

DESCRIPTION OF THE FIRST NEOTROPICAL SPECIES OF *BASSETTIA* ASHMEAD, 1887 (HYMENOPTERA, CYNIPIDAE, CYNIPINI) FROM PANAMA

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ABSTRACT

E. Medianero & J. L. Nieves-Aldrey. 2010. Description of the first Neotropical species of *Bassettia* Ashmead, 1887 (Hymenoptera, Cynipidae, Cynipini) from Panama. *Graellsia*, 66(2): 213-220.

A new species of *Bassettia* Ashmead, 1887, *Bassettia caulicola* (Hymenoptera, Cynipidae, Cynipini), from Panama is described. The new species induces galls on the stems of *Quercus bumelioides* Liebm. (Fagaceae sect. *Quercus*). The diagnostic characteristics, distribution data, and biology of the new species are given. The new species is included in the existing key for the identification of the Nearctic species of *Bassettia*. The morphological diagnosis of *Bassettia* and the first record of this genus in the Neotropical region are noted.

Key words: Cynipidae; oak gall wasps; *Bassettia*; *Quercus*; Panama.

RESUMEN

E. Medianero & J. L. Nieves-Aldrey. 2010. Descripción de la primera especie neotropical de *Bassettia* Ashmead, 1887 de Panamá (Hymenoptera, Cynipidae, Cynipini). *Graellsia*, 66(2): 213-220 (in English).

Se describe una nueva especie de *Bassettia* Ashmead, 1887, *Bassettia caulicola* (Hymenoptera, Cynipidae, Cynipini), de Panamá. La nueva especie induce agallas en los tallos de *Quercus bumelioides* Liebm. (Fagaceae secc. *Quercus*). Se aportan los caracteres diagnósticos de la nueva especie, su distribución y su biología. La nueva especie es incluida en la clave de identificación de la especies de *Bassettia* del Neártico. Se amplían los datos diagnósticos morfológicos del género *Bassettia* así como se comenta el primer registro de este género en la región neotropical.

Palabras Clave: Cynipidae; avispa galicolas; *Bassettia*; *Quercus*; Panamá.

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Introduction

Bassettia Ashmead, 1887 is a small genus of oak gall wasps (Cynipidae, Cynipini) from North America (Weld, 1952). Species of this genus have been collected in several states of the USA, including Arizona, California, Colorado, Florida, Georgia, Missouri, New Mexico, Virginia and Oregon (Kinsey, 1922; Melika & Abrahamson, 2007). Morphologically and biologically, *Bassettia* is closely related to the genera *Plagiotrochus* Mayr, 1881; *Callirhytis* Foerster, 1869; and *Loxaulus* Mayr, 1881 (Melika & Abrahamson, 2002). Currently, the genus *Bassettia* includes eight species (Melika & Abrahamson, 2007) that induce galls on white oaks. The species of this genus induce cryptic stem galls that develop under the bark of twigs in the form of elongated larval cells that usually do not cause swelling. The presence of the cryptic galls is usually evidenced by emergence holes of the adult insects on the twig surface. The known sexual generations induce small oval swellings on leaves (Kinsey, 1922; Melika & Abrahamson, 2007).

Since Ashmead (1887) proposed the genus *Bassettia*, new characters have been added for a better diagnosis of the genus (see Weld, 1921). Although Melika & Abrahamson (2007) have reviewed and redescribed the genus *Bassettia* recently, the taxonomic status of this genus is still problematic given the difficulty in finding phylogenetically informative or reliable characters that accurately define the genus and its limits with the closely related genera *Loxaulus*, *Plagiotrochus* and *Callirhytis*.

This paper is the first report of the genus *Bassettia* in Central America and includes a description of one new species from Panama. For the first time in *Bassettia*, the description of the morphological characters of a species is based on scanning electron microscopy, allowing the discussion of some new diagnostic characters of the genus.

Material and methods

STUDY MATERIAL. The insects studied were reared from galls collected from *Quercus bumeioides* Liebm. The adult insects emerged from the galls in rearing cages under laboratory conditions.

