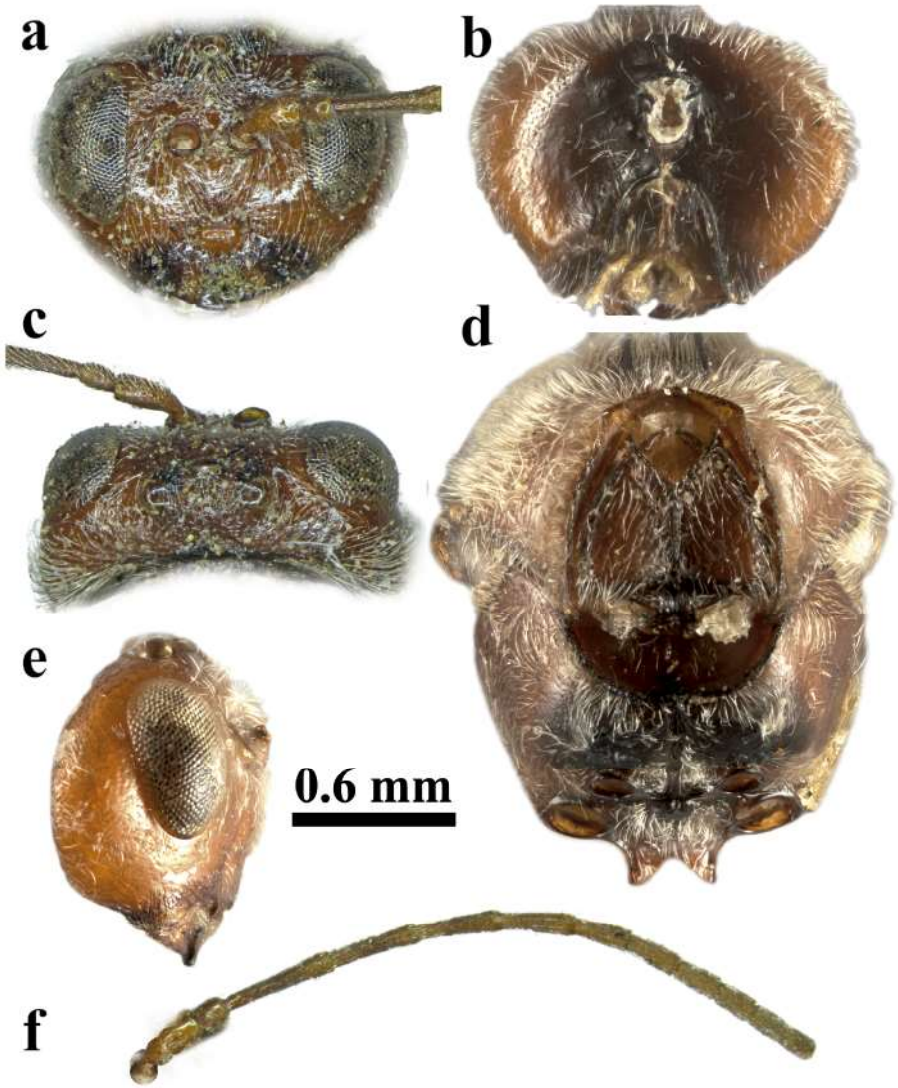

Figure 21a-f. *Femuros ruidum*, asexual female. a) Head in frontal view; b) head in posterior view; c) head in dorsal view; d) mesosoma in frontal view; e) head in lateral view; f) antenna.

of pronotum inconspicuous. Mesoscutum 1.2× as broad as long in dorsal view; weak coriaceous, without rugae, pubescent, with piliferous points more visible in the posterior half between notauli. Notaulus complete, deep, straight, converging posteriorly, in most posterior part distance between notauli shorter than distance between notaulus and side of mesoscutum; median mesoscutal line present; parapsidal lines and anterior parallel lines differentiated by alutaceous sculpture. Circumscutellar carina absent. Mesoscutellum as long as broad, uniformly rugose; overhanging metanotum, with sparse long setae. Mesoscutellar foveae differentiated, delimited posteriorly by a weak carinae, triangular, deep, with weak alutaceous to smooth bottom, separated by a median carina. Mesopleuron completely sculptured, coriaceous to weak reticulate with delicate carinae and sparse setae anteriorly, speculum smooth and shining; mesopleural triangle alutaceous, with dense white setae, hiding the surface sculpture; dorsal and lateral axillar areas with delicate parallel longitudinal carinae, glabrous; axillula alutaceous, pubescent; subaxillular bar smooth, glabrous, triangular, posteriorly as high slightly shorter than high of metanotal trough; metapleural sulcus reaching mesopleuron in upper 1/2 of its height; upper part of sulcus distinct; lower part

