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AMERICAN SPECIES OF THE LACEBUG  
GENUS *ACALYPTA* (HEMIPTERA: TINGIDAE)

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Introduction

The American species of the genus *Acalypta* have been in need of revisional study for years because of synonyms and confusion of its members in the literature and collections. The genus, with the exception of a Mexican indigene, is Holarctic in distribution and as the world species now stand, 10 full species are recognized from North America and 27 from the Palearctic region. The subspecies and varieties are not included in these tabulations. Species inhabiting the coastal region of northern Africa fall into the Mediterranean subregion of Holarctica.

Stål (1873) described the first American form as *Acalypta thomsonii* (pl. 8) from South Carolina. A total of nine species are known from the United States (including Alaska) and four of these are shared with Canada. The two Alaskan species, *A. nyctalis* and *A. lillianis*, are widely distributed in the United States and Canada. Only one species, *A. mniophila* (pl. 5), inhabits Mexico (central part) and it is known solely from the type specimen. The latter is the only American

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representative of the genus not known to occur in the Nearctic region. None of the species is common to both the Old and New Worlds. Fossil forms are unknown.

*Acalypta* comprises a well-defined, homogenous group of species with similar facies, especially the brachypterous forms (pls. 3-11, 13, 14). The macropterous form (pl. 12) is apparently rather uncommon and only known for three of the American species. The differences in habitus between the dimorphic forms of a species are depicted in the illustrations of *A. barberi* (pls. 11, 12). The macropterous forms likewise are similar in general aspect to one another.

The present paper is based largely upon the collections of the authors, which include all the American species and most of the European forms. The material in the U.S. National Museum, where all the American species are represented, and in the private collection of Mr. Joe Schuh, Kalamath Falls, Oreg., have also been studied. We are indebted to Patricia J. Hogue, Arlington, Va., and Liza Biganzoli, Washington, D.C., for the fine illustrations. The latter also prepared the map (pl. 2) showing the distribution of *Acalypta* spp. in the northwestern United States and bordering provinces of Canada. This work is a byproduct of a tingid project being conducted with the aid of a National Science Foundation grant.

### Genus *Acalypta* Westwood

*Acalypta* Westwood 1840 (synopsis) p. 121.—Stål 1873, pp. 118, 122; 1874, p. 51.—Horváth 1906, pp. 13, 24.—Oshanin 1908, p. 406; 1912, p. 42.—Banks 1910, p. 55.—Van Duzee 1916, p. 25; 1917, p. 211.—Osborn and Drake 1916a, p. 220.—Parshley 1923, pp. 696, 698.—Blatchley 1926, p. 480.—Drake 1928b, pp. 1-9.—China 1943, p. 245.—Hurd 1946, p. 462.—Bailey 1951, p. 32.—Kiritshenko 1951, pp. 240, 244.—Drake and Ruhoff 1959, p. 138; 1960, p. 31.

*Orthosteira* Fieber 1844, p. 46.

*Monanthia* (*Orthosteira*): Flor 1860, pp. 330, 331.

*Orthostira* [sic]: Fieber 1861, p. 130.—Lethierry and Severin 1896, p. 6.

*Fenestrella* Osborn and Drake 1916a, p. 222.—Parshley 1917a, p. 14.

*Drakella* Bergroth 1922, p. 152.—Parshley 1923, pp. 696, 698.—Blatchley 1926, p. 481.

Type species: *Tingis carinata* Panzer.

BRACHYPTEROUS FORM.—Small, ovate, obovate, or oblong (pls. 3, 7, 8), pronotum subdepressed, elytra more or less convex, general color brownish testaceous to blackish fuscous. Size small, ranging from 1.65-2.70 mm. long.

HEAD.—Short, only slightly produced in front of eyes, usually armed with one pair of stout, porrect, frontal spines, other spines wanting; eyes large, granulate; bucculae foliaceous, areolate, open or closed in front, extending backwards beneath anterior part of prosternum; sternal laminae of rostral sulcus uniseriate, present on all

three sternal divisions, open at base. Labium long, 4-segmented, extending to middle of or slightly beyond metasternum. Antennae long, slender; segment I short, stout, slightly longer and stouter than II; III longest, slenderest; IV moderately long, fusiform to subclavate.

**PRONOTUM.**—Subdepressed, punctate, unicarinate (pls. 3–6) or tricarinate (pls. 7–15); collar tectiformly raised at middle, produced forward over base of vertex; calli small, impunctate; median carina percurrent on hood and pronotum, ridgelike and without cells on hood, foliaceous and uniseriate on pronotum; lateral carinae customarily slightly lower than median carina, frequently raised anteriorly, composed of one row of areolae, either parallel or slightly divergent posteriorly; paranotum explanate, long, subrectangular, slightly reflexed, two or three areolae deep in front, only one or two wide opposite humeral angle; posterior process triangular, areolate. Legs moderately long, femora slightly swollen, tarsi 2-segmented.

**ELYTRA.**—Abruptly widened at base to that of pronotal width across paranota, slightly longer than and thus covering abdomen, with inner margins connivent, apices rounded and separated from each other; claval area not clearly defined, concealed beneath backward projection of pronotum; major divisions of costal, subcostal, discoidal, and sutural areas sharply defined by boundary veins from one another (pl. 1A); sutural area much reduced, narrow. Metathoracic wings obsolete. Hypocostal lamina (pl. 1F) of elytron either composed of one complete row of areolae or slightly wider and biseriate in basal third to half.

**ABDOMEN.**—Segmentation, spiracles, male and female genital segments as figured and labeled in plate 1.

**MACROPTEROUS FORM.**—Oblong. Pronotum swollen, convex across humeral angles, coarsely punctate. Anterior pair of coxal cavities more distant longitudinally from middle pair than in brachyptery. Elytra (pls. 1, 12) long, much longer as well as wider than abdomen, the sutural areas large, overlapping each other in repose so that their apices lie jointly rounded at rest; claval area (pl. 1) small, sharply defined, always concealed beneath backward projection of pronotum in resting position; costal, subcostal, discoidal, and sutural areas separated from one another by prominent boundary veins; metathoracic wings large, functional. Venation of elytron (pl. 1D) and hind wing (pl. 1E) as labeled in the illustrations. Other structures similar to those in brachypterous form.

Certain structural characters, which usually remain fairly constant in most tingid genera, vary considerably between the pterygopolymorphic forms within a species. These dimorphic differences include such features as: size and convexity of pronotum, spacing longitudinally of coxal cavities, form and length of elytra, absence or presence of

metathoracic wings, and general habitus (pls. 11, 12). These dimorphic differences and the structural characters used in classification are semidiagrammatically drawn with their respective names attached in the illustrations (pl. 1).

The American species of *Acalypta* are primarily muscicolous, but the host preference for the different kinds of mosses is unknown. Host label affixed to pins reads simply "moss," "mosses," or "sphagnum." Under unfavorable biotic conditions for mosses, nymphs and adults will seek less acceptable plants nearby for feeding purposes. For example, *A. barberi* was found feeding in numbers (nymphs and adults) on hops at Coburg, Oreg., August 26, 1935, by N. P. Larson. Very little is known about the biology of the American species.

### Key to Brachypterous Forms of American *Acalypta*

1. Pronotum unicarinate (pls. 1-6) . . . . . 2  
    Pronotum tricarinate (pls. 7-14) . . . . . 4
2. Hypocostal lamina uniseriate (pl. 5) . . . . . **A. mniophila**  
    Hypocostal lamina biseriate in basal third to half, thence posteriorly uniseriate . . . . . 3
3. Paranotum mostly triseriate; discoidal area obtusely rounded at apex; boundary vein separating discoidal and sutural areas elevated and strongly sinuate (pl. 3) . . . . . **A. duryi**  
    Paranotum usually biseriate, sometimes with one or two intercalated areolae in front; discoidal area acutely rounded at apex; boundary vein separating discoidal and subcostal areas less elevated, nearly straight in basal two-thirds, then apically gently curved inward (pl. 4) . . . . . **A. saundersi**
4. Form distinctly oblong; antennal processes spiniform, divergent, not excavated within (pl. 7) . . . . . **A. cooleyi**  
    Form ovate or obovate; antennal processes short, stout, blunt, excavated within (pls. 8-15) . . . . . 5
5. Discoidal area about three-fifths as long as an elytron, much narrower than subcostal area; areolae of paranotum and costal area very large (pl. 8).  
    **A. thomsonii**  
    Discoidal longer, at least two-thirds as long as an elytron; areolae smaller (pls. 9-15) . . . . . 6
6. Pronotal carinae low, little raised, each composed of one row of very small areolae; costal area also very narrow, composed of one row of very small areolae (pl. 9) . . . . . **A. nyctalis**  
    Pronotal carinae more foliaceous, each composed of one row of quadrate areolae; costal area wider, composed of one row of quadrate areolae . . . . . 7
7. Lateral carinae of pronotum divergent posteriorly (pls. 11, 13) . . . . . 8  
    Lateral carinae of pronotum parallel (pls. 14, 15) . . . . . 9
8. Paranotum with front and outer margins jointly rounded, not angulate at anterolateral corner; discoidal area deeply concavely impressed longitudinally, about three-fourths as long as elytron (pl. 13) . . . . . **A. lillianis**  
    Pronotum with outer margin nearly straight, not rounded but distinctly angulate at anterolateral corner, discoidal area about two-thirds as long as elytron (pl. 11) . . . . . **A. barberi**

9. Form elongate-ovate; antenna rather short, 0.79 mm. long, segment III twice the length of IV (pl. 14) . . . . . *A. vandykei*  
 Form obovate; antenna 0.94 mm. long, segment III more than two and a half times as long as IV (40:15) (pl. 15) . . . . . *A. vanduzeei*

*Acalypta duryi* Drake

## PLATE 3

*Fenestrella ovata* Osborn and Drake 1916a, p. 223, fig. 3; 1917, p. 155, pl. 8, fig. d.—Van Duzee 1917, p. 212.

