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The Saturniidae recorded in two montane forest areas in the Napo province, eastern Ecuador (Lepidoptera: Saturniidae)

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Abstract

Two provisional lists of Saturniidae (excluding Oxyteninae and Cercophaninae) recorded in the Cordillera de Huacamayos and in the Cosanga area (Napo province, Ecuador) are given. The Saturniid fauna of the Cordillera de Huacamayos counts 69 species whereas a total of 35 species has been recorded in the Cosanga area. This study is part of similar investigations aimed at understanding the Saturniid diversity in the Napo province, Ecuador.

KEY WORDS: Lepidoptera, Saturniidae, provisional lists, area of endemism, species communities, Napo, Ecuador.

Los Saturniidae registrados en dos áreas montañosas forestales en la provincia de Napo, este de Ecuador (Lepidoptera: Saturniidae)

Resumen

Se dan dos listas provisionales de los Saturniidae (excluyendo Oxyteninae y Cercophaninae) citados en la Cordillera de Huacamayos y en el área de Cosanga (provincia de Napo, Ecuador). La fauna de Saturniidos de la Cordillera de Huacamayos cuenta con 69 especies mientras que se han citado un total de 35 especies en el área de Cosanga. Este estudio forma parte de una investigación similar dirigida a comprender la diversidad de los Saturniidos en la provincia de Napo, Ecuador.

PALABRAS CLAVE: Lepidoptera, Saturniidae, lista provisional, área de endemismos, comunidades de especies, Napo, Ecuador.

Introduction

The general information on the distribution of the Ecuadorian Saturniidae are included in the study conducted by LEMAIRE & VENEDICTOFF (1989). More recently, additional data have been given by LEMAIRE (2002) in his recent revision of the Hemileucinae. Further information on the Saturniids of this country can be found in the booklet by PIÑAS & MANZANO (2003 but see RACHELI, 2004), and also in a recent update checklist of the Ecuadorian Hemileucinae (RACHELI & RACHELI, 2005). This paper deals with the Saturniidae recorded in two montane areas namely the Cordillera de Huacamayos and Cosanga, located on the eastern slope of the Andes, Napo province, Ecuador. The present contribution is arranged on the basis of some field expeditions conducted in Ecuador in particular from 1993 to 1997, and on a review of recent literature.

During the recent past, these two areas have been visited by several collectors according to the collector names listed by LEMAIRE (2002) and PIÑAS & MANZANO (2003). During our investigations in these areas, also the local peoples informed us about regular visits paid by other collectors. In any case, no detailed checklists have been published and the information on the species present in these two areas are scattered within several studies. For this reason, the aim of this paper is to summarize all the

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available information on the Saturniid species found in these two areas for a better knowledge of the Saturniid diversity in the Napo province. Indeed, analogous studies have been arranged for three other areas in the same province (RACHELI & RACHELI, 1998a, 1998b, 1999) and the present species inventories of these two Andean areas provide a further contribution in this way.

Material and methods

The area under investigation consists of two main sites namely the Cordillera de Huacamayos and the Cosanga area (Fig. 1). Both areas are located along the road Baeza-Tena, Napo province, on the eastern slope of the Andes. In detail, the Cordillera de Huacamayos (= Guacamayos) is located along

