

GEA, FLORA ET FAUNA

Description of a new *Andricus* species of gall wasp (Hym.: Cynipidae: Cynipini) on *Quercus macdougalii* (Fagaceae) from Oaxaca (Mexico)

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Abstract

A new species of oak gall wasp, *Andricus lianae* Clark-Tapia sp. nov., known only from its asexual generation that induces galls on the twigs of *Quercus macdougalii* Martínez, (section *Quercus*) is described. *Quercus macdougalii* is a poorly known species, endemic to Oaxaca and rare (located between 2700-3000 m.a.s.l.), endangered (included in the IUCN Red List). Diagnosis, distribution and data on biology of the new species are given. *Andricus lianae* Clark-Tapia sp. nov. represents the second species mentioned on this oak host.

Keywords: Cynipini, *Andricus*, new species, Mexico, *Q. macdougalii*.

Resum

Descripció d'una nova espècie d'*Andricus* (Hym.: Cynipidae: Cynipini) sobre *Quercus macdougalii* (Fagaceae) a Oaxaca (Mèxic)

Es descriu una nova espècie de cinípid, *Andricus lianae* Clark-Tapia sp. nov., coneguda només per la seva generació asexual que indueix gales a les branquetes de *Quercus macdougalii* Martínez (secció *Quercus*). *Quercus macdougalii* és una espècie poc coneguda, endèmica d'Oaxaca i rara (situada entre 2700-3000 m.s.n.m.), en perill d'extinció (inclosa a la Llista Vermella de la UICN). Es proporciona la diagnosi, la distribució i les dades de la biologia de la nova espècie. *Andricus lianae* Clark-Tapia sp. nov. representa la segona espècie esmentada en aquest hoste de roure.

Paraules clau: Cynipini, *Andricus*, espècie nova, Mèxic, *Q. macdougalii*.

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Introduction

Since update of the Mexican's fauna of cynipids carried out by Pujade-Villar *et al.* (2009), several species previously classified under *Andricus* Hartig, 1840 have been reassigned to other genera, including *Disholandricus* Melika, Pujade-Villar & Nicholls, 2021, *Dros* Kinsey, 1937, *Druon* Kinsey, 1937, *Erythres* Kinsey, 1937, *Femuros* Kinsey, 1937, *Feron* Kinsey, 1937, *Protobalandricus* Melika, Nicholls & Stone, 2018, *Striatoandricus* Pujade-Villar, 2020, and *Trichoteras* Ashmead, 1897. In the context of Mexico, a total of 33 species of *Andricus* are listed by Martínez-Romero *et al.* (2022). Later, *Andricus furnessulus* (Weld, 1944) was transferred to *Striatoandricus* by Cuesta-Porta *et al.* (2022), *A. protagion* Kinsey, 1937 (= *A. malinum* Kinsey, 1937) and *A. rusticum* Kinsey, 1937 to *Druon* by Cuesta-Porta *et al.* (2022), and *A. cylindratum* (Kinsey, 1937), *A. tecturnarum* Kinsey, 1920, *A.*

tibialis Kinsey, 1937 (= *A. tostum* Kinsey, 1937) (= *A. uterinus* Kinsey, 1937), *A. vitreus* Kinsey, 1937 (= *A. validus* Kinsey, 1937) and *A. verutus* Kinsey, 1937 to *Feron* by Cuesta-Porta *et al.* (2023). Furthermore, since Martínez-Romero *et al.* (2022), three additional *Andricus* species has been described from Mexico: *A. coombesi* in Pujade-Villar *et al.* (2024), *A. mazahua* in García-Martiñón *et al.* (2025) and *A. protector* in Pujade-Villar *et al.*, 2025, bringing the current number of *Andricus* species in Mexico to 26. Recently (Pujade-Villar *et al.*, 2025), four Mexican species have been considered *inter-tae sedis*: *Andricus burnetti* (Dailey & Sprenger, 1983), *A. marmoreus* Kinsey, 1920, *A. setifer* (Karsch, 1880) and *A. strues* (Kinsey, 1938).

