

## THE GENUS *LACCOCERA* VAN DUZEE (Homoptera: Delphacidae)

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The genus *Laccocera*, with *L. vittipennis* as genotype, was erected by Van Duzee in 1897 for the reception of three species of fulgorid leafhoppers, namely, *L. vittipennis*, *L. zonata*, and *L. obesa*. The only other comprehensive paper on the genus was by Crawford, in 1914, in which he retreated the species described by Van Duzee and added *L. bicornata* and *L. zonata* var. *flava*. The studies presented here are the results of an attempt to arrange the accumulated material belonging to the genus on the basis of the available publications. Three species, *L. oregonensis*, *L. minuta*, and *L. vanduzeei*, are described as new to science and *L. zonata* var. *flava* is raised to specific rank. Type study has revealed that *L. bicornata* is a synonym of *L. zonata*.

The genus is found in the temperate zone, and has not been recorded from any other than the Western Hemisphere. Its range involves the states of New York, New Hampshire, Michigan, Washington, Oregon, Idaho, Utah, Wyoming, North and South Dakota, Minnesota, Kansas, Colorado, Arizona, Texas, and Nevada, and the provinces of Quebec, Ontario, Saskatchewan, and British Columbia, Canada. Members of the genus feed on various grasses, e.g., *vittipennis* has been collected on wheat.

Although Van Duzee associated his genus *Laccocera* with the Old World genera, *Delphacinus* Fieber (1866) and *Eurysa* Fieber (1866), a study of genotypes, *D. mesomelas* (Boh.), and *E. lineata* (Perr.), failed to reveal any very close relationship between them. From these two genera, *Laccocera* may be differentiated by the presence of pits on various parts of the body. On the basis of the presence of pits in the adult stage, *Laccocera* is related to *Achorotile* Fieber (1866) and *Jassidaeus* Fieber (1866) but is easily distinguished from these genera by the single median carina on the frons.

Characteristics common to all species of the genus *Laccocera* Van Duzee are as follows: Head large, about as wide as pronotum, though sometimes wider, eyes extending over the pronotum for about one half its length. The vertex is nearly square or broader than long, with carinae separating the disc into five distinct cells, two of which are caudal, two lateral, and one median. The anterior margin of the vertex is truncate or convex as viewed dorsally. The frons is broad and marked by a median carina which forks near the apex of the vertex, the lateral compartments separated by this carina containing several macroscopic rounded pits, typically six or seven.

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The outer carinated margin of the frons, the vertex, pronotum, scutellum, dorsum, and venter of the abdomen are also pitted. The pronotum is short, considerably broader than long, with its posterior margin emarginate. The pronotum and scutellum are tricarinate and the scutellum is large. The anterior and middle tibiae are somewhat flattened. Brachypterous forms are present in all known species.

Two distinct groups of species may be distinguished within the genus. One group includes *L. vittipennis* Van Duzee, *L. minuta* sp. nov., and *L. vanduzeei*, sp. nov. In this group the species are not highly colored and the aedeagus is not a very elaborate structure. The other group holds the rest of the species. They are usually marked with red and/or yellow and the males have a more elaborate aedeagal structure, i.e., equipped apically with serrations or recurved processes not found in the first group.

If one is well acquainted with the genus, the external characters will suffice in separating the species. The main characteristics upon which the species have been separated, however, are the male genitalia and the structure of the head. The characters presented by the aedeagus, genital styles, and processes of the 10th abdominal segment of the male are sufficient for specific determination. These essential parts are usually available without internal dissection, although this method of study may be used as a last resort. As far as the head is concerned, the division of the vertex by carinae into five distinct cells, the shape and pitting of the frons, the margins of the vertex, have all proved characters of some importance. Size and general shape will also help separate the species. Color and wing venation are unreliable. Despite the fact that collectors often discard them as nymphs, the brachypterous forms studied far outnumber the macropterous ones. Consequently, the brachypterous males have been selected for description in this paper unless stated otherwise and other forms of polymorphic forms are to be considered identical with specified exceptions.

#### ACKNOWLEDGMENTS

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## KEY TO SPECIES

1. Vertex considerably broader than long; median cell of vertex either not angled anteriorly or bluntly so ..... 2  
     Vertex square or but slightly broader than long; median cell of vertex sharply angled anteriorly ..... 4
2. Body length less than 1.5 mm. to tip of abdomen. Median cell of vertex oblongate; styles quite short; aedeagus slender and but slightly curved ..... **L. minuta** sp. nov.  
     Body length greater than 1.5 mm. to tip of abdomen. Median cell of vertex hexagonal or rounded anteriorly; styles long; aedeagus considerably curved ..... 3
3. Anterior margin of vertex rounded; lateral margins of median cell of vertex nearly parallel, rounded anteriorly; pronotum not as wide as head; genital styles shorter and obliquely truncate.  
     ..... **L. vanduzeei** sp. nov.  
     Anterior margin of vertex straight; median cell hexagonal; pronotum about as wide as head; genital styles long and pointed at tip ..... **L. vittipennis** Van Duzee
4. Median carinae of vertex meet abruptly below apex; genital styles short; aedeagus blunt, barbed ..... **L. obesa** Van Duzee  
     Median carinae of vertex meet at or before apex; genital styles long; aedeagus long, either spatulate or hooked at tip ..... 5
5. Six prominent pits in each compartment of frons ..... 6  
     Seven prominent pits in each compartment of frons; aedeagus with process before tip resembling blade-shaped hook; processes of tenth abdominal segment long and curved ..... **L. zonata** Van Duzee
6. Aedeagus lobed at tip; anterior lateral margins of median cell of vertex straight ..... **L. flava** Crawford  
     Aedeagus hooked at tip about four serrations on ventral margin in front of hook; anterior lateral margins of median cell of vertex narrowed in middle ..... **L. oregonensis** sp. nov.

