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# THE SPHINGIDAE (LEPIDOPTERA) OF BAJA CALIFORNIA, MEXICO

JOHN W. BROWN[1]
Department of Entomological Sciences, University of California,
Berkeley, California 94720

AND

JULIAN P. DONAHUE
Natural History Museum of Los Angeles County,
900 Exposition Boulevard, Los Angeles, CA 90007-4057

**ABSTRACT.** Baja California is a rugged, mostly xeric peninsula situated along the northwestern coast of Mexico. With the exception of butterflies, the lepidopterous fauna of this region is poorly studied. Twenty-six species of Sphingidae are known from the peninsula, including one endemic species, *Sphinx xantus* Cary, and three endemic subspecies, *Manduca rustica cortesi* (Cary), *Pachysphinx occidentalis peninsularis* Cary [revised identification], and *Callionima falcifera guaycura* (Cary) [revised identification]. For each of the 26 species, information is presented on peninsular distribution, flight period, and possible larval host plants.

**Additional key words:** peninsular effect, host plants, distributions.

The peninsula of Baja California (or Lower California; here termed simply "Baja California") is situated along the northwestern coast of México, extending southeasterly approximately 1300 km from the international border to its tip at Cabo San Lucas. It is bordered by the state of California (Alta California) on the north, the Pacific Ocean on the west, and the Sea of Cortés (Gulf of California) on the east (Fig. 1). The mainland Mexican states of Sonora and Sinaloa lie to the east of the gulf. Much of the peninsula is a low lying desert. However, in the north are two major mountain ranges, the Sierra Juárez and the Sierra San Pedro Mártir, which represent extensions of the Peninsular Ranges of southern California. Two significant ranges occur in the southern third of the peninsula: the Sierra de la Giganta, running parallel to the eastern coast, and the Sierra de la Laguna in the center of the southern tip. Politically the peninsula is divided at the 28th parallel into a northern state, Estado de Baja California (here termed Baja California Norte to avoid confusion), and a southern state, Estado de Baja California Sur (Baja California Sur).

Although comparatively depauperate, the lepidopterous fauna of Baja California is nonetheless unique and diverse, primarily as a consequence of the nearly 10° range in latitude the peninsula embraces, and its relative isolation from mainland México. Except for butterflies,

[1] Research Associate, Entomology Department, San Diego Natural History Museum.

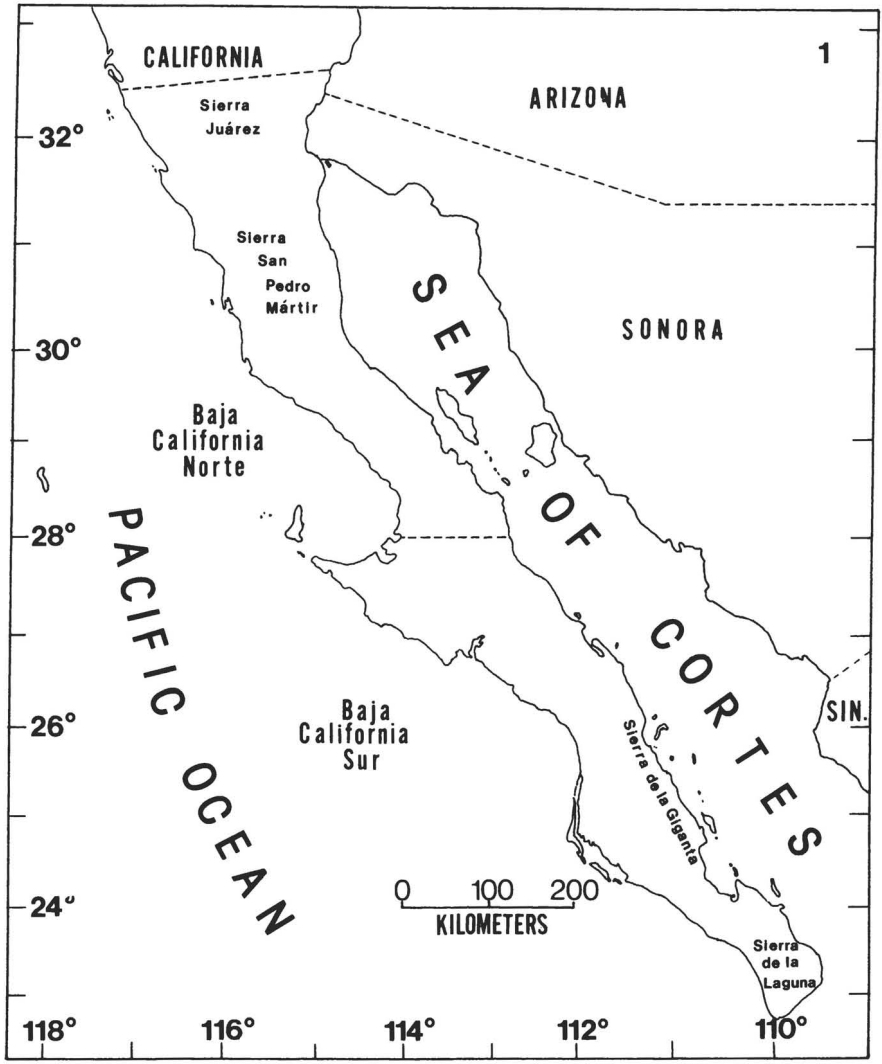



FIG. 1. The peninsula of Baja California and adjacent areas.

however, few lepidopterous families have been studied intensively. Prior to our study, a total of 20 species of Sphingidae had been credited to the Baja California fauna. Mooser (1940) treated 145 species of Sphingidae from the Republic of México, and specifically cited records of 5 species from Baja California, mostly in the collection of Carlos C. Hoffmann. Hoffmann (1942) cited 8 species, primarily Californian elements, as occurring specifically in Baja California, but provided no locality data. Cary (1963) presented records of 244 specimens repre-

senting 14 species taken in the Cape Region at the southern tip of the peninsula. Only two of these had been listed previously by Hoffmann (1942), the majority being widely ranging neotropical species cited by Hoffmann as occurring throughout México without specific reference to Baja California. In addition, Cary (1963) described four endemic taxa. Her paper laid the groundwork for biogeographic comparisons between the mainland and peninsular sphingid faunas. Schreiber (1978) cited Baja California as within the range of 7 species in his work on dispersal centers of neotropical Sphingidae; all of these had been listed previously either by Hoffmann (1942) or by Cary (1963). Recent collecting efforts have raised the number of sphingids known to occur in Baja California to 26.

## SPHINGID DISTRIBUTIONS

Although large and highly vagile insects, Schreiber (1978) has shown that sphingids exhibit biogeographic patterns comparable to animals of much lesser mobility. The species present in Baja California conform reasonably well to the biotic provinces or phytogeographic regions presented by Shreve (1951) and Wiggins (1980). Four general patterns of distribution are exhibited. 1) The Californian Province in the northwestern portion of the peninsula has a distinctive fauna composed primarily of temperate species including several montane and oak woodland associated elements (Figs. 8 and 15). 2) The Cape Region at the southern end of the peninsula supports a limited fauna of tropical elements similar to that of adjacent mainland Mexico, but with many fewer species (Figs. 17 and 18). 3) A number of common, widespread species range the length of the peninsula (Figs. 4, 5, and 20). 4) Two species exhibit disjunct patterns shown by several butterfly species; they are restricted primarily to the Californian Province but are represented by isolated populations in the Cape Region (Figs. 9 and 10). Apparent conformity to the phytogeographic regions probably has been enhanced by lack of intensive collecting and by biases toward specific areas (e.g., the Cape Region has received far more attention than any other area).

Simpson (1964) first recognized that North American peninsulas had fewer species present at their distal tips than at their mainland bases. He suggested that this pattern was neither coincidental nor transient, but was the result of an equilibrium between species colonization and extinction. Subsequent studies on various North American vertebrates (Cook 1969, Kiester 1971, Taylor & Regal 1978) corroborated Simpson's observation, and this pattern became known as the "peninsular effect." Simply defined, the peninsular effect states that species density or richness decreases as a function of distance from the mainland base of a peninsula.

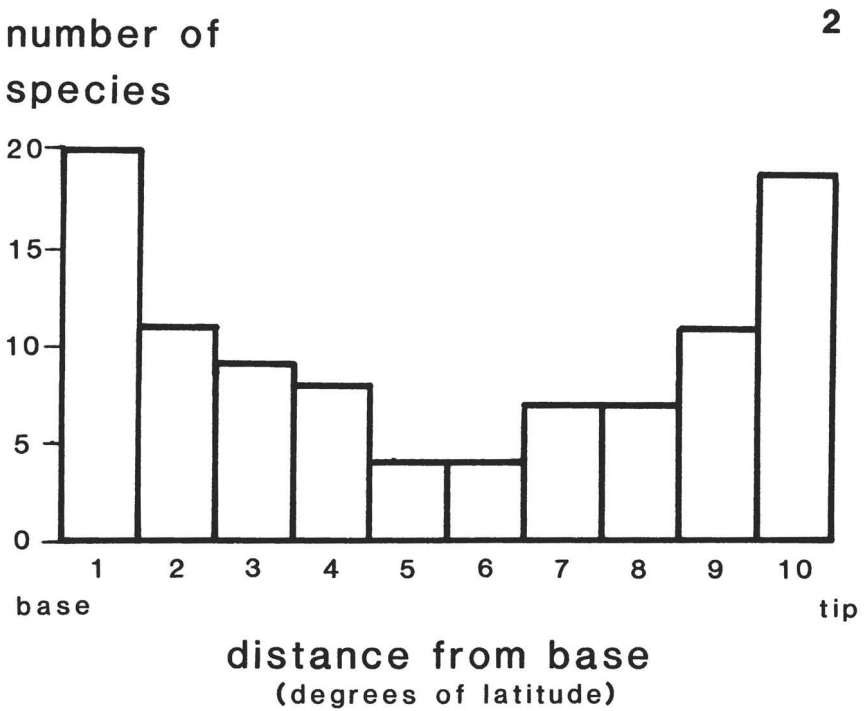



FIG. 2. Species density histogram for Baja California Sphingidae (base = north end of peninsula; tip = southern extremity).

Seib (1980) first questioned the general applicability of the peninsular effect when he demonstrated that the reptiles of Baja California did not conform to this pattern. Recently it has been shown that the butterflies of Baja California also do not conform to this biogeographic principle (Brown 1987). Likewise, sphingids illustrate a pattern of species richness contrary to that predicted by the peninsular effect (Fig. 2). High species density occurs not only at the northern base but at the distal tip as well. Species density appears to be a function of floral diversity (community complexity) and proximity to mainland species pools rather than distance from the mainland base of the peninsula.

## SPECIES ACCOUNTS

Unless indicated otherwise, nomenclature follows that of Hodges (1971). All capture records are listed for species represented by fewer than 25 specimens. Locality data were transcribed from specimen labels, thus there is a mixture of metric and English systems for distance and elevation. The distribution maps include localities for all specimens personally examined by us as well as all additional records cited (i.e.,

personal communication, etc.). Disposition of examined specimens is indicated by abbreviations (e.g., AMNH) listed in the Acknowledgments. Original descriptions are cited in full in the text; additional references are in abbreviated style but are cited in full in the Literature Cited section.

