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Baja California, with Descriptions of New  
Species (Lepidoptera, Geometridae)





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## Distributional Notes on Some Ennominae from Baja California, with Descriptions of New Species (Lepidoptera, Geometridae)

FREDERICK H. RINDGE<sup>1</sup>

### ABSTRACT

A summary is given of our current knowledge of the Semiothisini, Glaucinini, and Boarmiini of the peninsula of Baja California, Mexico. The members of these three tribes are among the most commonly collected geometrids of the subfamily Ennominae caught on the peninsula, comprising about half the genera and half the species now known. The Semiothisini and Glaucinini have species that tend to be widely distributed in Baja California, and to have relatively few endemic taxa; the Boarmiini, on the other hand,

tend to be more localized in their distribution, with a much higher percentage of endemic species. In all three tribes, the great majority of species have their closest relationships with the fauna of California and the Sonoran Desert of the United States.

The following new species are described (all are from Baja California unless otherwise specified): *Semiothisa piccoloi*, *Semiothisa baegerti*, *Hemimorina angulosa*, *Glaucina semidura*, *Pterotaea expallida* (Sonora), and *Pterotaea spinigera*.

### INTRODUCTION

The Lepidoptera of the peninsula of Baja California are relatively poorly known. It was less than 30 years ago that the first attempt was made to give a comprehensive listing of the butterflies (Rindge, 1948). Most moth families from that area have not been studied in detail. In recent years, however, more collecting has been done, and there is more material available to study as well as a greater interest in the varied fauna of that area. This was emphasized by the symposium on the Lepidoptera of Baja California at the twenty-fifth annual meeting of the Lepidopterists' Society at the Natural History

Museum of Los Angeles County on August 23, 1974. As an invited speaker, my topic concerned the moths of the subfamily Ennominae (Geometridae). The present paper is an amplification of that talk, and it includes the descriptions of several new species mentioned in my presentation.

Faunal papers on the geometrids of Baja California are few in number and limited in scope. Included in this category are those by Wright (1923) and Rindge (1969, 1973b). I do not intend to make use of faunal papers herein. For many years I have been studying the Ennominae

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of the New World, as I am primarily concerned with the North American fauna. These studies have resulted in a number of generic and tribal revisions. Whenever possible, I have included whatever material was available from Baja California. Some of these papers are cited below.

In North America north of Mexico, there are from 1200 to 1300 species of Geometridae. The members of the subfamily Ennominae number about half of the family, or about 650 species; they are contained in approximately 125 genera. Thus, the number of species in this one subfamily alone is roughly equal to the total number of species of all the true butterflies and skippers in the same geographic area. In Baja California, to date, I have been able to name more than 100 species; five new species (plus one from Sonora) are described in the present paper. There are at least another dozen species that have not yet been identified; additional specimens and revisionary studies are needed before these can be named. This makes approximately 125 Ennominae, or about one-fifth of the number of species found in the United States and Canada. On the generic level, some 40 genera are represented, with several more being needed for the presently unidentified species; this is about one-third the number of genera found to the north. Both these figures are quite remarkable when you compare the size and habitats of the Ennominae of Baja California with those of the United States and Canada.

The Ennominae have been quite successful in adapting to desert conditions. In the Great Basin and the Sonoran Desert of the United States, as well as in Baja California, the majority of species and genera found in arid situations belong to three tribes, namely the Semiothisini, Glaucinini, and Boarmiini. As far as the number of individual specimens goes, the largest percentage of ennomines from Baja California that I have examined belong in *Semiothisa* and *Glaucina*. As the majority of specimens belong to the above three tribes, I briefly summarize our knowledge of them below.

The members of these three tribes comprise about half the genera and half the species found on the peninsula. I am purposely restricting my coverage of the Ennominae to these groups because they are the ones with which I am most familiar. The Semiothisini and Glaucinini have

species that tend to be widely distributed on the peninsula, and to have relatively few endemic taxa (see tables 1 and 2). The Boarmiini, on the other hand, tend to be more localized in their distribution, with a much higher percentage of endemic species, and without any taxa being known from both parts of the peninsula (see table 3). In all three groups, the great majority of species have their closest relationships with those of California and the Sonoran Desert of the United States, with relatively few apparently having their closest relatives on mainland Mexico.

In this paper I use the following geographic names for the two major political divisions of the peninsula. Some of the specimens studied were collected when the entire area was a territory, divided at latitude 28° N into Baja California Norte and Baja California Sur. In 1952 the former became the State of Baja California, and the southern part remained a federal territory (Territorio Sur de Baja California). In 1974 the latter was granted statehood; at the time of this writing, an official name for the new state has not been chosen. My references will be to the State and to the Territory, as defined above, even though this terminology is not correct. Older specimens, labeled as being from Baja California Norte, are listed under the State; anything from south of latitude 28° N, as from the Territory.

The following abbreviations have been used:

AMNH, the American Museum of Natural History

CAS, the California Academy of Sciences, San Francisco

#### ACKNOWLEDGMENTS

The information contained herein has been accumulated over many years with the help and cooperation of many individuals. The majority of specimens that I have studied from Baja California are in the California Academy of Sciences, lent by Dr. P. H. Arnaud, Jr., and in the American Museum of Natural History. I have also studied the Cary-Carnegie Museum Expedition material in the Carnegie Museum, lent by Mr. H. P. Clench, and that of the Belvedere Expedition, in the San Diego Natural History Museum, lent by Mr. C. F. Harbison. Mr. R. Holland of



Albuquerque, New Mexico, has generously donated specimens to the American Museum of Natural History. I thank all those mentioned above and the others who have helped me.

SEMIOTHISINI

The Semiothisini form a very large tribe found throughout much or most of the world, especially in temperate and tropical regions. No one has as yet attempted a revision of this group from the New World, except for McGuffin's work (1972) on the relatively small Canadian fauna. This tribe contains approximately 150 species in North America, north of Mexico; of these, more than 125 belong to two large genera, *Semiothisa* and *Itame*. In Baja California, 28 species are assigned to this tribe; they are placed in seven genera with 19 of the species belonging in the genus *Semiothisa* (see table 1). Twenty-four species of this tribe are found on the Sonoran Desert portion of the peninsula, with four showing relationships to the fauna of the Mexican mainland. It would thus appear that the bulk of the Semiothisini in Baja California are of a northern origin.

