

The North American Moths of the
Genera *Phaeoses*, *Opogona*, and
Oinophila, with a Discussion of
Their Supergeneric Affinities
(Lepidoptera: Tineidae)

DONALD R. DAVIS

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SMITHSONIAN INSTITUTION PRESS

City of Washington

1978

ABSTRACT

Davis, Donald R. The North American Moths of the Genera *Phaeoses*, *Opogona*, and *Oinophila*, with a Discussion of Their Supergeneric Affinities (Lepidoptera: Tineidae). *Smithsonian Contributions to Zoology*, number 282, 39 pages, 128 figures, 1 map, 1978.—The general biology, distribution, morphology, and classification are reviewed for the North American species of the moth genera *Phaeoses*, *Opogona*, and *Oinophila*. The genus *Opogona* is reported for the first time from the United States, and two new species are described as *O. arizonensis* and *O. floridensis*. *Opogona purpuriella* Swezey is also reported as a port interception in California, but it is not believed to be established yet within the continental United States. The adults of five species are fully illustrated, as are the larvae and pupae of *Opogona omoscopa* (Meyrick) and *Oinophila v-flava* (Haworth). The family relationships of the genera are reviewed, and it is concluded that they represent valid members of the family Tineidae.

OFFICIAL PUBLICATION DATE is handstamped in a limited number of initial copies and is recorded in the Institution's annual report, *Smithsonian Year*. SERIES COVER DESIGN: The coral *Montastrea cavernosa* (Linnaeus).

Library of Congress Cataloging in Publication Data

Davis, Donald Ray

The North American moths of the genera *Phaeoses*, *Opogona*, and *Oinophila*, with a discussion of their supergeneric affinities (Lepidoptera: Tineidae)
(Smithsonian contributions to zoology ; no. 282)

Bibliography: p.

1. *Phaeoses*. 2. *Opogona*. 3. *Oinophila*. 4. Insectus—North America. I. Title. II. Series: Smithsonian Institution. Smithsonian contributions to zoology ; no. 282.

QL1.S54 no. 282 [QL561.T55] 591'.08s [595.7'81] 78-606147

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The North American Moths of the Genera *Phaeoses*, *Opogona*, and *Oinophila*, with a Discussion of Their Supergeneric Affinities (Lepidoptera: Tineidae)

Donald R. Davis

Introduction

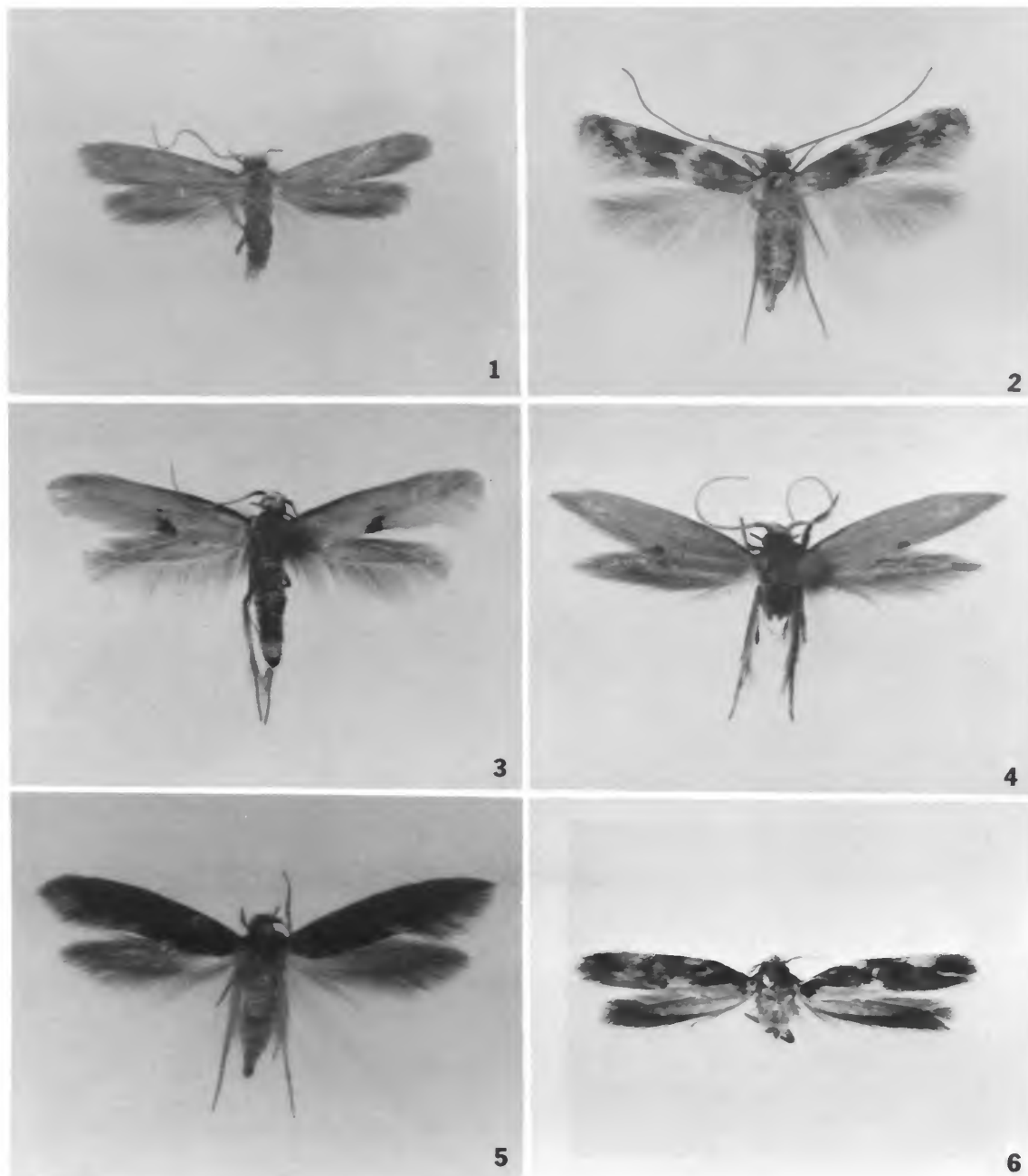
The family affinities of the three genera treated herein have invoked such a variety of queries and interpretations that I believe it important to re-examine their relationships, as well as to discuss the species presently known for the continental United States. It is also significant to note that one of these genera, *Opogona*, represents a new record for the region covered.

The genera *Phaeoses*, *Opogona*, and *Oinophila*, along with possibly several other genera outside the scope of this paper, are believed to represent a rather closely related assemblage of taxa within the family Tineidae. They may indeed justify recognition as a discrete subfamily, Hieroxestinae, as Zimmerman (1978:385) has recently proposed. However, the current array of subfamilies within the Tineidae (as listed by Căpușe, 1971) are so vaguely defined or so regional in representation as to make present comparisons involving this hierarchical level very difficult, if not impossible.

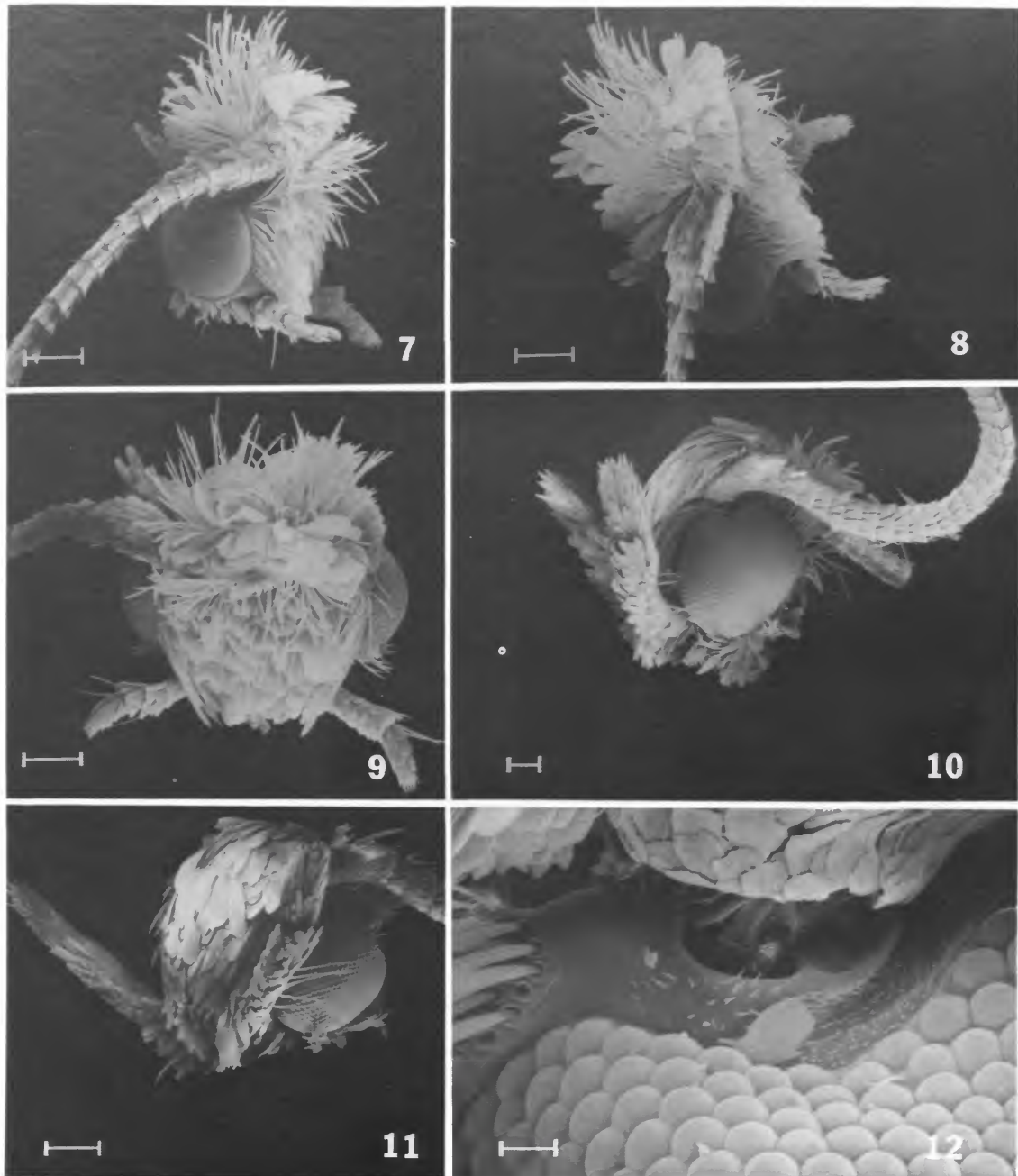
Previously, the family placement of the three genera under study vacillated amongst the Tineidae, Oinophilidae, Lyonetiidae, or Gracillariidae. The

monotypic and endemic nearctic genus *Phaeoses* was originally considered a member of the Oinophilidae by Forbes (1922), and its affinities have not been reexamined since. *Opogona* is a large, primarily pantropical genus of over 250 proposed species, including several supposed generic synonyms. Originally described in the Tineidae, it was later considered to be a member of the tineid subgroup Hieroxestides (proposed for the genus *Hieroxestis*) by Meyrick (1892), Oinophilidae by Forbes (1922) and Kuroko (1964), the Lyonetiidae by Meyrick (1928a) and most later authors, and the Gracillariidae (=Lithocolletidae) by Diakonoff (1948). Interestingly enough, Meyrick (1912) at one point had also associated this genus with the Gracillariidae. Misled by faulty information and without even examining the type-species, he proposed the monotypic genus *Exala* in this family. *Exala* was removed from the Gracillariidae by Viette (1948) and placed near *Hieroxestis* in the Lyonetiidae. Vari (1961) later reexamined the type-species, *E. strassenella* Enderlein, and concluded that it was a junior synonym of *Hieroxestis* and that it should be placed in the Oinophilidae. Herein, I have further synonymized *Exala* under *Opogona*. The genus *Oinophila* is represented by approximately 50 to 60 species largely confined to the Ethiopian and Indo-Malayan regions. Originally proposed in the

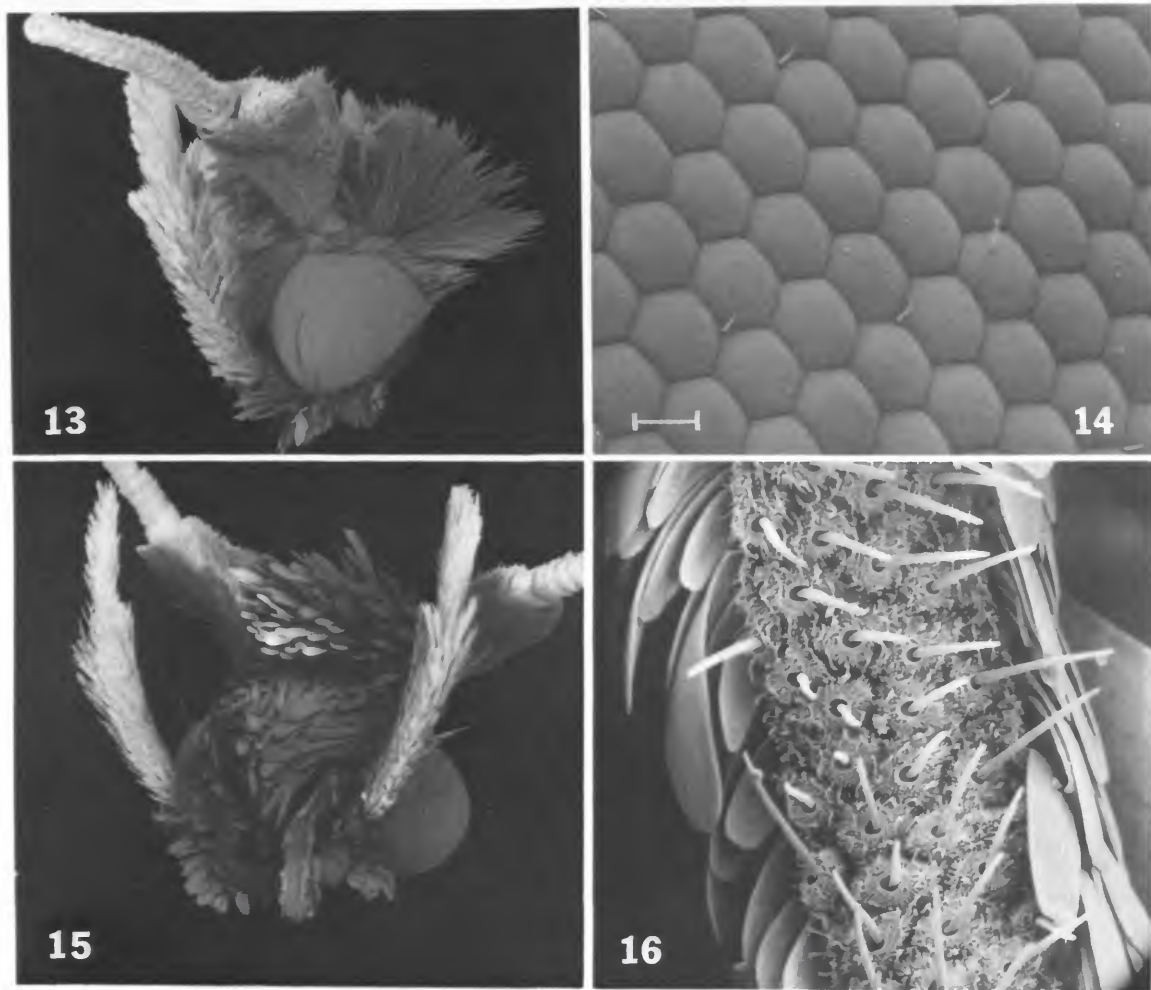
Donald R. Davis, Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560.



FIGURES 1-6.—Adults: 1, *Phaeoses sabinella* Forbes, ♂, wing expanse 8.2 mm; 2, *Oinophila v-flava* (Haworth), ♀, wing expanse 9.8 mm; 3, *Opogona arizonensis*, new species, ♀, holotype, wing expanse 14 mm; 4, *O. floridensis*, new species, ♂, holotype, wing expanse 15 mm; 5, *O. omoscopia* (Meyrick), ♀, wing expanse 19.5 mm; 6, *O. purpuriella* Swezey, ♀, wing expanse 12.5 mm.



FIGURES 7-12.—Head structure: 7-9, *Oinophila v-flava* (Haworth); 7, lateral view (scale = 100 μm); 8, laterodorsal view (scale = 100 μm); 9, anterior view (scale = 100 μm); 10-12, *Phaeoses sabinella* Forbes; 10, lateral view (scale = 50 μm); 11, anterolateral view (scale = 100 μm); 12, detail of dorsal rim of eye (scale = 10 μm).



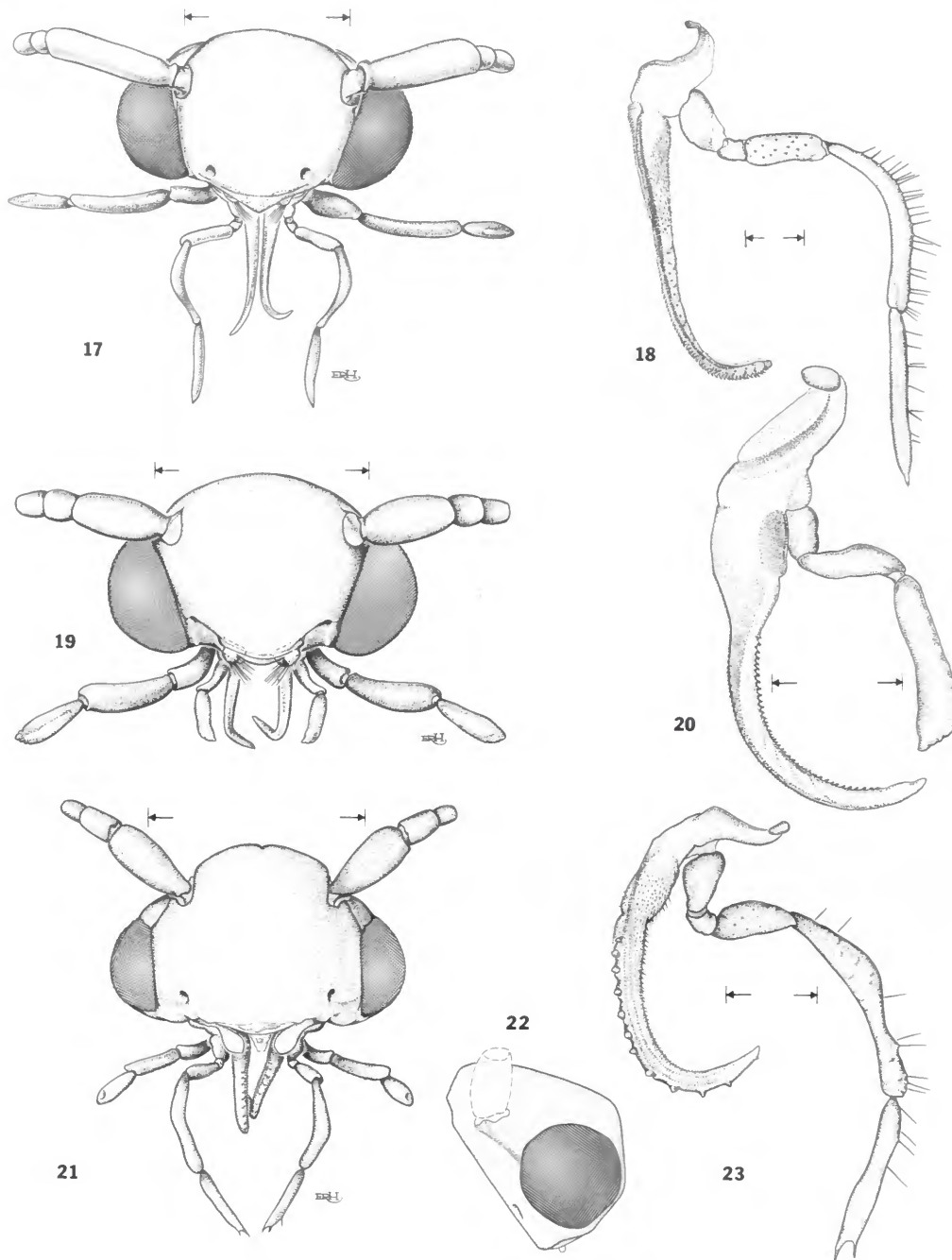
FIGURES 13-16.—Head structure: *Opogona omoscopia* (Meyrick): 13, lateral view, $\times 37$; 14, facets and microtrichia of eye (scale = 10 μm); 15 anterior view, $\times 37$; 16, mesal surface of galea, $\times 700$.