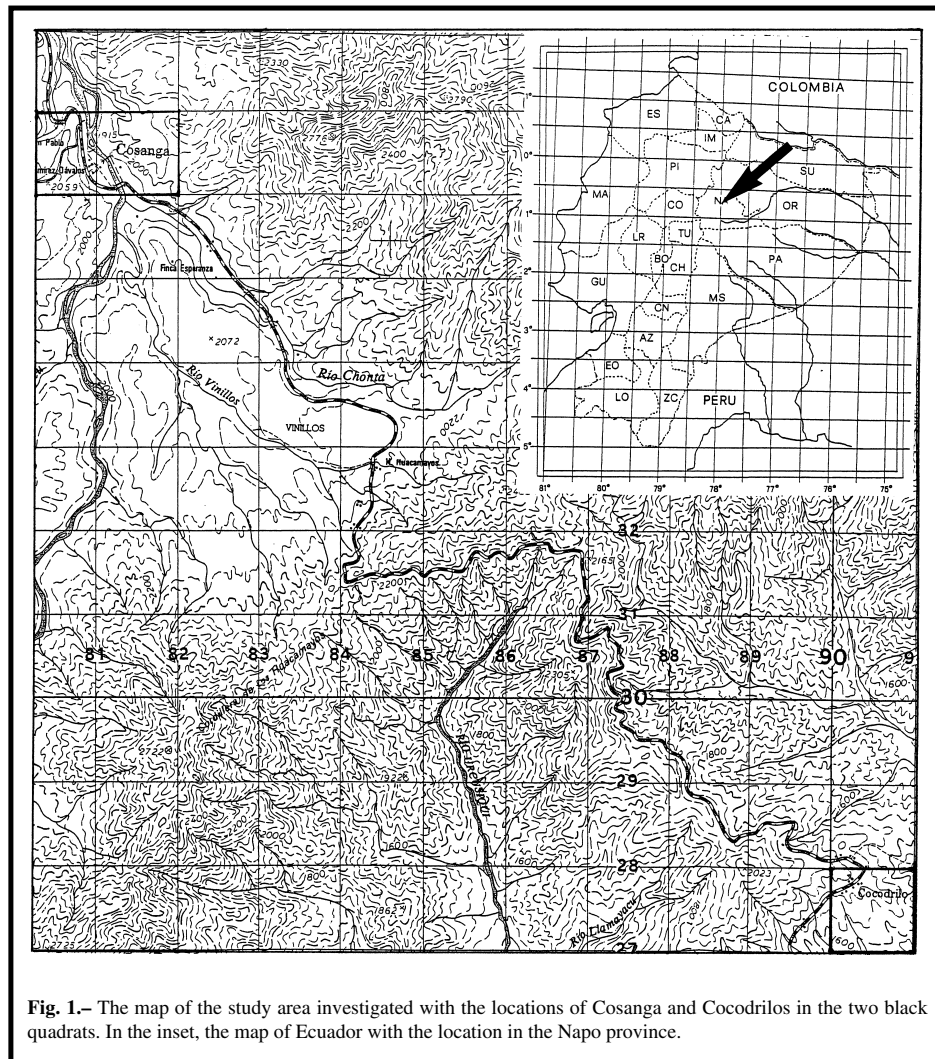


Fig. 1.— The map of the study area investigated with the locations of Cosanga and Cocalitos in the two black quadrats. In the inset, the map of Ecuador with the location in the Napo province.

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the road Baeza-Tena, properly between Cosanga and Narupa. The Saturniidae recorded for this area have been collected in three neighbouring sites, i.e. Cordillera de Huacamayos, 1700-1800 m (data from LEMAIRE & VENEDICTOFF, 1989; LEMAIRE, 2002), S. Elena, Huacamayo, 1800 m (data from RACHELI, 1995) and Cocodrilos, 1760 m. These three stations are located in an area of less than 0.5 km along the same road. The vegetation of this altitudinal belt is analogous to that of Borja (Cordillera de Guacra Urcu [= Huagra-urcu]), 1710 m, on the road Baeza-Lago Agrio, described as a typical montane forest by GRUBB *et al.* (1963).

The second area named Cosanga includes different stations, i.e. the small town of Cosanga and further sites along the road Cosanga-Tena, at km 5.5-6 (2150 m), at km 7 (2250 m) and at km 10.2 (2230 m). It is possible that some of these stations along this road are the same given that the records are gathered from previous studies by LEMAIRE & VENEDICTOFF (1989), by LEMAIRE (2002), by RACHELI (1995) and on unpublished data.

