

UNIVERSIDADE FEDERAL DO PARANÁ

GABRIELA GELINSKI FEOLA

TAXONOMY OF THE SPECIES OF *HELINA* ROBINEAU-DESVOIDY (DIPTERA:
MUSCIDAE) FROM HIGHLANDS OF COLOMBIA AND ECUADOR

CURITIBA

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(DIPTERA: MUSCIDAE) FROM HIGHLANDS OF COLOMBIA AND
ECUADOR**

Dissertação apresentada ao curso de Pós-Graduação em entomologia, Setor de ciências biológicas, Universidade Federal do Paraná, como requisito parcial à obtenção do título de Mestre em entomologia.

Orientador: Prof. Dr. Claudio José Barros de Carvalho

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Os membros da Banca Examinadora designada pelo Colegiado do Programa de Pós-Graduação em CIÊNCIAS BIOLÓGICAS (ENTOMOLOGIA) da Universidade Federal do Paraná foram convocados para realizar a arguição da dissertação de Mestrado de GABRIELA DELINSKI FEOLA intitulada: Taxonomy of the species of *Helina* Robineau-Desvoidy, (Diptera: Muscidae) from highlands of Colombia and Ecuador, sob orientação do Prof. Dr. CLAUDIO JOSE BARROS DE CARVALHO, que após terem inquirido a autora e realizada a avaliação do trabalho, são de parecer pela sua aprovação no rito de defesa. A outorga do título de mestre está sujeita à homologação pelo colegiado, ao atendimento de todas as indicações e correções solicitadas pela banca e ao pleno atendimento das demandas regimentais do Programa de Pós-Graduação.

CURITIBA, 21 de Fevereiro de 2020.

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RESUMO

Helina é um gênero de Muscidae, distribuído em todo o mundo, com aproximadamente 540 espécies, incluindo 100 espécies na região neotropical. Muitas espécies deste grande gênero são conhecidas apenas por suas descrições originais, sem fotografias das espécies-tipo nem desenhos de genitálias publicados. Analisamos as espécies conhecidas (por meio de descrição ou fotografia) da região e o material do Coleção Entomológica Padre Jesus Santiago nas áreas altas da Colômbia e do Equador entre (1,000 - 3,000 m acima do nível do mar) foi examinado. Dissecamos a genitália masculina e feminina e preparamos imagens de ambos os sexos de cada espécie. Aqui, descrevemos seis novas espécies: uma da Colômbia (*Helina* sp. nov. 1) e cinco do Equador (*Helina* sp. nov. 2; *Helina* sp. nov. 3; *Helina* sp. nov. 4; *Helina* sp. nov. 5 and *Helina* sp. nov. 6). Também encontramos três espécies já conhecidas, mas como novos registros para a área de estudo: *Helina longipila* (Stein, 1918) agora descrita apenas para Colômbia (retirada da Argentina e do Brasil). *Helina marginipennis* (Stein, 1904) agora descrita para o Equador. *Helina vierecki* Snyder, 1941 agora registrada para o Equador. Para todas as espécies conhecidas fizemos uma diagnose e as seis novas espécies receberam uma diagnose e uma descrição completa. Por fim, revalidamos *H. anthracina* Albuquerque, 1956 previamente sinonimizada como *H. longipila*. Incluímos uma chave de identificação para todas as espécies.

Palavras-chave: Colombia, Ecuador, *Helina*, Áreas altas.

ABSTRACT

The genus *Helina* (Family Muscidae) is found worldwide and comprises about 540 species, including the current 100 species of the Neotropical region. Many species in this large genus are known only from their original descriptions that include neither drawings nor images of the type species or their terminalia. We analyzed the known Neotropical-region species (by description or photographs) as well as the material of the *Coleção Entomológica* Padre Jesus Santiago Moure from the highlands of Colombia and Ecuador (1000 – 3000 m elevation). We dissected male and female terminalia and prepared images of specimens of both sexes. Here, we also describe six new species, one from Colombia (*Helina* sp. nov. 1) and five from Ecuador (*Helina* sp. nov. 2; *Helina* sp. nov. 3; *Helina* sp. nov. 4; *Helina* sp. nov. 5 and *Helina* sp. nov. 6). Also, we found new records for three species. *Helina longipila* (Stein, 1918) is now found only in Colombia (removed from Argentina and Brazil). *Helina marginipennis* (Stein, 1904) is now found in Ecuador. *Helina vierecki* Snyder, 1941 is also now found in Ecuador. We prepared new diagnoses for all the known species, as well as diagnosis and complete descriptions for the six new species. In so doing, we revalidated *H. anthracina* Albuquerque, 1956 previously synonymized with *H. longipila*. We include a key to all species.

Key-words: Colombia, Ecuador, *Helina*, Highlands.

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LIST OF ABBREVIATIONS

BPT	- Blue pan trap
MT	- Malaise trap
RPT	- Red pan trap
WPT	- White pan trap
YPT	- Yellow pan trap

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INTRODUÇÃO GERAL

Muscidae (Diptera) é composta por mais de 5210 espécies em 200 gêneros (Pape & Thompson 2013), e pode ser encontrada em todas as regiões biogeográficas (de Carvalho & Couri 2002), sendo mais diversa em áreas florestadas e mais escassa em regiões áridas (de Carvalho et al. 2005; Brown *et al.* 2010). É uma das famílias de dípteros com maior riqueza (Löwenberg-Neto & de Carvalho 2013), e pode ser encontrada desde áreas litorâneas até elevadas altitudes, como as cadeias montanhosas dos Andes (de Carvalho & Couri 2002; de Carvalho *et al.* 2005).

A família Muscidae é monofilética, como demonstrado por diversos métodos (Hennig 1965; de Carvalho 1989; McAlpine 1989; de Carvalho & Couri 2002; Pape & Thompson 2013; Kutty *et al.* 2008, 2014; Haseyama *et al.* 2015). Três caracteres morfológicos identificam essa monofilia: 1) o abdômen feminino possui menos de sete pares de espiráculos (ambos são apomorfias em Calyptratae), 2) sistema reprodutor masculino com um par de glândulas acessórias, e 3) ganchos bucais das larvas são mais aproximados uns dos outros (Hennig 1965; Skidmore 1985; McAlpine 1989).

Usando a morfologia, a classificação mais comum divide a família em oito subfamílias e tribos: Achantipterinae Rondani 1856, Atherigoninae Fan, 1965 Azeliinae Robineau-Desvoidy 1830, with the tribes Azeliini Robineau-Desvoidy 1830 and Reinwardtiini Brauer & Bergenstamm 1889; Coenosiinae Verrill 1888, com Coenosiini Verrill 1890 e Linnophorini Villeneuve 1902; Cyrtoneurinae Snyder 1954; Muscinae Latreille 1802, com Muscini Latreille 1802 e Stomoxyini Meigen, 1824; Mydaeinae Verrill 1888 e Phaoniinae Malloch e 1917 (de Carvalho *et al.* 2005). Mais recentemente apenas três subfamílias foram reconhecidas (com dados moleculares): Muscinae Latreille 1802, Cyrtoneurinae Snyder 1954 e Mydaeinae Verrill 1888 (Haseyama *et al.* 2015).

As larvas de Muscidae ocorrem em variados habitats podendo serem encontradas em esterco, carniça, ninho de pássaros e de mamíferos, lama e água corrente (Brown *et al.* 2010). Os hábitos alimentares também são bem variáveis, incluindo predação, fitofagia, hematofagia e saprofagia (Skidmore 1985). Elas também podem ser utilizadas na terapia larval e causar miíases. Os adultos podem ser encontrados em flores e em outros animais onde se alimentam de sangue (*Haematobia* Le Peletier & Serville in Latreille *et al.*, 1828, *Neivamyia* Pinto & Fonseca, 1930, *Stomoxys* Geoffroy, 1762) ou podem ser predadores (Coenosiinae) ou saprófagos. Além disso, ainda podem ser vetores de patógenos (*Musca domestica* Linnaeus, 1758) (de Carvalho & Couri 2002).

A coloração corporal varia em tons de cinza, preto e amarelo, tendo ainda algumas espécies metálicas em tons de azul e verde. Indivíduos desta família podem ser reconhecidos pela ausência de cerdas fortes no mero e no escutelo sem cerdas na face ventral, assim como a veia subcostal atingindo a veia costal em um ângulo mais acentuado (de Carvalho *et al.* 2005; Brown *et al.* 2010).

Helina Robineau-Desvoidy, 1830, é o segundo gênero mais rico de Muscidae (Patitucci *et al.* 2016) e é cosmopolita, com cerca de 540 espécies (Zhang *et al.* 2011; Xue & Sun 2015; Patitucci *et al.* 2016), das quais 100 podem ser encontradas na região Neotropical e, com frequência são conhecidas apenas por sua descrição original (de Carvalho *et al.* 2005, Patitucci *et al.* 2016). Algumas espécies foram incluídas em *Helina* por não conseguirem ser encaixadas a outros gêneros, gerando uma necessidade de revisão deste grupo (de Carvalho & Couri 2002, Patitucci *et al.* 2016). Pela taxonomia do gênero ser tão confusa, alguns autores (Stein 1911; Snyder 1941; Snyder 1949) criaram uma separação em grupos de espécies, relacionando-as à região de coleta com caracteres morfológicos em comum entre elas. Além disso, há uma grande falta de informação quanto a biologia tanto de imaturos quanto de adultos na América do Sul (Skidmore 1985; Patitucci *et al.* 2016).

As espécies de *Helina* conhecidas são distribuídas de tal maneira para a região Neotropical: Brasil (22 espécies), Peru (20), Argentina (16), Bolívia (11), Chile (8),

Equador (8), Colômbia (6), Paraguai (2), Venezuela (2), e Falkland Islands (1) (Löwenberg-Neto & de Carvalho 2013, Figura 1). Devida a ampla distribuição e difícil acesso a várias localidades em que podem ser encontradas (Pollet & Arias 2013), muitas espécies ainda são desconhecidas. Considerando que a diversidade tende a diminuir com maiores altitudes, áreas altas recebem menos atenção de coleta (Pollet & Arias 2013).

Este gênero é um repositório taxonômico (muitas espécies são inclusas *Helina* quando não se consegue identifica-las para outros gêneros (de Carvalho & Couri 2002, Patitucci *et al.* 2016), com a morfologia muito diversificada, dificultando a compreensão das espécies. Como consequência, várias sinonímias surgem com o tempo. Por exemplo,

Ariciella Malloch, 1918 (espécie-tipo, *A. flavicornis* Malloch); *Xenothoracochaeta* Malloch, 1921 (espécie-tipo, *X. prima* Malloch); *Airalips* Snyder 1949 (*Spilogaster plumata* Stein = *A. rufiguttata* Snyder). Mais tarde, todos esses nomes foram reunidos sob *Helina* devido a caracteres em comum das espécies de regiões geográficas próximas. (i.e., Neártico, Paleártico e região Neotropical; Snyder 1949).

Além da variedade, muitas espécies são morfologicamente similares, sendo difícil

defini-las. Com a sinonímia de *Xenothoracochaeta* com *Helina* (de Carvalho *et al.* 2005), a variação morfológica aumentou ainda mais. Por exemplo, agora em *Helina*, o prosterno, anepímero, mero, veias alares, espiráculo posterior e escutelo podem ou não conter cerdas. Portanto, seguimos o modelo de Patitucci (2016) em restringir a diagnose à área de estudo. Pela morfologia ser bem similar externamente, as genitálias são muito importantes para identificação de espécies.

Evidências morfológicas (Hennig 1965; Skidmore 1985; de Carvalho 1989, de Carvalho *et al.* 2019) e moleculares (Haseyama *et al.* 2015) indicam parafilia para as espécies do Paleártico. O gênero comporta uma morfologia que tem dividido o grupo em subgrupos (Snyder 1940, Hennig 1965), para facilitar a compreensão de suas relações internas.

Helina e *Ariciella* Malloch 1918 (um gênero Neotropical) foram relacionadas com duas espécies da Austrália (*H. antarctica* Bigot and *H. spilariformis* Malloch) que apresentam cerdas no mero e espiráculo posterior (Snyder, 1940). Algumas espécies do Neártico também foram relacionadas com *Airalips* Snyder 1949 e a *Xenothoracochaeta* Malloch 1921, devido a cerdas no prosterno, mero e no escutelo (Snyder 1949). Em sequência, *Xenothoracochaeta prima* Malloch 1921 foi sinonimizada com *Airalips differentia* Snyder 1949 devido a cerdas na porção ventral da terceira veia da asa (Snyder 1954). *Xenothoracochaeta* também foi sinonimizada posteriormente com *Helina* (de Carvalho *et al.* 2005).

Aqui, nós resolvemos algumas questões dentro do gênero examinando exemplares de elevadas altitudes que, possivelmente, correspondem a áreas de endemismo e que se tem poucos dados sobre a distribuição de Muscidae. Foram descritas seis novas espécies: uma da Colômbia (*Helina* sp. nov. 1) e cinco do Equador (*Helina* sp. nov. 2; *Helina* sp. nov. 3; *Helina* sp. nov. 4; *Helina* sp. nov. 5, e *Helina* sp. nov. 6). Também encontramos três espécies já conhecidas com novos registros para a área de estudo: *Helina longipila* (Stein, 1918) agora descrita apenas para Colômbia (retirada da Argentina e do Brasil); *Helina marginipennis* (Stein, 1904) agora descrita para o Equador; e, *Helina vierecki* Snyder, 1941 agora registrada para o Equador. Para todas as espécies conhecidas fizemos uma diagnose e as seis novas espécies receberam uma diagnose e uma descrição completa. Por fim, revalidamos *H. anthracina* Albuquerque, 1956 previamente sinonimizada como *H. longipila*. Incluímos também uma chave de identificação para todas as espécies da região estudada.

INTRODUCTION

Muscidae (Diptera), comprising more than 5210 species in 200 genera (Pape & Thompson 2013), while found in all biogeographic regions (de Carvalho & Couri 2002), are most diverse in forests and nearly absent from deserts (de Carvalho et al. 2005; Brown *et al.* 2010). Among the most speciose fly families (Löwenberg-Neto & de Carvalho 2013), they can be found from sea level to high altitudes, such as the Andes (de Carvalho & Couri 2002; de Carvalho *et al.* 2005).

The family Muscidae is monophyletic, demonstrated by a variety of methods (Hennig 1965; de Carvalho 1989; McAlpine 1989; de Carvalho & Couri 2002; Pape & Thompson 2013; Kutty *et al.* 2008, 2014; Haseyama *et al.* 2015). Three morphological characters identify their monophyly: 1) the abdomen in females has less than seven pairs of spiracles (an apomorphy in Calyptrate), 2) male reproductive system lacks without a pair of accessory glands, and 3) larval buccal hooks are compressed (Hennig 1965; Skidmore 1985; McAlpine 1989).

Using morphology, the most often used classification divides the family into eight subfamilies and tribes: Achantipterinae Rondani, 1856, Atherigoninae Fan, 1965, Azeliinae Robineau-Desvoidy, 1830, with the tribes Azeliini Robineau-Desvoidy, 1830 and Reinwardtiini Brauer & Bergenstamm, 1889; Coenosiinae Verral, 1888, with Coenosiini Verral, 1890 and Limnophorini Villeneuve, 1902; Cyrtoneurinae Snyder, 1954; Muscinae Latreille, 1802, with Muscini Latreille, 1802 and Stomoxyini Meigen, 1824; Mydaeinae Verral, 1888 and Phaoniinae Malloch, 1917 (de Carvalho *et al.* 2005). More recently, only three subfamilies were recognized (with analysis of protein-coding genes): Muscinae Latreille, 1802, Cyrtoneurinae Snyder, 1954 and Mydaeinae Verral, 1888 (Haseyama *et al.* 2015).

Habitats vary in which larvae of the Muscidae are found and include manure, carrion, bird and mammal nests, mud and running water (Brown *et al.* 2010). Feeding habits are similarly variable, including predation, phytophagy, hematophagy and saprophagy (Skidmore 1985). They also can be used in larval therapy and cause myiasis. Adults can be found on flowers and on animals where they may feed on blood (*Haematobia* Le Peletier & Serville in Latreille *et al.*, 1828, *Neivamyia* Pinto & Fonseca, 1930, *Stomoxys* Geoffroy, 1762) or they may be predators (Coenosiinae) or saprophages. Additionally, they may be vectors of pathogens (*Musca domestica* Linnaeus, 1758) (de Carvalho & Couri 2002).

Body color tends to vary among shades of gray, black and yellow, with some species being metallic blue or green. Individuals of this family can be recognized due to the meron lacking strong setae and the scutellum lacking setae on the ventral surface, apically and the subcostal vein that reaches the costal vein, usually with a sharp subapical angle (de Carvalho *et al.* 2005; Brown *et al.* 2010).

Helina Robineau-Desvoidy, 1830, is the second most species-rich genus in the Muscidae (Patitucci *et al.* 2016) and is also world-wide, with about 540 species (Zhang *et al.* 2011; Xue & Sun 2015; Patitucci *et al.* 2016), 100 of which are found in the Neotropical region and often known only from the original description (de Carvalho *et al.* 2005, Patitucci *et al.* 2016). Some species are known from higher elevations (Patitucci *et al.* 2016; de Carvalho *et al.* 2019).

Helina ssp are widely distributed in the Neotropical region, including Brazil (22 species), Peru (20), Argentina (16), Bolivia (11), Chile (8), Ecuador (8), Colombia (6), Paraguay (2 species), Venezuela (2 species), and the Falkland Islands (1) (Löwenberg-Neto & de Carvalho 2013, Figure 1). Due to the ample distribution and difficulty of access of many locations where they may be found (Pollet & Arias 2013), many species are likely to be unknown. While diversity declines with altitude, higher regions have received much less attention (Pollet & Arias 2013).

This is a taxonomic repository genus (many species were included in *Helina* when they could not be identified to any other genus (de Carvalho & Couri 2002, Patitucci *et al.* 2016)), with widely varying morphologies that introduce confusion in understanding the relationships among the species. As a consequence, several synonyms appeared over time. For example, Robineau-Desvoidy (1830) described the genus that was followed by several synonyms: *Ariciella* Malloch, 1918 (type-species, *A. flavicornis* Malloch); *Xenothoracochaeta* Malloch, 1921 (type-species, *X. prima* Malloch); *Airalips* Snyder, 1949 (*Spilogaster plumata* Stein = *A. rufiguttata* Snyder). Later, these were joined based on common characters and geographical regions (i.e., Nearctic, Palearctic and Neotropical regions; Snyder 1949).

Despite variability, many species are morphologically very similar, and so they are difficult to define. With the synonymy of *Xenothoracochaeta* with *Helina* (de Carvalho *et al.* 2005), variability has increased. For example, within *Helina*, the prosternum, anepimeron, meron, wing veins, posterior spiracle and scutellum may or may not have setulae. Thus, we followed Patitucci (2016) by restricting the diagnosis to each study area. Also, while external morphology is often quite similar, terminalia are much

more variable and useful for specific identification.

Morphological (Hennig 1965; Skidmore 1985; de Carvalho 1989, de Carvalho *et al.* 2019) and molecular evidence (Haseyama *et al.* 2015) indicates paraphyly for the species of the Palearctic. The genus *Helina* comprises many morphological varieties that have been divided into subgroups (Snyder 1940, Henning 1965) in an attempt to understand their relationships.

Here, we begin to resolve several questions of *Helina* in South America by examining the genus and sampling in higher elevations of Andes. We described five new species from Ecuador and one from Colombia and added three new records of known species. We also proposed a key to *Helina* species from Ecuador and Colombia.

OBJECTIVES

My main goal in this study is to review the species of *Helina* from the highlands of Colombia and Ecuador. Specific objectives follow:

- Provide a diagnosis for the genus *Helina* of highlands of Colombia and Ecuador.
- Propose a key for *Helina* ssp. of Colombia and Ecuador.
- Updated diagnosis of the species.
- Describe, and illustrate the terminalia of new and known species.
- Updated the distribution of where *Helina* ssp. are found.

MATERIAL AND METHODS

Study area

The material was collected in Cajanuma and Bombuscaro, in Podocarpus National Park (Bosque Nublado, Los Miradores, Orso de Anteojos, and Higueroes Trails) in the provinces of Loja and Zamora Chinchipe, and San Francisco Biological Reserve (Atajo and Canal Trails), in the province of San Francisco, in 2009. Podocarpus National Park (1642 km²) is an important hotspot with many endemic species in the eastern Andes (Rahbek *et al.* 1995; Ale-Rocha 2016). Bombuscaro is at an altitude of ca. 900 m, and 3800 m at Cajanuma, where the temperature varies from 12° C to 18° C (Rahbek *et al.* 1995; Brehm *et al.* 2005). The Reserva biológica San Francisco is in the Cordillera Real, in the eastern Andes of southern Ecuador, with an altitude of 2000 m – 3400 m, and temperatures of 6 °C – 19°C (Bussmann 2001; Beck *et al.* 2008). In Colombia, the material was collected in the departments of Magdalena (2,500 meters above sea level) and Boyacá (2,850–2,856 meters above sea level), in 2000. Magdalena (23188 km²) in the northern Colombian Andes has a temperature around 21°C, while Boyacá (23102 km²) in the middle Andes of Colombia has a median temperature ca. 12°C.

Specimens

The Diptera Biodiversity and Biogeography Laboratory of the Universidade Federal do Paraná received some Muscidae specimens from Ecuador, as part of a collaborative project, led by Marc A. Pollet (<http://www.naturalsciences.be/>). These specimens included 432 of *Helina* ssp. that were collected from 13 February to 5 March, 2009, using pan and Malaise traps. In the beginning of the study, we had 24 morphospecies and when we analyzed it more carefully, we separated 17 morphospecies of only females and 7 of males and females or only males. We only worked with morphospecies with male because it is easy to recognize them by the keys and chaetotaxy. The specimens are now deposited in the Padre Jesus Santiago Moure Entomological Collection (DZUP). Three specimens are from Colombia (collected during trapping periods 8 – 25 April 2000, 29 January – 15 February 2001, 27 March – 16 April 2001) using Malaise traps, by researchers at Antioquia University, Medellín (UdeA) from Colección Entomológica de la Universidade de Antioquia (CEUA). We also examined photographs (frontal, lateral and dorsal views) of type-specimens of species described from Ecuador and Colombia, acquired from the American Museum of Natural History (AMNH), Civico di Storia

Naturale (MSNM), Museum für Naturkunde der Humboldt-Universität (ZMHB), Museo Naturhistorisches, Staatliches Museum für Tierkunde (SMT), Museum Wien (NMW), Natural History Museum [formerly British Museum (Natural History)] (BMNH), Museu Nacional do Rio de Janeiro (MNRJ) and United States National Museum (USNM)).

The following abbreviations were used on label descriptions: BPT – blue pan trap; RPT – red pan trap; WPT – white pan trap; YPT – yellow pan trap and MT – malaise trap. Locality abbreviations were: C – Cajanuma (3,000 m), SF – San Francisco (2,000 m) and BB - Bombuscaro (1,000 m) for Ecuador (Table 1) and B - Boyaca (2,850 m), M - Magdalena (2,500 m) for Colombia (Table 2).