According to this, remaining 22 *Andricus* species from Mexico and the most part (16) found galls in twigs (Pujade-Villar *et al.*, 2025): three attack branches without causing globular tumoral galls (*A. breviramuli* Pujade-Villar,

2014; *A. fusiformis* Pujade-Villar, 2014 and *A. quercuslaurinus* Melika & Pujade-Villar, 2009) and 13 found tumoral galls (*A. bonansea* Mayr, 1905; *A. carrilloi* Pujade-Villar, 2013; *A. dugesi* Beutenmüller, 1917; *A. durangensis* Beutenmüller, 1911; *A. furnaceus* Kinsey, 1920; *A. guanajuatensis* Pujade-Villar, 2013; *A. mazahua* García-Martín & Pujade-Villar, 2025; *A. montezumus* Beutenmüller, 1913; *A. peredurus* Kinsey, 1920; *A. quercusbatatoides* (Ashmead, 1881) introduced from the USA; *A. santafe* Pujade-Villar, 2013; *A. tumefaciens* Pujade-Villar & Paretas-Martínez, 2012 and *A. tumeralis* Pujade-Villar, 2009); a single species (*A. aztecus*) the gall is unknown (although it may possibly produce a tuberous gall).

The aim of this study is describing a new species of tuberous gall wasps on *Q. macdougalii* Martínez an endemic oak from Oaxaca. Previously, these group of species were reviewed (Pujade-Villar *et al.*, 2013 and corrections in Pujade-Villar, 2014) and only a single species was described posteriorly: *A. mazahua* García-Martín & Pujade-Villar, 2025.

Material and Methods

Asexual adult gall wasps (δ) were reared from galls collected by the third author on *Q. macdougalii* in Oaxaca. They

were preserved in the laboratory by the second author, the adults were cut out from galls years after their collection.

We follow the current terminology of morphological structures (Liljeblad & Ronquist, 1998; Melika, 2006). Abbreviations for the fore wing venation follow Ronquist & Nordlander (1989); cuticular surface terminology follows that of Harris (1979).

Measurements and abbreviations used here include: F1–F11, 1st and subsequent flagellomeres; POL (postocellar distance) is the distance between the inner margins of the posterior ocelli; OOL (ocellar-ocular distance) is the distance from the outer edge of a posterior ocellus to the inner margin of the compound eye; LOL, the distance between lateral and frontal ocelli. The width of the fore wing radial cell is measured from the margin of the wing to the Rs vein.

The SEM pictures were taken by the first author in Barcelona University using field-emission gun environmental scanning electron microscope (FEI Quanta 200 ESEM), with low-resolution imaging without gold-coating the specimens. Optical images to habitus were taken by the third author with an Olympus U-CMAD3 adapted to a binocular microscope Olympus SZX10, combining 81 photographs with the software «Helicon Focus 6.7.1». Galls images were taken by the last author with a Canon PowerShot SX510 HS digital camera.

