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An annotated catalogue of the Paraguayan Sphingidae (Lepidoptera)

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Abstract

Although the Sphingidae (hawkmoths) of Paraguay are moderately well-known, comprehensive publications on the fauna are few and far between, and there is no modern taxonomic and biogeographical overview of the available data against which future researchers could work. Here we compile existing published data and review important national collections to provide a preliminary understanding of the distributions of Sphingidae species in the country. The presence of 100 species is documented, with a further three species pending documentation, three species considered to be of potential occurrence and seven species considered to have been erroneously cited. A complete bibliography of Paraguayan Sphingidae is provided, as well as taxonomic discussion, and a first attempt is made to associate sphingid species' distributions with the ecoregions present in the country. Four species are documented for Paraguay for the first time: *Cocytius mephisto* Haxaire & Vaglia, 2002*, Manduca exiguus* (Gehlen, 1942), *Erinnyis impunctata* Rothschild & Jordan, 1903 and *Xylophanes marginalis* Clark, 1917. Paraguayan specimens previously assigned to *Xylophanes porcus* (Hübner, [1823]) are re-assigned to the recently described species *Xylophanes alineae* Haxaire & C. Mielke, 2017 and *Xylophanes soaresi* Haxaire & C. Mielke, 2017. In addition, specimens of species previously named as *Manduca sexta* (Linnaeus, 1771) and *Protambulyx eurycles* (Herrich-Schäffer, [1854]) are referred to *Manduca paphus* (Cramer, 1779) and *Protambulyx fasciatus* (Gehlen, 1928) respectively. A provisional new taxonomic arrangement of the Paraguayan species of the genus *Neogene* Rothschild & Jordan, 1903 is also proposed in which *Neogene pictus* Clark, 1931 **syn. nov.** and *Neogene intermedia* Clark, 1935 **syn. nov.** are synonymized with *Neogene reevei* (Druce, 1882), and *Neogene albescens* Clark, 1929 **syn. nov.** is synonymized with *Neogene steinbachi* Clark, 1924.

Key words: distribution, Hawkmoths, specimens, status, taxonomy

Introduction

Due to their large size, abundance and frequency at which they are attracted to lights, hawkmoths (Lepidoptera: Sphingidae) constitute one of the more well-studied families of nocturnal Lepidoptera (Moré *et al.* 2005). Despite this, little is known of the ecology of many Neotropical species, and a shortage of museum specimens results in an incomplete picture of the distribution of all but the most widespread species in the region (Kitching *et al.* 2001).

Sphingidae play a significant role in the pollination of many species of native plants (Nilsson & Rabakonandrianina 1988; Haber & Frankie 1989; Miyake *et al.* 1998) and this crucial role in plant reproduction in all terrestrial ecosystems makes them important bioindicators. Consequently, studies of their diversity can provide important data for monitoring levels of environmental stress (Kevan 1999). Given the conspicuous nature of these charismatic moths, the ease

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with which they may be surveyed and collected, and their obvious utility in measuring and monitoring the health of ecosystems, it is perhaps surprising that more attention has not been paid to the group by conservationists and no regional or global conservation assessment of the family has ever been proposed or attempted. With deforestation and land use change rates in Paraguay reaching unprecedented levels (Cardozo *et al.* 2013), the availability of reliable data on biodiversity in the country is imperative for the efficient development and employment of mitigation measures and management proposals (Smith *et al.* 2017).

The Sphingidae fauna of Paraguay is moderately well-known, yet very few publications dealing specifically with the species in the country exist, and no formal up-to-date list of the documented species is currently available. In this paper, we review the available data on the distributions and taxonomy of the Paraguayan Sphingidae, including the examination of hitherto unpublished national collections, to provide a baseline for future studies on the group and biodiversity conservation actions.

History of Sphingid research in Paraguay

Although a few sphingid species have been described based on Paraguayan specimens in the 19th and early 20th centuries (e.g., *Xylophanes elara* (Druce, 1878) and *Eumorpha analis* (Rothschild & Jordan, 1903)), the first works dealing specifically with the species occurring in Paraguay were a brief mention of pest species of manioc by Bertoni (1924) and the first attempt at a country list by Schade (1927). The latter included 40 species with annotations, but did not reference any material and gave only scant distributional data. Podtiaguin (1941) provided a list of 34 species (one to genus level only) mainly from the Asunción area, with brief ecological notes for some. At this point 44 species had been published as occurring in Paraguay and Podtiaguin (1941) lamented the "deplorable state" of knowledge of Paraguayan Sphingidae. Despite this, over 40 years passed until the next publication, when Poulard (1983) gave a short list of 12 species from the geographically and ecologically disparate localities of Isla Yacyretá (ITA) and Cerro León (APY). Though the introduction stated that specimens were collected, no reference was made to where these were deposited and the whereabouts of this collection is currently unknown. Benítez Díaz (1988) published a list of 34 species (three identified only to genus level) housed in the collection of the Departamento de Entomología de la Facultad de Ingenieria Agronómica Universidad Nacional de Asunción (today the Colección Entomológica de la Facultad de Ciencias Agrarias) but he did not reference specimens directly in the publication. We provide the data of those specimens here.

Drechsel (1994) attempted the first modern summary of Paraguayan Sphingidae, greatly expanding the number of documented species, listing 83 species, seven of which the author had been unable to locate during his field studies. Though this publication was a valuable contribution, by providing only basic distributional information (typically to departmental level), it again omitted reference to specimens and their data. Drechsel (2014b) published a list of 51 species from the Reserva Natural Dimas (APA) and Drechsel (2014c) a list of 33 species from Estancia Garay Cué (CON). Although some species were illustrated photographically in these publications no details were provided as to the depository of any specimens that may have been collected. Drechsel (2014f) earlier gave a list of 48 species from Refugio Biológico Carapá (CAN) for which voucher specimens were deposited in the Itaipú museum, Hernandarias (APA). However, not all of the species listed in the publication are represented with specimens in the collection, and as specimen data was not provided in the publication we publish it here for the first time (note that some specimen numbers are duplicated). In addition, although Drechsel (2014f) stated that the field work took place between 28 March 1997 and 6 September 2006, all the specimens in the collection date from a single collection event from 20–23 November 2003. The whereabouts of the other specimens is unknown. Furthermore, the series of images included in that publication seem to have been used purely for illustrative purposes and thus we have not assumed that they are representative of specimens collected at the site.

The first publication to provide detailed specimen data was the catalogue of the collection in the Museo Nacional de Historia Natural del Paraguay by Ríos Díaz (2014). This augmented a list for the same collection provided previously by Kochalka *et al.* (1996), documenting 416 specimens and 74 species, and correcting misidentifications. Ríos Quintana (2015) reported on a collection mostly from the previously unsampled department of Ñeembucú that contained 392 specimens and 36 species, although all had been previously reported from Paraguay. Most recently, Smith *et al.* (2017) provided a documented list of 929 specimens and 63 species from the Reserva Natural Laguna Blanca (SPE), the largest single site collection so far for any Paraguayan locality, and added a further five species to the national list.

The provision of a modern, critically reviewed list of Paraguayan sphingid species is necessary to clarify taxonomic issues, identify gaps in our knowledge of distribution and act as an aid to future researchers. The production of a base

list reviewing all the available literature is a key step in focussing future research on where it will be most productive. We hope that this is the first step towards a better understanding of the Sphingidae of Paraguay.

Materials and method

New collections examined

The following collections that include Paraguayan Sphingidae are reported on here for the first time and new specimens listed below in the species accounts use the following collection codes.

CEFCA—(Colección Entomológica de la Facultad de Ciencias Agrarias de la Universidad Nacional de Asunción). A small (119 specimens of 36 species) but very well-preserved collection of moths mainly from Central department. Information on collectors is not available, but most specimens were collected during the mid-1970s.

CZPC—(Colección Zoológica Ecosara/Pro Cosara). A small collection of moths from Nueva Gambach at the southern tip of Parque Nacional San Rafael that was collected during the ECOSARA project run by Pro Cosara during 2007/2008. The major surviving part of this collection is now housed in the Museo Nacional de Historia Natural del Paraguay (see below).

CZPLT—(Colección Zoológica Para La Tierra, Reserva Natural Laguna Blanca, departamento San Pedro). Specimens in this collection from the Reserva Natural Laguna Blanca, departamento San Pedro (929 specimens and 63 species), were previously published by Smith *et al.* (2017). Additional small voucher collections of specimens from poorly sampled areas in the extreme west (Paraguayan Chaco, departamento Boquerón,) and south of the country (Parque Nacional San Rafael and Encarnación, departamento Itapúa) were collected by PS November 2014 to January 2020. The collection is currently housed at Centro IDEAL, Pilar, Paraguay.

CJHL—(Collection Jean Haxaire, Laplume, France). An almost complete collection of Sphingidae from the Americas, and one of the most important collections of Sphingidae in the world. About 70 000 specimens of Sphingidae representing more than 1350 species are currently housed in the collection, and it contains around 800 holotype and paratype specimens. Within this collection, 148 specimens of Sphingidae are from Paraguay.

IBIS—(Instituto de Bioecología e Investigación Subtropical, Universidad Nacional de Pilar, Pilar, departamento Ñeembucú). Largely comprised of specimens collected in the previously unsampled Ñeembucú department in extreme southwestern Paraguay by Andrés and Julio R. Contreras, and Erica Ríos Quintana between June 2006 and January 2014. These specimens have been documented in an unpublished thesis (Ríos Quintana 2015) but are reproduced here with errors corrected. The collection includes 392 specimens and 36 species. The collection is currently housed at Centro IDEAL, Pilar, Paraguay.

MIB—(Museo Itaipú Binacional, Hernandarias, departamento Alto Paraná). A large collection of specimens from the various Itaipú reserves, departamento Alto Paraná in the east of country, collected by U. Drechsel from October 2003 to March 2004, including 160 specimens and 51 species.

MNHNPY—(Museo Nacional de Historia Natural del Paraguay, San Lorenzo, departamento Central). Includes the surviving remnants of a once larger collection of Sphingidae from CZPC. We have examined the 39 specimens of 22 species that currently remain in this collection. The other 416 specimens in this collection, from other localities were published by Ríos Díaz (2014).

NHMUK—(Natural History Museum, London, U.K.; formerly British Museum (Natural History), BMNH). One of the largest and perhaps the most comprehensive collection of Sphingidae in the world in terms of species coverage. By the end of the Twentieth Century, it contained over 60 000 Sphingidae specimens in the Main Collection (derived mostly from that of Lord Walter Rothschild's Tring Museum, which was bequeathed in 1939), together with several unincorporated collections, such as those of Professor Hiroshi Inoue and Edward Wiltshire, and an undocumented number in the Supplementary Collections and Accessions. The collection of prepared specimens doubled in size in 2008 with the acquisition of most of the collection of the late Jean-Marie Cadiou, which also included an estimated 250 000 papered moths, bringing the total to around 370 000 specimens. The NHMUK collection is the most type rich of all Sphingidae collections and work is ongoing to document and digitize them. The total number of specimens from Paraguay remains to be determined but 38 records are reported here.

PROC—(Pro Cosara collection, Estancia Nueva Gambach, Parque Nacional San Rafael, departamento Itapúa). A small, uncatalogued voucher collection of 14 specimens collected locally. It is in poor condition and 12 species are represented.

Species List

Below, we provide a critical list of the species that have been documented as present in Paraguay, with a complete bibliographical review, and include data (locality and date of collection where available) on previously unpublished specimens. A list of taxonomic synonyms used in a Paraguayan context is provided for each species. We have applied strict criteria to this documentation and classify the species into four categories:

1. Species confirmed by us as occurring in Paraguay and that are supported by specimens and have been previously published in the scientific literature or are published here for the first time.

2. Species for which documentation is still pending. These are species for which previous reports or photographs exist but for which no associated specimen details are available to us. Formal documentation of these records is desirable.

3. Species that have been previously cited for Paraguay but lack supporting specimens. These are considered here to represent possible errors or misidentifications, although they potentially could occur in Paraguay given their known distributions.

4. Species considered to be erroneous citations. They have no known supporting material and seem certain to represent errors or misidentifications when considered in a global context.

The following abbreviations are used for the Paraguayan administrative departments (Fig. 1): Chaco region: APY Alto Paraguay, BOQ Boquerón, PHA Presidente Hayes. Oriental region: CON Concepción, AMA Amambay, SPE San Pedro, CAN Canindeyú, APA Alto Paraná, CEN Central (including the capital city of Asunción for practical purposes, although it is administratively and politically autonomous), COR Cordillera, CAA Caaguazú, PAR Paraguarí, GUA Guairá, CAZ Caazapá, ÑEE Ñeembucú, MIS Misiones, ITA Itapúa.

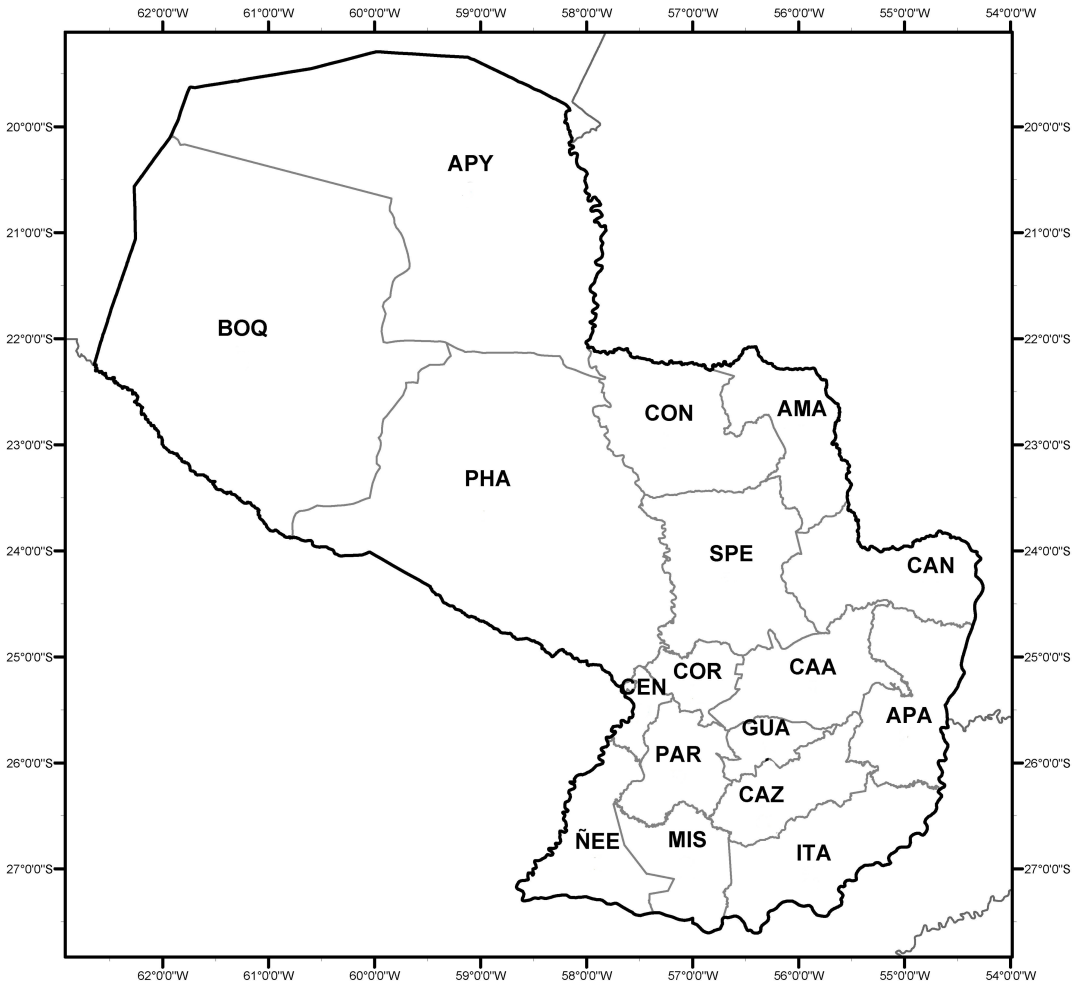

Figure 1. Map of Paraguay showing the political departments mentioned in the text. Departments as follows: Chaco region – Alto Paraguay (APY), Boquerón (BOQ), Presidente Hayes (PHA); Oriental region – Amambay (AMA), Alto Paraná (APA), Caaguazú (CAA), Canindeyú (CAN), Caazapá (CAZ), Central (CEN), Concepción (CON), Cordillera (COR), Guairá (GUA), Itapúa (ITA), Misiones (MIS), Ñeembucú (ÑEE), Paraguarí (PAR), San Pedro (SPE).

Additional abreviations: LSP Lost specimen, SP specimen, PH photograph.

For each confirmed species and those pending documentation, we include a brief section ("*Distribution*") that attempts a broad and preliminary categorization of its known distribution in Paraguay in terms of the ecorregions it inhabits (as defined by Hayes (1995) and Mereles (2013)), including comments about its frequency. These ecorregions can be broadly defined as follows: Alto Paraná Atlantic Forest (subtropical humid forests of eastern Paraguay); Cerrado (central South American savanna of the northern Oriental region of Paraguay); Dry Chaco (low, arid thorn forest and scrub of the western Occidental region); Humid Chaco (palm savanna and marshlands of the Paraguay River Basin); Pantanal (gallery forests and swamps of the north-eastern Chaco); Cerrados del Chaco (an area of Cerrado in the northern Chaco contiguous with the Chiquitania of Bolivia) and Southern Cone Mesopotamian Savanna (flooded Mesopotamian grasslands of the southern Oriental region).

We also make reference to the online distribution maps given by Drechsel (2014e) and online images at FAUNA Paraguay (2006 onwards), where these provide additional data to that covered by the criteria above. It should be noted that we have either been unable to vouch for the veracity of these records or are unaware of the location of supporting voucher specimens (if they exist), and thus have chosen to omit these records from the main distributional section pending their formal publication.

As necessary, we also include a section ("*Taxonomy*") that discusses recent changes in taxonomy or nomenclature as they affect the species concerned, particularly if these are relevant to the interpretation of past records. The higher level taxonomy follows Kitching & Rougerie *et al.* (2018), as updated and amended by Haxaire & Mielke ([2020]).

Results

Confirmed species

Subfamily Smerinthinae

Tribe Ambulycini

Taxonomy: For over a century after the revision by Rothschild & Jordan (1903), the name *Adhemarius gannascus* (Stoll, 1790) was applied to all moths with a superficially similar habitus that occur in the Caribbean and Central and South America. However, the study of Vaglia & Haxaire (2005) determined that several distinct species had been incorrectly synonymized with this name, of which *A. daphne* (Boisduval, [1875]) is relevant to the Paraguayan fauna. In Paraguay, *A. daphne* is apparently much the most commonly encountered species in the genus, and older records of *A. gannascus* (e.g., Benítez Díaz [1988]) must be treated with caution as most potentially, even probably refer to *A. daphne*.

Adhemarius daphne daphne (Boisduval, [1875])

Ambulyx Daphne Boisduval, [1875]. *Histoire naturelle des insectes (Spécies général des lépidoptères - Hétérocères)* 1: 184–185.

Adhemarius gannascus: Drechsel (1994) in part, Kochalka *et al.* (1996), Drechsel (2014f)

Adhemarius daphne: Drechsel (2014b, c), Ríos Díaz (2014), Smith *et al.* (2017)

Adhemarius daphne daphne: Ríos Quintana (2015)

APA: Reserva Natural Dimas (Drechsel 2014b); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); RNB Mbaracayú: Aguara-Ñu (Ríos Díaz 2014; SP); RNB Mbaracayú: Carapá (Ríos Díaz 2014; SP); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **CON:** Garay Cue (Drechsel 2014c; PH); **GUA**: Calle Florida (Ríos Díaz 2014; SP); **ITA**: Colonia Tarumá Estancia Parabel (Ríos Díaz 2014; SP); Encarnación (CZPLT 5589; 4 v 2018); PN San Rafael: Estancia Nueva Gambach (CZPLT 7103; 12 vii 2019), (CZPLT 7245; 21 vii 2019); (MNHNPY; 20 x 2008), (Ríos Quintana 2015; SP); **ÑEE:** Pilar (Ríos Quintana 2015; SP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Confined to eastern Paraguay where it is one of the more abundant hawkmoths in the Atlantic Forest and Cerrado ecorregions. Presence in ÑEE, together with a single undocumented report from PHA (Drechsel 2014e), suggest that the species can colonise Humid Chaco habitats, but the available records being few implies that it is presumably marginal, or at least much less abundant in such areas.

***Adhemarius eurysthenes* (C. Felder & R. Felder, 1874)**

Ambulyx eurysthenes C. Felder & R. Felder, 1874. *Reise ost. Fregatte Novara* (Zool.) 2 (Abt. 2): pl. 77, fig. 5.

