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## DISTRIBUTIONAL RECORDS OF CERTAIN RHOPALOCERA IN BAJA CALIFORNIA, MEXICO, WITH THE DESCRIPTION OF A NEW SUBSPECIES OF PAPILIO (HERACLIDES) ASTYALUS (GODART) (LEPIDOPTERA: PAPILIONIDAE)

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### INTRODUCTION

Since 1979 the authors have been investigating intensively the rhopaloceran fauna of Baja California, Mexico. Preliminary results complementing efforts by Rindge (1948), Powell (1958), MacNeill (1962), Miller (1970), and Holland (1972), appeared previously in the *Bulletin of the Allyn Museum* (Brown and Faulkner 1982). In the interim several more interesting records have accumulated, many as a result of two excursions taken in 1981 — a trip in March to Isla de Cedros by Faulkner and Andrews, and a fall expedition to the cape region by Faulkner, Andrews, and Brown.

In this paper 11 species of butterflies are reported from Baja California for the first time along with distributional data given for 3 additional species. The total number of species of Rhopalocera known to occur in Baja California is at present 170, and it is suspected that this figure represents about 90% of the actual butterfly species inhabiting the peninsula. When compared to its counterpart on mainland Mexico (Miller 1970; Hoffman 1940, 1941), the butterfly fauna is quite depauperate, typical of a peninsular region (Pielou 1979). Further and more conscientious collecting will undoubtedly turn up additional unrecorded species.

Species discussed in the text are as follows:

Family HesperIIDae      *Nyctelius nyctelius* (Latreille)

Family Lycaenidae	<i>Habrodais poodiae</i> Brown and Faulkner
	<i>Satyrium californica</i> (W. H. Edwards)
	<i>Mitoura near loki</i> (Skinner)
	<i>Ministrymon clytie</i> (W. H. Edwards)
	<i>Strymon alea</i> (Godman and Salvin)
	<i>Glaucopsyche piasus sagittigera</i> (Felder and Felder)
	<i>Euphilotes enoptes dammersi</i> (Comstock and Henne)
Family Nymphalidae	<i>Philotiella speciosa</i> (Hy. Edwards)
	<i>Speyeria callippe comstocki</i> (Gunder)
	<i>Speyeria coronis semiramis</i> (W. H. Edwards)
	<i>Euphydryas editha wrighti</i> Gunder
	<i>Asterocampa leilia</i> (W. H. Edwards)
Family Papilionidae	<i>Papilio (Heracles) astyalus occidentalis</i> new subspecies

Depositories abbreviated in the text are as follows: SDNHM, San Diego Natural History Museum, San Diego, California; CAS, California Academy of Sciences, San Francisco, California; AHF, Allan Hancock Foundation, University of Southern California, Los Angeles; GG, Glenn Gorelick, Sierra Madre, California; DL, Dan Lindsley, La Jolla, California; EW, Eduardo Welling, Merida, Mexico.

## SPECIES ACCOUNTS

### *Nyctelius nyctelius* (Latreille) 1824

*N. nyctelius* is widespread throughout western Mexico, Central and South America, and the Antilles (Miller 1970). It has been recorded once as far north as southern California (Emmel and Emmel 1973), and MacNeill (1975) has reported it as "recently rather common in southern Texas." It is therefore not surprising that it was recently discovered in Baja California. Four specimens (3 ♂, 1 ♀) were collected on the north side of a small lagoon at San Jose del Cabo, Baja California Sur, 2 April 1983 (D. Lindsley, DL). Since *N. nyctelius* is commonly encountered in agricultural as well as relatively undisturbed areas (MacNeill 1975), it is not known whether this species represents a recent introduction to the peninsula or has just been overlooked by previous collectors. The latter would seem unlikely, particularly in light of Miller's (1970) excellent report on the Cary-Carnegie Expedition, which summarized two months of intensive collecting in this area.

### *Habrodais poodiae* Brown and Faulkner 1982

This newly described species was previously known exclusively from the vicinity of Arroyo de Sauz and Laguna Hanson in the Sierra Juarez. It was recently discovered in the Sierra San Pedro Martir, more than 120 km to the south of the type locality. The Sierra San Pedro Martir population is geographically isolated from that of the Sierra Juarez, and in series the specimens display a consistent phenotypic distinctness from typical *H. poodiae*. These differences are possibly the result of altitudinal effects on the phenotype.

