The Saturniidae of the Loreto Road, Napo Province, Ecuador

(Lepidoptera)

by

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Abstract

Seventy five taxa of Saturniidae along the Loreto road, Napo province, Ecuador were surveyed. Data on the phenology, species richness and biogeographical information on the recorded taxa are reported. Pattern of coloration of male specimens of *Eacles masoni* and *Eacles ormondei* is discussed. Elusive species such as *Rhescyntis descimoni* LEMAIRE, 1975, *Rachesa adusta* (ROTHSCHILD, 1907) and *Hylesiopsis festiva* BOUVIER, 1929 were collected in the study area.

Introduction

During the last years, many papers on the Ecuadorian Saturniidae were published by various authors (LEMAIRE, 1977; LEMAIRE & VENEDICTOFF, 1989; LEMAIRE & TERRAL, 1994; RACHELI, 1994, 1995a, 1995b; RACHELI & RACHELI, 1997). Actually, the Ecuadorian Saturniid fauna (275 species) is one of the best known in the Neotropical region (RACHELI & RACHELI, 1998).

Faunistic studies on the Saturniidae of restricted areas in the Neotropical region are very scarce. The recent papers on the Mexican, Costarican and Peruvian Saturniidae are the only isolated examples (BEUTELSPACHER 1978, 1982a, 1982b, 1986; JANZEN, 1982, 1984, 1986; LAMAS, 1989).
According to CLENCH (1979), faunistic lists are of great importance for several aspects. Ecological and biological data are often included in this kind of studies, and these constitute basic information for further researches on taxonomy, zoogeography, ecology and conservation.

From a recent study carried out on an Ecuadorian locality, Misahualli in the Napo province, a total of 92 species of Saturniidae, 33 % of the total Ecuadorian Saturniid fauna, were recorded (RACHELI, 1995c; RACHELI & RACHELI 1998). Little known species such as *Automeris heppneri* and *Leucanella apollinairei* were collected in the Misahualli area as well as the second known specimen of *Rachesa adusta* was discovered in the Loreto Road area (see RACHELI, 1997; RACHELI & RACHELI, 1997).

Material and methods

Collecting methodology

The majority of the specimens were collected during a field trip made in July–August 1996. Additional material was collected by OLIVERIO and DANILO VELASTEGUI during December 1996, February to March and September 1997. The specimens were collected using a light-trap with a vapour mercury lamp.
Data for this study are also gathered from the species listed by LEMAIRE & VENEDICTOFF (1989) and by RACHELI & RACHELI (1997).

