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REVISION OF NEARCTIC GELECHIIDAE, I

THE LITA GROUP  
(LEPIDOPTERA: GELECHIOIDEA)

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Introduction

Busck's (1903) revision of the North American Gelechiidae is the only comprehensive treatment of the family for a major part of the Nearctic Region. Its usefulness is greatly limited by the large number of species described since 1903, the number of species described before that date but not correctly determined by Busck, the number of undescribed species, the inadequacy of descriptions based on maculation and venation for specific determination, and the recognition of the male and female genitalia as character systems with taxonomic value.

Subsequent to 1903 numerous gelechiids have been described by Busck, Braun, Walsingham, Kearfott, Meyrick, Forbes, Keifer, Freeman, Clarke, and Powell. Of these authors, only the last five have figured the genitalia of new species. In 1939 Busck published an extremely important work, "Restriction of the genus *Gelechia* . . .,"

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in which he defined several genera and associated species (formerly in *Gelechia*) with each genus. Only one or two representatives of each genus were figured; thus, most of the names, even though correctly associated generically, are not recognizable as species in that work. The result is that most of the described Nearctic gelechiids cannot be determined from the existing literature.

Failure to associate species with earlier names has led nearly all workers to describe and redescribe several species while leaving closely related, valid species unnamed. To avoid this situation I have examined nearly all of the existing type specimens and before completion of this series of papers plan to study all of them. Some types, particularly those of Chambers, are no longer extant. An attempt will be made to associate his names with species whenever possible.

This paper on the *Lita* group is the first of a series, the purpose of which is to make known the described and undescribed Nearctic gelechiids, to illustrate each species, and to present keys for identification of the genera and species. The most useful part of the work will appear last: the summary of major groups and keys to genera. However, until the fauna is moderately well known, generic definitions will continue to change.

Because of their small size, Microlepidoptera, in general, have been poorly collected; thus, distributional information usually is inadequate to give a complete picture of the geographic range of any species. One serious ramification of this point is that clinally variable character systems may remain unrecognized, and thus two or more populations may be given names when they represent discontinuous samples of a species rather than samples of two or more species. Variation appears to be the rule in the Lepidoptera and may occur in maculation, coloration, vestiture, size and shape of abdominal sclerites, width of antennal segments, or characters of the genitalia. However, suspected or anticipated variation cannot be confirmed on the basis of few specimens from widely scattered localities. Until much more diligent collecting is done for nearly all major Nearctic locality types, works of this nature are necessarily sketchy and subject to further revision.

As would be anticipated for a relatively large family, the larval habits are moderately diverse; but on the whole, living plant tissues are attacked. Some species are leaf or needle miners for all or part of the larval stage; many are leaf rollers or tiers; some are stem borers or gall formers; some feed in developing seed heads of composites; some are external feeders; and some feed on dried seeds. Normally, some shelter is present, whether it be a silk webbing, a gall, or a leaf roll. A few species, such as the pink bollworm [*Pectinophora*

*gossypiella* (Saunders)], the Angoumois grain moth [*Sitotroga cerealella* (Olivier)], the potato tuberworm [*Phthorimaea operculella* (Zeller)], and the lodgepole needle miner [*Coleotechnites milleri* (Busck)], are economically important. *Crasimorpha infuscata* Hodges is being studied for potential use as a biological control agent of a weed in Hawaii. The food plants and life histories of most species are unknown, and their study offers a challenge to anyone interested in rearing insects.

To insure relatively uniform handling and observation of specimens for study purposes, I have included the following comments: (1) Adult moths should be mounted and spread, and care should be taken so that the maculation is preserved and all parts are present. (2) Genitalic preparations should be made from the best specimens available so that later maculational comparisons can easily be made. (3) Age of the specimen must be considered when colors are observed. Several colors change over a period of time; thus, specimens that appear dark black or brown when relatively fresh become rather uniform yellow brown upon aging. Many gelechiids have a light dusting of blue green when they are alive; this color usually disappears within a few days after death. (4) The source of light available when the specimens are observed and the angle of light incidence on the scale surfaces will affect the appearance of colors. In this study the colors were seen under incandescent illumination (GE transparent bulb in an AO illuminator). (5) Maculation of most species is variable to some degree, and comparisons with illustrations and descriptions must be made with this fact in mind. (6) Both the male and the female genitalia can vary; so, several genitalic preparations may be necessary to learn the range of variation. (7) In many genera (e.g., *Recurvaria* Haworth, *Coleotechnites* Chambers, *Lita* Treitschke) the tegumen and vinculum should be opened so that they are approximately in the same plane rather than being in parallel planes. In most illustrations a ventral view of the male genitalia is shown to present characters of the juxta, gnathos, and uncus; however, a ventrolateral or lateral view of some species is also necessary to show the shape of the valvae. (8) Species of some genera, particularly *Dichomeris* Hübner, have the female frenulum fused so that the position of the retinaculum (medial rather than subcostal) or presence of the ovipositor must be observed to verify the sex. (9) Terminology of male genitalic structures, particularly of the valva, juxta, and vinculum, is apt to be somewhat misapplied because of fused parts. In some instances the valvae and vinculum appear to flow into one another rather than being separate. Reference to the illustrations should clarify any questions concerning the name used for a particular part.

In the systematic part of this paper I describe the maculation and color pattern of an individual specimen which usually is the one, or one of those, figured. Label data are presented verbatim with the exception that dates have been converted to a standard form.

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Abbreviations used for location of specimens are as follows:

- ANSP Academy of Natural Sciences, Philadelphia, Pennsylvania.  
AMNH American Museum of Natural History, New York, New York.  
AFB Collection of Annette F. Braun, Cincinnati, Ohio.  
BMNH British Museum (Natural History), London, England.  
CAS California Academy of Sciences, San Francisco, California.  
CNC Canadian National Collection, Ottawa, Canada.  
CM Carnegie Museum, Pittsburgh, Pennsylvania.  
CPK Collection of Charles P. Kimball, West Barnstable, Massachusetts.  
CNHM Chicago Natural History Museum, Chicago, Illinois.  
CU Cornell University, Ithaca, New York  
JGF Collection of John G. Franclemont, Ithaca, New York.  
LACM Los Angeles County Museum, Los Angeles, California.  
MOG Collection of Murray O. Glenn, Henry, Illinois.  
MCZ Museum of Comparative Zoology, Cambridge, Massachusetts.  
NSMS Nova Scotia Museum of Science, Halifax, Nova Scotia.  
USNM United States National Museum, Washington, D.C.  
UCB University of California, Berkeley, California.

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Work on this revision was started while I was a postdoctoral fellow with the National Science Foundation.

**TAXONOMIC TREATMENT.**—Suprageneric taxa are present in the Gelechiidae; however, their definition and relationships are in part connected with comparable units in the Gelechioidea. On the basis of material seen to date the Nearctic genera can be segregated into five groups; and for convenience the well-known genera, *Isophrictis* Meyrick, *Recurvaria*, *Gelechia* Hübner, *Dichomeris*, and *Anacamptis*

Curtis, are used to exemplify them. I am not certain what status should be assigned to these groups. For example, the *Isophrictis* group is as distinct from the other four as the timyrids are from the five; in other words, the two are equal in rank. Thus, I am inclined to treat each as a subfamily or tribe of the Gelechiidae. This problem becomes even more complex when other units are studied, e.g., the Xylorictidae, Copromorphidae, Oecophoridae, Momphidae, Symmocidae. After studying the venational and genitalic illustrations in Clarke's (1955, 1963, and 1965) work on the Meyrick types, the interrelationships among these so-called families become apparent—or put in another manner—the means of distinguishing one from another appear to be lacking. Several genera of xylorictids have oecophorid-type genitalia. The male genitalia of *Isophrictis* are more closely related to those of oecophorids than to the *Gelechia* type, but the wing shape and venation ally them with the gelechiids. In the same manner "*Hypatima*" *zesticopa* Meyrick (Gelechiidae) is close to *Meleonoma stomata* (Meyrick) (Oecophoridae). The question then must be asked: What criteria are valid for establishing relationships? Obviously, our present system does not truly reflect a natural system; but at this time I am in no position to rally adequate evidence to form the basis of a sound system. I do feel that we should be very cautious about proposing new taxa of family rank because this practice eventually would lead to a system wherein many small groups would be recognized but no interrelationships shown.

The *Lita* group, a member of the larger taxon exemplified by *Gelechia*, is closely related to *Gelechia* and *Gnorimoschema* Busck, and is arbitrarily separated from them by the presence of a terminal row (or rows) of caudally directed, modified setae on the uncus. In *Lita*, *Arla* Clarke, *Neodactylota* Busck, and *Eudactylota* Walsingham, these setae are scalariform; in *Friseria* Busck, *Sriferia*, new genus, *Rifseria*, new genus, *Schizovalva* Janse, *Parapsectris* Meyrick, *Araeovalva* Janse, and *Leuronoma* Meyrick, these setae are stout and usually long. *Neofriseria* Sattler is closely related to the *Lita* group, particularly in the structure of the valvae; but because the uncus lacks the terminal setae, it is excluded. A feature, apparently common to all of these genera and to *Gelechia* and *Gnorimoschema*, is the culcitula (new term proposed for the membranous pillowlike base of the gnathos); however, because I know the South African genera only through Janse's (1949–1964) diagnoses and illustrations, I cannot be certain whether this structure is always present.

The geographic distribution of the *Lita* group may be summarized as follows: *Lita*, 1 Holarctic, 1 Palearctic, and 20 Nearctic species; *Arla*, *Neodactylota*, *Eudactylota*, *Sriferia*, *Rifseria*, and *Friseria* are Nearctic; and *Parapsectris*, *Araeovalva*, *Leuronoma*, and *Schizovalva* are

Ethiopian (southern Africa). The South African genera are closely allied with *Friseria*. Sattler (1960) has shown that none of the Palearctic species of the *Gelechia* complex are referable to the *Lita* group with the exception of two species of *Lita*. Also, no Indo-Australian or Neotropical gelechiid examined to date is a member of the *Lita* group.

### Key to the Genera of the *Lita* Group

1. Valva consisting of a simple lobe . . . . . 2  
Valva consisting of a compound lobe or two or more lobes . . . . . 4
2. Valva very broad at base, apex narrow . . . . . *Araeovalva* Janse  
Valva linear, slightly expanded apically . . . . . 3
3. Lobes of juxta separate (figs. 100, 103) . . . . . *Eudactylota* Walsingham  
Lobes of juxta connected (at least by membrane) nearly to apex (fig. 66).  
*Lita* Treitschke
4. Aedeagus linear, length more than 10 times maximum width . . *Arla* Clarke  
Aedeagus stout or with expanded base . . . . . 5
5. Caudal setae of uncus scalariform . . . . . *Neodactylota* Busck  
Caudal setae of uncus not flattened . . . . . 6
6. Valva consisting of two simple lobes, each linear and somewhat expanded distally . . . . . 7  
Valva consisting of two or more lobes, lobes complex or saccal lobe very broad basally . . . . . 8
7. Aedeagus broad basally, very slender on distal three-fourths; costal lobe of valva shorter than medial lobe . . . . . *Rifseria*, new genus  
Aedeagus stout, narrowest beyond middle, apex somewhat expanded; costal lobe of valva longer than medial lobe . . . . . *Sriferia*, new genus
8. Costal lobe of valva slender, simple; saccal lobe very broad basally, becoming narrow, then relatively slender to apex . . . . . *Schizovalva* Janse  
Costal lobe of valva with medial or basal projections . . . . . 9
9. Uncus emarginate medially . . . . . *Leuronoma* Meyrick  
Uncus even or produced medially . . . . . 10
10. Hook of gnathos curved before one half, then straight and gradually tapering to apex . . . . . *Parapsectris* Meyrick  
Hook of gnathos curved at or beyond middle, abruptly turned just before apex . . . . . *Friseria* Busck

### *Lita* Treitschke

*Lita* Treitschke, 1833, Die Schmetterlinge Europas, vol. 9 (pt. 2), p. 76.

Type-species: *Tinea virgella* Thunberg, 1794 (= *Lita zebrella* Treitschke, 1833), designated by Walsingham, 1915, in Godman and Salvin, Biologia Centrali-Americana, vol. 42 (Lepidoptera-Heterocera, vol. 4), p. 410.

Head: smooth scaled; frontovertical processes present or absent; tongue moderate, scaled on basal one-third to one-half; labial palpus recurved, second and third segments slender, subequal in length, a short tuft on anterior surface of second segment; antenna two-thirds

to four-fifths length of forewing, simple. Forewing: broadly lanceolate; 12 veins present; 2 from cell at three-fourths length of cell; 3 and 4 distant to short stalked; 7 and 8 stalked. Hindwing: subquadrate, outer margin gradually moving to apex; 8 veins present; 3 and 4 connate or stalked; 5 closer to 4 than to 6 basally, curved upward from origin; 6 and 7 separate. Male genitalia: vinculum moderately broad; saccus developed; juxta fused basally with vinculum, lobes setate apically; valva linear, simple, slightly expanded apically; aedeagus moderately slender to stout, a linear, heavily sclerotized flange often present; manica with numerous short spicules near juncture with aedeagus; tegumen long; uncus broad, short with an apical row of broad scales; gnathos present, a strong hook; culcitula present. Female genitalia: corpus bursae membranous with numerous spinules; two signa present; an incomplete, sclerotized ring between ostium bursae and inception of ductus seminalis; ostium bursae a simple opening at base of eighth sternum, no associated sclerotized plates present; apophyses anteriores shorter than apophyses posteriores.

*Lita* species form an extremely compact group based upon the sum of all examined characters. Two basic wing patterns occur: one with a series of lines and/or dashes paralleling the veins, the other with spots, sometimes forming bands, at the middle and apex of the cell and occasionally with an oblique fascia at the base of the forewing. One species has both types within its range of variation. Frontal modifications in the form of raised prominences occur in eight species. When fully developed, three elements are present, a dorsal protuberance rising from the vertex, a medial protuberance rising from the frontoclypeus, and a ventral, low-margined, elliptical depression. The dorsal and medial protuberances become partially or wholly fused in some species. The male genitalia are nearly homogeneous among the species: aedeagal differences serve to distinguish groups of species. The female genitalia are also relatively uniform; however, the relative degree of sclerotization and curvature of the apophyses anteriores and the shape of the signa show minor differences. In *variabilis* (Busck) variation in the relative length of the ductus and corpus bursae occurs; thus, variation may be anticipated in other species. For males the sternum and tergum of the eighth abdominal segment differ in the shape of the anterior and posterior margins. Specific variation occurs, but many species can be defined by these characters. The relative width of antennal segments, particularly in males, and the width and shape of the sensory areas are diagnostic characters for some species. In others both characters seem to vary.

The group of species with a striate wing pattern forms, in part, a most confusing complex for satisfactory morphological analysis.

Unfortunately, the food plant is known for only three species of the complex, and in most instances few representatives of any one species are present in collections. Moreover, most specimens are from scattered localities; moderate series are available for only two species; and, in each of these two series variation seems to be relatively limited.

The species involved are *jubata*, new species, *nefrens*, new species, *princeps*, *recens*, new species, *rectistrigella*, *sironae*, new species, *thaliae*, new species, and *variabilis*. Within the series of *variabilis* in the USNM collection are specimens with the same maculation as *rectistrigella*, but which were not so identified. Also some of the specimens that were in the determined series of *rectistrigella* have been referred elsewhere. This is not to say that some species of the *variabilis* group do not have constant maculational differences. *L. princeps*, *recens*, and *sironae* usually can be identified on the basis of maculation alone.

Representatives of some populations, here designated as species, may prove to be races of variable species; however, the morphology of a limited number of specimens leads me to segregate several entities. Busck (1939) resurrected Treitschke's genus *Lita* and defined it using characters of the male and female genitalia. He included ten species of which *diversella* (Busck) and *prorepta* (Meyrick) are referable to *Arla* and *Sriferia*, new genus, respectively. *Lita crocipunctella* Walsingham is clearly a species of *Chionodes* and so is transferred. Thirteen new species are described in this paper, and *princeps* (Busck) is transferred from *Gnorimoschema* Busck; thus, the known world fauna consists of 22 species. *Lita solutella* (Zeller) is Palearctic, *virgella* (Thunberg) is Holarctic, and the remaining species are Nearctic, mainly western.

#### Key to Species of *Lita*

1. Frons and vertex produced . . . . . 2  
Frons and vertex smooth, not produced . . . . . 9
2. Distal portion of dorsal frontal protuberance with narrowly elliptical cross section (fig. 64) . . . . . **jubata**, new species  
Distal portion of dorsal frontal protuberance with broadly elliptical or circular cross section . . . . . 3
3. Forewing pattern a series of longitudinal lines (figs. 33, 34).  
**nefrens**, new species  
Forewing pattern with transverse or oblique elements (figs. 8, 15) . . . 4
4. Forewing with a dorsal, transverse band (or two spots combining to form band) at one-third (figs. 15, 17) . . . . . 5  
Forewing lacking a dorsal, transverse band at one-third . . . . . 6
5. Dorsal element of frontal protuberance tapering to apex; ventral element raised and partially fused with dorsal one (fig. 65) . . **puertella** (Busck)  
Dorsal element of frontal protuberance slightly expanded apically; ventral element low (fig. 59) . . . . . **deola**, new species
6. Margin of dorsal element of frontal protuberance heavily sclerotized (figs. 61, 62) . . . . . 7



- Margin of dorsal element of frontal protuberance not sharply defined (fig. 58); forewing with a faint oblique band running from costa at one-sixth to dorsum at one-fourth (fig. 9) . . . . . **incieur**, new species
7. Forewing with costa pale buff, strongly contrasting with dorsum (fig. 35); dorsal element of frontal protuberance broad to apex (fig. 59).  
**invariabilis** (Kearfott)
- Forewing with costa generally concolorous with dorsum (fig. 14); dorsal element of frontal protuberance tapering to apex (fig. 62) . . . . . 8
8. Dorsal element of frontal protuberance longest on dorsal margin, ventral portion open to ventral element (fig. 62) . . . . . **geniata**, new species
- Dorsal element of frontal protuberance longest on ventral margin, ventral margin present (fig. 61) . . . . . **barnesiella** (Busck)
9. Forewing pattern a series of lines parallel to veins (fig. 24) . . . . . 18
- Forewing pattern a series of dots and/or transverse fasciae (figs. 1, 20) . . . . . 10
10. A transverse bar (formed by coalescing of two spots) in cell at one-third length of forewing (fig. 18), remainder of wing without prominent markings . . . . . **dialis**, new species
- Forewing without a bar at one-third, if present, other dark marks prominent . . . . . 11
11. Forewing with an oblique band running from costa near base to dorsum at one-fourth (fig. 1) . . . . . **virgella** (Thunberg)
- Forewing lacking such a complete band, occasionally with a band from middle of wing to dorsum . . . . . 12
12. Forewing with a faint dark patch basally, outer third often with veins dark (fig. 19) . . . . . **pagella**, new species
- Forewing lacking basal dark patch, outer third with scales on veins concolorous with those on membrane . . . . . 13
13. Palearctic species . . . . . **solutella** (Zeller)
- Nearctic species . . . . . 14
14. Forewing with a faint oblique line from costa (or near costa) at base to middle of wing at one-fifth (fig. 26) . . . . . **thaliae**, new species, in part
- Forewing lacking basal oblique line . . . . . 15
15. Forewing usually with three well-defined dark spots in cell (fig. 28).  
**texanella** (Chambers)
- Forewing lacking distinct spots in cell (fig. 22) . . . . . 16
16. Antenna unicolorous cream to cream white basally . . . . . 17
- Antenna brown and white basally . . . . . **maenadis**, new species
17. Inner surface of second segment of labial palpus gray buff with at least a few brown or orange-brown scales; apex of valva globose.  
**obnubila**, new species
- Inner surface of second segment of labial palpus white; apex of valva ellipsoidal . . . . . **veledae**, new species
18. Forewing with black dashes in cell confluent, usually strongly contrasting with remainder of wing (fig. 31) . . . . . **princeps** (Busck)
- Forewing with two separate black dashes in cell, or none present . . . . . 19
19. Male antenna with sensory areas extending to dorsal surface of basal segments; female antenna with ventral sensory area bordered anteriorly with dark brown (darker than scales separating sensory areas).  
**recens**, new species
- Male antenna with sensory areas not extending to dorsal surface, rows of scales separating sensory areas ochreous; female antenna with unicolorous anterior borders . . . . . 20

20. Vein 3 of forewing from before end of cell, 3 and 4 moderately distant; dorsal margin tapering gradually to apex, dorsal and costal margins slightly convex before apex; flange of aedeagus without a well-defined apical area.  
21  
Vein 3 of forewing usually from end of cell, 3 and 4 connate or short stalked; dorsal margin slightly angled at end of 2, apex relatively acute; free portion of sclerotized flange of aedeagus with relatively parallel edges, apex blunt . . . . . *variabilis* (Busck)
21. Smaller species (forewing length: average 7.9 mm, range 7.0–8.5 mm); forewing with a pale yellow to brownish-orange subcostal streak from near base to one-third, a strong black dash on dorsal margin of cell from near base of two-fifths and another on costal margin of cell from two-fifths to three-fifths (fig. 25) . . . . . *sironae*, new species  
Larger species (forewing length: average 9.4 mm, range 8.2–11.5 mm); forewing usually lacking pale subcostal streak, many specimens lack the black dashes bordering the cell . . . . . 22
22. Forewing red brown with dark brown to brown black streaks (fig. 27).  
*thaliae*, new species, in part  
Forewing gray brown, buff brown, or brown, usually not strong red brown; anterior margin of eighth tergum more or less smoothly curved (fig. 24).  
*rectistrigella* (Barnes and Busck)

*Lita virgella* (Thunberg)

FIGURES 1, 66, 136, 169, 170

- Tinea virgella* Thunberg, 1794, *Dissertatio entomologica sistens insecta Suecica*, p. 92.  
*Lita virgella*.—Walsingham, 1915, in Godman and Salvin, *Biologia Centrali-Americana*, vol. 42 (Lepidoptera-Heterocera, vol. 4), p. 410.  
*Anacamptis longicornis* Curtis, 1827, *British Ent.*, vol. 4, p. 189.  
*Tinea histrionella* Geyer, 1832, *Samml. Europäischer Schmett.*, Tineae, pl. 70.  
*Lita zebrella* Treitschke, 1833, *Die Schmett. Europa*, vol. 9, pt. 2, p. 82.  
*Gelechia alternella* Kearfott, 1908, *Journ. New York Ent. Soc.*, vol. 16, p. 185.  
*Gelechia petulans* Braun, 1925, *Canadian Ent.*, vol. 57, p. 125.

Maculation: as in figure 1. Head: anterior surface of tongue covered with white and pale brown scales from base to one-third length; maxillary palpus white, sometimes with dusting of brown, porrect or curved over base of tongue; first segment of labial palpus white with ochreous stripe on outer surface, second segment white with dusting of brown scales, becoming more dense distally, third segment brown with dusting of white scales; scape of antenna brown heavily dusted with white, dorsal surface of shaft with segments brown on basal half, brown mixed with buff on distal half, ventral surface with more buff scales basally, brown distally; frons with a series of whitish scales from margin of eye to base of tongue, scales light brown and pale buff medially; vertex and occiput with scales light to medium brown apically, paler basally. Thorax: uneven brown. Forewing: dark brown with varying amounts of white defining pattern, distal third of wing often suffused with ochreous scales, cilia fuscous, Hindwing:

membrane and cilia fuscous. Prothoracic leg: coxa brown mixed with white on mesal surface, white on outer surface; femur white mixed with brown, mesal surface darker than lateral; tibia brown with white scales basally and apically; tarsus brown, white on base and apex of first segment and apex of second. Mesothoracic leg: similar to prothoracic leg, tibia with more white scales. Metathoracic leg: coxa and femur white with some brown scales; tibia brown laterally with dusting of white basally, a white fascia at one-half, white apically, dorsal tuft white to pale buff; tarsus white with apices of first through third segments white, base of first segment white. Abdomen: brown and buff dorsally, mainly white ventrally. Alar expanse: 12.5–17.0 mm. Male genitalia: as in figure 66 (RWH slide 2563). Female genitalia: as in figure 136 (RWH slide 2555).