Further general information on ecological, geobotanical and geographic features of Ecuador have been recently summarized by RACHELI & RACHELI (2001, and references therein). Further notes on these topics are also included in the ornithological book by RIDGELY & GREENFIELD (2001). Today, great part of the Cordillera de Huacamayos is a natural reserve although various areas, mainly around small towns, along the roads and rivers, have been totally deforested.

During our field expeditions in these areas, the specimens have been collected using a light-trap with a vapour mercury lamp. In detail, field expeditions in these areas have been conducted in April-May and October-November 1993, July 1996 and also in March 1997 and March 1998 by O. Velastegui. Few specimens have been also collected during further visits to Ecuador in 2000 and 2001.

Notes on the Saturniid faunas recorded in the two areas investigated

A total of 69 species have been recorded in the Cordillera de Huacamayos area while those found in the Cosanga area amount to 35 species (Tab. 1). A detailed list of the 78 species found in both areas is given in Tab. 2.

Tab. 1.— Total number of species in each of the two areas investigated.

	Cord. Huacamayos	Cosanga	Shared species
Arsenurinae	3	1	1
Ceratocampinae	11	5	3
Hemileucinae	50	26	20
Saturniinae	5	3	2
Total	69	35	26

The three Arsenurinae species recorded in the Cordillera de Huacamayo area revealed the presence of an Andean species, *Arsenura cymonia*, and two species, *Rhescyntis hippodamia* and *Parademonia platydesmia*, which are two euryzonal species. Indeed, both species are distributed in the Amazonian basin but they have been recorded also for moderate elevations along the eastern side of the Andes. Only *Arsenura cymonia* has been recorded in the Cosanga area. On a total of five species of Ceratocampinae recorded in the Cosanga area, only three of them are present also in the Cordillera de Huacamayos area which counts a total of 11 species. The Hemileucinae species in both areas count the highest number of species if compared with those of the other subfamilies. On a total of 26 Hemileucinae found in the Cosanga area, twenty species are shared with the fauna recorded in the Cordillera de Huacamayos. Lastly, the Saturniinae species count a total of five species in the Cordillera de Huacamayos and only three species are found in the Cosanga area. Although the two areas investigated are far only 10-12 km along the same road but located at different altitudes, a total of 26 species results to be shared between the areas (Tab. 1). In part, the species diversity of each areas seems to be mostly due to their respective altitudinal locations. On the other hand, the shared species count both typical Andean species and examples of endemisms for this area (see below).

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Among the species found in the Cordillera de Huacamayos area, it must be noticed the presence of two recently found endemic species (*Lonomia* sp. n., *Dirphia napoensis*). It is possible that these new species will be recorded also for neighbouring sites because other species (e.g. *Molippa azuelensis*, *Cerodirphia mota napoensis*, *Cerodirphia roseissima*, *Periphoba porioni*) show a very reduced range. All these species have been recorded for at least one of the two areas investigated in this study but all of them have been also recorded for the eastern neighbouring valley (road Baeza-Lumbaquí-Lago Agrio). Then, it seems that some Hemileucinae species have a congruent range into these two valleys, only. The presence of these species in this area confirms the existence of an area of endemism but further researches must be conducted aimed at identifying the limits of this area of endemism. Indeed, it is also possible that the area of endemism is wider compared to the ranges of other Hemileucinae species such as *Cerodirphia nadiana* and *Pseudautomeris yourii* which are present in this area but also in the Morona-Santiago province at the same elevations.

Lastly, the distributional data summarized in the present study give the opportunity to have a most complete view about the range limits of some species inhabiting this altitudinal belt. They will be useful also in the identification of the Saturniid areas of endemism in the Neotropical region which result to be not yet investigated (RACHELI, 2005).

Tab. 2.- List and notes on the Saturniid species recorded in the two areas investigated: Cordillera de Huacamayos = H; Cosanga = C.

