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New species of oak gallwasp from Mexico (Hymenoptera: Cynipidae: Cynipini) – a serious pest of *Quercus laurina* (Fagaceae)

G. Melika[1], D. Cibrián-Tovar[2], V. D. Cibrián-Llanderal[2], J. Tormos[3] & J. Pujade-Villar[4]

[1] Pest Diagnostic Laboratory, Plant Protection & Soil Conservation Directorate of County Vas, Ambrozy setany 9762 Tanakajd (Hungary). E-mail: melikageorge@gmail.com; [2] División de Ciencias Forestales, Universidad Autónoma Chapingo, Km 38.5 Carretera México-Texcoco. Chapingo, Estado de México, México. E-mails: dcibrian48@gmail.com; vicillan@yahoo.com.mx; [3] Universidad de Salamanca, Facultad de Biología, Unidad de Zoología, 37071-Salamanca (Spain). E-mail: tormos@usal.es; [4] Universitat de Barcelona, Facultat de Biologia, Departament de Biologia Animal, Avda. Diagonal 645, 08028-Barcelona (Spain). E-mail: jpujade@ub.edu

RESUMEN

Una nueva especie de la avispa de las agallas de los encinos, *Andricus quercuslaurinus* Melika & Pujade-Villar es descrita de México. Es conocido que generaciones sexuales y asexuales alternas inducen las agallas en *Quercus laurina*. Datos sobre la diagnosis, distribución y biología de la nueva especie son proporcionados. Parece ser una plaga seria de *Q. laurina* en algunas partes de México.

Palabras clave: Cynipidae, avispas de las agallas del encino, *Andricus*, taxonomía, morfología, distribución, biología.

ABSTRACT

A new species of oak gallwasp, *Andricus quercuslaurinus* Melika & Pujade-Villar, is described from Mexico. Alternate asexual and sexual generations are known to induce galls on *Quercus laurina*. Data on the diagnosis, distribution and biology of the new species is given. It appears to be a serious pest of *Q. laurina* in some parts of Mexico.

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

INTRODUCTION

Gallwasps (Cynipidae) are distributed mainly in the temperate zone of the Northern Hemisphere. The oak gallwasps (Cynipini) are by far the most species-rich group of gallwasps, with *ca*. 1000 species in 25 genera worldwide (Csóka *et al.*, 2005; Stone *et al*., 2007; Abe *et al*., 2007). The known fauna is the richest in the Nearctic region, with *ca*. 700 species in 22 genera (Melika & Abrahamson, 2002), which from *ca*. 154 species are known from Central America and Mexico and trophically associated with more than 30 oak species (Kinsey, 1936, 1937a, b, 1938; Pujade-Villar, 2008; Pujade-Villar *et al.*, 2009a, 2009b), while approximately 150 *Quercus* species are known from Mexico (Govaerts & Frodin, 1998) which 86 are considered endemic (Nixon, 1998; Zavala, 1998). Other species are known from the USA and Canada (Burks, 1979).

Some species of oak gallwasps appeared to be harmfull to oak trees they develop on, for example, *Plagiotrochus amenti* Kieffer, 1901 and *Disholcaspis cinerosa* (Bassett, 1881). *Plagiotrochus amenti* can be a dangerous pest of *Q. suber* L. in the Mediterranean area (Benia *et al*., 2009), particularly in northeastern Spain (Garbin *et al*., 2005), and in North and South America, where *Q. suber* has been introduced to provide cork for the wine industry (Bailey & Stange, 1966; Zuparko, 1996; Díaz, 1973). *Disholcaspis cinerosa* induces stem galls in Texas, USA, sometimes strongly affecting urban ornamental live oak trees (Frankie *et al.*, 1992). This aggressive impact on its host is unusual among cynipids, nevertheless, herein we describe another new oak gallwasp, which appears to be a serious pest of *Q. laurina* Bonpl. in some parts of Mexico.

MATERIALS AND METHODS

Adult gallwasps of both generations (sexual and asexual) were reared from galls collected on *Q. laurina* which belongs to Red oaks (*Quercus* subgenus, Lobatae section). We follow the current terminology of morphological structures (Liljeblad & Ronquist, 1998; Melika, 2006). Abbreviations for fore wing venation follow Ronquist & Nordlander (1989); cuticular surface terminology follows that of Harris (1979). Measurements and abbreviations used here include: F1–F12, 1st and subsequent flagellomeres; POL (post-ocellar distance) is the distance between the inner margins of the posterior ocelli; OOL (ocellar-ocular distance) is the distance from the outer edge of a posterior ocellus to the inner margin of the compound eye; LOL, 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.