SPECIMEN PREPARATION. For observation under a scanning electron microscope (SEM), adult cynipids

were observed without dissection using SEM at low vacuum, without coating. Micrographs were taken using a FEI QUANTA 200 microscope (low vacuum technique). Images of adult habitus, forewings and gall dissections were taken using a NIKON Coolpix 4500 digital camera attached to a Wild MZ8 stereo microscope. Measurements were made using a calibrated micrometer scale attached to an ocular of the light microscope. The terminology of morphological structures and abbreviations follows Ronquist & Nordlander (1989), Ronquist (1995), Nieves-Aldrey (2001) and Liljeblad *et al.* (2008).

Results

Bassettia caulicola Medianero & Nieves-Aldrey **sp. nov.** (Figs. 1, 2 & 3)

TYPE MATERIAL. Holotype ♂ (Fig. 3A) [in Museo Nacional de Ciencias Naturales, Madrid, Spain (MNCN), card-mounted. Cat. n° 2110]. PANAMA, Chiriquí, Volcan Baru, 8°46'36.8"N, 82°31'39.3"W, 2870 m; ex gall on stem of *Quercus bumeioides* Liebm. (Fagaceae), gall collected 22.xii.2008, insect emerged i.09, E. Medianero leg.

DIAGNOSIS AND COMMENTS. The shape of the head in frontal view, broadened genae behind eyes, the malar space without a sulcus, scape and pedicel broad and strongly flattened, elongated body, mesosoma flattened dorso-ventrally, mesoscutum transversely rugose, propodeum with two parallel lateral propodeal carinae and a median incomplete longitudinal carina, the tarsal claws simple, and third abdominal tergum with a ring of white setae at base, interrupted dorsally, includes the new species within the genus *Bassettia*. Additionally, the structure of the gall also agrees well with the characters of the *Bassettia* species. However, *B. caulicola* differs from all known species of *Bassettia* by its face with striae radiating from clypeus, reaching the ventral margin of the eye and toruli and extending into the area between toruli and eye. Additionally, *B. caulicola* differs from all known species of *Bassettia* by the 15 segmented antenna; the relatively shorter third abdominal tergum, not reaching half the length of the metasoma and by the shorter projection of the hypopygial spine.

The Nearctic species *B. tenuana* (Weld, 1921) and *B. virginiana* (Melika & Abrahamson, 2007) resemble in color the new species from Panama. However, *B. caulicola* differs from *B. tenuana* and *B. virginiana* at least in the number of antennal segments, the relatively longer projection of the