Tineidae, the genus was later recognized as a distinct family by Spuler (1898), wherein it was misspelled *Oenophilidae* [sic]. The *Oinophilidae* has been consistently recognized as a valid family down to the present day.

The basic morphology of all three genera agrees in most respects with that of typical Tineidae. The previous confusion regarding their supergeneric relationships apparently has been almost entirely due to a few atypical characteristics of the head. Principal among these are the relatively smooth

vestiture and varying degree of inclination and depression of the head. In contrast, the head vestiture of nearly all Tineidae is very rough, and the head capsule is more spherical. Because it has long been acceptable to include genera with smooth and even depressed heads (e.g., *Setomorpha* and *Tiquadra*) in the Tineidae, one cannot but wonder at the reasons for excluding *Phaeoses*, *Opogona*, and *Oinophilidae* as expressed in more recent times.

A number of morphological similarities strongly suggest the inclusion of the three genera in ques-



FIGURES 17-23.—Head structure: 17, *Opogona arizonensis*, new species (scale = 0.5 mm); 18, maxilla (scale = 0.1 mm); 19, *Phaeoses sabinella* Forbes (scale = 0.5 mm); 20, maxilla (scale = 0.1 mm); 21, *Oinophila v-flava* (Haworth) (scale = 0.5 mm); 22, lateral view; 23, maxilla (scale = 0.1 mm).

tion within the Tineidae. Conversely, I know of no apomorphy that would justify their separation. Members of all three genera possess a small series of from two to six erect bristles arising from the second segment of the labial palpus, which is a common feature apparently occurring in all known Tineidae. As in most genera of Tineidae, the maxillary palpi are well developed and five segmented in *Opogona* and *Oinophila*. The maxillary palpi are somewhat reduced (to three segments) in *Phaeoses*, but they remain prominent in size. In marked contrast, these appendages in the Lyonetiidae, as characterized by Kuroko (1964:5), are usually "obsolete" or rudimentary. The furcasterna are of the basic tineoid form with the metafurcasterna of *Oinophila* (Figure 38) and *Opogona* (Figure 35) being particularly similar to that of *Nemapogon* (Figure 41). The male genitalia differ appreciably in form between the three genera, although they share such features as lacking a gnathos and in possessing a prominent, often rod-shaped saccus. The male genitalia of *Opogona* bear close resemblance to that of many nemapogonine genera, particularly with regard to the widely separated, setigerous lobes of the uncus. The gnathos, however, is often well preserved in most Nemapogoninae.

The female genitalia of *Phaeoses*, *Opogona*, and *Oinophila* are even more similar in form to that of most Tineidae, at least as typified in the subfamilies Nemapogoninae, Scardiinae, and Tineinae. The ovipositor, being highly modified for probing, is capable of considerable extension. Not only are the anterior and posterior apophyses well developed, but a third, or tertiary, pair of apophyses is also evident in all three genera. Weakly developed, tertiary apophyses have also been observed in a few other Tineidae with greatly extensible ovipositors, as well as in a few primitive psychid genera and in most Eriocranioidea (Davis, 1978). The females of *Phaeoses sabinella* Forbes and some *Opogona* also possess a dense tuft of elongate hairs completely encircling the seventh segment. Similar tufts are also present in a few other Tineidae (e.g., *Hypoplesia*) and in all female Psychidae.

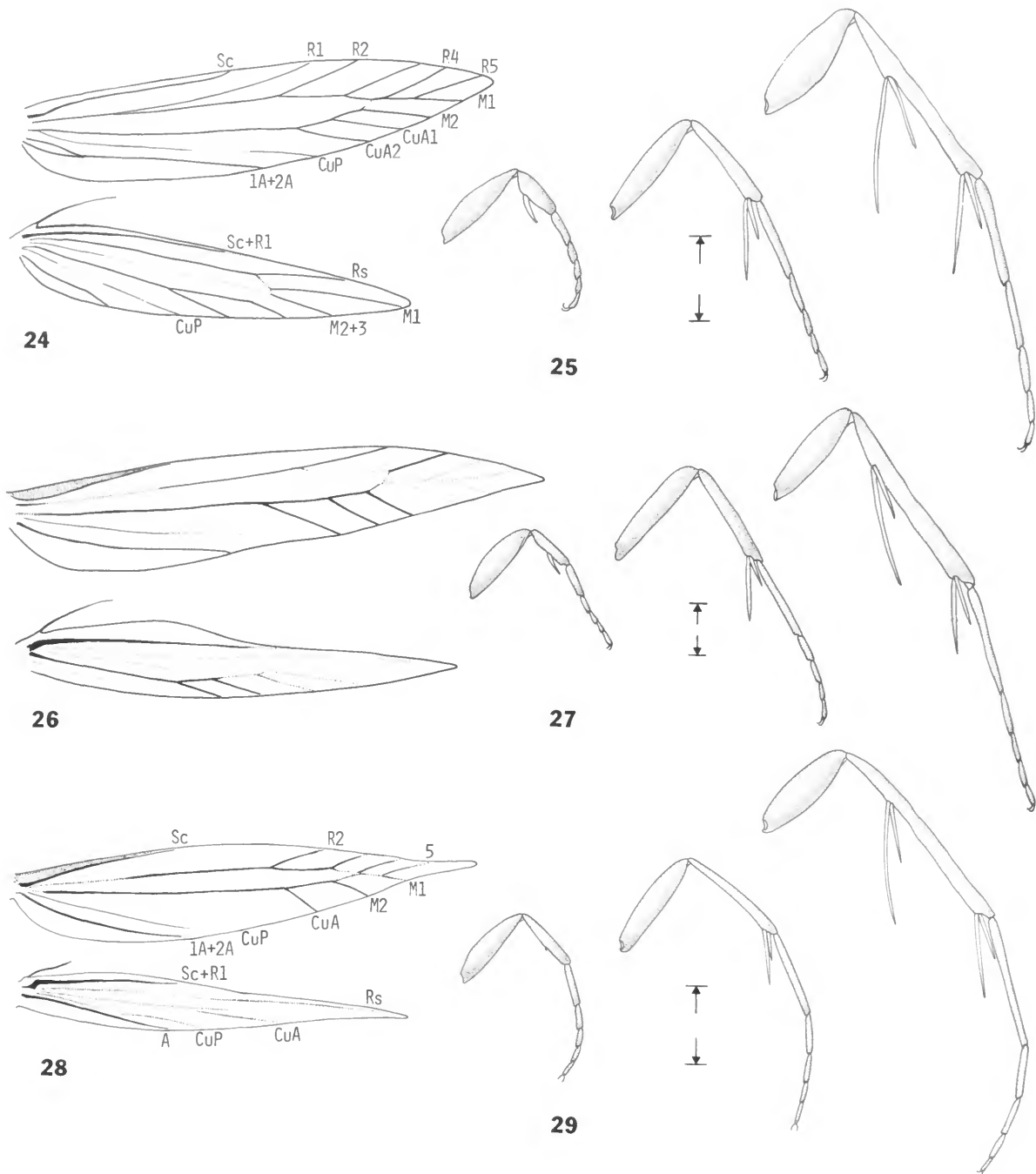
The significance of some adult features for the three genera studied is presently uncertain because of the general lack of comparative data with other groups. It is assumed that these are also typical of other Tineidae or that they fall within an expected, normal range of variation. For example, the mesal,

unscaled surfaces of the galeae in *Opogona* and *Oinophila* (not examined in *Phaeoses*) are heavily covered with oblique rows of densely spinose, slightly raised tubercles (Figure 16). A single, moderately long sensory seta arises from the center of each tubercle.

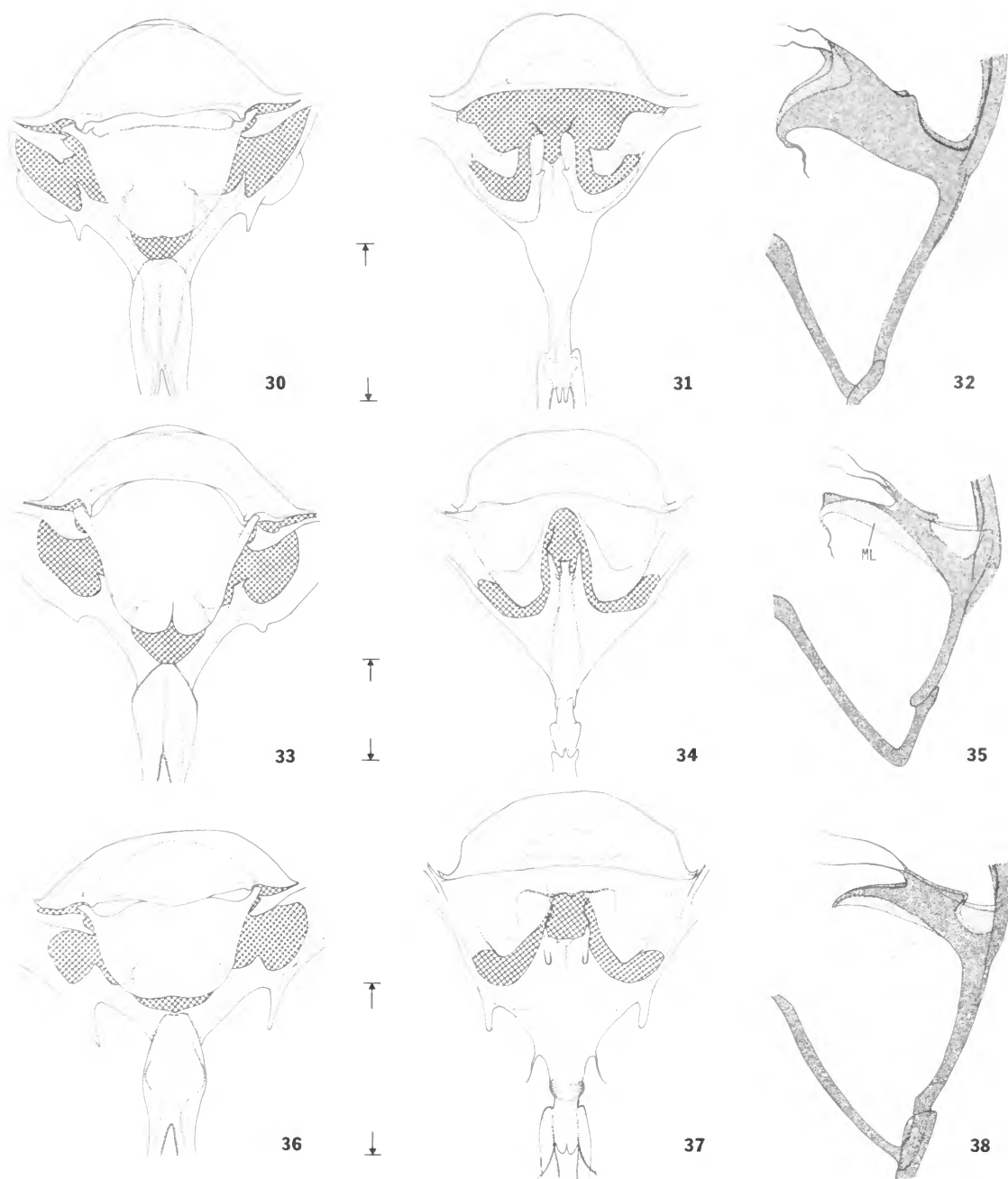
Although the frenulum in the male is typical in consisting of the normal, single bristle, this wing coupling mechanism varies among the females of the three genera examined. The frenulum is multiple in *Opogona* and *Oinophila*, with usually three to four bristles present in the former and two in the latter. The females of *Phaeoses sabinella* are unusual in possessing only a single bristle similar to the male.

Larvae of only two species, *Opogona omoscopia* (Meyrick) and *Oinophila v-flava* (Haworth), were available for this study. The larval structure of these two genera closely resemble one another and generally agree with that described for the Nemapogoninae, particularly *Nemapogon*. One major exception is that larvae of *Opogona* and *Oinophila* possess only a single pair of rudimentary ocelli compared to the typical number of five to six pair for the Nemapogoninae and one pair or less for the Tineinae. The chaetotaxy of the above genera and *Nemapogon* is very similar, particularly in the presence of only one SV seta on the meso- and metathorax (bisetose in Tineinae) and with SV2 also present on segment nine (absent in most Tineinae). The larva of *Oinophila v-flava* is rather unusual in possessing a greatly lengthened MSD2 on both the meso- and metathorax. The labrum of both genera is typically tineid in form with only three pair of epipharyngeal setae (compared to four pair in Psychidae).

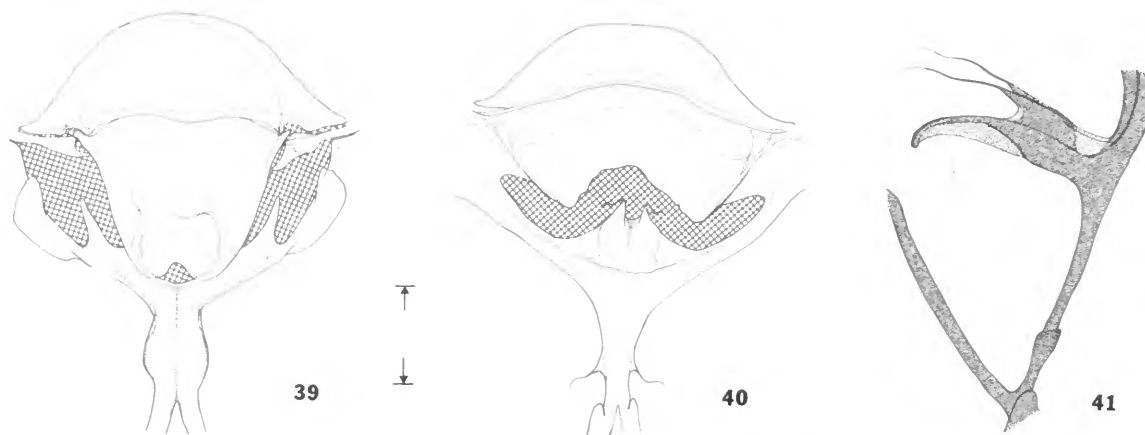
The arrangement of the crochets differs significantly between *Opogona* and *Oinophila*, although in both it is uniordinal and uniserial. In *Oinophila* they are arranged in a mesal penellipse (Figure 103) with the remainder of the proleg free of spines. The crochets in *Opogona omoscopia* are arranged in a simple ellipse with the smallest crochets situated laterally. In addition, a scattered series of small spines are present along the anterior edge of the planta, with the remainder of the proleg being naked. The presence of accessory spines bordering the planta has been noted in other Tineidae (e.g., *Acrolophus* and *Setomorpha*). As might be expected, these spines are usually identi-



FIGURES 24-29.—Wing and leg structure: 24, *Phaeoses sabinella* Forbes; 25, legs; 26, *Opogona arizonensis*, new species; 27, legs; 28, *Oinophila v-flava* (Haworth); 29, legs. (Scales = 0.5 mm.)



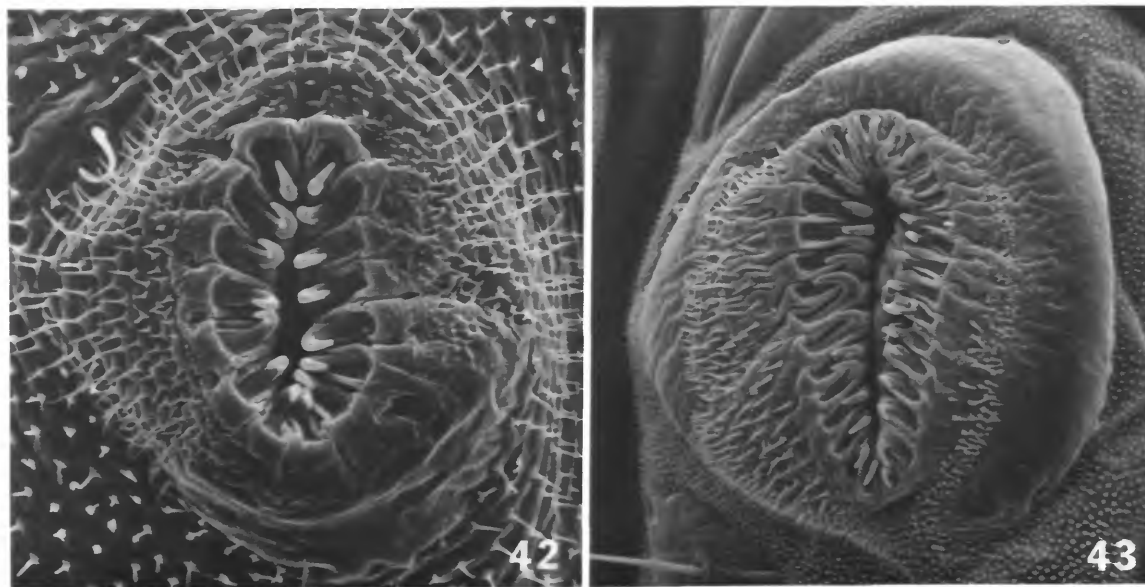
FIGURES 30-38.—Thoracic structure: 30, *Phaeoses sabinella* Forbes, mesothorax; 31, metathorax; 32, metafurcasternum, lateral view; 33, *Opogona arizonensis*, new species, mesothorax; 34, metathorax; 35, metafurcasternum, lateral view (ML = mesal lamella); 36, *Oinophila v-flava* (Haworth), mesothorax; 37, metathorax; 38, metafurcasternum, lateral view. (Scales = 0.3 mm.)



FIGURES 39-41.—Thoracic structure. *Nemapogon granella* (L.) (scale = 0.3 mm): 39, mesothorax; 40, metathorax; 41, metafurcasternum, lateral view.

cal to those over most of the body and merely represent a continuation of the normal body vestiture with little or no specialization involved. Consequently, I place little systematic importance on the relative distribution of spines over the prolegs in this group, except possibly as a generic or specific criterion. The range of variation in the vestiture of the prolegs within the Tineidae may be observed

by comparing Figures 42, 43, 75, and 103. In the primitive genus *Nemapogon* the prolegs are almost entirely covered with typical body spines (Figure 42). In *Setomorpha rutella* Zeller much of the proleg is naked except for a scattered series of small spines almost entirely circling the planta (Figure 43). The spines of the prolegs are further reduced in *Opogona* (Figure 75) and are completely absent



FIGURES 42, 43.—Larval crochets: 42, *Nemapogon granella* (L.), $\times 375$; 43, *Setomorpha rutella* Zeller, $\times 190$.

in *Oinophila* (Figure 103), with only the normal uniserial array of crochets remaining.

