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A REVISION OF THE BEE GENUS *PTILOGLOSSA* SMITH
(HYMENOPTERA: COLLETIDAE: DIPHAGLOSSINAE)

BY

RITA ISABEL VELEZ-RUIZ

A dissertation submitted in partial fulfillment of the requirements for the

Doctor of Philosophy

Major in Plant Science

South Dakota State University

2015

A REVISION OF THE BEE GENUS *PTILOGLOSSA* SMITH
(HYMENOPTERA: COLLETIDAE: DIPHAGLOSSINAE)

This dissertation is approved as a creditable and independent investigation by a candidate for the Doctor of Philosophy in Plant Science degree and is acceptable for meeting the dissertation requirements for this degree. Acceptance of this does not imply that the conclusions reached by the candidates are necessarily the conclusions of the major department.

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Este trabajo está dedicado a Martha, Oscar Alberto, Juan Camilo y Alejandro, quienes han sido siempre mi apoyo y me han dado fuerzas para seguir adelante.

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ABSTRACT

A REVISION OF THE BEE GENUS *PTILOGLOSSA* SMITH

(HYMENOPTERA: COLLETIDAE: DIPHAGLOSSINAE)

RITA ISABEL VELEZ-RUIZ

2015

Among bees of the tribe Caupolicanini, those in the genus *Ptiloglossa* are the most taxonomically diverse. The genus is inadequately defined, and the known species are poorly understood taxonomically. Many species are known only as males or females, and are relatively uncommon in museum collections.

This project explored the diversity of the bee genus *Ptiloglossa* Smith through a comprehensive morphological study, attempting to provide a basis for a more complete taxonomic revision of its species and proposing an hypothesis of their phylogenetic relationships.

Results of this study include one new species from Colombia: *P. colombiana* n. sp. *Ptiloglossa wilmattae* Cockerell, 1949 is determined to be a synonym of *P. thoracica* (Fox, 1895). The primary types of *P. aculeata*, *P. aenigmatica*, *P. amita*, *P. buchwaldi*, *P. chamelensis*, *P. concinna*, *P. costaricana*, *P. cyaniventris*, *P. decora*, *P. dubia*, *P. eximia*, *P. fulvopilosa*, *P. generosa*, *P. goffergei*, *P. hemileuca*, *P. hondurasica*, *P. hoplopoda*, *P. immixta*, *P. lanosa*, *P. latecalcarata*, *P. magretti*, *P. olivacea*, *P. ollantayi*, *P. pallida*, *P. psednozona*, *P. rugata*, *P. stafuzzai*, *P. styphlaspis*, *P. tenuimarginata*, *P. torquata*, *P. trichrootricha*, *P. willinki*, *P. wilmattae*, *P. xanthorhina* and *P. xanthotricha* were examined and each species re-described. Previous taxonomical work done on the genus considers mostly integumental and pubescence coloration patterns. This study

proposed new external characters to separate species. A separated key to identify males and females of *Ptiloglossa* is presented. Six groups of species are defined based on abdominal coloration and pubescence.

Although the phylogenetic analyses recovered the genus as a monophyletic clade, it is still necessary to propose new characters from internal morphology to help explain the relationships among species. *Crawfordapis* is recovered as the sister group of *Ptiloglossa* and *Caupolicana* is the sister of both. These results supported the monophyly of Caupolicanini bees. However, a more comprehensive study is necessary to elucidate the relationships among Caupolicanini bees; this can be done by including representatives of as many species as possible from both sexes. Molecular study is necessary to solve more clearly the phylogenetic relationships among *Ptiloglossa* species and also to help with the association of sexes.

INTRODUCTION

There are about 20,000 described species of bees (Insecta: Hymenoptera: Apoidea) worldwide (Michener 2007). Most published information pertains to those bees that are an integral part of human development and provide benefits to human societies such as honey, wax, pollen and pollination services. Bees are important pollinators of flowering plants, including most fruit plants. In the United States alone 75% of fruits, plants and vegetables produced annually are bee pollinated (Moisset & Buchmann 2011). By 2009 around \$11 billion profit was estimated to be derived from the pollination services of honeybees (*Apis mellifera* L.), plus an estimated \$3.5 billion from other non-*Apis* bees (Calderone 2012). For example, nearly all production of apples, oranges, tomatoes, almonds, blueberries, among other fruits, depend on bee pollination for a successful production of food and seed each year. Added to this, the value of honey production per year is around \$150 million (Sass 2011). Unequivocally, bees are crucial to maintain human populations. Although native bees (non-*Apis*) are responsible for pollination of many crop plants, little is known about their identity and how they interact with the ecosystem they inhabit.

There is strong evidence that in some cases native bee populations are declining rapidly. Cameron *et al.* (2011) found that a population of bumble bees in North America declined almost 96% in the last 20 years, suggesting that there is a strong need to study and understand other species of bees to better assess their status of pollinators before we lose them. The first step is to recognize the different species of native bees among the 20,000 described today because most of them are unknown or poorly studied. For that

reason a better taxonomic understanding of native bees is essential (Gonzalez *et al.* 2013). The species of *Ptiloglossa* fall into this category of great need for taxonomic.

Most native bees are solitary, do not produce honey, and can be found from xeric to humid habitats around the globe. A few groups, such as bumble bees, have received a considerable of attention because of their direct interaction with humans, but most bee taxa have little information available (Velez-Ruiz 2011; Gonzalez *et al.* 2013) and much is out of date. Taxonomy, ecology, biogeography and phylogenetics need to be addressed for most taxa especially to gain a better understanding of what is now called ‘pollinator decline’ and to contribute to global initiatives for pollinator conservation.

Higher Classification of *Ptiloglossa*

Ptiloglossa is taxonomically placed in the family Colletidae, subfamily Diphaglossinae, tribe Caupolicanini. The higher classification of bees, has changed little since Michener (1944). The first classifications were based on the degree of social behavior (solitary bees and social bees) and the degree of parasitism (parasitic or non-parasitic bees) (e.g., Lepelletier 1835, 1841; Thomson 1872; Schmiedeknecht, 1882 (as cited in Michener, 2007, p. 97)). The higher classification of bees today is relatively stable and most phylogenetic hypotheses involving bees has consistently recovered the clade as a monophyletic group (Michener 1944; Engel 2001; Debevec *et al.* 2012).

Today bees are grouped in seven families: Colletidae, Stenotritidae, Andrenidae, Halictidae, Melittidae, Megachilidae, and Apidae (Engel 2001; Danforth *et al.* 2004; Michener 2007). Ashmead (1899) established Colletidae, and Vachal (1909) included Diphaglossinae as one of its subfamilies. However it was Michener (1944) who

recognized the taxonomic category of subfamily, and he interpreted Colletidae as composed of six subfamilies: Euryglossinae, Hylaeinae, Chilicolinae, Colletinae (with tribes Paracolletini, Colletini and Caupolicanini), Stenotritinae and Diphaglossinae.

During a period of around 20 years, this classification of Colletidae had no changes. Michener (1965) focused his attention on new sets of characters and evidence presented by Moure (1945) about the homogeneity of Diphaglossinae (“*the morphology of glossae and paraglossae, the prodeum, the reduction of pterostigma, the presence of strong notauli, the morphology of hind basitarsus and the lack of pigial plate*”). Michener (1965) decided to reanalyze his 1944 data and transferred the tribe Caupolicanini from Colletinae to Diphaglossinae. Since then Diphaglossinae includes three tribes: Caupolicanini, Diphaglossini and Dissoglottini (Michener 2007).

The internal classification of Colletidae remained stable until the publication of the results of a phylogenetic study of short tongued bees by Alexander & Michener (1995). After analyzing the morphology of a large number of bee species of diverse clades and recovering the relationships between the families of bees, they found strong evidence to support the hypothesis that Stenotritinae is closely related to Colletidae, and this subfamily was given family status. Colletidae is currently divided into five subfamilies: Colletinae, Diphaglossinae, Xeromelissinae, Hylaeinae and Euryglossinae. Stenotritidae is a separate family composed of two genera with a unique Australian distribution (Michener 2007).

The characters used to separate Diphaglossinae from others subfamilies in Colletidae are consistent (e.g., the reduction of the stigma, the strong bifid glossae and the cocoon spinning behavior of the larvae, among others) and are considered

synapomorphies because all members of the subfamily have retained these traits from an inferred common ancestor. The retention of these characters supports the hypothesis of Diphaglossinae as a monophyletic group. However, separately Rozen (1984) in a study on nesting biology of the subfamily, and Alexander & Michener (1995) in one of the trees showing phylogenetic relationships of short-tongued bees, positioned Diphaglossinae as the sister group to the rest of Colletidae (Engel 2001; Almeida & Danforth 2009). Michener (2007) suggests that it is necessary to do a more detailed study of Colletidae including more taxa in order to have a better understanding of the phylogenetic relationships among the subfamilies.

Phylogenetic studies considering adult and larval morphology (Rozen 1984; Alexander & Michener 1995) and molecular studies (Brady & Danforth 2004) have helped to place Caupolicanini within Diphaglossinae, but have not been adequate to show the phylogenetic position of the subfamily within Colletidae. Classifications do not always reflect the history of the study group, therefore a recent study including morphological and molecular data shows the monophyly of Colletidae including the position of Diphaglossinae (Danforth *et al.* 2006).

Caupolicanini is one of the three tribes of Diphaglossinae (Caupolicanini, Diphaglossini, and Dissoglottini). Between them Caupolicanini is the most studied mainly because it is the most diverse of the three, and because of its resemblance to Stenotritidae. Moure (1945) and Michener (1966, 1986) defined some of the traits that are considered apomorphies of Caupolicanini: the presence of the episternal groove complete; the first flagellar segment longer than the pedicel and as long as the scape; the second submarginal cell smaller than third one, and wings coarsely papillate. These

common characteristics among Caupolicanini genera support the tribe as a monophyletic group.

Three genera are included in Caupolicanini: *Caupolicana* Spinola (about 45 species), *Crawfordapis* Moure (with only two species) and *Ptiloglossa* Smith (about 55 species). Michener's (1986) cladogram shows *Caupolicana* as the sister group to *Crawfordapis* and *Ptiloglossa*. Diagnostic characters for each genus are more or less controversial than the tribe classification, reflecting a poorly studied group (Michener 2007). In *Caupolicana*, some of the characters are variable and inconsistent, resulting in poor associations among species and suggesting that the genus may be paraphyletic (Michener 2007). *Crawfordapis* is the smallest of the genera; with a mixture of *Caupolicana* and *Ptiloglossa*-like characters causing the genus status to be questioned, although Moure (1964) and Michener (1966) showed that the genitalia of the species are quite different from those species of the other two genera. *Ptiloglossa* is a monophyletic and diverse genus, where sexual dimorphism is common. Characters used to separate the genus from the other two genera are consistent, but difficulties remain in associating sexes among the described species (most species have been described from only one sex).

The genus *Ptiloglossa* Smith, 1953

Ptiloglossa was first described by Smith (1853), and is distributed from the southwestern United States to northern Argentina, but oddly appears absent from Chile (Michener 2007). The genus is the central and most taxonomically diverse genus within Caupolicanini, with bees that are relatively large and robust, with yellow pubescence and integumental patterns, in combination with metallic coloration on the metasomal terga

(Moure 1945; Michener 2007). The crepuscular and matinal behavior likely explains the lack of specimens in collections as most general collectors are not seeking bees during those periods of the day.

The majority of bees of the world are active during bright and warm midday periods, although species that are active at low light intensities occur in the families Apidae, Andrenidae, Colletidae and Halictidae (Greiner 2005). Though crepuscular and nocturnal bees are a small proportion of the biota they present specific morphological characteristics that are adaptations for foraging in dim light and reducing the risk of predation and competition for pollen resources (Greiner 2005). One of the most common morphological characteristics in these bees is that they have greatly enlarged ocelli that help them navigate in dim light.

Among Caupolicanini, bees of the genera *Caupolicana* and *Ptiloglossa* are known for their matinal and late afternoon foraging activities (Linsley 1962; Linsley & Crazier 1970; Roberts 1971). These are robust and fast-flying bees restricted to the American tropical and subtropical regions (Michener, 1966, 1979, 2007). The trait of being active during dim light makes *Ptiloglossa* an uncommon group of bees in museums. Specimens housed in the collections are typically identified to family or genus only. As is common with other groups of bees, the sexes are poorly associated. Sometimes the species name is only assigned to one or a group of bees belonging to the same sex. So synonyms based on taxonomic segregation of sexes are a common issue in *Ptiloglossa* species.

By 1944 only 14 species of *Ptiloglossa* were known, but after Moure's (1945) revision of the genus, the diversity rose to 40 species. Timberlake (1946, 1965) described two species from Arizona, and Moure (1947, 1953) describe three species from Argentina

and Brazil. Moure (1987) then described seven more species from Brazil, Panama, Colombia and Mexico, providing a total of 52 described species. Since 1987 the genus has been included in studies that focus in other groups of bees, but *Ptiloglossa* was not the group of interest. Recent efforts elucidating the bee diversity of the world give 57 as the number of described species of *Ptiloglossa* (Ascher & Pickering 2014). The most recent addition to the genus was made by Ayala and Engel (2014), who described *P. chamelensis* from Mexico. According to Moure (1945), it is difficult to separate many species because of the historical omission of critical characters in keys and the incompleteness of many descriptions which makes the task of taxonomic interpretation very difficult. For this reason, these bees gained a reputation of taxonomic difficulty and few studies have focused on their classification or attempted to resolve species concepts.

Due to the increased interest in understanding native pollinators around the globe, in the last two decades there has been an increase in publications that provide information about flower records for *Ptiloglossa*, most of them in Brazil. Nesting behavior and plant associations have been studied in only a couple of species. Rozen (1984) described the nest of *Ptiloglossa fulvopilosa* (Cameron) from Trinidad. Like other colletid bees, *Ptiloglossa* nest solitarily in the soil, but sometimes in aggregations, with each female constructing cells with a diaphanous lining made from chewed plant fibers, a putative colletid synapomorphy (Michener 2007). Roberts (1971) found that these cells contained only very little pollen as food provisions for larvae, with the yeast fermenting these provisions probably providing necessary protein that is otherwise provided by pollen to other bees.

Evidence to date indicates that that *Ptiloglossa* are pollinators of various Solanaceae and Melastomaceae, and are “buzz pollinators” for various *Solanum* species (Coleman & Coleman 1982; Shelly *et al.* 1993; Nunes-Silva *et al.* 2010). Buzz pollination refers to the vibration produced by these bees when visiting flowers to help release the pollen from the anthers (Michener 2007). In addition, some authors suggest that Caupolicanini like *Ptiloglossa* are specialized to collect pollen in plants with poricidal anthers (Linsley & Crazier 1970; Hurd & Linsley 1976), but little evidence is given to support this conjecture.

Today, there are around 20 publications that describe the taxonomic diversity of the genus, and some include dichotomous keys. These keys are usually limited to species from a specific region, although Moure (1945) summarized information available at the time and provided the first key to identify *Ptiloglossa* males.

Taxonomy: Historical summary of *Ptiloglossa* species description

Characters to define and identify Caupolicanini genera come mainly from external morphology. The outer hind tibial spur mobility in males, the metallic or nonmetallic coloration of the terga, the shape of the base of the marginal cell of the front wing and the size and form of the basitarsus in females, are used to separate the three genera of the tribe (Michener 2007). The form of sternite 7 (S7) on males is the most common genitalic trait used to differentiate taxa within the tribe.

Smith (1853) described for the first time *Ptiloglossa* based on a female that he later designated *P. ducalis* Smith as the type species. Some of the characters that he used for the genus included the length of the first antennal segment equal to scape length;

mouth parts (mentum, labium, palpi) and wing venation (marginal and submarginal cells). In the first 46 years following the establishment of *Ptiloglossa* as a genus, only 12 species were described.

Smith (1861) described *P. eximia* Moure (as *Megacilissa eximia*) based on a female specimen, although he noted that the male specimen studied was similar to the female but smaller. He reported it from Mexico. Seventeen years later Cresson (1878) described *P. mexicana* (Cresson) (as *Megacilissa mexicana*) based on a single female collected by Sumichrast in Mexico. A year later, Smith (1879) described two more new species of *Megacilissa* based on male specimens: now *P. generosa* (Smith) from Venezuela and *P. tenuimarginata* (Smith) from Veracruz, Mexico. Fox (1895) described *P. thoracica* (Fox) (as *Megacilissa thoracica*) based on a female specimen from Tepic, Nayarit, Mexico and mentioned this species as related to *P. mexicana*.

Friese (1898) described three new species of the genus. *P. tomentosa* (Friese) (as *Megacilissa tomentosa*) and included descriptions of both sexes, but he never designated a type specimen. Later Urban & Moure (2001) designated the female from Cochabamba, Bolivia as the type of *P. tomentosa*. *Ptiloglossa pretiosa* (Friese) (as *Megacilissa pretiosa*) is based on a female from Brazil and closely resemble *P. tomentosa*.

Ptiloglossa olivacea (Friese) (as *Megacilissa olivacea*) was first described by Friese (1898); both sexes were described but there was no type specimen designated. Urban and Moure (2001) designated a male from Santa Cruz, Brazil as the type. Schrottky (1901, 1902a) re-described the species based on a female specimen from São Paulo, Brazil as *Megacilissa obscura*.

Friese (1899) described both sexes of *P. magretti* (Friese) (as *Megacilissa magretti*) from Venezuela and pointed out the species resemblance to *P. tomentosa*. Because Friese (1899) did not assign a type, Urban & Moure (2001) designated one the females from Venezuela as the type specimen. In the same paper Friese (1899) described *P. steinheili* (as *Megacilissa tomentosa* var. *steinheili*) from Colombia and pointed out similarities with *P. tomentosa*.

On the following 50 years there was interest in describing new species of *Ptiloglossa* and clarifying the distribution and classification. Friese (1900) described two new species of the genus: *P. virgili* (as *Megacilissa (Ptiloglossa) virgili*) based on a male from Santa Catarina, Brazil, and *P. tarsata* (Friese) (as *Megacilissa (Ptiloglossa) tarsata*) from a female in Argentina. However, Schrottky (1902b) described *Megacilissa metatarsalis* based on specimens of both sexes from Tucuman-Argentina, which was subsequently is designated as a synonym of *P. tarsata* (Friese, 1900) by Urban & Moure (2001). Cameron (1903) described *P. fulvopilosa* (as *Megacillisa fulvo-pilosa*) based on a male from Panama, and noted its resemblance to *P. eximia*.

Friese (1904) after reviewing the genus, decided to move all those *Megacilissa* species and include them into *Ptiloglossa*, because apparently under *Megacilissa* there was a mixture of species belonging to *Caupolicana* and *Ptiloglossa*. In the same paper Friese described two new species based on female specimens: *P. aculeata* Friese from Parana, Brazil and *P. eburnea* from Callanga, Peru, and considered the latter similar to *P. pretiosa*.

Schrottky (1904) described *P. matutina* (Schrottky) (as *Megacilissa matutina*) from a male collected in Alto Parana, Paraguay; in the description he points out that the species is similar to *P. eximia*.

Friese (1908) described three new species: *P. absurdipes*, a male from Tarata, Bolivia; *P. pallipes*, a female collected at Mollendo, Peru; and *P. buchwaldi* Friese (as *P. ducalis* var. *buchwaldi*) from both females and males collected at Guayaquil, Ecuador and Popayan, Colombia. Because Friese (1908) did not designate a type species of *P. buchwaldi*, Urban & Moure (2001) designated a female from Ecuador as lectotype. In the same paper Friese (1908) pointed out that *P. absurdipes* and *P. buchwaldi* were similar to *P. ducalis*.

Over a period of four years, three more species were added into the genus. Cockerell (1911) described *P. ollantayi* Cockerell based on a female from Piura, Peru and commented that despite it not being an outstanding specimen it can be separated from *P. matutina* and *P. eburnea* previously described from Peru. Cockerell (1912) then described *P. mayarum* from a female collected in Quirigua, Guatemala, and considered it very similar to *P. mexicana* (Cresson). Schrottky (1914) described *P. giacomellii* Schrottky from a male specimen collected in La Rioja, Argentina; this species is similar to *P. fulvopilosa* (Cameron).

During the first part of 1920's, four more species were added to *Ptiloglossa*. Cockerell (1923) described *P. lucernarum* Cockerell (as *P. ducalis lucernarum*) from a female specimen from Hill Estate, Guayana, and noted that this species is very close to *P. ducalis* and could be considered as a local race. Friese (1925) described three more species: *P. cyaniventris* Friese, a male collected in Cauca, Colombia; *P. fassli*, a male

from San Antonio, Colombia (he believed this species was similar to *P. ducalis*); and *P. pallida* Friese from a male specimen collected in Santiago del Estero, Argentina. He pointed out the latter species inhabited the same geographical area as *P. tarsata*.

About 20 years later, Moure resumed previous studies on the genus and focused on South American species (mainly those present in Brazil). Moure (1944) described *P. hemileuca* Moure from a female from Curitiba, Brazil and included a description of the. Moure (1945) described 12 new species in a review of the genus (based mainly on male specimens), provided comments on each species and discussed the inclusion of *P. tarsata* in a separate subgenus, *Ptiloglossodes*, based on evident morphological differences relative to other *Ptiloglossa*. The new species described were: *P. aenigmatica* Moure, a female collected in Sao Paulo, Brazil; *P. decora* Moure, a male from Rio de Janeiro, Brazil; *P. dubia* Moure, a male from Rio de Janeiro, Brazil (a female specimen was also described); *P. immixta* Moure, a male from Rio Grande do Sul, Brazil; *P. lanosa* Moure, a male from Minas Gerais, Brazil; *P. latecalcarata* Moure, a male from Sao Paulo, Brazil; *P. rugata* Moure, a male from Amazonas, Brazil; *P. stafuzzai* Moure, a male from Sao Paulo, Brazil; *P. styphlaspis* Moure, a male from Goias, Brazil; *P. xanthorhina* Moure, a male from Amazonas, Brazil and *P. xanthotricha* Moure, a male from Goias, Brazil. He also assigned *P. costaricana* Moure as *nomen novum* for *P. obscura* Friese, 1908 (as *Megacilissa obscura*) and *Megacilissa obscura* Schrottky, 1902 (synonym of *P. olivacea* (Friese, 1898)), because the name '*P. obscura*' was already preoccupied and could be confused.

During the last years of the 1940's, seven more species were described.

Timberlake (1946) described the only two species for the genus from the southwestern

United States: *P. arizonensis* Timberlake and *P. jonesi* Timberlake. Moure (1947) described the male of *P. psednozona* Moure from Salta, Argentina. Cockerell (1949) described *P. hondurasica* Cockerell, a female specimen from Agua Amarilla, Honduras, and points out its resemblance to *P. mayarum*; and he described the male of *P. wilmattae* from Zamorano, Honduras. The latter species is considered a synonym of *P. thoracica* in the present study. Moure (1953) described *P. goffergei* Moure a male specimen from Brazil, and then Urban & Moure (2001) designated a specimen collected in Santa Catarina, Brazil as lectotype. Moure (1953) also described *P. willinki* Moure from a set of five females from Argentina, and later Urban and Moure (2001) designated one of the females from Cordoba, Argentina as the lectotype.

Scattered publications since then have included descriptions of new species of *Ptiloglossa*. Roberts (1971) described *P. guinnae* using specimens of both sexes collected at their nest in Alajuela, Costa Rica; a male was designated as the holotype. Sixteen years later, Moure (1987) included the last set of species for the genus: *P. amita* Moure was described from both sexes, with a male specimen from Amazonas, Brazil designated as the holotype; *P. concinna* Moure was described from a single male collected in Lamayeque, Peru; *P. decipiens* Moure was described from a male collected in Chiriqui, Panama; both sexes of *P. fulvonigra* were described but the holotype was a male from Chiriqui, Panama; *P. hoplopoda* Moure was described from a male collected in Veracruz, Mexico; a male of *P. torquata* Moure was described from Bahia-Brazil; and *P. trichrootricha* Moure was described from a female from Cauca, Colombia. The most recently described species was identified by Ayala & Engel (2014) who described both males and females of *P. chamelensis* Ayala & Engel from Mexico.

Phylogenetic relationships among *Ptiloglossa* bees

Despite Caupolicanini being the largest tribe of Diphaglossinae, only one study of relationships among the genera of Diphaglossinae has been done by Michener (1986). Alexander & Michener (1995) supported the subfamily as monophyletic as proposed by Michener (1986), but they highlighted that only few specimens were used in the analysis. More recently, Almeida & Danforth (2009) and Danforth *et al.* (2012) studied the family Colletidae and presented a molecular hypothesis for monophyly and the relationships between the genera of the tribe. However, as in Alexander & Michener (1995), because their interest was to resolve the relationships at the family and/or subfamily levels, there was not enough data to examine the relationships at the generic or species levels within Diphaglossinae. Michener *et al.* (2003) highlighted the necessity of a genus-group study to understand the relationships among Caupolicanini genera the species within of each genus.

As noted above *Ptiloglossa* is the most taxonomically diverse genus of the tribe, and the lack of information associated to this particular group of bees is due to multiple factors. First there is scattered and little information about the biology, ecology and development of *Ptiloglossa* species, which is probably due to their activity early in the morning and/or in the evening. Second, these are solitary bees, fast fliers, and distributed in tropical and subtropical America where there are few people interested in the study of bees. And third, the morphological characters used in differentiation of genera and species in most cases are ambiguous and ill-defined, which make them a problematic group.

Therefore, the aim of this study is to review the biodiversity of the genus, understand and explain differences among the species. To do this, a clarification of the taxonomy of the species is presented, including a morphological review, an identification key for most *Ptiloglossa* species, and a morphology-based phylogenetic hypothesis.

MATERIALS AND METHODS

A total of 1168 specimens representing 48 of the 56 described species of *Ptiloglossa* until today were studied, including most primary types. Museums, institution and researchers that provided material for this study are listed with their respective abbreviations (arranged in alphabetical order):

AMNH: American Museum of Natural History, New York, USA; Jerome G. Rozen Jr and Eli Wyman.

BMNH: Natural History Museum of London (formerly British Museum of Natural History), London, England; David G. Notton.

DZUP: Departamento de Zoologia, Coleção Entomológica Pe. Jesus Santiago Moure, Universidade Federal do Paraná, Curitiba, Brazil; Gabriel Melo.

INBio: Instituto Nacional de Biodiversidad, San Jose, Costa Rica; Ronald Zuñiga.

INHS: Illinois Natural History Survey, University of Illinois, Champaign, Illinois, USA; Chris Dietrich and Dmitry Dmitriev.

LABUN: Laboratorio de Investigaciones en Abejas, Universidad Nacional de Colombia, Bogotá, Colombia; Guiomar Nates-Parra.

LINZ: Oberösterreichisches Landesmuseum, Linz, Austria; Fritz Gusenleitner.

MEFLG: Museo Entomológico ‘Francisco Luis Gallego’, Universidad Nacional de Colombia, Medellín, Colombia; John A. Quiroz and Sergio Orduz Peralta.

MZUSP: Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil; Carlos Roberto F. Brandão and Kelli Ramos.

OSUC : Triplehorn Insect Collection, The Ohio State University, Columbus, Ohio, USA; Luciana Musetti .

SEMC: Snow Entomological Museum Collection, Kansas University, Lawrence, Kansas, USA; Michael Engel and Jennifer C. Thomas.

UCRC: University of California Riverside, Riverside, California, USA; Doug Yanega.

USNM: Smithsonian National Museum of Natural History, Washington, DC, USA; Seán Brady.

ZMB: Museum für Naturkunde, Humboldt-Universität zu Berlin, Berlin, Germany; Frank Koch and Viola Richter.

ZSM: Zoologische Staatssammlung München, München, Germany; Stefan Schmidt.

Characters Studied

With the aim of standardize and clarify some of the observations made of original authors, all studied species were re-described. Morphological terminology used for re-descriptions, keys, and characters included for phylogenetic analyses were based upon those developed by Moure (1945), Michener (1986) and Ayala & Engel (2014). Other external morphology characters were added based on my own observations of specimens. Genitalia were extracted from male specimens only and were cleared using 10% KOH, washed with water, and after study, stored in microvials with glycerin and pinned beneath the specimen. Abbreviations used for re-descriptions of each species and the character list are as follows: OD, ocellar diameter; F1-F11, flagellomeres; T1-T7, terga; S1-S7, sterna.

Phylogenetic study of *Ptiloglossa*

A maximum parsimony analysis for the morphological characters was conducted using 'Tree analysis using New Technology' – TNT (Goloboff *et al.* 2008) software to obtain the optimal phylogenetic tree(s) that better explain the relationships among the species. The criteria used in the analysis were a heuristic non-restricted search (multiple Tree Bisection and Reconnection (TBR)) keeping a maximum of 10000 trees, 1000 replications, one starting tree per replication and zero random time. The consensus trees were obtained in a bootstrap analysis in Winclada-NONA (Nixon 2002).

Based on the cladistic analysis of Michener (1986) for the tribes of Diphaglossinae, the species used here as outgroups were *Cadeguala occidentalis* (Haliday) (Diphaglossini), *Caupolicana gayi* Spinola (Caupolicanini) and *Crawfordapis crawfordi* Cockerell (Caupolicanini). These species are considered representatives of the

taxa related to *Ptiloglossa* with enough morphological variation to help on the determination of the polarity of characters studied on the ingroup. A list of the species used in the analysis is in Table 1.

Characters of external morphology of head, mesosoma and metasoma of both males and females were selected, considering those previously used in the original descriptions of all *Ptiloglossa* species. Because sexual dimorphism is expected at least in some species of *Ptiloglossa*, representatives of both sexes were used for the analysis when possible.

Due to a high morphological variation within *Ptiloglossa* species, there are a lot of multistate characters, although 51% of them were coded as binary. Missing information was represented by a question mark on the matrix. All characters were treated as unweighted, unordered and nonadditive. For males, a total of 94 characters were examined for the initial analysis, from them 40 were considered uninformative, ambiguous or poorly defined, leaving 54 characters that were used in the second analysis. For females, a total of 92 characters were examined for the initial analysis, from them 38 were considered uninformative, ambiguous or poorly defined, leaving 54 characters for the second analysis.

After combining male and female characters, a morphological matrix of 108 characters was analyzed. After evaluating consistency and retention indexes on the resultant tree, only 94 (61 male, 33 female) were considered informative and were used for the final analysis. The character list and respective states are in Appendix I. The matrix with character states is in Appendix II. The resultant trees include the following abbreviations: L for tree length; Ci for consistency index and Ri for retention index.

Molecular characters were not used in this study due to a lack of adequate material. Also lack of economic resources combined with difficulty to collect new specimens made impossible to obtain material for molecular analysis.

Table 1. List of species used in the phylogenetic analysis of *Ptiloglossa*.

	Male	Female
Colletidae		
Diphaglossinae		
Diphaglossini		
<i>Cadeguala occidentalis</i> (Haliday, 1836)	X	X
Caupolicanini		
<i>Caupolicana gayi</i> Spinola, 1851	X	X
<i>Crawfordapis crawfordi</i> (Cockerell, 1919)	X	X
<i>Ptiloglossa aculeata</i> Friese, 1904	-	X
<i>Ptiloglossa aenigmatica</i> Moure, 1945	X	X
<i>Ptiloglossa amita</i> Moure, 1987	X	X
<i>Ptiloglossa arizonensis</i> Timerlake, 1946	X	X
<i>Ptiloglossa buchwaldi</i> Friese, 1908	-	X
<i>Ptiloglossa chamelensis</i> Ayala & Engel, 2014	X	X
<i>Ptiloglossa concinna</i> Moure, 1987	X	-
<i>Ptiloglossa costaricana</i> Moure, 1945	X	X
<i>Ptiloglossa cyaniventris</i> Friese, 1925	X	X
<i>Ptiloglossa decipiens</i> Moure, 1987	X	X
<i>Ptiloglossa decora</i> Moure, 1945	X	-
<i>Ptiloglossa dubia</i> Moure, 1945	X	X
<i>Ptiloglossa ducalis</i> Smith, 1853	X	X
<i>Ptiloglossa eximia</i> (Smith, 1861)	X	X
<i>Ptiloglossa fulvopilosa</i> (Cameron, 1903)	X	-
<i>Ptiloglossa generosa</i> (Smith, 1879)	X	-
<i>Ptiloglossa giacomellii</i> Schrottky, 1914	X	-
<i>Ptiloglossa goffergei</i> Moure, 1953	X	-
<i>Ptiloglossa hemileuca</i> Moure, 1944	X	X
<i>Ptiloglossa hondurasica</i> Cockerell, 1949	-	X
<i>Ptiloglossa hoplopoda</i> Moure, 1987	X	-
<i>Ptiloglossa immixta</i> Moure, 1945	X	-
<i>Ptiloglossa jonesi</i> Timberlake, 1946	X	X
<i>Ptiloglossa lanosa</i> Moure, 1945	X	-
<i>Ptiloglossa latecalcarata</i> Moure, 1945	X	-

<i>Ptiloglossa lucernarum</i> Cockerell, 1923	X	X
<i>Ptiloglossa magretti</i> (Friese, 1899)	-	X
<i>Ptiloglossa matutina</i> (Schrottky, 1904)	X	X
<i>Ptiloglossa mexicana</i> (Cresson, 1878)	X	X
<i>Ptiloglossa olivacea</i> (Friese, 1898)	X	-
<i>Ptiloglossa ollantayi</i> Cockerell, 1911	X	-
<i>Ptiloglossa pallida</i> Friese, 1925	X	-
<i>Ptiloglossa pretiosa</i> (Friese, 1898)	X	X
<i>Ptiloglossa pzednozona</i> Moure, 1947	X	-
<i>Ptiloglossa rugata</i> Moure, 1945	X	X
<i>Ptiloglossa stafuzzai</i> Moure, 1945	X	-
<i>Ptiloglossa styphlaspis</i> Moure, 1945	X	-
<i>Ptiloglossa tarsata</i> (Friese, 1900)	X	X
<i>Ptiloglossa tenuimarginata</i> (Smith, 1879)	X	X
<i>Ptiloglossa thoracica</i> (Fox, 1895)	X	X
<i>Ptiloglossa tomentosa</i> (Friese, 1898)	X	-
<i>Ptiloglossa torquata</i> Moure, 1987	X	-
<i>Ptiloglossa trichrootricha</i> Moure, 1987	-	X
<i>Ptiloglossa willinki</i> Moure, 1953	-	X
<i>Ptiloglossa xanthorhina</i> Moure, 1945	X	-
<i>Ptiloglossa xanthotricha</i> Moure, 1945	X	-

RESULTS AND DISCUSSION

Genus *Ptiloglossa* Smith 1853

Ptiloglossa Smith, 1853: 7

Type species: *Ptiloglossa ducalis* Smith, 1853: 7 by monotypy.

Ptiloglossa (*Ptiloglossodes*) Moure, 1945: 153.

Type species: *Megacilissa* (*Ptiloglossa*) *tarsata* Friese, 1900: 181 by original designation.

Smith (1853) established the genus with the description of *Ptiloglossa ducalis* based on a specimen collected by W. Wilson Saunders and now housed at the British Museum. As part of his notes, Smith (1853) described the genus by the length of first flagellomere being as long as scape and an elongate and pointed marginal cell. Other characters considered in his description such as proportions of head and thorax, wing venation and mouth parts are not exclusive to this genus. Friese (1904) noted that some species described under the genus *Megacilissa* Smith (today *Caupolicana* Spinola) belong to *Ptiloglossa* based on the original description by Smith (1853).

Vachal (1909) following Friese (1904) developed a new character set, and compiled a tabular presentation to determine genera of Apidae, and synonymize both *Ptiloglossa* and *Megacilissa* Smith with *Caupolicana* Spinola. A few years later, Ducke (1913) cataloged *Ptiloglossa* as a subgenus of *Caupolicana* and retained the synonymy. Cockerell (1919) mentioned that because there are only few characters that separate *Ptiloglossa* from *Caupolicana* it was difficult to delimit boundaries between them, then he accepted Vachal (1909), and suggested both genera should join to conform a single genus, *Caupolicana* Spinola.

Moure (1945) in his extensive revision about Diphaglossinae with an emphasis on *Ptiloglossa* used pubescence color (mainly yellow, brown and in only few specimens black with some bicolor setae); the form of the outer hind tibial spur of males; an elevated clypeus above the face and an abdomen metallic coloration as main characters to reconsider it a separate genus. Moure (1945) also proposed to separate *Ptiloglossa tarsata* (Friese, 1900) into a new subgenus *Ptiloglossodes* based on the absence of the hind tibial spur of males in this species.

Michener (1954) added the presence of a fused outer hind tibial spur on males to define *Ptiloglossa* as genus, but he makes no reference about *Ptiloglossodes*.

Subsequently, Michener (1966) reviewed the status of the genus and in his notes included *Ptiloglossodes* characters as exceptions on the description of the genus *Ptiloglossa*, considering *P. tarsata* as part of the genus..

Here *Ptiloglossodes*, and hence *Ptiloglossa tarsata*, is considered part of the *Ptiloglossa*. Modification of hind legs (absence of hind tibial spur and basitarsus triangulate) and wings (marginal cell not prolonged basally narrow) on this species are considered apomorphies.

Diagnosis:

Ptiloglossa species can be separated from other Caupolicanini with the combination of the following characters: Large bees 16 mm to 20 mm. Head narrower than thorax. Clypeus projected beyond the face. Female mandibles with three teeth and male mandibles with two teeth. First flagellomere as long as or longer than scape. Second flagellomere as long as pedicel. Body fully covered by dense pubescence varying from white to yellow, brown and black; in some cases pubescence can be bicolor. Thorax integument from brown to black (sometimes reddish). Notaulus, parapsidal line and episternal groove present. Wings apex papillated. Female wings not approaching the abdominal apex; male wings slightly surpassing the abdominal apex. Marginal cell prolonged basally narrow (except *P. tarsata*), second submarginal cell smaller than first and third. Outer hind tibial spur of male immobile, fused to tibiae (absent in *P. tarsata*). Hind basitarsus of female almost two times as long as broad. Abdomen usually with

metallic iridescence (except *P. thoracica*, *P. amita*, *P. aculeata*). Female pigdial plate visible with a rounded apex. Sixth sternum of male with thorn-like projections on the side. Male genitalia as in Figure 1.



Figure 1. Male genitalia of *Ptiloglossa jonesi* Timberlake. **A.** Dorsal view of genital capsule. **B.** Ventral view of genital capsule.

Relevant Characters Studied

Ptiloglossa is the most diverse genus in Caupolicanini and the species are difficult to separate because of close similarity. Moure (1945) mentioned that the scarce detail in some of the descriptions made it difficult to delimit species boundaries in the genus.

Here I discuss some of the characters, and combine male and female traits that show consistency and are included in the key to species and in the phylogenetic analysis.

- Labrum surface: Both females and males present important variations in the surface of labrum. The most common state in females is one or two tubercles, or striae on the labrum. A smooth labrum is the less common character state on females. In contrast, among males it is common to have a smooth labrum, a labrum striate on the labroclypeal area; only males of *P. hoplopoda* have two tubercles on the labrum.
- Clypeus projection: The clypeus projects beyond the face, but this projection varies among males. The most common state is having the clypeus evenly projected beyond the face, but a small group of males (*P. fulvopilosa*, *P. mexicana*, *P. ollantayi*, and *P. tenuimarginata*) have the upper part strongly projected beyond the face. Another character state of the clypeus is having the clypeus not projected.

In females, this character does not vary significantly, but they can be divided in two different groups: those having a flattened clypeus on disc or those having a rounded disc.
- Clypeus surface: The most common state in females is having the clypeus rugose-striate or with strong punctures looking like a rugose surface, followed by a clypeus with strong punctures (few, sometimes getting close to the clypeolabral margin). A smooth clypeus or the surface with minute punctures is not common among *Ptiloglossa* females. Most males have a smooth clypeus or with only a few scattered punctures as the most common state. A clypeus rugose or with strong punctures looking like a rugose surface, or a clypeus

smooth or with minute punctures, are the other character states for the clypeus surface.

- Interocellar, ocellocular, ocelloccipital and distance of compound eye from occipital margin: Few authors have considered this set of characters but sometimes small variations are decisive for separating *Ptiloglossa* species. Females commonly have interocellar, ocellocular and ocelloccipital distances less than or equal to 1.0 OD; in contrast, it is more common on males having ocellocular and ocelloccipital distances greater than 1.0 OD and interocellar distance less than or equal to 1.0 OD. This means that females have their ocelli close together and close to the compound eyes and the occiput in comparison to males.

Both females and males have the compound eyes at a distance less than 1.0 OD as the most common character state. Females of *P. costaricana* and *P. cyaniventris* have their compound eyes at a distance greater than 1.0 OD from the occipital margin. The compound eyes of *P. chamelensis* and *P. goffergei* males reach the occipital margin.

- Propodeal triangle integument: Almost all females have a smooth (or with minute punctures) propodeal triangle except *P. thoracica* which has striate propodeal triangle. This character varies more among males, being most commonly having the propodeum smooth or with minute punctures, while some other species have the propodeum striate on its sides, but males of *P. arizonensis*, *P. hoplopoda* and *P. rugata* have the basal area of the propodeal triangle rugose.

- Outer hind tibial spur of male: This character is strong and variable enough to form groups of species based on its shape and width (compared to tibial width) on basal area and tip shape. Surprisingly, only a few original descriptions of males include information about this character. In this study, this character is included for the first time. Variations of the inner hind tibial spur of males (serrate or not serrate) are shown to delimit species in some cases.

Most descriptions of *Ptiloglossa* species include a large group of coloration characters (structural or pubescence) but those traits are highly variable, adding difficulty in delimiting species morphologically. Although, most pubescence and integument coloration is uninformative or ambiguous for phylogenetic purposes, the following characters are useful for identification of some *Ptiloglossa* species:

- Labrum and clypeus color: This character varies between females and males but also among them. Females tend to have darker colors in the labrum (dark brown to black) and clypeus (from light brown to black, sometimes brown-reddish), although females of *P. mexicana* have a yellow labrum. The most common color in males for both labrum and clypeus is yellow, although some species have a brown integument but never black.
- Wings color: Even though most *Ptiloglossa* have their wings translucent yellow or brown, this character is highly noticeable when the wings are transparent smoky or translucent dark brown (almost black). Having dark

colored wings is more common in females than males. Only males of *P. colombiana* n.sp., *P. concinna*, *P. olivacea*, *P. psednozona* and *P. torquata* have darker wings than other species.

- Tegulae color: This is useful to separate some species. The color variation goes from light yellow to tawny, brown to dark brown and black.
- Pubescence of vertex, dorsum and mesopleuron: The main difference used when building the keys is whether the setae on these body areas are unicolor or bicolor. Although color variation is important in some species, among a set of specimens it is evident that these characters are highly variable and at some point subjective to the color interpretation and definition of who studied them. For this reason pubescence color was avoided when constructing the keys and in the final phylogenetic character set.
- Abdominal pubescence, marginal bands and T5-T7 pubescence color: This group of characters was included in the phylogenetic analysis as well as in the identification keys mainly because they help to separate female of some species. These as well as other pubescence characters are highly variable and should be used with care.

After having the opportunity of looking at a good representation of the diversity of species in the genus, it became evident that genitalia are crucial to helping delimit *Ptiloglossa* species. In this study, male genitalia were extracted and photographed when dissection was permitted.

Taxonomical treatment: Classification of *Ptiloglossa* Species

Nine of the 56 described species until today are not included in this review. The only specimen of *P. eburnea* Friese seen was at ZMB and is considered the lectotype of the species. After studying the specimen I discovered it is actually a species of *Caupolicana*. After studying all specimens obtained from different sources, no examples of *P. absurdipes* Friese, *P. fassli* Friese, *P. fulvonigra* Moure, *P. pallipes* Friese and *P. steinheili* (Friese) were found including their types. Also I saw no specimens of *P. guinnae*, *P. mayarum* or *P. virigili*, even though I understand the types are housed in SEMC, USNM and ZMB respectively. Because of scarce specimens available for these nine species, a more detailed study is required to determine their status.

The information presented below consists of a re-description of each *Ptiloglossa* species here studied; including comments and current known distribution, followed by a key for identify males and females.

***Ptiloglossa aculeata* Friese**

Ptiloglossa aculeata Friese, 1904: 19.

Ptiloglossa aculeata Schrottky, 1910: 56.

Holotype: Female, from Brazil, Parana, Curitiba; collected in March (ZMB).

Re-description:

Female. Body length 20 mm, forewing length 17 mm. Head. Mandibles dark brown with a rounded dark reddish apex. Preapical tooth with its apex not prominent (almost not differentiated). Malar area length less than 0.5 OD. Labrum brown-reddish, striate on the labroclypeal area. Clypeus brown-reddish, not projected beyond the face (flat, almost concave), integument with strong punctures separated by a distance equal or greater than a puncture width (getting close to the clypeolabral margin), long spine coming from each puncture. Paraocular area, pubescence light yellow. Supraclypeal area, pubescence bare. Supraclypeal area, integument brown. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye with pubescence same color as supraclypeal setae. Interocellar distance greater than 1.0 OD, pubescence light yellow with darker tips and longer than 1.0 OD. Ocellocular distance equal to 0.67 OD. Ocelloccipital distance shorter than 1.0 OD. Compound eye at a distance equal to 0.5 OD from occipital margin. Vertex pubescence light yellow with darker tips, shorter than 2 OD in length. Genal area less than 0.5 eye width, with completely white pubescence.

Mesosoma. Wings translucent yellow. Veins brown. Prestigma as long as stigma. Tegulae tawny, integument no transparent and pubescence covering only 0.5 of its surface. Thorax pubescence completely yellow. Mesopleural pubescence light yellow. Scutum integument black. Scutellum integument dark brown (reddish). Propodeal triangle, integument with minute punctures. Lateral surfaces of propodeum with light yellow pubescence. Venter pubescence light yellow. Front legs light brown to yellow. Medial and hind legs brown. Tarsi light brown to reddish. Apex hind femur pubescence

with a patch of dark hairs. Basitibial plate delimited by an outer carinated ridge. Hind basitarsus, inner margin slightly concave 2 times as long as wide.

Metasoma. T1 with brown integument, pubescence light yellow. T2-T4 with brown integument, pubescence golden-yellow. T4 with marginal area fasciate and a marginal band of whitish setae. T5-T6 with golden-yellow pubescence. Lateral areas of terga, pubescence similar to that on the disc (not white or black, if they are other color than black). Sterna margin pubescence shorter than 1.0 OD.

Material studied: The only specimen studied here was the holotype.

Distribution: Presently known from Argentina (Misiones) and Brazil (Paraná).

Comments: This species is easy to differentiate from females of others because its abdomen does not have the typical metallic luster and it has numerous spines with each coming from a single clypeal puncture; abdomen integument brown and all terga fully covered by dense golden-yellow pubescence.

Ptiloglossa aenigmatica Moure

Ptiloglossa aenigmatica Moure, 1945: 166.

Holotype: Female, not seen. I studied a female specimen from Brazil, São Paulo, Juquiá designated as paratype by Moure (1945) (DZUP).

Re-description:

Male. Body length 17 mm, forewing length 14 mm. Head. Mandibles light brown with a pointed dark reddish apex. Preapical tooth, apex well separated and pointed. Malar area length around 0.5 OD. Labrum and clypeus yellow; labrum smooth; clypeus projected beyond the face and flattened on the disc, integument rugose. Paraocular area pubescence white. Supraclypeal area integument brown-reddish, with light yellow pubescence. Area between antennal socket and compound eye with pubescence same color as supraclypeal setae. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance less than 1.0 OD, pubescence brown (with whitish branches) equal or shorter than 1.0 OD. Ocellocular distance less than 0.25 OD. Ocelloccipital distance greater than 1.5 OD. Compound eye at a distance equal to 0.33 OD from occipital margin. Vertex pubescence completely white or first half white, second half dark brown. Genal area less than 0.5 eye width, with a line of short white hairs close to the margin of the compound eye, followed by a group of yellow setae.

Mesosoma. Wings translucent yellow. Veins brown. Prestigma 2 times longer than stigma. Tegulae brown, transparent, not covered by pubescence. Thorax pubescence tawny with darker tips (lighter on its base). Mesopleural, pubescence light yellow with umber tips. Scutum and scutellum integument dark brown (reddish). Propodeal triangle integument with minute punctures. Lateral surfaces of propodeum with whitish setae with dark brown tips. Venter pubescence whitish on its base and dark brown on its apex. Front legs light brown to yellow. Medial and hind legs brown. Tarsi yellow. Apex hind femur with a patch of dark hairs. Outer hind tibial spur in lateral view shorter than inner tibial spur, basal area rounded and its width less than 0.25 tibial width, formed as a structure protruding from tibiae (normal), projecting and curving downward, tip shape with a long

and slender projection flagellum-like (can be broken). Inner hind tibial spur with well-defined slender dents (serrate). Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1 with brown integument, pubescence whitish with dark brown tips. T2-T4 brown integument, with a marginal band of whitish setae. T3 integument yellow. T5-T7 pubescence mostly whitish intermixed with some scattered dark brown hairs, the latter are closer to T7 apex. T7 brown pubescence on its rim. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) prominent.

Female. Body length 19 mm, forewing length 14 mm. Head. Mandibles brown with a truncate black apex. Preapical tooth with its apex well separated and pointed. Malar area length less than 0.5 OD. Labrum dark brown, with two tubercles on the middle (strong well-differentiated). Clypeus brown-reddish, not projected (rounded on the disc), integument rugose-striate or with strong punctures sometimes suggesting a rugose surface. Paraocular area, pubescence white. Paraocular area, up to supraclypeal area equal or less than diameter 1 antennal socket. Supraclypeal area integument brown reddish, white pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye with pubescence same color as supraclypeal pubescence. Interocellar distance equal to 1.0 OD, pubescence brown (whitish branches) longer than 1.0 OD. Ocellocular distance equal to 1.0 OD. Ocelloccipital distance shorter than 1.0 OD. Compound eye at a distance 0.75 to 1.0 OD from occipital margin. Vertex pubescence dark brown to black, shorter than 2 OD. Genal

area less than 0.5 eye width, with white pubescence and scarce dark brown hairs close to compound eye margin.

Mesosoma. Wings translucent brown. Veins brown-reddish. Prestigma as long as stigma. Tegulae tawny, integument transparent and pubescence covering 0.5 of its surface. Thorax pubescence first half whitish whit darker tips. Mesopleural, pubescence whitish with tawny tips. Scutum and scutellum integument reddish. Propodeal triangle, integument smooth. Lateral surfaces of propodeum with whitish pubescence. Venter pubescence whitish. Front and medial legs brown. Hind legs dark brown. Tarsi light brown to reddish. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate present and well delimited by strong ridges on each side (outer and inner). Hind basitarsus, inner margin slightly concave, 2 times as long as wide.

Metasoma. T1 with black integument, basal portion of pubescence whitish with black apex (and whitish branches). T2-T4 with dark brown to black integument, pubescence dark brown except for those white setae on the marginal band. T1-T4 with marginal area fasciate. T5-T6 with mostly dark brown pubescence but with some whitish setae on the sides of each tergum. Lateral areas of terga, pubescence white. Sterna margin pubescence as long as or longer than 2 OD.

Material studied: [1 Female-paratype] Brasil, Sao Paulo, Juquiá, Fonte Tapir, 400m, 3-xi-1940. Trav. & Trav. Fo.(DZUP). [2 Females, 2 Males] Brasil, Sao Paulo, Ubatuba (Base Inst. Ocean.), 26.1.9.ii.1971 Luz, P. Montouchet col. (MZUSP). [1Female] Brasil, Carquejo, Est. Ceara. Dirings (MZUSP). [2 Females] Brasil, Mato Grosso, Barro do Tapirape, 01/15/1966, Borys Malkin (SEMC).

Distribution: Presently known only from Brazil (Ceara, Mato Grosso, Minas Gerais, São Paulo).

Comments: Female of this species resembles *P. hondurasica* but differs with the thorax pubescence being white on its base with yellow tips on dorsum and completely yellow on mesopleura, also T1 pubescence is light yellow and dense on its sides, T2-T5 pubescence yellow, T2-4 with white pubescence on apical bands; T5-6 with tawny hairs and venter with yellow hairs; also eyes converge above; interocellar distance greater than 1.0 OD.

Here I describe for the first time the male of this species. Males of *P. aenigmatica* are very similar to the females but differs by the thorax dark brown (reddish), T3 yellow integument; T1 pubescence whitish with dark brown tips, T5-T7 pubescence mostly whitish intermixed with some scattered dark brown hairs, the latter are closer to T7 apex; outer hind tibial spur basal area rounded, protruding from tibia (normal), with a long-slender projection flagellum-like, inner hind tibial spur serrate.

Ptiloglossa amita Moure

Ptiloglossa amita Moure, 1987: 112.

Holotype: Male, from Brazil, Amazonas, Tefé (DZUP), female (paratype) with same locality but different collector and date of collection.

Re-description:

Male. Body length 17 mm, forewing length 14 mm. Head. Mandibles light brown with a truncate dark reddish apex. Preapical tooth, apex well separated and pointed. Malar area length less than 0.5 OD. Labrum and clypeus yellow; labrum smooth; clypeus projected beyond the face and flattened on the disc, integument without punctures (or few scattered). Paraocular area pubescence light yellow. Supraclypeal area integument light brown, with yellow pubescence (light yellow at the base). Area between antennal socket and compound eye with pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance equal to 1.0 OD, pubescence light yellow with some scattered brown setae, longer than 1.0 OD. Ocellocular distance equal to 0.25 OD. Ocelloccipital distance equal to 1.0 OD. Compound eye at a distance between 0.75 and 1.0 OD from occipital margin. Vertex pubescence yellow. Genal area as wide as 0.5 eye width, with white to light yellow pubescence.

Mesosoma. Wings translucent yellow. Veins brown. Prestigma 2 times longer than stigma. Tegulae yellow, no transparent, fully covered by dense pubescence. Thorax pubescence yellow with tawny tips (visible in lateral view). Mesopleural, pubescence light yellow, with amber tips. Scutum and scutellum integument dark brown (reddish). Propodeal triangle, integument striate on the sides. Lateral surfaces of propodeum with whitish pubescence with dark brown tips. Venter pubescence completely yellow. Front and medial legs light brown to yellow. Hind legs brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in lateral view as long as inner tibial spur, basal area bulbous, width 0.5 of tibial width, projection forming a right

angle from tibiae, tip shape rounded, slightly concave (like a spoon shape) and flattened (Figure 7). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.75 tibial length.

Metasoma. T1 with brown integument, pubescence yellow to tawny with darker tips. T2-T4 integument brown, with dark brown pubescence and a marginal band of whitish setae. T4 with dark brown pubescence and some orange setae restricted to the lateral part of tergite. T4-T5 without pubescence on the lateral side (trichotrichia). T5 to T7 pubescence mostly whitish but intermixed with some scattered dark brown hairs, the latter are closer to T7 apex. T7 dark brown pubescence on its rim. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) prominent.

Female. Body length 19 mm, forewing length 13 mm. Head. Mandibles dark brown with a rounded dark reddish apex. Preapical tooth, apex divided in two forming 2 tiny pointed teeth. Malar area, length less than 0.5 OD. Labrum and clypeus dark brown; labrum with two tubercles on the middle (strong well-differentiated); clypeus projected beyond the face and flattened on the disc; integument rugose-striate or with strong punctures sometimes suggesting a rugose surface. Paraocular area pubescence whitish mixed with scattered longer dark setae. Supraclypeal area integument brown, pubescence whitish mixed with scattered longer black setae. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye with a spot of darker setae (dark grey to black). Interocellar distance equal to 1.0 OD,

pubescence dark brown, longer than 1.0 OD. Ocellocular distance equal to 0.33 OD. Ocelloccipital distance shorter than 1.0 OD. Compound eye at a distance equal to 0.5 OD from occipital margin. Vertex pubescence dark brown to black, equal or longer than 2 OD. Genal area less than 0.5 eye width, with white pubescence.

Mesosoma. Wings translucent yellow. Veins brown. Prestigma 2 times longer than stigma. Tegulae dark brown, no transparent, pubescence covering 0.5 of it. Thorax pubescence light brown on its base and dark brown at the tips. Mesopleural, pubescence whitish with dark tips (look like grey hairs). Scutum and scutellum integument dark brown (reddish). Propodeal triangle integument smooth. Lateral surfaces of propodeum with light yellow pubescence. Venter pubescence dark hairs on the middle surrounded by white pubescence. Front and medial legs light brown to yellow. Hind legs brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate delimited by an outer carinated ridge. Hind basitarsus, inner margin slightly concave 2 times as long as wide.

Metasoma. T1-T4 integument reddish. T1 pubescence yellow with darker tips, marginal area fasciate. T2-T4 tawny pubescence on the disc (light yellow at its base) with whitish pubescence on marginal area. T5-T6 with dark brown to black pubescence. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). Sterna margin, pubescence as long as or longer than 2 OD.

Material studied: [1 Male-holotype] Brasil, Amazonas, Tefé, i-1961. R. Carvalho (DZUP). [1 Female-paratype] Brasil, Amazonas, Tefé, 400m, 1-4-xii-1965. F.M. Oliveira (DZUP).

Distribution: Presently known from Brazil (Amazonas), Peru (Loreto) and Venezuela.

Comments: Males are similar to those of *P. lucernarum* and *P. pretiosa* but differs by the outer hind tibial spur having basal area bulbous, width 0.5 of tibial width, projection forming a right angle from tibiae, tip shape rounded, slightly concave (like a spoon shape) and flattened. Females resemble *P. decipiens* but the ocellocular distance is less than 0.5 OD and pubescence of T2-T4 is dark yellow with white marginal bands.

Moure (1987) reported one male from Brazil, Amazonas, Manaus, x-1945, W. Praetorius coll., Donor Frank Johnson, and a female from Venezuela, Auyantepui, 1850 mts, Janeiro-1938, Phelps Venez. Expedition as paratypes, although I did not find those specimens at the AMNH.

Ptiloglossa arizonensis Timberlake

Ptiloglossa arizonensis Timberlake, 1946: 157.

Ptiloglossa arizonensis Timberlake, 1965: 47.

Holotype: Female, from United States, Arizona, Portal; not seen. Among specimens studied there are two paratypes from Arizona, Portal and two other paratypes from Arizona, Douglas, Chicarahua Mts. (UCRC).

Re-description:

Male. Body length 17 mm, forewing length 14 mm. Head. Mandibles light brown with a pointed dark reddish apex. Preapical tooth apex smooth and rounded. Malar area length between 0.75 to 1.0 OD. Labrum dark brown, with one round medial projection. Clypeus brown-reddish, not projected (rounded on the disc), with punctures separated by a distance less than a puncture diameter (sometimes minute). Paraocular area pubescence light yellow. Supraclypeal area, integument brown-reddish, with yellow pubescence (light yellow at the base). Supraclypeal area, integument brown-reddish. Area between antennal socket and compound eye with pubescence same color as supraclypeal setae. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance equal to 1.0 OD, pubescence yellow, longer than 1.0 OD. Ocellocular distance equal to 0.5 OD. Ocelloccipital distance equal to 1.0 OD. Compound eye at a distance between 0.75 and 1.0 OD from occipital margin. Vertex pubescence yellow. Genal area less than 0.5 eye width, with a line of short white hairs close to the margin of the compound eye, followed by a group of yellow hairs.