Amblypterus [*sic*]: *eurysthenes*: Poulard (1983)

Adhemarius eurysthenes: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014c), Ríos Díaz (2014), Smith *et al.* (2017)

CAN: RNB Mbaracayú: entre Jejuí-Mí y Lagunita km 10.6 (Ríos Díaz 2014; SP); RNB Mbaracayú: Puesto Lagunita (Ríos Díaz 2014; SP); **CEN:** San Lorenzo (CEFCA; 31 v 1967); **CON:** Garay Cue (Drechsel 2014c); **ITA:** Isla Yacyretá (Poulard 1983); **NEE:** Pilar (IBIS specimen no. 8(1).316; undated); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP); San Estanislao: Palomita (Ríos Díaz 2014; SP).

Distribution: The least commonly recorded member of the genus in Paraguay, with a wide but patchy occurrence in eastern Paraguay in Cerrado, Humid Chaco and Atlantic Forest ecoregions.

***Adhemarius gannascus* (Stoll, 1790)**

Sphynx Gannascus Stoll, 1790. *Die Uitlandsche Kapellen voorkomende in der drie Waereld-deelen Asia, Africa en America* 2 (suppl.): 157, pl. 35, fig 3.

Amplypterus ganascus [*sic*]: Schade (1927)

Amplipterus [*sic*] *ganascus* [*sic*]: Benítez Díaz (1988)

Adhemarius gannascus: Drechsel (1994) in part, Drechsel (2014b, c), Ríos Díaz (2014), Smith *et al.* (2017)

APA: Reserva Natural Dimas (Drechsel 2014b); **CAN**: RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); RNB Mbaracayú: Puesto La Morena (Ríos Díaz 2014; SP); **CEN:** Asunción (Benítez Díaz 1988; SP) (CEFCA; 25 xii 1966); San Lorenzo (Benítez Díaz 1988; SP) (CEFCA; 5 xii 1984); **CON:** Garay Cue (Drechsel 2014c); **ITA:** PN San Rafael: Estancia Nueva Gambach (CZPLT 5678; 15 vii 2018), (CZPLT 5773; 11 x 2018), (CZPLT 7102; 12 vii 2019); (PROC 185; 6 viii 2008), (MNHNPY; 6 ix 2008); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Frequently sympatric with other members of the genus, but typically less abundant than *A. daphne*. Known from the Atlantic Forest and Cerrado ecoregions, and marginally into the Humid Chaco.

***Orecta lycidas* (Boisduval, [1875])**

Ambulyx Lycidas Boisduval, [1875]. *Histoire naturelle des insectes (Spécies général des lépidoptères - Hétérocères)* 1: 191–192.

Orecta lycidas: Drechsel (1994), Drechsel (2014c), Smith *et al.* (2017)

Orecta lycidas lycidas: Ríos Quintana (2015)

AMA: PN Cerro Corá (NHMUK; xii 1993); **CON:** 15km SW of Yby-Yau (NHMUK; ii 1996); Garay Cue (Drechsel 2014c); **ÑEE:** Tacuaras (Ríos Quintana 2015; SP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Known only from eastern Paraguay where it appears strongly associated with the Cerrado ecoregion. Marginal occurrence in the Humid Chaco of ÑEE.

Taxonomy: Drechsel (2014e) assigned Paraguayan *Orecta* Rothschild & Jordan, 1903 to the recently described *O. comus* Mielke & Haxaire, 2013 but the known Paraguayan specimens are *O. lycidas* based on the results of DNA barcode analysis (J. Haxaire, unpubl. data). Nevertheless, some specimens from Laguna Blanca (Smith *et al.* 2017) exhibit characters that were assigned to *O. comus* in its original description (Mielke & Haxaire 2013), including a more falcate apex to and less contrasting markings on the forewings, and the reduced presence of white on the upperside of the abdomen. However, all have a basal spot on the forewings, a character considered diagnostic of *O. lycidas* according to Mielke & Haxaire (2013).

***Protambulyx astygonus* (Boisduval, [1875])**

Ambulyx Astygonus Boisduval, [1875]. *Histoire naturelle des insectes (Spécies général des lépidoptères - Hétérocères)* 1: 188.

Protambulyx astygonus: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014f), Ríos Díaz (2014), Eitschberger (2015), Smith *et al.* (2017)

AMA: PN Cerro Corá (Ríos Díaz 2014; SP); **APA:** Pikyry (MIB 1879; 19 ii 2004); **CAN**: Agr. Armisticio (CJHL; 23 viii- 1 ix 2008); Refugio Biológico Carapá (Drechsel 2014f), (MIB 845; 23 xi 2003); Refugio Biológico Mbaracayú (MIB 2547, 3099; 19–20 iii 2004); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); RNB Mbaracayú: Lagunita entrada al sendero Arroyo Morotí (Ríos Díaz 2014; SP); **PAR**: Cerro Acahay (Ríos Díaz 2014; SP); Sapucái (Ríos Díaz 2014; SP), (Eitschberger 2015; SP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Associated with Cerrado and its interface with the Atlantic Forest in the northern part of the Oriental region of Paraguay.

***Protambulyx fasciatus* (Gehlen, 1928)**

Protambulyx fasciatus Gehlen, 1928. *Internationale Entomologische Zeitschrift*, 21: 393.

Protambulyx eurycles: Drechsel (2014a), Smith *et al.* (2017)

COR: Pirareta (Drechsel 2014a; PH); **PAR:** Mbatovi (Drechsel (2014a; PH); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; PH, SP).

Distribution: This species has only been recently confirmed in Paraguay. It is apparently restricted to a small area of central eastern Paraguay (Drechsel 2014a, Smith *et al.* 2017), but may have been overlooked because of its similarity to the more widespread *P. astygonus*. At Laguna Blanca at least, this species is more common than *P. astygonus* (Smith *et al.* 2017).

Taxonomy: Previously treated as a junior synonym of *P. eurycles* (Herrich-Schaffer, [1854]), but raised to species status by Haxaire & Mielke ([2020]).

***Protambulyx strigilis* (Linnaeus, 1771)**

Sphinx strigilis Linnaeus, 1771. *Mantissa Plantarum Altera*: 538–539.

Protambulyx strigilis: Schade (1927), Podtiaguin (1941), Poulard (1983), Benítez Díaz (1988), Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, c, f), Ríos Díaz (2014), Smith *et al.* (2017)

AMA: PN Cerro Corá (Ríos Díaz 2014; SP); **APA:** Pikyry (MIB 1858, 1881; 19 ii 2004); Reserva Natural Dimas (Drechsel 2014b); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **CEN**: Areguá (Podtiaguin 1941; LSP); Asunción, San Lorenzo (Benítez Díaz 1988; SP) (CEFCA; 17 viii 1965, 30 & 31 v 1967); Limpio: Surubi-i (Ríos Díaz 2014; SP); **CON:** Garay Cue (Drechsel 2014c); **ITA:** Isla Yacyretá (Poulard 1983); PN San Rafael: Estancia Nueva Gambach (MNHNPY; 8 xii 2008); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Associated largely with Atlantic Forest and its interface with Cerrado and Mesopotamian Grasslands in eastern Paraguay, with marginal occurrence west of the Río Paraguay in the Humid Chaco and Pantanal ecoregions (Drechsel 2014e).

Subfamily Sphinginae

Tribe Sphingini

Subtribe "*Xanthopan* genus-group"

***Cocytius antaeus* (Drury, 1773)**

Sphinx Antaeus Drury, 1773. *Illustrations of Natural History* 2: index [91].

Cocytius antaeus hydaspus: Podtiaguin (1941)

Cocytius antaeus medor: Schade (1927), Podtiaguin (1941)

Cocytius duponchel: Benítez Díaz (1988)

Cocytius antaeus: Eitschberger (2006), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

BOQ: Camacho (= Mariscal Estigarribia) (Podtiaguin 1941; LSP); **CEN**: Asunción (Podtiaguin 1941), (NHMUK; ix 1922- iv 1923); Limpio: Surubi-i (Ríos Díaz 2014; SP); San Lorenzo (CEFCA 1 vii 1977); Ypacaraí (Benítez Díaz 1988; SP) (CEFCA 10 x 1986); **COR:** Caacupé (CEFCA 14 v 1996); **GUA:** Calle Florida (Eitschberger 2006; SP); Melgarejo (Eitschberger 2006; SP); **ÑEE:** Camba Cuá: Arroyo Caimán, Pilar (Ríos Quintana 2015; SP); **PAR:** Sapucay (= Sapucái) (NHMUK; xii 1900, iv 1993, v 1994, ix 1994, xii 1994, iii 1995, ix 1995, iv 1996), (Eitschberger 2006; SP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP); **Not located:** Palino Cue [perhaps Patiño Cue, Itauguá, CEN] (NHMUK; undated).

Distribution: Podtiaguin (1941) mentioned a specimen in the Museo de Historia Natural del Paraguay that he attributed to *C. a. hydaspus*. It lacked data but he assumed it came from "Camacho (Chaco)" – now known as the city of Mariscal Estigarribia, BOQ. The specimen is now lost. Benítez Díaz (1988) incorrectly listed the CEFCA specimen for Ypacaraí as *C. duponchel*, but it is clearly *C. antaeus*.

Drechsel (2014e) maps another locality in western BOQ, close to the Bolivian border. The species has been photographed at Encarnación, ITA on 8 July 2009 (FAUNA Paraguay 2006 onwards). Apparently uncommon, it does not show strong affinities to any ecoregion; there are records from Humid and Dry Chaco, Cerrado and Atlantic Forest zones.

***Cocytius duponchel* (Poey, 1832)**

Amphonyx Duponchel Poey, 1832. *Centurie de Lépidoptères de l'Ile de Cuba* 1: Num. 5.

Cocytius duponchel: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, f), Smith *et al.* (2017)

Amphonyx duponchel: Ríos Díaz (2014)

APA: Reserva Natural Dimas (Drechsel 2014b); **BOQ:** Drechsel (1994); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); RNB Mbaracayú: Carapá (Ríos Díaz 2014; SP); **ITA**: PN San Rafael: Estancia Nueva Gambach (CZPLT 7100; 12 vii 2019); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP); San Estanislao: Palomita (Ríos Díaz 2014; SP).

Distribution: Seemingly the most commonly encountered member of the genus in Paraguay with a fairly wide distribution in the Oriental region and with one record in the Chaco.

Taxonomy: Eitschberger (2006) transferred this species to the reinstated genus *Amphonyx* Poey, 1832 but this action was reversed by Haxaire & Mielke ([2020]), who resynonymized *Amphonyx* with *Cocytius*.

***Cocytius lucifer* Rothschild & Jordan, 1903**

Cocytius lucifer Rothschild & Jordan, 1903. *Novitates Zoologicae* 9 (suppl.): 59–60.

Cocytius lucifer: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014f), Smith *et al.* (2017)

Amphonyx lucifer: Eitschberger (2006), Ríos Díaz (2014), Ríos Quintana (2015)

CAN: Refugio Biológico Carapá (Drechsel 2014f); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP), **GUA**: Drechsel (1994); Cerro Acatí (Eitschberger 2006); Melgarejo (Eitschberger 2006; SP); Salto Cristal (Ríos Díaz 2014; SP); **ÑEE:** Pilar (Ríos Quintana 2015; SP); **PAR**: Drechsel (1994); Sapucái (Eitschberger 2006; SP); **SPE**: Drechsel (1994); Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP); San Estanislao: Palomita (Ríos Díaz 2014; SP).

Distribution: All records are from eastern Paraguay in Cerrado, Atlantic Forest and Humid Chaco habitats.

Taxonomy: Eitschberger (2006) transferred this species to the reinstated genus *Amphonyx* Poey, 1832 but this action was reversed by Haxaire & Mielke ([2020]), who resynonymized *Amphonyx* with *Cocytius*.

***Cocytius mephisto* Haxaire & Vaglia, 2002**

Cocytius mephisto Haxaire & Vaglia, 2002. *Lambillionea* 102: 481.

CAN: Reserva Puerto Adela (15 x 2002).

Distribution: Known in Paraguay only from two male specimens in the Insectarium Montreal, Canada and CJHL (Fig. 2). These are published here for the first time.

Taxonomy: Eitschberger (2006) transferred this species to the reinstated genus *Amphonyx* Poey, 1832 but this action was reversed by Haxaire & Mielke ([2020]), who resynonymized *Amphonyx* with *Cocytius*.

Subtribe Sphingina

Note: The possible migratory status of some species of *Manduca* is an area worthy of further investigation, with limited data suggesting that adults of some species may be either absent or do not fly in Paraguay during the austral winter (Martin *et al.* 2011).

***Manduca albiplaga* (Walker, 1856)**

Macrosila albiplaga Walker, 1856. *List of Specimens of Lepidopterous Insects in the Collection of the British Museum* 8: 202.

Manduca albiplaga: Drechsel (1994), Kochalka *et al.* (1996), Ríos Díaz (2014)

CAN: RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **GUA**: Drechsel (1994); Cerro Acatí (Ríos Díaz 2014; SP).

Distribution: Confined to eastern Paraguay in Cerrado and Atlantic Forest habitats. A specimen was photographed at Estancia Nueva Gambach, PN San Rafael, ITA on 25 October 2010 (FAUNA Paraguay 2006 onwards).

Figure 2. *Cocytius mephisto* ♂ Reserva Puerto Adela, Canindeyú department, 15.x.2002, in the Insectarium Montreal, Québec, Canada (photo: J. Haxaire).

***Manduca brasiliensis* (Jordan, 1911)**

Protoparce scutata brasiliensis Jordan, 1911. *Novitates Zoologicae* 18: 135.

Manduca scutata: Drechsel (1994)

CAN: Puerto Adela Reserve (NHMUK; x 2003); **GUA:** Drechsel (1994); **ITA:** PN San Rafael: Estancia Nueva Gambach (PROC 026; 18 viii 2008).

Distribution: A few records from Atlantic Forest areas in eastern Paraguay.

Taxonomy: Drechsel (1994) referred to this species as *Manduca scutata* (Rothschild & Jordan 1903), of which *M. brasiliensis* was formerly considered a subspecies (Racheli & Racheli 1994). It was reinstated as a species by Carcasson & Heppner (1996). *Manduca scutata* is an Andean species now considered to occur from Venezuela to central Peru; it is replaced in SE Peru, Bolivia and Jujuy, Argentina by the recently described *Manduca yelai* Brechlin & Haxaire, 2022.

Given the extreme external similarity of this species to *M. janira* (Jordan, 1911), and that it was not possible to confirm the identification of all specimens by either DNA barcoding and/or examination of the genital morphology, we should emphasise the preliminary nature of the identification of some specimens. However, the Puerto Adela specimen has been confirmed as *M. brasiliensis* and so we provisionally assigned all other similar specimens to this species pending further data.

***Manduca contracta* (Butler, 1875)**

Protoparce contracta Butler, 1875. *Proceedings of the Zoological Society of London* 1875: 12.

Protoparce lucetius: Podtiaguin (1941), Benítez Díaz (1988)

Manduca lucetius: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, f)

Manduca contracta: Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

AMA: Drechsel (1994); **APA:** Reserva Natural Dimas (Drechsel 2014b); **CAN:** Refugio Biológico Carapá (Drechsel 2014f); **CEN:** Puerto de Asunción (Podtiaguin 1941; LSP); San Lorenzo (Benítez Díaz 1988; LSP); **CON**: Bravo: Retiro Satí (Ríos Díaz 2014; SP); **GUA:** Drechsel (1994); **ITA**: PN San Rafael: Estancia Nueva Gambach (CZPLT 4814; 23 ix 2017); **ÑEE:** Pilar (Ríos Quintana 2015; SP); **PAR**: Drechsel (1994); PN Ybycuí, Sapucái (Ríos Díaz 2014; SP); **SPE**: Drechsel (1994); Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Widely distributed in eastern Paraguay in Cerrado, Humid Chaco and Atlantic Forest ecoregions. Drechsel (2014e) maps a single specimen from the Central Chaco.

Taxonomy: The valid name for this species has had a rather confused history due to the misidentification of the plate in Cramer's "*Uitlandsche Kapellen*", which led to the name *lucetius* being incorrectly applied to a SE South American species, and an Amazonian species being described as *Protoparce perplexa* Rothschild & Jordan, 1910. However, examination by Kitching & Cadiou (2000) of the original pattern plates of the "*Uitlandsche Kapellen*", which are held in the NHMUK Library & Archives, led to the discovery that the name *lucetius* correctly applied to the Amazonian species (and thus *perplexa* fell into synonymy with it) and to the next oldest available name, *contracta*, becoming the valid name for the SE South American species. Drechsel (1994, 2014b, f) refers to this species as *M. lucetius* but, to add to the confusion, photographs figured under this name on Drechsel´s website (http://www.pybio.org/2051/manduca/) are a mixture of *M. contracta* and *M. brasiliensis*.

Furthermore, until recently *Protoparce exiguus* was considered to be a junior synonym of *M. contracta*. Recognition by Haxaire *et al.* (2015) that the former is a valid species (see *M. exiguus* below) therefore casts doubt on all undocumented literature references to *M. contracta* and *M. lucetius* in Paraguay (and elsewhere) and these must thus be treated with caution.

Manduca corumbensis (Clark, 1920)

Chlaenogramma corumbensis Clark, 1920. *Proceedings of the New England Zoölogical Club* 7: 68.

Manduca corumbensis: Ríos Díaz (2014), Smith *et al.* (2017)

CON: PN Paso Bravo: Estancia Santa Sofía (Ríos Díaz 2014; SP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: A rare species known from only a few records and strictly associated with Cerrado.

Manduca diffissa (Butler, 1871)

Sphinx diffissa Butler, 1871. *Proceedings of the Zoological Society of London* 1871: 82.

Protoparce petuniae diffissa: Rothschild & Jordan (1903)

Manduca diffissa: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, c, f), Ríos Quintana (2015), Smith *et al.* (2017)

Manduca difissa [*sic*]: Ríos Díaz (2014)

"Paraguay": Rothschild & Jordan (1903); **APA:** Refugio Biológico Limoy (MIB 43, 103, 125, 140; 24–25 x 2003); Reserva Natural Dimas (Drechsel 2014b); **CAN**: RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014); Refugio Biológico Carapá (Drechsel 2014f); **CEN**: Drechsel (1994); Asunción (Ríos Díaz 2014; SP); **CON**: Cororó (Ríos Díaz 2014; SP); Garay Cue (Drechsel 2014c); **GUA:** Drechsel (1994); **ITA**: Estancia Parabel, Tres Marías (Ríos Díaz 2014; SP); PN San Rafael: Estancia Nueva Gambach (CZPLT 5398; 24 iii 2018); **ÑEE:** Pilar (Ríos Quintana 2015; SP 6342); **PAR**: Drechsel (1994); PN Ybycuí (Ríos Díaz 2014; SP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Widely distributed in eastern Paraguay but reaching as far west as Asunción and Pilar. Drechsel (2014e) maps two localities in the Dry Chaco of BOQ.

Taxonomy: Rothschild & Jordan (1903) listed Paraguay specimen(s) of *M. diffissa* in the Tring Museum (now in the NHMUK) under "*Protoparce petuniae diffissa*", i.e., what is now *Manduca diffissa petuniae*. Later, when describing *Manduca diffissa mesosa* (as *Protoparce diffissa mesosa*), they said that its syntypes differed "markedly from the pale southern form *P. d. diffissa*, which is found in the province of Buenos Aires, and resemble in colour more or less *P. d. petuniae* from South-Eastern Brazil and Paraguay" (Rothschild & Jordan 1916: 252). They gave no explanation for the change of subspecies assignment for the Paraguayan moths. A current consideration of the subspecies of *M. diffissa* across all of South America shows that their taxonomy is very confused and detailed study using both morphological and molecular data is required to clarify the situation. Consequently, we refrain here from assigning the records from Paraguay to any particular subspecies of *M. diffissa* pending further study. Specimen 6342 reported by Rios Quintana (2015) as *M. contracta* is *M. diffissa*.

***Manduca exiguus* (Gehlen, 1942)**

Protoparce lucetius exiguus Gehlen, 1942 *Entomologische Zeitschrift* 56 (16): 127.

PAR: Sapucay (NHMUK; viii 1903, ix 1903).

Distribution: Known only from a single locality in eastern Paraguay, roughly between the Humid Chaco and Atlantic Forest ecoregions. The species will have been overlooked because of its similarity to *M. contracta* and its distribution is possibly wider than is currently known.

Taxonomy: Previously synonymized with *M. lucetius* by Carcasson & Heppner (1996) and with *M. contracta* by Kitching & Cadiou (2000), it was revalidated as a species by Haxaire *et al.* (2015).

***Manduca florestan* (Stoll, 1782)**

Sphinx Florestan Stoll, 1782. *Die Uitlandsche Kapellen voorkomende in der drie Waereld-deelen Asia, Africa en America* 4: 216, pl. 394, fig. B.