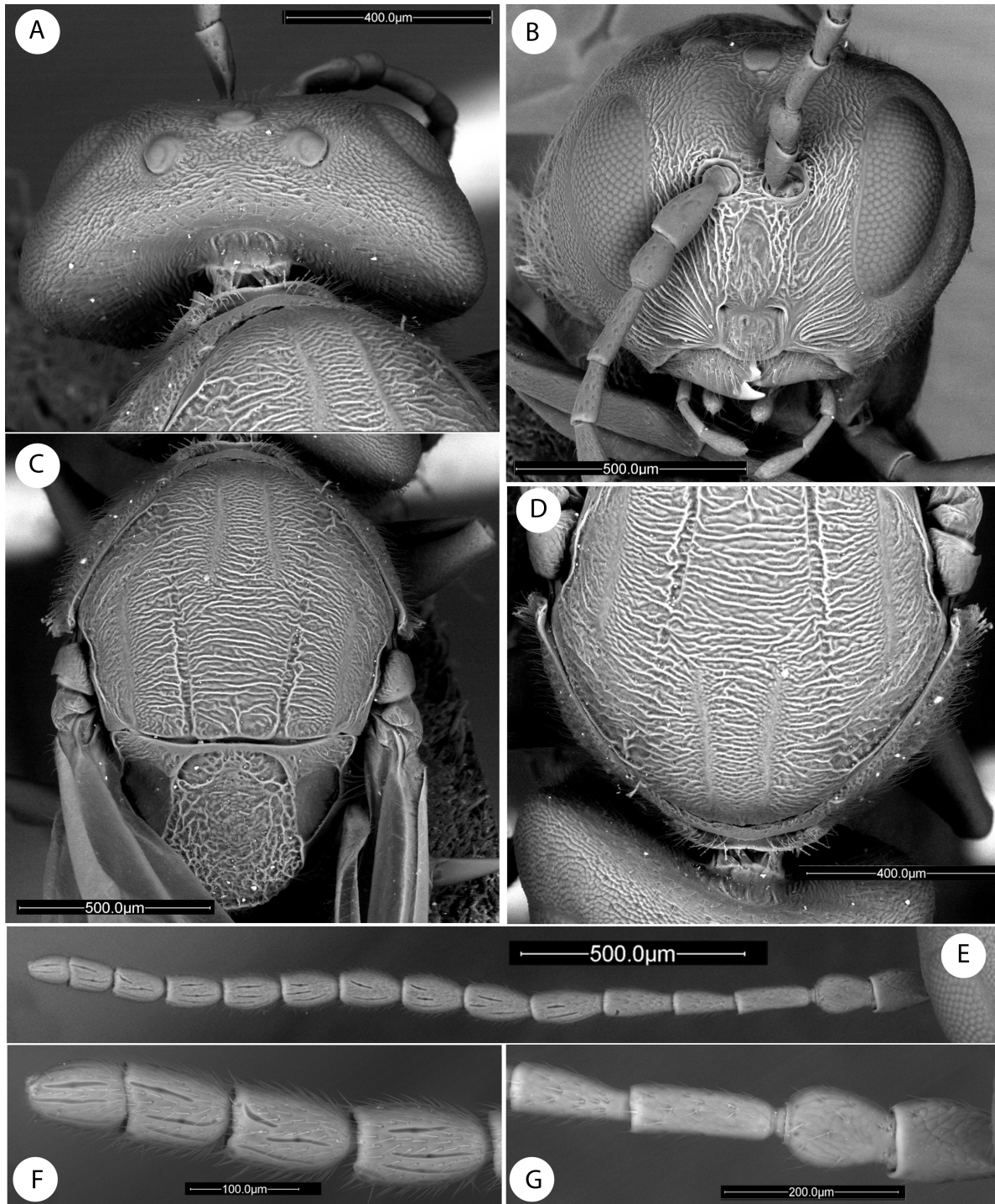


Fig. 1.— *Bassettia caulicola*: (A) Head dorsal view. (B) Head anterior view. (C) Mesosoma dorsal view. (D) Pronotum antero-dorsal view. (E) Female antenna. (F) Detail of last flagellomeres. (G) Detail of basal flagellomeres.

Fig. 1.— *Bassettia caulicola*: (A) Cabeza en vista dorsal. (B) Cabeza en visión anterior. (C) Mesosoma en visión dorsal. (D) Vista antero-dorsal del pronoto. (E) Antena de la hembra. (F) Detalle de los últimos flagelómeros. (G) Detalles de los flagelómeros basales de la antena.

hypopygial spine and the face with radiating striae from clypeus.

DESCRIPTION. Body length (measured from the anterior margin of the head to the posterior margin of the metasoma) 3.5 mm (N = 1) for females. Head and mesosoma of female black. Metasoma chestnut reddish, with one black spot in the anterodorsal area of T3 covering middle tergite. Mandibles, scape, pedicel, F1 y F2 of antenna, trochanter, apical parts of the femora, tibiae and tarsi of fore and middle legs light brown. Coxae, femora and F3-F13 of antenna dark brown to black. Forewing hyaline and veins light brown.

Female. Head in dorsal view approximately 2.5 times wider than long, as wide as mesosoma (Fig. 1A). POL 1.6 times longer than OOL, posterior ocellus separated from inner orbit of eye by 1.5 times its longest diameter. Head in anterior view (Fig. 1B) rounded, 1.1 times wider than high, genae strongly expanded behind eyes. Vertex, frons, and genae, alutaceous and bare. Occiput finely alutaceous, moderately pubescent with short white setae. Face with radiating striae from clypeus, reaching ventral margin of eye and toruli and extending into area between toruli and eye; the striae are present laterally, being more diffuse medially on the face; they are stronger and branched close to the ventral margin of the toruli. Clypeus square, smooth, moderately pubescent, the ventral margin slightly projecting over mandibles. Anterior tentorial pits, epistomal sulcus and clypeo-pleurostomal lines visible. Malar space 0.3 times as long as height of compound eye. Toruli situated at mid-height of compound eye; distance between antennal rim and compound eye 1.2 times width of antennal socket including rim. Ocellar plate not raised. Occipital carina absent.