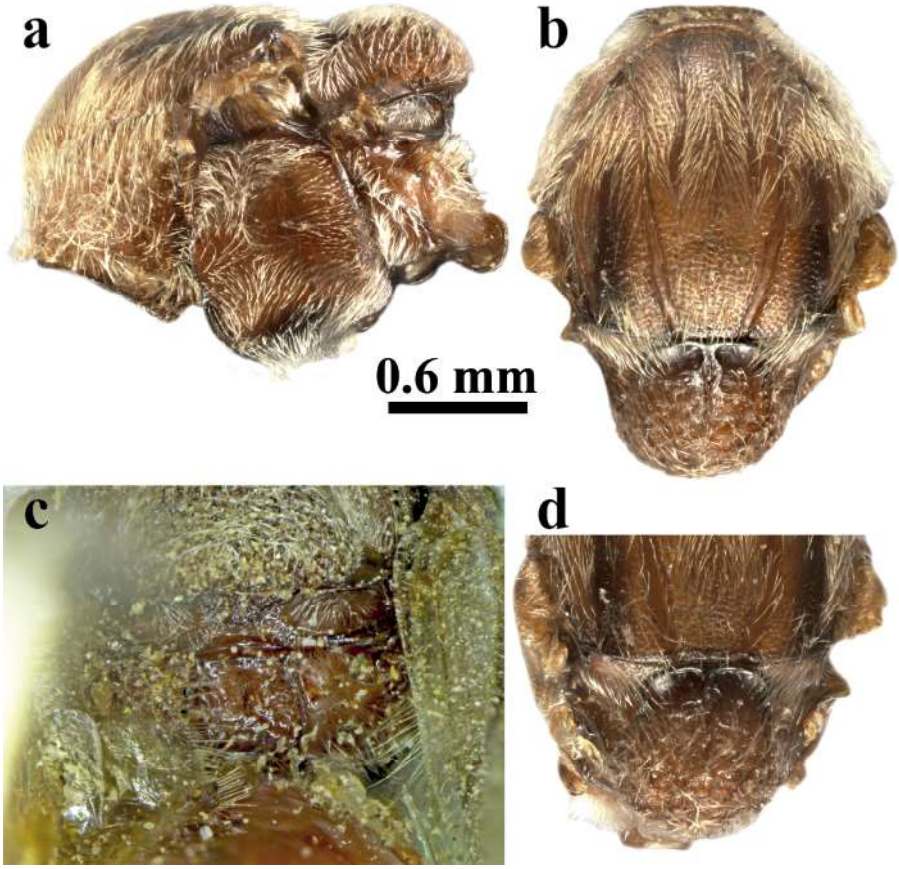

Figure 22a-d. *Femuros ruidum*, asexual female. a) Mesosoma in lateral view; b) mesosoma in dorsal view; c) propodeum; d) mesoscutellum.

of sulcus delimiting big area with dense long white setae. Metascutellum subrectangular, coriaceous with some weak longitudinal carina, curved ventrally; metanotal trough alutaceous, with dense setae; ventral bar of metanotal trough coriaceous dorsally and smooth ventrally; central propodeal area nearly smooth and glabrous; lateral propodeal carinae parallel by converging toward posterior end; lateral parts of propodeum uniformly alutaceous, densely pubescent. Nucha almost smooth and shining dorsally, with parallel sulci laterally. Legs with hind coxa broad, hind femur strongly broadened, with apical lobe; hind tibia with ventral carina on the ventral part extending to half the length of the tibia; base of tarsal claws with strong tooth.

Forewing (Fig. 20a) hyaline, 1.1× as long as body, pubescent, with cilia on margins; radial cell opened, around 2.6× as long as broad; veins light brown; areolet present. Rs+M vein obsolete heading towards the middle of the basal vein.

