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SOME NEW AND RARE RECORDS OF LEPIDOPTERA FOUND IN TEXAS

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INTRODUCTION

Some of the records treated here have appeared in the Lepidopterists' News (Season Summary) and others in the Southern Lepidopterists' News. For historical and biological abstracting purposes they are formalized in this paper, together with appropriate credits and reference citations.

It will be noted that these particular species, except for *Staphylus azteca* (Scudder) and *Atrytone mazai* Freeman (oversights), were not included in the 1981 Miller and Brown Catalogue/Checklist because their original appearance in the literature was not in a formal publication.

Three aberrant specimens (one Hesperiidae, two Nymphalidae) are illustrated for their novelty and their possible interest to geneticists. Analysis of the data presented in the 1981 Miller and Brown Catalogue/Checklist disclosed descriptions for many aberrant specimens. The following tabulation gives some degree of the genetic stability or instability within the various families of North American Rhopalocera. Data are arranged by family with the highest to lowest percent of species for which aberrations have been described. Thus, for the Nymphalidae with a total of 131 species, aberrations (total of 190) have been described for 61 species or 47% of them; with 22 aberrations having been described for a single species, *Occidryas chalcedona* (Doubleday). With so many aberrations found in a single species, one is inclined to question the validity of the 12 subspecies described for the same insect. Based on this single statistical factor (aberrations described and undescribed), it would appear that within the North American fauna the Nymphalidae is the least genetically stable.

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Table 1

SP. W/DESCRIBED ABS.

FAMILY	TOTAL SPECIES	ABERRATIONS NUMBER	%	GREATEST NO. DESC. ABS. FOR SINGLE SP.	TOTAL NO. DESC. ABS.
Nymphalidae	131	61	47	22	190
Papilionidae	35	14	40	6	44
Pieridae	63	20	32	12	55
Danaidae	4	1	25	4	5
Lycaenidae	136	25	18	7	59
Heliconiidae	7	1	14	4	4
Satyridae	50	4	8	2	5
Apaturidae	17	1	6	1	1
Hesperiidae	292	11	4	2	16
Riodinidae	25	0	0	0	0
Libytheidae	3	0	0	0	0
Grand Total	763	138	18	—	379

Because the occurrence in Texas of some of the species given in this paper may seem incredible, the authors believe certain comments on the "migratory" phenomenon of Lepidoptera is in order. Most of the species treated here are not considered permanent residents in the state, but it is believed that these and many other species occur in the southwestern United States more frequently than capture records indicate.

Dispersal of Lepidoptera is both inherent and persistent. Careful observation will disclose some movement by all species, small and fragile, large and strong alike. Movement of most species is not in mass so often observed in the Monarch, certain pierids, nymphalids, and libytheids. Rather, the movement is individual and not readily perceptible. Some notable examples of the latter include *Vanessa atalanta* (Linnaeus), *Abaeis nicippe* (Cramer), *Eurema mexicana* (Boisduval), *Nathalis iole* Boisduval, *Pontia protodice* (Boisduval and Leconte), *Hemiargus isola alce* (Edwards), *Leptotes marina* (Reakirt), *Brephidium exilis* (Boisduval), *Erynnis funeralis* (Scudder and Burgess), *Epargyreus clarus* (Cramer), and *Calpodes ethlius* (Stoll) just to name a few, all of which are multivoltine. Univoltine species, although seemingly sedentary and local, do move about but not to the same extent, partially because of their limited adult life expectancy.

Although the movement of all Lepidoptera is both inherent and dynamic, permanent range-extension establishment is complex and not readily understood. A satisfactory judgment on this cannot be expressed in general terms. As a first step toward understanding this phenomenon, the complete life history of the insect under study must be known. By complete life history we mean that certain questions regarding the insect's immature and adult stages must be answered: 1) Is the species univoltine or multivoltine? 2) Is it continuously brooded, or does it have a diapause? If it has a diapause, what type: ovum, larval, pupal, reproductive? 3) What factors trigger the diapausal mechanism? Is it genetically inherent or is it triggered by climatic changes? 4) If an herbivore, is it polyphagous? Multiphagous? Foodplant specific? Does it eat foliage, inflorescence, immature seeds only, or a combination of these? Are juvenile leaves essential to survival of the first instar larvae? 5) Are the known larval foodplants available? 6) What predators and parasites are associated with the adult and immature stages? What is the rate of parasitism? Predation? 7) Is there an obligatory association with other insects such as ants, as with the now extinct large Blue, *Maculinea arion* L.? 8) What are the climatic tolerances for the adult? For the immatures? Once these questions have been answered satisfactorily, one may then define the survival zone for the species being studied.

Among the more obvious factors or conditions affecting movement and permanent establishment of a given species are: 1) Climate (temperature ranges, humid or arid conditions). 2) Weather (prevailing air lanes, atmospheric disturbances). 3) Geophysical retardants or barriers (mountain ranges, deserts, great bodies of water). 4) Adult life expectancy of the species. 5) Botanical composition (significant changes to or the absence of acceptable larval foodplants, nectar sources, and habitats). Basic to range-extension establishment is the insect's ability to adapt to a new environment. A species that has become highly susceptible to parasitism, for example, can partially overcome this by simply moving to another area outside the current range of the parasite, or through wide dispersal of eggs. However, in so doing the species may move into an ecosystem totally incompatible to survival, at least over an extended period of time.

The functions of inherent movement among species are survival and perpetuation. Wide dispersal of both adults and immature stages facilitates these functions through conservation of larval food supply and nectar sources, by avoiding parasites and predators and by keeping the gene pool viable. Not infrequently a species will enter an environment to which it cannot adapt or which is only temporarily suitable. In such instances survival is limited. Some specific examples will explain how these limiting factors affect certain lepidopterous species. *Chioides albofasciatus* (Hewitson), whose normal survival zone is in extreme south Texas, frequently moves northward to San Antonio and central Texas. Here there is an abundance of acceptable larval foodplants and nectar sources for population establishment, but the limiting factor is climate, specifically the date of the first killing frost. In years when this date is later, the larva completes development and enters pupal diapause triggered by colder temperatures. During these same periods which may continue for four or five years, the species remains resident; the colder temperatures not affecting the pupa. When an early freeze defoliates the larval foodplant, larvae die of starvation, and reintroduction is necessary. The more extensive the killing frost, the more extensive the starvation and the longer the recovery period in subsequent years. *Adelpha bredowii eulalia* (Doubleday and Hewitson), whose normal survival zone is in far west Texas and southward, moves eastward and becomes established for a number of years on the Edwards Plateau and even farther eastward when climatic conditions are favorable. The species cannot tolerate high humidity, and when local climatic conditions change from relatively dry to relatively humid for an extended period, especially during pupal diapause, it is extirpated and must be reintroduced. Because the larvae eat various oaks (*Quercus* sp.), larval food supply is no problem.

Chlosyne janais (Drury) has the ability to enter larval diapause either from drought or from cold temperatures, either of which cause primary larval foodplants to become dormant. The limiting factor in this instance is not climate per se but rather the availability of a larval food supply and various parasites and predators. The normal range of this species in Texas is from about Medina County southward, but periodically it ranges as far north as Amarillo in the Texas panhandle. In November 1970, Kendall introduced into his lab garden *Anisacanthus wrightii* (Torr.) Gray, Acanthaceae, one of the several acceptable primary larval foodplants. These plants were colonized by *C. janais* the following year through normal dispersal, and the colony remained abundantly viable until 20 July 1981 after which no adults or immatures were seen until June 1982. Temporary extinction of the colony is attributed to predation by the imported fire ant, *Solenopsis invicta* Buren, even though parasitism played an important role in population control. During 1982 and 1983 several migrating females were observed to oviposit on acceptable larval foodplants in the lab garden, but none of the larvae survived to pupation. In September 1983 five widely separated clusters of gregarious early instar larvae were monitored. During a period of about three weeks, each of these clusters was observed attacked and destroyed by *Solenopsis invieta.* During the ten year period in which the species was established locally, ten parasites and eleven predators were recorded for the species. Parasitic Diptera includes four tachinids (three genera, four species) that attack the larva/pupa. Parasitic Hymenoptera includes three species of *Trichogramma* (one, n. sp. being described by D. L. Vincent) that attack eggs, destroy-

ing every egg in large multi-layered clusters; two chalcids (two genera, two species), one of which attacks the pupa, the other larva/pupa; and one ichneumonid on larva/pupa. Eleven predators were observed. Hymenopterous predators include three species of ants (Formicidae) that eat the larvae and pupae; one paper wasp (Vespidae) that eats larvae. Two spiders (Araneida), one jumping (Salticidae) that eats larvae and pupae that are not yet dry; and a green-lynx spider that captures the adult butterfly. Among predatory Orthoptera is a mantid (Mantidae) that eats the larva; a tree-cricket (*Oecanthus* sp.) that eats the egg masses; and a camel-cricket (*Ceuthophilus* sp.?) that destroys many pupae. A centipede (Chilpoda) was observed eating a larva that had crawled off to pupate, and a pill bug (Crustacea) eating a pupa. Doubtless many other parasites and predators, unknown at present, are associated with this butterfly.

There is substantial evidence that meteorological disturbances occasionally aid the dispersal of certain Lepidoptera over great distances from their normal survival zones. It is believed also that normal atmospheric "air lanes" play an important recurring roll in dispersal of certain species. This theory is supported by the occurrence of species in areas far removed from their normal habitats and ranges during periods when great storms or hurricanes were not present. Local recording of fresh specimens of these rarities is most likely the result of a single or partial brood produced by a gravid female that found its way into a suitable botanical area, far outside its survival zone. Two general works on insect dispersal resulting from weather systems are Johnson (1969) and Baker (1978).

Geophysical barriers must be evaluated in terms of individual species in the same manner as any of the other limiting factors mentioned. Altitude, per se, is probably no barrier at all for many species, but climate and vegetation resulting from altitude most certainly are. The principal reason for a given species being limited to certain mountain ranges and altitudes is adaptation.

Univoltine species with short life expectancy could not disperse over distances as great as those that live for three to six months. Still, they do move; otherwise how do we account for such wide geographical distribution of single brooded species like *Phaeostrymon alcestis* (Edwards), or such fragile multivoltine species as *Brephidium exilis* (Boisduval). Species with reproductive diapause and multivoltine species doubtless move over greater distances than others. Dispersal of certain species whose females are wingless is most likely accomplished through copulatory flight of the male. Normally, it is the gravid female's responsibility to locate a suitable larval foodplant, but with species such as *Orgyia leucographa* (Geyer), the males have undoubtedly developed a greater chemoceptor response for locating foodplants. This response is evident in many male species. A classic example is *Colias eurytheme* Boisduval in which the males will repeatedly patrol patches of larval foodplant in search of virgin females. Copulatory flights have been observed in many species, but such flights are not too significant where the female is also winged; frequently such flight is simply in search of a nectar source or, if disturbed, to locate another spot more secure from predation. Wingless female members of the family Psychidae, which copulate and deposit their eggs within the larval bag, present the most complex and sophisticated dispersal problems. Davis (1964: 7-8) gave their means of dispersal as manual (botanical commerce), by birds, wind and windstorms; of these, manual appears to be the most significant. Many lepidopterous species are economic pests for three basic reasons: 1) They are mostly multivoltine; 2) they are highly adaptable to various environments; 3) they are multiphagous and are not dependent on cultivated plants for survival. Other than climate, the establishment of immigrant populations or the extirpation of resident populations are influenced greatly by habitat changes resulting from land use and development. Agriculture, ranching, housing, and industrial development have the greatest long term, adverse affect and effect on habitats. The opposite of this is better land management of identified special habitats.

For each of the 36 taxa reported below all significant data available to us are given. Also, a judgment is made regarding the residency of each taxon within the United States. The senior author would welcome any additional relevant data, published or un-

published, which may have been missed.

HESPERIIDAE

Urbanus pronus Evans 1952

Urbanus Hübner 1807, Miller and Brown 1981: 7; Steinhauser 1981: 3 (generic synonymy and type data).
Urbanus pronus Evans 1952: 89, Type locality Ambato, Ecuador. Holotype in British Museum (NH).

McGuire and Rickard (1976: 8) recorded *Urbanus pronta* Evans for Texas and the United States, and they illustrated a ♂ from Tamaulipas, Mexico. They remarked: "Rickard took a ♀ along a railroad track near Madero, Hidalgo County [Texas] on 19 October 1969. It was visiting blossoms of *Lantana horrida* H. B. K." A recent genitalic examination of this specimen disclosed that it was a ♂ not a ♀, and that it is *Urbanus pronus* not *pronta*. The genitalia compares with that given by Steinhauser (1981) for *pronus*. Miller and Brown's (1981) inclusion of *pronta* in their Catalogue/Checklist (No. 25) based on the McGuire and Rickard report should be deleted and *pronus* added.

Autochton cincta (Plötz) 1882

Autochton Hübner 1823, Zutrage z. Exot. Schmett. 2: 13. Evans 1952 (2): 121. Miller and Brown 1981: 10 (generic synonymy and type data).
Autochton cincta (Plötz) 1882, Entomol. Z. 26: 261; Type locality Oaxaca, Mexico; location of type ?
= *Cecropterus cinctus*, Godman and Salvin 1894, 2: Tab. 80, Fig. 3 (misspelled).
= *Telegonus rotundatus* Mabille 1883, Bull. Soc. Ent. Belg. 27: 52.

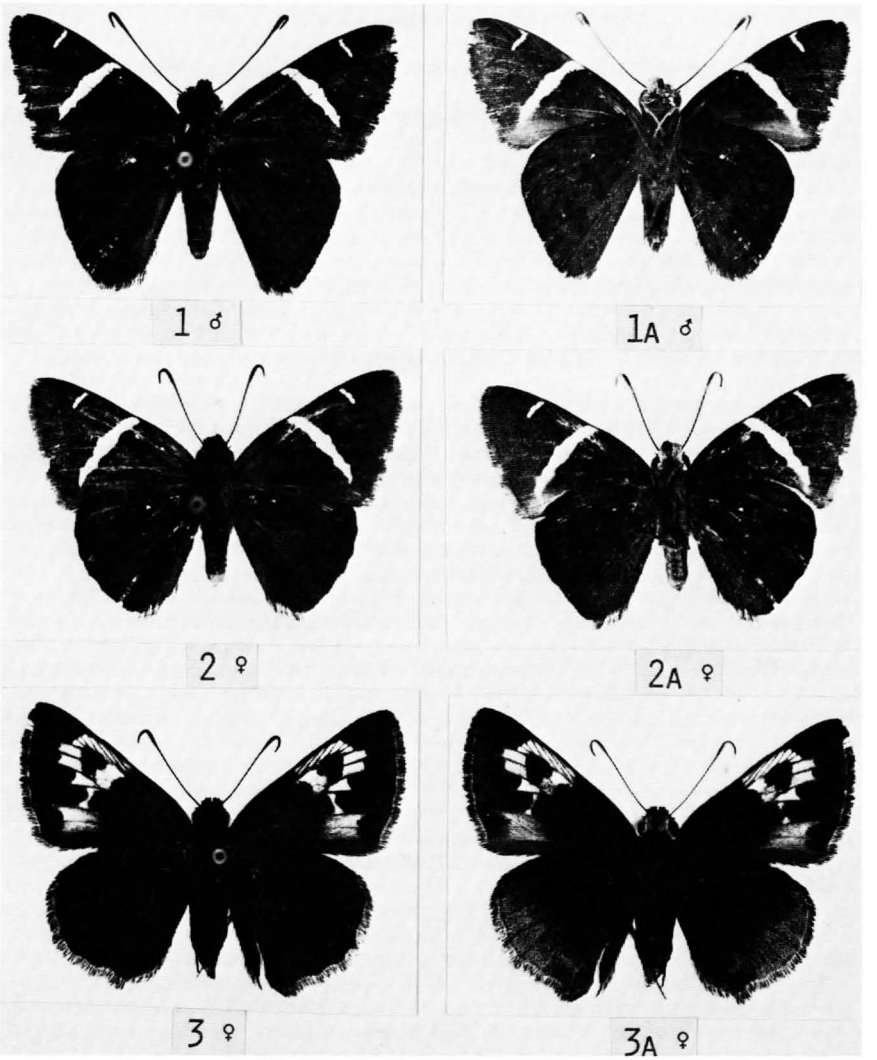
Ten examples of this species have been collected in Texas, all from Brewster County, Big Bend National Park: 10 August 1967 (1 ♂ ?), James A. Scott (first U. S. capture record); July 1968 (1 ♂ ?), John E. Hafernik Jr. (News Lepid. Soc. 3: 12/1969 — Season Summary) (first U. S. published record); 16 May 1973 (1 ♀) (Figs. **2, 2a**), and 10 September 1974 (1 ♀), both William W. McGuire; 16 April 1977 (1 ♂) (Figs. **1, 1a**), and 28 March 1982 (3 ♀) (Southern Lepidopterists' News 4(1): 4/1982), Edward C. Knudson; 16 April 1977 (1 ♂ ?), Frank R. Hedges; and April 1979 (1 ♂), Daniel S. Bogar (det. Kendall).

Kendall observed females of this species in Nuevo Leon, Mexico, ovipositing on *Desmodium grahamii* Gray and on *Desmodium angustifolium* (H.B.K.) DC, Leguminosae. Observed oviposition in nature was ca. 1130 hrs. CDST on 22 and 24 September 1977 and on 24 October 1979. At one spot near the summit of a pass through the Sierra Madre (Cumbres de Monterrey National Park), ca. 1822 m., *D. grahamii* is well established. Although livestock graze this area regularly, little damage to the larval foodplant was observed. In the lab larvae readily accepted *Desmodium paniculatum* (L.) DC. From larvae collected in nature, adults eclosed 8 January 1980 (1 ♂), 12 January 1980 (1 ♀), 20 January 1980 (1 ♂), and 9 May 1980 (1 ♂).

Because the known larval foodplants are deciduous perennials, it is believed that the species may have a pupal diapause, as does *Autochton cellus* (Boisduval and Leconte). An attempted outdoor rearing, on a living plant, appeared to be successful until 30 October when the larvae suddenly disappeared. Nearby predatory ants eating a microlepidopteron pupa were suspect. Based on limited biological data, it appears that *cincta* may be trivoltine. Although the population density may be quite low for reasons unknown at present, there is no reason to doubt the species is established in Texas. *Desmodium grahamii* and *D. psilophyllum* Schlect., which is probably acceptable, are found in Big Bend National Park.

Distribution of this species as given by Hoffmann (1941b), Evans (1952), and de la Maza (1976) include: South America, Guatemala, and Mexico (Oaxaca, Chiapas, Jalisco,

Michoacan, Morelos, Colima, and Sierra Madre Oriental). Kendall has specimens from both Nuevo Leon and Queretaro, Mexico.



Figures **1, 1a.** *Autochton cincta* (Plötz), ♂ upper and under surfaces; Texas: Brewster County, Big Bend National Park, Edward C. Knudson, 16 April 1977. Wing expanse 39 mm.

Figures **2, 2a.** *Autochton cincta* (Plötz), ♀ upper and under surfaces; Texas: Brewster County, Big Bend National Park, William W. McGuire, 16 May 1973. Wing expanse 38 mm.

