

A new species of *Disholcaspis* Dalla Torre and Kieffer oak gallwasp from Costa Rica (Hymenoptera: Cynipidae: Cynipini)

Una especie nueva de avispa formadora de agallas del género *Disholcaspis* Dalla Torre y Kieffer de Costa Rica (Hymenoptera: Cynipidae: Cynipini)

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ABSTRACT

A new species of oak gallwasp, *Disholcaspis costaricensis* Melika & Pujade-Villar, is described from Costa Rica. Only asexual females are known and they induce galls on *Quercus bumelioides*. Data on the diagnosis, distribution and biology of the new species are given.

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

RESUMEN

Se describe una nueva especie de avispa formadora de agallas de Costa Rica: *Disholcaspis costaricensis* Melika & Pujade-Villar. Sólo se conoce la generación asexual, la cual se obtiene de agallas colectadas en *Quercus bumelioides*. Se exponen los datos diagnósticos la distribución y biología de esta especie.

Palabras clave: Cynipidae, avispas cecidógenas, *Disholcaspis*, taxonomía, morfología, distribución, biología.



INTRODUCTION

The cynipid gallwasp fauna (Hymenoptera: Cynipidae) of Costa Rica is poorly known. Fergusson (1995) mentioned the presence of different cynipid genera; Díaz *et al.* (2002) listed six species of Cynipidae from the Neotropical Region. Recently two species, *Odontocynips hansonii* Pujade-Villar and *Andricus costaricensis* Pujade-Villar & Melika were described (Pujade-Villar 2009, Melika *et al.* 2009, respectively). From Panama, seven new oak gallwasp species were recently described: *Disholcaspis* Dalla Torre & Kieffer – two species (Medianero & Nieves-Aldrey 2011), *Amphibolips* Reinhard – three species (Medianero & Nieves-Aldrey 2010) and *Loxaulus* – two species (Medianero *et al.*, 2011).

The species diversity of the Mexican oak gallwasps is extraordinarily high, around 154 species are known, of which 10 species belong to the genus *Disholcaspis* (Kinsey 1920, 1937, 1938) and which are associated with more than 30 oak species (Pujade-Villar *et al.* 2009), while approximately 150 *Quercus* species are known from Mexico (Govaerts & Frodin 1998). Nineteen species of oaks are listed for Costa Rica (Govaerts & Frodin 1998), which definitely should support a large species richness of oak gallwasps. Pujade-Villar & Hanson (2006) estimated that the oak gallwasps (Cynipini) might be represented by more than 30 species. The new species described here is the first record of a *Disholcaspis* oak gallwasp species from Costa Rica.

MATERIALS AND METHODS

Adult gallwasps were reared from galls collected on *Quercus bumelioides* Liebm. (= *Q. copeyensis* C.H.Mull.).

We follow the current terminology of morphological structures (Liljebald & 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 P. Hanson.

The type material is deposited in the following institutions: UB, Universitat de Barcelona, Spain (curator J. Pujade-Villar); PDL, Pest Diagnostic Laboratory (the former Systematic Parasitoid Laboratory, SPL), Tanakajd, Hungary (G. Melika); Museo de Zoología, Universidad de Costa Rica (MZUCR) (P. Hanson).

***Disholcaspis costaricensis* Melika & Pujade-Villar, new species**
(Figs. 1-14)

Diagnosis. Most closely resembles two recently described *Disholcaspis* species from Panama: *D. bettyannae* Medianero & Nieves-Aldrey and *D. bisethiae* Medianero & Nieves-Aldrey. In *D. bettyannae* the antenna has 11 flagellomeres, while in *D. bisethiae* it has 12, as in *D. costaricensis* **n.sp.** In *D. costaricensis* POL is 1.2 times as broad as OOL, the lateral propodeal carinae are absent, and the prominent part of the ventral spine of the hypopygium is 4.0 times as long as broad ventrally, while in *D. bisethiae* POL is 1.75 times as broad as OOL, the lateral propodeal carinae are distinct and arched, and the prominent part of the ventral spine of the hypopygium is shorter, only 2.7 times as long as broad ventrally.

Description. ASEXUAL FEMALE.

Body length 3.9-4.2 mm (n=7).