The larval habits of *Opogona* and *Oinophila* are similar in that the larvae are general scavengers, typically feeding on fungi and dead or decaying plant remains. In this regard they resemble the habits of many Tineidae, especially the Nemapogoninae. The members of these two genera consequently are of little economic importance, although *Oinophila v-flava* often occurs commonly in homes and particularly cellars, where the larvae have been reported to damage dried foods and wine corks. A few species of *Opogona* occasionally are serious pests of bananas, sugarcane, and various tubers such as potato.

ACKNOWLEDGMENTS.—I wish to express my appreciation to a number of individuals who have aided me during the course of this work by providing critical information, specimens, or other special assistance. In this regard I wish to acknowledge Dr. John Bradley, Commonwealth Institute of Entomology, London, England; Dr. Gaden S. Robinson, British Museum (Natural History), London, England; Dr. Thomas D. Eichlin, California Department of Food & Agriculture, Sacramento, California;

Mr. Ronald S. Wielgus, Phoenix, Arizona; Mr. Donald M. Weisman, U.S. Department of Agriculture, Washington, D.C.; and Dr. Elwood C. Zimmerman, Commonwealth Scientific and Industrial Research Organization, Canberra City, Australia. Dr. Robinson was especially helpful in comparing specimens and replying to numerous inquiries of mine. For assistance with the illustrations I wish to thank Ms. Biruta Akerbergs and Elaine Hodges of the Department of Entomology, Smithsonian Institution. I am further indebted to Ms. Mary Jacque Mann of the Smithsonian Scanning Electron Microscope Laboratory and to Mr. Victor Kranz of the Smithsonian Photographic Laboratory for their much appreciated photographic assistance. Finally I wish to thank my colleagues in the institutions listed below for allowing me to examine specimens under their care.

CDA California Department of Food and Agriculture, Sacramento, California
 LACM Los Angeles County Museum of Natural History, Los Angeles, California
 USNM United States National Museum collections (in the National Museum of Natural History, Smithsonian Institution, Washington, D. C.)

Key to the North American Species of *Phaeoses*, *Opogona*, and *Oinophila*

1. Forewing with all five radial veins present. Maxillary palpus 3-segmented. Female genitalia without signum *Phaeoses sabinella*
 Forewing with only four radial veins. Maxillary palpus 5-segmented. Female usually with signa present 2
2. Epiphysis minute (Figures 29, 77, 78). CuA simple in both wings *Oinophila v-flava*
 Epiphysis well developed (Figure 27). CuA with two branches in both wings (*Opogona*) 3
3. Forewings almost entirely stramineous in color (Figure 3) 4
 Forewing predominantly dark fuscous (Figure 5) *Opogona omoscopa*
4. Male with saccus slender, rod shaped (Figure 111). Distribution southwestern United States *Opogona arizonensis*, new species
 Male with saccus V-shaped (Figure 115). Distribution southeastern United States *Opogona floridensis*, new species

Phaeoses Forbes

Phaeoses Forbes, 1922:98.—Fletcher, 1929:170.—McDunnough, 1939:102.

TYPE-SPECIES.—*Phaeoses sabinella* Forbes, 1922; original designation and monotypic.

ADULT.—Small, slender-winged moths with relatively smooth heads.

Wing Expanse: 7.5–10.5 mm.

Head: Vestiture smooth except for erect scales

bordering occipital margin. Antennae approximately 0.7 the length of forewing, 58-segmented; eye-cap and pecten absent; scape slightly flattened, concave ventrally, length less than greatest diameter of eye. Dorsal arms of tentorium obsolete. Ocelli absent. Eyes moderately large, dorsal margin of eye noticeable excavated (Figure 12) due to close proximity of antennal socket; interocular index approximately 0.6 (see Davis, 1975:5); corneal nipples present, spherical in form. Pilifers well developed, with

a prominent pair of lateral setal tufts. Mandibles present but greatly reduced, vestigial. Maxillary palpi reduced, 3-segmented with apical segment the longest, nearly equaling length of basal two combined; galeae short, exceeding length of maxillary palpi but only about 0.5 the length of labial palpi. Labial palpi porrect but curved laterally, elongate, nearly $\times 2.0$ the diameter of eye, without prominent tufts but with 2–3 stout bristles arising ventrally or laterally from segments 1 and 2.

Thorax: Mesothoracic furcal apophyses consisting of two short, stout subacute branches, the mesal pair with an attached tendon. Metafurcasternum with anteromedial process gradually enlarging anteriorly (as viewed laterally in Figure 32), then terminating in a pair of anterior apophyses and a median anterior ventral lamina, the latter being strongly curved ventrally; posterior apophyses reduced, consisting of a pair of rounded knobs without attached tendons. Prothoracic legs the shortest; tibia about 0.5 the length of tarsus, epiphysis present, well developed, approximately 0.6 the length of tibia. Mesothoracic legs with a single pair of apical spurs of unequal lengths, one being about 0.5 the length of the other. Metathoracic legs greatly elongated, with two pair of unequal spurs, one member being about 0.5 the length of the other; basal spurs situated near basal third of tibia, another pair at apex. Forewings slender, length nearly $\times 2$ the width, with most veins well preserved; radius 5-branched, R4 and 5 usually stalked to M1; R5 terminating above apex of wing; M2 and 3 fused; 1A and 2A separated at base; discal cell elongate, about 0.7 the length of forewing; base of medius not preserved. Hind wings slender with most veins present; M2 and 3 fused; base of medius faintly preserved in cell.

Abdomen: Female with a dense ring of long hair arising from seventh segment.

Male Genitalia: Uncus narrowly bifid. Tegumen fused with uncus and vinculum; anterior margin deeply excavated. Vinculum abruptly narrowing to form an elongate, rod-shaped saccus. Valvae elongate, relatively simple, partially fused together at their bases. Anellus a membranous ring. Aedeagus simple, slender and elongate, without cornuti.

Female Genitalia: Ovipositor elongate, extensible; posterior apophyses greatly lengthened, approximately $\times 1.2$ the length of anterior pair; tertiary apophyses faintly present. Bursa copulatrix reduced

in size, ductus bursae relatively short; signa absent.

DISCUSSION.—As judged by its general appearance and particularly by the smooth vestiture of its head, this little-known genus is probably most related to *Opogona*. Although the metathoracic furcasternum possesses the most aberrant form of the genera treated in this paper, its basic structure still resembles the general tineid type.

In his original description, Forbes (1922) erroneously states that labial palpal bristles are not "visible." As described in the foregoing description, however, a few stout bristles are typically present, but these are occasionally lost in rubbed specimens.

Phaeoses sabinella Forbes

FIGURES 1, 10–12, 19, 20, 24, 25, 30–32, 104–107, 124; MAP 1

Phaeoses sabinella Forbes, 1922:100.—Fletcher, 1929:170.—McDunnough, 1939:102.

ADULT (Figure 1).—Small, with slender, uniformly pale grayish brown to stramineous wings.

Wing Expanse: ♂, 7.5–8.5 mm; ♀, 8–10.5 mm.

Head: Vestiture smooth except for an irregular, transverse row of erect scales bordering occipital margin; color pale stramineous to whitish with a distinct luster. Antennae approximately 0.7 the length of forewing, 58-segmented; scape slightly flattened and concave ventrally, same color as head; flagellum concolorous with scape and with one row of narrow appressed scales per segment. Maxillary palpi stramineous to tawny, occasionally suffused with brown toward apex. Labial palpi whitish above, more brownish beneath, with 2–3 long stout bristles arising ventrally or laterally from first and second segments.

Thorax: Pronotum and tegulae light brownish. Meso- and metanota essentially naked. Venter stramineous to whitish. Legs generally stramineous ventrally and more brownish dorsally; dorsal surface of prolegs mostly dark brown. Forewings uniformly pale grayish brown to stramineous above and below, with a distinct luster. Hind wings more thinly scaled and more grayish in color, cilia stramineous.

Abdomen: Grayish brown above and beneath with a distinct luster; ventral surface sometimes with suffusion of silvery white; seventh segment of female with a dense ring of long yellowish white hairs.

Male Genitalia (Figures 104–107): Uncus narrowly divided into two acute lobes, bearing a sparse

scattering of elongate hairs ventrally; base of uncus indistinguishable from tegumen. Tegumen rather well developed, its anterior margin deeply excavated almost to base of uncus. Vinculum moderately developed, forming a relatively broad ring ventrally, indistinct from tegumen; saccus well set off from vinculum, elongate and rod shaped, approximately 0.45 the length of valva. Valvae relatively simple, elongate and slender with the mesal surfaces densely covered with elongate hairs and a dense patch of moderately long spinose setae at base of costal margin; bases of valvae fused medially. Anellus a distinct ring but mostly membranous. Aedeagus simple, slender, nearly straight, and without cornuti.

Female Genitalia (Figure 124): Tertiary apophyses faintly present. Genital plates deeply excavate with ostium bursae situated at base of excavation. Bursa copulatrix relatively reduced in size; ductus bursae

rather short and only slightly exceeding length of moderately inflated corpus; signa absent.

TYPE.—Holotype, ♀, 20 June 1917, holotype 594-1; in the entomological collection of Cornell University.

TYPE-LOCALITY.—Sabine River Ferry, Louisiana, opposite Orange, Texas.

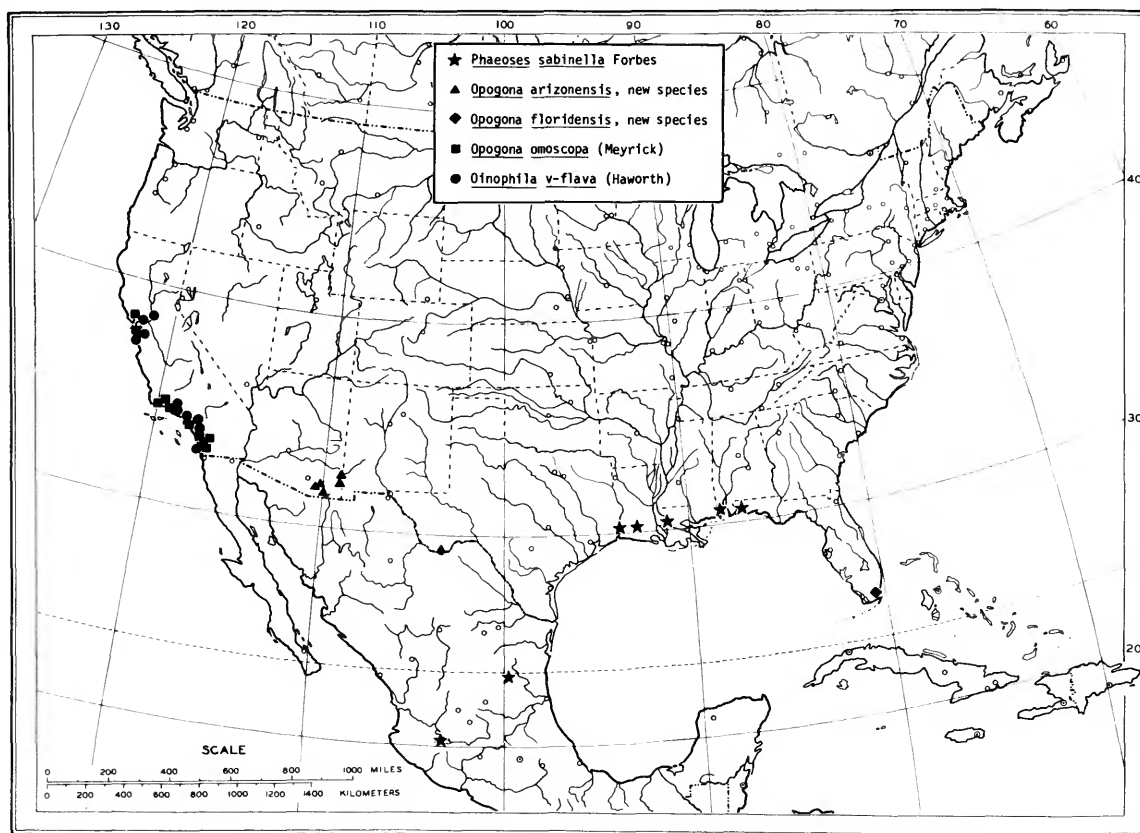
HOST.—Unknown.

FLIGHT PERIOD.—March to November; apparently multivoltine.

DISTRIBUTION. (Map 1).—This species is known to range widely through the southern portions of the Gulf Coastal Plain from northwestern Florida to Texas and thence southward into Mexico as far as the state of Jalisco at the southern limits of the Mexican Highland.

MATERIAL EXAMINED.—29 males and 16 females.

MEXICO, JALISCO: Jocotepec [20°18'N, 103°26'W]: 1 ♂, 14



MAP 1.—Distribution of North American species of *Phaeoses*, *Opogona*, and *Oinophila*.

Mar (USNM). TAMAUlipas: El Salto Falls, 26 mi [41.6 km] W of Antigua Morelos, 2000 ft [610 m]: 3 ♂, 2 ♀, 11–14 July (USNM).

UNITED STATES. FLORIDA: Escambia Co: Pensacola: 1 ♂, 12 Nov (USNM). LOUISIANA: Calcasieu Parish, Sabine River Ferry, opposite Orange, Texas: 3 ♂, 2 ♀ (paratypes), 20 June (USNM). Sam Houston State Park: 16 ♂, 12 ♀, 13–14 Aug (USNM). East Baton Rouge Parish: Baton Rouge: 2 ♂, 24 May (USNM). MISSISSIPPI: Hancock Co: Bay St. Louis: 1 ♂ (paratype), 17 Jun (CU). Harrison Co: Biloxi: 2 ♂ (paratype), 13 Jun (CU).

DISCUSSION.—Although seldom collected and consequently not represented in most collections of North American Lepidoptera, this species can be very common locally. It apparently thrives in extremely moist habitats such as cypress swamps and bayous. For example, both Mr. Gayle Strickland of Baton Rouge and the author have found *Phaeoses sabinella* to be very abundant in southern Louisiana. The original series, which consists of over 50 specimens, were mostly collected adjacent to rivers or their estuaries. Although little is known about the biology of this species, most probably the larvae are general scavengers and feed on dead and decaying plant material.

One of the unusual features of this genus and species is the excavated margin of the dorsal rim of the compound eye. The antennal sockets have partially invaded this region, thereby causing the rim to be noticeably indented (Figure 12).

Opogona Zeller

Opogona Zeller, 1853:504.—Meyrick, 1906:55.—Walsingham, 1907:712.—Spuler, 1910:420.—Walsingham, 1914:350.—Meyrick, 1915:232.—Philpott, 1927:329.—Meyrick, 1928b:398.—Fletcher, 1929:153.—Diakonoff, 1948:216; 1952:104.—Kuroko, 1964:50.—Zimmerman, 1978:387.

Lozostoma Stainton, 1859b:124 [type-species: *L. flavofasciata* Stainton, designated by Walsingham, 1907:712].—Meyrick, 1897:415; 1906:55 [synonym of *Opogona*].—Walsingham 1907:712 [synonym of *Opogona*]; 1914:351 [synonym of *Opogona*].—Meyrick 1915:232 [synonym of *Opogona*].—Fletcher, 1929:130, 153 [synonym of *Opogona*].—Zimmerman, 1978:387.

Conchyliospora Wallengren, 1861:387 [type-species: *C. simoniella* Wallengren, monotypic].—Fletcher, 1929:54, 153 [synonym of *Opogona*].—Diakonoff, 1952:104 [synonym of *Opogona*].—Zimmerman, 1978:387.

Cachura Walker, 1864:918 [type-species: *C. objectella* Walker, monotypic].—Moore, 1887:526.—Walsingham, 1914:351 [synonym of *Opogona*].—Fletcher, 1929:36, 154 [synonym of *Opogona*].—Diakonoff, 1952:104 [synonym of *Opogona*].—

Kuroko, 1964:50 [synonym of *Opogona*].—Zimmerman, 1978:387.

Dendroneura Walsingham, 1892:509 [type-species: *D. praestans* Walsingham, original designation and monotypic].—Meyrick, 1915:251 [synonym of *Opogona*].—Fletcher, 1929:65, 154 [synonym of *Opogona*].—Diakonoff, 1952:104 [synonym of *Opogona*].—Kuroko, 1964:50 [synonym of *Opogona*].—Zimmerman, 1978:387.

Hieroxestis Meyrick, 1893[1892]:567 [type-species: *H. omoscopya* Meyrick, monotypic]; 1901:576; 1906:55; 1915:232.—Durrant, 1925:12.—Meyrick, 1927:315 [synonym of *Opogona*].—Philpott, 1927:331.—Meyrick, 1928b:398 [synonym of *Opogona*].—Fletcher, 1929:109, 154 [synonym of *Opogona*].—Diakonoff, 1952:104 [synonym of *Opogona*].—Kuroko 1964:50 [synonym of *Opogona*].—Zimmerman, 1978:387 [synonym of *Opogona*].

Exala Meyrick, 1912:24 [type-species: *Gracilaria* [sic] *strassenella* Enderlein, monotypic; new synonym].—Fletcher, 1929:95 "*Lithocolletis*? . . . may belong to Tineidae."—Viette, 1948:17.—Vari, 1961:xiv [synonym of *Hieroxestis*].

TYPE-SPECIES.—*Opogona dimidiatella* Zeller, monotypic.

ADULT.—Small moths with slender, pointed wings and mostly smooth, somewhat flattened heads and depressed bodies.

Wing Expanse: 6–22 mm.

Head: Vestiture variable, typically smooth with a low, rounded ridge of broad scales at vertex between antennae that partially extends over the dorsal margin of frons; an erect tuft of hairlike scales sometimes present between vertex and occiput. Head capsule nearly round but noticeably flattened and obliquely slanted as viewed laterally. Dorsal arms of tentorium obsolete. Ocelli absent. Eyes approximately round, relatively small with an interocular index of about 0.7; corneal nipples present, spherical in form. Antennae with 80–102 segments, rather short, 0.7–0.8 the length of forewing; scape slightly flattened and ventrally concave. Pili-
fers relatively well developed, with conspicuous lateral setal tufts. Mandibles present but vestigial, largely hidden by labrum. Maxillary palpi elongate, exceeding length of shortened galeae, 5-segmented with fourth the longest, sometimes exceeding length of apical (fifth) by 2–3 times; apical segment occasionally elongate, nearly equaling fourth. Labial palpi porrect but curved laterally, elongate, nearly ×2 the diameter of eye; vestiture rather smooth except for 2–5 stout setae projecting laterally from apex of second segment.

Thorax: Mesothoracic furcal apophyses consisting of two short, stout branches, the mesal pair more

reduced and terminating in a sinuate tendon; the lateral pair relatively stout, with a truncate apex. Metafurcasternum with anteromedial process very similar to that of *Oinophila* and *Nemapogon*, gradually narrowing anteriorly (as viewed laterally in Figure 35); two pairs of furcal apophyses usually evident, posterior pair reduced, consisting of a pair of rounded knobs that occasionally may be reduced to smooth ridges; anterior pair more produced, attenuated, and terminating in elongate, sinuate tendons; anterior end of anteromedial process and mesal lamella slightly curved ventrad, sometimes with a sheet of membrane extending ventrally from mesal lamella. Prothoracic legs the shortest; tibia about 0.5 the length of tarsus; epiphysis present, well developed, nearly 0.5 the length of tibia. Mesothoracic legs with a single pair of apical spurs of unequal length, one being about 0.5 the length of other. Metathoracic legs greatly elongated with two pairs of unequal spurs, one being about 0.5 the length of other; basal spurs situated near basal third of tibia, another pair at subapex. Forewings slender, length approximately $\times 5$ the width; apex of forewings pointed, usually flat but turned dorsally in a few species; venation somewhat reduced; R1 absent; R4 stalked with R5; the latter terminating short of apex; M1 and 2 faint, stalked to R4+5; discal cell very elongate, approximately 0.7 the length of forewing; base of medial vein not preserved. Hind wings slender, pointed; venation very reduced, with only Sc+R1 and CuA well preserved; medial cell indistinct.