Three new species are described below. Two of them are endemics, as far as I know, with one occurring in the Territory only (*Semiothisa baegerti*), and the other (*Hemimorina angulosa*) being known from both parts of the peninsula. At least two other unnamed species occur in the southern end of the peninsula; additional material is needed before they can be named.

Approximately 40 percent of the species are found on all or most of the length of the peninsula; this widely ranging distribution is also true for many of these moths in the desert areas of the United States. This presumably indicates good dispersal ability by the adults, and the use of either widespread or a variety of foodplants. We know very little about the early stages of these moths.

Semiothisa piccoloi, new species  
Figures 1, 7, 8, 15

*Semiothisa* sp.: Rindge, 1969, p. 33; 1973b, p. 130.

*Diagnosis.* This species is related to *Semiothisa nigricomma* Warren. The present species can be

TABLE 1  
Semiothisini of Baja California

Genera	Species <sup>a</sup>		Distribution on Peninsula		
			State	Terri- tory	Both parts
<i>Chloraspilates</i>	1	0	0	0	1
<i>Elpiste</i>	2	0	2	0	0
<i>Fernaldella</i>	1	0	0	0	1
<i>Hemimorina</i>	1	1	0	0	1
<i>Itame</i>	3	0	2	0	1
<i>Semiothisa</i>	19	1	7	4	8
<i>Protitame</i>	1	0	1	0	0

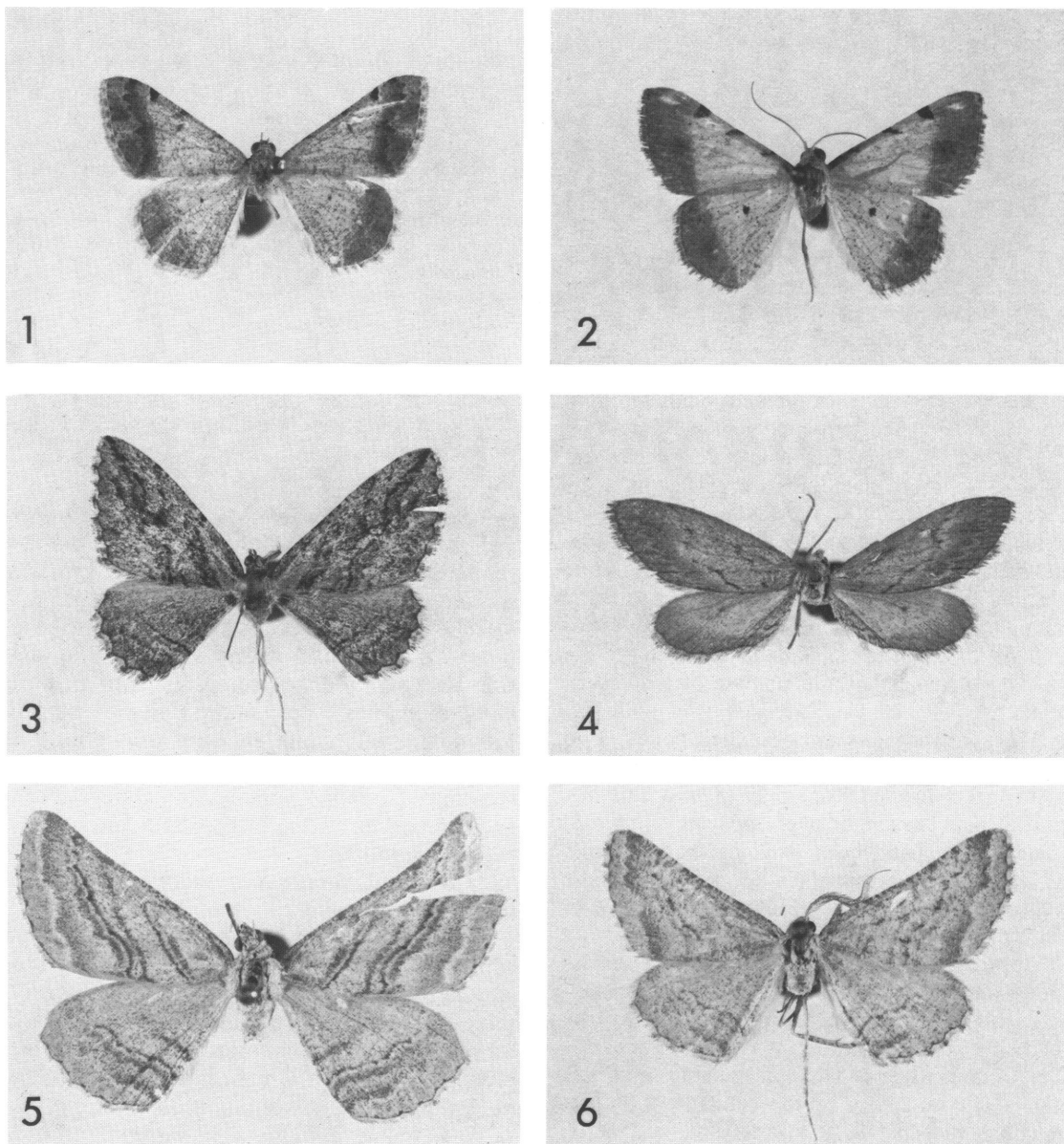
<sup>a</sup>These figures include the species described in the present paper.

recognized by the paler color of both the upper and under surfaces of the wings, and by the genitalia. In the male, the valves of *piccoloi* are shorter than those of *nigricomma*, and the sacculus in the new species has a curved spinelike process not found in Warren's species. The ventral plate of *piccoloi*, compared with that of *nigricomma*, has a deep, more U-shaped median indentation and a smaller, more slender process on the right side. In the female genitalia the sterigma of *piccoloi* is more strongly developed and the ventral surface of the last segment is less heavily sclerotized.

