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# A REVISION OF THE HOPLIA OF THE NEARCTIC REALM (COLEOPTERA: SCARABAEIDAE)

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# A REVISION OF THE *HOPLIA* OF THE NEARCTIC REALM (COLEOPTERA: SCARABAEIDAE)

by

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## INTRODUCTION

*Hoplia* Illiger is a widespread genus of approximately 250 species found from the Orient (including Japan) to Europe, South Africa, and Madagascar, as well as North and South America.

The tribe Hopliini appears to be centered in southern Africa, where 46 of the total of 62 genera (other than *Hoplia*) included in Dalla Torre's 1913 Catalog are endemic. *Hoplia* is the largest genus of the tribe and the only New World representative. Other genera are found in Asia (6), Asia Minor (1), Madagascar (7), or Madagascar and South Africa (2).

The New World species may be easily separated into three nearly disjunct groups: those species from the western nearctic, those from the eastern nearctic, and the neotropical species. The present part of the revision will treat only those species of *Hoplia* from the nearctic.

The only previous revisions of the genus in North America have been those of LeConte (1880) and Boyer (1940). Boyer's revision is very difficult to use.

The revision presented below is based upon 7,783 specimens examined from the western nearctic, 3,566 from the eastern nearctic, and several thousand more from the neotropical areas and Europe.

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## CLASSIFICATION AND MORPHOLOGY

Examination of the morphological characteristics of the species treated below has resulted in the discovery of few usable diagnostic characters. For this reason, it was felt that exhaustive morphological descriptions of the species would result in needless repetition. In the species treatments below, only those characteristics which would aid in recognition or identification were treated.

The male genitalia was studied and evaluated as a means of separating the species of *Hoplia.* No utilizable characters were found in the phallobase, parameres or internal sac.

Males differ from females in the species examined, as follows: females tend to be larger, generally have less scalation or pubescence, have a smaller antennal club, and, in profile, a convex abdomen.

Boyer (1940:4) states "The females of *trifasciata, sackeni, cazieri, humboldtensis* and *ferrisi* possess constantly an enlarged spur at the inner apex of the middle tibia which is not present in the males. This spur in other species either does not occur at all or is inconstant."

This statement is misleading, since three of the five "species" he listed (*cazieri, humboldtensis* and *ferrisi*) are known from five or fewer speci-

mens, and are here considered synonyms of other species. *H. cazieri* and *H. humboldtensis* are synonyms of *H. callipyge,* in which the character is inconstant. *H. trifasciata* (and its synonym *H. ferrisi*) is the most sexually dimorphic species of Nearctic *Hoplia;* thus it is not surprising that the apical spur, as well as many other characters, does appear to be constantly present in females. This "character" is deemed to be of little value, and is not utilized in the treatment below.

Specimens of *Hoplia* from Western North America are extremely difficult to determine. Some species are so variable that sympatric species may morphologically overlap in every diagnostic character. An example is presented in Figs. 18–22. Most specimens of *callipyge* have scales normally shaped and grouped as in Fig. 18; however, populations located on the margins of the distribution of this species have scales as in Figs. 19–22. Species sympatric with *callipyge* are illustrated in Figs. 15, 16, and 17. Considering the difficulties involved, workers could expect to correctly identify most, but not all specimens of Western *Hoplia,* they might encounter.

The eastern nearctic species are morphologically more distinctive than the western species. They are readily separable into two groups based upon cleavage of the posterior tarsal claw; in addition, there are other good and easily utilized characters for recognizing species.

At least one species (*H. floridana* Fisher) appears so different from the "typical" nearctic *Hoplia* that I at one time considered the erection of a new supra-specific category to include it and possibly *H. mucorea* Germar, which shares or approximates a number of the unusual characteristics of *H. floridana.* However, with *H. gilleti* n.sp and *H. mucorea,* a transitional series can be demonstrated for characters in question between one extreme *(floridana)* and the "typical" condition.

The greatest problems encountered in classification of the eastern species are with *H. laticollis* LeConte (see discussion under *H. callipyge*) and with the unusual specimens of *H. modesta* Hald. from Massachusetts (see under *modesta,* below). Field work or additional specimens may lead future workers to different conclusions than those presented below.

Since most eastern species are distinctive, only brief diagnostic descriptions are presented. For more detailed morphological descriptions, see Boyer (1940).

## GENERIC DIAGNOSIS

The tribe Hopliini is distinguishable from all other genera of North American Melolonthinae by the single claw on the posterior tarsi. *Leptohoplia,* a North American genus formerly placed in this tribe, but now included in the Anomalini (see; Howden and Hardy 1971; Potts 1974) may be interpreted as having a single hind tarsal claw; however, close

examination reveals the presence of a much reduced second tarsal "claw".

## *HOPLIA* ILLIGER*

*Hoplia* Illiger 1803:226, Burmeister 1844:177; Lacordaire 1856:195; LeConte 1856:284; 1880:191; LeConte and Horn 1883:251; Blatchley 1910:949; Boyer 1940:2; Medvedev 1952:203. North American Larvae: Ritcher 1949:12; 1966:89.

Type species: *Scarabaeus farinosus* Linnaeus 1761 (by Medvedev 1952:244).

*Echyra* Erichson 1847:705, type species: Not yet designated.

Subgenus *Hoplia* Illiger; Reitter 1902 (1903):115; Medvedev 1952:194, 244.

Subgenus *Hyperis* DeJean 1833:167; 1837:185; Blanchard 1845:211; 1850:71.
Type species: *Hoplia eversmanni* Falderman 1833:50 (=paupera Krynicky 1832:127) by monotypy.
*Hyperius* Medvedev 1952:203 (Error).
*Xenoplia* Medvedev 1952:193, 229. NEW SYNONYMY
Type species: *Hoplia paupera* Krynicky 1832:127 by orig. designation.

Subgenus *Decamera* Mulsant 1842:503; Lacordaire 1856:196; Jacquelin du Val 1860:46; Reitter 1902 (1903):111–115; Medvedev 1952:193, 214.
Type species: *Scarabaeus philanthus* Fuessly 1775:3 (in Medvedev 1952:214).

Subgenus *Sinoplia* Medvedev 1952:193, 233.
Type species: *Hoplia bifasciata* Medvedev 1952:233 by orig. designation.

Subgenus *Euchromoplia* Medvedev 1952:194, 235.
Type species: *Scarabaeus aureolus* Pallas 1781:18 by orig. designation.

The subgenus *Euhoplia* proposed by Medvedev (1952:194) must be considered an invalid name, since it was described without mention of a type species and without included species.

Utilization of the key by Medvedev (see Appendix) to place the North American species into subgenera (which are based upon European taxa)

* For a more extensive list of references to the pre-1900 old world literature on *Hoplia*, refer to Dalla Torre (1913:368) or Medvedev (1952:203).

yields unsatisfactory results, since at least some species would match parts of each side of some couplets. I believe that, for the present at least, our species should be placed in the nominate subgenus. Final correct placement can only be decided by a revision of the worldwide fauna.

## A KEY TO THE NEARCTIC SPECIES OF *HOPLIA*

1. Species found west of the Rocky Mountains ..... 2

1.[1] Species found east of the Rocky Mountains ..... 5

2. Species apparently without scales both dorsally and ventrally, although flattened, elongate scales which are nearly impossible to detect with light microscopy are present (see Fig. 17); clypeus notably broad, appearing bilobed from above; prothoracic hairs very dense and long; integumentary color black; from extreme Northern California, neighboring Nevada and Southwestern Oregon ..... *hirta* LeC.

2.[1] Species with at least some scales ventrally, or if without scales, not occurring in Northern California or Southwestern Oregon; clypeus either rounded, subarcuate, or broad, but not appearing bilobed from above; prothoracic hairs usually short, sparse, but occasionally long and dense (if long and dense, scales usually present); integumentary color varying from dark to rufotestaceous, usually testaceous or piceotestaceous; species occurring from Baja California to British Columbia, and the Pacific to the Rocky Mountains ..... 3

3. Lateral prothoracic angles reduced (Fig. 35); elytral scales usually present, numerous (except in worn individuals), usually contiguous, round (Fig. 15), usually brightly colored (Figs. 23–30); scales on ventral surface usually strongly metallic; occurring in the Sierra Nevada of California to the extreme Southern Cascades of Oregon ..... *dispar* LeC.

3.[1] Lateral prothoracic angles more prominent (Figs. 33 and 34); elytral scales varying in density from contiguous to absent (when present, scales elongate) (Figs. 16, 18–22); usually dull browns or greys, occasionally brightly colored, (when metallic colored, usually conspicuously intermixed with hairs); species occurring from Baja California to British Columbia, and the Pacific to the Rocky Mountains ..... 4

4. Anterior prothoracic angles more prominent (Fig. 34); elytral scales varying from oval to elongate (Figs. 18–22); dorsal scales usually brown or dull, occasionally metallic; pygidial scales usually metallic; mesotarsal claw less strongly curved, sharper (Fig. 13); smaller (5.7 mm to 10.5 mm); occurring from British Columbia to Baja California, from the Pacific Coast to Utah ..... *callipyge* LeC.*

4.[1] Anterior prothoracic angles less prominent (Fig. 33); elytral scales usually elongate (Fig. 16); dorsally scales usually light colored, non-metallic; pygidial scales metallic; mesotarsal claw more strongly curved (Fig. 14); larger (6.5 mm to 13 mm); from Central California North, to British Columbia, mainly montane; Sierras and Coast Ranges, etc. ..... *sackenii* LeC.

5. Metatarsal claws cleft (Occasional *H. modesta* have uncleft claws) ..... 6

5.[1] Metatarsal claws entire (Rarely specimens of *H. trifasciata* have one or more claws on the tarsus cleft, but in nearly every case, the other claw has been uncleft) ..... 9

6. Mesotarsus with a single tarsal claw ..... *equina* LeC.

6.[1] Mesotarsus with two tarsal claws ..... 7

7. Clypeal suture strongly carinate (Figs. 38, 39); prothorax convex, globose, lateral margins rounded, not flaring; scutellum broadly rounded posteriorly; body form elongate; anterior tibiae bidentate; with close round to oval scales dorsally; ground color piceous to piceo-testaceous to testaceous; Southeastern States ..... 8

7.[1] Clypeal suture not, or weakly, carinate (Fig. 36); prothorax flattened to slightly convex, not globose, lateral margins flaring; scutellum oval, more pointed posteriorly; body form more quadrate, shorter; clypeus flat to shallowly concave; anterior tibiae bidentate or tridentate; with or without scales dorsally; ground color testaceous to rufous, uncommonly piceous; Northern States and Southern Canada ..... *modesta* Hald.

8. Clypeus flat (Fig. 39), rufous; posterior femur swollen, width one-half length (.45 to .51); Florida ..... *floridana* Fisher

8.[1] Clypeus concave (Fig. 38), piceous; posterior femur narrower, width one-third length (.30 to .36); S. Carolina, Alabama and Georgia ..... *gilleti,* n. sp.

9. Clypeus with a definite carina separating it from the front, often a definite angle between front and clypeus (Fig. 37); anterior tibia bidentate; body form elongate, narrow ..... *mucorea* (Germ.)

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* This species is similar to *laticollis* LeC. of the Great Plains area, but differs in not having semierect to erect, white, hair-like scales intermixed with the shorter, oval recumbent pygidial scales.

9.[1] Front evenly sloping into the clypeus, not delimited by an angulate carina, (as in Fig. 36), frontoclypeal suture may be faintly carinate; anterior tibia bidentate or tridentate; body form more typical for *Hoplia,* truncate, and shorter ..... 10

10. Lateral margins of the prothorax, just anterior to the hind angles, concave (Fig. 32); hind angles well developed, approximately 90°; sexually dimorphic in coloration ..... *trifasciata* Say

10.[1] Lateral margins of the prothorax, just anterior to the hind angles, nearly straight, at most only very slightly bowed (Fig. 31); hind angles poorly developed, generally noticeably more than 90°; coloration of males and females similar ..... 11

11. Ground color black; prothorax with scales elongate, sparse, separated by more than their own width; Eastern States ..... ..... *trivialis* Harold

11.[1] Ground color testaceous to rufo-testaceous; prothorax with scales oval, dense, not separated by own width; Great Plains ..... ..... *laticollis* LeC.

## *HOPLIA DISPAR* LECONTE
(Figs. 1, 11, 15, 23–30, 35)

*Hoplia dispar* LeConte 1880:192; Essig 1926:445; Boyer 1940:9 Type: MCZ #3291, Lectotype, here designated, female, 8 mm in length, with the following data labels: 1, "Cal."; 2, "Type 3291"; 3, "H. dispar +"; 4 (Pink); "Lectotype *Hoplia dispar* LeConte by A. R. Hardy 1975". 14 paralectotypes (9 examined). Type locality: "California (Mountains) and Nevada"

Length 6.0 to 9.0 mm, width 3.5 to 5 mm. Integumentary color rufo-testaceous to piceo-testaceous, densely (contiguously) overlaid with round scales (except in worn individuals) (Fig. 15). Scales on ventral surface and pygidium always pearly to metallic silver-green. Scales of upper surface variously colored. Elytra and prothorax either uniform in coloration or patterned. Solid colored individuals light yellow to pale green to orange to light brown. If patterned, pattern as in Figs. 23–30. Heavily patterned individuals pale green and black, those individuals with faint patterns have black pattern superimposed upon any of the colors found in non-patterned individuals. Dorsal hairs short, scale-like, semi-erect. Lateral prothoracic angles reduced (Fig. 35). Mesotarsal claw compact (Fig. 11).

Specimens examined: 2440 (See Fig. 1).

ARIZONA: "White Mountains, Arizona." [?]

CALIFORNIA: "Calif."; "Cal."; "Ca." *Alameda Co.;* Berkeley. *Alpine Co.;* Charity; Hope Valley; Markleeville; Monitor Pass; 1.5 mi. N.E. Red Lake; Woodfords. *Amador Co.;* Harris Station; Tragedy Springs.

*Butte Co.;* N. Fork Feather River. *Calaveras Co.;* Avery; Camp Wolfboro, N. Fork Stanislaus Riv.; Donington [Dorrington?]. *El Dorado Co.;* American River; Bijou; Camino; China Flat; Echo Lake; Below Echo Summit; Fallen Leaf Lake; Glen Alpine; Grass Lake; Ice House; Ice House Road, 8 mi. N.; Kyburz; Lake Tahoe; Meyers; Phillips; Placerville; Pollock Pines; 2 mi. N.W. Pollock Pines; Pyramid Ranger Station; Riverton; Somerset; Stateline; Strawberry; Strawberry Valley; Tahoe; Tallac; 3 mi. E. Uncle Tom's Cabin; Whitehall; near Whitehall. *Fresno Co.;* Fresno; Huntington Lake. *Humboldt Co.;* Green Point. *Inyo Co.;* Bishop; Lone Pine; Owens Valley; Rock Creek. *Lassen Co.;* Hallelujah Junction; Silver Lake. *Los Angeles Co.;* "Los Angeles Co." *Madera Co.;* Castle Lake. *Mariposa Co.;* Fish Camp; Tamarack Lake. *Merced Co.;* "Merced Co."; Ediza Lake. *Mono Co.;* 31 mi. W. Benton; Big Springs; Bridgeport; Camp High Sierra; Coleville; Convict Lake; Devils Gate; Gibb's Canyon; Grant Lake; June Lake; Leavitt Meadows; 1 mi. E. Leavitt Meadows; 2 mi. W. Leavitt Meadows; Leevining; 5.5 mi. W. Leevining; Long Valley; Lundy; Mammoth; Mammoth Lake; Mono Lake; Rock Creek; Sardine Creek; Sherwin Lakes; Sonora Junction; Tioga Pass; 7 mi. E. Tioga Pass; Tom's Place; 4 mi. S.W. Tom's Place; Twin Lakes. *Nevada Co.;* Bear Valley; Boca; Donner Lake; Donner Pass; Fuller Lake; Grass Valley; Hobart Mills; Lake Spaulding; Nevada City; Ruckers Lake; Russell Valley; Sagenhen Creek; Truckee. *Placer Co.;* Alta; Auburn; Baxter; Brockway; Cisco; Donner Lake; Emigrant Gap; 5 mi. W. Foresthill; Summit; Towle. *Plumas Co.;* Buck's Lake; Chester; Chico-Chester; 1 mi. N. Elephant Butte; Gold Point Mine; Graeagle; Johnsville; 14 mi. W. Johnsville; Meadow Valley; Mount Hough; Onion Valley; 4 mi. W. Quincy; 4 mi. W. Storrie. *San Diego Co.;* Rainbow Lodge [?]. *Santa Clara Co.;* San Jose. *Shasta Co.;* 5 mi. E. Burney; 10 mi. W. Burney; Castella, Castle Creek; Castle Crags St. Park; Hat Creek; 3 mi. N. Hat Creek; 6 mi. S. Hat Creek; 2.3 mi. S.W. Hatchet Mountain Pass; "Lassen Nat."; 1 mi. E. Montgomery; Moose Camp; Old Station; 3 mi. S.W. Old Station; Shasta Springs; Shingleton. *Sierra Co.;* 6 mi. N. Bassets; Downieville; Gold Lake; Independence Lake; 7 mi. N. Sagehen Creek; Sardine Lakes; Sierraville; 10 mi. S. Sierraville; 2 mi. S. Snag Lakes; 5 mi. E. Weber Lake; Yuba Pass. *Siskiyou Co.;* Cole [Coles?]; Dunsmuir; Grass Lake; Harris Springs; Macdoel; McCloud; Mount Bradley; Mount Shasta; Mount Shasta Region; Panther Meadows, Mt. Shasta; Pondosa; Scott Bar; Shasta Retreat; Tallac; Tate [Cr.?]; Tennant; Weed; 5 mi. S. Weed. *Sonoma Co.;* Sonoma. *Tehama Co.;* Deer Creek; Manton; Mineral; 12 mi. W. Mineral; 13 mi. S. Mineral; 2 mi. S. Wilson Lake. *Trinity Co.;* Big Flats; Carrville; Coffee Creek; Eagle Creek; Mountain Meadow Ranch; Head of Coffee Creek. *Tuolumne Co.;* Dardanelles; Sonora Pass; 11 mi. N. Strawberry; 16 mi. E. Strawberry Lake. *Yolo Co.;* Davis. *Yuba Co.;* Strawberry Valley. *Yosemite National Park;* Yosemite Valley; Vernal Falls.