Abdomen: Female either with or without a dense hair tuft encircling seventh segment.

Male Genitalia: Uncus distinct, usually deeply divided into two large, widely separated, setigerous lobes. Tegumen moderately developed into a relatively broad band dorsally. Vinculum moderately to poorly developed, often forming (with saccus) a large V-shaped sclerite ventrally; saccus moderately to well developed, frequently elongate and rod shaped. Valvae well developed, elongate, typically divided at apex into two prominent lobes consisting of extensions of the costal margin and cucullus; valvae freely movable; transtilla absent. Anellus usually poorly developed, often membranous; a distinct juxta usually not evident. Aedeagus simple, slender and elongate, usually equaling length of entire genitalia; cornuti and exogenous spines absent.

Female Genitalia: Ovipositor very elongate, extensible; posterior apophyses greatly lengthened, frequently $\times 2$ or more the length of anterior pair; tertiary apophyses of tenth segment present but poorly developed. Ductus bursae typically elongate, slender, abruptly terminating at enlarged, ovoid corpus bursae; walls of corpus usually membranous but sometimes thickened; signa normally well developed, highly variable in number and form.

DISCUSSION.—As currently recognized, the genus *Opogona* is quite large, with approximately 250 species having been proposed. The greatest development of the group has occurred in the Old World tropics with relatively few species described from the New World. Based upon my own experience to date, this faunal discrepancy appears to be real and not merely the result of less attention being directed at the neotropical fauna. Many species, of course, remain to be discovered in the extremely diverse, largely unsampled American tropics; however, sample collections from several areas of the neotropics inevitably appear species poorer in *Opogona* when compared to comparable samples from paleotropical areas, particularly from the Indo-Pacific region. Currently, all 250 species referred to above are included in *Opogona*, although it is likely, after this large assemblage of species has been adequately studied, that other generic groupings will become substantiated.

The life histories of very few members of this large complex are known. Of the few that are, it has generally been found that the larvae tend to be geophilic and are scavengers, feeding upon the decaying remains of a wide range of plants with little or no evidence of host specificity. The great majority of the species, consequently, appear to be of little economic concern. A few species, however, may secondarily attack living plants or stored tubers and occasionally can be of some importance. Species with this habit include *O. dimidiatella* Zeller, *O. saccharella* Swezy, and *O. subcervinella* Walker, all of which are known to damage sugarcane growing in the fields.

In addition to its typical inadequacy to define the genus, Meyrick's original description of *Hieroxestis* also contains one serious error that should be noted. He mentions (1893:567) that the ocelli in this genus are small. Actually, ocelli are not known to be present in any *Opogona* or true Tineidae.

Opogona arizonensis, new species

FIGURES 3, 17, 18, 26, 27, 33–35, 111–114, 127; MAP 1

ADULT (Figure 3).—Moderately small, with slender, predominantly stramineous forewings bearing a single small, triangular, fuscous spot midway along hind margin.

Wing Expanse: ♂, 11.5–16 mm; ♀, 12.5–15 mm.

Head: Vestiture generally uniformly yellowish white and smooth; posterior portion of vertex smooth to occiput; scales between antennal sockets raised into a low, rounded ridge that slightly overhangs upper portion of frons; scales of frons smooth, closely appressed. Antennae approximately 0.65–0.7 the length of forewing, 64–67 segmented; scape slightly flattened and concave on ventral surface, vestiture tawny, heavily suffused with fuscous; flagellum uniformly stramineous except for slight fuscous suffusion occasionally present over basal 2–3 segments; one row of relatively narrow, appressed scales per segment. Maxillary palpi whitish, densely pubescent ventrally. Labial palpi whitish above, heavily suffused with fuscous ventrally and over apical segment.

Thorax: Pronotum stramineous; meso- and metanota mostly naked; tegulae stramineous above, fuscous below. Venter whitish. Pro- and mesothoracic legs predominantly white ventrally, heavily suffused with fuscous above; metathoracic legs entirely white to stramineous. Forewings entirely stramineous except for fuscous suffusion along base of costal margin and a prominent, triangular fuscous spot near middle of hind margin; fringe stramineous; ventral surface brownish fuscous. Hind wings pale gray above and below, more thinly scaled than forewings.

Abdomen: Stramineous to grayish fuscous above; usually paler beneath, stramineous to whitish; seventh segment of female with a dense encirclement of elongate stramineous hair.

Male Genitalia (Figures 111–114): Uncus deeply divided into two large, widely separated lobes bearing numerous, stout, elongate spinose setae on their mesal surfaces. Tegumen reduced to a relatively narrow, dorsal ring. Vinculum expanded posteriorly as well as anteriorly into a quadrate plate; saccus very slender, rod shaped, approximately 0.7 the length of valva. Valvae essentially undivided but with a prominent, rounded subapical lobe from costa bearing a dense cluster of elongate spinose setae mesally.

Anellus relatively weak, more sclerotized ventrally than dorsally. Aedeagus simple, straight, moderately slender, without cornuti.

Female Genitalia (Figure 127): Tertiary apophyses faintly present. Genital plates deeply lobed with ostium bursae situated ventrad to lobes. Corpus bursae with a relatively large pair of thornlike signa.

HOLOTYPE.—♀, 24 July 1959, coll. R. W. Hodges, Madera Canyon, Santa Rita Mts, 4880 ft [1488 m], Arizona, USNM 72095; in the National Museum of Natural History, Smithsonian Institution.

PARATYPES.—UNITED STATES. ARIZONA: Cochise Co: Carr Canyon, 5000 ft [1524 m], Huachuca Mts: 2 ♂, 21 May 1977, coll. R. Wielgus (USNM). Guadalupe Canyon, Peloncillo Mts: 2 ♀, 8 Nov 1975, coll. R. Wielgus (USNM). Palmerlee: 1 ♂, 2 ♀, ♀ genitalia slide USNM 18424, leg slide USNM 20742 (USNM). Paradise [Chiricahua Mts]: 1 ♂, 3 ♀, May–Aug (USNM). Pima Co: Madera Canyon, Santa Rita Mts, 4400 ft [1341 m]: 3 ♀, 12 Oct 1959, coll. R. Hodges (USNM); 1 ♀, 18 Oct 1959 (UCB); 4880 ft. [1488 m]: 1 ♀, 12 Oct 1959 (BMNH); 5 ♂, 4 ♀, 7 Jul–25 Oct 1959, ♂ genitalia slide USNM 16547; ♀ genitalia slides USNM 16548, 18421 (USNM); 1 ♀, 4 Aug 1959 (UCB); 5600 ft [1707 m]: 1 ♀, 1 Aug 1959 (USNM). TEXAS: Brewster Co: K Bar Ranch, Chisos Mts: 1 ♀, 2 Jun 1973, coll. R. Hodges, ♀ genitalia slide USNM 20254 (USNM). Described from a total of 9 males and 25 females.

HOST.—Unknown.

FLIGHT PERIOD.—May to October; apparently multivoltine.

DISTRIBUTION (Map 1).—Presently known only from southeastern Arizona and extreme southern Texas but undoubtedly ranging farther south into Mexico.

DISCUSSION.—This species and the following, *O. floridensis*, appear to possess a rather unique wing pattern distinct from all other known American species. However, two South African species, *O. cyrtomis* Meyrick and *O. trophis* Meyrick, exhibit very similar wing maculation. *Opogona arizonensis* may be distinguished from *O. floridensis* as well as from both African species by its uniformly yellowish white head and more slender saccus. The female of *O. floridensis* and the larvae of both North American species are presently unknown.

Opogona floridensis, new species

FIGURES 4, 115–118; MAP 1

ADULT (Figure 4).—Moderately small, with slender, almost entirely stramineous forewings, bearing a single, very small fuscous spot midway along hind wings.

Wing Expanse: ♂, 15–16 mm.

Head: Vestiture generally smooth and predominantly stramineous except for dark fuscous scaling posterior to antennae and frontal tuft; scales of vertex between antennae stramineous and typically raised to form a low, rounded ridgelike tuft that slightly extends over upper portion of frons; frons smooth, scales closely appressed. Antennae approximately 0.7 length of forewing, 80–93 segmented; scape stramineous above, heavily suffused with dark fuscous beneath, slightly flattened and concave ventrally; flagellum uniformly stramineous with one row of relatively slender scales per segment. Maxillary palpi stramineous, densely pubescent ventrally. Labial palpi mostly stramineous dorsally with a strong suffusion of dark fuscous ventrally, especially on apical segment.

Thorax: Pronotum stramineous; meso- and metanota naked; tegulae stramineous above, dark fuscous along costal margin and beneath. Venter whitish to pale stramineous. Prolegs stramineous to whitish ventrally, mostly dark fuscous above; mesothoracic legs similarly colored but with fuscous scaling above more faded and suffused; metathoracic legs mostly pale stramineous with slight suffusion of brownish fuscous over dorsum of tarsi. Forewings entirely stramineous except for dark fuscous scaling along basal fifth of costal margin and a small, faint fuscous spot midway along hind margin; fringe stramineous; ventral surface mostly brownish fuscous. Hind wings pale gray with stramineous fringe above and below, more thinly scaled than forewings.

Abdomen: Stramineous above; pale, more whitish ventrally.

Male Genitalia (Figures 115–118): Uncus deeply divided into two large, widely separated lobes bearing numerous elongate setae on their mesal surfaces. Tegumen moderately developed into a relatively broad ring dorsally. Vinculum relatively well developed, narrowing gradually to saccus which, together with vinculum, forms a broad V-shaped sclerite ventrally. Valvae prominently divided into two rounded lobes consisting of an extension of the costal margin and the cucullus; valvae without cluster of stout setae but with slender hairlike setae. Anellus forming a slightly sclerotized ring encircling aedeagus. Aedeagus simple, slightly curved beyond middle, and without cornuti.

HOLOTYPE.—♂, 24 Dec 1964, Miami, Fla., ex light trap, USDA lot 65–56, ♂ genitalia slide

USNM 18420, USNM type 72094: in the National Museum of Natural History, Smithsonian Institution.

PARATYPE.—UNITED STATES. FLORIDA: Dade Co: Miami: 1 ♂, 24 Dec 1964, coll. J. C. Buff, ex light trap, USDA lot 65–56, ♂ genitalia slide USNM 18426 (USNM); 1 ♂, 21 Dec 1964, coll. J. C. Buff, caught in black light trap in Miami Inspection Sta., USDA lot 65–2713 (USNM). Described from a total of 3 males.

Host.—Unknown.

FLIGHT PERIOD.—December.

DISTRIBUTION (Map 1).—Presently known only from the type-locality, which is located in the Atlantic Coastal Plain of extreme southern Florida.

DISCUSSION.—*Opogona floridensis* demonstrates closest resemblance both in maculation and in male genital structure to two South African species, *O. trophis* Meyrick and especially *O. cyrtomis* Meyrick. It may be distinguished from these two species by the costal lobe of the valva being less extended with the result that the apical cleft of the cucullus is less pronounced. In North America, *O. floridensis* most resembles *O. arizonensis* and may be easily separated from the latter in possessing dark fuscous scaling over the occipital region posterior to the antenna and by the broader, V-shaped saccus of the male.

Although only three specimens of *O. floridensis* have thus far been collected, all from the Miami Plant Quarantine Inspection Station, their capture in a black light trap as well as the species' close affinities to *O. arizonensis* suggest that it may be established in southern Florida and may not merely represent some infrequent exotic interception.

Opogona omoscopa (Meyrick)

FIGURES 5, 3–16, 44–47, 52–76, 119–123, 128; MAP 1

Hieroxestis omoscopa Meyrick, 1893[1892]:567; 1915:232.—Swezey, 1922:9.—Durrant, 1925:12.—Philpott, 1927:331.—Moore, 1959:346.

Opogona omoscopa (Meyrick).—Meyrick, 1930:321; 1937:88.—Viette, 1957:144.—Zimmerman, 1978:389.

Opogona apicalis Swezey, 1909:17; 1922:9 [synonym of *Hieroxestis omoscopa* Meyrick].—Zimmerman, 1978:389 [synonym of *Opogona omoscopa* (Meyrick)].

Hieroxestis praematura Meyrick, 1909:26; 1930:321 [synonym of *Opogona omoscopa* (Meyrick)].—Vari, 1961:xiv.—Zimmerman, 1978:389 [synonym of *Opogona omoscopa* (Meyrick)].

ADULT (Figure 5).—Moderately small, with slender, predominantly dark fuscous forewings.

Wing Expanse: ♂, 20–22 mm; ♀, 19–21 mm.

Head: Vestiture complex, varying according to position on head as follows: scales bordering occiput relatively broad, appressed and fuscous; vertex with a prominent, median tuft of erect, pale brownish hairs posterior of antennae and a smooth, nearly appressed ridgelike tuft of broad, silvery white scales between antennae that partially overhangs dorsal margin of frons; posterior erect tuft usually more developed in male; frons smooth with whitish, moderately broad scales. Antennae approximately 0.8 the length of forewing with 97–102 segments; scape slightly flattened and concave ventrally, vestiture pale brown with a prominent dorsal tuft in male; flagellum stramineous with scales tightly appressed, narrow, and arranged as one scale row per segment. Maxillary palpi densely covered with whitish scales dorsally, largely naked, pubescent ventrally; galeae naked. Labial palpi fuscous dorsally, much paler, nearly white ventrally and mesally with 4–6 slender bristles arising laterally from distal half of second segment.

Thorax: Pronotum dark fuscous; meso- and metanota stramineous, nearly naked. Venter whitish to stramineous. Prolegs fuscous dorsally, stramineous ventrally; tarsi faintly ringed with stramineous to light brown; meso- and metathoracic legs progressively paler dorsally, becoming entirely stramineous on latter. Forewings predominantly dark fuscous except for a very small costal spot of stramineous near base and a larger stramineous spot slightly basad of tornus; apex slightly upturned; fringe mostly stramineous irrorated with fuscous; ventral surface of forewings shiny brownish fuscous. Hind wings, including fringe, stramineous to pale brown, becoming more whitish toward base.

Abdomen: Uniformly whitish above and below; female without hair tufts arising from seventh segment.

Male Genitalia (Figures 119–122): Uncus consisting of two large, widely separated lobes arising somewhat ventrad beneath tegumen; inner surfaces densely covered with moderately elongate, spinose setae. Tegumen relatively well developed, forming a broad hood dorsally. Vinculum relatively broad, tapering gradually to a moderately long, broad saccus; saccus approximately $\times 0.35$ – 0.4 as long as valva and about $\times 1.5$ as long as broad. Valvae divided into an elongate, slender, and slightly curved costal lobe and a much shorter, acute sac-

cular lobe; no prominent spinose setae present. Anellus greatly reduced to an elongate, narrow ventral strip of moderately sclerotized tissue. Aedeagus simple, straight, and relatively short, approximately 0.5 the length of valva; cornuti absent.

Female Genitalia (Figure 128): Tertiary apophyses faintly present. Genital plates deeply lobed with ostium bursae arising between lobes. Corpus bursae with a single large peltate signum that internally covers one side of corpus.

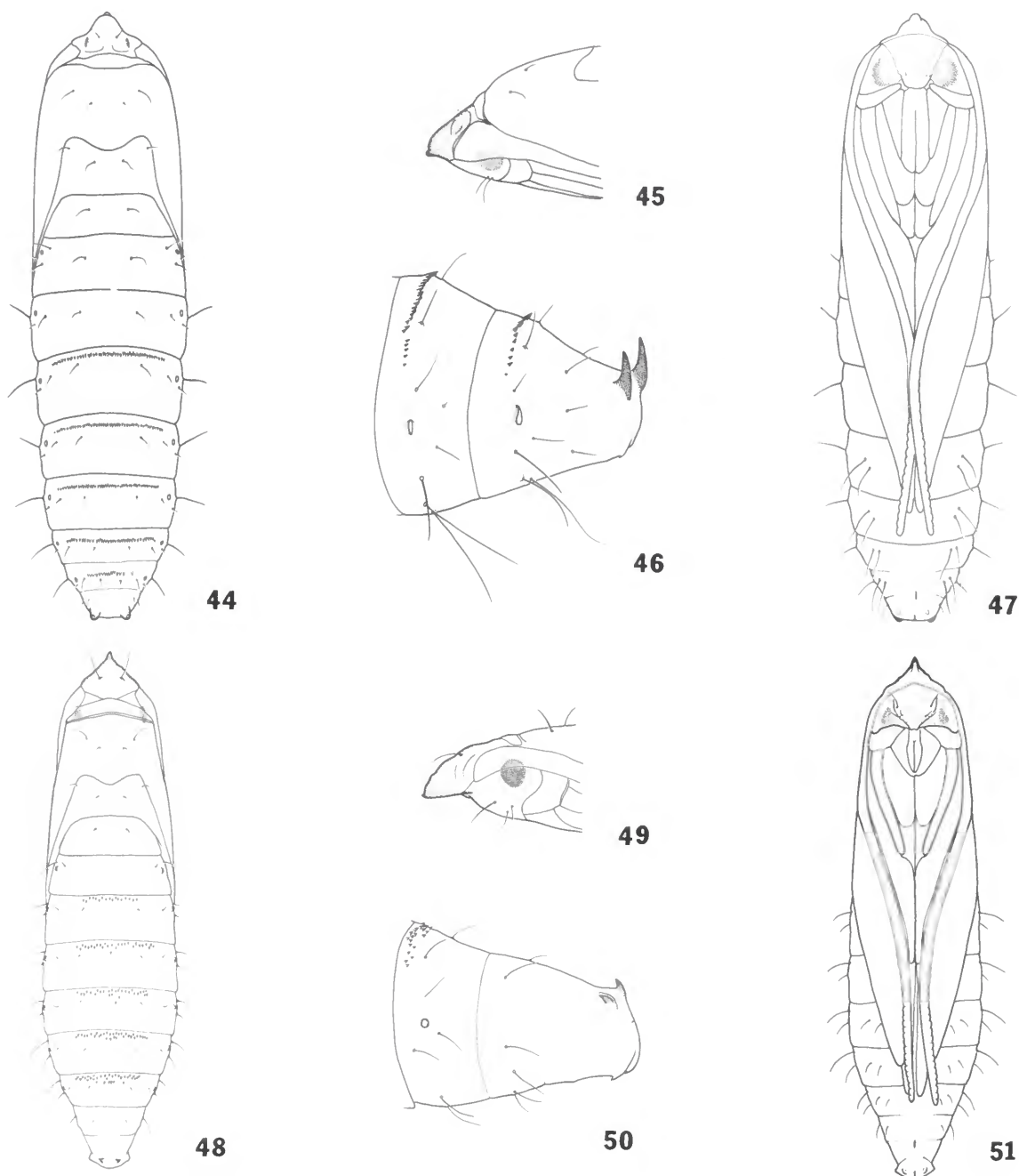
FEMALE PUPA (Figures 44–47).—Length 8.5 mm, maximum width 2.0 mm (in alcohol). Color predominantly reddish brown, particularly over dorsal surface and wing cases, becoming stramineous over ventral surface of abdomen. Head with frontal process (cocoon cutter) only slightly developed. A single (anterior), irregular row of short dorsal spines present on abdominal segments IV–VIII and decreasing in number posteriorly; tabulation of spines as follows: IV=52, V=46, VI=46, VII=36, VIII=15. Cremaster consists of a relatively large pair of slender hooks arising dorsally from segment IX+X; a pair of small tubercles also present ventrally on either side of anal groove.