**Laccocera minuta** sp. nov.

(Plate III, figs. 10, 11, 11a, 12, 13, 13a; Plate V, fig. 22)

This species is the smallest in the genus. It is related to **vittipennis** and to **vanduzeei** but is different in that the genital styles are very short, being about one half as long as in **vittipennis** and **vanduzeei** and the aedeagus is more slender and less curved. The three middle pits in each compartment of the frons form a cluster; the median cell of the vertex is almost parallel-margined and rounded anteriorly.

**Brachypterous male**

Length; to tip of abdomen 1.4 mm., to tip of forewing, 0.9 mm., of forewing, 0.5 mm.

**Structure:** Vertex approximately five-sixths of width; cephalic margin

rounded and caudal margin somewhat emarginate; median cell not distinctly hexagonal but posterior margin more angled than in other species; lateral cells large, somewhat broader through the middle with two pits present in each cell near anterior mesal area; caudal cells proportionately near size of lateral cells; anterior margins of vertex tend to curve outward at edges; lateral margins almost parallel. Pronotal length about one third width, deeply emarginate behind; lateral carinae with anterior ends approximating caudo-mesal angles of eyes, posterior ends diverging laterally, marked below by series of small pits; median carina faint; scutellum length greater than half its width; median carinae faintly distinct, almost straight; frons with greatest width above middle, posterior margin about twice as wide as anterior margin; length about one half greater than width; each of the two compartments with seven pits, two located anteriorly, three along the lateral margin, and two in the central area, this arrangement bringing three together in the middle to form a cluster.

**Color:** Similar in most respects to *vittipennis* and *vanduzeei*, vertex, frons, pronotum, and scutellum yellow to whitish, except for black to brown markings at cephalic margin of frons and black markings in each outer fourth of the pronotum and scutellum; on pronotum the black extends mesad more than in other species; dorsum of abdomen and venter black, except for a transverse band of white extending on the first four and part of the fifth abdominal segments.

**Male genitalia:** Styles short, broad at base, tapering rapidly to a point; processes of tenth abdominal segment very short, about one half as long as in *vittipennis*; aedeagus long and slender, curved slightly from proximal end, bending in opposite direction distally, coming to a point more as in *vanduzeei*.

**Brachypterous female.**

Length; to tip of forewing, 0.93 mm., of forewing, 0.52 mm., ovipositor black.

**Macropterous male.**

Length; to tip of forewing, 2.18 mm., to tip of abdomen, 1.4 mm., of forewing, 1.7 mm.; vertex length approximately two thirds of width; scutellum length almost three fourths its width, lateral carinae with posterior ends slightly convergent; otherwise similar to brachypterous male. Color as in brachypterous forms except for a bright orange-yellow coloration on the scutellum.

**Macropterous female.**

Length; to tip of forewing, 2.56 mm., to tip of abdomen, 1.74 mm., of forewing, 2.1 mm.; in other respects similar to macropterous male.

**Holotype** male, **allotype** female, and **paratypes**, 1 male and 3 females, Chiricahua Mts., Arizona, June 9, 1933, R. H. Beamer; other paratypes, 1 male, 3 females, Chiricahua Mts., June 9, 1933, P. W. Oman; 1 male, 1 female, Huachuca Mts., Arizona, July 8, 1932, J. D. Beamer; 1 female nymph,

Mustang Mt., Arizona, June 20, 1933, P. W. Oman. Types and paratypes in Snow Entomological Collections, University of Kansas, other paratypes in United States National Museum, and in University of Minnesota Collections.

***Laccocera vanduzeei* sp. nov.**

(Plate III, figs. 14, 14a, 15; Plate V, fig. 23)

This species is related to *vittipennis* and *minuta* but differs from these two by having the tips of the genital styles obliquely truncate and the anterior margin of the vertex roundly emarginate.

**Brachypterous male.**

Length; to tip of forewing, 1.0 mm., to tip of abdomen, 1.9 mm., of forewing, 0.52 mm.

**Structure:** Vertex nearly square, with anterior margin rounded; lateral margins of median cell almost parallel; lateral cells anteriorly truncate, tapering posteriorly, not distinctly broad in middle; a pair of pits present in each lateral cell in cephalo-mesal area; caudal cells large, with lateral carinae curved somewhat mesad; pronotum with distinct median carina, lateral carinae strongly curved; posteriorly marked by row of small pustules; head usually broader than pronotum; scutellum more than half as broad as long, lateral carinae widely separated, the distance from edge of scutellum to carinae being less than one-fourth total width of scutellum; frons considerably broader above the middle than at anterior or posterior margins, somewhat longer than broad, with each of its two compartments containing seven pits, two located anteriorly, three along lateral margin, and two posteriorly.

**Color:** Similar in most respects to *minuta* and *vittipennis*; vertex almost cream-colored; pronotum and scutellum cream-colored with lateral margins black to dark brown; pits light in color with dark centers; dorsum of abdomen blackish to dark brown, with transverse white band extending onto fourth tergite; venter blackish to dark brown.

**Male genitalia:** Ninth abdominal segment fairly large; processes of tenth abdominal segment short and narrow; genital styles divergent, not tapering to sharp point but obliquely truncate at tip; aedeagus long and slender tapering to a point, curvature of middle part less marked than in *vittipennis*.

**Brachypterous female.**

Length; to tip of forewing, 1.1 mm., to tip of abdomen, 1.94 mm., of forewing 0.62 mm.