*Drakella [ovata]*: Bergroth 1922, p. 152.

*Drakella ovata*: Blatchley 1926, p. 482, fig. 112.

*Acalypta ovata*: Drake 1928b, p. 3, fig. 1,a.

*Acalypta duryi* Drake 1930, p. 268.—Hurd 1946, p. 463.—Drake and Ruhoff 1959, p. 138.

BRACHYPTEROUS FORM.—Ovate, brown or grayish brown to blackish fuscous; antennae dark brown or fuscous with fourth segment black and subclavate; body beneath blackish fuscous; legs with femora fuscous, the tibiae and tarsi usually brown. Antennal measurements: segment I, 0.10 mm.; II, 0.09 mm.; III, 0.56 mm.; IV, 0.20 mm. Pronotum unicarinate, median carina slowly tapering posteriorly, with one row of three to five areolae behind hood, without areolae behind pronotal disc; paranotum slightly variable in areolation, angulate at anterolateral corner, usually three areolae deep in front and two opposite humeral angle. Costal area with one complete row of areolae, with a variable number of areolae in partial second row at base and apex, uniseriate in middle portion. Division of elytron as shown in illustration (pl. 3). Length 2.00–2.50 mm., width (elytra) 1.25–1.60 mm. Macropterous form unknown.

HOLOTYPE.—Brachypterous ♀, Cincinnati, Ohio, in Ohio State University, Columbus, Ohio.

DISTRIBUTION.—Ohio (Cincinnati), Tennessee (Great Smoky Mts., Sevier Co.), and North Carolina (Great Smoky Mts., Newfound Gap, elevation 5,000–5,200 ft.). Feeds and breeds on mosses. A brachypterous ♀ from the Great Smoky Mts., Tenn., is illustrated.

*Acalypta saundersi* Downes

## PLATE 4

*Drakella saundersi* Downes 1927b, p. 60.

*Acalypta saundersi*: Drake 1928b, p. 4, fig. 1,b; 1930, p. 268.—Hurd 1946, p. 463.—Drake and Ruhoff 1959, p. 138.

BRACHYPTEROUS FORM.—Small, ovate or obovate, sometimes more elongate-ovate, reddish brown to dark fuscous; body beneath flavous to dark fuscous. Legs brownish with femora broadly banded at middle with dark fuscous. Antenna with first, second, and third segments

dark fuscous, fourth segment testaceous to brown. Length 1.85–2.38 mm., width 1.00–1.30 mm.

Head armed with two stout frontal spines. Antennal measurements: segment I, 0.20 mm.; II, 0.09 mm.; III, 0.44 mm.; IV, 0.21 mm. Pronotum reticulately punctate, unicarinate; median carina raised anteriorly, uniseriate; hood obtusely projected forward between eyes; paranotum subrectangular, mostly biseriate, triseriate in front, anterolateral corner subangulate. Elytron with costal area uniseriate, frequently with one to three intercalated areolae at base and occasionally with several extra areolae a little before the apex; discoidal and sutural areas wide, each five or six areolae deep in widest part. Hypocostal lamina biseriate in basal third, thence posteriorly uniseriate.

HOLOTYPE.—Brachypterous ♀, Goldstream, British Columbia, Canadian National Collection, Ottawa, Canada.

DISTRIBUTION (pl. 2).—Canada: British Columbia. United States: Washington, Oregon. Feeds and breeds on mosses. A brachypterous female from Corvallis, Oreg., is illustrated.

#### *Acalypta sauteri* Drake

##### PLATE 6

*Acalypta sauteri* Drake 1942, p. 14.—Takeya 1951, p. 6.

BRACHYPTEROUS FORM.—Ovate to obovate, fuscous-brown with paranota and costal areas yellowish brown; body beneath dark fuscous. Antennal measurements: segment I, 0.12 mm.; II, 0.12 mm.; III, 0.45 mm.; IV, 0.22 mm. Pronotum unicarinate; median carina low, scarcely raised anteriorly, minutely uniseriate; paranotum wide, triseriate in front, anterolateral corner angulate. Costal area composed of one complete row of areolae, often with one or two intercalated cells at base. Hypocostal lamina biseriate basally, thence posteriorly uniseriate. Length 1.65–2.21 mm., width (elytra) 1.20–1.28 mm. Macropterous form unknown.

HOLOTYPE.—Brachypterous male, Honshu, Japan (printed locality label "Oayama" or "Ooyama" is an error and probably should read "Ohyama"), in Drake collection (USNM).

DISTRIBUTION.—Japan: Honshu. A brachypterous ♀ from Mt. Ohyama, Hanagawa Prefecture, Apr. 15, 1939, taken on moss, is illustrated. This species has been intercepted at New York City Port-of-Entry, on moss used in the packing of dormant nursery stock imported from Japan. It is very similar in general appearance to *A. duryi* and *A. saundersi*, but can easily be distinguished from them by the illustrations.

*Acalypta mniophila* Drake and Ruhoff

## PLATE 5

*Acalypta mniophila* Drake and Ruhoff 1959, p. 136, fig. 1.

BRACHYPTEROUS FORM.—Obovate, widest behind middle of elytra, fuscous-brown with pronotum and costal areas brown; body beneath blackish fuscous. Pronotum reticulate with areolae about same size as those in paranota, unicarinate; median carina low, composed of one row of very small areolae; hood low, obtusely projecting forward between eyes; paranota rather narrow, biseriate, with anterolateral corner rounded. Hypocostal lamina uniseriate. Elytra very convex; costal area narrow, mostly uniseriate, with a few extra areolae in apical third. Antennal measurements: segment I, 0.11 mm.; II, 0.08 mm.; III, 0.40 mm.; IV, 0.22 mm. Length 2.00 mm., width (elytra) 1.25 mm. Macropterous form and male unknown.

HOLOTYPE.—Brachypterous ♀, Central Mexico, on moss, Aug. 16, 1947, in U.S. National Museum (type no. 64870), illustrated.

DISTRIBUTION.—Known solely from the type specimen from Mexico. It can be distinguished from the species of *Acalypta* of the New World possessing unicarinate pronotum (*saundersi* and *duryi*) by the much narrower paranotum and costal area as depicted in the figures. The pair of frontal spines on the head is obsolete. The same structures distinguish it from *A. sauteri* from Japan.

*Acalypta cooleyi* Drake

## PLATE 7

*Acalypta cooleyi* Drake 1917, p. 213; 1928b, p. 9.—Van Duzee 1917, p. 814.—Hurd 1946, p. 463.—Drake and Ruhoff 1959, p. 138.

BRACHYPTEROUS FORM.—Oblong, fuscous-brown to dark fuscous, body beneath stramineous to blackish fuscous; rostral laminae of sternal sulcus brownish. Legs slender, dark brown with femora tending to be fuscous. Antenna brownish fuscous. Length 2.20–2.55 mm., width (elytra) 1.12–1.30 mm.

Head short, armed with two porrect, frontal spines. Antennal tubercles spiniform, divergent. Antenna long, slender, fourth segment fusiform, segmental measurements: I, 0.18 mm.; II, 0.08 mm.; III, 1.11 mm.; IV, 0.20 mm. Pronotum coarsely punctate, depressed, tricarinate, each carina strongly foliaceous, composed of one row of quadrate areolae, the lateral pair almost as highly elevated as median, slightly divergent posteriorly; paranotum wide, triseriate in form, biseriate opposite humeral angle, outer margin nearly straight; anterolateral corner distinctly angulate, often with a tooth or spine-like lateral projection. Legs slender, femora only a little swollen.

Elytron oblong; discoidal area long, with all boundary veins distinctly raised, longitudinally depressed so as to appear sulcate, mostly three areolae deep; costal area wide, varying from one to two complete rows of areolae. Hypocostal lamina uniseriate. Metathoracic wings obsolete. A brachypterous male from Pinhurst, Oreg., is here designated as the allotype.

MACROPTEROUS FORM.—Known only from the type specimen. Differs from the short-winged form in having pronotum more convex, all carinae slightly less raised; paranotum narrow, biseriate. Elytra with subcostal areas large and overlapping each other in resting posture; costal area biseriate at base and apex, uniseriate at middle. Metathoracic wings large, longer than the abdomen. Length 2.90 mm., width 1.20 mm.

HOLOTYPE.—Macropterous ♀, Bozeman, Montana, June 13, 1913, in Drake collection (USNM).

DISTRIBUTION (pl. 2).—Montana (Bozeman), Oregon (Pinhurst), and California (Sequoia National Forest). The brachypterous form (both sexes) was taken in numbers breeding on mosses at Pinhurst, Oreg., by Joe Schuh.

#### *Acalypta thomsonii* Stål

##### PLATE 8

*Acalypta thomsonii* Stål 1873, p. 122.—Banks 1910, p. 55.—Osborn and Drake 1916a, p. 220.—Heidemann 1917, p. 220, pl. 17, fig. 3 (fig. only).—Van Duzee 1916, p. 25; 1917, p. 211.—Parshley 1923, p. 699.—Blatchley 1926, p. 480, fig. 110.—Drake 1926, p. 377, pl. 34, fig. d; 1928b, p. 4, fig. 2.—Hurd 1946, p. 463.—Bailey 1951, p. 35.—Drake and Ruhoff 1959, p. 138.