Food plant: *Calluna*, *Erica*, *Vaccinium* (Ericaceae). These are European records. *L. virgella* has not been reared in the Nearctic Region.

Types: *virgella*, lectotype, present designation, male, bearing following label: lectotype, male, *Tinea virgella* Thunberg, by R. W. Hodges, in Thunberg Collection, Uppsala, Sweden; *longicornis*, lectotype, present designation, female, bearing following labels: female genitalia slide 3586 R. W. Hodges, lectotype, female, *Anacampsis longicornis* Curtis, by R. W. Hodges 1965, National Museum of Victoria, Melbourne, Australia; *histrionella*, lost; *zebrilla*, Hungarian National Museum, Budapest, Hungary; *alternella*, female, USNM; *petulans*, male, CNC.

#### Specimens examined:

UNITED STATES: ALASKA: White Horse, 2 ♂, 2 ♀, May 30, 31, 1916, USNM. CALIFORNIA: Deer Park Springs, Lake Tahoe, 1 ♀, June 24–30, LACM; Mineral King, Tulare Co., 1 ♀, July 8–15, CAS; Mt. Shasta, Siskiyou Co., 6 ♂, 2 ♀, Aug. 2 through Sept. 1, 1871, Walsingham, BMNH; Mt. Shasta, 7000 ft., 1 ♀, July 7–24, LACM; Mt. Shasta, 1 ♀, July 16–23, USNM; Panther Meadow, Mt. Shasta, 3 ♂, July 14, 1962, J. Powell, UCB; Ski Bowl, 14 road mi. E Shasta City, 7800 ft., Siskiyou Co., 2 ♂, 3 ♀, July 23, 1962, Rentz and MacNeill, CAS. COLORADO: Chimney Gulch, Golden, 4 ♂, Apr. 14, 1908, Oslar, USNM; Denver, S. Park, 1 ♀, USNM; Dream Lake, Rocky Mt. N. P., 1 ♂, Aug. 1, 1929, A. F. Braun, AFB; Hall Valley, Arctic Alpine zone, 11500–12500 ft., Park Co., 1 ♂, July 13–15, 1935, A. B. Klots, AMNH; Loveland, 1 ♂, July 1891, Smith, BMNH. MONTANA: Glacier Nat. Park, 1 ♀, July 28, 1928, A. F. Braun, AFB. OREGON: Red Top Mountain, 6000 ft., Klamath Co., 1 ♂, 1 ♀, July 7, 1955, J. F. G. Clarke, USNM; Skyline Ridge, Mt. Baker District, 1 ♂, Aug. 27, 1932, J. F. Clarke, CU; Strawberry Lake, Malheur Nat. Forest, 7000 ft., 1 ♀, July 13, 1955, J. F. G. Clarke, USNM. UTAH: Mirror Lake, Uintah Mts., Duchesne Co., 1 ♂, July 12, 1936, Klots, AMNH. WASHINGTON: Marten Lake, Whatcom Co., 1 ♀, Aug. 15, 1931, J. F. G. Clarke, USNM; Skyline Ridge, Mt. Baker Dist., 5 ♂, 1 ♀, Aug. 25, 27, 1932, J. F. G. Clarke, USNM; Slate Peak, 7200 ft., Okanogan Co., 5 ♂, July 28, 1962, J. F. G. Clarke, USNM; Table Mt., Whatcom Co., 2 ♂, Aug. 28, 1927, J. F. G. Clarke, USNM. WYOMING: University of

Wyoming Campus, Snowy Range, 10000-10500 ft., Albany Co., 9♂, July 17-23, 1935, A. B. Klots, AMNH.

CANADA: ALBERTA: Laggan, 4♂, 4♀, July 4, 10, 1925, O. Bryant, MCZ, USNM; Moraine Lake, 1♂, Aug. 6, 1923, J. McDunnough, AFB; Nordegg, 3♂, 5♀, June 8-19, 1921, J. McDunnough, CNC; Rocky Mountain House, 2♀, June 7, 1921, J. McDunnough, CNC; Shovel Pass, Jasper Park, 1♀, July 1, 1915, CU; Waterton Lakes, 1♀, June 20, 1923, J. McDunnough, CNC; same locality, 1♂, 1♀, May 29, 1922, C. H. Young, CNC. BRITISH COLUMBIA: Clinton, 1♀, June 14, 1938, J. K. Jacob, CNC; Duncans, Vancouver Is., 3♂, 5♀, May 18 through June, Henham, CNC, LACM, USNM; Hedley, 1♂, 1♀, July 19, 1923, C. B. Garrett, CNC; Kathleen Mt., Peachland, 2♂, May 23, 1936, A. N. Gartrell, CNC; Mt. Lolo, Kamloops, 2♂, May 31 and July 2, 1938, G. S. Walley, CNC; Paradise, 4♂, July 14, 1923, W. B. Anderson, CNC; Quamicham Lake, Vancouver Is., 1♂, May 10, 1908, CNC; Royal Oak, 1♀, May 20, 1917, R. C. Treherne, CNC; Sahltlam, 5♂, May 18, 1925, E. H. Blackmoore, CNC; Wellington, 1♂, G. W. Taylor, USNM. LABRADOR: Goose Bay, 1♀, June 17, 1948, W. W. Judd, CNC. MANITOBA: Aweme, 1♂, 6♀, May 15 through 28, N. Criddle, CNC, USNM; Riding Mt. Pk., 5♂, 3♀, June 2-5, 1938, J. McDunnough, CNC. NEW BRUNSWICK: Waweig, 2♂, June 6, 1938, T. N. Freeman, CNC. NORTHWEST TERRITORIES: Aklavik, 1♂, June 27, 1931, Bryant, USNM; Saw Mill Bay, 20♂, 5♀, June 12, 1948, D. F. Hardwick, CNC, USNM. NOVA SCOTIA: Mt. Uniacke, 1♂, June 8, 1950, D. C. Ferguson (McDunnough slide, Gel. 2s), NSMS; Bog, Prospect Road, Halifax, 1♀, June 4, 1954, D. C. Ferguson, NSMS; West Dover, Halifax, 1♂, June 16, 1954, D. C. Ferguson, NSMS. ONTARIO: Geraldton, 1♀, June 6, 1956, J. C. E. Riotte, AMNH; Smokey Falls, Mattagami River, 1♂, June 13, 1934, G. S. Walley, CNC. QUEBEC: Mare du Sault, Laurentides Park, 2550 ft., 1♀, July 10, 1954, Klots and Rindge, AMNH; Thunder River, 1♀, June 18, 1930, W. J. Brown, CNC. White River, 1♂, June 24, 1907, Knab, USNM. YUKON TERRITORY: Rampart House, 1♂, May 31, 1951, C. C. Loan, CNC.

Discussion: The maculation of *virgella* is highly variable, with the amount of white and intensity of the dark brown appearing somewhat different in each specimen. However, as a variable species, the maculation is still distinct from the other species of *Lita*. The pattern of dark brown bars separated by lighter areas is unique in the genus.

*Lita solutella* (Zeller)

FIGURES 2, 67, 143, 171, 172

*Gelechia solutella* Zeller, 1839, Isis von Oken, p. 199.

*Lita solutella*.—Busck, 1929, Proc. U.S. Nat. Mus., vol. 86, p. 573.

*Gelechia nigrobipunctatella* Lucas, 1932, Bull. Soc. Ent. France, vol. 37, p. 168.

Food plant: *Sarothamnus* (*Spartium*) *scoparius* L. and *Genista* spp.

Types: *solutella*, BMNH; *nigrobipunctatella*, male, Muséum National d'Histoire Naturelle, Paris.

Distribution: Austria, Bulgaria, England, France, Greece, Hungary, Italy, Poland, Spain, Syria, and Turkey.

Discussion: *L. solutella* is included in this treatment of the Nearctic fauna to complete the picture of the genus inasmuch as it is the only

extralimital species. It is an extremely variable species in maculation; some specimens are immaculate; others are well marked as is shown in figure 2.

*Lita variabilis* (Busck)

Figures 3-7, 68-70, 146, 151, 173, 174

*Gelechia variabilis* Busck, 1903, Proc. U.S. Nat. Mus., vol. 25, p. 871.

*Lita variabilis*.—Busck, 1939, Proc. U.S. Nat. Mus., vol. 86, p. 573.

Maculation: as in figures 3-7. Head: base of tongue white medially, brown laterally and distally; maxillary palpus white to buff white, folded over base of tongue; labial palpus with first segment pale brown, second segment white with scattered pale brown scales, third segment slightly darker than second with more brown scales; scape of antenna ochreous brown, shaft ochreous brown with more yellow basally than distally; frons, vertex, and occiput pale buff brown, apices of scales slightly darker buff brown. Thorax and forewing: yellow brown, scales with dark medial areas, dark areas of wing black or dark brown, some red brown streaks present; cilia paler than wing, first scale row black tipped, outer scale rows pale brown tipped. Hindwing: fuscous, veins lightly outlined in pale reddish orange, cilia buff. Prothoracic and mesothoracic legs: coxa and femur whitish laterally, brown anteromedially, tibia and tarsus brown, apices slightly pale. Metathoracic leg: coxa and femur whitish with some brown scales; tibia buff gray, apices of scales pale brown, dorsal tuft pale buff; tarsus brown, apices of first, second, and third segments off white. Abdomen: terga ochreous, apices of terga pale, terga 3-8 darker than one and two; first two sterna white, caudal ones gray brown. Alar expanse: 14.5-22.0 mm. Male genitalia: as in figures 68-70 (RWH slides 2572, 2588, and 2614). Aedeagus relatively linear; heavily sclerotized flange with broad apical extension at right angle with aedeagus. Female genitalia: as in figures 146 and 151 (RWH slides 2735 and 2744).

Food plant: Unknown.

Type: Male, USNM.

Specimens examined:

UNITED STATES: ARIZONA: Fort Valley, 7350 ft., 7½ mi. NW Flagstaff, Coconino Co., 24♂, 2♀, Aug. 10-Sept. 6, 1961, R. W. Hodges (RWH slide 2588), CU, USNM; Hart Prairie, 8500 ft., 10 mi. NNW Flagstaff, Coconino Co., 79♂, 18♀, Aug. 11-Sept. 6, 1961, R. W. Hodges (RWH slides 2259, 2584-7, 2589, 2744, and 2745), CU, USNM; Paradise, Cochise Co., 2♂, Oct. 1-7, USNM; Prescott, 1♂, Sept. 24-30, USNM; Redington, 1♂, USNM; White Mountains near McNary, Apache Co., 1♂, Sept. 15-30, 1925, O. C. Poling, USNM. CALIFORNIA: Azusa, Los Angeles Co., 1♂, 2♀, Oct. 12, 1939, Lloyd Martin, LACM; Barton Flats, San Bernardino Co., 1♂, Oct. 1, 1945, Sperry, AMNH; Cedarville, 3♂, Sept. 14, 1933, Jones (AB slide Oct. 10, 1933), USNM;

Ibanpah Mts., San Bernardino Co., 3♂, 1♀, Oct. 5, 1940, Henne and Comstock, LACM; Jacumba, 4♂, Sept. 28–Oct. 1, 1924, Piazza (RWH slide 2917), LACM; USNM; La Puerta Valley, 8♂, Sept. (RWH slide 2921), USNM; Lone Mtn., San Francisco Co., 3♂, Oct. 3–10, 1909, F. X. Williams, CAS; Monachee Meadows, Tulare Co., 8000 ft., 15♂, 3♀, Aug. 8–23 (RWH slides 3151, 3157, and 3158), USNM; near Mono Pass, NW Inyo Co., 12000 ft., 1♂, Aug. 7, 1959, C. D. MacNeill, CAS; Mt. Shasta, Siskiyou Co., 1♂, Aug. 1871, Walsingham, BMNH; Mt. Shasta, 1♀, Aug. 19, 1939, E. C. Johnston, CPK; Mt Shasta City, Nevada Co., 1♂, September (RWH slide 2615), USNM; Siskiyou Co., 1♂, Aug. 22, 1958, J. Powell, UCB; Placer Co., 3♂, 8♀, August–September (RWH slides 2628 and 2920; AB slide Apr. 3, 1931; RWH wing slide 53), AMNH, LACM MCZ, USNM; Rock Creek, 1 mi. SW Tom's Place, Mono Co., 2♂, Aug. 9, 1961 and Sept. 6, 1960, MacNeill, Rentz, and Lundgren, CAS; Ruby Lake, NW Inyo Co., 11500 ft., 2♀, Aug. 13, 1957, MacNeill and Powell, CAS, UCB; Mouth San Gabriel Canyon, Los Angeles Co., 2♂, Nov. 10, 1945, C. Henne, USNM; Upper Santa Ana River, San Bernardino Co., 3♂, 1♀, Sept. 7–14, Sperry and Melander (RWH slide 2922), AMNH, USNM; Silver Lake, Amador Co., 2♂, Aug. 21, 1936, E. C. Johnston (RWH slides 2572, and 3150), CNC, CPK; Twin Lakes, Alpine Co., 3♂, Aug. 21, 1938, E. C. Johnston (RWH slide 2614), CNC, CPK, USNM. COLORADO: no locality, 7♂ (RWH slides 3430 and 3431; AB slide Oct. 16, 1933), LACM, USNM; no locality, 7000 ft., 1♂ (RWH slide 3442), BMNH; no locality, 7000 ft., 3♂, August 1891, BMNH; no locality, 5000 ft., 4♂, July and August 1891, BMNH; Bear Creek, Morrison, 1♂, Oslar, USNM; Boulder, 1♂, Cockerell, USNM; Capitol City, Hinsdale Co., 3♂, July 25, 26, 1936, Klots, AMNH; Cripple Creek, 1♂, Sept. 3, 1899, USNM; Denver, 6♂, 1♀, Oslar (RWH slide 2924; AB slide Oct. 16, 1933), LACM, USNM; Durango, 1♂, Sept. 26, 1939, E. C. Johnston (RWH slide 2581), CNC; Estes Park, 1♂, Aug. 12, Mrs. Dyar, USNM; Glenwood Springs, 9♂, 3♀, August–September (RWH slide 2923), MCZ, USNM; Morrison, 1♂, August 1891, BMNH; Rocky Mtn. Natl. Park, 1♂, Aug. 15, 1937, Klots, AMNH; Silverton, 2♂, Aug. 8–15, *ex larva*, USNM; South Park, 2♂, Aug. 19, 21, 1905, USNM. CONNECTICUT: Putnam, Windham Co., 1♀, Sept. 5–7, 1961, A. B. Klots, AMNH. MASSACHUSETTS: Barnstable, 6♂, Sept. 5–12, C. P. Kimball (JFGC slide 10167). MONTANA: Boulder, 1♂, 1892, T. Ulke, USNM; Bozeman, 1♂, Aug. 20, 1928, J. McDunnough, CNC; Richel Lodge, 1♂, Aug. 20, 1939, Sperry, USNM. NEVADA: Mt. Magruder, Esmeralda Co., 1♀, Sept. 19, 1939, G. Willett, LACM. NEW MEXICO: Hell Canyon, 1♂, Sept. 16, 1916, C. Heinrich, USNM; Indian Spring, 1♀, Sept. 9, 1916, C. Heinrich (RWH slide 2735), USNM; Mescalero, 7000 ft., 1♂, Oct. 27, BMNH; Therma, 3♂, Aug. 12, 1932, AMNH. UTAH: Buckboard Flap Camp, 7 mi. W Monticello, 8800 ft., San Juan Co., 1♂, July 28, 1960, Rindge (RWH slide 2882), AMNH. Dividend, 2♂, Sept. 26, 28, BMNH; Eureka, 8♂, Aug. 20–27, 1911, Tom Spalding (RWH slide 2918), LACM, USNM; Stockton, 1♂, September 1908, BMNH. WASHINGTON: Kushi Canyon, Yakima Co., 13♂, 1♀, Aug. 20–Sept. 17, E. C. Johnston (RWH slide 2736), CNC; Satus Creek, Yakima Co., 6♂, 1♀, Aug. 19 and Sept. 19, 1949, E. C. Johnston (RWH slides 2632 and 2633), CNC, USNM. WYOMING: Green River L., Wind River Range, 1♂, July 24–Aug. 7, 1935, A. B. Klots, AMNH; Sacajawea Camp, 24 mi. W. Big Piney, 8400 ft., Sublette Co., 2♂, Aug. 2, 1959, Rindge, AMNH; Sheepeater Cliffs, Yellowstone N. P., 1♂, Aug. 17, 1962, Spangler (RWH slide 2640), USNM.

CANADA: BRITISH COLUMBIA: Kamloops, 1♂, Sept. 1, 1918, BMNH; Peachland, 2♂, Aug. 21, 22, 1909, J. B. Wallis, USNM. MANITOBA: Aweme,

9 ♂, 2 ♀, Aug. 14–29, N. Criddle (RWH slides 2748, 2749, 3434–3436; RWH wing slide 56), CNC, USNM; Beulah, 4 ♂, Aug. 15, (RWH slides 2625 and 2626), USNM; Westbourne, 1 ♂, Aug. 26, 1908, J. B. Wallis, USNM. SASKATCHEWAN: Attons Lake, 2 ♂, Aug. 20, 1940, A. R. Brooks (RWH slides 2746 and 2747), CNC, USNM; Earl Grey, 1 ♂, Aug. 2, 1924, J. D. Ritchie (RWH slide 3443), CNC, Harlan, 2 ♂, Aug. 10, 11, 1940, A. R. Brooks (RWH slide 3437), CNC; Saskatoon, 1 ♂, Aug. 14, 1940, A. R. Brooks, CNC.

Discussion: The moths illustrated indicate the range of maculational variation to be anticipated in this species. I have seen a moderate series of specimens from one area; and in it, although maculational variation is great, the extremes in size and color pattern are not present. As a guess, it would seem as though the species is extremely variable but that any given population will have a number of phenotypes smaller than the total of the species. Variability is not confined to maculation, color, and size. It is also expressed in the shape of the apical portion of the heavily sclerotized flange of the aedeagus in the male genitalia and in the relative length of the ductus bursae and corpus bursae in the female genitalia.

As might be expected, several species have been confused under the name *variabilis*. Most of them are easily distinguished by the frontal processes, antennal characters, and the shape of the aedeagus. *L. variabilis* is the only known species of *Lita* with the aedeagus shape as illustrated in figures 68–70.

#### *Lita barnesiella* (Busck)

FIGURES 8, 61, 85, 139, 175, 176

*Gelechia barnesiella* Busck, 1903, Proc. U. S. Nat. Mus., vol. 25, p. 875.

*Lita barnesiella*.—Busck, 1939, Proc. U. S. Nat. Mus., vol. 86, p. 573.

Maculation: as in figure 8. Head: tongue pale gray brown basally, becoming darker brown distally; maxillary palpus ascending, nearly attaining ventral margin of frontal depression, pale gray with scattered light brown scales; labial palpus pale gray with a few brown scales on posterior and lateral surfaces of second and third segments, anterior surface brown with a few pale gray scales, third segment brown with dusting of pale gray scales; scape of antenna brown buff, shaft piceous dorsally, ocherous ventrally; frons, vertex, and occiput pale buff, frontovertical processes as in figure 61. Thorax, forewing, and abdomen, pale buff overlaid with dark brown and varying shades of red brown, cilia of forewing pale buff. Hindwing: pale fuscous, veins slightly darker fuscous, cilia and tuft of scales on vein 1 pale buff. Prothoracic leg: coxa brown overlaid with pale buff, apex pale buff; femur and tibia dark brown with scattered pale buff scales, buff scales more abundant on outer surfaces; tarsus dark brown, apices of first, second, and third segments pale buff, ventral surface

of first segment pale buff. Mesothoracic leg: coxa off white on outer surface; femur and tibia dark brown with some pale buff flecks, a pale buff fascia just beyond middle of tibia, apex of tibia pale buff; tarsus dark brown dorsally, apices of first, second, and third segments pale buff, apex of fourth segment pale buff laterally. Metathoracic leg: coxa off-white; femur brown, heavily overlaid with pale buff; tibia pale buff with a few brown scales near base, a broad brown fascia just before middle and apex, dorsal scale tuft pale buff; tarsus dark brown externally, base of first segment and apices of all segments pale buff. Alar expanse: 15-25 mm. Male genitalia: as in figure 85 (RWH slide 2618). Heavily sclerotized flange of aedeagus with moderately acute apex, ductus ejaculatorius simplex one-and-one-half times length of aedeagus. Female genitalia: as in figure 139 (RWH slide 3144).

Food plant: Unknown.

Type: Male, USNM.

Specimens examined:

ARIZONA: Maricopa, Pinal Co., 1♂, Oct. 17, 1927, J. A. Kusche, CAS; Kingman, 1♂, Oct. 1-7, USNM; Mohave Co., 1♂, Oct. 8-15, USNM; same locality, 1♂, BMNH; Paradise, Cochise Co., Oct. 1-7, USNM; 4 mi. ESE Pine, 5400 ft., Gila Co., 2♂, Sept. 5, 1961, R. W. Hodges, USNM; Prescott, 8♂, 8♀, Oct. 1-30 (AB slide Aug. 16, 1933), USNM. CALIFORNIA: Loma Linda, 1♀, Nov. 6, G. R. Pilate, AFB; Southern Calif., 1♀ (RWH slide 2619), USNM; Willow Creek, Siskiyou Co., 14♂, Sept. 10-11, 1871, Walsingham (RWH slide 2879), BMNH, USNM. COLORADO: Denver, 6♂, Sept. 15, 1910, Osler, USNM; same locality, 1♂, 4♀ (AB slide Aug. 11, 1933), USNM; Durango, 1♂, 1♀, Osler, CAS, USNM; Glenwood Springs, 5♂, 1♀, July 16-September (AB slides Aug. 4, 1933 and Apr. 30, 1937), USNM; same locality, 3♂, Aug. 2, 22, 1892, W. Barnes, USNM; same locality, 2♂, September 1906, BMNH, LACM; Lamar, 4♂, 1♀, Sept. 24, 1945, E. C. Johnston (RWH slide 2573), CNC, USNM; Larimer Co., 2♂, 1♀, June, 4♂, July, 20♂, 2♀, August 1891, BMNH; Mesa-verde, 1♂, Sept. 27, 1945, E. C. Johnston (RWH slide 2618), CNC; Rock Creek Canyon, 3♂, Sept. 26-28, 1957, Margot May, CPK; no further locality, 11♂, BMNH, LACM, USNM. NEW MEXICO: Bent, 2♂, 1♀, 10.27, BMNH; Gallup, 1♂, Sept. 11, 1961, R. W. Hodges, USNM; Jemez Springs, 1♂, Oct. 1-7, USNM; Mescalero, 1♂, 10.27, BMNH. TEXAS: Bosque Co., 1♂, Oct. 6, 1876, Belfrage, BMNH. UTAH: Eureka, 2♂, Sept. 6, 9, 1910, T. Spalding, USNM; Stockton, 3♂, 1♀, Aug. 31-Sept. 10, T. Spalding (AB slides Aug. 8, 1933 and Apr. 29, 1937), USNM. WYOMING: Torrington, 1♂, Sept. 2, 1948, R. E. Pfadt (JFGC slide 9896), USNM.

Discussion: The maculation of *barnesiella* is relatively constant. The major variation is in the amount of dark brown and red brown on the forewing and thorax. Some specimens are very pale with the basal and antemedial triangular dark markings as the prominent features; others are moderately dark and have a general suffusion of dark brown on the forewings.

The frontal processes (fig. 61) are the major diagnostic feature of



*barnesiella*. Of the four species that might be confused with it by maculation, *texanella*, *pagella*, *incipur*, and *geniata*, the first two have a plain frons. *L. incicur* (fig. 58) has the interior of the dorsal projection spinose, that of *barnesiella* is smooth. The dorsal and medial frontal processes of *geniata* (fig. 62) lack separating margins; those of *barnesiella* are separated by the strong ventral margin of the dorsal process.