Dissections and terminology

Specimens were stored in 75% alcohol solution prior to being pin-mounted. With one specimen of each sex per species, dissection began by removal of the abdomen which was then placed in a solution of water and potassium hydroxide (KOH) 85% for 24 hours. Subsequently, the abdomen was placed in acetic acid (10%) for about 30 seconds, then 10 minutes in absolute alcohol, followed by washing with 70% alcohol. Terminalia were then placed on melted glycerinated gelatin where it was viewed and drawn under microscopy. Terminalia were then preserved in an Eppendorf with glycerin (following Gurney *et al.* 1964).

Terminology follows Cumming & Wood (2009), and we use the following abbreviations: acr s = acrostichal seta, ad = anterodorsal, av = anteroventral, d = dorsal, dc s = dorsocentral setae, dm-cu = discal medial-cubital crossvein, ial s = intra-alar, kepst s = katepisternal setae, m = medial vein, p = posterior, pd = posterodorsal, pra = prealar seta, pv = posteroventral, R₄₊₅ = branch 4 and 5 of radius, r-m = radial-medial crossvein, v = ventral.

Examination of specimens and preparation of figures

Specimens were examined and measured using a Wild Heerbrugg M8 stereoscopic microscope (4x and 10x). Photographs were received from the previously mentioned museums, or were taken using the Leica DFC 500 Auto-Montage Imaging system Leica of TaxonLine (UFPR - <http://www.taxonline.ufpr.br/>). Drawings were made using a Zeiss Standard 20 Microscope coupled to a camera lucida. Images were processed using Adobe Illustrator CC (<http://www.adobe.com/products/illustrator/>).

Species Descriptions

Individual specimens were identified using a key to genera (de Carvalho & Couri 2002) and keys to *Helina* species (Stein 1911; Malloch 1934; Snyder 1941; Snyder 1949; & Patitucci *et al.* 2016). We diagnose the known species and provide a complete diagnosis for the new species we describe herein.

Distribution maps

Distribution maps were made using QGis 2.18.11 (QGis-OSGeo4W-2.18.11-1-Setup-x86.exe).

RESULTS

***Helina* Robineau-Desvoidy, 1830**

Type species

Helina euphemioidea Robineau-Desvoidy (Coquillett 1901:137) = *Helina pertusa* Meigen (Carvalho and Couri 2002).

Diagnosis of *Helina* to the species from Colombia and Ecuador highlands.

Black, grey or yellowish. Male holoptic, female dichoptic; eyes slightly pubescent, with short or long cilia; arista plumose or pubescent; palpus filiform or elongated; 2 notopleural setae, the posterior always smaller than the anterior; presutural acrs differentiated or not; prescutellar acrs differentiated or not; dc s 1+3, 2+3 or 2+4; pra absent or present; kepst s 1+2 or 2+2; prosternum, meron and anepimeron bare or setulose; scutellum with or without cilia descending to ventral surface, veins bare or with cilia; veins R₄₊₅ divergent or convergent at the apically; lower calypter glossiform; calcar absent; first abdominal sternite bare.

Key to *Helina* species from Colombia and Ecuador
(Species in brackets were not examined)

1. Black, with grey pruinosity; wings with spots ... 2
- 1' Black, grey or brownish species; wings without spots ... 6
2. Prealar seta present; kepst s 2+2 ... 3
- 2' Prealar seta absent; kepst s 1+2 ... ***H. marginipennis* (Stein, 1904)**
3. Presutural acrs differentiated; dm-cu slightly curved; prescutellar acrs differentiated ... 4
- 3' Presutural acrs differentiated; dm-cu strongly curved; prescutellar acrs undifferentiated ... [***H. brevivena* Snyder, 1941**]
4. dc s 2+3; wing veins bare ... 5
- 4' dc s 2+4; wing veins haired ... [***H. fuscomarginata* (Snyder, 1949)**]
5. Legs black; arista with setulae not longer than base diameter; halter brown ...
***H. vierecki* Snyder, 1941**
- 5' Legs yellow; arista with setulae not longer than 2.5 x base diameter; halter yellow ... ***H. adelpha* (Schiner, 1868)**

6. Wing with several setulae after node on ventral surface of third wing vein and setae on costal vein; arista with setulae longer than flagellomere width; dm-cu slightly curved, meron and anepimeron with few setae ... 7
- 6' Wing veins bare (except costal); arista setulae, variable in size; dm-cu slightly or strongly curved; meron and anepimeron with or without few setae ... 10
7. dc s 1+3; halter brown or brown with yellow knob; lower and upper calypter with margin darkened or not ... 8
- 7' dc s 2+3; halter yellow with brownish knob; lower and upper calypter with margin darkened or not ... 9
8. Prescutellar setae differentiated and prealar less than 1/3 x length of posterior notopleural ... ***Helina* sp. nov. 5**
- 8' Prescutellar setae undifferentiated and prealar absent ... ***Helina* sp. nov. 3**
9. Lateral and apical setae of scutellum very strong, basal third and preapical longer but smaller than apical; arista brownish, base yellowish ... ***Helina* sp. nov. 4**
- 9' Lateral and apical setae of scutellum very long and strong, basal and preapical short and strong; arista entirely brown ... ***Helina* sp. nov. 6**
10. Dm-cu strongly curved, arista pubescent and dc s 1+3 ... ***H. prima* (Malloch, 1921)**
- 10' Dm-cu slightly or strongly curved, arista pubescent or plumose, dc s with 2 presutural setae ... 11
11. R₄₊₅ and M veins divergent or parallel at the apical, halter black, yellow or brown, calypter white or yellow ... 12
- 11' R₄₊₅ and M veins convergent apically, black, stalk base fulvous brown, calypter white ... [***H. browni* Snyder, 1957**]
12. Presutural acrs undifferentiated and acrostichal differentiated or not, dc s postsutural setae 3 ... 13
- 12' Presutural acrs and prescutellar setae differentiated, dc s postsutural setae 3 or 4 ... 14
13. Eyes with long cilia, prescutellar acrs about 1/2 length of last dc s, keps s 2+2 and hind tibia with 2 a and 2 av setae ... ***Helina* sp. nov. 2**
- 13' Eyes with short cilia, prescutellar acrs absent, keps s 1+2 and hind tibia with 1 ad and 3 av setae ... ***H. latipennis* (Stein, 1904)**
14. Black and yellow legs, palpus and body black ... 15

- 14' Black or brown and yellow legs, palpus yellow, body black, yellow or brownish ... 16
15. dc s 2+4, antenna inserted above the middle of the eyes, calypter yellowish and dm-cu strongly curved ... *H. dasyophtalma* Malloch, 1928
- 15' dc s 2+3, antenna inserted in the middle of the eyes, calypter yellow and dm-cu slightly curved ... *Helina* sp. nov. 1
16. Yellowish body, hyaline wings and yellow veins, kepst 1+2 or 2+2 ... 17
- 16' Darker body, hyaline wings and brown veins, kepst 1+2 or 2+2 ... 18
17. Abdomen with two distinct spots, body grayish, thorax with 2 distinct rows, antenna black and dm-cu slightly curved... *H. acrosticalis* Snyder, 1941
- 17' Abdomen without distinct spots, body brownish yellow, thorax with single big brown spot in the middle, antenna brown and dm-cu straight ... *H. acrinis* Snyder, 1941
18. Calypter with margin with a distinct color and arista with setae length about 1.5 x base diameter ... 19
- 18' Calypter with no distinct color on margin, all white and arista with setae length ≥ 2.5 x base diameter ... 20
19. Legs black and yellow, halter orange, calypter white with yellow margins, wing hyaline and mid tibia with two p bristles in the middle ... [*H. anubes* Snyder, 1941]
- 19' Legs black, halter black, calypter white with black margin, wing extensively infuscated at base ... [*H. notha* Snyder, 1941]
20. Fronto-orbital width about $3/4$ x diameter of the anterior ocellus, with four to six pairs of strong pairs of frontal bristles and some shorter setulae, gena height 3 x width of third antenna segment, wing infuscated at base along costal region, becoming gradually smoky to light brown hyaline at apically and along anal region ... [*H. equator* Snyder, 1941]
- 20' Fronto-orbital width $\sim 1/2$ x diameter of the anterior ocellus, with four or five pairs of strong bristles and several weaker setulae that extend half way to the anterior ocellus, gena height 2 x width of third antenna segment, wings yellowish with costal margin very darkened ... *H. longipila* (Stein, 1904)

Description and diagnosis of species

***Helina acrinis* Snyder, 1941**

(Fig. 3)

Helina acrinis Snyder, 1941:12. **Type-locality:** Peru, Chosica.

Diagnosis

Body brownish yellow, legs yellow, palpus and wing veins brown, with r-m and dm-cu clouded; second antenna segment yellow to orange-brown, 1,8x times as long as the third; the third black; calyptra and halter yellow; 2-3 parafrontal bristles; dcs 2+3; kepst s 2+2; 1 d seta on ad area of hind tibia and 2 weaker av on apical third.

Material examined. Original description based in male specimens and photos.

Distribution: Ecuador, Peru

***Helina acrosticalis* Snyder, 1941**

(Fig. 4)

Helina acrosticalis Snyder, 1941:13. **Type-locality:** Ecuador, Quito.

Diagnosis

Body grayish with dark spots on abdomen, legs yellow, palpus yellow halter and wing veins yellow, r-m and dm-cu clouded; second antenna segment brownish-orange, third antenna segment black, only 1,6x times as long as second, slightly broader than in *H. acrinis*; calyptra and halter yellow; parafrontal bristles as in *Helina acrinis*; dc s 2+3; kepst s 2+2; hind femora with longer and slender av and pv setae.

Material examined. Original description, based in male specimens and photos.

Distribution: Ecuador.

***Helina adelpha* (Schiner, 1868)**

(Fig. 5)

Spilogaster adelpha Schiner, 1868:300. **Type-locality:** "Süd-Amerika".

Diagnosis

Body grey, with brown spots on abdomen and brown strips on thorax; legs and palpus brown to black; spots on cross veins; antenna black, longest hairs on arista shorter than its basal diameter; 2-3 parafrontal setae; dc s 2+3; kepst 2+2; 1-2 ad seta on hind tibia.

Material examined. Original description based in male and female specimens. and photos.

Distribution: Mexico, Colombia, Peru.

Helina anubes Snyder, 1941

Helina anubes Snyder, 1941:18. Type-locality: Ecuador, Chimborazo, Urbino Cerro.

Diagnosis

Body black; legs black, palpus black; wings hyaline and cross-veins not infuscated, calyptra yellow with pale margins and halter brownish orange with knobs pale orange; with a complete row of parafrontal setae; antenna and palpus black; dc s : 2+4, kepst s 2+2; Hind femur with a complete row of av bristles, hind tibia with 2 median ad and av setae.

Material examined. Original description, based in female specimens.

Distribution: Ecuador.

Helina brevivena Snyder, 1941

Helina brevivena Snyder, 1941:19. Type-locality: Ecuador, Chimborazo, Cumbre Tililac.

Diagnosis

Body black, with golden yellow pruinosity; legs black; palpus black; the strongly curved posterior cross vein infuscated; antenna black; third antenna segment length 1.8 x as long as the second segment length; hairs on arista on same size or smaller than its basal diameter; calyptrae and halteres pale orange; 3-4 inwardly and 2 outwardly parafrontal setae; dc s 2+3; kepst s 2+2; hind tibia with three ad and three or four av median bristles.

Material examined. Original description based in female specimens.

Distribution: Ecuador.

***Helina browni* Snyder, 1941**

Helina browni Snyder, 1941:17. **Type-locality:** Ecuador, Uyambicho.

Diagnosis

Body black; legs black; palpus black; wings brownish hyaline without spots; antenna black; Upper calyptera white with black margin and lower without dark margin; halteres black with stalk lighter colored; parafrontal, dc s, kepst s as in *Helina longipila*; hind tibia with two median ad and four av bristles and with a row of five or six shorter p bristles on median half (similar to *H. longipila*).

Material examined. Original description based in male specimens.

Distribution: Ecuador.

***Helina dasyophtalma* Malloch, 1928**

(Fig. 6)

Helina dasyophtalma Malloch, 1928a:473. **Type-locality:** Peru, Lago Titicaca.

Diagnosis

Body black; legs black with orange on apical third of femora; palpus brown; wings hyaline with yellow veins at the base, becoming brownish apically, without spots; halter, calypter and base of wing yellow; wing veins yellow at the base and brown, apically; antenna brown with longest arista hairs as long as 1,5x the greatest diameter; 3 strong and 4 weaker parafrontal seta; dc s 2+4; kepst s 2+2; hind femur with a complete row of ad seta and 3 strong av setae.

Material examined. Original description based in male specimens and photos.

Distribution: Peru, Bolivia.

***Helina equator* Snyder, 1941**

Helina equator Snyder, 1941:18. **Type-locality:** Ecuador, Pichincha Prov.

Diagnosis

Body black with bluish-gray pruinescence; legs and palpus black, wings infuscated at base along costal region, becoming smoky at apex and along anal region; antenna black, longest arista hairs $\frac{1}{2}$ x width of largest third antenna segment or about

2.5 x longer than greatest arista diameter; calyptra white and halteres with stalk brownish orange eith knobs yellow; 5-6 pairs of parafrontal bristles dc s 2+4; kepst s 2+2; hind tibia with two median ad and av bristles and several median posterior bristle-like setulae.

Material examined. Original description based in male specimens.

Distribution: Ecuador.

***Helina fuscomarginata* (Snyder, 1949)**

Airalips fuscomarginata Snyder, 1949a:12. **Type-locality:** Colombia, Cali district, western Cordillera.

Diagnosis

Body brownish, legs lighter, especially apical portion of femora, wings with spots on cross veins and at apical area of wings; white calyptra with dark margins and halteres dark; dc s 2+3; mid femur with three or four ventral bristles on basal three-fourths, halter dark and dark calypter margins slightly more conspicuous; no weak pd setae on hind tibia. Palpus, parafrontals and kepst s with no information on original description and we were not able to see the photographs of type-material.

Material examined. Original description, based in female specimens.

Distribution: Colombia.

***Helina latipennis* (Stein, 1904)**

(Fig. 7)

Spilogaster latipennis Stein, 1904:435. **Type-locality:** Colombia, Cordillera & Bolivia, San Antonio.

Diagnosis

Body bluish black, legs brownish with some yellow parts on ventral surface of femora and on dorsal surface of tibiae; wing brownish with veins brown, without spots; antenna brownish, with longest arista hairs longer than 3 times the greatest arista diameter; upper calypter white with brown margin and lower calypter white with white margin, halteres brownish; 3 parafrontal setae; dc s 2+3; kepst s 1+2; 1 pd seta on hind tibia, 6 short and strong setae on apical and ventral surface.

Material examined. Original description based in male and female specimens and photos.

Distribution: Colombia, Bolivia.

***Helina longipila* (Stein, 1918)**

(Figs. 8 and 9)

Mydaea longipila Stein, 1918:217. **Type-locality:** Peru, Ollachea.

Diagnosis

Body black; legs black; palpus black; wings hyaline and very darkened on costal margin, calypter white; antenna black, with longest hairs on arista about twice as long as its greatest diameter, about half as long as width of third antennal segment; 4-5 pairs of strong parafrontal setae; dc s 2+4; kepst 2+2 and hind tibia with 2 ad and 1-3 av setae. On pv surface with hair-like setae, which are longest and slender on basal half. Very similar to *Helina* sp. nov. 2 from Ecuador (Figure 3).

Female. Body length: 5.7 – 6.5 mm; **wing length:** 6.1 – 6.9 mm.

Differs from male as follows: *Head.* Dichoptic, minimum distance between eyes 0.63 – 0.79 mm. *Head.* Frontal setae in 5 - 6 pairs, starting on basal level of pedicel and ending near ocellus. Fronto-orbital plate with few small setae. Ocellar triangle with pair of strong setae that reaches the third or fourth pair of frontal setae.

Legs. Mid femur with three misaligned setae (p to pd) on apical third; hind tibia with 1-3 av setae and no p seta.

Examined material. 22 males, 162 females:

Colombia: Boyacá, SFF Iguaque/cabaña Carrizal, 2850 m, 5°25'N;73°27'W, 27/03-16/04/2001 (MT) (1 ♂ CEUA); Magdalena. PNN SNSM/ El Ramo. 2500 m, 10° 48'N; 73°39'W. 29.01./15.02/2001 (MT) (1 ♂ CEUA).

Ecuador: Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, Rio San Francisco, 2000 m, 03°58'30"S 79°04'25"W, 13/02/2009-18/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-30/MP&ADB (1 ♂ and 6 ♀ RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Bosque Nublado, 3000 m. 16/02/2009-20/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-31/MP&ADB-001 (3 ♀ RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Bosque Nublado, 3000 m. 16/02/2009-20/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-31/MP&ADB-002 (9 ♀ DZUP 562909, 562925, 562924; 562919; 562927; 562921;

562920; 562923; 562922 and 1 RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 16/02/2009-20/02/2009 (WPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-31/MP&ADB-00. (1 ♂ 562911, 11 ♀ DZUP 563032; 562969; 562948; 562990; 562991; 562949; 563012; 562992; 563033; 562949; 562948); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 16/02/2009-20/02/2009 (WPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-31/MP&ADB-004 (1 ♂ RBINS/UTPL, 1 ♂ DZUP 562917, 5 ♀ DZUP 562970; 562929; 562950; 563033; 562971); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 16/02/2009-20/02/2009 (WPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-31/MP&ADB-005 (11 ♀ DZUP 563036; 563035; 562992; 562972; 562932; 562995; 562973; 563013; 562933, 563013; 563034 and 2 RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 16/02/2009-20/02/2009 (WPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-31/MP&ADB-006 (1 ♂ DZUP 562918, 6 ♀ DZUP 562953; 563014; 562994; 562951; 562993; 563037 and 1 RBINS/UTPL); labelled: Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 16/02/2009-20/02/2009 (BPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-31/MP&ADB-010 (1 ♀ DZUP 562952); Loja: Cajanuma, Podocarpus National Park, trail Oso de anteojos, 3000 m. 20/02/2009-27/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-31/MP&ADB-011 (2 ♀ DZUP 562930; 562931); Loja: Cajanuma, Podocarpus National Park, trail Oso de anteojos, 3000 m. 16/02/2009-20/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-31/MP&ADB-012 (5 ♂ RBINS/ITPL, 7 ♀ DZUP 562936; 562974; 563015; 563020; 563039; 563017; 562997; 1 ♀ RBINS/ITPL); Loja: Cajanuma, Podocarpus National Park, trail Bosque Nublado, 3000 m. 20/02/2009-27/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-34/MP&ADB-001 (1 ♀ DZUP); Loja: Cajanuma, Podocarpus National Park, trail Bosque Nublado, 3000 m. 20/02/2009-27/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-34/MP&ADB-002 (7 ♀ DZUP 563021; 562979; 563000; 562957; 562737; 562975; 563038); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 20/02/2009-27/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-34/MP&ADB-003 (2 ♂ RBINS/UTPL; 15 ♀ DZUP 562998; 562978; 562999; 562977; 563042; 563041; 562958; 562976; 562935; 562954; 562956; 562996; 563018; 562955; 562934 and 4 RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Los

Miradores, 3000 m. 20/02/2009-27/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-34/MP&ADB-004 (1 ♂ DZUP 562915; 8 ♀ RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 20/02/2009-27/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-34/MP&ADB-005 (1 ♂ RBINS/UTPL, 9 ♀ RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 20/02/2009-27/02/2009 (WPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-34/MP&ADB-006 (1 ♀ DZUP 13109 and 9 RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 20/02/2009-27/02/2009 (BPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-34/MP&ADB-009 (4 ♀ RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Oso de anteojos, 3000 m. 20/02/2009-27/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-34/MP&ADB-011 (1 ♀ RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Oso de anteojos, 3000 m. 20/02/2009-27/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, Sample code: EC/2009-34/MP&ADB-012 (1 ♂ RBINS/UTPL 2 ♂ DZUP 562916; 562910; 8 ♀ RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Bosque Nublado, 3000 m. 27/02/2009-05/03/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-37/MP&ADB-001 (2 ♀ RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Bosque Nublado, 3000 m. 27/02/2009-05/03/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-37/MP&ADB-002 (9 ♀ RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 27/02/2009-05/03/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-37/MP&ADB-003 (1 ♂ RBINS/ITPL 1 ♂ 562912; 9 ♀ RBINS/ITPL); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 27/02/2009-05/03/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-37/MP&ADB-004 (1 ♂ DZUP 562908; 3 ♀ RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 27/02/2009-05/03/2009 (WPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-37/MP&ADB-005 (3 ♀ RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 27/02/2009-05/03/2009 (BPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-37/MP&ADB-009 (1 ♀ RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 27/02/2009-05/03/2009 (BPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-37/MP&ADB-010 (4 ♀ RBINS/UTPL);

Loja: Cajanuma, Podocarpus National Park, trail Oso de anteojos, 3000 m. 27/02/2009-05/03/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-37/MP&ADB-012 (7 ♀ RBINS/UTPL).

Distribution: Peru, Ecuador and Colombia.

Remarks. *Helina anthracina* (Albuquerque, 1956h:8) was synonymized with *Helina longipila* by Albuquerque, 1979. See more information under *H. anthracina*. This is a new record for the species in Colombia.

***Helina marginipennis* (Stein, 1904)**

(Figs. 10 and 11)

Spilogaster marginipennis Stein, 1904:440. **Type-locality:** Colombia, Cordillera.

Diagnosis

This species differs by having black body, brown to black legs; palpus black; costal vein very darkened, spots on cross veins of wings and apically; antenna black with longest hairs scarcely longer than its diameter; calypter white with yellowish margin and halteres brown with darker knob; parafrontal with 1 strong and 1 weak pair of setae on anterior third; $dc\ s\ 2+3$; $kep\ s\ 1+2$; Hind tibia with one median and one av on apical fourth. Very similar to *Helina vierecki*.

Examined material. 5 males, 53 females.

Ecuador: Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Rio San Francisco, 2000 m, 03°58'30"S 79°04'25"W. 25/02/2009-03/03/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-36/MP&ADB-011 (1 ♂ DZUP 562966); Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 20/02/2009-27/02/2009 (WPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-34/MP&ADB-006 (1 ♂ DZUP 562963); Cajanuma, Podocarpus National Park, trail Oso de Anteojos, 3000 m. 20/02/2009-27/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-34/MP&ADB-012 (1 ♂ DZUP 562965); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 25/02/2009-03/03/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-36/MP&ADB-005 (1 ♂ DZUP 563010; and 6 ♀ DZUP 562987; 562985; 562983; 562988; 562984; 562986); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Rio San

Francisco, 2000 m, 03°58'30"S 79°04'25"W. 13/02/2009-18/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-30/MP&ADB (1 ♀ DZUP 562914); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 13/02/2009-18/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-30/MP&ADB-005 (1 ♀ DZUP 562941 and 4 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 13/02/2009-18/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-30/MP&ADB-006 (1 ♀ DZUP 562946 and 2 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79° 04'25"W. 13/02/2009-18/02/2009 (WPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-30/MP&ADB-007 (1 ♀ DZUP 562943); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Atajo, 2000 m, 03°58'30"S 79°04'25"W. 14/02/2009-18/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-30/MP&ADB-013 (2 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Atajo, 3000 m, 16/02/2009-20/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-31/MP&ADB-001 (3 ♀ RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 16/02/2009-20/02/2009 (WPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-31/MP&ADB-006 (2 ♀ DZUP 562967; 562962); Cajanuma, Podocarpus National Park, trail Oso de Anteojos, 3000 m. 16/02/2009-20/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-31/MP&ADB-012 (1 ♂ 562947); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 18/02/2009-25/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-33/MP&ADB (1 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 18/02/2009-25/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-33/MP&ADB-004 (2 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 18/02/2009-25/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-33/MP&ADB-006 (2 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 18/02/2009-25/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-33/MP&ADB-007 (2 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco,

Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 18/02/2009-25/02/2009 (WPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-33/MP&ADB-008 (1 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 18/02/2009-25/02/2009 (RPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-33/MP&ADB-010 (2 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 18/02/2009-25/02/2009 (BPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-33/MP&ADB-012 (1 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 17/02/2009-25/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-33/MP&ADB-015 (3 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 17/02/2009-25/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-33/MP&ADB-016 (2 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Rio San Francisco, 2000 m, 03°58'30"S 79°04'25"W. 25/02/2009-03/03/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-35/MP&ADB (1 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 25/02/2009-03/03/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009- (2 ♀ DZUP 562986; 562964); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 25/02/2009-03/03/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009 (1 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 25/02/2009-03/03/2009 (WPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-36/MP&ADB-007 (1 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 25/02/2009-03/03/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-36/MP&ADB-008 (3 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 25/02/2009-03/03/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-36/MP&ADB-010 (4 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 25/02/2009-03/03/2009 (BPT), leg. Marc Pollet & Anja de Braekeleer,

EC/2009-36/MP&ADB-011 (1 ♂ DZUP 562989); Cajanuma, Podocarpus National Park, trail Bosque Nublado, 3000 m. 16/02/2009-05/03/2009 (MT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-37/MP&ADB-013 (1 ♀ DZUP 562967).

