

BUTTERFLIES (PAPILIONOIDEA AND HESPERIOIDEA) OF CALAKMUL, CAMPECHE, MÉXICO

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ABSTRACT—We collected 423 species of diurnal butterflies (Rhopalocera) during 250 days of observations from March 1997 through January 2000 in the region of Calakmul, Campeche, Mexico. We present a list of 428 species recorded for Calakmul. This is the first reported list of butterflies for the state of Campeche, and it includes 290 new records for the state, 374 new records for Calakmul, and 1 new record for Mexico: *Monca telata*. Museum records were found for 5 additional species: *Caria melino*, *Cissia labe*, *Tmolus echion*, *Emesis lupina lupina*, and *Calephelis azteca*. The accumulation curve of species estimates that 457 species should be present in Calakmul, which suggests the list presented is 93% complete. We found that medium, tropical, semi-evergreen forest is the richest (371 species); more than a quarter of the butterflies of the Calakmul region were found exclusively in this forest. We also found the southern area slightly more abundant in species (82%) than the northern area (79%). Additionally, a comparison was made of the list generated for Campeche to lists from previous studies for Quintana Roo, Tikal-Guatemala National Park, and Belize. The comparison shows that 70%, 58%, and 54% of the butterfly species in Calakmul also are found in Tikal, Quintana Roo, and Belize, respectively.

RESUMEN—Recolectamos 423 especies de mariposas diurnas (Rhopalocera) de la región de Calakmul, en el estado de Campeche, México, desde marzo de 1997 a enero del 2000 completando 250 días de muestreo. Se presenta una lista de 428 especies registradas para Calakmul. Esta es la primera lista reportada de mariposas para el estado de Campeche y en ella se presentan 290 nuevos registros para este estado, 374 nuevos registros para la región de Calakmul y un nuevo registro para México: *Monca telata*. Cinco especies más fueron encontradas en ejemplares de museos: *Caria melino*, *Cissia labe*, *Tmolus echion*, *Emesis lupina lupina* y *Calephelis azteca*. Se presenta una curva de acumulación de especies con un número teórico de especies esperadas de 457. De acuerdo con este cálculo, la lista presentada está completa en un 93%. Encontramos que la selva tropical, mediana subperennifolia es mayor en riqueza específica (371), incluso más de un cuarto de las especies reportadas aquí para Calakmul se encontró exclusivamente en este tipo de vegetación. También encontramos que el sur es ligeramente más rico en especies (82%) que la región del norte de Calakmul (79%). Adicionalmente, se hizo una comparación con listas de especies encontradas en el estado de Quintana Roo, en el Parque Nacional Tikal-Guatemala y en Belice, donde se muestra que el 70%, 58% y 54% de las especies de Calakmul se comparten con Tikal, Quintana Roo y Belice, respectivamente.

The Calakmul Biosphere Reserve (CBR) was designated in 1989 to protect both biological and cultural heritage. With 723,185 ha, CBR is the largest protected tropical forest in Mexico. The area also includes extensive Mayan archaeological sites. After the collapse of the Mayan culture, the area was sparsely occupied. It

was not until 1940 that the logging of mahogany (*Swietenia macrophylla*) and cedar (*Cedrela odorata*) led to the settlement of Zoh-Laguna, which is located in the center of the region. From 1960 to the present, the area has become accessible by road and many settlements have started as a consequence of the government

strategy to encourage land settlement of the area (Weber, 1999). The settlements are in and around CBR, and the predominant economic activities for this region are agriculture and forestry. Preliminary results indicate that the Biosphere Reserve supports significant biological diversity. The area is comprised of 7 tropical ecosystems, representing a diverse fauna of vertebrates (Aranda, 1991; Smith et al., 2001; Calderon et al., 2003), invertebrates (Pozo y Cedeño-Vázquez, 1998), and plants (Martínez et al., 2001). The growth of the human community and the need for more usable land has produced a mosaic landscape of primary forest, second-growth forest, and agricultural fields (Martínez and Galindo-Leal, 2002).

There are no works reporting organized inventories of butterflies in Campeche. The study on Mexican butterflies by Godman and Salvin (1879–1901) cited only 2 species of butterflies for Campeche: *Eurema daira eugenia* and *Anaea troglodyta aidea*. *Eurema daira eugenia* had also been previously cited by Felder (1869). Of the few works that report species for Campeche, the most important works are those by Field (1939), who reported 20 species of Papilionoidea, and Hoffmann (1940, 1941), who reported 39 species of Papilionoidea and 15 of Hesperidae. This study represents the first organized inventory of butterflies for Campeche. The purpose of our investigation was to monitor amphibians, reptiles, and butterflies of the Calakmul area. In this paper, we present the butterfly inventory.

METHODS—Study Area—The Calakmul region (19°15' to 17°50'N, 90°20' to 89°00'W) is located in Mexico in the southern part of the Yucatan Peninsula, which extends from the Gulf of Honduras to the Términos Lagoon (Miranda, 1958). Calakmul is in the state of Campeche and borders the El Peten area of Guatemala (Fig. 1). This region is characterized by a flat lowland landscape with no important terrain elevations (100 to 250 m). Soils are shallow and calcareous and overlie a limestone platform (Stedman-Edwards, 2000). Precipitation is highly seasonal. A rainy season extends from June to November and a dry season from December to May. Annual precipitation varies from an average of 550 mm to 1,634 mm, producing dry and wet years. Although flooding occurs during the rainy season, once the rain stops, little water remains on the surface (Galindo-Leal, 2001). The mean annual temperature is 24.6°C.

The forest in this region is transitional between

the dryer scrub forest of the north of the Yucatan Peninsula to the humid tropical forest of the south in El Peten, Guatemala (Stedman-Edwards, 2000). The CBR has 50% medium tropical semi-evergreen forest, 35% low tropical semi-evergreen forest, and 5% high tropical evergreen forest, with the remainder of the habitats as grasslands and wetlands (INE y CONABIO, 1995; García-Gil et al., 2001). In the high tropical evergreen forest (H), located south of the CBR, the canopy can be higher than 25 m and some trees reach 40 m. The trees that dominate this forest belong to the family Sapotaceae. The most common species are *Manilkara zapota*, *M. chicle*, *Pouteria sapota*, *P. amygdalina*, *P. campechiana*, and *P. reticulata* (Galindo-Leal, 2001). In the medium tropical semi-evergreen forest (M), the canopy reaches 15 to 25 m, and 25 to 50% of these trees are deciduous. The commonest species are *Brosimum alicastrum*, *M. zapota*, and *Pouteria reticulata*. In some areas, trees lose almost 75% of their leaves. In this case, the most common species are *Guaiacum sanctum*, *Esenbeckia* (Rutaceae), *Beucarnea pliabilis*, and *Thouinia paucidentata*. In the low tropical semi-evergreen forest (L), the canopy never reaches more than 15 m, and 75% of these trees are deciduous. This forest is dominated by *T. paucidentata*, *B. pliabilis*, *G. sanctum*, *Lonchocarpus yucatanensis*, *Bursera simaruba*, *Haematoxylum campechianum*, *Ceiba schotti*, *Pseudobombax ellipticum*, and *Maytenus schippi*.

Literature and Collections—We consulted the computerized database at the Museum of Zoology, Facultad de Ciencias (MZFC) at the Universidad Nacional Autónoma de México. The database includes data from Mexican butterfly specimens examined in foreign and Mexican museums and collections, as well as data from the literature.