*Lita incicur*, new species

FIGURES 9-13, 58, 78, 137, 140, 177, 178

Maculation: as in figures 9-13. Head: tongue white to pale buff basally, becoming brown subbasally; maxillary palpus off white, folded over base of tongue; labial palpus, first segment with yellow brown and pale brown scales, second segment white with scattered yellow and pale brown scales, third segment with a mixture of white and brown scales; scape of antenna buff with scattered brown scales on dorsal surface, shaft greasy brown, some scales of distal half of basal segments greasy buff; frontovertical processes as in figure 58; frons buff white; vertex and occiput buff. Thorax; varying shades of buff and buff brown. Forewing: pale buff to orange; dark markings brown; cilia pale buff, apices of scales darker. Hindwing; shining fuscous, veins with orange brown, cilia buff. Prothoracic leg: white on posterolateral surface, pale brown with whitish scales on fronto-medial surface, apex pale buff; femur brown with whitish scales; tibia brown with a white fascia slightly beyond middle and another at apex; tarsus brown, apices of first three and base of first segment white. Mesothoracic leg: nearly as for prothoracic leg. Metathoracic leg: tibia white with an antemedial and preapical patch of brown scales. Abdomen: terga pale yellow basally, gray brown distally, apices of sterna buff white. Alar expanse: 17-27 mm. Male genitalia: as in figure 78 (RWH slide 2570). Apex of flange of aedeagus sickle shaped. Female genitalia: as in figures 137 and 140 (RWH slides 2616 and 2751).

Food plant: Unknown.

Type: Male, Smokey Valley, 6300 ft., Tulare Co., California, Sept. 28, 1946, C. Henne (RWH slide 2610), USNM type 67643.

Paratypes:

CALIFORNIA: Mammoth Lake, Inyo Co., 1♂, Aug. 15, 1921, O. C. Poling, USNM; Mono Pass, Inyo Co., 4♂, Aug. 13, 1957, J. Powell (RWH slides 2611 and 2612), UCB, USNM; Monachee Meadows, 8000 ft., Tulare Co., 2♂, Aug. 16-23, 1936, USNM; Mt. Shasta, Siskiyou Co., 12♂, 13♀, August 1871, Walsingham, BMNH, USNM; same locality, 7♂, 5♀, Aug. 19, 1939, E. C. Johnston (RWH slide 2571), CNC, USNM; Nevada Co., 2♂, September, CAS, USNM; same locality as type, 2♂, CU, USNM; Tuolumne Meadows, Tuolumne Co., 1♂, Aug. 27, 1960, W. E. Ferguson, UCB; Twin Lakes, Alpine Co., 4♂, Aug. 21,

1936, E. C. Johnston (RWH slide 2570), CNC, USNM; White Mt. Peak, 12500 ft., 5 mi. S, Mono Co., 1♂, 1♀, Aug. 15, 1960, S. F. Cook (RWH slides 2559 and 2560), UCB, USNM; Willow Creek, Siskiyou Co., 8♂, 3♀, Sept. 10-11, 1871, Walsingham (RWH slides 2877, 2878, 2880, and 3019), BMNH, USNM. COLORADO: Glenwood Springs, 4♂, Aug. 16-18, 1892, W. Barnes (AB slide Aug. 12, 1933; RWH slide 2609), USNM. OREGON: Crater Lake Park, South Rim, 7100 ft., 1♂, Sept. 13, 1930, H. A. Scullen, CU. WYOMING: Green River L., Wind River Range, 1♂, July 24-Aug. 7, 1935, A. B. Klots, AMNH; Sacajawea Camp, Middle Piney Creek, 8400 ft., Sublette Co., 1♂, Aug. 14, 1953, Rindge (RWH slide 2883), AMNH; Yellowstone Natl. Park, Madison Jet., 1♂, 2♀; Aug. 19, 1962, Spangler (RWH slides 2606 and 2616), USNM.

Other specimens examined:

CALIFORNIA: Mono Pass, Inyo Co., 1♂, Aug. 13, 1957, J. Powell, UCB, same locality, 12000 ft., 10♂, 4♀, MacNeill, and MacNeill, Rentz, and Landgren, CAS; Rock Creek, 1 mi. W. Tom's Plane, Mono Co., 1♂, 3♀, Sept. 6, 1960, MacNeill, CAS.

Discussion: *L. incicur* is similar to *texanella* and *obnubila* but differs from them in having frontovertical processes.

*Lita geniata*, new species

FIGURES 14, 62, 81, 179, 180

Maculation: as in figure 14. Head: tongue and maxillary palpus pale buff white, latter folded over base of tongue; labial palpus nearly white, outer surface of first segment and base of second segment with a few yellow-brown scales, scattered pale brown scales apically on second segment and generally on third segment; scape of antenna buff, shaft greasy brown (male, no females seen); scales of frons, vertex, and occiput buff; frontovertical processes as in figure 62. Thorax: varying shades of brown. Forewing: varying shades of brown; darker basally, becoming buff white apically, spots on disc dark brown, almost black; apices of ciliary scales darker than remainder of scale. Hindwing: fuscous buff, veins with more yellow orange; cilia pale buff. Legs: buff to off white basally, becoming brown distally; apices of basal tarsal segments off white; metathoracic tibia with pale buff dorsal tuft and three brown scale patches on outer surface, one subbasal, one antemedial, and one preapical. Abdomen: first three terga yellow, remaining terga yellow brown with pale apices; sterna greasy buff white, bases darker than apices. Alar expanse: 15.0-19.5 mm. Male genitalia: as in figure 81 (RWH slide 2604). Apex of heavily sclerotized flange of aedeagus narrow, sickle shaped. Female genitalia: no specimens available.

Food plant: Unknown.

Type: Male, La Puerta Valley, So. Calif., USNM type 67644.

Paratypes:

CALIFORNIA: same data as for type, 16♂ (RWH slides 2604 and 2605), BMNH,

CNC, CU, UCB, USNM; La Puerta, 3 ♂, Stephens, USNM; La Puerta Val., 1 ♂, Oct. 16–23, USNM; Loma Linda, 1 ♂, Oct. 22, G. R. Pilate, AFB; So. Calif., 1 ♂, USNM.

Discussion: *L. geniata* may be separated from *barnesiella* as indicated under the latter. The maculation of *geniata* is relatively constant with the exception of the costal area which may be brown to buff. Inasmuch as the known specimens are from one locality (the "So. Calif." specimen may represent the same population), the amount of variation is likely to be small. When other populations are discovered, more phenotypes may be observed.

### *Lita puertella* (Busck)

Figures 15, 16, 65, 80, 149, 181, 182

*Gelechia puertella* Busck, 1916, Proc. Ent. Soc. Washington, vol. 18, p. 148.

*Lita puertella*.—Busck, 1939, Proc. U.S. Nat. Mus., vol. 86, p. 573.

Maculation: as in figures 15 and 16. Pale form: head, thorax, and forewing pale yellowish white; labial palpus with a few pale ocherous scales scattered on lateral surface; maxillary palpus folded over base of tongue; shaft of antenna ocherous basally becoming darker distally; markings on forewing brown; hindwing pale fuscous yellow; cilia pale buff; abdomen pale ocher dorsally, pale yellowish white ventrally; legs pale yellowish white, becoming brown distally, prothoracic leg darker than metathoracic leg, apices of tarsal segments yellowish white except last two of prothoracic leg and ultimate segment of mesothoracic leg. Dark form: much as given for pale form but with overlay of brown and red brown. Lower portion of frontal process (fig. 65) with strongly carinate margin, inner surface pitted; dorsal portion with a small, circular cross section, margin even and strongly carinate. Alar expanse: 16–20 mm. Male genitalia: as in figure 80 (RWH slide 2598). Heavily sclerotized flange of aedeagus generally uniform in width, tapering to acute apex. Female genitalia: as in figure 149 (RWH slide 3145).

Food plant: Unknown.

Type: Male, USNM.

Specimens examined:

ARIZONA: Maricopa, Pinal Co., 1 ♂, Oct. 17, 1927, J. A. Kuseche, CAS; Phoenix, 1 ♂, Oct. 29, Cockerell, USNM. CALIFORNIA: Desert Springs, San Bernardino Co., 4 ♂, Oct. 17, 1960, Hurd and Powell (RWH slides 2567 and 2568), UCB, USNM; near Essex, San Bernardino Co., 1 ♂, 3 ♀, Oct. 30, 1939, J. A. Comstock (RWH slide 3145), LACM, USNM; Ivanpah Mts., San Bernardino Co., 11 ♂, Oct. 5, 1940, J. A. Comstock (RWH slide 2597), LACM, USNM; same locality, 4 ♂, Oct. 8, 1940, C. Henne, LACM; La Puerta Valley, So. Calif., 74 ♂, September through Oct. 23 (AB slides), Sept. 10, 1930, Mar. 2, 1931, and Apr. 28, 1937 (RWH slides 2566, 2598, 2599, and 2600), LACM, USNM; Providence Mts., 3 ♂, 2 ♀, Oct. 8, 1936, Sperry, AMNH, CNC; Rock Cr., 1 mi. W Tom's

Place, Mono Co., 3 ♂, Aug. 9, 1959, C. D. MacNeill, CAS; West Riverside, 1 ♂, Oct. 28, 1905 (AB slide Aug. 1, 1933), USNM.

Discussion: *L. puertella* is a highly variable species in regard to maculation, ranging from pale yellowish-white specimens with two prominent dark brown spots on the forewings to brown specimens with the dark brown spots barely discernible. I have seen numerous intermediate stages between the two extremes.

*L. deoia* and *dialis* superficially resemble *puertella*. *L. dialis* is easily separated because it lacks a frontal process. The lower section of the frontal process of *puertella* has a strong, high ventral margin; that of *deoia* has a rounded, poorly defined ventral margin.

*Lita deoia*, new species

FIGURE 17, 82, 183, 184

Maculation: as in figure 17. Head: buff white, maxillary palpus folded over base of tongue; outer surface of first segment of labial palpus pale brown, apex of third segment brown; scape of antenna with a dorsomedial brown patch, shaft greasy brown; frontovertical protuberance much as for *invariabilis* (fig. 59), dorsal protuberance more nearly circular, ventral margin slightly flattened. Thorax: buff white. Forewing: buff white, tinged with pale yellow and brown, dark markings brown. Hindwing: shining pale fuscous, veins slightly darker, cilia buff. Prothoracic leg: coxa and femur white on outer surface, inner surface of coxa white with scattered brown scales, inner surface of femur brown with scattered white scales; tibia brown with a postmedial and apical white band; base and apex of basitarsus and apex of second tarsal segment white. Mesothoracic leg: as for prothoracic leg but with more white scales on inner surface of femur, inner surface of tibia white. Alar expanse: 20.5 mm. Male genitalia: as in figure 82 (RWH slide 2556). Apex of flange of aedeagus broad and blunt, much as for *variabilis*. Female genitalia: no specimens available.

Food plant: Unknown.

Type: Male, Smokey Valley, 6000 ft., Tulare Co., Calif., Sept. 28, 1946, C. Henne (RWH slide 2556), USNM type 67645.

Discussion: Superficially, *deoia* looks like the light form of *puertella* or *dialis*. It differs from *dialis* in having frontovertical processes. It may be distinguished from *puertella* (fig. 65) by the ventral margin of the lower frontal processes being poorly defined; in *puertella* this margin is raised and heavily sclerotized. The frontal process of *deoia* is broad, that of *puertella* is narrow; the medial process of *puertella* is raised more than its apical width, that of *deoia* is raised less than one-third its apical width.

*L. deoia* and *puertella* are very close, and it may be that *deoia*

represents a population of *puertella*; however, evidence to support this hypothesis is lacking.

*Lita dialis*, new species

FIGURES 18, 83, 132, 185, 186

Maculation: as in figure 18. Head: tongue buff; maxillary palpus pale buff, folded over base of tongue; labial palpus white, apex of third segment tinged with yellow brown; scape and base of antenna buff, shaft greasy buff brown apically; frons, vertex, and occiput pale buff. Thorax: buff white. Forewing: buff white to buff, dark spot brown, cilia buff white. Hindwing: shining pale fuscous, veins darker and tinged with yellow gray, cilia buff. Legs brown with scale bases pale brown to white; a white fascia at middle and apex of each tibia, dorsal tuft on metathoracic tibia off white, apices of first three or four tarsal segments and base of basitarsi white. Abdomen: terga greasy ocher, paler on basal terga, apices of terga pale; sterna greasy brown, apices of segments greasy buff, many scales with buff lines. Alar expanse: 17.5–20.0 mm. Male genitalia: as in figure 83 (J.F.G.C. slide 10208). Apex of flange of aedeagus tapering to blunt tip. Female genitalia: as in figure 132 (RWH slide 2603).

Food plant: Unknown.

Type: Male, Paradise, Cochise Co., Ariz., March (RWH slide 2602), USNM type 67646.

Paratypes:

ARIZONA: Southern Arizona, 1 ♂, USNM; Wickenburg, 1 ♀, May 20, 1957, Sperry, USNM. NEW MEXICO: Carlsbad, Eddy Co., 2 ♂, May 17, 1950, E. C. Johnston (RWH slide 2603), CNC. TEXAS: Alpine, 5000–8000 ft., 4 ♂, April–July, AFB; Brewster Co., 5000 ft., 7 ♂, 2 ♀, 4.26, BMNH, USNM; no further locality, 1 ♂, May 19, 1953, O. J. Robertson (JFGC slide 10208), USNM. MEXICO: Durango, La Resolana, 1 ♂, Feb. 21, 1953, E. I. Schlinger, UCB.

Discussion: *L. dialis* is similar in appearance to *deovia* and *puertella* but differs from them in lacking frontovertical processes. Individual specimens differ in the amount of brown scaling so that the moths appear pale buff to gray brown.

*Lita pagella*, new species

FIGURE 19, 20, 84, 145, 187, 188

Maculation: as in figures 19 and 20. Head: tongue buff brown to brown laterally, some pale buff scales medially; maxillary palpus pale buff, folded over base of tongue; first segment of labial palpus white on inner surface, outer surface white basally, brown from middle to apex, pale buff on ventrodorsal portion, second segment buff white to white with scattered brown scales, third segment mainly

brown on anterior surface, white on posterior surface; scape of antenna orange brown dorsally, buff white ventrally, shaft greasy brown; frons buff white; vertex and occiput buff. Thorax: scales brown, buff brown to pale buff, most scales paler basally than apically. Forewing: orange brown and varying shades brown, cilia orange buff basally, pale buff distally. Hindwing: fuscous, veins dark, cilia pale buff. Prothoracic leg: coxa with anterior surface brown, basal row of scales buff white, posterolateral surface white; femur brown anteriorly, mottled brown and white posteriorly; tibia brown, a buff fascia beyond middle, apex white; tarsus brown, base and apex of first segment buff white. Mesothoracic leg: as for prothoracic leg, outer surface of coxa white, apex of tibia buff. Metathoracic leg: coxa white, outer surface of femur white with scattered brown scales; tibia greasy brown black, an oblique buff white subbasal fascia, another at three-fifths, apex white, dorsal tuft off white; tarsus brown black, base of first segment and apices of all segments pale. Abdomen: first three terga greasy pale yellow, remaining terga pale buff; sterna white to buff white. Alar expanse: 17-19 mm. Male genitalia: as in figure 84 (RWH slide 2608). Apex of flange of aedeagus acute, free portion nearly at right angle with aedeagus. Female genitalia: as in figure 145 (RWH slide 2574).

Food plant: Unknown.

Type: Female, Fort Valley, 7350 ft., 7½ mi. NW Flagstaff, Coconino Co., Ariz., Aug. 27, 1961, Ronald W. Hodges (RWH slide 2574), USNM type 67647.

Paratypes:

ARIZONA: Mohave Co., 1 ♀, Sept. 8-16, USNM; Paradise, Cochise Co., 8 ♀ Aug. 24-Oct. 7, USNM; White Mts., 7200-11500 ft., 1 ♂, Aug. 10-30, 1925, O. C. Poling, USNM. CALIFORNIA: Jacumba, 3 ♂, Sept. 27-Oct. 2, 1924, Piazza (RWH slide 2608), LACM, USNM. COLORADO: Colorado Springs, Fountain Valley School, 1 ♂, Aug. 20-31, 1932 (ABK slide 18 Jan. 23), AMNH; Rock Creek Canyon, 1 ♂, Sept. 10, 1947, Margot May (RWH slide 2876), CPK; Salida, 1 ♀, Aug. 27, 1938, Sperry (RWH slide 2884), AMNH. NEW MEXICO: Bent, 3 ♂, October 1927 (RWH slide 3020), BMNH, USNM; Mountain Park, 1 ♀ August 1927, BMNH.

Discussion: *L. pagella* may be separated from *barnesiella* and *incicur* by the smooth frons and from *thaliae* by the entire basal area of the forewing being dark or with dark spots. Some specimens are much paler than the one described.

*Lita obnubila*, new species

FIGURES 21, 87, 135, 189, 190

Maculation: as in figure 21. Head: tongue pale buff, some scales brown tipped; maxillary palpus pale buff, folded over base of tongue;

first segment of labial palpus white on inner surface, buff brown on outer surface, second and third segments buff white with scattered brown scales; scape of antenna buff white lightly dusted with brown, shaft greasy buff basally becoming buff brown distally; frons buff white; scales of vertex and occiput buff white with pale brown apices. Thorax: gray buff, scales streaked with gray, many scales with narrow brown border at apex; last row of scales of tegula buff white. Forewing: white, buff white, pale yellow, red brown, and brown; many scales of cilia tipped with red brown. Hindwing: fuscous, veins broadly covered with scales that appear shining orange at some angles of light incidence, cilia buff. Legs: mottled buff white and brown, each succeeding pair paler than the preceding one, apices of tarsal segments and sometimes dorsal surfaces off white. Abdomen: anterior two terga pale yellow, succeeding ones buff white; sterna buff white with scattered brown scales, apices unicolorous. Alar expanse: 19–23 mm. Male genitalia: as in figure 87 (RWH slide 3459). Apex of valva globose. Female genitalia: as in figure 135 (RWH slide 3460).

Food plant: Unknown.

Type: Male, Fort Davis, Tex., 5000 ft., 5.28 (RWH slide 3459), BMNH.

Paratypes:

Same data as for type, 3♂, 1♀ (RWH slides 2881 and 3460), BMNH, USNM.

Discussion: Superficially, *obnubila* appears like some specimens of *texanella*; however, the forewings of *obnubila* lack distinct spots in the cell; the apices of the valvae are globose, ellipsoidal in *texanella*; the two projections on the anterior margin of the eighth sternum (fig. 189) are uniformly broad to the apex, in *texanella* these projections taper somewhat to the apex; the ratio of width of the segment bearing the apophyses anteriores to the total length from the apex of the papillae anales to the anterior margin of the bursa copulatrix is 1:5 in *obnubila*, 1:7 in *texanella*. *L. obnubila* may be separated from *veledae* by the apices of the valvae being globose and the inner surface of the second segment of the labial palpus being mottled.

#### *Lita maenadis*, new species

FIGURES 22, 133

Maculation: as in figure 22. Head: tongue white basally becoming pale brown medially; maxillary palpus white, folded over base of tongue; inner surface of first segment of labial palpus white, scales of outer surface pale buff basally, brown distally, second segment white with scattered brown scales, third segment brownish, bases of scales nearly white; dorsal surface of scape pale buff with brown blotches,

ventral surface buff, ventral surface of shaft buff, individual scales of dorsal surface pale buff basally, dark brown distally, several half segments pale buff basally; frons nearly white; vertex and occiput buff white, brown tuft of scales above eye. Thorax: buff white, many scales with darker streaks. Forewing: buff white to white, several brown or red-brown tipped scales; first row of scales of cilia brown tipped, others unicolorous. Hindwing: pale fuscous, veins darker, cilia pale buff. Prothoracic leg: coxa white with several brown tipped scales on anterior surface, posterolateral surface white; femur and tibia brown, bases of scales pale buff, apex of tibia white; tarsus brown, base of first segment and apices of first and second segments white. Mesothoracic leg: much as for prothoracic leg but somewhat lighter, outer surface of coxa white, a white streak just beyond middle of tibia. Metathoracic leg: as for mesothoracic leg but lighter, dorsal tuft on tibia buff white. Alar expanse: 18-20 mm. Male genitalia: no specimens available. Female genitalia: as in figure 133 (RWH slide 2583).

Food plant: *Senecio* species.

Type: Female, Blanco's Corral, White Mts., Mono Co., Calif., 10150 ft., Aug. 25, 1960, P. D. Hurd, *Senecio* (RWH slide 2583), CAS.

Paratype:

Placer Co., Calif., 1♀, August, Koebele, CAS.

Discussion: *L. maenadis* is nearest to *obnubila* but may be separated by the antenna being multicolored basally; in *obnubila* the antenna is unicolorous off white basally.

#### *Lita veledae*, new species

FIGURES 23, 88, 191, 192

Maculation: as in figure 23. Head: tongue pale buff to buff white; maxillary palpus buff white, somewhat curved over base of tongue; first segment of labial palpus white on inner surface, white with a few orange scales on outer surface; second segment white on inner surface, white with scattered orange scales on outer surface, third segment mainly white but with numerous orange and pale brown scales anteriorly; scape of antenna buff white on ventral surface, brownish on dorsal surface, shaft pale buff basally (antennae not complete on unique specimen); frons buff white; vertex and occiput buff white tinged with yellow. Thorax: buff white with three brown streaks (possibly grease marks), tegulae tinged with yellow. Forewing: buff white to white, suffused with pale orange brown on dorsal third, a row of yellow scales on outer margin. Hindwing: shining gray white, cilia buff white. Prothoracic leg: coxa white on posterolateral surface,



anterior surface buff white; femur white on outer surface, pale brown medially, gray white on edges; tibia pale brown with a gray white fascia at three-fifths, apex gray white; tarsus brown, base and apex of basitarsus and apex of second segment white. Mesothoracic leg: absent on type. Metathoracic leg: coxa and femur buff to buff white, many scales streaked with gray, trochanter nearly white; tibia white with a faint streak of orange-brown scales at one-fourth and another at four-fifths; tarsus white to gray brown depending upon angle of light incidence, ventral surface orange brown basally, brown distally, apices of segments pale. Abdomen: not observed before dissection was made. Alar expanse: 17 mm. Male genitalia: as in figure 88 (RWH slide 2885). Female genitalia: no specimens available.

Food plant: Unknown.

Type: Male, Dixieland, Imperial Co., Calif., Mar. 15-30, 1922, O. C. Poling (RWH slide 2885). USNM type 67648.

Discussion: *L. veledae* may be distinguished from *obnubila* by having the inner surface of the second segment of the labial palpus pure white and by having the apices of the valvae ellipsoidal. In many superficial respects *veledae* is similar to *maenadis* but differs in having the base of the shaft of the antenna unicolorous, whereas that of *maenadis* is brown and white.

All of the characters examined and used to separate *veledae* and *maenadis* may be indicative of nothing more than the two sexes of a species or of two semiseparate populations of a species; however, without further knowledge based on more specimens (and preferably reared series) of either, I am recognizing two entities.

#### *Lita rectistrigella* (Barnes and Busck)

FIGURES 24, 72, 144, 193, 194

*Gelechia rectistrigella* Barnes and Busck, 1920, Contr. Nat. Hist. Lep. N. America, vol. 4, p. 229.

*Lita rectistrigella*.—Busck, 1939, Proc. U.S. Nat. Mus., vol. 86, p. 573.

Maculation: as in figure 24. Head: tongue gray white basally; maxillary palpus pale buff, folded over base of tongue; labial palpus gray white, liberally dusted with brown; scape of antenna dark brown, shaft ochreous basally becoming brown distally in male, gray white interspersed with brown basally becoming brown distally in female, sensory areas of male usually covering one-half to nearly all of ventral surface of one-half of each segment basally; frons gray white; vertex and occiput buff. Thorax: gray white overlaid with brown. Forewing: streaks of gray white between brown on veins, outer margin with dark brown at ends of veins; scales of cilia gray white, apex of each scale pale brown. Hindwing: fuscous, cilia buff. Legs:

brown with buff to gray white at apices of tarsal segments. Abdomen: ocherous basally, paler distally, posterior margin of segments pale buff; ventral surface yellow white with scattered brown scales. (This description was taken mainly from the specimen used for the photograph. Others differ in the amount of brown present on various surfaces.) Alar expanse: 17.0–20.5 mm. Male genitalia: as in figure 72 (RWH slide 2642). Female genitalia: as in figure 144 (RWH slide 2629).