Chlaenogramma obscura: Podtiaguin (1941)

Protoparce florestan: Schade (1927), Podtiaguin (1941)

Manduca florestan: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, c, f), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

"Paraguay" (Podtiaguin 1941; LSP); **APA:** Pikyry (MIB 1876; 19 ii 2004); Refugio Biológico Limoy (MIB 115, 145; 24–25 x 2003); Reserva Natural Dimas (Drechsel 2014b); Tati Yupi (MIB 31; 24 x 2003); **CAN**: Refugio Biológico Carapá (Drechsel 2014f), (MIB 792; 22 xi 2003); Refugio Biológico Mbaracayú (MIB 2842; 20 iii 2004); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); RNB Mbaracayú (Ríos Quintana 2015; SP); **CEN:** Drechsel (1994); Colonia Elica [= Villa Elisa ?] (Podtiaguin 1941; LSP); Colonia Italia (Podtiaguin 1941; LSP); **CON**: Cororó, PN San Luis (Ríos Díaz 2014; SP); Garay Cue (Drechsel 2014c); **GUA:** Drechsel (1994); **ITA**: Capitán Miranda: El Tirol (Ríos Quintana 2015; SP); Estancia Parabel (Ríos Díaz 2014; SP); PN San Rafael: Estancia Nueva Gambach (PROC; no data), (MNHNPY; 28 ix 2008, 14 X 2008); **ÑEE:** Pilar (Ríos Quintana 2015; SP); **PAR**: Drechsel (1994); Cerro Acahay (Ríos Díaz 2014; SP); **PHA:** Mouth of the Pilcomayo river (Podtiaguin 1941; LSP); **SPE**: Drechsel (1994); Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP); San Estanislao: Palomita (Ríos Díaz 2014; SP).

Distribution: Locally common in Cerrado, Humid Chaco and Atlantic Forest habitats in eastern Paraguay. Drechsel (2014e) maps two localities for the extreme north of APY in the Cerrados del Chaco habitats that correspond to a transition between Bolivian Chiquitania and Dry Chaco.

***Manduca fosteri* (Rothschild & Jordan, 1906)**

Protoparce fosteri Rothschild & Jordan, 1906. *Novitates Zoologicae* 13: 178.

Protoparce fosteri: Schade (1927), Podtiaguin (1941)

Manduca fosteri: Drechsel (1994),

CEN: Colonia Nueva Italia (Podtiaguin 1941; LSP); Parque Urbano de Asunción (Podtiaguin 1941; LSP); **GUA**: Drechsel (1994); **ITA:** PN San Rafael: Estancia Nueva Gambach (PROC; undated); **PAR**: Sapucay (Rothschild & Jordan 1906), (Drechsel (1994).

Distribution: A rarely recorded species associated with humid forests of the central part of the Oriental region of Paraguay.

Taxonomy: Described from a single specimen now in the NHMUK collected by William Foster at Sapucay (=Sapucái), PAR, Paraguay on 22 January 1905 (illustrated at http://sphingidae.myspecies.info/taxonomy/term/1736) and named in honour of the collector. Podtiaguin (1941) described the species as "extremely rare" and mentioned a specimen collected in December (no year given) by Pedro Willim at Colonia Italia (= Nueva Italia), CEN that was sent to "Paris" (current whereabouts unknown, but it was not located in the MNHN) and another collected in the Parque Urbano de Asunción, CEN on 23 April 1936.

***Manduca hannibal hannibal* (Cramer, 1779)**

Sphinx Hannibal Cramer, 1779. *Die Uitlandsche Kapellen voorkomende in der drie Waereld-deelen Asia, Africa en America* 3: 39, pl. 216, fig. A.

Manduca hannibal: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, f), Ríos Díaz (2014)

AMA: Drechsel (1994); PN Cerro Corá (Ríos Díaz 2014; SP); **APA:** Refugio Biológico Limoy (MIB 123, 139, 142; 24–25 x 2003); Reserva Natural Dimas (Drechsel 2014b); **CAN:** Refugio Biológico Carapá (Drechsel 2014f), (MIB 770, 868; 22–23 xi 2003); **GUA:** Drechsel (1994); **PAR**: Drechsel (1994); PN Ybycuí (Ríos Díaz 2014; SP); **SPE**: Drechsel (1994); San Estanislao: Palomita (Ríos Díaz 2014; SP).

Distribution: Associated with Cerrado and Atlantic Forest in eastern Paraguay, with most records from the east of that region.

***Manduca incisa* (Walker, 1856)**

Macrosila incisa Walker, 1856. *List of Specimens of Lepidopterous Insects in the Collection of the British Museum* 8: 205.

Protoparce incisa: Schade (1927)

Manduca incisa: Drechsel (1994), Kochalka *et al.* (1996), Ríos Díaz (2014)

AMA: Drechsel (1994); PN Cerro Corá (Ríos Díaz 2014; SP); **CAN**: RNB Mbaracayú: Jejuí-Mí (Ríos Díaz (2014); **CON**: Bravo: Retiro Satí (Ríos Díaz 2014; SP); **GUA:** Schade (1927); Drechsel (1994); **ITA:** PN San Rafael: Estancia Nueva Gambach (CZPLT 5010; 23 xii 2016), (CZPLT 5756; 12–13 xi 2018); **PAR**: Rothschild & Jordan (1916); Drechsel (1994); **SPE**: Drechsel (1994); San Estanislao: Palomita (Ríos Díaz 2014; SP).

Distribution: An uncommon species associated with Atlantic Forest and Cerrado in eastern Paraguay.

Taxonomy: Potential confusion between this species and *Manduca lefeburii* (which lacks the dark medial line along the upper abdomen) (Haxaire 1995) means that older literature citations for both species should probably be treated with caution.

***Manduca lefeburii* (Guérin-Méneville, [1844])**

Sphinx Lefeburii Guérin-Méneville, [1844]. *Iconographie Regne Animal de G. Cuvier (Insectes)* 3: 494.

Protoparce lefeburei [*sic*]: Benítez Díaz (1988)

Manduca lefeburei [*sic*]: Drechsel (1994, 2014b, f)

Manduca lefeburii: Ríos Díaz (2014), Smith *et al.* (2017)

"Paraguay": Rothschild & Jordan (1903, 1916); **AMA**: Gasory (Ríos Díaz 2014; SP); **APA:** Refugio Biológico Limoy (MIB 43, 121, 124; 24 x 2003); Reserva Natural Dimas (Drechsel 2014b); **CAN:** Refugio Biológico Carapá (Drechsel 2014f), (MIB 888; 23 xi 2003); **CEN:** San Lorenzo (Benítez Díaz 1988; SP: CEFCA; 20 ii 1974); **CON**: PN Paso Bravo: Estancia Santa Sofía (Ríos Díaz 2014; SP); **GUA:** Drechsel (1994); **PAR**: Drechsel (1994); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: An uncommon species associated with Atlantic Forest and Cerrado in eastern Paraguay.

Taxonomy: The presence of the recently described and extremely similar *M. herbini* Haxaire, 2014 in Paraguay is also expected in the Cerrado zone.

***Manduca leucospila* (Rothschild & Jordan, 1903)**

Protoparce leucospila Rothschild & Jordan, 1903. *Novitates Zoologicae* 9 (suppl.): 66.

Protoparce leucopsila Rothschild & Jordan, 1903. *Novitates Zoologicae* 9 (suppl.): 87 [*lapsus calami*].

Manduca leucospila: Smith *et al.* (2017)

SPE: Reserva Natural Laguna Blanca (Smith *et al.* 2017; PH, SP).

Distribution: Despite many years of trapping in the Reserva Natural Laguna Blanca, this species is still only known from a single specimen collected in October in the Cerrado zone. Possibly a migratory species (Martin *et al.* 2011), it is perhaps a vagrant individual.

***Manduca lichenea* (Burmeister, 1855)**

Sphinx Lichenea Burmeister, 1855. *Abhandlungen der Naturforschenden Gesellschaft zu Halle* 3 (4) (Sber.): 68.

Protoparce lichenea: Schade (1927), Podtiaguin (1941)

Manduca lichenea: Poulard (1983), Ríos Díaz (2014)

Manduca armatipes: Drechsel (1994), Kochalka *et al.* (1996)

APY: Cerro León (Poulard 1983); **COR:** Schade (1927); **GUA**: Salto Cristal (Ríos Díaz 2014; SP); **ITA:** PN San Rafael: Estancia Nueva Gambach (PROC 525; 1 ix 2008), (PROC 536; 4 iv 2008), (MNHNPY; 10 ix 2008, 27 xii 2008), (CZPLT 4813; 23 ix 2017), (CZPLT 5768 & 5781; 8 ix 2018), (CZPLT 5762; 11 x 2018); **PAR:** Schade (1927); **SPE**: San Estanislao: Palomita (Ríos Díaz 2014; SP).

Distribution: An uncommon species distributed mainly in the Atlantic Forest zone of eastern Paraguay. The report by Poulard (1983) from the Dry Chaco at Cerro León, APY requires confirmation as there have been no other Chaco records to date.

Taxonomy: Kochalka *et al.* (1996) misidentified specimens of this species in the MNHNPY as *Manduca armatipes* (Rothschild & Jordan, 1916), but this was corrected by Ríos Díaz (2014). See Fig. 3.

Figure 3. Comparative plate indicating differences in habitus between *Manduca armatipes* (left) and *M. lichenea* (right) described in the text (photo: J. Haxaire).

Manduca manducoides (Rothschild, [1895])

Phlegethontius Manducoides Rothschild, 1894b [1895]. *Deutsche Entomologische Zeitschrift, Iris* 7: 302.

Manduca manducoides: Drechsel (1994), Ríos Díaz (2014), Smith *et al.* (2017)

AMA: PN Cerro Corá (Larva MNHNPY; x 2009)**; CAN**: RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **PAR**: Drechsel (1994); Sapucay (= Sapucái) (NHMUK; viii-ix 1903); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Few records, mainly from the northern half of eastern Paraguay in Cerrado and its transition to Atlantic Forest.

Manduca paphus (Cramer, 1779)

Sphinx Paphus Cramer, 1779. *Die Uitlandsche Kapellen voorkomende in der drie Waereld-deelen Asia, Africa en America* 3: 39, pl. 216, fig. B.

Protoparce sexta paphus: Schade (1927), Podtiaguin (1941), Benítez Díaz (1988)

Manduca sexta: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, c, f), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

AMA: Estancia La Niña (Ríos Díaz 2014; SP); **APA:** Pikyry (MIB 1841; 19 ii 2004); Refugio Biológico Limoy (Ríos Díaz 2014; SP); Reserva Natural Dimas (Drechsel 2014b); **BOQ:** Agropil SA, Mariscal Estigarribia (Ríos Díaz 2014; SP); Fortín Toledo (CZPLT 5182 & 5186; 22 ix 2016), (CZPLT 5187; 21 ix 2016), (CZPLT 5203; 23 ix 2016); PN Teniente Enciso (CZPLT 3404; 28 ii-1 iii 2015), (CZPLT 3465; 3–4 iv 2015), (CZPLT 5869; 1 xii 2018), (CZPLT 5870; 2 xii 2018); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); RNB Mbaracayú (Ríos Quintana 2015; SP); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz (2014); **CEN**: Asunción (Podtiaguin 1941); Mariano Roque Alonso: Puente Remanso (Ríos Díaz 2014; SP); **CON**: Cororó, PN Paso Bravo: Retiro Satí (Ríos Díaz 2014; SP); Garay Cue (Drechsel 2014c); **GUA**: Entre Ñumí y Garay km24, Salto Cristal (Ríos Díaz 2014; SP); **ITA**: Encarnación (CZPLT 7341; 28 v 2019); Estancia Parabel (Ríos Díaz 2014; SP); Pirapó (Benítez Díaz 1988; LSP); PN San Rafael: Estancia Nueva Gambach (Ríos Quintana 2015; SP), (CZPLT 4816 & 4817; 23 ix 2017), (CZPLT 7339; 21 vii 2019), (MNHNPY; 10 ix 2008); **ÑEE:** Camba Cuá: Arroyo Caimán, Pilar (Ríos Quintana 2015; SP); **PAR**: Cerro Acahay (Ríos Díaz 2014; SP); La

Colmena (Benítez Díaz 1988; LSP); **PHA**: Cruce Los Pioneros (Ríos Díaz 2014; SP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Common to abundant throughout the country.

Taxonomy: Formerly considered to be a subspecies of *Manduca sexta* (Linnaeus, 1763), *M. paphus* was raised to species level by Haxaire & Mielke ([2020]).

***Manduca rustica rustica* (Fabricius, 1775)**

Sphinx rustica Fabricius, 1775. *Systema Entomologiae*: 540.

Protoparce rustica: Schade (1927), Podtiaguin (1941), Benítez Díaz (1988)

Manduca rustica: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, c, f), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

AMA: PN Cerro Corá (Ríos Díaz 2014; SP); **APA:** Refugio Biológico Limoy (MIB 108, 126; 24 x 2003); Reserva Natural Dimas (Drechsel 2014b); **BOQ:** Fortín Toledo (CZPLT 5275; 20 ix 2016), (CZPLT 5183; 21 ix 2016), (CZPLT 5192 & 5215; 23 ix 2016); PN Teniente Enciso (CZPLT 5060; 23 xi 2015); **CAN**: Refugio Biológico Carapá (Drechsel 2014f), (MIB 766; 22 xi 2003); Refugio Biológico Mbaracayú (MIB 2843; 20 iii 2004); RNB Mbaracayú: Ñandu Rokái (Ríos Díaz 2014; SP); **CEN:** Asunción (Podtiaguin 1941), (Benítez Díaz 1988; SP: CEFCA; 5 iv 1967, 26 ix 1973, 21 vi 1986, 27 vi 1986); San Lorenzo (Benítez Díaz 1988; SP: CEFCA; 27 xi 1974, 26 ix 1975, 19 vii 1986); **CON**: Cororó (Ríos Díaz 2014; SP); Garay Cue (Drechsel 2014c); Horqueta (CEFCA; 3 iv 2015); **GUA**: Entre Ñumí y Garay km24 (Ríos Díaz 2014; SP); **ITA**: Estancia Parabel, Obligado (Ríos Díaz 2014; SP); PN San Rafael: Estancia Nueva Gambach (MNHNPY; 15 x 2008, 27 xi 2008, 1 xii 2008), (CZPLT 5381; 27 i 2018), (CZPLT 5373; 3 ii 2018); **ÑEE:** Pilar (Ríos Quintana 2015; SP); **PHA**: Cruce Los Pioneros (Ríos Díaz 2014; SP); Laguna Capitán (CZPLT 3414; 23–24 iii 2015); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: A common species found across the country in all the major eco-regions.

***Neococytius cluentius* (Cramer, 1775)**

Sphinx cluentius Cramer, 1775. *Die Uitlandsche Kapellen voorkomende in der drie Waereld-deelen Asia, Africa en America* 1: 124, pl. 78, fig. B.

Cocytius cluentius: Schade (1927), Podtiaguin (1941), Benítez Díaz (1988), Drechsel (1994), Kochalka *et al.* (1996)

Neococytius cluentius: Drechsel (2014b, f), Ríos Díaz (2014)

APA: Pikyry (MIB 1857; 18 ii 2004); Reserva Natural Dimas (Drechsel 2014b); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); RNB Mbaracayú: km 10.6 entre Jejuí-Mí y Lagunita (Ríos Díaz 2014; SP); **CEN:** Asunción (Podtiaguin 1941; LSP), (Benítez Díaz 1988; SP: CEFCA; 20 vii 1971); Colonia Elisa (Podtiaguin 1941; LSP); **GUA:** Drechsel (1994); **PAR:** Drechsel (1994); **SPE**: Drechsel (1994); San Estanislao: Palomita (Ríos Díaz 2014; SP).

Distribution: Largely distributed in the Atlantic Forest and Cerrado zones of eastern Paraguay. Drechsel (2014e) maps a single locality in the Dry Chaco, BOQ, close to the Bolivian border.

Taxonomy: The taxonomy of the species of the genus *Neogene* is far from clear and stable. DNA barcodes appear to be misleading in this genus, showing no consistent correlations with either morphology (both wing and body coloration and pattern, and male genital structure) or geographical distributions. Although habitus may be more reliable (based on a better correlation with biogeography), it too should be treated with caution, especially as in the context of this work Paraguay may represent a hybrid zone where several species meet and potentially interbreed. Future rearing studies and nuclear DNA sequence analyses may assist in resolving some of the taxonomic issues in this genus, but until then, we recommend that the identifications associated with the records published here be treated as provisional and that all undergo critical review once the species limits of the group have been clearly defined. We provide illustrations of typical male specimens of each of the nominal species as employed here, and brief diagnoses (see Taxonomy section of each species) to assist future researchers. However, there is great variation in both colour and pattern and many specimens may not be confidently identified and assigned to a species at the present time. Females, many of which lack or have very reduced markings, are particularly difficult.

***Neogene curitiba* Jones, 1908**

Neogene curitiba Jones, 1908. *Transactions of the Entomological Society of London* 1908: 167.

Neogene curitiba: Drechsel (1994)

CEN: Mariano Roque Alonso (Drechsel 1994); **CON:** (NHMUK; 1936).

Distribution: Just two records from Paraguay, one without specific data.

Taxonomy: This species typically has an almost uniformly black forewing and a bright white hindwing with a broad black marginal band and sometimes black veins (Fig. 4). It is currently considered to occur across southern Brazil, into eastern Bolivia and the Paraguay River Basin of northern Paraguay.

Neogene dynaeus (Hübner, [1831])

Hyloicus Dynaeus Hübner, 1825 [1831]. *Zuträge zur Sammlung Exotischer Schmettlinge* 3: 19, pl. [80], figs 463, 464.

Neogene dynaeus: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b), Ríos Díaz (2014), Smith *et al.* (2017)

AMA: Drechsel (1994); PN Cerro Corá (CJHL; 1 ii 1993); **APA:** Reserva Natural Dimas (Drechsel 2014b); **CAN:** Tava Yopoi (CJHL; 26 x – 4 xi 2007); **CON**: Drechsel (1994); Cororó (Ríos Díaz 2014; SP); **SPE**: Reserva Natural Laguna Blanca (NHMUK), (Smith *et al.* 2017; SP).

Distribution: Apparently associated with Cerrado and its transition to Atlantic Forest in the northern Oriental region of Paraguay

Taxonomy: Typically, the pale markings on the forewing (if present) extend medially from the wing base towards the tornus then turn up to the apex and the hindwings are mostly semi-translucent white with a narrow marginal band and slightly dark veins (Fig. 5). This is principally a Brazilian species, just extending into the northern Oriental region of Paraguay.

Neogene reevei (Druce, 1882)

Hyloicus Reevei Druce, 1882. *Entomologist's Monthly Magazine* 19: 18.

Sphinx Baruta Berg, 1883, *Anales de la Sociedad Científica Argentina* 15: 151.

Sphinx cossoides Rothschild, 1894c, *Novitates Zoologicae* 1: 94.

Neogene pictus Clark, 1931 **syn. nov.**. *Proceedings of the New England Zoölogical Club* 12: 78.

Neogene intermedia Clark, 1935 **syn. nov.**. *Proceedings of the New England Zoölogical Club* 15: 19.

Neogene reevi [*sic*] *minor* Clark, 1938. *Proceedings of the New England Zoölogical Club* 17: 39.

Hyloicus Reevei: Druce (1882)

Neogene pictus: Clark (1931), Drechsel (1994)

Neogene intermedia: Clark (1935)

Neogene reevi minor: Clark (1938)

Neogene reevei: Drechsel (1994)

Neogene cf. *reevei* Ríos Díaz (2014)

"Paraguay": (Druce 1882), (Rothschild & Jordan 1903); **BOQ:** Nueva Asunción (NHMUK; xii 1997); PN Teniente Enciso (CZPLT 3459; 12 iv 2015); **CAA**: Caaguaru (= Caaguazú) (Clark 1931; holotype of *N. pictus*); **CAZ:** Colonia Neufeld (CJHL; 24 x – 2 xi 2008); Estancia La Lejana (CJHL; 20 xi – 30 xi 2008); **CON:** Horqueta (NHMUK; 1936), (Clark 1938; type series of *N. r. minor*); PN Paso Bravo: Estancia Sta Sofia (CJHL; 25 x 2002); **PAR:** Sapucay (= Sapucái) (NHMUK; ii 1899), (NHMUK; xii 1932), (Clark 1935; 29 xii 1932, holotype of *N. intermedia*), (CJHL; 15 xi 1992); **PHA**: Drechsel (1994); Laguna Capitán (Ríos Díaz 2014; SP); Nanawa (NHMUK; xii 1926).

Distribution: The most frequently collected species of the genus in Paraguay. Following the new synonymies proposed here, the species occurs across northern Argentina, southern Bolivia, Paraguay and southern Brazil.

Taxonomy: This species was described based on material from Paraguay collected by "Reeve" from an unspecified locality and deposited in the NHMUK.

Neogene reevei is the largest and perhaps the most variable species of the genus in regard to its habitus. Typically, the pale forewing band runs transversely across the wing and the area basal to this often has a pale lilac flush (Fig. 6). The hindwings may be similar to those of either typical *N. curitiba* or typical *N. dynaeus*. Indeed, very dark specimens of *N. reevei*, especially females, very closely resemble *N. curitiba* but are never truly black.