### *Satyrium californica* (W. H. Edwards) 1862

A common hairstreak in many of the higher mountains of southern California (Emmel and Emmel 1973), *S. californica* was previously unrecorded from Baja California. Four males and 1 female of this species were collected 9.4 km northwest of Laguna Hanson, Sierra Juarez, Baja California Norte, 22 June 1980 (D. Faulkner, SDNHM), and 2 additional males, 3 June 1982 (J. Brown and D. Faulkner, SDNHM).

### *Mitoura near loki* (Skinner) 1907

A unique population of *Mitoura* was discovered on the northeast end of Isla de Cedros following the first significant rain the area had received in more than 8 months. The first specimens were collected 20 March 1981 (D. Faulkner, SDNHM), about a half

mile up a canyon just south of the fishing village at Punta Norte. The insects were found in close association with California juniper (*Juniperus californica* Carr.), undoubtedly the larval host. All specimens collected in the following 2 days were freshly emerged adults, 7 males and 6 females. The last day of collecting, 22 March 1981, proved rather unsuccessful. Although more specimens were on the wing, they were also more active and, owing to the rough terrain, much more difficult to capture.

Adults phenotypically resemble *M. loki*, differing primarily in their smaller size and in the uniform maroon-brown color of the ventral hindwing surface, replacing the hindwing green of *M. loki*.

*Ministrymon clytie* (W. H. Edwards) 1877

Widely distributed throughout much of Mexico and extending north into southern Texas and Arizona, this little hairstreak was only recently documented as occurring on the peninsula by the capture of a single female specimen on the beach at Todos Santos, Baja California Sur, 23 July 1981 (G. Gorelick, SDNHM). With its broad distribution on the mainland, it is surprising that this species has not previously been reported from Baja California.

*Strymon alea* (Godman and Salvin) 1887

This rather uncommon hairstreak, superficially resembling *S. columella* (Fabricius) in its spring form, was also recently discovered in the cape region of Baja California. Capture records are as follows:

San Bartolo microwave station, 2 ♂, 24 July 1981 (G. Gorelick, SDNHM), 5 ♂, 25 July 1981 (G. Gorelick, GG);

San Antonio microwave station, 1 ♂; 27 August 1982 (J. Brown, SDNHM).

*S. alea* is found in the southern lowlands of Mexico and along both coasts, extending north into south-central Texas (Scott 1975) on the eastern side, and to the southern end of the Baja California peninsula on the west. Taxonomic difficulties previously associated with this seasonally dimorphic species were eliminated by the placement of *S. laceyi* (Barnes and McDunnough) in synonymy with *S. alea* (Clench 1966).

*Glaucopsyche piasus sagittigera* (Felder and Felder) 1865

Populations of *G. piasus* (Boisduval) inhabiting southern California represent the subspecies *sagittigera*. Although formerly widespread in occurrence, particularly in the Los Angeles area, the insect now appears to be locally extinct throughout most of its former range (Emmel and Emmel 1973). In San Diego County the species occurs in a few highly localized colonies in the Laguna Mountains. Recently, a sizable colony was discovered in the Sierra Juarez of northern Baja California. Specimen records, all from Baja California Norte, include the following:

- 1) .7 km south of El Condor, 15 May 1982 (Brown and Faulkner, SDNHM);
- 2) El Hondo, 3 May 1975 (D. Faulkner, SDNHM);
- 3) Japa, Mpio. Tecate, elevation 1225 m, 24 May 1978 (Eduardo Welling, EW);
- 4) Loma Tova, Mpio. Tecate, elevation 1025 m, 18 May 1973 (Eduardo Welling, EW).