Colour. Head uniformly reddish brown, except darkish brown to black postociput around occipital foramen and postgenal bridge; maxillary and labial palps, mandibles and antennae uniformly reddish brown. Pronotum reddish brown, propleura black; mesoscutum reddish brown, except narrow black stripes along anterior parallel lines; mesoscutellum and scutellar foveae reddish brown; mesopleuron, mesopleural triangle and lateral, areas of propodeum reddish brown; metapleuron, central propodeal area, metascutellum, metanotal troughs and nucha dark brown to black. Mesosoma ventrally dark brown to black. Legs uniformly reddish brown, with inner part of coxae black. Entire metasoma and ventral spine of hypopygium uniformly reddish brown.

Head. 2.5 times as broad as long from above, 1.3 times as broad as high and as broad as mesosoma in front view, with moderately dense white setae uniformly distributed on frons, lower face and malar space, with setae more dense on postgena. Lower face, malar space and area between compound eye and antennal torulus delicately coriaceous, shiny. Gena microreticulate, broadened behind eye, visible in front view behind eye, broader than cross diameter of eye; malar space without striae and sulcus, height of compound eye 2.2 times as high as length of malar space. POL 1.2 times as broad as OOL; OOL 3.6 times as long as length of lateral ocellus and 2.3 times as long as LOL; lateral ocelli nearly round, black, slightly smaller than ovate central ocellus. Transfacial distance 1.5 times as broad as height of eye; diameter of antennal torulus 1.4 times as long as distance between toruli, distance between torulus and inner margin of eye 1.5 times as long as diameter of torulus; lower face delicately coriaceous, without striae, with elevated coriaceous median area. Clypeus trapezoidal, broader ventrally than dorsally, delicately coriaceous, with elevated central area, ventrally rounded and widely emarginate, without median incision; anterior tentorial pits elongated, deep, epistomal sulcus and clypeo-pleurostomal line distinct, widely and deeply impressed. Frons, vertex and occiput uniformly microreticulate; interocellar area microreticulate, only very slightly elevated. Postociput coriaceous, with longitudinal subparallel fragmented striae around occipital foramen; postgena smooth, impressed and coriaceous around occipital foramen and postgenal bridge; posterior tentorial pits large, deep, area around them strongly impressed; height of occipital foramen nearly equal to height of postgenal bridge; hypostomal carina

emarginate, not going around oral foramen, continuing into postgenal sulcus. Labial palpus 3-segmented, maxillary palpus 5-segmented. Antenna with 12 flagellomeres; slightly longer than mesosoma; scape+pedicel slightly shorter than F1, pedicel slightly longer than broad; F1 = F2, F2 1.2 times as long as F3; F3 slightly longer than F4, subsequent flagellomeres shorter, F12 only slightly longer than F11; placodeal sensilla on F6-F12 conspicuous, on F3-F5 inconspicuous, absent on F1-F2.

Mesosoma. Slightly longer than high. Pronotum smooth dorsally, delicately coriaceous laterally, without parallel striae along the impressed anterolateral margin of pronotum; propleuron slightly darker than the mesosoma dorsally and laterally, especially in a narrow stripe along margins, coriaceous, concave in mediocentral part. Mesoscutum with dense white setae, shiny, delicately coriaceous to microreticulate, especially between notauli; slightly longer than broad in dorsal view (largest width measured across mesoscutum at the level of the base of tegulae). Notauli extending to half length of mesoscutum, with smooth shiny bottom, slightly converging posteriorly; anterior parallel lines distinct, smooth, shiny, extending to one third of mesoscutum length, parapsidal lines distinct, smooth, shiny and broad, starting away from posterior margin and extending at least half length of mesoscutum; median mesoscutal line absent; parascutal carina distinct only to the base of tegula; transscutal fissure distinct, slightly elevated in a form of distinct sharp carina. Mesoscutellum subglobular, only very slightly longer than broad, the broadest part in the middle height, uniformly coriaceous, overhanging metanotum; scutellar foveae indistinctly delimited from mesoscutellar disk, narrow, ovate, with smooth shiny bottom, with indistinct narrow elevated coriaceous median carina. Mesopleuron and speculum uniformly delicately coriaceous, with very dense white setae; mesopleural triangle coriaceous; dorsal axillar area delicately coriaceous with very dense white setae; lateral axillar area coriaceous, shiny; axillula coriaceous, with few white setae; subaxillular bar smooth, shiny, triangular shaped, highest posteriorly, its height nearly equal to height of metanotal trough; postalar process long, with parallel striae; metapleural sulcus reaching mesopleuron above middle height. Metascutellum uniformly microreticulate, metanotal trough smooth, shiny, with dense white setae; ventral impressed area smooth, with longitudinally orientated delicate rugae, shorter than height of metascutellum; central propodeal area smooth, shiny, with some delicate striae, delimited from rest of propodeum by the absence of setae; lateral propodeal carinae absent; lateral propodeal area delicately coriaceous, with dense white setae; nucha coriaceous, shiny, without striae and wrinkles.