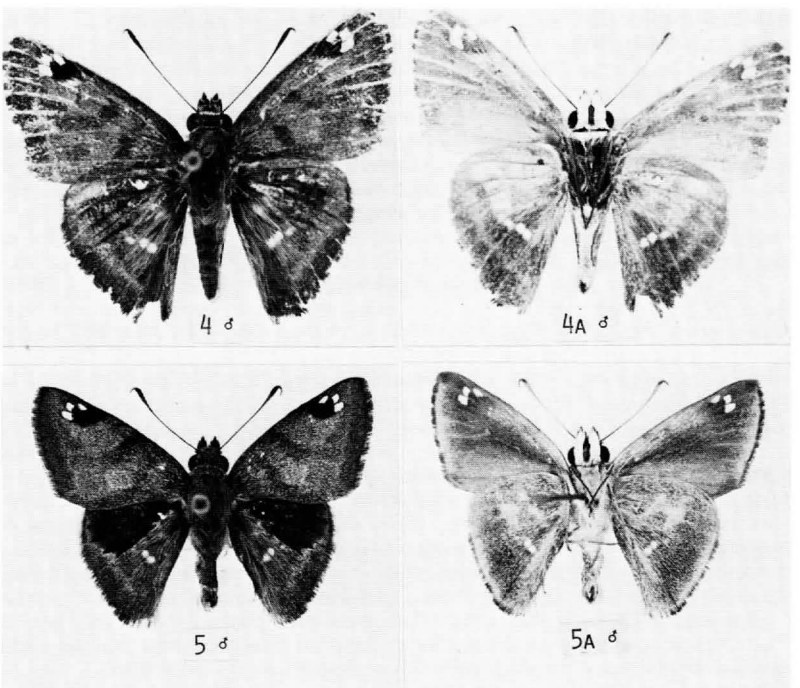
Figures **3, 3a.** *Thorybes pylades* (Scudder), ab. ♀ upper and under surfaces; Texas: Bexar County, San Antonio, Roy O. Kendall, 11 June 1982. Wing expanse 40 mm.

ab. *Thorybes pylades* (Scudder) 1870

One ♀ (Figs. **3, 3a**), very good condition, collected by Kendall 11 June 1982 in his lab garden at San Antonio, Bexar County, Texas. It is noted that two other aberrations have been described, for this species, in the literature: "immaculata" (Skinner) 1911, which lacks the translucent spots of the fore wings, and "integra" Lanktree 1968. We have not seen the description of the latter and, therefore, do not know how it differs from the specimen here illustrated.

Arteurotia tractipennis tractipennis (Butler and Druce) 1872

Arteurotia tractipennis Butler and Druce 1872, Cist. Ent. 1: 112; Type locality Costa Rica; Holotype in British Museum (NH).
Butler and Druce 1874, Proc. Zool. Soc. London, p. 367.
Butler 1874, Lepid. Exot., Tab. 64, p. 187, fig. 5.
Plötz 1882, Berl. ent. Zeitschr, p. 256.
Staudinger 1876, Verh. zool.-bot. Ges. Wien, 25: 117 (syn.: *Helias ribbei*).
Godman and Salvin 1894, 2: 356, 357, Tab. 82, fig. 1 (♂ genitalia).
Seitz 1922, 5: 885, 891, pl. 172g.



Figures **4, 4a.** *Arteurotia tractipennis tractipennis* (Butler & Druce), ♂ upper and under surfaces; Texas: Hidalgo County, Bentsen-Rio Grande Valley State Park, Nadine M. McGuire, 2 September 1972. Wing expanse 28 mm.

Figures **5, 5a.** *Arteurotia tractipennis tractipennis* (Butler & Druce), ♂ upper and under surfaces; Mexico: Tamaulipas, Sierra Cucharas, nr. Ciudad Mante, Roy O. & C. A. Kendall, *ex larva* 10 March 1974. Wing expanse 25 mm.

Arteurotia tractipennis tractipennis, Evans 1953, (3): 35.

One ♂ (Figs. **4**, **4a**) Mission, Hidalgo County, Texas, 2 September 1972, Nadine M. McGuire (in Kendall coll.). Because this specimen was somewhat worn, a reared example from Mexico is illustrated for comparison (Figs. **5**, **5a**).

Kendall (*in* Kendall and McGuire, 1975) found larvae of this species in leaf shelters in Mexico feeding on foliage of *Croton niveus* Jacquin, and *Croton reflexifolius* H. B. K., Euphorbiaceae. There seems little or no reason why this species should not become established in extreme south Texas, at least periodically. A possible local larval foodplant is *Croton cortesianus* H. B. K. which grows commonly in the area where the specimen was collected.

Distribution of the nominate species of this monotypic genus as given by Evans (1953), and Hoffmann (1941b) is: Mexico (Veracruz, Tabasco, Campeche, Yucatan, Chiapas), and Tamaulipas (Kendall and McGuire collections); Guatemala, Honduras, Nicaragua, Costa Rica, Panama, Colombia, Surinam, and Bolivia (Cochabamba).

Pellicia dimidiata dimidiata Herrich-Schäffer 1870

Pellicia dimidiata Herrich-Schäffer 1870. Corr. Blatt Regensb. 24: 160;
Type locality Mexico. Location of type ?
Pellicia dimidiata dimidiata, Evans 1953, (3): 61.
= *didia* Möschler 1876, = *corinna* Plötz 1882, = *nivonicus* Plötz 1884,
= *bilinea* Mabille 1889, = *bobae* Weeks 1906, = *hypsipyle* Hayward 1947.

One ♂ (Figs. **6**, **6a**) 25 October 1975, Bentsen-Rio Grande Valley State Park, Hidalgo County, Texas, John B. Vernon (News Lepid. Soc. 2:8/76 - Season Summary).

Evans (1953), and Hoffmann (1941b) gave the distribution of this species as: Chiriqui, Venezuela, Colombia, Guatemala, Honduras, Salvador, Nicaragua, Costa Rica, Panama, Trinidad, Tobago, Br. Guiana, Fr. Guiana, Ecuador (Chimbo), Iquitos (Upper Amazons) and Mexico (Veracruz, Tabasco, Colima). Kendall collected it from Tamaulipas, Mexico (3 ♂, 19 and 22 January 1974).

Staphylus azteca azteca (Scudder) 1872

Pholisora azteca Scudder 1872. 4th Ann. Rept. Peabody Acad. Sci. [1871]: (1872). Type locality Tehuantepec, Oaxaca, Mexico. Holotype in MCZ?
Staphylus azteca azteca, Evans 1953, (3): 91. Freeman 1977, J. Lepid. Soc. 31(1): 62. Miller and Brown 1981, (2): 15 (generic synonymy and type data, but species not listed).

Freeman (1977) recorded a single ♀ example 2 June 1940 from ca. 11 mi. (7 km.) north of Alpine, Brewster County, Texas. Kendall (1976) recorded larval foodplants for the species from northeastern Mexico as *Celosia nitida* Vahl., and *Achyranthes asper* L., both Amaranthaceae. These two plants are found in Texas, but the plant most likely used in the area where the Texas specimen was taken could be *Celosia palmeri* Watson, which grows in open woodlands and about boulders in mountains of the Trans-Pecos. There seems no reason why this species should not be found in Texas at least periodically. The climatic tolerances of the species remains to be determined, but there may be sparse populations closely associated with acceptable larval foodplants.

Evans (1953) and Hoffmann (1941b) gave the distribution as: Honduras, Salvador, Costa Rica, Guatemala, Mexico (Veracruz, Tabasco, Oaxaca, Valle de Tehuacán — por el lado del Pacifico hasta Colima). Freeman (1977) recorded it from the Mexican states of: Tamaulipas (June), San Luis Potosi (June, July, August), Nayarit (September), Colima (March, April), Veracruz (August). Kendall (1976) collected it in Tamaulipas, Mexico (2 ♂, 5 ♀ *ex larva* 1-19 January 1975).

Vettius fantasos fantasos (Stoll) 1780

Vettius Godman *in* Godman and Salvin 1901, 2: 589-782. Type-species *phyllus* Cramer 1777 by original designation.
Papilio fantasos Stoll 1780. Pap. Exot. 4: T. 300, figs. E., F. Type locality Surinam. Location of type ?
Carystus fantasos, Hoffmann 1941b, 12: 280 (# 1199).
Vettius fantasos fantasos, Evans 1955, (4): 184. = *abebalus* Stoll 1781, = *eucherus* Plötz 1882.

One ♂ (Figs. **7, 7a**) 24 October 1975, Penitas, a small village ca. 7 mi. (11 km.) west of Mission, Hidalgo County, Texas, Edward C. Knudson (News Lepid. Soc. 2: 8/1976 — Season Summary).

In Tamaulipas, Mexico, Kendall (1976) observed females ovipositing on *Lasiacis* sp., probably *divaricata* (L.) Hitchcock, Gramineae and reared it through with difficulty due to rapid desiccation of the cut plant. *Lasiacis* appears to be the primary larval foodplant in Tamaulipas, and possibly elsewhere. This botanical genus is not represented in Texas. Should this skipper become established in Texas, the larval foodplant used would most likely be *Arundo donax* L., Giant Reed, or *Phragmites australis* (Cav.) Trin. *ex* Steud., Common Reed, both Gramineae.

Evans (1955) and Hoffmann (1941b) gave the distribution of this species as: Honduras, Nicaragua, Panama, Colombia, Venezuela, Tobago, Jamaica, Br. Guiana, Fr. Guiana, Peru (Tarapote), Bolivia, Para, Pernambuco, Maranham, S. Brazil (Rio Petropolis), Paraguay, and Mexico (Veracruz, Oaxaca, Tabasco, Campeche, Yucatan, Quintana Roo, Chiapas, Costa del Pacifico en Guerrero, Jalisco, Colima). Kendall has specimens collected in Mexico from Nuevo Leon (3 March 1974), San Luis Potosi (17, 24 December 1973), and Tamaulipas (18, 30 December 1973, 7, 12, 25 January and 3, 6, 24 February 1974).

Atrytone mazai Freeman 1969

Atrytone mazai Freeman 1969. J. Lepid. Soc. 23 (Supplement 2): 1-62. Type locality Mexcala, Guerrero, Mexico. Holotype in USNM (NH). Miller and Brown 1981: 41 (generic synonymy and type data, but species not listed).

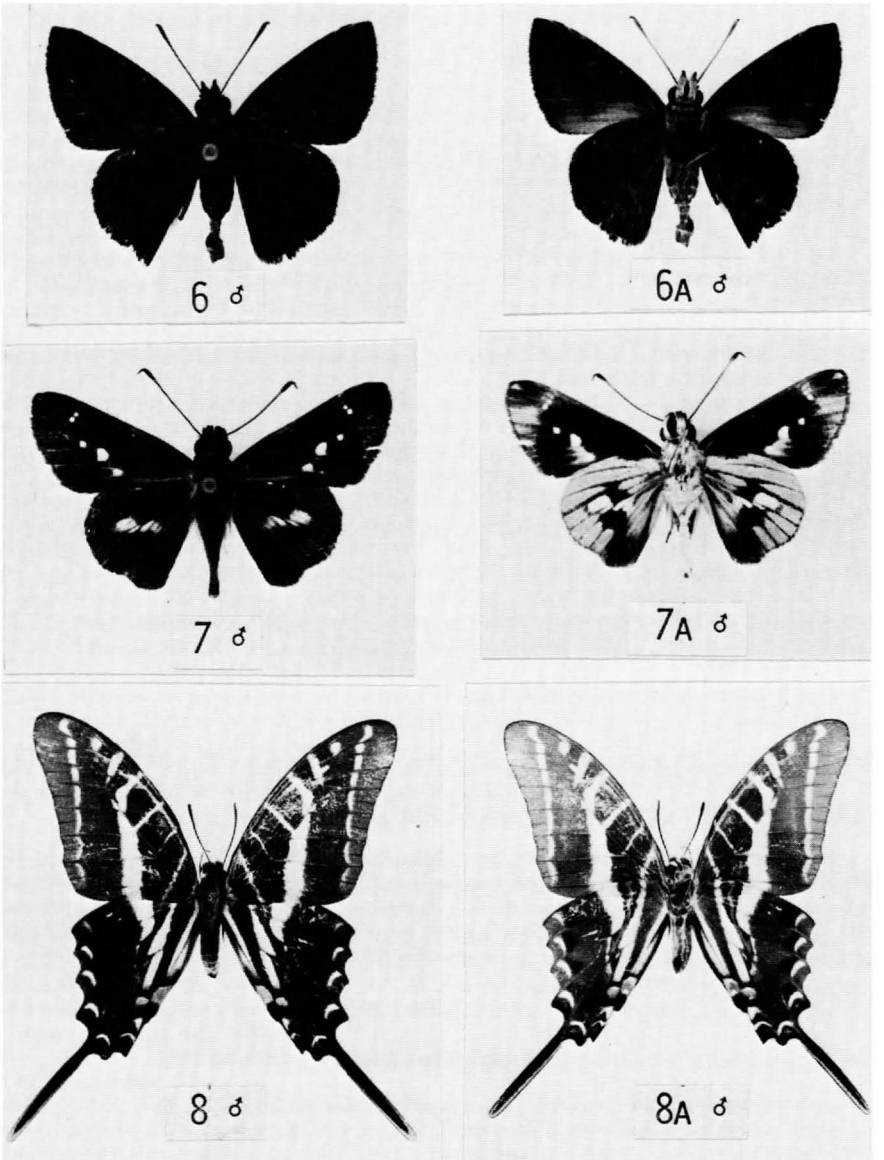
One ♂ (paratype) was collected 2 June 1935 at Laredo, Webb County, Texas by H. A. Freeman. The female of the species is unknown at present. We suspect that the climate of southwest Texas meets the needs of this species, but the habitat, including larval foodplant, remains to be determined. There may be a low resident population of this species in Texas, and if so, may be temporally distributed.

PAPILIONIDAE

Eurytides philolaus (Boisduval) 1836

Four ♂ examples of this species have been collected in Texas. The first 3 were taken in 1958 on Padre Island near Port Isabel, Cameron County by Jack E. Lipes. These were later recorded in the literature by Jae (1970). The specific dates collected and current location of the specimens are: 21 July (Allyn Museum of Entomology), 24 July (Figs. **8, 8a**) (Kendall collection), and 21 July (Lipes collection). The fourth example, a badly worn specimen, was collected 24 October 1974 at Brownsville, Cameron County by McGuire (Kendall collection).

It is believed that the life history of this species has not been recorded; however, Philip J. DeVries informed us that in Costa Rica the larval foodplant is *Annona* species. In Mexico there are 8 genera of Annonaceae, 12 species of *Annona* alone. Several of these species are not only widely distributed in Mexico but are cultivated for fruit or or-



Figures **6, 6a.** *Pellicia dimidiata dimidiata* Herrich-Schäffer, ♂ upper and under surfaces; Texas: Hidalgo County, Bentsen-Rio Grande Valley State Park, John B. Vernon, 25 October 1975. Wing expanse 27 mm.

Figures **7, 7a.** *Vettius fantasos fantasos* (Stoll), ♂ upper and under surfaces; Texas: Hidalgo County, Penitas, ca. 11 km W of Mission, Edward C. Knudson, 24 October 1975. Wing expanse 29 mm.

Figures **8, 8a.** *Eurytides philolaus* (Boisduval), ♂ upper and under surfaces; Texas: Cameron County, South Padre Island, Jack E. Lipes, 24 July 1958. Wing expanse 59 mm.

nament. There can be no doubt that in Mexico, *E. philolaus* utilizes one or more species of *Annona* and possibly other genera. The closely related *E. marcellus,* well established in eastern Texas, utilizes both *Asimina parviflora* (Michx.) Dun., and *A. triloba* (L.) Dun., Annonaceae. Although the climatic tolerances for *E. philolaus* are unknown, most likely they are about the same as for *E. marcellus.* It is therefore conceivable that should a gravid female find its way into the eastern part of the state, a colony could be established. Currently, the absence of an acceptable larval foodplant for a distance of at least 400 air miles (645 km.) appears to represent a spatial distribution barrier for species entering our area from Mexico. The most probable route for such specimens would be up the coast from Veracruz. *Annona glabra* L., most likely a larval foodplant, grows around salt water, associated with mangroves in Veracruz and elsewhere along the Gulf Coast and Bay of Campeche. It is possible too that *Annona* could be introduced in extreme south Texas as an ornamental, which could one day provide a larval food source for the species.

Williams (1937) documented the migratory movement of the species. Brown (1943), Comstock (1958) and Welling (1958) recorded the "mud puddle" behavior of the species. Thousands of specimens have been observed both in flight and congregated at moist spots.

Hoffmann (1941a) gave the general distribution in Mexico as, "Tierras templada y caliente de la Region Oriental (Tamaulipas hasta Yucatan). Chiapas; Oaxaca; en la Sierra Madre Occidental y la costa del Pacifico hasta Nayarit y Sinaloa." Additional specific collections include Chiapas — no dates (de la Maza E. and de la Maza E., 1976); Jalisco — summer (Comstock, 1958), 12 June 1969 (4 ♂), W. P. Hord (Kendall collection); Puebla — April (Beutelspacher, 1976a); Quintana Roo — mostly March and April (Welling, 1958); San Luis Potosi — March, April (Beutelspacher, 1976a), April, June (Brown, 1943); Tabasco — February, May, July (Routledge, 1977); Tamaulipas — April (Beutelspacher, 1976a), April, August (de la Maza E. and de la Maza E., 1976); Veracruz — May (Brown, 1943), June (Ross, 1975), June (Beutelspacher, 1976a), no date (de la Maza E. and de la Maza E., 1976); Tabasco — no date (de la Maza E. and de la Maza E., 1976); Yucatan — March, April (Welling, 1958).

Papilio victorinus victorinus (Doubleday) 1844

Papilio victorinus Doubleday 1844. Ann. Mag. N. H. 14: 418. Type locality West coast of America. Holotype in British Museum (NH) ?
Papilio victorinus victorinus, Rothschild and Jordan 1906. Novitates Zool. 13: 635-636.

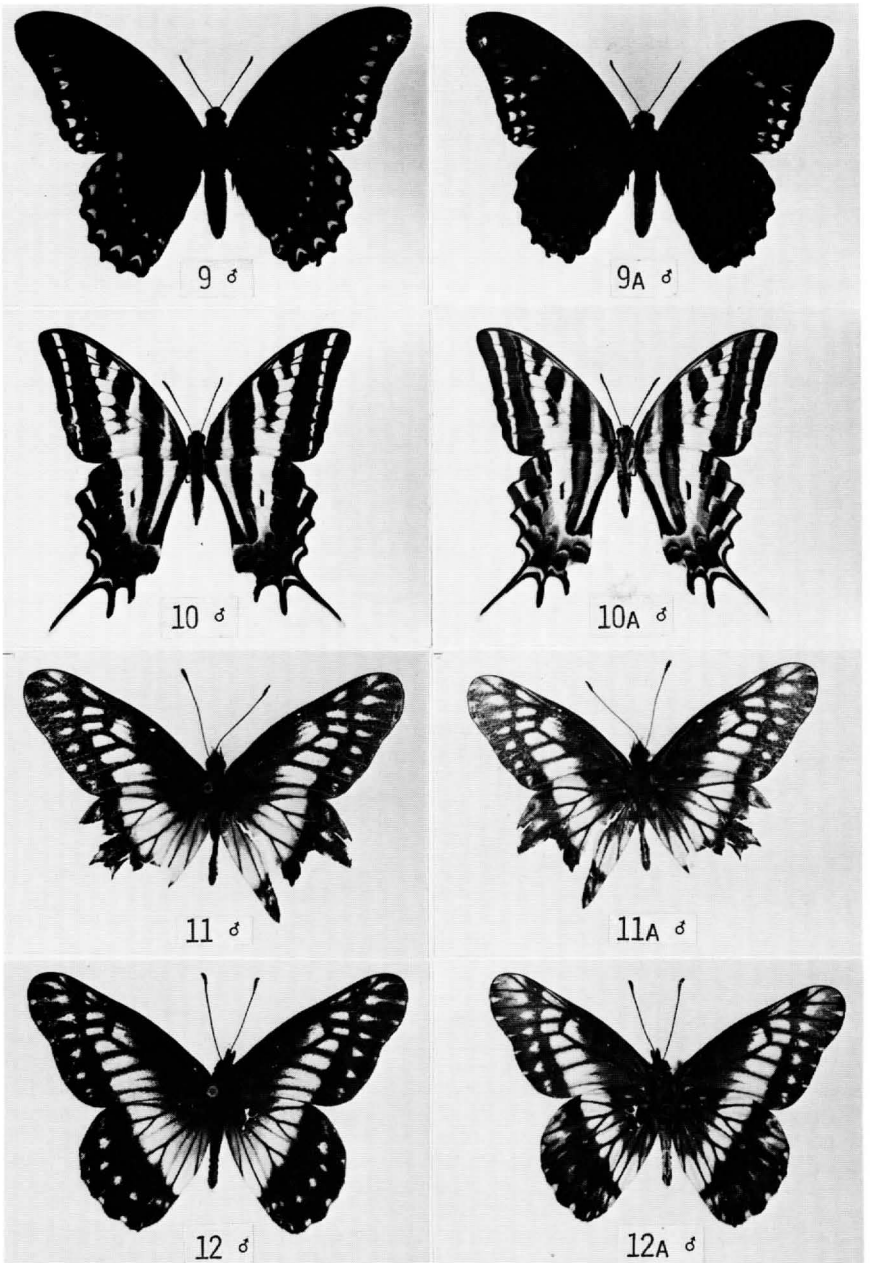
Rothschild and Jordan (1906) distinguished the nominate species from *morelius* by the presence of a spot of variable size in the cell of forewing beneath, and gave the habitat as eastern Mexico to Nicaragua.