*Euphilotes enoptes dammersi* (Comstock and Henne) 1933

This subspecies is the southernmost component of the *E. enoptes* complex. "It was originally presumed to be an inhabitant of the desert, but several colonies have been discovered at moderately high elevations in the mountains of southern California and in west-central Arizona" (Langston 1975). Three females and 1 male of this species were collected 1 km south of El Condor in the Sierra Juarez, Baja California Norte, 1 September 1981 (D. Faulkner), and an additional 2 females, 4 September 1981 (D. Faulkner). The habitat at this locality is principally juniper-pinyon pine forest. The adults were found in association with *Eriogonum wrightii* Torrey ex Benth (Polygonaceae), the probable larval host at this locality.

*Philotiella speciosa* (Hy. Edward) 1876

A series of 12 specimens (7 ♂, 5 ♀) was taken 5 and 7 April 1982, 80 km south of Ca-

tavina in Baja California Norte. A sympatric population of *Euphilotes battoides* near *bernardino* (Barnes and McDunnough) was also sampled. The previously recorded southern range of *P. speciosa* is more than 400 km to the north in western Imperial County, California (Thorne 1961). Potential larval hostplants found in association with the adult insects were *Chorizanthe pulcella* Brandege and *Eriogonum thurberi* Torrey (both Polygonaceae). The April captures of this butterfly correspond precisely with the time it is on the wing in southern California.

*Speyeria callippe comstocki* (Gunder) 1925

This southernmost subspecies of the *S. callippe* group is found at many localities in cismontane southern California, as well as in the coastal ranges. In San Diego County it occurs from the coastal foothills into the Laguna Mountains. Three male specimens of *S. callippe comstocki* were collected 6.5 km south of El Condor, Sierra Juarez, Baja California Norte, 28 May 1981 (J. Brown and D. Faulkner, SDNHM). An additional 15 specimens (11♂, 4♀) were collected at the same locality 20 June 1981 (J. Brown, SDNHM). The habitat association at this locality, juniper-pinyon pine forest, is remarkably dissimilar to other localities where this insect occurs in southern California. However, in the more northern parts of its range, *S. callippe* typically occurs in "semi-desert" habitats (Hammond 1981).

*Speyeria coronis semiramis* (W. H. Edwards) 1886

Previously unrecorded from Baja California, a single male specimen of this fritillary species was captured 9 km south of El Condor, Sierra Juarez, 20 June 1981 (J. Brown, SDNHM). *S. coronis semiramis* is just one of several montane californian elements that has long been suspected as occurring in the northern mountain ranges of Baja California but has eluded collectors.

*Euphydryas editha wrighti* Gunder 1929

Wright's checkerspot occurs in many coastal and mesa areas of San Diego County. However, throughout much of southern California its favored habitats are rapidly disappearing as a direct consequence of housing demands and other habitat modifications. In Baja California Norte this species is still rather common and widespread. It has been collected in the following localities:

- 1) Aguajito Springs, Valle de la Trinidad, 20 March 1936 (C. F. Harbison, SDNHM);
- 2) Ridriguez Dam, Tijuana, 8 March 1977 (P. Spade, SDNHM);
- 3) 2.7 mi (4.5 km) north of El Testarazo, 6 March 1979 (D. Faulkner and J. Brown, SDNHM);
- 4) Table Mountain, 12 April 1979 (D. Faulkner, SDNHM);
- 5) Mexico Highway 3, Ojos Negros Junction, 13 April 1980 and 4 April 1981 (J. Brown, SDNHM).

*Asterocampa leilia* (W. H. Edwards) 1874

A single male specimen of the hackberry butterfly was collected 18.2 km southwest of San Jose de Comundu, Baja California Sur, 12 October 1981 (D. Faulkner, SDNHM). Also, a male specimen was recently located in the collection of the AHF with the following data: Puerto Escondido, Baja California Sur, 12 March 1937 (J. Garth). Although *A. leilia* is common in southeastern Arizona and in the mountains of Sonora and Chihuahua, Mexico (Howe 1975), these are the first verified records of this species' occurrence in Baja California. The widespread distribution of hackberry (*Celtis* sp.), the probable host of *A. leilia*, suggests that the insect may occupy a more extensive range in Baja California than is now known.