Sampling Protocol—The inventory effort began in March 1997 and ended in January 2000, with a total of 250 days in the field. This is part of a larger study in which we conducted standardized surveys for long-term monitoring in both disturbed and protected habitats with a sampling protocol similar to Austin et al. (1996) in Tikal National Park, Guatemala. We chose 6 localities within or near the northern portion of the CBR and 5 more within or near of southern portion (Fig. 1). To attract some species, we used 35 Van Someren-Rydon traps (Rydon, 1964) baited with banana, pineapple, and beer. We also used hand nets and visual identification when possible. During the first year, we collected in the wet and dry season, the second year we collected only during the wet season, and the third year we visited the localities on a monthly basis. Of all the individuals captured, about 30% were collected and placed in glassine bags labeled with date, collector, locality, and vegetation type. For specimens with difficult identification, we were advised by J. Llorente-Bousquets from MZFC, A. D. Warren from Oregon State

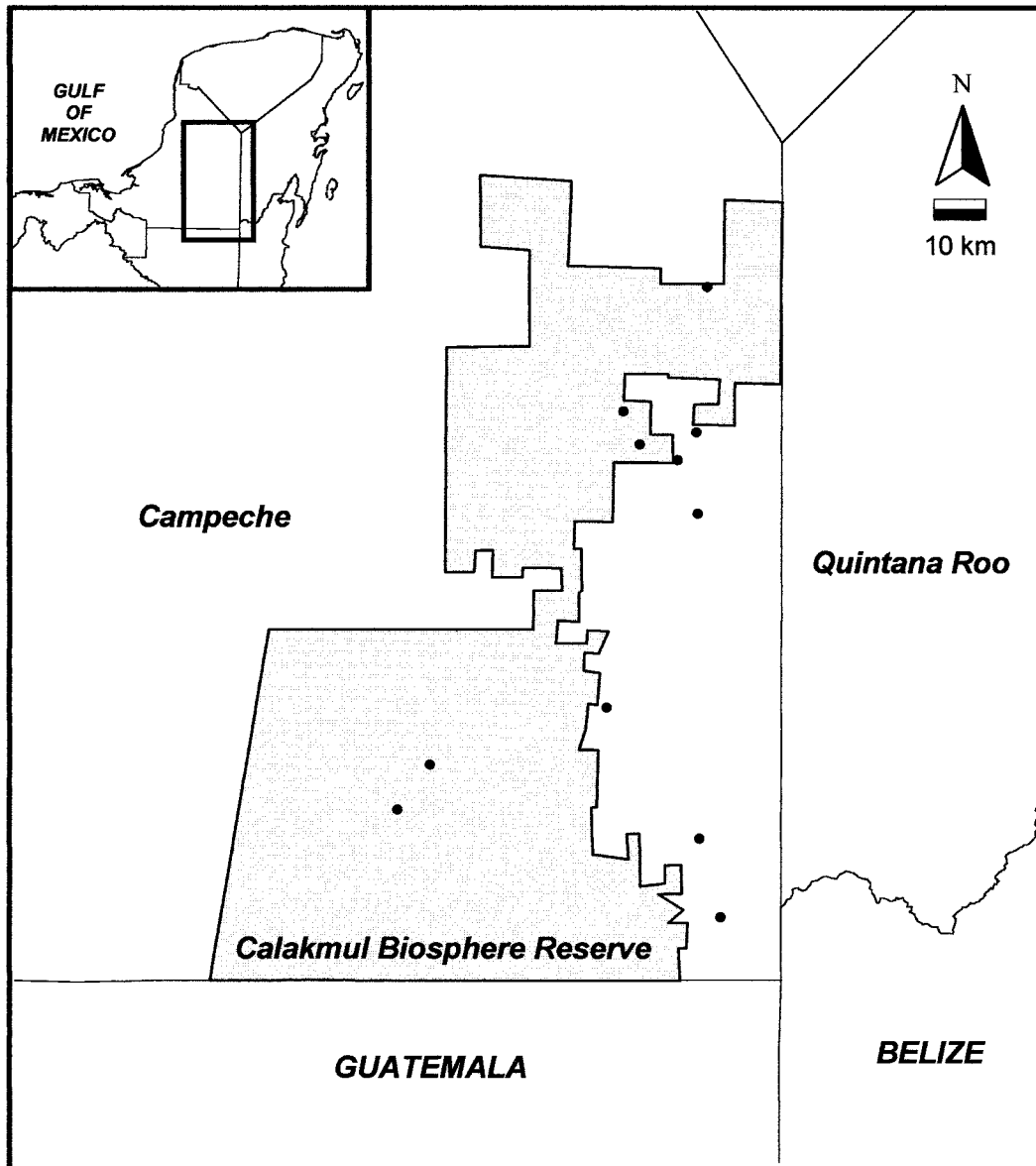


FIG. 1—Map of the Calakmul Biosphere Reserve, México. Study sites indicated by a black circle. Longest distance between northern sites and southern sites was 112.5 km.

University, and G. Austin from the Nevada Natural History Museum. Specimens are currently stored at the Museum of Zoology at El Colegio de la Frontera Sur-Chetumal, Mexico. Duplicate specimens are deposited at MZFC, Mexico.

Analysis—We combined data from the literature, museum records, and the data we obtained in the field to construct a table in which we specified the new records for the Calakmul region, for the state

of Campeche, and for Mexico. We also reported the vegetation type and the area of distribution for each species we recorded. The species recorded 3 or fewer times in a year were considered rare, whereas common species were those recorded in at least 25% of the study sites and during 25% of the sampling days (Sparrow et al., 1994). Our species list follows the phylogenetic classification by Lamas et al. (pers. comm.). We checked the adequacy of our inventory

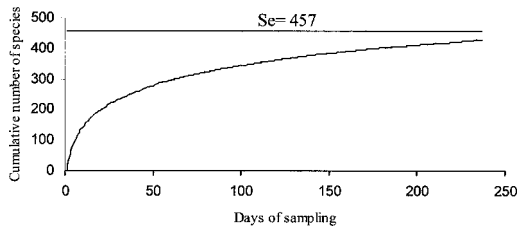


FIG. 2—Species cumulative curve for butterflies in all vegetation types surveyed in Calakmul Biosphere Reserve, México. Asymptote calculated by Clench method. Number of species expected (Se) for study area is 457.

by generating a species accumulation curve using the EstimateS 5 software (Colwell, 1997). We calculated the theoretical species number for this area using the method described by Clench (1979).

RESULTS—We recorded in the field a total of 65,385 individuals, representing 423 species of butterflies from southwestern Campeche, including 230 genera in 20 subfamilies and 5 families in the superfamilies Hesperioidea and Papilionoidea. Only 5 species were not collected, but were found in museums. These are *Caria melino*, *Cissia labe*, *Tmolus echion*, *Emesis lupina lupina* (Coleccion Nacional de Insectos. Instituto de Biología, Universidad Nacional Autónoma de México CNIN), and *Calephelis azteca* (American Museum of Natural History). Of the 423 species collected, only 129 had been previously reported or collected for Campeche, and only 47 for the Calakmul region. We report 290 species in Campeche for the first time. For the Calakmul area, 374 species are new records. One species, *Monca telata*, is a new record for Mexico. The theoretical species number calculated for this area was 457 species (Fig. 2). We present a list of 428 species of butterflies from the Calakmul region (Appendix 1). The list includes 231 genera in 20 subfamilies.

We found the medium semi-evergreen tropical forest the richest (371 species), representing 88% of the total species recorded in the Calakmul area. We found 27% of the species in Calakmul only in the M forest (Fig. 3). In the H forest, we found 22% of the species. Six species (*Philaethria diatonica*, *Castilia ofella*, *Tigridia acesta* ssp., *Mechanitis menapis doryssus*, *Mechanitis polymnia lycidice*, and *Zizula cyna cyna*) are restricted to this forest type. The L forest

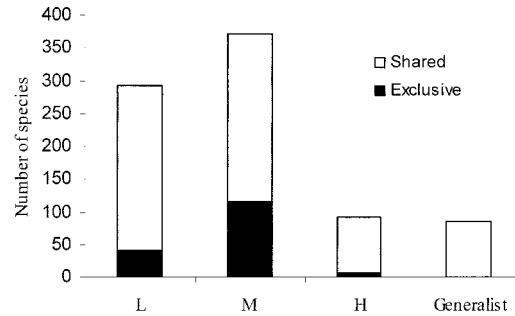


FIG. 3—Species richness of butterflies found in each type of vegetation in Calakmul Biosphere Reserve, México. Species shared among 3 forest types referred to as Generalist. L = low, tropical, semi-evergreen forest; M = medium, tropical, semi-evergreen forest; H = high, tropical, evergreen forest. See text for description of forest types.

shared 86% of species with the M forest. The majority of species restricted to 1 type of vegetation were HesperIIDae (84 species) followed by LycaenID species (53 species). These were restricted to the L and M forest (Fig. 4).