NEVADA: "Nev." "Lake Tahoe, Nevada". *Carson City;* Carson City. *Douglas Co.;* Valley Hot Springs. *Mineral Co.;* Walker Lake. *Washoe Co.;* Mount Rose; Reno; Verdi.

OREGON: *Jackson Co.;* Ashland; Ashland Mountain; Copper.

Phenology: March (2); April (47); May (116); June (1361); July (632); August (34).

Remarks: This species is readily distinguished from all others by the round elytral scales and reduced prothoracic angulation.

*Hoplia dispar* is commonly collected on flowers of *Ceanothus* spp., but has also been recorded from: *Achillea millefolium* L.; *Chrysanthemum leucanthemum* L.; *Eriogonum* sp.; *Rhododendron occidentale* (T.&G.); *Rosa* sp. Elevations of sea level to at least 2,713 m. (8,900 ft.).

## *HOPLIA SACKENII* LECONTE
(Figs. 3, 14, 16, 33)

*Hoplia sackenii* LeConte 1880:192; Essig 1926:445; Boyer 1940:21. Type: MCZ #3289. Lectotype, here designated; male 10 mm. in length with the following data labels: 1, "Sierra Nevada, Cal. Summit Lake, Tahoe, Webber Lake, July 17–27 B. Osten Sacken"; 2, "Type 3289"; 3, "H. sackenii LeC."; 4, *"Hoplia sackenii* LeC."; 5, (pink), "Lectotype Holia sackenii LeC. by A. R. Hardy 1975". One paralectotype female. Type locality: "California, Summit Lake, Sierra Nevada . . . ; San Diego".

Length 6.5 to 13.0 mm, width 3.4 to 6.2 mm. Integumentary color rufous to rufo-testaceous, or slightly darker; with scattered, elongate scales (Fig. 16) in most individuals. Ventrally without dense scalation. Dorsally without a definite pattern. Dorsal hairs absent to scattered, usually long, fine, semi-erect to erect. Lateral prothoracic angles developed (Fig. 33). Mesotarsal claw elongate (Fig. 4).

Specimens examined: 567 (See Fig. 3).

CALIFORNIA: *Alpine Co.;* Charity; Glen Alpine; Hope Valley; Lake Alpine; Mosquito Lake. *Amador Co.;* Cooks Station; Fiddletown; 5 mi. E. Jackson; Silver Lake; 4 mi. N. Silver Lake. *Calaveras Co.;* Camp Wolfeboro. *Contra Costa Co.;* Danville. *El Dorado Co.;* China Flat; Desolation Valley, Lake Tahoe; Echo Lake; Fallen Leaf Lake; Heather Lake; Ice House; 8 mi. N. Ice House Road; Lake Tahoe; Myers; Phillips; Riverton; Tallac; Wright's Lake. *Fresno Co.;* "General Grant National Park"; Huckleberry Meadow; Huntington Lake; Sequoia Lake. *Kings Co.;* Kettlemen Hills. *Madera Co.;* Bass Lake; French Trail; Lake Ediza; Oakhurst. *Marin Co.;* Lagunitas; Phoenix Lake; San Anselmo; Taylor State Park. *Mariposa Co.;* Boundry Hill Re-

search Area, Yosemite National Park; Fish Camp; Summerdale; Yosemite; Yosemite Valley. *Mendocino Co.;* Fort Bragg; Mendocino. *Monterey Co.;* Co. only. *Nevada Co.;* Donner Lake; Donner Pass; Donner Summit; Nevada City; Norden; Truckee; Tyler. *Placer Co.;* Cisco; Forestville; Summit. *Plumas Co.;* Buck's Lake; Clio; Johnsville; 10 mi. S. Johnsville; 14 mi. W. Johnsville; Meadow Valley; Quincy; 4 mi. W. Quincy; 2 mi. N.W. Spring Garden. *Sacramento Co.;* Folsom Lake. *San Diego Co.;* Buckman Springs. *San Francisco Co.;* San Francisco. *San Mateo Co.;* Half Moon Bay. *Santa Cruz Co.;* Boulder Creek; Santa Cruz. *Shasta Co.;* Tamarack Lake. *Sierra Co.;* 6 mi. N. Bassets; Gold Lake; Yuba Pass. *Siskiyou Co.;* Pondosa. *Sonoma Co.;* Jenner; Monte Rio; Sebastapol. *Stanislaus Co.;* Modesto. *Trinity Co.;* Carrville; Coffee Creek; Eagle Creek; Hayfork; Nevada City; Trinity River Camp. *Tulare Co.;* Balch Park; Giant Forest; Hot Springs; Kings Canyon National Park, Big Meadows; Sequoia National Park. *Tuolumne Co.;* Coffee Creek; Strawberry. *Yolo Co.;* Davis. *Yuba Co.;* Bullards Bar.

NEVADA: *Churchill Co.;* Fallon.

OREGON: *Benton Co.;* Alsea; Corvallis. *Sherman Co.;* Deschutes River Park; 3 mi. E. Celilo. *Wasco Co.;* The Dalles.

WASHINGTON: *Grays Harbor Co.;* Westport. *Pierce Co.;* Puyallup. *Yakima Co.;* Mt. Adams.

CANADA: *British Columbia;* Massett, Graham Id; Phillips Canyon; 12 mi. N. Rock Creek; 2 mi. S. Salmo.

MEXICO: "Mexico" [Data doubtful].

Phenology: March (27); April (12); May (57); June (234); July (140); August (12).

Remarks: This species does not seem to have a preferred host, but has been recorded from: *Azalea* sp.; "Barley"; "Grass-Brush"; "Pear"; "Pine"; *Ribes* sp. Elevations of sea level to at least 2,865 m. (9,400 ft.).

A small population of beetles centered around Trail, British Columbia, appears to be referable to this species. Although closely resembling *sackenii,* it lacks the characteristic elytral scales, and is apparently disjunct from the general population. The numbers of specimens examined, however, is small (12) and represents only two collections. Examination of additional material is necessary to determine the correct placement of these specimens.

*H. sackenii* may be distinguished from other western species by the light colored elongate elytral scales (Fig. 16). Some individuals lack elytral scales, and may key to, or resemble, *callipyge.* For a discussion of these specimens, see under *callipyge.*

## *HOPLIA CALLIPYGE* LECONTE
(Figs. 4, 13, 18–22, 34)

*Hoplia callipyge* LeConte 1856:285; 1880:191; Essig 1926:445; Boyer 1940: 16; Chapin 1946:79.

*Hoplia oregona* LeConte 1856:284; 1880:193; Boyer 1940:16; Chapin 1946:80.

*Hoplia oregona deserticola* Boyer 1940:20 NEW SYNONYMY.

*Hoplia pubicollis* LeConte 1856:285 (nec. Juster 1849:62); 1880:191, 193; Essig 1926:445.

*Hoplia convexula* LeConte 1856:285; 1880:193.

*Hoplia irrorata* Le Conte 1857:40 (nec. Blanchard 1850:71); 1880:193.

*Hoplia mutata* Gemminger and Harold 1869:1113 (new name for *irrorata* LeC.); LeConte 1880:193.

*Hoplia lecontei* Dalla Torre 1913:376 (new name for *pubicollis* LeC.).

*Hoplia utahensis* Boyer 1940:24 NEW SYNONYMY.

*Hoplia cazieri* Boyer 1940:8 NEW SYNONYMY.

*Hoplia humboldtensis* Boyer 1940:12 NEW SYNONYMY.

Type locality: California.

Types: *Hoplia callipyge* LeConte, MCZ #3261, Lectotype, here designated; male, 8 mm in length, with the following data labels: 1, [gold disc] 2, "Type 5; 3261"; 3, "callipyge 5"; 4, (pink), "Lectotype Hoplia callipyge LeC. by A. R. Hardy 1975". 4 paralectotypes (3 examined). *Hoplia oregona* LeConte, MCZ #3258, a unique female, in poor condition. *Hoplia pubicollis* LeConte, MCZ #3260, Lectotype, here designated, male, 7.9 mm in length, with the following data labels: 1, [gold disc]: 2, "Type 5; 3260"; 3, "publicollis"; 4, "Lectotype, Hoplia publicollis LeC. by A. R. Hardy 1975". *Hoplia convexula* LeConte, MCZ #3257, a unique male (?), in fair condition. *Hoplia irrorata* LeConte, not in LeConte or Horn Collections, or in MCZ, presumed lost. *Hoplia utahensis* Boyer, CAS #4702. *Hoplia cazieri* Boyer, CAS #4703, a teneral male, allotype CAS #4704. *Hoplia humboldtensis* Boyer CAS #4705, a female. *Hoplia oregona deserticola* Boyer, CAS #4706.

Type localities: *callipyge,* "California" [gold disc]; *oregona,* [blue disc]; *pubicollis,* "California" [gold disc]; *convexula,* "Sacramento" [gold disc]; *irrorata* "Oregon" and "California"; *utahensis,* Wylie Camp, Zion Canyon, Utah; *cazieri,* Las Vegas, Nevada; *humboldtensis,* Willow Creek, Humboldt Co., Calif.; *oregona deserticola,* Big Pine, Inyo Co., Calif.

Length 5.75 to 10.5 mm, width 3.4 to 5.0 mm. Integumentary color testaceous to rufotestaceous to brown. Scale color usually brown, occasionally semimetallic, pastel colored. Scalation varying from dense, contiguous to nearly completely absent. Usually densely scaled ventrally. Scales usually elongate or oval, occasionally rounder, elytral scales not presenting a definite pattern (Figs. 18–22). Pubesence dense to absent, usually brownish, erect. Lateral prothoracic angles not reduced.

Specimens examined: 4744 (See Fig. 4).

ARIZONA: *Navajo Co.;* 4 mi. N. White River. *Santa Cruz Co.;* Mt. Washington, Nogales [Records Questionable].

CALIFORNIA: *Amador Co.;* Fiddletown; Ione; 5 mi. S.W. Jackson; Plymouth; Volcano. *Alameda Co.;* Alameda; Hayward; Midway City; Oakland; Piedmont; Sunol. *Alpine Co.;* Blue Lakes; Fredericksburg; Hope Valley; Markleeville; Red Lake; Woodfords; 4 mi. W. Woodfords. *Butte Co.;* Bangor; Oroville; Paradise; Richardson Springs. *Calaveras Co.;* Altaville; Angels Camp; Avery; Big Trees; Mokelumne Hill; Murphys; West Point. *Colusa Co.;* Cooks Spring; Rumsey Canyon. *Contra Costa Co.;* Antioch; Danville; Marsh Creek Springs; "Morgan Terr. Road"; Mount Diablo; Redwood Creek; Richmond; Walnut Creek. *Del Norte Co.;* Crescent City; Smith River. *El Dorado Co.;* Aukum; Camino; 3 mi. S. Camino; Echo Lake; El Dorado; Fallen Leaf; Fallen Leaf Lake; Green Valley; Green Wood; 2 mi. N. Kelsey; Kyburz; Meyers; 2 mi. S. Meyers; Nashville; Placerville; Pyramid Ranger Station; Shingle Springs; South Lake Tahoe; Stateline; Tallac; "3 mi. E. Uncle Tom's Cabin" [Uncle Tom's?]; near Whitehall. *Fresno Co.;* Caruthers; Cedar Grove, Kings Canyon; Clovis; Coalinga; Dunlap; Fowler; Fresno; N. Fresno; Herndon; Kearny Park; Kerman; Kings River Canyon; S. Fork, Kings River Canyon; Mendota; Parlier; Pine Ridge; Selma; Trimmer. *Humboldt Co.;* Albee Creek Campground; 15 mi. N. Weott; Blocksburg; Fort Seward; Guadelupe River; Honey Dew; 10 mi. W. Honey Dew; Redwood Creek; 5 mi. N. Richardson's Grove; Willow Creek. *Imperial Co.;* Co. only. *Inyo Co.;* Big Pine; Bishop; 3 mi. E. Bishop; Deep Springs Lake; Deep Springs School; Independence; Lone Pine; Olancha; Owens Lake; S. W. Shore, Owens Lake; Owens Valley; Wyman Canyon, White Mountains. *Kern Co.;* Alder Creek Campground; Arvin; Bakersfield; Caliente; 2 mi. E. Glennville; 18 mi. E. Glennville, Greenhorn Mountains; Havilah; Isabella; Kernville, Kern River; Oildale; Piute Mountains, Rancheria Creek; 9 mi. N. Tehachapi; Tehachapi Pass; 4.8 mi. N.E. Wofford Heights. *Kings Co.;* Corcoran; Lemoore. *Lake Co.;* Adams Spring; Anderson Springs; Cache Creek; N. Fork Cache Creek, Highway 20; Hallville; Konocti Bay, Clear Lake; Lakeport; Lower Lake, Cash Creek [Cache Creek?]. *Lassen Co.;* Doyle; Litchfield; Hallelujah Junction. *Los Angeles Co.;* Agoura; Alhambra; Azusa; Big Tujunga Canyon; Burbank; Camp Baldy; Charleton Flats; Covina; Downey;