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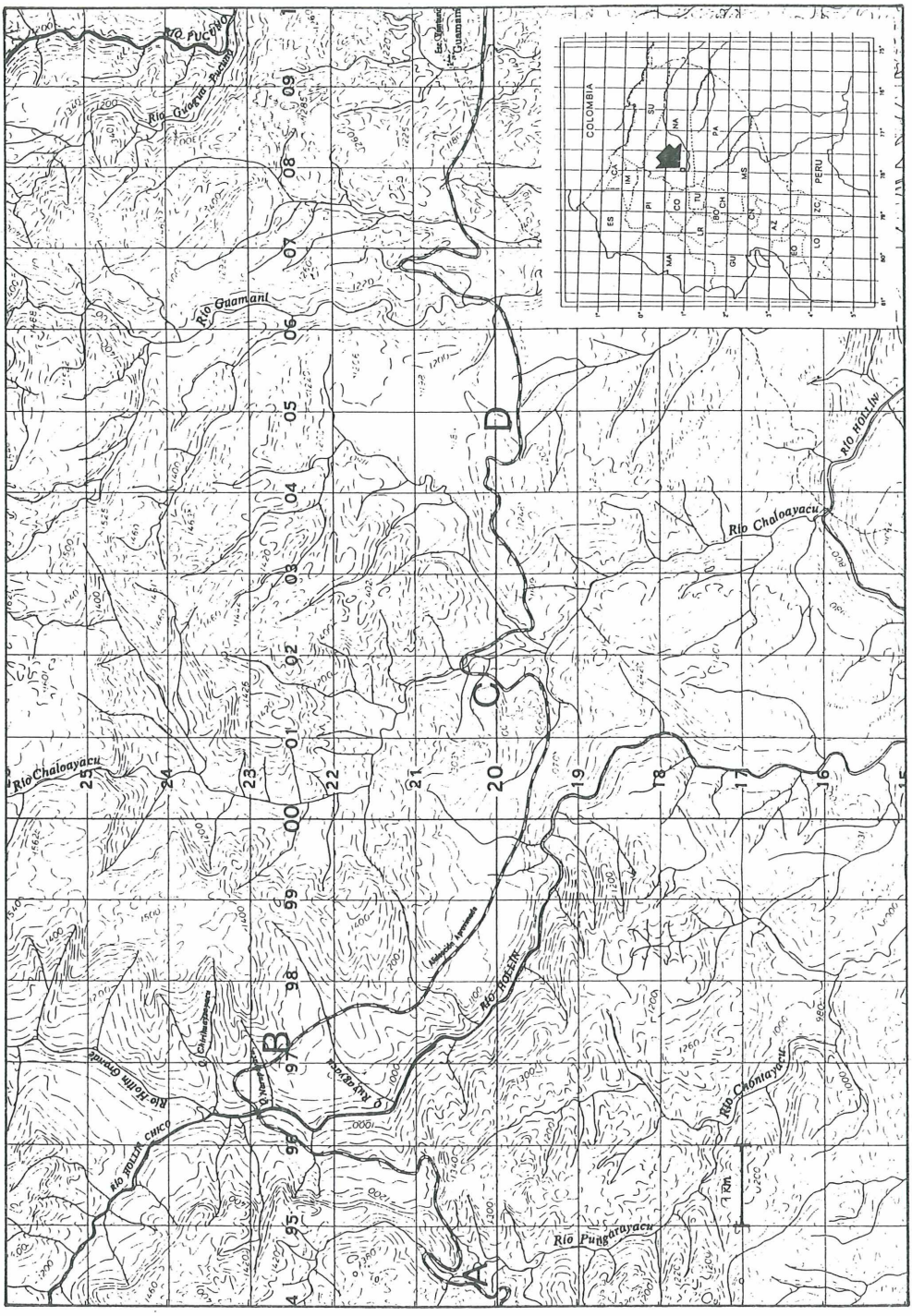
1 9th contribution to the knowledge of Saturniidae of Ecuador.


Río Guamani
Río Chaloayacu
Río Chontayacu
Río Pungarayacu
COLOMBIA
PERU
A
B
C
D

Study area

The study area (fig. 1) comprehends an altitudinal transect from 1000 m to 1250 m along the Loreto Road, Napo province. This road, locally called Loreto Road, starts from the cross-road of Narupa at 1100 m, along the road Cosanga-Tena, on the eastern slope of the Andes and leads eventually to Coca.
This area is considered as a sub-tropical rain region by CAÑADAS CRUZ (1983), or as a lower montain rain forest (for details see GRUBB et al., 1963; HARLING, 1979; BALSLEV, 1988). Two main rivers cross this area, namely Rio Hollin and Rio Chalua Yacu.
The material reported in this study was collected in the following four localities: A = Loreto Road km 11, "Las Minas" (data from LEMAIRE & VENEDICTOFF, 1989); B = Rio Hollin (km 16–18), 1000 m; C = Rio Chalua Yacu (km 21–24), 1200 m; D = Loreto Road km 30–40, including also Puma Urcu, 1100–1200 m.
When LEMAIRE & VENEDICTOFF (1989) wrote their paper this road was only 11 km long and it stopped near "Las Minas". It is likely then that the material reported by these authors came from "Las Minas" area. This locality is not situated at 1500 m but at approx. 1250 m.
Today, great parts of the forested areas were destroyed during the last years by the human influence especially along the road and the rivers where the deforestation is especially concentrated (see RENNER et al., 1990).

