

A REVISION OF THE GENUS *SABULODES*
(LEPIDOPTERA, GEOMETRIDAE)

FREDERICK H. RINDGE

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ABSTRACT

The genus *Sabulodes* is revised for the first time, and *Phengommataea* Hulst is placed in its synonymy. The genus is redescribed and divided into four groups; the latter are defined primarily on the basis of male genitalia and secondary sexual characters. Keys are given to the species, based on male and female genitalia. All species are described, and both the adults and their genitalia are illustrated; distributional data are given for all species. The following are described as new: *Sabulodes caberata oberthuri* (Ecuador), *plauta* (Mexico), *solola* (Guatemala), *wygodzinskiyi* (Colombia), *setosa* (Mexico), *mucronis* (Jamaica), *laticlavata* (Cuba), *curta* (Puerto Rico), *striata* (Guyana), *triangula* (Brazil), *loba*

(Mexico), *depile* (Bolivia), *pumilla* (Guatemala), and *huachuca* (United States: Arizona).

A large number of Neotropical species have been placed in *Sabulodes*, but the great majority do not belong in the genus. The 36 included species are distributed from southwestern Canada (British Columbia) and the western United States, south to southern South America and the Greater Antilles. They appear to be absent from the Lesser Antilles, Trinidad, the lower Amazonian basin, northeastern Brazil, and Chile.

At least two species in the genus are commercial pests; these are *aegrotata* Guenée in California, and *caberata* Guenée in Brazil.

INTRODUCTION

The genus *Sabulodes* has never been revised. This became very evident several years ago when I made a cursory investigation of a number of the species that were included in the genus and found a highly diverse assemblage. In addition, I knew that the scientific name of the "omnivorous looper," a commercial pest in California, was incorrect (although being properly placed in *Sabulodes*). These considerations led me to undertake the present revisionary study. The purpose of the present paper is to revise *Sabulodes*, to describe and illustrate all the included species and their genitalia, and to discuss some of the problems within the genus.

Guenée, in proposing the genus in 1857, included nine new species arranged in three groups; he did not designate a type species. Unfortunately this assemblage of species is polyphyletic; only the two members of his group II are now being retained in *Sabulodes*. No type species was named until 1896, when Hulst designated *S. caberata* Guenée; this action has been overlooked or ignored by most subsequent workers. The result has been that a considerable number of species, mainly Neotropical, have either been described in or transferred to *Sabulodes*. Many of these species show a surprising amount of major venational differences, considerable variation in antennal

structures, especially in the males, and an assortment of different types of genitalia. As early workers relied heavily on venational differences and secondarily on antennal structures (but never looked at genitalia) for generic placement, it is indeed surprising to me that so many obviously different, unrelated species have been lumped together in *Sabulodes*. More than 70 species have been placed in this genus; at least three-fourths of them do not belong here (see Appendix 2). It is not possible to accurately place them in their correct genera at present.

Sabulodes first appeared in the North American literature in 1891, when Smith listed it and one incorrectly identified species. Subsequent workers included a variety of different species under this generic name, ignoring or overlooking Hulst's designation of the type species. Among the more popular or supposedly scientific publications that perpetuated this error were Holland (1919, p. 353) and Forbes (1945, p. 108); neither work included a single species that actually belongs in this genus. McDunnough (1938), in his check list, was the first to have used the genus in its correct sense; however, he perpetuated the incorrect specific name for the "omnivorous looper."

In addition to designating the type species of

Sabulodes, Hulst (1896) described that genus for the first time in the North American literature. In the same publication he proposed *Phengommataea* as a new genus. In revisionary papers, such as the one by Hulst, and in check lists, closely related genera are normally grouped together. Apparently Hulst did not consider these two as being closely related, as the descriptions are 41 pages apart, appearing at the opposite ends of the Ennominae. Both Dyar ("1902"[1903]) and Smith (1903) followed Hulst's arrangement with only a minimum of changes. Barnes and McDunnough (1917a) also used the same wide separation of the two genera, but placed them in the Geometrinae. The next listing was by McDunnough (1938); here, for the first time, *Phengommataea* and *Sabulodes* appear consecutively, followed by their sister group *Enypia* Hulst, and are correctly replaced in the Ennominae.

At first glance, *Phengommataea* and *Sabulodes* appear to be distinct genera. The one North American species of the latter genus, very closely related to the type species, has relatively broad, yellowish wings with weak maculation, and hind wings that are concolorous with the forewings. The species of *Phengommataea*, heretofore known only from the United States and Canada, have narrower, slightly more elongate wings, with the forewings ranging in color from cream to yellowish or brown, with one species being reddish, with indistinct to prominent maculation, and often a contrastingly colored median area; the hind wings are paler than the forewings, and tend to have little or no maculation. However, the venation, antennae, and genitalia of these two groups appear identical; the only noticeable structural differences are the presence of the hair pencil on the hind tibia of the male, and the associated row of setae on the ventral surface of the abdomen in *Sabulodes*; in *Phengommataea* these are absent. When all the species of the complex are studied, the above structural differences, associated with wing proportions and pattern, break down. Several species, ranging from Bolivia into Mexico, have the wing shape, color, and pattern of *Sabulodes* but lack the tibial hair pencil and abdominal row of setae. As a result, it is impossible to separate

Phengommataea and *Sabulodes*; consequently, the former is placed as a junior synonym of the latter.

My previous studies have shown that the presence of the tibial hair pencil and abdominal row of setae are usually of greater systematic value on the species level than as a generic character; both conditions often occur within a genus (see Rindge, 1972 and references therein; Rindge, 1973a, 1973b). The results of the present revision agree with my previous studies. The more primitive genera in the Ennominae are without the hair pencil and abdominal setae; hence, this is assumed to be the plesiomorphic state. *Sabulodes* is one of the more highly evolved Ennominae. When compared with related genera, the presence of the hair pencil and abdominal setae in *Sabulodes* represents the plesiomorphic condition; within the genus, the loss of these characters presumably represents a reversal.

In the present paper I have divided the 36 species of *Sabulodes* into four groups. Some of the main characters that have been used to define these groups, and certain smaller clusters of species within them, are given in table 1. The polarity of these characters is based on comparisons with related genera and with other genera I have revised. This division is based primarily on males, as they possess a large number of useful attributes. Of the eight characters listed in table 1, only four pertain to females. The best way to segregate the males is by studying their genitalia; this is necessary to be certain of the identification of the species, as many are practically identical in color, pattern, and size. The female genitalia are not so useful for defining the groups; I have been able to separate only two of the four by these structures. However, the female genitalia have, in most cases, good (or at least usable) specific characters that can be used for identification. A word of caution is in order here; in a number of species only a few females are known, and hence the key to their organs is based on too few examples to be reliable. Whenever possible, work with male dissections, as the key to these structures is thought to be more trustworthy.

Nearly 3300 specimens have been studied

TABLE 1

Character	Plesiomorphic Condition	Apomorphic Condition
Secondary sexual characters of male	1. With hind tibial hair pencil and row of abdominal setae 2. Without anteroventral pair of abdominal processes	Without these characters With these characters
Wings. 1. Shape	Relatively short and broad	More elongate
2. Pattern	Weak; present on all wings	Stronger; on forewings only
3. Hindwings	Concolorous with forewings	Paler than forewings
Food plants	Broad leaved shrubs, trees	Conifers
Male genitalia		
1. Apex of uncus	Tapering, pointed	Swollen, rounded
2. Socii	Membranous, transverse	Sclerotized, longitudinal

for this paper; the males outnumbered the females by slightly less than two to one. I have examined 447 genitalic slides (271 males, 176 females); the majority of these were prepared by me. Slide mounts of the antennae and legs of both sexes of all species, when practical, have been made and studied. Either holotypes or syntypes for all names used in this paper have been studied, and their genitalia dissected when necessary; for one species no original type material has been found. Whenever possible, the holotypes or lectotypes are illustrated in the present paper. All specimens studied by me at the American Museum of Natural History have had either identification or type labels placed on their pins. Slightly more than half the moths studied, and more than two-thirds of the genitalic preparations, are in the collection of the American Museum of Natural History.

The taxonomy of the genus has been in such a confused state that the usage of names for the Middle and South American species is completely unreliable. As a result, I have made practically no attempt to give literature citations for the adults or early stages from this area, outside of the original descriptions.

A great deal is yet to be learned about the early stages of *Sabulodes*. Two species are known to be commercial pests; these are *aegrotata* in California and *caberata* in southern Brazil. The former is the only species known to me to have the complete life history described in the literature; some of the preparatory stages of *edwardsata* have been described.

Food plants are known, at least in part, for only *aegrotata*, *caberata caberata*, *spoliata berkeleyata*, and *edwardsata*. Everything else is yet to be discovered.

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UC, the University of California, Berkeley; J. A.
Powell

SYSTEMATIC DESCRIPTIONS

GENUS *SABULODES* GUENÉE

Sabulodes Guenée, 1857, p. 42. Walker, 1860a, p. 32. Druce, 1891 (1891-1900), p. 13. Smith, 1891, p. 65; 1903, p. 81. Hulst, 1896, p. 382. Dyar, "1902" [1903], p. 346. Barnes and McDunnough, 1917a, p. 123. McDunnough, 1938, p. 170. Schaus, 1940, p. 316.

Phengommataea Hulst, 1896, p. 341. Dyar, "1902" [1903], p. 319. Smith, 1903, p. 75. Barnes and McDunnough, 1917a, p. 115. McDunnough, 1938, p. 170. NEW SYNONYMY.

Diagnosis. The adults are most easily recognized by the genitalia. The male structures have a characteristic free costal arm on each valve and a prominent, tapering or rounded uncus; the females have an elongate, more or less digitate, lamella postvaginalis and a relatively large corpus bursae without a signum. Both sexes have simple antennae. The wings vary from being broad to somewhat elongate; the forewings have 12 veins and no areole. Most species have the upper surface of the wings unicolorous buff, ochraceous, or grayish white, with weakly defined maculation; others are pale yellowish brown with a darker brown median area, and one has reddish brown forewings with longitudinal silvery white maculation. The lengths of the forewings vary from 13 to 26 mm.

Adult. Head: eyes large, rounded, naked; front flat or weakly swollen, barely extending beyond eyes; tongue well developed; palpi rising to above middle of eyes, first and second segments more or less equal in length, third segment short to moderately long, tightly scaled; antennae of both sexes simple, upper surface scaled, under surface minutely pubescent, with or without one or two lateral pairs of setae posteriorly on each segment. Thorax moderately stout, collar and patagia with long slender scales, below with shorter, woollike scales; fore tibia with short, thick process arising in distal half of segment; hind tibia with two pairs of spurs, males with or without hair

pencil. Abdomen moderate, elongate; without dorsal tufts; males with or without median row of setae ventrally on third segment, and eighth segment unmodified.

Forewings either broad or elongate, outer margin rounded or angulate at vein M_3 ; with 12 veins; most specimens without areole; R_{1+2} stalked with weak cross vein from Sc to R_{1+2} , latter separating beyond cell; R_5 from stalk before R_{3+4} ; M_1 from shortly beyond upper angle; udc straight, mdc weakly curved, ldc strongly curved; Cu_1 from below lower angle; fovea absent. Hind wings broad, outer margin rounded or weakly projecting at vein M_3 ; frenulum strong; Sc approximate to R in basal portion of cell; R from upper angle; M_3 from lower angle; cell extending about half length of wing; Cu_1 from about one-third distance between angle and Cu_2 .

Upper surface of wings either unicolorous buff, ochraceous, or grayish white, with weakly defined maculation, and hind wings concolorous with forewings; or pale yellowish brown forewings with darker brown median area, or reddish brown forewings with longitudinal silvery white maculation, and hind wings of both types paler than forewings. Length of forewings from 13 to 26 mm.

Male Genitalia. Uncus varying from relatively narrow and tapering, having bluntly pointed apex, to broad, scarcely narrower than base, with apex wedge-shaped to broadly rounded; socius at end of pair of elongate digitate processes, arranged transversely or longitudinally; gnathos prominent, broad, with minutely tuberculate median enlargement; valves moderate, tapering, inner surface evenly and sparsely setose, simple except for large, heavily sclerotized costa, extending posteriorly beyond valve as curved or angled free arm; transtilla variably represented; anellus well sclerotized, either rounded anteriorly, flattened or cuplike, extending posteriorly as elongate process, evenly sclerotized or with lateral ridges, or

slender and furca-like; cristae and furca absent; tegumen broad, elongate; saccus variable in length, shorter than tegumen in most species, anteriorly bluntly pointed or tapering to more elongate point; aedeagus slightly longer than combined lengths of tegumen and socius, anterior end sclerotized ventrally, with dorsal one-third to one-half occupied by ductus ejacularis, posterior end wholly or partially sclerotized, ventral surface with or without row of heavily sclerotized toothlike projections or sclerotized ridge; vesica, when everted, extending ventrally or to right side, membranous, simple, tubelike, with or without one or more small swellings.

Female Genitalia. Papillae anales short, posteromedian area curved, forming elliptical or round aperture, with rim thickly setose, and with apophyses attached medially; apophyses posteriores of moderate length, 1.4 to 2.6 mm. long; sterigma with sclerotized, variably ornamented, elongate, digitate lamella postvaginalis, lateral areas partly or entirely sclerotized, plain or ridged; ductus bursae sclerotized, short and broad, or slender and elongate, dorsoventrally flattened, lateral margins appearing more heavily sclerotized than median area; ductus seminalis arising either on left side of ductus bursae from small swelling of corpus bursae, or medially; corpus bursae large, membranous, posterior end more or less asymmetrical with left side extending further posteriorly ventrally than right side, tending to have small, longitudinally striate area near posterior end on either or both ventral or dorsal surfaces, anterior end of corpus rounded, bluntly pointed, or swollen; signum absent.

Early Stages. Very poorly known, as the complete life history has been described only for *aegrotata*; in addition, the caterpillar of *edwardsata* has been described. The early stages of some Neotropical species may be known but I have not included any; until the identifications are checked, the names that have been used are liable to be incorrect.

Food Plants. These are very poorly known, and much work needs to be done with the early stages. Food plants of two members of group I are known, at least in part. In North America, *aegrotata* is a general feeder on a great variety of plants and trees, excluding conifers; in Bra-

zil, *caberata* is known to defoliate eucalyptus. Both *spoliata* and *edwardsata*, members of group IV, feed exclusively on conifers. It is tempting to theorize that the species of group I are basically feeders on broad-leaved vegetation, and those of group IV feed primarily on conifers. Nothing is known about the food plants of the members of groups II and III; based on their distribution, I suspect that their caterpillars would feed on broad-leaved plants and trees.

Type Species. For *Sabulodes*, *Sabulodes caberata* Guenée, 1857; designated by Hulst, 1896, p. 382.

For *Phengommataea*, *Tetracis edwardsata* Hulst, 1886; designated by Hulst, 1896, p. 341.

Distribution. Western North America, from south central British Columbia in the north, through the United States, Mexico and Central America to southern Brazil, plus the Greater Antilles. No species are known from Chile, the low-lying portions of the Amazonian drainage system, northeastern Brazil, Surinam, French Guiana, Trinidad, or the Lesser Antilles. The greatest concentration of species is in Mexico and the United States, as two-thirds of the known species occur in these two countries.

Remarks. See the Introduction for the placing of *Phengommataea* as a synonym of *Sabulodes* and the division of the genus into four groups.

I have made no attempt to prepare a key to the species based on the color, maculation, and similar characters. Practically all the Neotropical species have very similar colors and patterns, and are superficially indistinguishable. It is strongly advised to dissect and study the genitalia; keys are provided for the structures of both sexes. As mentioned in the Introduction, the key to the female genitalia should be used with caution; whenever possible it is advisable to work with the male structures.

KEY TO SPECIES

Based on Male Genitalia and Secondary Sexual Characters¹

1. Ventral surface of third segment of abdomen with median row of setae 2

¹The males of *laticlavata*, *curta* (both in group II), and *puebla* (group IV) are unknown.

- Ventral surface of third segment of abdomen without median row of setae (group IV) 19
- 2(1). Ventral surface of third segment of abdomen with median row of setae only 3
- Ventral surface with anterior lateral process on each side bearing row of thick elongate spines, extending to third segment of abdomen (group III) 16
- 3(2). Socius membranous, transverse; anellus weakly sclerotized, flat (group I) 4
- Socius weakly sclerotized, longitudinal; anellus strongly sclerotized, furca-like (group II) 15
- 4(3). Uncus tapering to point 5
- Uncus broadly swollen apically, not tapered 8
- 5(4). Gnathos with small median swelling, 0.2 to 0.4 mm. in width, having very slender scobinate area 6
- Gnathos with broadly swollen and wide scobinate area, 0.6 to 0.8 mm. in width *plauta*
- 6(5). Aedeagus 3.0 to 3.5 mm. in length *caberata*
- Aedeagus 2.5 to 2.8 mm. in length 7
- 7(6). Anellus with anterior margin tending to be broader, more V-shaped, and with posterior region smoothly sclerotized *aegrotata*
- Anellus with anterior margin tending to be narrower, more U-shaped, and with posterior region finely punctate *solola*
- 8(4). Costal arms slender, elongate 9
- Costal arms broad, short 11
- 9(8). Costal arms broadly curved; aedeagus with posteroventral row of toothlike projections *wygodzinskyi*
- Costal arms bent at right angle, distal portion straight; aedeagus without toothlike projections 10
- 10(9). Everted vesica with swelling on posterior surface; combined lengths of tegumen and saccus 2.25 to 2.60 mm.; median swelling of gnathos 0.10 to 0.15 mm. wide *prolata*
- Everted vesica with swelling on right side; combined lengths of tegumen and saccus 2.15 to 2.35 mm.; median swelling of gnathos 0.2 to 0.3 mm. wide *atropesaria*
- 11(8). Free costal arms thickly setose 12
- Free costal arms without setae 13
- 10(11). Projecting portion of costal arm extending 0.3 to 0.4 mm. beyond valve *boliviaria*
- Projecting portion of costal arm extending 0.2 to 0.3 mm. beyond valve .. *setosa*
- 13(11). Aedeagus having spinose or dentate band posteriorly *arses*
- Aedeagus without spines or teeth posteriorly 14
- 14(13). Each valve with free costal arm simple, tapering *matrica*
- Each valve with free costal arm flattened and having posteromedial margin irregularly dentate *subalbata*
- 15(3). Each costal arm with apical portion sharply recurved *mucronis*
- Each costal arm with apical portion weakly bent *striata*
- 16(2). Aedeagus with terminal spining, without digitate process 17
- Aedeagus without terminal spining, with prominent digitate process 18
- 17(16). Anellus with sclerotized portion roughly triangular in outline, short, 0.75 to 0.80 mm. in length, continued posteriorly as membranous area *triangula*
- Anellus with sclerotized portion digitate, elongate, 1.3 to 1.6 mm. in length *exhonorata*
- 18(16). Costa with sclerotized basal portion of even width *loba*
- Costa with sclerotized basal portion swollen near base *subopalaria*
- 19(1). Each costal arm bent at right angle 20
- Each costal arm sharply recurved 32
- 20(19). Uncus with strong median point 21
- Uncus rounded, without median point .. 23
- 21(20). Apex of each costal arm finely setose; gnathos with large tuberculate median enlargement *depile*
- Apex of each costal arm smoothly sclerotized; gnathos with small median enlargement 22
- 22(21). Aedeagus 1.75 to 1.80 mm. in length *sericeata*
- Aedeagus 1.90 to 2.05 mm. in length *dissimilis*
- 23(20). Each costal arm with bent, free section 0.1 mm. in length *mastaura*
- Each costal arm with bent, free section 0.3 mm. or longer 24
- 24(23). Aedeagus less than 3.0 mm. in length . 25
- Aedeagus 3.2 to 3.6 mm. in length *niveostriata*
- 25(24). Aedeagus 1.6 to 2.3 mm. in length 26
- Aedeagus 2.4 to 3.0 mm. in length ... 29
- 26(25). Aedeagus 1.6 to 1.8 mm. in length 27
- Aedeagus 2.0 to 2.8 mm. in length . *argyra*
- 27(26). Aedeagus 1.6 mm. in length *matrona*

- Aedeagus 1.7 to 1.8 mm. in length 28
- 28(27). Gnathos with median enlargement tending to have anterior margin truncate, broad *mastaura*
- Gnathos with median enlargement tending to have anterior margin bluntly wedge-shaped, narrower *meduana*
- 29(25). Aedeagus 2.40 to 2.60 mm. in length *olifata*
- Aedeagus 2.65 to 2.95 mm. in length 30
- 30(29). Aedeagus 2.65 to 2.75 mm. in length . . 31
- Aedeagus 2.80 to 2.95 mm. in length *mabelata*
- 31(30). Gnathos with lateral arms 1.5 mm. wide; combined length of tegumen and saccus 2.5 to 2.6 mm. *huachuca*
- Gnathos with lateral arms 2.0 mm. wide; combined length of tegumen and saccus 2.3 mm. *duoangulata*
- 32(19). Distal portion of each costal arm thickly dentate, median projecting portion broad, 0.15 to 0.20 mm. wide at thickest point *edwardsata*
- Distal portion of each costal arm sparsely dentate, median projecting portion narrower, 0.10 mm. wide *spoliata*

Based on Female Genitalia¹

1. Corpus bursae with posterior portion deeply convoluted and partially sclerotized, with ductus seminalis arising near middle (group III) 33
- Corpus bursae not as above 2
- 2(1). Sterigma with lateral areas membranous; lamella postvaginalis and ductus bursae of about same length and width (group II) 30
- Without above characters (groups I, IV) . . 3
- 3(2). Lamella postvaginalis with apex pointed . 4
- Lamella postvaginalis with apex square or concave medially 23
- 4(3). Lamella postvaginalis longer than ductus bursae 5
- Lamella postvaginalis shorter than or equal to length of ductus bursae 12
- 5(4). Lamella postvaginalis 0.6 to 0.7 mm. in length *matrona*
- Lamella postvaginalis 1.0 to 1.7 mm. in length 6
- 6(5). Lamella postvaginalis broadly enlarged or swollen anteriorly, sharply tapering to elongate apex *subalbata*

¹The females of *pumilla* and *duoangulata* (both in group IV) are unknown.

- Lamella postvaginalis not as above 7
- 7(6). Lamella postvaginalis 0.4 mm. at widest point *olifata*
- Lamella postvaginalis 0.5 to 0.8 mm. wide 8
- 8(7). Lamella postvaginalis C-shaped in cross section *aegrotata*
- Lamella postvaginalis weakly curved or flat in cross section 9
- 9(8). Lamella postvaginalis 1.45 to 1.70 mm. in length 10
- Lamella postvaginalis 1.00 to 1.20 mm. in length 11
- 10(9). Apophyses posteriores 1.60 to 1.70 mm. in length *huachuca*
- Apophyses posteriores 1.85 to 1.90 mm. in length *mabelata*
- 11(9). Ductus bursae 0.4 to 0.8 mm. in length (at midline) *spoliata*
- Ductus bursae 0.8 to 1.0 mm. in length *edwardsata*
- 12(4). Sterigma heavily sclerotized, with rectangular invaginated area, having large posteriorly directed flange, around anterior portion of lamella postvaginalis 13
- Sterigma not as above 14
- 13(12). Sterigma with pair of posterolateral ridges, often connected by transverse ridge; lamella postvaginalis not extending beyond posterior margin of sterigma *arses*
- Sterigma smoothly sclerotized, lamella postvaginalis extending beyond posterior margin of sterigma *matrica*
- 14(12). Lamella postvaginalis 0.65 mm. at widest point *niveostriata*
- Lamella postvaginalis 0.20 to 0.50 mm. wide 15
- 15(14). Lamella postvaginalis 1.1 to 1.2 mm. in length 16
- Lamella postvaginalis 0.5 to 1.0 mm. in length 17
- 16(15). Lamella postvaginalis 0.3 to 0.4 mm. at widest point *prolata*
- Lamella postvaginalis 0.2 to 0.3 mm. wide *wygodzinskyi*
- 17(15). Lamella postvaginalis 0.45 to 0.50 mm. wide *atropesaria*
- Lamella postvaginalis 0.30 to 0.40 mm. wide 18
- 18(17). Lamella postvaginalis about equal in length to ductus bursae 19
- Lamella postvaginalis at least 1 mm. shorter than ductus bursae 21
- 19(18). Apophyses posteriores 1.5 mm. in length *puebla*

- Apophyses posteriores 2.0 to 2.2 mm. in length 20
- 20(19). Sterigma 0.7 mm. long, measured on midline *meduana*
- Sterigma 0.8 mm. long *mastaura*
- 21(18). Ductus bursae 0.7 to 1.0 mm. long (at midline) 22
- Ductus bursae 1.1 to 1.4 mm. long . *argyra*
- 22(21). Apophyses posteriores 1.5 to 1.7 mm. long *sericeata*
- Apophyses posteriores 1.8 to 2.2 mm. long *dissimilis*
- 23(3). Lamella postvaginalis equal in length to ductus bursae and 0.7 to 0.9 mm. in width 24
- Lamella postvaginalis not equal in length to ductus bursae, and 0.3 to 0.7 mm. in width 25
- 24(23). Lamella postvaginalis 1.1 to 1.4 mm. in length *caberata*
- Lamella postvaginalis 1.4 to 1.7 mm. in length *plauta*
- 25(23). Lamella postvaginalis 0.5 to 0.7 mm. in width 26
- Lamella postvaginalis 0.3 to 0.4 mm. in width 28
- 26(25). Ductus bursae 0.4 to 0.8 mm. in length (at midline) *spoliata*
- Ductus bursae 0.8 to 1.2 mm. in length . 27
- 27(26). Lamella postvaginalis with anterior margin in form of prominently raised, finely dentate ridge *solola*
- Lamella postvaginalis with anterior margin a low weakly convoluted swelling *aegrotata*
- 28(25). Ductus bursae 0.9 to 1.1 mm. in length . 29
- Ductus bursae 1.1 to 1.2 mm. in length ... *depile*
- 29(28). Apophyses posteriores 2.3 to 2.5 mm. in length *boliviaria*
- Apophyses posteriores 2.0 to 2.1 mm. in length *setosa*
- 30(2). Lamella postvaginalis 0.80 to 1.00 mm. in length *mucronis*
- Lamella postvaginalis 0.50 to 0.75 mm. in length 31
- 31(30). Lamella postvaginalis 0.50 to 0.60 mm. in length *laticlavata*
- Lamella postvaginalis 0.70 to 0.75 mm. in length 32
- 32(31). Ductus bursae in 0.8 mm. in length; apophyses posteriores 1.5 mm. in length *curta*
- Ductus bursae 1.0 mm. in length; apophyses posteriores 1.7 mm. in length .. *striata*
- 33(1). Corpus bursae with posterior convoluted and sclerotized portion longer than membranous anterior portion 34
- Corpus bursae with posterior convoluted and sclerotized portion shorter than membranous anterior portion 35
- 34(33). Lamella postvaginalis with posterior margin rounded or bluntly pointed, without median point *loba*
- Lamella postvaginalis with median point *subopalaria*
- 35(33). Ductus bursae 0.4 to 0.6 mm. in length (at midline) *triangula*
- Ductus bursae 0.7 to 1.0 mm. in length *exhonorata*

GROUP I

The members of this group are characterized by the males having a hind tibial hair pencil and a median row of setae ventrally on the third abdominal segment. The male genitalia have the uncus either elongate, relatively slender and tapering to a point, or broadly swollen with a rounded posterior margin; the valves have their costal arms bent at a right angle or gently curved. The female genitalia have a relatively short ductus bursae (0.5 to 2.0 mm. in length), the apical portion of the lamella postvaginalis varies from being square to pointed, and the ductus seminalis arises on the left side or near the midline ventrally.

The moths are dull white, buff or ochraceous in color, with extremely similar patterns; the fore and hind wings are concolorous and have similar maculation. In every species the specimens are large to moderate in size, with the length of the forewings varying from 14 to 26 mm.

Group I contains 12 species; one is divided into two subspecies. The species have a geographic range from the coast of Oregon to southern Brazil and Argentina; seven occur in North and Central America, with the remaining five being found in the Andes and southern Brazil. Most of the species appear to fly in every month of the year. Some, invariably the least collected and hence poorest represented in collections, are known to fly only during several nonconsecutive months; additional collecting will undoubtedly fill in much of the year. Definite food plant information is known only

for two species. One is the North American *aegrotata*; this insect is polyphagous and a commercial pest. It is known to feed on the members of 27 different families of plants, but this does not include conifers. The second is the southern South American *caberata caberata*; this insect is a commercial pest of eucalyptus in southern Brazil.

Sabulodes caberata Guenée

Sabulodes caberata Guenée, 1857, p. 45.

Diagnosis. This large South American species has male genitalia that have the uncus tapering to a point, the aedeagus more than 3 mm. in length, and the everted vesica with two elongate swellings. The female genitalia have a large, almost circular (in cross section) lamella postvaginalis, and a corpus bursae that is more than twice as long as the combined lengths of the lamella postvaginalis and ductus bursae.

Male. Head with vertex varying from whitish to buff, front narrowly dark grayish brown dorsally, whitish buff ventrally; palpi slightly darker than ventral portion of front. Thorax above varying from unicolorous whitish to buff or ochraceous; below whitish, buff or ochraceous anteriorly in some specimens; legs whitish, tending to be darker on outer surfaces, having variable number of brown or dark brown scales. Abdomen above dull cream or pale buff, with variable number of brown or dark brown scales; below paler.

Upper Surface of Wings: Forewings unicolorous, varying from dull cream to pale buff or ochraceous, evenly covered with scattered pale grayish brown scales; maculation weakly represented, cross lines pale grayish brown; t. a. line obsolescent, present in some specimens below vein Cu, straight, inwardly oblique, sometimes represented by small dark dots on veins R, Cu, and A; discal spot either absent or present as small dark dot; median band tending to be most prominent of cross lines, broad, diffuse, straight, extending from about vein M_1 or M_2 to inner margin; t. p. line represented by row of small dark dots on all or most of veins, with dots weakly connected by thin line, extending straight from veins R_5 to Cu_1 , then inwardly curved or angled, meeting inner mar-

gin at median band; s. t. and terminal lines absent; fringe concolorous with wing. Hind wings concolorous with forewings; maculation similar to that of forewings, with obsolescent intradiscal line, relatively prominent median band and extradiscal line; outer portion of wing similar to that of forewing.

Under Surface of Wings: All wings unicolorous, slightly paler than upper surface and having fewer dark scales, inner margin of forewing whitish below vein $Cu-Cu_2$; maculation of forewings varying from obsolescent to having brown discal spot, brown area between t. p. and s. t. lines and row of dark dots representing s. t. line; maculation of hind wings represented, in some specimens, by small discal dot and row of dark dots representing s. t. line; terminal line absent on all wings; fringes concolorous with wings, some specimens with small dark area opposite each vein ending.

Length of Forewing: 19 to 24 mm.

Female. Similar to male.

Length of Forewing: 20 to 25 mm.

Male Genitalia. Uncus with basal portion broad, slightly tapering, each side straight or weakly biconcave, with apical portion evenly tapering or ventrally produced, having short hooklike apex; socius rounded or somewhat wedge-shaped, elongate setae arising postero-dorsally; gnathos with sides of equal width, medially with moderate projection and low median ridge having variable number of minute scobinations; valves with each costal arm separating from valve at one-half to three-fifths length of costa, bent at right angle, free arm weakly curved, with dorsal surface variably scobinate, apically tapering to point; transtilla formed from dorsally extended bases of costa; anellus with anterior portion ovate, flat, wider posteriorly, posterior extension of paired sclerotized lateral thickenings becoming enlarged distally; saccus with elongate anterior point; aedeagus 3.0 to 3.5 mm. in length, with prominent posteroventral spinelike teeth, one to six in number, some specimens with teeth in two rows; vesica, when everted, extending laterally to right side, slender, tapering, with small posterior and dorsal sacs directed toward aedeagus.

Female Genitalia. Sterigma with large lamella postvaginalis, lateral walls curved, not

meeting ventrally, separated by about 0.3 mm., apparently double dorsolaterally, 0.7 to 0.9 mm. in width, 1.1 to 1.4 mm. in length, slightly enlarged anteriorly, posterior margin varying from flatly rounded to having small, U-shaped median indentation; sterigma with elongate, sclerotized lateral margins, thickened and folded around lamella postvaginalis, tapered and rounded distally; ductus bursae 1.1 to 1.4 mm. in length, widest posteriorly, anteriorly meeting corpus bursae diagonally, lateral margins apparently thickened; ductus seminalis arising ventrally on left side from swelling of corpus bursae; corpus bursae very long, 6 to 8 mm. in mated specimens, posteriorly with ventral, ribbed, weakly sclerotized swelling, dorsally extending slightly posteriad of juncture with ductus bursae in many specimens, entire structure with weak longitudinal striations. Apophyses posteriores 1.6 to 2.3 mm. in length.

Remarks. This species is divided into two subspecies, one occurring at relatively low elevations in southeastern South America, and the other in the Andes.

Sabulodes caberata caberata Guenée
Figures 1, 2, 15, 21

Sabulodes caberata Guenée, 1857, p. 45. Walker, 1860a, p. 34. Oberthür, 1911, p. 40, pl. LXXIX, fig. 862.

Diagnosis. The upper and under surfaces of both the body and wings are whitish to pale buff; the apical area of the under surface of the forewings is concolorous with the remainder of the wing.

Male. Body and wings, above and below, whitish to pale buff; cross lines of upper surface of wings relatively well defined; under surface of wings unicolorous, without dark apical area on forewings.

Length of Forewing: 19 to 23 mm.

Female. Similar to male.

Length of Forewing: 20 to 24 mm.

Male Genitalia. As described for the species.

Female Genitalia. As described for the species.

Early Stages. Undescribed.

Food Plant. *Eucalyptus* spp.; these are intro-

duced trees; the native food plant is not known. The larvae are a commercial pest, with infestations of 300 hectares of eucalyptus occurring in Minas Gerais, Brazil. It is also reported on rose foliage in São Paulo (specimens not examined; D. C. Ferguson, in letter).

Type. Guenée described *caberata* from one male and one female. Both specimens are now in the collection of the British Museum (Natural History); the male is in excellent condition but the female is not. The male is hereby designated, and has been labeled, as the lectotype (see fig. 1). The genitalia of this specimen are on slide FHR 18043.

Type Locality. Brazil.

Distribution. The humid subtropical zone of southern Brazil, eastern Argentina, and Paraguay. (See Appendix 1 for locality data of specimens examined.) This subspecies probably occurs in Uruguay, although no material has been seen from that country. Biezanko, Ruffinelli, and Carbonell (1966, p. 14) stated that *Sabulodes aegrotata* (a misidentification) occurs in Uruguay; it is possible that their citation actually refers to *caberata caberata*.

Flight Period. Specimens have been examined that were caught in every month of the year except June and October; presumably the moths can be caught throughout the year.

Remarks. Eighty-seven specimens (64 males, 23 females) and 10 genitalic dissections (seven males, three females) have been studied.

The members of this subspecies have wings that are quite constant in color and maculation. Oberthür's figure (1911, pl. LXXXIX, no. 862) is a good representation of this population, although the cross lines on the upper surface of the wings are a bit too dark and contrastingly colored.

Sabulodes caberata oberthuri, new subspecies
Figures 3, 4

Sabulodes caberata boliviaria Oberthür, 1911, p. 40 (in part, not pl. LXXXIX, fig. 863).

Diagnosis. The upper surfaces of the body and wings are darker than in nominate *caberata*, with the maculation of the wings above tending to be more diffuse and less clearly represented. The apical area of the forewings below tends to have a large dark brown area.

Male. Body and wings above ochraceous to brownish buff; cross lines of upper surface of wings tending to be more diffuse and less clearly and contrastingly represented as compared with nominate subspecies; under surface of wings darker than in nominate *caberata*, tending to have dark brown apical area on forewings.

Length of Forewing: 20 to 24 mm.; holotype, 22 mm.

Female. Similar to male.

Length of Forewing: 17 to 26 mm.; allotype, 25 mm.

Male Genitalia. As described for the species.

Female Genitalia. As described for the species.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Holotype, male, Tandapi, 1500 meters, on road from Aloag to Santo Domingo, 55 km. southwest of Quito, Pichincha, Ecuador, December 25, 1970 (L. E. Peña); allotype, female, same data and collector but January 28, 1971. The genitalia of the holotype are mounted on slide FHR 17835 and of the allotype on FHR 17832. Paratypes, all from Ecuador: *Pichincha*: same data and dates as types, nine males, eight females; Tandapi, 1500 meters, August 7-19, 1969 (P. and B. Wygodzinsky), one male; Quito to Santo Domingo, 1200 meters, February 25, 1965 (L. E. Peña), three males, 11 females. *Azuay*: Santa Isabel, 600 meters, 65 km. southwest of Cuenca, February 18, 1965 (L. E. Peña), one female. *Bolivar*: Balzapampa, "route de Quito, 7bre 8bre", 1893 (M. de Mathan), one male. *Loja*: "Environs de Loja", 1891, 1893, two males; Loja, December, 1892, one male. *Santiago-Zamora*: Zamora, 35 miles east southeast of Loja, Loja Province, March 27-31, 1965 (L. E. Peña), one male, one female.

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 British Museum (Natural History).

I have purposely restricted the type series to specimens from Ecuador.

Distribution. The Andes, from northwestern Argentina into Venezuela. (See Appendix 1 for

locality data of specimens examined.) Specimens with altitude data indicate a range from 450 to 3000 meters.

Flight Period. Every month of the year, even though no specimens have been seen as yet that were caught in June.

Remarks. One hundred sixteen specimens (84 males, 32 females) and 33 genitalic dissections (23 males, 10 females) have been studied.

Oberthür (1911, p. 40) was correct in stating that specimens of *caberata* from Peru and Bolivia are darker than those from southern Brazil (nominate *caberata*); accordingly he proposed *bolivaria* for what he assumed to be this population. What he did not realize, as he did not study the genitalia, was that there are five species occurring in Bolivia and they all look very much like one another. At least four of these Bolivian species are in the Oberthür collection, now in the British Museum. Oberthür's *bolivaria* represents a species distinct from *caberata*.

The moths of this subspecies have wings that are more variable in color and maculation than are those of nominate *caberata*. Specimens from Tucuman, Argentina (two males, three females) are browner than any others known to me; I include them as members of this subspecies. While there is a fair amount of individual variation within this population, the included members are much more likely to be mistaken for some of the other Andean species rather than to be confused with nominate *caberata*.

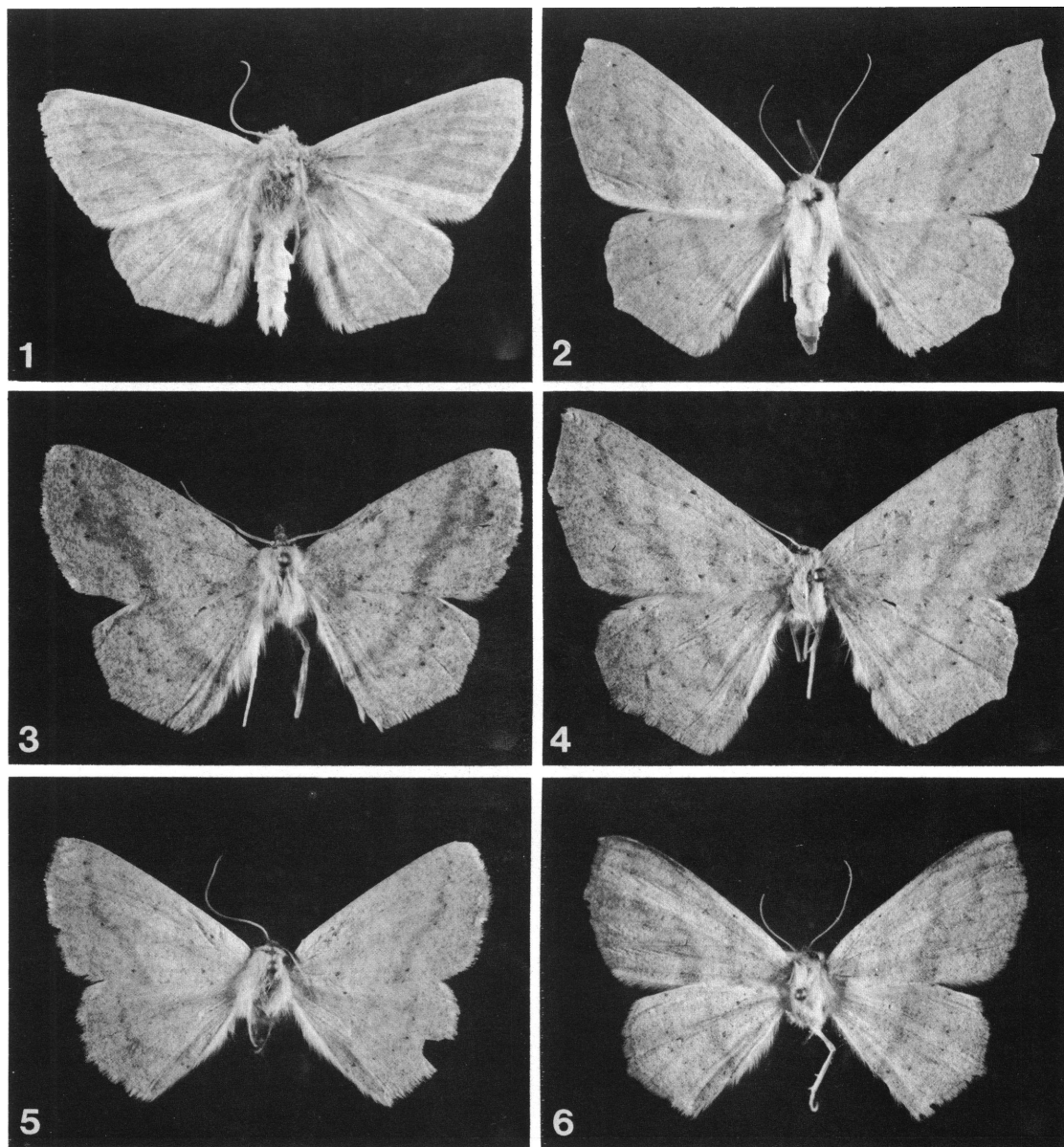
Etymology. I take pleasure in naming this subspecies after Charles Oberthür, who first called attention to it.

***Sabulodes plauta*, new species**

Figures 5, 6, 16, 22

Sabulodes aegrotata (misidentification): Druce, 1891 (1891-1900), p. 15 (in part).

Diagnosis. This large Mexican and Central American species is very similar in color and maculation to *caberata oberthuri*; the genitalia should be used to separate the two. In the male structures, the present species can be recognized by the much wider median swollen area of the gnathos, and in the female by the longer and differently shaped lamella postvaginalis and by the longer ductus bursae.



FIGS. 1-6. Adults of *Sabulodes*. 1, 2. *S. caberata caberata* Guenée. 1. Male, lectotype, Brazil (BMNH). 2. Female, Buenos Aires, Argentina, December 7, 1951 (AMNH). 3, 4. *S. caberata oberthuri*, new subspecies. 3. Male, holotype, Tandapi, Pichincha, Ecuador, December 25, 1970 (L. E. Peña; AMNH). 4. Female, allotype, Tandapi, Pichincha, Ecuador, January 28, 1971 (L. E. Peña; AMNH). 5, 6. *S. plauta*, new species. 5. Male, holotype, Jalapa, Mexico (W. Schaus; AMNH). 6. Female, allotype, Jalapa, Mexico (W. Schaus; AMNH). All $\times 1.4$.

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

Upper Surface of Wings: Similar to that of

caberata oberthuri but with maculation tending to be slightly more prominent; all wings with more scattered dark brown scales.

Under Surface of Wings: Similar to that of *caberata oberthuri* but tending to have weaker maculation, with reduced apical area near apex of forewing.

Length of Forewing: 18 to 22 mm.; holotype, 20 mm.

Female. Similar to male.

Length of Forewing: 20 to 24 mm.; allotype, 22 mm.

Male Genitalia. Similar to those of *caberata*, differing mainly as follows: uncus longer and more slender; socius more rounded apically, with setae situated apically, fewer in number; gnathos with broader median enlargement, more than twice as wide as long, median ridge in shape of inverted Y; valves with each free costal arm much longer, curving beyond valve, smooth, not scobinate; anellus with anterior portion more slender, having slender longitudinal ridge, posterior pair of broad sclerotized lateral thickenings with outward median projection, distal end tending to be more or less square; aedeagus 3.1 to 3.5 mm. in length, with prominent sclerotized ridge enlarged posteriorly and bearing variable number of small prominent toothlike enlargements; vesica, when everted, extending ventrally, with large posterior sac at end of aedeagus, and with double smaller swelling on right side, apically tapering.