One ♂ (Figs. **9, 9a**) collected 17 August 1974 at Laredo, Webb County, Texas by James K. Adams (News Lepid. Soc. 3 [4]: 6/1978. This represents the first and only known record for the United States. Adams collected the specimen nectaring on cultivated flowers.

Muyshondt and Muyshondt (1976) described and illustrated the egg, larva (various instars) and pupa. They also illustrated the adult butterfly, and cocoon of *Meteorus* sp. (a larval-host parasite). *Persea americana* Miller, Lauraceae or the well known auguata or avocado of commerce, was given as the larval foodplant. Most likely other *Persea* species, and closely related genera are utilized by *victorinus.* Should the insect become established in south Texas, possible larval foodplants of Lauraceae could include: *Cinnamomum camphora* (L.) Nees and Ebermaier, Camphor-tree, a cultivated ornamental in south Texas where it has become naturalized; *Persea borbonia* (L.) Sprengel, growing naturally from Corpus Christi northeastward up the coast into eastern Texas; *Lindera benzoin* (L.) Blume, Spicebush, distributed mostly through eastern Texas but may be found westward to Kerr and Bandera counties.

Hoffmann (1941a) gave the distribution in Mexico, "Tierras templada y caliente de la region Oriental, por el Norte hasta Nuevo Leon y Tamaulipas." Other specific Mexican

locations are: Beutelspacher (1975), September, Las Minas, Veracruz; de la Maza and de la Maza (1976), April, August, Cañón del Novillo, Tamaulipas; Gonzalez Cota (1978), April, December, Barranca de Patla, Puebla; de la Maza and de la Maza (1978), Yanga,



Fortin, and Tuxpango, Veracruz; de la Maza (1979), Cola de Caballo and Villa de Santiago, Nuevo Leon, and (1980), Santa Maria del Rio, San Luis Potosi; de la Maza and de la Maza (1979), Catemaco, Dos Amates, and El Vigia, Veracruz; White L. and White L. (1980), Cuidad Valles, San Luis Potosi; Kendall collected it in El Naranjo, San Luis Potosi (21 February 1976), and Cola de Caballo, Nuevo Leon (18 March 1977). Munroe, Ross, and Williams (1967) recorded it from El Jaral, Honduras (5 November 1962).

Pterourus pilumnus (Boisduval) 1936

Papilio pilumnus Boisduval 1836. Spec. Gen. Lepid. 1: 340. Type locality Mexico. Holotype in British Museum (NH)?
Munroe 1960, Can. Entomol. Supplement 17: 1-51 (Questionably placed it with the *glaucus* group.)
Pterourus pilumnus, Miller and Brown 1981: 67.

One ♂ (Figs. **10, 10a**) was collected three mi. (five km.) east of Fernando, Cameron County, Texas on 18 May 1932. Fernando, at that time, was a small community on the Arroyo Colorado ca. three mi. NNE of Rio Hondo. This specimen is in the Los Angeles County Museum, ex collection Lloyd M. Martin. In verbal communication, 8 March 1981, Martin informed Kendall that the specimen had been obtained from Louis H. Bridwell, a commercial collector, who lived at Forestburg, Montague County, Texas, a small town near the Oklahoma border. A cursory check of Bridwell's activities disclosed that he, personally, never collected in Cameron County. It is therefore assumed that he either purchased or traded for the specimen from someone who probably resided in the lower Rio Grande Valley of Texas. As far as it can be determined, this is the only known Texas record. The species is well established, however, near Monterrey, Nuevo Leon, Mexico, and it probably occurs in south Texas more often than the record would indicate. Tyler (1975) reported: "In Los Angeles County Museum is a specimen from Falcon Reservoir, Texas, from Zapata or Starr County." On 19 April 1982, Kendall wrote Tyler to confirm the record, and on 22 April 1982 he replied: "Last night I spent a couple of hours reading over pre-1975 correspondence in hopes of locating the reference to a *pilumnus* from Falcon Reservoir, but without any luck. My feeling is that the record should be dropped, on the grounds that its source had seen the specimen in the L. A. Museum, but misremembered the locale." Julian P. Donahue confirmed that the above mentioned and figured specimen is the only one from Texas in the LACM(NH).

Schaus (1884) described the larva and pupa and reported that the larva feeds on Laurel. Although we can find no specific botanical larval foodplant record, the species most likely feeds on *Persea* and other related Lauraceae. The record of *Kalmia* sp. (Tietz, 1972) as a larval foodplant is of dubious value. It appears that Tietz interpreted Laurel, given by Schaus to be *Kalmia* sp., which is of the Ericaceae rather than Lauraceae. Possibly the same members of the Lauraceae given for *Papilio victorinus* are utilized by *pilumnus*.

Hoffmann (1941a) gave the distribution in Mexico as, "Tierras templada y caliente de casi todo el pais." Additional specific state records from Mexico: Morelos: de la Maza E.

Figures **9, 9a.** *Papilio victorinus victorinus* (Doubleday), ♂ upper and under surfaces; Texas: Webb County, Laredo, James K. Adams, 17 August 1974. Wing expanse 98 mm.

Figures **10, 10a.** *Pterourus pilumnus* (Boisduval), ♂ upper and under surfaces; Texas: Cameron County, Fernando, *leg.* ?, L. A. County Museum (NH), 18 May 1932. Wing expanse 79 mm.

Figures **11, 11a.** *Catasticta nimbice nimbice* (Boisduval), ♂ upper and under surfaces; Texas: Brewster County, Big Bend National Park, Michael A. Rickard, 13 May 1977. Wing expanse 49 mm.

Figures **12, 12a.** *Catasticta nimbice nimbice* (Boisduval), ♂ upper and under surfaces; Mexico: San Luis Potosi, El Salto Falls, Roy O. & C. A. Kendall, 16 December 1974. Wing expanse 51 mm.

(1975), Tepoztlan, July - September. Nuevo Leon: Brown (1943), Galeana, 1 August 1939 (3 ♂), 35 km W of Linares, 7 August 1939 (1 ♂), Villa Santiago, 17-21 June 1940 (4 ♂), all leg. H. Hoogstraal; Kendall collected this species at Cola de Caballo (Horsetail Falls), 17-18 March 1977 (6 ♂), 4 May 1978 (1 ♂). Puebla: Gonzalez C. (1978), Barranca de Patla y Alaededores, April - October. Tamaulipas: Maeki and Remington (1959), Ciudad Victoria, 2 August (2 ♂); Emmel (1961), 4 km E of Gomez Farias, 5 March 1959 (1); de la Maza E. and de la Maza E. (1976), Canon Del Novillo, August 1973, April 1974; Brown (1943), Victoria, 10 June 1935 (2 ♂), leg. H. A. Freeman. Veracruz: Beutelspacher (1975), Las Minas, April, September, October.

PIERIDAE

Catasticta nimbice nimbice (Boisduval) 1836

Miller and Brown (1981) included this species for the United States based on information which Brown had received some 50 years earlier when he prepared a monograph of the genus. Unfortunately the manuscript together with color paintings of all the extant types were lost when it was sent to a colleague for review. The exact published source of the record has not been located, but there is no reason to doubt its existence.

In their Note 239, Miller and Brown (1981) gave the following remark: "There is some doubt as to the authenticity of this species' occurrence in the U. S. It lives in Mexico in forests with much mistletoe (the larval foodplant), a habitat that is vastly different from those where it was reported. At the same time, the mistletoe-feeding *Atlides halesus* is found where *nimbice* was reported, hence, a larval foodplant must be available." In personal correspondence Brown was under the impression that this record was from Brownsville, Texas. There is an abundance of mistletoe throughout Texas, especially in the western half of the state. The specific climatic tolerances of *nimbice* have not been determined. A judgment as to its possible permanent establishment in Texas is therefore withheld pending further investigation. Indications are, however, that like most other pierids, *nimbice* is migratory and may be expected to range into Texas periodically. When this happens, there is no reason why a gravid female could not produce at least a partial brood.

In addition to the specimen reported by Miller and Brown (1981), 2 other examples have been collected in Texas. One ♂ (Figs. **11, 11a**), 13 May 1977, Brewster County, Big Bend National Park, Michael A. Rickard, and 28 March 1982 (1 ♂), good condition, same location (+ 1 sighting), Edward C. Knudson (Southern Lepid. News 4(1): 4/1982). Because the Texas specimen illustrated is somewhat worn, an example from Mexico is shown for comparison (Figs. **12, 12a**).

Although it seems to be well known that the larval foodplant of this species is mistletoe, *Phoradendron* sp., Loranthaceae, we are unaware of a published life history. Beutelspacher (1980) gave *Phoradendron velutinum* (DC.) Nutt. as the larval foodplant in the Valley of Mexico. In Big Bend National Park, five species of mistletoe may be found, the two most common are *Phoradendron bolleanum* (Seem.) Eichler on juniper, and *P. coryae* Trel. on oak and hackberry. Mistletoe was present at all locations in Mexico, both forested and xeric chaparral habitats, where Kendall has found the insect.

Hoffmann (1941a) gave the distribution in Mexico as, "Tierras fria y templada del Centro y del Sur." Other specific records from Mexico are: Coahuila: nr. Saltillo, 17 September 1977 (1 ♂), 6 November 1978 (1 ♂), and nr. Parras, 3 November 1978 (2 ♀), Kendall and in his collection. Hidalgo: Brown (1944), Jacala 24-28 June 1939 (2 ♂), leg. H. Hoogstraal; Miller and Clench (1968), 13 January 1966 (1 ♂, 1 ♀). Michoacan: Brown (1944), Tancitaro, 30 July 1940 (1 ♀), leg. H. Hoogstraal. Morelos: de la Maza E. (1975), Rancho Viejo y Tepoztlan, October, February. Nuevo Leon: 50 km WSW of Linares, 2 March 1974 (2 ♂); nr. the village of El Potosi, 19 September 1977 (1 ♂, 3 ♀) others seen; Cola de Caballo, 12 May 1978 (2 ♂), 23 October 1979 (1 ♂), all Kendall and in his collection. Tamaulipas: Emmel (1961), nr. Gomez Farias, 5 March 1959 (several). Tlaxcala: 5 km N of Tlaxco, 31 March 1977 (9 ♂, 3 ♀), Kendall and in his collection.

Veracruz: Beutelspacher (1975), Las Minas, October.

LYCAENIDAE

Eumaeus toxea (Godart) 1824

Eumenia toxea Godart 1824. Encyc. Meth. 9: (Supplement) 826. Type locality "interior of Central America." Holotype in Museum Nationale de Histoire Naturelle, Paris, France.

Eumaeus toxea, Goodson 1947, Entomologist: 80: 273-276.

Nomenclatural discussion: Miller and Brown (1981) followed Kirby (1871) and other more recent workers in placing *toxea* Godart as a synonym of *minijas* Hübner. In personal correspondence dated 3 January 1983, Robert K. Robbins advised: "I have recently examined *Eumaeus* genitalically, and found that what was called *minijas* in Seitz is actually 6 species in two species groups which are sympatric over much of South America. However, *toxea* is the only species of the 6 which occurs in Mexico to Honduras, as Goodson (1947) suggested." We have elected to follow Robbins in treating all reports of *minijas* from Texas and Mexico as *toxea*.

Edwards (1871) in his synopsis (Vol. I, Butterflies of North America) was the first to record this species for the United States. He gave the habitat as Texas and New Mexico. In 1876 Scudder included the species in his synonymic list on page 103 as number 195, and gave the distribution as Texas, New Mexico (Mexico and Central America). Edwards in his 1877 revised Catalogue remarked: "It will be found that something over twenty species formerly accredited to the fauna have been dropped, and this has been done for want of authentication, ... Several of them were included in the Synopsis from verbal information received by me when I first began to collect butterflies." *Eumenia minijas* was one of the species dropped (p. 62). Strecker (1878), apparently not agreeing with Edwards (1877), included the species in his catalogue (p. 103) and gave the distribution as S. W. Texas, Mexico, and Panama. Skinner (1898) apparently agreed with Strecker and included the species in his catalogue as number 251. Holland (1902) included it saying it was found in southern Texas, but in his 1931 revised edition said it was common from southern Texas to northern Argentina. Dyar (1903), McDunnough (1938), dos Passos (1964), and Miller and Brown (1981) included the species as occurring in the United States. Klots (1951) stated that it probably does not occur in the United States despite old records. Clench (1961) southern Texas, probably only as a rare stray, southward to South America. Pyle (1981) listed the range as South America rarely to S. Texas.

We have located eight examples of this species in collections from Texas. Seven of these are in the Los Angeles County Museum (NH) (Martin and Truxal, 1955), a pair of which are illustrated (Figs. **13, 13a, 14, 14a**). All seven are from Hidalgo County, March 1915, ex collection Lloyd M. Martin. In March 1981 Martin informed Kendall by telephone that he had obtained the specimens from Louis H. Bridwell who lived at Forestburg, Montague County, Texas, who engaged in the sale and exchange of specimens. Bridwell died in 1951. He was listed in The Naturalists' Directory for 1929, and his interests were given as: "Collect, exchange, buy, sell Macro and Micro Lepidoptera and Coleoptera of the Southwest." He was a charter member of The Lepidopterists' Society, and his special interests were given as: "*Incisalia* and *Catocala*, exchange, buy, sell." Based on correspondence between A. E. Brower and Bridwell, the latter started collecting Lepidoptera about 1926 and in 1930 he was still a real novice. Although his correspondence lists a number of Texas counties in which Bridwell collected or intended to collect, extreme south Texas was not mentioned. We assume, therefore, that the seven specimens of *E. toxea* (=*minijas*) from Hidalgo County were collected by someone other than Bridwell, since 1915 was apparently before Bridwell began to collect.

The remaining specimen, a ♂ without abdomen, is in the National Museum of

Natural History. Robbins advised that it is from the Barnes Collection. The data label reads "minyas, female, So Tex., Burnet Co., July". This specimen might have been the basis for Skinner's including the species in his 1898 catalogue. In support of this possibility, Barnes in 1900 (Notes on North American diurnals with some additions and corrections to Dr. Skinner's Catalogue. Ent. News 11: 328-332) made no mention of this species. We might logically assume therefore that Skinner had included the name based on Barnes' specimen. The source of the other early United States records for this species remains unknown.

It is interesting that *E. toxea* would be the species to enter the United States. Both *E. toxea* and *debora* Geyer seem to be well established in northeastern Mexico, but of the two, *debora* is by far the most abundant and found nearer extreme south Texas. In Nuevo Leon, Santa Rosa Canyon, ca. 110 air km southeast of Monterrey (ca. 200 km from Texas) *debora* is well established and abundant at times. The most northern Mexican records we have for *toxea* is just north of Ciudad Mante, Tamaulipas, ca. 360 air km from Texas. It is doubtful that either of these species would become established in Texas because there are no native stands of their larval foodplants in the state. Introduced ornamental cycads might, however, support a temporary brood, but these ornamentals are usually species not used by *toxea* and *debora*.

Safford (1919) in reviewing the life history of *Eumaeus atala* Poey (as recorded by Schwarz, 1888) remarked: "On plate 45, figure 9, is shown the closely allied *Eumaeus minyas* [= *toxea*], which ranges from Texas to Brazil, and in all probability passes its early stages on Cycadaceous plants related to *Zamia*." The life history of *E. toxea* (= *minijas*) was recorded by Ross (1964), who described and illustrated the egg, larva, and pupa. He found larvae feeding on the foliage of *Zamia loddingsii* var. *angustifolia* (Regal) Schuster, in Veracruz, Mexico, as Safford had suggested.

On 22 December 1974, ca. 16 km northwest of Ciudad Mante, Tamaulipas, Mexico, Kendall observed a female oviposit beneath the leaflets of *Z. loddingsii*. Examination of the plant disclosed 20 clusters of eggs (10 of 29 each, 4 of 2 each, 3 of 3 each, and 3 of 4 eggs each). Interestingly and just the opposite of Ross' observations, Kendall found that the early instar larvae ate (only) the epidermis of the dormant foliage below ; later, the larvae ate entire leaflets. On 14 January 1975, also near Ciudad Mante, Kendall found 2 additional plants containing egg clusters. One plant with three clusters (7, 8 and 13 eggs each); eight of the eggs had hatched but only four larvae were found. The other plant contained 11 clusters (1 of 2, 2 of 4, 1 of 5, 2 of 6, 1 of 8, 1 of 9, and 3 of 10 eggs each); 35 of the 74 eggs had hatched, but only nine larvae were found. Once more on 23 January 1975, in Paso del Abra, ca. 10 km south of Ciudad Mante, one cluster of 13 hatched eggs was found; 12 larvae were present. A few of the above immatures were reared through, but most were preserved; adults ex ova 3, 4 February 1975. The difference in the number of hatched eggs and larvae found may have resulted from predation. No eggs or larvae were found parasitized, although doubtless certain parasitoids are associated with this host. A single first instar larval cannibalization was observed.

Hoffmann (1941a) gave the distribution in Mexico as, "Tierras templada y caliente del Sur y por las 2 Costas hasta Tamaulipas y Sinaloa. Peninsula de Yucatan." Other specific Mexican records include: Ross (1964), Veracruz (February - October); Routledge (1977), Tabasco (between May 1976 and July 1977). Kendall has it from San Luis Potosi (18 February 1976 and 4 February 1980); Tamaulipas (22 December 1974).

Cyanophrys herodotus (Fabricius) 1793

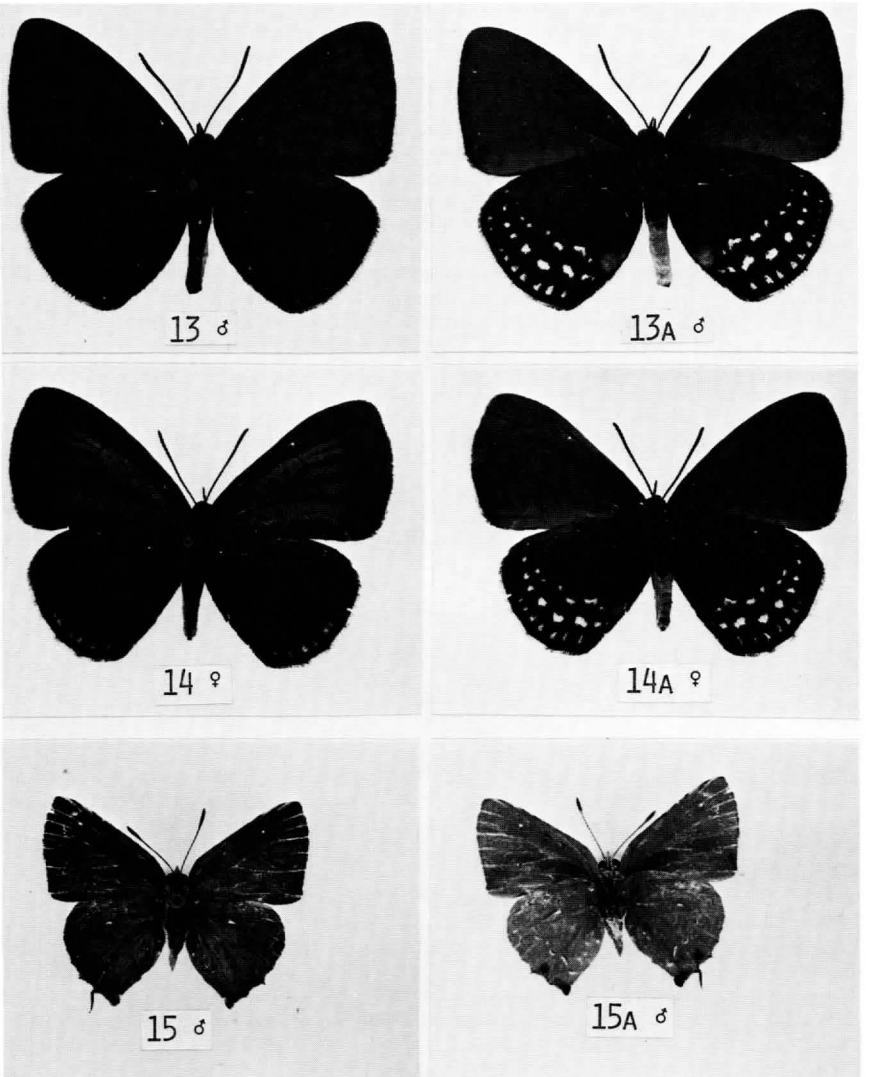
Hesperia herodotus Fabricius 1793, Ent. Syst., 3 (part 1): 286 (No. 100). Type locality "in Indiis". Holotype presumed lost (Zimsen, 1964).