Distribution: Colombia, Ecuador, Peru and Bolivia.

Remarks. This is a new record for Ecuador.

***Helina notha* Snyder, 1941**

Helina notha Snyder, 1941:20. **Type-locality:** Ecuador, Miaza Ridge, Volcán Tungurahua.

Diagnosis

Body and legs black; palus black; wings infuscated at the base; antenna black with longest hairs on arista about 1,5 x as long as its greatest diameter; calyptra with margins black; halteres black; 4 strong and 1 weak inwardly and 2 strong outwardly parafrontal bristles; dc s 2+4; kepst 2+2; hind tibia with two or three median ad and av bristles.

Material examined. Original description based on female specimens.

Distribution: Ecuador.

***Helina prima* (Malloch, 1921)**

(Fig. 12)

Xenothoracocheata prima Malloch, 1921b:170. **Type-locality:** Colombia, Villavicencio, Quataquia River.

Diagnosis

Body black to brownish, legs and palpus; wing hyaline with brown veins and no spots; antenna brown with longest arista hair length \approx greatest width of third antenna segment; calypter whitewith darkmargin; halteresbrown. 3-4 parafrontal setae; dc s 1+3; kepst s 1+2 and hind tibia with 2 ad setae.

Material examined. Original description based in male and female specimens and photos.

Distribution: Colombia, Peru.

***Helina vierecki* Snyder, 1941**

(Figs. 13 and 14)

Helina vierecki Snyder, 1941:8. **Type-locality:** Colombia, La Cumbee.

Diagnosis

This species differs from *Helina marginipennis* by halter yellow and calypter yellowish-white; hairs on arista not longer than twice as long as its great diameter; keps s 2+2 and hind femora with 7-8 av and a row of hair-like setae on pv surface (Figure 10). Palpus, wings, antenna color and dc s are equal in *Helina marginipennis*.

Female. Body length: 5.7 - 6.5 mm; **wing length:** 6.1 - 6.9 mm.

Differs from male as follows: *Coloration.* Legs (especially tibia) yellowish. *Head.* Dichoptic, minimum distance between eyes 0.63 – 0.79 mm. *Head.* Frontal setae 5 – 6 pairs that begin at base of pedicel and end near ocellus. Fronto-orbital plate with few small setae near the antenna. Ocellar triangle with a pair of strong setae that reaches the third or fourth pair of frontal setae. *Thorax.* Anepisternum with a row of 6 – 7 strong setae. *Legs.* Mid femur with two or three P setae on apical third. Hind tibia with 1 ad seta, 2 av setae.

Examined material. 5 males, 11 females.

Ecuador: Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 13/02/2009-18/02/2009 (BPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-30/MP&ADB-012 (1 ♂ 562940 and 1 ♀ RBINS/UTPL); San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 17/02/2009-25/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-33/MP&ADB-016 (1 ♂ RBINS/UTPL); Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 20/02/2009-27/02/2009 (BPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-34/MP&ADB-010 (1 ♂ DZUP 562982); Cajanuma, Podocarpus National Park, trail Bosque Nublado, 3000 m. 27/02/2009-05/03/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-37/MP&ADB-002 (1 ♂ DZUP 563023); Cajanuma, Podocarpus National Park, trail Canal, 3000 m. 13/02/2009-03/03/2009 (MT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-36/MP&ADB-017 (1 ♂ DZUP 563045); Cajanuma, Podocarpus National Park, trail Bosque Nublado, 3000 m. 16/02/2009-20/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-31/MP&ADB-002 (1 ♀ RBINS/UTPL); Cajanuma, Podocarpus National Park, trail Los

Miradores, 3000 m. 16/02/2009-20/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-31/MP&ADB-00 (1 ♀ RBINS/UTPL); San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 18/02/2009-25/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-33/MP&ADB-005 (1 ♀ DZUP 562961); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 18/02/2009-25/02/2009 (WPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-33/MP&ADB-007 (1 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 18/02/2009-25/02/2009 (BPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-33/MP&ADB-012 (1 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 25/02/2009-03/03/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-36/MP&ADB-005 (1 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 25/02/2009-03/03/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-36/MP&ADB-009 (1 ♀ DZUP 563044); Zamora Chinchipe: San Francisco, Reserva biológica San Francisco, trail Canal, 2000 m, 03°58'30"S 79°04'25"W. 25/02/2009-03/03/2009 (BPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-36/MP&ADB-011 (1 ♀ DZUP 563024); Loja: Cajanuma, Podocarpus National Park, trail Bosque Nublado, 3000 m. 16/02/2009-05/03/2009 (MT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-37/MP&ADB-013 (2 ♀ RBINS/UTPL).

Distribution: Colombia, Ecuador.

Remarks. First record in Ecuador and the first description of the female.

***Helina* sp. nov. 1**

(Figs. 15 and 16)

Diagnosis

Body black, legs yellow apically on femora and on apical 2/3 of the tibia; palpus black; wings hyaline without spots; antenna black with brown pruinosity; upper and lower calypter yellow; halter yellow; 6 pairs of frontal setae; dc s 2+3; kepst s 1+2; Hind tibia with 2 av setae, 4 ad and 3 p setae.

Description

Male: Body length: 6.7 mm; **wing length:** 6.3 mm.

Coloration. Body black with silver pruinosity. Parafacial, lunule, fronto-orbital plate and gena with silver pruinosity; proboscis black. Frontal vitta black with light brown pruinosity anteriorly. Antenna black with brown pruinosity; arista and palpus black. Thorax black with silver pruinosity; dorsum of scutum with one presutural longitudinal stripe. Lower and upper calypter yellow. Halter yellow. Legs yellow and black: mid and hind femur ventral preapical yellow, hind tibia black first 1/3; claws black; pulvilli brownish. Wing brownish with veins brown and costal vein not darkened.

Head. Holoptic, minimum distance between eyes 0.24 mm. Eyes with long cilia. Frontal setae of six pairs, starting at base of pedicel, ending at middle of frontal vitta. Fronto-orbital plate bare. Ocellar triangle with a pair of strong setae that reaches almost the first pair of frontal setae. Flagellomere $\approx 1.8 \times$ pedicel length, pedicel with three strong setae. Antenna inserted in the middle level of eyes. Postpedicel ending before insertion of vibrissa. Arista with longest hairs far do not exceed width of postpedicel: a little longer than the diameter of the arista; ventral hairs in arista present, almost with the same size of dorsal hairs. Palpus filiform. Proboscis retractile. Vibrissa under ventral margin of the eye, fully developed. Ocellar triangle very short (less than 1/3 length of frontal vitta).

Thorax. Chaetotaxy: presutural acrs differentiated (one small pair and two misaligned strong setae). Prescutellar acrs differentiated (one pair). dc s: 2+3. 4 postpronotal setae; 1 presutural ial s; 2 postsutural ial s. 2 notopleural setae, the posterior is smaller than the anterior. Pra about 1/2 the length of posterior notopleural setae. Supra-alar 1+2, posterior is shorter. Scutellum with 1 strong lateral and 1 apical scutellar seta on each side and basal scutellar setae $\sim 1/4 \times$ length of lateral. Prosternum bare. Anepisternum with 9 strong setae. kepst s 2+2. Lower calypter glossiform and about twice as large as upper calypter.

Wing. With bare veins, except costa. R_{4+5} and M_1 veins are divergent at the apical area. dm-cu vein slightly curved.

Legs. Fore femur with complete row of pd and pv setae. Fore tibia with one p seta. Mid femur with a row of pv setae which decrease in size towards apical, 3 misaligned setae on pd surface, near apical area. Mid tibia with 4 p setae, smaller closer to apical area, on apical has 2 d, 1 pd, 1 ad, 2 a, 2 av and 1 pv setae. Hind femur with a complete row of av setae that thicken towards apical area, a row of V setae that ends before the apical third and a complete row of ad setae. Ad and pd seta on femur apical. Hind tibia with apical area with 2 av, 4 ad, 3 p, 1 d, 1 pd and 1 p setae. Hind tarsus with claws like fore tarsus

and pulvilli smaller than fourth tarsomere.

Abdomen. First abdominal sternite bare.

Male terminalia. Sternite 5 length \approx width, two projections on bottom, without protuberance at the apical region, covered with setae. Cercal plate, covered with setae, strait and divided into two plates. Large surstylus, covered with setae. Aedeagus almost strait.

Female. Unknown.

Examined material.

Holotype:

Colombia: Boyacá, SFF Iguaque/Cabaña Mamaramos, 2856m, 5°25'N; 73°27'W, 8-25/6/2000 (MT). Cod 184. (CEUA)

Distribution. Colombia.

Remarks. Specimen were previously dissected, so abdomen color and presence of seta on first sternite are uncertain. Fore leg on left side, mid leg on right side missing. Tarsus of mid leg on both sides and hind leg right side are broken.

***Helina* sp. nov. 2**

(Figs. 17 and 18)

Diagnosis

Body black, legs entirely blacks, palpus black; wings hyaline very darkened on costal margin without spots; antenna black with longest hairs on arista almost the same width of postpedicel; calypter white, halter brown with yellow knob; 7 pairs of frontal setae; dc s 2+3; kepst s 2+2; hind tibia with 2 ad setae, 2 av setae and 6 p setae. The species is very similar to *Helina longipila*.

Description

Male: Body length: 7.4 mm; **wing length:** 7.5 mm.

Coloration. Body black with silver pruinosity. Parafacial, fronto-orbital plate, lunule and gena with silver pruinosity; proboscis black. Frontal vitta black with light brown pruinosity anteriorly. Antenna black with brown pruinosity; arista and palpus black. Thorax black with brown pruinosity; dorsum of scutum without presutural longitudinal stripes. Lower and upper calypter white. Halter brown with yellow knob. Legs entirely black; claws black; pulvilli yellow. Wing brownish with veins dark brown and costal vein very darkened. Abdomen black.

Head. Holoptic, the shortest distance between the eyes 0.16 mm. Eyes with long cilia. Frontal setae in 7 pairs, starting on basal level of pedicel and ending after the half of frontal vitta. Fronto-orbital plate bare. Ocellar triangle with a pair of strong setae that reaches almost the sixth pair of frontal setae. Flagellomere measuring about 1,8 times the length of the pedicel, which has three strong setae. Antenna inserted in the middle level of eyes. Postpedicel ending before insertion of vibrissa. Arista with longest hairs almost the same width of postpedicel; ventral hairs in arista present. Palpus filiform. Proboscis retractile. Vibrissa inserted under the ventral level of the eye and fully developed. Ocellar triangle very small (less than 1/3 of frontal vitta).

Thorax. Chaetotaxy: presutural acrs undifferentiated and prescutellar acrs differentiated in one pair. dc s: 2+3. 4 postpronotal setae (2 smaller); 1 presutural ial s; 2 postsutural ial s. 2 notopleural setae, the posterior is smaller than the anterior. Prealar about 1/2 the length of posterior notopleural seta. Supra-alar 1+2, the posterior one is smaller. Scutellum with lateral and apical setae with almost the same size, basal and subapical setae smaller, without setae descending on ventral surface. Prosternum, anepimeron and meron bare. Anepisternum with one row of strong setae and some smaller around. kepst s 2+2. Lower calypter glossiform and about twice as large as upper calypter.

Wing. With bare veins, except costa. R₄₊₅ and M₁ vein are slightly divergent at the apical area. dm-cu vein strongly curved.

Legs. Fore femur with a complete row of pd and pv setae and a row of d seta on apical third. Fore tibia with one p setae. Fore tarsus with claws and pulvilli as long as the third tarsomere. Mid femur with a median row of pv setae which decrease closer to the apical area. Mid tibia with two p and one apical seta on p, d, ad, av and pv surface. Mid tarsus with claw and pulvilli as in fore tarsus. Hind femur with a row of v setae that ends on apical third, a row of av setae and a complete row of ad setae. Apical seta on pd and d surface. Hind tibia with 2 ad setae, 2 av setae and 6 p setae. There is apical seta on ad, a and av surface. Hind tarsus with claws like fore tarsus and pulvilli as long as the fourth tarsomere.

Abdomen. First abdominal sternite bare.

Male terminalia. Sternite 5 with similar length and width and covered with setae. Cercal plate with setae only at the apical area and almost divided into two plates. Long surstylus, almost with no setae. Aedeagus slightly curved.

Female. Length. Body: 8.7-10 mm, wing 8.2-8.5 mm.

Differs from male as follows: **Head.** Dicoptic, minimum distance between eyes 0.86-0.95

mm. **Head.** Frontal setae also in nine pairs, but starting on basal level of pedicel and ending near the ocellus. Ocellar triangle with a pair of strong setae that reaches almost the fourth pair of frontal setae. **Thorax.** 3-4 postpronotal setae (2 of them are larger) **Legs.** There is no P setae on hind tibia (Figure 12).

Female terminalia. Tergite 8 divided into 2 enlarged plates. Epiproct curved. Cercal plate digitiform and covered with setae. Hypoproct rounded, setulose and sclerotizes.

Examined material. 2 male and 10 females.

Holotype:

Ecuador: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 27/02/2009-05/03/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-37/MP&ADB-003 (1 ♂).

Paratypes:

Ecuador: Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 16/02/2009-20/02/2009 (WPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-31/MP&ADB-005 (2 ♀ DZUP 563005; 653006); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 20/02/2009-27/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-34/MP&ADB-004 (1 ♂ DZUP 563007 and 1 RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Oso de Anteojos, 3000 m. 20/02/2009-27/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-34/MP&ADB-011 (1 ♀ RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 20/02/2009-27/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-37/MP&ADB-002 (1 ♀ DZUP 563009); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 20/02/2009-27/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-37/MP&ADB-011 (1 ♀ RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores, 3000 m. 20/02/2009-27/02/2009 (YPT), leg. Marc Pollet & Anja de Braekeleer, EC/2009-37/MP&ADB-013 (1 ♀ DZUP 563008 and 1 ♀ RBINS/UTPL); Zamora Chinchipe: San Francisco. Reserva biológica San Francisco, trail Atajo. 2000 m. 18/02/2009-25/02/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-30/MP&ADB (1 ♀ RBINS/UTPL).

Distribution: Ecuador

Remarks. The species has a general morphology similar to *Helina longipila*.

Taxonomy *Helina* sp. nov. 3

(Figs. 19 and 20)

Diagnosis

Body black; legs brownish and yellow; palpus black; wings brownish, without spots; antenna black with silver pruinosity, with longest arista hairs exceeding width of postpedicel; lower and upper calypter white yellowish with margin brownish; halteres brown with yellow knob; 5-6 pairs of frontal setae; dc s 1+3; kepst s 1+2 and hind tibia with 1 ad seta and 1-2 av setae.

Description

Male: Body length: 7.5 mm; **wing length:** 8.69 mm.

Coloration. Body black. Parafacial and gena with silver pruinosity; lunule and proboscis black. Frontal vitta and fronto-orbital plate black with light brown pruinosity anteriorly. Antenna black with silver pruinosity; arista brownish with base yellowish and palpus black. Thorax black with silver pruinosity; dorsum of scutum without presutural longitudinal stripes. Lower and upper calypter white yellowish with margin brownish. Halter brown with yellow knob. Legs brownish and yellow; claws black; pulvilli yellow. Wing brownish with veins dark brown and costal vein not darkened. Abdomen black.

Head. Male holoptic, the shortest distance between the eyes 0.16 mm. Eyes with short cilia. Frontal setae in 5 pairs, starting on basal level of pedicel and ending before the half of frontal vitta. Fronto-orbital plate bare. Ocellar triangle with a pair of strong setae that reaches almost the first pair of frontal setae. Flagellomere measuring about 2,5 times the length of the pedicel, which has two strong setae. Antenna inserted in the middle level of eyes. Postpedicel ending before insertion of vibrissa. Arista with longest hairs exceeding width of flagellomere; ventral hairs in arista present. Palpus filiform. Proboscis retractile. Vibrissa inserted under the ventral level of the eye and fully developed. Ocellar triangle very small (less than 1/3 of frontal vitta).

Thorax. Chaetotaxy: prescutellar and presutural acr s undifferentiated. dc s: 1+3. 1 postpronotal seta; 1 presutural ial s; 2 postsutural ial s. 2 notopleural setae, the posterior is smaller than the anterior. Prealar absent. Supra-alar 1+2, the posterior one is smaller. Scutellum with 1 strong lateral and 1 apical scutellar setae in each side and lateral scutellar setae is about 1/2 the length of basal one, without cilia descending to ventral surface. Prosternum and anepimeron bare, meron with fine bristles, above posterior spiracle. Anepisternum with one row of 5 strong setae. Katepisternal 1+2. Lower calypter

glossiform and about twice as large as upper calypter.

Wing. Several setulae beyond node on ventral surface of third wing vein., and setae on costal vein. R₄₊₅ and M₁ vein are divergent apically. dm-cu vein slightly curved.

Legs. Fore femur with a complete row of d and pv setae. Fore tibia with one adseta and one d, pd, p and pv, on apical area. Fore tarsus with claws and pulvilli as long as the third tarsomere. Mid femur with 6 v setae which on basal half and one ad, pd, p and pv apical seta. Mid tibia with 2 p setae and one ad, pd, p, pv, v, av and a apical seta. Mid tarsus with claw and pulvilli as in fore tarsus. Hind femur with 3 preapical setae on av surface, a row of ad, 2 d and 1 pd seta. Hind tibia with 1 ad setae, 2 av setae and 1 preapical seta on d, ad, pd, av, p and a very long one on pv surface. Hind tarsus with claws like fore tarsus and pulvilli as long as the fourth tarsomere.

Abdomen. First abdominal sternite bare.

Male terminalia. Sternite 5 with similar length and width, and setae only at the base. Cercal plate without setae on base and divided into two plates. Large surstylus, with no seta. Aedeagus almost strait.

Female. Length. Body: 6.2-7.6 mm, **Wing:** 5.6-7.6 mm.

Differs from male as follows: **Head.** Dichoptic, minimum distance between eyes 0.5-0.8; fronto-orbital plate with a row of small setae; Frontal setae in one very strong pair near antenna and 2 less strong near the ocellus. Ocellar triangle with a pair of strong setae that reaches almost the first pair of frontal setae. **Legs.** Mid femur with 2-4 v setae which on basal half and one ad, pd, p on apical seta. Hind femur with 1-2 preapical setae on av surface, a row of ad, 1 d and 1 pd seta. Hind tibia with 1 ad seta, 1-2 av setae and 1 each preapical d, ad, pd, av, p seta and a very long seta on pv surface.

Female terminalia. Tergite 8 divided into 2 enlarged plates. Epiproct curved and with apical setae. Cercal plate digitiform and covered with setae. Hypoproct rounded, with apical setae and sclerotizes.

Examined material. 1 male and 6 females:

Holotype:

Ecuador: Loja: Cajanuma, Podocarpus National Park, trail Bosque Nublado. 3000 m. 20/02/2009-27/02/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer. EC/2009-34/MP&ADB-001 (1♂ RBINS/UTPL)

Paratypes:

Ecuador: Zamora Chinchipe: San Francisco. Reserva biológica San Francisco, trail Atajo. 2000 m. 18/02/2009-25/02/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-33/MP&ADB-015 (1♀ RBINS/UTPL); Zamora Chinchipe: San Francisco. Reserva biológica San Francisco, trail Canal. 2000 m. 18/02/2009-25/02/2009. (WPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-33/MP&ADB-008 (1♀ DZUP 563004); Zamora Chinchipe: San Francisco. Reserva biológica San Francisco, trail Canal. 2000 m. 18/02/2009-25/02/2009. (WPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-36/MP&ADB-008 (1♀ DZUP 563046); Zamora Chinchipe: San Francisco. Reserva biológica San Francisco, trail Canal. 2000 m. 13/02/2009-18/02/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-30/MP&ADB-004 (1♀ DZUP 563025); Zamora Chinchipe: San Francisco. Reserva biológica San Francisco, trail Canal. 2000 m. 13/02/2009-18/02/2009. (WPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-30/MP&ADB-007 (1♀ RBINS/UTPL P); Zamora Chinchipe: San Francisco. Reserva biológica San Francisco, trail Canal. 2000 m. 18/02/2009-25/02/2009. (WPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-33/MP&ADB-007 (1♀ RBINS/UTPL).

Distribution. Ecuador (Holotype).

***Helina* sp. nov. 4**

(Figs. 21 and 22)

Diagnosis

Body black; legs brownish and light yellow apically on femora and yellow tibia; palpus black; wings brownish, without spots; antenna black with silver pruinosity and arista with longest hairs less than flagellomere width; lower and upper calypter yellowish with margin brownish; halter yellow with brownish knob; 3 strong frontal setae; dc s 2+3; kepst 1+2; hind tibia with 1 ad setae, 2 av setae, 0-3 small p.

Description

Male: Body length: 7.4 – 7.6 mm; **wing length:** 8.2 – 8.5 mm.

Coloration. Body black with grey pruinosity. Parafacial and gena with silver pruinosity; lunule and proboscis black. Frontal vitta and fronto-orbital plate black with light brown pruinosity anteriorly. Antenna black with silver pruinosity; arista brownish, base yellowish, palpus black. Thorax black with silver pruinosity; dorsum of scutum with four presutural longitudinal stripes. Lower and upper calypter yellowish with margin brownish. Halter yellow with brownish knob. Legs brownish and light yellow; claws

black; pulvilli yellow. Wing brownish with veins dark brown and costal vein slightly yellowish. Abdomen black.

Head. Male holoptic, minimum distance between eyes 0.15 – 0.24 mm. Eyes have short cilia. Frontal setae as 3 strong pairs, starting at base of pedicel, ending prior to half of the frontal vitta. Fronto-orbital plate bare. Ocellar triangle with pair of strong setae that reaches almost the first pair of frontal setae. Flagellomere ~ 3 x pedicel length, pedicel has 2 setae, 1 very strong and 1 weaker. Antenna at midway between eyes. Postpedicel ends before insertion of vibrissa. Arista with longest hair length > flagellomere width; ventral hairs on arista. Palpus filiform. Proboscis retractile. Vibrissa inserted beneath ventral eye level, fully developed. Ocellar triangle very small (less than 1/3 of frontal vitta).