Female Genitalia. Similar to those of *caberata*, differing mainly as follows: lamella postvaginalis slightly larger, 1.4 to 1.7 mm. in length, with curved, weakly striate junction with ductus bursae, slightly constricted anteriorly, posterodorsal margin more deeply cleft; sterigma with lateral margins more rugose around lamella postvaginalis; ductus bursae longer, 1.4 to 1.7 mm. in length, slightly narrower; ductus seminalis arising more to left of ductus bursae; corpus bursae with wider posterior sclerotized area near ductus bursae. Apophyses posteriores longer, 1.9 to 2.6 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Holotype, male, and allotype, female, Jalapa, [Veracruz], Mexico (W. Schaus). The genitalia of the holotype are mounted on slide FHR 14271 and of the allotype on FHR 14290. Paratypes, all from Veracruz, Mexico:

same data and collector as holotype, 28 males, 53 females; Jalapa, no collector or date, one male, one female; Jalapa, September (C. C. Hoffmann), one male, one female; Jalapa (M. Trujillo), two males, two females; Jalapa (J. Camelog), one male; Jalapa, August 1948, December 1948, one male, one female; Orizaba, July 18, 1948, July 1948, September 1948, November 1948, three males, two females; Orizaba, February 1896, April 1896 (W. Schaus), two males; Orizaba, June 1907 (C. C. Hoffmann), one female; Coatepec, one male; Villa Juarez, October 1951, one female; Cuesta de Misantla (M. Trujillo), one female; "Vera Cruz", 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, of the British Museum (Natural History), and of the National Museum of Natural History.

I have purposely restricted the type series to specimens from Veracruz, Mexico.

Distribution. Southern Mexico to western Panama. (See Appendix 1 for locality data of specimens examined.) The species is found from near sea level up to at least 2730 meters.

Flight Period. Adults have been captured in every month of the year.

Remarks. One hundred sixty-two specimens (71 males, 91 females) and 28 genitalic dissections (16 males, 12 females) have been studied.

The amount of individual variation in color and pattern is about the same as is found in *caberata oberthuri*.

The toothlike projections near the posterior end of the aedeagus in *caberata* tend to be rather large, clearly defined and separate. In *plauta* there is generally a raised dentate ridge with a variable number of smaller dentitions. In *caberata* the ventral membranous area between the sterigma and papillae anales is smooth when extended; in *plauta* it tends to have a number of rather prominent transverse ridges.

At least some of Druce's material of *aegrotata* (a misidentification) is referable to this species (Druce, 1891 [1891-1900], p. 15); specimens from Jalapa and Cuesta de Misantla, Veracruz, are now paratypes of *plauta*. I have not examined any of his identified and labeled specimens from Guatemala, Panama, Colom-

bia, or Peru; material from the last two countries definitely does not belong to this species.

Etymology. The specific name is from the Latin *plautus*, broad or flat, in reference to the nature of the median swollen area of the gnathos.

Sabulodes aegrotata (Guenée), revised status
Figures 7-14, 17, 23

Tetracis aegrotata Guenée, 1857, p. 141. Packard, 1876, p. 555, pl. 13, fig. 65 (male).

Choerodes aegrotata: Packard, 1870, p. 382. Edwards, "1873" [1874], p. 372 (early stages).

Sabulodes aegrotata: Smith, 1891, p. 65 (as synonym of *dositheata*); 1903, p. 81 (as synonym of *caberata*). Dyar, "1902" [1903], p. 346 (as synonym of *caberata*).

Ennomus [sic] (*Antepione*) *aegrotata*: Gumpfenberg, 1895, p. 380.

Sabulodes caberata form *aegrotata*: Barnes and McDunnough, 1917a, p. 123. McDunnough, 1938, p. 170. Pronin, "1952" [1953], p. 94 (illustrated).

Sabulodes caberata (misidentification): Hulst, 1896, p. 383. Dyar, "1902" [1903], p. 346. Smith, 1903, p. 81. Barnes and McDunnough, 1917a, p. 123. Comstock, 1929, p. 56, pl. 32 (early stages). Essig, 1936, p. 701, figs. 579-581 (early stages, adult). McDunnough, 1938, p. 170. Quayle, 1938, p. 347, figs. 239, 240 (adult, larvae, pupae). Forbes, 1945, p. 193 (pupa). Pronin, "1952" [1953], p. 94 (illustrated). Frick and Hawkes, 1970, p. 1088 (food plants). Tietz, 1972, p. 152. McFarland, 1975, p. 118 (food plants). Wheeler, 1975, p. 37 (food plant).

Sabulodes dositheata (misidentification): Smith, 1891, p. 65. Dyar, 1894, p. 56 (early stages, food plants).

Ennomos ? *arsesaria* Walker, 1860a, p. 260.

Sabulodes arsesaria [sic]: Dyar, "1902" [1903], p. 346 (as synonym of *caberata*).

Sabulodes arsesaria: Barnes and McDunnough, 1917a, p. 123 (as synonym of *caberata*).

Sabulodes caberata form "arsesaria": Pronin, "1952" [1953], p. 94 (illustrated).

Sabulodes caberata form *cottlei* Barnes and Ben-

jamin, 1926, p. 41. McDunnough, 1938, p. 170. Pronin, "1952" [1953], p. 94 (illustrated).

Diagnosis. This North American species is variable in color and maculation; it is the only *Sabulodes* known to have a melanistic form. The present species is similar to *caberata*; the genitalia should be used to separate the two. In the male structures, the present species has a tapering uncus, a small rounded median enlargement of the gnathos, and the everted vesica has a large rounded dorsal swelling; in the female, the lamella postvaginalis is much flatter and the ridged sterigma is larger.

Male. Head, thorax, and abdomen similar to those of *caberata*; some specimens with upper portion of front without dark band.

Upper Surface of Wings: Variable in color, ranging from cream or pale yellow to ochraceous, brown or blackish brown (melanistic form); maculation absent in some specimens, when present, similar to that of *caberata*, with t. a., t. p. and extradistal lines tending to be emphasized by brown venular dots; fringe either concolorous with wing or with brown spot opposite each vein.

Under Surface of Wings: Similar to upper surface but slightly paler; maculation varying from being absent to having prominent dark brown area near apex of forewings and complete s. t. line on all wings.

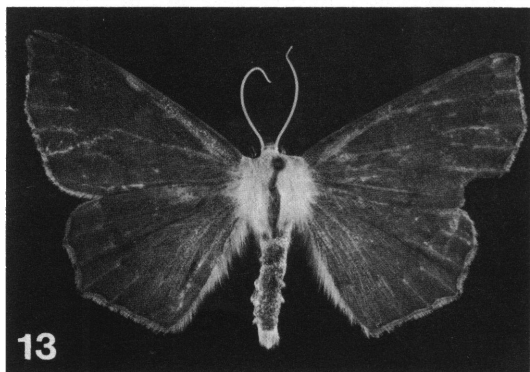
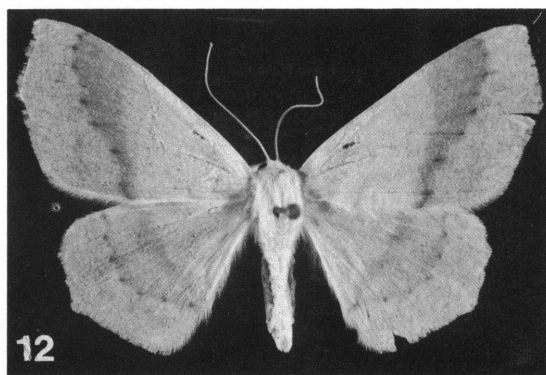
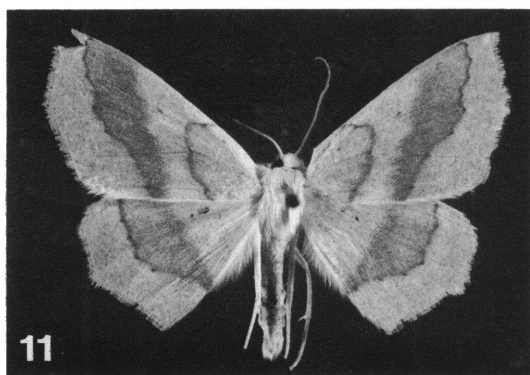
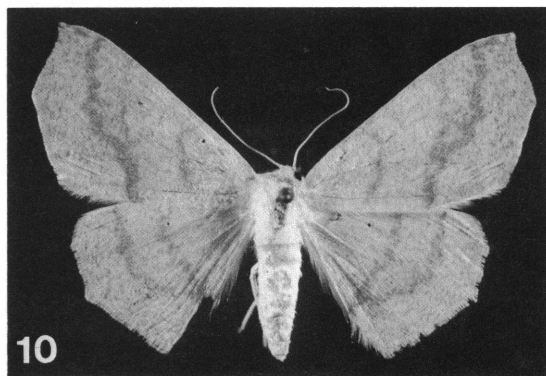
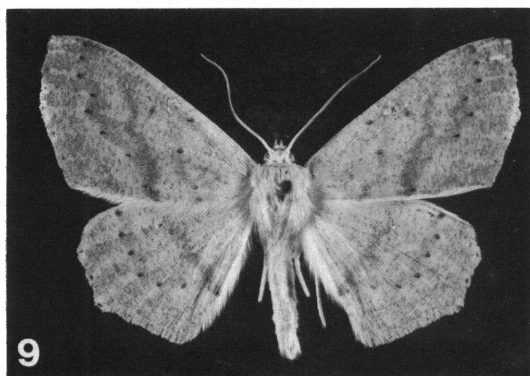
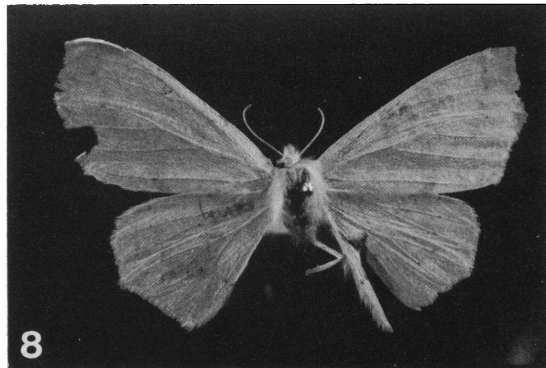
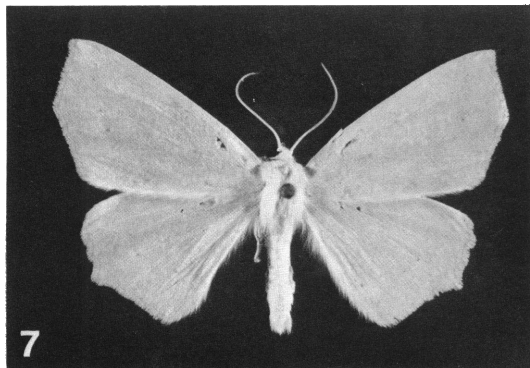
Length of Forewing: 17 to 23 mm.

Female. Similar to male.

Length of Forewing: 20 to 26 mm.

Male Genitalia. Similar to those of *caberata*, differing mainly as follows: uncus longer and more slender; gnathos with smaller median projection and ridge; valves with each free costal arm bent at right angle, straight, smooth, not scobinate; anellus narrower anteriorly, posterior extension wider, especially posteriorly, more evenly sclerotized, having partial longitudinal median groove; aedeagus with low posteroventral sclerotized ridge having from

FIGS. 7-14. Adults of *Sabulodes aegrotata* (Guenée). 7. Male, Rancho La Sierra, California, July 7, 1953 (A. H. Rindge; AMNH). 8. Female, holotype of *Ennomos* ? *arsesaria* Walker, California (BMNH). 9. Male, Petaluma, California, May 1, 1940 (E. C. Johnston; AMNH). 10. Female, Berkeley, California, June 22, 1948 (F. H. Rindge; AMNH). 11. Male, Los Gatos, California, May 1, 1943 (G. E. Pollard; AMNH). 12. Female, Laytonville, California, August 25, 1948 (R. F. Sternitzky; AMNH). 13. Male, holotype of "cottlei," San Francisco, California (USNM). 14. Female, Albany, California, November 24, 1969 (K. E. Frick; AMNH). All $\times 1.4$.



three to 14 short spinelike teeth, some specimens with teeth in two or three rows; vesica, when everted, extending laterally to right side, broad near aedeagus, having small posterior swelling and large dorsal swelling with smaller dorsal sac, vesica tapering distally.

Female Genitalia. Similar to those of *caberata*, differing mainly as follows: lamella postvaginalis 1.1 to 1.4 mm. in length, shallower, less circular in cross section, with wider ventromedian spacing, and having either rounded or tapering, pointed posterior end; sterigma relatively long and narrow, posteriorly concave, variably rugose near lamella postvaginalis; ductus bursae shorter, 1.0 to 1.1 mm. in length, narrower, less swollen posteriorly; ductus seminalis arising from more definite lobelike sac to left of ductus bursae; corpus bursae with more elongate sclerotized band posteroventrally. Apophyses posteriores 1.6 to 2.1 mm. in length.

Early Stages. These are well known, as this species is a commercial pest. Descriptions have been given by Edwards ("1873" [1874]), Dyar (1894), Comstock (1929), Essig (1936), and Quayle (1938), among others.

Food Plants. The common name for this species is the omnivorous looper. This is very appropriate for this polyphagous species, which feeds on a great variety of plants and trees. Food plant lists are given by Essig (1936) and Tietz (1972), among others; 27 families of plants are attacked (Frick and Hawkes, 1970). Commercial crops that are attacked include avocado, citrus, and walnuts. Apparently the caterpillars of this species do not eat conifers.

Types. Guenée described *aegrotata* from one male in Boisduval's collection. Guenée's types of North American moths were purchased by William Barnes, and all are supposedly in the National Museum of Natural History. However, there is no type specimen of *aegrotata*; instead, there is a handwritten note in that collection stating that this type was never received. The collection does have two specimens, both females, that are presumably from the Guenée collection (and have been in the Mabille, Oberthür, and Barnes collections); one bears a holographic label that states, in part, "ex coll.

Bdv., specimen typicum descriptum." It is doubtful that Guenée would have confused the sexes of this species, as both the tip of the abdomen and frenulum are distinctive. Hence I doubt if either one of these moths is the original type. The collection of the British Museum (Natural History) does not have any material that could be considered as a possible type (D. S. Fletcher, in letter). Viette (1950) does not list it among the types in the Muséum National d'Histoire Naturelle. Consequently, I am assuming that the type is lost. As there is no possibility of confusing this species with any other in the area in which it occurs, I do not think the designation of a neotype would serve any real purpose, and so I have not taken this step.

Walker described *arsesaria* from a single female. This specimen (see fig. 8) is in the British Museum (Natural History); its genitalia are mounted on slide FHR 17982.

The holotype, male, of form "cottlei" (see fig. 13) is in the National Museum of Natural History.

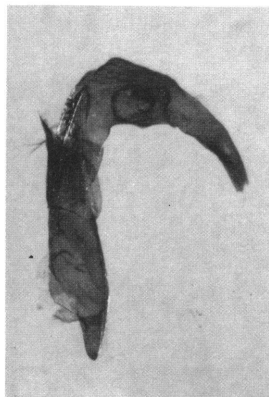
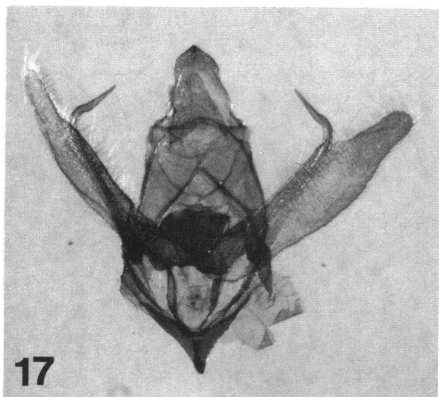
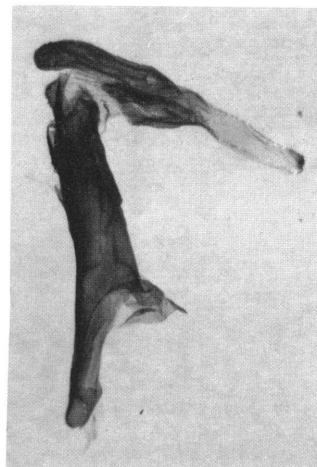
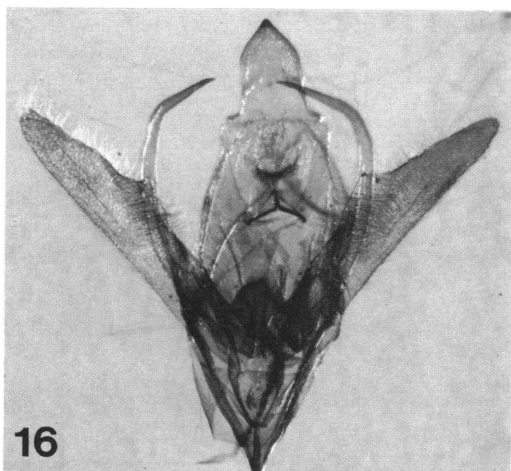
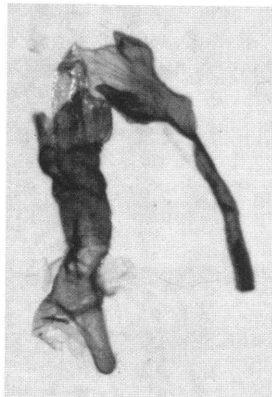
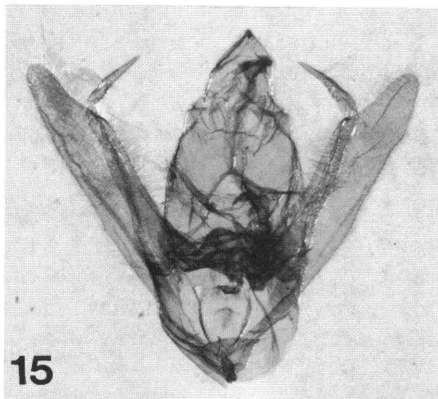
Type Localities. California, for both *aegrotata* and *arsesaria*. San Francisco, San Francisco County, California, for "cottlei."

Distribution. Coastal western North America, from northwestern Baja California to northwestern Oregon. The species occurs on the Channel Islands off the southern California coast; I have examined material from Santa Catalina, Santa Cruz, and Santa Rosa Islands. (See Appendix 1 for locality data of specimens studied.)

Flight Period. Every month of the year.

Remarks. Two hundred eighty-four specimens (206 males, 78 females) and 24 genitalic dissections (15 males, 9 females) have been studied.

The adults of this species show the greatest variation in color and pattern of any *Sabulodes*. The upper surface of the wings ranges from a pale cream color, without any trace of pattern, to a dark brownish black, with but a faint trace of maculation (form "cottlei"); intergrades of all colors and patterns are present. The greatest amount of variation is found in the San Francisco Bay area; to a lesser degree, it is found



FIGS. 15-17. Male genitalia of *Sabulodes*. 15. *S. caberata caberata* Guenée, Boraceia, São Paulo, Brazil, October 21-25, 1963 (P. Wygodzinsky; AMNH). 16. *S. plauta*, new species, La Unión, Zacapa, Guatemala, November 5, 1972 (E. C. Welling; AMNH). 17. *S. aegrotata* (Guenée), Reed, Oregon, July 16-31, 1926 (E. McKinney; AMNH).

northward. The moths from southern California are relatively uniform; a number of specimens tend to be paler than the ones from central California.

The genitalia of *aegrotata* are quite similar to those of the two preceding species. The males have a narrower gnathos, with the median enlargement being much smaller in *plauta*. In the everted vesica, the present species has larger swellings than are found in either *caberata* or *plauta*. There are variations in size of these swellings, but these are presumed to be the result of everting. The apex of the lamella postvaginalis is apparently more variable in *aegrotata* than in the two preceding species, as it is seldom alike in any two specimens. The range of variation is from having a small median indentation (never as large as in *plauta*), to more or less truncate, to being rounded or bluntly pointed.

***Sabulodes solola*, new species**

Figures 18, 24, 27, 28

Diagnosis. This large species, from Mexico and Guatemala, is somewhat variable in color and maculation; it is very similar to *aegrotata*, and the genitalia are helpful in separating the two species. In the male, the present species has the anterior margin of the anellus tending to be narrower and more U-shaped, with the posterior region being finely punctate, whereas in *aegrotata* the anterior margin is wider and more V-shaped, with the posterior region smoothly sclerotized. The lamella postvaginalis of the present species has the anterior margin prominently V-shaped, being finely and irregularly dentate; in *aegrotata* this margin is much less prominent and more rounded.

Male. Head, thorax, and abdomen similar to those of *aegrotata*; front with dark ventral band tending to be reduced or absent.

Upper Surface of Wings: Variable in color, ranging from cream or pale yellow to pale brown, having few to very many pale grayish brown to brown scales; maculation variable, ranging from obsolescent to weakly represented, similar to that of *aegrotata*; t. p. and extradiscal lines with variable number of venular dots; fringe tending to have weak dots opposite vein endings.

Under Surface of Wings: Similar to that of *aegrotata*, with variable amount of pale grayish brown scaling.

Length of Forewing: 19 to 22 mm.; holotype, 20 mm.

Female. Similar to male.

Length of Forewing: 20 to 23 mm.; allotype, 22 mm.

Male Genitalia. Similar to those of *aegrotata*, differing mainly as follows: gnathos with larger, more rectangular median area, 0.3 mm. in width, and with weakly developed longitudinal ridge; valves with each free costal arm bent at right angle, slender, weakly sinuate to straight; anellus with surface slightly more punctate; aedeagus with low posteroventral ridge having from two to eight spinelike teeth; vesica with swellings nearer aedeagus.

Female Genitalia. Similar to those of *aegrotata*, differing mainly as follows: lamella postvaginalis 1.3 to 1.4 mm. in length, flatter, semicircular in cross section, anterior end prominently V-shaped with raised, finely and irregularly dentate margin; posterior margin variable, ranging from flatly rounded, to having median incision, or bluntly pointed; sterigma shorter and more V-shaped, more smoothly sclerotized, with one or more narrow transverse ridges on each side; ductus bursae 0.8 to 1.2 mm. in length, lateral sclerotized areas slightly narrower, posterior end with rounded swelling; corpus bursae tending to be slightly shorter. Apophyses posteriores 1.7 to 2.0 mm. in length.

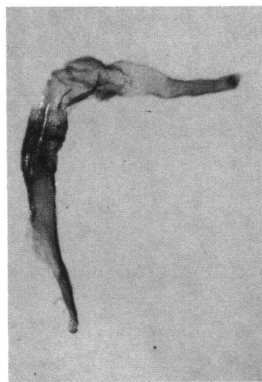
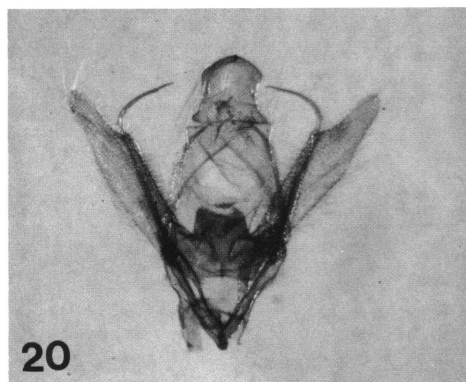
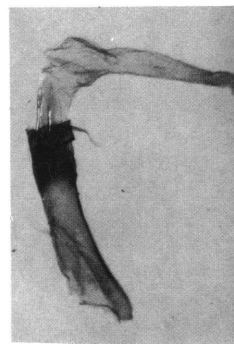
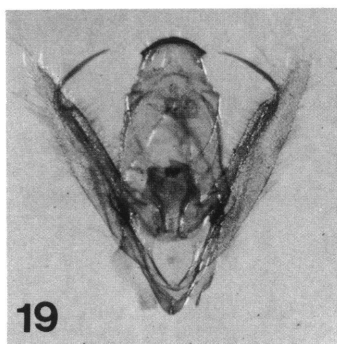
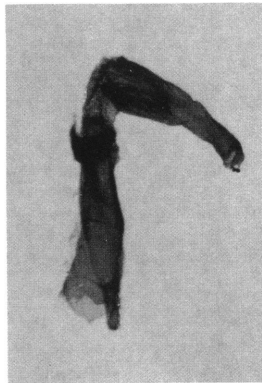
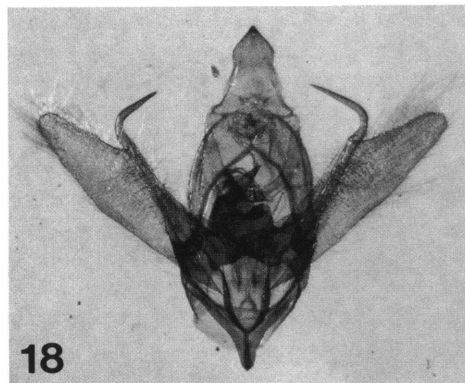
Early Stages. Unknown.

Food Plant. Unknown.

Types. Holotype, male, Chuchexik, above 2250 meters, Municipio Santa Lucia Utatlan, Solola, Guatemala, October 17, 1966 (E. C. Welling); allotype, female, same data and collector but dated October 18, 1966. The genitalia of the holotype are mounted on slide FHR 14285, and of the allotype on FHR 17856. Paratypes, all from Guatemala: *Solola*: same data as types, October 17, 19, 1966, two males, three females; same data and collector as types, 2200 meters, November 2, 3, 1975, four males, two females; Xajaxac, 2325 meters, November 1, 1975 (E. C. Welling), one male; Pahaj, 2350 meters, Municipio Santa Lucia Utatlan, November 5, 1975 (E. C. Welling), one male, one

female; Los Encuentros, 2400 meters, October 30, 1975 (E. C. Welling), one male. *Chimaltenango*: Quisache, 1750 meters, Municipio Acatenango, November 10, 1966 (E. C. Welling), one male; Tecpan, Guatemala, 2125

meters, October 29, 1975 (E. C. Welling), two males, three females; Sumpango, 1800 meters, October 26, 1975 (E. C. Welling), one male; Zaragoze, 2000 meters, October 27, 1975 (E. C. Welling), two males.



FIGS. 18-20. Male genitalia of *Sabulodes*. 18. *S. solola*, new species, Ixmiquilpan, Hidalgo, Mexico, September 26, 1967 (E. C. Welling; AMNH). 19. *S. prolata*, new species, El Choro, La Paz, Bolivia, January 7-8, 1976 (L. E. Peña; AMNH). 20. *S. atropesaria* (Walker), holotype, Bogota, Colombia (BMNH).

The holotype and allotype are in the American Museum of Natural History; paratypes are in the collections of that institution and of the British Museum (Natural History).

I have purposely restricted the type series to specimens from Guatemala.

Distribution. Guatemala and Mexico. (See Appendix 1 for locality data of specimens examined.) This species is apparently restricted to the Highlands Zone; those specimens with altitude data are from 1700 to 2725 meters.

Flight Period. Adults have been seen in every month of the year except February and April; the species probably flies throughout the year.

Remarks. Fifty-one specimens (28 males, 23 females) and 20 genitalic dissections (10 males, 10 females) have been studied.

A comparison of the genitalia of both sexes indicates that this species is closely related to *aegrotata*. The color and maculation of *solola*, while being variable, do not begin to show the amount of variation present in the more northern species.

The present species is sympatric in part of its distribution with *plauta*. The latter is more widespread, extending south into Panama, and it apparently occurs at a considerably greater range of elevations, from near sea level to above 2700 meters. In color and maculation, *solola* tends to be slightly paler, to have more brown scaling over the upper surface of the wings, and to have less contrasting maculation than is found in *plauta*.

The range of variation within the genitalia of both sexes of *solola* is about the same as is found in the preceding species. One of the more obvious variants is found in the everted vesica; as already mentioned under *aegrotata*, this is presumed to be the result of everting. Another variant is the apex of the lamella postvaginalis; this, too, was discussed for the previous species.

Etymology. The specific name is a noun in apposition taken from the type locality.

***Sabulodes prolata*, new species**

Figures 19, 25, 29, 30

Diagnosis. This South American species is slightly smaller than *caberata oberthuri*, has

paler wings and tends to have nebulous dark spots in the outer part of the forewings on vein M_3 and in cell Cu_2 . The present species is separated, in the male genitalia, from all the preceding species by the broad uncus, and in the female genitalia by the much longer and more slender ductus bursae.

Male. Head, thorax, and abdomen similar to those of *caberata oberthuri*, but with dorsal dark band of front tending to be wider.

Upper Surface of Wings: Cream-colored, more or less heavily and evenly covered with pale grayish brown scales; maculation as in *caberata oberthuri* but with cross lines narrower, less diffuse, and tending to have nebulous grayish brown spots in outer part of forewings on vein M_3 and in cell Cu_2 ; t. a., t. p., and extradiscal lines with small dark venular dots.

Under Surface of Wings: Similar to that of *caberata oberthuri* but whiter; forewing with subapical patch small, dark brown, with second dark brown spot on vein M_3 in most specimens; s. t. line represented on all wings by small dark brown venular dots.

Length of Forewing: 18 to 21 mm.; holotype, 21 mm.

Female. Similar to male.

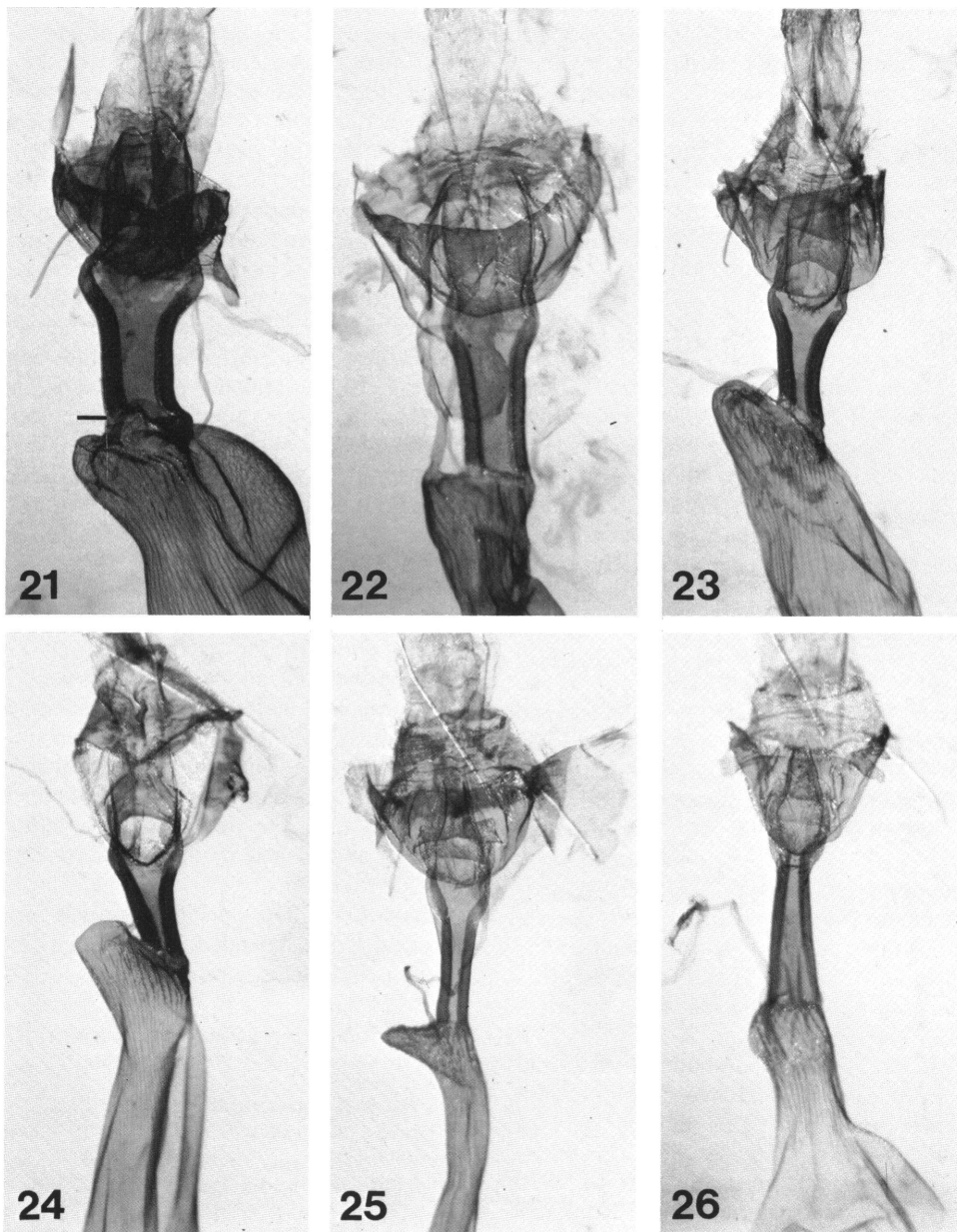
Length of Forewing: 19 to 22 mm.; allotype, 21 mm.

Male Genitalia. Similar to those of *aegrotata*, differing mainly as follows: uncus weakly narrowed medially, swollen apically, apex bluntly tapered and having small median projection; socius slender, finger-like; gnathos elongate, 0.7 to 0.8 mm. long, narrow, with small triangular median enlargement having finely denticulate surface, 0.10 to 0.15 mm. wide; valves with apical portion more slender, each free costal arm more broadly rounded when separating from valve, with apical portion of arm more slender; anellus with larger anterior elliptical section, posterior section shorter, more sharply divergent laterally; combined lengths of tegumen and saccus 2.25 to 2.60 mm.; aedeagus 2.4 to 2.8 mm. in length, without any spinelike teeth posteriorly; vesica, when everted, extending ventrally, straight, at about right angle to aedeagus, having low posterior swelling near apex of aedeagus.

Female Genitalia. Similar to those of *solola*,

differing mainly as follows: lamella postvaginalis shorter, 1.1 to 1.2 mm. in length, nar-

rower, ventral surface flattened, with sides slightly converging dorsally, apex pointed; ste-



FIGS. 21-26. Female genitalia of *Sabulodes*. 21. *S. caberata caberata* Guenée, Curitiba, Paraná, Brazil, April 20, 1973 (O. Mielke; AMNH). 22. *S. plauta*, new species, allotype, Jalapa, Mexico (W. Schaus; AMNH). 23. *S. aegrotata* (Guenée), holotype of *Ennomos ? arsesaria* Walker, California (BMNH). 24. *S. solola*, new species, paratype, Chuchexik, Solola, Guatemala, November 1, 1975 (E. C. Welling; AMNH). 25. *S. prolata*, new species, paratype, Podocayo, Peru (AMNH). 26. *S. atropesaria* (Walker), Balzapampa, Bolivar, Bolivia, 1893 (M. de Mathan; BMNH).

rigma with large median area having raised ridge on each side, laterally with posteriorly extended areas, their posterior margins rugose; ductus bursae much longer and more slender, 1.5 to 2.0 mm. in length, posteriorly swollen and extending around lamella postvaginalis; ductus seminalis arising from jutting lobe to left of ductus bursae; corpus bursae tending to have posterior sclerotized area on dorsal surface, and tending to be more constricted medially. Apophyses posteriores 1.9 to 2.0 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Holotype, male, and allotype, female, Machu Picchu, 2300 meters, Cuzco, Peru, October 21-24, 1972 (P. Wygodzinsky). The genitalia of the holotype are mounted on slide FHR 17825 and of the allotype on FHR 17842. Paratypes, all from Peru: La Merced, [Junín], various dates in February, March, August, September, and October 1951 (Rivas), 20 males; Chanchamayo, La Merced, [Junín] (C. O. Schunke), two males; Chanchamayo, [Junín] (Schunke) two males; Chanchamayo, [Junín], one male; Huancabamba, Cerro de Pasco, [Pasco] (E. Boettger), two males, one label without elevation, the other "6-10,000 ft."; Huancabamba, [Pasco], one male; La Oroya, R[ío] Inambari, Carabaya, 3100 feet, [Puno], September, [19]05 (Ochenden), one male; Podacayo, 11,000 feet, one female.

The holotype and allotype are in the American Museum of Natural History; paratypes are in the collections of that institution and of the British Museum (Natural History).

I have purposely limited the type series to specimens from Peru.

Distribution. Central and southern Peru, and adjacent Bolivia in the Andes, and southeastern Brazil. (See Appendix 1 for locality data of specimens examined.) The Andean specimens have been captured from about 900 to 3300 meters; the Brazilian material from 830 to 950 meters.

Flight Period. Specimens have been examined from every month of the year except June, November, and December.

Remarks. Forty-three specimens (38 males, five females) and 14 genitalic dissections (nine males, five females) have been studied.

The amount of individual variation in color and maculation is relatively small in *prolata*. The most obvious variability is in the presence or absence of the nebulous dark spots in the outer part of the forewings above; there is a rather large range in the size of the two spots, and whether both or just one are present.

There is some variation in the thickness and curvature of the free costal arm in the male genitalia. Specimens from Peru (six dissections) appear to have relatively slender and very weakly bicurved arms, whereas material from Brazil (two dissections) have the arms slightly thicker and evenly curved. In the female genitalia, there is a difference in the combined lengths of the lamella postvaginalis and the ductus bursae, measured from the posterior tip of the former to the midline junction of the latter with the corpus bursae. In two specimens from Peru this length is 2.5 to 2.7 mm., in the one Bolivian dissection it is 2.7 mm., but in both Brazilian specimens the distance is 3.2 mm.

The distribution of *prolata*, insofar as it is known, shows a gap of more than 1000 miles between the Andean and Brazilian populations. It is probable that this is, at least in part, a reflection of the lack of collecting in the intervening territory. Much more material is needed before we can begin to tell if there is any significance to the differences in genitalia as outlined above, and if this is indeed correlated with distribution.

Etymology. The specific name is from the Latin *prolatus*, extended or elongated, in reference to the ductus bursae.

Sabulodes atropesaria (Walker)

Figures 20, 26, 31-34

Choerodes ? *atropesaria* Walker, 1860a, p. 222.

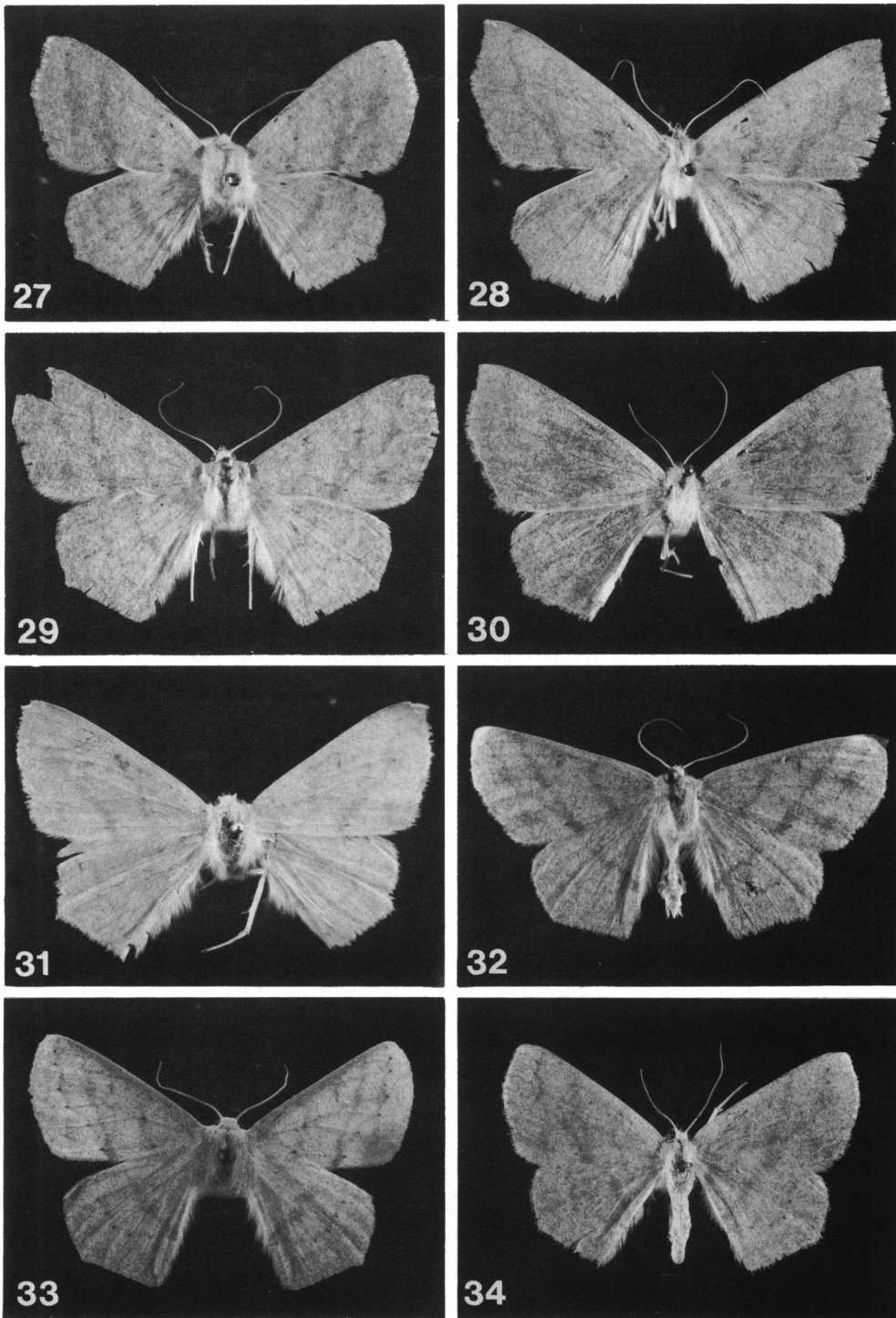
Druce, 1891 (1891-1900), p. 16 (as synonym of *colombiata*).

Sabulodes atropesaria: Prout, 1910, p. 308.

Tetracis aegrotata v[ariety] *polyphagaria* Felder, Felder, and Rogenhofer, 1873 (1864-1875), p. 19, pl. 122, fig. 5 (male). NEW COMBINATION and NEW SYNONYM.

Sabulodes arenularia Snellen, 1874, p. 12, pl. 1, fig. 1 (male). Prout, 1910, p. 308 (placed as synonym of *atropesaria*).

Diagnosis. This Andean species is similar to



FIGS. 27-34. Adults of *Sabulodes*. 27, 28. *S. solola*, new species. 27. Male, holotype, Chuchexik, Solola, Guatemala, October 17, 1966 (E. C. Welling; AMNH). 28. Female, allotype, Chuchexik, Solola, Guatemala, October 18, 1966 (E. C. Welling; AMNH). 29, 30. *S. prolata*, new species. 29. Male, holotype, Machu Picchu, Cuzco, Peru, October 21-24, 1972 (P. Wygodzinsky; AMNH). 30. Female, allotype, Machu Picchu, Cuzco, Peru, October 21-24, 1972 (P. Wygodzinsky; AMNH). 31-34. *S. atropesaria* (Walker). 31. Male, holotype, Bogota, Colombia (BMNH). 32. Male, lectotype of *Tetracis aegrotata* var. *polyphagaria* Felder, Felder, and Rogenhofer, Bogota, Colombia (BMNH). 33. Male, lectotype of *S. arenularia* Snellen, Bogota, Colombia (RM). 34. Female, Balzapamba, Bolivar, Ecuador, 1893-1894 (M. de Mathan; BMNH). All $\times 1.4$.

prolata, but lacks the dark submarginal spots on the forewings of that species. The best way to separate the two species is by their genitalia; in the present species, the male structures have a shorter tegumen and saccus, the median swelling of the gnathos is wider, and the everted vesica has a swelling on the right side. In the female genitalia, the lamella postvaginalis is shorter and broader, the sterigma is differently shaped, and the ductus seminalis arises nearer the ductus bursae.

Male. Head, thorax, and abdomen similar to those of *prolata*, but some specimens slightly darker above.

Upper Surface of Wings: Similar to that of *prolata* in color and maculation, some specimens having more dark scaling and with submarginal spots of forewing reduced or absent.

Under Surface of Wings: Similar to that of *prolata*, with forewings varying from having only subapical patch, to separate dark subapical and vein M_3 areas, to dark brown band from costa posterior to vein M_3 .

Length of Forewing: 18 to 22 mm.

Female. Similar to male.

Length of Forewing: 18 to 20 mm.

Male Genitalia. Similar to those of *prolata*, differing mainly as follows: smaller, combined lengths of tegumen and saccus 2.15 to 2.35 mm.; uncus tending to be slightly less enlarged distally; gnathos shorter, 0.6 to 0.7 mm. long, more heavily dentate median enlargement 0.2 to 0.3 mm. wide; aedeagus 2.5 to 2.7 mm. in length; vesica, when everted, having swelling on right side near apex of aedeagus.

Female Genitalia. Similar to those of *prolata*, differing mainly as follows: lamella postvaginalis shorter, broader, 0.9 to 1.0 mm. in length, apex evenly tapering to point; sterigma tending to be more strongly developed around junction of lamella postvaginalis and ductus bursae, central area shorter, tending to be convex posteriorly and not as well defined laterally; ductus bursae 1.5 to 1.6 mm. in length, tending to increase slightly in width anteriorly; ductus seminalis arising near left side of ductus bursae; corpus bursae with small rounded area to left of junction with ductus bursae, posteriorly more broadly sclerotized, not as constricted medially and having fewer

longitudinal striations. Apophyses posteriores 1.7 to 1.8 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Walker described *atropesaria* from a single male (see fig. 31); the holotype is in the British Museum (Natural History). Its genitalia are mounted on slide FHR 18013.