Mouthparts (Fig. 1B), mandibles strong, exposed; with dense white setae in base, right mandible with three teeth; left with two teeth.

Antenna (Figs. 1E-G) of moderate length, as long as 1/2 body length; with 15 segments; flagellum not broadening towards apex; with relatively shorter, erect setae, and elongate placodeal sensilla visible on F4-F13.(Fig. 1F). Relative lengths of antennal segments: 15:13:19:15:17:17:16:15:15:14:13:13:13:11:10. Pedicel (Fig. 1G), broad and flattened, 1.5 as long as wide and 0.8 as long as scape; F1 1.3 times as long as F2, slightly flattened ventrally. F6-F13 longer than wide, F13 1.4 times longer than wide, as long as F12 (Fig. 1F).

Placodeal sensillae on F4-F13 disposed in one row of 2-3 sensillae in each flagellomere.

Mesosoma in lateral view 1.3 times longer than high (Fig. 2A). Pronotum, pubescent; lateral surface of pronotum weakly coriaceous rugose; ratio of length of pronotum medially/laterally = 0.27; pronotal plate indistinct dorsally (Fig. 1D).

Mesonotum (Fig. 1C). Mesoscutum transversely rugose and weakly pubescent. Notauli percurrent posterior and medially, scarcely traceable in anterior or one third; not quite convergent posteriorly, crossed by the transversal striate sculpture; median mesoscutal impression indistinct, lost in the rugose sculpture. Anteromedian signa clearly visible. Transscutal fissure narrow. Scutellum (Fig. 1C) in dorsal view longer than wide, approximately 0.5 times as long as mesoscutum, uniformly reticulate-rugose, in lateral view only slightly extended posteriorly over the dorsellum. Scutellar foveae ellipsoidal, small; approximately 1/6 as long as scutellum, not deep, the inner margins scarcely distinct, lost in the rugose sculpture; their posterior margins weakly marked. Mesopleuron with some transversal striae in the medial area and alutaceous sculpture in the interspaces, the sculpture also present although weaker on dorsal and ventral areas of mesopleuron. (Fig. 2A).

Metanotum (Fig. 2B). Metapectal-propodeal complex. Metapleural sulcus meeting posterior margin of mesopectus at mid-height of metapectal-propodeal complex (Fig. 2A). Lateral propodeal carinae distinct, strong, subparallel (Fig. 2B); median propodeal area narrow, with a median longitudinal carina incomplete dorsally and bare, sides of propodeum outward of central area densely pubescent with relatively long white setae. Nucha with some longitudinal rugae.

Legs moderately pubescent; femora and tibiae slender; metatarsal claws simple, with a strongly bent apical tooth and without a basal lobe or tooth (Fig. 2F).

Forewing (Fig. 3B) as long as body, veins strongly pigmented. Radial cell 3.5 times as long as wide; open along anterior margin; areolet, triangular. First abscissa of radius not bumped, second abscissa of radius slightly bent, apically not reaching margin of wing. M short, nearly straight, only reaching half wing. Rs+M reaching basalis at its mid-height. A short hair fringe on apical margin of wing.

Metasoma (Fig. 2C) 0.8 times as long as head and mesosoma combined, in lateral view 1.2 times