Images of wasp anatomy were produced with a digital Nikon Coolpix 4500 camera attached to a Leica DMLB compound microscope, followed by processing in CombineZP (Alan Hadley) and Adobe Photoshop 6.0. Gall images were taken by Víctor David Cibrián-Llanderal with a DSC Leica 295 camera attached to a Leica M80 stereomicroscope followed by processing with Leica application suite V3.3.0.

The type material is deposited in the next institutions: UB, University of Barcelona, Spain (J. Pujade-Villar); PDL, Pest Diagnostic Laboratory (the former Systematic Parasitoid Laboratory, SPL), Tanakajd, Hungary (G. Melika); USNM, U.S. National Museum of Natural History, Smithsonian Institution, Washington, DC, U.S.A. (M. Buffington); UACh,

Universidad Autónoma Chapingo, Estado de México, México (D. Cibrián-Tovar).

RESULTS

Andricus quercuslaurinus Melika & Pujade-Villar, new species (Figs 1-38)

Type material. HOLOTYPE. Asexual female: MEXICO, Hidalgo, La Victoria, municipio de Acaxochitlán, 19-25. II.2009. Col. V.C-Ll & D.C-T [Víctor David Cibrián-Llanderal & David Cibrián-Tovar]; asexual female, No. 3, stem swelling galls on *Quercus laurina* (deposited in UB). PARATYPES (8 asexual females, 43 males and 60 sexual females): asexual females with the same labels as the holotype; males and sexual females: MEXICO, Hidalgo, La Victoria, municipio de Acaxochitlán, 12.VI.2009. Col. V.C.Ll. & D.C.T. [Víctor David Cibrián-Llanderal & David Cibrián-Tovar]; sexual form, No. 17, integral leaf gall on *Quercus laurina.*

Deposited material. UB (Holotype asexual female and 1 asexual female paratype preserved in ethanol; 5 pinned female paratypes and 10 male paratypes preserved in ethanol; 5 pinned sexual female paratypes and 10 sexual female paratypes preserved in ethanol), PDL (2 asexual female paratypes, 6 male and 10 sexual female paratypes), USNM (1 asexual female paratype, 5 male and 5 sexual female paratypes), and UACh (3 asexual female paratypes, 8 pinned male paratypes and 9 male paratypes preserved in ethanol, 12 pinned sexual female paratypes and 18 sexual female paratypes preserved in ethanol).

Diagnosis. *Andricus quercuslaurinus* belongs to the group of *Andricus* species without a basal lobe on tarsal claws. Numerous species, placed by Weld (1952) into the *Callirhytis* Förster were transferred to the *Andricus* Hartig genus by Melika & Abrahamson (2002). The asexual females belong to the group of *Callirhytis* species (sensu Weld) which induces stem swelling-like galls on Red oaks – third and all subsequent metasomal tergites uniformly micropunctate, tarsal claws are simple, without a basal lobe; legs, including fore and mid coxae are chestnut brown, except hind coxae which are mostly black; hind femurs are slightly darker; hind tarsomere II only slightly shorter than V. Morphologically most closely resembled species are: *Callirhytis quercusclavigera* (Ashmead, 1881) (on *Q. laurifolia*, known from Florida, USA), *C. quercuscornigera* (Osten Sacken, 1865) (on *Q. palustris* and other red oaks; Massachusetts to Georgia, Iowa and Florida; both generations are known, the sexual one induces leaf galls); *C. quercuspunctata* (Bassett, 1863) (on *Q. coccinea, Q. palustris, Q. velutina*, known from Maine, Ontario, Canada). In all three mentioned species the mesoscutum always uniformly microreticulate, without punctures, matt, while in *A. quercuslaurinus* the mesoscutum alutaceous, especially in between notauli; with transverse parallel striae anteriorly and some deep punctures medially, shiny. See also Comments below.