Elizabeth Lake; "L. Elizabeth Can."; Griffith Park; Lake Hughes; Lancaster; Los Angeles; Mount Wilson; Oxnard; Pasadena; Pine Canyon; Pomona; Puente; Roosevelt; San Gabriel; San Gabriel Mountains; San Gabriel River Bird Sanctuary; San Marino; Saugus; Tanbark Flat; Topanga Canyon; Big Tujunga Canyon; Van Nuys; 2.5 mi. S.S.W. Valyermo; Westwood; Whittier. *Madera Co.;* Ahwahnee; Bass Lake; Cascadal; Chiquito Creek; Chowchilla; French Trail; Madera; 1 mi. S. Madera; Northfork; Oakhurst; O'Neals; Placer Stn. Chiquito; Raymond; Reds Meadow; Sugar Pine. *Marin Co.;* "Bt. Phoe-Mlp"; San Rafael. *Mariposa Co.;* Boundry Hill Research Area, Yosemite N.P.; Buck Meadows, Highway 120; El Portal; Mariposa; Miami; Mount Bullion; Swamp Lake; Wawona; Yosemite National Park; Yosemite Valley. *Mendocino Co.;* Fort Bragg; Laytonville; Leggett; Miller Dam; Mt. House; Philo; Ukiah; Ukiah Grade; near Yorkville. *Merced Co.;* G. J. Hatfeld State Park; Kearney Ranch; Livingston; Los Banos; Meced; Winton. *Mono Co.;* 3 mi. W. Benton; Blancos Corral; Bridgeport; Coleville; Cottonwood Creek; Devils Gate; 26 mi. N. Fales Hotsprings; Leavitt Meadows; Leevining; Rock Creek; Tom's Place; Sonora Junction; Topaz; Twin Lakes; 5 mi. S. Walker; Walker River; White Mountains. *Monterey Co.;* Arroyo Seco Camp; Asilomar; Big Sur; Bradley; Carmel; Del Monte; Pacific Grove; Paradise Springs; Pleyto; Salinas; Soledad; Tassajara; Tassajara Hot Springs. *Napa Co.;* Calistoga; Conn Valley Picnic Area; Monticello; Mount Saint Helena; Napa; Pope Valley; Samuel Springs. *Nevada Co.;* Alta Sierra near Grass Valley; Boca; Camp Celio near Nevada City; Cedar Ridge; Donner Lake; Emigrant Gap; Grass Valley; Hobart Mills; Indian Springs; Nevada City; Ruckers Lake; Russell Valley; Sagehen Creek; Truckee; 7 mi. S.E. Truckee; Vera Lake. *Orange Co.;* Anaheim; Cypress; Santa Ana; Trabuco Canyon. *Placer Co.;* Auburn; 4 mi. S. Auburn; Brockway; Casa Loma; Clipper Gap; Colfax; Carnelian Bay; Folsom Lake; Lincoln; Loomis; 2 mi. W. Loomis; Newcastle; Rocklin. *Plumas Co.;* Buck's Lake; Clip; Genesee; Gold Lake Camp; Onion Valley; Quincy; 4 mi. W. Quincy. *Riverside Co.;* Corona; Hemet; Herkey Creek; Hidden Lake; Idyllwild; Palm Springs; Pinyon Flat; Riverside; Santa Ana River; Snow Creek Canyon; Soboba Springs; Temecula. *Sacramento Co.;* Arcade; Carmichael; Fair Oaks; Folsom; 2 mi. E. Folsom; 10 mi. N.E. Folsom; 14 mi. E. Folsom; Mather; Natoma; Orangevale; Sacramento; Sacramento River Levee. *San Benito Co.;* Junction Clear Creek and Coalinga Roads; Pinnacles Monument. *San Bernardino Co.;* Chino; Cotton; Lake Arrowhead; Lythe Creek; Ontario; Oro Grande; 12 mi. E. Twenty-nine Palms; Victorville; Waterman Canyon. *San Diego Co.;* Laguna Mountains; San Diego; Warners. *San Francisco Co.;* San Francisco; Lake Merced. *San Joaquin Co.;* Lodi. *San Luis Obispo Co.;* Dune Lakes, 3 mi. S. Oceano; Oceano; Oso Flaco; Oso Flaco Lake; Pismo Beach; San Luis Obispo; Santa Margarita. *San Mateo Co.;* Ana Nuevo Pt.; Burling-

hame; Colma; Half Moon Bay; San Bruno. *Santa Barbara Co.;* Santa Cruz Island, Canyon del Medio; Santa Cruz Island, Canada del Puerto; Santa Cruz Island, Coches Prietos; Santa Ynez Mountains; Vandenberg. *Santa Clara Co.;* Los Gatos; Mt. Hamilton; San Jose; Santa Clara; Stanford University. *Santa Cruz Co.;* Ben Lomond; Felton; Santa Cruz; Watsonville. *Shasta Co.;* Burney; Castella; Castle Crag; Hat Creek; Hat Creek Post Office; 3 mi. N. Lakehead; 1 mi. E. Montgomery Creek; Old Station; Redding; Shingletown. *Sierra Co.;* Sierraville, Smith Mill; 15 mi. S.E. Sierraville; Yuba Pass. *Siskiyou Co.;* Castle Creek; Cole; Dunsmuir; Hamburg; Junct. Klamath-Salmon Rivers; McBride Springs; McCloud; Mount Shasta; Seiad. *Solano Co.;* Dixon; Fairfield; Gates Canyon. *Sonoma Co.;* Bodega Bay; Cazadero; 2 mi. E. Duncan Mills; Forrestville; Glen Ellen; Mark West Springs; Santa Rosa; Sebastapol. *Stanislaus Co.;* Del Puerto Canyon; Denair; Hughson; La Grange; Modesto; Oakdale; Turlock. *Sutter Co.;* Yuba City. *Tehama Co.;* S. Fork, Battle Creek; Mineral; Red Bluff; Richfield. *Trinity Co.;* Bowermann Meadows; Carrville; Coffee Creek; Hayfork; Plummer Springs Road; Trinity Center; Trinity River Camp; Weaverville. *Tulare Co.;* near Ash Mountain; Ash Mountain Road; below Badger; Bear Camp; Brige Inn; Kaweah River; Camp Nelson; Dinuba; Horse Creek at Highway 198; Hot Springs; 8 mi. N. Hot Springs; Johnsondale; Kaweah; N. Fork Kaweah River; S. Fork Kaweah River; near Three Rivers; Lemon Cove; Lloyd Meadows; Monache Meadows; Porterville; Potwisha; Salt Creek; San Joaquin Mill; Sequoia National Park; Paradise Valley; Springville; "3 mi. above Springville"; Strathmore; Three Rivers; 3 mi. N. Three Rivers; Tule Indian Reservation; Visalia. *Tuolumne Co.;* Basin Creek, 5 mi. E. Tuolumne City; Chinese Camp; Coffee Creek; Big Flat; Dardanelles; Eleanor Lake; Hetch Hetchy Dam; Jacksonville; Keystone; Lealand Meadow; near Mather; Oak Recreation Camp; Pinecrest; Strawberry; 11 mi. N. Strawberry; Swamp Lake; N. Fork Tuolumne River, 3 mi. N.E. Tuolumne; Tuolumne Meadows; Twain-Harte. *Ventura Co.;* Blue Point Campground; vicinity Piru Creek; Camp Ozena, Upper Cuyama; Oxnard; Santa Paula. *Yolo Co.;* Cache Creek Canyon; Davis; Elkhorn Ferry; Putah Canyon; Rumsey; 3 mi. N.W. Rumsey; 4 mi. W. Rumsey; 6 mi. N. Rumsey. *Yosemite National Park;* Chilnualna Falls; Crane Flats; Miguel Meadows; Yosemite; Yosemite Valley.

IDAHO: *Ada Co.;* Boise. *Payette Co.;* Parma.

NEVADA: *Churchill Co.;* Fallon. *Clark Co.;* Las Vegas; Warm Springs. *Douglas Co.;* 3 mi. S. Genoa. *Esmeralda Co.;* Dyer. *Humboldt Co.;* Winnemucca. *Lincoln Co.;* Hiko. *Lyon Co.;* Dayton. *Nye Co.;* 1.6 mi. S. Springdale. *Ormsby Co.;* Carson City. *Washoe Co.;* Gallena Creek; Nixon; Patrick; Pyramid Lake; Reno; Verdi. *White Pine Co.;* Lund.

NEW MEXICO: 4 mi. W.N.W. Gallines [Record questionable; not

located].

OREGON: *Baker Co.;* Huntington. *Douglas Co.* [?]; Woodruff Meadows at Union Cr. *Hood River Co.;* Hood River. *Jackson Co.;* Prospect. *Morrow Co.;* Boardman. *Multnomah Co.;* Portland. *Umatilla Co.;* Blue Mountains; Tollgate Road; Hermiston; Milton-Freewater.

UTAH: *Beaver Co.;* Wildcat Valley. *Cache Co.* [?]; Bear County. *Duchesne Co.;* Ft. Duchesne. *Grand Co.;* Moab. *Juab Co.;* Callao. *Utah Co.;* Provo. *Washington Co.;* Saint George; Washington; Zion National Park; Zion National Park, Wylie Camp.

WASHINGTON: *Asotin Co.;* Asotin. *Clark Co.;* Lewis River; 5 mi. N. La Center. *Columbia Co.;* Dayton. *Grant Co.;* Grand Coulee-Blue Lake. *Walla Walla Co.;* Lowden; Walla Walla. *Yakima Co.;* Toppenish.

CANADA: *British Columbia;* Cawston; Oliver; 6 mi. N.W. Oliver; Sprout Lake; Summerland.

MEXICO: *Baja California Norte;* Sierra San Pedro Martir; La Joya.

Phenology: February (2); March (24); April (370); May (1733); June (1252); July (537); August (56); September (3); October (5); November (3); December (1).

Remarks: This species does not appear to have a preferred host, but adults have been recorded as collected on: *Alyssum maritimum* (L.); *Azalea* blossom; "Australian Holly"; "Barley"; "Blackberry"; *Calochortus luteus* Dougl.; "Carrot"; *Clarkia* sp.; "Clover" (*Trifolium* sp.); *Eriodictyon californicum* (H & A); *Eriodictyon crassifolium* Benth.; "Grape" (*Vitis* sp.); "Wild Honeysuckle" (*Lonicera* sp.); "Klamath Weed"; "Lawn"; *Malvastrum fremontii* Torr.; *Medicago sativa* L.; *Melilotus* sp.; *Mentha* sp.; *Mimulus* sp.; *Mimulus guttatus* Fisch.; "Navel Orange"; *Nephthytis* sp.; "Oak" (*Quercus* sp.); *Pyracantha* sp.; "Rosebud"; *Rosa* sp.; *Rosa californica* C. & S.; *Rhamnus* sp.; *Salix goodingii* Ball.; "Sand Dunes"; "Spanish Broom" (*Genista hispanica*); "Strawberry" (*Frageria* sp.); "Sunflower" (*Helianthus* sp.); "Thistle"; *Trifolium variegatum* Nutt.

It is interesting to note that *callipyge* has never been recorded on *Ceanothus* or *Pinus,* the apparent preferred hosts of *dispar* and *hirta* respectively. The only record of larval hosts are "Lawn" and "Reared-Privet Root". Elevations of sea level to at least 3,048 m. (10,000 ft.)

This species is difficult to categorize, and is most easily identified by eliminating other known sympatric species, leaving this taxon. This species may be separated from *dispar* by the shape of the elytral scales (round in *dispar,* teardrop shaped or elongate in *callipyge*) and the more pronounced thoracic angles (see Figs.). From *sackenii* it may be distinguished by the shape of the elytral scales (elongate in *sackenii*), and frequently the elytral ground color (more rufous in *sackenii*). Females

of *sackenii* are darker and lack elytral scales, and in these respects could be confused with *callipyge;* however, among the specimens examined, most individuals of *sackenii* which could be confused with *callipyge* are some of the largest individuals of the species examined, while specimens of *callipyge* are usually in the middle of the size range or smaller. Scaleless individuals of *callipyge* frequently occur outside of the range of *sackenii.*

The species *H. callipyge, H. laticollis,* and *H. hirta* are difficult to distinguish from each other. *H. callipyge* is extremely variable, and presents no definite geographically associated character cline which would allow the recognition of distinct units or populations. Rather, the variability of any given character or group of characters seems to be expressed in a random fashion throughout the range of the species. For an example of the futility of any attempt to describe the variants of *H. callipyge,* the reader is referred to the listing by Boyer 1940:16-20 (under *H. oregona*).

The relationship of *H. callipyge* and *H. laticollis* is unclear. At present, the two are considered distinct species, but studies based upon more specimens from the Rocky Mountain areas may prove that they are merely subspecies of the same species.

*Hoplia hirta* is either an uncommon variant of *H. callipyge,* a distinct species with a wider range of morphological variation than is acknowledged below, or a distinct species that is very closely approached by a phenotypical variation of *callipyge.* For a discussion of the differences between *callipyge* and *hirta,* see under *hirta.*

There is a population in the Blue Mountains of Washington and Oregon, presumed to be of this species, which lacks scales but has short hairs in their place. Although this population lacks the scales of *callipyge,* thus keying to *hirta,* it lacks any other characteristics of *hirta,* but otherwise is within the range of morphological variation of *callipyge.* Individuals of this population also are smaller than those of the general population.

Some individuals from Boise and Parma, Idaho are smaller, have the elytra corrugated and lack hairs, and are rufo-testaceous with a slightly darker prothorax. Although they carry paratype labels with a manuscript name I can find no evidence Boyer ever validated the name by publication.

## *HOPLIA HIRTA* LECONTE
(Figs. 2, 12, 17)

*Hoplia hirta* LeConte 1880:193; Boyer 1940:12. Type: MCZ #3288, male. Type locality: "Nevada" ["probably near Lake Tahoe"—Boyer]

Length 7.0 to 9.5 mm, width 3.5 to 5.2 mm. Integumentary color dark,

piceous. Elytral scales small, elongate, dark in coloration, difficult to see unless under high magnification (Fig. 17). Pubesence usually dense, erect on prothorax, sparse elsewhere; long, dark colored. Clypeal angles rounded, produced, to give a bilobed appearance from above. Lateral prothoracic angles not reduced.

Specimens examined: 70 (See Fig. 2).

CALIFORNIA: "Calif." *Lassen Co.;* Facht; Mt. Lassen National Park. *Plumas Co.;* Co. only. *San Francisco Co.;* San Francisco [Record questionable]. *Shasta Co.;* Mountains West of Nieubieber; Old Station. *Siskiyou Co.;* Macdoel; McCloud.

NEVADA: "Nev."

OREGON: "Or." *Deschutes Co.;* La Pine; Wickiup Reservoir. *Douglas Co.;* Diamond Lake. *Klamath Co.;* "Klamath"; Rainbow Creek, 4 mi. S. Lake of the Woods. *Lake Co.;* Chewaucan River (Dam Site).

Phenology: April (9), May (32), June (20), July (1).

Remarks: Recorded on *Pinus ponderosa* Dougl. and *Pinus contorta* Dougl.

This species may be distinguished from other Western *Hoplia* by the uniform dark (piceous) integumentary coloration with elongate elytral scales, the thick, long prothoracic hairs and the bilobed clypeus. Some specimens of *H. callipyge* also have elongate scales, and have the integument dark; however, they then either do not have the dense prothoracic hairs, or do not occur within the range of *hirta* as given above. The clypeus of *callipyge,* however, is never bilobed.

## *HOPLIA LATICOLLIS* LECONTE
(Fig. 5)

*Hoplia laticollis* LeConte 1856:284; 1880:191; Boyer 1940:13. Type: MCZ #3259. Lectotype here designated. Male, with the following labels: 1, Green disc. 2, Type 3, 3259 [Red]. 3, *laticollis* 3. 4, Lectotype Hoplia laticollis LeC. by A. R. Hardy [Red]. 2 Paralectotypes. Type locality: New Mexico and Kansas.

Length 6 mm to 8.5 mm; truncate, normal *Hoplia* shape. Ground color of elytra pale testaceous, prothorax darker, piceo-testaceous. Squamae oval, close on dorsal surface. Posterior tarsal claws uncleft. Pygidium with few elongate white scales scattered among the usual oval scales. Anterior tibia tridentate. Posterior tarsal claw solid (uncleft).

Specimens examined: 148 (see Fig. 5)

ARIZONA: *Navajo Co.;* 4 mi. N. Whiteriver. *Santa Cruz Co.;* Nogales; Mt. Washington.

COLORADO: *Arapahoe Co.;* Littleton.

MONTANA: [?] No further data.

NEBRASKA: *Cherry Co.;* Dewey Lake Township; Valentine Wlfe. Refuge. *Cuming Co.;* West Pt. *Dodge Co.;* North Bend. *Holt Co.*; Co. record only. *Hooker Co.;* Mullen. *Lancaster Co.;* Lincoln. *Sioux Co.;* Monroe Canyon; Sowbelly Can.; Warbonnet Canyon.

NEW MEXICO: *Sandoval Co.;* Jemez Spgs; Jemez Mts.

NORTH DAKOTA: *Williams Co.;* Williston.

SOUTH DAKOTA: *Custer Co.;* Custer.

TEXAS: No further data.

WYOMING: *Goshen Co.;* 7 mi. N.W. Torrington.

MANITOBA: Ames; Aweme; Douglas; Onah; Treesbank; Winnipeg.

ONTARIO: Long Point.

Phenology: June (64); July (43); August (1).

Remarks: Recorded from: "Pines"; sweeping; alcohol pitfall trap. From elevations of 1550 m. (5,140 ft.) and 1825 m. (6,000) ft. (2 specimens with altitude data).