1. *Agrius cingulatus* (Fabricius) (Figs. 3, 21)
*Sphinx cingulata* Fabricius, 1775, Systema Entomologiae, 545.
*Agrius cingulatus;* Hodges, 1971:22.

This widespread Neotropical species occurs throughout much of Mexico, ranging into the southern parts of the United States. Strays are known from as far north as Nova Scotia (Hodges 1971). Although most Baja California records are from the Cape Region, *A. cingulatus* probably occurs over most of the peninsula. It has been taken in coastal as well as montane areas, and there is a single record from the northern desert. *A. cingulatus* is probably multiple-brooded; adults fly from July through April in the southern portion of the peninsula. Possible host plants in Baja California include *Datura* (Solanaceae) and several species of *Ipomoea* (Convolvulaceae).

**Specimens examined:** BAJA CALIFORNIA NORTE: Rancho Santa Inez, 540 m, 1M, 27-VII-82, W. Clark and P. Blom (CI); SW end Isla San Estebán, 1M, 28-VII-86, D. Faulkner (SDNHM). BAJA CALIFORNIA SUR: Ramal de Naranjas, 6 mi W Highway near Santa Anita, 1M, 11-X-83, F. Andrews and D. Faulkner (SDNHM); 36.3 mi SE Todos Santos, 1M, 10-X-83, F. Andrews and D. Faulkner (SDNHM); El Salto, 8 mi E Todos Santos, 1F, 9-X-83, F. Andrews and D. Faulkner (SDNHM); Ricardo's RV Park, 2 mi N Cabo San Lucas, 1M, 6-I-84, R. Wells (RW); 2 mi E El Triunfo, 1F, 12-VIII-66, J. Chemsak, J. Doyen and J. Powell (UCB); Sierra de la Laguna, Rancho La Burrera, 1.9 rd mi S and 12.6 mi E Todos Santos, 1600′, 1F, 15-IX-85, J. and K. Donahue (LACM).

**Additional records:** BAJA CALIFORNIA SUR: San Bartolo microwave tower, 2000′, 24-VII-81, R. Holland (pers. comm.); Playa San Cristobal, 15 mi N Cabo San Lucas, 100′, 18-IV-84, J. Brown (sight record).

2. *Manduca sexta sexta* (Linnaeus) (Figs. 4, 22)
*Sphinx sexta* Linnaeus, 1763, Centuria Insectorum Rariorum, 27.
*Phlegethontius sextus sextus;* Cary, 1963:193.
*Manduca sexta;* Hodges, 1971:29.

*M. sexta* is abundant throughout the peninsula, ranging north well into California; it is absent only at the highest elevations. Cary (1963) also records it from Sonora and Sinaloa. In Baja California adults have been taken from March through December. It is most common in the late summer and fall. Larvae feed on a wide variety of Solanaceae including potato, tomato, and tobacco.

3. *Manduca quinquemaculata* (Haworth) (Figs. 5, 23)
*Sphinx quinquemaculata* Haworth, 1803, Lepidoptera Britannica 1:59.
*Phlegethontius quinquemaculatus;* Cary, 1963:194.
*Manduca quinquemaculata;* Hodges, 1971:31.

This species is very similar to *M. sexta,* from which it can be distinguished by the presence of an almost continuous, straight, black subterminal line on the forewing. The two are broadly sympatric throughout Baja California, however, *M. quinquemaculata* is considerably less abundant. It is equally common in both the northern and southern halves of the peninsula. Captures extend from March through October. Larval hosts are the same as those given above for *M. sexta.*

4. *Manduca rustica cortesi* (Cary) (Figs. 6, 24)
*Phlegethontius rusticus cortesi* Cary, 1963, Ann. Carnegie Mus. 36:194.
*Manduca rustica cortesi;* Schreiber, 1978:41, 62.

Although capture records do not illustrate an extensive peninsular distribution, *M. rustica* probably occurs throughout Baja California. It is frequent to the north in adjacent

southern California where it is probably resident. The subspecies *cortesi* was described from specimens taken in the Cape Region, and the name is applicable to southern California material as well. *M. rustica cortesi* averages smaller than the nominate subspecies; its white over-scaling and black and white maculation are in strong contrast to the typical brown and white markings of *M. rustica rustica* (Fabricius). Adults fly in the summer and fall, with captures ranging from July to November. Hosts available in Baja California include *Bignonia* (Bignoniaceae) and *Verbena* (Verbeneaceae), and probably other members of these two families, such as the widespread *Chilopsis linearis* (Cav.) Sweet and the more southern *Tecoma stans* (L.) Juss. (both Bignoniaceae).

5. *Sphinx xantus* Cary (Figs. 7, 25)

*Sphinx xantus* Cary, 1963, Ann. Carnegie Mus. 36:196; Schreiber 1978:45.

This endemic species has been found over a wide range of elevations in the Cape Region, and ranges north along the eastern side of the peninsula to Bahía de las Animas in Baja California Norte. Captures extend from August to November. *S. xantus* is the peninsular counterpart of the mainland *S. istar* (Rothschild and Jordan). Cary (1963) presents several morphological characters distinguishing the two: *xantus* is smaller in forewing length and more somber brown than the lighter and variegated *S. istar*; the male genitalia are also distinct. The differences between *S. xantus* and *S. istar* are not as great as those between many species in the genus. However, until biological data to the contrary become available, we will treat them as separate species. The larval host plant is unknown.

**Specimens examined:** BAJA CALIFORNIA NORTE: Bahía de las Animas, sea level, 1M, 1F, 5-IX-85, J. and K. Donahue (#96,431, LACM). BAJA CALIFORNIA SUR: 7 mi S San Pedro, 3M, 10-VIII-66, Chemsak, Doyen and Powell (UCB); Highway 19, 14.5 rd mi NW Cabo San Lucas, 250′, 5M, 11-IX-83, J. and K. Donahue (LACM); Sierra de la Giganta, Ligui microwave tower, 32 mi S Loreto, 1500′, 1M, 4-IX-84, J. and K. Donahue (#88,114, LACM); Sierra de la Laguna, Rancho San Antonio de la Sierra, 11.6 rd mi SE KP 147.6, 3000′, 2M, 11/12-IX-85, J. and K. Donahue (#97,169, LACM); San José del Cabo, 1M (holotype), 26-XI-61, 1M (paratype), 27-XI-61, Cary-Carnegie Expedition (CMNH).

6. *Sphinx chersis* (Hübner) (Figs. 7, 28)

*Lethia chersis* Hübner, 1823, Sammlung exotischer Schmetterlinge, 2.
*Sphinx chersis;* Hodges, 1971:58.

This widespread western U.S. species ranges into the northern portion of the peninsula. Adults have been taken from May to September in adjacent southern California. Potential larval hosts available in Baja California include *Fraxinus* (Oleaceae), *Prunus* (Rosaceae), and *Populus* (Salicaceae) (Essig 1926, Hodges 1971).

**Specimens examined:** BAJA CALIFORNIA NORTE: 4 mi N Santo Tomás, 800′, 2M, 28-V-70, R. Holland (AMNH); Sierra San Pedro Mártir, Meling Ranch [2200′], 1M, 13-V-66 (LACM); 4 mi SW La Zapopita, Valle de Trinidad, 1M, 1F, 16-IV-61, F. Truxal (LACM).

7. *Sphinx libocedrus* Edwards (Figs. 8, 27)

*Sphinx libocedrus* Henry Edwards, 1881, Papilio 1:115; Hodges, 1971:61.

There are two records of *S. libocedrus* from near the southern tip of the peninsula. It is uncertain whether the specimens represent a resident population or stray individuals. Hodges (1971) indicates that *S. libocedrus* flies from July through September in Texas and Arizona; both Baja California captures are from September. *Forestiera neomexicana* A. Gray (Oleaceae), the only documented larval host (Hodges 1971), occurs in the Cape Region (Wiggins 1980).

**Specimens examined:** BAJA CALIFORNIA SUR: 10 mi SW San José del Cabo, 1M, 1-IX-59, Radford and Werner (CAS); 6 mi E El Aguaje, summit Cañon Santo Tomás Rd, 3500′, 1M, 1-IX-87, R. Wells (RW).

8. *Sphinx perelegans* Edwards (Figs. 8, 26)

*Sphinx perelegans* Henry Edwards, 1874, Proc. Calif. Acad. Sci. 5:109; Hoffmann, 1942:221; Hodges, 1971:61.

*S. perelegans* is common in the Californian Province, particularly in montane and oak woodland areas, and ranges south along the west coast to San Quintín. Capture records extend from April to September, probably representing two broods. Hodges (1971) suggests *Symphoricarpos* (Caprifoliaceae) as the larval host; Essig (1926) mentions *Prunus* (Rosaceae) and *Arctostaphylos* (Ericaceae).

9. *Sphinx sequoiae engelhardti* Clark (Figs. 9, 29)
*Sphinx dolli engelhardti* Clark, 1919, Proc. New England Zool. Club 6:104.
*Sphinx sequoiae engelhardti;* Clark, 1920:66.

In Baja California, *S. sequoiae* Boisduval is known only from the pinyon-juniper woodland areas at the northern end of the Sierra Juárez and near Valle de la Trinidad. The subspecies *S. sequoiae engelhardti* is primarily a desert inhabitant occurring in the southern portion of the range of *S. sequoiae*; it is phenotypically very similar to *S. dollii* Neumoegen. In adjacent southern California *S. sequoiae* has been collected from April to August. The larval host is *Juniperus californica* Carr. (Cupressaceae).

**Specimens examined:** BAJA CALIFORNIA NORTE: 16 km S La Rumorosa, 2M, 27-V-78, E. Sleeper (CSULB); 4 mi SW La Zapopita, Valle de la Trinidad, 1M, 16-IV-61, F. Truxal (LACM); near Zapopita, Valle de Trinidad, 1M, 7/8-IV-61, F. Truxal (LACM).

10. *Smerinthus cerisyi* Kirby (Figs. 9, 30)
*Smerinthus cerisyi* Kirby, 1837, Fauna Boreali-Americana 4:301.
*Smerinthus cerisyi cerisyi;* Mooser, 1940:435.
*Smerinthus cerisyi saliceti* Boisduval, 1875, Histoire Naturelle des Insectes, Species Général des Lépidoptères Hétérocères 1:35; Hoffmann, 1942:222.
*Smerinthus cerisyi ophthalmica* Boisduval, 1855, Bull. Soc. Entomol. France 332; Cary, 1963:197.

*S. cerisyi* occurs commonly throughout much of the Californian Province, particularly at middle elevations and in riparian habitats, but it is also represented in the Cape Region by an isolated population. The Cape Region of Baja California marks the southern limit of this characteristically temperate species (Cary 1963); Mooser (1940) noted its presence in Baja California Norte, without further detail. *S. cerisyi* has been recorded from March through September in the north, and in November and January in the Cape Region. *Salix* and *Populus* (Salicaceae) serve as larval hosts elsewhere (Comstock and Dammers 1943, Hodges 1971).