The sexual females and males most closely resemble the sexual generation of *Callirhytis quercuscornigera*, described by Melika & Buss (2002). In *C. quercuscornigera* females last antennal flagellomere strongly flattened, distinctly broader than the previous one; the posterior half of internotauli area smooth, shiny; the median mesoscutal line absent; cilia on the forewing margin is short and sparse while in *A. quercuslaurinus* females last antennal flagellomere very slightly flattened, only slightly broader than the previous one; the internotauli area uniformly alutaceous; the median mesoscutal line present; cilia on the forewing margin is long and dense. In *C. quercuscornigera* males the mesoscutellum is polished, glabrous, smooth; the mesopleuron uniformly delicately coriaceous, with some striae, while in *A. quercuslaurinus* males the entire mesoscutellum or at least the disk is alutaceous, matt; the mesopleuron with paralell longitudinal striae going across the entire width of mesopleuron and occupying central 1/3. See also Comments below.

DESCRIPTION

Asexual female (Figs 1-16).

Colour. Head, except chestnut brown antenna and mandibles, and mesosoma black; legs dark brown, with darker coxae; metasoma brown, darker dorsally.

Head. Alutaceous to reticulate, with very few short white setae, more denser on lower face and clypeus, 2.4 times as broad as long from above, 1.2 times as broad as high and slightly broader than mesosoma in front view. Gena delicately coriaceous, broadened behind eye, visible in front view behind eye, narrower than cross diameter of eye; malar space reticulate, without striae, 0.5 times as long as height of eye. POL nearly 2.0 times as broad as OOL; OOL 1.6 times as long as length of lateral ocellus and as long as LOL; ocelli elongated. Transfacial distance 1.2 times as broad as height of eye; diameter of antennal torulus slightly larger than distance between them, distance between torulus and inner margin of eye 1.4 times as long as diameter of torulus; lower face with numerous irregular striae, extending to antennal sockets, with denser white setae and elevated coriaceous median area. Clypeus quadrangular, delicately coriaceous, with elevated central area, laterally and ventrally widely emarginate, with median incision; anterior tentorial pits, epistomal sulcus and clypeo-pleurostomal line distinct, deep. Frons, vertex, interocellar area and occiput uniformly delicately coriaceous. Postocciput and postgena reticulate, impressed around occipital foramen; posterior tentorial pits large, deep, area around them strongly impressed; height of occipital foramen larger than height of gula; hypostomal carina emarginate, not going around oral foramen, continuing into gular sulcus. Labial palpus 3-segmented, maxillary palpus 5-segmented. Antenna with 13 flagellomeres; slightly longer than mesosoma; scape 1.9 times as long as pedicel; pedicel subglobose, slightly longer than broad; F1 1.1 times as long as F2, 2.3 times as long as pedicel; F2 1.4 times as long as F3; F3=F4, subsequent flagellomeres shorter, F13=F12; placodeal sensilla on F4-F13, absent on F1-F3; black spots indicate the attachment of setae.

Mesosoma. Only slightly longer than high. Pronotum smooth dorsally, with numerous strong irregular rugae laterally; propleuron brown, coriaceous, shiny, concave in mediocentral part. Mesoscutum alutaceous, especially in

between notauli; with transverse parallel striae anteriorly and some deep punctures medially; subequal, only slightly longer than broad in dorsal view (largest width measured across mesoscutum on the level of the base of tegulae). Notauli complete, deep and broad, with smooth bottom, distinctly impressed, slightly converging and broadened posteriorly; anterior parallel lines extending to 1/2 length of mesoscutum, slightly impressed; parapsidal lines distinct and broad, start away from posterior margin and extending to 2/3 length of mesoscutum; median mesoscutal line absent or present in a form of short impressed area medioposteriorly. Mesoscutellum 0.8 times as long as mesoscutum, uniformly rugose, with stronger irregular wrinkles, quadrangular, nearly as long as broad, overhanging metanotum; scutellar foveae very narrow, with parallel longitudinal striae on the bottom, with distinct elevated narrow coriaceous median carina dividing the base of mesoscutellum into two halves. Mesopleuron and speculum uniformly longitudinally striate; mesopleural triangle with longitudinal nearly parallel striae; dorsal axillar area smooth, without setae; lateral axillar area with wrinkles; axillula coriaceous, with few white setae; subaxillular bar smooth, shiny, with parallel sides, its height less than height of metanotal trough; postalar process long, with parallel striae; metapleural sulcus reaching mesopleuron in the upper half. Metascutellum uniformly coriaceous, metanotal trough coriaceous, with dense white setae; ventral impressed area as high as height of metascutellum, smooth; central propodeal area smooth, shiny, with numerous irregular wrinkles and rugae, lateral propodeal carinae strong, high, subparallel; lateral propodeal area with irregular wrinkles and dense white setae; nucha with irregular longitudinal striae.