Thorax. Chaetotaxy: prescutellar and presutural acrs undifferentiated. dc s: 2+3. 1 postpronotal seta; 1 presutural ial s; 2 postsutural ial s. 2 notopleural setae, posterior is shorter than anterior. Prealar about 1/3 of posterior notopleural. Supra-alar 1+2, posterior is smaller. Scutellum with 1 strong basal and 1 apical scutellar setae in each side and no lateral scutellar setae; without cilia descending to ventral surface. Prosternum, anepimeron and meron bare. Anepisternum with row of 5 strong setae in front of row of weaker setae. Katepisternal 1+2. Lower calypter glossiform and about twice as large as upper calypter.

Wing. Several setulae after node on ventral surface of third wing vein, setae on costal vein. R₄₊₅ and M₁ vein divergent apically. dm-cu vein slightly curved.

Legs. Fore femur with a complete row of d, pd and pv setae. fore tibia with 1 ad seta and 1 each d, pd, av and pv apical seta. fore tarsus with claws and pulvilli as long as the third tarsomere. Mid femur with a row of v setae on basal half and 1 each pd, p and pv seta and two ad apical seta. mid tibia with 2 p setae and 1 each ad, pd, p, pv, v, av, and a apical seta. Mid tarsus with claw and pulvilli as in fore tarsus. hind femur with row of setae on av surface, row of ad, 1 d and 1 pd apical seta. hind tibia with 1 ad setae, 2 av setae, 0 – 3 small p setae and 1 each preapical d, ad and a seta. hind tarsus with claws as fore tarsus and pulvilli as long as the fourth tarsomere.

Abdomen. First abdominal sternite bare.

Male terminalia. Sternite 5 length ≈ width, covered with setae. Cercal plate with setae at base and divided into two plates. Large surstylus with setae at the base and apically. Aedeagus curved (Figure 16).

Female. Length. Body: 6.4-7.7 mm, **wing:** 7.6-8.7 mm.

Differs from male as follows: **Head.** Dichoptic, minimum distance between eyes 0.55 – 0.7 mm; fronto-orbital plate with a row of small setae; frontal setae 1 very strong pair near antenna and 3 less strong near ocellus. Ocellar triangle with pair of strong setae that almost reaches the first pair of frontal setae. **Legs.** mid femur without pv setae, 3 av seta on apical half and 1 pd, p and d apical setae. Mid tibia with 2 p setae and one ad, pd, p, pv, v, av and a apical setae. Mid tarsus claw and pulvilli as in fore tarsus. Hind femur with 1 - 3 setae on av surface, on basal half a row of ad, 2 d and 1 pd apical setae. Hind tibia with row of ad setae, 1 – 2 av setae, 0 - 1 p seta, and 1 each preapical d, ad and a setae. Hind tarsus claws as fore tarsus and pulvilli size \approx fourth tarsomere length.

Female terminalia. Tergite 8 divided into 2 enlarged plates. Epiproct curved and with apical setae. Cercalplatedigitiformandcoveredwithsetae. Hypoproct rounded, covered with setae and sclerotizes.

Examined material. 3 males, 19 females.

Holotype:

Ecuador: Loja: Cajanuma, Podocarpus National Park, trail Bosque Nublado. 3000 m. 20/02/2009-27/02/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer. EC/2009-34/MP&ADB-002 (1 ♂ RBINS/UTPL).

Paratypes:

Ecuador: Loja: Cajanuma, Podocarpus National Park, trail Bosque Nublado. 3000 m. 27/02/2009-05/03/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-37/MP&ADB-001 (1 ♂ DZUP 563049 and 1 RBINS/UTPL); Zamora Chinchipe: San Francisco. Reserva biológica San Francisco, trail San Francisco. 2000 m. 18/02/2009-25/02/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer EC/2009-33/MP&ADB (1 ♀ DZUP 563030); Loja: Cajanuma, Podocarpus National Park, trail Oso de Antejos. 3000 m. 20/02/2009-27/02/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-34/MP&ADB-011 (2 ♀ RBINS/UTPL); Cajanuma, Podocarpus National Park, trail Oso de Antejos. 3000 m. 20/02/2009-27/02/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-34/MP&ADB-012 (2 ♀ DZUP 13115; 563029); Loja: Cajanuma, Podocarpus National Park, trail Bosque Nublado. 3000 m. 16/02/2009-05/03/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-37/MP&ADB-013 (3 ♀ RBINS/UTPL); Cajanuma, Podocarpus National Park, trail Oso de Antejos. 3000 m. 16/02/2009-20/02/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-31/MP&ADB-011. (2 ♀ DZUP 563051; 563027); Loja: Cajanuma, Podocarpus National

Park, trail Oso de Anteojos. 3000 m. 16/02/2009-20/02/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-31/MP&ADB-012 (1 ♀ DZUP 563050); Loja: Cajanuma, Podocarpus National Park, trail Bosque Nublado. 3000 m. 20/02/2009-27/02/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-34/MP&ADB-002 (1 ♀ RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Bosque Nublado. 3000 m. 20/02/2009-27/02/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-34/MP&ADB-0011 (2 ♀ DZUP 563026; 563027); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores. 3000 m. 20/02/2009-27/02/2009. (WPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-34/MP&ADB-005 (1 ♀ RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores. 3000 m. 20/02/2009-27/02/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-34/MP&ADB-004 (1 ♀ DZUP 563047); Loja: Cajanuma, Podocarpus National Park, trail Los Miradores. 3000 m. 16/02/2009-20/02/2009. (WPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-31/MP&ADB-006 (1 ♀ RBINS/UTPL); Loja: Cajanuma, Podocarpus National Park, trail Oso de Anteojos. 3000 m. 27/02/2009-05/03/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-37/MP&ADB-012 (2 ♀ RBINS/UTPL).

Distribution. Ecuador.

***Helina* sp. nov. 5**

(Figs. 23 and 24)

Diagnosis

Body black; legs brownish with apical third of femurs yellowish; palpus black; wings with no spots; antenna brownish, with longest hairs exceeding width of flagellomere; lower calypter white with yellow margin and upper calypter white with black margin; halter brown; 3 strong and 3 weak frontal setae; dc s 1+3; kepst 1+2; hind tibia with 1 ad, 2 av setae, 5-7 small p setae.

Description

Male: Body length: 6.2-7.6 mm; **wing length:** 7.3-8.2 mm.

Coloration. Body black with grey pruinosity. Parafacial and gena with silver pruinosity; lunule and proboscis black with silver pruinosity. Frontal vitta and fronto-orbital plate black with light brown pruinosity anteriorly. Antenna black with silver pruinosity; arista brownish with base yellowish and palpus black. Thorax black with silver pruinosity;

dorsum of scutum without presutural longitudinal stripes. Lower calypter white with yellow margin and upper calypter white with margin black. Halter brown. Legs brownish with apical area of femurs yellowish, on ventral surface; claws black; pulvilli yellow. Wing brownish with veins dark brown and costal vein slightly yellowish. Abdomen black.

Head. Male holoptic, the shortest distance between the eyes 0.08-0.11 mm. Eyes with short cilia. Frontal setae in 3 strong pairs and 3 weaker, starting on basal level of pedicel and ending before the half of frontal vitta. Fronto-orbital plate bare. Ocellar triangle with a pair of strong setae that reaches almost the third pair of frontal setae. Flagellomere measuring about 2,5 times the length of the pedicel, which has one very strong seta and two weaker. Antenna inserted in the middle level of eyes. Postpedicel ending before insertion of vibrissa. Arista with longest hairs exceeding width of flagellomere; ventral hairs in arista present. Palpus filiform. Proboscis retractile. Vibrissa inserted under the ventral level of the eye and fully developed. Ocellar triangle very small (less than 1/3 of frontal vitta).

Thorax. Chaetotaxy: prescutellar acrs in one weak pair and presutural acrs undifferentiated. DC: 1+3. 1 postpronotal seta; 0-1 small presutural seta; 2 postsutural setae. 2 notopleural setae, the posterior is smaller than the anterior. Prealar less than 1/3 of posterior notopleural. Supra-alar 1+2, posterior smaller. Scutellum with 1 strong basal and 1 apical scutellar setae on each side and 1 weaker lateral scutellar seta; cilia cover scutellum including ventral surface. Prosternum bare, anepimeron and meron with fine setae. Anepisternum with one row of 5 strong setae and a row of weaker setae posteriorly. Katepisternal 1+2. Lower calypter glossiform and about twice as large as upper calypter.

Wing. Several setulae after node on ventral surface of third wing vein, setae on costal vein. R_{4+5} and M_1 vein diverge apically. dm-cu vein slightly curved.

Legs. Fore femur with a complete row of d, pd, pv setae and few weaker setae on basal half. Fore tibia with 1 ad mid seta, row of 6 – 8 smaller ad setae on apical third, 1 d and 1 pd apical setae. Fore tarsus with claws and pulvilli as long as the third tarsomere. Mid femur with complete row of v setae and 1 basal av, 1 d and 1 ad apical setae. Mid tibia with 2 – 3 p setae and 1 each ad, pd, p, pv, av, and a very long v apical setae. Mid tarsus with claw and pulvilli as in fore tarsus. Hind femur with a row of setae on av surface, a row of ad, 1-2 d and 1 pd apical setae. Hind tibia with 1 ad, 2 av, 5 - 7 small p, and 1 preapical d, 2 ad, and 1 av setae. Hind tarsus with claws like fore tarsus and pulvilli as long as the fourth tarsomere.

Abdomen. First abdominal sternite bare.

Male terminalia. Sternite 5 length \approx width, covered with setae. Cercal plate covered with setae and almost divided into two plates. Large surstylus with setae at base. Aedeagus almost strait.

Female. Unknown.

Examined material. 3 males.

Holotype:

Zamora Chinchipe: San Francisco. Reserva biológica San Francisco, trail Canal. 2000 m. 13/02/2009-18/02/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-30/MP&ADB-005 (1 ♂ RBINS/UTPL).

Paratypes:

Zamora Chinchipe: San Francisco. Reserva biológica San Francisco, trail Canal. 2000 m. 13/02/2009-18/02/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-30/MP&ADB-004 (1 ♂ RBINS/UTPL); Zamora Chinchipe: San Francisco. Reserva biológica San Francisco, trail Canal. 2000 m. 18/02/2009-25/02/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009- (1 ♂ DZUP 563031).

Distribution: Ecuador

***Helina* sp. nov. 6**

(Figs. 25 and 26)

Diagnosis

Body black; legs (except on apical and ventral surface of femurs and on fore tibia); palpus black; wings brownish, without spots; antenna black with longest arista hairs exceeding width of flagellomere; upper calypter white with black margin, lower calypter white; halteres brown with base yellow; 3 pairs of strong and 3 pairs of weaker frontal setae; dc s 2+3; kepst s 1+2; hind tibia with 1 ad setae and 1 av seta at the middle, 1 d apical seta and 1 preapical seta on pd, pv, av and 1 a seta.

Description.

Male: Body length: 7.6 mm; **wing length:** 8.8 mm.

Coloration. Body black. Parafacial and gena with silver pruinosity; lunule and proboscis black. Frontal vitta and fronto-orbital plate black with light brown pruinosity anteriorly. Antenna black with silver pruinosity; arista brown and palpus black. Thorax black with

silver pruinosity; dorsum of scutum with two presutural longitudinal stripes. Lower calypter white and upper calypter brownish with margin black. Halter brown with base yellow. Legs black and all femurs and fore tibia yellow apically; claws black; pulvilli yellow. Wing hyaline with black veins and costal vein not darkened. Abdomen black.

Head. Male holoptic, the shortest distance between the eyes 0.23 mm. Eyes with short cilia. Frontal setae 3 strong and 3 weaker pairs, starting at basal level of pedicel, ending prior to halfway along frontal vitta. Fronto-orbital plate bare. Ocellar triangle with pair of strong setae that reaches almost the first pair of frontal setae. Flagellomere measuring about 2 times the length of the pedicel, which has two strong and 3 weaker setae. Antenna inserts at mid eye level. Postpedicel ends before insertion of vibrissa. Arista with longest hairs exceeding width of flagellomere; ventral hairs in arista present. Palpus filiform. Proboscis retractile. Vibrissa inserted beneath the ventral margin of the eye, fully developed. Ocellar triangle very small (less than 1/3 of frontal vitta).

Thorax. Chaetotaxy: prescutellar acrs differentiated in a pair of setae, presutural acrs undifferentiated. dc s: 2+3. 1 postpronotal seta; 1 presutural ial s; 2 postsutural ial s. 2 notopleural setae, anterior is larger. Prealar absent. Supra-alar 1+2, posterior smaller. Scutellum with basal, lateral, subapical and apical scutellar setae on each side, with cilia, but not on ventral surface. Prosternum and anepimeron bare, meron with fine bristles, above posterior spiracle. Anepisternum with one row of 5 strong and long setae. kepst s 1+2. Lower calypter glossiform and about twice as large as upper calypter.

Wing. Several setulae beyond node on ventral surface of third wing vein., and setae on costal vein. R₄₊₅ and M₁ vein diverge apically. dm-cu vein slightly curved.

Legs. Fore femur has complete row of d, pd, av and pv setae, 7 strong apical setae of av surface. Fore tibia with 1 ad seta, and 1 d, 1 p and 1 pv apically. Fore tarsus with claws and pulvilli \approx third tarsomere length. Mid femur with 5 mid a setae and 1 apical a seta, 5 apical av setae, a row of basal pv setae and 3 apical pv, 1 apically of p and 2 pd. Mid tibia with 2 pd setae and 1 ad, 1 d, 1 pd, 1 pv, 1 av and 1 long v apical seta. Mid tarsus claw and pulvilli as foretarsus. Hind femur with a row of ad setae, 4 apical av setae, 8 pv apical setae and 1 pd apical. Hind tibia, middle with 1 ad setae and 1 av seta, 1 d apical seta and 1 preapical seta on pd, pv, av and 1 a seta. Hind tarsus claws as in fore tarsus, pulvilli \approx fourth tarsomere length.

Abdomen. First abdominal sternite bare.

Male terminalia. Sternite 5 length \approx width, covered with setae. Cercal plate with strong apical setae and incompletely divided into two plates. Large surstylus with setae at base.

Aedeagus very curved.

Female. Unknown.

Examined material. 1 male.

Holotype:

Zamora Chinchipe: San Francisco. Reserva biológica San Francisco, trail Rio San Francisco. 2000 m. 18/02/2009-25/02/2009. (YPT). leg. Marc Pollet & Anja de Braekeleer, EC/2009-33/MP&ADB (1 ♂ RBINS/UTPL).

Distribution. Ecuador.

***Helina anthracina* Albuquerque, 1956, revalidated**
(Fig. 27)

Helina anthracina Albuquerque, 1956: Holotype male, MNRJ, paratypes MNRJ, BMNH.
Type-locality: Brazil, Rio de Janeiro, Itatiaia, Macieira.

Helina anthracina; Pont 1972, Lopes *et al.* 1997.

Albuquerque, 1979 synonymized *Helina anthracina* and *Helina longipila* only with a note at the end of the article, without further details regarding the decision. However, in 1956, Albuquerque illustrated the wings and the genitalia of *Helina anthracina*. The terminalia is very close to *H. longipila*, specially by cercal plate, although the external morphology has a discrepancy.

Diagnosis

Helina anthracina has 8 pairs of strong frontal setae and several weaker setulae more than half way to the anterior ocellus. Ocular triangle with a pair of strong setae that reaches almost the first pair of frontal setae. 2 postpronotal setae. Mid femur with 1 pd seta and 2 p preapical. Mid tibia with 3 P setae. Hind femur with ad and av in an apical row. Hind tibia with 3 median av bristles, pv with row of apical setae, 1 apical seta on each av, ad and d surfaces. Wings yellowish and calypter brownish with margin brown, r-m node very infuscated.

We revalidated this species because *H. longipila* (with which it was combined, compare with above paragraph), has 4 – 5 pairs of strong frontal bristles and several

weaker setulae that extend halfway to the anterior ocellus. The ocellar triangle has a pair of strong setae that extends to nearly the third pair of frontal setae, and has 4 – 7 postpronotal setae. The mid femur has a row of PV setae that decrease in size towards apically. The mid tibia has two P setae. Hind femur with a complete row of long, slender anteroventral, ventral and posteroventral bristles, the former longest apically and the latter longest at base, and the ventral series much shorter. Hind tibia with 1 – 3 median AV bristles, the PV surface with a clump of hair-like setulae covering almost the entire surface, decreasing in length apically. Wings brownish with costal margin very dark, calypter white with margin yellowish to white, r-m node less infuscated.

Distribution. Argentina and Brazil.

Examined material: Original description and photograph

Remarks. *Helina anthracina* was considered a synonym of *Helina longipila* Stein, 1918, by Albuquerque (1979). However, comparing the original description (above) and the photographs of ventral, lateral and frontal view of the type-species (Figure 21), these are clearly two different species justifying the revalidation of *H. anthracina*.

General view of collected specimens

Of the total specimens evaluated, 270 specimens from Ecuador (between 1,000 – 3,000 m altitude), 201 were collected in yellow (YPT), 38 in white (WPT), 17 in blue (BPT), 5 in red pan traps (RPT), while only 9 were collected in Malaise traps (MT). Specimens from Colombia were collected in Malaise traps at 2,500 to 2,900 m altitude. One species, however (*Helina longipila*), was collected in Ecuador in blue, red, yellow and white pan traps and also in Colombia by Malaise trap.

DISCUSSION

Before this present contribution, Colombia had seven described species and now has eight. In Ecuador, there were eight species and now there are 13. In addition, we also revalidated a species from Brazil. The identification key should help researchers to identify their material more easily, since it complies all the species already known for the region together with the six new species described here.

On taxonomy, the diagnoses made for the species follow a set of characters that help in their identification, since there is not only one character that can separate different species. The general diagnosis of the genus is restricted to the study area because it is known that there is a lot of morphological variation within the genus and that not necessarily species from other regions will have the same characters, besides some characters are common for highlands specimens (such as long bristles on eyes).

As many species are visually close, chaetotaxy helps to separate them. But, in addition, genital dissection helps even more in this separation (especially when they are very similar and with little variation on chaetotaxy). The sternite 5, cercal plate (easier to see the difference when compare different species) epandrium, surstyli, phallapodeme, epiphallus, postgonite, distiphallus and pregonite can shows important differences between the species, in males. In female specimens, there is more differences on hypoproct, epiproct, tergite 8 and sternite 8.

Nonetheless, not only is the genus poorly understood with respect to relationships, the biology of most species (both adults and immatures) is also poorly studied and often anecdotal. Some labels have information that may suggest some aspects of their behavior. In the 270 specimens from Ecuador (1,000 – 3,000 m altitude), 201 were collected in yellow, 38 in white, 17 in blue, 5 in red pan traps, while only 9 were collected in Malaise traps. Clearly, Malaise trap design and pan trap colors (indicate some preferences) are important for capturing insect pollinators (Campbell & Hanula 2007). Yellow and white pan traps tend to catch many Diptera (Disney et al. 1982; Campbell & Hanula 2007), and include phytophagous insects (Kirk 1984) and predators (Leksono *et al.* 2005), while Malaise traps tend to capture a diversity of flying insects (Matthews and Matthews 1970; Campbell & Hanula 2007), as well as insects that fly higher. Trap capture frequency suggests that these Ecuadorian species are likely to visit flowers, adding to our biological understanding. But their role as pollinators will require further study, because no pollen was collected in association with the flies. Specimens from Colombia were collected in

Malaise traps at 2,500 to 2,900 m altitude, and due to the nature of the trap, this provides no additional biological information. One species, however (*Helina longipila*), was also collected in Ecuador in blue, red, yellow and white pan traps.

However, it is necessary to take in account that in Ecuador, Malaise trap was only used in 1000m, and at this altitude we had little sample of specimens (most of our specimens were collected in 2000m and 3000m). It is important to highlight this, as it may be that the pan traps are really effective for highland *Helina*, but it can also be a skewed data due to not having much Malaise.

Some records outside of the Neotropical region (there are no similar records on this region, neither on highlands of Colombia and Ecuador) note the association of *Helina* with some plants, but do not identify the species (only by genus, what may indicate a problem in being able to identify specimens at species level). For example, *Helina* sp. appears as floral visitors of Apocynaceae, in South Africa (Jhonson *et al.* 2009), Epacridaceae, in Australia (Armstrong 2012) and Juncaceae, in China (Huang *et al.* 2013). These articles suggest that there is a certain relationship between *Helina* and flowering plants, however this subject is still little explored and there is not enough information to generate a wide discussion. To this, future studies should focus on the genus behavior.

In summary, here we revalidate a species and identify an additional six new species of the large and complex genus *Helina* and provide some preliminary information that will help in further study. We recommend that further study employ pan traps of various colors because our evidence suggests that some species, at least, may often visit flowers. Using several colors may ensure that should species have color preferences, sampling will not be biased towards a single color. Also, observations might be carried out when flowers are available to determine any association that might exist and may indicate how to better sample the flies. Additional study of terminalia and biology will be instrumental in elucidating the relationships among the many species in the *Helina* complex.

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TABLES

Table 1. Localities, trap type and number of individuals of *Helina* ssp. collected by species from Ecuador. The following abbreviations were used on label descriptions: BPT – blue pan trap; RPT – red pan trap; WPT – white pan trap; YPT – yellow pan trap and MT – malaise trap. Locality abbreviations were: C – Cajanuma (3,000 m) and SF – San Francisco (2,000 m). Trapping was also carried out in Bombuscaro (1,000 m) but no *Helina* ssp. were collected.

Locality	Species														
	<i>Helina longipila</i>		<i>Helina marginipennis</i>		<i>Helina vierecki</i>		<i>Helina</i> sp. nov. 2		<i>Helina</i> sp. nov. 3		<i>Helina</i> sp. nov. 4		<i>Helina</i> sp. nov. 5		<i>Helina</i> sp. nov. 6
	SF	C	SF	C	SF	C	SF	C	SF	SF	C	SF	SF		
MT	-	-	-	1	1	2	-	2	-	-	3	-	-		
BPT	-	9	2	-	4	2	-	-	-	-	-	-	-		
RPT	-	-	4	-	1	-	-	-	-	-	-	-	-		
WPT	-	24	2	3	1	-	-	2	4	-	2	-	-		
YPT	7	124	27	5	3	3	1	7	3	1	16	3	1		
Total	164		44		17		12		7	22		3	1		

Table 2. Localities of the three specimens collected in Colombia. These abbreviations were used on labels: MT – malaise pan trap. Localities: B - Boyaca (2,850 m), M - Magdalena (2,500 m).

Species	<i>Helina longipila</i>		<i>Helina</i> sp. nov. 1
Locality	B	M	B
Number	1	1	1

FIGURES



Figure 1. Distribution of the known *Helina* from Neotropical region, according to Löwenberg-Neto & de Carvalho (2013).



Figure 2. General locations of additional records of *Helina* spp. from this study. Purple spot: *Helina* sp. nov. 1; *Helina* sp. nov. 3; *Helina longipila*; *Helina vierecki*. Red spot: *Helina longipila*; *Helina marginipennis*; *Helina vierecki*; *Helina* sp. nov. 2; *Helina* sp. nov. 3; *Helina* sp. nov. 4; *Helina* sp. nov. 5; *Helina* sp. nov. 6.