*Papilio (Heracles) astyalus* (Godart) 1819

This widespread neotropical swallowtail occurs from South America north throughout much of Mexico. Populations from Costa Rica northward have previously been placed under the subspecies *P. astyalus pallas* (Gray) (Emmel 1975). However, it

has recently been noted (Diaz Frances and de la Maza 1978) that specimens of *P. astyalus* from the western coast of Mexico (Guerrero to southern Sinaloa) probably represent an undescribed subspecies; unfortunately the limited material available has inhibited further diagnosis of this population. Additionally, a population of *P. astyalus* was recently discovered in the cape region of Baja California Sur. A reasonable series of the insect confirms the phenotypic integrity and uniqueness of this Baja California population. Accordingly, we propose a name for this distinct subspecies.

## SYSTEMATIC DESCRIPTION

### *Papilio (Heracles) astyalus occidentalis* new subspecies

Figures 3a, 3b, and 3c

**Male:** forewing length  $\bar{x}$  = 50.2 mm (range 48.0 - 52.5 mm;  $n$  = 5). Head and thorax dark brown above, with a very fine yellow line from near the base of the antenna to the base of the forewing. Undersurface of head and thorax thickly clothed in yellow hairs. Abdomen yellow with a single, narrow, dark brown longitudinal stripe along the mid-dorsal surface from the joint of the thorax to the tip of the abdomen. Antennae brown with a light fulvous club.

**FW upperside:** dark brown with a bright yellow diagonal band extending from near the apex to the inner margin. Band about as broad as the dark brown postmedian area. Band consists of a row of adjacent ovaloid yellow patches occurring between the major veins; the last three yellow patches from Cu<sub>1</sub> to the inner margin finely divided by a thin brown line of scales at Cu<sub>2</sub> and 2A. Other patches progressively more separated toward the apex. A row of small yellow dots along outer margin of wing. A yellow dash may or may not be present in the upper portion of the discal cell. **HW upperside:** dark brown concolorous with forewing, except for a broad yellow patch over entire basal area. Row of six large yellow lunules in terminal area; lunules progressively smaller toward outer angle. An orange-red spot at anal angle, a small iridescent blue crescent above and a small yellow dot below. Well-developed tail at end of M<sub>3</sub>, solid brown in color.

**FW underside:** dark brown dusted with yellow overscaling. Markings as on upperside but slightly expanded, less well defined, and lighter yellow in color. Major veins through discal cell indicated by yellow overscaling. **HW underside:** mostly dark brown concolorous with forewing; entire basal area yellow, with an adjacent lighter yellow band toward the margin. Markings as in upperside but slightly expanded, more diffuse, and lighter yellow in color. A row of seven iridescent blue crescents at outer edge of discal area, occasionally bordered basally by a faint row of orange-red dots. Yellow scaling of lunule bordering M<sub>3</sub> never extending into the tail.

**Male Genitalia:** Indistinguishable from those of nominate or other *P. astyalus* subspecies.

**Female:** forewing length  $\bar{x}$  = 57.0 mm (range 55.5 - 58.0 mm;  $n$  = 3). Head, thorax, and abdomen jet black; undersurface of head and thorax with a few yellow hairs; face and palpi yellow. Each spiracle along lateral sides of abdomen indicated by a minute white dot. Antennae black with a trace of orange on the club.

**FW upperside:** flat black, lightly dusted with white scaling in apical, subterminal, and postmedian areas. Diffuse, white dash perpendicular to major veins near costal margin just beyond apical end of discal cell. A row of six or seven white dots in subterminal area, parallel to margin; one dot in middle of each cell from vein M<sub>1</sub> to 2A. Additional row of small white dots in marginal area. **HW upperside:** black with a row of six bright blue markings along the outer edge of discal area, occasionally bordered basally by an adjacent, though generally incomplete, row of orange-red dots, and marginally by a row of bold white crescents. A well developed tail at termination of M<sub>3</sub>.

**FW underside:** as in upperside, but colors not so vivid. **HW underside:** as in upperside, but with a row of seven large bright iridescent blue crescents at outer edge of discal area, bordered basally by a parallel row of seven orange-red spots. Scalloped

outer margin of wings between major veins, filled with thin white crescent-shaped marks.

*Female Genitalia:* not examined.