*Male.* Head, thorax, and abdomen similar to those of *nigricomma*.

*Upper Surface of Wings:* Forewings grayish white, basal two-thirds lightly marked with grayish brown scales, outer third of wings heavily suffused with dark grayish brown and dark brown scales, forming broad dark band most prominent basad of s. t. line; cross lines absent except for blackish brown spots on costa, and for weak s. t. line; terminal area variably suffused with brown; terminal line of small black intravenular dots; fringe white basally, broadly grayish brown opposite veins, becoming narrowly gray distally. Hind wings slightly paler than forewings, with outer portion broadly dark gray; maculation absent except for tiny discal dot; terminal line obsolescent; fringe similar to that of forewing.

*Under Surface of Wings:* Slightly paler than upper surface, with scattered dark grayish brown



FIGS. 1-6. Adults. 1. *Semiothisa piccoloi*, new species, holotype male, El Coyote, Baja California Sur, April 12, 1972 (R. W. Holland; AMNH). 2. *S. baegerti*, new species, holotype male, 7 miles N Santa Anita, Baja California Sur, January 7, 1959 (H. B. Leech; CAS). 3. *Hemimorina angulosa*, new species, holotype male, 5 miles E San Agustín, Baja California, November 15, 1967 (D. Patterson; CAS). 4. *Glaucina semidura*, new species, paratype female, San[to] Domingo, Baja California, October 23, 1941 (Ross and Bohart; CAS). 5. *Pterotaea expallida*, new species, holotype male, La Cholla, Sonora, March 9, 1930 (AMNH). 6. *P. spinigera*, new species, holotype male, 7 miles NNW Rosarito, Baja California, April 8, 1961 (A. Smith; CAS). All  $\times 2.1$ .



scales; outer third of all wings broadly dark gray; maculation absent except for discal dots.

Length of Forewing: 10 to 12 mm.; holotype 11 mm.

*Female.* Similar to male but with outer third of wings tending to be slightly less contrasting in color.

Length of Forewing: 11 to 12 mm.; allotype 11.5 mm.

*Male Genitalia.* Similar to those of *nigricomma*, differing mainly as follows: uncus slightly narrower at base; valve with costa straighter, more posteriorly directed; anterior lobe of valve shorter, with small distal projection, right lobe with prominent, anterior, curved saccular spinelike projection and two posterior projections, left lobe without anterior projection but with more convex anterior margin; aedeagus shorter, broader, posteriorly more curved. Ventral plate with deeper, narrower cleft with shorter weakly capitate arm on left side, right side with narrower, more pointed process.

*Female Genitalia.* Similar to those of *nigricomma*, differing mainly as follows: sterigma with less heavily sclerotized lamella antevaginalis, more circular in outline around ductus bursae, and with posterior points more rounded; lamella postvaginalis with two larger and more rounded lobes; ductus bursae narrower, with shorter sclerotized neck; corpus bursae with posterior portion more slender.

*Types.* Holotype, male, El Coyote, Baja California Sur, Mexico, April 12, 1972 (R. W. Holland); allotype, female, Hotel Mulege, Mulege, Baja California Sur, Mexico, April 9, 1972 (R. W. Holland). The genitalia of the holotype are on slide FHR 17053, and of the allotype on 17196. Paratypes: *Baja California Sur*: same data as holotype, two males; same data as allotype, two males, two females; Guayacura Hotel grounds, La Paz, November 5, 1961 (Cary-Carnegie Expedition), one male, one female; Arroyo San Bartolo, November 13, 1961 (Cary-Carnegie Expedition), one female; San Bartolo, elevation 700 feet, March 14, 1974 (R. W. Holland), one male, two females; 3 miles southwest of Mission San Javier, December 14, 1958 (H. B. Leech), one female; San Venancio, October 8, 1941 (Ross and Bohart), one male; Todos Santos, October 10, 1941 (Ross and

Bohart), one male, March 19-20, 1974 (R. W. Holland), one female; Agua Caliente, cape region, October 16, 1941 (Ross and Bohart), one female; Boca de La Sierra, near Miraflores, elevation 1000 feet, March 15, 1974 (R. W. Holland), one female; 7 miles north of Santa Anita on Highway Sur No. 19, January 7, 1959 (H. B. Leech), one female; 10 miles southwest of Canipole, August 28, 1959 (K. W. Radford and F. G. Werner), one male. *State of Baja California*: 7 miles north northwest of Rosarito, April 8, 1961 (A. Smith), one male; Mezquital, August 25, 1959 (K. W. Radford and F. G. Werner), one male. *Arizona*: Madera Canyon, Santa Rita Mountains, September 5, 1956, one male; Laguna Mountains, Yuma County, January 20, 1949 (D. L. Bauer), one male.

The holotype and allotype are in the collection of the American Museum of Natural History; paratypes are in the collections of that institution and of the California Academy of Sciences.

*Remarks.* Warren described *nigricomma* from Guadalajara, Jalisco. Specimens are before me from Oaxaca, Guerrero, Sinaloa, and Sonora, Mexico. Material from southern Texas may or may not be conspecific; there appear to be some consistent genitalic differences between these two populations, although they are not too obvious at first glance. The present species is easily mistaken for *nigricomma*, until the genitalia are studied.

*Etymology.* This species is named after Father Francisco María Píccolo, S. J. (1654-1729), one of the outstanding pioneer missionaries and explorers of California. He was born in Palermo, Sicily, and so I have used the Italian spelling of his name, rather than the modified Spanish orthography of Pícolo. Father Píccolo served on the peninsula from 1697 until his death.

#### *Semiothisa baegerti*, new species

Figures 2, 9, 10, 16

*Semiothisa* sp.: Rindge, 1969, p. 34.