Neogene pictus (Fig. 11) was described from a single female collected by Emil Kaempfer on 15 November 1930 at "Caaguaru, central Paraguay at 1000 ft altitude" (= Caaguazú) and is deposited in the Carnegie Museum of Natural History, Pittsburgh, PA, USA (CMNH). Drechsel (1994) confused the illustration in d'Abrera ([1987]) with the holotype specimen, suggesting as a result that the type locality was Sapucay. However, the specimen illustrated in that work is a NHMUK specimen that was collected after the species was described. The holotype of *N. pictus* is apparently just a dark female of *N. reevei*.

Neogene intermedia (Fig. 9) was described from a male collected by R. Heinrich Kaempfer on 29 December 1932 at "Sapucay" and is deposited in the CMNH. It was stated to be "midway between *N. reevi* [*sic*] Druce and *N. pictus* B. P. Clark" and thus falls within the range of individual colour variation of *N. reevei*.

Figure 4. *Neogene curitiba* ♂ Alto Rio Arinos, Diamantino, Brazil 6.x.1999, in CJHL (BC-Hax3265) (photo: J. Haxaire).

Figure 5. *Neogene dynaeus* ♂ Fazenda Barra Mansa, Goiás, Brazil x.1992, in CJHL (photo: J. Haxaire).

Figure 6. *Neogene reevei* ♂ Est. Sta Sofia, PN Paso Bravo, Concepción department, 25.x.2002, in CJHL (BC-Hax5280) (photo: J. Haxaire).

Figure 7. *Neogene steinbachi* ♂ Est. Sta Sofia, PN Paso Bravo, Concepción department, 25.x.2002, in CJHL (BC-Hax5179) (photo: J. Haxaire).

Neogene reevi [sic] *minor* (Fig. 10) was described from three males and two females collected by Alberto Schulze in 1936 at "Horqueta", Paraguay. Two males and a female are deposited in the CMNH, but the remaining pair have not yet been located (they were not located in the NHMUK). They are just small specimens of *N. reevei* and the subspecies was synonymized with the nominotypical subspecies by Carcasson & Heppner (1996).

***Neogene steinbachi* Clark, 1924**

Neogene steinbachi Clark, 1924. *Proceedings of the New England Zoölogical Club* 9: 11–21.

Neogene albescens Clark, 1929 **syn. nov.**. *Proceedings of the New England Zoölogical Club* 11: 12.

CON: Est. Sta Sofia, PN Paso Bravo (CJHL; 25 x 2002).

Distribution: Known from the Paraguayan Cerrado, this is the first record of this species in Paraguay (Fig. 3). The species has also been photographed at PN Teniente Enciso (BOQ) in the Dry Chaco (PS 10 November 2012). Otherwise, it occurs in the central and southern Bolivia and NW Argentina.

Taxonomy: *N. steinbachi* is the smallest, palest and greyest species of *Neogene*. On the forewings, the main pale band (the width of which can vary greatly) runs transversely across the wing from the costa to the inner margin, rather than obliquely to the apex (Fig. 7). Following study of the holotype of *Neogene albescens* (Fig. 8), we consider this to be a junior synonym of *N. steinbachi*.

Subtribe Acherontiina

***Agrius cingulata* (Fabricius, 1775)**

Sphinx cingulata Fabricius, 1775. *Systema Entomologiae*: 545.

Herse cingulata: Schade (1927)

Herse cinculata [*sic*]: Podtiaguin (1941)

Agrius cingulatus [*sic*]: Benítez Díaz (1988), Drechsel (2014b, c, f)

Agrius cingulata: Drechsel (1994), Kochalka *et al.* (1996), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

APA: Pikyry (MIB 1868; 19 ii 2004); Refugio Biológico Limoy (MIB 146; 25 x 2003); Reserva Natural Dimas (Drechsel 2014b); **BOQ:** PN Teniente Enciso (CZPLT 3463; 3–4 iv 2015); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); Estancia Río Corrientes (Ríos Díaz 2014; SP); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **CEN**: Areguá (Podtiaguin 1941); Asunción (Podtiaguin 1941), (CEFCA; 29 iii 1968), (Ríos Díaz 2014; SP); Colonia Elisa (Podtiaguin 1941); Colonia Nueva Italia (Podtiaguin 1941); Santísima Trinidad (Podtiaguin 1941); San Lorenzo (Benítez Díaz 1988; SP: CEFCA; 14 ii 1973); **CON**: Garay Cue (Drechsel 2014c); PN Paso Bravo: Retiro Satí (Ríos Díaz 2014; SP); **GUA**: Salto Cristal (Ríos Díaz 2014; SP); **ITA:** PN San Rafael: Estancia Nueva Gambach (PROC 646; no data); **ÑEE:** Pilar (Ríos Quintana 2015; SP); **PHA:** Chaco-i (Podtiaguin 1941); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP); San Estanislao: Palomita (Ríos Díaz 2014; SP).

Distribution: A widespread species found throughout the country in all ecoregions, but rarely common.

Subfamily Macroglossiinae

Tribe Dilophonotini

Subtribe Dilophonotina

***Aellopos clavipes clavipes* (Rothschild & Jordan, 1903)**

Sesia tantalus clavipes Rothschild & Jordan, 1903. *Novitates Zoologicae* 9 (suppl.): 436.

Aellopos clavipes: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014d), Ríos Díaz (2014), Ríos Quintana (2015)

APA: Reserva Natural Dimas (CJHL; 7–10 ii 2008); **BOQ**: Drechsel (1994); **CAN:** RNB Mbaracayú (Ríos Quintana 2015; SP); **CEN**: Benítez Díaz (1988); Asunción (Ríos Díaz 2014; SP), (CEFCA 16 vi 1966); San Lorenzo (Ríos Díaz 2014; SP); **CON**: Drechsel (1994); Estancia Centurión (Ríos Díaz 2014; SP); **ÑEE:** Guazú Cuá: Isla Hú (Ríos Quintana 2015; SP); Pilar (Ríos Quintana 2015; SP); Tacuaras: Arroyo Las Hermanas (Ríos Quintana 2015; SP); **SPE:** (Drechsel 2014d; PH).

Distribution: Widespread in all ecoregions.

Figure 8. *Neogene albescens.* Holotype. La Rioja, Argentina. (photo: J. Haxaire).

Figure 9. *Neogene intermedia*. Holotype. Sapucái, Paraguay. (photo: J. Haxaire).

Figure 10. *Neogene reevei minor.* Syntype. Horqueta, Paraguay. (photo: J. Haxaire).

Figure 11. *Neogene pictus*. Holotype. "Caaguaru"(=Caaguazú), Paraguay. (photo: J. Haxaire).

Note: Drechsel (2014d) states that during "summer 1999/2000" this species suddenly appeared "everywhere in the country", a phenomenon that the author attributed to "periodic migration" but is more consistent with a temporary outbreak (which is known in this genus, see Janzen [1985]). The early stages in Paraguay were documented by Drechsel (2014d).

Aellopos fadus (Cramer, 1775)

Sphinx Fadus Cramer, 1775. *Die Uitlandsche Kapellen voorkomende in der drie Waereld-deelen Asia, Africa en America* 1: 95, pl. 61, fig. C.

Aellopos fadus: Drechsel (1994, 2014f), Smith *et al.* (2017)

"Paraguay": Rothschild & Jordan (1903); **CAN**: Refugio Biológico Carapá (Drechsel 2014f), (CJHL; 1–10 xii 2007); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Confirmed Paraguayan specimens are from the interface of Cerrado and Atlantic Forest.

Aellopos tantalus tantalus (Linnaeus, 1758)

Sphinx Tantalus Linnaeus 1758. *Systema Naturae* (10th ed.) 1: 493

Aellopos tantalus: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014f), Ríos Díaz (2014)

"Paraguay": Rothschild & Jordan (1903); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); **CEN**: Drechsel (1994); Asunción (Ríos Díaz 2014; SP), (CEFCA 22 xii 1964); San Lorenzo (Ríos Díaz 2014; SP); **CON**: Estancia Centurión (Ríos Díaz 2014; SP).

Distribution: Known Paraguayan specimens are from the northern half of the Oriental region in Cerrado, Atlantic Forest and Humid Chaco. Probably more widespread than currently understood.

Aellopos titan titan (Cramer, 1777)

Sphinx Titan Cramer, 1777. *Die Uitlandsche Kapellen voorkomende in der drie Waereld-deelen Asia, Africa en America* 2: 73, Pl. 142, fig. F.

Sesia titan: Schade (1927), Podtiaguin (1941), Benítez Díaz (1988)

Aellopos titan: Drechsel (1994, 2014b), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

APA: Reserva Natural Dimas (Drechsel 2014b); **CEN**: Asunción (Podtiaguin 1941; LSP), (Benítez Díaz 1988; SP: CEFCA; 10 ii 1968); San Lorenzo (Ríos Díaz 2014; SP); **ITA:** Encarnación (CZPLT 3261; 29 xii 2014); **ÑEE:** Pilar (Ríos Quintana 2015; SP); **PAR**: Rothschild & Jordan (1903); Sapucái (Ríos Díaz 2014; SP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Widespread and generally frequent in all habitats in eastern Paraguay.

Callionima falcifera (Gehlen, 1943)

Hemeroplanes falcifera Gehlen, 1943. *Entomologische Zeitschrift* 57: 50.

Callionima falcifera: Drechsel (1994, 2014b), Ríos Díaz (2014), Smith *et al.* (2017)

AMA: Pedro Juan Caballero (Ríos Díaz 2014; SP); **APA:** Refugio Biológico Limoy (MIB 112; 24 x 2003); Reserva Natural Dimas (Drechsel 2014b); **CON**: Cororó (Ríos Díaz 2014; SP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Uncommon, mainly in the northern half of the Oriental region in Cerrado and Atlantic Forest ecorregions.

Callionima grisescens (Rothschild, 1894c)

Callioma grisescens Rothschild, 1894c. *Novitates Zoologicae* 1: 73.

Hemeroplanes grisescens: Schade (1927), Podtiaguin (1941)

Callionima grisescens: Poulard (1983), Drechsel (1994), Kochalka *et al.* (1996), Eitschberger (2001), Drechsel (2014c), Ríos Díaz (2014), Smith *et al.* (2017)

Hemerophanes [*sic*] *pandenyculata* [*sic*]: Benítez Díaz (1988)

Callionima grisecens [*sic*]: Ríos Quintana (2015)

APY: Cerro León (Poulard 1983); PN Defensores del Chaco: Madrejón (Ríos Díaz 2014; SP); Puerto Leda (Benítez Díaz 1988; SP: CEFCA 5 xi 1956); **BOQ:** 150 km N of Filadelvia (= Filadelfia) (Eitschberger 2001; SP); Agropil SA (Ríos Díaz 2014; SP); Campo Loro (Ríos Díaz 2014; SP); Colonia Neuland (Ríos Díaz 2014; SP); Fortín Nueva Asunción (Ríos Díaz 2014; SP); Fortín Toledo (CZPLT 3994–3995; 1 iv 2015), (CZPLT 5216, 5217 & 5223; 20 ix 2016), (CZPLT 5226; 21 ix 2016), (CZPLT 5184; 22 ix 2016); Mariscal

Estigarribia (Ríos Díaz 2014; SP); PN Teniente Enciso (Ríos Díaz 2014; SP), (CZPLT 3410; 28 ii-1 iii 2015), (CZPLT 3464; 3–4 iv 2015), (CZPLT 5872 & 5873; 2 xii 2018); **CEN:** (Eitschberger 2001,SP); Asunción (Podtiaguin 1941); Colonia Elisa (Podtiaguin 1941); San Lorenzo (Benítez Díaz 1988; SP: CEFCA 31 v 1967); **CON**: Garay Cue (Drechsel 2014c); PN Paso Bravo: Estancia Santa Sofía (Ríos Díaz 2014; SP); **GUA:** (Eitschberger 2001; SP); **ÑEE:** Pilar (Ríos Quintana 2015; SP); **PAR**: (Eitschberger 2001; SP); Sapucái (Eitschberger 2001; SP), (Ríos Díaz 2014; SP); **PHA**: Cruce Los Pioneros (Ríos Díaz 2014; SP); Laguna Capitán (CZPLT 3416; 23–24 iii 2015), (CZPLT 5020; 1 vii 2016); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: An abundant species that is associated with drier habitats in the Dry and Humid Chaco, and Cerrado ecoregions.

Taxonomy: Ríos Quintana (2015) listed a specimen (IBIS specimen no. 6856; 16 xi 1007) from Encarnación, ITA but this locality is erroneous. The specimen was collected by PS in Teniente Enciso National Park, BOQ.

Callionima guiarti (Debauche, 1934)

Hemeroplanes parce Guiarti Debauche, 1934. *Bulletin du Musée Royal d´Histoire Naturelle de Belgique* 10: 1–10.

Callionima guiarti: Eitschberger (2001), Smith *et al.* (2017)

"Alto Paraguay" (NHMUK; SP); **AMA:** PN Cerro Corá (NHMUK; iv 1986; SP); **CAA:** (NHMUK; SP); **CON:** (NHMUK; SP); **GUA:** Cerro Akati (=Akatî or Acatí) (NHMUK; xii 1993; SP), (Eitschberger 2001; SP); **PAR:** (NHMUK; SP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Apparently fairly widespread in Atlantic Forest and Cerrado habitats throughout much of eastern Paraguay, but often overlooked.

Taxonomy: *Callionima guiarti* was described from three males, the holotype and two paratypes, from an unspecified locality in Paraguay in the Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium. It was synonymized with *Callionima parce parce* by Soares (1993), treated as a distinct subspecies by Carcasson & Heppner (1996), then resynonymized with the nominotypical subspecies by Kitching & Cadiou (2000), before being revalidated once more as a species by Eitschberger (2001). However, that chequered taxonomic history means that older reports of both *C. parce* and *C. falcifera* from Paraguay may include records of this species and must therefore be treated with caution.

Callionima inuus (Rothschild & Jordan, 1903)

Hemeroplanes inuus Rothschild & Jordan, 1903. *Novitates Zoologicae* 9 (suppl): 391.

Hemeroplanes inuus: Schade (1927)

Hemerophanes inuus: Benítez Díaz (1988)

Callionima inuus: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014f), Martin *et al.* (2011), Drechsel (2014b, c, Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

AMA: Estancia La Niña, PN Cerro Corá (Ríos Díaz 2014; SP); **APA:** Pikyry (MIB 1689, 1691, 1703; 18 ii 2004); Refugio Biológico Limoy (MIB 1533; 24 x 2003); Reserva Natural Dimas (Drechsel 2014b); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); Refugio Biológico Mbaracayú (MIB 2438, 2549; 18–19 iii 2004); RNB Mbaracayú (Ríos Quintana 2015; SP); RNB Mbaracayú: km10.6 entre Jejuí-Mí y Lagunita (Ríos Díaz 2014; SP); RNB Mbaracayú: Lagunita (Ríos Díaz 2014; SP); **CEN**: Asunción (Podtiaguin 1941; LSP), (Benítez Díaz 1988; SP: CEFCA 18 x 1971, 28 v 1974); Colonia Elisa (Podtiaguin 1941; LSP); San Lorenzo (Benítez Díaz 1988; SP: CEFCA 10 vi 1974), (Ríos Díaz 2014; SP); **CON:** Garay Cue (Drechsel 2014c); **ITA:** Encarnación (CZPLT 3462; 25 v 2015), (CZPLT 5212; 25 iv 2016); PN San Rafael: Estancia Nueva Gambach (PROC; no data), (MNHNPY; 19 v 2008); **ÑEE:** Isla Umbú: Islerías (Ríos Quintana 2015; SP); Pilar (Ríos Quintana 2015; SP); **PAR**: Rothschild & Jordan (1903); PN Ybycuí (Ríos Díaz 2014; SP); Sapucay (= Sapucái) (Martin *et al.* 2011; SP), (Ríos Díaz 2014; SP); **PHA:** Chaco-i (Podtiaguin 1941; LSP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Widespread and common throughout eastern Paraguay.

Taxonomy: The species description is based in part on specimens from "Sapucay, near Villa Rica" (Sapucái, PAR) collected by William Foster and from an unspecified locality in Paraguay collected by Dr Bohls. It should be noted that Sapucái is over 50km west of Villarrica by the old railway line (no longer functioning), but as the nearest "important" town, Villarrica was frequently used as reference in that time.

***Callionima nomius* (Walker, 1856)**

Calliomma Nomius Walker, 1856. *List of Specimens of Lepidopterous Insects in the Collection of the British Museum* 8: 109.

Callionima nomius: Drechsel (2014f), Eitschberger (2001), Ríos Díaz (2014)

AMA: Estancia La Niña (Ríos Díaz 2014; SP); **APA:** Refugio Biológico Carapá (Eitschberger 2001; SP); Refugio Biológico Limoy (CJHL; 9–14 v 2005); **CAN**: Agr. Armisticio (CJHL; 23 viiii- 1 ix 2008); Refugio Biológico Carapá (Drechsel 2014f), (NHMUK; iv 1998); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP).

Distribution: An uncommon species associated with Cerrado and Atlantic Forest in the extreme east of the Oriental region of Paraguay.

Taxonomy: Paraguayan specimens are notably small and correspond well in size to those of Santa Catarina and Paraná, Brazil.

***Callionima parce* (Fabricius, 1775)**

Sphinx Parce Fabricius, 1775. *Systema Entomologiae*: 543.

Callionima parce: Poulard (1983), Drechsel (1994), Kochalka *et al.* (1996), Eitschberger (2001), Drechsel (2014b, c, f), Ríos Díaz (2014), Smith *et al.* (2017)

AMA: Estancia La Niña (Ríos Díaz 2014; SP); PN Cerro Corá (Ríos Díaz 2014; SP); **APA:** Reserva Natural Dimas (Drechsel 2014b); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); Refugio Biológico Mbaracayú (MIB 3032; 20 iii 2004); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **CEN**: Cerro Lambaré (Ríos Díaz 2014; SP); Cororó (Ríos Díaz 2014; SP); **CON**: Garay Cue (Drechsel 2014c); **GUA:** Cerro Acatí (Eitschberger 2001; SP); Melgarejo (Eitschberger 2001; SP); **ITA:** Isla Yacyretá (Poulard 1983); PN San Rafael: Estancia Nueva Gambach (MNHNPY; 7 i 2009); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Widespread and common throughout much of the country, although apparently absent or very rare in the Chaco.

Taxonomy: See *C. guiarti*.

***Erinnyis alope alope* (Drury, 1773)**

Sphinx Alope Drury, 1773. *Illustrations of Natural History* 1: index [131].

Erinnyis alope: Bertoni (1924), Schade (1927), Podtiaguin (1941), Poulard (1983), Benítez Díaz (1988), Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, c, f), Ríos Díaz (2014), Smith *et al.* (2017)

AMA: Pedro Juan Caballero, PN Cerro Corá (Ríos Díaz 2014; SP); **APA:** Pikyry (MIB 1850; 19 ii 2004); Refugio Biológico Limoy (MIB 120; 24 x 2003); Reserva Natural Dimas (Drechsel 2014b); **CAN**: Refugio Biológico Carapá (Drechsel 2014f), (MIB 866, 919; 23 xi 2003); Refugio Biológico Mbaracayú (MIB 2522, 3061; 18–20 iii 2004); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **CEN**: Asunción (Podtiaguin 1941), (Benítez Díaz 1988; SP: CEFCA 7 vii 1967, 16 vi 1986); Limpio: Surubi-i (Ríos Díaz 2014; SP); San Lorenzo (Benítez Díaz 1988; SP: CEFCA 21 ii 1968, 30 ix 1982); **CON**: Cororó (Ríos Díaz 2014; SP); Garay Cue (Drechsel 2014c); **GUA**: Cordillera de Yvyturuzú cerca de Garay (Ríos Díaz 2014; SP); **ITA:** Encarnación (CZPLT 5225; 20 iv 2016); Isla Yacyretá (Poulard 1983); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Widespread and common in eastern Paraguay. Drechsel (2014e) maps two localities in the Dry Chaco. Bertoni (1924, 1942) considered this species a pest of the human food staple mandioca and offered advice on how to control it.

***Erinnyis crameri* (Schaus, 1898)**

Dilophonota crameri Schaus, 1898. *Entomological News* 9: 136.

Erinnyis crameri: Benítez Díaz (1988), Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, f), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

"Paraguay": Rothschild & Jordan (1903); **AMA**: PN Cerro Corá (Ríos Díaz 2014; SP); **APA:** Pikyry (MIB 1866, 1873; 19 ii 2004); Refugio Biológico Limoy (MIB 131; 24 x 2003); Reserva Natural Dimas (Drechsel 2014b); **CEN**: Asunción (Benítez Díaz 1988; SP: CEFCA 13 ii 1973); Cerro Lambaré (Ríos Díaz 2014; SP); San Lorenzo (Benítez Díaz 1988; SP: CEFCA 16 vi 1967, 5 iv 1974, 10 vi 1974); **CAN**: Refugio Biológico Carapá (Drechsel 2014f), (MIB 864; 23 xi 2003); Refugio Biológico Mbaracayú (MIB 2563; 19 iii 2004); **CON**: Cororó (Ríos Díaz 2014; SP); **COR**: Tobatí (Ríos Díaz 2014; SP); **ITA:** Capitán Miranda: El Tirol (Ríos Quintana 2015; SP); Encarnación (Ríos Quintana 2015; SP), (CZPLT 3254; 22 i 2015); PN San Rafael: Estancia Nueva Gambach (CZPLT 5380; 27 i 2018); **ÑEE:** Mayor Martínez (Ríos Quintana 2015; SP); Pilar (Ríos Quintana 2015; SP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Widespread and common in eastern Paraguay.