Legs. All tarsi with dense uniform long white setae; all tarsal claws with distinct but short basal lobe.

Wings. Forewing slightly longer than body, hyaline, with moderately long dense cilia on margin, radial cell 3.2 times as long as broad; R1 and Rs nearly reaching wing margin; areolet small, triangular, closed and distinct; projection of M reaching basalis slightly below 1/2 of its height. Rs well pigmented, slightly curved, vein 2r slightly angulated but not prolonged by a stump into the radial cell.

Metasoma longer than head+mesosoma, slightly longer than high in lateral view, smooth and shiny; 2nd metasomal tergite dorsally occupying nearly half of metasoma length, with large

patch of dense white setae laterally; subsequent tergites uniformly smooth, shiny, without setae. Ventral spine of hypopygium long, needle-like, prominent part nearly 4.0 times as long as broad in ventral view, with long white dense setae, located in two rows from both lateral sides of spine; apical setae extending beyond apex of spine but not forming a tuft.

Gall (Fig. 14). Globular, monothalamic, with a more or less distinct nipple at the apex; hard, with a felt-like covering, growing in clusters of two to five galls. Green when young and growing, turning brown to dark brown when old. Diameter 8 to 12 mm. Internally with a compact, rather hard, corky texture and containing a free oval yellowish larval cell.

Type material. HOLOTYPE asexual female: COSTA RICA, San José, Cerro de la Muerte, Est. Biol. Cuerici, 2.600 m, ii-1997, P. Hanson; *Quercus copeyensis*, gray *Disholcaspis* gall (deposited in UB). PARATYPES: 3 paratypes females with the same label as the holotype (deposited in UB, Spain); 3 paratypes COSTA RICA, Cartago 6 km S. Empalme, 2500m. 26.iii.1995. P. Hanson; *Quercus copeyensis*, gray *Disholcaspis* gall (2 paratypes deposited in PDL, Hungary, 1 paratype deposited in MZUCR, Costa Rica).

Additional material (deposited in MZUCR). 2 females: Costa Rica, San José, Villa Mills area, 3000m, i.1989, P. Hanson; 2 females: Costa Rica, San José, Villa Mills area, 3000m, iii.1998, P. Hanson; 11 females: Costa Rica, San José, 19 km S. Empalme, Mirador Quetzales, 2600m, iii.1999, P. Hanson.

Biology. Only asexual females are known, inducing galls on *Quercus bumelioides* Liebm. (Section *Quercus* of *Quercus*, white oaks), distributed from Panama through Costa Rica, Nicaragua and Honduras to Guatemala; unknown from Mexico (Govaerts & Frodin 1998). Mature galls were collected from January to March, and adults emerged shortly after the galls were collected. Further study is needed to determine the phenology of this species.

Etymology. The species is named after the country in which it was collected, Costa Rica.

Distribution. Currently known only from Costa Rica.

DISCUSSION

Four species of *Disholcaspis* have been described from the Neotropical Region, one species from Mexico (*D. regina* Kinsey, 1937 on *Q. microphylla* Née.), two species from Panama (*D. bettyannae* Medianero & Nieves-Aldrey, 2011 on *Q. bumelioides* Liebm. and *D. bisethiae* Medianero & Nieves-Aldrey, 2011 on *Quercus lancifolia* Schledl & Cham.), and one species from Costa Rica (*D. costaricensis* on *Q. bumelioides* Liebm., in this study). Nevertheless, Mexico has 11 more species of *Disholcaspis* in the Nearctic area (Pujade-Villar *et al.*, 2009). Accordingly, two *Disholcaspis* species (*D. bettyannae* from Panama and *D. costaricensis* from Costa Rica) are known to associate with *Q. bumelioides*.

