

BUTTERFLIES (LEPIDOPTERA: PAPILIONOIDEA) ATTRACTED TO TREE SAP (O EXUDATES) IN COLOMBIA*

Julián A. Salazar-E.¹

Resumen

A preliminary checklist is presented of fruit-feeding butterflies that visit the exudation of seven species of trees observed in several zones of Colombia. Additional data on secretion types, composition, butterfly behavior and the other insects sharing the same phenomena are included.

Palabras clave: feeding, Colombia, exudations, Coleoptera, Hymenoptera, food guild, proboscis.

MARIPOSAS ATRAÍDAS POR EXUDACIONES DE CORTEZAS DE ÁRBOLES EN COLOMBIA (LEPIDOPTERA: PAPILIONOIDEA)

Abstract

En este trabajo se publica una lista preliminar de especies de mariposas frugívoras, que se alimentan de exudados segregados por las cortezas de siete especies de árboles existentes en varias regiones de Colombia. Adicionalmente, se suministran datos de los tipos de secreciones, composición, hábitos de las mariposas y de otros insectos que comparten dicho fenómeno.

Key words: alimentación, Colombia, exudación, Coleoptera, Himenoptera, gremios alimenticios, proboscis.

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¹ Facultad de Ciencias Exactas y Naturales, Programa de Biología, Universidad de Caldas, julianadolfoster@gmail.com

INTRODUCTION

The Lepidoptera with their variety of colors and hyper diverse wing patterns are the most conspicuous species within the class Insecta. Almost all species have specialized eating habits using a proboscis, the tubular mouth parts evolved for the absorption of liquids or diluted foods (Fig. 1) (SCOBLE, 1995). The singular morphology of the proboscis is related to the feeding habits of adult Lepidoptera and the substrates on which they feed and is evident in both Rhopalocera (Glossata) and Heterocera (MOLLEMAN *et al.*, 2005, 2010; KRENN, 2010; ZENKER *et al.*, 2010). The last author details the proboscis of several butterfly species with electron microscopy images, illustrating the differences of those that feed on the nectar of flowers, pollen feeders and those that feed on rotting fruit, finding significant differences in the structures of the different groups studied. Likewise there are studies of sections of the functional mechanism and related muscles that act during the feeding process.

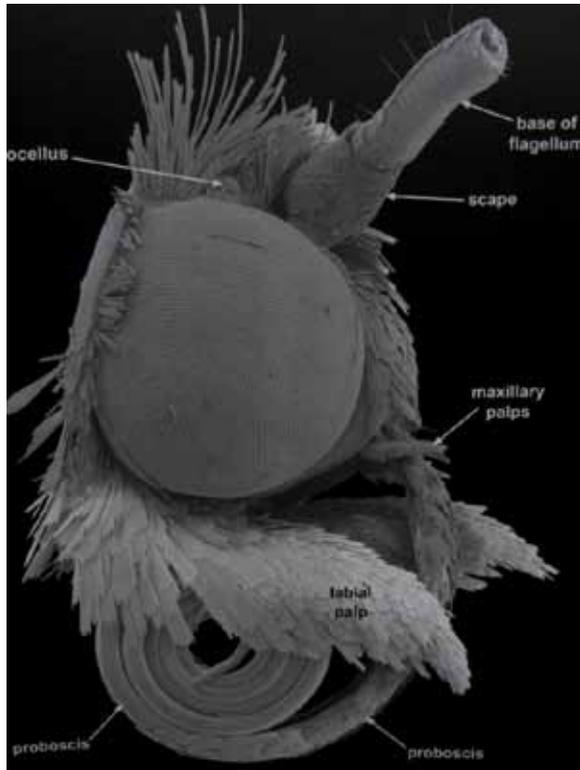


Figure 1. Butterfly head showing mouthparts and the coiled proboscis (after SCOBLE, 1995).