**Color:** As in brachypterous male with exception that white band on tergum extends over a greater portion of abdomen.

**Macropterous female.**

Length; to tip of forewing, 2.7 mm., to tip of abdomen, 2 mm., of forewing, 2.7 mm.

**Color:** Somewhat lighter yellow scutellum.

**Holotype** male, **allotype** female, 2 males, 42 female **paratypes**, Grand Canyon, Arizona, August 11, 1927, R. H. Beamer; other paratypes 11 females, Grand Canyon, August 11, 1927, L. D. Anderson; 5 females, Grand Canyon, August 11, 1927, P. A. Read; 3 females, Oak Creek Canyon, Arizona, August 14, 1927, L. D. Anderson; 1 male, Laguna Mts., Calif., July 14, 1929, L. D. Anderson; 1 female, Laguna Mts., July 14, 1929, R. H. Beamer; 1 female, Orange County, Calif., July 14, 1929, R. H. Beamer; 12 males, 22 females, Craig, Colo., June 30, 1931, R. H. Beamer. Types and paratypes in Snow Entomological Collections, University of Kansas; other paratypes in United States National Museum and University of Minnesota Collections.

***Laccocera vittipennis* Van Duzee**

(Plate II, figs. 6, 6a, 7, 7a; Plate V, fig. 24)

1895. *Delphacinus vittipennis* Van Duzee MS, Slosson, Ent. News, 6:5.

1895. *Delphacinus vittatus* Van Duzee MS, Gillette and Baker, Hemip. Colo., p. 69.

1897. *Laccocera vittipennis* Van Duzee, Bul. Buf. Soc. Nat. Sci., 5:242 (described).

This species is the most common in the genus and the most wide spread. It is related to *minuta* and *vanduzeei* but the genital styles are longer and taper more to a point, and the aedeagus is considerably more curved. The median cell of the vertex is almost hexagonal rather than rounded anteriorly as in the above two species.

**Brachypterous male.**

Length; to tip of forewing, 1.12 mm., to tip of abdomen, 1.8 mm., of forewing 0.65 mm.

Structure: Greatest width of vertex considerably more than length along midline, anterior margin almost straight, caudal margin straight; median cell almost hexagonal with lateral margins parallel; lateral cells broad, widest through middle at which point their width is slightly more than width of median cell, each lateral cell containing two pits in its cephalo-mesal region; caudal cells with lateral carinae almost straight; pronotum reniform, shorter than vertex, deeply emarginate; median carina prominent, traversing length of pronotum; lateral carinae strongly curved, extending to lateral margins, with a row of 9 to 11 pits below each carina; scutellum with an indistinct median carina; lateral carinae pitted at caudal ends; frons divided into two compartments, each containing seven pits, two being anteriorly located and near the median carina, two posterior and three smaller ones along the lateral margin, of which one is near posterior margin of frons while other two are near middle; width of frons at caudal margin is same as width just above middle, narrowing to almost one third its breadth at cephalic margin.

**Color:** Vertex and pronotum dull white to dirty yellow; scutellum ivory to bright fulvous; lateral margins of pronotum and scutellum dark brown to blackish; upper portion pale yellow.

**Male genitalia:** Ninth abdominal segment large; genital styles long, their length considerably greater than anal tube processes, broad at base, converging laterally, slightly bent at acute tip; anal tube processes curved, resembling a claw; anal tube short; aedeagus strongly curved from base, ab-

ruptly bending about one fourth distance from tip in opposite direction, tapering to sharp point at apex.

**Brachypterous female.**

Length; to tip of abdomen, 2.1 mm., to tip of forewing, 1.1 mm., of forewing, 0.60 mm.

**Macropterous male.**

Length; to tip of forewing, 2.62 mm., to tip of abdomen, 1.7 mm., of forewing, 2.2 mm., scutellum larger and more highly colored than in brachypterous forms.

**Macropterous female.**

Length; to tip of forewing, 2.76 mm., to tip of abdomen, 1.9 mm., of forewing, 2.35 mm.

Studies have been made on 115 males and 252 females from 13 states: Colorado, Idaho, Michigan, Minnesota, Montana, New Hampshire, New York, North Dakota, Oregon, South Dakota, Washington, Wyoming, and from South Saskatchewan, Canada. The majority of these are brachypterous. It has been possible to study homotypes made by P. W. Oman and a type from the Cornell University Collection has been available. Material collected from the type locality and other type material from Colorado have also been available.

Nineteen per cent of the males, 30 per cent of the females, and 26 per cent of the total number of specimens studied were macropterous, indicating a predominance of the brachypterous forms.

***Laccocera obesa* Van Duzee**

(Plate IV, figs. 18, 19, 19a, 20, 20a; Plate V, fig. 25)

1895. *Delphacinus obesus* Van Duzee MS, Gillette and Baker, Hemip. Colo., p. 69.

1897. *Laccocera obesa* Van Duzee, Bul. Buf. Soc. Nat. Sci., 5:244 (described).

This species is smaller but somewhat similar in coloration to *oregonensis* and *flava*. It has a **shorter** and broader aedeagus than found in any other species of the genus. The barbed apex of the aedeagus helps to differentiate *obesa* from all others in the genus. It also differs from all other species in the genus in that the lateral carinae of the median cell of the vertex extend beyond the apex to meet at the posterior margin of the frons. A modified redescription is given as follows:

**Brachypterous male.**

Length; to tip of forewing, 0.94 mm., of body, 1.6 mm., of forewing, 0.52 mm.