Disholcaspis costaricensis n. sp. can be differentiated from *D. regina* and *D. bettyannae* by the number of flagellomeres (12 in *D. costaricensis* and 11 in the other two species). The other Neotropical species, known from Panama, can be differentiated by the host and by the length of the hypopygial spine: *D. costaricensis* associates with *Q. bumelioides* and the hypopygial spine is 4.0 times as long as broad while *D. bisethiae* associates with *Q. lancifolia* and the hypopygial spine is only 2.7 times as long as broad.

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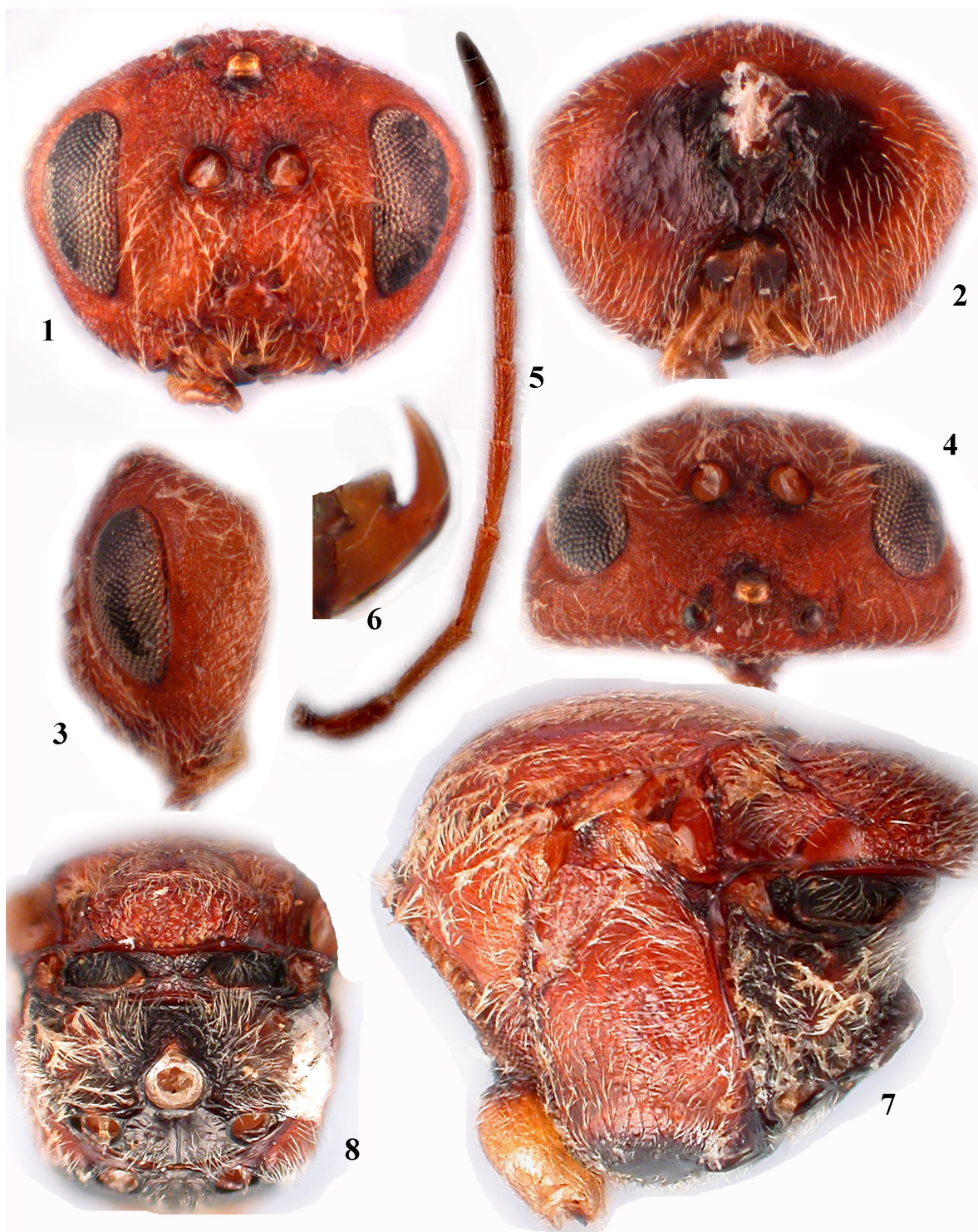
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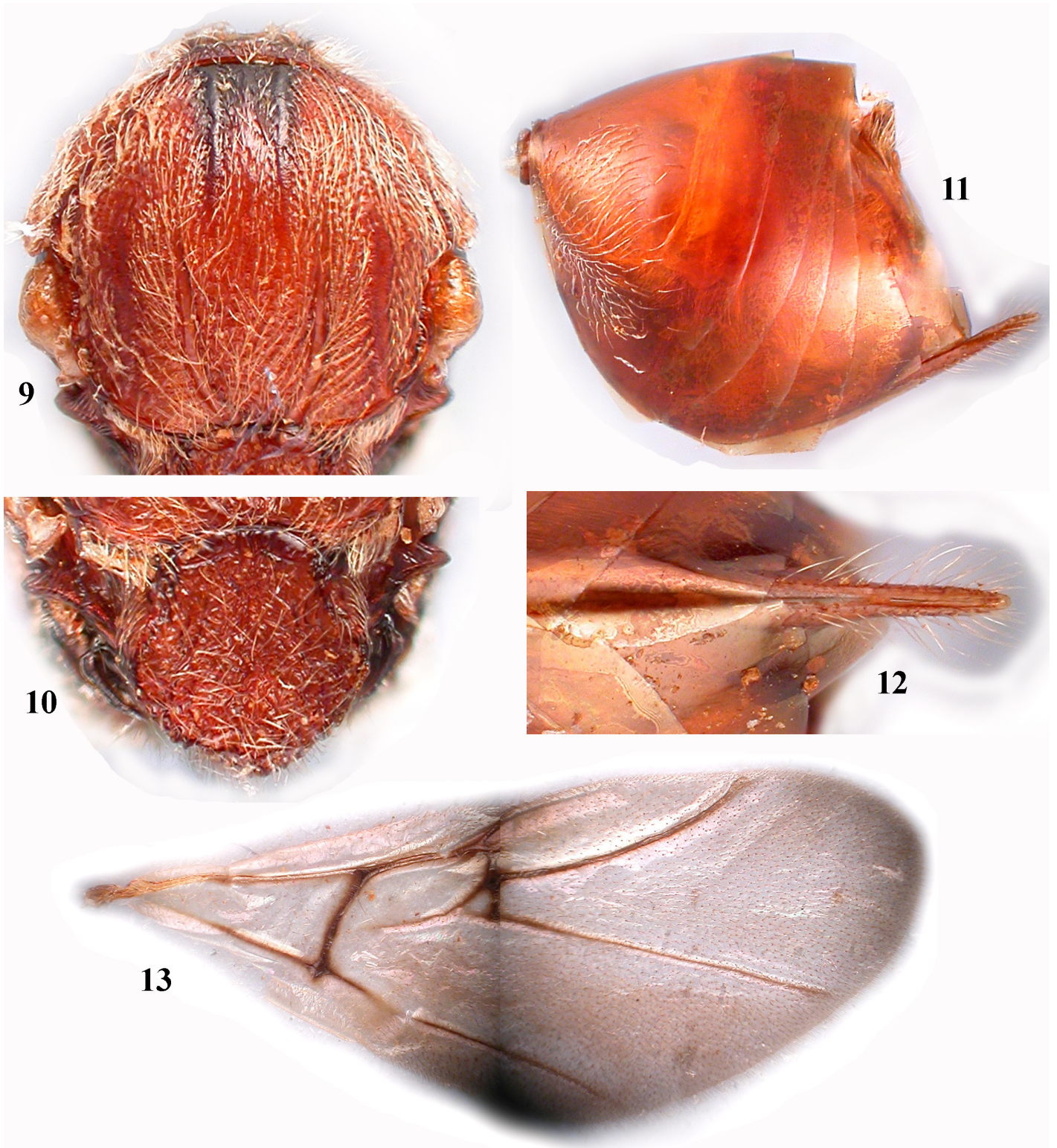
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Figures 1-8. *Disholcaspis costaricensis*, new species, asexual female: 1, head (anterior view); 2, head (posterior view); 3, head (lateral view); 4, head (dorsal view); 5, antenna; 6, hind tarsal claw; 7, mesosoma (lateral view); 8, metascutellum and propodeum (posterodorsal view).



Figures 9-13. *Disholcaspis costaricensis*, new species, asexual female: 9, mesoscutum (dorsal view); 10, mesoscutellum (dorsal view); 11, metasoma (lateral view); 12, ventral spine of hypopygium (ventral view); 13, forewing.



Figures 14. *Disholcaspis costaricensis*, new species, galls (gall photos by P. Hanson).