Callophrys Billberg 1820, Enum. Ins. Mus. Billberg: 80.

Thecla herodotus, Clench 1946, Entomologist 79: 152-157. = *Thecla leucania* Hewitson 1868; = *Thecla sicrana* Jones 1912.

Cyanophrys Clench 1961: 211; Miller and Brown 1981: 106.

Three examples of this species have been collected in Texas, Hidalgo County: Bentsen-Rio Grande Valley State Park, 22 May 1972 (1 ♂) worn, W. W. McGuire, det. Harry K. Clench (in Kendall collection), first United States record; 29 June 1975 (1 ♂) (Figs.



Figures **13, 13a.** *Eumaeus toxea* (Godart), ♂ upper and under surfaces; Texas: Hidalgo county, *leg.* ?, L. A. County Museum (NH), March 1915. Wing expanse 49 mm.

Figures **14, 14a.** *Eumaeus toxea* (Godart), ♀ upper and under surfaces; Texas: Hidalgo County, *leg.* ?, L. A. County Museum (NH), March 1915. Wing expanse 48 mm.

Figures **15, 15a.** *Cyanophrys herodotus* (Fabricius), ♂ upper and under surfaces; Texas: Hidalgo County, Bentsen-Rio Grande Valley State Park, Michael A. Rickard, 29 June 1975 (published date), label date 30 June 1975. Wing expanse 27 mm.

15, 15a), M. A. Rickard and in his collection (News Lepid. Soc. - Season Summary 2: 8/1976), first informal published record; Madero, nr. LaLomita Mission, 27 October 1975 (1 ♂), good condition, Frank D. Fee and in his collection (specimen examined by authors). This species may be resident in Texas.

We are unaware of a published life history for the species, however, several larval foodplants have been reported. In Brazil, Silva, et al. (1967-1968) gave the flowers of *Mangifera indica* L. (Mango of commerce), Anacardiaceae. In Uruguay, Biezanko et al. (1974) gave *Lithraea brasiliensis* March., *Schinus molle* L., and *Schinus polygamus* (Cavanilles) Cabrera, all Anacardiaceae. In Panama, Robbins and Aiello (1982) found a larva feeding on the foliage of *Mikania* sp., Compositae, and reared it through. They also observed females ovipositing on *Lantana camara* L., and *Cornutia grandifolia* (Schlecht. and Cham.) Schauer *in* D.C., both Verbenaceae, but the larvae were unsuccessfully reared through on these plants. We expect the blossom buds of these plants would be more acceptable to the larvae than the foliage.

Although it is unknown what plants or parts thereof are utilized in Texas by this species, potential plants include *L. camara*, *Schinus terebinthifolius* Raddi, *S. longifolius* (Lindley) Spegazzini and Girola, and *S. molle*. All of these plants are found in extreme south Texas, but *S. terebinthifolius* is especially common as an ornamental. Perhaps the larvae are primarily blossom bud feeders. In some instances, larvae may complete development on foliage (juvenile ?) when blossom buds are not available.

In Mexico, Hoffmann (1941a) gave the distribution as, "Tierras templada y caliente de Veracruz, Tabasco, Chiapas, Oaxaca. Por la costa del Pacifico hasta Sinaloa. Cuenca del Rio Balsa, Jalisco. Michoacan." Welling (1963) took a ♂ at UV light in Merida, Yucatan. Kendall has a fresh ♂, 12 June 1969, Puerto Vallarta, Jalisco, W. P. Hord, det. Harry K. Clench. Ross (1976) reported it from the Sierra de Tuxtla, Veracruz (April - October, but uncommon). In Honduras, Monroe et al. (1967) took a ♂, 17 September 1962 at El Jaral, Cortes.

Cyanophrys amyntor distractus Clench 1946

Papilio amyntor Cramer 1775, Pap. Exot. 1, pl. 48 E. = *Papilio menalcas* Cramer 1779, Pap. Exot. 3, pl. 259 A, B.

Thecla amyntor distractus Clench 1946, Entomologist 79: 152-154. Type locality Rio Minero, Muzo, Colombia. Holotype in British Museum (NH).

Cyanophrys Clench 1961: 211; Miller and Brown 1981: 106. Robert K. Robbins in personal correspondence dated 17 January 1983, advised: "*Distractus* Clench is a distinct, good species; there is little reason to list it as a subspecies". Pending a formal revision of the genus, the subspecies status is retained.

One ♀ (Figs. **16, 16a**) was collected in Texas, Brewster County, ca. 20 mi. (32 km) south of Alpine, nr. Woodward Ranch, 15 March 1977, Timothy E. Vogt, Illinois Natural History Survey Collection. With a view toward confirming the capture and to obtain additional habitat data, a letter was posted to Vogt on 29 April 1981. Vogt, then living in Carbondale, Illinois, replied on 5 June 1981, saying: "During the middle of March 1977 I participated in a geological field trip in the southwestern United States. The trip was sponsored by the Geology Club of the University of Illinois, Urbana. I recall collecting specimens from a creek bottom near Woodward Ranch." Referring to a county map, this location is shown to be flanked on the east by Ash Creek and on the west by Calamity Creek; the creeks converge a few miles farther south.

This species is well established in Mexico in habitats similar to the above, where thorny hackberry is found. On 22 January 1974, in northeastern Tamaulipas, ca. 30 mi. (50 km) north of Ciudad Mante, at Rancho Pico de Oro, Kendall observed a female ovipositing in juvenile leaf axils of *Celtis iguanaea* (Jacq.) Sarg., Ulmaceae. Two eggs were recovered from the shrub, and 32 additional eggs were obtained from the captive female. Eggs hatched from 26 January to 1 February. Larvae ate mostly juvenile foliage. Pupation occurred between 16 and 22 February 1974. Adults emerged from 3 to

8 March 1974 (3 ♂, 6 ♀); one of these females is illustrated (Figs. **17, 17a**) for comparison with the Texas specimen. Several eggs, larvae, and pupae were preserved.

No doubt *Celtis pallida* Torr., closely related to *C. iguanaea*, is also used by this species as a larval foodplant. Although the latter has not been found in Texas, *C. pallida* is very common in western and southern Texas, the most likely acceptable local larval foodplant for the species. Although the climatological thresholds for *C. distractus* are unknown at present, periodic residence in Texas should be expected.

In Mexico Hoffmann (1941a) gave the distribution as, "Tierras templada — calida y caliente del Sur de Veracruz, Tabasco." In Honduras, Monroe, et al. (1967) reported collecting 1 ♂, 21 August 1962 at El Jaral.

Erora quaderna sanfordi dos Passos 1940

Erora laeta sanfordi dos Passos 1940, American Mus. Novitates 1052: 1-2. Type locality White Mountains, Arizona. Holotype in American Museum of Natural History.
Erora quaderna sanfordi, Clench 1943, J. New York Ent. Soc. 51: 221-223; Roever 1962, J. Lepid. Soc. 16(1): 1-4; Miller 1980, J. Lepid. Soc. 34(2): 209-216; Klots and dos Passos 1982, J. New York Ent. Soc. 89(4): 295-331.

Roever (1962) reported this species as occurring in Texas. Although Klots and dos Passos (1982) cite the paper by Roever, they do not include Texas in the distribution for the species, nor did Miller (1980). *Sanfordi* appears to be established in Big Bend National Park, even though it has been collected but a few times.

All known Texas records are from Brewster County, Big Bend National Park [Chisos Mountains]: 12 June 1937, 1 ♀, Rollin H. Baker (Figs. **18, 18a**), specimen in Park Headquarters collection (Roever, 1962); 9 August 1961, 2 ♂, H. A. Freeman (News Lepid. Soc. - Season Summary 3: 6/1962); 6 May 1964 (several), Kilian Roever (personal communication, 2 May 1966); 22 June 1976, 1 ♂, Frank R. Hedges (News Lepid. Soc. -Season Summary 2: 10/1977); 27 March 1983, 3 ♂, 1 ♀, Edward C. Knudson (personal communication, 6 April 1983); 27 March 1983, 1 ♂, 1 ♀, M. A. Rickard.

Klots, accompanied by Roever (Klots and dos Passos, 1982), found a single larva 29 April 1969, in Arizona, feeding on foliage of *Quercus emoryi* Torrey, Fagaceae, and it was reared through. The mature larva and pupa were described and illustrated by Klots and dos Passos (1982). They believe *sanfordi* to be bivoltine in Arizona; Texas records would tend to support this contention, pending mass rearing of the species to determine exactly what happens in nature. It probably has a pupal diapause. *Quercus emoryi* is a common oak species in Big Bend National Park; this and other oak species are probably used as larval foodplants at this location.

Glaucopsyche lygdamus oro (Scudder) 1876

Nomenclature: Miller and Brown 1981: 120 (No. 514f).

There is a ♂ specimen (Figs. **19, 19a**) from Texas in the Illinois Natural History Survey Collection, Urbana. The only data on the specimen pin is a small printed label "Tex.". In the absence of more specific clues, we can only speculate regarding the date of capture and location. The most likely area would be the northwestern quadrant of the Texas panhandle. The month of capture was probably March. We have no idea who the collector might have been. Although there is probably no established colony of this subspecies in Texas, it should be found in the western panhandle area from time to time.

This specimen may have been from the Andreas Bolter collection. Several other species of Lepidoptera in the INHS bear the same printed "Tex." label, but some specimens have an additional printed label "Andreas Bolter Collection". Most of the pins of the specimens examined are black, but a few are stainless. All have nylon heads, and all specimens were loose on their pins. This would seem to indicate that all these specimens had been papered and later relaxed, pinned and spread. If they are Bolter specimens, then this occurred after his death. Bolter died 18 March 1900 (Anonymous,

Ent. News 11: 45). He had lived in Chicago since 1855. His collection was willed to the Department of Entomology, University of Illinois, Urbana. Rapp (1945) reported: "Today the collection is in good condition, but the nomenclature is that of 1900. Unfortunately, there is very little collection data with the specimens, the majority having only state labels." This would tend to confirm that the *oro* specimen is from the Bolter Collection, even though it does not bear such label. If this is true, we may further assume that it was acquired between 1855 and 1900.

It is appropriate that three other related subspecies be discussed briefly here. *Glaucopsyche lygdamus couperi* Grote 1873. F. H. Snow (1905) reported taking *Lycaena couperii* Grote in the Brownsville, Cameron County, Texas area sometime between 6 June and 8 July 1905. In an attempt to learn what Snow had collected and determined as *couperii,* a letter was posted to Dr. Orley R. Taylor Jr., University of Kansas. In letter dated 7 February 1983, Taylor reported that George Byers had searched through the specimens in the Snow Entomological Museum and could not find the specimen in question. We are at a loss to know what species Snow might have mistaken for *couperii.* Perhaps after publication, Snow discovered the error but never published a correction.

Glaucopsyche lygdamus jacki Stallings and Turner 1947. When describing this subspecies, Stallings and Turner remarked: "It should occur throughout western Oklahoma and northern Texas, meeting *oro* in New Mexico." We believe that *jacki* does occur from time to time in the Texas panhandle, and there may be an established colony there somewhere. However, we are unaware of any Texas record at this time.

Glaucopsyche lygdamus lygdamus (Doubleday) 1841. In the area around Texarkana, Bowie and Cass counties, Texas, migrants from the Arkansas population should be found from time to time. Karpuleon (1970) reported collecting a fresh ♂ of this subspecies on 30 March 1968 at Lake Texarkana, Cass County, Texas. This specimen, the only known record from the state, is in Kendall's collection as reported by Karpuleon.

RIODINIDAE

Apodemia mormo mormo (C. and R. Felder) 1859

Nomenclature: Miller and Brown 1981: 131 (No. 544a).

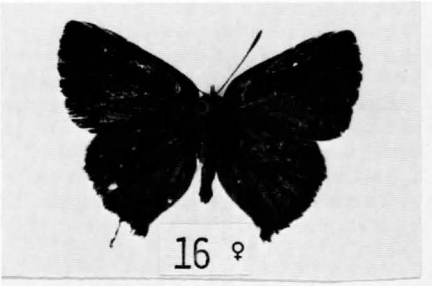
In personal communication with Kendall, 28 August 1973, the late Harry K. Clench wrote: "A while back I was rearranging our North American Riodinidae, and incorporating the Philadelphia Academy material. Among the latter I found a pair of specimens of *Apodemia m. mormo* labelled 28 miles east of Austin, Texas, M. Hebard. The labels are hand lettered; Morgan Hebard was an extremely careful scientist, and his data should be considered more than usually reliable; but there is no date of collection; no more information than I have given. This locality is far outside the usual range of the species, and other subspecies intervene between it and the range of *m. mormo,* particularly in New Mexico and western Texas. Frankly, I think a mistake was made somewhere, but I thought you would be interested in the record, and that you might possibly want to go there and check out the area to see if it really does occur there.

Figures **16, 16a.** *Cyanophrys amyntor distractus* Clench, ♀ upper and under surfaces; Texas: Brewster County, ca. 32 km S of Alpine, Timothy E. Vogt, 15 March 1977, Illinois Natural History Survey. Wing expanse 25 mm.

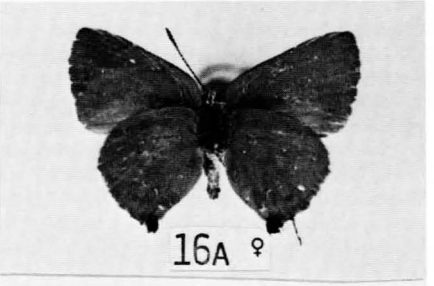
Figures **17, 17a.** *Cyanophrys amyntor distractus* Clench, ♀ upper and under surfaces; Mexico: Tamaulipas, Rancho Pico de Oro, ca. 50 km N of Ciudad Mante, Roy O. & C. A. Kendall, *ex ovum* 7 March 1974. Wing expanse 27 mm.

Figures **18, 18a.** *Erora quaderna sanfordi* dos Passos, ♀ upper and under surfaces; Texas: Brewster County, Big Bend National Park, Rollin H. Baker, 12 June 1937, Park Headquarters collection. Wing expanse 25 mm.

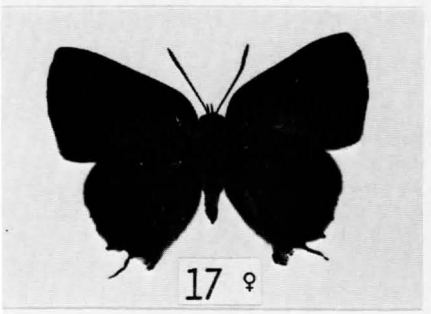
Figures **19, 19a.** *Glaucopsyche lygdamus oro* (Scudder), ♂ upper and under surfaces; Texas: no other data, Illinois Natural History Survey. Wing expanse 30 mm.



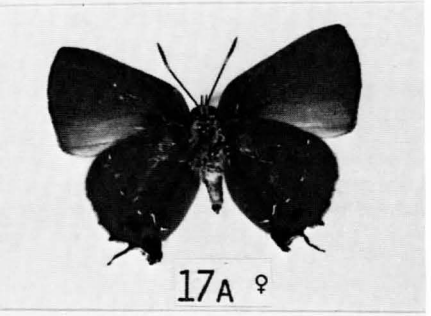
16 ♀



16A ♀

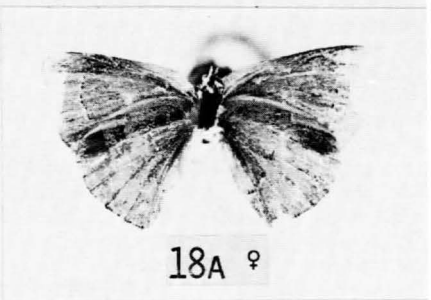


17 ♀

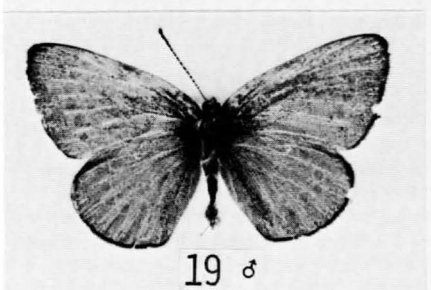


17A ♀

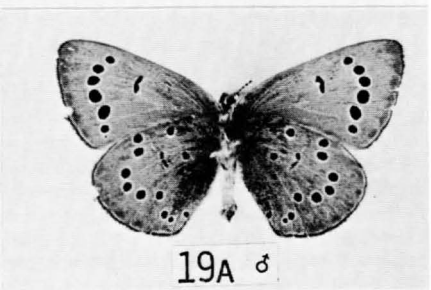
18 ♀



18A ♀



19 ♂



19A ♂

"I'm hoping one day to do a revision of *Apodemia*, and would be happy if I could dispose of this strange record one way or the other! I imagine you feel the same way."

James A. G. Rehn (1948), a collecting companion of Morgan Hebard on most of his field trips, wrote that Hebard spent all or part of five collecting summers in Texas between 1906 and 1928. In an attempt to determine the date the two *Apodemia mormo* were collected, an inquiry was mailed to the Academy of Natural Sciences of Philadelphia, where Hebard had worked and placed his collection. Donald Azuma, Collection Manager of Entomology, responded by making an exhaustive search of the field notebooks, and various publications by Hebard and Rehn and numerous specimens in the Academy from Texas. He was unable to find any specimen or reference to this specific location. A subsequent search of the Hebard-Rehn field notes by Mrs. Ruth Griffith of the ANSP disclosed that they were collecting in the El Paso area during July and August 1907. Although not specifically mentioned, Texas was probably visited briefly again in 1909; Rehn (1948: 59) stated that they visited all major areas of the western states except a few well known to them. From 15 July to 26 September 1912, their field notes show they collected in the San Antonio - Dallas area. Although Austin was not specifically mentioned, it is highly probable that this was the time when the two *Apodemia mormo* were collected. Rehn (1948: 62) reported that their plan of work first used was following railroad lines and stopping at points roughly fifty miles apart or with sharply contrasting physiography, and then striking out for promising environments. A side trip from Austin was therefore most likely. Referring to a current map of Texas, the location "28 miles east of Austin" would place the spot near McDade if one traveled due east by air; if by highway, one would travel ESE to a spot near Bastrop. One might assume that travel at the time was either by foot or horseback. There were few settlers in the area at the time, and no extensive fences were involved; therefore, either location (spot) would be appropriate.

Because Hebard was not especially interested in Lepidoptera, he may have overlooked placing a date on the specimen labels. Hebard (1943) indicates that he either collected or observed a specimen of *Parcoblatta bolliana* (a roach) at Austin in 1917. This specimen could not be found in the ANSP collection. Although each of the five summers which were spent in Texas have not been identified, the year 1917 is ruled out because Hebard was on active duty with the United States Army at the time, serving first in the Signal Corps and then in the Military Intelligence Division. He was released shortly after signing of the Armistice, and soon resumed his research work. The summer of 1920 was spent in Jamaica, Panama, and Colombia. We have been unable to determine what other specific areas were collected between 1920 and 1928 except that the Austin, Texas area was not. We therefore conclude that the most probable collecting date for the *Apodemia mormo* specimens was 15 July - 26 September 1912. Lastly, Hebard holograph labels on the two specimens were confirmed.

The pair of specimens in question are illustrated here (Figs. **20, 20a, 21, 21a**). Durden (1982: foot note 11) referred to these specimens as falling close to *Apodemia mormo mejicanus*. It will be noted from the illustrations that these specimens have distinct white spots on a black-gray background, and that they lack an orange-red rust post median band on the dorsal hindwing. Such markings would seem to place them as nominate *mormo*. To resolve the taxonomic problems of the complex, it may require reevaluation based on extensive rearing of its several subspecies.