*Diagnosis.* This species has the outer third of the wings reddish brown, compared with the dark grayish brown of *piccoloi*. The genitalia of both sexes are quite distinct, with the male having a much shorter anterior lobe of the valve and a strong tooth on each side of the cleft of

the ventral plate; the female has the seventh sternite broadly sclerotized.

*Male.* Head with vertex pale gray; front and palpi dull reddish brown, with latter short, scarcely exceeding front; antennae ciliate. Thorax above pale gray to gray; below whitish gray; legs whitish gray, with variable number of scattered dark brown scales, and with outer surface of forelegs pale brown. Abdomen pale gray with some faintly grayish brown scaling; below pale gray.

Upper Surface of Wings: Forewings with basal two-thirds pale gray, weakly suffused with faintly ochreous brown, outer third of wing solidly reddish brown; cross lines absent but marked on costa by blackish brown spots; discal dot and terminal line absent; fringe slightly grayer than wing. Hind wings concolorous with forewings, pale basally and broadly reddish brown distally; maculation absent except for black discal spot and for scattered black scales.

Under Surface of Wings: Basal portion of all wings paler than above, with scattered dark brown scales; outer third of wings broadly ochreous brown, with partial band or areas of dark brown scales basally; maculation absent except for traces of discal dots, sometimes absent on forewings, and of cross lines on costa of forewings.

Length of Forewing: 9 to 10 mm.; holotype, 9.5 mm.

*Female.* Similar to male but tending to have slightly more scattered dark scaling above and below.

Length of Forewing: 10 to 11 mm.; allotype, 10.5 mm.

*Male Genitalia.* Uncus relatively short and broad, narrowed medially and distally with parallel sides, apex broad, concave medially, with small apical spine; gnathos with triangular median enlargement having concave sides; valve with costal arm broadly sclerotized, posteriorly directed, costa S-shaped, apex pointed with ventral protuberance from outer margin opposite gnathos; anterior lobe of valve small, scarcely extending beyond costal arm, bluntly rounded

apically, and with weak median spinose ridge; aedeagus straight, posteriorly sclerotized on right side, having one elongate spinose projection and with or without second much smaller, more distal projection. Ventral plate deeply cleft, well sclerotized, both sides extending past end of abdomen as slender, tapering points and each having an elongate ventrolateral spinelike arm, each side having finely setose dorsal median ridge extending to base and then curved dorsally, becoming more heavily setose.

*Female Genitalia.* Sterigma with very large lamella antevaginalis, broadly sclerotized over most of seventh sternite, anteriorly with several narrow transverse ridges, then large, broad, smoothly sclerotized area with curved ventral ridge, curving dorsally and becoming finely denticulate, roughly S-shape in profile, extending to posterior end of lamella postvaginalis; latter somewhat rectangular, with posterior ends rounded, and with median projection thickened laterally; ductus bursae broad, with width about four times greater than length, pointed distally, posterior margin strongly concave medially; corpus bursae elongate, with slender, long posterior necklike section being longer than slightly swollen anterior section; signum absent.

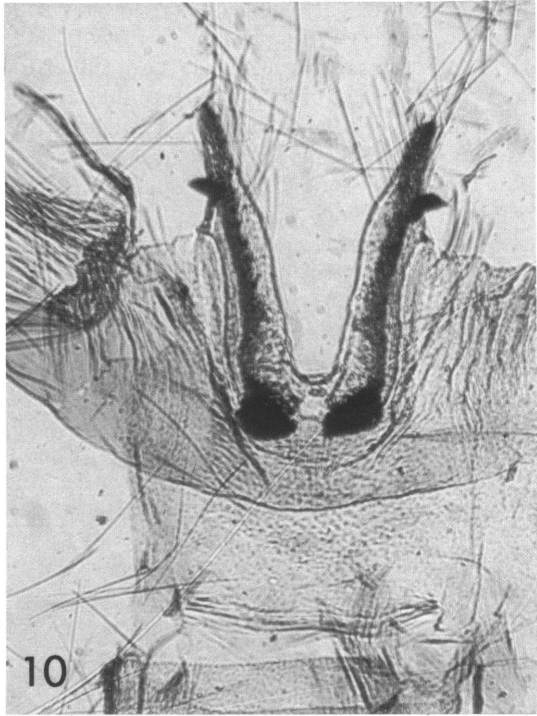
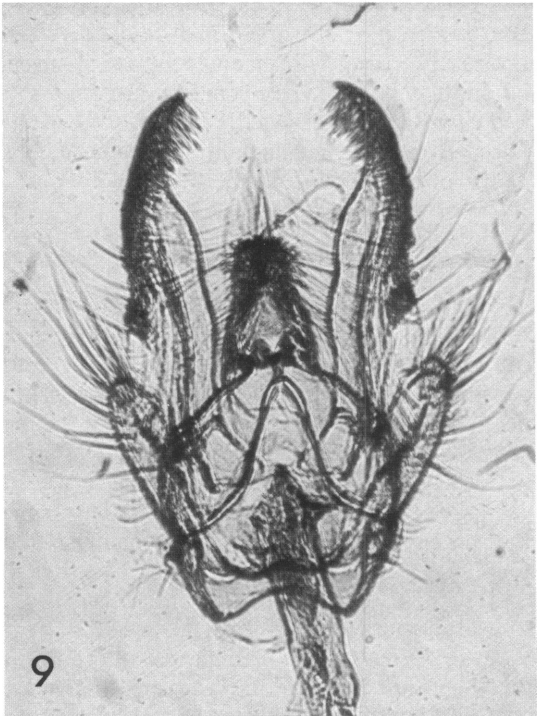
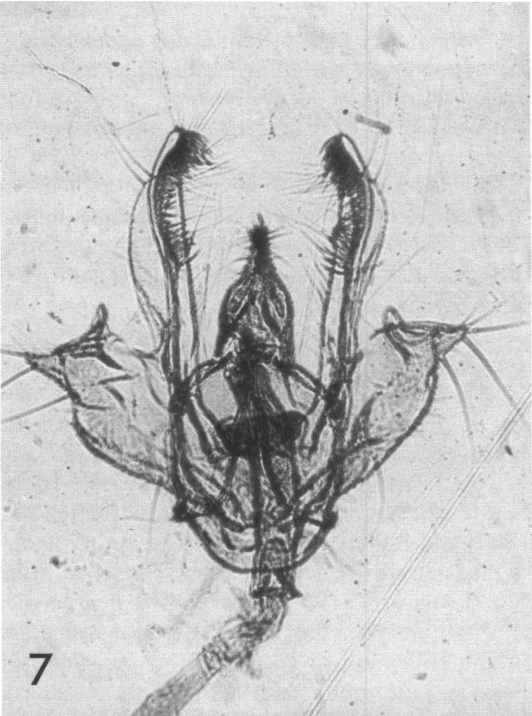
*Types.* Holotype, male, and allotype, female, 7 miles north of Santa Anita, on Highway Sur No. 19, Baja California Sur, Mexico, January 7, 1959 (H. B. Leech). The genitalia of the holotype are mounted on slide FHR 17267, and of the allotype on 16907. Paratypes, all from Baja California Sur: same data as types, two males, five females; 0.5 miles north of Miraflores, January 6, 1959 (H. B. Leech), one female; Boca de La Sierra, near Miraflores, elevation 1000 feet, March 15, 1974 (R. W. Holland), one female; San José del Cabo, November 17, 1961 (Cary-Carnegie Expedition), one female.