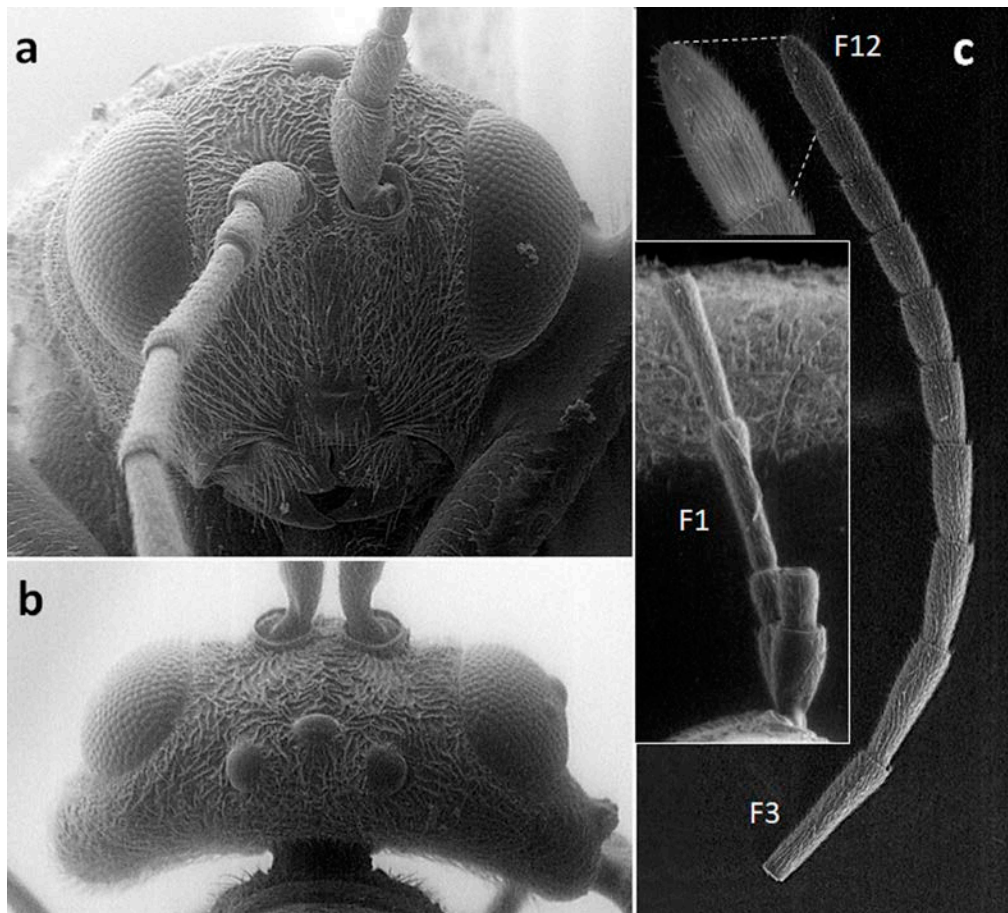


Figure 1. *Andricus lianae* Clark-Tapia sp. nov.: (a) head in frontal view, (b) Head in dorsal view, (c) antennae (F = flagellomer).