Felder, Felder and Rogenhofer had at least one male and one female when naming *polyphagaria*. Only the male (see fig. 32) has been located; it is hereby designated, and it has been labeled as, the lectotype. Its genitalia are on slide FHR 18112. This type is in the collection of the British Museum (Natural History).

Snellen described *arenularia* from three male specimens. In the collection of the Rijksmuseum van Natuurlijke Historie, R. de Jong has located two specimens labeled by Snellen that are *arenularia*. One is a male, the other a female; the latter cannot be considered as a syntype, unless Snellen misidentified its sex. I hereby designate, and have labeled, the male as the lectotype of *arenularia* (see fig. 33); its genitalia are mounted on slide FHR 18126. The lectotype bears the following Snellen labels: "65; Am. mer. N. Grenada. v. Nolcken."

Type Locality. Bogota, Cundinamarca, Colombia (for *atropesaria*, *polyphagaria*, and *arenularia*).

Distribution. In the Andes from Colombia into Bolivia. Insofar as can be ascertained from label data, this species occurs at relatively low elevations, ranging from about 300 to 2400 meters. (See Appendix 1 for locality data of specimens studied.) Prout (1910, p. 308) reported the species as occurring in Argentina, but without having seen the actual specimens; this distributional record needs to be verified.

Flight Period. February, July, August, September, and November are the only definite dates available. As more than half the specimens studied were undated, it is assumed that *atropesaria* has a longer flight period than indicated above.

Remarks. Thirty specimens (24 males, six females) and 21 genitalic dissections (17 males, four females) have been studied.

The holotype of *atropesaria* is somewhat worn but the maculation is still relatively dis-

tinct. The genitalia are distinctive, and hence there is no problem in identifying the species.

The lectotype of *polyphagaria* is in excellent condition. Presumably it was this male specimen that served as the model for the figure of the male given by the Felders and Rogenhofer; the similarity is not noticeable, as the figure is very inaccurate.

The lectotype of *arenularia* is also in excellent condition. It is quite possible that this specimen was the model for Snellen's plate 1, figure 1; this illustration is quite accurate.

In size, color, maculation, and degree of variability, *atropesaria* is almost indistinguishable from *prolata*. The genitalia also indicate a close relationship between the two species. The female structures have characters that are more easily recognized in separating *atropesaria* from *prolata*.

The synonymy, given by Druce (1891 [1891-1900], p. 16) for *atropesaria* is in error, as *colombiata* Guenée has been removed from *Sabulodes*. The Mexican specimens listed by Druce (*op. cit.*) under the above name are *subalbata* (Dognin).

***Sabulodes wygodzinskyi*, new species**

Figures 35, 36, 47, 56

Diagnosis. This Colombian species is very similar to *prolata*, and the two should be separated by means of the genitalia. In the male structures, the present species has the costal arms of the valves broadly curved, and the aedeagus with a posteroventral row of teethlike projections (in *prolata*, the costal arms are bent at a right angle, with the distal portion straight, and the aedeagus is without teethlike projections); in the female, the present species has a much smaller and differently shaped lamella postvaginalis, a larger sterigma and a wider ductus bursae than are found in *prolata*.

Male. Head, thorax, and abdomen similar to those of *prolata*, with dark dorsal band across front tending to be narrower.

Upper Surface of Wings: Similar in color and pattern to *prolata*, tending to have less clearly defined maculation and lacking the subterminal spots.

Under Surface of Wings: Similar to that of

prolata, with subapical dark spot less strongly represented.

Length of Forewing: 18 to 21 mm.; holotype, 18 mm.

Female. Similar to male.

Length of Forewing: 18 to 20 mm.; allotype, 18 mm.

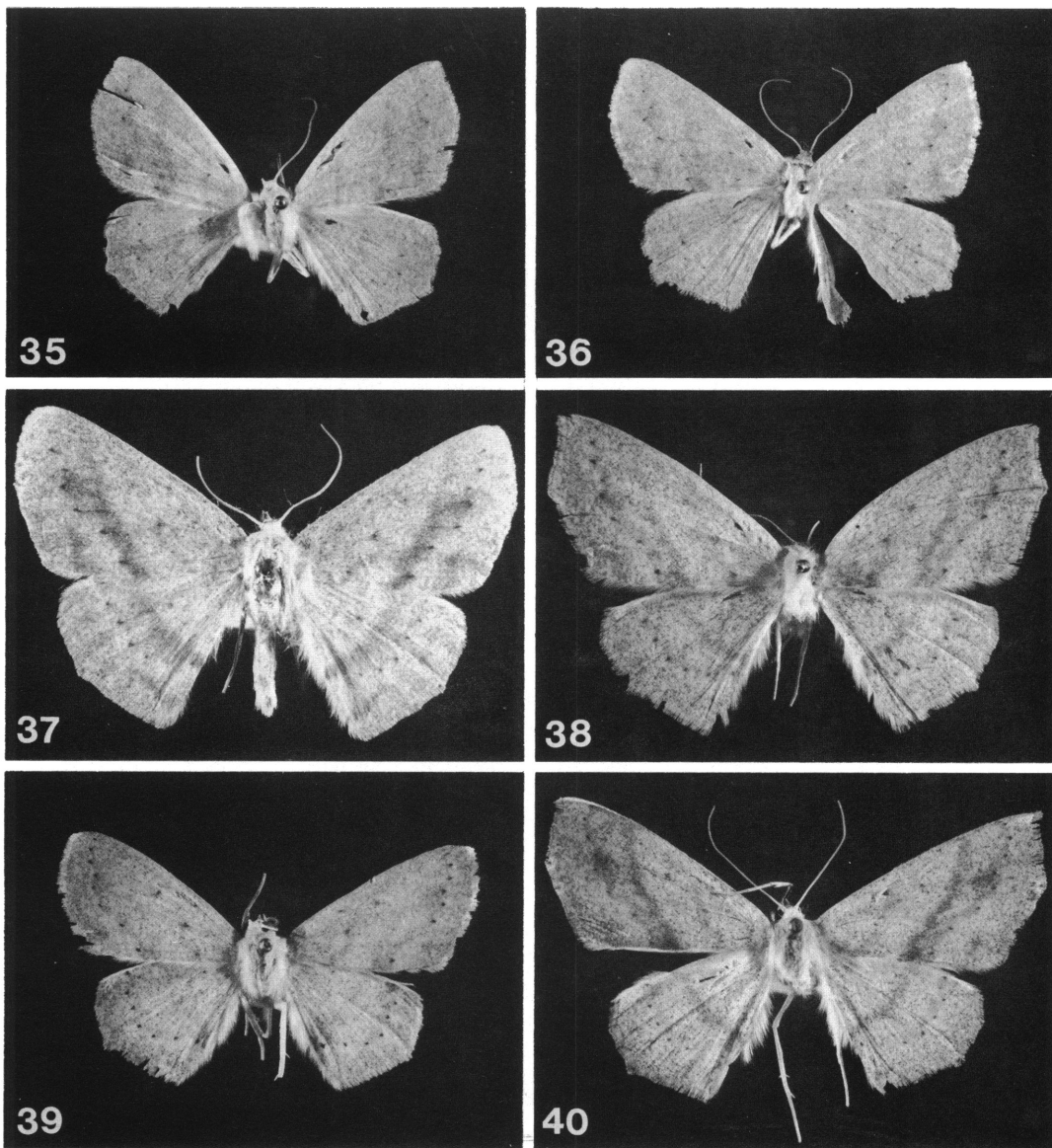
Male Genitalia. Similar to those of *prolata*, differing mainly as follows: uncus with apical portion scarcely swollen; gnathos with small median swelling, 0.15 to 0.20 mm. wide; valves with each free costal arm broadly curving away from valve, apical portion more elongate, very slender; anellus with posterior margin of anterior section sharply and distinctly narrowed, posterior section with each side more broadly sclerotized; aedeagus 2.5 to 2.6 mm. in length, having longitudinal row of two to four spinelike teeth near posterior end; vesica, when everted, extending to right side, and having large swelling posteriorly near apex of aedeagus.

Female Genitalia. Similar to those of *prolata*, differing mainly as follows: lamella postvaginalis shorter, 0.9 mm. in length, broader, semicircular in outline, having raised posteriorly-directed ridge on dorsal surface medially, extending as lateral ridges anteriorly to ductus bursae, posteriorly beyond lamella postvaginalis and terminating in point: sterigma broadly lunate, curving around lamella postvaginalis, being more obvious on right side, and with transversely rugose posterior margin: ductus seminalis arising from left on strongly developed lobe: corpus bursae with narrow dorsal posterior sclerotized area. Apophyses posteriores 1.7 to 1.9 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Holotype, male, and allotype, female, Finca San Pablo, 1800 meters, 3 kilometers north of Albán, Cundinamarca, Colombia, August 1-12, 1967 (P. and B. Wygodzinsky). The genitalia of the holotype are mounted on slide FHR 14952 and of the allotype on FHR 17928. Paratypes, all from Colombia: same data as holotype, eight males, one female; El Congo, Cauca Valley, June, 1917, one male; no additional data (just "Colombia"), six males, one female.



FIGS. 35-40. Adults of *Sabulodes*. 35, 36. *S. wygodzinskyi*, new species. 35. Male, holotype, Finca San Pablo, Cundinamarca, Colombia, August 1-12, 1967 (P. and B. Wygodzinsky; AMNH). 36. Female, allotype, Finca San Pablo, Cundinamarca, Colombia, August 1-12, 1967 (P. and B. Wygodzinsky; AMNH). 37, 38. *S. boliviaria* Oberthür. 37. Male, holotype, Yunga del Espiritu Santo, Cochabamba, Bolivia, 1888-1889 (P. Germain; BMNH). 38. Female, 50 km. W of Quito, Pichincha, Ecuador, February 24, 1965 (L. E. Peña; AMNH). 39, 40. *S. setosa*, new species. 39. Male, holotype, Vista Hermosa, Oaxaca, Mexico, September 29, 1962 (E. C. Welling; AMNH). 40. Female, allotype, Vista Hermosa, Oaxaca, Mexico, September 22, 1962 (E. C. Welling; AMNH). All $\times 1.5$.

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 British Museum (Natural History).

Distribution. Colombia. (See Appendix 1 for locality data of specimens examined.)

Flight Period. June and August. Additional collecting will undoubtedly increase the known flight period.

Remarks. Twenty-one specimens (18 males, three females) and six genitalic dissections (four males, two females) have been studied.

The moths from Finca San Pablo and "Colombia" are all very similar to one another, whereas the single specimen from El Congo has the upper surface of the wings slightly darker and has more contrasting cross lines and stronger discal dots on the forewings. These differences are not reflected in the genitalia.

Etymology. I take great pleasure in naming this species for my friend and colleague Pedro Wygodzinsky who, assisted by his wife, Betty, collected part of the type series.

Sabulodes boliviaria Oberthür, new status
Figures 37, 38, 48, 57

Sabulodes caberata var. *boliviaria* Oberthür, 1911, p. 41, pl. LXXXIX, fig. 863 (holotype male).

Diagnosis. This Andean species is similar in color and maculation to *caberata oberthuri* but tends to have a wider median area on the upper surface of the forewings. The genitalia should be used to separate the two species. The male structures of the present species can be recognized by the broad capitate uncus and by the setose costal arms; the female by the smaller size, the narrow elongate lamella postvaginalis and by the shorter and thinner ductus bursae, as compared with *caberata*.

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

Upper Surface of Wings: Color varying from cream to brownish buff; maculation similar to that of *caberata* but tending to have wider median area on forewings, and t. a. line longer and more oblique, extending from or near discal dot.

Under Surface of Wings: Color as in *caberata* but with maculation more variable, ranging from nebulous, pale subapical area on forewings to prominent, broad, dark brown subapical band extending from costa into cell Cu_1 and continued on hind wings as paler, less clearly defined band to vein Cu_1 .

Length of Forewing: 20 to 22 mm.

Female. Similar to male.

Length of Forewing: 24 to 25 mm.

Male Genitalia. Similar to those of *prolata*, differing mainly as follows: uncus with base 0.8 to 0.9 mm. wide, with apex having weak lateral projections and median point; gnathos with median enlargement broader than wide, 0.35 to 0.40 mm. across, having weak anteromedian indentation; each valve with shorter, thicker costal arm, broadly curved to form right angle, distal portion extending beyond valve 0.3 to 0.4 mm., thickly covered with short spines on inner surface; anellus with shorter anterior portion, with posterior margin deeply biconcave, posterior portion slightly longer and wider, with more gradually expanding lateral margins; aedeagus 2.5 to 2.7 mm. in length, anterior half sclerotized on ventral surface only, posterior portion on dorsal surface and having short raised ridge with one or several low teeth on left side; vesica, when everted, extending ventrally, having large swelling on right side near apex of aedeagus.

Female Genitalia. Similar to those of *caberata*, differing mainly as follows: lamella postvaginalis longer, 1.2 mm. in length, with pair of lateral ridges extending almost entire length, right ridge extending further anteriorly and curving medially, posterior end deeply emarginate and U-shaped between ridges; sterigma broad, flattened, weakly sclerotized; ductus bursae shorter, 0.9 to 1.1 mm. in length, more slender, without posterior enlargement; ductus seminalis arising nearer ductus bursae, from shorter, less prominent lateral swelling of corpus bursae; corpus bursae with narrow posterior sclerotized area variable in location and extent, either dorsal, ventral, or partially reduced on both surfaces. Apophyses posteriores longer, 2.3 to 2.5 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Type. The holotype, male (see fig. 37), is in the collection of the British Museum (Natural History). Its genitalia are mounted on slide FHR 18079.

Type Locality. Yunga del Espiritu Santo, Cochabamba, Bolivia.

Distribution. Colombia, Ecuador, and Bolivia. (See Appendix 1 for locality data of specimens studied.) I assume that this species also occurs in Peru, although I have not seen any specimens from that country. Based on the few records available, it appears that the moth occurs from about 1500 to 3000 meters in elevation.

Flight Period. January, February, March, June, September, and November. Additional collecting will presumably fill in some or all of the months not listed.

Remarks. Fifteen specimens (eleven males, four females) and 10 genitalic dissections (six males, four females) have been studied.

The holotype is in excellent condition, and it presumably served as the model for Oberthür's figure, published with the original description. The type is not as contrastingly colored as the figure on the upper surface, as the dark areas of the specimen include only the somewhat Y-shaped median and t. p. lines and the median band of the hind wings; the costa and outer margins of all wings are only scarcely darker than the remainder of the wings. The under surface of the figure is a good representation of the holotype.

The upper surface of the wings is, as usual in the species of this group, rather variable in color and maculation. The color tends to be darker, and the outer margins of the wings more angulate, than in the preceding four species. The wings vary from having a "smooth" even color to a "rough," finely speckled tone. The maculation is usually moderately well represented. In general appearance, this species is very similar to the sympatric *caberata* populations, and it is not surprising that Oberthür confused the two. The genitalia of the two species are very different. There appears to be more variation in the color and pattern of the wings than in the genitalia.

***Sabulodes setosa*, new species**

Figures 39, 40, 49, 58

Diagnosis. This central American species is similar to *boliviaria* but is paler in color. The genitalia should be used to separate the two species. The male structures of the present species have the projecting part of the costal arm shorter; in the female the lamella postvaginalis is much flatter and the anterior end is more elliptical, and the corpus bursae is without the posterolateral lobe on the left side, as compared with *boliviaria*.

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

Upper Surface of Wings: Similar in color and maculation to *boliviaria*, tending to be a more uniform buff with scattered brown scales, and with some specimens having slightly more contrastingly colored maculation.

Under Surface of Wings: Similar to that of *boliviaria*; dark subapical area variable in intensity and size, not extending posteriad to vein Cu_1 and absent from hind wings.

Length of Forewing: 18 to 22 mm.; holotype, 19 mm.

Female. Similar to male, but with maculation of upper surface tending to be slightly more strongly represented in some specimens.

Length of Forewing: 22 to 25 mm.; allotype, 23 mm.

Male Genitalia. Similar to those of *boliviaria*, differing mainly as follows: smaller; saccus with processes more posteriad; gnathos with smaller median enlargement, 0.3 mm. wide, with rounded anterior margin; each valve with shorter, more sharply angled free costal arm, 0.2 to 0.3 mm. in length, with apex recurved and thickly covered with short spine-like projections; aedeagus 2.5 to 2.7 mm. in length, posteriorly on left side with more apical, multiple row of short dentitions; vesica, when everted, having smaller swelling basally on left side.

Female Genitalia. Similar to those of *boliviaria*, differing mainly as follows: lamella postvaginalis flattened, barely curved in cross section, without lateral ridges, anterior end slightly swollen, with large elliptical area at

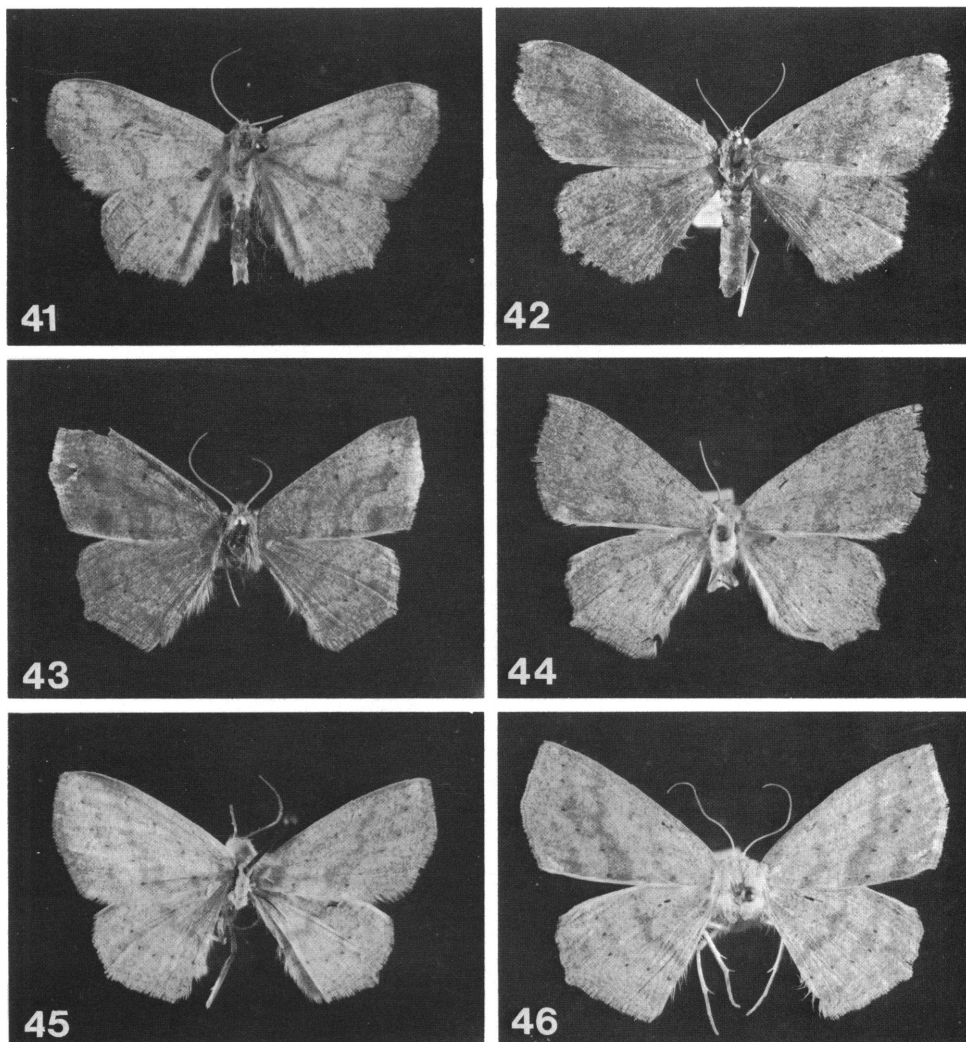
junction with ductus bursae, lamella post-vaginalis weakly and evenly narrowed posteriorly, posterior end truncate, posteromedially varying from having weak indentation to strongly incised; sterigma slightly smaller; ductus bursae laterally broadly sclerotized, posteriorly weakly swollen; ductus seminalis aris-

ing more medioventrally; corpus bursae without posterolateral lobe on left side, weakly swollen and sclerotized ventrally. Apophyses posteriores shorter, 2.0 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Holotype, male, Vista Hermosa,



FIGS. 41-46. Adults of *Sabulodes*. 41, 42. *S. arses* Druce. 41. Male, lectotype, Coatepec, Mexico (USNM). 42. "Type ♀," Coatepec, Mexico (BMNH). 43, 44. *S. matrica* Druce. 43. Male, lectotype, Volcán de Irazú, Costa Rica (BMNH). 44. Female, Jalapa, Veracruz, Mexico, September (C. C. Hoffmann; AMNH). 45, 46. *S. subalbata* (Dognin). 45. Male, lectotype, Lino, Panama (Fassel; USNM). 46. Female, Puntarenas, Monteverde, Costa Rica, December 20, 1960 (C. W. Palmer; AMNH). All $\times 1.4$

4650 feet, Municipio Comaltepec, Oaxaca, Mexico, September 29, 1962 (E. C. Welling); allotype, female, same data but September 22, 1962. The genitalia of the holotype are mounted on slide FHR 18122, and of the allotype on FHR 14286. Paratypes, all from Oaxaca, Mexico: same data as holotype, September 22, 24, 1962, one male, one female; Mo Cuou, 7050 feet, Cerro Pelon, Municipio Yolox, September 17, 1962 (E. C. Welling), five males; Cerro Pelon, 7050 feet, Municipio Yolox, September 12, 13, 1961 (E. C. Welling), three females.

The holotype, allotype, and paratypes are in the collection of the American Museum of Natural History.

I have purposely restricted the type series to specimens from Mexico.

Distribution. From southern Mexico to western Panama. (See Appendix 1 for locality data of specimens studied.) Label data for elevations of the specimens ranges from 1200 to about 2100 meters.

Flight Period. Adults have been caught in June, September, and November.

Remarks. Fifteen specimens (10 males, five females) and eight genitalic dissections (six males, two females) have been studied.

The pattern on the upper surface of the wings is quite variable. The row of venular dots on the t. p. and extradiscal lines is normally present, but in varying degrees of intensity. The cross lines and discal spots may be almost completely absent, or they may be prominent. As is the usual case within *Sabulodes*, the genitalia should be used for determination. There is relatively little variation in the genitalia, with the exception of the apical row of short dentitions on the aedeagus. This row varies in length and in the number of toothlike projections.

Etymology. The specific name is from the Latin *setosus*, bristly or covered with bristles, in reference to the apical portion of the free costal arm of each valve.

Sabulodes arses Druce

Figures 41, 42, 50, 59

Sabulodes arses Druce, 1891 (1891-1900), p. 14; 1893 (1881-1900), pl. 42, figs. 11 (male), 12, 13 (females).

Diagnosis. This species, from Mexico and Guatemala, is smaller and grayer than any of the preceding ones. The male genitalia are recognized by the apically swollen uncus, the broad, evenly setose valves, the broad, short, sclerotized costal arms, and by the aedeagus having a spinose or dentate band posteriorly. The female genitalia are characterized by heavily sclerotized lamella postvaginalis and stergma, the latter having a large rectangular incision in the anterior side for the ductus bursae.

Male. Head, thorax, and abdomen similar to those of *setosa*, but with dorsal surface tending to have more gray scaling.

Upper Surface of Wings: Wings grayish white, heavily and more or less evenly covered with gray scales; maculation similar to that of *setosa* but tending to be more clearly represented, and with s. t. and extradiscal lines tending to be shaded distally by a pale band; s. t. line with outward projections on veins M_3 and Cu_1 ; terminal line narrow, present on all wings.

Under Surface of Wings: All wings whitish, with a few scattered brown scales; s. t. line present on all wings, brown, narrow, fading out posteriorly; brown discal dot on each forewing; terminal line brown, narrow, on all wings; fringe concolorous with each wing, with or without small brown patch opposite veins.

Length of Forewing: 17 to 18 mm.

Female. Similar to male.

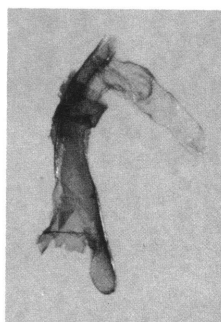
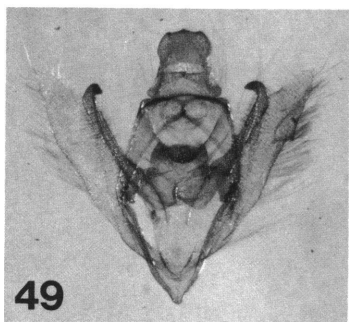
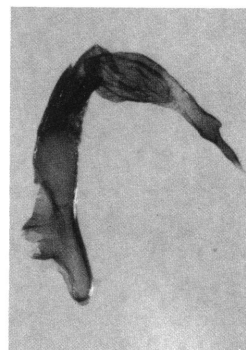
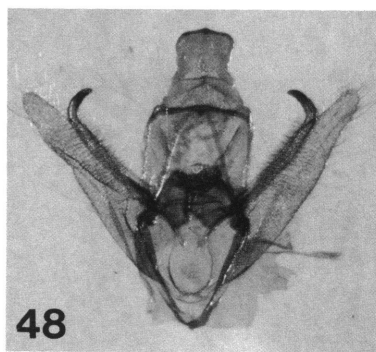
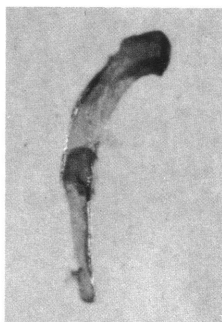
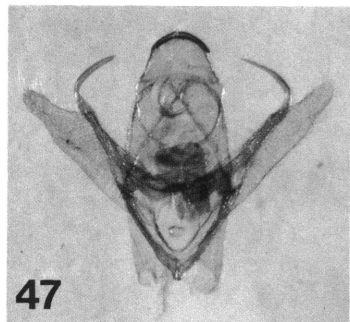
Length of Forewing: 17 to 19 mm.

Male Genitalia. Similar to those of *boliviana*, differing mainly as follows: uncus more constricted medially, posterior swollen portion with paired group of setae laterally on ventral surface, and with posterior margin evenly curved, not having median or lateral points or swelling; gnathos tending to be more V-shaped, median enlargement more or less triangular; valves with each inner surface thickly and finely setose, with each free costal arm thick, curved, smoothly sclerotized; anellus with anterior portion longer, posterior portion shorter, latter with narrower outer margins; aedeagus 2.2 to 2.3 mm. in length, posterior end with sclerotized dorsal surface slender, angled ventrally, left margin at bend of angle with raised dentate ridge becoming broadened anteriorly;

vesica, when everted, recurved to parallel aedeagus, with broad swelling on right side.

Female Genitalia. Lamella postvaginalis heavily sclerotized, short, 0.6 to 0.8 mm. in length, weakly concave dorsally, slightly broadened anteriorly, sides either straight or weakly tapering, posterior end blunt or sharply pointed; sterigma with lateral areas heavily sclerotized, anterior margin rounded laterally,

medially with deep rectangular incision for lamella postvaginalis and posterior end of ductus bursae, posterior end of incision straight or rounded, with raised rim, posterior margin of sterigma more or less straight or with shallow anterior indentation medially, lateral areas smooth or weakly rugose, and with or without transverse ridge between posterior margin and rim of median indentation; ductus bursae



FIGS. 47-49. Male genitalia of *Sabulodes*. 47. *S. wygodzinskyi*, new species, paratype, El Congo, Cauca Valley, Colombia, June, 1917 (BMNH). 48. *S. boliviaria* Oberthür, holotype, Yunga del Espiritu Santo, Cochabamba, Bolivia, 1888-1889 (P. Germain; BMNH). 49. *S. setosa*, new species, Cerro Punta, Chiriquí, Panama, June, 1962 (R. Zweifel; AMNH).

shorter, 0.8 to 0.9 mm. in length, evenly increasing in width posteriorly, laterally very broadly sclerotized; ductus seminalis arising from prominent lobe of corpus bursae with dorsal area of sclerotization posteriorly. Apophyses posteriores shorter, 1.4 to 1.8 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Druce described *arses* from one male and two females. The male is in the collection of the National Museum of Natural History, and is in excellent condition. This specimen was labeled by Druce as the "♂ Type"; it is hereby designated and has been labeled as the lectotype (see fig. 41). The genitalia are mounted on slide FHR 18065. It should be noted that the abdomen had been glued onto the thorax; I feel perfectly confident that it had been correctly associated.

The two female syntypes are in the collection of the British Museum (Natural History).

Type Locality. Coatepec, Veracruz, Mexico.

Distribution. Southern Mexico and Guatemala. (See Appendix 1 for locality data of specimens examined.) The only modern specimens (caught this century) I have seen were taken at elevations from above 1350 to 2200 meters.

Flight Period. February through June, September, November, and December. Additional collecting may very well fill in some or all of the months not listed.

Remarks. Forty-five specimens (26 males, 19 females) and 19 genitalic dissections (10 males, nine females) have been studied.

The male lectotype served as the model for Druce's plate 42, figure 11. The figure is grayer than the type specimen; this could be due to fading, as freshly caught specimens of this species are grayer than old ones. The maculation of the figure is fairly accurate, but the cross lines are not exact.

Druce's "♀ Type" is largely held together with glue, as the thorax has been stuck to and glued to the pin; the abdomen also was glued on. The genitalia have not been dissected; nevertheless, I am certain that this female is properly associated with the lectotype. It does not match the figure (plate 42, figure 12) given with the original description particularly well;

The moth has much less prominent maculation, lacking the very noticeable t. p. line and discal spot.

Druce's second female syntype is from Jalapa [Veracruz], Mexico (M. Trujillo). It is rather badly rubbed, especially parts of the left wings. It is probable that this moth was the model for Druce's plate 42, figure 12. Its genitalia are mounted on slide FHR 17902.

This species is the first of a group of three species, all from Mexico and Central America, that are smaller and grayer than all of the preceding species. As previously mentioned, freshly caught moths tend to be slightly grayer than older specimens. There appears to be less individual variation in color and pattern within this species than in the previous ones.

There is variation in the male genitalia in the amount and size of the setae on the inner face of each valve. Some valves have relatively few, small-sized setae; others have the inner face thickly covered with many more, apparently slightly thicker setae. The former condition seems to be the commoner; there is an intergradation between the two extremes.

There is also variability in the female genitalia. The apex of the lamella postvaginalis is varied from truncate to sharply pointed, and the sterigma is somewhat variable in its shape.

Sabulodes matrica Druce

Figures 43, 44, 51, 60

Sabulodes matrica Druce, 1891 (1891-1900), p. 16; 1893 (1881-1900), pl. 42, fig. 19 (male).

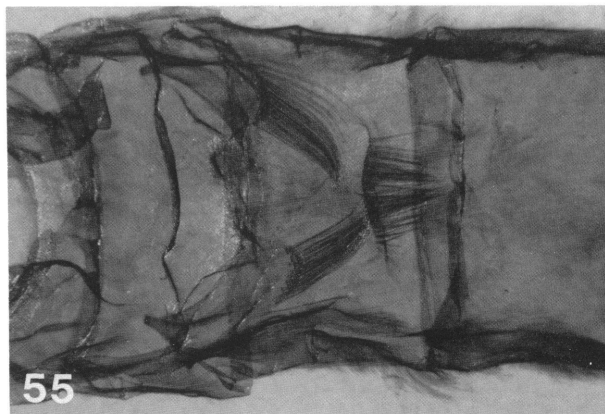
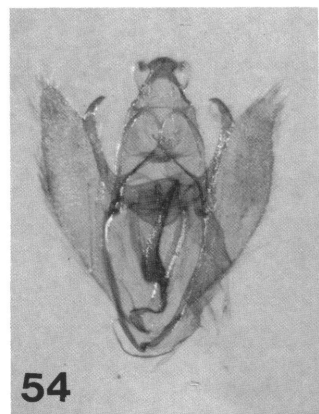
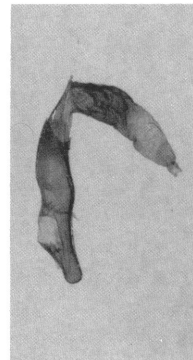
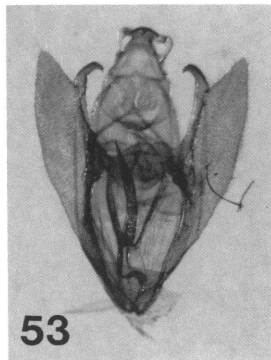
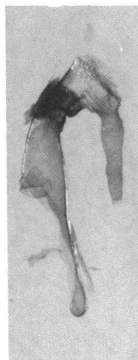
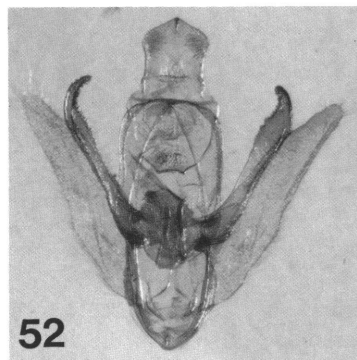
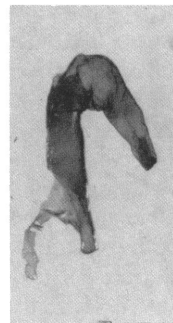
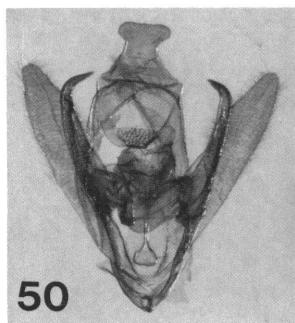
Diagnosis. This species, from Mexico and Central America, is similar to *arses* but tends to be paler in color. The genitalia should be used to separate the two species. The male structures of the present species can be recognized by the aedeagus not having any spines or toothlike projections posteriorly; the female by the longer and thinner lamella postvaginalis and by the differently shaped sterigma, as compared with *arses*.

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

Upper Surface of Wings: Wings slightly paler and more ochraceous than in *arses*; maculation similar but tending to be more clearly defined.

Under Surface of Wings: Similar to that of *arses* but tending to be slightly whiter, some

specimens with nebulous subapical dark area. Length of Forewing: 17 to 18 mm.



FIGS. 50-54. Male genitalia of *Sabulodes*. 50. *S. arses* Druce, lectotype, Coatepec, Mexico (USNM). 51. *S. matrica* Druce, lectotype, Volcán de Irazú, Costa Rica (H. Rogers; BMNH). 52. *S. subalbata* (Dognin), Tamazunchale, San Luis Potosi, Mexico, December 14, 1971 (W. H. Howe; AMNH). 53. *S. mucronis*, new species, holotype, 1 mile N of Hardwar Gap, Jamaica, November 12-20, 1966 (E. L. Todd; USNM). 54. *S. striata*, new species, holotype, "Brit. Guiana" (BMNH).

Fig. 55. Male abdomen, anteroventral portion, of *S. triangula*, new species, Carlos Pfannl, Paraguay, September 25, 1951 (Schade; AMNH).

Female. Similar to male.

Length of Forewing: 17 to 19 mm.

Male Genitalia. Similar to those of *arses*, differing mainly as follows: uncus with more slender setae laterally; gnathos squarer, median enlargement rectangular, broader than long, 0.3 mm. in width; valves more slender, having few setae on each inner surface, each free costal arm slightly longer, inner surface apically weakly flattened, tending to be wedge-shaped rather than tapering to point; anellus with posterior portion tending to be shorter; aedeagus shorter, 1.8 to 1.9 mm. in length, posterior end curved ventrally, without raised ridge or teeth; vesica, when everted, extending ventrally, having large dorsally directed sac on right side.

Female Genitalia. Similar to those of *arses*, differing mainly as follows: lamella postvaginalis tending to be slightly thinner and longer, more tapering apex sharply pointed, extending beyond posterior edge of sterigma with lateral margins more wedge-shaped, median incision with longer posterior rim, in length between one-third and two-fifths length incision, posterior margin of sterigma weakly concave medially, with weak transverse ridge paralleling posterior margin. Apophyses posteriores 1.6 to 1.7 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Druce described *matrica* from four specimens; both sexes were represented. The specimen labeled by Druce as the "♂ Type" is hereby designated, and has been labeled, as the lectotype. Its genitalia are mounted on slide FHR 18110. This specimen (see fig. 43), as well as Druce's "♀ Type," are in the collection of the British Museum (Natural History).

Type Locality. Volcán de Irazú, Cartago, Costa Rica, at an elevation of between 6000 and 7000 feet.

Distribution. Southern Mexico and Costa Rica. (See Appendix 1 for locality data of specimens studied.) I strongly suspect that the species occurs in some of the intervening countries but no specimens have come to my attention as yet. Known elevations extend from about 1200 to 2000 meters.

Flight Period. March, April, June, and Sep-

tember. Additional collecting undoubtedly will show a longer flight period.

Remarks. Eleven specimens (six males, five females) and nine genitalic dissections (four males, five females) have been studied.

The lectotype is in excellent condition except for the left forewing that lacks the tip and has a small rubbed area. The figure given by Druce (pl. 42, fig. 19) is quite accurate when compared with the lectotype. There are some relatively slight differences in the course of the cross lines; the lectotype has the t. p. and extradiscal lines more biangulate in the middle of the wings, and the median line of the forewings is narrower.

Based on the limited material available (six males, two females from Costa Rica; three females from Mexico), I do not see any noticeable differences between the specimens from the two countries, although it is possible that the Mexican females have a weaker median line on the upper surface of the wings than do the Costa Rican examples. There appears to be relatively little individual variation in color and maculation in the small sample before me.

The male genitalia do not show much variability. There is some variation in the lamella postvaginalis and sterigma in the female. In the former structure, there are differences in width and shape of the apex; in the sterigma, the changes occur in the raised and recurved area around the lamella postvaginalis and in the extent of the posterior transverse median ridge.

Sabulodes subalbata (Dognin), new combination

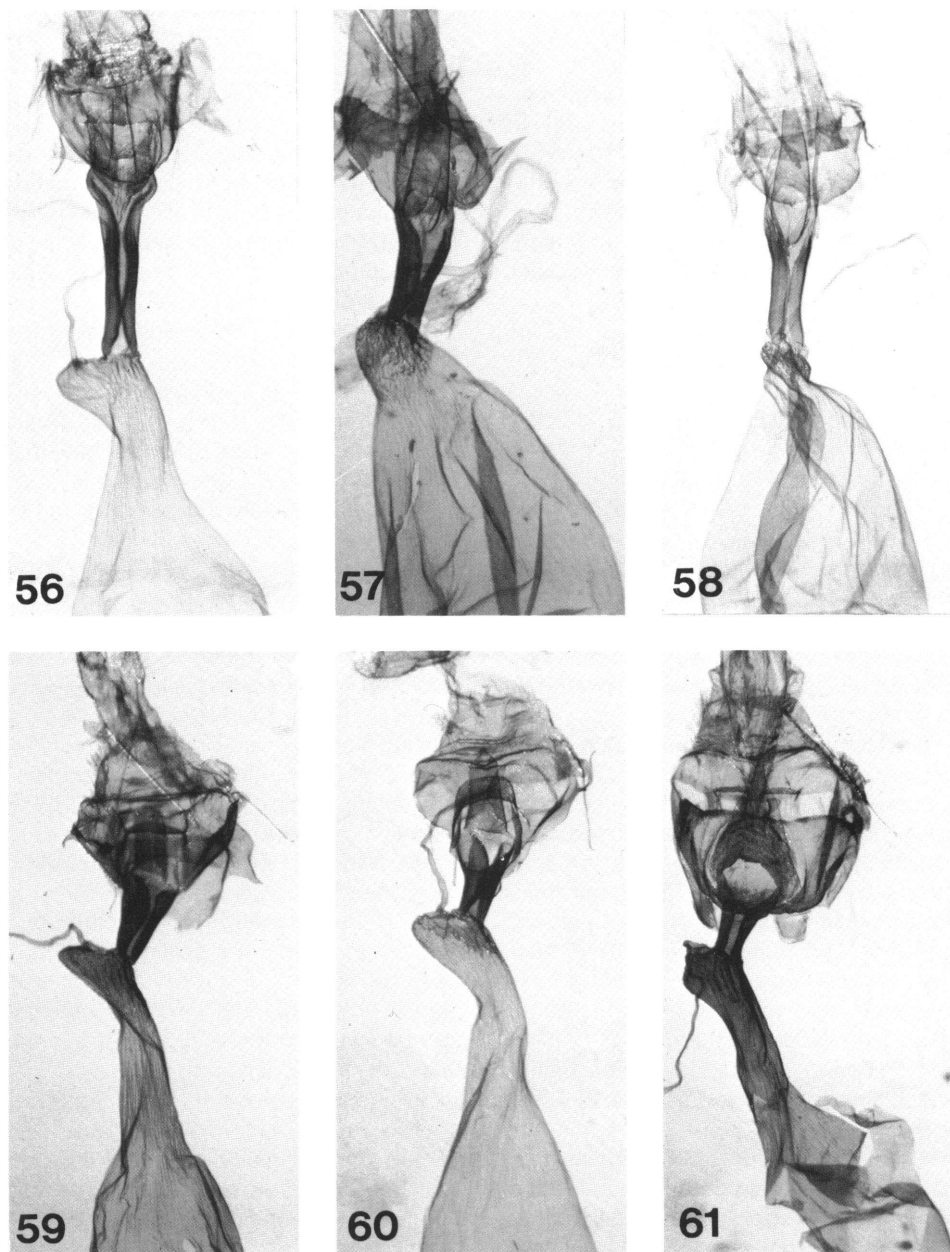
Figures 45, 46, 52, 61

Sabulodes colombiata (misidentification): Druce, 1891 (1891-1900), p. 16 (in part).

Sabulodes caberata (misidentification): Druce, 1891 (1891-1900) p. 16 (in part).

Spododes subalbata Dognin, 1913, p. 408.

Diagnosis. This Central American species is very similar to *matrica*; the genitalia should be used to separate the two. In the male structures, each valve of the present species has its costal arm flattened and the posteromedial margin is irregularly dentate, and the aedeagus is



FIGS. 56-61. Female genitalia of *Sabulodes*. 56. *S. wygodzinskyi*, new species, allotype, Finca San Pablo, Cundinamarca, Colombia, August 1-12, 1967 (P. and B. Wygodzinsky; AMNH). 57. *S. boliviaria* Oberthür, Bogota, Colombia, February (BMNH). 58. *S. setosa*, new species, allotype, Vista Hermosa, Oaxaca, Mexico, September 22, 1962 (E. C. Welling; AMNH). 59. *S. arses* Druce, San Cristobal, Chiapas, Mexico, April 10, 1969 (R. Wind; AMNH). 60. *S. matrica* Druce, Veracruz, Mexico, April 1896 (W. Schaus; BMNH). 61. *S. subalbata* (Dognin), Baleu, Alta Verapaz, Guatemala, June 6, 1966 (E. C. Welling; AMNH).

2.5 to 2.6 mm. in length; in the female genitalia both the lamella postvaginalis and the lateral areas of the sterigma are larger and differently shaped, as compared with *matrica*.

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

Upper Surface of Wings: Color and maculation similar to those of *matrica*, but with cross lines tending to be slightly wider and more diffuse, with median line thicker near posterior margin.

Under Surface of Wings: Similar to that of *matrica*; forewings with subapical dark area absent.

Length of Forewing: 14 to 18 mm.

Female. Similar to male.

Length of Forewing: 16 to 20 mm.

Male Genitalia. Similar to those of *matrica*, differing mainly as follows: larger, combined lengths of tegumen and saccus 2.3 to 2.5 mm. (2.0 mm. in *matrica*); uncus less constricted medially, bluntly pointed apically, having strongly developed lateral setal groups and median apical point; gnathos weakly W-shaped medially, anteriorly with sclerotized ridge, posteriorly rounded around dentate area; each valve with broader, flattened free arm, extending posteriorly as far as apex of valve, posteromedian margin finely and irregularly dentate; anellus tending to be tapering, without prominent median constriction, posterior portion narrower than base of anterior portion; aedeagus 2.5 to 2.6 mm. in length, without raised ridge or teeth; vesica, when everted, extending ventrally and anteriorly, having large dorsally directed sac on right side.

Female Genitalia. Lamella postvaginalis large, broad anteriorly, tapering posteriorly, apical section digitate, slender, straight or somewhat crooked, extending beyond posterior margin of sterigma; sterigma with lateral areas large, smoothly sclerotized, narrowly incised around base of lamella postvaginalis, having pair of short transverse ridges between incision and shallowly V-shaped posterior margin of sterigma; ductus bursae short, 0.6 to 0.8 mm. in length, narrowed anteriorly, becoming almost three times as wide posteriorly; ductus seminalis arising from lobe of corpus bursae to left of ductus bursae; corpus bursae sclerotized

dorsoposteriorly, posterior half slender, anteriorly broadened. Apophyses posteriores 1.7 to 1.8 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Dognin described *subalbata* from one pair of specimens; both are in the collection of the National Museum of Natural History. I hereby designate and have labeled the male as the lectotype (see fig. 45). Its genitalia are mounted on slide HWC 1141.

Type Locality. Lino, Chiriquí, Panama, at 800 meters elevation.