**Specimens examined:** BAJA CALIFORNIA NORTE: Meling Ranch (San José), 1M, 30-VI-68, 1M, 2-VII-68, 1M, 1F, 29-VI-68, all D. Patterson (CAS), 1M, 5-IV-71, H. Real (CAS); 1 mi N Meling Ranch, 1M, 17-III-72, J. Doyen and J. Powell (UCB); trail Las Encinas to La Sanja, Sierra San Pedro Mártir, 1M, 27-V-58, D. Patterson (CAS); 4 mi S Las Encinas, 1M, 2-VI-58, D. Patterson (CAS); "Mexicali, Rubirosa," 1M, 11-IX-61, D. Patterson (CAS); Agua Caliente (San Carlos), 18.5 km E Maneadero, 1M, 1F, 6-VII-73, P. Arnaud (CAS); 8 mi E Tecate, 1M, 6-VII-84, J. Brown and P. Tocco (SDNHM); Arroyo Santo Domingo, 5.7 mi E Hamilton Ranch, 1M, 1F, 22-IV-63, H. Leech and P. Arnaud (CAS); 3 mi S San José del Castillo, 1F, 16-VI-63, E. Sleeper (CSULB). BAJA CALIFORNIA SUR: 4 mi W summit, El Aguaje-Miraflores, Sierra de la Laguna, 1F, 23-I-87, R. Wells (RW); Arroyo San Bartolo, 4F, 1-XI-61, 2F, 15-XI-61, Cary-Carnegie Expedition (CMNH); Arroyo San Bernardo, 3F, 17-XI-61, Cary-Carnegie Expedition (CMNH); Puerto Chileno, 1F, 26-XI-61, Cary-Carnegie Expedition (CMNH).

**Additional records:** BAJA CALIFORNIA NORTE: Mike's Sky Ranch, Sierra San Pedro Mártir, 3600′, 18-VI-70, R. Holland (pers. comm.).

11a. *Pachysphinx occidentalis occidentalis* (Edwards) (Figs. 10, 31)
*Smerinthus modestus* var. *occidentalis* Henry Edwards, 1875, Proc. Calif. Acad. Sci. 6:92.
*Smerinthus imperator* Strecker, 1878, Lepidoptera, Rhopaloceres and Heteroceres, Indigenous and Exotic, 125.
*Pachysphinx modesta imperator* form *kunzei* Rothschild and Jordan, 1903, Novit. Zool. 9(suppl.):343.
*Pachysphinx modesta occidentalis;* Mooser, 1940:436.

*Pachysphinx modesta imperator;* Hoffmann, 1942:223.
*Pachysphinx occidentalis;* Hodges, 1971:91.

The nominate subspecies is found sporadically throughout the northern portion of the peninsula. It is most common at middle elevations and in riparian areas where *Populus* and *Salix* (Salicaceae), its larval hosts, grow.

**Specimens examined:** BAJA CALIFORNIA NORTE: Meling Ranch (San José), 1M, 30-VI-68, 1M, 1-VII-68, D. Patterson (CAS); Agua de Chale, 22 mi S San Felipe, 1M, 18-VI-68, D. Patterson (CAS); Low. Corona, Sierra San Pedro Mártir, 1M, 14-VI-61, E. Sleeper (CSULB); San José del Castillo, 4M, 3-IX-61, 1M, 1F, 15-VI-61, E. Sleeper (CSULB); 3 mi S San José del Castillo, 1M, 1F, 15-VI-63, E. Sleeper (CSULB); 10 mi S San Matias Peak, Sierra San Pedro Mártir, 1F, 28-VIII-60, E. Sleeper (CSULB).

**Additional records:** Rothschild and Jordan (1903) cite a pair of specimens from Lower California (in the Paris Museum) in their original description of *P. modesta imperator* form *kunzei*, hesitating to recognize the taxon as a distinct subspecies for lack of enough material. We have not examined these specimens, but they may refer to *P. occidentalis peninsularis* (see below).

11b. *Pachysphinx occidentalis peninsularis* Cary (Fig. 10)
*Pachysphinx modesta peninsularis* Cary, 1963, Ann. Carnegie Mus. 36:198; Schreiber 1978:48.

A unique population of *P. occidentalis* was discovered in the Cape Region by the Cary-Carnegie Expedition (Cary 1963). No additional specimens have been collected. The type series is from San José del Cabo near the coast, but the insect also may inhabit the Sierra de la Laguna where its probable larval hosts, *Populus* and *Salix* (Salicaceae), occur.

**Specimens examined:** BAJA CALIFORNIA SUR: San José del Cabo, 2F (holotype and paratype), 25-X-61, Cary-Carnegie Expedition (CMNH).

12. *Erinnyis ello* (Linnaeus) (Figs. 11, 32, 33)
*Sphinx ello* Linnaeus, 1758, Systema Naturae (10th ed.) 1:491.
*Erinnyis ello;* Cary, 1963:198; Hodges, 1971:99.

This widespread species of the American tropics ranges throughout the peninsula, uncommon only in the mountains. *E. ello* is most abundant in the Cape Region. In the northern portion of the peninsula *E. ello* flies from July through September; in the southern portion captures range from July through January. Larval hosts include a variety of plants in the Euphorbiaceae.

13. *Erinnyis crameri* (Schaus) (Figs. 12, 34)
*Dilophonota crameri* Schaus, 1898, Entomol. News 9:136.
*Erinnyis crameri;* Hodges, 1971:100.

*E. crameri* occurs throughout most of mainland Mexico (Hoffmann 1942). It has been collected only once in Baja California, and may not be a breeding resident. Hodges (1971) indicates that all documented larval host plants are in the Apocynaceae.

**Specimens examined:** BAJA CALIFORNIA NORTE: Hiway 1, ca. 10 mi NNW Cataviña, 2400', 1M, 1/2-IX-83, J. and K. Donahue (LACM).

14. *Erinnyis obscura obscura* (Fabricius) (Figs. 12, 35)
*Sphinx obscura* Fabricius, 1775, Systema Entomologiae, 538.
*Erinnyis obscura;* Cary, 1963:200; Hodges, 1971:101.

This little sphingid occurs throughout the lowlands, but is common only in the southern third of the peninsula, where it has been taken from sea level to 3000 feet. It is widespread on the mainland, ranging north well into the southern United States. It is occasional in southern California where it may be resident. Captures range from August through March in the Cape Region. It is both sexually and seasonally polymorphic, and there is some confusion whether *E. obscura* and *E. domingonis* (Butler) represent separate species or merely color forms of the same species (Hodges 1971). The two are genitalically indistinguishable, and *domingonis*-like individuals may be taken sympatrically with *E. obscura*. Comstock and Dammers (1935) report *Philibertia* (Asclepidaceae) as the larval host.

15. *Pachylia syces syces* (Hübner) (Figs. 13, 36)
*Enyo syces* Hübner, 1822, Verzeichniss bekannter Schmettlinge, 132.
*Pachylia syces;* Cary, 1963:200.

This widespread Neotropical species ranges north at least to the state of Sinaloa on the Mexican mainland (Hoffmann 1942). It was first reported from Baja California by Cary (1963). On the peninsula, *P. syces* is uncommon, and is confined to the Cape Region. D'Almeida (1944) reports *Ficus* (Moraceae) as the larval host; several species are available in the Cape Region.

**Specimens examined:** BAJA CALIFORNIA SUR: Los Barriles, 1F, XI-67, V. Stuart (RW); Hotel Hacienda, Cabo San Lucas, 1F, 16-II-80, J. McBurney (LACM); Los Cabos airport, 30 mi NE Cabo San Lucas, 1F, 5-IX-83, E. Hawks (LACM); 6 mi W Los Barriles, El Coro Rd, 1F, 25-I-87, R. Wells (RW); Bahia de las Palmas, 1F, 12-XI-61, Cary-Carnegie Expedition (CMNH).

16. *Callionima falcifera guaycura* (Cary) (Figs. 14, 37)
*Hemeroplanes parce guaycura* Cary, 1963, Ann. Carnegie Mus. 36:200.
*Callionima parce guaycura;* Schreiber, 1978:51.

Although long treated as *C. parce* (Fabricius) (Hoffmann 1942, Cary 1963, Hodges 1971, Schreiber 1978), J. Cadiou (pers. comm.) has examined the type specimens of this and related species, and advises that *C. falcifera* (Gehlen) is the correct name for this western Mexican taxon. The weakly distinguished, endemic subspecies *C. falcifera guaycura* is widely distributed throughout nearly the entire southern third of the peninsula, including the southern portion of the Vizcaino Desert. It is most common in the lowlands of the Cape Region, at times abundant at beach localities, but has been collected up to about 1000 m in the Sierra de la Laguna near San Antonio and Miraflores. Captures range throughout the year with peaks in September and October and again in April and May. During peak flight periods, *C. falcifera* may be taken in abundance. Although the early stages are unknown, the larvae of other members of the genus are known to feed on plants in the Apocynaceae.

17. *Aellopos clavipes* (Rothschild and Jordan) (Figs. 15, 38)
*Sesia tantalus clavipes* Rothschild and Jordan, 1903, Novit. Zool. 9(suppl.):436.
*Aellopos clavipes;* Hodges, 1971:111.

*A. clavipes* is abundant in the Cape Region; there is a single record from the northern portion of the peninsula. It occurs from the immediate coast to about 1300 m in the Sierra de la Laguna. Adults are diurnal and avidly visit flowers. Captures range from August to February. Other members of the genus utilize Rubiaceae as larval hosts.

**Specimens examined:** BAJA CALIFORNIA NORTE: San Quintín, 1F, 12-VIII-54, alfalfa, Rohlf (SDHNM). BAJA CALIFORNIA SUR: 2 mi S La Paz, 2M, 6-VIII-66, J. Chemsak (UCB), 1F, 11-VIII-66, J. Powell (UCB); San José del Cabo, 1M, 11/16-IX-67, J. Chemsak and A. Michelbacher (UCB); 26 mi W La Paz, 1M, 10-VIII-66, J. Powell (UCB); 7 mi S San Pedro, 1M, 10-VIII-66, J. Doyen (UCB); 9 mi SW La Paz, 1M, 1F, 14-VIII-66, J. Powell (UCB); Hotel Finisterra, Cabo San Lucas, 1M, 28-XI-80, J. and P. Brown (SDNHM); 4.2 mi W Miraflores, 1F, 30-IX-80, F. Andrews and D. Faulkner (SDNHM); 27 km NE Todos Santos, 900′, on flowers of *Antigonon leptopus,* 1F, 8/9-X-75, R. Snelling (LACM); Cañon Santo Tomás Rd., 6 mi E El Aguaje, 3500′, 3M, 1-II-87, R. Wells (RW).