Metasoma (Fig. 20b) shorter than head+mesosoma, longer than high. 2nd metasomal tergum occupying 3/4 parts of metasoma length, with lateral patch of white setae, without or with obsolete micropunctures; all subsequent terga uniformly and entirely smooth or with obsolete micropunctures. Prominent part of ventral spine of hypopygium needle-like, around 3.5-4.0× as long as broad, with sparse setae laterally, without apical tuft of setae. Body length: 3.2-4.0 mm (Kinsey, 1937a).

Gall (Fig. 20c). Bud gall, globular to spherical, unilocular, sessile, located on main or side twigs, solitary or occasionally in groups of 2 or 3 galls. It is normally spherical (diameter up to 17 mm), distorted by the bracts, deformed leaves, and petioles, which are fused on the surfaces. Green touched with red when young, silvery and purple-brown when mature (similar to the twig bark). In section, a hard wall is observed that surrounds the gall, a spongy-opened and lax tissue and a large spherical central larval chamber thick and hard walled, up to 7 mm in

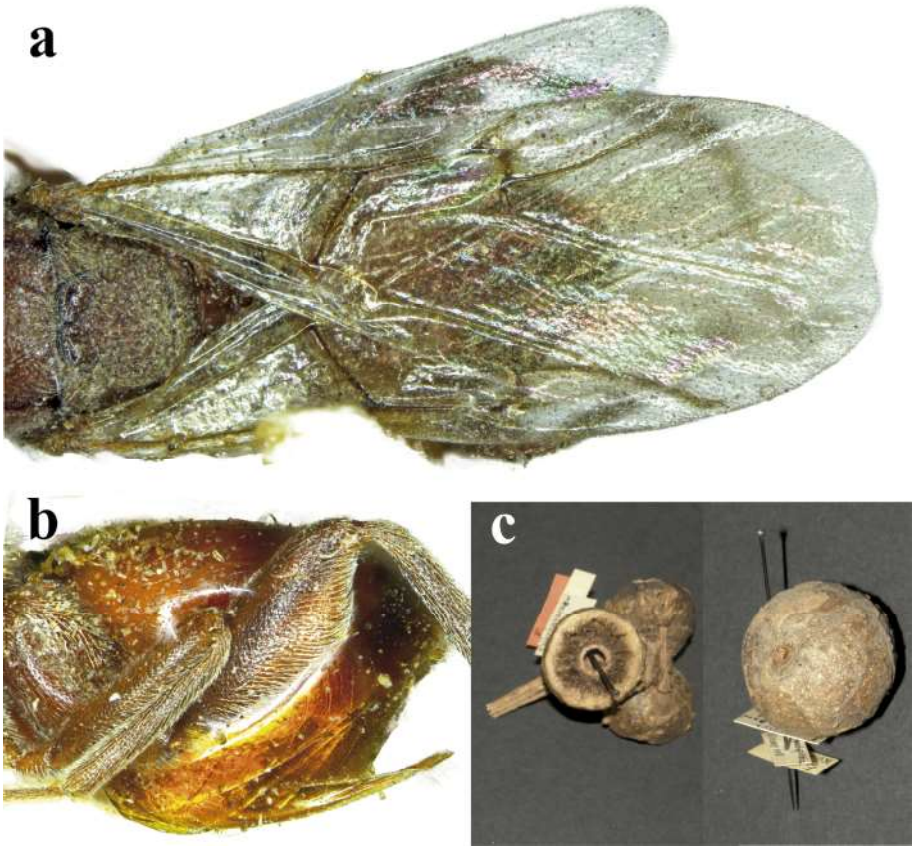

Figure 23a-c. *Femuros ruidum*, asexual female (a-b). a) Fore wing; b) metasoma in lateral view; c) galls, deposited in the AMNH.

diameter even in small galls; the spongy tissue usually is darker in mature galls.