Distribution. From southern Mexico to western Panama. (See Appendix 1 for locality data of specimens studied.) As far as can be told from the label data, this species flies at elevations from less than 100 meters to above 2250 meters.

Flight Period. Specimens have been examined that were caught in every month of the year except March and April.

Remarks. One hundred forty-six specimens (125 males, 21 females) and 22 genitalic dissections (12 males, 10 females) have been studied.

The lectotype is in excellent condition, although the mounting of the specimen leaves something to be desired. Dognin's "Type ♀," with its genitalia on slide HWC 1142, is a somewhat worn specimen; as a result, it looks paler than the male.

Fresh specimens, in good condition, do not appear to exhibit too much variation. Apparently the moths can quickly become worn, perhaps due to being rubbed when captured; these specimens are paler, and have lost some of the maculation and dark scaling.

In the male genitalia it is doubtful if any two specimens have the posteromedian margin of the costal arms the same; this margin is variably toothed or serrate. There is some variation in the median area of the gnathos, as it varies from being large and having numerous minute swellings, to being much reduced in both size and in the number of the swellings. In the female genitalia *subalbata* shows the same type of variability as is found in *arses* and *matrica*. The lamella postvaginalis may have a bulbous anterior portion and an elongate, slender terminal area, or else it may more

or less evenly taper from base to apex. The sterigma shows variability in the size and position of the transverse ridges, in the area around the base of the lamella postvaginalis, and in the posterior margin.

I have examined the following specimens identified by Druce (1891 [1891-1900], p. 16): Cuesta de Misantla, Mexico, one female, and Cordova, Veracruz, Mexico, one female, both as *colombiata*; Volcán de Atitlán, 2500 to 3500 feet, Guatemala, one male, Las Mercedes, 3000 feet, Guatemala, two males, and Volcán de Chiriquí, 2000 to 3000 feet, 2000 feet, below 4000 feet, Panama, three males and one female, all as *caberata*. All the above specimens are *subalbata* (Dognin), and are in the collection of the British Museum (Natural History).

GROUP II

As in group I, the males of this section have a hair pencil on the hind tibia and a median row of setae ventrally on the third abdominal segment. The included species are characterized by having an apically swollen uncus, socii that are lightly sclerotized and project posteriorly almost as far as the end of the uncus, valves having their costal arms curved or hooked distally, the anellus being heavily sclerotized, slender, median, furca-like, and by the aedeagus without the spinelike row posteriorly. The female genitalia have a short ductus bursae (0.5 to 0.7 mm. in length) slightly smaller than the apically pointed lamella postvaginalis, and the ductus seminalis arises on the left side.

The moths are scarcely separable from the Antillean species of group IV and some of those of group I when just color and pattern are used. The genitalia should be studied to differentiate the species. The moths have a wing length of 14 to 20 mm.

Group II contains four species. Three of these occur in the Greater Antilles, and one in Guyana. The species are poorly represented in collections; two are known from the female only. The flight periods are also very poorly known; we have no information at all on two of the species. Nothing is known about the life histories or food plants of the members of group II.

Sabulodes mucronis, new species

Figures 53, 62, 63, 82

Diagnosis. The small-sized Jamaican species can be recognized by the characters for the group.

Male. Head with vertex white, with some scales apically brownish, to pale buff; front white or pale buff; palpi rising to middle of eye, extending beyond front of eye by slightly more than one-half diameter of eye, pale brownish basally, becoming gray distally. Thorax whitish to pale grayish brown above, below with prothorax pale grayish brown, white posteriorly; legs white, forelegs grayish brown on outer surface, all legs variably marked with brown or grayish black scales, and with small black patch at distal end of each femur. Abdomen pale grayish brown above, with scattered grayish black scales, white below.

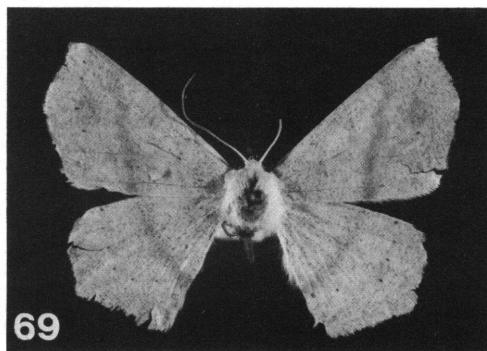
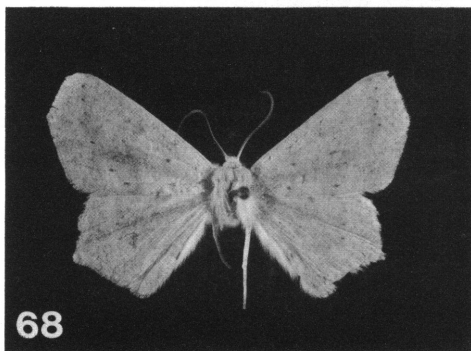
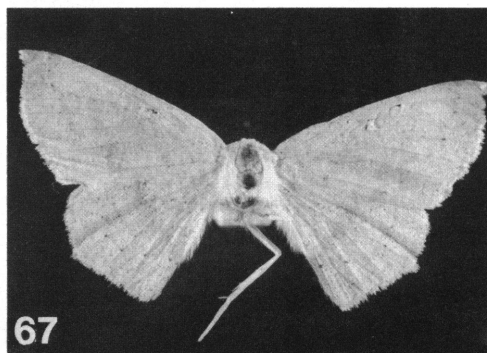
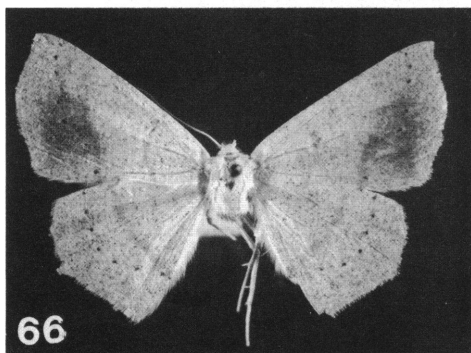
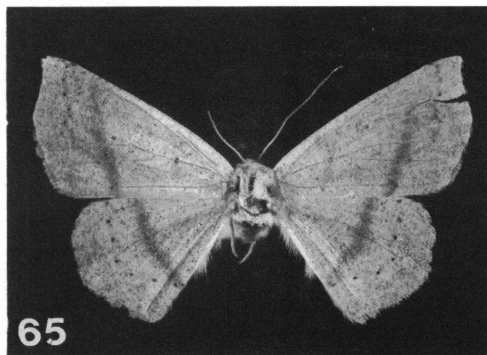
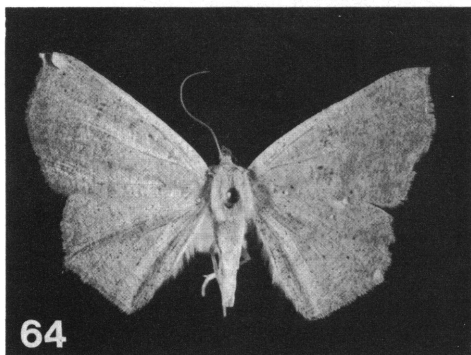
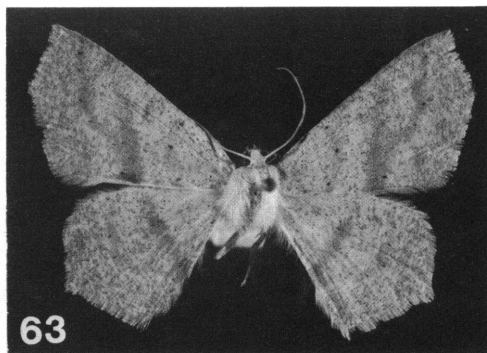
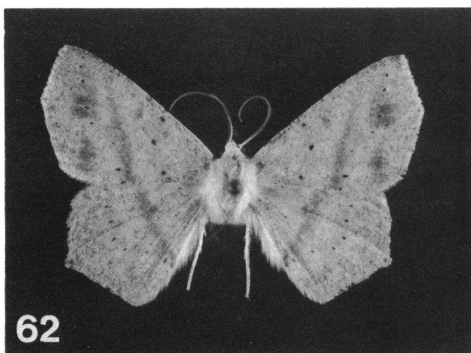
Upper Surface of Wings: Forewings dull white, pale grayish white, or pale grayish brown, with more or less extensive areas of grayish brown or pale gray scaling, some specimens with nebulous darker patches in cells M_2 and M_3 distad of t. p. line and, more faintly, above inner angle; maculation obsolescent, with t. a. and t. p. lines having black venular dots, course as in previous species; median line straight, extending across wings; discal dash present; fringe concolorous with wing. Hind wings concolorous with forewings; median and extradiscal lines present, latter with black venular dots; discal spot present or absent; fringe concolorous with wing.

Under Surface of Wings: All wings white, with scattered black and brownish black scales; forewings with pale brown costa and brown or grayish brown subapical patch; discal dots present, that of forewing larger than that of hind wing; maculation absent except for subterminal lines on all wings, represented by small black venular dots; fringes concolorous with wings.

Length of Forewing: 14 to 18 mm.; holotype, 16 mm.

Female. Similar to male, but tending to be slightly grayer.

Length of Forewing: 16 to 20 mm.; allotype, 20 mm.



Male Genitalia. Uncus with anterior portion tapering, apically bulbous, with prominent median point; socii lightly sclerotized, elongate, extending posteriorly almost as far as posterior margin of uncus, apically with area of medially directed setae; gnathos broad laterally, tapering medially, forming projecting, rounded, median enlargement having scobinate surface; valves bluntly pointed apically, costa well sclerotized, broad, free arm curving and apically hooked, tapering to point; anellus heavily sclerotized, furca-like, situated medially, anterior end somewhat S-shaped, projecting dorsally and connected to median extension of valves, posteriorly slender, tapering to point, slightly concave, surface finely pitted, and with slender, sclerotized, straplike lateral areas extending to near base of valves; aedeagus 1.9 to 2.0 mm. in length, posterodorsally sclerotized and curved ventrally, without row of posterior spinelike teeth; vesica, when everted, extending ventrally as simple tube having slight swellings on right side near aedeagus.

Female Genitalia. Sterigma with slender lamella postvaginalis 0.8 to 1.0 mm. in length, concave anteriorly, tapering posteriorly to blunt point, a short, more or less posteriorly truncate lamella antevaginalis, and weakly sclerotized lateral areas, rounded anteriorly, truncate posteriorly, having several striations; ductus bursae shorter than lamella postvaginalis, slender, tapering anteriorly; ductus seminalis arising to left of ductus bursae; corpus bursae with anterior three-fourths swollen, globose, posterior fourth slender, tubelike, with small sclerotized area near ductus bursae, and with longitudinal striations extending anteriorly onto globose portion. Apophyses posteriores 1.55 to 1.65 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Holotype, male, and allotype, female, 1 mile north of Hardwar Gap, Portland Parish, Jamaica, November 12-20, 1966 (E. L. Todd). (The locality is spelled "Hardware" Gap on the printed labels.) The genitalia of the holotype are mounted on slide FHR 18077 and of the allotype on FHR 18022. Paratypes, all from Jamaica: same data as holotype, five males, three females; Hardwar Gap, 4800 feet [Portland Parish], July 13-15, 1960 (P. and C. Vaurie), one female; Mandeville, 2250 feet, Manchester Parish, January 13-15, 1920 (F. E. Watson), one female; Cumberland District, 3000 feet, Clarendon Parish, December 15-18, 1919 (F. E. Watson), one female; Newcastle [St. Andrews Parish], one male, one female; Cuichona (W. J. Kaye), one female; no additional data or collector, four males, three females; no additional data (J. M. St. J. Yates), one female (F. W. Jackson), one female.

The holotype and allotype are in the collection of the National Museum of Natural History; paratypes are in the collections of that institution, of the American Museum of Natural History, and of the British Museum (Natural History).

Distribution. Jamaica. (See Appendix 1 for locality data of specimens studied.)

Flight Period. January, July, November, and December. It is possible that these dates more accurately reflect the visits of collectors than the true flight period of the moth.

Remarks. Twenty-five specimens (11 males, 14 females) and seven genitalic dissections (two males, five females) have been studied.

There is some variability in the strength of the maculation. The holotype and allotype have very prominent cross lines; the holotype has the darkened areas distad of the t. p. line on the upper surface more strongly developed than in other specimens before me.

FIGS. 62-69. Adults of *Sabulodes*. 62, 63. *S. mucronis*, new species. 62. Male, holotype, 1 mi. N of Hardwar Gap, Jamaica, November 12-20, 1966 (E. L. Todd; USNM). 63. Female, allotype, 1 mi. N of Hardwar Gap, Jamaica, November 12-20, 1966 (E. L. Todd; USNM). 64-66. *S. laticlavata*, new species. 64. Female, paratype, Pinar del Rio, Cuba (Robert; USNM). 65. Female, holotype, Pinar del Rio, Cuba (Robert; USNM). 66. Female, paratype, Pinar del Rio, Cuba (Robert; USNM). 67. *S. curta*, new species, female, holotype, Coamo Springs, Puerto Rico, June 5-7, 1915 (AMNH). 68, 69. *S. striata*, new species. 68. Male, holotype, "Brit. Guiana" (BMNH). 69. Female, allotype, "Brit. Guiana" (BMNH). All $\times 1.6$.

Etymology. The specific name is from the Latin *mucro*, a sharp point, in relation to the shape of the furca-like anellus.

Sabulodes laticlav, new species

Figures 64-66, 83

Diagnosis. This Cuban species, known from the female only, has the upper surface of the wings browner than in *mucronis*, and the median line tends to be more strongly represented in most specimens. The female genitalia of the present species have a shorter lamella postvaginalis and longer apophyses posteriores than does the preceding species.

Male. Unknown.

Female. Similar to *mucronis*, differing mainly as follows: palpi longer; upper surface of wings slightly browner or more ochraceous, with median line tending to be more prominent.

Length of Forewing: 16 to 20 mm.; holotype, 19 mm.

Male Genitalia. Unknown.

Female Genitalia. Similar to those of *mucronis*, differing mainly as follows: sterigma smaller, lamella postvaginalis 0.5 to 0.6 mm. in length; ductus bursae shorter, 0.5 to 0.6 mm. in length; corpus bursae with posterior one-fourth to one-third narrowed, posterior end with dorsal sclerotized area, longitudinal striations weakly represented. Apophyses posteriores 1.6 to 2.1 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Holotype, female, Pinar del Rio, Cuba (Robert). The genitalia of the holotype are mounted on slide FHR 18030. Paratypes, all from Cuba: same data as holotype, eight females; Baracoa [Oriente], one female; Santiago [Oriente], one female. I do not know whether the locality Pinar del Rio refers to the city or to the province of the same name.

The holotype and all paratypes are in the collection of the National Museum of Natural History.

Distribution. Cuba (see Appendix 1 for locality data of specimens studied).

Flight Period. Unknown.

Remarks. Eleven specimens (all females) and five genitalic dissections have been studied.

Most females of *laticlav* have the broad, prominent median line on the upper surface of the wings, but the line varies in width and intensity of color. A few examples have this line narrowed and reduced, or even obsolescent. One moth has a very large dark area extending from vein M_2 into cell Cu_2 in the outer portion of the forewings. Two other specimens have small diffuse dark areas on the forewings, one about the middle of the t. p. line and the other in the tornus.

In the genitalia, there is some variation in the texture of the lamella postvaginalis, as it ranges from being smoothly sclerotized to variably rugose.

Etymology. The specific name is from the Latin *laticlavus*, having a broad stripe, in reference to the maculation.

Sabulodes curta, new species

Figures 67, 84

Sabulodes caberata (misidentification): Schaus, 1940, p. 317.

Diagnosis. This species, from Puerto Rico, is known only from the female; it can be distinguished from *mucronis* by means of the genitalia. The female structures of the present species have a shorter and smaller lamella postvaginalis and a differently shaped corpus bursae.

Male. Unknown.

Female. Similar to *mucronis*, differing mainly as follows: palpi slightly paler; upper surface of wings slightly more cream-colored, with obscure maculation.

Length of Forewing: 19 mm. (holotype).

Male Genitalia. Unknown.

Female Genitalia. Similar to those of *mucronis*, differing mainly as follows: sterigma with smaller lamella postvaginalis, 0.7 mm. in length; ductus bursae shorter, 0.8 mm. in length; corpus bursae with posterior two-fifths slightly narrowed, longitudinal striations very faintly represented, anterior three-fifths weakly globose. Apophyses posteriores 1.5 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Type. Holotype, female, Coamo Springs,

Puerto Rico, June 5-7, 1915. The genitalia of the type are mounted on slide FHR 17788.

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

Distribution. Puerto Rico.

Flight Period. June.

Remarks. One specimen and one genitalic dissection have been studied.

The holotype is the specimen identified and labeled by Schaus (1940, p. 317) as *caberata*.

Etymology. The specific name is from the Latin *curtus*, short, in relation to the length of the lamella postvaginalis.

***Sabulodes striata*, new species**

Figures 54, 68, 69, 85

Diagnosis. This small species, occurring in Guyana, can be separated from *mucronis* by the more weakly represented maculation. The genitalia of the present species, as compared with *mucronis*, have a differently shaped valve and free costal arm in the male, and a narrower lamella postvaginalis, a differently shaped corpus bursae, and longer apophyses posteriores in the female.

Male. Similar to *mucronis*, differing mainly as follows: upper surface of wings pale, more cream-colored, with less dark scaling and with maculation less clearly defined; dots of t. a., t. p. and extradiscal lines smaller, more orange colored; hind wing with outer margin more angulate.

Length of Forewing: 15 mm. (holotype).

Female. Similar to male, but tending to have more dark scaling.

Length of Forewing: 15 to 18 mm.; allotype, 18 mm.

Male Genitalia. Similar to those of *mucronis*, differing mainly as follows: valves with each apex more bluntly rounded, free costal arms with each tip less hooked; aedeagus 1.9 mm. in length, posteriorly less curved and not as heavily sclerotized.

Female Genitalia. Similar to those of *mucronis*, differing mainly as follows: sterigma with lamella postvaginalis tending to be slightly narrower, sides parallel, and with more clearly defined lateral areas; corpus bursae with posterior one-third very slender, having numerous

fine longitudinal striations extending onto swollen anterior two-thirds. Apophyses posteriores 1.7 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Holotype, male, allotype, female, and one paratype, female, "Brit. Guiana." The genitalia of the holotype are on slide FHR 18019, and of the allotype on FHR 17946.

The holotype, allotype, and paratype are in the collection of the British Museum (Natural History).

Distribution. Guyana. (See Appendix 1 for locality data of specimens studied.)

Flight Period. Unknown.

Remarks. Three specimens (one male, two females) and two genitalic dissections (one male, one female) have been studied.

The allotype is larger and has more brown scaling than either the holotype or the paratype. The paratype is very similar to the holotype, although it is a bit more worn.

Etymology. The specific name is from the Latin *striatus*, furrowed, in reference to the surface of the corpus bursae.

GROUP III

The males of this group have both the hair pencil on the hind tibia and the median row of setae ventrally on the third abdominal segment. In addition there is a lateral process on each side of the abdomen, bearing a row of thick elongate spines; the process arises ventrally from the posterior margin of the tympanic organ, with the spines extending posteriorly to the middle of the third abdominal segment (see fig. 55). Ventrally, both the seventh and eighth segments have an elongate, fanlike tuft of very slender hairlike scales lying under the normal abdominal scaling. The male genitalia of all species have a tapering, pointed uncus; the valves have their free costal arm sharply recurved to reverse direction and then swing medially. The female genitalia have the posterior portion of the corpus bursae elongate and slender, partly sclerotized and convoluted, with the ductus seminalis arising ventrally at about the middle of this elongation.

In the color and maculation the adults of all

species are very similar to each other. The upper surface of the wings is a faintly speckled grayish white or ochraceous white, with rather indistinct cross lines. A black spot may or may not be present about the middle of the inner margin of the forewing; this is more often represented in the female than in the male. The wings tend to have the outer margin more sharply angulate than in the other groups. The length of the forewing varies from 18 to 25 mm.

Group III contains four species. One occurs in southern South America, one in Mexico and Central America, another from southern Mexico to southern South America, and the last in the Greater Antilles. The mainland species tend to fly throughout the year; this may also apply to the Antillean species but more collecting is needed before this can be stated categorically. No reared specimens have been examined, and hence no definite early stage or food plant records are given. It is probable that *exhonorata*, the most widely ranging species in the genus, has a variety of hosts.

***Sabulodes triangula*, new species**

Figures 55, 70, 71, 78, 86

Diagnosis. This species from southern South America can best be recognized by its genitalia. The male structures have a short, triangular anellus; the female, a moderate lamella postvaginalis tending to have narrowly convoluted sides and a ductus bursae 0.4 to 0.6 mm. in length.

Male. Head with vertex pale ochraceous white; front white, partly or wholly pale ochraceous white; palpi extending beyond eye less than diameter of eye, white, with grayish brown scaling laterally. Thorax pale ochraceous white or pale grayish brown above; below white; legs white, with variable amount of brown scaling, outer surface of each foreleg tending to be grayish brown. Abdomen pale ochraceous white or pale grayish brown above, white below.

Upper Surface of Wings: Forewings white with extensive areas of pale ochraceous white or pale grayish brown, and with variable number of scattered, usually solitary, dark brown scales; maculation very weakly defined by

nebulous bands of darker scaling; t. a. line arising on costa approximately one-fourth distance from base, outwardly curved, with basal bend on vein Cu, meeting inner margin about three-tenths distance from base; discal dash weakly represented or absent; median line somewhat irregular in course, passing distad of discal dash; t. p. line arising 2 to 3 mm. from apex, represented by small black venular dots, those above inner margin enlarged in a few specimens, extending posteriorly to vein M_3 , with or without a very nebulous darkened area at that point, then broadly concave to meet inner margin two-thirds distance from base; inner angle with nebulous darkened area in most specimens; fringe concolorous with wing, having variable number of small black patches at ends of veins. Hind wings concolorous with forewings and having same type of maculation; intradiscal line absent; median shade line broad, complete, passing just distad of small to nebulous discal dot; extradiscal line represented by small black venular dots; fringes as on forewings.

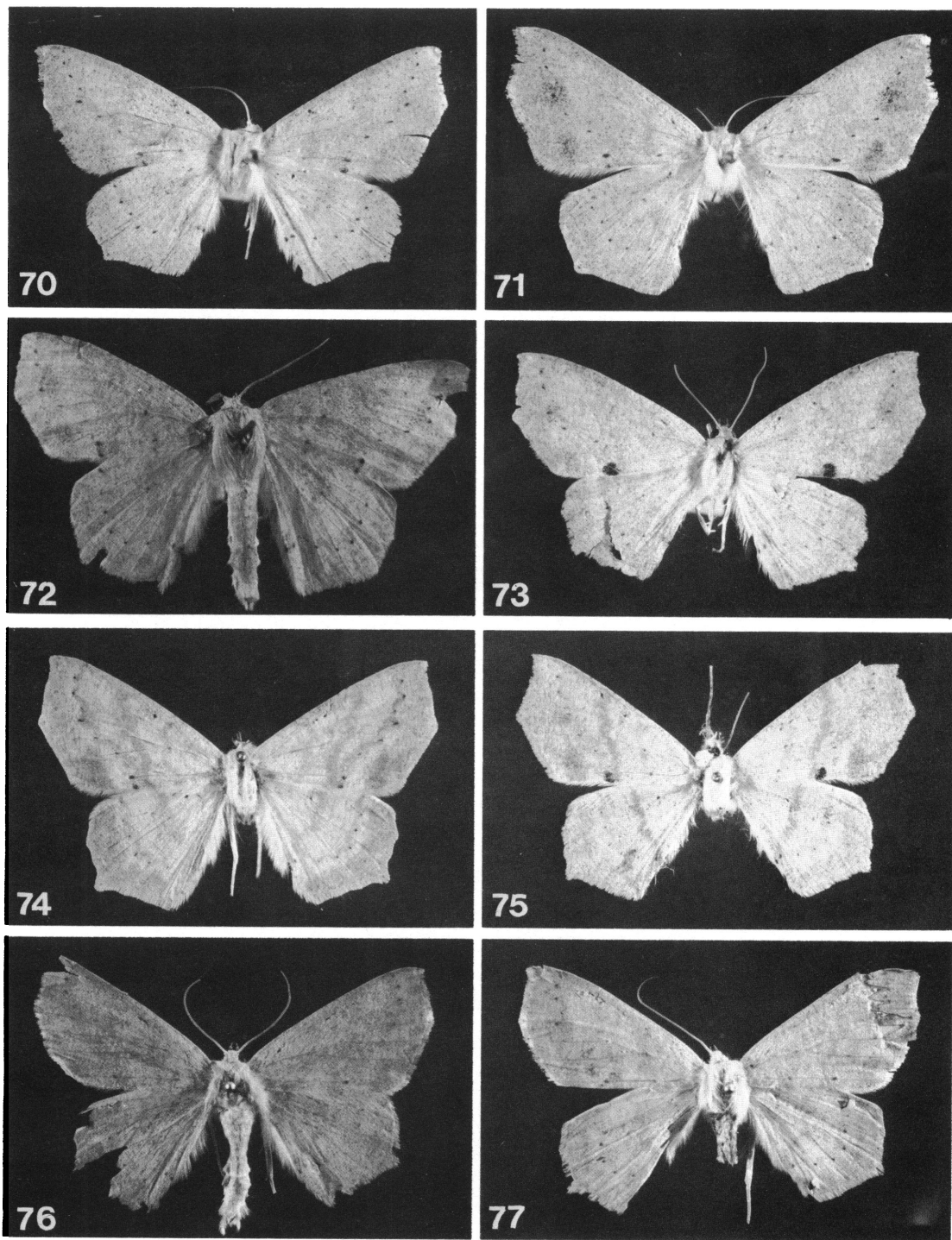
Under Surface of Wings: All wings white, with variable number of black or brownish black scales; forewings without maculation except for prominent discal dash, somewhat nebulous subapical area, and incomplete t. p. line; fringes white, with variable number of small, black, venular patches.

Length of Forewing: 19 to 23 mm.; holotype, 21 mm.

Female. Similar to male; palpi longer, as long as diameter of eye; maculation tending to be slightly stronger, with venular dots of t. p. and extradiscal lines more prominent.

Length of Forewing: 21 to 25 mm.; allotype, 24 mm.

Male Genitalia. Uncus triangular, elongate, tapering to ventrally curved point; socius digitate, transverse, well-separated medially, apically with slender, short setae; gnathos with sides broad, flat inner margins V-shaped, outer margins well rounded, median enlargement elongate, tapering, heavily sclerotized, posterior surface flattened, granular; valves tapering apically, each apex broadly rounded, costa heavily sclerotized, with free arm arising near middle, broadly curved dorsally (when valves are open), recurving ventrally and swinging



FIGS. 70-77. Adults of *Sabulodes*. 70, 71. *S. triangula*, new species. 70. Male, holotype, Nova Teutonia, Brazil, August 17, 1952 (F. Plaumann; AMNH). 71. Female, allotype, Nova Teutonia, Brazil, August 8, 1952 (F. Plaumann; AMNH). 72, 73. *S. exhonorata* Guenée. 72. Male, holotype, Brazil (BMNH). 73. Female, Independencia, Paraguay, October 24, 1950 (AMNH). 74, 75. *S. loba*, new species. 74. Male, holotype, San Jeronimo, Chiapas, Mexico, October 9, 1973 (E. C. Welling; AMNH). 75. Female, allotype, San Jeronimo, Chiapas, Mexico, July 22, 1973 (E. C. Welling; AMNH). 76, 77. *S. subopalaria* (Walker). 76. Male, holotype, "St. Domingo" (BMNH). 77. Male, holotype of *Choerodes subclararia* Walker, "St. Domingo" (BMNH). Males $\times 1.4$; females $\times 1.3$

medially, each arm smoothly sclerotized, tapering to point; transtilla formed by large, subrectangular structures; anellus with anterior portion smoothly sclerotized, rounded, extending posteriorly as more or less triangular process 0.75 to 0.80 mm. in length, posterior part of process membranous, with slender lateral, sclerotized margins; saccus rounded anteriorly; aedeagus 3.3 to 3.7 mm. in length, posterodorsal surface heavily sclerotized, flattened, tapering to point, with several rows of short, thick posteriorly projecting teeth near left margin, 0.8 to 0.9 mm. in length, innermost row being longest and thickest, with posteroventral surface membranous; vesica, when everted, forming elongate, simple tube ventrad of aedeagus, basal portion weakly longitudinally striate, medially weakly convoluted, posteriorly simple.

Female Genitalia. Sterigma with lamella postvaginalis 1.0 to 1.1 mm. in length, rectangular, with bluntly pointed posterior end, sides more or less convoluted, smoothly sclerotized medially; sterigma with lateral areas extending posteriorly beyond lamella postvaginalis, anterior margins oblique, posterior margins convex, smoothly sclerotized; ductus bursae 0.4 to 0.6 mm. in length (measured at midline), smoothly sclerotized, anterior end diagonal; ductus seminalis arising ventrally from sclerotized posterior portion of corpus bursae anteriorly of middle; corpus bursae with posterior one-fourth to one-third narrowed, sclerotized and convoluted, anterior portion membranous, more or less elliptical, surface weakly striate. Apophyses posteriores 1.6 to 2.1 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Holotype, male, Nova Teutonia, [Santa Catarina], Brazil, August 17, 1952 (F. Plaumann); allotype, female, same data, August 8, 1952. (The locality is spelled "Nuevo Teutonia" on the printed Sperry Collection labels.) The genitalia of the holotype are mounted on slide FHR 14315, and of the allotype on FHR 14310. Paratypes, all from Brazil: *Santa Catarina*: same data as holotype, some with 300 to 500 meters, various dates in January, April, May, June, July, and August, 1946, 1948, 1952, and 1953, 13 males, four

females; no data, one female. *Rio Grande do Sul*: Porto Alegre, one male; Pelotas, November 21, 1956, December 18, 1954 (C. Biezanko), two males. No data, two males.

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 British Museum (Natural History).

I have purposely restricted the type series to specimens from Brazil.

Distribution. Southeastern Brazil, Paraguay, and northern Argentina. (See Appendix 1 for locality data of specimens examined.)

Flight Period. April through January.

Remarks. Fifty-seven specimens (49 males, eight females) and 15 genitalic dissections (11 males, four females) have been studied.

The males vary from having the upper surface of the wings plain and relatively unmarked to having the cross lines distinct. A few examples have one or two small black spots on the t. p. line on the anal vein and inner margin; this character tends to be more strongly expressed in the females.

There is some variation in the male genitalia in the triangular portion of the anellus. The shape is somewhat variable, as some examples have straight sides, whereas others have a somewhat swollen anterior portion and concave sides. The apical portion is usually pointed and sclerotized, but in some specimens the apex is membranous and appears more or less bifurcate. There is also variation in the size and number of teeth on the aedeagus.

Etymology. The specific name is from the Latin *triangulus*, having three sides, triangular, in reference to the characteristic shape of the anellus.

Sabulodes exhonorata Guenée

Figures 72, 73, 79, 87

Sabulodes exhonorata Guenée, 1857, p. 45. Prout, 1910, p. 307. Oberthür, 1911, p. 40, pl. LXX-XIX, fig. 868 (male).

Clysis subpalaria (in part): Walker, 1860a, p. 46.

Diagnosis. The adults of this widely ranging species tend to have the t. p. and extradiscal lines of the upper surface more clearly repre-

sented than in *triangula*. The genitalia have the best characters to separate the two species. In the males, the anellus is much more elongate, and, in the female, the ductus bursae is much shorter in the present species.

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

Upper Surface of Wings: Similar to that of *triangula*, but tending to have fewer scattered dark brown scales; t. a., t. p. and extradiscal lines tending to have more prominent blackish brown venular dots with twin dots of t. p. line at anal vein and inner margin enlarged.

Under Surface of Wings: Similar to that of *triangula*, but with subapical patch, t. p. and extradiscal lines more strongly represented.

Length of Forewing: 19 to 23 mm.

Female. Similar to male, but having slightly longer palpi, and tending to have (in about half of specimens studied) twin dots of t. p. line at anal vein and inner margin enlarged and forming one prominent spot.

Length of Forewing: 22 to 25 mm.

Male Genitalia. Similar to those of *triangula*, differing mainly as follows: socius tending to be smaller; gnathos tending to have more slender sides and to be less V-shaped along inner margins; free costal arms slightly more slender, somewhat flattened in some specimens; anellus extending posteriorly as elongate sclerotized process 1.3 to 1.6 mm. in length, apex bluntly pointed; aedeagus 3.1 to 3.9 mm. in length, multiple row of teeth near posterior end shorter, 0.4 to 0.6 mm. in length, and smaller.

Female Genitalia. Similar to those of *triangula*, differing mainly as follows: lamella postvaginalis narrower, longer, 1.2 to 1.5 mm. in length; lateral margins not convoluted; ductus bursae larger, longer, 0.7 to 1.0 mm. in length (measured at midline), widest anteriorly, tapering posteriorly; corpus bursae with much shorter and broader posterior sclerotized and convoluted portion, sclerotization in form of band at junction of narrow and broadened areas, about one-fifth length of corpus bursae. Apophyses posteriores 1.6 to 2.3 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Type. Guenée described *exhonorata* from one male. This specimen (see fig. 72) is in the collection of the British Museum (Natural History); its genitalia are mounted on slide FHR 18123.

Type Locality. Brazil.

Distribution. From southern Mexico, through Central America to southern South America. This species is known from Venezuela and Guyana, although most specimens are from the western portion of the continent, including both sides of the Andes. Most specimens do not have altitude data on their labels; those that do indicate that the species has been captured between 360 and 2150 meters. (See Appendix 1 for locality data of specimens examined.) Biezanko, Ruffinelli, and Carbonell (1966, p. 14) recorded this species from Uruguay; this citation could refer to either *triangula* or the present species.

Flight Period. The moths probably fly during every month of the year, even though I have not seen any dated March or April.

Remarks. Seventy-seven specimens (61 males, 16 females) and 36 genitalic dissections (24 males, 12 females) have been studied.

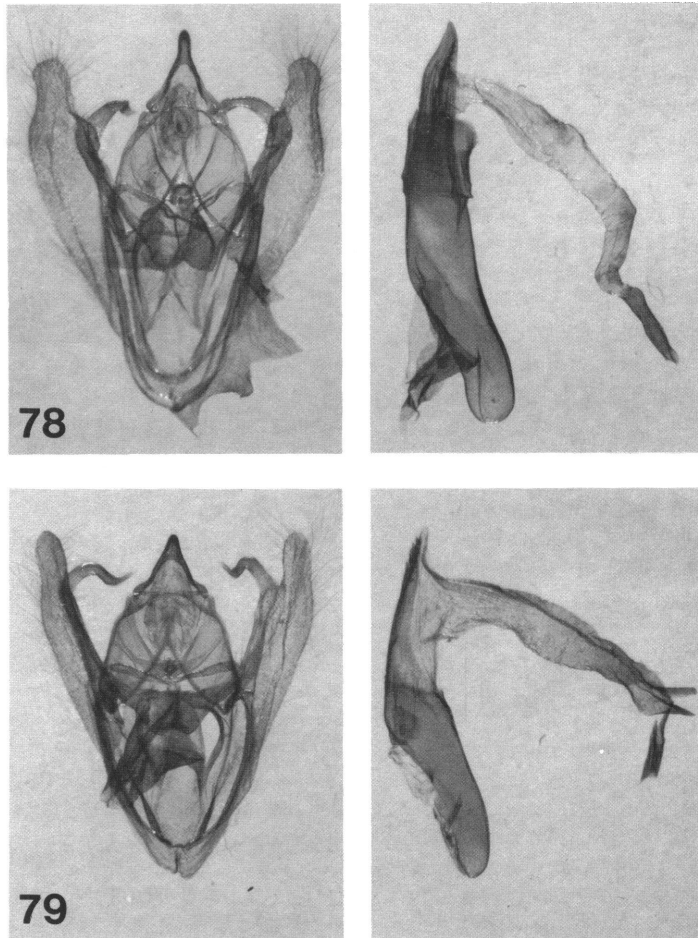
The holotype is in quite good condition, notwithstanding a few minor chips from the margins of two wings; the wings on the left side have been glued back onto the thorax.

The colored figure given by Oberthür (1911, pl. LXXXIX, fig. 868) is not of the type; however, it is a pretty good match for the holotype. The figure is slightly too yellow, and the terminal areas are too contrastingly colored.

The "Female?" of *subopalaria* Walker appears to belong to this species; see the discussion of the specimen under Types of *subopalaria*, below.

On the upper surface of the wings, the t. p. line usually has a more or less complete series of small black venular dots. In the males the posterior pair tend to be equal in size or slightly larger than the remainder of the series; only rarely are they noticeably enlarged. In the females however, between one-half and two-thirds of the specimens have this pair enlarged; in most instances, they are fused to produce a prominent spot.

As in the preceding species, there is some



FIGS. 78, 79. Male genitalia of *Sabulodes*. 78. *S. triangula*, new species, Carlos Pfannl, Paraguay, September 25, 1951 (Schade; AMNH). 79. *S. exhonorata* Guenée, Mato Grosso, Brazil, 1886 (P. Germain; BMNH).

variation in the anellus. It ranges in length from 1.3 to 1.6 mm.; the apex may be sharply pointed, rounded, or slightly asymmetrical. In the female genitalia there is variation in the amount of sclerotization and convolutions of the posterior portion of the corpus bursae.

***Sabulodes loba*, new species**
Figures 74, 75, 80, 88

Sabulodes arenularia (misidentification): Druce, 1891 (1891-1900), p. 13.

Diagnosis. This species, from Mexico and Central America, is very similar to the preced-

ing species; the genitalia should be used for identification. The males differ from both the preceding species by having a digitate process on the aedeagus, and the females by lacking a sclerotized ductus bursae and in the very long posterior portion of the corpus bursae.

Male. Head, thorax, and abdomen similar to those of *exhonorata*; palpi with third segment shorter, 0.4 mm. in length (0.5 to 0.6 mm. in *exhonorata*).

Upper Surface of Wings: Similar to that of *exhonorata* but having fewer scattered dark brown scales.

Under Surface of Wings: Similar to that of

exhonorata but tending to have dark subapical patch less clearly defined.

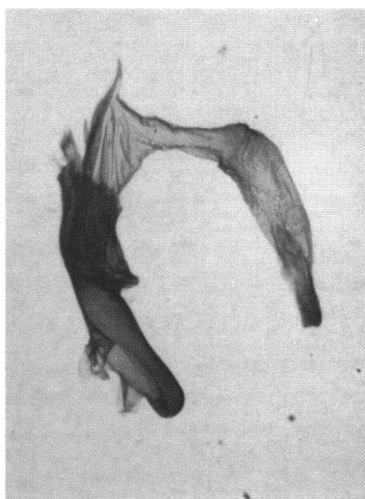
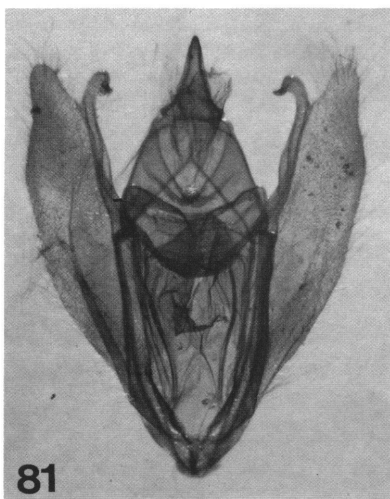
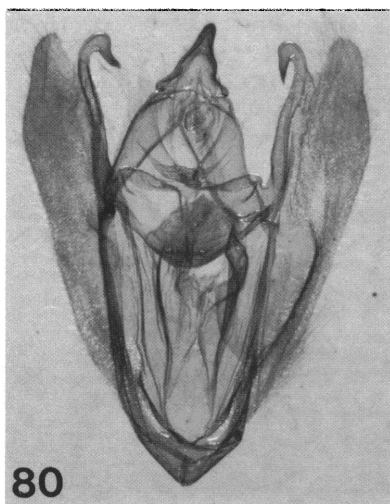
Length of Forewing: 20 to 24 mm.; holotype, 22 mm.

Female. Similar to male, but with third segment of palpi longer (0.5 to 0.6 mm. in length; 0.6 to 0.8 mm. in *exhonorata*).

Length of Forewing: 22 to 25 mm.; allotype, 24 mm.

Male Genitalia. Similar to those of *triangula*, differing mainly as follows: more

elongate, with combined lengths of tegumen and saccus 3.4 to 3.7 mm. (2.6 to 2.9 mm. in *triangula*); uncus smaller, narrower; gnathos narrower, with less heavily sclerotized median process, having smooth posterior surface; valves elongate, more slender, costa of even width, posterior-curved portion smaller; anellus with anterior sclerotized, subtriangular portion 0.7 to 0.9 mm. in length, with posterior area membranous; aedeagus angled near middle, 3.2 to 3.6 mm. in length, posterodorsal sclerotized



FIGS. 80, 81. Male genitalia of *Sabulodes*. 80. *S. loba*, new species, paratype, Misantla, Veracruz, Mexico (W. Gugelmann; BMNH). 81. *S. subopalaris* (Walker), Holquin, Cuba (Parish; BMNH).

portion more elongate, flatter, without teeth but having prominent digitate process extending from left margin.

Female Genitalia. Similar to those of *triangula*, differing mainly as follows: lamella postvaginalis longer, 1.0 to 1.4 mm. in length, lateral margins not convoluted; lamella antevaginalis more heavily sclerotized; ductus bursae membranous, not differentiated; corpus bursae with very long posterior convoluted portion, sclerotized anteriorly, totaling three-fifths length of corpus bursae, anterior portion ovate or elliptical. Apophyses posteriores 1.5 to 2.0 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Holotype, male, San Jeronimo, 600 meters, Chiapas, Mexico, October 9, 1973 (E. C. Welling); allotype, female, same data, July 22, 1973. The genitalia of the holotype are mounted on slide FHR 17873, and of the allotype on FHR 17866. Paratypes, all from Mexico: *Chiapas*: same data as holotype, July 18, 1973, October 27, 1973, one male, one female; San Jeronimo, Volcán Tacana, 450 meters, various dates in August, September, and October, 1970 (E. C. Welling), 10 males, eight females, *Veracruz*: Cerro Azul, July 2, 3, 1926 (C. C. Hoffmann), two females; Presidio, September 1939 (C. C. Hoffmann), one female; Jalapa, without date, and April 1896 (W. Schaus), two females; Misantla (W. Gugelmann), one male, two females; Cuesta del Misantla (M. Trujillo), four females. *San Luis Potosí*: Tamazunchale, 300 feet, December 11, 12, 21, 1971 (W. H. Howe), one male, two females; Valley of the Hausteca, 4 miles northwest of Tamazunchale, December 14, 1971 (W. H. Howe), one female; Xilitla, 350 feet, December 20, 1971 (W. H. Howe), one female. *Puebla*: Puebla, 7050 feet, August, 1931 (C. C. Hoffmann), one male. No data (C. C. Hoffmann), 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 British Museum (Natural History).

I have purposely limited the type series to specimens from Mexico.

Distribution. Southern Mexico to western Panama. (See Appendix 1 for locality data of specimens studied.) Label data indicate that the species flies from less than 90 meters to over 900 meters.

Flight Period. April, July through October, and December. Additional collecting will undoubtedly increase the number of months.

Remarks. Forty-four specimens (15 males, 29 females) and 13 genitalic dissections (five males, eight females) have been studied.

I have studied the following moths identified by Druce (1891 [1891-1900], p. 13) as *arenularia*: Cuesta de Misantla, Mexico (M. Trujillo), three females; Volcán de Chiriquí, 2000-3000 feet, Panama (Champion), one female. These specimens are in the British Museum (Natural History); the ones from Mexico are included in the type series of *loba*.

As in *exhonorata*, the males seldom have the posterior pair of dots on the t. p. line enlarged or fused, but this occurs in about half the females.

Etymology. The specific name is from the Latin *lobus*, an elongated projection or protuberance, in reference to the digitate process of the aedeagus.