Considering the distance from the Austin location to the nearest well established colony of nominate *mormo* (ca. 600 air mi./972 km.), and the much greater distance of several of the other species (treated in this paper) from their native habitats, there seems no reason why these should not be accepted as authentic Texas captures. Whether or not a resident population exists today remains to be determined, but Durden (1982: foot note 11) reports a sight record at Austin on 13 October 1968. If a colony is present, a possible larval foodplant in the Austin area would be *Eriogonum longifolium* Nutt., Polygonaceae. This plant is a native perennial, blooming from June to August, and ranging from the Texas panhandle and Oklahoma into east Texas and west Louisiana. It is found mostly on sandy soil on the edges of pine and oak woodlands

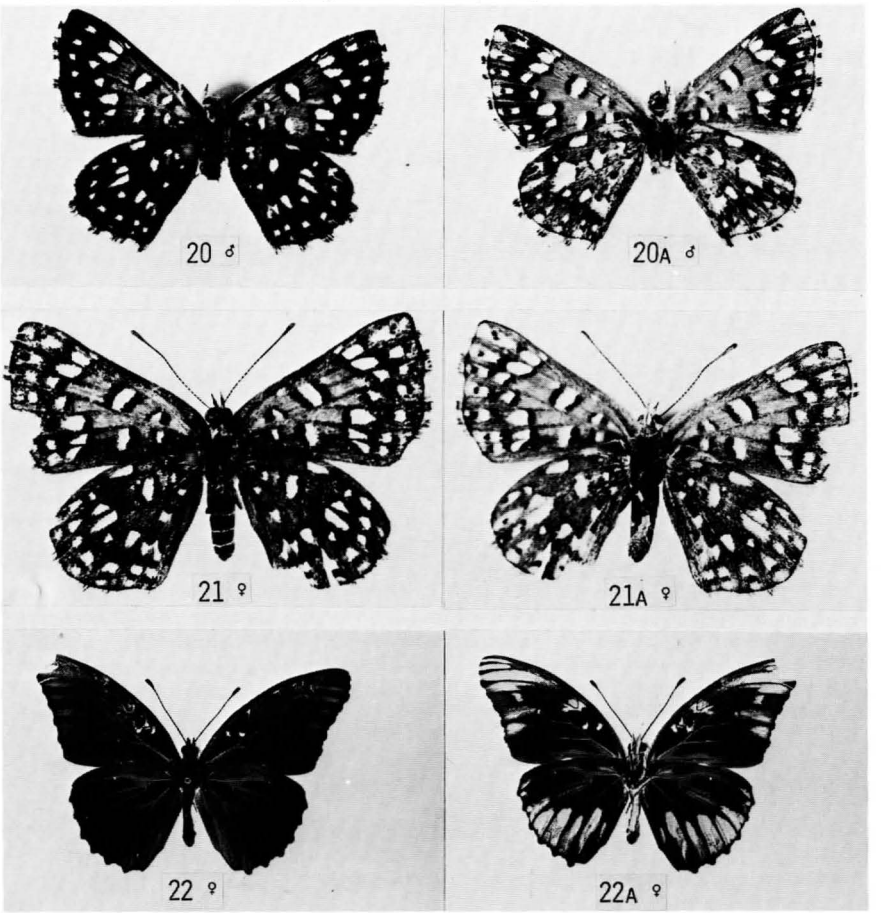
(Correll and Johnston, 1970); it is illustrated by Ajilvsgi (1979).

HELICONIIDAE

ab. Agraulis vanillae incarnata (Riley) 1926

Nomenclature: Miller and Brown 1981: 133 (No. 555b).

Michener (1942) in reviewing *Agraulis vanillae* recognized nine subspecies, including



Figures **20, 20a.** *Apodemia mormo mormo* (C. & R. Felder), ♂ upper and under surfaces; Texas: Bastrop County, 28 mi (45 km) E of Austin, Morgan Hebard, 15 July - 26 September 1912?, Carnegie Museum of Natural History. Wing expanse 25 mm.

Figures **21, 21a.** *Apodemia mormo mormo* (C. & R. Felder), ♀ upper and under surfaces; Texas: Bastrop County, 28 mi (45 km) E of Austin, Morgan Hebard, 15 July - 26 September 1912?, Carnegie Museum of Natural History. Wing expanse 33mm.

Figures **22, 22a.** *Agraulis vanillae incarnata* (Riley), ab. ♂ upper and under surfaces; Texas: Angelina County, 13 km NE of Lufkin, C. D. Fisher, 9 October 1972, Stephen F. Austin State University collection. Wing expanse 72 mm.

two which he described at the time. Gunder described, named and illustrated four aberrations of *incarnata* from California: ♂, "comstocki", 1925; ♀, "fumosus", 1927; ♂, "margineapertus", 1928; and ♀, "hewlettae", 1930. de la Torre y Callejas (1970) described and illustrated in color an aberrant ♂ of *Agraulis vanillae insularis* Maynard from Cuba.

Probably the most striking aberrant yet known for *A. vanillae* is a ♀ *incarnata* in the Stephen F. Austin State University collection, Nacogdoches, Texas. This specimen (Figs. **22, 22a**) was collected 9 October 1972, 8 mi (13 km.) NE of Lufkin, Angelina County, Texas by C. D. Fisher.

Dryadula phaetusa (Linnaeus) 1758

Nomenclature: Miller and Brown 1981: 133 (No. 557).
Stichel 1907, Genera Insectorum, Fasc. 63: 13, described 3 forms: "stupenda", "deleta", and "lutulenta".

There are two known examples of this species from Texas. Glazbrook (1934) collected and recorded the first specimen, a ♂ (first United States record). It was taken 19 December 1933 at Sarita, Kenedy County. The specimen is now in the Department of Entomology collection at Texas A&M University. Although Glazbrook reported it to be a perfect specimen at the time, the abdomen has been lost to dermestids, and there is a nick on each rear wing. The second specimen, another ♂, very fresh (Figs. **23, 23a**) was collected 19 July 1981 at Garland, Dallas County by John A. Stidham (News Lipid. Soc. - Season Summary 2: 22/1982). The specimen is now in the American Museum of Natural History. In the Season Summary it was reported as *Dryas stupenda* (Stichel); the form "stupenda" was characterized by Stichel as being brilliant red instead of fiery red.

Kimball (1965: 39) referred to 14 specimens of this species from Florida in the Los Angeles County Museum, which were collected 10, 21 February 1932 by Grimshawe [Florence M.]. Kimball doubted their authenticity because no other collector had found it. We see no reason why this widespread but uncommon species should not find its way into southern Florida from time to time, just as it does in Texas where doubtless at least a partial brood is produced. Every vicariant specimen which finds its way into the United States is not collected.

In Trinidad, W.I., Beebe, et al. (1960) gave the larval foodplant as *Passiflora*. In Uruguay, Biezanko, et al. (1974) reported the larval foodplants to be *Passiflora coerulea* L. and *P. quadrangularis* L. In south Texas, *P. coerulea*, a perennial, robust, and high climbing species, is grown rather extensively as an ornamental. Doubtless other species of *Passiflora* are utilized by this insect. Obviously too, much remains to be learned about the insect's survival thresholds.

NYMPHALIDAE

Speyeria cybele cybele (Fabricius) 1775

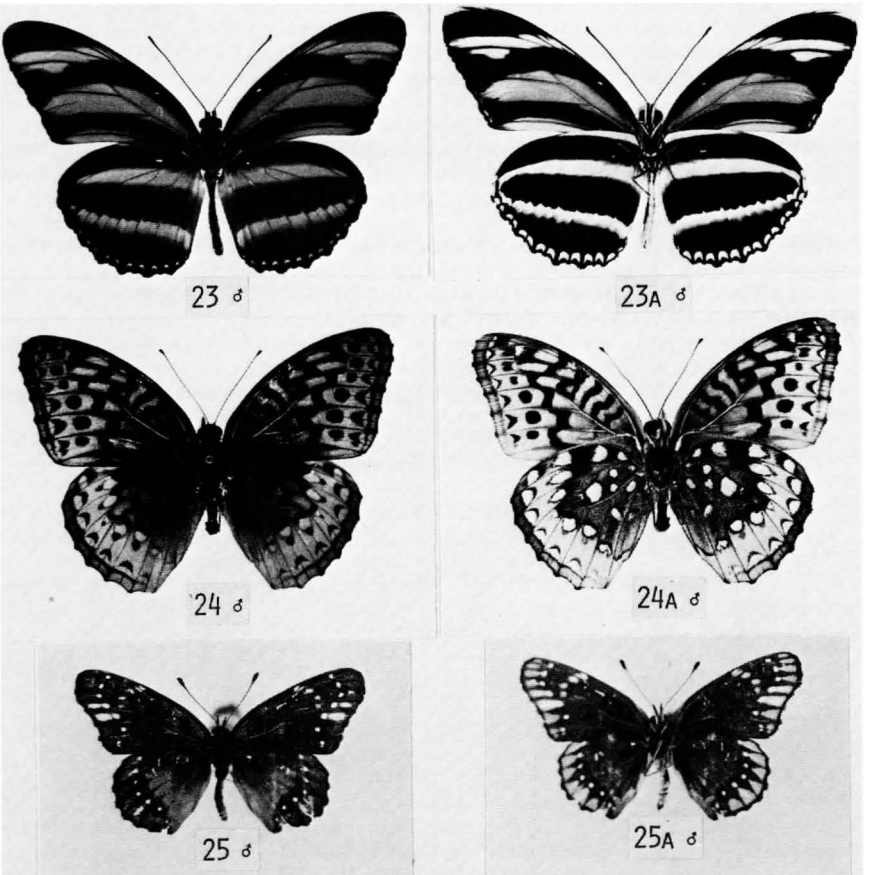
Nomenclature: Miller and Brown 1981: 136 (No. 565a).

One ♂ (Figs. **24, 24a**) was collected in March 1980, by William Witteman at his residence, 12220 New Sulphur Springs Road, ESE of San Antonio, Bexar County, Texas. Witteman reported seeing several other specimens nectaring on blossoms of cultivated Yellow Sweet Clover, *Melilotus officinalis* (L.) Lam., Leguminosae, but not recognizing it as something most unusual for the area, only one specimen was collected.

Because Bexar County is a most unlikely location for the species to be found, several questions were asked in order to confirm the capture. Witteman had earlier introduced violets as ornamentals from three separate locations: 1) near Onancock, Virginia, 2) Annapolis, Maryland (Eastern Shore), and 3) Ore City, Upshur County, Texas. Assuming

that *cybele* had been unknowingly introduced with the violets, the Ore City location was eliminated immediately. Inquiry was then made of Stanley S. Nicolay who lives near Onancock, Virginia, and L. Paul Grey, an authority on *Speyeria*, to determine if they were aware of any records of *cybele* from Onancock. They were not. This left the Maryland location from which the violets had been dug in early June 1979.

Clark and Clark (1951: 58-59) reported *cybele* to be distributed infrequently on the Coastal Plain and on the Eastern Shore (Accomack and Northampton Counties) of Virginia. They indicated that it was univoltine and that males started flying about the middle of May and the females about the first of June. Fales (1974: 222-229) reported the species established in all botanical zones of Maryland. L. Paul Grey advised in letter



Figures **23, 23a.** *Dryadula phaetusa* (Linnaeus), ♂ upper and under surfaces; Texas: Dallas County, Garland, John A. Stidham, 19 July 1981, American Museum of Natural History. Wing expanse 82 mm.

Figures **24, 24a.** *Speyeria cybele cybele* (Fabricius), ♂ upper and under surfaces; Texas: Bexar County, 12220 New Sulphur Springs Road, ESE of San Antonio, William Witteman, March 1980 (an introduction), Kendall collection. Wing expanse 72 mm.

Figures **25, 25a.** *Chlosyne lacinia adjutrix* Scudder, ♂ upper and under surfaces; Texas: Kleberg County, Sarita, [H. Glazbrook], 10 October 1932, Texas A&M University collection. Wing expanse 40 mm.

dated 24 April 1983 that: "Violets dug in Maryland in June could well have concealed larvae of this species. Presumably they could be small, second or third instar since they emerge over a long period of time." With this information, there can be no doubt that the immatures were introduced from Maryland. Because the winters are mild in Bexar County, Texas, diapause would be terminated and larval development completed much earlier than in Maryland.

Although *cybele* may enter northern Texas from time to time through normal dispersal of populations in Oklahoma and Arkansas, this introduction is the only known record at present, and there is no indication that a local colony was established. The most likely location in the state for *Speyeria* is in the Guadalupe Mountains National Park, Culberson County. *Speyeria atlantis* is well established in Lincoln National Forest, Otero County, New Mexico, some 80 air mi. (130 km.) NW of the National Park. Insufficient field work has been done in the National Park to know for sure, but seemingly suitable habitats and larval foodplants exist there.

ab. *Chlosyne lacinia adjutrix* Scudder 1875

Nomenclature: Miller and Brown 1981: 154 (No. 599b).

There are two, almost identical, aberrant male specimens in the Department of Entomology collection, Texas A&M University. One of these (Figs. **25, 25a**) was collected 10 October 1932, the other on 2 November 1932 at Sarita, Kleberg County, Texas. Apparently they were collected by H. Glazbrook (based on holographic labels and date). Although there is great variability in the markings of this subspecies, especially in the females, it is interesting that two, almost identical aberrant specimens would be found in the same population. Two other aberrant *adjutrix* were reported by Neck (1975, 1980) from Austin, Texas; a ♂ on 10 October 1971, and a ♀?, on 18 October 1973.

Chlosyne ehrenbergi (Geyer) 1833

Morpheis ehrenbergii Geyer 1833, Samml. exot. Schmett. 3: Pl. 443 (5)(named figure only). Type locality Mexico? Location of type? Scudder 1874, Proc. American Acad. Arts and Sci. 10: 221 (sole species and therefore type, but preoccupied).

Anemeca ehrenbergii (Hübner), Kirby 1871, Synonymic Catalogue, No. 179; Scudder 1874 (sole species and therefore type).

Chlosyne ehrenbergi, Higgins 1960, Trans. R. Ent. Soc. 12(14): 381-475. (We follow Higgins in placing this species in the genus *Chlosyne;* however, further taxonomic study may show that it is best retained in *Anemeca.*).

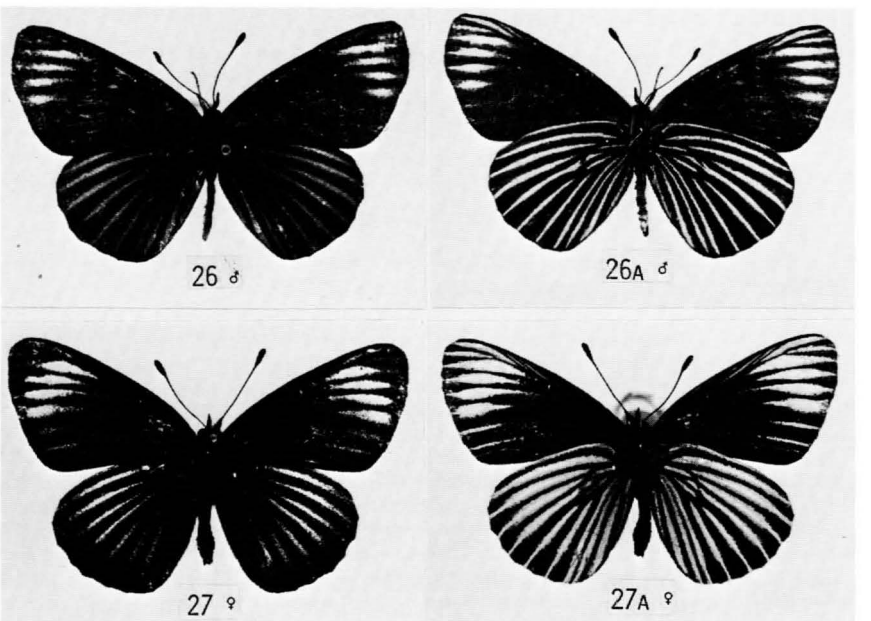
Higgins (1960) reported one example from "Texas" in the British Museum, no further data; he did not indicate the sex. We have no idea who the collector might have been, but presume it was collected toward the end of the 19th century. A pair (Figs. **26, 26a, 27, 27a**), ex larva, 10 mi. (16 km.) S. of Cuernavaca, Morelos, Mexico (Lee D. Miller and Richard C. Pine), Allyn Museum of Entomology, are illustrated. The species probably ranges northward into Texas more often than the single early record would indicate. *Buddleja,* its larval foodplant, is found from the Rio Grande in Texas to Oaxaca, Mexico.

Vazquez (1934) gave an excellent account of the life history. The adult (both surfaces), wing venation, male genitalia, egg, larva (including setal patterns for each of six instars), and the pupa are described and illustrated. In Mexico, larvae are monophagous on foliage of *Buddleja* species, particularly *cordata* H. B. K., Loganiaceae, which is commonly called tepozan, tepozan blanco, zompanle, zoyalizan, and salvia real. Vazquez reported three generations annually in the Valle of Mexico, with some overlapping of broods. Larvae from eggs deposited in late October develop slowly during the winter, depending upon climate, and produce adults in mid April. Adults of the second genera-

tion emerge from mid-July to mid-August. The third generation appears in late October. Larvae tend to be gregarious in the earlier instars. The larval foodplants (mostly shrubby) are frequently completely defoliated by last instar larvae. At times it is something of a pest in Mexico City (Dale W. Jenkins, pers. comm.). Based on these data, it would appear that the species is continuously brooded, with larval development retarded due to lowered temperatures during the winter months.

The immature stages of *ehrenbergi* have been collected by a number of individuals: Vazquez (1934) as stated above; Miller and Pine in 1967 (pers. comm., 1980); Donald J. Harvey in 1978 (pers. comm., 1980), de la Maza (1975), and Warren H. Wagner Jr. (pers. comm. w/D. Harvey, 1980). On 28 February 1980, near Rioverde, San Luis Potosi, Roy and Connie Kendall collected ca. 160 last instar larvae and seven pupae on two small shrubs of *Buddleja sessiliflora* H. B. K. (found also along the Rio Grande in Cameron and Hidalgo Counties, Texas). All larvae present on the two shrubs were not collected. On 2 March 1980, they found a fresh single layered cluster of eggs beneath a terminal leaf of this plant; all were preserved. Again, on 4 March 1980, they found another cluster of eggs, somewhat strung-out beneath a leaf; these were kept for rearing, but all were parasitized. From the larvae collected, 75 pupated from 1 to 11 March 1980, and adults eclosed (14 ♂, 37 ♀) from 12 to 22 March 1980. On 8 March 1980, a ♀ eclosed, ex pupa. About 150 eggs, 89 larvae, 23 pupae, and 10 deformed adults ex larvae, were preserved.

From these rearings, a number of interesting parasites were obtained. DIPTERA: Tachinidae: ex host larva/pupa (7), *Spoggosia claripennis* (Macquart); and ex host larva (5), *Lespesia* sp., both det. D. Wilder, USDA. HYMENOPTERA: Braconidae: ex host



Figures **26, 26a.** *Chlosyne ehrenbergi* (Geyer), ♂ upper and under surfaces; Mexico: Morelos, 16 km S of Cuernavaca, Lee D. Miller & Richard C. Pine, *ex larva* September 1967, Allyn Museum of Entomology. Wing expanse 47 mm.

Figures **27, 27a.** *Chlosyne ehrenbergi* (Geyer), ♀ upper and under surfaces; Mexico: Morelos, 16 km S of Cuernavaca, Lee D. Miller & Richard C. Pine, *ex larva* September 1967, Allyn Museum of Entomology. Wing expanse 56 mm.

larva (3), *Cotesia* sp. nr. *limenitidis* Riley, det. S.R. Shaw, USDA; Pteromalidae: ex host (larva?)/pupa (1), *Pteromalus puparum* (Linnaeus), det. E. E. Grissell, USDA; Chalcididae: ex host pupa (possibly larva/pupa) (1), *Spilochalcis dorsata* (Cresson), det. E. E. Grissell, USDA; Trichogrammatidae: ex host ova (45 ♂, 145 ♀), *Trichogramma* n. sp., det. D. L. Vincent, USDA, description in press.

Lastly, it should be mentioned that Vazquez (1934) found larvae of two moth species feeding on *Buddleja* with *ehrenbergi*: *Sinopsis mexicanaria* Walker, Geometridae, and *Halisidota caryae* Harris, Arctiidae. Kendall found larvae of *Opiscalea ocellata* Walker, Noctuidae feeding on *Buddleja sessiliflora* in San Luis Potosi, near Rioverde, det. Robert Poole, Dept. Entomology, Smithsonian Institution.