18. *Hemaris diffinis* (Boisduval) (Figs. 15, 39)
*Macroglossa diffinis* Boisduval, 1836, Histoire Naturelle des Insectes, Species Général des Lépidoptères, 1:pl. 15.
*Hemaris diffinis;* Hodges, 1971:117.

This Nearctic species is restricted to the middle elevations (1300–1700 m) of the Sierra Juárez and the Sierra San Pedro Mártir. Captures range from June through September; it is most common in July. Adults are diurnally active and strongly attracted to the flowers of low growing annuals, especially the purple flowers of *Monardella* (Lamiaceae). Although *H. senta* (Strecker) is reported as occurring in Baja California Norte by Mooser (1940), Hoffmann (1942), and Schreiber (1978), based on specimens in the Hoffmann

collection, their citations probably refer to *H. diffinis*. Reported larval hosts include *Symphoricarpos* and *Lonicera* (Caprifoliaceae) (Hodges 1971).

**Specimens examined:** BAJA CALIFORNIA NORTE: 15 mi E Meling Ranch, Sierra San Pedro Mártir, 4M, 1F, 20-VI-79, J. Brown and D. Faulkner (SDNHM); Las Encinas, Sierra San Pedro Mártir, 4M, 14-VII-80, J. Brown and D. Faulkner (SDNHM); 6 mi N Laguna Hanson, Sierra Juárez, 1F, 21-VII-80, J. Brown and D. Faulkner (SDNHM); 2–5 km S El Condor, Sierra Juárez, 1F, 5-IX-83, D. Faulkner (SDNHM); 19 mi E Ojos Negros, 1M, 21-VII-1980, J. Brown and D. Faulkner (SDNHM).

19. *Eumorpha satellitia* (Linnaeus) (Figs. 16, 40)
*Sphinx satellitia* Linnaeus, 1771, Mantissa Plantarum Altera, 539.
*Eumorpha satellitia;* Hodges, 1971:123.

This widespread Neotropical species is uncommon in Baja California. The few specimens are from the Cape Region, and were collected from July through October. Moss (1920) reports the larval host as *Cissus* (Vitaceae).

**Specimens examined:** BAJA CALIFORNIA SUR: 2.3 mi SW San Bártolo, 1F, 1-X-81, F. Andrews and D. Faulkner (SDNHM); Punta Lobos, 1M, 20-VII-71, H. Real and R. Main (CAS); Miraflores, 1M, 1-VIII-71, H. Real and R. Main (CAS); Los Cabos airport, 30 mi NE Cabo San Lucas, 1F, 5-IX-83, E. Hawks (LACM); Sierra de la Laguna, Rancho La Burrera, 1.9 rd mi S and 12.6 mi E Todos Santos, 1600′, 1M, 15-IX-85, J. and K. Donahue (#97,345, LACM); Sierra de la Laguna, Rancho San Antonio de la Sierra, 11.6 rd mi SE KP 147.6, 3000′, 5M, 3F, 11/12-IX-85, J. and K. Donahue (#97,169, LACM).

20. *Eumorpha achemon* (Drury) (Figs. 16, 41)
*Sphinx achemon* Drury, 1773, Illustrations of Natural History 2:51.
*Pholus achemon;* Hoffmann, 1942:229.
*Eumorpha achemon;* Hodges, 1971:124.

*E. achemon* occurs throughout much of the eastern United States ranging west to Arizona and California (Hodges 1971), and south into the Mexican states of Sonora, Chihuahua, and Durango (Hoffmann 1942). In Baja California, *E. achemon* has been collected rarely. Commonly associated with *Vitis* species (Vitaceae) elsewhere, *E. achemon* may eventually be encountered in the northwestern portion of the peninsula where grapes are cultivated.

**Specimens examined:** BAJA CALIFORNIA SUR: La Presa de San Ysidro, near La Purisima, 1M, 21/29-V-84, N. Bloomfield (SDNHM); Highway 1, KP 20, 12 rd mi NE Villa Insurgentes, 250′, 1M, 7-IX-83, J. and K. Donahue (LACM).

**Record:** "Baja California" (no further data) (Hoffmann 1942:229).

21. *Eumorpha vitis* (Linnaeus) (Figs. 17, 42)
*Sphinx vitis* Linnaeus, 1758, Systema Naturae (10th ed.) 1:491.
*Pholus vitis;* Cary, 1963:202.
*Eumorpha vitis;* Hodges, 1971:126.

Although confined to the Cape Region, this tropical species is the most common sphingid in the southern portion of the peninsula. It may be encountered in almost every habitat from the coasts to the mountains. Captures range from July through November. Hodges (1971) lists *Vitis* (Vitaceae) as the larval host in the southern United States and mainland Mexico. Two males from Sierra de la Laguna (LACM) have orchid pollinia attached to the eyes, suggesting the use of orchids as a nectar source.

22. *Eumorpha fasciata* (Sulzer) (Figs. 17, 43)
*Sphinx fasciatus* Sulzer, 1776, Abgekurtze Gesch. der Insecten 1:151.
*Pholus fasciatus;* Cary, 1963:202.
*Eumorpha fasciata;* Hodges, 1971:126.

Although widely distributed from northern Argentina to Nova Scotia (Hodges 1971), *E. fasciata* is extremely rare in Baja California. The single specimen listed by Cary (1963) is the only Baja California record to date. Moss (1912) reports the food plant as a member of the Onagraceae.

**Specimen examined:** BAJA CALIFORNIA SUR: San José del Cabo, 1F, 25-X-61, Cary-Carnegie Expedition (CMNH).

23. *Euproserpinus phaeton* Grote and Robinson (Figs. 18, 44)
*Euproserpinus phaeton* Grote and Robinson, 1865, Proc. Entomol. Soc. Philadelphia 5:178; Hoffmann, 1942:231; Hodges, 1971:143.

This diminutive, diurnal sphingid is exceptionally inconspicuous as it flies rapidly within a few inches of the ground. It is most frequently found in dry washes and flat areas in the desert regions of southern California. It ranges south into Baja California at least as far as Valle de la Trinidad, a desert intrusion between the Sierra Juárez and the Sierra San Pedro Mártir. The single spring brood flies from late February to April in southern California. Comstock and Dammers (1935) report *Oenothera* (Onagraceae) as the larval host.

**Specimens examined:** BAJA CALIFORNIA NORTE: Aguajito Spring, Valle de la Trinidad, 1F, 20-III-36, C. Harbison (SDNHM).

**Additional records:** BAJA CALIFORNIA NORTE: Hiway 3, 4.7 mi N Valle de las Palmas, 2M, 3F, 2023-II-72, J.-M. Cadiou (JC).

24. *Xylophanes tersa* (Linnaeus) (Figs. 18, 45)
*Sphinx tersa* Linnaeus, 1771, Mantissa Plantarum Altera, 538.
*Xylophanes tersa;* Cary, 1963:202; Hodges, 1971:150.

Although seldom encountered in numbers, *X. tersa* may be locally and seasonally common in Baja California, where it is confined to the southern tip of the peninsula. It occurs from the coastal lowlands to about 900 m in the Sierra de la Laguna. It is apparently single-brooded with adults having been taken from September to early December. Elsewhere the larvae feed on Rubiaceae; larval hosts in Baja California are unknown.

25. *Xylophanes pluto* (Fabricius) (Figs. 19, 46)
*Sphinx pluto* Fabricius, 1777, Genera Insectorum, 274.
*Xylophanes pluto;* Hodges, 1971:149.

Hoffmann (1942) indicated that *X. pluto* occurred throughout Mexico with the exception of the northwestern region. We have examined single specimens from both Sinaloa (UCB) and Baja California. The probable host in Baja California is *Chiococca* (Rubiaceae).

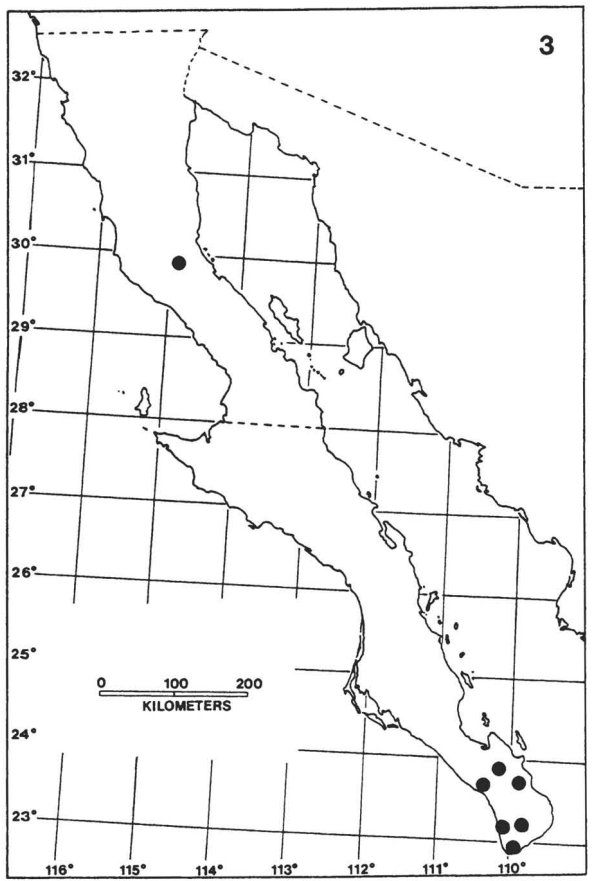
**Specimen examined:** BAJA CALIFORNIA SUR: Hwy 19, 14.5 rd mi NW Cabo San Lucas, 250', 1M, 11-IX-83, J. and K. Donahue (LACM).

26. *Hyles lineata* (Fabricius) (Figs. 20, 47)
*Sphinx lineata* Fabricius, 1775, Systema Entomologiae, 541.
*Celerio lineata;* Cary, 1963:153.
*Hyles lineata;* Hodges, 1971:153.

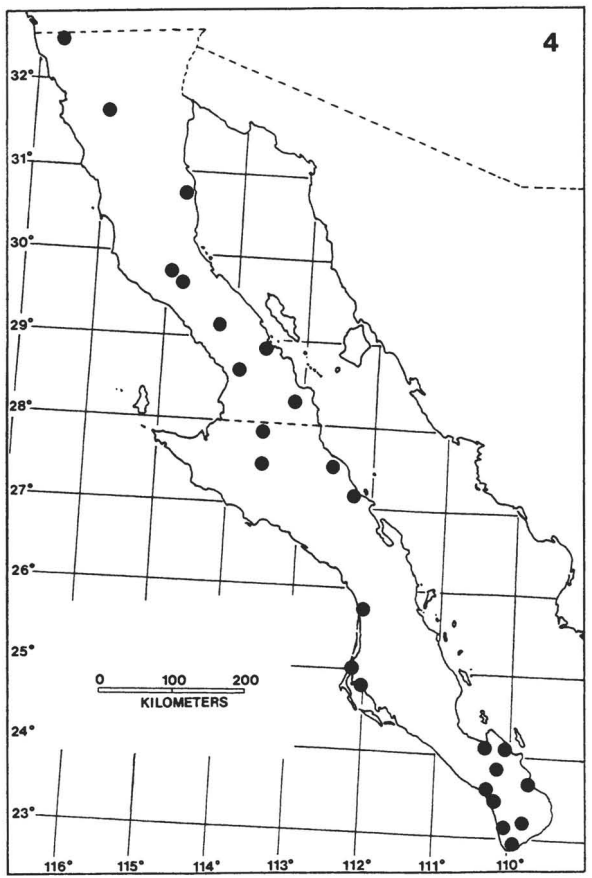
*H. lineata* is by far the most common and widespread sphingid in Baja California. It ranges from the coastal lowlands to the mountains; it is common in the desert areas; it is also known from several islands both in the Sea of Cortés (e.g., Isla Angel de la Guarda and Isla Mejia) and along the Pacific coast (e.g., Isla de Cedros and Isla Guadalupe). In the north it is on the wing from March through October; in the south captures range throughout the year with a peak in September through November. Larval hosts encompass many genera in several families including Rosaceae, Solanaceae, Onagraceae, Portulacaceae, and Nyctaginaceae.