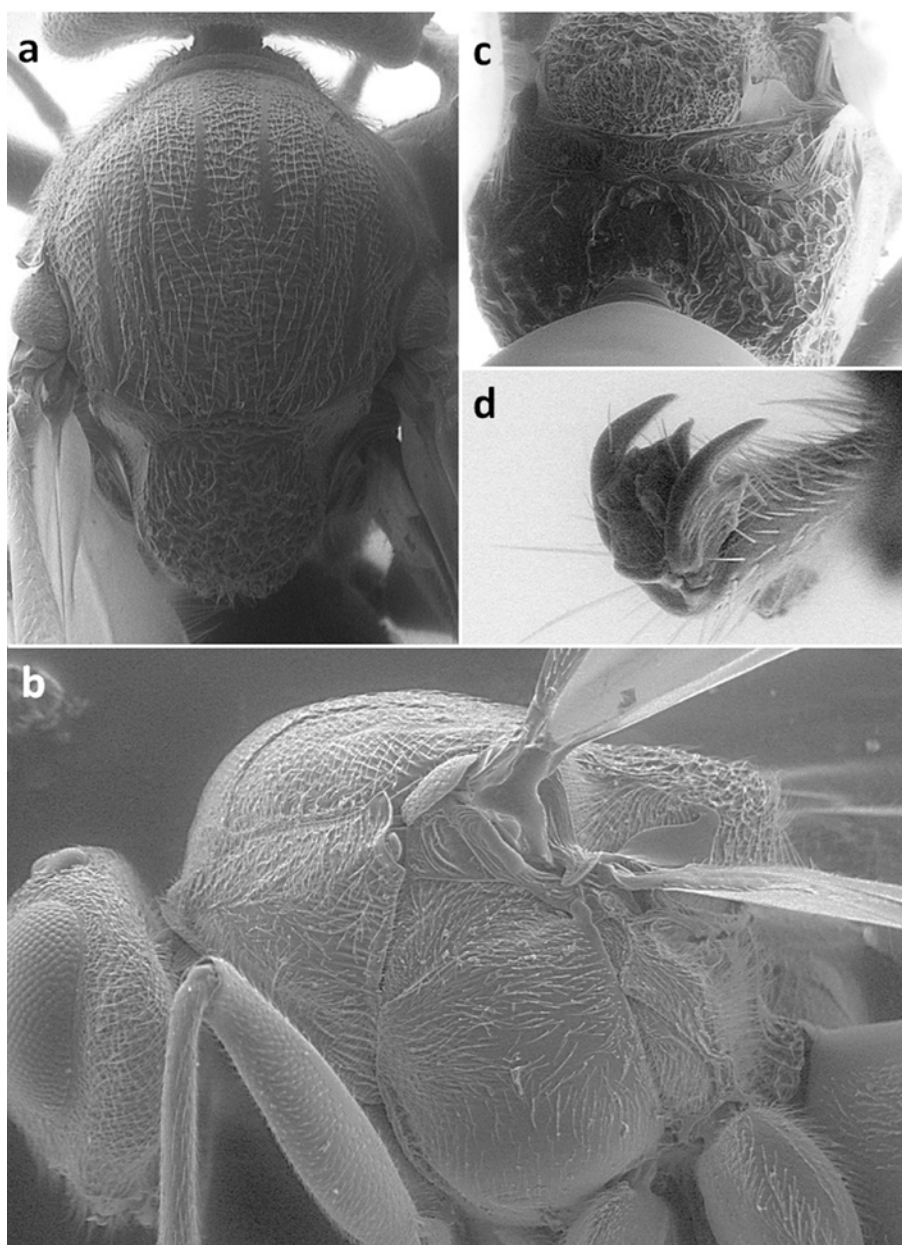


Figure 2. *Andricus lianae* Clark-Tapia sp. nov.: Mesosoma in dorsal view, (b) head and mesosoma in lateral view, (c) propodeum, (d) tarsal claws.

The type material is deposited in the UB, Universitat de Barcelona, Catalonia (J. Pujade-Villar coll.).

Results

Andricus lianae Clark-Tapia sp. nov.

(Figs. 1-4)

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Type material

Holotype asexual female labelled as “MEX, El Mirador, Santiago Comaltepec (Chinantec community, Oaxaca), 17°10'01”N – 93°35'58”W, *Q. macdougallii*, (14.v.2024) 20.v.2024”, JP-V col. (black label); Holotype *Andricus li-*

anae Clark-Tapia n. sp., desig. JP-V 2024” (red label). Paratypes; 3 asexual females with the same data as holotype; (15.v-16.vi.2024) 19.vi-7.vii.2024: 5 asexual females. The holotype and paratypes are deposited in the collection of JP-V (University of Barcelona, UB).

Additional material

Same data as holotype: 3 asexual females (UNSIJ); (15.v-16.vi.2024) 19.vi-7.vii.2024: 3 asexual females (UNSIJ).

Diagnosis

The new species has the metasoma with terga completely pubescent, forewing ciliated in margin, antennae shorter than body, scutellar foveae with linear elements very conspicuous

and vein Rs+M reaching basal vein, as occurs in *A. guanajuatensis*, *A. tumeralis*, *A. montezumus* and *A. dugesi*. The new species differs of *A. tumeralis*, *A. montezumus* and *A. dugesi* in the sculpture of mesoscutum (with some transversal carinae in *A. lianae* n. sp., strongly rugose in *A. tumeralis*, *A. montezumus* and *A. dugesi*). The new species differs of *A. guanajuatensis* to having the mesoscutum transversally carinate-rugose (mesoscutum with fine transverse and parallel carinae in *A. guanajuatensis*), ventral spine of hypopygium short, 5.0-6.0 times as long as wide (7.0-8.0 times as long as wide in *A. guanajuatensis*), metasoma reddish (metasoma black in *A. guanajuatensis*) and central propodeum smooth without any plate inside (with a basal plate in 2/3 inferior part with parallel elements in *A. guanajuatensis*).

Description. Asexual female.

Length. Female: 3.3-3.7 mm (n=2).

Colour (Fig. 4a). Head and mesosoma black; scapus and pedicel brown, flagellomeres black; legs brown with coxae partially black; metasoma reddish brown. Pubescence silvery.

