

# BULLETIN OF THE ALLYN MUSEUM

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## NEOTROPICAL NYMPHALIDAE VIII. REVISION OF *EUNICA*

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### A. INTRODUCTION

*Eunica* Hübner is a large neotropical genus which includes 45 species and 24 subspecies. The males are black or brown, usually marked or glossed with iridescent blue (some have white markings) and there are characteristic ocelli on the ventral surface of the hindwing. The females are brown with white maculae or a white band on the forewing, and only a few species show blue or green iridescence. The forewings of both sexes are rounded or truncate. The male genitalia and the distinctive hypandrium or subgenital plate in the male are valuable for species identification. Males of some species have androconial hair patches on the wings.

The genus occurs from Florida and Texas through México, Central America, the West Indies and South America to Argentina. The largest number of species occur in the Andean area, and in the Amazon valley.

The objectives of this revision are to a) accurately define the genus *Eunica*, b) determine whether it is congeneric with the closely-related African genus *Sallya* Hemming, c) determine if the monotypic genus *Libythis* Felder, should be included in the genus, d) accurately define identifiable valid species and subspecies of *Eunica* and synonymize invalid taxa, e) determine accurate ranges for the species and subspecies, and f) develop a logical phylogenetic sequence of species.

When valid taxa and their ranges are established, a scientific basis will be available to determine which species and subspecies are rare or endangered and to help in their conservation. This is especially important since *Eunica* are part of the neotropical rain forest biota which is being decimated rapidly.

*Eunica* are of special value in biogeographic study because of their close relationship with the African genus *Sallya*. This is the only African genus of the subfamily Eurytelinae that is in a more advanced tribe. All other African genera of this subfamily are in the more primitive tribe Eurytelini. A study relating the biogeography of Africa and South America for the subfamily is underway. *Eunica* is also of value in studying the biogeography of South America and its relationships to Central America and to the West Indies (Miller & Miller, 1989).

The taxonomy of *Eunica* has been greatly confused and there are many synonyms. Accurate identification has been difficult, so that a revision is urgently needed.

Taxonomic work on *Eunica* butterflies began in 1775 and due to their popularity with lepidopterists, 125 names have been described in the genus. Much of the synonymy is due to the variation of wing pattern and coloration. Some of the species, especially the females, are rare or infrequently collected so that adequate comparison is often difficult. Immature stages are known for only seven species of *Eunica*.

The genus contains a wide variety of different "forms" and has been split into several genera in the past, and *Evonyma* Hübner was also commonly used. Seitz (1915) says that *Eunica* have "an amazing constancy". However, Brown and Heineman (1972) stated that *Eunica* may include several genera. In the present revision all species are included in *Eunica* and the monotypic genus *Libythis* is included and synonymized. The genus *Sallya* from Africa is sometimes included in *Eunica* (Fox, 1965). It is closely related, but there are fundamental differences (see Secs. D & E).

The critical definition of species and subspecies of *Eunica* requires study of the morphology of male genitalia and the subgenital plate or hypandrium. Failure to examine these structures has led to confusion. For example, the names of *Eunica* used by D'Abrera (1987) were published without use of these characters. He states (p. 540), "the following arrangement differs somewhat from that of Seitz Vol. 5, and is tentative pending the proposed revision of the genus by Jenkins." I have attempted to identify the figures in D'Abrera (see Appendix A), but since his photographs of the male dorsal and ventral surfaces are nearly always from different specimens (which may be different subspecies) identifications are difficult. Accurate identification of both males and females requires examination of both dorsal and ventral surfaces of the same specimen so that determinations are tentative, especially of females since the ventral surfaces are not illustrated.

While the figures in D'Abrera are beautiful, there are about fifty errors or omissions in the taxonomy which are listed in Appendix A. Errors in the synonymy, distribution, identification of characters, and the lack of any systematic order makes it of limited taxonomic use. Since his work was not intended as a critical revision, his unsupported suggested synonymies, many preceded with question marks, are not considered in this revision.

## B. MATERIALS AND METHODS

Specimens of *Eunica* were collected and studied in the field in 16 neotropical countries by the author. Thirty-two museum and private collections were examined and the *Eunica* were identified. Type specimens of *Eunica* were studied in the Allyn Museum of Entomology, the Museum of Comparative Zoology, Harvard Univ., Boston, the British Museum of Natural History, London, Muséum national d'Histoire naturelle, Paris, the Museo de Historia Natural de Ciudad de México, and the Museu Nacional, Rio de Janeiro, Brazil. Types in the Zoologische Museum an der Humboldt Universität, Berlin, were photographed by L. Miller and G. Lamas.

The characters used for identification of species and subspecies include: palpi, wing patterns, wing coloration, wing venation, sexual dimorphism, male hair pencils and androconia, male genitalia, hypandria and rami, and female genitalia. Series of adult specimens were used to study the range of variation in single localities, especially in intergrade areas of subspecies. Keys are presented for identification of species based on wing coloration and pattern of both males and females, and for male genitalia, hypandria and rami. Separate keys were made for differentiating subspecies. Data have been compiled for each specimen examined including sex, date, geographic locality, elevation and museum in which it is found. Full data are presented only for rare or new species or subspecies. The exact localities are presented for each specimen examined, but other data on sex, dates and elevation are summarized for more common taxa. These detailed data are available from the author.

The nomenclature of wing veins follows Miller (1970). The venation and nomenclature

of *Eunica* are illustrated in Figures 1 and 2 which represent the extremes in wing venation in the genus. The terminology for the male and female genitalia follows Klots (1970) and the hypandrium or subgenital plate (sternite VIII) including the lateral appendages or rami follows Tuxen (1970). Hypandrium is the oldest (1861) and most widely used term for the male subgenital plate in various insect orders. There are over 20 synonyms or other terms for this or similar related structures including velum, navicula, mappa, octavel, and the gonostatumen. Male genitalia and hypandria were dissected, drawn, and put in glycerine vials that were numbered and deposited with their corresponding specimens.

The distribution maps (Figs. 341-380) are based on specimens determined by the author. Combined circles, triangles or squares indicate intergrades between subspecies at intergrade or tension zones. An "X" after a locality name indicates intergrades.

8,711 specimens were identified in museums or private collections or were collected in the field. There were 7,510 males and only 1,201 females studied and identified. Different types were studied and compared with other specimens. Color photographs were made of the types and other critical specimens and the negatives and prints are deposited in the Allyn Museum.

The holotypes of two new species and two new subspecies described are deposited in the Allyn Museum and in the Universidade Federal de Paraná, Brazil.

#### COLLECTIONS EXAMINED

- AME - Allyn Museum of Entomology, Florida Museum of Natural History, Sarasota FL (L. D. Miller)
- AMNH - American Museum of Natural History, New York City, NY (F. H. Rindge)
- BMNH - British Museum (Natural History), London, England (R. I. Vane-Wright, P. Ackery)
- BMB - Booth Museum, Brighton, England (G. Legg)
- CAS - California Academy of Sciences, San Francisco, CA (P. H. Arnaud)
- CB - California Insect Survey, University of California, Berkeley, CA. (J. A. Powell)
- CMP - Carnegie Museum of Natural History, Pittsburgh, PA (J. E. Rawlins)
- DB - Danny Burk Collection, South Bend, IN
- DM - De la Maza Collection, México City, México
- UNAM - Museo de Zoología, Facultad de Ciencias, UNAM, México City, México (J. Llorente)
- FSCA - Division of Plant Industry, Florida Dept. Agriculture, Gainesville, FL.
- GS - Gordon B. Small Collection, Balboa, Panamá (now in USNM)
- HD - Henri Descimon Collection, Marseille, France
- JC - Dale and Joanne Jenkins Collection, Sarasota, FL
- KB - Keith S. Brown Jr. Collection, Campinas, Brazil
- LACM - Los Angeles County Museum of Natural History, Los Angeles, CA (J. P. Donahue)
- MCM - Museo de Historia Natural de la Ciudad de México, México City, México
- MPM - Milwaukee Public Museum, Milwaukee, WI (A. M. Young and S. S. Borkin)
- MNRJ - Museu Nacional, Rio de Janeiro, Brazil (J. Cândido de Mello Carvalho)
- MNHP - Muséum national d'Histoire naturelle de Paris, Paris, France (G. Bernardi)
- MCZ - Museum of Comparative Zoology, Harvard University, Boston, MA (M. D. Bowers)
- NC - James Neidhofer Collection, Milwaukee, WI (in MPM)
- ANSP - Philadelphia Academy of Sciences (in CMP)
- RO - Romero Collection, Maracay, Venezuela
- USNM - National Museum of Natural History, Smithsonian Institution, Washington, D. C. (J. F. Gates Clarke and R. Robbins)
- FMNH - Herman Strecker Collection (now in Field Museum of Natural History, Chicago, IL)
- TE - Thomas Emmel Collection, Gainesville, FL
- UC - Facultad de Agronomía, Universidad Central de Venezuela, Maracay, Venezuela



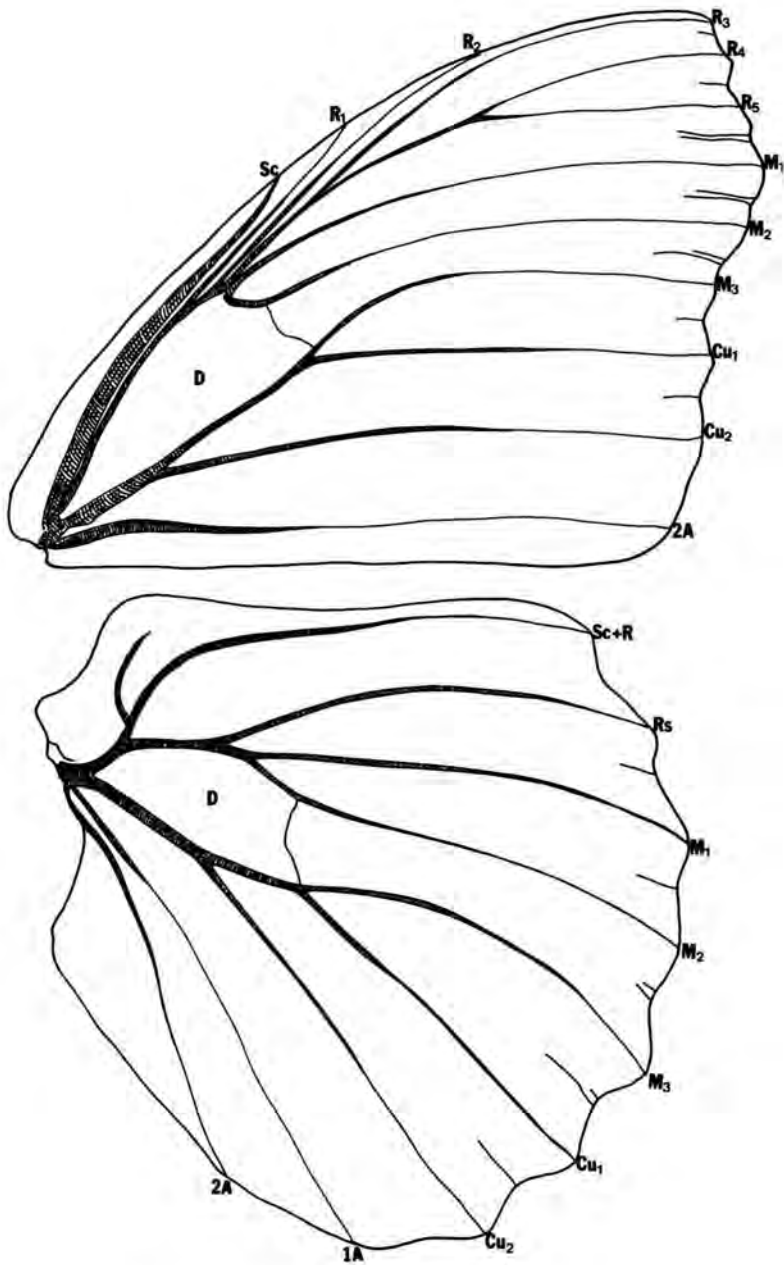


Figure 1. Wing venation of *Eunica olympias*.

(F. Fernandez and L. D. Otero)

MJP - Universidad Nacional Mayor de San Marcos, Museo de Historia Natural, Lima, Perú (G. Lamas)

UFPC - Universidade Federal de Paraná, Curitiba, Brazil (O. Mielke)

VK - Harold L. King Collection, Sarasota, FL (now in FSCA)

ZMHB - Museum für Naturkunde, Universität zu Berlin, Zoologisches Museum

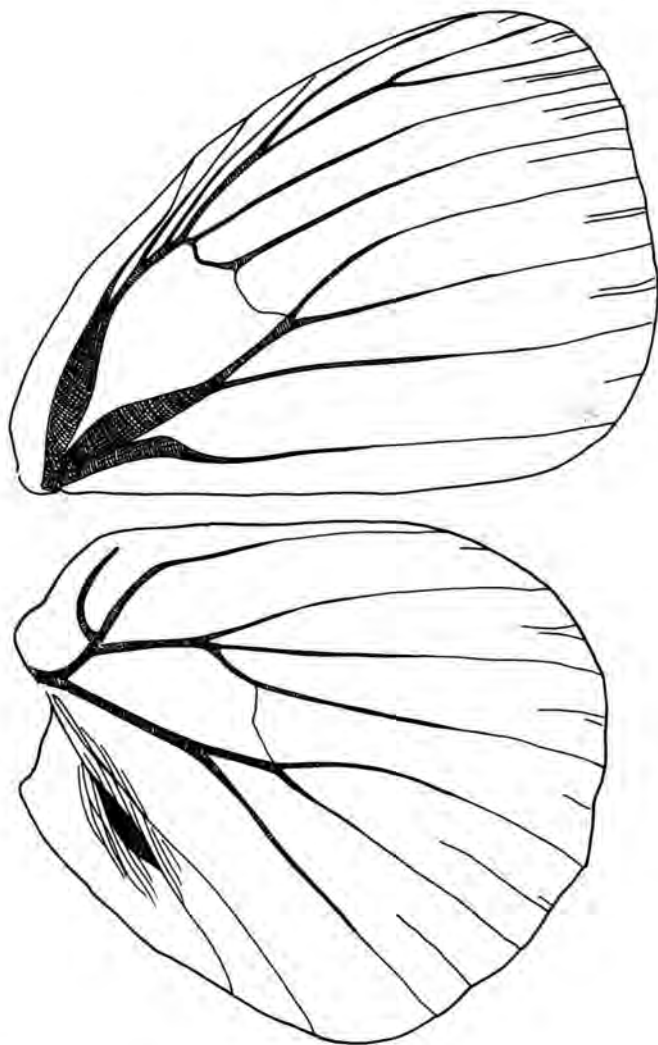


Figure 2. Wing venation of *Eunica amelia*.

## C. BIONOMICS

*Eunica* is distributed from southern Texas and Florida in the United States south through Central America and the West Indies, and in every South American country except Chile. The greatest number of species is found in the Andean region from Colombia to Perú (Fig. 3). The Amazon basin also contains many species as does the Guyana highland area. A number of species occur in southeastern Brazil and Argentina. Fourteen *Eunica* taxa occur in Central America and ten in México, but mostly as subspecies of South American species. In the West Indies only three species or subspecies are found of which two are indigenous.

Most species of *Eunica* are found in deep forests in openings and roads and paths and at the edges of forests. They occur mostly in tropical evergreen, tropical semideciduous forest, submontane and montane rain forests, and in some second growth areas. In addition, some species such as *E. eburnea* Fruh. live in more open areas and are found on shrubs and trees at the edges of pastures and cultivated areas. Another species, *E. margarita* (Godart), is often found in open prairie or swampy grassland. The males of many species are found in roads near forests or on muddy or sandy places or wet rocks on the margins

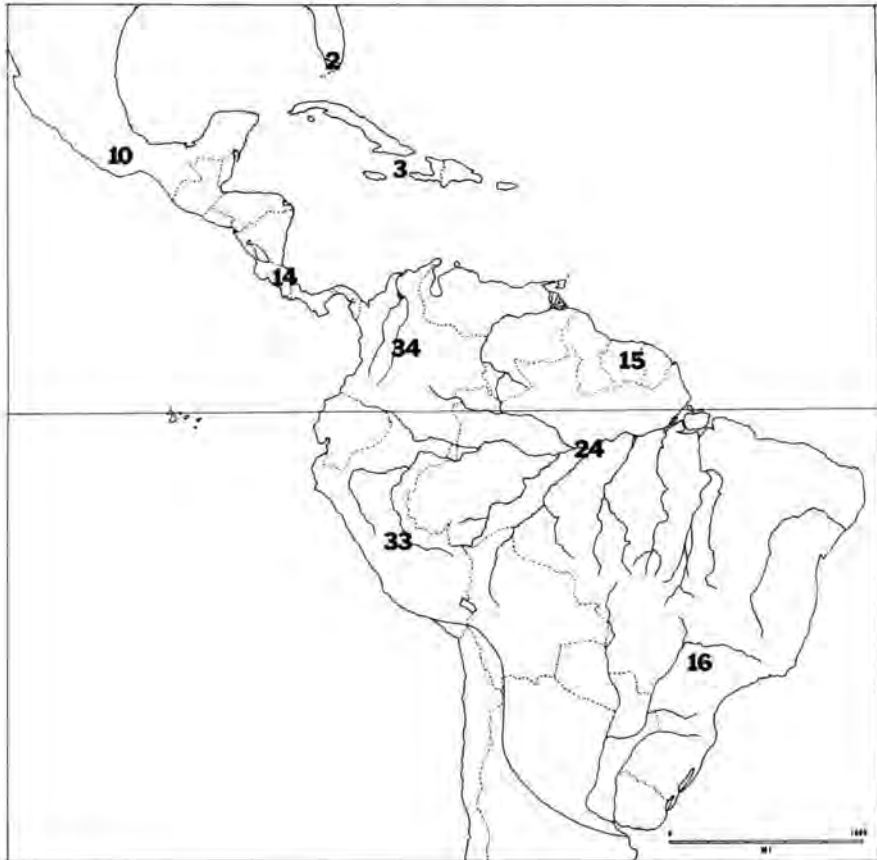


Figure 3. Distribution of species and subspecies of the genus *Eunica*.

of streams, drinking water and basking in the sun. They also congregate on fermenting bagasse at small sugar mills.

Adults often rest on tree trunks and sometimes on leaves. They are highly attracted to rotting fruits of various types, especially fermented bananas, and to fruit-baited traps which some species will enter. They are also found on fermented sap on injured trees. Some of the species can be seen flying at 10-30 meters height in forests and can be collected only by putting fruit-baited traps in the forest canopy. I have never seen them feeding at flowers, but Opler and Krizek (1984) report *E. tatila* Herrich-Schäffer visiting flowers. They are also attracted to human perspiration.

While most species of *Eunica* are uncommon, a few are very common such as the migratory *E. monima* Cramer, and a number are rare or only collected on rare occasions. It is unusual to see more than one specimen at a time, except during an emergence or migration, which may occur for a short period. Some species may be found one year and never be seen for several years. *E. monima* has been found in June-July in a single generation followed by nearly complete disappearance of the adults for the rest of the year in Costa Rica (DeVries, 1987). The relative rarity of many species of *Eunica* in collections may be explained by emergence of single generations, small emergences in many years, and the relative difficulty of collecting from such places as forest canopies. Species found in second growth and open areas such as *E. monima*, *E. tatila*, *E. eburnea* and *E. margarita* are more common in collections, and the females are relatively common. Females of other species, especially those occurring in deep forests, are very rare in collections and some are known only from single or a few specimens. Females rarely fly and bask in the sun in forest openings, roads, or along streams, with the males, but mostly remain hidden in the forests.

The adults fly only when the sun is shining even in deep forests. If it becomes cloudy and temporarily overcast, the flight activity ceases. The males fly from about 0900 to about 1400 hours. The more common species in open country may be active until about 1600 hours. Examination of collection records show that over the years many species may be collected throughout much of the year, some species have discrete emergence periods, and many species are too rare to be able to provide accurate data on the period of emergence.

Adults have been found at elevations from sea level to over 2,000 m with many occurring at about 300-800 m, especially on the foothills and slopes of the Andes mountain range. The Cordillera of Central America appear to offer suitable habitats and conditions.

Most species of *Eunica* are relatively fast strong fliers, easily disturbed, and difficult to catch. Some species appear to show some territoriality and will return to the same branch or leaf after being disturbed. Other species have been observed to fly in the forest canopy only coming near the ground to feed on fermenting fruit. Those species fly readily if disturbed and rarely return to the same place. The different behavior of various species and sporadic observations, make it difficult to generalize on the behavior of *Eunica* adults.

1. *Migration*. A few species have sporadic large emergences and emigrate. For example:

*Eunica tatila bellaria* Fruhstorfer. Adults have been reported emigrating in very great numbers in Paysandu, Uruguay in February 1902 and March 1943 and in Tucumán, Argentina in December 1918 (Williams, 1945).

*Eunica phasis* C. & R. Felder. Although this species has been considered to be uncommon, K. Brown (pers. comm.) states that he observed 100 adults/min. cross a 100 m front for six to eight hrs. and estimated eight million adults at Santa Inéz, 30 km N. of El Manteco, Bolívar, Venezuela on 27 July 1988. A voucher specimen he collected from the swarm was typical *E. phasis*.

*Eunica monima*. This species has been observed flying in migratory swarms sometimes with other species of butterflies and they have been captured at sea. The most distant dispersal was a stray found in Caldwell, Kansas, over 1,500 km north of known breeding places. *E. monima* (including *E. modesta* Bates records) is highly migratory and sometimes forms a part of the swarms of pierids. They occur as outbreaks in Costa Rica (records since 1912) and thousands migrate. DeVries (1987) states that migrations occur on both slopes of the Cordilleras. Williams (1945) reports thousands in Corozal and Orange Walk,

Belize, and a large flight in June 1926 near Caracas, Venezuela. A huge flight was reported in Southeastern México in June 1940. In western Trinidad, adults have been observed in migration from west to east. In August 1926, adults swarmed around Queen's Park, Port of Spain, Trinidad, all travelling west to east at about three m above the ground. In July 1961, migrations occurred at Forest Reserve, Penal and Siparia, Trinidad (Barcant, 1970).

*Eunica maja* (Fabr.). Williams (1945) reports that Dr. A. Seitz saw such large swarms of *E. maja* (before 1931) in the middle of São Paulo, Brazil that they were a nuisance to people. They migrate frequently according to K. Brown (pers. comm.).

2. *Food Plants.* *Eunica* larvae have been found feeding on *Euphorbiaceae* (Table 1) including the genera *Sebastiana*, *Gymnanthes* and *Mabea*. It is of interest that they also have been reported to occur on *Rutaceae* (*Xanthoxylum*) and *Burseraceae* (*Bursera* and *Protium*), both of which are in the Sapindales.

Most records for *Sallya* report larvae feeding on *Euphorbiaceae* including *Sapium*, *Maprounea*, *Excoecaria* and *Macaranga*. They have also been reported on *Sterculiaceae* (*Sterculia*) and *Bignoniaceae* (*Kigelia*) for *Sallya* (Sevastopulo, 1975). These families are not closely related to *Euphorbiaceae*.

*Eunica monima* larvae are reported to be communal and form tent-like webs on gumbo limbo which they may defoliate. Larvae of *E. mira* Godman & Salvin and *E. malvina albida* Jenkins are stated by DeVries (1987) to feed on the inflorescence of flowers of *Mabea occidentalis*. He states that *E. mira* larvae feed on the male flowers and spin a web around the flowers as they are eaten. When there are no flowers only the young leaves are eaten. Young larvae of *E. margarita* (*E. eburnea*?) double over small leaves of *Sebastiana* to form a hiding place (Biezanko, 1949). Müller (1886) described all five larval stages and

Table 1. Host Plants of *Eunica* Larvae

Euphorbiales		
Euphorbiaceae		
<i>Gymnanthes lucida</i>		
<i>Eunica tatila tatilista</i>	Florida	Minno (pers. comm.)
<i>Eunica tatila tatilista</i>	Florida	Kimball (in litt.)
<i>Gymnanthes marginata</i> "Branquilla"		
<i>Eunica margarita</i>	S. Brazil	d'Araujo et al. (1968)
<i>Mabea occidentalis</i>		
<i>Eunica mira</i>	Panama	DeVries (1987)
<i>Eunica mira</i>	Costa Rica	Steiner in DeVries (1986)
<i>Eunica mygdonia omoa</i>	Costa Rica	DeVries (1987)
<i>Eunica malvina albida</i>	Costa Rica	DeVries (1986)
<i>Sebastiana klotzschiana</i>		
<i>Eunica margarita</i>	S. Brazil	Biezanko (1949)
<i>Sebastiana</i> sp.		
<i>Eunica margarita</i>	S. Brazil	Müller (1886)
Sapindales		
Burseraceae		
<i>Bursera simaruba</i> "Gumbo limbo"		
<i>Eunica monima</i>	Costa Rica	Janzen (1983)
<i>Eunica monima</i>	Florida	DeVries (1986-1987)
<i>Protium insigne</i>	Florida	Minno (Pers. comm.)
<i>Eunica monima</i>	Trinidad	Barcant (1970)
Rutaceae		
<i>Xanthoxylum pentamon</i>		
<i>Eunica monima</i>	Mexico	Dyar (1912)

the pupae, and states that the first four stages feed on young leaf shoots and after the fourth feed on mature green leaves.

#### D. TAXONOMY

##### *Eunica* Hübner, [1819]

- Eunica* Hübner, [1819]. Verz. Bekannt. Schmett. (4): 61. Type species by designation of Scudder, 1875. Proc. Amer. Acad. Arts Sci. 10: 171. *Papilio monima* Stoll [1782], in Cramer, Uitl. Kapellen, 4(33): 202 pl. 387, f. F. & G.
- =*Evonyma* Hübner [1819]. Verz. Bekannt. Schmett., (4): 61 Type-species by designation of Scudder 1875. Proc. Amer. Acad. Arts Sci., 10: 176. *Papilio amelia* Cramer [1777] Uitl. Kapellen, 2(12): 61, pl. 136, f. B. & C. Subjective synonym.
- =*Eunice* Geyer, in Hübner [1832]. Zutr. z. Samml. Exot. Schmett., 4: 39. Type-species by designation of Hemming 1939. Proc. R. Ent. Soc. London, (B) 8: 134. *Eunice taurione* Geyer, in Hübner [1832], Zutr. z. Samml. Exot. Schmett. 4: 39. Preoccupied by *Eunice Rafinesque* (1815) and *Eunice Schinz* (1822).
- =*Callianira* Doubleday and Hewitson [1847]. Gen. Diurn. Lepid. 1: pl. 28, f. 1. Type-species by monotypy *Callianira alcmena* Doubleday and Hewitson [1847]. Gen. Diurn. Lepid. 1: pl. 28, f. 1. Preoccupied by *Callianira Péron* and *Lesueur* (1810) and by *Callianira* Hübner [1819].
- =*Faunia* Poey, 1847. Mem. Soc. R. Econ. Habana, 2(3): 178. Type-species by monotypy *Papilio orphise* Cramer [1775]. Uitl. Kapellen 1:67. Preoccupied by *Faunia Robineau-Aesvoidy* (1830).
- =*Amycla* Doubleday [1849]. Gen. Diurn. Lepid. 1:223. Type-species by monotypy *Eunice taurione* Geyer, in Hübner [1832], Zutr. Samml. Exot. Schmett., 4: 39. Preoccupied by *Amycla Rafinesque* (1815).
- =*Libythina* Felder, C. 1861. Nova Acta Leop. Carol. 28. (3):49. Type-species by monotypy *Libythea cuvierii* Godart [1819]. Enc. Meth. 9. Ins. (1): 171, n. 6. [Syn. nov.]

The genus *Eunica* is in the subfamily (or tribe) Eurytelinae, tribe Epicaliini, and subtribe Eunicina with the genera *Cybdelis* and *Sallya*. (Eurytelinae may prove to be a tribe when we understand the taxonomy of the Nymphalidae better, especially after comparative study of larvae.) Biblidinae Boisduval, 1883. Nouv. Ann. Mus. Hist. nat. (Paris), 2(2): 177, 201, is an earlier usage but is an invalid synonym according to Bridges (1988).

*Description:* Adult male. Antennae with about 43 segments, the terminal 12 forming a small club. Palpi of male long to short and ovate, those of the female longer and pyriform. Foreleg of male hairy, tarsus single-segmented. Middle and hind legs spinous ventrally, claws short and curved. The forewing may be truncate or rounded with entire or serrate margins (Figs. 1 and 2). The Sc and/or Cu and M stems may be slightly swollen, swollen, or greatly inflated. R<sub>1</sub> and R<sub>2</sub> always branch basal to the end of the discal cell. The discal cell is always closed by m<sub>1</sub>-m<sub>2</sub>, which may be a thin cross vein. The dorsal hindwing (DHW) has a single humeral or precostal vein. The discal cell is closed by a thin m<sub>2</sub>-m<sub>3</sub> vein. The ventral hindwing (VHW) has a curved row of five to seven submarginal ocelli or divided into an anterior ellipse with two or three ocelli and a posterior ellipse with two ocelli or two separate ocelli. The male dorsal forewing (DFW) may or may not have white or light maculae or a white postmedian band. Most species have some blue iridescent markings on the dorsal surfaces of the wings. The females are mostly brown with white maculae or a white postmedian band on the DFW, with only a few species with blue or green markings.

The male genitalia are characterized by having an uncus with a small, usually separate extended apical "beak". The tegumen is elongate and constricted posteriorly. Several species have dense setae laterally. The gnathos is reduced, narrowed or shortened, rarely with a gnathos arm and fused ventrally. The valva is highly variable and may have unusual horns or extensions as shown in Figures 264-309. The hypandrium or ventral plate is greatly modified and varies greatly between species. It may be broad or a narrow elongate rod

and in a few species have postero-lateral rami. The female genitalia always have two elongate signa on the corpus bursae. However, they show few reliable taxonomic characters and no key is presented.

Larvae are known for only seven species of *Eunica*. I have been able to examine larvae of *E. malvina* Bates, *E. monima*, *E. tatila*, *E. mira* and *E. mygdonia* (Godart). *E. margarita* was described by Müller (1886). *E. sophonisba* (Cramer) was painted in color by Moss (in BMNH). Larvae of *E. mira* and *E. mygdonia* were loaned by DeVries, and larvae of *E. monima* and *E. tatila* by M. Minno. The numbers of spines in the dorsal and subdorsal rows were counted and are summarized in Table 2. This shows that *E. malvina* and *E. tatila* have well-developed spines in the dorsal and subdorsal rows, but *E. monima* and *E. margarita* have most of the spines reduced to warts or small setae.

*E. tatila* is rather heavily dark-spined with a row of dark dorso-lateral markings and with a reddish longitudinal stripe laterally. *E. margarita* has a green body with a black head; there is a white lateral stripe on the body and whitish dorsal warts (Müller, 1886). *E. malvina* has many large branched spines which are orange in a dried specimen. The body color is unknown. *E. monima* has an olive-drab body with a longitudinal black stripe and a yellow stripe above the legs; the head capsule has the dorsal half orange and the ventral half black (DeVries, 1988). *E. sophonisba* has a yellow-green body with some yellowish areas and dark spines. The head capsule is yellowish (painting by Moss). *E. mira* has a shiny brick red body encircled on all segments with rings of dull yellow; there is a red dorsal line bordered by yellow. The dorsal spines are black and lateral spines are yellow; the head capsule is reddish-brown with prominent head horns (DeVries, 1988).

The genus *Eunica* is relatively large, including 69 taxa. It has been split into different genera in the past and *Evonyma* was commonly used. Brown and Heineman (1972) state, "*Eunica* may really represent several groups well enough defined to rank as independent genera." Godman and Salvin (1883) wrote, "The position of certain pencils of hairs on the wings, or their absence altogether, affords a ready method of dividing the numerous



Figure 4. Larva of *Eunica mygdonia*.



species of the genus into sections, and gives fairly natural results in grouping allied species together." Seitz (1915) commented on *Eunica* as follows: "About 80 forms of considerable geographic variability but concerning the specimens from the same region, mostly being of an amazing constancy, form this genus."

The members of the genus vary greatly in external appearance and there are major differences in the male genitalia and hypandria. However, they all have  $R_1$  and  $R_2$  branching before the distal end of the discal cell on the forewing, and the fore- and hind wing discal cells are closed. The adults have distinctive ocelli on the ventral hind wing which help identify the different species. The major diagnostic characters of the genus are as follows:

1. Male uncus with a terminal small, usually separate, extended and curved beak.
2. Male tegumen elongate and often constricted posteriorly.
3. Male gnathos reduced, narrowed or shortened, rarely with a gnathos arm and rarely fused or joined ventrally.
4. Forewing with base of the costa somewhat angled.
5. Male wings black or brown usually marked or glossed with iridescent blue, females dimorphic, usually brown with white maculae or band on forewing.

Fox *et al.* (1965) stated "African butterflies formerly assigned to *Crenis* Boisduval are congeneric with the American butterflies belonging to *Eunica*, a situation long ago noted by Aurivillius (1908-1925:204)." *Crenis* refers to the genus now known as *Sallya* from Africa and Madagascar. Van Son (1979) states, "... although the apparently close relationship between the two genera has been known for a long time, the lumping of *Sallya* and *Eunica* appears to be unwarranted until more is known of the genitalia and the early

Table 2. Spines on Larvae of *Eunica*

	Anterior												Posterior		Antennae on Head	
	T1	T2	T3	A1	A2	A3	A4	A5	A6	A7	A8	A7	A8			
<b>MALVINA</b>																
Dorsal	0	0	0	3	3	3	3	3	3	0	0	4	4	spined	Jenkins, (BMNH)	
Subdorsal	2	<u>5</u>	<u>6</u>	3	3	3	3	3	3	4	4	0	0			
<b>MONIMA (a)</b>																
Dorsal	1	W	W	W	W	W	W	W	W	W	W	W	<u>3</u>	None	Jenkins	
Subdorsal	1	W	W	W	W	W	W	W	W	W	<u>4</u>	0	0			
<b>MARGARITA</b>																
Dorsal	0	0	0	W	W	W	W	W	W	W	W	0	0	knobbed	Müller (1886)	
Subdorsal	1	1	<u>5</u>	0	W	W	W	W	W	4	4	0	0			
<b>SOPHONISBA</b>																
Dorsal	0	0	0	?	?	?	?	?	?	?	?	?	3-4	spined	Jenkins, (Moss painting)	
Subdorsal	1	1	<u>4-5</u>	1	1	1	1	1	1	1	1	4-5	0	0		
<b>TATILA (a)</b>																
Dorsal	0	0	0	1	1	1	1	1	1	0	0	<u>3</u>	<u>3</u>	knobbed	Jenkins	
Subdorsal	2	3	<u>5</u>	1	1	1	1	1	1	<u>4</u>	<u>5</u>	0	0			
<b>MYGDONIA (b)</b>																
Dorsal	0	0	0	3	3	3	3	3	3	0	0	4	4	knobbed	Jenkins	
Subdorsal	2	<u>5</u>	<u>6</u>	3	3	3	3	3	3	<u>4</u>	<u>4</u>	0	0			
<b>MIRA (b)</b>																
Dorsal	0	0	0	1	1	1	1	1	1	0	0	2	4	knobbed	Jenkins	
Subdorsal	2	3	<u>5</u>	2	2	2	2	2	2	4	4	0	0			

5 = chalazae with five spines

(a) larvae from M. Minno

(b) larvae from P. DeVries

W = wart

stages of *Eunica* and other closely related neotropic genera."

After dissection and comparison of all of the genitalia, hypandria and other structures of species of *Eunica* and most *Sallya* species, I have found that there are fundamental differences that characterize the two genera. In *Sallya* the male tegumen is very shortened, not as long as the uncus. The uncus is not heavily constricted posteriorly and does not have a separated "beak". The gnathos is absent or vestigial without a gnathos arm. The male hypandria of *Sallya* have very elongate postero-lateral rami appendages, similar to *Hamadryas* Hübner. Extended rami are absent in *Eunica*, except in three species. The larvae of a number of species of *Sallya* have been well-studied and illustrated. Unfortunately only a few species of *Eunica* larvae are known. The host plants of *Sallya* (stated previously) are different from those of *Eunica* (Table 1). The very marked differences in the male genitalia and hypandria support the separation of *Eunica* and *Sallya* as distinct and separate genera.

The monotypic genus *Libythis* containing only the species *cuvierii* (Godart) was described by C. Felder (1861). It was characterized by the unusually long palpi and the extension of  $Cu_2$  on the hind wings. However, my studies (Sec. E) show that it is a typical *Eunica* with all of the unique major characters of the genus, especially the greatly reduced narrow gnathos without a gnathos arm; a narrowed chitinized beak at the apex of the uncus; and an angled base of the costa of the forewing. The most closely related taxon is *Eunica tatila bellaria* which is from the same region as *E. cuvierii*. The palpi are also long in *E. tatila* (2.5-4.0 mm) and the wing patterns of *bellaria* and *E. cuvierii* are very similar. *E. tatila* has some extension on the hindwing at  $M_1$ , while *E. cuvierii* has a strong extension at  $Cu_1$ . The wing venation is nearly identical. I can see no reason to consider *Libythis* as a valid genus and it is here synonymized with *Eunica*.

An attempt was made to understand the relationships of the species of *Eunica* and to provide a logical sequence. A phylogenetic analysis of detailed morphological characters was made (Tables 3, 4) using cladistic methods (see Sec. E. Phylogeny). The species of the genus show a distinct progression of changes in the ocelli on the VHW. This progresses from the primitive condition illustrated by Schwanwitsch (1924) with a full complement of seven or eight complete submarginal ocelli through a sequence ending in two fused ocelli anteriorly and one or two posteriorly as described in Table 3 (characters 8-12). These and other characters result in delineation of nine species groups. The ocelli are illustrated in Figures 5a to 5f. Seitz (1915) presented a reasonable sequence of species in *Eunica* apparently based mainly on these characters. However, I have found the presence and location of hair pencils (androconia in males used by Godman and Salvin (1883) to designate species groups, to be of little value (Table 3, characters 34 and 35). They are found on the DHW of more advanced species, and five species have androconia on both the DHW and VHW. Species groups are indicated in the cladogram (Text Fig. 1) of *Eunica* but they are not formally recognized and described. The sequence of species in this revision is based on this proposed phylogeny.

#### KEY TO MALE *EUNICA*

- |     |  |                  |
|-----|--|------------------|
| 1a. | DFW with broad white median-postmedian band; basal third whitish-grey . . . . .  | 2                |
| 1b. | DFW without broad white median- postmedian band, basal third not whitish-grey . . . . .  | 4                |
| 2a. | DFW angular, truncate, margin extending outward at $M_1$ and at $Cu_1-Cu_2$ , incurved between these veins; proximal margin of white postmedian band nearly straight, not strongly indented at $M_1$ ; with three subapical maculae (p.44) . . . . . | <i>margarita</i> |
| 2b. | DFW not angular, truncate, without margin extended at $Cu_1-Cu_2$ , without incurved margin from $M_1-Cu_1$ ; proximal margin of white postmedian band strongly indented at $M_1$ . . . . .  | 3                |
| 3a. | DFW with four prominent subapical white maculae; discal cell with very small white median macula; distal margin with checkered fringes (p.46) . . . . .  | <i>eburnea</i>   |
| 3b. | DFW with three prominent and a small white maculae; discal cell with a large elongate white median macula; distal margin black (p.47) . . . . .  | <i>ingens</i>    |

- 4a. DFW basal half and DHW grey, or light grey-brown; DFW distal half black with six or seven white maculae; VHW light grey with seven (or six) postmedian ocelli (Fig. 5b); DHW with black markings ..... 5
- 4b. DFW basal half and DHW not grey or light grey-brown; without combination of characters in 4a ..... 8
- 5a. DFW angular, truncate; DHW with prominent black veins and six black postmedian ocelli and broad black lunate maculae forming a wavy submarginal line; DFW discal cell with a diagonal line of black spots (p.50) ..... *heraclitus*
- 5b. DFW not extended, truncate and without prominent black veins and six black ocelli ..... 6
- 6a. DFW with large, white postmedian maculae; a large white macula present in  $Cu_1-2A$ ; VHW with black ocelli without white pupils (p.49) ..... *interphasis*
- 6b. DFW with smaller white postmedian maculae, no white macula present in  $Cu_1-2A$  ..... 7
- 7a. VHW with prominent basal, medial and submarginal lines; six ocelli; some large and black with white pupils (Fig. 5b) (p.51) ..... *phasis*
- 7b. VHW without prominent lines or ocelli (p.53) ..... *macris*

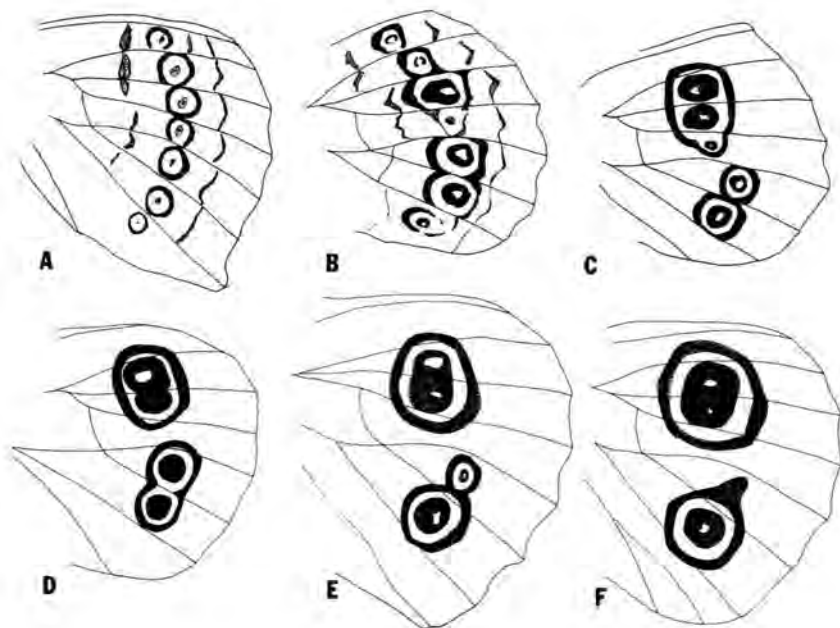


Figure 5. Ocellar patterns on ventral hind wings showing phylogenetic sequence a. *E. cuvierii*; b. *E. phasis*; c. *E. concordia* d. *E. amelia*; e. *E. alpais*; f. *E. alcmena*.

- 8a. DFW with three postmedian white maculae in a row and three white maculae in subapical area; and a white macula in Cu<sub>2</sub>-2A; purplish color basally; wing very truncate with apical margin concave or projected at M<sub>1</sub>; VHW with seven postmedian ocelli . . . . . 9
- 8b. DFW without white macula in Cu<sub>2</sub>-2A; and not truncate with apical margin incurved . . . . . 10
- 9a. HW with Cu<sub>2</sub> and 2A greatly extended (Fig. 5a). Palpi very long (4.0-5.5 mm) and porrect (p.22) . . . . . *cuvierii*
- 9b. HW without Cu<sub>2</sub> and 2A extended. Palpi not as long (2.0-4.0 mm) (p.25) . . . . . *tatila*
- 10a. VHW with seven postmedian ocelli; very ornate contrasting pattern of marbled black, tan and brown; margin heavily scalloped; DFW angularly truncate with bright blue or purple basally; there may be a subapical white band or maculae; no basally very swollen veins . . . . . 11
- 10b. Without all of above characters . . . . . 12
- 11a. DFW bright blue basally; with subapical diagonal white band (may be very faint on DFW but obvious on VFW) (p.40) . . . . . *olympias*
- 11b. DFW dull purplish; with two or three white subapical maculae (p.37) . . . . . *caelina*
- 12a. DFW with white to dull brown maculae in postmedian and/or subapical spots . . . . . 13
- 12b. DFW without white to brown postmedian maculae and/or subapical spots . . . . . 22
- 13a. DFW with two white subapical maculae and from none to three postmedian maculae . . . . . 14
- 13b. DFW with three very diffuse, brownish (or purplish) postmedian maculae in a diagonal row; no white subapical maculae . . . . . 19
- 14a. DFW with three diffuse whitish postmedian maculae and two subapical white maculae; size small (20 mm); wings rather elongate and somewhat pointed, not angularly truncate or dentate (p.76) . . . . . *monima*
- 14b. DFW with two subapical whitish maculae and none to two postmedian whitish maculae (if three postmedian maculae present, then basal area purplish) . . . . . 15
- 15a. VHW with two anterior postmedian ocelli enclosed in an ellipse, ocellus in M<sub>1</sub>-M<sub>2</sub> black with a white pupil; DFW bluish-purple in basal three-quarters, with two white subapical maculae and a white macula in Cu<sub>1</sub>-Cu<sub>2</sub> (p.80) . . . . . *violetta*
- 15b. VHW with two anterior ocelli not enclosed by an elliptic line; no ocelli with white pupils . . . . . 16
- 16a. DFW dark blackish-brown, very truncate with dentate margins . . . . . 17
- 16b. DFW purplish to purplish-blue in basal half; slightly truncate with smooth margins; VHW brown with median line heavily scalloped . . . . . 18
- 17a. VHW grey-buff with dark brown markings, five distinct postmedian ocelli (p.54) . . . . . *amycla*
- 17b. VHW brownish-purple with four distinct postmedian ocelli; (DFW may have three postmedian brownish maculae) (p.56) . . . . . *mygdonia*
- 18a. DFW with one to three whitish postmedian maculae; VHW light brown to tan with thin, darker, scalloped median and submarginal lines (p.30) . . . . . *bechina*
- 18b. DFW with one white and one diffuse apical spots; no postmedian maculae; VHW light brown with very dark brown, heavily scalloped median lines (p.33) . . . . . *evelide*
- 19a. DFW dark brown, no purple, with a postmedian row of three diffuse, lighter brown maculae; VHW whitish tinged with light purplish, with four prominent and one smaller ocelli; DHW unmarked brown (p.67) . . . . . *malvina*
- 19b. DFW dull purplish in basal half; DHW with some purple color . . . . . 20
- 20a. DFW with two or three purplish postmedian maculae; DHW with purplish iridescence extending to submargin; VHW dark purplish-brown (ocelli as in Fig. 5c); not extended in anal area (p.70) . . . . . *concordia*
- 20b. DFW with a diagonal row of three pale diffuse brownish (or diffuse whitish)

	maculae; DHW with purplish iridescence only in basal half; VHW not dark purplish-brown; tornus produced	21
21a.	VHW diffuse pale magenta; postmedian ocelli and other markings not prominent (p.61)	<i>maja</i>
21b.	VHW with bold reddish-brown markings and four prominent ocelli, the anterior pair enclosed in a dark ellipse containing orange, and the black ocelli have white pupils (p.66)	<i>anna</i>
22a.	VHW with four postmedian, black, blind ocelli; an orange or rufous streak extending from the base through the cell and filling $M_2-M_3$ to the margin; VFW pale green or blue with black cross bars and maculae	23
22b.	Without all characters in 22a	25
23a.	DHW with distal half brilliant azure blue (p.99)	<i>sophonisba</i>
23b.	DHW with steely-iridescent green in distal half	23
24a.	VHW with orange in discal cell extending through $M_2-M_3$ to margin; VFW without prominent tan area at base of $Cu_2-2A$ (p.96)	<i>chlororhoa</i>
24b.	VHW with dark ochre suffused basal area extending through $M_2-M_3$ and suffusing outer margin; VFW with prominent tan area at base from $Cu_2$ to the inner margin (p.98)	<i>mira</i>
25a.	VFW with blue or green basal area, and blue or green cellular, cell-end and subapical cross bands	24
25b.	VFW not green or blue in basal area or in cross band in the discal cell and beyond	27
26a.	DHW with distal third iridescent blue (p.116)	<i>venusia</i>
26b.	DHW with a submarginal band of iridescent green which may extend as a faint marking to postmedian area, or green may be absent but a narrow blackish-purple submarginal line may be present (p.111)	<i>volumna</i>
27a.	DFW all black and DHW with bright iridescent blue on distal third (p.103)	<i>norica</i>
27b.	Not with iridescent blue on distal third of DHW, and DFW all black	28
28a.	VHW drab brown with median line strongly scalloped; five simple ocelli with darker brown rings; two anterior ocelli, not enclosed in a circle or ellipse (p.35)	<i>elegans</i>
28b.	VHW without strongly scalloped median line and five simple ocelli with darker brown rings; two anterior ocelli separate from others and often enclosed in a circular ring or ellipse	29
29a.	VHW with six or seven post median ocelli; three anterior ocelli encircled; dorsal surface with purplish over most of wing; size small (18-24 mm) (p.72)	<i>marsolia</i>
29b.	VHW without six or seven postmedian ocelli	30
30a.	DFW elongated, dull brown with a lighter brown diffuse postmedian area, basal area dull brownish-purple; DHW dull brownish-purple; VHW dull brown with two anterior white-pupilled ocelli enclosed by a thin ellipse of reddish-brown, a single ocellus in $Cu_1-Cu_2$ and a faint ocellus in $M_2-Cu_1$ (p.110)	<i>brunnea</i>
30b.	Not with the above characters	31
31a.	DFW with truncate apical area strongly produced at $M_1$ , abruptly angled basad at $M_2$ ; basal three-quarters purplish to dark brownish-purple; VHW with dull brown diffuse and obscure markings	32
31b.	DFW not truncated as above; not concave at $M_1$ , and with dull brown diffuse and obscure markings	33
32a.	DFW purplish; VHW with mottled brown colors; ocelli brown with small black and white pupils (p.92)	<i>sydonia</i>
32b.	DFW with dull brownish or blackish purple; VHW shining drab brown with barely visible markings and ocelli (p.60)	<i>caralis</i>
33a.	DHW with basal black patch in $Sc+R_1-M_2$ ; VFW with contrasting black androconial patch at juncture of $Cu_1$ and $Cu_2$	34
33b.	Without black androconial patches on either DHW or VFW	35



- 34a. Dorsal surface of wings purple-black or brownish-purple; VHW shining reddish-brown; anterior ocelli small, white-pupilled; median line thin and squarish (p.106) ..... *carias*
- 34b. DFW basal three-quarters bluish-purple, outer quarter black; DHW with pruinose light bluish-purple; VHW with anterior pair of ocelli in a reddish ellipse with ocellus in Rs-M<sub>1</sub>, very large white and posterior ocellus small white; median line broad and diffuse (p.87) ..... *incognita*
- 35a. Wings blackish-purple; VHW grey-brown with three anterior ocelli (two ocelli with white centers) enclosed in an ellipse, and two posterior ocelli; VFW with three brownish postmedian maculae in a diagonal row; apical area pale grey; DHW without long hair pencil (p.83) ..... *clytia*
- 35b. Without combination of above characters ..... 36
- 36a. Wings blackish-purple; DHW with long hair pencil (5 mm long) in basal half of wing in Sc+R<sub>1</sub>-M<sub>1</sub>, VHW purplish grey; two anterior ocelli, anterior one with large white pupil (p.81) ..... *veronica*
- 36b. Without combination of above characters ..... 37
- 37a. DFW with bright blue-purple in basal third extending distally to tornus area; VHW pale magenta with prominent red-brown circles around ocelli (Fig. 5d) (p.89) ..... *amelia*
- 37b. VHW without bright blue-purple confined to basal area and extending distally to tornus ..... 38
- 38a. Upper surface of wing uniformly purple or dull blackish-purple, especially basally, outer margins may be black ..... 39
- 38b. Upper surface of wings with iridescent blue or purple markings, DHW with bright sub-marginal and/or marginal markings ..... 41
- 39a. VHW dark reddish-magenta; median band broken into very broad reddish maculae (p.85) ..... *orphise*
- 39b. VHW with thin median band entire or broken into thin reddish lines ..... 40
- 40a. VHW with median thin line unbroken; anterior ocelli small, the anterior most with a small white pupil (p.78) ..... *pusilla*
- 40b. VHW with median line broken into several separate lines; anterior ocelli large with both ocelli with large white pupils (p.81) ..... *viola*
- 41a. VHW dull brown with relatively small ocelli, surrounded by thin darker brown circles; median line thin, darker brown not broken into thick maculae (p.122) ..... *europa*
- 41b. VHW with a pair (or fused) anterior ocelli with white pupils, surrounded by a yellowish or orange ring and an outer ellipse or median line broken into separate thick lines or maculae ..... 42
- 42a. DFW extended truncate; DHW with iridescent blue or bluish-purple over half extending into discal cell; VHW with median line broken into separate thick red-brown maculae, without an elongate wide line separating the two anterior ocelli from the posterior ..... 43
- 42b. DFW not extended truncate, DHW with iridescent blue or purple confined to submarginal area; VHW with an elongate thick brown line extending medially outward between the anterior pair of ocelli and the posterior ocelli or ocellus ..... 44
- 43a. Wing margins smooth, without white fringe; DFW very elongated distally, iridescent blue in posterior part of discal cell not anterior to M<sub>2</sub>; VFW with dull brown diffuse markings (p.122) ..... *araucana*
- 43b. Wing margins heavily dentate with white fringe; DFW with purple or blue extending to anterior margin of wing; VFW with blackish area with three postmedian whitish maculae (p.117) ..... *alpais*
- 44a. DFW black with iridescent purple extending as a relatively narrow band around the anterior and submarginal area, not widened in apical area, DHW with the submarginal and marginal area purple (p.130) ..... *pomona*
- 44b. Wings black with iridescent blue or bluish-purple markings expanded apically;

DHW with submarginal area blue (or bluish-purple) and marginal area black (p.127) . . . . . *alcmena*

#### KEY TO FEMALE *EUNICA*

- 1a. DFW with three white (or light colored) postmedian maculae and two to three subapical white maculae . . . . . 2
- 1b. DFW with a white postmedian diagonal cross band, complete or broken into segments or a subapical white, brown, or green "band" . . . . . 21
- 2a. DFW with a white postmedian macula or whitish area in  $Cu_1-2A$  . . . . . 3
- 2b. DFW without a white postmedian macula in  $Cu_1-2A$  . . . . . 9
- 3a. VHW with an anterior pair of ocelli enclosed in a ring and two ocelli in  $M_1-Cu_1$  (p.61) . . . . . *maja*
- 3b. VHW with six or seven postmedian ocelli . . . . . 4
- 4a. Palpi long (2.0-5.5 mm); upper surface of wings with at least some purplish or bluish color . . . . . 5
- 4b. Palpi usually shorter (< 2.5 mm); upper surface of wing grey and black with no purplish . . . . . 6
- 5a. Palpi long (4.0-5.5 mm); hind wing with  $Cu_1-2A$  greatly extended (Fig. 5a) (p.22) . . . . . *cuvierii*
- 5b. Palpi shorter (2.0-4.0 mm); hind wing not extended at  $Cu_1-2A$ . Forewing with apical area excavated from  $R_4$  to  $M_1$  (p.25) . . . . . *tatila*
- 6a. DFW very extended truncate; DHW with five prominent black post-median ocelli, and broad black lunate maculae forming a wavy submarginal line (p.50) . . . . . *heraclitus*
- 6b. DFW rounded or truncate, not very extended truncate; DHW with only two to four diffuse, black postmedian ocelli present . . . . . 7
- 7a. DFW with wing rounded only slightly truncate, with white macula in  $Cu_1-2A$ ; DHW with one or two diffuse black postmedian ocelli; VHW with small black ocelli without white pupils (p.49) . . . . . *interphasis*
- 7b. DFW angular truncate; with diffuse whitish area in  $Cu_1-2A$ ; DHW usually with two to four postmedian ocelli . . . . . 8
- 8a. VHW with very prominent basal, medial and submarginal lines; large, prominent heavily ringed postmedian ocelli, some large black with white pupils (Fig. 5b) (p.51) . . . . . *phasis*
- 8b. VHW with less prominent lines, postmedian ocelli not heavily dark-ringed, small black ocelli without white pupils (p.53) . . . . . *macris*
- 9a. VHW with five to seven ocelli (if five, anterior ocelli not enclosed) . . . . . 10
- 9b. VHW with four (or five) ocelli, the anterior pair (or three ocelli) enclosed . . . . . 12
- 10a. DFW with angularly truncate apical area very extended at  $M_1$  (p.54) . . . . . *amycla*
- 10b. DFW not angularly truncate, more rounded . . . . . 11
- 11a. VHW with four anterior ocelli enclosed; several ocelli with white pupils (p.72) . . . . . *marsolia*
- 11b. VHW with anterior ocelli not enclosed; ocelli without white pupils; light brown base color with dark brown scallops (p.30) . . . . . *bechina*
- 12a. VHW with five ocelli, with an ellipse enclosing two large and one posterior small ocelli . . . . . 13
- 12b. VHW with four ocelli with an ellipse enclosing two ocelli . . . . . 14
- 13a. VHW base color whitish and pale magenta; ellipse enclosing ocelli containing whitish-buff around ocelli (p.67) . . . . . *malvina*
- 13b. VHW base color purplish; ellipse enclosing ocelli containing brownish-purple around ocelli (Fig. 5c); DFW angular truncate, very extended at  $M_1$  (p.70) . . . . . *concordia*
- 14a. DFW with postmedian diagonal row of maculae diffuse bluish or purplish-white . . . . . 15



14b. DFW with postmedian row of maculae white	16
15a. DHW iridescent blue; DFW postmedian maculae bluish; VHW median band and maculae thick and reddish (p.85)	<i>orphise</i>
15b. DHW brownish-purple; DFW postmedian maculae purplish, VHW median band and maculae thin red-purple lines (p.84)	<i>viola</i>
16a. VHW with postmedian ocellus in $M_1$ - $M_2$ with white pupil	17
16b. VHW with postmedian ocellus in $M_1$ - $M_2$ without white pupil	19
17a. DFW extended apically, rounded truncate; VHW median line broad reddish, broken into broad bands and maculae (p.66)	<i>anna</i>
17b. DFW not extended apically nor truncate; VHW median line narrow and brown	18
18a. VHW with ash-grey base color; with basal line extending to $Cu_2$ (p.83)	<i>clytia</i>
18b. VHW with pale magenta base color; with basal line incomplete, not extending posterior to $M_1$ (p.81)	<i>veronica</i>
19a. VHW anterior two postmedian ocelli not enclosed in an ellipse; DFW with angular truncate wing (p.56)	<i>mygdonia</i>
19b. VHW anterior two postmedian ocelli enclosed in an ellipse; DFW without angular truncate margin, size small	20
20a. DFW with bright purplish in basal half, DHW with purplish overcast (p.78)	<i>pusilla</i>
20b. DFW with basal half brown; DHW brown (p.76)	<i>monima</i>
21a. DFW with subapical curving band of white, steely-green or dull brown	22
21b. DFW without a subapical curving band; a white postmedian diagonal cross band present	24
22a. DFW with subapical curving band of white, and a postmedian diffuse greenish band; DHW mostly grey (p.98)	<i>mira</i>
22b. DFW without subapical white band	23
23a. DFW rounded not strongly truncate, subapical curving band steely-green; DHW black with distal half steely-green (p.96)	<i>chlororhoa</i>
23b. DFW strongly truncate, subapical curving band dull brown, basal half dull purple (p.60)	<i>caralis</i>
24a. DFW with median and postmedian area with a very broad, white, diagonal band; basal third and DHW light to dark grey	25
24b. DFW basal third and DHW not grey	27
25a. DFW angular truncate with margin extending outward at $M_1$ ; proximal margin of white median band nearly straight, not strongly indented at $M_1$ ; with four subapical maculae (p.44)	<i>margarita</i>
25b. DFW not angularly truncate; proximal margin of white median band strongly indented at $M_1$	26
26a. DFW with four prominent white subapical maculae, discal cell with very small whitish median macula; distal margin indented with checkered fringe (p.46)	<i>eburnea</i>
26b. DFW with three prominent and a small white maculae; discal cell with an elongate white median macula; distal margin entire without checkered fringe (p.47)	<i>ingens</i>
27a. DFW with postmedian band broken into two separate nearly equal-sized large white maculae or patches; no subapical white maculae (p.103)	<i>norica</i>
27b. DFW with postmedian band mostly unbroken with white components touching (except small posterior macula in some species)	28
28a. Size small (< 20 mm), wing rounded not truncate; VHW with three or four anterior ocelli enclosed in an ellipse, and three posterior ocelli (p.75)	<i>marsolia paraensis</i>
28b. Size larger; without ocelli as above	29
29a. DFW with a median area of iridescent blue proximal to the postmedian white diagonal crossband	30
29b. DFW without median area of iridescent blue proximal to white crossband	31

30a. DFW larger 36 mm; VHW pale brown (p.122)	<i>araucana</i>
30b. DFW smaller 30 mm; VHW purplish to purplish-brown (p.120)	<i>alpais excelsa</i>
31a. VFW with blue in the discal cell area	32
31b. VFW without blue in the discal cell area	34
32a. VHW with an orange or rufous streak extending from the base through the cell and filling $M_1-M_2$ to the margin (p.99)	<i>sophonisba</i>
32b. VHW without orange or rufous streak	33
33a. Dorsal wing surfaces blue (p.111)	<i>volumna</i>
33b. Dorsal wing surfaces green (p.116)	<i>venusia</i>
34a. DFW with three subapical white maculae	35
34b. DFW with none or two subapical white maculae	38
35a. DFW not angular truncate; VHW light dull buff base color with median and submedian lines composed of thin lunate maculae (p.33)	<i>evelide</i>
35b. DFW angular truncate with $M_1$ extended to a point; VHW not light dull buff and markings as above	36
36a. Dorsal surfaces black; VHW black and heavily mottled or marbled, with six or seven post- median ocelli (p.37)	<i>caelina</i>
36b. Dorsal surfaces brown with distal half of DFW black; VHW not black and heavily mottled and marbled; with five postmedian ocelli	37
37a. VHW with costal submedian area white or pale buff; some ocelli black with white pupils (p.92)	<i>sydonia</i>
37b. VHW without costal submedian area white; ocelli rather inconspicuous and without white pupils (p.59)	<i>mygdonia omoa</i>
38a. DFW with two white subapical maculae	39
38b. DFW with no white subapical maculae	41
39a. VHW with a small pair of median ocelli in $Rs-M_2$ not enclosed in a thick ellipse; two small postmedian ocelli in $M_1-Cu_2$ ; median line thin and entire (p.122)	<i>europa</i>
39b. VHW with a pair of large postmedian ocelli enclosed in a thick circle or ellipse, median line thicker	40
40a. VHW with four reddish ocelli surrounded by reddish circles (Fig. 5d); median line very thick red and broken into maculae; pale yellow markings in basal and median area (p.89)	<i>amelia</i>
40b. VHW with brownish background; a pair of large black anterior ocelli surrounded by orange-brown inside a brown ellipse (p.130)	<i>pomona</i>
41a. VHW black and brown mottled; six or seven postmedian ocelli; upper surfaces steely-green; wing margins very dentate (p.40)	<i>olympias</i>
41b. VHW not black and brown mottled; not with six or seven ocelli; upper surfaces not steely-green and without very dentate margins	42
42a. VHW dull tan with heavily scalloped median line; five simple ocelli, anterior two ocelli not enclosed in ellipse (p.35)	<i>elegans</i>
42b. VHW with median line not heavily scalloped; four ocelli, with two anterior enclosed in an ellipse	43
43a. VHW dull brown, median line thin; DFW with thin postmedian white band with posterior segments small, thin and separated	44
43b. VHW purplish-brown or magenta, median line thick; DFW with white postmedian band not narrowing to small separated segments	45
44a. VFW with discal cell with three dark crossbars; DFW with smaller (1 mm) white spot in $Cu_1-Cu_2$ (p.106)	<i>carias</i>
44b. VFW with discal cell with two small dark spots, distal part curving and dark distally; DFW with larger (3 mm) white maculae in $Cu_1-Cu_2$ (p.110)	<i>brunnea</i>
45a. DFW with broad white postmedian cross- band tapering at both ends, with a thin, dark, median cross band; VHW pale magenta; ocelli in $M_3$ to $Cu_2$ are simple rings; ocelli in $Rs$ to $M_2$ with large white pupils (p.87)	<i>incognita</i>
45b. DFW with white postmedian cross band about same width and narrower; VHW dark brownish-purple; ocelli in $M_3$ to $Cu_2$ with white centers; a black ring and	

an orange ring; ocelli in Rs to M<sub>2</sub> with small white dot in pupils (Fig. 5f) (p.127) ..... *alcmena*

#### KEY TO MALE GENITALIA AND HYPANDRIA OF *EUNICA*

- 1a. Hypandrium very narrow and elongate; rod-like rami separate and pointed ... 2  
 1b. Hypandrium not very narrow, not rod-like ..... 3  
 2a. Rami with a single lateral tooth (Fig. 285) ..... *concordia*  
 2b. Rami with about five lateral teeth (Fig. 300) ..... *norica*  
 3a. Uncus with a prominent curved horn-like projection (superuncus) on dorsal surface ..... 4  
 3b. No dorsal curved horn-like projection or superuncus ..... 8  
 4a. Hypandrium bell-shaped; rami projecting outwardly and posteriorly as pointed triangles; valvae blunt without projections; uncus with a large horn basal to a horn-like beak (Fig. 274) ..... *ingens*  
 4b. Hypandrium not bell-shaped, rami not as above; valvae tapered and attenuated ..... 5  
 5a. Valva strongly constricted at middle, expanded distally with chitinous tooth-like projections; hypandrium constricted and rami elongate with pointed teeth (Fig. 291) ..... *clytia*  
 5b. Valva not strongly constricted at middle and then expanded ..... 6  
 6a. Valva with tapering projections at crista; hypandrium roughly triangular with expanded rami posteriorly; uncus with long hairs (Fig. 292) ..... *viola*  
 6b. Valva without tapering projections at crista; hypandrium not triangular; uncus without long hairs ..... 7  
 7a. Valva very long and attenuated with no lateral extensions; hypandrium with lateral outward projections (Fig. 273) ..... *eburnea*  
 7b. Valva with lateral long projection at middle, about four heavily chitinized teeth and a lip near apex; hypandrium without any projections (Fig. 275) ..... *interphasis*  
 8a. Valva with a lateral projection at middle with dentate termination; uncus basally constricted with dorsal surface strongly dentate and with tooth-like projections ..... 9  
 8b. Valva without lateral projection at middle with dentate termination; uncus without dorsal surface strongly dentate except terminally ..... 11  
 9a. Valva with lateral projection elongate with teeth protruding about half of the length; hypandrium very broad basally and heavily constricted (Fig. 278) ..... *macris*  
 9b. Valva with lateral projection terminating in a rosette of teeth; hypandrium not very broad basally ..... 10  
 10a. Gnathos with an expanded arm; valva with a lip near apex (Fig. 277) ..... *phasis*  
 10b. Gnathos long and attenuated without an expanded arm; valva without a lip near the apex (Fig. 276) ..... *heraclitus*  
 11a. Uncus humped and curved with a series of dorsal teeth near the apex at base of beaked tip (Fig. 284) ..... *malvina*  
 11b. Uncus not humped and curved with a series of dorsal teeth at the apex at base of beaked tip ..... 12  
 12a. Tegumen with large black bristles or setae, which extend over part of the uncus ..... 13  
 12b. Tegumen without large black bristles or setae ..... 15  
 13a. Rami broadly rounded; valva with enlargement at crista (Fig. 279) ..... *amycla*  
 13b. Rami not broadly rounded; no enlargement at crista on valva ..... 14  
 14a. Rami somewhat elongated with lateral teeth; uncus strongly curved upward (Fig. 281) ..... *caralis*  
 14b. Rami absent; end of hypandrium squarish with no lateral teeth; uncus not

	curved upward (Fig. 280) .....	<i>mygdonia</i>
15a.	Hypandrium with rami strongly extended as two elongate projections, or heavily toothed inwardly .....	16
15b.	Hypandrium with rami only slightly extended, without elongate projections or heavily toothed inwardly .....	24
16a.	Rami elongate closely joined at base, projecting from center .....	17
16b.	Rami not closely joined at base; rami are elongate postero-lateral projections .....	18
17a.	Hypandrium strongly tapering, not constricted at middle; gnathos narrow and elongate with gnathos arm (Fig. 287) .....	<i>monima</i>
17b.	Hypandrium strongly constricted in middle; gnathos short and wide, without gnathos arm (Fig. 288) .....	<i>pusilla</i>
18a.	Hypandrium with square posterior projection between rami; uncus with long setae dorsally and ventrally (Fig. 289) .....	<i>violetta</i>
18b.	Hypandrium without square posterior projection between rami .....	19
19a.	Rami relatively thick and long with many toothed projections (Fig. 272) .....	<i>margarita</i>
19b.	Rami relatively narrow and long, smooth without toothed projections (Fig. 296) .....	<i>sydonia</i>
20a.	Rami projecting laterally with five to six large teeth laterally or posteriorly; valva with a terminal chitinized tooth (Figs. 265-266) .....	<i>tatila</i>
20b.	Without rami projecting laterally with five to six large teeth .....	21
21a.	Rami extending laterally, strongly tapering, with many internal projections; valva with terminal tooth and two curving projections (Fig. 290) .....	<i>veronica</i>
21b.	Without characters above .....	22
22a.	Rami extended and pointed with one or two large teeth or projections internally .....	23
22b.	Rami squarish blunt with one large tooth internally; valva with projection distal to crista (Fig. 269) .....	<i>elegans</i>
23a.	Rami with two teeth internally; valva without curved projection distal to crista, with apical tooth (Fig. 267) .....	<i>bechina</i>
23b.	Rami with one large internal tooth; valva with curved projection distal to crista (Fig. 268) .....	<i>evelide</i>
24a.	Valva elongate with a rounded end with a curved subapical tooth; hypandrium very broad, nearly circular, with a posterior projection with rounded postero-lateral lobes, gnathos broad .....	25
24b.	Valva without a curved subapical tooth .....	26
25a.	Hypandrium nearly circular as broad as long with posterior extension, lobes extending laterally (Fig. 283) .....	<i>anna</i>
25b.	Hypandrium about two-thirds as broad as long; narrowly extending posteriorly with lobes directed posteriorly (Fig. 302) .....	<i>brunnea</i>
26a.	Valva with an elongated tooth at crista (Fig. 282) .....	<i>maja</i>
26b.	Valva without elongated tooth at crista .....	27
27a.	Tegumen strongly constricted; uncus bent upward abruptly at 45° to 90° angle .....	28
27b.	Tegumen not strongly constricted; uncus not bent upward abruptly .....	30
28a.	Valva with swollen area at crista (Fig. 309) .....	<i>pomona</i>
28b.	Valva without swollen crista .....	29
29a.	Valva shortened and strongly curved apex; hypandrium slightly expanded postero-laterally (Fig. 307) .....	<i>europa</i>
29b.	Valva elongate tapering and slightly curved at apex; hypandrium not slightly expanded postero-laterally (Fig. 308) .....	<i>alcmena</i>
30a.	Rami with dorsal and ventral pointed projections, may appear as four projections on hypandrium; valva very broad at base and tapering (Fig. 299) .....	<i>sophonisba</i>
30b.	Rami not appearing as four pointed projections on hypandrium .....	31

- 31a. Hypandrium roughly triangular, nearly as broad as long, strongly tapering to narrow square end; aedeagus with split chitinous structure in distal half (Fig. 293) ..... *orphise*
- 31b. Hypandrium not nearly as wide as long, not triangular and tapering to a square end ..... 32
- 32a. Valva curved and tapering to a chitinous curved and pointed apex, gnathos long and thin, hypandrium oval and narrowed posteriorly with inward pointed extensions or small rami (Fig. 264) ..... *cuvierii*
- 32b. Valva not curved and tapering to a chitinous curved and pointed apex, without combination of above characters ..... 33
- 33a. Uncus very setose; valva elongate with square end (Fig. 295) ..... *amelia*
- 33b. Uncus not very setose ..... 34
- 34a. Hypandrium very constricted and narrow posteriorly; valva very long and narrow, not pointed (Fig. 286) ..... *marsolia*
- 34b. Hypandrium not very constricted and narrow posteriorly ..... 35
- 35a. Valva large (about 2X length of saccus) broad and tapering to a point, tegumen constricted before uncus ..... 36
- 35b. Valva much less than 2X length of saccus ..... 37
- 36a. Hypandrium deeply constricted, posterior flared out (Fig. 270) ..... *caelina*
- 36b. Hypandrium less deeply constricted and posterior slightly expanded (Fig. 271) ..... *olympias*
- 37a. Hypandrium relatively narrow, not expanded at base (Fig. 294) ..... *incognita*
- 37b. Hypandrium not relatively narrow, expanded or bulbous at base ..... 38
- 38a. Rami with defined pointed posterior projections, valva relatively short and blunt with pointed tip, aedeagus relatively long and narrow (Fig. 301) ..... *carias*
- 38b. Rami with pointed projections of hypandrium; valva more attenuated and pointed ..... 39
- 39a. Rami postero-laterally extended with serrate edge on inner margin and covered by a flap. Valva with expansion at crista. Hypandrium broad (Fig. 306) ..... *araucana*
- 39b. Rami without serrate edge on inner margin and not covered by a flap ..... 40
- 40a. Hypandrium not constricted and then expanded, but forming an attenuated and strongly pointed projection. Saccus thinner and narrow ..... 42
- 40b. Hypandrium constricted posteriorly, and expanded postero-laterally to form wide or rounded postero-lateral projection. Valva tapering to a narrowed pointed projection. Saccus relatively large ..... 41
- 41a. Valva long and narrow. Hypandrium much broader (almost 2X) at base than posteriorly (Fig. 297) ..... *chlororhoa*
- 41b. Valva broader, not attenuated except at apex. Hypandrium not much broader at base than posteriorly ..... *mira*
- 42a. Valva with some expansion at crista. Postero-lateral corners of hypandrium rounded or blunt ..... 43
- 42b. Valva strongly attenuated without any expansion at crista. Postero-lateral corners of hypandrium pointed posteriorly (Fig. 303) ..... *volumna*
- 43a. Aedeagus curved; uncus slightly setose; postero-lateral corners of hypandrium with small rounded lobes (Fig. 305) ..... *alpais*
- 43b. Aedeagus straight; uncus with longer setae; postero-lateral corners of hypandrium broad and square (Fig. 304) ..... *venusia*

*Eunica cuvierii* (Godart), [1819]

Figures 6-9, 264, 309, 341

*Libythea cuvierii* Godart, [1819]. Enc. Meth. 9. Ins. (1): 171.n. 6. TL: "Amérique Méridionale". Syntypes: Location of type unknown.  
 =*Eunica hyperipte* Hübner [1823]. Samml. Ex. Schmett. 2: pl. 87. TL: Unknown. Syntype:



Location unknown.