## Possible Species

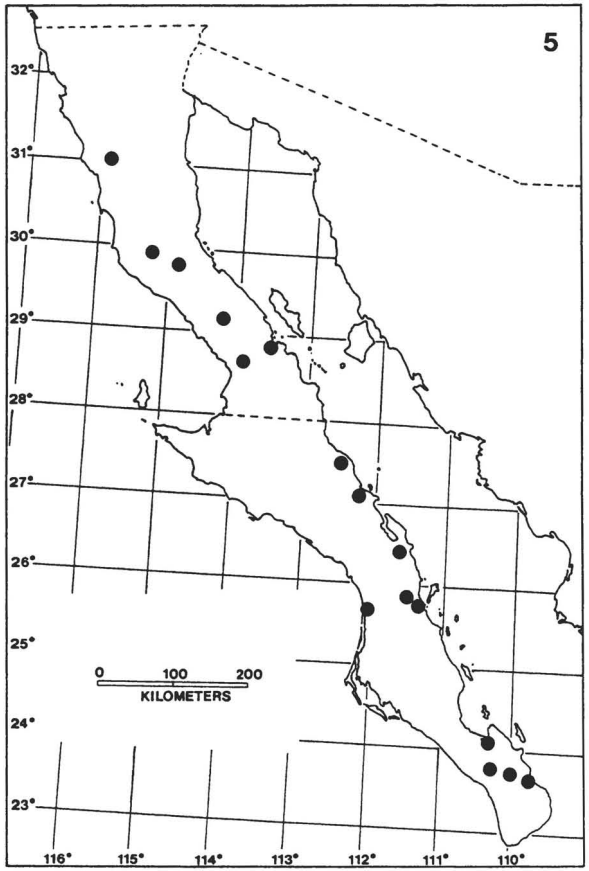
The Californian Province in the northwestern portion of the peninsula represents a significant southern intrusion of Nearctic elements, both floral and faunal. Physiographically, this region is an extension of the area to the immediate north. Most of the sphingids present in southern California occur here as well. Two Californian species for which recent Baja California records are conspicuously absent are *Proserpinus clarkiae* (Boisduval) and *Arctonotus lucidus* Boisduval. Mooser (1940) cites an unspecified number of each from Baja California Norte in the col-