This species is very difficult to distinguish from the western *H. callipyge,* and may prove to be just a form of that species. The uncleft claws, non-carinate clypeal suture, and distribution should distinguish this species from all Eastern species. It is differentiated by the erect white scale-like hairs on the pygidium, which are absent in *callipyge.*

## *HOPLIA TRIFASCIATA* SAY
(Figs. 6, 32)

*Hoplia trifasciata* Say 1825:200; Lacordaire 1856:196; LeConte 1856:286; 1880:191, 193; Blatchley 1910:949; Boyer 1940:22.

*H. primaria* Burmeister 1844:192; Lacordaire 1856:196; LeConte 1856:285; 1880:193; Boyer 1940:22.

*H. tristis* Melsheimer 1846:141; Lacordaire 1856:196; LeConte 1856:286; 1880:193; Boyer 1940:22.

*H. ferrisi* Boyer 1940:10. NEW SYNONYMY

Types: *trifasciata:* Probably destroyed. Type locality: not given. *primaria:* Not examined. Type locality: "Nord Amerika". *tristis:* MCZ #23412. Type locality: Virginia. *ferrisi:* USNM #52901. Type locality: Rochester, Pa.

Length 6 mm to 10 mm, form quadrate, "typical". Males: Ground color rufo-piceous. Surface of head densely punctate, sparsely scalate.

Prothorax densely punctate, provided with semi-erect to recumbent elongate white scales. Elytra closely, finely punctate, with close, elongate, semi-erect to recumbent, white to brown scales. Pygidium and ventral surfaces with close, recumbent, oval to round, opalescent semi-metallic, light colored scales intermixed with erect to semi-erect, light colored, fine hairs.

Females: Ground color rufous; upper surfaces densely, often contiguously, covered with round to oval, recumbent, cream to tan to brown scales, intermixed with sparse, erect, fine, short hairs. Under surfaces densely clothed with round to oval, opalescent scales.

Both sexes: Tarsal claws uncleft (see remarks below); posterior prothoracic angles defined by an emargination of the lateral margin just anterior to the angle (Fig. 32). Anterior tibia bidentate (rarely) to weakly tridentate (usually).

Specimens examined: 1554 (see Fig. 6)

ALABAMA: *Shelby Co.;* Alabaster.

CONNECTICUT: *Fairfield Co.;* Danbury. *Hartford Co.;* Enfield; Farmington; Hartford. *Litchfield Co.;* Colebrook; Cornwall; Litchfield; "Northville" [Worthville?]. *New Haven Co.;* New Haven; South Meriden. *New London Co.;* Lyme.

FLORIDA: *Charlotte Co.;* Ft. Myers [?].

GEORGIA: *Fulton Co.;* Atlanta. *Raybun Co.;* Clayton.

ILLINOIS: *Champaign Co.;* Homer. *Kankakee Co.;* Hopkins Park. *Pope Co.*; Co. record only. *Putnam Co.*; Co. record only. *Vermilion Co.;* Oakwood.

INDIANA: *Laporte Co.;* Tremont. *Montgomery Co.;* Shades St. Park. *Parke Co.;* Turkey Run St. Park. *Starke Co.:* Knox; N. Judson.

IOWA: *Johnson Co.;* Iowa City; N. of N. Liberty.

KENTUCKY: Keesville. [Not located].

MAINE: *Androsscoggin Co.;* Monmouth. *Kennebec Co.;* Litchfield. *Oxford Co.;* Bethel; Norway. *Penobscot Co.;* Bradley; Orono. *Sagadanoc Co.;* Brunswick. *Somerset Co.;* Bigelow Plantation. *Washington Co.;* E. Machias. *York Co.;* Old Orchard.

MARYLAND: *Baltimore Co.;* Baltimore. *Montgomery Co.;* Minnie Isl. near Cabin John; Plummers Island.

MASSACHUSETTS: *Barnstable Co.;* Woods Hole. *Bristol Co.;* Dartmouth; Dighton; Fall River. *Essex Co.;* Mer'ck River Drift [Merrimac Riv.?]; Salisbury Beach. *Hampden Co.;* Springfield. *Hampshire Co.;* Amherst; North Hampton. *Middlesex Co.;* Arlington; Billercia; Cambridge; Concord; Framingham; Hopkinton; Lexington; Lowell; Newton; Sherborn; Sudsbury; S. Framingham; S. Sudsbury; Tyngsboro; Wayland; Wellesley. *Norfolk Co.;* Avon; Dover; Natick. *Plymouth*

*Co.;* Pembroke; Wareham. *Suffolk Co.;* Boston; Brookline; Milton. *Worcester Co.;* Southboro.

MICHIGAN: *Arenac Co.;* Omer-Rifle River. *Bay Co.;* Co. record only. *Chippewa Co.;* Sault Ste. Marie; Whitefish Point. *Ingham Co.;* E. Lansing; Lansing. *Kent Co.;* "G. Rap." [Grand Rapids?]. *Keweenaw Co.;* "Eagle Har. L. Sup." [Eagle Harbor, Lake Superior?]. *Livingston Co.;* E. S. George Reserve. *Mackinac Co.* ; Co. record only. *Marquette Co.;* Marquette. *Midland Co.;* Sanford. *Montmorency Co.;* Onaway, 12.5 mi. S. *Newaygo Co. Oakland Co.*; Co. record only. *Ottawa Co.;* Macatawa B'h. *Roscommon Co.;* Higgins Lake; *Schoolcraft Co.;* Gulliver Lake. *St. Clair Co.;* Co. record only. *Van Buren Co.;* So. Haven. *Washtenaw Co.;* Co. record only. *Wayne Co.;* Detroit.

MINNESOTA: *Clearwater Co.;* Itasca Pk.

MISSOURI: "Mo."

NEW HAMPSHIRE: *Carroll Co.;* Conway Intervale. *Cheshire Co.;* Dublin; Jafrey. *Coos Co.;* Fabyans; Gorham; Lancaster; Mt. Washington; Randolph; Shelburne; Twin Mt. *Grafton Co.;* Bretton Wds.; Franconia; Moosilawkee; Rumney. *Hillsborough Co.:* Antrim; Manchester; Monadnock. *Rockingham Co.;* Exeter RR [?]. Hampton. *Strafford Co.;* Durham. *Sullivan Co.;* Claremont.

NEW JERSEY: *Bergen Co.*; Hackensack; Montvale; Westwood. *Burlington Co.*; Mt. Holly; Palmyra; Riverton; Taunton Lake. *Camden Co.*; Westville. *Gloucester Co.*; Cecil. *Mercer Co.*; Trenton. *Morris Co.*; Morristown; Riverdale. *Passaic Co.*; "Passaic: unc". *Sussex Co.*; Hopatcong; "Cran Lake" [Cranberry Lake?]. *Warren Co.*; Phillipsburg.

NEW YORK: *Bronx Co.*; Bronx. *Cattaraugus Co.*; Co. record only. *Clinton Co.*; Black Brook; Little Valley. *Erie Co.*; Buffalo; Lancaster; "Ton. Ind. Res." *Essex Co.*; Chilson; Keene; Port Henry, Lake Champlain. *Long Island Co.*; East Marion; Mattituck; Montank; Orient; Parkville; Riverhead; Rockaways; Southold. *Monroe Co.*; Co. record only. *Brighton Co.*; Rochester; West Webster. *Niagara Co.*; Newfane; Okott. *Oneida Co.*; Clinton. *Orleans Co.*; Lyndonville; Medina. *Richmond Co.*; Eltingville; Staten Isl. *St. Lawrence Co.*; Potsdam. *Suffolk Co.*; Shelter Island. *Tompkins Co.*; Co. record only. *Ulster Co.*; Oliverea; Slide Mt. *Warren Co.*; Warrensburg. *Washington Co.*; "Putnam" Valley [Station?]; Whitehall. *Wayne Co.*; Newark. *Westchester Co.*; Peekskill, Scarsdale. *Wyoming Co.*; Pike.

NORTH CAROLINA: *Buncombe Co.*; Asheville. *Duplin Co.*; Co. record only. *Faison Co.*; Co. record only. *Greenville Co.*; Tryon. *Haywood Co.*; Mt. Sterling.

OHIO: *Ashtabula Co.*; Jefferson. *Clinton Co.*; Co. record only. *Franklin Co.*; Columbus. *Geavga Co.*; Burton. *Hamilton Co.*; Cincinati. *Hock-*

*ing Co.*; Co. record only. *Shelby Co.*; Sidney. *Warren Co.*; Co. record only. *Williams Co.*; "N.W. Twp."

PENNSYLVANIA: *Cambria Co.*; Patton. *Dauphin Co.*; Dauphin. *Philadelphia Co.*; Philadelphia. *Pike Co.*; Milford. *Potter Co.*; Germania. *Sullivan Co.*; Forksville; Laporte. *Warren Co.*; Warren.

RHODE ISLAND: *Kent Co.*; Warwich. *Providence Co.*; Providence.

SOUTH CAROLINA: *Anderson Co.*; Clemson College. *Oconee Co.*; Fish Hatchery.

TENNESSEE: *Morgan Co.*; Burrville. *Sevier Co.*; Gatlinburg.

VERMONT: *Essex Co.*; Ferdinand. *Orleans Co.*; E. Charleston. *Washington Co.*; Plainfield; Windham; Brattleboro.

VIRGINIA: *Fairfax Co.*; Falls Church; Great Falls.

WASHINGTON D.C.: No further data.

WEST VIRGINIA: *Pocahontas Co.*; Cranberry Glades.

WISCONSIN: *Bayfield Co.*; Bayfield. *Wood Co.*; Cranmoor

ALBERTA: Macleod [?].

MANITOBA: Victoria Beach [Not located].

NEW BRUNSWICK: St. John.

NOVA SCOTIA: Cape Breton Island.

ONTARIO: Addington; Barrys Bay; Bells Corners; Blackburn; Chalk River; Collingwood; Constance Bay; Gordon Lake; Henfrew; Honey Harbor; Huntsville, Arrowhead Prov. Park; Kenora; Leamington; Marmora; Mer Bleve; Merivale; Minden; Miners Bay; N. Falls; Ojibway; Orilla; Orrville; Petawawa Res.; Pt. Pelee; Rainy River; Roseland; Saulte Ste. Marie; Spencerville; Stittsville (Hwy. 15); Sydney Field Stn.; Toronto; Walsingham; Windsor.

QUEBEC: Aylmer; Beech Grove; Berthierville; Brome; Burbidge; Cap Cat; Cascapedia; Fourt Coulonge; Gaspe; Harrington Lake; Hull; Gatineau Pk.; Joliette; Kazubazua; Kingsmere; Montreal; Summit King Mt.; Old Chelsea; Perkins; Ramsey Lake; Gutineau Park; St. Ganut; Wakefield.

Phenology: March (3); April (117); May (509); June (449); July (74); August (4); September (3).

Remarks: Recorded from: Honeysuckle; blossoms of *Prunus serotina; Prunus pennsylvania*; *Prunus* flowers; Cherry blossoms; flower of Wild Cherry; feeding on Pear blossoms; *Salix* flowers; Willows; "Flowers"; Apple blossoms; Shadbush flowers; on *Amelanchier*; feeding on *Viburnum*; "Swarming to W. Pine limbs"; leafing oak twigs; in old log. At elevations to 1225 m (4,000 ft.).

This species is easily recognized by the following combination of characters: uncleft tarsal claws; noncarinate clypeal suture; lateral prothoracic margin emarginate anterior to posterior angles; and dimorphic coloration of the sexes.

*H. trifasciata* is the most dimorphic species of *Hoplia* in the new world. Females are fairly large, usually brown with tan markings, and resemble *H. sackenii* from the Western United States. Males are smaller, black with faint white scalation forming a barely visible pattern, and resemble *H. trivialis.*

The type of *Hoplia ferrisi* is a female of this species with very pronounced markings, which has both hind tarsal claws cleft. The author has examined a number of specimens of this species which have one claw of the hind tarsi cleft, and the other normal. The type of *H. ferrisi* is the only specimen examined with both claws cleft, but it is otherwise unmistakably of this species.

## *HOPLIA TRIVIALIS* HAROLD
(Figs. 8, 31)

*H. trivialis* Harold 1869:1115; LeConte 1880:191, 193; Blatchley 1910:-949; Boyer 1940:22.

*Hoplia debilis* LeConte 1856:285 (nec. Burmeister 1844:195); 1880:193; Boyer 1940:23. Type: MCZ #3256. Type locality: Pennsylvania.

Length 6 mm to 8 mm, form quadrate "typical *Hoplia*"; ground color piceous. Head, thorax and elytra with erect, fine, brown hairs. Prothorax and elytra with scattered, oval to elongate, cream to brown scales. Pygidum and ventral surfaces with oval, opalescent scales, generally separated by at least their own width. Posterior prothoracic angles greater than 90°, not offset by an emargination of the lateral prothoracic margin (Fig. 31). Anterior tibiae weakly tridentate; tarsal claws uncleft.

Specimens examined: 728 (see Fig. 8)

ALABAMA: *Clay Co.*; Cheaha St. Pk. *Madison Co.*; Montesano St. Pk.

COLORADO: "Col." [?].

CONNECTICUT: *Fairfield Co.*; Noroton.

GEORGIA: *Cobb Co.*; Kennesaw. *Forsyth Co.*; Gainesville. *Fulton Co.*; Atlanta. *Rabun Co.*; Clayton.

ILLINOIS: *Adams Co.*; Quincy.

KENTUCKY: *Jefferson Co.*; "Lou'vlle" [Louisville].

MARYLAND: *Anne Arundel Co.*; Friendship Airport; Odenton. *Baltimore Co.*; Baltimore. *Cecil Co.*; Northeast. *Harford Co.*; Perryman. *Montgomery Co.*; Cabin John; Great Falls Potomac R.; Laurel; Plum-

mer's Is.; 2 mi. E. Silver Spr., *Prince Georges Co.*; Beltsville; Bladensburg; Cheltenham; College Park; Greenbelt.

MASSACHUSETTS: *Middlesex Co.;* Wayland.

MISSISSIPPI: *Lincoln Co.*; Ruth. *Prentiss Co.*; Baldwyn.

NEW HAMPSHIRE: No further data.

NEW JERSEY: *Burlington Co.*; Masonville; Mt. Holly; Palmyra; Riverton. *Camden Co.*; Atco; Clementon; Westville. *Essex Co.*; Millburn; Paterson. *Gloucester Co.*; Cecil; Glassboro; Wenonah. *Middlesex Co.*; Jamesburg; Old Bridge. *Ocean Co.*; Lakehurst.

NEW YORK: *Richmond Co.*; Staten Isl.

NORTH CAROLINA: *Columbus Co.*; Whiteville. *Orange Co.*; Chapel Hill. *Polk Co.*; Tryon. *Union Co.;* Co. record only. *Wake Co.*; Raleigh.

PENNSYLVANIA: *Delaware Co.;* Co. record only. *Montgomery Co.*; Abington.

RHODE ISLAND: *Washington Co.*; Kingston.

SOUTH CAROLINA: *Anderson Co.*; Clemson (Clemson College). *Oconee Co.*; CCC Camp Fz; The Tunnel; Walhalla; Westminster. *Pickens Co.*; Six Mile.

TENNESSEE: *Warren Co.*; Morrison.

TEXAS: *Grayson Co.*; Sherman.

VIRGINIA: *Accomack Co.*; Co. record only. *Fairfax Co.*; Falls Church; Pimmit Run; Great Falls; Mt. Vernon. *Henrico Co.*; Co. record only. *Nansemond Co.*; Co. record only. *Spotsylvania Co.*; Fredricksburg.

DISTRICT OF COLUMBIA: No further data.

WISCONSIN: No further data.

Phenology: March (37); April (428); May (109); June (7); July (1).

Remarks: Collected at: Malaise trap; under rock; sweeping young pines; ex light; ex woods trash; ex hickory foliage; ex pecan; leaves of oak sprout; ex *Cornus*; ex *Quercus rubra*; *Quercus; "Ameliancher"* [*Amelanchier*].

This species is easily confused with males of *H. trifasciata. H. trivialis* lacks the lateral prothoracic emargination anterior to the hind angles which is found in *trifasciata* (Figs. 31, 32); additionally, the ventral abdominal scales in *trifasciata* are round to oval, and nearly contiguous. Those scales of *trivialis* are oval to elongate, and generally separated by at least their own width. Potentially this species may be confused with dark specimens of *H. modesta,* but is separable from that species by the entire posterior tarsal claws (cleft in *modesta*).