*Description:* Male. The palpi are very long (4.0-5.5 mm) and narrow. The DFW is angular and truncate with a small projection at  $M_1$ ; the base color is brownish with a purplish sheen; there is a postmedian row of three white maculae, two subapical and another white spot in  $Cu_2$ -2A. The DHW is brown with a thin submarginal darker line. The wing margin is undulating with a prominent projection at  $Cu_2$  (Fig. 5a). The VFW has a pattern of white maculae similar to the DFW, plus a narrow white cross bar in the discal cell. The VHW is brown with an undulating, thin darker median line and a similar submarginal line, enclosing seven, circular brown ocelli, each with a dark central spot. Male genitalia. (Fig. 264).

Female. DFW and VFW similar to the  $\delta$  but with larger white maculae. The base color of all wings is lighter brown than the male. There is very limited purplish sheen on the DFW. Female genitalia. (Fig. 309a).

Average wing length  $\delta$  (26.0-29.0)27.5 mm,  $\varphi$  (27.0-30.0)28.5 mm.

*Distribution:* Occurs in the lower basin of the Amazon River in Pará to Tefé, Brazil and south to Bolivia and in Mato Grosso to Rio de Janeiro in Brazil (Fig. 341). (Distribution is not complete because some museum specimens were not examined since *cuvierii* was not considered to be a *Eunica* in my earlier studies.)

*Taxonomy and Variation:* *E. cuvierii* is very similar to *E. tatila bellaria* in appearance except for the longer palpi and extended area in  $Cu_2$  on the hindwings. The wing patterns and markings on the DFW and VHW are nearly identical. The location of the Godart type material of *E. cuvierii* is unknown and I did not locate the type in MNHP. There is some variation in the amount of dark purple in the basal half of the DFW, in the size of the white median maculae and in the darker color of the VHW. *Eunica hyperipte* Hübner



Figures 6-9. *Eunica cuvierii* (Godart)  $\delta$  dorsal (6) ventral (7) surfaces. BOLIVIA, No specific locality (AME).  $\varphi$  dorsal (8) ventral (9) surfaces. BRAZIL, Pará, Santarém (AME).

was synonymized by Kirby (1871).

*Biology*: "Occurs only in typical cerrado, flying rapidly among the stunted trees 1 m above the ground. Does not enter forests." (Brown & Mielke, 1967). *E. cuvierii* has also been found in recently burned-over forest area in Minas Gerais. It appears to be a savannah species that usually does not occur in heavy forest.

Adults have been collected in every month of the year with perhaps more records in the summer from December to February at elevations from about 100 to 1100 m.

Specimens Examined: 108 ♂ 22 ♀

BRAZIL: *Pará*, Santarém Nov. Jul. Oct. 6 ♂ 1 ♀ AME; 17 ♂ 2 ♀ BMNH; Rio Tapajós 2 ♂ BMNH; May 1 ♂ Jul. 1 ♀ CMP; Jul. 1 ♀ USNM; Obidos Oct. 1 ♂ AMNH; 2 ♂ BMNH; Aug. 1 ♂ CMP; Juruti 1 ♂; 5 ♂ 1 ♀ BMNH; *Maranhão*, Primeira Cruz 1 ♂ BMNH; *Minas Gerais*, Parque Rio Doce Jun. 2 ♂ AME; *Mato Grosso*, Chapada, 5 ♂ BMNH; Cuyabá Dec. 9 ♂ USNM; *Distrito Federal*, Jardim Zoológico 1020 m Mar. 1 ♂; Sobradinho 1100 m Feb. Mar. Apr. May, June 5 ♂ 1 ♀ (Brown & Mielke, 1967); Feb. 1 ♂ USNM; July 1 ♀ AME; *Rio de Janeiro*, Tres Rios 1 ♂ BMNH; *Goiás*, Leopoldo de Bulhões 1000 m Dec. 11 ♂ 2 ♀; Chapada dos Veadeiros 1 ♂ 1 ♀; Campinas 1 ♂ BMNH; Vianópolis 1000 m 4 ♂ BMNH; Mar. Nov. Dec. 9 ♂ 1 ♀ (Brown & Mielke, 1967); Bomfim Oct. 1 ♂ (not seen); *Rondônia*, Porto Velho 7 ♂ BMNH; *Amazonas*, Tefé 1 ♂; Rio Negro 6 ♂ 1 ♀ BMNH; BOLIVIA: No specific locality 2 ♂ BMNH; 1 ♂ AME; *La Paz*, Coroico 1 ♂ 1 ♀ BMNH; *La Paz* 1 ♀ BMNH; San Agustín, Mapiri 1 ♂ BMNH.

#### *Eunica tatila* (Herrich-Schäffer), [1855]

*E. tatila* is one of the most common and widespread species in the genus. It is highly variable, which has resulted in a number of synonyms. Three taxa are recognized, the nominate *E. t. tatila* from S. Texas and México to Costa Rica; *E. tatila tatilista* from S. Florida, the West Indies and Guyane; and *E. tatila bellaria* from South America. These can be separated by the key to subspecies. *E. t. bellaria* is common in southern Brazil and the surrounding area but it is uncommon in central and northern South America. Specimens from Colombia are similar to the distinct population from S. Brazil, but specimens from Perú have some characters of *E. t. tatila* and appear to intergrade in a cline through Juyuy, Argentina, to typical *E. t. bellaria*. The bluish and purplish colors are highly variable in the amount and intensity of coloring.

The three populations of *E. tatila* are distinct, however, the nomenclature is not positive. Herrich-Schäffer [1855] clearly illustrated *E. tatila* specimens labelled "México", and the original description states "Am. Cent." as the type locality. The illustrations have white centers on the VHW ocelli, typical of Mexican specimens. It is possible that he included specimens from different localities as syntypes since a specimen labelled "Syntype/origin/tatila/Cuba Coll. H. Sch." in the ZMHB is typical of *E. tatila tatilista*.

*Description*: Male. The DFW is truncate with a toothed, incised concavity at the apex due to projection of  $M_1$ ; the base color is purplish grading to blackish in the distal third, with seven prominent white maculae. The DHW is grey-brown with some purplish color with a thin black submarginal line. The VHW has a complete row of six to seven postmedial ocelli; the base color is usually purplish but highly variable. Male genitalia. (Fig. 265-266) The hypandrium has broad denticulate rami. The uncus is bent dorsally; the valvae are elongate with an apical tooth.

Female. Has similar markings on the DFW as the male, but with bright iridescent blue or purple to brown. Markings on other wing surfaces are similar to the male. Female genitalia. (Fig. 310).

#### Key to Subspecies of *Eunica tatila*

##### Males.

- 1a. VHW with row of postmedial ocelli with black centers ..... *tatilista*
- 1b. VHW with row of postmedial ocelli with white pupil ..... 2
- 2a. DFW with median and postmedial maculae relatively small, sometimes partly



- obscured; macula in  $Cu_2-2A$  usually reduced; color dull violet blue; size smaller (wing length 19-25 mm) ..... *bellaria*
- 2b. DFW with median and postmedian maculae large and bright white color, macula in  $Cu_2-2A$  large and white; color bright bluish purple, size larger (wing length 23-30 mm) ..... *tatila*
- Females.
- 1a. VHW with row of postmedian ocelli with black centers; DFW with bluish-purple in basal area, color reduced on DHW ..... *tatilista*
- 1b. VHW with row of postmedian ocelli with white pupils ..... 2
- 2a. Dorsal surfaces mostly brown, no basal blue or purple color ..... *bellaria*
- 2b. DFW with bright iridescent blue in basal half of wing; DHW with some bluish-purple ..... *tatila*

*Eunica tatila tatila* (Herrich-Schäffer) [1855]

Figures 10-13, 265, 310, 342

*Cybdelis tatila* Herrich-Schäffer [1855] Samml. Neuer Aussereurop. Schmett. 54, pl. 17, f. 69-72. TL: "Am[erica] Mer[idionale]" [México on figures!] Syntype: Location unknown. In the ZMHB, a specimen is labelled "379/209 ♂ /origin./*tatila* H. Sch./Syntype/Coll. H. Sch., Cuba" This syntype is *E. tatila tatilista*.

= *Eunica caerulea* Godman & Salvin, 1877. Proc. Soc. Zool. London 1:64. TL: Guatemala [Río Polochic]. Syntypes: HT ♂ BMNH, RH 9307 (Examined) [Syn. nov.]

*Description:* As in *E. tatila* except for differences listed for *E. t. tatila* in the key to subspecies.

Average wing length ♂ (23-30)26 mm, ♀ (25-31)27 mm.

*Distribution:* *E. t. tatila* is found from northern México and Central America to Costa Rica (Fig. 342). There is a record of a single, probably wind-blown specimen from Kansas (Howe, 1975).

*Taxonomy and Variation:* The four figures from México by Herrich-Schäffer [1855] including the critical white pupils of the VHW ocelli accurately identify *E. t. tatila*. However, the location of these types is unknown. The syntype in the ZMHB is actually *E. tatila tatilista*. *E. caerulea* was described from Guatemala on the basis of more purple tinge of the blue area of the wings, with the VHW deeper brown and the markings much less distinctly defined. Godman and Salvin (1883) realized that their *E. caerulea* was a synonym of *E. tatila* and synonymized it, but this name has been used as a subspecies by Seitz (1915) and others, including DeVries (1987). I have examined the type of *E. caerulea*, and it is a relatively dark specimen but typical of the highly variable *E. tatila tatila* and it is again synonymized here. The amount of iridescent blue on the DFW and DHW of the females and the violet suffusion of the males is highly variable, as illustrated by de la Maza and Turrent (1985). Examination of large series of specimens also shows a few additional white spots, and great variation in the size of the white, usually squarish maculae. None of the variation showed any correlated geographical distribution. All *E. t. tatila* had whitish centers in most of the the postmedian ocelli on the VHW; however, there was much variation in the darkness and pattern on the VHW even in series from the same locality. There appears to be some seasonal variation in the darkness and pattern of the VHW, with darker plainer forms during the wet season in July, and lighter with more pattern in December. I collected series of fresh specimens during July in dry canyons in México, with mostly very dark plain patterns but a few had more distinct patterns. Unusual patterns include narrow, light tan longitudinal streak in  $M_2-M_3$ , or a large pale patch in the distal third of the VHW.

*Biology:* *E. t. tatila* is locally common in México in semi-deciduous, evergreen or dry forests in stream valleys and dry canyons. The adults fly in areas with *Myscelia ethusa* (Doyère) and *Myscelia cyananthe* (C. & R. Felder) and have rather similar habits of flying

rapidly in short flights and settling on wet or dry rocks, leaves, tree trunks, or canyon walls. They are most active from about 1000 to 1400 hours on sunny hot days and usually feed on sap flows, rotting fruit and feces. According to Opler and Krizek (1984) they rarely visit flowers in Central America but were observed visiting *Cordia* sp. (Boraginaceae), *Casearia*, (Flacourtiaceae), *Baltimora* (Asteraceae), and a liana (Asclepiadaceae).

The adults have been found from sea level to about 1,500 m elevation in México and Central America. They have been collected mostly in the wet season from June to December with the largest population occurring in July. There appear to be more records in September to December in Nayarit and Guerrero, México in the Pacific coastal area. *E. tatila* is said to be migratory, but I have seen no definite records of the nominate form migrating, as do the related subspecies.

Specimens Examined: 188 ♂ 62 ♀

MEXICO: *Tamaulipas*, Gomez Farías; Cañón de Novilla; Ciudad Victoria; *Veracruz*, Córdoba; Presidio; San Juan Evangelista; Palo Gaucho; Santacomapán; Jalapa; Misantla; Coatepec; Atoyac; Tezonapa; Río Coatzacoalcos; Rinconada; Conejos; Tejeria; Teocelo; Fortín de las Flores; *San Luis Potosí*, Tamazanchale; Presidio; *Nuevo Leon*, Monterrey; *Puebla*, Puebla; Santiago; Barranca de Patla; *Michoacán*, Coahana; *Morelos*, Cuernavaca; *Guerrero*, Balsas; Río Santiago; Atoyac de Alvarez; *Nayarit*, Compostela; Palapita; Jalisco; *Colima*, Colima; *Campeche*, Yacasay; Candelaria; *Oaxaca*, Loxicha; *Chiapas*, Ocozocoatla; San Carlos; Chicoasen; El Aguacero; Montebello; Mapaco; *Yucatán*, Pisté; Balancanche; *Quintana Roo*, Xcan; GUATEMALA: *Alta Verapaz*, Baleu; San Cristobal; *Quetzaltenango*, Volcán Santa María; *Izabal*, Quiriguá Viejo; Polochic Valley; EL SALVADOR: *San Salvador*, San Salvador; HONDURAS: *Cortés*, San Pedro Sula; *Comayagua*, La Libertad;



Figures 10-13. *Eunica tatila tatila* (Herrich-Schäffer). ♂ dorsal (10) ventral (11) surfaces. MEXICO, Tamaulipas, Cañón de Novilla (JC). ♀ dorsal (12) ventral (13) surfaces. MEXICO, Puebla (AME).

BELIZE: *Toledo*, Punta Gorda; COSTA RICA: *Cartago*, Juan Viñas; *San José*, Moravia de Chirripo; Redondo.

*Eunica tatila tatilista* Kaye, 1926

Figures 14-17, 266, 310, 342

*Eunica tatila tatilista* Kaye, 1926. Trans. Ent. Soc. London: 473. TL: Jamaica, Rae Town. Type: 1 ♀ Holotype. AME (Examined).

*Description:* As in *E. tatila* except for differences listed for *E. t. tatilista* in the key to subspecies.

Average wing length ♂ (22-29)26 mm, ♀ (26-31)27 mm.

*Distribution:* Found in south central and southern Florida, the Florida Keys, and the West Indies: Cuba, some Bahama Islands, Puerto Rico, Jamaica, Haiti and Dominican Republic. There is a single record in Cayenne, Guyane which is doubtful; however this subspecies is migratory (Fig. 342).

*Taxonomy and Variation:* The ♀ type is in the AME collection. Kaye (1926) in the original description states that he knew of no other record than the type ♀ from Rae Town, Jamaica, 30 June, 1898. "The characteristic of the Jamaican race in the ♀ is the very vivid almost metallic blue of the fore-wing, the hind-wing being of a more purple blue, and less intense." The holotype ♀ has more bright blue on the DFW than most other ♀ specimens I have examined, but is otherwise typical of the subspecies. In old specimens from Florida the intensity of blue may fade in ♀ specimens. The critical characters for identifying *E. t. tatilista* in both sexes are the black central dot with no white in the ocelli of the VHW, the black spots on the DHW, and the smaller, narrower



Figures 14-17. *Eunica tatila tatilista* Kaye. ♂ dorsal (14) ventral (15) surfaces. UNITED STATES, Florida, Upper Key Largo (AME). ♀ dorsal (16) ventral (17) surfaces. JAMAICA, RaeTown. Holotype *Eunica tatila tatilista* Kaye (AME).

and often dingier white spots in the DFW. All other subspecies of *E. tatila* have ocelli with white pupils in the center of the VHW ocelli.

There has been much confusion about the type-locality of *E. t. tatila*, since a "syntype" came from Cuba. The label of México on the Herrich-Schäffer figures of the type and the type locality "Am. Mer." helps to resolve this problem. There is great variation in *E. t. tatilista* in the amount of blue and purple, in the size and amount of whiteness of the maculae on the DFW and in the blue, and purple and black spots on the DHW. The VHW ground color varies from light color with prominent markings and ocelli to plain blackish-grey. A few specimens have a long narrow longitudinal stripe in the  $M_2$ - $M_3$  of the VHW. The dates of collection with color or pattern of the VHW shows no correlation with season or geographic area. Alayo and Hernández (1987) have noted four fundamental patterns of coloration, particularly on the VHW, which they illustrated.

**Biology:** The subspecies occurs in hardwood hammocks, evergreen or semi-deciduous subtropical or tropical forest, meadows and open pastures. I have collected adults on the limbs of trees in the Florida Keys. They rest on the trunk or branches with the head down and the wings closed. They are readily disturbed and fly rapidly. They are attracted to rotting banana and mango and other fruit. Schwartz (1989) reports it feeding on flowers of *Lantana ovatifolia* and *Cordia haitiensis*.

In Cuba, Alayo and Hernández (1987) report that it is rare, except on occasions when there are migrations. Schwartz (1989) states that in Dominican Republic, it is locally common and is found from 0845 to 1700 hours at temperatures from 18° to 38° C.

Adults have been collected every month of the year, particularly from June to December in south Florida and the Florida Keys. They are found from sea level to 2227 m elevation (Schwartz, 1989) in the West Indies.

Specimens Examined: 260 ♂ 91 ♀

UNITED STATES: *Florida*, Royal Palm State Park; Monroe Co.; Volusia Co.; New Smyrna, W. Palm Beach; Upper Key Largo; Plantation Key; Key Largo; Coral Sound; Royal Palm Key; Tavernier; Fort Myers; Florida City; Everglades Park; Coconut Grove; Homestead; Miami; Deer Hammock; Matheson Hammock; Paradise Key; Islamorada; Upper Maticumbe Key; Lignumvitae Key; CUBA: *Habana*, La Habana; *Camaguey*, Camaguey; *Granma*, Sierra Maestra; Limones; *Holguin*, Holguin; Tánamo; *Guantanamo*, Guantanamo; *Santiago de Cuba*, Santiago de Cuba; Torquino; *Isle of Pines*; *Pinar del Rio*, Rangel; Vinales; San Blas; Santa Clara; BAHAMA ISLANDS: *North Andros Island*, Fresh Creek; *San Salvador Island*, Guana Cay; PUERTO RICO: Arecibo; Mayaguez; Ponce; Cambaloche Forest; Bosque Estatal Guanico; HAITI: Port-au-Prince; Daquiri; Petionville; Pine Bay; Petite Goâve; JAMAICA: Rae Town; DOMINICAN REPUBLIC: El Limón; Jimani; (Schwartz (1989) reports many records, mostly in southern Dominican Republic); GUYANE: *Guyane*, Cayenne.

#### *Eunica tatila bellaria* Fruhstorfer 1908

Figures 18-21, 264, 310, 342

*Eunica tatila bellaria* Fruhstorfer, 1908. Stett. Ent. Zeit. 69: 47-48. TL: Brazil, Espírito Santo. Syntypes: 2 ♂ BMNH. (Examined).

=*Eunica tatila tatilina* Fruhstorfer, 1908. Stett. Ent. Zeit. 69: 47-48. TL: "Alto Amazonas." There is a specimen in the BMNH labeled "Type/Columbien/Fruhstorfer/ Presumed type of *tatilina* Fruhst." Syntype: BMNH "Type" ♂ (Examined)

**Description:** As in *E. tatila* except for the differences listed for *E. t. bellaria* in the key to subspecies.

Average wing length ♂ (20-27)23 mm, ♀ (20-27)25 mm.

**Distribution:** Occurs from Chiriquí, Panamá, Colombia and Venezuela south into Perú and Bolivia to northern Argentina and southern Brazil. It is absent from the Amazon basin and the Guianas (Fig. 342)

**Taxonomy and Variation:** The type of *E. t. bellaria* in the BMNH from Espírito Santo, Brazil is typical of this subspecies population, which is smaller, with dull purple, and smaller white maculae on the DFW. The female lacks any purplish color. This population occurs in southern Brazil and Paraguay. However, westward in Jujuy, Argentina, the adults may be brighter purple with larger and whiter maculae on the DFW which Fruhstorfer has named *E. tatila tatilina*. There appears to be a cline from the distinctive *E. t. bellaria* extending northwestward through Argentina and Bolivia to Perú. Hayward (1964) synonymized *tatilina* under *E. t. bellaria*. However, it should be pointed out that the Peruvian specimens look distinctive with the ♂ appearing almost indistinguishable from ♂ *E. t. tatila* from Central America. Intensive collecting of series of fresh specimens from critical localities is required to resolve this problem.

**Biology:** Adults are found in semideciduous forest. Although this subspecies is rather widespread and not uncommon, little has been reported on its biology. It has been collected every month of the year, with most specimens found in midsummer from December to February. The subspecies occurs from sea level to 1200 m elevation.

Specimens Examined: 162 ♂, 41 ♀

PANAMA: *Chiriquí*, Chiriquí; COLOMBIA: *César*, Manaure; *Santander*, Simiti; *Tolima*, El Boquerón; VENEZUELA: *Bolívar*, Guasipati; PERU: *San Martín*, Tarapoto; *Jepelacio*; *Junín*, La Merced; *Pasco*, Pozuzo; BOLIVIA: *Santa Cruz*, Buenavista; San José; Sierra Chiquitos; Ichilo; PARAGUAY: *Central*, Asunción; Trinidad; *Guairá*, Colonia Independencia; Villarrica; *Pedro Juan Caballero*, Pedro Juan Caballero; *Paraguari*, Sapucay; *Caaguazú*, Yhu; *Concepción*, Concepción; *Arroyos y Esteros*, Areguá; Guarani; Puerto Bertoni; ARGENTINA: *Misiones*, Sa. de Misiones; Iguazú; *Tucumán*, Tucumán; *Jujuy*, San Pedro; Cucho; Jujuy; *Corrientes*, Santa Tomé; *Catamarca*, Catamarca; *Córdoba*; *Formosa*; *Salta*; *Chaco*; BRAZIL: *Distrito Federal*, Parque do Gama; *Goiás*, Jatai; *Maranhão*, Imperatriz; *Bahia*, San Antônio do Barra; *Matto Grosso*, Diamantino; Buriiti; Chapada; Nioaque; *Minas Gerais*, Paracatú; Curvelo; Paraopeba; Cambuquira; Bodoquena;



Figures 18-21. *Eunica tatila bellaria* Fruhstorfer. ♂ dorsal (18) ventral (19) surfaces. BRAZIL, Espírito Santo. Syntype *Eunica tatila bellaria* Fruhstorfer (BMNH). ♀ dorsal (20) ventral (21) surfaces. ARGENTINA, Jujuy, San Pedro (AME).

Salobra; *Espírito Santo*, Lapa; São Francisco; *Paraná*, Rolândia; Ponta Grossa; Valinhos; Vila Velha; Foz de Iguaçu; Guará; Quedas; Castro; *São Paulo*, Mirassol; Araras; Rio Preto; Loreto; Rio Tieté; Salto das Cruzes; Araçatuba; São Paulo; Isla Solteira; Lavinia; Batatais; Anhangai; *Rio de Janeiro*, Rio de Janeiro; Itatiaia; Paineiras; Jacarénagua; Petrópolis; *Santa Catarina*, Cauna; *Rio Grande do Sul*, Porto Alegre.

*Eunica bechina* (Hewitson), 1852

*Eunica bechina* is closely related to *E. evelide* and *E. elegans*. *E. bechina* and *E. evelide* are quite variable and various taxa have been described which are part of the normal variation of the species except one subspecies of *bechina*. *E. evelide* is restricted to Colombia, but *E. bechina* and *E. elegans* are more widespread. The complete row of six or seven ocelli and very undulate markings on the VHW are distinctive, as are the ♂ hypandria with short rami having inwardly directed teeth. Determination of the validity of the species status required detailed study of the male genitalia and hypandria.

*Description*: Male. The DFW have only a slight truncate extension, with smooth wing margins. There are two to three white postmedial and two to three subapical white maculae. The DFW is suffused with bluish-purple except in the apical area. The DHW is brownish with bluish-purple suffusion in the basal three-fourths or less. The VFW has similar maculae as on the DFW. The VFW is blackish-grey except basally and a grey apical area. The VHW is tan and has a complete row of six or seven circular postmedial ocelli with a submedian, postmedian and submarginal row of thin, dark, scalloped wavy lines. Male genitalia. (Fig. 267). The hypandrium has pointed rami each with two pointed teeth on the internal surface directed internally. The valva is elongate and attenuate and may have an apical tooth.

Female. The DFW is brown in the basal half, black in the distal half, and contains a postmedian row of three large white and three smaller white subapical maculae. The DHW is brown with a thin submarginal line. The ventral surface is similar to the male. Female genitalia. (Fig. 311).

Key to Subspecies of *Eunica bechina*

Males.

- 1a. DFW with two large and one smaller, prominent, white subapical maculae, and a postmedian row of three large white maculae (the middle macula rarely smaller). The VHW has more prominent, darker, purplish, scalloped lines and a general purplish-brown background . . . . . *magnipunctata*
- 1b. DFW with two white maculae and a third very small anterior dusky spot (if present). There is one or usually two submedian whitish maculae and a middle diffuse third spot may be present or absent. The VHW is usually light tan to light brown, and occasionally with a purplish-brown overcast . . . . . *bechina*

Females.

The DFW of *E. b. magnipunctata* has somewhat larger white maculae than *E. b. bechina*, otherwise they are quite similar.

*Eunica bechina bechina* (Hewitson), 1852

Figures 22-25, 267, 311, 343

*Cybdelis bechina* Hewitson, 1852. Exot. Butt. I. *Cybdelis* [63] pl. [32]. f. 10. TL: "River Amazon". Syntypes: ♂ BMNH Rh. 9312 "Amazons", Coll. Hewitson (Examined) = *Eunica bechina choriennes* Fruhstorfer, 1909. Stett. Ent. Zeit. 22: 212-213. TL: Brazil, Espírito Santo. Syntypes: BMNH 2 ♂ Coll. Fruh. (Examined) [Syn. nov.] = *Eunica bechina medellina* Fruhstorfer, 1909. Stett. Ent. Zeit. 2: 212. TL: Colombia. Syntypes: ♂ "Type with Staudinger's original label, acquired from A. Bang-Haas." Not found in BMNH or ZMHB [Syn. nov].



*Description:* As in *E. bechina* except for differences listed for *E. b. bechina* in the key to subspecies.

Average wing length ♂ (27-31)29 mm, ♀ (30-32)31 mm.

*Distribution:* The nominate form occurs from northern Colombia through Venezuela, the Guianas and the Amazon basin and into Ecuador, Perú and Bolivia (Fig. 342).

*Taxonomy and Variation:* The male type specimen from Hewitson's collection in the BMNH is typical of the most common form. The illustration by Hewitson (1852) shows the underside dull grey instead of the rich brown of the type. The DFW of the male varies from having two prominent (or a third small) white subapical maculae, and a postmedian row of maculae, usually with two or three diffuse light maculae to two subapical and one light postmedial spot (*chorienes*). Typical *E. b. bechina* has two prominent (or a third small) white subapical maculae. The postmedian row of maculae usually has two or three diffuse light maculae.

I have examined the male labeled type of *E. bechina chorienes* from Espirito Santo, Brazil. It has two white subapical maculae and two faint postmedian maculae. It is an extreme form which may be found occasionally throughout the range and does not represent a subspecies. The VHW of *chorienes* is not distinctive but is darker than average specimens. *E. b. chorienes* is synonymized as an occasional variant without specific range. Two specimens from Zaragosa, Colombia have more intensive bright bluish-purple extending over most of the DFW, with two large white subapical maculae, and a postmedian diagonal row of three white maculae with the middle spot diffuse or absent. The VFW has the same maculation but is more diffuse. This agrees with the description of *E. bechina medellina* Fruh. Bluish coloration is seen in many specimens over the range of *E. bechina* and is not geographically segregated. *E. bechina medellina* Fruh. is synonymized as a minor variation.

In addition to the variation of maculae on the male DFW, there is much variation in



Figures 22-25. *Eunica bechina bechina* (Hewitson). ♂ dorsal (22) ventral (23) surfaces. "Amazons" Syntype *Cybdelis bechina* Hewitson (BMNH). ♀ dorsal (24) ventral (25) surfaces. PERU, Huánuco, Tingó María (JC).



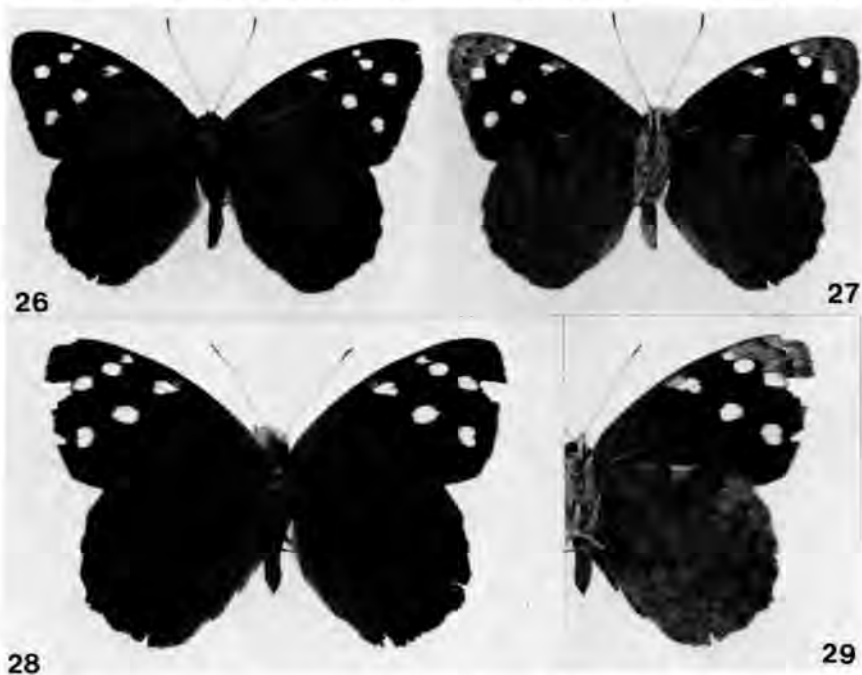
the amount of bluish-purple or dull purplish color on the DFW and DHW, which also varies with the light and angle at which the specimens are viewed. The fuzzy scalloped pattern of lines and ocelli on the VHW also varies with the base color, which may vary from light to slightly darker brown.

*Biology:* Brown and Mielke (1967) state that *E. bechina* is associated with dry deciduous cerrado or savannah vegetation. This probably refers to *E. bechina magnipunctata*. Nothing is known to have been written about the biology of this species. I have collected adults at Tingo María, Perú, in open scrubby area but not in savannah or cerrado.

Adults have been collected every month of the year. There does not appear to be any peak of abundance. They occur from sea level to over 800 m in elevation.

Specimens Examined: 287 ♂ 26 ♀

COLOMBIA: *Cundinamarca*, Bogotá (Error?); *Putumayo*, Umbria; *Antioquia*, Zaragosa; *Caquetá*, San Vicente del Caguan; *Amazonas*, Leticia; VENEZUELA: *Amazonas*, Yavita; San Carlos de Río Negro; Cerro Duida; Lat. 3° Long. 65°; Río Orinoco; *Delta Amacura*, Río Acure; *Monagas*, Barrancas; *Bolívar*, Guri; Río Caroni; Caicara; GUYANE: *Guyane*, St. Jean du Maroni; "Guyane interior"; GUYANA: No specific locality; ECUADOR: *Napo*, Curaray; *Tungurahua*, Hacienda Santa Inéz; PERU: *Loreto*, Pebas; Iquitos; Mishana; Lago Yarina-Cocha; Río Nanay; Río Tapiche; Río Pacaya; *San Martín*, Jepelacio; Moyobamba; *Amazonas*, Pongo de Rentema; *Huánuco*, Tingo María; Río Pichis; Río Huallaga; Tournavista; *Ucayali*, Pucallpa; *Junín*, Satipo; Chanchamayo; San Ramon; La Merced; Río Ipoki; Ipokieri; Río Perené; Pasco, Chuchurras; Río Pachitea; Oxapampa; Palcazu; Pozuzo; *Cuzco*, Cosñipata; Río Colorado; *Puno*, Tirapata; Inambari; Chaquimayo;



Figures 26-29. *Eunica bechina magnipunctata* Talbot. ♂ dorsal (26) ventral (27) surfaces. BRAZIL, Mato Grosso, Melguira. Holotype *Eunica bechina magnipunctata* Talbot (BMNH). ♀ dorsal (28) ventral (29) surfaces. BRAZIL, Mato Grosso, Melguira. Allotype *Eunica bechina magnipunctata* Talbot (BMNH).

Carabaya; La Unión a Astillero; Río Yahuar Mayo; BOLIVIA: *Cochabamba*, Chapare; Cristal Mayo; BRAZIL: *Amazonas*, Tefé; Río Juruá; São Paulo de Olivença; Benjamin Constant; Tabatinga; Manicoré; Arima; Río Purús; Río Calary-Uaupés; Nova Olinda; Lábria; Sebastopol; Maués; Humaitá; Fonte Boa; *Acre*, Alto Juruá; Rondônia, Pimenta Buena; Vilhena; Porto Velho; Calama; Cachoeira do Samuel; *Pará*, Obidos; Santarém; km 1118 Cuiabá-Santarém; Paricatuba; *Goiás*, Goiás; Chapada dos Veadeiros; Cristalina; Maranhão, Imperatriz; *Distrito Federal*, Brasília; Sobradinha; *Mato Grosso*, Cuiabá; Río Brillhante; Diamantino; Jaciara; Buriti; Chapada dos Guimarães; Nioaque; Sinop; *Minas Gerais*, Pirapora; Iracá; Paraopeba; *Rio de Janeiro*, Río de Janeiro; *São Paulo*, Itararé; *Paraná*, Campo Mourão; Castro.

*Eunica bechina magnipunctata* Talbot, 1928

Figures 26-29, 267, 311, 343

*Eunica bechina magnipunctata* Talbot, 1928. Bull. Hill Mus. 2:208. TL: Brazil, Mato Grosso, Melguira, 10 mi. S. Diamantino, 700 m. Types: Holotype ♂ and Allotype ♀ BMNH (Examined).

*Description*: As in *E. bechina* except for differences listed for *E. b. magnipunctata* in the key to subspecies.

Average length ♂ (27-31)29 mm, ♀ (28-29)28.5 mm.

*Distribution*: Eastern Brazil from Maranhão and Bahia into the planalto from Mato Grosso and Paraná eastward (Fig. 342).

*Taxonomy and Variation*: The type series, including the ♂ holotype, was examined in the BMNH and they are typical of this subspecies population. The larger white maculae on the DFW of the males is pronounced. The VHW is slightly darker and the brownish-purple markings are more prominent. There is some variation in the presence of the central white macula in the postmedian row on the male DFW. The female is very similar to *E. b. bechina* but the VHW is somewhat darker. The ♂ genitalia and hypandria of *E. b. bechina* and *E. b. magnipunctata* are nearly identical.

*Biology*: This subspecies is typical of the dry cerrado or savannah with dry deciduous woodlands. Brown and Mielke (1967) consider it to be a most characteristic species of the cerrado in the planalto of southeastern Brazil. They state that *E. bechina* has habits very similar to "*Libythina cuvierii*" flying rapidly among stunted trees in the dry cerrado, about one meter above the ground. It does not enter forests and is sometimes attracted to baits. Adults have been collected from May to December at elevations from a few hundred to 710 m.

Specimens Examined: 29 ♂ 4 ♀

BRAZIL: *Mato Grosso*, Melguira, 16 km S. Diamantino; 1 ♂ 1 ♀ types, BMNH; Chapada dos Guimarães ♂ BMNH; 1 ♀ MCZ; Diamantino 700 m. ♂ BMNH; Buriti ♂ BMNH; Nioaque 2 ♂ AME; *Minas Gerais*, Fazenda Jaguara Dec. 1 ♂ AME; Sete Lagoas Jul. (hilltop) 1 ♂ AME; *Parana*, São Jeronymo ♂ BMNH; Campo Mourão Jan. 1 ♂ AME; Bahia, Santo Antônio da Barra ♂ BMNH; Maranhão, São Domingos ♂ BMNH; *Goiás*, no specific locality ♂ BMNH; Bella Vista ♂ BMNH; *São Paulo*, Casa Branca ♂ BMNH; Itararé 800 m. Mar. 1 ♂ AME; Río Bonito 1 ♂ FMNH; São Paulo 1 ♀ MCZ.

*Eunica evelide* Bates, 1864 [Stat. rev.]

Figures 30-33, 268, 312, 344

*Eunica evelide* Bates, 1864. J. Entomol. 197. TL: "New Granada" Bogotá on label "HT," Syntypes: ♂ BMNH Rh. 9313 (Examined).

=*Eunica emmelina* Staudinger, [1886], Exot. Schmett. 1: 109. TL: Colombia. Río San Juan. Syntypes: 2 ♂ ZMHB. "Syntype/Origin./emmelina Stgr; Eun. evelide (G&S). Río San Juan, Colomb." 1 ♂. (Color photos of type examined.) [Syn. nov.]

=*Eunica bechina evelide* Bates. Seitz, 1915. Macrolep. World 5:490 [Stat. rev.]

=*Evonyme elegans electa* Röber, 1923. Stett. Ent. Zeit. 84:96. TL: Muzo & "Magdalenenstrome," Colombia. Syntypes: ♂ & ♀ Location unknown. [Syn. nov.]

*Eunica evelide* was presented as a subspecies of *E. bechina* by Seitz (1915). Study of the ♂ genitalia and hypandrium shows that it is a distinct species more closely related to *E. elegans*. The male wing coloration, maculae, and female maculation also show it is distinct from *E. bechina*. This species is restricted to Colombia and it is not common.

**Description:** Male. The DFW has a single white subapical macula with two (rarely one) additional smaller diffuse whitish maculae. The base color is black with iridescent blue or bluish-purple in the basal half. The DHW is blackish-brown with blue-purple in the discal area. The VFW is blackish-brown with a light tan apical area and with similar white maculae as on the DFW. The VHW is brown with a complete row of six or seven postmedian circular ocelli. The median and submarginal lines are dark, wavy, and scalloped, broad and fuzzy. Male genitalia. (Fig. 268). The ♂ hypandrium has two pointed rami, each with a single, large, inwardly-pointed tooth. The valva has a swollen apex with a prominent tooth-like projection at the crista.

Female. The DFW has the basal half brown, distal half black, with a broad bright white postmedian diagonal cross band which may be complete or irregularly indented. There are three conspicuous white subapical maculae. The DHW is brown with a submarginal dark line. The VFW is tan basally and black surrounding the white cross band and maculae. The apical area is grey. The VHW is similar to the male. Female genitalia. (Fig. 312).

Average wing length ♂ (28-32)30 mm, ♀ (31-32)31.5 mm.



Figures 30-33. *Eunica evelide* Bates. ♂ dorsal (30) ventral (31) surfaces. "New Granada", [COLOMBIA] (Bogotá on label). Syntype *Eunica evelide* Bates (BMNH). ♀ dorsal (32) ventral (33) surfaces. No locality data (ex. coll. J. Doll (USNM)).

*Distribution:* This species is found only in central and western Colombia (Fig. 344). A specimen labeled "Guyane" in the Joicey Coll. BMNH is certainly an error.

*Taxonomy and Variation:* The male type of *E. evelide* from Bogotá, Colombia in the Bates collection has a label "type HT" which may be the holotype. The wings are somewhat damaged but the specimen is typical of the general population of *E. evelide*. It has the typical two white subapical maculae on the DFW, deep bluish color in the basal half, and the VHW has the usual very dark fuzzy scallops. I recognize this as a separate species (which is closely related to *E. bechina* and *E. elegans*) not only by the above characters, but also by the hypandrium and ♂ genitalia, and the distinctive female. There is some variation in the faint maculation of the postmedian row of spots and in the amount of blue on the ♂ DFW.

*E. emmelina* Staudinger was described on the basis of the two reduced subapical white maculae on the DFW and the blue limited to the basal half. This reduced maculation is normal variation over the range and the blue coloration is the usual amount of color for *E. evelide* so that *E. emmelina* is synonymized. The syntype ♂ in the ZMHB confirms the synonymy. *Evonyma elegans electra*, described by Röber (1923) from Muzo and the Magdalena river area, is based on brighter blue on the dorsal surface, three white subapical maculae on the DFW, and stronger markings on the underside. Röber's description details *E. evelide* quite accurately. He was confused about *E. elegans* which has no DFW maculae. Further, Muzo is within the range of *E. evelide*, and *E. elegans* is not known from Colombia (except an error from Bogotá). This taxon of Röber is synonymized under *E. evelide*.

There is some variation in the amount of white markings in the subapical area of the ♂ DFW. There may be one, two, or three white maculae which vary in size. The amount of dark iridescent blue on the DFW and DHW is somewhat variable. The females also vary in the amount of white in the postmedian band on the DFW and in the size of the three white subapical maculae. The dark markings on the VHW is fairly constant in males but varies in intensity in females.

*Biology:* Nothing is reported on the biology of *E. evelide*. The only collection records are in August to October. Fassel (1918) reports it from about 400 to 800 m elevation, but some of the locality records appear to be below this level.

Specimens Examined: 54 ♂ 3 ♀

COLOMBIA: *Cundinamarca*, Bogotá ♂ ♀ BMNH; 2 ♂ AME; 2 ♂ 1 ♀ USNM; 4 ♂ CMP; Paima 1 ♂ AMNH; 1 ♂ MPM; Villeta 1 ♂ FMNH; *Valle*, Jiménez 1 ♂ MNRJ; *Valle de Cauca* 1 ♂ AMNH; BMNH; *Chocó*, Río San Juan; *Antioquia*, Medellín Aug. 4 ♂ AME; *Boyacá*, Muzo 3 ♂ AMNH; BMNH; 2 ♂ AME; *Santander*, head of Río Carare, Río Suárez 1 ♂ AMNH; *Meta*, Pipiralito 1 ♂ MNHP; "Gacheta" Oct. 1 ♂ AME.

#### *Eunica elegans* Salvin, 1869

Figures 34-37, 269, 313, 345

*Eunica elegans* Salvin, 1869. Ann. Mag. Nat. Hist. 4: 173 n. 19. TL: BOLIVIA: Apolobomba; PERU: [Pasco], Pozuzo; [Cuzco], Cosñipata. Syntypes: BMNH ♂ Labeled "Type/HT, Apolobomba, Bolivia, (Pearce)." (Examined).

*Description:* Male. The DFW has smooth rounded wing margins, with the basal half bluish-purple, the distal half brownish-black with no white markings. The DHW is the same color as the DFW, with a thin submarginal line. The VFW is black-brown with a grey-brown apical area with a thin submarginal line. The VHW has a complex row of six or seven circular ocelli, and the median and submarginal lines are very scalloped and convoluted. All markings are dark brown, broad, and very diffuse. The base color is tan to light brown. Male genitalia. (Fig. 269). The ♂ hypandrium has squarish rami with one large and some smaller teeth directed internally. The uncus has a superuncus horn basal to the tip. The valva is swollen at the apex with a tooth at the crista.

Female. The DFW is brown with a white postmedian diagonal cross band with no white

maculae; the apical area is darker. The DFW is brown. The VFW has a white band surrounded by black; otherwise similar to the male. Female genitalia. (Fig. 313).

Average wing length ♂ (28-32)30 mm, ♀ (29-32)30.5 mm.

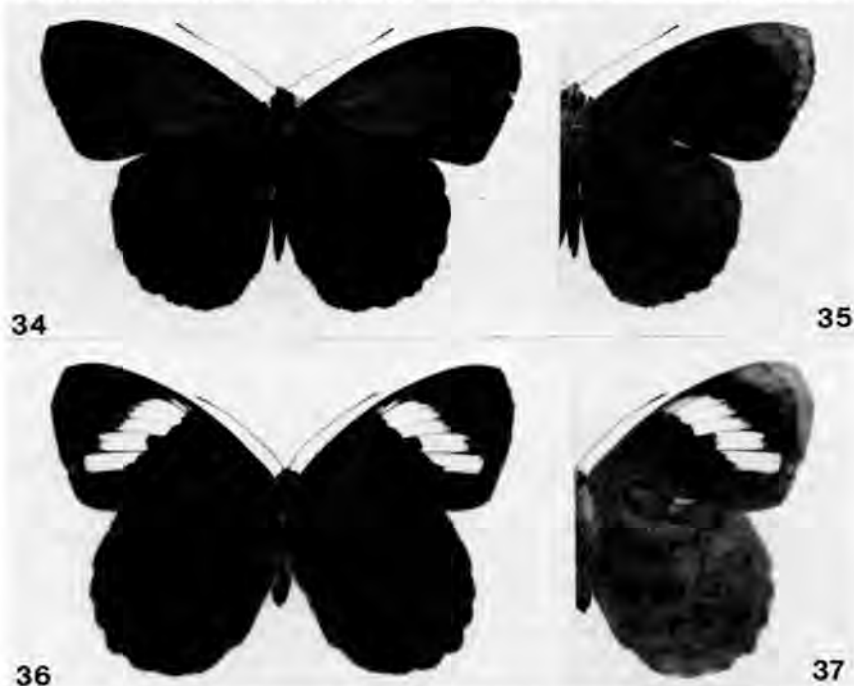
*Distribution:* Occurs from Ecuador in the Andean area south to central Bolivia and in Acre, Brazil (Fig. 345). There are two specimens labeled Colombia with no specific locality and one from Bogotá. Two records from Africa are errors.

*Taxonomy and Variation:* A ♂ type specimen of *E. elegans* labeled "TYPE, HT from Bolivia was examined and it compares well with the general population. The amount of blue on the DFW and DHW of the ♂ varies slightly. There are no white maculae and the rounded subapical area is distinctive. The females are readily identified by the white postmedian diagonal cross band on the DFW without any white subapical maculae, and the VHW with the diffuse dark scallop markings and a complete row of five circular ocelli.

*Biology:* This species occurs in forested areas of the eastern and western slopes of the Andes mountains. I have collected a ♀ at Tingo María, Perú in an opening in evergreen tropical forest. Adults have been found in June, July, September, November, and December. They occur mostly at higher elevations from about 800 to 2,000 m.

Specimens Examined: 73 ♂ 11 ♀

COLOMBIA: *Cundinamarca*, Bogotá (almost certainly an error); no specific locality 2 ♂ MCZ; ECUADOR: *Napo*, Río Napo BMNH; *Tungurahua*, Baños Jun. 1 ♂ 1 ♀ AME; PERU: *Huánuco*, Tingo María Sep. 1 ♀ JC; Jul. 1 ♂ AME; Río Huallaga 2 ♂ AMNH; Nov. BMNH; *San Martín*, Río Seco 1 ♂ AME; *Moyobamba* BMNH; *Pasco*, Pozuzo Nov. 1 ♂ MNRJ; *Chuchurras* 1 ♂ MJP; *Río Pichis* BMNH; *Junín*, Chanchamayo 1,500 m 1



Figures 34-37. *Eunica elegans* Salvin. ♂ dorsal (34) ventral (35) surfaces. BOLIVIA [La Paz], Apolobomba. Syntype *Eunica elegans* Salvin (BMNH). ♀ dorsal (36) ventral (37) surfaces. ECUADOR, Tungurahua, Baños (AME).

♀ AME; 4 ♂ 2 ♀ AMNH; 7 ♂ 2 ♀ USNM; BMNH; Satipo 2 ♂ AMNH; La Merced 800 m 2 ♂ MJP; 1 ♂ 1 ♀ BMNH; San Ramon 1 ♂ MJP; BMNH; Río Perené 1 ♂ MJP; Cuzco, Río Colorado BMNH; Cosñipata 1000 m, BMNH; Cuzco; Puno, Inambari BMNH; Carabaya, Santo Domingo 2,000 m Jun. BMNH; Oroya BMNH; Agualani BMNH; BOLIVIA: La Paz, Apolabamba 1 ♂ BMNH; Yungas de la Paz, 1,000 m 1 ♂ AME; Santa Cruz, Buenavista; BRAZIL: Acre, Rio Juruá 1 ♂ MNRJ; Amazonas, "Caranavi" (=Carauari?) Dec. 1 ♀ LACM; AFRICA: Karinga 1 ♂ LACM, Awka 1 ♂ LACM (Error).

*Eunica caelina* (Godart), [1824]

*E. caelina* and *E. olympias* C. and R. Felder are closely related species with a distinctive appearance, especially of the females. The male genitalia and hypandria are similar but distinct. *E. caelina* occurs in much of South America except in Colombia and most of Venezuela. *E. olympias* occurs in México and Central America, Colombia and Venezuela. There is overlap in range in Ecuador and Perú. *E. caelina* has distinctive heavily serrated wing margins and the VHW has a complete row of six large ocelli with white pupils, and a heavily marbled background with dark brown, tan and white.

*Description*: Male. The DFW has truncate heavily serrate wing margins, and is bluish-purple except with brown or black subapical area; the postmedian area has one diffuse whitish macula in  $Cu_1-Cu_2$  and a diffuse lighter blue marking anteriorly. The DHW is brown and heavily scalloped with a checkered fringe. The DFW is black with a postmedian pale band of diffuse grey maculae, three white subapical maculae, and a grey apical area. The VHW has a complete row of six or seven large postmedian ocelli with whitish centers. The wing is heavily marbled and mottled with black-brown, rich brown, tan and white. Male genitalia. (Fig. 270).

Female. Similar to the male with the DFW dark brown with a broad white median diagonal crossband and three white subapical maculae. The DHW is dark brown. The VFW is similar to the DHW but with additional apical markings. The VHW is similar to the male. Female genitalia. (Fig. 314).

Key to subspecies of *E. caelina*

Males.

- 1a. DFW with iridescent azure blue coloration, with three prominent white subapical maculae surrounded by black. White macula in the postmedian area in  $Cu_1-Cu_2$  is an elongate whitish dash or absent. The DHW is blackish-brown ..... *caelina*
- 1b. DFW with dull purplish coloration, with two white subapical maculae (a third anterior spot if present is minute pale purplish) surrounded by dull brown. Whitish macula in the postmedian area in  $Cu_1-Cu_2$  is very diffuse whitish. The DHW is dull brown ..... *alycia*

Females.

- 1a. DFW with a broad, white, postmedian, diagonal cross band (6-7 mm) with relatively smooth entire margins, with a white macula extending into  $Cu_2-2A$  ..... *caelina*
- 1b. DFW with a relatively narrow, postmedian, diagonal cross band (4-5 mm) with very irregular, heavily indented margins, with no white macula in  $Cu_2-2A$  ..... *alycia*

*Eunica caelina caelina* (Godart), [1824]

Figures 38-41, 270, 314, 346

*Vanessa caelina* Godart, [1824] Enc. Meth. 9: 822. TL: "Brasil" Syntypes: ♂ MNHP? (not found).



=*Eunica mabildei* Röber, 1903. Stett. Ent. Zeit. 64: 346-347. TL: Brazil, Rio Grande do Sul. Syntypes: ♂ ♀ Location unknown. [Syn. nov.]

*Description:* As in *E. caelina* except for differences listed for *E. c. caelina* in the key to subspecies.

Average wing length ♂ (30-34)32 mm, ♀ (30-35)32 mm.

*Distribution:* The nominate subspecies occurs from Goiás to Rio Grande do Sul in Brazil and Argentina and westward in Mato Grosso and Paraguay where intergrades occur with *E. c. alycia* (Fig. 346).

*Taxonomy and Variation:* The location of the Godart type of *E. c. caelina* is unknown and could not be located in MNHP. The description is quite sufficient with the three white subapical maculae and extensive deep blue coloration of the ♂ DFW, as well as the whitish diffuse diagonal band on the VFW. *E. mabildei*, described by Röber from Rio Grande do Sul, Brazil, is an exact synonym. Röber (1923) stated that the illustration of *caelina* (Seitz, 1916, 100Bb) was actually *mabildei*, and that *alycia* Fruhst. was a synonym of *caelina*! *E. mabildei* is here synonymized. *E. caelina* var. *splendens* Staudinger *i.l.* was described in Hall (1983) as having more extended blue on the ♂ DFW with the comment that he did not think it deserved the name of a local race. This name is also synonymized. There is little variation except the intensity of markings on the VHW. The ♀ has a broad white diagonal postmedian band nearly twice the size of the band in *E. c. alycia*.



Figures 38-41. *Eunica caelina caelina* (Godart). ♂ dorsal (38) ventral (39) surfaces. PERU, Junín, Satipo. (locality error?) (AME). ♀ dorsal (40) ventral (41) surfaces. BRAZIL, Santa Catarina, São Bento do Sul (JC).

*Biology*: Occurs at lower elevations in openings in tropical evergreen forest. I have collected a series of females at São Bento do Sul in Santa Catarina, Brazil. The adults fly very rapidly and are difficult to catch. They have been found nearly every month of the year with more records in summer from November to March.

Specimens Examined: 90 ♂ 19 ♀

BRAZIL: *Goias*, Chapada dos Veadeiros X; *Rio de Janeiro*, Rio de Janeiro; *São Paulo*, San José de Rio Preto; São Paulo; *Mato Grosso*, Salobra; *Paraná*, Tibaji; Palmas; Ponta Grossa; Castro; São Jeronymo; Guarapuava; *Santa Catarina*, Joinville; Nova Teutonia; Pinhal; Blumenau; São Bento do Sul; Lapa; Rio dos Cedros; *Rio Grande do Sul*, Trombudo Alto; PERU: *Junin*, Satipo 1 ♂; *Loreto*, Marotta 2 ♂; (These Peruvian specimens are probably errors, but might be a relict population in Perú.) PARAGUAY: *Boquerón*, Santa Cruz X; ARGENTINA: *Misiones*, Misiones.

*Eunica caelina alycia* Fruhstorfer, 1909

Figures 42-45, 270, 314, 346

*Eunica caelina alycia* Fruhstorfer, 1909. Stett. Ent. Zeit. 2: 210. TL: "Amazonas supr." Holotype: BMNH 1 ♂ HT, Figs. 42-43. (Examined).



Figures 42-45. *Eunica caelina alycia* Fruhstorfer. ♂ dorsal (42) ventral (43) surfaces. "Amazonas supr." Holotype *Eunica caelina alycia* Fruhstorfer (BMNH). ♀ dorsal (44) ventral (45) surfaces. BRAZIL, Amazonas, Tefé (BMNH).

*Description:* As in *E. caelina* except for differences listed for *E. c. alycia* in the key to subspecies.

Average wing length ♂ (29-35)31 mm, ♀ 28 mm.

*Distribution:* Occurs from southern Venezuela, Colombia and Ecuador to Bolivia and central Brazil in the Amazon valley. Intergrades occur in Mato Grosso and Paraguay (Fig. 346).

*Taxonomy and Variation:* The holotype male in the BMNH has two subapical white maculae and a very small third spot in the costal area of the DFW. Most of the population of this subspecies lacks this small spot, otherwise the holotype is typical of the subspecies.

Intergrade males from Mato Grosso have three subapical white maculae with the costal spot smaller, and have less dark blue than *E. c. caelina* on the DFW. The ♀ has a narrower white postmedian band on the DFW than *E. c. caelina*.

*Biology:* This subspecies is found in openings in tropical evergreen forest at lower elevations, especially in river valleys. I have collected males at banana fruit baits at Puerto Misahualli in Ecuador. They fly very rapidly. Adults have been collected nearly every month of the year at elevations of about 100-800 m.

Specimens Examined: 97 ♂ 10 ♀

COLOMBIA: No specific locality. VENEZUELA: *Amazonas*, Mt. Duida; ECUADOR: *Napo*, Puerto Misahualli; PERU: *Loreto*, Pebas; Río Javari; *San Martín*, Jepelacio; *Junín*, Satipo; *Passo*, Pichis rd.; Río Pachitea; *Madre de Dios*, Inambari; Boca Río la Torre; *Shintuya*; *Puno*, Tirapata; *Carabaya*; *Huacamayo*; *Cuzco*, Cosñipata; BOLIVIA: *Santa Cruz*, Buenavista; *Cochabamba*, Chapare; *Beni*, Trinidad; BRAZIL: *Amazonas*, Humaitá; *Tefé*; Benjamin Constant; *Tabatinga*; *Acre*, Alto Juruá; *Rondonia*, Cachoeiro do Samuel; *Pimenta Buena*; *Pará*, Obidos; *Amapá*, Serra do Novio; *Mato Grosso*, Diamantino; *Chapada dos Guimarães* X; *Nioaque* X; *Cuiabá* to *Corumbá*; *Rio Juruena*.

#### *Eunica olympias* C. and R. Felder, 1862

*E. olympias* has been mistakenly included under *E. augusta* by Seitz (1915) and others. It is a well marked species with three distinctive subspecies extending from México to Perú. The heavily serrated margins, blue coloration and often white banding of the DFW in the male, and the heavily marbled VHW with seven ocelli readily identify the species. The female is distinctive with steely-green color and a white band on the DFW.

*Description:* Male. The DFW is truncate and heavily serrate, black with the basal third and costal area to two-thirds deep, iridescent azure-blue, or all blue to subapical area; without any subapical white band, or a narrow or broad white subapical diagonal cross band. The DHW is black, heavily serrate with white margins in the indentations, discal area with blue. The VFW is blackish-brown with a postmedian small or large white band with two subapical maculae surrounded by a black and tan apical area. The VHW has a complete row of seven large postmedian ocelli with white pupils. The wing is heavily marbled and mottled with tan, rich brown, brown-black and white. Male genitalia. (Fig. 271). The ♂ hypandrium is constricted posteriorly, widening at the posterior end. The valva is elongate, attenuated and triangular.

Female. The DFW has a serrate margin; the basal half is steely blue-green with a narrow median black band and a broad postmedian diagonal cross band with black apical one-third. The DHW is steely blue-green with black borders, deeply serrated margins with white in the indentations. Female genitalia. (Fig. 315).

#### Key to Subspecies of *E. olympias*

##### Males.

- 1a. DFW with brilliant azure blue over entire wing including tornus area, except a broad white subapical diagonal cross band (3-4 mm). VFW with a broad white subapical cross band (4 mm) basal two-thirds black ..... *agustina*
- 1b. DFW with azure blue limited to basal half except in discal area, extending to

- subapical cross band, tornus area black. Subapical white diagonal cross band absent or narrower (1-3 mm). VFW with a narrower white cross band (1-3 mm); basal two-thirds brown or brownish-black . . . . . 2
- 2a. DFW without any subapical white diagonal crossband or usually a thin, diffuse, light bluish-grey band, barely perceptible; no whitish macula in  $M_3$ -Cu<sub>1</sub>; VFW with a narrow pale blue cross band (1-2 mm anteriorly) . . . . . *olympias*
- 2b. DFW with a narrow white subapical diagonal crossband (1-2 mm) with a whitish macula in  $M_3$ -Cu<sub>1</sub>. VFW with subapical white crossband (2 mm) . . . . . *augusta*

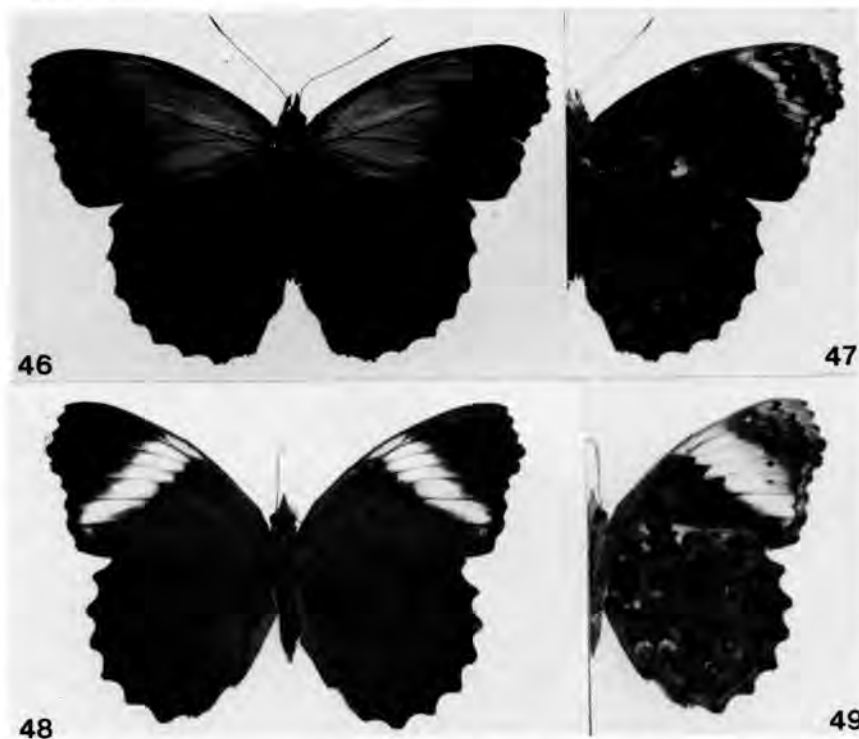
#### Females.

No consistent differences were observed between the females of the three subspecies. There is a tendency for the ♀ of *E. o. augusta* to have a medial extension of white in the basal subcostal area, which is usually not present in *E. o. olympias*.

*Eunica olympias olympias* C. & R. Felder, 1862 [Stat. rev.]

Figures 46-49, 271, 315, 347

*Eunica olympias* C. & R. Felder, 1862. Wien. Ent. Monat. 6: 420-421. TL: Nova Granada, in provincia Bogotá, prope Villeta, alt. 3200 ped. Syntypes: BMNH 1 ♂ Type (Felder Coll.) (Examined).



Figures 46-49. *Eunica olympias olympias* C. & R. Felder. ♂ dorsal (46) ventral (47) surfaces. "Nova Granada, in Provincia Bogotá, prope Villeta." Syntype *Eunica olympias* C. & R. Felder (BMNH). ♀ dorsal (48) ventral (49) surfaces. COLOMBIA, Cundinamarca, Muzo (AMNH).

*Eunica augusta olympias* Fldr. Seitz, 1915. *Macrolep. World* 5: 487. [Stat. rev.].

**Description:** As in *E. olympias* except for differences listed for *E. o. olympias* in the key to subspecies.

Average wing length ♂ (28-35) 31 mm, ♀ 33 mm.

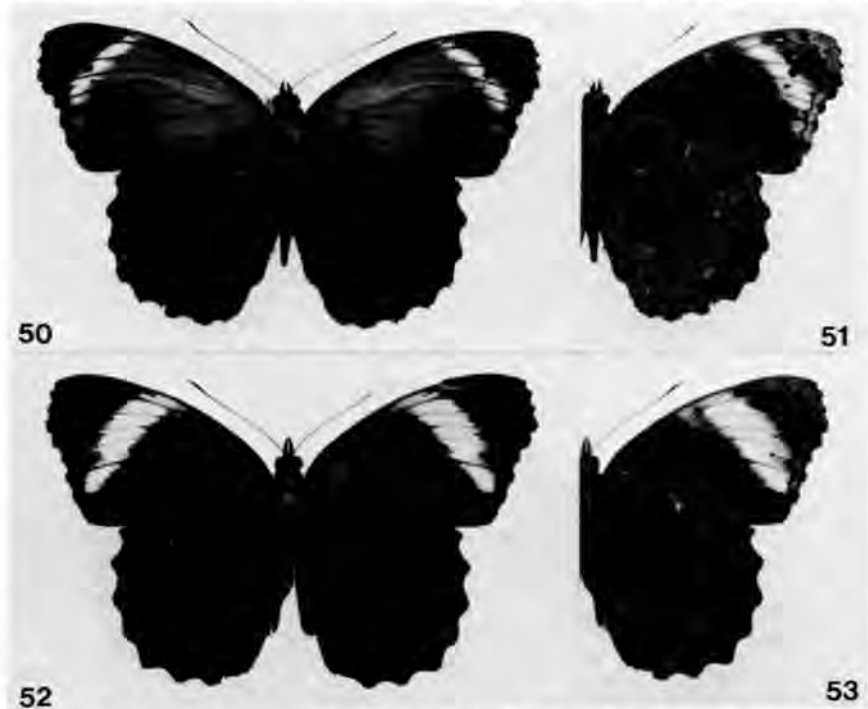
**Distribution:** Occurs from Venezuela through the Andes area of Colombia south to Ecuador and perhaps to central Perú. Intergrades with *E. o. augusta* occur in Colombia and in the adjacent area in Panamá. (Fig. 347)

**Taxonomy and Variation:** The type in the Felder collection in the BMNH is typical of the population of this nominate subspecies. There is a faint grey shadow of thin blue-grey maculae in a subapical diagonal line on the ♂ DFW, with variation in the presence or absence and amount of light shading in this line. There is also some variation in the darkness and markings on the heavily patterned VHW. The amount of iridescent blue in the basal half of the DFW varies only slightly. The female has a steely-green upper surface with a broad white diagonal band on the DFW.