Food plant: Unknown.

Type: Female, USNM.

Specimens examined:

UNITED STATES: ARIZONA: Douglas, 1 ♀, Sept. 16, 1923, USNM; Mohave Co., 1 ♀, Sept. 16, 1923, USNM; Paradise, Cochise Co., 1 ♀, Oct. 1–7 (RWH slide 2591), USNM; White Mts., 7200 ft., 1 ♂, Aug. 15, 1925, O. C. Poling (RWH slide 2641), USNM. CALIFORNIA: La Puerta Valley, 4 ♂, 2 ♀, September–October 23 (RWH slides 2629 and 2642), USNM; 7 mi. N Temecula, Riverside Co., 1 ♀, Oct. 19, 1960, J. Powell, UCB; Upper Santa Ana River, San Bernardino Co., 1 ♂, 1 ♀, Sept. 15–19, Sperry, USNM; West Riverside, 2 ♂, 1 ♀, Oct. 26, 27, 1925 (AB slide Mar. 21, 1933, RWH slide 2590), USNM. COLORADO: Bear Creek, Morrison, 3 ♂, Aug. 23, 1904 (RWH slide 3432), USNM; Denver, 7 ♂, Sept. 5, 9, Osler (RWH slides 3424–3429), USNM; Durango, 1 ♀ Sept. 26, 1945, E. C. Johnston (RWH slide 2637), CNC; Lamar, 3 ♂, Sept. 24, 1945, E. C. Johnston (RWH slides 2734, 3433, and 3441), CNC; Rock Creek Canyon, 3 ♂, Sept. 10–29, 1957, Margot May (RWH slides 3438–3440; RWH wing slide 55), CPK, USNM; no locality, 5000 ft., 2 ♂, August 1891, BMNH. MONTANA: Boulder, 1 ♂, Titus Ulke (RWH slide 2750), USNM; Butte, 4 ♂, Sept. 12, 1945, E. C. Johnston (RWH slide 2635), CNC, USNM. NEW MEXICO: Ft. Wingate, 1 ♀, Sept. 1–7, USNM; Hell Canyon, 1 ♂, Sept. 15, 1916, C. Heinrich (RWH slide 2624), USNM; Mesilla, 1 ♂, C. N. Ainslie, USNM. UTAH: Deer Creek, Provo Canyon, 1 ♂, Sept. 16, 1918, T. Spalding, USNM; Eureka, 1 ♂, Aug. 27, 1911, T. Spalding (JFGC slide 9906), USNM; Lehi, 3 ♂, Sept. 29, 30, 1939, H. F. Thornley, CNC; Salt Lake City, 1 ♀, 5–90, Ainslie (RWH slide 2643), USNM; Spanish River, 1 ♂, Sept. 4–8, CNC. WASHINGTON: Satus Creek, Yakima Co., 1 ♂, Sept. 16, 1949, E. C. Johnston (RWH slide 2752), CNC.

CANADA: ALBERTA: Dorothy, 1 ♂, 1921, W. G. Hodgson, BMNH.

Discussion: *L. rectistrigella*, as defined above, includes a relatively homogeneous appearing group of moths. The major criteria for recognition of the males are the width of the sensory areas of the antennae, the aedeagus of the male genitalia, and the smooth frons. A series of specimens from Colorado and Montana have the sensory areas of the male antennae about one-third to one-half the width of a segment, and two well-defined bars are present on the forewings. They would seem to be *variabilis* from these characters; however, the male genitalia place them with *rectistrigella*. Three possible interpretations exist for this series: (1) The width of the male antennal sensory areas is variable and thus has no taxonomic significance in this species. (2) The width of the male antennal sensory areas is not

variable and thus is taxonomically significant. (3) The width of the male antennal sensory areas has taxonomic significance at the sub-specific level. Of the three possibilities, I have tentatively concluded that the first is correct; however, until the species has been reared and the progeny of known females studied, I cannot be certain. Because no females have been correlated with the series of males under discussion, I have discarded the second interpretation. However, females of several species of *Lita* are uncommon to rare in collections, and it could be that none have been collected. That the series might represent a subspecies of *rectistrigella* seems unlikely inasmuch as a "normal" male is known from Denver, Colorado; six of the second type of male are from Denver. Thus, no geographic separation is apparent.

*L. rectistrigella* may be separated from the other striate species of *Lita* as follows: *jubata* and *nefrens* have frontal processes; the aedeagus of *variabilis* has the apex of the flange blunt, that of *rectistrigella* is poorly defined; *princeps* has a well-defined bar on the forewing but no other lines, *rectistrigella* has series of lines; *sironae* is a smaller species (alar expanse 14–17 mm.) that consistently has two bars on the forewing, *rectistrigella* is a larger species (alar expanse: 17.0–20.5 mm.) that usually lacks dark bars on the forewing; the antennal segments of *recens* are bicolored (buff white and pale brown) and have the male sensory areas extending to the dorsal surface, the antennal segments of *rectistrigella* are not bicolored, and the sensory areas are confined to the ventral surface; the anterior margin of the eighth tergum of *thaliae* is roughly triangular (fig. 197), that of *rectistrigella* is more evenly rounded (fig. 193).

*Lita sironae*, new species

FIGURES 25, 73, 142, 195, 196

Maculation: as in figure 25. Head: tongue with buff white scales basally, brown medially; maxillary palpus with buff white scales, some scales streaked with pale brown; first segment of labial palpus buff brown on outer surface, white on inner surface, second and third segments white with scattered brown scales; ventral surface of scape of antenna greasy buff, some scales brown tipped, dorsal surface pale buff with numerous brown scales, shaft orange becoming darker distally (♂), individual shaft segments white on basal half, pale orange on distal half basally, becoming darker distally (♀); frons, vertex, and occiput pale buff with pale brown to brown apices. Thorax: scales brown streaked with pale buff, scales of distal half of tegula buff white streaked with pale brown. Forewing: streaked with white, buff white, pale yellow, brown, and black; many scales streaked; scales of cilia buff white, apices of basal row tipped with brown, apices of

medial and distal rows tipped with pale brown. Hindwing: fuscous with numerous orange scales, cilia buff, apices of scales slightly darker. Prothoracic leg: coxa, femur, and tibia dark brown, scales pale basally, outer surface of coxa gray brown; tarsus yellow brown, apices of first and second and base of first segment white. Mesothoracic leg: coxa buff white; femur, tibia, and tarsus brown, a dorsal white streak at middle of tibia, apex of tibia white, base of basitarsus white, apices of tarsal segments slightly paler than remainder of segments. Metathoracic leg: coxa and femur buff white, many scales of femur streaked with brown; tibia buff white, apices of many scales pale brown to brown, dorsal tuft pale buff, apex white; tarsus pale brown, base of first segment white, apices of segments buff white. Alar expanse: 14-17 mm. Male genitalia: as in figure 73 (RWH slide 2630). Female genitalia: as in figure 142 (RWH slide 2631).

Food plant: Unknown.

Type: Male, San Diego, Calif. (RWH slide 2630), USNM type 67649.

Paratypes:

CALIFORNIA: same locality as type, 41 ♂, 11 ♀, May 1-7 and Oct. 8-30 (RWH slide 2631, JFGC slides 9900 and 9901), BMNH, CNC, CU, and LACM; same locality as type, 5 ♂, Oct. 1-16, 1920, Karl Coolidge, LACM, USNM; same locality as type, 3 ♂, 2 ♀, Sept. 21-Nov. 20, 1923, Piazza, LACM, USNM; Desert Springs, San Bernardino Co., 1 ♀, October 17, 1960, Hurd and Powell, UCB; Los Angeles Co., 1 ♀, September, CAS; Mouth, San Gabriel Canyon, Los Angeles Co., 1 ♂, Nov. 11, 1945, C. Henne, USNM.

Other specimens examined:

CALIFORNIA: San Diego, 1 ♂, 2 ♀, Oct. 8-15, CAS.

Discussion: *L. sironae* is nearest to *rectistrigella*, differing in having a pale yellow to orange-brown subcostal streak on the base of the forewing and in the smaller average size (7.9 mm. for *sironae*, 9.4 mm. for *rectistrigella*). The signa of *sironae* are from 0.28-0.38 mm. long, and the distance from the outer surface to the apex of the inwardly projecting termen is 0.16-0.22 mm. The same dimensions for *rectistrigella* are 0.72-0.78 mm. and 0.28-0.29 mm. In *sironae* the inwardly projecting termen of the signum is more nearly vertical with the outer margin than is that of *rectistrigella*. In the latter this projection is not abruptly angled from the outer margin.

#### *Lita thaliae*, new species

FIGURES 26, 27, 74, 150, 197, 198

Maculation: as in figures 26 and 27. Head: tongue white basally, becoming pale brown medially; maxillary palpus white, folded over base of tongue; first segment of labial palpus pale brown with a dorsobasal white patch; second and third segments white with scat-

tered pale brown scales; scape of antenna white to buff white with pale brown dusting dorsally; shaft greasy pale orange basally becoming orange brown distally ( $\sigma^7$ ), shaft blotchy greasy brown dorsally, buff ventrally ( $\text{♀}$ ); frons off white; vertex and occiput pale buff. Thorax; mainly buff, some scales streaked with brown and a few brown scales streaked with buff. Forewing: off white, pale buff, pale yellow, and brown; ridges of many scales white or off white; cilia pale to dark buff, scale apices of basal row brown. Hindwing: pale fuscous, veins and costal margin shining pale orange; cilia buff. Prothoracic leg: outer surface white, anteromedial surface a mixture of gray brown and white; femur and tibia pale brown mixed with white, apex and epiphysis of tibia white; tarsus pale brown, base of first segment and apices of first and second segments white. Mesothoracic leg: coxa white; femur appearing gray on outer surface; tibia pale brown, a white streak at middle, apex white; tarsus gray brown, apices of segments and base of first segment pale gray to white. Metathoracic leg: coxa, femur, and tibia white, tibia with a few brown scales; tarsus off white with scattered brown scales. Alar expanse: 19.0–20.5 mm. Male genitalia: as in figure 74 (RWH slide 2578). Female genitalia: as in figure 150 (RWH slide 2582).

Food plant: *Chrysothamnus nauseosus* (Pallas) Britten.

Type: Male, Eureka, Utah, August 16, 1911, Tom Spalding, USNM type 67650.

Paratypes:

CALIFORNIA: Nevada Co., 1  $\text{♀}$ , September, CAS; near Sonora Peak, Tuolumne Co., 11000 ft., 1  $\sigma^7$ , Aug. 6, 1959, C. D. MacNeill, CAS; 1 mi. W Tom's Place, Mono Co., 1  $\text{♀}$ , Aug. 13, 1957, ex *Chrysothamnus nauseosus consimilis*, J. Powell (RWH slide 2582), UCB. COLORADO: Glenwood Springs, 2  $\sigma^7$ , August 1892, W. Barnes (AB slide Aug. 14, 1933; RWH slide 3249); same locality, 1  $\sigma^7$ , August 1889, MCZ; no further locality, 1  $\sigma^7$ , AMNH. UTAH: same locality as type, 20  $\sigma^7$ , 11  $\text{♀}$ , Aug. 16–Sept. 9, 1911 (RWH slides 2577–2580 and 2594), CAS, USNM; Stockton, 1  $\sigma^7$ , Sept. 6, 1907, USNM.

Discussion: The faint oblique line from the costa at the base of the forewing to the middle of the forewing at one-fifth will separate nonstriate specimens of *thaliae* from *pagella*, *barnesiella*, and *texanella*. Superficially, striate specimens of *thaliae* are similar to some specimens of *incicur*, *variabilis*, and *rectistrigella*. By lacking frontovertical processes *thaliae* differs from *incicur*, and in the shape of the aedeagus (*rectistrigella* type) it differs from *variabilis*. *L. thaliae* differs from most known males of *rectistrigella* by having narrow sensory areas on the basal segments of the antenna. The basal extension of the aedeagus differs from that of *rectistrigella* by being more heavily sclerotized. Females of *thaliae* have the heavy setae at the base of the papillae anales numerous and in several rows; females of *recti-*

*strigella* have a single row of heavy setae in this position. The series of specimens from Utah tends to be relatively uniform in hue, whereas the specimens from Colorado and California are generally darker, often having white areas replaced by pale buff ones.

*Lita texanella* (Chambers)

FIGURES 28, 29, 76, 148, 199, 200

*Anesychia texanella* Chambers, 1880, Journ. Cincinnati Soc. Nat. Hist., vol. 2, p. 179.

*Lita texanella*.—Busck, 1939, Proc. U.S. Nat. Mus., vol. 86, p. 573.

Maculation: as in figures 28 and 29. Head: tongue with a few white scales at base, scales elsewhere pale basally becoming dark brown medially; maxillary palpus white (some scales brown tipped), folded over base of tongue; labial palpus, scales of first segment gray brown basally, dark brown apically, second and third segments white with heavy dusting of dark brown scales; scales of scape of antenna buff with brown tips, shaft yellow orange (♂), buff white with scattered brown scales basally, becoming brown distally (♀); scales of frons pale gray white with pale brown apices, scales of vertex and occiput buff white with brown apices. Scales of thorax and forewing buff white with brown apices and medial streaks, dark marks on forewing formed by scales with broad brown borders, scales of cilia lack medial dark markings. Hindwing: fuscous, cilia buff. Prothoracic leg: coxa white with a few dark scales laterally, anteromedially dark brown, apex buff white; scales of femur, tibia, and tarsus dark brown apically, paler basally, apices of first and second tarsal segments pale. Mesothoracic leg: much as for prothoracic one. Metathoracic leg: paler than prothoracic leg, dorsal tuft on tibia pale buff. Abdomen: ocherous dorsally, segments pale apically, ventral surface pale brown, segments lighter apically. Alar expanse: 21–27 mm. Male genitalia: as in figure 76 (RWH slide 2569). Apex of heavily sclerotized flange of aedeagus blunt. Female genitalia: as in figure 148 (RWH slide 3148).

Food plant: Unknown.

Type: Lectotype, present designation, male, bearing following labels: Type, 1424; 12/4; Chambers, ~~Kentucky~~; *Anesychia texanella*, Texas-Cham.; Lectotype by R. W. Hodges. MCZ.

Specimens examined:

UNITED STATES, TEXAS: Fort Davis, 3♂, 3.28, BMNH; Kerrville, 2♂, 2♀ (AB slide Sept. 25, 1934), USNM; same locality, 1♂, March 10, H. Lacey (RWH slide 2569), USNM; no further locality, 1♂, MCZ.

MEXICO, NUEVO LEON: 3 mi. E Galeana, 5000 ft., 6♂, 8♀, Aug. 7–9, 1963, Duckworth and Davis (RWH slides 3146–3149), CNC, CU, USNM.

Discussion: Some specimens of *incicur* are much like *texanella* on

the basis of maculation; however, *texanella* lacks a frontovertical process, *incicur* has one.

Some specimens, particularly females, have more yellow in the basic color scheme than occurs in the specimen described for the species.

*Lita recens*, new species

FIGURES 30, 75, 147, 201, 202

Maculation: as in figure 30. Head: buff white medially, brown laterally; maxillary palpus buff white, folded over base of tongue; first segment of labial palpus white on inner surface, pale brown on outer surface, second segment brown heavily dusted with white basally, anterior surface lacking white scales, third segment brown with some white scales, anterior surface off white; dorsal surface of scape of antenna brown, ventral surface buff, a faint anterior white line at base, shaft white and red brown, sensory areas on most of antenna extending to anterior surface (♂), shaft brown with few white scales, sensory areas narrow, obliquely placed on segments, bordered with brown anteriorly (♀); frons, vertex, and occiput mottled buff brown. Thorax: buff brown. Forewing: scales white, buff white, pale yellow, brown, and dark brown, many scales with apices, many scales streaked with a second color; cilia gray white, apices of scales brown. Hindwing: fuscous, scales shining orange at certain angles of light incidence, veins somewhat darker, cilia buff. Prothoracic leg: anterior surface of coxa mottled buff brown, apex pale, posterolateral surface with brown and white scales; femur and tibia brown with few pale scales, posterior surfaces whitish, apex of tibia white; tarsus brown, base and apex of basitarsus and apices of second and third segments white. Mesothoracic leg: as for prothoracic leg but with anterior surface of coxa white. Metathoracic leg: coxa and femur white mixed with gray brown; tibia mottled white, gray brown, and brown on outer surface, dorsal tuft buff white; tarsal segments pale brown to brown, apices pale. Alar expanse: 17–22 mm. Male genitalia: as in figure 75 (RWH slide 2595). Female genitalia: as in figure 147 (RWH slide 2627).

Food plant: *Stenatopsis linearifolius* (de Candolle) Rydberg, leaf tier. *Ericameria cuneata* (Gray) McClatchie.

Type: Male, Mt. Shasta, Calif., Aug. 19, 1939, E. C. Johnston USNM type 67651.

Paratypes:

UNITED STATES: CALIFORNIA: same data as for type, 17 ♂, 4 ♀, CNC, CPK, USNM; 8 mi NW Chester, Plumas Co., 1 ♂, Aug. 18, 1958, J. Powell, UCB; Desert Springs, San Bernadino Co., 1 ♂, Oct. 17, 1960, Hurd and Powell, UCB; Hungry Valley, 5 mi. S Gorman, Ventura Co., 1 ♀, Oct. 1, 1959, J. Powell, UCB; Jacumba, 1 ♂, Sept. 28, 1924, USNM; La Puerta Valley, 2 ♂, Oct. 16,

1923 (JFGC slide 9909), MCZ, USNM; same locality, 1 ♂, Stephens, USNM; Lovejoy Butte, Los Angeles Co., 1 ♂, iss. Sept. 18, 1942, C. Henne, *ex larva* on *Ericameria cuneata spathulata*, USNM; Palmdale, Los Angeles Co., 7 ♂, 2 ♀, iss. Sept. 8-25, 1939, J. A. Comstock, larva leaf tyer on *Stenatopsis linearifolius* (JFGC slide 9911), LACM, USNM; Sheep Rock, Siskiyou Co., 1 ♂, Sept. 3, 1871, Walsingham, BMNH; Truckee, 1 ♂, Sept. 8-15, USNM. COLORADO: Glenwood Springs, 1 ♀, Aug. 22, 1892, Barnes (RWH slide 2627), USNM; Salida, 1 ♂, Aug. 27, 1938, Sperry, USNM. MONTANA: Butte, 2 ♂, Sept. 12, 1945, E. C. Johnston, CNC. NEW MEXICO: Therma, 1 ♂, Aug. 12, 1932, Klots, AMNH. OREGON: Baker, 1 ♂, Sept. 24, 1946, J. H. Baker, USNM; Biggs, 2 ♂, Oct. 2, 1945, E. C. Johnston, CNC; Crooked R., nr. Ft. Klamath, Jackson Co., 1 ♀, Sept. 21-23, 1871, Walsingham, BMNH; Lake Co., T 23 S, R 14 E, S21, 3 ♂, Aug. 20, 1958, G. R. Kraft (RWH slide 2595), USNM. UTAH: Eureka, 1 ♂, 1 ♀, Aug. 19, 27, 1911, T. Spalding (JFGC slide 9910), USNM; Stockton, 1 ♂, Sept. 1, 1904, T. Spalding, USNM. WASHINGTON: Wenatchee, 2 ♂, Aug. 23 and Sept. 12, 1929, J. F. Clarke (JFGC slide 9908), USNM.

CANADA: BRITISH COLUMBIA: Nicola, 1 ♂, Sept. 6, 1923, E. R. Buckell, CNC; Oliver, 2 ♂, Sept. 5, 16, 1953, D. F. Hardwick, J. E. H. Martin, CNC.

#### Other specimens examined:

CALIFORNIA: Mt. Mono Pass, NW, 12,000 ft., Inyo Co., 1 ♂, Aug. 9, 1959, C. D. MacNeill, CAS; Victorville, San Bernardino Co., 1 ♀, Oct. 12, 1936, C. Dammers (RWH slide 2753), USNM. MONTANA: Boulder, 1 ♀, T. Ulke (RWH slide 2751), USNM.

Discussion: *L. recens* is much like some specimens of *variabilis*, *sironae*, and *rectistrigella*. The most obvious differences are those of the antennae (particularly in the male) in which the sensory areas extend to and slightly on the dorsal surface. In the females the anterior dark brown border of the sensory areas will distinguish this species from the others.

#### *Lita princeps* (Buseck)

FIGURES 31, 86, 153, 203, 204

*Gnorimoschema princeps* Buseck, 1910, Proc. Ent. Soc. Washington, vol. 11, p. 175. *Lita princeps*.—Buseck, 1939, Proc. U.S. Nat. Mus., vol. 86, p. 573.

Maculation: as in figure 31. Head: tongue with white scales basally; maxillary palpus white with a few pale gray brown scales, folded over base of tongue; first segment of labial palpus white mesally, brown laterally, second and third segments white with scattered brown scales; scape of antenna white with dusting of brown scales, dorsal surface of shaft with segments brown basally, buff white distally, ventral surface buff except for piceous sensory areas; frons white with some pale brown tipped scales; vertex and occiput buff with pale brown tipped scales. Thorax: tegula white with brown tipped scales basally, pale yellow distally; disk pale yellow. Forewing: scales on costal half at base and costal margin buff white with brown tips, scales on area costad and distad of medial brown



streak white to buff white with pale brown apices, scales dorsad of brown streak pale yellow, a few buff tipped scales on outer margin, scales of cilia white to buff white with pale brown tips. Hindwing: fuscous, veins slightly darker than membrane, cilia pale buff brown. Prothoracic leg: coxa white on posterior surface, anterior surface brown (scales white tipped with brown); femur, tibia, and tarsus brown with scattered white scales, solid brown on third through fifth tarsal segments, apices of first and second and base of first tarsal segment white. Mesothoracic leg: as for prothoracic leg but with lateral surface of femur and tibia white and a few white scales at apex of third tarsal segment. Metathoracic leg: coxa and femur white with scattered pale brown scales; tibia white ventrally, buff white with some pale brown tipped scales dorsally, dorsal tuft buff white; first tarsal segment white with some brown scales, segments two through five brownish, apices whitish. Abdomen: dorsal surface ochreous basally, mixed pale brown, white, and buff distally and on ventral surface. Alar expanse: 16.5–20.0 mm. Male genitalia: as in figure 86 (RWH slide 2565). Aedeagus stout, maximum width one-fifth maximum length. Female genitalia: as in figure 153 (RWH slide 2564).

Food plant: Unknown.

Type: Female, USNM.

Specimens examined:

UNITED STATES: CALIFORNIA: Barton Flats, San Bernardino Co., 1 ♂, Oct. 13, 1945, Sperry, AMNH; Jacumba, 1 ♀, Oct. 1, 1924, (RWH slide 2596), USNM; Rock Creek, 1 mi. W of Tom's Place, Mono Co., 3 ♂ Sept. 6, 1960, C. D. MacNeill, CAS; Upper Santa Ana River, San Bernardino Co., 1 ♂, 12 ♀, Sept. 14–20, 1947 and 48, Sperry (RWH slide 2564) CPK, USNM; no further locality, 1 ♀, BMNH. COLORADO: Durango, 1 ♀, Sept. 26, 1945, E. C. Johnston, CNC; Mesaverde, 2 ♂, Sept. 27, 1945, E. C. Johnston (RWH slide 2565), CNC, USNM. IDAHO: Hagerman, Blue Gulch, 1 ♀, Sept. 23, 1932, USNM. MONTANA: Butte, 1 ♀, Sept. 12, 1945, E. C. Johnston, CNC. NEW MEXICO: Frijoles Canyon, 1 ♂, Sept. 8, 1941, Sperry, USNM. OREGON: Crooked River, nr. Ft. Klamath, Jackson Co., 6 ♂, 16 ♀, Sept. 21–23, 1871, Walsingham, BMNH; 15 mi. NW of Vale, 1 ♂, Sept. 9, 1962, K. Goeden, USNM. UTAH: Dividend, 5 ♂, 9.28, BMNH; Eureka, 1 ♂, 1 ♀, Aug. 27, 1911, T. Spalding, LACM, USNM; Stockton, 1 ♂, 1 ♀, Aug. 29 and Sept. 12, T. Spalding, USNM. WASHINGTON: Dry Falls, 1 ♂, 3 ♀, Sept. 11, 1945, E. C. Johnston, CNC; Pullman, 1 ♂, Sept. 23, 1925, J. F. Clarke (JFGC slide 3237), USNM; Satus Creek, Yakima Co., 2 ♂, 1 ♀, Sept. 16, 19, 1949, E. C. Johnston, CNC; Wenatchee, 5 ♂, Aug. 21–Sept. 5, 1929, J. F. Clarke (AB slide Apr. 4, 1931), USNM.