Taxonomic summary

Type material examined. Holotype asexual female deposited in the AMNH: "Mex. (City), 32E; D.F. 10,600; gall 1.3.32, 13 females, 4.24.32 ", "*Q. repanda*, Kinsey Coll.", red handwriting label "Femuros repandae Holo~~Para~~type" "AMNH_IZC 00267207" (white label with a QR code). Paratypes: 15 females with same data as holotype, except for 6 females with different emergence date "4.16.32" (13 females deposited in the AMNH, 2 paratype females deposited I the JP-V col., UB). Type material from *F. ruidum* belonging to *F. repandae*. Seven females deposited in the AMNH "Mex. ⊕, Cuernavaca 8N, Mor. 8700; gall 1.7.32, 1 female, 4.10.32", "*Q. texcocana*, Kinsey Coll.", red handwriting label "*Femuros ruidum* Paratype".

Additional material. Material deposited in JP-V col. (UB), 15 asexual females: 1 female "San Juan Coajomulco, 19°45'21.0" N, 99°59'06.4" W, Jocotitlan, Estado de México, México, (MEX254), Ex *Q. martinezii*, (16.x.2013) 10.vi.2014: 1f, D. García-Martiñón leg."; 2 females "San Juan Coajomulco, 19°45'21.0" N, 99°59'06.4" W, Jocotitlan, Estado de México, México, (MEX255), Ex *Q. rugosa*, (22.ix.2013) 30.iii.2014: 1f, D. García-Martiñón leg."; 4 females "San Juan Coajomulco, 19°45'21.0" N, 99°59'06.4" W, Jocotitlan, Estado de México, México, (MEX256), Ex *Q. obtusata*, (18.i.2014) 28.i-5.iii.2014: 1f, D. García-Martiñón leg."; 3 females "La Cumbre, 17°10'01" N, 96°35'58" W, Santa Catarina Ixtepeji, Oaxaca, México, (MEX649), Ex *Q. rugosa,* (02.ii.2020) 10. vi.2020: 3 females, R. Clark leg."; 3 females "Santa María Yavesía, 17°16'04.8" N, 96°26'06.5" W, Santa María Yavesía, Oaxaca, México, (MEX650), Ex *Q. crassifolia*, (20.i.2022) 20.iii-20.iv.2022: 3 females, R. Clark leg"; 2 females "La Congoja, 22°09'34.5" N 102°33'05.2" W, San José de Grácia, Aguascalientes, México, (MEX651), Ex *Q. grisea*, (12.xii.2021) 15.ii-03.iii.2022: 2 females, R. Clark leg.".

Biology. The asexual generation is only known for inducing galls on *Q. deserticola* Trel. (= *texcocana* Trel.), *Q. grisea* Liebm., *Q. martinezii* C.H.Muller, *Q. obtusata*