**Biology:** Adult males are found in river valleys especially in wet places. It has been collected in March, June, July, October, and December, but probably occurs throughout the year. Fassl (1918) indicates that adults are found on the eastern slope of the Andes at elevations from 300 to 1000 m.

Specimens Examined: 90 ♂ 10 ♀

COLOMBIA: *Cundinamarca*, Bogotá X; *Villeta*; *Boyacá*, Muzo; *Tunja*; *Santander*, Río



Figures 50-53. *Eunica olympias augusta* Bates. ♂ dorsal (50) ventral (51) surfaces. GUATEMALA, [Alta Verapaz], Río Polochic. Syntype *Eunica augusta* Bates (BMNH). ♀ dorsal (52) ventral (53) surfaces. GUATEMALA, [Alta Verapaz], Río Polochic. Syntype *Eunica augusta* Bates (BMNH).

Opón; *Valle Cauca*, No specific locality; *Meta*, Pipiralito; VENEZUELA: *Zulia*, Santa Barbara; *Aragua*, Choroni; Rancho Grande; *Distrito Federal*, Caracas; ECUADOR: PERU: *Pasco*, Río Palcazu; Chuchurras; *Junín*, Satipo. (Peruvian records need validation.)

*Eunica olympias augusta* Bates, 1866 [Stat. rev.]

Figures 50-53, 271, 315, 347

*Eunica augusta* Bates, 1866. Ent. Mon. Mag. 3: 135 no. 106. TL: Guatemala [*Alta Verapaz*], Río Polochic. Syntypes: BMNH 1 ♂ Rh. 9328, 1 ♀ Rh. 9329. (Examined).

*Description*: As in *E. olympias* except for differences listed for *E. o. augusta* in the key to subspecies.

Average wing length ♂ (28-34)30 mm, ♀ (32-33)32.5 mm.

*Distribution*: This subspecies is found from Veracruz, México south in Central America to Panamá, where it intergrades at the border of Colombia with *E. o. olympias* (Fig. 347).

*Taxonomy and Variation*: A male marked TYPE: HT (Figs. 50 & 51) in the Godman-Salvin collection (BMNH) is typical of this population. It has a white macula in Cu<sub>1</sub>-Cu<sub>2</sub> on the ♂ DFW, which occurs in about 75% of the specimens I have examined. The white subapical diagonal band on the ♂ DFW is somewhat variable in width. There is much variation in the darkness and pattern on the heavily patterned VHW, but none of the variation appears to be correlated with geographic distribution.

*Biology*: The bright iridescent blue and the white subapical band make this species obvious in the field, and its biology is better known than most *Eunica*. The adults occur in evergreen tropical forest, montane rainforest and cloud forest. They are usually found along rivers and streams, resting on wet sand, wet rocks, mud, or tree trunks. They are usually solitary and fly near the ground or up to 3 m, but not in the canopy. Adults fly erratically in bright sun usually from 1000 to 1400 hours. I have collected adults in Palenque and Santa Rosa in Chiapas, Mexico. de la Maza and Turrent (1985) report that this subspecies occurs from 100 to 1000 m elevation in México. De Vries (1987) states that adults are found from sea level to 1,300 m on both slopes of the Cordillera in Costa Rica and that he has seen them migrating with *Eunica monima* through mountain passes in the Cordillera de Guanacaste. He observed both sexes visiting wet sand at rivers in the Talamancan cloud forests. *C. o. augusta* has been collected throughout the year with more records in the rainy season from June to September.

Specimens Examined: 107 ♂ 14 ♀

MEXICO: *Veracruz*, Catemaco; Orizaba; Coatepec; Sierra de Tezonapa; Presidio; Córdoba; *Oaxaca*, San Juan Bautista; Cuicatlán; Sierra de Juárez; Uxpanapa; *Chiapas*, Esquintla; San Jeronimo; La Granja; Mapastepec; San Quintín; Santa Rosa Comitán; Palenque; Bonampak; San Antonio Buenavista; Chajul; GUATEMALA: *Retalhua*, Retalhua; San Sebastián; *Izabal*, Quirigua; *Quetzaltenango*, Coatepeque; *Verapaz*, Tolimán; San Jeronimo; Polochic Valle; *El Petén*, Sayaxché; BELIZE: No specific locality; EL SALVADOR: *San Salvador*, San Salvador; HONDURAS: *Olancho*, Olanchito; *Cortés*, San Pedro Sula; COSTA RICA: *Cartago*, Cartago; *Heredia*, La Selva; *San José*, Hacienda el Rodeo; *Alajuela*, San Mateo; *Guanacaste*, Parque Santa Rosa; PANAMA: *Chiriquí*, Chiriquí; Bugaba; *Veraguas*, Veraguas; *Darién*, Cerro Pirre 1000 m X; COLOMBIA: *Cundinamarca*, Bogota X; No specific locality X.

*Eunica olympias agustina* R. de la Maza, 1982 [Stat. rev.]

Figures 54-55, 271, 315, 347

*Eunica augusta agustina* R. de la Maza, 1982. Rev. Soc. Mex. Lep. 7(1): 6-7, f 12, 13. TL: MEXICO: Guerrero, El Faisanal. Types: 1 ♂ HT (MCM), 18 ♂ 2 ♀ paratypes (Examined).



*Description:* As in *E. olympias* except for differences listed for *E. o. agustina* in the key to subspecies.

Average wing length ♂ (28-32)30 mm.

*Distribution:* The known distribution is limited to the montane rain forest in Guerrero, México, from three known localities at elevations from 500 to 1100 m (Fig. 347).

*Taxonomy and Variation:* I have examined the holotype ♂ and 18 ♂ and 2 ♀ paratypes. There is little variation except in the number of black ocellar spots in the wide white diagonal subapical band on the ♂ DFW. There is also variation in the darkness and intensity of DHW markings.

*Biology:* This very rare subspecies is limited to montane rain forest. I have collected a male at Nueva Delhi, Guerrero, on 11 Nov. 1982 where it was flying above wet sand near a small rainforest stream. Adults have been collected in February, April, May, November and December, with most specimens collected in May.

Specimens Examined: 23 ♂ 2 ♀

MEXICO: Guerrero, El Faisanal 1150 m 18 ♂ 2 ♀ (MCM; BMNH; DM; AME; AD); Río Santiago, Atoyac de Alvarez 680 m 3 ♂ (coll. & identified by J. Llorente (UNAM); Nueva Delhi, Atoyac de Alvarez 680 m 1 ♂ (UNAM); Nueva Delhi 680 m 1 ♂ (JC).

*Eunica margarita* (Godart) [1824]

Figures 56-59, 272, 316, 348

*Nymphalis margarita* Godart [1824]. Enc. Meth. 9:406 TL: "Brasil" Syntypes: 1 ♂ MNHP. (Examined)

=*Eunica margarita eburnea* Seitz, 1915. Macrolep. World 5: 485-486, Pl. 100 Ac (1916) (nec. Fruhstorfer, 1907) (Misident.).

*E. margarita* is a distinctive black and white species that unfortunately has been generally misidentified due to the wrong identification in the plates in Seitz (1916). It was confused with *E. eburnea* which he considered as a subspecies. I examined the Godart type in MNHP (Figs. 56-57). The male genitalia and hypandria are completely different in the two species. *E. margarita* can be distinguished by the whitish coloring, the broad, white DFW band and the truncate shape with indented margin between  $M_1$  and  $Cu_2$ . This species is found in southeastern Brazil, Paraguay, and northern Argentina.

*Description:* Male. The DFW basal third is grey containing a white square. There is a broad white median band followed by the distal third black, with three white subapical maculae (four in *E. eburnea*). The outer wing margin is truncate, incurved between  $M_1$  and  $Cu_2$ , with an extension at  $Cu_2$ . The VFW has a submedian black crossband and a narrow



Figures 54-55. *Eunica olympias agustina* R. de la Maza. ♂ dorsal (54) ventral (55) surfaces. MEXICO, Guerrero, El Faisanal. Syntype *Eunica augusta agustina* R. de la Maza (AME).

postmedian black crossband, with the apical area grey. The DHW is grey with two black submarginal bands. The VHW is marbled grey and white with six small indistinct postmedian ocelli. Male genitalia. (Fig. 272). The ♂ hypandrium is unique in having two large and elongate rami with the posterior half with projecting teeth.

Female. The female is almost identical to the male but is usually larger. The DFW has three large and one small white subapical ocelli, and the DHW has much broader and more diffuse submarginal bands. Female genitalia. (Fig. 316).

Average wing length ♂ (22-25)23 mm, ♀ (25-27)26 mm.

*Distribution:* This species is found from Bahía to Mato Grosso, Brazil south in Paraguay to northern Argentina, and Rio Grande do Sul, Brazil (Fig. 348).

*Taxonomy and Variation:* I have examined the Godart male type of *E. margarita* in MNHP which is typical of the general population of *E. margarita*. It is unfortunate that Seitz (1915 and 1916) confused *E. margarita* and *E. eburnea* since this has caused much taxonomic confusion and misidentification. The figure of *E. margarita* in Staudinger (1888, pl. 40) is too stylized to identify accurately but appears to be *E. eburnea*. The critical characters of *E. margarita* (compared to *E. eburnea*) are: the DFW is incurved below the truncate subapical area; there are three instead of four white subapical maculae; the VFW has a broad, submedian black band; the DFW broad, white band does not have a deep proximal indentation to  $M_3$ . There is some variation in the presence of a very small fourth subapical white macula in  $R_5-M_1$  of the DFW. There is also variation in the amount of black in the apical third and basal third of the DFW and in the grey shading of the DHW and VHW.

The ♂ hypandrium of *E. margarita* is distinctive with elongate toothed rami and an uncus without any horn but with a small beaked tooth at the apex.

*Biology:* The published observations are subject to doubt due to the misidentifications resulting from the Seitz error. I have collected *E. margarita* at Campinas, Brazil in a large grassy opening in semideciduous tropical forest, and at Curitiba, Brazil in an open marshy pastured grassland plain, surrounded by scrubby deciduous savannah.

Adults have been collected in March-April and August to December, and at elevations



Figures 56-59. *Eunica margarita* (Godart). ♂ dorsal (56) ventral (57) surfaces. "BRAZIL". Syntype *Nymphalis margarita* Godart (MNHP). ♀ dorsal (58) ventral (59) surfaces. PARAGUAY, Guairá, Villarica (CMP).

from near sea level to several hundred m.

Specimens Examined: 146 ♂ 35 ♀

PARAGUAY: *Guairá*, Colonia Independencia; Villarrica; *Arroyos y Esteros*, Araguá; *Caaguazú*, Yhu; *Paraguarí*, Sapucuy; *San Pedro*, San Pedro; *Central*, Asunción; *Neembucú*, Neembucú; URUGUAY: *Montevideo*, Montevideo; ARGENTINA: *Buenos Aires*, Buenos Aires; *Entre Rios*, Concordia; *Corrientes*; *Misiones*; BRAZIL: *Bahia*, Cachimbo; Rio Mucuri; Mucuri; *Minas Gerais*, Caraça; Belo Horizonte; Poços de Caldas; Carmo do Rio Claro; Varginha; Sete Lagoas; Caxambú; *Mato Grosso*, Nioaque; *Rio de Janeiro*, Rio de Janeiro; *São Paulo*, Corrego Azul; Indiana; Araras; Serra Azul; São Paulo; Amparo; Loreto; Porto Cabral; Rio Clara; Araçatuba; *Paraná*, Castro; San José; Foz de Iguaçu; Campinas; *Santa Catarina*, Joinville; Nova Teutonia; *Rio Grande do Sul*, Pelotas.

*Eunica eburnea* Fruhstorfer, 1907 [Stat. rev.]

Figures 60-63, 273, 317, 349

*Eunica margarita eburnea* Fruhstorfer, 1907. Soc. Ent. 22(5): 34. TL: "Sta. Catharina and Rio Grande do Sul." Syntypes: 2 ♂ 1 ♀. BMNH "Type" 1 ♂ (Examined).

*Eunica margarita margarita* Seitz, 1915. Macrolep. World 5: 485-486 pl. 100 Ad. (1916) (nec. Godart) (Misident.)

*Description*: The DFW is not truncate, the basal third is silver grey with a small elongate white macula, the middle third is a broad white band indented proximally at  $M_2$ . The distal third is black with four squarish white subapical maculae. The DHW is silver-grey with a black submarginal band and black apical markings. The VFW is similar to the DFW except the apical area is grey. The VHW is heavily marbled and sculptured dark



Figures 60-63. *Eunica eburnea* Fruhstorfer. ♂ dorsal (60) ventral (61) surfaces. BRAZIL. Santa Catarina, Joinville (JC). ♀ dorsal (62) ventral (63) surfaces. [BRAZIL], Santa Catarina and Rio Grande do Sul. Syntype *Eunica margarita eburnea* Fruhstorfer (BMNH).

grey to grey-brown, with six to seven postmedian ocelli which may be obvious or difficult to discern in the heavily marbled pattern. Male genitalia. (Fig. (273). The ♂ hypandrium has lateral triangular shaped projections. The uncus has a heavily chitinized basal horn and a curved small chitinized beak at the apex, the valva is long and attenuated.

Female. Same as the male except for much darker silver grey and darker markings on the DHW. The VHW is much darker and may have very dark medial markings. Female genitalia. (Fig. 317).

Average wing length ♂ (23-28)25 mm, ♀ (25-29)26.5 mm.

*Distribution:* Occurs from Espírito Santo, Brazil to Paraguay and south to Buenos Aires, Argentina and Uruguay. (Fig. 349)

*Taxonomy and Variation:* Fruhstorfer (1907) described *eburnea* as a subspecies of *margarita*. Seitz (1915) misidentified both *eburnea* and *margarita* and his descriptions and figures are transposed, which has resulted in misidentifications in most collections. Seitz (1916) shows a figure 100 Ac labeled *eburnea* which is actually *margarita*, and 100 Ad labeled *margarita* which is *eburnea*. I have examined the ♀ Fruhstorfer type of *eburnea* in the BMNH (Figs. 62-63) and it is a typical female of the population. Hayward (1964) correctly identified *eburnea* and *margarita* from Argentina.

*E. eburnea* has no truncate subapical area, and there is no incurving on the outer margin. The white cross band on the DFW is deeply indented on the proximal margin at M<sub>3</sub>, and there are always four distinct, white, squarish subapical maculae on the DFW. On the VFW, the proximal border of the white cross band is a narrow black band.

*Biology:* This species is quite common and I have collected it in various localities in southern Brazil, Uruguay, Paraguay, and Argentina. Adults perch most commonly on trees and bushes at the edges of pastured grassland and pampas or margins of riverine gallery forest. They are found along fence rows, near habitations and in savannahs. They usually fly out into the pasture and usually return to the same perching places so that capture is easy. Adults are recorded for every month of the year generally at lower elevations from near sea level to a few hundred meters.

Specimens Examined: 208 ♂ 68 ♀

ARGENTINA: *Entre Rios*, Salto Grande; Concordia; *Misiones*, Misiones; *Corrientes*, Posadas; Santo Tomé; *Buenos Aires*, Buenos Aires; *Chaco*; *Formosa*, Formosa; PARAGUAY: *Paraguari*, Sapucay; *Guiará*, Villarrica; *Caaguazú*, San José; *Yhu*; *Itapúa*, Encarnación; *Caazapá*, Buena Vista; *San Pedro*, San Pedro; *Neembucú*, Neembucú; URUGUAY: *Florida*, Florida; *Montevideo*, Montevideo; *Paysandú*, Paysandú; *Colonia*, Estanzuela; BRAZIL: *Mato Grosso*, Djamantino; *Minas Gerais*, Belo Horizonte; *Passa Quatro*; *Virginia*; *Passos*; *Itatiaia*; *Espírito Santo*, Itabapoana; *Colatina*; *São Paulo*, São Paulo; *Pinhal*; *Itaici*; *Rio Preto*; *Araçatuba*; *Jacarehy*; *Loreto*; *Leme*; *Itaquaquecetuba*; *Ypiranga*; *Butantan*; *Rio de Janeiro*, *Rio de Janeiro*; *Teresópolis*; *Paraná*, *Jacaré*; *Castro*; *Tibajy*; *Fernandez Pinheiro*; *Ponta Grossa*; *Curitiba*; *Vila Velha*; *Carambei*; *Chopinzinha*; *Guarapuava*; *Foz de Iguaçu*; *Porto Amazonas*; *Araucária*; *Cascatinha*; *San José dos Pinhais*; *Santa Catarina*, *Porto Urrião*; *Rio Lavatudo*; *Joinville*; *Painel*; *Lajes*; *Cauna*; *Nova Teutonia*; *Blumenau*; *Rio Grande do Sul*, *São Leopoldo*; *Guaraní*; *Pelotas*; *Porto Alegre*; *Bela Vista*; *Bom Jesus*; *Bacão de Categipe*.

#### *Eunica ingens* Seitz (1915) [Stat. rev.]

Figures 64-67, 274, 350

*Eunica margarita* forma *ingens* Seitz, 1915. *Macrolep. World*. 5: 486. pl. 100 A d (1916)  
TL: "Bolivia, 7 to 800 m" Syntypes: 1 ♂ BMNH "ingens/TYPUS/Buenavista, East Bolivia 750 m. Aug. 06-April 07 (Steinbach)". (Examined).  
=*Eunica methymna* Staudinger, in lit. Hall (1983) [Nomen nudum]

*Description:* The DFW is not truncate; the basal third is silver-grey with an elongate pointed white macula medially in the discal cell, the middle third is a broad white cross band, followed by the outer third black, with three squarish white subapical maculae.

The DHW is silver-grey with a black submarginal band and with dark marginal apical maculae. The VFW basal third is grey and black with a white elongate macula as above, a broad white median band, bordered by a black band with three white maculae and a grey apical area. The VHW is mottled grey with six or seven small insignificant or more obvious postmedian ocelli. Male genitalia. (Fig. 274). The ♂ hypandrium is bell-shaped with triangular rami posteriorly. The remarkable uncus has a heavily chitinized pointed posterior horn with a heavily chitinized superuncus horn at the base of the posterior horn.

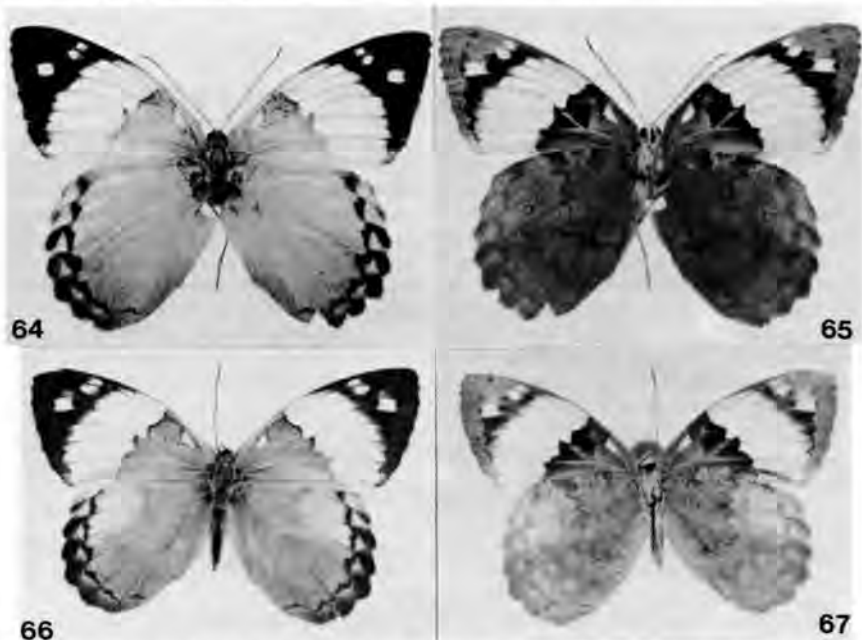
Female. Similar to the male but may be darker in shading.

Average wing length ♂ (28-32)30 mm, ♀ (30-31.5) mm.

*Distribution:* Occurs from Imperatriz, Maranhão, Brazil to Perú, Bolivia to Misiones, Argentina. (Fig. 350). A specimen from Curitiba, Brazil (MNHP) may be mislabelled.

*Taxonomy and Variation:* I have examined the male specimen in the BMNH marked "TYPUS". It is slightly darker on the VHW in comparison with a series of Steinbach specimens collected near the type locality. There is some variation in *E. ingens* in the darkness of the pearly grey surface of the dorsal wing surfaces, and in the presence or absence of a very small white macula in  $R_s-M_1$  on the DFW. The very large size, the pearly grey surface instead of grey and white mottled wings, the lack of any incurving in the apical margin of the wing, non-truncate, the more triangular instead of rectangular white costal macula on the costal area of the DFW, and the usually darker VHW distinguish *E. ingens*. It has previously been considered to be a subspecies or form of *E. margarita*; however, *E. ingens* has a very distinctive hypandrium with triangular rami, and a unique uncus with a basal chitinized horn and a large heavily chitinized uncus beak posteriorly. The posterior valva is blunt instead of attenuated.

*Biology:* *E. ingens* has been collected nearly every month of the year. It has been reported by Seitz (1915) to occur only in certain years, is sometimes rare for a long period, until it suddenly appears in great numbers. It has been collected at elevations from 100 to



Figures 64-67. *Eunica ingens* Seitz. ♂ dorsal (64) ventral (65) surfaces. BOLIVIA, "Buenavista, East Bolivia." Syntype *Eunica margarita* forma *ingens* Seitz (BMNH). ♀ dorsal (66) ventral (67) surfaces. PERU, [San Martín] Japelacio (AMNH).

800 mostly 400 to 700 m.

Specimens Examined: 97 ♂ 10 ♀

PERU: *San Martín*; Juanjui; Japelacio; Tarapoto; Río Huallaga; *Ucayali*, Pucallpa; *Pasco*, Pozuzo; *Madre de Dios*, Boca Río la Torre; BOLIVIA: *Santa Cruz*, Prov. de Sara; Buenavista; Santiago; BRAZIL: *Rondônia*, Ariquemes; Porto Velho; *Mato Grosso*, Chapada, Cuiabá; Buriti 700 m; Rondonópolis; Jaciara; ; Cáceres; Diamantino; Fazenda São João; Nioaque; Uirapuru; *Santa Catarina*, Rio Vermelho; *Goias*, Aragarças; *Maranhão*, *Imperatriz*; São Paulo, Araçatuba; Rio Preto; Guará; *Distrito Federal*, Brasília; ARGENTINA: *Misiones*, San Ignacio; Villa Lúcia.

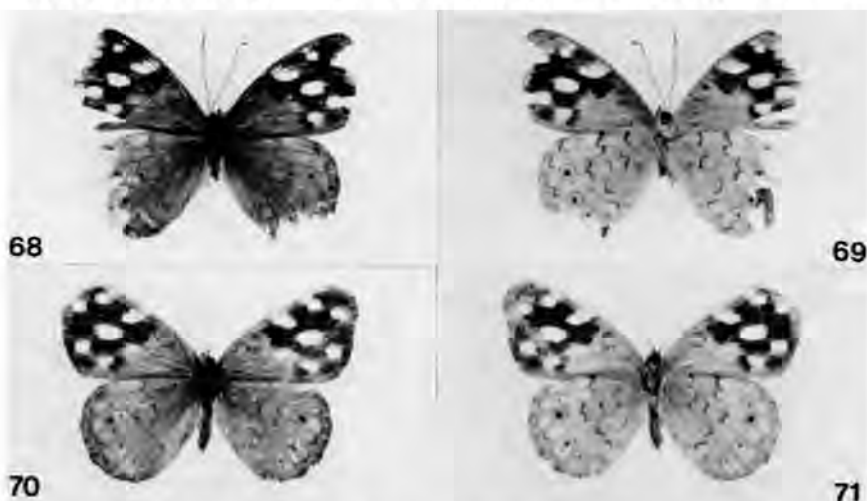
*Eunica interphasis* [Spec. nov.]

Figures 68-71, 275, 348

This remarkable new species is based on a male from Rondônia, Brazil, a male from Mato Grosso, and a female from Pará, Brazil. It appears to be most closely related to *E. phasis* of the *E. heraclitus* species group. However, *E. interphasis* is distinctive and unique with male genitalia intermediate between the *E. margarita* species group and *E. heraclitus* species group. It has an elongate smooth uncus with a small chitinous horn at the base more like *E. eburnea*. It does not have the very constricted heavily toothed uncus as the *E. heraclitus* group but has an unusual valva with an elongate extended lateral arm terminating in a small rosette of teeth. About three-fourths from the base there are four chitinized extensions on the inner face, with a subterminal extended flap and terminating with two chitinized teeth. The hypandrium is quite different from *E. macris* and *E. heraclitus* with no restriction in the middle but more or less rectangular shaped.

This species appears to be a relatively primitive species of the *E. macris*-*E. heraclitus* group based on the uncus and hypandrium, but the unique projections on the valvae and horn on the uncus are apomorphic. It appears to be a species intermediate between *E. eburnea* and *E. macris*.

*Description*: Male. The DFW has the basal third grey-brown with a curved narrow black



Figures 68-71. *Eunica interphasis* Jenkins. ♂ dorsal (68) ventral (69) surfaces. BRAZIL, Rondônia, Jaru. Holotype *Eunica interphasis* Jenkins (AME). ♀ Dorsal (70) ventral (71) surfaces. BRAZIL, Mato grosso, Buriti. Paratype *Eunica interphasis* Jenkins (KB).



band at the end of the discal cell. The distal two-thirds is blackish with seven white maculae, a median white macula in Cu<sub>2</sub>-2A, three large white postmedian maculae and three subapical maculae. The DHW is grey-brown with a few dark postmedian black spots and a black submarginal line. The VFW basal third is grey with white maculae as on the DFW, with the subapical and apical area grey. The VHW is silvery-grey and has some basal lines, an undulating dark thin median line and six postmedian circular ocelli with dark pupils, followed by an undulating thin dark submarginal line. Male genitalia. (Fig. 275). The ♂ hypandrium and genitalia are described above.

Female. Similar to the male except the apical half of the DFW is more black and the white maculae are larger. The VFW has more black background and the maculae are larger and more contrasting. The wing is rounded with very little truncate projection in the subapical area.

Wing length ♂ 21.5 mm, ♀ 23 mm.

HOLOTYPE: BRAZIL: *Rondônia*, Jaru. M. Collected 9 August 1976 by C. Callaghan. Genitalia dissection No. M7011 in small vial with holotype. Presently in the AME. It will be deposited in the collection of the UFPC, Curitiba, Brazil.

PARATYPES: BRAZIL: *Pará*, near Tucuparé at Km 1288 Cuiabá-Santarém Hy, ♀ collected 19 August 1978 by C. J. Callaghan, in the AME. BRAZIL, *Mato Grosso*, Buriti ♀ collected 26 July 1972 by K. S. Brown in coll. K. S. Brown.

*Distribution*: Presently known only from Jaru, *Rondônia*, Buriti, *Mato Grosso*, and Tucuparé, *Pará*, Brazil. (Fig. 348).

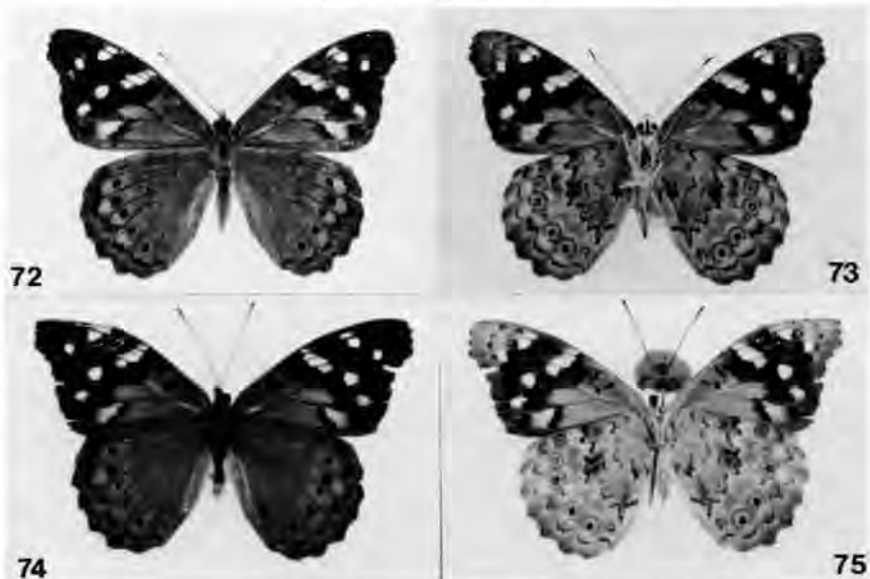
*Taxonomy and Variation*: Only three specimens are known.

*Biology*: Adults have been collected at elevations from near sea level to about 500 m. A ♂ was collected in August and a ♀ in July.

This species is named *E. interphasis* since it is related to *E. phasis*, but is also intermediate with the *E. margarita* species group.

*Eunica heraclitus* Gundlach, 1881. [Stat. rev.]

Figures 72-75, 276, 318, 351



Figures 72-75. *Eunica heraclitus* (Poey). ♂ dorsal (72) ventral (73) surfaces. CUBA, specific locality unknown (FMNH). ♀ dorsal (74) ventral (75) surfaces. CUBA, specific locality unknown (AMNH).

*Eunica heraclitus* Gundlach, 1881. Contr. Ent. Cubans. p. 52. TL: Cuba. Syntype: Location unknown.

=*Eunica macris heraclitus* Gundlach. Seitz, 1915. Macrolep. World 5:485. [Stat. rev.]

It is surprising to find this species of *Eunica* isolated on the island of Cuba. It is most closely related to *E. phasis* which occurs in Colombia, Venezuela, and Guyana to Bolivia. This distinctive species group includes *E. heraclitus*, *E. interphasis*, *E. phasis*, and *E. macris*. The adults are dull brown with truncate wings and with the distal half of the DFW blackish with six or seven white maculae similar to those of *E. tatila*. The postmedian ocelli on the VHW show a decrease in size of the ocellus in  $M_2-M_3$ , starting the transformation sequence of loss of this ocellus and division into two groups of ocelli. Seitz (1915) considered *E. heraclitus* to be a subspecies of *E. macris*.

**Description:** Male. The DFW has an extended, strongly truncate margin; the basal half is dull brown with thin dark cross lines in the discal cell and in  $Cu_1-2A$ . The distal half is black with a dull, whitish postmedian diagonal band and white maculae, with three whitish subapical maculae. The DHW is dull brown with black veins, a row of five or six postmedian black spots, and a diffuse black wavy submarginal line and blackish on the serrated marginal extensions. The VFW is grey-brown with wavy dark basal medial and postmedian lines and seven postmedian circular ocelli with black or white centers. Male genitalia. (Fig. 276). The  $\delta$  uncus is basally constricted with a heavily serrate dorsal surface. The valva has an extended arm at the middle terminating in a round club covered with teeth. There is a flap extending inward just before the posterior tip.

Female. Almost exactly the same as the male except somewhat darker brown and more intense markings and a white diffuse macula in  $Cu_1-2A$  on the DFW. Female genitalia. (Fig. 318).

Average wing length  $\delta$  (23-27)25 mm,  $\varnothing$  28 mm.

**Distribution:** Throughout the island of Cuba. (Fig. 351). Three male *E. heraclitus* in the BMNH labelled Costa Rica are surely mislabelled.

**Taxonomy and Variation:** The location of the type(s) is unknown. There is some variation in the amount of white and size of the maculae on the DFW of the males. The darkness of the veins and the size of the five or six black ocelli varies.

**Biology:** Gundlach (1881) states that it is fairly common in woodlands around Havana, Cuba, especially sipping the juice of fermented mango fruit. The only dates reported are May and July. Alayo and Hernández (1987) report that this species is apparently very rare and has been collected only in the extreme western part of Cuba in the most recent reports. However, they have never collected this species.

Specimens Examined 22  $\delta$  7  $\varnothing$

CUBA: *Pinar del Rio*, Rangel July 3  $\delta$  MCZ; Santa Cruz de los Pinos, Gundlach (1881); Vuelta Abajo; *Matanzas*, Ensenada de Cochinos; *Sancti Spiritus*, Trinidad; *Granma*, "Sierra Maestra al sur de Bayamo"; *Camaguey*, Camaguey May 1  $\delta$  AM; *Havana*, Havana, 4  $\delta$  AMNH; 2  $\varnothing$  AMNH; "Cuba" 1  $\delta$  1  $\varnothing$  CMP; 1  $\delta$  MNRJ; 3  $\delta$  USNM; 4  $\delta$  3  $\varnothing$  BMNH; 2  $\delta$  FMNH; 1  $\varnothing$  AMNH; COSTA RICA: No specific locality 3  $\delta$  BMNH (Error).

### *Eunica phasis* C. & R. Felder, 1862 [Stat. rev.]

Figures 76-79, 277, 319, 351

*Eunica phasis* C. & R. Felder, 1862. Wien. Ent. Mon. 6: 111-112. TL: Brasil, "Rio Negro" (Error?). Syntypes  $\delta$  BMNH. (Examined)

=*Eunica macris phasis* Fldr. Seitz, 1915. Macrolep. World 5: 485. [Stat. rev.],

*E. phasis* has larger and whiter maculae on the DFW than *E. heraclitus*. The DHW does not have prominent black veins or black postmedian spots, and the VHW has larger more prominent postmedian ocelli with darker centers. The gnathos is enlarged into a

gnathos arm in *E. phasis*, which was not seen in *E. heraclitus*.

**Description:** Male. The DFW has a truncate margin, the basal half is dark brown, the posterior half is black with three postmedian maculae, the anterior one elongate across several veins, and there are three white subapical ocelli. The DHW is brown without black veins and usually no black postmedian spots or faintly marked from below in worn specimens. The VFW basal half is grey with a large, white, square macula in  $Cu_1-Cu_2$ , with white maculae as in the DFW, with a grey-white apical area. The VHW is grey-white with undulating dark basal medial and submarginal lines, with a complete row of seven very prominent ocelli, three with large black pupils. The ocellus in  $M_2-M_3$  is reduced in size. Male genitalia. (Fig. 277). The  $\delta$  uncus is very constricted and covered with teeth dorsally. The gnathos is expanded at the tip forming a gnathos arm. The valva has an extended arm at the middle that terminates in a toothed rosette.

Female. Similar to the male but with larger and whiter maculae on the DFW, and prominent black postmedian spots on the DHW. The VFW and VHW are whiter with more intense markings especially the postmedian ocelli. Female genitalia. (Fig. 319).

Average wing length  $\delta$  (24-26)25 mm,  $\varphi$  (26-27)25.5 mm.

**Distribution:** Occurs from Colombia to Guyana south to Pará and the Madeira River in Brazil, and from Perú to western Bolivia. (Fig. 351).

**Taxonomy and Variation:** I have examined the male type in the Felder collection in the BMNH. It is typical of the general population of *E. phasis*. There is some variation in the size of white maculae on the DFW and the black ocelli on the DHW.

**Biology:** I have collected this species in openings in semi-deciduous tropical forest in relatively dry sandy dune areas in Guyana. They are reported to come to white light.

Dr. K. Brown (pers. comm.) reports this species migrating at Santa Inéz, 30 km. N. of El Manteco, Bolívar, Venezuela on 27 June 1988. He observed about 100/minute across a 100 m front for 6-8 hrs., along a 50-80 km road stretch, an estimate of about  $8 \times 10^9$ /day.

Adults have been recorded in June and October to January and collected from about



Figures 76-79. *Eunica phasis* C. and R. Felder.  $\delta$  dorsal (76) ventral (77) surfaces. BRAZIL, "Rio Negro." Syntype *Eunica phasis* C. and R. Felder (BMNH).  $\varphi$  dorsal (78) ventral (79) surfaces. PERU, Junín, La Merced (BMNH).

100 m to 700 m elevation.

Specimens Examined 103 ♂ 7 ♀

COLOMBIA: *Cundinamarca*, Bogotá; *Antioquia*, Medellín; *Boyacá*, Muzo; *Meta*, Río Meta; *Valle del Cauca*, No specific locality; VENEZUELA: *Bolívar*, Santa Inéz, El Manteco; GUYANA: E. Demarara, Mackenzie (Linden); ECUADOR: *Napo*, Curaray; PERU: *Loreto*, Iquitos; *Mishana*; *Pebas*; lower Río Ucayali; *Humayta*; *San Martín*, Moyobamba; *Jepelacio*; *Ucayali*, Pucallpa; *Huánuco*, Río Huallaga; *Pasco*, Pozuzo; *Junín*, Satipo; Chanchamayo; *Perené*; Río Colorado; La Merced; *Madre de Dios*, Boca Río La Torre; *Puno*, Carabaya; *Yahuarmayo*; *Chaquimayo*; BOLIVIA: *La Paz*, Mapiri; BRAZIL: *Amazonas*, Tefé; São Paulo de Olivença; Benjamin Constant; Río Itacuai; Río Negro; *Pará*, Santarém.

*Eunica macris* (Godart), [1824]

Figures 80-83, 278, 351

*Nymphalis macris* Godart, [1824]. Enc. Meth. 9: 417, no. 212. TL: "Brasil". Syntypes: (♂) MNHP? (not found).

= *Eunica macris aeshrion* Fruhstorfer, 1907. Soc. Entomol. 22(5): 43-44. TL: Paraguay. Syntypes: BMNH 2 ♂. One labelled "TYPE/ Paraguay ex coll. Fruhstorfer." (Examined) [Syn. nov.]

The taxonomy of this group of species is difficult. Fruhstorfer (1909) and Seitz (1915) considered *E. macris* as a species with three subspecies *heraclitus*, *aeshrion*, and *phasis*. Seitz stated "On the whole, large series show that both the ground color and the grey or black apex vary a great deal in the same district and the denominations much rather signify aberrations than being names of special races." After study of over 216 ♂ and



Figures 80-83. *Eunica macris* (Godart) ♂ dorsal (80) ventral (81) surfaces. BRAZIL, Bahia (BMNH). ♀ dorsal (82) ventral (83) surfaces. BRAZIL, Bahia (BMNH).

24 ♀ and dissections of ♂ and ♀ genitalia and ♂ hypandria I recognize four species: *E. macris*, *E. heraclitus*, *E. phasis*, and a new species *E. interphasis*.

**Description:** Male. The DFW is truncate, dingy grey-brown in the basal half, the posterior half is black with a postmedian row of three maculae (smaller than in *E. phasis*) and two and a smaller third subapical maculae. The DHW is dingy grey-brown without any dark veins or postmedian black spots, a thin, wavy, submarginal line is present. The VFW basal half is grey-brown with white maculae as on the DFW plus a white macula in  $Cu_1-Cu_2$ , and a grey apical area. The VHW is grey-white with thin, dark, undulating basal, medial and postmedial lines. The seven postmedian circular ocelli are smaller and less prominent. Male genitalia. (Fig. 278). The ♂ uncus is very constricted basally and has a very dentate dorsal margin. The gnathos may or may not be expanded at the tip. The valva has an extended elongate arm at the middle, which is heavily toothed on over half its length, without a terminal knob or rosette. There is a subterminal extended flap.

Female. Similar to the male, but has a blacker distal half and larger whiter maculae on the DFW, including a white macula in the  $Cu_1-Cu_2$ . The VFW is similar with white markings as on the DFW. The DHW has five or six black postmedial spots.

Average wing length ♂ (23-26)24 mm, ♀ (25-26) 25.5 mm.

**Distribution:** This species is found in Brazil from Pernambuco to Mato Grosso south to São Paulo, Paraguay, Catamarca, Argentina and eastern Bolivia. (Fig. 351).

**Taxonomy and Variation:** The location of the Godart type from Brazil of *E. macris* is unknown. I could not find it in MNHP. *E. macris* is relatively uncommon and is quite variable. A cause of confusion is *E. macris aeschrion*. I have studied the ♂ specimen marked type in the BMNH. It has a reduced black area and a small white macula in the apical half of the DFW. There are no black ocelli on the DHW and the ocelli on the VHW is lightly ringed and not as conspicuous as in *E. macris*. The male valvae have the same unusual extension arm in the middle. The range of *E. aeschrion* is from Paraguay and lower Mato Grosso to eastern Bolivia. However, it also occurs in various localities in the range of *E. macris* and also appears to intergrade extensively. Resolving the taxonomic relationships will require a detailed study with series of fresh specimens from the critical localities. This may be phenotypic variation, and *E. aeschrion* is tentatively considered to be a synonym of *E. macris* pending further study.

There is some variation in *E. macris* in the number of black ocelli (from six to two) on the male DHW. There is much variation in the size of the white maculae on the DFW.

**Biology:** Little is known about the biology of this species. Adults have been collected from September to April and in June and July, at elevations from near sea level to several hundred m, mostly at lower elevations.

Specimens Examined: 91 ♂ 9 ♀

BRAZIL: Pernambuco, No specific locality; Bahia, Salvador; Santo Antônio da Barra; Pará, Rio Cuminá; Itaituba; Goiás, Anapolis; Taguatinga; Distrito Federal, Brasília; São Paulo, Loreto; Ypiranga; São Paulo; Rio de Janeiro, Rio de Janeiro; Petrópolis; Santo Antônio dos Brotos; Nova Friburgo; Minas Gerais, Nova Lima; Cantagallo; Mato Grosso, Urucum; Corumbá; Cuiabá; Buriti; Chapada dos Guimarães; Diamantino; Rondônia, Porto Velho; Jaru; PARAGUAY: Asunción, Trinidad; Paraguari, Sapucay; Central, Asunción; BOLIVIA: Santa Cruz, Punto Suárez; ARGENTINA: Catamarca.

#### *Eunica amycla*, (Godart) [1824]

Figures 84-87, 279, 352

*Vanessa amycla* Godart, [1824]. Enc. Meth. 9(2): 823, 59-60. TL: Brazil. Syntypes: "♀ ♀". I could not find any types in MNHP.

=*Cybdelis careta* Hewitson, 1852. Exot. Butt. [63]. pl. [32], f. 11-12. TL: "River Amazon". Syntypes: BMNH 1 ♂ Type Rh. 9214 (Examined). [Syn. nov?]

*E. amycla*, *E. mygdonia*, and *E. caralis* form a species group characterized by males with truncate dark brownish-purple wings and especially by the male genitalia with the

tegumen having unique, large, long, black brushes on the posterior half. There is a sequence of six prominent postmedian ocelli on the VHW to reduction to near obliteration with the ocellus in  $M_2$ - $M_3$  very reduced.

*E. amycla* Godart [1824] is based only on translation of the original description. There are no published figures, and I was unable to locate any type material in MNHP. Godart states that it is known only from individual females and that there are four white spots on the DFW. There are no known ♀ *Eunica* with four white spots that would relate to this description. It best fits the rare *E. careta* male for nearly all characters. There are usually four small maculae on the DFW and six large ones on the ♂ VFW and the original description states that the VFW spots are the same as on the DFW; otherwise *E. careta* would appear to be a synonym. I am provisionally using the name *E. amycla* instead of *E. careta* until more definite proof is established. However, there is a good probability that these Godart types may no longer exist.

*Description: Male.* The DFW is strongly truncate with wavy margins, blackish-brown with purple overcast with two (or three) small, white subapical maculae and a diffuse, white submarginal macula in  $Cu_1$ - $Cu_2$ . The DHW is blackish-brown with an indistinct black submarginal line. The VFW is black with a basal light brown comma in the discal cell, there is a postmedian row of three white maculae and three white subapical maculae with a grey apical area including circular spots. The VHW is grey-brown with darker diffuse basal and medial undulating lines, and a row of five postmedian circular ocelli with diffuse darker centers. Male genitalia. (Fig. 279). The ♂ hypandrium has two large lobes. The tegumen has very large black brushes on each side extending posteriorly. The uncus is basally constricted and beaked. The valva has an apical tooth.

*Female.* The DFW has the basal half brown, the distal half black with three white



Figures 84-87. *Eunica amycla* (Godart). ♂ dorsal (84) ventral (85) surfaces. "River Amazon." Syntype *Cybelis careta* Hewitson (BMNH). ♀ dorsal (86) ventral (87) surfaces. No specific locality. (CMP).



postmedial and three white subapical maculae. The DHW is lighter brown than in the male. The ventral surfaces are similar to the male, but the white maculae are larger and whiter, with a whitish median macula in  $Cu_2$ -2A.

Average wing length ♂ (29-31) 30 mm, ♀ 30.5 mm.

*Distribution:* This relatively rare species is found in the upper Amazon basin in western Amazonas and Rondônia, Brazil and Perú. (Fig. 352). There are two specimens labelled "RIO" (AME). If this refers to Rio de Janeiro it would be far out of the known range.

*Taxonomy and Variation:* A male labelled TYPE of *E. careta* in the Hewitson collection in the BMNH was found to be the same as other specimens examined. There is some variation in shading of the two diffuse whitish subapical maculae and the macula in  $Cu_1$ - $Cu_2$  on the ♂ DFW in addition to the intensity of darkness and pattern in the VHW.

*Biology:* This species is quite rare in collections with only 37 specimens examined. I have not seen any recent freshly collected specimens. However, Bates (1864) states "A very common species at Ega [Tefé], Upper Amazons; but found nowhere else, as far as I am aware." The only collection date record is in October. It is found at lower elevations from near sea level to about 200 m.

Specimens Examined: 34 ♂ 4 ♀

PERU: Loreto, Iquitos, Jun. ♂ MJP; Pasco, Río Pachitea 1 ♂ AMNH; BRAZIL: Amazonas, Tefé 8 ♂, 4 ♀ BMNH; 1 ♂ MNRJ; 1 ♂ AME; 1 ♂ CMP; Juruá 1 ♂ BMNH; Rio Uaupés-Rio Calary 3 ♂ AMNH; Amazonas, no specific locality 2 ♂ AME; 1 ♂ CMP; 6 ♂ BMNH; Rondônia, Calama, Oct. 1 ♂ BMNH; "Rio" ? Rio de Janeiro ? 2 ♂ AME; No locality data 1 ♂ AME; 2 ♂ CMP; "Amazon" 3 ♂ MCZ.

#### *Eunica mygdonia* (Godart) [1824]

This common widespread species is quite similar to the rarer *E. amycla* but has five instead of three (or four) white maculae on the DFW. The species is divided into two distinct populations. *E. m. mygdonia* females have six white maculae on the DFW, while surprisingly, females of *E. m. omoa* from Central America have a broad white postmedial diagonal cross band plus three white subapical maculae. The VHW is a study of rich red-brown purple-brown colors with four prominent postmedian ocelli and a very reduced ocellus in  $M_2$ - $M_3$ .

*Description:* Male. The DFW is truncate, blackish-brown with a deep purplish overcast. There is a postmedian row of three diffuse brownish maculae and two white subapical spots. The DHW is more brownish with a dark submarginal line. The VFW is brown at the base with a V-shaped white marking in the discal cell; the base color is black with three white postmedian and subapical maculae. The apical area is pale purplish. The VHW is brownish-purple and has two broad, dark red-brown basal and medial blotches, a purplish medial and submarginal line and two pairs of postmedian circular ocelli with a small remnant of an ocellus in  $M_2$ - $M_3$ . Male genitalia. (Fig. 280). The male hypandrium is constricted posteriorly. The tegumen has large black brushes on each side posteriorly. The uncus is basally constricted and terminally beaked. The valva is triangular.

Female. The DFW is brown in the basal half, and the distal half is black with three subapical white maculae and a postmedian band of white or three white maculae. Female genitalia (Fig. 320).

#### Key to Subspecies of *Eunica mygdonia*

##### Males.

- 1a. DFW brownish-black with a postmedian row of three diffuse whitish-brown maculae; VFW with a white V-shaped macula in the discal cell . . . . . *mygdonia*
- 1b. DFW blackish-brown without any postmedian maculae or usually one faint brown macula in  $Cu_1$ - $Cu_2$ . One or two other postmedian lighter diffuse smudges may be observed. VFW with a brown V- or comma-shaped macula in the discal cell . . . . . *omoa*

## Females.

- 1a. DFW with a row of three prominent white postmedian maculae and three white subapical maculae. . . . . *mygdonia*  
 1b. DFW with a broad white postmedian diagonal cross band and three white subapical maculae . . . . . *omoa*

*Eunica mygdonia mygdonia* (Godart), [1824]

Figures 88-91, 280, 320, 353

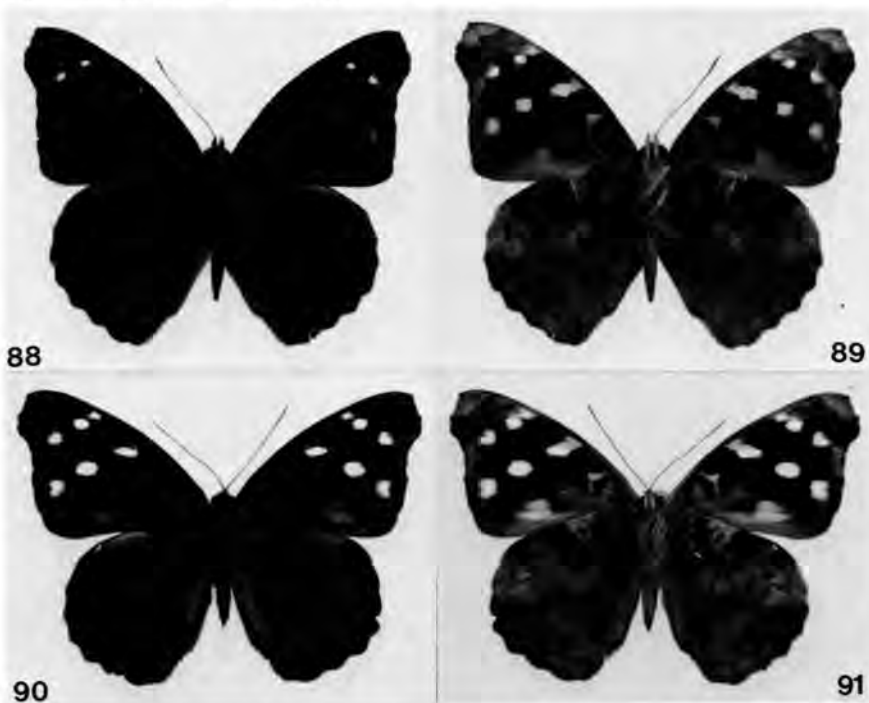
*Nymphalis mygdonia* (Godart), [1824]. Enc. Meth. 9: 416. TL: "Brésil". Syntypes: ? ♀  
 Location unknown. (Not found in MNHP.)

Description: As in *E. mygdonia* except for differences listed for *E. m. mygdonia* in the key to subspecies.

Average wing length ♂ (27-32) 30 mm, ♀ (28-32) 30 mm.

Distribution: This subspecies is widely distributed through most of South America from Venezuela, the Guyanas and Trinidad south to Bolivia and southern Brazil. (Fig. 353).

Taxonomy and Variation: The location of the Godart type ♀ of *E. mygdonia* is unknown. I could not find it in MNHP. The description by Godart (1824) is said to be based on females, but he gives an accurate description of the male of *E. mygdonia*, especially "five indistinct white spots" on the DFW. The description fits in all characters accurately for the distinctive ocelli on the VHW.



Figures 88-91. *Eunica mygdonia mygdonia* (Godart). ♂ dorsal (88) ventral (89) surfaces. ECUADOR, Napo, Puerto Napo (JC). ♀ dorsal (90) ventral (91) surfaces. ECUADOR, Napo, Alto Pununo, Misah (AME).

In MNHP I found two males marked "types" of *Cydelis johanna* Boisduval, MS. These are typical *E. m. mygdonia*, and since the name is unpublished, it is a *nomen nudum*.

There is variation in the amount of white on the five subapical and postmedian maculae on the ♂ DFW. There is much variation in the intensity of darkness and the pattern on the VHW on both ♂ and ♀.

**Biology:** Occurs in tropical evergreen and tropical semi-deciduous forest in a variety of habitats. It flies rapidly and often perches on leaves. I have collected males in several localities in Ecuador. It has been collected every month of the year with more collected in October to February. It is apparently more abundant in some years and rare in others. The adults occur from near sea level to 2,000 m elevation.

Specimens Examined: 188 ♂ 22 ♀

COLOMBIA: *Cundinamarca*, Veragua; Bogotá; *Chocó*, Río San Juan; *Meta*, Villavicencio; *Boyacá*, Muzo; *Cauca*; *Carabobo*, Valencia; *Putumayo*, Umbría; *César*, Manaure; VENEZUELA: *Zulia*, La Kasmera; *Amazonas*, Yavita; Monte Duida; Cerro Marahuaca; Unión Orinoco-Ugueto; San Juan de Manapiare; *Mérida*, Mérida; *Carabobo*, Yuma; *Miranda*, Los Encantos; *Bolívar*, Auyán-tepui; Guri; Caicara; Suapure; *Aragua*, El Limón; GUYANE: *Guyane*, Cayenne; TRINIDAD: *St. George West*, Symonds Valley; ECUADOR: *Napo*, Curaray; Puerto Napo; Tena; Puerto Misahualli; *Tungurahua*, San José; Río Julita; *Pastaza*, Abitagua; *Pichincha*, Taguaza; PERU: *Loreto*, Iquitos; Río Cachiacu; Río Ucayali; Pebas; Nauta; Lago Yarina-Cocha; Mishana; *Amazonas*, Pongo de Rentema; *Huánuco*, Tingo María; Cahuapuna; Tournavista; *Pasco*, Chuchurras; Río Palcazu; Río Pachitea; Pozuzo; *Cuzco*, Cuzco; *San Martín*, Japelacio; *Junín*, La Merced; Río Perené; Río Colorado; Satipo; *Madre de Dios*, Madre de Dios; Boca Río la Torre; *Puno*, Carabaya; Inambari; BOLIVIA: *Santa Cruz*, Chapare; Portachuelo; Río Palmatilla; Río



Figures 92-95. *Eunica mygdonia omoa* Hall. ♂ dorsal (92) ventral (93) surfaces. COSTA RICA, Puntarenas, Palmar Norte (AME). ♀ dorsal (94) ventral (95) surfaces. PANAMA, Canal Zone, Los Rios (USNM).

Yapacani; *Cochabamba*, Cristal Mayo; BRAZIL: *Amazonas*, São Paulo de Olivença; Tefé; Manacapuru; Nova Olinda; Rio Calary-Uaupés; Rio Papuri; Marabitanas; Jauarét; Manicoré; Benjamin Constant; Fonte Boa; Humaitá; Manaus; Igarapé Preto; *Rondônia*, Cachoira do Samuel; Pimenta Buena; Vilhena; Calama; *Acre*, Alto Juruá; *Mato Grosso*, Buriti; Cuiabá; Diamantino; Cáceres; Barra do Bugres; Chapada; Juruena; Cuiabá-Santarém 500 km; *Minas Gerais*, São Jacinto Vale; Cantagalo; *Espírito Santo*; *São Paulo*, Itapura; Ilha Solteira; Pereira Barreto; *Pará*, Santarém; Obidos; Itaituba; *Goiás*, Mirandópolis; *Maranhão*, Imperatriz; *Santa Catarina*, Joinville; *Rio de Janeiro*, Rio de Janeiro.

*Eunica mygdonia omoa* Hall, 1919

Figures 92-95, 280, 320, 353

*Eunica mygdonia omoa* Hall, 1919. Entomol. :197. TL: Guatemala, [Izabal], Puerto Barrios. Syntypes: BMB ♂ ♀.  
 = *Eunica mygdonia* Godart [1824] 416. Godman & Salvin, 1883. Biol. Central Amer. 1: 227.  
 = *Eunica anna* Butler & Druce, 1874. Proc. Zool. Soc. 349 (nec Cramer) (Misdet.)

*Description:* As in *E. mygdonia* except for differences listed for *E. m. omoa* in the key to subspecies.

Average wing length ♂ (27-32) 30 mm, ♀ (30-34) 32 mm.

*Distribution:* The known distribution extends from Veracruz, México south in Central America to Panamá. (Fig. 353).

*Taxonomy and Variation:* The original description of *E. m. omoa* states that the ♂ has slightly darker wings, and the two small white subapical spots are whiter and more sharply defined. This is usually true but there is much variation. The female, however, is different since it has a distinctive white postmedian diagonal band crossed by dark veins.

Mexican specimens are larger than Costa Rican specimens and lighter brown, and the females have broader more diffuse white bands on the DFW and less pattern on the VHW, but these differences are not considered to be sufficient to describe a separate subspecies.

*Biology:* Adults are found in evergreen tropical forest and semi-deciduous tropical forest. They are more common on the Pacific slope of Costa Rica and Guatemala. This is a relatively uncommon subspecies and is usually solitary. It has been collected every month of the year with more records from June to December, and has been found from sea level to 1,200 m elevation in Costa Rica (DeVries, 1987).

Specimens Examined: 113 ♂ 8 ♀

MEXICO: *Veracruz*, Presidio Jun. 2 ♂ MPM; *Tabasco*, No specific locality 1 ♂ USNM; *Oaxaca*, Chimalapa Aug. Sep. 2 ♂ 1 ♀ AME; *Chiapas*, La Granja, Tacana Volcano 450 m, Jun. 5 ♂ AMNH; La Unión de Juárez 4 ♂ AMNH; Mapastepec Mar. Jul. Aug. 2 ♂ 3 ♀ AME; 3 ♂ UFPC; Tapachula 1 ♂ FSCA; Chajul DM; Arroya Miranda, Río Lacantún 6 ♂ MCZ; GUATEMALA: *Retalhue*, Retalhue, San Sebastián 1 ♂ USNM; *Escuintla*, Escuintla 5 ♂ USNM; Zapote BMNH; *Izabal*, Cayuga 1 ♂ USNM; Puerto Barrios; *Santa Rosa*, Guazacapan BMNH; *Puntarenas* Palmar 14 ♂ VK; Patulul 1 ♂ MCZ; BELIZE: *Toledo*, Punta Gorda 1 ♂ AMNH; HONDURAS: *Cortés*, San Pedro Sula BMNH; COSTA RICA: *Alajuela*, San Mateo 1 ♂ BMNH; 1 ♂ CMP; *Puntarenas*, Boruca Apr. 1 ♂ MPM; Palmar Norte 17 ♂ 2 ♀ FSCA; Río Térraba 3 ♂ USNM; *Cartago*, Turrialba 1 ♂ FSCA; *Guanacaste*, Parque Santa Rosa 300 m (DeVries); PANAMA: *Canal Zone*, Lion Hill 1 ♀ BMNH; Barro Colorado Island ex. ova 1 ♂ 1 ♀ USNM; Los Ríos Feb. 1 ♂ USNM; *Chiriquí*, Chiriquí 1 ♂ AMNH; *Veraguas*, Coiba Dec. 1 ♂ USNM; Santa Fé 230 m Oct. 1 ♂ USNM; *Veraguas* 1 ♀ BMNH.

*Eunica caralis* Hewitson, 1857

*E. caralis* is a member of the *E. amycla* and *E. mygdonia* group with the male genitalia

having an unusual brush of long hairs on the tegumen. However, in general appearance the male is similar to *E. sydonia*, and this has caused some confusion. They both have extended truncate forewings, a somewhat extended posterior anal area on the hindwings and a general dull purplish color. *E. sydonia* has a conspicuous white fringe on both wings, black male androconial tufts in the costal area of the DHW, and usually at the fork of  $Cu_1$  -  $Cu_2$  on the VFW. The VHW has a definite pattern with obvious ocelli. The female is brown with three white subapical maculae and a broad white diagonal postmedian band. The female of *E. caralis* is very similar to the male except with a curving brownish subapical diffuse whitish-brown band and less purplish on the DFW.

*Description:* Male. The DFW is purplish-brown in the basal three-fourths with the distal fourth contrasting brown, wing extended truncate with the apical area slightly darker purplish-brown. The DHW is all purplish-brown with the anal angle somewhat extended. All wing margins are smooth or slightly undulating and without a small white fringe. The VFW is brown with diffuse, blackish maculae, and blackish bands in the discal area; the subapical area is brown and the apical area light purplish. The VHW is dull or iridescent purplish-brown with a diffuse purplish median postmedian and submarginal bands, and the six postmedian ocelli are diffuse and difficult to delineate. Male genitalia. (Fig. 281). The ♂ hypandrium has two short rami, which are heavily toothed. There is a large dark brush of elongate hairs on each side of the tegumen, and the uncus is bent upward. The valva is roughly triangular and attenuated to an upturned point.

Female. (*E. c. ariba*). Very similar to the male except that the DFW has less purplish, is broadly mottled and there is a very diffuse, lighter brownish postmedian cross band and a dull, diffuse, whitish curving subapical crossband. The DHW is dull purplish-brown with no markings. The VFW is brown and has three blackish bands in the discal cell, with dull brownish cross bands in the postmedial and subapical areas as above in the DFW. The VHW is similar to the male.

#### Key to Subspecies of *Eunica caralis*

##### Males.

- 1a. Larger (ave. 36.5 mm), DFW duller purplish-brown with very diffuse border with distal fourth dull brown, lighter subapical area not strongly contrasted. VFW with a broad diffuse brownish subapical area; apical area brown with pale purplish overcast. . . . . *caralis*
- 1b. Smaller (ave. 32 mm), DFW dark bluish-purple, terminating with a narrow light brown subapical curving cross band, apical area dark brownish-purple. VFW with a postmedian narrow brown cross band, subapical brown cross band, apical area very pale purplish with whitish overcast. The hind wing margin is more undulating. . . . . *ariba*

##### Females.

The female of *ariba* is described above. I do not have a female of *caralis* for comparison. However, two females of *E. e. caralis* were examined earlier, and they are generally similar to *ariba* except with less contrast in colors.

*Eunica caralis caralis* (Hewitson), 1857 [Stat. rev.]

Figures 96-97, 281, 354

*Cybdelis caralis* Hewitson, 1857. Exot. Butt. 2: *Cybdelis*, [45], pl. [23]. ♀ 18-19. TL: "New Grenada". Syntypes: ♂ BMNH. A ♂ labeled "*caralis* Hew./TYPE/Columbien/Fruh." is type? (Examined)

= *Eunica picea* C. & R. Felder, 1861. Wien. Ent. Mon. 5: 105, n. 84. TL: Venezuela, [Distrito Federal], Caracas. Syntypes: 1 ♂ BMNH (Felder Coll.) (Examined) [Syn. nov.]

*Description:* As in *E. caralis* except for differences listed for *E. c. caralis* in the key to subspecies.

Average wing length ♂ (34-38) 36.5 mm.

*Distribution:* The nominate form occurs in Colombia and Venezuela, (Fig. 354). Old specimens labelled Honduras and Panama without specific locality labels may be errors. These records need to be confirmed if possible.

*Taxonomy and Variation:* The type of *E. caralis* is uncertain, but a ♂ labelled "*caralis* Hew./TYPE/ Colombien/Fruh." is in the BMNH. The original description states that the type was in the Hewitson Collection. The type is well illustrated by Hewitson, (1857) and it represents the Colombia population accurately. There is little variation. The type of *E. picea* is in the Felder collection in the BMNH. It is from Venezuela and is somewhat darker than *E. e. caralis*, but is otherwise quite similar. I have not seen any ♀ *E. picea*. It is synonymized here, but may be considered a darker extreme population.

*Biology:* Adults have been collected in January, August, October, and November. They are found from about 100 to 1600 m elevation.

Specimens Examined: 68 ♂, 2 ♀?

HONDURAS: No specific locality BMNH (Error?); PANAMA: No specific locality BMNH (Error?); COLOMBIA: *Cundinamarca*, Bogotá 2 ♂ CMP; 2 ♂ MPM; BMNH; *Antioquia*, Mesopotamia 1600 m 1 ♂ AMNH; Río Cocorná 400 m Aug. 1 ♂ AMNH; Frontino BMNH; *Boyacá*, Muzo 3 ♂ AME; 1 ♂ UFPC; BMNH; *Magdalena*, Santa Marta, las Taguas BMNH; *Meta*, Río Guatiguá; Buena Vista BMNH; Peperital BMNH; *Caldas*, Manizales BMNH; *Cauca*, San Juan de Micay BMNH; Papayán BMNH; *Tolima*, Río Chili BMNH; No specific locality 3 ♂ MNHP; 2 ♂ MNRJ; 1 ♂ USNM; 1 ♂ AMNH; 1 ♂ AME; VENEZUELA: *Distrito Federal*, Caracas 1 ♂ type of *E. picea* BMNH; No specific locality 1 ♂ BMNH.

*Eunica caralis ariba* Fruhstorfer, 1908

Figures 98-101, 281, 354

*Eunica ariba* Fruhstorfer, 1908. Stett. Ent. Zeit. 69: 48. TL: "Brazil?" ? Type: 1 ♂ Holotype. Location unknown.

*Eunica caralis ariba* Fruhstorfer, 1909. Stett. Ent. Zeit. 2: 212-213. (Stat. rev. by Fruhstorfer.)

*Description:* As in *E. caralis* except for differences listed for *E. c. ariba* in the key to subspecies.

Average wing length ♂ (31-34) 32 mm, ♀ (32.5-34) 33 mm.



96

97

Figures 96-97. *Eunica caralis caralis* (Hewitson). ♂ dorsal (96) ventral (97) surfaces. VENEZUELA, [Distrito Federal], Caracas. Syntype *Eunica picea* C. and R. Felder (BMNH).



*Distribution:* Occurs from Ecuador south on the Andean slopes through Perú to central Bolivia. (Fig. 354).

*Taxonomy and Variation:* I could not find the holotype of *E. ariba* in the BMNH. Fruhstorfer refers to the type with a label by Staudinger. It is clearly described, but the type locality is in doubt. Fruhstorfer (1909) realized that it is a subspecies of *caralis* and made the change. There is some variation in the intensity of bluish-violet especially in older specimens. The DFW is always dull with fuzzy or diffuse markings and ocelli even in fresh specimens.

*Biology:* I have collected male specimens in openings in evergreen tropical forest at Tingo María, Perú at 670 m. Adults have been collected from elevations of 150 to 1650 m with one reported record of 3,500 m which is very questionable. They have been found in February, March, July, September, November, and December.

Specimens Examined: 64 ♂ 3 ♀

ECUADOR: *Zamora-Chinchi*, Zamora; Zumbi 700 m. Oct. 4 ♂ AME; *Pastaza*, Abitagua, Río Pastaza 1200 m Dec. 1 ♂ AME; Oct. 1 ♂ CMP; BMNH; *Morona-Santiago*, Sucua 1 ♂ JC; *Tungurahua*, Hacienda la Mascota, Río Topo, 1500 m 1 ♂ CMP; Baños, Río Blanco 1,650 m Feb. 1 ♂ MPM; Ambato BMNH; *Pichincha*, La Vindilla 3,500 m (?), Jul 1 ♂ AME; PERU, *Ucayali*, Pucallpa 150 m Dec. 1 ♂ MJP; *Huánuco*, Tingo María 670 m, Mar. Jul. 2 ♂ JC; 1 ♂ MJP; Pozuzo BMNH; *Cuzco*, Cosñipata BMMN; *Junín*, Chanchamayo 1 ♂ USNM; 1 ♂ AMNH; Sanibeni 840 m Sep. 1 ♂ CMP; Satipo 1 ♂ CMP; La Merced BMNH; *Puno*, Santo Domingo 2,000 m Nov. BMNH; Carabaya BMNH; Inambari BMNH; *Pasco*, La Salud; BOLIVIA: *Cochabamba*, Río Chapare Mar. 1 ♂ 1



98



99



100



101

Figures 98-101. *Eunica caralis ariba* Fruhstorfer. ♂ dorsal (98) ventral (99) surfaces. PERU, Huánuco, Tingo María (JC). ♀ dorsal (100) ventral (101) surfaces. ECUADOR, Tungurahua, Ambata (BMNH).

♀ MPM; Mar. 1 ♂ MPM; Cochabamba 600 m 1 ♂ BMNH; Río Cristal Mayo 1 ♀ MPM; Santa Cruz, Buenavista 400 m 1 ♂ MPM; La Paz, Coroico; BRAZIL: Fruhstorfer type! No specific locality.