Other related works have treated, in addition to the morphological characters, such aspects as habits the communities of Lepidoptera have adapted and the use of certain food resources for adult diet benefits (NORRIS, 1935; HALL & WILLMOTT, 2000; BOGGS & DAU, 2004; MOLLEMAN *et al.*, 2005; RIBEIRO *et al.*, 2010). However what is not well known are those Neotropical species that have the predilection, in addition to feeding on fermented fruits, of imbibing the exudates or secretions from tree bark. These exudates are a resource of additional energy, rich in nutrients and are highly appreciated by insects, and include representative species of Lepidoptera. The objective of this work is to identify some of these butterflies in Colombia that specialize in this type of substrate and also the trees that have the property of secreting surface bark exudates.

PRELIMINARY DATA

Studies on the attraction of butterflies and other insects to tree exudates are scarce, and appear sporadically cited or illustrated in informative works about butterflies (HOLLAND, 1922; KLOTS, 1960; OWEN, 1971; SCOBLE, 1995; FRANCINI, 2010). For example, NORRIS (1935) mentions that sap exudates from wounded tree bark attracts several species of Nymphalid butterflies, and by feeding on those liquids become completely intoxicated and unable to fly. In this same context is the pioneer work of FOX-WILSON & HORT (1926) which is a detailed study of the insects that visit sap exudates from trees in Europe. They note that the most common species with this habit is *Vanessa atalanta* (L.), besides other records for *Vanessa antiopa* (L.) and *Vanessa polychloros* (L.) (BENSON, 1877; PEACHELL, 1900). Other species with the same known behavior are *Vanessa c-album* (L.), *Limenitis camilla* (Scudder), *Argynnis pandora* Schiff., *Apatura iris* (L.), *Satyrus* sp. and also the Lycaenidae *Zepyrus quercus* (L.) (FOX-WILSON & HORT, 1926; NORRIS, 1935).

In tropical environments of Africa the butterflies of the genus *Charaxes* are strongly attracted to these exudates, as documented in KNOLL (1921), TRIMEN (1862-1866), SCHULTZE (1916) and more recently VANE-WRIGHT (2003) *et al.* KRENN (2008) found in an area of Costa Rica and Panamá a wide variety of butterfly feeding habits and discriminated them into categories of species that feed on the nectar of flowers, pollen, blood, sweat, rotten fruit, carrion, excrement and tree sap exudates. The author states that there are representatives of the Nymphalidae family which never consume nectar in the course of their life, but only fruit juices, fungi and plant exudates. This specialized group constitutes about 40 to 55% of all tropical forest Nymphalidae butterflies DE VRIES (1987), those which have a proboscis morphology particularly adapted for this purpose. Most of them can uptake liquids by rubbing the proboscis on wet surfaces (Fig. 2), while the Charaxinae butterflies can drill through the skin of decomposed fruits (KRENN *et al.*, 2001; MOLLEMAN *et al.*, 2005). This guild in tropical areas is mainly comprised of the Charaxinae, Morphinae, Brassolinae, Satyrinae, Biblidinae and Limenitidinae, all subfamilies of nymphalids butterflies (DE VRIES, 1988; SHAHABUDDIN & TERBORGH, 1999; DE VRIES & WALLA, 2001; FREITAS & BROWN, 2004; RIBEIRO *et al.*, 2010; DE VRIES *et al.*, 2012).



Figure 2. *Caligo oileus scamander* (Bsd.) feeding on the exudate of an Aguacate tree (J.A. Salazar photo).