About 60% of the species were distributed in the entire region. The remaining species were found exclusively in the south (21%) or the north (18%). The south had a slightly more abundant representation. When comparing our list with other studies for Quintana Roo, Tikal-Guatemala National Park, and Belize, we found that 70% of the butterflies listed for Calakmul can be also found in Tikal. The numbers of species shared with Quintana Roo and Belize are much less, with 58% and 54% shared, respectively (Table 1).

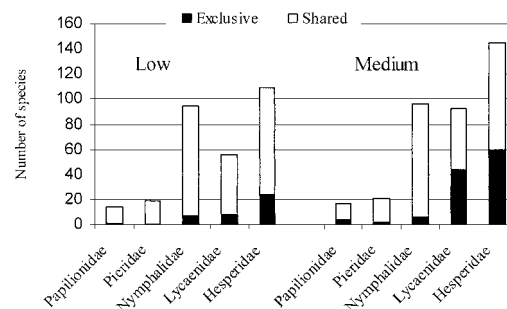


FIG. 4—Richness of butterfly species shared by and exclusive to the low, tropical, semi-evergreen forest and medium, tropical, semi-evergreen forest by family.

TABLE 1—Distribution of species recorded from Calakmul (CAL; this study), contiguous state of Quintana Roo (QROO; de la Maza and Gutiérrez, 1992), country of Belize (BEL; Meerman, 1993, 1999), and the park of Tikal, Guatemala (TIKAL; Austin et al., 1996), showing percentages of Calakmul species unique to each region. Numbers in parentheses are the number of the species exclusively from Calakmul

CAL total	CAL-TIKAL	CAL-QROO	CAL-BEL	CAL-QROO-BEL-TIKAL
428 (66)	298	249	230	158
100% (15%)	70%	58%	54%	37%

DISCUSSION—According to the theoretical species total ($SE = 457$) calculated for Calakmul, we sampled 93% of its total butterfly fauna. Based on these calculations, our list is almost a complete species list of this region; however, it is important to point out that the main study effort was made in 2 types of vegetation in the region: the L forest and M forest. There are some places in the south with patches of H forest, but these areas are difficult to reach in the rainy season. We think some of the species reported by Austin et al. (1996) for Tikal might also be found in these inaccessible H forest patches in southern Calakmul. If we are correct, this could increase our list of species to 665.

The proportion of the species shared between L and M forests is similar to the proportion of the tree species shared between those forests (Pérez-Salicrup, in press) in the Calakmul region (86% versus 82%, respectively). Also, the proportion of the species endemic to the L forest (9%) is the same for the tree species (Pérez-Salicrup, in press).

Fifteen percent of the fauna recorded in Calakmul has not been recorded in Quintana Roo, the border region of Belize, or the Tikal area in Guatemala. The species lists reported for Belize (Meerman, 1993, 1999) and Quintana Roo (de la Maza-Elvira and Gutiérrez, 1992) were obtained through a shorter time and with a different survey method. We believe that increasing the sampling effort at Quintana Roo likely would increase the number of species for Quintana Roo, thus increasing the

number of species shared between Calakmul and Quintana Roo. This is especially true for the southern part of Quintana Roo, where the landscape is similar to Calakmul. The case of Belize is different, because it has habitats not present in Calakmul. The study by Meerman (1999) included butterflies recorded in localities of the Maya Mountains. This is the richest area for butterfly species in Belize (Meerman, 1999), and it has a cloud forest that is not found in any other area of the Yucatan Peninsula.

Regarding the 5 species found in museums and not observed in our field work, we know that *Tmolus echion*, found in the CNIN collection for the Calakmul region, was reported in abundance in Quintana Roo (de la Maza-Elvira and Gutiérrez, 1992), and it also is reported for Tikal (Austin et al., 1996) and Belize (Meerman, 1999). In Tikal, *T. echion* is found in the L forest, the same kind of habitat that we surveyed in the region of Calakmul 35 km south of X-Pujil. We cannot explain why we did not find *T. echion* in Calakmul. *Emesis lupina lupina* was reported for the north and center of Quintana Roo, and in Corozal and the Maya Mountains in Belize. The species *Caria melino* is rare in the southern part of Quintana Roo. *Cissia labe* and *Calephelis azteca* are only found in the Maya Mountains in Belize, making it likely that we would not find either of these 2 species in Calakmul (even considering a greater survey effort for Quintana Roo or Belize).

The species distribution among the 5 families is similar to those reported for Tikal Park by Austin et al. (1996): 4.2% of Papilionidae, 4.9% of Pieridae, 25.7% of Nymphalidae, 25% of Lycaenidae, and 40.2% of Hesperidae. These proportions are also similar to those reported by Llorente-Bousquets et al. (1996) for Mexico, but are somewhat different from those reported by Heppner (1991) for the Neotropical butterfly fauna. In our list, hesperiids and papilionids are over-represented. It is necessary to continue the systematic collection and documentation of the butterflies in all the states of Campeche and Quintana Roo, and also in the country of Belize.

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APPENDIX 1—List of butterflies of Calakmul. the list includes 5 families, 4 of the superfamily Papilionoidea and 1 of the Hesperioidea. See text for description of vegetation types.

Taxon	New records ¹	Literature records ²	Museums ³	Vegetation type ⁴	Area ⁵
PAPILIONIDAE (18 species)					
<i>Battus philenor acauda</i> (Oberthür, 1879)	C			M	S/r
<i>Battus polydamas polydamas</i> (Linnaeus, 1758)	C			G	B
<i>Battus laodamas copanae</i> (Reakirt, 1863)	CK	4	AMNH	L-M	B
<i>Parides sesostris zeslos</i> (Cary, [1853])	CK	4, 13		L-M	S
<i>Parides erithalion polyzelus</i> (C. Felder & R. Felder, 1865)	C			L-M	S
<i>Parides iphidamas iphidamas</i> (Fabricius, 1793)	CK		CNIN	G	B
<i>Protographium epidaus epidaus</i> (Doubleday, 1846)	CK	4, 13	AMNH	L-M	B
<i>Protographium philolaus philolaus</i> (Boisduval, 1836)	CK	13	AMNH, CNIN	L-M	B
<i>Protographium ageslaus neosilaus</i> (Hopffer, 1865)	CK	4, 13	AMNH	G	B
<i>Protesilaus macrosilaus penthesilaus</i> (C. Felder & R. Felder, 1865)	C			M	B
<i>Priamides rogeri</i> (Boisduval, 1836)	C			G	B
<i>Priamides anchistades idaeus</i> (Fabricius, 1793)	C			L-M	S
<i>Troilides torquatus mazai</i> (Beutelspacher, 1977)	C			M	S/r
<i>Heracides thoas autocles</i> (Rothschild & Jordan, 1906)	CK	3, 13	AMNH	G	B
<i>Heracides cressphonites</i> (Cramer, 1777)	CK	3, 13	AMNH	G	B
<i>Calaides ornithion ornithion</i> (Boisduval, 1836)	C			L-M	B
<i>Calaides asbyalus pallas</i> (Gray, [1853])	CK	4	AMNH	M	S/r
<i>Pterourus menaitius victorinus</i> (Doubleday, 1844)	C			L	B
PIERIDAE (21 species)					
<i>Anteos clorinde</i> (Godart, [1824])	C			G	B
<i>Anteos maerula</i> (Fabricius, 1775)	CK			G	B/c
<i>Phoebis agarithe agarithe</i> (Boisduval, 1836)	CK	3	CNIN	G	B/c
<i>Phoebis argante</i> ssp.	CK	3, 21	USNM, CNIN	G	B
<i>Phoebis philea philea</i> (Linnaeus, 1763)	CK		AMNH, CNIN	G	B/c
<i>Phoebis sennae marcellina</i> (Cramer, 1777)	CK	3	CNIN	G	B
<i>Rhabdodryas trite</i> ssp.	C			M	S/r
<i>Aphrissa staitira staitira</i> (Cramer, 1777)	CK	21	SDNHM, CNIN	L-M	B
<i>Abaeis nicippe</i> (Cramer, 1779)	CK		CNIN	L-M	B
<i>Pyrsitia dina westwoodi</i> (Boisduval, 1836)	CK	21	USNM, CNIN	L-M	B
<i>Pyrsitia lisa centralis</i> (Herrich-Schäffer, 1865)	CK	3	AMNH, CNIN	M	N/r

APPENDIX 1—Continued.