## *HOPLIA MODESTA* HALDEMAN
(Figs. 7, 36)

*Hoplia modesta* Haldeman 1843:304; Lacordaire 1856:196; Le Conte 1856:285; 1880:191; Blatchley 1910:949; Boyer 1940:14.

*H. singularis* Burmeister 1844:192; LeConte 1856:285; 1880:193; Boyer 1940:14.

*H. monticola* Melsheimer 1846:142; Lacordaire 1856:196; Le Conte 1856:286; 1880:193; Boyer 1940:15.

*H. helvola* Melsheimer 1846:141; Lacordaire 1856:196; LeConte 1856:286; 1880:193; Boyer 1940:14, 22. NEW SYNONYMY

*H. modesta* var. *barbata* Blatchley 1910:949.

*H. barbata* Blatchley; Boyer 1940:15.

Types: *modesta*, MCZ, unnumbered, see remarks, below. Type locality: Pennsylvania. *H. singularis*, Not examined. Type locality: "Nord-Amerika". *H. monticola*, MCZ #23414. Type locality: Pennsylvania. *H. barbata*, Not examined. Type locality: Virgo & Owen Co's (Ind.). *H. helvola*, MCZ #23413. Type locality: Virginia.

Length 6 mm to 8.5 mm. Form quadrate "typical". Ground color rufous to rufo-testaceous to piceo-testaceous. Prothorax with very small, recumbent, round to oval, cream to tan tinged with green scales, generally separated by at least their own diameter. Elytra with elongate, white to cream colored scales, separated by at least own width. Ventral surfaces with oval to elongate, close, opalescent scales. Clypeal suture not carinate (see Fig. 36). Anterior tibia bidentate to weakly tridentate. Posterior tarsal claws cleft.

Specimens examined: 826 (see Fig. 7)

"ATLANTIC STATES".

CONNECTICUT: *Hartfort Co.*; Windsor. *Litchfield Co.*; Canaan. *Middlesex Co.*; Portland.

DELAWARE: No further data.

GEORGIA: *Clarke Co.*; 3 mi. N. Athen; Whitehall Forest. *Cobb Co.*; Dallas. *DeKalb Co.*; Stone Mt. *Fulton Co.*; Atlanta.

ILLINOIS: *Cook Co.*; N. Chicago. *Lake Co.*; Dunes Park; Zion. *Rock Is. Co.*; Rock Island.

INDIANA: No further data.

IOWA: *Dickinson Co.;* Lake Okoboji. *Henry Co.;* Mt. Pleasant (5 mi. S.W.). *Iowa Co.;* Co. record only. *Johnson Co.*; Iowa City. *Lee Co.*; Ft. Madison. *Muscatine Co.*; Moscow. *Ringgold Co.*; Benton. *Story Co.*; Ames.

MAINE: *York Co.*; Kennebunk; Old Orchard; Saco. *Oxford Co.*; Rumford; Norway; Lake Pennisewassee.

MARYLAND: *Montgomery Co.*; Cabin John; Great Falls; Plummers Is.

MASSACHUSETTS: *Barnstable Co.*; Chatham; Eastham; Truro; Harwich (Sand Dunes). *Bristol Co.*; Fall River. *Berkshire Co.*; Monterey. *Essex Co.*; Ipswich; Manchester; Salisbury. *Franklin Co.*; Northfield. *Hampshire Co.*; Co. record only. *Nantucket Co.*; Nantucket Is. *Norfolk Co.*; Cohasset. *Plymouth Co.*; Hanson; Marion; Orleans. *Middlesex Co.*; Lowell; Sherborn; Tyngsboro. *Worcester Co.*; Fitchburg; Northboro; Berlin.

MICHIGAN: *Delta Co.*; Co. record only.

MINNESOTA: *Chisago Co.*; North Branch. *Crow Wing Co.*; Pelican Lake; Nisswa. *Hennepin Co.*; Co. record only.

NEW HAMPSHIRE: *Coos Co.*; Twin Mt. *Grafton Co.*; Bethlehem; Franconia. *Sullivan Co.*; Claremont.

NEW JERSEY: *Atlantic Co.*; Atlantic City; Brigantine; Ocean City. *Bergen Co.*; Palisades. *Cape May Co.*; Sea Isle. *Gloucester Co.*; Woodbury. *Mercer Co.*; Trenton. *Ocean Co.*; Sea Side Park. *Sussex Co.*; Hopatcong. *Warren Co.*; Phillipsburg.

NEW YORK: *Nassau Co.*; Jones Beach; Long Beach; Long Is. *Queens Co.*; Far Rockaway; L. I.; Rockaway, (Beach). *Suffolk Co.*; Babylon; Mountauk Pt. Long Is. *Westchester Co.*; Peekskill, Long Is.

NORTH CAROLINA: *Buncombe Co.*; Asheville; Black Mts. *Cherokee Co.*; Murphy. *Henderson Co.*; Mills River. *Jackson Co.*; Gay. *Madison Co.*; Hotsprings; Pisgah Forest. *Rutherford Co.*; Lake Lure. *Swain Co.*; Cherokee. *Wake Co.*; Raleigh.

NORTH DAKOTA: *Ransom Co.*; 5 mi. N.W. Mcleod.

OHIO: *Hamilton Co.*; Cincinati. *Hocking Co.*; Conkles' Hollow; Pine Creek. *Jackson Co.*; Rock Run. *Ross Co.*; Shawnee St. For. *Scioto Co.*; Co. record only. *Warren Co.*; Co. record only.

PENNSYLVANIA: *Butler Co.*; Evans City. *Dauphin Co.*; Harrisburg. *Northhampton Co.*; Easton. *Union Co.*; W. Winfield. *Westmoreland Co.*; Ligonier.

RHODE ISLAND: *Washington Co.*; Kingston; Watchill. *Kent Co.*; Warwick.

SOUTH CAROLINA: *Anderson Co.*; Clemson College. *Greenville Co.*; Saluda Mts. *Pickens Co.*; Eastatoe River.

TENNESSEE: *Sevier Co.*; Gatlinburg.

VERMONT: No further data.

VIRGINIA: *Alex Co.*; Co. record only. *Fairfax Co.*; Falls Church; Great Falls. *Nelson Co.*; Co. record only.

WASHINGTON D. C.: No further data.

WISCONSIN: No further data.

ONTARIO: Normandale; Toronto.

Phenology: April (2); May (57); June (401); July (120); August (12).

Remarks: Recorded as: "on beach"; "sand dunes"; on *Viburnum*; on flowers of *Viburnum*; tulip popular. One elevation record at 365 m (1,200 ft.).

This species most closely resembles *H. equina* (tan forms) or *H. trivialis* (dark forms). From *H. equina* it is easily distinguishable by two mesotarsal claws vs. a single claw (*equina*). The cleft metatarsal claw and noncarinate clypeal suture will distinguish this species from other Nearctic *Hoplia*.

There is a local "variant", presumed to be of this species, which is centered in Massachusetts. These specimens appear to be very worn individuals. Most are lacking scales, and are rufous to rufo-testaceous. These specimens lack many characters that would place them with ease in any recognized species; however, they are morphologically close to, and I believe them to be associated with, *H. modesta*. Boyer (1940:6) includes this population in his key as *H. trivialis* in couplet 4.

There are three specimens of *H. modesta* in the LeConte collection at the MCZ, which are presumed to be the type material for this species. There is no indication that Haldeman had more than one specimen before him at the time of description. I therefore have placed a type label on the first specimen in LeConte's series as the presumed type.

## *HOPLIA EQUINA* LEC.
(Fig. 9)

*Hoplia equina* LeConte 1880:193; Boyer 1940:9 Type: MCZ #3290. Lectotype, here designated. Specimen with the following labels: 1, Tyngs Mass. 2, 3, 2. 4, Type 3290 [Red]. 5, H. equina LeC. 6, Lectotype Hoplia equina LeC. by A. R. Hardy [Red]. 1 paralectotype. Type locality: Tyngsboro, Mass.

Length 5.7 mm to 8.5 mm. Form quadrate "typical". Ground color testaceous. Head, prothorax, elytra, and ventral surfaces with scattered to close, oval to elongate, white to tan to opalescent scales, usually separated by at least own width. Clypeal suture not carinate. Anterior tibiae bidentate (most commonly) to tridentate. Posterior tarsal claws cleft, mesotarsal claws single.

Specimens examined: 193 (see Fig. 9)

CONNECTICUT: *New Haven Co.*; Guilford; W. Haven. *Litchfield Co.*; Pleasant Valley. *Windham Co.*; Pomfret.

DELAWARE: *Kent Co.*; Willow Grove.

MARYLAND: *Prince Georges Co.*; Beltsville. *Wicomico Co.*; Pittsville.

MASSACHUSETTS: *Bristol Co.*; Dighton. *Hampshire Co.*; Amherst. *Middlesex Co.*; Framingham; Sherborn; Tyngsboro. *Suffolk Co.*; Brookline. *Worcester Co.*; Berlin; Northboro; Southboro.

NEW HAMPSHIRE: *Rockingham Co.*; Hampton.

NEW JERSEY: *Middlesex Co.*; Milltown. *Morris Co.*; Great Swamp; Chatham.

NEW YORK: *Bronx Co.*; N.Y.C.; Van Courtland Pk. *Nassau Co.*; Wantagn, L. I.

PENNSYLVANIA: *Delaware Co.;* Lansdowne. *Monrow Co.;* Tannersville. *Northhampton Co.;* Lehigh Gap.

Phenology: April (5); June (107); July (39); August (4).

Remarks: Recorded as collected: "sweeping"; "sweeping grass"; on *Vaccinum.*

This species is the most easily diagnosed of Nearctic *Hoplia. Hoplia equina* is the only species with a single mesotarsal claw.

## *HOPLIA MUCOREA* (GERMAR)

(Figs. 9, 37)

*Melolontha mucorea* Germar 1824:129.

*Hoplia mucorea* (Germar); Burmeister 1844:193; Lacordaire 1856:196; LeConte 1856:287; 1880:191, 193; Boyer 1940:15.

*Hoplia meridionalis* Boyer 1940:14. NEW SYNONYMY

Types: *M. mucorea,* not examined. Type locality: America septentrional. *H. meridionalis:* CAS #4943. Type locality: Alachua Co.; Fla.

Length 5.3 mm to 8 mm. Form elongate, parallel sided. Ground color rufo-piceous to testaceous, head and prothorax generally darker than elytra. Head deeply, coarsely punctate, clypeal suture strongly carinate. Body surfaces (including head and clypeus) with numerous short to long, erect, stout hairs which are brown to cream colored. Thorax with many semi-recumbent, close-set, intermixed light and dark, oval to elongate scales. Elytra with many scattered, recumbent, pale oval scales. Pygidium and ventral surfaces with many close-set, recumbent to semi-erect, oval scales. Anterior tibia strongly bidentate. Posterior tarsal claws solid.

Specimens examined: 55 (see Fig. 9)

FLORIDA: *Alachua Co.;* Gainesville; Newnan L. Biol. St. *Brevard Co.*; Co. record only. *Clay Co.;* Green Cove Springs. *Osceola Co.;* Kissimmee. *St. John's Co.;* St. John's Bluff. *Seminole Co.;* Sanford.

GEORGIA: *Glynn Co.;* Jekyll Island; *Ware Co.;* Waycross.

NORTH CAROLINA: *Dare Co.;* Roanoake Is.

SOUTH CAROLINA: *Aiken Co.;* Aiken. *Charleston Co.;* Charleston; Meggett.

Phenology: March (2); April (13); May (11); June (2).

Remarks: The only collection data for this species is one record stating, "from Japanese Beetle Trap".

Superficially, this species is most likely to be confused with *H. floridana* or *H. gilleti,* but can be separated from those species by the solid *(mucorea)* vs. cleft *(floridana, gilleti)* hind tarsal claws. It can be easily distinguished from other *Hoplia* with solid hind tarsal claws by the strongly carinate clypeal suture (Fig. 37) and more elongate, parallel sided form of *H. mucorea.*

Boyer (1940) recognized that he had two similar species in the material before him, one undescribed. He assigned the name *mucorea* to one and named the other as *meridionalis.* The taxon to which he assigned the name *mucorea* had cleft hind tarsal claws, although the description by Germar clearly states that it is solid. Boyer evidently realized his mistake, since there are specimens in the USNM collection of the species he called *mucorea* with type labels, indicating he intended to describe a new species. This new species was evidently never published. *Hoplia meridionalis* Boyer, then, is truly, *H. mucorea* (Germar), and Boyer's *H. mucorea* is undescribed. For the latter taxon, I propose the name *Hoplia gilleti* below.

## *HOPLIA GILLETI* N.SP.

(Figs. 10, 38)

*Hoplia mucorea* Germar in Boyer 1940.

Holotype male: Length 6.5 mm, width (prothorax) 2.5 mm. Form elongate, parallel sided. Ground color piceous to rufo-piceous. Vertex and clypeus coarsely-rugosely pitted and tuberculate. Clypeal suture carinate (Fig. 38); clypeus concave, semicircular. Clypeus and vertex with scattered, erect, brown hairs. Prothorax and elytra with scattered to dense, oval to elongate, cream colored scales intermixed with scattered, semi-erect to erect, brown hairs. Lateral prothoracic margin somewhat rounded, not flattened or flared. Ventral surfaces and pygidium with close to contiguous, oval opalescent scales intermixed with scattered, semi-erect to erect, long, white hairs. Elytra testaceous. Antennal

club over 1/2 the length of basal segments. Anterior tibia strongly bidentate. Posterior tarsal claws cleft.

Allotype female: Length 7.3 mm, width (prothorax) 2.7 mm. Agrees with male, except for these characteristics: more globose, less elongate; ground color slightly darker; antennal club approximately 1/2 length of basal segments.

Paratypes: Length 6.5 mm to 8 mm. Agree with types in most respects. Major differences are in coloration and scalation.

Type material: (84 specimens, see Fig. 10)

Holotype, male (USNM), Allotype (USNM) and 38 paratypes: South Carolina, Blackville, J. G. Watts Collr.: 9 May 1938 (Holotype, Allotype, 14 male, 1 female paratypes); 16 May 1938 (10 males, 1 female); 6 May 1938 (9 males); 2 May 1938 (2 males, 1 female) (USNM, CNC, CAS ARH, MCZ). Eleven additional paratypes: South Carolina, Colletion Co., 5 mi. E. Canadys, Edisto Riv. Hiway 61, 19-22 May 1968, O. L. Cartwright (2 males, USNM); South Carolina, Aiken, 31 May 1957, Howden and Brown ( 2 males, HFH, CNC); South Carolina, Edisto exp. Sta., Blackville, 19 May 1938, O. L. Cartwright (2 males, USNM); South Carolina, Meggett 26 May 1934, O. L. Cartwright (1 male, USNM); Alabama, Alex City, 19 May 1958, Trap Light (1 male, FDA); Georgia, Savannah, 15 May 1917, C. B. Harper (2 males, USNM); Georgia, Richmond Co., Fort Gordon, 30 May 1958, R. R. Snelling (1 female, ARH); Georgia, Emanuel Co. 2.5 mi. S. E. Kite, 29 April 1976, R. Turnbow, on *Quercus laevis* Walter (16 males, RHT, ARH); Georgia, Johnson Co. 1 mi. E. Kite, 25 May 1976, R. Turnbow, on *Quercus laevis* Walter (17 males, RHT, ARH).

Remarks: This species appears most closely related to *H. mucorea* but differs in having a cleft posterior tarsal claw (solid in *mucorea),* and the ventral abdominal scales metallic (non-metallic in *mucorea*). Both, along with *H. floridana,* have a strongly carinate clypeal suture, which distinguishes these three from other North American species. *Hoplia floridana* has a flat clypeus, as opposed to the concave clypeus in *H. gilleti* and *H. mucorea.*

This species is dedicated to the memory of the late Dr. G. W. Gillet, Professor of Botany at the University of California, Riverside.