Legs. Fore tibiae with very few short scattered white setae; tarsal claws simple, without basal lobe, hind tarsomere V nearly 2.0 times as long as tarsomere II.

Wings. Forewing longer than body, hyaline, with short dense cilia on margin, radial cell 3.75 times as long as broad; R1 and Rs nearly reaching wing margin; areolet large, triangular, closed and distinct; projection of M reaching basalis in its lower 1/3.

Metasoma longer than head+mesosoma, longer than high in lateral view; 2nd metasomal tergite occupying half length of mesosoma, smooth, shiny, with few short setae antero-ventrally; subsequent tergites uniformly and entirely micropunctate; 5th tergite incised laterally. Ventral spine of hypopygium very short, prominent part as long as broad, with white setae, extending beyond apex of spine.

Body length 3.0-3.3 mm (n=5).

Etymology. The species is named after the host plant, *Q. laurina* Bonpl., which on it induces galls in both, sexual and asexual generations.

Gall (Figs 17-18). The complete growth and development of the gall untill mature stage requires at least 30 months. Asexual females lay eggs in twigs about 1-3 cm in diameter, in late spring and early summer of the first year. In late winter or early spring of the second year, the diameter of the infected twig is rapidly increasing. At this stage, developing galls are spherical, contiguous contact between them deforms the branch, galled tissue reaches up to 40 cm long and 3.5 cm wide. Surface of the galled tissue is smooth and light green. In the summer of the third year, many of the larval chambers acquire a "horn shaped" form, and some are projecting through the exterior surface of the gall; many of these chambers are expulsed and fall down to the ground. By the end of the third year, pupae are formed and during late January and February of the next year adults emerge.

Sexual female (Figs 19-22, 28-35).

Colour. Head black, except yellowish brown lower face, mandibles palpi and mouthparts. Antenna and legs uniformly light brown. Mesosoma light brown, metasoma light brown, slightly darker dorsally.

Head. Alutaceous, with very few short white setae, more denser on lower face and clypeus, 2.2 times as broad as long from above, 1.2 times as broad as high and slightly broader than mesosoma in front view. Gena alutaceous, not broadened behind eye, invisible in front view behind eye, at least 2.0 times narrower than cross diameter of eye; malar space alutaceous, with few short striae radiating from clypeus, 0.5 times as long as height of eye. POL nearly 2.4 times as broad as OOL; OOL 1.8 times as long as length of lateral ocellus, LOL 1.9 times as long as OOL; ocelli elongated. Transfacial distance 1.2 times as broad as height of eye; diameter of antennal torulus 1.5 times as long as distance between them, distance between torulus and inner margin of eye 1.2 times as long as diameter of torulus; lower face and slightly elevated median area uniformly alutaceous, with white setae. Clypeus subquadrangular, slightly higher than broad, with parallel sides, alutaceous, emarginated laterally and ventrally, with elevated central area, ventrally without median incision; anterior tentorial pits, epistomal sulcus and clypeo-pleurostomal line distinct, deep. Frons, vertex, interocellar area and occiput uniformly alutaceous. Postocciput and postgena alutaceous, impressed around occipital foramen; posterior tentorial pits large, deep, area around them strongly impressed; height of occipital foramen larger than height of gula; hypostomal carina emarginate, not going around oral foramen, continuing into gular sulcus. Labial palpus 3-segmented, maxillary palpus 5-segmented. Antenna with 11 flagellomeres; slightly longer than mesosoma; scape 1.7 times as long as pedicel; pedicel subglobose, 1.4 times as long as broad; F1 1.2 times as long as F2, 1.4 times as long as pedicel; F2 slightly longer than F3; F3 slightly longer than F4, subsequent flagellomeres shorter, F11 1.9 times as long as F10. Placodeal sensilla on F4-F11, absent on F1-F3.