Taxon	New records ¹	Literature records ²	Museums ³	Vegetation type ⁴	Area ⁵
<i>Pyrisitia nise nelphe</i> (R. Felder, 1869)	CK	3	AMNH, Nevada, CNIN	G	B/c
<i>Pyrisitia proteropa proteropa</i> (Fabricius, 1775)	CK		CNIN	G	B
<i>Eurema albata celata</i> (R. Felder, 1869)	CK		AMNH	G	B
<i>Eurema arborea boisduvaliana</i> (C. Felder & R. Felder, 1865)	CK		CNIN	L-M	B
<i>Eurema daira eugenia</i> (Wallengren, 1860)	CK	1, 2, 20	CNIN	G	B
<i>Kricogonia lyside</i> (Godart, 1819)	CK	11, 21	AMNH, CNIN	G	B/c
<i>Glutophrissa drusilla tenuis</i> (Lamas, 1891)	CK		SDNHM	G	B/c
<i>Pierballia viardi viardi</i> (Boisduval, 1836)	CK	21	AMNH, CNIN	G	B/c
<i>Ascia monuste monuste</i> (Linnaeus, 1764)	CK	3	Nevada	G	B
<i>Ganyra josephina josepha</i> (Salvin & Godman, 1868)	CK	3, 21	AMNH, CNIN	L-M	B
Nymphalidae (110 species)					
<i>Phlaethia diatonica</i> (Fruhstorfer, 1912)	C			H	S/r
<i>Dione juno huascuma</i> (Reakirt, 1866)	C				B
<i>Agraulis vanillae incarnata</i> (Riley, 1926)	CK		AMNH, Nevada	G	B
<i>Dryadula phaetusa</i> (Linnaeus, 1758)	CK	3	AMNH	G	B
<i>Dryas iulia moderata</i> (Riley, 1926)	CK		USNM, AMNH	G	B/c
<i>Euoides aliphera gracilis</i> Stichel, 1903	CK		CNIN	G	B
<i>Euoides isabella eva</i> (Fabricius, 1793)	CK		AMNH, CNIN	G	B
<i>Heliconius charitonia vazquezae</i> W. P. Comstock & F. M. Brown, 1950	CK	9	USNM, AMNH, CNIN	G	B/c
<i>Heliconius erato peliveranus</i> Doubleday, 1847	CK		USNM, AMNH, CNIN	G	B/c
<i>Euptoieta claudia daunius</i> (Herbst, 1798)	CK		CNIN	L-M	B
<i>Euptoieta hegesia hoffmanni</i> Stichel, 1938	C			G	B
<i>Anartia amathaea fatima</i> (Fabricius, 1793)	CK		SDNHM	G	B/c
<i>Anartia jatrophae luteipicta</i> Fruhstorfer, 1907	CK	3	CNIN	G	B/k
<i>Siproeta epaphus epaphus</i> (Latreille, [1813])	C		CNIN	M	N/r
<i>Siproeta stelenes biplogiata</i> (Fruhstorfer, 1907)	CK	4	CAS	G	B/c
<i>Janonia evarate</i> ssp.	CK		AMNH, CNIN	M-H	B
<i>Chlosyne erodyle erodyle</i> (H. W. Bates, 1864)	CK			M	S

APPENDIX 1—Continued.

Taxon	New records ¹	Literature records ²	Museums ³	Vegetation type ⁴	Area ⁵
<i>Chlosyne gaudialis gaudialis</i> (H. W. Bates, 1864)	CK		MZFC	L	S
<i>Chlosyne janais janais</i> (Drury, 1782)	C			G	B
<i>Chlosyne lacinia lacinia</i> (Geyer, 1837)	CK		Nevada, CNIN	G	B
<i>Thessalia theona</i> Ménétrés, 1855			Nevada, CNIN	G	B/c
<i>Phyciodes phaon</i> (W. H. Edwards, 1864)	C			L-M	B
<i>Anthanassa argentea</i> (Godman & Salvin, 1882)	C			L-M	B/r
<i>Anthanassa frisia tulcis</i> (H. W. Bates, 1864)	C			G	B/c
<i>Castilia myia myia</i> (Hewitson, [1864])			AMNH	G	B
<i>Castilia ofella</i> (Hewitson, [1864])	C			H	S/r
<i>Historis odius dious</i> Lamas, 1995	C			G	B/c
<i>Historis acheronta acheronta</i> (Fabricius, 1775)	C			L-M	B
<i>Historis acheronta acheronta</i> (Fabricius, 1775)	C			L-M	B
<i>Smyrna blomfieldia datis</i> Fruhstorfer, 1980	C			L-M	B
<i>Colobura dirce dirce</i> (Linnaeus, 1758)	C			G	B
<i>Tigridia acesta</i> ssp.				H	S/r
<i>Biblis hyperia aganisa</i> Boisduval, 1836			AMNH	L-M	B/c
<i>Mestra dorcas amymone</i> (Ménétriés, 1857)			AMNH, Nevada, CNIN	L-M	B/c
<i>Myscelia cyaniris cyaniris</i> Doubleday, [1848]	CK		CNIN	L-M	B
<i>Myscelia ethusa ethusa</i> (Doyère, [1840])	CK	14		L	B/c
<i>Catonephele mexicana</i> Jenkins & R. G. Maza, 1985	C			L	S/r
<i>Catonephele numita esite</i> (R. Felder, 1869)	CK	16		L-M	B
<i>Nessaea aglaura aglaura</i> (Doubleday, [1848])	C			L-M	B
<i>Eunica alcmena alcmena</i> (Doubleday, [1847])			AMNH	G	B
<i>Eunica montana</i> (Stoll, 1782)	CK		Nevada	L-M	B
<i>Eunica talita talita</i> (Herrich-Schäffer, [1855])		17, 19	AMNH, CNIN,	G	B/c
<i>Hamadryas amphinome mexicana</i> (Lucas, 1853)	C			M	S/r
<i>Hamadryas februa februa</i> (Godart, [1824])	CK	12	CNIN	G	B/c
<i>Hamadryas feronia farinulenta</i> (Fruhstorfer, 1916)	C			L-M	B
<i>Hamadryas guatemalena guatemalena</i> (H. W. Bates, 1864)		4, 12	CNIN	G	B
<i>Hamadryas julitta</i> (Fruhstorfer, 1914)	C			L-M	B/c
<i>Pyrrhogyra neaerea hypsenor</i> Godman & Salvin, 1884	C			L-M	B
<i>Pyrrhogyra otolais otolais</i> H. W. Bates, 1864	CK	16		L-M	N
<i>Temenis laothoe hondurensis</i> Fruhstorfer, 1907	C			L-M	B

APPENDIX 1—Continued.