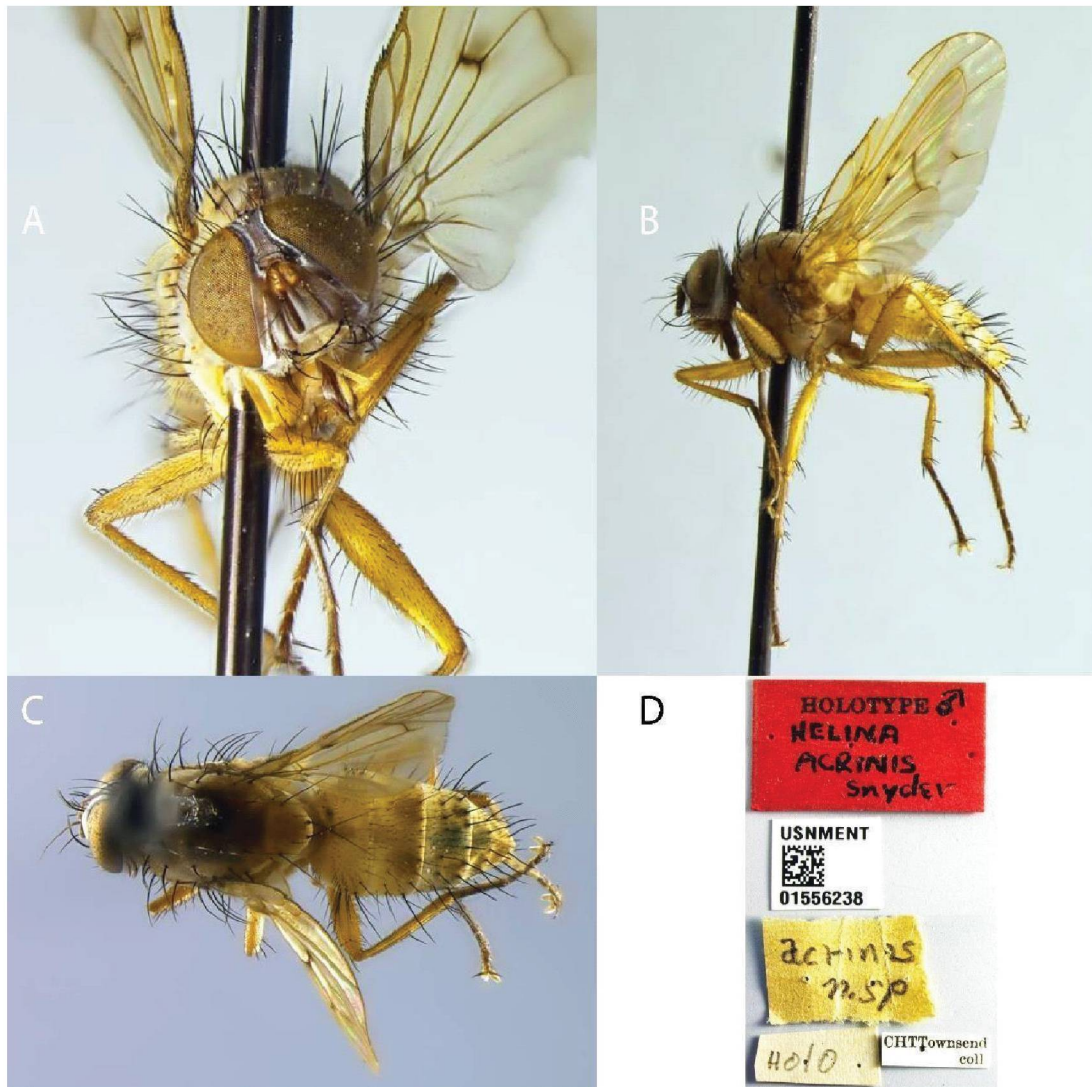


Figure 3. *Helina acrinis* Snyder. A-D Photographs of type material (male): A. Frontal view; B. Lateral view. C. Dorsal view. D. Labels.

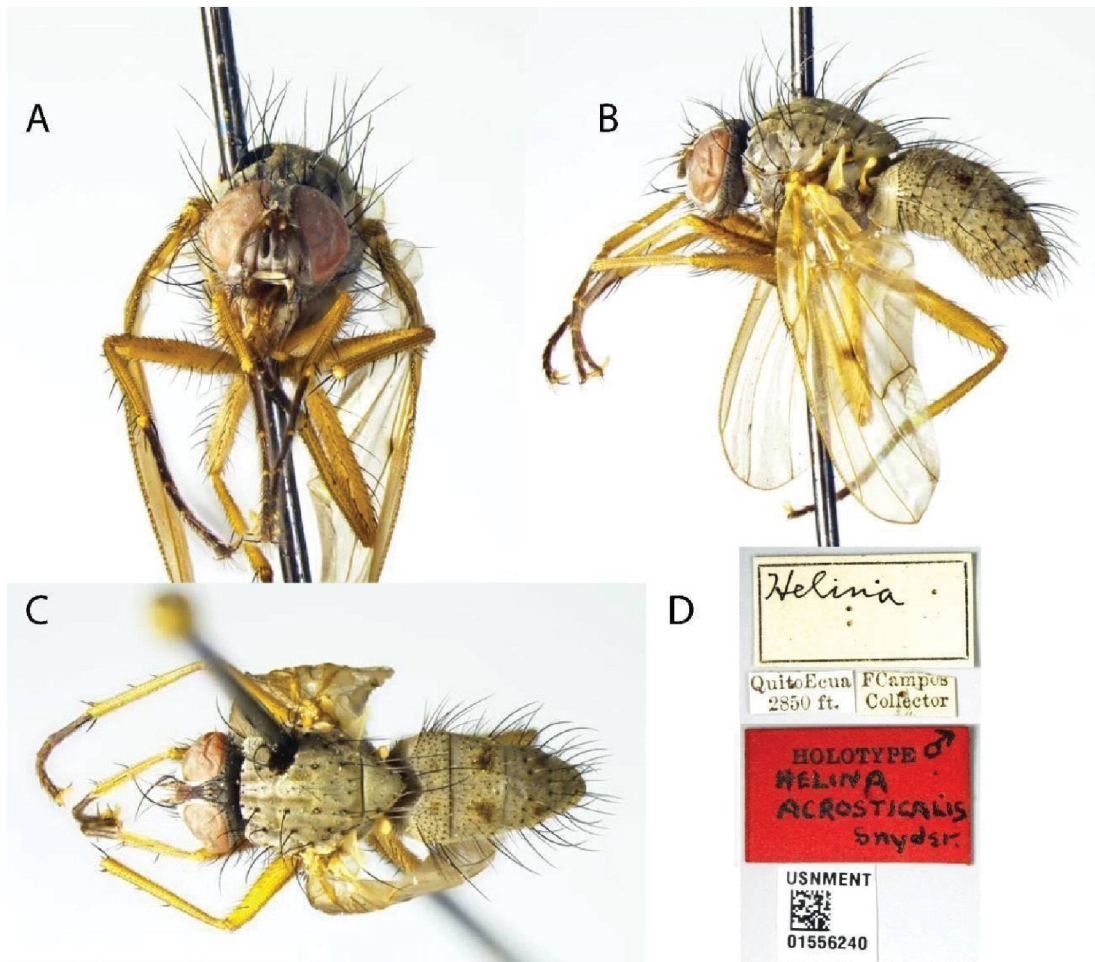


Figure 4. *Helina acrosticalis* Snyder. **A-D** Photographs of type material (male): **A.** Frontal view; **B.** Lateral view. **C.** Dorsal view. **D.** Labels.

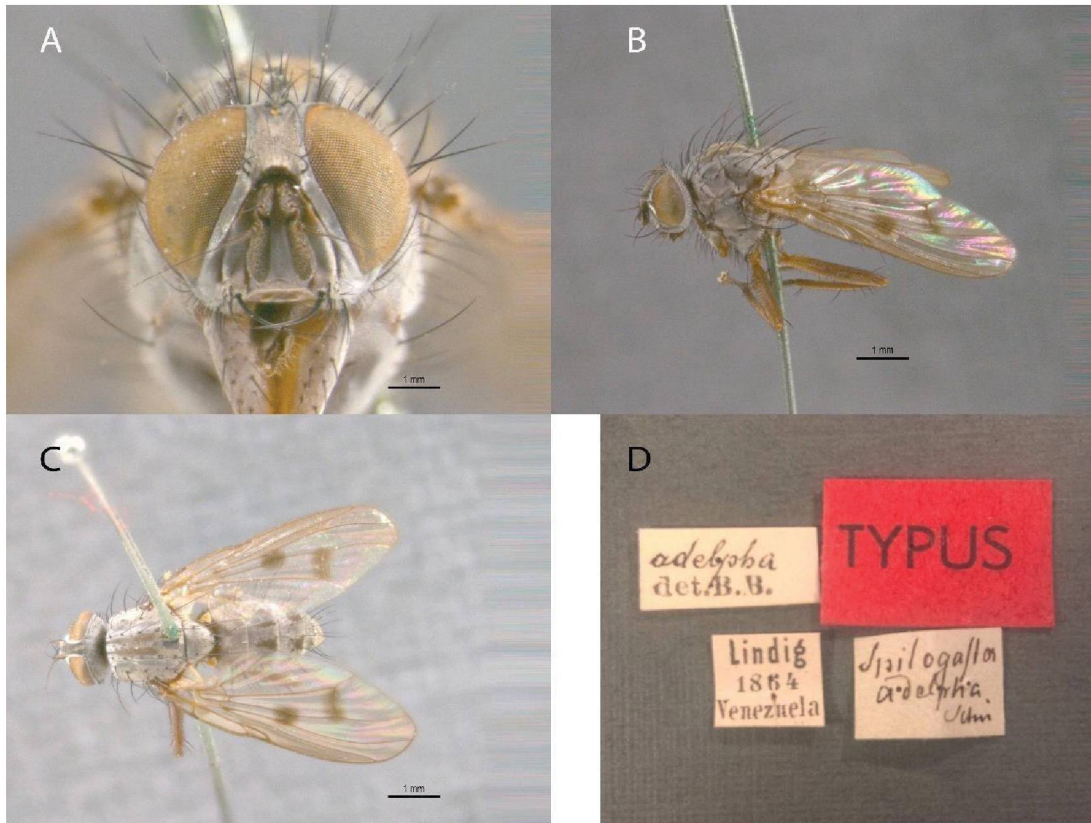


Figure 5. *Helina adelpha* Snyder. **A-D** Photographs of type material (male): **A.** Frontal view; **B.** Lateral view. **C.** Dorsal view. **D.** Labels.

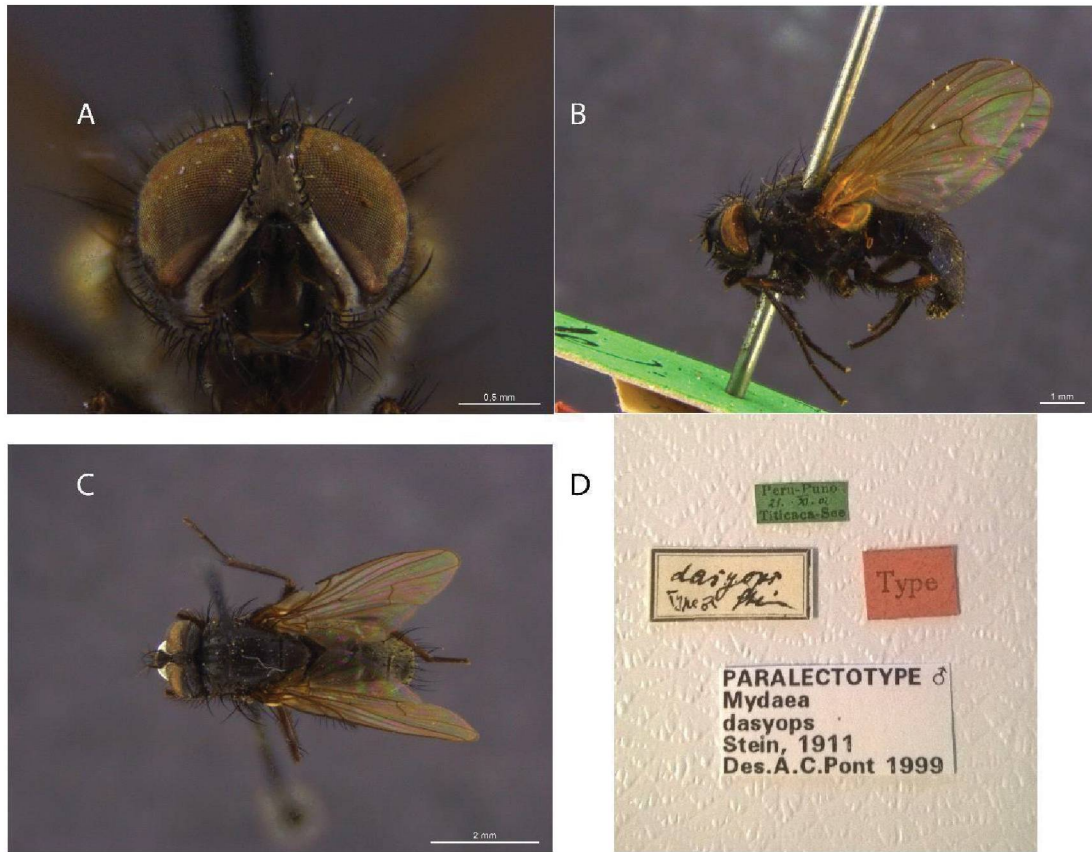


Figure 6. *Helina dasyophthalma* Snyder. **A-D** Photographs of type material (male): **A.** Frontal view; **B.** Lateral view. **C.** Dorsal view. **D.** Labels.

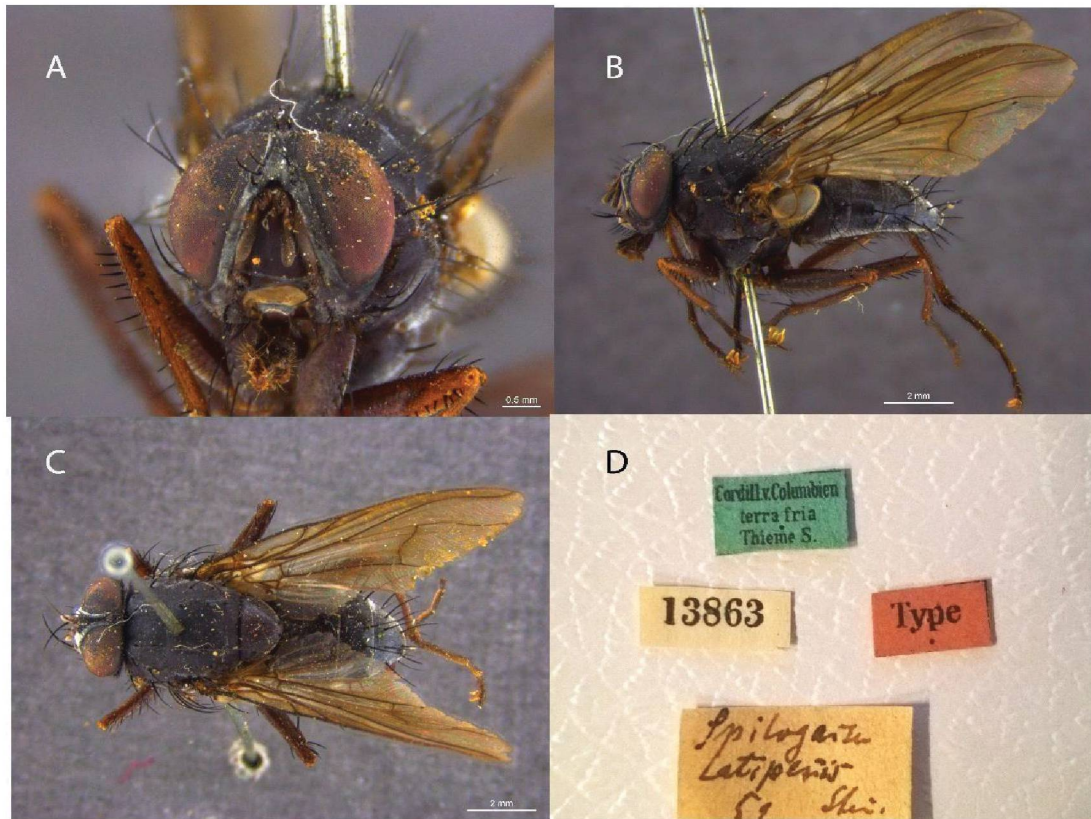


Figure 7. *Helina latipennis* Stein. **A-D** Photographs of type material (male): **A.** Frontal view; **B.** Lateral view. **C.** Dorsal view. **D.** Labels.

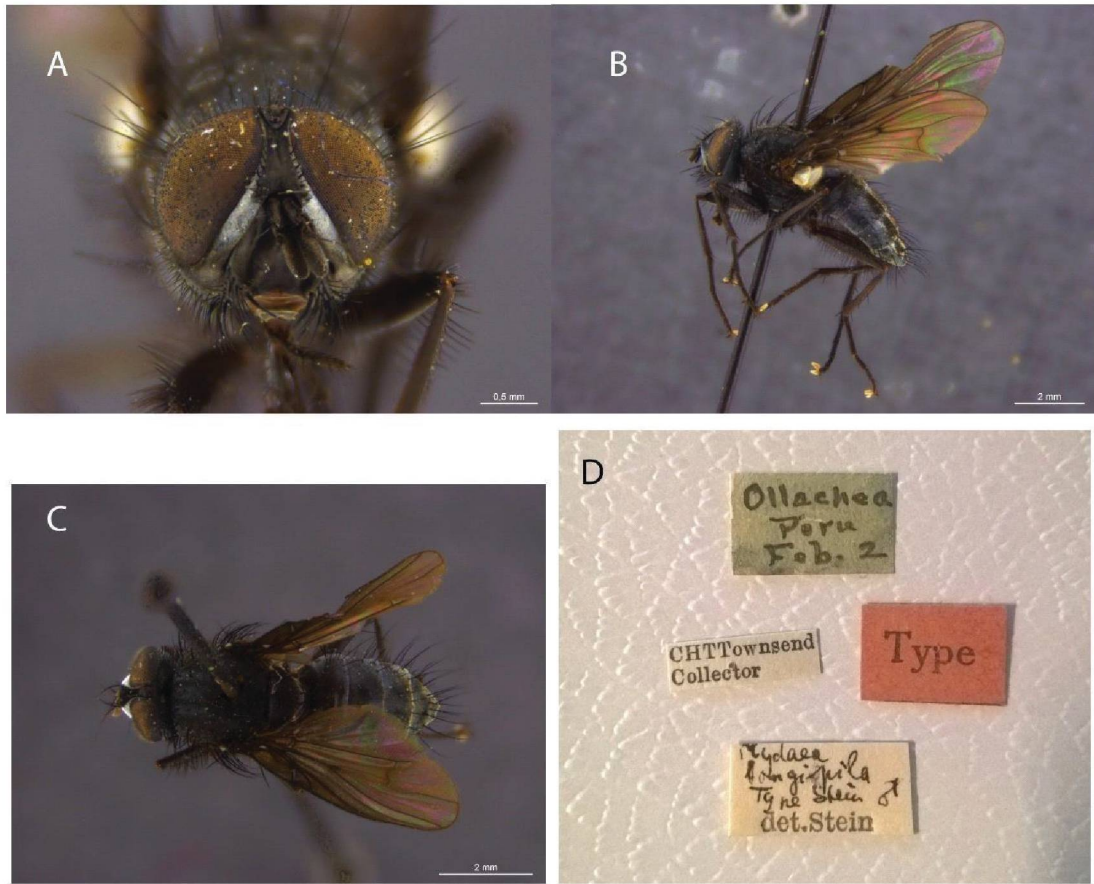


Figure 8. *Helina longipila* Stein. **A-D** Photographs of type material (male): **A.** Frontal view; **B.** Lateral view. **C.** Dorsal view. **D.** Labels.

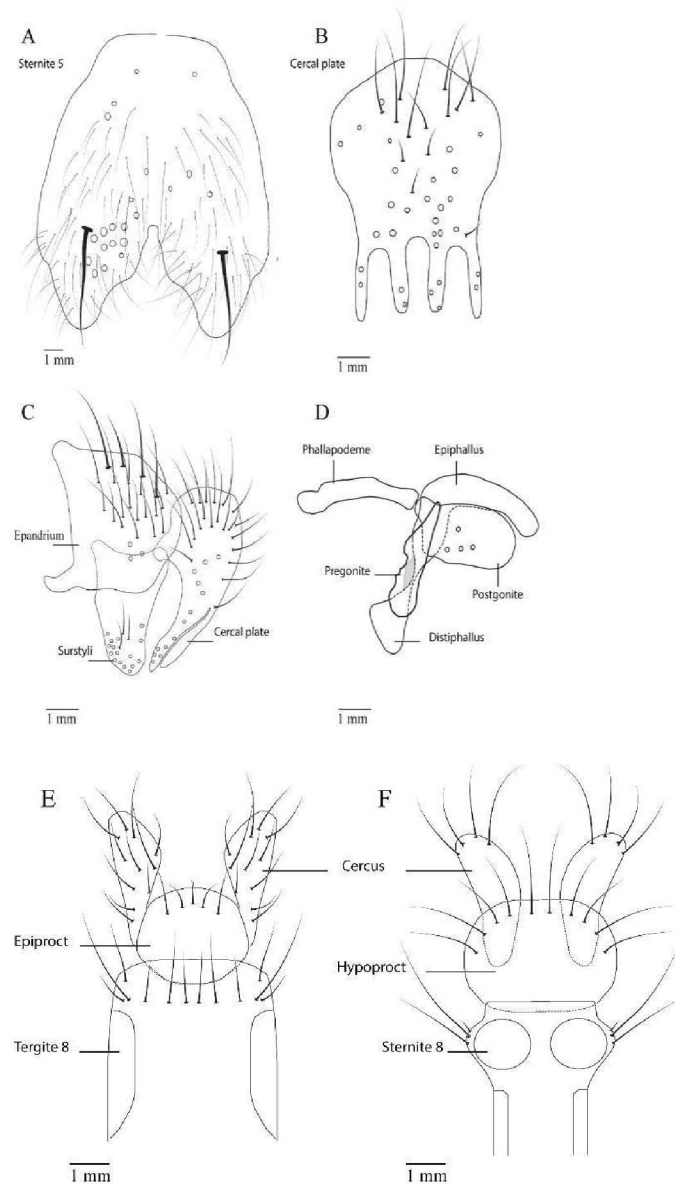


Figure 9. *Helina longipila* Stein. **A-D** male terminalia: **A.** Sternite 5. **B.** Cercal plate, posterior view. **C.** Cercal plate, surstyli and epandrium, lateral view. **D.** Phallic complex, lateral view. **E-F** Female terminalia apical portion of ovipositor: **E.** Dorsal view. **F.** Ventral view.