BACKGROUND IN COLOMBIA

The author's first experience of this phenomena was in March of 1987 during a visit to the biological station of the Organization for Tropical Studies (OTS) in Costa Rica. A *Panacea prola lysimache* (G. & S.) female, males of *Prepona laertes octavia* (Hbn) and *Opsiphanes* spp., were seen feeding on exudates of a unknown tree. Specific observations in Colombia are rare; VÉLEZ & SALAZAR (1991) and ANDRADE (1998) refer to the feeding habits of butterflies according to substrate or food guild groups but do not mention those that feed on tree sap. URIBE & SALAZAR (1998) note some species sighted at Caño Limón, Arauca, such as *Archaeoprepona demophon* (L.), *Colobura dirce* (L.), and *Opsiphanes cassina* ssp. feeding on exudates of small trees. SALAZAR *et al.* (2003) mentioned that certain species of trees secrete a sweet fluid from the bark that may be more effective than traps to capture butterflies, as it happened in a region of the Eastern Cordillera. Also detailed in this paper was the observation of *Agrias amydon amaryllis* Mich., *A. amydon athenais* Fruhst., and *Prepona pylene jordani* Fruhst., attracted to exudates in the Western Cordillera. OROZCO *et al.* (2009) found 9 species of fruit feeding butterflies in the southwest of Antioquia, one of them (*Colobura dirce* L.) was cited feeding on decomposed fruit, bark exudates and the droppings of mammals.

GARCÍA *et al.* (2002) states that adults in the subfamily Charaxinae inhabit the forest canopy and feed on fermented fruits, decomposing organic material, mammal excreta and tree exudates that produce acetyl ferments from the wounds caused by boring insect. Finally VALENCIA *et al.* (2005) cited the following species that feed on exudates of unidentified trees: *Archaeoprepona amphimachus* (L.), *Fountainea*

glycerium (Dbl), *Memphis philumena indigotica* (Salv.), *Colobura dirce* (L.), *Historis orion dious* (Lam.), *Panacea prola* (Dbl.), *Consul fabius cecrops* (Dbl.) and *Opsiphanes quiteria cauca* (Rob). The authors also assert that *Prepona philipponi* (LM.) feeds on exudates, visits bee (Meliponini) honeycombs and imbibes the honey spilled on the crevices of logs, and that *Siderone galanthis* (Cr.) adults feed on exudates from wounds of the bark of "Yarumo" (*Cecropia* spp.), Cecropiaceae trees.

MATERIALS AND METHODS

Observations were carried out in the Municipality of Riosucio, Caldas (Vereda Aguacatal, La Iberia and Loma Las Brujas) located between 1510 and 1750 masl. Additionally in other locations the phenomena was observed in places such as Bajo Tablazo-Manizales, El Arroyo-Villamaría, and in the Eastern Cordillera at Chirajara located in the Municipality of Guayabetal at 1200 masl. Dates include: April 2, 21-30, May 1, 7 and 15, July 5, November 6, 7, 13, 14, and 15 of 2011, March 26 and April 20, 2013. Butterflies feeding on trees exudates were photographed with a Canon Power-Shot 480A of 10.0 megapixels and a Canon Eos 3000 N. Observed species were identified visually but were not captured. The reference material is deposited at the Museum of Natural History, University of Caldas (MHN-UCa).

Secretions were collected in 2 cm plastic vials and preserved on ice. The samples were analyzed at the biochemistry laboratory at the University of Caldas by thin layer chromatography. The samples were diluted in 1.5 ml of ethanol and then placed in a silica chromatographic plate (2.5 cm wide x 5 cm. high) and wet with a mixture of hexane and ethyl acetate for 4 minutes. A UV lamp was also used to reveal any additional composition. Butterfly taxonomy follows the classification of LAMAS (2004) except for some recently described species (SALAZAR & CONSTANTINO, 2001; ORTIZ-ACEVEDO & WILLMOTT, 2013; MAIA-SILVA, 2013). SARMIENTO (1994), MARTÍNEZ (2000) and SUÁREZ & AMAT (2007) papers were consulted for the other groups of arthropods. The trees were identified with the help of PÉREZ-ARBELÁEZ (1996), MURILLO (2000), CAMPOS *et al.* (2008), CENICAFÉ (2010) and the Herbarium at the University of Caldas.