Results and discussion

A total of 74 species (75 taxa) were collected in the study area (see Appendix). The total number of species and taxa is different because two distinct subspecies of *Eacles ormondei* are recorded. A discussion on this species is reported below.
The phenology of the species recorded in the localities B, C and D is summarized in the Appendix. The locality A is excluded because LEMAIRE & VENEDICTOFF (1989) did not report the phenological data.
The highest cumulative number of species (32) was collected in August and September while in March and December there were 27 species.

The composition of Saturniid fauna of Loreto Road is shown in Tab. 1. Actually, the 26% of the total Ecuadorian Saturniid fauna is present in the study area.

Tab. 1: Saturniid fauna of Loreto Road with proportions based on 74 species.

Subfamilies	Total species recorded in the study area	Proportion of total species in the study area	Total species recorded for Ecuador	Proportion of total ecuadorian species
Arsenurinae	11	14.9%	28	39%
Ceratocampinae	16	21.6%	50	50%
Hemileucinae	41	55.4%	179	22%
Saturniinae	6	8.1%	18	33%
Total	74	100%	275	26%

LEMAIRE & VENEDICTOFF (1989) have reported 20 taxa for the locality A. A total of 33 taxa were collected at the locality B, 44 at the locality C and 39 at the locality D (Tab. 2).

Tab. 2: Total number of taxa of each subfamilies recorded in the four localities.

Subfamilies	Locality A	Locality B	Locality C	Locality D
Arsenurinae	3	4	6	8
Ceratocampinae	5	7	12	11
Hemileucinae	10	20	22	18
Saturniinae	2	2	4	2
Total	20	33	44	39

The number of shared taxa among the localities in the study area is shown in Tab. 3. The localities B-C have the highest figure of shared taxa (27) while the localities A-D share the lowest with only 6 taxa.
It is likely that the evident difference in the total number of shared species recorded is due to the still imperfect knowledge of the total number of species in each locality.

Tab. 3: Shared taxa among paired localities.

Subfamilies	A—B	A—C	A—D	B—C	B—D	C—D
Arsenurinae	2	2	2	4	3	4
Ceratocampinae	2	3	3	7	6	8
Hemileucinae	2	2	1	14	9	11
Saturniinae	2	2	0	2	0	0
Total	8	9	6	27	18	23

Notwithstanding this premise, some examples of temporal and spatial distribution and variability of species along Loreto road are presented. Little known species such as *Rhescyntis descimoni* LEMAIRE, 1975, *Eacles callopteris* ROTHSCHILD, 1907, *Schausiella carabaya* (ROTHSCHILD, 1907), *Procitheronia fenestrata* (ROTHSCHILD, 1907), *Hylesiopsis festiva* BOUVIER, 1929 and *Copaxa cineracea* ROTHSCHILD, 1895 were collected in the study area and especially in the locality C.
The restricted range of *Rhescyntis descimoni* overlaps in an area considered as a centre of endemism named Sucua (sensu BROWN, 1979, 1982a, 1982b, 1987). The range of this species lies more or less in the middle of this centre, due to the limits of Sucua which are given from S Colombia to N Peru. The few known specimens of this Ecuadorian endemism came from Sucumbios, Napo and Morona Santiago provinces and were collected from November to February (LEMAIRE, 1975; LEMAIRE, 1980; LEMAIRE & VENEDICTOFF, 1989).
Schausiella carabaya and *Hylesiopsis festiva* are two very scarce eastern Andean species of moderate elevations (1200–1800 m). *Eacles callopteris* and *Copaxa cineracea* are especially distributed between 600–1400 m, but there are records also for higher and/or lower localities (see LEMAIRE, 1988; RACHELI, 1994). *Procitheronia fenestrata* is an amazonian species distributed also on the eastern slope of the Andes up to 1000 m.