Mesosoma. Wings translucent brown. Veins yellow (tawny). Prestigma 2.5 times longer than stigma. Tegulae yellow, no transparent, fully covered by dense pubescence. Thorax pubescence on dorsum and pleura completely tawny (lighter on its base). Scutum and scutellum black. Propodeal triangle slightly rugose at its basal margin. Lateral surfaces of propodeum with tawny setae (light at the base). Venter pubescence completely yellow or tawny. Front, middle and hind legs light brown to yellow. Tarsi yellow. Apex hind femur with pubescence same color than other. Outer hind tibial spur in lateral view shorter than inner tibial spur, basal area rounded and its width equal to 0.25 of tibial width, formed as a structure protruding from tibiae (normal), projection forming

an acute angle from tibiae, tip shape bulbous and wider than the tip of the inner tibial spur (Figure 8). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1 with dark brown integument, pubescence yellow (or golden yellow). T2-T4 with dark brown integument, pubescence golden (yellow) on the disc and tawny on marginal area. T5- T7 pubescence completely dark yellow (tawny). T7 with brown pubescence on its rim brown. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn -like spines) prominent. S7, S8 and genital capsule as in Figure 43.

Female. Body length 20 mm, forewing length 14 mm. Head. Mandibles completely dark brown (almost black), rounded apex. Preapical tooth, apex smooth and rounded. Malar area length less than 0.5 OD. Labrum dark brown, with two tubercles on the middle (strong well-differentiated). Clypeus brown-reddish, not projected (rounded on the disc), integument rugose-striate or with strong punctures sometimes suggesting a rugose surface. Paraocular area with short white pubescence intermixed with scattered light yellow longer setae. Supraclypeal area integument black, with light yellow pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye with a spot of darker hairs (dark grey to black). Interocellar distance shorter than 1.0 OD, pubescence light yellow with darker tips, longer than 1.0 OD. Ocellocular distance greater than 1.0 OD. Ocelloccipital distance shorter than 1.0 OD. Compound eye at a distance 0.75 to 1.0 OD from occipital

margin. Vertex pubescence yellow, equal or longer than 2 OD. Genal area as wide as 0.5 eye width, with white pubescence.

Mesosoma. Wings translucent yellow. Veins yellow (tawny). Prestigma 2 times longer than stigma. Tegulae tawny, transparent, with pubescence covering 0.5 it. Thorax pubescence light yellow with dark-yellow tips. Mesopleural, pubescence yellow with tawny tips. Scutum and scutellum dark brown (reddish). Propodeal triangle integument with minute punctures. Lateral surfaces of propodeum with whitish setae. Venter pubescence light yellow. Front legs light brown to yellow. Medial and hind legs brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate present (delimited by an outer ridge). Hind basitarsus inner margin slightly concave, width 2 times as long as wide.

Metasoma. T1 with brown integument, light yellow pubescence. T2-T4 black integument, with light yellow pubescence (looking whitish on the marginal band). T1-T4 marginal area fasciate. T5-T6 covered by dark brown to black pubescence. Lateral areas of terga pubescence black or dark brown. Sterna margin pubescence as long as or longer than 2 OD.

Material studied: [1 Female] USA, Arizona, Cochise, Douglas, 22-Aug-43, W. W. Jones, Netting (AMNH_BEE 00134652). [3 Males] USA, Arizona, Cochise, Portal, 27-Jul-67, V. Roth, Netting, 1500 (AMNH_BEE 00134656 to 58). [10 Females] USA, Arizona, Cochise, 3 mi NE of Portal, 21-Aug-70, J. G. Rozen & K. C. Rozen, Netting, Fabaceae, Cassia (AMNH_BEE 00134479 to 82, AMNH_BEE 00134487, AMNH_BEE 00134646 to 50). [1 Female] USA, Arizona, Cochise, 6 mi NE of Portal, 21-Aug-71, J.

G. Rozen & M. Favreau, Netting (AMNH_BEE 00134491). [2 Females] USA, Arizona, Cochise, 6 mi NE of Portal, 24-Aug-71, J. G. Rozen & M. Favreau, Netting (AMNH_BEE 00134492, AMNH_BEE 00134498). [1 Female] USA, Arizona, Cochise, Portal, 31-Aug-82, J. G. Rozen, from nest #1, Netting, 1500 (AMNH_BEE 00134642). [1 Female] USA, Arizona, Cochise, Portal, 1-Sep-82, J. G. Rozen, Netting, 1500 (AMNH_BEE 00134493). [1 Male] USA, Arizona, Cochise, Southwestern Research Station (SWRS), 5 mi W of Portal, 1-Aug-56, C. Cazier & M. A. Cazier, Netting, (AMNH_BEE 00134655). [2 Males] USA, Arizona, Cochise, Portal, 5-Jul-64, J. H. Puckle, M. A. Mortenson & M. A. Cazier, Netting, 1433 (AMNH_BEE 00134653 - 54). [1 Female] USA, Arizona, Cochise, Portal, 13-Jul-64, J. H. Puckle, M. A. Mortenson & M. A. Cazier, Netting, 1433 (AMNH_BEE 00134478). [2 Females] USA, Arizona, Cochise, Portal, 1-Sep-82, J. G. Rozen, Netting, 1500 (AMNH_BEE 00134643 - 44). [2 Females] USA, Arizona, Cochise, Portal, 2-Sep-82, J. G. Rozen, from nest of #6, Netting, 1500 (AMNH_BEE 00134645). [1 Female] USA, Arizona, Cochise, Southwestern Research Station (SWRS), 5 mi W of Portal, 2-Aug-56, C. Cazier & M. A. Cazier, Netting (AMNH_BEE 00134483). [1 Female] USA, Arizona, Cochise, Southwestern Research Station (SWRS), 5 mi W of Portal, 12-Jul-56, E. Ordway, Netting (AMNH_BEE 00134485). [1 Female] USA, Arizona, Cochise, Southwestern Research Station (SWRS), 5 mi W of Portal, 17-Jul-56, Ordway, Netting (AMNH_BEE 00134489). [1 Female] USA, Arizona, Cochise, Southwestern Research Station (SWRS), 5 mi W of Portal, 24-Jul-56, Ordway, Netting (AMNH_BEE 00134486). [1 Female] USA, Arizona, Cochise, Southwestern Research Station (SWRS), 5 mi W of Portal, 28-Jul-56, Ordway, Netting (AMNH_BEE 00134484). [1 Female] USA, Arizona, Cochise,

Portal, 24-Jul-64, J. H. Puckle, M. A. Mortenson & M. A. Cazier, Netting, 1433
 (AMNH_BEE 00134488). [1 Female] USA, Arizona, Cochise, Portal, 15-Aug-83, J. G.
 Rozen & M. Favreau, Netting, 1500 (AMNH_BEE 00134490). [3Females] USA,
 Arizona, Cochise, 2 mi E of Paradise, 17-Aug-83, J. G. Rozen & M. Favreau, Netting
 (AMNH_BEE 00134494 - 97). [1 Female] USA, Arizona, Cochise, Portal, 25-Aug-83, J.
 G. Rozen, Netting, 1500 (AMNH_BEE 00134497). [1 Male] USA, Arizona, Graham,
 Noon Creek, Graham Mountains, 25-Jul-69, G. D. Butler (AMNH_BEE 00134659). [1
 Male] USA, New Mexico, Hidalgo, mi 6 Rucker Canyon (31.6795 N, 109.3112 W), 29-
 Aug-2008, R. I. Velez-Ruiz (MEFLG). [1 Male] USA, AZ, Huachuca Mts., Copper
 Canyon W of Montezuma, On *Cuercus hypoleucoides*, A. Camus (SEMC). [1] Mexico,
 Morelos, Sierra de Huatla, C.E.A.M.I.S.H., Huatla, 2.5km N, 4.0km W, 1050ft,
 18.45000 -99.03330, 09/04/1996, Robert Brooks (SEMC 254214). [1 Female] USA, AZ,
 Cochise, Cave Creek Ranch 1 mi S Portal, Ex *Solanum elaeagnifolium*, 8/17/1969, E.G.
 Linsley (SEMC). [2] USA, Arizona, Cochise, Cave Creek Ranch, 1 mi S Portal, 31.90920
 -109.14530, *Solanum elaeagnifolium*, 08/03/1969, E. Linsley (SEMC 990654-990655).
 [1] USA, Arizona, Cochise, Cave Creek Ranch, 1 mi S Portal, 31.90920 -109.14530,
Solanum elaeagnifolium, 08/05/1969, E. Linsley, (SEMC 990656). [1] USA, Arizona,
 Cochise, Cave Creek Ranch, 1 mi S Portal, 31.90920 -109.14530, *Solanum*
elaeagnifolium, 08/12/1969, E. Linsley, (SEMC 990657). [1] USA, Arizona, Cochise,
 Cave Creek Ranch, 1 mi S Portal, 31.90920 -109.14530, *Solanum elaeagnifolium*,
 08/17/1969, E. Linsley, (SEMC 990658). [3] USA, Arizona, Cochise, Paradise, *Solanum*
elaeagnifolium, 08/19/1969, E. Linsley (SEMC 990659). [3] USA, Arizona, Cochise,
 Portal, 2 mi N, 31.94250 -109.14080, 08/19/1970, E. Linsley (SEMC 990664-99066-

990666). [1] USA, Arizona, Cochise, Portal, 2 mi N, 31.94250 -109.14080, 08/21/1970, E. Linsley (SEMC 990667). [1] USA, Arizona Cochise, Portal, 31.91360 -109.14080, *Solanum elaeagnifolium*, 08/13/1963, E. Linsley (SEMC 990668). [1] USA, Arizona, Cochise, Carr Canyon; Huachuca Mts., 5400ft, 08/18/1971, Roy Snelling (SEMC 990669). [1] USA, Arizona, Cochise, Huachuca Mts., Copper Canyon, W of Montezuma Pass, *Quercus hypoleucoides*, 07/30/1987, G. Nelson (SEMC 990670). [1] USA, Arizona, Cochise, Carr Canyon; Huachuca Mts., 5400ft, 08/09/1952, Leech & Green (SEMC 990671). [1] USA, Arizona, Cochise, Huachuca Mts, Ash Canyon, 31.38190 - 110.22440, 06/26/1989 (SEMC 990672). [1] USA, Texas, Cameron Cameron, Southmost, *Passiflora*, 04/16/1952, Michener, Beamer, LaBerge, Wille (SEMC 990673). [1] USA, Arizona, Cochise, Davis Mt; Cochise Mine, off San Simone Rd, turnoff 5 mi from Portal Rd Jct., 5500ft, 07/1967, J. Linsley (SEMC 990674). [1] USA, Arizona, Cochise, Portal; Foothills Rd., *Solanum*, 08/15/1985, Ethel Villalobos (SEMC 990676). [1] USA, Arizona, Cochise, Rustlers Park, 2 mi E; Chiricahua Mts., 08/05/1972 (SEMC 990677). [1] USA, Arizona, Cochise, Portal; Foothills Rd. *Solanum*, 08/15/1985, Ethel Villalobos (SEMC 990678). [2 Females-Paratypes] USA, AZ, Portal, 8/12/1944, W.W. Jones (UCRC ENT 427052 – 427053). [1 Female-Paratype] USA, AZ, Douglas, Chicarahua Mts., 8/22/1947, W.W. Jones (UCRC ENT 427054). [1 Female-Paratype] USA, AZ, Douglas, Chicarahua Mts., 8/22/1943, W.W. Jones (UCRC ENT 427055). [1 Female] USA, AZ, Cochise, 1 mi E. Portal, 8/11/1967, E.I. Schlinger (UCRC ENT 427056). [1 Male] USA, AZ, Pima Co., Box Cyn. Santa Rita Mts., T19S R15E S12, 7.viii.1999, R.A. Weppler (UCRC ENT60068). [1 Male] Mexico, Sonora, 30 mi E. Agua Prieta, (Before daybreak), July 31, 1974, Vincent D. Roth (UCRC ENT 427061). [1

Male] USA, AZ, Pima County, Box Canyon, Santa Rita Mountains, July 25, 1989 (UCRC ENT 427060). [1 Male] USA, Arizona, Pima Co., Box Canyon, 1465m, 31 47' 53"N 110 46' 38"W, 22-vii-2000, D. Powell (UCRC ENT41111).

Distribution: Presently known from United States (Arizona, New Mexico, Texas), Mexico (Morelos).

Comments: Females resemble those of *P. eximia* but differs by the pubescence of T2-T4 light yellow and differ from *P. mexicana* in yellow with tawny tips pubescence on dorsum and mesopleura. In both cases *P. arizonensis* has the clypeus not projecting and rounded on the disc. Males of this species are similar to *P. jonesi* and *P. mexicana* but differs by having a brown-reddish clypeus, not projected and rounded on the disc; tip shape of the outer hind tibial spur is bulbous and basal area rounded.

Ptiloglossa buchwaldi Friese

Ptiloglossa buchwaldi Friese, 1908: 21.

Lectotype: Female, from Ecuador, Guayas, Guayaquil (ZMB).

Re-description:

Female. Body length 19 mm, forewing length 14 mm. Head. Mandibles dark brown (almost black) with rounded apex. Preapical tooth apex well separated and pointed. Malar area, length less than 0.5 OD. Labrum brown, with two tubercles on the middle (strong well-differentiated). Clypeus brown-reddish, projected beyond the face and flattened on the disc, integument rugose-striate or with strong punctures sometimes

suggesting a rugose surface. Paraocular area pubescence white. Supraclypeal area integument black, with whitish pubescence intermixed with scattered longer black setae. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye with a spot of darker setae (dark grey to black). Interocellar distance shorter than 1.0 OD, pubescence brown, longer than 1.0 OD. Ocellocular distance equal to 0.67 OD. Ocelloccipital distance shorter than 1.0 OD. Compound eye at a distance equal to 0.5 OD from occipital margin. Vertex pubescence dark brown to black. Genal area less than 0.5 eye width, with white pubescence.

Mesosoma. Wings translucent yellow. Veins yellow (tawny). Prestigma 2.5 times longer than stigma. Tegulae yellow, transparent, with pubescence covering 0.5 of it. Thorax pubescence tawny with darker tips. Mesopleural, pubescence dark brown (with whitish branches). Scutum and scutellum black. Propodeal triangle integument with minute punctures. Lateral surfaces of propodeum with light yellow pubescence. Venter pubescence golden-yellow. Front, medial and hind legs brown. Tarsi light brown to reddish. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate present delimited by an outer carinated ridge. Hind basitarsus, inner margin slightly concave, 1.5 times as long as wide.

Metasoma. T1-T2 yellow (dark yellow) integument. T1 pubescence yellow with darker tips. T2 pubescence tawny (except for those on the marginal band). T3-T4 integument brown, pubescence dark brown (except for those on the marginal band). T1-T4 marginal area fasciate. T2-T4 whitish pubescence on marginal area. T5 to T6 pubescence dark brown on the disc and light brown close to the margin. Lateral areas of

terga, pubescence black or dark brown. Sterna margin, pubescence as long as or longer than 2 OD.

Material studied: [1 Female-lectotype] Ecuador, Guayas, Guayaquil, September, F.G. v. Buchwald (ZMB).

Distribution: Presently known from Colombia (Popayan); Costa Rica; Ecuador (Guayaquil).

Comments: This species was considered as a subspecies of *P. ducalis* but differs by having pubescence of thorax tawny with darker tips, pubescence of mesopleura dark brown. Males have a hefty long outer tibial spur and yellow clypeus (Friese 1908).

Ptiloglossa chamelensis Ayala & Engel

Ptiloglossa chamelensis Ayala & Engel, 2014: 3.

Holotype: Male, from México, Jalisco, Chamela, (Instituto de Biología, Universidad Nacional de México; IB-UNAM).

Re-description:

Male. Body length 21 mm, forewing length 15 mm. Head. Mandibles brown with pointed black apex. Preapical tooth apex not prominent (almost not differentiated). Malar area length less than 0.5 OD. Labrum and clypeus yellow (being labrum darker yellow); labrum smooth; clypeus projected beyond the face and flattened on the disc, integument without punctures or few scattered. Paraocular area pubescence yellow. Supraclypeal area

integument brown-reddish, with yellow pubescence. Area between antennal socket and compound eye with pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance equal to 1.0 OD, pubescence tawny, equal or shorter than 1.0 OD. Ocellocular distance equal to 0.25 OD. Ocelloccipital distance greater than 1.5 OD. Compound eye reaching the occipital margin. Vertex pubescence tawny. Genal area less than 0.5 eye width, pubescence completely yellow.

Mesosoma. Wings translucent brown. Veins yellow (tawny). Prestigma 2 longer than stigma. Tegulae yellow, transparent, pubescence covering 0.5 of it. Thorax pubescence first half tawny with darker tips. Mesopleural, pubescence tawny with darker tips. Scutum and scutellum integument dark brown (reddish). Propodeal triangle, integument striate on the sides. Lateral surfaces of propodeum with light yellow, darker tips pubescence. Venter pubescence tawny with darker tips. Front and medial legs light brown to yellow. Hind legs brown. Tarsi tawny. Apex hind femur pubescence same color than other. Outer hind tibial spur in lateral view shorter than inner tibial spur, basal area laterally flattened and its width is equal to 0.5 of tibial width, spur projection almost parallel to margin of tibiae, tip shape laterally flattened (Ayala & Engel 2014). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.75 tibial length.

Metasoma. T1-T4 with reddish integument reddish. T1 pubescence yellow or tawny with darker tips. T2-T4 pubescence dark brown (except for those golden hairs on the marginal band). T5 to T7 pubescence completely dark brown to black. T7 with brown

pubescence on its rim. Lateral areas of terga, pubescence black. S6 projections on the side (thorn-like spines) prominent.

Female. Body length 20 mm, forewing length 13 mm. Head. Mandibles brown with black apex with a rounded apex. Preapical tooth, apex divided in two forming 2 tiny pointed teeth. Malar area, length less than 0.5 OD. Labrum brown, smooth. Clypeus brown-reddish, projected beyond the face and flattened on the disc, integument with many minute punctures. Paraocular area, pubescence whitish mixed with scattered longer dark hairs. Supraclypeal area integument black with whitish pubescence mixed with scattered longer black hairs. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance equal to 1.0 OD, pubescence whitish with darker tips, equal or shorter than 1.0 OD. Ocellocular distance greater than 1.0 OD. Ocelloccipital distance shorter than 1.0 OD. Compound eye at a distance equal to 0.5 OD from occipital margin. Vertex pubescence black. Genal area less than 0.5 eye width, with pubescence completely white.

Mesosoma. Wings translucent yellow. Veins yellow (tawny). Prestigma 2 longer than stigma. Tegulae brown, not transparent and not covered by pubescence. Thorax pubescence light brown on its base and dark brown at the tips. Mesopleural, pubescence black (sometimes with dark brown branches). Scutum and scutellum integument black. Propodeal triangle, integument with minute punctures. Lateral surfaces of propodeum with light yellow setae with darker tips. Venter pubescence black with whitish or brown branches. Front, medial and hind legs dark brown. Tarsi tawny. Apex hind femur

pubescence with a patch of dark hairs. Basitibial plate present and well delimited by strong ridges on each side (outer and inner). Hind basitarsus, inner margin slightly concave 2 times as long as wide.

Mesosoma. T1-T4 integument black, pubescence completely golden-yellow, marginal area fasciate present. T2-T4 pubescence color on marginal area equal to pubescence on disc. T5-T6 pubescence completely dark brown to black. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). Sterna margin, pubescence as long as or longer than 2 OD.

Material studied: [1 Male-holotype] Mexico, Jalisco, Chamela, 26/30-IX-1985, F.D. Parker & T.L. Griswold (IB-UNAM). [1 Male-paratype] Mexico, Morelos, Huatla, Sierra de Huatla, C.E.A.M.I.S.H, 2.5 Km N, 40 Km W., 1050 m, 18 27' 0'' N 99 2' 0'' W, (MEX 1986 005), 9/4/1996, R. Brooks (SEMC). [1 Female-paratype] Mexico, Puebla, NW Concha, Sinaloa, taken on *Amoreuxia palmatifida*, 7/20/1953, Univ. Kasas Mexico Expedition, (SEMC). [1 Female-paratype] Mexico, approx. 14 mi E San Blas, Nayarit, Antigonon 6:35 am, 7/2/1968, D.H.J. (SEMC). [1 Male-4 Females] Mexico, Michoacan, Gabriel Zamora, 2 mi N., 06/10/1968, Daniel Janzen (SEMC 990661, 990682 to 990685). [1 Female] Mexico, Nayarit, San Blas, approx. 14 mi E. 07/02/1968, Daniel Janzen (SEMC 990697). [1 Female] Mexico, Jalisco, Chamela Biological Station, 19.53330 - 105.06670, 07/26/1982, S. Bullock (SEMC 990694). [6 Females] Mexico, Sinaloa, La Concha, 3 mi NW; Escuinapa 50m, *Amoreuxia palmatifida*, 07/29/1953, Univ. of Kans. Mex. Exped. (SEMC 990686 to 990691). [1 Female] Mexico, Jalisco, Chamela, 09/13/1983, S. Bullock (SEMC 990695). [1 Male] Mexico, Jalisco, Chamela Biological Station, 19.53330 - 105.06670, 09/25/1985, Charles Michener (SEMC 990693). [1

Female] Mexico, Jalisco, Chamela Biological Station, 19.53330 -105.06670, 09/17/1985, F. Noguera (SEMC 990696). [1 Female] Mexico, Jalisco, Fiesta Amer. sign; Melaque, 21 km N., 10/22/1987, Chemsak & Powell (SEMC 990692).

Distribution: Presently known from Mexico (Jalisco, Michoacán, Morelos, Nayarit, Puebla and Sinaloa).

Comments: This species resembles *P. rugata* but males differ by having the tip of the outer hind tibial spur laterally flattened and the ocellocular distance equal to 0.25 OD; females have metasoma almost covered by golden-yellow pubescence, T5-T6 pubescence dark brown to black; clypeus brown-reddish, projected beyond the face and flattened on the disc.

Ptiloglossa colombiana Velez-Ruiz, new species

(Figures 2 & 3)

Holotype: Male, from Colombia, Caldas, Antioquia (MEFLG).

Description:

Male. Body length 22 mm, forewing length 15.5 mm. Head. Mandibles brown with pointed black apex. Preapical tooth, apex well separated and pointed. Malar area, length less than 0.5 OD. Labrum light brown, smooth. Clypeus dark brown, projected beyond the face and flattened on the disc, rugose integument. Paraocular area, pubescence white (with some scattered dark brown to black hairs). Supraclypeal area integument black, pubescence whitish mixed with scattered longer black hairs. Area between antennal socket and compound eye, pubescence with a spot of darker hairs (dark

grey to black). Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance less than 1.0 OD, pubescence dark brown, longer than 1.0 OD. Ocellocular distance equal to 0.33 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance between 0.75 and 1.0 OD from occipital margin. Vertex pubescence dark brown. Genal area less than 0.5 eye width, pubescence completely white or light yellow.

Mesosoma. Wings translucent brown. Veins brown-reddish. Prestigma 2 longer than stigma. Tegulae dark brown, no transparent, fully covered by dense pubescence. Thorax pubescence yellow with dark tips, axillae pubescence black to very dark-brown. Mesopleural, pubescence black hairs with whitish branches (looks like black hairs). Scutum and scutellum integument black. Propodeal triangle, integument smooth. Lateral surfaces of propodeum with a mix of completely light yellow hairs and light yellow with darker tips hairs. Venter pubescence completely black. Front, medial and hind legs black. Tarsi light brown-reddish. Apex hind femur pubescence same color than other. Outer hind tibial spur in lateral view as long as inner tibial spur, basal area laterally flattened and its width almost as wide as tibiae, spur projection curving downward, tip shape laterally flattened (Figure 2B). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument black. T1 pubescence yellow (or golden yellow). T2-T3 pubescence black. T4 pubescence golden-yellow. T4 to T5 with a spot apparently without pubescence on the lateral side (trichotrichia). T5 to T7 pubescence golden-yellow. T7 pubescence on its rim black. Lateral areas of terga, pubescence similar to

those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn -like spines) prominent. S7, S8 and genital capsule as in Figure 3.

Holotype: Male, Colombia, Antioquia, Caldas, En vuelo, Oct. 1973, R. Velez (MEFLG).

Paratype: Male, Colombia, Antioquia, Caldas, En vuelo, Sept. 1973, G. Sierra (MEFLG).

Etymology: The species name comes from the country where was first collected by R. Velez (Colombia, Caldas, Antioquia).

Distribution: Presently known only from Colombia (Antioquia)

Comments: This species resembles *P. concinna* but differs by having the labrum smooth, vertex pubescence black, genal area less than 0.5 eye width, thorax pubescence yellow with dark tips, axillae pubescence black to very dark-brown, T1 and T4 pubescence golden-yellow.



Figure 2. *Ptiloglossa colombiana* male, new species from Colombia. **A.** Lateral view; **B.** Hind tibial spur.

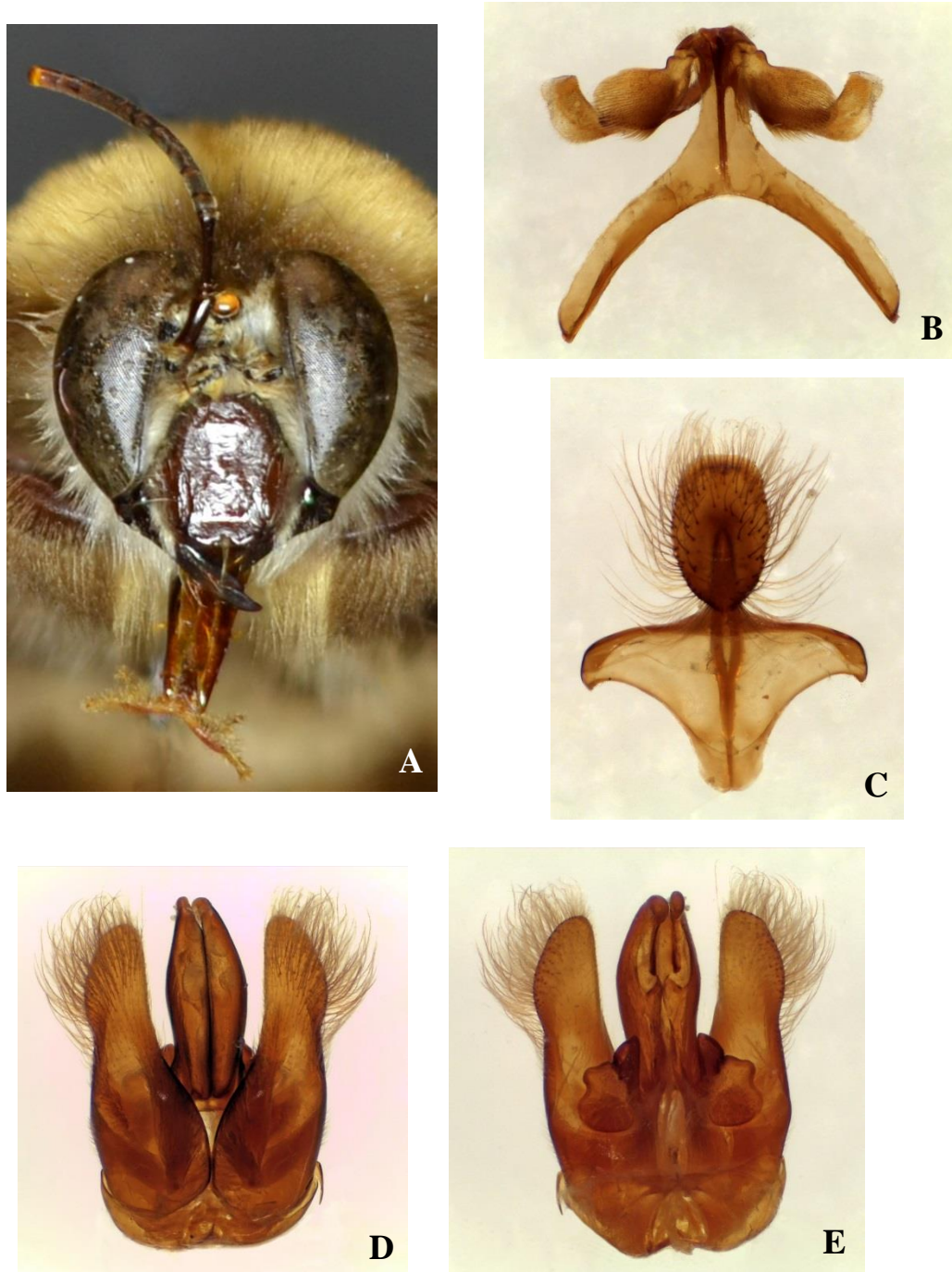


Figure 3. *Ptiloglossa colombiana* new species: **A.** Face; **B.** Metasomal sternum 7 (S7), dorsal view; **C.** Metasomal sternum 8 (S8), dorsal view; **D.** Genitalia dorsal view; **E.** Genitalia ventral view.

Ptiloglossa concinna Moure

Ptiloglossa concinna Moure, 1987: 122.

Holotype: Male, from Peru, Lambayeque, Olmos (DZUP).

Re-description:

Male. Body length 17 mm, forewing length 13.5 mm. Head. Mandibles dark brown with a pointed dark reddish apex. Preapical tooth, apex smooth and rounded. Malar area, length around 0.5 OD. Labrum dark brown, with one round medial projection. Clypeus brown-reddish, projected beyond the face and flattened on the disc, integument with strong punctures sometimes suggesting a rugose surface. Paraocular area, pubescence white. Supraclypeal area integument brown-reddish with white pubescence. Area between antennal socket and compound eye with a spot of darker hairs (dark grey to black). Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance less than 1.0 OD, pubescence brown with whitish branches, equal or shorter than 1.0 OD. Ocellocular distance equal to 0.5 OD. Ocelloccipital distance greater than 1.5 OD. Compound eye at a distance equal to 0.33 OD from occipital margin. Vertex pubescence completely white or first half white, second half dark brown. Genal area as wide as 0.5 eye width with completely white or light yellow pubescence.

Mesosoma. Wings translucent dark brown (almost black). Veins dark brown. Prestigma 2 longer than stigma. Tegulae dark brown, no transparent, fully covered by dense pubescence. Thorax pubescence completely black. Mesopleural, pubescence light yellow, with tawny tips. Scutum and scutellum integument black. Propodeal triangle,

integument with minute punctures. Lateral surfaces of propodeum with whitish setae. Venter pubescence whitish on its base and dark brown on its apex. Front, medial and hind legs dark brown. Tarsi dark brown. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur, in lateral view shorter than inner tibial spur, basal area laterally flattened almost as wide as tibiae, forming an acute angle from tibiae, tip shape laterally flattened (Figure 9). Inner hind tibial spur with well defined, slender dents. Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument black, T1 pubescence whitish with dark brown tips. T2-T4 pubescence black, without marginal bands. T1 marginal area fasciate absent. T5-T7 pubescence mostly whitish but intermixed with some scattered dark brown hairs, the latter are closer to T7 apex. T7 pubescence on its rim black. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn -like spines) prominent.

Material studied: [1 Male-holotype] Peru, Olmos, Lambayeque, i-1950, W.A. Llanos (DZUP). [2 Females] Ecuador, Azuay, Rio Leon (abt 50 mi along rd from Cuenca to Loja), 1700m, -3.46666 -79.26666, Netting, 21-Mar-65, L. E. Pena (AMNH_BEE 00019309-00019310).

Distribution: Presently known from Peru (Lambayeque), Ecuador (Azuzay).

Comments: This species resembles *P. olivacea* but differs by the labrum with a round medial projection, pubescence on genal area completely white and pubescence on mesepisternum light yellow with tawny tips, basal area of outer hind tibial spur is laterally flattened, almost as wide as tibia, its tip laterally flattened.

Ptiloglossa costaricana Moure

Megacilissa obscura Schrottky, 1902a: 412.

Ptiloglossa obscura Friese, 1908: 25.

Ptiloglossa costaricana Moure, 1945:152.

Lectotype: Female, from Costa Rica, San José, San Carlos (ZMB).

Re-description:

Male. Body length 17 mm, forewing length 13 mm. Head. Mandibles light brown with a pointed dark reddish apex. Preapical tooth, apex smooth and rounded. Malar area, length around 0.5 OD. Labrum and clypeus yellow; labrum smooth; clypeus projected beyond the face and flattened on the disc, integument without punctures (or few scattered). Supraclypeal area integument black with light yellow pubescence. Area between antennal socket and compound eye, pubescence with a spot of darker hairs (dark grey to black). Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance less than 1.0 OD, pubescence tawny with darker tips, longer than 1.0 OD. Ocellocular distance equal to 0.5 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance between 0.75 and 1.0 OD from occipital margin. Vertex pubescence first half tawny, second half dark brown. Genal area as wide as 0.5 eye width, with pubescence completely white or light yellow.

Mesosoma. Wings translucent brown. Veins dark yellow (tawny). Prestigma more than 2.5 times longer than stigma. Tegulae yellow, transparent, fully covered by dense pubescence. Thorax pubescence first half tawny with darker tips. Mesopleural,

pubescence tawny with darker tips. Scutum and scutellum integument black. Propodeal triangle, integument smooth. Lateral surfaces of propodeum with light yellow pubescence with darker tips. Venter pubescence completely light yellow. Front legs dark brown. Medial and hind legs black. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur, in lateral view shorter than inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), basal width 0.25 of tibial width, spur projection forming an acute angle from tibiae, tip shape rounded, concave but not flattened (Figure 10). Inner hind tibial spur with well defined, slender dents. Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument black, pubescence yellow (or golden). T1 marginal area fasciate. T2 to T4 without marginal bands. T5-T7 pubescence completely dark brown to black. T7 pubescence on its rim dark brown. Lateral areas of terga, pubescence black. S6 projections on the side (thorn-like spines) prominent. S7, S8 and genital capsule as in Figure 44.

Female. Body length 16 mm, forewing length 13 mm. Head. Mandibles dark brown with pointed dark reddish apex. Preapical tooth, apex smooth and rounded. Malar area, length less than 0.5 OD. Labrum brown, with two tubercles on the middle (strong well-differentiated). Clypeus brown-reddish, projected beyond the face and rounded on the disc, integument with strong punctures separated by a distance equal or greater than a puncture width (getting close to the clypeolabral margin). Paraocular area, pubescence whitish mixed with scattered longer dark hairs. Supraclypeal area integument brown-

reddish, with dark brown to black pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye, pubescence with a spot of darker hairs (dark grey to black). Interocellar distance shorter than 1.0 OD, pubescence dark brown, equal or shorter than 1.0 OD. Ocellocular distance greater than 1.0 OD. Ocelloccipital distance equal to 1.0 OD. Compound eye at a distance equal to 1.5 OD from occipital margin. Vertex pubescence black. Genal area as wide as 0.5 eye width, with white pubescence and scarce dark brown hairs close to compound eye margin.

Mesosoma. Wings translucent brown. Veins dark brown. Prestigma 2.5 longer than stigma. Tegulae dark brown, no transparent, not covered by pubescence. Thorax pubescence light brown on its base and dark brown at the tips. Mesopleural, pubescence dark brown (with whitish branches). Scutum and scutellum integument dark brown (reddish). Propodeal triangle, integument with minute punctures. Lateral surfaces of propodeum with light yellow pubescence. Venter pubescence light yellow. Front legs brown. Medial and hind legs dark brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate delimited by an outer ridge. Hind basitarsus, inner margin slightly concave, almost as long as wide.

Metasoma. T1-T4 integument dark brown. T1 pubescence yellow with darker tips. T2-T4 pubescence dark brown, without marginal bands, marginal area fasciate. T5-T6 pubescence completely dark brown to black. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). Sterna margin, pubescence as long as or longer than 2 OD.

Material studied: [1 Female-lectotype] Costa Rica, San José, San Carlos, Burgdorf (ZMB). [1 Female] Costa Rica, Puntarenas, Monteverde, 10.30585 -84.80981, 27-Sep-79, C. Lumer (AMNH_BEE 00038453). [1] Costa Rica, Limon Prov., 9.4 Km. W. de Bribri, Suretka, 200 m, 9.622929 -82.772958, 9-11 Jun 1983, DH Janzen & W. Hallwachs (INBio). [1] Costa Rica, Prov. Alajuela, La Fortuna. Sector Catarata, 500m., 10.43646 -84.675838, Tp. Malaise (L_N_268500_462500 #51667), AGO 1998, G. Carballo (INBio). [1] Costa Rica, Prov. Guanacaste, A.C.G, La Cruz, Pque Nal Guanacaste, Cerro el Hacha. 400m, 10.899849 -85.577334, Tp. de Luz (L_N_320000_364000 #5254016), OCT-4 NOV 1987, I. A. Chacón (INBio). [1] Costa Rica, Prov. Guanacaste, A.C.G, Liberia, P. N. Gte, Est Mengo, Volcán Cacao, Bque Primario, 1000m, 10.925 -85.47513, Manual (L_N_322740_375198 #52569), JUN 1987, Janzen (INBio). [1] Costa Rica, Prov. Guanacaste, A.C.G, Liberia, Pque Nal Gte, Est Cacao, 1000-1150m, 10.928721 -85.4722489, Manual (L_N_323150_375500 #52583), MAR 1988, Espinoza (INBio). [1] Costa Rica, Prov. Guanacaste, Liberia, P. N.Guanacaste, Est.Mengo, Bosque Primario, 1000m, 10.925 -85.475, Manual ((red, libre) L_N_322740_375198 #52598), 11-13 JUN 1987, Janzen (INBio). [1] Costa Rica, Prov. Puntarenas, A.C.L.A.C, Buenos Aires, P.I.L.A, Cerro Frantz. 2134m, 9.055102 82.989472, Manual (L_S_334150_574450 #52442), 12-26 MAR 1999, J. Azofeifa (INBio). [1] Costa Rica, Prov. Puntarenas, A.C.L.A.P, Buenos Aires, Estación Altamira. 1450m, 9.032985 -83.009978, Malaise (L_S_331700_572200 #53723), 18 ABR-14 MAY 1999, R. Villalobos (INBio). [1] Costa Rica, Prov. Puntarenas, Cerro Biolley, Estacion Altamira, ACLA, PILA, 1766m, 9.039314 -83.009966, (L_S_332400_572200 #50847) 8 JUN-20 JUL 1998, R. Villalobos (INBio). [1] Costa Rica, Prov. Puntarenas,

Est. Agujas, 300mm, 8.534815 -83.426667, (L_S_276750_526550 #8486), 18-24 SET 1996, A. Azofeifa (INBio). [4] Costa Rica, Prov. Alajuela, P.N. Volcán Tenorio, Sector El Pílon, Send. El Mirador, 700 - 800m, 10.704603 -84.992304, Tp. Luz (L_N_298212_427913 #74432), 22 JUL 2003, J. Azofeifa (INBio). [1] Costa Rica, Prov. Alajuela, Guatuso, P.N. V. Tenorio, Punto 2: Falda N Cerro Montezuma, 1160m, 10.698113 -85.018467, Tp. Luz. (L_N_297500_425050 #94186), 27 JUN 2008, J. A. Azofeifa (INBio). [1] Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Punto 2: Falda N Cerro Montezuma, 1160m, 10.698113 -85.018467, Tp. Luz. (L_N_297500_425050 #94402), 28 JUL 2008, J. A. Azofeifa (INBio). [1] Costa Rica, Prov. Alajuela, Guatuso, P.N.V.Tenorio, Sitio Catarata, Send. Bambuza Vulgaris, 700-800m, 10.703594 -84.991512, Tp. Luz Mercurio (L_N_298100_428000 #97671), 18 AGO 2009, J. A. Azofeifa (INBio). [1] Costa Rica, Prov. Alajuela, Guatuso, P.N.V.Tenorio, Sitio Catarata, Send. Bambuza, 700-800m, 10.703594 -84.991512, Luz Mercurio. (L_N_298100_428000 #98174), 12 SEP 2009. J. A. Azofeifa, M. Calderón, O. Gutiérrez (INBio). [1] Costa Rica, Prov. Alajuela, Guatuso, Sitio Catarata Río Buenavista, 700-800m, 10.706992 -84.983685, Tp. Luz. (L_N_298474_428857 #91074), 23 MAR 2007, J. A. Azofeifa (INBio). [5] Costa Rica, Prov. Alajuela, P.N. Volcán Tenorio, Est. Pílon, El Mirador, 800m, 10.700846 -85.008875, Tp. Luz Mercurio. (L_N_297800_426100 #77651), 17-18 JUL 2004. J. Azofeifa (INBio). [1] Costa Rica, Prov. Alajuela, San Ramón, Est. Biol. Villa Blanca, Send. Doña Estrella, 1115m, 10.201361 -84.485101, Colecta Libre. (L_N_242482_483371 #96541), 28 NOV-2 DEC 2008, R. Rojas (INBio). [1] Costa Rica, Prov. Alajuela, San Ramón, Est. Biol. Villa Blanca, 1115m, Tp. Luz Mercurio (L_N_242482_483371 #96534), 10.201361 -

84.485101, 23-25 ABR 2009, R. Rojas (INBio). [1] Costa Rica, Prov. Alajuela, San Ramón, Est. Biol. Villa Blanca, 1115m, Tp. Luz Mercurio (L_N_242482_483371 #96217), 10.201361 -84.485101, 25-29 NOV 2008, R. Rojas (INBio). [2] Costa Rica, Prov. Alajuela, San Ramón, Est. Biológica Universidad ATM, 4 km SO Chachagua, 450m, Tp. de Luz (L_N_262618_468821 #100898), 10.383333 -84.618056, 13-15 ABR 2010, W. Porras (INBio). [1] Costa Rica, Prov. Alajuela. San Ramón, Estación Biológica Universidad ATM, 4 km SO Chachagua, 450m, Tp. de Luz (L_N_262618_468821 #99568), 10.383333 -84.618056, 25 NOV 2009, W. Porras (INBio). [1] Costa Rica, Prov. Alajuela, San Ramón, Z.P. Arenal-Monteverde, Bosque Eterno de los Niños, Refugio Chuta, 1500-1600m, Colecta Libre (L_N_259160_456050 #101292), 10.351942 - 84.734644, 14-15 SEP 2010, R. Rojas (INBio). [2] Costa Rica, Prov. Alajuela, Sarapiquí, Los Cedros, Hacienda La Cayuga, 1500-1600m, Libre (L_N_241900_518500 #85740), 10.19609 -84.164493, 18 SEP 2004, J. A. Azofeifa (INBio). [1] Costa Rica, Prov. Cartago, R.F. Río Pacuare, Sector Quebrada frente a Estac. Barbilla, 500m, Libre (L_N_218400_596650 #72120), 9.982435 -83.451857, 5 - 6 NOV 2002, Esteban León (INBio). [1] Costa Rica, Prov. Cartago, P.N. Tapantí, Mirador, 1300-1400m, Tp. Luz (L_N_191100_560650 #85514), 9.73635 -83.780628, 22-23 FEB 2006, M. Moraga, B. Hernández, B. Gamboa (INBio). [4] Costa Rica, Prov. Cartago, P.N. Tapantí, Est. Tapantí, 1200-1300m, Tp. Luz (L_N_193224_560349 #90457), 9.755556 -83.783333, 24 ENE 2007, J. A. Azofeifa (INBio). [1] Costa Rica, Prov. Cartago. Paraíso, P.N. Tapantí-Macizo de La Muerte, P.N. Tapantí, 1500-1600m, Tp. de Luz (L_N_187786_560725 #102554), 9.706639 -83.780167, 1-7 SEP 2008, R. González Tenorio (INBio). [1] Costa Rica, Prov. Guanacaste, Macizo Miravalles, Estación Cabro Muco, 1100m, Libre

(L_N_299769_411243 #74525), 10.718333 -85.144722, 23 JUN - 6 JUL 2003, B. Hernández (INBio). [1] Costa Rica, Prov. Guanacaste, Cañas, Laguna La Vieja, Finca M. Campos, 600-700m, Tp. Luz Mercurio (L_N_292100_421100 #91629), 10.649209 - 85.054462, 13 JUN 2007, J. A. Azofeifa, M. Campos (INBio). [3] Costa Rica, Prov. Heredia, Sarapiquí, Cecafor, 50m, Tp. Luz (L_N_263229_539616 #86841), 10.38878 - 83.971554, 1-4 AGO 2006, J. A. Azofeifa, B. Gamboa, M. Moraga (INBio). [1] Costa Rica, Prov. Heredia. Sarapiquí. P.N. Braulio Carrillo. 16Km SSE La Virgen, 1050-1150m, INBio-ALAS (L_N_250000_527100 #91404), 10.269277 -84.085947, 21 ABR 2001 (INBio). [1] Costa Rica, Prov. Heredia, Sarapiquí, P.N. Braulio Carrillo, 16Km SSE La Virgen, 1050-1150m, Transecto INBio-OET-ALAS (L_N_250000_527100 #86265), 10.269277 -84.085947, 21 FEB-9 MAR 2001 (INBio). [1] Costa Rica, Prov. Limón. Veragua Rainforest, Campamento, 400-440m, Tp. Luz Mercurio (L_N_212220_625230 #96548), 9.92573 -83.191405, 23-27 ABR 2009, R. Villalobos (INBio). [1] Costa Rica, Prov. Puntarenas, Buenos Aires, Estación Altamira, Cerro Biolley, 1766m, Manual (L_S_572200_332400 #61901), 9.039314 -83.009966, 01-18 FEB 2001, D. Rubí (INBio). [1] Costa Rica, Prov. Puntarenas, Buenos Aires, Estación Altamira, Sendero a Casa Coca, 1700m, Manual (L_S_574400_331750 #61902), 9.033401 -82.989967, 01-18 FEB 2001, D. Rubí (INBio). [1] Costa Rica, Prov. Puntarenas, Buenos Aires, P.Int. La Amistad, Send. Gigantes, 1460m, Libre (L_S_331800_572100 #66439), 9.033891 - 83.010885, 10 - 20 DEC 2001, D. Rubí (INBio). [1] Costa Rica, Prov. Puntarenas, Z.P. Arenal-Monteverde, Estación Monteverde, 1400 - 1500m, Libre, (L_N_253250_449300 #67350), 10.298423 -84.796196, 4 AGO 2001, Charlotte Skov (INBio). [1] Costa Rica, Prov. Puntarenas, ACLAP, Z.P. Las Tablas, Sitio Coto Brus, 1900-2000m, Tp. Luz.

(L_S_325350_598500 #85935), 8.975062 -82.77091, 4 ABR 2006, J.A. Azofeifa, M. Moraga, B. Gamboa (INBio). [8] Costa Rica, Prov. Puntarenas, Buenos Aires, Alto Jalisco, 900-1000m, Tp. Luz Mercurio (L_S_327533_523213 #95832), 8.99583 - 83.455555, 22-26 FEB 2009, E. Ulate, J. A. Azofeifa, M. Moraga (INBio). [1] Costa Rica, Prov. Puntarenas, Golfito, Jiménez, Est. El Tigre, Area Administrativa, 47m, Tp. Luz. (L_S_277800_529600 #92869), 8.546089 -83.397802, 17-18 NOV 2007, J. A. Azofeifa (INBio). [6] Costa Rica, Prov. Puntarenas, Osa. R.F. Golfo Dulce, Cerro Brujo. 612m, Tp. Luz Mercurio (L_S_290700_509100 #95674), 8.662821 -83.583982, 24-25 ENE 2009, J. A. Azofeifa, A. Chamorro (INBio). [1] Costa Rica, Prov. San José, Vázquez de Coronado, R.F. Cordillera Volcánica Central, Albergue Monserrat, 1730m, Tp. de Luz. (L_N_224286_544222 #102387), 10.03662 -83.929946, 24 JUL 2010, J. A. Azofeifa, A. Picado, M. A. Zumbado (INBio). [1] Costa Rica, Guanacaste Prov., Estacion Mengo, SW side V. Cacao, 1100 m, 10.930083 -85.470423, 3 Jan 1987, DH Janzen & W. Hallwachs (INBio). [1] Costa Rica, Alajuela Prov., Finca San Gabriel, 16km ENE Quebrada Grande, 650m, 10.875173 -85.400711, 11 NOV 1983, D. Janzen, W. Hallwachs (INBio). [2] Costa Rica, Puntarenas Prov., Monteverde, 1500m, 10.30520 -84.798944, 3 Jan 1984, D.H. Janzen & W. Hallwachs (INBio). [1] Costa Rica, Cartago Prov., Tapanti, Rio Grande de Orosi, 1300-1400 m., 9.775254 -83.795598, (9 45 x83 50), 9 Apr 1984, DH Janzen & W. Hallwachs (INBio). [1] Costa Rica, Cartago Prov., Tapanti, Rio Grande de Orosi, 1300-1400 m, 9.775254 -83.795598, (9 46 x 83 50), 23 Jan 1985, DH Janzen & W. Hallwachs (INBio). [3] Costa Rica, 10.269277 -84.085947 (INBio). [1 Male] Costa Rica, Guanacaste, Cacao Biological Station, 1050 m, 10 55 38 N 85 27 7 W, 7/11/2000, J. Asher, R. Brooks & Z. Falin (SEMC). [4] Costa Rica, Puntarenas,

Monteverde, Estacion La Casona, 1520m, 03/31/1996, K. Martinez (SEMC 990698-990701). [2 Male] Costa Rica, Puntarenas, Monteverde, Estacion La Casona, 1520, 08/06/1995, K. Martinez (SEMC 990702 & 990703). [1] Costa Rica, Puntarenas, Estacion Pittier, 1670, 10/09/1995, M. Moraga (SEMC 990704). [1] Costa Rica, Puntarenas, Sendero Altamira, 3.8 km NW Estacion Pittier 1740, 01/18/1996, M. Moraga (SEMC 990705). [1] Costa Rica, Puntarenas, Estacion Pittier, 1670, 01/18/1995, S. Avila (SEMC 990706). [1 Female] Costa Rica, Puntarenas, Estacion Pittier, 1670, 01/18/1995, A. Maroto (SEMC 990707). [2] Costa Rica, Puntarenas, Estacion Pittier, 1670, 01/18/1995, M. Chinchilla (SEMC 990708 & 990709). [1] Costa Rica, Guanacaste, Estacion Pitilla; Santa Cecilia, 9 km S, 700, 08/14/1992, P. Rios (SEMC 990710). [2] Costa Rica, Cartago, Tapanti National Park, 1250, 07/1991, G. Mora (SEMC 990711 & 990713). [1] Costa Rica, Guanacaste, Estacion Pitilla; Santa Cecilia, 9 km S, 700, 03/1990, Rios, Moraga & Blanco (SEMC 990712). [20 Females] Costa Rica, Alajuela, Rio Sarapiquí; Vara Blanca, 8 km N, 02/21/1966, R. Roberts (SEMC 990714-990733). [1] Costa Rica, Puntarenas, Rincon, 2.5 mi SW; Osa Peninsula, 8.70000 -83.48330, 02/28/1967, OTS advanced zoology course (SEMC 990734). [2] Costa Rica, Puntarenas, Rincon, 2.5 mi SW; Osa Peninsula, 8.70000 -83.48330, 02/27/1967, OTS advanced zoology course (SEMC 990735 & 990739). [1] Costa Rica, Puntarenas, Rincon, 2.5 mi SW; Osa Peninsula, 8.70000 -83.48330, 03/03/1967, OTS advanced zoology course (SEMC 990736). [2] Costa Rica, Puntarenas, Rincon, 2.5 mi SW; Osa Peninsula, 8.70000 -83.48330, 03/04/1967, OTS advanced zoology course (SEMC 990737-990742). [1] Costa Rica, Puntarenas, Rincon, 2.5 mi SW; Osa Peninsula, 8.70000 -83.48330, 3/06/1967, OTS advanced zoology course (SEMC 990743). [1] Costa Rica, Puntarenas,

Rincon, 2.5 mi SW; Osa Peninsula, 8.70000 -83.48330, 03/12/1967, OTS advanced zoology course (SEMC 990744). [1] Costa Rica, Puntarenas, San Vito, 6 km S, 8.70000 - 83.00000, 03/19/1967, OTS advanced zoology course (SEMC 990745). [2] Costa Rica, Puntarenas, Wilson Botanical Garden, Las Cruces, San Vito, 1100, 8.78420 -82.96000, 06/20/1990, David Brzoska (SEMC 990746 & 990747). [1] Costa Rica, San Jose, San Jose, 08/1963, Charles Michener (SEMC 990748). [2] Costa Rica, San Jose, San Jose, 07/07/1963, Michener, C & Michener D. (SEMC 990749 & 990755). [1] Costa Rica, Puntarenas, San Vito, 6 km S, 8.70000 -83.00000, 03/17/1967, OTS advanced zoology course (SEMC 990750). [1] Costa Rica, Puntarenas, Monteverde, 1620, 10.31670 - 84.80000, 08/18/1976, Robert Gorton (SEMC 990751). [2] Costa Rica, Tres Rios, Cartago, *Solanum*, 01/28/1967, Daniel Janzen (SEMC 990752 & 990753). [2 Females] Panama, Canal Zone, Juan Mina, 03/07/1945, C.D. Michener (SEMC 990754). [1] Costa Rica, San Jose, San Jose, 07/15/1963, Charles Michener (SEMC 990756). [1] Panama, Chiriqui, El Volcan, 02/29/1936, F. Lutz (SEMC 990757). [1] Panama, Chiriqui, Volcancito Arriba, 8.78333 -82.46667, 06/07/1994, J. White (SEMC 990758). [1] Costa Rica, Puntarenas, Wilson Botanical Garden, 08/14/1992, David Brzoska (SEMC 990759). [1] Panama, Panama, Cerro Campana, 07/23/1965, L. Dotson (SEMC 990760). [1] Costa Rica, Puntarenas, Monteverde, 10.48333 -84.83333, 02/05/1963, Rettenmeyer & Rettenmeyer (SEMC 990761).

Distribution: Presently known from Costa Rica (Alajuela, Cartago, Guanacaste, Heredia, Limon, Puntarenas, San José), Panama (Canal Zone, Chiriqui, Panama).

Comments: Females of this species resembles *P. obscura* (Schrottky, 1902), now *P. olivacea*, but differs by the thorax pubescence being light brown at its base and dark

brown at the tips, T1 pubescence yellow with darker tips, T2-T4 without pubescence forming marginal bands. They are also similar to *P. pretiosa* females but without white bands of hairs in T2-T4.

Moure (1945) proposed *P. costaricana* as *nom. nov.* for *Ptiloglossa obscura* Friese, 1908 (as *Megacilissa obscura*) and *Megacilissa obscura* Schrottky, 1902 (synonym of *P. olivacea* (Friese, 1898)), because '*P. obscura*' was a previously occupied name.

Ptiloglossa cyaniventris Friese

Ptiloglossa cyaniventris Friese, 1925: 13.

Lectotype: Male, from Colombia, Cauca, Popayán (ZMB).

Re-description:

Male. Body length 20 mm, forewing length 16 mm. Head. Mandibles light brown with a truncate dark reddish apex. Preapical tooth, apex not prominent (almost not differentiated). Malar area, length less than 0.5 OD. Labrum and clypeus yellow; clypeus projected beyond the face and flattened on the disc, integument without punctures (or few scattered). Paraocular area, pubescence yellow. Supraclypeal area integument dark brown, with yellow pubescence. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance less than 1.0 OD, pubescence yellow, longer than 1.0 OD. Ocellocular distance equal to 0.5 OD.

Ocelloccipital distance greater than 1.5 OD. Compound eye at a distance between 0.75 and 1.0 OD from occipital margin. Vertex pubescence dark brown Genal area less than 0.5 eye width, with yellow pubescence.

Mesosoma. Wings translucent brown. Veins yellow (tawny). Prestigma 2 longer than stigma. Tegulae yellow, transparent, with pubescence covering 0.5 of it. Thorax pubescence yellow with tawny tips (visible in lateral view). Mesopleural, pubescence tawny with darker tips. Scutum and scutellum black. Propodeal triangle, integument striate on the sides. Pubescence lateral sides of propodeum yellow. Venter pubescence completely yellow or tawny. Front and medial legs light brown to yellow. Hind legs dark brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur, in lateral view shorter than inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), with a basal width less than 0.25 tibial width, spur projection forming an acute angle from tibiae, tip shape rounded, concave but not flattened (Figure 11). Inner hind tibial spur with well defined, slender dents. Hind basitarsus as long as 0.5 tibial length.

Metasoma. T1-T4 with black integument black. T1 with yellow pubescence yellow (or golden yellow). T2-T4 pubescence black, without marginal bands. T5-T7 pubescence completely dark brown to black. T7 with black pubescence on its rim. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn -like spines) prominent. S7, S8 and genital capsule as in Figure 45.

Female. Body length 20 mm, forewing length 16 mm. Head. Mandibles completely black with rounded apex. Preapical tooth, apex divided in two forming 2 tiny pointed teeth. Malar area, length almost 1.0 OD. Labrum and clypeus black. Labrum surface striate on the labroclypeal area. Clypeus not projected (rounded on the disc), integument with punctures separated by a distance less than a puncture diameter (sometimes minute). Paraocular area pubescence whitish mixed with scattered longer dark hairs. Supraclypeal area integument black, with whitish pubescence mixed with scattered longer black hairs. Clypeoantennal distance longer than the diameter of antennal socket. Area between antennal socket and compound eye with a spot of darker hairs (dark grey to black). Interocellar distance greater than 1.0 OD, pubescence black, longer than 1.0 OD. Ocellocular distance equal to 1.0 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance equal to 1.5 OD from occipital margin. Vertex pubescence black. Genal area wider than 0.5 eye width, with white pubescence.

Mesosoma. Wings translucent dark brown (almost black). Veins black. Prestigma 2 longer than stigma. Tegulae yellow, transparent, with pubescence covering 0.5 of it. Thorax pubescence light yellow with dark-yellow tips. Mesopleural, pubescence yellow with tawny tips. Scutum and scutellum integument black. Propodeal triangle integument with minute punctures. Lateral surfaces of propodeum with dark brown pubescence. Venter pubescence black with whitish or brown branches. Front, medial and hind legs black. Tarsi black. Apex hind femur pubescence same color than other. Basitibial plate delimited by an outer carinated ridge. Hind basitarsus, inner margin straight, parallel to the outer margin, 2 times as long as wide.

Metasoma. T1-T4 integument black. T1 pubescence dark brown (whitish on its base). T2-T3 pubescence black, without marginal bands. T4 pubescence black with very few white setae on its side. T5-T6 pubescence dark brown to black. Lateral areas of terga, pubescence black or dark brown. Sterna margin, pubescence long (as long as or longer than 2 OD).

Material studied: [1 Male-lectotype] Colombia, Cauca, Popayan; collected by Lehmann (ZMB). [1 Female] Argentina, ruta 40, 25Km NE Hualfin, 2200m, 27 07 S 66 39 W; 9/2/2010; leg. M. Halada (LINZ).