RESULTS

1) Trees that secrete exudates

Exudates found on certain tree bark are produced as a response to mechanical wounds caused by animal and human actions or pathological processes (BAXTER, 1952). In the first case an example is the well-known extraction process of latex from the bark of the rubber trees *Hevea brasiliensis* M.R. (Euphorbiaceae) (DOLIWA, 2008). Pathogens or diseases are recognized by various symptoms that show on the bark and cause fluids to leak from the tissues, according to MARSHALL-WARD (1901) this reveals the abnormal state of the tree, often due to bacteria present in the wound caused by mechanical damage, insects and fungi (*Phytophthora* spp.). The author includes in this treatise on the diseases of plants a special chapter on exudation and rot, including the phenomena of tumescence, decomposition, humidity, acidification, dew, gomosis and the emergence of diverse workflows that

facilitate a profuse or permanent exudation in the barks. In Colombia eight species of trees have been registered as producers of bark secretions whose fermentation was attractive to butterflies and other orders of insects (Figs. 3-4).



Figure 3. An Aguate tree showing the trunk affected by exudations (dark areas) (J.A. Salazar photo).



Figure 4. An Escobo tree with exudates (dark areas) and a female of *Rydonia pasibula* (Dbl.) feeding on the sap (J.A. Salazar photo).

However this phenomena is common also in many species of trees that secrete fluids and do not attract any type of arthropod feeding (see Tabs. 1 and 2).

Table 1. Tree species detected with butterflies feeding on the exudates.

Tree	Family	Spanish Common Name
<i>Eucalyptus globulus</i> Labill.	Myrtaceae	Eucalipto
<i>Salix humboldtiana</i> Mol. Willd	Salicaceae	Sauce
<i>Sapindus saponaria</i> L.	Sapindaceae	Chumbimbo
<i>Alchornea bogotensis</i> Pax-K.	Euphorbiaceae	Escobo
<i>Persea</i> sp.	Lauraceae	Aguacatillo
<i>Persea gratissima</i> Gaerth.	Lauraceae	Aguacate
<i>Quercus</i> sp.	Fagaceae	Castaño-Gavilán
<i>Citrus</i> spp.	Rutaceae	Naranjo

Table 2. Other species of trees which produce exudates, but are not attractive to butterflies.

Tree	Family	Spanish Common Name
<i>Eucalyptus pulverulenta</i> Sins.	Mirtaceae	Eucalipto
<i>Eriobotrya japonica</i> Ldl.	Rosaceae	Níspero del Japón
<i>Pinus patula</i> Shiede	Pinaceae	Pino
<i>Araucaria excelsa</i> Rob-Br.	Araucariaceae	Araucaria
<i>Acacias</i> sp.	Mimosaceae	Acacia
<i>Juglans</i> sp.	Juglandaceae	Cedro Negro
<i>Bombacopsis</i> sp.	Bombacaceae	Ceibo
Species unknown 1		
Species unknown 2		

TYPES OF EXUDATES

O'GILVIE (1924) observed several types of exudates on the bark of Elm trees, Chestnuts and Apples in Europe. He found mud red flows and another of a whitish color appearing in elms and willows. Bacteria and other organisms were detected in both types including *Fusarium*, *Isaria*, *Torula*, *Alternaria* etc. and yeasts (*Oospora*, *Verticillium*, *Chlorella*). In this work exudate types are categorized by their consistency: melosa (pines), resinous (eucalyptus, cedro, acacia), gummy (araucaria), gelatinous (unknown tree), viscose (aguacate, níspero, ceibo) and frothy (aguacate, escobo) (Figs. 5-10). The last, like some resins such as Eucalyptus and Willow, were attractive assets to butterflies.

**Fig. 5.** Exudation on a Pine tree.**Fig. 6.** Exudation on a Eucaliptus tree.

Composition

According to FOX-WILSON & HORT (1926) the tree sap mostly contains variable amounts of sugar, which is easily fermented and produces in the company of several yeasts, alcoholic products. Sparkling exudates have been detected from reduced sugar and from that not reduced as fructose, glucose, dextrose and levulose (maltose) (OMURA *et al.*, 2011) in an acidic reaction (pH 4-5), especially in the viscous exudate of Oak and also contained insoluble components composed of cellulose. A preliminary chromatographic analysis of the foamy secretion from the bark of the "Escobo" tree revealed polyphenol compounds.



Fig. 7. An Acacia tree exudation.