Taxon	New records ¹	Literature records ²	Museums ³	Vegetation type ⁴	Area ⁵
<i>Nica flavilla bachiana</i> (R. G. Maza & J. Maza, 1985)			AMNH	L-M	B/c
<i>Dynamine dyomis</i> Geyer, 1837	C			L-M	B
<i>Dynamine theseus</i> (C. Felder & R. Felder, 1861)	C			M	N/r
<i>Dynamine postverta mexicana</i> d'Almeida, 1952		16	AMNH, CNIN	G	B
<i>Callicore texa titania</i> (Salvin, 1869)	C			L	S/r
<i>Adelpha basiloides basiloides</i> (H. W. Bates, 1865)	C			L-M	B
<i>Adelpha fessonia fessonia</i> (Hewitson, 1847)	CK	4	AMNH, AMNH	L-M	B
<i>Adelpha iphichus iphichola</i> (H. W. Bates, 1864)				G	B
<i>Adelpha ixia leucas</i> Fruhstorfer, 1915	C			L-M	B
<i>Adelpha naxia ephiphida</i> (C. Felder & R. Felder, 1867)	C			L-M	B
<i>Adelpha phylaca phylaca</i> (H. W. Bates, 1866)	C			L	S/r
<i>Adelpha serpa massilia</i> (C. Felder & R. Felder, 1867)	C			G	B/c
<i>Marpesia chiron marius</i> (Cramer, 1779)	CK		AMNH	G	B/c
<i>Marpesia petreus</i> ssp.	C			L-M	B
<i>Archaeoprepona demophon centralis</i> (Fruhstorfer, 1905)		17	CNIN	L-M	B/c
<i>Archaeoprepona demophon gutina</i> (Fruhstorfer, 1904)			CNIN	G	B/c
<i>Prepona laertes octavia</i> Fruhstorfer, 1905	CK		CNIN	L-M	B
<i>Prepona pylene philetas</i> Fruhstorfer, 1904	C			L-M	B
<i>Zaretis callidryas</i> (R. Felder, 1869)	C			L-M	B
<i>Siderone galanthis</i> ssp.	C			L-M	B
<i>Anaea troglodyta aidea</i> (Guérin-Ménéville, [1844])	CK	2, 3, 5	AMNH, CNIN	L-M	B/c
<i>Consul electra electra</i> (Westwood, 1850)	CK		AMNH	G	B
<i>Fountainea eurpyle confusa</i> (A. Hall, 1929)			CNIN	L-M	B/c
<i>Fountainea glycerium yucatanum</i> (Witt, 1980)	C			L-M	B
<i>Memphis artacaena</i> (Hewitson, 1869)	CK		CNIN	M	B/r
<i>Memphis forsteri</i> (Godman & Salvin, 1884)	CK		AMNH, CNIN	L-M	B/c
<i>Memphis hedemanni</i> (R. Felder, 1869)	C			L-M	B
<i>Memphis phila boisduvali</i> W. P. Comstock, 1961	C			L-M	B/c
<i>Memphis pithyusa</i> (R. Felder, 1869)		3	AMNH, CNIN	G	B
<i>Asterocampa idylla argus</i> (H. W. Bates, 1864)	C			G	B
<i>Doxocopa laure laure</i> (Drury, 1773)			AMNH, SDNHM, CNIN, Nevada	G	B
<i>Doxocopa pavon theodora</i> (Lucas, 1857)	CK		AMNH	G	B
<i>Morpho achilles montezuma</i> Guenée, 1859		3, 4	AMNH, CNIN	L-M	B/c
<i>Opsiphanes invirae fabricii</i> Boisduval, 1870)	CK	3	AMNH, CNIN	G	B

APPENDIX 1—Continued.

Taxon	New records ¹	Literature records ²	Museums ³	Vegetation type ⁴	Area ⁵
<i>Opisiphantes quiteria quirinus</i> Godman & Salvin, 1881	C			L-M	B
<i>Caligo atreus uranus</i> Herrich-Schäffer, 1850	C			G	B
<i>Caligo leucer memnon</i> (C. Felder & R. Felder, 1867)	C			M-H	B
<i>Eryphanis aescacus aescacus</i> (Herrich-Schäffer, 1850)	C			M	B/r
<i>Manataria maculata</i> (Hopffer, 1874)	C			L	S
<i>Cepheopychia glaucina</i> (H. W. Bates, 1864)	CK	4	CNIN	G	B
<i>Cissia labe</i> (Butler, 1870)	N ⁶				
<i>Cissia pseudoconfusa</i> Singer, DeVries & Ehrlich, 1983	C	4	AMNH, CNIN	G	B/c
<i>Cissia</i> sp.				L-M	B
<i>Cylopsis</i> sp.	C			L	B/r
<i>Hermeuptychia hermes hermes</i> (Fabricius, 1775)		3	CNIN	G	B/c
<i>Magneuptychia libye</i> (Linnaeus, 1767)			CNIN	L-M	B
<i>Pareuptychia binocula metaleuca</i> (Boisduval, 1870)	C			G	B
<i>Pareuptychia ocirrhoe</i> sp.			AMNH, CNIN	L-M	B/c
<i>Toxetis virgata</i> (Cramer, 1776)	C			G	B/c
<i>Toxetis thamyra</i> (Cramer, 1779)	C			L-M	B
<i>Vareuptychia usitata pieria</i> (C. Felder & R. Felder, 1867)			CNIN	G	B/c
<i>Vareuptychia similis</i> (Butler, 1867)			CNIN	G	B/c
<i>Ypthimoides renata</i> (Stoll, 1780)			CNIN	G	B/c
<i>Danaus eresimus montezuma</i> Talbot, 1943	CK	7	USNM, CNIN	G	B
<i>Danaus gilippus thersippus</i> (H. W. Bates, 1863)	CK		CNIN	G	B
<i>Danaus plexippus plexippus</i> (Linnaeus, 1758)	CK	3	AMNH	G	B
<i>Lycorea halia atergatis</i> Doubleday, [1847]	C			M-H	S/r
<i>Mechanitis menapis doryssus</i> H. W. Bates, 1864	C			H	S/r
<i>Mechanitis polymnia lycidice</i> H. W. Bates, 1864	C			H	S/r
<i>Pteronymia cobyto cobyto</i> (Guérin-Ménéville, [1844])	CK		CNIN	G	B
<i>Libytheana carinenta mexicana</i> Michener, 1943	CK		CNIN	G	B
LYCAENIDAE (107 species)					
<i>Euselasia chrysiptre</i> (H. W. Bates, 1866)	C			M	N/r
<i>Euselasia sergia sergia</i> (Godman & Salvin, 1885)	C			L-M	N/r
<i>Euselasia mystica</i> (Schaus, 1913)	C			M	N/r
<i>Euselasia aurantiaca aurantiaca</i> (Salvin & Godman, 1868)	C			M	N/r
<i>Euselasia</i> sp.				M	N
<i>Mesoemita tetrica</i> (Stichel, 1910)			AMNH, CNIN	G	B

APPENDIX 1—Continued.

Taxon	New Literature records ¹	Literature records ²	Museums ³	Vegetation type ⁴	Area ⁵
<i>Napaea umbra umbra</i> (Boisduval, 1870)	C			L-M	B
<i>Rhetus arcus thia</i> (Morrisse, 1838)	C			G	B
<i>Rhetus perianther naevianus</i> Stichel, 1910	C			M	N
<i>Nothene erota</i> ssp.	C			M	N/r
<i>Calephelis wrighti</i> Holland, 1930	C			L-M	B
<i>Calephelis fulmen</i> Stichel, 1910	C			L-M	N
<i>Calephelis stallingsi</i> McAlpine, 1971	C			L-M	S
<i>Calephelis maya</i> McAlpine, 1971	C			L-M	B
<i>Calephelis azteca</i> McAlpine, 1971	N		AMNH		
<i>Calephelis yucatepauensis</i> R. G. Maza & Turrent, 1977	C			L-M	B
<i>Calephelis browni</i> McAlpine, 1971	C			L-M	B
<i>Calephelis tikal</i> Austin, 1993	C			L-M	B/c
<i>Calephelis</i> sp.				G	B
<i>Charis zama</i> H. W. Bates, 1868			CNIN	L-M	B
<i>Caria ino melicerta</i> Schaus, 1890	C			M	S
<i>Caria stillaticia</i> Dyar, 1912	C			M	S/r
<i>Caria melino</i> Dyar, 1912	N		CNIN		
<i>Caria mantinea lampeto</i> Godman & Salvin, 1886	C			M	S
<i>Baeotis zonata</i> zonata R. Felder, 1869	C			G	B
<i>Baeotis sulphurea macularia</i> (Boisduval, 1870)	C			M	S/r
<i>Melanis fixa fixa</i> (Boisduval, 1836)	CK			L-M	B
<i>Mesene silaris</i> Godman & Salvin, 1878	C		CNIN	M	N/r
<i>Mesene</i> sp.				L-M	N
<i>Synnemachia accusatrix</i> Westwood, [1851]	C			M	N/r
<i>Sarota psaros psaros</i> Godman & Salvin, 1886	C			M	N/r
<i>Anteros carausius carausius</i> Westwood, [1851]	C			L-M	S
<i>Galydina sturmula hegas</i> R. Felder, 1869	C			L-M	B
<i>Emesis aurimma</i> (Boisduval, 1870)	C			L-M	B
<i>Emesis mandana furor</i> Butler & H. Druce, 1872	C			G	B
<i>Emesis tenedia tenedia</i> C. Felder & R. Felder, 1861			AMNH, CNIN	L-M	B
<i>Emesis lupina lupina</i> Godman & Salvin, 1886	N		CNIN		
<i>Emesis emesia</i> (Hewitson, 1867)	C			G	B
<i>Emesis tegula</i> Godman & Salvin, 1886	C			L-M	B
<i>Argyrogrammana stilbe holosticta</i> (Godman & Salvin, 1878)	C		CNIN	M	N