*Eunica maja* (Fabricius), 1775

*E. maja* has extended truncate wings with three dull whitish or brownish postmedian maculae. There is a conspicuous blue-purple color dorsally, and small ocelli on the VHW. It occurs in southern South America with a rare subspecies in Colombia and Peru.

*Description:* Male. The DFW is extended truncate, the basal three-fourths is bluish-purple with three postmedian, diffuse, white maculae, darker subapical area with three very diffuse light brown maculae and a darker apex. The DHW is brown glossed with bluish-purple, the anal margin is extended. The VFW is dull brown with dark discal markings and three whitish postmedian maculae in a dark area; the apical area is brownish-purple with a thin line of four commas. The VHW is dull brownish-purple with dark wavy median and submarginal lines and postmedian ocelli with two ocelli with white pupils joined anteriorly, and a large and a small ocellus posteriorly. Male genitalia. (Fig. 282). The male hypandrium is blunt posteriorly with teeth. The gnathos is long and thin; the valva is swollen at the crista and has an erect chitinized tooth. There is a pointed apex.

Female. The DFW has the basal third brown, the distal two-thirds black, with seven large white maculae including one in  $Cu_2-2A$ . The DHW is brown with a submarginal dark line. The VFW has the basal area grey and distal two-thirds has white maculae as on the DFW. The apical area is grey with a line as in the male. The VHW is similar to the male. Female genitalia. (Fig. 321).

Key to Subspecies of *Eunica maja*

Males.

- 1a. DFW with apex more extended and less truncate, not as incurved posterior to the apex. Basal half dull purple, distal half dull brown without whitish maculae, no subapical maculae. VHW with two postmedian anterior ocelli with very black-ringed large white pupils. . . . . *noerina*
- 1b. DFW truncate heavily incurved posterior to the apex. Basal two-thirds bluish-purple, with three whitish postmedian maculae and three diffuse brownish subapical maculae. VHW with inconspicuous ocelli, the anterior two with white pupils barely ringed with black. . . . . *maja*

Females.

No consistent differences have been found to separate the females of these subspecies.

*Eunica maja maja* (Fabricius), 1775

Figures 102-105, 282, 321, 355

*Papilio maja* Fabricius, 1775. Syst. Ent. : 512 n. 295. TL: "Brazil" Syntypes: BMNH, (Type in Banks Collection).

= *Nymphalis maia* Godart [1824] Enc. Meth. 9: 417 n. 210.

= *Cybdelis naeris* Herrich-Schäffer [1855]. Samml. ex. Schmett. 77, t[17] f. 65-68. 1858: 51 TL: "Mexico" [Error]. Syntypes: ♂ ♀ (Location of types unknown).

*Description:* As in *E. maja* except for differences listed for *E. m. maja* in the key to subspecies.

Average wing length ♂ (20-28)26 mm, ♀ (22-30)27 mm.

*Distribution:* Occurs in southern Brazil from Espírito Santo and Goiás to Central Bolivia, Paraguay, and northern Argentina south to Buenos Aires. (Fig. 355).

*Taxonomy and Variation:* The Fabrician types according to Butler (1869) "the type and a second specimen of *P. maja* are in the Banksian Collection." This was confirmed by Lamas (pers. comm.). The figure in Jones' Icones 1785 [vol. IV (slide 441)] of Fabricius'

*maia* No. 454 is confusing. It shows a figure of a ♀ ventral surface which is similar to a ♀ *E. maja* except for two white apical maculae. The dorsal view, presumably of a male(?), has two prominent white subapical maculae instead of a brownish-white suffusion in this area, three postmedian suffused maculae and purplish in the basal half. The female has three subapical and three postmedian white maculae. The male and female are transposed. The description of the female agrees with the male, but the dorsal view does not resemble *E. maja* and could not be determined. Godart [1824] states that Fabricius is misleading, that he not only mixed the male for a female of *E. maia* but also confused this species with *agathis* or *agathina* of Cramer [this is in error].

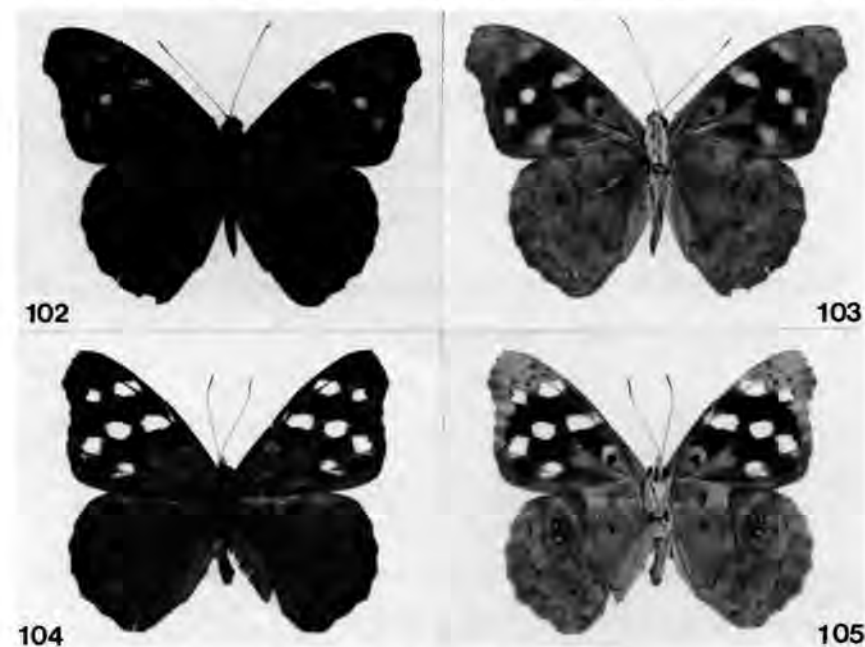
Herrich-Schäffer [1855] described *Cybdelis naeris* and illustrated the male and female (pl. 681, figs. 65-68) from México! These are typical *E. maja*, and *E. naeris* was synonymized by Kirby (1871) and Seitz (1915).

There is much variation in size and in the amount of whitish-brown in the maculae on the DFW of the male. There is also much variation in the submarginal maculae on the VHW of the male and female.

*Biology:* Adults have been collected every month of the year, but mostly during the summer from September to February. They have been found at elevations from near sea level to over 500 m.

Specimens Examined: 163 ♂ 95 ♀

BOLIVIA: *Santa Cruz*, Prov. de Sara; PARAGUAY: *Central*, Asunción; Patiño Cué; *Paraguarí*, Sapucay; *Guiará*; Villarrica; ARGENTINA: *Buenos Aires*, Buenos Aires; El Jabali; *Corrientes*; *Formosa*; *La Rioja*; *Misiones*; *Santa Fé*; *Chaco*; BRAZIL: *Goiás*, Goiás; *Espírito Santo*, Collatina; Itapemirim; Baixo Guandu; Itaguaçu; Linhares; Marataises; Itabapoana; *Minas Gerais*, Ipanema; Flamengo; Caxambú; Cambuquiera; Sambaia; Caraça;



Figures 102-105. *Eunica maja maja* (Fabricius). ♂ dorsal (102) ventral (103) surfaces. BRAZIL, Espírito Santo, Linhares (AME). ♀ dorsal (104) ventral (105) surfaces. BRAZIL, Espírito Santo, Linhares (AME).

San Jacinto Vale; Cantagalo; *São Paulo*, São Paulo; Rio Clara; Araras; Mirassol; Loreto; Lavinia; Alto Paraná; Ilha Solteira; Getulina; Ilha Seca; Salto Avanhandava; Mogy Guaçu; Cerro Azul; Anhangai; Santos; Bauru; Araçatuba; Batatais; *Rio de Janeiro*, Rio de Janeiro; Tijuca; Petrópolis; Jacarepaguá; Boca do Mato; Paineiras; Cavalão; Gávea; Angra; Rio Preto; Quemados; Nova Friburgo; Santo Antônio dos Brotos; *Paraná*, Ponta Grossa; Guarapuava; Guairá; Castro; Caviúna; Jaguariaíva; N. Paraná; *Santa Catarina*, Joinville; Londrina; Trombudo Alto; *Acre*, Rio Juruá, Taumaturgo (?).

*Eunica maja noerina* Hall, (1935) [Stat. rev.]

Figures 106-109, 282, 321, 355

*Eunica noerina* Hall, 1935. Entomologist. 68: 222. TL "Upper Amazon". Syntypes: 2 ♂ BMB.

*Description:* As in *E. maja* except for differences listed for *E. m. noerina* in the key to subspecies.

Average wing length ♂ (25-29)27 mm. ♀ 25.5 mm

*Distribution:* Occurs in north-central Colombia, southern Perú, and perhaps in Obidos, Pará, and Taumaturgo, Acre, Brazil (Fig. 355). This subspecies is either rare or rarely collected and the exact distribution is not known.

*Taxonomy:* *E. m. noerina* was described by Hall (1935). It is similar to *E. m. maja* and has been confused with it. The male genitalia are nearly identical, but the ♂ hypandrium of *E. m. noerina* is somewhat broader and has more teeth posteriorly. I have not examined the 2 ♀ types in the BMB. There is some variation in the purplish coloring on the dull brownish background and in the size of the white ocelli in the anterior pair of ocelli on the VHW.

*Biology:* Nothing is known about the biology except that it has been collected from July to October at elevations of from 300 m to 800 m and perhaps below 200 m at Obidos,



Figures 106-109. *Eunica maja noerina* Hall. ♂ dorsal (106) ventral (107) surfaces. PERU, Madre de Dios, Boca Río la Torre (MJP). ♀ dorsal (108) ventral (109) surfaces. PERU, Madre de Dios, Boca Río la Torre (MJP).

## Brazil.

Specimens Examined: 25 ♂ 1 ♀

COLOMBIA, *Cundinamarca*, Bogotá 10 ♂ BMNH; 3 ♂ AME; *Santander*, El Centro 2 ♂ USNM; PERU: *Madre de Dios*, Boca Río la Torre 300 m. Jul.-Sep., Nov. Dec. 11 ♂ 1 ♀ UN; Puerto Maldonado 30 km S, Oct. 1 ♂ USNM; ? BRAZIL: *Pará*, Obidos 1 ♂ AMNH; *Acre*, Río Juruá, Taumaturgo 1 ♂ UFPC.

*Eunica anna* (Cramer), 1780

Figures 110-111, 283, 356

*Papilio anna* Cramer, 1780. *Papil. Exot.* 158, 173, pl. 281, f. A. B. TL: "Surinam" Syntypes: W. van der Meulen. Probable syntype in the Felder Coll. in the BMNH (Lamas, pers. comm.).

*Description:* The DFW has an extended, rounded truncate margin, the basal half is iridescent purple and the distal half is dull brown with three, lighter brown, postmedian and three diffuse subapical maculae. The DHW is iridescent purple in the basal part and the remainder brown with a dark submarginal line. The VFW is light brown basally with three whitish postmedian and three subapical maculae. The apical area is grey-purple with a curving line. The VHW is pale purple and has two broad, reddish-brown maculae and a diffuse median band and a submarginal line. There are two black postmedian ocelli with white pupils joined together in an oval, with a yellow iris and small and large, posterior, circular ocelli with black pupils and yellow iris. Male genitalia. (Fig. 283). The ♂ hypandrium is nearly round with a posterior narrowed projection with two lobes. The uncus is attenuated and beaked. The valva is elongate, spatulate and rounded and has a curved chitinous horn between the crista and apex.

Female. The DFW is brown with or without blue at the base, there are three large postmedian and two subapical white maculae. The DHW is without blue or with a faint blue overcast at the base, with indistinct submarginal markings. The VHW is similar to the male but lighter color.

Average wing length ♂ (30-31)30.5 mm.

*Distribution:* This rare species is found from Colombia and Guyane in the central Amazon to Perú (Fig. 356). A record from Costa Rica is an error. Godman and Salvin (1883) state that Butler and Druce (1874) misidentified *E. anna* and that it is *E. mygdonia [omoa]*.

*Taxonomy and Variation:* The ♂ was described by Cramer (1780) and the figures (A & B, pl. 281) are sufficiently accurate to characterize the ♂. I have not been able to positively identify the type. I have found some variation in the size of the white pupil in the anterior ocelli of the VHW. The ♀ is rare and only two specimens are known to



Figures 110-111. *Eunica anna* (Cramer). ♂ dorsal (110) ventral (111) surfaces. PERU, Huánuco, Río Huallaga (AMNH).

have been found.

*Biology:* Nothing is known of the biology except that it is rare and has been collected in February. It has been found at elevations from near sea level to about 200 m, usually near rivers.

Specimens Examined: 34 ♂ 2 ♀

COLOMBIA: *Putumayo*, Florida 1 ♂ BMNH; *Meta*, San Martín Feb. 1 ♂ USNM; "Senyo" 1 ♂ BMNH; *Santander*, El Centro 1 ♂ AMNH; PERU: *Loreto*, Iquitos 1 ♂ AMNH; *Pebas* 1 ♂ MNRJ; *Pasco*, Río Palcazu 1 ♂ BMNH; *San Martín*, Japelacio 1 ♂ AMNH; *Huánuco*, Río Huallaga 1 ♂ AMNH; BRAZIL: *Amazonas*, Río Uaupés, 1 ♂ BMNH; São Paulo de Olivença 1 ♂ BMNH; Tefé 1 ♂ BMNH; Benjamin Constant 1 ♂ MNRJ; Rio Javari 1 ♂ BMNH; Manicoré 1 ♂ MNRJ; *Pará*, No specific locality 1 ♂ FMNH; Obidos 1 ♂ AMNH; SURINAM: Type locality (Cramer, 1780); GUYANA: No specific locality Hall (1983); COSTA RICA: Butler & Druce (1872) [Error].

*Eunica malvina* Bates, 1864

*E. malvina* is a widespread species extending from México to Bolivia and southern Brazil.

*Description:* Male. The DFW is blackish-brown with three whitish-brown, postmedian maculae and three similar subapical maculae. There is a dark purplish suffusion or overcast. The DHW has a color similar to the DFW. There is a thin, dark, submarginal line on both wings. The VFW is light brown with a whitish crescent in the discal cell and three postmedian and three subapical white maculae. The apical area is pale grey-violet with six or seven black spots, the distal four form a narrow curving line. The VHW is grey-violet with two large, brown costal maculae and medial and submarginal brown lines. Two large, postmedian, black and one anal ocelli have white pupils with a yellow iris, the two anterior ocelli are enclosed, and there is a much smaller ocellus in  $M_2-M_3$ . There are two posterior ocelli with the forward ocellus half the size of the more posterior. Male genitalia. (Fig. 284). The ♂ hypandrium is slightly narrowed posteriorly. The uncus is bent upward with heavily chitinized teeth at the base of the beak.

Female. The DFW has the basal area light brown, the distal half is black with three bright white postmedian and three subapical maculae. The DHW is brown with a fine submedial line. The VFW is similar to the ♂ but with larger whiter maculae. The VHW is similar to the ♂. Female genitalia. (Fig. 322)

Key to Subspecies of *Eunica malvina*

Males.

- 1a. VFW with three very large postmedian white maculae sharply defined, square or rectangular in shape. The central rectangular white macula in  $M_1-Cu_1$  is 3.5-4.5 mm and is bordered distally by a black ocellar spot ..... *albida*
- 2a. VFW with smaller postmedian whitish maculae usually rounded in shape with diffuse edges. The white macula in  $M_1-Cu_1$  is 2.5-3.5 mm and does not extend to a black ocellar spot ..... *malvina*

Females.

- 1a. DFW with three very large, rectangular, white, contiguous maculae nearly forming a white band. The white macula in  $M_3-Cu_1$  is 5.0-7.0 mm. VFW with large subapical white maculae, and the apical area nearly all white ..... *albida*
- 1b. DFW with three squarish or rounded smaller postmedian white maculae not contiguous with each other. The central white macula in  $M_3-Cu_1$  is 3.0-4.0 mm. VFW with smaller subapical white maculae, and the apical area is greyish-purple ..... *malvina*

*Eunica malvina malvina* Bates, 1864 [Stat. rev.]



*Eunica malvina* Bates, 1864. J. Entomol. 2: 195, Pl. 9, f. 2, 2a. TL: Brazil, [Pará] Obidos. Syntypes: BMNH 1 ♂ Rh. 9315, 1 ♀ Rh 9316. Bates Coll.; Godman Salvin Coll. (Examined)

*Description:* As in *E. malvina* except for the differences listed for *E. m. malvina* in the key to subspecies.

Average wing length ♂ (26.0-32.0)29.5 mm, ♀ (26.5-32.0)29.0 mm.

*Distribution:* Occurs from Colombia, Venezuela, and the Guyanas south to southern Perú, Bolivia and southeastern Brazil to Rio de Janeiro. (Fig. 357).

*Taxonomy:* I have examined specimens marked "TYPE HT ♂ & ♀" in the BMNH. They are typical of the South American population, and agree with the description by Bates, (1864). There is variation in size and darkness of coloring of the dorsal surface of males, and in the intensity of markings on the VHW, especially the longitudinal, whitish, stripe in  $M_2-M_3$ . There is similar variation in the females. On the DFW, there is sometimes a small extra white macula in  $R_2-M_1$ .

*Biology:* Occurs at the edges and in openings of evergreen tropical forest, especially in wet places and at fermenting fruit baits. I have collected specimens in Ecuador and Perú on fruit baits. They are found from near sea level to about 600 m elevation. Adults have been collected every month of the year with more records in March and September.

Specimens Examined 122 ♂ 65 ♀

COLOMBIA: César, Manaure; Amazonas, Isla la Ronda; Valle, Cartago; Magdalena, San Pablo; Cundinamarca, Bogotá; Santander, El Centro; Barrancabermeja; Sinistara; Meta, Villavicencio; Putumayo, Puerto Umbría; Caquetá; VENEZUELA: Carabobo, Yuma; Valencia; Miranda, Las Encantos; Monagas, Jusepin; La Esperanza; Bolívar, Bochinche; Chapare; Caicara; Suapure; Táchira, La Morita; Aragua, El Limón; Sucre, Carúpano; Amazonas (0° -66°); GUYANA: Berbice, New River Triangle, Camp Jaguar; Mazaruni-



Figures 112-115. *Eunica malvina malvina* Bates. ♂ dorsal (112) ventral (113) surfaces. BRAZIL, [Pará] Obidos. Syntype *Eunica malvina* Bates (BMNH). ♀ dorsal (114) ventral (115) surfaces. BRAZIL, [Pará], Obidos. Syntype *Eunica malvina* Bates (BMNH).

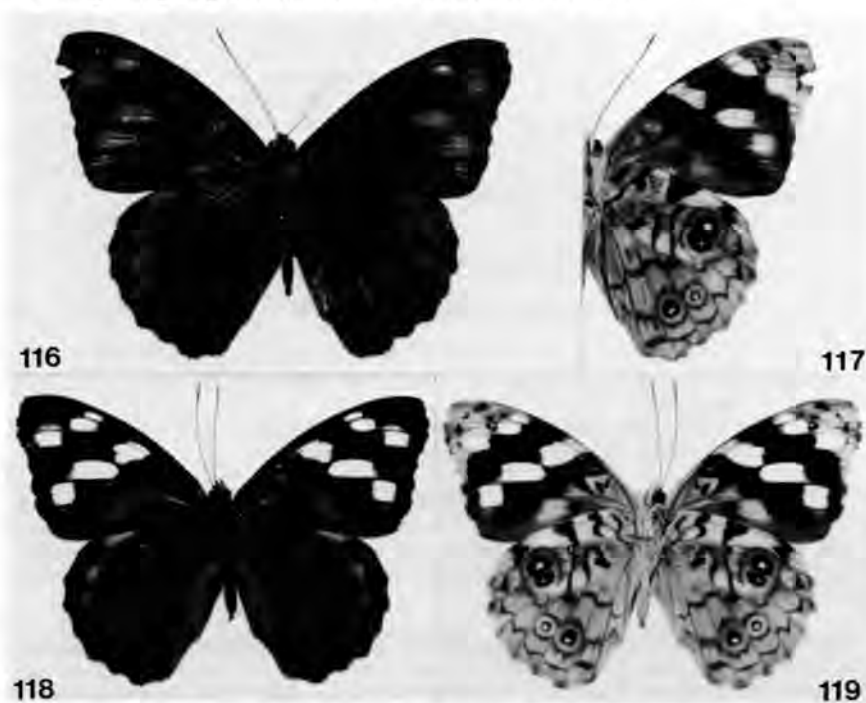
*Potaro*, Omai; Carimang River; SURINAM: *Brokopondo*, Berg en Dal; GUYANE: *Guyane*, Bas-Maroni; St. Jean du Maroni; Upper Maroni; TRINIDAD: *Saint George*, Saint Anna; Symond's Valley; ECUADOR: *Tungurahua*, Río Negro; Río Topo; *Napo*, Curaray; Puerto Misahualli; Arosmena Tola [Sarzacu]; PERU: *Loreto*, Mazan, Camp Explorana; Mishana; Pebas; Iquitos; Río Nanay; Boquerón del Padre Abad; *Junín*, Satipo; Chanchamayo; *Pasco*, Río Pichis; Chuchurras; Palcazu; *Huánuco*, Río Huallaga; *Madre de Dios*, Boca Río Torre; Río de las Piedras; Puerto Maldonado; *Puno*, Inambari; Oroya; BOLIVIA: *Santa Cruz*, Río Yapacani; *Cochabamba*, Todos Santos; BRAZIL: *Amazonas*, Maués, São Paulo Olivença; Tabatinga; Benjamin Constant; Tefé; Villa Nova; Fonte Boa; Rio Calary-Uaupés; *Pará*, Obidos; Bragança; Benevides; Utinga; Itaituba; Santarém; Caradas; Uraricará; *Minas Gerais*, São Jacinto Vale; *Mato Grosso*, Cuiabá; Santa Teresa; Pirapetinga; Chapada; Nioaque; Buriti; *Rio de Janeiro*, Teresópolis; Xerém; *Roraima*, Vista Alegre; Rio Surubá; *Acre*, Eirunapé; Alto Juruá; São Paulo; Araçatuba.

*Eunica malvina albida* [ssp. nov.]

Figures 116-119, 284, 322, 357

*Description:* As in *E. malvina* except for the differences listed for *E. m. albida* in the key to subspecies. The ♂ genitalia (Fig. 322) of *E. m. albida* has heavily chitinized, dorsal teeth on the uncus more distally, mostly on the beak, than in *E. m. malvina* in the specimens studied.

Average wing length ♂ (28-32)29.5 mm, ♀ (27-31)29.0 mm.



Figures 116-119. *Eunica malvina albida* Jenkins. ♂ dorsal (116) ventral (117) surfaces. MEXICO, Chiapas, Mapastepec. Holotype *Eunica malvina albida* Jenkins (AME). ♀ dorsal (118) ventral (119) surfaces. GUATEMALA, Santa Rosa, Coatepeque. Paratype *Eunica malvina albida* Jenkins (CB).

HOLOTYPE: MEXICO: 1 ♂ *Chiapas*, Mapastepec. Collected June 1960 (T. Escalante) in AME.

PARATYPES: MEXICO: ♂ *Chiapas*, Mapastepec, 1 ♂ June 1960 (T. Escalante) AME; Chajul 1 ♂ DM; GUATEMALA: *Santa Rosa*, Guazacapan 1 ♂ AME; Coatepeque 1 ♂ 2 ♀ CB; COSTA RICA: *Puntarenas*, Palmar Norte 3 ♂ FSCA; PANAMA, *Canal Zone*, Los Rios 1 ♀ FSCA; *Veraguas*, Calobre 1 ♂ 1 ♀ BMNH.

*Distribution*: Occurs from Tabasco and Chiapas, México south in Central America to the Canal Zone, Panamá (Fig. 357).

*Taxonomy and Variation*: There is variation in size, in the darkness of the dorsal surface of the male and in the intensity of markings on the VHW, especially the whitish longitudinal stripe in  $M_2$ - $M_3$ .

*Biology*: Adults are found at the edges of forests, especially tropical evergreen forest. The males visit water seepage and both sexes are attracted to rotting fruit according to DeVries (1987). He states that they occur from sea level to 700 m on the Pacific slope of Costa Rica, in association with all forest habitats. *E. m. albida* is present throughout the year, though in reproductive diapause during the dry season.

Specimens Examined 25 ♂ 17 ♀

MEXICO: *Chiapas*, Mapastepec Jun. 2 ♂ AME; La Granja Jul. 1 ♂ AMNH; Chajul (de la Maza, 1985); *Tabasco*, Humanguillo (de la Maza, 1985); GUATEMALA: *Santa Rosa*, Guazacapan Jun. 1 ♂ 1 ♀ BMNH; 1 ♂ AME; Coatepeque 1 ♂ 2 ♀ JP; *Quetzaltenango*, Volcán Santa María 1 ♂ BMNH; *San Marcos*, El Tumbador 800 m 2 ♀ BMNH; *Izabal*, Cayuga Jun. 1 ♂ USNM; *Escuintla*, Zapote 1 ♂ BMNH; *Escuintla* Jun. 1 ♂ USNM; No specific locality 1 ♂ CMP; 1 ♀ MCZ; COSTA RICA: *Alajuela*, San Mateo 1 ♂ BMNH; 1 ♀ USNM; *Bagaces*, Bagaces 100 m Jun 1 ♂ USNM; *Puntarenas*, Palmar Norte Jun. 1 ♂ AME; 2 ♂ FSCA; San Vito 1,150 m (DeVries); *Guanacaste*, Parque Santa Rosa 300 m (DeVries); Cañas Nov. 50 m. 1 ♂ USNM; BELIZE: No specific locality 1 ♀ AMNH; PANAMA *Chiriquí*, Chiriquí 1 ♂ BMNH; *Veraguas*, Calobre 1 ♂ 1 ♀ BMNH; *Veraguas* 2 ♂ BMNH; *Panamá*, Río Trinidad 2 ♀ AMNH; *Canal Zone*, Summit 1 ♂ 1 ♀ USNM, Farfan 1 ♂ JC, Los Rios Feb. 2 ♀ USNM; Madden Dam 1 ♀ USNM; Barro Colorado Island Jul. 1 ♀ MCZ; No specific locality 1 ♂ 1 ♀ BMNH.

#### *Eunica concordia* (Hewitson), 1852

Figures 120-123, 285, 323, 358

*Cybdelis condordia* Hewitson, 1852. Exot. Butt. I. *Cybdelis* [61], pl. [31], f. 1. TL: "Amazon", "Type" is from [Brazil] "São Paulo" [de Olivença]. Syntypes: ♂ BMNH Rh. 9309 (Examined)

= *Evonyma concordia satura* Röber, 1923. Stett. Ent. Zeit. 84:96. TL: "West-Columbien" (Magdalenenstrom). Syntypes: Location unknown. [Syn. nov].

*E. concordia* is the last species of the *E. maja* group. It has iridescent blue, angularly truncate wings, with five diffuse brownish-white maculae on the DFW. The ♂ hypandrium is completely different, being very elongate and narrow, terminating with small, bifurcate rami with sharp points. It is quite similar to the distantly related *E. norica*, which is very different in most other characters.

*Description*: Male. The DFW is angularly truncate with a dentate margin, iridescent blue except for the outer border: there are three postmedian and two subapical diffuse brownish-white maculae. The DHW is iridescent blue especially in the postmedian area; the margin is dentate with white fringe. The VFW has a basal white comma in the discal cell, three whitish postmedian and one or two diffuse subapical maculae. The apical area is greyish-purple. The VHW is purplish with broad, reddish-brown, basal and medial markings and a submarginal thin line. There are two anterior, black ocelli with white,

ovate pupils with a yellow iris. There are two posterior ocelli with black pupils. Male genitalia. (Fig. 285). The male hypandrium is very narrow and elongate with bifurcate rami with pointed projections.

Female. The DFW is light brown in the basal half, and the distal half is dark brown with six white maculae and a light area in  $Cu_2-2A$ . The DHW is brown with a submarginal line. The VFW has seven whitish maculae. The VFW is similar to the  $\delta$  but a submedian costal macula is whiter. Female genitalia. (Fig. 323).

Average wing length  $\delta$  (22-28)26 mm,  $\varphi$  (26-27)26.5 mm.

*Distribution:* Occurs from Colombia to Guyane and throughout the Amazon basin west to Ecuador and Perú. (Fig. 358)

*Taxonomy and Variation:* I have examined the type  $\delta$  of *E. concordia*, and it is typical of the population. There is a relatively small amount of variation in color and pattern but great variation in size. A common variation is that described by Röber (1923) as *Evonyme concordia satura*. This is said to have more intensive and brighter iridescent blue on the dorsal surfaces, with much less prominent lighter maculae, and the ventral surfaces darker. *E. c. satura* is found in the same localities as the typical form. It may be a seasonal form of no taxonomic significance and is synonymized here.

*Biology:* This species is widely distributed and locally common in evergreen tropical forest especially near rivers. I have collected adults in forest openings in several localities in Perú. It has been collected every month of the year with most specimens collected in September-October and in March. This species has been found from near sea level to about 800 m elevation.

Specimens Examined: 123  $\delta$  18  $\varphi$

COLOMBIA: *Meta*, Río Ocoa; Serranía La Macarena; Villavicencio; *Amazonas*, Isla la Ronda; *Santander*, El Centro; *Cundinamarca*, Bogotá; Putumayo; Caquetá; VENEZUELA: *Amazonas*, Cerro Duida; GUYANA: *Berbice*, New River Triangle, Camp Jaguar; "British Guiana"; no specific locality; SURINAM: *Suriname*, Geldersland; GUYANE: *Guyane*, St. Jean du Maroni; St. Laurent; Nouveau Chantier; ECUADOR: *Tungurahua*,



Figures 120-123. *Eunica concordia* (Hewitson).  $\delta$  dorsal (120) ventral (121) surfaces. BRAZIL, [Amazonas], "São Paulo" [de Olivença]. Syntype *Cybdelis concordia* Hewitson (BMNH).  $\varphi$  dorsal (122) ventral (123) surfaces. "Amazons" (BMNH).

Baños Runtun; "Incinsilla"; PERU: Loreto, Mishana; Explornapo, 70 km NE Iquitos; Iquitos; Pebas; Río Cachiyacu; Ucayalí, Pucallpa; San Martín, Jepelacio; Tarapoto; Junín, Río Perené; Huánuco, Tingo María; Pasco, Río Pichis; Cahuapanas; BRAZIL: Amazonas, Río Calary-Uaupés; Tonantins; Manicoré; Río Uraricuero; Huitanaã; Lábrea; São Paulo de Olivença; Tefé; Benjamin Constant; Río Papuri; Uypiranga; Humaitá; Rondônia, Porto Velho; Jaru; Mato Grosso, Diamantino; Barra do Bugres; Alto Rio Xingú; Posto Jacaré; Pará, Santarém; Obidos; Paragominas; Itaituba; Roraima, Rio Surubai; Ururicaponá; Acre, Alto Juruá.

*Eunica marsolia* (Godart), [1824]

*E. marsolia* is a small, bluish-purple colored species with rounded non-truncate wings. It is most closely related to *E. monima* and *E. pusilla* and forms a species group. *E. marsolia* has relatively primitive ♂ genitalia, but instead of having the VHW ocelli separate and in a row, this species has three anterior ocelli combined into an enclosed ellipse. The females have five or six white maculae, and a new subspecies has a postmedian white band of large maculae.

*Description: Male.* The DFW is bluish-purple in the basal three-fourths, the distal fourth is black with two very faint, subapical, brownish maculae. The DHW is bluish-purple with long, hairy, black male androconia in the discal cell. The VHW has a light discal cell with black diagonal lines, a postmedian dark area, and a subapical area of light purplish with ocelli. The VHW is variable, purplish or greyish in color, with three prominent postmedian ocelli anteriorly, a small ocellus in  $M_2-M_3$ , and three posterior ocelli. There is a broken median line and an undulating submarginal line. Male genitalia. (Fig. 286). The ♂ hypandrium is constricted and narrowed posteriorly. The uncus is elongate and beaked and the valva is long and attenuated not pointed.

*Female.* The DFW has the basal half brown and the distal half black, with three postmedial white maculae (or a diagonal band of white maculae) and two or three subapical white maculae. The DHW is brown with a thin dark median and submarginal line, and usually dark postmedian ocelli. The VFW is grey in the basal half and the distal half is black with maculae as on the DFW, with a grey-purple apical area. The VHW is similar to the ♂ but may have less darker purplish background. Female genitalia. (Fig. 324).

Key to Subspecies of *Eunica marsolia*

Males.

- 1a. VHW base color grey with purplish wash of anterior half of the medial area; ocelli from  $M_2$  very distinct posteriorly with thick ring around ocelli strongly contrasted. . . . . *fasulia*
- 1b. VHW with base color purplish including posterior half; ocelli and surrounding thin ring not strongly contrasted with purplish background . . . . . 2
- 2a. Forewing length smaller (18-19 mm); VHW area basal to median line light greyish-purple; darker distal to median line. . . . . *paraensis*
- 2b. Forewing length usually larger (18-24 mm); VHW suffused with purplish color . . . . . *marsolia*

Females.

- 1a. DFW with a postmedian diagonal band of five or six generally contiguous white maculae; two white maculae present in  $Cu_1-Cu_2$ . Size smaller (17-19 mm) . . . . . *paraensis*
- 1b. DFW with three separate white maculae in postmedian area; only one white macula in  $Cu_1-Cu_2$ . Size larger (19-24 mm). . . . . 2
- 2a. VHW base color light grey with purplish only in surrounding area of four anterior ocelli; ocelli from  $M_2$  posteriorly very distinct; area distal to median line in posterior half grey . . . . . *fasulia*
- 2b. VHW base color purplish; area distal to median line darker purple . . . . . *marsolia*

*Eunica marsolia marsolia* (Godart), [1824] [Stat. rev.]

Figures 124-127, 286, 324, 359

*Nymphalis marsolia* Godart, [1824]. Enc. Meth. 9: 418, n. 214. TL: "Brasil". Syntypes:

♂ ♀ Location unknown. Not found in MNHP.

?=*Eunica taurione* Geyer, 1832. Zuträge Exot. Schmett. 39, pl. [135], f. 783-784. TL: "Ostindien" (Error). [Brazil?]. Syntypes: Location unknown. (Vienna?)

*Description:* As in *E. marsolia* except for differences listed in the key to subspecies. Average wing length ♂ (18-24)22.5 mm, ♀ (22-24)22.5 mm.

*Distribution:* Occurs from Bahia, south to São Paulo in eastern Brazil mainly in the coastal region. (Fig. 359). A record from Australia is an error.

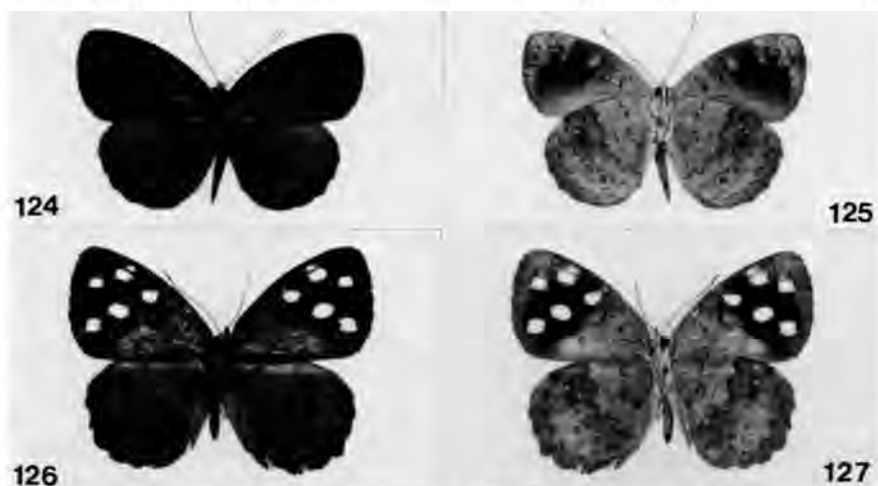
*Taxonomy and Variation:* The syntype ♂ and ♀ of *E. marsolia* by Godart [1824] were not found in the MNHP. The original description is sufficiently clear to distinguish *E. m. marsolia*. The ♂ syntypes of *E. taurione* Geyer (1832) have not been found. Fruhstorfer (1909) synonymized *E. taurione* [♀ Brazil] as a synonym of *E. m. marsolia* when he described *E. m. fasula*. It was considered by Seitz (1915) as a species with ♀ *marsolia* as a synonym. Without having any available types for study, I tentatively include *E. taurione* as a synonym. The type locality "Ostindien" is an error, although Fruhstorfer (1909) designates a ♀ from Brazil.

There is some variation in the presence of two obscure and diffuse, subapical, brownish maculae on the ♂ DFW. The amount of bluish-purple iridescence on the dorsal wing surface depends on the angle of light. There is some variation in the amount of general purplish suffusion on the ♂ VHW. Some variation occurs in the darkness of postmedian maculae on the ♀ DHW and in the size of the white maculae on the ♀ DFW.

*Biology:* Adults have been collected from February to June at lower elevations from near sea level to a few hundred m.

Specimens Examined 19 ♂ 16 ♀

BRAZIL: Bahia, Salvador 2 ♂ JC; Grungogi May 1 ♂ MNRJ; No specific locality 1 ♂ BMNH; Espírito Santo, Linhares Feb. Mar. Jun. 2 ♂ 1 ♀ AME; Colatina 1 ♂ MNRJ;



Figures 124-127. *Eunica marsolia marsolia* (Godart). ♂ dorsal (124) ventral (125) surfaces. BRAZIL, Bahia, Salvador (JC). ♀ dorsal (126) ventral (127) surfaces. BRAZIL, Espírito Santo, Marataisas (AME).



No specific locality 1 ♂ 2 ♀ BMNH; Marataias Apr. Jun. 8 ♂ 8 ♀ AME; *Rio de Janeiro*, Rio de Janeiro 1 ♂ 3 ♀ BMNH; Santo Antônio dos Brotos 1 ♀ BMNH; Minas Gerais, no specific locality 2 ♂ 1 ♀ BMNH; *São Paulo*, São Paulo 1 ♂ BMB; AUSTRALIA: *Cape York*, Queens Flood, MCZ: (Error in labelling).

*Eunica marsolia fasula* Fruhstorfer, 1909

Figures 128-131, 286, 324, 359

*Eunica marsolia fasula* Fruhstorfer, 1909. Stett. Ent. Zeit. 68: 215. TL: "Amazonas Sup. "♂ Type" [Perú], Pebas. Syntypes: BMNH 1 ♂ 1 ♀, ♂ Amaz. S., ♀ Pebas. (Examined).

*Description*: As in *E. marsolia* except for differences listed in the key to subspecies. Average wing length ♂ (19-23)21.5 mm, ♀ (19-24)22 mm.

*Distribution*: Found from Colombia and southern Venezuela to southern Perú and in the upper Amazon basin to Rondônia, Brazil, (Fig. 359).

*Taxonomy and Variation*: I have studied the ♂ and ♀ syntypes in the BMNH and they are typical of the population. However, the original description by Fruhstorfer is poor. He states that the ♀ is smaller and darker, the white maculae on the DFW are much smaller, and the dark distal area more extensive; the submarginal spots "more pregnant" on the DHW. Study of series of females show that all of these characters are subject to variation and are not diagnostic. A ♀ intergrade with *E. m. paraensis* from Nova Olinda, Brazil, has larger white maculae on the DFW.

*Biology*: I have collected ♂ and ♀ specimens in forested localities in Ecuador and Perú. They occur in evergreen tropical forest especially in extensive river valleys. The adults are found in openings in the forest and are attracted to baits. They have been collected nearly every month of the year at elevations of from about 200 to 800 m.

Specimens Examined: 57 ♂ 10 ♀

COLOMBIA: *Amazonas*, Putumayo; Caquetá 400 m Jan. 1 ♂ 1 ♀ USNM; Río Tacana Nov. 1 ♂ AMNH; *Cundinamarca*, Bogotá 1 ♂ 1 ♀ BMNH; Colombia interior 1 ♂ BMNH; VENEZUELA: *Bolívar*, Minicia 1 ♀ UC; ECUADOR: *Napo*, Puerto Misahuallí Nov. 2



Figures 128-131. *Eunica marsolia fasula* Fruhstorfer. ♂ dorsal (128) ventral (129) surfaces. "Amazonas sup." [PERU, Loreto], Pebas. Syntype *Eunica marsolia fasula* Fruhstorfer (BMNH). ♀ dorsal (130) ventral (131) surfaces. [PERU, Loreto] Pebas. Syntype *Eunica marsolia fasula* Fruhstorfer (BMNH).

♂ JC; Tena Jan. 1 ♂ 1 ♀ JC; No specific locality 1 ♂ BMNH; PERU: Loreto, Mazán, Explorama Aug. 1 ♀ JC; Pebas 5 ♂ 1 ♀ BMNH; Iquitos 1 ♂ USNM; 3 ♂ AMNH; ♂ BMNH; Río Pacaya Aug. Sep. ♂ BMNH; Río Nanay, Mishana 150 m Jan. 3 ♂ MJP; Ucayali, Pucallpa Jul. 1 ♂ AME; Amazonas, San Carlos 1 ♂ USNM; San Martín, Japelacio 1 ♂ AMNH; Huánuco, Río Huallaga 3 ♂ AMNH; Tingo María Jun. 1 ♂ FSCA; 1 ♂ AMNH; Sep. 1 ♂ AME; Tournavista 1 ♂ AME; Santa Teresa 360 m Jul. 1 ♂ USNM; Junín, Satipo Feb. Jun. Jul. Oct. 11 ♂ CMP; Pasco, Chuchurras 450 m 1 ♂ USNM; 1 ♂ MJP; Madre de Dios, Puerto Maldonado 1 ♂ USNM; Puno, Carabaya ♂ BMNH; La Unión ♂ BMNH; Yahuarmayo ♂ BMNH; BRAZIL: Amazonas, São Paulo de Olivença 1 ♂ MNRJ; Nova Olinda, intergrade Jun. 1 ♀ CMP; Rondônia, Jaru Aug. 1 ♀ AME.

*Eunica marsolia paraensis* [Ssp. nov.]

Figures 132-135, 286, 324, 359

**Description:** As in *E. marsolia* except for differences listed for *E. m. paraensis* in the key to subspecies.

Average wing length ♂ (18-19)18.5 mm, ♀ (17-19)18 mm.

**HOLOTYPE:** BRAZIL: Pará, Cachimbo (5.40 km) km 1164 Cuiabá-Santarém, Jul. 1 ♂ C. J. Callaghan (AME). To be deposited in the collection of UFPC.

**PARATYPES:** BRAZIL: Pará, Cachimbo (5.40 km) km 1164 Cuiabá-Santarém, Jul. 1 ♀, S. S. Nicolay (USNM); Pará, Rio Ari, Tucuparé, km. 1288, Cuiabá-Santarém, Jul. 1 ♂ 4 ♀, C. J. Callaghan (AME).

**Distribution:** Presently known from seven localities in Amazonas, Rondônia and, Pará, Brazil (Fig. 359).

**Taxonomy and Variation:** There is some variation in the white diagonal band on the ♀ DFW. The white macula in Cu<sub>1</sub>-Cu<sub>2</sub> may be a long white rectangle with a slight dark spot, or may be broken into two square white maculae. The same variation is found on the VFW.

**Biology:** The type series was collected July 17-19, 1978 at relatively low elevations.

**Specimens Examined:** 4 ♂ 8 ♀

BRAZIL: Pará, Rio Ari, Tucuparé, km. 1288, Cuiabá-Santarém, Jul. 1 ♂, 4 ♀ C. J.



Figures 132-135. *Eunica marsolia paraensis* Jenkins. ♂ dorsal (132) ventral (133) surfaces. BRAZIL, Pará, km 1164 Cuiabá-Santarém. Holotype *Eunica marsolia paraensis* Jenkins (UFPC) ♀ dorsal (134) ventral (135) surfaces. BRAZIL, Pará, km 1164 Cuiabá-Santarém. Paratype *Eunica marsolia paraensis* Jenkins (AME).

Callaghan (AME); Cachimbo (S. 40 km) km. 1164 Cuiabá-Santarém, Jul. 1 ♂ C. J. Callaghan (AME); Jul. 1 ♀ S. S. Nicolay (USNM); Itaituba 1 ♀ MNRJ; Amazonas, Tefé 1 ♀ MNRJ; Humaitá 1 ♂ BMNH; Manicoré 1 ♂ MNRJ; Rondônia, Porto Velho 1 ♀ MNRJ.

*Eunica monima* (Cramer), 1782

Figures 136-139, 287, 325, 360

*Papilio monima* Cramer, 1782. Pap. Exot. 4: pl. 387, f. F. G. TL: "Cote de Guinée, pres. de Della Mina" (Error). Syntypes: coll. E. de Marre.

=*Nymphalis myrto* Godart, [1824]. Enc. Meth. 9: 418, n. 213. (unnecessary *nomen novem* for *Papilio monima* Cramer, 1782.)

=*Eunica modesta* Bates, 1864. Ent. Mon. Mag. 1(5): 113. TL: "Guatemala", ♀ Center Valleys, Guatemala. Syntypes: BMNH ♂ Rh 9308, ♀ Rh 9475 (Examined) [Syn. nov.]

=*Eunica monima f. habanae* Seitz, 1915. Macrolep. World 5: 485, pl. 100 A c, f. 5, 6 (1916). TL "Cuba". Syntypes: Location unknown. [Syn. nov.]

=*Eunica pusilla fairchildi* Bates, 1935. Bull. Mus. Comp. Zool. 78: 177. TL: Cuba, Santa Clara, Cienfuegos Bay, La Milpa. Holotype: ♂ (MCZ 16604) (Examined) [Syn. nov.]

=*Cybdelis mycenis* Boisduval MS. In the Lucas collection in the Museum of Paris there is a specimen with this label, which is typical *E. monima*. [Nomen nudum].

**Description:** Male. The DFW is variable, the brownish basal half has a purple or bluish wash; the distal half is dark brownish-purple with three postmedian and two or three subapical white maculae. The wing is slightly truncate with a smooth margin. The VHW is brown with a purplish overcast, usually with a thin, dark, submarginal line. The VFW basal half is light brown with thin, black lines in the discal cell, with a dark, diffuse, postmedian area, and white maculae similar to the DFW. The apical area is pale purplish with a row of subapical dark commas. The VHW is reddish-purple with thin, basal, medial, and submarginal lines. The postmedial ocelli have two contiguous anterior ocelli with a small third ocellus attached and two posterior ocelli. Male genitalia. (Fig. 287). The ♂ hypandrium is narrowed posteriorly with two elongate rami joined at the base. The gnathos is long and has a gnathos arm. The valva is elongate and not attenuate.

Female. The DFW is brown, the basal half and darker distal half with some purplish and five white maculae. The DHW is brown with a thin submarginal line. The ventral surface is similar to the male except lighter greyish-purple. Female genitalia (Fig. 325).

Average wing length ♂ (16-22)20.5 mm, ♀ (20-24)21.5 mm.

**Distribution:** Occurs from southern Texas through México and Central America to northern Colombia and Venezuela to Trinidad and the West Indies. (Fig. 360). It is migratory and was collected once in Kansas in the United States.

**Taxonomy and Variation:** *E. monima* is highly variable, common, and widespread which accounts for the many synonyms. The location of the Cramer type of *E. monima* is unknown. However, in Cramer (1782) the figures (PL. 387, fig. f, g) distinguish this species even though the type locality is in error. The description (p. 202) however, does not help in identification. *E. myrto* Godart [1824] is an unnecessary name for *E. monima* and has been synonymized by Kirby (1871) and others. I have examined the Bates types of *E. modesta* in the BMNH, a ♂ and a ♀ each marked TYPE-HT from Guatemala. They are typical *E. monima* and *E. modesta* is synonymized. Bates (1864) compared his *E. modesta* only with *E. pusilla*. It has been considered as a valid species for the Central American form (Godman & Salvin, 1883) but also as a subspecies (DeVries, 1987).

The species in Cuba is somewhat variable, and was described by Seitz (1915) (as *E. monima habanae*), who thought it might be a seasonal form with brighter blue, larger, and the under surface brighter. I have examined a series of Cuban specimens, and they have the same range of variation as the entire population, and *E. m. habanae* is synonymized. A second form from Cuba was described by M. Bates (1935) as *E. pusilla fairchildi*. He stated that it is smaller than *E. monima* and that the Cuban form does not agree very well with *E. pusilla*. I have examined the holotype ♂ from Cienfuegos

Bay, Cuba in the MCZ. It is a small but typical *E. monima* and is synonymized. *E. monima* is highly migratory, and there is little opportunity for isolation and subspeciation. There is much variation in the presence and amount of white in the DFW white, postmedial maculae, in the presence and intensity of bluish-purple and especially in the intensity of markings on the VHW. These variations occur in the same locality, and some may be related to seasons. The female is always dull brown without the blue in ♀ *E. pusilla*.

**Biology:** The adults occur commonly in various types of tropical forest areas, and I have collected *E. monima* in various localities in México, Honduras, and Costa Rica. Adults have been collected in forest openings, near forests, on muddy flats, at fermenting fruit baits, and on animal feces. In Dominican Republic, Schwartz (1989) observed *E. monima* feeding on flowers of *Lantana ovatifolia* and white mangrove, *Laguncularia racemosa*. He collected adults from 0900 to 1750 hrs. at temperatures of 28° C to 42° C. In Costa Rica, DeVries (1987) states: "During outbreak, this species is very common in Guanacaste during the early rainy season, then later mass migrates across the Cordillera de Guanacaste to the Atlantic slope. During such times, the migrations are all along the Pacific slope, but their final destination is unknown." There are also other recorded observations of migrations of *E. monima*. Adults are found throughout the year, but there is a population increase in May to August. They occur at elevations from near sea level to 1200 m elevation.

**Immature Stages:** Larvae have been reared on *Bursera simaruba* (Burseraceae) (DeVries 1987) in Costa Rica, and in Cuba (Alayo and Hernández, 1987). The host record of *Zanthoxylon* (Rutaceae) (Dyar, 1912) needs to be reconfirmed. The egg, mature larva and pupa were described by DeVries (1987).

Specimens Examined: 463 ♂ 159 ♀

UNITED STATES: *Kansas*, Caldwell; *Texas*, Hidalgo Co., Santa Ana Wildlife Refuge; Pharr; Brownsville; *Florida*, Dade County; Miami; Perrine; Goulds; Key Largo; Homestead; W. Palm Beach; Hendry Co; La Belle; Stock Island; Big Pine Key; CUBA: *Santa Clara*, La Milpa; Cienfuegos Bay; Soledad; *Pinar del Rio*, San Cristobal; Rangel; *Guantanamo*, Guantanamo; *Santiago de Cuba*, Santiago de Cuba; Sibonéy Cobre; *Las Tunas*, Tanamo; *Granma*, Sierra Maestre; Río Torquino; *Matanzas*, Matanzas; BAHAMA ISLANDS: *San Salvador Island*, Jake Jones Rd; *North Andros Island*, Nicolls Town; Fresh Creek; JAMAICA: Port Antonio; *St. Thomas*, Hampton Court; Pt. Henderson; St. Cartomen;



Figures 136-139. *Eunica monima* (Cramer). ♂ dorsal (136) ventral (137) surfaces. GUATEMALA, "Centr. Valleys." Syntype *Eunica modesta* Bates (BMNH). ♀ dorsal (138) ventral (139) surfaces. GUATEMALA, "Centr. Valleys". Syntype *Eunica modesta* Bates (BMNH).

HAITI: *Port-au-Prince*, Petionville; Port-au-Prince; Jérémie; Las Cayes; PUERTO RICO: DOMINICAN REPUBLIC: *Santo Domingo*, Santo Domingo; Santiago; La Vega; (Schwartz, 1989, reports many localities); TRINIDAD: *St. George East*, Arima Valley; *Nariva*, Río Clara; MEXICO: *Tamaulipas*; Gomez Farías; *Veracruz*, Presidio; Fortín de las Flores; Catemaco; Tezonapa; Motzorongo; Misantla; Tijeria; Jalapa; Rinconada; Córdoba; Teocelo; Orizaba; Tuxpango; *Nuevo Leon*, Monterrey; *Distrito Federal*, México City; *San Luis Potosí*, Tamazunchale; El Salto; Palitla; Valles; Xilitla; *Sinaloa*, Concordia; Labreras Summit; Potrerillos; Mazatlán; Cosala; Panuco; *Nayarit*, Laguna Mario del Oro; Tepic; San Blas; Compostela; Singayta; Jumatán; La Yerba; La Bujada; *Sonora*, Gurocoba; *Guerrero*, Acahuizotla; Zihuatanejo; Mexcala; Candelaria-Loxicha; Iguala; Chilpancingo; Acapulco; Atoyac; *Tabasco*, Tepequintla; *Durango*, Durango; *Morelos*, Cuernavaca; *Yucatán*, Pisté; *Oaxaca*, Chiltepec; Temascal; Tehuantepec; Tepantepec; Chacalapa; *Chiapas*, Lago Montebello; San Carlos; Las Delicias; San Quintín; San Cristobal; Rancho Santa Ana; Comitán; Soyolapan; San Jeronimo; Musté; Chicoasén; Chorreadero; Soconusco; GUATEMALA: *Alto Verapaz*, Baleu; San Cristobal; Izalco; Polochic Valley; *Izabal*, Quiriguá Viejo; *Escuintla*, Escuintla; *Quetzaltenango*, Volcán Santa María; *Zacapa*, *Zacapa*; *Retalhuleu*, San Sebastián; *Santa Rosa*, Guazacapan; *Baja Verapaz*, San Jeronimo; Patulul; BELIZE: *Toledo*, Punta Gorda; Río Grande; EL SALVADOR: *La Libertad*, La Libertad; *Sansonate*, Izalco, Aticora Park; *San Salvador*, Lago Ilopongo; HONDURAS: *Francisco Morazán*, Tegucigalpa; *Cortés*, San Pedro Sula; *Comayagua*, La Libertad; Taulabé; NICARAGUA: *Managua*, Managua; *Río San Juan*, Chontales; *Matagalpa*, Matagalpa; COSTA RICA: *San José*, Atenas; Santa Ana; *Puntarenas*, Monteverde; *Heredia*, La Selva; *Guanacaste*, Bayaces, Parque Santa Rosa; Cañas; *Cartago*, Irazú; PANAMA: *Chiriquí*, Chiriquí; *Colón*, Portobello; *Darién*, Isla Maje; COLOMBIA: *Magdalena*, Bonda; Minca; Santa Marta; Sierra Nevada; Cesar; Chiriquaná; VENEZUELA: *Aragua*, Rancho Grande; El Limón; Maracay; Turmero; *Distrito Federal*, Caracas; *Nueva Esparta*, El Copey; *Carabobo*, San Esteban.

*Eunica pusilla* Bates, 1864

Figures 140-143, 288, 326, 361



Figures 140-143. *Eunica pusilla* Bates. ♂ dorsal (140) ventral (141) surfaces. BRAZIL, Pará, "L. Amazons". Syntype *Eunica pusilla* Bates (BMNH). ♀ dorsal (142) ventral (143) surfaces. BRAZIL, Pará, Santarém. Syntype *Eunica pusilla* Bates (BMNH).



- Eunica pusilla* Bates, 1864. J. Entom. 2: 198, pl. 9, f. 5-5a. TL: [Amazon Valley"] ♂ Brazil, Pará. ♀ Brazil, Pará, Santarém. Syntypes: BMNH ♂ Rh 9310, ♀ Rh 9311 marked TYPE HT (Examined)
- = *Eunica monima modesta* Seitz, 1915. Macrolep. World 5: 485, pl. 100 A b, f. [6] & [7] (1916) (*nec* Bates) [Misidet.]
- = *Eunica oenomaus* Staudinger name on specimen. Panamá, Chiriquí. From ANSP, now in CMP. Ms. name. (Examined) [Nomen nudum]

**Description:** Male. The DFW is bluish-purple and has an entire margin. The DHW is bluish-purple diffusing into brown; the margins are serrate. The VFW is brownish and diffuse blackish in maculae with five diffuse brownish maculae; apical area light purple. The VHW is purple with a median and submarginal line; postmedial ocelli with two joined anteriorly in an ellipse, the anterior one with a white pupil, posterior black pupil, and two (or three) posterior ocelli. Male genitalia. (Fig. 288). Male hypandrium elongate, narrow at the middle with two large swollen rami. The uncus is long and beaked; the valva is elongate but not attenuate.

Female. The DFW has the basal half purplish, the blackish-purple distal half has five white maculae. The DHW is brown with a purplish overcast, and with a submarginal dark line. The VFW is grey in the basal half with a white comma in the discal cell. The distal half is dark with five white maculae, the apical area is pale purplish with a curving dark line. The VHW is similar to the male. Female genitalia. (Fig. 326).

Average wing length ♂ (15-23)20.5 mm, ♀ (21-22)21.5 mm.

**Distribution:** Occurs from Costa Rica, Panamá, Colombia, Venezuela, Guyana and Pará, Brazil to Perú and Bolivia to Espirito Santo and Santa Catarina, Brazil, (Fig. 361).

**Taxonomy and Variation:** I have examined the syntype ♂ and ♀ of *E. pusilla* marked "TYPE-HT" in the BMNH. They are typical of the population, but the female has less bluish-purple marking than most females. There is great variation in size of both males and females. The male is identified easily with the triangular shaped wing and bluish-purple iridescence with no spots or maculae. The female is more difficult to distinguish from the similar *E. monima*. *E. pusilla* females have bluish-purple iridescence and whiter maculae on the DFW. On the VHW there are two posterior ocelli, the more posterior in Cu<sub>1</sub>-Cu<sub>2</sub> is about twice the size of the ocellus in M<sub>3</sub>-Cu<sub>1</sub>, and has a prominent black pupil. The ♂ hypandrium is very distinct from *E. monima*. *E. pusilla fairchildi* has been reported from Cuba (Bates, 1935), but is synonymized under *E. monima*.

**Biology:** *E. pusilla* has been collected in or near semi-deciduous and evergreen tropical forests. I have collected a female in an opening in tall forest on an island in the Bayano dam reservoir in Panamá. The males are relatively common, but females are rarely collected. Females are common in the closely related *E. monima*. *E. pusilla* were captured at sea a few miles off Punta Mala, Panamá, in the company of other butterflies, in May 1873. They were probably migrating (Godman & Salvin, 1883).

Adults have been collected every month of the year with more in May-July and October to January at elevations from sea level to about 600 m.

Specimens Examined 284 ♂ 18 ♀

COSTA RICA: *Puntarenas*, Palmar Norte; *Guanacaste*, Cañas; PANAMA: *Chiriquí*, Chiriquí; *Potrerrillos*; *Bugaba*; *Canal Zone*, Madden Dam; *Veraguas*, Calobre; *Veraguas*; *Peninsula de Azuero*; at sea off *Punta Mala*; *Darién*, Bayano; COLOMBIA: *Boyacá*, Muzo; *Cundinamarca*, Bogotá; *Meta*, Villavicencio; *Ocoa*; *Caño Quenane*; *Santander*, El Centro; *Sinistero*; ECUADOR: *Pichincha*, Santo Domingo de los Colorados; *Manabí*, Palmar; VENEZUELA: *Mérida*, Mérida; *Barinas*, Ticoporo; *Bolívar*, El Hormiguero; El Dorado; GUYANA: *Mazaruni*-*Potaro*, Carimang River; *E. Demerara-W.C. Berbice*, Demerara River; PERU: *Loreto*, Yarina-Cocha; Upper Río Tapiche; *San Martín*, Japelacio; *Juanjui*; *Ucayali*, Pucallpa; *Pasco*, Palcazu; *Chuchurras*; Río Pachitea; *Madre de Dios*, Tambopata; *Boca Río la Torre*; Río las Piedras; *Junín*, Satipo; *La Merced*; *Puno*, Carabaya; BOLIVIA: *Cochabamba*, Río Chapare; *Santa Cruz*, Río Yapacani; Prov. de Sara; *San Matías*; *Portachuelo*; *Beni*, *Villa Bella*; *Cachuela Esperanza*; BRAZIL: *Amazonas*, *Nova Olinda*;



Chapada dos Guimarães, Tefé; São Paulo de Olivença; Ypiranga; Humaitá; Fonte Boa; Pará, Obidos; Acre, Alto Juruá; Xapuri; Rondônia, Vilhena; Pimenta Buena; Jaru; Cachoeira do Samuel; Mato Grosso, Cuiabá; Buriti; Cáceres; Barra do Bugres; Rondonópolis; Rosario Oeste; Alta Rio Xingú; Tapirapuá; Goiás, Goiânia; Espírito Santo, Linhares; Colatina; Santa Catarina, Rio Vermelho.

*Eunica violetta* Staudinger, [1885]

Figures 144-145, 289, 362

*Eunica violetta* Staudinger [1885] Exot. Schmett. 1: 110, pl. 40, [1886]. TL: Perú, [Loreto], Pebas. Syntypes: 3 ♂. 1 ♂ labelled Syntype was photographed by G. Lamas and L. D. Miller in the ZMHB. It bears labels "/*violetta* Stgr./Origin./Syntype/Pebas/". This is designated as Lectotype and it is identified with a red label. I have examined a ♂ specimen from Pebas, Perú in the BMNH, possibly a syntype.

*Description*. Male. The DFW is violet-blue, with the apical area and the outer margin brown. There are two subapical, round, whitish maculae and one postmedial whitish macula in Cu<sub>1</sub>-Cu<sub>2</sub>, and a hint of two other maculae (as on the VFW). The DHW is violet-blue with broad brown margins, and a diffuse submarginal line. The VFW discal area has a black bar and a whitish comma; the postmedian area is blackish with a whitish macula in Cu<sub>2</sub>-2A; there are three white postmedian maculae and two white subapical maculae. The apical area is grey-brown with a curved line. The VHW is brownish, with two basal lines and curved medial and subapical lines. The two anterior postmedian ocelli have a small black anterior ocellus and a very large black ocellus with a white pupil and two posterior ocelli; the anal ocellus is larger, and black with a white pupil. Male genitalia. (Fig. 289). I have dissected the ♂ hypandrium and genitalia of the lectotype. The hypandrium is distinctive with long narrow pointed rami extending laterally and a square posterior projection. The uncus is covered with long setae both dorsally and ventrally. There is a terminal chitinous projection on the valva.

Female. unknown.

Wing length ♂ 28 mm.

*Distribution*: Reported only from Pebas, Loreto, Perú and from Tefé, Amazonas, Brazil, (Fig. 362).

*Taxonomy and Variation*: The male labelled syntype in the ZMHB (Figs. 144-145) has three white maculae and bluish coloring on the DFW, and the VHW has a coloration and ocellar pattern different from any of the closely related species. The ocellus in *E. violetta* in Rs-M<sub>1</sub> is much smaller than in M<sub>1</sub>-M<sub>2</sub>, the reverse of *E. viola*. (I have examined a specimen (BMNH) which has three white maculae on the DFW, is a syntype of *E. violetta*, and



Figures 144-145. *Eunica violetta* Staudinger. ♂ dorsal (144) ventral (145) surfaces. PERU, Loreto, Pebas. Syntype *Eunica violetta* Staudinger (ZMHB).

is illustrated in D'Abrera (1987, p. 544). The figure in Seitz (1916 pl. 100 d) shows three yellow instead of white maculae on the DFW, and larger white pupils on the four ocelli on the VHW. Seitz (1915) stated:

"As the description of this species by the author refers to the figure, specimens corresponding exactly to it are, however, not lying before me. I bring a copy of STAUDINGER'S figure which is said to be painted according to 2 not quite sound ♂♂ and, therefore, may be inexact. The ♀ is not described. Pebas. Maybe it is only a form of *viola* Bates also originating from Pebas, which would thus form the type of the name; although the latter has a more reddish coloured under surface, and red markings, yet the design of both is the same. On the upper surface of *viola* the small light spots in the apical area are covered up with dark, or missing altogether, and the bluish-violet reflection is less; these differences also occur in *clytia* and *veronica* and are only individual there. Teffé, Pebas."

The original figure by Staudinger (1885: pl. 40) is a more exact representation than in Seitz.

The pattern of white marks on the DFW, the ocellar pattern of markings of the VHW, the unique hypandrium, and the distinct male genitalia are all diagnostic.

*Biology*: Nothing is known of the biology except that it occurs from two localities on the upper Amazon river at elevations under 200 m.

Specimens Examined: 4 ♂ 0 ♀

BRAZIL: Amazonas, Tefé 1 ♂ ZMHB; PERU: Loreto, Pebas 1 ♂ BMNH; 2 ♂ ZMHB.

*Eunica veronica* Bates, 1864

Figures 146-149, 290, 362

*Eunica veronica* Bates, 1864. J. Entomol. 2: 198, pl. 8, f. 1. TL: Brazil, [Amazonas] São



Figures 146-149, *Eunica veronica* Bates. ♂ dorsal (146) ventral (147) surfaces. PERU, Loreto, Explornapo (JC). ♀ dorsal (148) ventral (149) surfaces. PERU, Loreto, Iquitos (AMNH).

Paulo de Olivença; Tonantins. Syntypes: BMNH Rh. 9339, 1 ♂ TYPE (Examined).

*Description:* Male. The DFW is dark purple-brown, the non-truncate margins are smooth. The DHW is the same color as the DFW with an androconial area of very long black setae. The VFW basal third is grey, the postmedial third is cloudy blackish-grey, and the apical area is grey with two black ocelli and a curved line of four thin dark maculae. The VHW is greyish-purple with two short, basal purple lines, and undulating medial and submarginal lines. The postmedial ocelli include two black anterior ocelli with large white pupils enclosed in an ellipse, and two posterior ocelli, with a black pupil on the anal ocellus. Male genitalia. (Fig. 290). The ♂ hypandrium is constricted and has two sharp pointed extended rami with sharp teeth. The uncus is thin and beaked. The valva is unique with two apical teeth and a subapical doubly curved projection.

Female. The DFW has the basal half light brown, the distal half black, with three postmedial and two subapical white maculae. The VFW is the same as the ♂ but with five white maculae and the VHW is the same as the ♂.

Average wing length ♂ (25-28)26.5 mm, ♀ (25.5-27)26.25 mm.

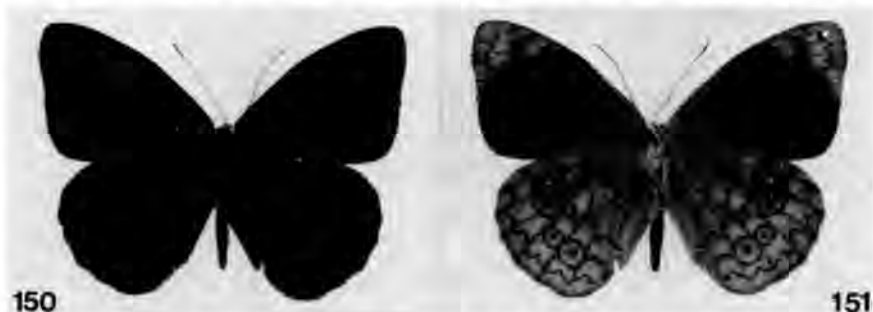
*Distribution:* Occurs from Colombia to central Perú and in the upper Amazon basin to Tefé and Manicoré in Amazonas and Rondônia, Brazil. Two ♂ specimens from Brazil, Pará, Rio Cumina (UFPC) and 1 ♂ from Chiriquí, Panamá (CMP) appear to be outside of the probable range of this species, (Fig. 362).

*Taxonomy and Variation:* I have examined a ♂ specimen labeled "type" in the BMNH. It agrees with the description and figure of Bates (1864). There is much variation in size, and the dorsal surface may be bluish-purple to brownish-purple in the male. On the VHW there may be light or partial purplish suffusion.

*Biology:* Occurs at edges of evergreen tropical forest especially in river valleys. I have collected it on fermenting banana baits in Perú. It is relatively uncommon, and the female is very rare in collections, known from two specimens. Adults have been collected from March to November at elevations from about 100 to 300 m.

Specimens Examined: 68 ♂ 2 ♀

PANAMA: Chiriquí, Chiriquí 1 ♂ AME (?); COLOMBIA: Amazonas, Leticia Oct. 2 ♂ MPM; Isla la Ronda Oct. 2 ♂ AMNH; Rio Cotuhé Sep. Nov. 2 ♂ AMNH; Putumayo, Umbria 1 ♂ AMNH; PERU: Loreto, Mishana Nov. 3 ♂ MPM; Explorama, Mazán Mar. 1 ♂ JC; Explornapo, 45 km NW Francisco de Orellana Mar. 1 ♂ AME; Iquitos 1 ♀ AMNH; Lago Yarina-Cocha Jul. 1 ♂ CMP; Cabalococha BMNH; Rio Ucayali BMNH; Pebas 1 ♀ BMNH; Rio Marañon BMNH; BRAZIL: Amazonas, Tonantins Jul. BMNH; Nova Olinda, Rio Purús, May 3 ♂ CMP; São Paulo de Olivença 1 ♂ CMP; 1 ♂ MP; BMNH; Alto Rio Itacoai 1 ♂ UFPC; Manicoré Aug. 4 ♂ AME; Tefé BMNH; Juruá BMNH; Fonte Boa BMNH; Pará, Rio Cumina 2 ♂ UFPC (?); Rondônia, Pimenta Buena Jul. 1 ♂ UFPC. Jaru Aug. 1 ♂ AME; Santo Antônio, Rio Madeira Sep. 1 ♂ UFPC.