The holotype and allotype are in the collection of the California Academy of Sciences; paratypes are in the collections of that institution and of the American Museum of Natural History.

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FIGS. 7-10. Male genitalia and ventral plates of *Semiothisa*. 7, 8. *S. piccoloi*, new species, holotype, El Coyote, Baja California Sur, April 12, 1972 (R. W. Holland; AMNH). 7. Genitalia. 8. Ventral plate. 9, 10. *S. baegerti*, new species, holotype, 7 miles N Santa Anita, Baja California Sur, January 7, 1959 (H. B. Leech; CAS). 9. Genitalia. 10. Ventral plate.





*Remarks:* The exact placement of this distinctive species will have to await a revisionary study of the genus.

*Etymology:* This species is named after Father Johann Jakob Baegert, S. J. (1717-1772), one of the early missionaries of the southern part of the peninsula. Father Baegert, an Alsatian, served in California from 1751 to 1768.

**Hemimorina angulosa, new species**

Figures 3, 11, 17

*Diagnosis.* This species can be separated from *Hemimorina dissociata* McDunnough by the more angulate t. p. line on the upper surface of the forewings; this line, as well as the t. a. line, is not heavily and contrastingly bordered by black scaling, and thus the forewings are more unicolorous.

*Male.* Head, thorax, and abdomen similar to those of *dissociata*; palpi longer, with third segment decumbent; antennal pectinations of equal length on both sides of shaft (in *dissociata*, pectinations on one side are one-fourth longer than on other).

Upper Surface of Wings: Gray, heavily and evenly covered with dark grayish brown and black scales; cross lines black, slender, similar to those of *dissociata* but with t. p. line more angulate, and neither t. a. nor t. p. lines with wide, prominent shade bands, instead with slight concentration of dark scales; terminal line black, complete; fringe concolorous with wing, paler at vein endings. Hind wings concolorous with forewings, paler anteriorly; extradiscal line incomplete anteriorly; terminal line and fringe similar to those of forewings.

Under Surface of Wings: Forewings pale gray, of hind wings whitish gray, both with scattered dark scales and without maculation except for faint trace of discal spot on hind wings; terminal line present, weakly represented on forewings; fringe white, narrowly grayish black at vein endings and distally.

Length of Forewing: 12 mm. (holotype).

*Female.* Similar to male, but with both surfaces of wings tending to be somewhat more heavily covered with dark scales.

Length of Forewing: 12 to 14 mm.; allotype, 13 mm.

*Male Genitalia.* Similar to those of *dissociata*,

differing mainly as follows: uncus with more truncate apex, lateral points not strongly produced; gnathos with longer median projection; valve with costal arm straighter, anterior lobe with much wider base; aedeagus not enlarged or sclerotized apically.

*Female Genitalia.* Similar to those of *dissociata*, differing mainly as follows: corpus bursae longer, 5.1 to 5.2 mm. in length (compared with 3.8 to 4.6 mm. in *dissociata*); signum less strongly spinose.

*Types.* Holotype, male, and allotype, female, 5 miles east of San Agustín ["St. Augustine" on label], State of Baja California, Mexico, November 15, 1967 (D. Patterson). The genitalia of the holotype are mounted on slide FHR 15615, and of the allotype on 17190. Paratypes: Todos Santos, Baja California Sur, October 10, 1941 (Ross and Bohart), one female; San Pedro, about 4 miles south of Todos Santos, Baja California Sur, January 13, 1959 (H. B. Leech), one female.

The holotype, allotype, and one paratype are in the collection of the California Academy of Sciences; the other paratype is in the American Museum of Natural History.

*Remarks.* The two paratypes from the Todos Santos area have the upper surface of the wings noticeably paler, with more contrasting maculation, than do the types from San Agustín.

*Etymology.* The specific name is from the Latin *angulosis*, angular, in reference to the course of the t. p. line.

**GLAUCININI**

The Glaucinini is a tribe I named, defined, and revised in 1959. It is much smaller than the Semi-othisini, containing only 41 species in four genera. The members of this tribe have not developed really distinctive color, pattern, or genitalic characters. As a result, specific determinations are difficult in most cases. The use of genitalia is usually required to accurately name the species; these structures have been illustrated for all the known species.