Fig. 8. Exudation of an Araucaria tree.



Fig. 9. Exudation of an Aguacate tree.



Fig. 10. Exudation of an Escobo tree.

2) Communities of butterflies that attend the exudates. Some observations.

This work reports on the communities of butterflies that imbibe the exudates of seven species of trees. They belong to the guild of the fruit feeding species and are composed of representatives of the family Nymphalidae; subfamilies Charaxinae, Brassolinae, Satyrinae, Limenitidinae; Biblidinae and Nymphalinae. A total of 61 species in 35 genera of butterflies were registered. In addition other insects belonging to the orders Coleoptera and Hymenoptera that in some way interact with species of butterflies on the exudates and as regular visitors also were identified. Several butterflies that frequented the exudates of Aguacate, Aguacatillo, Gavilán and Escobo were seen especially between the hours of 8 a.m., to 3 p.m. It should be noted that certain species such as *Pycina zamba* (Dbl.), *Opsiphanes* spp. and *Caligo* spp. were observed only very early, surely because their crepuscular activity, after which they disappear from the exudates. Noted also is that the fermented product of the exudates can intoxicate the butterflies while feeding, to such an extent that they can be taken manually or be photographed with ease, even with species of the elusive genus *Agrias* (Figs. 11 and 12).



Figures 11 & 12. A Male of *Agrias amydon* (Hew.) on the trunk of an unidentified tree. This rare butterfly is normally very wary but in an intoxicated state from the fermented exudate allowed the close approximation of the observer. (Photo courtesy of J. Cristóbal Ríos-Málaver, Altos del Pipe, Venezuela).

This irresistible attraction to butterflies is due to the release of odors by the breakdown and fermentation of the components of the exudates. In fact OMURA *et al.* (2000) in his studies on the secretions of oaks in Japan, found 14 volatile compounds such as ethanol and acetic acid which produced strong reactions in two species of Nymphalidae, *Kaniska canace* (L.) and *Vanessa indica* (Herbst), and attracted them to feed. This is probably the case with exudates observed in Colombia which exercised a strong attraction to different organisms, and more when the secretory activity in the bark is constant. An Aguacate tree observed produced a flow for 5 months (April-September, 2011) and in the case of an Escobo, for more than two years (November 2011 to June 2013). Long time exudation was observed from a single oak tree in a garden in Surrey, England which maintained this activity for up to five years FOX-WILSON & HORT (1926). This suggests that in old trees the exudation may be constant, as was found in trees of Aguacate on the Atlantic coast (F. Montero, pers. com.). From the analysis of the list of butterflies in Annex I, it is clear that most of the observed individuals arriving at exudates, are male (Figs. 13-17). However the females of some species like *Epiphile epimenes* (Hew.), *Cymatogramma xenocles fissilis* (Hall), *C. perenna austrina* (Comstock) and *Manataria hercyna maculata* (Hopffer) were quite common.



Fig. 13. *Smyrna blomfieldia* (F.).



Fig. 14. *Caligo prometheus* (Koll.).



Fig. 15. *Prepona laertes caucensis* (LM).



Fig. 16. *Pycina zamba* (Dbl.).

In terms of effectiveness, we can say that this natural method for the attraction of diurnal species may be more effective than those obtained with the use of artificially baited traps (Figs. 18-20), type Van Someren-Rydon, using fruit, fish or shrimp in decomposition. This phenomena can be utilized, in rainforest areas where colorful butterflies of the fruit feeding guild inhabit, as another alternative for the capture of rarities.



Figure 17. Males of *Opsiphanes tamarindi* (Fldr) and *Pycina zamba* (Dbl.) on the bark of Escobo tree (J.A. Salazar photo).



Fig. 18. Four species on an Escobo tree.



Fig. 19. *Colobura* and *Memphis* on an Aguacate tree.



Figure 20. *Manataria maculata* (Hpfr.) (top) and *Catonepebe mumilia esite* (Fldr) female.