## *HOPLIA FLORIDANA* FISHER
(Figs. 10, 39)

*Hoplia floridana* Fisher 1918:140; Boyer 1940:11. Type: USNM #23460. Type locality: Lake Wales, Florida

Length 7 mm to 8.5 mm. Form elongate. Ground color of vertex, prothorax, and ventral surfaces of thorax piceous to rufo-piceous. Ground color of clypeus, elytra, abdomen, and legs rufous to rufo-

testaceous. Vertex, body surfaces and legs sparsely to closely covered with round to oval, white to grey, recumbent scales, intermixed with scattered short, erect, light hairs. Clypeal suture strongly carinate (Fig. 39); clypeus plane; posterior femur swollen, width 5 times length. Anterior tibia strongly bidentate. Posterior claw cleft.

Specimens examined: 10 (includes Holotype and Allotype) (see Fig. 10)

FLORIDA: *Lake Co.;* Ferndale. *Polk Co.;* Lake Wales.

Phenology: April (7).

Remarks: Recorded, "ex *Citrus* sp."

*Hoplia floridana* is perhaps the most distinctive *Hoplia* in North America. The elongate, parallel form and distinctive clypeus should make this species easily recognizable.

Closest to *H. gilleti* and *H. mucorea,* separable from both by the flat clypeus (concave in *gilleti, mucorea*), and from *mucorea* by the cleft hind tarsal claw (solid in *mucorea*).

## SPECIES INCERTAE SEDIS

### *HOPLIA CINEREONEBULOSA* NONFRIED

*Hoplia cinereonebulosa* Nonfried 1895:288; Dalla Torre 1913:371. Type: Not located. Type locality: "San Louis, Nieder-Californien"

*H. cinereonebulosa* was described from a single specimen from "San Louis" *(sic.),* Baja California. I can find no locality by this name on any of the maps which I have checked. There are, however, numerous localities named "San Luis", scattered the length of the peninsula. If this refers to a northern locality, there is a good possibility that this is a synonym of *H. callipyge,* since the description is inadequate. If the reference is to a southern locality, it could refer to a distinct species. Saylor (1948), in his treatment of the Scarabaeidae of Baja California, does not mention any records of *Hoplia.*

### *HOPLIA LIMBATA* LECONTE

*Hoplia limbata* LeConte 1856:284; 1880: 191; Blatchley 1910:949; Boyer 1940:15. Type MCZ #3255. Lectotype here designated: Male with the following labels: 1, [Yellow disc.] 2, Type 2. 3255 [Red]. 3, *limbata* 2. 4, Lecotype *Hoplia limbata* LeC. by A. R. Hardy [Red]. 1 paralectotype, 1 unlabeled specimen (LeConte collection, MCZ). Type locality: "Evansville, Indiana".

This species was provisionally synonymized by Boyer (1940). It is not like any currently recognized North American species, but does resemble specimens I have seen from the Neotropics. Since it has never been recollected, I believe the locality data to be in error, and therefore, do not consider this species to be part of the Nearctic fauna.

## *HOPLIA OBLONGA* GYLLENHAL

*Hoplia oblonga* Gyllenhal (as mentioned by Boyer 1940:5) was described from specimens without data. They probably do not represent any North American species, since the size (as given by Burmeister 1944:523, "A large species, longer than *H. bilineata* (=*H. aulica* p. 178), but not wider"; *H. aulica,* as cited above, ranges from 8.75 to 13.15 mm) is greater than that of any new world species to which the name could be applied.

# LITERATURE CITED


Blanchard, C. E. 1845. Histoire des insectes, traitant de leurs moeurs et de leurs métamorphoses en général, et comprenant une nouvelle classification fondée sur leurs rapports naturels. Vol. 2, 524 pp. Paris.

_____1850. Muséum d'Histoire Naturelle de Paris. Catalogue de la collection entomologique. Classe des insectes. Ordre des coléoptères. Vol. 1, pp. 1–128. Paris.

Blatchley, W. F. 1910. The Coleoptera or beetles of Indiana. Bull. Indiana Dep. Geol. Nat. Res., No. 1, pp. 1–1386.

Boyer, L. B. 1940. A Revision of the species of Hoplia occurring in America north of Mexico (Coleoptera: Scarabaeidae). Microentomology 5(1):1–31.

Burmeister, H. C. C. 1844. Handbuch der entomologie, Vol. 4, pt. 1 (Coleoptera Lamellicornia anthobia et Phyllophaga systellochela). pp. 1–587. Berlin.

Chapin, E. A. 1946. Necessary changes of names in the Coleopterous family Scarabaeidae. Proc. Biol. Soc. Washington 59:79–80.

Dalla Torre, K. W. 1913. Scarabaeidae: Melolonthinae IV. *IN* Junk and Schenkling, Coleopterorum Catalogus. pars 50. pp. 291–450. Berlin.

Dejean, P. F. M. A. 1833. Catalogue des coléoptères de la collection de M. le compte Dejean. Troisieme edition. Livr. 2, pp. 97–176. Paris.

_____ 1837. Catalogue des coléoptères de la collection de M. le comte Dejean. Troisieme edition, revue, corrigee et augmentee. Livr. 5. pp. 385–503.

Erichson, W. F. 1847. Naturgeschichte der Insecten Deutschlands. Abt. 1, Coleoptera, Vol. 3, Lief. 5, pp. 641–800.

Essig, E. O. 1926. Insects of Western North America. MacMillan Co., New York. 1035 pp.

Faldermann, F. 1833. Species Novae Coleopterorum Mongoliae et Sibiriae. Bull. Moscou 6:46–72.

Fisher, W. S. 1918. A new *Hopha* from Florida. Canadian Entomologist, 50:140–142.

Fuessly, J. C. 1775. Verzeichniss der ihm bekannten Schweizerischen insecten. 62 pp. Zürich.

Gemminger, M. and von Harold E. 1869. Catalogus coleopterorum hucusque decriptorum synonymicus et systematicus. 4:979–1346.

Germar, E. F. 1824. Insectorum species novae aut minus cognitae, descriptionibus illustratae. 624 pp. Halae.

Haldeman, S. S. 1843. Descriptions of North American species of Coleoptera, presumed to be undescribed. Proc. Acad. Nat. Sci. Philadelphia, 1:298–304.

Harold, E. von 1869. *IN* Gemminger, M. and von Harold E. Catalogus coleopterorum hucusque descriptorum synonymicus et systematicus. 4:979–1346.

Howden, H. F. and Hardy, A. R. 1971. Generic placement and adult behavior of the genus Leptohoplia Saylor. Proc. Entomol. Soc. Wash. 73(3):337–341.

Illiger, J. C. W. 1803. Verzeichniss der in Portugall einheimischen Kafer. Erste Lieferung. Mag. Insektenk. Vol. 2, pp. 186–258.

Jacquelin du Val, P. N. C. 1860. Glanures entomologiques. 2 vols., 164 pp. Paris.

Krynicky, J. 1832. Enumeratio Coleopterorum Rossiae meridionalis et praecipue in Universitatis in Caesarea Charcoviensis circulo obvenientium, quae annorum 1827–1831 spatio observavit. Bull. Moscou 5:69–179.

Kuster, H. C. 1849. Die Kafer Europa's Vols. 17, 18, 19. 100 pts. Nurnberg.

Lacordaire, J. T. 1856. Histoire naturelle des Insectes. Genera des Coleopteres. Vol. 3. pp. 1–594. Paris.

Le Conte, J. L. 1856. Synopsis of the Melolonthidae of the United States. Journ. Acad. Nat. Sci. Philadelphia ser. 2, 3:225–288.

_____1857. [Reports of explorations and surveys for a railroad route from the Mississippi River to the Pacific Ocean]. Report upon insects collected on the survey. 72 pp. Washington. [A preprint of a report published 1860].

_____1880. Short studies of North American Coleptera. Trans. Amer. Entomol. Soc. 8:163–218.

LeConte, J. F. and Horn, G. H. 1883. Classification of the Coleoptera of North America. Prepared for the Smithsonian Institution. Smith. Misc. Coll. 26(4):1–567.

Linnaeus, C. 1761. Fauna Suecica. Ed. 2. 578 pp., Stockholm.

Medvedev, S. I. 1952. Fauna SSSR. Coleoptera. Vol. X, No. 2. Scarabaeidae, Melolonthinae, pt. 2. pp. 1–274, Moscow.

Melsheimer, F. E. 1846 (1845). Descriptions of new species of Coleoptera of the United States. Proc. Acad. Nat. Sci. Philadelphia. 2:134–160, 1844 (1845).

Mulsant, E. 1842. Histoire naturelle des coléoptères de France, pt. 2. lamellicornes. pp. 1–623. Paris.

Pallas, P. S. 1781. Icones insectorum praesertim Russiae Sibiriaeque peculiarum, quae collegit et descriptionibus illustravit, pt. 1. pp. 1-56. Erlangae.

Potts, R. W. L. 1974. Revision of the Scarabaeidae: Anomalinae 1. The Genera Occurring in the United States and Canada. Pan-Pacific Entomol. 50(2):148–154.

Reitter, E. 1902 (1903). Bestimmungstabelle der Melolonthidae aus der europaischen Fauna und den angrenzenden Landern, enthaltend die gruppen der Rutelini, Hoplini, und Glaphyrini. Verh. Nat. Ver. Brunn 41:108, 111–126.

Ritcher, P. O. 1949. Larvae of Melolonthinae, with keys to Tribes, Genera, and Species (Coleoptera: Scarabaeidae). Kentucky Agric. Exp. Stn. Bull. 537:1–36.

_____1966. White Grubs and their allies. A Study of North American Scarabaeoid Larvae. Oregon St. Univ. Monogr.-St. Entomol. 4:1–219. Corvallis, Oregon.

Say, T. 1825. Descriptions of new species of Coleopterous insects inhabiting the United States. Journ. Acad. Nat. Sci. Philadelphia, 5(1):160–204.

Saylor, L. 1948. Contributions toward a knowledge of the Insect Fanna of Lower California. No. 10, Coleoptera: Scarabaeidae. Proc. Calif. Acad. Sci. 4th. ser. 24(10):337–374.

## APPENDIX

As a part of the investigations on this genus, the various subgenera utilized for species in Europe and Asia were investigated to determine the correct placement of the North American species. Even though it is not directly applicable to the species treated here, the information on subgenera is presented in the hopes it may prevent duplication of effort by future workers. The key presented below is a modification of a translation from the Russian originals presented by Medvedev (1952).

### A KEY TO THE [EUROPEAN] SUBGENERA OF *HOPLIA*

1. Antennae 10-segmented, rarely female with 9-segmented antennae; abdomen with only one transverse band on each sternite, rarely with few scattered hairs ..... subgenus *Decamera*

1.[1] Antennae of males and females 9-segmented, if 10-segmented, then the body greatly elongated (reminiscent of *Rhizotrogus*), convex, while the head and abdomen are covered with long protruding hairs or bristles ..... 2

2. Abdomen with long protruding hairs or bristles; claws of the hind leg not laciniate ..... subgenus *Hyperis*

2.[1] Abdomen on each sternite with one transverse band of hairs, sometimes with additional scattered short hairs; claws of the hind leg laciniate* ..... 3

3. Smaller claws of the fore and middle leg always laciniate and only about ¼ to ⅕ shorter than the larger, rarely ½ the length of larger. The pronotum for the most part considerably narrower than the base of the elytral base, its posterior margin evenly rounded-off, without a notch on the front of the posterior angle (very rarely (*H. rheini*) with notches) ..... 4

3.[1] Smaller claws of the fore and middle legs laciniate or ordinary, at least ½ the length of the larger, but sometimes very small, rudimentary, densely appressed to larger. The pronotum equal to or slightly narrower than the base of the elytra, its posterior margin convex at the middle, on each side in front of the posterior angle with a wide, rounded, sometimes faint notch, into which enters a humeral tubercle of the elytra ..... subgenus *Hoplia*.

*Although many of our species lack cleft claws, I believe they would have to pass through this half of the couplet, since, in addition, *Hyperis* (=*Xenoplia*) totally lacks scales.

4. The head, and particularly the pronotum, covered with quite dense, very long, protruding black bristles, the elytra with raised and long protruding bristles, pygidium and ventral surfaces with long bristles; claws of the posterior leg are laciniate on top, externally with a longitudinal grove ..... subgenus *Sinoplia*

4.[1] Body with fairly short or very short bristles, abdomen only with one transverse row of hairs on each sternite, sometimes, in addition, with thin scattered bristles; claws of the posterior leg simple ..... subgenus *Euchromoplia*

## FIGURE LEGENDS

Figures 1-2, *Hoplia* spp., distribution. Fig. 1, *H. dispar.* Fig. 2, *H. hirta.*

Figure 3, *Hoplia sackenii,* distribution.

Figure 4, *Hoplia callipyge,* distribution.

Figure 5, *Hoplia laticollis,* distribution.

Figure 6, *Hoplia trifasciata,* distribution.

Figures 7-8, *Hoplia* spp., distribution. Fig. 7, *H. modesta.* Fig. 8, *H. trivialis.*

Figure 9, *Hoplia equina* and *H. mucorea,* distribution.

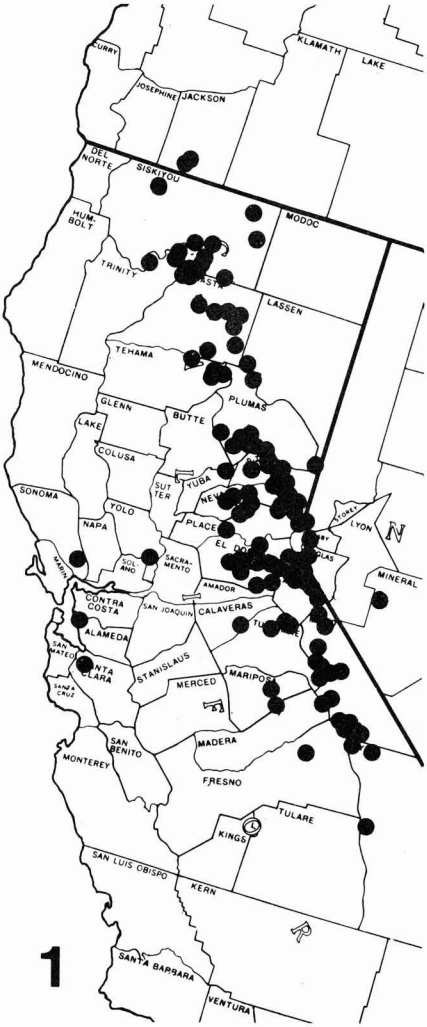
Figures 10-14, *Hoplia* spp. Fig. 10, *H. gilleti* and *H. floridana,* distribution. Figs.11-14, Mesotarsal claws of; (Fig.11) *H. dispar,* (Fig. 12) *H. hirta,* (Fig. 13) *H. callipyge,* and (Fig. 14) *H. sackenii.*

Figures 15-22, *Hoplia* spp., elytral scale types. Fig. 15, *H. dispar.* Fig. 16, *H. sackenii.* Fig. 17, *H. hirta.* Fig. 18, "typical" *H. callipyge.* Fig. 19, *H. callipyge,* Boardman, Ore. Fig. 20, *H. callipyge,* Zion Canyon, Utah. Fig. 21, *H. callipyge,* Asotin, Wash. Fig. 22, *H. callipyge,* Oso Flaco, Calif.

Figures 23-30, *Hoplia dispar,* variation in dorsal pattern.

Figures 31-35, *Hoplia* spp., prothoracic shapes. Fig. 31, *H. trivialis,* showing lack of lateral emargination. Fig. 32, *H. trifasciata,* showing lateral emargination. Fig. 33, *H. sackenii.* Fig. 34, *H. callipyge.* Fig. 35, *H. dispar.* Figs. 33-35 to same scale.