**Structure:** Vertex little broader than long, almost square, somewhat rounded along cephalic margin, posterior margin straight; lateral cells almost equal in size to median cell, each with two pits along mesal margin. Caudal cells almost obtuse, separated at middle by a distinct carina which divides at about middle of vertex to form caudal boundaries of median cell; margin extending around small oblong eyes is supplied with several small

pits, usually numbering seven; pronotum deeply emarginate along posterior margin with a fairly well marked median carina; lateral pronotal carinae diverge laterally and are marked below by a series of several pits, usually 10 or 11; median carina of scutellum is poorly marked; frons with six prominent pits in each compartment, two located anteriorly and two posteriorly near median carina, and a smaller pair near lateral margin above middle; seventh pit so commonly present in members of this genus has risen above posterior margin of frons; width of frons at posterior margin somewhat less than width above middle; dorsum of abdomen broad, pitted, somewhat less so than in other species.

**Color:** Brachypterous male exists in two distinct color forms, one quite similar in coloration to majority of macropterous and brachypterous females; this type has vertex, pronotum, and scutellum light to soiled yellow, scutellum fulvous to dark brown in lateral compartments, middle raised portion yellow; venter is light fulvous, dotted with brown; dorsum of abdomen pale yellow marked with brown in lateral regions; forewings brownish; pits banded with dull yellow, centers brown. The other type of color form has vertex, pronotum, scutellum, and frons, a bright yellow; forewings black, as is venter and tergites of abdomen; dorsum of abdomen is marked with transverse white to yellow band across second to fourth tergites, extending onto fifth and sixth; pits are black, with no light banding; legs are red to orange-yellow, lineated with brown.

**Male genitalia:** Styles short and stout, tapering to tip; no median carina below and between styles; processes of anal tube very short, curved at tip; aedeagus short, blunt at tip, with minute spines regularly placed along dorsal margin which is abruptly notched over one half distance to tip, somewhat like a knitting needle.

**Brachypterous female.**

Length; of body, 1.9 mm., to tip of forewing, 0.96 mm., of forewing, 0.52 mm.; color light as discussed under brachypterous male.

**Brachypterous female.**

Length; of body, 2 mm., to tip of forewing, 2.2 mm.; scutellum well developed and somewhat elevated in middle.

Studies have been made on 134 males and 146 females from 11 states: Arizona, Colorado, Iowa, Kansas, Montana, Nebraska, New Mexico, South Dakota, Texas, Utah, Wyoming. These exhibit a variety of color forms. No macropterous males have been observed.

In this species 20 per cent of the females studied were macropterous and, of both sexes, slightly under 11 per cent of the specimens studied were macropterous. No macropterous males have been observed. A macropterous female from Ft. Collins, Colorado, has been compared with the type specimen by P. W. Oman, Bureau of Entomology and Plant Quarantine. Other specimens studied agree structurally with this specimen and the writer believes the identifications correct.



**Laccocera zonata** Van Duzee

(Plate II, figs. 8, 8a, 9, 9a; Plate V, fig. 26)

1895. *Delphacinus zonatus* Van Duzee, MS, Gillette and Baker, Hemip. Colo., p. 69.1897. *Laccocera zonata* Van Duzee, Bul. Buf. Soc. Nat. Sci., 5:243 (described).1914. *Laccocera bicornata* Crawford, Proc. U.S. Nat. Mus., 46:582.

The unique structure of the aedeagus, having a secondary process just before the distal margin which suddenly expands and then tapers to a point, distinguishes this from all other species in the genus. No other species studied exhibits such an accessory structure. The processes of the tenth abdominal segment are almost twice as long as in any other species. Seven prominent pits in each compartment of the frons readily separate it from *flava* and *oregonensis*. A redescription is given as follows:

**Brachypterous male.**

Length; of body, 2.04 mm., to tip of forewing, 1.2 mm., of forewing, 0.5 mm.

**Structure:** Head large, wider than thorax, eyes overlap pronotum for over one half their length, first antennal segment one half length of second segment; vertex broader than long, and anterior margin rounded, becoming obtusely angled; caudal margin straight; all carinae distinct, lateral carinae straight and meeting anteriorly before apex of vertex, thus forming large triangular median cell; lateral cells elongated, narrow in middle and with pair of pits present in cephalo-mesal area; caudal cells large; pronotum considerably longer than in other species, slightly less than one third its width, emarginated caudally for one half its length with row of pits, usually nine, following the curved lateral carinae; median carina less distinct, lateral carinae converging but slightly, marked posteriorly on either side by a pit; frons considerably wider just above middle than at anterior or posterior margin, longer than wide; each compartment contains seven pits, two situated anteriorly, three at middle and two posteriorly; latter pair considerably removed from posterior margin of frons; dorsum of abdomen broader than generally found in other species; forewings extend to second antennal segment; pits present on abdominal segments, numbering from two to five on the sides of each segment.

**Color:** Pronotum, vertex, and scutellum yellow to ivory; pits lighter around periphery than in centers; forewings black, dorsum of abdomen black-

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**EXPLANATION OF PLATE I**

Fig. 1. Head, pronotum, and scutellum to show carinae and cells.

Fig. 2. Lateral view of male abdomen, showing abdominal processes, aedeagus, and genital styles. ....

Fig. 3. Ovipositor.

Fig. 4. *Laccocera flava* Crawford, brachypterous male.

Fig. 4a. *L. flava* Crawford, frontal view of male.

Fig. 5. *L. flava* Crawford, dark colored brachypterous female.

Fig. 5a. *L. flava* Crawford, frontal view of brachypterous female.

Fig. 5b. *L. flava* Crawford, flavous brachypterous female.

Fig. 5c. *L. flava* Crawford, flavous brachypterous female, frontal view.