CANADA: BRITISH COLUMBIA: Oliver, 1000 ft. 3 ♂, Aug. 28–Sept. 5, 1953, D. F. Hardwick, CNC; same locality, 2 ♂, 1 ♀, Sept. 8–15, 1953, J. E. H. Martin, CNC.

Discussion: *Lita princeps* differs from the other species of *Lita* by having the two black dashes in the cell usually joined and broad. In

most specimens the remainder of the forewing is pale and thus contrasts sharply with the black dash.

Color variation occurs in *princeps* to the extent of a general darkening of all areas. The color description given above was made from a relatively light colored specimen. In some specimens the longitudinal streak on the forewing is divided into its two component parts; however, I have seen no specimens in which the faint longitudinal streaking, typical of *variabilis*, is present.

*Lita jubata*, new species

FIGURES 32, 63, 64, 77, 141, 205, 206

Maculation: as in figure 32. Head: tongue whitish basally; maxillary palpus buff white, folded over base of tongue; labial palpus whitish, first segment with pale brown scales basally, second segment with brown scales on anterior, medial, and lateral surfaces, third segment solid white on anterior edge, with brown scales elsewhere; antenna cinereous brown, scape and apical half of shaft darker than base of shaft; lower portion of frons pale buff; vertex buff brown; occiput paler than vertex; frontovertical processes as in figures 63 and 64. Thorax and forewing pale buff; darker markings of forewing brown and black; cilia pale, scale apices slightly darker. Hindwing: fuscous, cilia fuscous yellow. Legs: buff white overlaid with brown basally, darker distally, apices of tibiae and first through third or fourth tarsal segments pale. Abdomen: first three terga cinereous yellow, caudal ones greasy pale brown, sterna greasy brown with pale buff apices. Alar expanse: 16–20 mm. Male genitalia: as in figure 77 (JFGC slide 9903). Female genitalia: as in figure 141 (JFGC slide 9905).

Food plant: *Chrysothamnus viscidiflorus* Nuttall and *C. nauseosus* (Pallas) Britten. Specimens were reared from the flowers.

Type: Male, Satus Creek, Yakima Co., Washington, Sept. 19, 1949, E. C. Johnston, CNC.

Paratypes:

CALIFORNIA: 9 mi. S Bridgeport, Mono Co., 3 ♀, Sept. 10, 1957, *ex* flowers *Chrysothamnus*, J. A. Chemsak, UCB, USNM; 1 mi. S Hobart Mills, 1 ♀, Sept. 1, 1957, *Chrysothamnus viscidiflorus typicus*, J. M. Linsley, UCB; Nevada Co., 2 ♀, September (JFGC slide 9905), USNM; Sagehen near Hobart Mills, 1 ♀, Sept. 5, 1957, B. J. Adelson, UCB; Sheep Rock, Siskiyou Co., 1 ♂, Sept. 3, 1871, Walsingham, BMNH; 3 mi. N Terro, Lassen Co., 1 ♀, Sept. 7, 1957, *Chrysothamnus nauseosus speciosus*, J. A. Chemsak, UCB; Twin Lakes, Alpine Co., 1 ♂, Aug. 21, 1936, E. C. Johnston (JFGC slide 4079), USNM. COLORADO: Denver, 1 ♀, Oslar, LACM; Glenwood Springs, 6 ♂, August and September (JFGC slide 9902), MCZ, USNM; Rock Creek vic. Colorado Springs, 1 ♂, Aug. 25, 1935, Klots, AMNH; Salida, 3 ♂, Aug. 26, 27, 1938, Sperry, AMNH, USNM; South Park,

1 ♂, Aug. 21, 1905, LACM. IDAHO: Hagerman-Blue Gulch, 2 ♂, Sept. 23, 1932, USNM; Idaho Falls, Bonneville Co., 1 ♀, Sept. 9, 1950, Rindge, AMNH. MONTANA: Boulder, 1 ♂, 1 ♀, USNM; Bozeman, 1 ♂, Aug. 20, 1928, J. McDunnough, CNC. UTAH: Stockton, 4 ♂, Sept. 1-7, 1904, T. Spalding (JFGC slide 9903), USNM. WASHINGTON: Pullman, 1 ♂, Sept. 18, 1930, J. F. Clarke, CU; Satus Creek, Yakima Co., 21 ♂, 1 ♀, Sept. 16, 19, 1949, E. C. Johnston (RWH slide 2634), CNC, USNM; Wenatchee, 2 ♂, Sept. 5, 1929 (JFGC slide 9904), USNM.

Discussion: *L. jubata* is a striate winged *Lita* of the *rectistrigella* genitalic group. It may be distinguished from the other known species by the frontovertical processes (figs. 63, 64). In *jubata* the vertical process has a linear cross section; other striate winged species have a circular cross sectioned vertical process or lack processes.

*Lita nefrens*, new species

FIGURES 33, 34, 57, 60, 71, 138, 207, 208

Maculation: as in figures 33 and 34. Head: scales of tongue brown, pale basally, a medial row of white scales basally; maxillary palpus buff white, folded over base of tongue; first segment of labial palpus white mesally, brown on lateral surface, second segment mainly white with a few brown scales on mesal and posterior surfaces, a small dorsobasal patch of brown scales on lateral surface, and a narrow row of brown scales on anterior surface, third segment mainly brown with scattered buff white scale segments, anterior surface white; scape of antenna brown with scattered buff scale segments, shaft ocherous becoming darker apically (♂), shaft brown dorsally, ocherous ventrally, brown apically (♀); frons buff white; vertex and occiput buff brown, scales pale basally, darker apically; frontovertical processes as in figures 57 and 60. Thorax: brown, many scales with buff brown streaks, tegulae brown basally, buff brown apically. Forewing: brown, many scales with buff streaks, light streaks white, buff white or buff; cilia buff white, scale apices pale brown. Hindwing: fuscous with pale ocher reflections, cilia buff. Prothoracic leg: brown; posterolateral surface of coxa white; posterior surface of femur and tibia with many white scales; apices of coxa, femur, tibia, and first two tarsal segments white or off white. Mesothoracic leg: much as for prothoracic leg but with more white scales, tibia with a medial white fascia, base of basitarsus white. Metathoracic leg: with more white than first two, dorsal tibial tuft buff white, dorsal surface of tarsal segments buff white apically. Abdomen: greasy cinereous, dorsum lighter than venter, apices of segments pale. Alar expanse: 15-22 mm. Male genitalia: as in figure 71 (RWH slide 2638). Aedeagus of *rectistrigella* type. Female genitalia: as in figure 138 (RWH slide 2639).

Food plant: *Chrysothamnus nauseosus* (Pallas) Britten.

Type: Male, Sonora Pass, Tuolumne Co., Calif., Aug. 21, 1959, J. Powell, CAS.

Paratypes:

CALIFORNIA: 9 mi. S Bridgeport, Mono Co., 4 ♀, Sept. 10, 1959, J. A. Chemsak, UCB; Monachee Meadows, 8000 ft., Tulare Co., 1 ♀, Aug. 8-15, USNM; Nevada Co., 1 ♀, Sept., G. Willett, LACM; Ravendale, Lassen Co., 2 ♂, 3 ♀, Sept. 7, 1957, *Chrysothamnus nauseosus speciosus*, B. J. Adelson, UCB; same data as type, 4 ♂, 1 ♀ (RWH slide 2638), UCB, USNM; same locality as type, 1 ♀, Aug. 15, 1959, G. I. Stage (RWH slide 2639), USNM; 1 mi. W Tom's Place, Mono Co., 1 ♂, Aug. 13, 1957, J. Powell, *Chrysothamnus nauseosus consimilis*, UCB; Upper Santa Ana R., San Bernardino Co., 1 ♂, Sept. 22, 1947, Sperry, USNM; Westgard Pass, Inyo Co., 1 ♂, 4 ♀, Sept. 14, 15, 1938, G. Willett, LACM. COLORADO: Durango, 3 ♂ Sept. 26, 1945, E. C. Johnston, CNC; Glenwood Springs, 1 ♂, August 1899, MCZ; Lamar, 7 ♂, Sept. 24, 1945, E. C. Johnston, CNC, USNM. NEW MEXICO: Embido, 1 ♂, Sept. 26, Cockerell, USNM. NEVADA: Montgomery Pass, Mineral Co., 3 ♂, 3 ♀, Sept. 16, 1939, Geo. Willett, LACM; Mt. Magruder, Esmeralda Co., 3 ♀, Sept. 19, 1939, Geo. Willett, LACM, USNM. UTAH: Stockton, 1 ♂, Sept. 5, 1904, T. Spalding, CU. WASHINGTON: Dry Falls, 1 ♂, Sept. 11, 1945, E. C. Johnston, CNC.

Other specimens examined:

CALIFORNIA: Rock Cr., 1 mi. W Tom's Place, Mono Co., 2 ♀, Sept. 6, 1960, C. D. MacNeill, CAS; Sonora Pass, Tuolumne Co., 1 ♂, Aug. 21, 1959, C. W. O'Brien, CAS.

Discussion: *L. nefrens* is a striate-winged species with frontovertical processes. It may be separated from *jubata* by the circular cross section of the dorsal process, that of *jubata* has a linear cross section.

The color description of *nefrons* was taken from the type. Some specimens are lighter in hue.

#### *Lita invariabilis* (Kearfott)

FIGURES 35, 59, 79, 134, 209, 210

*Gelechia invariabilis* Kearfott, 1908, Journ. New York Ent. Soc., vol. 16, p. 184.  
*Lita invariabilis*.—Busck, 1939, Proc. U.S. Nat. Mus., vol. 86, p. 573.

Maculation: as in figure 35. Head: tongue pale gray basally, slightly darker distally; maxillary palpus pale gray, folded over base of tongue; first segment of labial palpus nearly white, outer surface tinged with yellow, second segment pale gray dusted with brown, third segment brown dusted with pale gray; scape of antenna pale gray basally becoming light piceous distally, shaft piceous on dorsal surface, ocherous on ventral surface of basal half, piceous on distal half; frons pale buff; vertex and occiput with buff brown-tipped scales medially. Thorax: tawny with scattered pale buff and brown scales. Forewing: costal margin brown intermixed with buff from base to two-thirds length of wing; a broad pale buff band from near base to three-fourths length

of wing, margined dorsally by off white; sinuous marking dark brown; area dorsad of this line fulvous; an off-white fascia at three-fourths followed by a mixture of dark brown, fulvous, and gray brown scales; cilia medium gray. Hindwing: pale fuscous, veins slightly darker; cilia and tuft of scales on vein 1 pale buff. Prothoracic leg: coxa, femur, and tibia dark brown overlaid with off white scales; tarsal segments dark brown on anterior and lateral surfaces, base of first and apices of first through third segments off white. Mesothoracic leg: coxa white tinged with pale buff; femur off white, heavily dusted with dark brown; tibia brown with a fascia at one-half and another at apex; tarsus dark brown with base of first and apices of first through third segments off white. Metathoracic leg: coxa and femur off white with scattered brown scales; tibia off white, dorsal scale tuft pale buff, a brown scale patch at two-fifths and another at four-fifths; tarsus brown, first segment with off white basally and apically, second through fifth segments off white apically. Abdomen: buff dorsally, off white to buff ventrally. Alar expanse: 18-22 mm. Male genitalia: as in figure 79 (RWH slide 2592). Heavily sclerotized flange of aedeagus sickle shaped, apex sharply acute, ductus ejaculatorius simplex one-and-one-third to one-and-one-half length of aedeagus. Female genitalia: as in figure 134 (RWH slide 2593).

Food plant: Unknown.

Type: Male, USNM.

Specimens examined:

ARIZONA: Mohave Co., 1♂, Sept. 24-30, USNM. CALIFORNIA: Inyo Co., 5-6000 ft., 4♂, 1♀, Oct. 15-30, 1922, O. C. Poling (RWH slides 2592 and 2593), USNM; Round Valley, Inyo Co., 4♂, 1♀, Oct. 15-30, 1921, O. C. Poling (AB slides Apr. 20, 1937 and Apr. 21, 1937), CAS, USNM; Willow Creek, Siskiyou Co., 1♀, Sept. 10-11, 1871, Walsingham, BMNH. COLORADO: Boulder, 1♀, Sept. 5, Cockerell, USNM; Salida, 2♂, Aug. 26, 1938, Sperry, USNM. NEW MEXICO: Gallinas Canyon, 1♀, BMNH; Gallup, 1♂, Sept. 11, 1961, R. W. Hodges, USNM. OREGON: Biggs, 1♀, Oct. 2, 1945, E. C. Johnston, CNC. UTAH: Dividend, 2♀, 9.28, BMNH; Eureka, 1♂, Sept. 2, 1911, T. Spalding, USNM; Stockton, 3♂, 3♀, Sept. 5-8, 1904, T. Spalding (AB slides Sept. 26, 1934 and Apr. 28, 1937), BMNH, USNM.

Discussion: No other known species of *Lita* has the strongly marked, angular line on the forewing. *L. invariabilis* has, as the name implies, a stable color pattern. Observed variation occurs on the forewings with the dorsal half basally and the apical third ranging from pale to dark red brown.

### *Arla* Clarke

*Arla* Clarke, 1942, Proc. U.S. Nat. Mus., vol. 92, p. 269.

Type-species: *Arla tenuicornis* Clarke, 1942, original designation.

Head: smooth scaled; tongue extending beyond metathoracic

coxa, scaled to one-third; maxillary palpus folded over base of tongue; labial palpus recurved, second segment slightly longer than third, all segments slender, apex acute; antenna simple, two-thirds to three-fourths length of forewing, length of basal segments two-thirds width in male, three-halves width in female, pecten absent. Forewing: broadly lanceolate, apex broadly acute; 12 veins present; 6 closer to 7 and 8 than to 5 basally; 7 and 8 stalked, 7 to costa. Hindwing: trapezoidal, outer margin moving gradually to termen, termen slightly produced; 8 veins present; 3 and 4 approximate basally; 5 slightly arched costally near base; 6 separate, straight; 7 slightly sinuous;  $R_1$  running into Sc at one-sixth. Male genitalia: valva bilobate, each lobe extending to base, costal lobe longer than ventral one; saccus developed, tapering to apex; apex of juxta nearly attaining apex of valva; aedeagus slender, a heavily sclerotized flange on caudal half; manica heavily spined or unarmed; tegumen long; uncus shaped like capital letter omega, wide scales on caudal margin; gnathos hook-shaped; culcitula present. Female genitalia: signum absent; ductus bursae heavily sclerotized posteriorly, membranous anteriorly; eighth abdominal segment almost membranous; ostium bursae near anterior margin of eighth sternum; apophyses posteriores more than twice length of apophyses anteriores.

*Arla* is closely related to *Lita* but may be readily separated by the bilobed valvae and the lack of a signum. The broad basal antennal segments would appear to be a further development of some *Lita* species that have thickened antennal segments.

Only two species of *Arla* are known, and both of them are from the western tier of states.

### Key to Species of *Arla*

#### BASED ON MACULATION

1. Frons gray white; forewing usually red brown; a brown spot above fold at one-third, one on fold at one-half, and one above end of fold, one at two-thirds length of cell, one at end of cell, and one on costa opposite one at end of fold; alar expanse 14.5-16.5 mm. . . . . ***diversella*** (Busck)
- Frons streaked gray white and gray brown; forewing gray brown; three faint brown spots on forewing, one at middle of fold, one in cell slightly beyond one on fold, and one at end of cell; alar expanse 18.0-22.5 mm. . . . . ***tenuicornis*** Clarke

#### BASED ON MALE GENITALIA

1. Manica with scalelike spines; apex of flange of aedeagus acute; lateral margins of eighth tergum excavated anteriorly (fig. 90) . . . ***tenuicornis*** Clarke
- Manica without scalelike spines; apex of flange of aedeagus relatively blunt; lateral margins of eighth tergum straight (fig. 91) . . . ***diversella*** (Busck)

## BASED ON FEMALE GENITALIA

1. Sclerotized portion of ductus bursae seven times width of ostium bursae; same region longer than apophyses anteriores . . . . . *diversella* (Busck)  
 Sclerotized portion of ductus bursae one and two-thirds width of ostium bursae; same region shorter than apophyses anteriores.

*tenuicornis* Clarke

*Arla tenuicornis* Clarke

FIGURES 36, 89, 90, 152, 211, 212

*Arla tenuicornis* Clarke, 1942, Proc. U.S. Nat. Mus., vol. 92, p. 269.

Maculation: as in figure 36. Head: tongue mixed gray white and brown; maxillary palpus gray white, apex brown; outer surface of first segment of labial palpus pale brown, scale bases gray white, inner surface off white, second and third segments mixed brown and gray white; dorsal surface of antenna greasy brown, ventral surface ocher in male, alternating bands of greasy brown and ocher in female; frons, vertex, and occiput mixed gray white and pale brown. Thorax: light brown, scale bases pale. Forewing: most scales brown tipped, gray white basally, some scales buff tipped. Hindwing: fuscous, cilia gray buff. Prothoracic leg: coxa mixed gray white and brown; femur, tibia, and tarsus brown (scale bases gray white) a few gray white scales on dorsal surface of tibia at base of epiphysis, apex of tibia, apices of tarsal segments, and base of basitarsus nearly white. Mesothoracic leg: coxa off white; femur, tibia, and tarsus mixed brown and gray white, apices of tibia and tarsal segments and base of basitarsus off white. Metathoracic leg: coxa off white, several scales gray white; trochanter, femur, tibia, and tarsus mixed gray white and pale brown; dorsal tibial tuft off white; base and apex of basitarsus and apices of segments two through four off white. Abdomen: dorsal surface mottled gray white and pale brown. Alar expanse: 18.0–22.5 mm. Male genitalia: as in figures 89 and 90 (RWH slide 3226). Female genitalia: as in figure 152 (RWH slide 3154).

Food plant: Unknown.

Type: Male, USNM.

Specimens examined:

CALIFORNIA: The Geysers, Sonoma Co., 5♂ 8♀, June 3, 21, 1938, E. C. Johnston (RWH wing slide 58), CNC, USNM; Lytle Creek, 1♀, May 18, 1936, Sperry (RWH slide 3152), USNM; Scott's Valley, Lake Co., 2♀, June 17–19, 1871, Walsingham, BMNH; Shasta Retreat, Siskiyou Co., 3♂, 4♀, June 16–23 (AB slides Feb. 14, 1933 and Sept. 4, 1936; JFGC slide 3768; RWH slide 2613), USNM; Yosemite Valley, 1♂, July 1925, E. H. Nast, CAS. WASHINGTON: Brooks Mem. Park, Klickitat Co., 2♂, May 30, 1949, E. C. Johnston, CNC; Kussi Canyon, Yakima Co., 2♂, May 28, 1949, E. C. Johnston, CNC; Satus

Creek, Yakima Co., 2 ♂, May 28, 1949, E. C. Johnston (RWH slide 3226), CNC, USNM; Stinson Creek, Mason Co., 4 ♂, June 18, 1949, E. C. Johnston, CNC; Warwick, Klickitat Co., 1 ♂, June 9, 1931, T. C. Clarke (JFGC slide 3767), USNM.

Discussion: *A. tenuicornis* may be separated from *diversella* by the relatively uniformly colored forewing, the presence of scalariform spines of the manica, and the broad opening of the ductus bursae. Females of *tenuicornis* approach some specimens of *L. variabilis* in appearance. The lack of a signum will quickly distinguish them from any species of *Lita*.

*Arla diversella* (Busck), new combination

FIGURES 37, 91, 92, 154, 213, 214

*Gelechia diversella* Busck, 1916, Proc. Ent. Soc. Washington, vol. 18, p. 149.

Maculation: as in figure 37. Head: tongue gray white for short distance basally, then brown; maxillary palpus gray white; outer surface of first segment of labial palpus brown, inner surface gray white, second segment gray white dusted with brown, third segment as for second but with more brown on inner surface; dorsal surface of antenna greasy brown, ventral surface ocher (♂); dorsal surface of scape and base of shaft mixed brown and gray white, scales of dorsal surface of shaft brown apically, pale basally, ventral surface alternating buff and brown (♀); frons buff white; vertex and occiput pale gray, scales tipped with pale brown. Thorax: red brown, basal row of scales brown; scales on metathorax gray white. Forewing: red brown, brown, and pale gray, cilia pale gray. Hindwing: fuscous, cilia gray buff. Prothoracic leg: coxa and femur brown mixed with gray white; tibia and tarsus brown, scale bases gray white, apex of tibia, base and apex of basitarsus, and apices of second and third tarsal segments gray white. Mesothoracic leg: coxa gray and white; femur, tibia, and tarsus as for prothoracic leg but with more gray white, apex of fourth tarsal segment gray white. Metathoracic leg: much as for mesothoracic leg but paler, dorsal tibial tuft off white. Abdomen: dorsal surface shining pale gray; ventral surface gray brown, apices of sterna pale. Alar expanse: 14.5–16.5 mm. Male genitalia: as in figures 91 and 92 (RWH slide 2557). Female genitalia: as in figure 154 (RWH slide 2558).

Food plant: *Lotus* species.

Type: Female, USNM.

Specimens examined:

CALIFORNIA: Deer Creek, El Dorado Co., 1 ♂, 1 ♀, iss. May 31 and June 6, 1935, reared from *Lotus*, H. H. Keifer, USNM; La Mesa, San Diego Co., 1 ♂, Apr. 15, 1950, E. C. Johnston, CNC; Moraga Ridge, Alameda Co., 1 ♂, June 11,



1936, H. H. Keifer, CAS; Morro Rock, San Louis Obispo Co., 1 ♀, May 4, 1962, J. Powell, UCB; San Diego Co., 28 ♂, 4 ♀, Apr. 16–June 13, W. S. Wright, Ricksecker (AB slide Mar. 5, 1931; RWH slides 2557 and 2558), LACM, MCZ, USNM.

Discussion: *A. diversella* may be separated from *tenuicornis* as indicated in the keys. The two valval lobes, slender aedeagus, sclerotized ductus bursae, and lack of signum associate *diversella* with *Arla* rather than *Lita*.

The collection record from El Dorado county indicates that *diversella* at least has a wider distribution than coastal Southern California and that it may be found in Oregon and Washington.

### *Neodactylota* Busck

*Neodactylota* Busck, 1903, Proc. U.S. Nat. Mus., vol. 25, p. 835.

Type-species: *Dactylota snellenella* Walsingham, 1888, original designation.

Head: smooth scaled; tongue moderate, scaled for short distance basally; maxillary palpus slightly folded over base of tongue to drooping; labial palpus recurved, slender, second and third segments subequal in length; antenna with pecten absent, two-thirds to four-fifths length of forewing, simple. Forewing: broadly lanceolate; 12 veins present; 2 from cell at two-thirds length of cell; 2, 3, 4, and 5 subparallel; 6 closer to 7 than to 5; 7 and 8 stalked. Hindwing: dimorphic ♂, outer margin deeply emarginated; 6 veins present, 4 and 5 absent; 6 and 7 united to three-fifths, 6 to outer margin, 7 to costa; ♀, wing quadrate, termen produced; 8 veins present; 3 and 4 separate to short stalked; 5 arising closer to 4 than to 6. Male genitalia: valva with two costal lobes; juxta fused with vinculum basally; aedeagus relatively linear. Female genitalia: ostium bursae on anterior margin to middle of eighth sternum; eighth sternum unadorned to slightly so; apophyses posteriores longer than apophyses anteriores.