The Glaucinini are found from central Texas to coastal southern California, north in the Great Basin to Wyoming and Washington, and south to the vicinity of Mexico City. The area of greatest concentration of both species and specimens is in the Sonoran Desert. When I revised the tribe in



TABLE 2  
Glaucinini of Baja California

Genera	Species <sup>a</sup>		Distribution on Peninsula		
	Described	Endemic	State	Terri- tory	Both parts
<i>Eubarnesia</i>	1	0	0	0	1
<i>Glaucina</i>	10	2	4	2	4
<i>Paraglaucina</i>	1	0	1	0	0
<i>Synglochis</i>	1	0	0	0	1

<sup>a</sup>These figures include the species described in the present paper.

1959, only nine species were known to me from Baja California, and all of these were from the State. Today 13 species are known to occur on the peninsula, with one being described in the present paper (see table 2). Of the endemic species, one occurs in the southern part of the State (*Glaucina semidura*, described below); the other (*G. ugartei* Rindge) is known only from Isla San José in the Gulf of California. Of the 13 described species, two or three may have originally come from Mexico; the remainder are from either coastal California or the Sonoran Desert.

About half the species are found on most of the length of the peninsula, as they are much more wider ranging than previously known. This is a slightly higher percentage than is found in the preceding tribe. Once again, this presumably indicates good dispersal ability by the adults and the use of either widespread or a variety of food-plants. Unfortunately, our knowledge of the early stages of this tribe is practically nil.

#### *Glaucina semidura*, new species

Figures 4, 12, 18

*Glaucina abdominalis* Grossbeck (?): Wright, 1923, p. 114 (*partim*).

**Diagnosis.** This species is allied to *Glaucina ochrofuscaria* (Grote), and can be distinguished by its genitalia. The male structures of the present species have a differently shaped sacculus arm and a more heavily sclerotized, angulate strip in the vesica with more prominent teeth. The female genitalia have a shorter ductus bursae, and the posterior portion of the ductus bursae is sclerotized on the left side only.

**Male.** Head, thorax, and abdomen similar to those of *ochrofuscaria*. Upper surface of forewings similar to that of *ochrofuscaria* but slightly more heavily suffused with dark brown scales, and with posterior portion of t. p. line tending to be somewhat more angulate. Hind wings, and under surface of all wings, similar to those of *ochrofuscaria*.

Length of Forewing: 11 mm. (holotype).

**Female.** Similar to male; forewings above tending to be slightly more grayish, with maculation slightly more distinct.

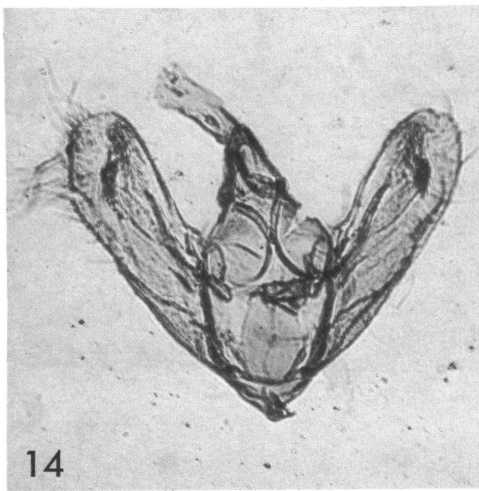
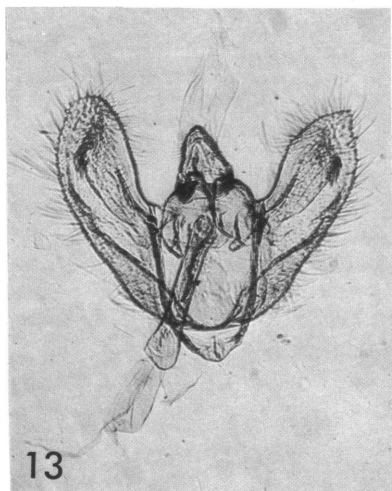
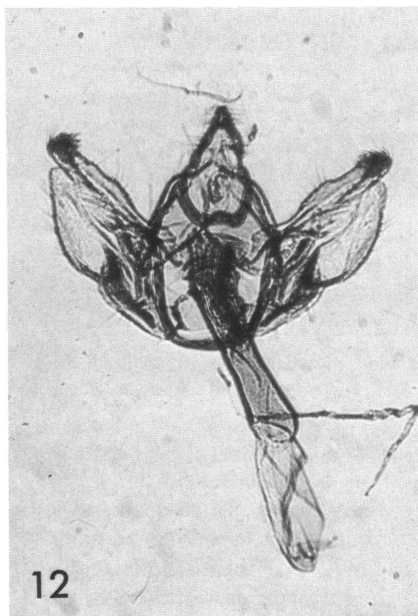
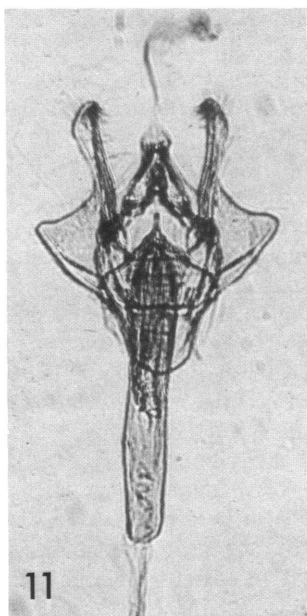
Length of Forewing: 11.5 to 12.0 mm.; allotype, 11.5 mm.

**Male Genitalia.** Similar to those of *ochrofuscaria*, differing mainly as follows: uncus with posterior margin of uncus flatter, width of base only slightly smaller than length of uncus; gnathos with slightly smaller median swelling; valve with costal margin having more prominent swelling; sacculus arm very short, evenly increasing in width, with three elongate terminal spines, their length equal to width of aedeagus, or 0.2 mm. (compared with 0.15 mm. in *ochrofuscaria*); base of valve with sclerotized band angled medially, distal portion with thickened strip of even width; anellus wider than long; aedeagus thicker and slightly shorter; vesica armed with more angulate sclerotized strip, in length nearly one-half length of aedeagus, posterior end pointed, with more blunt teeth, and with anterior end more swollen.

**Female Genitalia.** Similar to those of *ochrofuscaria*, differing mainly as follows: ductus bursae very short; corpus bursae sclerotized posteriorly on left side only; signum tending to have longer rays.