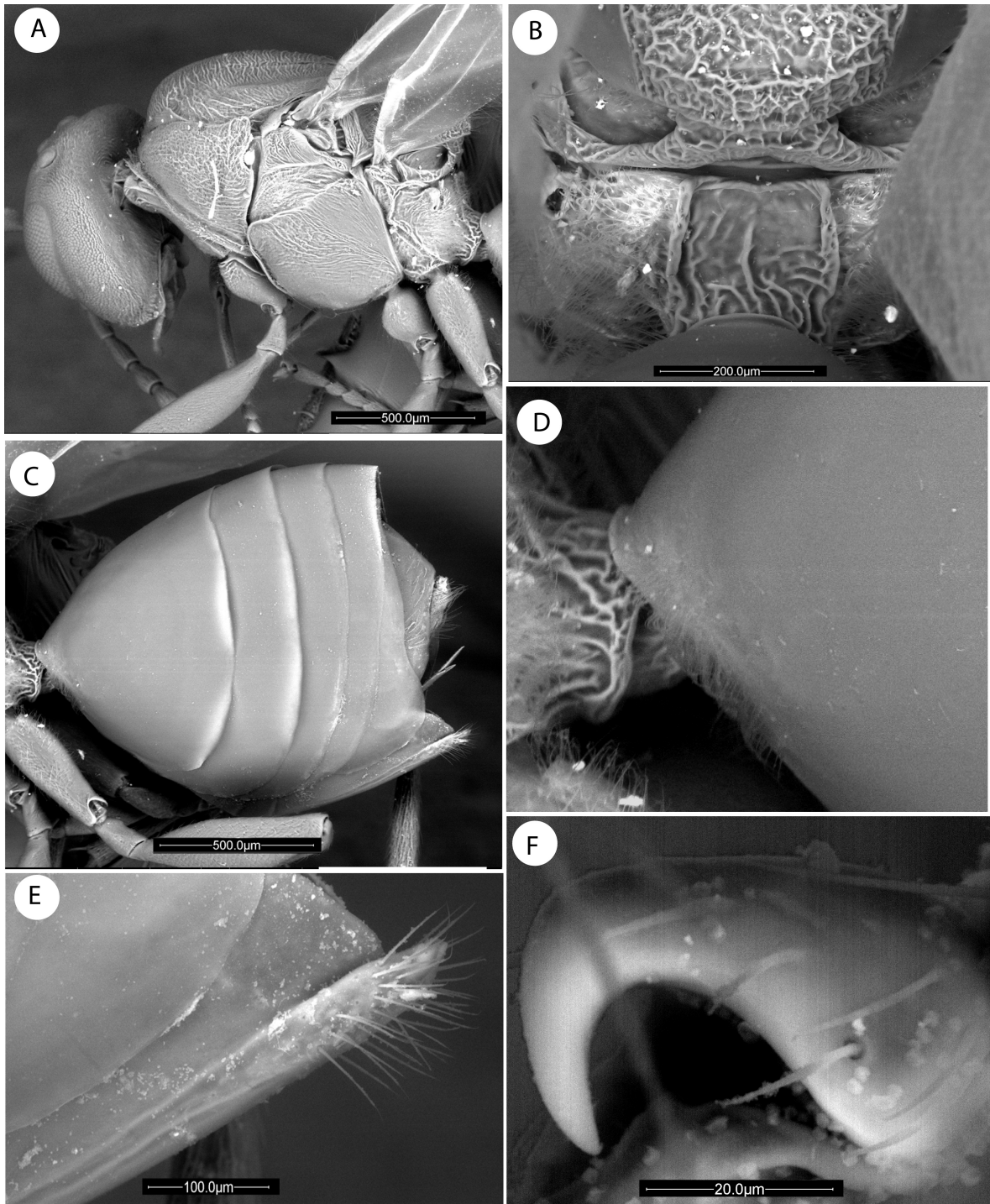


Fig. 2.— *Bassettia caulicola*: (A) Mesosoma lateral view. (B) Propodeum. (C) Metasoma lateral view. (D) Detail ring of setae at base of third abdominal tergum. (E) Detail of ventral spine of hypopygium. (F) Metatarsal claw.

Fig. 2.— *Bassettia caulicola*: (A) Vista lateral del mesosoma. (B) Propodeo. (C) Vista lateral del metasoma. (D) Detalle del anillo de sedas en la base del tercer terguito abdominal (E) Detalles de la espina ventral de hipopigio. (F) Uña metatarsal.

longer than high. Third abdominal tergum covering one third of metasoma, with a ring of white setae laterally at its base, interrupted dorsally (Fig. 2D); subsequent tergites smooth and bare. Projecting part of the hypopygial spine short (Fig. 2E); barely 1.1 times as long as wide in ventral view; lateral margins of the hypopygial spine with setae reaching the apex of spine, but not forming an apical hair patch.