Mesosoma. Only slightly longer than high. Pronotum smooth dorsally, with some parallel delicate striae laterally; propleuron brown, smooth or alutaceous, shiny, concave in mediocentral part. Mesoscutum alutaceous, especially in between notauli, with more smooth surface aside notauli and especially in posterior half; subequal, only slightly longer than broad in dorsal view (largest width measured across mesoscutum on the level of the base of tegulae). Notauli complete, deep and broad, with smooth bottom, distinctly impressed, slightly converging and broadened posteriorly; anterior parallel lines extending to 1/2 length of mesoscutum, slightly impressed;

parapsidal lines indistinct, start at the level of tegulae, indicate by smooth surface; median mesoscutal line extending at least to 2/3 length of mesoscutum, indicate by interrupted rounded or elongated impressions. Mesoscutellum 0.7 times as long as mesoscutum, uniformly alutaceous; broader in posterior 1/3, longer than broad, overhanging metanotum; scutellar foveae transverse, narrow, with smooth bottom, with distinct broad alutaceous median carina dividing the base of mesoscutellum into two halves; in some paratypes median elevated area indistinct. Speculum uniformly alutaceous to smooth, shiny, mesopleuron in mediocentral part with longitudinal parallel delicate striae; mesopleural triangle with longitudinal delicate parallel striae; dorsal and lateral axillar areas smooth, shiny; axillula alutaceous, with few white setae; subaxillular bar smooth, shiny, with parallel sides, in the most posterior part elevated and where its height more than height of uniformly delicately coriaceous metanotal trough; postalar process long, with parallel striae; metapleural sulcus reaching mesopleuron at its half height. Metascutellum smooth; ventral impressed area smooth, as high as height of metascutellum; central propodeal area smooth, shiny, with many irregular wrinkles and rugae, lateral propodeal carinae strong, high, subparallel; lateral propodeal area with irregular wrinkles and dense white setae; nucha with irregular longitudinal striae.

Legs. Tarsal claws simple, without basal lobe, hind tarsomere V nearly 2.0 times as long as tarsomere II.

Wings. Forewing longer than body, hyaline, with long dense cilia on margin, radial cell 5.5-5.8 times as long as broad; R1 on a short distance running along wing margin, Rs nearly reaching wing margin; areolet small, delimited by indistinct veins; projection of M reaching basalis at half height.

Metasoma longer than head+mesosoma, longer than high in lateral view; 2nd metasomal tergite occupying half length of mesosoma; all tergites smooth, shiny. Ventral spine of hypopygium very short, prominent part as long as broad, with white setae, extending beyond apex of spine.

Body length 1.8-2.1 mm (n=10).

Male (Figs 23-27, 36). Similar to female but often mesosoma and metasoma dark brown to black; forewing longer. Compound eyes and ocelli larger, antenna longer with 13 flagellomeres, F1 slightly curved, longer than F2; F2 longer than F3; F3 to F13 thicker than F1 and F2; placodeal sensilla absent on F1 and F2. Body length 1.6–1.9 mm (n=13).

Gall (Figs 37-38). Juicy integral monolocular leaf galls are located on the central vein, rarely on leaf petiole, causing a vein swelling. The fully grown gall is 13 mm long and 5.6 mm wide. Generally one gall per leaf occurs, rarely more; up to six galls per leaf were detected. In this case the separate galls are fused and it seems that the galls are multilocular. During the gall development, the colour of the surrounding leaf tissues changes from green to brown-yellow and the vein swelling is enlarging. As the cynipid larva matures, the main vein changes to purple colour. The central larval chamber is oval. When the gall matures, the tissues become hard. Adults emerge from early May to early July.

Biology. Alternate asexual and sexual generations are known, both inducing galls on *Quercus laurina* (Section Lobatae of *Quercus*, red oaks), which is distributed in Mexico, Guatemala and El Salvador (Govaerts & Frodin 1998). In the state of Hidalgo of Central Mexico, severe outbreaks of this newly described cynipid species cause the death of thousands of trees in natural stands of *Q. laurina*. The decline and death of trees is due to the twig and stem swellings caused by asexual galls. For Mexico, this is the first reported cynipid gallwasp capable to kill trees of different ages and sizes. A local infestation took place in a private forest in 2003 and the severe outbreak remained active until summer of 2009 without any signals of reduction of harmful impact, in spite of intensive management applied. There is no doubt that this species could expand its distribution and jeopardize the survival of *Q. laurina* in other parts of Mexico.

Distribution. Currently known from the type locality only: México, Estado de Hidalgo, Municipio de Acaxochitlán, La Victoria, [N 20 10´16´´ and O 98 11´25´´], 2120 m a.s.l.