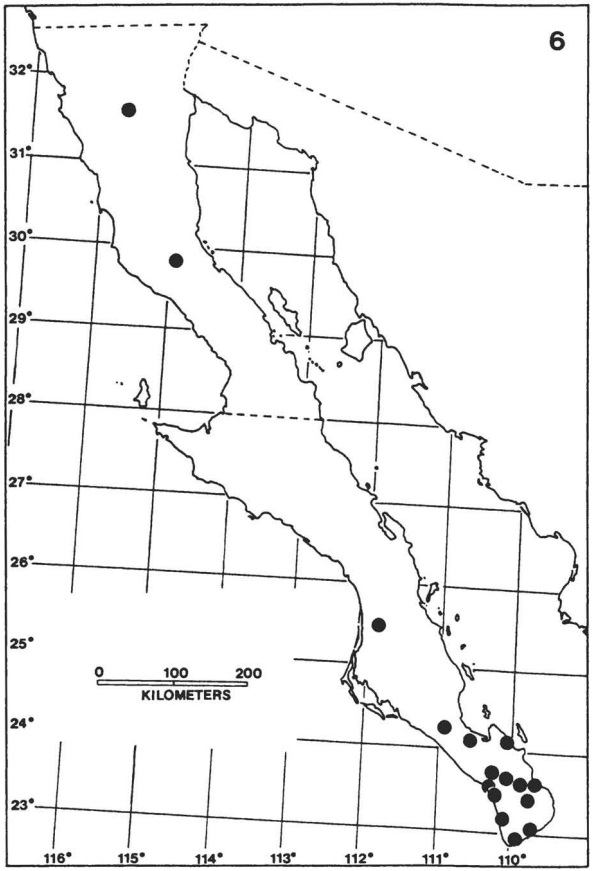

**3.** Distribution of *Agrius cingulatus*.



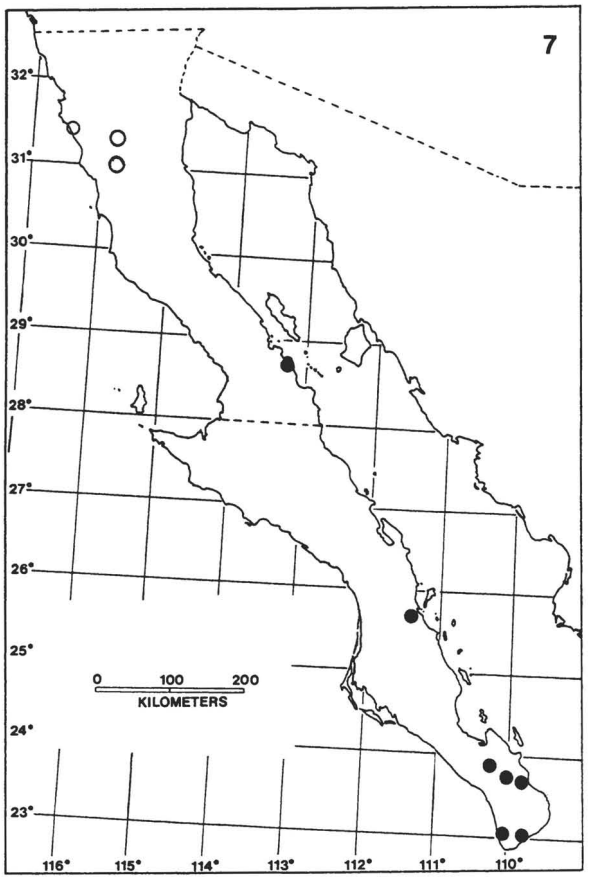

**4.** Distribution of *Manduca sexta*.



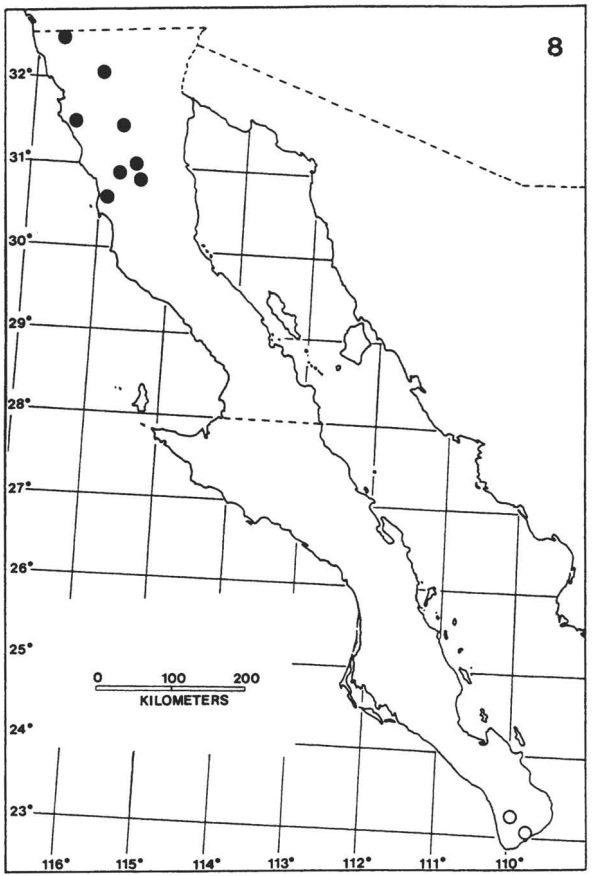

5. Distribution of *Manduca quinquemaculata*.



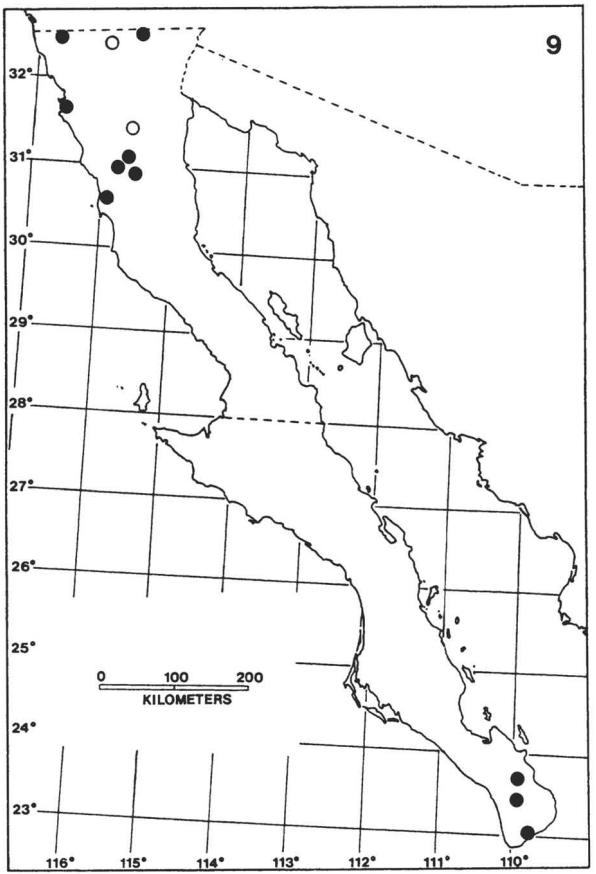

6. Distribution of *Manduca rustica*.



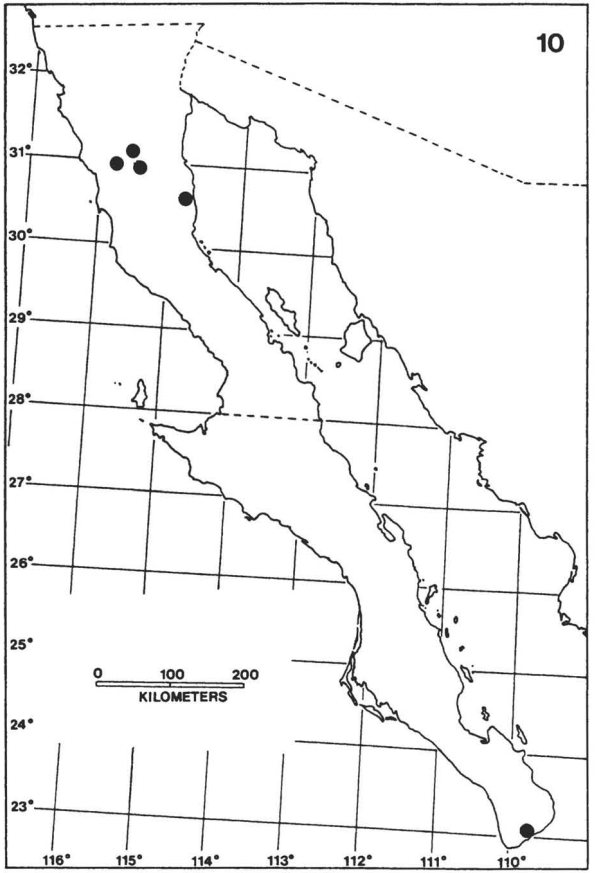

**7.** Distribution of *Sphinx xantus* (closed circles) and *S. chersis* (open circles).



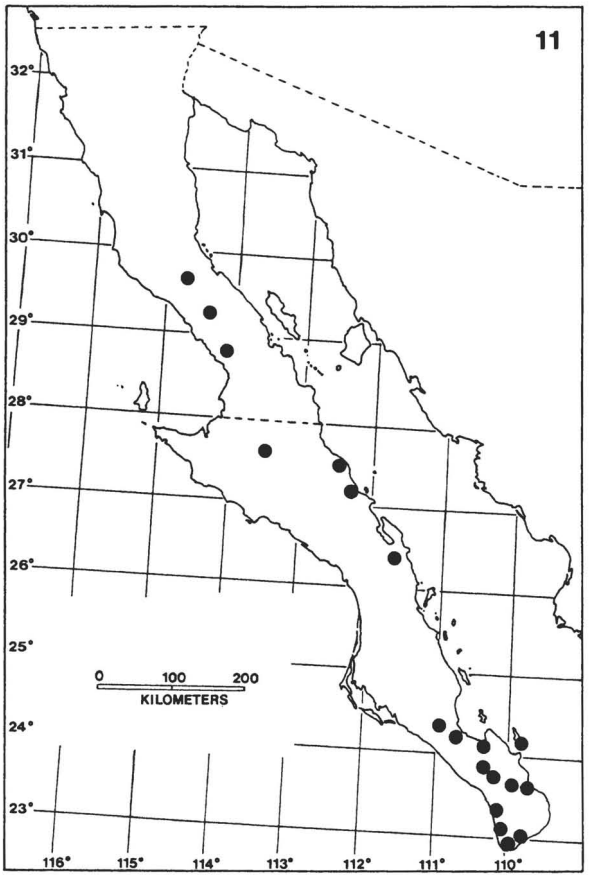

**8.** Distribution of *Sphinx libocedrus* (open circles) and *S. perelegans* (closed circles).



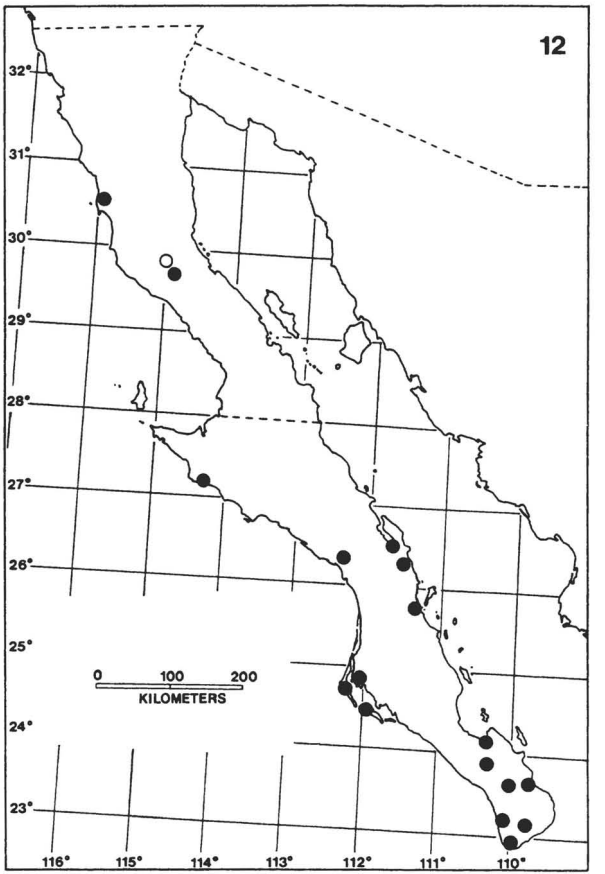

**9.** Distribution of *Sphinx sequoiae* (open circles) and *Smerinthus cerisyi* (closed circles).



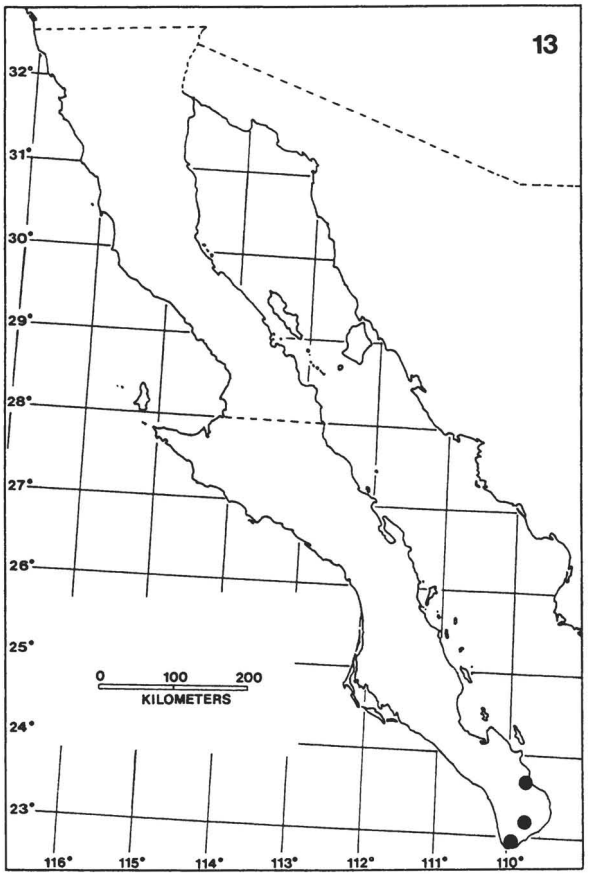

**10.** Distribution of *Pachysphinx occidentalis.*



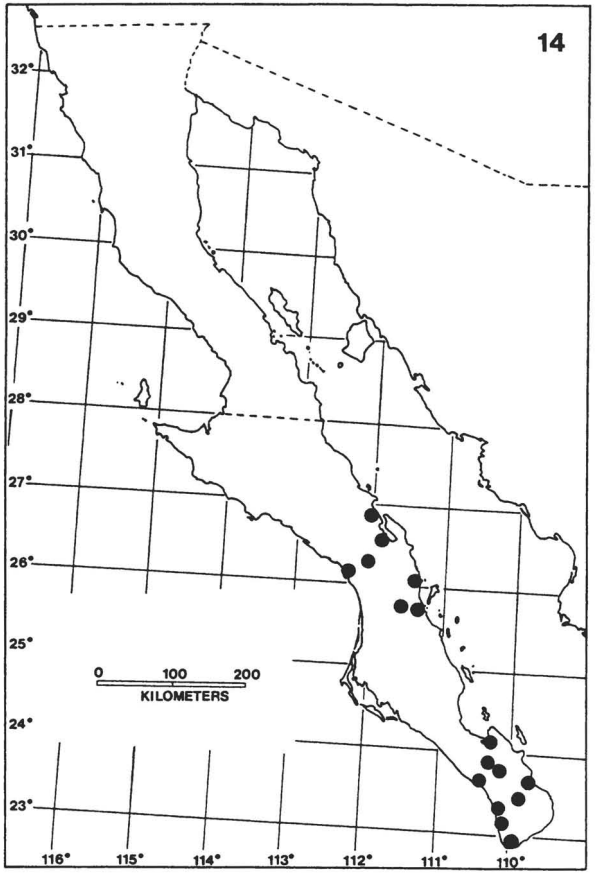

**11.** Distribution of *Erinnyis ello.*



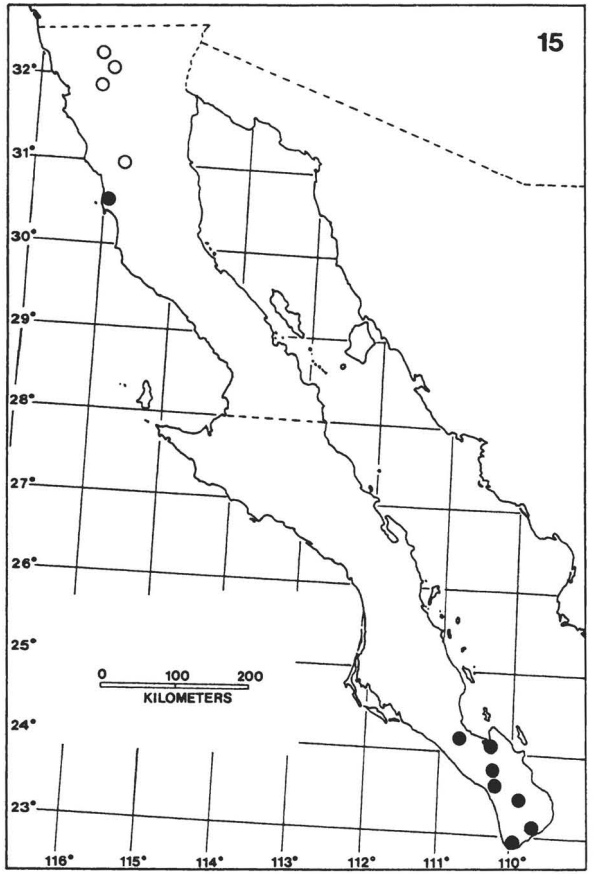

**12.** Distribution of *Erinnyis crameri* (open circles) and *E. obscura* (closed circles).



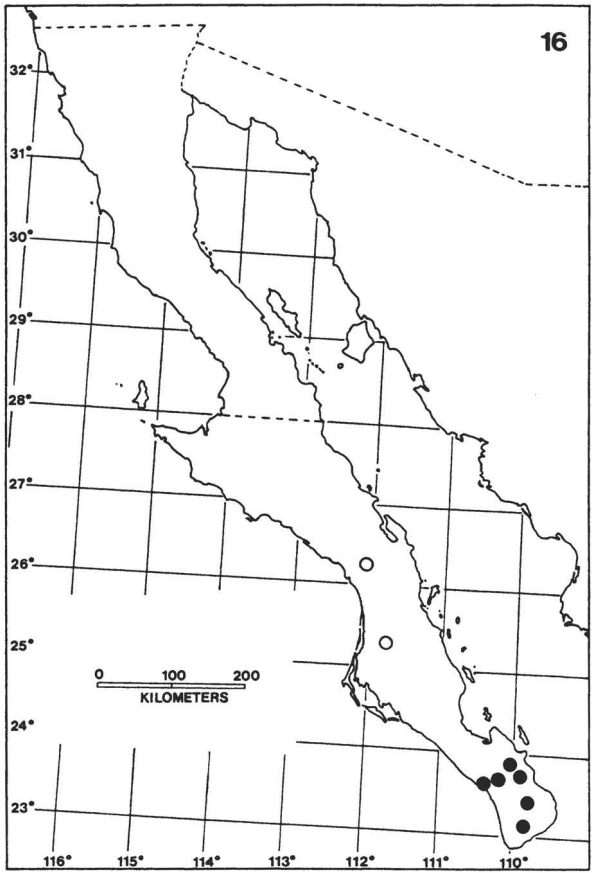

13. Distribution of *Pachylia syces*.



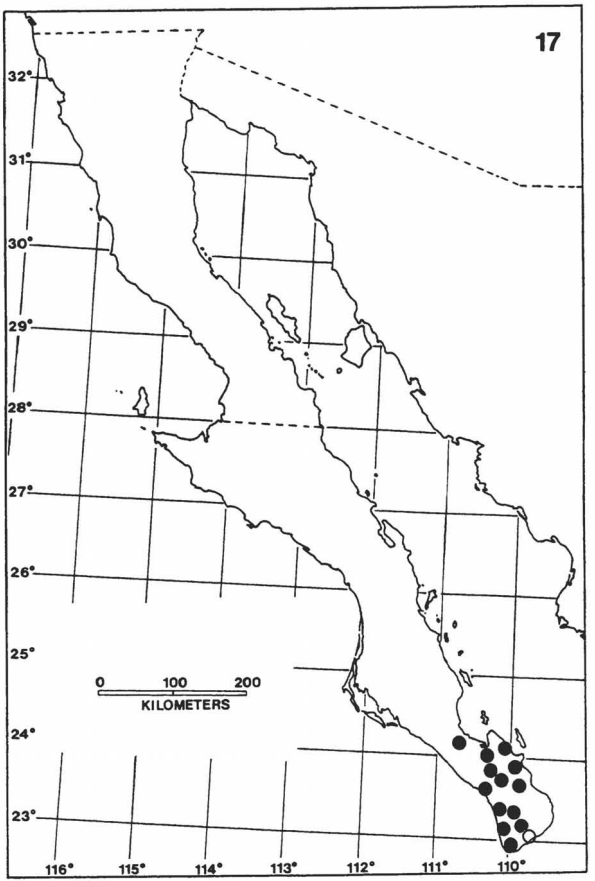

14. Distribution of *Callionima falcifera*.



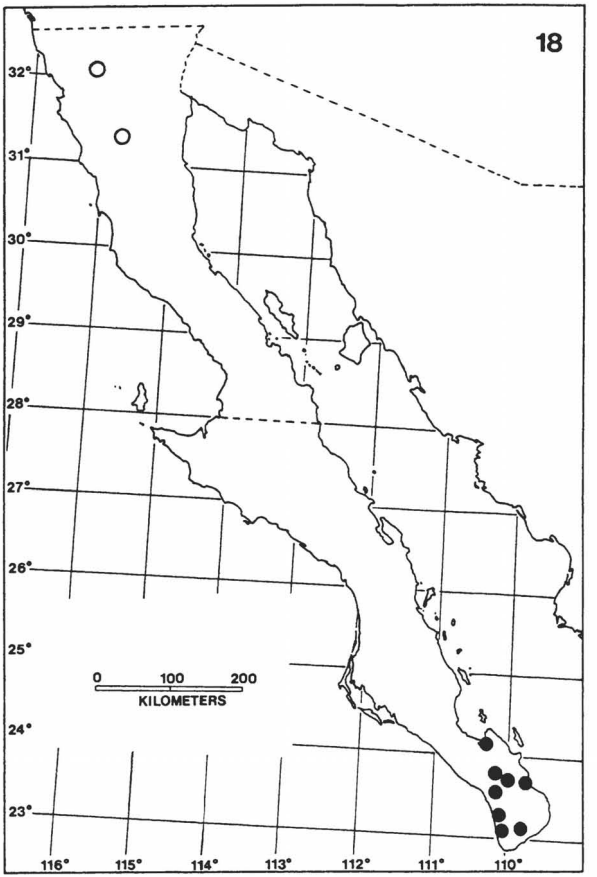

**15.** Distribution of *Aellopos clavipes* (closed circles) and *Hemaris diffinis* (open circles).



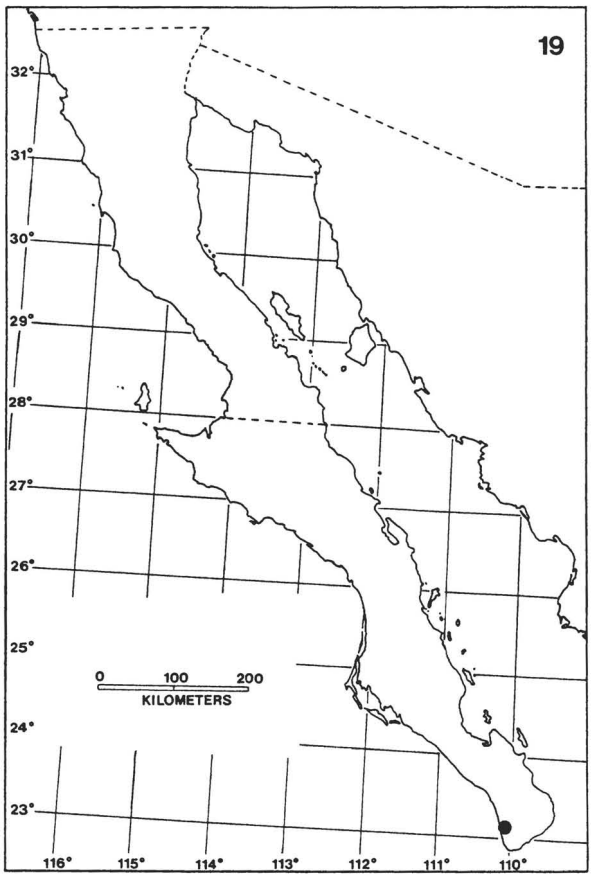

**16.** Distribution of *Eumorpha satellitia* (closed circles) and *E. achemon* (open circles).



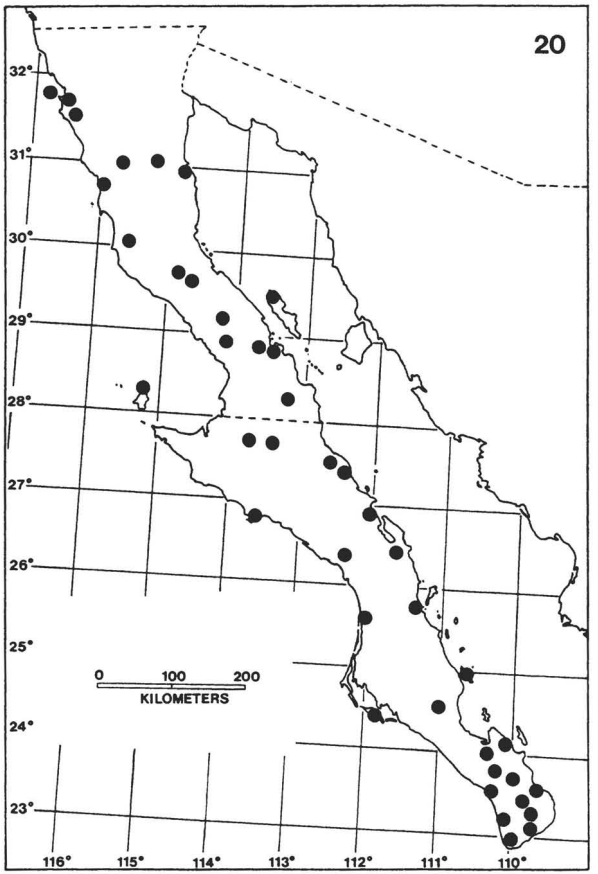

**17.** Distribution of *Eumorpha vitis* (closed circles) and *E. fasciata* (open circles).



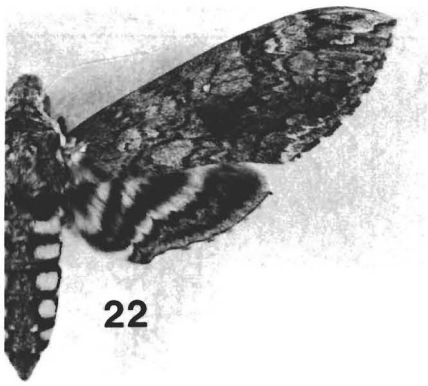

**18.** Distribution of *Euproserpinus phaeton* (open circles) and *Xylophanes tersa* (closed circles).

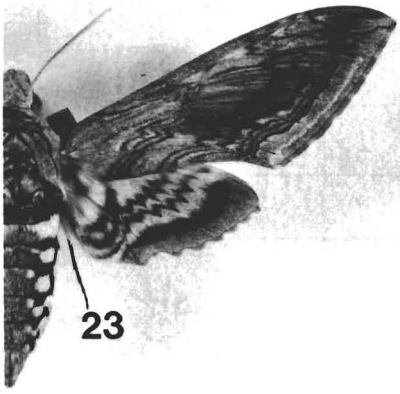


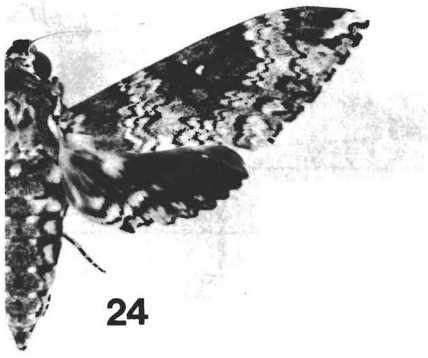