Distribution: Presently known only from Colombia (Cauca).

Comments: This bee is easy to differentiate from other *Ptiloglossa* species because both sexes have a metallic blue abdomen, thorax with yellow pubescence with tawny tips. Males of the species have a yellow clypeus projected beyond the face and flattened on disc; outer hind tibial spur with a basal area rounded, occupying less 0.25 tibial width, tip shape rounded, concave but not flattened; T1 pubescence yellow. Here is described for the first time a female specimen of the species, very similar to the male but with clypeus yellow and T1 pubescence dark brown (whitish on its base).

The species name comes from the Latin *cyaneus* meaning blue and Latin *ventris* meaning belly; doing reference to the distinctive blue abdomen of the specimens.

***Ptiloglossa decipiens* Moure**

Ptiloglossa decipiens Moure, 1987: 126.

Holotype: Male, from Panama, Chiriquí, Volcán Chiriquí (BMNH).

Re-description:

Male. Body length 16.5 mm, forewing length 13.5 mm. Head. Mandibles brown with pointed black apex. Malar area length less than 0.5 OD. Labrum dark brown, smooth. Clypeus yellow, projected beyond the face and flattened on the disc, integument without punctures or few scattered. Paraocular area pubescence white. Supraclypeal area integument black, pubescence light yellow. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance equal to 1.0 OD, pubescence light yellow intermixed with some scattered brown setae, longer than 1.0 OD. Ocellocular distance equal to 0.67 OD. Ocelloccipital distance equal to 1.0 OD. Compound eye at a distance equal to 0.5OD from occipital margin. Vertex pubescence first half tawny, second half dark brown. Genal area as wide as 0.5 eye width, pubescence completely white or light yellow.

Mesosoma. Wings translucent brown. Veins brown. Prestigma 2.5 longer than stigma. Tegulae tawny, no transparent, fully covered by dense pubescence. Thorax pubescence completely tawny (lighter on the base) with darker tips. Mesopleural, pubescence tawny with darker tips. Scutum and scutellum black. Propodeal triangle, integument with minute punctures. Lateral surfaces of propodeum light yellow. Venter pubescence completely light yellow. Front legs light brown to yellow. Medial legs brown. Hind legs dark brown. Tarsi yellow. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in lateral view shorter than inner tibial spur, basal area

laterally flattened and its basal width 0.25 of tibial width, spur projection forming an acute angle from tibiae, tip shape rounded, concave but not flattened (Figure 12). Inner hind tibial spur serrate. Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument dark brown. T1 pubescence yellow or tawny with darker tips. T2-T4 pubescence completely tawny. T5 to T7 pubescence mostly whitish but intermixed with some scattered dark brown hairs, the latter are closer to T7 apex. T7 pubescence on its rim dark brown. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) prominent.

Female. Body length 16 mm, forewing length 13 mm. Head. Mandibles black with a rounded dark reddish apex. Preapical tooth apex not prominent (almost not differentiated). Malar area length less than 0.5 OD. Labrum and clypeus brown-reddish. Labrum with two tubercles on the middle (strong well-differentiated). Clypeus not projected, rounded on the disc; surface rugose-striate or with strong punctures suggesting a rugose surface. Paraocular area pubescence whitish mixed with scattered longer dark hairs. Supraclypeal area integument brown-reddish, with whitish pubescence mixed with scattered longer black hairs. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye, pubescence with a spot of darker hairs (dark grey to black). Interocellar distance equal to 1.0 OD, pubescence dark brown, longer than 1.0 OD. Ocellocular distance greater than 1.0 OD. Ocelloccipital distance shorter than 1.0 OD. Compound eye at a distance 0.75 to 1.0 OD

from occipital margin. Vertex pubescence dark brown to black. Genal area less than 0.5 eye width, with white pubescence and scarce dark brown hairs close to compound eye margin.

Mesosoma. Wings translucent brown. Veins dark brown. Prestigma 2.5 longer than stigma. Tegulae tawny, no transparent, pubescence covering 0.5 of it. Thorax pubescence light brown on its base and dark brown at the tips. Mesopleural, pubescence whitish with dark tips (look like grey hairs). Scutum and scutellum black. Propodeal triangle integument with minute punctures. Lateral surfaces of propodeum with light yellow pubescence. Venter pubescence dark hairs on the middle surrounded by white pubescence. Front legs light brown. Medial and hind legs dark brown. Tarsi light brown to reddish. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate delimited by an outer ridge. Hind basitarsus, inner margin slightly concave, 1.5 times as long as wide.

Metasoma. T2-T4 integument brown. T1-T4 pubescence dark brown. T5-T6 pubescence completely dark brown to black. Lateral areas of terga, pubescence similar to those on the disc. Sterna margin, pubescence as long as or longer than 2 OD.

Material studied: [1 Male-holotype] Panama, Chiriquí, Volcán Chiriquí (BMNH). [1 Male-paratype] Panama, V. de Chiriqui, 25-4000 ft, Champion (DZUP). [2 Females] Costa Rica, Puntarenas, San Vito, 8.82000 -82.97000, 01/22/1967, OTS advanced zoology course (SEMC 990902 & 990904). [1] Costa Rica, Guanacaste, Rincon de la Vieja, Sendero Santa Maria, 800, 01/07/1994, E. Araya (SEMC 990912).

Distribution: Presently known from Panama (Chiriquí), Costa Rica (Guanacaste, Puntarenas).

Comments: This species is only known from the male and it resembles *P. styphlaspis* but differs in having interocellar distance equal or slightly shorter than 1.0 OD; outer hind tibial spur basal area laterally flattened, with tip shape rounded, concave but not flattened; inner hind tibial spur serrate (with well defined, slender dents).

Ptiloglossa decora Moure

Ptiloglossa decora Moure, 1945: 154.

Holotype: Male, from Brazil, Rio de Janeiro, Itatiaia (DZUP). Male, paratype at the Entomological Collection of Instituto Oswaldo Cruz-Rio de Janeiro, Brazil (IOC), specimen not seen.

Re-description:

Male. Body length 18 mm, forewing length 14.5 mm. Head. Mandibles light brown with a pointed dark reddish apex. Preapical tooth, apex well separated and pointed. Malar area length around 0.5 OD. Labrum and clypeus yellow. Labrum smooth. Clypeus projected beyond the face and flattened on the disc, integument without punctures (or few scattered). Paraocular area pubescence light yellow. Supraclypeal area integument dark brown, pubescence light yellow. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance equal to 1.0 OD,

pubescence light yellow with scattered brown setae. Ocellocular distance equal to 0.5 OD. Ocelloccipital distance equal to 1.0 OD. Compound eye at a distance equal to 0.5OD from occipital margin. Vertex pubescence dark brown. Genal area less than 0.5 eye width, with a line of short white hairs close to the margin of the compound eye, followed by a group of light yellow pubescence.

Mesosoma. Wings translucent brown. Veins brown. Prestigma 2.5 longer than stigma. Tegulae yellow, transparent, fully covered by dense pubescence. Thorax and mesopleura pubescence first half tawny with darker tips. Scutum black. Scutellum dark brown (reddish). Propodeal triangle, integument smooth. Lateral surfaces of propodeum with whitish pubescence and dark brown tips. Venter pubescence mostly white with a line of dark brown hairs giving continuation to those on mesepisternum. Front legs brown. Medial and hind legs dark brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in lateral view as long as inner tibial spur, basal area rounded formed as a structure protruding from tibiae (normal), with a basal width 0.33 of tibial width, spur projection forming an acute angle from tibiae, tip shape rounded, concave but not flattened (Figure 13). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.75 tibial length.

Metasoma. T1-T4 integument dark brown. T1 pubescence whitish with dark brown tips. T2-T4 pubescence dark brown. T5 with mostly dark brown or black hairs but with a marginal band of whitish hairs, T6-T7 with dark hairs. T7 pubescence on its rim black. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) prominent.

Material studied: [1 Male-holotype] Brazil, Rio de Janeiro, Itatiaia, 13-xii-1935, J.F. Zikan leg. (DZUP). [1 Male] Brasil, Para, Belem, ix-1964, E. Dente (MZUSP). [1 Male] Brasil, Para, Belem, i-1965, E. Dente (MZUSP).

Distribution: Presently known from Brazil (Para, Rio de Janeiro).

Comments: This species resembles *P. decipiens* but differs by having an ocellocular distance equal to less than 0.5 OD; genal area less than 0.5 eye width; T1 pubescence whitish with dark brown tips. Moure (1945) mentioned its similarity with *P. virgili* but supposedly differing by the yellow clypeus, although specimens with this character state were not seen.

***Ptiloglossa dubia* Moure**

Ptiloglossa dubia Moure, 1945: 155.

Holotype: Male, from Brazil, Rio de Janeiro, Itatiaia (DZUP). There are two female paratypes, one at DZUP and the other at IOC, the latter was not seen.

Re-description:

Male. Body length 18 mm, forewing length 14.5 mm. Head. Mandibles black with a pointed dark brown apex. Preapical tooth, apex well separated and pointed. Malar area, length less than 0.5 OD. Labrum and clypeus brown. Labrum smooth. Clypeus projected beyond the face and flattened on the disc, rugose surface. Paraocular area, pubescence white. Supraclypeal area integument black, pubescence light yellow. Area

between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance greater than 1.0 OD, pubescence whitish (or very light yellow). Ocellocular distance equal to 0.5 OD. Ocelloccipital distance equal to 1.0 OD. Compound eye at a distance equal to 1.25 OD from occipital margin. Vertex pubescence completely white or first half white, second half dark brown. Genal area less than 0.5 eye width, with white or very light yellow pubescence.

Mesosoma. Wings translucent brown. Veins dark brown. Prestigma 2 longer than stigma. Tegulae yellow, transparent, fully covered by dense pubescence. Thorax pubescence tawny with darker tips. Mesopleural, pubescence light yellow with tawny tips. Scutum and scutellum black. Propodeal triangle, integument with minute punctures. Lateral surfaces of propodeum light yellow with darker tips. Venter pubescence completely light yellow. Front, medial and hind legs brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur, in lateral view shorter than inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), with its basal width less than 0.25 tibial width, spur projection curving downward, tip shape rounded, concave but not flattened (Figure 14). Inner hind tibial spur serrate. Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument black. T1-T2 pubescence golden-yellow T3 pubescence black. T4 pubescence golden-yellow. T2 to T4 pubescence color on marginal area golden. T4-T5 with a spot apparently without pubescence on the lateral side (trichotrichia). T5 to T7 pubescence mostly dark brown but with some whitish hairs on the sides or intermixed. T7 pubescence on its rim black. Lateral areas of terga,

pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn -like spines) prominent.

Female. Body length 17.5 mm, forewing length 14 mm. Head. Mandibles completely black with pointed apex. Preapical tooth apex well separated and pointed. Malar area, length less than 0.5 OD. Labrum and clypeus brown-reddish. Labrum striate on the labroclypeal area. Clypeus projected beyond the face and flattened on the disc, surface rugose-striate or with strong punctures suggesting a rugose surface. Paraocular area pubescence white. Supraclypeal area integument brown-reddish, with a line of short whitish setae close to the clypeal margin, followed by a group of long brown pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Interocellar distance equal to 1.0 OD, pubescence light brown with darker tips, longer than 1.0 OD. Ocellocular distance equal to 1.0 OD. Ocelloccipital distance equal to 1.0 OD. Compound eye at a distance equal to 0.5 OD from occipital margin. Vertex pubescence light brown with dark tips. Genal area as wide as 0.5 eye width, with white pubescence.

Mesosoma. Wings translucent brown. Veins brown. Prestigma 2.5 longer than stigma. Tegulae yellow, no transparent, fully covered by dense pubescence. Thorax pubescence light brown on its base and dark brown at the tips. Mesopleural, pubescence light yellow to white on its base and black on its tips. Scutum and scutellum dark brown (reddish). Propodeal triangle, integument smooth. Lateral surfaces of propodeum with

whitish pubescence. Venter pubescence light brown. Front, medial and hind legs light brown to yellow. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate delimited by an outer carinated ridge. Hind basitarsus, inner margin slightly concave, 1.5 times as long as wide.

Metasoma. T1-T2 integument light brown. T2-T4 integument dark brown. T1-T4 pubescence yellow (being lighter in T1); pubescence color on marginal area whitish. T5 pubescence disc golden-yellow, marginal band of T5 and T6 with dark brown to black hairs. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). Sterna margin, pubescence long (as long as or longer than 2 OD).

Material studied: [1 Male-holotype] Brazil, Rio de Janeiro, Itatiaia, 27-ix-1927, J.F. Zikan leg. (DZUP). [1 Female-alotype] Brazil, Sao Paulo, Rio Claro, x-1939, P.F. Pereira leg. (DZUP).

Distribution: Presently known from Brazil (Minas Gerais, Paraná, Rio de Janeiro, São Paulo).

Comments: Males of this species are similar to those of *P. eximia* and *P. mexicana* but differs by having the ocellocular distance equal to 0.5 OD; T2-T4 pubescence golden-yellow; T5 to T7 pubescence mostly dark brown with some whitish hairs on the sides. Females differ from males by having the clypeus rugose-striate and the ocellocular distance equal to 1.0 OD.

Ptiloglossa ducalis Smith

Ptiloglossa ducalis Smith, 1853: 7.

Ptiloglossa ducalis Schrottky, 1910: 57.

Holotype: Female, unknown type locality, deposited at Oxford University Museum (OUM). Specimen not seen.

Re-description:

Male. Body length 16 mm, forewing length 12 mm. Head. Mandibles dark brown with pointed dark reddish apex. Preapical tooth, apex smooth and rounded. Malar area, length less than 0.5 OD. Labrum and clypeus yellow. Labrum smooth. Clypeus projected beyond the face and flattened on the disc, with strong punctures suggesting a rugose surface. Paraocular area, pubescence light yellow with some scattered long dark hairs. Supraclypeal area, integument black, pubescence whitish with tawny tips. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance greater than 1.0 OD, pubescence black, longer than 1.0 OD. Ocellocular distance equal to 0.25 OD. Ocelloccipital distance equal to 1.0 OD. Compound eye at a distance between 0.75 and 1.0 OD from occipital margin. Vertex pubescence first half tawny, second half dark brown. Genal area less than 0.5 eye width, with a group of black or dark brown hairs close to the margin of the compound eye, followed by whitish hairs.

Mesosoma. Wings translucent brown. Veins dark brown. Prestigma as long as stigma. Tegulae dark brown, no transparent, fully covered by dense pubescence. Thorax

pubescence mostly black being dark brown on the basal portion. Mesopleural, pubescence light yellow, with tawny tips. Scutum and scutellum black. Propodeal triangle, integument with minute punctures. Lateral surfaces of propodeum whitish with dark brown tips. Venter pubescence dark brown. Front, medial and hind legs brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in lateral view as long as inner tibial spur, area rounded, formed as a structure protruding from tibiae (normal), with a basal width 0.33 of tibial width, spur projection forming an acute angle from tibiae, tip shape with a long and slender projection flagellum-like (can be broken) (Figure 15). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T2 integument dark brown. T3-T4 integument black. T1 pubescence whitish. T2-T4 pubescence black with marginal band of white hairs. T5 to T7 pubescence completely dark brown to black. T7 pubescence on its rim black. S6 projections on the side (thorn-like spines) prominent. S7, S8 and genital capsule as in Figure 46.

Female. Body length 17 mm, forewing length 13 mm. Head. Mandibles black with pointed dark reddish apex. Preapical tooth, apex smooth and rounded. Malar area, length less than 0.5 OD. Labrum brown-reddish, with one round medial projection. Clypeus black, projected beyond the face and flattened on the disc, surface rugose-striate or with strong punctures suggesting a rugose surface. Paraocular area, pubescence whitish mixed with scattered longer dark hairs. Supraclypeal area integument black, with

a line of short whitish setae close to the clypeal margin, followed by a group of long brown pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye, pubescence with a spot of darker hairs (dark grey to black). Interocellar distance greater than 1.0 OD, pubescence whitish with darker tips, equal or shorter than 1.0 OD. Interocellar pubescence. Ocellocular distance equal to 0.67 OD. Ocelloccipital distance shorter than 1.0 OD. Compound eye at a distance between 0.75 to 1.0 OD from occipital margin. Vertex pubescence black, equal or longer than 2 OD. Genal area less than 0.5 eye width, with white pubescence.

Mesosoma. Wings translucent brown. Veins dark brown. Prestigma 2 longer than stigma. Tegulae brown, transparent, with pubescence surrounding the plate, bare on center (this can be effect of someone studying the specimen before; it could be fully covered by pubescence). Thorax pubescence first half whitish with darker tips. Mesopleural, pubescence black (sometimes with dark brown branches). Scutum and scutellum black. Propodeal triangle, integument smooth. Lateral surfaces of propodeum with whitish pubescence. Venter pubescence dark hairs on the middle surrounded by white pubescence. Front and medial legs brown. Hind legs dark brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate delimited by an outer carinated ridge. Hind basitarsus, inner margin slightly curved, 2 times as long as wide.

Metasoma. T1-T4 integument black. T1 pubescence close to thorax whitish, black with whitish branches on its margin. T2-T4 pubescence black, with marginal band of whitish setae. T5 to T6 pubescence completely dark brown to black. Lateral areas of

terga, pubescence similar to those on the disc (not white or black, if they are other color than black). Sterna margin, pubescence long (as long as or longer than 2 OD).

Material studied: [1 Female] Brasil, Sao Paulo, C. Jordão Lefevre, 1200m, (Aluz), Fev. 1963, J. Guimarães, Morgante, Rocha, Barroso & L.T.F. (MZUSP). [1 Male] Brasil, Ceara, Carquejo, Mai 1962, Dirings (MZUSP). [1 Female] Brasil, Sao Paulo, Barueri, 30-iii-1968, K. Lenko col. (MZUSP). [1 Female] Brasil, Sao Paulo, Barueri, a luz 5:00h, 30-x-1967, K. Lenko col. (MZUSP). [1 Female] Brasil, Sao Paulo, Barueri, a luz 5.00 horas, 16-xi-1967, K. Lenko col. (MZUSP). [2 Females] Brasil, Sao Paulo, Barueri, xi-1966, K. Lenko col. (MZUSP). [1 Female] Brasilien, Nova Teulonia, 3500m, 27 11' 52 23', 10-6-1948, Frilz Plaumann (MZUSP).

Distribution: Presently known from Argentina (La Rioja, Mendoza); Bolivia; Brasil (Ceara, Sao Paulo); Ecuador; Paraguay (Alto Paraná)

Comments: This species is related to *P. buchwaldi* and *P. lucernarum* but differs by having the paraocular area pubescence whitish with some scattered long dark hairs; thorax pubescence mostly black being dark brown on the basal portion; interocellar distance greater than 1.0 OD. These three species are very similar among them, for such reason *P. buchwaldi* and *P. lucernarum* and have been considered subspecies of *P. ducalis* (Cockerell 1923).

Ptiloglossa eximia (Smith)

Megacilissa eximia Smith, 1861: 150.

Megacilissa eximia Fox, 1893: 421.

Megacilissa eximia Friese, 1898: 63.

Megacilissa (Ptiloglossa) eximia Friese, 1900: 180.

Caupolicana eximia Vachal, 1904: 23.

Ptiloglossa eximia Schrottky, 1907: 10.

Holotype: Female, from Mexico (BMNH).

Re-description:

Male. Body length 19 mm, forewing length 15 mm. Head. Mandibles light brown with pointed dark reddish apex. Preapical tooth, apex not prominent (almost not differentiated). Malar area, length less than 0.5 OD. Labrum and clypeus yellow. Labrum smooth. Clypeus projected beyond the face and flattened on the disc, surface without punctures or few scattered. Paraocular area, pubescence yellow. Supraclypeal area integument dark brown, yellow pubescence. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance less than 1.0 OD, pubescence yellow, equal or shorter than 1.0 OD. Ocellocular distance equal to 0.25 OD. Compound eye at a distance equal to 0.5OD from occipital margin. Vertex pubescence first half tawny, second half dark brown. Genal area as wide as 0.5 eye width, with a line of short white hairs close to the margin of the compound eye, followed by a group of yellow hairs.

Mesosoma. Wings translucent yellow. Veins yellow (tawny). Prestigma 2.5 longer than stigma. Tegulae brown, transparent, fully covered by dense pubescence. Thorax and mesopleural pubescence tawny with darker tips. Scutum and scutellum black. Propodeal triangle smooth. Lateral surfaces of propodeum pubescence yellow with apical half dark brown. Venter pubescence completely yellow or dark yellow. Front legs light brown to yellow. Medial and hind legs dark brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in lateral view shorter than inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), with basal width less than 0.25 tibial width, spur projection forming a right angle from tibiae, tip shape rounded, concave but not flattened (Figure 16). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1 integument dark brown, T2-T4 darker brown. T1 pubescence yellow with darker tips. T2-T4 pubescence dark brown with marginal band whitish. T4-T5 with a spot apparently without pubescence on the lateral side (trichotrichia. T5 to T7 pubescence mostly dark brown but with some whitish hairs on the sides or intermixed. T7 pubescence on its rim dark brown. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) prominent.

Female. Body length 19 mm, forewing length 14 mm. Head. Mandibles dark brown with rounded dark reddish apex. Preapical tooth, apex not prominent (almost not

differentiated). Malar area, length less than 0.5 OD. Labrum and clypeus brown-reddish. Labrum surface smooth. Clypeus projected beyond the face and flattened on the disc, surface rugose-striate or with strong punctures suggesting a rugose surface. Paraocular area, pubescence white. Supraclypeal area integument brown-reddish, pubescence yellow or whitish with darker tips. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye, pubescence with a spot of darker hairs (dark grey to black). Interocellar distance shorter than 1.0 OD, pubescence whitish with darker tips, longer than 1.0 OD. Ocellocular distance equal to 0.5 OD. Ocelloccipital distance shorter than 1.0 OD. Vertex pubescence dark brown to black. Genal area less than 0.5 eye width, pubescence white.

Mesosoma. Wings translucent brown. Veins brown. Prestigma 2 longer than stigma. Tegulae yellow, no transparent, pubescence covering 0.5 of it. Thorax pubescence light yellow with dark-yellow tips. Mesopleural pubescence dark brown (with whitish branches). Scutum and scutellum dark brown (reddish). Propodeal triangle smooth. Lateral surfaces of propodeum pubescence light yellow with darker tips. Venter pubescence dark hairs on the middle surrounded by white pubescence. Front, medial and hind legs light brown to yellow. Tarsi light brown to reddish. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate delimited by an outer ridge. Hind basitarsus inner margin straight, parallel to the outer margin, 2 times as long as wide.

Metasoma. T1-T4 integument dark brown. T1-T6 pubescence tawny (light yellow at its base). Lateral areas of terga, pubescence black or dark brown. Sterna margin, pubescence long (as long as or longer than 2 OD).

Material studied: [1 Female-holotype] Mexico; 17a. 404. Leg in vial (BMNH).
 [1 Female] Costa Rica, Heredia, 200 ft., approx. 6 km E of Selva Verde Lodge, Sarapiquí
 Chilamate, Netting, 31-Jul-91, G. E. Martinez (AMNH_BEE 00135451). [1 Female]
 French Guiana, Régina, Route de L'est 65 km E of Cayenne, collected in herbaceous
 edge, Netting (100 Label), 11-Feb-91 C. Snyder (AMNH_BEE 00135452). [1 Male]
 Brazil, Mato Grosso, Barra do Tapirape, -14.8333 -55.98333, (near Ilka Bananal, coords
 approximate; cited on some labels as Barrodo Tapirape), Netting, 12/28/1965 to
 1/15/1966, B. Malkin (AMNH_BEE 00135453 & 00135454). [1 Male] Trinidad and
 Tobago, Trinidad, Arima, Verdant Vale, Arima Valley, Netting, 7-Feb-65, J. G. Rozen
 (AMNH_BEE 00135455). [1 Male] Trinidad and Tobago, Trinidad, Arima, Arima
 Valley, 10.645 -61.28 (fallingrain.com in conj w local website, Netting, Gazetteer),
 2/10/1964 to 2/22/1964, J. G. Rozen & P. Wygodzinsky (AMNH_BEE 00135456). [1
 Male] Panama, V. de Chiriqui, Champion, 2 -5000 ft, 1913, Godman-Salvin (BMNH). [1
 Female] Guatemala, S. Geronimo, Godman-Salvin Collection, Champion (BMNH). [1
 Female] Venezuela, Aragua, Rancho Grande, 1100 m, 7/22-31/1967, R.W.Poole
 (NMNH). [2] Costa Rica, Limon Prov., 9.4 Km. W. de Bribri, Suretka, 9.622929 -
 82.772958, 9-11 Jun 1983, 200 m, DH Janzen & W. Hallwachs (INBio). [5] Costa Rica,
 Prov. San José, Puriscal, Albergue Los Mora, 200-300m, 9.680703 -84.369488, (Tp. Luz.
 L_N_184893_496032 #85231), 18 ENE 2006, B. Gamboa, M. Moraga, J. Azofeifa & B.
 Hernández (INBio). [5] Costa Rica, Heredia Prov., Finca La Selva (OTS) Puerto Viejo de
 Sarapiquí, 50m, 10.431958 -84.0091, 6-9 Mar 1985 D.H. Janzen & W. Hallwachs
 (INBio). [4] Costa Rica, Prov. Alajuela, Upala. Bijagua, Finca Inti – Aura, 10.759255 -
 85.011339, 320m, Tp. Luz Mercurio (L_N_304260_425844 #96552), 27 ABR 2009, J.

A. Azofeifa (INBio). [4] Costa Rica, Prov. Puntarenas, Golfito, Est. El Tigre, 8.546089 - 83.397802, 47m, Tp. Luz (L_S_277800_529600 #93409), 27-28 FEB 2008, J. A.

Azofeifa (INBio). [8] Costa Rica, Guanacaste Prov., Finca Biesnan, Colonia Refug. Los Angeles, 11 Km E Quebrada Grande, 10.873193 -85.451009, 500m, 13 JUN 1985, D.H. Janzen & W. Hallwachs (INBio). [9] Costa Rica, Prov. San José, Tarrazú, San Carlos, Reserva Ríos Paraíso, Albergue Pecarí, 9.564961 -84.12575, 405m, Tp. Luz (L_S_390500_449600 #86039), 30 ABR-3 MAY 2006, B. Gamboa, M. Moraga & J. A.

Azofeifa (INBio). [7] Costa Rica, Prov. Puntarenas, Garabito, Fca. Queb. Bonita-Garabu, La Fila, 9.571849 -84.597058, 100-150m, Tp. Luz Mercurio (L_S_391360_397860 #95322), 23 NOV 2008, Zumbado, Hernández, Azofeifa & Moraga (INBio). [3] Costa Rica, Prov. Guanacaste, A.C.G, La Cruz, Pque Nal Guanacaste, Cerro el Hacha. 400m, 10.899849 -85.577334, Tp. de Luz (L_N_320000_364000 #52540), 16 OCT-4 NOV 1987. I. A. Chacón (INBio). [1] Costa Rica, Prov. Guanacaste, Nicoya, Ostional, Río Montaña, 0-100m, 9.984868 -85.682682, Tp. Luz (L_N_218850_352050 #77315), 15 JUN 2004, B. Gamboa, D. Briceño, M. Moraga & Y. Cárdenas (INBio). [2] Costa Rica, Prov. Alajuela, Upala, Río Chimurria, Fca. Los Padilla, 500m, 10.725562 -85.00167, Tp. Luz Mercurio (L_N_300532_426894 #102749), 3 SEP 2011. J. A. Azofeifa (INBio). [4] Costa Rica, Prov. San José, Tarrazú, Z.P. Cerro Nara, Falda NE Finca Oldemar Valverde, 735m, 9.499849 -84.011765, Tp. Luz Mercurio (L_S_383285_462107 #99501), 25-30 MAY 2010, J. A. Azofeifa, L. Chaverri, B. Hernández, J. Montero, A. Solís & M. Solís (INBio). [2] Costa Rica, Puntarenas Prov., Fila Esquinas, 35 Km. S. Palmar Norte, 150 m (elev 8 grados 45 min. x 83 grados 20 min), 8.751282 -83.316764, 7-8 Jan 1983, DH Janzen & W. Hallwachs (INBio). [1] Costa Rica, Prov. Puntarenas, Golfito, Jiménez, Est.

El Tigre, Area Administrativa. 47m, 8.546089 -83.397802, Tp. Luz (L_S_277800_529600 #92863), 11-12 NOV 2007, J. A. Azofeifa (INBio). [4] Costa Rica, Prov. Puntarenas, Golfito, Jiménez, Est. El Tigre, Area Administrativa, 47m, 8.546089 -83.397802, Tp. Luz (L_S_277800_529600 #92860), 8-9 NOV 2007, J. A. Azofeifa (INBio). [2] Costa Rica, Heredia Prov., Fca. La Selva, Puerto Viejo de Sarapiquí, 10.431958 -84.0091, 4 August 1981, DH Janzen & W. Hallwachs (INBio). [2] Costa Rica, Prov. Puntarenas, P.N. Corcovado, Sector La Leona, Cerro Puma, 100 - 300m, 8.454816 -83.495034, Libre (L_S_267700_518900 #75592), 17 SEP - 6 OCT 2003, M. Moraga (INBio). [1] Costa Rica, Alajuela Prov., Finca San Gabriel, 15Km E. Quebrada Grande, 630m, 10.886026 -85.400757, 8 Feb 1983. D.H. Janzen & W. Hallwachs (INBio). [3] Costa Rica, Alajuela Prov., Finca San Gabriel (16km ENE Quebrada Grande), 650m, 10.875173 -85.400711, 11 NOV 1983, D. Janzen & W. Hallwachs (INBio). [1] Costa Rica, Prov. Guanacaste, A.C.G, Liberia, Pque Nal Santa Rosa, Estación Santa Rosa, Tp. de Luz (L_N_313000_359800 #52561), 300m, 10.8364 - 85.615491, ENE 1996, Hallwachs (INBio). [1] Costa Rica, Prov. Alajuela, P.N. Arenal. A.C.A, San Carlos, Send. Pilón, 650m, 10.442743 -84.71649, Manual (L_N_269200_458050 #63661), 22 JUL 2001, G. Carballo (INBio). [1] Costa Rica, Prov. Puntarenas, A.C.O, Golfito, Reserva Ftal Golfo Dulce, Est Agujas, 250-350m, 8.536614 - 83.425512, Manual (red, libre) (L_S_276750 _526550 #53710), 3-22 JUL 1999, J. Azofeifa (INBio). [3] Costa Rica, Prov. Puntarenas, A.C.O, Golfito, Pque Nal Corcovado, Estación Sirena, 0-100m, 8.480172 -83.594922, Tp. de Luz (L_S_270500_507900 #52608), 13-22 MAR 1980, Janzen (INBio). [1] Costa Rica, Prov. Alajuela, San Ramón. Est. Biol. Villa Blanca, Send. Doña Estrella, 1115m, 10.201361 -

84.485101, Colecta Libre (L_N_242482_483371 #96541), 28 NOV-2 DEC 2008, R. Rojas (INBio). [2] Costa Rica, Alajuela Prov., Finca San Gabriel (16 kmENE Queb. Grande), 650 m, 10.875173 -85.400711, 9 Mar 1984, DH Janzen & W. Hallwachs (INBio). [2] Costa Rica, Prov. Alajuela, P.N. Volcán Tenorio, Sector El Pilón, Send. La Catarata, El Mirador, 800m, 10.702466 -84.990696, (Tp. Luz, L_N_297975_428089 #83523), 12 MAY 2005, J. A. Azofeifa (INBio). [3] Costa Rica, Prov. Cartago, Turrialba, M.N. Guayabo, Est. Guayabo, 1100-1200m, 9.97216 -83.692198, Tp. Luz (L_N_217200_570300 #91200), 7-8 MAY 2007, M. Moraga, J. A. Azofeifa, R. González & E. Navarro (INBio). [1] Costa Rica, Prov. Puntarenas, Golfito, Jiménez, Est. El Tigre, Area Administrativa, 47m, 8.546089 -83.397802, Tp. Luz (L_S_277800_529600 #92866), 14-15 NOV 2007. J. A. Azofeifa (INBio). [1] Costa Rica, Heredia Prov., Finca La Selva (OTS), Puerto Viejo de Sarapiquí, 50m, 10.431958 -84.0091, 14-15 Nov 1982, DH Janzen & W. Hallwachs (INBio). [7] Costa Rica, Prov. Guanacaste, La Cruz, Bosque Nuevo, 300-400m, 11.053653 -85.35765, Tp. Luz (L_N_336925_388073 #93680), 15-16 ABR 2008, J. A. Azofeifa & M. A. Zumbado (INBio). [2] Costa Rica, Prov. Puntarenas, Golfito, Jiménez, Est. El Tigre, Area Administrativa, 47m, 8.546089 -83.397802, Tp. Luz (L_S_277800_529600 #92870), 28-29 NOV 2007, J. A. Azofeifa (INBio). [3] Costa Rica, Prov. Alajuela, San Ramón, Estación Biológica Universidad ATM, 4 km SO Chachagua, 450m, 10.383333 -84.618056, Tp. de Luz (L_N_262618_468821 #99568), 25 NOV 2009, W. Porras (INBio). [2] Costa Rica, Prov. Puntarenas, P.N. Piedras Blancas, Centro Operativo, 3m, 8.739863 -83.293143, Tp. Luz (L_S_299240_541100 #93414), 6-7 MAR 2008, J. A. Azofeifa (INBio). [2] Costa Rica, Prov. Puntarenas, Golfito, Est. El Tigre, 47m, 8.546089 -83.397802, Tp. Luz (L_S_277800_529600

#93411), 26-27 FEB 2008, J. A. Azofeifa (INBio). [2] Costa Rica, Prov. Alajuela, P.N. Volcán Tenorio, Estación El Pílon, 700 - 800m, 10.704603 -84.992304, Tp. Luz (L_N_298212_427913 #83524), 10 MAY 2005, J. A. Azofeifa (INBio). [1] Costa Rica, Prov. Puntarenas, Golfito, Jiménez, Est. El Tigre, Area Administrativa, 47m, 8.546089 - 83.397802, Tp. Luz (L_S_277800_529600 #92869), 17-18 NOV 2007, J. A. Azofeifa (INBio). [1] Costa Rica, Prov. Puntarenas, Golfito, Est. Tigre, 47m, 8.546089 - 83.397802, Tp. Luz (L_S_277800_529600 #92556), 1 OCT 2007, J. A. Azofeifa (INBio). [4] Costa Rica, Prov. Alajuela, Upala, P.N. Volcán Tenorio, Albergue Heliconias, 800-900m, 10.718881 -85.029934, Tp. Luz (L_N_299800_423800 #86394), 6-9 JUN 2006, B. Gamboa & M. Moraga (INBio). [2] Costa Rica, Prov. Puntarenas, Golfito, Est. El Tigre, área administrativa, Tp. Luz (L_S_277800_529600 #92127), 0-100m, 8.546089 -83.397802, 10 AGO 2007, J. A. Azofeifa (INBio). [1] Costa Rica, Prov. S. Jose, Est. Bijagual, Res. Biol. Carara, 500 m, 9.747145 -84.563354 , (L- N 192250_474760), Set 1990, G. Varela (INBio). [1] Costa Rica, Prov. Guanacaste, A.C.G, La Cruz, Pque Nal Guanacaste, Est Biol Maritza, 600-700m, 10.962581 -85.484265, Tp. de Luz (L_N_326900_374200 #52560), 1 JUN 1987, Janzen (INBio). [2] Costa Rica, Prov. Alajuela, P.N. Volcán Tenorio, Estación El Pílon, 700 - 800m, 10.704603 - 84.992304, Tp. Luz (L_N_298212_427913 #83820), 1 JUL 2005, J. Azofeifa (INBio). [3] Costa Rica, Osa Peninsula, Sirena, Corcovado, Nat. Pk., 8.480171 -83.591289, 1May 1984, D.H. Janzen & W. Hallwachs (INBio). [1] Costa Rica, Heredia, Est. Biol. La Selva, 50-150m, 10 26 N 84 01 W (10.439193 -84.010919), Aug 1995, INBio- OET (INBio). [1] Costa Rica, Prov. Alajuela, San Carlos, La Fortuna, Sector Catarata, 500m, 10.43646 -84.675838, Manual (L_N_268500_462500 #5738), 1MAR 1998, G. Carballo (INBio).

[1] Costa Rica, Prov. Guanacaste, Bagaces, P.N. Palo Verde, Estación Palo Verde, 24m, 10.347194 -85.347556, Tp. de Luz (L_N_258758_388930 #104270), 21 MAY 2012, M. A. Zumbado, J. A. Azofeifa & M. Hernandez (INBio). [1] Costa Rica, Prov. Puntarenas, A.C.O, Golfito, Reserva Ftal Golfo Dulce, Est Agujas, 250-350m, 8.536614 -83.425512, Manual (red, libre) (L_S_276750_526550 #53606), 4-22 MAY 1999, J. Azofeifa (INBio). [1] Costa Rica, Guanacaste Prov., Casa de Roberto, Estacion Pitilla, 500m, 7Km S. Santa Cecilia, W85 25 33, N11 00 18(11.002567 -85.425852), May 1988, GNP Biodiversity Survey (INBio). [2] Costa Rica, Prov. Guanacaste, A.C.G, La Cruz, Pque Nal Guanacaste, Casa Oeste, Cerro El Hacha, 12 Km SE La Cruz, 300m, 11.005677 -85.564946, Manual (red, libre) (L_N_331700_365400 #53237), ENE 1988 (INBio). [1] Costa Rica, Prov. Heredia, Santo Domingo, Santa Rosa, INBio, 1100m, 9.973625 -84.094391, Colecta Libre (L_N_217300_526200 #106225), 6 MAR 2013, B. Hernández (INBio). [1] Costa Rica, Prov. Alajuela, P.N. Arenal, Sendero Mena, 600m, 10.466206 -84.751964, Libre (L_N_271800_454170 #62875), 22 MAY 2001, G. Carballo (INBio). [2] Costa Rica, Guanacaste Pv., Estacion Maritza, 600m W side Volcan Orosi, 10.962542 -85.495244, 18 Feb 1988, D. H. Janzen & W. Hallwachs (INBio). [1] Costa Rica, Prov. Puntarenas, P.N. Piedras Blancas, Puesto Esquinas, Quebrada Seca, 20m, 8.70604 -83.279982, Tp. Luz (L_S_295501_542552 #93413), 8-9 MAR 2008, J. A. Azofeifa & E. Benavides (INBio). [3] Costa Rica, Prov. Guanacaste, Nandayure, Finca Agua Fría, 0 -100m, 10.019858 -85.250033, Tp de Luz (L_N_222550_399500 #67756), 8 ABR 2002, I. Jimenez Morera & W. Porras (INBio). [1] Costa Rica, Prov. Puntarenas, Osa, R.F. Golfo Dulce, Cerro Brujo, 612m, 8.662821 -83.583982, Tp. Luz Mercurio (L_S_290700_509100 #95674), 24-25 ENE 2009, J. A. Azofeifa & A. Chamorro

(INBio). [1] Costa Rica, Prov. Puntarenas, Golfito, Est. El Tigre, área administrativa. 0-100m, 8.546089 -83.397802, Tp. Luz (L_S_277800_529600 #92126), 21 JUL 2007, J. A. Azofeifa (INBio). [2] Costa Rica, Prov. Puntarenas, R. Priv. Karen Mogensen, Alred. Estación, 350m, 9.867095 -85.059952, Tp. Luz Mercurio (L_N_205600_420300 #74580), 5 JUL 2003, M. A. Zumbado & Y. Cardenas (INBio). [1] Costa Rica, Prov. Alajuela, Guatuso, P.N. Volcán Tenorio, Est. Pilon, 700-800m, 10.704605 -84.99231, Colecta Libre (L_N_298212_427913 #99799), 2 JUN 2010, A. García-López (INBio). [1] Costa Rica, Guanacaste Prov., La Maritza, Hda. Orosi, 550m, 10.958898 -85.502549, 2-5 June 1986, W. Hallwachs & D.H. Janzen (INBio). [1] Costa Rica, Prov. Puntarenas, Golfito, Jiménez, Est. El Tigre, Area Administrativa, 47m, 8.546089 -83.397802, Tp. Luz. L_S_277800_529600 #92871, 30 NOV-1 DEC 2007. J. A. Azofeifa (INBio). [1] Costa Rica, Prov. Puntarenas, Golfito, Jiménez, Est. El Tigre, Area Administrativa. 47m, 8.546089 -83.397802, Tp. Luz (L_S_277800_529600 #92867), 15-16 NOV 2007, J. A. Azofeifa (INBio). [1] Costa Rica, Alajuela Prov., Finca San Gabriel, 650 m (16 km ENE Queb. Grande), 10.875173 -85.400711, 11-15 June 1986, I. Gauld & J. Thompson (INBio). [1] Costa Rica, . Prov. Guanacaste, Estación Pitilla, 300-400m, 11.033333 -85.408334, Tp. Luz (L_N_334696_382526 #87200), 3-4 OCT 2006, B. Gamboa & M. Moraga (INBio). [1] 10.439193 -84.010919 (INBio). [1] Costa Rica, Prov. Limón, R.B. Hitoy Cerere, Talamanca, Cerro Bitarkara, 1025m, 9.640278 -83.1375, Tp. Luz (L_S_398841_558082 #78492), 16 OCT 2004, B. Gamboa, D. Briceño, M. Moraga & Y. Cárdenas (INBio). [1 Male] Paraguay, Puerto Bertoni, Alto Parana, 2/00/1910 (SEMC). [1 Male] Costa Rica, Alajuela, Fca. San Gabriel, 2Km SW Dos Rios, 600 m, GNF Biodiv. Survey, (318800, 383500), 5/00/1989 (SEMC). [1 Male] Peru, Madre de Dios,

Yanayacu, Cerro Alto, Madre de Dios River, 375 m, 12 25 12 S 71 5 30 W, (PERU1800 075), ex: black light, 10/22/2000, R. Brooks (SEMC). [1 Male] Trinidad, Curepe, 5/12/1964, F.D. Rennete (SEMC). [1 Female] Peru, Santa Isabel, Cusco, 11/00/1951, F. Woyikowski (SEMC). [1 Female] Costa Rica, Heredia, La Selva Biol. Stn. (OTS), 6/15/1990, D. Brzoska (SEMC). [1 Female] Brazil, Bahia, Figueira Preta (SEMC). [1 Female] Costa Rica, Heredia, Puerto Viejo, W Selva Verde Lodge, 10 20 6 N 84 9 54 W (CR1B99 002), 5/22/1999, D. Brzoska (SEMC). [1] Panama, Panama, Cerro Campana, 06/1956, Carl Rettenmeyer (SEMC 990765). [5] Panama, Canal Zone, Barro Colorado Island, 9.18330 -79.85000, 04/01/1963, Rettenmeyer & Rettenmeyer (SEMC 991052, 991053, 990767, 990773 & 990782). [1] Mexico, Oaxaca, Temascal, 5 mi E, 12/21/1963, Daniel Janzen (SEMC 990811). [2] Trinidad and Tobago, Trinidad Island, Nariva, Nariva Swamp, 12/28/1963, F. Bennett (SEMC 990856 & 990857). [2] Costa Rica, Guanacaste, Los Almendros; Guanacaste National Park, 07/22/1992, E. Lopez (SEMC 990843 & 990844). [1] Panama, Canal Zone, Barro Colorado Island, 9.18330 -79.85000, 04/23/1963, Rettenmeyer & Rettenmeyer (SEMC 990784). [7] Costa Rica, Alajuela, San Gabriel, 2 km SW; Dos Rios, 600, 05/1989, GNP Biod. Sur. (SEMC 990793 to 990799). [1] Panama, Canal Zone, Barro Colorado Island, 9.18330 -79.85000, 07/05/1996, Michael Engel (SEMC 991046). [1] Ecuador, Pichincha, Tinalandia, 04/14/1998, David Brzoska (SEMC 990830). [1] Panama, Canal Zone, Barro Colorado Island, 9.18330 -79.85000, 06/29/1956, Rettenmeyer & Rettenmeyer (SEMC 990771). [1] Costa Rica, Guanacaste, Estacion Pitilla; Santa Cecilia, 9 km S, 700, 05/19/1993, P. Rios (SEMC 990817). [1] Mexico, Oaxaca, Temascal, 11/23/1963, Daniel Janzen (SEMC 990804). [1] Argentina, Salta, Buena Vista, 03/1951, A. Martinez (SEMC 990850). [1] Peru, Cuzco,

Paucartambo, Santa Isabel, -12.99996 -71.30007, 11/1951, Felix Woytkowski (SEMC 990823). [5] Costa Rica, Puntarenas, Las Cruces Biological Station, 8.78570 -82.95970, 05/26/1989, David Brzoska (SEMC 990786 to 990790). [1] Costa Rica, Limon, Hacienda La Suerte; Hacienda Tapezco; Tortugeuro, 29 km W, 40, 10.45000 -83.78333, 08/31/1979, Tapezco Rainforest Expedition (SEMC 990837). [4] Panama, Canal Zone, Barro Colorado Island, 9.18330 -79.85000, 03/15/1963, Rettenmeyer & Rettenmeyer (SEMC 991054 & 990775-990777). [1] Mexico, Oaxaca, Temascal, 12/04/1963, Daniel Janzen (SEMC 990810). [1] Panama, Canal Zone, Barro Colorado Island, 9.18330 -79.85000, 04/21/1963, Rettenmeyer & Rettenmeyer (SEMC 990783). [1] Mexico, San Luis Potosi, Xilitla, 700, 09/01/1991, Douglas Yanega (SEMC 990862). [1] Paraguay, Alto Parana, Puerto Bertoni , 02/1910 (SEMC 990829). [1] Panama, Canal Zone, Barro Colorado Island, 9.18330 -79.85000, 06/16/1956, Rettenmeyer & Rettenmeyer (SEMC 990770). [1] Costa Rica, Guanacaste, Rio Gongora; Guanacaste National Park, 600, 06/1992, ParataxonomyCourseIII (SEMC 990816). [1 Female] Mexico, Oaxaca, Temascal, 10/22/1963 (SEMC 990803). [1] Costa Rica, Alajuela, Playuelas; Cano Negro Wildlife Refuge, 20m, 12/31/1992, K. Martinez (SEMC 990849). [1] Costa Rica, Limon, Amubri, 70, 07/28/1993, G. Gallardo (SEMC 990822). [1] Ecuador, Napo, Jatun Sacha Biological Station; Puerto Napo, 21 km E, 400, 07/11/1994, Francois Genier (SEMC 990836). [3] Panama, Canal Zone, Barro Colorado Island, 9.18330 -79.85000, 07/18/1996, Michael Engel (SEMC 991049-991051). [1] Mexico, Oaxaca, Temascal, 5 mi E, 11/27/1963, Daniel Janzen (SEMC 990809). [1] Trinidad and Tobago, Trinidad Island, Curepe, 05/12/1964, F. Bennet (SEMC 990855). [1] Costa Rica, Puntarenas, Carara National Park; Quebrada Bonita Station, 50, P. Campos (SEMC 990842). [1]

Venezuela, Aragua, El Limon, 12/19/1966, R. Rubio (SEMC 990828). [2 Male] Panama, Canal Zone, Barro Colorado Island, 40, 9.18330 -79.85000, 06/15/1956, Rettenmeyer & Rettenmeyer (SEMC 991056 & 990769). [1] Costa Rica, Heredia, La Virgen; Puerto Viejo, 220, 04/24/1993, M. Ortiz (SEMC 990815). [1] Mexico, San Luis Potosi, El Salto, Naranjo, 23.09930 -100.81670, 08/30/1991, Douglas Yanega (SEMC 990861). [2] Mexico, Oaxaca, Temascal, 11/16/1963 (SEMC 990802 & 990806). [2] Venezuela, Aragua, Cagua, 04/1965, E. Doreste (SEMC 990847 & 990848). [1] Costa Rica, Puntarenas, Manuel Antonio National Park; Quepos, 80, 04/1992, C. Cano (SEMC 990821). [1] Venezuela, Lara, Rio Claro, 06/05/1975, R. Turner (SEMC 990834). [1] Mexico, Oaxaca, Temascal, 11/26/1963, Daniel Janzen (SEMC 990808). [2] Argentina, Misiones, Panambi, 12/1957 (SEMC 990851 & 990854). [3] Panama, Canal Zone, Barro Colorado Island, 9.18330 -79.85000, 03/22/1963, Rettenmeyer & Rettenmeyer (SEMC 990779-990781). [1] Costa Rica, Puntarenas, Carara National Park; Quebrada Bonita Station, 50, P. Campos (SEMC 990841). [3] Argentina, Cordoba, Punilla, Santa Fe, 10/22/1942 (SEMC 990827, 990852, 990853). [1] Panama, Canal Zone, Barro Colorado Island, 9.18330 -79.85000, 05/03/1956, Rettenmeyer & Rettenmeyer (SEMC 990768). [1] Costa Rica, San Jose, San Antonio de Escazu, 2 km S, 1500, 07/08/1988, William Wcislo (SEMC 991057). [2] Costa Rica, Puntarenas, Corcovado National Park; Sirena Station, 03/22/1980, Janzen & Hallwachs (SEMC 990813 & 990814). [1] Costa Rica, San Jose, San Jose, 08/1963, Charles Michener (SEMC 990860). [1] Mexico, Oaxaca, Temascal, 10/25/1963, Daniel Janzen (SEMC 990801). [1] Mexico, Veracruz, Cordoba, 07/14/1965, Roy Snelling (SEMC 990833). [1] Panama, Canal Zone, Barro Colorado Island, 9.18330 -79.85000, 03/07/1956, Rettenmeyer & Rettenmeyer (SEMC 990774).

[1] Costa Rica, Guanacaste, Cacao Biological Station; Volcano Cacao, SW side, 1400, 08/1991, C. Chaves (SEMC 990820). [1] Mexico, Oaxaca, Temascal, 11/21/1963, Daniel Janzen (SEMC 990807). [1] Costa Rica, Cartago, Grano de Oro; Chirripo; Turrialba, 1120, 08/31/1992, P. Campos (SEMC 990840). [1] Costa Rica, Cartago, Turrialba, 602m, 9.88333 -83.63333, 08/17/1965, Rettenmeyer, Elzinga, & Brockman (SEMC 990826). [1] Costa Rica, San Jose, San Jose, 08/13/1963, Michener & Kerfoot (SEMC 990859). [1] Costa Rica, Puntarenas, Manuel Antonio National Park; Quepos, 80, 04/1992, G. Varela (SEMC 990846). [1] Panama, Canal Zone, Barro Colorado Island, 9.18330 -79.85000, 07/12/1996, Michael Engel (SEMC 991048). [1] Mexico, Veracruz, Cordoba, 07/06/1966, Buckett, Gardner, & Gardner (SEMC 990832). [1] Costa Rica, Puntarenas, Corcovado National Park; Sirena Station, 100, 10/1993, G. Fonseca (SEMC 990819). [1] Costa Rica, Puntarenas, Rincon de Osa, 08/24/1969, P. Kazan (SEMC 990825). [1] Costa Rica, Puntarenas, Wilson Botanical Garden, Las Cruces, San Vito, 1100m, 8.78420 -82.96000, 06/20/1990, David Brzoska (SEMC 990792). [1] Costa Rica, Puntarenas, Carara National Park; Quebrada Bonita Station, 50, P. Campos (SEMC 990839). [1] Panama, Canal Zone, Barro Colorado Island, 9.18330 -79.85000, 05/19/1956, Rettenmeyer & Rettenmeyer (SEMC 990766). [1] Costa Rica, Heredia, Finca La Selva, Puerto Viejo, 10/13/1965, Daniel Janzen (SEMC 990812). [1] Trinidad and Tobago, Trinidad Island, Nariva, Nariva Swamp, 09/1966, F. Bennett (SEMC 990858). [1] Costa Rica, Puntarenas, Manuel Antonio National Park; Quepos, 80, 05/1993, G. Varela (SEMC 990845). [1] Panama, Canal Zone, Barro Colorado Island, 9.18330 -79.85000, 05/04/1963, Rettenmeyer & Rettenmeyer (SEMC 990785). [1] Panama, Canal Zone, Barro Colorado Island, 9.18330 -79.85000, 07/07/1996, Michael

Engel (SEMC 991047). [1 Male] Venezuela, Aragua, El Limon, 450m, 04/20/1961,
 Fernando Fernandez (SEMC 990831). [1] Panama, Canal Zone, Barro Colorado Island,
 9.18330 -79.85000, 07/13/1956, Rettenmeyer & Rettenmeyer (SEMC 990772). [1] Costa
 Rica, Limon, Manzanillo; Gandoca y Manzanillo, 100, 10/13/1992, Freddy Quesada
 (SEMC 990818). [1] Mexico, Oaxaca, Temascal, 11/18/1963 (SEMC 990805). [1]
 Panama, Canal Zone, Barro Colorado Island, 9.18330 -79.85000, 06/30/1967,
 Robert Beard (SEMC 990824). [1] Costa Rica, Heredia, La Selva Biological Station,
 10.43330 -84.01670, 06/16/1990, David Brzoska (SEMC 990791). [1] Costa Rica,
 Puntarenas, Rincon, 2.5 mi SW; Osa Peninsula, 8.70000 -83.48330, 02/27/1967, OTS
 advanced zoology course (SEMC 990838). [1] Panama, Canal Zone, Barro Colorado
 Island, 9.18330 -79.85000, 03/18/1963, Rettenmeyer & Rettenmeyer (SEMC 990778). [1
 Female] Brasil, Para, Belem, ix-1964, E. Dente (MZUSP). [1 Female] Brasil, Para,
 Reserva Guama, iii-1964, E. Dente (MZUSP). [1 Female] Brasil, Rondonia, Forte
 Principe da Beira, 19-xi-3-xii-1967, G.R. Kloss (MZUSP). [1 Female] Suriname,
 Marowijne distr., Anapaike (Rio Lawa), x-1963, B. Malkin (MZUSP). [1 Male] Brazil,
 Rio Grande do Sul, Guarani, i-7-1954, C. Biezanko (AMNH).

Distribution: Presently known from Bolivia; Brasil (Para, Rondonia); Costa Rica
 (Cartago, Heredia, Puntarenas, San Jose); Guatemala; Mexico (Oaxaca, Veracruz);
 Panama (Barro Colorado); Suriname (Marowijne); Venezuela (Aragua).

Comments: This species is similar to *P. mexicana* but females differ by having
 dark brown to black legs; males with clypeus and labrum yellow; abdomen pubescence
 dark brown.

Ptiloglossa fulvopilosa (Cameron)

Ptiloglossa fulvo-pilosa Cameron, 1903: 237.

Ptiloglossa fulvopilosa Schrottky, 1914: 625.

Ptiloglossa mexicana Cockerell, 1919: 178.

Ptiloglossa fulvopilosa Linsley & Cazier, 1970: 253.

Holotype: Male, from Panama, Pacific side (BMNH).

Re-description:

Male. Body length 16 mm, forewing length 14 mm. Head. Mandibles dark brown with pointed dark reddish apex. Preapical tooth, apex smooth and rounded. Malar area, length around 0.5 OD. Labrum and clypeus yellow. Labrum smooth. Clypeus upper part projected beyond the face and flattened on the disc, with punctures separated by a distance less than a puncture diameter (sometimes minute). Paraocular area pubescence white. Supraclypeal area integument light brown, pubescence yellow. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance equal to 1.0 OD, pubescence tawny with darker tips, longer than 1.0 OD. Ocellocular distance equal to 1.0 OD. Ocelloccipital distance equal to 1.5 OD. Vertex with a mix of yellow and dark brown (being the latter predominant) pubescence. Genal area as wide as 0.5 eye width, with a line of short white setae close to the margin of the compound eye, followed by a group of light yellow pubescence.

Mesosoma. Wings translucent yellow. Veins yellow (tawny). Prestigma as long as stigma. Tegulae yellow, transparent, fully covered by dense pubescence. Thorax and mesopleura pubescence tawny with darker tips. Scutum and scutellum black. Propodeal triangle smooth. Lateral surfaces of propodeum with a mix of completely light yellow hairs and light yellow with darker tips hairs. Venter pubescence light yellow. Front, medial and hind legs light brown to yellow. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in lateral view shorter than inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), with a basal width 0.5 of tibial width, spur projection forming a right angle from tibiae, tip shape rounded, concave but not flattened (Figure 17). Inner hind tibial spur with well defined, slender dents. Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument dark brown, pubescence tawny (sometimes with light yellow on its base). T4-T5 with a spot apparently without pubescence on the lateral side (trichotrichia). T5-T7 pubescence yellow (tawny). Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn -like spines) prominent.

Material studied: [1Male-holotype] Panama, Pacific side, G.F. Mathew (BMNH). [1 Male] Panama, Chiriqui, V. de Chiriqui, 4000 - 5000 ft, 1913, Godman-Salvin (BMNH). [1 Male] Panama, Toboga Island, (Proboscis and wings mounted; HymSlide 1085-188b), 6/12/1911, Busck (NMNH).

Distribution: Presently known from Mexico (Veracruz); Panama (Chiriqui, Toboga Island); Trinidad and Tobago.

Comments: This species is close to *P. eximia* but differs by having the upper part of the clypeus projecting beyond the face and flattened on disc; inner hind tibial spur serrate; abdomen covered by tawny pubescence.

Ptiloglossa generosa (Smith)

Megacilissa generosa Smith, 1879: 59.

Megacilissa generosa Smith, 1898: 68.

Ptiloglossa generosa Moure, 1945: 152.

Holotype: Male, from Venezuela (BMNH).

Re-description:

Male. Body length 17 mm, forewing length 14 mm. Head. Mandibles brown with pointed black apex. Preapical tooth, apex smooth and rounded. Malar area, length less than 0.5 OD. Labrum and clypeus yellow. Labrum smooth. Clypeus projected beyond the face and flattened on the disc, with punctures separated by a distance less than a puncture diameter (sometimes minute). Paraocular area pubescence light yellow with some scattered long dark hairs. Supraclypeal area integument dark brown, pubescence yellow with darker tips. Area between antennal socket and compound eye, pubescence with a spot of darker hairs (dark grey to black). Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance equal to 1.0 OD, pubescence tawny with darker tips, longer than 1.0 OD. Ocellocular distance equal to 0.5 OD. Ocelloccipital

distance shorter than 1.0 OD. Compound eye at a distance equal to 1.25 OD from occipital margin. Vertex with a mix of yellow and dark brown pubescence (being the latter predominant). Genal area as wide as 0.5 eye width, with long tawny setae intermixed with scarce long dark pubescence.