APPENDIX 1—Continued.

Taxon	New Literature records ¹	records ²	Museums ³	Vegetation type ⁴	Area ⁵
<i>Pseudonymphidia cleavista</i> (Butler, 1871)	C			M	S
<i>Apodemia hypoglauca hypoglauca</i> (Godman & Salvin, 1878)	C			M	N
<i>Thisbe irenea belides</i> Stichel, 1910	C			L-M	B
<i>Thisbe lycorias lycorias</i> (Hewitson, [1853])	C			M	B
<i>Lemonias agave agave</i> Godman & Salvin, 1886	C			M	S/r
<i>Juditha molpe molpe</i> (Hübner, [1808])			AMNH, CNIN	G	B/c
<i>Synargis calyce mycone</i> (Hewitson, 1865)	C			L-M	B
<i>Pandemos godmani</i> (Dewitz, 1877)	C			L-M	B/r
<i>Theope virgilius</i> (Fabricius, 1793)	C			M	B
<i>Theope eupolis</i> Schaus, 1890	C			M	S/r
<i>Theope publius incompositus</i> J. Hall, 1999			AMNH	M	N/r
<i>Caloclasma litina</i> (Butler, 1870)	C			L-M	B
<i>Leptotes cassius strigata</i> (W. H. Edwards, 1877)	C		AMNH, CNIN	G	B/c
<i>Zizula cyna cyna</i> (W. H. Edwards, 1881)	C			H	S/r
<i>Hemiarigus ceravunus</i> Hübner, [1818]	CK		USNM, CNIN	L-M	B
<i>Evers comyntas</i> (Godart, [1824])			CNIN	G	B
<i>Celastrina angiolus gozora</i> (Boisduval, 170)	C			L	N/r
<i>Eumaeus toxea</i> (Godart, 1824)			USNM, CNIN	G	B/c
<i>Brangas getus</i> (Fabricius, 1787)	C			L-M	B
<i>Evevus regalis</i> (Cramer, 1775)	CK			L-M	B
<i>Thecla heraclides</i> (Godman & Salvin, 1887)	C		CNIN	L	S/r
<i>Atlides halesus</i> (Cramer, 1777)	C			L-M	B
<i>Atlides gaumeri</i> (Godman, 1901)	C			L-M	B
<i>Atlides polybe</i> (Linnaeus, 1763)	C			L-M	B
<i>Atlides carpasia</i> (Hewitson, 1868)	C			M	S
<i>Pseudolycaena damo</i> (H. Druce, 1875)	C			G	B
<i>Theritas hemon</i> (Cramer, 1775)	C			M	S/r
<i>Cyanophrys fustus</i> (Godman & Salvin, 1887)	C			M	S/r
<i>Cyanophrys herodotus</i> (Fabricius, 1793)	C			M	S/r
<i>Cyanophrys longula</i> (Hewitson 1868)	C			M	S/r
<i>Rekoa meton</i> (Cramer, 1779)	CK				
<i>Rekoa palegon</i> (Cramer, 1780)			CNIN	G	B
<i>Rekoa marius</i> (Lucas, 1857)			CNIN	L-M	B
<i>Arctiacaecus sito</i> (Boisduval, 1836)	C		CNIN	L-M	B
				G	B

APPENDIX 1—Continued.

Taxon	New Literature records ¹	records ²	Museums ³	Vegetation type ⁴	Area ⁵
<i>Aratacus jada</i> (Hewitson, 1867)	C			L-M	B/r
<i>Thecla ligurina</i> (Hewitson, 1874)	C			L	B
<i>Thecla lyde</i> (Godman & Salvin, 1887)	C			L	B
<i>Magnastigma elsa</i> (Hewitson 1877)	C			M	B
<i>Chlorostrymon simaethis</i> (Drury, 1773)	C			M	N/r
<i>Celmia conoveria</i> (Schaus, 19020)	C			M	N/r
<i>Allosmaitia strophius</i> (Godart, 1824)	C			L	N
<i>Lamprospilus collucia</i> (Hewitson, 1877)	C			M	S/r
<i>Thecla galliena</i> (Hewitson, 1877)	C			M	N/r
<i>Electrostrymon sangala</i> (Hewitson, 1868)	CK		CNIN	M	S/r
<i>Galyopsis isoboon</i> (Butler & H. Druce, 1872)	CK		CNIN	M	N
<i>Strymon melinus</i> (Hübner, 1813)	C			L	S/r
<i>Strymon yojoa</i> (Reakirt, 1867)	C			G	B
<i>Strymon mulucha</i> (Hewitson, 1867)	C			G	S/r
<i>Strymon cestri</i> (Reakirt, 1867)	C			M	S/r
<i>Strymon alca</i> (Godman & Salvin, 1887)	C			M	B/r
<i>Strymon bebrycia</i> (Hewitson, 1868)	C			M	S/r
<i>Strymon istapa</i> (Reakirt, 1867)	C			L-M	B
<i>Strymon bazochii</i> (Godart, 1824)	CK		USNM	M	S
<i>Strymon serapio</i> (Godman & Salvin, 1887)	C			M	B/r
<i>Strymon megarus</i> (Godart, 1824)	C			M	S/r
<i>Strymon ziba</i> (Hewitson, 1868)	CK		CNIN	M	S/r
<i>Tmolus echion</i> (Linnaeus, 1767)	N		CNIN		
<i>Ministrymon azia</i> (Hewitson, 1873)	C			L	N/r
<i>Ministrymon una</i> (Hewitson, 1873)	C			M	N/r
<i>Ostrinotes keila</i> (Hewitson, 1869)	C				
<i>Panthiades bithias</i> (Cramer, 1777)	C				
<i>Panthiades bathildis</i> (C. Felder & R. Felder, 1865)					
<i>Panthiades phaleros</i> (Linnaeus, 1767)	C		CNIN	L-M	B
<i>Thecla echelta</i> (Hewitson, 1867)	C			M	N/r
<i>Parrhasius polibetes</i> (Stoll, 1781)	C			M	S/r
<i>Michaechus ira</i> (Hewitson, 1867)	C			M	N
<i>Chalybs janias</i> (Cramer, 1779)	C			L	S
				M	N

APPENDIX 1—Continued.