OTHER ASSOCIATED INSECTS

During the course of the observations made on tree exudate in this study, other arthropods were also present on the flows. FOX-WILSON & HORT (1926) made a count of insects visiting an Oak tree, listing several species of Diptera, Hymenoptera and Coleoptera, many of them attracted by chemotropism, stimulated by the smell of the exudate.



Figure 20. *Trachyderes succinctus* (Coleoptera) and the wasp *Polistes erythrocephalus* (Hymenoptera) at the exudation of an Escobo tree. A butterfly, *Fountainea glycerium comstocki* Witt is in the background (J.A. Salazar photo).



Figure 21. Male specimens of *Fountainea glycerium comstocki* Witt (left) and *Rydonia pasibula* (Dbl.) (right) together with some Coleoptera and Hymenoptera insects sucking the exudations of Escobo tree (J.A. Salazar photo).

In this study they found an commensal association similar to the one found by HEDSTROM & ELMQUIST (1984) in Costa Rica with the beetle *Gymnetis liturata* Olivier (Cetoniinae) and the charaxine butterfly *Prepona laertes* (Hbn). Here at least 4 species of Coleoptera: *Gymnetis pantherina* Blanchard, *Amithao decemguttatum* Watherhouse, *Euphoria precaria* Janson (Cetoniinae) and *Trachyderes succinctus* (Cerambycidae) and the wasp *Polistes erythrocephalus* L. (Hymenoptera) chew certain parts of the bark cortex which produces an exudation that is exploited by several species butterflies (eg. *Epiphile epimenes* Hewitson, *Catonephele numilia esite* Felder, *Fountainea glycerium comstocki* Witt, *Cymatogramma xenocles fissilis* Hall, *Diaethria clymena marchallii* Guer-Ménéville, and *Rydonia pasibula* Doubleday, among others) (Figs. 21-22).

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Appendix 1

Checklist of the butterflies that feed on sap-exudations of some trees in Colombia

Family									
Genus and Species	Sex	No ind.	Aguacate	Aguacatillo	Escobo	Sauce	Eucalipto	Gavilan	Chumbimbo
Nymphalidae									
Brassoliniæ									
<i>Caligo oileus scamander</i> (Bsd.)	♂ ♀	4	X		X	X		X	
<i>C. prometheus</i> (Koll.)	♂ ♀	2	X		X				
<i>C. illionens oberon</i> (Bdr.)	♀	1	X						
<i>Eryphanis lycomedon</i> (Fldr.)	♀		X						
<i>E. opimus</i> (Sigr.)	♂♂	2					X	X	
<i>Opiphanes bogotana</i> (Dist.)	♂		X						
<i>O. tamarindi</i> (Fldr.)	♂♂	5	X	X	X				X
<i>O. quiteria cauca</i> (Rob.)	♂	2	X						X
<i>O. cauzina monastius</i> (Fruhst.)	♂♂	4	X		X	X			
Family									
Genus and Species	Sex	No ind.	Aguacate	Aguacatillo	Escobo	Sauce	Eucalipto	Gavilan	Chumbimbo
Nymphalidae									
Brassoliniæ									
<i>Narepe cauca</i> (Cass.)	♂	1						X	
<i>Dynastor macrotaris haxibai</i> Ob.	♂	1					X		
Satyrinæ									
<i>Mygona irmina</i> (Dbl.)	♂	1					X		
<i>Lasiophila napatona sombra</i> Th.	♂	1					X		
<i>Podalodes phrasiaca</i> sp.	♂	1					X		
<i>Pronophila unifasciata hrenus</i> Th.	♂	1					X		
<i>P. unifasciata antioquiense</i> Pyrez	♂	4	X		X				
<i>Praepronophila perperna</i> (Hew.)	♂	1	X						
<i>Forsterinaria neorajpha</i> (Fldr.)	♂	1	X						
<i>Manataria hercyna maculata</i> Hpf.	♂♂	8	X		X				
<i>Tuygetis thamyra</i> (Cr.)	♂	1	X						

Family

Genus and Species	Sex	No ind.	Aguacate	Aguacatillo	Escobo	Sauce	Eucalipto	Gavilan	Chumbimbo
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Nymphalidae**Satyrinae**