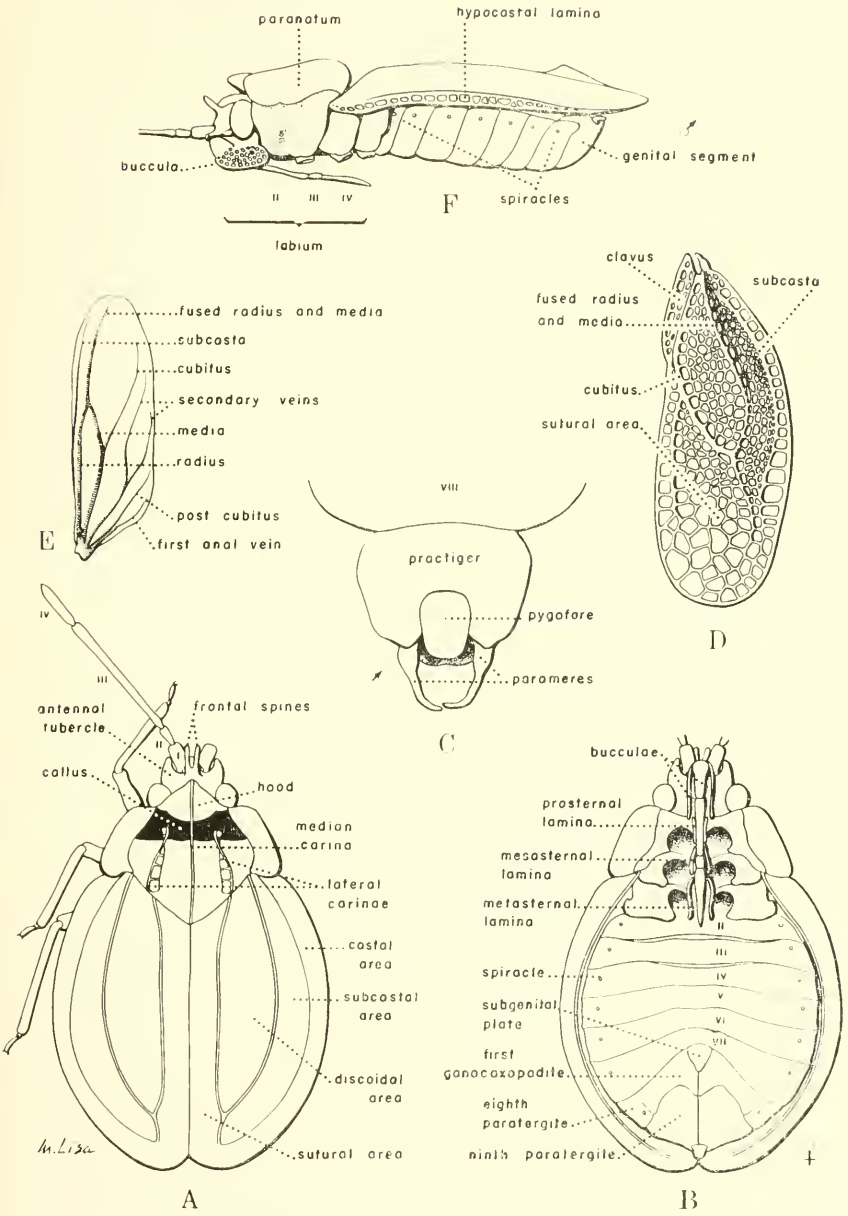
*Orthostira thomsoni*: Lethierry and Severin 1896, p. 7.

*Acalypta madelinae* Torre-Bueno 1926, p. 117.

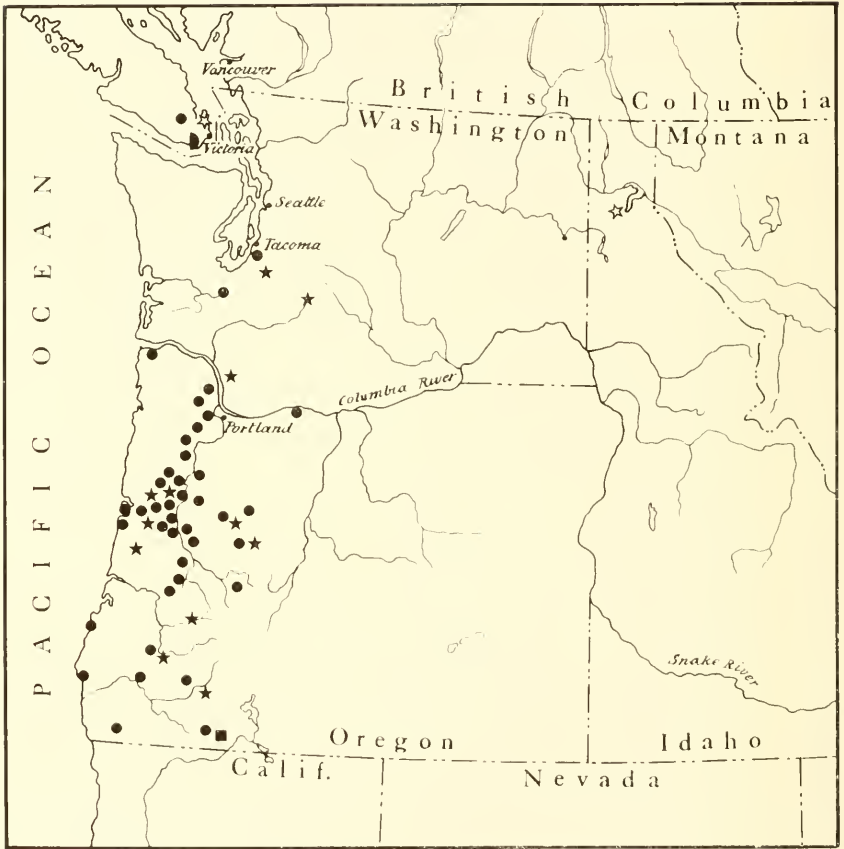
BRACHYPTEROUS FORM.—Obovate or ovate, testaceous to brownish testaceous with appendages brown to fuscous; fourth antennal segment black; body beneath flavous to dark brown or fuscous.

Head brown, with frontal spines and antennal process testaceous; bucculae closed in front. Antennal measurements: segment I, 0.18 mm.; II, 0.10 mm.; III, 0.53 mm.; IV, 0.22 mm. Pronotum depressed, tricarinate; lateral carinae low, much less raised than median carina, divergent posteriorly, usually with one row of tiny areolae; median carina distinctly raised anteriorly, with a short row of three or four fairly large areolae in front, then posteriorly with areolae becoming obsolete; paranotum wide, almost rectangular in outline, biseriate or triseriate in front and biseriate at base, with anterolateral corner angulate; hood obtusely produced in front. Hypocostal lamina uniseriate.





*Acalypta*, structures used in classification.



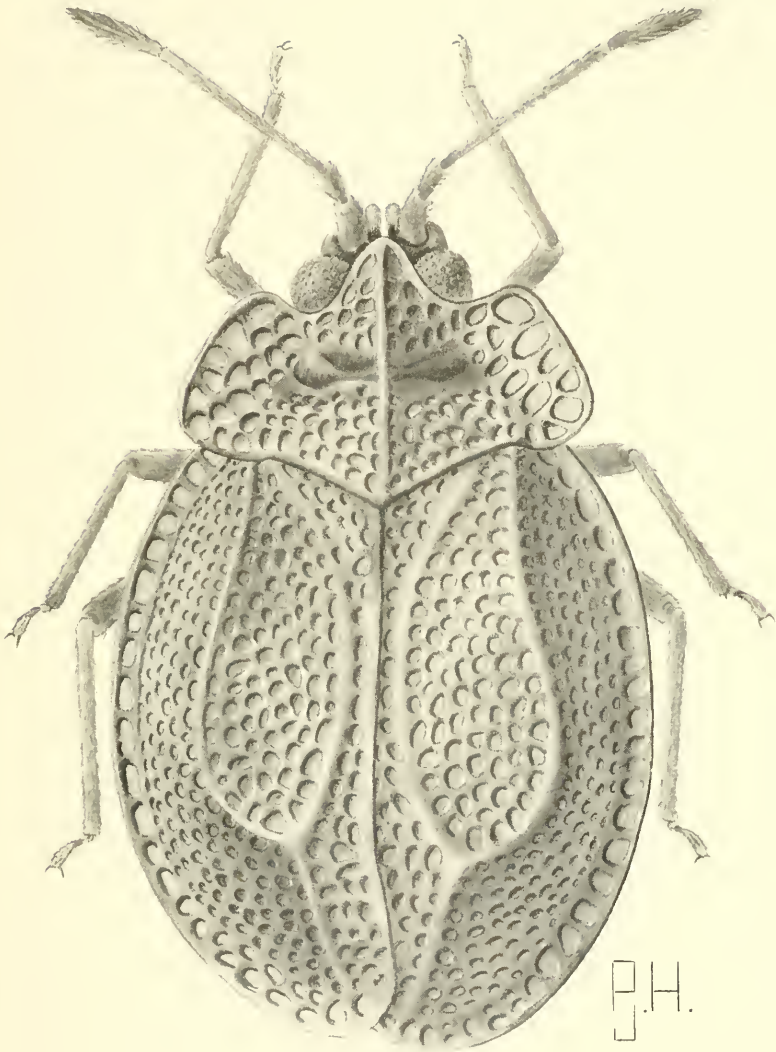
Distribution of *Acalypta* in Northwestern United States and Canada:

● *A. barberi* Drake

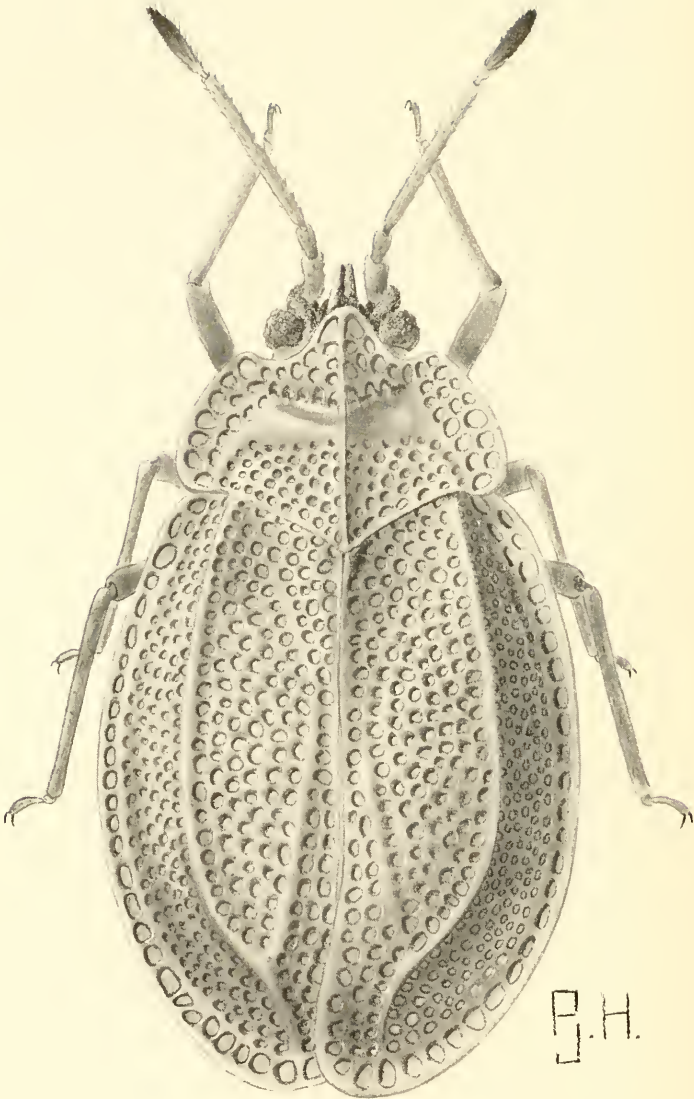
☆ *A. lillianis* Torre-Bueno

★ *A. saundersi* Downes

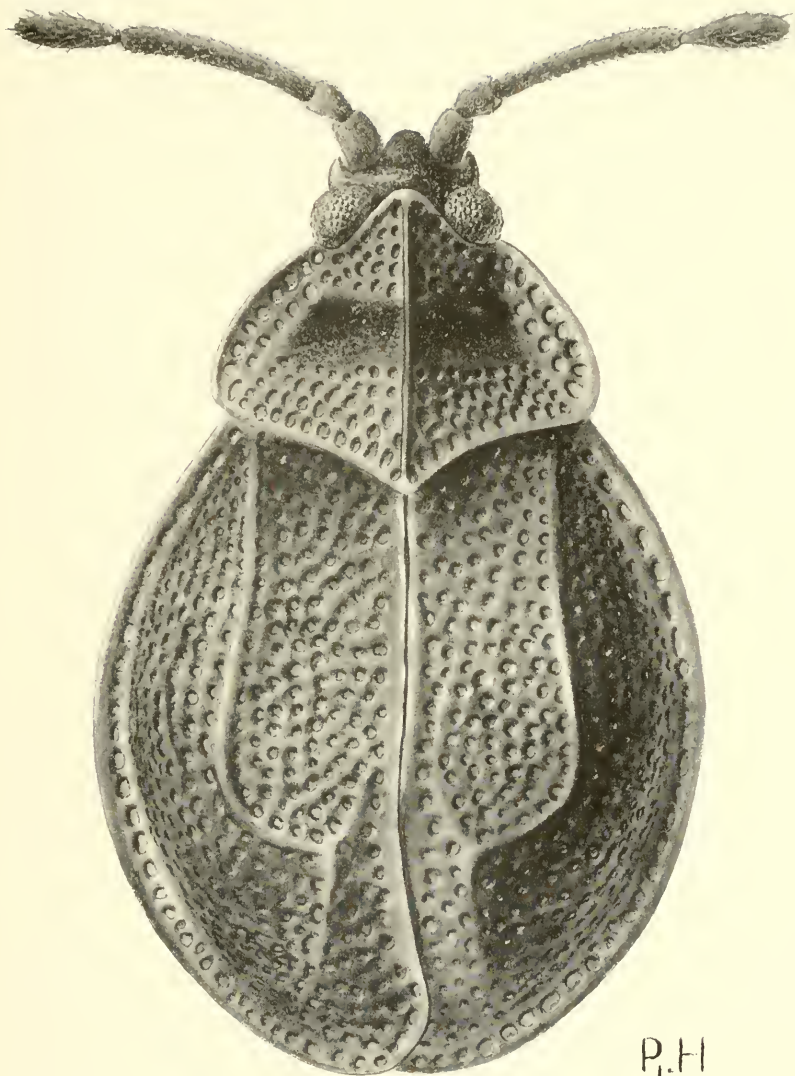
■ *A. cooleyi* Drake



*Acalypta duryi* Drake.

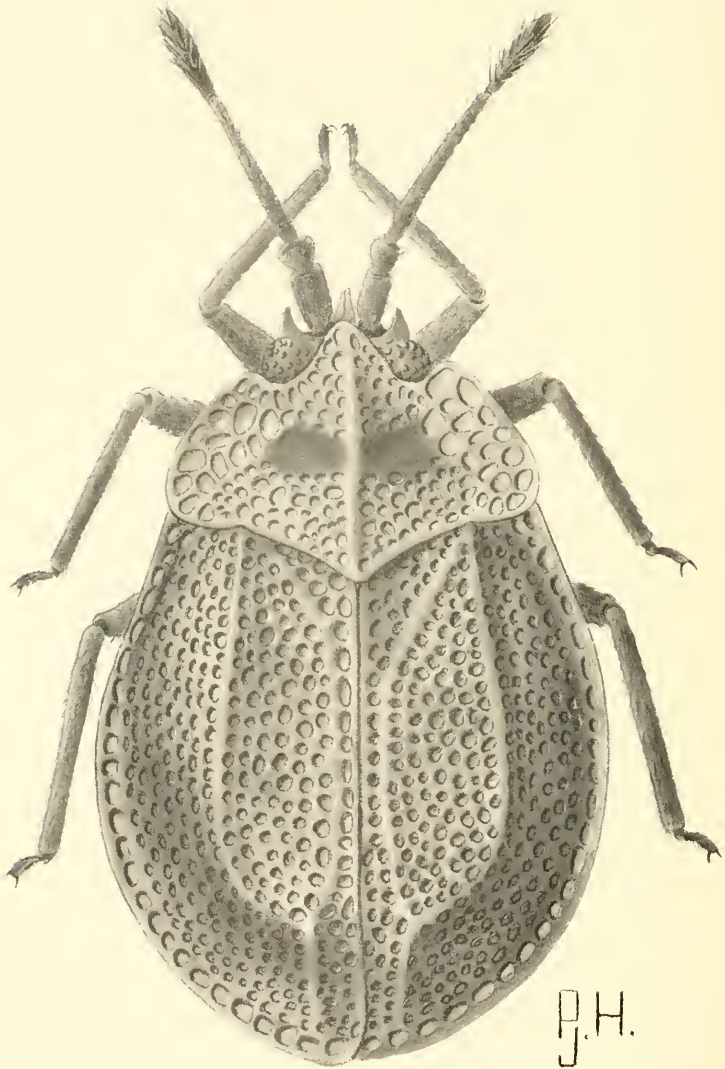


*Acalypta saundersi* Downes.