Comments. The presence or absence of a basal lobe on the tarsal claw was showed of no generic diagnostic value (Melika & Abrahamson, 2002). Two big oak gallwasp genera, *Callirhytis* and *Andricus* include species either, with or without basal lobe on the tarsal claws respectively (Weld, 1952). Thus, many species positioned by Weld (1952) into *Callirhytis* (as a genus without a basal lobe on tarsal claws), in fact, belong to *Andricus* and vice versa. A number of nearctic *Andricus* and *Callirhytis* species are known to induce stem swelling-like galls on *Quercus* L. subgenus *Quercus* and within the latter, on all three known sections: Lobatae (*Erythrobalanus*), *Protobalanus* and *Quercus* (Dalla Torre & Kieffer, 1910; Weld, 1952; Burks, 1979; Pujade-Villar *et al*., 2009b). In the Diagnosis above we gave a distinct monophyletic group of species, within which the newly described *Andricus querculaurinus* was placed. However, there are other morphologically distinct groups of Nearctic *Callirhytis* (sensu Weld, 1952) -- *Andricus* (sensu Melika & Abrahamson, 2002), which induce stem swelling-like galls: (i) *Callirhytis quercussuttoni* (Bassett, 1881); *Callirhytis seminosa* (Bassett, 1890); *C. quercusphellos* (Osten Sacken, 1861), *C. perdens* (Kinsey, 1922), and the recently described *Andricus costaricensis* Pujade-Villar & Melika, 2009 from Costa Rica (Melika *et al*., 2009) on Red oaks; (ii) *C. clavula* (Osten Sacken, 1865), *C. quercusbatatoides* (Ashmead, 1881), *C. floridana* (Ashmead, 1887); *C. frequens* (Gillette, 1892) on White oaks. There are only two species, *C. quercusmedullae* (Ashmead, 1885) and *C. medularis* Weld, 1957 which known to induce stem swelling-like galls on Red oaks, and which definitely belong to the *Callirhytis* genus, with a transversely striate mesoscutum, thus other species should not be included into *Callirhytis* 'sensu stricto'.

Preliminary morphological analysis made by some coauthors (GM and JP-V) showed that the mentioned above species, which induce stem swelling-like galls on different sections of oaks, form distinct morphologic and phylogenetic units. Thus, it is quite possible that some of this discrete morphologic groups form distinct genera, separate monophyletic groups. A decision, whether these groups will stay in the *Andricus* genus

or will be transferred into separate genera, will be made later, after careful examination of all Nearctic species. Untill than, we treat herein described new species in the *Andricus* genus, because in this species the mesoscutum is not transversally striate, which is the main characteristic of *Callirhytis* 'sensu stricto'.