Sabulodes subopalaria (Walker), revised status

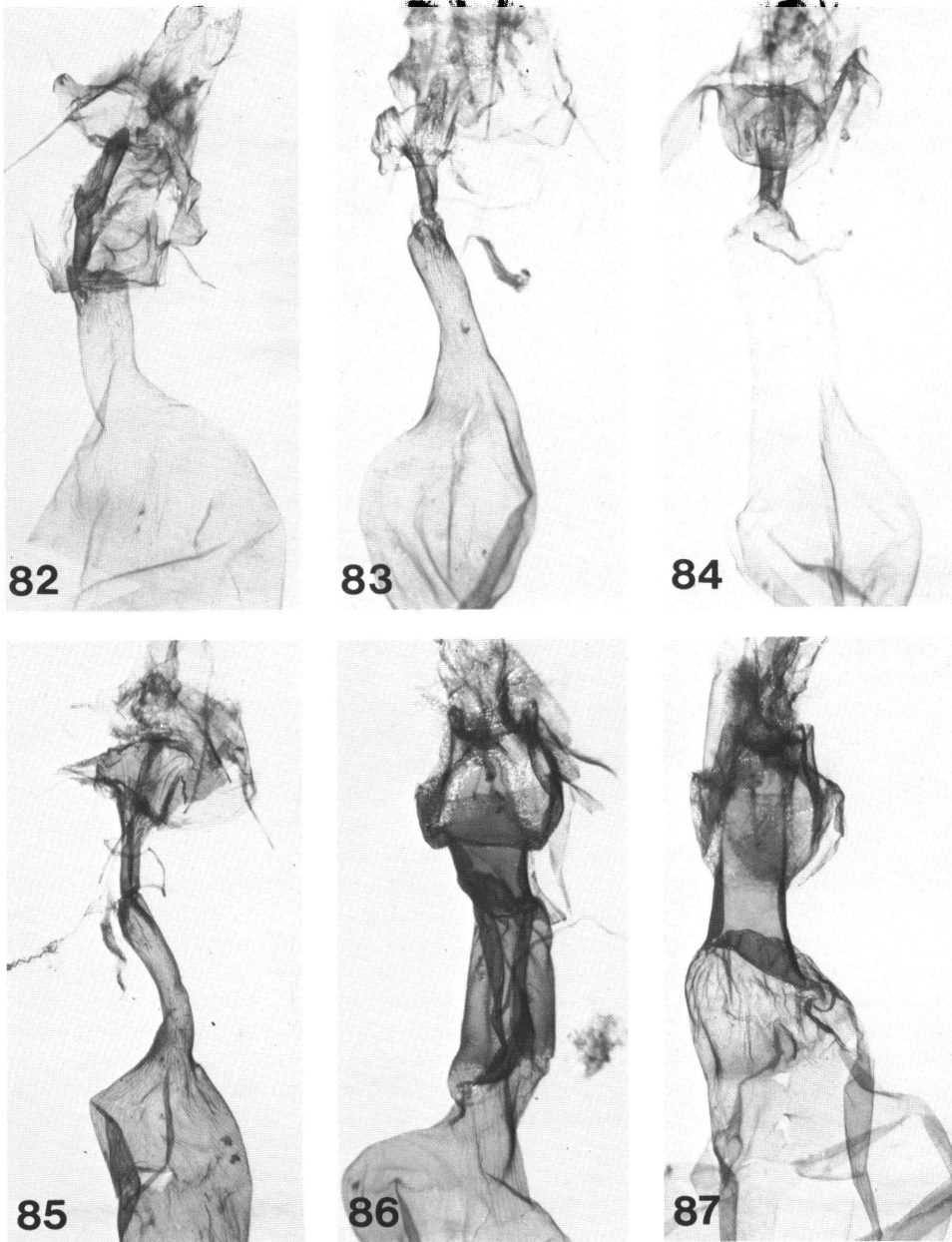
Figures 76, 77, 81, 89

Clysia subopalaria Walker, 1860a, p. 46. Druce, 1891 (1891-1900), p. 16 (as synonym of *Sabulodes colombiata*). Prout, 1910, p. 307 (placed as synonym of *Sabulodes exhonorata*). Schaus, 1940, p. 316 (as synonym of *exhonorata*).

Choerodes subclararia Walker, 1860a, p. 221; 1860b, p. 493 (placed as synonym of *subopalaria*). Druce, 1891 (1891-1900), p. 16 (as synonym of *Sabulodes colombiata*). Schaus, 1940, p. 316 (as synonym of *exhonorata*).

Diagnosis. This species, from the Greater Antilles, is slightly smaller than *loba*, and has slightly darker wings. In the male genitalia the costa is swollen near the base, and in the female structures both the lamella postvaginalis and the posterior convoluted portion of the corpus bursae are slightly shorter than the comparable structures in *loba*.

Male. Head, thorax, and abdomen similar to



FIGS. 82-87. Female genitalia of *Sabulodes*. 82. *S. mucronis*, new species, paratype, Hardwar Gap, Jamaica, July 13-15, 1960 (P. and C. Vaurie; AMNH). 83. *S. laticlavia*, new species, paratype, Pinar del Rio, Cuba (Robert; USNM). 84. *S. curta*, new species, holotype, Coamo Springs, Puerto Rico, June 5-7, 1915 (AMNH). 85. *S. striata*, new species, allotype, "Brit. Guiana" (BMNH). 86. *S. triangula*, new species, paratype, Nova Teutonia, Santa Catarina, Brazil, April 1953 (F. Plaumann; AMNH). 87. *S. exhonorata* Guenée, Independencia, Paraguay, October 24, 1950 (AMNH).

those of *loba* but tending to be slightly darker above; palpi with third segment 0.4 mm. in length.

Upper Surface of Wings: As in *loba* but tending to be slightly more ochraceous, and to have more scattered dark brown scaling.

Under Surface of Wings: Similar to that of *loba*, or slightly more ochraceous.

Length of Forewing: 18 to 20 mm.

Female. Similar to male but with third segment of palpi 0.5 to 0.7 mm. in length.

Length of Forewing: 20 to 24 mm.

Male Genitalia. Similar to those of *loba*, differing mainly as follows: gnathos with posterior surface of median process weakly granular; valves with costa tending to be swollen near base; anellus with anterior sclerotized subtriangular portion 0.6 to 0.9 mm. in length; aedeagus 3.3 to 3.5 mm. in length.

Female Genitalia. Similar to those of *loba*, differing mainly as follows; lamella postvaginalis tending to be slightly shorter, more rounded apically and having small median point; corpus bursae with posterior convoluted portion tending to be slightly shorter, with anterior membranous portion slightly larger. Apophyses posteriores 1.4 to 1.7 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Walker described *subopalaria* from a single male, and *subclararia* from a single "female"; the latter is actually a male. Walker misidentified the sex of the moth. Shortly after describing these two taxa, Walker realized that he had two names applying to one species, and hence published his 1860b note on their synonymy. Walker labeled very few of his type specimens; this was done some time after the descriptions appeared. In the case of the two names under consideration here, the labeling was apparently done by A. G. Butler (D. S. Fletcher, in letter), who followed the 1860b synonymy. The result is that both moths bear the holographic labels *Choerodes subclararia* Walker, one with the word "type" added; hence there is no labeled specimen of *subopalaria*.

I have examined both the specimens upon

which Walker based his descriptions; they are in the collection of the British Museum (Natural History). Both Fletcher and I agree that the one labeled as being the "type" of *subclararia* is, in reality, the holotype of *subopalaria* (see fig. 76); its genitalia are mounted on slide FHR 18114. The second specimen, the misidentified female, with half the abdomen missing, is therefore the type of *subclararia* (see fig. 77). I have placed holotype labels on the two specimens with their proper names.

As stated above, Walker based his description of *subopalaria* on a single male specimen; this was followed by a second description of the "Female"? Because Walker expressed doubt, I have not considered the female to be a syntype of *subopalaria*, but to be a specimen dubiously associated with that species. This female is from Rio [de] Janeiro, Brazil; it is in the University Museum collection, Oxford. A photograph of this specimen, kindly furnished me by D. S. Fletcher, indicates that this is probably a specimen of *exhonorata*; the genitalia should be studied to make the identification certain.

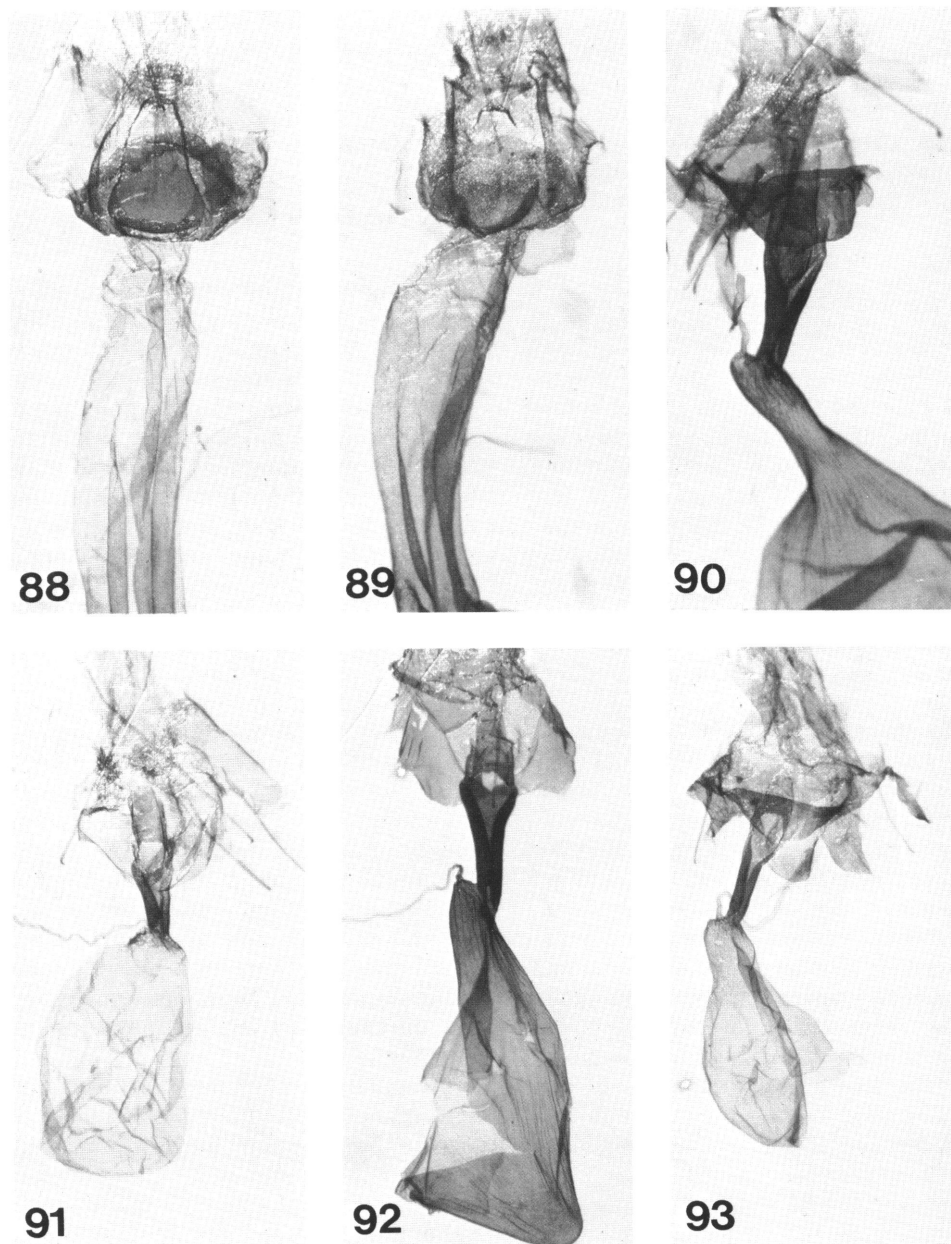
Type Locality. "St. Domingo. From Mr. Tweedie's collection" (for both *subopalaria* and *subclararia*).

Distribution. Cuba, Hispaniola, and Puerto Rico. (See Appendix 1 for locality data of specimens studied).

Remarks. Eighteen specimens (six males, 12 females) and 10 genitalic dissections (four males, six females) have been studied.

The holotype of *subopalaria* is in fairly good condition, although somewhat rubbed, and has both wings on the left side with incomplete margins. The holotype of *subclararia* is less rubbed and hence shows the pattern more clearly; the apical portion of the right forewing has been glued back on, as has the partial abdomen. The length of the forewings of the two types is exactly the same, notwithstanding Walker's statement that the length of the wings of *subopalaria* is 20 lines, and of *subclararia*, 18 lines.

The males of this species apparently show relatively little variation in color and pattern. The females, on the other hand, appear to vary



FIGS. 88-93. Female genitalia of *Sabulodes*. 88. *S. loba*, new species, San Juancito, Honduras (G. Lewis; AMNH). 89. *S. subopalaria* (Walker), San Lorenzo, Dominican Republic, July 10, 1915 (AMNH). 90. *S. depile*, new species, allotype, Paracti, Cochabamba, Bolivia, February 1-5, 1976 (L. E. Peña; AMNH). 91. *S. mastaura* Druce, "♀ Type," Las Vigas, Veracruz, Mexico (USNM). 92. *S. argyra* Druce, Baleu, Alta Verapaz, Guatemala, June 14, 1966 (E. C. Welling; AMNH). 93. *S. puebla*, new species, holotype, Manzanilla, Puebla, Mexico, July 21, 1918 (C. C. Hoffmann; AMNH).

in the strength and width of the cross lines on the upper surface of the wings; three have a very prominent black spot on the hind margin of the forewings near the t. p. line, whereas the remaining nine specimens do not have this feature. More and fresher material is needed to ascertain the range of variability, especially in the males.

GROUP IV

The members of this group are characterized by the males being without both the hair pencil on the hind tibia and the median row of setae ventrally on the third abdominal segment. The male genitalia have a broadly swollen uncus in all species; the valves have their free costal arm either bent at a right angle or sharply recurved to reverse direction and then swing medially. The female genitalia have a relatively short ductus bursae (0.4 to 2.3 mm. in length), the apical portion of the lamella postvaginalis is pointed, and the ductus seminalis arises either on the left side or ventrally.

The moths show a greater variety of pattern and color than is to be found in any of the other groups. Some species are superficially indistinguishable from those of group I; others are whitish or buff with a straight or slightly bicurved t. p. line; one species has reddish brown forewings above with silver-white streaks paralleling the veins; others are buff with a contrasting dark brown median area on the forewings. The upper surface of the hind wings may be either concolorous with the forewing or a contrasting whitish, usually without maculation. The length of the forewing varies from 13 to 23 mm.

Group IV contains 16 species; one is divided into three subspecies. The species occur from southern British Columbia to Bolivia. Only one is known from South America, while nine occur in North America, north of Mexico; the remainder occur in Mexico and Guatemala. The flight periods indicate that the species are either single or double brooded, or else have a more or less continuous series of hatchings from early spring into fall. The early stages of only one species (*edwardsata*) have been described.

Food plants are known for two species and, in both cases, conifers are the host plants. It is highly likely that many or most of the species in the group will prove to have caterpillars that are conifer feeders.

Sabulodes depile, new species

Figures 90, 94, 95, 106

Diagnosis. In color, maculation, and size, this Andean species is very similar to *boliviaria* of group I. The present species can be recognized by the characters for group IV.

Male. Head with vertex ochraceous; front with ochraceous band across top, white below; palpi extending beyond eye distance equal to length of eye, pale ochraceous. Thorax above pale ochraceous or buff, below white, pale buff anteriorly; legs white to pale ochraceous brown, ends of fore- and mid-tibia narrowly black. Abdomen above buff or pale ochraceous, with scattered brown scales; below white, with a few brown scales.

Upper Surface of Wings: All wings pale ochraceous or buff, with evenly scattered pale brown scales; forewings with cross lines weakly represented or partially obsolescent, brown, course as in members of group I; discal dot brown, small; small, brown venular spots on veins in t. a. and t. p. lines, latter more prominent than former; fringe concolorous with wing. Hind wings with maculation similar to that of forewings, with small brown discal dot, nebulous intradiscal band, and brown venular spots on extradiscal line present; fringe as on forewings.

Under Surface of Wings: All wings white; forewings with ochraceous scaling along costa, subapical brown patch, brown discal dot, and partial s. t. line indicated by dark brown venular dots; hind wings with scattered brown scales anteriorly and distally, with small brown discal dot and brown venular dots indicating s. t. line; fringes concolorous with all wings, occasionally with brown scales opposite middle veins in hind wings.

Length of Forewing: 20 to 22 mm.; holotype, 20 mm.

Female. Similar to male; palpi slightly

longer; forewings with each apex more sharply pointed, with outer margin weakly concave between apex and vein M_3 .

Length of Forewing: 23 to 25 mm.; allotype, 25 mm.

Male Genitalia. Uncus short, broad, similar to that of *boliviaria*, apically rounded, with small lateral swellings and with more prominent median point; socius digitate, posteromedially angled, with elongate setae arising from posterior surface near each apex; gnathos with sides of moderate width, having large median enlargement 0.4 mm. wide, its surface coarsely scobinate; valves with each costal arm bent at right angle, apical portion thick, bluntly pointed, finely dentate; anellus with elliptical anterior portion, bluntly pointed or rounded anteriorly, with small median depression, posterior portion sclerotized, sides diverging, posterior margin with each side rounded; saccus tapering to point; aedeagus 2.55 to 2.70 mm. in length, posteriorly curved ventrally, with slight ridge on left side having single tooth; vesica, when everted, extending ventrally, slender, tapering, with small but elongate sac on right side directed toward aedeagus.

Female Genitalia. Sterigma with lamella postvaginalis 1.0 to 1.2 mm. in length, slightly concave, sides parallel except for slight anterior swelling, posterior end with sides extended into points, concave between; sterigma with lateral areas broad, triangular on each side of ostium bursae, smoothly sclerotized, posterior margin weakly bilobed; ductus bursae 1.1 to 1.2 mm. in length, posteriorly wider than ostium bursae, decreasing in width anteriorly, lateral margins broadly thickened; ductus seminalis arising from lobe of corpus bursae to left of ductus bursae; corpus bursae with slender posterior portion set at angle to ductus bursae, broadly swollen anteriorly, surface with longitudinal striations, posteriorly with convoluted sclerotized band. Apophyses posteriores 2.3 to 2.5 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Holotype, male, and allotype, female, Paracti, 2200 meters, Chapare, Cochabamba, Bolivia, February 1-5, 1976 (L. E.

Peña). The genitalia of the holotype are mounted on slide FHR 18165, and of the allotype on FHR 18010. Paratypes, all from Bolivia: same data as holotype, five males, 10 females; Yungas del Palmar, 2000 meters, Cochabamba, February 5, 1950, March, 1951, seven males; Yungas de Espiritu Santo, 1888-1889 (P. Germain), two males; La Paz (E. Garlepp), one male; no data (G. Garlepp), three males.

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 British Museum (Natural History).

I have purposely restricted the type series to specimens from Bolivia.

Distribution. From central Peru to central Bolivia. (See Appendix 1 for label data of specimens studied.) Those few specimens with definite altitude data indicate that the species occurs from 2000 to 2300 meters.

Flight Period. February, March, and October.

Remarks. Thirty-three specimens (22 males, 11 females) and nine genitalic dissections (seven males, two females) have been studied.

It is probable that Oberthür included specimens of *depile* under his *boliviaria*; see the discussion, above, under *caberata oberthuri*. I have examined material from the Oberthür collection, now in the British Museum (Natural History), from Yungas de Espiritu Santo, Cochabamba, Bolivia, the type locality of *boliviaria*; *oberthuri*, *boliviaria*, and *depile* are all represented. All three are very similar to one another; the surest way to identify them is by a study of their genitalia.

The genitalia of the present species are very similar to those of *boliviaria*. The best method of distinguishing the males is by the presence or absence of the row of setae on the ventral surface of the third abdominal segment. In the female structures, *depile* tends to have a slightly longer ductus bursae and a more elongate posterior narrowed portion of the corpus bursae.

Etymology. The specific name is from the Latin *depilis*, without hair, in reference to the

absence of the hair pencil on the hind tibia of the male.

Sabulodes mastaura Druce

Figures 91, 96, 97, 107

Sabulodes mastaura Druce, 1891 (1891-1900), p. 14; 1893 (1881-1900), pl. 42, figs. 9 (male), 10 (female).

Diagnosis. This Mexican species can be separated from *depile* by its darkened median area, by the slightly yellower wings, and by the greater inward curvature of the t. p. line in the lower part of the forewings. The genitalia of both sexes are smaller than those of *depile*; in the males the uncus lacks the median point of the Andean species, and the female has the lamella postvaginalis ending in a point rather than being strongly concave.

Male. Head, thorax, and abdomen similar to those of *depile* but paler in color; palpi shorter, not reaching middle of eye, extending slightly more than half diameter of eye in front of eye.

Upper Surface of Wings: All wings pale buff, with scattered dull grayish brown scales; median area slightly darker than basal and distal areas; maculation weakly represented, similar to that of *depile*, differing in having straighter t. a. line, median line more parallel to t. a. line, t. p. line concave between veins and having greater inward curve in lower portion of wing; t. a. and t. p. lines with weak, small, orange-brown or grayish brown venular dots. Hind wings similar to forewings, with intradiscal line going across middle of wing, at greater angle to extradiscal line than in *depile*.

Under Surface of Wings: All wings whitish, forewings with ochraceous or brownish scaling along costa; maculation obsolescent, with or without small discal dot, with brownish black venular dots indicating s. t. lines on all wings.

Length of Forewing: 18 to 20 mm.

Female. Similar to male, but with more pronounced grayish brown and dark brown scaling, more clearly defined maculation and discal dots.

Length of Forewing: 19 to 21 mm.

Male Genitalia. Smaller than those of *depile*; uncus short, broad, apically truncate, without median or lateral points; gnathos broad laterally, with large, scobinate median enlarge-

ment; valves with each sclerotized costa flattened, arm bent at right angle, slender, sharply pointed, 0.25 to 0.30 mm. long; anellus sagittate anteriorly with short, angled, median ridges, posterior portion sclerotized, sides diverging; aedeagus 1.7 to 1.8 mm. in length, slightly curved, row of variable number of teeth posteriorly on left side.

Female Genitalia. Sterigma with moderate lamella postvaginalis, 0.7 mm. in length, slightly concave, sides parallel, tapering to blunt point apically; sterigma broad, smoothly sclerotized, triangular on each side of lamella postvaginalis, apices attenuate, posterior margins inwardly oblique; ductus bursae 0.7 to 0.8 mm. in length, slightly swollen posteriorly to become barely wider than lamella postvaginalis, decreasing in width anteriorly, lateral margins apparently thickened; ductus seminalis arising to left of midline; corpus bursae moderate, swollen anteriorly, posteriorly with slender, weakly convoluted sclerotized band on dorsal surface. Apophyses posteriores 2.0 to 2.2 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Druce described *mastaura* from an unspecified number of specimens of both sexes. The specimen labeled by Druce as his "♂ Type" is hereby designated, and has been labeled, as the lectotype (see fig. 96). It is USNM 12335; its genitalia are mounted on slide FHR 18067. The lectotype is labeled "Vera Cruz, Mexico"; the original description gives Las Vigas as the type locality. Druce's "♀ Type" is also in the collection of the National Museum of Natural History; its genitalia are mounted on slide FHR 18016.

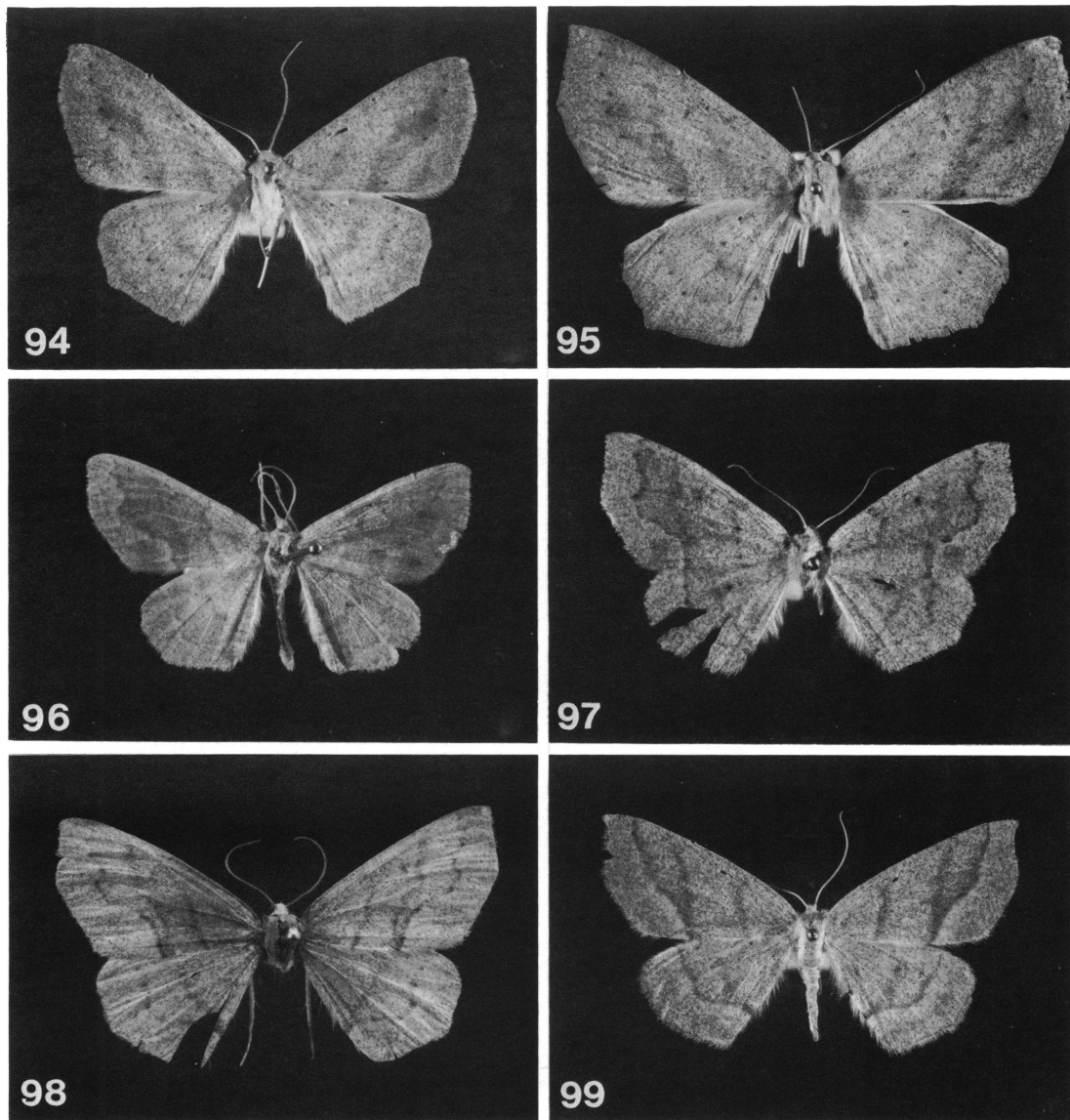
Type Locality. Las Vigas, Veracruz, Mexico.

Distribution. Southern Mexico. (See Appendix 1 for locality data of specimens examined.) The two localities where *mastaura* has been caught are at elevations of about 2150 to 2425 meters.

Flight Period. May and September.

Remarks. Six specimens (two males, four females) and four genitalic dissections (two males, two females) have been studied.

The lectotype is somewhat worn, especially the upper surface of the right forewing. It is



FIGS. 94-99. Adults of *Sabulodes*. 94, 95. *S. depile*, new species. 94. Male, holotype, Paracti, Cochabamba, Bolivia, February 1-5, 1976 (L. E. Peña; AMNH). 95. Female, allotype, Paracti, Cochabamba, Bolivia, February 1-5, 1976 (L. E. Peña; AMNH). 96, 97. *S. mastaura* Druce. 96. Male, lectotype, Las Vigas, Veracruz, Mexico (USNM). 97. "Type ♀," Las Vigas, Veracruz, Mexico (USNM). 98, 99. *S. argyra* Druce. 98. Male, lectotype, Totonicapán, Guatemala (BMNH). 99. Female, Chuchexik, Solola, Guatemala, November, 2, 1975 (E. C. Welling; AMNH). All $\times 1.4$.

highly probable that Druce's figure of the male (pl. 42, fig. 9) was based on this specimen, as it is the only specimen of that sex known to me from the type locality. The figure is moderately

accurate, but the maculation and color are slightly wrong. The median area of the lectotype is more contrasting in color, and the course of the cross lines of the figure is only

relatively accurate. The figure is completely without the darkened area in the tornus. The figure of the female (pl. 42, fig. 10) was undoubtedly based on Druce's "♀ Type." Figure 10 is a more accurate representation of the actual specimen than is figure 9.

Due to the limited amount of material available, and of the age of most of the specimens (I have only studied one specimen collected in this century), it is difficult to say much about the variability of the species. The one fresh specimen (collected in 1961) is paler in color and has less dark scaling than do the original specimens from the Schaus collection. I suspect that this is due to color change with age, a common occurrence. On the other hand, the fresh specimen is from Oaxaca, while all of the others are from Veracruz; it is possible that some or all of the variation could be geographic.

Sabulodes argyra Druce

Figures 92, 98, 99, 108

Sabulodes argyra Druce, 1891 (1891-1900), p. 14; 1893 (1881-1900), pl. 42 figs. 7 (male), 8 (female).

Diagnosis. This Guatemalan species tends to be slightly darker and to have less angulate t. p. and extradiscal lines than are found in *mastaura*. In the present species, the male genitalia have a more elongate and more medially constricted uncus and a longer aedeagus than are found in *mastaura*. The female genitalia are also larger, with longer lamella postvaginalis and ductus bursae, and more elongate lateral areas of the sterigma, as compared with *mastaura*.

Male. Head, thorax, and abdomen similar to those of *mastaura*, but having more grayish brown scaling; palpi grayish brown, short, extending beyond eye less than one-third diameter of eye.

Upper Surface of Wings: All wings variable in color, ochraceous, grayish brown, or brown, more or less evenly covered with dull gray or grayish brown scales; maculation similar to that of *mastaura* but tending to be more prominent, with t. a. line straighter, t. p. line tending to be faintly outlined on distal side by narrow

yellow-orange band, to have stronger venular dots, and not to be concave between veins. Hind wings similar to forewings, with straight, broad median shade band, and extradiscal line similar to t. p. line.

Under Surface of Wings: Grayish white, with variable number of grayish brown scales, especially anteriorly on forewings; discal dots and venular dots of s. t. lines usually present on all wings.

Length of Forewing: 16 to 19 mm.

Female. Similar to male but tending to have more gray scaling above and below; wings with cross lines tending to be slightly more prominent, grayer, with yellow-orange outer border of t. p. and extradiscal lines appearing more prominent.

Length of Forewing: 18 to 23 mm.

Male Genitalia. Similar to those of *mastaura*, differing mainly as follows: uncus narrower, more constricted anteriorly of swollen apical portion; each valve with free costal arm tending to have flattened portion extending away from valve short distance, giving arm distal curvature next to valve (instead of being smoothly curved as in *mastaura*); anellus tending to be broader anteriorly; aedeagus longer, 2.0 to 2.8 mm. in length; everted vesica extending to right side, having large dorsal swelling near aedeagus.

Female Genitalia. Similar to those of *mastaura*, differing mainly as follows: larger; sterigma with lamella postvaginalis 0.7 to 0.9 mm. in length, sides slightly tapering; sterigma with lateral areas more attenuate laterally, posterior margin shallowly V-shaped, lateral areas smoothly sclerotized; ductus bursae 1.1 to 1.4 mm. in length, weakly swollen posteriorly, wider than lamella postvaginalis, then constricted and sides either parallel or slightly tapering anteriorly; ductus seminalis arising on left side from swelling of corpus bursae; corpus bursae moderate in length, slightly diagonal in position, with longitudinal striations and with very slender, sclerotized, convoluted band posteriorly. Apophyses posteriores 1.8 to 2.2 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

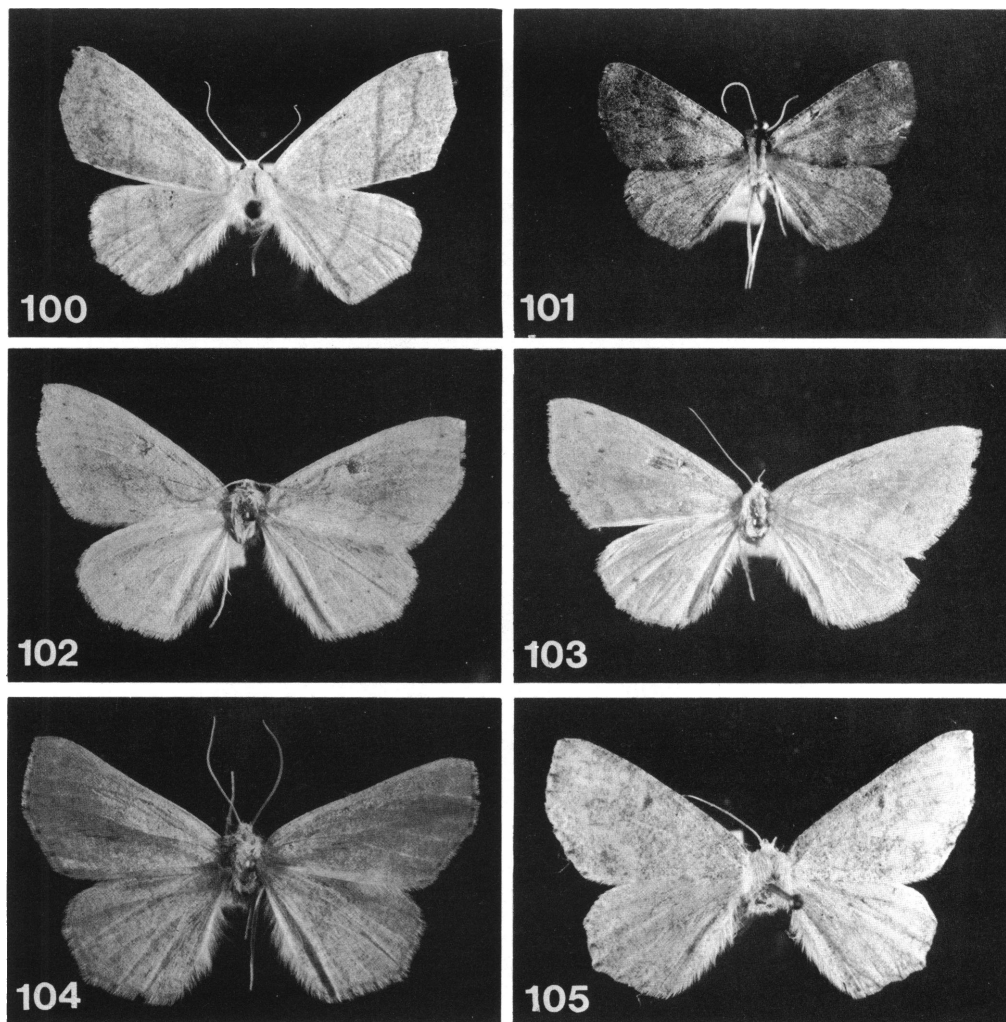
Types. Druce described *argyra* from one

male and one female; both specimens are in the collection of the British Museum (Natural History). I hereby designate and have labeled the male as the lectotype (see fig. 98). Its genitalia are mounted on slide FHR 18015.

Type Locality. Totonicapán, Totonicapán, Guatemala. The locality is given as "Totonica-

pam" in both the original description and on the pin label.

Distribution. The mountains of central Guatemala, at elevations of from about 850 to 3000 meters. (See Appendix 1 for locality data of specimens studied.) The types were taken in "pine-woods on the summit of the Cordillera



FIGS. 100-105. Adults of *Sabulodes*. 100. *S. puebla*, new species, female, holotype, Manzanilla, Puebla, Mexico, July 21, 1918 (C. C. Hoffmann; AMNH). 101. *S. pumilla*, new species, male, holotype, Quisache, Chimaltenango, Guatemala, November 10, 1966 (E. C. Welling; AMNH). 102, 103. *S. matrona* Druce. 102. Male, lectotype, Las Vigas, Veracruz, Mexico (USNM). 103. Female, Veracruz, Mexico (USNM). 104, 105. *S. meduana* Druce. 104. Male, lectotype, Las Vigas, Veracruz, Mexico (USNM). 105. Female, Coatepec, Mexico (USNM). All $\times 1.4$.

above Totonicapam" (Druce, 1891 [1891-1900], p. 14).

Flight Period. June, October through January.

Remarks. Nineteen specimens (12 males, seven females) and 10 genitalic dissections (five males, five females) have been examined.

The lectotype is now much more worn than is indicated in Druce's figure 7. The maculation of the type is still fairly distinct, but the figure is much clearer and better defined. The maculation of the figure is fairly accurate.

The color of the upper surface of the wings is not only variable within each sex, but the color of the two sexes is different; this is well shown in Druce's figures. The males range from ochraceous and grayish brown to several shades of brown; the females are grayish white to pale ochraceous, and are heavily scaled with gray. It is difficult to find two specimens that are the same color.

In the male genitalia there is considerable variation in the extent of the dentate area on the aedeagus; this varies from two to three teeth to almost two dozen.

Sabulodes puebla, new species

Figures 93, 100

Diagnosis. This Mexican species can be recognized, in the female (the male being unknown), by cream-colored wings having distinct cross lines. The female genitalia can be separated from those of *argyra* by the shorter ductus bursae and apophyses posteriores.

Male. Unknown.

Female. Head, thorax, and abdomen similar to those of *argyra* but more cream-colored.

Upper Surface of Wings: Forewings unicolorous pale cream-colored, evenly suffused with grayish brown scales; cross lines grayish brown, complete, distinct; t. a line at one-third length of wing, not marked on costa, extending straight across wing, meeting inner margin one-third distance from base; discal dot absent; median line arising on costa three-fourths distance from base, extending straight across wing, parallel with t. a. line; t. p. line arising on vein R_5 2 mm. from outer margin, weakly concave to vein Cu_1 , then inwardly concave to meet inner margin at same spot as median line, t. p. line

edged outwardly by narrow orange-brown line, tending to be thickened on veins; fringe concolorous with wing. Hind wings concolorous with forewings, and having distinct maculation; intradiscal line and discal dot absent; median line complete, straight; extradiscal line complete, paralleling outer margin, and having orange-brown venular dots; fringe concolorous with wing.

Under Surface of Wings: All wings white, with faint creamy tinge; forewings with costa darkened, and with scattered grayish brown scales in anterior part of wing; hind wings with a few, widely scattered grayish brown scales anteriorly and distally; maculation very faintly reflected from upper surface.

Length of Forewing: 18 mm. (holotype).

Male Genitalia. Unknown.

Female Genitalia. Similar to those of *argyra*, differing mainly as follows: lamella postvaginalis tending to be slightly shorter, with anterior portion more attenuate; sterigma with lateral areas more weakly sclerotized, narrower, apparently meeting lamella postvaginalis near middle; ductus bursae shorter, 0.8 mm. in length, and narrower; corpus bursae with more rounded posterior end. Apophyses posteriores shorter, 1.5 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Type. Holotype, female, Manzanilla, Puebla, Mexico, July 21, 1918 (C. C. Hoffmann) (see fig. 100). The genitalia of the holotype are mounted on slide FHR 18008.

The holotype is in the American Museum of Natural History.

Distribution. Known only from the type locality.

Flight Period. July.

Remarks. One specimen and one genitalic dissection have been studied.

Etymology. The specific name is a noun in apposition taken from the type locality.

Sabulodes matrona Druce

Figures 102, 103, 109, 133

Sabulodes matrona Druce, 1891 (1891-1900), p. 15; 1893 (1881-1900), pl. 42, fig. 14 (male).

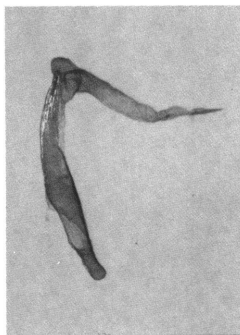
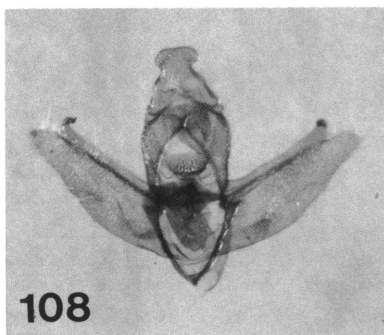
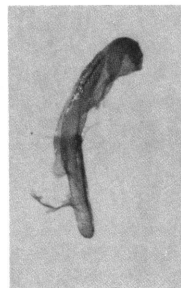
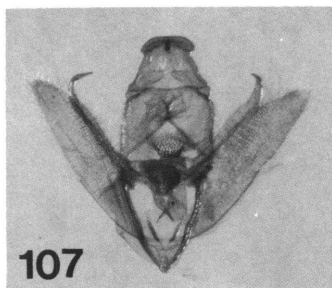
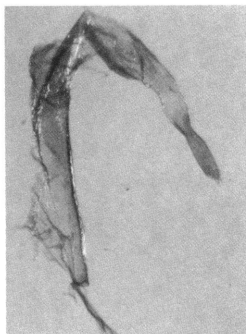
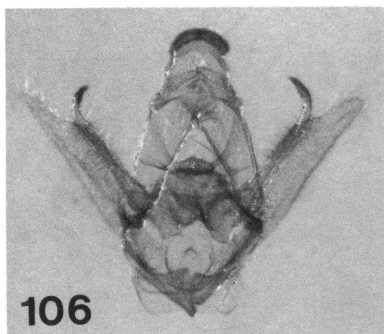
Diagnosis. This Mexican species can be recognized by the upper surface of the wings

being yellower than in other species. The genitalia, as compared with those of *argyra*, are smaller in the male, and, in the female, have a shorter ductus bursae and apophyses posteriores.

Male. Head with vertex yellowish white dorsally, pure white on bases of antennae; front yellowish white; palpi slightly paler than front, extending in front of eye one-third to one-half diameter of eye. Thorax yellowish white above, paler below; legs whitish, with pale grayish

brown scaling on outer surfaces. Abdomen whitish above and below.

Upper Surface of Wings: Forewings unicolorous deep cream to yellowish white, with a few scattered pale grayish brown scales; cross lines very weakly represented or obsolescent, apparently much like those of *argyra* in course and location; fringe concolorous with wing. Hind wings concolorous with forewings; maculation obsolescent; fringe concolorous with wing.



FIGS. 106-108. Male genitalia of *Sabulodes*. 106. *S. depile*, new species, paratype, Yungas de Espiritu Santo, Cochabamba, Bolivia, 1888-1889 (P. Germain; BMNH). 107. *S. mastaura* Druce, lectotype, Las Vigas, Veracruz, Mexico (USNM). 108. *S. argyra* Druce, lectotype, Totonicapán, Guatemala (Champion; BMNH).

Under Surface of Wings: All wings slightly paler than above, disc of forewing slightly whiter and faintly shining; maculation absent except for s. t. line on all wings, represented by small dark brown venular dots, and by small discal dots; fringes concolorous with wings, and having small, dark brown spots opposite some veins.

Length of Forewing: 17 to 19 mm.

Female. Similar to male, tending to have maculation slightly better defined on wings with slightly more dark brown scaling.

Length of Forewing: 18 to 20 mm.

Male Genitalia. Similar to those of *argyra*, differing mainly as follows: smaller, with combined lengths of tegumen and saccus 1.4 to 1.5 mm. (1.8 to 2.0 mm. in *argyra*); uncus shorter; costa straighter, not convex medially; anellus with anterior portion less elongate, more angular, posterior portion with broader divergent arms; aedeagus 1.6 mm. in length, with teeth of posterior row reduced in number.

Female Genitalia. Similar to those of *argyra*, differing mainly as follows: lamella postvaginalis shorter, 0.6 to 0.7 mm. in length; sterigma with lateral triangular areas weakly rugose, concave medially around lamella postvaginalis, posterior margin not reaching apex of lamella postvaginalis; ductus bursae shorter, 0.5 to 0.7 mm. in length, not enlarged posteriorly. Apophyses posteriores 1.8 to 1.9 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Druce described *matrona* from seven specimens from the Schaus collection, with only the male being mentioned and figured. Four males and one female are now in the collection of the National Museum of Natural History, including the one bearing Druce's holographic "♂ Type" label. This specimen is hereby designated as the lectotype, and it has been so labeled (see fig. 102); it is USNM 32337. The genitalia of the lectotype are mounted on slide HWC 1131.

Type Locality. Las Vigas, Veracruz, Mexico.

Distribution. Veracruz, Mexico. (See Appendix 1 for locality data of specimens examined.)

Flight Period. May (only one specimen has the date of capture on the label).

Remarks. Seven specimens (five males, two females) and five genitalic dissections (three males, two females) have been studied.

The lectotype is in good condition, although there are some rubbed and descaled areas, especially on the right forewing. Druce's illustration (pl. 42, fig. 14) of *matrona* is fairly good, although the anterior portion of the t. p. line is a bit asymmetrical, which is incorrect. In addition, the figure has the venation too prominent; the cross lines and all discal dots are too strongly represented. The color of the figure is slightly too yellow. The moths themselves are rather variable in color; some specimens approach the color of *dissimilis* (Hulst).

Sabulodes meduana Druce

Figures 104, 105, 111, 134

Sabulodes meduana Druce, 1891 (1891-1900), p. 15; 1893 (1881-1900), pl. 42, fig. 15 (male).

Diagnosis. This Mexican species can be recognized by the upper surface of the wings being ochraceous or buff, and having obsolescent maculation. The genitalia, as compared with those of *matrona*, have a longer aedeagus in the male, and longer lamella postvaginalis, ductus bursae, and apophyses posteriores in the female.

Male. Head with vertex and front variable in color, ranging from white to pale ochraceous; palpi concolorous with or slightly darker than front, with length as in *matrona*. Thorax pale ochraceous to ochraceous above, paler below; legs whitish, with pale grayish brown scaling on outer surfaces. Abdomen pale ochraceous above and below.