Mesosoma. Wings translucent yellow. Veins yellow (tawny). Prestigma 2 longer than stigma. Tegulae dark brown, transparent, fully covered by dense pubescence. Thorax pubescence completely tawny (lighter on the base) with darker tips. Mesopleural pubescence dark brown. Scutum and scutellum black. Propodeal triangle smooth. Lateral surfaces of propodeum with whitish pubescence with dark brown tips. Venter pubescence mostly white with a line of dark brown hairs giving continuation to those on mesepisternum. Front, medial and hind legs dark brown. Tarsi light brown to reddish. Apex hind femur pubescence same color than other. Outer hind tibial spur in lateral view as long as inner tibial spur, basal area laterally flattened, with a basal width 0.5 of tibial width, spur projection forming a right angle from tibiae, tip shape rounded, slightly concave (like a spoon shape) and flattened (Figure 18). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument dark brown. T1 pubescence white. T2-T3 pubescence dark brown. T4-T7 pubescence tawny. T4-T5 with a spot apparently without pubescence on the lateral side (trichotrichia). T7 pubescence on its rim yellow (tawny). Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) prominent. S7, S8 and genital capsule as in Figure 47.

Material studied: [1Male-holotype] Venezuela (BMNH). [1 Female] Tobago W.I., Nocturnal (37; 1914-237), 3/31/1914, G.H. Sworder (BMNH).

Distribution: Presently known from Tobago; Venezuela.

Comments: This species is similar to *P. olivacea* but differs by having the clypeus and labrum yellow; outer hind tibial spur basal area laterally flattened, tip shape rounded, slightly concave (like spoon shape) and flattened.

Ptiloglossa giacomellii Schrottky

Ptiloglossa giacomellii Schrottky, 1914: 625.

Holotype: Male, from La Rioja, Argentina; not seen. Repository collection unknown.

Re-description:

Male. Body length 19 mm, forewing length 15 mm. Head. Mandibles dark brown with pointed dark reddish apex. Preapical tooth, apex well separated and pointed. Malar area, length around 0.5 OD. Labrum and clypeus yellow. Labrum smooth. Clypeus projected beyond the face and flattened on the disc, surface without punctures or few scattered. Paraocular area, pubescence light yellow. Supraclypeal area integument dark brown, pubescence yellow. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance less than 1.0 OD,

pubescence yellow, longer than 1.0 OD. Ocellocular distance equal to 0.33 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance equal to 0.5OD from occipital margin. Vertex pubescence first half tawny, second half dark brown. Genal area as wide as 0.5 eye width, pubescence white or light yellow.

Mesosoma. Wings translucent yellow. Veins brown. Prestigma 2 longer than stigma. Tegulae yellow, transparent, fully covered by dense pubescence. Thorax and mesopleural pubescence tawny with darker tips. Scutum and scutellum black. Propodeal triangle smooth. Lateral surfaces of propodeum with tawny pubescence (light at the base). Venter pubescence completely yellow or tawny. Front legs light brown to yellow. Medial and hind legs dark brown. Tarsi tawny. Apex hind femur pubescence same color than other. Outer hind tibial spur in lateral view shorter than inner tibial spur, basal area bulbous, with basal width 0.25 of tibial width, spur projection curving downward, tip shape with a long and slender projection flagellum-like (can be broken) (Figure 19). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument dark brown. T1 pubescence tawny (sometimes with light yellow on its base). T2-T4 pubescence dark brown (in some cases except for those on the marginal band) with marginal band golden. T5-T7 pubescence yellow (tawny). T7 pubescence on its rim yellow (tawny). Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) prominent.

Material studied: [1 Male] Argentina, Salta, La Viña, -25.03333 -65.6, (Netting/GeoLocate Software), 3/1-31/1996, M. Fritz (AMNH_BEE 00019306). [1 Male] Argentina, Salta, Rosario de Lerma, -24.98333 -65.58333, (Netting/GeoLocate Software), 1/1-31/1983, M. Fritz (AMNH_BEE 00019307). [1 Male] Argentina, Salta, Sumalao, -25.0705 -65.50997, (just S of Rosario de Lerma; Used GeoLocate with online gazetteers to find approx cords; Netting), 1/1-31/1997, M. Fritz (AMNH_BEE 00019308).

Distribution: Presently known from Argentina (La Rioja, Salta).

Comments: This species resembles *P. fulvopilosa* but the outer hind tibial spur basal area bulbous, spur projection curving downward, tip shape with a long and slender projection flagellum-like; inner hind tibial spur with many minute dents (not too prominent); T2-T4 pubescence dark brown and setae on marginal area golden.

Ptiloglossa goffergei Moure

Ptiloglossa goffergei Moure, 1953: 69.

Lectotype: Male, from Brazil, Santa Catarina, Canavieiras (DZUP).

Re-description:

Male. Body length 16 mm, forewing length 14.5 mm. Head. Mandibles light brown with pointed dark reddish apex. Preapical tooth, apex well separated and pointed. Malar area, length around 0.5 OD. Labrum and clypeus. Labrum smooth. Clypeus

projected beyond the face and flattened on the disc, with punctures separated by a distance less than a puncture diameter (sometimes minute). Paraocular area pubescence yellow. Supraclypeal area integument light brown, pubescence yellow with darker tips. Area between antennal socket and compound eye pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance equal to 1.0 OD, pubescence black, equal or shorter than 1.0 OD. Ocellocular distance equal to 0.25 OD. Ocelloccipital distance equal to 1.0 OD. Compound eye reaching the occipital margin. Vertex pubescence dark brown. Genal area less than 0.5 eye width, with a line of short white setae close to the margin of the compound eye, followed by a group of yellow pubescence.

Mesosoma. Wings translucent yellow. Veins brown-reddish. Prestigma 2 longer than stigma. Tegulae brown, no transparent, fully covered by dense pubescence. Thorax pubescence tawny with darker tips. Mesopleural whitish or very light yellow pubescence. Scutum brown reddish. Scutellum yellow. Propodeal triangle smooth. Lateral surfaces of propodeum with tawny pubescence (light at the base). Venter pubescence tawny with darker tips. Front legs light brown to yellow. Medial and hind legs brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in lateral view as long as inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), basal width 0.25 of tibial width, spur projection forming an acute angle from tibiae, tip shape with a long and slender projection flagellum-like (can be broken) (Figure 20). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument dark brown. T1 pubescence tawny (sometimes with light yellow on its base). T2-T4 pubescence dark brown with marginal band tawny. T5-T7 pubescence dark brown to black. T7 pubescence on its rim dark brown. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) without projections.

Material studied: [1 Male-lectotype] Brazil, Santa Catarina, Canasvieiras, i-1946, Cr. C.N. Gofferge leg. (DZUP). [1 Male-paratype] Brazil, Santa Catarina, Canavieiras, 01/1946, Gofferge (SEMC1122288).

Distribution: Presently known from Brazil (Santa Catarina, São Paulo).

Comments: This species resembles *P. decora* because of similarities in thorax pubescence, but differs by having tip shape of the outer hind tibial spur with a long and slender flagellum-like projection. Moure (1953) mentions that this bee is structurally similar to *P. psednozona* but the ocelloccipital distance is equal to 1.0 OD; supraclypeal pubescence yellow with darker tips; compound eye reaching the occipital margin.

Ptiloglossa hemileuca Moure

Ptiloglossa hemileuca Moure, 1944: 3.

Holotype: Female from Brazil, Paraná, Curitiba (DZUP).

Re-description:

Male. Body length 14.5 mm, forewing length 13.5 mm. Head. Mandibles dark brown with pointed dark reddish apex. Preapical tooth, apex well separated and pointed. Malar area, length around 0.5 OD. Labrum brown, smooth. Clypeus light brown, not projected, rounded on the disc, with minute punctures. Paraocular area pubescence white. Supraclypeal area integument dark brown, pubescence whitish with tawny tips. Area between antennal socket and compound eye, pubescence with a spot of darker hairs (dark grey to black). Clypeoantennal distance longer than the diameter of antennal socket. Interocellar distance greater than 1.0 OD, pubescence brown with whitish branches, longer than 1.0 OD. Ocellocular distance equal to 0.67 OD. Ocelloccipital distance greater than 1.5 OD. Compound eye at a distance between 0.75 and 1.0 OD from occipital margin. Vertex pubescence completely white or first half white, second half dark brown. Genal area as wide as 0.5 eye width, pubescence white or light yellow.

Mesosoma. Wings translucent yellow. Veins brown. Prestigma as long as stigma. Tegulae brown, no transparent, pubescence covering 0.5. Thorax pubescence first half whitish with darker tips. Mesopleural pubescence whitish with tawny tips. Scutum and scutellum integument black. Propodeal triangle with minute punctures. Lateral surfaces of propodeum with whitish pubescence with dark brown tips. Venter pubescence white or whitish with tawny tips. Front and medial legs brown. Hind legs dark brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in lateral view as long as inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), basal width 0.25 of tibial width, spur projection curving downward, tip shape with a long and slender projection flagellum-like (can be broken)

(Figure 21). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument black, pubescence yellow (or golden yellow). T5 to T7 pubescence completely tawny. T7 pubescence on its rim dark brown. S6 projections on the side (thorn-like spines) prominent.

Female. Body length 18 mm, forewing length 13 mm. Head. Mandibles black with pointed dark reddish apex. Preapical tooth, apex divided in two forming 2 tiny pointed teeth. Malar area, length less than 0.5 OD. Labrum and clypeus black. Labrum with one or two small protuberances on the middle of the disc. Clypeus not projected, rounded on the disc, with few scattered strong punctures. Paraocular area pubescence white. Supraclypeal area integument black, pubescence yellow (light yellow at the base). Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye, pubescence with a spot of darker hairs (dark grey to black). Interocellar distance equal to 1.0 OD, pubescence whitish with darker tips, longer than 1.0 OD. Ocellocular distance greater than 1.0 OD. Ocelloccipital distance equal to 1.0 OD. Compound eye at a distance 0.75 to 1.0 OD from occipital margin. Vertex pubescence black. Genal area as wide as 0.5 eye width, pubescence white.

Mesosoma. Wings translucent brown. Veins brown. Prestigma 2 longer than stigma. Tegulae dark brown, no transparent, not covered by pubescence. Thorax and mesopleural pubescence whitish with darker tips (look like grey hairs). Scutum and scutellum black. Propodeal triangle with minute punctures. Lateral surfaces of

propodeum pubescence light yellow. Venter pubescence whitish. Front legs dark brown. Medial and hind legs black. Tarsi light brown to reddish. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate delimited by an outer ridge. Hind basitarsus inner margin slightly concave, width 1.5 times as long as wide.

Metasoma. T1-T4 integument dark brown. T1-T4 pubescence tawny (can be light yellow on its base). T5 to T6 pubescence dark brown with some orange hairs that increase its quantity on the apical terga, sometimes at the sides. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). Sterna margin, pubescence long (as long as or longer than 2 OD).

Material studied: [1Female-holotype] Brazil, Paraná, Curitiba, ii-1939, Claretiano (DZUP). [1 Male-alotype] Brazil, Paraná, Curitiba, iv-1939, Claretiano (DZUP). [1 Female] Brazil, Mato Grosso, 12 50 S 51 47 W, 2/24/1968, O.W. Richards, On *Cassia angustifolia*, Campo (BMNH). [1 Female] Brazil, Parana, Curitiba, 02/1939, Claretiano (SEMC 1122289). [1 Female] Brasil, Mato Grosso, Serra Caraça, 1380m, xi-1961, Kloss, Lenko, Martins & Silva (MZUSP).

Distribution: Presently known from Brazil (Mato Grosso, Minas Gerais, Paraná, São Paulo).

Comments: This species is similar to *P. aenigmatica* because of the white pubescence with darker tips on thorax but females differ by having the labrum and clypeus black; clypeus with few scattered strong punctures on disc; T1-T4 pubescence tawny (light yellow at its base); T5 to T6 pubescence dark brown with some orange hairs that increase its quantity on the apical terga, sometimes at the sides. Males differ by

having labrum and clypeus brown; clypeus not projected (rounded on the disc); inner hind tibial spur with many minute dents (not serrate); T5-T7 pubescence tawny.

Ptiloglossa hondurasica Cockerell

Ptiloglossa hondurasica Cockerell, 1949: 431.

Holotype: Female, from Honduras, Agua Amarilla (USNM).

Re-description:

Female. Body length 17 mm, forewing length 11 mm. Head. Mandibles completely dark brown (almost black) with truncate apex. Preapical tooth apex not prominent (almost not differentiated). Malar area, length less than 0.5 OD. Labrum brown-reddish, with two tubercles on the middle (strong well-differentiated). Clypeus black, projected beyond the face and rounded on the disc, surface rugose-striate or with strong punctures suggesting a rugose surface. Paraocular area pubescence whitish mixed with scattered longer dark setae. Supraclypeal area integument black, pubescence whitish mixed with scattered longer black setae. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye, pubescence with a spot of darker hairs (dark grey to black). Interocellar distance greater than 1.0 OD, pubescence white equal or shorter than 1.0 OD. Ocellocular distance greater than 1.0 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance 0.75 to 1.0 OD from occipital margin. Vertex pubescence dark brown to black. Genal area less

than 0.5 eye width, pubescence white with scarce dark brown hairs close to compound eye margin.

Mesosoma. Wings translucent yellow. Veins brown. Prestigma 2 longer than stigma. Tegulae tawny, transparent, with pubescence covering 0.5 of it. Thorax pubescence light yellow with black tips. Mesopleural, pubescence whitish with dark tips (look like grey hairs). Scutum and scutellum black. Propodeal triangle with minute punctures. Lateral surfaces of propodeum pubescence light yellow. Venter pubescence dark hairs on the middle surrounded by white pubescence. Front, medial and hind legs dark brown. Tarsi light brown to reddish. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate delimited by an outer carinated ridge. Hind basitarsus inner margin straight, parallel to the outer margin, 2 times as long as wide.

Metasoma. T1 integument brown. T2-T4 integument black. T1 pubescence light yellow. T2-T4 pubescence golden-yellow. T2-T4 pubescence marginal band whitish. T5-T6 pubescence mostly dark brown but with some whitish hairs on the sides. Lateral areas of terga, pubescence black or dark brown. Sterna margin, pubescence short (shorter than 1.0 OD).

Material studied: [1Female-holotype] Honduras, Agua Amarilla, December 15 (USNM).

Distribution: Presently known only from Honduras (Agua Amarilla).

Comments: This bee resembles *P. aenigmatica* and *P. hemileuca* but differs by having light yellow pubescence with yellow tips on dorsum and white with dark tips (look like grey hairs) on mesopleura; T1 pubescence light yellow; T2-T4 with white

bands of hairs; T5 to T6 pubescence mostly dark brown but with some whitish hairs on the sides; interocellar distance greater than 1.0 OD.

Ptiloglossa hoplopoda Moure

Ptiloglossa hoplopoda Moure, 1987: 124.

Holotype: Male, from Mexico, Veracruz, Omealca (DZUP).

Re-description:

Male. Body length 17 mm, forewing length 13.5 mm. Head. Mandibles light brown with pointed dark reddish apex. Preapical tooth apex smooth and rounded. Malar area, length less than 0.5 OD. Labrum brown, with two tubercles on the middle. Clypeus light brown, not projected, rounded on the disc, with strong punctures suggesting a rugose surface. Paraocular area pubescence yellow. Supraclypeal area integument dark brown, pubescence yellow (light yellow at the base). Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance longer than the diameter of antennal socket. Interocellar distance less than 1.0 OD, pubescence yellow, longer than 1.0 OD. Ocellocular distance equal to 0.5 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance equal to 0.33 OD from occipital margin. Vertex pubescence tawny. Genal area as wide as 0.5 eye width, with a line of short white setae close to the margin of the compound eye, followed by a group of yellow pubescence.

Mesosoma. Wings translucent brown. Veins brown. Prestigma 2.5 longer than stigma. Tegulae tawny, no transparent, fully covered by dense pubescence. Thorax and mesepisternum pubescence completely tawny (lighter on the base). Scutum black. Scutellum dark brown (reddish). Propodeal triangle integument strongly rugose on the basal area. Lateral surfaces of propodeum with tawny pubescence (light at the base). Venter pubescence completely yellow or tawny. Front and medial legs light brown to yellow. Hind legs dark brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in lateral view shorter than inner tibial spur, basal area bulbous, basal width 0.33 of tibial width; spur projection curving downward, tip shape bulbous and wider than the tip of the inner tibial spur (Figure 22). Inner hind tibial spur serrate. Hind basitarsus as long as 0.75 tibial length.

Metasoma. T1-T4 integument dark brown. T1 pubescence tawny (sometimes with light yellow on its base). T2-T4 pubescence light yellow. T4-T5 with a spot apparently without pubescence on the lateral side (trichotrichia). T5 with mostly dark brown or black setae but with a marginal band of whitish hairs, T6-T7 fully covered by dark hairs. T7 pubescence on its rim dark brown. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) prominent.

Material studied: [1 Male-holotype] Mexico, Veracruz, Orizaba, Omealca, Febrero 1940, J.M. Sanches (DZUP).

[1 Male] Mexico, 1913, Godman-Salvin, Salle Coll. (BMNH). [1] Costa Rica, Guanacaste Prov., Finca Biesnan, Colonia Refug. Los Angeles, 11 Km E Quebrada

Grande, 500m, 10.873193 -85.451009, 13 JUN 1985, D.H. Janzen & W. Hallwachs (INBio). [1] Costa Rica, Puntarenas Prov., Osa Peninsula 2.5 mi. SW. Rincon, 08 42 N 83 29 W, II-21 to 28-1967, OTS Adv.Zoo.Course (INBio). [1] Costa Rica, Guanacaste Pr., W. of Carmona Nicoya, 600-700m, 9.996735 -85.274583, 19 Aug 1982, D.H. Janzen & W. Hallwachs (INBio). [2] Costa Rica, Prov. Puntarenas, Golfito, 6 Km S. San Vito, 500-600m, 8.7 -83, Colecta Libre (L_S_294877_573364 #107641), 13-18 MAR 1967, OTS Adv. Zoo Course (INBio). [5] Mexico, San Luis Potosi, Ciudad Maiz, 5 mi E, 1433, 22.44680 -99.56710, 08/23/1954, Univ. of Kans. Mex. Exped. (SEMC 990897 to 900901). [1] Mexico, Yucatan, Merida, 18 mi S, *Solanum*, 07/07/1966, Daniel Janzen (SEMC 990910). [1] Costa Rica, San Jose, San Antonio de Escazu, 1350, 01/16/1988, William Wcislo (SEMC 990909). [2] Mexico, Jalisco, La Piedad, 22 mi NW, *Asclepias*, 07/23/1954, J. MacSwain (SEMC 990905 & 990907). [1] Mexico, Jalisco, La Piedad, 22 mi NW, 07/23/1954, E. Schlinger (SEMC 990906). [1] Mexico, San Luis Potosi, El Salto, 23.09930 -100.81670, 07/11/1961, Univ. of Kans. Mex. Exped. (SEMC 990895). [1] Mexico, Hidalgo, Santa Maria Amajac, *Tagetes erecta*, 09/15/1992, L. Godinez (SEMC 990913). [1 Female] Mexico, Hidalgo, Actopan, Xoxaft, *Bidens pilosa*, 09/17/1992, L. Godinez (SEMC 990908). [1] Mexico, Nuevo Leon, Iturbide, 2 mi E, 07/28/1978, Plitt & Schaffner (SEMC 990911).

Distribution: Presently known only from Costa Rica (Guanacaste, Puntarenas, San Jose); Mexico (Hidalgo, Jalisco, Nuevo Leon, San Luis Potosi, Veracruz, Yucatan).

Comments: This bee is very similar to *P. rugata* because both have the propodeal triangle rugose on the basal area but differs by having the clypeus almost covered by dense pubescence, labrum striate on its base and with two tubercles on the middle; outer

hind tibial spur with basal area bulbous, curving downward, tip shape bulbous and wider than the tip of the inner tibial spur; T1 pubescence tawny, T2-T4 pubescence on marginal band light yellow, T5 with mostly dark brown or black hairs but with a marginal band of whitish hairs, T6-T7 with dark hairs.

Ptiloglossa immixta Moure

Ptiloglossa immixta Moure, 1945: 157.

Holotype: Male, from Brazil, Rio Grande do Sul, Esteio (DZUP); male paratype at IOC not seen.

Re-description:

Male. Body length 17 mm, forewing length 14 mm. Head. Mandibles dark brown with pointed dark reddish apex. Preapical tooth apex well separated and pointed. Malar area, length around 0.5 OD. Labrum brown, with one round medial projection. Clypeus light brown, not projected, rounded on the disc, without punctures or few scattered. Paraocular area pubescence white. Supraclypeal area integument black, pubescence light yellow. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance greater than 1.0 OD, pubescence yellow, longer than 1.0 OD. Ocellocular distance equal to 0.67 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance between 0.75 and 1.0 OD from occipital margin. Vertex pubescence first half tawny, second half dark brown. Genal area wider than 0.5 eye

width, with a line of short white setae close to the margin of the compound eye, followed by a group of yellow pubescence.

Mesosoma. Wings translucent brown. Veins brown. Prestigma 2.5 longer than stigma. Tegulae tawny, transparent, fully covered by dense pubescence. Thorax and mesopleural pubescence completely tawny (lighter on the base). Scutum and scutellum black. Propodeal triangle with minute punctures. Lateral surfaces of propodeum pubescence tawny (light at the base). Venter pubescence completely yellow or tawny. Front and medial legs brown. Hind legs dark brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in lateral view as long as inner tibial spur, basal area bulbous, basal width 0.33 of tibial width, spur projection curving downward, tip shape with a long and slender projection flagellum-like (can be broken) (Figure 23). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument dark brown. T1-T4 pubescence tawny (sometimes with light yellow on its base), pubescence on marginal band golden. T4-T5 with a spot apparently without pubescence on the lateral side (trichotrichia). T5-T7 pubescence tawny. T7 pubescence on its rim dark brown. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) prominent.

Material studied: [1 Male-holotype] Brazil, Rio Grande do Sul, Esteio, iii-1943, R.C.P. Negrini leg. (DZUP).

Distribution: Presently known from Brazil (Rio Grande do Sul).

Comments: This species resembles *P. matutina* but differs by having the thorax pubescence completely tawny (lighter at the base); outer hind tibial sur basal area bulbous, projection curving downward, tip shape with a long and slender flagellum-like projection.

Ptiloglossa jonesi Timberlake

Ptiloglossa jonesi Timberlake, 1946: 158.

Ptiloglossa jonesi Timberlake, 1965: 47.

Holotype: Female (holotype and paratype), United States, Arizona, Portal (Citrus Experiment Station, Riverside). Specimen not seen.

Re-description:

Male. Body length 16 mm, forewing length 12.5 mm. Head. Mandibles light brown with pointed dark reddish apex. Preapical tooth apex well separated and pointed. Malar area, length less than 0.5 OD. Labrum dark brown, smooth. Clypeus yellow, not projected, rounded on the disc, with punctures separated by a distance less than a puncture diameter (sometimes minute). Paraocular area pubescence white. Supraclypeal area integument brown-reddish, pubescence light yellow. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance less than 1.0 OD, pubescence yellow, longer than 1.0 OD. Ocellocular distance equal to 0.33 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance equal to 0.33

OD from occipital margin. Vertex pubescence yellow. Genal area less than 0.5 eye width, pubescence white or very light yellow.

Mesosoma. Wings translucent yellow. Veins brown. Prestigma 2 longer than stigma. Tegulae yellow, transparent, fully covered by dense pubescence. Thorax pubescence first half tawny with darker tips. Mesopleural, pubescence completely tawny (lighter on the base). Scutum and scutellum black. Propodeal triangle, integument with minute punctures. Lateral surfaces of propodeum with light yellow pubescence. Venter pubescence yellow or tawny. Front, medial and hind legs light brown to yellow. Tarsi yellow. Apex hind femur pubescence same color than other. Outer hind tibial spur in lateral view as long as inner tibial spur, basal area laterally flattened, basal width 0.25 of tibial width, spur projection curving downward, tip shape bulbous and wider than the tip of the inner tibial spur (Figure 24). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument dark brown (T1 lighter brown). T1-T4 pubescence golden-yellow. T4-T5 with a spot apparently without pubescence on the lateral side (trichotrichia). T5 to T7 pubescence mostly black hairs but those on the margin golden-yellow. T7 pubescence on its rim dark brown. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) short.

Female. Body length 18 mm, forewing length 13 mm. Mandibles dark brown with pointed dark reddish apex. Preapical tooth apex well separated and pointed. Malar

area length less than 0.5 OD. Labrum and clypeus dark brown. Labrum surface with two tubercles on the middle (strong well-differentiated). Clypeus projected beyond the face and rounded on the disc, with few scattered strong punctures. Paraocular area pubescence white. Supraclypeal area integument black, pubescence whitish mixed with scattered longer black hairs. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye, pubescence with a spot of darker hairs (dark grey to black). Interocellar distance equal to 1.0 OD, pubescence whitish with darker tips, longer than 1.0 OD. Ocellocular distance greater than 1.0 OD. Ocelloccipital distance shorter than 1.0 OD. Compound eye at a distance equal to 0.5 OD from occipital margin. Vertex pubescence light brown with light yellow branches. Genal area less than 0.5 eye width, pubescence white.

Mesosoma. Wings translucent yellow. Veins yellow (tawny). Prestigma 2 longer than stigma. Tegulae yellow, transparent, fully covered by dense pubescence. Thorax pubescence light yellow with dark-yellow tips. Mesopleural, pubescence yellow with tawny tips. Scutum and scutellum black. Propodeal triangle with minute punctures. Lateral surfaces of propodeum pubescence light yellow. Front, medial and hind legs light brown to yellow. Tarsi yellow. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate delimited by an outer ridge. Hind basitarsus inner margin slightly curved, 2 times as long as wide.

Metasoma. T1 integument reddish. T2-T4 integument black. T1 pubescence light yellow. T2-T4 pubescence golden-yellow. T5 on its disc with golden-yellow pubescence, marginal band of T5 and T6 with dark brown to black hairs. Lateral areas of terga,

pubescence similar to those on the disc (not white or black, if they are other color than black). Sterna margin, pubescence long (as long as or longer than 2 OD).

Material studied: [2 Females] USA, Arizona, Cochise, Willcox, 32.25278 - 109.83139, 20-Aug-83, J. G. Rozen & B. L. Rozen (AMNH_BEE 00082074 & 00082075). [3 Female] USA, Arizona, Cochise, Portal, 1500m, 31.91361 -109.14083, 5-Jul-64, J. H. Puckle, M. A. Mortenson & M. A. Cazier (AMNH_BEE 00082076 to 00082078). [1 Female] USA, Arizona, Cochise, Portal, 1500m, 31.91361 -109.14083, 8-Jul-64, J. H. Puckle, M. A. Mortenson & M. A. Cazier (AMNH_BEE 00082079). [1 Female] USA, Arizona, Cochise, Portal, 1500m, 31.91361 -109.14083, 13-Jul-64, J. H. Puckle, M. A. Mortenson & M. A. Cazier (AMNH_BEE 00082080). [1 Female] USA, Arizona, Cochise, Portal, 1500m, 31.91361 -109.14083, 24-Jul-64, J. H. Puckle, M. A. Mortenson & M. A. Cazier (AMNH_BEE 00082081). [1 Male] USA, Arizona, Cochise, Portal, 1500m, 31.91361 -109.14083, 4-Jul-64, J. H. Puckle, M. A. Mortenson & M. A. Cazier (AMNH_BEE 00082082). [1 Male] USA, Arizona, Cochise, Portal, 1500m, 31.91361 -109.14083, 6-Jul-64, J. H. Puckle, M. A. Mortenson & M. A. Cazier (AMNH_BEE 00082083). [1 Male] USA, Arizona, Cochise, Portal, 1500m, 31.91361 -109.14083, 10-Jul-64, J. H. Puckle, M. A. Mortenson & M. A. Cazier (AMNH_BEE 00082084). [1 Male] USA, Arizona, Cochise, Portal, 1500m, 31.91361 -109.14083, 7-Jul-64, J. H. Puckle, M. A. Mortenson & M. A. Cazier (AMNH_BEE 00082085). [2 Male] USA, Arizona, Cochise, 3 mi NE of Portal, 31.944 -109.105, (Collected at 5:10 - 6:30 Am, Fabaceae, *Cassia*), 21-Aug-70, J. G. Rozen & K. C. Rozen (AMNH_BEE 00082086 & 00082087). [2 Male] USA, Arizona, Cochise, 4 mi E of Willcox, 1273m, 32.23915 -109.77285, (Collected at 5:45 - 7:30 AM, Fabaceae, *Psorothamnus*), 29-Aug-

92, J. G. Rozen (AMNH_BEE 00082088 & 00082089). [1 Female] USA, Arizona, Cochise, 18 mi ESE of Willcox, 32.149 -109.56524, (Solanaceae, *Solanum*), 30-Jul-81, J. H. Cane (AMNH_BEE 00166915). [1 Male] Mexico, Jalisco, Encarnacion de Diaz, On fls. Of *Eysenhardtia polystachya*, 7/28/1951, H.E. Evans (SEMC). [1 Male] Mexico, 6 Km NW Alvarado, V.C., Label: D.H. Janzen, 8/8/1962, J.K. Drew (SEMC). [1 Female] USA, Arizona, Cochise, Douglas, *Larrea tridentata*; 05:00 - 05:29, 7/18-19/1973, E.G & G.M. Linsley (SEMC). [1] United States, Arizona, Cochise, Douglas, 31.34440 - 109.54470, *Solanum elaeagnifolium*, 08/09/1962, Mont Cazier (SEMC 990891). [2] United States, Arizona, Cochise, Douglas, 31.34440 -109.54470, *Cucurbita foetidissima*, 07/31/1975, Linsley & Linsley (SEMC 990877 & 990878). [1] United States, Arizona, Cochise, Portal Vicinity, 2 mi N, *Cassia bahinioides*, 08/16/1970, E. Linsley (SEMC 990865). [1] Mexico, Veracruz, Alvarado, 6 km NW, *Passiflora*, 08/08/1962, Daniel Janzen (SEMC 990884). [5] United States, Arizona, Cochise, Rt. 186 & Ft. Bowie Road, 1 mi E, 32.32640 -109.46930, *Solanum*, 08/01/1981, James Cane (SEMC 990867 to 990871). [1] Mexico, Sinaloa, Topolobampo, 08/05/1963, H. Hardy (SEMC 990890). [1] United States, Arizona, Cochise, Portal vicinity, 31.91360 -109.14080, *Larrea tridentata*, 08/25/2011, E. Linsley (SEMC 990864). [1] Mexico, Sonora, Guaymas, Guaymas, 4 mi S, 27.89270 -110.51740, 07/20/1958, J. Alcorn (SEMC 990883). [1] United States, Arizona, Cochise, Douglas, 31.34440 -109.54470, 08/12/1962, Mont Cazier (SEMC 990889). [1] United States, Arizona, Pima Rillito, 32.41470 -111.15560, 12/18/1975, Linsley & Linsley (SEMC 990876). [1] United States, Arizona, Cochise, Portal vicinity, 31.91360 -109.14080, 08/1975, E. Linsley (SEMC 990863). [1] United States, Arizona, Cochise, Portal, 31.91360 -109.14080, 07/22/1945, W. Jones (SEMC

990882). [1] United States, Arizona, Cochise, Pearce, 31.90500 -109.82000, *Asclepias*, 08/05/1954, F. Werner (SEMC 990888). [3] United States, Arizona, Cochise, Douglas, 31.34440 -109.54470, *Larrea tridentata*, 07/19/1973, Linsley & Linsley (SEMC 990873 to 990875). [1] Mexico, Veracruz, Veracruz, 19.19920 -96.13780, *Convolvulus*, 08/10/1962, Daniel Janzen (SEMC 990894). [1] United States, Arizona, Santa Cruz, Pena Blanca, Oro Blanco Mts., 08/05/1960, L. Martin (SEMC 990881). [1] United States, Arizona, Cochise, Douglas, 31.34440 -109.54470, *Larrea*, 08/11/1940, W. Swisher (SEMC 990887). [1] Mexico, Jalisco, Chamela Biological Station, 19.53330 -105.06670, 07/27/1982, S. Bullock (SEMC 990893). [1] United States, Arizona, Cochise, Douglas, 31.34440 -109.54470, *Solanum elaeagnifolium*, 08/18/1962, Cazier & Linsley (SEMC 990880). [1] United States, Arizona, Cochise, Portal, 4700, 07/21/1964, Puckle, Mortenson & Cazier (SEMC 990886). [1] Mexico, Aguascalientes, 07/28/1951, H. Evans (SEMC 990892). [1] United States, Arizona, Cochise, Douglas, 31.34440 -109.54470, *Solanum rostratum*, 08/17/1962, Cazier & Linsley (SEMC 990879). [1] United States, Arizona, Cochise, Wilcox, 18 mi SW, 32.06000 -110.05000, *Solanum elaeagnifolium*, 07/30/1981, James Cane (SEMC 990866). [1] Mexico, Nayarit, San Blas, 21.51810 -105.24030, 06/15/1955, Borys Malkin (SEMC 990885). [1] United States, Arizona, Cochise, Rt. 186 & Ft. Bowie Road, 1.3 mi N, *Solanum elaeagnifolium*, 08/03/1981, James Cane (SEMC 990872). [1 Female] Mexico, Sonora, Ba. San Carlos, 8/9-15/1989, E.M. Fisher (UCRC ENT 427062).

Distribution: Presently known from Mexico (Aguascalientes, Jalisco, Nayarit, Sinaloa, Sonora, Veracruz); United States (Arizona).

Comments: This species resembles *P. arizonensis* but females differ by having the clypeus smooth; interocellar distance equal to 1.0 OD; T5 on its base with golden-yellow hairs, marginal half of T5 and T6 with dark brown to black pubescence. Males have clypeus yellow; labrum smooth; interocellar distance less than 1.0 OD; outer hind tibial spur basal area laterally flattened, curving downward, tip shape bulbous and wider than the tip of the inner tibial spur; T5 to T7 pubescence mostly black hairs but those on the margin golden yellow.

Ptiloglossa lanosa Moure

Ptiloglossa lanosa Moure, 1945: 163.

Holotype: Male, Brazil, Minas Gerais, Mar de Espanha (DZUP).

Re-description:

Male. Body length 17.5 mm, forewing length 14 mm. Head. Mandibles dark brown with pointed dark reddish apex. Preapical tooth apex well separated and pointed. Malar area, length around 0.5 OD. Labrum and clypeus yellow. Labrum smooth. Clypeus projected beyond the face and flattened on the disc, with strong punctures sometimes suggesting a rugose surface. Paraocular area, pubescence white. Supraclypeal area integument dark brown, pubescence whitish. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance greater than 1.0 OD, pubescence brown with whitish branches, longer than 1.0 OD. Ocellocular

distance equal to 0.33 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance between 0.75 and 1.0 OD from occipital margin. Vertex pubescence light yellow with darker tips. Genal area wider than 0.5 eye width, pubescence white or light yellow.

Mesosoma. Wings translucent brown. Veins brown. Prestigma 2.5 longer than stigma. Tegulae tawny, no transparent, fully covered by dense pubescence. Thorax pubescence completely tawny (lighter on the base) with darker tips. Mesopleural pubescence light yellow, with tawny tips. Scutum dark brown (reddish). Scutellum black. Propodeal triangle with minute punctures. Lateral surfaces of propodeum pubescence light yellow. Venter pubescence completely white or whitish with tawny tips. Front legs light brown to yellow. Medial and hind legs brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in lateral view shorter than inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), basal width 0.25 of tibial width, spur projection forming an acute angle from tibiae, tip shape with a long and slender projection flagellum-like (can be broken) (Figure 25). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus long as 0.67 of tibial length.

Metasoma. T1-T2 integument brown. T-T43 integument dark brown. T1 pubescence golden-yellow. T2-T4 pubescence light yellow. T5-T6 pubescence white, T7 apex with black hairs. T7 pubescence on its rim dark brown. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) prominent.

Material studied: [1 Male-holotype] Brazil, Minas Gerais, Mar de Espanha, 26-xi-1910, J.F. Zikan (DZUP). [1 Male] Colombia, Magdalena, Cienaga Siberia, Alto Cordoba, 09/19/10, J. Medina (LABUN). [1 Male] Brazil, Sao Paulo, Jundiá, i-1901, M. Beron (MZUSP).

Distribution: Presently known from Brazil (Minas Gerais, Sao Paulo); Colombia (Magdalena).

Comments: This species has its thorax covered by dense tawny pubescence with darker tips; outer hind tibial spur basal area rounded, 0.25 of tibial width, formed as a structure protruding from tibiae, tip shape with a long and slender projection flagellum, T2 to T4 pubescence color on marginal area light yellow; pubescence T5-T6 white, T7 apex with black hairs.

Ptiloglossa latecalcarata Moure

Ptiloglossa latecalcarata Moure, 1945: 164.

Holotype: Male, Brazil, São Paulo, Guarulhos (DZUP).

Re-description:

Male. Body length 16 mm, forewing length 15 mm. Head. Mandibles light brown with pointed dark reddish apex. Preapical tooth apex well separated and pointed. Malar area, length around 0.5 OD. Clypeus yellow, labrum tawny (its darker yellow). Labrum smooth. Clypeus projected beyond the face and flattened on the disc, with strong

punctures suggesting a rugose surface. Paraocular area pubescence light yellow. Supraclypeal area integument yellow, pubescence light yellow. Area between antennal socket and compound eye, pubescence with a spot of darker hairs (dark grey to black). Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance equal to 1.0 OD, pubescence yellow, longer than 1.0 OD. Ocellocular distance equal to 0.25 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance equal to 0.5OD from occipital margin. Vertex pubescence first half tawny, second half dark brown. Genal area less than 0.5 eye width, pubescence completely white or light yellow.

Mesosoma. Wings translucent yellow. Veins brown. Prestigma 2.5 longer than stigma. Tegulae tawny, transparent, pubescence covering 0.5 of it. Thorax pubescence tawny (lighter on the base). Mesopleural pubescence tawny with darker tips. Scutum brown reddish. Scutellum dark yellow (tawny). Propodeal triangle with minute punctures. Lateral surfaces of propodeum pubescence light yellow. Venter pubescence completely yellow or tawny. Front, medial and hind legs light brown to yellow. Tarsi yellow. Apex hind femur pubescence same color than other. Outer hind tibial spur in lateral view as long as inner tibial spur, basal area bulbous, basal width almost as wide as tibiae, spur projection almost parallel to margin of tibiae, tip shape with a long and slender projection flagellum-like (can be broken) (Figure 26). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument dark brown. T1- T4 pubescence tawny. T5 to T7 pubescence completely yellow (tawny). T7 pubescence on its rim yellow (tawny). Lateral

areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn -like spines) prominent.

Material studied: [1 Male-holotype] Brazil, São Paulo, Guarulhos, ii-1942, P.J. Moure leg. (DZUP). [1] Brazil, Sao Paulo, Sao Carlos, 04/01/1956, Charles Michener (SEMC 990914).

Distribution: Presently known from Brazil (Minas Gerais, São Paulo).

Comments: This bee is similar to *P. tomentosa* but differs by having the abdomen pubescence completely tawny; outer hind tibial spur basal area bulbous almost as wide as tibiae, projecting almost parallel to margin of tibiae, tip shape with a long and slender projection flagellum-like.

Ptiloglossa lucernarum Cockerell

Ptiloglossa lucernarum Cockerell, 1923: 442.

Holotype: Female, Guyana, 'Hills Estate, R. Massaruni' (BMNH).

Re-description:

Male. Body length 18 mm, forewing length 14 mm. Head. Mandibles dark brown with pointed dark reddish apex. Preapical tooth apex well separated and pointed. Malar area, length less than 0.5 OD. Labrum and clypeus yellow. Labrum smooth. Clypeus projected beyond the face and flattened on the disc, surface without punctures or few scattered. Paraocular area pubescence yellow. Supraclypeal area integument brown-

reddish, pubescence tawny with scattered dark brown hairs. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence.

Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance less than 1.0 OD, pubescence tawny with darker tips, equal or shorter than 1.0 OD. Ocellocular distance equal to 0.25 OD. Ocelloccipital distance equal to 1.0 OD.

Compound eye at a distance equal to 0.5OD from occipital margin. Vertex pubescence first half tawny, second half dark brown. Genal area less than 0.5 eye width, with a line of short white setae close to the margin of the compound eye, followed by a group of yellow pubescence.

Mesosoma. Wings translucent yellow. Veins yellow (tawny). Prestigma 2 longer than stigma. Tegulae yellow, transparent, fully covered by dense pubescence. Thorax and mesopleural pubescence tawny with darker tips. Scutum and scutellum integument dark brown (reddish). Propodeal triangle striate on the sides. Lateral surfaces of propodeum pubescence yellow at its base and black at the apex. Venter pubescence tawny with darker tips. Front legs light brown to yellow. Medial and hind legs brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in lateral view shorter than inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), basal width 0.25 of tibial width, spur projection forming an acute angle from tibiae, tip shape rounded, slightly concave (like a spoon shape) and flattened (Figure 27). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument dark brown. T1 pubescence tawny with darker tips. T2-T4 pubescence dark brown, pubescence color on marginal area golden. T4-T5 with a

spot apparently without pubescence on the lateral side (trichotrichia). T5 to T7 pubescence mostly black hairs but those on the margin golden-yellow. T7 pubescence on its rim black. Lateral areas of terga, pubescence black. S6 projections on the side (thorn-like spines) prominent.

Female. Body length 18 mm, forewing length 14 mm. Head. Mandibles black with rounded dark reddish apex. Preapical tooth apex divided in two forming 2 tiny pointed teeth. Malar area, length around 0.5 OD. Labrum and clypeus black. Labrum with two tubercles on the middle (strong well-differentiated). Clypeus projected beyond the face and flattened on the disc, rugose-striate or with strong punctures suggesting a rugose surface. Paraocular area, pubescence whitish mixed with scattered longer dark hairs. Supraclypeal area integument black, pubescence dark brown to black. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Interocellar distance shorter than 1.0 OD, pubescence black, longer than 1.0 OD. Ocellocular distance greater than 1.0 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance 0.75 to 1.0 OD from occipital margin. Vertex pubescence dark brown to black. Genal area as wide as 0.5 eye width, pubescence white with scarce dark brown hairs close to compound eye margin.

Mesosoma. Wings translucent dark brown (almost black). Veins dark brown. Prestigma 2.5 longer than stigma. Tegulae black, no transparent, pubescence covering 0.5 of it. Thorax and mesopleural pubescence black with whitish-brown branches. Scutum

and scutellum black. Propodeal triangle with minute punctures. Lateral surfaces of propodeum pubescence black with whitish or brown branches. Venter pubescence black with whitish or brown branches. Front, medial and hind legs black. Tarsi dark brown. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate delimited by an outer carinated ridge. Hind basitarsus inner margin slightly concave, 1.5 times as long as wide.

Metasoma. T1-T4 integument black. T1 pubescence black. T2 pubescence basal half black, marginal half golden-yellow. T3-T4 pubescence golden-yellow. T5-T6 pubescence completely dark brown to black. Lateral areas of terga, pubescence black or dark brown. Sterna margin, pubescence long (as long as or longer than 2 OD).

Material studied: [1Female-holotype] Guyana, 'Hills Estate, R. Massaruni' (BMNH). [1 Male] Brit. Guiana, Kamakusa, (Written on a label: missidentified 1956), G. Salt collection 9/00/1922, H. Lang (BMNH). [3 Females] Colombia, Cundinamarca, San Antonio del Tequendama, Vereda Rosales, 2000 m, 05/09/2003, A. Rodriguez & J. Hernandez (LABUN). [1 Female] Colombia, Santander, Charalá, Corregimiento Virolin, 1700 m, 02/12/1981, Diú (LABUN). [1 Female] Colombia, Antioquia, Envigado, Loma del Escobero, 2459 m, 06 07 03 N 32 16 W, 1/20/2010, Sepulveda-Cano P. & Osorio N. (Papa-Bosque, Trans Papa, Jama, 9:00am, 19C, 65% HR) (MEFLG). [2 Male] Trinidad, Sangre Grande, B.W.I. (Biting man), 6/24/1955, T.H.G. Aitken (SEMC). [1 Female] Colombia, Cundinamarca, La Victoria Rosales, 8/16/2002, J. Hernandez & A. Riveros (SEMC). [1] Brazil, Mato Grosso, Chavantina, Rio das Mortes, 07/1962, Alvarenga & Oliveira (SEMC 990919). [1] Brazil, Sao Paulo, Sao Carlos, 01/13/1946, D. Dias (SEMC 990918). [1] Argentina, Misiones, Panambi, 12/1957 (SEMC 990925). [1] Colombia,

Valle del Cauca, EL Queremal, 3.6 Km W, 1300, 02/14/1976, R. Wilkerson (SEMC 990917). [1] Panama, Chiriqui, Boquete, 10 mi W, 03/11/1960 (SEMC 990924). [1 Female] Colombia, Cundinamarca, Rosales, San Antonio de Tequendama, 2000m, 05/09/2003, Rodrigues & Hernandez (SEMC 990916). [1] Brazil, Sao Paulo, Rio Claro, 12/1942, Jesus Moure (SEMC 990922). [1] Venezuela, Aragua, Rancho Grande Biological Station, Henri Pittier National Park, 12/07/1976, J. Robertson (SEMC 990921).

Distribution: Presently known from Argentina (Misiones); Brazil (Mato Grosso, Sao Paulo); Colombia (Antioquia, Cundinamarca, Santander, Valle del Cauca); Guyana (Kamakuzza, Mazaruni); Panama (Chiriquí); Trinidad and Tobago (Sangre Grande); Venezuela (Aragua).

Comments: This species is closely related to *P. ducalis* but females differ by having labrum black, with two tubercles on the middle (strong well-differentiated); ocellocular distance greater than 1.0 OD; thorax pubescence black with whitish-brown branches; mesopleura pubescence black. Males have their clypeus with some scattered punctures; pubescence of thorax and T1 tawny with darker tips; outer hind tibial spur basal area rounded, formed as a structure protruding from tibiae (normal), projection forming an acute angle from tibiae, tip shape rounded, slightly concave and flattened.

Ptiloglossa magrettii (Friese)

Megacilissa magrettii Friese, 1899: 243.

Ptiloglossa magrettii Schrottky, 1914: 626.

Lectotype: Female, from Venezuela (ZMB).

Re-description:

Female. Body length 19 mm, forewing length 16 mm. Head. Mandibles brown with rounded black apex. Preapical tooth apex smooth and rounded. Malar area, length around 0.5 OD. Labrum and clypeus brown-reddish. Labrum with one round medial projection. Clypeus projected beyond the face and flattened on the disc, rugose-striate or with strong punctures suggesting a rugose surface. Paraocular area pubescence whitish mixed with scattered longer dark hairs. Supraclypeal area integument black, pubescence whitish mixed with scattered longer black setae. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye, pubescence with a spot of darker hairs (dark grey to black). Interocellar distance equal to 1.0 OD, pubescence black, longer than 1.0 OD. Ocellocular distance greater than 1.0 OD. Ocelloccipital distance shorter than 1.0 OD. Compound eye at a distance 0.75 to 1.0 OD from occipital margin. Vertex pubescence dark brown to black. Genal area as wide as 0.5 eye width, pubescence white with scarce dark brown hairs close to compound eye margin.

Mesosoma. Wings translucent brown. Veins yellow (tawny). Prestigma 2 longer than stigma. Tegulae dark brown, transparent, not covered by pubescence. Thorax and mesopleural pubescence black with brown branches. Scutum and scutellum integument black. Propodeal triangle, integument with minute punctures. Lateral surfaces of propodeum pubescence black with whitish or brown branches. Venter pubescence black

with whitish or brown branches. Front, medial and hind legs dark brown. Tarsi dark brown. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate delimited by an outer carinated ridge. Hind basitarsus, inner margin straight, parallel to the outer margin, 1.5 times as long as wide.

Metasoma. T1 integument brown. T2-T4 integument black. T1 pubescence yellow with darker tips. T2-T4 pubescence golden-yellow. T5 to T6 pubescence tawny. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). Sterna margin, pubescence long (as long as or longer than 2 OD).

Material studied: [1 Female-lectotype] Venezuela, Boncard, 1890 (ZMB).

Distribution: Presently known from Peru; Venezuela.

Comments: This species is similar to *P. tomentosa* but the female abdomen is covered by dense golden-yellow pubescence being yellow with darker tips in T1; tegulae black. Males are as hairy as females but have outer hind tibial spur basal area triangular and laterally flattened, curved downwards with a long thin projection; inner hind tibial spur serrate (Friese, 1899).

Ptiloglossa matutina (Schrottky)

Megacilissa matutina Schrottky, 1904: 346.

Ptiloglossa matutina Schrottky, 1907: 11.

Ptiloglossa matutina Moure, 1945: 168.

Holotype: Male, from Paraguay, Itapúa, Villa Encarnación; not seen. Repository collection unknown.

Re-description:

Male. Body length 16 mm, forewing length 12 mm. Head. Mandibles brown with pointed black apex. Preapical tooth, apex smooth and rounded. Malar area, length less than 0.5 OD. Labrum yellow, smooth. Clypeus light brown, projected beyond the face and flattened on the disc, with minute punctures. Paraocular area pubescence light yellow. Supraclypeal area integument black, pubescence tawny with scattered dark brown hairs. Area between antennal socket and compound eye pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance greater than 1.0 OD, pubescence tawny with darker tips, longer than 1.0 OD. Ocellocular distance equal to 0.5 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance between 0.75 and 1.0 OD from occipital margin. Vertex pubescence dark brown. Genal area as wide as 0.5 eye width, pubescence completely white or light yellow.

Mesosoma. Wings translucent yellow. Veins brown-reddish. Prestigma 2 longer than stigma. Tegulae brown, no transparent, fully covered by dense pubescence. Thorax and mesopleural pubescence tawny with darker tips. Scutum and scutellum black. Propodeal triangle smooth. Lateral surfaces of propodeum pubescence light yellow. Venter pubescence light yellow. Front, medial and hind legs light brown to yellow. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in

lateral view shorter than inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), basal width 0.5 of tibial width, projection forming an acute angle from tibiae, tip shape rounded, concave but not flattened. Inner hind tibial spur with many minute dents (not too prominent) (Figure 28). Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1 integument dark brown. T2-T4 integument from brown to tawny. T1-T4 pubescence light yellow. T5-T7 pubescence completely dark brown to black. T7 pubescence on its rim dark brown. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) prominent.

Female. Body length 17 mm, forewing length 13 mm. Head. Mandibles brown with rounded black apex. Preapical tooth apex smooth and rounded. Malar area, length less than 0.5 OD. Labrum brown, with two tubercles on the middle (strong well-differentiated). Clypeus brown-reddish, not projected (rounded on the disc), with few scattered strong punctures. Paraocular area pubescence whitish mixed with scattered longer dark hairs. Supraclypeal area integument brown-reddish, pubescence with a line of short whitish hairs close to the clypeal margin, followed by a group of long brown hairs. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Interocellar distance equal to 1.0 OD, pubescence brown with whitish branches, longer than 1.0 OD. Ocellocular distance equal to 0.67 OD. Ocelloccipital

distance shorter than 1.0 OD. Compound eye at a distance 0.75 to 1.0 OD from occipital margin. Vertex pubescence dark brown to black. Genal area as wide as 0.5 eye width, pubescence white.

Mesosoma. Wings translucent yellow. Veins yellow (tawny). Prestigma 2 longer than stigma. Tegulae tawny, transparent, not covered by pubescence. Thorax pubescence tawny with darker tips. Mesopleural, pubescence dark brown (with whitish branches). Scutum and scutellum integument dark brown (reddish). Propodeal triangle with minute punctures. Lateral surfaces of propodeum pubescence light yellow with darker tips. Venter pubescence light yellow. Front, medial and hind legs light brown to yellow. Tarsi light brown to reddish. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate present and well delimited by strong ridges on each side (outer and inner). Hind basitarsus inner margin straight, parallel to the outer margin, 1.5 times as long as wide.

Metasoma. T1-T4 integument black T1-T4 pubescence light yellow with marginal band whitish. T5 to T6 pubescence completely dark brown to black. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). Sterna margin, pubescence long (as long as or longer than 2 OD).

Material studied: [1 Female] Paraguay, Puerto Bertoni, Alto Paraguay, 1/00/1910, A de W (BMNH). [1 Female] Paraguay, Puerto Bertoni, Alto Paraguay, 3/31/1909 (NMNH). [2] Venezuela, Aragua, El Limon, 450m, 04/20/1961, Fernando Fernandez (SEMC 990928 & 990929). [1] Argentina, Misiones, A. Ogloblin (SEMC 990934). [2] Peru, La Libertad, Cartavio; Santiago de Cao; Ascope, -7.89167 -79.22278, 02/05/1937, E. Smyth (SEMC 990926 & 990927). [1] Honduras, Atlantida, La Ceiba,

16.00000 -86.75000, 05/15/1949, E. Becker (SEMC 990933). [1] Costa Rica, Heredia, La Selva Biological Station, 10.43330 -84.01670, 06/15/1990, David Brzoska (SEMC 990932). [1] Brazil, Sao Paulo, Sao Carlos, 01/13/1946, D. Dias (SEMC 990931). [1] Brazil, Sao Paulo, Ipiranga, 01/02/1943, E. Navajas (SEMC 990930). [1 Female] Paraguay, Itapua, Encarnacion, *Phaseolus*, 02/04/1906, C. Schrottky (SEMC 990935). [3 Females & 2 Males] Brasil, Sao Paulo, Jundiai, (Ducke rev.13), i-1901, M. Beron (MZUSP). [1 Female] Brasil, 1909, (Ducke rev.13), Standniger (MZUSP). [1 Female] Mexico, 1900, (Ducke rev.13, specimen 17.606), Buysow (MZUSP). [1 Female] Brasil, Sao Paulo, Barueri, xi-1966, K. Lenko col. (MZUSP). [3 Female] Brasil, Sao Paulo, Barueri, 22-i-1967, K. Lenko leg. (MZUSP). [2 Female] Brasil, Sao Paulo, Barueri, iii-1962, K. Lenko col. (MZUSP). [2 Female] Brasil, Sao Paulo, Barueri, 2-iii-1964, K. Lenko leg. (MZUSP). [1 Male] Brasil, Sao Paulo, Barueri, 27-ii-1962, K. Lenko col. (MZUSP). [1 Female] Brasil, Sao Paulo, Barueri, 5-ii-1968, K. Lenko col. (MZUSP). [1 Female] Brasil, Sao Paulo, Barueri, xi-1963, K. Lenko leg. (MZUSP). [1 Female] Brasil, Sao Paulo, Barueri, 20-xii-1965, K. Lenko leg. (MZUSP). [1 Female] Brasil, Sao Paulo, Barueri, 19-ii-1967, K. Lenko leg. (MZUSP). [1 Female] Brasil, Goias, Jatai, Faz. Aceiro, x-1962, Exp. Dep. Zool. (MZUSP). [1 Female] Brasil, Goias, Jatai, Faz. Cachoeirinha, x-1962, Exp. Dep. Zool. (MZUSP).

Distribution: Presently known from Argentina (Misiones); Brazil (Goias, Sao Paulo); Costa Rica (Heredia); Honduras (Atlantida); Mexico; Paraguay (Alto Paraná, Itapua, Puerto Bertoni); Peru (La Libertad); Venezuela (Aragua).

Comments: This species resembles *P. eximia* but males differ by having clypeus black; labrum brown (yellow); tegulae tawny; thorax pubescence yellow with tawny tips;

outer hind tibial spur as long as inner, with a long flagellum-like tip; T1 pubescence tawny, T2-T4 pubescence on marginal band golden, T5 with yellowish pubescence on the sides and dark in the middle of the disc, T6-T7 fully dark . Females differ from that species in having labrum with two tubercles on the middle (strong well-differentiated); clypeus with few scattered strong punctures.

Ptiloglossa mexicana (Cresson)

Megacilissa mexicana Cresson, 1878: 221.

Megacilissa mexicana Fox, 1893: 421.

Megacilissa mexicana Friese, 1898: 64.

Ptiloglossa mexicana Cockerell, 1912: 221.

Ptiloglossa mexicana Michener, 1954: 24.

Holotype: Female, from Mexico; specimen not seen. Deposited at the Academy of Natural Sciences, Philadelphia (ANSP).

Re-description:

Male. Head. Mandibles light brown with pointed dark reddish apex. Preapical tooth apex smooth and rounded. Malar area, length less than 0.5 OD. Labrum and clypeus yellow. Labrum smooth. Clypeus upper part projected beyond the face and flattened on the disc, with minute punctures. Paraocular area pubescence yellow. Supraclypeal area integument brown-reddish, pubescence yellow. Area between antennal socket and

compound eye pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance equal to 1.0 OD, pubescence tawny with darker tips, equal or shorter than 1.0 OD. Ocellocular distance equal to 0.25 OD. Ocelloccipital distance equal to 1.0 OD. Compound eye at a distance equal to 0.5 OD from occipital margin. Vertex pubescence tawny with dark brown apex. Genal area as wide as 0.5 eye width, pubescence with a line of short white hairs close to the margin of the compound eye, followed by a group of light yellow hairs.

Mesosoma. Wings translucent yellow. Veins brown. Prestigma 2 longer than stigma. Tegulae yellow, transparent, fully covered by dense pubescence. Thorax and mesopleural pubescence tawny with darker tips. Scutum and scutellum black. Propodeal triangle smooth. Lateral surfaces of propodeum pubescence yellow with apical half dark brown. Venter pubescence completely yellow or tawny. Front, medial and hind legs light brown to yellow. Tarsi tawny. Apex hind femur pubescence same color than other. Outer hind tibial spur in lateral view as long as inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), basal width 0.33 of tibial width, spur projection almost parallel to margin of tibiae, tip shape rounded, concave but not flattened (Figure 29). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.75 tibial length.

Metasoma. T1-T4 integument brown. T1 pubescence tawny (sometimes light yellow at its base). T2-T4 pubescence dark brown (in some cases except for those on the marginal band), with marginal bands golden. T4-T5 with a spot apparently without pubescence on the lateral side (trichotrichia). T5 to T7 pubescence mostly whitish but intermixed with some scattered dark brown hairs, the latter are closer to T7 apex. T7

pubescence on its rim dark brown. Lateral areas of terga, pubescence black. S6 projections on the side (thorn-like spines) prominent. S7, S8 and genital capsule as in Figure 48.

Female. Body length 19 mm, forewing length 13 mm. Head. Mandibles brown with pointed black apex. Preapical tooth apex divided in two forming 2 tiny pointed teeth. Malar area, length less than 0.5 OD. Labrum tawny, with two tubercles on the middle (strong well-differentiated). Clypeus brown-reddish, projected beyond the face and flattened on the disc, with strong punctures suggesting a rugose surface. Paraocular area pubescence whitish mixed with scattered longer dark hairs. Supraclypeal area integument brown-reddish, pubescence whitish mixed with scattered longer black hairs. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye pubescence with a spot of darker hairs (dark grey to black). Interocellar distance greater than 1.0 OD, pubescence brown with whitish branches, longer than 1.0 OD. Ocellocular distance equal to 1.0 OD. Compound eye at a distance equal to 0.5 OD from occipital margin. Vertex pubescence dark brown to black. Genal area as wide as 0.5 eye width, pubescence white.