LARVA (Figures 52–76).—Length of largest larva 21 mm, maximum diameter 2 mm (in alcohol).

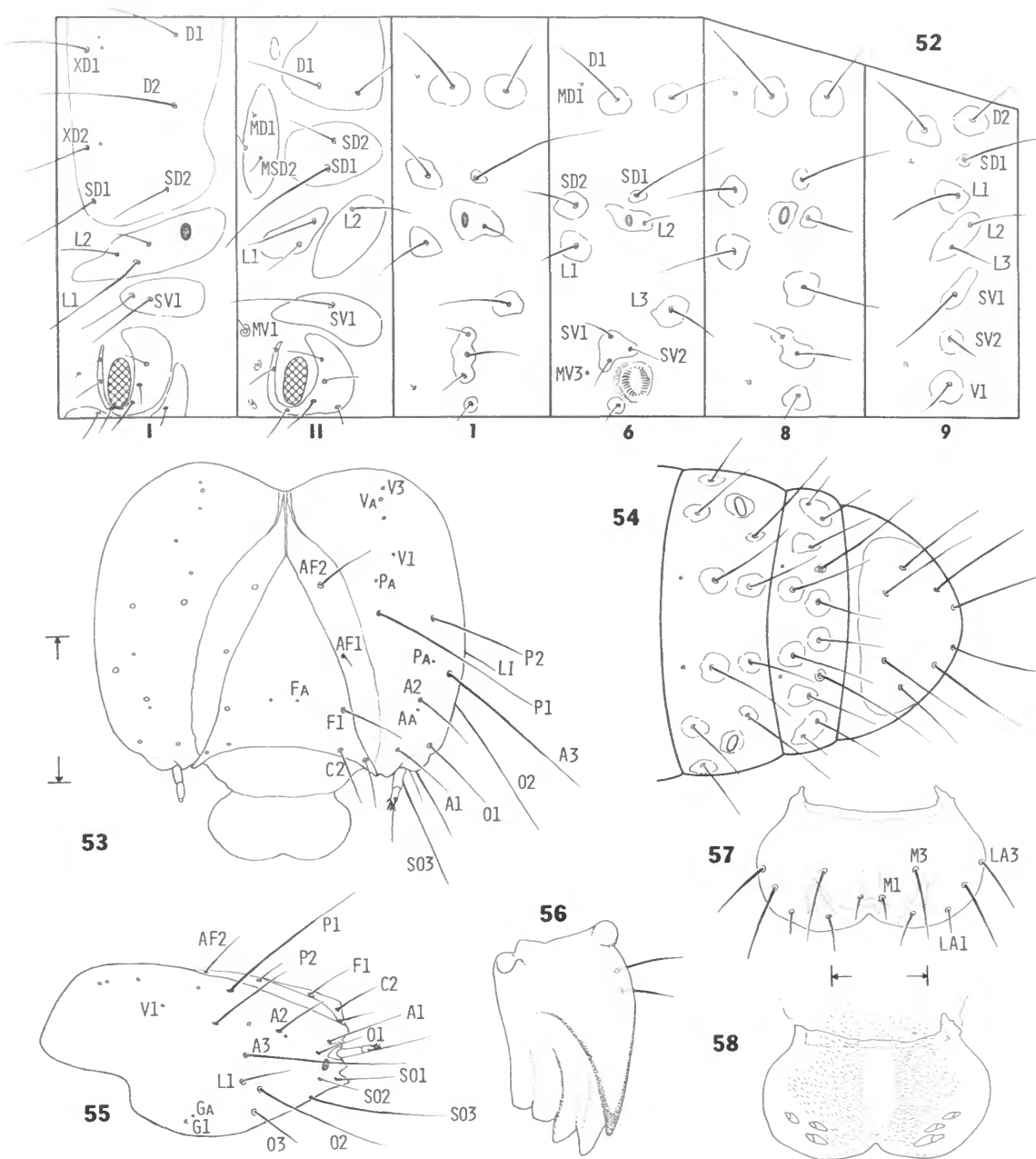
Head: Hypognathous, subovoid, maximum width 1.3 mm. Color uniformly dark reddish brown except for pale stramineous area immediately posterior to ocellus. Chaetotaxy as figured. Ocelli rudimentary, consisting of a single pigmented spot immediately posterior and slightly below antennal socket. Mandible with 5 cusps. Spinneret elongate, slender, with a minute, circular subapical orifice. Labial palpi 2-segmented, slender, slightly less than spinneret in length; apical seta less than 0.5 the length of apical (second) segment.

Thorax: Notal plates and pinnacula dark reddish brown, very distinct on otherwise whitish integument. Meso- and metathorax with L2 arising on a separate pinnacula from L1 and 3; MSD2 reduced in size although easily discernible, similar in length to MSD1 with which it shares a large pinnaculum. Legs well developed, 5-segmented; tarsal claw simple, slightly curved, with a shallow notch on ventral edge at basal third.

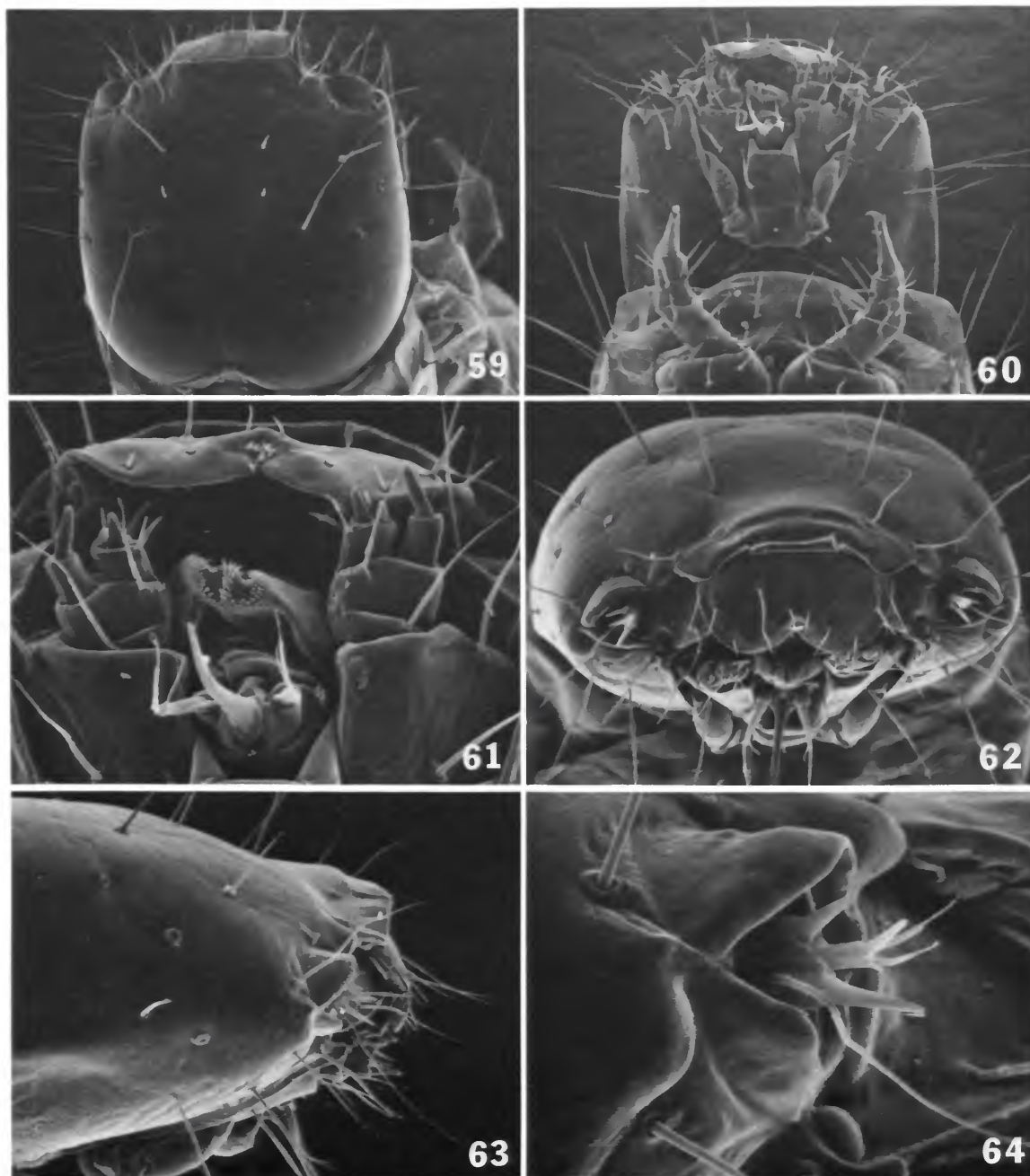
Abdomen: Whitish in color with brownish pinnacula. Integument of thorax and abdomen covered with numerous, minute spinules. L2 usually on same pinnaculum bearing spiracle. Prolegs well



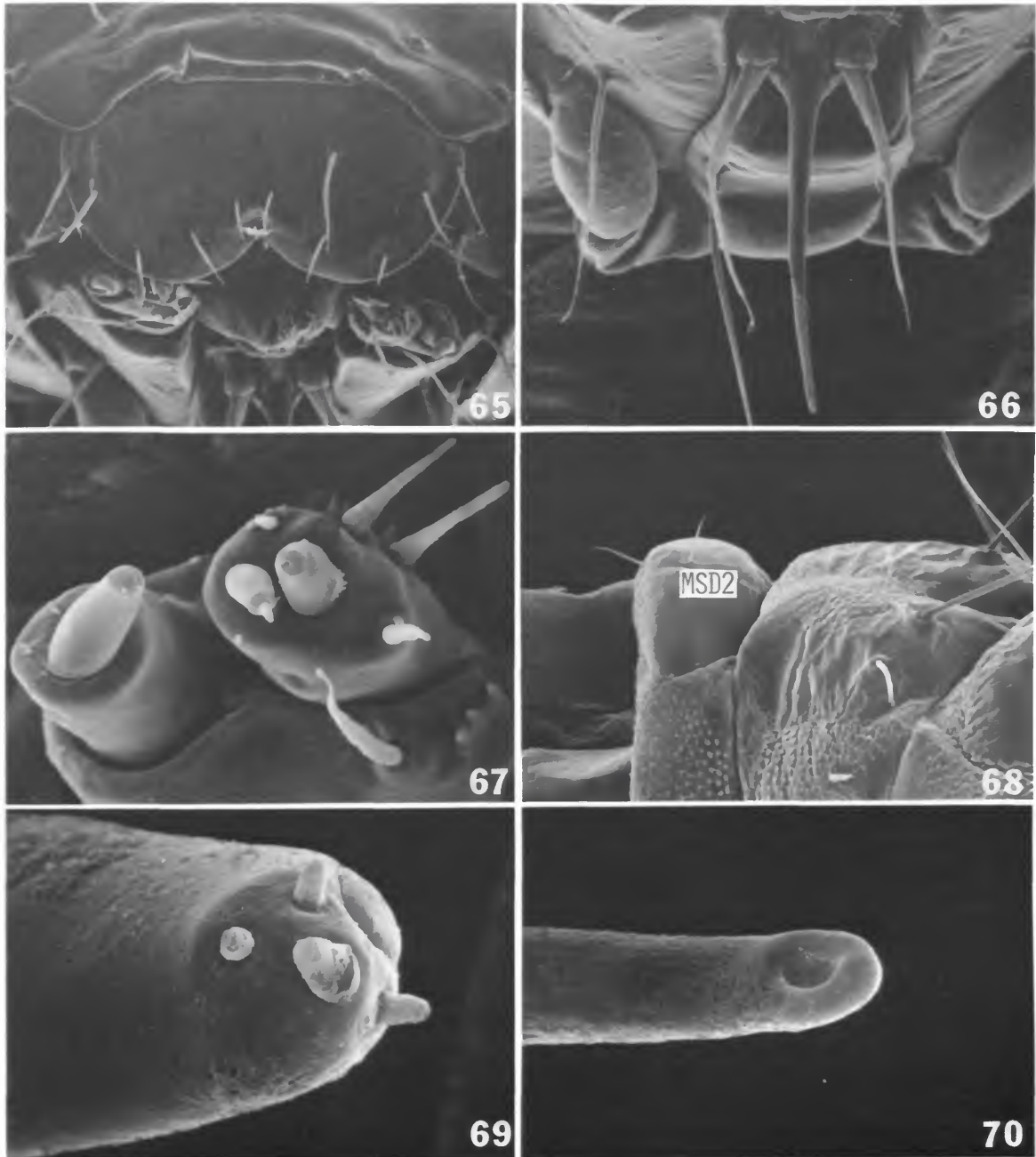
FIGURES 44-51.—Pupae: 44, *Opogona omoscopa* (Meyrick), ♀, dorsal view, length 8.5 mm; 45, lateral view of head; 46, lateral view of segments VI-X; 47, ventral view; 48, *Oinophila v-flava* (Haworth), ♀, dorsal view, length 4.2 mm; 49, lateral view of head; 50, lateral view of segments VI-X; 51, ventral view.



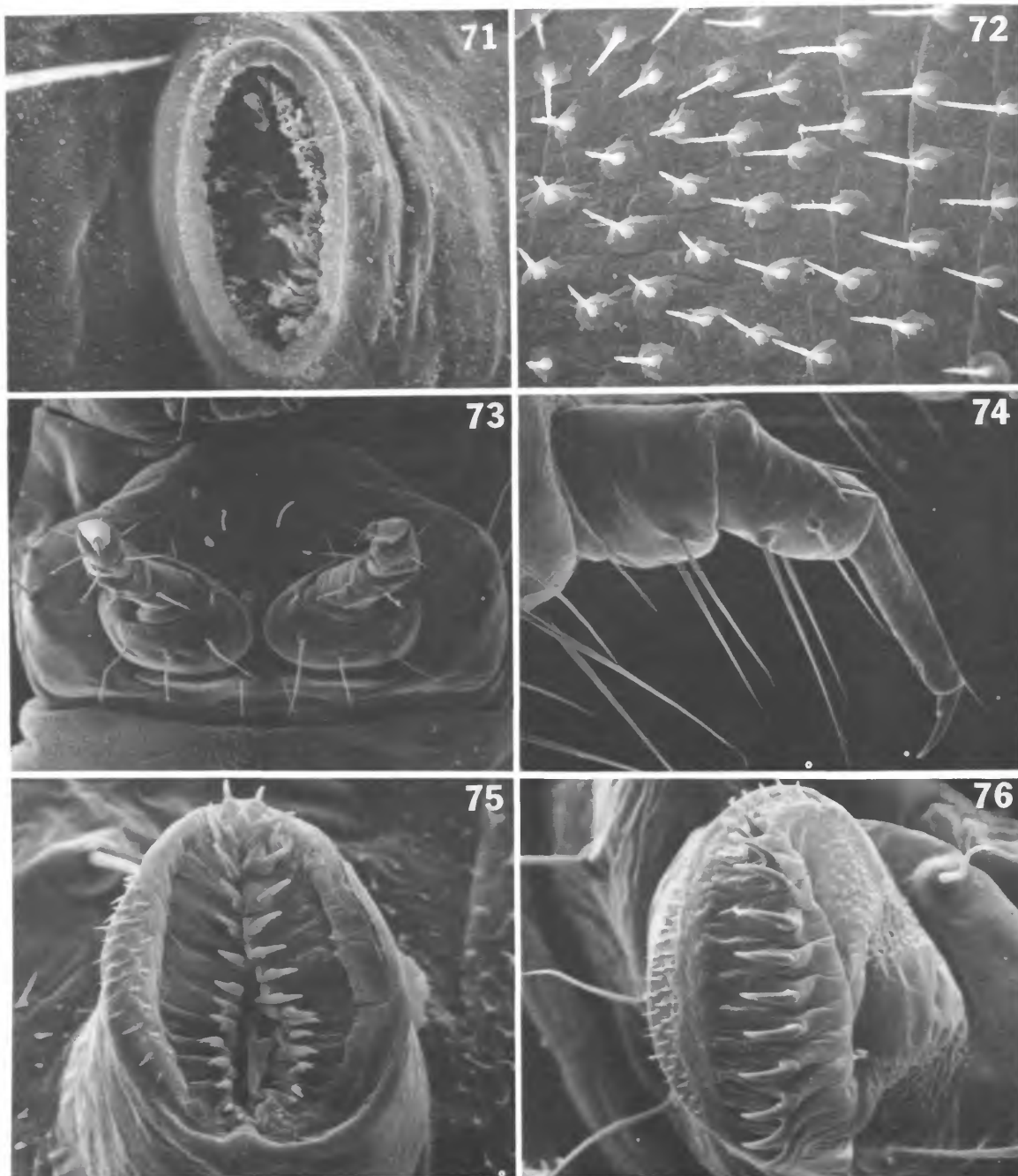
FIGURES 52-58.—*Opogona omoscopa* (Meyrick), larval chaetotaxy: 52, lateral view of prothorax, mesothorax, and abdominal segments 1, 6, 8, and 9; 53, dorsal view of head (scale = 0.5 mm); 54, dorsal view of abdominal segments 8-10; 55, lateral view of head; 56, mandible, ventral view; 57, labrum, dorsal view (scale = 0.2 mm); 58, labrum, ventral view.



FIGURES 59-64.—*Opogona omoscopa* (Meyrick), larval structure: 59, dorsal view of head, $\times 60$; 60, ventral view of head $\times 56$; 61, ventral view of head, $\times 175$; 62, anterior view of head, $\times 90$; 63, lateral view of head, $\times 100$; 64, antenna, $\times 350$. (Plate reduced to 88%.)



FIGURES 65-70.—*Opogona omoscopia* (Meyrick), larval structure: 65, labrum, $\times 180$; 66, detail of spinneret and labial palpi, $\times 225$; 67, maxilla, $\times 750$; 68, lateral view of mesothorax, $\times 140$; 69, apex of maxillary palpus, $\times 5200$; 70, apex of spinneret, $\times 3000$. (Plate reduced to 88%.)



FIGURES 71-76.—*Opogona omoscopia* (Meyrick), larval structure: 71, prothoracic spiracle, $\times 875$; 72, vestiture of intersegmental area of mesothorax, $\times 600$; 73, prothorax, ventral view, $\times 80$; 74, prothoracic leg, $\times 170$; 75, crochets of abdominal proleg, $\times 350$; 76, crochets of anal prolegs, $\times 300$. (Plate reduced to 88%.)

developed on segments III–VI and X; crochets III–VI uniordinal, uniserial, and arranged in a complete ellipse composed of approximately 30 spines; smallest crochets situated laterally; a scattered series of 20–30 smaller spines also present along anterior edge of planta; anal prolegs with 15–17 crochets in a single transverse series and approximately 20–30 smaller spines present along anterior edge of planta.

TYPE.—Lectotype, ♂ (present designation): New South Wales, Sydney, 6 Dec 1884, Meyrick; genitalia slide no. 1868; deposited in the British Museum (Natural History).

TYPE-LOCALITY.—Sydney, New South Wales, Australia.

HOSTS.—Mostly restricted to dead or dying plant material.

FLIGHT PERIOD.—Late May to late July in California; probably multivoltine.