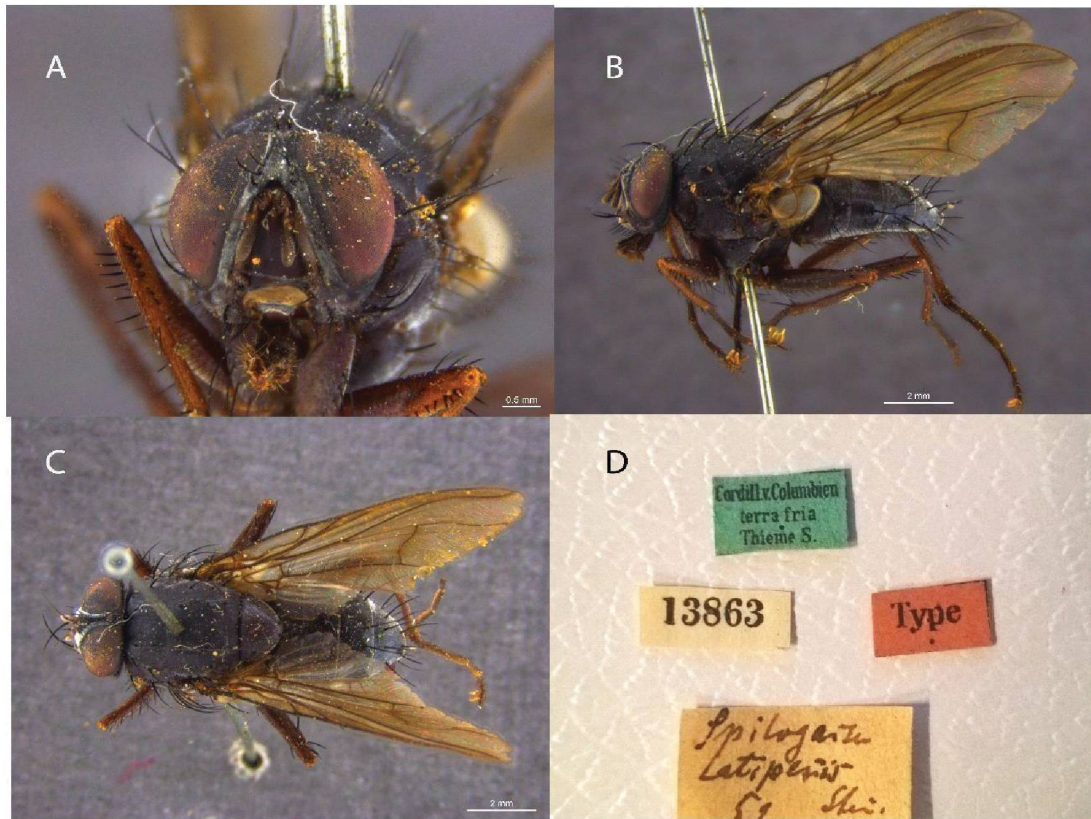


Figure 7. *Helina latipennis* Stein. **A-D** Photographs of type material (male): **A.** Frontal view; **B.** Lateral view. **C.** Dorsal view. **D.** Labels.

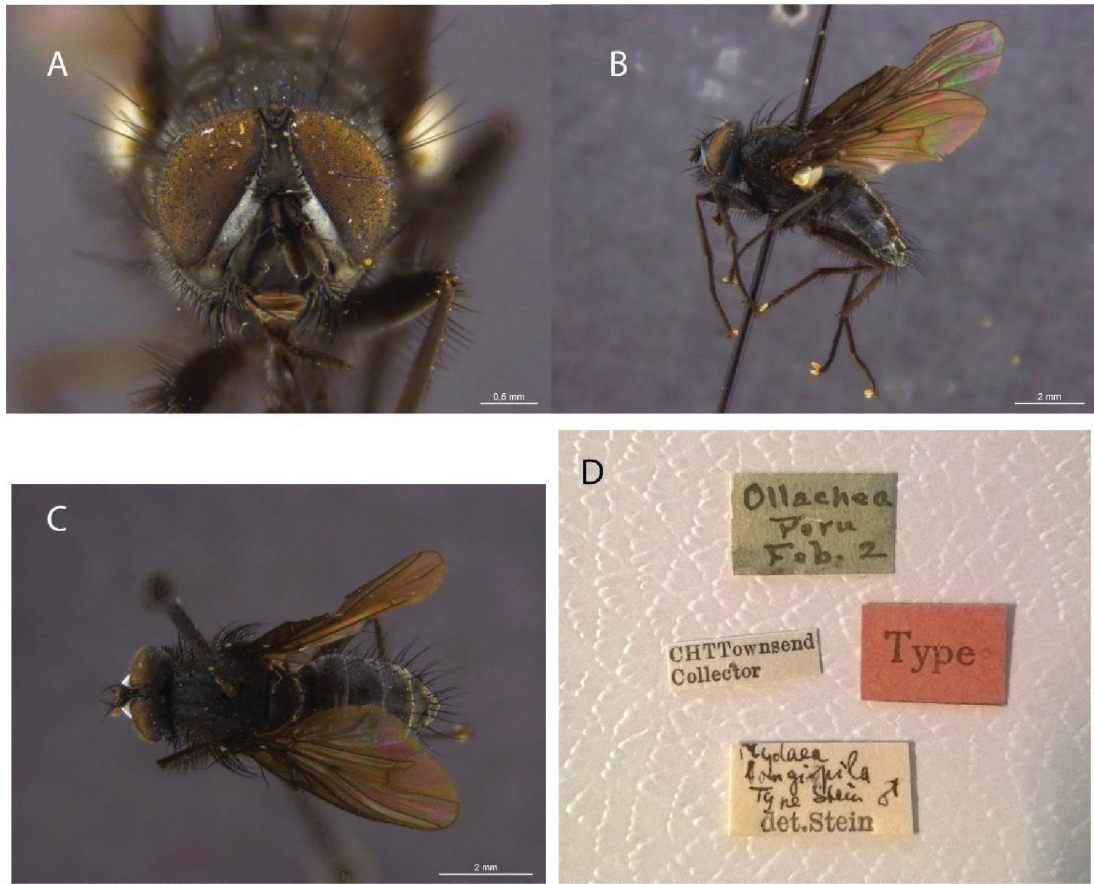


Figure 8. *Helina longipila* Stein. **A-D** Photographs of type material (male): **A.** Frontal view; **B.** Lateral view. **C.** Dorsal view. **D.** Labels.

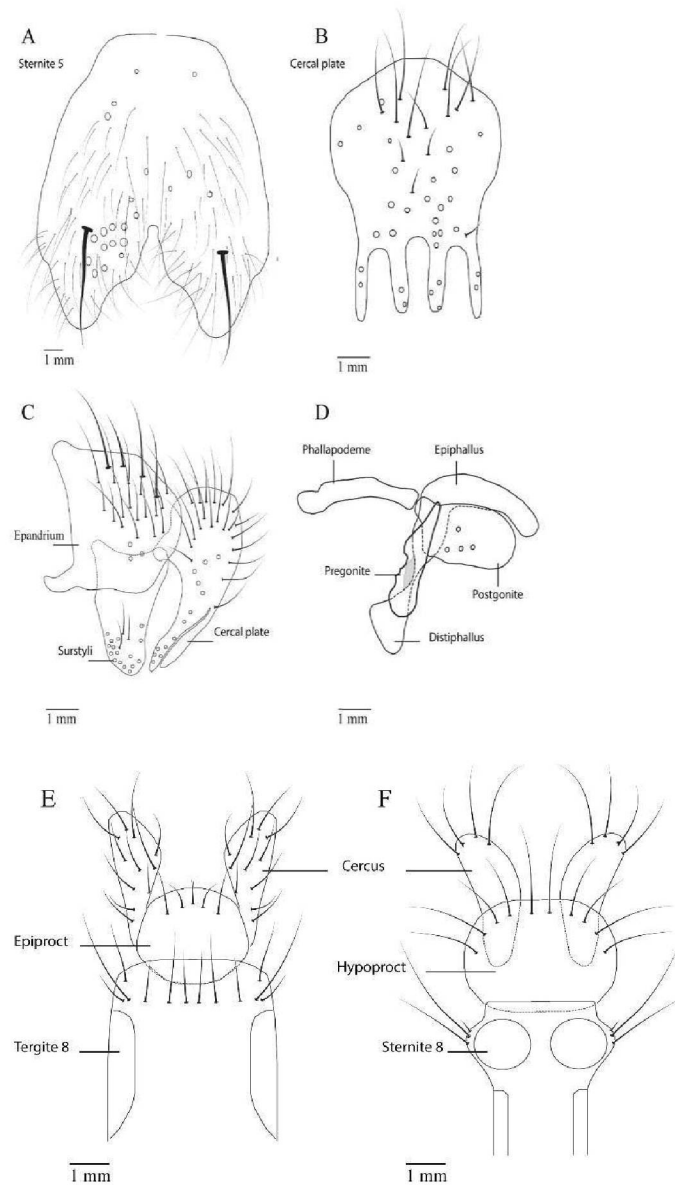


Figure 9. *Helina longipila* Stein. **A-D** male terminalia: **A.** Sternite 5. **B.** Cercal plate, posterior view. **C.** Cercal plate, surstyli and epandrium, lateral view. **D.** Phallic complex, lateral view. **E-F** Female terminalia apical portion of ovipositor: **E.** Dorsal view. **F.** Ventral view.

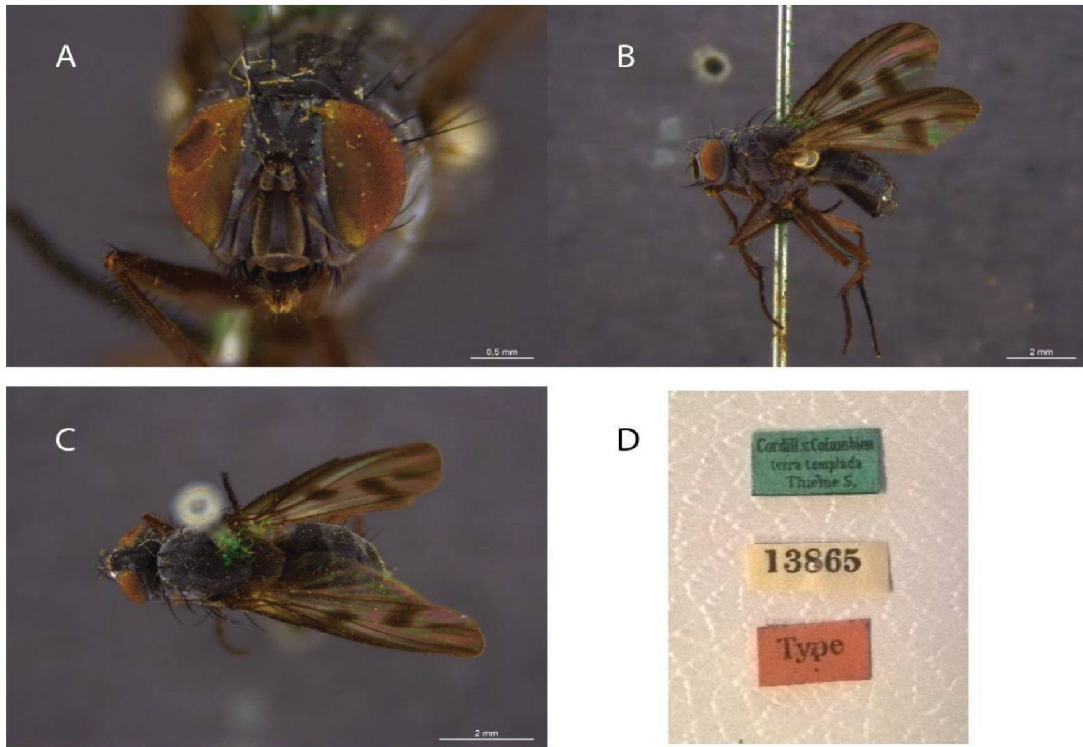


Figure 10. *Helina marginipennis* Stein. **A-D** Photographs of type material (male): **A.** Frontal view; **B.** Lateral view. **C.** Dorsal view. **D.** Labels.

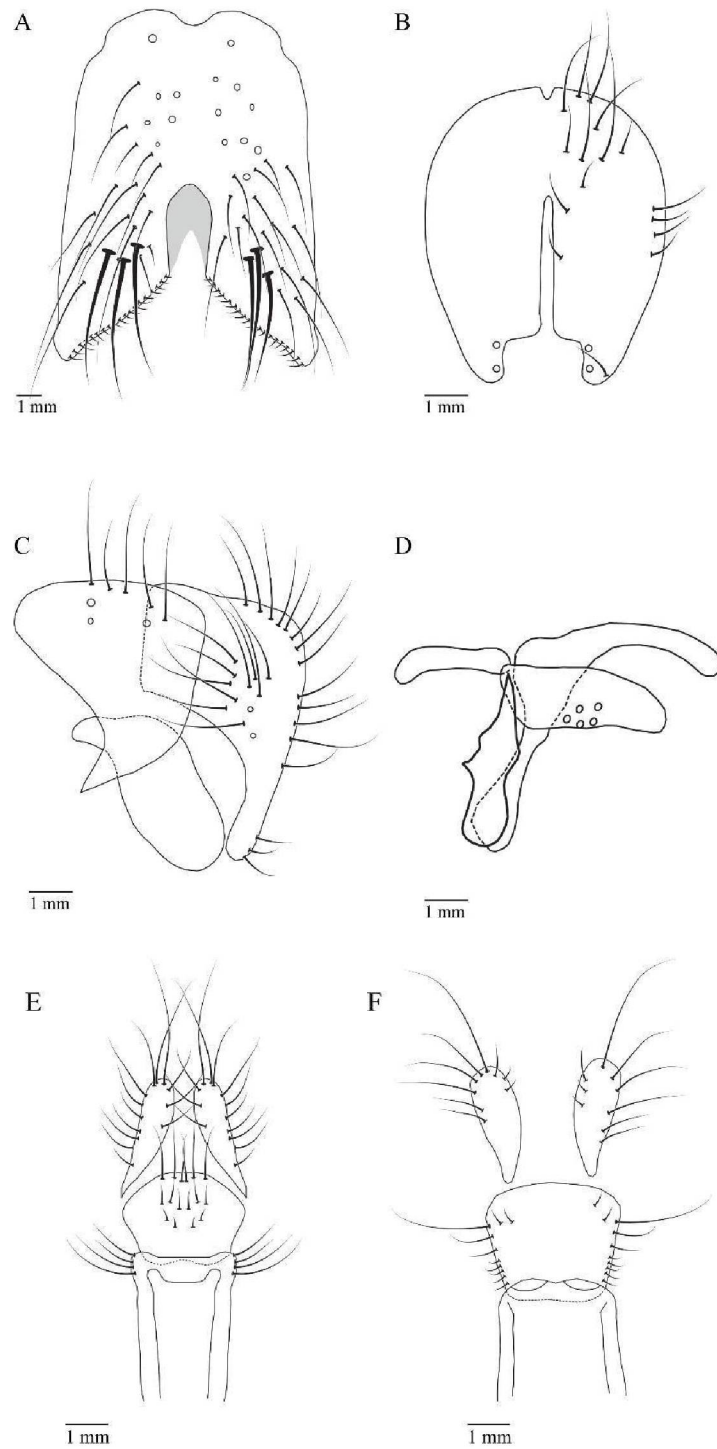


Figure 10. *Helina marginipennis* Stein. **A-D** Photographs of type material (male): **A.** Frontal view; **B.** Lateral view. **C.** Dorsal view. **D.** Labels.

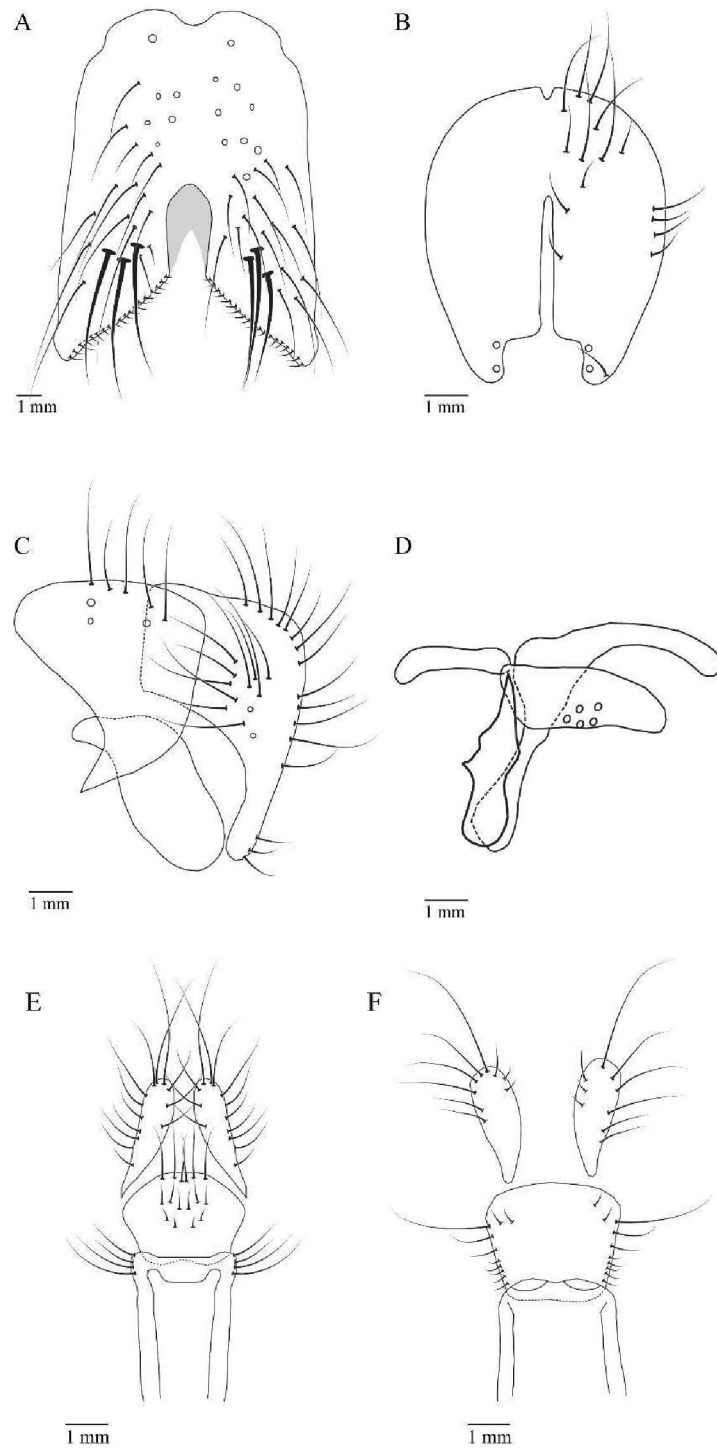


Figure 11. *Helina marginipennis* Stein. **A-D** male terminalia: **A.** Sternite 5. **B.** Cercal plate, posterior view. **C.** Cercal plate, surstyli and epandrium, lateral view. **D.** Phallic complex, lateral view. **E-F** Female terminalia, apical portion of ovipositor: **E.** Dorsal view. **F.** ventral view.

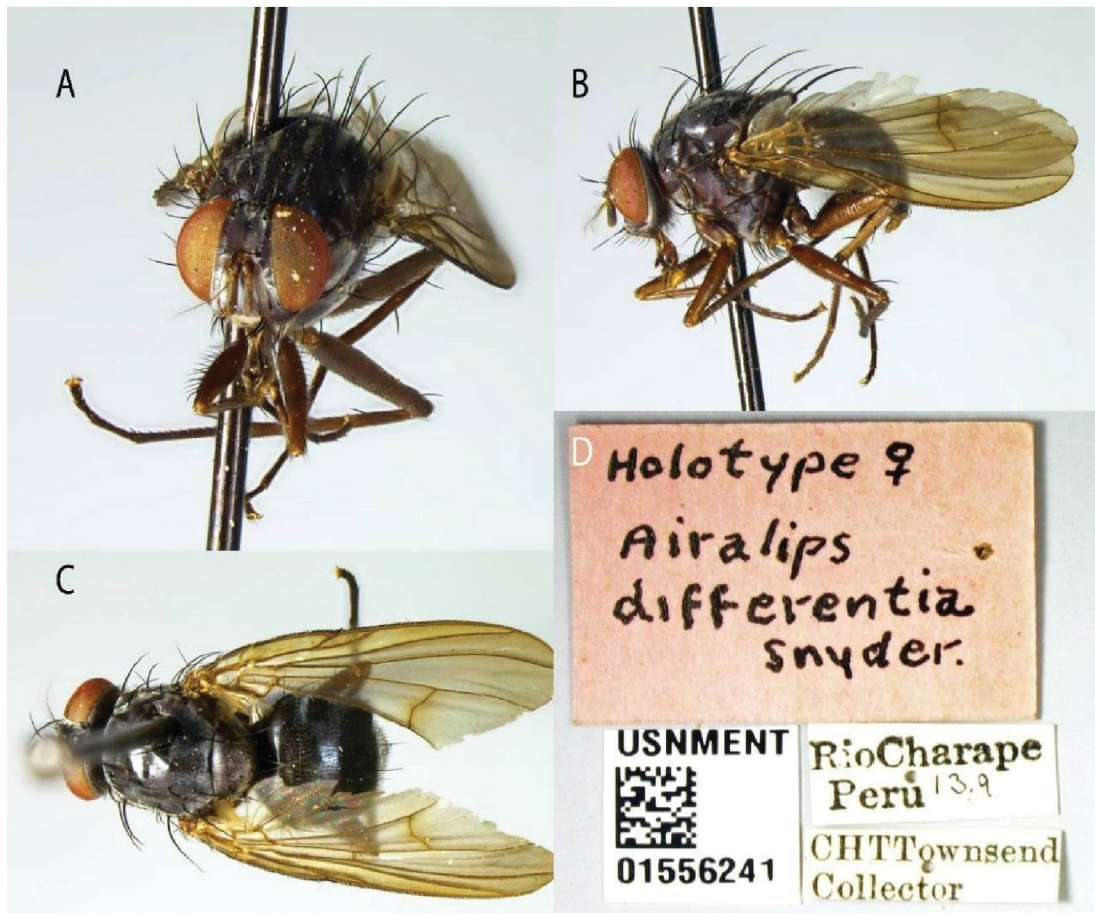


Figure 12. *Helina prima* (Malloch) (*Airalips differentia*). A-D Photographs of type material (male): **A.** Frontal view; **B.** Lateral view. **C.** Dorsal view. **D.** Labels.