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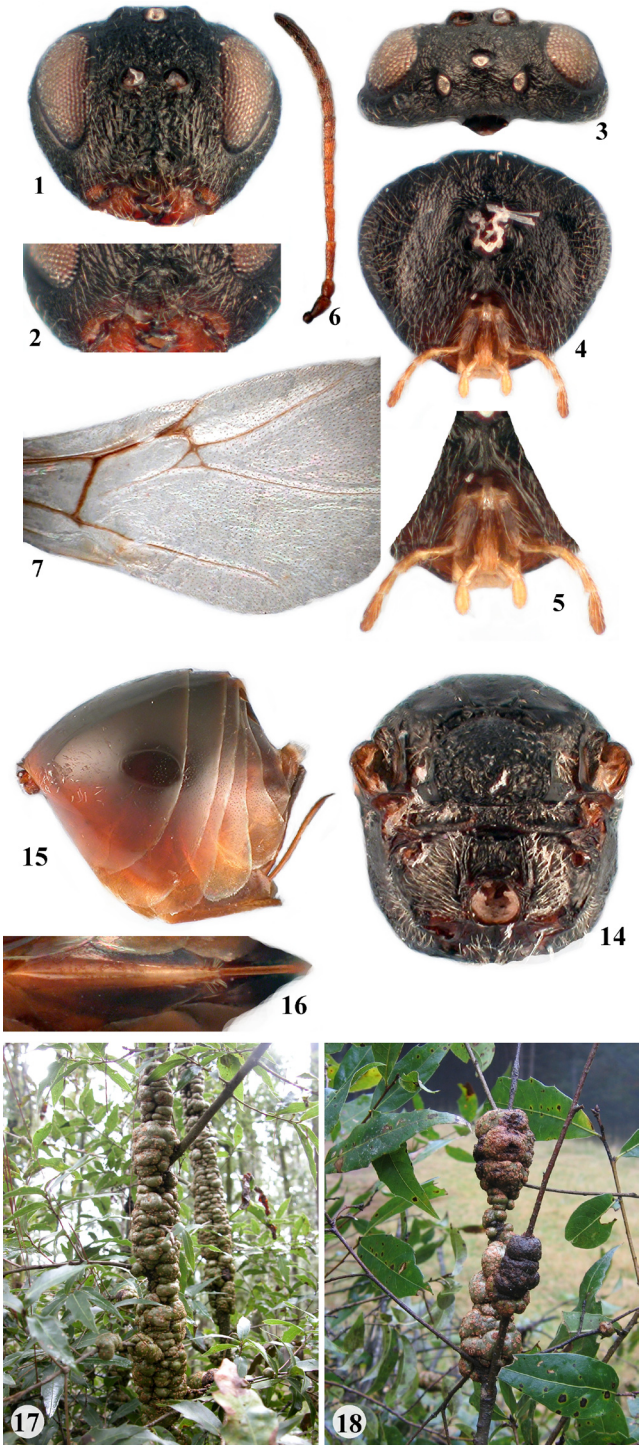
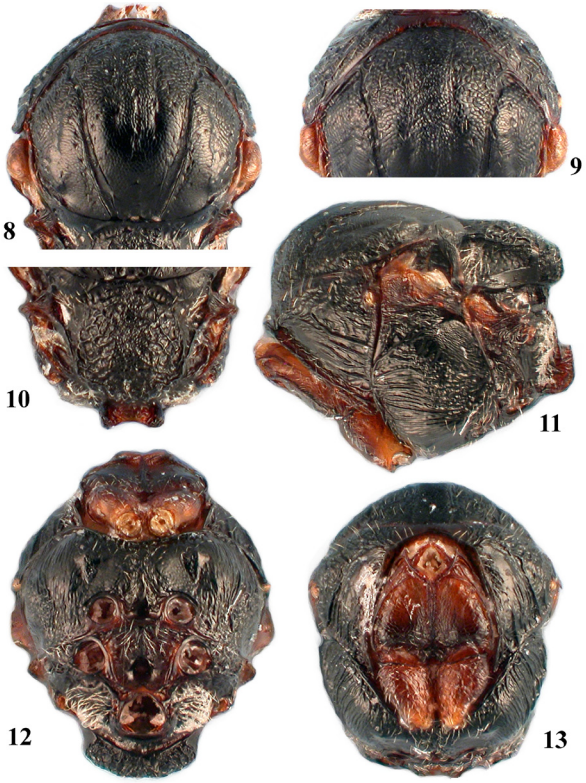
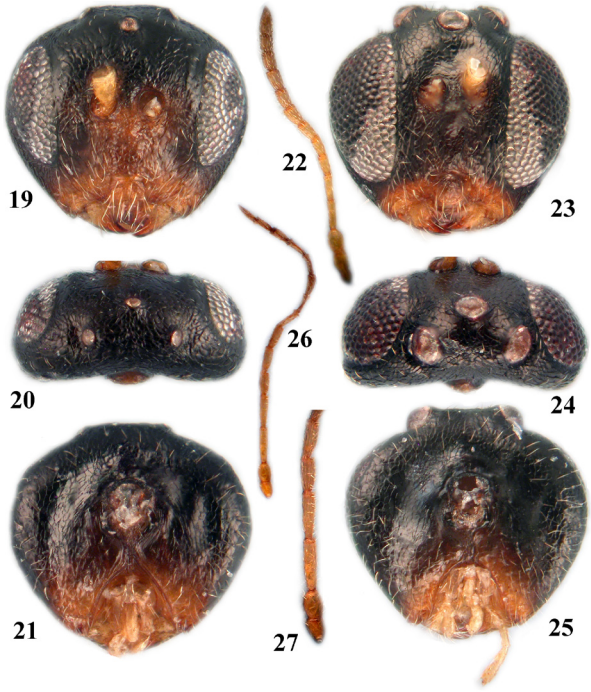
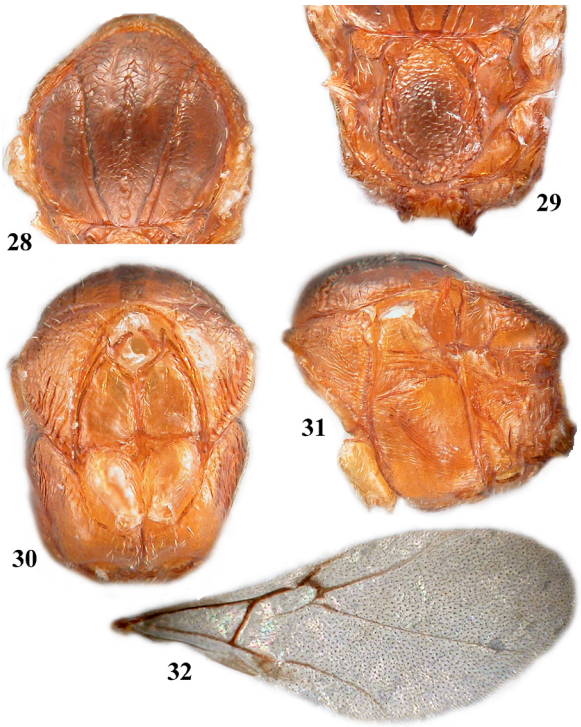
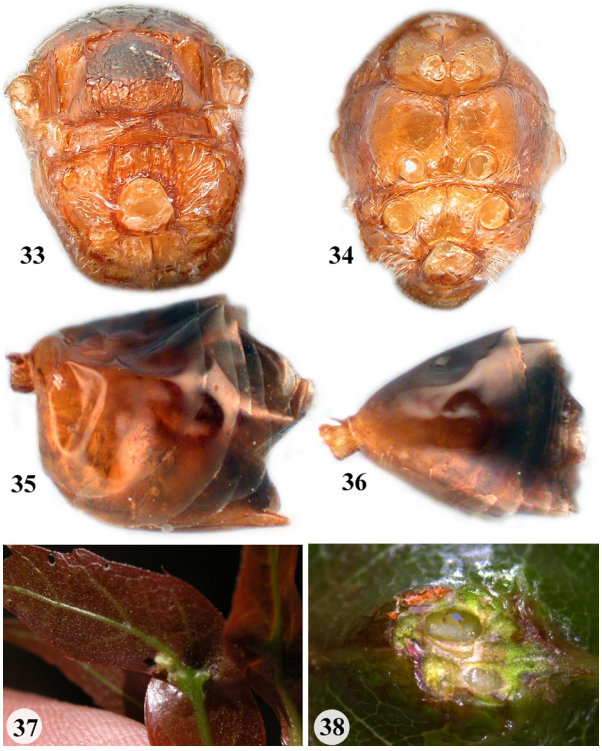