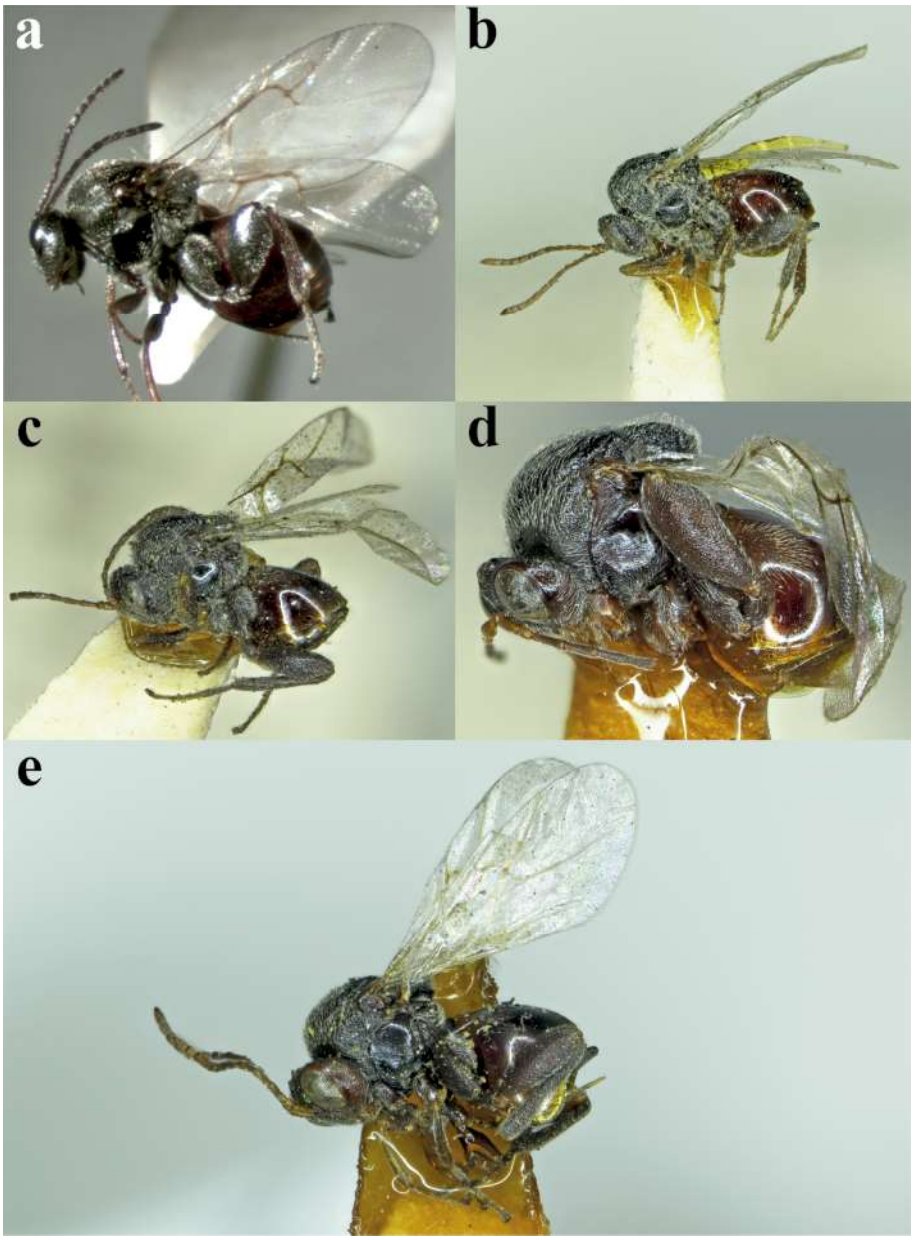

Figure 24a-e. Lateral habitus of holotypes. a) *Andricus calvoi* sp. nov.; b) *Andricus geniale* comb. rev.; c) *Andricus integrum* comb. rev.; d) *Andricus lusum* comb. rev.; e) *Andricus perfectum* comb. rev.

Bonpl., *Q. repanda* Bonpl., *Q. rugosa* Née (section *Quercus*, subsection *Leucomexicanae*, white oaks), and 1 oak species from section *Lobatae, Q. crassifolia* Bonpl.. The adult galls were collected between September and February; adults emerge between January and April (Kinsey 1937a).

Distribution. México: México City (Kinsey 1937a).

Femuros ruidum Kinsey, 1937
Figs. 21a-f, 22a-d, 23a-c
Femuros ruidum Kinsey, 1937; in Kinsey, 1937a: 67-68, female, gall; Pujade-Villar & Ferrer-Suay, 2015: 8.
Andricus ruidus (Kinsey): Weld, 1952: 309.

Diagnosis. *Femuros ruidum* differs from *F. repandae* by having the POL 2.0× as long as OOL, the OOL is equal to length of lateral ocellus, the malar space 0.4× as long