Upper Surface of Wings: Forewings grayish white, heavily and evenly covered with grayish brown and dull brown scales, producing a unicolorous ochraceous, buff or grayish brown; maculation obsolescent or absent, some specimens with discal dash and t. p. line weakly indicated, latter represented by venular dots and faint orange-brown distal shade band; fringe concolorous with wing, with or without dark venular spots. Hind wings concolorous with forewings; maculation obsolescent; fringe as forewings.

Under Surface of Wings: All wings paler than above, with forewings below vein Cu whitish; maculation absent except for discal dots and incomplete, very faint s. t. lines on all wings, represented by small venular dots; fringes concolorous with wings, with faint to prominent brown spots opposite veins.

Length of Forewing: 18 to 20 mm.

Female. Similar to male, tending to have maculation and venular dots in fringes slightly better defined with more dark brown scaling.

Length of Forewing: 20 mm.

Male Genitalia. Similar to those of *matrona*, differing mainly as follows: uncus larger, base 0.7 to 0.8 mm. wide (0.5 to 0.6 mm. in *matrona*); costa broader, weakly convex distally before becoming free arm, latter more evenly tapering to point; anellus with prominent inverted V-shaped ridges in center of anterior swelling; aedeagus longer, 1.7 to 1.8 mm. in length, with prominent posterior row of teeth.

Female Genitalia. Similar to those of *ma-*

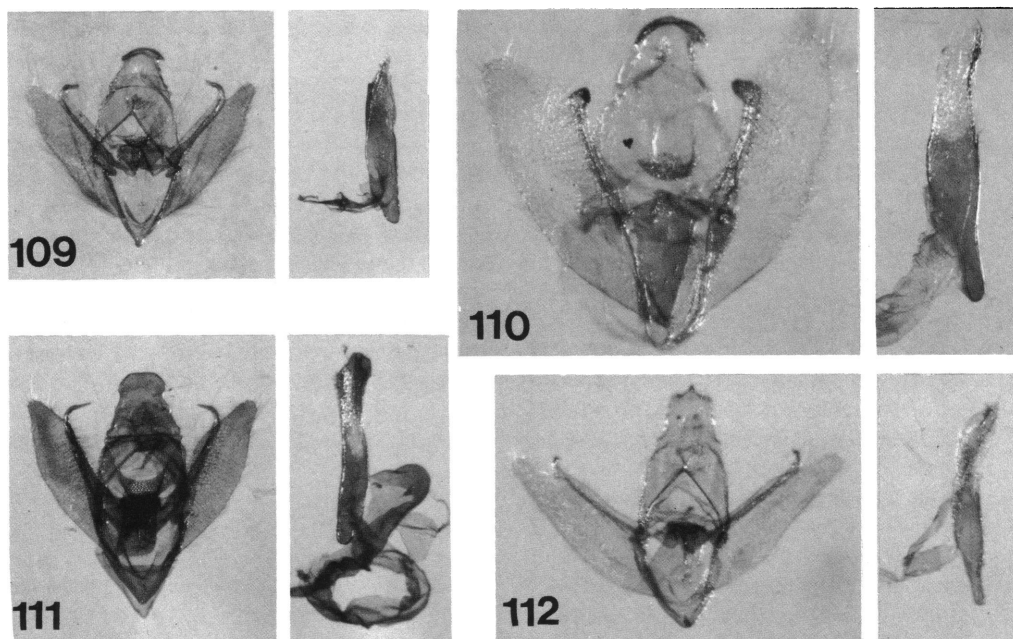
trona, differing mainly as follows: lamella postvaginalis larger, 0.8 mm. in length; stegma with lateral areas smoothly and more weakly sclerotized, more slender, rounded posteromedially; ductus bursae longer, 0.8 mm. in length, with posterior end prominently swollen. Apophyses posteriores 2.2 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Druce described *meduana* from four specimens from the Schaus collection, with only the male being mentioned and figured. Four males, bearing Druce's holographic labels, are now in the collection of the National Museum of Natural History, including the one with the "♂ Type" label. This specimen is hereby designated as the lectotype (see fig. 104), and it has been so labeled; it is USNM 12337. The genitalia of the lectotype are mounted on slide HWC 1139.

Type Locality. Las Vigas, Veracruz, Mexico.



FIGS. 109-112. Male genitalia of *Sabulodes*. 109. *S. matrona* Druce, Veracruz, Mexico (USNM). 110. *S. pumilla*, new species, holotype, Quisache, Chimaltenango, Guatemala, November 10, 1966 (E. C. Welling; AMNH). 111. *S. meduana* Druce, Jalapa, Mexico (AMNH). 112. *S. dissimilis* (Hulst), Smoky Valley, California, June 22, 1947 (C. Ingham; AMNH). Figure 110 is shown at twice the magnification of the others.

Distribution. Veracruz, Mexico. (See Appendix 1 for locality data of specimens examined.)

Flight Period. Unknown.

Remarks. Seven specimens (six males, one female) and six genitalic dissections (five males, one female) have been studied.

The lectotype is in fairly good condition, although the wings are somewhat rubbed and descaled. Even without being rubbed, the wings have very little maculation; other syntypes have the markings somewhat more strongly represented. The species is quite variable in the color of the upper surface of the wings, and in the extent and strength of the markings.

Druce's figure 15 was obviously drawn from the lectotype. This illustration gives a fairly good representation of the moth, although the venular dashes near the apex of each forewing are too strongly represented.

***Sabulodes pumilla*, new species**

Figures 101, 110

Diagnosis. This Guatemalan species is the smallest known *Sabulodes*, and it is the only one with dark brown wings. The male genitalia can be recognized by their small size and by the short extension of the free costal arm.

Male. Head with vertex pale grayish brown; front brownish black dorsally, pale grayish brown below; palpi brownish black, very short, scarcely extending beyond eye. Thorax above grayish brown; below gray; legs gray, forelegs brown on outer surface. Abdomen above grayish brown, paler below.

Upper Surface of Wings: All wings grayish brown, with numerous brown and brownish black scales; maculation obscure, only faintly indicated, apparently similar to preceding species; t. a. line represented by dark costal dot, then extending more or less straight across wing; discal dot present, located in broad, very nebulous median band; t. p. line represented by dark costal spot and dark venular spots weakly connected by faint brown line, concave between veins in upper portion of wing, and broadly concave below. Hind wings similar to forewings, faintly grayer; maculation obsolescent, with faint straight median line and extra-discal line represented.

Under Surface of Wings: Dull gray, with scattered grayish brown scales; discal spots and s. t. lines indicated on all wings.

Length of Forewing: 14 mm. (holotype).

Female. Unknown.

Male Genitalia. Uncus with apical portion broadly and evenly swollen; gnathos with moderate lateral strips and with broad, relatively slender, scobinate median enlargement; each valve with short arm, free portion arising about middle of valve, bent at right angle, 0.1 mm. in length, thick, setose, bluntly pointed; anellus with moderate anterior portion, swollen and sclerotized posteriorly; aedeagus 1.3 mm. in length, with small tooth and swelling distally.

Female Genitalia. Unknown.

Early Stages. Unknown.

Food Plant. Unknown.

Type. Holotype, male, Quisache, 1750 meters, Municipio Acatenango, Chimaltenango, Guatemala, November 10, 1966 (E. C. Welling). The genitalia of the holotype are mounted on slide FHR 14834.

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

Distribution. Guatemala, being known only from the type locality.

Flight Period. November.

Remarks. One specimen and one genitalic dissection have been studied.

This species, based on color and general appearance, is quite different from all the other included members of the genus. The genitalia leave no doubt as to its generic placement.

Etymology. The specific name is from the Latin *pumillus*, dwarfish or little, in reference to the size of the species.

***Sabulodes dissimilis* (Hulst), new combination**

Figures 112-114, 135

Phengommataea dissimilis Hulst, 1898, p. 215.

Dyar, "1902" [1903], p. 319. Smith, 1903, p. 75.

Barnes and McDunnough, 1917a, p. 115. McDunnough, 1938, p. 170. Rindge, 1955, p. 141.

Destutia dissimilis: Barnes and McDunnough, 1918, p. 157.

Diagnosis. This species, from the southwestern United States, can be distinguished from all preceding ones by the longer and more slender forewings, and by the evenly colored pale yellowish wings having obsolescent mac-

ulation. The genitalia are similar to those of *argyra*; in the male, the present species can be recognized by the strong median ridge and point on the uncus and, in the female, by the smaller lamella postvaginalis and sterigma.

Male. Head with vertex and front white; palpi covered with mixture of white and brown scales, very short, extending one-third diameter of eye in front of eye. Thorax above faintly yellowish, white below; legs white, with some brown scaling. Abdomen above faintly yellowish; below white, with a few scattered brown scales.

Upper Surface of Wings: Forewings unicolorous pale yellowish white, with or without varying amounts of very pale grayish brown scaling and transverse striations in outer portion of wing; maculation usually represented by t. p. line only, varying from completely absent to weakly indicated, very pale grayish brown when present, tending to be fairly straight; t. a. and partial median line weakly represented in some specimens. Hind wings slightly whiter than forewings, with or without some faint grayish brown scaling distally; without maculation.

Under Surface of Wings: Slightly paler than upper surface, with all wings concolorous; without maculation or with small amount of brown scaling apically on forewings.

Length of Forewing: 13 to 17 mm.

Female. Similar to male.

Length of Forewing: 13 to 19 mm.

Male Genitalia. Uncus broad, sides parallel medially, apically with posterior median ridge and strong ventral point; socius short, broad, not extending to mid-line; gnathos broad laterally, narrowing anteriorly, with median swelling reduced or absent; valves with each sclerotized costa flattened or slightly concave, angled as in *argyra*; anellus with elliptical anterior portion having median depression, posterior ends divergent, each part rounded distally; aedeagus 1.90 to 2.05 mm. in length, with row of teeth from sclerotized ridge posteriorly on left side; everted vesica apparently extending to right side.

Female Genitalia. Sterigma with lamella postvaginalis 0.6 to 0.7 mm. in length, slightly concave, tending to be variable in shape, with sides parallel or evenly tapering, apex narrowly

truncate; sterigma with lateral areas weakly and smoothly sclerotized, attenuate laterally; ductus bursae 0.8 to 1.0 mm. in length, slightly and evenly decreasing in width anteriorly, lateral margins narrowly thickened; ductus seminalis arising ventrad or slightly to left of ductus bursae from slight swelling of corpus bursae; corpus bursae slightly swollen anteromedially, posteriorly with longitudinal striations, posterior end with or without partial sclerotized band on dorsal surface. Apophyses posteriores 1.8 to 1.9 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Type. Hulst did not specify either the number of specimens or their sex in his description of *dissimilis*. The holotype (see fig. 113) is a male in the collection of the American Museum of Natural History (Rindge, 1955, p. 141); its genitalia are mounted on slide FHR 8943.

Type Locality. Glenwood Springs, Garfield County, Colorado.

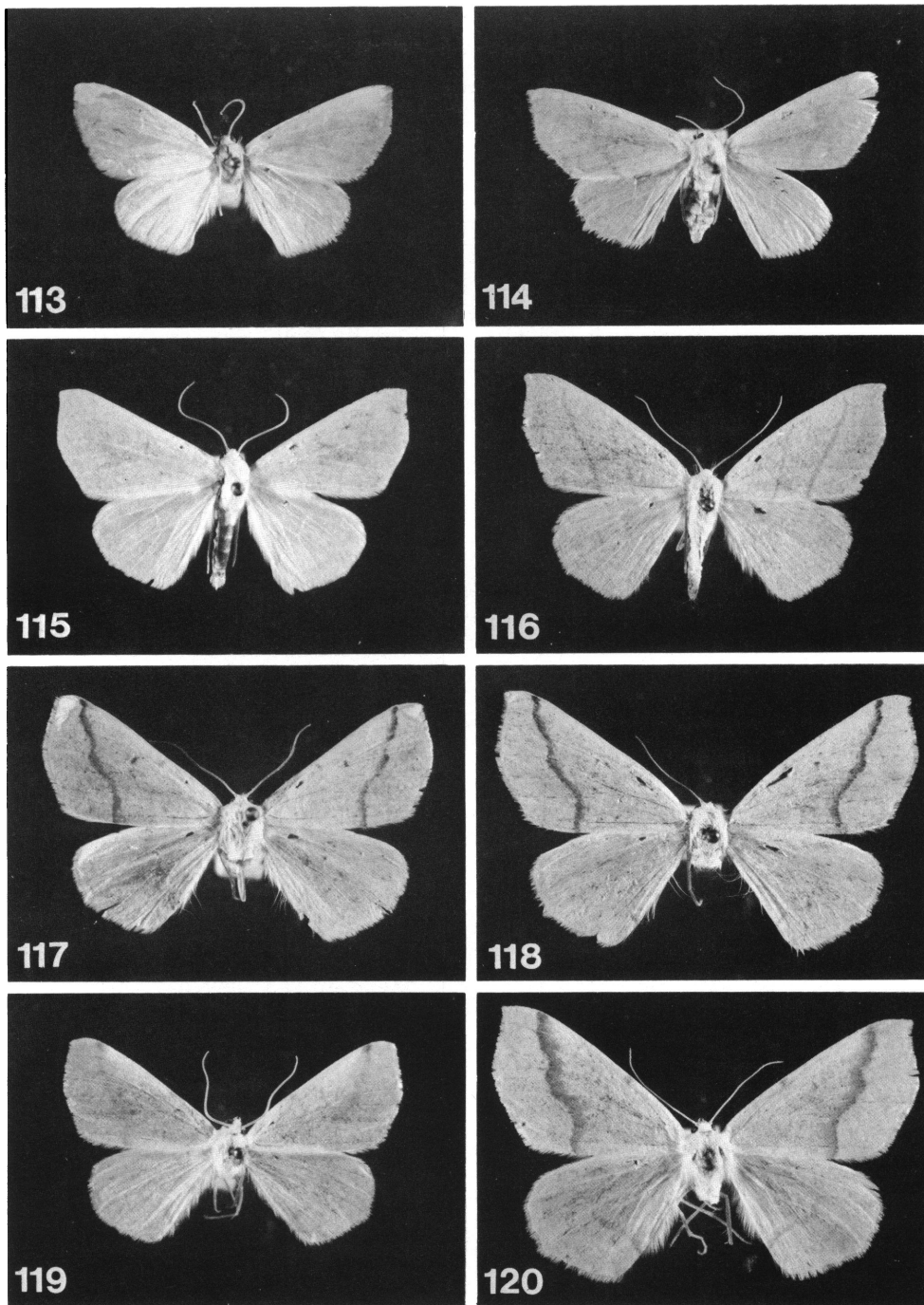
Distribution. From California (Mojave Desert and adjacent Sierra Nevada) east to western Colorado and south to western Texas. Indicated elevations are from about 1450 to 2500 meters. In Arizona the species occurs in the northern and central areas, with the Mogollon Rim being about its southern limit. (See Appendix 1 for locality data of specimens studied.)

Flight Period. From April into October.

Remarks. One hundred eighty-eight specimens (137 males, 51 females) and 13 genitalic dissections (seven males, six females) have been studied.

Freshly emerged specimens of this species are slightly darker in color than those that have been flying for some time; the latter appear paler and more washed out, presumably due to an apparent loss of some scales. This same phenomena occurs in the closely related *sericeata*.

The wing pattern of *dissimilis* is faint, obsolescent, or absent. In a few specimens, where the pattern is relatively well defined, a partial median line is present, extending from about the middle of the wing to the costa. This is an intermediate condition between all those species of groups I, II, III, and the South and Central American species of group IV where the median line may be complete and entire.



FIGS. 113-120. Adults of *Sabulodes*. 113, 114. *S. dissimilis* (Hulst). 113. Male, holotype, Glenwood Springs, Colorado, October 1-7 (AMNH). 114. Female, High Rolls, New Mexico, August 23 (AMNH). 115, 116. *S. sericeata* Barnes and McDunnough. 115. Male, Carr Canyon, Arizona, June 7, 1964 (R. F. Sternitzky; AMNH). 116. Female, Miller Canyon, Arizona, July 5, 1974 (R. F. Sternitzky; AMNH). 117, 118. *S. huachuca*, new species. 117. Male, holotype, Miller Canyon, Arizona, June 26, 1974 (R. F. Sternitzky; AMNH). 118. Female, allotype, Miller Canyon, Arizona, June 26, 1974 (R. F. Sternitzky; AMNH). 119, 120. *S. mabelata* (Sperry). 119. Male, allotype, Todd's Lodge, Arizona, September 16, 1941 (G. H. and J. L. Sperry; AMNH). 120. Female, holotype, Todd's Lodge, Arizona, September 12, 1947 (G. H. and J. L. Sperry; AMNH). All $\times 1.4$.

Sabulodes sericeata Barnes and McDunnough,
revised status

Figures 115, 116, 127, 136

Sabulodes sericeata Barnes and McDunnough,
1917b, p. 261, pl. 28, fig. 4 (lectotype male).

Destutia sericeata: Barnes and McDunnough, 1918,
p. 157.

Phengommataea sericeata: McDunnough, 1938, p.
170.

Diagnosis. This species, from southern Arizona, is very similar to *dissimilis*; the present species tends to be slightly larger, and to have the upper surface of the wings paler and with more clearly defined maculation. The genitalia of the two species are also similar to one another; in the male the present species has a shorter aedeagus (1.75 to 1.80 mm. in length, compared with 1.90 to 2.05 mm. in *dissimilis*), and, in the female, a shorter lamella postvaginalis (0.5 to 0.6 mm., compared with 0.6 to 0.7 mm. in *dissimilis*) and shorter apophyses posteriores (1.5 to 1.7 mm., compared with 1.8 to 1.9 mm.).

Male. Head, thorax, and abdomen similar to those of *dissimilis* but with the last two white above.

Upper Surface of Wings: Forewings unicolorous creamy white, with buff cross lines; t. a. line outcurved in cell, then going straight to inner margin; faint discal dot usually present; t. p. line complete, varying from weakly bicurved to having lower portion almost straight; s. t. and terminal lines absent. Hind wings either concolorous with forewing or very slightly paler; median line weakly represented in some specimens but usually absent; extradiscal line faint, tending to fade out anteriorly, paralleling outer margin of wing.

Under Surface of Wings: Slightly paler than upper surface, all wings concolorous; without maculation except for partial t. p. line on forewings near costa.

Length of Forewing: 13 to 17 mm.

Female. Similar to male.

Length of Forewing: 16 to 19 mm.

Male Genitalia. Similar to those of *dissimilis*, differing mainly as follows: uncus tending to be slightly broader and shorter, posterior end having less prominent posterolateral corners and smaller median ridge; gnathos with

small, weakly tuberculate median swelling; aedeagus shorter, 1.75 to 1.80 mm. in length.

Female Genitalia. Similar to those of *dissimilis*, differing mainly as follows: lamella postvaginalis shorter, 0.5 to 0.6 mm. in length; sterigma with smaller lateral areas; ductus bursae shorter, 0.7 to 0.9 mm. in length; corpus bursae tending to have less prominent longitudinal striations. Apophyses posteriores 1.5 to 1.7 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. This species was described from one male and two females. I hereby designate, and have labeled, the "Type ♂" as the lectotype; it is in the collection of the National Museum of Natural History.

Type Locality. Paradise, Cochise County, Arizona.

Distribution. Southeastern Arizona, being known from Cochise and Santa Cruz counties only. (See Appendix 1 for locality data of specimens examined.)

Flight Period. From May to October.

Remarks. Two hundred thirty-five specimens (130 males, 105 females) and nine genitalic dissections (five males, four females) have been studied.

The species is relatively constant in color and maculation. Freshly emerged specimens are of a deeper, slightly yellowish color than are worn moths. There is some variability in the cross lines, being mainly represented in the t. a. line, which varies from completely absent to being as strongly represented as the t. p. line.

Barnes and McDunnough were certainly not far wrong when they said, in the original description of *sericeata*, that their "species seems allied to *matrona* Druce." Druce's species has broader and shorter wings, plus a median line on the upper surface of the forewings.

Sabulodes huachuca, new species

Figures 117, 118, 128, 137

Diagnosis. This species from southern Arizona and New Mexico can be separated from *sericeata* by its larger size, dark brown discal spot, and the more prominent and angular t. p. line on the upper surface of the forewings. The genitalia of the present species are larger than

those of *sericeata*; the uncus lacks the posterior ridge and prominent point of *sericeata*, and the present species has a much larger lamella postvaginalis and ductus bursae.

Male. Head, thorax, and abdomen similar to those of *sericeata*; some specimens faintly cream-colored on upper surface of thorax and patagia.

Upper Surface of Wings: Forewings unicolorous cream-colored, with a few faint, pale brownish gray striations in some specimens; maculation brown with prominent discal spot and complete t. p. line; t. a. line absent in most specimens, when present represented by brown costal spot and spot on anal vein; t. p. line arising on costa about nine-tenths length of forewing, going at right angle to costa to vein R_4 , slightly concave to vein R_5 , inwardly oblique, concave on vein M_2 , convex on vein M_3 , parallel with outer margin to vein Cu_1 , then with large, shallow bend to anal vein, meeting inner margin three-fourths distance from base; s. t. line absent; fringe variable, either concolorous with wing or with small dark patches opposite some vein endings and at apex of wing. Hind wings whiter than forewings; maculation absent or very weakly represented by small discal dot and incomplete extradiscal line.

Under Surface of Wings: All wings faintly creamy white, with forewings tending to become somewhat cream-colored distally; costa of forewings creamy buff; maculation absent or obsolescent, all discal dots present, small, and with t. p. line weakly represented in some specimens; fringe of forewing either unicolorous, concolorous with wing, or with dull brown scaling opposite some vein endings.

Length of Forewing: 18 to 21 mm.; holotype, 19 mm.

Female. Similar to male, but tending to have more prominent and slightly darker brown t. p. line.

Length of Forewing: 18 to 22 mm.; allotype, 21 mm.

Male Genitalia. Uncus broad, apical section tapering, bluntly pointed, without median ridge and point; gnathos broad laterally, with large, scobinate, anteriorly bluntly pointed, median area; each valve with elongate costa extending

seven-eighths length of valve before being angled, free arm slender, tapering to sharp point, 0.5 to 0.6 mm. in length; anellus elliptical anteriorly, posteriorly divergent; aedeagus 2.65 and 2.75 mm. in length, with row of strong spines posteriorly; everted vesica extending ventrally, slender, with rounded sac on right side and smaller posterior sac, both near aedeagus.

Female Genitalia. Sterigma with elongate lamella postvaginalis, 1.45 mm. in length, slightly concave, more or less elliptical in outline, apex bluntly pointed; sterigma with lateral areas large, each side triangular and having one or two longitudinal ridges, posterior margin indented medially; ductus bursae 1.20 to 1.25 mm. in length, widest posteriorly, slightly asymmetrical, with left side weakly concave and right straight, lateral margins broadly thickened; ductus seminalis arising from small swelling near left margin of ductus bursae; corpus bursae somewhat asymmetrical, with posterior swelling on left side and enlarged medially on right side, posterior end with narrow, complete sclerotized band. Apophyses posteriores 1.6 to 1.7 mm. in length.

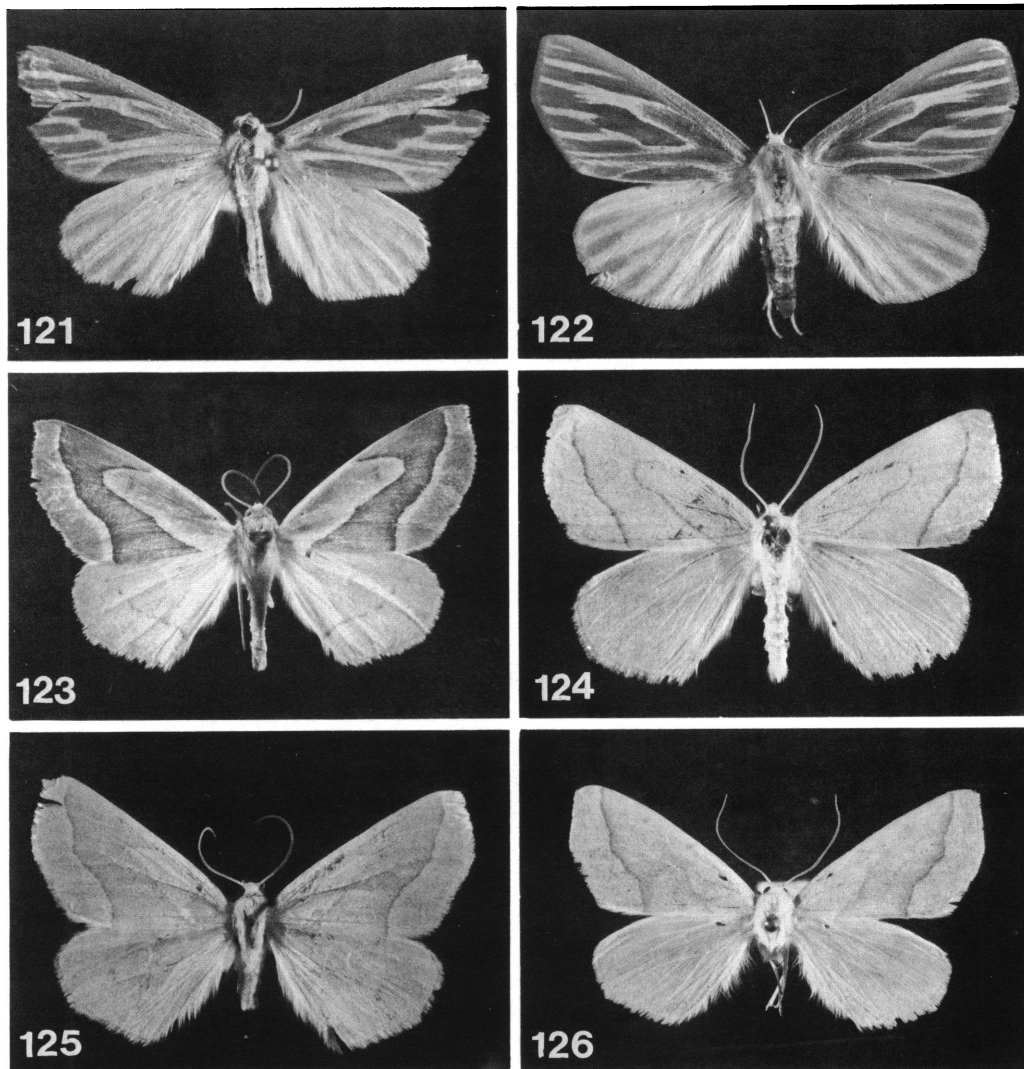
Early Stages. Unknown.

Food Plant. Unknown.

Types. Holotype, male, and allotype, female, Miller Canyon, 5000 feet, Huachuca Mountains, Cochise County, Arizona, June 26, 1974 (R. F. Sternitzky); both are from the author's collection. The genitalia of the holotype are mounted on slide FHR 18084, and of the allotype on FHR 17639. Paratypes: *Arizona: Cochise County*: same data as holotype, various dates in March, May, June, July, 1964, 1967, 1968, 1969, 1974, six males, three females; Miller Canyon, Huachuca Mountains, May 26, 1963 (L. M. Martin), 31 males, 12 females; Ramsey Canyon, Huachuca Mountains, various dates in April, May, June, August, September, October, 1964 through 1968 (R. F. Sternitzky), 12 males, 20 females; Ash Canyon, Huachuca Mountains, May 30, 1968, October 1, 1968 (R. F. Sternitzky), one male, two females; Carr Canyon, Huachuca Mountains, various dates in June, September, 1964, 1965, 1967, 1968 (R. F. Sternitzky), three males, three females; Garden Canyon, Huachuca Mountains, Septem-

ber 13, 1967 (R. F. Sternitzky), one male, one female; Sierra Vista, September 15, 1965, September 14, 1966 (R. F. Sternitzky), two males; Southwestern Research Station of the American Museum of Natural History, 5 miles west of

Portal, 5400 feet, September 15, 1968 (A. B. Klots), two females; same locality, May 26, 27, 1960, September 12, 14, 1959 (C. W. Kirkwood), three males, one female; South Fork Camp, Cave Creek, Chiricahua Mountains,



FIGS. 121-126. Adults of *Sabulodes*. 121, 122. *S. niveostriata* (Cockerell). 121. Male, holotype of both *niveostriata* and lectotype of *Phengommataea gertruda* Hulst, Cusack Ranch, Colorado (AMNH). 122. Female, Alpine Divide Camp, Arizona, July 18, 1965 (F., P., and M. Rindge; AMNH). 123, 124. *S. olifata* (Guedet). 123. Male, holotype, Turkey Flat, Arizona, July 22, 1927 (CAS). 124. Male, Las Rusias, Durango, Mexico, August 14-18, 1972 (Powell, Veirs, and MacNeill; UC). 125, 126. *S. duoangulata* (Cassino and Swett). 125. Male, holotype, Palmerlee, Arizona (MCZ). 126. Male, Miller Canyon, Arizona, June 26, 1974 (R. F. Sternitzky; AMNH). All $\times 1.5$.

May 21, 1962 (L. M. Martin), one female; Cave Creek, east side of Chiricahua Mountains, 5000 feet, September 13, 1966 (R. H. Leuschner), one female. *Santa Cruz County*: Canelo Valley, June 17, 1964 (R. F. Sternitzky), one male, one female; Elgin, August 13, 1967 (R. F. Sternitzky), one female; Sonoita Creek, 10 miles south of Patagonia, September 29, 1964 (R. F. Sternitzky), three females. *New Mexico*: Cherry Creek Camp, 6900 feet, 13 miles north of Silver City, Grant County, July 10, 1964 (F., P., and M. Rindge), 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, of the British Museum (Natural History), of the Los Angeles County Museum of Natural History, and of R. H. Leuschner.

Distribution. Southeastern Arizona and southwestern New Mexico.

Flight Period. From March into October.

Remarks. One hundred fourteen specimens (62 males, 52 females) and fourteen genitalic dissections (11 males, three females) have been studied.

There is very little seasonal variation within *huachuca*, notwithstanding its flight period of nine months. Individual variation occurs in the width and color of the t. p. line in specimens caught throughout the year.

Etymology. The specific name is a noun in apposition taken from the type locality.

Sabulodes mabelata (Sperry), new combination

Figures 119, 120, 129, 138

Phengommataea mabelata Sperry, 1948, p. 91.

Diagnosis. This Arizona species can be distinguished from *huachuca* by the longer palpi, by the slightly more angulate wings, by the upper surface of the forewings having a smaller and less prominent discal spot, and by the wider t. p. line being a paler brown, tending to fade out on the inner side instead of being sharply defined. The genitalia, when compared with those of *huachuca*, have the gnathos with a conical anterior projection of the median enlargement, and a longer aedeagus; the female structures have a longer and more slender

lamella postvaginalis that is more concave in cross section, and longer apophyses posteriores.

Male. Head, thorax, and abdomen similar to those of *huachuca* but with longer palpi, rising to about middle of eye and extending beyond front of eye by 0.5 mm. (0.3 mm. in *huachuca*).

Upper Surface of Wings: All wings tending to have outer margins angulate at veins M_3 ; forewings pale, unicolorous, cream-colored, paler than in *huachuca*; maculation similar to that of *huachuca*, but with discal dot reduced or absent, and with t. p. line a paler brown, wider, becoming paler on inner side, being between 0.5 to 1.5 mm. in width. Hind wings slightly paler than forewings; maculation as in *huachuca* but without discal dot.

Under Surface of Wings: All wings paler than on upper surface; forewings with faintly brownish cream costa and with some pale grayish brown scaling in apical region; maculation faintly mirroring that of upper surface.

Length of Forewing: 17 to 20 mm.

Female. Similar to male, but with slightly longer palpi (extending 0.5 mm. beyond eye), having some scattered brown scales on body and wings, and tending to have slightly darker t. p. line.

Length of Forewing: 19 to 23 mm.

Male Genitalia. Very similar to those of *huachuca*, differing mainly as follows: gnathos with median enlargement having anterior projection conical, apically bluntly rounded, with scobinations extending along outer margins; aedeagus longer, 2.80 to 2.95 mm. in length.

Female Genitalia. Very similar to those of *huachuca*, differing mainly as follows: lamella postvaginalis tending to be longer (1.45 to 1.70 mm.) and more slender, to be more concave in cross section, to have more parallel sides, and to have blunter apex; ductus bursae tending to be symmetrical, 1.20 to 1.45 mm. in length. Apophyses posteriores 1.85 to 1.90 mm. in length.

Early Stages. Unknown.

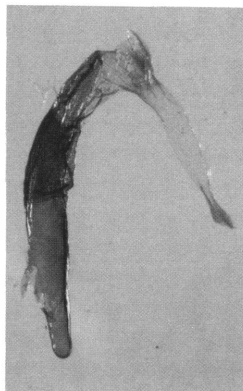
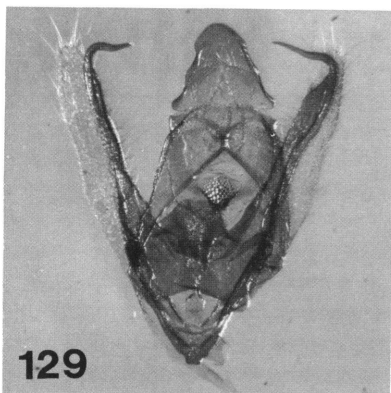
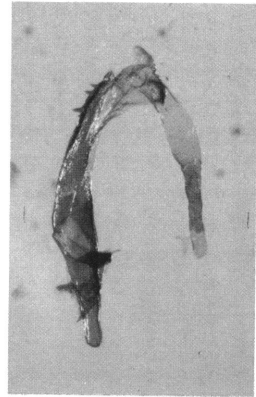
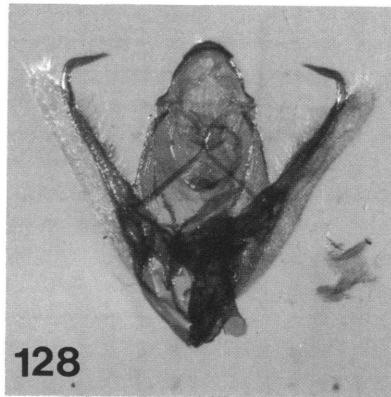
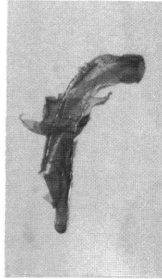
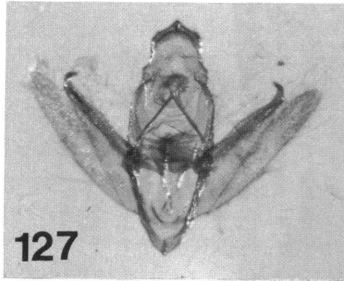
Food Plant. Unknown.

Types. The holotype, female, and allotype, male, are in the collection of the American Museum of Natural History (see figs. 119, 120). The genitalia of the holotype are mounted on

slide FHR 17958, and of the allotype on slide HWC 1489.

Type Locality. Todd's Lodge, Oak Creek Canyon, Coconino County, Arizona.

Distribution. Northern and central Arizona; the species apparently does not occur much to the south of the Mogollon Rim. The moths have been taken at elevations of from about



FIGS. 127-129. Male genitalia of *Sabulodes*. 127. *S. sericeata* Barnes and McDunnough, Southwestern Research Station of the American Museum of Natural History, Arizona, June 1958 (W. J. Gertsch; AMNH). 128. *S. huachuca*, new species, paratype, Cherry Creek Camp, New Mexico, July 10, 1964 (F. P., and M. Rindge; AMNH). 129. *S. mabelata* (Sperry), Workman Creek, Arizona, May 30, 1976 (R. Wielgus; AMNH).

1575 to 1950 meters. (See Appendix 1 for locality data of specimens examined.)

Flight Period. May and June; September and October.

Remarks. Forty-eight specimens (29 males, 19 females) and seven genitalic dissections (three males, four females) have been studied.

For some reason, most of the specimens of *mabelata* in collections are worn and appear rubbed. This abraded condition can reduce the maculation, and hence makes it more difficult to determine the species. In addition, there is some variation in the width of the t. p. line of the upper surface of the forewings; in general, males have the line narrower than the females.

Sabulodes niveostriata (Cockerell), new combination

Figures 121, 122, 130, 139

Caripeta niveostriata Cockerell, 1893, p. 359.

Phengommataea niveostriata: Barnes and McDunnough, 1917a, p. 115. McDunnough, 1938, p. 170.

Phengommataea gertruda Hulst, 1896, p. 342. Dyar, "1902" [1903], p. 319; 1903, p. 226. Smith, 1903, p. 75. Barnes and McDunnough, 1912, p. 35, pl. 16, fig. 12 (adult female); 1917a, p. 115 (as synonym of *niveostriata*). Rindge, 1955, p. 144.

Diagnosis. This species is unique in the genus in having the upper surface of the forewings reddish brown with longitudinal silvery white streaks. The genitalia are distinguished by the length of the aedeagus (3.2 to 3.6 mm.) and of the ductus bursae (1.9 to 2.3 mm.); both are the longest of any known species in group IV.

Male. Head with vertex all white or having some reddish brown hairlike scales; front varying from white or cream to pale reddish brown; palpi pale brownish white. Thorax above pale brownish or pale reddish brown; below white with considerable pale reddish brown scaling; legs pale brown on outer surface, white on inner surface. Abdomen above white to pale brownish white, below slightly darker brown, with posterior margins of segments white above and below.

Upper Surface of Wings: Forewings reddish brown, tending to be slightly darker in center of wing and above inner margin; maculation

silvery white, longitudinal, occurring as stripes in cells, except for large, approximately triangular area in center of wing; fringe pale reddish brown, in some specimens darkened at vein endings. Hind wings white, with veins reddish brown; discal dot and cross lines absent; fringes white or very pale reddish brown, reddish brown opposite vein endings.

Under Surface of Wings: All wings white, with veins more or less broadly reddish brown; costa of forewing slightly browner than veins and base of cell; cross lines and discal dots absent; fringes as above.

Length of Forewing: 18 to 21 mm.

Female. Similar to male.

Length of Forewing: 20 to 23 mm.

Male Genitalia. Similar to those of *huachuca*, differing mainly as follows: larger; uncus with posterior margin truncate; gnathos with median enlargement tending to have more numerous and slightly smaller scobinations; anellus only slightly enlarged anteriorly, weakly sclerotized, with prominent median ridges extending posteriorly to more heavily sclerotized posterior portion of anellus; aedeagus 3.2 to 3.6 mm. in length, with prominent posterior ridge and teeth; everted vesica extending to right side, slender, with small, rounded anterior and posterior sacs near aedeagus.

Female Genitalia. Similar to those of *huachuca*, differing mainly as follows: larger; lamella postvaginalis with anterior end slightly bulbous, posterior end attenuate, apex bluntly pointed; ductus bursae much longer, 1.9 to 2.3 mm. in length, with sides tending to be evenly tapered; corpus bursae with smaller posterior swelling, tending to have more longitudinal striations. Apophyses posteriores 1.8 to 2.1 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Cockerell proposed *niveostriata* in his 1893 paper on the insect fauna of the mid-alpine zone of Custer County, Colorado. He collected in that area from 1887 to 1890. To aid in determining the names of some of the moths, specimens were sent to G. D. Hulst, who "was very kind in identifying species" (1892, p. 306). At least one specimen of the present species was sent to Hulst; he gave Cockerell the name "*Caripeta niveostriata*

Hulst MS," and retained the moth. Cockerell published this name, as given in the previous sentence, plus the locality data of the specimen, and a diagnosis; nothing was said about the number of specimens or any types. Hulst did not publish anything on *niveostriata*. As the Cockerell specimen is extant, and it is the one upon which Hulst based the name *niveostriata*, I am considering this male as the holotype of that name, and have so labeled it. The specimen is in the American Museum of Natural History (see fig. 121).

Hulst described *gertruda* from at least three specimens; he gave "Colorado, from Mr. Cockerell and Mr. Bruce" as part of the original description (1896, p. 342). The type specimen in the Hulst collection (Rindge, 1955, p. 144) is the one received from Cockerell; apparently Hulst either forgot or ignored his own application of *niveostriata* to the very same moth. I hereby designate, and have labeled, the Cockerell specimen as the lectotype of *gertruda*; it is in the American Museum of Natural History. This one male is hence both the holotype of *niveostriata* and the lectotype of *gertruda*. There is a male and female from "Colo. Bruce," in the National Museum of Natural History collection, that are labeled as types of *gertruda*; these can be considered as lectoparatypes.

Type Locality. Cusack Ranch, Custer County, Colorado, for both *niveostriata* and *gertruda*. The ranch was "situated just on the divide between the Grape Creek and Texas Creek basins . . ."; its elevation was given as 8192 feet (Cockerell, 1893, p. 307). The general area is between the Wet Mountains, to the east, and the Sangre de Cristo Range, to the west; nearby towns are Silver Cliff and Westcliffe.

Distribution. The southern Rocky Mountain states of Colorado, Utah, Arizona, and New Mexico. The species is known from the Sierra Madre Occidental in Chihuahua and Durango. The indicated elevations range from about 1525 to 3225 meters. (See Appendix 1 for locality data of specimens examined.)

Flight Period. June through September; a single November record.

Remarks. Four hundred sixty-one specimens (384 males, 77 females) and 15 genitalic dis-

sections (nine males, six females) have been studied.

This species is completely unlike any other in the genus insofar as color and pattern go. It is much more likely to be confused, at first glance, with the sympatric arctiid *Aemilia ambigua* (Strecker), as both species have similarly colored forewings and the same general type of pattern.

Sabulodes olifata (Guedet), new combination
Figures 123, 124, 131, 140

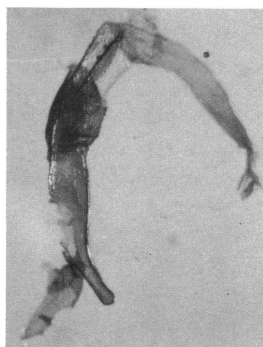
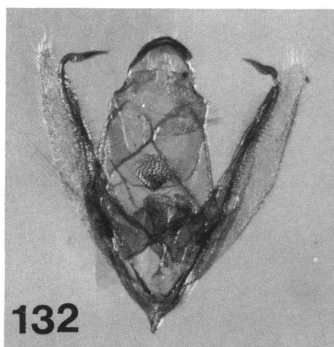
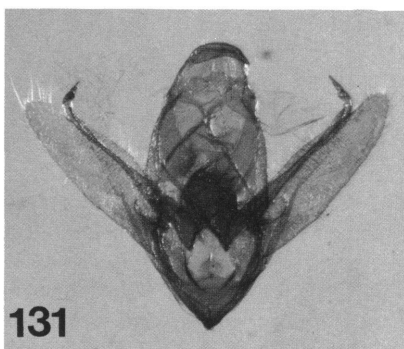
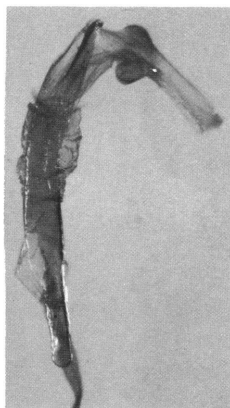
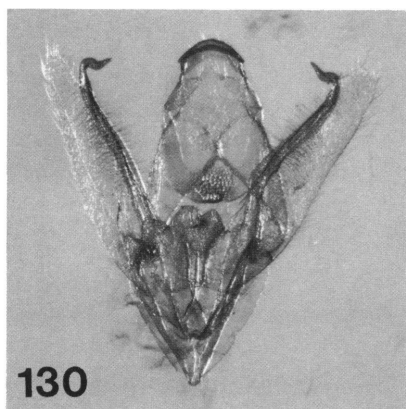
Phengommataea olifata Guedet, 1939, p. 31.

Diagnosis. This Arizona species can be recognized by the yellowish upper surface of the forewings having a complete brown median area that is sharply narrowed opposite the discal cell. The genitalia are similar to those of *niveostriata* but smaller; in the present species the aedeagus is 2.5 to 2.6 mm. in length, and the ductus bursae is 1.2 to 1.3 mm. long.

Male. Head, vertex and front white with very faint yellowish tint; palpi white or slightly pale brown distally, extending beyond eye two-thirds diameter of eye. Thorax above pale yellowish white, below white; legs white, with variable amount of pale brown scaling. Abdomen whitish above and below.

Upper Surface of Wings: Forewings yellow or faintly yellowish brown, with complete brown median area; t. a. and t. p. lines dark brown, each shaded on outside of median area by complete yellow band about 0.5 mm. in width; t. a. line arising indistinctly on costa basad of middle, going sharply outwardly to beyond end of discal cell, then broadly curved and going basad, with slight inward bend on vein Cu₂, to meet inner margin one-fifth distance from base; discal dot absent; t. p. line arising 1.5 to 2.0 mm. from apex of wing, weakly S-shaped or biconcave, meeting inner margin about three-fourths distance from base; s. t. line absent; fringe concolorous with wing. Hind wings very pale unicolorous yellowish white; most specimens without maculation, some with faint trace of incomplete extradiscal line in lower portion of wing; fringe concolorous with wing.