Figures 150-151. *Eunica clytia* (Hewitson). ♂ dorsal (150) ventral (151) surfaces. ECUADOR, Napo, Puerto Misahuallí (JC).

*Eunica clytia* (Hewitson), 1852

Figures 150-151, 291, 363

*Cybdelis clytia* Hewitson, 1852. Exot. Butt. I. *Cybdelis* [62], pl. [31], f. 5. TL: "Amazons"

Syntypes: BMNH ♂ Rh 9338. Coll. Saunders. (Examined)

= *Eunica clytia* D'Abrera, 1987. Butterflies Neotropical Region IV: 594 (nec. Hewitson).[The illustrated is a ♀ of *E. veronica*] (Misidet.)

*E. clytia* is one of the most abundant species of *Eunica*, but females are rare in collections. *E. clytia* has no maculae on the male DFW. The wings have smooth margins, are not truncate, and may be deep, light, or bluish-purple with no markings except black androconia on some specimens. The very rare females are brown with white maculae.

The male genitalia is unique with a valva greatly swollen at the crista and with heavily chitinized, protruding teeth. *E. clytia* and *E. veronica* are similar, but *E. veronica* males have a distinctive DHW androconial area of very long, black setae, which are absent in *E. clytia*. *E. veronica* also has two short basal lines instead of a complete, wavy basal line on the VHW.

**Description:** Male. The DFW is dark bluish-purple with no markings, with more dark brown toward the margins. The margins are non-truncate and smooth. The DHW is similar to the DFW. The VFW basal third is grey, the postmedial third is blackish, the apical fourth is whitish-grey with black ocelli and a subapical curving line of four thin, wavy maculae. The VHW is grey with a light violet overcast, and with thin, purplish basal, median, and postmedian lines. The postmedian ocelli include two black-ringed ocelli with white pupils and a small anterior ocellus in an ellipse, and two posterior ocelli. Male genitalia. (Fig. 291). The ♂ hypandrium has two extended pointed rami with chitinized teeth. The uncus is setose and has a dorsal horn. The valva is very swollen at the crista with three chitinized teeth and an apical tooth.

Female. The DFW has the basal half brown, the distal half black, with three postmedian and two subapical white maculae. The VFW is similar to the ♂, but with five white maculae. The VHW is similar to the ♂.

Average wing length ♂ (25-29)27.5 mm.

**Distribution:** Occurs from western Colombia and southern Venezuela, southern Perú to the upper Amazon basin in Brazil to Rondônia, (Fig. 363). A record from Chiriquí, Panamá (AME) should be validated if possible.

**Taxonomy and Variation:** I have examined the male specimen labelled TYPE in the BMNH and it is typical of the population of *E. clytia*. There is some variation in the large series I have collected from specific localities. The amount of dark violet is quite variable on the dorsal surfaces of the males. On the VFW of males the amount of black suffusion varies greatly and on the VHW some specimens are pale grey sometimes with pruinose, while others may be partly or entirely suffused with purplish. These variations may be seasonal, they do not appear to be geographically related. A ♀ was not available for illustration. Earlier identifications of four females need to be rechecked.

**Biology:** This species is one of the most abundant of all *Eunica*, with nearly 500 males examined. The males congregate around wet muddy and sandy banks of rivers in large numbers. They are found at the edges of evergreen tropical forest and semideciduous tropical forests.

Adults have been collected every month of the year, and there appears to be population peaks in July to November in the localities in Ecuador and Perú where I have collected them. Bates (1964) states, "The commonest species of the genus at Ega [Tefé]; in some years appearing by the hundreds (almost all males) on the muddy margins of the river, in August and September." They occur at elevations from about 100 m to 1000 m.

Specimens Examined 488 M (4 ♀ ?)

PANAMA: Chiriquí, Chiriquí (1 ♂ AME); COLOMBIA: Cundinamarca, Bogotá; Chocó, El Valle; Santander, El Centro; Amazonas, Río Tacana; Isla la Ronda; Caquetá, San

Vicente; *Putumayo*, Río Putumayo; *Meta*, Manzanares; Villavicencio; Serranía la Macarena; VENEZUELA: *Amazonas*, Cerro Duida; Yavita; ECUADOR: *Napo*, Tena; Puerto Misahuallí; Arajuno; Río Coca; Curaray; [Arosmena Tola] Sarzayacu; Río Pastaza; *Tungurahua*, Río Verde; *Chimborazo*, Chimborazo; PERU: *Loreto*, Explorama; Mazán; Aguaytía; Iquitos; Balsapuerto; Pebas; Mishana; Cachiyacu; *San Martín*; Jepelacio; Chambirayacu; *Huánuco*, Tingo María; Río Huallaga; Tournavista; *Junín*, Satipo; Sanibeni; Río Pichis; Chanchamayo; *Cuzco*, *Cuzco*; Cosñipata; *Pasco*, Chuchurras; Palcazu; *Puno*, Xucuri; Chirimayo; Carabaya; Yahuar mayo; La Pampa; Huacamayo; *Madre de Dios*, Río Madre de Dios; Inambari; Shintuya; BRAZIL: *Amazonas*, São Gabriel; Río Calary-Uapés; Humaitá; *Acre*, Alto Juruá; *Rondônia*, Cachoeira do Samuel; Porto Velho.

*Eunica viola* Bates, 1864

Figures 152-155, 292, 327, 364

*Eunica viola* Bates, 1864. J. Entomol. 2: 199, n. 34, pl. 9, f. 4. TL: Brasil, [Amazonas], São Paulo [de Olivença]; Tonantins; Ega [=Tefé]. Syntypes: BMNH ♂ Rh. 9322 (Tonantins) ♀ Rh. 9323 (Tonantins) (Examined)

*Eunica amycla violascens* Bryk, 1953. Arkiv. för Zool. 5(1): 104. TL: Brazil, [Amazonas], Taraquá. Syntypes: 6 ♂ RNHL [Syn. nov.].

*Description*: Male. The DFW and the DHW are dark purplish-brown, and the margins are entire. The VFW basal area is brown with a small band and a black macula in the discal cell; the postmedial area is brown with diffuse cloudy and blackish areas, the apical area is purplish with a curving dark line. The VHW is purple with short basal lines, and there is a very curving medial line and a wavy submarginal line. There are two anterior



Figures 152-155. *Eunica viola* Bates. ♂ dorsal (152) ventral (153) surfaces. "Amazons". (USNM). ♀ dorsal (154) ventral (155) surfaces. BRAZIL, Amazonas, Nova Olinda (CMP).

postmedian ocelli: the anterior with a large white pupil and posterior with smaller white pupil, both surrounded by black and enclosed in an ellipse. The two posterior ocelli are circular, the anal ocellus has a white pupil. Male genitalia. (Fig. 292). The  $\delta$  hypandrium is constricted and has two rami expanded at the tips. The uncus is setose and has a dorsal horn. The valva has two large pointed projections at the crista.

Female. The DFW has the basal half brown with purple overcast, the distal half is brownish-purple with three whitish postmedian maculae and three subapical maculae, the central macula is white, and the others usually more brownish-purple. The VFW is similar to the  $\delta$  but with six white maculae as dorsally. The VHW is similar to the  $\delta$  but may be lighter purple in some specimens. Female genitalia. (Fig. 327).

Average wing length  $\delta$  (29-32)30.5 mm,  $\varphi$  (27-31)30 mm.

*Distribution:* Occurs from Colombia to Guyana and south to central Peru and the upper Amazon basin in Brazil (Fig. 364).

*Taxonomy and Variation:* I have examined a male and female specimen each marked TYPE in the BMNH from Tonantins, Brazil and they are typical of the population of *E. viola*. There is variation in the size of the circle surrounding the anterior pair of ocelli on the VHW. In specimens from Guyana and some in Venezuela, the circle, the ocelli, and the white pupil are smaller with finer lines. I have not seen enough specimens to determine whether this could be a subspecies. The females are highly variable, with some having prominent white maculae on the DFW, while others may have one or two of the three subdiscal maculae whitish and the postmedian diagonal row of three or four maculae may be nearly absent or with diffuse purplish-white.

*E. amycla violascens* Bryk is a synonym of *E. viola* according to G. Lamas, who examined the type (pers. comm.). A male specimen of *E. viola* in the MNHP had a Boisduval manuscript name of *Cybdelis rema*. It is typical *E. viola* and is made a *nomen nudum*.

*Biology:* Bates (1864) reports that *E. viola* was abundant at Tonantins and São Paulo de Olivença, Brazil, but it is usually uncommon or rare in its range. I have collected it at the edge of evergreen tropical forest in Peru. It is found in nearly all months of the year at elevations from near sea level to about 800 m.

Specimens Examined: 107  $\delta$ , 16  $\varphi$

COLOMBIA: *Amazonas*, Río Tacana 1  $\delta$  AMNH; Leticia 1  $\delta$  AMNH; Isla la Ronda 1  $\delta$  AMNH; Tunja 1  $\delta$  AMNH; Río Vaupés, Mitú Aug. 1  $\delta$  AME; Tاراqué RMS; GUYANA: *Rupununi*, Karisparu Jul. Aug. 1  $\delta$  3  $\varphi$  BMNH; *Mazaruni-Potaro*, Carimagua River 2  $\delta$  BMNH; Potaro River Mar. 2  $\delta$  AME; VENEZUELA: *Amazonas*, Cerro Duida 2  $\delta$  AMNH; Yavita, San Simón del Cocuy; Cerro Noblino Mar. 10  $\delta$  USNM; San Carlos de Río Negro Aug. 1  $\varphi$  MJP; No specific locality 1  $\varphi$  AMNH; ECUADOR: Napo, No specific locality BMNH; *Pastaza*, Puyo 1000 m Dec. 1  $\delta$  AME; PERU: *Loreto*, Cabalocoche BMNH; Iquitos 8  $\delta$  AMNH; 1  $\delta$  CMP; BMNH; Pebas BMNH, 1  $\delta$  MNRJ; Mishana Apr. 1  $\delta$  MPM; Explornapo, 45 km NW Francisco de Orellana Mar. 1  $\delta$  AME; Río Nanay 150 m Jan. 1  $\delta$  MJP; 1  $\delta$  AMNH; Río Cachiyacu, Balsapuerto Oct. BMNH; *San Martín*, Jepelacio 4  $\delta$  AMNH; Achinamiza Jun 1  $\delta$  MJP; Pongo del Cainarache Jun. 1  $\delta$  MJP; *Huánuco*, Río Huallaga 1  $\delta$  USNM; 6  $\delta$  AMNH; Tingo María Jun. 1  $\delta$  JC; BRAZIL: *Amazonas*, Río Calary-Uaupés Sep. 4  $\delta$  AMNH; Tonantins 1  $\delta$  MNRJ; Tefé 1  $\delta$  MNRJ; São Paulo de Olivença 1  $\delta$  MNRJ; Tabatinga BMNH; Fonte Boa BMNH; Juruá BMNH; Nova Olinda 1  $\varphi$  CMP; Huitanaá, Río Purús Mar. 2  $\delta$  CMP; *Rondônia*, Porto Velho BMNH.

#### *Eunica orphise* (Cramer), 1776

Figures 156-159, 293, 328, 365

*Papilio orphise* Cramer, 1776. *Uitlandsche Kapellen*. . . :67, 154 pl. 42, f. E. F. TL: "Cap de Bonne Expérance" [Error], "Surinam". Syntypes: BMNH  $\varphi$ . (not found)  
=*Eunica tryphosa* (Geyer), 1837. In Hübner, *Samm. Exot. Schmett.* 34, pl. 161, f. 935-936.



- TL: "Suriname" Syntypes: ♂ Vienna?  
 = *Cybdelis castalia* Hewitson, 1852. Exot. Butt. 2: 62, pl. 31, f. 4. TL: "Amazon" Syntypes  
 ♂ BMNH, TYPE Rh. 9342. Coll. Saunders (Examined)  
 = *Evonyma orphise marcusii* Orfila, 1951. Pub. Univ. Cochabamba 46-58. TL: "Bolivia"  
 Holotype: 1 ♂ No. 52179, Coll. Nac. Argentina, Buenos Aires. [Syn. nov.]

**Description:** Male. The DFW is deep violet-blue, the apical area and margins are broadly black, and there are no other markings. The wing margins are smooth with grey fringe. The DHW is the same color extending to the margin, with a small tuft of setae at the Sc vein. The VFW discal cell has a black macula, a tan comma and a black area; the medial and postmedial area are black with three postmedial tan maculae; the subapical area is pruinose-purple with a narrow curved line and purple border. The VHW is purplish-red, and may be pruinose with two broad, basal, red-brown maculae. The medial line is broad, red-brown, and there is a narrow, undulating, submarginal line. The postmedian ocelli have two anterior ocelli black with white pupils enclosed by a thick-lined ellipse. The anal ocellus has a black and a white pupil, about three times the size of the ocellus in  $M_1$ -Cu<sub>1</sub>. Male genitalia. (Fig. 293). The ♂ hypandrium is roughly triangular without rami. The valva is very elongate with a small apical tooth.

Female. The DFW and DHW are iridescent dark blue to light purple with black basal markings. The DFW distal half is darker with three white postmedian and two or three subapical white maculae. The VFW is similar to the ♂ except for five or six whitish maculae as above. The VHW is the same as the ♂, and may be reddish or pruinose-purplish. Female genitalia. (Fig. 328).

Average wing length ♂ (22.5-28.5) 27 mm, ♀ (26-28.5) 28 mm.

**Distribution:** Occurs from Colombia and Guyana south to Bolivia and throughout most of the Amazon basin, (Fig. 365).

**Taxonomy and Variation:** The female of *E. orphise* was described by Cramer (1776). I could not find the type in the BMNH. The figure by Cramer clearly distinguishes the ♀. The male was described by Hübner (1837) as *Eunica tryphosa* from Surinam, and was synonymized by Seitz (1915). The male was redescribed by Hewitson (1852) as *Cybdelis*



Figures 156-159. *Eunica orphise* (Cramer). ♂ dorsal (156) ventral (157) surfaces. "Amazon". Syntype *Cybdelis castalia* Hewitson (BMNH). ♀ dorsal (158) ventral (159) surfaces. PERU, San Martín, Jepelacio (AMNH).

*castalia*. I have examined the ♂ specimen labelled TYPE in the BMNH, and it is typical *E. orphise*. This specimen also has labels of "*orphise*" and "*tryphosa*" as well as type "*Cybdelis castalia*" ♂ Hew. Seitz (1915) also synonymized *C. castalia* under *E. orphise*.

Orfila (1951) published a map showing specific ranges and distributions by crosshatching of *o. orphise*, *o. castalia*, *o. marculsi* and two hypothesized new subspecies in Colombia and Perú. *E. castalia* is stated to be a subspecies based on comparing one specimen (locality not stated) in the Argentina national collection with the Hewitson figure of the male underside. His subspecies "4" in Colombia and "5" in Perú with exact ranges are based on imagination since he states that he has seen no examples. *E. o. marculsi* is based on the DFW with slight extension of the wing at  $M_3$ , more blue color on the wing than *castalia*, more reddish on the VHW and larger ocelli and presumed differences in the valva from *castalia*. Examination of series from single localities throughout the range of *orphise* shows that these characters are variable and of no significance. Bolivian specimens are not significantly different from those from Ecuador, Perú, and Guyana. While the speculation of Orfila is imaginative, it can be laid to rest with *E. o. marculsi* made a synonym. The only differences noted in comparing large series is that the VHW of Colombian specimens is usually more brick-reddish purple instead of pruinose greyish red-brown, and the VFW has less intense light-brown maculae. These differences appear to be clinal and also variable in series from the same locality so that no subspecies are recognized.

*Biology*: This species is relatively common and widely distributed in the Amazon basin. It occurs in evergreen tropical forest and semideciduous tropical forest. I have collected it in various localities in Ecuador and Perú at fruit baits at the edges of forests or in forest openings. Adults have been collected every month of the year at elevations from near sea level to about 800 m.

Specimens Examined: 249 ♂ 12 ♀

VENEZUELA: Amazonas, Mt. Duida; COLOMBIA: Cundinamarca, Bogotá; Otanche; Boyacá, Muzo; Santander, Río Opón; Antioquia, Zaragoza; Medellín; Cauca, Cauca Valley; Tolima, Quindío; Río Chili; Putumayo, Umbria; GUYANA: Mazaruni-Potaro, Omai; Potaro River; GUYANE: Guyane, St. Jean du Maroni; Bas Maroni; Cayenne; SURINAM: No specific locality; ECUADOR: Morona-Santiago, Macas; Pastaza, Sarayacu; Puyo; Napo, Curaray; Tena; Puerto Misahualli; PERU: Loreto, Iquitos; Pebas; Caballococha; Río Cachiayacu; Río Marañón; Mishana; Yurimaguas; Río Nanay; Aguaytía; San Martín, Juanjui; Jepelacio; Moyobamba; Huánuco, Tingo María; Río Huallaga; Pasco, Pozuzo; Cahuapanas; Chuchurras; Palcazu; Cuzco, Pilcopata; Junín, Chanchamayo; Satipo; La Merced; Río Colorado; Puno, Chaquimayo; BOLIVIA: Cochabamba, Chapare; Cochabamba; Santa Cruz, Río Juntas; Alto Palmar; BRAZIL: Amazonas, Tabatinga; São Paulo de Olivença; Jauareté; Huitanaã; Manacapuru; Nova Olinda; Maués; Benjamin Constant; Manicoré; Tefé; Lago Acará; Uypiranga; Rondônia, Vilhena; Pimenta Buena; Cachoeira do Samuel; Pará, Obidos; Monte Cristo; Río Xingú; Mato Grosso, Cuiabá; Diamantino; Maranhão, Imperatriz; Acre, Alto Juruá.

#### *Eunica incognita* [Sp. nov.]

Figures 160-163, 294, 366

=*Eunica taurione* Hall, [1916 ms., microfiche publication, 1983] pp. 41-43, nec. Hübner [1832] Hall described *incognita* accurately based on a ♂ from Ecuador. (Hall, in supplemental notes, later recognized that *E. taurione* is a synonym of *E. marsolia*).

*Description*: Male. The DFW is bright bluish-purple except a broad black apical and marginal area, wing not truncate, without markings and the margin is smooth with a whitish fringe. The DHW is all bright bluish-purple except a dark costal area and a costal androconial area of black hairs. The VFW discal area is light brown with four black cross bars,  $Cu_1$ - $Cu_2$  is mostly black, the apical half is brown with a subapical row of diffuse

black maculae and a large silvery-white subapical macula with diffuse pruinose anterior to the apex; the outer margin is reddish-purple. The VHW is light brownish-purple with broad, dark red-purple lines and maculae. There are two broad, basal, maculae, a broad curving and wavy median line, and a row of lunate broad submarginal maculae. There are five postmedial ocelli. The anterior one is a large white macula surrounded by a black border, the posterior one smaller, both enclosed in a thick red-brown oval with a very small ocellus on the posterior border. There are two posterior ocelli, the anal ocellus with a black and white pupil. Male genitalia. (Fig. 294). The  $\delta$  hypandrium is elongate terminating in two points. The beaked uncus is slightly upturned. The valva is roughly triangular pointed posteriorly.

Female. The DFW has the basal half brown with black markings. There is a broad white postmedian diagonal cross band and a darker apical area. The VFW is similar to the  $\delta$  except the broad white cross band. The VHW is similar to the  $\delta$ .

Average wing length  $\delta$  (28-29)28.5 mm,  $\eta$  29 mm.

HOLOTYPE: 1  $\eta$ , PERU: Loreto, Pebas. Leg. J. Hauswell, Godman-Salvin Coll. 1915-3. BMNH.

PARATYPES: 3  $\delta$ .

Deposition of type material: Holotype  $\eta$  (Pebas, Perú), and 1  $\delta$  Paratype (interior of Colombia) in BMNH; 1  $\delta$  Paratype (Para, Brazil) in AME; 1  $\delta$  Paratype (A. G. Weeks Coll. no locality data) MCZ.

*Distribution*: This new species is presently known from Colombia, Ecuador, Pebas, Perú and Pará, Brazil. (Fig. 366).

*Taxonomy and Variation*: The holotype female (Figs. 162-163) and the three paratype males have been studied (Figs. 160-161). The  $\delta$  specimen from the Weeks Coll. in MCZ has a pencilled label "Strecker can't May 99" which apparently means that the specimen was sent to Strecker who was unable to identify it in May 1899. There is little variation in the brilliant blue coloring of the dorsal surface of the males. One male has a somewhat larger anterior white ocellus in  $R_s-M_1$  than the other males. However, there are too few specimens to accurately study the range of variation.

*Biology*: Nothing is known about the biology of this species except that a male was



Figures 160-163. *Eunica incognita* Jenkins.  $\delta$  dorsal (160) ventral (161) surfaces. "Interior of Colombia". Paratype *Eunica incognita* Jenkins (BMNH).  $\eta$  dorsal (162) ventral (163) surfaces. PERU, Loreto, Pebas. Holotype *Eunica incognita* Jenkins (BMNH).

collected 17 July 1978 in Pará, Brazil. The known collections are from elevations of less than about 200 m.

Specimens Examined: 4 ♂ 1 ♀

COLOMBIA: "Interior of Colombia" Wheeler. 1 ♂ Godman & Salvin Coll. BMNH; (Examined); ECUADOR: No specific locality, 1 ♂ In Coll. Prof. Thieme, described accurately by Hall, (1983) ms. as *E. taurione* Hb. However, later in the manuscript it is noted "not *taurione*. *taurione* = *marsolia*"; PERU: Loreto, Pebas 1 ♀ Godman & Salvin Coll. (identified as *E. veronica*) BMNH (Examined); BRAZIL: Pará, Km. 958 Cuiabá to Santarém. 17 Jul. 1978, leg. C. J. Callaghan. 1 ♂ AME (Examined); No locality: 1 ♂ "247, A. G. Weeks Coll." MCZ (Examined). "Strecker can't May '99."

*Eunica amelia* (Cramer), 1777

*E. amelia* is the only species of *Eunica* with the apical area of the forewing shortened so that it is longer at the tornus. It is also the only species with a very swollen anal vein on the DHW and anal androconia of long black hairs (Fig. 2). The bright bluish-purple in the basal third extends distally to the tornus and is distinctive.

*Description*: Male. The DFW is bright bluish-purple in the basal third to half and extends posteriorly to the tornus. The wing has the apical area shortened. The margin is entire with white fringe. The VHW is blackish-brown, the anal vein is enlarged as a spindle medially, and there is an anal androconial area with very long black hairs. The margin is entire with white fringe. The VFW is grey basally with a black macula, a tan crescent, and black in the discal cell. The distal two-thirds is black with a tan macula at the end of the discal cell. The apical area is grey-violet with two black ocelli and a curving reddish subapical line. The VHW is reddish-purple with two thick, red-brown, basal maculae, a very broad medial band reduced posteriorly to narrower lines and a broken submarginal line. The postmedian ocelli have two fused ocelli, the anterior with a large, white center enclosed by a broad reddish ellipse. The posterior two ocelli are partly fused with larger reddish pupils, about equal in size. Male genitalia. (Fig. 295). The ♂ hypandrium is constricted and cut off posteriorly. The beaked uncus is setose. The valva is elongate and blunt with an apical point.

Female. The DFW has the basal half brown, there is a broad white postmedian diagonal crossband, and two subapical white maculae. The DHW is brown with darker brown border. The VFW is similar to the ♂ except for white markings as on the DFW. The VHW is more whitish especially basally between the basal and medial markings, and there may be a white stripe in  $M_2$ - $M_3$ , greatly contrasting with the base color (in *erroneata*).

Key to subspecies of *E. amelia*

Male.

- 1a. VHW with a white area or streak between  $M_2$  and  $M_3$ . VFW with a narrow, usually curved, buff postmedial band from  $R_1$  to  $M_2$  ..... *amelia*
- 1b. VHW without a white area or streak between  $M_2$  and  $M_3$ . VFW with a very broad buff postmedial squarish or rectangular band ..... *erroneata*

Female.

- 1a. VHW with mostly white in posterior two-thirds with ocellar rings generally absent.  $M_2$ - $M_3$  with a prominent white streak except basal purplish markings ..... *amelia*
- 1b. VHW with mostly light purplish in posterior two-thirds, with complete purple ocellar rings.  $M_2$ - $M_3$  with some white but completely bisected by extensive ocelli ..... *erroneata*

*Eunica amelia amelia* (Cramer), 1777 [Stat. rev.]

*Papilio amelia* Cramer, 1777. *Papilio* Exot. 2: 61, 147. pl. 136, f. B & C. TL: "Suriname."  
 Syntypes: ♀ Coll. Baron Rengers. (Location unknown).

*Description:* As in *E. amelia* except for differences listed for *E. a. amelia* in the key to subspecies.

Average wing length ♂ (23-26)24.5 mm, ♀ (22.5-25)24 mm.

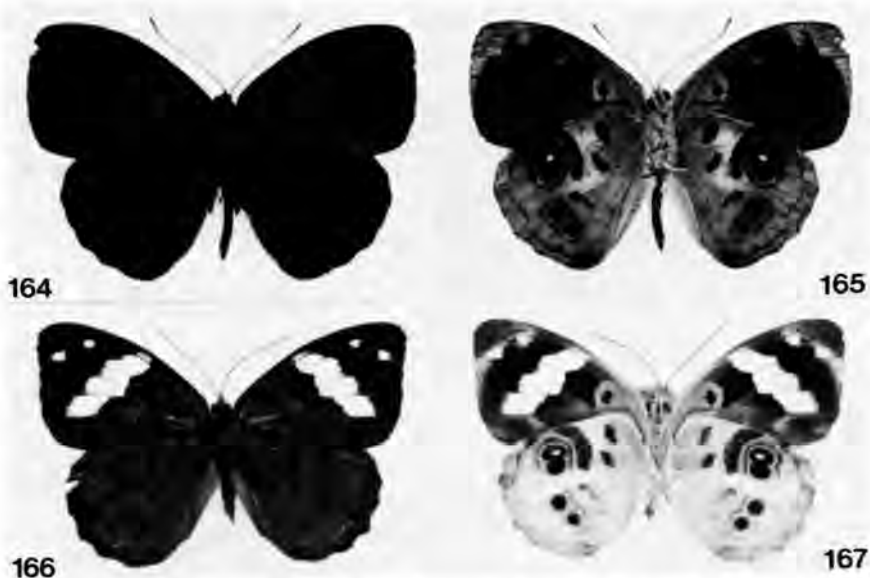
*Distribution:* This subspecies occurs in the Guyanas and northern Brazil in Maranhão, Roraima and Amapá, (Fig. 367).

*Taxonomy and Variation:* The figure of the ♀ type of *E. amelia* by Cramer (1777) is quite distinctive but the type has not been located. The female of *E. amelia* has a complete whitish longitudinal stripe in  $M_2$ - $M_3$  and extensive white on the VHW in the range of the nominate species and a partial stripe in the range of *E. amelia erroneata*. The male has this VHW stripe present or partially developed in the range of *E. a. amelia*. In the range of *E. a. erroneata*, it is usually absent but a small stripe may be present. *E. erroneata* described by Oberthür as a species is tentatively recognized as a subspecies of *E. amelia*.

*Biology:* Nothing is known of the biology except that it has been collected at lower elevations in March, July and September.

Specimens Examined: 14 ♂ 14 ♀

GUYANA: *Mazaruni-Potaro*, Kartabo 1 ♂ CMP; Tumatumari Jul. 1 ♀ AME; Bartica 1 ♀ AME; Potaro Road Mar. 2 ♂ AME; *East Berbice*, Parish's Peak, BMNH; SURINAM: *Paramaribo*, Paramaribo 1 ♀ BMNH; No specific locality 1 ♂ CMP; BMNH; 1 ♂ 1 ♀ MNRJ; GUYANE: *Guyane*, Cayenne 1 ♀ USNM; St. Jean du Maroni 1 ♂ USNM; BMNH; Lower Maroni BMNH; 1 ♂ AME; St. Laurent BMNH; TRINIDAD: No specific locality BMNH; BRAZIL: *Maranhão*, Montes Aúreos BMNH; *Roraima*, Vista Alegre Dec. 1 ♀ KB; *Amapá*, Amapá MNRJ.



Figures 164-167. *Eunica amelia amelia* (Cramer). ♂ dorsal (164) ventral (165) surfaces. GUYANA, Mazaruni-Potaro, Potaro River (AME). ♀ dorsal (166) ventral (167) surfaces. GUYANA, Mazaruni-Potaro, Tumatumari (AME).

*Eunica amelia erroneata* Oberthür, 1916 [Stat. rev.]

Figures 168-171, 295, 367

- Eunica erroneata* Oberthür, 1916. Etudes Léop. Comp. 12: 38-39, pl. 406, f. 3491. TL: Perú [Cuzco], Illapani. Syntypes: ♂ BMNH (Examined)  
 = *Eunica amelia* Staudinger & Schatz, 1888 (nec Cramer, 1777) Exot. Schmett. 1: 110, pl. 40.  
 = *Eunica amelia* var. *concolor* Zikán, 1937. TL: Brazil, Amazonas, São Gabriel. Syntypes: (7 ♂) [IOC] [Syn. nov.]

*Description:* As in *E. amelia* except for differences listed for *E. a. erroneata* in the key to subspecies.

Average wing length ♂ (20.0-27.0) 24.0 mm, ♀ (22.5-24) 23.5 mm.

*Distribution:* Occurs from Colombia to Perú and in central Brazil (Fig. 367).

*Taxonomy and Variation:* I have examined the male specimen from the Oberthür collection labelled TYPE in the BMNH. It is typical of the population except that some males have a partial light streak in  $M_2$ - $M_3$  on the VHW as in *E. a. amelia*. In describing *E. erroneata*, Oberthür used more space criticizing the German Staudinger than describing the new form, and as a result, it is poorly characterized. Detailed study of a larger number of *E. amelia*, especially fresh series from the same locality, may show that the increased light streak in *E. a. amelia* is only an aberration, more common in the Guyana region. There is variation in the amount of blue-violet color in the discal area of the DHW.

*Eunica amelia* var. *concolor* is based on seven males from São Gabriel, Brazil, of which five are typical *E. amelia*, one ♂ has a faint white fringed border, and one has no white border. The presence of the white fringe varies with wear and is of no taxonomic significance. This is the only difference in the series of specimens from the same locality and



Figures 168-171. *Eunica amelia erroneata* Oberthür. ♂ dorsal (168) ventral (169) surfaces. PERU, Cuzco, Illapani. Syntype *Eunica erroneata* Oberthür (BMNH). ♀ dorsal (170) ventral (171) surfaces. BRAZIL, Amazonas, Manacapuru (CMP).



var. *concolor* is synonymized.

*Biology:* This subspecies is found at the edges and in openings in evergreen and in semi-deciduous tropical forest. I have collected adults at fruit and feces baits in openings and at the edge of forests in various localities in Ecuador and Perú. Bates (1864) states, "Very abundant at St. Paulo [São Paulo de Olivença], Upper Amazons; the males being attracted by scores to the dung of vultures, on the borders of the woods."

Adults have been collected nearly every month of the year from near sea level to about 800 m elevation.

Specimens Examined: ♂ 135 ♀ 8

COLOMBIA: *Antioquia*, Zaragosa; *Boyacá*, Muzo; Río Putumayo; Florida; ECUADOR: *Tungurahua*, Río Topo-Pastaza; *Napo*, Tena; *Pastaza*, Sarayacu; PERU: *Loreto*, Aguatia; Pebas; Iquitos; Caballocoche; *Huánuco*, Tingo María; Huánuco; Río Huallaga; *San Martín*, Japelacio; *Junín*, Río Shuaro; Pichis Road; La Merced; *Pasco*, Pozuzo; Cahuapanas; Río Pichis; Chuchurras; Palcazu; *Cuzco*, Illapani; *Puno*; Río Inambari; Yahuarimayo; Carabaya; Tirapata; *Madre de Dios*, Boca Río la Torre; Lagarto; Puerto Maldonado; BRAZIL: *Amazonas*, São Paulo de Olivença; Manacapuru; Igarapé Preto; Manicoré; *Mato Grosso*, Cuiabá; Corumbá.

#### *Eunica sydonia* (Godart), [1824]

*E. sydonia* is perhaps the most variable species in the genus *Eunica*. The VHW of almost every specimen is different, and this has resulted in a plethora of names which are here synonymized.

Examination of a number of type specimens and over 430 specimens resulted in recognition of *E. s. sydonia* in South America and one rather poorly separated subspecies *E. s. carena* in México and Central America. The main difference is the presence of a distinct black androconial patch on the VFW of ♂ *E. s. carena*, which is nearly always absent in *E. s. sydonia*. There is little difference in the ♂ genitalia and hypandria of the two subspecies. There is more purplish on the discal cell of the DHW of *E. s. sydonia*, but this is variable.

*Description:* Male. The DFW is extended truncate, with bright blue or bluish-purple in the basal three-fourths, with the distal fourth black. The wing margin is undulating with white fringe on the margins. The DHW has a black androconial patch of long hairs in the basal costal area, and black with bluish in the discal area. The VFW has a black androconial patch (*in carena*) in the basal area posterior to the discal cell, brown and black markings with a light brown postmedial band, and light purplish subapical and apical area with a black macula. The VHW is very variable with various patterns of greyish-purple with brown and ochre. The postmedian ocelli are divided into two or three anteriorly and two posteriorly, with some ocelli with white and others with dark pupils. Male genitalia. (Fig. 296). The ♂ hypandrium is unique with elongate, narrow postero-lateral rami. The beaked uncus is elongate and upturned at the apex. The valva is elongate, and may be enlarged distally and terminates with a small tooth.

Female. The DFW has the basal half brown with a median diagonal white cross band and with the remainder of the wing black, with two or three subapical white maculae. The DHW is brown with a dark submarginal line. The VFW has a light lunate marking in the discal cell and a white band and white subapical maculae on the DFW with additional three small, curving, spots and a black macula. The VHW is highly variable from all grey brown with few markings, to heavily marked with a wide, dark median band and well marked ocelli. Female genitalia. (Fig. 329).

#### Key to subspecies of *E. sydonia*

Male.

- 1a. VFW with prominent black androconial patch at fork of  $Cu_1$  and  $Cu_2$ , contrasting with dull tan or light brown; VFW subapical area with black macula with white

- pupil, and three white ocelli anteriorly; VHW with variable pattern, usually with Cu<sub>2</sub> to 2A and with light ochre streak crossed by dark bands. DHW with none or a small amount of purplish in costal area . . . . . *caresa*
- 1b. VFW without prominent black androconial patch at fork of Cu<sub>1</sub> and Cu<sub>2</sub> (absent in 48 of 50 ♂); VFW subapical area with black macula without white pupil, usually with 2 or 3 white ocelli and usually with the third small or nearly missing; VHW with highly variable pattern from dull grey to heavily patterned with black, ochre, and grey. The ocelli may be absent or with prominent with a black and white pupil. DHW with more purplish, extending throughout the discal cell and beyond . . . . . *sydonia*
- Females.
- 1a. VFW with three conspicuous subapical white maculae; white median diagonal cross band nearly the same width, not narrowly constricted in middle . . . *caresa*
- 1b. VFW with two conspicuous subapical white maculae (a third small or indistinct macula may be present), the median diagonal cross band is usually narrower, more irregular, and constricted in the middle . . . . . *sydonia*

*Eunica sydonia sydonia* (Godart), [1824] [Stat. rev.]

Figures 172-175, 296, 329, 368

- Nymphalis sydonia* Godart [1824] Enc. Meth. 9: 416, n. 207. TL: "Brésil". Syntypes: ♂ MNHP? (not found)
- = *Cybdelis empyrea* Herrich-Schäffer, [1858]. Ex. Schmett. 54. [1855] pl. [18], f. 73-76. TL: "Brasil". Syntypes: ♂ ♀ BMNH? [Syn. nov.]
- = *Eunica campana* C. & R. Felder, 1861. Wien. Ent. Monat. 6: 104 n. 82. TL "Nova Granada". Syntypes: G. Lamas studied the type in the BMNH (pers. comm.). [Syn. nov.]
- = *Eunica indigophana* C. & R. Felder, 1861. Wien. Ent. Monat. 6: 104, n. 83. TL: Venezuela, Caracas (Dr. Moritz). Syntypes: 1 ♂ BMNH (Felder Coll). (Examined) [Syn. nov.]
- = *Eunica sydonia poppaana* Fruhstorfer, 1909. Stett. Ent. Zeit. II: 209-210. TL: "Surinam". Syntypes: 3 ♂ 1 ♀ BMNH (1 ♂ 1 ♀ labelled type) (Examined) [Syn. nov.]

*Description:* As in *E. sydonia* except for the differences listed for *E. s. sydonia* in the key to subspecies.

Average wing length ♂ (30-37.5)34 mm, ♀ (30-35)33.5 mm.

*Distribution:* Occurs in South America from Colombia, Venezuela, and the Guyanas south to Bolivia and southern Brazil. (Fig. 368)

*Taxonomy and Variation:* The Godart type of *E. sydonia* was sought but not found in the MNHP. The original description is sufficiently accurate to identify this highly variable species. *E. empyrea* was designated by Herrich-Schäffer [1858]. His published figures 73-76 of the male and female show that it is a synonym. This was pointed out by Fruhstorfer (1909). This synonymy was refuted by Röber (1923) on the basis of the toothed wing margins, shining violet color and presumed error in locality. He stated that it is a close relative or conspecific with *E. caresa*. These are not valid differences, and it is considered to be a synonym. *E. campana* was described by Felder and Felder (1861) based on the ♂ DFW being a little brighter blue, the apical area of the VFW stronger violet-white and the VHW with ocelli more prominent. These are all minor variations found throughout the range. The type of *E. campana* in the BMNH was studied by G. Lamas (pers. comm.), and he states that it is a synonym. *E. indigophana* was described by C. and R. Felder (1861) from Venezuela based on brighter blue reflection and a "dark undulate stripe before the margin." I have studied the ♂ specimen with a type label in the Felder collection in the BMNH. It is typical *E. s. sydonia* with the VHW darker than average which occurs randomly in the population. This species is synonymized here.

*E. sydonia poppaana* was described by Fruhstorfer from 3 ♂ and 1 ♀ from Surinam, based on the violet on the DHW of the ♂ more expanded and the VHW dusted with grey. I have examined the ♂ and ♀ marked types. They are typical *E. s. sydonia* with

the ♂ VHW more plain grey than average, but this is a common variation. *E. s. poppaeana* is synonymized.

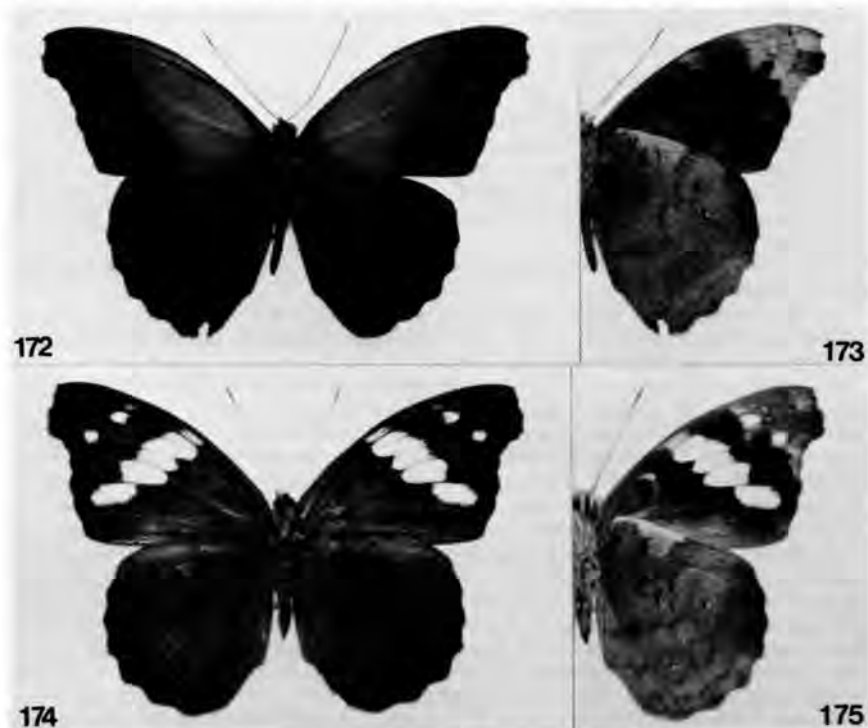
As stated previously, there is a large amount of variation of the VHW in *E. s. sydonia*. It has been confused with *E. s. carena*, which was considered a separate species, and also with *E. caralis*, which it resembles superficially.

**Biology:** *E. s. sydonia* is a widespread species which occurs mostly in evergreen tropical forest areas. It is also found on the edges and banks of streams and in muddy areas. It is attracted to fermenting fruit bait on which I collected it at Tingo María, Perú. It is usually not common, and often occurs singly, but I have examined 342 specimens.

Adults are found every month of the year, but there are more collection records from July to December. They occur at elevations from near sea level to about 1,000 m. Fassl (1918) states that *E. sydonia* was found from 300 to 800 m on the western slopes and from 300 to 1000 m on the eastern slopes of the Andean Cordilleras.

Specimens Examined: 299 ♂ 43 ♀

COLOMBIA: *Meta*, Villavicencio; Río Ocoa; Cuchilla; Forzoza; Vista Hermosa; *Cundinamarca*, Bogotá; Cananche; *Tolima*, Las Vegas; *Santander*, Barrancabermeja; El Centro; La Lechero; Río Opón; *Valle del Cauca*; *Boyacá*, Muzo; *Magdalena*, Santa Marta; *Chocó*, Río San Juan; Río Pablo; *César*, Manaure; VENEZUELA: *Aragua*, El Limon; *Distrito Federal*, Caracas; *Mérida*, El Vigía; La Fria; *Táchira*, San Juanquin de Navay; *Monagas*, La Esperanza; *Carabobo*, Yuma; Valencia; *Bolívar*, Caicara; SURINAM: GUYANE: *Guyane*, St. Jean du Maroni; St. Laurent; ECUADOR: *Napo*, Río Napo;



Figures 172-175. *Eunica sydonia sydonia* (Godart). ♂ dorsal (172) ventral (173) surfaces. "SURINAM". Syntype *Eunica sydonia poppaeana* Fruhstorfer (BMNH). ♀ dorsal (174) ventral (175) surfaces. "SURINAM". Syntype *Eunica sydonia poppaeana* Fruhstorfer (BMNH).

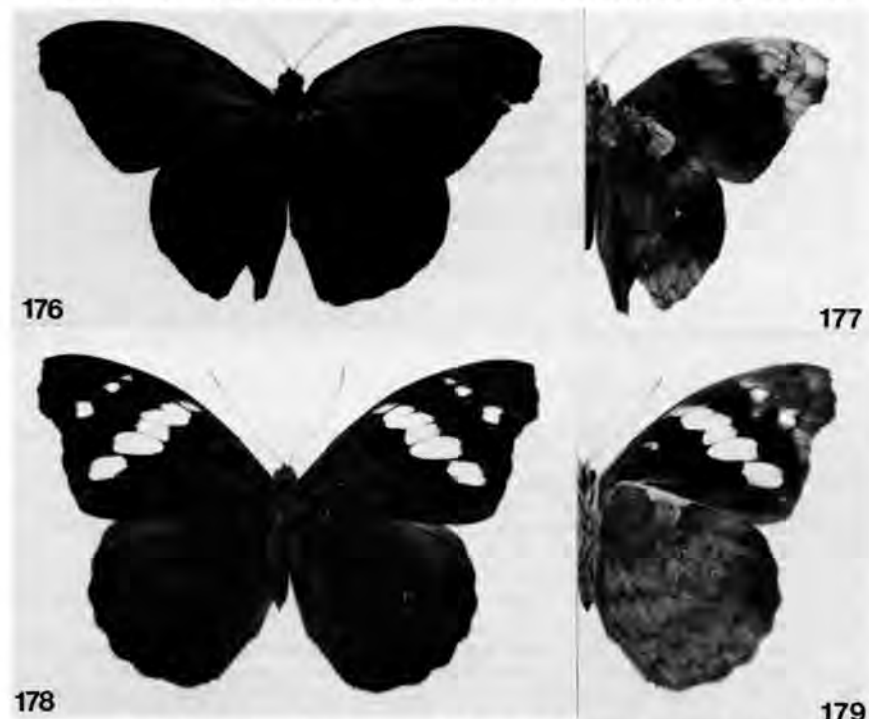
Curaray; Aguano; *Pastaza*, Sarayacu; *Chimborazo*, Hacienda Cutuguay; PERU: Loreto, Cabalococha; Iquitos; Pebas; *Huánuco*, Tingo María; *Pasco*, Pozuzo; Pucallpa; Oxapampa; *Junín*, Chanchamayo; La Merced; Satipo; San Ramón; Río Mazanari; San Luis de Shuaro; Río Perené; *Puno*, Río Xucuri, Río Inambari; *Madre de Dios*, Las Piedras; Boca Río la Torre; Puerto Maldonado; BOLIVIA: *Cochabamba*, Chapare; Todos Santos; Cochabamba; San Mateo; *Santa Cruz*, Río Ichilo; BRAZIL: *Amazonas*, Manicoré; Manaus; Benjamin Constant; Fonte Boa; São Paulo de Olivença; Nova Olinda; Tefé; Tonantins; *Acre*, Alto Juruá; *Rondônia*, Cachoeira do Samuel; *Mato Grosso*, Cuiabá; Buriti; Rondonópolis; Jaciara; Vera; Barra do Bugres; Diamantino; Chapada; *Minas Gerais*, Vespaciano; Nioaque; Km 200 Belo Horizonte to Realeza; *Bahia*, Salvador; Agua Preta; Ilheus; *Pará*, Obidos; Santarém; Cantagalo; *Rio de Janeiro*, Rio de Janeiro; Resende; Petrópolis; Paineiros; Corcovado; Serra do Santa Teresa; Angra dos Reis; Jacarepaguá; *São Paulo*, São Paulo; Mogi-Guaçu; Araras.

*Eunica sydonia caresa* (Hewitson), 1857 [Stat. rev.]

Figures 176-179, 296, 329, 368

*Cybdelis caresa* Hewitson, 1857. Exot. Butt. 2: *Cybdelis*, [46], pl. [23], f. 20. TL: "New Granada", Syntypes: 1 ♂ BMNH, Rh. 9336 (Examined)

=*Eunica cabira* (nec. C. & R. Felder, 1861). TL: Locality unknown. Syntypes: ♂ BMNH, Rh. 9337. "Type/Druce Coll. Ex. Kaden Coll./Godman & Salvin Coll./*Eunica cabira* ♂ Felder." (This type which is actually *E. sydonia caresa*, does not agree with the



Figures 176-179. *Eunica sydonia caresa* (Godart) ♂ dorsal (176) ventral (177) surfaces. "New Granada". Syntype *Cybdelis caresa* Hewitson (BMNH). ♀ dorsal (178) ventral (179) surfaces. "Amazones Perou" (BMNH).

description of *E. cabira* (actually *E. carias cabira*). It is not a typical Felder type specimen with a gold label. The original description states that the specimen was in the Kaden coll., but the type is typical of *E. s. carena* thereby making this type-designation by Riley erroneous. [Pseudotype]

*Description:* As in *E. sydonia* except for differences listed for *E. s. carena* in the key to subspecies.

Average wing length ♂ (30-36)33 mm, ♀ (30-34)32.5 mm.

*Distribution:* This subspecies occurs in Oaxaca and Chiapas, México into Central America to Panamá (Fig. 368).

*Taxonomy and Variation:* The Hewitson ♂ specimen labelled TYPE Rh. 9336 in the BMNH was examined, and it is typical of the Central American population. The type label states "N. Granada" but this formerly included Panamá, Colombia and Venezuela. The intensity of color and pattern is quite variable in the VHW of this subspecies. The purplish coloring on the dorsal surface is relatively constant, but this is variable when viewed at different angles of light.

*Biology:* The adults are found in evergreen tropical forest and are relatively uncommon. They have been collected in February to September and December with most specimens found in the wet season in June to August. They occur from near sea level to 1600 m in elevation. In México they are reported at elevations from sea level to 500 m.

Specimens Examined: 74 ♂ 14 ♀

MEXICO: *Oaxaca*, Chimalapa; *Chiapas*, Motozintla; La Granja; Tapachula; Escuintla; Mapastepic; Palenque; Chajul; la Independencia; Chiripa; GUATEMALA: *Escuintla*, Escuintla; Zapote; *Retalhuleu*, Retalhuleu; *Quetzaltenango*, Coatepeque; *Izabal*, Quiriguá; *El Petén*, Sayaxché; *Santa Rosa*, Guazacapan; HONDURAS: No specific locality; COSTA RICA: *Cartago*, Cartago; *Turrialba*; *Puntarenas*, Palmar Norte; Cañas; *Bagaces*, Bagaces; *Alajuela*, San Mateo; *Guanacaste*, Cordillera de Guanacaste; Cañas; *San José*, Carillo; PANAMA: *Canal Zone*, Barro Colorado Island; Farfan; Madden Dam; Summit; Gatun; *Colón*, Colón; *Santa Rita Mts.*; *Chiriquí*, Chiriquí; *Darién*, Cana; *Veraguas*, Isla Coiba; COLOMBIA: Hewitson type, no specific locality.

#### *Eunica chlororhoa* Salvin, 1869

Figures 180-183, 297, 330, 369

*Eunica chlororhoa* Salvin, 1869. Ann. Mag. Nat. Hist. 4: 172, n. 18. TL: Perú, [Cuzco], Cosñipata Valley. Syntypes: BMNH ♂ Rh. 9333, Leg. Whitley, Godman Salvin Coll. (Examined).

=*Eunica chlorochroa* [sic] Seitz, 1915. Macrolep. World 5: 487. [Lapsus calami]

*Description:* Male. The DFW is entirely jet black or with some green at the tornus. The DHW basal third is black with long androconial hairs; the distal two-thirds is iridescent steely-green, and all wing margins are smooth. The VFW has a row of black bars and maculae on a light blue background, and the posterior half has diffuse black patches. The VHW base color is blue with basal black maculae, and there is a median partial band and four round black postmedian ocelli with two outer rows of black maculae; there is an orange-ochre stripe extending distally in  $M_2-M_3$  or wider. Male genitalia. (Fig. 297). The ♂ hypandrium has pointed postero-lateral projections posteriorly; the uncus arm is long and thin, the valva elongate and attenuated.

Female. The DFW has black markings on a dark blue background with pale, cloudy blue or green at the tornus, a subapical band of light blue or green, and the apex is black. The DHW basal half is brown with black markings, the distal half is shining green or pale blue usually with darker markings, and the margins are darker with white fringe. The ventral surfaces are similar to the ♂, but the DHW orange-ochre stripe may be paler. Female genitalia. (Fig. 330).

Average wing length ♂ (27-33)29.5 mm, ♀ (27-31)29.5 mm.

*Distribution:* Occurs on the eastern slopes of the Andes in southern Colombia, Ecuador, to southern Perú, and also in the upper Amazon in Perú and western Amazonas, Brazil. (Fig. 369).

*Taxonomy and Variation:* I have studied the ♂ specimen labelled TYPE from the Cosñipati Valley in Perú in the BMNH. It is typical of the general population of *E. chlororhoa*. The spelling of the name is *E. chlororhoa* in the original description (Salvin, 1869) but it is frequently misspelled *E. chlorochroa*. Both spellings are found on the type specimen. There is variation in the presence and amount of green on the tornus of the DFW of the male, and some variation in the intensity of light blue or greenish on the under surfaces. These variations occur in series from the same localities.

There is an interesting aberration in a ♂ from Inambari, Perú, in the BMNH. The dorsal surfaces are normal, but the VFW has the basal three-fourths suffused with black and the outer fourth slate blue. The VHW has the black maculae suffused together, with the submarginal maculae and postmedial ocelli connected in a "dumbbell" pattern. The brown-ochre longitudinal stripe in  $M_2-M_3$  is nearly normal. The female dorsal surfaces show much variation in the amount of light blue-green.

*Biology:* Occurs in tropical rain forest in openings and forest edges and along streams. I have collected males in openings in evergreen tropical forest in Perú. Adults have been collected every month of the year at elevations of about 200 to 800 m.

Specimens Examined: 152 ♂ 9 ♀

COLOMBIA: *Putumayo*, Umbria; ECUADOR: *Bolívar*, Balzapamba; *Morona Santiago*, Macas; PERU: *Loreto*, Iquitos; *Pebas*; Upper Río Marañón; *Amazonas*, Río Santiago; *San Martín*, Japelacio; *Moyobamba*; *Tarapoto*; *Huánuco*, Tingo María; *Previsto*; Río



180



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Figures 180-183. *Eunica chlororhoa* Salvin. ♂ dorsal (180) ventral (181) surfaces. PERU, Cuzco, Cosñipata Valley. Syntype *Eunica chlororhoa* Salvin (BMNH). ♀ dorsal (182) ventral (183) surfaces. ECUADOR, Bolívar, Balzapamba (AME).



Huallaga; Pasco, Chuchurras; Cahuapanas; Chambirayacu; Pozuzo; La Salud; Junin, Rio Perené; Chanchamayo; La Merced; Satipo; Sanibeni; Río Colorado; Puno, Tirapata; Río Yahuar mayo; Carabaya; Río Huacamayo; Madre de Dios, Inambari; BRAZIL: Amazonas, Benjamin Constant; Río Javari; Río Itacuai.

*Eunica mira* Godman & Salvin, 1877

Figures 184-187, 298, 331, 369

*Eunica mira* Godman & Salvin, 1877. Proc. Zool. Soc. Lond. (1): 63. TL: Panamá, Veragua[s]. Type: Holotype ♀ BMNH Rh. 9332.

=*Eunica mira costaricensis* Niepelt, 1920: Int. Ent. Zeit. 14(3): 1-3. TL: "Costa Rica" Coll. Brade. Type: Holotype ♀ BMNH (Examined) [Syn. nov.]

=*Eunica chlorochroa* (sic) *cygoea* Hall, 1929. Entomol. 62: 133. TL: "Colombia" (First named *cygoea* by Boisduval but not published by him). Type: Holotype ♂ BMNH, Ex Oberthür coll. (Examined) [Syn. nov.]

*Description*: Male. The DFW is jet black without markings, and the wing margins are entire. The DHW costal area is brownish with an androconial area of long black hairs; the basal half is black and the distal half is a bronzed iridescent steely-green. The VFW basal color is blue with black cross bars and maculae in the anterior half, with tan basally in the area posterior to Cu, and diffuse brown to black more distally. The VHW is blue with black maculae, a black median band, two anterior ocelli in a black ellipse and two posterior ocelli with black submarginal maculae. The posterior half from  $M_1$  is heavily saturated with reddish-ochre. Male genitalia. (Fig. 298). The ♂ hypandrium is narrower than *E. chlorochroa*, and the valva is shorter and thicker.

Female. The DFW is blue with many diffuse black maculae. There is a striking white, subapical, diagonal crossband and a black apex. The DHW is mottled brownish-black,



Figures 184-187. *Eunica mira* Godman and Salvin. ♂ dorsal (184) ventral (185) surfaces. Holotype *Eunica chlorochroa* (sic) *cygoea* Hall (BMNH). ♀ dorsal (186) ventral (187) surfaces. PANAMA, Canal Zone, Gatun (CMP).

with a whitish margin. The VFW is blue with black bars and maculae, and the subapical area is white, with a curving row of four black maculae. The posterior border of the discal cell is red-ochre. The VHW is similar to the male but less red-ochre. The submarginal and marginal areas are white, with a submarginal row of black dashes. Female genitalia. (Fig. 331).

Average wing length ♂ (24.0-27.5)25.5 mm, ♀ (24-27)25.5 mm.

*Distribution:* Occurs in northern Nicaragua through Costa Rica, Panamá and western Colombia. (Fig. 369).

*Taxonomy and Variation:* I have studied the ♀ holotype of *E. mira* from Veraguas, Panamá (BMNH) and compared it with the ♀ holotype of *E. mira costaricensis* Niepelt (BMNH) which is clearly a synonym. The female of *E. mira* was first described in 1877 and the male was unknown until it was described as *E. chlororhoa* [sic] *cygoea* by Hall (1929). The male has not been illustrated previously (Figs. 184, 185) and is apparently rather rare, since I have been able to examine only four specimens. It has almost exactly the same pattern and coloration on the VHW as the female, and *E. chlororhoa cygoea* Hall is synonymized.

*E. mira* is closely related to *E. chlororhoa* and was considered to be a subspecies; however, there are many diagnostic characters. In the males, the *E. mira* have a unique pale buff, triangular area on the VFW, with a spreading brownish suffusion basally and distally on the VHW. The DHW has a narrower steely-greenish color posteriorly with the tornus not broadly greenish. The ♂ valva is shorter and thicker than in *E. chlororhoa*, and the hypandrium is a different shape. The female is distinct with a white, subapical cross band both dorsally and ventrally on the DFW. The female also has the DHW dark smoky grey with a white marginal area instead of the posterior half of the DHW steely-greenish as in *E. chlororhoa*. The VHW is similar to the male.

*Biology:* DeVries (1987) has studied *E. mira* in Costa Rica. He states: "Occurs from sea level to 500 m on both slopes, in association with primary rain forest habitats and most common in swamp forest. The males are found along riparian edges and light gaps. During the morning they perch about five to ten meters above the ground. Around midday the males dart about in the forest understory and later in the afternoon perch on tree trunks, sometimes in the canopy. Females oviposit at midday and fly in the forest understory. Although this species is rarely collected, an isolated *Mabea occidentalis* in the forest rarely fails to attract a female around midday. I have never collected this species feeding on rotting fruits or at water. In Costa Rica, populations tend to be localized around stands of the hostplant."

Adults have been collected from January to May and July and August. It is found from sea level to 1150 m in Costa Rica.

Specimens Examined: 4 ♂ 13 ♀

NICARAGUA: *Comarca del Cabo*, San Ramon 125 m, May 1 ♀ BMNH; Rio Wanks; COSTA RICA: *Limón*, Tortuguero, Hacienda la Suerta/Tapezco Aug. 1 ♀ LACM; Rio Revantázon Mar. 1 ♀ BMNH; Colonia Socorro, 900 m (DeVries); No specific locality 1 ♀ HT "*costaricensis*" Niepelt; *Heredía*, La Selva 100 m (DeVries); *Puntarenas*, San Vito 1150 ♂ (DeVries); PANAMA: *Colón*, Santa Rita Mts. 700 m Mar. 1 ♂ JC; *Colón* 300-400 m, Jan-Mar 2 ♂ 2 ♀ GS; *Darién*, Cerro Pirre 350 m, El Real Apr. 1 ♂ GS; *Canal Zone*, Barro Colorado Island 1 ♀ USNM; 1 ♀ CMP; 1 ♀ MCZ; Gatun Jul. 1 ♀ CMP; Summit May 1 ♀ Jan. 1 ♀ GS; *Veraguas*, Veraguas Holotype *mira* 1 ♀ BMNH; COLOMBIA: No specific locality. Holotype *cygoea* Hall, 1 ♂ BMNH;

#### *Eunica sophonisba* (Cramer), 1782

*E. sophonisba* has a highly unusual pattern on the VHW, somewhat reminiscent of the genus *Asterope* (= *Callithea*), with blue background and black maculae. The jet black upper surface with iridescent blue on the DHW is striking when seen in the field. This species appears to be related to *E. chlororhoa* and *E. mira*.

*Description:* Male. The DFW is jet black, usually with bright blue in the tornus. The

DHW is black with a baso-costal androconial patch of black hairs, the basal third is black, and the distal two-thirds is brilliant, shining blue. The VFW has a light to darker blue base color with black cross bands in the discal cell, two postmedian ocelli and a curving subapical line of four to six narrow maculae. The VHW is light to darker blue with black basal maculae, a median row or stripe of black maculae, two postmedian, black, ocelli encircled in an ovate ring, two round, posterior ocelli with black pupils and a submarginal line of black dashes. There is a longitudinal stripe of light orange-ochre to dark brown-ochre extending outward in  $M_2-M_3$ . Male genitalia. (Fig. 299). The ♂ hypandrium is broad with four posterior projections. The roughly triangular valva has an upturned pointed apex.

Female. The DFW has the basal half dark blue with black markings. There is a white postmedian diagonal cross band with the distal area black. The VFW has a blue discal cell with black cross bands, a white postmedian band as above, and the distal area is light blue with two rows of four black maculae. The posterior part of the wing is brownish. The VHW is similar to the ♂. Female genitalia. (Fig. 332).

#### Key to Subspecies of *Eunica sophonisba*

##### Males.

- 1a. Ventral surfaces pale grey-blue; VHW with a yellow-ochre longitudinal stripe in  $M_2-M_3$ ; VFW with relatively narrow black cross bands in the discal cell. There is a tan postmedian extension from the tan posterior area. DFW with or without bright blue in the tornus ..... *sophonisba*
- 1b. Ventral surfaces darker blue or blue-green; VHW with darker brown-ochre longitudinal stripe in  $M_2-M_3$ ; VFW with broad black cross bands in the discal cell. There is no tan postmedian extension from the reddish-brown posterior area, and there is an extensive diffuse black area. DFW always with bright blue in the tornus ..... *agele*

##### Females.

- 1a. DFW with relatively narrow postmedian diagonal white cross band (3.5-5.0 mm), proximal margin straight, not extending inward at end of discal cell. VHW with a yellow-ochre longitudinal stripe in  $M_2-M_3$ ; anterior postmedian ocellus in  $Rs-M$ , black without blue pupil ..... *sophonisba*
- 1b. DFW with relatively broad postmedian diagonal, white cross band (5.0-7.0 mm) proximal margin incurved at end of discal cell. VHW with darker brown-ochre longitudinal stripe in  $M_2-M_3$ ; anterior postmedian ocellus in  $Rs-M$ , black with a light blue pupil ..... *agele*

#### *Eunica sophonisba sophonisba* (Cramer), 1782

Figures 188-191, 299, 332, 370

*Papilio sophonisba* Cramer, 1782. Papil. Exot. 4: 12, 251, pl. 295, f. A & B. TL: Surinam.

Syntypes: Coll. Stoll. ♀ type not found. In the BMNH 1 ♂ labelled "TYPE/Suriname VI-X Fruhstorfer!" (Examined)

= *Eunica sophonisba mossi* Hall, 1928. Entomol. 61: 13. TL: [Brazil] Pará. Syntypes: 1 ♂ BMB; 1 ♂ in BMNH (Examined) [Syn. nov.]

*Description:* As in *E. sophonisba* except for differences listed for *E. s. sophonisba* in the key to subspecies.

Average wing length ♂ (25-27)26.5 mm, ♀ (27.5-30)21.9 mm.

*Distribution:* Occurs from central Venezuela through the Guyanas to Pará and Maranhão, Brazil, (Fig. 370).

*Taxonomy and Variation:* The original description and figures by Felder were based on a female. I have examined a ♂ specimen from Surinam from the Fruhstorfer coll. in the BMNH with a pink label TYPE, and a label *sophonisba* ♂ Cramer. This specimen has an orange or orange-light ochre longitudinal stripe in  $M_2-M_3$  on the VHW. In the ♂

VFW, there is a postmedian, light buff band, extending from the posterior edge into the central black area.

*E. sophonisba mossi* Hall was described from males from Pará, Brazil. Hall (1928) states "♂ upperside differs from *E. sophonisba sophonisba* Cr. in the blue band of hind wings being much broader, extending into the cell and in the blue spot near the hinder angle of forewings being also enlarged. Underside a little darker than in *E. sophonisba sophonisba* but much paler than in *E. sophonisba agele* Seitz". Study of a larger series of 34 ♂ *E. s. sophonisba* and 67 ♂ *E. s. agele* shows that the amount of blue on the DHW is variable in both subspecies, the blue on the outer posterior angle of the DFW is always present in *E. s. agele* and may be present or absent in *E. s. sophonisba*. There is some variation in the darkness of the undersides. I have not seen the ♂ type at the BMB. Hall (1983) states "Pará. 1 ♂ (type) in my own collection and several ♂♂ in BMNH." I have examined the male type in the BMNH and it is typical *E. s. sophonisba*. *E. s. mossi* is synonymized.

**Biology:** Adults are found in openings and at the edges of high evergreen tropical forest and deciduous tropical forest. I have collected a ♀ in a forest opening at Kamarang, Guyana. They have been found in February, March, July, August and October at elevations from near sea level to about 200 m.

Specimens Examined: 34 ♂ 35 ♀

VENEZUELA: *Bolívar*, Mision Kavanayén 1 ♂ 1 ♀ UC; Santa Elena de Uairén 1 ♂ 1 ♀ UC; Bochinche 1 ♂ UC; El Playon, Río Caura 1 ♀ UC; Río Grande 200 m 2 ♂ (at blacklight) USNM; GUYANA: *Mazaruni-Potaro*, Kamarang Oct. 1 ♀ JC; Potaro River Feb. Mar. Oct. 1 ♂ 4 ♀ AME; Tumatumari Jul. Aug. 2 AME; Essaquiwo River BMNH; *E. Demerara-WC Berbice*, Demerara River BMNH; *Northwest*, Barima River ♂ BMB; SURINAM: *Paramaribo*, Paramaribo BMNH; No specific locality, Type 1 ♂ BMNH; 1 ♂ MNRJ; GUYANE: *Guyane*, Cayenne BMNH; 1 ♂ USNM; St. Jean du Maroni



Figures 188-191. *Eunica sophonisba sophonisba* (Cramer). ♂ dorsal (188) ventral (189) surfaces. "SURINAM". Syntype *Papilio sophonisba* Cramer (BMNH). ♀ dorsal (190) ventral (191) surfaces. GUYANA, Mazaruni-Potaro, Potaro River (AME).

BMNH; St. Laurant du Maroni BMNH; BRAZIL: Pará, Guamá MNRJ; Aramanaí BMNH; Utinga MNRJ; Belém Oct. 1 ♀ CAS; Maranhão, Montes Aúreos BMNH.

*Eunica sophonisba agele* Seitz, 1915

Figures 192-195, 299, 332, 370

*Eunica sophonisba* forma *agele* Seitz, 1915. Macrolep. World 5: 487, pl. 99-100 a. TL: Brazil [Amazonas] Humaitá; Perú, [Loreto], Iquitos, "Colombia." Syntypes: ♂ ♀ Location unknown. There is a ♂ labelled TYPE from Iquitos, Perú, Rothschild Coll. in the BMNH (Examined)

=*Eunica falsata* Oberthur, 1916. Lep. Comp. 12: 39-40, Pl. 157, 3495-3496. TL: Perú [San Martín], Chambirayacu; [Loreto], Iquitos; Pebas; Brazil [Amazonas] São Paulo [de Olivença]. Syntypes: ♂ ♀ BMNH [Syn. nov.]

*Description:* As in *E. sophonisba* except for differences listed for *E. s. agele* in the key to subspecies.

Average wing length ♂ (20-30)27.5 mm, ♀ (27-30)28 mm.

*Distribution:* Occurs from Colombia to southern Perú and in the upper basin of the Amazon in Brazil in Amazonas, Acre, and Rondônia. (Fig. 370).

*Taxonomy and Variation:* I have examined a ♂ specimen from Iquitos, Perú labelled TYPE of *agele* in the Rothschild Coll. in the BMNH. but its status is uncertain. The typical *E. s. agele* population has the VHW with a dark, chocolate-ochre, longitudinal stripe in  $M_2$ - $M_3$ , and always has bright blue in the posterior angle of the DFW in the male. The amount and intensity of blue on the DHW is variable.



Figures 192-195. *Eunica sophonisba agele* Seitz. ♂ dorsal (192) ventral (193) surfaces. ECUADOR, Napo, Puerto Misahuallí (JC). ♀ dorsal (194) ventral (195) surfaces. BRAZIL, Amazonas, Manacapuru (BMNH).

The type of *E. falsata* Oberthür from the Upper Amazon was not found in the BMNH. This form is adequately described and the color plate shows that it is a synonym of *E. s. agele* and is synonymized here. *E. s. mossi* Hall is an apparent intergrade and is discussed under *E. s. sophonisba*. The female is steely-blue with a broad white diagonal crossband on the DFW. There is variation in the width of this band, but never as narrow as in *E. s. sophonisba*.

**Biology:** Occurs in openings and at the edges of tall evergreen tropical forest especially near rivers. I have collected males in several localities in Ecuador near fermenting fruit baits in forest openings. The males and females fly very fast and are difficult to collect so that although they are uncommon in collections, they are not rare. The females fly in the same places as the males and are collected more often than many other female *Eunica*. Adults are occasionally attracted to blacklights or white lights.