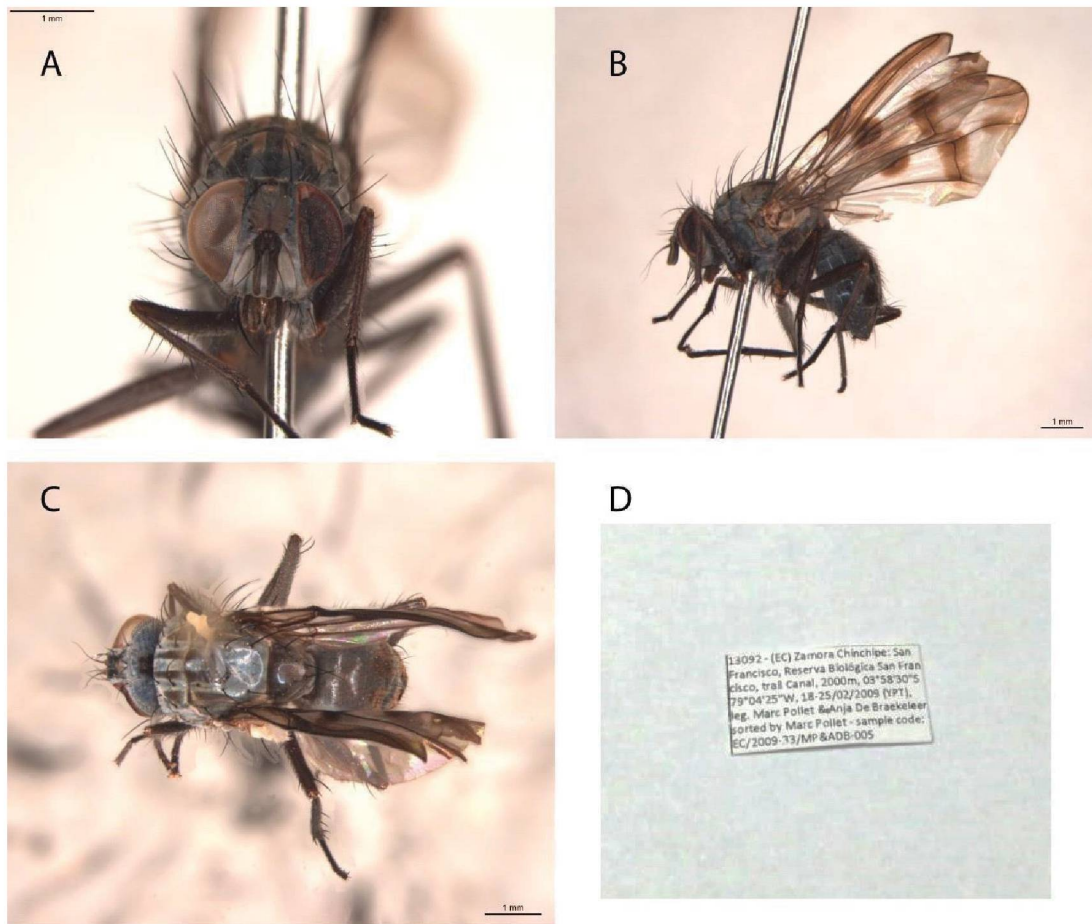


Figure 13. *Helina vierecki* Snyder. **A-D** Photographs of material from our collection (female): **A.** Frontal view; **B.** Lateral view. **C.** Dorsal view. **D.** Label.

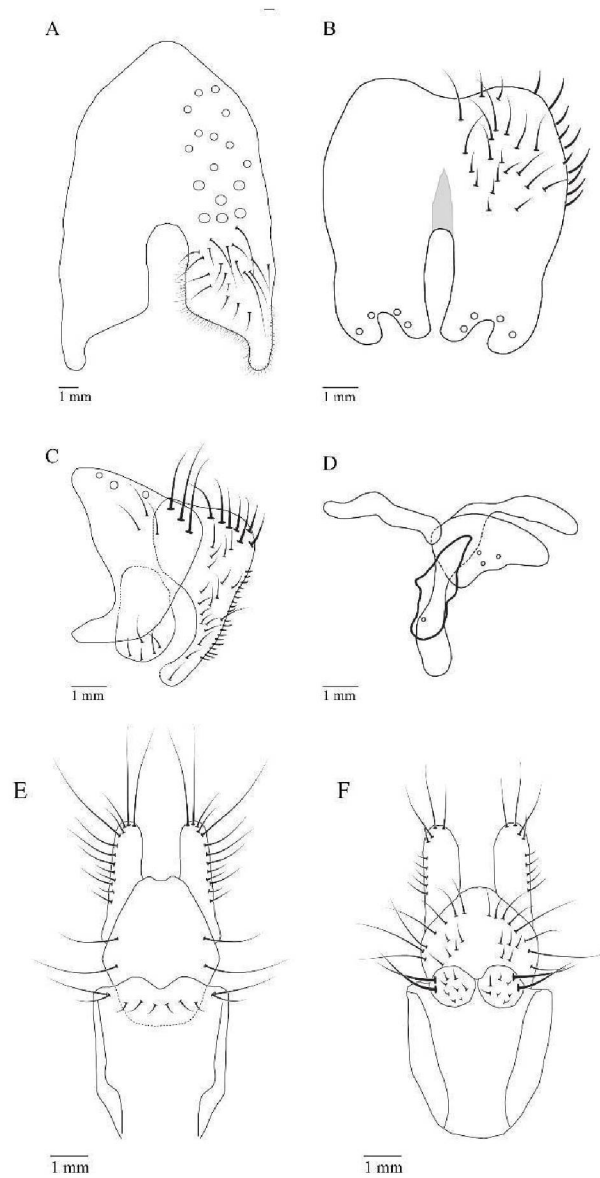


Figure 14. *Helina vierecki* Snyder. **A-D** male terminalia: **A.** Sternite 5. **B.** Cercal plate, posterior view. **C.** Cercal plate, surstyli and epandrium, lateral view. **D.** Phallic complex, lateral view. **E-F** Female terminalia, apical portion of ovipositor: **E.** Dorsal view. **F.** Ventral view.

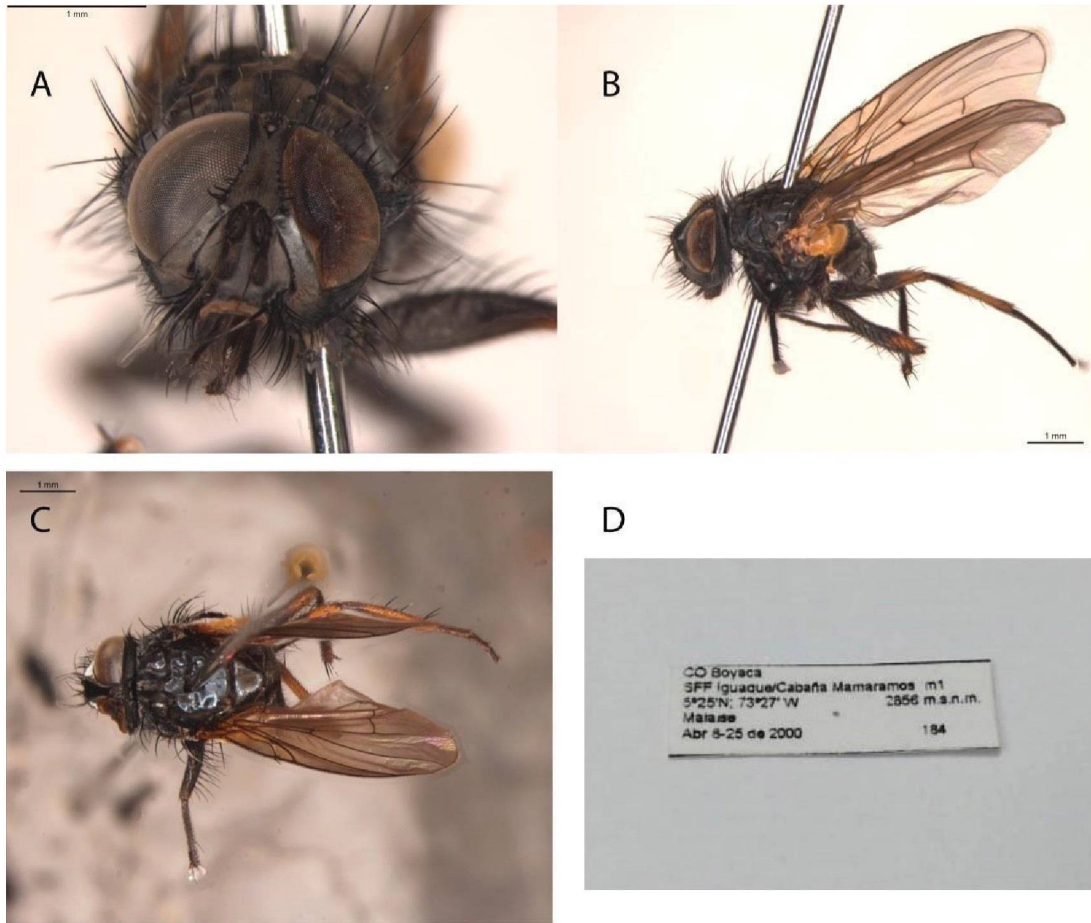


Figure 15. *Helina* sp. 1 (new). **A-D** Photographs of material from our collection (male): **A.** Frontal view; **B.** Lateral view. **C.** Dorsal view. **D.** Label.

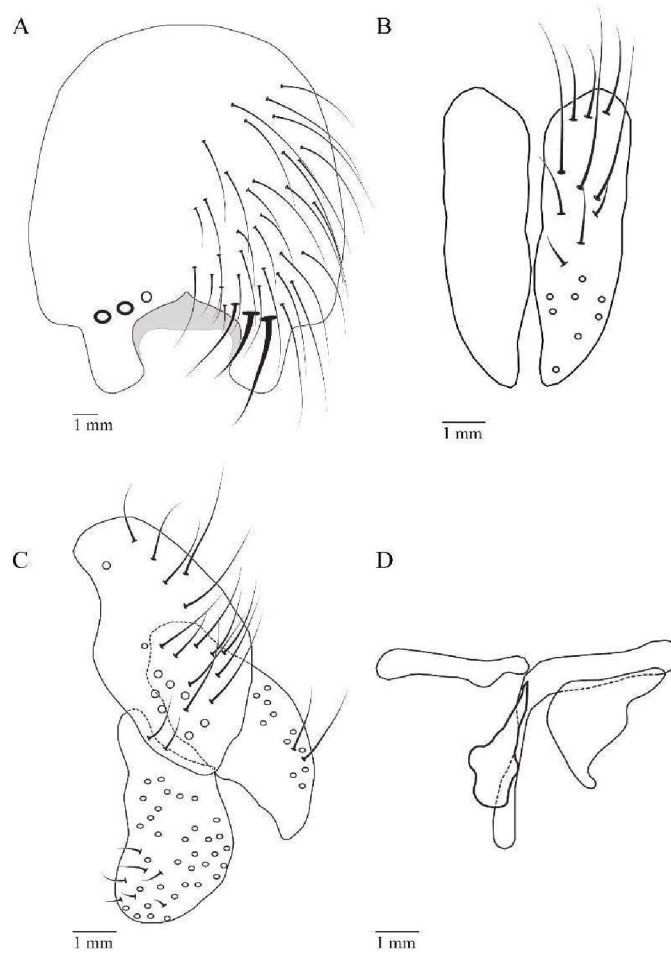


Figure 16. *Helina* sp. 1 (new). **A-D** male terminalia: **A.** Sternite 5. **B.** Cercal plate, posterior view. **C.** Cercal plate, surstyli and epiandrium, lateral view. **D.** Phallic complex, lateral view.

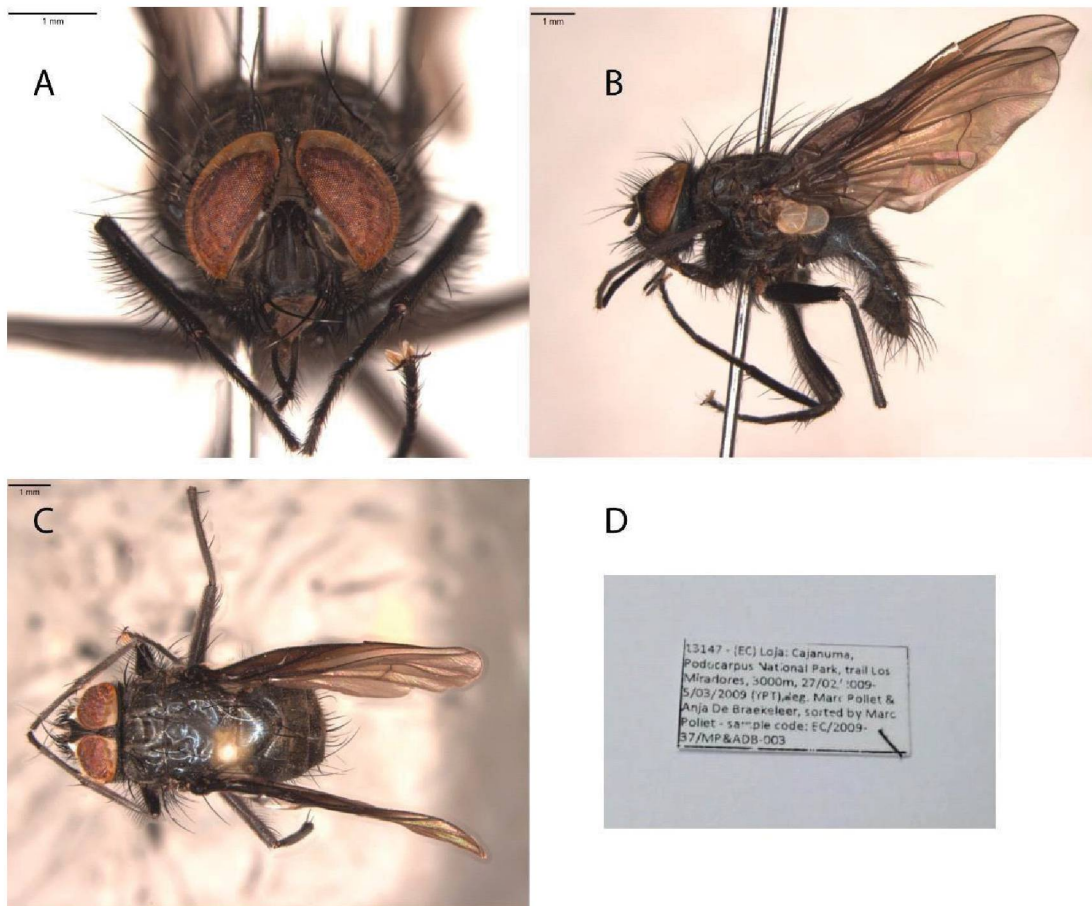


Figure 17. *Helina* sp. nov. 2 **A-D** Photographs of material from our collection (male): **A.** Frontal view; **B.** Lateral view. **C.** Dorsal view. **D.** Label.

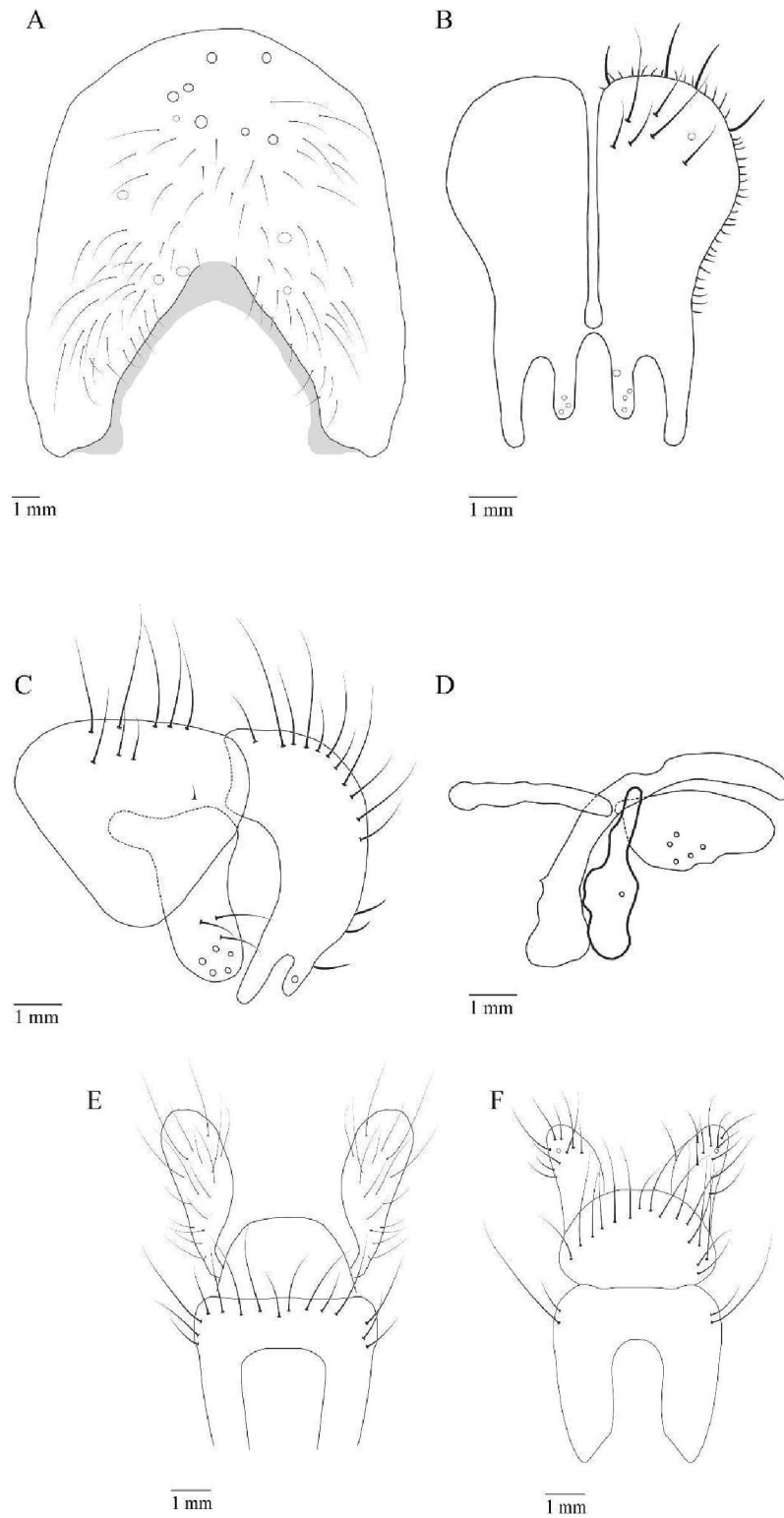


Figure 18. *Helina* sp. nov. 2. **A-D** male terminalia: **A.** Sternite 5. **B.** Cercal plate, posterior view. **C.** Cercal plate, surstyli and epandrium, lateral view. **D.** Phallic complex, lateral view. **E-F** female terminalia, apical portion of ovipositor: **E.** Dorsal view. **F.** Ventral view

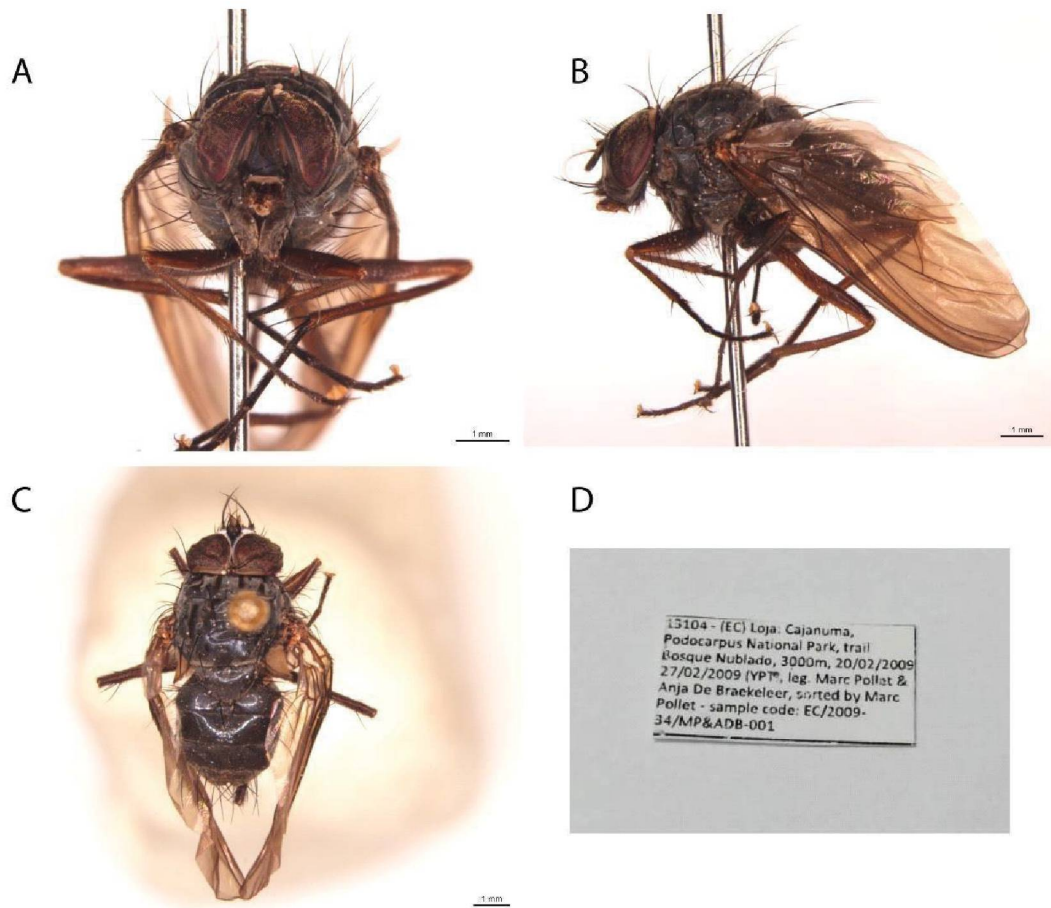


Figure 19. *Helina* sp. nov. 3. **A-D** Photographs of material from our collection (male): **A.** Frontal view; **B.** Lateral view. **C.** Dorsal view. **D.** Label.

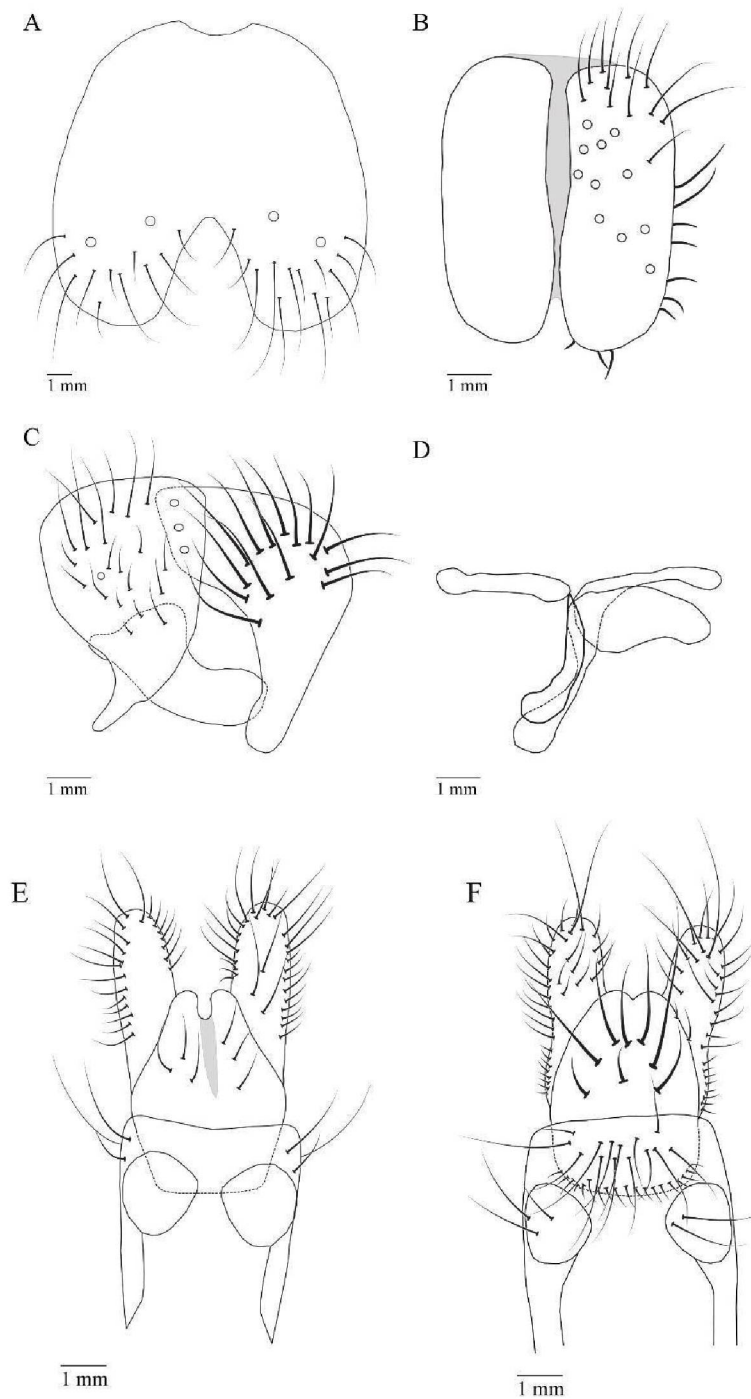


Figure 20. *Helina* sp. nov. 3. **A-D** male terminalia: **A.** Sternite 5. **B.** Cercal plate, posterior view. **C.** Cercal plate, surstyli and epandrium, lateral view. **D.** Phallic complex, lateral view. **E-F** female terminalia, apical portion of ovipositor: **E.** Dorsal view. **F.** Ventral view.