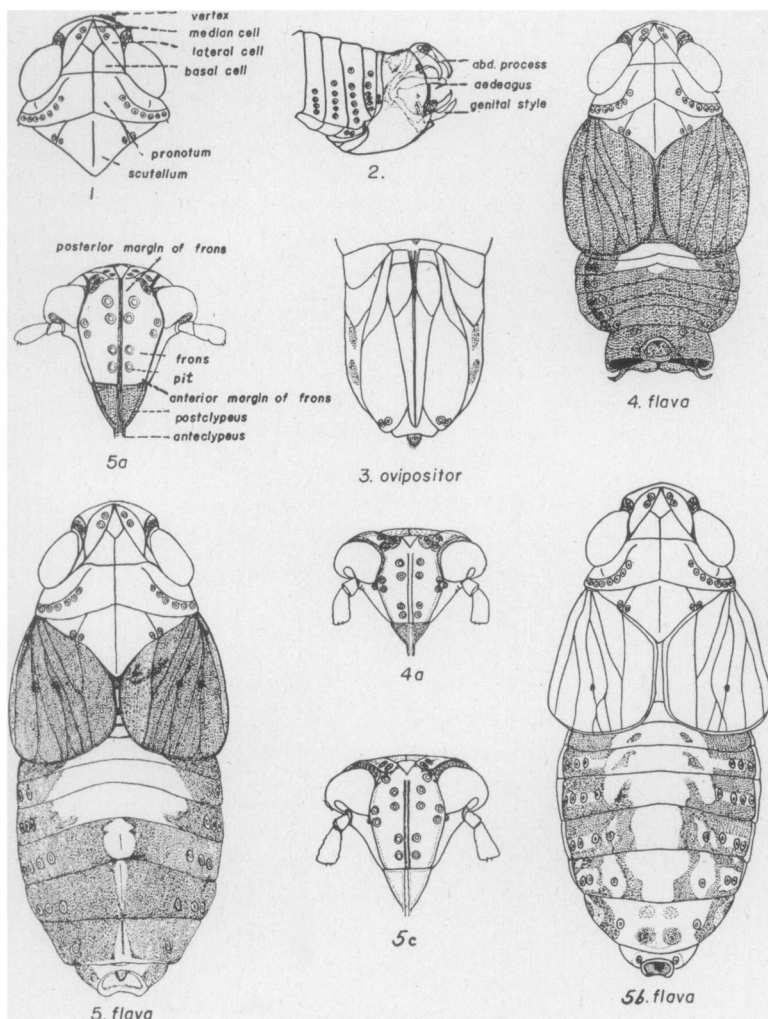


PLATE I

ish, marked with transverse white to yellow band which usually extends on to fourth segment; pits black; venter blackish with pits black; coxae are brown, marked with dull yellow areas; frons fulvous to dirty yellow; legs yellow, yellow-brown, or orange.

**Male genitalia:** Styles broad proximally, tapering broadly to pointed distal margin; processes of tenth abdominal segment very long and curved; aedeagus extends from base as a broad blade which tapers to blunt point on dorsal side, bearing on ventral margin near tip a flat process which extends laterally for short distance, then suddenly bends dorsally, gradually broadening into a flat bulbous lobe to terminate in spine-like apex.

**Brachypterous female.**

Length; of body, 2.28 mm., to tip of forewing, 1.26 mm., of forewing, 0.68 mm.

**Color:** There are two color forms of brachypterous females, both different from the male; one form considerably darker than other with vertex, pronotum, and scutellum almost fulvous; dorsum of abdomen marked with brown, with a few yellow patches near middle; pits surrounded by dull yellow bands; second form pale yellow with lateral margins of abdominal tergites marked with brown; forewings light in color; legs usually yellow in both forms, but may vary to brown.

**Macropterous male.**

Only one macropterous form has been observed. It is similar to brachypterous male with exception of wings. Male genitalia immediately place it in this species.

**L. zonata** is found only in Arizona and Colorado. Only one macropterous male has been seen but 65 brachypterous males, 23 brachypterous females and 11 female nymphs were studied. Specimens compared with the type by P. W. Oman have been available for study.

***Laccocera flava* Crawford**

(Plate I, figs. 4, 4a, 5, 5a, 5b, 5c; Plate V, fig. 27)

1914. *Laccocera zonata* var. *flava* Crawford, Proc. U.S. Nat. Mus., 46:581.

The aedeagus in this species is spatulate at the tip. This separates it from the most nearly related species, *oregonensis*, which has a hooked tip on the aedeagus. The genital styles are more slender than in either *oregonensis* or *zonata*.

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EXPLANATION OF PLATE II

- Fig. 6. *L. vittipennis* Van Duzee, brachypterous male.  
Fig. 6a. *L. vittipennis* Van Duzee, frontal view of brachypterous male.  
Fig. 7. *L. vittipennis* Van Duzee, brachypterous female.  
Fig. 8. *L. zonata* Van Duzee, brachypterous male.  
Fig. 8a. *L. zonata* Van Duzee, frontal view of brachypterous male.  
Fig. 9. *L. zonata* Van Duzee, brachypterous female.  
Fig. 9a. *L. zonata* Van Duzee, frontal view of brachypterous female.