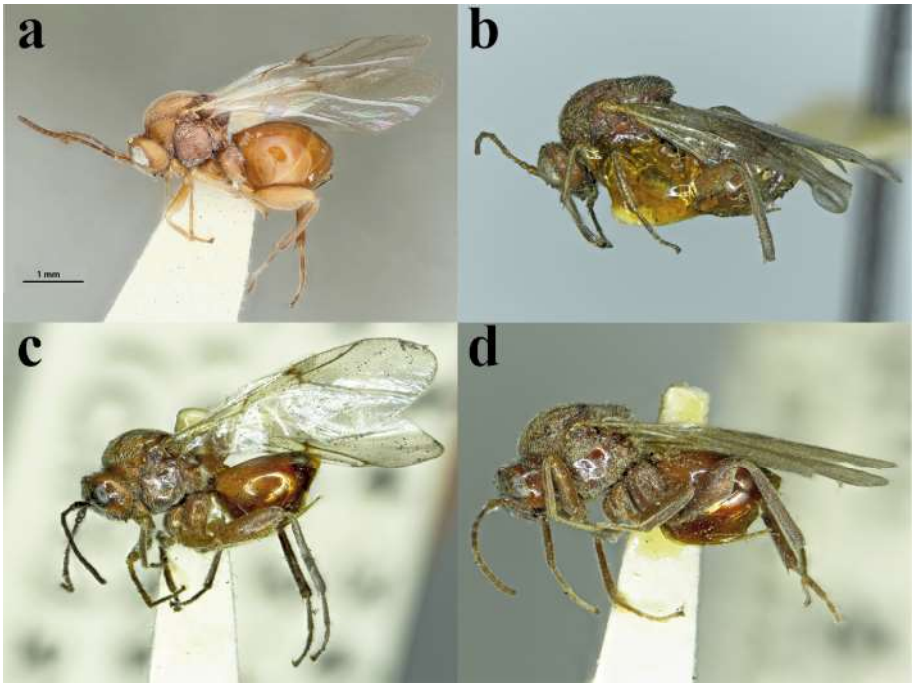

Figure 25a-d. Lateral habitus of holotypes. a) *Femuros bracteatus* comb. nov.; b) *Femuros ocri*; c) *Femuros repandae*; d) *Femuros ruidum*.

as height of the eye; the transfacial distance subequal to the height of the eye. Differs from *F. ocri* by the densely pubescent and distinctly punctured mesopleuron; the speculum pubescent and punctured except for a small smooth central area; propodeal carinae bent outwards.

Redescription. Asexual female (Figs. 21a-f, 22a-d, 23a-b). Head, mesosoma, metasoma and legs reddish-brown (without darker areas); antenna light brown, last flagellomere darker; tegula yellowish. Wing veins brown.

Head (Fig. 21a-e) transversally oval, broadest part below toruli, broader than high and narrower than mesosoma in frontal view, with short dense white setae; 1.3× as broad as high in anterior view and head 2.4× as broad as long in dorsal view. Gena alutaceous, slightly broadened behind eye, as broad as cross diameter of eye, measuring along transfacial line. Malar space weak alutaceous to smooth, without striae radiating from clypeus, malar sulcus absent; eye 2.1× as high as length of malar space. Inner margins of eyes parallel. POL 1.6× as long as OOL, OOL 2.6× as long as diameter of lateral ocellus and longer than LOL, all ocelli rounded, of same size. Transfacial distance 1.2× as long as height of eye; toruli located above mid height of head, frons shorter than height of lower face, diameter of antennal torulus 2.0× as long as distance between them, distance between torulus and eye slightly longer than diameter of torulus. Lower face alutaceous to weak coriaceous, raised central part below the toruli coriaceous, pubescent. Clypeus impressed, coriaceous, rounded ventrally, medially not incised, anterior tentorial pits distinct; epistomal sulcus and clypeo-pleurostomal line distinctly impressed. Frons uniformly coriaceous, without striae, with few setae, piliferous points visible; interocellar area coriaceous with piliferous points; space between lateral ocellus to compound eye almost smooth and shining. Vertex and occiput coriaceous. Antenna (Fig. 21f) shorter than length of head + mesosoma, with 11 flagellomeres; pedicel 1.5× longer than broad; flagellomeres from F5 broadening until apical end; F1 1.4× as long as F2 and 4.1× as long as pedicel; subsequent flagellomeres progressively shortened; F11 longer than F10, sometimes F11 with a very inconspicuous suture and thus antenna with 12 flagellomeres. Placodeal sensilla on F5-F11.

Mesosoma (Figs. 21d, 22a-d) 1.2× as long as high, pubescent, concave in lateral view. Sides of pronotum alutaceous, with white setae and inconspicuous carinae in upper lateroposterior part, anterolateral rim of pronotum inconspicuous. Mesoscutum 1.1× as broad as long in dorsal view; weak coriaceous, without rugae, pubescent, with piliferous points more visible in the posterior half