Taxon	New records ¹	Literature records ²	Museums ³	Vegetation type ⁴	Area ⁵
HESPERIIDAE (172 species)					
<i>Pyrrhopyge mulleri</i> (Bell, 1934)	C			M	B/r
<i>Elbella scylla</i> (Ménétriés, 1855)	C			M	S/r
<i>Myscelus amystis hages</i> (Godman & Salvin, 1893)	C			L-M	B
<i>Phocidæ spalemon lilea</i> (Reakirt, [1867])	C			L-M	B
<i>Phocides belus</i> Godman & Salvin, 1893	CK	3, 6		M	B
<i>Phocides pigmalion pigmalion</i> (Cramer, [1779])	CK	6		M	S
<i>Phanus marshallii</i> Kirby, 1880	C			L-M	B
<i>Udranomita kikihawai</i> (Weeks, 1906)	C			L	S/r
<i>Protides mercurius mercurius</i> (Fabricius, 1787)	C			L-M	B
<i>Epargyreus exadeus cruza</i> Evans, 1952	C			L-M	N
<i>Epargyreus spina spina</i> Evans, 1952	C			L-M	B
<i>Epargyreus</i> sp.				M	B
<i>Polygonus manueli manueli</i> Bell & W. P. Comstock, 1948	CK	8		L-M	B/c
<i>Chioides catillus albofasciatus</i> (Hewitson, 1867)	C			M	S
<i>Chioides zilpa</i> (Butler, 1872)	C			M	S/r
<i>Agana asander asander</i> (Hewitson, 1867)	C			L-M	B/r
<i>Agana claxon</i> Evans, 1952	C			L	S
<i>Agana aurunce hypozonius</i> (Plötz, 1880)	C			M	N/r
<i>Agana metophis</i> (Latreille, [1824])	C			L-M	B
<i>Agana coeloides</i> Austin & Mielke, 1997	C			L	S/r
<i>Typhedanus unudatus</i> (Hewitson 1867)	C			M	N/r
<i>Typhedanus ampyx</i> (Godman & Salvin, 1893)	C			L-M	B
<i>Typhedanus salas</i> H. A. Freeman, 1977	C			L-M	B
<i>Polythrix octomaculata</i> (Sepp, 1848)	C		L-M	B/r	
<i>Polythrix asine</i> (Hewitson, 1867)	C		L-M	B	
<i>Codatractus carolos</i> Evans, 1952	C		M	S/r	
<i>Codatractus alcaeus</i> (Hewitson, 1867)	C		L-M	B	
<i>Codatractus yucatanus</i> H. A. Freeman, 1977	C		L-M	S	
<i>Codatractus melon</i> (Godman & Salvin, 1893)	C		M	S/r	

APPENDIX 1—Continued.

Taxon	New records ¹	Literature records ²	Museums ³	Vegetation type ⁴	Area ⁵
<i>Ridens allyni</i> H. A. Freeman, 1979	C			M	B/r
<i>Urbanus proteus proteus</i> (Linnaeus, 1758)	C			L-M	B
<i>Urbanus viterboana</i> (Ehrmann, 1907)	C			L-M	N/r
<i>Urbanus belli</i> (Hayward, 1935)	C			M	N/r
<i>Urbanus esmeraldus</i> (Butler, 1877)	C			L	B/r
<i>Urbanus evona</i> Evans, 1952	C			L-M	B
<i>Urbanus dorantes dorantes</i> (Stoll, [1790])	C		L-M	B	
<i>Urbanus teleus</i> (Hübner, 1821)	C		L-M	B	
<i>Urbanus tanna</i> Evans, 1952	C		L-M	B	
<i>Urbanus simplicius</i> (Stoll, [1790])	C		M	N/r	
<i>Urbanus proene</i> (Plötz, 1881)	C		L-M	B/r	
<i>Urbanus doryssus doryssus</i> (Swainson, 1831)	C		L-M	B	
<i>Urbanus albimargo albimargo</i> (Mabille, 1875)	C			L	N
<i>Astraptes fulgenerator azul</i> (Reakirt, [1867])	C			L-M	B
<i>Astraptes egregius</i> (Butler, 1870)	CK	6		L-M	B
<i>Astraptes enotrus</i> (Stoll, [1781])	C			L-M	B
<i>Astraptes alantus latia</i> Evans, 1952	C			L-M	S/r
<i>Astraptes alector hopfferi</i> (Plötz, 1882)	C			L	S/r
<i>Astraptes anaphus annetta</i> Evans, 1952	C			L-M	B
<i>Narcosius parisi helen</i> (Evans, 1952)	C			L-M	B
<i>Narcosius</i> sp.				L-M	S
<i>Calliades zeutus</i> (Möschler, 1879)	C			L-M	S
<i>Autochton longipenis</i> (Plötz, 1882)	C			L-M	B/r
<i>Autochton zarex</i> (Hübner, [181])	C			MM	N
<i>Autochton</i> spp.	C			M	N/r
<i>Thessia jalapus</i> (Plötz, 1882)	C			M	N
<i>Achalarus albociliatus albociliatus</i> (Mabille, 1877)	C			M	B
<i>Achalarus toxeus</i> (Plötz, 1882)	C			M	N/r
<i>Cabares potrillo potrillo</i> (Lucas, 1857)	C			L-M	B
<i>Nascus phocus</i> (Cramer, [1777])	C			L-M	B
				M	N/r

APPENDIX 1—Continued.

Taxon	New records ¹	Literature records ²	Museums ³	Vegetation type ⁴	Area ⁵
<i>Oryza calathana calanus</i> (Godman & Salvin, 1894)	C			L-M	B
<i>Celaenorrhinus stola</i> Evans, 1952	C			L-M	B/r
<i>Saphilepia clonius</i> (Cramer, [1775])	C			L-M	B
<i>Cogia calchas</i> (Herrich-Schäffer, 1869)	C			L-M	B
<i>Arteurotia tractipennis tractipennis</i> Butler & H. Druce, 1872	CK	6, 15		M	S/r
<i>Polyctor cleta</i> Evans, 1953	CK	6, 10		M	N/r
<i>Nisoniades godma</i> Evans, 1953	C			L-M	B
<i>Nisoniades rubescens</i> (Möschler, 1877)	C			L	N/r
<i>Nisoniades</i> sp.				L-M	B
<i>Pellicia arina</i> Evans, 1953	C			L-M	B
<i>Pellicia dimidiata</i> Herrich-Schäffer, 1870	C			L	N
<i>Pachyneuria</i> spp.	C			L-M	B
<i>Staphylus vulgata</i> (Möschler, 1879)	C			M	N/r
<i>Staphylus lentis</i> Steinhauser, 1989	C			L-M	B/r
<i>Gorythion begga pyralina</i> (Möschler, 1877)	C			L-M	B
<i>Gorythion vox</i> Evans, 1953	C			M	N/r
<i>Zera</i> spp.	C			L-M	B
<i>Quadrus cerialis</i> (Stoll, [1782])	C			M	N
<i>Quadrus contubernalis</i> (Mabille, 1883)	C			M	N/r
<i>Quadrus lugubris lugubris</i> (R. Felder, 1869)	C			L-M	B
<i>Sostrata nordica</i> Evans, 1953	CK	6		L-M	B
<i>Paches loxus zonula</i> (Mabille, 1889)	CK	6		M	N/r
<i>Atarnes saltii</i> (C. Felder & R. Felder, 1867)	C			M	N/r
<i>Mylon memippus</i> (Fabricius, 1777)	C			L-M	B
<i>Mylon pelopidas</i> (Fabricius, 1793)	CK	6		M	N
<i>Carrhenes canescens canescens</i> (R. Felder, 1869)	C			M	S/r
<i>Xenophanes tryxus</i> (Stoll, [1780])	C			M	B/r
<i>Antigonus nearchus</i> (Latreille, [1817])	C			M	S/r
<i>Antigonus erosus</i> (Hübner, [1812])	C			L-M	B
<i>Systasa pulverulenta</i> (R. Elder, 1869)	C			L-M	S
<i>Aethilla lavochrea</i> Butler, 1872	C			L-M	B

APPENDIX 1—Continued.