Under Surface of Wings: All wings unicolorous, pale yellowish white; some specimens



FIGS. 130-132. Male genitalia of *Sabulodes*. 130. *S. niveostriata* (Cockerell), Estes Park, Colorado, July 21, 1968 (A. and M. E. Blanchard; AMNH). 131. *S. olifata* (Guedet), Chiricahua Mts., Arizona, August 8, 1927 (J. A. Kusche; AMNH). 132. *S. duoangulata* (Cassino and Swett), Miller Canyon, Arizona, June 26, 1974 (R. F. Sternitzky; AMNH).

with pale brown scaling in anterior portion of discal cell of forewings; most specimens without maculation, some with very faint s. t. line on all wings, represented by small, pale brown venular spots; fringes concolorous with wings.

Length of Forewing: 19 to 20 mm.

Female. Similar to male.

Length of Forewing: 21 to 22 mm.

Male Genitalia. Similar to those of *huachuca*, differing mainly as follows: smaller;

uncus with posterior margin flatly rounded; gnathos broader; anellus broad anteriorly, scarcely narrowed medially, with weakly developed median ridges; aedeagus 2.5 to 2.6 mm. in length, with prominent apical toothed ridge; everted vesica extending to right side, with two small elongate sacs near and equidistant to aedeagus, both tapering distally, one on posterior surface, other on right side.

Female Genitalia. Similar to those of *huachuca*, differing mainly as follows: lamella postvaginalis 1.2 to 1.3 mm. in length, more slender, tending to have almost parallel sides, apex evenly rounded; sterigma with lateral areas smoothly sclerotized; ductus bursae 1.3 to 1.4 mm. in length, more slender, less swollen posteriorly; corpus bursae with more slender posterior end, becoming bulbous anteriorly. Apophyses posteriores 1.8 to 2.1 mm. in length.

Early Stages. Unknown.

Food Plant. Unknown.

Type. The holotype, male, and allotype female, are in the California Academy of Sciences; the former is type no. 4783 (see fig. 123).

Type Locality. Turkey Flat, Chiricahua Mountains, Cochise County, Arizona.

Distribution. Southern Arizona and Durango (see Appendix 1 for locality data of specimens examined). Indicated elevations range from about 1650 to 2900 meters. Presumably the species occurs in suitable habitats along the Sierra Madre Occidental in between the presently known localities.

Flight Period. July and August.

Remarks. Sixty-one specimens (41 males, 20 females) and six genitalic dissections (four males, two females) have been studied.

This species is easily recognized by its color and pattern. Specimens from the Chiricahua Mountains in Arizona vary in the color of the upper surface of the forewings, from a yellow to a brownish yellow depending on the amount of dark scaling and the age of the specimen. Freshly emerged specimens are brighter in color than those that have been flying for some time. The color of the median area of the forewings also varies, being more or less contrasting and conspicuous. Three specimens are

known from the Santa Catalina Mountains of Arizona; they have a much less contrastingly colored median area than do the above. The four specimens from Durango appear to be somewhat worn; they have rather pale forewings, and the median area is scarcely contrasting, thus appearing more similar in appearance to Santa Catalina Mountain moths. More material is needed, especially from other areas, before the significance of this variation is known.

Sabulodes duoangulata (Cassino and Swett),
new combination
Figures 125, 126, 132

Phengommatea [sic] *duoangulata* Cassino and Swett,
1923, p. 4.

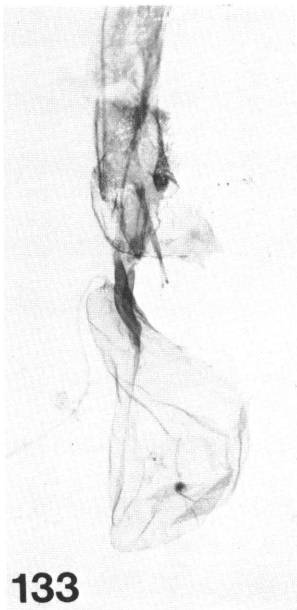
Phengommataea duoangulata: Sperry, 1948, p. 90.

Diagnosis. This Arizona species can be distinguished from *olifata* by its paler and less contrastingly colored forewings above, and by the t. a. line being more angulate and not extending so far distally. The male genitalia of the present species can be recognized by the elongate longitudinal ridge in the anellus, a character not present in *olifata*.

Male. Head, thorax, and abdomen similar to those of *olifata*; palpi shorter, extending beyond eye one-half diameter of eye.

Upper Surface of Wings: Forewings pale yellow to very faintly yellowish brown, with complete pale yellowish brown median area; t. a. and t. p. lines brown, narrow, each tending to be shaded on outside by faintly visible yellowish band; t. a. line arising on costa about two-fifths distance from base, sharply curved outward into cell, scarcely extending beyond middle of wing, then reversing direction, being weakly bisinuate to reach inner margin one-fourth to one-third distance from base; discal dot absent; t. p. line arising 1.5 to 2.0 mm. from apex of wing, similar in course to that of *olifata*; fringe concolorous with wing. Hind wings pale unicolorous yellowish white, without maculation; fringe concolorous with wing.

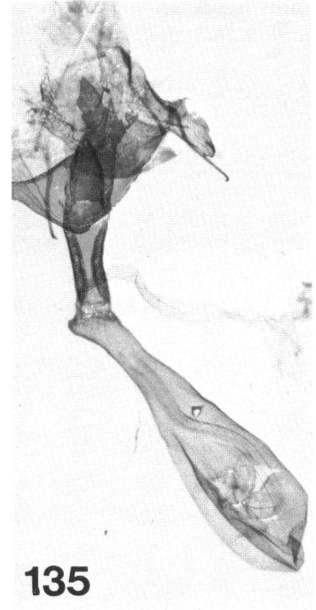
Under Surface of Wings: All wings unicolorous, pale yellowish white; without maculation except for t. p. line showing through from upper surface; fringes concolorous with wings.



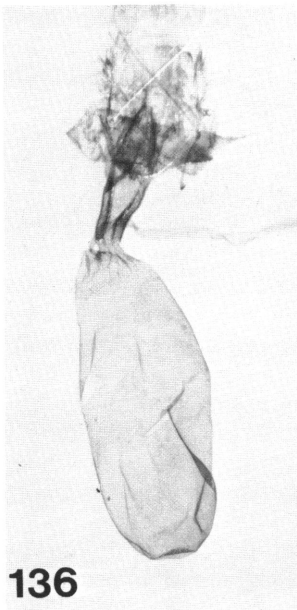
133



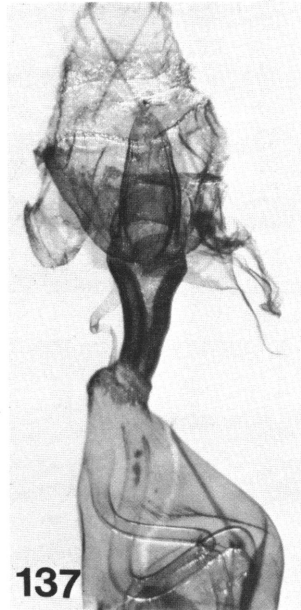
134



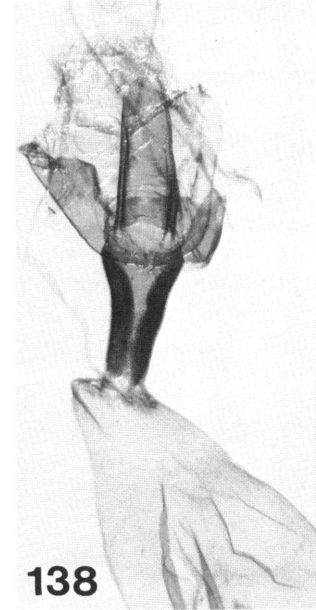
135



136



137



138

FIGS. 133-138. Female genitalia of *Sabulodes*. 133. *S. matrona* Druce, Las Vigas, Veracruz, Mexico, May 1896 (W. Schaus; BMNH). 134. *S. meduana* Druce, Coatepec, Mexico (USNM). 135. *S. dissimilis* (Hulst), Sierra Diablo wildlife management area, Texas, June 7, 1969 (A. and M. E. Blanchard; AMNH). 136. *S. sericeata* Barnes and McDunnough, Sonoita Creek, Arizona, September 29, 1964 (R. F. Sternitzky; AMNH). 137. *S. huachuca*, new species, paratype, Carr Canyon, Arizona, September 25, 1965 (R. F. Sternitzky; AMNH). 138. *S. mabelata* (Sperry), holotype, Todd's Lodge, Arizona, September 12, 1947 (G. H. and J. L. Sperry; AMNH).

Length of Forewing: 18 to 19 mm.

Female. Unknown

Male Genitalia. Similar to those of *olifata*, differing mainly as follows: uncus with basal portion tending to have parallel sides, posterior portion more sharply narrowed; gnathos with median enlargement tending to be slightly larger, more pointed anteriorly; anellus with anterior portion narrower, with parallel sides and having prominent median longitudinal ridge, posterior portion narrower; aedeagus 2.7 mm. in length, everted vesica with posterior swelling and smaller one on right side.

Female Genitalia. Unknown.

Early Stages. Unknown.

Food Plant. Unknown.

Type. Holotype, male, MCZ 21884 (see fig. 125); the genitalia are mounted on Cassino's slide 2308 (not examined). Sperry (1948) has commented on the spelling of the specific name on the type label.

Type Locality. Palmerlee, Cochise County, Arizona.

Distribution. Southeastern Arizona, being known only from Cochise County. (See Appendix 1 for locality data of specimens examined.)

Flight Period. June.

Remarks. Two specimens (both males) and one genitalic dissection have been studied.

The holotype is in fine condition, and is easily recognized by its maculation. Unfortunately, there is no date of capture on its labels. This species is by far the rarest of our North American *Sabulodes*, and I have been able to locate only two specimens. Both were taken in the Huachuca Mountains, the type not later than 1923, and the specimen from my collection on June 26, 1974.

Sabulodes spoliata (Grossbeck), new combination

Phengommataea spoliata Grossbeck, 1908, p. 27.

Diagnosis. This California species can be distinguished from all the preceding ones by the t. a. line of the forewings, when present, being rounded or angulate and not extending beyond the middle of the wing. The male genitalia can be distinguished from all those of the preceding species by the sharply recurved cos-

tal arms; the female structures by the broad lamella postvaginalis and very short ductus bursae.

Male. Head, vertex and front white or faintly brownish white; palpi creamy white to pale brown, scarcely rising above lower margin of eye. Thorax pale brown to creamy white above, below white to faintly brownish white; legs pale brown. Abdomen yellowish white or pale brownish white above and below.

Upper Surface of Wings: Forewings creamy white to light brown, with median area adjacent to cross lines darker brown; t. a. line varying from obsolescent to complete, arising on costa between three-tenths and one-third distance from base, either evenly curved or angulate into discal cell, turning posteriorly to meet inner margin same distance from base as origin on costa; median area with costal portion paler than in center of wing; discal dot usually absent, rarely present; t. p. line blackish brown, complete, arising about 2 mm. from apex of forewing, inwardly sinuous to vein M_2 , then sharply curved outward to vein M_3 , parallel with outer margin to vein Cu_1 , then more or less evenly concave to meet inner margin two-thirds distance from base; s. t. line absent; fringe concolorous with wing. Hind wings white or pale yellowish white; maculation absent except for extradiscal line across middle in some specimens; fringe concolorous with wing.

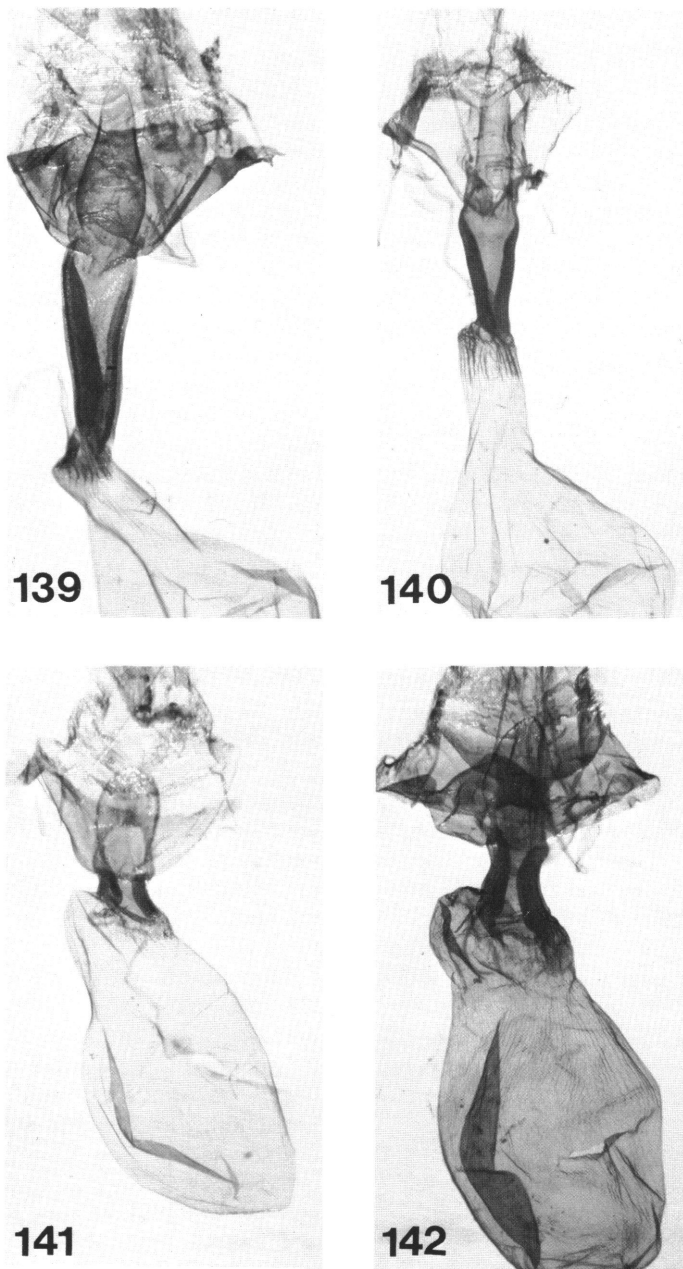
Under Surface of Wings: Forewings faintly yellowish white or brownish white, hind wings slightly creamy white, without maculation, or with faint trace of t. p. and extradiscal lines represented.

Length of Forewing: 15 to 20 mm.

Female. Similar to male, but with maculation tending to be more strongly represented, resulting in more contrastingly colored wings.

Length of Forewing: 18 to 21 mm.

Male Genitalia. Uncus broad, posterior surface angulate, and having prominent median point; gnathos of equal width laterally and anteriorly, without noticeable median enlargement; valves with each free costal arm elongate, extending posteriorly just beyond uncus, then sharply recurved to parallel basal portion, apical section evenly curved medially, terminating in sharp point, surface of apical section finely



FIGS. 139-142. Female genitalia of *Sabulodes*. 139. *S. niveostriata* (Cockerell), Red Canyon Camp, Utah, August 2, 1965 (F., P., and M. Rindge; AMNH). 140. *S. olifata* (Guedet), Southwestern Research Station of the American Museum of Natural History, Arizona, August 27, 1955 (W. J. Gertsch; AMNH). 141. *S. spoliata* (Grossbeck), Carmel, California, April 4, 1960 (R. H. Leuschner; AMNH). 142. *S. edwardsata* (Hulst), Wallace, Idaho, July 19, 1941 (O. Huellemann; AMNH).

denticulate; anellus with small, elliptical anterior portion, posterior section with heavily sclerotized lateral margins; aedeagus 2.00 to 2.65 mm. in length, with posterior ridge having several small teeth; everted vesica extending to right side, forming dorsoventral tubular structure centered on aedeagus.

Female Genitalia. Sterigma with lamella postvaginalis relatively short and broad, 1.0 to 1.1 mm. in length, sides curving, apex broadly rounded; sterigma with lateral areas attenuate, smoothly sclerotized except for ridge paralleling shallowly V-shaped posterior margin; ductus bursae short, 0.4 to 0.7 mm. in length, broad, constricted posteromedially, right side longer than left, resulting in diagonal attachment to corpus bursae; ductus seminalis arising ventrally on left side of ductus bursae; corpus bursae short, somewhat diagonal in position, tapering at both ends, weakly striate longitudinally, posterior end with slender, incomplete, weakly sclerotized band on ventral surface. Apophyses posteriores 1.7 to 2.0 mm. in length.

Early Stages. Unknown.

Food Plant. One specimen has been examined that was reared from "white pine."

Distribution. California.

Remarks. The species is divided into three subspecies.

Sabulodes spoliata spoliata (Grossbeck), new combination
Figures 141, 143, 144

Phengommataea spoliata Grossbeck, 1908, p. 27.
Barnes and McDunnough, 1917a, p. 115. McDunnough, 1938, p. 170.

Diagnosis. This population, found along the coast of central California, can be recognized by the brown forewings.

Male. Upper surface of forewings light brown, with median area darker brown; t. a. line varying from obsolete to fairly well defined, curved or angulate; t. p. line in lower portion of wing narrowly shaded outwardly by yellow band, in width equal to t. p. line above inner margin, becoming narrower and disappearing anteriorly. Hind wings above tending to

be faintly brownish white, and to have extradiscal line present in posterior part of wing.

Length of Forewing: 15 to 19 mm.

Female. Similar to male, but with maculation tending to be more strongly represented, resulting in more contrastingly colored wings.

Length of Forewing: 18 to 19 mm.

Male Genitalia. As described for the species.

Female Genitalia. As described for the species.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Grossbeck described *spoliata* from one male and one female. The former is USNM 34237, with its genitalia on slide HWC 979; this specimen is hereby designated, and has been labeled, as the lectotype (see fig. 143). The female is in the collection of the American Museum of Natural History.

Type Locality. Monterey County, California.

Distribution. Coastal California, being known from Monterey and Mendocino counties. (See Appendix 1 for locality data of specimens examined.) This population is known only from the western side of the Outer Coast Range.

Flight Period. From March through December.

Remarks. Ninety six specimens (56 males, 40 females) and six genitalic dissections (five males, one female) have been studied.

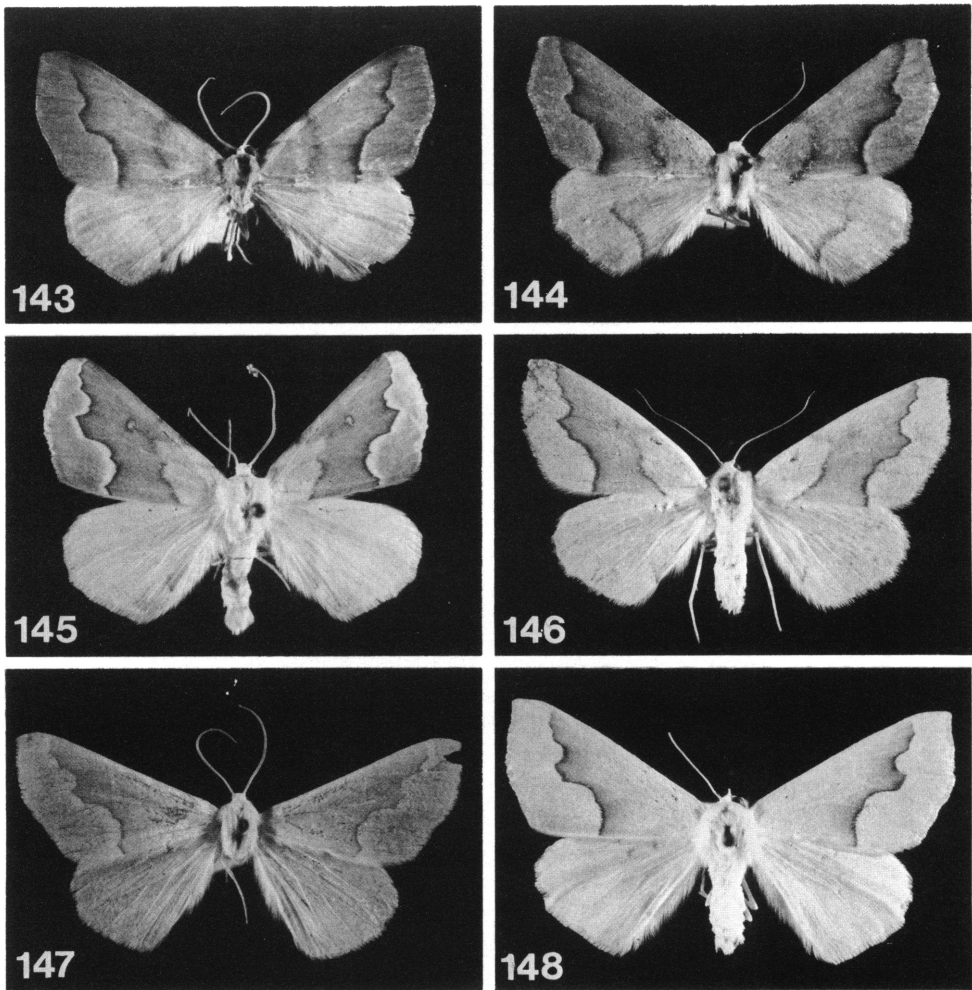
This population has browner forewings than do the other subspecies. These moths also have, in the great majority of specimens, a clearly defined t. a. line. These characters, along with their coastal distribution, will serve to identify nominate *spoliata*.

The single male from Mendocino County has darker brown forewings with the cross lines more contrastingly outlined than do most specimens from Monterey County.

Sabulodes spoliata berkeleyata (Wright), emendation, new combination, and new status
Figures 145, 146, 153

Phengommataea edwardsata berkleyata Wright, 1917, p. 124. McDunnough, 1938, p. 170.

Diagnosis. The population of the Inner



FIGS. 143-148. Adults of *Sabulodes*. 143, 144. *S. spoliata spoliata* (Grossbeck). 143. Male, lectotype, Monterey County, California (USNM). 144. Female, Carmel, California, April 4, 1960 (R. H. Leuschner; AMNH). 145, 146. *S. spoliata berkeleyata* (Wright). 145. Male, San Leandro, California, April 24, 1957 (T. W. Davis; LA). 146. Female, Camp Condor, California, August 16, 1942 (P. Denton; AMNH). 147, 148. *S. spoliata lagunata* (Cassino and Swett). 147. Male, holotype, Laguna Mts., California, September 1922 (MCZ). 148. Female, Hathaway Creek, California, August 2, 1940 (J. A. Comstock; LA). All $\times 1.5$.

Coastal Ranges of California has the upper surface of the forewings cream-colored or faintly yellowish, with the contrasting brown median area delimited basally by a distinct, complete t. a. line.

Male. Upper surface of forewings cream-colored or faintly yellowish, some specimens with a faint brownish suffusion; median area brown, delimited basally by distinct, complete,

evenly curved or angulate t. a. line; discal dot variable, being either absent, a dark brown dot, or a pale, dark ringed spot; t. p. line either with or without outward shading of complete yellowish band, prominent when present. Hind wings above creamy white, with or without partial extradiscal line in lower portion of wing.

Length of Forewing: 18 to 19 mm.

Female. Similar to male.

Length of Forewing: 18 to 20 mm.

Male Genitalia. As described for the species.

Female Genitalia. As described for the species.

Early Stages. Undescribed.

Food Plant. The holotype bears the label "Larvae on white pine."

Type. The holotype, male, is in the collection of the San Diego Natural History Museum.

Type Locality. Berkeley, Contra Costa County, California.

Distribution. The eastern side of the Outer Coast Ranges and the adjacent areas of California, extending from Napa County south to the Transverse Range in southern Kern County; the population extends to the west in Ventura and Santa Barbara counties, reaching the ocean. (See Appendix 1 for locality data of specimens examined.)

Flight Period. March through October.

Remarks. Eighty-seven specimens (45 males, 42 females) and five genitalic dissections (three males, two females) have been studied.

The type locality for this population is Berkeley; the name on the holotype label, in Wright's handwriting is "*berkeleyata*." In the original description it is spelled "*berkeleyata*"; this is an incorrect original spelling and so I have emended the name.

The holotype was in excellent condition when I studied it in 1963. The maculation is clearly defined on the specimen so there can be no question as to what it represents.

The adults are somewhat variable in the color and pattern of the upper surface of the forewings. Specimens from the northern and central portions of the range are relatively uniform in color, having the basal and distal areas of the wings paler and contrasting with the median area. The discal spot varies from being absent to relatively large, usually isolated in the median area. The moths from the Transverse Range tend to be paler in color than more northern examples. Specimens from Santa Barbara County have been taken from about sea level to the higher mountains; they show the most variation. This is expressed in the color of

the forewings, which ranges from the pale color found in northern specimens, to a dark brown, approaching nominate *spoliata*. There is also variation in the t. a. line, as it may be strongly represented, as in northern *berkeleyata*, or obsolescent, approaching examples of the following subspecies. It is probable that the Santa Barbara County population is a hybrid one of recent development and occurrence.

Sabulodes spoliata lagunata (Cassino and Swett), new combination and new status
Figures 147, 148

Phengommatea [sic] *lagunata* Cassino and Swett, 1923, p. 7.

Phengommataea lagunata: McDunnough, 1938, p. 170.

Diagnosis. The population from the mountains of southern California has the upper surface of the forewings cream-colored, with the median area brownish distally, fading off basally to merge with the basal area, the t. a. line being absent.

Male. Upper surface of forewings cream-colored, without brownish suffusion; median area pale brown or brown distally along t. p. line, evenly and gradually becoming paler basally to merge imperceptibly with basal area; t. a. line absent. Hind wings above creamy white, without maculation.

Length of Forewing: 17 to 20 mm.

Female. Similar to male; a few specimens with faint hint of t. a. line on forewings above.

Length of Forewing: 18 to 22 mm.

Male Genitalia. As described for the species.

Female Genitalia. As described for the species.

Early Stages. Unknown.

Food Plant. Unknown.

Types. Holotype, male, and allotype, female; the former is MCZ 21883 (see fig. 147), and its genitalia are mounted on slide FHR 18059.

Type Locality. Laguna Mountains, San Diego County, California.

Distribution. The mountains of southern California. Specimens with altitude data indicate that the species occurs from about 1050 to

2200 meters in elevation. (See Appendix 1 for locality data of specimens studied.)

Flight Period. From May into October.

Remarks. One hundred thirty-eight specimens (80 males, 58 females) and seven genitalic dissections (five males, two females) have been studied.

The holotype is in good condition, although there is a small chip out of the right forewing.

There appears to be relatively little variation within this population, outside of that between freshly emerged specimens and those that have been flying for some time. The fresh moths are brighter and more contrasting in color than older specimens. Females tend to have more brown in the median area than do males.

It would not surprise me if this population occurs in either the Sierra de Juarez or the Sierra San Pedro Martir, Baja California.

Sabulodes edwardsata (Hulst), new combination

Figures 142, 149-152, 154

Tetracis edwardsata Hulst, 1886, p. 203. Smith, 1891, p. 65. Rindge, 1955, p. 141.

Phengommataea edwardsata: Hulst, 1896, p. 342. Dyar, "1902" [1903], p. 319. Smith, 1903, p. 75. Barnes and McDunnough, 1917a, p. 115. McDunnough, 1938, p. 170. Prentice, 1963, p. 501, fig. 316 (distribution in Canada). Sugden, 1968, p. 31.

Phengommataea edwardsiata [sic]: Dyar, 1904, p. 908.

Diagnosis. The species from western North America can be distinguished by its large size, contrastingly colored forewings, and by the strongly outcurved t. a. line that extends distally beyond the end of the discal cell.

Male. Head, vertex and front white; palpi with mixed white and pale brown scaling, extending beyond eye about half diameter of eye. Thorax pale yellowish white above, white below; legs white on inner surfaces, tending to be pale brown on outer sides. Abdomen white or partially pale yellowish white above, white below.

Upper Surface of Wings: Forewings pale yellowish brown, with band about 1 mm. wide of pale yellow basad of t. a. and distad of t. p.

lines; median area brown, tending to be slightly paler along costa; cross lines dark brown, prominent, complete; t. a. line arising on costa one-third distance from base, curving outwardly to beyond end of discal cell, then C-shaped, having somewhat sinuous course to meet inner margin one-fifth distance from base; discal spot absent; t. p. line arising on costa 1.5 to 2.0 mm. from apex of wing, weakly outwardly dentate on veins, with basal bend between veins M_1 and M_3 , outwardly projecting across cell M_3 , then with larger basal bend to anal vein, meeting inner margin about three-fourths distance from base; s. t. line absent; fringe concolorous with wing. Hind wings white, becoming faintly yellowish distally; without maculation except for brown spot indicating extradiscal line on anal margin; fringe faintly yellowish.

Under Surface of Wings: Forewings white with faint yellowish tinge, and with median area showing through from upper surface; hind wings faintly yellowish white, without maculation; all fringes concolorous with wings.

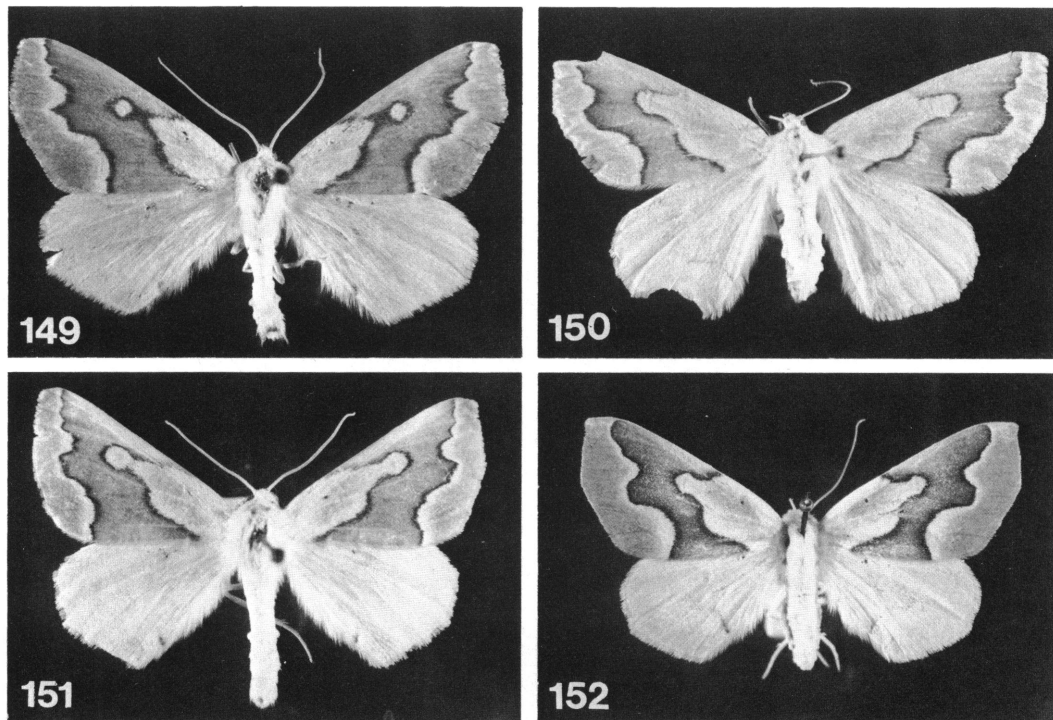
Length of Forewing: 18 to 21 mm.

Female. Similar to male; hind wings above with extradiscal line extending part way across wings in some specimens.

Length of Forewing: 19 to 23 mm.

Male Genitalia. Similar to those of *spoliata*, differing mainly as follows: larger; uncus tending to have posteromedian ridge; gnathos with slight median thickening; valves with each free costal arm extending only as far as posterior end of uncus, sharply recurved, with apical section broadly curved and thicker, with surface of apical portion thickly but minutely dentate; anellus with larger anterior section and shorter posterior portion; aedeagus 2.55 to 2.85 mm. in length, with elongate ridge having variable number of short teeth; everted vesica as in *spoliata* but tending to be more slender.

Female Genitalia. Similar to those of *spoliata*, differing mainly as follows: lamella postvaginalis larger, 1.2 mm. in length, variable in shape and width, elliptical, posterior end bluntly pointed; sterigma with lateral areas attenuate, similar to those of *spoliata*; ductus bursae 0.8 to 1.0 mm. in length; ductus semi-



FIGS. 149-152. Adults of *Sabulodes edwardsata* (Hulst). 149. Male, Miami Ranger Station, California, July 3, 1946 (F. H. Rindge; AMNH). 150. Female, holotype, Soda Springs, California (AMNH). 151. Male, Miami Ranger Station, California, August 1, 1946 (F. H. Rindge; AMNH). 152. Female, Lazy T Ranch, Oregon, July 15, 1949 (G. H. and J. L. Sperry; AMNH). All $\times 1.45$.

nalis arising medially; corpus bursae with posterior end curved to left, ending in broad swelling laterad of posterior end of ductus bursae, entire corpus bursae weakly striate longitudinally. Apophyses posteriores 1.6 to 2.1 mm. in length.

Early Stages. The caterpillar has been described by Sugden (1968, p. 31).

Food Plants. *Pseudotsuga*, *Pinus*, *Picea*, and *Tsuga* (Prentice, 1963, p. 501; Sugden, 1968, p. 31) in British Columbia. There is a specimen from a pupa on *Pinus radiata* D. Don in the University of California, Berkeley, collection, with the locality Santa Rosa, California.

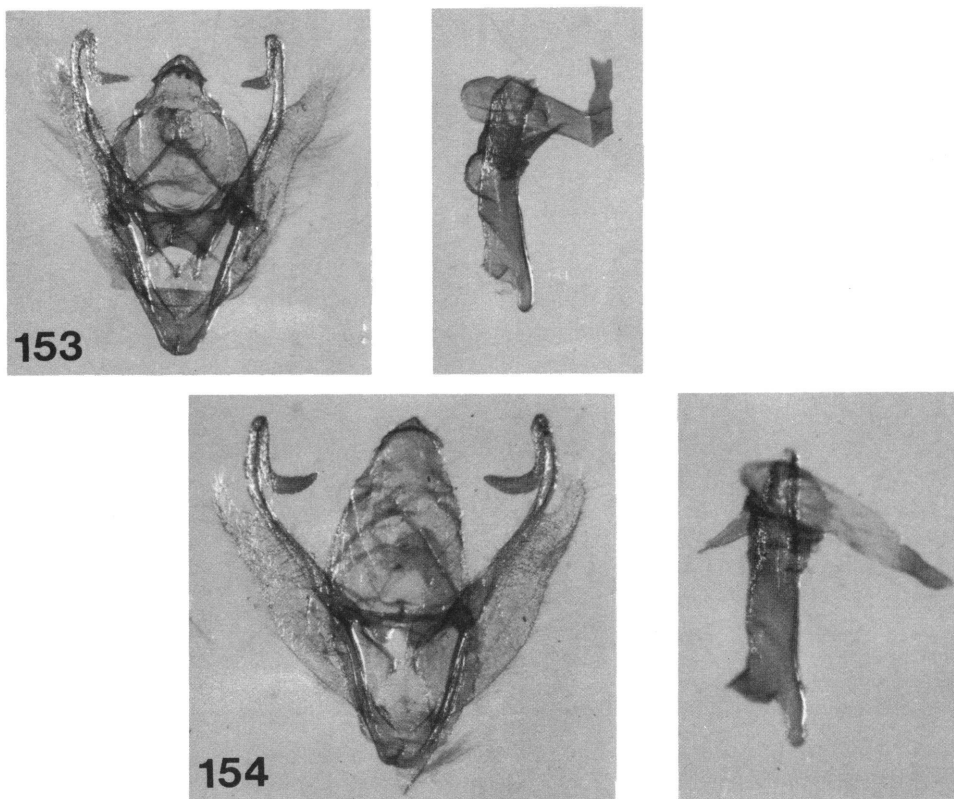
Type. Holotype, female, in the collection of the American Museum of Natural History (see fig. 150).

There are two specimens, one male and one female, in the collection of the National Museum of Natural History, that bear Hulst's type labels. Neither are types, as the species was described from a single female in the collection of Henry Edwards.

Type Locality. Soda Springs, Siskiyou County, California.

Distribution. California, and adjacent Nevada, north to south central British Columbia, including Idaho and Montana. One specimen has been seen labeled "Colo. Bruce"; this is a doubtful record that needs verifying. (See Appendix 1 for locality data of specimens examined.)

In California, *edwardsata* is found the length of the Sierra Nevadas and Cascade Mountains, from Kern and Ventura counties



FIGS. 153, 154. Male genitalia of *Sabulodes*. 153. *S. spoliata berkeleyata* (Wright), Walnut Creek, California, April 20, 1946 (F. H. Rindge; AMNH). 154. *S. edwardsata* (Hulst), Klamath Falls, Oregon, July 21, 1955 (J. Schuh; AMNH).

north. It is absent from southern California, and from coastal California as far north as San Francisco. It has been taken sparingly in Marin County, and in the mountains north of San Pablo Bay, with one specimen being known from Mendocino County.

Flight Period. From April into October.

Remarks. Five hundred seventeen specimens (283 males, 234 females) and 14 genitalic dissections (nine males, five females) have been studied.)

The holotype is in fairly good condition, although it is a bit rubbed and has the wing margins on the left side somewhat torn.

The great majority of specimens have the t. a. line extended distally into the median area as

a U-shaped or slightly lobate projection. In any series of specimens there are some in which the lobate configuration becomes more and more pronounced, until the end of the lobe is cut off from the basal area; this produces what appears to be a discal spot. This latter style of maculation is also found in some examples of *berkeleyata*, and undoubtedly led to that name being described as a subspecies of *edwardsata*; as indicated above, this was an incorrect association. The present species is larger, darker, and has more contrastingly colored maculation than does *spoliata berkeleyata*. *Sabulodes edwardsata* does not occur sympatrically with *berkeleyata* with the possible exceptions of Napa and Ventura counties, California.

LIST OF SPECIES WITH THEIR KNOWN DISTRIBUTION

Genus *Sabulodes* Guenée, 1857

Phengommataea Hulst, 1896

Group I

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. <i>caberrata</i> Guenée, 1857 <ol style="list-style-type: none"> a. <i>caberrata</i> Guenée, 1857 b. <i>oberthuri</i>, new subspecies 2. <i>plauta</i>, new species 3. <i>aegrotata</i> (Guenée), 1857 <ol style="list-style-type: none"> <i>caberrata</i> auct. <i>arsesaria</i> (Walker), 1860 "cottlei" Barnes and Benjamin, 1926 4. <i>solola</i>, new species 5. <i>prolata</i>, new species 6. <i>atropesaria</i> (Walker), 1860 <ol style="list-style-type: none"> <i>polyphagaria</i> Felder, Felder, and Rogenhofer, 1873 <i>arenularia</i> Snellen, 1874 7. <i>wygodzinskyi</i>, new species 8. <i>boliviana</i> Oberthür, 1911 9. <i>setosa</i>, new species 10. <i>arses</i> Druce, 1891 11. <i>matrica</i> Druce, 1891 12. <i>subalbata</i> (Dognin), 1913 | <p>South America
Brazil, Paraguay, Argentina
Venezuela to northwestern Argentina
Southern Mexico to western Panama
Coastal western United States
(California, Oregon) and adjacent Mexico</p> <p>Mexico, Guatemala
Peru, Bolivia, Brazil
Colombia to Bolivia</p> <p>Colombia
Colombia, Ecuador, Bolivia
Southern Mexico to western Panama
Southern Mexico, Guatemala
Southern Mexico, Costa Rica
Southern Mexico to western Panama</p> |
|---|--|

Group II

- | | |
|---|--|
| <ol style="list-style-type: none"> 13. <i>mucronis</i>, new species 14. <i>laticlavata</i>, new species 15. <i>curta</i>, new species 16. <i>striata</i>, new species | <p>Jamaica
Cuba
Puerto Rico
Guyana</p> |
|---|--|

Group III

- | | |
|---|--|
| <ol style="list-style-type: none"> 17. <i>triangula</i>, new species 18. <i>exhonorata</i> Guenée, 1857 19. <i>loba</i>, new species 20. <i>subopalaria</i> (Walker), 1860 <ol style="list-style-type: none"> <i>subclararia</i> (Walker), 1860 | <p>Brazil, Paraguay, Argentina
Southern Mexico to southern South America
Southern Mexico to western Panama
Cuba, Hispaniola, Puerto Rico</p> |
|---|--|

Group IV

- | | |
|--|--|
| <ol style="list-style-type: none"> 21. <i>depile</i>, new species 22. <i>mastaura</i> Druce, 1891 23. <i>argyra</i> Druce, 1891 24. <i>puebla</i>, new species 25. <i>matrona</i> Druce, 1891 26. <i>meduana</i> Druce, 1891 27. <i>pumilla</i>, new species 28. <i>dissimilis</i> (Hulst), 1898 | <p>Peru, Bolivia
Mexico
Guatemala
Mexico
Mexico
Mexico
Guatemala
United States (California to Texas,
Utah, Colorado)</p> |
|--|--|

29. *sericeata* Barnes and McDunnough, 1917
 30. *huachuca*, new species
 31. *mabelata* (Sperry), 1948
 32. *niveostriata* (Cockerell), 1893
 gertruda (Hulst), 1896
 33. *olifata* (Guedet), 1939
 34. *duoangulata* (Cassino and Swett), 1923
 35. *spoliata* (Grossbeck), 1908
 - a. *spoliata* (Grossbeck), 1908
 - b. *berkeleyata* (Wright), 1917
 - c. *lagunata* (Cassino and Swett), 1923
 36. *edwardsata* (Hulst), 1886
- United States (Arizona)
United States (Arizona, New Mexico)
United States (Arizona)
United States (southern Rocky
 Mountain states), Mexico
United States (Arizona), Mexico
United States (Arizona)
United States (California)
United States (California)
United States (California)
United States (California)
Canada (British Columbia), United States (Pacific
 coast and northern Rocky Mountain states)

APPENDIX 1

MATERIAL EXAMINED

For convenience, the species, as well as the countries, states, and counties under each species, are listed alphabetically. Complete dates and collectors are omitted, but the information is on file at the American Museum of Natural History.

Sabulodes aegrotata (Guenée)

Mexico. BAJA CALIFORNIA: San Quentin, July (AMNH); Ensenada, May (AMNH).

United States. CALIFORNIA: *Alameda Co.*: Hayward, January, February, May, June, December (AMNH); Castro Valley, March (AMNH); Albany, November (AMNH); Cresta Blanca Canyon, Livermore, March (CNC). *Contra Costa Co.*: Berkeley, April, May, June, September, October (AMNH, CNC); Lafayette, March (AMNH); Richmond, October (UC). *Del Norte Co.*: Smith River, January, February, December (AMNH). *Humboldt Co.*: Orleans, May (AMNH); Trinidad, September (AMNH); Patricks Point State Park, July (AMNH). *Los Angeles Co.*: Los Angeles, January, February, June, July (AMNH, BM); Santa Monica, May, June, December (AMNH); Singing Springs, May (AMNH); Glendale, February (AMNH); Long Beach (AMNH); Pasadena, February (BM); Arcadia, October (BM); Santa Catalina Island, February (LA). *Marin Co.*: Orleans-Lagunitas, June (AMNH); Novato, March (JB); Mill Valley, September, November (CNC). *Mendocino Co.*: Laytonville, July, August, September (AMNH, CNC); 11 mi. N of Laytonville, June (AMNH); Fort Bragg, April (AMNH). *Monterey Co.*: Big Sur, June, October (AMNH); Pacific Grove, June, September, October (AMNH); Asilomar, May (AMNH); no data (AMNH). *Napa Co.*: Napa, July (AMNH). *Riverside Co.*: Rancho La Sierra, Arlington, May through Au-

gust (AMNH); Palm Springs, January through May (AMNH); Riverside, March, April, June, July (AMNH); Glen Ivy, October (AMNH). *San Bernardino Co.*: Barton Flats, September (AMNH); Burnt Mill Canyon, Lake Arrowhead, September (UC). *San Diego Co.*: San Diego, January, May, June, August, September, October (AMNH); Borrego, January (AMNH); Julian, September (AMNH); La Jolla, December (AMNH); Point Loma, April, May (AMNH). *San Francisco Co.*: San Francisco, January, March, July through November (AMNH). *San Luis Obispo Co.*: Morro Bay, March, June, September (AMNH); San Luis Obispo, October, November (AMNH). *San Mateo Co.*: San Mateo, May (AMNH). *Santa Barbara Co.*: Carpenteria, September (AMNH); Santa Barbara, June, September, October (AMNH); Santa Cruz Island, March, August (LA); Santa Rosa Island, November (LA). *Santa Clara Co.*: Los Gatos, May, October (AMNH). *Santa Cruz Co.*: Ben Lomond, June (AMNH); Santa Cruz, October (AMNH, CNC). *Sonoma Co.*: Petaluma, May, October (AMNH); Eldridge (AMNH); Valley Ford, August (JB). *Ventura Co.*: Wheeler Hot Springs, August (AMNH). OREGON: *Coos Co.*: Coos Bay, September (AMNH); South fork Coquille River, September (AMNH). *Douglas Co.*: South fork Umpqua River, 14 mi. N of Tiller, June (CNC). *Josephine Co.*: Oregon Caves National Monument, August, September (AMNH, JB). *Lane Co.*: Reed, July (AMNH); Lake Cleowax, September (SJ). *Lincoln Co.*: Waldport, April, September (AMNH); Yachats, August (AMNH); Beverly Beach State Park, September (JB). *Marion Co.*: Salem, March (JB).