**19.** Distribution of *Xylophanes pluto*.



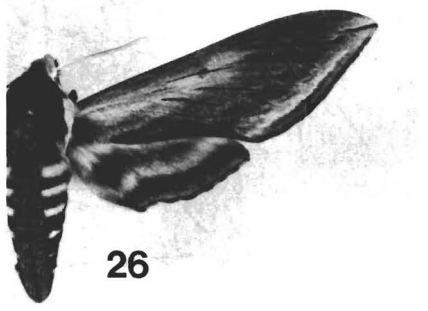

**20.** Distribution of *Hyles lineata*.

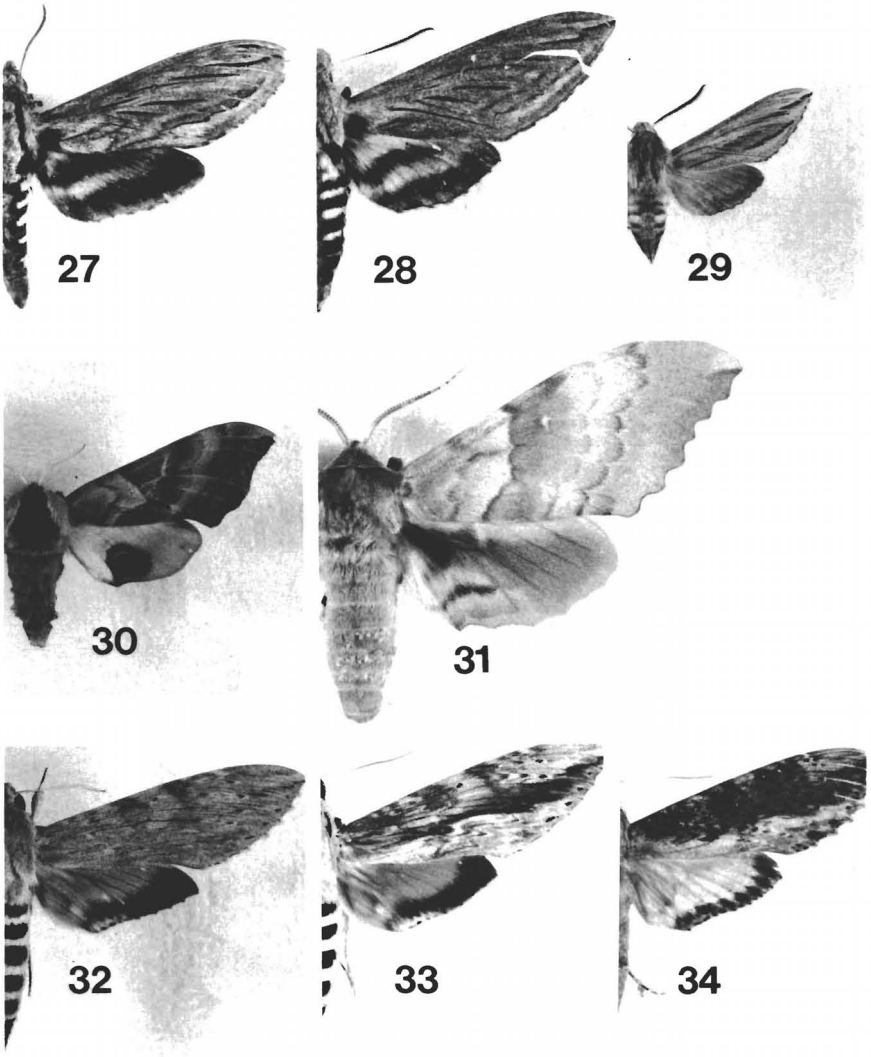





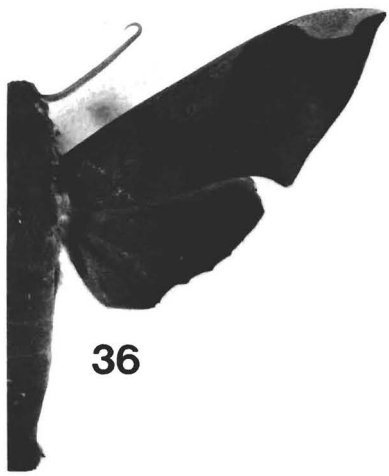


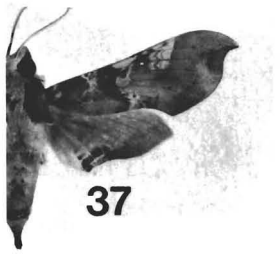

FIGS. 21–26. **21,** *Agrius cingulatus.* **22,** *Manduca sexta.* **23,** *Manduca quinquemaculata.* **24,** *Manduca rustica.* **25,** *Sphinx xantus.* **26,** *Sphinx perelegans.*



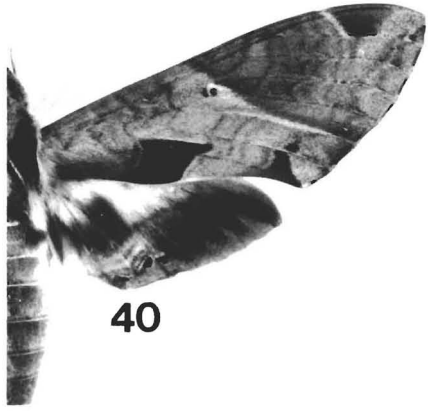

FIGS. 27–34. **27,** *Sphinx libocedrus.* **28,** *Sphinx chersis.* **29,** *Sphinx sequoiae.* **30,** *Smerinthus cerisyi.* **31,** *Pachysphinx occidentalis.* **32,** *Erinnyis ello* (male). **33,** *Erinnyis ello* (female). **34,** *Erinnyis crameri.*

lection of Carlos C. Hoffmann, a reference which subsequently has been repeated, without examination of the material, by Hoffmann (1942), Hodges (1971), and Schreiber (1978), for the former species, and by Hoffmann (1942) for the latter. Hodges (pers. comm.) indicates that he has not examined specimens from this area. Both Hodges' and

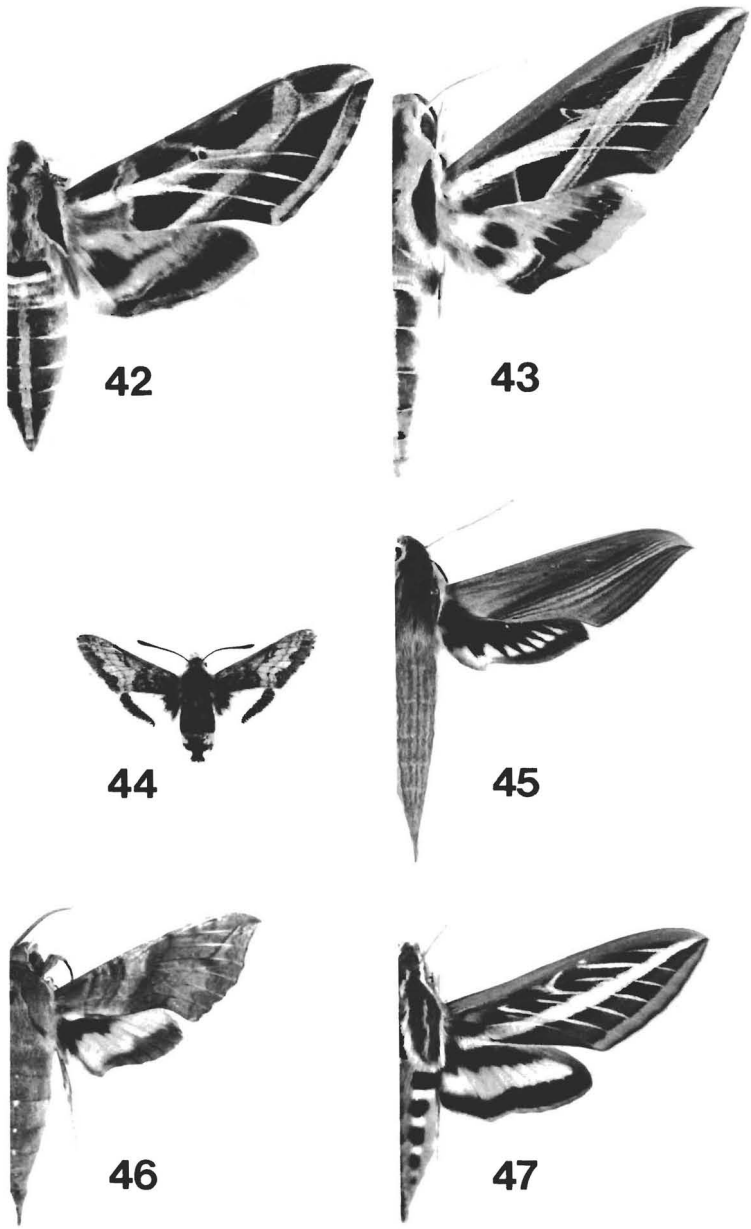







FIGS. 35–41. **35,** *Erinnyis obscura.* **36,** *Pachylia syces.* **37,** *Callionima falcifera* (female). **38,** *Aellopos clavipes.* **39,** *Hemaris diffinis.* **40,** *Eumorpha satellitia.* **41,** *Eumorpha achemon.*




FIGS. 42–47. **42,** *Eumorpha vitis*. **43,** *Eumorpha fasciata*. **44,** *Euproserpinus phaeton*. **45,** *Xylophanes tersa*. **46,** *Xylophanes pluto*. **47,** *Hyles lineata*.

Schreiber's citations presumably are based on Mooser's and/or Hoffmann's records. There is no apparent reason why either of these species should be absent from the northern chaparral or montane regions; both have been taken to the immediate north in San Diego County, California.