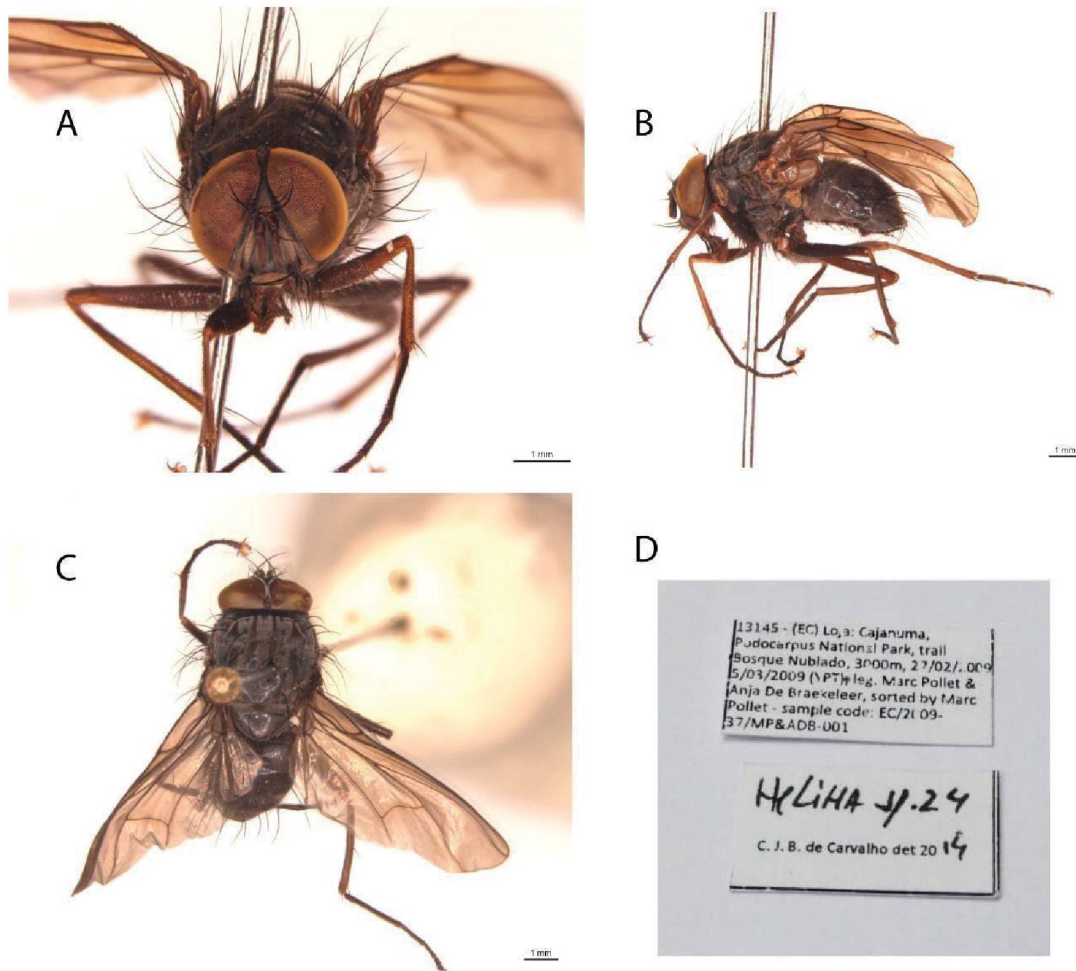


Figure 21. *Helina* sp. nov. 4. **A-D** Photographs of material from our collection (male): **A.** Frontal view; **B.** Lateral view. **C.** Dorsal view. **D.** Label.

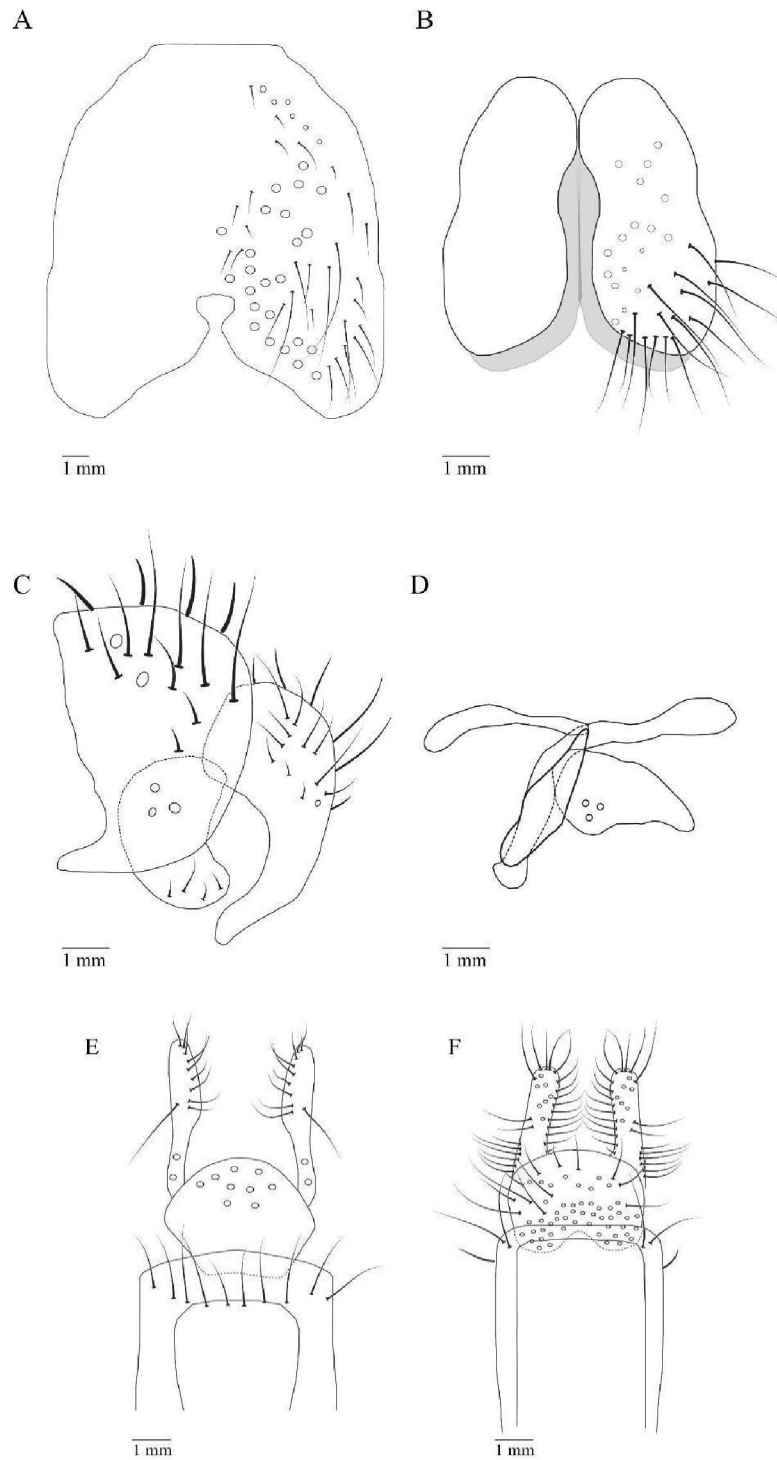


Figure 22. *Helina* sp. Nov. 4. **A-D** male terminalia: **A.** Sternite 5. **B.** Cercal plate, posterior view. **C.** Cercal plate, surstyli and epandrium, lateral view. **D.** Phallic complex, lateral view. **E-F** female terminalia, apical portion of ovipositor: **E.** Dorsal view. **F.** ventral view.

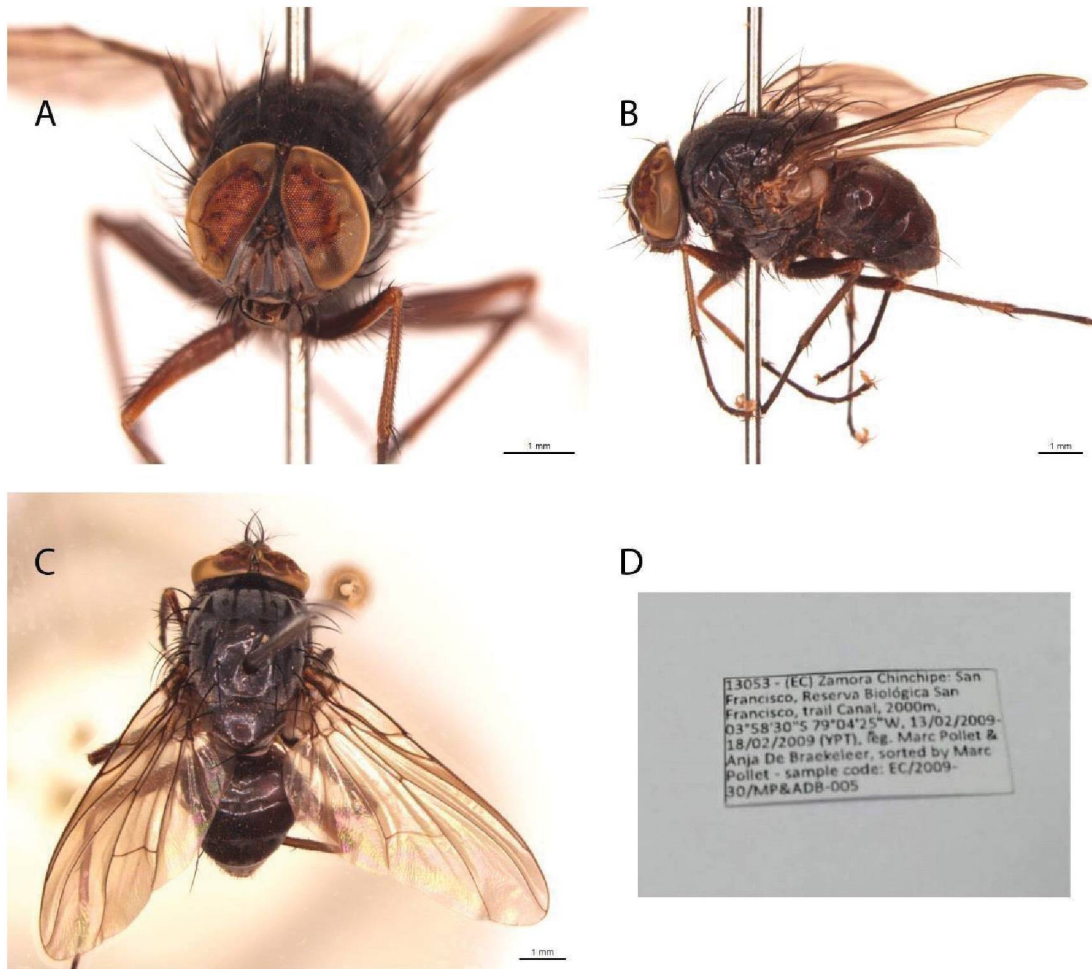


Figure 23. *Helina* sp. nov. 5. **A-D** Photographs of material from our collection (male): **A.** Frontal view; **B.** lateral view. **C.** dorsal view. **D.** Label.

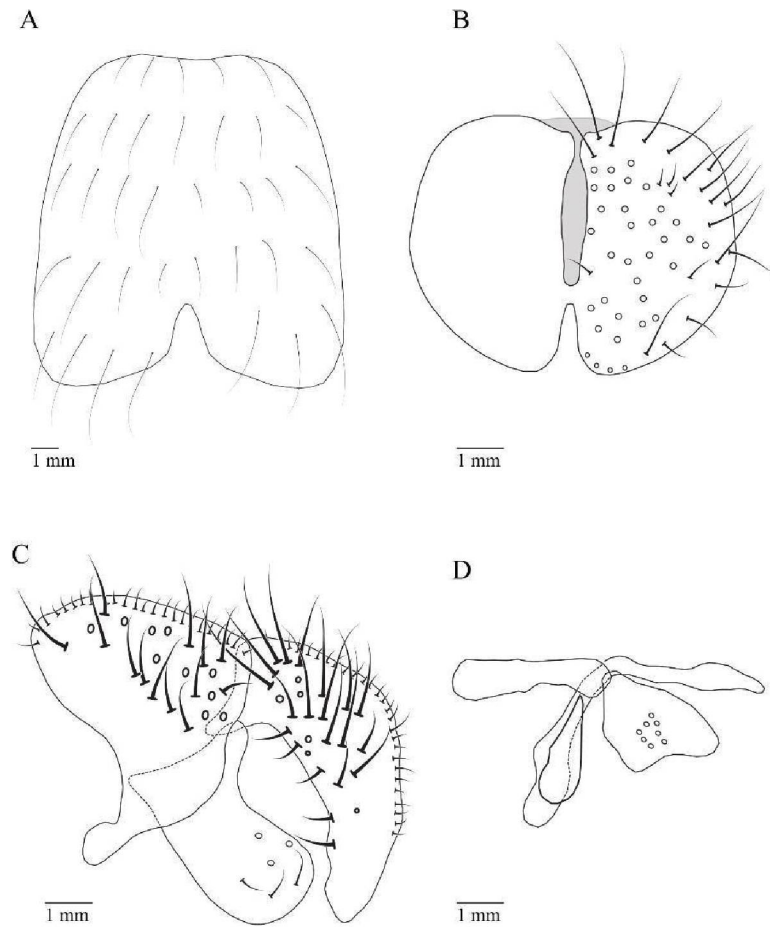


Figure 24. *Helina* sp. nov. 5. **A-D** male terminalia: **A.** Sternite 5. **B.** Cercal plate, posterior view. **C.** Cercal plate, surstyli and epandrium, lateral view. **D.** Phallic complex, lateral view.

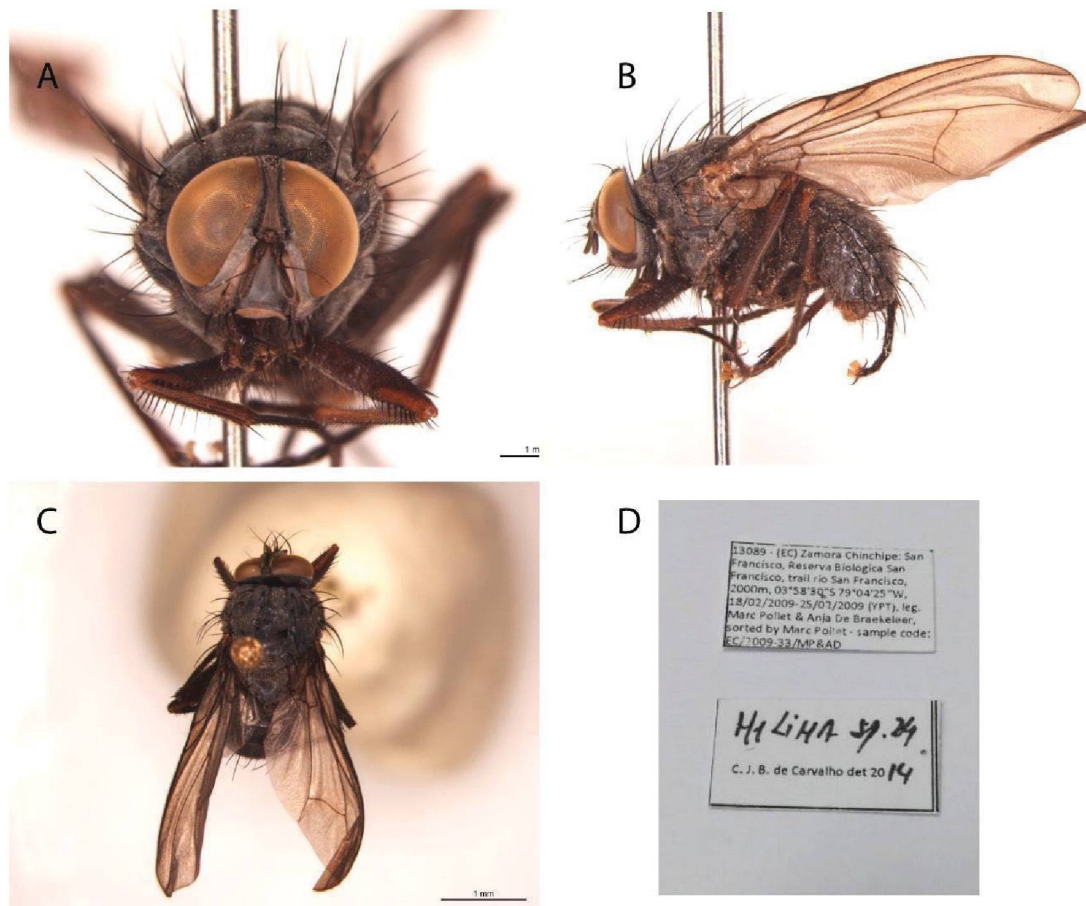


Figure 25. *Helina* sp. nov. 6. **A-D** Photographs of material from our collection (male): **A.** Frontal view; **B.** Lateral view. **C.** Dorsal view. **D.** Label.

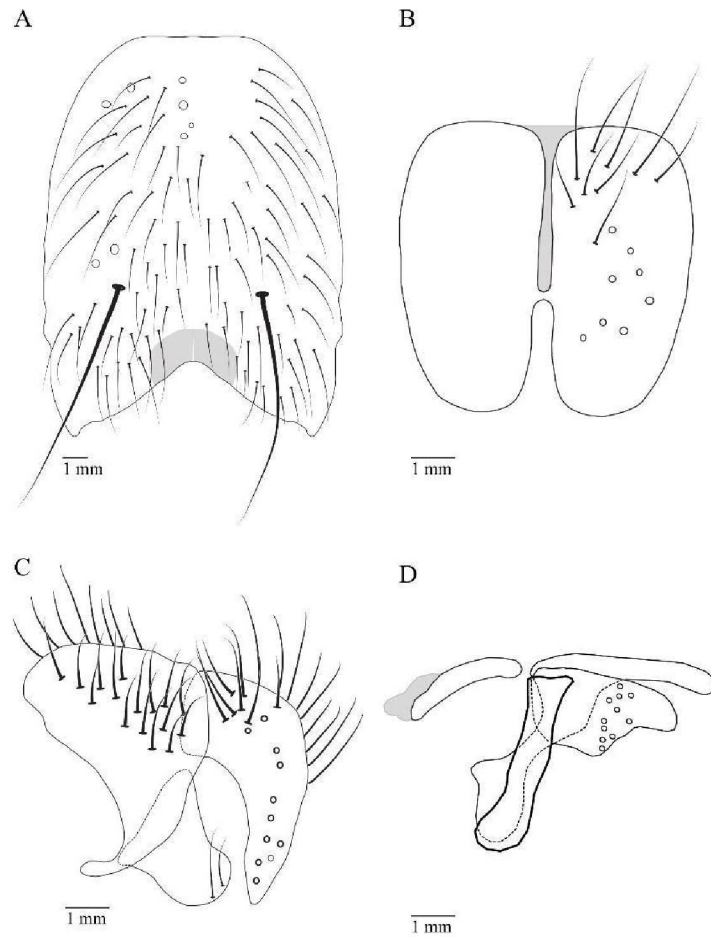


Figure 26. *Helina* sp. nov. 6. **A-D** male terminalia: **A.** Sternite 5. **B.** Cercal plate, posterior view. **C.** Cercal plate, surstyli and epandrium, lateral view. **D.** Phallic complex, lateral view.

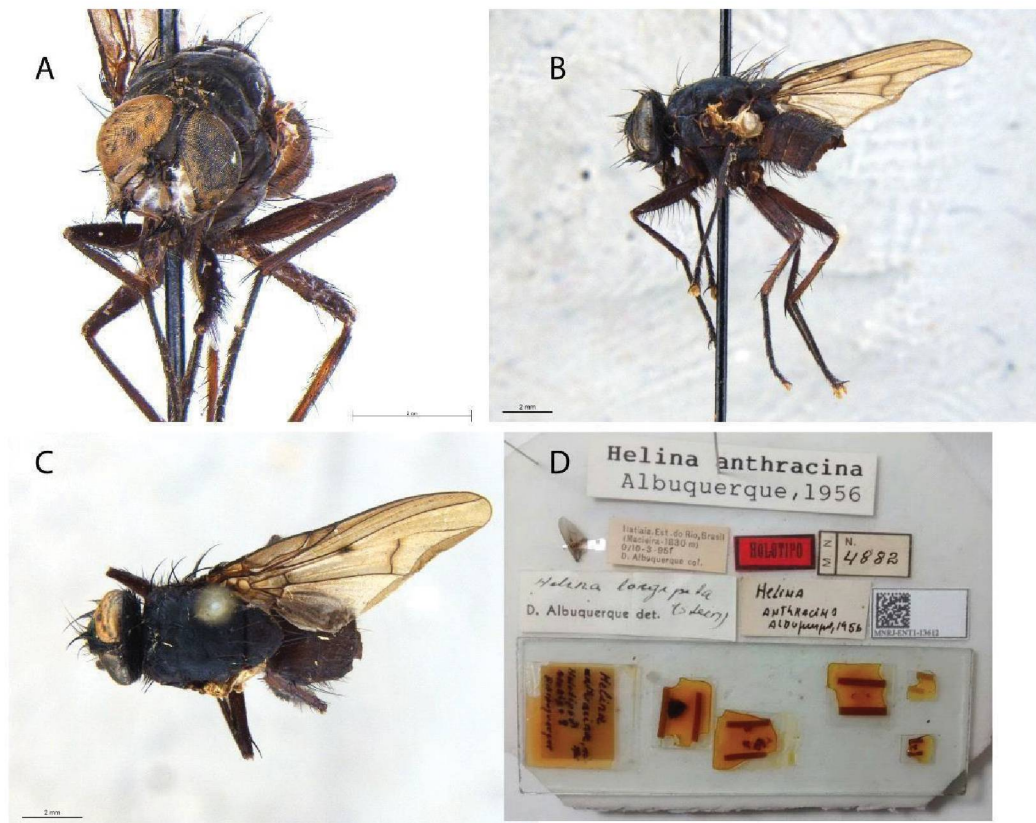


Figure 27. *Helina anthracina* Albuquerque. **A-D** Photographs of type material (male): **A.** Frontal view; **B.** Lateral view. **C.** Dorsal view. **D.** Labels.