**Types.** Holotype, male, and allotype, female, Mezquital, Baja California (State), Mexico, August 25, 1959 (K. W. Radford and F. G. Werner); caught in a light trap. The genitalia of the holotype are mounted on slide FHR 15653 and of the allotype on 15792. Paratypes, both from the State of Baja California: Angeles Bay, Gulf of California, June 25, 1921 (E. P. Van Duzee), one female; San[to] Domingo, October 23, 1941 (Ross and Bohart), one female.

The holotype, allotype, and second paratype are in the California Academy of Sciences; the first paratype is in the American Museum of Natural History.



FIGS. 11-14. Male genitalia. 11. *Hemimorina angulosa*, new species, holotype, 5 miles E San Agustín, Baja California, November 15, 1967 (D. Patterson; CAS). 12. *Glaucina semidura*, new species, holotype, Mezquital, Baja California, August 25, 1959 (Radford and Werner; CAS). 13. *Pterotaea spinigera*, new species, holotype, 7 miles NNW Rosarito, Baja California, April 8, 1961 (A. Smith; CAS). 14. *P. expallida*, new species, holotype, La Cholla, Sonora, March 9, 1930 (AMNH).

**Remarks.** Because of the limited number of specimens available and their somewhat rubbed condition, the only certain way to recognize this species is by a study of the genitalia. For a description and illustrations of *ochrofuscaria*, see

Rindge, 1959, page 336, text figures 32 (distribution), 69, 101 (male and female genitalia), plate 27, figures 5-8 (adults).

**Etymology.** The specific name is from the Latin prefix *semi-*, half, and *durus*, hard, in



relation to the posterior portion of the corpus bursae.

BOARMIINI

The Boarmiini comprise another very large group, being strongly developed in the temperate and tropical areas of the world. Eight genera of this tribe are known to occur in Baja California. *Anavitrinella* McDunnough is not included in table 3 or in the following figures, pending a revision of this largely Neotropical genus; it is believed that at least two species occur on the peninsula. With the added exception of *Aethaloida* McDunnough, I have published revisionary studies of the remaining genera (see Rindge, 1966, 1968, 1970, 1973a, 1974). Of the 20 species occurring on the peninsula, 18 or 19 have their closest relationships with the moths of California and the Sonoran Desert.

The members of this tribe demonstrate a different distributional pattern than that found in the two other tribes covered in this paper, with a much higher percentage of endemism, and with no species known to occur in both the State and Territory (see table 3). Five of the species are endemics, with two being known from the State (*Chesiadodes pallens* Rindge, *Pterotaea spinigera*, described below) and three from the Territory (*Anacamptodes cerasta* Rindge, *Chesiadodes daedalea* Rindge, and *Pterotaea salviae* Rindge).

TABLE 3  
Boarmiini of Baja California

Genera	Species <sup>a</sup>		Distribution on Peninsula		
	Described	Endemic	State	Territory	Both parts
<i>Aethaloida</i>	1	0	1	0	0
<i>Anacamptodes</i>	5	1	3	2	0
<i>Chesiadodes</i>	2	2	1	1	0
<i>Hesperumia</i>	1	0	1	0	0
<i>Hulstina</i>	3	0	3	0	0
<i>Pterotaea</i>	6	2	5	1	0
<i>Stenoporpia</i>	2	0	2	0	0

<sup>a</sup>These figures include the species described in the present paper.

***Pterotaea expallida*, new species**  
Figures 5, 14

*Diagnosis.* This species can be distinguished from *Pterotaea sperryae* McDunnough by the pale gray coloration of the upper surface of the wings. In the male genitalia the uncus is broader and less attenuate, and the spining on the valves is much more slender.

*Male.* Head and palpi pale gray, with numerous scattered dark brown scales; palpi projecting beyond front. Thorax above grayish white, with some darker scales; below grayish white; legs with mixture of grayish white and light brown scales; hind tibia without hair pencil and groove. Abdomen grayish white above, with scattered brown scales; below grayish white.

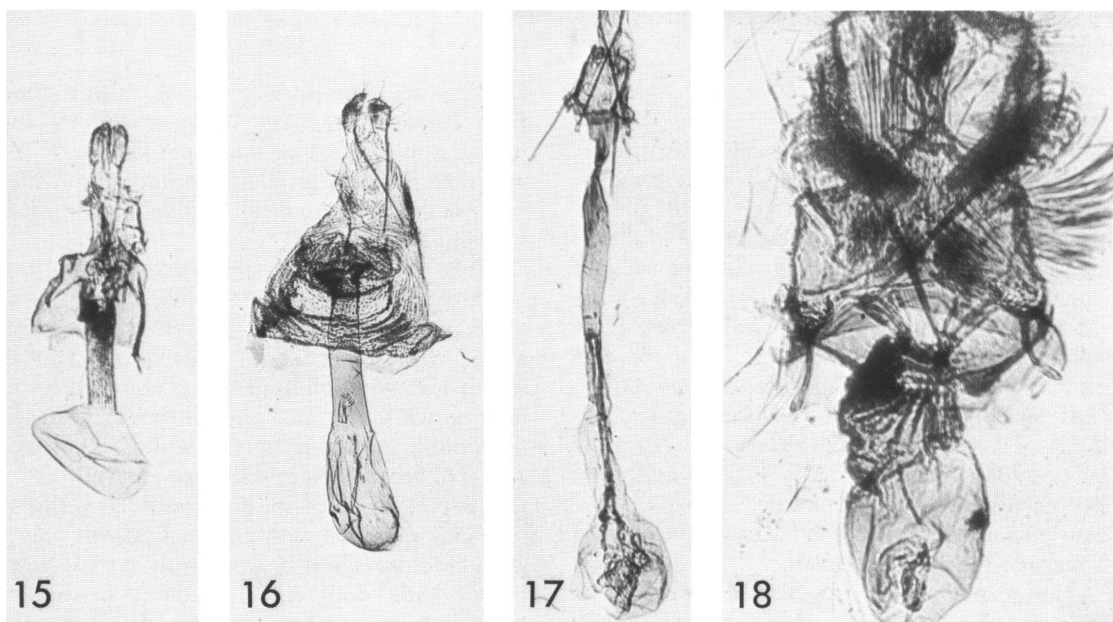
*Upper Surface of Wings:* Forewings white or pale grayish white, with gray and grayish brown scaling; cross lines brown, with broad, paler brown shade bands; t. a. line arising one-third of distance from base on radial vein, sharply curved outward in cell, then swinging basad, going almost straight to inner margin one-fourth distance from base; median shade line almost straight in course; t. p. line arising on costa three-fourths distance from base as costal spot, spot on vein M<sub>1</sub>, then extending from about vein M<sub>3</sub>, thickened on veins, with broad basal curve in cell Cu<sub>2</sub>; subterminal area white or grayish white basally, brownish gray distally; s. t. line complete, white; terminal area pale gray; terminal line fading out anteriorly, with small black brown intravenular spots; fringe white, darkened at vein endings.