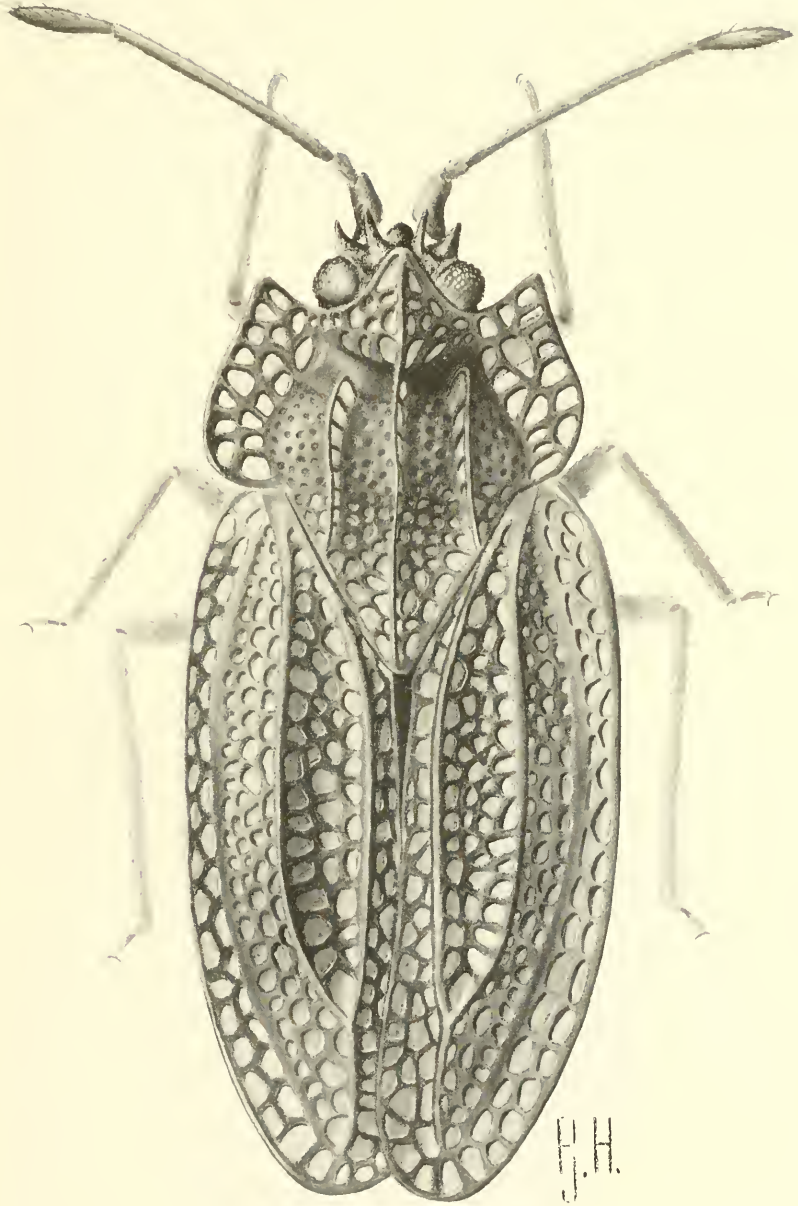


P. H.

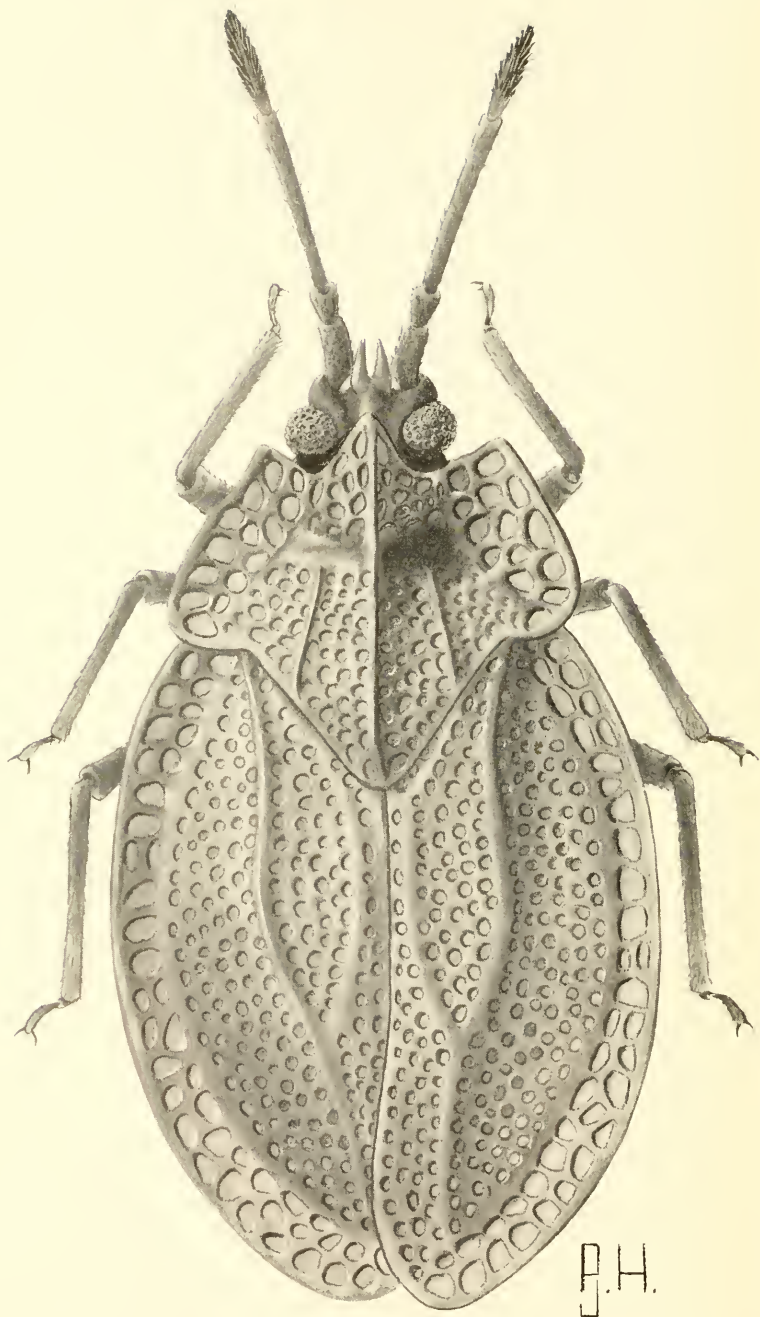
*Acalypta mniophila* Drake and Ruhoff.



*Acalypta sauteri* Drake.

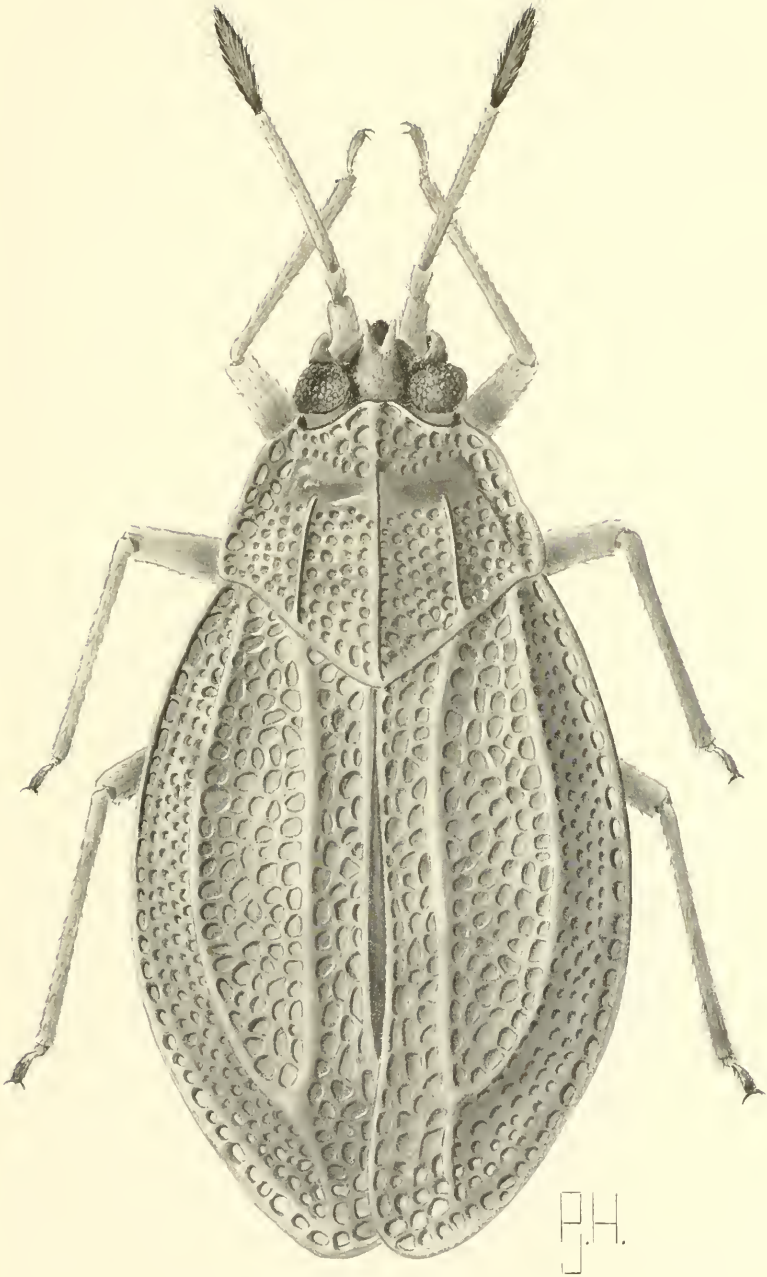


*Acalypta cooleyi* Drake.