between notauli. Notaulus complete, deep, straight, converging posteriorly, in most posterior part distance between notauli shorter than distance between notaulus and side of mesoscutum; median mesoscutal line absent; parapsidal lines and anterior parallel lines differentiated by alutaceous sculpture, almost smooth. Circumscutellar carina absent. Mesoscutellum slightly longer than broad, uniformly rugose; overhanging metanotum, with sparse long setae. Mesoscutellar foveae differentiated, triangular, relatively deep, not defined posteriorly with alutaceous bottom, separated by a median carina. Mesopleuron alutaceous to smooth, pubescent with piliferous points, speculum smooth and shining; mesopleural triangle alutaceous, with dense white setae, hiding the surface sculpture; dorsal and lateral axillar areas with delicate parallel longitudinal carinae, glabrous; axillula alutaceous, pubescent; subaxillular bar smooth, glabrous, triangular, posteriorly as high slightly shorter than high of metanotal trough; metapleural sulcus reaching mesopleuron in upper 1/2 of its height; upper part of sulcus distinct; lower part of sulcus delimiting big area with dense long white setae. Metascutellum subrectangular, coriaceous with some weak longitudinal carina, curved ventrally; metanotal trough alutaceous, with dense setae; ventral bar of metanotal trough coriaceous; central propodeal area nearly alutaceous with some rugae and glabrous; lateral propodeal carinae parallel by converging toward posterior end; lateral parts of propodeum uniformly alutaceous to smooth, densely pubescent. Nucha almost smooth and shining dorsally, with parallel sulci laterally. Legs (Fig. 23b) with hind coxa broad, hind femur strongly broadened, with apical lobe; hind tibia with ventral carina on the ventral part extending to 4/5 the length of the tibia; base of tarsal claws with strong tooth.

Forewing (Fig. 23a) hyaline, 1.1× as long as body, pubescent, with cilia on margins; radial cell opened, around 2.6× as long as broad; veins light brown; areolet present. Rs+M vein obsolete heading towards the middle of the basal vein.

Metasoma (Fig. 23b) shorter than head+mesosoma, slightly longer than high. Metasomal tergite 2 occupying 2/3 parts of the metasoma, with lateral patch of white setae, without micropunctures or micropunctures obsolete, all subsequent tergites uniformly and entirely smooth or with obsolete micropunctures. Prominent part of ventral spine of hypopygium needle-like, around 5.5× as long as broad, with sparse setae laterally, without apical tuft of setae. Body length: 3.0-4.3 mm (Kinsey, 1937a).

Gall (Fig. 23c). Similar to *F. repandae* but larger, diameter up to 23 mm.

Taxonomic summary

Type material of *F. ruidum*. Holotype asexual female: "Mex. ⊕, Cuernavaca 8N, Mor. 8700; gall 1.7.32, 8 females, 3.5.32", "*Q. texcocana*, Kinsey Coll.", red handwriting label "Femuros ruidum Holo~~Para~~type" (deposited in AMNH: AMNH_IZC 00267208). Paratypes: 3 females and 3 galls "Mex. ⊕, Cuernavaca 8N, Mor. 8700; gall 1.7.32, 1 female, 4.10.32", "*Q. texcocana*, Kinsey Coll.", red handwriting label "*Femuros ruidum* Paratype" (1 female in AMNH; 1 female in JP-V col; 1 female and galls in HMNH); 3 females "Mex (City) 12W, D.F. 8500', Mex. ⊕, gall 1.13.32, 10 females, 4.10.32", "*Q. texcocana*, Kinsey Coll.", "*Femuros ruidum* Kinsey coll." (1 female in JP-V col; 2 females in HMNH). Type material of *F. repandae* belonging to *F. ruidum*. Paratypes: 1 female "Mex. (City), 32E; D.F. 10600; gall 1.3.32, 9 females, 4.16.32", "*Q. repanda*, Kinsey Coll.", red handwriting label "*Femuros repandae* Paratype" (deposited in JP-V col).

Additional material. Seven asexual females deposited in the JP-V col. (UB) with the label "Universidad de la Sierra Juárez, 17°18'54" N, 96°28'58" W, Ixtlán de Juárez, Oaxaca, México, (MEX646-648), Ex *Q. glaucoides*, R. Clark leg." and different collection and emergence dates: 1 female "(10.iii.2018) 27.iv.2018"; 3 females "(08.xii.2020) 10.i- 20.ii.2021"; and 3 females "(10.xii.2018) 10.i.2019".

Biology. The asexual generation is only known to induce galls on *Q. deserticola* (= *texcocana* Trell.) and *Q. rugosa* Née (= *conglomerata* Trel. = *rhodophlebia* Trel.), according to Kinsey (1937a); and *Q. glaucoides* Mart. & Gal. (section *Quercus*, subsection *Leucomexicanae*, white oaks) in this study. The galls were collected between December and March, and the adults emerge between January and April.