*Types.* Holotype male: San Antonio microwave tower, Baja California Sur, Mexico, 27 August 1982 (J. Brown, SDNHM). Allotype female: 48 km north of Todos Santos, Baja California Sur, Mexico, 4 October 1981 (J. Brown, SDNHM). Two ♀ and 4 ♂ paratypes, all Baja California Sur, Mexico, as follows: 1 ♀, 49 km north of Todos Santos, 29 August 1982 (J. Brown, SDNHM); 1 ♀, 9 km east of Todos Santos, 4 October 1981 (J. Brown, SDNHM); 2 ♂, San Bartolo microwave tower, 3 October 1981 (J. Brown and D. Faulkner, SDNHM); 1 ♂, Ramal Los Naranjos, 10 km west of Mexico Highway 1, 26 August 1982 (D. Faulkner, SDNHM); and 1 ♂, 49 km north of Todos Santos, 29 August 1982 (G. Brueya, SDNHM).

*Disposition of types.* The holotype male and allotype are deposited in the collection of the SDNHM. One male and one female paratype are deposited in the Allyn Museum of Entomology, Sarasota, Florida; one male and one female paratype are deposited in the Instituto de Biología, Mexico City, Mexico.

*Etymology.* The name *occidentalis* means "of the west" in Latin.

*Early Stages:* Currently unknown.

*Discussion.* *Papilio (Heraclides) astyalus pallas* was described from specimens taken in Oaxaca, Mexico, and in its typical form, occurs throughout the eastern states of Mexico, with strays known from as far north as southern Texas (Fig. 5). In populations of *P. astyalus* from "vertiente del Pacifico", Guerrero to southern Sinaloa (Diaz Frances and de la Maza 1978), the yellow FW band of the male is much narrower (Figs. 1a-4a), the insects approach *P. (H.) ornythion* (Boisduval) in general appearance. However, the female varies from typical *pallas* phenotype in the vicinity of Colima, to *occidentalis*-like phenotype in southern Sinaloa. The female specimen from Arizona illustrated in Howe (1975) and the specimen from "vertiente del Pacifico" illustrated in Diaz Frances and de la Maza (1978) both appear to represent forms intermediate between *pallas* and *occidentalis*.

*P. a. occidentalis* represents resident populations limited to the cape region of Baja California Sur. It is clearly distinguishable from *pallas* in both sexes. Males are narrow-banded (Table 1); females are large, almost entirely black, with a series of sharply contrasting white marginal markings in both the fore- and hindwings, as described above. In typical *pallas* females, the ground color is not as dark, and the marginal markings are yellow; the row of bright orange-red dots at the outer margin of the DHW discal area present in *pallas* is generally faint or altogether absent in *occidentalis*. In *occidentalis* both sexes have a stout, well-developed hindwing tail at the termination of vein M<sub>1</sub> (Figs. 1-4, Table 1).

A single female specimen collected near San Antonio, Baja California Sur, is extremely flight-worn and slightly atypical. The row of orange-red dots on the DHW is well developed as on *pallas*, and due to the poor condition of the specimen, the extent of hindwing tail development is not clear. This specimen appears to be a stray of the *occidentalis*-like populations inhabiting adjacent mainland Mexico, and owing to this uncertainty is excluded from the type series. The entire Baja California population may have originated from the arrival of such a specimen across the Gulf of California, and there is no apparent reason why odd specimens should not make such crossings even today whenever the appropriate conditions occur.