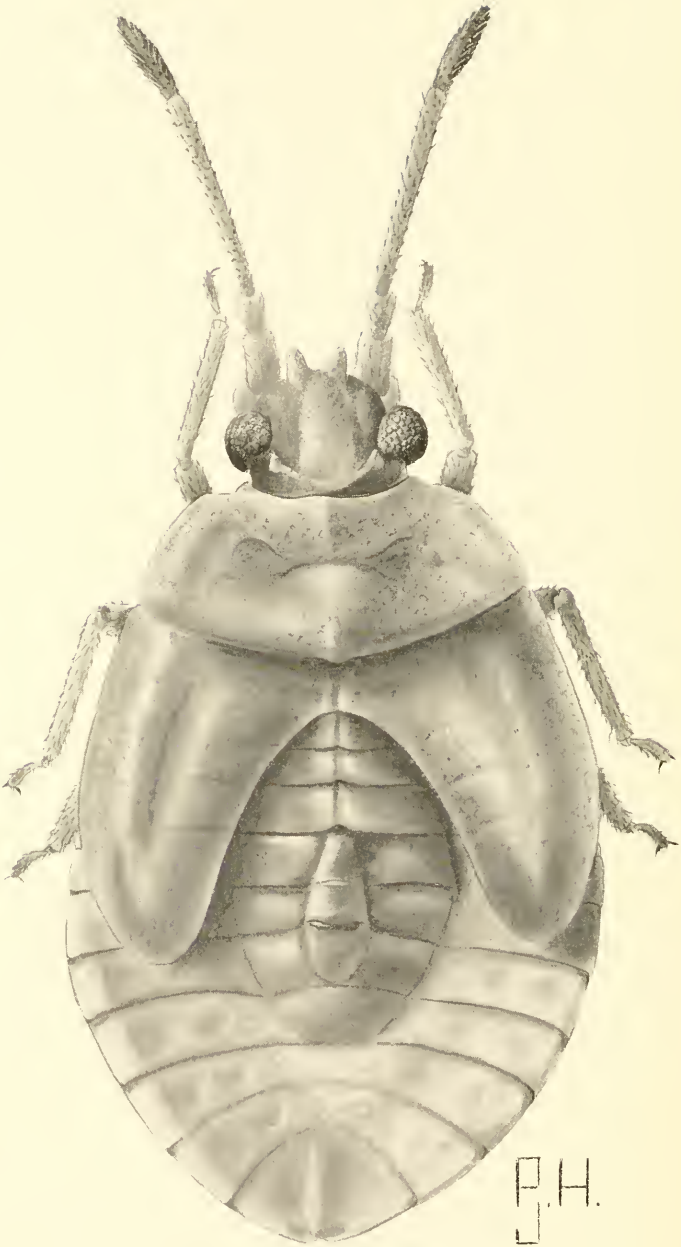


*Acalypta thomsonii* Stål.

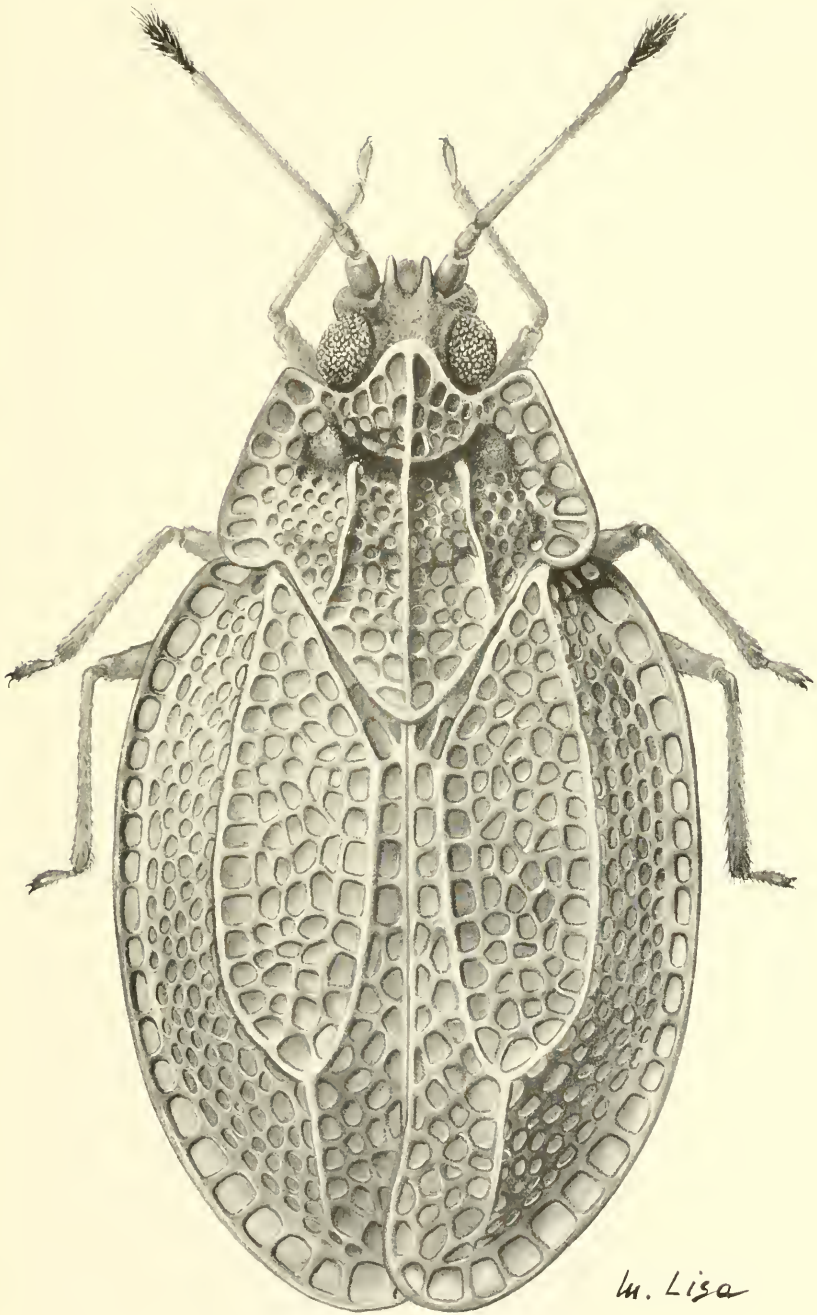




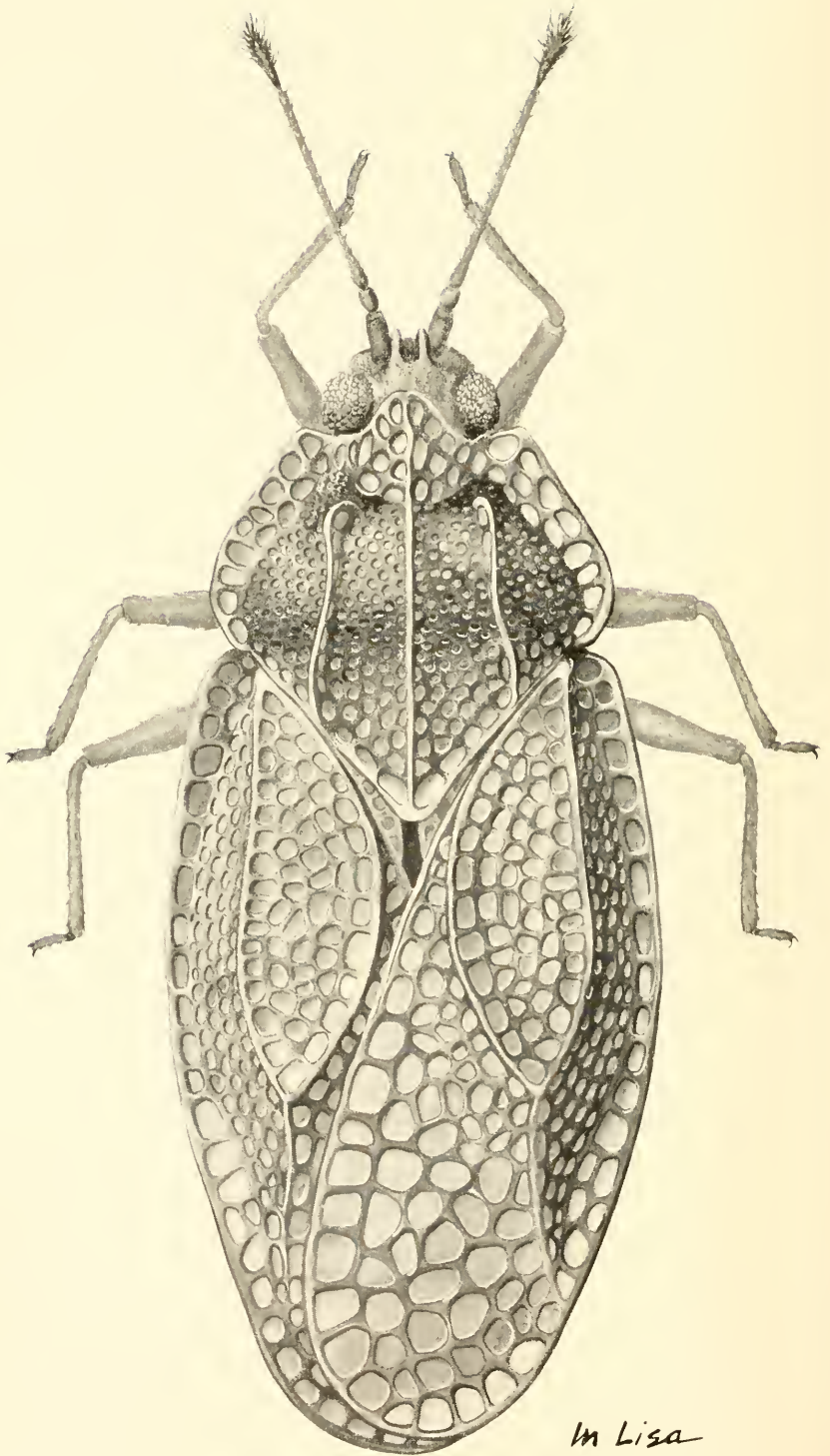
*Acalypta nyctalis* Drake, brachypterous form.



*Acalypta nyctalis* Drake, fifth instar.