Erinnyis ello ello (Linnaeus, 1758)

Sphinx Ello Linnaeus, 1758. *Systema Naturae* (10th ed.) 1: 491.

Erinnyis ello: Bertoni (1924), Schade (1927), Podtiaguin (1941), Benítez Díaz (1988), Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, c, f), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017), Mendoza *et al.* (2019)

AMA: Pedro Juan Caballero (Ríos Díaz 2014; SP); PN Cerro Corá (Ríos Díaz 2014; SP); **APA:** Centro Forestal (Ríos Díaz 2014; SP); Colonia Yguazú (Ríos Díaz 2014; SP); Pikyry (MIB 1816, 1870; 19 ii 2004); Reserva Natural Dimas (Drechsel 2014b); **APY:** PN Defensores del Chaco: Madrejón (Ríos Díaz 2014; SP); **BOQ:** Drechsel (1994); Mariscal Estigarribia (Ríos Díaz 2014; SP); PN Teniente Enciso (CZPLT 3405 & 3406; 28 ii-1 iii 2015), (CZPLT 5903 & 5904; 2 xii 2018); **CAZ:** PN Caazapá (Ríos Díaz 2014; SP); **CAN**: Refugio Biológico Carapá (Drechsel 2014f), (MIB 873, 890, 893, 897, 940; 22–23 xi 2003); Refugio Biológico Mbaracayú (MIB 2435, 2568; 18–19 iii 2004); RNB Mbaracayú: Carapá (Ríos Díaz 2014; SP); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **CEN**: Asunción (Podtiaguin 1941), (Benítez Díaz 1988; SP: CEFCA 21 iii 1966, 1238: 3 v 1973, 1 v 1986, 6 v 1986, 16 vi 1986, 14 x 1986); Itá (CEFCA 13 v 1986); Limpio: Surubi-i (Ríos Díaz 2014; SP); Loma Pytá (Ríos Quintana 2015; SP); San Lorenzo (Benítez Díaz 1988; SP: CEFCA 1248: 10 iii 1966, 20 ii 1974); **CON**: 5km NE of Tacuatí (Ríos Díaz 2014; SP); Cororó (Ríos Díaz 2014; SP); Estancia San Luis (Ríos Díaz 2014; SP); Garay Cue (Drechsel 2014c); **COR:** Emboscada (CEFCA 19 v 2012); **GUA**: Salto Cristal (Ríos Díaz 2014; SP); **ITA**: Capitán Miranda: Hotel El Tirol (Ríos Quintana 2015; SP); Encarnación (CZPLT 3256; 23 xii 2014), (CZPLT 7340; 31 v 2019); Estancia Parabel (Ríos Díaz 2014; SP); PN San Rafael: Estancia Nueva Gambach (PROC 249; 11 vii 2008), (MNHNPY; 7 xii 2008, 9 iv 2008); **ÑEE:** Mayor Martínez (Ríos Quintana 2015; SP); Pilar (Ríos Quintana 2015; SP); **PAR**: PN Ybycuí (Ríos Díaz 2014; SP); **PHA:** Drechsel (1994); Laguna Capítan (CZPLT 5026; 30 vi 2016); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Widespread throughout the country and typically one of the most abundant hawkmoths in all habitats. Known locally as "Marandová de la mandioca", the larvae of this species are considered the biggest pest of manioc (or mandioca), *Manihot esculenta*, the staple human carbohydrate food plant in Paraguay (Mendoza *et al.* 2019). Bertoni (1924) was the first author to speak of this species as a pest of mandioca and offer advice on how to control it.

Erinnyis lassauxii (Boisduval, 1859)

Anceryx Lassauxii Boisduval, 1859. *Annales Société Entomologique de France* 1859: clvii.

Erinnyis lassauxi [*sic*]: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, c, f), Ríos Díaz (2014), Ríos Quintana (2015)

Erinnyis lassauxii: Smith *et al.* (2017)

APA: Reserva Natural Dimas (Drechsel 2014b); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); Refugio Biológico Mbaracayú (MIB 2564; 19 iii 2004); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **CEN**: Asunción (CEFCA 4 v 1967); Cerro Lambaré (Ríos Díaz 2014; SP); **CONC:** Garay Cue (Drechsel 2014c); **ITA:** Capitán Miranda (Ríos Quintana 2015; SP); PN San Rafael: Estancia Nueva Gambach (MNHNPY; 24 iv 2008, 23 ix 2008); **ÑEE:** Pilar (Ríos Quintana 2015; SP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Widespread in all habitat types throughout the country, though typically at lower density than other members of the genus.

Erinnyis impunctata (Rothschild & Jordan, 1903)

E. [rinnyis] lassauxi f. *impunctata* Rothschild & Jordan, 1903. *Novitates Zoologicae* 9 (supp): 365.

BOQ: PN Teniente Enciso (CJHL; 25–26 xi 2007), (CZPLT 3407; 28 ii-1 iii 2015), (CZPLT 5905 & 5906; 2 xii 2018).

Distribution: Four specimens from the same locality in an area of Dry Chaco forest represent the first Paraguayan records (Fig. 12).

Taxonomy: Originally described as a form of *E. lassauxii*, *E. impunctata* was first formally raised to subspecies status by Cary (1949), then to a full species by Lichy (1968). It was then implicitly resynonymized with *Erinnyis lassauxi* [*sic*] by d'Abrera ([1987]), only to be implicitly reinstated as a species by Alvarez Corral & Alvarez Sierra (1994), which status was confirmed by Haxaire & Herbin (1999).

Erinnyis obscura obscura (Fabricius, 1775)

Sphinx obscura Fabricius, 1775. *Systema Entomologiae*: 538.

Erinnyis obscurus [*sic*]: Schade (1927)

Erinnyis domingonis: Podtiaguin (1941), Drechsel (1994), Kochalka *et al.* (1996), Ríos Díaz (2014)

Figure 12. *Erinnyis impunctata* ♂ PN Teniente Enciso, Boquerón department, 28.ii.-1.iii.2015, CZPLT 3407, in CZPLT (photo: Leigh McMahon). a) dorsal, b) ventral. Note the lack of paired small black spots on the abdominal sternites.

Erinnyis obscura: Podtiaguin (1941), Benítez Díaz (1988), Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, c, f), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

Erinnyis obscura obscura: Martin *et al.* (2011)

AMA: Pedro Juan Caballero (Ríos Díaz 2014; SP); **APA:** Pikyry (MIB 1747; 18 ii 2004); Reserva Natural Dimas (Drechsel 2014b); **APY:** PN Defensores del Chaco: Madrejón (Ríos Díaz 2014; SP); **BOQ:** Drechsel (1994); Fortín Toledo (CZPLT 5188; 22 ix 2016); PN Teniente Enciso (CZPLT 3408; 28 ii-1 iii 2015), (CZPLT 5907–5909; 2 xii 2018); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); Refugio Biológico Mbaracayú (MIB 2553; 19 iii 2004); RNB Mbaracayú (Ríos Quintana 2015; SP); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **CEN**: Asunción (Podtiaguin 1941), (Benítez Díaz 1988; SP: CEFCA 17 ii 1967, 17 v 1972); Limpio: Surubi-i (Ríos Díaz 2014; SP); San Lorenzo (Benítez Díaz 1988; SP: CEFCA 2 ii 1967), (Martin *et al.* 2011; SP); **CON:** Garay Cue (Drechsel 2014c); **GUA:** Villarrica (Benítez Díaz 1988; SP: CEFCA 16 i 1974); **ITA:** PN San Rafael: Estancia Nueva Gambach (Ríos Quintana 2015; SP); **ÑEE:** Camba Cuá: Arroyo Caimán (Ríos Quintana 2015; SP); Humaitá (Ríos Quintana 2015; SP); Pilar (Ríos Quintana 2015; SP); **PAR**: Sapucái (Ríos Díaz 2014; SP); **PHA**: Cruce Los Pioneros (Ríos Díaz 2014; SP); Laguna Capitán (CZPLT 3415; 23–24 iii 2015); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Widespread and common throughout the country.

Taxonomy: Following recent studies by Haxaire & Herbin (2000) and Tuttle (2007), we include *Erinnyis domingonis* (Butler, 1875) within this species.

Erinnyis oenotrus (Cramer, 1780)

Sphinx Oenotrus Cramer, 1780. *Die Uitlandsche Kapellen voorkomende in der drie Waereld-deelen Asia, Africa en America* 4: 22, pl. 301, fig. C.

Erinnyis oenotrus: Schade (1927), Podtiaguin (1941), Benítez Díaz (1988), Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014 b, c, f), Martin *et al.* (2011), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

AMA: Pedro Juan Caballero (Ríos Díaz 2014; SP); **APA:** Pikyry (MIB 1884; 19 ii 2004); Reserva Natural Dimas (Drechsel 2014b); **APY:** PN Defensores del Chaco: Madrejón (Ríos Díaz 2014; SP); **CAN**: Jasy Kañy (Ríos Díaz 2014; SP); Puente de Arroyo Guazú (Ríos Díaz 2014; SP); Refugio Biológico Carapá (Drechsel 2014f), (MIB 755, 786, 843, 846, 858, 874, 930; 22–23 xi 2003); Refugio Biológico Mbaracayú (MIB 2566, 2571, 2572; 20 iii 2004); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **CEN**: Asunción (Podtiaguin 1941), (Benítez Díaz 1988; SP: CEFCA 1 iv 1969); Puente Remanso (Ríos Díaz 2014; SP); San Lorenzo (CEFCA 1258: vii 1960, 26 iv 1974), (Martin *et al.* 2011; SP), (Ríos Díaz 2014; SP); **CON**: Garay Cue (Drechsel 2014c); PN San Luis (Ríos Díaz 2014; SP); **ITA:** Encarnación (CZPLT 3255; 29 xii 2014); PN San Rafael: Estancia Nueva Gambach (MNHNPY; no date); **ÑEE:** Pilar (Ríos Quintana 2015; SP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Widespread and common throughout the country.

Eupyrrhoglossum sagra (Poey, 1832)

Macroglossa sagra Poey, 1832. *Centurie de Lépidoptéres de l'Ile de Cuba* (1): Num. [19].

Eupyrrhoglossum sagra: Schade (1927), Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014 b, f), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

"Paraguay": Rothschild & Jordan (1903); **APA:** Reserva Natural Dimas (Drechsel 2014b); **APY:** Base 5 Adrián Jara (Ríos Díaz 2014; SP); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); **GUA**: Melgarejo (Drechsel 1994), (Ríos Díaz 2014; SP); **ITA:** Encarnación (CZPLT 5588; 4 v 2018), (CZPLT 7205, 7206; 16 vi 2019); **ÑEE:** Pilar (Ríos Quintana 2015; SP); Tacuaras: Arroyo Las Hermanas (Ríos Quintana 2015; SP); Villalbín: Dunas Teniente Sánchez (Ríos Quintana 2015; SP); **SPE**: Palomita (Drechsel 1994); Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: A widespread but generally uncommon species, apparently absent from the driest western reaches of the Chaco. Drechsel (2014c) published a photograph of this species in his fauna of Garay Cue, CON but omitted it from the list of species recorded from the site in the appendix. The same photograph also appears in Drechsel (2014f) for Refugio Biológico Carapá, CAN.

Isognathus caricae caricae (Linnaeus, 1758)

Sphinx Caricae Linnaeus, 1758. *Systema Naturae* (10th ed.) 1: 491.

Isognathus caricae: Smith *et al.* (2017)

SPE: Reserva Natural Laguna Blanca (Smith *et al.* 2017; PH, SP).

Distribution: Known from four specimens collected during November, December and March at a single site in the Cerrado zone (Smith *et al.* 2017).

Madoryx bubastus bubastus (Cramer, 1777)

Sphinx Bubastus Cramer, 1777. *Die Uitlandsche Kapellen voorkomende in der drie Waereld-deelen Asia, Africa en America* 2: 84, pl. 149, fig. E.

Madoryx bubastus: Benítez Díaz (1988), Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b), Ríos Díaz (2014)

APA: Colonia Yguazú (Benítez Díaz 1988; SP: CEFCA; 13 ix 1985); Refugio Biológico Limoy (MIB 116; 24 x 2003); **CAN:** Reserva Natural Dimas (Drechsel 2014b); **CEN:** Asunción (Benítez Díaz 1988; SP: CEFCA; 11 vii 1968); **COR**: Naranjo (Ríos Díaz 2014; SP); **GUA**: Calle Florida (Ríos Díaz 2014; SP); **ITA:** Encarnación (CZPLT 3257; 22 xii 2014).

Distribution: Associated mainly with the Atlantic Forest and Cerrado ecoregions, with additional records from the Cerrados del Chaco ecoregion, APY mapped by Drechsel (2014e).

Madoryx oiclus oiclus (Cramer, 1779)

Sphinx Oiclus Cramer, 1779. *Die Uitlandsche Kapellen voorkomende in der drie Waereld-deelen Asia, Africa en America* 3: 39, pl. 216, fig. C.

Madaryx oiclus: Schade (1927)

Madoryx oiclus: Schade (1928), Poulard (1983), Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, c), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

Madoryx oilus [*sic*]: Benítez Díaz (1988)

APA: Reserva Natural Dimas (Drechsel 2014b); **CAN**: Refugio Biológico Mbaracayú (MIB 2559; 19 iii 2004); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **CEN**: Drechsel (1994); Asunción (CEFCA; 16 v 1966); San Lorenzo (Benítez Díaz 1988; SP: CEFCA; 26 ix 1967, 27 v 1980); **CON:** Garay Cue (Drechsel 2014c); **GUA**: Drechsel (1994); Colonia Independencia (Schade 1928), (Ríos Díaz 2014; SP); **ITA:** Isla Yacyretá (Poulard 1983); PN San Rafael: Estancia Nueva Gambach (CZPLT 5607; 1 v 2018); **ÑEE:** Pilar (Ríos Quintana 2015; SP); **PAR**: Drechsel (1994); **PHA:** Puerto Galileo (CJHL; 13–15 ix 2007); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Mainly east of the Paraguay River in the Atlantic Forest, Cerrado and Humid Chaco ecoregions, with an additional locality in the Cerrados del Chaco ecoregion, APY mapped by Drechsel (2014e).

Nyceryx alophus (Boisduval, [1875])

Perigonia Nephus Variété *Perigonia Alophus* Boisduval, [1875]. *Histoire naturelle des insectes (Spécies général des lépidoptères - Hétérocères)* 1: 323.

Nyceryx alophus: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, f), Ríos Díaz (2014), Smith *et al.* (2017)

"Paraguay": Rothschild & Jordan (1903); **APA:** Refugio Biológico Limoy (MIB 109; 24 x 2003); Reserva Natural Dimas (Drechsel 2014b), (CJHL; 19–23 xii 2006); **CAN**: Refugio Biológico Carapá (Drechsel 2014f), (MIB 783; 22 xi 2003); **COR:** Drechsel (1994); **GUA**: Drechsel (1994); Salto Cristal (Ríos Díaz 2014; SP); Villarrica (NHMUK); **ITA:** PN San Rafael: Estancia Nueva Gambach (CZPLT 4807; 8 ix 2017); **PAR:** Drechsel (1994); **SPE**: Drechsel (1994); Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP); San Estanislao: Palomita (Ríos Díaz 2014; SP).

Distribution: Relatively common in the Cerrado and Atlantic Forest ecoregions of eastern Paraguay.

Nyceryx continua (Walker, 1856)

Lophura continua Walker, 1856. *List of Specimens of Lepidopterous Insects in the Collection of the British Museum* 8: 108.

Nyceryx continua: Drechsel (1994), Kochalka *et al.* (1996), Ríos Díaz (2014)

CAA: Carumbé (NHMUK; ii 1973); **CAN:** Agr. Armisticio (CJHL; 23 viii – 1 ix 2008); **CEN:** (Drechsel 1994); **GUA:** (Drechsel 1994); Salto Cristal (Ríos Díaz 2014; SP); **ITA:** PN San Rafael: Estancia Nueva Gambach (PROC; ix 2007), (CZPC 224; ix 2008; LSP), (MNHNPY; 15 x 2008); **PAR:** (Drechsel 1994); **SPE:** (Drechsel 1994); Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Uncommon in the Cerrado and Atlantic Forest ecoregions of eastern Paraguay.

Nyceryx furtadoi Haxaire, 1996

Nyceryx furtadoi Haxaire, 1996. *Lambillionea* 96: 351.

Nyceryx furtadoi: Ríos Díaz (2014), Smith *et al.* (2017)

APY: General Colmán (NHMUK; x 1996; SP), (Ríos Díaz 2014; SP); **BOQ:** PN Teniente Enciso (CJHL; 25–26 xi 2007); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Apparently rare, known from few records in the Dry Chaco and Cerrado.

Nyceryx nictitans (Boisduval, [1875])

Perigonia Nictitans Boisduval, [1875]. *Histoire naturelle des insectes (Spécies général des lépidoptères - Hétérocères)* 1: 322–323.

Nyceryx nictitans: Drechsel (2014b, c)

APA: Reserva Natural Dimas (Drechsel 2014b); **CON:** Garay Cue (Drechsel 2014c); **ITA:** Encarnación (NHMUK; i 1922).

Distribution: Records in eastern Paraguay are very few but geographically widespread. This appears to be a naturally rare species.

Nyceryx riscus (Schaus, 1890)

Enyo riscus Schaus, 1890. *Entomologica Americana* 6: 20.

Nyceryx riscus: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, f), Ríos Díaz (2014), Smith *et al.* (2017)

AMA: Drechsel (1994); **APA:** Refugio Biológico Limoy (MIB 128; 24 x 2003); Reserva Natural Dimas (Drechsel 2014b); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); Refugio Biológico Mbaracayú (MIB 2993; 20 iii 2004); **CEN**: Limpio: Surubi-i (Ríos Díaz 2014; SP); San Lorenzo (CEFCA 2 x 1982); **GUA**: Drechsel (1994); entre Ñumí y Garay km24 (Ríos Díaz 2014; SP); **SPE**: Drechsel (1994); Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Relatively common in the Cerrado and Atlantic Forest ecoregions of eastern Paraguay.

Nyceryx stuarti (Rothschild, 1894a)

Pachygonia stuarti Rothschild, 1894a. *Novitates Zoologicae* 1 (4): 665.

Nyceryx stuarti: Smith *et al.* (2017)

SPE: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Rare. Documented from a single locality in the Cerrado zone. A photographic record from the Atlantic Forest at Jejuí-Mí, RNB Mbaracayú CAN, 25 August 2008 (PS) suggests wider presence of this species in Paraguay. Perhaps overlooked.

Pachylia ficus (Linnaeus, 1758)

Sphinx Ficus Linnaeus, 1758. *Systema Naturae* (10th ed.) 1: 491.

Pachylia ficus: Schade (1927), Podtiaguin (1941), Poulard (1983), Benítez Díaz (1988), Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, c, f), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

"Throughout eastern Paraguay": Drechsel (1994); **APA:** Reserva Natural Dimas (Drechsel 2014b); **APY:** Cerro León (Poulard 1983); **CAN**: Refugio Biológico Carapá (Drechsel 2014f), (MIB 763; 22 xi 2003); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **CEN**: Asunción (Podtiaguin 1941); Cerro Lambaré (Ríos Díaz 2014; SP); Colonia Elisa (Podtiaguin 1941); Jardín Botánico (Podtiaguin 1941); San Lorenzo (Benítez Díaz 1988; SP: CEFCA; 13 vi 1977, 28 v 1986); **CON:** Garay Cue (Drechsel 2014c); San Carlos de Apa (Ríos Díaz 2014; SP); **ITA:** PN San Rafael: Estancia Nueva Gambach (MNHNPY; 20 vi 2008), (PROC 257; 15 vii 2008); **ÑEE:** Pilar (Ríos Quintana 2015; SP); **PAR**: PN Ybycuí (Ríos Díaz 2014; SP); **PHA:** Villa Hayes (Podtiaguin 1941); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Widespread in eastern Paraguay in all habitats. The report from the Dry Chaco at Cerro León, APY by Poulard (1983) is questionable.

Note: During February 2005, the distinctive black-and-yellow banded larvae became a feature in the national press under the headline "gusano mortal" (deadly worm), purportedly representing a threat to public safety. Furthermore, the defensive hissing and body-flicking reactions of later stage larvae when molested reinforced the idea amongst the public that they were aggressive and dangerous. Despite assurances by biologists that the larvae posed no threat, this irresponsible reporting led to the cutting down of fig trees (the host plant) in a bid to "control" populations in some areas (ABC Color 2005).

***Pachylia syces syces* (Hübner, [1819])**

Enyo Syces Hübner, [1819]. *Verzeichniss bekannter Schmettlinge*: 132.