ARSEURINAE	H	C
<i>Arsenura cymonia</i> (Rothschild, 1907)	X	X
<i>Rhescyntis hippodamia</i> (Cramer, 1777)	X	
<i>Parademonia platydesmia</i> (Rothschild, 1907)	X	
CERATOCAMPINAE		
<i>Eacles ormondei violacea</i> Lemaire, 1975	X	X
<i>Bathyphebia flavior</i> Oiticica & Michener, 1950		X
<i>Bathyphebia eminens</i> (Dognin, 1891)	X	X
<i>Citheronia andina</i> Lemaire, 1971	X	
<i>Schausiella carabaya</i> (Rothschild, 1907)	X	
<i>Syssphinx bidens</i> (Rothschild, 1907)	X	
<i>Syssphinx</i> sp. near <i>ocellata</i> (Rothschild, 1907)	X	
<i>Adeloneivaia acuta</i> (Schaus, 1896)	X	
<i>Adeloneivaia catoxantha</i> (Rothschild, 1907)	X	
<i>Rachesa breteuili</i> (Bouvier, 1927)	X	
<i>Rachesa nisa</i> (Druce, 1904)		X
<i>Rachesa reventador</i> Lemaire, 1975	X	
<i>Citioica homoea</i> (Rothschild, 1907)	X	X
HEMILEUCINAE		
<i>Lonomia</i> new sp.	X	
<i>Periga occidentalis</i> (Lemaire, 1972)	X	
<i>Periga parvibulbacea</i> (Lemaire, 1972)	X	
<i>Periga galbimaculata</i> (Lemaire, 1972)	X	X
<i>Periga lobulata</i> Lemaire, 2002	X	
<i>Hirpida gaujoni</i> (Dognin, 1894)	X	X
<i>Hirpida nigrolinea</i> (Druce, 1904)	X	
<i>Catacantha stramentalis</i> (Draudt, 1929)	X	
<i>Hylesia nanus</i> (Walker, 1855)	X	X
<i>Hylesia andensis</i> Lemaire, 1988	X	X
<i>Hylesia leilex</i> Dyar, 1913	X	
<i>Hylesia bouvereti</i> Dognin, 1899		X
<i>Hylesia pauper</i> Dyar, 1913	X	