DISTRIBUTION (Map 1).—A widely occurring, essentially pantropical species, presently known from the Australian, Ethiopian, and Indian regions and Oceania, but restricted thus far in North America to the coastal areas of southern California, where it has been collected from Marin County south to San Diego County.

MATERIAL EXAMINED.—5 males, 8 females, 1 pupa, and 9 larvae.

UNITED STATES. CALIFORNIA: Alameda Co: Fremont: 1 larva, 15 Nov 1976 (CDA). Los Angeles Co: Los Angeles: 1 larva, 4 Aug 1971 (USNM). Los Angeles, Highland Park Dist: 1 ♀, 2 Aug 1972 (LACM). Marin Co: Corte Madera: 1 larva 14 Jan 1974 (CDA). Orange Co: Hunting Beach: 1 larva, 1 Nov 1976 (CDA). San Diego Co: La Jolla: 3 larvae, 2 pupae, 20 Aug 1976 (CDA). Vista: 2 ♂, 18–26 Oct 1975 (LACM); 1 ♂, 19 Sep 1974 (LACM). Santa Barbara Co: Carpinteria: 2 ♀, 27 Jun 1971 (CDA); 1 larva, 2 Jul 1974 (USNM). Carpinteria, Sandy Cove: 2 ♂, 1 ♀, 20 Feb 1977 (LACM). Goleta: 1 ♀, 23 May 1969, 1 larva, 22 Oct 1970 (CDA); 2 larvae, 22 Oct 1970 (USNM). Santa Barbara: 3 ♀, 12 Jun 1969 (USNM). Summerland: 1 ♂, 25 Jul 1969 (USNM).

DISCUSSION.—*Opogona omoscopa* was originally described from Australia and has since been found to occur in several other faunal regions. It ranges rather widely in southern Africa, Malagassy Republic, Australia, New Zealand, and India and is scattered through several oceanic island groups. It was first reported in Hawaii by Swezey (1909) under the junior synonym *O. apicalis*. The present paper marks the first report of this species in North America. Although I first became aware of its pres-

ence in California several years ago from specimens collected in 1969 and submitted for identification, an exact determination of the species was not possible until now. Recent collecting by J. Powell seems to indicate that the species is becoming rather common in parts of southern California in the general area of its first detection (i.e., Santa Barbara County), a fact that was not true only a few years earlier. It is possible, therefore, that *O. omoscopa* may be a relatively recent introduction into this country.

Moore (1959) describes the egg as being approximately 0.3 mm in length, smooth, shiny and ovoid, with a translucent, whitish color. Eclosion occurs from 10 to 12 days following oviposition.

As is believed generally true for most of the known species in this nearly cosmopolitan genus, the larva of *Opogona omoscopa* appears to be of little economic significance and may feed upon only dead and decaying plant material. Meyrick (1893) originally reported the larva feeding on sheets of cork in Australia. In Hawaii, Swezey (1909) observed larvae feeding on rotting sugarcane, particularly that which had been damaged by cane borers or that had died from other causes. Living portions of the sugarcane (e.g., buds) may occasionally be eaten if those areas happen to be contiguous to damp, decaying plant debris. In Australia, Moore (1959) reported larvae feeding on the decaying remains of *Sida rhombifolia* L., old corms of *Gladiolus* species, decaying stems of *Amaranthus hybridus* L., flower ends of mature *Curcubita pepo* L. that were in contact with soil, and on rotting *Pteridium aquilinum* Kuhn. In addition, Moore found larvae feeding in very wet, stacked hardwood in a lumberyard, particularly of *Podocarpus dacrydioides* A. Richard, and in rotting *Eucalyptus grandis* Maiden and *Eucalyptus saligna* J. E. Smith. Zimmerman (1978) refers to the larvae as scavengers and reported them to be common in rotten wood, bark, and dead leaves. In Hawaii he records them as having been reared from *Acacia koa* A. Gray, *Clermontia* species, dead fern fronds, *Hibiscadelphus giffardianus* Rock, *Rubus hawaiiensis* A. Gray, *Saccharum officinarum* L. and *Wikstroemia* species. In California larvae have already been associated with a number of diverse plants, such as avocado [*Persea* species], *Fuchsia* species, *Cyclamen* species (bulbs), *Limonium* species, and *Thuja* species.

Pupation occurs inside a flimsy silken cocoon

composed of a framework of fine webbing to which is attached an assortment of excreta and plant fragments. The cocoon may be largely hidden inside the workings of the larva in timber, stems of weeds, grasses, etc., or it may be exposed. Before the emergence of the adult, the pupal shell is normally protruded approximately two-thirds its length from the cocoon. Moore (1959) reported the length of the pupation period to be 25 days during June at Lisarow, Australia. The time required from oviposition to adult emergence was found to be from 10 to 12 weeks during the warmer months at this same locality, extending to four months during colder periods.

Moore observed no evidence of parasitism during his studies, but he did report the larvae of *O. omoscopa* to be infected by an entomogenous fungus, *Vermicularia* species. Zimmerman (1978) has recorded a bethylid parasite as "probably *Sierola opogone* Fullaway."

The most closely related species to *O. omoscopa* appear to be *O. heroicella* Viette and *O. strassenella* (Enderlein), new combination. As figured by Viette (1948, 1957), the genitalia of both species, particularly *O. strassenella*, are very similar to *O. omoscopa*. According to Viette's description of these species, however, their wing patterns differ considerably.

Adult *O. omoscopa* resemble *O. aurisquamosa* (Butler) closely in general appearance but are larger and darker in color. Males of the two species may be easily distinguished by the much more extended saccus of *O. aurisquamosa*.

Opogona purpuriella Swezey

FIGURE 6

Opogona purpuriella Swezey, 1913:280.—Zimmerman, 1978:396.

Although this species is not known to be established within the continental United States, its capture at a port of entry suggests that it may eventually be naturalized here. For this reason, a photograph of this easily recognized moth has been included (Figure 6). Although amply distinct from the known North American *Opogona*, it bears close resemblance to *O. allaini* Clarke described from Rapa Island.

The only North American interception record of

O. purpuriella known to me is of a unique female collected 19 October 1964 at San Pedro, Los Angeles County, California, in association with a shipment of legume seed pods imported from Hawaii.

Oinophila Stephens

Oinophila Stephens, 1848:xli.—Herrich-Schäffer, 1855:336.—Stainton, 1859a:369.—Snellen, 1882:474.—Rebel, 1901:240.—Meyrick, 1828a:817.—Fletcher, 1929:152.—Powell, 1964:155. *Oenophila* [sic] Zeller, 1853:505.—Heinemann, 1877:696.—Spuler, 1910:420. *Gephyristis* Meyrick, 1909:27 [type-species: *G. onchiala* Meyrick, monotypic].—Fletcher, 1929:98 [synonym of *Oinophila*].

TYPE-SPECIES.—*Gracillaria v-flava* Haworth, original designation by Stephens and monotypic.

ADULT.—Small, slender winged moths with a partially smooth head and a transversely divided tuft of hair arising from vertex.

Wing Expanse: 8.5–10 mm.

Head: Vestiture complex, frons and occipital region posterior to antennae and vertex covered by smooth, broad scales; vertex with two clusters of hairlike scales separated by a transverse row of flat, broad scales. Head capsule subtriangular viewed ventrally, with vertex extended anterodorsally between antenna. Dorsal arms of tentorium obsolete. Ocelli absent. Eyes approximately round, slightly flattened along ventrocaudal margin, reduced in size, with an interocular index of about 0.5; corneal nipples present, spherical in form. Antennae relatively long, nearly equaling length of forewing, 62–64 segments; scape cylindrical. Pilifers poorly developed, lateral setal tufts nearly absent. Mandibles present, moderately large but nonfunctional. Maxillary palpi elongate, exceeding length of shortened galeae, 5-segmented with fourth segment the longest and exceeding length of basal three segments combined; apical segment moderately long, about 0.8 the length of fourth. Labial palpi 3-segmented, moderately long, slightly longer than galeae, porrect but strongly directed laterally; scale tufts absent but with 3–6 stout setae projecting laterally from apex of second segment.

Thorax: Mesothoracic furcal apophyses consisting of two short and subacute lobelike branches; the mesal pair with an attached tendon. Metafurcasternum with anteromedial process similar to that of *Opogona*, gradually narrowing anteriorly (as viewed laterally in Figure 38); two pair of furcal apophyses

present; posterior pair reduced, consisting of a pair of rounded knobs without attached tendons; anterior pair more produced, attenuated and terminating in elongate, sinuate tendons; anterior apex of anteromedial process and mesal lamella only slightly curved ventrad, and with a broad sheet of membrane extending ventrally from mesal lamella. Prothoracic legs the shortest; tibia about 0.5 the length of tarsus; epiphysis (Figures 77–78) typically present but extremely reduced to a vestigial microscopic but articulated spur near middle. Mesothoracic legs with a single pair of apical spurs of unequal lengths, one being about 0.5 the length of the other. Metathoracic legs greatly elongated, with two pairs of unequal spurs, one member being about 0.5 the length of other; basal spurs situated near basal third of tibia, another pair at subapex. Forewings very slender, length about $\times 5$ the width; apex attenuated; venation reduced; R1 absent; R5 terminating short of apex; M1 stalked with R5; M3 absent; CuA1 and CuA2 probably fused; discal cell extremely long, extending about 0.75 the length of forewing; base of medial vein not preserved. Hind wings lanceolate, venation greatly reduced, nearly obsolete except for well-preserved Sc+R1 and A; medial cell indistinct.

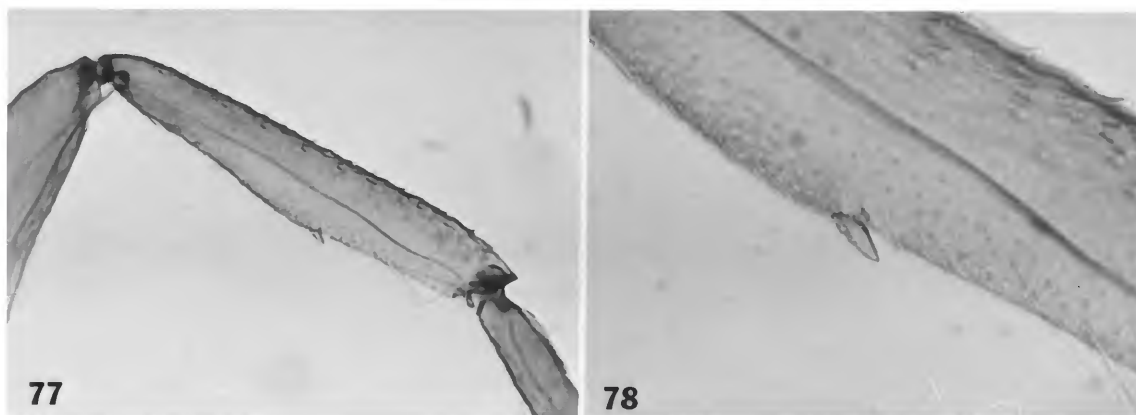
Abdomen: Female without hair tuft arising from seventh segment.

Male Genitalia: Uncus well developed, broad at base and immediately constricted to a short, narrow apex. Tegumen well developed, anterior margin

deeply excavated; tegumen fused laterally with vinculum to form a broad cylinder. Saccus distinct, elongate and rod shaped. Valvae greatly reduced to rounded lobes but with elongate internal apophyses; bases of valvae strongly fused. Annellus membranous. Aedeagus simple, without cornuti.

Female Genitalia: Ovipositor elongate, extensible; posterior apophyses greatly lengthened, approximately $\times 2.2$ the length of anterior pair; tertiary apophyses faintly present. Bursa copulatrix rather reduced in length and volume; signa absent.

DISCUSSION.—Because the composition and structural limits of the genus *Oinophila* have never been well defined, the foregoing “generic” description is almost entirely based upon that of the type-species, *O. v-flava*. For example, it may later be found that some of the more unusual morphological features possessed by *O. v-flava* (e.g., the extremely reduced epiphyses, or the peculiar scaling of the vertex) may not be shared by any other member of the genus. Or, more likely, it may eventually be decided that most of the species currently residing under *Oinophila* should be removed and placed elsewhere. Although approximately 40 to 50 species of *Oinophila* have been proposed, primarily from southern Africa and the Indo-Malayan region, the basic morphology of very few of these has been studied, with the result that the natural relationships of the great majority are still uncertain. Until most of these species are properly studied, the definition of the genus as proposed must remain conservative.



FIGURES 77, 78.—*Oinophila v-flava* (Haworth): 77, prothoracic tibia; 78, detail of epiphysis.

Oinophila v-flava (Haworth)

FIGURES 2, 7-9, 21-23, 28, 29, 36-38, 48-51, 77, 78, 79-103,
108-110, 125; MAP 1

Gracillaria v-flava Haworth, 1828:530.—Stephens, 1834:365.—Wood, 1845:232.

Oinophila v-flava (Haworth).—Stephens, 1848:xli.—Stainton, 1859a:396.—Snellen, 1876:51; 1882:474.—Meyrick, 1928a:817.—Fletcher, 1929:152.—Corbet and Tams, 1943:103, 121, 127, 133, 138.—Ford, 1949:179.—Powell, 1964:155.—Clark, 1965:105.—Bradley, 1966:130.—Bradley, Fletcher, and Whalley, 1972:9.

Oenophila [sic] *v-flavum*—Zeller, 1853:505 [misspelling].—Heinemann, 1877:696.—Walsingham, 1907:712.—Spuler, 1910:420.—Rebel, 1940:47.

Oinophila v-flavella—Herrich-Schäffer, 1855:336 [misspelling].—Snellen, 1882:474 [synonym of *O. v-flava*].—Corbet and Tams, 1943:103 [synonym of *O. v-flava*].

Oinophila v-flavum—Rebel, 1901:240.—Maxwell-Lefroy, 1923:394 [misspelling].—Tilden, 1951:157; 1959:53.

ADULT (Figure 2).—Small, with slender fuscous forewings bearing two irregular, oblique, pale ochreous bands.

Wing Expanse: ♂, 8.5–9 mm; ♀, 8.5–10 mm.

Head: Vestiture complex; vertex with a prominent, rough tuft of pale ochreous, hairlike scales sharply divided by a transverse row of broad, more whitish scales extending between antennae; occipital region of head posterior to tuft smoothly covered by broad, brownish scales; frons smooth, covered by broad, whitish scales. Antennae relatively long, nearly equaling the length of forewing, 62–64 segmented; scape cylindrical, brownish fuscous above, heavily suffused with white beneath; flagellum brownish above, suffused with white ventrally; a single row of narrow, appressed scales per segment. Maxillary palpi whitish. Labial palpi with basal two segments whitish except for lateral cluster of 4–6 brownish hairs at apex of second segment; apical segment brownish fuscous with suffusion of white ventrally.

Thorax: Pronotum and tegulae brownish to grayish fuscous. Meso- and metanota naked. Venter whitish with a silvery luster. Legs generally whitish beneath and brownish fuscous dorsally; apices of tibiae and of each tarsal segment ringed with dull white. Forewings brownish to grayish fuscous with two irregular bands of pale ochreous; basal band the most distinct, transversing wing at basal third and consisting of two narrow oblique bands joining medially to form a V with its pointed end directed toward the wing apex; the distal band more variable

in shape, varying from a single oblique band directed toward the apex, or reduced to a small apical patch of ochreous scales; fringe pale brown; ventral surfaces of forewings uniformly brownish fuscous. Hind wings much lighter in color, uniformly pale grayish brown above and below.

Abdomen: Pale tawny to stramineous above; paler, more silvery white ventrally. Female without dense hair tufts encircling seventh segment.

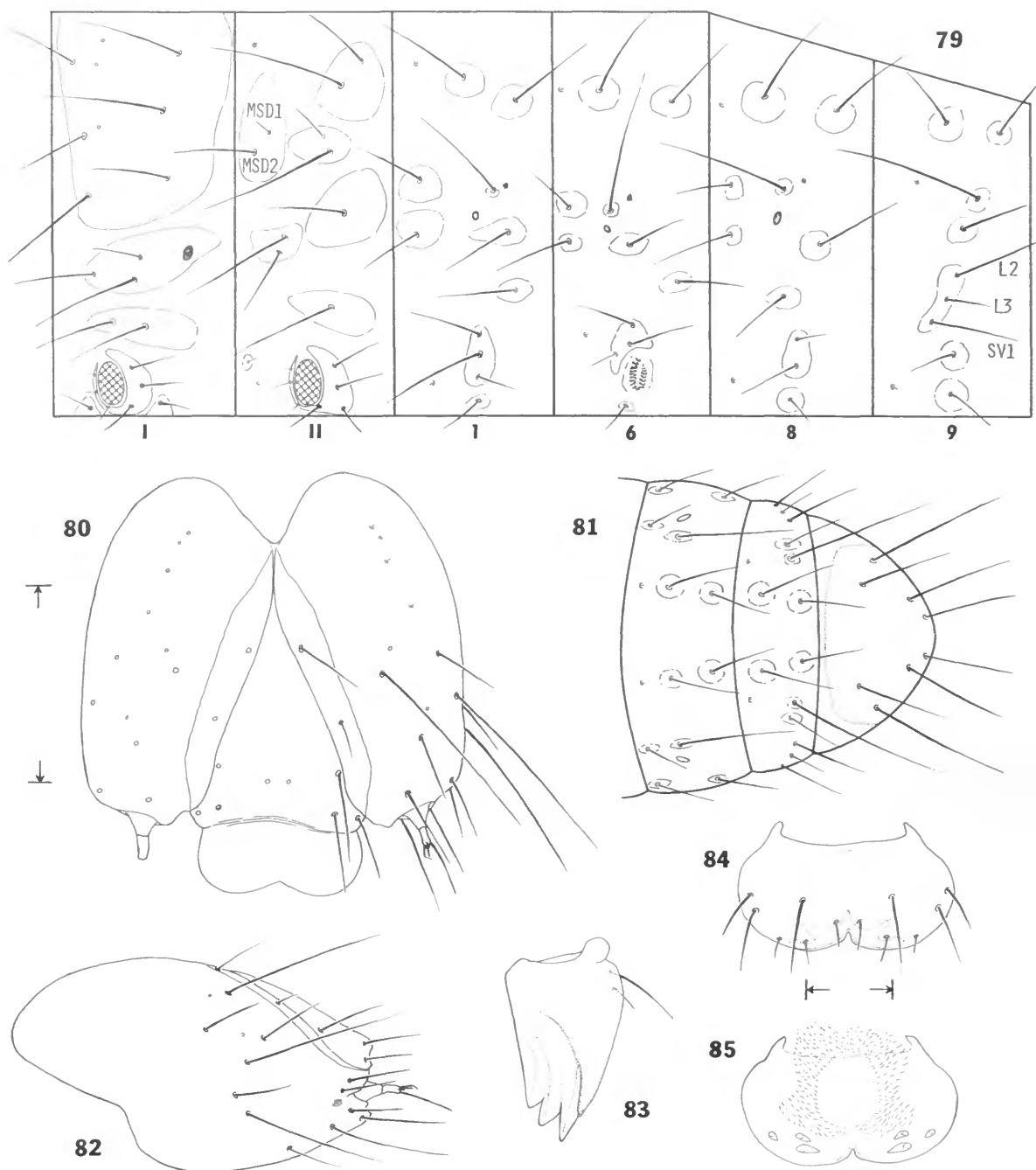
Male Genitalia (Figures 108–110): Uncus broad at base, immediately constricted to a short narrow, bifurcate apex; dorsal surface of uncus slanted steeply to apex. Tegumen well developed, deeply clefted at middorsal line, fused with vinculum to form a broad cylinder. Saccus distinctly set off from vinculum, rod shaped, elongate, about 0.7 the maximum length of tegumen. Valvae reduced to short rounded lobes, with elongate apophyses extending internally; total length of valvae including apophyses approximately equal to saccus in length, with the apophyses comprising over 0.6 of total length. Anellus indistinct, membranous. Aedeagus simple, nearly straight, without cornuti, approximately equal in length to that of entire genitalia.