Pachylia syces: Schade (1927), Podtiaguin (1941), Benítez Díaz (1988), Drechsel (1994), Drechsel (2014f), Ríos Díaz (2014)

"Paraguay": Rothschild & Jordan (1903); **CEN**: Drechsel (1994); Capiatá (Ríos Díaz 2014; SP); Fernando de la Mora (Ríos Díaz 2014; SP); Loma Pytá (Ríos Díaz 2014; SP); San Antonio (Podtiaguin 1941); San Lorenzo (Benítez Díaz 1988; SP: CEFCA; 3 xi 1972); **CAN**: Refugio Biológico Carapá (Drechsel 2014f).

Distribution: Occurs sympatrically with *P. ficus* but is much less commonly collected with only scattered records in eastern Paraguay. This species flies at dusk and dawn and is rarely attracted to lights. An individual was photographed in Encarnación, ITA on 9 December 2008 (FAUNA Paraguay 2006 onwards).

***Pachylioides resumens* (Walker, 1856)**

Pachylia resumens Walker, 1856. *List of Specimens of Lepidopterous Insects in the Collection of the British Museum* 8: 190.

Pachylia resumeus: Schade (1927)

Pachylia resumens: Podtiaguin (1941), Benítez Díaz (1988)

Pachylioides resumens: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, c, f), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

"Paraguay": Rothschild & Jordan (1903); **"Throughout eastern Paraguay":** Drechsel (1994); **AMA**: PN Cerro Corá (Ríos Díaz 2014; SP); **APA:** Pikyry (MIB 1859; 19 ii 2004); Refugio Biológico Limoy (MIB 114, 137; 24–25 x 2003); Reserva Natural Dimas (Drechsel 2014b); Monumento Nacional Puerto Bertoni, Puerto Stroessner (= Ciudad del Este) (Ríos Díaz 2014; SP); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); Refugio Biológico Carapá (MIB 774–885; 22–23 xi 2003); Refugio Biológico Mbaracayú (MIB 2561, 2562; 19 iii 2004); RNB Mbaracayú (Ríos Quintana 2015; SP); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **CEN**: Asunción (Ríos Díaz 2014; SP), (CEFCA; 27 vi 1966); Capiatá (CEFCA; 20 vii 1985); Jardín Botánico (Podtiaguin 1941; LSP); San Lorenzo (Benítez Díaz 1988; SP: CEFCA; 31 v 1967, 26 vi 1967, 20 vi 1974, 11 x 1982, 5 v 1986); Santísima Trinidad (Podtiaguin 1941; LSP); **CON**: Cororó (Ríos Díaz 2014; SP); Garay Cue (Drechsel 2014c); **GUA**: entre Ñumí y Garay km24 (Ríos Díaz 2014; SP); Salto Cristal (Ríos Díaz 2014; SP); Villarrica (CEFCA; 17 iv 1976); **ITA:** Isla Yacyretá: Estancia Melgarejo (Ríos Díaz 2014; SP); Encarnación (CZPLT 3252; 15 i 2015), (CZPLT 7210; 1 vii 2019); PN San Rafael: Estancia Nueva Gambach (CZPLT 7101; 12 vii 2019), (MNHNPY; 6 ix 2008, 21 xii 2008); **ÑEE:** Pilar (Ríos Quintana 2015; SP); Tacuaras (Ríos Quintana 2015; SP); **PAR**: PN Ybycuí (Ríos Díaz 2014; SP); **PHA:** Remancito (Podtiaguin 1941; LSP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: One of the most abundant hawkmoths in eastern Paraguay where it occurs in Cerrado, Atlantic Forest and Humid Chaco ecoregions. Drechsel (2014e) maps three records from the Dry Chaco, suggestive perhaps of local movements.

***Perigonia ilus* Boisduval, 1870**

Perigonia Ilus Boisduval, 1870. *Considerations sur les Lepidoptères envoyés du Guatemala à M. de l'Orza*: 66

Pengonia lusca F. forma ilus: Podtiagun (1944)

Perigonia ilus: Ríos Díaz (2014), Smith *et al.* (2017)

APY: Base 5 Adrián Jara (Ríos Díaz 2014; SP); **CEN:** Jardín Botánico (Podtiaguin 1944); Santísima Trinidad (Podtiaguin 1944); **CON**: PN San Luis (Ríos Díaz 2014; SP); **GUA:** Villarrica (Podtiaguin 1944); **ITA:** Encarnación (CZPLT 5211; 25 iv 2016), (CZPLT 7204; 28 v 2019); PN San Rafael: Estancia Nueva Gambach (MNHNPY; 10 ix 2008); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Uncommon but widespread in eastern Paraguay, with marginal occurrence in the extreme northern Chaco.

Taxonomy: Long treated as either a form (e.g., Rothschild & Jordan 1903), a subspecies (e.g., Bryk 1953), or simply a junior synonym (e.g., Bridges 1993; Carcasson & Heppner 1996) of *Perigonia lusca*, *P. ilus* was most recently reinstated as a full species by Haxaire & Herbin (1999). We follow Haxaire & Herbin (1999) and use *P. ilus* to refer to specimens that have a yellow anal angle on the ventral side of the hindwing.

***Perigonia lusca lusca* (Fabricius, 1777)**

Sphinx lusca Fabricius, 1777. *Genera Insectorum*: 272.

Perigonia lusca f. *interrupta*: Poulard (1983)

Perigonia lusca: Drechsel (1994), Drechsel (2014b, c, f), Ríos Díaz (2014)

AMA: Drechsel (1994); **APA:** Refugio Biológico Limoy (MIB 1567; 24 x 2003); Reserva Natural Dimas (Drechsel 2014b); **APY:** Cerro León (Poulard 1983); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); **CEN:** Drechsel (1994); **CON**: Garay Cue (Drechsel 2014c); San Carlos del Apa (Ríos Díaz 2014; SP); **GUA:** Drechsel (1994); **PAR:** Drechsel (1994); **SPE:** Drechsel (1994).

Distribution: Distribution unclear. Referenced over a wide geographic area by Drechsel (1994, 2014b, c, f), but we are aware of only two confirmed specimens from the Cerrado and Atlantic Forest zones. Drechsel presumably uses the name in the old sense, which includes *P. ilus* (in the sense it is used here) and *P. passerina*, as he cites neither of these species in his works. Probably in the same sense, "*Perigonia lusca*" was mentioned as a "yerba mate" (tea) pest (*Ilex paraguariensis*) by Benítez Díaz (2002).

Perigonia pallida (Rothschild & Jordan, 1903)

Perigonia pallida Rothschild & Jordan, 1903. *Novitates Zoologicae* 9 (suppl): 425.

Perigonia pallida: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, c), Ríos Díaz (2014), Smith *et al.* (2017)

AMA: Drechsel (1994); **APA:** Pikyry (MIB 1662; 18 ii 2004); Refugio Biológico Limoy (MIB 107; 24 x 2003); Reserva Natural Dimas (Drechsel 2014b); **APY:** Base 5 Adrián Jara (Ríos Díaz 2014; SP); **BOQ:** Fortín Toledo (CZPLT 3993; 1 iv 2015); PN Teniente Enciso (CZPLT 3409; 28 ii-1 iii 2015), (CZPLT 3471; 3–4 iv 2015), (CZPLT 5902; 2 xii 2018); **CEN:** Drechsel (1994); **CON:** Garay Cue (Drechsel 2014c); **GUA:** Drechsel (1994); **SPE**: Drechsel (1994); Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP); San Estanislao: Palomita (Ríos Díaz 2014; SP).

Distribution: Widespread and typically common in all habitats, though there are no records south of 26º S.

Perigonia passerina (Boisduval, [1875])

Perigonia Passerina, Boisduval [1875]. *Histoire naturelle des insectes (Spécies général des lépidoptères - Hétérocères)* 1: 327–328.

Perigonia lusca: Kochalka *et al.* (1996)

Perigonia passerina: Ríos Díaz (2014), Ríos Quintana (2015)

COR: Naranjo (Ríos Díaz 2014; SP); **PAR:** Rothschild & Jordan (1903); **ÑEE:** Pilar (Ríos Quintana 2015; SP); **SPE**: San Estanislao: Palomita (Ríos Díaz 2014; SP).

Distribution: Uncommon but widespread in eastern Paraguay with records from Atlantic Forest, Cerrado and Humid Chaco.

Taxonomy: Considered to be a form of *Perigonia lusca* by Rothschild & Jordan (1903), it was reinstated to species status by Haxaire (1996).

Phryxus caicus (Cramer, 1777)

Sphinx Caicus Cramer, 1777. *Die Uitlandsche Kapellen voorkomende in der drie Waereld-deelen Asia, Africa en America* 2: 42, pl. 125, fig. F.

Grammodia caicus: Benítez Díaz (1988)

Phryxus caicus: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, f), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

APA: Reserva Natural Dimas (Drechsel 2014b); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); Refugio Biológico Mbaracayú (MIB 2558, 3029; 19–20 iii 2004); **CEN**: Drechsel (1994); Asunción (Benítez Díaz 1988; SP: CEFCA; 9 iv 1973, x 1973); Loma Pytá (Ríos Quintana 2015; SP), (Ríos Díaz 2014; SP); San Lorenzo (Benítez Díaz 1988; SP: CEFCA; 20 v 1979), (Ríos Díaz 2014; SP); **GUA:** Drechsel (1994); **ITA:** Isla Yacyretá: Estancia Melgarejo; **ÑEE:** Humaitá (Ríos Quintana 2015; SP); Isla Umbú: Islerías (Ríos Quintana 2015; SP); Pilar (Ríos Quintana 2015; SP); **PAR:** Drechsel (1994); **SPE**: Drechsel (1994); Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP); San Estanislao: Palomita (Ríos Díaz 2014; SP).

Distribution: Widespread at low density and nowhere common. Drechsel (2014e) indicates additional localities in the Dry and Humid Chaco of Boquerón, Presidente Hayes and Alto Paraguay departments, suggesting a wide range and generalist habitat preference.

Pseudosphinx tetrio (Linnaeus, 1771)

Sphinx Tetrio Linnaeus, 1771. *Mantissa Plantarum Altera*: 538.

Pseudosphinx tetrius [*sic*]: Schade (1927)

Pseudosphinx tetrio: Podtiaguin (1941), Drechsel (1994), Ríos & Drechsel (2017)

"Paraguay": Rothschild & Jordan (1903); Podtiaguin (1941; LSP); **APA:** Ciudad del Este (Ríos & Drechsel 2017; PH); **BOQ:** Loma Plata (Ríos & Drechsel 2017; PH); Fortín Toledo (Ríos & Drechsel 2017; SP); **CEN:** Asunción, Barrio Las Carmelitas (Ríos & Drechsel 2017; PH); Asunción, Barrio Mburucuyá (Ríos & Drechsel 2017; SP); Asunción, Barrio Recoleta (Ríos & Drechsel 2017; SP); Asunción, Barrio Terminal (Ríos & Drechsel 2017; PH); **COR:** around Caacupé (Podtiaguin 1941; LSP).

Distribution: Podtiaguin (1941) stated that the species was "very rare", that a specimen was taken "en los alrededores de Caacupé" (around Caacupé) in January 1916 and that there was a female (now lost) in the Museo de Historia Natural del Paraguay labelled "Paraguay" but with no other collection data. These were the only known reports of the species in Paraguay until larvae were found at diverse localities in November 2015. Multiple reports across the country since represent a remarkable appearance and spread of a species that had apparently been absent for many decades (Ríos & Drechsel 2017).

Subtribe Philampelina

***Aleuron chloroptera* (Perty, [1833])**

Sphinx chloroptera Perty, [1833]. *Delectus Animalium Articulatorum*: 155–156.

Aleuron chloroptera: Schade (1927), Podtiaguin (1941), Drechsel (1994)

Aleuron chloropterum [*sic*]: Drechsel (2014b, f)

"Paraguay": (NHMUK; undated); **APA:** Reserva Natural Dimas (Drechsel 2014b); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); **CEN**: Asunción (Podtiaguin 1941; LSP).

Distribution: The most frequently encountered member of the genus in Paraguay, with the majority of records from Atlantic Forest areas in the eastern part of the Oriental region.

***Aleuron iphis* (Walker, 1856)**

Enyo Iphis Walker, 1856. *List of Specimens of Lepidopterous Insects in the Collection of the British Museum* 8: 116.

Aleuron iphis: Schade (1927), Drechsel (1994), Drechsel (2014b), Ríos Díaz (2014)

APA: Reserva Natural Dimas (Drechsel 2014b; PH); **PAR**: PN Ybycuí (Ríos Díaz 2014; SP).

Distribution: Few reports from the Atlantic Forest region of eastern Paraguay.

***Aleuron neglectum* (Rothschild & Jordan, 1903)**

Aleuron neglectum Rothschild & Jordan, 1903. *Novitates Zoologicae* 9 (suppl.): 398.

Aleuron neglectum: Schade (1927), Drechsel (1994)

Aleuron neglectum paraguayana: Clark (1931)

CAA: Caaguaru (= Caaguazú) (Clark 1931); **PAR:** Sapucay (= Sapucái) (NHMUK; i 1905); **ÑEE:** Pilar (CZPLT 5465; 22 vi 2008).

Distribution: Known only from old specimens from the Atlantic Forest region of eastern Paraguay until a specimen was collected in Humid Chaco in the southwestern Orient of Paraguay.

Taxonomy: Clark (1931) described the subspecies *A. n. paraguayana* based on some very dark specimens collected by Emil Kaempfer during November 1930 at Caaguaru (= Caaguazú) but it was synonymized with the nominotypical subspecies by Kitching & Cadiou (2000).

***Enyo gorgon* (Cramer, 1777)**

Sphinx Gorgon Cramer, 1777. *Die Uitlandsche Kapellen voorkomende in der drie Waereld-deelen Asia, Africa en America* 2: 73, pl. 142, fig. E.

Epistor gorgon: Schade (1927), Podtiaguin (1941)

Enyo gorgon: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, f), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

"Throughout eastern Paraguay": Drechsel (1994); **APA:** Pikyry (MIB 1927; 19 ii 2004); Reserva Natural Dimas (Drechsel 2014b); **CAN:** Refugio Biológico Carapá (Drechsel 2014f), (MIB 780, 867; 22–23 xi 2003); Refugio Biológico Mbaracayú (MIB 2527; 19 iii 2004); RNB Mbaracayú (Ríos Quintana 2015; SP); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **CEN:** Asunción (Podtiaguin 1941; LSP), (CEFCA 1203: 18 xii 1966); **CON**: PN Paso Bravo: Estancia Santa Sofía (Ríos Díaz 2014; SP); **GUA**: Salto Cristal (Ríos Díaz 2014; SP); **ITA:** Encarnación (CZPLT 3259; 19 i 2015); PN San Rafael: Estancia Nueva Gambach (CZPC 141; 5 vi 2008;

LSP), (MNHNPY; 6 xi 2008), (Ríos Quintana 2015; SP); **ÑEE:** Pilar (Ríos Quintana 2015; SP); **PAR**: Rothschild & Jordan (1903); Sapucái (Ríos Díaz 2014; SP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP); Vacajhú (Ríos Díaz 2014; SP).

Distribution: An abundant and widespread species throughout eastern Paraguay, although apparently absent from the Chaco region.

Enyo lugubris lugubris (Linnaeus, 1771)

Sphinx lugubris Linnaeus, 1771. *Mantissa Plantarum Altera*: 537–538.

Epistor lugubrir [*sic*]: Podtiaguin (1941)

Epistor lugubris: Schade (1927)

Enyo lugubris: Poulard (1983), Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, c, f), Ríos Díaz (2014), Smith *et al.* (2017)

Enyo lugubris lugubris: Ríos Quintana (2015)

APA: Reserva Natural Dimas (Drechsel 2014b); **APY:** Cerro León (Poulard 1983); **CAN**: Refugio Biológico Carapá (Drechsel 2014f), (MIB 601, 767, 791, 934; 20–23 xi 2003); Refugio Biológico Mbaracayú (MIB 3053; 20 III 2004); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **CEN**: Asunción (Podtiaguin 1941; LSP), (CEFCA; 9 v 1974, 18 ii 1986); Cerro Lambaré (Ríos Díaz 2014; SP); Limpio: Surubi-i (Ríos Díaz 2014; SP); San Lorenzo (CEFCA; 28 vi 1967, 20 iv 1982); **CON:** Garay Cue (Drechsel 2014c); **ITA**: Capitán Miranda: El Tirol (Ríos Quintana 2015; SP); Encarnación (CZPLT 7207; 31 v 2019); **ÑEE:** Pilar (Ríos Quintana 2015; SP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: An abundant and widespread moth in all habitats mainly in the Oriental region, with one photographed in the Dry Chaco at Parque Nacional Teniente Enciso on 30 September 2014 (PS).

Enyo ocypete (Linnaeus, 1758)

Sphinx Ocypete Linnaeus, 1758. *Systema Naturae* (10th ed.) 1: 489.

Triptopogon ocypete: Benítez Díaz (1988)

Enyo ocypete: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, c, f), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

Enyo ocypetes [*sic*]: Ríos Quintana (2015)

"Paraguay": Rothschild & Jordan (1903); **"Throughout eastern Paraguay":** Drechsel (1994); **AMA**: PN Cerro Corá (Ríos Díaz 2014; SP); **APA:** Reserva Natural Dimas (Drechsel 2014b); **BOQ:** Drechsel (1994); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); Refugio Biológico Mbaracayú (MIB 2526, 2551; 19 iii 2004); RNB Mbaracayú (Ríos Quintana 2015; SP); **CEN:** Asunción (CEFCA; 10 IV 1967, 22 v 1967, 1206: 10 x 1973); San Lorenzo (Benítez Díaz 1988; SP: CEFCA; 1207: 7 vi 1973, 1260: 17 v 1974, 1289: 20 ii 1974, 1293: 15 v 1966, 7 v 1973); **CON**: Cororó (Ríos Díaz 2014; SP); Garay Cue (Drechsel 2014c); **GUA**: Cordillera de Yvyturuzú cerca de Garay (Ríos Díaz 2014; SP); **ITA**: Encarnación (Ríos Quintana 2015; SP); **ÑEE:** Pilar (Ríos Quintana 2015; SP); **PHA**: Villa Hayes (Ríos Díaz 2014; SP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: An abundant and widespread species in all habitats throughout the country.

Eumorpha adamsi (Rothschild & Jordan, 1903)

Pholus adamsi Rothschild & Jordan, 1903. *Novitates Zoologicae* 9 (suppl.): 488.

Eumorpha adamsi: Drechsel (2014c)

AMA: Parque Nacional Cerro Corá (USNM; 7–10 iv 1986); **CON:** Garay Cue (Drechsel 2014c).

Distribution: Apparently confined to the Cerrado zone of the northern Oriental region and the paucity of records suggests it is uncommon even there. Drechsel (2014e) maps four localities in the Cerrado zone of AMA and CON. The first Paraguayan record is a specimen in the National Museum of Natural History, Washington, D.C., USA (USNM).

Eumorpha analis (Rothschild & Jordan, 1903)

Pholus satellitia analis Rothschild & Jordan, 1903. *Novitates Zoologicae* 9 (suppl.): 482.

Pholus satellitia: Podtiaguin (1941)

Eumorpha satellita [*sic*]: Drechsel (1994), Kochalka *et al.* (1996)

Eumorpha satellitia: Drechsel (2014f)

Eumorpha analis: Drechsel (2014b, c), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

"Paraguay": Rothschild & Jordan (1903); **AMA**: PN Cerro Corá (Ríos Díaz 2014; SP); **APA:** Refugio Biológico Limoy (MIB 144; 25

x 2003); Reserva Natural Dimas (Drechsel 2014b); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **CON**: Garay Cue (Drechsel 2014c); PN Paso Bravo: Estancia Santa Sofia (Ríos Díaz 2014; SP); **GUA**: Salto Cristal (Ríos Díaz 2014; SP); **ITA:** PN San Rafael: Estancia Nueva Gambach (MNHNPY; 23 ix 2008), (PROC 412; 12 viii 2008), (CZPLT 5214; 17–18 viii 2014), (CZPLT 5009; 23 xii 2016), (CZPLT 5772; 11 x 2018); **ÑEE:** Humaitá (Ríos Quintana 2015; SP); Pilar (Ríos Quintana 2015; SP); **PAR:** Paraguarí (Podtiaguin 1941; LSP); **PHA:** Villa Hayes (Podtiaguin 1941; LSP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP); San Estanislao: Palomita (Ríos Díaz 2014; SP).

Distribution: Widespread and often common throughout eastern Paraguay in the Atlantic Forest, Cerrado and Humid Chaco zones. One photographic record from the Dry Chaco by Marcelo Bombaci at PN Teniente Enciso, BOQ during October 2007 (FAUNA Paraguay: FPSPH0012PH). Drechsel (2014e) maps two localities in APY and one in BOQ west of the Río Paraguay.

Taxonomy: This species was long considered to be a subspecies of *E. satellitia* (Linnaeus, 1771), but was raised to species status by Haxaire & Herbin (1999). The type specimens of this species are from Paraguay, attributed to Dr. Bohls but without specific locality.