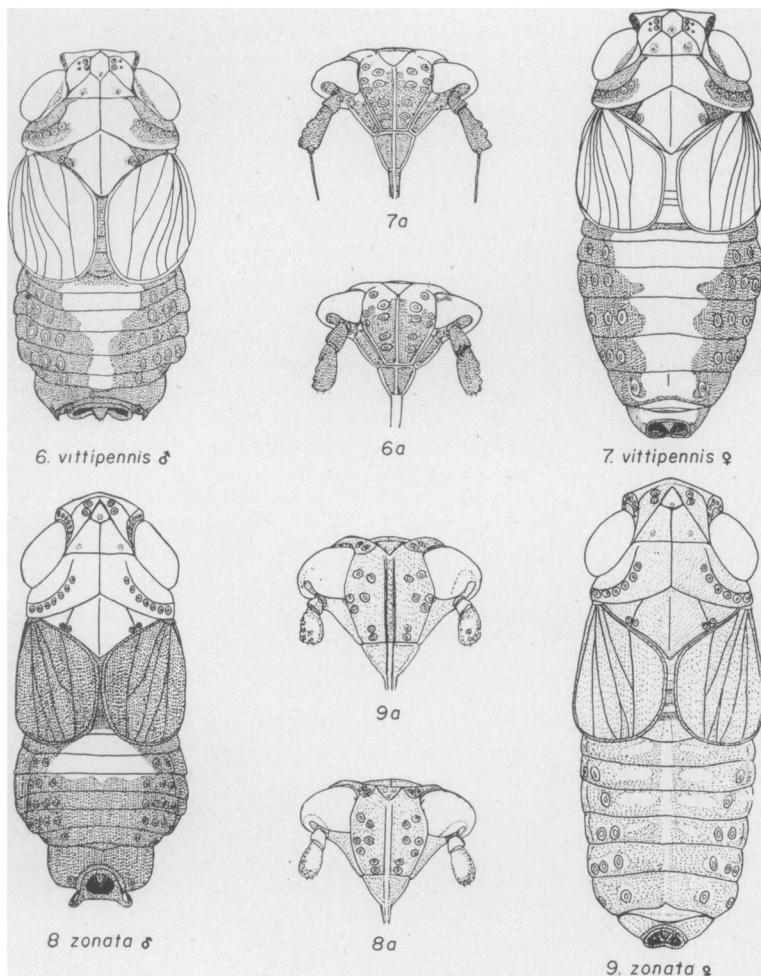


PLATE II

Crawford's (1914) original description is not adequate. It reads as follows: "Very similar in all characters, except color, to the species. Color almost uniform light flavous, with faint brown markings on abdomen and venter. Three females out of more than 100 specimens show this character with almost no intergradations. Very probably this is not more than a varietal form of the species—scarcely a seasonal variation, however, as all the specimens were apparently taken at the same time of the year." Because this description is inadequate, a redescription is necessary.

**Brachypterous male.**

Length; of body, 1.88 mm., to tip of forewing, 1.2 mm., of forewing, 0.70 mm.

**Structure:** Vertex with anterior margin distinctly rounded, caudal margin emarginate, median cell angulate anteriorly due to lateral carinae being straight and meeting before apex of vertex; lateral cells about twice the length of median cell, width approximately same with two well marked pits near middle of cephalic half of each cell; caudal cells large, carinae distinct; vertex about one half width of pronotum; greatest width of vertex broader than length of vertex along mid-line; pronotum about three and one half times as wide as long; scutellum about one-half as long as wide; frons considerably longer than broad, wider just above the middle, each lateral half well marked with six distinct pits, anterior and posterior mesal pairs of which are considerably larger than lateral marginal pair; an indistinct seventh pit is present just above posterior margin of frons.

**Color:** Vertex, frons, pronotum, and scutellum creamy yellow; pits banded light, with dark centers; forewings and venter of abdomen black; dorsum of abdomen black except for transverse white band extending on to third and fourth tergites; legs light orange with coxal and pleural pieces brownish.

**Male genitalia:** Styles broad at base, gradually and sinuately curving to tip where it ends in a slight hook; processes of tenth abdominal segment short and slightly curved; aedeagus is broad proximally, then suddenly narrowed, being somewhat bent at middle, whence it tapers to spatulate tip, the latter bearing a row of small spines which extend about half the distance to first bend of aedeagus.

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EXPLANATION OF PLATE III

- Fig. 10. *L. minuta* sp. nov., brachypterous male.  
Fig. 11. *L. minuta* sp. nov., macropterous male.  
Fig. 11a. *L. minuta* sp. nov., frontal view of macropterous male.  
Fig. 12. *L. minuta* sp. nov., brachypterous female.  
Fig. 13. *L. minuta* sp. nov., macropterous female.  
Fig. 13a. *L. minuta* sp. nov., frontal view of macropterous female.  
Fig. 14. *L. vanduzeei* sp. nov., brachypterous male.  
Fig. 14a. *L. vanduzeei* sp. nov., frontal view of brachypterous male.  
Fig. 15. *L. vanduzeei* sp. nov., brachypterous female.