Figures 36-39, *Hoplia* spp., clypeal shape. Fig. 36, *H. modesta.* Fig. 37, *H. mucorea.* Fig. 38, *H. gilleti.* Fig. 39, *H. floridana.* Arrows indicate pronounced clypeal carina.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MINERAL
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CALAVERAS
ALAMEDA
SAN MATEO
SANTA CLARA
STANISLAUS
MERCED
MARIPOSA
SANTA CRUZ
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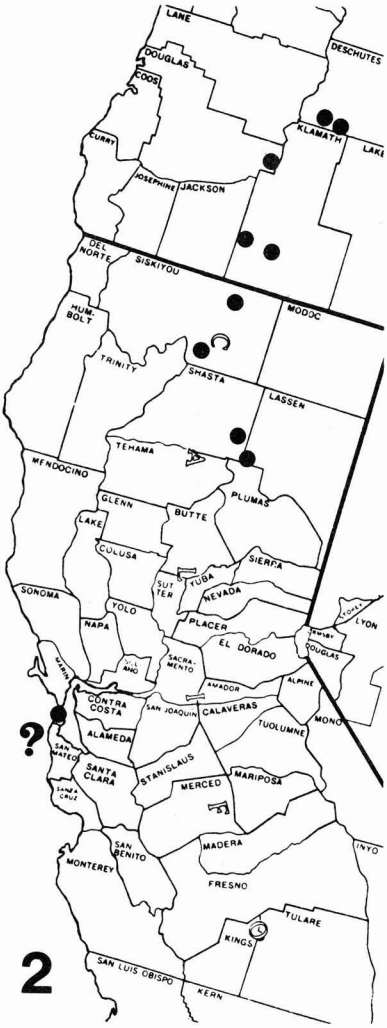
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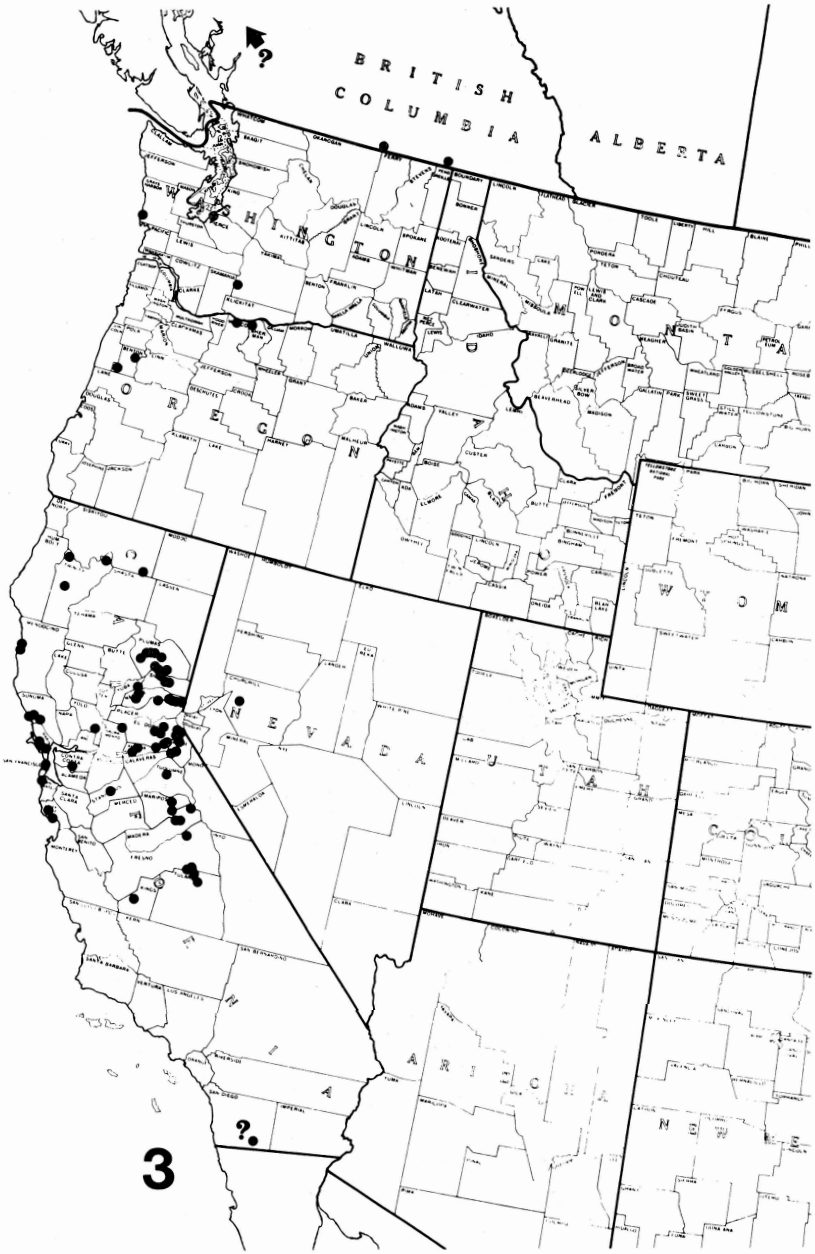
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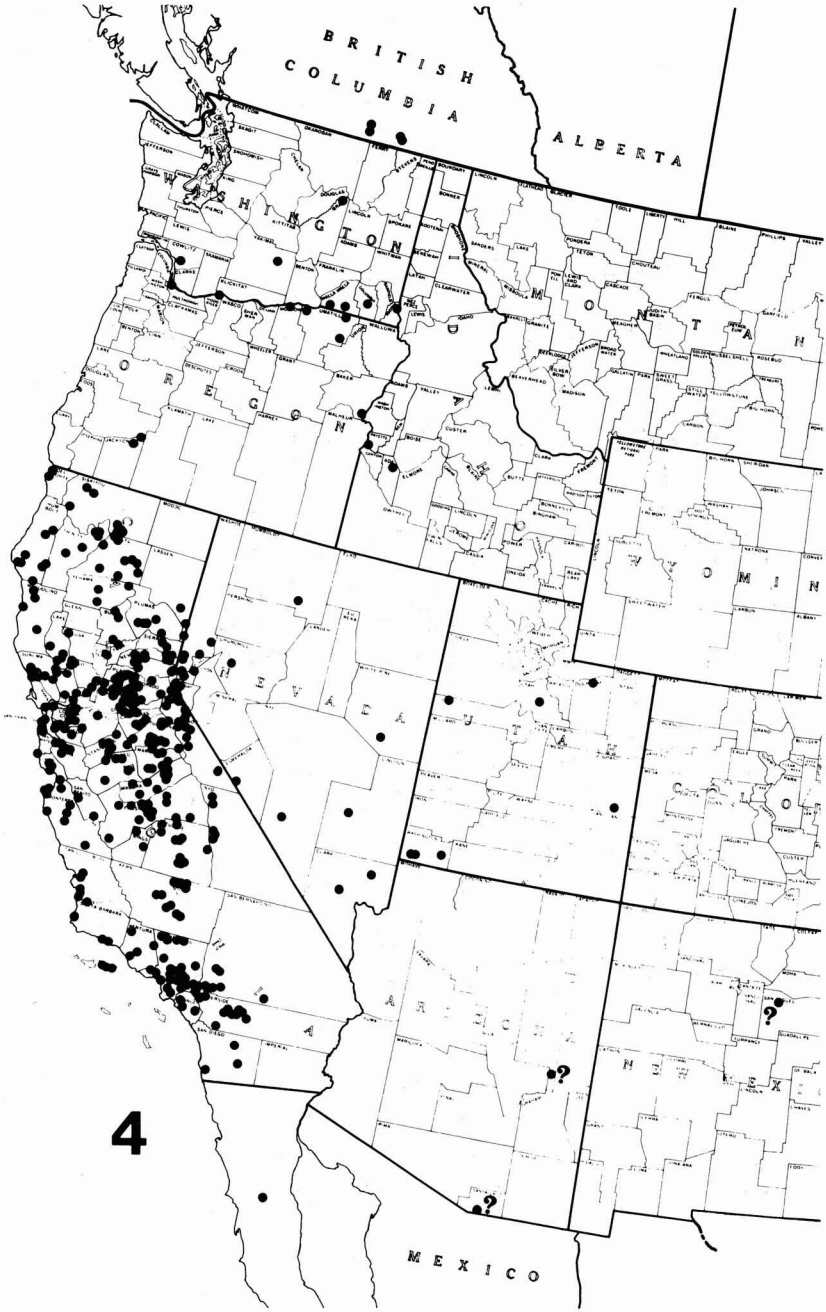
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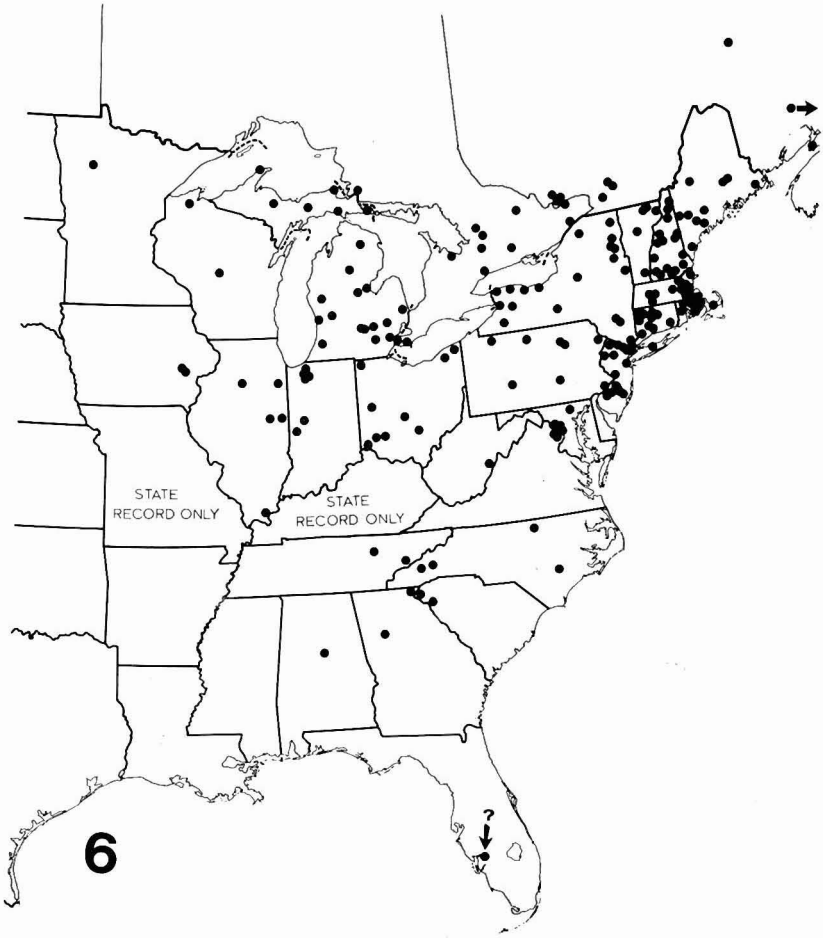
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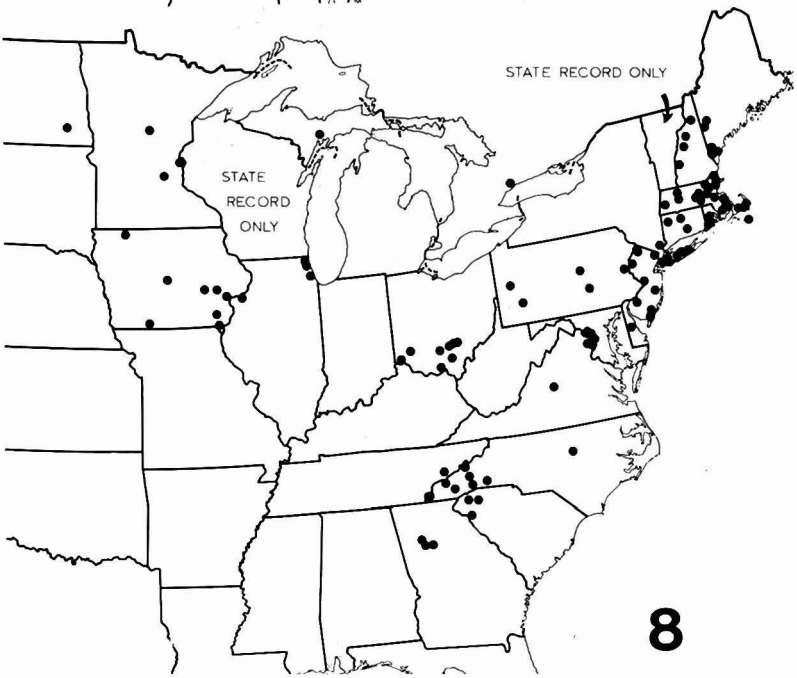
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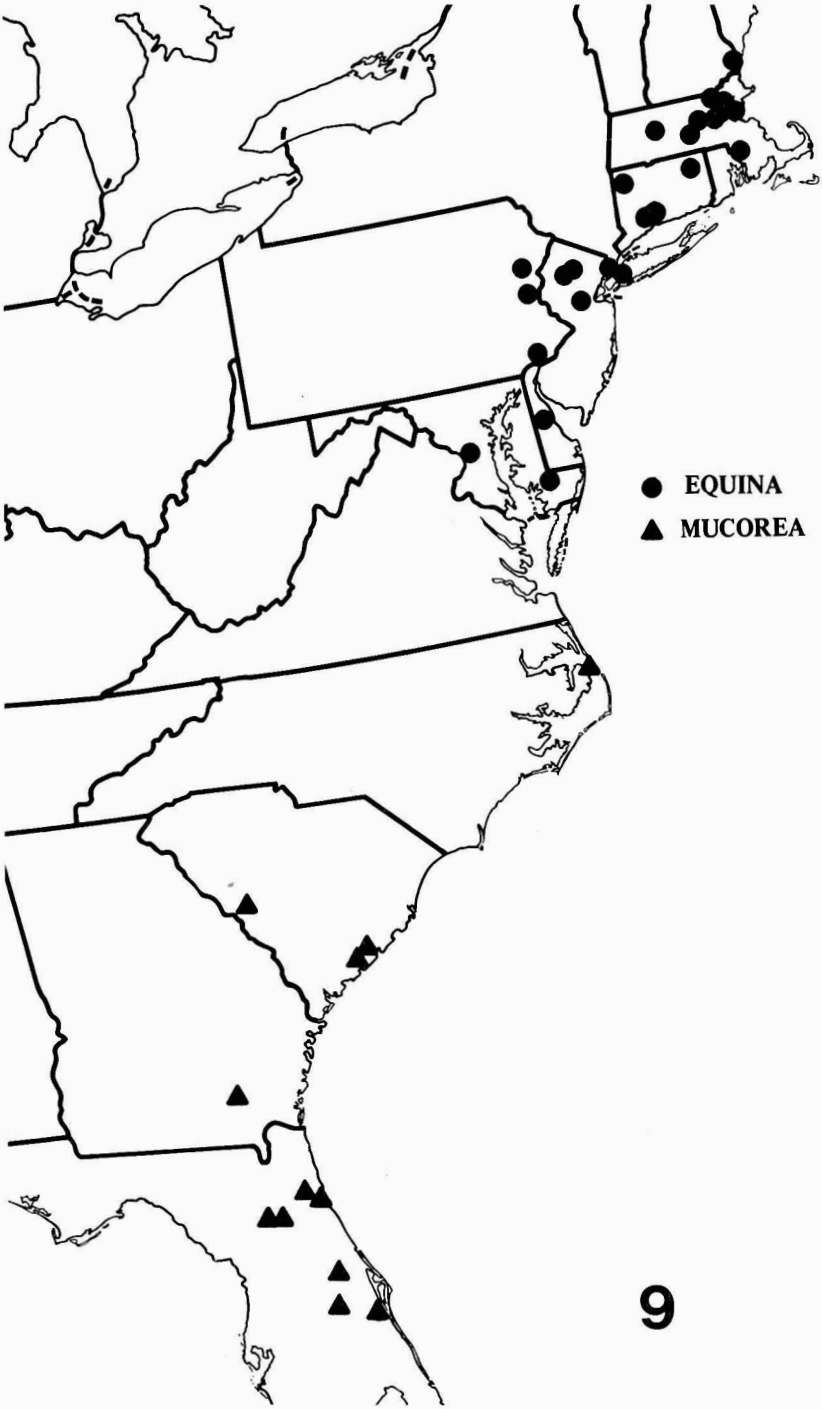
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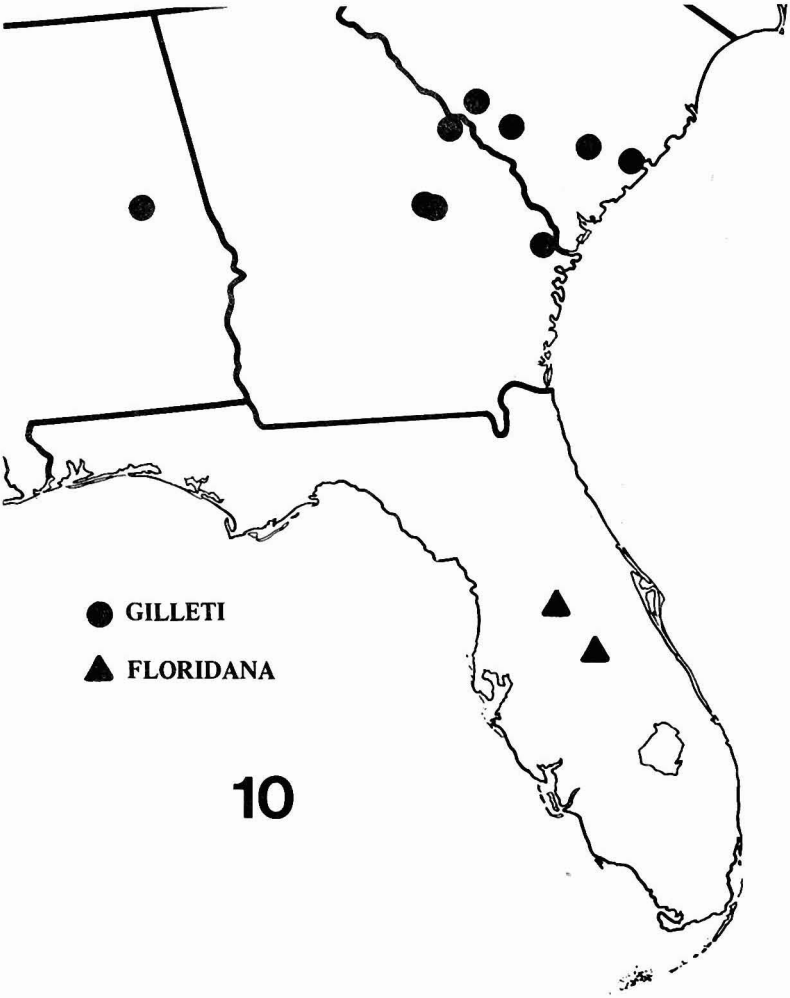