The Neotropical sphingid fauna of the Cape Region at the southern end of the peninsula is exceedingly depauperate compared with that of the Mexican mainland. Species recorded from Sinaloa and Sonora that eventually may be discovered in this region include *Sphinx merops* Boisduval, *Erinnyis yucatana* (Druce), *Pachylia ficus* (Linnaeus), *Cautethia spuria* (Boisduval), *Eumorpha labruscae* (Linnaeus), and *Xylophanes falco* (Walker). In addition, J. Cadiou (pers. comm.) has suggested that the following widely ranging Neotropical species may eventually be documented from the peninsula: *Erinnyis alope* (Drury), *E. domingonis*, *Enyo lugubris* (Linnaeus), and *Pseudosphinx tetrio* (Linnaeus).

## ACKNOWLEDGMENTS

We acknowledge with thanks the assistance of the following individuals whose cooperation permitted the use of specimens in their care (the following abbreviations are used in the text to indicate disposition of specimens examined): F. Rindge, American Museum of Natural History (AMNH), New York; P. Arnaud, Jr., California Academy of Sciences (CAS), San Francisco; W. Clark, College of Idaho (CI), Caldwell; J. Rawlins, Carnegie Museum of Natural History (CMNH), Pittsburgh, Pennsylvania; E. Sleeper, California State University, Long Beach (CSULB); C. Hogue, Los Angeles County Museum of Natural History (LACM); E. and D. Hawks, San Diego, California (now LACM); J.-M. Cadiou (JC) personal collection, Saint Cloud, France; J. McBurney (JM) personal collection (now LACM), Anaheim, California; R. Wells (RW) personal collection, Jackson, California; D. Faulkner, San Diego Natural History Museum (SDNHM), San Diego, California; J. Powell, Essig Museum of Entomology (UCB), University of California, Berkeley; R. Schuster, Bohart Museum of Entomology (UCD), University of California, Davis. Duplicate specimens from the LACM collection are being deposited in the Instituto de Biología, Universidad Nacional Autónoma de México, D. F., México.

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