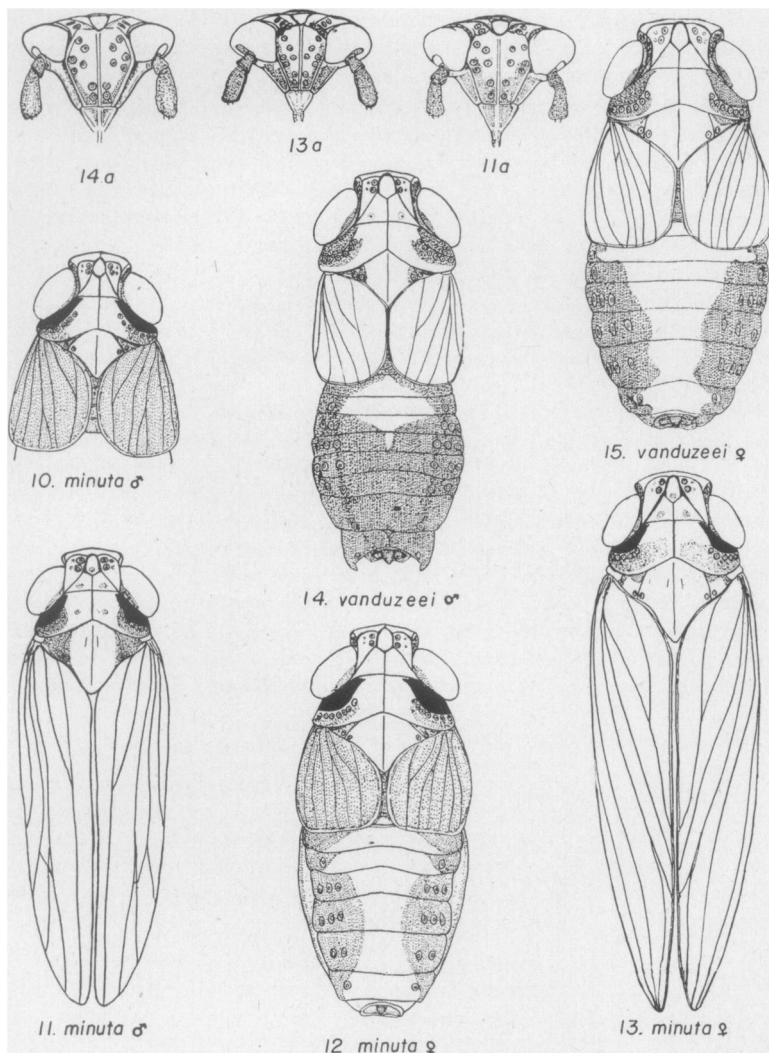


PLATE III

**Brachypterous female.**

Variable. Small, dark-colored form: Length; of body, 2.38 mm., to tip of forewing, 1.14 mm., of forewing, 0.62 mm.

Large, highly colored form: Length; of body, 2.6 mm., to tip of forewing, 1.36 mm., of forewing, 0.76 mm.

**Color:** Several colorations. One similar to male; one fuscous for general body color with light forewings; another more highly colored, with frons, pronotum, scutellum, and vertex glazed yellow, with forewings almost brownish-red; legs vary from dull yellow to light orange often marked brown and yellow. There seems to be little constancy in nature since specimens collected at the same time exhibit variation.

**Macropterous female.**

Length; of body, 2.5 mm., to tip of forewing, 3.3 mm., of forewing, 2.42 mm., scutellum almost as long as broad.

Types in collection of Pomona College, California. These were not available for study.

A brachypterous female from Ormsby Co., Nevada, has been compared with the type of *zonata* var. *flava* by P. W. Oman. It agrees structurally but does not have the fulvous coloration of the type. The author is raising this variety to specific rank, basing the determination on the structural similarity with males correlated with the females studied, and the fact that they have a very distinct difference in male genital structure from the other species. No macropterous males have been seen by the author. The female is quite variable in size and coloration, the latter of which relates the species to *zonata* and *oregonensis*. Fifty-nine males and sixty-seven females have been studied from five states: California, Nevada, Oregon, Utah, and Washington. Of these, two were macropterous, and the rest brachypterous.

***Laccocera oregonensis* sp. nov.**

(Plate IV, figs. 16, 16a, 17, 17a; Plate V, fig. 28)

This species is similar in coloration in some respects to *zonata* and *flava* but the aedeagus differs by having a series of serrations, usually four, just before a hooked tip; styles narrower, anterior lateral carinae of median cell curved in middle. The processes of the tenth abdominal segment are about one half the length of the processes in *zonata* and similar to *flava* in this respect.

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**EXPLANATION OF PLATE IV**

- Fig. 16. *L. oregonensis* sp. nov., brachypterous male.  
Fig. 16a. *L. oregonensis* sp. nov., frontal view of brachypterous male.  
Fig. 17. *L. oregonensis* sp. nov., brachypterous female.  
Fig. 18. *L. obesa* Van Duzee, brachypterous female.  
Fig. 19. *L. obesa* Van Duzee, macropterous female.  
Fig. 19a. *L. obesa* Van Duzee, frontal view of macropterous female.  
Fig. 20. *L. obesa* Van Duzee, brachypterous male.  
Fig. 20a. *L. obesa* Van Duzee, frontal view of brachypterous male.