RACHELI & RACHELI (1997) reported that the Saturniid fauna of Loreto road is composed of a mixture of Amazonian and Andean elements. Typical Andean species, such as *Syssphinx bidens* (ROTHSCHILD, 1907), *Automeris boops* (FELDER & ROGENHOFER, 1874), *Automeris amanda subobscura* WEYMER, 1909 and *Leucanella contei* (LEMAIRE, 1967) coexist in the localities B and C with Amazonian species such as *Rhescyntis h. hippodamia* (CRAMER, 1777), *Procitheronia fenestrata* and *Lonomia a. achelous* (CRAMER, 1777).

An example of species variability may be that of the Ecuadorian subspecies of *Eacles ormondei* and *Eacles masoni*. In eastern Ecuador, *Eacles ormondei* is distributed altitudinally from 250 m up to 2200 m. Two different subspecies are described from low and high altitude localities, i. e. *peruviana* BOUVIER, 1927 and *violacea* LEMAIRE, 1975, respectively. This latter subspecies was reported by LEMAIRE & VENEDICTOFF (1989) for Loreto Road km 11.
The subspecies *peruviana* is characterised by a large brown reddish area on the FWs, while in *violacea* the same area is dark brown, interspersed with yellow scales of the background. Also the discal band of the HWs is brown and larger.
Male specimens from Loreto Road have an intermediate pattern of coloration between these two extremes. It is suggested that it may constitute an altitudinal clinal variation for the coloration and for the size of the dark areas. However, this morph is more similar to *peruviana* rather than to *violacea*. Also male specimens of *Eacles masoni*, here reported as *fulvaster* ROTHSCHILD, 1907, have an intermediate pattern of coloration. Two different subspecies of *Eacles masoni* are distributed in Ecuador, *tyrannus* DRAUDT, 1930 and *fulvaster* ROTHSCHILD, 1907, from western and eastern slope of the Andes, respectively. The male specimens collected in the study area are apparently more similar to the western subspecies, currently considered as an endemism of the western slope of the Andes from Colombia to Ecuador (see LEMAIRE, 1988).

A distributional analysis of seventy taxa, excluding the five undetermined taxa, were ordered according to the faunal regions of LEMAIRE (1988), HEPPNER (1991) and BROWN et al. (1995). The Saturniids of the study area comprise 32 Andean elements, 28 Amazonian elements while the others 10 are widespread elements.

These data on the Saturniids of Loreto Road might confirm the point of view of LEMAIRE & VENEDICTOFF (1989) about the presence of a transitional zone between the Amazonian and Andean regions.

A more complete analysis of the "pre-Andean" (sensu LEMAIRE & VENEDICTOFF, 1989) and transitional zone faunas which together apparently constitute a wide ecotonal area, will be discussed when more material will be gathered. We predict that the Saturniid diversity of Loreto Road might approach that of Misahualli area with 92 species of Saturniidae (RACHELI & RACHELI, 1998).

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Appendix:

Taxa recorded in the study area: presence-absence in the four localities.

1 = presence; 0 = absence. A = Loreto Roadkm 11, "Las Minas" (data from LEMAIRE & VENEDICTOFF, 1989); B = Rio Hollin (km 16–18), 1000 m; C = Rio Chalua Yacu (km 21–24), 1200 m; D = Loreto Road km 30–40, near Puma Urcu, 1100–1200 m.