Figures 1-7. *Andricus quercuslaurinus*, **new species**, asexual female: 1, head (anterior view); 2, clypeus (anterior view); 3, head (dorsal view); 4, head (posterior view); 5, mouthparts (posterior view); 6, antenna; 7, forewing (part). **Figures 8-13.** *Andricus quercuslaurinus*, **new species**, asexual female: 8, mesoscutum (dorsal view); 9, mesoscutum (dorsal view, anterior part); 10, mesoscutellum (dorsal view); 11, mesosoma (lateral view); 12, mesosoma (ventral view); 13, pronotum and propleuron (anterior view). **Figures 14-18.** *Andricus quercuslaurinus*, **new species**, asexual female: 14, metascutellum and propodeum (posterodorsal view); 15, metasoma (lateral view); 16, ventral spine of hypopygium (ventral view); 17-18, asexual stem swelling-like galls (gall photos by V.D. Cibrián-Llanderal).







Figures 19-27. *Andricus quercuslaurinus*, **new species**, sexual form: 19-21, female, head: 19, anterior view; 20, dorsal view; 21, posterior view. 22, female, antenna. 23-25, male, head: 23, anterior view; 24, dorsal view; 25, posterior view. 26, male, antenna; 27, male, antenna (part). **Figures 28-32.** *Andricus quercuslaurinus*, **new species**, sexual female: 28, mesoscutum (dorsal view); 29, mesoscutellum (dorsal view); 30, pronotum and propleuron (anterior view); 31, mesosoma (lateral view); 32, forewing. **Figures 33-38.** *Andricus quercuslaurinus*, **new species**, sexual form: 33-35, female: 33, metascutellum and propodeum (posterodorsal view), 34, mesosoma (ventral view), 35, metasoma (lateral view). 36, metasoma, male (lateral view). 37-38, sexual galls on leaves: 37, general view; 38, dissected gall (gall photos by V.D. Cibrián-Llanderal).

Mariposa. Imágen tomada en un hotel de Taxco, Guerrero.