<i>Taygetis lineata</i> (G. & S.)	♂♂	6	X		X				
<i>Taygetomorpha celia</i> (Cr.)	♂	1	X						
<i>Pareuptychia ocirrhoe</i> (F.)	♂	1	X						
<i>P. metaleuca</i> (Bsd.)	♂	2	X						
<i>Magneuptychia libye</i> (L.)	♂	3			X				
<i>M. nebulosa</i> (Bltr.)	♂	3			X				

Charaxinae

<i>Fountainea nessus</i> (Latr.)	♂	4	X	X		X		X	
<i>F. glycerium comstocki</i> Witt	♂♂	8	X	X	X	X		X	
<i>F. nobilis titan</i> (Fldr.)	♂	2		X					
<i>F. centaurus</i> (Fldr.)	♂	2						X	
<i>Memphis lyceus</i> Druce	♂	2	X					X	

Family

Genus and Species	Sex	No ind.	Aguacate	Aguacatillo	Escobo	Sauce	Eucalipto	Gavilan	Chumbimbo
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Nymphalidae**Charaxinae**

<i>Memphis pseudiphis</i> (Sigr.)	♂	2	X					X	
<i>M. moruus</i> (F.)	♂	1				X			
<i>Rydonia pasibula</i> (Dbl.)	♂♀	3	X		X				
<i>Cymatogramma austrina</i> (Coms)	♂♀	6	X		X				
<i>C. arginussa onophis</i> (Fldr.)	♂	1		X					
<i>C. xenocles fissilis</i> Hall	♂♀	4	X		X				
<i>Consul fabius bogotanus</i> (Dbl.)	♂	1	X						
<i>Siderone galanthis thebais</i> (Fldr.)	♂	1							X
<i>Archaeoprepona priene</i> (Hew.)	♂	2		X					
<i>A. chromus</i> (Guerin-Men.)	♂	2	X			X			
<i>A. amphimachus</i> (F.)	♂	2	X	X					
<i>A. demophoon gulina</i> (Fruhst.)	♂	3	X		X				X
<i>A. demophoon muson</i> (Fruhst.)	♂	3	X			X		X	

Family

Genus and Species	Sex	No ind.	Aguacate	Aguacatillo	Escobo	Sauce	Eucalipto	Gavilan	Chumbimbo
Nymphalidae									
Charaxinae									
<i>Prepona praeneste</i> (Hew.)	♂	1		X					
<i>P. laertes caucaensis</i> (LM.)	♂♀	3	X		X				X
Biblidinae									
<i>Biblis hyperia</i> (Cr.)	♂	1	X						
<i>Catonephele chromis</i> (Dbl.)	♂	2				X		X	
<i>C. numilia esite</i> (Fldr.)	♂♀	3	X		X			X	
<i>Cybdelis mnasyllus</i> (Dbl.)	♂	1						X	
<i>Epiphile epimenes</i> (Hew.)	♂♀	8	X		X			X	
<i>Diaethria clymena marchalli</i> (Guer)	♂	6			X				
<i>D. gabaza</i> (Hew.)	♂	1		X					
Nymphalinae									
<i>Colobura dirce</i> (L.)	♂	6	X			X			X

Family

Genus and Species	Sex	No ind.	Aguacate	Aguacatillo	Escobo	Sauce	Eucalipto	Gavilan	Chumbimbo
Nymphalinae									
<i>Historis acheronta</i> (F.)	♂	1	X						
<i>H. orion dious</i> Lamas	♂	3	X			X			
<i>Smyrna blomfieldia</i> (F.)	♂♀	9	X		X				X
<i>Pycina zamba</i> (Dbl.)	♂♂	7	X		X				
<i>Hamadryas feronia</i> (L.)	♂	2							X
<i>H. fornax fornacalia</i> (Fruhst.)	♂	1	X						
Limnitiidae									
<i>Adelpha serpa celerio</i> (Btlr.)	♂	1						X	