Head (Figs. 1a-b). Sparse pubescent, 2.0 times as wide as long from above, 1.2 times as wide as high in frontal view and slightly shorter than mesosoma. Lower face with striae radiating from clypeus extending to eye margin interspace reticulate. Gena broadened behind eye, 0.2 as wide as transverse diameter of eye; malar space 0.25-0.27 times as long as eye height, malar sulcus absent. Ocellar area not elevate, interocellar area weakly rugose, coriaceous; POL:OOL:LOL is 20:12:8, lateral ocellus is 7.0. Transfacial distance slightly longer than eye height; diameter of torulus (including rims) around 3.5 times as large as distance between toruli, distance between torulus and inner margin of eye equal as diameter of torulus; inner margins of eyes con-

verging. Clypeus smooth, curved ventrally, not incised, sparsely pubescent; anterior tentorial pits, epistomal sulcus and clypeopleurostomal line distinct. Frons, vertex, interocellar area and occiput weakly rugae with interspaces from coriaceous; median frontal carina absent.

Antenna (Fig. 1c). 12 flagellomeres, F12 without incision but with two rows of placodeal sensilla. Longer than head+mesosoma (91:60) and shorter than body length (91:110); pedicel 1.5 times as long as wide; F1-F3 slightly broader distally; all flagellomeres straight; F1 longer than scape+pedicel; F1 slightly longer than F2; F2 equal than F3, F3=F4; F4-F8 shorter and progressively shortening in length; F9 =F10 and longer F11; F12 shorter F10+F11; placodeal sensilla inconspicuous but visible on F6-F12.

Mesosoma (Figs. 2a-c). Around 1.25 times as long as high in lateral view, with sparse white setae. Mesoscutum slightly wider than long in dorsal view; weakly rugose-carinate with interspaces coriaceous and shiny. Notauli complete with smooth and shiny bottom. Anterior parallel lines reaching tegula level, divergent distally, alutaceous. Parapsidal lines distinct and broad, weakly alutaceous and shiny, starting from posterior margin and extending more than 1/2 length of mesoscutum. Parascutal carina anteriorly ending just at notauli level, poorly visible before tegulae. Median mesoscutal line absent. Mesoscutellum around 0.5 times as long as mesoscutum, as long as broad, overhanging metanotum, uniformly rugous; scutellar foveae inconspicuous, superficial with a rugose coriaceous bottom. Mesopleuron setose, alutaceous, carinated, not punctuated, with a smooth area basally; mesopleural triangle conspicuously setose with the same sculpture of mesopleuron; axillula dull, alutaceous, with white setae; subaxillular bar smooth, shiny, as height as metanotal trough; postalar present; metapleural sulcus reaching me-

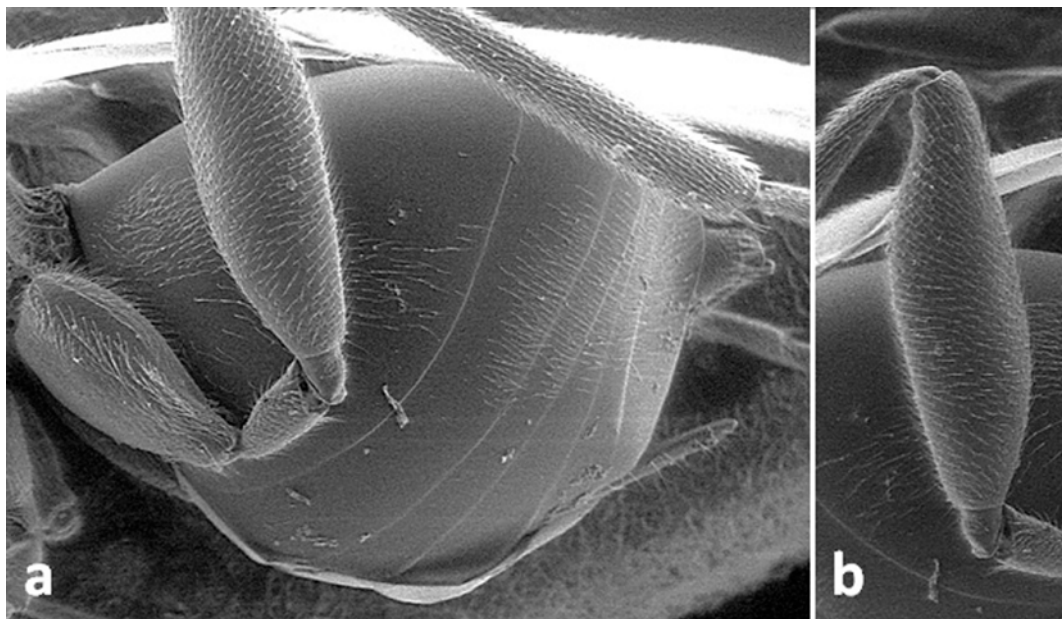


Figure 3. *Andricus lianae* Clark-Tapia sp. nov.: (a) metasoma in lateral view, (b) last femur.