GALL (Figs. 3C & D). Stem galls develop under the bark of twigs of *Q. bumelioides* in the form of elongated larval cells that usually do not cause swellings (Fig. 3D). The only evidence of galling is the presence of typical adult emergence holes (Fig. 3C). The galls containing fully developed adults are found in December, at the beginning of the dry season in Panama. The studied insects emerged in January.

ETYMOLOGY. Named after the stem cryptic gall of this species.

DISTRIBUTION. Based on our data, *B. caulicola* is found between 2870–3100 m at Chiriqui, Panama, around the upper limit of growth of *Quercus* species in Panama.

BIOLOGY. Only the asexual generation is known, inducing galls on *Quercus bumelioides* Liebm. (= *Q. copeyensis*).

In the key for the identification of the Nearctic species of *Bassettia* (Melika & Abrahamson 2007), the new species goes to couplet 6 and can then be distinguished as follows:

- Radiating striae from clypeus present, reaching the ventral margin of the eye and toruli. Antenna with 15 segments. Projection of hypopygial spine approximately as long as wide *B. caulicola* sp. nov.
- Radiating striae from clypeus completely absent. Antennae with 14 segments. Projection of the hypopygial spine clearly longer than wide **Nearctic species of *Bassettia* (*B. gemmae*, *B. ligni*, *B. floridana*, *B. pallida*, *B. virginiana*, *B. weldi*, *B. tenuana*)**

Discussion

The study of this new species from Panama created some doubts in us regarding its correct generic classification within *Bassettia* given the presence of

some character states that do not fit within the diagnosis of this genus in the recent revision of Melika & Abrahamson (2007), namely the presence of facial radiating striae, the number of antennal segments and the relative length of the hypopygial spine. However, in all the remaining characters the new species fits well in *Bassettia*, and we prefer to be conservative in deciding its generic placement. If our classification is correct, the taxonomic limits of *Bassettia* should be enlarged to include the new diagnostic characters. Within the tribe Cynipini, the new species is also closely similar in many characters to species of the genera *Callirhytis* Foerster and *Plagiotrochus* Mayr, mainly because of the presence of a transversely striated mesoscutum and facial striae. However, the species of *Plagiotrochus*, in addition to their different geographic distribution, host plant data and biology, have a different mesopleural sculpture and a different conformation of the propodeum, with lateral propodeal carina bowed or angulated (these are subparallel in *Bassettia*). With regard to its affinities with the genus *Callirhytis*, the new species shares some characters with this genus, such as the presence of radiating striae on the face, subparallel lateral propodeal carina, wrinkled mesoscutum and a short hypopygial spine. However, the absence of a malar sulcus, the presence of a median propodeal carina and the characters of the forewings exclude the new species from the genus *Callirhytis*.

A final, closely related genus to *Bassettia* is *Loxaulus*, of which we describe two new species from Panama (Medianero *et al.*, in prep.). The species of *Loxaulus* share with *Bassettia* a similar biology and galls, as well as a closely similar morphology. However, the species of the two genera can be distinguished by the presence of a conspicuous malar sulcus and a different forewing venation in the *Loxaulus* species. The limits of these closely allied genera are imprecise as demonstrated by their taxonomic and nomenclatorial instability. More taxonomical, revisional and phylogenetic work is clearly needed to clarify the issue. Hopefully, recent morphological phylogenetic analysis (Liljeblad *et al.*, 2008) and other ongoing molecular phylogenetic studies will throw light on the phylogenetic relationships of the Cynipini and allow new, more natural and stable generic classifications.

The discovery of *Bassettia* in Panama represents the southernmost known distribution of this genus in America, confirming that it is represented in Central