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#### LITERATURE CITED

- Brown, J. W., and D. K. Faulkner, 1982. New Rhopalocera records for Baja California with the description of a new species of *Habrodais* Scudder (Lepidoptera: Theclinae). Bull. Allyn Mus. 67:1-6.
- Clench, H. K., 1966. The synonymy and systematic position of some Texas Lycaenidae. J. Lepid. Soc. 20:65-70.
- Diaz Frances, A., and J. de la Maza Elvira, 1978. Guia ilustrada de las mariposas Mexicanas, parte 1, familia Papilionidae. Soc. Lepid. Publ. Especiales 3:1-15.
- Emmel, J. F., 1975. The family Papilionidae, in Howe, W. H. (editor), *The Butterflies of North America*. Doubleday and Co., Inc., New York.
- Emmel, T. C., and J. F. Emmel, 1973. Butterflies of southern California. Nat. Hist. Mus. Los Angeles Co., Sci. ser. 26:1-148.
- Hammond, P. C., 1981 (1983). The colonization of violets and *Speyeria* butterflies on the ash-pumice fields deposited by Cascadian volcanoes. J. Res. Lepid. 20(3):179-191.
- Hoffman, C. C., 1940. Catalogo sistematico y zoogeografico de los Lepidopteros Mexicanos. Ann. Inst. Biol. Mex., 11(2):639-739.
- , 1941. Catalogo sistematico y zoogeografico de los Lepidopteros Mexicanos, secunde parte, 12(1):237-294.
- Holland, R., 1972 (1973). Butterflies of middle and southern Baja California. J. Res. Lepid. 11(3):147-160.
- Howe, W. H., 1975. The genus *Asterocampa*, in Howe, W. H. (editor), *The Butterflies of North America*. Doubleday and Co., Inc., New York.
- Langston, R., 1975. The genus *Philotes*, in Howe, W. H. (editor), *The Butterflies of North America*. Doubleday and Co., Inc., New York.
- Miller, L. D., 1970. Reports on the Margaret M. Cary-Carnegie Museum expedition to Baja California, Mexico, 1961. Ann. Carnegie Mus. 41(5):169-200.
- Pielou, E., 1979. *Biogeography*. 351 pp. John Wiley and Sons, New York.
- Powell, J. A., 1958. Additions to the knowledge of the butterfly fauna of Baja California Norte. J. Lepid. Soc. (Lepid. News) 12(1-2):26-32.
- Rindge, F. H., 1948. Contributions toward a knowledge of the insect fauna of Lower California, Lepidoptera: Rhopalocera. Proc. Calif. Acad. Sci., 24(8):289-312.
- Scott, J. A., 1975. The genus *Strymon*, in Howe, W. H. (editor), *The Butterflies of North America*. Doubleday and Co., Inc., New York.
- Thorne, F. T., 1961. Extensions of range and a new host plant of *Philotes speciosa* (Lepidoptera: Lycaenidae). Bull. So. Calif. Acad. Sci. 60(1):37-39.