Systematic list of the taxa recorded along the Loreto Road	Distribution along the Loreto Road			
	A	B	C	D
1. *Arsenura armida* (CRAMER, 1779)	1	1	1	1
2. *Arsenura mossi* JORDAN, 1922	0	0	0	1
3. *Arsenura ciocolatina* DRAUDT, 1930	0	0	0	1
4. *Arsenura albopicta* JORDAN, 1922	0	0	1	0
5. *Arsenura rebeli* GSCHWANDNER, 1920	1	1	1	1
6. *Arsenura b. batesii* (FELDER & ROGENHOFER, 1874)	0	1	1	0
7. *Titaea tamerlan amazonensis* LEMAIRE, 1980	0	0	0	1
8. *Rhescyntis h. hippodamia* (CRAMER, 1777)	0	1	1	1
9. *Rhescyntis hermes* (ROTHSCHILD, 1907)	0	0	0	1
10. *Rhescyntis descimoni* LEMAIRE, 1975	0	0	1	1
11. *Copiopteryx s. semiramis* (CRAMER, 1775)	1	0	0	0
12. *Eacles imperialis cacicus* (BOISDUVAL,1868)	1	0	1	1
13. *Eacles penelope* (CRAMER, 1775)	0	0	0	1
14. *Eacles masoni fulvaster* ROTHSCHILD, 1907	0	1	1	0
15. *Eacles callopteris* ROTHSCHILD, 1907	0	0	1	0
16. *Eacles ormondei peruviana* BOUVIER, 1927	0	1	1	1
17. *Eacles ormondei violacea* LEMAIRE, 1975	1	0	0	0
18. *Citheronia andina* LEMAIRE, 1971	0	1	1	1
19. *Procitheronia fenestrata* (ROTHSCHILD, 1907)	0	0	1	1
20. *Schusiella carabaya* (ROTHSCHILD, 1907)	0	0	1	0
21. *Syssphinx molina* (CRAMER, 1780)	0	0	0	1
22. *Syssphinx bidens* (ROTHSCHILD, 1907)[2]	0	1	1	1

2 Erroneously reported as *Adeloneivaia j. jason* (BOISDUVAL, 1872) by RACHELI & RACHELI (1997).

Systematic list of the taxa recorded along the Loreto Road	Distribution along the Loreto Road			
23. *Adeloneivaia acuta* (SCHAUS, 1896)	1	1	1	1
24. *Adeloneivaia c. catoxantha* (ROTHSCHILD, 1907)	0	1	1	1
25. *Adeloneivaia boisduvalii* (DOÙMET, 1859)	0	0	0	1
26. *Rachesa adusta* (ROTHSCHILD, 1907)	0	0	1	0
27. *Citioica anthonilis* (HERRICH-SCHÄFFER, [1854])	1	1	1	1
28. *Citioica homonea* (ROTHSCHILD, 1907)	1	0	0	0
29. *Lonomia d. descimoni* (LEMAIRE, 1972)	1	0	0	0
30. *Lonomia a. achelous* (CRAMER, 1777)	0	1	1	0
31. *Periga galbimaculata* (LEMAIRE, 1972)	0	0	0	1
32. *Periga parvibulbacea* (LEMAIRE, 1972)	0	1	0	0
33. *Automeris boops* (FELDER & ROGENHOFER, 1874)	0	1	1	1
34. *Automeris duchartrei* BOUVIER, 1936	0	1	1	1
35. *Automeris liberia* (CRAMER, 1780)	0	0	1	1
36. *Automeris amanda subobscura* WEYMER, 1909	0	1	1	1
37. *Automeris a. annulata* SCHAUS, 1906	0	0	0	1
38. *Automeris pomifera* SCHAUS, 1906	0	0	1	0
39. *Leucanella c. contempta* (LEMAIRE, 1967)	0	1	1	0
40. *Leucanella contei* (LEMAIRE, 1967)	0	1	1	0
41. *Pseudautomeris irene armirene* (STRAND, 1920)	0	1	1	0
42. *Gamelia abasia* (STOLL, 1781)	0	1	0	1
43. *Gamelia neidhoeferi* LEMAIRE, 1967	1	0	0	0
44. *Gamelia viettei* LEMAIRE, 1967	0	1	0	0
45. *Hyperchiria nausica* (CRAMER, 1779)	0	1	1	1
46. *Hyperchiria acuta* (CONTE, 1906)	0	1	1	0
47. *Automerina caudatula* (FELDER & ROGENHOFER, 1874)	0	0	1	1
48. *Automerula auletes* (HERRICH-SCHÄFFER, [1854])	0	0	1	1
49. *Hylesiopsis festiva* (BOUVIER, 1929)	0	0	1	0
50. *Hylesia nanus* (WALKER, 1855)	0	1	0	1
51. *Hylesia andensis* LEMAIRE, 1988	1	0	0	0
52. *Hylesia leilex* DYAR, 1913	1	0	0	0
53. *Hylesia athlia* DYAR, 1913	1	0	0	0
54. *Hylesia olivenca* SCHAUS, 1927	1	0	0	0
55. *Hylesia murex* DYAR, 1913	1	0	0	0
56. *Hylesia subfasciata* DOGNIN, 1916	1	0	0	0
57. *Hylesia melanostigma* (HERRICH-SCHÄFFER, [1855])	0	0	0	1
58. *Paradirphia o. oblita* (LEMAIRE, 1976)	0	0	1	1
59. *Molippa nibasa* MAASSEN, 1885	0	1	1	1
60. *Dirphia crassifurca* LEMAIRE, 1971	1	1	1	0
61. *Dirphia avia* (STOLL, 1780)	0	1	1	1
62. *Dirphia* spec. (near f. *fraterna* FLD. & RGNHFR., 1874)	0	0	1	0
63. *Dirphiopsis flora orientalis* (LEMAIRE, 1976)	1	1	1	1
64. *Pseudodirphia peruviana* (BOUVIER, 1924)	0	1	0	0
65. *Pseudodirphia andicola* BOUVIER, 1930	0	1	0	0