The species included in *Neodactylota*, as defined above, can be separated from those in *Eudactylota* by the presence of well or moderately well defined spots on the disk of the forewing; by the hindwing shape being dimorphic between the sexes (the outer margin is deeply emarginated in the male with a concomitant loss of veins 4 and 5, whereas the outer margin of the female is normal); and by the valva having two costal lobes.

With the addition of three new species the total known for the genus is four. However, further collecting in Mexico and adjacent areas of the Southwest may reveal that others exist. Unfortunately, very little is known of the distribution of any of the species.

Key to Species of *Neodactylota*

## BASED ON MACULATION

1. Head with metallic lead-colored scales on vertex and occiput.
  - basilica*, new species
  - Head without metallic colored scales . . . . . 2
2. Dark spots of forewing well defined, surrounded by narrow margin of pale colored scales . . . . . 3
  - Dark spots of forewing not well defined, not margined by pale colored scales.
    - egena*, new species
3. Second and third segments of labial palpus dark gray with scattered gray white scales, an anterior gray white line on third segment.
  - snellenella* (Walsingham)
  - Second and third segments of labial palpus pale yellow, third segment becoming brown apically . . . . . *liguritrix*, new species

## PARTIAL KEY BASED ON MALE GENITALIA

1. Medial invagination of juxta extending to base of juxta.
  - snellenella* (Walsingham)
  - Medial invagination of juxta one-third length of juxta . . . . . 2
2. Distal costal lobe of valva curved and slightly twisted, very slender on distal half . . . . . *liguritrix*, new species
  - Distal costal lobe straight, gradually tapering to apex.
    - basilica*, new species

## PARTIAL KEY BASED ON FEMALE GENITALIA

1. Eighth tergum produced medially (fig. 157) . . . . . *basilica*, new species
  - Eighth tergum not produced medially . . . . . 2
2. Eighth sternum heavily sclerotized, caudal margin emarginate medially, a semicircular sclerotized band parallel with caudal margin (fig. 156).
  - egena*, new species
  - Eighth sternum lightly sclerotized, caudal margin not defined, no special sclerotized bands (fig. 155) . . . . . *snellenella* (Walsingham)

*Neodactylota snellenella* (Walsingham)

FIGURES 38, 93, 95, 155, 215, 216

*Dactylota snellenella* Walsingham, 1888, Insect life, vol. 1, p. 84.*Neodactylota snellenella*.—Busck, 1903, Proc. U.S. Nat. Mus., vol. 25, p. 836.

Maculation: as in figure 38. Head: tongue mottled gray white and brown basally; maxillary palpus gray white with a few brown scales, folded over base of tongue; first segment of labial palpus mainly white with some brown and brown-tipped scales; second segment brown with several white scales, white scales more numerous basally, third segment mainly brown, anterior surface white; scape of antenna brown, scale bases pale, with an anterior white line and a posteroapical white scale row, shaft pale yellow on anterior surface, dorsal surface brown basally, segments brown and pale yellow short

distance beyond base; lower portion of frons gray white, many scales brown tipped medially; scales of vertex and occiput buff brown with brown apices, scales of medial area of vertex gray with metallic reflections. Thorax: scales gray, tipped and streaked with brown; apex of tegula pale buff. Forewing: scales yellow, white, gray, buff, red brown, and brown, often streaked with a light or dark hue; most scales tipped with brown. Hindwing: fuscous, margins of scales darker than remainder of scale, scales shining orange at some angles of light incidence; cilia pale buff. Prothoracic leg: anterior surface of coxa gray white, many scales tipped with brown; femur and tibia brown with several gray white scales, outer surface of femur mainly white, tibia with a white scale row just beyond middle and at apex; tarsus dark brown, scales lighter basally, base and apex of basitarsus and apex of second segment white, apex of third segment with a few white scales. Mesothoracic leg: lighter than prothoracic leg; tibia with an oblique white fascia at one-fourth and another at one-half, apex white; base and apex of basitarsus and apices of second and third segments white. Metathoracic leg: coxa and femur mainly white with scattered brown scales; tibia with a broad white streak at one-fourth and another at three-fifths, apex white, scales of dorsal tuft pale buff basally becoming white distally; tarsal segments gray brown basally, broadly marked with white or gray white apically. Abdomen: terga greasy ocher basally, gray brown distally, apices of terga pale; sterna buff white, scales becoming greasy shortly after death of specimen. Alar expanse: 15.5–18.0 mm. Male genitalia: as in figures 93 and 95 (RWH slide 2150). Distal costal lobe of valva about one-fourth length of basal costal lobe; lobes of juxta nearly separated. Female genitalia: as in figure 155 (RWH slide 3155).

Food plant: Unknown.

Type: Lectotype, present designation; male, bearing following labels: (1) Type. (2) Arizona, Morrison, 1883, 35345. (3) Walsingham Collection, 1910–427. (4) *Dactylota snellenella*, Wlsm., U.S. Dept Agr. Div Ent. Ins. Life. I-84 (1888); Type ♂, descr. (5) BM(NH) ♂ genitalia slide no. 9209. In BMNH.

Specimens examined:

ARIZONA: Huachuca Mts., 1 ♂, Sept. 17, 1903, Osler, BMNH; Santa Rita Mts., Madera Canyon, 4880 ft., Santa Cruz Co., 2 ♂, 1 ♀, May 3–June 7, 1963, J. G. Franclemont (RWH wing slide 80), JGF; no further locality, 1 ♂, 1881, Morrison (RWH slide 2150), USNM; no further locality, 1 ♀, 1883, Morrison (RWH slide 3155), BMNH. TEXAS: Ft. Davis, 5000 ft., 1 ♂, 5. 28, BMNH.

Discussion: The alar expanse of *snellenella* is at least 3 mm. more than that of *basilica*, *liguritrix*, or *egena*. The lack of metallic colored

scales on the vertex and the gray white labial palpi will separate *snellenella* from *basilica* and *liguritrix*, respectively.

In Madera Canyon *snellenella* appears to be a spring species inasmuch as no specimens were taken during the 1959 season from June 29–November 11. On the other hand the specimen from the Huachuca Mts. (less than 50 miles distant) was collected in September; thus, the species may emerge sporadically during the year.

*Neodactylota liguritrix*, new species

FIGURES 39, 102, 106, 217, 218

Maculation: as in figure 39. Head: tongue with mixed buff white and brown scales basally, becoming brown; maxillary palpus buff white, somewhat drooping and curved over base of tongue; first segment of labial palpus nearly white on inner surface, outer surface with brown, second segment pale yellow with some pale brown scales on outer surface at base, third segment yellow, becoming brown apically on inner and anterior surfaces; scape of antenna buff, shaft buff basally, becoming greasy brown distally; frons pale buff; vertex and occiput pale buff, medial scales with dark margins. Thorax: base of tegula and medial area of mesothorax gray brown; apex of tegula and lateral margins of mesothorax pale buff; a lateral dark brown spot on mesothorax near apex of tegula and one at middle of caudal margin; metathorax gray brown to lead colored. Forewing: most scales pale buff, many tipped with gray brown; costal margin gray brown; spots on disk dark brown. Hindwing: fuscous, cilia dark fuscous yellow. Prothoracic leg: gray brown, scale bases pale; some off white scales at base and apex of basitarsus and at apex of second tarsal segment. Mesothoracic leg: coxa with numerous buff white scales on outer surface; femur gray brown; tibia mottled buff and gray brown, mainly buff; dorsal surface of basitarsus and apices of second and third segments off white, remainder gray brown. Metathoracic leg: outer surface of coxa mainly buff, medial scales streaked with brown; trochanter gray brown; femur buff on dorso-lateral margin, gray brown on lateral surface; tibia gray brown laterally, a buff fascia at one-fifth and one at base of first pair of tibial spurs, dorsal tuft buff; apex white; tarsus gray brown on outer surface, dorsal surface of first two and base of third segment pale buff, apices of first four segments pale buff. Abdomen: greasy gray brown dorsally, first two terga with ocher cast; scales of sterna gray brown, pale basally. Alar expanse: 10.5–12.0 mm. Male genitalia: as in figures 102 and 106 (RWH slide 3153). Distal costal lobe slender, somewhat sinuous; apex of basal costal lobe twisted; apex of juxta emarginated. Female genitalia: no specimens available.

Food plant: Unknown.

Type: Male, Corpus Christi, Tex., Mar. 28, 1943, at light W. M. Gordon, CU type 4219.

Paratypes:

Same locality as type, 4♂, Mar. 28 and May 22, 1943, W. M. Gordon (RWH slide 3153, RWH wing slide 75), CU, USNM.

Discussion: In appearance, *liguritrix* is nearest to *basilica*; it differs in lacking metallic lead-colored scales on the vertex and occiput. *N. liguritrix* has the dark spots on the disk much more distinct than does *egena*.

*Neodactylota basilica*, new species

FIGURES 40, 94, 98, 157, 219, 220

Maculation: as in figure 40. Head: tongue buff white basally; maxillary palpus buff white, somewhat drooping; first segment of labial palpus buff white with some gray-brown scales before middle, second segment pale yellow, third segment pale yellow becoming brown black from middle to apex on anterior and inner surfaces; scape of antenna buff white dorsally, gray brown ventrally, shaft ocher basally becoming greasy brown distally, several segments bi-colored; frons buff white; scales of middle of vertex and occiput shining lead colored, lateral scales yellow. Thorax: irregularly mottled with buff white, gray brown, and dark brown; apex of tegula buff white; a lateral dark brown spot on thorax at apex of tegula; caudal margin of mesothorax with a small dark brown spot medially; metathorax with lead gray-colored scales. Forewing: scales buff white with gray-brown apices, spots dark brown; costal margin, especially basally, gray brown. Hindwing: fuscous, cilia slightly paler than membrane. Prothoracic leg: gray brown; a few buff white scales at apex of coxa and at two-thirds and apex of tibia, apices of first two tarsal segments white. Mesothoracic leg: coxa with buff-white scales on outer surface; tibia buff white on dorsal surface; tarsus with buff white on dorsal surface and apex of first and second segments. Metathoracic leg: gray brown; dorsal tuft of tibia buff white; dorsal surface of first two tarsal segments off-white, apex of third and fourth segments buff. Abdomen: lead gray, basal terga with dark ocher reflections; sterna gray brown, first segment buff. Alar expanse 10.5–12.0 mm. Male genitalia: as in figures 94 and 98 (RWH slide 721). Distal costal lobe of valva about one-half length of basal costal lobe; apex of juxta emarginated. Female genitalia: as in figure 157 (RWH slide 1245).

Food plant: Unknown.

Type: Male, Sycamore Canyon, 3800 ft., Santa Cruz Co., Ariz., Sept. 25, 1959, R. W. Hodges, CU type 4220.

## Paratypes:

ARIZONA: Peña Blanca Canyon, Santa Cruz Co., 2♂, 1♀, Aug. 7-Sept. 4, 1959, R. W. Hodges (RWH slides 721, 941, and 1245; RWH wing slides 76 and 79), CU, USNM.

Discussion: The metallic lead-colored scales on the vertex and occiput will separate *basilica* from *snellenella*, *liguritrix*, and *egena*.

*Neodactylota egena*, new species

Figures 41, 156

Maculation: as in figure 41. Head: tongue pale buff; maxillary palpus pale buff, porrect to drooping along base of tongue; labial palpus pale buff to pale yellow, third segment with brown scales; scape of antenna buff with overlay of brown tipped scales, segments of shaft bicolored basally, pale buff and brown, mainly brown distally; frons pale buff; vertex and occiput gray buff with purple reflections medially, a tuft of orange scales above eye. Thorax: gray brown, scale bases pale, caudolateral margins buff. Forewing: nearly uniform gray brown, scale bases pale; marks on disk brown, not strongly contrasting with gray-brown background; cilia buff. Hindwing: fuscous. Prothoracic leg: coxa pale buff; femur, tibia, and tarsus gray brown; femur with numerous pale buff scales; tibia with apex and some scattered scale rows pale buff; base and apex of basitarsus and apex of second tarsal segment pale buff. Mesothoracic leg: much as for prothoracic leg but with more pale scales. Metathoracic leg: coxa buff white; femur buff white with some gray scales; tibia pale brown ventrolaterally, dorsal tuft pale buff, a fascia at base of first pair of spurs and apex pale buff; tarsus pale brown basally becoming darker distally, dorsal surface of basitarsus and part of second segment pale buff, apices of segments pale. Abdomen: not observed before dissection was made. Alar expanse: 10.5 mm. Male genitalia: no specimens available. Female genitalia: as in figure 156 (RWH slide 1532).

Food plant: Unknown.

Type: Female, Madera Canyon, 4880 ft., Santa Rita Mtns., Ariz. Oct. 19, 1959, R. W. Hodges (RWH slide 1532), CU type 4221.

Discussion: The small size immediately separates *egena* from *snellenella*; the relative indistinctness of the dark spots of the forewings separates it from *basilica* and *liguritrix*.

*Eudactylota* Walsingham

*Eudactylota* Walsingham, 1911, in Godman and Salvin, *Biologia Centrali-Americana*, vol. 42 (Lepidoptera-Heterocera, vol. 4), p. 54.

Type-species: *Neodactylota barberella* Busck, 1903, original designation.

Head: smooth scaled; tongue moderate, scaled to one-third or one-half length; maxillary palpus porrect to drooping, somewhat folded over base of tongue; labial palpus recurved, slender, second and third segments subequal in length; antenna with pecten absent, two-thirds to three-fourths length of forewing, simple. Forewing: broadly lanceolate; 12 veins present; 2, 3, 4, and 5 equidistant, subparallel; 7 and 8 stalked, 7 to costa. Hindwing: subquadrate, apex strongly produced, outer margin indented between 5 and 6; 6 and 7 stalked, 6 to outer margin;  $R_1$  showing as cross vein between Sc and Rs. Male genitalia: valva with one costal lobe; juxta fused with vinculum basally, lobes separate, stout setae present near inner margin on distal half; saccus moderate; aedeagus somewhat globose basally; tegumen broad; spined culcitula present; gnathos a strong hook. Female genitalia: ductus bursae long; corpus bursae with a single signum; ostium bursae on eighth sternum, eighth sternum usually with medial folds with numerous fine spines; apophyses posteriores much longer than apophyses anteriores.

Walsingham proposed *Eudactylota* for *barberella* (Busck). Later authors have treated the genus as a synonym of *Neodactylota*; however, the two are distinct on characters of facies, wing shape, venation, and male genitalia as is indicated under *Neodactylota*.

*Stomopteryx iobapta* Meyrick is transferred to *Eudactylota*, and two new species are described bringing the number of known species to four. Nothing is known of the life history of any species, and very little is known of their distribution.

### Key to Species of *Eudactylota*

#### BASED ON MACULATION

1. Anterior surface of third segment of labial palpus with a white line . . . . . 2  
 Anterior surface of third segment of labial palpus without a white line.  
**barberella** (Busck)
2. Second segment of labial palpus with interior ventral margin white, ventral margin black . . . . . **diadota**, new species  
 Ventral margin of second segment of labial palpus with mixed black and white scales . . . . . 3
3. Outer, apical metathoracic tibial spur white basally, gray black distally (usually); pinkish white fascia on forewing relatively narrow, confined apically, buff streaks along costal and outer margins absent or faint.  
**iobapta** (Meyrick)
 Outer, apical metathoracic tibial spur white basally and distally, gray black medially; pinkish white fascia on forewing relatively broad, gradually darkening to apex; buff streaks along costal and outer margins prominent.  
**abstemia**, new species

## BASED ON MALE GENITALIA

1. Lobes of juxta distant basally, width of opening greater than basal width of lobe . . . . . 2
- Lobes of juxta approximate basally . . . . . 3
2. An invaginated sclerotized band between lobes of juxta (fig. 100).  
     . . . . . **diadota**, new species
- No sclerotized band between lobes of juxta . . . . . **barberella** (Busck)
3. Lobes of juxta separated to base, inner margin uniformly sclerotized (fig. 96).  
     . . . . . **iobapta** (Meyrick)
- Lobes of juxta separated to one-third, inner margin where lobes join heavily  
     sclerotized (fig. 105). . . . . **abstemia**, new species

## BASED ON FEMALE GENITALIA

1. Anterior margin of eighth sternum emarginated medially (fig. 160) . . . . . 2
- Anterior margin of eighth sternum not emarginated medially (fig. 158) . . . . . 3
2. Lateral sclerites (folds) of eighth sternum touching medially, caudal margins  
     relatively abruptly angled (70-80 degrees) beyond ostium bursae, no heavily  
     sclerotized ridges caudad of ostium bursae (fig. 160).  
     . . . . . **abstemia**, new species
- Lateral sclerites (folds) of eighth sternum not touching medially, caudal  
     margins diverging after point of closest proximity, later diverging with  
     approximately a 45 degree angle; heavily sclerotized ridges caudad of  
     ostium bursae present (fig. 159) . . . . . **diadota**, new species
3. Lateral sclerites of eighth sternum nearest anteriorly, gradually diverging  
     posteriorly (fig. 158) . . . . . **iobapta** (Meyrick)
- Lateral sclerites of eighth sternum nearest posteriorly, becoming indistinct  
     beyond point of proximity (fig. 161) . . . . . **barberella** (Busck)

***Eudactylota barberella* (Busck)**

FIGURES 42, 101, 103, 161, 221, 222

*Neodactylota barberella* Busck, 1903, Proc. U.S. Nat. Mus., vol. 25, p. 836.*Eudactylota barberella*.—Walsingham, 1911, in Godman and Salvin, Biologia Centrali-Americana, vol. 42 (Lepidoptera-Heterocera, vol. 4), p. 55.

Maculation: as in figure 42. Head: tongue mottled with unicolorous brown and white scales; maxillary palpus white with a few brown scales, curved over base of tongue; first segment of labial palpus white, a dorsolateral row of brown scales, second and third segments brown with scattered white scales, white scales more numerous on basal two-thirds of second segment; dorsal surface of scape of antenna brown, an anterior white line, apex mainly white, ventral surface white, shaft brown with an anterior broken white line, many segments with white scales; frons, vertex, and occiput buff brown, scales with dark apices. Thorax: anterior margin of tegula brown, remainder red brown; mesothorax dark gray brown medially, red brown laterally; metathorax pale buff. Forewing: brown, red brown, gray brown, gray white, and white; many scales with purple reflections. Hindwing: pale fuscous, shining orange at some angles of light incidence, cilia pale fuscous. Prothoracic leg: coxa brown,



heavily overlaid with white; femur brown, moderately overlaid with white; tibia and tarsus brown, scale bases pale, especially on tibia, a white fascia at middle and another at apex of tibia, apices of first three tarsal segments white or with white scales. Mesothoracic leg: as for prothoracic leg. Metathoracic leg: coxa white basally, gray brown with purple reflections distally; trochanter gray brown with a few partially white scales medially, pale buff apically; femur brown heavily overlaid with white; tibia brown, scale bases pale, an oblique white fascia at base of first pair of spurs, apex white, dorsal tuft streaked buff and fuscous; tarsus brown, apices of first four segments white. Abdomen: greasy gray brown dorsally, first two terga somewhat ochreous; ventral surface gray brown, first sternum pale yellow, caudal margin of second sternum pale yellow. Alar expanse: 11–14 mm. Male genitalia: as in figures 101 and 103 (RWH slides 2151 and 2152). Female genitalia: as in figure 161 (RWH slide 2153).

Food plant: Unknown.

Type: Female, USNM.

Specimens examined:

UNITED STATES: ARIZONA: Dewey, 1 ♀, June 16–23, USNM; Fort Valley, 7½ mi. NW Flagstaff, 7350 ft., Coconino Co., 10 ♂, 3 ♀, June 21–Aug. 21, 1961, R.W. Hodges (RWH slides 2152–2154; RWH wing slide 67), BMNH, CU, USNM; Hart Prairie, 10 mi. NNW Flagstaff, 8500 ft., Coconino Co., 3 ♂, June 23 and July 14, 1961, R.W. Hodges (RWH slide 2151), CU, USNM; Williams, 1 ♀, May 27, H.S. Barber (RWH slide 2149), USNM. COLORADO: Boulder, 1 ♀, USNM; Boulder, University of Colorado Campus, 1 ♀, July 16, T.D.A. Cockerell, USNM. NEW MEXICO: Las Vegas, 1 ♀, Aug. 11, H.S. Barber (RWH wing slide 68).

MEXICO: GUERRERO: Amula, 6000 ft., 1 ♀, Aug. 18, H.H. Smith, USNM.

Discussion: *E. barberella* may be quickly separated from the other species of *Eudactylota* by the lack of an anterior white line on the third segment of the labial palpus. The male genitalia are nearest those of *iobapta* but differ by having the lobes of the juxta slightly swollen before the apex; those of *iobapta* taper gradually to the apex.

*Eudactylota iobapta* (Meyrick), new combination

FIGURES 43, 96, 97, 158, 223, 224

*Stomopteryx iobapta* Meyrick, 1927, Exot. Micr., vol. 3, p. 352.

Maculation: as in figure 43. Head: tongue with white and gray brown scales basally; maxillary palpus white, somewhat drooping at side of tongue; first segment of labial palpus white with a brown saddle near apex, second segment brown heavily dusted with white, third segment brown with an anterior white line and an interrupted white line on inner surface from near base to three-fifths, posterior surface mainly white; antenna brown, scape with an anterior white line

continued on shaft as a broken line, a posterior broken white line on shaft from base to beyond one-half; ventral margin of frons white followed by a series of brown and white scales running from anterior margin of eye to middle; vertex and occiput buff brown, scales with dark apices, all with metallic reflections. Thorax: tegula and mesothorax shining orange brown, mesothorax gray brown mesally; metathorax buff. Forewing: mainly shining orange brown, costal margin mixed brown and white, fascia off white, a buff streak on costal margin starting at fascia, cilia buff. Hindwing: fuscous, shining orange brown at certain angles of light incidence, cilia pale fuscous. Prothoracic leg: coxa and femur brown moderately dusted with white; tibia brown with a few scattered white scales, a white streak above base of epiphysis, apex white; tarsus brown, apices of first three segments white. Mesothoracic leg: coxa mainly white, some gray brown scales medially; femur speckled greasy white and brown; tibia brown, scale bases pale, a white fascia at one-half, apex white; tarsus brown, apices of first four segments white. Metathoracic leg: coxa white, gray medially; trochanter mixed gray brown and white; femur speckled brown and white; tibia mainly brown on outer surface, scale bases pale, a white fascia at base of first pair of spurs, apex white, tuft buff to white; tarsus brown, scale bases pale on first segment, apices of first four segments white. Abdomen: greasy gray brown dorsally, first two terga somewhat dark ocher; ventral surface gray brown, scales at apices of sterna with buff white streaks, first sternum pale yellow. Alar expanse: 9-13 mm. Male genitalia: as in figures 96 and 97 (RWH slide 2164). Female genitalia: as in figure 158 (RWH slide 2161).

Food plant: Unknown.

Type: Male, BMNH.

Specimens examined:

UNITED STATES: ARIZONA: Chiricahua Mts., nr. Portal, 3 ♀, July 4 and 8, 1939, A.F. Braun, AFB; Madera Canyon, 4880 ft., Santa Rita Mtns., Santa Cruz Co., 18 ♂, 13 ♀, June 29-Aug. 30, 1959, R.W. Hodges (RWH slides 944, 2160, 2164; RWH wing slide 69), CU, USNM; Palmerlee, 1 ♂, BMNH; Peña Blanca Canyon, Santa Cruz Co., 1 ♂, 15 ♀, Aug. 7-26, 1959, R.W. Hodges (RWH slides 2161 and 2166; RWH wing slide 70), CU, USNM; same locality, 1 ♀, June 7, 1963, J.G. Franclemont, JGF; 4 mi. ESE Pine, 5400 ft., Gila Co., 2 ♀, Sept. 1 and 5, 1961, R.W. Hodges (RWH slide 2163), USNM; West Fork, 6500 ft., 16 mi. SW Flagstaff, Coconino Co., 1 ♂, July 13, 1961, R.W. Hodges (RWH slide 2162), USNM. TEXAS: Alpine, Brewster Co., 1 ♂, 2 ♀, May 22, 1950, E.C. Johnston, CNC; Ft. Davis, Jeff Davis Co., 2 ♀, May 20, 1950, E.C. Johnston, CNC; Limpia Canyon, Jeff Davis Co., 4 ♂, 1 ♀, May 20-June 4, 1950, E.C. Johnston, CNC; Brewster Co., 5000 and 7000 ft., 4 ♂, 5 ♀, 3.28-4.26, AFB, BMNH.