In Mexico Hoffmann (1941a) gave the distribution as, "Sinaloa, Nayarit, Colima, Jalisco; Sierra Volcanica Transversal, Valle de Mexico, Mesa Central, Sierra Madre del Sur (Guerrero y Oaxaca), Morelos, Puebla." Vazquez (1934) as "extiende por todo el lado del Pacifico, desde la parte norte de Sinaloa y parte limitrofe de Durango por toda la Sierra Madre Occidental pasando por Jalisco, Michoacan, Guerrero hasta Oaxaca; el centro del pais, Guanajuato, Estado de Mexico, Distrito Federal, Estado de Puebla hasta los limites de la Sierra Madre Oriental de Mexico." Brown (1944) reported it from Hidalgo (23 June, 24 July 1939, 3 ♂, 10 ♀), and from Michoacan (20-30 July 1940, 2 ♂, 1 ♀). Higgins (1960) gave Jalapa, Colima, Oaxaca, Salle, Anemeca, Guerrero, etc. It is inadequately clear what Higgins meant by "Salle" and "Anemeca", these are not Mexican states; it may simply reflect poor editing. Monsieur A. Salle visited Mexico in March [1857], and he described the adult and immature stages of *Eutachyptera psidii*, Lasiocampidae, from that visit. Higgins may have had information that Salle collected *Anemeca* during that visit; however, Kirby didn't erect the genus until 1871. Beutelspacher (1975) recorded it from Las Minas, Veracruz (June, October, November). de la Maza (1975) collected it at Rancho Viejo, Morelos (February, September). Guzman (1976) collected it at Chalma, Estado de Mexico (March, April), and Barrera (1977) collected it in the Sierra de Nanchititla, Estado de Mexico. Kendall collected it at Rioverde, San Luis Potosi (28, 29 February 1980, 5 ♂, 3 ♀).

86-w

Chlosyne melitaeoides (C. and R. Felder) 1867

Synchloe melitaeoides C. and R. Felder 1867, Reise Novara 3: 396. Type locality "Mexico". Holotype in British Museum (NH).
Chlosyne Butler 1870, Cist. Ent. 1: 38; Scudder 1875; Hemming 1934.
Chlosyne melitaeoides, Higgins 1960, Trans. R. Ent. Soc. London 12(14): 381-475.

This species (Figs. **28, 28a, 29, 29a**) is new to Texas and the United States, although there may be a few misidentified earlier specimens in collections. Twenty-three examples were collected in Starr County, Texas by McGuire: 20 October 1973, Rio Grande City, 1 ♀; 22 October 1974, ca. 16 km. ESE of Rio Grande City, 1 ♂; 22 October 1974, ca. 1.62 km. E of Garciaville, 3 ♂, 8 ♀; 22 October 1974, ca. 10 km. W of Sullivan city, 1 ♂, 1 ♀, 24 October 1974, ca. 6 km. W. of Sullivan City, 2 ♂, 6 ♀. Also in Starr County, nr. El Sauz, 19 October 1976, Kendall saw a fresh specimen (♀ ?), just out of reach, nectaring on blossoms in a thorn forest; when the specimen flew away, he was unable to follow it through the chaparral. A pair of specimens (♂, 22 October 1974 and ♀, 24 October 1974) were placed in the British Museum (NH) where L. G. Higgins confirmed our tentative determination. Two pair (1 ♂, 2 ♀, 22 October 1974 and 1 ♂, 24 October 1974) were placed in the Allyn Museum of Entomology.

Apparently nothing is known of the life history of *melitaeoides*, but larval foodplants may be members of the Acanthaceae such as *Anisacanthus* and *Carlowrightia*. Based on collection records, the species would seem to be at least trivoltine. It probably has a larval diapause.

In Mexico Hoffmann (1941a) gave the distribution as, "Valle de Tehuacán, Puebla."

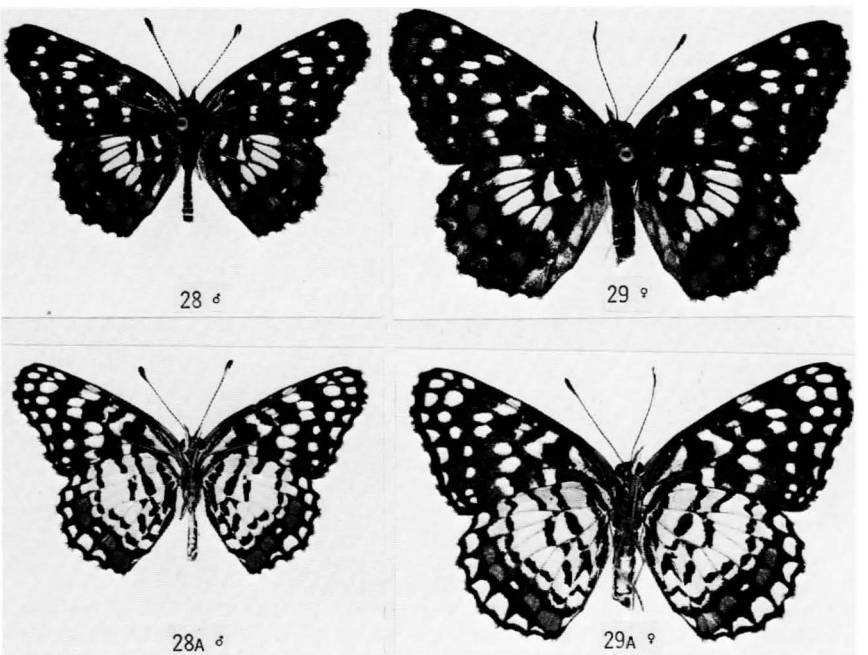
Some specific records from Mexico are: Chiapas: San Christobal de las Casas, 14 July 1973, 1 ♂, Peter Hubbel, collection of Douglas Mullins. Nuevo Leon: ca. 41 km. SSW of Monterrey, 24 September 1977, the Kendalls collected a fresh ♂, and saw 2 others probing a moist spot nr. a mountain stream; at Chipinque, ca. 11 km. WSW of Monterrey, 3 July 1978, 1 ♂, worn, E. V. Gage, det. Kendall, and on 4 July 1979, same location and collector, several specimens including 4 ♀; de la Maza and de la Maza (1981), at Chipinque, 5 September 1971, 1 ♂, 1 ♀. San Luis Potosi: Rio Santa Catarina, de la Maza and de la Maza (1981), 30 September 1979, 1 ♀, collection of Douglas Mullins. Tamaulipas: nr. San Fernando, 24 October 1974, 2 ♂, 2 ♀, McGuire, in collection of Douglas Mullins; also 23 mi. N of San Fernando, 2 August 1973, 1 ♀, L. D. and J. Y. Miller in Allyn Museum.

Epiphile adrasta adrasta Hewitson 1876

Epiphile [Boisduval ms.] Doubleday, 1844, List Spec. Lepid. Ins. British Mus. I:90 London. 1844-1848. Type species (*orea*) by designation of Scudder, Proc. American Acad. Arts. and Sci., 10: 165 (1875).

Epiphile adrasta Hewitson 1876, Exot. butts. 2: pl. Nymphalidae, figs. 9, 10, 11. Type locality "Mexico". Holotype in British Museum (NH). Descimon and de Maeght 1979, Rev. Soc. Mex. Lepid. 5(1): 39-47.

One ♀ (Figs. **30, 30a**) was taken in Texas, Hidalgo County, Santa Ana National



Figures **28, 28a.** *Chlosyne melitaeoides* (C. & R. Felder), ♂ upper and under surfaces; Texas: Starr County, 1.62 km E of Garciaville, William W. McGuire, 22 October 1974, Allyn Museum of Entomology. Wing expanse 38 mm.

Figures **29, 29a.** *Chlosyne melitaeoides* (C. & R. Felder), ♀ upper and under surfaces; Texas: Starr County, 1.62 km E of Garciaville, William W. McGuire, 22 October 1974, Allyn Museum of Entomology. Wing expanse 46 mm.

Wildlife Refuge, 27 October 1973 by M. A. Rickard (News Lepid. Soc. - Season Summary 2: 7-8/1974); McGuire and Rickard (1974). This species should be found in extreme south Texas from time to time, where at least a partial brood should be produced. In this part of the state, *Serjania brachycarpa* Gray, Sapindaceae, one of its larval foodplants, is abundantly common. The butterfly may be continuously brooded; if so, the winter climate in extreme south Texas may be unsuitable for permanent establishment.

Muyshondt (1973) published notes on the life history of *adrasta*, and gave Sapindaceae, especially *Paullinia*, as the larval foodplant in El Salvador.

Near El Naranjo, San Luis Potosi, Mexico between 13 and 24 January 1976, Kendall found seven larvae feeding on foliage of *Serjania racemosa* Schumacher, Sapindaceae. Four larvae pupated from 28 to 30 January 1976, and three ♀ eclosed 10 February 1976 (2), and 12 February 1976 (1); three larvae and a pupa were preserved. In Tamaulipas, nr. Gomez Farias, 6 January 1974, two larvae and two eggs were found on *Serjania brachycarpa* Gray; these were preserved. At the same location, 17 January 1974, four eggs (observed ♀ deposit 2) and four larvae were collected on *Paullinia tomentosa* Jacq.; all were preserved, including one larva that pupated. On 31 January 1974 at Rancho Pico de Oro, ca. 49 km. N of Ciudad Mante, Kendall collected two larvae, one on *P. tomentosa*, the other on *S. brachycarpa;* they were reared on *P. tomentosa*; they pupated 26 January and 3 February 1974; two ♀ eclosed 4 and 14 February 1974. On 10 November 1974 at El Nacimiento Rio Mante, nr. Ciudad Mante, a ♀ was observed ovipositing on foliage of *S. brachycarpa* but was not collected. On 5 January 1975 at Quintero, nr. Ciudad Mante, one larva was found feeding on *S. racemosa*, and another one on *P. tomentosa;* one larva was preserved and the other pupated 28 January 1975, a ♀ eclosed 6 February 1975.

Not unlike many other nymphalids, a ♂ *adrasta* was observed "spitting" or recycling fluid on a rock, 21 November 1974 at Pasa del Abra, ca. 11 km. S of Cuidad Mante. At Quintero, 10 December 1975, a ♂ was collected while probing animal dung.

Descimon and Mast de Maeght (1979) gave the distribution in Mexico as: "Chiapas, Tabasco, Oaxaca, Veracruz (Catalogo Hoffmann); Veracruz; Atoyac, Cuesta de Misantla, Cordoba, Orizaba, Jalapa (British Museum N. H.), region de Orizaba (Mus. National Histoire Nat., Paris), Catemaco (coll. H. Descimon); Oaxaca: Chiltepec (coll. H. Descimon); Chiapas: Muste, Santa Rosa Comitan, carretera a Santa Helena, 600 m alt. (coll. H. Descimon); Ocozocuautla (coll. de la Maza); Veracruz: el Vigia, Fortin, Teocelo (coll. de la Maza);Nuevo Leon: Cola de Caballo, 20 km. al SE de Monterrey (coll. de la Maza)." Kendall has it from Nuevo Leon: Cola de Caballo (1 ♂, 2 November 1978); San Luis Potosi: El Salto Falls (1 ♀, 24 December 1972; 1 ♂, 16 November 1974; 1 ♂, 17 November 1974; 1 ♂, 9 December 1975); nr. Tamazunchle (1 ♂, 20 February 1974); at El Naranjo (1 ♂, 17 January 1976). Tamaulipas: Paso del Abra (1 ♀, 23 December 1973; 1 ♂, 21 November 1974); at Rancho Pico de Oro (1 ♀, 26 December 1973); at Gomez Farias (1 ♀, 27 December 1973; 1 ♀, 17 January 1974; 1 ♂, 27 January 1974); at Quintero (1 ♂, 8 January 1974; 1 ♂, 7 January 1975; 1 ♂, 10 December 1975); at El Nacimiento Rio Frio (2 ♂, 12 February 1974).

Occidryas chalcedona (Doubleday) 1847

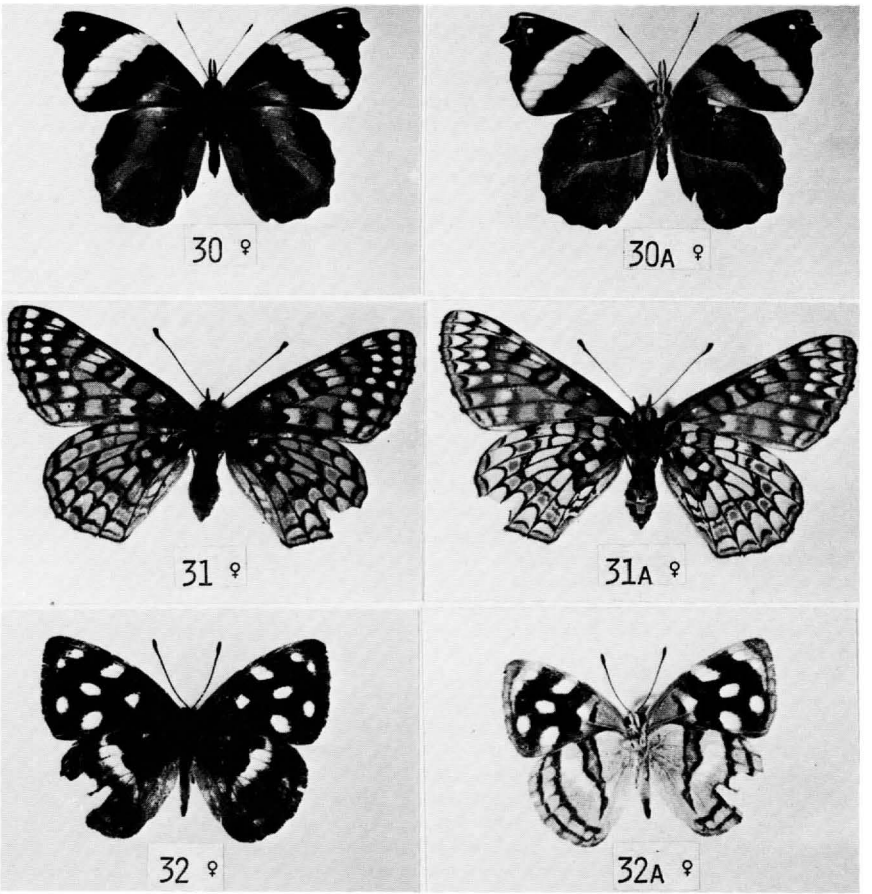
Nomenclature: Miller and Brown 1981: 165 (No. 632a).

This species is known in Texas from a single ♀ (Figs. **31, 31a**), Randall County, Palo Duro Canyon State Park, 5 May 1961, Lloyd M. Martin, Los Angeles County Museum. There may be an isolated colony here, but further study is needed to determine this. The single record may represent only normal movement of the species.

Because we have but a single female specimen, we are reluctant to consider it other than the nominate species. It is interesting to note that Miller and Brown (1981) list 11 subspecies for this insect, and nine of these were described from California. In addition, 16 aberrations, one form, and two synonyms have been described. It seems incredible

that so many subspecies could be found in such a small geographical area. We suspect that most of this variability may be attributed to climatic conditions and to an unstable gene pool.

Chalcedona is univoltine with larval diapause. Larvae are polyphagous on Scrophulariaceae (*Penstemon, Besseya, Castilleja, Collinsia, Cymbalaria, Dipsacus, Mimulus, Pedicularis, Veronica,* and *Orthocarpus* the last in lab, Masters - 1979); Caprifoliaceae (*Symphoricarpus, Lonicera*); Valerianaceae (*Plectritis*); Orobanchaceae (*Orobanche*); Plantaginaceae (*Plantago*); Boraginaceae (*Mertensia*); Labiatae (*Trichostema, Stachys*); and Rosaceae (*Rosa*) all published in the literature (Tietz, 1972).



Figures **30, 30a.** *Epiphile adrasta adrasta* Hewitson, ♀ upper and under surfaces; Texas: Hidalgo County, Santa Ana National Wildlife Refuge, Michael A. Rickard, 27 October 1973. Wing expanse 58 mm.

Figures **31, 31a.** *Occidryas chalcedona* (Doubleday), ♀ upper and under surfaces; Texas: Randall County, Palo Duro Canyon State Park, Lloyd M. Martin, 5 May 1961, L. A. County Museum (NH). Wing expanse 51 mm.

Figures **32, 32a.** *Dynamine tithia* (Geyer), ♀ upper and under surfaces; Texas: Brewster County, 32 km S of Alpine, Timothy E. Vogt, 15 March 1977, Illinois Natural History Survey. Wing expanse 30 mm.

All of the families and most of the botanical genera are found in Texas; however, only *Castilleja, Penstemon,* and *Plantago* are found in the area where the ♀ *chalcedona* was taken. The first two of these are the most likely larval foodplants locally.

Dynamine tithia (Geyer) 1823

Sironia tithia Geyer 1823, *in* Hübner, Zutr. Z. Samml. exot. Schmett. 2:31. Type locality "South Brazil". Holotype lost ?

Dynamine: Miller and Brown 1981: 182 (generic synonomy and type-species data); Ebert *in* Biezanko et al., 1978, Rev. Centro Ciencias Rurais 8 (suplemento): 1-84 (believes *tithia* a synonym of *irena* Godart 1821).

One ♀ (Figs. **32, 32a**), new to Texas and the United States, was collected 15 March 1977, in Brewster County, Woodward Ranch, ca. 20 mi. (32 km.) South of Alpine by Timothy E. Vogt, Illinois Natural History Survey collection. The specimen was taken by Vogt while on a geological field trip sponsored by the Geology Club, University of Illinois, Urbana and confirmed in correspondence with Vogt dated 5 June 1981.

Müller (1886) described the larva and compared the pupa to that of *Dynamine mylitta.* He gave *Dalechampia triphylla* Lam. and *D. stipulaceae* Mull. Arg., Euphorbiaceae, as larval foodplants. The larva eats pollen [blossom buds] and most likely immature fruits and juvenile leaves as does *Dynamine dyonis.* Röber (1916) summarized the larval description and cited the same larval foodplants given by Müller. Biezanko, et al. (1974), reported *Dalechampia stenosepala* Muell. Arg. as a larval foodplant in Uruguay. There can be no doubt that at such times as this species works its way northward through Mexico and into western Texas that the larvae feed on *Tragia* sp., and on *Tragia* and *Dalechampia* in Mexico, as does *dyonis* and *mylitta.*

Previous distribution of this species was limited to Brazil. Hoffmann (1941a) did not include it for Mexico, and we have been unable to locate specimens from there. de la Torre y Callejas (1971) did not find it in Cuba. Keith S. Brown, in letter dated 20 October 1982, remarked: "You could only have *D. tithia* if it is an introduction, since the species is restricted to southeastern Brazil (quite frequent near Campinas). It may be conspecific with the very similar *D. racidula* of the Amazon, and *D. salpensa* of Central America." Because Brewster County is very sparsely populated and essentially undeveloped except for ranching, an unintentional manual introduction seems unlikely. No unusual climatic conditions which might account for the record occurred during the time-frame involved. Two possible explanations for the species being found in Texas are: 1) it worked its way up through Mexico establishing temporary colonies along the way; 2) a very localized population exists in Mexico, not yet found by collectors, or it has been collected in Mexico and misidentified.

From a bionomic standpoint, there seems no reason why this species should not be established, at least sparsely, in Mexico. Its larval foodplants are the same as those for *D. mylitta,* a common Mexican species. Both species are sympatric and synchronic in the Central Brazil Plateau where Brown and Mielke (1967, 1968) reported it to be uncommon but regular. In extreme south Texas there is an established population of *D. dyonis,* but this population is so small most of the time, it is easier to locate larvae than the adults. In October 1899 there was a great outbreak of *dyonis* in Texas, and again in October 1968 (69 years later) when it ranged over much of Texas. The same may be true of *tithia* in Brazil and possibly Mexico. The biological controls in force here are unknown, but probably certain parasites and predators are involved. Cannibalism is a distinct possibility during periods when little inflorescence is produced due to foodplant seasonality and climatic conditions. Heavy cannibalism in *dyonis* has been observed by Kendall (unpublished) and Doyle (1979).

Capture records from Brazil are: January, February, June, December (Brown and Mielke, 1967); Ebert (1969) reported the species rare to very rare February to May and November.

Diaethria asteria, Godman and Salvin) 1894

Nomenclature: Miller and Brown 1981: 182 (No. 677).