Systematic list of the taxa recorded along the Loreto Road	Distribution along the Loreto Road			
66. *Pseudodirphia* spec. 1	0	0	0	1
67. *Pseudodirphia* spec. 2	0	0	1	0
68. *Pseudodirphia* spec. 3	0	0	0	1
69. *Pseudodirphia* spec. 4	0	1	1	0
70. *Copaxa decrescens* WALKER, 1855	0	0	0	1
71. *Copaxa cineracea* ROTHSCHILD, 1895	0	0	1	0
72. *Rothschildia e. erycina* (SHAW, [1796])	0	0	0	1
73. *Rothschildia lebeau inca* ROTHSCHILD, 1907	1	1	1	0
74. *Rothschildia arethusa rhodina* JORDAN, 1911	0	0	1	0
75. *Rothschildia orizaba peruviana* ROTHSCHILD, 1907	1	1	1	0
Total	**20**	**33**	**44**	**39**

Phenology of the species recorded in the study area except locality A.

	Feb-ruary	March	July	August	Sep-tember	De-cember
1. *Arsenura armida* (CRAMER, 1779)		B			C	D
2. *Arsenura mossi* JORDAN, 1922				D		
3. *Arsenura ciocolatina* DRAUDT, 1930						D
4. *Arsenura albopicta* JORDAN, 1922					C	
5. *Arsenura rebeli* GSCHWANDNER, 1920		B-C	B		B-C	B
6. *Arsenura b. batesii* (FELDER & ROGENHOFER, 1874)		C			B-C	
7. *Titaea tamerlan amazonensis* LEMAIRE, 1980				D		
8. *Rhescyntis h. hippodamia* (CRAMER, 1777)		B	B	D	C	B
9. *Rhescyntis hermes* (ROTHSCHILD, 1907)						D
10. *Rhescyntis descimoni* LEMAIRE, 1975					C	D
11. *Eacles imperialis cacicus* (BOISDUVAL,1868)						
12. *Eacles penelope* (CRAMER, 1775)				D		
13. *Eacles masoni fulvaster* ROTHSCHILD, 1907		C	B		B-C	
14. *Eacles callopteris* ROTHSCHILD, 1907			C			
15. *Eacles ormondei peruviana* BOUVIER, 1927	B-D	B-C	C-D	D	C	D
16. *Citheronia andina* LEMAIRE, 1971		B-C	B	D	B-C	
17. *Procitheronia fenestrata* (ROTHSCHILD, 1907)				D	C	
18. *Schusiella carabaya* (ROTHSCHILD, 1907)		C				
19. *Syssphinx molina* (CRAMER, 1780)		B				
20. *Syssphinx bidens* (ROTHSCHILD, 1907)		C		B	B-C	D
21. *Adeloneivaia acuta* (SCHAUS, 1896)		B	B	D	B-C	B
22. *Adeloneivaia c. catoxantha* (ROTHSCHILD, 1907)				D		D
23. *Adeloneivaia boisduvalii* (DOÜMET, 1859)				D		
24. *Rachesa adusta* (ROTHSCHILD, 1907)		C				
25. *Citioica anthonilis* (HERRICH-SCHÄFFER, [1854])	D		B		C	D
26. *Lonomia a. achelous* (CRAMER, 1777)		C				
27. *Periga galbimaculata* (LEMAIRE, 1972)						D
28. *Periga parvibulbacea* (LEMAIRE, 1972)			B			
29. *Automeris boops* (FELDER & ROGENHOFER, 1874)		C		D		B