Distribution. México: México City, Morelos, and Oaxaca (Kinsey, 1937a).

Discussion

After carefully studying the type materials of the *Femuros* species described by Kinsey (1937a, b), we have observed distinct morphologies. The species *F. repandae*, *F. ruidum*, and *F. ocri* have a smooth lower face of the head, while the rest of the species (*A. geniale*, *A. integrum*, *A. lusum*, and *A. perfectum*) have a sculptured lower face with carinae radiating from the clypeus. This latter group of species has been provisionally transferred to the *Andricus* genus. *Andricus* is a polyphyletic genus, and although several species have recently been transferred

to other genera (such as *Striatoandricus*, *Disholandricus*, *Druon*, *Dros*, *Feron*, *Protobalandricus*, and *Trichoteras*), there remains a significant number of species groups within *Andricus* that require further assessment. The morphological characteristics of the species currently included in *Andricus* display excessive variation, making it difficult to determine reliable diagnostic characters. The species transferred into *Andricus* in this study exhibit the radiating carinae from the clypeus, which is one of the few characters broadly used to define *Andricus*.

The Cynipini genera are known for exhibiting a high level of homoplasy (Liljeblad et al., 2008), making it challenging to identify exclusive diagnostic characters for most genera. Recognition of these genera relies on a combination of characters rather than any single defining feature, further complicating the task of generic delimitation. Although, the morphological distinctiveness of *Femuros* compared to its closest genera is evident (see diagnosis). The etymology of *Femuros* refers to the broadening of the hind femur on the ventral margin near the distal end, although this feature is not exclusive to *Femuros* (see diagnosis). Additionally, the presence of an internal carina on the hind tibia, previously considered exclusive to *Femuros*, loses its exclusivity after transferring some species to the genus *Andricus*. This character is also found in the unrelated genus *Odontocynips*. Regardless of its distinctiveness, little is known about the relationships between *Femuros* and the rest of the Cynipini genera. It is suspected to be closely related to *Andricus*, probably to the species transferred in this study. If that is the case, the distinctiveness of *Femuros* should be assessed with the support of molecular data and would also be dependent on the taxonomy of *Andricus* and how this macro genus is assessed.

The galls of *Femuros* are now exclusively round bud galls with small bracts partially covering their surface with radiating lamellae connecting the larval chamber and the lignified outer shell. There is a certain degree of variation in terms of the gall size between the species; *F. ruidum* usually induces the biggest galls (up to 23 mm in diameter), but the size distribution overlaps with the galls of *F. repandae* and *F. ocri*. Hence, the galls of *Femuros* are almost impossible to tell apart without the confirmation of the adult wasp.

The galls of the studied *Andricus* species are mostly barrel-shaped or cup-shaped bud galls, with an apical depression, forming a central cavity that can be widely open to the exterior or almost closed, with thick lignified parenchyma. The apical walls of the outer shell of the gall can be opened forming a distinct cup or cover the apical part of the central cavity. The larval chamber is closer to the base of the gall.

The host plant associated with *Femuros* and the newly transferred *Andricus* are mainly oak species from section *Quercus*, subsection *Leucomexicanae*, except for a single record of *F. repandae* galling on *Q. crassifolia* (section *Lobatae*). Species galling on 2 different sections are extremely rare and in many cases such records have been corrected. This last record on *Q. crassfolia* may be attributed to an accidental host swap since *F. repandae* galls mainly in section *Quercus*. Further samplings should confirm this record and the occurrence of it if ever repeated.

Acknowledgments

VCP was supported by the University of Barcelona, grant number APIF 2018-2019. We thank all the staff and colleagues of the AMNH during VCP's visit for their help and support: James Carpenter, Christine Lebeau, Melody Doering, Morgan H Chase, Marcel Hermes, Nayeli Gutiérrez, and Royce Cumming. We are also thankful to Matt Buffington (Smithosnian Institution, USA) and Mar Ferrer-Suay for their pictures of the type materials. This research was funded by "PID2021-128146NB-I00/MCIN/AEI/10.13039/501100011033/" and "FEDER una manera de hacer Europa".

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