Mesosoma. Wings translucent brown. Veins brown. Prestigma 2.5 longer than stigma. Tegulae tawny, transparent, pubescence covering 0.5 of it. Thorax and mesopleural pubescence light yellow or white with black tips. Scutum and scutellum integument dark brown (reddish). Lateral surfaces of propodeum pubescence light yellow with darker tips. Venter pubescence dark hairs on the middle surrounded by white

pubescence. Front, medial and hind legs light brown to yellow. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate delimited by an outer carinated ridge. Hind basitarsus inner margin slightly concave, 1.5 times as long as wide.

Metasoma. T1-T3 integument brown, T4 dark brown T1 pubescence tawny (can be light yellow on its base). T2-T3 pubescence golden-yellow. T4 pubescence dark brown with yellow margin. T5 to T6 pubescence completely dark brown to black. Lateral areas of terga, pubescence black or dark brown. Sterna margin, pubescence long (as long as or longer than 2 OD).

Material studied: [1 Female] Colombia, Magdalena, Santa Marta, Mt. San Lorenzo, 7000 ft, G. Salt Coll.; B.M. 1931-343, 11/8/1923 M.R.C. (BMNH). [1 Female] Mexico, N. Yucatan, Godman-Salvin Collection 1911-24, Gaumer (BMNH). [2] Costa Rica, Prov. Alajuela, Upala, Bijagua, Finca Inti – Aura, 320m, 10.759255 -85.011339, Tp. Luz Mercurio. (L_N_304260_425844 #96552), 27 ABR 2009, J. A. Azofeifa (INBio). [1] Costa Rica, Prov. Alajuela, P.N. Volcán Tenorio, Sector El Pilón, Send. El Mirador, 700 - 800m, 10.704603 -84.992304, Tp. Luz (L_N_298212_427913 #74432), 22 JUL 2003. J. Azofeifa (INBio). [1] Costa Rica, Prov. Guanacaste, Bagaces, Pque Nal Palo Verde, Sendero Guayacán. 40m, 10.34957 -85.352355, Malaise seca (L_N_388400_259050 #61399), 08-12 FEB 2001, I. Jiménez (INBio). [1] Costa Rica, Prov. Guanacaste, Liberia, P. N. Guanacaste, Estación Mengo, Bosque Primario, 1000m, 10.925 -85.475, Manual (red, libre) (L_N_322740_375198 #52599), 18 JUN 1987, Janzen (INBio). [1] Costa Rica, Prov. Guanacaste, Bagaces, P. N. Palo Verde, Estación Palo Verde, 10m, 10.34957 -85.352355, Libre (L_N_259050_388400 #65256), 2 AGO 2000, M. A. Zumbado (INBio). [1] Costa Rica, Prov. Guanacaste, Bagaces, P.N. Palo

Verde, Sector Palo Verde, Cerro Guayacán, 160m, 10.352318 -85.341398, Manual (L_N_389600_259350 #61888), 10 JUN 1999, I. Jimnez (INBio). [1] Costa Rica, Prov. Guanacaste, Est. Sta. Rosa, P. N. Sta. Rosa, 300m, 10.83641 -85.615491, (L-N 313000_359800), Ene 1991, D. H. Janzen (INBio). [1] Costa Rica, Prov. Alajuela, R.F. Grecia, Bosque del Niño, Send. Los Pinos, 1900-2000m, 10.157344 -84.247783, Tp. Luces (L_N_237611_509375 #91920), 25-28 JUN 2007, R. González, M. Moraga & E. Navarro (INBio). [1] Costa Rica, Prov. Puntarenas, Cóbano, Est. Cabo Blanco, 15 a 100m, 9.623365 -85.091264, Luz ambiente (L_N_175150_416300 #62059), 25 ABR 2001, W. Porras (INBio). [1] Costa Rica, Prov. Guanacaste, A.C.G, La Cruz, Pque Nal Guanacaste, Cerro El Hacha. 400m, 10.899849 -85.577334, Tp. de Luz (L_N_320000_364000 #52541), 18 SET-7 OCT 1987, I. A. Chacón (INBio). [1] Costa Rica, Prov. Guanacaste, Bagaces, P.N. Palo Verde, Sector Palo Verde, 10m, 10.366668 -85.383266, Manual (L_N_260952_385020 #56892), 13-21 MAY 2000, I. Jiménez (INBio). [1 Male] Costa Rica, Guanacaste, Playa Coco, 2/22/1966, D.H.J. (SEMC). [1 Female] Nicaragua, Managua, 3 mi SW Managua, 2/26/1956, J.R. Alcorn (SEMC). [1 Female] El Salvador, Mt. San Salvador, 6/29/1963, M.E. Irwin & D.Q. Cavagnaro (SEMC). [1] Costa Rica, Guanacaste, Estacion Murcielago, Vicinity; Cuajiniquil, 8 Km SW, 100m, 06/1989, GNP Biod. Sur. (SEMC 990973). [3] Costa Rica, Guanacaste, Filadelfia, 7 mi S, 03/08/1954 (SEMC 990960 to 990961). [1] Mexico, Veracruz, Cotaxtla Experimental Station, 2.3 mi W; Cotaxtla, *Solanum seaforthianum*, 07/13/1962, Daniel Janzen (SEMC 990947). [1] Nicaragua, Managua, Managua, 3 mi SW, 02/26/1956, J. Alcorn (SEMC 990966). [2 Males] Mexico, Yucatan, Tizimin, El Cuyo; Reserva de la Biosfera Río Lagartos, 01/11/1995, H. Contraras (SEMC 990953 &

990954). [1] Mexico, Yucatan, G. Gaumer (SEMC 990940). [1] Mexico, Oaxaca, Temascal, 5 mi E, 01/29/1964, Daniel Janzen (SEMC 990972). [1] Costa Rica, Guanacaste, Canas, 20 Km SW, 03/12/1989, Frank Parker (SEMC 990959). [1] Mexico, San Luis Potosi, Xilitla, 700m, 09/01/1991, Douglas Yanega (SEMC 990946). [1 Female] Mexico, Jalisco, Chamela, Est Biologia UNAM, 06/11/1986, S. Bullock (SEMC 990978). [1] United States, Texas, Cameron, Cameron, Southmost, *Passiflora*, 04/16/1952, Michener, Beamer, LaBerge & Wille (SEMC 990965). [2] Guatemala, Retalhuleu, Retalhuleu, 5 mi W; Rio Nil, 07/14/1966, Daniel Janzen (SEMC 990952 & 990963). [1] Mexico, Yucatan, G. Gaumer (SEMC 990939). [1] Costa Rica, Guanacaste, El Coco, 06/20/1963, Charles Michener (SEMC 990971). [1] Mexico, Oaxaca, Temascal, 10/22/1963 (SEMC 990958). [1 Male] Mexico, Oaxaca, Temascal, 5 mi E, 09/26/1963, Daniel Janzen (SEMC 990977). [1] Mexico, Michoacan, Gabriel Zamora, 2 mi N, 06/10/1968, Daniel Janzen (SEMC 990964). [1] Costa Rica, Guanacaste, Playas del Coco, 02/22/1966 (SEMC 990951). [1] Mexico, Yucatan, G. Gaumer (SEMC 990938). [1] El Salvador, San Salvador, 06/29/1963, Irwin & Cavagnaro (SEMC 990970). [1] Mexico, Veracruz, Cordoba, 07/06/1966, Buckett, Gardner, & Gardner (SEMC 990957). [1] Costa Rica, Guanacaste, Santa Rosa Biological Station, 300, 10.86580 -85.60890, 05/1989, GNP Biod. Sur (SEMC 990976). [1] Mexico, Oaxaca, Temascal, 5 mi E, 01/13/1964, Daniel Janzen (SEMC 990950). [1] Mexico, Yucatan, G. Gaumer (SEMC 990937). [1] Panama, Chiriqui, El Volcan, 02/27/1936, W. Gertsch (SEMC 990969). [1] Costa Rica, Guanacaste, Filadelfia, 7 mi SW, 03/03/1954, Wille & Daly (SEMC 990956). [1] Costa Rica, Puntarenas, Manuel Antonio National Park; Quepos, 80m, 04/1992, C. Cano (SEMC 990975). [1] Mexico, Oaxaca, Temascal, 5 mi E, 01/07/1964, Daniel

Janzen (SEMC 990949). [1] Mexico, Yucatan, G. Gaumer (SEMC 990936). [1] Mexico, Tamaulipas, Victoria Ciudad Victoria, near, 05/10/1989, E. Sugden (SEMC 990968). [1] Mexico, San Luis Potosi, Tamazunchale, Tamazunchale, 21.26110 -98.79170, 03/29/1951, William Stephen (SEMC 990955). [1] Costa Rica, Guanacaste, Los Mesones; Parque Nacional Barra Honda, 100, 03/1995, M. Reyes (SEMC 990974). [1] Mexico, Oaxaca, Temascal, 5 mi E, 12/18/1963, Daniel Janzen (SEMC 990948). [1] Mexico, Jalisco, Chamela Biological Station, 19.53330 -105.06670, 07/21/1989, Robert Brooks (SEMC 990967). [5 Females] Mexico, San Luis Potosi, El Salto de Agua, 23.09930 -100.81670, 05/20/1989, Douglas Yanega (SEMC 990941 to 990945). [1 Female] Mexico, San Luis Potosi, El Salto de Agua, 5/20/1989, D. Yanega (UCRC ENT 427067).

Distribution: Presently known from Colombia (Magdalena); Costa Rica (Alajuela, Guanacaste, Puntarenas); El Salvador (San Salvador); Guatemala (Retalhuleu); Mexico (Jalisco, Michoacan, Oaxaca; San Luis Potosi, Tamaulipas, Yucatan, Veracruz); Nicaragua (Managua); Panama (Chiriquí); United States (Texas).

Comments: This species resembles *P. eximia* but females have clypeus with strong punctures sometimes suggesting a rugose surface; vertex pubescence dark brown to black; wings translucent brown; veins brown; T1-T3 pubescence tawny, T4 pubescence dark brown, T5 to T6 pubescence completely dark brown to black. Males have clypeus yellow; vertex pubescence first half tawny, second half dark brown; interocellar distance equal to 1.0 OD; thorax, pubescence tawny with darker tips; outer hind tibial spur broad basally, curving downward, long, rounded, concave but not flattened; T1-T3 pubescence tawny, T4 pubescence dark brown, T5 to T7 pubescence

mostly whitish but intermixed with some scattered dark brown hairs, the latter are closer to T7 apex.

Ptiloglossa olivacea (Friese)

Megacilissa olivacea Friese, 1898: 68.

Megacilissa obscura Schrottky, 1901: 215.

Megacilissa obscura Schrottky, 1902a: 412.

Ptiloglossa olivacea Schrottky, 1910: 56.

Ptiloglossa olivacea Bertony, 1911: 135.

Ptiloglossa olivacea Schrottky, 1914: 626.

Lectotype: Male, from S. Cruz, Brazil (ZMB).

Re-description:

Male. Body length 19 mm, forewing length 15 mm. Head. Mandibles completely dark brown, apex pointed. Preapical tooth apex smooth and rounded. Malar area, length around 0.5 OD. Labrum dark brown, smooth. Clypeus light brown, projected beyond the face and flattened on the disc, surface without punctures or few scattered. Paraocular area pubescence white with some scattered dark brown to black setae. Supraclypeal area integument black, pubescence whitish mixed with scattered longer black hairs. Area between antennal socket and compound eye pubescence with a spot of darker hairs (dark

grey to black). Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance equal to 1.0 OD, pubescence brown with whitish branches, longer than 1.0 OD. Ocellocular distance equal to 0.25 OD. Ocelloccipital distance greater than 1.5 OD. Compound eye at a distance equal to 0.5OD from occipital margin. Vertex pubescence dark brown. Genal area less than 0.5 eye width, pubescence with a line of short white setae close to the margin of compound eyes, followed by scattered long dark brown to black pubescence.

Mesosoma. Wings translucent dark brown (almost black). Veins dark brown. Prestigma 2.5 longer than stigma. Tegulae dark brown, no transparent, fully covered by dense pubescence. Thorax pubescence dark brown to black hairs with whitish branches (it look like if they were whitish hairs with darker tips, but they are not). Mesopleural, pubescence black hairs with whitish branches (looks like black hairs). Scutum and scutellum black. Propodeal triangle smooth. Lateral surfaces of propodeum pubescence black with whitish branches. Venter pubescence black hairs with whitish branches. Front, medial and hind legs brown. Tarsi yellow. Apex hind femur pubescence same color than other. Outer hind tibial spur in lateral view as long as inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), basal width 0.25 of tibial width, spur projection forming a right angle from tibiae, tip shape with a long and slender projection flagellum-like (can be broken) (Figure 30). Inner hind tibial spur serrate. Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument brown. T1-T7 pubescence dark brown to black. T7 pubescence on its rim black. Lateral areas of terga, pubescence similar to those on the

disc. S6 projections on the side (thorn -like spines) prominent. S7, S8 and genital capsule as in Figure 49.

Material studied: [1 Male-lectotype] Brazil, S. Cruz, (Südbrasilien), A. Speyer-Altona (ZMB). [1 Female] Colombia, Santa Marta, Vista Nieve, 5000 ft. (Bosque Secundario/COD LABUN 008495), 2/25/1923, M.R.C. (BMNH). [1 Female] Colombia, Santander, Charalá, Corregimiento Virolin, Finca La Sierra, 2325 m, Abril 7 1995, C. Sarmiento (LABUN).

Distribution: Presently known Brazil (Paraná, Rio Grande do Sul, Santa Cruz, Santa Catarina, São Paulo); Colombia (Santa Marta, Santander); Paraguay.

Comments: This species resembles *P. generosa* but differs by having labrum dark brown; clypeus light brown; ocellocular distance equal to 0.25 OD; ocelloccipital distance greater than 1.5 OD; compound eye at a distance equal to 0.5OD from occipital margin; thorax and mesopleural pubescence dark brown to black hairs with whitish; outer hind tibial spur basal area rounded, formed as a structure protruding from tibiae, basal width 0.25 of tibial width, tip shape with a long and slender projection flagellum-like; abdomen pubescence dark brown.

***Ptiloglossa ollantayi* Cockerell**

Ptiloglossa ollantayi Cockerell, 1911: 287.

Syntype: Male, from Peru, Piura (AMNH). Holotype, female with the same locality; not seen. Repository collection unknown.

Re-description:

Male. Body length 16 mm, forewing length 12 mm. Head. Mandibles light brown with pointed dark reddish apex. Preapical tooth apex well separated and pointed. Malar area, length less than 0.5 OD. Labrum and clypeus yellow. Labrum smooth. Clypeus upper part projected beyond the face and flattened on the disc, without punctures or few scattered. Paraocular area pubescence light yellow. Supraclypeal area integument yellow, pubescence light yellow. Area between antennal socket and compound eye pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance less than 1.0 OD, pubescence light yellow with brown tips, equal or shorter than 1.0 OD. Ocellocular distance less than 0.25 OD. Ocelloccipital distance equal to 1.0 OD. Compound eye at a distance equal to 0.5OD from occipital margin. Vertex pubescence light yellow with darker tips. Genal area less than 0.5 eye width, pubescence white to light yellow.

Mesosoma. Wings translucent yellow. Veins yellow (tawny). Prestigma 2.5 longer than stigma. Tegulae yellow, transparent, fully covered by dense pubescence. Thorax and mesopleural pubescence tawny with darker tips. Scutum and scutellum integument brown. Propodeal triangle with minute punctures. Lateral surfaces of propodeum pubescence light yellow with darker tips. Venter pubescence completely light yellow. Front, medial and hind legs light brown to yellow. Tarsi yellow. Apex hind femur pubescence same color than other. Outer hind tibial spur in lateral view as long as inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), basal width 0.25 of tibial width, spur projection almost parallel to margin of tibiae, tip shape with a long and slender projection flagellum-like (can be broken) (Figure 31). Inner

hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.75 tibial length.

Metasoma. T1-T4 integument yellow. T1 pubescence yellow or tawny with darker tips. T2-T4 pubescence light yellow, marginal band white. T4-T5 with a spot apparently without pubescence on the lateral side (trichotrichia). T5 to T7 pubescence completely yellow (tawny). T7 pubescence on its rim light yellow. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) prominent.

Material studied: [1 Male-syntype] Peru, Piura, March 1911, C.H.T. Townsend (AMNH).

Distribution: Presently known from Peru (Piura).

Comments: Cockerell (1911) described the species based on a female specimen, although males are similar structurally and in pubescence patterns, the outer hind tibial spur has basal area rounded, formed as a structure protruding from tibiae, projected almost parallel to margin of tibiae, tip shape with a long and slender projection flagellum-like. Cockerell (1911) on his paper mentions females are similar to *P. eburnea* and *P. matutina* but differs by having tawny pubescence and the eyes converge more above.

Ptiloglossa pallida Friese

Ptiloglossa pallida Friese, 1925: 14.

Holotype: Male, from Argentina, Santiago del Estero, 'Rio Salado' (ZMB).

Re-description:

Male. Body length 14 mm, forewing length 12 mm. Head. Mandibles light brown with pointed dark reddish apex. Preapical tooth apex not prominent (almost not differentiated). Malar area, length 0.75 to 1.0 OD. Labrum and clypeus yellow. Labrum smooth. Clypeus projected beyond the face and flattened on the disc, with minute punctures. Paraocular area pubescence white Supraclypeal area integument brown-reddish, pubescence whitish. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance greater than 1.0 OD, pubescence whitish or very light yellow, longer than 1.0 OD. Ocellocular distance equal to 0.5 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance equal to 1.25 OD from occipital margin. Vertex pubescence light yellow with darker tips. Genal area less than 0.5 eye width, pubescence completely white or light yellow.

Mesosoma. Wings translucent yellow. Veins brown. Prestigma 2.5 longer than stigma. Tegulae yellow, transparent, fully covered by dense pubescence. Thorax pubescence yellow with tawny tips (visible in lateral view). Mesopleural, pubescence white with tawny tips. Scutum and scutellum integument dark brown (reddish). Propodeal triangle with minute punctures. Lateral surfaces of propodeum pubescence light yellow with darker tips. Venter pubescence completely light yellow. Front, medial and hind legs light brown to yellow. Tarsi yellow. Apex hind femur pubescence same color than other. Outer hind tibial spur in lateral view shorter than inner tibial spur, basal

area rounded, formed as a structure protruding from tibiae (normal), basal width less than 0.25 tibial width, spur projection forming an acute angle from tibiae, tip shape rounded, concave but not flattened (Figure 32). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument brown. T1-T4 pubescence golden-yellow. T4-T5 with a spot apparently without pubescence on the lateral side (trichotrichia). T5 to T7 pubescence tawny. T7 pubescence on its rim light yellow. Lateral areas of terga, pubescence white. S6 projections on the side (thorn -like spines) prominent. S7, S8 and genital capsule as in Figure 50.

Material studied: [1 Male-holotype] Argentina, Santiago del Estero, Chaco, 'Rio Salado', January, flying (ZMB).

Distribution: Presently known from Argentina (Santiago del Estero).

Comments: This bee resembles *P. tarsata* but is smaller in size and has the outer hind tibial spur fused to the tibia, basal area rounded, formed as a structure protruding from tibiae, projected forming an acute angle from tibiae, tip shape rounded, concave but not flattened.

Ptiloglossa pretiosa (Friese)

Megacilissa pretiosa Friese, 1898: 67.

Ptiloglossa pretiosa Friese, 1904: 20.

Ptiloglossa pretiosa Moure, 1995: 940.

Holotype: Female, from Brazil (ZMB). Specimen not seen.

Re-description:

Male. Body length 17 mm, forewing length 13.5 mm. Head. Mandibles light brown with pointed dark reddish apex. Preapical tooth apex well separated and pointed. Malar area length 0.75 to 1.0 OD. Labrum and clypeus yellow. Labrum smooth. Clypeus projected beyond the face and flattened on the disc, with strong punctures suggesting a rugose surface. Paraocular area, pubescence light yellow. Supraclypeal area integument light brown, pubescence yellow. Area between antennal socket and compound eye, pubescence with a spot of darker hairs (dark grey to black). Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance equal to 1.0 OD, pubescence tawny with darker tips, longer than 1.0 OD. Ocellocular distance equal to 0.33 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance equal to 1.25 OD from occipital margin. Vertex pubescence first half tawny, second half dark brown. Genal area as wide as 0.5 eye width, pubescence white or light yellow.

Mesosoma. Wings translucent brown. Veins brown-reddish. Prestigma 2 longer than stigma. Tegulae tawny, transparent, fully covered by dense pubescence. Thorax and mesopleural pubescence tawny with darker tips. Scutum and scutellum integument reddish. Propodeal triangle smooth. Lateral surfaces of propodeum pubescence tawny (light at the base). Venter pubescence completely yellow or tawny. Front and medial legs light brown to yellow. Hind legs brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in lateral view as long as inner tibial spur, basal

area bulbous, basal width 0.5 of tibial width, spur projection curving downward, tip shape with a long and slender projection flagellum-like (can be broken) (Figure 33). Inner hind tibial spur serrate. Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument dark brown. T1 pubescence yellow or tawny with darker tips. T2-T4 pubescence dark brown, marginal band light yellow. T5 to T7 pubescence mostly dark brown but with some whitish hairs on the sides or intermixed. T7 pubescence on its rim dark brown. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) without projections. S7, S8 and genital capsule as in Figure 51.

Female. Body length 19 mm, forewing length 12.5 mm. Head. Mandibles black with rounded dark reddish apex. Preapical tooth, apex divided in two forming 2 tiny pointed teeth. Malar area, length less than 0.5 OD. Labrum dark brown, with two tubercles on the middle (strong well-differentiated). Clypeus black, projected beyond the face and flattened on the disc, with strong punctures separated by a distance equal or greater than a puncture width (getting close to the clypeolabral margin). Paraocular area pubescence whitish mixed with scattered longer dark hairs. Supraclypeal area integument black, pubescence with a line of short whitish setae close to the clypeal margin, followed by a group of long brown pubescence. Clypeoantennal equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye, pubescence with a spot of darker hairs (dark grey to black). Interocellar distance greater than 1.0 OD, pubescence black, longer than 1.0 OD. Ocellocular distance equal to 0.67 OD.

Ocelloccipital distance shorter than 1.0 OD. Compound eye at a distance 0.75 to 1.0 OD from occipital margin. Vertex pubescence black. Genal area as wide as 0.5 eye width, pubescence white.

Mesosoma. Wings translucent dark brown (almost black). Veins black. Prestigma 2 longer than stigma. Tegulae black, no transparent, not covered by pubescence. Thorax pubescence black with whitish-brown branches. Mesopleural, pubescence black (sometimes with dark brown branches). Scutum and scutellum integument black. Propodeal triangle smooth. Lateral surfaces of propodeum pubescence black with whitish or brown branches. Venter pubescence black with whitish or brown branches. Front, medial and hind legs black. Tarsi dark brown. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate delimited by an outer carinated ridge. Hind basitarsus, inner margin slightly concave, 1.5 times as long as wide.

Metasoma. T1-T4 integument black T1 pubescence light yellow. T2 pubescence black, marginal band yellow. T5 to T6 pubescence completely dark brown to black. Lateral areas of terga, pubescence light yellow. Sterna margin, pubescence long (as long as or longer than 2 OD).

Material studied: [1 Female] Bolivia, La Paz, Sud Yungas Colaya, (G. Salt Coll.; B.M. 1931-343), 01/01/1949, A. Martinez (SEMC 990979). [2 Female] Brasil, Mato Grosso do Sul, Aquidauana, 20 26' 07.2" S 55 39' 32.8" W, (SISBIOTA – CNPq/FAPESP, Malaise 09), 26.xi-11.xii 2011, Lamas, Nihei & eq. Col. (MZUSP). [1 Female] Brasil, Mato Grosso do Sul, Aquidauana, 20 26' 03.7" S 55 39' 28.8" W, (SISBIOTA – CNPq/FAPESP, Malaise 07), 11-26.x.2010, Lamas, Nihei & eq. Col.

(MZUSP). [1 Female] Brasil, Mato Grosso do Sul, Porto Murtinho, 21 40' 59.7"S 57 46' 42.5" W, (SISBIOTA – CNPq/FAPESP, Malaise 31), 10-25.i.2012, Lamas, Nihei & eq. Col. (MZUSP). [1 Female] Brasil, Sao Paulo, Riberao Grande, Pq. Est. de intervalos, 24 16' 28.0"S 48 25' 14.8"O, (Malaise Ponto 1), 22.xii.2009, N.W. Perioto e eq. cols. (MZUSP). [1 Female] Brasil, Sao Paulo, Riberao Grande, Pq. Est. de intervalos, 24 16' 28.0"S 48 25' 14.8"O, (Malaise Ponto 1), 20.xii.2010, N.W. Perioto e eq. cols. (MZUSP). [1 Female] Brasil, Sao Paulo, Riberao Grande, Pq. Est. de intervalos, 24 16' 23.6"S 48 25' 21.8"O, (Malaise Ponto 5), 22.xi.2010, N.W. Perioto e eq. cols. (MZUSP). [2 Female] Brasil, Minas Gerais, Conceição do Mato Dentro, S. Serpentina, 19.09870 S 43.33596 W (Area 5), 17-27.iv.2011, Silva R.R. & E.Z. Albuquerque cols. (MZUSP). [1 Male] Brasil, Mato Grosso do Sul, Aquidauana, 20 25' 59"S 55 39' 20.8" W (Malaise 08), 26.xii.2011-11.i.2012, Lamas, Nihei & eq. Col. (MZUSP). [1 Male] Brasil, Mato Grosso do Sul, Aquidauana, 20 26' 07.2"S 55 39' 32.8" W (Malaise 09), 11-26.ix.2012, Lamas, Nihei & eq. Col. (MZUSP).

Distribution: Presently known from Bolivia (La Paz); Brazil (Mato Grosso do Sul, Minas Gerais, Paraná, Rio Grande do Sul, Rio de Janeiro, São Paulo).

Comments: This species was described from females, although considering original descriptions, males have same pubescence as females and its abdomen is olive green. This bee resembles *P. tomentosa* but differs by the thorax pubescence black with whitish-brown branches; mesopleural pubescence black; T1 pubescence whitish, T2 to T4 marginal pubescence yellow.

Ptiloglossa psednozona Moure

Ptiloglossa psednozona Moure, 1947: 219.

Holotype: Male, from Argentina, Salta, Carapari river (DZUP).

Re-description:

Male. Body length 16 mm, forewing length 14 mm. Head. Mandibles dark brown with pointed dark reddish apex. Preapical tooth apex well separated and pointed. Malar area, length less than 0.5 OD. Labrum and clypeus yellow. Labrum smooth. Clypeus projected beyond the face and flattened on the disc, without punctures or few scattered. Paraocular area pubescence light yellow. Supraclypeal area integument black, pubescence light yellow. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance less than 1.0 OD, pubescence light yellow with some scattered brown hairs, equal or shorter than 1.0 OD. Ocellocular distance equal to 0.25 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance equal to 0.5OD from occipital margin. Vertex pubescence light yellow with darker tips. Genal area less than 0.5 eye width, pubescence white or light yellow.

Mesosoma. Wings transparent (smoky). Veins brown. Prestigma 2 longer than stigma. Tegulae yellow, transparent, fully covered by dense pubescence. Thorax and mesopleural pubescence yellow with tawny tips (visible in lateral view). Scutum and scutellum integument black. Propodeal triangle with minute punctures. Lateral surfaces of propodeum pubescence yellow at the base and black on the distal half. Venter pubescence mostly white with a line of dark brown hairs giving continuation to those on

mesepisternum. Front legs brown. Medial and hind legs dark brown. Tarsi tawny. Apex hind femur pubescence same color than other. Outer hind tibial spur in lateral view shorter than inner tibial spur, basal area bulbous, basal width 0.25 of tibial width, spur projection curving downward; tip shape with a long and slender projection flagellum-like (can be broken) (Figure 34). Inner hind tibial spur serrate. Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument black. T1 pubescence golden-yellow. T2-T4 pubescence black, marginal band golden. T4-T5 with a spot apparently without pubescence on the lateral side (trichotrichia). T5 to T7 pubescence completely yellow (tawny). T7 pubescence on its rim brown. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) prominent.

Material studied: [1 Male-holotype] Argentina, Salta, Carapari river, 13-i-45, Briadarolli leg. (DZUP). [1 Male] Argentina, Jujuy, Los Perales, 2/6/1950, Monros-Willink (SEMC).

Distribution: Presently known from Argentina (Cordoba, Jujuy, Salta, and Tucumán).

Comments: This bee resembles *P. giacomellii* and differs in only a few characters; genal area less than 0.5 eye width. Wings transparent (smoky); propodeal triangle, integument with minute punctures. Pubescence lateral sides of propodeum yellow on the basal half and black on the distal half. Venter pubescence mostly white with a line of dark brown hairs giving continuation to those on mesepisternum. Inner hind

tibial spur with well defined, slender dents. with a spot apparently without pubescence on the lateral side (trichotrichia) present in T4-T5.

Ptiloglossa rugata Moure

Ptiloglossa rugata Moure, 1945: 161.

Holotype: Male, from Brazil, Amazonas, Parauari river (DZUP).

Re-description:

Male. Body length 18 mm, forewing length 14 mm. Head. Mandibles light brown with pointed dark reddish apex. Preapical tooth apex smooth and rounded. Malar area, length around 0.5 OD. Labrum and clypeus yellow. Labrum smooth. Clypeus projected beyond the face and flattened on the disc, without punctures or few scattered. Paraocular area pubescence light yellow. Supraclypeal area integument brown-reddish, pubescence yellow (light yellow at the base). Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance less than 1.0 OD, pubescence brown with whitish branches, longer than 1.0 OD. Ocellocular distance equal to 0.5 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance between 0.75 and 1.0 OD from occipital margin. Vertex pubescence light yellow with darker tips. Genal area as wide as 0.5 eye width, with a line of short white setae close to the margin of the compound eye, followed by a group of yellow pubescence.

Mesosoma. Wings translucent brown. Veins dark brown. Prestigma 2.5 longer than stigma. Tegulae tawny, transparent, pubescence covering 0.5 of it. Thorax pubescence yellow with tawny tips (visible in lateral view). Mesopleural, pubescence completely tawny (lighter on the base). Scutum black. Scutellum dark brown (reddish). Propodeal triangle strongly rugose on the basal area. Lateral surfaces of propodeum pubescence tawny (light at the base). Venter pubescence mostly white with a line of dark brown hairs giving continuation to those on mesepisternum. Front legs brown. Medial and hind legs dark brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in lateral view as long as inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), basal width 0.25 of tibial width, tip shape rounded, concave but not flattened (Figure 35). Inner hind tibial spur serrate. Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument dark brown. T1 pubescence yellow or tawny with darker tips. T2-T4 pubescence dark, marginal band whitish. T4-T5 with a spot apparently without pubescence on the lateral side (trichotrichia). T5 to T7 pubescence mostly dark brown but with some whitish hairs on the sides or intermixed. T7 pubescence on its rim dark brown. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) prominent.

Female. Body length 21 mm, forewing length 14 mm. Head. Mandibles completely dark brown (almost black), apex rounded. Preapical tooth, apex smooth and

rounded. Malar area, length less than 0.5 OD. Labrum and clypeus black. Labrum with two tubercles on the middle (strong well-differentiated). Clypeus projected beyond the face and rounded on the disc, rugose-striate or with strong punctures suggesting a rugose surface. Paraocular area pubescence whitish mixed with scattered longer dark hairs. Supraclypeal area integument black, pubescence dark brown to black. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye, pubescence with a spot of darker hairs (dark grey to black). Interocellar distance shorter than 1.0 OD, pubescence black, longer than 1.0 OD. Ocellocular distance greater than 1.0 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance 0.75 to 1.0 OD from occipital margin. Vertex pubescence black. Genal area less than 0.5 eye width, pubescence white.

Mesosoma. Wings translucent dark brown (almost black). Veins black. Prestigma as long as stigma. Tegulae black, no transparent, not covered by pubescence. Thorax and mesopleural pubescence black with whitish-brown branches. Scutum integument dark brown (reddish). Scutellum integument black. Propodeal triangle with minute punctures. Lateral surfaces of propodeum pubescence black with whitish or brown branches. Venter pubescence black with whitish or brown branches. Front, medial and hind legs black. Tarsi black. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate delimited by an outer carinated ridge. Hind basitarsus, inner margin straight, parallel to the outer margin, 1.5 times as long as wide.

Metasoma. T1-T4 integument black. T1 pubescence black. T2 pubescence basal half black, marginal half golden-yellow. T3-T4 pubescence golden-yellow. T5 with golden-yellow setae at its base, marginal half of T5 and T6 with dark brown to black

hairs. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). Sterna margin, pubescence long (as long as or longer than 2 OD).

Material studied: [1 Male-holotype] Brazil, Amazonas, Parauari river, iii-1937, C. Worontzow leg. (DZUP). [1 Male] Panama, Chiriqui, Bugaba, Champion, *Salvia*, 1913, Godman-Salvin (BMNH). [1 Male] Guatemala, S. Geronimo, 1913, Champion (BMNH). [1] Costa Rica, Prov. Limon, Cerro Tortuguero, P. N. Tortuguero, 0 - 100m, 10.584815 -83.529205 (L- N 285000_588000), May 1990, J. Solano (INBio). [1 Female] Panama, Panama, Cerro Jefe; Cerro Azul, 15 km NE, 07/01/1967, R. Dressler (SEMC 990982). [1 Male] Costa Rica, Limon, Hacienda La Suerte; Hacienda Tapezco; Tortugeuro, 29 km W, 40m, 10.45000 -83.78333, 08/31/1979, Tapezco Rainforest Expedition (SEMC 990981). [1] Panama, Canal Zone, Barro Colorado Island, 40m, 9.18330 -79.85000, 04/17/1952, Carl Rettenmeyer (SEMC 990980).

Distribution: Presently known from Brazil (Amazonas); Costa Rica (Limon); Guatemala (San Geronimo); Panama (Barro Colorado Island, Chiriqui, Panama).

Comments: This species is similar to *P. chameleensis* males but differs by having clypeus evenly projected beyond the face and flattened on the disc; ocellocular distance equal to 0.5 OD; outer hind tibial spur basal area rounded, formed as a structure protruding from tibiae, tip shape rounded, concave but not flattened. Inner hind tibial spur with well defined, slender dents. Females differ by having vertex pubescence black; thorax pubescence black with whitish-brown branches; mesopleural pubescence black (sometimes with dark brown branches).

Ptiloglossa rugata also resembles *P. xanthorhina* but differs by having thorax pubescence yellow with tawny tips; basal area of propodeal triangle strongly rugose; outer hind tibial spur basal area rounded, formed as a structure protruding from tibiae, tip shape rounded, concave but not flattened. Inner hind tibial spur serrate (with well defined-slender dents).

***Ptiloglossa stafuzzai* Moure**

Ptiloglossa stafuzzai Moure, 1945: 159.

Holotype: Male, Brazil, São Paulo, Batatais (DZUP).

Re-description:

Male. Body length 15.5 mm, forewing length 14 mm. Head. Mandibles light brown with pointed dark reddish apex. Preapical tooth, apex smooth and rounded. Malar area, length around 0.5 OD. Labrum and clypeus yellow. Labrum smooth. Clypeus projected beyond the face and flattened on the disc, with punctures separated by a distance less than a puncture diameter (sometimes minute). Paraocular area pubescence white. Supraclypeal area integument dark brown, pubescence light yellow. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance equal to 1.0 OD, pubescence tawny with darker tips, longer than 1.0 OD. Ocellocular distance equal to 0.5 OD. Ocelloccipital distance shorter than 1.0 OD. Compound eye at a distance between 0.75 and 1.0 OD from occipital margin. Vertex

pubescence first half tawny, second half dark brown. Genal area as wide as 0.5 eye width, with a group of black or dark brown setae close to the margin of the compound eye, followed by whitish pubescence.

Mesosoma. Wings translucent yellow. Veins brown-reddish. Prestigma 2.5 longer than stigma. Tegulae tawny, no transparent, fully covered by dense pubescence. Thorax and mesopleural pubescence tawny with darker tips. Scutum and scutellum integument black. Propodeal triangle smooth. Lateral surfaces of propodeum pubescence tawny (light at the base). Venter pubescence completely light yellow. Front, medial and hind legs light brown to yellow. Tarsi tawny. Apex hind femur pubescence same color than other. Outer hind tibial spur in lateral view as long as inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), basal width 0.5 of tibial width, spur projection curving downward, tip shape laterally flattened (Figure 36). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.5 tibial length.

Metasoma. T1-T4 integument dark brown. T1 pubescence tawny (sometimes with light yellow on its base). T2-T4 pubescence dark brown, marginal band light yellow. T5 to T7 pubescence completely yellow (tawny). T7 pubescence on its rim dark brown. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn -like spines) prominent.

Material studied: [1 Male-holotype] Brazil, São Paulo, Batatais, iii-1943, A.M. Stafuzza leg. (DZUP). [1 Male-paratype] Brazil, Batatais, Sao Paulo, Marzo 1943, A. Stafuzza (DZUP). [1 Male-paratype] Brazil, Campinas, Goyaz, i-1936, Borgmeyer et S.

Lopes (DZUP). [1 Male] Paraguay, Guaira, Colonia Independencia, 08/1951, Juan Foerster (SEMC 990983).

Distribution: Presently known from Brazil (Batatais, Campinas, Goiás, São Paulo); Paraguay (Guaira).

Comments: This species resembles *P. xanthotricha* but differs by having the interocellar distance equal or greater than 1.0 OD; T1 pubescence tawny, T2-T4 pubescence dark brown with marginal band of light yellow hairs, T5-T7 pubescence completely yellow (tawny); outer hind tibial spur basal area rounded, formed as a structure protruding from tibiae, basal width 0.5 of tibial width, curving downward, tip shape laterally flattened.

Ptiloglossa styphlaspis Moure

Ptiloglossa styphlaspis Moure, 1945: 162.

Holotype: Male, from Brazil, Goiás, Goiânia, 'Campinas' (DZUP).

Re-description:

Male. Body length 15.5 mm, forewing length 14 mm. Head. Mandibles dark brown with pointed dark reddish apex. Preapical tooth apex smooth and rounded. Malar area, length less than 0.5 OD. Labrum tawny (when clypeus yellow, its darker yellow), smooth. Clypeus yellow, projected beyond the face and flattened on the disc, rugose. Paraocular area pubescence white. Supraclypeal area integument brown-reddish,

pubescence light yellow. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance greater than 1.0 OD, pubescence brown with whitish branches, longer than 1.0 OD. Ocellocular distance equal to 0.5 OD. Ocelloccipital distance equal to 1.0 OD. Compound eye at a distance between 0.75 and 1.0 OD from occipital margin. Vertex pubescence dark brown. Genal area less than 0.5 eye width, with a group of black or dark brown setae close to the margin of the compound eye, followed by whitish pubescence.

Mesosoma. Wings translucent brown. Veins dark brown. Prestigma 2.5 longer than stigma. Tegulae tawny, transparent, fully covered by dense pubescence. Thorax and mesopleural pubescence yellow with tawny tips (visible in lateral view). Scutum and scutellum integument black. Propodeal triangle with minute punctures. Lateral surfaces of propodeum pubescence whitish with dark brown tips. Venter pubescence completely white or whitish with tawny tips. Front, medial and hind legs brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in lateral view shorter than inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), basal width 0.25 of tibial width, spur projection curving downward, tip shape with a long and slender projection flagellum-like (can be broken) (Figure 37). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument dark brown. T1 pubescence golden-yellow. T2-T4 pubescence dark brown, marginal band whitish. T4-T5 with a spot apparently without pubescence on the lateral side (trichotrichia). T5 to T7 pubescence mostly dark brown but

with some whitish hairs on the sides or intermixed. T7 pubescence on its rim black. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn -like spines) prominent.

Material studied: [1 Male-holotype] Brazil, Goiás, Goiânia, Campinas, 1935, R. Spitz leg. (DZUP). [1 Male-paratype] Brazil, Sao Paulo, Batatais, xii-1943 (DZUP).

Distribution: Presently known from Brazil (Goiás, São Paulo).

Comments: This species is similar to *P. decipiens* but differs by having the clypeus rugose; interocellar distance greater than 1.0 OD; outer hind tibial spur basal area rounded, formed as a structure protruding from tibiae, projection curving downward, tip shape with a long and slender projection flagellum-like; inner hind tibial spur with many minute dents.

Ptiloglossa tarsata (Friese)

(Figures 4, 5 & 6)

Megacilissa (Ptiloglossa) tarsata Friese, 1900: 181.

Megacilissa metatarsalis Schrottky, 1902b: 317.

Ptiloglossa tarsata Friese, 1904: 100.

Caupolicana metatarsalis Vachal, 1904: 23.

Ptiloglossa (Ptiloglossodes) tarsata Moure, 1945: 153.

Lectotype: Female, from Argentina (ZMB).

Re-description:

Male. (Figures 4 & 5). Body length 17-19mm, forewing length 14-14.5 mm.

Head. Mandibles dark brown with pointed dark reddish apex. Preapical tooth apex smooth and rounded. Malar area, length between 0.75 to 1.0 OD. Labrum tawny, with one round medial projection. Clypeus brown-reddish, not projected, rounded on the disc, with punctures separated by a distance less than a puncture diameter (sometimes minute). Paraocular area pubescence yellow. Supraclypeal area integument brown-reddish, pubescence yellow. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance longer than the diameter of antennal socket. Interocellar distance equal to 1.0 OD, pubescence yellow, longer than 1.0 OD. Ocellocular distance equal to 0.5 OD. Ocelloccipital distance equal to 1.0 OD. Compound eye at a distance between 0.75 and 1.0 OD from occipital margin. Vertex pubescence light yellow with darker tips. Genal area less than 0.5 eye width, with a line of short white setae close to the margin of the compound eye, followed by a group of yellow pubescence.

Mesosoma. Wings translucent brown. Veins yellow (tawny). Prestigma as long as stigma. Tegulae yellow, no transparent, fully covered by dense pubescence. Thorax and mesopleural pubescence whitish with darker tips. Scutum black. Scutellum dark brown (reddish). Propodeal triangle smooth. Lateral surfaces of propodeum pubescence whitish. Venter pubescence completely light yellow. Front, medial and hind legs light brown to yellow. Tarsi yellow. Apex hind femur pubescence same color than other. Outer hind

tibial spur absent (Figure 4B). Inner hind tibial spur serrate. Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1 integument black, pubescence tawny (sometimes with light yellow on its base). T2-T4 integument and pubescence dark brown, marginal band golden. T5-T7 pubescence yellow (tawny). T7 pubescence on its rim yellow (tawny). Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) prominent.

Female. (Figure 6). Body length 18 mm, forewing length 14 mm. Head. Mandibles dark brown with truncate dark reddish apex. Preapical tooth apex smooth and rounded. Malar area, length less than 0.5 OD. Labrum and clypeus dark brown. Labrum with one round medial projection. Clypeus not projected, rounded on the disc, rugose-striate or with strong punctures suggesting a rugose surface. Paraocular area, pubescence whitish mixed with scattered longer dark setae. Supraclypeal area integument brown-reddish, pubescence dark brown to black. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye, pubescence with a spot of darker hairs (dark grey to black). Interocellar distance greater than 1.0 OD, pubescence dark brown, longer than 1.0 OD. Ocellocular distance greater than 1.0 OD. Ocelloccipital distance equal to 1.0 OD. Compound eye at a distance 0.75 to 1.0 OD from occipital margin. Vertex pubescence dark brown to black. Genal area as wide as 0.5 eye width, pubescence white with scarce dark brown hairs close to compound eye margin.

Mesosoma. Wings translucent brown. Veins brown. Prestigma as long as stigma. Tegulae tawny, transparent, pubescence covering 0.5 of it. Thorax pubescence light brown on its base and dark brown at the tips. Mesopleural, pubescence light yellow to white on its base and black on its tips. Scutum and scutellum integument dark brown (reddish). Propodeal triangle with minute punctures. Lateral surfaces of propodeum pubescence dark brown. Venter pubescence whitish. Front, medial and hind legs light brown to yellow. Tarsi light brown to reddish. Apex hind femur pubescence same color than other. Basitibial plate delimited by an outer carinated ridge. Hind basitarsus inner margin slightly concave, 1.5 times as long as wide.

Metasoma. T1-T4 integument black. T1 pubescence dark brown. T2-T4 pubescence black, marginal band yellow. T5 on its base with golden-yellow setae, marginal half of T5 and T6 with dark brown to black hairs. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). Sterna margin, pubescence long (as long as or longer than 2 OD).

Material studied: [1Female-lectotype] Argentina, La Ottomana, Staudinger leg. (ZMB). [1 Female] Paraguay, Chaco, Nanawa, (B.M. 1927-388), 10/21/1926, A. Pride (BMNH). [1 Male] Argentina, Tucuman, Trancas, San Pedro de Colalao, 7/1949, J. Foester (SEMC). [1 Male] Argentina, Santa Fe, Tostado, F.C.C.N. El Orden, Andres J. Gai (SEMC). [1 Male] Argentina, Terr. Formosa, Gran Guardia, J. Forerster (SEMC). [1 Male] Argentina, Santiago del Estero, El Pinto, 11/00/1956 (SEMC). [1 Female] Argentina, Province Santa Fe, Tostado F.C.C.N., El Orden, Andres J. Gai (SEMC). [5 Females] Argentina, Santa Fe, Tostado FCCN railway.; El orden, Andres Gai (SEMC 990992 to 990996). [1] Argentina, Santiago del Estero, 900m, 02/1957, Fernandez

(SEMC 990998). [4 Female] Argentina, Tucuman, Trancas, Mimilito, 11/01/1983, Fernando Lobo (SEMC 990984 to 990987). [4 Female] Argentina, Tucuman, Trancas, Mimilito, 01/26/1984, Fernando Lobo (SEMC 990988 to 990991). [1] Argentina, Salta, Arundel, 11/1949, M. Senkute (SEMC 990997). [1] Argentina, Santiago del Estero, El Pinto, 11/1956 (SEMC 991004). [1] Argentina, Jujuy, Los Perales, 02/06/1950, Monros & Willink (SEMC 991003). [1] Argentina, Formosa, Gran Guardia, Juan Foerster (SEMC 991002). [1] Argentina, Salta, Salta, 02/1950, A. Prosen (SEMC 991001). [1] Argentina, Tucuman, Trancas, San Pedro de Colalao, 12/1949, Juan Foerster (SEMC 990999). [1 Male] Argentina, Gnral Güenes (salida p. Campo Santo), 756m, 40.155°S 65 03.655°W (24 grados), on *Serjania* sp. (Sapindaceae), Cooperative research Int. M. Lillo, ARG, Tucuman & Cornell University, USA, 11.xi.2004, E. Almeida (MZUSP). [1 Male] Argentina, Museum Paris Prov. De Santiago del Estero Bords du Rio Salado Averias, 1909, E.R. Wagner (MZUSP). [1 Female] Argentina, Museum Paris Prov. Chaco de Santiago del Estero Bords du Rio Salado La palisa del Bracho, 25 kil N.o D'Icaño, 1909, E.R. Wagner (MZUSP).

Distribution: Presently known from Argentina (Formosa, Jujuy, Salta, Santa Fe, Santiago del Estero, Tucumán); Paraguay (Chaco, Itapúa).

Comments: This species is similar to *P. eximia* and *P. mexicana* but female with the clypeus rugose; thorax pubescence light brown on its base and dark brown at the tips; mesopleural pubescence light yellow to white on its base and black on its tips; scopa ferruginous; T2-T4 pubescence marginal bands golden, T5 on its base with golden-yellow hairs, marginal half of T5 and T6 with dark brown to black hairs. Male similar to

female but metatibiae wide at its base, triangular; outer hind tibial spur absent; T1 pubescence tawny, T2-T4 pubescence dark brown with marginal band golden.



Figure 4. *Ptiloglossa tarsata* male. **A.** Lateral view; **B.** Hind tibial spur.

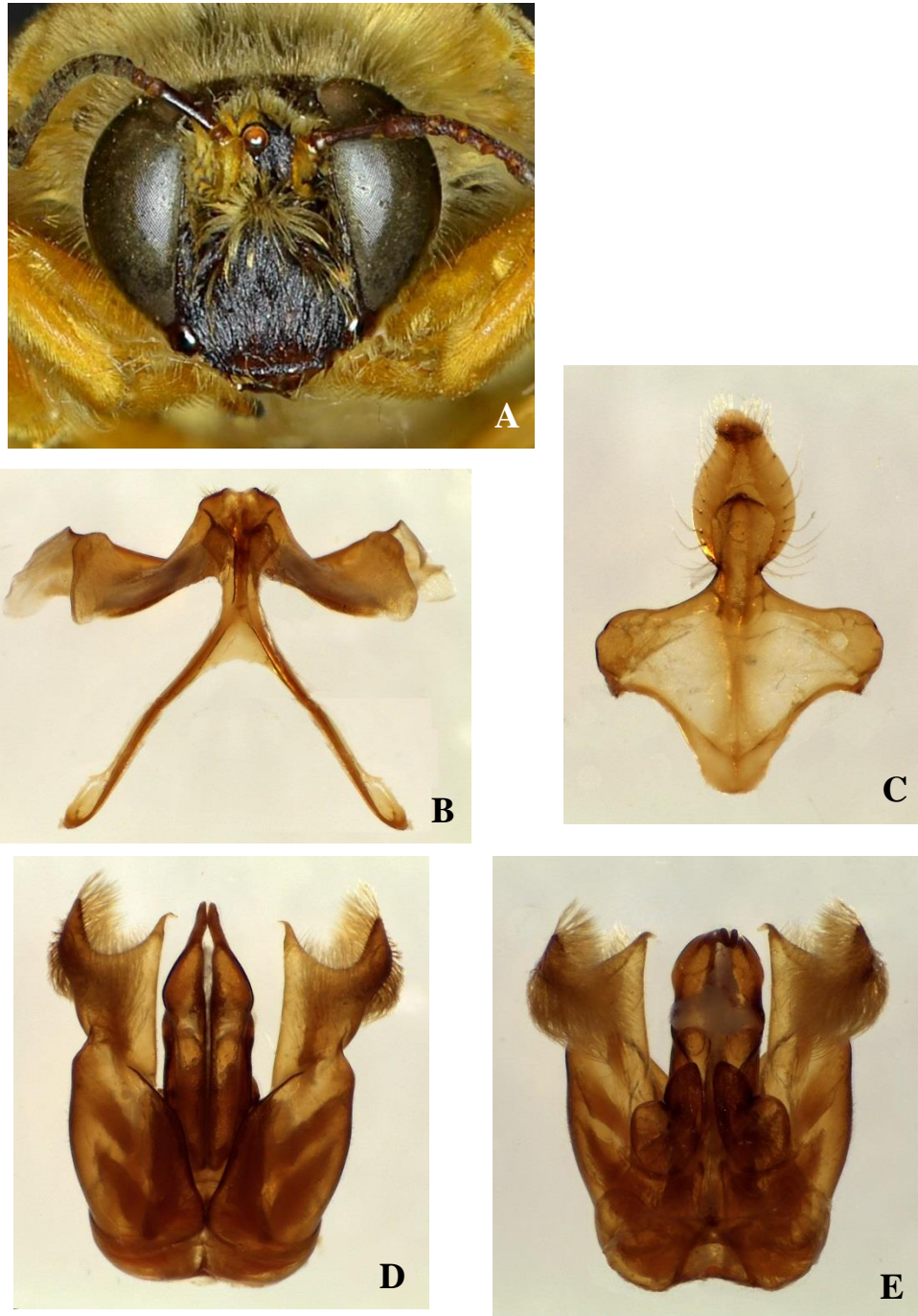


Figure 5. *Ptiloglossa tarsata* male: **A.** Face. **B.** Metasomal sternum 7 (S7), dorsal view; **C.** Metasomal sternum 8 (S8), dorsal view; **D.** Genitalia dorsal view; **E.** Genitalia ventral view.



Figure 6. *Ptiloglossa tarsata* female. **A.** Lateral view; **B.** Face.

Ptiloglossa tenuimarginata (Smith)

Megacilissa tenuimarginata Smith, 1879: 58.

Ptiloglossa tenuimarginata Smith, 1898: 65.

Caupolicana tenuimarginata Cockerell, 1905: 343.

Holotype: Male, from Mexico, Veracruz, Orizaba (BMNH).

Re-description:

Male. Body length 18 mm, forewing length 14 mm. Head. Mandibles dark brown with pointed dark reddish apex. Preapical tooth apex smooth and rounded. Malar area, length less than 0.5 OD. Labrum and clypeus yellow. Labrum smooth. Clypeus upper part projected beyond the face and flattened on the disc, with punctures separated by a distance less than a puncture diameter (sometimes minute). Paraocular area pubescence light yellow. Supraclypeal area integument yellow, pubescence yellow. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance less than 1.0 OD, pubescence yellow, equal or shorter than 1.0 OD. Ocellocular distance equal to 0.25 OD. Ocelloccipital distance equal to 1.5 OD. Vertex pubescence with a mix of yellow and dark brown (being the latter predominant). Genal area wider than 0.5 eye width, with a line of short white setae close to the margin of the compound eye, followed by a group of light yellow pubescence.

Mesosoma. Wings translucent yellow. Veins yellow (tawny). Prestigma 2.5 longer than stigma. Tegulae tawny, transparent, fully covered by dense pubescence.

Thorax pubescence tawny (lighter on the base) with darker tips. Mesopleural, pubescence dark brown to black. Scutum and scutellum integument dark brown (reddish). Propodeal triangle integument smooth. Lateral surfaces of propodeum pubescence light yellow with darker tips. Venter pubescence completely light yellow. Front and medial legs light brown to yellow. Hind legs dark brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in lateral view shorter than inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), basal width 0.25 of tibial width, spur projection curving downward, tip shape rounded, slightly concave (like a spoon shape) and flattened (Figure 38). Inner hind tibial spur serrate. Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T4 integument brown. T1 pubescence tawny (sometimes with light yellow on its base). T2-T4 pubescence dark brown (in some cases except for those on the marginal band), marginal band whitish. T4-T5 with a spot apparently without pubescence on the lateral side (trichotrichia). T5 to T7 pubescence mostly black hairs but those on the margin golden-yellow. S6 projections on the side (thorn -like spines) prominent. S7, S8 and genital capsule as in Figure 52.

Female. Body length 18 mm, forewing length 13 mm. Head. Mandibles brown with truncate black apex. Preapical tooth apex smooth and rounded. Malar area, length less than 0.5 OD. Labrum and clypeus brown-reddish. Labrum with two tubercles on the middle (strong well-differentiated). Clypeus not projected, rounded on the disc, rugose-striate or with strong punctures suggesting a rugose surface. Paraocular area pubescence

whitish mixed with scattered longer dark hairs. Supraclypeal area integument brown-reddish, with a line of short whitish setae close to the clypeal margin, followed by a group of long brown pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye, pubescence with a spot of darker hairs (dark grey to black). Interocellar distance equal to 1.0 OD, pubescence brown with whitish branches, longer than 1.0 OD. Ocellocular distance equal to 0.67 OD. Ocelloccipital distance shorter than 1.0 OD. Compound eye at a distance equal to 0.5 OD from occipital margin. Vertex pubescence dark brown to black. Genal area less than 0.5 eye width, pubescence white.

Mesosoma. Wings translucent brown. Veins brown. Prestigma 2.5 longer than stigma. Tegulae tawny, transparent, pubescence covering 0.5 of it. Thorax pubescence tawny with darker tips. Mesopleural, pubescence dark brown (with whitish branches). Scutum and scutellum integument dark brown (reddish). Propodeal triangle with minute punctures. Lateral surfaces of propodeum pubescence light yellow with darker tips. Venter pubescence whitish. Front, medial and hind legs brown. Tarsi light brown to reddish. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate present and well delimited by strong ridges on each side (outer and inner). Hind basitarsus, inner margin straight, parallel to the outer margin, 1.5 times as long as wide.

Metasoma. T1-T4 integument brown. T1 pubescence light yellow with dark tips. T2-T3 pubescence light yellow. T4 pubescence dark brown. T2-T4 pubescence marginal band whitish. T5-T6 pubescence dark brown to black. Lateral areas of terga, pubescence black or dark brown. Sterna margin, pubescence long (as long as or longer than 2 OD).

Material studied: [1 Male-holotype] Mexico, Veracruz, Orizaba, 17a.401 (BMNH). [1 Male] Mexico, Presidio, Godman-Salvin collection, 1913, Forrer (BMNH). [1 Female] Colombia, Antioquia, Medellin, at light, 2/27/1931, W.A. Archer (NMNH). [2 Male] Colombia, Antioquia, Amaga, Aug. 1937, F.L. Gallego (MEFLG).

Distribution: Presently known from Colombia (Antioquia); Mexico (Presidio, Veracruz).

Comments: Smith (1879) mention this species is possible the male of *P. eximia* because only differs by pubescence of hind legs and terga pubescence dark brown. I found this species similar to *P. mexicana* but males differ by having interocellar pubescence yellow; ocelloccipital distance equal to 1.5; thorax pubescence completely tawny (lighter on the base) with darker tips; mesopleural pubescence dark brown; pubescence lateral sides of propodeum light yellow with darker tips; outer hind tibial spur basal area rounded, formed as a structure protruding from tibiae (normal), basal width 0.25 of tibiae, curving downward, tip shape rounded, slightly concave (like a spoon shape) and flattened; inner hind tibial spur serrate. Females differ in apex of preapical tooth smooth and rounded; ocellocular distance equal to 0.67 OD; thorax pubescence tawny with darker tips; mesopleural pubescence dark brown (with whitish branches); T1 pubescence light yellow with dark tips, T2 to T4 pubescence on marginal bands whitish.

Ptiloglossa thoracica (Fox)

Megacilissa thoracica Fox, 1895: 270.

Ptiloglossa thoracica Cockerell, 1923: 443.

Ptiloglossa wilmattae Cockerell, 1949: 432, new synonym.

Holotype: Female, from Mexico, Nayarit (Lower California), Tepic (CAS).

Specimen not seen.

Re-description:

Male. Body length 20 mm, forewing length 15 mm. Head. Mandibles dark brown with pointed dark reddish apex. Preapical tooth apex smooth and rounded. Malar area, length around 0.5 OD. Labrum brown-reddish, smooth. Clypeus yellow, not projected, rounded on the disc, with strong punctures sometimes suggesting a rugose surface. Paraocular area pubescence light yellow. Supraclypeal area integument light brown, pubescence light yellow. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance less than 1.0 OD, pubescence yellow, longer than 1.0 OD. Ocellocular distance equal to 0.33 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance equal to 0.5OD from occipital margin. Vertex pubescence tawny. Genal area less than 0.5 eye width, with a line of short white setae close to the margin of the compound eye, followed by a group of yellow pubescence.