	Feb-ruary	March	July	August	Sep-tember	De-cember
30. *Automeris duchartrei* BOUVIER, 1936	D	B-C	B-C		B-C	D
31. *Automeris liberia* (CRAMER, 1780)					C	D
32. *Automeris amanda subobscura* WEYMER, 1909	B		C	D	B-C	D-C
33. *Automeris a. annulata* SCHAUS, 1906				D		
34. *Automeris pomifera* SCHAUS, 1906		C				
35. *Leucanella c. contempta* (LEMAIRE, 1967)	B	C			B	
36. *Leucanella contei* (LEMAIRE, 1967)	B	C			B	
37. *Pseudautomeris irene armirene* (STRAND, 1920)		C			B	
38. *Gamelia abasia* (STOLL, 1781)				D	B	
39. *Gamelia viettei* LEMAIRE, 1967				B		B
40. *Hyperchiria nausica* (CRAMER, 1779)				D	B	
41. *Hyperchiria acuta* (CONTE, 1906)		C		C	C	B
42. *Automerina caudatula* (FELDER & ROGENHOFER, 1874)			C	D		D
43. *Automerula auletes* (HERRICH-SCHÄFFER, [1854])		C		D	C	D
44. *Hylesiopsis festiva* (BOUVIER, 1929)						C
45. *Hylesia nanus* (WALKER, 1855)				D		
46. *Hylesia melanostigma* (HERRICH-SCHÄFFER, [1855])				D		
47. *Paradirphia o. oblita* (LEMAIRE, 1976)		C		D		
48. *Molippa nibasa* MAASSEN, 1885				D	B-C	D
49. *Dirphia crassifurca* LEMAIRE, 1971		C		B	B	
50. *Dirphia avia* (STOLL, 1780)		B	B	D	B-C	B-D
51. *Dirphia* spec. (near *f. fraterna* FLDR. & RGNHFR., 1874)		C				
52. *Dirphiopsis flora orientalis* (LEMAIRE, 1976)				B-D		D
53. *Pseudodirphia peruviana* (BOUVIER, 1924)				B		
54. *Pseudodirphia andicola* BOUVIER, 1930						B
55. *Pseudodirphia* spec. 1				D		
56. *Pseudodirphia* spec. 2					C	
57. *Pseudodirphia* spec. 3						D
58. *Pseudodirphia* spec. 4					B-C	
59. *Copaxa decrescens* WALKER, 1855				D		
60. *Copaxa cineracea* ROTHSCHILD, 1895					C	
61. *Rothschildia e. erycina* (SHAW, [1796])				D		
62. *Rothschildia lebeau inca* ROTHSCHILD, 1907		B		B	B-C	B
63. *Rothschildia arethusa rhodina* JORDAN, 1911					C	
64. *Rothschildia orizaba peruviana* ROTHSCHILD, 1907		B			B-C	
total	**6**	**27**	**13**	**32**	**32**	**27**

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