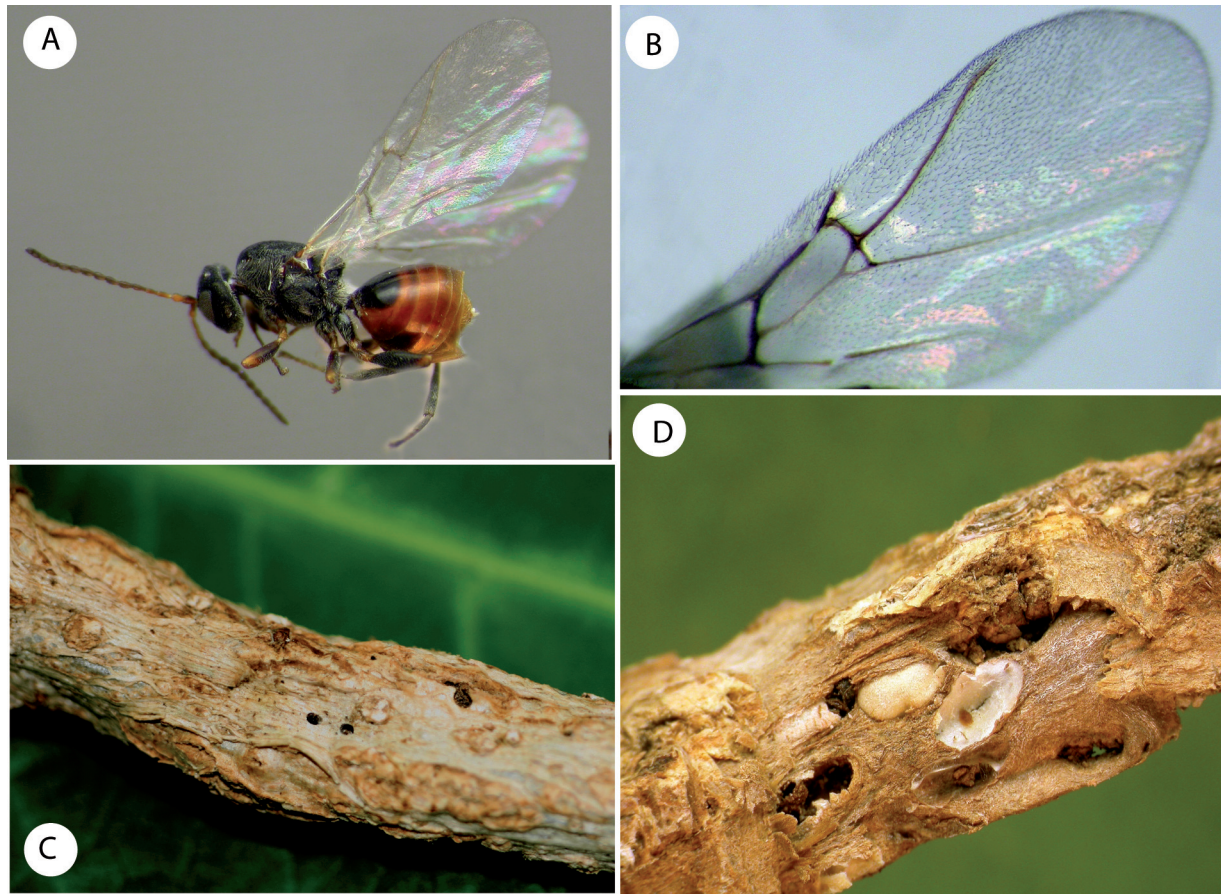


Fig. 3.— *Bassettia caulicola*: (A) Habitus, female. (B) Forewing of female. (C) Mature gall, showing the adult emergence holes. (D). Section of a gall showing the larval cells.

Fig. 3.— *Bassettia caulicola*: (A) Habitus de la hembra. (B) Ala anterior de la hembra. (C) Agalla madura mostrando los orificios de salida de los adultos. (D) Agalla seccionada mostrando las celdillas larvales.

America and the Neotropical Region. We predict that the genus could be demonstrated to be even more species-rich in this biogeographical region after new samplings are made in Mexico and Central America.

Acknowledgements

We are indebted to Isabel Izquierdo Moya and George Melika for critical revision of the manuscript. We are also grateful to Elvis Segundo for assistance with field samplings and to Laura Tormo and Marta Furió (MNCN) for technical assistance in the production of SEM photographs. Enrique Medianero was supported by a scholarship granted by IFARHU-SENACYT and the University of Panama, and JLNA was in part supported by research projects CGL2005-01922/BOS and CGL2009-10111.

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Recibido / Received, 15-XI-2010

Aceptado / Accepted, 1-XII-2010

Publicado impreso / Published in print, 29-XII-2010