Mesosoma. Wings translucent brown. Veins brown-reddish. Prestigma 2.5 longer than stigma. Tegulae tawny, no transparent, fully covered by dense pubescence. Thorax

and mesopleural pubescence tawny (lighter on the base). Scutum and scutellum integument dark brown (reddish). Propodeal triangle striate on the sides. Lateral surfaces of propodeum pubescence tawny (light at the base). Venter pubescence completely yellow or tawny. Front legs light brown to yellow. Medial and hind legs brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in lateral view as long as inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), basal width less than 0.25 tibial width, spur projection forming an acute angle from tibiae, tip shape rounded, concave but not flattened (Figure 39). Inner hind tibial spur serrate. Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1-T2 integument reddish. T3-T4 integument yellow. T1-T7 pubescence tawny (sometimes with light yellow on its base). T7 pubescence on its rim light yellow. Lateral areas of terga, pubescence light yellow. S6 projections on the side (thorn-like spines) prominent. S7, S8 and genital capsule as in Figure 53.

Female. Body length 18-21 mm, forewing length 14.5 mm. Head. Mandibles black with pointed dark reddish apex. Preapical tooth apex smooth and rounded. Malar area, length less than 0.5 OD. Labrum dark brown, striate on the labroclypeal area. Clypeus brown-reddish, not projected, rounded on the disc, rugose-striate or with strong punctures suggesting a rugose surface. Paraocular area pubescence black. Supraclypeal area integument brown, pubescence dark brown to black. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Interocellar distance

shorter than 1.0 OD, pubescence black, longer than 1.0 OD. Ocellocular distance equal to 1.0 OD. Ocelloccipital distance equal to 1.0 OD. Compound eye at a distance equal to 0.5 OD from occipital margin. Vertex pubescence black. Genal area less than 0.5 eye width, pubescence black with whitish branches.

Mesosoma. Wings translucent dark brown (almost black). Veins dark brown. Prestigma 2 longer than stigma. Tegulae black, no transparent, pubescence covering 0.5 of it. Thorax and mesopleural pubescence black with whitish-brown branches. Scutum black. Scutellum dark brown (reddish). Propodeal triangle with minute punctures and striate on basal margin (at its sides). Lateral surfaces of propodeum pubescence black with whitish or brown branches. Venter pubescence black with whitish or brown branches. Front, medial and hind legs dark brown. Tarsi dark brown. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate delimited by an outer carinated ridge. Hind basitarsus, inner margin straight, parallel to the outer margin, 2 times as long as wide.

Metasoma. T1-T4 integument dark brown. T1-T6 pubescence dark brown to black. Lateral areas of terga, pubescence similar to those on the disc (not white or black). Sterna margin, pubescence long (as long as or longer than 2 OD).

Material studied: [1 Male] Honduras, Zamorano, on *Ipomoea*, (*Ptiloglossa wilmattae* Type No. 58432), October 29, W.P. Cockerell (USNMENT 00534544). [1] Costa Rica, Prov. Heredia, Sarapiquí, P.N. Braulio Carrillo, Z.P. La Selva, El Ceibo, 500-600m, 10.329083 -84.080102, Colecta Libre (L_N_256615_527735 #94229), 10 AGO 2005, I. Chavez (INBio). [1 Male] Mexico, Jalisco, 22 mi NW La Piedad,

Asclepias, 7/23/1954, E.I. Schlinger (SEMC). [1 Female] Mexico, Jalisco, 22 mi NW La Piedad, 7/23/1954, J.W. MacSwain (SEMC). [1] Mexico, Jalisco, Arroyo Chamela, Chamela, 19.53330 -105.06670, 09/30/1985, Ricardo Ayala (SEMC 991038). [2] Mexico, Oaxaca, Camaron, 2 km E, 09/10/1965, Daniel Janzen (SEMC 991029 & 991030). [2 Females] Mexico, Jalisco, La Piedad, 22 mi NW, *Asclepias*, 07/23/1954, E. Schlinger (SEMC 991020 & 991022). [2] Mexico, Jalisco, Chamela Biological Station, UNAM, 1073, 09/15/1982, S. Bullock (SEMC 991035 & 991036). [2] Mexico, Jalisco, Tizapan, 09/15/1963, Daniel Janzen (SEMC 991027 & 991028). [1] Mexico, Puebla, Acatlan, 8 mi SE, 1500m, 09/07/1968 (SEMC 991034). [15] Mexico, Jalisco, La Piedad, 22 mi NW, *Asclepias*, 07/23/1954, J. MacSwain (SEMC 991008 to 991019, 991021, 991026 & 991042). [1] Mexico, Jalisco, Chamela, Est Biologia UNAM, 09/22/1982, S. Bullock (SEMC 991037). [1] Mexico, Oaxaca, Presa Benito Juarez, *Passiflora*, 09/08/1968, Daniel Janzen (SEMC 991033). [3 Males] Mexico, Jalisco, La Piedad, 22 mi NW, 07/23/1954, J. MacSwain (SEMC 991006, 991007 & 991041). [2] Mexico, Guerrero, Chilpancingo, 23.2 mi N, Sapindaceae, 08/11/1966, Daniel Janzen (SEMC 991031 & 991032). [1] Mexico, Jalisco, Chamela Biological Station, 19.53330 - 105.06670, 10/08/1985, Griswold & Parker (SEMC 991040). [1] Costa Rica, Guanacaste, Los Almendros, 300m, 11/20/1994, L. Lopez (SEMC 991039). [1] Costa Rica, Puntarenas, San Vito, 6 km, 8.70000 -83.00000, 03/18/1967, OTS advanced zoology course (SEMC 991005).

Distribution: Presently known from Costa Rica (Guanacaste, Heredia, Puntarenas); Honduras (Zamorano); Mexico (Chiapas, Guerrero, Jalisco, Nayarit, Oaxaca, Puebla).

Comments: After reviewing type specimens and descriptions *P. wilmattae* is here treated as a new synonym of *P. thoracica*.

This species is similar to *P. mexicana* but females differ by having the labrum dark brown, striate on the labroclypeal area; interocellar distance less than 1.0 OD; wings translucent dark brown (almost black); thorax pubescence black with whitish-brown branches; mesopleural pubescence black (sometimes with dark brown branches); T1-T4 pubescence dark brown, without marginal bands. Males labrum brown-reddish; clypeus not projected, rounded on the disc, with strong punctures suggesting a rugose surface; interocellar distance less than 1.0 OD; ocellocipital distance equal to 1.5 OD, thorax and mesopleural pubescence completely tawny (lighter on the base); outer hind tibial spur basal area rounded, formed as a structure protruding from tibiae with a width less than 0.25 tibiae, projection forming an acute angle from tibiae, tip shape rounded, concave but not flattened; inner hind tibial spur serrate; T1-T2 integument reddish, T3-T4 integument yellow, T1-T4 pubescence tawny, T5 to T7 pubescence tawny.

Ptiloglossa tomentosa (Friese)

Megacilissa tomentosa Friese, 1898: 66.

Ptiloglossa tomentosa Moure, 1945: 153.

Lectotype: Female, from Bolivia, Cochabamba, Tarata (ZMB). Specimen not seen.

Re-description:

Male. Body length 21 mm, forewing length 14 mm. Head. Mandibles light brown with pointed dark reddish apex. Preapical tooth, apex well separated and pointed. Malar area, length around 0.5 OD. Labrum and clypeus yellow. Labrum smooth. Clypeus projected beyond the face and flattened on the disc, with punctures separated by a distance less than a puncture diameter (sometimes minute). Paraocular area pubescence light yellow. Supraclypeal area integument yellow, pubescence yellow. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance greater than 1.0 OD, pubescence yellow, longer than 1.0 OD. Ocellocular distance equal to 0.5 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance between 0.75 and 1.0 OD from occipital margin. Vertex pubescence first half tawny, second half dark brown. Genal area less than 0.5 eye width, pubescence completely white or light yellow.

Mesosoma. Wings translucent yellow. Veins brown. Prestigma 2 longer than stigma. Tegulae yellow, no transparent, fully covered by dense pubescence. Thorax pubescence completely tawny (lighter on the base). Mesopleural pubescence tawny with darker tips. Scutum black. Scutellum dark brown (reddish). Lateral surfaces of propodeum pubescence tawny (light at the base). Venter pubescence yellow or tawny. Front, medial and hind legs light brown to yellow. Tarsi yellow. Apex hind femur pubescence same color than other. Outer hind tibial spur in lateral view as long as inner tibial spur, basal area laterally flattened, basal width almost as wide as tibiae, spur projection forming an acute angle from tibiae, tip shape with a long and slender

projection flagellum-like (can be broken). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.75 tibial length.

Metasoma. T1-T4 integument dark brown. T1 pubescence tawny (sometimes with light yellow on its base). T2-T4 pubescence dark brown, marginal band light yellow. T4-T5 with a spot apparently without pubescence on the lateral side (trichotrichia). T5 with light yellow hairs intermixed with some scattered dark hairs; the other light yellow pubescence. T7 pubescence on its rim dark brown. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) prominent.

Material studied: [1 Male] Brazil, Paraiba, Joazeirinho, 25 VIII 1955, A.A. H.e. Silva (SEMC 0991063).

Distribution: Presently known from Bolivia (Cochabamba); Brazil (Paraiba); Ecuador; Venezuela.

Comments: This species resembles *P. pretiosa* but differs by the thorax pubescence tawny (lighter on base); mesopleura pubescence tawny with darker tips; T1-T4 pubescence tawny (sometimes with light yellow on its base), T2 pubescence dark brown. Differs from *P. goffergei* in having thorax pubescence tawny (lighter on the base), mesopleura pubescence tawny with darker tips; T2-T4 with marginal bands light yellow; T5 with light yellow hairs intermixed with some scattered dark hairs, T6-T7 with light yellow pubescence.

Ptiloglossa tomentosa males have hind tibial spur differs by basal area laterally flattened, as width as tibiae, projection forming an acute angle from tibiae, tip shape long

and slender, flagellum-like projection; inner hind tibial spur with minute dents (not too prominent).

Ptiloglossa torquata Moure

Ptiloglossa torquata Moure, 1987: 120.

Holotype: Male, from Brazil, Bahia, Maracás (DZUP) and paratype from same locality.

Re-description:

Male. Body length 16.5 mm, forewing length 14 mm. Head. Mandibles black with pointed dark brown apex. Preapical tooth, apex well separated and pointed. Malar area, length around 0.5 OD. Labrum and clypeus dark brown. Labrum smooth. Clypeus projected beyond the face and flattened on the disc, without punctures or few scattered. Paraocular area pubescence light yellow. Supraclypeal area integument dark brown, pubescence yellow (light yellow at the base). Area between antennal socket and compound eye, pubescence with a spot of darker hairs (dark grey to black). Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance equal to 1.0 OD, pubescence light yellow with some scattered brown setae, longer than 1.0 OD. Ocellocular distance equal to 0.5 OD. Ocelloccipital distance equal to 1.5 OD. Compound eye at a distance between 0.75 and 1.0 OD from occipital margin. Vertex pubescence dark brown. Genal area as wide as 0.5 eye width, with a line of short

white setae close to the margin of the compound eye, followed by a group of light yellow pubescence.

Mesosoma. Wings translucent dark brown (almost black). Veins dark brown. Prestigma 2 longer than stigma. Tegulae dark brown, no transparent, pubescence covering 0.5 of it. Thorax pubescence black. Mesopleural pubescence light yellow with tawny tips. Scutum and scutellum integument black. Propodeal triangle striate on the sides. Lateral surfaces of propodeum pubescence whitish with dark brown tips. Venter pubescence dark brown. Front legs brown. Medial and hind legs dark brown. Tarsi tawny. Apex hind femur pubescence same color than other. Outer hind tibial spur in lateral view as long as inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), basal width less than 0.25 tibial width, spur projection curving downward, tip shape with a long and slender projection flagellum-like (can be broken) (Figure 40). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1 integument black. T1 pubescence tawny (sometimes with light yellow on its base). T2-T4 integument and pubescence dark brown. T4 with a marginal band of whitish hairs. T4-T5 with a spot apparently without pubescence on the lateral side (trichotrichia). T5-T6 pubescence white, T7 margin with black setae. T7 pubescence on its rim dark brown. Lateral areas of terga, pubescence similar to those on the disc (not white or black, if they are other color than black). S6 projections on the side (thorn-like spines) prominent.

Material studied: [1 Male-holotype] Brazil, Bahia, Maracás, 970 m, Fevereiro 1963, Francisco M. de Oliveira (DZUP). [1 Male-paratype] Brazil, Bahia, Maracás, 970 m, Fevereiro 1963, Francisco M. de Oliveira.

Distribution: Presently known from Brazil (Bahia).

Comments: This bee is easy to differentiate from other *Ptiloglossa* species because of a distinctive band of yellow hairs in pronotum, it also has labrum and clypeus dark brown; thorax pubescence black; mesopleura pubescence light yellow with umber tips; T2-T4 pubescence dark brown, T4 with a marginal band of whitish hairs, T5-T6 pubescence white, T7 apex with black hairs.

***Ptiloglossa trichrootricha* Moure**

Ptiloglossa trichrootricha Moure, 1987: 118.

Holotype: Female, from Colombia, Cauca, Monte Redondo (DZUP).

Re-description:

Female. Body length 19.5 mm, forewing length 15 mm. Head. Mandibles dark brown with truncate dark reddish apex. Preapical tooth apex not prominent (almost not differentiated). Malar area, length around 0.5 OD. Labrum and clypeus brown-reddish. Labrum with two tubercles on the middle (strong well-differentiated). Clypeus projected beyond the face and flattened on the disc, rugose-striate or with strong punctures suggesting a rugose surface. Paraocular area pubescence short white hairs intermixed

with scattered light yellow longer hairs. Supraclypeal area integument brown-reddish, pubescence dark brown to black. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Interocellar distance shorter than 1.0 OD, pubescence dark brown, longer than 1.0 OD). Ocellocular distance greater than 1.0 OD. Ocelloccipital distance equal to 1.0 OD. Compound eye at a distance 0.75 to 1.0 OD from occipital margin. Vertex pubescence dark brown to black. Genal area wider than 0.5 eye width, pubescence white.

Mesosoma. Wings translucent dark brown (almost black). Veins black. Prestigma as long as stigma. Tegulae black, no transparent, pubescence covering 0.5 of it. Thorax and mesopleural pubescence black with whitish-brown branches. Scutum and scutellum black. Propodeal triangle with minute punctures. Lateral surfaces of propodeum pubescence black with whitish or brown branches. Venter pubescence black with whitish or brown branches. Front, medial and hind legs black. Tarsi black. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate delimited by an outer carinated ridge. Hind basitarsus, inner margin slightly concave.

Metasoma. T1-T4 integument black. T1 pubescence black. T2-T4 pubescence golden-yellow. T5-T6 pubescence completely dark brown to black. Lateral areas of terga, pubescence black or dark brown. Sterna margin, pubescence long (as long as or longer than 2 OD).

Material studied: [1Female-holotype] Colombia, Cauca, Monte Redondo, (Colecao Campos Seabra), 5 de Dezembro de 1956, Juan Foerster leg. (DZUP).

[2Females-paratype] Colombia, Cauca, Monte Redondo, (Colecao Campos Seabra), 5 de Dezembro de 1956, Juan Foerster leg. (DZUP).

Distribution: Presently known from Colombia (Cauca).

Comments: This bee differs from other *Ptiloglossa* in having labrum and clypeus brown-reddish, labrum with two tubercles on the middle (strong well-differentiated), clypeus projected beyond the face and flattened on the disc; sides of propodeum pubescence black; T1 pubescence black, T2-T4 pubescence tawny, lateral sides of T1-T2 with a group of white hairs, T5-T6 pubescence black.

Ptiloglossa willinki Moure

Ptiloglossa willinki Moure, 1953: 68.

Lectotype: Female, from Argentina, Córdoba, Tortoral (DZUP).

Re-description:

Female. Body length 17 mm, forewing length 13 mm. Head. Mandibles brown with rounded black apex. Preapical tooth apex smooth and rounded. Malar area, length around 0.5 OD. Labrum brown, with two tubercles on the middle (strong well-differentiated). Clypeus light brown, projected beyond the face and flattened on the disc, with few scattered strong punctures. Paraocular area pubescence whitish mixed with scattered longer dark setae. Supraclypeal area integument color brown-reddish, bare. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Area

between antennal socket and compound eye, pubescence with a spot of darker hairs (dark grey to black). Interocellar distance equal to 1.0 OD, pubescence dark brown, equal or shorter than 1.0 OD. Ocellocular distance greater than 1.0 OD. Ocelloccipital distance shorter than 1.0 OD. Compound eye at a distance equal to 0.25 OD from occipital margin. Vertex pubescence dark brown to black. Genal area less than 0.5 eye width, pubescence white.

Mesosoma. Wings translucent brown. Veins dark brown. Prestigma 2 longer than stigma. Tegulae dark brown, no transparent, not covered by pubescence. Thorax and mesopleural pubescence black with whitish-brown branches. Scutum and scutellum black. Propodeal triangle with minute punctures. Lateral surfaces of propodeum pubescence dark brown. Front legs brown. Medial and hind legs dark brown. Tarsi dark brown. Apex hind femur pubescence with a patch of dark hairs. Basitibial plate delimited by an outer carinated ridge. Hind basitarsus, inner margin straight, parallel to the outer margin, 2 times as long as wide.

Metasoma. T1-T4 integument brown. T1 pubescence light yellow. T2-T6 pubescence golden-yellow. Lateral areas of terga, pubescence similar to those on the disc (not white or black). Sterna margin, pubescence long (as long as or longer than 2 OD).

Material studied: [1 Female-lectotype] Argentina, Córdoba, Tortoral, 18-ii-1948, coll. P. Lopes (DZUP). [2 Females-paratype] Argentina, Córdoba, Tortoral, 18-ii-1948, coll. P. Lopes (DZUP). [1 Female] Argentina, Tucuman, Las Cejas, 04/11/1968, C. Porter (SEMC 991044). [1 Female] Argentina, Tucuman, Trancas, San Pedro de Colalao, 02/1948, Juan Foerster (SEMC 991043). [1 Female] Argentina, Tucuman, Tacanas,

01/1948, P. Arnau (SEMC 1122290). [1 Female] Argentina, Tucuman, Rio Medina, 1400m, -26.00000 -65.00000, 01/26/1963, Werner (SEMC 991045).

Distribution: Presently known from Argentina (Cordoba, Salta, Tucumán).

Comments: This bee resembles *P. ducalis* but differs by having the labrum brown with two tubercles on the middle (strong well-differentiated); clypeus light brown; ocellocular distance greater than 1.0 OD; compound eye at a distance equal to 0.25 OD from occipital margin; thorax pubescence and mesopleura black with whitish-brown branches; T1 pubescence light yellow, T2-T4 pubescence golden-yellow, T5 to T6 pubescence golden-yellow.

Ptiloglossa xanthorhina Moure

Ptiloglossa xanthorhina Moure, 1945: 158.

Holotype: Male, from Brazil, Amazonas, Parauari river (DZUP).

Re-description:

Male. Body length 16.5 mm, forewing length 15 mm. Head. Mandibles light brown with pointed dark reddish apex. Preapical tooth apex smooth and rounded. Malar area, length between 0.75 to 1.0 OD. Labrum and clypeus yellow. Labrum smooth. Clypeus projected beyond the face and flattened on the disc, without punctures or few scattered. Paraocular area pubescence yellow. Supraclypeal area integument black, pubescence yellow with darker tips. Area between antennal socket and compound eye,

pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than diameter of antennal socket. Interocellar distance greater than 1.0 OD, pubescence tawny with darker tips, longer than 1.0 OD. Ocellocular distance equal to 0.67 OD. Ocelloccipital distance greater than 1.5 OD. Compound eye at a distance equal to 1.25 OD from occipital margin. Vertex pubescence first half tawny, second half dark brown. Genal area wider than 0.5 eye width, pubescence yellow.

Mesosoma. Wings translucent brown. Veins dark brown. Prestigma 2 longer than stigma. Tegulae yellow, no transparent, pubescence covering 0.5 of it. Thorax and mesopleural pubescence tawny with darker tips. Scutum and scutellum black. Propodeal triangle with minute punctures. Lateral surfaces of propodeum pubescence yellow on the basal half and black on the distal half. Venter pubescence completely yellow or tawny. Front legs light brown to yellow. Medial and hind legs dark brown. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in lateral view shorter than inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal, basal width 0.25 of tibial width, spur projection forming an acute angle from tibiae, tip shape rounded and pointed (Figure 41). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.75 tibial length.

Metasoma. T1 integument dark brown. T1 pubescence yellow or tawny with darker tips. T2-T4 integument reddish. T2-T4 pubescence dark brown, marginal band light yellow. T5 with mostly dark brown or black setae but with a marginal band of whitish pubescence, T6-T7 with dark setae. T7 pubescence on its rim black. Lateral areas of terga, pubescence similar to those on the disc (no white). S6 projections on the side (thorn-like spines) prominent.

Material studied: [1 Male-holotype] Brazil, Amazonas, Rio Parauari, iii-1937, C. Worontzow leg. (DZUP).

Distribution: Presently known from Brazil (Amazonas).

Comments: This bee differs from other *Ptiloglossa* species in having the malar area greater than 0.75 OD; clypeus without punctures or few scattered; interocellar distance greater than 1.0 OD; ocellocular distance equal to 0.67 OD; ocelloccipital distance greater than 1.5 OD; outer hind tibial spur basal area rounded, width 0.25 of tibiae, projected forming an acute angle from tibiae, tip shape rounded and pointed.

Ptiloglossa xanthotricha Moure

Ptiloglossa xanthotricha Moure, 1945: 161.

Holotype: Male, from Brazil, Goiás, Goiânia, 'Campinas' (DZUP).

Re-description:

Male. Body length 15 mm, forewing length 14.5 mm. Head. Mandibles light brown with pointed dark reddish apex. Preapical tooth apex well separated and pointed. Malar area, length around 0.5 OD. Labrum and clypeus yellow. Labrum smooth. Clypeus projected beyond the face and flattened on the disc, without punctures or few scattered. Paraocular area pubescence light yellow. Supraclypeal area integument black, pubescence light yellow. Area between antennal socket and compound eye, pubescence same color as supraclypeal pubescence. Clypeoantennal distance equal to or shorter than

diameter of antennal socket. Interocellar distance equal to 1.0 OD, pubescence whitish or very light yellow, longer than 1.0 OD. Ocellocular distance equal to 0.67 OD.

Ocelloccipital distance equal to 1.0 OD. Compound eye at a distance equal to 1.25 OD from occipital margin. Vertex pubescence light yellow with darker tips. Genal area as wide as 0.5 eye width, with a line of short white setae close to the margin of the compound eye, followed by a group of yellow pubescence.

Mesosoma. Wings translucent yellow. Veins dark brown. Prestigma 2.5 longer than stigma. Tegulae tawny, transparent, fully covered by dense pubescence. Thorax and mesopleural pubescence tawny with darker tips. Scutum black. Scutellum dark brown (reddish). Propodeal triangle striate on the sides. Lateral surfaces of propodeum pubescence light yellow with darker tips. Venter pubescence completely yellow or tawny. Front, medial and hind legs light brown to yellow. Tarsi tawny. Apex hind femur pubescence with a patch of dark hairs. Outer hind tibial spur in lateral view shorter than inner tibial spur, basal area rounded, formed as a structure protruding from tibiae (normal), basal width 0.33 of tibial width, spur projection curving downward, tip shape with a long and slender projection flagellum-like (can be broken) (Figure 42). Inner hind tibial spur with many minute dents (not too prominent). Hind basitarsus as long as 0.67 of tibial length.

Metasoma. T1 integument black. T2-T4 integument reddish. T1-T4 pubescence light yellow. T5-T7 pubescence with mostly light brown setae intermixed with dark hairs being the latter more abundant on T7. T7 pubescence on its rim yellow (tawny). Lateral areas of terga, pubescence similar to those on the disc (not white or black). S6 projections on the side (thorn-like spines) prominent.

Material studied: [1 Male-holotype] Brazil, Goiás, Goiânia, Campinas, 1935, R. Spitz leg. (DZUP). [1 Male] Brasil, Sao Paulo, Riberao Preto, Jardim Recreio, 10-iii-1994, C.G. Froehlich leg. (MZUSP).

Distribution: Presently known from Brazil (Goiás, Minas Gerais, Sao Paulo).

Comments: This species is similar to *P. stafuzzai* but differs by having the interocellar distance equal to 1.0 OD; outer hind tibial spur basal area rounded, formed as a structure protruding from tibiae curving downward, basal width 0.33 of tibial width, tip shape with a long and slender projection flagellum-like; T1-T4 pubescence light yellow, T5-T7 pubescence mostly light brown hairs intermixed with dark pubescence, being the latter more abundant in T7.



Figures 7 – 12. Hind tibial spur of males: **7.** *Ptiloglossa amita*; **8.** *P. arizonensis*; **9.** *P. concinna*; **10.** *P. costaricana*; **11.** *P. cyaniventris*; **12.** *P. decipiens*.



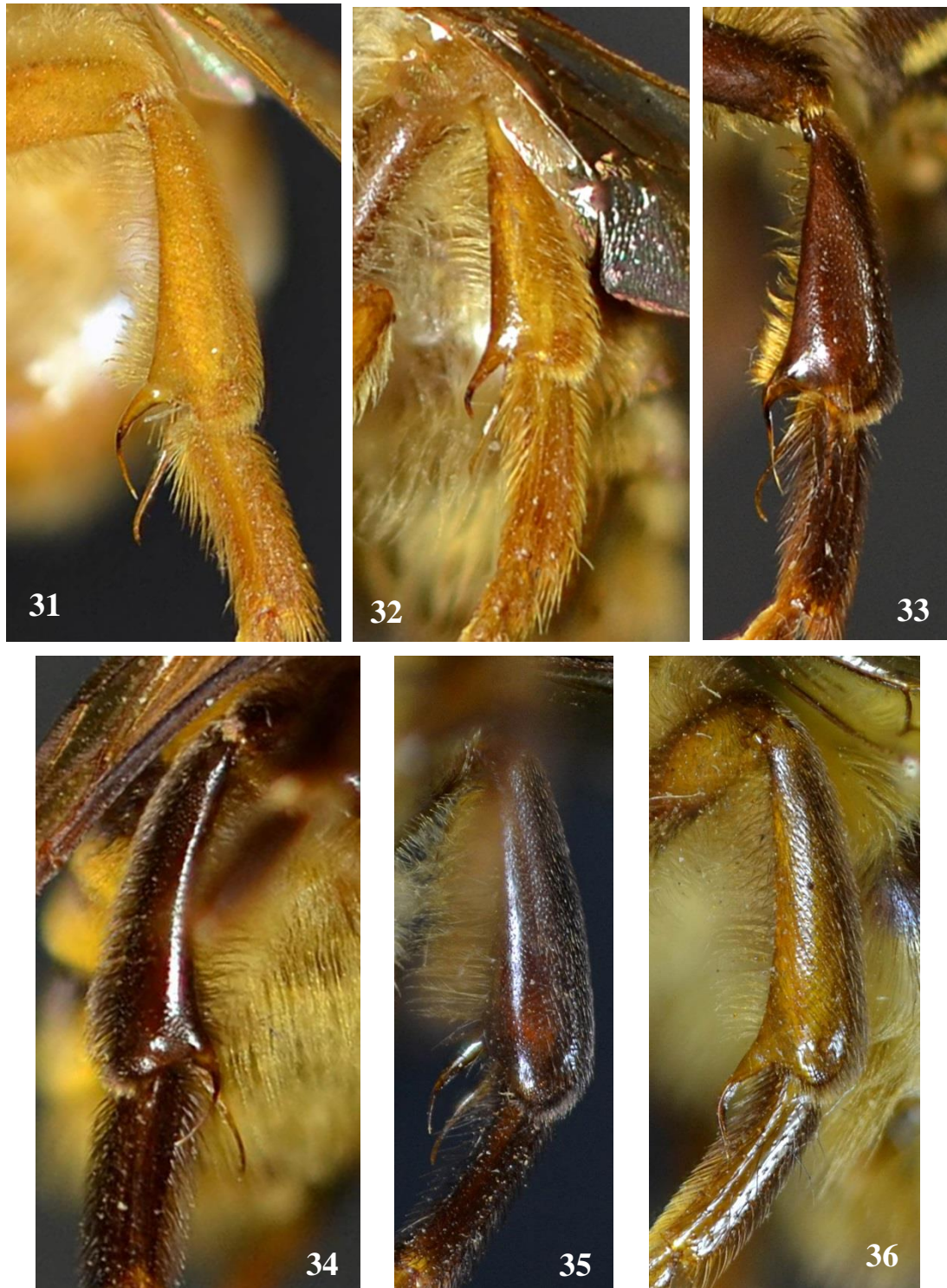
Figures 13 – 18. Hind tibial spur of males: **13.** *Ptiloglossa decora*; **14.** *P. dubia*; **15.** *P. ducalis*; **16.** *P. eximia*; **17.** *P. fulvopilosa*; **18.** *P. generosa*.



Figures 19 – 24. Hind tibial spur of males: **19.** *Ptiloglossa giacomellii*; **20.** *P. goffergei*; **21.** *P. hemileuca*; **22.** *P. hoplopoda*; **23.** *P. immixta*; **24.** *P. jonesi*.



Figures 25 – 30. Hind tibial spur of males: **25.** *Ptiloglossa lanosa*; **26.** *P. latecalcarata*; **27.** *P. lucernarum*; **28.** *P. matutina*; **29.** *P. mexicana*; **30.** *P. olivacea*.



Figures 31 – 36. Hind tibial spur of males: **31.** *Ptiloglossa ollantayi*; **32.** *P. pallida*; **33.** *P. pretiosa*; **34.** *P. psednozona*; **35.** *P. rugata*; **36.** *P. stafuzzai*.



Figures 37 – 42. Hind tibial spur of males: **37** *Ptiloglossa styphlaspis*; **38.** *P. tenuimarginata*; **39.** *P. thoracica* **40.** *P. torquata*; **41.** *P. xanthorhina*; **42.** *P. xanthotricha*.

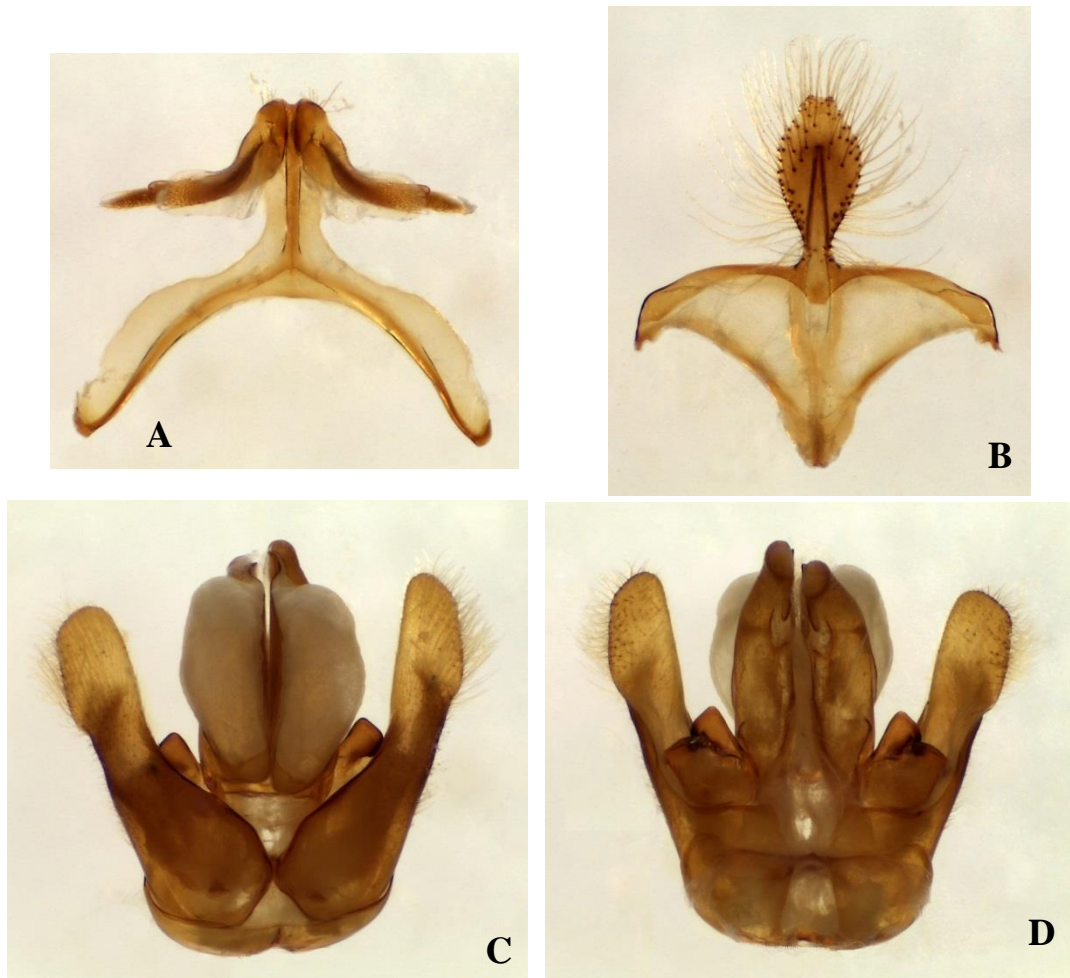


Figure 43. Terminalia *Ptiloglossa arizonensis* male: **A.** Metasomal sternum 7 (S7), ventral view; **B.** Metasomal sternum 8 (S8), dorsal view; **C.** Genitalia dorsal view; **D.** Genitalia ventral view.

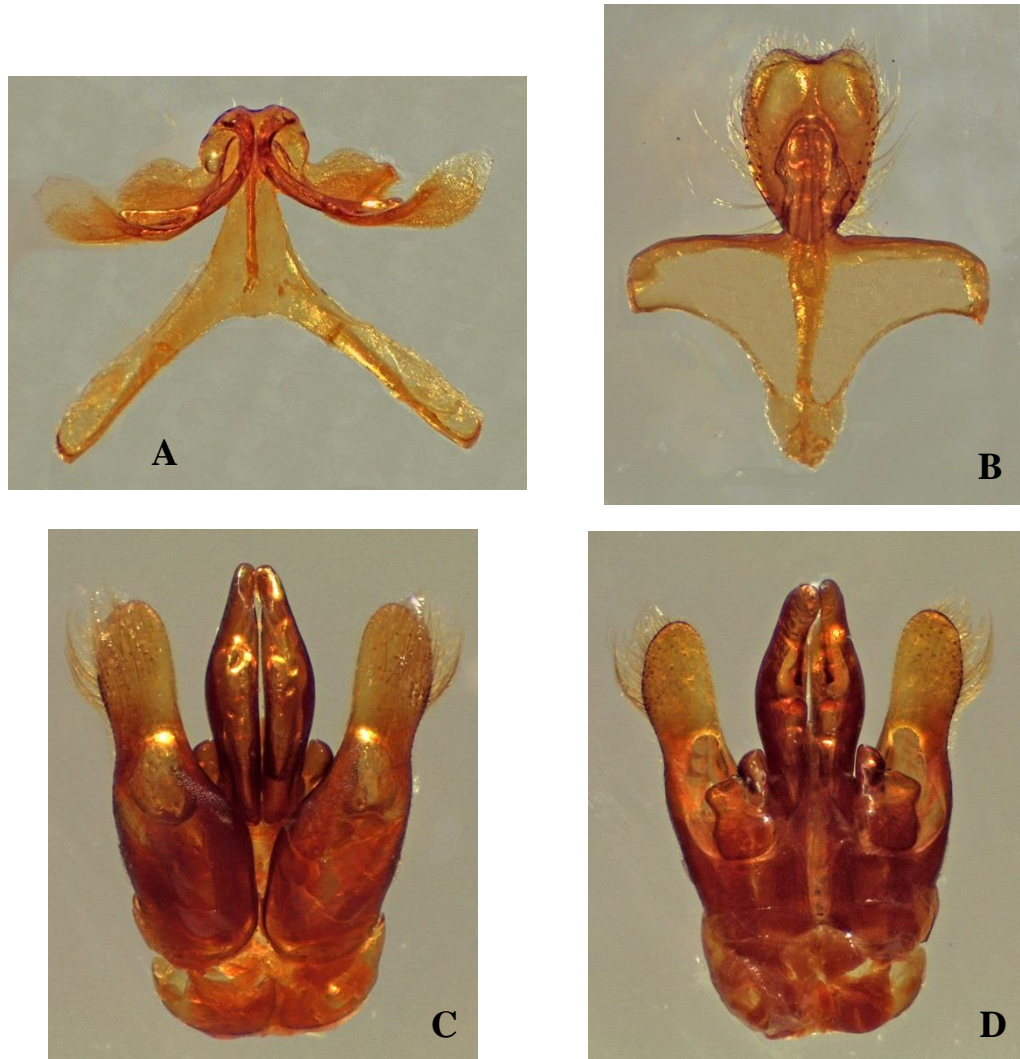


Figure 44. Terminalia *Ptiloglossa cyaniventris* male: **A.** Metasomal sternum 7 (S7), ventral view; **B.** Metasomal sternum 8 (S8), dorsal view; **C.** Genitalia dorsal view; **D.** Genitalia ventral view.

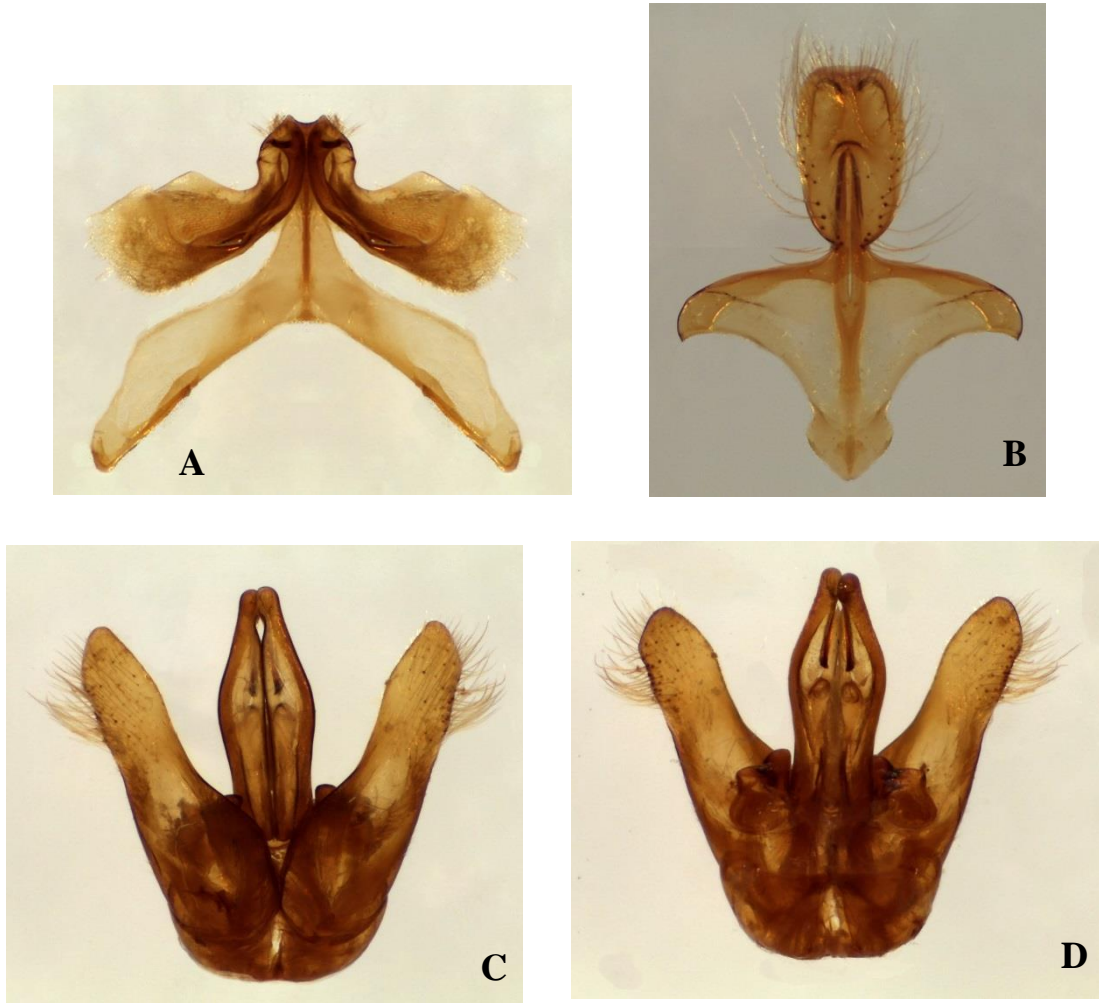


Figure 45. Terminalia *Ptiloglossa ducalis* male: **A.** Metasomal sternum 7 (S7), ventral view; **B.** Metasomal sternum 8 (S8), dorsal view; **C.** Genitalia dorsal view; **D.** Genitalia ventral view.

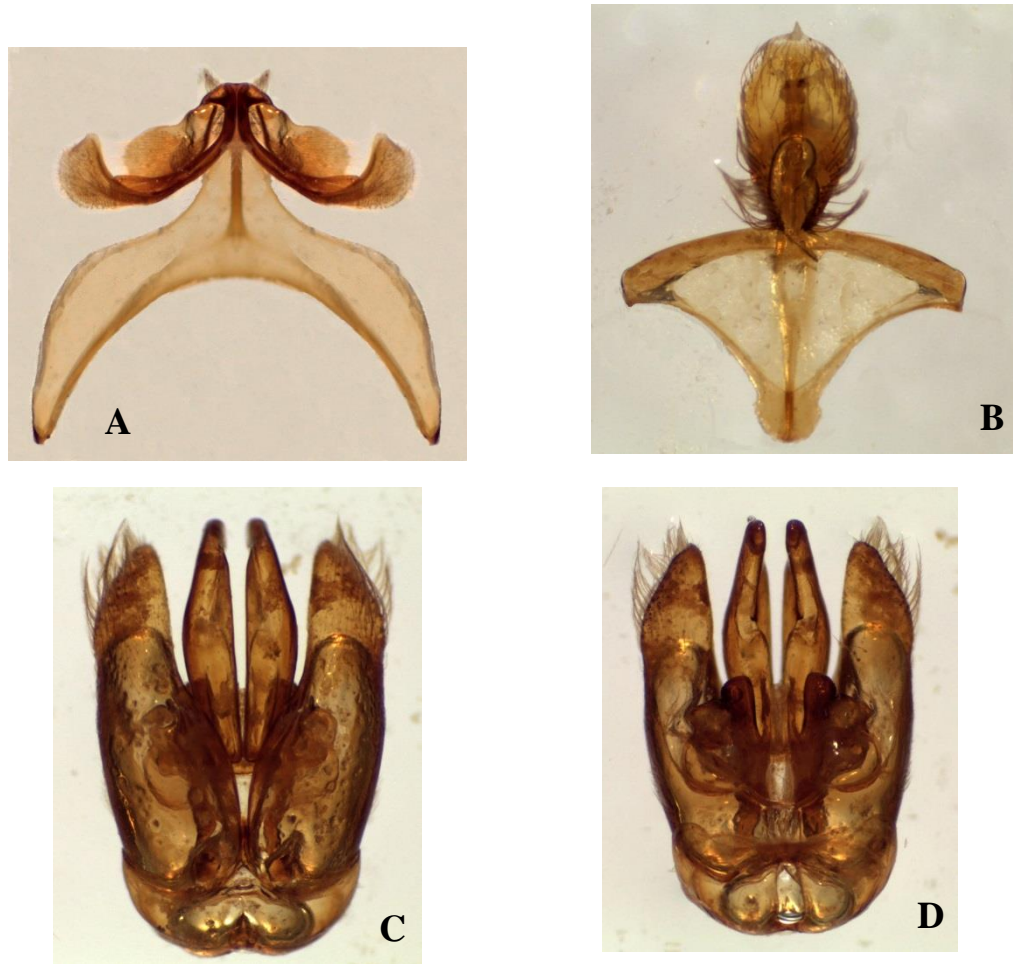


Figure 46. Terminalia *Ptiloglossa generosa* male: **A.** Metasomal sternum 7 (S7), ventral view; **B.** Metasomal sternum 8 (S8), dorsal view; **C.** Genitalia dorsal view; **D.** Genitalia ventral view.

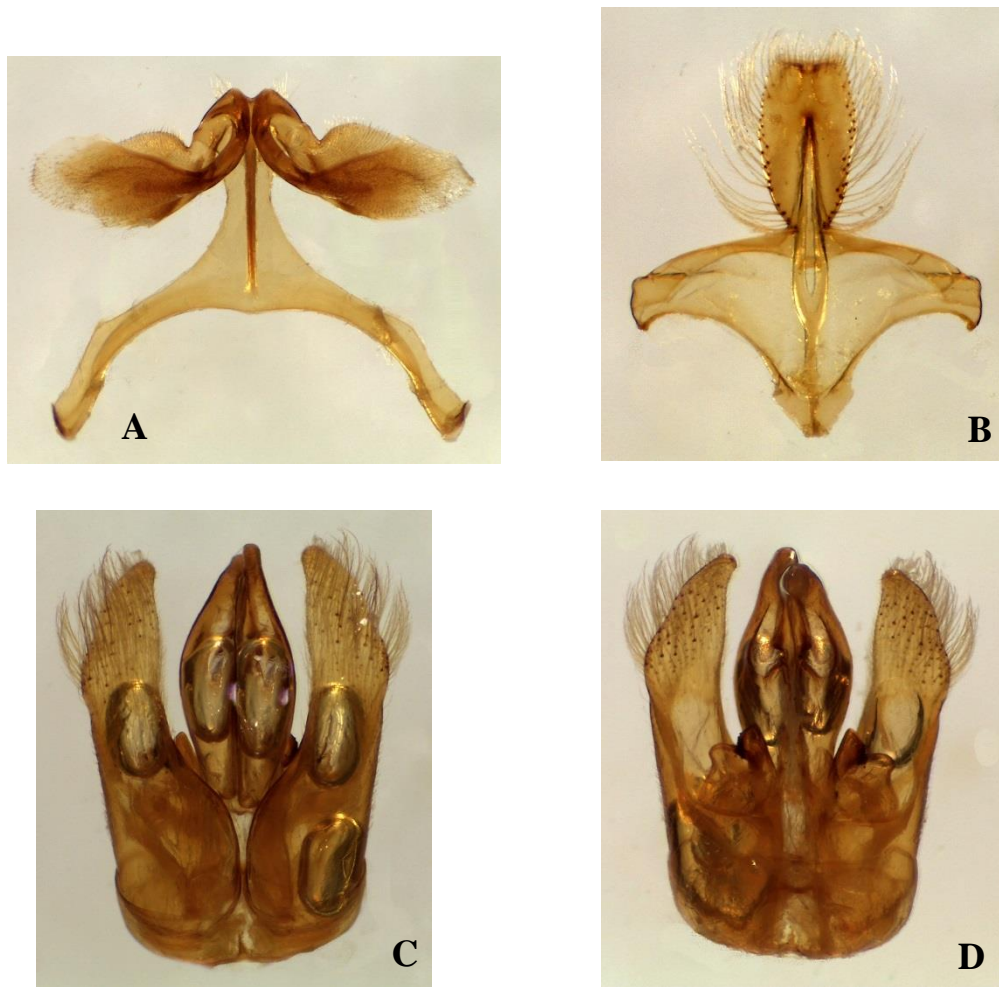


Figure 47. Terminalia *Ptiloglossa mexicana* male: **A.** Metasomal sternum 7 (S7), ventral view; **B.** Metasomal sternum 8 (S8), dorsal view; **C.** Genitalia dorsal view; **D.** Genitalia ventral view.

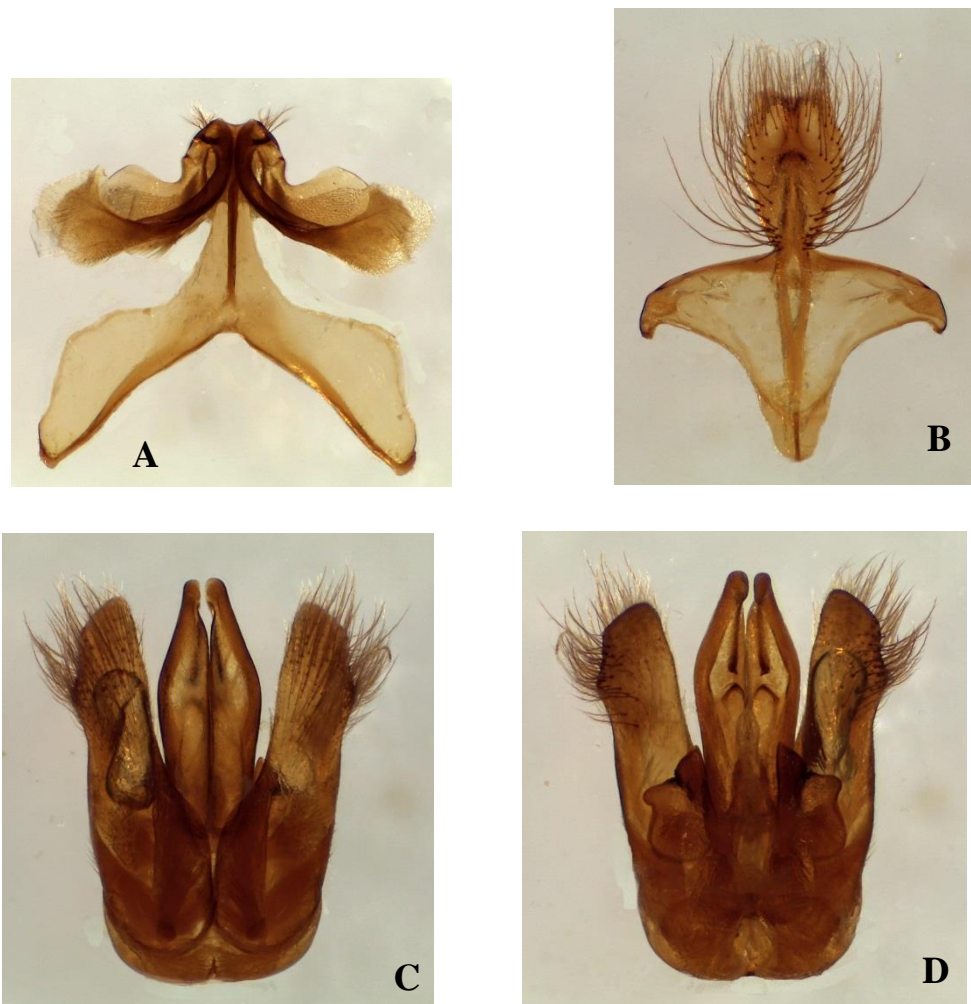


Figure 48. Terminalia *Ptiloglossa olivacea* male: **A.** Metasomal sternum 7 (S7), ventral view; **B.** Metasomal sternum 8 (S8), dorsal view; **C.** Genitalia dorsal view; **D.** Genitalia ventral view.

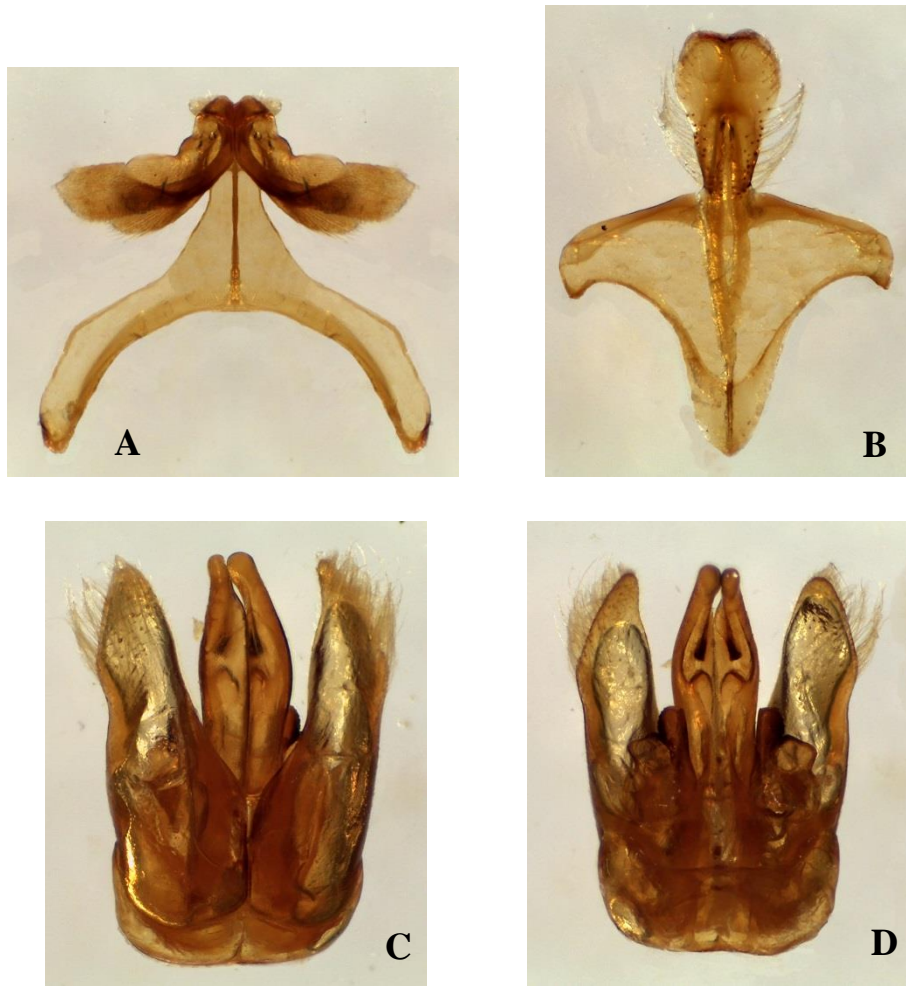


Figure 49. Terminalia *Ptiloglossa pallida* male: **A.** Metasomal sternum 7 (S7), ventral view; **B.** Metasomal sternum 8 (S8), dorsal view; **C.** Genitalia dorsal view; **D.** Genitalia ventral view.

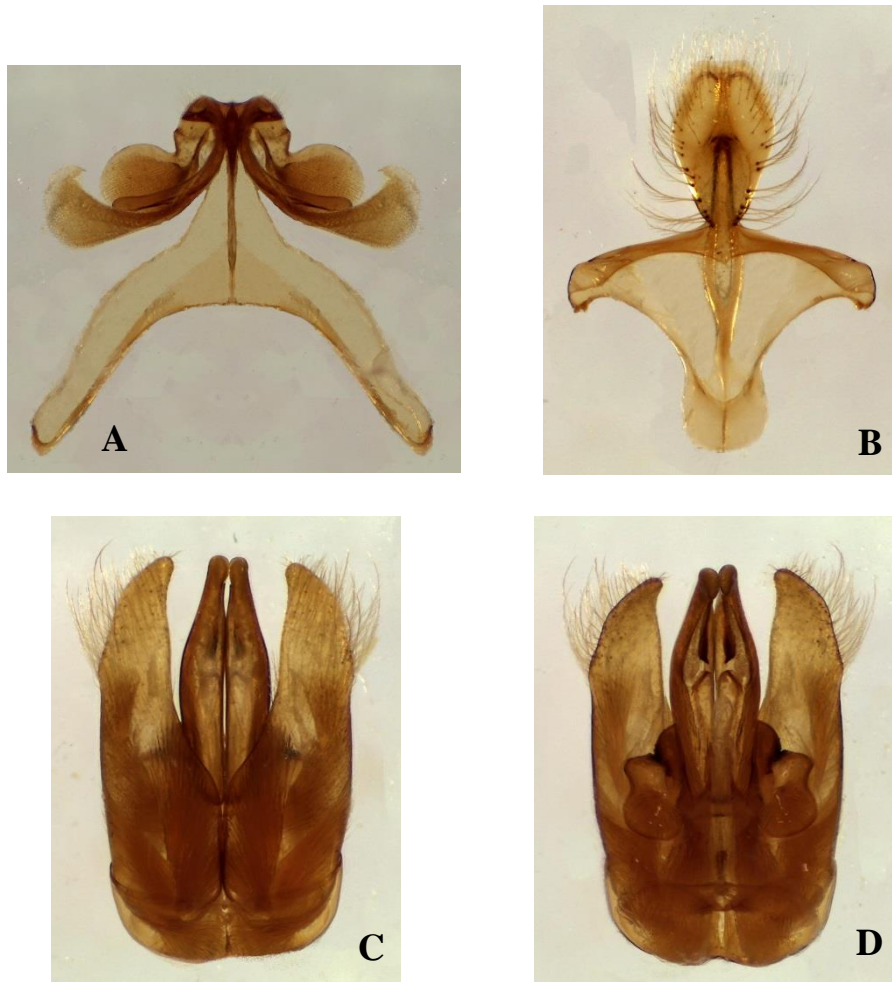


Figure 50. Terminalia *Ptiloglossa pretiosa* male: **A.** Metasomal sternum 7 (S7), ventral view; **B.** Metasomal sternum 8 (S8), dorsal view; **C.** Genitalia dorsal view; **D.** Genitalia ventral view.



Figure 51. Terminalia *Ptiloglossa tenuimarginata* male: **A.** Metasomal sternum 7 (S7), ventral view; **B.** Metasomal sternum 8 (S8), dorsal view; **C.** Genitalia dorsal view; **D.** Genitalia ventral view.

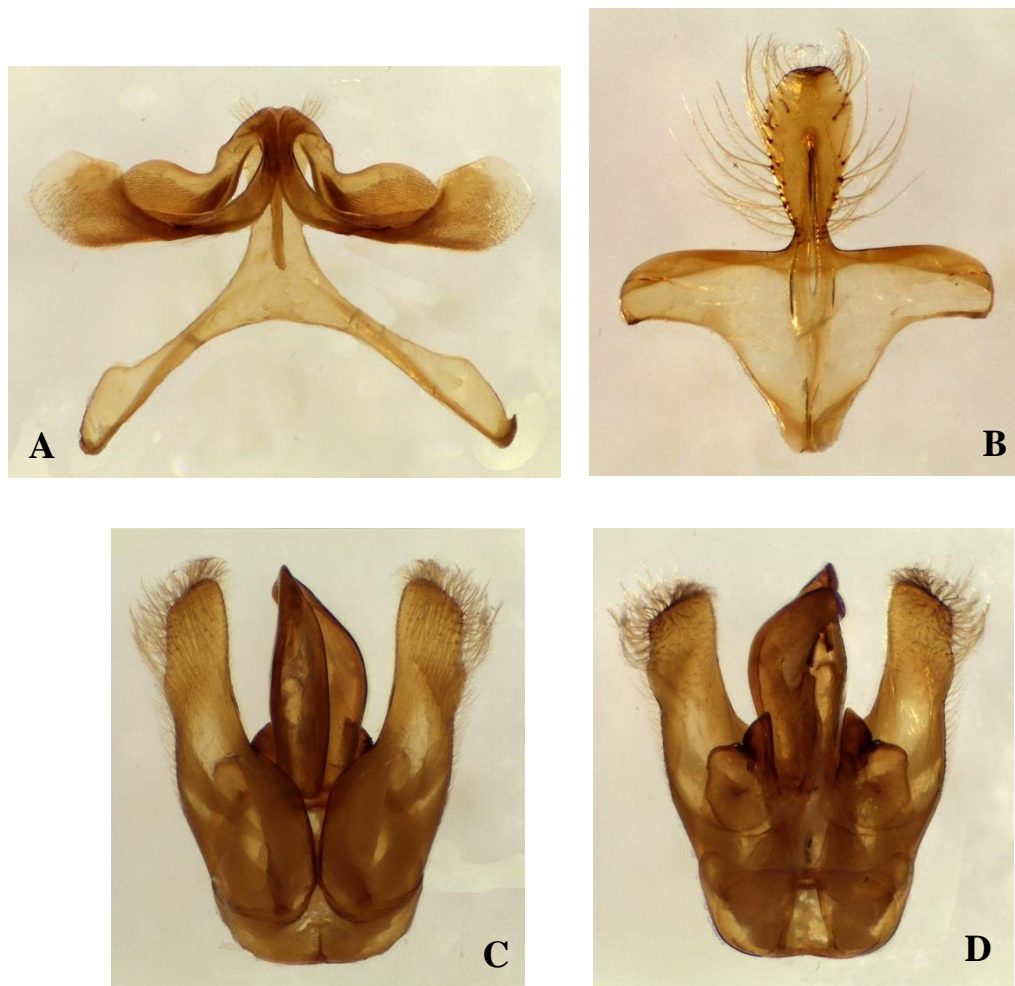


Figure 52. Terminalia *Ptiloglossa thoracica* male: **A.** Metasomal sternum 7 (S7), ventral view; **B.** Metasomal sternum 8 (S8), dorsal view; **C.** Genitalia dorsal view; **D.** Genitalia ventral view.