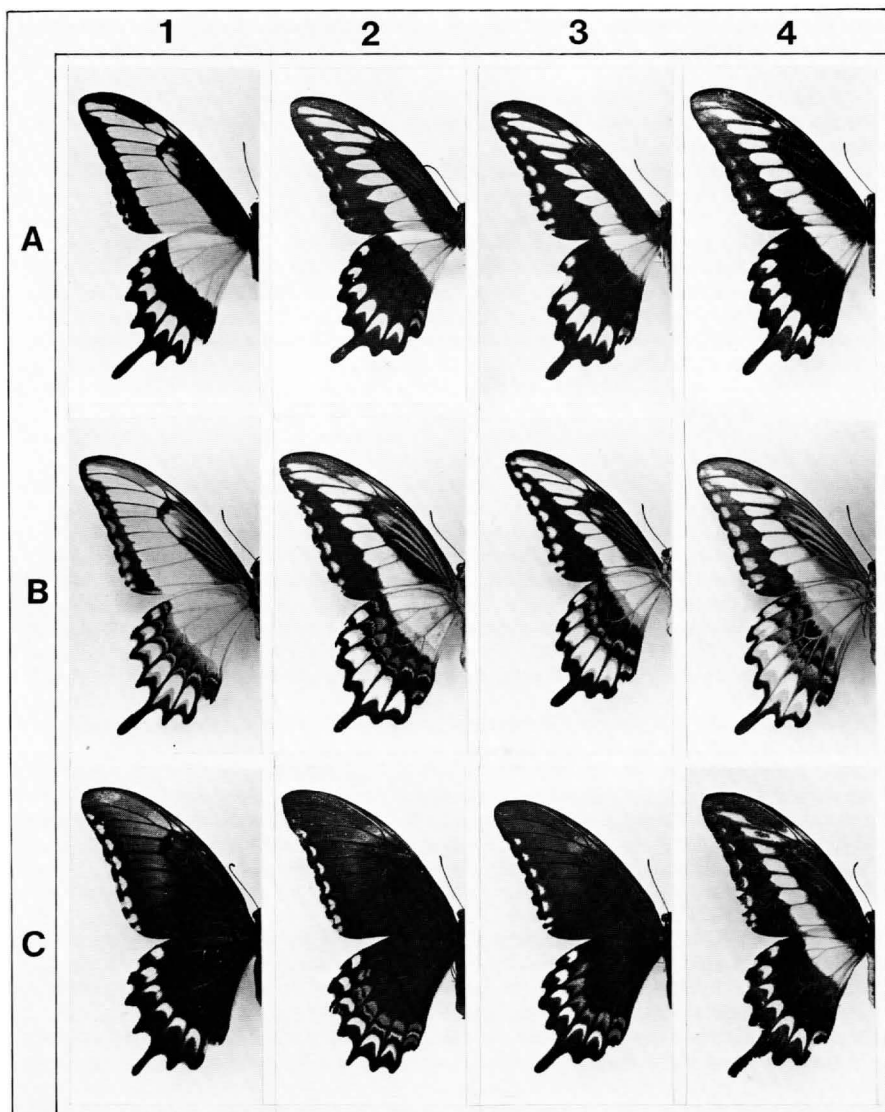


Figure 1. *Papilio astyalus astyalus*, Brazil, a) ♂, upperside, b) ♂, underside, c) ♀, upperside.

Figure 2. *Papilio astyalus* near *pallas*, Colima, Mexico, a) ♂, upperside, b) ♂, underside, c) ♀, upperside.

Figure 3. *Papilio astyalus occidentalis*, Baja California Sur, a) ♂, upperside, b) ♂, underside, c) ♀, upperside.

Figure 4. *Papilio ornythion*, Texas, a) ♂, upperside, b) ♂, underside, d) ♀, upperside.



TAXON	FOREWING BAND WIDTH male	YELLOW LUNULE BORDERING M <sub>3</sub> VHW male	HINDWING TAIL female	DIMORPHISM
<i>P. a. astyalus</i>	very broad	never extending into tail	slightly reduced	sexually dimorphic
<i>P. a. pallas</i>	broad	never extending into tail	greatly reduced	sexually dimorphic
<i>P. a. occidentalis</i>	narrow	never extending into tail	well developed	sexually dimorphic
<i>P. ornithion</i>	narrow	always extending into tail	well developed	females polymorphic

Table 1. Comparison of selected characters of taxa discussed in the text.

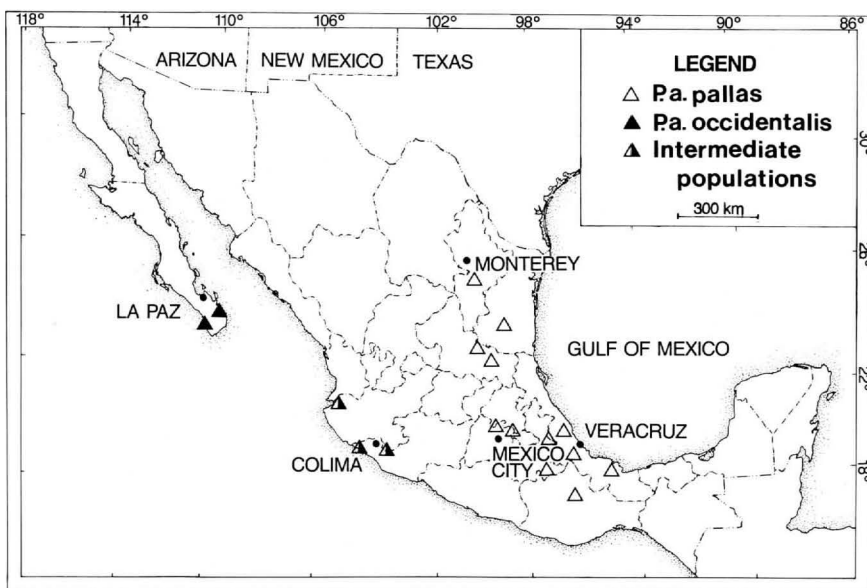


Figure 5. Distribution of *P. astyalus* complex in Mexico.

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