Eumorpha anchemolus (Cramer, 1779)

Sphinx Anchemolus Cramer, 1779. *Die Uitlandsche Kapellen voorkomende in der drie Waereld-deelen Asia, Africa en America* 3: 50, pl.224, fig.C.

Pholus anchemolus: Benítez Díaz (1988)

Eumorpha anchemalus [*sic*]: Kochalka *et al.* (1996)

Eumorpha anchemolus: Drechsel (1994), Ríos Díaz (2014)

CEN: Cerro Lambaré (Ríos Díaz 2014; SP); San Lorenzo (Benítez Díaz 1988; SP: CEFCA; 3 vii 1974).

Distribution: A rare species known from few reports. Drechsel (2014e) maps the species for the Dry Chaco, BOQ close to the Bolivian border, but provides no image to support the identification.

Eumorpha fasciatus fasciatus (Sulzer, 1776)

Sphinx Fasciatus Sulzer, 1776. *Abgekürtze Geschichte der Insecten nach dem linnaeischen System* 1: 151.

Pholus fasciatus: Schade (1927), Benítez Díaz (1988)

Eumorpha fasciata [*sic*]: Drechsel (2014b, f)

Eumorpha fasciatus: Drechsel (1994), Kochalka *et al.* (1996), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

Eumorpha fasciatus fasciatus: Martin *et al.* (2011)

APA: Reserva Natural Dimas (Drechsel 2014b); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); Refugio Biológico Mbaracayú (MIB 3059, 3060; 20 iii 2004); RNB Mbaracayú (Ríos Díaz 2014; SP); **CEN**: Asunción (CEFCA; 21 xii 1967), (Martin *et al.* 2011; SP), (Ríos Díaz 2014; SP); San Lorenzo (Benítez Díaz 1988; SP: CEFCA; 14 iii 1974, 10 xi 1983), (Ríos Díaz 2014; SP); **CON**: PN San Luis (Ríos Díaz 2014; SP); **GUA:** Schade (1927); **ÑEE:** Camba Cuá: Arroyo Caimán (Ríos Quintana 2015; SP); Guazú Cua: Isla Hu (Ríos Quintana 2015; SP); Isla Umbú: Islerías (Ríos Quintana 2015; SP); Pilar (Ríos Quintana 2015; SP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Widespread and often common throughout eastern Paraguay in the Atlantic Forest, Cerrado and Humid Chaco zones. Photographed by Aldo Fretes in the Pantanal at Tres Gigantes, APY (FAUNA Paraguay: FPSPH0021PH; 16 September 2012) and by PS in Encarnación, ITA (FAUNA Paraguay: FPSPH0018PH; 31 January 2009). Drechsel (2014e) maps several localities in the Chaco in BOQ and PHA departments.

Eumorpha labruscae (Linnaeus, 1758)

Sphinx Labruscae Linnaeus, 1758. *Systema Naturae* (10th ed.) 1: 491.

Pholus labruscae: Schade (1927), Podtiaguin (1941), Benítez Díaz (1988)

Pholus labrucae [*sic*]: Podtiaguin (1941)

Eumorpha labruscae: Poulard (1983), Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, c, f), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

AMA: PN Cerro Corá (Ríos Díaz 2014; SP); **APA:** Reserva Natural Dimas (Drechsel 2014b); **BOQ:** PN Teniente Enciso (CZPLT 5867; 1 xii 2018); **CAN**: Refugio Biológico Carapá (Drechsel 2014f), (MIB 757; 22 xi 2003); Refugio Biológico Mbaracayú (MIB 3058, 3064; 20 iii 2004); RNB Mbaracayú (Ríos Quintana 2015; SP); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **CEN**: Asunción (Benítez Díaz 1988; SP: CEFCA 28 ix 1980), (Ríos Díaz 2014; SP); San Lorenzo (Benítez Díaz 1988; SP: CEFCA; 13 vii

1966); **CON**: Garay Cue (Drechsel 2014c); Horqueta, PN San Luis (Ríos Díaz 2014; SP); **COR**: Altos (Ríos Díaz 2014; SP); **ITA:** Encarnación (CZPLT 3589; 31 viii 2015); Isla Yacyretá (Poulard 1983); PN San Rafael: Estancia Nueva Gambach (MNHNPY; 19 vii 2008, 23 ix 2008), (PROC; no data), (CZPLT 4808; 8 ix 2017); **ÑEE:** Pilar (Ríos Quintana 2015; SP), (CZPLT 6177; 28 iii 2019); Tacuaras (Ríos Quintana 2015; SP); **PAR:** Paraguarí (Podtiaguin 1941; LSP), (CEFCA; 12 vii 2000); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: A common species found across the country in all habitats. Observed in the Pantanal region (PS pers. obs. PN Río Negro: Tres Gigantes, APY; 18 October 2017) and Drechsel (2014e) maps several localities in the Chaco in APY, BOQ and PHA departments.

***Eumorpha megaeacus* (Hübner, [1819])**

Daphnis Megaeacus Hübner, [1819]. *Verzeichniss bekannter Schmettlinge*: 134.

PAR: La Rosada (CJHL; 20 iii 2010); Sapucay (= Sapucái) (NHMUK; xii 1904 – i 1905).

Distribution: Two specimens only are known, both from PAR in the central forest ecoregion. This species is apparently rare across its entire distribution, but is rarely attracted to lights and thus perhaps under-recorded.

***Eumorpha vitis vitis* (Linnaeus, 1758)**

Sphinx Vitis Linnaeus, 1758. *Systema Naturae* (10th ed.) 1: 491.

Pholus vitis: Schade (1927), Podtiaguin (1941), Benítez Díaz (1988)

Eumorpha vitis: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014c, f), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

"Paraguay": Rothschild & Jordan (1903); **BOQ:** PN Teniente Enciso (CZPLT 5871; 2 xii 2018); **CAN**: Refugio Biológico Carapá (Drechsel 2014f), (MIB 620; 20 xi 2003); **CEN**: Areguá (Podtiaguin 1941; LSP); Asunción (Benítez Díaz 1988; SP: CEFCA; 11 iii 1967); Cerro Lambaré (Ríos Díaz 2014; SP); **COR:** Piribebuy (CEFCA 2 iv 2012); **CON**: Cororó (Ríos Díaz 2014; SP); Garay Cue (Drechsel 2014c); San Carlos de Apa (Ríos Díaz 2014; SP); **ITA**: Encarnación (5022; 21 xii 2016); **ÑEE:** Isla Umbú: Islerías (Ríos Quintana 2015; SP); Pilar (Ríos Quintana 2015; SP); Tacuaras: Arroyo Las Hermanas (Ríos Quintana 2015; SP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Widespread and frequent throughout Paraguay. Drechsel (2014e) maps numerous localities in the Chaco in APY, BOQ and PHA departments, suggesting it is frequent on both sides of the Río Paraguay.

***Unzela japix discrepans* Walker, 1856**

Unzela discrepans Walker, 1856. *List of Specimens of Lepidopterous Insects in the Collection of the British Museum* 8: 162.

Unzela japix: Smith *et al.* (2017)

SPE: Reserva Natural Laguna Blanca (Smith *et al.* 2017; PH, SP).

Distribution: Rare. Documented from a single locality from the interface of the Atlantic Forest and Cerrado. A photographic record from the Atlantic Forest at Jejuí-Mí, RNB Mbaracayú, CAN, 2 August 2013 (PS) and a single mapped locality in Alto Paraná department (Drechsel 2014e) suggests wider presence of this species in the northeastern Atlantic Forest zone.

Tribe Macroglossini

Subtribe Choerocampina

***Hyles euphorbiarum* (Guérin-Méneville & Percheron, 1835)**

Sphinx Euphorbiarum Guérin-Méneville & Percheron, 1835. *Genera des Insectes* 2 (8): pl. 3, fig. 1.

Celerio euphorbiarum: Schade (1927)

Hyles euphorbiarum: Drechsel (1994), Ríos Quintana (2015)

BOQ: PN Teniente Enciso (Ríos Quintana 2015; SP); **GUA:** Villarrica (Schade 1927); Drechsel (1994); **ÑEE:** Pilar (Ríos Quintana 2015; SP).

Distribution: Though Schade (1927) speculated that this species "should be common on the Paraná" there are in fact very few Paraguayan records. In addition to those cited here, Drechsel (2014e) maps two localities in Boquerón department, three in PHA and one in southern COR. Its distribution is apparently closely linked to Dry and Humid Chaco ecoregions, and it is presumably migratory.

***Hyles lineata* (Fabricius, 1775)**

Sphinx lineata Fabricius, 1775. *Systema Entomologiae*: 541.

Celerio lineata: Podtiaguin (1941)

BOQ: Loma Plata (CZPLT-3455; 10 iv 2015); **CEN:** Asunción y sus alrededores (Podtiaguin 1941; LSP).

Distribution: Podtiaguin (1941) described this species as "very common from November until the end of April" and that it "figures in all the collections". However, there have been only a handful of records since, all of which are from the Dry and Humid Chaco ecoregions. In addition to the specimen cited here, Drechsel (2014e) maps two localities in BOQ and another in western PHA. This is a migratory species and the reasons for its decline in abundance in Paraguay are unknown.

***Xylophanes alineae* Haxaire & C. Mielke, 2018**

Xylophanes alineae Haxaire & Mielke, 2018. *The European Entomologist* 9 (2): 63.

Xylophanes porcus (in part): Ríos Díaz (2014), Smith *et al.* (2017)

Xylophanes pocus continentalis: Ríos Quintana (2015)

CAN: RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **GUA**: Salto Cristal (Ríos Díaz 2014; SP); **ÑEE:** Tacuaras: Arroyo Las Hermanas (Ríos Quintana 2015; SP); **SPE**: San Estanislao: Palomita (Ríos Díaz 2014; SP).

Distribution: Cerrado, Atlantic Forest and Humid Chaco ecoregions. Possibly widespread in eastern Paraguay.

Taxonomy: Together with *Xylophanes soaresi* (q.v.), *X. alineae* was recently split from *X. porcus continentalis* Rothschild & Jordan, 1903 by Haxaire & Mielke (2018).

***Xylophanes anubus* (Cramer, 1777)**

Sphinx Anubus Cramer, 1777. *Die Uitlandsche Kapellen voorkomende in der drie Waereld-deelen Asia, Africa en America* 2: 46, pl. 128, fig. C.

Xylophanes anubus: Schade (1927), Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014c), Ríos Díaz (2014)

Xylophanes anubus anubus: Ríos Quintana (2015)

CAN: RNB Mbaracayú: Puesto La Morena (Ríos Díaz 2014; SP); **CON:** Garay Cue (Drechsel 2014c); **COR**: Drechsel (1994); Naranjo (Ríos Díaz 2014; SP); **GUA:** Drechsel (1994); Itape (Schade 1927); **GUA**: Drechsel (1994); **ITA:** Encarnación (CZPLT 3253; 18 xi 2014), (CZPLT 7208; 19 xii 2018); **ÑEE:** Pilar (Ríos Quintana 2015; SP); **PAR**: Drechsel (1994); Sapucái (Ríos Díaz 2014; SP);

Distribution: Widespread in eastern Paraguay, but relatively uncommon, occurring in the Cerrado, Atlantic Forest and Humid Chaco ecoregions.

***Xylophanes crenulata* Vaglia & Haxaire, 2009**

Xylophanes crenulata Vaglia & Haxaire, 2009. *The European Entomologist* 1: 95.

Xylophanes ceratomioides: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014f)

Xylophanes ceratomoides [*sic*]: Kochalka *et al.* (1996)

Xylophanes crenulata: Vaglia & Haxaire (2009), Drechsel (2014b), Ríos Díaz (2014)

AMA: Drechsel (1994); **APA:** Pikyry (MIB 1844; 19 ii 2004); Refugio Biológico Limoy (MIB 100, 118; 24 x 2003); Reserva Natural Dimas (Drechsel 2014b; PH); **CAN**: Refugio Biológico Carapá (Drechsel 2014f), (MIB 739, 896; 22–23 xi 2003), (Vaglia & Haxaire 2009); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); Tava Yopoi (CJHL; 26 x - 4 xi 2007); **GUA**: Drechsel (1994); Cordillera del Yvyturuzú (Ríos Díaz 2014: SP); **ITA:** Encarnación (CZPLT 3258; 11 xii 2014); PN San Rafael: Estancia Nueva Gambach (MNHNPY; 6 xi 2008), (CZPLT 6063; 10 xi 2018); **PAR**: Drechsel (1994); **SPE**: Drechsel (1994); San Estanislao: Palomita (Ríos Díaz 2014; SP).

Distribution: Widespread in eastern Paraguay, but relatively uncommon, occurring mainly in the Atlantic Forest ecoregions and the interface with the Cerrado zone.

Taxonomy: This species was split from *X. ceratomioides* (Grote & Robinson, 1866) by Vaglia & Haxaire (2009) based in part on two male Paraguayan specimens from Refugio Carapá, CAN collected on 21 April 1999 by U. Drechsel.

Xylophanes chiron nechus (Cramer, 1777)

Sphinx Nechus Cramer, 1777. *Die Uitlandsche Kapellen voorkomende in der drie Waereld-deelen Asia, Africa en America* 2: 125, pl.178, fig.B.

Xylophanes chiron nechus: Schade (1927)

Xylophanes chiron: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, c, f), Ríos Díaz (2014), Smith *et al.* (2017)

"Central and northeast Paraguay" Drechsel (1994); **AMA**: PN Cerro Corá (Ríos Díaz 2014; SP); **APA:** Pikyry (MIB 1845, 1867; 19 ii 2004); Refugio Biológico Limoy (MIB 127; 24 x 2003); Reserva Natural Dimas (Drechsel 2014b); **CAN**: Refugio Biológico Carapá (Drechsel 2014f), (MIB 928; 23 xi 2003); Refugio Biológico Mbaracayú (MIB 3025, 3049, 3050; 20 iii 2004); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); RNB Mbaracayú: Puesto La Morena (Ríos Díaz 2014; SP); **CON:** Garay Cue (Drechsel 2014c); **GUA**: Salto Cristal (Ríos Díaz 2014; SP); **ITA:** PN San Rafael: Estancia Nueva Gambach (CZPLT 6062; 10 xi 2018); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP); San Estanislao: Palomita (Ríos Díaz 2014; SP).

Distribution: A common *Xylophanes* in eastern Paraguay, occurring in the Cerrado and Atlantic Forest ecoregions.

Xylophanes elara (Druce, 1878)

Darapsa Elara Druce, 1878. *Entomologist's Monthly Magazine* 14: 249.

Xylophanes elara: Kochalka *et al.* (1996), Drechsel (2014b), Ríos Díaz (2014), Smith *et al.* (2017)

"Paraguay": Druce (1878); (Rothschild & Jordan 1903); **APA:** Reserva Natural Dimas (Drechsel 2014b); **CAN**: RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **PAR:** Sapucay (NHMUK; xii 1903, ii 1904, xi 1904, xii 1904); **SPE**: Drechsel (1994); Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP); San Estanislao: Palomita (Ríos Díaz 2014; SP).

Distribution: Restricted to the Atlantic Forest region of central and eastern Paraguay.

Taxonomy: This species was described based on material collected from an unspecified locality in Paraguay.

Xylophanes fosteri Rothschild & Jordan, 1906

Xylophanes fosteri Rothschild & Jordan, 1906. *Novitates Zoologicae* 13: 182.

Xylophanes fosteri: Schade (1927), Podtiaguin (1941), Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b), Ríos Díaz (2014)

AMA: Drechsel (1994); **APA:** Reserva Natural Dimas (Drechsel 2014b); **CEN:** Colonia Elisa (Podtiaguin 1941; LSP); **GUA**: Drechsel (1994); Salto Cristal (Ríos Díaz 2014); **PAR**: Drechsel (1994); Sapucay (Rothschild & Jordan 1906); PN Ybycuí, Sapucái (Ríos Díaz 2014; SP).

Distribution: Restricted to the Atlantic Forest region of central and eastern Paraguay.

Taxonomy: This species was described from a pair of Paraguayan specimens collected in February and October 1903 by William Foster at Sapucay (= Sapucái, PAR) and was named in his honour.

Xylophanes kaempferi Clark, 1931

Xylophanes kaempferi Clark, 1931. *Proceedings of the New England Zoölogical Club* 12: 81–82.

Xylophanes kaempferi: Clark (1931), Drechsel (1994)

CAA: Caaguaru (= Caaguazú) (Clark 1931).

Distribution: Known only from the type locality in the Atlantic Forest ecoregion.

Taxonomy: Clark (1931) described this species based on a single, badly worn female from Caaguaru (= Caaguazú), Paraguay, collected by Emil Kaempfer on 15 November 1930, and described as being similar to *X. elara* "but obviously a distinct form". There have been no further records of this species and its taxonomic status requires review. The holotype may in fact be a worn *X. elara* (specimen examined by JH).

Xylophanes loelia (Druce, 1878)

Choerocampa Loelia Druce, 1878. *Entomologist's Monthly Magazine* 14: 249.

Xylophanes libya: Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014f)

Xylophanes loelia: Drechsel (2014b), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

AMA: Drechsel (1994); PN Cerro Corá (Ríos Díaz 2014; SP); **APA:** Reserva Natural Dimas (Drechsel 2014b); **CAN**: Refugio Biológico Carapá (Drechsel 2014f), (CJHL; 1–10 xii 2007); Refugio Biológico Mbaracayú (MIB 2428, 2990, 2991; 18–20 iii 2004); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **CEN**: Drechsel (1994); **ÑEE:** Pilar (Ríos Quintana 2015; SP); **PAR**: Drechsel (1994); **SPE**: Drechsel (1994); Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Restricted to the Atlantic Forest region of central and eastern Paraguay, with marginal occurrence in the Humid Chaco region of ÑEE.

Xylophanes marginalis Clark, 1917

Xylophanes tyndarus marginalis Clark, 1917. *Proceedings of the New England Zoölogical Club* 6: 69.

CAN: Reserva Puerto Adela (15 xi 2002).

Distribution: Known in Paraguay only from one male specimen in the Insectarium Montreal, Canada, seen and identified by JH. It is published here for the first time.

Taxonomy: Formerly considered to be a subspecies of *Xylophanes tyndarus* (Boisduval, [1875]), *X. marginalis* was raised to species level by Kitching & Cadiou (2000).

Xylophanes pistacina (Boisduval, [1875])

Philampelus Pistacina Boisduval, [1875]. *Histoire naturelle des insectes (Spécies général des lépidoptères - Hétérocères)* 1: 199.

Xylophanes pistacina: Drechsel (1994), Smith *et al.* (2017)

"Paraguay": Rothschild & Jordan (1903), (NHMUK; undated); **APA:** Refugio Biológico Limoy (MIB 104, 106, 110; 24 x 2003); **CAA:** Caaguazú (Benítez Díaz 1988; LSP); **CAN:** Tava Yopoi (CJHL; 26 x – 4 xi 2007); **PAR:** Sapucay (= Sapucái) (NHMUK; ix 1903, x 1903, x 1904); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Restricted to the Atlantic Forest region of central and eastern Paraguay.

Xylophanes pluto (Fabricius, 1777)

Sphinx pluto Fabricius, 1777. *Genera Insectorum*: 274.

Xylophanes pluto: Schade (1927), Podtiaguin (1941), Poulard (1983), Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014, f), Ríos Díaz (2014), Smith *et al.* (2017)

APA: Reserva Natural Dimas (Drechsel 2014b); **CAN**: Refugio Biológico Carapá (Drechsel 2014f), (MIB 564, 876, 900; 20–23 xi 2003); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **CEN**: Colonia Elisa (Podtiaguin 1941; LSP); Cerro Lambaré (Ríos Díaz 2014; SP); **CON**: Cororó (Ríos Díaz 2014; SP); **GUA**: Salto Cristal (Ríos Díaz 2014; SP); **ITA:** Encarnación (CZPLT; 3 xii 2019); Isla Yacyretá (Poulard 1983); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Widespread and fairly common in all habitats in eastern Paraguay. Drechsel (2014e) maps a single locality in BOQ close to the Bolivian border and a single locality close to the Pilcomayo and Paraguay Rivers in PHA.

Xylophanes soaresi Haxaire & C. Mielke, 2018

Xylophanes soaresi Haxaire & Mielke, 2018. *The European Entomologist* 9 (2): 65.

Xylophanes porcus (in part): Smith *et al.* (2017)

CAN: Agr. Armisticio (CJHL; 23 viii - 1 ix 2008; male paratype); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: Confirmed occurrence at the interface of Cerrado and Atlantic Forest, but possibly widespread in eastern Paraguay.

Taxonomy: Together with *Xylophanes alineae* (q.v.), *X. soaresi* was recently split from *X. porcus continentalis* by Haxaire & Mielke (2018).

Xylophanes tersa tersa (Linnaeus, 1771)

Sphinx tersa Linnaeus, 1771. *Mantissa Plantarum Altera*: 538.