Taxon	New records ¹	Literature records ²	Museums ³	Vegetation type ⁴	Area ⁵
<i>Achyrodes basistrus heros</i> Ehrmann, 1909	CK	6		L-M	N/r
<i>Eantis thraso</i> (Hübner, [1807])	C			M	N/r
<i>Eantis tamenund</i> (W. H. Edwards, [1871])	C			M	S
<i>Grasis stigmaticus stigmaticus</i> (Mabille, 1883)	C			L	S/r
<i>Timochares trifasciata trifasciata</i> (Hewitson, [1868])	CK	6		G	B
<i>Timochares rufifasciatus rufifasciatus</i> (Plötz, 1884)	C			M	S/r
<i>Anastrus sempiternus sempiternus</i> (Butler & H. Druce, 1872)	C			M	N/r
<i>Anastrus nearcticus</i> (Möschler, 1879)	C			M	S/r
<i>Ebrictas</i> sp.				M	S
<i>Ebrictas anacreon</i> (Staudinger, 1876)	C			M	S/r
<i>Cycloglypha thrasibulus</i> (Fabricius, 1793)	C			M	N/r
<i>Helias cama</i> Evans, 1953	C			M	S/r
<i>Campopleura theramenes</i> Mabille, 1877	C			M	S
<i>Chiomara georgina georgina</i> (Reakirt, 186)	C			M	N/r
<i>Giomara mithrax</i> (Möschler, 1879)	CK	6		L	S/r
<i>Gesta invisus</i> (Butler & H. Druce, 1872)	C			L	S/r
<i>Pyrgus adepta</i> Plötz, 1884	C			G	B
<i>Pyrgus philetas</i> W. H. Edwards, 1881	C			M	N/r
<i>Pyrgus oleus</i> (Linnaeus, 1767)	C			G	B
<i>Heliopeles macaira</i> (Reakirt, [1867])	C			L-M	B
<i>Heliopeles arsalle</i> (Linnaeus, 1758)	CK	3		G	B
<i>Heliopeles alana</i> (Reakirt, 1868)	C			L-M	B
<i>Synapte pecta</i> Eans, 1955	C			L-M	B
<i>Zariaspes mys</i> (Hübner, [1808])	C			L-M	B
<i>Anthoptus insignis</i> (Plötz, 1882)	C			L-M	B
<i>Anthoptus epictetus</i> (Fabricius, 1793)	C			M	N/r
<i>Coriticea corticea</i> (Plötz, 1883)	C			M	N
<i>Coriticea lysias</i> (Plötz, 1883)	C			L-M	B/r
<i>Vinius tryhana</i> (Kaye, 1914)	C			L-M	B
<i>Callimormus juvenis</i> Scudder, 1872	C			M	B
<i>Callimormus saturnus</i> (Herrich-Schäffer, 1869)	C			L-M	B
<i>Virga virginis</i> (Möschler, 1883)	C			L-M	B
<i>Virga clenchi</i> L. D. Miller, 1970	C			M	S/r
				L	S

APPENDIX 1—Continued.

Taxon	New records ¹	Literature records ²	Museums ³	Vegetation type ⁴	Area ⁵
<i>Mnasides gelta</i> Godman, 1901	C			L-M	B
<i>Mnasichlitchetaom</i> Godman, 1901	C			L-M	B
<i>Methionopsis ina</i> (Plötz, 1882)	C			L-M	B
<i>Mnaseas bicolor</i> (Mabille, 1889)	C			L-M	B/r
<i>Phanes aletes</i> (Geyer, [1832])	C			L	S/r
<i>Monca telata</i> (Herrich-Schäffer, 1869)	M			M	S/r
<i>Monca tytaeus</i> (Plötz, 1883)	C			L-M	B/r
<i>Nastra leucone leucone</i> (Godman, 1900)	C			M	N/r
<i>Cynaenies theogenis</i> (Capronnier, 1874)	C			L	S/r
<i>Cynaenies trebius</i> (Mabille, 1891)	C			L-M	B
<i>Cynaenies fraus</i> (Godman, 1900)	C			M	N/r
<i>Vehilius inca</i> (Scudder, 1872)	C			L-M	B
<i>Vehilius illudens</i> (Mabille, 1891)	CK	6		L-M	B
<i>Remella remus</i> (Fabricius, 1798)	C			L	N/r
<i>Remella</i> spp.				L-M	B
<i>Lerema accius</i> (J. E. Smith, 1797)	C			L-M	B
<i>Lerema liris</i> Evans, 1955	C			L-M	B
<i>Lerema lochius</i> (Plötz, 1883)	C			L	S/r
<i>Morys valerius valda</i> Evans, 1955	C			L-M	B
<i>Morys geisa lyde</i> Godman, 1900	C			M	N
<i>Vetivus fantatos</i> (Stoll, [1780])	CK	15, 18		L-M	B
<i>Vetivus onaca</i> Evans, 1955	C			M	N/r
<i>Vetivus tertiamus</i> (Herrich-Schäffer, 1869)	C			M	N/r
<i>Tromba xanthura</i> (Godman, 1901)	CK	6		L-M	B/r
<i>Synale cynaxa</i> (Hewitson, 1867)	C			M	N/r
<i>Carystus phorceus</i> (Cramer, [1777])	C			L	N/r
<i>Damas clavus</i> (Herrich-Schäffer, 1869)	C			M	N/r
<i>Carystoides</i> sp.	C				
<i>Perichares philetes adela</i> (Hewitson, [1867])	C			L	S/r
<i>Orses cynisca</i> (Swainson, 1821)	C			L-M	S/r

APPENDIX 1—Continued.

Taxon	New Literature records ¹	Museums ³	Vegetation type ⁴	Area ⁵
<i>Rhithon osca</i> (Plötz, 1883)	C		M	N/r
<i>Conga chydaca</i> (Butler, 1877)	C		L-M	S/r
<i>Copaedes minima</i> (W. H. Edwards, 1870)	C		M	N/r
<i>Hylophila phyleus phyleus</i> (Drury, [1773])	C		L-M	B
<i>Atalopodes campestris campestris</i> (Boisduval, 1852)	C		L-M	B
<i>Pobites vibex praeceps</i> (Scudder, 1872)	C		L-M	B/r
<i>Wallengrenia otho otho</i> (J. E. Smith, 1797)	C		L	S/r
<i>Pompeius pompeius</i> (Latreille, [1824])	C		L-M	B
<i>Amblyscirtes tolteca tolteca</i> Scudder, 1872	C		M	N/r
<i>Lerodea eufala</i> (W. H. Edwards, 1869)	C		L	S/r
<i>Lerodea arabus</i> (W. H. Edwards, 1882)	C		L	S/r
<i>Panoquina ocola</i> (W. H. Edwards 1863)	C		L	S/r
<i>Panoquina herbolus</i> (Scudder, 1872)	C		L-M	B/r
<i>Panoquina leucas</i> (Fabricius, 1793)	C		L	B
<i>Panoquina pauper</i> (Mabille, 1878)	C		M	S/r
<i>Panoquina evadens</i> (Stoll, [1781])	C		L-M	N
<i>Vacerra titana</i> (Hewitson, [1866])	C		L	S/r
<i>Aides brilla</i> (H. A. Freeman, 1970)	C		M	N/r
<i>Neoxeniades luda</i> (Hewitson, 1877)	C		L-M	B

¹ New records; CK = Calakmul; C = Campeche; M = México.

² Literature records: 1 = Felder, 1869; 2 = Godman & Salvin, 1878–1901; 3 = Field, 1939; 4 = Hoffmann, 1940; 5 = Johnson and Comstock, 1941; 6 = Hoffmann, 1941; 7 = Forbes, 1943; 8 = Bell and Comstock, 1948; 9 = Comstock and Brown, 1950; 10 = Freeman, 1967; 11 = Welling, 1973; 12 = Jenkins, 1983; 13 = Beutelspacher and Howe, 1984; 14 = Jenkins, 1984; 15 = Kendall and McGuire, 1984; 16 = de la Maza and Turrent, 1985; 17 = de la Maza, 1987; 18 = Balcázar, 1988; 19 = Jenkins, 1990; 20 = Beutelspacher, 1991; 21 = Llorente-Bousquets et al., 1997.

³ CNIN = Colección Nacional de Insectos, Instituto de Biología, Universidad Nacional Autónoma de México.

⁴ Vegetation type: M = medium, tropical, semi-evergreen forest; L = low, tropical, semi-evergreen forest; H = high, tropical, semi-evergreen forest, G = generalist.

⁵ Area of distribution: N = north; S = south; B = broad; r = rare; c = common.

⁶ Not found in our fieldwork.