MEXICO: MEXICO: ruins of Teotihuacán, 1 ♂, 1 ♀, July 25, 1963, Duckworth and Davis (RWH slides 3462 and 3463), USNM. NUEVO LEON: 3 mi. E

Galeana, 5000 ft., 2 ♂, 8 ♀, Aug. 7-9, 1963, Duckworth and Davis (RWH slides 3333-3335), USNM.

Discussion: Some specimens of *iobapta* are very near *abstemia* in maculation, and for these the genitalia should be examined for placement. The uniformly sclerotized inner margin of the lobes of the juxta will separate *iobapta* from *abstemia* and *diadota*; the lobes of the juxta tapering to the apex will separate *iobapta* from *barberella*.

Specimens vary in the coloration of the forewings: Some are golden brown, others dark brown.

*Eudactylota diadota*, new species

FIGURES 44, 99, 100, 159, 225, 226

Maculation: as in figure 44. Coloration: as for *iobapta* except for the following: second segment of labial palpus with a black ventral line, third segment with a white line on anterior and posterior surfaces; forewing with pink scales on costal margin from fascia to apex; metathoracic tibia with an oblique white fascia starting at one-fifth, another starting just before first pair of spurs; abdomen gray buff dorsally, apices of segments buff white, pale gray buff ventrally, apices of segments pale. Alar expanse: 9.5-12.0 mm. Male genitalia: as in figures 99 and 100 (RWH slide 2157). Female genitalia: as in figure 159 (RWH slide 946).

Food plant: Unknown.

Type: Male, Madera Canyon, 4880 ft., Santa Rita Mtns., Ariz., June 29, 1959, R. W. Hodges (RWH slide 2156), CU type 4222.

Paratypes:

Same locality as type, 6 ♂, 13 ♀, June 29-Aug. 27, 1959, R.W. Hodges (RWH slides 946, 2157, and 2158; RWH wing slides 71 and 72), BMNH, CU, USNM.

Discussion: Superficially, *diadota* is similar to *iobapta* and *abstemia* but differs in having a black line on the anterior surface of the labial palpus. The pink on the outer costal margin will separate *diadota* from the other species of *Eudactylota*.

*Eudactylota abstemia*, new species

FIGURES 45, 104, 105, 160, 227, 228

Maculation: as in figure 45. Coloration: as for *iobapta*; forewing with more pinkish-white scales. Alar expanse: 8-11 mm. Male genitalia: as in figures 104 and 105 (RWH slide 942). Female genitalia: as in figure 160 (RWH slide 2155).

Food plant: Unknown.

Type: Male, Madera Canyon, 4880 ft., Santa Rita Mtns., Ariz., Aug. 12, 1959, R.W. Hodges (RWH slide 942), CU type 4223.

Paratypes:

Same locality as type, 5 ♂, 21 ♀, July 14-Aug. 28, 1959, R.W. Hodges (RWH

slides 943, 945, and 2155; RWH wing slides 73 and 74), AMNH, BMNH, CAS, CNC, CU, and USNM.

Discussion: *E. abstemia* may be separated from *barberella* by the presence of an anterior white line on the third segment of the labial palpus; from *diadota* by the ventral margin of the second segment of the labial palpus having white scales; and from *iobapta* by the juxtal lobes being heavily sclerotized on the inner basal one-third. The females of *abstemia* and *iobapta* may be separated by the ostium bursae being near the caudal margin of the eighth sternum in *abstemia*, at one-third in *iobapta*.

### *Friseria* Busck

*Friseria* Busck, 1939, Proc. U.S. Nat. Mus., vol. 86, p. 573.

Type-species: (*Gelechia lindenella* Busck, 1903) = *Gelechia cockerelli* Busck, 1903, original designation.

Head: smooth scaled; tongue moderate, scaled to one-third or one-half; maxillary palpus folded over base of tongue; labial palpus recurved, second and third segments subequal in length, second segment slightly thicker than third, apex acute; antenna two-thirds length of forewing, ciliate in male, simple in female, pecten absent. Forewing: broadly lanceolate, apex broadly acute; 12 veins present; 7 and 8 stalked, 7 to costa. Hindwing: trapezoidal, outer margin gradually moving to termen, apex scarcely produced; 8 veins present; 3 and 4 approximate to connate; 5 arching costally beyond base; 6 and 7 approximate to stalked, usually separate; 7 sinuous;  $R_1$  running into Sc at one-fifth. Male genitalia: valva with costal lobe free, two other lobes from ventral margin of costal lobe (variously developed); vinculum narrow laterally, saccus broadly rounded; aedeagus with base expanded; tegumen broad, gnathos hook shaped; culcitula present; uncus short, caudal margin with long, stout setae. Female genitalia: signum a plate with an inwardly projecting flange from each end (flange very small to large and heavily sclerotized); eighth sternum with lateral folds; ostium bursae near caudal margin of eighth sternum; apophyses posteriores longer than apophyses anteriores.

*Friseria* is nearest to *Rifseria* and *Sriferia*. The genera may be separated as indicated under *Rifseria*.

Some species of *Friseria* have maculation very similar to that of *Parastega* Meyrick species, and the venation of neither is diagnostic; however, the male genitalia of *Parastega* are characterized by having asymmetrical, single lobed valvae and a long uncus which lacks enlarged setae on the caudal margin. The signum of *Parastega* is as for *Gelechia*.

The known species of *Friseria* occur in the Southwest and Mexico; thus, the genus may have evolved in the Mexican highlands.

Busck (1939) proposed *Friseria* for *cockerelli*, *lindenella*, *malindella*, *sarcochlora*, *repentina*, and *fuscotaeniella*. Of these *lindenella*, *malindella*, and *sarcochlora* are synonyms of *cockerelli*, and *fuscotaeniella* is removed to *Risera*, new genus; *F. infracta* (Walsingham) and *lacticaput* (Walsingham) are transferred from *Gelechia*, and *acaciella* (Busck) is transferred from "*Telphusa*." Two new species, *nona* and *caieta*, are described, bringing the number of recognized species to seven.

### Key to Species of *Friseria*

#### BASED ON MACULATION

1. Forewing white overlaid with black; two patches of raised scales on fold, one dorsad of fold, and one at end of cell . . . . . *caieta*, new species  
Forewing brown, no patches of raised scales . . . . . 2
2. Forewing dark purplish brown basally, followed by an oblique white or buff fascia running from costa to half way between fold and dorsum . . . . . 5  
Forewing pale brown basally, if dark brown, not followed by pale colored fascia . . . . . 3
3. Forewing with middle third purplish black . . . . . 4  
Forewing varying shades of brown, never with a broad black band at middle . . . . . *cockerelli* (Busck)
4. Forewing with an oblique dark brown fascia at one-third, bordered basally by orange scales; outer third of costal margin uniformly dark with black tipped, gray scales . . . . . *repentina* (Walsingham)  
Forewing usually lacking complete dark brown fascia at one-third; costal margin pale orange brown with dark streaks, scales usually tipped with white, preceded by black . . . . . *nona*, new species
5. Head and basal half of thorax uniformly buff . . . *lacticaput* (Walsingham)  
Head and thorax mottled brown . . . . . 6
6. Apex of white fascia attenuated (fig. 52) . . . . . *acaciella* (Busck)  
Apex of white fascia not attenuated (fig. 54) . . . . . *infracta* (Walsingham)

#### BASED ON MALE GENITALIA

1. Culcitula spined . . . . . 2  
Culcitula bare . . . . . *cockerelli* (Busck)
2. Culcitula large, extending laterally beyond base of gnathos, culcicular setae more than twice medial height of culcitula (fig. 112) . . . . . 3  
Culcitula small, not extending laterally beyond base of gnathos; culcicular setae not extending laterally beyond base of gnathos; culcicular setae less than one-fourth medial height of culcitula (fig. 118) . . . . . 4
3. Medial lobe of valva with distal margin convex, apex truncate (fig. 116).  
*nona*, new species  
Medial lobe of valva with distal margin sinuate, apex acute (fig. 122).  
*repentina* (Walsingham)
4. Costal lobe of valva with a lobe from ventral surface at one-half its length, valva appearing quadrilobate (fig. 117) . . . . . *acaciella* (Busck)  
Costal lobe of valva lacking such a lobe, valva appearing trilobate (fig. 113) . 5
5. Costal lobe of valva with a ventral flange on distal half . . . . . 6  
Costal lobe of valva without a ventral flange on distal half (fig. 120).  
*lacticaput* (Walsingham)

6. Lobes from ventral margin of valva more than one-half length of valva (fig. 113) . . . . . *caieta*, new species  
 Lobes from ventral margin of valva less than one-fourth length of valva (fig. 115) . . . . . *infracta* (Walsingham)

*Friseria cockerelli* (Busck)

FIGURES 46, 47, 107-110, 162, 229, 230

*Gelechia cockerelli* Busck, 1903, Proc. U.S. Nat. Mus., vol. 25, p. 871.

*Friseria cockerelli*.—Busck, 1939, Proc. U.S. Nat. Mus., vol. 86, p. 573.

*Gelechia lindenella* Busck, 1903, Proc. U.S. Nat. Mus., vol. 25, p. 876. [New synonymy.]

*Gelechia malindella* Busck, 1910, Proc. Ent. Soc. Washington, vol. 11, p. 179. [New synonymy.]

*Gelechia sarcochlora* Meyrick, 1929, Exot. Micr., vol. 3, p. 491. [New synonymy.]

Maculation: as in figures 46 and 47. Head: tongue mixed gray white and pale brown; maxillary palpus creamy white; outer surface of first segment of labial palpus gray brown (scales pale basally), inner surface white, outer surface of second segment gray brown on basal half, mixed white and gray brown distally, inner surface white with some gray-brown scales near apex, third segment mixed gray brown and pale gray, posterior surface nearly white; dorsal surface of scape of antenna dark brown, ventral surface buff, individual scales of dorsal surface of shaft ocher basally, brown distally, ventral surface pale ocher; frons and lower vertex creamy white, a few dark brown scales before anterior margin of eye; scales of upper vertex and occiput pale buff, apices pale gray brown. Thorax: mixed brown and buff. Forewing: buff, brown, gray brown, and red brown. Hindwing: fuscous, cilia pale buff. Prothoracic leg: coxa mixed creamy white and brown, apex creamy white; femur mixed gray white and brown with a purple cast at certain angles of light incidence; tibia brown with a buff fascia at base of epiphysis and at apex, scale bases pale; tarsus brown, base and apex of basitarsus and apex of second segment pale buff. Mesothoracic leg: coxa and trochanter creamy white; femur mixed gray white and brown; tibia brown, scale bases pale, a scale tuft at middle, apex of scale tuft and of tibia pale buff; tarsus brown, base and apex of basitarsus and apex of second segment pale buff. Metathoracic leg: coxa creamy white basally, gray distally; trochanter creamy white; femur mixed white and brown; tibia mixed creamy white, brown, and pale brown, tuft pale buff, outer tibial spurs brown; tarsus brown and creamy white, apices of first four or all segments pale. Abdomen: mottled gray brown, ventral surface with several gray-white scales. Alar expanse: 12-17 mm. Male genitalia: as in figures 107-110 (RWH slides 1706 and 3224). Female genitalia: as in figure 162 (RWH slide 3225).

Food plant: *Prosopis* spp. Leaf feeder.

Types: *cockerelli*, female, USNM; *lindenella*, male, USNM; *malindella*, male, USNM; and *sarcochlora*, male, BMNH.

Specimens examined:

UNITED STATES: ARIZONA: Ajo, 5♂, 1♀, Mar. 1-30 and May 1-15, O.C. Poling, MCZ, USNM; Baboquivari Mts., Pima Co., 10♂, 11♀, Apr. 23-Sept. 15, Poling, Sperry, Snow (AB slide June 16, 1937), AMNH, MCZ, USNM; Chiricahua Mts., 1♀, Sept. 22, 1927, J. Kutsche, CAS; Fairbanks, San Pedro River, 1♀, Sept. 6, 1927, J. Kutsche, CAS; Fish Creek, Tonto Nat. Forest, 1♂, May 9-10, 1918, J.C. Bradley, CU; Ft. Grant, Pinaleno Mts., 3♂, 1♀, July 15-19, 1917, J.C. Bradley, CU; Hot Springs, 1♂, 1♀, June 26, H.S. Barber, USNM; Kensley, Arivaca Rd., 1♂, May 6, 1958, *ex* mesquite leaves, Stephenson and Alexander (JFGC slide 1111), USNM; Madera Canyon, Santa Rita Mtns., 4000-5600 ft., 13♂, 37♀, July 1-Oct. 26, 1959, R.W. Hodges (RWH slides 1710, 1717, and 3223-3225), CU, USNM; Mohave Co., 2♂, 1♀, May 1-15, USNM; Organ Pipe Cactus Nat. Monument, 1♀, Aug. 31, 1961, D. Rentz, CAS; Paradise, Cochise Co., 2♂, March and July, USNM; Peña Blanca Canyon, Santa Cruz Co., 26♂, 48♀, Aug. 7-Sept. 1, 1959, R.W. Hodges (RWH slides 1706-1709), CU, USNM; Phoenix, 2♂, 2♀, Kunze, USNM; 30 mi. E Quijotoa, Pima Co., 1♂, Aug. 28-29, 1927, J.C. Bradley, CU; Ramsey Canyon, Huachuca Mts., 1♀, Sept. 1-2, 1927, J.C. Bradley, CU; San Carlos, 2♂, May 12-13, 1918, J.C. Bradley, CU; Sells P.O., Indian Oasis, Pima Co., 20♂, 18♀, Apr. 1-30, 1923, O.C. Poling (AB slides Aug. 11, 1934, Sept. 28, 1936, and June 11, 1937), MCZ, USNM; Wellton, Yuma Co., 4♂, May 5-6, 1918, J.C. Bradley, CU; no further locality, 4♂, 2♀, Morrison, BMNH. CALIFORNIA: Chino Canyon, Palm Springs, 1♂, Apr. 19, 1950, E.C. Johnston, CNC; Cronise Valley, San Bernardino Co., 1♂, Apr. 29, 1956, J. Powell, UCB; Dixieland, Imperial Co., 2♂, Apr. 1-30, 1922, O.C. Poling, USNM; Indio, 2♀, May 1, 1918, J.C. Bradley, CU; La Puerta, 1♂, 1♀, July 1911, Wright and Field, USNM; Mason Valley, 1♂, Aug. 10, 1938, C. M. Dammers, USNM; Mirage Lake, San Bernardino Co., 2♂, 1♀, Apr. 18, 1935, C. Dammers, MCZ, USNM; Needles, 1♀, Apr. 1-6, 1918, J.C. Bradley, CU; Palm Springs, 3♂, 1-6, 1921, K.R. Coolidge, USNM; Surprise Canyon, Panamint Mts., Inyo Co., 1♂, 1♀, Apr. 24, 1957, J. Powell, UCB; Thermal, 100 ft. below tide, 1♂, Aug. 17-18, 1927, CU; 29 Palms, San Bernardino Co., 2♀, Apr. 20-21, 1950, E.C. Johnston, CNC. NEVADA: Charleston Mts., Kyle Canyon, Clarke Co., 1♀, Apr. 26, 1950, E.C. Johnston, CNC; Clarke Co., 2♂, Apr. 24-30, USNM. NEW MEXICO: Bent, 1♀, 7.27, USNM; Carlsbad, Otero Co., 1♂, 3♀, May 17, 1950, E.C. Johnston, CNC, USNM; 10 mi. E Deming, 2♂, July 12, 1917, J.C. Bradley, CU; Mesilla, 2♂, 8♀, C.N. Ainslie (AB slides Aug. 12, 1934 and Sept. 24, 1934), USNM; Mesilla Park (mesquite near), 5♂, 3♀, July 12, 1917, J.C. Bradley, CU; Otero Co., 2♂, 3♀, May 10, 1950, E.C. Johnston, CNC, USNM; White City, Eddy Co., 2♂, 8♀, May 14-17, 1950, E.C. Johnston, CNC, USNM. TEXAS: Alpine, Brewster Co., 1♀, May 22, 1950, E.C. Johnston, CNC; Big Bend Nat. Park, Brewster Co., 1♂, 3♀, June 20, 1950, E.C. Johnston, CNC; Bosque Co., 1♂, May 27, 1876, BMNH; Brownsville, 3♂, 5♀, Feb. 27 through June, Barber, Freeman, and Townsend, CNC, MCZ, USNM; Burnett Co., 1♂, September, F.G. Sharpp, USNM; Corpus Christi, 1♂, June 17, 1943, W.M. Gordon, CU; Cotulla, 1♂, May 12, 1906, Crawford and Pratt, USNM; Fedora, 5♂, Mar. 31 and Apr. 1, MCZ; Fever, 1♀, Apr. 1, 1897, USNM; Ft. Davis, Jeff Davis Co., 1♂, 1♀, May 20, 1950, E.C. Johnston, CNC; Kerrville, 1♂, F.C. Pratt, USNM; Limpia Canyon, Jeff Davis Co., 1♂, 1♀, May 20, 1950, E.C. Johnston, CNC; Marathon, Brewster Co., 1♂, 3♀, May 23, 1950, E.C. Johnston, CNC; Odessa, Ector Co., 1♂,

May 30, 1950, E.C. Johnston, CNC; Pecos, Reeves Co., 2♂, 17♀, May 18 and June 2, 1950, E.C. Johnston, CNC, USNM; Sabinal, 3♂, Feb. 26 and Mar. 14, 1910, F.C. Pratt (AB slide Sept. 30, 1937), USNM; San Antonio, 1♂, May 20-22, 1918, J.C. Bradley, CU; San Benito, 1♂, 2♀, August and Sept. 8-15, USNM.

MEXICO: BAJA CALIFORNIA: Chapala Dry Lake, 1♀, Sept. 25, 1941, Ross and Bohart, CAS; El Marmol, 1♀, Sept. 24, 1941, Ross, and Bohart, CAS. HIDALGO: 3 mi. E Zimapan, 6400 ft., 2♂, 4♀, July 31-Aug. 1, 1963, Duckworth and Davis, USNM. NUEVO LEON: 3 mi. E Galeana, 5000 ft., 1♂, 1♀, Aug. 7-9, 1963, Duckworth and Davis, USNM. TAMAULIPAS: 4 mi. SW Ciudad Victoria, 1100 ft., 1♀, July 10, 1963, Duckworth and Davis, USNM; 6 mi. S Ciudad Victoria, 1050 ft., 1♂, 1♀, Aug. 6, 1963, Duckworth and Davis, USNM.

Discussion: *F. cockerelli* may be readily separated from the other species of *Friseria* by the buff to dark brown color of the forewings and by the lack of fasciae. *F. caieta* appears blue white and black, the other species have a complete or partial oblique fascia at one-third or one-fourth on the forewing.

The various synonyms of *cockerelli* reflect the species variability in maculation. Meyrick's *sarcochlora* is a pale form; the three Busck names cover pale, medium, and dark forms. In a given locality all gradations between nearly immaculate buff to dark brown specimens are likely to occur. Neither the male nor female genitalia reflect the maculational differences.

#### *Friseria caieta*, new species

FIGURES 48, 111, 113, 124, 163, 231, 232

Maculation: as in figure 48. Head: tongue white with a few brown flecks; maxillary palpus white, a few apical scales tipped with brown; first segment of labial palpus white with a dorsal brown saddle, second segment white with an incomplete brown band near base and a brown band on outer and anterior surfaces before apex, third segment white with a brown ring at one-fourth and a brown ring before apex; dorsal surface of scape of antenna brown with white scales subbasally and at apex, ventral surface white; shaft mixed brown and white or gray basally, becoming mainly brown distally; frons white; vertex and occiput white, some scales with brown apices. Thorax: white, several scales on tegula and middle of mesothorax dark brown tipped. Forewing: white, dark brown, and orange brown, many brown scales with gray bases. Hindwing: fuscous, cilia pale buff. Prothoracic leg: anterior surface of coxa mixed white and brown, femur and tibia brown with some white scale bases, apex of tibia and a fascia at base of epiphysis white; tarsus brown, apices of first three segments white. Mesothoracic leg: coxa and femur mainly white with some brown scales; tibia mainly



brown, scale bases white, apex and medial tuft white; tarsus brown, apices of first three segments white. Metathoracic leg: coxa and trochanter white with some gray brown scales; femur white with brown scales; tibia brown (scale bases pale), a subbasal white fascia, another at base of first pair of spurs, apex white; base and apex of basitarsus and apices of second and third segments white. Abdomen: mottled gray brown, buff, and gray, ventral surface paler than dorsal surface. Alar expanse: 12–14 mm. Male genitalia: as in figures 111, 113, and 124 (RWH slide 3219). Female genitalia: as in figure 163 (RWH slide 1238).

Food plant: Unknown.

Type: Male, Madera Canyon, 4880 ft., Santa Rita Mtns., Aug. 23, 1959, R.W. Hodges, CU type 4224.

Paratypes:

ARIZONA: same locality as type, 89♂, 86♀, July 11–Sept. 3, 1959, R.W. Hodges (RWH slides 1235–1238 and 3219; RWH wing slides 61 and 62), AMNH, BMNH, CAS, CNC, CU, UCB, USNM; same locality except for elevation, 4000 ft., 2♂, 5♀, Aug. 9, 1959, R.W. Hodges, CU, USNM; Peña Blanca Canyon, Santa Cruz Co., 9♂, 15♀, Aug. 7–Sept. 1, 1959, R.W. Hodges, CU, USNM,

Other specimens examined:

ARIZONA: Baboquivari Mts., Pima Co., 1♂, 4♀, June 1–Oct. 30, O.C. Poling, USNM; Madera Canyon, 4400 ft., Santa Rita Mtns., Pima Co., 1♂, 1♀, June 8 and 9, 1963, J.G. Franclemont, JGF; Paradise, Cochise Co., 1♀, June 1–7, USNM. TEXAS: Alpine, Brewster Co., 1♀, May 22, 1950, E. C. Johnston, CNC; Brewster Co., 7000 ft., 1♀, 4.26, BMNH; Ft. Davis, Jeff Davis Co., 2♀, May 20, 1950, E. C. Johnston, CNC.

Discussion: *F. caieta* may be quickly separated from the other species of *Friseria* by the presence of white scales over most of the forewings and head.

#### *Friseria repentina* (Walsingham)

FIGURES 49, 119, 122, 123, 167, 233, 234

*Gelechia repentina* Walsingham, 1911, in Godman and Salvin, *Biologia Centrali-Americana*, vol. 42 (Lepidoptera-Heterocera, vol. 4) p. 65.

*Friseria repentina*.—Busck, 1939, Proc. U.S. Nat. Mus., vol. 86, p. 573.

Maculation: as in figure 49. Head: tongue pale buff and pale brown; maxillary palpus orange; outer surface of first segment of labial palpus orange with a few gray-brown scales, inner surface pale buff, second segment orange with a brown ring (incomplete posteriorly) at one-third and another at three-fourths, third segment orange with a brown ring at one-third and another at two-thirds; dorsal surface of scape of antenna brown, an orange band at one-fourth, apex orange; frons pale gray; vertex and occiput orange, most scales with orange brown apices. Thorax: mottled orange brown, brown, and orange;

apex of tegula mainly orange; disk mainly brown. Forewing: orange, red brown, brown, gray brown, and buff; gray-brown scales with purple reflections. Hindwing: fuscous, cilia buff. Prothoracic leg: coxa and femur pale orange heavily dusted with brown; tibia brown with a faint subbasal orange band, another at base of epiphysis, apex orange; tarsus brown, base and apex of basitarsus and apices of second and fifth segments buff. Mesothoracic leg: coxa mainly pale buff, a row of brown-tipped scales before apex; femur buff mottled with brown; tibia brown with subbasal, medial, and apical pale buff fasciae; tarsus brown, base and apex of basitarsus and apices of second and fifth segments pale buff. Metathoracic leg: coxa buff and gray white with some gray-brown splotches; femur buff flecked with brown, brown fasciae at one-fourth and two-thirds; tibia pale brown (scale bases pale) with pale buff to buff white fasciae at one-fifth, middle, and apex, dorsal tuft pale buff, outer spurs pale basally, brown distally; tarsus brown, base and apex of basitarsus and apices of remaining segments pale buff. Abdomen: not available. Alar expanse: 13-15 mm. Male genitalia: as in figures 119, 122, and 123 (AB slide June 10, 1937). Female genitalia: as in figure 167 (RWH slide 3477).