The adults are found in nearly every month of the year at elevations of about 100 to 1,000 m. Fassl (1918) states that it is found on the eastern slopes only of the Andes from 300-1,000 m elevation.

Specimens Examined: 67 ♂ 35 ♀

COLOMBIA: *Cundinamarca*, Bogotá BMNH; *Meta*, Villavicencio; Forzosa; Cuchilla Mar. May Sep. 2 ♂ 5 ♀ AME; *Amazonas*, Leticia 1 ♂ AMNH; Río Tacana 12 ♂ AMNH; ECUADOR: *Napo*, Puerto Misahuallí Nov. 2 ♂ JC; Puerto Napo Jan. 1 ♂ JC; Tena Jan. 1 ♀ JC; Napo BMNH; Curaray BMNH; PERU: *Loreto*, Río Nanay, Mishana 150 m Jan 1 ♂ 1 ♀ MJP; Iquitos 2 ♂ 3♀ USNM; 1 ♂ MJP; MNRJ; ♂ BMNH; Humayta BMNH; Pebas BMNH; Río Cachiayacu BMNH; Nauta BMNH; Explornapo, Río Napo, Mar. 1 ♂ AME; *San Martín*, Chambirayacu BMNH; *Huánuco*, Tingo María Aug. 1 ♂ DB; *Madre de Dios*, Manu, Puesto Pakitsa Sep. 1 ♂ MJP; Boca Río la Torre, Jul. Oct. 5 ♂ 2 ♀ MJP; BRAZIL: *Amazonas*, Manicoré MNRJ; Tefé MNRJ; BMNH; São Paulo de Olivença MNRJ; BMNH; 1 ♂ CMP; Benjamin Constant MNRJ; Rio Parauari MNRJ; Rio Papure MNRJ; Manacapuru Mar. Apr. Sep. Oct. 3 ♂ 2 ♀ CMP; Tabatinga; *Acre*, Alto Juruá MNRJ; *Rondônia*, Jaru Aug. 1 ♂ AME.

#### *Eunica norica* (Hewitson), 1852

*E. norica* males are quite common. They are black with the posterior third to half bright blue or purplish-blue. The VHW has striking large, fused, anterior and black ocelli with two white pupils, and a bold pattern. The male hypandrium is very narrow, long, and extended, quite similar to *E. concordia*, but they are otherwise not closely related.

**Description:** Male. The DFW is black and somewhat truncate. The DHW has the basal half black, distal half iridescent blue or bluish-purple with black dentate margins. The VFW is brown with black maculae in the discal cell and whitish median macula. There is a round, black, subapical macula and a curving black apical line. The VHW is light or dark brown with wide, nearly black, basal maculae, a wide median band, and a submarginal line. The postmedial ocelli have two large, black, joined anterior ocelli with white pupils in a large oval ring. The two separate posterior ocelli are black surrounded by light brown, both enclosed in a black double enclosure. Male genitalia. (Fig. 300) The ♂ hypandrium is very narrow, elongate and tapering to bifurcate rami with heavy teeth. The valva is elongate with a round tip. The gnathos terminates with a gnathos arm.

Female. The DFW is light to dark brown with a postmedian wide white diagonal cross band or two large white maculae. The DHW is brown with a submarginal line. The VFW is light brown, with white postmedian bands or maculae as dorsally, and with an apical black cross band. The VHW is the same as in the ♂, but may have larger and thicker maculae. Female genitalia. (Fig. 333).

#### Key to Subspecies of *Eunica norica*

##### Males.

- 1a. DHW with distal third to half purplish-blue. VHW usually lighter brown base color; two posterior ocelli usually the same size . . . . . *norica*



- 1b. DHW with distal half iridescent shining blue, VHW usually darker, more reddish-purple or reddish-brown base color; two posterior ocelli usually with ocellus in  $M_3-Cu_1$ , smaller than anal ocellus (in  $Cu_1-Cu_2$ )..... *occia*
- Females.
- 1a. DFW with very broad large white postmedian diagonal cross band (8-10 mm); base color brownish black..... *norica*
- 1b. DFW with two narrower (6 mm) white postmedian well-separated white maculae; base color brown..... *occia*

*Eunica norica norica* (Hewitson), 1851

Figures 196-199, 300, 333, 371

*Cybdelis norica* Hewitson, 1852. Exot. Butt. I. *Cybdelis* [64], pl. [32], f. 13. TL: "N. Granada". Colombia. Syntypes: BMNH ♂ Rh. 9326. Hewitson Coll. (Examined) = *Evonyma norica lichyi* Orfila, 1954. 47, figs. 4-6. TL: Venezuela, Caracas. Holotype: ♂ (MBR) [Syn., nov.]

*Description:* As in *E. norica* except for differences listed for *E. n. norica* in the key to subspecies.

Average wing length ♂ (25.5-29.5)27.5 mm, ♀ (27.5-28.5)28.0 mm.

*Distribution:* Occurs from Costa Rica and Panamá to Colombia and northern Venezuela, and the western slopes of the Andes mountains in Ecuador, (Fig. 371). A ♂ specimen labelled "México, G. N. Pilate" in MCZ may be an error.

*Taxonomy and Variation:* I have examined the ♂ specimen marked "TYPE of *E. norica*" in the BMNH, and it is typical of the many specimens from Colombia. I have not seen the type of *E. n. lichyi* Orfila from Caracas, Venezuela. Other Venezuelan specimens are



Figures 196-199. *Eunica norica norica* (Hewitson). ♂ dorsal (196) ventral (197) surfaces. "Nova Granada". Syntype *Cybdelis norica* Hewitson (BMNH). ♀ dorsal (198) ventral (199) surfaces. COSTA RICA, San José, Parque B. Carillo (DeVries coll.).

typical *E. n. norica*, and it is tentatively synonymized. The population in Costa Rica probably belongs to *E. n. norica*. The males appear to be the same as the type, however, three females from Costa Rica may be different with a darker dorsal surface and broader, more diffuse white, diagonal cross bands on the DFW and more reddish purple on the VHW. It would be valuable to compare with females from Colombia. Throughout the range there is variation in the size of the iridescent blue area on the ♂ DHW and in the sizes of the two white ocellar pupils in the large anterior ocellus in the VHW. The two joined posterior ocelli each have round, black, circular maculae usually equal in size but may vary.

**Biology:** The adults are found in evergreen tropical forest especially at higher elevations. DeVries (1987) states: "Recently discovered in Costa Rica, this species occurs at 800 to 1,300 m on both slopes, in association with cloud forest habitats. It is seasonal and local, flying during April and May in the Carrillo Belt and other Talamancan areas. I have never seen this species at any other time. Males visit wet sand at water crossings, and perch in the canopy and subcanopy along edges and in gaps. Both of these activities take place from early morning until midday. The rare females are found along ridges and mountain passes. This species is rare in collections and very seldom seen in nature, in contrast to its apparent abundance in South America."

In Colombia and Ecuador, adults have been collected at elevations from several hundred m to 1,200 m in February, March, June, July, October, and November.

Specimens Examined: 94 ♂ 6 ♀

COSTA RICA: *San José*, Parque B. Carrillo, La Montura; *Cartago*, Juan Viñas; *Puntarenas*, San Vito; PANAMA: *Darién*, Cana, *Panamá*, Altos de Pacora, Cerranía de Pirre; COLOMBIA: *Santander*, Río Opón; Landazuri; Bolívar; Río Suárez; Head Río Carare; Tunja; *Magdalena*, El Jordán; *Boyacá*, Muzo; *Antioquia*, Medellín; Mesopotamia; Zaragosa; *Cundinamarca*, Bogotá; Cananche; *Valle de Cauca*, Salado; Cali; Río San Joaquín; Micay; Río Dagua; Juntas; *Meta*, San Martín; Píperalito; ECUADOR: *Pichincha*, Santo Domingo de los Colorados; Río Toachi; *Esmeraldas*; Cachabi; *Chimborazo*, Chimbo; *Zamora-*



Figures 200-203. *Eunica norica occia* Fruhstorfer. ♂ dorsal (200) ventral (201) surfaces. PERU, Pasco, Pozuzo. Syntype *Eunica norica occia* Fruhstorfer (BMNH). ♀ dorsal (202) ventral (203) surfaces. PERU, San Martín, Japelacio (AMNH).

*Chinchipe*, Zamora X; *Napo*, Archidona; VENEZUELA: Mérida, Mts. of Mérida; *Distrito Federal*, Caracas.

*Eunica norica occia* Fruhstorfer, 1909

Figures 200-203, 300, 333, 371

*Eunica norica occia* Fruhstorfer, 1909. Stett. Ent. Zeit. 2: 211. TL: Perú, [Pasco], Pozuzo. Syntypes: BMNH 2 ♂, "Type" ♂ / Perú / Fruhstorfer (Examined)

*Description*: As in *E. norica* except for differences listed for *E. n. occia* in the key to subspecies.

Average wing length ♂ (23-28)26.0 mm, ♀ 26.5 mm.

*Distribution*: Occurs from the eastern slope of the Andes cordillera in Ecuador through Perú to Bolivia (Fig. 371).

*Taxonomy and Variation*: I have examined a male marked "Type" of *E. n. occia* in the BMNH and it is typical of the population. There is variation in the amount of blue marking on the DHW of the ♂, in the intensity of markings on the VHW, and in the size of the ocellar maculae. The DFW rarely has blue on the tornus.

*Biology*: The adults are quite common in openings and at the borders of high tropical evergreen forests. I have collected large series of males in various localities in Ecuador and Perú, especially at fruit baits fairly close to the ground. They occur at elevations from a few hundred m to 1200 m in every month of the year. They are not especially common at any particular period but appear to have successive generations.

Specimens Examined: 266 ♂ 2 ♀

ECUADOR: *Napo*, Tena; Puerto Misahualli; Río Cotapino; *Morona-Santiago*, Macas; *Pastaza*, Puyo; Río Pastaza; La Mascota; Huagra- Yacu; Abitagua; *Zamora-Chinchipe*, Zamora X; Layateo; *Tungurahua*, Río Topo; Baños; Vehucutin; La Mascota; PERU: *Loreto*, Boquerón del Padre Abad; Marotta; *Ucayali*, Pucallpa; *Huánuco*, Tingo María; *San Martín*; Moyobamba, Tarapoto; Juanjui; *Junín*, La Merced; Chanchamayo; Satipo; Río Pangoa; Sanibeni; San Pedro; *Madre de Dios*, Shintuya; Boca Río la Torre; Inambari; *Pasco*, Chuchurras; Oxapampa; Palcazu; *Cuzco*, Cosñipata; Illapani; *Puno*, Yahuar mayo; Agualani; La Oroya; Carabaya; La Unión; San Gabán; BOLIVIA: *La Paz*, Muchanes; Mapiri; San Augustin.

*Eunica carias* Hewitson, [1857]

*Eunica carias* extends from Venezuela on the Andean slopes south to Bolivia. It is highly variable. Colombian male specimens have the DFW light brown and the VFW distal third brownish without or with faint grey subapical maculae. In Ecuador the DFW is darker with some violet, and the VFW has more prominent white maculae. This character is intensified in Perú and in Bolivia, the specimens are black with deep purple on the DFW, and the VFW is mostly black with prominent whitish maculae. There is similar variation in markings and shading on the VHW. This population has been subdivided into three species plus three subspecies. I have carefully studied the types of five of these taxa. The sixth, a type of *E. cabira* C. and R. Felder (BMNH) unfortunately has erroneous labelling, since the type labelled *E. cabira* is actually *E. sydonia carena*. Study of 353 ♂ specimens indicates that there are probably two valid subspecies, *E. c. carias* and *E. carias cabira*. In addition, these subspecies have nearly identical male genitalia and hypandria.

*E. carias cabira* is quite variable, and this has resulted in probably four synonyms for *E. carias cabira*. It is possible to find examples of four or five of these named taxa in a series from a single locality. Although I studied Venezuelan specimens (at Maracay) before understanding the range of variation in this species, the exact status of Venezuelan specimens is not certain since I have not been able to study the type of *E. c. cabira* (from Caracas). The remarkable disjunct range of *E. c. cabira* supports this being composed

of two subspecies. The Ecuador, Peru, and Bolivia populations would be *E. c. tenebrosa* Salvin. However, I have not been able to find any consistent characters to support this position. Dr. G. Lamas (pers. comm.) believes *E. c. tenebrosa* is a distinct population.

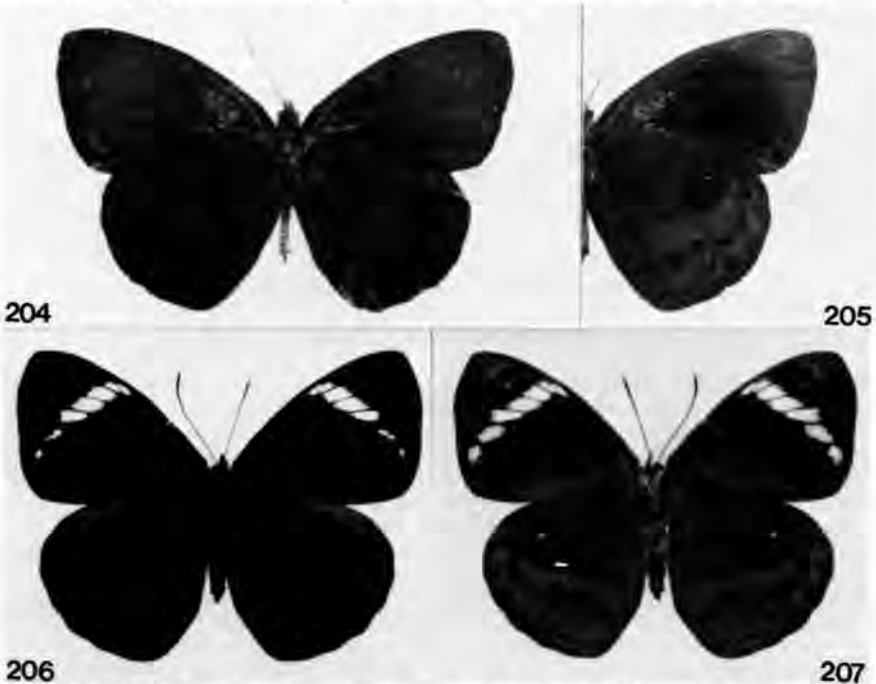
*Description:* Male. The DFW is shining, golden brown to purplish-black. The DHW has a basal, costal, black androconial area, the costal area is brown, and the remainder of the wing purplish-brown to purplish-black. The VFW has a black androconial area on the cubital vein, usually with black markings in the discal cell. There is a large diffuse black area, and there may or may not be white subapical and apical testaceous markings. The VHW is dull reddish-brown; there are two anterior fused ocelli with two white pupils surrounded by an oval darker ring. There are two or three posterior ocelli some usually with white pupils. Male genitalia. (Fig. 301). The male hypandrium is broadly oval, extended posteriorly with two pointed projections. The beaked uncus is attenuated.

Female. The DFW is brown or purplish-brown with a relatively narrow white postmedian diagonal cross band divided posteriorly into separate narrow maculae. The ventral surfaces are similar to the ♂ except white postmedian band as on the DFW. Female genitalia. (Fig. 334).

#### Key to Subspecies of *E. carias*

Male.

- 1a. DFW shining golden-brown; VFW with plain shining, reddish-brown without white subapical testaceous markings (rarely very slight dull markings); VHW with anterior postmedian ocellus with one white macula ..... *carias*
- 1b. DFW purplish-brown to purplish black; VFW with whitish subapical patch,



Figures 204-207. *Eunica carias carias* (Hewitson). ♂ dorsal (204) ventral (205) surfaces. "Nova Granada". Syntype *Cybdelis carias* Hewitson (BMNH). ♀ dorsal (206) ventral (207) surfaces. COLOMBIA, Valle Cauca, Cali (MPM).

with a proximal, dark, narrow band and three or four whitish maculae proximally; VHW with anterior postmedian ocellus usually with two white maculae, and the posterior ocelli sometimes with white pupils . . . . . *cabira*

## Female

- 1a. DFW brownish-purple in distal half and a highly contrasting, narrow, white, postmedian diagonal cross band, very narrow posteriorly; VFW and VHW characters same as male *carias* . . . . . *carias*  
 1b. DFW brown with a narrow, white, postmedian diagonal crossband; VFW and VHW characters same as male *cabira* . . . . . *cabira*

*Eunica carias carias* (Hewitson), [1857] [Stat. rev.]

Figures 204-207, 301, 334, 372

*Cybdelis carias* Hewitson, [1857]. Exot. Butt. 2: *Cybdelis*. [46], pl. [23], f. 21-22. TL "New Granada". Syntypes: ♂ BMNH Rh. 9330 (Hewitson Coll.) (Examined)

*Description*: As in *E. carias* except for differences listed for *E. c. carias* in the key to subspecies.

Average wing length ♂ (29-32)31 mm, ♀ (28-33)30.5 mm.

*Distribution*: Occurs in central and western Colombia and perhaps into Venezuela. The records from Panamá and Costa Rica need to be confirmed (Fig. 372).

*Taxonomy and Variation*: I have studied the ♂ specimen in the BMNH labelled type. It is typical of all other Colombian specimens examined. There is some variation in the size of specimens and in the intensity of markings on the VHW.

*Biology*: Occurs mainly on the western slopes of the Andes from about 1,500 to 2,300 m elevation (Fassl, 1918). The adults are found in moist muddy places near forests. They have been collected in February and April to July with most records in June and July.

Specimens Examined: 185 ♂ 25 ♀

COSTA RICA: No specific locality 1 ♂ BMNH; PANAMA: No specific locality 1 ♂ USNM; COLOMBIA: *Cundinamarca*, Bogotá; *Carmen de Yacopi*; *Llanos de San Martín*; *Zipaquirá*; *Chocó*, *Bellavista*; *Meta*, *Piperalito*; *Boyacá*, *Muzo*; *Valle Cauca*, *Cali*; *Antioquia*, *Mesopotamia*; *Cauca*, *Río San Joaquín*; *Tolima*, *Las Maximas*; *Río San Fernando*; *La Marina*; *Río Ambeina*.

*Eunica carias cabira* C. & R. Felder, 1861 [Stat. rev.]

Figures 208-211, 301, 334, 372

*Eunica cabira* C. & R. Felder, 1861. *Wien. Ent. Monat.* 5: 105, n. 85. TL: Venezuela, Caracas ♂ Leg. Moritz, Coll. Kaden. Type: 1 ♂ BMNH Rh. 9337. This specimen is actually

*Eunica sydonia carena* Hewitson. This type specimen is mislabeled. (Pseudotype).

=*Eunica tenebrosa* Salvin, 1869. *Ann. Mag. Nat. Hist. (n.)* 4: 173, n. 20. TL: Perú, [Pasco], Pozuzo. Godman Salvin Coll. Syntypes: ♂ BMNH Rh. 9331. (Examined) [Syn. nov.] (?)

=*Eunica cabira gerwisa* Fruhstorfer, 1907. *Soc. Entomol.* 5: 33-34. TL: Perú, [Pasco], Pozuzo. Syntypes: 8 ♂ BMNH. Coll. Fruh. (Examined) [Syn. nov.]

=*Eunica cabira ninetta* Fruhstorfer, 1907. *Soc. Entomol.* 5: 33-34. TL: "Ecuador" Syntypes: 2 ♂ BMNH, Coll. Fruh. (Examined) [Syn. nov.]

=*Eunica cabira editha* Fruhstorfer, 1907. *Soc. Entomol.* 5: 33-34. TL: Bolivia, [La Paz], Suapi. Holotype: 1 ♀ BMNH, Coll. Fruh. (Examined) [Syn. nov.]

*Description*: As in *E. carias* except for differences listed for *E. carias cabira* in the key to subspecies.

Average wing length ♂ (28-32)30 mm, ♀ 30 mm.

*Distribution*: Occurs from Caracas, Venezuela to Ecuador, Perú and Bolivia on the slopes

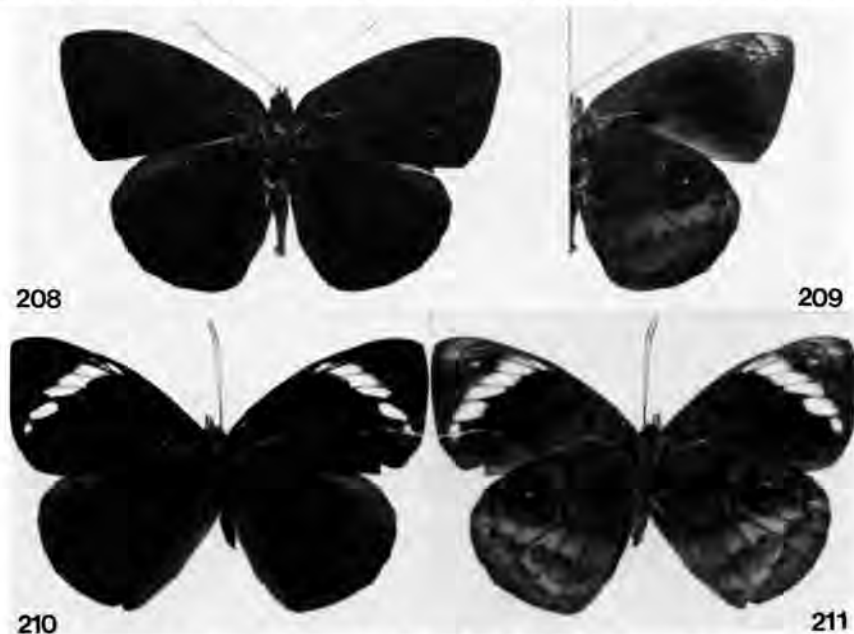
of the Andes mountains (Fig. 372).

**Taxonomy and Variation.** The ♂ specimen labelled type "*E. cabira*" in the Felder Coll. in the BMNH is actually *E. sydonia caresa* Hewitson. The type specimen has been accidentally misidentified and I was unable to find another specimen, which may be the actual ♂ type described from Caracas, Leg. Moritz, Kaden Coll. The original description by Felder (1861), while not sufficiently detailed, appears to apply to the population from Venezuela to Bolivia. I have examined a male specimen of *E. tenebrosa* Salvin from Perú (BMNH) marked "Type HT". It is typical of the population of *E. c. cabira* with the characters listed in the key to subspecies. It is tentatively synonymized but may represent a distinct population from Ecuador to Bolivia. Fruhstorfer (1907) described three subspecies *E. c. gerwisa*, *E. c. ninetta* and *E. c. editha*. I have studied the ♂ specimens marked type in the BMNH for all of these taxa. They are all typical *E. carias cabira* with minor variations that can be found in a series from single localities and have no validity. There is somewhat of a cline in the appearance of certain characters with an increase of dark brownish-purple to purple black ending in Bolivia. However, there is much variation locally in specific localities. There is similar variation in the white subapical markings on the VFW and in the intensity of markings on the VHW, especially in the number of white pupils in the ocelli. All three of these Fruhstorfer taxa are synonymized.

**Biology:** This is a relatively common subspecies found mainly on the eastern slopes of the Andes Cordillera from about 500 to 1500 m. I have collected adults in Perú at mud puddles. They have been found nearly every month of the year with most in July and August.

Specimens Examined: 164 ♂, 11 ♀

GUYANA: *Mazaruni-Potara*, Potaro River; VENEZUELA: *Distrito Federal*, Caracas; *Táchira*, Umuquena; *Aragua*, Rancho Grande; *Lara*, Terepalma; *Barinas*, La Chimenea;



Figures 208-211. *Eunica carias cabira* C. and R. Felder. ♂ dorsal (208) ventral (209) surfaces. PERU, Pasco, Pozuzo. Syntype *Eunica tenebrosa* Salvin (BMNH). ♀ dorsal (210) ventral (211) surfaces. ECUADOR, "Oriente" (AMNH).



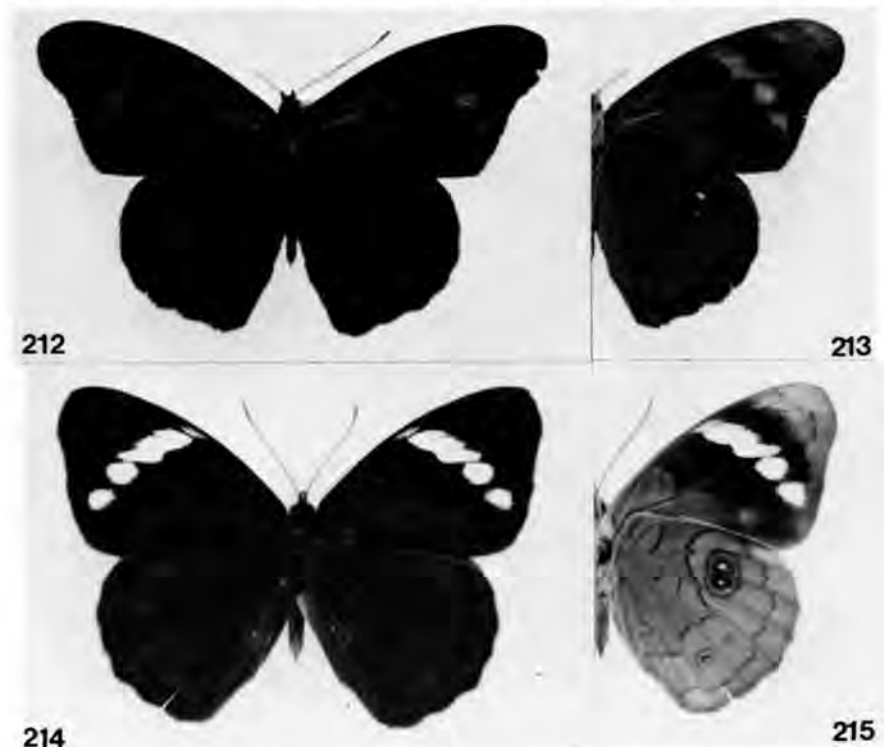
*Mérida*, Mérida; ECUADOR: *Napo*, Río Napo; *Morona-Santiago*, Macas; *Tungurahua*, Ambato; *Pastaza*, Puyo; *Guayas*, Guayaquil; PERU: *San Martín*, Rioja; *Jepelacio*; *Huánuco*, Tingo María; Río Huallaga; *Previsto*; *Pasco*, Pozuzo; *Cahuapanas*; Río Pichis; *Cuzco*, Río Colorado; *Cosñipata*; *Junin*, Chanchamayo; La Merced; Río Sanibeni; *Satipo*; *Shuaro*; Río Perené; *Puno*, Inca Mines; *Carabaya*; La Aroya; *Agulani*; *Santo Domingo*; *Madre de Dios*, Inambari; BOLIVIA: *Cochabamba*, Chapare; *Cochabamba*; *Alto Palmar*; *Cristal Mayo*; *La Paz*, Suapi; *Yungas de la Paz*; *Chairo*; *Río Zongo*; *Chulumani*; *Santa Cruz*, Río Juntas.

*Eunica brunnea* Salvin, 1869

Figures 212-215, 302, 373

*Eunica brunnea* Salvin, 1869. *Ann. Mag. Nat. Hist.* 4: 173-4. TL: Perú [Cuzco] Cosñipata Valley. Holotype: BMNH ♂ Rh. 9317 Coll. by H. Whitely. (Examined)

*Description*: Male. The DFW is purplish-brown in the basal half, there is a diffuse, lighter brown, postmedian diagonal crossband, a lighter brown apical area, and the wing is produced at the apex. The DHW is purple-brown with a darker margin. The VFW is dull brown with diffuse darker postmedian and subapical patches. The VHW is dull brown with thin darker basal, medial and submarginal lines. The two anterior postmedial ocelli



Figures 212-215. *Eunica brunnea* Salvin. ♂ dorsal (212) ventral (213) surfaces. PERU, Cuzco, Cosñipata Valley. Holotype *Eunica brunnea* Salvin (BMNH). ♀ dorsal (214) ventral (215) surfaces. PERU, Madre de Dios, Inambari (BMNH).

are black with white pupils in a dark oval; there is a larger ocellus with a white pupil and a small ocellus in  $M_7-Cu_1$ . Male genitalia. (Fig. 302). The hypandrium is broad and narrowed posteriorly. The valva has a subapical claw.

Female. The DFW is brown in the basal half, and there is a narrow white postmedian cross band. The DHW is brown with a submarginal line. The VFW is dull brown and diffuse black with white cross band as dorsally, with grey-purple apical VHW as in the ♂.

Average wing length ♂ (30-33)32 mm, ♀ 32.5 mm.

*Distribution:* Occurs from northern Colombia south in the eastern Andean slopes through Ecuador and Perú to western Bolivia. Records from Iquitos, Perú and Obidos, Brazil in the AMNH need to be confirmed (Fig. 373).

*Taxonomy and Variation:* I have examined the holotype ♂ (BMNH), and it is the same as other males examined. Some ♂ specimens appear to have more brownish-purple on the dorsal surfaces. I have been able to find only a single female to examine.

*Biology:* This is a quite rare species, and little is known of its biology. It has been collected in April, June, September and October in both wet and dry seasons. It appears to occur at higher elevations from about 400 to 1600 m, but there are insufficient data to be positive.

Specimens Examined: 35 ♂ 1 ♀

COLOMBIA: *Santander*, El Centro 3 ♂ AMNH; "Interior" BMNH; ECUADOR: *Zamora-Chinchipe*, Zamora BMNH; PERU: *Loreto*, Iquitos (?) 3 ½ AMNH; *Junín*, Chanchamayo June BMNH; Satipo 1 ♂ AMNH; *Cuzco*, Cosñipata BMNH; *Madre de Dios*, Inambari 1 ♀ BMNH; *Puno*, La Unión, Río Huacamayo, Carabaya 700 m Nov. BMNH; Chaquimayo 800 m Apr. BMNH; BOLIVIA: *La Paz*, Bella Vista, 400 m Sep. BMNH; Farinas 1600 m BMNH; BRAZIL: *Pará*, Obidos (?) 1 ♂ AMNH (probably an error).

#### *Eunica volumna* (Godart), [1824]

*Eunica volumna* is a highly variable, widespread species which has been subdivided into eight species and subspecies. I have studied the types of five of these taxa and have examined topotypical specimens of the other related taxa. Critical study of all of the specimens available indicates that there is the nominate form and one subspecies with allopatric distributions. This is further confirmed by there being no significant differences in the male genitalia and hypandria. The species is subdivided into the nominate form *E. v. volumna*, which has a distinctive pattern on the VHW, and the subspecies *E. v. celma*, in which the ♂ has the dorsal surface similar to *E. v. volumna*, but the VHW pattern is similar to *E. venusia*. The female of *E. v. volumna* has the same VHW pattern of the male and narrower white bands on the DFW. The females of *E. v. celma* and *E. venusia* are quite similar except the greenish color of *E. venusia* which is overemphasized in Seitz (1916 pl. 100 B, C) and the ventral surface is poorly illustrated.

The angular truncate forewings, undulate posterior wings, black DFW in the ♂ and especially the bluish markings on the VFW identify this species.

*Description:* Male. The DFW is black with a truncate and dentate margin with white fringe. The DHW is black with a thin to broad, blue, submarginal line or band. There may be black postmedian ocellar markings and additional bluish shading. The VFW has a blue discal area with a black crossband and two additional black crossbands. The subdiscal area is blue with an irregular, oval, brownish macula outlined in black, and three narrow apical maculae in a line. The VHW has a large oval ring with two fused ocelli with two light pupils. There are two postmedian nearly separate ocelli posteriorly with the ocellus in  $M_7-Cu_1$  smaller. Male genitalia. (Fig. 303). The ♂ hypandrium is oval with two pointed posterior projections. The valva is roughly triangular pointed at the apex.

Female. The DFW is slate blue with dark markings and a postmedian white diagonal crossband. The DHW is slate blue with black markings and a black submarginal line and margin with white fringe in the dentations.

Key to Subspecies of *Eunica volumna*

## Male.

- 1a. VHW with thin dark lines and markings, no broad diffused maculae in basal half which is pale grey-blue; DHW with relatively narrow blue or purplish submarginal line or band ..... *volumna*
- 1b. VHW with three broad, thick, maculae in the basal third of the VHW, with additional variably thick, broad, maculae in an irregular median line. DHW with blue, undulate, submarginal band with a proximal, black, wavy line; there may be indistinct dark blue or purplish iridescence in distal third ..... *celma*

## Female.

- 1a. VHW with thin, dark lines and markings similar to the male; DFW with relatively narrow, postmedian, white, diagonal band (4-6 mm at widest part); DHW with few small black maculae ..... *volumna*
- 1b. VHW with three broad, thick, maculae in the basal third of the VHW, with additional variably thickened maculae in an irregular median line; DFW with relatively broad postmedial white diagonal band 9-11 mm at widest part; DHW with prominent black maculae. Dorsal surfaces of wings bright blue or grey blue; black maculae more defined DFW with postmedian white diagonal band with more defined margins ..... *celma*



216



217



218



219

Figures 216-219. *Eunica volumna volumna* (Godart). ♂ dorsal (216) ventral (217) surfaces. BRAZIL, "Bahia". Syntype *Faunia tithonia* C. and R. Felder (BMNH). ♀ dorsal (218) ventral (219) surfaces. BRAZIL, Santa Catarina (BMNH).

*Eunica volumna volumna* (Godart), [1824]

Figures 216-219, 303, 374

*Nymphalis volumna* Godart, [1824]. Enc. Meth. 9: 416, n. 206. TL: "Brasil" Holotype: MNHP? 1 ♂ HT (not found).

= *Faunia tithonia* C. & R. Felder, [1867] Reise Nov. Lep. 3: 407, no. 613, pl. 52, f. 6-8.

TL: Brasil, Bahia. Syntypes: BMNH ♂ Type, Felder Coll. (Examined) [Syn. nov.]

= *Eunica volumna intricata* Fruhstorfer, 1909. Stett. Ent. Zeit. 2: 214. TL: Brasil, Santa Catarina, Blumenau. Holotype: BMNH 1 ♂ HT "Type Fruhst." (Examined) [Syn. nov.]

= *Cybdelis alpharea* Boisduval. A very poor undescribed specimen (♀) was found in the MNHP with this label. [Nomen nudum].

*Description:* As in *E. volumna* except for differences listed for *E. v. volumna* in the key to subspecies.

Average wing length ♂ (32.5-33.5)33 mm, ♀ (33-36)34.5 mm.

*Distribution:* *E. v. volumna* is found in southeast Brazil from Bahia to Mato Grosso south to Santa Catarina, Brazil (Fig. 374).

*Taxonomy and Variation:* I was not able to find the Godart type of *E. volumna* (MNHP), and its location is unknown. This is a very distinctive taxon and while variable, is not easily confused with the other subspecies. I have studied the ♂ Felder type specimen of *E. tithonia* (BMNH) and it is a synonym of *E. v. volumna*. Similarly the ♂ specimen marked type of *E. volumna intricata* in the Fruhstorfer collection (BMNH) is a synonym of *E. v. volumna*. Both of these synonymized types are typical of the population of *E. v. volumna*. There is slight variation in the width of the narrow submarginal blue band on the DHW of the ♂, in the intensity of blue shading on the VFW and in the markings of the VHW. The ♀ varies from dark blue to grey-blue.

*Biology:* Very little is known of the biology of this relatively rare subspecies. I collected a male in an opening in semi-deciduous Parana pine forest near Santa Catarina, Brazil. It has been found in nearly every month of the year at elevations from near sea level to about 700 m.

Specimens Examined: 26 ♂ 15 ♀

BRAZIL: *Goiás*, Chapada dos Veadeiros 1 ♂ MNRJ; *Bahia*, Bahia BMNH; *Espírito Santo*, Jacaraípe Feb. 2 ♂ 3 ♀ UFPC; *Mato Grosso*, Diamantino Sep. 3 ♂ UFPC; Buriti 600 m Jun. 2 ♂ UFPC; 1 ♂ KB; Nioaque, Nov. 1 ♂ AME; BMNH; Rondonópolis 1 ♀ KB; *Corumbá* 1 ♀ USNM; *Minas Gerais*, Carmo do Rio Claro MNRJ; Belo Horizonte, Apr. 1 ♂ KB; Cachimbo Oct 1 ♂ KB; *Distrito Federal*, Sobradinha Aug. 1 ♂ KB; *Rio de Janeiro*, Rio de Janeiro BMNH; *São Paulo*, Itai [Itahy] BMNH; Guarujá Sept. Oct. 2 ♂ 1 ♀ DB; Paraná, "Chepo" BMNH; *Santa Catarina*, Joinville Feb. 1 ♂ JC; Itajaí Feb. 1 ♀ UFPC; No specific locality 1 ♀ BMNH; Jan. 1 ♂ 1 ♀ UFPC; Blumenau MNRJ.

*Eunica volumna celma* (Hewitson), 1852

Figures 220-223, 303, 374

*Cybdelis celma* Hewitson, 1852. Exot. Butt. 1:61, pl. 31, f. 3. TL: "Amazon" [Brazil], Ega [Tefé] Leg. Bates. Syntypes: ♂ "Rh 9319, BMNH Godman & Salvin Coll./Type" (Examined)

= *Faunia persephone* C. & R. Felder, [1867] Reise Nov. Lep. 406, no. 612. TL: Colombia [Cundinamarca], Bogotá. Syntypes: ♂ Type BMNH (G. Lamas, pers. comm.) [Syn. nov.]

= *Eunica volumna celmina* Fruhstorfer, 1909. Stett. Ent. Zeit. 2: 214-215. TL: Bolivia [La Paz], Suapi, Garl. Holotype: ♂ BMNH (Examined) [Syn. nov.]

= *Evonyma persephone proserpina* Röber, 1923. Stett. Ent. Zeit. 84: 96. TL: Bolivia, [La Paz], Río Zongo, 750 m. Syntypes: ♂ ♀, Location unknown. [Syn. nov.]

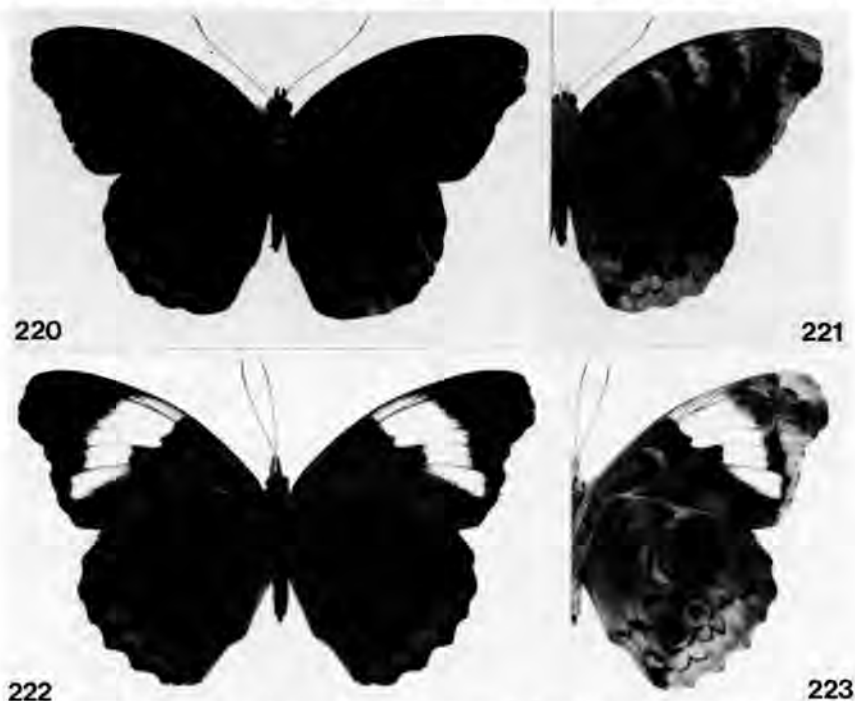
*Description:* As in *E. volumna* except for differences listed for *E. v. celma* in the key to subspecies.

Average wing length ♂ (32.5-37)35 mm, ♀ (34.5-37.5)35.5 mm.

*Distribution:* This subspecies is found from central Colombia south in Bolivia and in scattered localities in the Amazon basin to near Belém, Pará, at the mouth of the Amazon river (Fig. 374). There is a ♀ specimen labelled "Trinidad" (AME), which is probably an error since it is so isolated and distant from other known localities.

*Taxonomy and Variation:* I have studied the ♂ type of *E. v. celma* (BMNH). It was collected by Bates at Tefé, Brazil. It is typical of the *E. v. celma* population. *E. persephone* was described by C. and R. Felder (1867) from Bogota, Colombia. The Felder's original Latin description is sufficiently clear to distinguish this as *E. v. celma*, which they stated is closely related to *celma* and *E. persephone* is synonymized. I have studied a ♂ specimen labelled "type/Suapi, Bol. Garl. *celma celmina* Fruhst.!" This holotype ♂ (BMNH) is a completely typical *E. v. celma*, and it is synonymized. *Evonyma persephone proserpina* Röber (1923) was described as the ♂ having a smaller black area and more blue on the VFW, more posterior blue on the DHW and lighter brown color without pale lilac. These are typical variations seen in a series from the same locality. I have studied a series of Bolivian specimens, including some from near the type locality. They are all typical *E. v. celma*, and *E. persephone proserpina* is synonymized.

There is some variation in the width and intensity of the steely-blue submarginal band on the ♂ DHW and in the presence of indistinct, dark, steely-blue shading in the distal third of the DHW and presence of two black postmedian ocelli. There is also variation in the amount of blue in the pale blue, irregular postmedian band on the VFW and in



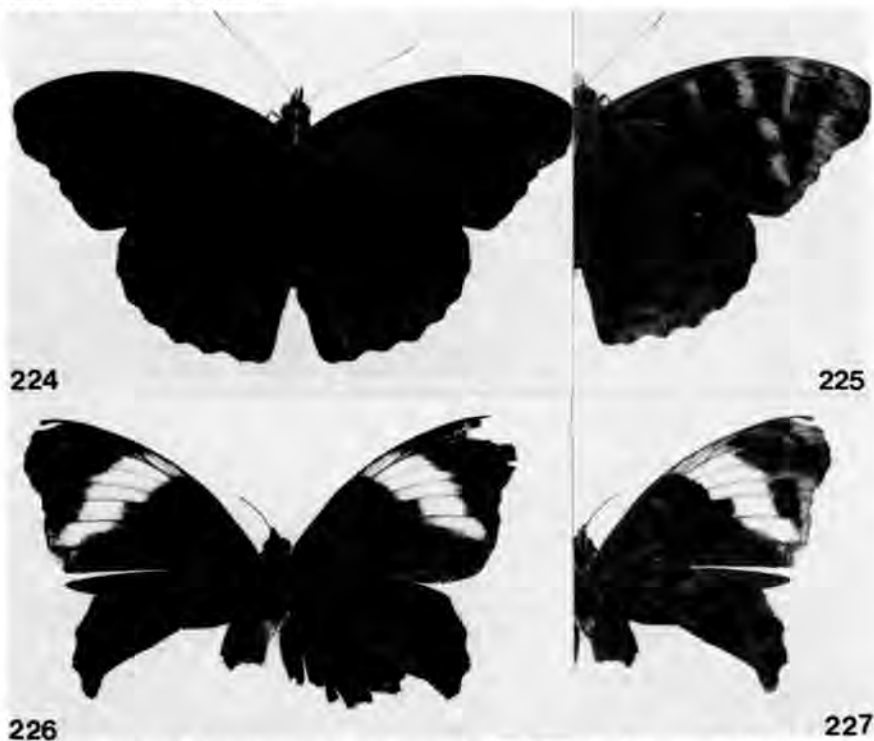
Figures 220-223. *Eunica volumna celma* (Hewitson). ♂ dorsal (220) ventral (221) surfaces. "U. Amazons, Ega." [BRAZIL, Amazonas, Tefé]. Syntype *Cybdelis celma* (BMNH). ♀ dorsal (222) ventral (223) surfaces. PERU, [San Martín], Jelepacio (AMNH).

the amount of pale grey-brown in the posterior VHW. The females may have the dorsal surface bright steely-blue or grey-blue and vary in the amount of lighter coloration posteriorly on the VHW.

*Biology:* This subspecies occurs in evergreen tropical forest especially near rivers. I have collected males from several localities in Ecuador and Perú. It has been found in every month of the year with no observed seasonal peak. In Colombia, Fassl (1918) states that it is known only on the eastern slopes of the Andes cordillera from 300 to 1,000 m. In other parts of its range it has been collected from near sea level to 1,300 m.

Specimens Examined: 129 ♂ 3 ♀

COLOMBIA: *Meta*, Villavicencio; Puente Guatiguiá; Monte Carlo; *Tolima*, Las Vegas; *Cundinamarca*, Bogotá; ECUADOR: *Napo*, Cotapino; Puerto Misahualli; *Tungurahua*, Río Topo-Pastaza; PERU: *Loreto*, Pebas; Iquitos; *Amazonas*, Pongo Rentema; Chachapoyas; *San Martín*, Moyobamba; Juanjui; Jepelacio; Chambirayacu; *Huánuco*, Río Huallaga; Tingo María; *Junín*, La Merced; Chanchamayo; Río Perené; Satipo; Río Colorado; *Cuzco*, Río Urubamba; *Pasco*, Río Palcazu; Pozuzo; Chuchurras; BOLIVIA: *La Paz*, Coroico; Suapi; Apolobamba; Farinas; Chimate; San Ernesto; Río Corijahuara; Guanay; Río Mapiri; Río Zongo 750 m (type *proserpinus*); *Santa Cruz*, Río Yapacani; Río Surutu; Prov. de Sara; Buenavista; *Cochabamba*, Ichilo; Chapare; Alto Palmar; Cristal Mayo; BRAZIL: *Amazonas*, Benjamin Constant; Tefé; Manicoré; Río Madeira; "Alexandra"; *Pará*, Obidos; Utinga; *Rondônia*, Pimenta Buena; "Pacos Nova; Vilahena; *Acre*, Alto Juruá; Porto Walter; "Marutucum."



Figures 224-227. *Eunica venusia* (C. and R. Felder). ♂ dorsal (224) ventral (225) surfaces. "Nova Granada". Syntype *Faunia venusia* C. and R. Felder (BMNH). ♀ dorsal (226) ventral (227) surfaces. PANAMA, Canal Zone, Piña (AME).



*Eunica venusia* (C. & R. Felder), [1867]

Figures 224-227, 304, 335, 375

*Faunia venusia* C. & R. Felder [1867], Reis. Nov. Lep. 3: 407, pl. 52, f. 3-5. TL: Colombia, Bogotá. Syntypes: BMNH ♂ type in Felder Coll. ♀ (Examined)

This species is closely related to *E. volumna*, and while I originally considered it to be a subspecies, morphological differences support it as a separate species. The light blue-green on the VFW and iridescent blue on the DHW of males is distinctive. The females have a steely-green dorsal surface with a wide, white postmedial band on the DFW and light blue-green on the VFW.

*Description:* Male. The DFW is jet black, there is a truncate margin and a white marginal fringe. The DHW is black in the basal half, the distal half (or more) is iridescent blue, with darker dentate margin and white fringe. The VFW has a pale blue cross band in the discal cell, a pale blue postmedian cross band and pale blue in the subapical and apical area, with an irregular, oval, subapical macula and four curving, black, apical linear maculae. The VHW has a wide, dark, basal and medial maculae. The anterior ocellus has two fused black ocelli with two light blue pupils, surrounded by a large oval. The two posterior ocelli are separate and black with pale pupils each surrounded by light brown, and each in a separate ring. Male genitalia. (Fig. 304). The ♂ hypandrium is oval, constricted posteriorly and has a broader end. The valva is tapering and triangular in shape with a swelling at the crista.

Female. The DFW is steely-green with dark markings, a broad white postmedian diagonal crossband and a black apical area. The DHW is steely-green also with dark markings. The VFW is similar to the ♂ but with a white band as dorsally. The VHW is similar to the male. Female genitalia. (Fig. 335).

Average wing length ♂ (34.0-36.0)35.0 mm. ♀ 37.0 mm.

*Distribution:* Occurs from Palenque in southern México through Central America to western Colombia, (Fig. 375). A ♂ labelled Satipo, Perú (AME) is certainly an error.

*Taxonomy and Variation:* The Felder male specimen labelled "TYPE Nova Granada" in the BMNH was examined. It has a darker VHW than most *E. venusia* males. There is little variation on the dorsal surface. On the VHW, the Mexican and Panamanian specimens have a pale bluish-purple overcast, which is mostly dark brown with slight blue around the ocelli in Colombian males. The females have a much broader white postmedian diagonal band on the DFW than *E. volumna*. They vary in color from steely-green to dark blue, and there is variation in the size of the black maculae on the DHW. The VHW has a similar pattern as the males, but the basal color, especially distally, has much whitish.

*Biology:* The relatively rare adults are found in tropical evergreen rain forest. In México, de la Maza and Turrent (1985) report it to be rare. They collected adults from May to August on wet sand along river margins at altitudes from 180 to 500 m. DeVries (1987) states: "Occurs from sea level to 600 m on both slopes, in association with primary rain forest habitats. This rare Costa Rican species is known only from the forests of the Osa Peninsula and those of the Carrillo. Encountered along rivers that have large areas of beach where the males visit wet sand intermittently between very rapid, short flights. This species is very difficult to capture because of its erratic flight."

The adults have been collected at elevations from near sea level to about 1,000 m. They have been found nearly every month of the year.

Specimens Examined: 43 ♂ 4 ♀

MEXICO: Chiapas, Bonampak; Yaxchilan; Río Usumacinta; Río Lacantun (de la Maza, 1985); Palenque May 1 ♂ AME; Río Chixoy Aug 1 ♂ MCZ; HONDURAS: No specific locality ♂ BMNH; COSTA RICA: Puntarenas, Río Térraba 1 ♂ GS; Palmar Norte, Jan. 1 ♂ GS; Corcovado 500 (DeVries); San José, La Montura 1,000 m (DeVries); PANAMA: Chiriquí, Chiriquí ♂ BMNH; 4 ♂ FMNH; Bugaba ♂ BMNH; Panamá, Cerro Jefe 700

m Mar. 1 ♂ GS; *Veraguas*, Veraguas ♂ BMNH; 1 ♂ MPM; Cerro Campana 700 m Jan. 1 ♂ GS; *Canal Zone*, Piña Feb. 1 ♀ AME; Summit Dec. 1 ♀ GS; COLOMBIA: *Cundinamarca*, Bogotá ♂ BMNH; 1 ♂ MPM; 1 ♂ CMP; 2 ♂ AME; Cananche ♂ BMNH; *Antioquia*, Zaragoza Jul. 1 ♂ MPM; *Santander*, La Lechera, Río Opón, Tunja 1 ♂ AMNH; *Caldas*, Guamocó 1 ♂ AMNH; *Tolima*, Honda 1 ♂ MP; *Magdalena*, No specific locality 1 ♂ MP; "Boca Culebra" 1 ♂ MP; PERU: *Junín*, Satipo Oct. 1 ♂ AME (Probably error!)

*Eunica alpais* (Godart), [1824]

*E. alpais* is one of the most variable species of *Eunica*, and seven species and subspecies have been described. *E. alpais* was described on the basis of a female, while all the others are based on males. The type locality of *E. alpais* is "Brazil", and the type specimen is unknown. Therefore, the exact ♂ of *E. alpais* is in conjecture. There is much variation in the brightness of blue or the presence of dull purple on the DFW of the ♂ but since both occur in series from single localities and the same dates, this is not recognized to be of taxonomic importance. There are no significant differences in male genitalia or hypandria throughout the range of the species. I have recognized the nominate form and one Central American subspecies, *E. a. excelsa*. There is a tendency for dull-purple specimens to occur in the middle Amazon, and future research may indicate another subspecies may be valid.

The females show variation in the white markings of the DFW. *E. a. excelsa* from Central America has a broad, white, postmedial diagonal crossband with some iridescent blue proximal to the band. *E. alpais* from "Brazil" has three, white, postmedian maculae with much bluish-violet suffusion in the basal half. *E. cinara* var. *vega* from Guyana has three very large, white, postmedian maculae forming a broken band, with some blue proximal to the maculae. Only seven ♀ specimens have been available for study in South America.

*Description: Male.* The DFW has a black apical area and a large black medial posterior area, the remainder is blue or purplish, the margin is truncate and dentate with white fringe. The DHW is mostly blue or purplish except black on costal, anal and marginal areas; the margin is dentate with marginal, white, fringe. The DFW is brown or black with a tan macula in the discal area; there is a postmedian band of three lighter maculae and a subapical, irregular oval, containing three black ocelli and four apical black maculae. The VHW is brown or dark purplish with large, basal, maculae and a submarginal row of dark maculae. The two anterior black postmedian ocelli have two white pupils surrounded by an orange ring and a concentric black oval. The posterior ocellus in  $Cu_1-Cu_2$  is large and black with a white pupil and orange and black concentric circles. The ocellus in  $M_3-Cu_1$  is a small, separate dark ring. Male genitalia. (Fig. 305). The male hypandrium is oval with posterior projections. The valva is triangular and attenuated.

*Female.* The DFW is brown with a white, diagonal postmedian crossband, or three white maculae with bright blue proximal and distal to the maculae or band, with two and a small third subapical white maculae. The DHW is brown with a submarginal dark line. The VFW is brown with a white macula in the discal cell, a white band or three white maculae as on dorsal surface; similar to the male on the VHW. Female genitalia. (Fig. 336).

Key to Subspecies of *Eunica alpais*

Males.

- 1a. DHW with brilliant iridescent blue only in the posterior half. VHW with ocellus in  $Cu_1-2A$  very small and usually removed from ocellus in  $Cu_2-2A$  ..... *excelsa*
- 1b. DHW with bluish-purple extending into basal half; VHW with ocellus in  $Cu_1-Cu_2$  larger, usually with white pupil and adjacent to ocellus in  $Cu_2-2A$  ..... *alpais*

Females.

- 1a. DFW with broad, white, diagonal postmedian cross band; medial area proximal to band pale blue-green; VHW may be deep purplish-brown ..... *excelsa*
- 1b. DFW with three white postmedian maculae, with some blue proximal to the maculae, or the basal half blue ..... *alpais*

*Eunica alpais alpais* (Godart), [1824]

Figures 228-231, 305, 336, 376

*Nymphalis alpais* Godart [1824], Enc. Meth. 9: 416 no. 209. TL: Brazil Holotype: MNHP(?)

♀ *E. alpais* was accurately described by Godart, but no illustration was published.  
= *Cybdelis cinara* Hewitson, 1852. Exot. Butt. 1: [61], pl. [31] f. 2. TL: "Amazon" [Brazil]  
Ega [Tefé] Syntypes: BMNH ♂ Rh 9321 (Examined) [Syn. nov.]

= *Eunica aspasia* C. & R. Felder, 1861. Wien. Ent. Mon. 5: 104, n. 81. TL: "Ecuador"  
Syntypes: BMNH ♂ "Ecuador type", Felder Coll. (Examined) [Syn. nov.]

= *Eunica cinara oreandra* Fruhstorfer, 1909. Stett. Ent. Zeit. 2: 215. TL: Perú, [Pasco],  
Pozuzo. Holotype: BMNH ♂ "cinara oreandra Fruh". (Examined) [Syn. nov.]

= *Eunica cinara* var. *vega* Hall, 1919. Entomol. p. 197. TL: Guyane, St. Jean du Maroni.  
Syntypes: ♂ ♀ BMB. [Syn. nov.]

= *Eunica excelsa* forma *excelsissima* Zikán, 1937. p.423. TL: Brazil, São Gabriel, Rio Negro.  
Syntypes: 2 ♂ (IOC) [Syn. nov.]

*Description:* As in *E. alpais* except for differences listed for *E. a. alpais* in the key to subspecies.

Average wing length ♂ (31-36)33 mm, ♀ (32-34) 33 mm.

*Distribution:* The range extends from Venezuela, Colombia and Guyana south in the Andes cordillera slopes to central Bolivia, and in the Amazon basin. (Fig. 376).

*Taxonomy and Variation:* I was unable to find the Godart female type of *E. alpais* (MNHP). I have examined a male specimen labeled type of *E. cinara* (BMNH). It is not in good condition but is typical of most of the population of *E. a. alpais*. Hewitson's



Figures 228-231. *Eunica alpais alpais* (Godart). ♂ dorsal (228) ventral (229) surfaces. PERU, Pasco, Pozuzo. Syntype *Eunica cinara oreandra* Fruhstorfer (BMNH). ♀ dorsal (230) ventral (231) surfaces. GUYANE, Guyane, Cayenne (USNM).

description and figure (1852) are not accurate. The specimen is a male (not ♀ as shown in the plate, fig. 2) and there is no "brilliant purple" but a subdued bluish-purple on the upper surfaces. The figure illustrates the VHW more vividly marked and a large anterior ocellus with the central eyespots surrounded by bright yellow instead of dull orange-brown. There are three diffuse, light, tan postmedian maculae instead of two striking light maculae. There is much variation in the nominate population especially in the color of the dorsal surface. In some specimens, particularly in the Amazon basin, there is more dull purplish color, while in Ecuador and parts of Perú, the color is more bluish, especially on the DHW. In a fresh series of twenty males I collected in Tingo María, Perú, seventeen are bright blue and three are dull purplish. In other localities in Ecuador, Perú, and Bolivia, both forms occur with more purplish in northeastern Perú and in the Amazon basin of Brazil. The ventral surfaces also vary, with less distinct maculation on the VFW and in the amount of dull purplish on the VHW. This variation is not always related to the dorsal coloration so that no subspecies with definable areas are recognized (except *E. a. excelsa* in Central America). This variation is the basis for the various taxa that have been described. I have examined the ♂ specimen labelled type of *E. aspasia* from Ecuador in the Felder collection. It is typical *E. alpais* with slightly more blue shading on the DHW than *E. alpais* and the under surfaces have less purplish. It is here synonymized. I have examined the ♂ specimen of *E. cinara oreandra* labelled "Type" described from Perú in the Fruhstorfer collection (BMNH). It is almost identical with *E. a. alpais* and is synonymized. *E. cinara* var. *vega* Hall was described from Guyane on the basis of the more brilliant blue on the upper surface and the VHW with whiter maculae. The ♀ has five larger white maculae and less blue proximally. These characters are variable, and the specimens I have examined from Guyane are not sufficiently different to be recognized as a subspecies and *E. c. vega* is synonymized. *E. excelsa* form *excelsissima* Zikán from São Gabriel, Brazil, has more intense and more extensive blue than the figure of *excelsa* by Seitz (pl. 100 B, C.) The underside has smaller more sharply delineated lighter maculae and a more violet cast, and is a common variation. I have examined specimens from the type locality, and there is nothing distinctive. This example of the normal variation is also synonymized. More detailed study of *E. alpais* may show that a variable subspecies might be extricated from this range of variation, but none are presently recognized in South America. As previously stated there is some variation in the females, but they are too uncommon to be of much value in this study.

*Biology:* *E. a. alpais* is found in the canopy of evergreen tropical rainforest. It can be seen flying with *Asterope* and *Agrias* above and within the canopy. I have collected adults attracted to baits, especially fermented bananas, in traps in the forest canopy in Ecuador and Perú. I have also collected them flying in openings in secondary forest near a river and flying near cacao drying areas in Tingo María, Perú.

Adults have been collected every month of the year with more found in June and July. They have been collected at elevations from near sea level to 1100 m. On the eastern slopes of the Andes cordillera Fassl (1918) reports adults from elevations of 300 to 1000 m.

Specimens Examined: 215 ♂, 7 ♀

COLOMBIA: *Cundinamarca*, Bogotá; *Valle*, Río Dagua; Cauca Valley; Cali; *Putumayo*, Umbria; Caquetá; "Purulo"; VENEZUELA: *Barinas*, Ticoporo; *Bolívar*, Caicara; Río Aguas Negras; *Amazonas*, La Esmeralda; Yavita; GUYANE: *Guyane*, Cayenne; St. Jean du Maroni; ECUADOR: *Zamora-Chinchipe*, Zumbi; *Zamora*; *Imbabura*, Paramba; *Napo*, Tena; *Churuyacu*; *Tungurahua*, Río Topo-Pastaza; Hacienda la Merced; Baños; *Pastaza*, Sarayacu; *Morona-Santiago*, Gualaquiza; Macas; PERU: *Loreto*, Iquitos; Marotta; Mishana; *Aguaytia*; *Lago Yarina Cocha*; Pebas; *Humayta*; *Huánuco*, Tingo María; Río Huallaga; *Tournavista*; *San Martín*, Jepelacio; *Moyobamba*; *Amazonas*, Huambo; Pongo de Rentema; *Pasco*, Río Pichis; *Cahuapanas*; *Pozuzo*; *Chuchurras*; Río *Palcazu*; *Junin*; *Satipo*; *Chanchamayo*; *La Merced*; *Puno*, *San Gabán*; *La Unión*; *Madre de Dios*, *Puerto Maldonado*; BOLIVIA: *La Paz*, *Mapiri*; *Apolobamba*; *Santa Cruz*, Río *Surutu*; *Cochabamba*, *Alto Palmar*; *Chapare*; Río *Yapacani*; *Cochabamba*; BRAZIL: *Amazonas*, Río *Calary-Uaupés*; *Todos Santos*; *Hyutanahá*; *São Paulo de Olivença*; *Benjamin Constant*;

Tabatinga; Lago Acará; Tefé; Tonantins; Jauareté; Rio Uaupés; Fonte Boa; Santo Antônio de Javari; Acre, Alto Juruá; Rondônia, Pimenta Buena; Cachoeira do Samuel; Pacaás Novos, Pará, Obidos; Mato Grosso, Cuiabá.

*Eunica alpais excelsa* Godman & Salvin, 1877 [Stat. rev.]

Figures 232-235, 305, 336, 376

*Eunica excelsa* Godman & Salvin, 1877. Proc. Zool. Soc. 1: 63. TL: Panamá, Chiriquí. Syntypes: BMNH 1 ♂ Rh 9320. "Type HT/Godman & Salvin Coll./ Type sp. figured/" (Examined)

*Description:* As in *E. alpais* except for differences listed for *E. a. excelsa* in the key to subspecies.

Average wing length ♂ (29-30)29.5 mm, ♀ (31-34)32 mm.

*Distribution:* Occurs from Chimalapa, Oaxaca, México to southern Panamá and perhaps in northwestern Colombia. (Fig. 376).

*Taxonomy and Variation:* I have examined the male specimen from Chiriquí, Panamá of *E. excelsa* labelled type in the Godman and Salvin collection (BMNH). It has the typical bright iridescent blue-green on the DHW (not as greenish as in the Godman and Salvin (1883) illustration (pl. 23, figs. 12, 13). There is some variation in *E. a. excelsa*.

The VHW of male specimens from Panamá and Costa Rica are usually more brownish as in the type of *E. excelsa* and more typical of *E. a. alpais*. However, Mexican male specimens have a striking pattern with more intense markings and overlaid with a bluish purple cast. There is a gradation from Colombia to México with an increase in intensity



Figures 232-235. *Eunica alpais excelsa* Godman & Salvin. ♂ dorsal (232) ventral (233) surfaces. PANAMA, Chiriquí, Chiriquí. Syntype *Eunica excelsa* Godman and Salvin (BMNH). ♀ dorsal (234) ventral (235) surfaces. PANAMA, Canal Zone, Piña (FSCA).

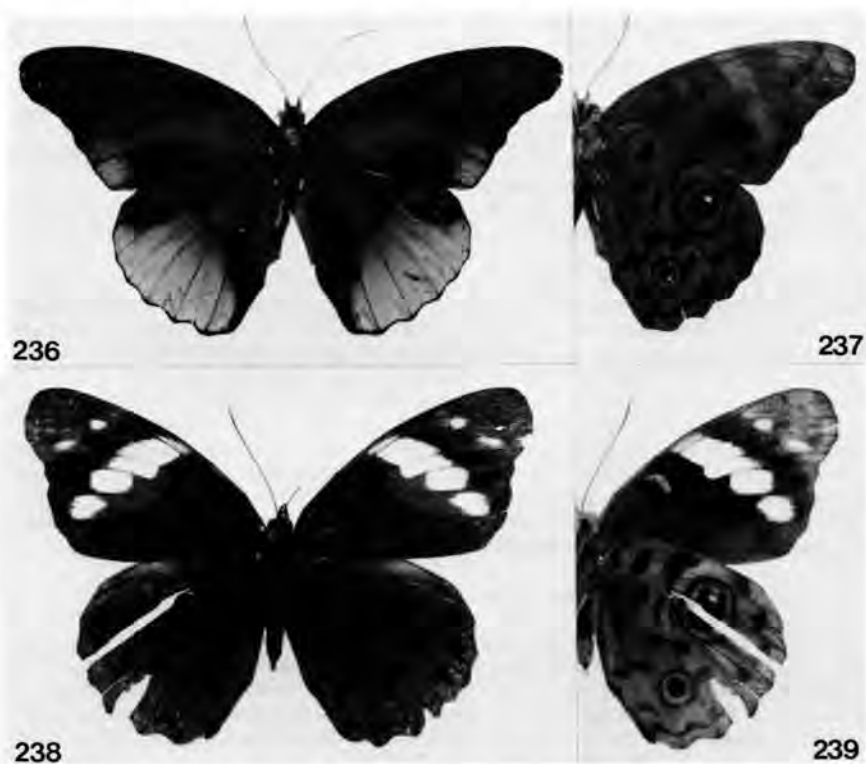
and color of the VHW as well as a decrease in the size of the ocellus in  $M_3$ -Cu<sub>1</sub>. This is more pronounced than in the increased dull purplish overcast in populations from Ecuador to Bolivia.

**Biology:** Adults are found in the canopy of the evergreen tropical rain forest and visiting wet sand along rivers. DeVries (1987) states: "Similar to *E. venusia* in habits and distribution. I have observed solitary males perched in the forest canopy along rivers fly out to chase passing butterflies. The flight, as in *E. venusia*, is very fast. This species is rare in Costa Rican collections"

Adults have been collected at elevations from near sea level to 1,050 m in nearly every month of the year. A series of 12 females was collected in the Canal Zone and Colón, Panamá by H. L. King.

Specimens Examined: 19 ♂ 15 ♀

MEXICO: *Oaxaca*, Chimalapa Sep. 1 ♂ AME; *Chiapas*, Bonampak; Chajul (De la Maza and Turrent); BELIZE: *Stann Creek*, Belize 1 ♂ BMNH; GUATEMALA: *Escuintla*, Escuintla 1 ♂ USNM; COSTA RICA: *Puntarenas*, Corcovado 500 m (De Vries); *Cartago*, Turrialba 1 ♂ USNM; *San José*, Parque Carillo, La Montura 1050 m, Jun. 1 ♂ GS; PANAMA: *Chiriquí*, Chiriquí 1 ♂ BMNH; Bugaba 300 m 11 ♂ BMNH; *Canal Zone*, Piña Feb. June Oct. 11 ♀ FSCA; Gatun 1 ♀ GS; *Colón*, Colón 1,500 m Feb. 1 ♂ 2 ♀ GS; *Darién*, Cana Jun 1 ♂ GS; No specific locality May 1 ♀ AME.



Figures 236-239. *Eunica araucana* C. and R. Felder. ♂ dorsal (236) ventral (237) surfaces. COLOMBIA, [Cundinamarca], Bogotá. Syntype *Eunica araucana* C. and R. Felder (BMNH). ♀ dorsal (238) ventral (239) surfaces. COLOMBIA, Valle del Cauca, Cali (BMNH).



*Eunica araucana* C. & R. Felder, 1862

Figures 236-239, 306, 337, 377

*Eunica araucana* C. & R. Felder, 1862. Wien. Ent. Mon. 6: 421, no. 130. TL: Colombia [Cundinamarca], Villeta. Syntypes: BMNH 1 ♂ "/Bogotá, Lindig/3200"/*Araucana n.*" Felder Coll. (Examined)

*Description:* Male. The DFW is blackish-brown with blue-purple basally, and extending to the tornus. The wing is entire, strongly truncate and elongated. The DHW is black with the distal half bright, shining blue with purplish extending proximally, and the margin is dentate. The VFW is dull brown with a lighter brown postmedian band, two subapical ocelli and two or three apical black maculae. The VHW is dull reddish-purple with broad basal and medial maculae and a submarginal row of dashes. The anterior two ocelli are fused with two white pupils surrounded by a yellow-orange ring and an oval outline. The posterior ocellus is black with a white pupil, surrounded by a ring of orange and a dark circle. The ocellus in  $M_2-Cu_1$  is small and attached. Male genitalia. (Fig. 306). The male uncus has a long beak. The valva is elongate and pointed.

Female. The DFW is brown with a white postmedian crossband with bright blue proximally and two subapical white maculae. The ventral surfaces are similar to the ♂ except the VFW has a white band and maculae as dorsally. Female genitalia. (Fig. 337).

Average wing length ♂ (35-36)35.5 mm, ♀ 38 mm.