Figure 53. *Ptiloglossa aculeata* type, female. **A.** Lateral view; **B.** Face.



Figure 54. *Ptiloglossa aenigmatica* type, female. **A.** Lateral view; **B.** Face.



Figure 55. *Ptiloglossa amita* male. **A.** Lateral view; **B.** Face.



Figure 56. *Ptiloglossa amita* female. **A.** Lateral view; **B.** Face.



Figure 57. *Ptiloglossa arizonensis* male. **A.** Lateral view; **B.** Face.



Figure 58. *Ptiloglossa arizonensis* female. **A.** Lateral view; **B.** Face.



Figure 59. *Ptiloglossa buchwaldi* female. **A.** Lateral view; **B.** Face.



Figure 60. *Ptiloglossa concinna* male. **A.** Lateral view; **B.** Face.



Figure 61. *Ptiloglossa costaricana* male. **A.** Lateral view; **B.** Face.



Figure 62. *Ptiloglossa costaricana* type, female. **A.** Lateral view; **B.** Face.

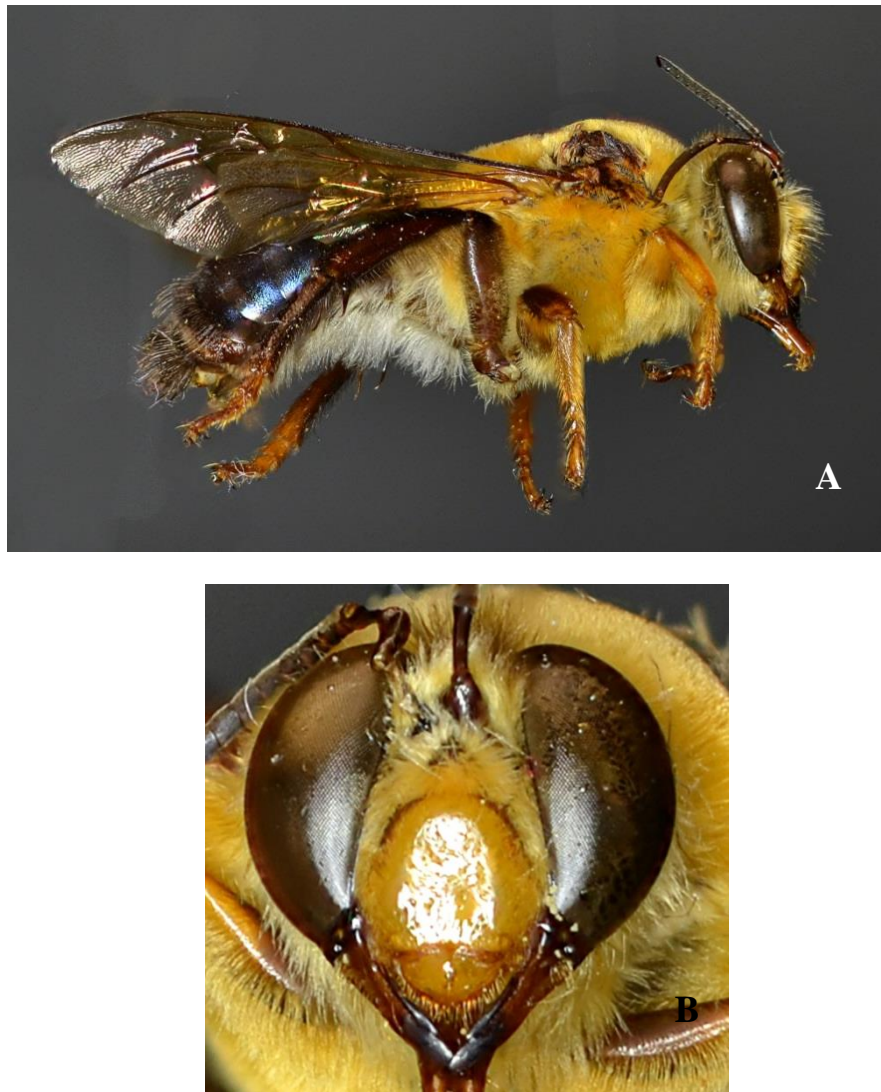


Figure 63. *Ptiloglossa cyaniventris* type, male. **A.** Lateral view; **B.** Face.



Figure 64. *Ptiloglossa cyaniventris* female. **A.** Lateral view; **B.** Face.



Figure 65. *Ptiloglossa decipiens* type, male. **A.** Lateral view; **B.** Face.



Figure 66. *Ptiloglossa decora* male. **A.** Lateral view; **B.** Face.

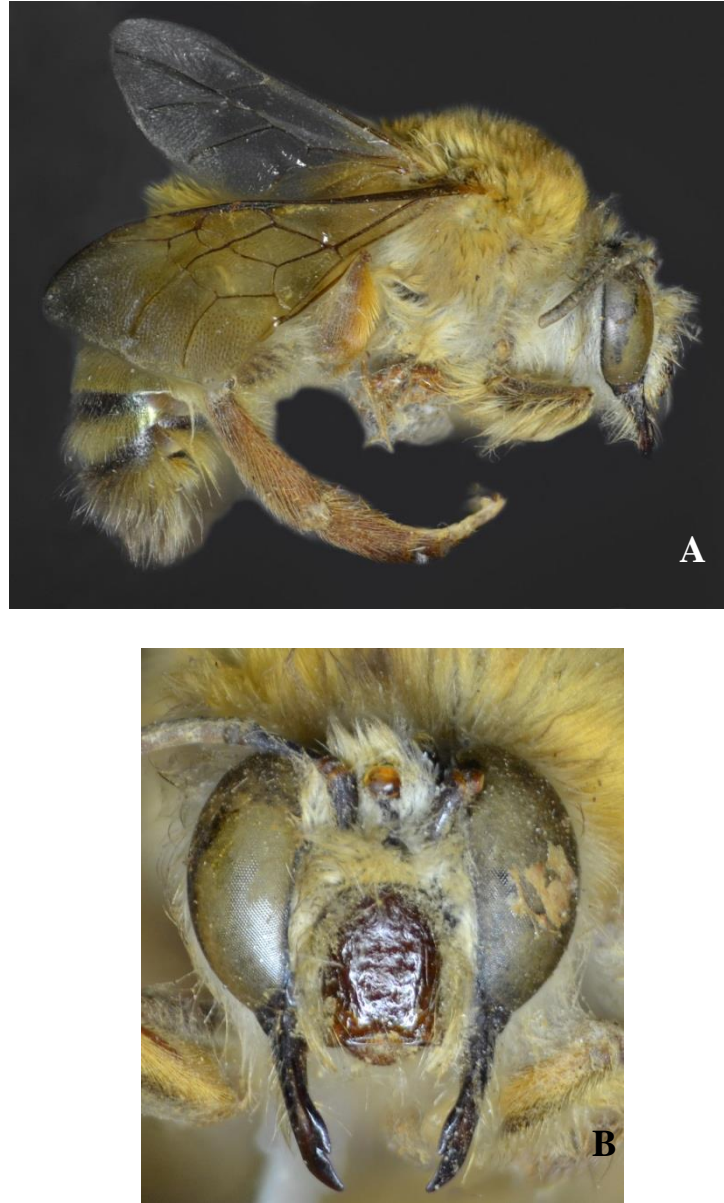


Figure 67. *Ptiloglossa dubia* male. **A.** Lateral view; **B.** Face.



Figure 68. *Ptiloglossa dubia* female. **A.** Lateral view; **B.** Face.



Figure 69. *Ptiloglossa ducalis* male. **A.** Lateral view; **B.** Face.



Figure 70. *Ptiloglossa eximia* male. **A.** Lateral view; **B.** Face.

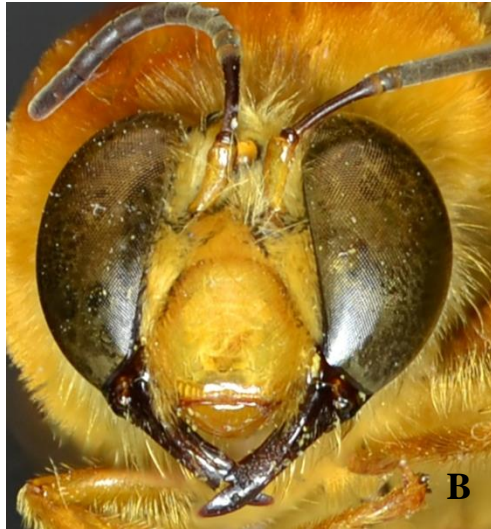


Figure 71. *Ptiloglossa giacomellii* female. **A.** Lateral view; **B.** Face.

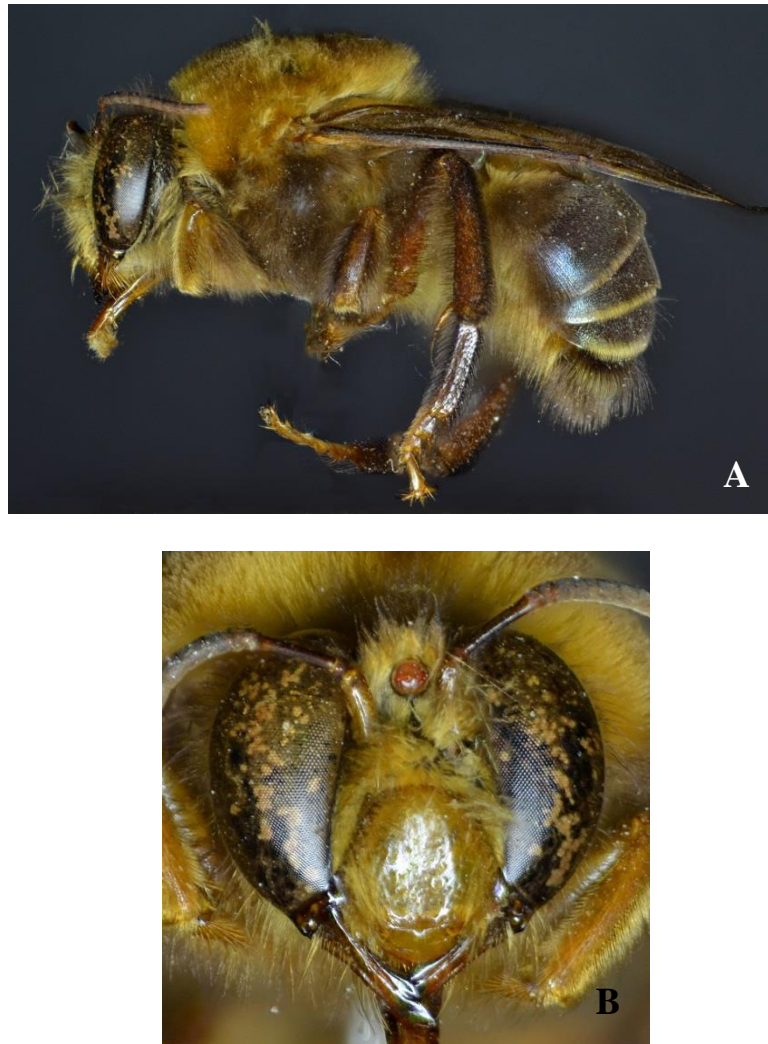


Figure 72. *Ptiloglossa goffergei* male. **A.** Lateral view; **B.** Face.



Figure 73. *Ptiloglossa hemileuca* male. **A.** Lateral view; **B.** Face.

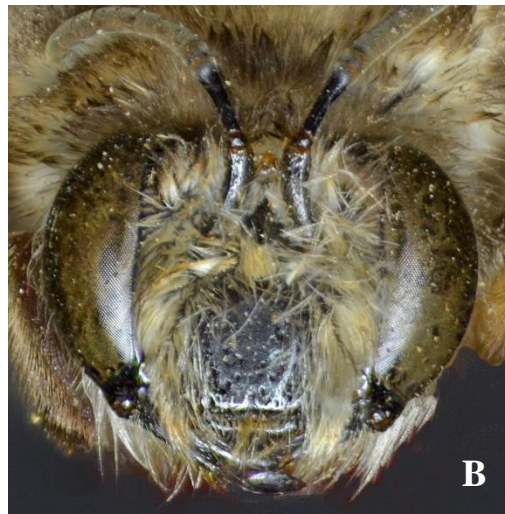


Figure 74. *Ptiloglossa hemileuca* female. **A.** Lateral view; **B.** Face.



Figure 75. *Ptiloglossa hondurasica* female. **A.** Lateral view; **B.** Face.



Figure 76. *Ptiloglossa hoplopoda* female. **A.** Lateral view; **B.** Face.



Figure 77. *Ptiloglossa immixta* female. **A.** Lateral view; **B.** Face.



Figure 78. *Ptiloglossa jonesi* male. **A.** Lateral view; **B.** Face.



Figure 79. *Ptiloglossa jonesi* female. **A.** Lateral view; **B.** Face.



Figure 80. *Ptiloglossa lanosa* female. **A.** Lateral view; **B.** Face.



Figure 81. *Ptiloglossa latecalcarata* male. **A.** Lateral view; **B.** Face.

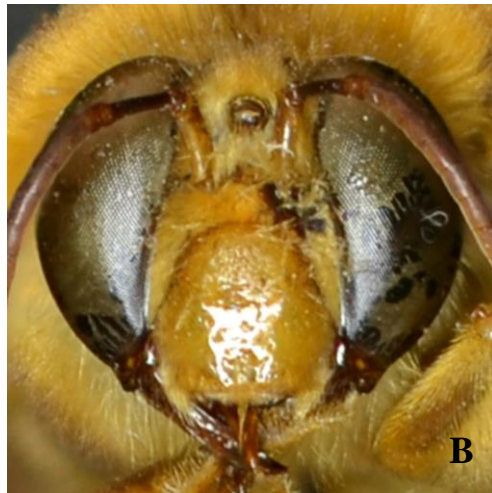


Figure 82. *Ptiloglossa lucernarum* male. **A.** Lateral view; **B.** Face.

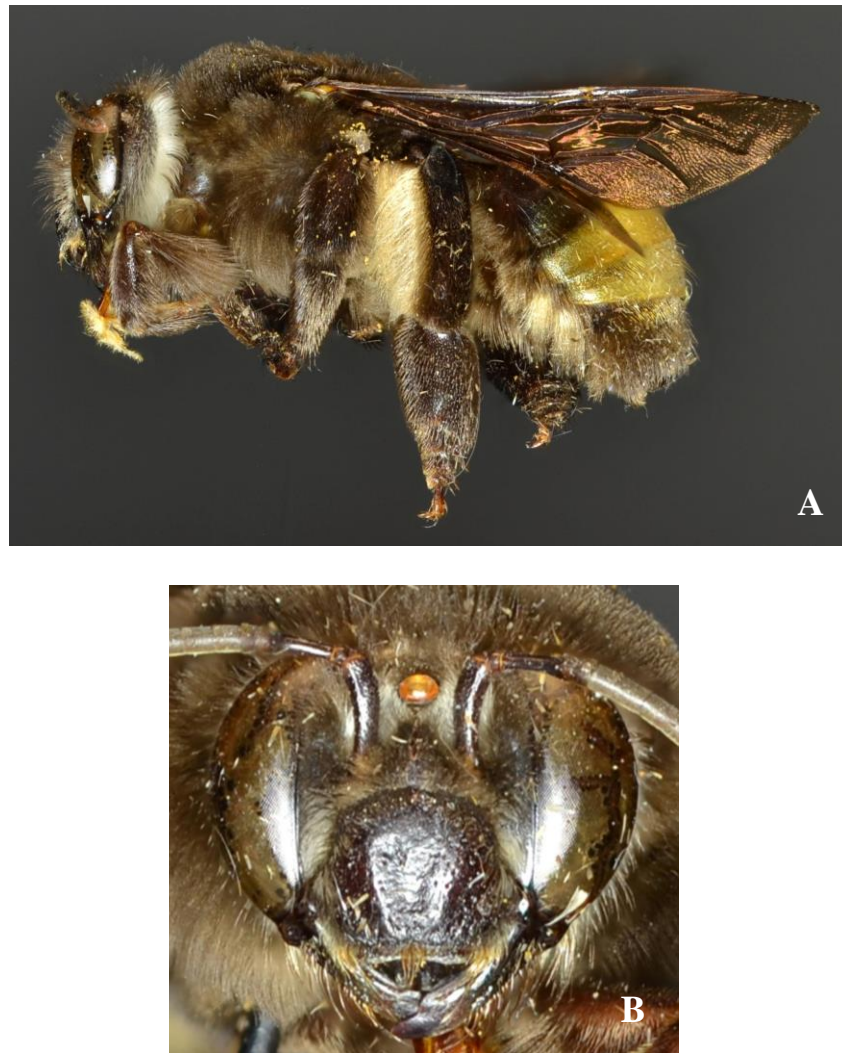


Figure 83. *Ptiloglossa lucernarum* female. **A.** Lateral view; **B.** Face.



Figure 84. *Ptiloglossa magretti* female. **A.** Lateral view; **B.** Face.



Figure 85. *Ptiloglossa matutina* male. **A.** Lateral view; **B.** Face.



Figure 86. *Ptiloglossa matutina* female. **A.** Lateral view; **B.** Face.



Figure 87. *Ptiloglossa mexicana* male. **A.** Lateral view; **B.** Face.



Figure 88. *Ptiloglossa mexicana* female. **A.** Lateral view; **B.** Face.



Figure 89. *Ptiloglossa olivacea* male. **A.** Lateral view; **B.** Face.

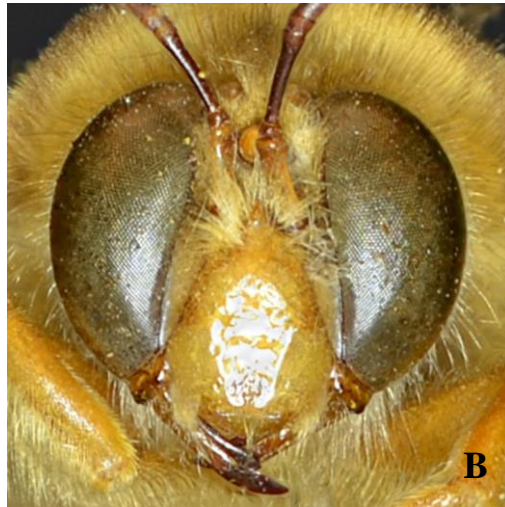


Figure 90. *Ptiloglossa ollantayi* male. **A.** Lateral view; **B.** Face.



Figure 91. *Ptiloglossa pallida* male. **A.** Lateral view; **B.** Face.



Figure 92. *Ptiloglossa pretiosa* male. **A.** Lateral view; **B.** Face.



Figure 93. *Ptiloglossa pretiosa* female. **A.** Lateral view; **B.** Face.



Figure 94. *Ptiloglossa psednozona* male. **A.** Lateral view; **B.** Face.



Figure 95. *Ptiloglossa rugata* male. **A.** Lateral view; **B.** Face.



Figure 96. *Ptiloglossa rugata* female. **A.** Lateral view; **B.** Face.



Figure 97. *Ptiloglossa stafuzzai* male. **A.** Lateral view; **B.** Face.



Figure 98. *Ptiloglossa styphlaspis* male. **A.** Lateral view; **B.** Face.



Figure 99. *Ptiloglossa thoracica* male. **A.** Lateral view; **B.** Face.



Figure 100. *Ptiloglossa thoracica* female. **A.** Lateral view; **B.** Face.



Figure 101. *Ptiloglossa torquata* male. **A.** Lateral view; **B.** Face.



Figure 102. *Ptiloglossa trichrootricha* female. **A.** Lateral view; **B.** Face.



Figure 103. *Ptiloglossa willinki* female. **A.** Lateral view; **B.** Face.



Figure 104. *Ptiloglossa xanthorhina* male. **A.** Lateral view; **B.** Face.



Figure 105. *Ptiloglossa xanthotricha* male. **A.** Lateral view; **B.** Face.

Morphological Species Groups

Six groups based on morphological characters are defined using integument color T2-T4 and pubescence color on tergite discs (without considering margins) of males.

With this grouping identification of *Ptiloglossa* species is facilitated. Those species with associated sexes, notes on females are added. For those species with only females known, specific notes are offered in each group.

Group 1: abdomen brown or yellow with yellow pubescence

P. matutina

P. pallida

P. ollantayi

P. thoracica (T2 integument brown reddish)

- Species with only females known:

P. aculeata

Note: female specimens with this abdominal characters are *P. tenuimarginata* (T4 pubescence dark); *P. mexicana* (T4 integument dark brown, T4 pubescence dark).

Group 2: abdomen brown or yellow with dark pubescence

P. aenigmatica

P. amita

P. eximia

P. tenuimarginata

- Species with only females known:

P. buchwaldi (T2 pubescence yellow)

Note: female specimens with these abdominal characters are *P. decipiens*

Group 3: abdomen black with dark pubescence

P. colombiana n. sp. (T4 pubescence yellow)

P. concinna

P. cyaniventris

P. psednozona

P. ducalis (T2 integument dark brown)

Note: female specimens with these abdominal characters are *P. cyaniventris*, *P.*

ducalis, *P. pretiosa*, and *P. tarsata*.

Group 4: abdomen black with yellow pubescence

P. costaricana

P. dubia

P. hemileuca

- Species with only females known:

P. hondurasica

P. magretti

P. trichrootricha

P. willinki

Note: female specimens with this abdominal characters are *P. arizonensis*, *P. chamelensis*, *P. jonesi*, *P. lucernarum* (T2 pubescence black with yellow apex), *P. matutina*, *P. rugata* (T2 pubescence black with yellow apex)

Group 5: abdomen dark brown (sometimes reddish) with yellow pubescence*P. arizonensis**P. decipiens**P. fulvopilosa**P. hoplopoda**P. immixta**P. jonesi**P. latecalcarata**P. xanthotricha* (T4 integument black)

Note: female specimens with this abdominal characters are *P. amita*, *P. eximia*, *P. dubia* (T2 integument lighter brown), *P. hemileuca*.

Group 6: abdomen dark brown (sometimes reddish) with dark brown pubescence*P. chamelensis**P. decora**P. generosa**P. giacomellii*

P. goffergei

P. lanosa (T2 integument lighter brown; wide yellow margins)

P. lucernarum

P. mexicana

P. olivacea

P. pretiosa

P. rugata

P. stafuzzai

P. styphlaspis

P. tarsata

P. tomentosa

P. torquata

P. xanthorhina

Note: female specimens with this abdominal characters are *P. aenigmatica* (T2 integument black), *P. costaricana*, *P. thoracica*.

Keys to *Ptiloglossa* species

Separate keys are provided to the males and females to reduce confusion and ease identification. The following keys do not consider integumental coloration or abdominal pubescence as the main characters to identify *Ptiloglossa* species, this simplifies the keys and avoids confusion with traits otherwise useful for phylogenetic analysis. Thus, the groups defined above are not delimited in the keys. However in some cases coloration is used to separate species or narrower groups of species. The keys do present new

structural characters as presented above for purposes of identification of most male and female *Ptiloglossa* species.

Key to males

1. Clypeus not projected beyond the face, rounded on the disc **2**
 - Clypeus projected beyond the face (evenly or only on upper portion), flattened or rounded on the disc **8**
2. Labrum yellow (tawny); outer portion of hind tibiae without an immobile spur fused close to the apex (spur absent) ***P.tarsata***
 - Labrum brown (can be reddish); outer portion of hind tibiae with an immobile spur fused close to the apex **3**
3. Inner hind tibial spur serrate (with small teeth) **4**
 - Inner hind tibial spur with many minute dents (not prominent) **5**
4. Outer hind tibial spur (in lateral view) shorter than inner tibial spur, basal area bulbous as wide as 0.33 of tibial width, tip shape bulbous and wider than the tip of the inner tibial spur; T1-T4 integument dark brown, T1 pubescence tawny, T2-T4 light yellow, T5 with mostly dark brown or black hairs but with a marginal band of whitish hairs, T6-T7 with dark hairs ***P. hoplopoda***
 - Outer hind tibial spur (in lateral view) as long as inner tibial spur, basal area rounded less than 0.25 tibial width, tip shape rounded, concave but not flattened; T1-T2 integument reddish, T3-T4 integument yellow, T1-T4 pubescence tawny, T5 to T7 pubescence tawny ***P. thoracica***
5. Interocellar distance less than or equal to 1.0 OD; ocellocular distance less or equal to

- 0.5 OD; outer hind tibial spur tip bulbous and wider than the tip of the inner tibial spur **6**
- Interocellar distance greater than 1.0 OD; ocellocular distance greater or equal to 0.67 OD **7**
6. Clypeus brown-reddish; labrum with one round medial projection; interocellar distance equal to 1.0 OD; outer hind tibial spur basal area, tip shape bulbous and wider than the tip of the inner tibial spur; T5- T7 pubescence completely dark yellow (tawny)..... ***P. arizonensis***
- Clypeus yellow; labrum smooth; interocellar distance less than 1.0 OD; outer hind tibial spur basal area laterally flattened, curving downward, tip shape bulbous and wider than the tip of the inner tibial spur; T5 to T7 pubescence mostly black hairs but those on the margin golden yellow..... ***P. jonesi***
7. Labrum smooth; ocelloccipital distance greater than 1.5 OD; thorax and mesopleura pubescence whitish with darker tips; outer hind tibial spur basal area rounded (normal), as wide as 0.25 of tibial width; T2-T4 pubescence on marginal area as yellow as those on the disc (golden), T2-T4 without trichotrichia on the side ***P. hemileuca***
- Labrum with one round medial projection; ocelloccipital distance less than or equal to 1.5 OD; thorax and mesopleura pubescence tawny; outer hind tibial spur basal area bulbous, as wide as 0.33 of tibial width; T2-T4 pubescence on marginal area golden, T2-T4 with trichotrichia on the side ***P. immixta***
8. Outer hind tibial spur tip shape laterally flattened **9**
- Outer hind tibial spur tip shape with a long slender projection flagellum-like **12**

- Outer hind tibial spur tip shape rounded in any of this combinations: concave but not flattened, slightly concave or rounded and pointed **24**
- 9. Clypeus, scape and tegulae yellow; thorax pubescence (including axillae) tawny with darker tips; outer hind tibial spur basal width as wide as 0.5 tibial width **10**
- Clypeus, scape and tegulae dark brown (can be reddish); thorax pubescence black (including axillae) or mostly yellow with darker tips and axillae pubescence black; outer hind tibial spur basal width almost as wide as tibiae **11**
- 10. Ocelloccipital distance greater than 1.5 OD; compound eye reaching occipital margin; vertex pubescence tawny; propodeal triangle integument striate on the sides; T5 to T7 pubescence dark brown to black ***P. chamelensis***
- Ocelloccipital distance less than 1.0 OD; compound eye at a distance between 0.75 and 1.0 OD from occipital margin; vertex pubescence first half tawny, second half dark brown; propodeal triangle smooth; T5 to T7 pubescence tawny ***P. stafuzzai***
- 11. Labrum with one round medial projection; ocelloccipital distance greater than 1.5 OD; compound eye at a distance less than 0.5; vertex pubescence white (sometimes with dark brown apex); thorax pubescence black; mesopleura pubescence light yellow with tawny tips; inner hind tibial spur serrate; T1 pubescence whitish with dark brown tips ***P. concinna***
- Labrum smooth; ocelloccipital distance less than or equal to 1.5 OD; compound eye at a distance between 0.75 and 1.0 OD from occipital margin; vertex pubescence dark brown; thorax pubescence yellow with dark tips, axillae pubescence dark-brown to black; mesopleura pubescence black with whitish branches; inner hind tibial spur with many minute dents (not prominent); T1 pubescence yellow (or golden)

- *P. colombiana* n. sp.
12. Ocelloccipital distance greater than 1.5 OD **13**
- Ocelloccipital distance less than or equal to 1.0 OD **14**
 - Ocelloccipital distance greater 1.0 OD or equal to 1.5 OD **18**
13. Labrum and clypeus yellow; compound eye at a distance 0.33 OD from occipital margin; vertex pubescence white (sometimes with dark brown tips); wings translucent yellow; thorax pubescence tawny with darker tips; mesopleura pubescence light yellow with tawny tips; T1 pubescence whitish with dark brown tips; T5-T7 pubescence mostly whitish intermixed with some scattered dark brown hairs, the latter are closer to T7 apex *P. aenigmatica*
- Labrum dark brown; clypeus light brown; compound eye at a distance equal to 0.5 OD from occipital margin; vertex pubescence dark brown; wings translucent dark brown (almost black); thorax and mesopleural pubescence dark brown to black hairs with whitish; T1 pubescence dark brown; T5 to T7 pubescence completely dark brown to black *P. olivacea*
14. Clypeus surface smooth or with minute punctures..... **15**
- Clypeus surface rugose or with strong punctures suggesting a rugose surface
..... **17**
15. Upper part of clypeus projected beyond the face and flattened on the disc; supraclypeal area integument yellow; interocellar distance less than 1.0 OD
..... *P. ollantayi*
- Clypeus evenly projected beyond the face and flattened on the disc; supraclypeal area integument light brown to black; interocellar distance greater or equal to 1.0 OD.... **16**

16. Ocellocular distance equal to 0.25 OD; compound eye reaching the occipital margin; vertex pubescence dark brown; mesopleura pubescence whitish (or yellowish) with darker tips; propodeal triangle, integument smooth; T1 pubescence tawny; T2-T4 pubescence dark brown *P. goffergei*
- Ocellocular distance equal to 0.67 OD; compound eye at a distance greater than 1.0 OD from occipital margin; vertex pubescence light yellow with darker tips; mesopleura pubescence tawny with darker tips; propodeal triangle striate on the sides; T1-T4 pubescence light yellow *P. xanthotricha*
17. Ocellocular distance equal to 0.25 OD; vertex pubescence tawny with apical part dark brown; tegulae dark brown; thorax pubescence black being dark brown on the basal portion; mesopleural pubescence light yellow with tawny tips; T1 pubescence whitish; T5-T7 pubescence completely dark brown to black *P. ducalis*
- Ocellocular distance equal to 0.5 OD; vertex pubescence dark brown; tegulae tawny; thorax and mesopleural pubescence yellow with tawny tips (visible in lateral view); T1 pubescence yellow (or golden); T5-T7 pubescence mostly dark brown but with some whitish hairs on the sides or intermixed *P. styphlaspis*
18. Outer hind tibial spur basal width almost as wide as tibiae **19**
- Outer hind tibial spur basal width less than or equal to 0.5 of tibial width **20**
19. Clypeus with strong punctures sometimes suggesting a rugose surface; interocellar distance less than or equal to 1.0 OD; compound eye at a distance equal to 0.5 OD from occipital margin; outer hind tibial spur basal area bulbous with a flagellum-like projection almost parallel to margin of tibiae; abdomen pubescence tawny without distinctive pubescence on marginal bands *P. latecalcarata*

- Clypeus smooth or with minute punctures; interocellar distance greater than 1.0 OD; compound eye at a distance between 0.75 to 1.0 OD from occipital margin; outer hind tibial spur basal area laterally flattened with a flagellum-like projection forming an acute angle from tibia; T1 pubescence tawny, T2-T4 pubescence dark brown with marginal bands of light yellow pubescence, T5 with light yellow hairs intermixed with some scattered dark hairs; T6-T7 pubescence light yellow *P. tomentosa*
- 20. Outer hind tibial spur basal area rounded (normally protruding from tibiae) **21**
- Outer hind tibial spur basal area bulbous **22**
- 21. Labrum and clypeus yellow; clypeus with strong punctures sometimes suggesting a a rugose surface; interocellar distance greater than 1.0 OD; ocellocular distance less than 0.5 OD; wings translucent light brown; thorax pubescence tawny with darker tips; propodeal triangle with minute punctures; T1 pubescence yellow (or golden yellow), T2-T4 pubescence light yellow *P. lanosa*
- Labrum and clypeus dark brown; clypeus smooth or with few scattered punctures; interocellar distance equal to 1.0 OD; ocellocular distance equal to 0.5 OD; wings translucent dark brown (almost black); thorax pubescence black with a band of yellow pubescence in pronotum; propodeal triangle striate on the sides; T1 pubescence tawny, T2-T4 pubescence dark brown with a marginal band of whitish hairs only present in T4 *P. torquata*
- 22. Clypeus with strong punctures sometimes suggesting a rugose surface; compound eye at a distance greater or equal to 1.0 OD; hind femur apex with a patch of dark hairs; outer hind tibial spur as long as inner spur, basal width equal to 0.5 of tibial width; T5-T7 pubescence dark brown with some intermixed white hairs or at the

- sides..... *P. pretiosa*
- Clypeus smooth or with some few scattered punctures; compound eye at a distance less than 1.0 OD; hind femur apex pubescence same color than rest of femur; outer hind tibial spur shorter than inner spur, basal width shorter than 0.5 of tibial width; T5-T7 pubescence yellow **23**
23. Vertex pubescence first half tawny, second half dark brown; genal area as wide as 0.5 eye width; wings translucent yellow; propodeal triangle smooth; venter pubescence tawny; inner hind tibial spur with minute dents (not serrate); T4-T5 without trichotrichia *P. giacomellii*
- Vertex pubescence light yellow with darker tips; genal area less than 0.5 eye width; wings transparent (smoky); propodeal triangle with minute punctures; venter pubescence mostly white with a line of dark brown hairs giving continuation to those on mesepisternum; inner hind tibial spur serrate; T4-T5 with trichotrichia (a spot apparently without pubescence on the lateral side of disc) *P. psednozona*
24. Inner hind tibial spur serrate (well defined, slender dents) **25**
- Inner hind tibial spur with many minute dents (not prominent) **30**
25. Propodeal triangle striate on the sides or strongly rugose on basal portion **26**
- Propodeal triangle smooth or with minute punctures **27**
26. Ocelloccipital distance greater than 1.5 OD; vertex pubescence dark brown; genal area less than 0.5 eye width; propodeal triangle striate on the sides; hind basitarsus as long as 0.5 tibial length; abdomen integument metallic blue; T5-T7 pubescence dark brown to black *P. cyaniventris*
- Ocelloccipital distance less than or equal to 1.5 OD; vertex pubescence light yellow

- with darker tips; genal area as wide as 0.5 eye width; propodeal triangle strongly rugose on basal portion; hind basitarsus as long as 0.67 tibial length; abdomen integument not metallic blue; T5-T7 pubescence mostly dark brown but with some intermixed whitish hairs or at the sides *P. rugata*
27. Upper part of clypeus projected beyond the face and flattened on the disc; supraclypeal area integument light brown; ocellocular distance equal to 1.0 OD; propodeum lateral pubescence mixed: those close to thorax black, those close to abdomen yellow; outer hind tibial spur basal width equal to 0.5 of tibial width *P. fulvopilosa*
- Clypeus evenly projected beyond the face and flattened on the disc; supraclypeal area integument black; ocellocular distance less than 1.0 OD; propodeum lateral pubescence light yellow (sometimes with darker tips); outer hind tibial spur basal width less than 0.5 of tibial width)..... **28**
28. Labrum and clypeus brown; clypeus rugose; compound eye at a distance greater than or equal to 1.25 OD; genal area less than 0.5 eye width *P. dubia*
- Labrum and clypeus yellow; clypeus smooth or with few scattered punctures; compound eye at a distance less than or equal to 1.0 OD; genal area as wide as 0.5 eye width **29**
29. Labrum and clypeus yellow; interocellar distance less than 1.0 OD; ocellocular distance equal to 0.5 OD; ocelloccipital distance equal to 1.5 OD; compound eye at a distance between 0.75 and 1.0 OD from occipital margin; propodeal triangle smooth; outer hind tibial spur basal area rounded; T5-T7 pubescence completely dark brown to black *P. costaricana*

- Labrum dark brown, clypeus yellow; interocellar distance equal to 1.0 OD; ocellocular distance equal to 0.67 OD; ocelloccipital distance equal to 1.0 OD; compound eye at a distance equal to 0.5 OD from occipital margin; propodeal triangle with minute punctures; outer hind tibial spur basal area laterally flattened; T5 to T7 pubescence whitish intermixed with some scattered dark brown hairs, the latter are closer to T7 apex..... *P. decipiens*
- 30. Compound eye at a distance equal to 0.5 from occipital margin **31**
- Compound eye at a distance between 0.75 to 1.0 OD from occipital margin..... **34**
- Compound eye a distance greater than 1.0 OD from occipital margin **35**
- 31. Genal area less than 0.5 eye width; scutellum dark brown-reddish; venter pubescence tawny with darker tips or white at the base with dark brown apex **32**
- Genal area as wide as 0.5 eye width; scutellum black; venter pubescence yellow... **33**
- 32. Interocellar distance less than 1.0 OD; ocellocular distance equal to 0.25 OD; vertex pubescence first half tawny, second half dark brown; propodeal triangle striate on the sides, pubescence lateral sides of propodeum yellow on the basal half and black on the distal half; outer hind tibial spur tip rounded, slightly concave (like a spoon shape) and flattened; T1 pubescence yellow with darker tips; T2 to T4 pubescence on band area golden; T5 to T7 pubescence mostly black hairs but those on the margin golden-yellow..... *P. lucernarum*
- Interocellar distance equal to 1.0 OD; ocellocular distance equal to 0.5 OD; vertex pubescence dark brown; propodeal triangle smooth; pubescence lateral sides of propodeum whitish with dark brown tips; outer hind tibial spur tip rounded, concave but not flattened; T1 pubescence whitish with dark brown tips; T2 to T4 pubescence

- without marginal; T5 pubescence dark brown or black with a marginal band of whitish hairs, T6-T7 fully covered with dark pubescence *P. decora*
33. Clypeus projected beyond the face and flattened on the disc; interocellar distance less than 1.0 OD; apex hind femur pubescence with a patch of dark hairs; outer hind tibial spur projection forming a right angle from tibiae; T2-T4 pubescence on marginal area whitish; T5-T7 pubescence mostly dark brown but with some whitish hairs on the sides or intermixed *P. eximia*
- Clypeus upper part projected beyond the face and flattened on the disc; interocellar distance equal to 1.0 OD; apex hind femur pubescence same color than other; outer hind tibial spur projection almost parallel to margin of tibiae; T2-T4 pubescence on marginal area golden; T5-T7 pubescence mostly whitish but intermixed with some scattered dark brown hairs, the latter are closer to T7 apex..... *P. mexicana*
34. Interocellar distance equal to 1.0 OD; ocellocular distance equal to 0.25 OD; ocelloccipital distance equal to 1.0 OD; vertex pubescence yellow; outer hind tibial spur basal area bulbous, tip shape rounded, concave (like a spoon shape) and flattened; T1 pubescence yellow, T2-T4 pubescence dark brown with marginal band of whitish setae, T4 with dark brown pubescence and some orange setae restricted to the lateral part of tergite; T5 to T7 pubescence mostly whitish but intermixed with some scattered dark brown hairs, the latter are closer to T7 apex *P. amita*
- Interocellar distance greater than 1.0 OD; ocellocular distance equal to 0.5 OD; ocelloccipital distance equal to 1.5 OD; vertex pubescence dark brown; outer hind tibial spur basal area rounded, tip shape rounded, concave but not flattened; T1-T4 pubescence light yellow without marginal band; T5 to T7 pubescence completely

- dark brown to black..... *P. matutina*
35. Malar area less than 0.5 OD; interocellar distance equal to 1.0 OD; ocelloccipital distance less than or equal to 1.0 OD; tegulae dark brown; outer hind tibial spur basal area laterally flattened..... *P. generosa*
- Malar area greater than 0.5 OD; interocellar distance greater than 1.0 OD; ocelloccipital distance greater than 1.0 OD; tegulae yellow; outer hind tibial spur basal area rounded protruding from tibiae (normal) **36**
36. Ocellocular distance equal to 0.5 OD; genal area less than 0.5 eye width; mesopleura pubescence white with tawny tips; apex hind femur pubescence same color than the rest; outer hind tibial spur tip shape rounded, concave but not flattened; T1-T4 pubescence golden-yellow without marginal bands of pubescence, T5-T7 pubescence tawny..... *P. pallida*
- Ocellocular distance equal to 0.67 OD; genal area wider or equal to 0.5 eye width; mesopleura pubescence tawny with darker tips; apex hind femur pubescence with a patch of dark hairs; outer hind tibial spur tip shape rounded and pointed; T1 pubescence yellow with darker tips, T2-T4 pubescence dark brown with a marginal band of light yellow pubescence, T5 with mostly dark brown to black pubescence but with a marginal band of whitish hairs, T6-T7 pubescence dark brown to black
..... *P. xanthorhina*

Key to females

1. Interocellar distance greater than 1.0 OD 2
 - Interocellar distance less than or equal to 1.0 OD..... 8

2. Clypeus with minute punctures or with few strong punctures (getting close to clypeolabral margin)..... 3
 - Clypeus rugose-striate or with strong punctures sometimes suggesting a rugose surface..... 5

3. Preapical teeth not to prominent (almost not differentiated); clypeus brown-reddish; wings translucent yellow, veins brown; scutellum dark brown (reddish); venter pubescence light yellow; T1 integument brown; T2-T6 pubescence yellow
 - *P. aculeata*
 - With two differentiated and pointed teeth, clypeus black; wings translucent dark brown (almost black), veins black; scutellum black; venter pubescence black with white or brown branches; T1 integument black; T2-T6 pubescence black (T4 with some whitish pubescence on the margin or at the sides) 4

4. Malar area almost 1.0 OD; labrum striate; ocellocular distance equal to or greater than 1.0 OD; ocelloccipital distance greater than 1.0 OD; compound eye at a distance greater than or equal to 1.5 OD from occipital margin; thorax pubescence yellow with dark yellow tips; abdomen metallic blue..... *P. cyaniventris*
 - Malar area less than 0.5 OD; labrum with two strong tubercles in the middle; ocellocular distance less than 1.0 OD; ocelloccipital distance equal to 1.0 OD;

- compound eye at a distance less than or equal to 1.0 OD from occipital margin;
 thorax pubescence black with whitish or brown branches; abdomen not metallic blue
 *P. pretiosa*
5. Ocellocular distance less than 1.0 OD; tegulae brown *P. ducalis*
- Ocellocular distance greater than or equal to 1.0 OD; tegulae dark yellow **6**
6. Clypeus black; genal area less than 0.5 eye width; scutum and scutellum black;
 mesopleura pubescence white with dark tips (look like grey) *P. hondurasica*
- Clypeus brown or brown-reddish; genal area wider than or as wide as 0.5 eye width;
 scutum and scutellum dark brown (reddish); mesopleura pubescence light yellow to
 white with black tips (not grey) **7**
7. Mandible with two differentiated and pointed teeth; labrum dark yellow; compound
 eye at a distance less than or equal to 0.5 OD; thorax pubescence light yellow with
 black tips; apex hind femur with a patch of dark pubescence *P. mexicana*
- Mandible with teeth smooth and rounded; labrum dark brown; compound eye at a
 distance less than or equal to 0.75 OD; thorax pubescence light brown with dark
 brown tips; apex hind femur same color pubescence *P. tarsata*
8. Compound eye at a distance less than or equal to 0.5 OD from occipital margin..... **9**
- Compound eye at a distance greater than 0.5 OD from occipital margin **16**
9. Ocellocular distance less than 1.0 OD **10**
- Ocellocular distance greater than or equal to 1.0 OD **12**

10. Clypeus not projected, rounded on disc; supraclypeal pubescence white short setae close to clypeal margin followed by long brown hairs *P. tenuimarginata*
- Clypeus projected beyond the face and flattened on disc; supraclypeal pubescence mostly white with some scattered black hairs **11**
11. Ocellocular distance less than or equal to 0.5 OD; tegulae not transparent dark brown; thorax pubescence light brown with dark brown tips; scutum and scutellum dark brown (reddish); venter pubescence dark surrounded by white setae; T4 pubescence tawny, marginal band white *P. amita*
- Ocellocular distance greater than 0.5 OD; tegulae transparent yellow; thorax pubescence tawny with darker tips; scutum and scutellum black; venter pubescence yellow; T4 pubescence; T4 dark brown, marginal band white..... *P. buchwaldi*
12. Mandible with two differentiated pointed tooth; labrum smooth; clypeus with minute punctures; T1 integument black *P. chamelensis*
- Mandible with one pointed tooth or with one smooth and rounded tooth; labrum striate or with tubercles; clypeus rugose-striate or with strong punctures; T1 integument brown (can be reddish) or yellow **13**
13. Labrum striate; clypeus rugose-striate or with strong punctures suggesting a rugose surface; area between medial ocellus and compound eye pubescence same color as supraclypeal..... **14**

- Labrum with two tubercles in the middle; clypeus with few scattered strong punctures; area between medial ocellus and compound eye pubescence with a spot of dark hairs (dark brown, grey or black) **15**

- 14. Preapical tooth apex well separated and pointed; clypeus projected beyond the face and flattened on disc; vertex pubescence light brown with dark tips; genal pubescence white, genal area as wide as 0.5 eye width; tegulae yellow; mesopleura pubescence light yellow or white with black tips ***P. dubia***

- Preapical tooth apex smooth and rounded; clypeus not projected, rounded on disc; vertex pubescence black; genal pubescence black with whitish branches, genal area less than 0.5 eye width; tegulae black; mesopleura pubescence black (sometimes with dark brown branches)..... ***P. thoracica***

- 15. Preapical tooth apex well separated and pointed; labrum and clypeus dark brown; clypeus projected and rounded on disc; compound eye at a distance greater than or equal to 0.5 OD from occipital margin; thorax pubescence light yellow with dark yellow tips ***P. jonesi***

- Preapical tooth apex smooth and rounded; labrum brown, clypeus light brown; clypeus projected beyond the face and flattened on disc; compound eye at a distance less than 0.5 OD or equal to 0.25 OD from occipital margin; thorax pubescence black with whitish or brown branches ***P. willinki***

- 16. Clypeus projected beyond the face (rounded or flattened on disc) **17**

- Clypeus not projected, rounded on disc..... **22**

17. Ocelloccipital distance greater than 1.0 OD **18**
- Ocelloccipital distance less than or equal to 1.0 OD **19**
18. Mandible with two pointed preapical teeth; clypeus flattened on disc; vertex pubescence dark brown; genal area as wide as 0.5 eye width; T5-T6 pubescence completely dark brown to black ***P. lucernarum***
- Mandible with one preapical tooth smooth and rounded; clypeus rounded on disc; vertex pubescence black; genal area less than 0.5 eye width; T5 pubescence yellow at base, marginal band of T5 and T6 dark brown to black ***P. rugata***
19. Mesopleura pubescence dark brown (with whitish branches); venter pubescence light yellow or with dark setae in the middle surrounded by whitish pubescence **20**
- Mesopleura pubescence completely black; venter pubescence black with whitish or brown branches..... **21**
20. Labrum with two tubercles on middle; clypeus with strong punctures separated by a distance greater than or equal to a puncture diameter (not rugose); ocellocular distance greater than or equal to 1.0 OD; genal area greater than or as wide as 0.5 eye width; tegulae dark brown; thorax pubescence light brown with dark brown tips; T2-T6 pubescence dark brown ***P. costaricana***
- Labrum smooth; clypeus rugose-striate or with close strong punctures, suggesting a rugose surface; ocellocular distance less than or equal to 0.5 OD; genal area less than 0.5 eye width; tegulae yellow; thorax pubescence light yellow with dark yellow tips; T2-T6 pubescence tawny ***P. eximia***

21. Labrum with one round medial projection; genal area as wide as 0.5 eye width; tegulae transparent dark brown; T1 pubescence yellow with darker tips; T5-T6 pubescence tawny *P. magretti*
- Labrum with two tubercles on middle; genal area wider than 0.5 eye width; tegulae not transparent black; T1 pubescence black; T5-T6 pubescence dark brown to black *P. trichrootricha*
22. Clypeus with few scattered strong punctures **23**
- Clypeus rugose-striate or with close strong punctures suggesting a rugose surface **24**
23. Labrum and clypeus black; area between medial ocellus and compound eye with a post of dark pubescence (dark brown, grey or black); ocellocular distance greater than or equal to 1.0 OD; thorax and mesopleura pubescence white with dark tips *P. hemileuca*
- Labrum brown, clypeus reddish brown; area between medial ocellus and compound eye pubescence same color as supraclypeal area; ocellocular distance less than 1.0 OD; thorax pubescence tawny with dark tips, mesopleura pubescence dark brown *P. matutina*
24. Supraclypeal area integument black; interocellar distance less than 1.0 OD; vertex pubescence yellow; genal area as wide as 0.5 eye width; mesopleura pubescence yellow with tawny tips *P. arizonensis*

- Supraclypeal area integument reddish brown; interocellar distance equal to 1.0 OD; vertex pubescence dark brown to black; genal area less than 0.5 eye width; mesopleura pubescence white with amber or black tips (looks like grey) **25**
25. Area between medial ocellus and compound eye pubescence same color as supraclypeal area; thorax pubescence white with dark tips, T1 pubescence whitish on basal area with black setae on margin; T5-T6 pubescence dark brown with white pubescence on the sides *P. aenigmatica*
- Area between medial ocellus and compound eye with a spot of darker pubescence (dark brown, grey or black); thorax pubescence light brown with dark brown tips; T1 pubescence dark brown; T5-T6 pubescence completely dark brown *P. decipiens*

Phylogenetic analysis of *Ptiloglossa* species

In the final analysis a total of six trees were recovered with a length (L) of 826 steps, a consistency index (Ci) of 18, and a retention index (Ri) of 38. After analyzing all trees with a consensus strict methodology, four nodes collapsed and a unique tree was produced: L=838, Ci=18, Ri37 (Figure 54).

The analysis shows the relationships between *Ptiloglossa*, *Caupolicana* and *Crawfordapis*. The synonymy between *Ptiloglossa* and *Caupolicana* proposed by Vachal (1909), and supported by Ducke (1913) and Cockerell (1919) is here rejected. Although *Ptiloglossa* is a monophyletic clade, it is more closely related to *Crawfordapis* than to *Caupolicana*.

The phylogenetic hypothesis obtained supports the cladogram presented by Otis *et al.* (1982) based on larval characters, and the cladogram by Michener (1986) based on adult morphology. All three analyses recover *Ptiloglossa* as the sister group of *Crawfordapis*. These results also support the idea proposed by Michener *et al.* (2003) where *Ptiloglossa* + *Crawfordapis* is the sister group of *Caupolicana*.

The strength of this study is that all analyses performed recovered *Ptiloglossa* as a monophyletic genus. The monophyly is supported by five synapomorphic characters and a combination of homoplasious characters (Figure 55). Reinforcement of these findings is that they agree with results from the molecular phylogeny of Colletidae by Almeida & Danforth (2009).

Although it is evident that a large amount of homoplasious characters are part of the consensus tree, this cladogram can be considered as a successful and new approximation to understanding the relationships between *Ptiloglossa* species. Here, with only four nodes collapsed indicate that there is still a need to clarify species boundaries. The inclusion of internal morphological characters of species may help to clarify these nodes.

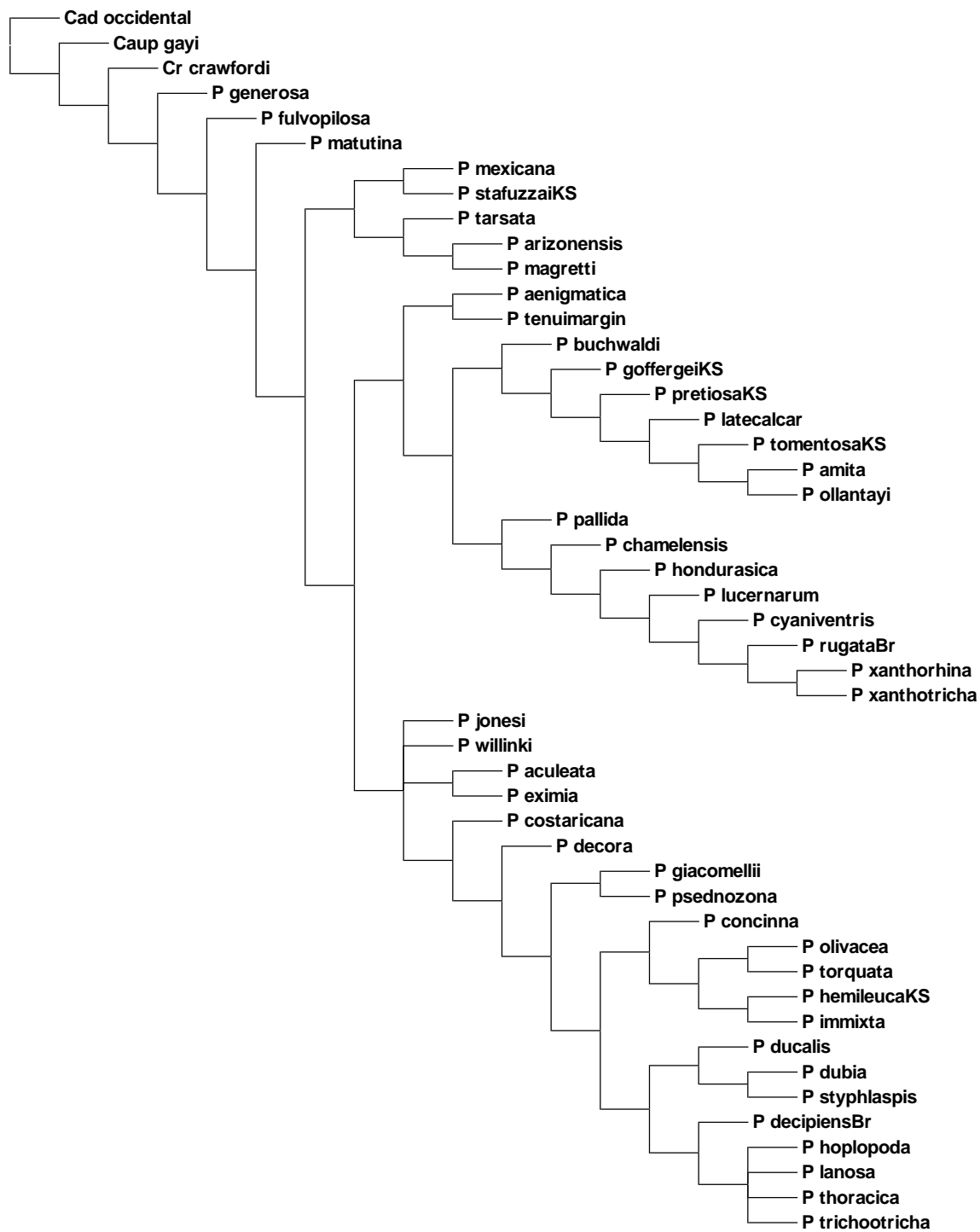


Figure 106. *Ptiloglossa* phylogeny based on male and female characters (94 characters total). Consensus tree of 6 resultant trees; L=838, Ci=18, Ri37, 4 nodes collapsed.

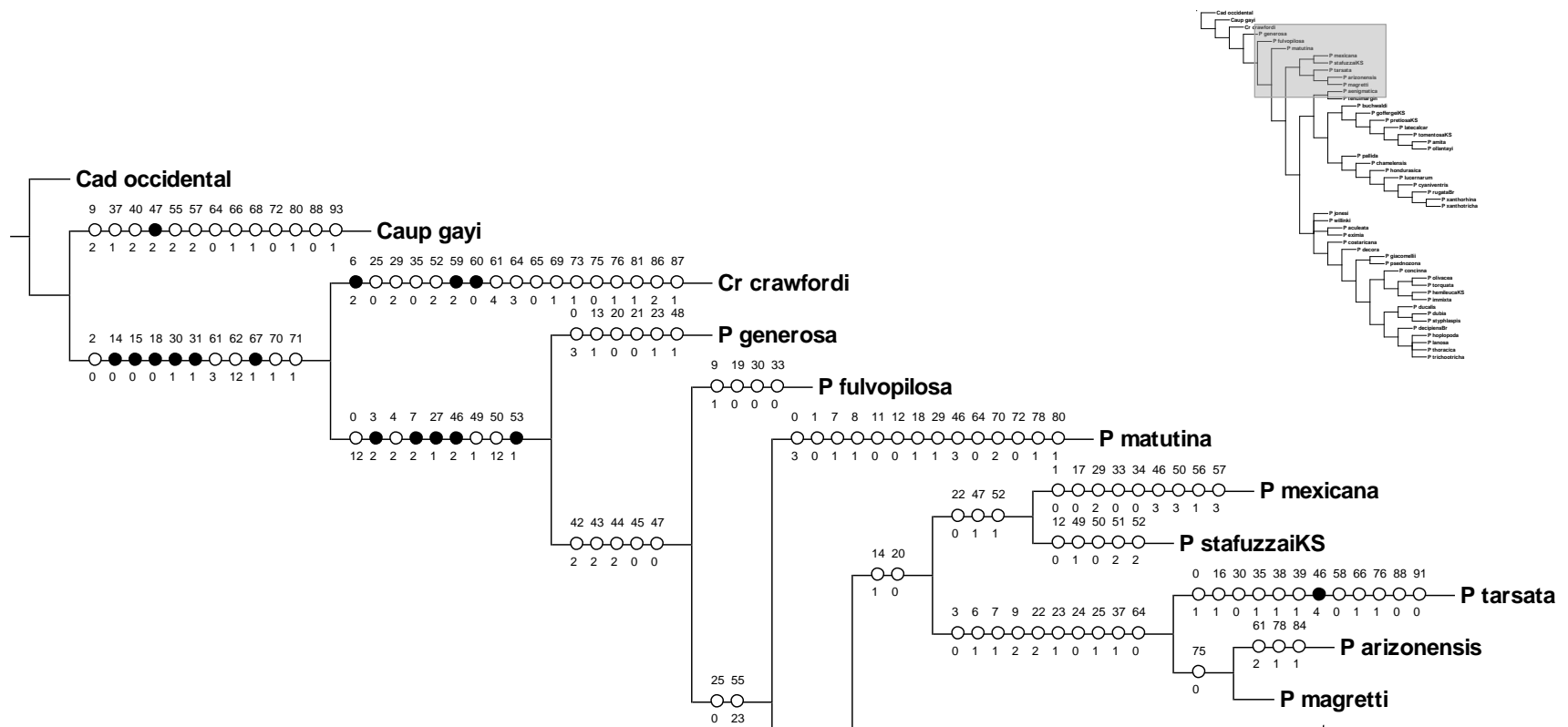


Figure 107. Characters and character states for the hypothesis of the phylogeny of *Ptiloglossa*. Black dots represent synapomorphies, white dots represent homoplasies.