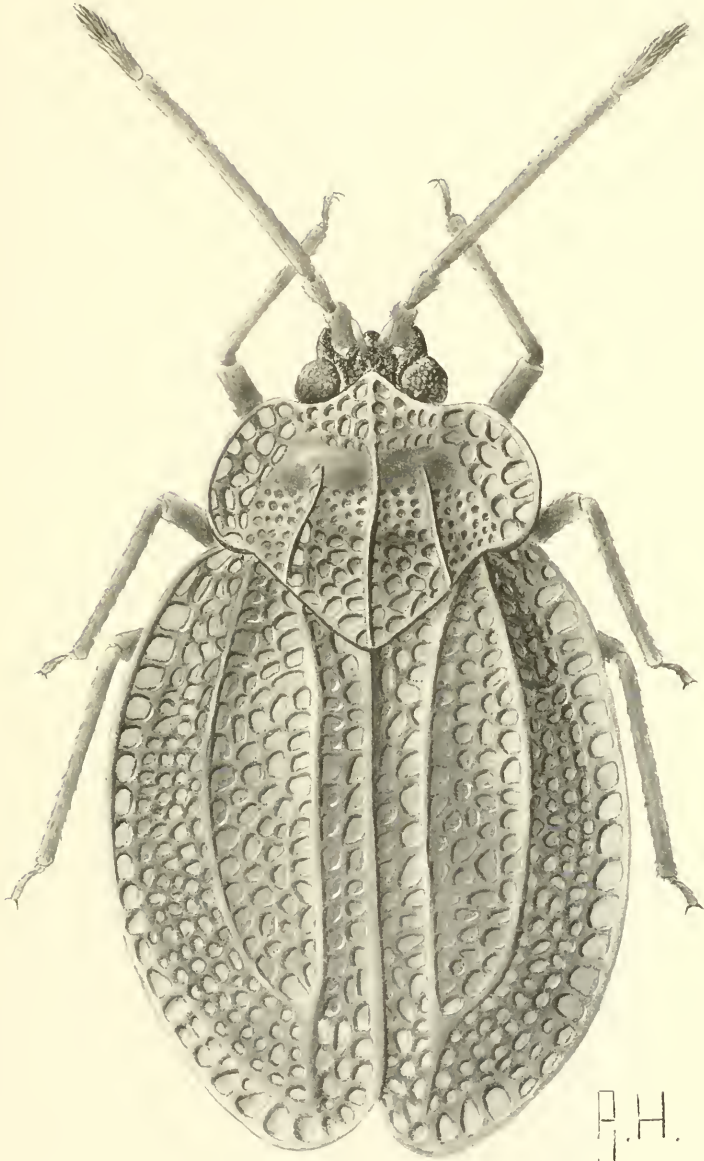


*Acalypta barberi* Drake, brachypterous form.

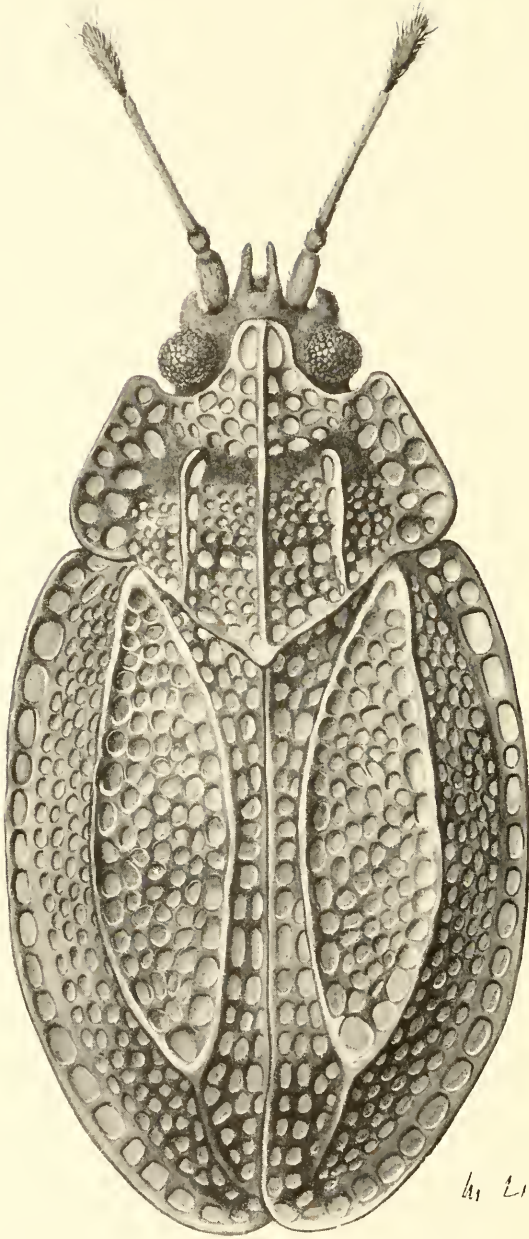


*In Lisa*

*Acalypta barberi* Drake, macropterous form.

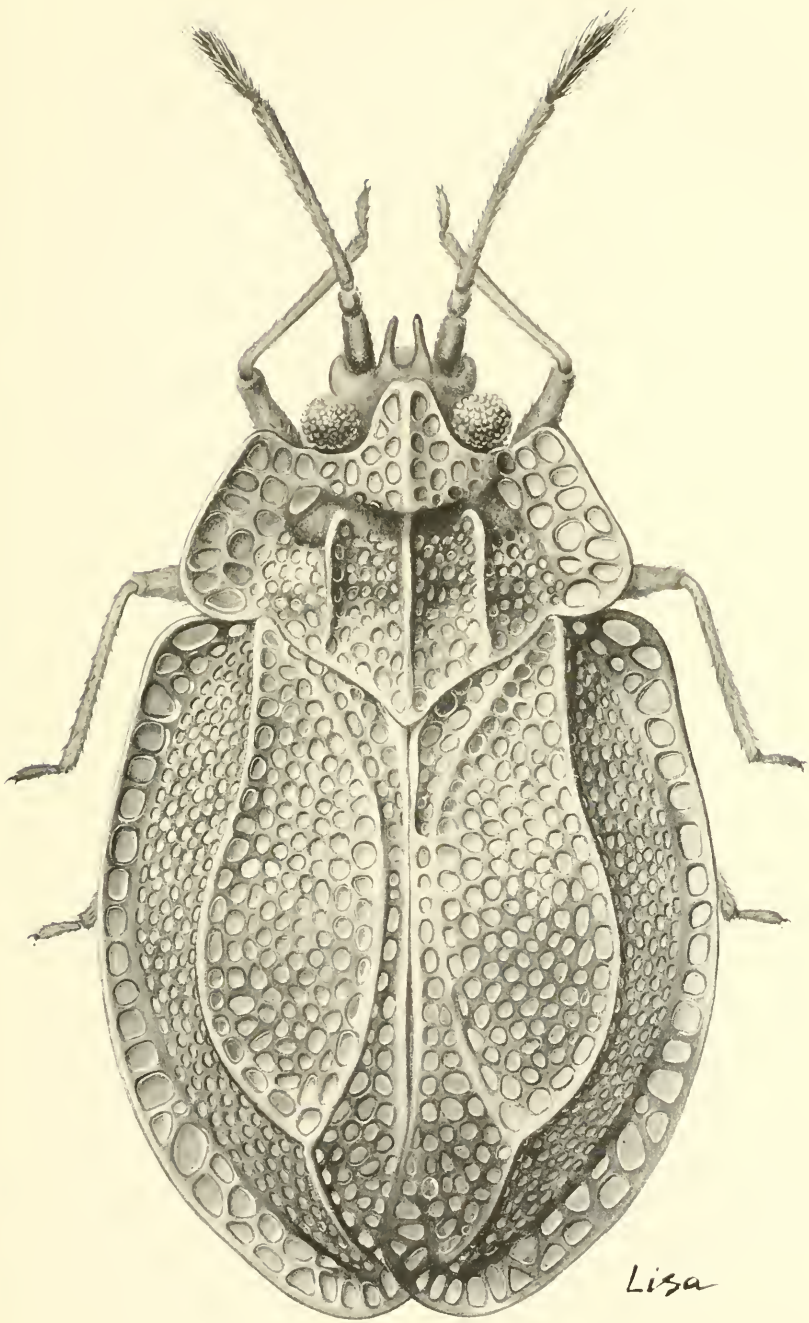


*Acalypta lillianis* Torre-Bueno.



h<sub>1</sub> Lisa

*Acalypta vandyke*. Drake.



*Lisa*

*Acalypta vanduzeei* Drake.





Elytra with fairly large areolae; costal area wide, varying in almost all degrees from one to two complete rows of large areolae, usually with one and a partial second row of areolae; discoidal area narrow, shorter than in other members of the genus, narrower than subcostal area, acutely angulate at base and apex, three or four areolae deep in widest part. Length 2.30–2.70 mm., width (elytra) 1.25–1.55 mm. Macropterous form unknown.

HOLOTYPE.—Brachypterous ♂, "Carolina meridionalis" (S.C.), in Naturhistoriska Riksmuseum, Stockholm, Sweden.

DISTRIBUTION.—Massachusetts, Rhode Island, New Jersey, Maryland, District of Columbia, Virginia, Georgia, North Carolina, South Carolina, and Florida. Known only from the eastern coastal states. Adults and nymphs were collected on mosses, the only known host. It has also been collected during the winter months on mosses. A brachypterous ♀ from Rhode Island is illustrated.

#### *Acalypta nyctalis* Drake

PLATES 9, 10

*Acalypta nyctalis* Drake 1928b, pp. 3, 5.—Hurd 1946, p. 463.—Bailey 1951, p. 35.—Lindberg 1958, p. 13.—Drake and Ruhoff 1959, p. 139.