Food plant: Unknown.

Type: Female, BMNH.

Specimens examined:

MEXICO: GUERRERO: Amula, 6000 ft., 1♂, 2♀, Sept. 18, H. H. Smith (AB slide June 10, 1937; RWH slide 3477; RWH wing slide 84), BMNH, USNM.

Discussion: *F. repentina* is close to *nona* but may be separated on maculation as indicated in the key. Unobserved variation may occur in the maculation; however, only three specimens are available for examination. The male genitalic differences as pointed out in the key and shown in the figures are diagnostic.

All of the specimens with the facies of *repentina* and *nona* from Arizona have been *nona*. Further collecting in northern and central Mexico has not turned up additional specimens of either, but this may be a result of each being a fall-emerging species.

#### *Friseria nona*, new species

FIGURES 50, 112, 116, 121, 166, 235, 236

Maculation: as in figure 50. Coloration much as for *repentina* with the exception that the orange of *repentina* is generally replaced with buff. Abdomen: mottled buff and gray brown, becoming greasy. Alar expanse: 10.0-13.5 mm. Male genitalia: as in figures 112, 116, and 121 (RWH slide 3220). Female genitalia: as in figure 166 (RWH slide 3222).

Food plant: Unknown.

Type: Male, Madera Canyon, 4880 ft., Santa Rita Mtns., Ariz., Oct. 25, 1959, R. W. Hodges, CU type 4225.

Paratypes:

ARIZONA: same locality as type, 4400–5600 ft., 95♂, 47♀, June 26–Oct. 26, 1959, R. W. Hodges (RWH slides 712, 713, 3220–3222, and 3237–3244; RWH wing slides 63 and 64), AMNH, BMNH, CAS, CNC, CU, USNM; Peña Blanca Canyon, Santa Cruz Co., 5♂, 5♀, Aug. 7–Sept. 1, 1959, R. W. Hodges (RWH slides 3245 and 3246), CU, USNM.

Other specimens examined:

ARIZONA: Aravaipa Canyon, Pinal Co., 1♀, May 21, 1953, Dietrich, CU; Baboquivari Mts., 6♂, 9♀, Apr. 15–July 15, 1924, O. C. Poling, USNM; Chiricahua Mts., near Portal, 1♀, July 5, 1939, A. F. Braun, AFB; Patagonia, 1♀, May 26, 1953, Dietrich, CU; Pinal Mts., 2♂, July and August, 1900, Kunze, USNM; Santa Catalina Mts., Pima Co., 1♀, July 24–31, USNM.

Discussion: See the comments under *repentina* for means of separating the two species.

*Friseria lacticaput* (Walsingham), new combination

FIGURES 51, 120, 126, 164, 237, 238

*Gelechia lacticaput* Walsingham, 1911, in Godman and Salvin, *Biologia Centrali-Americana*, vol. 42 (Lepidoptera-Heterocera, vol. 4), p. 61.

Maculation: as in figure 51. Head: tongue buff with a few pale brown-tipped scales basally; maxillary palpus pale buff basally, darker distally; first segment of labial palpus mottled buff and pale brown, inner surface pale buff, second segment pale buff and orange with incomplete pale brown rings at two-fifths and three-fourths, posterior surface nearly white, third segment pale buff with a brown ring at two-fifths and another at four-fifths; dorsal surface of scape orange with a pale brown medial band, ventral surface pale buff, shaft buff on first eight or nine segments then mainly brown; frons, vertex, and occiput buff, many scales tipped with orange. Thorax: orange on basal half, apex of tegula and a line across mesothorax pale buff; apex of mesothorax dark brown; metathorax pale buff. Forewing: dark brown, base orange and pale buff, fascia buff white, tornal area creamy white. Hindwing: fuscous, cilia pale fuscous and buff. Prothoracic leg: coxa and femur buff white, a few brown scales at middle of coxa, a brown fascia just beyond middle of femur; tibia brown and black dorsally; pale buff ventrally, base, part of medial tuft and apex of apical tuft pale buff; tarsus buff with brown-black dorsal saddles on first four segments. Mesothoracic leg: much as for prothoracic leg. Metathoracic leg: coxa, trochanter, and femur buff white, a few post medial brown scales on femur; tibia buff white, a small subbasal patch of brown scales, a pale brown streak at one-fourth, middle of outer tibial spurs dark brown; tarsus mainly buff.

Abdomen: buff white mottled with gray scales on caudal segments. Alar expanse: 10–16 mm. Male genitalia: as in figures 120 and 126 (AB slide Oct. 14, 1936). Female genitalia: as in figure 164 (RWH slide 3476).

Food plant: Unknown.

Type: Female, BMNH.

Specimens examined:

MEXICO: GUERRERO: Amula, 6000 ft., Sept. 18, H.H. Smith (AB slide Oct. 14, 1936; RWH wing slide 84), USNM. YUCATAN: Mérida, 1♂, 1♀, July 29, 1964, P.J. Spangler (RWH slides 3475 and 3476), USNM.

Discussion: *F. lacticaput* may be separated from *cockerelli*, *caieta*, *repentina*, and *nona* by the presence of the buff white to white costal fascia at one-third; and from *acaciella* and *infracta* by the head and anterior half of the thorax being buff.

Forewings of the fresh specimens are nearly black with a slight luster as contrasted with the dark brown of the specimens collected for the "Biologia."

*Friseria acaciella* (Busck), new combination

FIGURES 52, 53, 117, 118, 125, 165, 239, 240

*Telphusa acaciella* Busck, 1906, Proc. U.S. Nat. Mus., vol. 30, p. 722.

Maculation: as in figures 52 and 53. Head: tongue mottled buff and brown, dark basally; maxillary palpus pale brown, flecked with buff; outer surface of first segment of labial palpus gray brown, inner and dorsal surfaces buff white, second segment gray brown, apex dark orange, third segment dark brown (scale bases pale), base and middle with orange scales, apex buff; dorsal surface of scape of antenna brown, apex pale, ventral surface buff white, first two scale rows brown, dorsal surface of shaft brown (scale bases pale), ventral surface brown with each half segment buff; scales of frons buff with gray brown apices; vertex and occiput with gray brown to brown-tipped scales, a fascicle of orange scales from dorsal margin of eye. Thorax: mottled dark brown, brown black, and red brown. Forewing: black, dark gray brown, brown, buff white, and orange. Hindwing: fuscous, cilia gray brown tinted with buff. Prothoracic leg: coxa and femur buff flecked with brown, a transverse fascia on femur at three-fourths; tibia brown with orange at base of epiphysis, apex, and at apex of epiphysis; tarsus brown, base and apex of basitarsus, apex of second and entire fifth segment pale buff. Mesothoracic leg: much as for prothoracic leg; medial tibial tuft orange basally, dark brown before apex, gray apically; apex of fourth tarsal segment pale buff. Metathoracic leg: coxa, trochanter, and femur buff white, a transverse brown band near base of trochanter, near base of femur,

and at two-thirds of femur; tibia mainly pale buff, gray brown between tibial spurs, outer tibial spurs dark gray brown medially, pale buff basally and apically; apices of all tarsal segments pale buff. Abdomen: mottled pale buff and pale brown. Alar expanse: 11.0–12.5 mm. Male genitalia: as in figures 117, 118, and 125 (RWH slides 3328 and 3330). Female genitalia: as in figure 165 (RWH slide 3331).

Food plant: *Acacia farnesiana* Willdenow and *Mimosa* species.

Type: Female, USNM.

Specimens examined:

UNITED STATES: LOUISIANA: New Orleans, 4♂, 1♀, Oct. 17, 1904, E.S.G. Titus (RWH slides 3328 and 3332), USNM. TEXAS: Brownsville, 7♂, 12♀, Jan. 14–July 4, Barber, Piazza (AB slide Sept. 22, 1936; RWH wing slides 77 and 78), CAS, USNM; Corpus Christi, 1♂, iss. May 17, 1923, ex *Acacia farnesiana* USNM; Los Borregos, Brownsville, 1♂, June 5, 1904, H.S. Barber, USNM; Mercedes, 1♂, 1♀, Jan. 2, 1956, P.T. Riherd, H.L. Schamlzied, CPK, USNM; Nueces River, 5 mi. SW Mathis, 1♂, 3♀, Aug. 12, 1963, Duckworth and Davis, USNM; Richmond, Brazos River, 6♂, 5♀, June 22, 1917, J.C. Bradley, CU, San Benito, 6♂, 9♀, April–Sept. 15 (AB slide Aug. 1, 1933), USNM; San Diego, 1♂, May 23, 1895, E.A. Schwarz, USNM; Victoria, 6♂, 10♀, June, Caudell, Schwarz, Mitchell, Hinds, Bradley, AMNH, CU, USNM.

MEXICO: COAHUILA: 10 mi. N Monclova, 1500 ft., 1♂, July 7, 1963, Duckworth and Davis, USNM. HIDALGO: 3 mi. E Zimapan, 6400 ft., 1♀, July 31–Aug. 1, 1963, Duckworth and Davis, USNM. NUEVO LEÓN: Anegada Arroya, 1250 ft., 16 mi. S Linares, 5♂, 3♀, July 19, 1963, Duckworth and Davis, USNM; 3 mi. E Galeana, 5000 ft., 1♀, Aug. 7–9, 1963, Duckworth and Davis (RWH slide 3329), USNM. TAMAULIPAS: 4 mi. SW Ciudad Victoria, 1200 ft., 1♂, 5♀, Duckworth and Davis (RWH slide 3331), USNM; 6 mi. S Ciudad Victoria, 1050 ft., Aug. 6, 1963, Duckworth and Davis, USNM; El Salto Falls, 2000 ft., 26 mi. W Antigua Morelos, 2♀, July 11–14, 1963, Duckworth and Davis, USNM.

Discussion: *F. acaciella* may be separated from *cockerelli*, *caieta*, *repentina*, and *nona* by the fascia from the costa at one-third, from *lacticaput* by the dark thorax; and from *infracta* by the outer margin of the fascia being irregular, pointing to the tornus, whereas that of *infracta* is rounded.

In some specimens the fascia is buff brown; however, no other characters are correlated with this feature, and gradients between this condition and that given in the present description exist.

*Friseria infracta* (Walsingham), new combination

FIGURES 54, 114, 115, 128, 241, 242

*Gelechia infracta* Walsingham, 1911, in Godman and Salvin, *Biologia Centrali-Americana*, vol. 42 (Lepidoptera-Heterocera, vol. 4), p. 61.

Maculation: as in figure 54. Head: tongue missing on examined specimen; maxillary palpus greasy brown, pale basally; first segment of labial palpus brown on outer surface, dorsal and inner surfaces buff white, second segment brown with pale orange to buff white

bands at one-third, two-thirds, and apex, third segment orange with a brown band at one-third and another at two-thirds; dorsal surface of scape of antenna brown with some orange basally and apically, ventral surface buff, dorsal surface of shaft greasy brown, ventral surface buff and brown; scales of frons, vertex, and occiput gray brown apically, pale basally, a fascicle of orange scales above eye. Thorax: dark gray brown, metathorax buff. Forewing: pale buff, white, dark gray brown, and black. Hindwing: fuscous, cilia fuscous tinged with buff. Prothoracic leg: coxa and femur streaked buff and brown; tibia brown, apex and an incomplete band at base of epiphysis orange to buff white; tarsus brown, base and apex of basitarsus and apices of second and fifth tarsal segments buff. Mesothoracic leg: coxa buff, many scales streaked with gray, trochanter pale buff streaked with brown; femur buff and brown; tibia brown, apex yellow and white; tarsus brown, base and apex of basitarsus and apices of second, fourth, and fifth segments pale buff. Metathoracic leg: coxa and trochanter with some pale brown scales; femur pale buff streaked with brown; tibia pale brown, a pale subbasal streak, another at base of first pair of tibial spurs, and apex nearly white, dorsal tuft streaked buff and buff white; tarsus brown, base of basitarsus, apices of segments two through four, and all of fifth segment buff white. Abdomen: not observed before dissection was made. Alar expanse: 15 mm. Male genitalia: as in figures 114, 115, and 128 (RWH slide 3461). Female genitalia: no specimens available.

Food plant: Unknown.

Type: Male, BMNH.

Specimen examined:

MEXICO: GUERRERO: Amula, 6000 ft., 1♂, Sept. 18, H. H. Smith (RWH slide 3461; RWH wing slide 83), USNM.

Discussion: *F. infracta* may be separated from *cockerelli*, *caieta*, *repentina*, and *nona* by the presence of the costal, white fascia on the forewing; from *lacticaput* by the dark head and thorax; and from *acaciella* by the rounded apical portion of the fascia. The valvae of the male genitalia of *infracta* have an extremely heavily sclerotized costal lobe; the two lobes from the ventral surface are short; whereas the costal lobe of *acaciella* is less heavily sclerotized, has an additional ventrodiscal lobe, and one of the lobes from the ventral margin is more than one-half the length of the costal lobe.

### *Rifseria*, new genus

Type-species: *Gelechia fuscotaeniella* Chambers, 1878.

Head: smooth scaled; tongue moderate, scaled to one-half; maxillary palpus short, folded at base of tongue; labial palpus recurved,

second and third segments subequal in length, second segment slightly thickened with scales ventrally, third segment slender, apex acute; antenna two-thirds length of forewing, simple. Forewing: broadly lanceolate, apex acute; 12 veins present; 6, 7, and 8 stalked, 6 to dorsum, 7 and 8 to costa. Hindwing: trapezoidal, apex produced, acute; 8 veins present, 3 and 4 short stalked; 5 from 3+4 at a right angle; 6 and 7 stalked, 6 to termen, 7 to costa, 7 sinuous. Abdomen: second and third terga with lateral patches of stout setae. Male genitalia: valva with two lobes separate to juncture of tegumen and vinculum, dorsal lobe slender; vinculum broad, quadrate medially; aedeagus with expanded base; tegumen long; uncus hood shaped, with an apical row of short, stout setae; gnathos present, hook shaped; culcitula present. Female genitalia: signum lightly sclerotized, elliptical, two short ridges near each end; ostium bursae at caudal margin of eighth sternum; eighth segment heavily sclerotized, anterior margin a thickened sclerotized ridge; apophyses anteriores short, apophyses posteriores moderate.

*Rifseria* is near *Friseria* and *Srifseria* but differs from both by having 6, 7, and 8 of the forewing stalked, terga two and three with permanent setae, and the apical setae of the uncus short and stout. It differs from *Friseria* in that the costal lobes of the valvae are separate to the base in the males and that the eighth abdominal segment of the female is heavily sclerotized.

*Rifseria fuscotaeniella* (Chambers), new combination

FIGURES 55, 129, 130, 168, 243, 244

*Gelechia fuscotaeniella* Chambers, 1878, Bull. U.S. Geol. Geogr. Surv. Terr., vol. 4, p. 89.

Maculation: as in figure 55. Head: tongue and maxillary palpus brown; first segment of labial palpus brown on outer surface, white on inner surface, outer surface of second segment brown (scales pale basally) on basal third or half, white elsewhere, third segment white except for brown apex and sometimes a brown band at two-thirds; dorsal surface of antenna brown, ventral surface of scape off white, ventral surface of shaft greasy pale brown basally; frons with a row of brown scales from anterior margin of eye to base of tongue, remainder of frons, vertex, and occiput white; a row of brown scales behind eye. Thorax: white; base of tegula brown, apex sometimes red brown; apex of mesothorax dark brown; metathorax gray white. Forewing: white, dark marks brown, some red brown, buff, and pale gray present; cilia white below apex, buff at tornus. Hindwing: fuscous, cilia buff. Prothoracic leg: anteromesal surface brown (scales pale basally), apices of femur, tibia, and tarsal segments buff white. Mesothoracic leg: coxa mainly white, some scales gray; femur, tibia,

and tarsus brown (scales pale basally), apices of tibia and tarsal segments buff white. Metathoracic leg: coxa white basally, gray white distally; trochanter pale gray brown, scales with light streaks; femur white dorsally becoming brown ventrally; tibial scales mixed buff white and pale brown, tuft buff white; apices of first four tarsal segments off white, outer surface with a brown dorsal saddle. Abdomen: buff white dorsally, permanent setae orange; ventral surface pale buff, segments two through six with a lateral gray-brown patch. Alar expanse: 10.5–16.0 mm. Male genitalia: as in figures 129 and 130 (RWH slide 1249). Female genitalia: as in figure 168 (RWH slide 1251).

Food plant: Unknown.

Type: Male, MCZ.

Specimens examined:

UNITED STATES: ARIZONA: Ajo, Pima Co., 1 ♀, Mar. 1–15, 1923, O.C. Poling, USNM; Baboquivari Mts., Pima Co., 1 ♀, Oct. 15–30, 1924, O.C. Poling, USNM; Fort Valley, 7½ mi. NW Flagstaff, 7350 ft., Coconino Co., 1 ♂, July 17, 1961, R.W. Hodges, USNM; Hart Prairie, 10 mi. NNW Flagstaff, 8500 ft., Coconino Co., 1 ♂, July 12, 1961, R.W. Hodges, USNM; Huachuca, 1 ♀, Aug. 3, 1899, MCZ; Madera Canyon, 4880 and 5600 ft., Santa Rita Mtns., 3 ♂, 5 ♀, Sept. 13–Oct. 27, 1959, R.W. Hodges (RWH slides 1249–1252), CU, USNM; same locality, 2 ♂, 1 ♀, May 11–16, 1963, J. G. Franclemont, JGF; Molino Basin, Santa Catalina Mts., Pima Co., 1 ♀, June 10, 1959, MacNeill, CAS; Palmerlee, 1 ♀, USNM; Paradise, Cochise Co., 2 ♂, June 1–7, USNM; Ramsay Canyon, Huachuca Mts., 1 ♂, July 10–15, 1941, A.B. Klots, AMNH; Redington, 1 ♀, USNM; Vail Lake Road, 9½ mi. SE Flagstaff, 6500 ft., Coconino Co., 1 ♂, 1 ♀, July 11, 18, 1961, R.W. Hodges, USNM. CALIFORNIA: Atascadero, 1 ♀, July 26, 1935, E.C. Johnston, USNM; Avalon, Santa Catalina Is., 1 ♂, May 17, 1932, MCZ; 12 mi. SE Ivanpah, San Bernardino Co., 2 ♂, 1 ♀, May 1, 1956, J. Powell, UCB; Los Angeles, 1 ♀, Oct. 26, 1920, K.R. Coolidge (AB slide Sept. 21, 1934), USNM; Lytle Creek, San Bernardino Co., 1 ♀, June 29, 1946, C. Henne (RWH slide 3248), USNM; Mt. Palomar, San Diego Co., 1 ♂, July 18, 1963, J. Powell, UCB; San Diego, 1 ♂, Oct. 20, 1920, K.R. Coolidge (AB slide Sept. 21, 1934), USNM; Walnut Cr., foot Shell Ridge, Contra Costa Co., 1 ♀, Apr. 22, 1962, J. Powell, UCB. COLORADO: Boulder, 1 ♀, Cockerell (AB slide June 11, 1937), USNM; Chimney Gulch, Golden, 1 ♀, June 7, 1907, Oslar, USNM; Denver, 1 ♀, MCZ; Glenwood Springs, 2 ♂, August 1899, MCZ, USNM. NEVADA: Clarke Co., 1 ♀, May 16–23, USNM. UTAH: Eureka, 3 ♂, 1 ♀, Aug. 13–22, 1911, Tom Spalding, USNM; Warner Ranger Sta., 9000 ft., La Sal Mts., 1 ♀, July 1933, A.B. Klots, AMNH.

CANADA: BRITISH COLUMBIA: Fraser Mills, 1 ♂, June 22, 1921, L. E. Marmont, USNM. MANITOBA: Aweme, 5 ♂, 2 ♀, Sept. 5–25, N. Criddle (AB slide June 11, 1937; RWH wing slide 60), CNC, USNM.

Discussion: *R. fuscotaeniaella* is moderately variable in maculation with gradations between nearly all white and dark specimens known. The head, thorax, and left wings remain of the type specimen. It is a nearly white representative of the species.



*Sriferia*, new genus

Type-species: *Gelechia prorepta* Meyrick, 1923.

Head: smooth scaled; tongue moderate, scaled to one-half; maxillary palpus porrect; labial palpus recurved, sickle shaped, second and third segments subequal in length, second segment thicker than third; antenna one-half length of forewing, simple. Forewing: broadly lanceolate, apex almost rounded; 12 veins present; 7 and 8 stalked, 7 to costa. Hindwing: trapezoidal, outer margin gradually moving to apex, apex slightly produced, broadly acute; 8 veins present; 3 and 4 short stalked; 5 at right angle from 3 and 4; 6 and 7 separate; 7 sinuous;  $R_1$  merging with Sc near base. Male genitalia: saccus developed, slightly expanded anteriorly; vinculum narrow; valva with two linear costal lobes, separate to juncture between tegumen and vinculum; aedeagus stout, basal half expanded; tegumen long, uncus moderate with apical row of long, stout setae; gnathos hook shaped; culcitula present. Female genitalia: unknown.

*Sriferia* may be separated from *Friseria* by the lobes of the valvae being separate to the base and by the quadrate saccus and from *Rifseria* by the long apical setae on the uncus, lack of permanent setae on the abdominal terga, and by vein 6 of the forewing being separate from 7 and 8.

*Sriferia prorepta* (Meyrick), new combination

FIGURES 56, 127, 131, 245, 246

*Gelechia prorepta* Meyrick, 1923, Exot. Micr., vol. 3, p. 19.

*Gelechia fulmenella* Busck, 1910, Proc. Ent. Soc. Washington, vol. 11, p. 178.

[Preoccupied.]

Maculation: as in figure 56. Head: tongue and maxillary palpus buff white to white; first segment of labial palpus cream white to white, second segment cream white, becoming brownish on anterior surface, third segment brown, posterior surface gray white to cream white basally; dorsal surface of antenna brown, ventral surface of scape and base of shaft buff white; frons white; vertex and occiput gray brown. Thorax: gray brown. Forewing: dark scales gray to purple gray, tipped with brown; fascia white; cilia fuscous, Hindwing: fuscous, cilia gray brown. Prothoracic leg; coxa white basally and apically, gray brown medially; femur, tibia, and tarsus brown, apices of femur, tibia, and first two tarsal segments white. Mesothoracic leg: coxa and femur white, femur gray apically; tibia and tarsus gray brown, apices of tibia and first two tarsal segments white or pale. Metathoracic leg: coxa, trochanter, and femur white with some pale gray scales; tibia and tarsus dark gray to gray brown, a white fascia at base of first pair of tibial spurs, extending into dorsal

tuft, gray; apices of first two tarsal segments white or pale. Abdomen: gray, apices of segments pale, first, second, and third terga with orange scales. Alar expanse: 11.0-14.5 mm. Male genitalia: as in figures 127 and 131 (RWH slide 2624). Female genitalia: no specimens available.

Food plant: Unknown.

Type: Male, USNM.

Specimens examined:

ARIZONA: Mohave Co., 2♂, May 1-7 (RWH wing slide 59), USNM.  
CALIFORNIA: Essex, San Bernardino Co., 2♂, Apr. 10, 1936, C. Dammers (RWH slide 2621), USNM; Split Rock Tank, Mohave Desert, 1♂, May 20, 1938, Sperry, AMNH.

Discussion: No females of *prorepta* are known; thus, the genus cannot be diagnosed for this sex.

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