Xylophanes tersa: Schade (1927), Podtiaguin (1941), Benítez Díaz (1988), Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, c, f), Ríos Díaz (2014), Ríos Quintana (2015), Smith *et al.* (2017)

APA: Refugio Biológico Limoy (MIB 105, 119; 24 x 2003); Reserva Natural Dimas (Drechsel 2014b); **BOQ:** Agropil SA, Fortín Nueva

Asunción (Ríos Díaz 2014; SP); Fortín Toledo (CZPLT 3992; 1 iv 2015); PN Teniente Enciso (CZPLT 3472; 3–4 iv 2015); **CAN**: Refugio Biológico Carapá (Drechsel 2014f); Refugio Biológico Mbaracayú (MIB 3020; 20 iii 2004); RNB Mbaracayú (Ríos Quintana 2015; SP); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **CEN**: Asunción (Podtiaguin 1941; LSP), (CEFCA; 10 xii 1967, 13 ix 1982); Capiatá (Ríos Díaz 2014; SP); Cerro Lambaré (Ríos Díaz 2014; SP); Loma Pytá (Ríos Quintana 2015; SP); San Lorenzo (Benítez Díaz 1988; SP: CEFCA; 16 x 1967, 14 iv 1972, 17 xi 1972, 26 iv 1974, 11 x 1982, 10 iii 2011); **CON**: Cororó (Ríos Díaz 2014; SP); Garay Cue (Drechsel 2014c); **ITA:** Encarnación (CZPLT 3260; 3 xi 2014), (CZPLT 7209; 3 i 2019); Isla Yacyretá: Estancia Melgarejo (Ríos Díaz 2014; SP); PN San Rafael: Estancia Nueva Gambach (MNHNPY; 1 ix 2008, 11 ix 2008), (PROC; no data), (CZPC 537; 1 ix 2008; LSP), (CZPC 560; 11 vi 2008; LSP), (CZPLT 6064; 10 xi 2018); **ÑEE:** Guazú Cuá: Isla Hu (Ríos Quintana 2015; SP); Isla Umbú (Ríos Quintana 2015; SP); Pilar (Ríos Quintana 2015; SP); Tacuaras (Ríos Quintana 2015; SP); **PHA**: Cruce Los Pioneros (Ríos Díaz 2014; SP); Laguna Capitán (CZPLT 3380; 23–24 iii 2015); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP).

Distribution: The most common Paraguayan *Xylophanes*, distributed throughout the country in all ecoregions.

Xylophanes titana (Druce, 1878)

Choerocampa Titana Druce, 1878. *Entomologist's Monthly Magazine* 14: 249.

Xylophanes titana: Drechsel (1994), Drechsel (2014f), Ríos Díaz (2014)

CAN: Refugio Biológico Carapá (Drechsel 2014f), (MIB 604, 754; 20–22 xi 2003); RNB Mbaracayú: Jejuí-Mí (Ríos Díaz 2014; SP); **GUA**: Drechsel (1994); Calle Florida (Ríos Díaz 2014; SP); **ITA:** PN San Rafael: Estancia Nueva Gambach (CZPLT 5775–5780; 8–10 x 2018), (CZPLT 7338; 21 vii 2019).

Distribution: Restricted to the Atlantic Forest region of central and eastern Paraguay.

Xylophanes tyndarus (Boisduval, [1875])

Choerocampa Tyndarus Boisduval, [1875]. *Histoire naturelle des insectes (Spécies général des lépidoptères - Hétérocères)* 1: 264.

Xylophanes pistacina: Benítez Díaz (1988)

Xylophanes tyndarus: Drechsel (1994), Ríos Díaz (2014), Smith *et al.* (2017)

APA: Refugio Biológico Limoy (MIB 130; 24 x 2003); **CAN:** Agr. Armisticio (CJHL; 23 viii - 1 ix 2008); **CEN:** Asunción (Benítez Díaz 1988; SP: CEFCA 10 x 1967); **COR:** Naranjo (Ríos Díaz 2014; SP); **GUA**: Calle Florida (Ríos Díaz 2014; SP); **SPE**: Reserva Natural Laguna Blanca (Smith *et al.* 2017; SP); San Estanislao: Palomita (Ríos Díaz 2014; SP).

Distribution: Occurs in the Atlantic Forest and Cerrado regions of eastern Paraguay. Drechsel (2014e) maps a locality in CON close to the Río Apa.

Species Pending Documentation

Neogene corumbensis Clark, 1922

Neogene corumbensis Clark, 1922. *Proceedings of the New England Zoölogical Club* 8: 6.

Distribution: This species is distributed principally in the dry areas of eastern Bolivia and adjacent western Brazil but seems to just reach the northern edge of Paraguay in the Cerrado zone close to the Apa River. However, we were unable to examine any Paraguayan specimens and thus treat it as pending documentation.

Taxonomy: Very similar to *N. dynaeus* but the pale forewing band curves to the costa and the hindwings are typically dark. Very dark females may be impossible to assign to this species or to *N. dynaeus*.

Enyo taedium australis (Rothschild & Jordan, 1903)

Epistor taedium australis Rothschild & Jordan, 1903. *Novitates Zoologicae* 9 (suppl.): 407.

Enyo taedium: Drechsel (1994)

GUA: Cordillera de Yvytyrusu (Drechsel 1994); **PAR:** Sapucay (= Sapucái) (Drechsel 1994)

Distribution: We are unaware of any specimens of this species to confirm its occurrence in Paraguay. Drechsel (2014e) maps a single locality corresponding approximately to the Cordillera de Yvytyrusu, GUA. However, no images are provided to support the identification, and given the discrepancies between the published records and his online map we treat the species as pending documentation.

***Hemeroplanes triptolemus* (Cramer, 1779)**

Sphinx triptolemus Cramer, 1779. *Die Uitlandsche Kapellen voorkomende in der drie Waereld-deelen Asia, Africa en America* 3: 40, pl. 216 fig F.

Distribution: The first evidence of the occurrence of this species in Paraguay is a series of three images and four mapped localities (CON, PHA and PAR) provided by Drechsel (2014e). However, no reference to specimens is provided and there is no cross referencing of images to localities. Consequently, we treat this species as pending documentation.

Hypothetical Species

***Adhemarius palmeri* (Boisduval, [1875])**

Ambulyx palmeri Boisduval, [1875]. *Histoire naturelle des insectes (Spécies général des lépidoptères - Hétérocères)* 1: 181.
Amplypterus palmeri: Podtiaguin (1941)

Note: Podtiaguin (1941) listed this species as "not rare" during December in Chaco-i, Villa Hayes and Puerto Barbero (all PHA) and added that it was also found in January at Santisima Trinidad (CEN). However, there have been no further records of this species in Paraguay and Podtiaguin listed no other members of the genus. D'Abrera ([1987]) listed it for Paraguay with a query. This species is of potential occurrence in Paraguay but the published localities are rather distant from the Atlantic Forest zone where it might be expected. More evidence is required for acceptance.

***Pachygonidia subhamata* Walker, 1856**

Perigonia subhamata Walker, 1856. *List of Specimens of Lepidopterous Insects in the Collection of the British Museum* 8: 102.
Pachygonidia subhamata: Drechsel (1994)

Note: *Pachygonidia subhamata* was listed for Paraguay by Drechsel (1994) with a note that he had not found the species in the country. The source of this would have been Rothschild & Jordan (1903), who listed among the specimens of *P. subhamata* in the Tring Museum a specimen from "Paraguay". This would have been the basis of the distribution range given by d'Abrera ([1987]) of "Mexico to Paraguay". Under *P. subhamata*, Rothschild & Jordan (1903) also listed two moths from "Espirito Santo", Brazil that subsequently proved to be specimens of *Pachygonidia mielkei* Cadiou, 1997, but of the Paraguay moth, Cadiou (1997: 516) stated, "the specimen from Paraguay mentioned by the same authors (l.c.:-410) is a female *subhamata*, representing the southernmost record for that species so far." We have also examined the Paraguay specimen, now in the NHMUK, and concur with Cadiou's conclusion. However, this species is not known to occur in Brazil (Haxaire & Mielke, [2020]), Bolivia (Kitching *et al.* 2001) or Argentina (Moré *et al.* 2005). Instead, it is distributed well to the north in South America (Ecuador, Colombia) and Central America. This gap of over 2500km is suggestive an error of provenance, but members of the genus *Pachygonidia* are not readily attracted to lights and are therefore generally underrecorded. Consequently, we give the NHMUK specimen the benefit of the doubt and consider it possible that *P. subhamata* may be confirmed to occur in Paraguay.

***Xylophanes depuiseti* (Boisduval, [1875])**

Eucheryx depuiseti Boisduval, [1875]. *Histoire naturelle des insectes (Spécies général des lépidoptères - Hétérocères)* 1: 222–223.
Xylophanes depuiseti: Schade (1927), Drechsel (1994)

Note: Listed for Paraguay by Schade (1927) who mentioned finding a caterpillar on a totally denuded plant and rearing it through to adult but provided no further details of locality or date. This is a rare species confined to coastal south and southeast Brazil in Espírito Santo, Rio de Janeiro, Paraná and Santa Catarina states (Martin *et al.* 2011, Haxaire & Mielke [2020]) (Paraná, C. Mielke pers. comm.). Schade (1927) described the larva thus, "The caterpillar is uniformly leaf green in colour with a solid dark brown horn and has a blue, red and white rimmed ocelli on the third segment". The larva of *X. depuiseti* has otherwise never been described. As there have been no further reports of this species in Paraguay and the documented Brazilian records are geographically quite distant, we consider that the record should be treated with caution until confirmation of its presence in Paraguay is obtained. However, we highlight the tantalising similarity of the larval description to that of the sister species *X. adalia* (Druce, 1881), including the unusual "dark brown horn" and consider that this lends credibility to the claim that Schade was correct.

Erroneous Citations

Manduca andicola (Rothschild & Jordan, 1916)
Protoparce andicola Rothschild & Jordan, 1916. *Novitates Zoologicae* 23: 251.
Protoparce andicola: Podtiaguin (1941)

Note: Podtiaguin (1941) stated that two males of *M. andicola*, collected by Dr. C. Fiebrig on 23 February 1915 at San Bernadino, COR, were in the collection of the Museo de Historia Natural del Paraguay (located at the Botanical Garden of Asunción). Though these specimens are now lost, the similarity of this species to *Manduca lefeburii*, and *Manduca incisa* (neither of which were listed by Podtiaguin (1941)) is difficult to ignore, and *M. andicola* was even briefly treated as a subspecies of *M. incisa* (Kernbach 1957). *Manduca andicola* is distributed only in montane regions of Bolivia, Peru and Ecuador, and thus it seems certain that the Paraguayan records are misidentifications.

Manduca armatipes **(Rothschild & Jordan, 1916)**
Protoparce armatipes Rothschild & Jordan, 1916. *Novitates Zoologicae* 23: 252.
Manduca armatipes: Drechsel (1994)

Note: *Manduca armatipes* is superficially similar to the much smaller *M. lichenea* in external appearance (Fig. 3), especially when moths are worn or discoloured by exposure to high humidity (which changes the green pigments to brown). However, when fresh, *M. lichenea* is easily recognized by the yellowish green upperside ground colour; in contrast *M. armatipes* is a greyish or blackish moth with at most a slight greenish tinge in some specimens. The thoracic scaling also differs in that many of the scales are erect or partially erect in *M. lichenea*, making the moth look somewhat hairy, whereas they lie flat in *M. armatipes*, giving the thorax a smooth appearance. The male genitalia are also quite different. In *M. armatipes*, the dorsal edge of the harpe has numerous teeth, some of which themselves have teeth, and the lateral bar of the everted vesica of the phallus lacks an apical tooth (or at best has a slight bump) (see http://sphingidae.myspecies.info/taxonomy/term/1672/media). In contrast, in *M. lichenea*, the dorsal edge of the harpe has a larger, well-separated single tooth and the lateral bar of the everted vesica of the phallus has a conspicuous recurved apical tooth (see http://sphingidae.myspecies.info/taxonomy/term/1770/media). The two species are separate geographically (not sympatric), with *M. armatipes* occurring in Andean and subandean areas of northwest Argentina and southern Bolivia, and *M. lichenea* in both lowland and highland areas of northeastern Argentina and southern Brazil. All Paraguayan specimens purporting to be *M. armatipes* that we have seen come from lowland areas and habitats that would be associated with *M. lichenea*, and all have proven to be that species. Drechsel (1994) listed *M. armatipes* from PAR and SPE but did not list *M. lichenea*, but to be fair, this paper predated the clarification of the status of *M. lichenea* by Kitching & Cadiou (2000). Drechsel (2014e) maps two localities (in GUA and PAR) but makes no reference to specimens and the identifications cannot be corroborated. However, given the biogeography of the species, we consider it highly unlikely that *M. armatipes* will be found to occur in Paraguay.

Manduca chinchilla **(Gehlen, 1942)**
Protoparce chinchilla Gehlen, 1942. *Entomologische Zeitschrift* 56 (16): 127.
Manduca chinchilla: Eitschberger & Melichar (2014)

Note: Drechsel (2014e) maps localities in PHA, CON and MIS for this species. The specimen from Puerto Galilelo (PHA) referred to by Eitschberger & Melichar (2014) is illustrated at http://www.pybio.org/2051/manduca/. *Manduca chinchilla* has been, and still is, a species that is poorly understood. It was originally described from syntypes from Arequipa in the extreme southwest of Peru and from Caracas in Venezuela. The most typical specimens are still those from the dry coastal regions of SW Peru, in the departments of Lima, Ancash and Arequipa. Eitschberger & Melichar (2014) then reported specimens of *M. chinchilla* from more distant and inland localities in the Peruvian departments of Cajamarca and Madre de Dios, as well as a single specimen from eastern Paraguay. However, these moths do not fully agree in habitus with those of the coastal Peruvian populations of *M. chinchilla* (which have a finer and more "powdery" forewing pattern and "hairier" thorax than typical *M. rustica*), although the male genitalia were said to match. In addition, Eitschberger (2014) reported a specimen of *M. chinchilla* from the Argentinian province of Misiones and stated that the *Manduca rustica rustica* from the Argentinian state of Salta illustrated by Moré *et al.* (2005) was also a specimen of *M. chinchilla*. The former was said to have been confirmed by dissection of the genitalia, but these were not illustrated and so the conclusion cannot be independently assessed. The problem of "*chinchilla*-like" *Manduca*

rustica was also discovered during the 2014 recuration of the genus *Manduca* in NHMUK. In addition to "typical" *M. chinchilla* from SW Peru (Lima, Tacna, Arica), several very convincing *M. chinchilla*-like moths reared by Miles Moss in Brazil, Pará (Belém city) were found. These would be well outside the present range of the species, but interestingly, regarding these specimens, Moss (1920) noted that there were two "apparently distinct larvae, found feeding at the same time in the Botanic Gardens on two species of *Cordia*, one being an exotic from Japan and yielding a larva of a very intense green [and the other was a bluish-green]. Both, however, on emergence proved to be typical *rustica*, and were probably the progeny of the same mother". In view of the recent study of Eitschberger & Melichar (2014), this conclusion must be reassessed, together with the veracity, previously suspect, of the syntype of *M. chinchilla* from Caracas. However, a note of caution must be introduced. In their discussion of the genitalia, Eitschberger & Melichar (2014) compared *M. chinchilla* only with the genitalia of male and female *M. rustica rustica* from Arizona and Texas, USA, respectively (they may, of course, have undertaken a broader comparison but the USA specimens were the only ones illustrated). These populations are about as far removed from the southern South American *M. chinchilla* as it is possible to get and so would be expected to maximize any morphological differences between the two taxa. A comparison should have been made with sympatric *M. rustica* from Peru and Paraguay. Thus, until appropriate comparisons are made, ideally including DNA barcode data, the status of the populations attributed to *M. chinchilla* away from SW Peru (and in the current context, that said to be from Paraguay) must be considered unverified.

***Manduca tucumana* (Rothschild & Jordan, 1903)**

Protoparce tucumana Rothschild & Jordan, 1903. *Novitates Zoologicae* 9 (suppl.): 81.
Manduca tucumana: Drechsel (1994)

Note: *Manduca tucumana* was listed by Drechsel (1994) for Paraguay but with a note that he had not found the species in the country. The source of this would have been Rothschild & Jordan (1903), who stated, in the list of syntypes in the original description of *M. tucumana*, "…a third from Paraguay in the Musée Royal d'Hist. nat., Bruxelles". This country record was repeated by d'Abrera ([1987]), who gave the distribution as "Northern Argentina (Tucumán, Salta), Paraguay", and was also cited by Rodríguez-Ramírez (2014). We have examined the syntype specimen from Paraguay in the Musee Royal d'Histoire Naturelle, Bruxelles, and found that it is a misidentified specimen of either *Manduca brasiliensis* or *M. janira*. Like *M. armatipes* (see above), *M. tucumana* is endemic to the Andes of northeastern Argentina and southern Bolivia, where it occurs above 1000 m (Kitching *et al.* 2001, Moré *et al.* 2005). Thus, given the biogeography of the species and that the Paraguay syntype of *Manduca tucumana* is a misidentified *Manduca brasiliensis* or *M. janira*, we consider it highly unlikely that *M. tucumana* will be found to occur in Paraguay.

***Enyo bathus bathus* (Rothschild, 1904)**

Epistor bathus Rothschild, 1904. *Novitates Zoologicae* 11: 436.
Epistor bathus: Schade (1927)

Note: Schade (1927) cited this species for Paraguay, describing it as "almost as common as" the other two members of the genus that he listed (*E. gorgon* and *E. lugubris*). However, there have been no further reports of this species in Paraguay and the similarity of *Enyo bathus* to *E. gorgon* and perhaps even *E. taedium* renders the diagnosis highly questionable. *Enyo bathus* is known only from the Andean region of Ecuador, Peru and western Bolivia and thus it seems certain that the Paraguayan records are misidentifications.

***Callionima denticulata* (Schaus, 1895)**

Calliomma denticulata Schaus, 1895. *Entomological News* 6: 141.
Hemerophanes [*sic*] *pandenyculata* [*sic*]: Benítez Díaz (1988)

Note: Benítez Díaz (1988) cited specimens from San Lorenzo (CEN) and Puerto Leda (APY), but Paraguay is well out of range for that taxon, the closest confirmed locality being in northwestern Bolivia. We have examined the two specimens in CEFCA and have confirmed them to be females of *Callionima grisescens* (q.v.). Incidentally, the name intended by Benítez Díaz (1988) was apparently *Hemeroplanes pan denticulata*.

***Xylophanes porcus continentalis* Rothschild & Jordan, 1903**

Xylophanes porcus continentalis Rothschild & Jordan, 1903. *Novitates Zoologicae* 9 (suppl.): 686.
Xylophanes porcus (in part): Drechsel (1994), Kochalka *et al.* (1996), Drechsel (2014b, f)

APA: Hernandarias: Centro Ambiental (MIB 1215; 24 xi 2003); Refugio Biológico Limoy (MIB 103; 24 x 2003); Reserva Natural Dimas (Drechsel 2014b); Refugio Biológico Carapá (Drechsel 2014f), (MIB 622, 875; 20–23 xi 2003)

Taxonomy: Haxaire & Mielke (2018) demonstrated that the species previously recorded in Paraguay as *X. porcus continentalis* was actually two different and separate species, *X. alineae* and *X. soaresi* (q.v.), and that *X. porcus continentalis* itself does not occur in southeastern South America (including Paraguay). However, we have been unable to re-examine the above Atlantic Forest specimens and specimens associated with literature citations of "*X. porcus"* or *"X. porcus continentalis"*, and so have not been able to assign them to either *X. alineae* or *X. soaresi*.

Discussion

The number of species confirmed as occurring in Paraguay is now 100, with one further species known to occur from photographic records but lacking formal scientific documentation and two others with a claimed presence, but for which no verifiable material was available to us. These remaining three species (*Neogene corumbensis*, *Enyo taedium australis* and *Hemeroplanes triptolemus*) are treated as pending documentation. For the first time, the presence in Paraguay of *Cocytius mephisto*, *Manduca exiguus, Erinnyis impunctata* and *Xylophanes marginalis* is confirmed, and the names *Manduca paphus, Neogene steinbachi, Protambulyx fasciatus*, *Xylophanes alineae* and *X. soaresi* are applied to Paraguayan specimens.

Thanks to the recent collections of Ulf Drechsel (working mainly in the Cerrado and Atlantic Forest of northern eastern Paraguay), Andrés and Julio Contreras (working out of ÑEE) and Para La Tierra (working in PN San Rafael and Laguna Blanca), the sphingid fauna of some parts of the country are now well-documented. However, large gaps still exist in our knowledge. Sphingid diversity in the Humid and Dry Chaco is apparently low and likely transitory for many species, but even so few specimens exist in collections. Collections are required from the remote Pantanal region (eastern and northern APY), where our understanding of distributions is seriously deficient. There have also been few modern collections in southern Paraguay, with no specimens available from MIS (which corresponds broadly to the Mesoptamian Grasslands ecoregion), and very few from ITA. Both are areas where sphingid diversity might be expected to be high and be potential sources of new country records.

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