*Distribution:* Occurs in Panamá, northwestern Venezuela, western Colombia and central Ecuador (Fig. 377). There is a single male from Tefé, Brazil in the MCZ which is very probably an error.

*Taxonomy and Variation:* I have examined a male type of *E. araucana* in the Felder Collection (BMNH) and it is typical of the population (Figs. 236-237).

There is some variation in the amount and intensity of black shading in the VFW and in the amount of reddish-purple shading on the VHW of the males.

*Biology:* This species is relatively uncommon and restricted in distribution. It has been found in January, February, May to July and November at elevations from 280 to 1,200 m.

Specimens Examined: 61 ♂, 7 ♀

PANAMA: *Chiriquí*, Chiriquí 1 ♂ USNM; *Darién*, Cana 500 m Jul. 1 ♂ USNM; *Canal Zone*, Colón, St. Rita Mts. 300 m 1 ♂ 4 ♀ USNM; COLOMBIA: *Antioquia*, Zaragoza May 2 ♂ MPM; *Mesopotamia* 1 ♂ AMNH; *Frontino* BMNH; *Medellín* BMNH; *San Rafael* 1200 m 1 ♂ Jun. Jul. BMNH; *Valdevia* BMNH; *Chocó*, San Pablo, Río San Juan 1 ♂ BMNH; *Río Condoto* BMNH; *Valle*, Río Dagua BMNH; *Cauca Valley* 1 ♂ AMNH; *Cali*, 1000 m Jan. 1 ♀ MPM; *Cundinamarca*, Bogotá, BMNH; *Villeta* 1000 m 1 ♂ BMNH Type; *Santander*, Barrancabermeja 1 ♂ AMNH; *El Centro* 2 ♂ AMNH; *Río Opón*, La Borrascosa Nov. 1 ♂ AMNH; *Caldas*, Guamocó 1 ♂ AMNH; *Boyacá*, Tunja 4 ♂ AMNH; "Purula" 280 m BMNH; No specific locality 4 ♂ USNM; BMNH; VENEZUELA: *Táchira*, Río Frio 1 ♂ UC; *Zulia*, Santa Rosa de Aguas Claras, Sierra Perija 1 ♂ UC; ECUADOR: *Imbabura*, Hacienda Paramba, BMNH; BRAZIL: Amazonas, Tefé 1 ♂ MCZ (?).

*Eunica eurota* (Cramer, [1776])

This is a widespread and variable species that has been associated with eight species and subspecies names. The nominate form and one subspecies are recognized. The numerous names have resulted in part from the variation in blue and purple wing color of this *Eunica* species group. *E. eurota* is readily identified by its small ocelli on the VHW and the curving blue (or purple) area on the front and distal wing margins of the DFW, and the similar extensive color on the distal half of the DHW.

*Description:* Male. The DFW is jet black with the costal margin blue or purple curving around in the apical area and extending submarginally, usually to the tornus. The DHW is black with the distal half shining blue or purple. The VFW is dull brown with diffuse

black areas, there may be tan areas, especially postmedial and apical. The VHW is dull purplish-brown, with a thin, median line and undulating submarginal line. The anterior ocelli are small, fused, and may have two white pupils enclosed in an oval. There are two posterior ocelli, the ocellus in  $M_1-Cu_1$  is smaller and separate. Male genitalia. (Fig. 307). The  $\delta$  uncus is constricted, upturned and beaked. The valva is elongate and pointed.

Female. The DFW is dark brown with a white, postmedian, diagonal crossband and two white subapical maculae on a black distal third. The DHW is brown with a black, thin submarginal line. The VFW is dull brown with a white postmedian crossband in a black area, usually with two subapical white maculae and a curving thin black apical line. VHW same as  $\delta$ . Female genitalia. (Fig. 338).

#### Key to Subspecies of *Eunica eurota*

##### Male.

- 1a. VHW with two prominent anterior ocelli joined in an ellipse; the ocelli have whitish or light blue pupils; two prominent posterior ocelli, the posterior with a light bluish pupil. VFW with a light buff median diagonal band of about three indistinct maculae. Dorsal surfaces usually blue . . . . . *eurota*
- 1b. VHW with two obscure brown circles anteriorly, the pupils of the ocelli with usually a small brown pupil or a small white dot; two small obscure ocelli posteriorly with no pupil or a small brown dot. VFW with only a lighter brown, diffuse, diagonal median band if present. Dorsal surfaces usually purplish or bluish-purple . . . . . *dolores*

##### Females.

- 1a. VHW as in male *eurota*. DFW with two prominent, white subapical maculae; VFW with two white subapical maculae. VHW same as males . . . . . *eurota*
- 1b. VHW as in male *dolores*. DFW with two small whitish dots; VFW without two white subapical maculae. VHW same as males . . . . . *dolores*

#### *Eunica eurota eurota* (Cramer), [1776]

Figures 240-243, 307, 338, 378

*Papilio eurota* Cramer, [1776]. Papil. Exot. 37, 152 pl. 24, f. c & d. TL: "Indes Occidentalis" Syntypes: coll. E. de Marre (not found in Cramer Coll., BMNH).

=*Nymphalis euphemia* Godart, [1824], Enc. Meth. 9: 418, n. 216. TL: Brazil. Unnecessary *nom. nov.* for *Papilio eurota* Cramer, [1776].

=*Eunica vetula* Staudinger, 1888 Ex. Schmett. 1: 110. TL: Brasil, [Amazonas], Tefé. Syntypes:  $\delta$  ZMHB. (Examined type photo) [Syn. nov.]

=*Eunica eurota myrthis* Fruhstorfer, 1908. Stett. Ent. Zeit. 69: 46. TL: "Oberer Amazonas" Rio Uaupés, Coll. Fruh. Syntypes: 1  $\delta$  BMNH "Presumed type of *myrthis* Fruh./ *Eurota flora*/TYPE." (Examined) [Syn. nov.]

=*Eunica eurota theophania* Fruhstorfer, 1908. Stett. Ent. Zeit. 69: 46. TL: Brazil [Amazonas] Manaus. Holotype:  $\delta$  BMNH Coll. Fruhstorfer (Examined) [Syn. nov.]

=*Evonyma eurota muson* Fruhstorfer, 1912. Ent. Rundsch. 29(2): 15. TL: Perú, [Junín] Chanchamayo (Thamm) Syntypes:  $\delta$  ZMHB. (Examined type photo) [Syn. nov.]

*Description:* As in *E. eurota* except for differences listed for *E. e. eurota* in the key to subspecies.

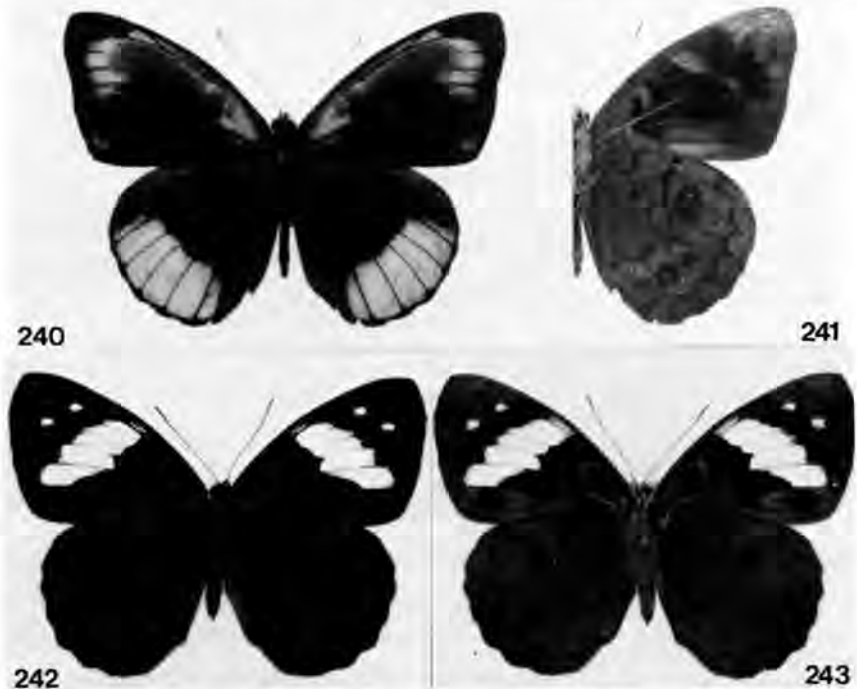
Average wing length  $\delta$  (28-34)31 mm,  $\eta$  (28-33)31.5 mm.

*Distribution:* Occurs from Colombia to Venezuela and the Guyanas, south to Bolivia and the Amazon basin, (Fig. 378).

*Taxonomy and Variation:* I was unable to find the Cramer type, but the illustrations are suitable to accurately identify it as *E. e. eurota*. *Eunica euphemia* was described by Godart [1824] as a new species, but he cites Cramer's *E. eurota* in the description. It is an unnecessary name and was synonymized by Kirby (1871). I have examined color

photographs of the type of *E. vetula* Staudinger (1888) from the ZMHB from Tefé, Brazil. This is typical *E. e. eurota*, purplish phase, from the Amazon basin, and it is synonymized. *E. eurota myrthis* was described by Fruhstorfer (1908) from the Rio Uaupés, Brazil, on the basis of the lighter and more greyish ventral wing surfaces than typical *flora*. I have examined a specimen from the Fruhstorfer coll. in the BMNH which states "/Presumed type of *myrthis* Fruhst./*eurota flora* Feld/Rio Uaupés/". (Fruhstorfer and many others confused *flora* as belonging to *eurota* instead of *alcmena*). This specimen, which would be a holotype, is typical of *E. e. eurota* as are other specimens examined from that region. There is some variation in the darkness and intensity of markings from the same locality, and there is no basis for recognizing this subspecies and it is synonymized. I have examined a male specimen from Manaus, Brazil, labelled "Type-*theophania* Fruhst." in the BMNH. It is the typical bluish-purple phase of *E. e. eurota* from the Amazon basin, similar to *E. vetula*, and it is synonymized. *E. e. muson* Fruhstorfer (1912) was described from Chanchamayo, Perú, on the basis of smaller size. He also stated the female is darker with a wider and whiter cross band on the DFW than those from Pebas, Perú. I have examined color photographs of a male labelled "syntype, *Evonyme eurota muson* Fruhstorfer (G. Lamas) '87)/Chanchamayo, Perú/" (ZMHB). This is typical *E. e. eurota* blue phase from the western part of the range. Size is of no significance, and the darkness of the female and width and whiteness of the DFW crossband is variable in series. This taxon is synonymized.

*E. eurota eurota* is variable and widespread. In the male the dorsal surface varies as in *E. alpais*, with mostly purplish markings on the DFW and on the DHW. The large posterior area is iridescent blue in the western part of the range, while in the lower Amazon



Figures 240-243. *Eunica eurota eurota* (Cramer). ♂ dorsal (240) ventral (241) surfaces. "Oberer Amazonas", Rio Uaupés. "Presumed type of [*Eunica eurota*] *myrthis* Fruh./*Eurota flora*/Type" (BMNH). ♀ dorsal (242) ventral (243) surfaces. ECUADOR, Napo, Puerto Misahuallí (JC).

basin, this is mostly purplish. However, this is variable within series from the same locality and date. The ventral surface has a variable amount of black on the VFW and intensity of color and pattern on the VHW. There is some variation in the median line proximal to the ocelli. The females vary in the darkness of the upper surface and in the width of the white median crossband of the DFW. I have collected females with narrow or wide bands from the same locality in Ecuador. On the basis of limited specimens, there appears to be a population with narrower white bands in the lower Amazon region. More research is needed to explain the variation in blue and purple coloration in series from the same locality.

*Biology:* Adults are quite common in evergreen tropical forest and semideciduous tropical forest. They fly in the canopy and at lower levels in openings in the forest. I have collected series of males in Ecuador and Perú. Bates (1864) states: "A very abundant species in some parts of the Upper Amazons. I once saw it in flocks of many hundred individuals (males only), flying over a half-dry watercourse near the village of Caicara." Adults are attracted to fermenting fruit baits and have been collected every month of the year at elevations from near sea level to about 1200 m. In Colombia on the western slopes of the Andes, Fassl (1918) reports them from 300 to 1000 m elevation.

Specimens Examined: 324 ♂, 51 ♀

GUYANE: *Guyane*, St. Jean du Maroni; Maroni River; COLOMBIA: *Meta*, Villavicencio; Cuchillo; Forzoza; *Valle Cauca*; Amazonas, Río Loreto-Yacu; *Putumayo*, Umbría; Mocoa; VENEZUELA: *Bolívar*; La Cerba; Caicara; Amazonas, Unión Río Orinoco and Río Ugueto; Suapure; *Apure*, Sarare; ECUADOR: *Napo*, Río Napo; Latas; Río Coca; Archidona; Curaray; Tena; Puerto Misahuallí; Cayambe; Laguna San Marcos; *Morona-Santiago*, Macas; *Tungurahua*, Baños; Río Topo; *Pastaza*, Río Pastaza; *Zamora-Chinchipe*, Zamora; PERU: *Loreto*, Iquitos; Lago Yarina Cocha; Mishana; Río Urubamba; Caballococha; Humayta; Pebas; Río Ampiyacu; Río Tapiche; *Ucayali*, Pucallpa; Amazonas, Pongo de Rentema; Río Utcubamba; *Huánuco*, Tingo María; Río Hualaga; Río Pichis; Tournavista; *Pasco*, Chuchurras; Pozuzo; *Cuzco*, Mishagua; Cosñipata; *Junin*, Satipo; Chanchamayo; La Merced; Río Perené; Río Tono; San Ramón; *Puno*, Carabaya; *Madre de Dios*, Boca Río la Torre; *San Martín*, Chambiriyacu; Jepelacio; BOLIVIA: *Santa Cruz*, Buenavista; Santa Cruz de la Sierra; Santiago del Estero; Prov. Sara; Río Yapacani; *Cochabamba*, Río Ichilo; Chapare; Todos Santos; *La Paz*, Mapiro; Guanay; Apolobomba; La Paz; *Beni*, Trinidad; Guayamerin; BRAZIL: Amazonas, São Paulo de Olivença; Tefé; Fonte Boa; Manicoré; Benjamin Constant; Tabatinga; Tonantins; Calary-Uaupés; Lago Puraquequara; *Acre*, Alto Río Jurua; *Rondônia*, Pimenta Buena; Porto Velho; Abuna; Aliança; Cachoeira do Samuel; Jaru; *Pará*, Obidos; *Mato Grosso*, Diamantino; Serrado Montador.

*Eunica eurota dolores* (Prittwitz), 1871 [Stat. rev.]

Figures 244-247, 307, 338, 378

*Faunia dolores* Prittwitz, 1871. Stett. Ent. Zeit. :244. TL: [BRAZIL] Rio de Janeiro.

Syntypes: 1 ♂ ZMHB. Examined by G. Lamas (pers. comm.).

= *Evonyma eurota dymanes* Fruhstorfer, 1912. Ent. Rundsch. 29(2): 15. TL: Brasil, Santa Catarina, Blumenau. Syntypes: 1 ♂ Coll. Staudinger, ♀ Coll. Fruhstorfer BMNH (Examined) and syntype ♂ in the ZMHB (photo by G. Lamas). [Syn. nov.]

= *Eunica eurota flora* Fruhstorfer, 1907. Stett. Ent. Zeit. 68: 228 (from Espírito Santo, (nec. Fruhstorfer, 1907) (Misident.).

*Description:* As in *E. eurota* except for differences listed for *E. eurota dolores* in the key to subspecies.

Average wing length ♂ (28-31.5)29.5 mm, ♀ (27.5-32)30.5 mm.

*Distribution:* Occurs from Bahia to southern Mato Grosso to Santa Catarina, Brazil (Fig. 378).

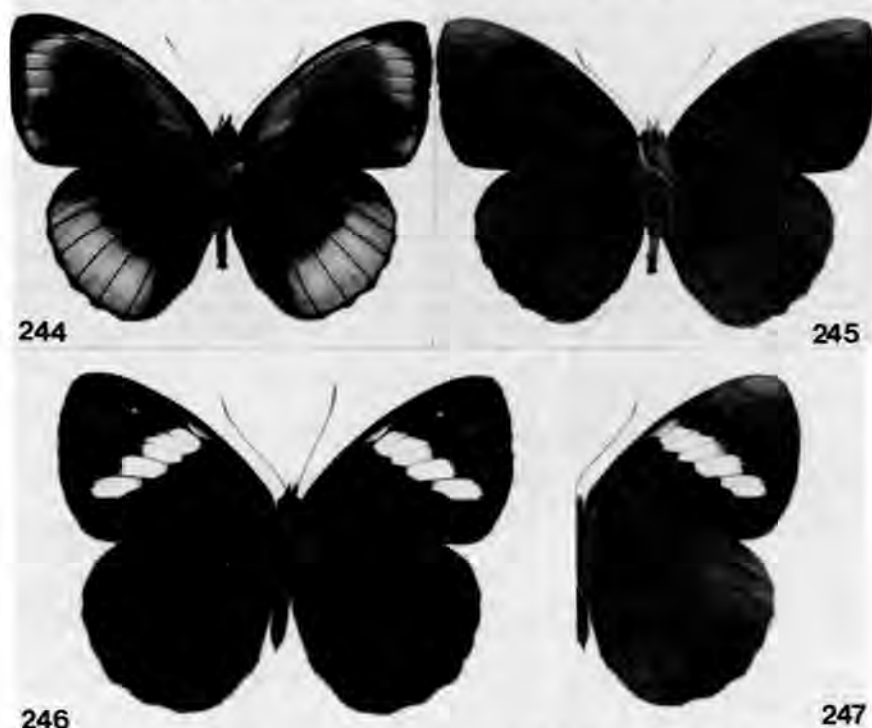
*Taxonomy and Variation:* *E. dolores* was described by Prittwitz (1871), based on smaller

size and on the less-distinct VHW markings. While some specimens are smaller, the average size differs little from *E. e. eurota*, but the markings of the VHW of this population are distinctive. *E. dymanes* was described by Fruhstorfer from Blumenau, Santa Catarina, Brazil. I have examined a male marked TYPE in the Fruhstorfer coll. in the BMNH. It is typical of the *E. e. dolores* population, with more black markings on the VFW than usual, but still in the average range. I have examined color pictures of a syntype ♂ from Blumenau marked "*Evonyma eurota dymanes* Fruhstorfer; G. Lamas det. '87". No ♀ syntype was found. This male has a lighter coloration of the VFW than the other syntype. Examination of a large series shows that there is only one subspecies in southeastern Brazil, and *E. e. dymanes* is synonymized. As noted above, there is variation in the darkness of the VFW and from light to dark brown on the VHW. The female population varies only in the intensity of brown coloration above and below. The white postmedian band on the DFW is rather constant in the 11 ♀ examined.

**Biology:** I have collected five specimens including four females from São Bento do Sul and Joinville, Santa Catarina, Brazil in tropical and subtropical forest areas. Adults have been collected in most months but more in February and March at elevations of about 100 to over 400 m.

**Specimens Examined:** 56 ♂, 11 ♀

**BRAZIL:** *Bahia*, Ilhéus 1 ♂ UFPC; *Uraçuca* 1 ♂ MNRJ; *Goiás*, Goiás BMNH; MNRJ; Anápolis Oct. 1 ♂ MNRJ; *Paraná*, North Paraná 1 ♀ AMNH; 4 ♂ AMNH; Rolândia 1 ♂ AMNH; Castro BMNH; *Foz de Iguaçú*; *Rio de Janeiro*, Rio de Janeiro BMNH; *São*



Figures 244-247. *Eunica eurota dolores* (Prittwitz). ♂ dorsal (244) ventral (245) surfaces. BRAZIL, Rio de Janeiro. Syntype *Faunia dolores* Prittwitz (ZMHB). ♀ dorsal (246) ventral (247) surfaces. BRAZIL, Santa Catarina, Saõ Bento do Sul (JC).



Paulo, São Paulo Feb. 1 ♂ UFPC; Mogi-Guaçu 1 ♂ USNM; Araras; Santa Catarina, Joinville, Feb. 1 ♂ 1 ♀ JC; 1 ♀ UFPC; São Bento do Sul Feb. Mar. 3 ♀ JC; Rio Vermelho, Cáceres 400 m 4 ♂ UFPC; Trombudo Alto Apr 1 ♂ AME; "Corupa" Apr. 1 ♂ 1 ♀ MPM; Blumenau BMNH; Mato Grosso, Nioaque Nov. 1 ♂ AME; Chapada dos Guimarães 1 ♂ USNM X; Rondônia, Jaru Aug. 1 ♂ KB.

*Eunica alcmena* (Doubleday), [1847]

*E. alcmena* is one of the most abundant species of *Eunica*. It is somewhat variable, and the nominate form and one subspecies are recognized. It is possible that another subspecies exists from Colombia to Nicaragua, which has more purple on the dorsal surface and brown ventrally instead of reddish-purple and lacks the intensity and contrast of the Méxican form. However, study of a rather large series show too much clinal and other variation to recognize another valid subspecies.

*Description:* Male. The DFW is black with the discal cell shining blue or bluish-purple, extending and expanding into the subapical area and may extend posteriorly to the tornus. The DHW is black with the broad, submarginal band shining blue or bluish-purple. The VFW is brown with diffuse black areas, a black subapical ocellus and a thin black apical curving line. The VHW is brown to reddish-purple with broad basal dark maculae, an expanded medial line, and a wide submarginal line. Two anterior postmedial ocelli are fused with two white pupils surrounded by an orange and dark ellipse. There are two (or one) posterior black ocelli with a white pupil in an orange circle ringed by a darker circle. The ocellus in  $M_2-Cu_1$  is smaller or absent. Male genitalia. (Fig. 308). The male hypandrium is narrowed posteriorly. The uncus is constricted, upturned and beaked.

Female. The DFW is brown in the basal half, blackish in the distal half. There is a white postmedian diagonal cross band and none, two or three white subapical maculae. The VFW is like the ♂ except a white postmedian cross band and from none to three subapical whitish maculae. Female genitalia (Fig. 339).

Key to Subspecies of *Eunica alcmena*

Males.

- 1a. DFW with discal area blue or bluish-purple, which may be interrupted or narrowed in the medial area with black, followed by an expanded blue or purplish-blue in the subapical area, not extending posterior to  $M_1$ , DHW with relatively narrow blue or purple marginal band (usually 3-5 mm). . . . . *alcmena*
- 1b. DFW with discal area shining blue (rarely bluish-purple) expanding distally and curving posteriorly to the tornus. DHW with broader, shining blue posterior area (4.5-7 mm) . . . . . *flora*

Females.

- 1a. DFW dark brown basal half; white post-median diagonal crossband usually curving. No subapical (rarely one small) maculae . . . . . *alcmena*
- 1b. DFW lighter brown basal half; white postmedian crossband not curving. Two (rarely three) subapical white maculae . . . . . *flora*

*Eunica alcmena alcmena* (Doubleday), [1847] [Stat. rev.]

Figures 248-251, 308, 339, 379

*Callianira alcmena* Doubleday, [1847]. Gen. Diurn. Lep. pl. 28, f. 1. TL: "México" Syntypes: BMNH ♂ "Rh 9327/D.&H. pl. 28, f. 1" (Examined)

*Description:* As in *E. alcmena* except for differences listed in the key to subspecies. Average wing length ♂ (27-35)31 mm, ♀ (29.5-35)32 mm.

*Distribution:* Occurs from Colima on the west coast and Jalapa on the east coast of México, south through Central America to central Colombia and in western and northern



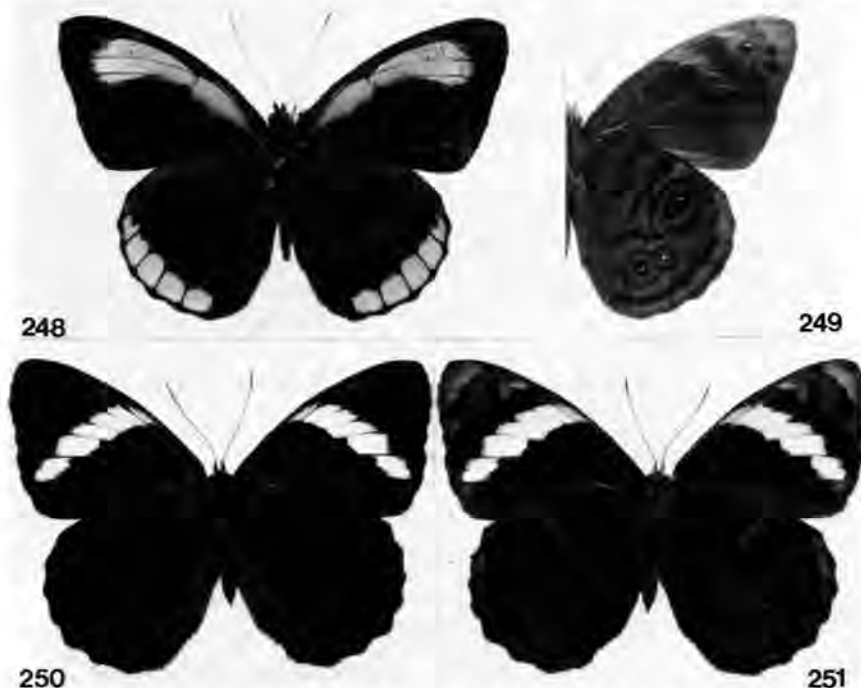
Venezuela, (Fig. 379).

**Taxonomy and Variation:** I have examined a male from México in the BMNH labelled TYPE and figured by Doubleday and Hewitson. It is typical of the Méxican population with a much darker and more intense markings on the VHW than specimens with brownish VHW from Panamá and Colombia. However, these variations are clinal or gradational with both occurring in Costa Rica. There is some basis for considering these two subspecies; however, the dorsal surfaces are nearly identical in the two populations. Some Méxican specimens also have a dark purplish overcast on the VHW and more black markings on the VFW. The northern Colombian and Panamanian specimens have typical *E. a. alcmena* dorsal markings, but the VHW has the small accessory ocellus in  $M_2$ -Cu, absent or reduced as in some *E. a. flora*. Some specimens have a wider blue posterior band on the DHW as in *E. a. flora*.

**Biology:** *E. a. alcmena* are found in tropical evergreen rainforest and in semi-deciduous tropical forest. The males are most common along river banks and at moist places. They are attracted to feces and fermenting fruit. I have collected males in various localities in México. DeVries (1987) states: "As in other species, the female is rarely seen. I have only seen them flying at midday along water courses within the forest, searching for oviposition sites in the understory. Both sexes feed on fresh mammal dung, and occasionally the males are attracted to rotting fruits." The adults are found in most months of the year but more have been collected in June to October. They occur at elevations from near sea level to 1,000 m throughout the range from México to Colombia.

Specimens Examined: 290 ♂ 28 ♀

MEXICO: Veracruz, Presidio; Los Tuxtlés; Dos Amates; Catemaco; Tezonapa; Orizaba;



Figures 248-251. *Eunica alcmena alcmena* (Doubleday). ♂ dorsal (248) ventral (249) surfaces. "MEXICO", no specific locality. Syntype *Callianira alcmena* Doubleday (BMNH). ♀ dorsal (250) ventral (251) surfaces. MEXICO, Veracruz, Presidio (AME).

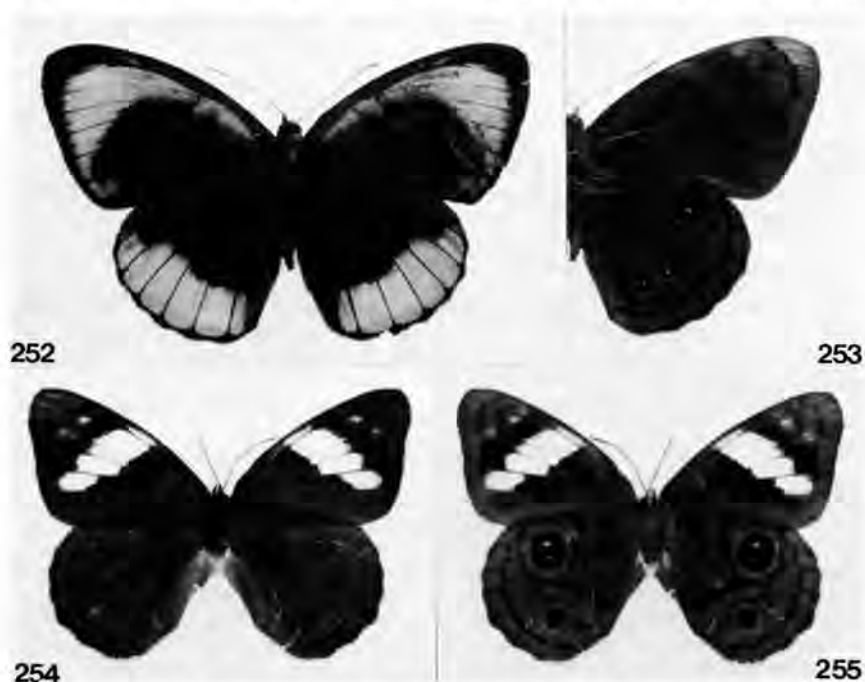
Córdoba; Motzorongo; Jalapa; Atoyac; Tapalpan; Uxpanapa; *Morelos*, Cuernavaca; *Oaxaca*, La Esperanza; Chiltepec; Comaltepec; Candelaria-Loxicha; Chimalapa; Valle Nacional; Tehuantepec; Jacatepec; Metates; Chacalapilla; *Chiapas*, Bonampak; Puente Chamula Rd.; Ocozucatlá; Buenavista; Montes Azules; Ocosingo; Palenque; San Quintín; Chajul; Chicoasén; Río Lacantún; Mapastepec; *Colima*, La Salada; Colima; *Tabasco*, Teapa; GUATEMALA: *Alta Verapaz*, Choctún; Chixoy; Telemán; Polochic Valley; Tucuru; *Izabal*, Cayuga; El Petén, Sayaxché; BELIZE: *Toledo*, Río Grande; *Corozal*, Corozal; HONDURAS: *Cortés*, San Pedro Sula; NICARAGUA: *Matagalpa*, Matagalpa; COSTA RICA: *Alajuela*, San Mateo; *Puntarenas*, Buenos Aires; Venecia de Osa; Corcovado; San Vito; Rincón; Palmar Norte; Río Terraba; *Cartago*, Cartago; *Heredia*, La Selva; *San José*, La Montura; PANAMA: *Chiriquí*, Chiriquí; Cerro la Galera; Bugaba; *Darién*, Cana; *Canal Zone*, Madden Forest; Gamboa; COLOMBIA: *Antioquia*, Zaragoza; Medellín; *César*, Manaure; *Risaralda*, Pereira; *Cundinamarca*, Bogotá; Cananche; *Tolima*, Tolima; Las Vegas; Quindío; *Meta*, Villavicencio; *Magdalena*, Onaca; Las Taguas; *Boyacá*, Muzo; *Valle*, Río Dagua; VENEZUELA: *Aragua*, Rancho Grande; *Barinas*, Ticoporo; *Miranda*, Santa Lucía; *Mérida*, Mucuchachí; Mérida.

*Eunica alcmena flora* C. & R. Felder, 1862

Figures 252-255, 308, 339, 379

*Eunica flora* C. & R. Felder, 1862. Wien. Ent. Mon. 6: 111 no. 83. TL: "Rio Negro" (country?). Syntypes: BMNH 1 ♂ "Type/Rio Negro Type/Flora N./Felder Coll." (Examined)

= *Eunica irma* Fruhstorfer, 1908. Soc. Entomologia 22(5): 44. TL: Perú, [Pasco], Pozuzo.



Figures 252-255. *Eunica alcmena flora* C. and R. Felder. ♂ dorsal (252) ventral (253) surfaces. "Rio Negro" (country?) Syntype *Eunica flora* C. and R. Felder (BMNH). ♀ dorsal (254) ventral (255) surfaces. PERU, Junin, La Merced (JC).

Syntypes: 10 ♂ Coll. Fruh. Location unknown. [Syn. nov.]

*Description:* As in *E. alcmena* except for differences listed for *E. a. flora* in the key to subspecies.

Average wing length ♂ (29-33)31 mm.

*Distribution:* This subspecies is found from Valle del Cauca, Colombia, south in the Andean slopes to Bolivia. It also occurs in Pebas, Perú (Fig. 379).

*Taxonomy and Variation:* I have examined a male specimen labelled "TYPE: *flora*" from Río Negro, [country unknown] in the Felder coll. (BMNH). It is typical of the *E. a. flora* population. *E. irma* Fruhstorfer was described from 10 ♂ from Pozuzo, Peru. He and other authors mistakenly associated *E. flora* with *E. eurota*, which resulted in the redescription of *E. a. flora*. (The original description accurately describes *E. a. flora*, and *E. irma* is synonymized.) In the males there is slight variation in the iridescent blue being slightly purplish-blue in some specimens, and the width of the apical blue area on the DHW is somewhat variable. On the VHW there is some variation in the size of the small accessory ocellus in  $M_1-Cu_1$ , but these characters are variable in series from the same locality. Since this subspecies is quite common, it was possible to compare suitable series from various localities.

*Biology:* I have collected series of adult males in various localities in Ecuador and Perú in evergreen tropical rain forest and in semi-deciduous tropical forest. They are attracted to baits of feces or fermenting fruit, especially banana, and will enter bait traps. Adults are found in the forest canopy and at wet places and river banks. They have been collected every month of the year especially from July to November at elevations of about 200 m to 1000 m.

Specimens Examined: 245 ♂

COLOMBIA: VALLE, Cali; ECUADOR: *Morona-Santiago*, Gualaquiza; Macas; *Chimborazo*, Riobamba; *Zamora-Chinchi*, Zumbi; *Napo*, Río Coca; Río *Napo*; *Pastaza*, Huagra-Yacu; El Partidero; *Tungurahua*, La Merced; Baños; Río Pano; PERU: *Loreto*, Pebas; *Aguaytia*; *Amazonas*, Huambo; *Huánuco*, Tingo María; Río Pichis; Río Huallaga; *San Martín*, Tarapoto; Moyobamba; *Cuzco*, Illapani Viejo; Río Colorado; *Pasco*, Pozuzo; *Cahuapanas*; Chuchurras; Río Palcazu; *Junín*, Chanchamayo; La Merced; Satipo; *Puno*, Inambari; Río Yahuar mayo; La Pampa; Río Tavera; Inca Trail; BOLIVIA: *Cochabamba*, Cochabamba; Cristal Mayo; Chapare; *Santa Cruz*, Río Juntas; Río Yapacani; Sicasica; *La Paz*, Río Zongo.

#### *Eunica pomona* (C. & R. Felder), 1867

*E. pomona* and *E. amata* have been included as subspecies of *E. alcmena* in Seitz (1915). However, they are sympatric with *E. alcmena* and are quite different in many characters so that they are considered as a separate species, *E. pomona*, with *E. p. amata* as a subspecies. The exact range of *E. p. pomona* is in question since there are seven scattered localities out of the main range in Colombia. More research is needed on the distribution of this species.

*Description:* Male. The DFW is black with a long longitudinal purple stripe in the costal area, curving narrowly in the apical area and extending in the submarginal area to the tornus. The DHW is black with a submarginal purple band. The VFW is brown with diffuse blackish areas, usually two black subapical ocelli and a black, curving apical line. The VHW has two basal maculae, the median line is broken into two separate segments and a submarginal line. The anterior postmedian ocellus is very large and black with two whitish pupils surrounded by an orange ring and dark circle. The posterior ocellus is large and black with a white pupil; the ocellus in  $M_2-Cu_1$  is absent, separate, or absorbed in the large, posterior circular ring. Male genitalia. (Fig. 309). The ♂ hypandrium is constricted posteriorly with two projections. The uncus is very constricted, upturned and beaked. The valva is elongate and terminates in a point or tooth.

Female. The DFW is brown in the basal half; the distal half is black with a white,

postmedian, diagonal crossband and three subapical white maculae. The VFW is brown with blackish areas and white markings as dorsally. There are two black subapical ocelli and a curving black apical line. The VHW is the same as the ♂. Female genitalia. (Fig. 340).

Key to Subspecies of *Eunica pomona*

Males.

- 1a. VHW with median lines relatively narrow; two basal maculae relatively narrow; posterior postmedian ocelli with anterior ocellus in  $M_2$ - $Cu_1$ , small but separate; anterior double ocellus and ring somewhat smaller . . . . . *amata*  
 1b. VHW with median line very thick especially in the costal area; two basal maculae very broad, posterior one nearly round; posterior postmedian ocellus single with ocellus in  $M_2$ - $Cu_1$ , absent or absorbed within ring of large ocellus in  $Cu_1$ - $Cu_2$ ; anterior double ocellus and ring averages larger . . . . . *pomona*

Females.

- 1a. Same characters as on ♂ VHW . . . . . *amata*  
 1b. Same characters as on ♂ VHW, but anterior ocellus in  $M_2$ - $Cu_1$ , may be absorbed within ring or joined to it . . . . . *pomona*

*Eunica pomona pomona* (C. & R. Felder), 1867 [Stat. rev.]

Figures 256-259, 309, 340, 380



Figures 256-259. *Eunica pomona pomona* (C. and R. Felder). ♂ dorsal (256) ventral (257) surfaces. "Nova Granada, [COLOMBIA], Bogotá." Syntype *Faunia pomona* C. and R. Felder (BMNH). ♀ dorsal (258) ventral (259) surfaces. "COLOMBIA", no specific locality (AME).

*Faunia pomona* C. & R. Felder, 1867. Reise Nov. Lep. 3: 407, pl. 52, f. 11, 12. TL: "Nova Granada: Bogota". Syntypes: 1 ♂ BMNH in Felder Coll. (Examined)  
 = *Eunica pomona* f. *pompata* Fruhstorfer, 1909. Stett. Ent. Zeit. 2: 211. TL: "Colombia"  
 Syntypes: 1 ♂ Coll. Fruh. BMNH (Examined) [Syn. nov.]

*Description:* As in *E. pomona* except for differences listed for *E. p. pomona* in the key to subspecies.

Average wing length ♂ (29-34)30.5 mm, ♀ (29-31)30 mm.

*Distribution:* Occurs in the western half of Colombia and in western Venezuela. There are six specimens which include Porto Velho, São Paulo de Olivença and Manicoré, Brazil, Puerto Maldonado, and La Merced, Perú, and Guayaquil, Ecuador. These need to be corroborated, if possible, to accurately determine the range of *E. p. pomona* (Fig. 380).

*Taxonomy and Variation:* I have examined the male type of *E. pomona* from Bogota, Colombia in the Felder collection (BMNH). It is typical of the Colombian population. I have examined the male specimen of *E. pomona* f. *pompata* from Colombia labelled TYPE in the Fruhstorfer collection (BMNH). It is almost exactly the same as the type of *E. pomona* and is synonymized. There is some variation in the purplish to bluish-purple shading of the markings on the dorsal surface. There is also variation in the size or presence of the accessory ocellus in  $M_3-Cu_1$  on the VHW in both ♂ and ♀. The width of the white postmedian diagonal cross band of the ♀ varies slightly.

*Biology:* The adults are found in evergreen tropical rain forest. They have been collected in most months of the year from elevations of about 300 to 800 m.

Specimens Examined: 260 ♂ 30 ♀

COLOMBIA: *Antioquia*, Medellín; Río Cocororá; Frontino; Zaragoza; *Cundinamarca*, Bogotá; Cananche; Viota; *Boyacá*, Muzo; Tunja; *Santander*, Río Suárez; La Lechera; Río Opón; Head of Río Carare; La Seville; Barrancabermeja; El Centro; *Valle*, Río Dagua; *Risaralda*, Pereira; *Putumayo*, Caquetá; VENEZUELA: *Mérida*, El Vigía; ECUADOR: *Guayas*, Guayaquil (Error?); PERU: *Madre de Dios*, Puerto Maldonado (Error?); *Junín*, La Merced (Error?); BRAZIL: *Amazonas*, São Paulo de Olivença (Error?); Manicoré (Error?); *Rondônia*, Porto Velho (Error?).

#### *Eunica pomona amata* Druce, 1874 [Stat. rev.]

Figures 260-263, 309, 340, 380

*Eunica amata* Druce, 1874. Cist. Ent. 1: 285. TL: Costa Rica. Syntypes: BMNH 1 ♂ Rh 9318, "*E. amata* Druce Type" (Examined)

*Description:* As in *E. pomona* except for differences listed for *E. p. amata* in the key to subspecies.

Average wing length ♂ (29-33)31 mm, ♀ (28-31)30 mm.

*Distribution:* Occurs in México, Guatemala, Costa Rica, and Darién, Panama. The single ♂ from México (no specific locality, and the single ♀ from Guatemala extend the range considerably and should be confirmed if possible (Fig. 380).

*Taxonomy and Variation:* I have examined a male specimen labelled TYPE HT from Costa Rica in the Godman and Salvin collection (BMNH). While the dorsal surface markings are nearly typical of the population of *E. p. amata* throughout its range, the size of the ocelli on the VHW is smaller than most specimens. This caused Druce (1874) to comment on its resemblance to *E. eurota* on the under surface. *E. p. amata* is marginally distinct from *E. p. pomona*, but it is maintained as a separate subspecies.

*Biology:* DeVries (1987) states: "Occurs from sea level to 500 m on both slopes, in association with primary rain forest. The males are similar in habits to *E. alcmena*, but I have not taken them at rotting fruits. Both species fly together on the Osa Peninsula. Rare in Costa Rican Collections."

Adults have been collected from March, May to July and in October at elevations from

about 500 to 1,150 m.

Specimens Examined: 19 ♂ 2 ♀

MEXICO: No specific locality, 1 ♂ AMNH; GUATEMALA: *Izabal*, Cayuga May 1 ♀ USNM; COSTA RICA: *San José*, La Montura 1,000 m (DeVries); *Puntarenas*, Palmar Norte Jun 3 ♂ FSCA; 1 ♂ GS; Rincón, Osa Peninsula Mar. 1 ♂ LACM; Río Terraba 4 ♂ GS; San Vito 1,150 m (DeVries); PANAMA: *Chiriquí*, Cerro la Galera Jul. 1 ♀ GS; Potrerillos Oct. 1 ♀ LACM; *Chiriquí* BMNH; *Darién*, Cana 8 ♂ GS.

#### E. PHYLOGENY

*Eunica* has been a subject of debate on whether it really should be subdivided into more than one genus. A second problem is whether it is congeneric with the African genus *Sallya*. A third problem is whether the very closely related monotypic genus *Libythis* should be included in *Eunica*. A large genus such as *Eunica* requires extended study to develop a logical sequence of species and to define species groups.

A cladistic study was undertaken to help resolve these problems. The subtribe Eunicina was defined in a cladistic study of the Eurytelinae (in prep.). Eunicina includes *Eunica*, *Sallya*, *Libythis* and *Cybdelis* (in which I include *Sea sophronia*). *Sallya* and *Cybdelis* were used as outgroup genera and in addition *Catocelia*, (a new genus to be described which includes the *Myscelia cyaniris* species group) which is in the closely related subtribe Catonephelina. *Libythis cuvierii* was tentatively included as a species of *Eunica*. A



Figures 260-263. *Eunica pomona amata* Druce. ♂ dorsal (260) ventral (261) surfaces. "COSTA RICA", no specific locality. Syntype *Eunica amata* Druce (BMNH). ♀ dorsal (262) ventral (263) surfaces. GUATEMALA, [Izabal], Cayuga (USNM).



morphological study was undertaken of these genera and the 45 species of *Eunica*. The characters examined included wing venation and shape, male androconial areas, male genitalia, male hypandria, female genitalia, palpi, antennae, wing color and pattern elements especially the ocelli of the VHW. Fifty five binary characters were found which are presented in Table 3. The assumed more advanced or apomorphic state is listed first followed by the plesiomorphic or more primitive state (tested by outgroup analysis).

A character matrix is presented in Table 4 for the 45 species of *Eunica* and the three outgroup genera. Fifty five binary characters are scored for the 48 taxa. The hypothesized apomorphic state is represented by 1, the plesiomorphic state by 0, and unknown by 9. There are 42 synapomorphies and 13 autapomorphies. A shortcoming of characters for the present analysis is the absence of larval, egg, and pupal characters, which makes this analysis tentative.

Cladistic analyses were carried out by computer using the PAUP package (version 2.4.1, Swofford, 1985). Multiple parsimony and global branch swap options and other analytic options were used. Increased character weighting of ocellar characters resulted in more steps and was discarded. The most parsimonious cladogram (Text Fig. 1), had 103 steps and an efficiency index of 0.40. Other similar trees had trivial rearrangements and spurious resolutions of polychotomies. The only significant difference in computer trees was the relative location of *E. cuvierii* due to alternate resolutions of characters 7 and 26.

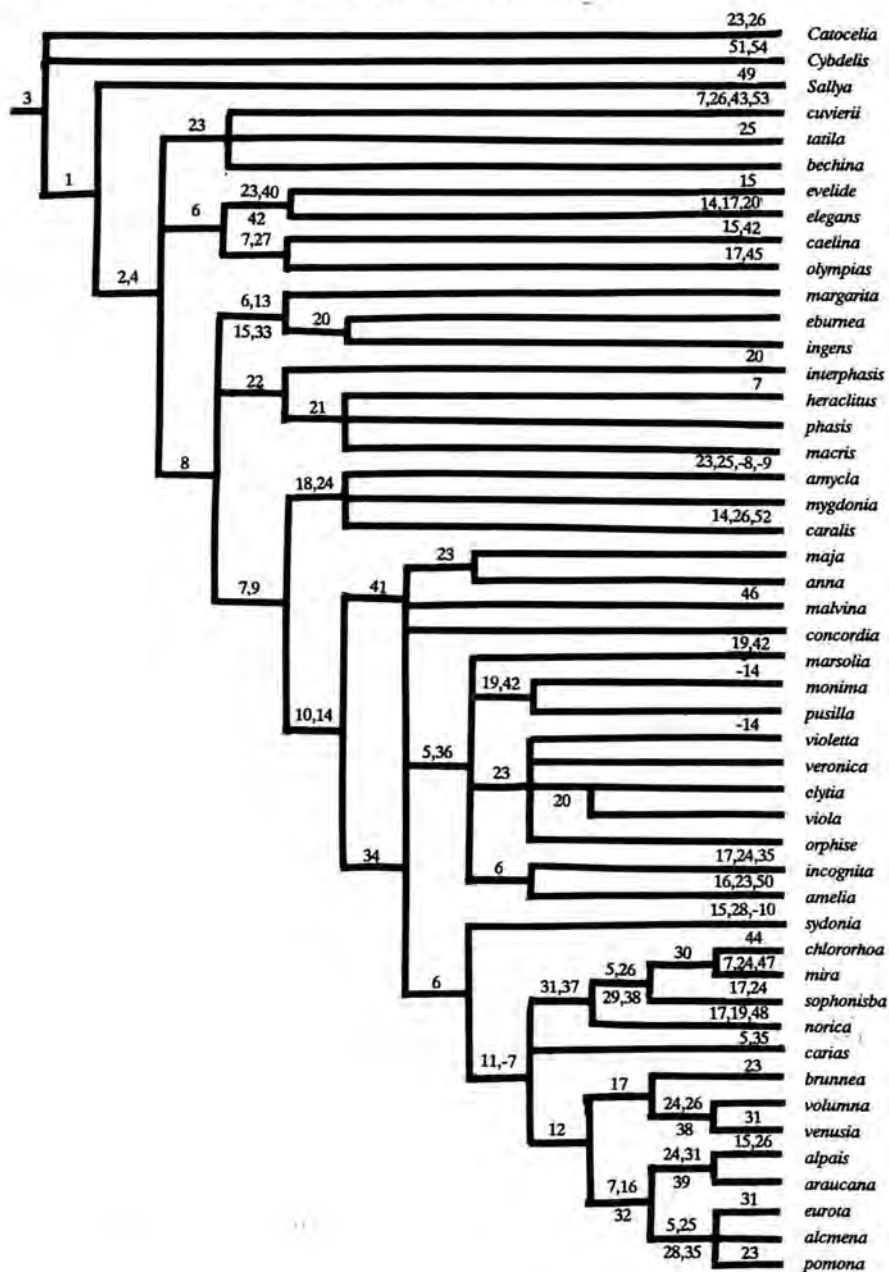
The ocelli on the VHW were found to be of major importance in this study. There is an apparent transformation series based on a sequence from six or seven ocelli in the more primitive state as defined by Schwanwitsch (1924) similar to Fig. 5a. There is an apparent progression in the reduction in number of ocelli (Figs. 5a-5f) in which there are six or seven ocelli; two or three ocelli anteriorly and two or three posteriorly; to an anterior and posterior pair of fused ocelli encircled by an ellipse or ring. The posterior set may be reduced to a single ocellus (Table 3, characters 8-12). Differences in wing venation and

Table 3. List of Characters of *Eunica*

1. ♂ gnathos greatly reduced, narrowed or very short, usually without gnathos arm / gnathos not reduced.
2. ♂ uncus with a narrowed beak at apex / without narrowed beak.
3. DFW with Sc and/or Cu or M enlarged or swollen / not enlarged.
4. Forewing with angled base of costa / without angled base.
5. ♂ forewing outer margin straight, not truncate / truncate.
6. ♀ DFW with usually white medial, postmedial or subapical crossband / without white crossband.
7. Forewing with  $m_2$ - $m_1$  joining  $M_3$  distal to branch of  $M_3$  and Cu, /  $m_2$ - $m_1$  joining at branch of  $M_3$  and  $Cu_1$ .
8. VHW with three separate anterior and two or three separate posterior ocelli (ocellus in  $M_2$ - $M_3$  very small or absent) (Fig. 4b) / VHW with five to seven separate ocelli (Fig. 4a).
9. VHW with two separate anterior ocelli and two or three separate posterior ocelli / with three separate anterior and two or three separate posterior ocelli (Fig. 4b).
10. VHW with two anterior ocelli in ellipse with ocellus in  $M_2$ - $M_3$  attached or included and two posterior ocelli (Fig. 4c) / with two or three anterior separate ocelli and two or three posterior separate ocelli (Fig. 4b).
11. VHW with two separate black anterior ocelli in ellipse (or partly fused with two white centers in *norica*), and two separate posterior black ocelli (may be encircled) (Fig. 4d) / two or three anterior separate ocelli and two or three posterior separate ocelli (Fig. 4b).
12. VHW with two anterior ocelli in ellipse with centers fused, posterior ocellus in  $Cu_1$ - $Cu_2$  larger than in  $M_2$ - $Cu_1$  (Figs. 4e-4f) / without anterior ocelli with centers fused.
13. ♂ DFW with very broad white band / without very broad white band.
14. ♂ DFW without any white markings / with white markings.

15. ♀ DFW with white median crossband with three subapical white spots / with white median maculae.
16. ♀ DFW with white median crossband with two subapical white spots/ with white median crossband and no subapical white spots.
17. ♀ DFW with white median or postmedian crossband and no subapical white spots / without white median crossband.
18. ♂ tegumen with dense mass of long hairs / without dense long hairs.
19. ♂ hypandrium long and narrow / not long and narrow.
20. ♂ uncus with superuncus horn / without superuncus horn.
21. ♂ uncus with all of dorsal surface serrate / without dorsal serration.
22. ♂ valva with extended protuberance at midpoint or basal half / without such extended protuberance.
23. ♂ valva with protuberance or tooth at crista or apex / without such protuberance.
24. ♂ valva triangular in shape / not triangular.
25. ♂ uncus bent dorsally at over 45° angle / not bent dorsally at 45° angle.
26. FW with Cu stem vein basal to branch of Cu<sub>2</sub>, one-half to branch Cu<sub>1</sub> / two-thirds.
27. FW with Cu stem vein basal to branch of Cu<sub>2</sub>, one-third to branch Cu<sub>1</sub> / one-half.
28. FW with Cu stem vein basal to branch of Cu<sub>2</sub>, one-fourth to branch Cu<sub>1</sub> / one-third.
29. HW humeral (precostal) vein joins Sc + R<sub>1</sub> at junction to Rs / joins Sc + R<sub>1</sub> distal to junction of Rs.
30. ♀ DFW with green or white subapical band / without green or white subapical band.
31. ♂ DHW with distal half blue or metallic green / distal half not blue or metallic green.
32. ♂ DFW with blue only in costal and outer submarginal areas / without blue in costal and outer submarginal areas.
33. DHW white or light grey / not white or grey.
34. ♂ DHW with androconial area / DHW without androconial area.
35. ♂ DHW and VHW with androconial area/ area on both DHW and VHW without androconia.
36. DFW with Sc and/or Cu or M with a very inflated spindle / with these veins only enlarged.
37. ♂ VHW with longitudinal stripe in M<sub>2</sub>-M<sub>3</sub> / without longitudinal stripe in M<sub>2</sub>-M<sub>3</sub>.
38. VFW with blue markings / VFW without blue markings.
39. ♀ DFW with white postmedian band with blue on proximal margin, DHW brown / without this combination of characters.
40. ♂ valva with blunt apex and subapical curved extension/without blunt apex and subapical curved extension.
41. ♂ DFW with purplish-brown postmedian maculae/without purplish-brown postmedian maculae.
42. ♀ sterigma very elongated / ♀ sterigma not elongate (more square).
43. Palpi very long (> 4.0 mm) / palpi shorter (< 4.0 mm).
44. ♀ DFW with green subapical band / without green subapical band.
45. ♀ DHW all metallic green without maculae / DHW not all metallic green.
46. ♂ uncus with several dorsal teeth near apex / uncus without several dorsal teeth near apex.
47. ♀ DFW with subapical white band / without subapical white band.
48. ♂ DFW with two large white postmedian maculae / DFW without two large white postmedian maculae.
49. ♂ tegumen very short and compressed / tegumen not very short and compressed.
50. ♂ VHW with a swollen spindle in 2A covered with androconial hairs (Fig. 2) / VHW without a swollen spindle in 2A.
51. ♂ saccus very enlarged and short/ saccus elongate.
52. ♀ DFW purple with brown subapical band / without brown subapical band.
53. HW with Cu<sub>2</sub> extended / HW without Cu<sub>2</sub> extended.
54. FW with R<sub>2</sub> vein arising distal to end of discal cell / FW with R<sub>2</sub> vein arising proximal to end of discal cell.
55. ♂ gnathos absent/ gnathos present (may be greatly reduced).



Text Figure 1. PHYLOGENY OF *EUNICA*

shape were of importance as synapomorphies. The male genitalia and especially the male hypandria were important in characterizing the genus, as well as delineating species and smaller groups of species. Female genitalia were of limited value. The presence or absence of white markings on the wings of both sexes was valuable, especially the white postmedian band and subapical white maculae on the DFW of the females. Male androconial patches (Table 3, characters 34 and 35) were of some value.

Cladistic analysis suggests that *Eunica* is a monophyletic genus. It can be divided into nine (or ten) species groups (which are of limited value). The analysis also indicates that *Libythina cuvierii* should be included in the genus *Eunica* and that the genus *Libythina* should be synonymized.

*Sallya* and *Eunica* are closely related but are separate genera. The remarkable compression of the tegumen (character 49) in addition the absence of the gnathos (character 55) and the presence of extended rami on the hypandrium are distinctive for *Sallya*.

A tentative phylogeny, based on the data presently available, shows a sequence of species from *E. cuvierii* to *E. pomona*. This appears to be a plausible phylogeny based on presently available data.

#### F. ACKNOWLEDGMENTS

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I would like to express appreciation to my wife, Joanne F. Jenkins, for help in collecting *Eunica* in many tropical countries, frequently under rather primitive conditions. I wish to thank her also for help in curating specimens, for providing excellent secretarial and computer assistance, and for inking all drawings.

#### G. LITERATURE CITED

- Alayo, D., P. & L. R. Hernández. 1987. *Atlas de las Mariposas Diurnas de Cuba. (Lepidoptera: Rhopalocera)*. Editorial Científico Técnica Habana. 148 pp.
- Barcant, M. 1970. *Butterflies of Trinidad and Tobago*. London, Collins. 314 pp., 28 pls.
- Bates, H. W. 1864. Contributions to an insect fauna of the Amazon Valley. Lepidoptera - Nymphalinae. *J. Ent.* 2(10): 175-213, pls. 9-10.
- Bates, D. M. 1935. The butterflies of Cuba. *Bull. Mus. Comp. Zool.* 78(2): 63-258.
- Biezanko, C. M. 1949. Acraeidae, Heliconiidae et Nymphalidae de Pelotas e seus arredores. Pelotas, *Livraria Globo*, 16 pp. 1 pl.
- Bridges, C. A. 1988. Catalogue of Family-Group and Genus-Group names. (Lepidoptera: Rhopalocera). Pub. by C. A. Bridges, Urbana, Illinois.
- Brown, F. M. and B. Heineman. 1972. *Jamaica and its Butterflies*. London, E. W. Classey Ltd. xv + 478 pp., 10 pls.
- Brown, K. S. Jr. and O. H. H. Mielke. 1967. Lepidoptera of the Central Brazil Plateau. I. Preliminary list of Rhopalocera; Introduction, Nymphalidae, Libytheidae. *J. Lepid. Soc.* 21(2): 77-106; (3): 145-168.
- Bryk, F. 1953. Lepidoptera aus dem Amazonasgebiete und aus Perú gesammelt von Dr. Douglas Melin und Dr. Abraham Roman. *Ark. Zool. (N.S.)* 5: 1-268.
- Butler, A. G. 1869. Descriptions of new and little known forms of diurnal lepidoptera. *Trans. Ent. Soc. London* p. 274, pl. 5.
- Butler, A. G. and H. Druce. 1872. Descriptions of new genera and species of Lepidoptera from Costa Rica. *Cist. Ent.* 1: 95-118.
- Butler, A. G. and H. Druce. 1874. List of the butterflies of Costa Rica, with descriptions

- of new species. *Proc. Zool. Soc. London* 3: 330-370.
- Cramer, P. 1775-1782. *De Uitlandsche Kapellen voorkomende in de drie Waereld-Deelen Asia, Africa en America*. V. 1, p. 1-132 (1775); V. 1, p. 133-156 (1776); V. 2, p. 1-152 (1777); V. 3, p. 1-288 (1779-1780), V. 4, 1-28 (1780).
- D'Abrera, B. 1987. *Butterflies of the Neotropical Region*. Part IV. *Nymphalidae (Partim)*. Hill House, Victoria, Australia pp. 540-554.
- d'Araujo, A. G. et al. 1968. *Quarto Catálogo dos Insectos que Vivem nas Plantas do Brasil, seus Parasitos e Predadores*. Min. Agr. Rio de Janeiro. Pt. 2, Tomo 1, pp. 622.
- de la Maza, R. and R. Turrent. 1985. Mexican Lepidoptera. Eurytelinae I. *Soc. Mex. Lepid. Pub. Esp.* 444, 19 pls.
- DeVries, P. J. 1986. Host plant records and natural history notes on Costa Rican butterflies. (*Papilionidae, Pieridae and Nymphalidae*). *J. Res. Lepid.* 24(4): 290-333.
- DeVries, P. J. 1987. *The Butterflies of Costa Rica and their Natural History. Papilionidae, Pieridae, Nymphalidae*. Princeton Univ. press. 327 pp., 50 pls.
- Druce, H. 1874. Descriptions of new species of diurnal lepidoptera chiefly from tropical America. *Cist. Ent.* 1(10): 285-290.
- Dyar, H. G. 1912. Descriptions of the larvae of some Lepidoptera from Mexico. *Proc. Ent. Soc. Wash.* 14: 54-58.
- Fassl, A. H. 1918. Die Vertikale Verbreitung der Lepidopteren in der Colombischen Ost-Cordillere. *Ent. Rundsch.* 85(1): 1-8.
- Felder, C. 1861. Nova Act. Akad. Caesar. Leopold. 28(3): 49. Felder, C. and R. Felder. 1861. Lepidoptera nova Columbiae. *Wien. Ent. Monat.* 5(4): 97-111.
- Felder, C. and R. Felder. 1867. *Reise der osterreichischen Fregatte Novara un die Erde in den Jahren 1857*. Zool. Theil. Zweiter Band: Zweiter Abtheilung, Vienna, 5 parts. Heft 3: pp. 379-535; pls. 48-74.
- Fox, R. M., A. W. Lindsey, H. K. Clench, and L. D. Miller. 1965. *The Butterflies of Liberia*. Mem. Am. Ent. Soc. 19: 1-438.
- Fruhstorfer, H. 1907. Neue Lokalforme der Gattung *Eunica*. *J. Soc. Ent. Intern.* 22(5): 33-44.
- Fruhstorfer, H. 1908. Eine neue *Eunica* aus der alcmena-Gruppe und Beschreibung neuer Lokalformen. *Stett. Ent. Zeit.* 69: 46-48.
- Fruhstorfer, H. 1909. Neues über Rhopaloceren I. Neue *Eunica*. *Stett. Ent. Zeit.* 22: 210-215.
- Fruhstorfer, H. 1912. Neue Nymphaliden des neotropischen gebietes aus der Sammlung Staudinger. *Ent. Rundschau.* 29: 14-15.
- Godart, J. B. [1824]. In Latreille, P. A. & J. B. Godart, 1819-[1824], *Encyclopédie Méthodique. Histoire naturelle [Zoologie]*. 9. Entomologie. Paris. 828 pp.
- Godman, F. D. and O. Salvin [1883]. *Biologia Centrali-Americana. Insecta. Lepidoptera-Rhopalocera*. London, Taylor & Francis 1: 222-229.
- Gundlach, J. C. 1881. (Vol. 1. Lepidopteros, 445 pp.) in *Contribution a la Entomologia Cubana*, 3 vol. 1881-1891. A. Alvarez & Co., Habana.
- Hall, A. 1928. Some new forms of Nymphalinae (Rhopalocera). *Entomol.* 61: 13.
- Hall, A. 1929. *Entomol.* 62: 133.
- Hall, A. 1935. New forms of Nymphalinae and Ithomiinae. *Entomol.* 68: 221-227.
- Hall, A. 1983. *A monograph of the butterflies of the subfamily Nymphalinae*. Microfische. Brighton.
- Hayward, K. J. 1964. *Genera et Species Animalium Argentinorum* 3: 1-472, 20 pls.
- Heppner, J. B. & G. Lamas. 1982. Acronyms for world museum collections of insects, with an emphasis on neotropical Lepidoptera. *Bull. Ent. Soc. Amer.* 28(3): 305-315.
- Herrich-Schäffer, G. [1855]. *Samml. Neuer Aussereurop. Schmett.* Regensburg, G. J. Manz. 2: 54, f. 69-72.
- Hewitson, W. C. 1852. *Exotic Butterflies, being illustrations of new species selected chiefly from the collection of Saunders & Hewitson*, London, V. Voorst. I. *Cybdelis* 61, 63. 2: *Cybdelis* [46] pl. 23.
- Hewitson, W. C. 1861. Descriptions of new diurnal Lepidoptera. *J. Ent.* 1: 155-158, pls. 9-10.
- Howe, W. H. 1975. *The Butterflies of North America*. Doubleday & Co., Garden City,



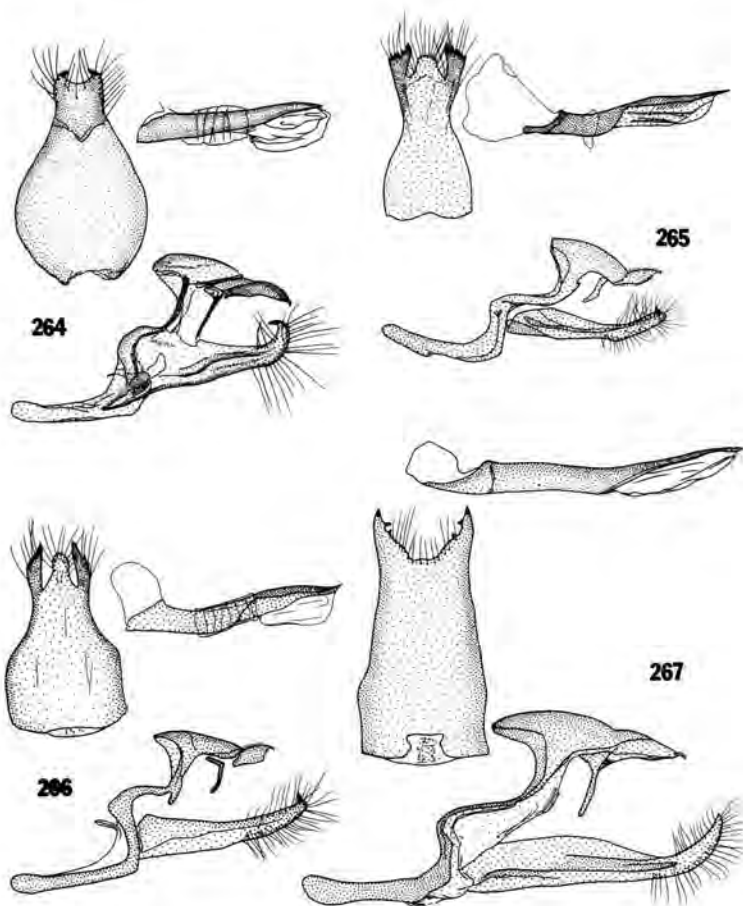
- N. Y. 633 pp.
- Hübner, J. 1806[1838]. *Sammlung Exotischer Schmetterlinge*. Augsburg, 3 vol. 228 pp., 500 pls. Vol. 1, [1806]1819], Vol. 2, [1819]1827], Vol. 3, [1827-1838].
- Janzen, D. H. 1983. *Costa Rica Natural History*. Chicago: Univ. Chicago Press.
- Jones, W. 1783-1785. "Icones" 6+[1] vols. (unedited, see Waterhouse, 1938).
- Kaye, W. J. 1926. The butterflies of Jamaica. *Trans. Ent. Soc. London* 1925. (3/4): 455-504.
- Kirby, W. F. 1871. *A synonymic catalogue of diurnal lepidoptera*. London, John Van Voorst 1: 690 pp. (1871); 2 (suppl.): 691-883 (1877).
- Klotz, A. E. 1970. Lepidoptera, pp. 115-130, in Tuxen, S. L. (Ed). *Taxonomists Glossary of Genitalia in Insects*. Copenhagen, Munksgaard, 359 pp.
- Miller, L. D. 1970. Nomenclature of wing veins and cells. *J. Res. Lepid.* 8(2): 37-48.
- Miller, L. D. and J. Y. Miller. 1989. The biogeography of West Indian butterflies (Lepidoptera: Papilionoidea, Hesperioidea): A vicariance model. In C. A. Wood, Ed., *Biogeography of the West Indies, Past, Present, and Future*. Gainesville, Sandhill Crane Press. 229-262.
- Müller, W. 1886. Südamerikanische Nymphalidenraupen, Versuch einer natürlichen Systems der Nymphaliden, *Zool. Jb.* 1: 417-678.
- Opler, P. A. and G. O. Krizek. 1984. *Butterflies East of the Great Plains: an Illustrated Natural History*. Johns Hopkins Univ. Press, Baltimore, Maryland. 294 pp.
- Orfila, R. N. 1951. Lepidopteros Bolivianos Nuevos o poco conocidos. *Pub. Univ. Cochabamba*. pp. 46-58.
- Prittwitz, O. F. W. C. 1871. *Stett. Ent. Zeit.* 244. Taf. 52, f. 11-12.
- Röber, J. 1923. Neue Schmetterlinge USW. *Stett. Ent. Zeit.* 84: 94-96.
- Salvin, O. 1869. Descriptions of new species of butterflies from tropical America. *Ann. Mag. Nat. Hist.* 4(4): 163-181.
- Schwanwitsch, B. N. 1924. On the ground-plan of wing pattern in nymphalids and certain other families of the rhopaloceros Lepidoptera. *Proc. Zool. Soc. London*. 1924: 509-528, 4 pls.
- Schwartz, A. 1989. *The Butterflies of Hispaniola*. Univ. Florida Press, Gainesville. 580 pp.
- Seitz, A. 1915. The Macrolepidoptera of the World. V: *Eunica*. 481-536 pp.
- Seitz, A. 1916. Macrolepidoptera of the World. V. Illustrations, *Eunica*.
- Sevastopulo, D. G. 1975. A list of food-plants of East African macrolepidoptera. Part 1. Butterflies (Rhopalocera). *Bull. Amateur Ent. Soc. London* 34: 84-92, 125-132.
- Staudinger, O. in Staudinger, O., and E. Schatz. 1884-1888. *Exotische Tagfalter in systematischer Reihenfolge mit Berücksichtigung neuer Arten* Vol. 1: 334 pp., 100 pls. 1885, Vol 1, pp. 35-102, pls. 31-60; 1886, Vol. 1, pp. 103-174, pls. 61-80; 1888, Vol. 1, pp. 235-333, pls. 96-100.
- Swofford, D. L. 1985. Phylogenetic Analysis Using Parsimony, Version 2.4.1. PAUP Users Manual. *Ill. Nat. Hist. Survey*. Champaign, Ill.
- Tuxen, S. L. 1970. *Taxonomists' Glossary of Genitalia in Insects*. Ejnar Munksgaard, Copenhagen. pp. 359.
- Van Son, G. 1979. *The Butterflies of Southern Africa. Part IV. Nymphalidae. Nymphalinae*. Transvaal Museum, Pretoria, 286 pp.
- Williams, C. B. 1945. Evidence for the Migration of Lepidoptera in South America. *Rev. Ent. Rio de Janeiro* 16(1-2): 113-131.