*Under Surface of Wings:* Pale grayish white, with variable number of brown and grayish brown scales; hind wings slightly paler than forewings; maculation with faint trace of outer cross line on all wings; terminal line pale brown; fringe as on upper surface.

Length of Forewing: 17.0 mm. (holotype).

*Female.* Unknown.

*Male Genitalia.* Uncus very broad, 0.3 mm. wide at base and in length, triangular, tapering to bluntly rounded apex; gnathos with short, apically truncate median enlargement; valves with each costal area increasing in width apically, occupying about half of inner face of valve, posterodistal area scarcely raised, with outer



FIGS. 15-18. Female genitalia. 15. *Semiothisa piccoloi*, new species, allotype, Mulege, Baja California, April 9, 1972 (R. W. Holland; AMNH). 16. *S. baegerti*, new species, allotype, 7 miles N Santa Anita, Baja California Sur, January 7, 1959 (H. B. Leech; CAS). 17. *Hemimorina angulosa*, new species, paratype, Todos Santos, Baja California Sur, October 10, 1941 (Ross and Bohart; AMNH). 18. *Glauцина semidura*, new species, paratype, Angeles Bay, Baja California, June 25, 1921 (E. P. Van Duzee; AMNH).

double row of seven to 10, anterodistally directed, very slender spines, those on right valve tending to be slightly more widely spaced than those on left valve; cristae small and inconspicuous; anellus elongate, broadly elliptical; aedeagus shorter than combined lengths of saccus and tegumen, and with slightly curved, pointed, sclerotized posterior end; vesica with row of small spines occupying about half the length of the aedeagus. Abdomen without ventral row of setae on third segment.

*Female Genitalia.* Unknown.

*Type.* Holotype, male, La Cholla, Sonora, Mexico, March 9, 1930; from the collection of G. H. and J. L. Sperry. The genitalia of the type are on slide JLS 1860.

The type is in the collection of the American Museum of Natural History.

*Remarks.* The male genitalia are similar to those of *crinigera* Rindge (1970, p. 286, fig. 58), in that both species have a broad uncus and similarly shaped gnathos. The present species

differs from *crinigera* in having smaller and fewer spines on the posterodistal area of the valve, and in having a much longer sclerotized strip in the aedeagus. *Crinigera* was placed in group I of my revision; *expallida* goes in group II, containing those species with a raised front and lacking the tibial hair pencil and groove. The females of both *crinigera* and *expallida* are unknown.

*Etymology.* The specific name is from the Latin *expallidus*, very pale, relating to the color of the wings.

#### ***Pterotaea spinigera*, new species**

Figures 6, 13

*Diagnosis.* This is a relatively small grayish white species with indistinct maculation and a pale terminal area. The male genitalia are very similar to those of *expallida* but can be recognized by the different spination on the valves and by the more prominent spination in the vesica.

*Male.* Head similar to that of *expallida* but

palpi shorter, scarcely extending beyond front. Thorax and abdomen similar to those of *expallida*, tending to have slightly fewer dark scales.

Upper Surface of Wings: Forewings similar to those of *expallida* but slightly grayer in color, and with maculation only weakly defined, cross lines with slender or obsolescent shade lines; t. a. line obsolescent, apparently not so strongly excurved in cell as in *expallida*; t. p. line with median section slightly undulate; subterminal area concolorous with median area basally, becoming dark gray distally and having inward notch in cell  $M_3$  on outer margin; s. t. line present, indicated mainly by pale gray terminal area contrasting with subterminal area; terminal line similar to that of *expallida* but paler brown; fringe white, narrowly dark brown opposite vein endings. Hind wings similar to those of *expallida* but more grayish white.

Under Surface of Wings: Similar to that of *expallida* but with maculation obsolescent.

Length of Forewing: 13.5 mm. (holotype).

*Female*. Unknown.

*Male Genitalia*. Similar to those of *expallida*, differing mainly as follows: smaller; uncus 0.23 mm. long, base 0.26 mm. across; gnathos with median enlargement shorter; each valve with costa more broadly sclerotized basally, posterodistal area with simple row of about six slightly thicker spines; aedeagus with slightly swollen anterior end; vesica with prominent slightly curved row of spines. Abdomen without ventral row of setae on third segment.

*Female Genitalia*. Unknown.

*Type*. Holotype, male, 7 miles north northwest of [Rancho] Rosarito, State of Baja California, Mexico, April 8, 1961 (A. Smith). The genitalia of the holotype are mounted on slide FHR 17271.

The type is in the collection of the California Academy of Sciences.

*Remarks*. The type locality is between Agua de Refugio and El Marmolito.

The male genitalia of this species are similar to those of *crinigera* and *expallida*. Along with the latter species, it is placed in my group II of *Pterotaea* (Rindge, 1970, p. 287).

*Etymology*. The specific name is from the Latin *spinigera*, spiny, in relation to the armature of the valves.

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