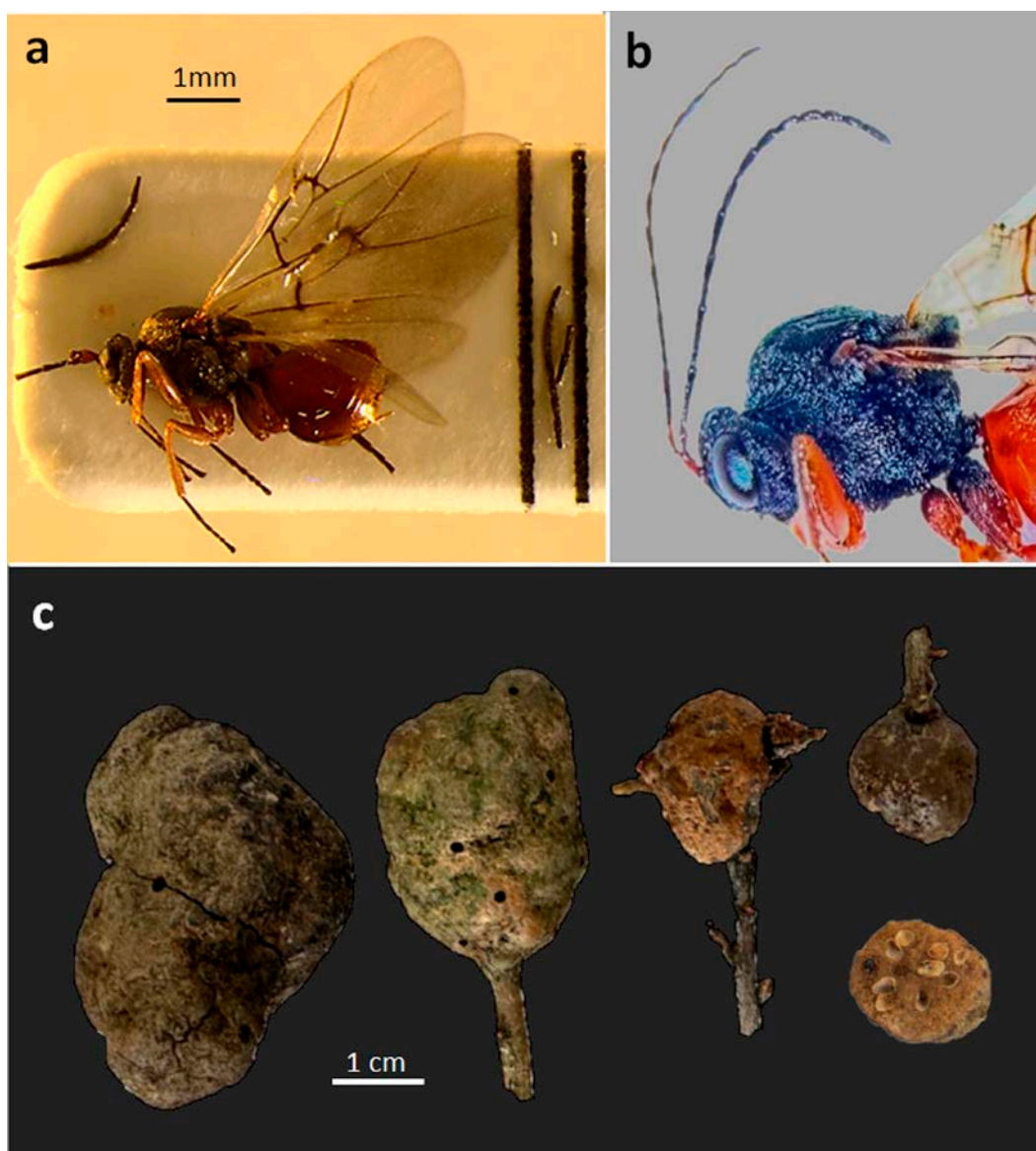


Figure 4. *Andricus lianae* Clark-Tapia sp. nov.: (a) adult, lateral habitus mounted, (b) detail of head and mesosoma (overexposed), (c) gall and cut section.