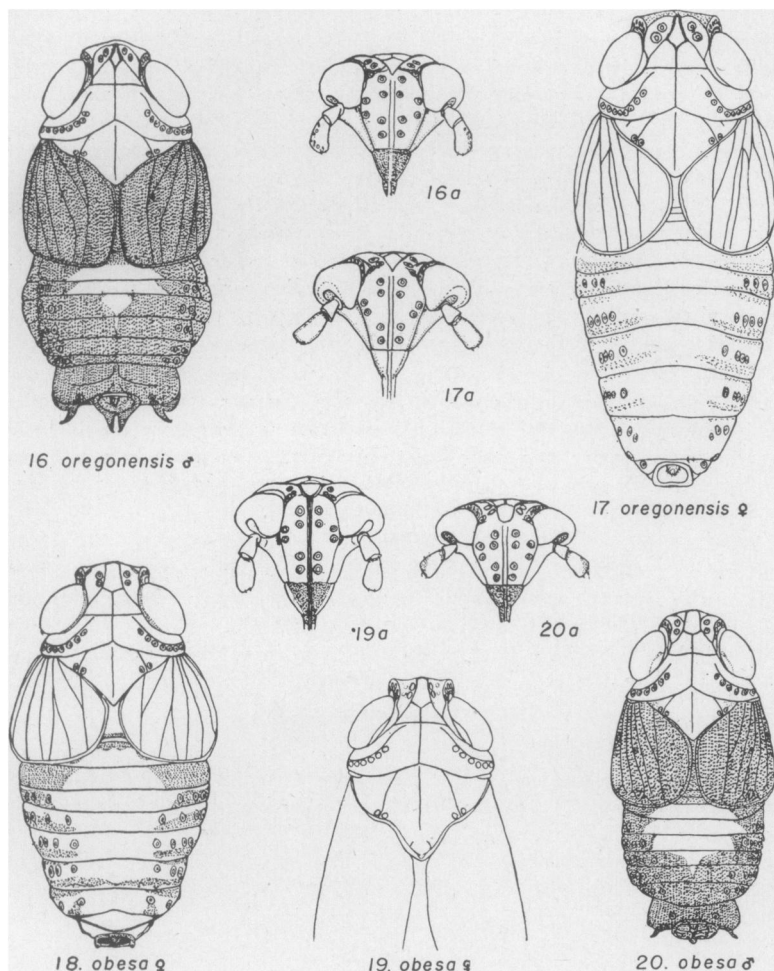


PLATE IV



**Brachypterous male.**

Length; of body, 1.9 mm., to tip of forewing, 1.1 mm., of forewing, 0.62 mm.

**Structure:** Greatest width of vertex considerably more than length along mid-line, anterior margin rounded, posterior margin straight; median cell smaller with lateral carinae narrowing anteriorly and extending forward where they meet before anterior margin of vertex; lateral cells rounded at cephalic border, containing two pits in center of each cell; caudal cells only slightly larger in comparison to lateral cells; pronotum caudally emarginate; median carina distinct; lateral carinae sharply curved, with row of pits, usually 10 in number, below them; scutellum slightly more than one half as long as wide; pitting and carinae similar to *zonata*; frons considerably longer than broad, distinctly wider above middle; six pits in each compartment, two located anteriorly, two posteriorly near median carina and two at middle of lateral margin; there is also a pit just above posterior lateral margin of frons which is not distinctly a frontal pit.

**Color:** Similar to *flava*; yellow, rather than ivory markings present; forewings black, dorsum of abdomen black, with transverse white to yellow band extending on to fifth abdominal segment; venter black; pits black on dorsum of abdomen and venter, light on vertex, frons, pronotum, and scutellum; legs dull orange to almost bright red, tarsi brown to yellow, legs banded fulvous.

**Male genitalia:** Styles broad at base, narrowing gradually to middle, then bending slightly before tapering rapidly to a point; processes of tenth abdominal segment curved, comparatively short; aedeagus broad at proximal end, narrowed through middle, typically with four serrations on ventral margin before tip, where it abruptly curves to form distinct hook.

**Brachypterous female.**

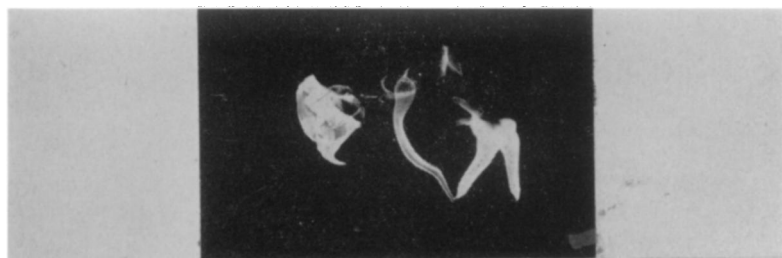
Length; of body, 2.3 mm., to tip of forewing, 1.2 mm., of forewing, 0.7 mm., pale yellowish brown coloration.

**Holotype** male, **allotype** female, **paratypes**, 11 males, and 9 females, Criterion, Oregon, July 2, 1935, R. H. Beamer; other paratypes, 17 males, 24 females, Criterion Pass, Oregon, July 2, 1935, P. W. Oman. Types and paratypes in Snow Entomological Collections, University of Kansas; other paratypes in collections of the University of Minnesota, and the United States National Museum.

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EXPLANATION OF PLATE V

- Fig. 22. Male genitalia of *L. minuta*, sp. nov.
- Fig. 23. Male genitalia of *L. vanduzeei*, sp. nov.
- Fig. 24. Male genitalia of *L. vittipennis* Van Duzee.
- Fig. 25. Male genitalia of *L. obsea* Van Duzee.
- Fig. 26. Male genitalia of *L. zonata* Van Duzee.
- Fig. 27. Male genitalia of *L. flava* Crawford.
- Fig. 28. Male genitalia of *L. oregonensis* sp. nov.



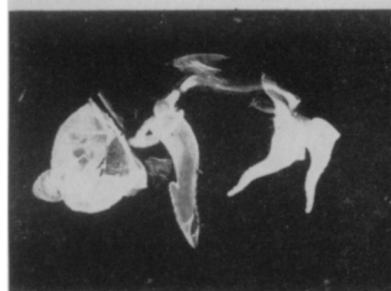
22. *L. minuta*



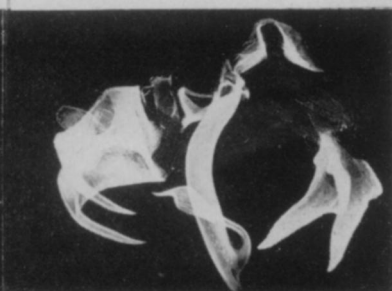
23. *L. vanduzeei*



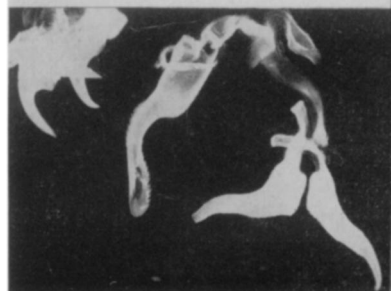
24. *L. vittipennis*



25. *L. obesa*



26. *L. zonata*



27. *L. flava*



28. *L. oregonensis*