BRACHYPTEROUS FORM.—Elongate-ovate, brownish testaceous, antenna testaceous with fourth segment black, legs testaceous. Antennal measurements: segment I, 0.15 mm.; II, 0.10 mm.; III, 0.25 mm.; IV, 0.25 mm. Head with frontal spines rather slender; bucculae open in front. Pronotum reticulate, tricarinate; carinae low, outer pair less elevated than median and slightly divergent posteriorly, each carina slightly raised and becoming uniseriate anteriorly; paranotum rather narrow, mostly biseriate, with a few extra areolae in front; hood small, feebly roundly produced anteriorly. Elytron with very long discoidal area, as wide or slightly wider than subcostal area; costal area usually entirely uniseriate, with small areolae. Hypocostal lamina uniseriate. Length 2.60–2.72 mm., width (elytra) 1.22 mm. Macropterous form and male unknown.

HOLOTYPE.—Brachypterous ♀, Franconia, New Hampshire, in U.S. National Museum (type no. 51715).

DISTRIBUTION.—United States: New Hampshire, Alaska (Point Richardson and Fairbanks); Canada: Newfoundland and Alberta. This is our most northerly distributed member of the genus. A brachypterous ♀ from Point Richardson and the last nymphal instar from Fairbanks, Alaska, are illustrated.

*Acalypta barberi* Drake

PLATES 11, 12

*Acalypta barberi* Drake 1934, p. 196.—Hurd 1946, p. 463.—Drake and Ruhoff 1959, p. 138.

*Acalypta mera* Drake 1941, p. 142.—Hurd 1946, p. 465.

BRACHYPTEROUS FORM.—Ovate, obovate or elongate-ovate, brownish to dark fuscous, often with a slight reddish tinge, body beneath stramineous to dark fuscous, head often black. Legs brownish, femora usually darker. Antenna brownish with fourth segment blackish. Length 1.90–2.24 mm., width 0.90–1.20 mm.

Head with a pair of porrect frontal spines; bucculae areolate, open in front; antennal measurements: segment I, 0.15 mm.; II, 0.11 mm.; III, 0.46 mm.; IV, 0.20 mm. Pronotum coarsely punctate, tricarinate, each carina composed of one row of moderately large areolae; lateral carinae slightly less raised than median carina, divergent posteriorly; hood small, projected over base of vertex, obtusely rounded at apex; paranotum wide, biseriate, or wider and triseriate in front, anterolateral corner angulate. Hypocostal lamina uniseriate. Elytron with divisions and areolae as shown in illustration.

MACROPTEROUS FORM.—Pronotum distinctly convex, coarsely punctate, carinae slightly less elevated than in brachyptery; paranota biseriate or wider with several interpolated areolae in front and before apex. Elytra much longer than abdomen, sutural areas overlapping each other at rest; clavus distinct, concealed beneath triangular process of pronotum in resting posture; discoidal area about four-sevenths as long as elytron; costal area mostly uniseriate, often with a few intercalated areolae at base and before apex. Length 2.16–2.44 mm., width (elytra) 1.12 mm.

HOLOTYPE.—Brachypterous ♀, Merrifield, New York, July 21, 1927, C. R. Crosby, U.S. National Museum.

DISTRIBUTION.—United States: New York, Oregon. Canada: British Columbia, New Brunswick. See map (pl. 2) for distribution in western United States and Canada. Several thousand specimens were collected by means of Berlese funnels in Oregon by the junior author and associate. Mr. Joe Schuh also has taken many specimens in Oregon. Feeds and breeds on mosses. Numerous adults and nymphs were collected on hops at Coburg, Oreg., Aug. 26, 1935, N. P. Larson. The hops were serving as temporary host plants after the mosses had dried up.

*Acalypta lillianis* Torre-Bueno

## PLATE 13

- Acalypta lillianis* Torre-Bueno 1916, p. 39.—Osborn and Drake 1916a, p. 221, figs. 1, 2.—Van Duzee 1916, p. 25; 1917, p. 212.—Parshley 1917a, p. 14; 1917b, p. 53; 1923, p. 698.—Barber 1922, p. 17.—McAtee 1923, p. 145.—Blatchley 1926, p. 481, fig. 111.—Drake 1928a, p. 100; 1928b, p. 6.—Froesehner 1944, p. 669.—Hurd 1946, p. 463.—Bailey 1951, p. 32.—Lindberg 1958, p. 14.—Byers 1959, p. 191.—Drake and Ruhoff 1959, p. 139.
- Acalypta ovata* Osborn and Drake 1916b, p. 9, fig. 1.—Van Duzee 1917, p. 212.—Drake 1932, p. 100.
- Acalypta grisea* Heidemann 1917, p. 218, pl. 17, fig. 2.—McAtee 1917, p. 78.—Van Duzee 1917, p. 813.
- Acalypta modesta* Parshley 1921, p. 16.—Downes 1925, p. 14; 1927a, p. 10.—Drake 1928b, pp. 3, 7.

BRACHYPTEROUS FORM.—Ovate, obovate, or elongate-ovate, dark brown to dark fuscous brown. Antenna brown with first two and fourth segments blackish fuscous, III testaceous, sometimes also fuscous, body beneath stramineous to dark fuscous. Length 2.00–2.35 mm., width (elytra) 1.20–1.40 mm.

Head short, armed with two, porrect, frontal spines; bucculae closed or open in front; labium extending to end of sternal sulcus, open at base. Pronotum tricarinate, each carina raised anteriorly and composed of a row of fairly large areolae, the lateral carinae slightly divergent posteriorly; paranotum moderately wide, entirely biseriate or with some extra areolae anteriorly, front and lateral margins jointly rounded, thus rounded at anterolateral corner. Elytron with discoidal area long, slightly more than three-fourths as long as elytron, boundary veins raised, longitudinally sulcate; costal area uniseriate, sometimes with a few intercalated areolae at base and a little in front of apex; subcostal area as wide or slightly wider than discoidal area, each three to four areolae deep in widest part. Hypocostal lamina uniseriate. Hind wings absent.

MACROPTEROUS FORM.—Oblong. Pronotum distinctly convex, tricarinate; carinae less elevated than in brachypterous form, each uniseriate, the lateral pair divergent posteriorly. Elytra much longer than abdomen, sutural areas overlapping each other in repose; clavus well developed, concealed under the backward projection of pronotum in repose; discoidal area about five-sevenths as long as elytron. Metathoracic wings long, functional. Other characters similar to those in brachypterous form. Length 3.00–3.12 mm., width 1.25 mm.

LECTOTYPE.—♀, White Plains, New York, in Snow Museum, University of Kansas.

DISTRIBUTION.—United States: Maine, New Hampshire, Massachusetts, Vermont, Connecticut, New York, Pennsylvania, Ohio, Indiana, Illinois, Iowa, Michigan, Minnesota, North Dakota, Wisconsin, Nebraska, Virginia, New Jersey, North Carolina, Rhode Island, Idaho, Tennessee, Maryland, District of Columbia, Alaska. Canada: Quebec, Ontario, Newfoundland, British Columbia.

The furcate discoidal area and rounded outer margins of the pronotum separate *A. lillianis* from closely allied species. Host records are from mosses.

*Acalypta vandykei* Drake

PLATE 14

*Acalypta vandykei* Drake 1928b, pp. 3, 8.—Hurd 1946, p. 463.—Drake and Ruhoff 1959, p. 139.

BRACHYPTEROUS FORM.—Elongate-ovate, dark reddish brown with head and body beneath dark fuscous. Antenna with fourth segment subclavate, measurements: segment I, 0.13 mm.; II, 0.08 mm.; III, 0.38 mm.; IV, 0.20 mm. Pronotum with lateral carinae parallel, slightly less raised than median carina, with nearly quadrate areolae; paranotum fairly wide, triseriate in front, biseriate opposite humeral angle. Hypocostal lamina uniseriate. Size and arrangement of areolae and divisions of elytron as shown in illustration. Length 1.88 mm., width (elytra) 1.10 mm. Macropterous form unknown.

HOLOTYPE.—Brachypterous ♂, San Francisco County, California, in California Academy of Sciences.

DISTRIBUTION.—California.

This species can be separated from *A. barberi* by the characters employed in the key. *A. lillianis* differs from the above species by having a longer and more sulcate discoidal area and jointly rounded front and lateral margins of the paranotum. Collected on moss. The allotype is figured.

*Acalypta vanduzeei* Drake

PLATE 15

*Acalypta vanduzeei* Drake 1928b, pp. 3, 8.—Hurd 1946, p. 463.—Drake and Ruhoff 1959, p. 139.

BRACHYPTEROUS FEMALE.—Ovate, brown with head blackish, body beneath yellowish brown. Pronotum rather short, tricarinate; carinae raised anteriorly, each composed of one row of nearly quadrate areolae; lateral carinae parallel, slightly less raised than median; hood obtuse at apex; paranotum biseriate opposite humeral angle,

triseriate in front, angulate at anterolateral corner. Hypocostal lamina uniseriate. Antenna with segment IV fusiform, measurements: segment I, 0.13 mm.; II, 0.08 mm.; III, 0.38 mm.; IV, 0.20 mm. Elytron with divisions and areolae as in illustration. Length 2.25 mm., width (elytra) 1.30 mm.

**HOLOTYPE.**—Brachypterous ♂, Green Point Ranch, Humboldt County, California; in California Academy of Sciences, Golden Gate Park, San Francisco, Calif.

**DISTRIBUTION.**—Known only from the two type specimens. The form and longer third antennal segment separate this species from *A. vandykei*. Inhabits moss. The allotype is illustrated.

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