#### APPENDIX A. Errors and Omissions in *Eunica* in D'Abrera (1987)

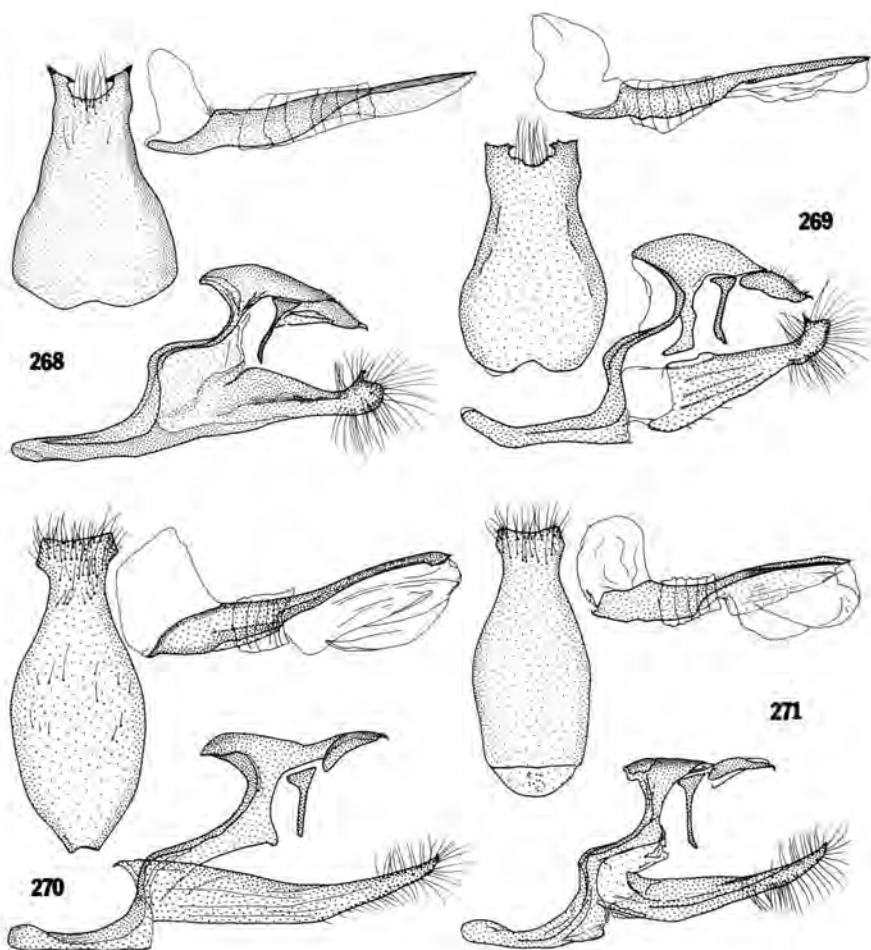
- p. 554 *Libythina cuvierii* is *E. cuvierii*;
- p. 551 *E. tatila coerulea* ♂ V is *E. tatila tatila*; *E. tatila tatilista* is omitted;
- p. 550 *E. bechina magnipunctata* is omitted;
- p. 548 *E. caelina alycia* is omitted; *E. olympias* ♂ D is *E. o. olympias*; *E. augusta augusta* ♂ D is *E. olympias augusta*; *E. augusta augustina* [sic] is *E. olympias agustina*;
- p. 552 *E. margarita eburnea* is *E. eburnea*; *E. margarita ingens* is *E. ingens*, *E. phasis* is omitted; *E. macris* is *E. phasis*; *E. mygdonia omoa* is omitted;

- p. 546 *E. caralis campana* ♂ V is *E. caralis ariba*;
- p. 541 *E. taurione* ♂ V is *E. marsolia fasula*; *E. m. marsolia* is omitted; *E. monima* (f. *habanae* and f. *modesta* are synonyms); *E. monima* f. *pusilla* is *E. pusilla*;
- p. 552 *E. noerina* is *E. maja noerina*;
- p. 544 *E. clytia* ♀ is *E. veronica* ♀; *E. ? sp.* is *E. incognita*;
- p. 540 *E. amelia* ♀ V is *E. amelia erroneata*;
- p. 546 *E. sydonia* ♂ D is *E. sydonia caresa*; *E. sydonia caresa* is omitted; *E. sydonia* ♂ V is *E. sydonia sydonia*;
- p. 544 *E. carias ninetta* is *E. carias cabira*; *E. carias tenebrosa* is *E. carias cabira*; *E. carias cabira* is omitted;
- p. 541 *E. chlorochroa chlorochroa* [sic] is *E. chlororhoa*; *E. chlorochroa* [sic] *mira* is *E. mira*;
- p. 548 *E. volumna* is *E. v. volumna*; *E. celma* is *E. volumna celma*; *E. venusia* (*E. persephone* is a syn. of *E. v. celma*).
- p. 546 *E. alpais cinara* is *E. alpais alpais*; *E. alpais oreandra* is *E. alpais alpais*; *E. alpais aspasia* is *E. alpais alpais*; *E. alpais vega* is *E. alpais alpais*; *E. excelsa* is *E. alpais excelsa*;
- p. 542 *E. eurota euphemia* is *E. eurota eurota*; *E. eurota dolores* is omitted; *E. pomona amata* is omitted.

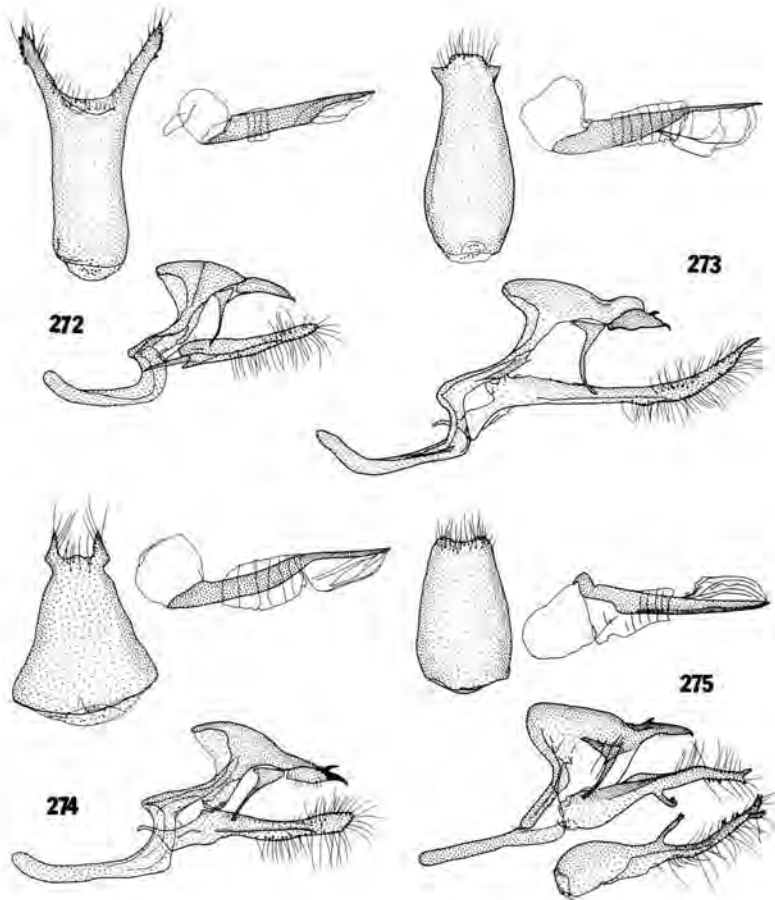
The newly described taxa to be added are as follows: *E. incognita*, *E. interphasis*, *E. marsolia paraensis*; and *E. malvina albida*.



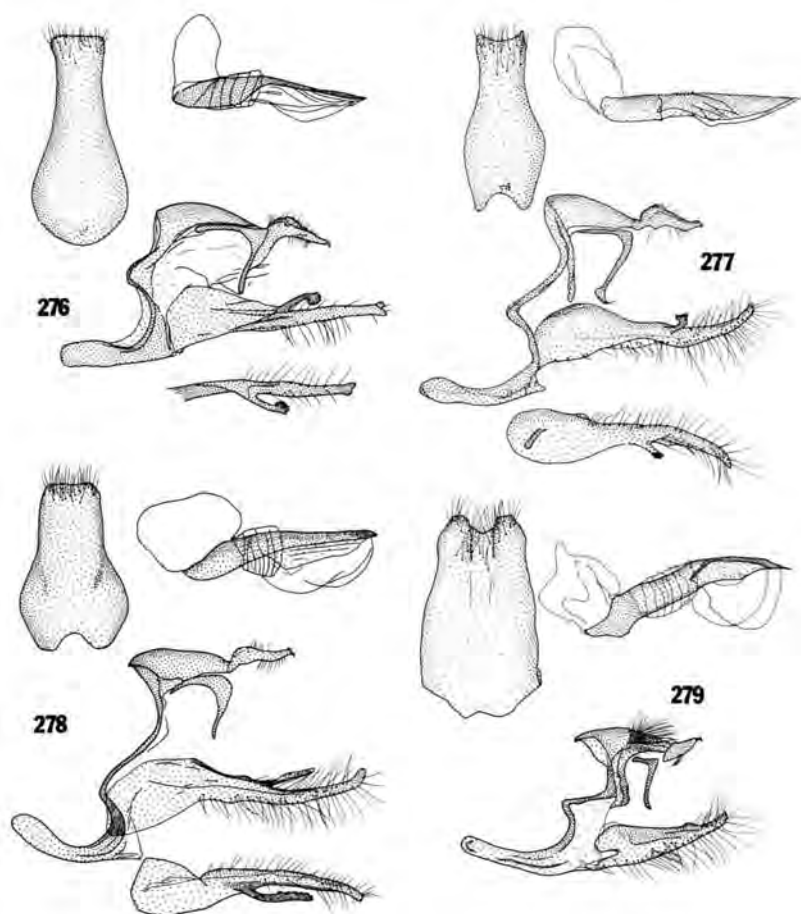
Figures 264-267. ♂ genitalia and hypandria of *Eunica*. 264. *Eunica cuvierii*. 265. *Eunica tatila tatila*. 266. *Eunica tatila tatilista*. 267. *Eunica bechina*.



Figures 268-271. ♂ genitalia and hypandria of *Eunica*. 268. *Eunica evelide*. 269. *Eunica elegans*. 270. *Eunica caelina*. 271. *Eunica olympias*.

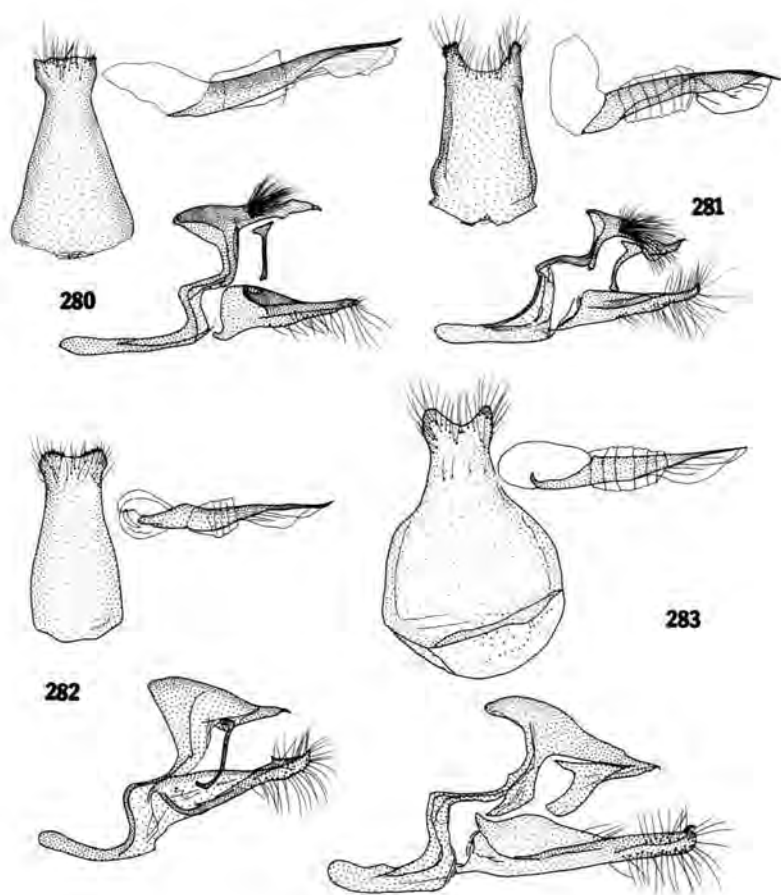


Figures 272-275. ♂ genitalia and hypandria of *Eunica*. 272. *Eunica margarita*. 273. *Eunica eburnea*. 274. *Eunica ingens*. 275. *Eunica interphasis*.

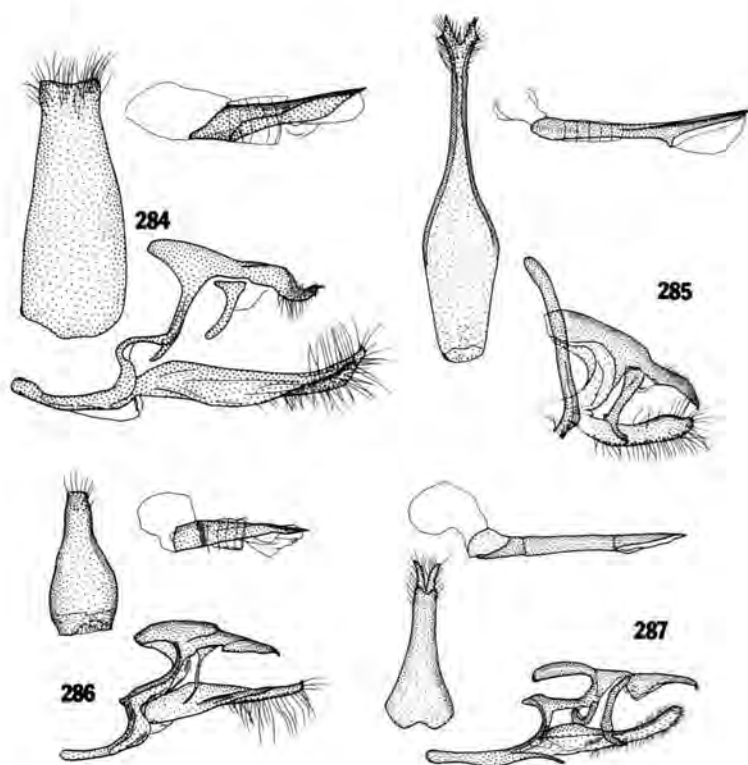


Figures 276-279. ♂ genitalia and hypandria of *Eunica*. 276. *Eunica heraclitus*. 277. *Eunica phasis*. 278. *Eunica macris*. 279. *Eunica amycla*.

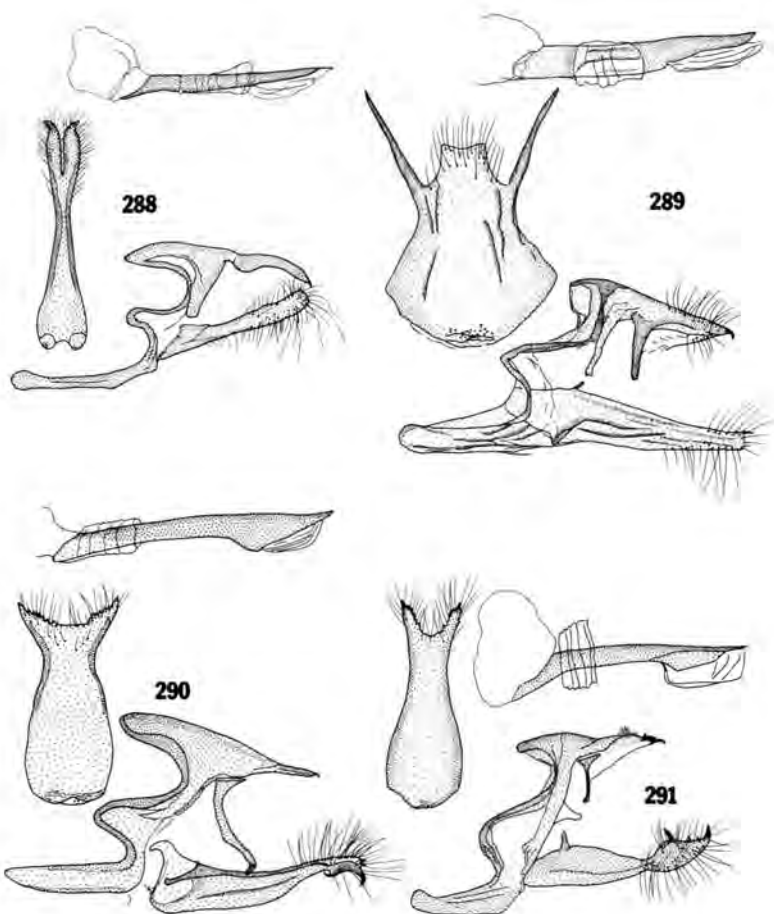




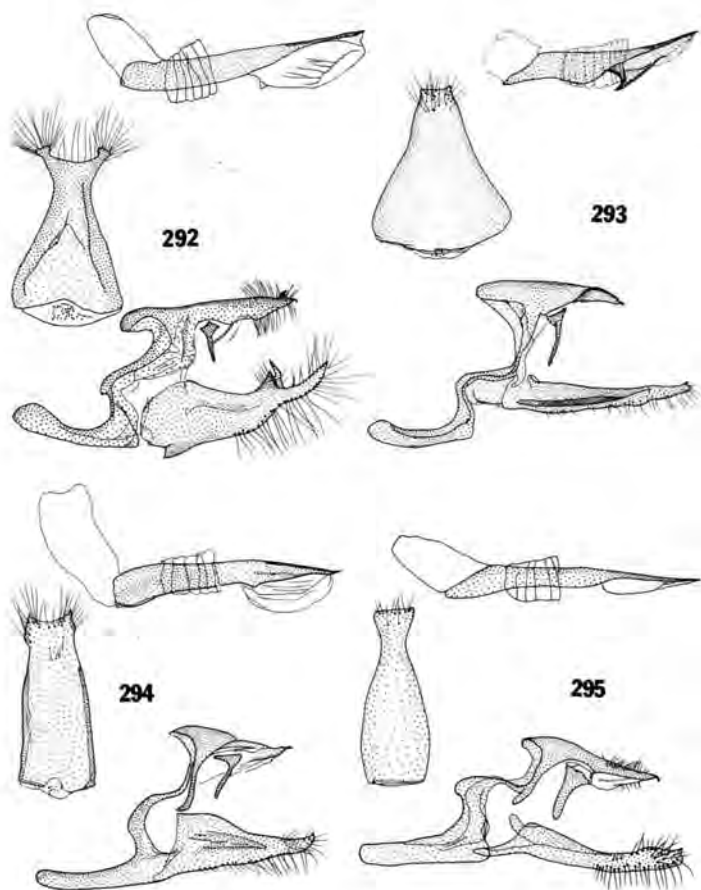
Figures 280-283. ♂ genitalia and hypandria of *Eunica*. 280. *Eunica mygdonia*. 281. *Eunica caralis*. 282. *Eunica maja*. 283. *Eunica anna*.



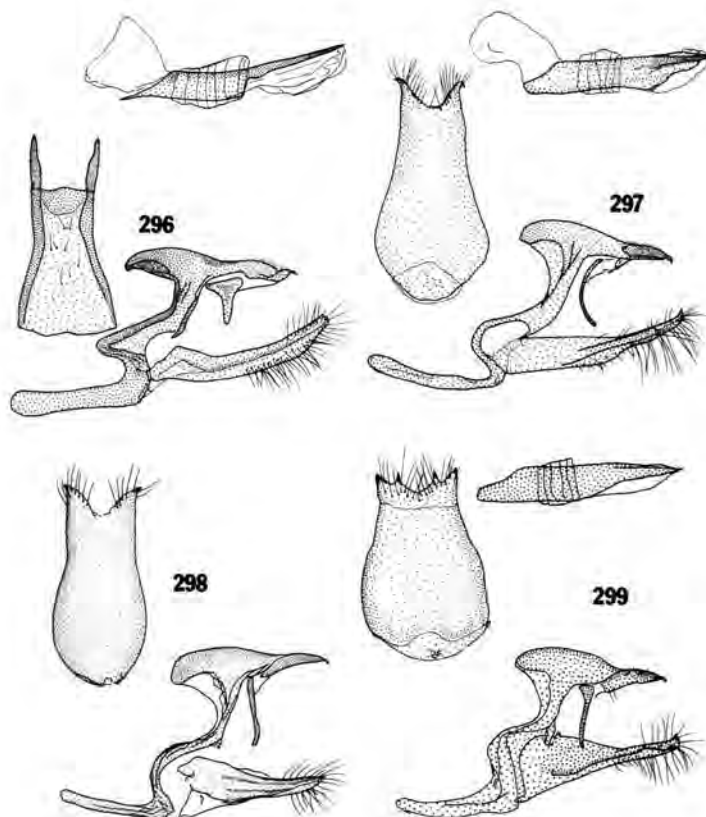
Figures 284-287. ♂ genitalia and hypandria of *Eunica*. 284. *Eunica malvina*. 285. *Eunica concordia*. 286. *Eunica marsolia*. 287. *Eunica monima*.



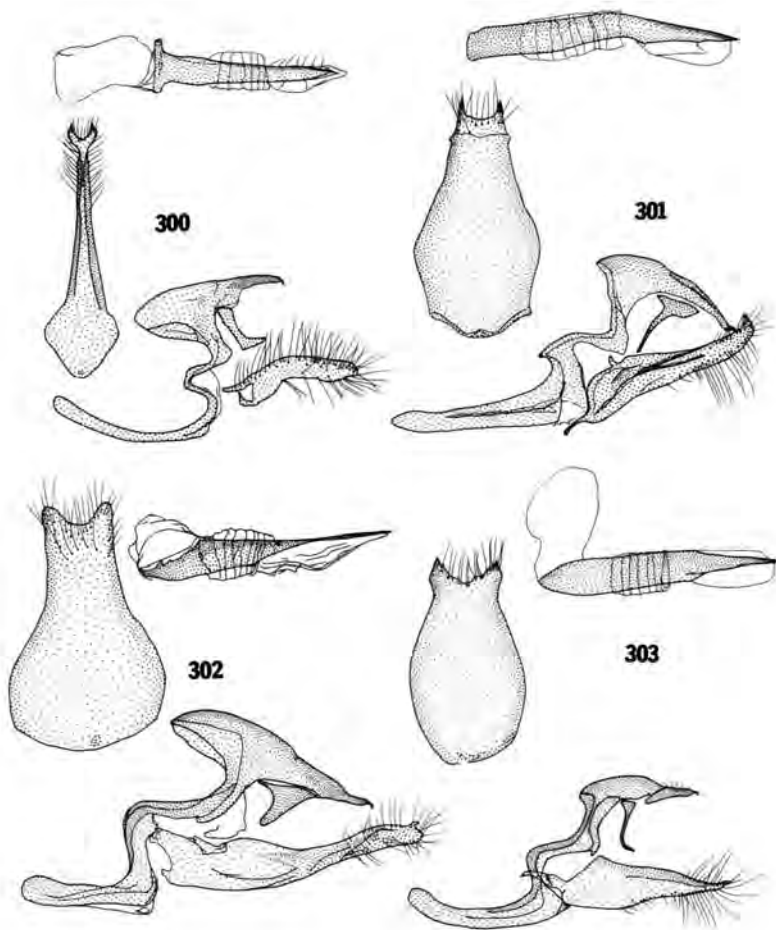
Figures 288-291. ♂ genitalia and hypandria of *Eunica*. 288. *Eunica pusilla*. 289. *Eunica violetta*. 290. *Eunica veronica*. 291. *Eunica clytia*.



Figures 292-295. ♂ genitalia and hypandria of *Eunica*. 292. *Eunica viola*. 293. *Eunica orphise*. 294. *Eunica incognita*. 295. *Eunica amelia*.

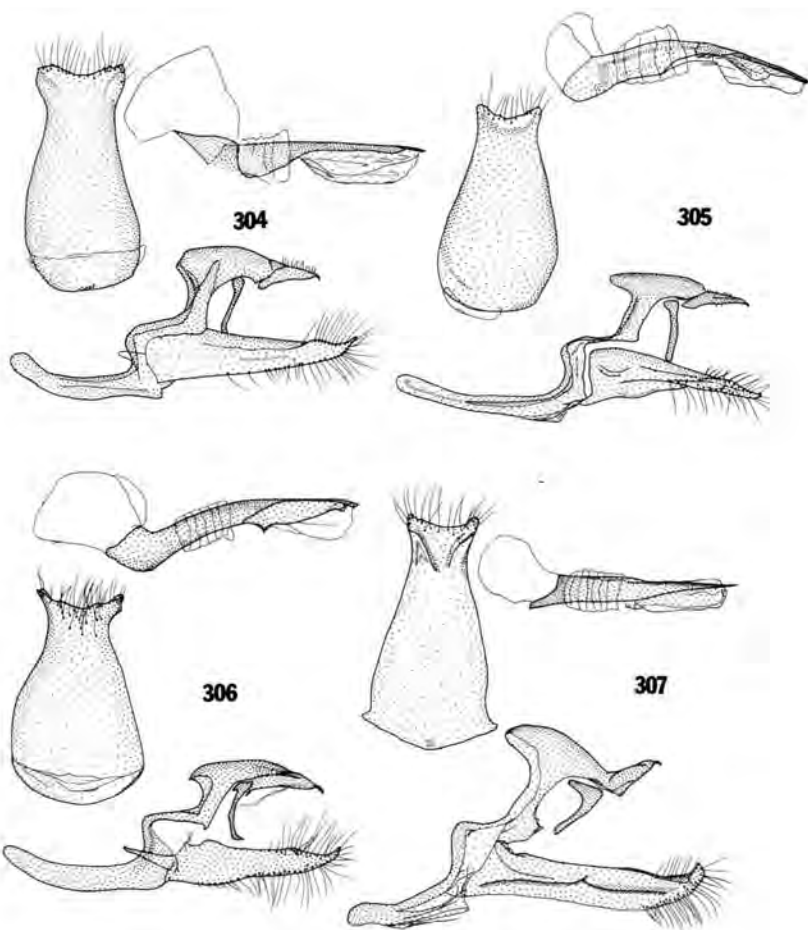


Figures 296-299. ♂ genitalia and hypandria of *Eunica*. 296. *Eunica sydonia*. 297. *Eunica chlororhoa*. 298. *Eunica mira*. 299. *Eunica sophonisba*.

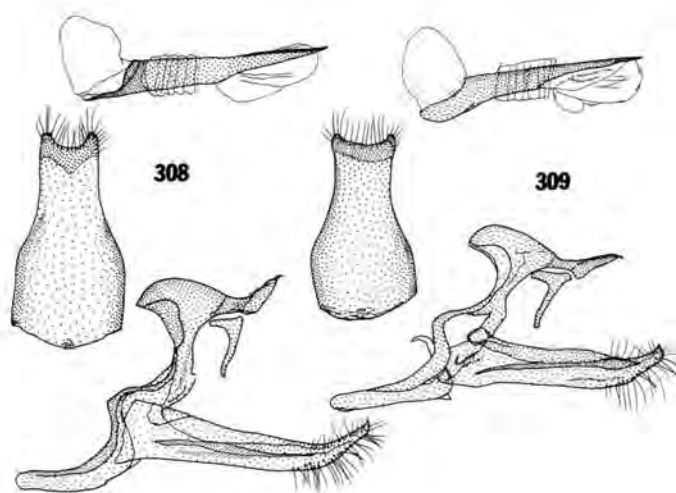


Figures 300-303. ♂ genitalia and hypandria of *Eunica*. 300. *Eunica norica*. 301. *Eunica carias*. 302. *Eunica brunnea*. 303. *Eunica volumna*.

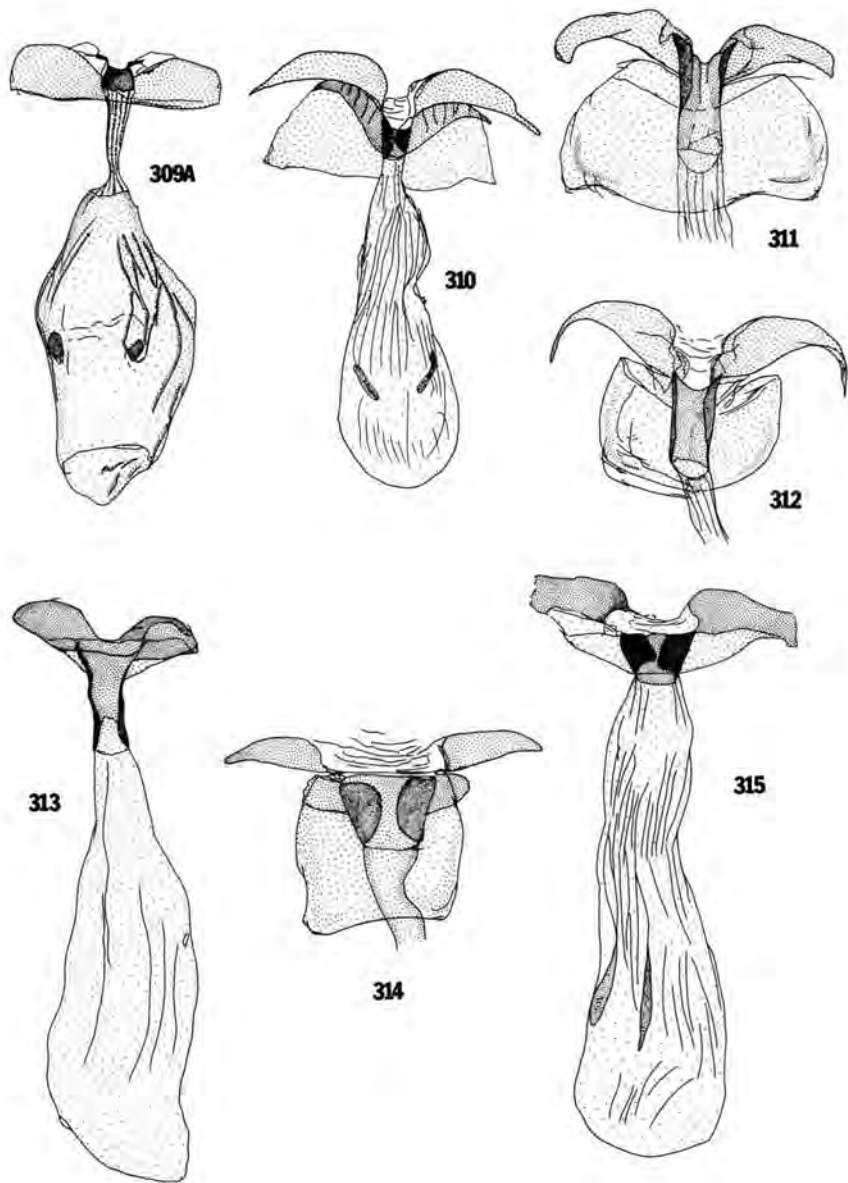




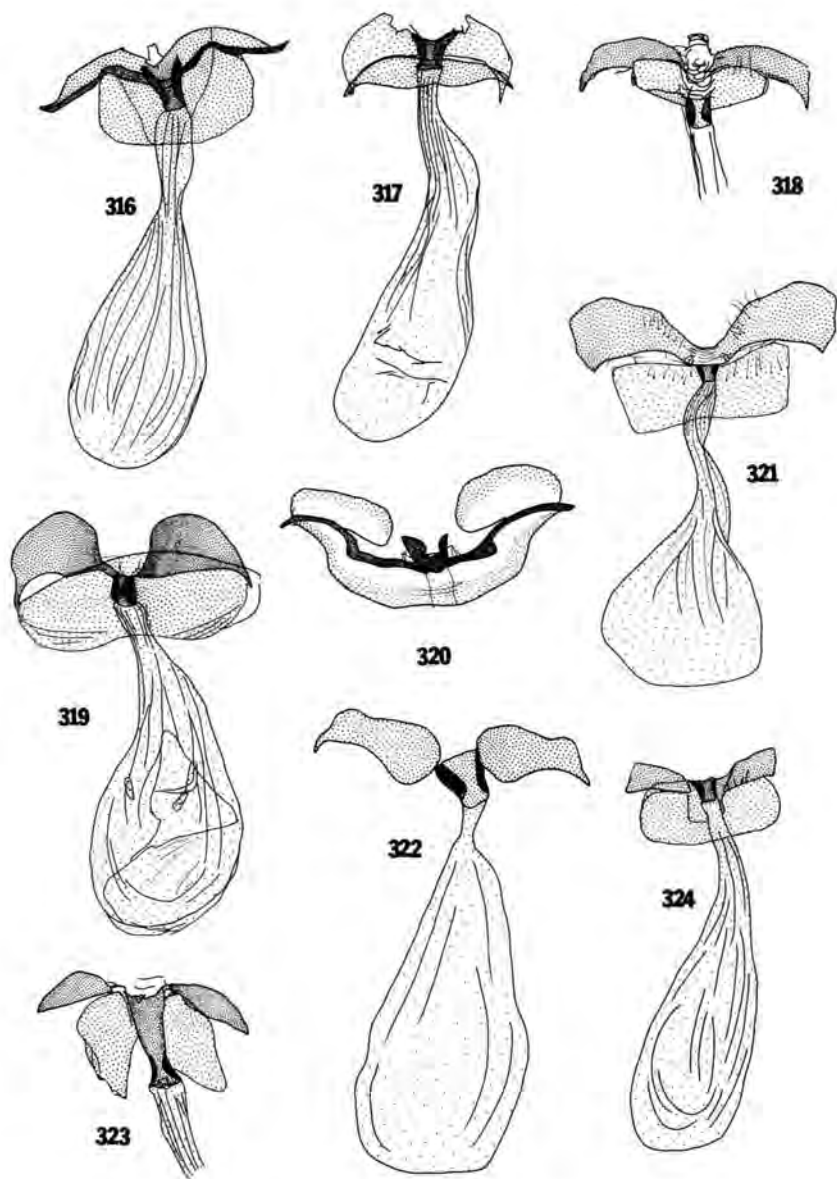
Figures 304-307. ♂ genitalia and hypandria of *Eunica*. 304. *Eunica venusia*. 305. *Eunica alpais*. 306. *Eunica araucana*. 307. *Eunica eurota*.



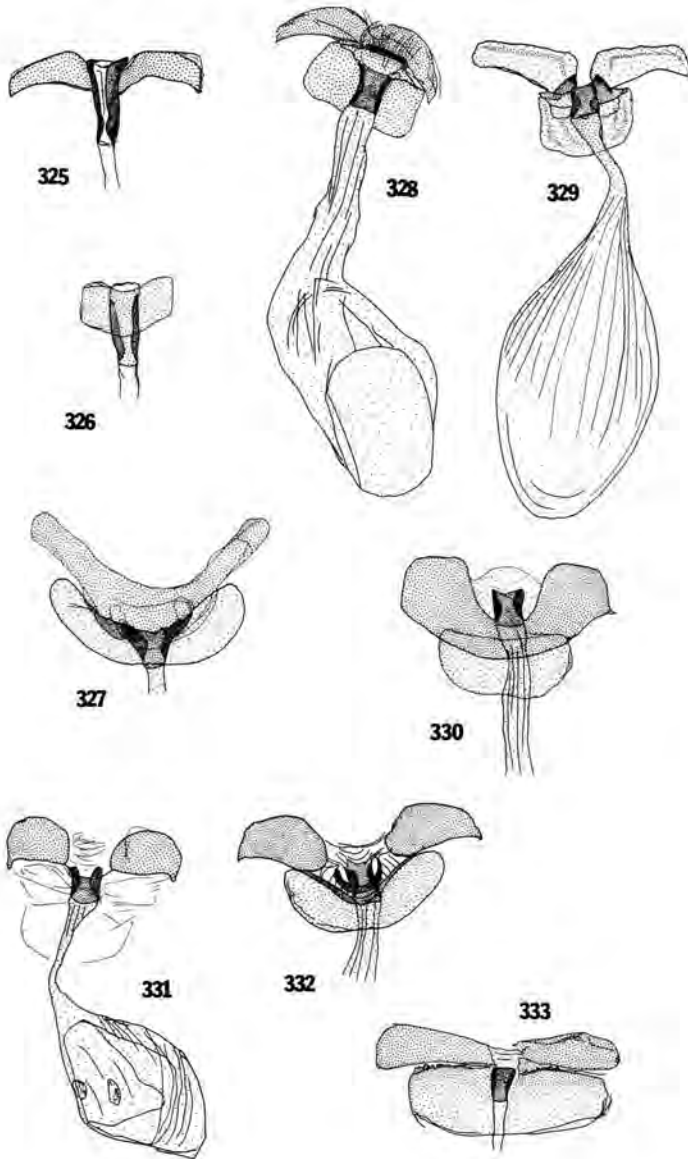
Figures 308-309. ♂ genitalia and hypandria of *Eunica*. 308. *Eunica alcmena*. 309. *Eunica pomona*.



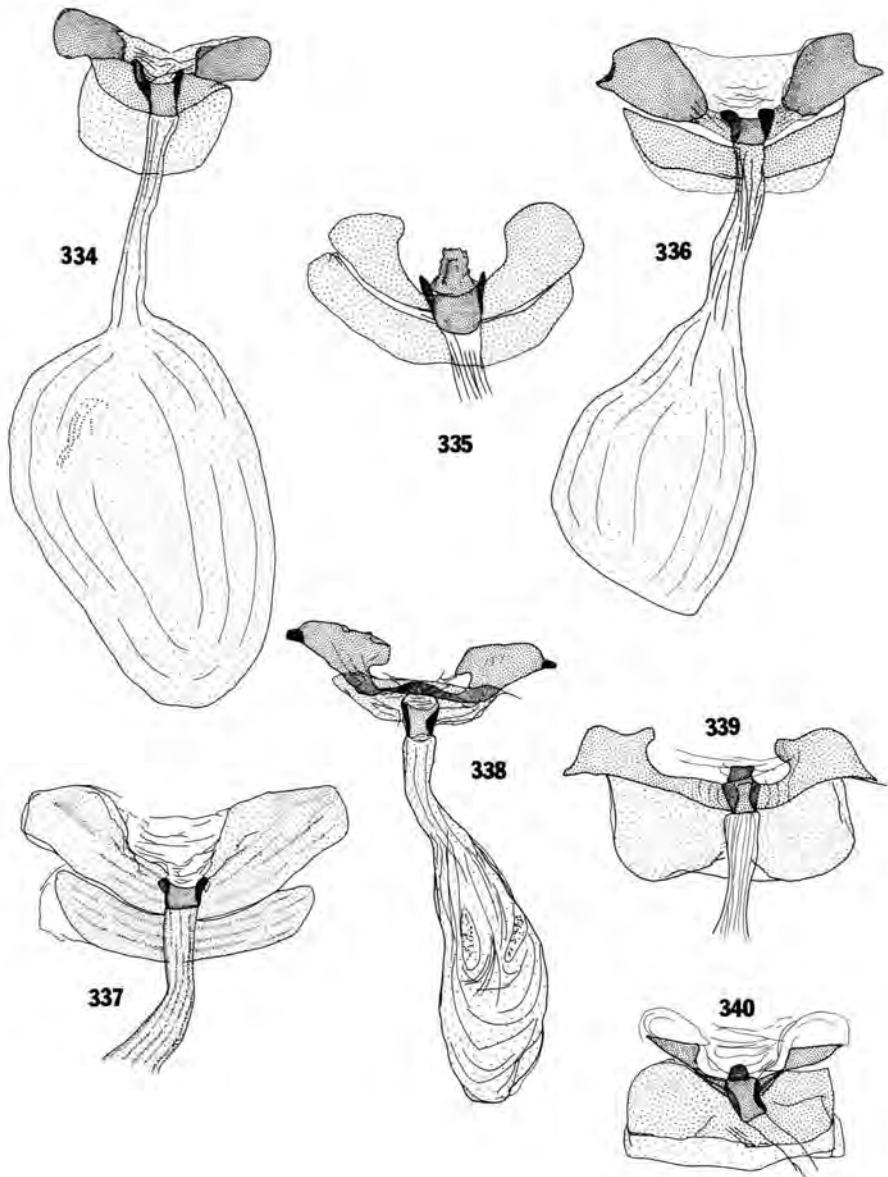
Figures 309a-315. ♀ genitalia of *Eunica*. 309a. *Eunica cuvierii*. 310. *Eunica tatila*. 311. *Eunica bechina*. 312. *Eunica evelide*. 313. *Eunica elegans*. 314. *Eunica caelina*. 315. *Eunica olympias*.



Figures 316-324. ♀ genitalia of *Eunica*. 316. *Eunica margarita*. 317. *Eunica eburnea*. 318. *Eunica heraclitus*. 319. *Eunica phasis*. 320. *Eunica mygdonia*. 321. *Eunica maja*. 322. *Eunica malvina*. 323. *Eunica concordia*. 324. *Eunica marsolia*.



Figures 325-333. ♀ genitalia of *Eunica*. 325. *Eunica monima*. 326. *Eunica pusilla*. 327. *Eunica viola*. 328. *Eunica orphise*. 329. *Eunica sydonia*. 330. *Eunica chlororhoa*. 331. *Eunica mira*. 332. *Eunica sophonisba*. 333. *Eunica norica*.



Figures 334-340. ♀ genitalia of *Eunica*. 334. *Eunica carias*. 335. *Eunica venusia*. 336. *Eunica alpais*. 337. *Eunica araucana*. 338. *Eunica eurota*. 339. *Eunica alomena*. 340. *Eunica pomona*.





Figure 341. Distribution of *Eunica cuvieri*.



Figure 342. Distribution of subspecies of *Eunica tatila*, ■ = *tatila*; ○ = *tatilista*; ● = *bellaria*.

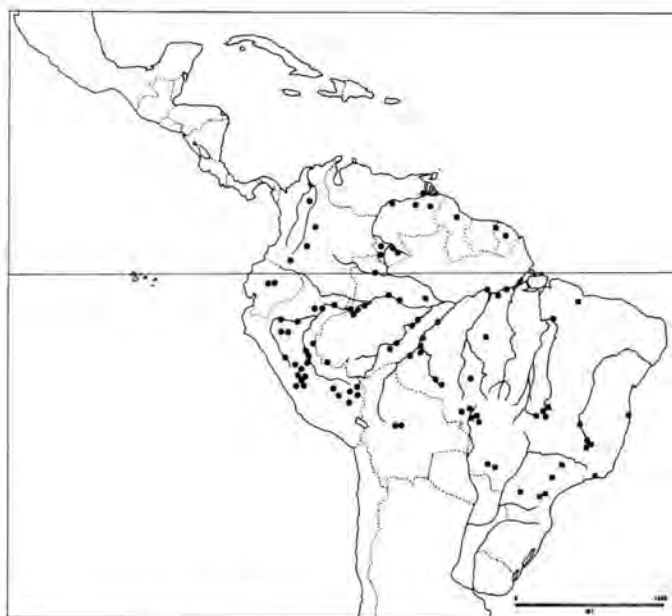


Figure 343. Distribution of subspecies of *Eunica bechina*, ●=*bechina*; ■=*magnipunctata*.

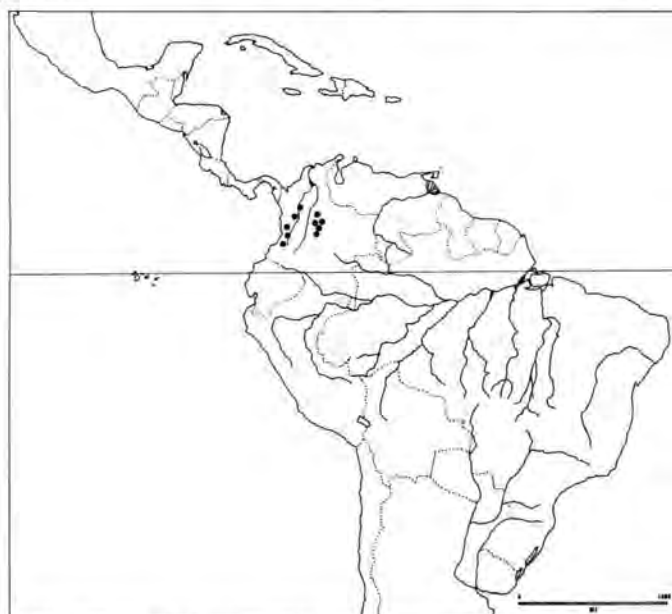


Figure 344. Distribution of *Eunica evelide*.

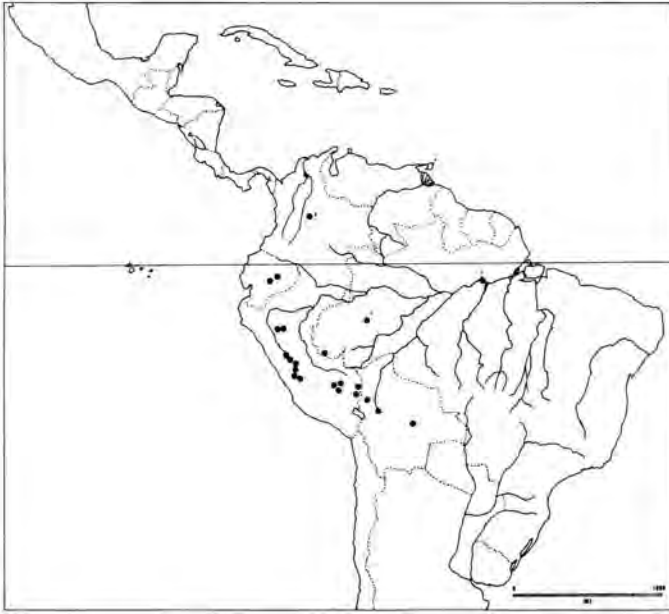


Figure 345. Distribution of *Eunica elegans*.



Figure 346. Distribution of subspecies of *Eunica caelina*, ● = *caelina*; ■ = *alycia*.



Figure 347. Distribution of subspecies of *Eunica olympias*, ○=*olympias*; ●=*augusta*; ▲=*agustina*.

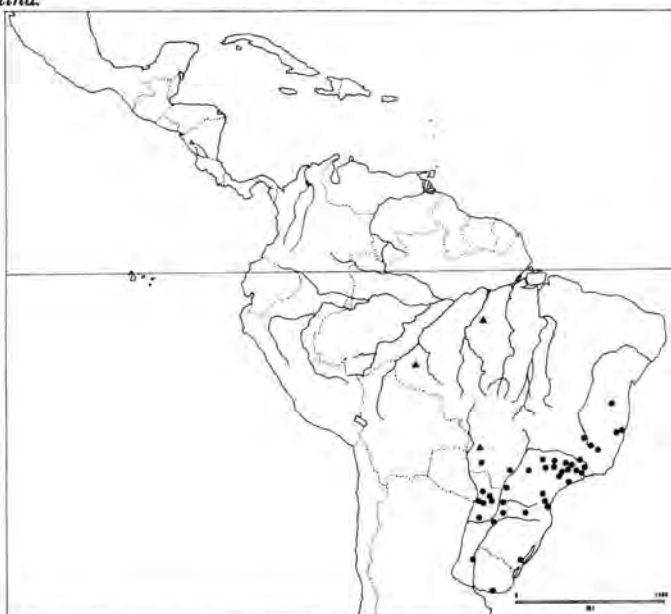


Figure 348. Distribution of *Eunica margarita* ● and *Eunica interphasis* ▲



Figure 349. Distribution of *Eunica eburnea*.

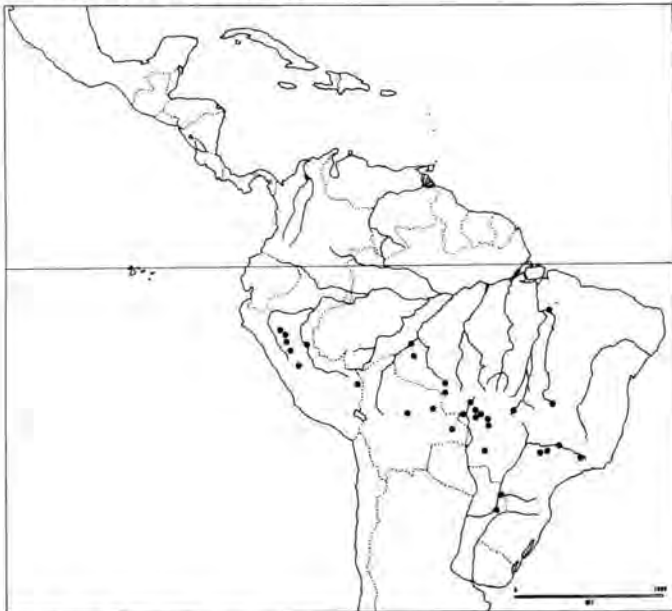


Figure 350. Distribution of *Eunica ingens*.



Figure 351. Distribution of *Eunica heraclitus* ○; *Eunica macris* ●; and *Eunica phasis* ■.



Figure 352. Distribution of *Eunica amycla*.





Figure 353. Distribution of subspecies of *Eunica mygdonia*, ● = *mygdonia*; ○ = *omoa*.

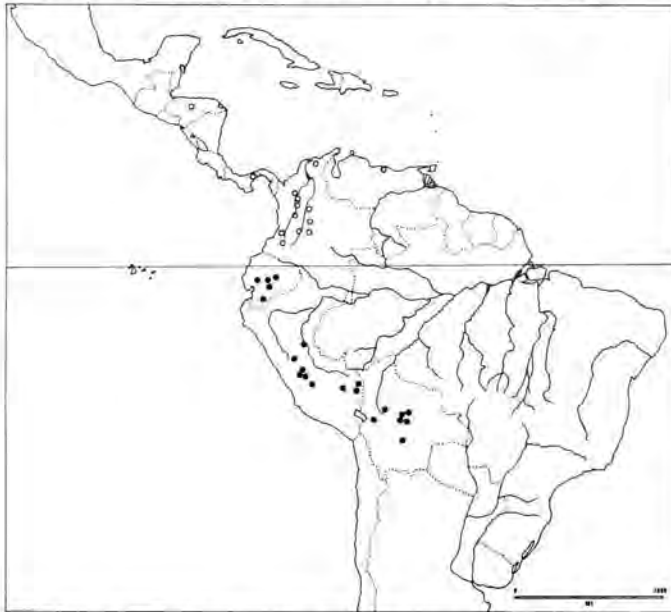


Figure 354. Distribution of subspecies of *Eunica caralis*, ○ = *caralis*; ● = *ariba*.

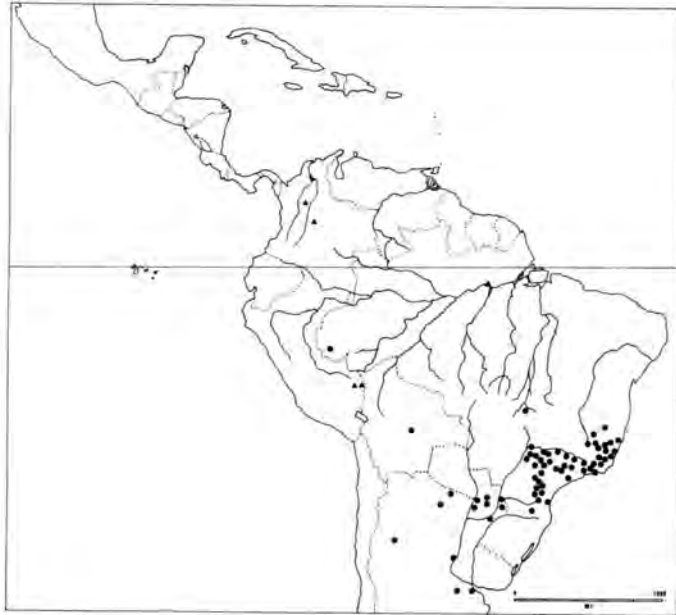


Figure 355. Distribution of subspecies of *Eunica maja*, ● = *maja*; ▲ = *noerina*.

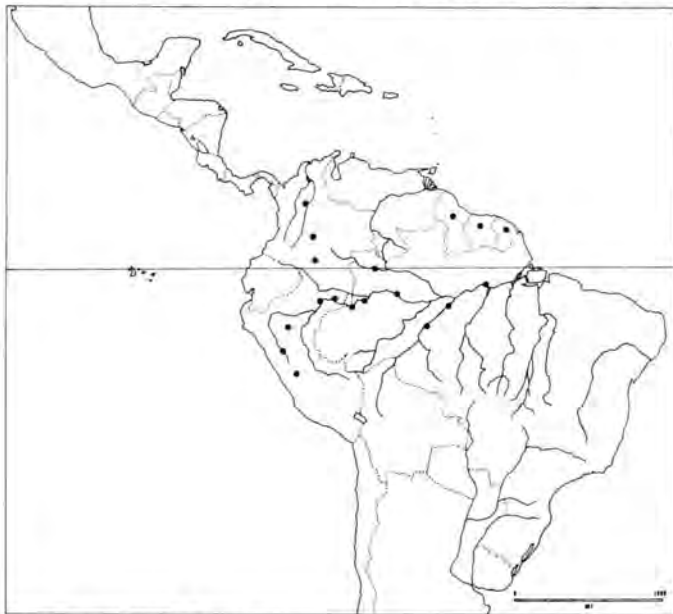


Figure 356. Distribution of *Eunica anna*.



Figure 357. Distribution of subspecies of *Eunica malvina*, ● = *malvina*; ○ = *albida*.



Figure 358. Distribution of *Eunica concordia*.



Figure 359. Distribution of subspecies of *Eunica marsolia*, ○ = *marsolia*; ● = *fasula*; ■ = *paraensis*.



Figure 360. Distribution of *Eunica monima*.

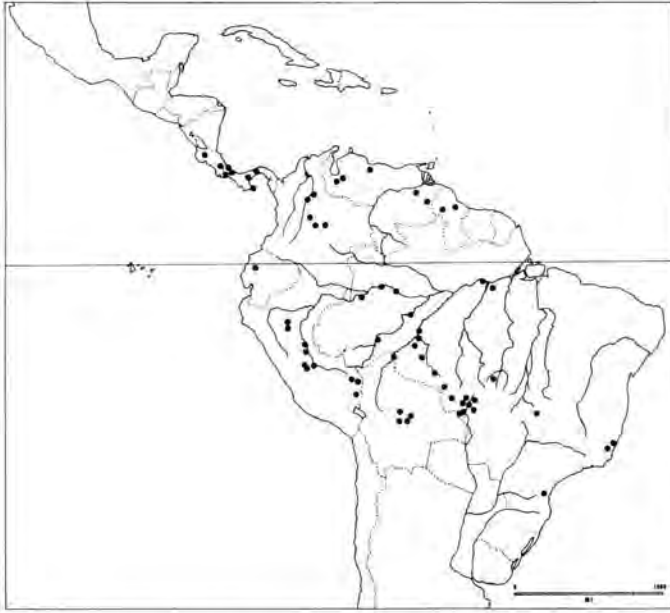


Figure 361. Distribution of *Eunica pusilla*.

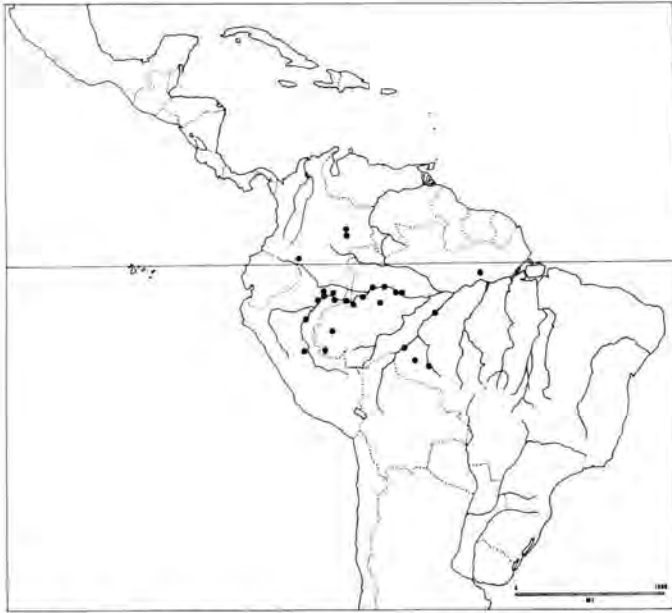


Figure 362. Distribution of *Eunica veronica* ● and *Eunica violetta* ■.



Figure 363. Distribution of *Eunica clytia*.



Figure 364. Distribution of *Eunica viola*.



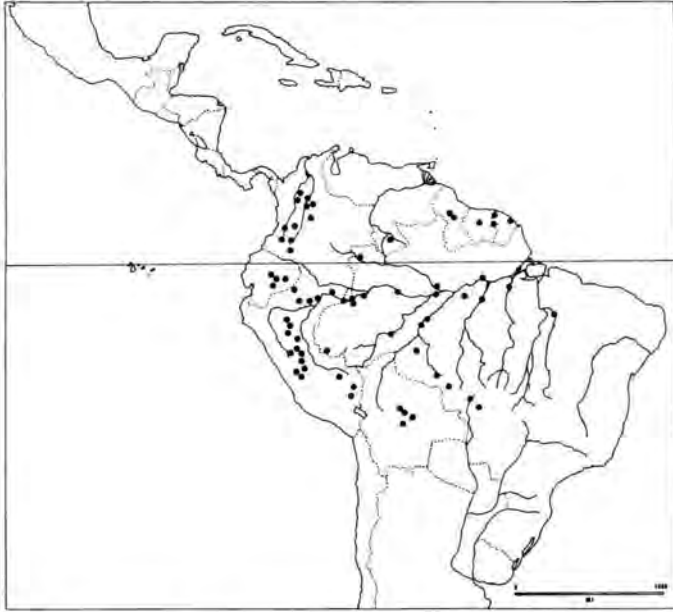


Figure 365. Distribution of *Eunica orphise*.



Figure 366. Distribution of *Eunica incognita*.

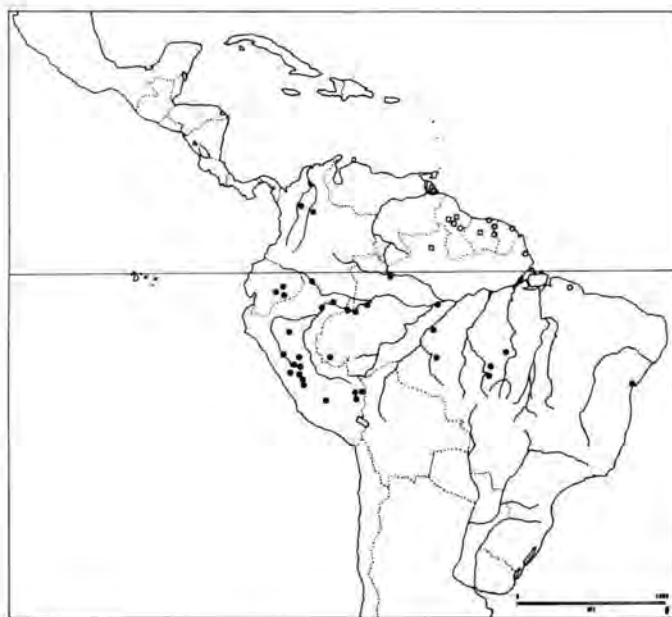


Figure 367. Distribution of subspecies of *Eunica amelia*, ○ = *amelia*; ● = *erroneata*.



Figure 368. Distribution of subspecies of *Eunica sydonia*, ● = *sydonia*; ○ = *caresa*.

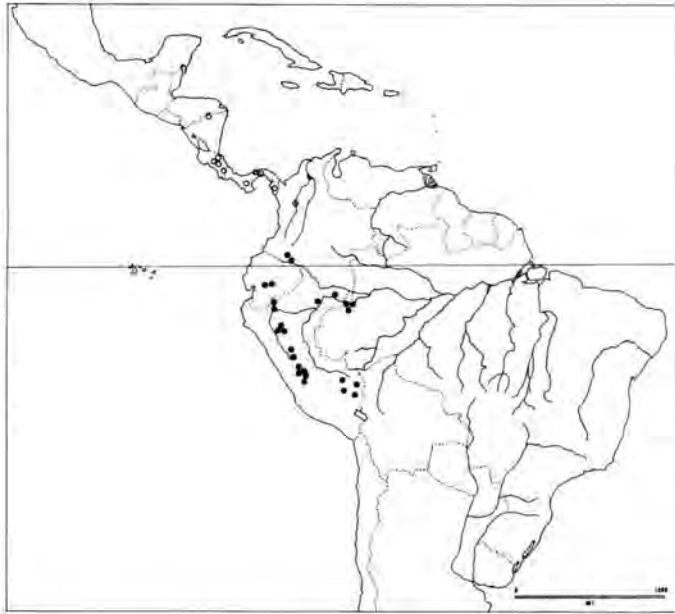


Figure 369. Distribution of *Eunica chlororhoa* ● and *Eunica mira* ○.

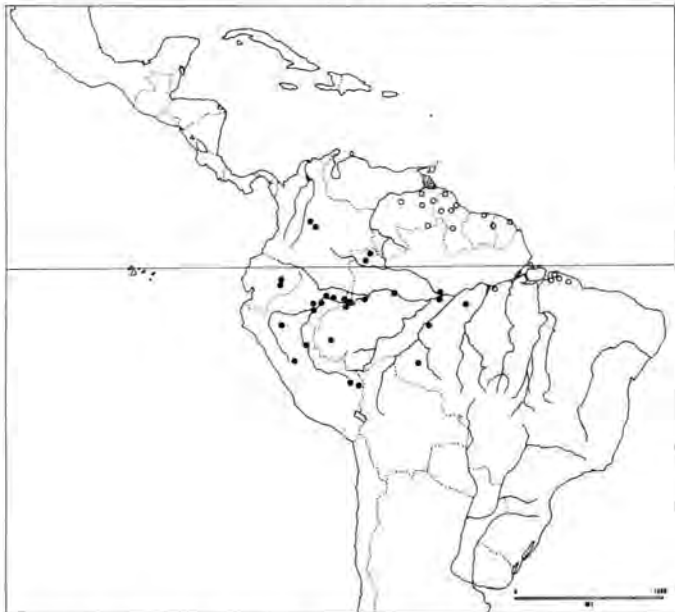


Figure 370. Distribution of subspecies of *Eunica sophonisba*, ○ = *sophonisba*; ● = *agele*.

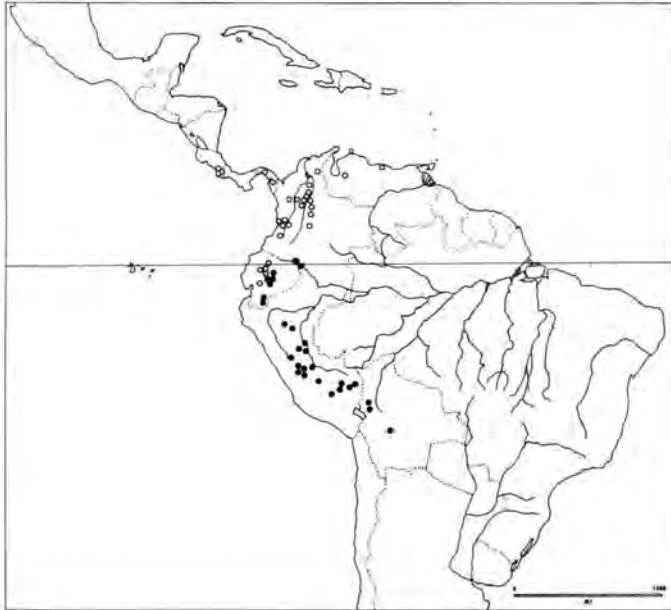


Figure 371. Distribution of subspecies of *Eunica norica*, ○ = *norica*; ● = *occia*.

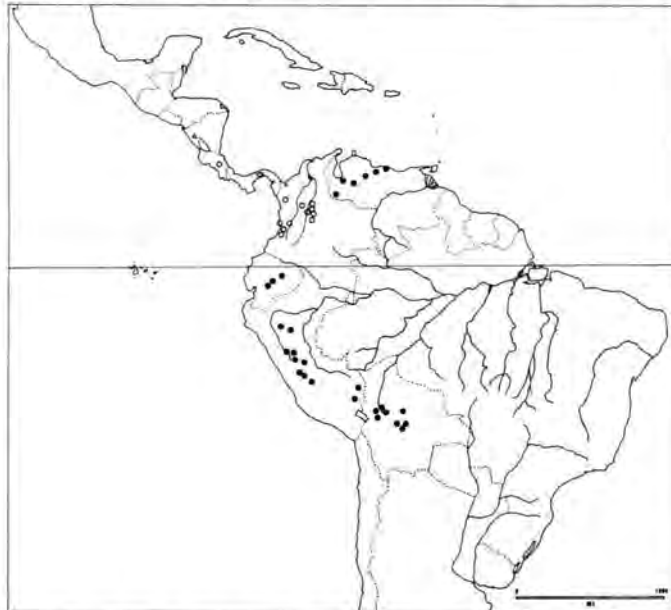


Figure 372. Distribution of subspecies of *Eunica carias*, ○ = *carias*; ● = *cabira*.



Figure 373. Distribution of *Eunica brunnea*.

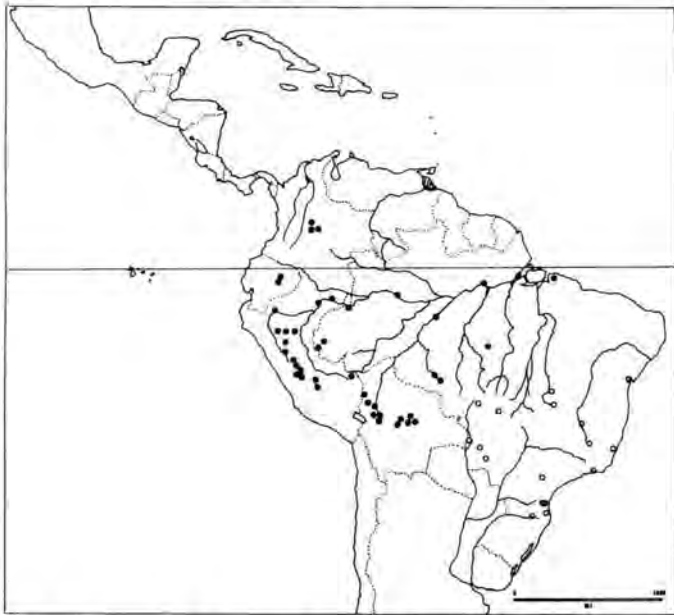


Figure 374. Distribution of subspecies of *Eunica volumna*, ○ = *volumna*; ● = *celma*.

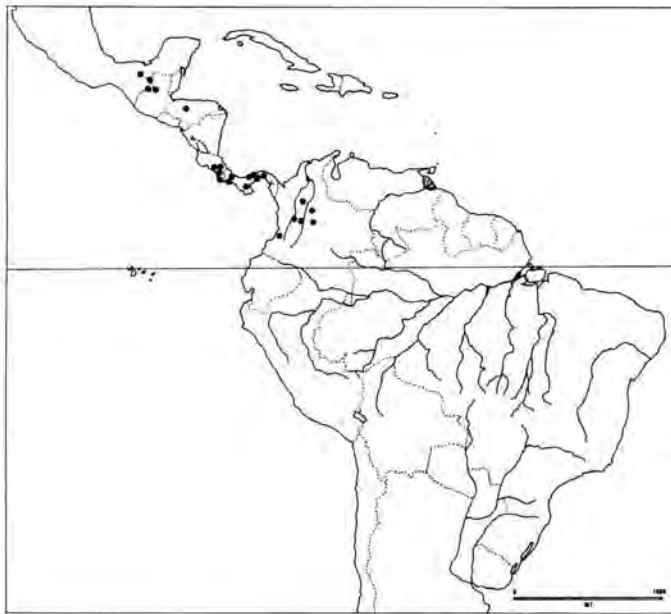


Figure 375. Distribution of *Eunica venusia*.



Figure 376. Distribution of subspecies of *Eunica alpais*, ● = *alpais*; ○ = *excelsa*.





Figure 377. Distribution of *Eunica araucana*.



Figure 378. Distribution of subspecies of *Eunica eurota*, ● = *eurota*; ○ = *dolores*.



Figure 379. Distribution of subspecies of *Eunica alcmena*, ○ = *alcmena*; ● = *flora*.



Figure 380. Distribution of subspecies of *Eunica pomona*, ● = *pomona*; ■ = *amata*.

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\*Dale W. Jenkins  
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