So far as we know, only one example of this species has been collected in Texas, taken in July 1939 at Alamo, Hidalgo County, by D. Ring, who then lived there. Ring gave the specimen to Mrs. E. J. Kelso who gave it to H. A. Freeman who turned it over to Don B. Stallings (H. A. F. letter dated 28 January 1981). Stallings sent the specimen to W. P. Comstock for determination on 16 March 1945. It was formally recorded for Texas and the United States by Stallings and Turner (1946). The specimen is currently in the Peabody Museum of Yale University (D.B.S. letter dated 7 May 1981).

A line drawing of the underside of this specimen is given in Ehrlich and Ehrlich (1961, Fig. 311); the date "V" given beneath the drawing should be "VII", and the distribution given "common in northern Mexico" could apply only to *Diaethria anna*. Klots (1951: 279) mentioned this specimen and gave the date of capture as "1 July", but the specimen label reads "July 1939".

The illustration by Howe (1975, pl. 15, figs. 5, 14) is not *D. asteria* but a ♂ *Cyclogramma bacchis* (Doubleday), unrecorded from the United States. This error was pointed out by Beutelspacher (1976b), de la Maza E. (1977), and Miller and Brown (1981: 239, Note 585). de la Maza E. (1977) illustrated both surfaces of a ♂ *D. asteria* and compared it to *D. astala*. de la Maza gave the distribution in Mexico as, "Tierra caliente y templada de Colima y Nayarit," while Hoffmann (1941a) gave only "Nayarit".

We are unaware of a published life history or larval foodplant for this species, but the larvae may feed on *Trema*, Ulmaceae.

Diaethria anna (Guérin-Méneville) 1844

Callicore anna Guerin-Méneville 1844, Icon. Regn. Anim.: 480. Type locality Mexico? Holotype lost?
Diaethria: Miller and Brown 1981: 182 and Notes 11, 584 (generic synonomy and type-species data).

In letter dated 9 February 1981, Robert C. Simpson wrote: "On May 6, 1973 I saw and collected a specimen of *Diaethria anna* in Brewster County, Big Bend National Park within 100 yards of the Rio Grande at Rio Grande Village.... For several years I have worked as a field research scientist for the Ontario government and as a result of moving every few months I never mounted the butterfly. Although I have most of my collections now in Virginia, that group of papered butterflies must still be in Ontario at my parents place as I could locate only one of my 1973 Texas specimens envelopes. As the situation stands you will probably have to accept this as a hypothetical encounter until I locate the specimen. I do however know the group well as I have collected butterflies extensively in northwestern, eastern and southern Mexico."

In a following letter dated 23 September 1981, Simpson remarked: "The outlook for my specimen of *Diaethria anna* is not good. One of my parent's barns and a storage building burned to the ground. My mother is quite certain that is where the papered specimens were stored. Under these circumstances if you would like to publish the record, please do so..... If by chance it turns up, I will photograph the specimen and send the slides to you to change it from hypothetical to verifiable."

Of the five *Diaethria* species found in Mexico, *anna* is the most common, and the one that might be expected to be found more frequently in Texas. It should be pointed out, however, that the collecting sites in Texas for both *anna* and *asteria* are equal distance from their respective Mexican populations. We may conclude then that population density per se is not a significant movement factor for this genus.

The illustration of a live specimen (underside) in Pyle (1981, Fig. 687) is *D. anna*, not *clymena*. This specimen was photographed in Mexico by Harry N. Darrow at Encino, ca. 45 km. N of Cuidad Mante, Tamaulipas (Darrow, letter dated 27 August 1981);

clymena is not one of the five species recorded for Mexico.

Apparently the preferred larval foodplant for most, if not all, of the *Diaethria* species is *Trema*, Ulmaceae. Müller (1886) described the immature stages of *D. meridionalis* Bates and gave the larval foodplant as *Trema micrantha* (L.) Blum. Scudder (1892), referring to the Florida population of *clymena*, quoted Müller's life history but treated *meridonalis* as a variation of *clymena*. Although the larval foodplant for *clymena* remains unknown, it most likely feeds on *Trema micrantha* or *T. lamarckiana*, both being found in Florida (Kimball, 1965: 43; Lenczewski, 1980: 21). In Uruguay, Biezanko et al. (1974) gave *Celtis spinosa* Spreng. as larval foodplant for both *D. meridionalis* and *D. candrena* Godart.

In Mexico at Gomez Farias, Tamaulipas, Kendall found *anna* associated with *Trema micrantha*. On 27 December 1973 he observed a female oviposit on the foliage of this plant (small tree); both the female and egg were recovered but the female did not oviposit in captivity. The egg hatched 1 January 1974, and the larva was offered *Celtis pallida* Torr. which it refused and died. On 31 December 1974 in same location and tree, 14 first instar larvae were found. Those that were not parasitized died later due to malnutrition. It was impossible to keep the cut *Trema* fresh under field conditions, and the nearest known tree to field headquarters was some 35 mi. (57 km.) away. It was interesting to note that the larval damage to the foliage was similar to that of *Anaea* and *Limenitis*, i. e. the leaf is eaten away leaving the midrib on which the larva rests when not feeding.

The geographical distribution of *anna* in Mexico, was given by de la Maza E. (1977) as, "Tierra caliente y templada de la vertiente del Golfo de Mexico; desde el sur de Tamaulipas hasta el norte de Chiapas. Peninsula de Yucatan." Beutelspacher B. (1975) recorded it from Las Minas, Veracruz (August, September). Ross (1976) found it common at Sierra de Tuxtla, Veracruz (15 June - 30 October). Saldana M. (1976) described and illustrated an aberrant *anna* from Barranca de Patla, Edo., Puebla. de la Maza E. (1977) described and illustrated one form (from Puebla) and 5 aberrations (from Oaxaca and Veracruz) of *anna*. Kendall collected it in San Luis Potosi, nr. Tamazunchale (1 ♂, 20 February 1974); Tamaulipas: Gomez Farias (3 ♀, 27 December 1973; 6 ♂, 6 January 1974; and 1 ♂, 17 January 1974); El Nacimiento Rio Frio (1 ♂, 12 February 1974); El Nacimiento Rio Sabinas (1 ♂, 25 January 1975); Veracruz: Fortin de las Flores (1 ♂, 24 March 1977, and 1 ♂, 25 March 1977).

It is unlikely that either *anna* or *asteria* will become established in Texas unless they adapt to feeding on *Celtis pallida*, or a considerable amount of *Trema* is introduced which would provide a constant larval food supply. Climatic tolerances for the species are unknown at present. Even if a larval food supply were available, it is possible that no more than one brood could be produced occasionally.

Hamadryas guatemalena marmarice (Fruhstorfer) 1916

Peridromia guatemalena marmarice Fruhstorfer 1916, *in* A. Seitz, Grosschmett. Erde 5: 542. Type locality Orizaba and Guadalajara, Mexico. Syntypes in British Museum (NH) (BM 15-116); ♂ illustrated (Jenkins, 1983: 66-67).

Hamadryas: Miller and Brown 1981: 183 (generic synonomy and type-species data).

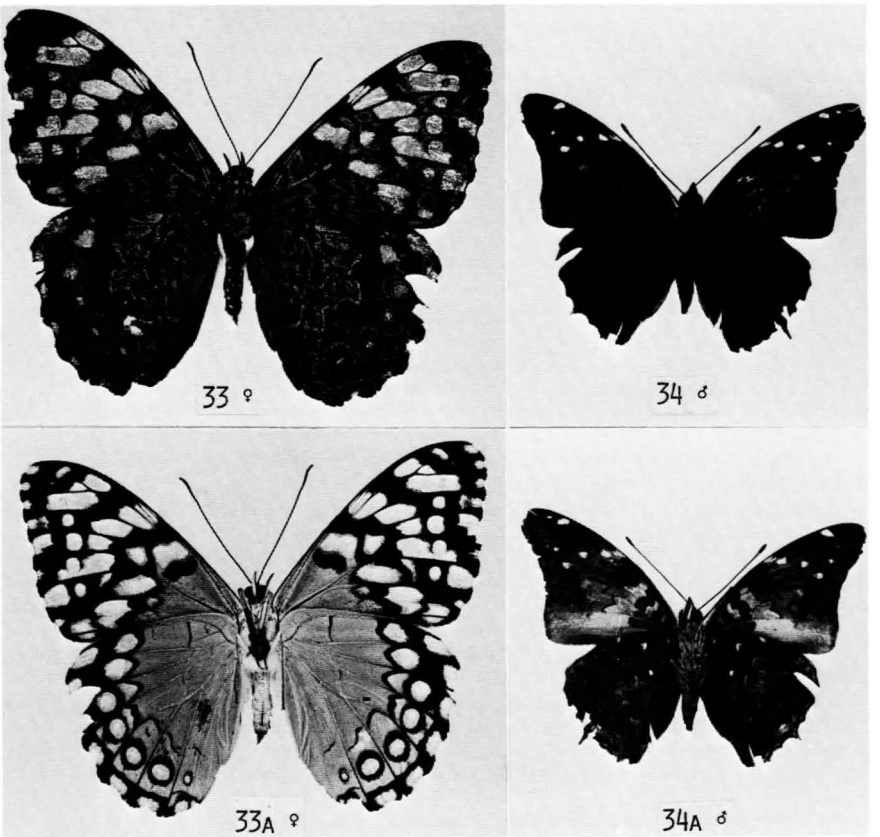
Hamadryas guatemalena marmarice, Jenkins, Dale W., *Hamadryas* in the United States. J. Lepid. Soc. (in press).

One ♀ (Figs. **33, 33a**) from Texas, Hidalgo County, Bentsen-Rio Grande Valley State Park, 18 August 1974, Frank R. Hedges (News Lepid. Soc. - Season Summary 2/3: 8/1975, as *fornax*, and gave the date as 19 August). Pyle (1981: 647, Fig. 759) illustrates this species as *fornax*. The live specimen illustrated was photographed by Harry N. Darrow in Mexico; *marmarice* det. confirmed by Dale W. Jenkins 3 March 1982. It is probably a periodic resident in Texas.

We are unaware of a published life history or larval foodplant record for *marmarice*; however, Muyshondt and Muyshondt (1975) gave *Dalechampia scandens* (L.), Euphor-

biaceae for nominate *guatemalena* in El Salvador. We would expect that *marmarice* feeds in the larval stage on *Tragia* in Texas.

In Mexico Jenkins (1983) gave the distribution as Tamaulipas: Cuidad Mante; Tampico; Rancho Pico de Oro; El Nacimiento Rio Frio; Altamira; 100 km S. Ciudad Victoria; 45 km N. Ciudad Victoria; Chamal; Encino; Gomez Farias. Sonora: Alamos; San Jose. Sinaloa: Mazatlan; 70 km NE Mazatlan; Rosario; Venado. Nayarit: Laguna Santa Maria del Oro 67 m; Mecatan; Singuyta; Compostela; Tepic; Acaponeta. Jalisco: Guadalajara; Puerto Vallarta. Colima: Juarez; Madrid; Colima. Michoacan: Santelma; Coahuayana. San Luis Potosi: Tamazunchale; Quinta Chilla; Media Luna near Rioverde; El Naranjo. Morelos: Rancho Viejo. Guerrero: La Venta 100 m; El Treinta 220 m; Rio Papagayo, Tierra Colorada; Iguala; Coyuca; Acapulco; El Playon; Zihuatenejo; Acahuizotla; Petatlan. Veracruz: Tezonapa; Orizaba; Cordoba; Catemaco; Dos Amates; Santa Rosa; Jalapa; Coatepec; Tuxtepec, Pureza. Oaxaca: Comaltepec; Candelaria; Soyolapan; Juarez; Sierra Juarez; Tuxtepec; Chiltepec; Candelaria-Loxicha; Temascal; Salina Cruz X. Chiapas: Muste; Paraiso; Sayula; Pinola; San Carlos;



Figures **33, 33a.** *Hamadryas guatemalena marmarice* (Fruhstorfer), ♀ upper and under surfaces; Texas: Hidalgo County, Bentsen-Rio Grande Valley State Park, Frank R. Hedges, 18 August 1974. Wing expanse 72 mm.

Figures **34, 34a.** *Historis acheronta cadmus* (Cramer), ♂ upper and under surfaces; Texas: Presidio County, Shafter, Veryl Board & John E. Hafernik Jr., 13 August 1969, Texas A&M University collection. Wing expanse 79 mm.

Ocozocuautla X; Mapastepec. Although specimens collected by Kendall were determined by Jenkins, and are included in the above, specific dates and sexes may be of interest to some readers. San Luis Potosi: El Naranjo (1 ♀, 13 January 1976); Media Luna nr. Rioverde (2 ♂, 20 February 1980). Tamaulipas: Ciudad Mante (1 ♀, 20 December 1973; 1 ♀, 2 January 1974; 1 ♂, 2 ♀, 25 November 1974); at El Nacimiento Rio Frio (1 ♀, 12 February 1974); at Rancho Pico de Oro nr. Los Kikos (1 ♀, 22 January 1974).

Historis acheronta cadmus (Cramer) 1775

Nomenclature: Miller and Brown 1981: 184 (No. 687a).

We have been unable to determine the source of the first record of this insect for the United States. Morris (1860) may have been the first to include it in a formal list of North American Lepidoptera. On page 9 of his Catalogue, both *acherontia* Fabricius (New York? to Brazil) and *cadmus* Cramer (Southern States) are listed under the genus *Nymphalis/Limenitis*. From this we might conclude that two records were available to Morris, and that he considered them separate species. Weidemeyer (1864: 523) listed *Megistanis cadmus* and gave *pherecides* and *sulalia* as synonyms. Edwards (1871: 23) in his Synopsis listed *Megistanis acheronta* (Texas; New Mexico) and gave *cadmus* as a synonym. Later, Edwards (1877: 61) dropped the name from his Catalogue for "want of authentication". Holland (1916) illustrated the species in his Butterfly Guide as *Coea acheronta*, and remarked: "It occurs about Brownsville, Texas, but is not common there." Holland did not, however, list the species in his 1902 or 1916 editions of The Butterfly Book, but the 1931 edition (1955 revision) included it and an illustration with the remark, "... has been reported from southern Florida". There is no mention of the earlier Texas record. Most other 20th century authors have expressed doubt that it occurs in the United States, since none of the earlier authors gave the source of their information.

One ♂ (Figs. **34, 34a**) was collected in Texas, Presidio County, Shafter, 13 August 1969 by Veryl Board and John E. Hafernik Jr. This specimen is in the Texas A&M University collection. Although this species should be found from time to time in Texas, there is little chance that it will ever become established here. The known larval foodplant is not found in the state, and the climatic tolerances for the insect are unknown.

The life history has been worked out in part by Muyshondt and Muyshondt (1979). They described and illustrated the fifth instar larva, the pupa, and the adult. In El Salvador they gave the larval foodplant *Cecropia mexicana* Hemsl., Moraceae, and it probably uses *Cecropia* throughout its breeding range.

Seitz (1921) remarked: "Distributed from Mexico over the West Indies and Central America to South Brazil, where it is still common at times; it rests on tree-trunks head downwards, often with the wings spread out wide, comes to sugar and flies very rapidly. I have no doubt that the unknown larva has short, thick spines and lives on *Cecropia*." Hoffmann (1941a) gave the distribution in Mexico as, "Tierra templadocalida de Veracruz, Tabasco, Chiapas, Oaxaca (Region del Istomo)." Routledge (1977) took it in Tabasco with no other data. Lamas (1981) recorded the nominate species from SE Peru without further details. The migratory habit of the species in tropical South America was noted by Williams (1949), and in Honduras by Monroe, et al. (1967). Welling (1963) found it attracted to UV light in Central America.

Smyrna blomfildia datis Fruhstorfer 1907

Papilio blomfildia Fabricius 1781, Spec. Ins., 2: 84.

Smyrna Hübner 1823, Samml. exot. Schmett., 2: pl. [65]. Type-species by monotypy *Papilio blomfildia* Fabricius (1781).

Smyrna blomfildia datis Fruhstorfer 1907, Internat. Ent. Zschr. Guben 1: 319. Type locality Mexico and Central America. Holotype in British Museum (NH) ?

One ♀ (Figs. **35, 35a**) new to Texas and the United States, was collected in Hidalgo County, Weslaco, 1200 S. Nebraska Street, 3 December 1978 by Nancy Hackett as it fed on decaying bananas in her yard. Another ♀, Texas A&M University collection, was collected at Weslaco on 10 November 1983 by H. A. Dean. Like *S. karwinskii* Geyer, *blomfildia* is probably not resident in Texas. If, however, *Urtica* sp. is an acceptable larval foodplant, it may produce a partial brood in extreme south Texas on occasion.

Schaus (1884) described the larva (last instar) and pupa. The larval foodplant was given as Malhombre [=*Myriocarpa cordifolia* Liebm., Urticaceae]. Müller (1886) gave a brief description of a larva which was repeated by Seitz (1921) and Hayward (1964). Muyshondt and Muyshondt (1978) described and illustrated the immature stages (egg, first - fifth instar larvae, pupa) and the upper and under surfaces of both male and female. They gave larval foodplants as *Urera baccifera* (L.) Gaud., *U. caracasana* (Jacq.) Griseb., and *Urticastrum mexicanum* (Liebm.) Kuntze, all Urticaceae.

In Mexico Hoffmann (1941a) gave the distribution as, "Tierras templada y caliente del Sur y de las 2 Costas. Por el lado del Pacifico hasta Nayarit, por el lado del Golfo hasta el Norte de Veracruz, hasta alturas de mas de 2200 metros (Valle de Mexico), peninsula de Yucatan." Routledge (1977) recorded it from Tabasco. In Quintana Roo, Welling (1958) observed it probing injured roots of mangrove. Beutelspacher (1980) illustrated a ♂, November, Valle de Mexico. Kendall has it from Tamaulipas: Gomez Farias (1 ♀, 17 January 1974; 1 ♂, 19 November 1974), and El Nacimiento Rio Frio (4 ♂, 2 ♀, 12 February 1974). In British Honduras Ross (1964) collected a ♂ as it fed on sap exuding from a mango tree. In Honduras, Monroe et al. (1967) recorded a ♂ 21 August 1962 at El Jaral. Brown and Mielke (1967) took males on the Central Brazil Plateau at wet sand and bait but found it uncommon.

Smyrna karwinskii Geyer 1833

Nomenclature: Miller and Brown 1981: 184 (No. 688).

Although recorded in the literature for Texas and the United States, we have not located a voucher specimen to confirm this. Weidemeyer (1864: 523) seems to have been the first to include the species in a list for the United States. Edwards (1871: 21) included the name in his Synopsis and gave the distribution as Texas and New Mexico, but in his 1877 catalogue, it was dropped for want of authentication. It is clear that the United States record was from Weidemeyer, while the Texas record was Edwards, the exact source of which has not been determined. Scudder (1892) gave the distribution as Texas and New Mexico. Holland (1931: 71, revised ed.) illustrated a ♂ collected by him in spring of 1930 at Cuernavaca, Mexico. He remarked, "It is reported as a rare straggler about Brownsville, Texas.". Klots (1951: 280) lists the species and quotes Holland regarding its occurrence at Brownsville, Texas. More recent authors have doubted its occurrence in the United States. We have no doubt that it does range into south Texas from time to time, but it will probably never become established here.

The illustration in Pyle (1981, Fig. 686) is not *karwinskii* but *blomfildia*, a live specimen photographed by Harry N. Darrow in Tamaulipas, Mexico. Communal roosting habits were noted by Muyshondt and Muyshondt (1974) and Beutelspacher (1975). Adults were observed by Muyshondt and Muyshondt to feed on tree sap, fermenting fruits, and at mud puddles, but not at flowers.

The life history was published in part by Schaus (1884) in which he described the larva and pupa and gave the larval foodplant as Malhombre [=*Myriocarpa cardifolia* Liebm., Urticaceae]; he indicated the pupal stage was about six weeks. Muyshondt and Muyshondt (1978) described and illustrated the immature stages (egg, larva, pupa) and compared them to that of *blomfildia*. Both surfaces of both sexes were illustrated. Larval foodplants common to both *karwinskii* and *blomfildia* are given as *Urera baccifera*, *U. caracasana* and *Urticastrum mexicanum* all Urticaceae.

In Mexico Hoffmann (1941a) gave the distribution as, "Tierras templada y caliente de

toda la region del Golfo: de Tamaulipas a Yucatan, Oaxaca. Cuenca del Rio Balsas."