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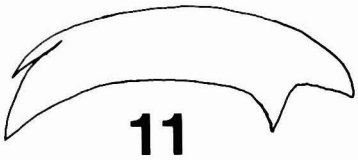

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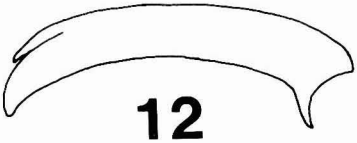

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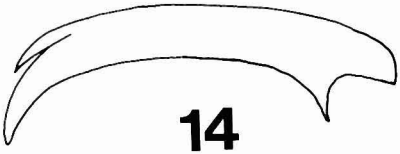

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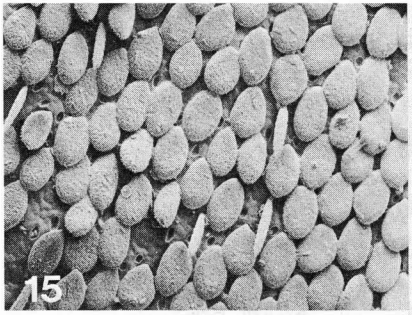
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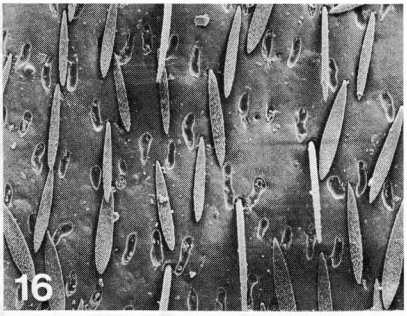
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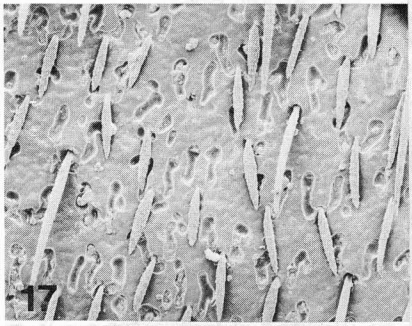
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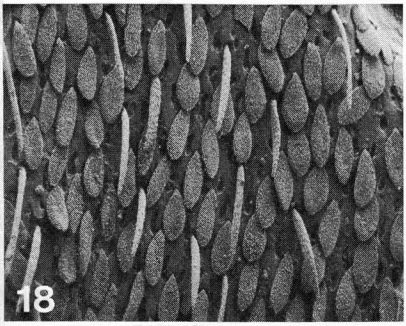
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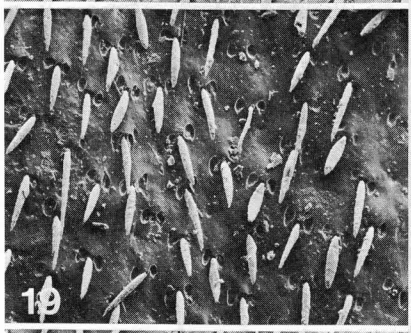
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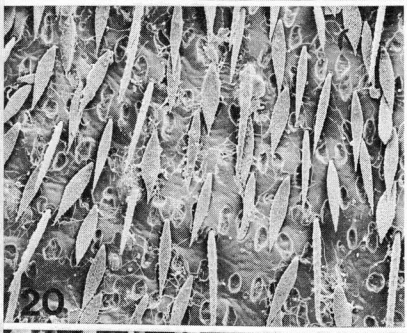
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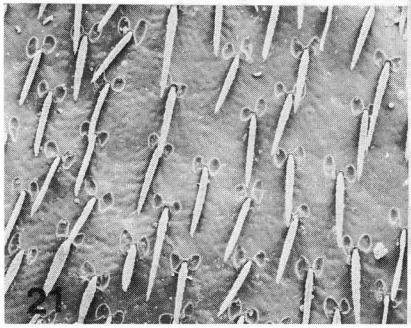
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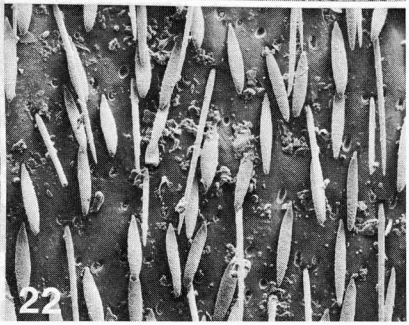
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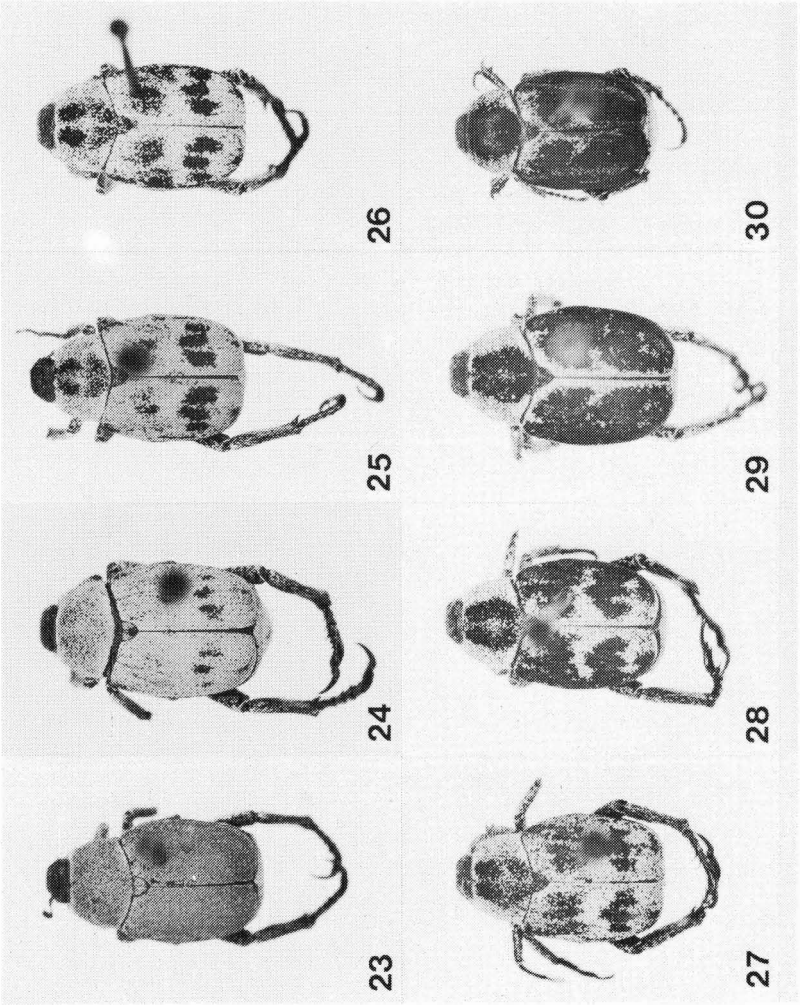
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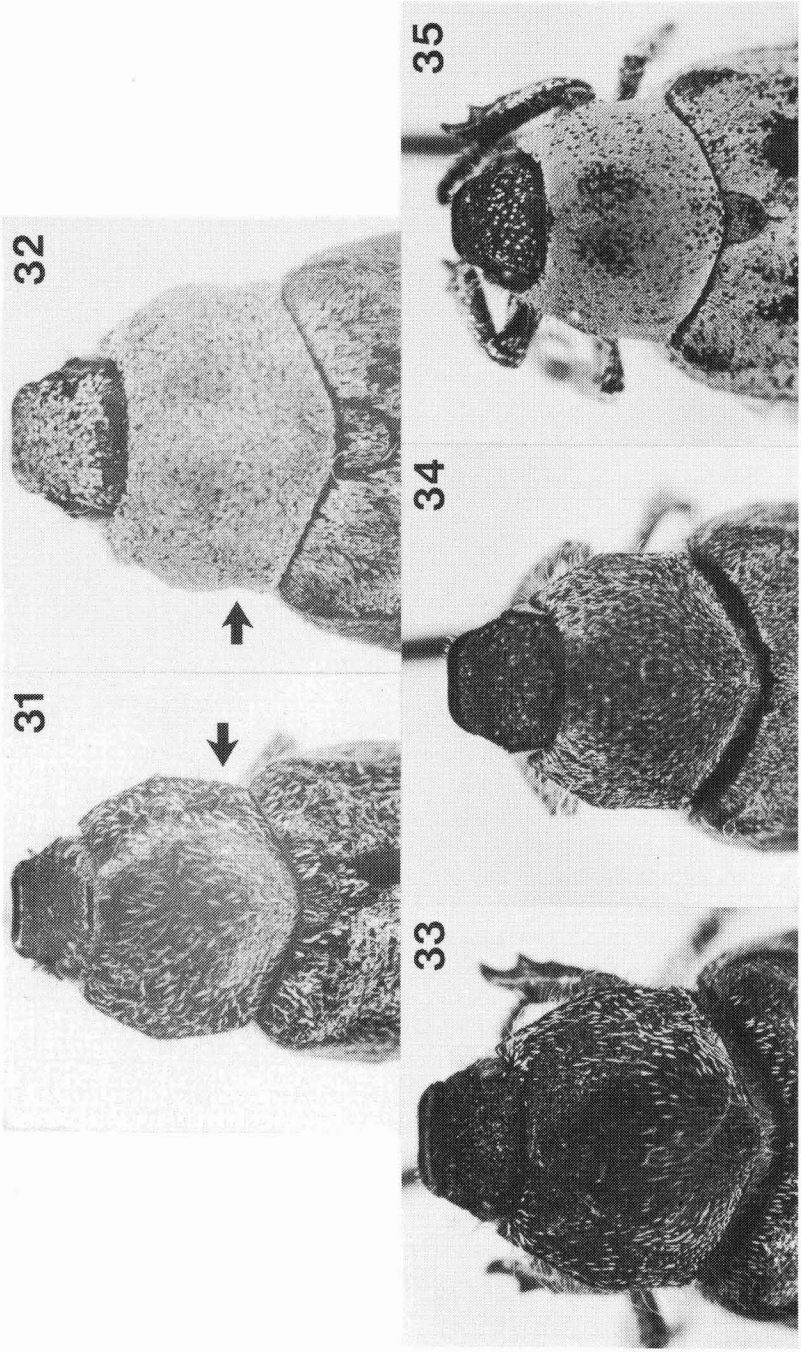
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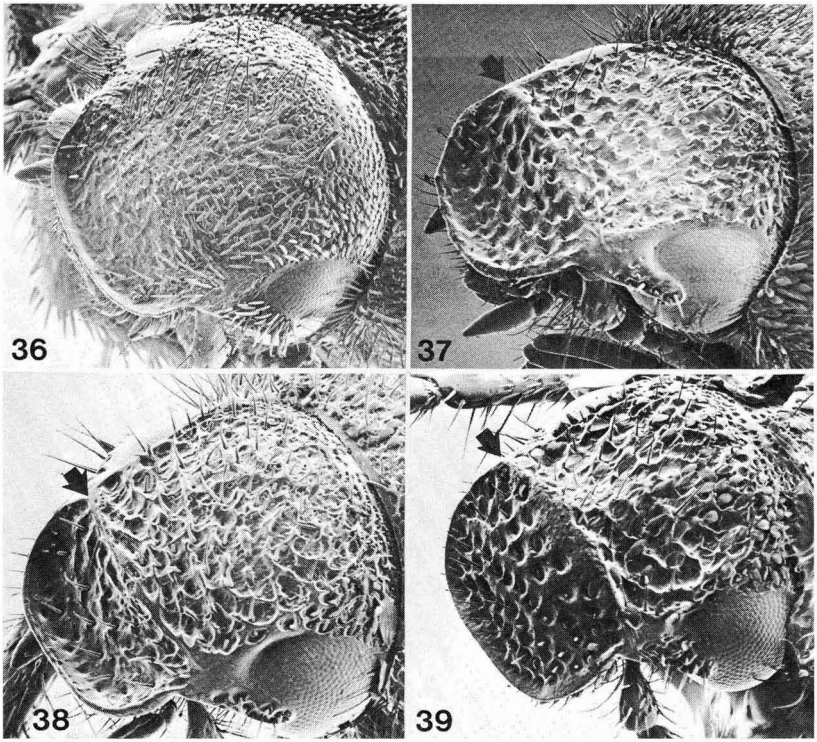
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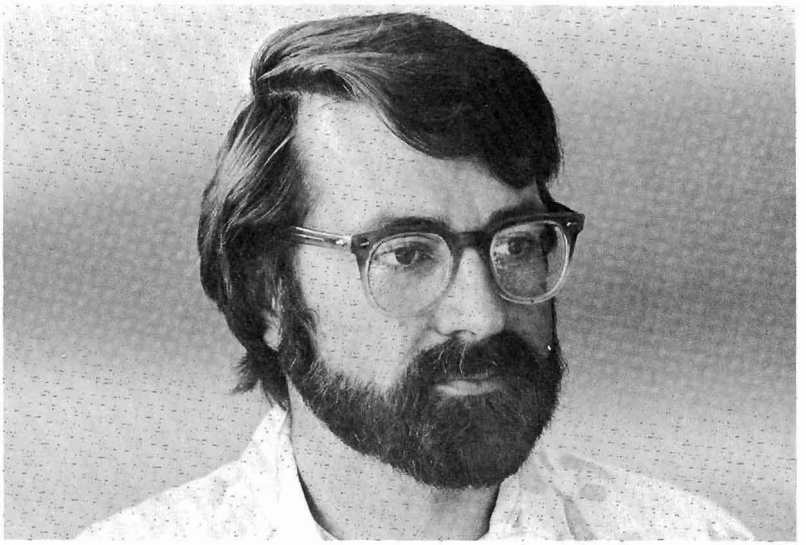

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## DR. ALAN R. HARDY

Dr. Alan R. Hardy has been with the California Department of Food and Agriculture for the last five years as a Systematic Entomologist. His identification responsibilities are the minor orders, including Orthoptera and Hemiptera but not Homoptera, and the other, non-Arachnid, Arthropods. His research interests are on the systematics and zoogeography of Scarabaeidae on a world-wide basis. He is also interested in sand dune ecosystems.

Alan was born in Ann Arbor, Michigan, and arrived in Long Beach, California in 1949, after several stops along the way. His wife's name is Wanda, who is a biology teacher at the secondary school level. Alan received his B.S. and M.A. degrees at California State University at Long Beach, after an interruption of a year while working as a collector in Africa for the Smithsonian Institution. He attended Cornell University, and the University of California at Riverside, where he received the Ph.D. degree in Systematic Entomology. He has taught at secondary school level, and at several colleges. Alan currently is serving as Co-editor of The Pan-Pacific Entomologist.