sopleuron above 1/2 of its height. Metascutellum strongly microreticulate, rectangular slightly curved basally. Metanotal trough alutaceous with short white setae; ventral impressed area twice as narrow as metascutellum height, strongly coriaceous-carinated. Propodeum rugose with interspaces alutaceous, shiny, setose laterally, glabrous centrally with some setae in the 1/4 anterior; posterolateral process shortly projected; central propodeal area alutaceous, shiny, with many irregular rugae weak impressed, propodeal carinae curved, with an alutaceous sculpture. Nucha with irregular wrinkles and rugae.

Legs. Tarsal claws with basal tooth (Fig. 2d); femur III not incised apically (Fig. 3b).

Forewing. Longer than body length, hyaline, with cilia on anterior margin, radial cell around 3.7 times as long as wide; 2r angled; R1 not reaching wing margin; Rs very slightly curved, distal part parallel to margin of forewings; areolet present; Rs+M visible, reaching basalis at half length.

Metasoma (Fig. 3a). Shorter than head+mesosoma (around 0.8 times), longer than high in lateral view, with dense setae laterally in all tergites, more densely present in the posterior margin of terga, smooth; Prominent part of ventral spine of hypopygium needle-like, tapering to apex, around 5.0-6.0 times as long as wide, with two parallel rows of short white scattered setae that do not extend beyond the spine apex.

Gall (Fig. 4b).

Galls are irregular, woody, brown, fusiform enlargements surrounding small twigs. Polythalamus, 2.0–7.0 cm long x 1.0–4.0 cm wide. The inner tissue is spongy so the gall does not have a hard consistency. Larval chambers (3.0 x 4.5 mm) are scattered throughout the gall tissue; the walls of the chambers are yellowish and thin. Galls remain on oak branches for several years and darken with time.

Host

Quercus macdougallii Martínez (section *Quercus*) endemic in Oaxaca (Mexico).

Distribution

Mexico (El Mirador, Santiago Comaltepec, Oaxaca).

Biology

Only the asexual generation. Adults emerge late spring or early summer.

Etymology

In honour to Dr. Cecilia Liana Alfonso Corrado, wife of Ricardo Clark-Tapia.

Discussion

Quercus macdougallii is a rare oak endemic to Oaxaca (located between 2800–3000 m.a.s.l.), endangered (included in the IUCN Red List). The first species mentioned in this oak was *Neuroterus chinanteco* Pujade-Villar & Clark, 2023, but it is not the only gall we collected (Pujade-Villar *et al.*, 2023). Here we describe the second gall wasps associated to *Q. macdougallii*.

In Mexico the section *Quercus* (white oaks) of oaks is represented by 77 species (Valencia, 2004), while cynipid galls were found only on 37 of them. Moreover, the total number of oak species in Mexican exceeds 160, of which more than half (86) are endemic, with more than 200 Cynipini species described (Martínez-Romero *et al.*, 2022), than we can conclude that there are still many species to be described. We estimate that the number of species in Mexico could approach to the 1000 species if we consider that almost 500 species of Cynipini are known in northern Mexico (Burks, 1979) in a diversity of oaks close to 90 species (Nixon, 2008).

The newly described species belongs to the group of *Andricus* species inducing tuberous galls. The Mexican species inducing this gall morphology were revised by Pujade-Villar *et al.* (2013) and Pujade-Villar (2014). Most of the species of this group exhibit faint to coarse carinae or rugae in the mesoscutum. This feature is hypothesized to be an adaptation to carve through heavily lignified galls and risen sculptures are probably correlated with the hardness of mature galls. *Andricus lianae* induces relatively soft galls and exhibits a fainter sculpture compared to morphologically related species with harder galls: *A. tumeralis*, *A. montezumus* and *A. dugesi*.

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