Female Genitalia (Figures 125–126): Tertiary apophyses extremely faint but present. Ostium bursae enclosed by a small sclerotized ring, opening between bases of a pair of relatively distinct genital plates from which arise the anterior apophyses. Ductus bursae moderately long, slightly exceeding length of anterior apophyses; corpus bursae with a symmetrical pair of relatively broad, platelike signa situated posteriorly near junction with ductus.

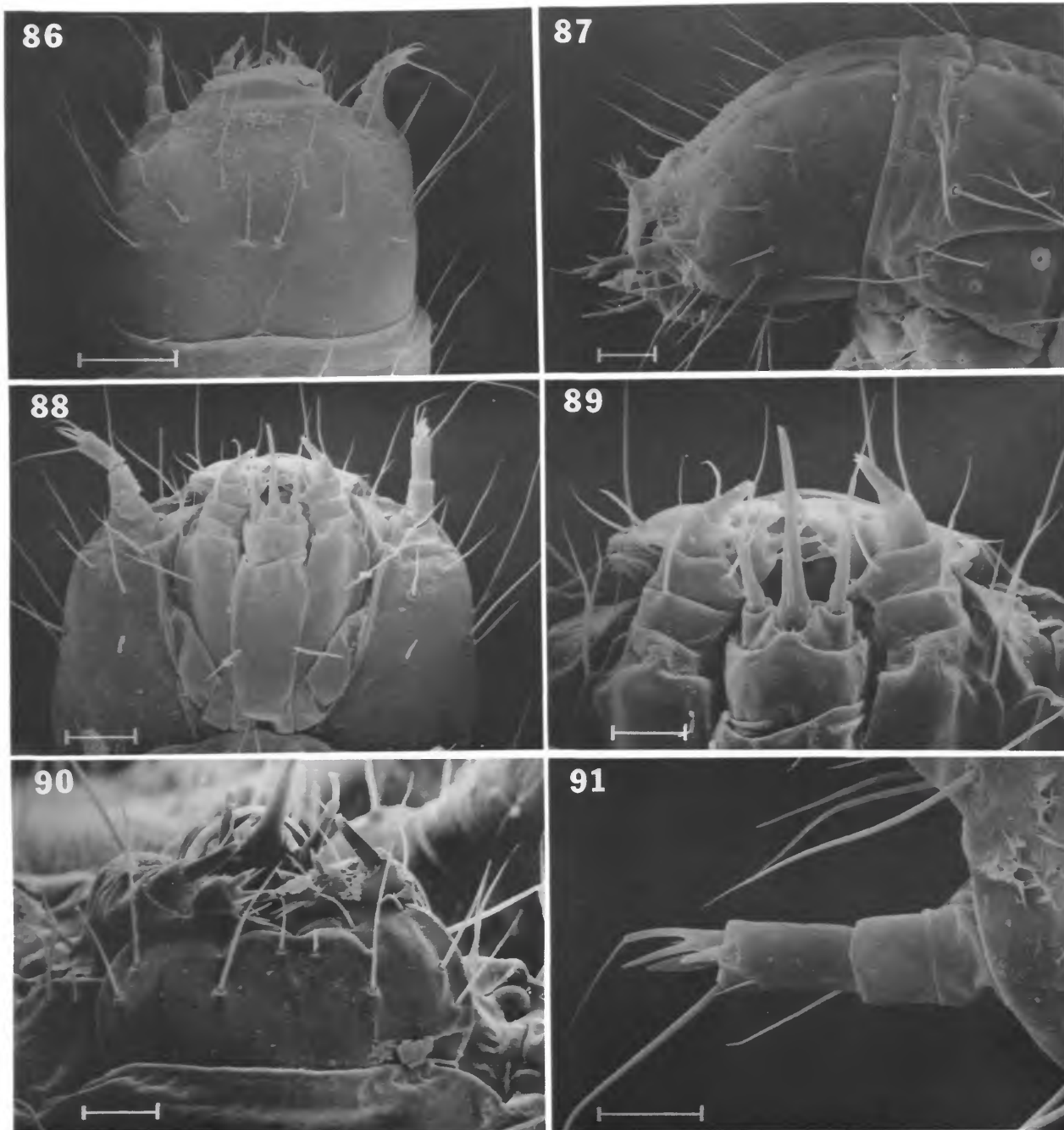
FEMALE PUPA (Figures 48–51).—Length 4.2 mm, maximum width 1.0 mm. Color uniformly pale brown to stramineous. Head with a prominent frontal process (cocoon cutter). A single (anterior) irregular row of short dorsal spines present on abdominal segments III–VII; posterior segments with spines partially arranged in two ranks; tabulation of spines as follow: III=17, IV=27, V=28, VI=32, VII=33. Cremaster consisting of a small pair of short hooks arising dorsally from segment IX+X; a similar but smaller pair of ventral spines present on either side of anal groove.

LARVA (Figures 79–103).—Length of largest larva 8.3 mm (in alcohol); maximum diameter 0.7 mm.

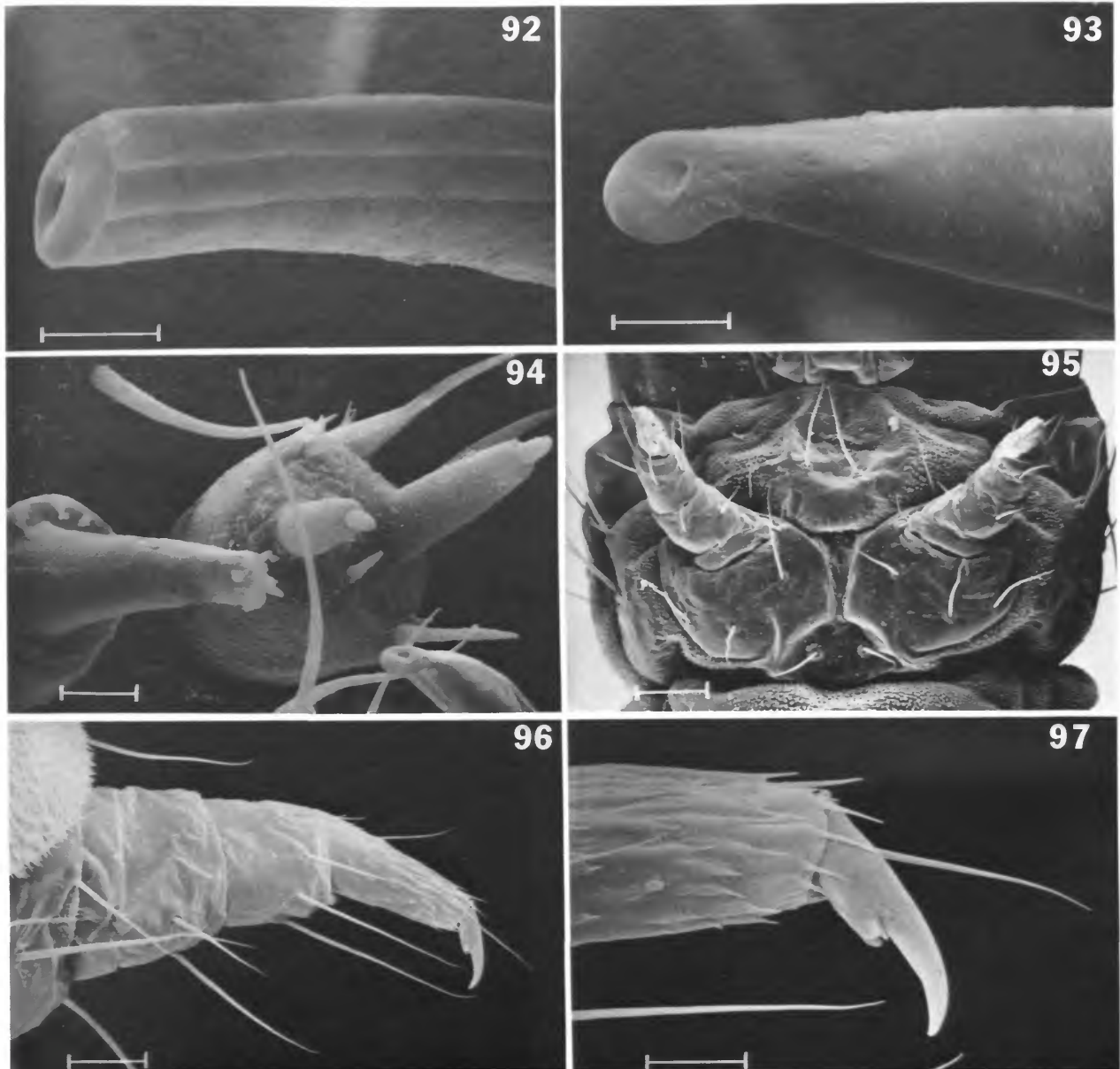
Head: Hypognathous, subquadragonal, maximum width about 0.55 mm, color dark brown, paler at sides and posteriorly. Chaetotaxy as figured.



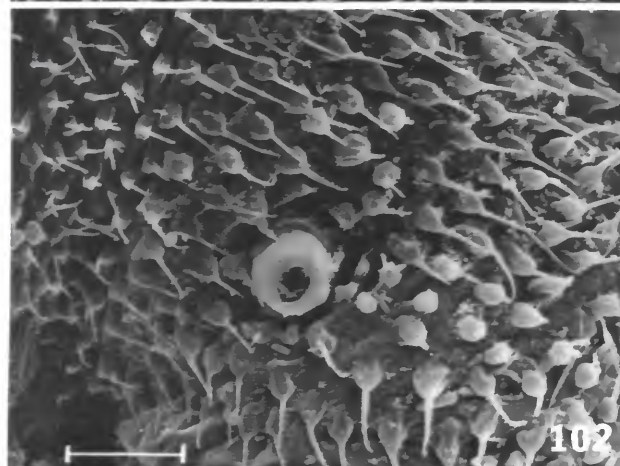
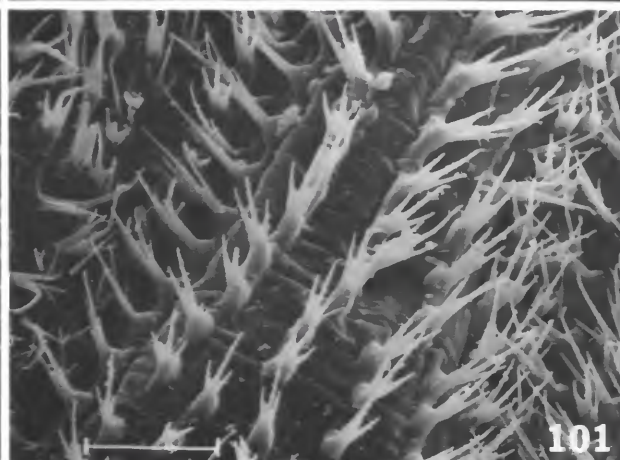
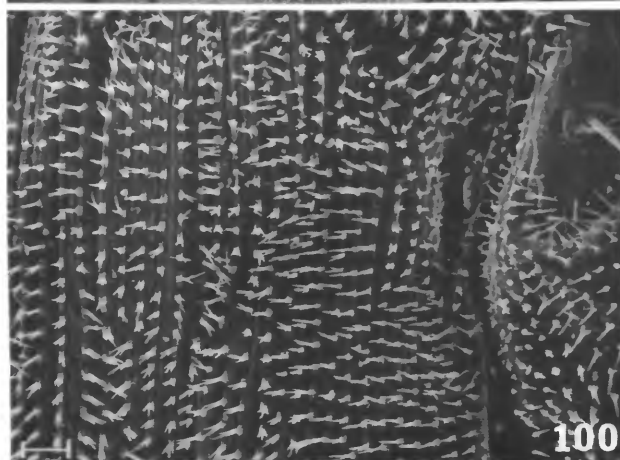
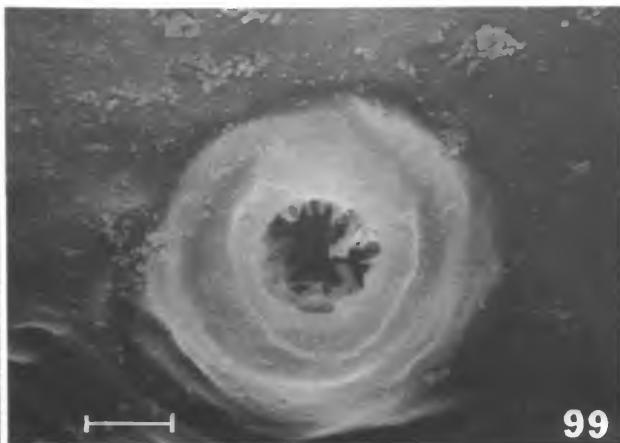
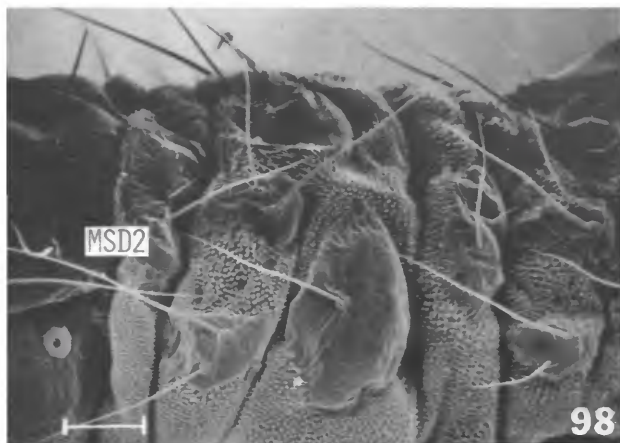
FIGURES 79-85.—*Oinophila v-flava* (Haworth), larval chaetotaxy: 79, lateral view of prothorax, mesothorax, and abdominal segments 1, 6, 8, and 9; 80, dorsal view of head (scale = 0.3 mm); 81, dorsal view of abdominal segments 8-10; 82, lateral view of head; 83, mandible; 84, labrum, dorsal view (scale = 0.1 mm); 85, labrum, ventral view.



FIGURES 86-91.—*Oinophila v-flava* (Haworth), larval structure: 86, dorsal view of head, $\times 98.5$ (scale = $200\text{ }\mu\text{m}$); 87, lateral view of head, $\times 111$ (scale = $100\text{ }\mu\text{m}$); 88, ventral view of head, $\times 135$ (scale = $100\text{ }\mu\text{m}$); 89, ventral view of head, $\times 300$ (scale = $50\text{ }\mu\text{m}$); 90, labrum, $\times 300$ (scale = $50\text{ }\mu\text{m}$); 91, antenna, $\times 429$ (scale = $50\text{ }\mu\text{m}$). (Plate reduced to $84\frac{1}{2}\%$.)



FIGURES 92-97.—*Oinophila v-flava* (Haworth), larval structure: 92, spinneret, lateroventral view, $\times 4620$ (scale = $5\text{ }\mu\text{m}$); 93, spinneret, $\times 4600$ (scale = $5\text{ }\mu\text{m}$); 94, maxilla $\times 1530$ (scale = $10\text{ }\mu\text{m}$); 95, ventral view of prothorax, $\times 146$ (scale = $100\text{ }\mu\text{m}$); 96, prothoracic leg $\times 302$ (scale = $50\text{ }\mu\text{m}$); 97, tarsal claw, $\times 959$ (scale = $20\text{ }\mu\text{m}$). (Plate reduced to $84\frac{1}{2}\%$.)



← FIGURES 98–103.—*Oinophila v-flava* (Haworth), larval structure: 98, lateral view of mesothorax, $\times 133$ (scale = 10 μm); 99, prothoracic spiracle, $\times 1590$ (scale = 10 μm); 100, vestiture of abdominal intersegmental area, ventral, $\times 377$ (scale = 20 μm); 101, detail of figure 100, $\times 1170$ (scale = 20 μm); 102, vestiture surrounding fourth abdominal spiracle, $\times 991$ (scale = 20 μm); 103, crochets of abdominal proleg, $\times 801$ (scale = 20 μm). (Plate reduced to 84%.)

Ocelli rudimentary, consisting of a single pigmented spot posterior to antennal socket. Mandibles relatively slender, with three large cusps, and one smaller lateral cusp closely appressed to largest cusp. Spinneret slender, elongate, with a minute, circular, subapical orifice. Labial palpi 2-segmented, slender, with an elongate apical seta about $\times 1.5$ the length of apical segment. Postgenae widely separated, interconnecting cuticle membranous.

Thorax: Notal plates and pinnacula pale yellowish brown, moderately distinct on otherwise whitish integument. Meso- and metathorax with L2 arising on a separate pinnaculum from L1 and L3. MSD2 of meso- and metathorax greatly lengthened, similar in size to D2, and situated on a large pinnaculum with a much shorter MSD1. Legs well developed, 5-segmented; tarsal claws simple, slightly curved with a rather large, abrupt notch midway along ventral edge.

Abdomen: Whitish in color with pale yellowish brown pinnacula. Nonsclerotized portions of integument of thorax and abdomen covered with numerous, minute, mostly trispinulate tubercles arranged in definite, transverse rows. Spiracles not situated on pinnacula bearing L2. Prolegs well developed on segments 3–6 and 10; abdominal crochets uniordinal, uniserial, and arranged in a mesal penallipse composed of approximately 17–20 spines; planta without marginal spines; anal prolegs with 11–13 crochets in a single transverse series.

TYPE.—Lectotype, ♀; designated by Bradley (1966:130).

TYPE-LOCALITY.—Great Britain.

HOST.—The larva is apparently a scavenger, primarily feeding upon dried or decaying plant material.

FLIGHT PERIOD.—Predominantly April to November; reportedly (Ford, 1949) univoltine in Europe but probably multivoltine in California.

DISTRIBUTION (Map 1).—Widespread through many temperate areas, including central and southwestern Europe, the Azores, Madeira, and Canary Islands, and South Africa. Most recently this species

has been reported from the United States (Tilden, 1951) and the Juan Fernandez Islands (Clarke, 1965). Within the United States it is known to range primarily through coastal California from Sacramento County south to San Diego County.

MATERIAL EXAMINED.—7 ♂, 17 ♀, 2 pupae, and 17 larvae.

UNITED STATES. CALIFORNIA: Los Angeles Co: Eagle Rock: 1 ♀, 9 July (LACM). Los Angeles, Exposition Park, 3rd floor of LACM: 1 ♀, 25 May (LACM). Los Angeles, Eagle Rock Dist: 2 ♀, 6 Jun (LACM). Los Angeles, Highland Park Dist: 1 ♂, 5 ♀, 16 May–8 Jun (LACM). Los Angeles, Mt Washington Dist, elev. 840 ft [256 m]: 3 ♀, 10–25 Jun, 1 ♂, 2 ♀, 6 Oct–13 Nov (LACM). Westwood Hills: 1 ♀, 1 Apr (LACM). Sacramento Co: Sacramento: 1 ♂, 1 ♀, 1 Oct (CDC); 1 ♂, 1 Oct (USNM); 2 pupae, 14 larvae 1 Nov (CDC). Santa Clara Co: Stanford University: 1 ♂, em. 28 Apr (USNM). Ventura Co: Specific locality unknown: 1 ♂, 1 ♀, 24 Oct (CDA); 1 ♂, Jul (USNM); 1 larva, 12 Sep. (CDA); 2 larvae, 12 Sep, USNM slides 20257, 20448, 20449 (USNM).