Sabulodes argyra Druce

Guatemala. ALTA VERAPAZ: Baleu, Mpio. San

Cristobal Verapaz, above 1350 m., June (AMNH); Chajsel, Mpio. Coban, 1400 m., January, December (AMNH). SOLALA: Chuchexik, Mpio. Santa Lucia Utatlan, 2200-2250 m., October, November (AMNH); Pahaj, Mpio. Santa Lucia Utatlan, 2350 m., November (AMNH). TOTONICAPÁN: Totonicapán, 8500 to 10,000 ft. (BMNH). ZACAPA: La Unión, 850 m., November (AMNH).

Sabulodes arses Druce

Guatemala. ALTA VERAPAZ: Baleu, Mpio. San Cristobal Verapaz, above 1350 m., June (AMNH). CHIMALTENANGO: Quisache, Mpio. Acatenango, 1750 m., November (AMNH).

Mexico. CHIAPAS: San Cristobal de las Casas, April, May, June, September, December (AMNH, CNC). VERACRUZ: Jalapa, March (AMNH, BMNH); Orizaba, February, March (BMNH); Coatepec (USNM).

Sabulodes atropesaria (Walker)

Bolivia. No data (BMNH).

Colombia. CUNDINAMARCA: Bogota (AMNH, BMNH). No data (AMNH).

Ecuador. BOLIVAR: Balzapampa (BMNH). CHIMBORAZO: Chimbo, 1000 ft., January to June, August (BMNH). LOJA: "Environs de Loja" (AMNH, BMNH); W of Zamora, 1200 m., November (AMNH); El Monje, "prés Loja" (BMNH). NAPO-PASTAZA: Sarayacu (BMNH). PICHINCHA: 50 km. W of Quito on road to Santo Domingo, 2400 m., February (AMNH).

Peru. CAJAMARCA: Río Tabaconas, 6000 ft. (BMNH). HUÁNUCO: Pozuzu (BMNH). JUNIN: Estancia Naranjal, San Ramon, 1000 m., July (AMNH); Chanchamayo, La Merced (BMNH); La Merced (AMNH). PUNO: Uruhuasi, 7000 ft., April, May (BMNH).

Sabulodes boliviaria Oberthür

Bolivia. COCHABAMBA: Yunga del Espiritu Santo (BMNH).

Colombia. ANTIOQUIA: El Cerro, Frontino, 6000 ft., June (BMNH). CUNDINAMARCA: Bogota, 10,000 ft., November (AMNH), and in and near town, February, March (BMNH). Not Located: Siato, Río Siato, slopes of Choco, 5200 ft., September (BMNH).

Ecuador. IMBABURA: N of Perucho, near Otavalo, 2000 m., January (AMNH). PICHINCHA: 50 km W of Quito, on road to Santo Domingo, 2400 m., February (AMNH).

Sabulodes caberata caberata Guenée

Argentina. BUENOS AIRES: Vicente Lopez,

November, December (AMNH); Olivos, January, November (AMNH); Buenos Aires, November, December (AMNH); Villa Ballester, February, August, December (AMNH).

Brazil. MINAS GERAIS: No locality, September (USNM). PARANÁ: Curitiba, 900 m., April, June (AMNH); Castro (BMNH). RIO DE JANEIRO: Petropolis (BMNH); Teresopolis, 1000 m., November (CNC). SANTA CATARINA: Nova Teutonia, April, May, July, August (AMNH); Rio Vermelho, 830 m., April, May (BMNH); Rio Laeiss, Blumenau, September (BMNH); no data, March (LA). SÃO PAULO: São Paulo, November, December (AMNH); Ypiranga, December (AMNH); Boraceia, near Salesopolis, 800 m., October (AMNH). No data (BMNH).

Paraguay. No locality, August (AMNH). SAN PEDRO: E of San Estanilao (road to Saltos del Guirara), November (AMNH). Not located: Paso Yobay, December (AMNH).

Sabulodes caberata oberthuri, new subspecies

Argentina. JUJUY: Jujuy, May (AMNH). SAN JUAN: No locality, November (AMNH). TUCUMÁN: Tucumán, 450 m., April, May (BMNH).

Bolivia. COCHABAMBA: Yungas del Palmar, 2000 m., March, July (AMNH); Yunga del Espiritu Santo (BMNH); Río Solocame, 1200 m., January (BMNH); Paracti, Chapare, 2000 m., February (AMNH). LA PAZ: From Caranavi to Santa Ana on Alto Río Beni road, 1100-1600 m., January (AMNH); Unduavi to Coroico, 3000 m., Yungas de La Paz, January (AMNH).

Colombia. CAQUETA: Popoyán (BMNH). CUNDINAMARCA: Finca San Pablo, 3 km. N of Albán, 1800 m., August (AMNH); Bogota (BMNH). TOLIMA: Cañon del Tolima, 1700 m., April, December (BMNH). No data (AMNH).

Ecuador. AZUAY: Santa Isabel, 65 km. SW of Cuenca, 600 m., February (AMNH). BOLIVAR: Balzapampa, route to Quito (BMNH). LOJA: "Environs de Loja" (BMNH); Loja, December (BMNH). PICHINCHA: Tandapi, on road from Aloag to Santo Domingo, 55 km. SW of Quito, 1500 m., January, August, December (AMNH); Quito to Santo Domingo, 1200 m., February (AMNH). SANTIAGO-ZAMORA: Zamora, 35 mi. ESE of Loja, Loja Prov., March (AMNH).

Peru. AMAZONAS: Huambo (BMNH). JUNIN: La Merced, February, August, September, October (AMNH). PIURA: Quiroz, November (AMNH). No data (AMNH, BMNH).

Venezuela. MERIDA: Mérida, 1630 m., November (BMNH). No data (BMNH).

***Sabulodes curta*, new species**

Puerto Rico. Coamo Springs, June (AMNH).

***Sabulodes depile*, new species**

Bolivia. COCHABAMBA: Yungas del Palmar, 2000 m., February, March (AMNH); Yunga de Espiritu Santo (BMNH); Paracti, Chapare, 2200 m., February (AMNH). LA PAZ: La Paz (BMNH). No data (BMNH).

Peru. CUZCO: Machu Picchu, 2300 m., October (AMNH). PASCO: Huancabamba, Cerro de Pasco, 6-10,000 ft. (BMNH). No data (BMNH).

***Sabulodes dissimilis* (Hulst)**

United States. ARIZONA: *Coconino Co.*: Todd's Lodge, Oak Creek Canyon, June (AMNH); Dennison, May (AMNH, CNC). *Gila Co.*: East Verde River, 5 mi. N of Payson, October (LA). *Grand Canyon Natl. Park*: North Rim, 8200 ft., July (RHL); South Rim, 7200 ft., June (RHL). *Mohave Co.*: No locality, June (AMNH); Pine Mt. Lake Lodge, Hualapi Mts., June (LA); Hualapi Mt. Park, 6400 ft., June (RHL). *Yavapai Co.*: Prescott, 5400 ft., May, June (AMNH). "South Arizona," July (AMNH). CALIFORNIA: *Los Angeles Co.*: 2½ mi. SSW of Valyermo, 4800 ft., June (LA). *Mono Co.*: Topaz Inspection Station, September (LA); Holiday camp, 1 mi. W of Highway 395, August (LA). *Tulare Co.*: Smoky Valley, June (AMNH, LA). COLORADO: *Garfield Co.*: Glenwood Springs, October (AMNH). *Mesa Verde Natl. Park*: August (AMNH); Headquarters camp, 7000 ft., July (RHL). *Ouray Co.*: Ouray Peak, August (CAS). NEVADA: *Lincoln Co.*: 9 mi. W of Caliente, 6200 ft., September (CNC); 10 mi. E of Panaca, 6500 ft., September (CNC). *Nye Co.*: Ichthyosaur State Park, June (LA). *White Pine Co.*: 24 mi. E of Lund, 6000 ft., September (CNC). NEW MEXICO: *Bernalillo Co.*: 3 mi. S of Tijeras, 6800 ft., July, September (AMNH); Juan Tabo Canyon, Sandia Mts., May (LA); Cedar Crest, Sandia Mts., 7500 ft., June, August (AMNH). *Grant Co.*: McMillan Camp, 14 mi. N of Silver City, 7000 ft., July (AMNH); Cherry Creek Camp, 13 mi. N of Silver City, 6900 ft., July (AMNH); Silver City, July (CNC). *Hidalgo Co.*: Clanton Draw, 4.1 mi. E of Geronimo Pass, Peloncillo Mts., 5400 ft., April (AMNH). *McKinley Co.*: Ft. Wingate, July (AMNH). *Otero Co.*: High Rolls, July, August, September (AMNH, LA, MCZ). *Sandoval Co.*: Frijoles Canyon, June, September (AMNH); Sandia Mts., 7000 ft., June (DH); Juan Tabo Canyon, Sandia Mts., 6800 ft., May, June (AMNH); Evergreen Hills, Juan Tabo Canyon, Sandia Mts., 7000 ft., June (AMNH); Jemez

Springs, May through September (CNC, MCZ). *Soconito Co.*: Gran Quivira National Monument, August (LA). TEXAS: *Culberson Co.*: Sierra Diablo Wildlife Management Area, 6000 ft., June, September (AMNH). *Jeff Davis Co.*: Mt. Locke, Davis Mts., near McDonald Observatory, 6700 ft., August (AMNH); 5 mi. SE of Mt. Livermore, 6000 ft., August (AMNH). UTAH: *Kane Co.*: Circle YH Ranch, Glendale, June (AMNH).

***Sabulodes duoangulata* (Cassino and Swett)**

United States. ARIZONA: *Cochise Co.*: Palmerlee (MCZ); Miller Canyon, Huachuca Mts., 5000 ft., June (AMNH).

***Sabulodes edwardsata* (Hulst)**

Canada. BRITISH COLUMBIA: Arrowhead Lake, August (MCZ, USNM); Kaslo, July, August (CNC, MCZ); Wellington, August (USNM); Goldstream, August (USNM); 11 mi. N of Creston, 2000 ft., July (CNC); 3 mi. W of Nelson, 2100 ft., July (CNC); Oliver, 1000 ft., August (CNC); Seton Lake, August (CNC); Revelstoke, July (CNC); near entrance, Revelstoke Park, Revelstoke, July (CNC); Glenemma Range, July (CNC); Narrows, Shushwap, July (CNC); Great Central Lake, July (CNC); Westminster (MCZ).

United States. CALIFORNIA: *Alpine Co.*: Wood Fords, August (LA). *Calaveras Co.*: 4 mi. E of Murphy's, 3000 ft., June, July (UC); Calaveras Big Trees, June (CAS, UC); Arnold, July (UC); 1.5 mi. SE of Railroad Flat, June (UC). *El Dorado Co.*: Grizzly Flats, August, September, October (AMNH, LA); near Meeks Bay, August (AMNH); Pollock Pines, 3800 ft., July (LA); 10 mi. E of Georgetown, 4100 ft., September (CNC); Blodgett Forest, 13 mi. E of Georgetown, June, July (UC); Bijou, September (UC). *Fresno Co.*: Riverton, August (LA); Big Creek, August (LA); Hume Lake, August (LA). *Glenn Co.*: Plunkett Meadow, July (UC). *Inyo Co.*: Hunters Flats, July. *Kern Co.*: Greenhorn Mts., July (LA); Rancheria Creek, Piute Mts., 4350 ft., June (LA); Kernville, September (UC). *Lake Co.*: Anderson Springs, May, August (JB, RHL). *Lassen Co.*: Fredonyer Camp, 5200 ft., July (JRH). *Madera Co.*: Bass Lake, August (LA, RHL). *Mariposa Co.*: Miami Ranger Station, June, July (AMNH, CAS, UC). *Marin Co.*: Mill Valley, May, September (CNC, UC). *Mendocino Co.*: Etsel Ridge, 3 (air) mi. S of Eel River Ranger Station, 3700 ft., June (UC). *Modoc Co.*: Davis Creek, August (MCZ); Cedar Pass, July (LA); Cedar Pass Camp, 5900 ft., July (UC); no locality, July (MCZ). *Mono Co.*: Mammoth Lakes, July (LA); Mammoth, July (LA); Mammoth area, July (LA); 1 mi. SW of Tom's

Place, August, September (UC); 1 mi. W of Tom's Place, August (UC). *Napa Co.*: Mt. St. Helena, June (CAS); Napa, April, September (CAS); 1 mi. N of Angwin, May (CAS). *Nevada Co.*: near Cisco, 6100 ft. (LA). *Placer Co.*: Ward Creek, 2 mi. S of Tahoe City, 6050 ft., June through September (LA); Silver Creek, near Lake Tahoe, 6200 ft., September (UC); Michigan Bluff, September (CAS); Tahoe Vista, 6400 ft., August (JB). *Plumas Co.*: 4 mi. W of Quincy, July (UC). *Sequoia Natl. Park*: Giant Forest, July (AMNH); Grant Grove, June (LA). *Shasta Co.*: Hat Creek, August (CAS); Shasta, June (CAS); along Hat Creek, July (RHL); no locality (UC). *Sierra Co.*: 6 mi. WNW of Sierraville, 6700 ft., August (CNC); St. Charles Hill, July (CAS). *Siskiyou Co.*: Mt. Shasta City, June, July (UC); Soda Springs, July, August (AMNH); McBride Spring, June (UC); McBride Spring, Mt. Shasta, July (UC); Weed, June (UC); no locality, August, September (AMNH, USNM). *Solano Co.*: No locality, September (AMNH, MCZ, USNM). *Sonoma Co.*: Santa Rosa, May (UC); Petaluma, September (CNC); Guerneville, September (CAS); Glen Ellen, August (CAS). *Tehama Co.*: Childs Meadow, 5000 ft., July (RHL). *Tulare Co.*: Kennedy Meadow, August (LA). *Tuolumne Co.*: 4 mi. W of Pinecrest, June (AMNH); Strawberry, July (UC); Twain Harte, 4000 ft., May (CAS); Crane Flat Creek Camp, September (RHL). *Ventura Co.*: Mt. Pinos, 8400 ft., August (UC). *Yosemite Natl. Park*: Yosemite Valley, June, July, September (CAS, LA, UC); no locality, September (LA). *Yuba Co.*: Challenge, July (CAS). Not located: Middle Cala. (USNM). IDAHO: *Bonner Co.*: 1.5 mi. W of Nordman, 2600 ft., July, August (LA); Priest Lake, 2400 ft., June, July, August (LA). *Lemhi Co.*: 4th of July Canyon, N of Salmon, July, August (LA). *Shoshone Co.*: Wallace, June through September (AMNH, LA). MONTANA: *Lincoln Co.*: Libby, August (CAS). *Missoula Co.*: Camel Hump Ranger Station, July (CAS). NEVADA: *Douglas Co.*: Glenbrook, June, August (LA); Stateline, July (UC). *Washoe Co.*: 6.4 mi. up Hiway. 27 from Steamboat Springs, August (CAS). OREGON: *Baker Co.*: Spring Creek, Baker, July (JB, RHL); Baker, July (JB); Pine Creek, Baker, July (JB). *Benton Co.*: Corvallis, June (JB, SJ). *Clackamas Co.*: near Firwood Road, 4 mi. W of Oregon City, August (AMNH). *Jackson Co.*: 3 mi. S of Ashland, 3500 ft., July (UC). *Josephine Co.*: Cave Junction, along Illinois River, 2000 ft., August (LA, RHL). *Klamath Co.*: Klamath Falls, July (AMNH). *Wallowa Co.*: Lazy T Ranch, near Joseph, July (AMNH); Chief Joseph Mt., Joseph, August (AMNH). *Yamhill Co.*: Summit Prairie, Grand Ronde, August (CAS). WASHINGTON: *Chelan Co.*: Lake Wenatchee, near Stevens Pass, 1800 ft.,

July (LA). *Columbia Co.*: Dayton, June (AMNH); Dayton, 1620 ft., July (JB). *Klickitat Co.*: Satus Pass, Goldendale, August (RHL). *Okanogan Co.*: Brewster, September (USNM). *Walla Walla Co.*: Walla Walla, June (AMNH). *Yakima Co.*: River Bend Camp, near Rimrock, 2500 ft., August (LA); 4.5 mi. W of railroad station, Yakima, 1300 ft., August, September (LA); Toppenish Creek, 1250 ft., July, August (LA).

Sabulodes exhonorata Guenée

Bolivia. BENI: Region Chapare, 400 m., May, July, September (AMNH). Not located: Buena Vista (AMNH); Buenavista, 750 m. and without elevation, August to April, July to October (BMNH).

Brazil. GOIAS: 20 km. N of São João da Aliança, May (LA); no locality (BMNH). MATO GROSSO: Burity, 20 mi. NE of Cuyabá, 2250 ft., September, October (BMNH). RIO DE JANEIRO: Organ Mts., near Tijuca (BMNH). SANTA CATARINA: São Bento do Sul, Rio Vermelho, 650 m., August (AMNH). SÃO PAULO: Sacupay, N of São Paulo, November (AMNH); Boraceia Biological Station, 850 m., near Salesópolis, September (CNC).

Colombia. ANTIOQUIA: Mesopotamia, 5000 ft. (AMNH). MAGDALENA: Onaca, Sta. Marta, 2200 ft., September, October (BMNH); Makasaka, Sta. Marta (BMNH). No data (BMNH).

Ecuador. IMBABURA: Paramba, November, December (BMNH). NAPO-PASTAZA: Sarayacu (BMNH).

Guatemala. IZABAL: Cayuga, August (BMNH). QUEZALTENANGO: Volcán Sta. Maria, June (BMNH). No locality (BMNH).

Guyana. Anundudaru, Potaru River, 2000 ft., January (AMNH).

Mexico. CHIAPAS: San Jeronimo, Volcán Tacana, 450 m., September (AMNH). PUEBLA: Puebla, 7050 ft., August (AMNH).

Panama. No locality (BMNH).

Paraguay. ALTO PARANA: Puerto Presidente Stroessner, December (AMNH). CAAZAPA: Independencia, September, October (AMNH). PARANA: Saltos del Guaira, December (AMNH); SW of Saltos del Guaira, December (AMNH); 28 km. W of Saltos del Guaira, November (AMNH). Not located: Paso Yobay, November, December (AMNH); Caa-guazú, November (AMNH); Carlos Pfannl, September (AMNH).

Peru. AMAZONAS: Chachapoyas (BMNH); Huambo (BMNH). JUNIN: Satipo, February, May through August (AMNH). PUNO: Chaquimayo, 2500 to 3000 ft., June, July (AMNH); Yahuarmayo, 1200 ft., October, November (AMNH).

Venezuela. CARABOBO: Valencia (BMNH). Not located: San Estaban, June (BMNH).

***Sabulodes huachuca*, new species**

United States. ARIZONA: *Cochise Co.*: Miller Canyon, Huachuca Mts., 5000 ft., March, May, June, July (AMNH, LA); Ramsey Canyon, Huachuca Mts., April through June, August through October (AMNH); Ash Canyon, Huachuca Mts., May, October (AMNH); Carr Canyon, Huachuca Mts., June, September (AMNH); Garden Canyon, Huachuca Mts., September (AMNH); Sierra Vista, September (AMNH); Southwestern Research Station of the American Museum of Natural History, 5 mi. W of Portal, 5400 ft., May, September (AMNH, LA); South Fork Camp, Cave Creek, Chiricahua Mts., May (LA); Cave Creek, E side of Chiricahua Mts., 5000 ft., September (RHL). *Santa Cruz Co.*: Canelo Valley, June (AMNH); Elgin, August (AMNH); Sonoita Creek, 10 mi. S of Patagonia, September (AMNH). NEW MEXICO: *Grant Co.*: Cherry Creek Camp, 13 mi. N of Silver City, 6900 ft., July (AMNH).

***Sabulodes laticlavata*, new species**

Cuba. PINAR DEL RIO: Pinar del Rio (?; see discussion of type locality; USNM). ORIENTE: Baracoa (USNM); Santiago (USNM).

***Sabulodes loba*, new species**

Guatemala. ZACAPA: La Unión, 850 m., September (AMNH).

Honduras. San Juancito (AMNH).

Mexico. CHIAPAS: San Jeronimo, 600 m., July, August, October (AMNH); San Jeronimo, Volcán Tacana, 450 m., August, September, October (AMNH). SAN LUIS POTOSÍ: Tamazunchale, 300 ft., December (AMNH); Valley of the Huasteca, 4 mi. NW of Tamazunchale, December (AMNH); Xilitla, 350 ft., December (AMNH). VERACRUZ: Cerro Azul, July (AMNH); Presidio, September (AMNH); Jalapa, April (AMNH, BMNH); Misantla (BMNH); Cuesta de Misantla (BMNH). No locality (AMNH).

Panama. CHIRIQUÍ: Volcán de Chiriquí, 2000-3000 ft. (BMNH).

***Sabulodes mabelata* (Sperry)**

United States. ARIZONA: *Coconino Co.*: Todd's Lodge, Oak Creek Canyon, June, September, October (AMNH, CNC, LA, MCZ); Oak Creek Canyon, 5200 ft., May (RHL). *Gila Co.*: Workman Creek, Sierra Ancha Mts., 6200 ft., May (AMNH); Tonto Creek State Fish Hatchery, Mogollon Rim, 6400 ft., June (LA); Christopher Creek, Mogollon Rim, 5800 ft., June (LA).

***Sabulodes mastaura* Druce**

Mexico. OAXACA: Cerro Pelon, Mpio. Yolox, 7050 ft., September (AMNH). VERACRUZ: Las Vigas, May (BMNH, USNM).

***Sabulodes matrica* Druce**

Costa Rica. CARTAGO: Orosi, 1200 m. (BMNH); Juan Vinas, June (BMNH); Irazú, 6000-7000 ft. (BMNH). No locality (BMNH).

Mexico. VERACRUZ: Jalapa, September (AMNH); Orizaba, March, April (BMNH).

***Sabulodes matrona* Druce**

Mexico. VERACRUZ: Las Vigas, May (BMNH, USNM); Jalapa (AMNH).

***Sabulodes meduana* Druce**

Mexico. VERACRUZ: Las Vigas (USNM); Jalapa (AMNH, USNM); Coatepec (USNM).

***Sabulodes mucronis*, new species**

Jamaica. *Clarendon Par.*: Cumberland district, 3000 ft., December (AMNH). *Manchester Par.*: Mandeville, 2250 ft., January (AMNH). *Portland Par.*: Hardwar Gap, 4800 ft., July (AMNH); 1 mi. N of Hardwar Gap, September (USNM). *St. Andrew Par.*: Newcastle (BMNH). Not located: Chichona (BMNH). No locality (BMNH, USNM).

***Sabulodes niveostriata* (Cockerell)**

Mexico. CHIHUAHUA: 14 mi. W of Cuauhtemoc, 7600 ft., August (LA). DURANGO: 10 mi. W of El Salto, 9000 ft., July, August (CNC).

United States. ARIZONA: *Apache Co.*: Alpine Divide Camp, 4 mi. N of Alpine, 8500 ft., July (AMNH); McNary, 7200 ft., August (MCZ); White Mts. (MCZ, USNM); near McNary, White Mts., August (USNM); Ditch Camp, 9 mi. E of McNary, July (LA); Greer, 8300 ft., July, 8500 ft., August (CNC, RHL). *Cochise Co.*: Ramsey Canyon, Huachuca Mts., September, November (AMNH); Fly's Peak, Chiricahua Mts., 9500 ft., July (CAS); Bar Foot Ridge, Chiricahua Mts., 8500 ft., July, August (CAS); Turkey Flat, Chiricahua Mts., 8000-9000 ft., July, (CAS). *Coconino Co.*: 3 mi. NW of Flagstaff, 7000 ft., August (AMNH); Flagstaff, July (AMNH, LA); Williams (MCZ); Lockette Meadow, San Francisco Peaks, 8600 ft., July (LA); Bill Williams Mt., on road to ski area, 2

mi. SSW of Williams, 7150 ft., July (LA); 7 mi. W of Williams, July (LA); Blue Mt., 8800 ft., August (CAS); Parks, August (RHL). *Gila Co.*: Middle Pioneer Camp, Pinal Mts., 5000-6100 ft., August (AMNH); Tonto Creek State Fish Hatchery, Mogollon Rim, 6400 ft., June (LA); Tonto Canyon Campground, June (LA). *Grand Canyon Natl. Park*: North Rim, July, August, 8200 ft., July (AMNH, JB, RHL). *Greenlee Co.*: Beaver Creek, S of Alpine, July, August (AMNH). *Pima Co.*: Bear Wallow, Santa Catalina Mts., 7600 ft., August (AMNH); Redington (MCZ); Tucson, June, July (CAS). *COLORADO*: *Boulder Co.*: Nederland, 9500 ft., August (CNC); Left Hand Canyon, 6000 ft., July (RHL). *Clear Creek Co.*: Echo Lake, Mt. Evans, 10,600 ft., August (CNC); Doolittle Ranch, Mt. Evans, 9800 ft., August (CNC). *Custer Co.*: Cusack Ranch, Willow Creek, 8129 ft. (AMNH). *El Paso Co.*: Rock Creek, vic. Colorado Springs, 8200 ft., July (AMNH); Rock Creek Canyon, Colorado Springs, July, August (AMNH, LA); Manitou, August (USNM). *Gilpin Co.*: Tolland, 9000-12,000 ft., July (AMNH). *Jefferson Co.*: Lookout Mt., 7000 ft., July (AMNH, CAS); Clear Creek, Golden (AMNH). *La Plata Co.*: Durango (USNM). *Larimer Co.*: Estes Park, 7800 ft., July (AMNH, CNC, LA, RHL); Big Thompson Canyon, 6500 ft., July (RHL). *Rocky Mt. Natl. Park*: July, August (AMNH, LA). *Teller Co.*: Big Spring Ranch, Florissant, July, August (LA, JB); Florissant Fossil Beds Natl. Mon., 8350 ft., July (AMNH). *NEW MEXICO*: *Catron Co.*: Bursum Camp, 18 mi. E of Alma, 9000 ft., July (AMNH). *Grant Co.*: McMillan Camp, 13 mi. N of Silver City, 6800 ft., July (AMNH); Pinos Altos, Pinos Altos Mts., July (USNM); Cherry Creek Camp, Mogollon Mts., August (LA). *Lincoln Co.*: Cedar Creek Camp, 2 mi. N of Ruidoso, 7000 ft., July (AMNH). *Otero Co.*: Pine Camp, 2 mi. NE of Cloudcroft, 8600 ft., July (AMNH). *Sandoval Co.*: Horseshoe Springs Camp, 2 mi. W of La Cueva, 7900 ft., July, August (AMNH); Frijoles Canyon, July, August (AMNH); Simpson's Ranch, E of La Jara, 7500-8000 ft., July (AMNH). *San Miguel Co.*: Las Vegas Hot Springs, August (USNM). *Santa Fe Co.*: Santa Fe, August (AMNH); 10 mi. NE of Santa Fe, 9500 ft., July (AMNH); 6 mi. NE of Santa Fe, 8000 ft., August (AMNH). *Valencia Co.*: Mt. Taylor, 8800 ft., July (DH). *UTAH*: *Bryce Canyon Natl. Park*: Lodge, August (AMNH); North camp, 8000 ft., August (AMNH). *Garfield Co.*: Red Canyon, August (AMNH); Red Canyon, 12 mi. SE of Panguitch, 7200 ft., August (AMNH); Red Canyon Camp, 11 mi SE of Panguitch, 7200 ft., July (AMNH); Blue Spruce Camp, 18 mi. N of Escalante, 8000 ft., July (AMNH); 1 mi. N of Bryce Canyon Natl. Park, 8000 ft., August (AMNH).

Sabulodes olifata (Guedet)

Mexico. DURANGO: Las Rusias, 12 mi. E of La Ciudad Durango, 9200 ft., August (UC).

United States. ARIZONA: *Cochise Co.*: Fly's Peak, Chiricahua Mts., 9000-9800 ft., July, August (AMNH, LA, USNM); Chiricahua Mts., 8000-9000 ft., July, August (AMNH); Southwestern Research Station of the American Museum of Natural History, 5 mi. W of Portal, 5400 ft., August (AMNH); Turkey Flat, Chiricahua Mts., 8000-9000 ft., July (CAS); Pinery Canyon, Chiricahua Mts., July (LA); Upper camp, Pinery Canyon, Chiricahua Mts., July (LA); Stewart Camp, 1 mi. S of Portal, August (UC); Rustler Park, Chiricahua Mts., 8000-9000 ft., July, August (CAS, UC); Chiricahua Mts., 8500 ft., August (CAS); Pinery Camp, Chiricahua Mts., 6800 ft., August (RHL); Ramsey Canyon, Huachuca Mts., August (JB).

Sabulodes plauta, new species

Costa Rica. CARTAGO: San Vito de Java, 1400 m., February (AMNH); Orosi, 1200 m. (BMNH). PUNTARENAS: Monteverde, 1400 m., March (AMNH). SAN JOSÉ: Candelaria Mts. (BMNH). No locality (BMNH).

Guatemala. ALTA VERAPAZ: Baleu, Mpio. San Cristobal Verapaz, June (AMNH); Chajsel, Mpio. Coban, 1400 m., December (AMNH). BAJA VERAPAZ: San Gerónimo (BMNH). CHIMALTE-NANGO: Quisache, Mpio. Acatenango, 1750 m., June, November (AMNH). EL QUICHÉ: St. Tomas, Chichicastenango, 7060 ft., December (AMNH). QUEZALTENANGO: Volcán Santa Maria, July (AMNH). ZACAPA: La Unión, 850 m., January, November (AMNH).

Honduras. San Juancito (AMNH).

Mexico. CHIAPAS: San Cristobal de las Casas, 7200 ft., February, April, May, June, August through December (AMNH, CNC); El Triunfo, Mpio. Mapastepec, 6050 ft., March (AMNH); San Jeronimo, Volcán Tacana, 450 m., September (AMNH); Simojovel, July (CNC); 9 mi. SE of Teopisca, Highway 24, May (CNC); La Granja, October (AMNH). DISTRITO FEDERAL: San Angel, May (AMNH); San Pedro de los Pinos, August (AMNH). GUERRERO: Acapulco, November (AMNH). HIDALGO: Guerrero Mill, 9000 ft. (AMNH). MICHOACAN: Tuxpan, July (CNC). SAN LUIS POTOSÍ: Tamazunchale, 300 ft., December (AMNH); Xilitla, 350 ft., December (AMNH). VERACRUZ: Jalapa, September, December (AMNH, BMNH, USNM); Coatepec (AMNH); Orizaba, February, April, June, July, September, November (AMNH, BMNH); Villa Juarez, October

(AMNH); Cuesta de Misantla (BMNH); no locality (BMNH).

Panama. CHIRIQUÍ: Cerro Punta, June (AMNH); El Volcan, March (AMNH); no locality (BMNH).

***Sabulodes prolata*, new species**

Bolivia. LA PAZ: From Caranavi to Santa Ana on the Río Alto Beni road, 1100 m., January (AMNH); El Choro, Yungas de La Paz, 900 m., January (AMNH); Undavi to Coroico, Yungas de La Paz, 3000 m., January (AMNH).

Brazil. PARANÁ: Castro, 950 m. (BMNH). SANTA CATARINA: Nova Teutonia, April, May, July (AMNH).

Peru. CUZCO: Machu Picchu, 2300 m., October (AMNH). JUNIN: La Merced, February, March, August, September, October (AMNH); Chanchamayo, La Merced (BMNH); Chanchamayo (BMNH). PASCO: Huancabamba (BMNH); Huancabamba, Cerro de Pasco, 6000-10,000 ft. (BMNH). PUNO: La Oroya, Río Inambari, Carabaya, 3100 ft., September (BMNH). Not located: Podacayo, 11,000 ft. (AMNH).

***Sabulodes puebla*, new species**

Mexico. PUEBLA: Manzanilla, July (AMNH).

***Sabulodes pumilla*, new species**

Guatemala. CHIMALTENANGO: Quisache, Mpio. Acatenango, 1750 m., November (AMNH).

***Sabulodes sericeata* Barnes & McDunnough**

United States. ARIZONA: *Cochise Co.*: Chiricahua Mts. (AMNH); Southwestern Research Station of the American Museum of Natural History, 4 mi. W of Portal, 5400 ft., May, June, August, September, October (AMNH, JB, LA); Cave Creek, Chiricahua Mts., May, September (AMNH, CNC, RHL); Ramsey Canyon, Huachuca Mts., June through October (AMNH, LA, RHL); Carr Canyon, Huachuca Mts., June, July (AMNH); Parker Canyon, Huachuca Mts., September (AMNH); Miller Canyon, Huachuca Mts., May (AMNH, LA); Sierra Vista, May, July, September (AMNH); Hereford, June (MCZ); South fork, Cave Creek, 5000 ft., May (BM, LA); Sunnyside Canyon, Huachuca Mts., September (LA); Sunnyside, W side Huachuca Mts., July (LA); Chiricahua National Monument, September (LA); Cochise Stronghold, Dragoon Mts., October (JB, LA); no locality, August (LA). *Santa Cruz Co.*: Sonoita Creek, 10 mi. S of Patagonia, September (AMNH); Madera Canyon, Santa Rita Mts., May, September, October (JB, LA).

***Sabulodes setosa*, new species**

Costa Rica. CARTAGO: Orosi, 1200 m. (BMNH).

Guatemala. CHIMALTENANGO: Quisache, Mpio. Acatenango, 1750 m., November (AMNH).

Mexico. OAXACA: Vista Hermosa, Mpio. Comaltepec, 4650 ft., September (AMNH); Mo Cuou, Cerro Pelon, Mpio. Yolox, 7050 ft., September (AMNH); Cerro Pelon, Mpio. Yolox, 7050 ft., September (AMNH).

Panama. CHIRIQUÍ: Cerro Punta, 6000 ft., June (AMNH).

***Sabulodes solola*, new species**

Guatemala. CHIMALTENANGO: Quisache, Mpio. Acatenango, 1750 m., November (AMNH); Tecpan Guatemala, 2125 m., October (AMNH); Sumpango, 1800 m., October (AMNH); Zaragoza, 2000 m., October (AMNH). SOLOLA: Chuchexik, Mpio. Santa Lucia Utatlan, 2200-2250 m., October, November (AMNH); Xajaxac, 2325 m., November (AMNH); Pahaj, Mpio. Santa Lucia Utatlan, 2350 m., November (AMNH); Los Encuentros, 2400 m., October (AMNH).

Mexico. CHIAPAS: San Cristobal de las Casas, January, March, May, September through December (AMNH). DURANGO: 10 mi. W of El Salto, 9000 ft., June through August (CNC). HIDALGO: Ixmiquilpan, 1700 m., September (AMNH). MEXICO: Coyoacan, July (AMNH).

***Sabulodes spoliata berkeleyata* (Wright)**

United States. CALIFORNIA: *Alameda Co.*: Piedmont Pines, NE of Oakland, June (UC); Oakland, September (AMNH); San Leandro, April (LA); Mocho Canyon, June (LA). *Contra Costa Co.*: Walnut Creek, April, August through October (AMNH, CNC, LA, UC); 3 mi. NE of Diablo, 2100 ft., October (CNC); Orinda, October (UC); El Cerrito, October (CAS); Berkeley, March through June, September (CAS, LA, SDM, UC, USNM). *Kern Co.*: Camp Condor, near Mt. Pinos, 6500 ft., August (AMNH). *Napa Co.*: Angwin (LA). *San Benito Co.*: Pinnacles Natl. Mon., 9 mi. ENE of Soledad, 1300 ft., October (CNC). *San Luis Obispo Co.*: Pozo, May (UC); La Panza Camp, 12 mi. NE of Pozo, May (UC). *San Mateo Co.*: Palo Alto, May, October (AMNH, LA). *Santa Barbara Co.*: Santa Barbara, July (AMNH, LA); Summerland, April through August (AMNH, LA); Figueroa Mt., June through August (LA); Serena Park, July (LA). *Ventura Co.*: Ozena Camp, Cuyama River, 1 mi. E of Hiway 33, October (UC); Mt. Pinos, 5500 ft., 7500 ft., 8000 ft., July (RHL).

Sabulodes spoliata lagunata (Cassino and Swett)

United States. CALIFORNIA: *Los Angeles Co.*: Manaker Flats, August (AMNH); Mt. Wilson, June through August (LA, MCZ, USNM); Buckhorn, 7000 ft., July (LA); Beverly Hills, October (LA); 2½ mi. SSW of Valyermo, 4800 ft., May, August, September (LA); Benedict Canyon, 5 mi. N of Beverly Hills, July (LA); Buckhorn Flats, July (LA); Buckhorn Flats, Angeles Crest Highway, 6500 ft., August (UC); near Mt. Waterman, Angeles Crest Highway, 6300 ft., August (UC); Chilao Flats, 6000 ft., June (RHL); Angeles Crest Highway, 3500 ft., July (RHL). *Riverside Co.*: Idyllwild, 5300 ft., 6000 ft., June, August, September (AMNH, LA, RHL, UC); Mountain Center, October (LA); Kenworthy, September (CNC); 3 mi. N of Anza, 6100 ft., September (CNC). *San Bernardino Co.*: Upper Santa Ana River, July, August (AMNH, LA); Lake Arrowhead, August (AMNH); Big Bear Lake, July, August (AMNH, LA); Barfoot Flats, August (AMNH); Barton Flats, August (AMNH); Crestline, July (LA); Hathaway Creek, August (LA); San Bernardino Mts., June (LA); Forest Home, June, August, September (LA); Camp O-ongo, near Running Springs, 6300 ft., August (LA); Mt. Baldy, August (LA); Bluejay, near Lake Arrowhead, July, August (LA); 4 mi. NW of Wrightwood, 7200 ft., September (CNC); near Lake Arrowhead, May (UC); Rimforest, 3 mi. SW of Lake Arrowhead, 5600 ft., July, October (RHL). *San Diego Co.*: Julian, September (AMNH); Laguna Mts., September (MCZ, USNM); 4 mi. NW of Mt. Laguna, 5600 ft., September (CNC); Mt. Palomar, July (UC); Mt. Laguna, June (UC); Burnt Ranchera Camp, September (UC); Cuyamaca State Park, S of Julian, 4000 ft., May (RHL).

Sabulodes spoliata spoliata (Grossbeck)

United States. CALIFORNIA: *Mendocino Co.*: coast, near Ft. Bragg, August (RHL). *Monterey Co.*: Pacific Grove, September (AMNH, MCZ); Carmel, March through December (AMNH, CAS, JB, LA, RHL); between Carmel and Paraiso Springs, October (CAS). No locality (AMNH).

Sabulodes striata, new species

Guyana. "Brit. Guiana" (BMNH).

Sabulodes subalbata (Dognin)

Costa Rica. CARTAGO: San Vito de Java, 1400 m., February (AMNH); Orosi, 1200 m. (BMNH). PUNTARENAS: Monteverde, 4600 ft., December (AMNH).

Guatemala. ALTA VERAPAZ: Baleu, Mpio. San Cristobal Verapaz, above 1350 m., June, September (AMNH); Chajsel, Mpio. Coban, January (AMNH). CHIMALTENANGO: Quisache, Mpio. Acatenango, 1700 m., November (AMNH). QUEZALTENANGO: Las Mercedes, 3000 ft., (BMNH). SOLOLA: Chuchexik, Mpio. Santa Lucia Utatlan, above 2250 m., October (AMNH). SUCHITEPÉQUEZ: San Isidro, 1600 ft. (BMNH); Volcán de Atitlán, 2500-3500 ft. (BMNH). ZACAPA: La Unión, 850 m., January, August through December (AMNH).

Mexico. CHIAPAS: Santa Anita, July (AMNH); San Jeronimo, Volcán Tacana, 450 m., August, September, October (AMNH); San Jeronimo, 600 m., July (AMNH); San Quintin, September (AMNH); La Granja, October (AMNH); Santa Rosa, May (AMNH). SAN LUIS POTOSI: Tamazunchale, 300 ft., December (AMNH). VERACRUZ: Orizaba (AMNH); Jalapa (AMNH); Questa de Misantla (BMNH); Cordova (BMNH).

Panama. CHIRIQUÍ: Volcán de Chiriquí, 2000-4000 ft. (BMNH); Lino, 800 m. (USNM).

Sabulodes subopalaria (Walker)

Cuba. CAMAGÜEY: Camagüey, May (AMNH). HABANA: Santiago de las Vegas, May (USNM). PINAR DEL RIO: No locality (USNM). ORIENTE: Holguín (BMNH); Santiago (USNM); Baracoa (USNM). No locality (BMNH).

Dominican Republic. Sanchez, June (AMNH); San Lorenzo, June (AMNH); "St. Domingo" (BMNH).

Puerto Rico. Aguadilla, March (AMNH).

Sabulodes triangula, new species

Argentina. MISIONES: Puerto Bemberg, April (BMNH). SAN JUAN: San Juan, November (AMNH).

Brazil. SANTA CATARINA: Nova Teutonia, 300-500 m., January, April through August (AMNH); no locality (AMNH). RIO GRANDE DO SUL: Porto Alegre (AMNH); Pelotas, November, December (AMNH). No locality (AMNH).

Paraguay. CAAZAPA: Independencia, September, October, November (AMNH). PARAGUARI: Sapucay, near Villa Rica, July, September (BMNH). PARANA: 28 km. W of Saltos del Guaira, November (AMNH); SW of Saltos del Guaira, November (AMNH); Saltos del Guaira, December (AMNH). Not located: Paso Yobay, November, December (AMNH); Carlos Pfannl, September (AMNH); Caa-guarzú, November (AMNH); "Paraguay central" (BMNH). No locality (AMNH).

***Sabulodes wygodzinskyi*, new species**

Colombia. CUNDINAMARCA: Finca San Pablo,

8 km. N of Albán, 1800 m., August (AMNH).
VALLE DEL CAUCA: El Congo, June (BMNH).
No locality (AMNH).

APPENDIX 2

SPECIES EXCLUDED FROM *SABULODES*

The following species, either described in *Sabulodes* or placed therein by subsequent authors, do not belong in the genus (see discussion in Introduction). As there is no summary or catalogue of the literature for the Neotropical Geometridae, this list may not be complete. For the species found in North America, north of Mexico, this problem does not exist as the required generic placements have been made.

Sabulodes acidaliata Guenée, 1857
Sabulodes animata Oberthür, 1911
Sabulodes ardilla Dognin, 1896
Sabulodes arge Druce, 1891
Sabulodes arnissa Druce, 1891
Sabulodes bermeja Dognin, 1896
Sabulodes (?) *bilineata* Warren, 1897
Sabulodes brumosa Dognin, 1896
Sabulodes cenchriaria Oberthür, 1911
Sabulodes cephalionaria Oberthür, 1911
Sabulodes cerambaria Oberthür, 1911
Sabulodes colombiata Guenée, 1857
Sabulodes cosmatina Prout, 1935
Sabulodes dentinata Guenée, 1857
Sabulodes dositheata Guenée, 1857
Sabulodes esquina Dognin, 1900
Sabulodes exsecrata Schaus, 1911
Sabulodes flavopuncta Dognin, 1896
Sabulodes glaucularia Snellen, 1874
Sabulodes gonnapearia Oberthür, 1911
Sabulodes gorgoniaria Oberthür, 1911
Sabulodes gorgophonaria Oberthür, 1911
Sabulodes gorgorisaria Oberthür, 1911
Sabulodes gorgosaria Oberthür, 1911

Sabulodes gorgyria Oberthür, 1911
Sabulodes gorgythionata Oberthür, 1911
Sabulodes gortyniaria Oberthür, 1911
Sabulodes granula Dognin, 1896
Sabulodes himerata Guenée, 1857
Sabulodes infida Schaus, 1911
Sabulodes lapa Dognin, 1900
Sabulodes lineata Schaus, 1911
Sabulodes maciza Dognin, 1896
Sabulodes miligina Dognin, 1923
Sabulodes mimallonata Oberthür, 1911
Sabulodes mimula Thierry-Mieg, 1894
Sabulodes mimulata Oberthür, 1911
Sabulodes molorcharia Oberthür, 1911
Laudosia monastica Dognin, 1893
Sabulodes monasticaria Oberthür, 1911
Cirsodes mosticana Dognin, 1900
Sabulodes muscistrigata Guenée, 1857
Sabulodes nubifera Schaus, 1911
Sabulodes paraniebla Dognin, 1900
Sabulodes pectinicornata Guenée, 1857
Sabulodes petropolisaria Oberthür, 1911
Sabulodes planaria Schaus, 1911
Epione ? *polydora* Thierry-Mieg, 1892
Sabulodes primada Dognin, 1900
Sabulodes pumilis Dognin, 1900
Sabulodes rasata Dognin, 1896
Sabulodes rotundata Dognin, 1918
Sabulodes schunckeii Oberthür, 1911
Sabulodes socoides Prout, 1935
Sabulodes tinonaria Dognin, 1896
Sabulodes mosticana torneensis Prout, 1935
Sabulodes turmalis Schaus, 1911
Sabulodes unicolor Dognin, 1900

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