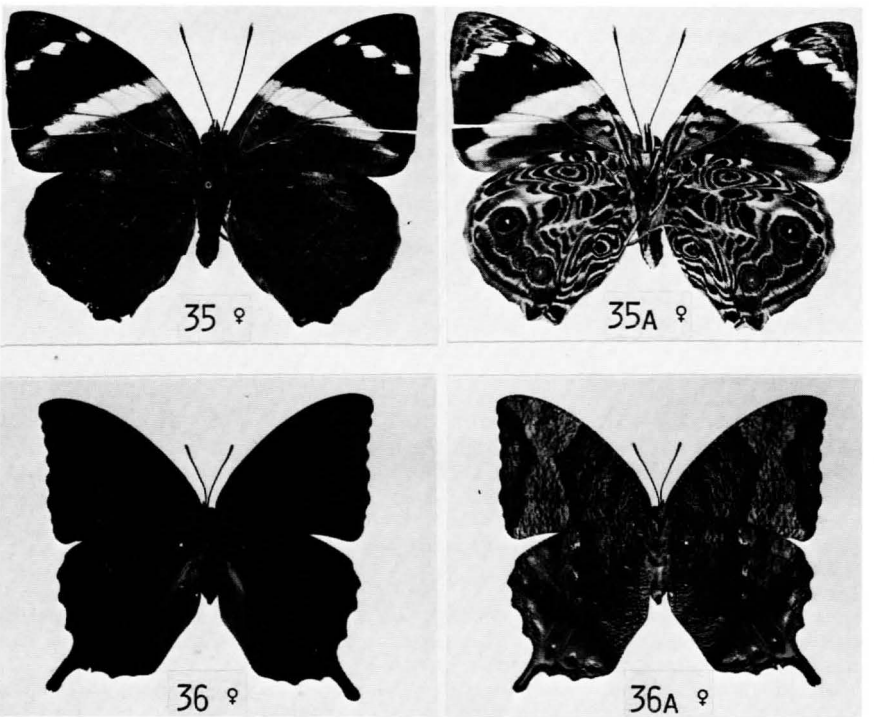
Memphis echemus Doubleday and Hewitson) 1849

Cymatogramma echemus Doubleday and Hewitson 1849, Genera Diur. Lep. 2: 316, pl. 49, fig. 4. Type locality Honduras. Holotype ♀ in British Museum (NH), type No. 10364.

Memphis: Miller and Brown 1981: 186 (generic synonomy and type-species data.

One ♀ (Figs. **36, 36a**) 22 May 1938, Texas, Colorado County, Weimer, collector unknown, Illinois Natural History Survey collection. In an attempt to determine who collected this specimen, an inquiry was mailed to Roderick R. Irwin, who had determined the specimen in 1970. In reply dated 12 May 1981, Irwin said: "At the time I found it in the Survey collection and determined it, I planned to publish a note on it, but I never got around to it. I did, however, attempt to find out who the collector had been, but without success; I was not even able to learn the source of the specimen." The authors would be most grateful to anyone who might have knowledge of this capture and provide the name of the collector or possible collector.

Until now, the distribution of this species appears to have been limited to Honduras, Bahama Islands (Nassau - Sharpe, 1900), and Cuba (de la Torrey y Callejas, 1951).



Figures **35, 35a.** *Smyrna blomfildia datis* Fruhstorfer, ♀ upper and under surfaces; Texas: Hidalgo County, Weslaco, 1200 S. Nebraska St., Nancy Hackett, 3 December 1978. Wing expanse 72 mm.

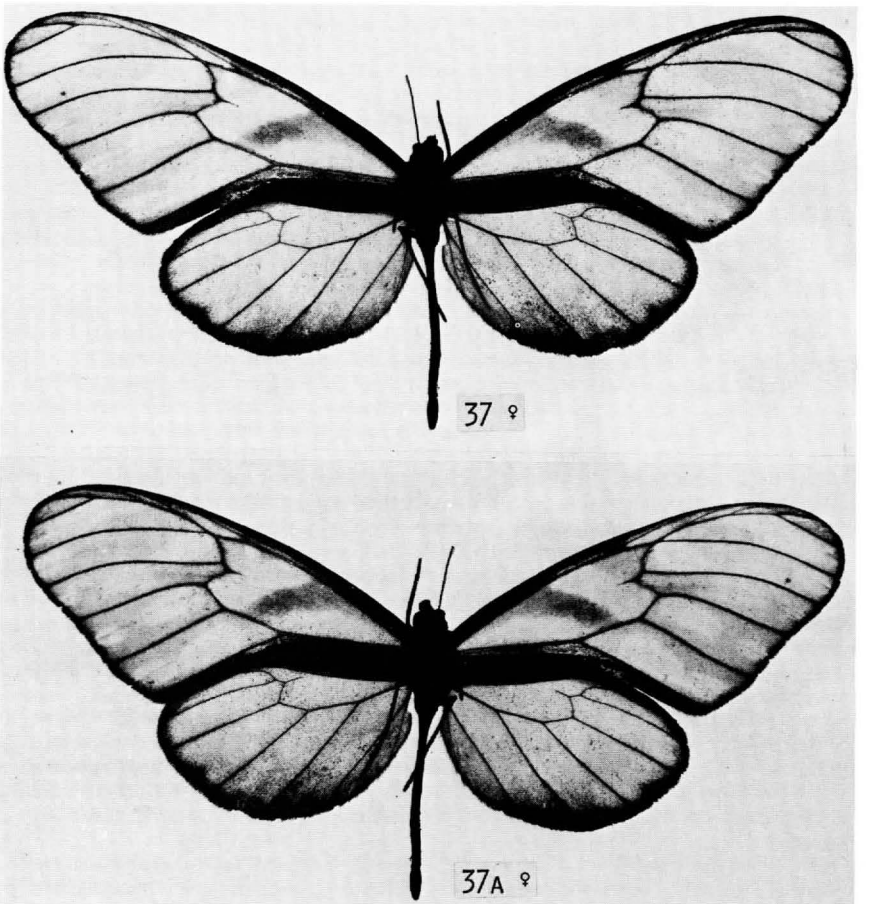
Figures **36, 36a.** *Memphis echemus* (Doubleday & Hewitson), ♀ upper and under surfaces; Texas: Colorado County, Weimer, *leg.* ?, Illinois Natural History Survey. Wing expanse 57 mm.

Apparently nothing is known of the life history of *echemus*. Assuming that it utilizes the same larval foodplants as other species in the genus, we see no reason why a gravid female, brought here by whatever means could not produce at least a partial brood. Until more is known about its life history and climatic tolerances, a judgment will be withheld on its chances for establishment.

ITHOMIIDAE

Dircenna klugii (Geyer) 1837

Ceratinia klugii Geyer 1837, *in* Hübner, Zutr. Samm. Exot. Schmett. (5): 5, No. 401, pl. [138], ff. 801-802. Type locality "Mexico". Holotype lost?
Dircenna Doubleday 1847, Gen. Diurn. Lep. (1): 119, pl. 17. Type-species *Dircenna iambe* Doubleday 1847, designated by Scudder 1875, Proc. American Acad. Arts Sci.



Figures **37, 37a.** *Dircenna klugii* (Geyer), ♀ upper and under surfaces; Texas, ex coll. Bethune, no other data (*leg.* Gustaf Wilhelm Belfrage?), Royal Ontario Museum. Wing expanse 75 mm.

10: 157.

This species has appeared in the literature a number of times as occurring in the United States. The earliest reference is Anonymous 1881, Brooklyn Ent. Soc. Checklist (Additions and Corrections, No. 90½). Lintner (1884) recorded it as having been taken in Texas. Smith (1891: 8, No. 5), Skinner (1898: 2, No. 5), Holland (1902: 89, pl. 8, fig. 1), Dyar (1903: 33, No. 305), McDunnough (1938: 11, No. 94), and Klots, (1951: 276) indicated that it had been found in the United States. Klots, however, doubted its occurence in the eastern United States and suggested that it should be dropped from our checklists. dos Passos (1961), and Miller and Brown (1981) excluded it from their lists.

Nine examples of the species, which were collected in Texas, have been found in two museums. A tenth specimen, reported in the literature (Lintner, 1884), has not been located. There are five ♀ in the Royal Ontario Museum, ex collection C. J. S. Bethune. One of these (Figs. **37, 37a**) is illustrated (courtesy Photographic Department, ROM). Each of the five specimens contains a label marked "Texas, ex coll. Bethune", no other data. It may be that these specimens came from Gustaf Wilhelm Belfrage of Norse, Texas (a commercial collector). It is known that Bethune obtained other Texas specimens from Belfrage (see following species). It is also known that Belfrage made a month-long collecting trip to the Mexican border, probably at Laredo in April 1869 (Geiser, 1948: 235). It seems quite possible that the specimens were collected by him and sold to Bethune. Lintner (1884) reported the capture of this species by George B. Sennett and his field assistant F. S. Webster in 1877 at Brownsville, Cameron County, 1-10 April 1877 or at Hidalgo, Hidalgo County, Texas 17 April - 10 May 1877 (the specific date, location, or sex was not given). It is possible that *klugii* may have been present in Texas from Laredo to Brownsville during a period of some eight years (1869-1877), if so then the ROM specimens were most likely collected in 1869 by Belfrage.

Although Lintner did not publish the Sennett/Webster record until 1884, apparently he reported the capture orally or in correspondence to his colleagues; thus the earlier publication date (1881, Anon.). Because Sennett was primarily interested in Ornithology, he had turned over all of the Lepidoptera collected in extreme south Texas to Lintner for study and determination. It was thought that Lintner may have retained the specimen of *klugii* and that at his death in 1898, it had been sold to the New York State Museum. This possibility was followed up, and in letter dated 27 October 1981, Tim L. McCabe advised that the NYSM had purchased the Lintner collection, but that it included no examples of *Dircenna klugii*. Much of the material was labelled J. A. Lintner collection or just Lintner collection with no date-locality labels.

In letter dated 5 December 1981, Mary D. Cohen, Research Associate, Buffalo Museum of Science, advised that there were four examples of *D. klugii* from Texas in the BMS: 2 ♂, no date; 1 ♂, June 1902; 1 ♀, July 1904, Brownsville. Possibly all of these were from the Brownsville area, and if so, it would seem to indicate that the species was possibly resident again in south Texas about the turn of the century. Det. labels on these four specimens were by W. T. M. Forbes 1933, and Alexander B. Klots about the same time; none by Lintner.

Apparently Holland was unaware of Lintner's 1884 report when he wrote: "Whether the insect has ever been taken within the limits of the United States is uncertain. It is another of the species attributed to our fauna by Reakirt." This statement appeared in the 1902, 1916 and 1931 editions of The Butterfly Book. In the 1916 Butterfly Guide, Holland gave the habitat as Southern California [Baja?] and Mexico according to Reakirt.

Kendall reared this species in northern Mexico from larvae found feeding on the foliage of *Solanum lanceifolium* Jacq., and *S. umbellatum* Mill., Solanaceae. Specific rearing records are: San Luis Potosi: Hwy. 85 just south of Tamazunchale, 20 February 1974, four last instar larvae on *S. lanceifolium;* two larvae were preserved, the other two pupated 23 and 25 February 1974, one of which died and was preserved. A ♀ eclosed 4 March 1974. On 17 January 1976, ca. 3 km. W of El Naranjo, a number of lar-

vae were collected on two plants of *S. lanceifolium* (one plant hosted 30 larvae). In the field lab, larvae readily ate *S. hirtum* Vahl. Several larvae proved to be parasitized by Tachinidae, *Patelloa* sp. nr. *leucaniae* (Coq.), det. C. W. Sabrosky (specimen in USNM); several larvae were preserved. Of those reared through, 25 pupated between 20 and 28 January 1976; 7 ♂, 9 ♀ emerged between 2 and 8 February 1976. In Tamaulipas, nr. the village of Quintero, south of Ciudad Mante, two larvae were found feeding on *S. umbellatum*, 1 December 1974, one parasitized larva was preserved, the other pupated 11 December 1974, and it, too, was preserved. At the same location on 7 December 1974, and 5 January 1975, additional larvae were collected on *S. umbellatum*, all were preserved. It should be noted that females deposit their eggs beneath leaves, and the larvae rest beneath leaves when not feeding. The immature stages and larval behavior are similar to *Dircenna relata* Butler and Druce as given by Young (1973). In Oaxaca, de la Maza E. (1979) found eggs and larvae of this species on *Solanum torvum* Swartz, and he gave a brief larval description.

In Texas the plant most likely to be used as a larval foodplant would be *Solanum erianthum* D. Don. (*S. verbascifolium* of authors). This is a tall perennial shrub or small tree to 3 m high with entire leaves to 30 cm long. The plant has been reported also from southern Florida. It is unknown whether or not at one time this plant was widespread in extreme south Texas, but the chances are good that it was before the region became developed as an agricultural winter garden area. *Kluggi* may occur more frequently in extreme south Texas than records would indicate. There are simply too few collectors working the area throughout the year, and from year to year, to know for sure.

In Mexico Hoffmann (1941a) gave the distribution as, "Tierras templada y caliente de Veracruz, Oaxaca, Tabasco, Chiapas - Sierra Madre del Sur (Guerrero). Sube en las montanas de Veracruz y Puebla hasta 2500 m (La Malinche)."

Greta polissena umbrana (Haensch) 1909

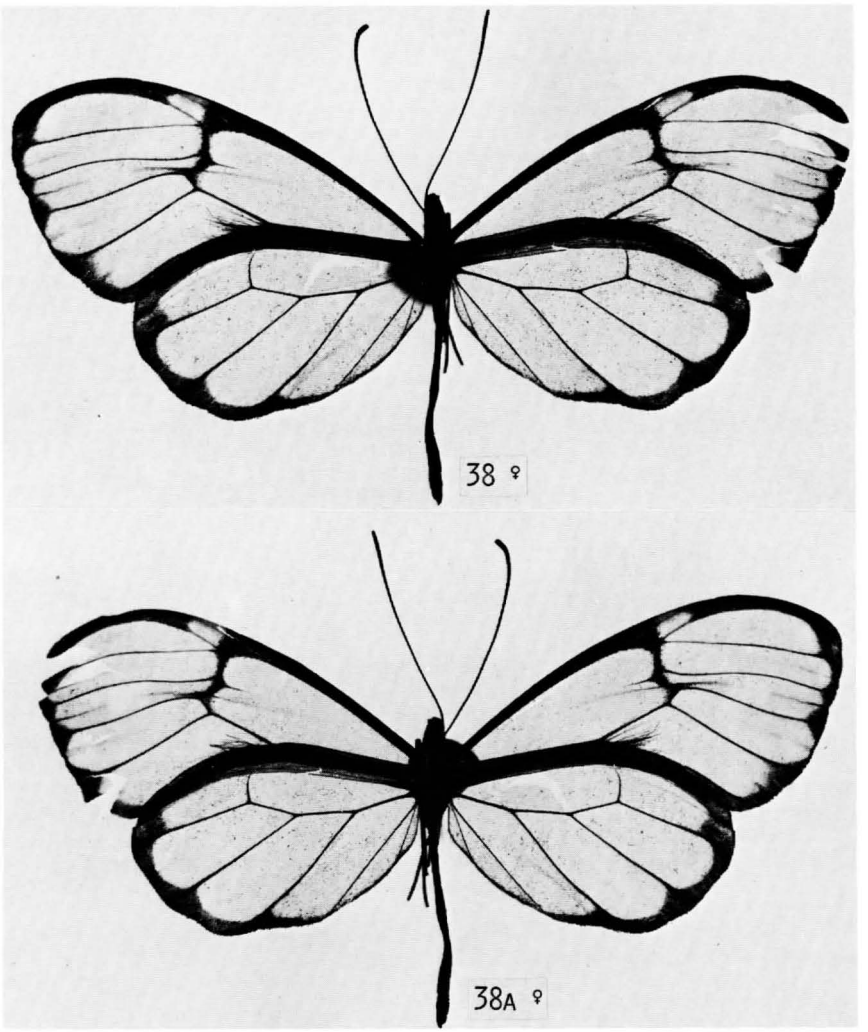
Papilio diaphanus Drury 1773, Ill. Nat. Hist. 2: 13, pl. 7, fig. 3; index p. [1].
Hymenitis Hübner 1816, Verz. bekannt. Schmett., Augsburg. Fox 1963, J. Res. Lepid. 2(3): 173-184.
Hymenitis diaphana (of authors) within the United States.
Hymenitis polissena umbrana Haensch 1909, Familie: Danaidae. *In* A. Seitz, Grosschmett. Erde, Stuttgart. 5: 113-171, pls. 31-41 (p. 164, pl. 41f). Type locality Costa Rica. Holotype location?
Greta Hemming 1934, Generic names Holarctic Butterflies 1 (1758-1863); designated type-species as *Hymenitis diaphane* Hübner 1816.

Weidemeyer (1864: 514) was the first to include the species in a list for the United States; the source of his information is unknown. Edwards (1870: 10) included it in his Synopsis and gave its distribution in the United States as Florida and Louisiana. Grote (1875: 10) remarked: "I cannot find any authority for the occurrence of this butterfly within our limits excepting Edwards' Synopsis, and Mr. Edwards does not recollect upon what grounds he placed it there." Apparently Grote overlooked Weidemeyer's earlier Catalogue. Later, Edwards (1877) dropped the species from his revised Catalogue for "want of authentication". It should be noted however that in so doing he indicated that the "United States" record was from Weidemeyer's Catalogue; that the "Florida" record was from his own Synopsis and that no explanation was given for the "Louisiana" record.

On 2 January 1969 Rev. J. C. E. Riotte, then Research Associate with the Royal Ontario Museum, informed Kendall that there were 2 examples of this species in ROM under the name *Hymenitis diaphanus* labeled "Texas" from Mr. Belfrage, 1870, ex coll. Rev. Charles James Stewart Bethune. One of these 2 ♀ specimens is illustrated (Figs. **38, 38a**) (courtesy Photographic Department, ROM), the other specimen "is a bedraggled specimen with breaks in both front wings clumsily repaired" (David Barr, ROM). In 1970 a 35 mm color slide of this specimen was sent to Herman G. Real for examina-

tion and comment. He determined the specimen to be *Hymenitis polissena umbrana*, but thought the chances of it being taken in Texas to be "fantastically small". Although the occurrence of this butterfly in Texas may seem incredible, it is little more so than for *Memphis echemus* and *Dynamine tithia*, which have more recent documentation.

Because these specimens were collected by Gustaf Wilhelm Belfrage, the date 1870 was probably the year Bethune received them. Belfrage most likely collected them on his 1869 field trip to the Mexican border as discussed under *Dircenna klugii*. It should be noted that *umbrana* was not described until 40 years later, and thus the det. *H. diaphanus*. No doubt this name reached Edwards (1870) either orally or through cor-



Figures **38, 38a.** *Greta polissena umbrana* (Haensch), ♀ upper and under surfaces; Texas: Belfrage, 1870, ex coll. Bethune, ROM. Wing expanse 60 mm.

respondence. The location "Florida" instead of Texas given by Edwards in his Synopsis is not readily understood (lapsus memoriae?).

This butterfly is known to feed in the larval stage on *Cestrum fragile, nocturnum, rugulosum* and four undetermined species, all Solanaceae (William H. Haber 1978, PhD thesis, University of Minnesota - Philip J. DeVries, personal correspondence 15 October 1981). In Texas three species of *Cestrum* are found, one of these is *nocturnum* L., an introduction which occasionally escapes cultivation in south Texas. It is a shrub to about 3 m high, with glabrous angled slender branches; leaves thin, with a distinct petiole to 2 cm long, mostly ovate-oblong to elliptic, short-acuminate, to 15 cm long, generally about 35 mm wide, glabrous and more or less shining on both sides (Correll and Johnston, 1970: 1403): commonly called Night Jessamine.

Fox (1963: 179) gave the distribution of *umbrana* as Costa Rica and western Panama, and gave a thought provoking discussion of the zoogeographic considerations relating to this subspecies. It is an intriguing mystery how this, and several other species treated in this paper, found their way into Texas. One possibility is a manual introduction which we believe unlikely. We also rule out "traded, mislabeled" for various reasons given in the discussion. The most logical explanation seems to be inherent dispersal. By whatever means it was "introduced", we believe the climatic conditions in Texas to be unfavorable for more than temporary residency.

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