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<i>Hylesia roseata</i> Dognin, 1914		X
<i>Hylesia terrosex</i> Dognin, 1916	X	
<i>Hylesia mymex</i> Dyar, 1913	X	
<i>Hylesia gigantex orbana</i> Schaus, 1932	X	
<i>Hylesia praeda praeda</i> Dognin, 1901	X	
<i>Hylesiopsis festiva</i> (Bouvier, 1929)	X	
<i>Gamelia neidhoeferi</i> Lemaire, 1967	X	X
<i>Hyperchiria nausica</i> (Cramer, 1779)	X	
<i>Hyperchiria acuta</i> (Conte, 1906)	X	
<i>Automerina cypria</i> (Gmelin, 1790)	X	
<i>Automeris boops</i> (Felder & Rogenhofer, 1874)	X	
<i>Automeris duchartrei</i> Bouvier, 1936	X	
<i>Automeris amanda subobscura</i> Weymer, 1909	X	
<i>Automeris abdominalis</i> (Felder & Rogenhofer, 1874)	X	X
<i>Automeris harrisorum</i> Lemaire, 1967	X	
<i>Automeris pomifera</i> Schaus, 1906	X	
<i>Automeris grammodes</i> Jordan, 1912	X	X
<i>Automeris alticola</i> Lemaire, 1975		X
<i>Automeris napoensis</i> Lemaire, 2002		X
<i>Leucanella lynx</i> (Bouvier, 1930)	X	X
<i>Leucanella contempta</i> (Lemaire, 1967)	X	
<i>Leucanella contei</i> (Lemaire, 1967)	X	X
<i>Pseudautomeris yourii</i> Lemaire, 1985	X	X
<i>Pseudautomeris pohli</i> Lemaire, 1967	X	
<i>Pseudautomeris irene armirene</i> (Strand, 1920)	X	
<i>Molippa simillima</i> Jones, 1907	X	
<i>Molippa azuelensis</i> Lemaire, 1976		X
<i>Paradirphia andicola</i> Lemaire, 2002	X	X
<i>Meroleucoides rectilineata</i> Lemaire & Venedictoff, 1989	X	X
<i>Cerodirphia wellingi roseissima</i> Lemaire, 2002	X	
<i>Cerodirphia mota napoensis</i> Lemaire, 1982	X	X
<i>Cerodirphia nadiana</i> Lemaire, 1975	X	X
<i>Dirphia horca</i> Dognin, 1894	X	X
<i>Dirphia napoensis</i> Racheli & Racheli, 2005	X	
<i>Dirphia avia</i> (Stoll, 1780)	X	X
<i>Dirphia somniculosa confluens</i> Bouvier, 1930	X	X
<i>Dirphia fraterna</i> (Felder & Rogenhofer, 1874)	X	
<i>Periphoba porioni</i> Lemaire, 1982	X	X
<i>Dirphiopsis flora</i> (Schaus, 1911)	X	
<i>Pseudodirphia thiaucourti</i> Lemaire, 1982	X	
<i>Pseudodirphia andicola</i> Bouvier, 1930	X	X
<i>Pseudodirphia peruviana</i> (Bouvier, 1924)		X
<i>Pseudodirphia infuscata</i> (Bouvier, 1924)	X	X
SATURNIINAE		
<i>Copaxa expandens</i> Walker, 1855	X	
<i>Copaxa andensis</i> Lemaire, 1971	X	X
<i>Copaxa semioculata</i> (Felder & Rogenhofer, 1874)		X
<i>Rothschildia lebeau inca</i> Rothschild, 1907	X	
<i>Rothschildia orizaba peruviana</i> W. Rothschild, 1907	X	
<i>Rothschildia aricia xanthina</i> Rothschild, 1907	X	X

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Periga bispinosa (Lemaire, 1972) has been listed by LEMAIRE & VENEDICTOFF (1989) but subsequently this record has not been confirmed by LEMAIRE (2002).

On the fruitfulness of faunistical studies: the analysis of the species communities and the historical and ecological implications

Broadly speaking, there is a general agreement that a study regarding the presence or the absence of species (i.e. faunistical list, inventory) in a given area is one of the most simple investigation. In part, it is true but it is also the first step in understanding the biological diversity. In presenting the checklist of the Misahualli Saturniid fauna, RACHELI & RACHELI (1998a) argued about the few published papers regarding Saturniid inventories for Neotropical sites. A faunistical or provisional list for a given area permits to have some basic information on the range limits for all the species inhabiting the area investigated and it introduces a preliminary attempt of the analysis of its biotic composition. Although the majority of the studies conducted on the species communities have been based on contemporary conditions to explain the species diversity, it must be pointed out that the phylogenetic relationships of the species play a fundamental role also in the analysis of species communities (GRANDCOLAS, 1998; BROOKS & Mc LENNAN, 2002). Although the arguments and methods debated by BROOKS & Mc LENNAN (2002) in the study of species communities are the most powerful, the absence of phylogenetic analyses of Saturniidae at the lowest categories does not permit the use of their method. However, the absence of phylogenetic analysis is common in the majority of the analysis of species communities (LOSOS, 1996) and it does not allow us to answer to the several questions regarding the evolution of community/ies under investigation.

In any case, a preliminary attempt in the study of species communities can be formulated according to the application of other parsimonious approaches recently used also in ecological analysis (NEL *et al.*, 1998; PELLENS *et al.*, 2005). In this context, we believe that faunistical lists are a powerful tool and the first step for further researches and by no means they remain only an inventory of species. The replacement of narrative-based explanations and phenetic clusterings in the analysis of species communities by the application of parsimonious methods will open new frontiers also in the use of this kind of investigations.

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