DISCUSSION.—Although originally described from Great Britain in 1828, *Oinophila v-flava* was not reported from the United States until 1951 by Tilden. This record was based upon a single specimen reared in association with *Baccharis pilularis* A. DeCandolle at Stanford University in Palo Alto, California. Since 1951 this moth has been found to range rather widely through coastal California. As discussed by Powell (1964), the earliest record dates back nearly a century to a unique specimen collected perhaps by Coquillett in Los Angeles County.

Published records to date suggest this species to be temperate in distribution and absent from the tropics. In this regard, Meyrick's (1928a:817) statement that "probably the species has been introduced into Europe, and its habits here [in Great Britain] are artificial; elsewhere it occurs at large . . ." is of interest, although he does not suggest where the origin of *O. v-flava* might be. On the same page, however, he does mention that the genus is particularly well represented in Africa and to a lesser extent in the Indo-Malayan region. Undoubtedly, the actual range of *O. v-flava* is much greater than

is presently known. As pointed out by Powell (1964), the presence of *O. v-flava* in an area can be inconspicuous and, thus, may escape detection for some time. The moths are not strongly phototropic and consequently are not readily captured by normal methods.

The larva is generally considered to be a scavenger and has been associated with a variety of hosts. Stephens (1848) early reported the presence of *O. v-flava* in wine cellars of London where the larvae feed in fungi and wine corks. This latter habit as well as its preference for dried vegetable material (Corbet and Tams, 1943) has prompted some authors (e.g., Maxwell-Lefroy, 1923) to consider this species as a minor household pest in Europe. Meyrick (1928a) reported that the larvae lived in silken galleries amongst fungi growing on cellar walls. In California this species has been reared in association with various, mostly unrelated plants such as *Baccharis pilularis* A. DeCandolle (Tilden, 1951, 1959), "cocas palm" (possibly *Arecastum romanzoffianum* Beccari—Powell, 1964), palm tree bark, and old grass clippings.

In Great Britain, Ford (1949) has reported a single generation for this species with the larvae feeding in May and June, the pupae appearing in June and July, and the adults flying during July

and August. Several records in California indicate adult activity at various times during the year. Some of these involving reared adults, however, may not reflect natural emergence periods because of possible unnatural rearing conditions. But, as suggested by Powell (1964), the moderate climate of coastal California may enable the species to maintain more or less continuous activity.

The larvae of *O. v-flava* may be recognized by the extremely long proprioceptor setae MSDS on the meso- and metathorax (Figures 79, 98). The integument over much of the body is also unusual in being densely covered by transverse rows of predominantly trispinulate tubercles (Figures 100, 101). In addition to being relatively smaller in size, the larva is further distinguished from that of *Opogona omoscopa* in lacking marginal spines on the planta and in possessing a more lightly pigmented head and pinnacula.

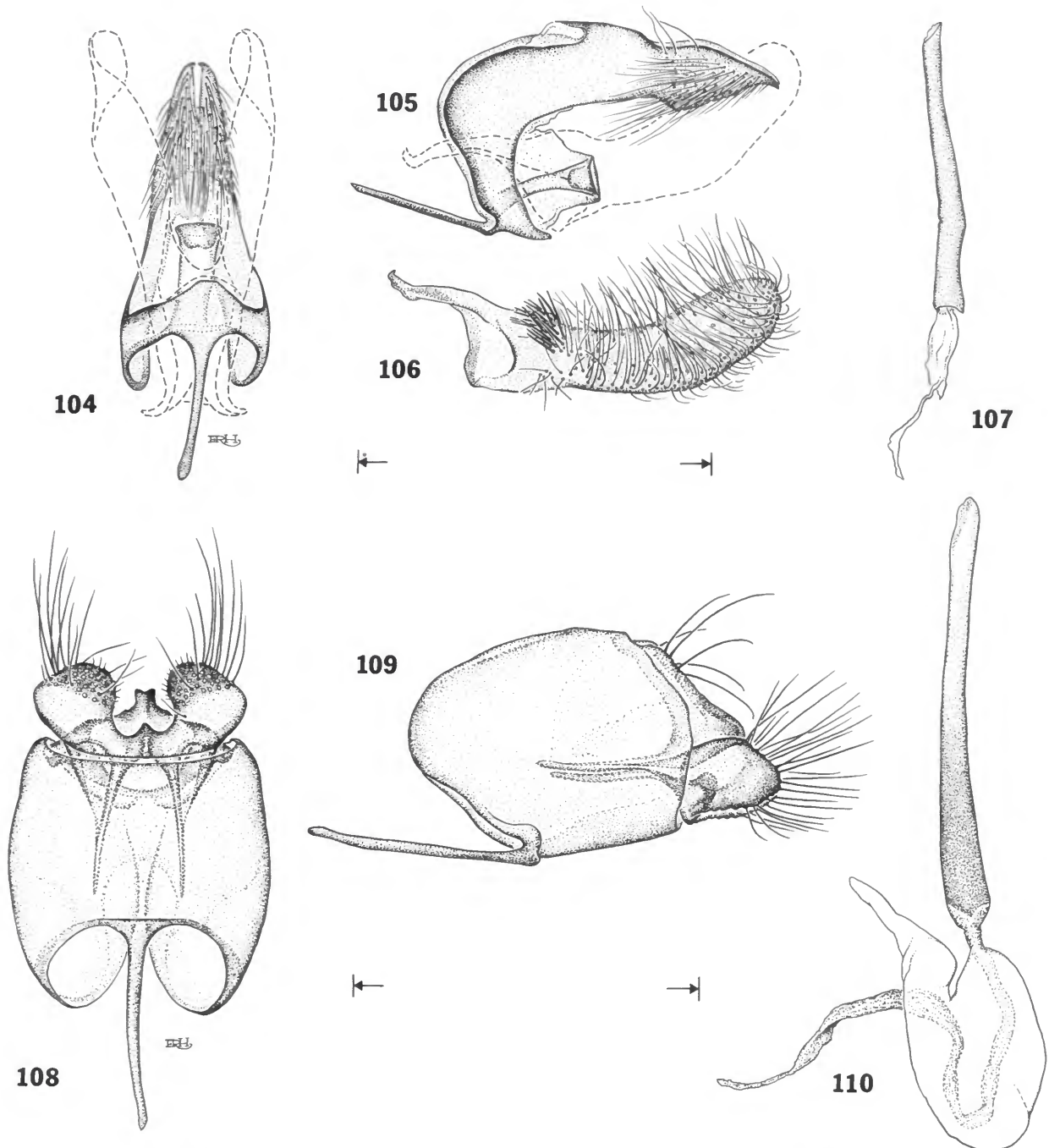
Only two pupal specimens (both females) were available for study. The female pupa may be characterized by the possession of a greatly enlarged frontal ridge (i.e., cocoon cutter), an anterior row of minute dorsal spines on segments III to VII, and a reduced, dorsal cremaster consisting of a pair of small spines and a more reduced pair of ventral spines.

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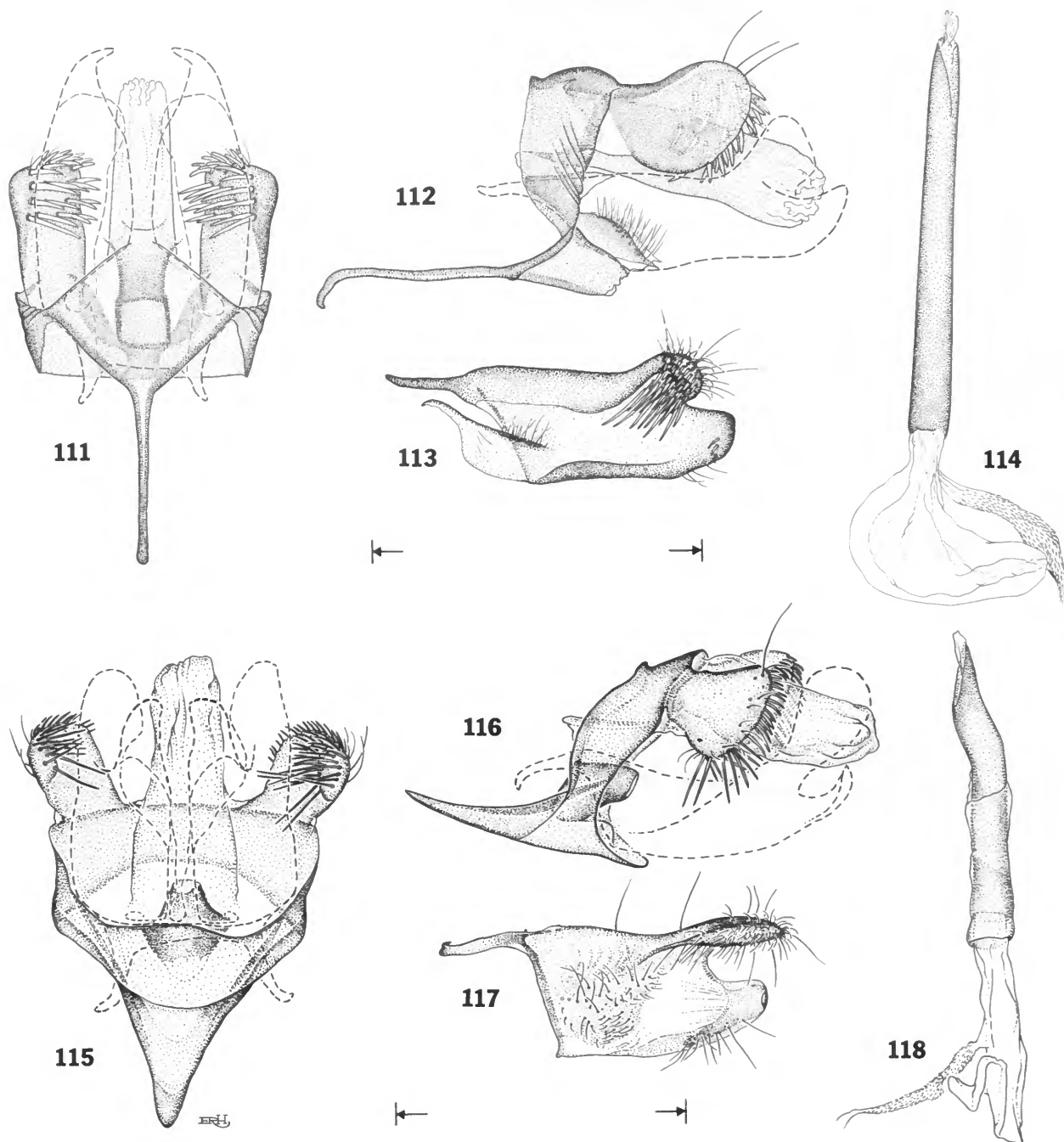
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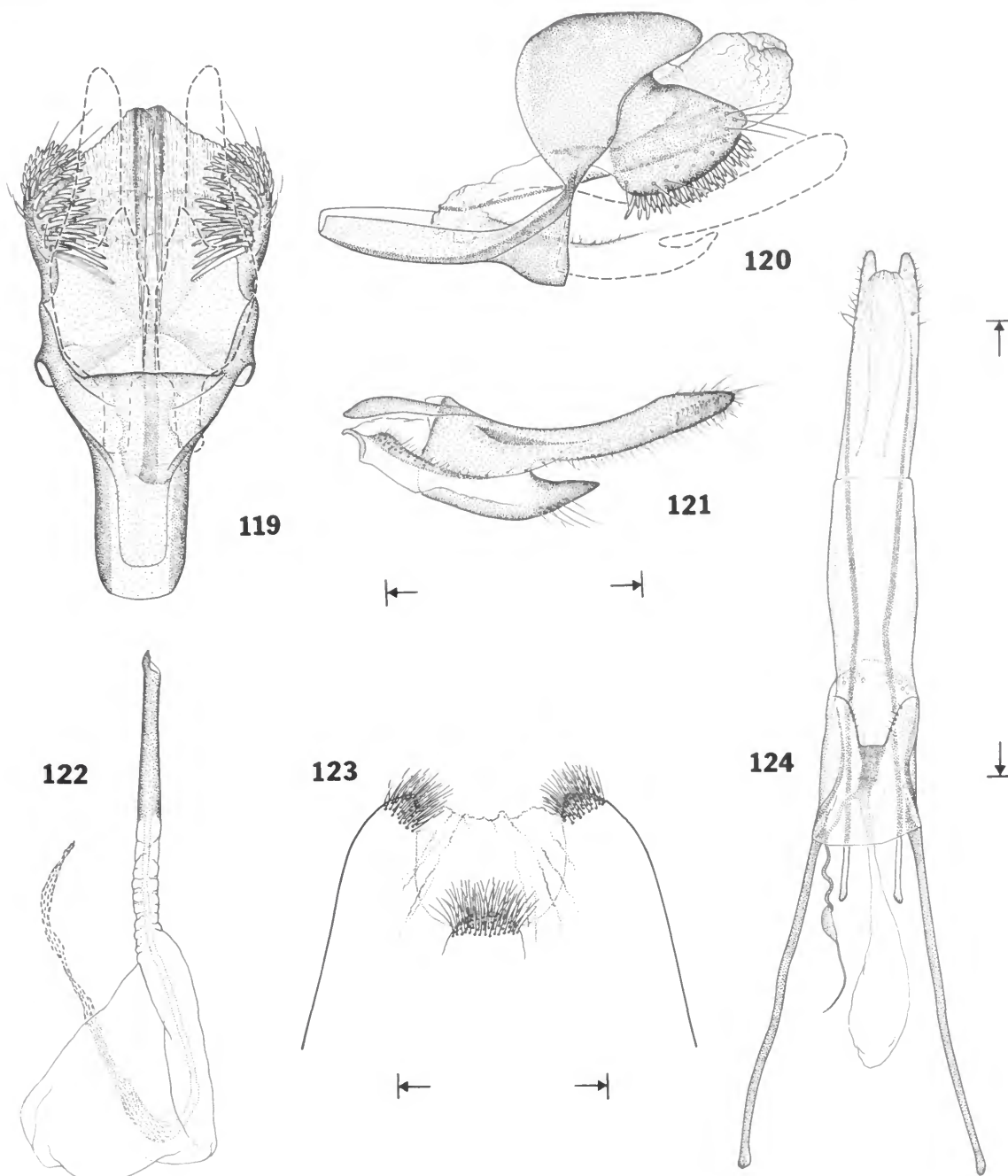
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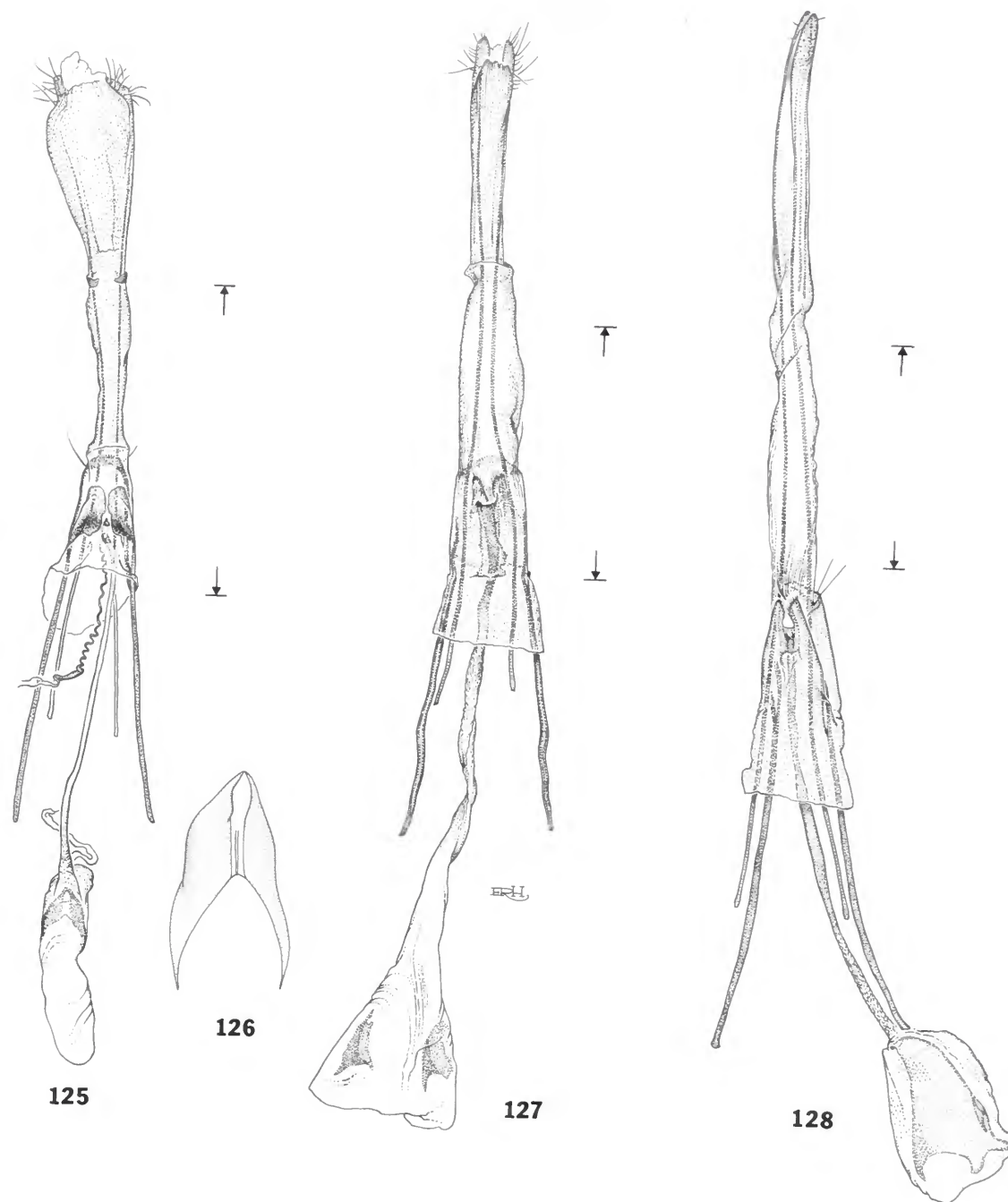
FIGURES 104-110.—Male genitalia: 104, *Phaeoses sabinella* Forbes, ventral view; 105, lateral view; 106, valva; 107, aedeagus (scale = 0.5 mm); 108, *Oinophila v-flava* (Haworth), ventral view; 109, lateral view; 110 aedeagus (scale = 0.3 mm).



FIGURES 111-118.—Male genitalia: 111, *Opogona arizonensis*, new species, ventral view; 112, lateral view; 113, valva; 114, aedeagus (scale = 0.5 mm); 115, *Opogona floridensis*, new species, ventral view; 116, lateral view; 117, valva; 118, aedeagus (scale = 0.5 mm).



FIGURES 119-124.—Male and female genitalia: 119, *Opogona omoscopia* (Meyrick), ventral view; 120, lateral view; 121, valva; 122, aedeagus (scale = 0.5 mm); 123, male, caudal margin of seventh abdominal segment (scale = 0.5 mm); 124, *Phaeoses sabinella* Forbes, female genitalia, ventral view (scale = 1.0 mm).



FIGURES 125–128.—Female genitalia, ventral view: 125, *Oinophila v-flava* (Haworth); 126, detail of signa; 127, *Opogona arizonensis*, new species; 128, *Opogona omoscopa* (Meyrick). (All scales = 1.0 mm).

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