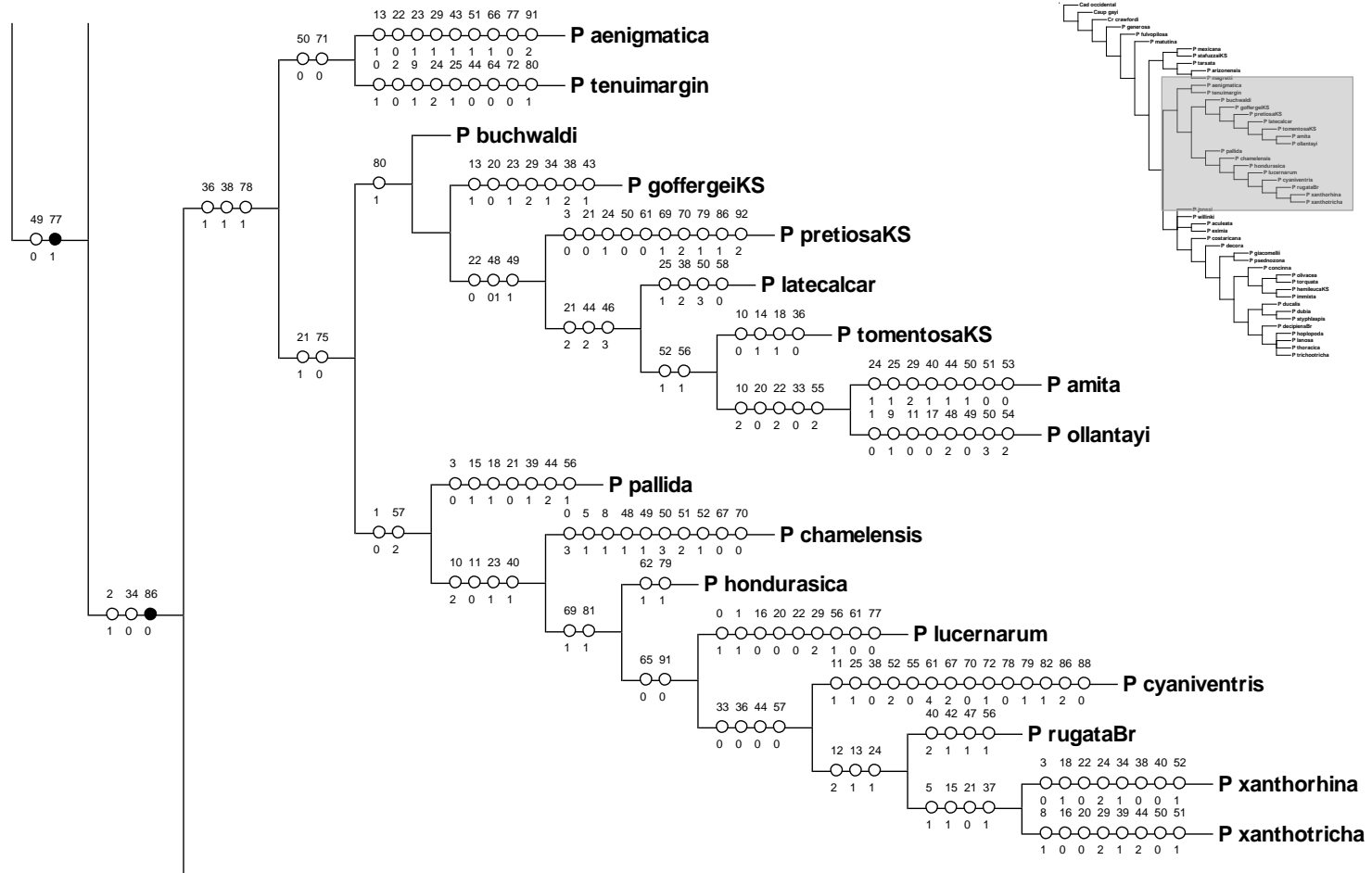


Figure 107. Continuation.

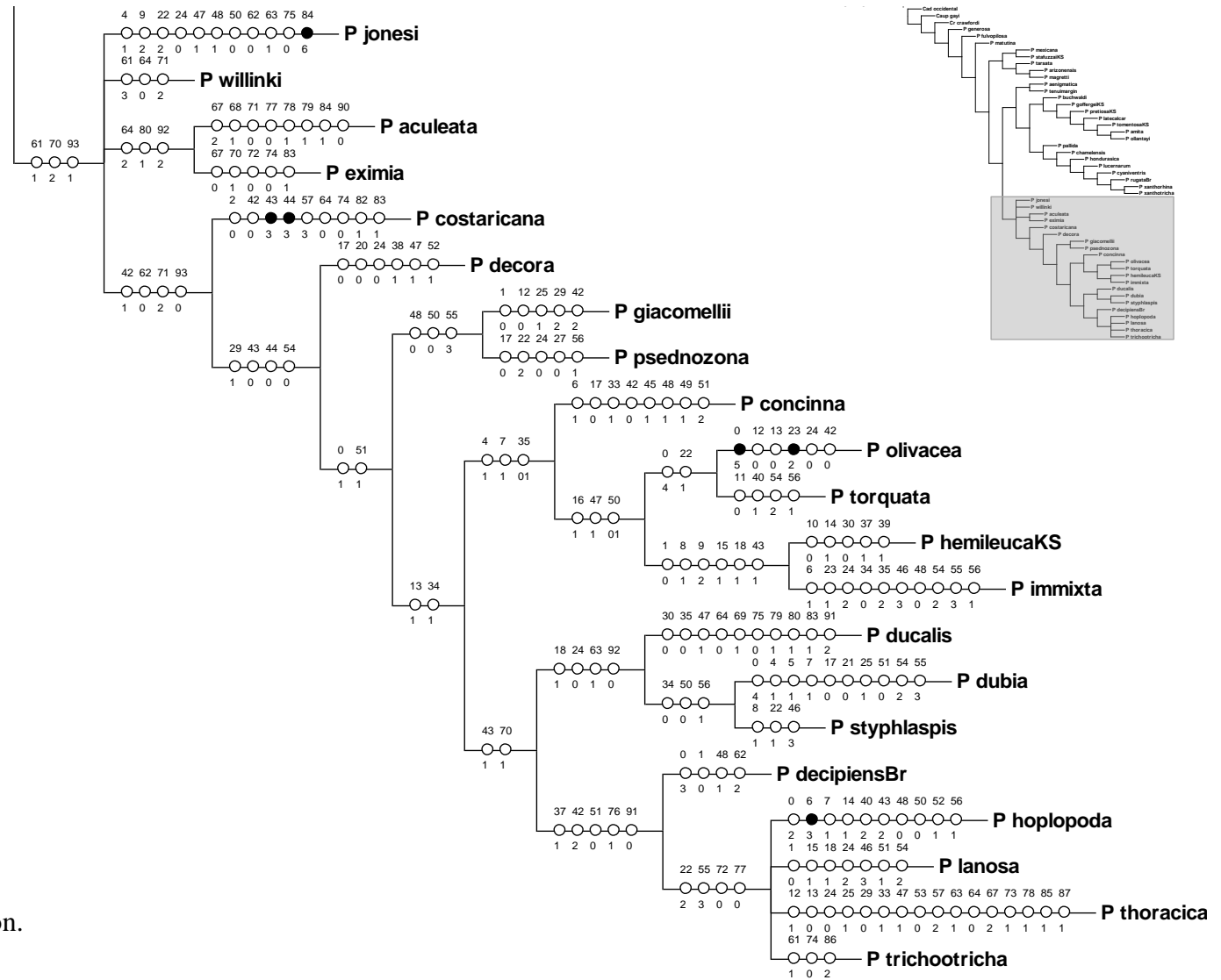


Figure 107. Continuation.

APPENDIX I

Ptiloglossa character list. all characters are considered unweighted, unordered and nonadditive (94 characters total).

Males

1. Mandibles color: 0) black with dark reddish apex, 1) dark brown with dark reddish apex, 2) light brown with dark reddish apex, 3) brown with black apex, 4) black with dark brown apex, 5) completely dark brown.
2. Mandible apex integument: 0) opaque, 1) shiny.
3. Preapical tooth, apex: 0) smooth and rounded, 1) well separated and pointed; 2) not prominent [almost not differentiated].
4. Malar space length: 0) around 0.75 to 1.0 OD; 1) greater than 1.0 OD; 2) equal or less than 0.5 OD.
5. Labrum color: 0) black; 1) brown sometimes reddish; 2) yellow to dark yellow.
6. Labrum integument: 0) shiny, 1) opaque.
7. Labrum surface: 0) smooth; 1) with one round medial projection; 2) striate on the labroclypeal area; 3) with two tubercles on the middle.
8. Clypeus color: 0) black; 1) light brown to dark brown, sometimes reddish; 2) yellow.
9. Clypeus integument: 0) shiny, 1) opaque.

10. Clypeus projection: 0) evenly projected beyond the face; 1) upper part projected beyond the face; 2) not projected.
11. Clypeus surface: 0) with minute punctures; 1) rugose or with strong punctures suggesting a rugose surface; 2) without punctures or few scattered.
12. Lateral part of clypeus, pubescence: 0) short [equal or shorter than 1.0 OD]; 1) long [longer than 1.0 OD].
13. Clypeus length: 0) a little more than 0.5 as long as wide, 1) almost as long as wide, 2) rectangular [1.25 longer than wide].
14. Paraocular area, integument: 0) shiny, 1) opaque.
15. Paraocular area, up to supraclypeal area: 0) narrow [equal or less than diameter 1 antennal socket], 1) wider [longer than diameter 1 antennal socket].
16. Inner orbits: 0) converging above, 1) not converging above.
17. Ocelli diameter: 0) wider than diameter antennal socket, 1) as wide as diameter of antennal socket.
18. Interocellar pubescence: 0) short [equal or shorter than 1.0 OD], 1) long [longer than 1.0 OD].
19. Interocellar distance: 0) equal or shorter than 1.0 OD; 1) greater than 1.0 OD.
20. Ocellocular distance: 0) equal or greater than 1.0 OD; 1) less than 1.0 OD.
21. Ocelloccipital distance: 0) equal or shorter than 1.0 OD; 1) greater than 1.0 OD.

22. Compound eye, above: 0) at a distance equal to 1.25 OD; 1) reaching the occipital margin; 2) at a distance less than 1.0 OD.
23. Vertex pubescence color: 0) white or yellow basally with second half dark brown or completely white; 1) dark brown to black (sometimes intermixed with yellow pubescence); 2) yellow or light yellow with darker tips.
24. Genal area, pubescence color: 0) white (sometimes with black or dark brown hairs close to the margin of the compound eye) or light yellow (sometimes with line of short white hairs close to the margin of the compound eye; 1) yellow (sometimes with a line of short white hairs close to the margin of the compound eye or intermixed with scarce long dark hairs); 2) with a line of short white hairs close to the margin of compound eyes, followed by scattered long dark brown to black hairs.
25. Genal area: 0) less than 0.5 eye width; 1) as wide as 0.5 eye width; 2) wider than 0.5 eye width.
26. Pedicel length: 0) as long as F2, 1) shorter than F2, 2) longer than F2.
27. F1 length: 0) shorter than scape; 1) as long as or longer than scape.
28. Wings color: 0) transparent [smoky] or translucent dark brown [almost black]; 1) translucent brown or yellow.
29. Distal area of fore wing: 0) coarsely papillated; 1) weakly or not papillated.
30. Stigma color: 0) as dark as prestigma, 1) darker than prestigma, 2) slightly lighter than prestigma.

31. Prestigma length: 0) as long as or shorter than stigma; 1) 2 times or more long than stigma.
32. Base of marginal cell: 0) not prolonged narrow on its base; 1) prolonged as narrow and pointed on its base.
33. Second submarginal cell: 0) almost as large as third; 1) smaller than first and third.
34. Marginal cell color: 0) darker than other, 1) same color than subsequent ones.
35. Tegulae integument: 0) transparent; 1) no transparent.
36. Scutum pubescence color: 0) dark brown to black; 1) whitish with darker tips; 2) yellow to dark yellow (sometimes with darker tips).
37. Scutum integument color: 0) black; 1) brown to dark brown (sometimes reddish).
38. Scutum integument: 0) shiny; 1) opaque.
39. Scutellum integument color: 0) black; 1) brown to dark brown (sometimes reddish); 2) yellow.
40. Scutellum integument: 0) shiny, 1) opaque.
41. Propodeal triangle, integument: 0) smooth or with minute punctures; 1) striate on its sides; 2) rugose on the basal area.
42. Episternal groove: 0) absent; 1) present.
43. Front legs color: 0) dark brown, 1) brown, 2) light brown to yellow, 3) black.
44. Medial legs color: 0) dark brown, 1) brown, 2) light brown to yellow, 3) black.

45. Hind legs color: 0) dark brown, 1) brown, 2) light brown to yellow, 3) black.
46. Tarsi color: 0) yellow, 1) tawny, 2) light brown to reddish, 3) dark brown, 4) black.
47. Outer hind tibial spur: 0) present and mobile with inner margin dentate [small teeth];
1) present and mobile with inner margin edentate [smooth]; 2) present and immobile with inner margin dentate [small teeth]; 3) present and immobile, with inner margin edentate [smooth]; 4) absent.
48. Outer hind tibial spur, length in lateral view: 0) shorter than inner tibial spur, 1) as long as inner tibial spur, 2) slightly longer than the inner tibial spur.
49. Outer hind tibial spur basal area: 0) bulbous; 1) laterally flattened; 2) rounded, formed as a structure protruding from tibiae [normal].
50. Outer hind tibial spur, basal width: 0) equal or less than 0.33 of tibial width; 1) equal or more than 0.5 of tibial width.
51. Outer hind tibial spur projection: 0) curving downward, 1) forming a right angle from tibiae, 2) forming an acute angle from tibiae, 3) almost parallel to margin of tibiae.
52. Outer hind tibial spur, tip shape: 0) rounded or bulbous and pointed, sometimes concave and flattened; 1) with a long and slender projection flagellum-like [can be broken]; 2) laterally flattened.
53. Hind basitarsus length: 0) 0.67 of tibial length, 1) 0.75 tibial length, 2) 0.5 tibial length.
54. Integument metasoma: 0) without metallic iridescence; 1) usually metallic iridescent

55. T4 punctures: 0) separated by a distance equal to a puncture width, 1) separated by a distance less than a puncture width, 2) separated by a distance greater than a puncture width.
56. T2 to T4 pubescence color on marginal area: 0) similar to those on the disc; 1) dark brown with some orange hairs that increase its quantity on the apical terga; 2) white (sometimes only present on T4); 3) varying from light yellow, to dark yellow, to golden yellow.
57. T4 – T5 with a spot apparently without pubescence on the lateral side (trichotrichia): 0) absent; 1) present.
58. Lateral areas of terga, pubescence color: 0) similar to those on the disc [not white or black, if they are other color than black]; 1) dark brown intermixed with some orange hairs [the latter increase its presence as it approaches the apex]; 2) light yellow to white; 3) black.
59. Sterna margin, pubescence length: 0) short [shorter than 1.0 OD]; 1) long [as long as or longer than 2 OD].
60. S7 of Male. 0) with three lobes, two of them large; 1) with paired apical lobes; 2) with no paired apical lobes.
61. Apices of gonoforceps: 0) slender and stylus-like; 1) wide, truncate and bending to the center; 2) wide, rounded or slightly truncate but straight (not bending).

Female

62. Mandibles color: 0) black with dark reddish apex, 1) dark brown with dark reddish apex, 2) dark brown [almost black], 3) brown with black apex, 4) completely black.
63. Mandible apex: 0) pointed, 1) truncate, 2) rounded.
64. Mandible apex integument: 0) opaque, 1) shiny.
65. Preapical tooth, apex: 0) smooth and rounded, 1) well separated and pointed, 2) not prominent [almost not differentiated]; 3) with two differentiated teeth, divided in two forming 2 tiny pointed teeth.
66. Labrum color: 0) black; 1) dark brown to black [sometimes reddish]; 2) yellow [when clypeus yellow, it is darker yellow].
67. Labrum integument: 0) shiny, 1) opaque.
68. Labrum surface: 0) smooth or with minute punctures; 1) with one or two tubercles on the middle [strong, well differentiated]; 2) striate.
69. Clypeolabral margin: 0) sulcus well defined, 1) sulcus well defined on the sides, 2) without sulcus.
70. Clypeus color: 0) light brown to dark brown, sometimes reddish; 1) black.
71. Clypeus surface: 0) with minute punctures; 1) rugose-striate or with strong punctures sometimes suggesting a rugose surface; 2) with strong punctures [few, sometimes getting close to the clypeolabral margin].

72. Upper part of clypeus, pubescence along the internal margin: 0) short (equal or shorter than 1.0 OD), 1) long (longer than 1.0 OD); 2) absent.
73. Lateral part of clypeus, pubescence (clypeal lobe): 0) short (equal or shorter than 1.0 OD); 1) long (longer than 1.0 OD).
74. Paraocular area, pubescence: 0) white or light yellow mixed with light yellow or darker hairs 1) black.
75. Paraocular area, up to supraclypeal area: 0) narrow (equal or less than diameter 1 antennal socket), 1) wide (longer than diameter 1 antennal socket).
76. Supraclypeal area, integument color: 0) black 1) brown to brown reddish.
77. Frons, pubescence color: 0) completely light yellow or white (sometimes mixed with white hairs with dark tips); 1) dark brown to black.
78. Area between medial ocellus and compound eye (facial fovea), pubescence: 0) same color as supraclypeal pubescence; 1) with a spot of darker hairs (dark brown, dark grey or black).
79. Inner orbits: 0) converging above, 1) not converging above.
80. Interocellar distance: 0) equal or shorter than 1.0 OD; 1) greater than 1.0 OD.
81. Ocellocular distance: 0) equal or greater than 1.0 OD; 1) less than 1.0 OD.
82. Ocelloccipital distance: 0) equal or shorter than 1.0 OD; 1) greater than 1.0 OD

83. Compound eye, above: 0) at a distance equal or less than 1OD; 1) at a distance greater than 1.0 OD.
84. Vertex pubescence length: 0) short (shorter than 2 OD), 1) long (longer than 2 OD).
85. Vertex pubescence color: 0) dark brown to black (sometimes light brown with dark tips); 1) yellow or light yellow with darker tips.
86. Genal area, pubescence color: 0) white (sometimes with scarce dark brown hairs close to margin of compound eye); 1) dark brown to black (sometimes with a band of whitish hairs close to compound eye margin).
87. Genal area: 0) less than 0.5 eye width, 1) as wide as 0.5 eye width, 2) wider than 0.5 eye width.
88. Propodeal triangle, integument: 0) smooth or with minute punctures; 1) strongly striated or with minute punctures and striate on basal margin (mainly at its sides)
89. Apex hind femur pubescence color: 0) same color than other, 1) with a patch of dark hairs.
90. hind basitarsus of Female. 0) 1.5 times as long as broad or almost as long as broad; 1) 2 times as long as broad.
91. Integument metasoma: 0) without metallic iridescence; 1) usually metallic iridescent.
92. T1 pubescence color: 0) black or dark brown (sometimes whitish at its base); 1) completely yellow (sometimes golden or yellow with dark tips); 2) basally whitish and black on its apex.

93. T2 to T4 pubescence color on marginal area: 0) whitish; 1) without pubescence on the marginal area; 2) yellow (sometimes only present in T4).
94. T5 to T6 pubescence color: 0) dark brown to black (sometimes with whitish hairs on its sides or with some orange hairs on its sides that increase its quantity on the apical terga); 1) yellow or golden yellow [sometimes marginal half of T5 and T6 with dark brown to black hairs].

APPENDIX II

Character matrix used for phylogenetic analysis of *Ptiloglossa* species; [?] represents missing information. Male characters go from 1 to 61, female characters from 62 to 94.

No.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	<i>Cad_occidentalis</i>	0	1	0	0	0	0	0	0	0	1	1	1	0	0	2	2	0	0	0	0	0	1	0	0	
2	<i>Cr_crawfordi</i>	0	0	0	0	1	1	1	1	2	0	0	0	0	1	0	2	0	0	1	0	0	0	0	0	2
3	<i>Caup_gayi</i>	1	0	0	0	0	1	1	1	1	2	0	0	2	0	1	2	0	0	2	0	0	1	0	0	0
4	<i>P_aculeata</i>	?	1	0	?	1	1	1	1	1	2	?	0	?	?	?	?	?	?	?	?	?	?	?	?	?
5	<i>P_aenigmatica</i>	2	1	1	1	1	1	1	1	1	2	2	0	0	1	2	2	0	1	0	1	2	1	2	0	0
6	<i>P_amita</i>	3	1	1	0	1	1	1	1	1	2	2	0	0	1	2	0	1	0	1	2	2	1	2	0	0
7	<i>P_arizonensis</i>	2	1	1	1	1	1	1	1	1	2	0	0	2	1	2	2	0	0	2	0	2	0	1	1	1
8	<i>P_buchwaldi</i>	?	1	1	?	1	1	1	1	1	2	?	0	?	?	?	?	?	?	?	?	?	?	?	?	?
9	<i>P_chamelensis</i>	2	1	1	1	1	1	1	1	1	2	2	0	0	1	2	1	1	2	1	2	3	2	2	0	0
10	<i>P_concinna</i>	2	?	?	1	1	1	1	1	1	2	2	0	0	1	0	1	1	2	0	1	1	0	1	1	1
11	<i>P_costaricana</i>	2	1	1	1	1	1	1	1	1	2	2	0	0	1	2	2	0	0	0	2	2	0	2	0	0
12	<i>P_cyaniventris</i>	3	1	1	1	1	1	1	1	1	2	2	0	0	1	2	2	0	0	1	2	2	2	2	0	0
13	<i>P_decipiens</i>	2	1	1	1	1	1	1	1	1	2	2	0	0	1	2	1	0	0	0	2	3	1	2	0	0
14	<i>P_decora</i>	2	?	?	1	1	1	1	1	1	2	2	0	0	1	2	2	0	0	0	2	2	1	2	0	0
15	<i>P_dubia</i>	2	1	1	1	1	1	1	1	1	2	2	0	0	1	2	2	0	0	0	1	4	1	1	0	0
16	<i>P_ducalis</i>	2	1	1	1	1	1	1	1	1	2	2	0	0	0	0	2	0	1	0	1	1	0	2	0	0
17	<i>P_eximia</i>	2	1	1	1	1	1	1	1	1	2	2	0	0	1	2	2	0	0	0	2	2	2	2	0	0
18	<i>P_fulvopilosa</i>	2	?	?	1	1	1	1	1	1	2	2	0	1	0	2	2	1	0	0	0	1	0	2	0	0
19	<i>P_generosa</i>	2	?	?	1	1	1	1	1	1	2	2	0	0	1	2	1	1	0	0	0	3	0	2	0	0
20	<i>P_giacomellii</i>	2	?	?	1	1	1	1	1	1	2	2	0	0	1	2	0	0	1	0	2	1	1	2	0	0
21	<i>P_goffergei</i>	2	?	?	1	1	1	1	1	1	2	2	0	0	1	2	2	0	1	0	0	2	1	2	0	0
22	<i>P_hemileuca</i>	2	1	1	1	1	1	1	1	1	2	2	0	2	0	1	2	0	1	0	0	1	1	1	0	0

No.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
23	<i>P_hondurasica</i>	?	1	1	?	1	1	1	1	1	2	?	0	?	?	?	?	?	?	?	?	?	?	?	?
24	<i>P_hoplopoda</i>	2	?	?	1	1	1	1	1	1	2	2	0	2	1	2	0	0	0	2	1	2	0	1	3
25	<i>P_immixta</i>	3	?	?	1	1	1	1	1	1	2	2	0	2	1	2	0	0	1	0	2	1	1	1	1
26	<i>P_jonesi</i>	2	1	1	1	1	1	1	1	1	2	2	0	2	1	2	1	0	0	0	0	2	1	1	0
27	<i>P_lanosa</i>	3	?	?	1	1	1	1	1	1	2	2	0	0	1	2	2	0	1	0	1	1	1	2	0
28	<i>P_latecalcarata</i>	3	?	?	1	1	1	1	1	1	2	2	0	0	1	2	0	1	1	0	1	2	1	2	0
29	<i>P_lucernarum</i>	3	1	1	1	1	1	1	1	1	2	2	0	0	1	2	2	0	0	1	2	1	1	2	0
30	<i>P_magretti</i>	?	1	1	?	1	1	1	1	1	2	?	0	?	?	?	?	?	?	?	?	?	?	?	?
31	<i>P_matutina</i>	3	1	1	1	1	1	1	1	1	2	2	0	0	1	2	2	1	0	0	0	3	0	2	0
32	<i>P_mexicana</i>	3	1	1	1	1	1	1	1	1	2	2	0	1	1	2	2	0	0	0	0	2	0	2	0
33	<i>P_olivacea</i>	2	?	?	1	1	1	1	1	1	2	2	0	0	1	0	2	0	1	0	2	5	0	1	0
34	<i>P_ollantayi</i>	3	?	?	1	1	1	1	1	1	2	2	0	1	1	2	2	0	1	0	2	2	1	2	0
35	<i>P_pallida</i>	2	?	?	1	1	1	1	1	1	2	0	0	0	1	2	2	0	0	0	0	2	2	2	0
36	<i>P_pretiosa</i>	2	1	1	1	1	1	1	1	1	2	0	0	0	1	2	0	1	1	0	1	2	1	2	0
37	<i>P_psednozona</i>	2	?	?	1	1	1	1	1	1	2	2	0	0	1	2	0	0	1	0	2	1	1	2	0
38	<i>P_rugataBr</i>	2	1	1	1	1	1	1	1	1	2	2	0	0	1	2	2	0	0	2	2	2	0	2	0
39	<i>P_stafuzzai</i>	2	?	?	1	1	1	1	1	1	2	2	0	0	1	2	2	1	2	0	0	2	0	2	0
40	<i>P_styphlaspis</i>	3	?	?	1	1	1	1	1	1	2	2	0	0	1	2	2	0	1	0	1	1	0	2	0
41	<i>P_tarsata</i>	4	1	1	1	1	1	1	1	1	2	0	0	2	0	1	-	-	-	0	0	1	0	2	1
42	<i>P_tenuimargina</i>	2	1	1	1	1	1	1	1	1	2	2	0	1	1	2	2	0	0	0	0	1	0	2	0
43	<i>P_thoracica</i>	2	1	1	0	1	1	1	1	1	2	2	0	2	1	2	2	0	0	1	1	1	0	1	0
44	<i>P_tomentosa</i>	3	?	?	1	1	1	1	1	1	2	2	0	0	1	2	1	1	1	?	0	2	1	2	0
45	<i>P_torquata</i>	2	?	?	1	1	1	1	1	1	2	2	0	0	1	0	2	0	1	1	2	4	1	1	0
46	<i>P_trichrootricha</i>	?	?	1	?	1	1	1	1	1	2	?	0	?	?	?	?	?	?	?	?	?	?	?	?
47	<i>P_willinki</i>	?	1	1	?	1	1	1	1	1	2	?	0	?	?	?	?	?	?	?	?	?	?	?	?
48	<i>P_xanthorhina</i>	2	?	?	1	1	1	1	1	1	2	0	0	0	1	2	2	0	0	0	2	2	0	2	0
49	<i>P_xanthotricha</i>	2	?	?	1	1	1	1	1	1	2	2	0	0	1	2	2	0	1	1	2	2	1	2	0

No.		25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
1	<i>Cad_occidentalis</i>	0	1	1	0	0	0	0	0	1	2	0	0	3	1	1	0	0	0	1	2	0	0	1
2	<i>Cr_crawfordi</i>	0	0	1	0	1	0	1	0	1	0	0	1	3	0	0	1	1	1	1	0	0	1	1
3	<i>Caup_gayi</i>	0	0	1	0	0	0	0	0	1	0	0	2	3	0	1	1	1	1	0	1	1	0	0
4	<i>P_aculeata</i>	?	?	?	?	0	0	0	?	?	?	?	?	?	?	?	?	?	?	1	1	0	2	0
5	<i>P_aenigmatica</i>	2	0	0	0	0	0	0	0	1	2	0	0	0	1	0	1	1	2	1	1	1	1	0
6	<i>P_amita</i>	2	1	1	1	0	1	0	0	1	0	0	1	1	0	0	1	0	2	1	1	0	1	0
7	<i>P_arizonensis</i>	1	0	1	0	0	1	0	0	1	1	0	0	2	1	0	1	0	2	1	1	0	1	0
8	<i>P_buchwaldi</i>	?	?	?	?	0	1	0	?	?	?	?	?	?	?	?	?	?	?	1	1	0	1	0
9	<i>P_chamelensis</i>	2	0	0	0	0	1	0	1	0	1	1	0	3	1	0	1	1	1	0	1	0	0	0
10	<i>P_concinna</i>	1	1	1	0	?	?	?	0	1	2	0	0	2	0	0	1	1	2	?	?	?	?	?
11	<i>P_costaricana</i>	2	1	0	0	0	1	0	0	1	2	0	0	2	0	0	1	1	2	1	1	0	1	0
12	<i>P_cyaniventris</i>	2	0	0	0	1	1	0	0	1	1	0	0	2	1	0	1	1	2	1	0	0	2	0
13	<i>P_decipiens</i>	2	1	1	0	0	1	0	0	1	2	0	0	2	0	?	1	0	2	1	1	0	1	0
14	<i>P_decora</i>	2	0	0	0	?	?	?	0	1	2	0	1	2	0	0	1	0	2	?	?	?	?	?
15	<i>P_dubia</i>	1	0	0	1	0	0	0	0	1	2	1	0	0	0	1	1	0	0	1	1	0	2	0
16	<i>P_ducalis</i>	2	0	1	0	1	1	0	0	1	2	0	1	2	0	1	1	0	2	1	1	0	1	0
17	<i>P_eximia</i>	2	1	0	1	0	1	0	0	1	2	0	0	1	1	0	1	1	2	0	1	0	0	0
18	<i>P_fulvopilosa</i>	2	1	?	?	?	?	?	0	1	2	0	0	1	0	0	0	1	?	?	?	?	?	?
19	<i>P_generosa</i>	2	1	?	?	?	?	?	0	1	2	0	1	1	1	0	1	0	0	?	?	?	?	?
20	<i>P_giacomellii</i>	2	1	0	0	?	?	?	0	1	0	0	0	0	0	0	1	1	2	?	?	?	?	?
21	<i>P_goffergei</i>	2	0	1	0	?	?	?	0	1	0	0	1	2	1	0	1	0	1	?	?	?	?	?
22	<i>P_hemileuca</i>	1	1	1	0	1	1	0	1	1	2	0	1	0	0	1	1	1	2	1	0	1	1	0
23	<i>P_hondurasica</i>	?	?	?	?	1	1	0	?	?	?	?	?	?	?	?	?	?	?	0	1	0	1	0
24	<i>P_hoplopoda</i>	1	1	1	1	?	?	?	0	1	2	0	0	0	1	0	1	1	2	?	?	?	?	?
25	<i>P_immixta</i>	1	2	0	1	?	?	?	1	1	2	0	1	0	1	1	1	1	2	?	?	?	?	?
26	<i>P_jonesi</i>	2	0	0	1	0	1	0	0	1	2	0	1	0	0	0	1	1	2	1	1	0	1	0
27	<i>P_lanosa</i>	2	2	1	0	?	?	?	0	1	2	0	0	2	0	1	1	1	2	?	?	?	?	?

No.		25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
28	<i>P_latecalcarata</i>	2	0	0	0	?	?	?	0	1	0	0	1	3	0	0	1	1	2	?	?	?	?	?
29	<i>P_lucernarum</i>	2	0	0	1	1	0	0	0	0	0	0	0	2	1	0	1	0	2	0	0	0	1	0
30	<i>P_magretti</i>	?	?	?	?	0	1	0	?	?	?	?	?	?	?	?	?	?	?	1	1	0	1	0
31	<i>P_matutina</i>	1	1	1	0	0	0	0	1	0	0	0	0	2	0	1	1	1	2	0	1	0	1	0
32	<i>P_mexicana</i>	2	1	0	1	0	1	0	0	1	2	0	1	3	0	0	1	0	2	1	2	0	1	0
33	<i>P_olivacea</i>	1	0	1	0	?	?	?	0	1	0	0	1	1	2	0	1	1	2	?	?	?	?	?
34	<i>P_ollantayi</i>	2	0	0	1	?	?	?	0	0	0	0	1	3	0	0	1	0	2	?	?	?	?	?
35	<i>P_pallida</i>	2	0	0	1	?	?	?	0	1	0	0	0	2	0	1	1	1	0	?	?	?	?	?
36	<i>P_pretiosa</i>	2	1	0	0	1	1	0	0	1	0	0	1	0	0	0	1	1	0	1	1	0	1	0
37	<i>P_psednozona</i>	2	0	0	1	?	?	?	0	1	2	0	0	0	0	0	1	1	2	?	?	?	?	?
38	<i>P_rugataBr</i>	2	1	0	1	1	1	0	0	0	2	0	1	?	1	0	1	1	2	0	0	0	1	0
39	<i>P_stafuzzai</i>	2	1	1	0	?	?	?	0	1	0	0	1	0	0	0	1	0	2	?	?	?	?	?
40	<i>P_styphlaspis</i>	2	0	0	1	?	?	?	1	1	2	0	0	0	0	1	1	0	2	?	?	?	?	?
41	<i>P_tarsata</i>	1	0	1	0	0	1	0	0	1	1	0	?	-	1	0	1	0	2	1	1	1	?	0
42	<i>P_tenuimargina</i>	2	2	?	?	0	1	0	0	1	2	0	0	0	0	0	1	1	?	0	1	0	1	0
43	<i>P_thoracica</i>	2	0	1	0	0	0	1	0	1	1	0	1	2	1	0	1	1	2	0	1	0	2	1
44	<i>P_tomentosa</i>	2	0	1	1	?	?	?	0	1	0	0	1	2	0	1	1	1	2	?	?	?	?	?
45	<i>P_torquata</i>	1	1	1	1	?	?	?	0	0	2	0	1	0	0	0	1	1	2	?	?	?	?	?
46	<i>P_trichrootricha</i>	?	?	?	?	0	0	0	?	?	?	?	?	?	?	?	?	?	?	0	1	0	1	0
47	<i>P_willinki</i>	?	?	?	?	0	1	0	?	?	?	?	?	?	?	?	?	?	?	?	1	0	1	0
48	<i>P_xanthorhina</i>	2	2	1	0	?	?	?	0	0	2	1	0	2	1	1	1	1	0	?	?	?	?	?
49	<i>P_xanthotricha</i>	2	1	0	0	?	?	?	1	0	2	1	0	0	1	0	1	0	0	?	?	?	?	?

No.		48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
1	<i>Cad_occidentalis</i>	1	1	0	0	0	1	1	1	1	1	1	0	1	0	1	1	0	0	0	0	0	0	0
2	<i>Cr_crawfordi</i>	2	0	0	1	0	0	0	0	0	0	1	1	0	0	2	1	0	0	0	0	0	0	0
3	<i>Caup_gayi</i>	1	0	1	0	0	0	0	1	1	0	1	1	1	0	0	1	0	1	0	0	0	0	0
4	<i>P_aculeata</i>	0	1	1	0	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
5	<i>P_aenigmatica</i>	0	0	0	0	0	1	1	0	0	1	0	0	0	1	1	1	1	0	1	0	2	1	1
6	<i>P_amita</i>	0	0	1	0	0	1	0	0	0	0	1	2	1	1	2	0	1	0	1	0	2	2	1
7	<i>P_arizonensis</i>	1	0	0	0	0	1	0	1	1	0	1	2	1	1	1	1	0	1	0	0	2	2	2
8	<i>P_buchwaldi</i>	0	0	1	0	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
9	<i>P_chamelensis</i>	0	0	0	0	0	0	0	0	0	1	0	2	0	1	0	1	1	0	1	0	2	2	1
10	<i>P_concinna</i>	?	?	?	?	?	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
11	<i>P_costaricana</i>	1	0	0	0	1	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	3	3
12	<i>P_cyaniventris</i>	2	1	0	1	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	2	2	0
13	<i>P_decipiens</i>	0	0	0	0	0	0	?	0	0	0	1	0	0	1	1	0	0	1	0	0	2	1	0
14	<i>P_decora</i>	?	?	?	?	?	1	0	0	0	1	0	1	0	1	1	0	0	0	1	0	1	0	0
15	<i>P_dubia</i>	1	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	1
16	<i>P_ducalis</i>	0	1	1	0	0	1	1	0	0	0	1	0	0	1	0	0	0	0	0	0	1	1	1
17	<i>P_eximia</i>	0	0	1	0	?	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0
18	<i>P_fulvopilosa</i>	?	?	?	?	?	1	0	0	0	0	1	1	1	1	0	0	0	0	0	0	2	2	2
19	<i>P_generosa</i>	?	?	?	?	?	1	1	0	0	0	1	1	1	1	0	?	0	?	0	?	0	0	0
20	<i>P_giacomellii</i>	?	?	?	?	?	0	0	0	0	0	1	0	1	1	2	0	0	0	0	0	2	0	0
21	<i>P_goffergei</i>	?	?	?	?	?	1	1	0	0	0	0	1	0	1	2	1	1	0	2	0	2	1	1
22	<i>P_hemileuca</i>	1	0	0	0	0	0	1	1	1	1	1	0	0	1	1	0	0	1	0	1	1	1	0
23	<i>P_hondurasica</i>	0	1	0	1	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
24	<i>P_hoplopoda</i>	?	?	?	?	?	1	1	1	0	0	1	2	0	1	1	0	0	1	1	0	2	2	0
25	<i>P_immixta</i>	?	?	?	?	?	0	1	0	1	1	1	0	0	1	0	0	0	0	0	0	1	1	0
26	<i>P_jonesi</i>	0	0	0	0	0	1	0	0	0	0	1	2	0	1	0	1	0	0	0	0	2	2	2
27	<i>P_lanosa</i>	?	?	?	?	?	0	1	0	1	0	1	2	0	1	1	0	1	1	0	0	2	1	1

No.		48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
28	<i>P_latecalcarata</i>	?	?	?	?	?	1	0	0	0	0	1	0	1	1	0	1	1	0	2	0	2	2	2
29	<i>P_lucernarum</i>	1	0	0	1	0	1	0	0	0	0	0	0	0	1	2	1	1	0	1	0	2	1	1
30	<i>P_magretti</i>	1	0	0	0	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
31	<i>P_matutina</i>	1	0	1	0	0	0	0	0	1	0	1	1	0	1	1	1	0	0	0	0	2	2	2
32	<i>P_mexicana</i>	1	1	0	0	0	0	0	1	1	0	0	0	0	1	2	0	0	0	0	0	2	2	2
33	<i>P_olivacea</i>	?	?	?	?	?	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0
34	<i>P_ollantayi</i>	?	?	?	?	?	0	0	0	0	0	0	2	0	1	0	0	1	0	1	0	2	2	2
35	<i>P_pallida</i>	?	?	?	?	?	0	0	0	1	1	1	2	?	1	0	1	1	0	1	1	2	2	2
36	<i>P_pretiosa</i>	1	1	1	0	0	1	0	0	0	0	1	0	0	1	0	1	1	0	1	0	2	2	1
37	<i>P_psednozona</i>	?	?	?	?	?	1	0	0	0	0	0	2	0	0	1	0	0	0	0	0	1	0	0
38	<i>P_rugata</i>	0	0	0	1	0	0	1	0	0	1	1	2	0	1	0	0	0	0	1	0	1	0	0
39	<i>P_stafuzzai</i>	?	?	?	?	?	1	0	1	1	0	1	0	0	1	0	1	0	0	0	0	2	2	2
40	<i>P_styphlaspis</i>	?	?	?	?	?	1	1	0	0	0	1	1	0	1	1	0	0	0	0	0	1	1	1
41	<i>P_tarsata</i>	1	1	0	0	0	1	0	1	1	1	1	2	1	1	0	1	0	1	1	1	2	2	2
42	<i>P_tenuimargina</i>	0	0	1	0	0	1	0	0	0	1	0	1	1	1	0	1	1	0	1	0	2	2	0
43	<i>P_thoracica</i>	0	0	0	0	0	1	0	0	0	0	1	2	1	1	0	1	1	1	1	0	2	1	1
44	<i>P_tomentosa</i>	?	?	?	?	?	1	0	1	0	0	1	0	0	1	0	1	0	0	1	0	2	2	2
45	<i>P_torquata</i>	?	?	?	?	?	1	1	0	0	1	1	1	?	0	0	0	0	0	0	0	1	0	0
46	<i>P_trichrootricha</i>	2	0	0	0	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
47	<i>P_willinki</i>	0	0	0	0	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
48	<i>P_xanthorhina</i>	?	?	?	?	?	0	1	0	1	1	1	0	0	1	0	0	0	1	0	0	2	0	0
49	<i>P_xanthotricha</i>	?	?	?	?	?	0	1	0	1	0	1	2	0	1	2	0	0	1	1	1	2	2	2

No.		91	92	93	94
1	<i>Cad_occidentalis</i>	1	0	0	0
2	<i>Cr_crawfordi</i>	1	0	1	0
3	<i>Caup_gayi</i>	0	1	0	1
4	<i>P_aculeata</i>	1	1	2	1
5	<i>P_aenigmatica</i>	1	2	0	0
6	<i>P_amita</i>	1	1	0	0
7	<i>P_arizonensis</i>	1	1	1	0
8	<i>P_buchwaldi</i>	1	1	0	0
9	<i>P_chamelensis</i>	1	1	1	0
10	<i>P_concinna</i>	?	?	?	?
11	<i>P_costaricana</i>	1	1	1	0
12	<i>P_cyaniventris</i>	0	0	1	0
13	<i>P_decipiens</i>	1	0	1	0
14	<i>P_decora</i>	?	?	?	?
15	<i>P_dubia</i>	1	1	0	1
16	<i>P_ducalis</i>	1	2	0	0
17	<i>P_eximia</i>	1	1	2	0
18	<i>P_fulvopilosa</i>	?	?	?	?
19	<i>P_generosa</i>	?	?	?	?
20	<i>P_giacomellii</i>	?	?	?	?
21	<i>P_goffergei</i>	?	?	?	?
22	<i>P_hemileuca</i>	1	1	2	0
23	<i>P_hondurasica</i>	1	1	0	0
24	<i>P_hoplopoda</i>	?	?	?	?
25	<i>P_immixta</i>	?	?	?	?
26	<i>P_jonesi</i>	1	1	1	1
27	<i>P_lanosa</i>	?	?	?	?

No.		91	92	93	94
28	<i>P_latecalcarata</i>	?	?	?	?
29	<i>P_lucernarum</i>	1	0	1	0
30	<i>P_magretti</i>	1	1	1	1
31	<i>P_matutina</i>	1	1	0	0
32	<i>P_mexicana</i>	1	1	2	0
33	<i>P_olivacea</i>	?	?	?	?
34	<i>P_ollantayi</i>	?	?	?	?
35	<i>P_pallida</i>	?	?	?	?
36	<i>P_pretiosa</i>	1	1	2	0
37	<i>P_psednozona</i>	?	?	?	?
38	<i>P_rugata</i>	1	0	1	1
39	<i>P_stafuzzai</i>	?	?	?	?
40	<i>P_styphlaspis</i>	?	?	?	?
41	<i>P_tarsata</i>	0	0	2	1
42	<i>P_tenuimargina</i>	1	1	0	0
43	<i>P_thoracica</i>	1	0	1	0
44	<i>P_tomentosa</i>	?	?	?	?
45	<i>P_torquata</i>	?	?	?	?
46	<i>P_trichrootricha</i>	1	0	1	0
47	<i>P_willinki</i>	1	1	1	1
48	<i>P_xanthorhina</i>	?	?	?	?
49	<i>P_xanthotricha</i>	?	?	?	?

LITERATURE CITED

- Alexander, B.A. & Michener, C.D. (1995). Phylogenetic studies of the families of short-tongued bees. *University of Kansas Science Bulletin*, 55, 377–424.
- Almeida, E.A.B. & Danforth, B.N. (2009). Phylogeny of colletid bees (Hymenoptera: Colletidae) inferred from four nuclear genes. *Molecular Phylogenetics and Evolution*, 50, 290–309.
- Ascher, J.S. & Pickering, J. (2014). Discover Life's bee species guide and world checklist. Retrieved from <http://www.discoverlife.org/mp/20qsearch=Ptiloglossa>
- Ashmead, W.H. (1899). Classification of the bees, or the superfamily Apoidea. *Transactions of the American Entomological Society*, 26, 49–100.
- Ayala, R. & Engel, M.S. (2014). A new species of *Ptiloglossa* from Mexico, with new records of *Ptiloglossa cyaniventris* from Panama and Costa Rica (Hymenoptera: Colletidae). *Journal of Melittology*, 35, 1–13.
- Bertoni, A. de W. (1911). Contribución á la biología de las avispas y abejas del Paraguay. *Anales del Museo Nacional de Buenos Aires*, 15, 97–146.
- Brady, S.G. & Danforth, B.N. (2004). Recent intron gain in elongation factor-1 of colletid bees. *Molecular Biology and Evolution*, 21, 691–696.
- Calderone, N.W. (2012). Insect Pollinated Crops, Insect Pollinators and US Agriculture: Trend Analysis of Aggregate Data for the Period 1992–2009. *PLoS ONE*, 7 (5), e37235. doi:10.1371/journal.pone.0037235
- Cameron, P. (1903). Descriptions of new species of Hymenoptera taken by Mr. Edward Whymper on the "Higher Andes of the Equator". *Transactions of the American Entomological Society*, 29, 225–238.

- Cameron, S.A., Lozier, J.D., Strange, J.P., Koch, J.B., Cordes, N., Solter, L.F. & Griswold, T.L. (2011). Patterns of widespread decline in North American bumble bees. *Proceedings of the National Academy of Sciences of the United States of America*, 11 (2), 662–667.
- Cockerell, T.D.A. (1905). Notes on some bees in the British Museum. *Transactions of the American Entomological Society*, 31, 309–364.
- Cockerell, T.D.A. (1911). Descriptions and records of bees XXXVIII. *Annals and Magazine of Natural History*, 8 (8), 282–290.
- Cockerell, T.D.A. (1912). Descriptions and records of bees- XLIV. *Annals and Magazine of Natural History*, 8 (9), 554–568.
- Cockerell, T.D.A. (1919). Bees in the collection of the United States National Museum. *Proceedings of the United States National Museum*, 55, 167–221.
- Cockerell, T.D.A. (1923). Some bees from British Guiana. *Annals and Magazine of Natural History*, 9 (11), 442–459.
- Cockerell, T.D.A. (1949). Bees from Central America, principally Honduras. *Proceedings of the United States National Museum*, 98, 429–490.
- Coleman, J.R. & Coleman, M.A. (1982). Reproductive biology of an Andromonoecious *Solanum* (*S. palanacanthum* Dunal). *Biotropica*, 14 (1), 69–75.
- Cresson, E.T. (1878). Descriptions of new species of North American bees. *Proceedings of the Academy of Natural Sciences of Philadelphia*, 30, 181–221.
- Danforth, B. N., Brady, S. G. & Pearson, A. (2004). Single copy nuclear genes recover Cretaceous-age divergences in bees. *Systematic Biology*, 53 (2), 309–326.

- Danforth, B. N., Cardinal, S., Praz, C., Almeida, E.A.B. & Michez, D. (2012). The Impact of Molecular Data on Our Understanding of Bee Phylogeny and Evolution. *Annual Review of Entomology*, 58, 57–78.
- Danforth, B.N., Sipes, S., Fang, J. & Brady, S.G. (2006). The history of early bee diversification based on five genes plus morphology. *Proceedings of the National Academy of Science USA*, 103, 15118–15123.
- Debevec, A.H., Cardinal, S. & Danforth, B.N. (2012). Identifying the sister group to the bees: a molecular phylogeny of Aculeata with an emphasis on the superfamily Apoidea. *Zoologica Scripta*, 41, 527–535.
- Ducke, A. (1913). Die natürlichen Bienengenera Südamerikas. *Zoologische Jahrbücher. Abteilung für Systematik, Geographie und Biologie der Tiere.*, 34, 51–116.
- Engel, M.S. (2001). A monograph of the Baltic amber bees and evolution of the Apoidea (Hymenoptera). *Bulletin of the American Museum of Natural History*, 259, 1–192.
- Fox, W.J. (1893). Synopsis of the N. American species of Megacilissa. *Psyche* 6 (203), 421–422.
- Fox, W.J. (1895). Third report on some Mexican Hymenoptera, principally from Lower California. *Proceedings of the California Academy of Sciences*, 2 (5), 260–272.
- Friese, H. (1898). Monographie der Bienengattungen *Megacilissa*, *Caupolicana*, *Diphaglossa* und *Oxaea*. *Annalen des K-K Naturhistorischen Museums in Wien*, 13 (1), 59–88.
- Friese, H. (1899). Monographie der Bienengattungen *Megacilissa*, *Caupolicana* und *Oxaea*. *Annalen des K-K Naturhistorischen Museums in Wien*, 14 (3), 239–246.

- Friese, H. (1900). Neue Bienenarten Süd-America's. *Entomologische Nachrichten*, 26 (12), 180–184.
- Friese, H. (1904). Zweiter Nachtrag zu den Bienengattungen *Caupolicana*, *Ptiloglossa* und *Oxaea* (Hym.). *Zeitschrift für systematische hymenopterologie und dipterologie*, 4, 17–20.
- Friese, H. (1908). Die Apidae (Blumenwespen) von Argentina nach den Reisenergebnissen der Herren A. C. Jensen-Haarup und P. Jörgensen in den Jahren 1904-1907. *Flora Fauna*, 10, 1–94.
- Friese, H. (1925). Neue neotropische Bienenarten, zugleich II. Nachtrag zur Bienenfauna von Costa Rica. (Hym.). *Stettiner Entomologische Zeitung*, 86 (2), 1–41.
- Goloboff, P.A., Farris, J.S. & Nixon, K.C. (2008). TNT, a free program for phylogenetic analysis. *Cladistics*, 24, 1–13.
- Gonzalez, V.H., Griswold, T.L. & Engel, M.S. (2013). Obtaining a better taxonomic understanding of native bees: where do we start *Systematic Entomology*, 38, 645–653.
- Greiner, B. (2005). *Adaptations for nocturnal vision in insect apposition eyes*. (Ph.D. thesis), Lund University, Lund.
- Hurd, P.D. & Linsley, E.G. (1976). The bee family Oxaeidae with a revision of the North American species (Hymenoptera, Apoidea). *Smithsonian Contributions to Zoology*, 220, 1–75.
- Linsley, E. G. (1962). The colletid *Ptiloglossa arizonensis* Timberlake, a matinal pollinator of *Solamun* (Hymenoptera). *Pan-Pacific Entomology*, 38, 75–82.

- Linsley, E.G. & Crazier, M.A. (1970). Some competitive relationship among matinal and late afternoon foraging activities of *Caupolicanini* bees in southeastern Arizona (Hymenoptera, Colletidae). *Journal of the Kansas Entomological Society*, 43, 251–261.
- Michener, C.D. (1944). Comparative external morphology, phylogeny, and a classification of the bees. *Bulletin of the American Museum of Natural History*, 82, 151–326.
- Michener, C.D. (1954). Bees of Panamá. *Bulletin of the American Museum of Natural History*, 104 (1), 5–175.
- Michener, C.D. (1965). A classification of the bees of the Australian and South Pacific regions. *Bulletin of the American Museum of Natural History*, 130, 1–362, pls. 361–365.
- Michener, C.D. (1966). The classification of the Diphaglossinae and North American species of the genus *Caupolicana* (Hymenoptera, Colletidae). *University of Kansas Science Bulletin*, 46 (20), 717–751.
- Michener, C.D. (1979). Biogeography of the bees. *Annals of the Missouri Botanical Garden*, 66 (3), 277–347.
- Michener, C.D. (1986). A review of the tribes Diphaglossini and Dissoglottini (Hymenoptera, Colletidae). *The University of Kansas Science Bulletin*, 53 (4), 183–214.
- Michener, C.D. (2007). *The Bees of the World*. The Johns Hopkins University Press, Baltimore, Maryland, 913 pp.

- Michener, C.D., Engel, M.S. & Ayala, R. (2003). The bee genus *Caupolicana* in Central America (Hymenoptera: Colletidae). *Journal of the Kansas Entomological Society*, 76 (2), 160–171.
- Moisset, B. & Buchmann, S. (2011). *Bee Basics: An Introduction to Our Native Bees* L. Stritch, J. Nelson, T. Prendusi, & L. Davies Adams (Eds.), 40 pp.
- Moure, J.S. (1944). Apoidea da coleção do Conde Amadeu A. Barbiellini (Hym. Apoidea). *Revista de Entomologia (Rio de Janeiro)*, 15 (1-2), 1–18.
- Moure, J.S. (1945). Contribuição para o conhecimento dos Diphaglossinae, particularmente *Ptiloglossa* (Hym. - Apoidea). *Arquivos do Museu Paranaense*, 4 (6), 137–178.
- Moure, J.S. (1947). Notas sobre algunas abejas dela provincial de Salta (Hym. Apoidea). *Revista de la Sociedad Entomologica Argentina*, 3 (3), 153–218.
- Moure, J.S. (1953). Notas sobre Colletidae sul-americanos (Hymenoptera, Apoidea). *Dusenian*, 4 (1), 61–78.
- Moure, J.S. (1964). Os espécies de *Zikanapis*, com a descrição de dois novos subgêneros e duas espécies novas. *Studia Entomologica*, 7, 417–458.
- Moure, J.S. (1987). Contribuição para o conhecimento do gênero *Ptiloglossa* (Hymenoptera, Colletidae). *Acta Biologica Paranaense*, 16 (1, 2, 3, 4), 107–131.
- Moure, J. S. (1995). Reestudo de alguns tipos de abelhas neotropicais descritos por Friese e conservados no Museu de Berlim (Apoidea, Colletidae, Anthophoridae). *Revista Brasileira de Zoologia*, 12 (4), 939–952.

- Nixon, K.C. (2002). WinClada ver. 1.00.08 Published by the author, Ithaca, NY.
Available at <http://www.cladistics.com>.
- Nunes-Silva, P., Hrnčir, M. & Imperatriz-Fonseca V.L. (2010). A polinização por vibração. *Oecologia Australis*, 14 (1), 140–151.
- Otis, G.W., McGinley, R.J., Garling, L. & Malaret, L. (1982). Biology and systematics of the bee genus *Crawfordapis*. *Psyche*, 89, 279–296.
- Roberts, R.B. (1971). Biology of the crepuscular bee *Ptiloglossa guinnae* n. sp. with notes on associated bees, mites and yeasts. *Journal of the Kansas Entomological Society*, 44, 283–294.
- Rozen, J.G.J. (1984). Nesting biology of Diphaglossinae bees. *American Museum Novitates*, 2786, 1–33.
- Sass, J. (2011). Why We Need Bees: Nature's Tiny Workers Put Food on Our Tables. *Natural Resources Defense Council*, (March 2011). Retrieved from <https://www.nrdc.org/wildlife/animals/files/bees.pdf>
- Schrottky, C. (1901). Biologische Notizen solitärer Bienen von S. Paulo (Brasilien). *Allgemeine Zeitschrift für Entomologie*, 6, 209–216.
- Schrottky, C. (1902a). Ensaio sobre as abelhas solitárias do Brazil. *Revista do Museu Paulista*, 5, 330–613.
- Schrottky, C. (1902b). Les espèces des genres *Megacilissa*, *Caupolicana*, *Oxaea*, *Epicharis*, *Centris*, *Meliphila* et *Euglossa* dans le collection du Musée National de Buenos Aires. *Anales del Museo Nacional de Buenos Aires*, 7, 317–327.
- Schrottky, C. (1904). Beitrag zur Kenntnis einiger Südamerikanischer Hymenopteren. *Allgemeine Zeitschrift für Entomologie*, 9, 344–349.

- Schrottky, C. (1907). Contribución al conocimiento de los himenópteros del Paraguay. *Annales Cientificos Paraguayos*, 7 (1), 1–78.
- Schrottky, C. (1910). Neue und wenig bekannte südamerikanische Bienen. *Entomologische Rundschau*, 27, 56–57.
- Schrottky, C. (1914). Einige neue Bienen aus Süd-Amerika. *Deutsche entomologische Zeitschrift*, 1914, 625–630.
- Shelly, R.E.T., Villalobos, E.M., Buchman, S.L. & Cane, J.H. (1993). Temporal patterns of floral visitation for two bees species foraging on *Solanum*. *Journal of the Kansas Entomological Society*, 66, 319–327.
- Smith, F. (1853). *Catalogue of Hymenopterous Insects in the Collection of the British Museum. Part I. Andrenidae and Apidae*. London, 197 pp.
- Smith, F. (1861). Descriptions of new genera and species of exotic Hymenoptera. *Journal of Entomology [London]*, 1, 146–155.
- Smith, F. (1879). *Descriptions of New Species of Hymenoptera in Collection of the British Museum*. London: British Museum, 240 pp.
- Timberlake, P. H. (1946). Two new species of *Ptiloglossa* from Arizona. *Pan-Pacific Entomology*, 22 (4), 156–158.
- Timberlake, P. H. (1965). Notes on Caupolicanini bees of Arizona (Hymenoptera: Apoidea). *Journal of the New York Entomological Society*, 73 (1), 46–48.
- Urban, D. & Moure, J.S. (2001). Catálogo de Apoidea da região Neotropical (Hymenoptera, Colletidae). II. Diphaglossinae. *Revista Brasileira de Zoologia*, 18 (1), 1–34.

Vachal, J. (1904). Voyage de M. G. A. Baer au Tucuman (Argentine). Hymenoptera Mellifera (Familia unica: Apidae). *Revue d'Entomologie (Caen)* 23, 9–26.

Vachal, J. (1909). Espèces nouvelles ou litigieuses d' Apidae du haut Bassin du Parana et des régions contiguës et délimitation d' une nouvelle sous-famille Diphaglossinae (Hym.). *Revue d' Entomologie*, 28, 5–64.

Velez-Ruiz, R.I. (2011). Recuento sobre las publicaciones de las abejas silvestres de Colombia. *Boletín del Museo Entomológico Francisco Luís Gallego*, 3 (3), 15–29.