

THE GENUS DIKRANEURA AND ITS ALLIES IN  
NORTH AMERICA

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## THE GENUS DIKRANEURA AND ITS ALLIES IN NORTH AMERICA.

By E. D. BALL AND D. M. DELONG.

A recent study of the species of the genus *Dikraneura* occurring in North America has brought out the fact that there are a number of additions and corrections that should be made to the list in the Van Duzee Catalog. It has also shown that there are three distinct groups of species included in our fauna. One of these differs so markedly in both structure and habits from the typical group that it has been generically separated in this paper.

*D. variata* Hardy, the type of the genus, has the third apical cell in the elytron long and rectangular. A group of species closely related to *variata* occurs in our fauna, while a second group has the third apical cell short, triangular, and with a pedicel of varying length. This second group bears the same relation to *Dikraneura* proper that *Typhlocyba* bears to *Erythroneura* and as in the two latter genera this character seems to be constant and correlated with a number of other characters which render the groups quite distinct.

### KEY TO THE GENERA.

- A. Third apical cell of elytra long and slender, usually nearly rectangular at the base, never petiolate.....Genus *Dikraneura* Hardy.  
AA. Third apical cell of elytra short, broad at apex, triangular, petiolate.....  
Genus *Alconeura* n. gen.

### Genus *Dikraneura* Hardy.

*Dikraneura* Hardy Trans. Tyneside Nat. Field Club I, p. 423, 1850.  
*Notus* Fieber Verh. Zoo-Bot. Ges Wien XVI, p. 508, 1866.

Elytra without an appendix. Four longitudinal nervures running directly to the base of the apical cells without branching. No closed cells in the elytra before the apicals, four apical cells, the third usually long and slender and always nearly rectangular at the base. The fourth cell variable, the cross nervure sometimes indistinct. Under wings with a marginal vein and two closed cells at the apex, the first two nervures uniting to form the outer boundary of the first apical. Head conical, usually rectangular or even acutely angular in the female, more rounding in the male.

The two major groups set off below differ widely in habits. The members of the first group are all small slender leafhoppers with long closely folded elytra usually unicolorous, greenish-yellowish or pale, occasionally variably ornamented with red.

They are widely distributed inhabitants of damp meadows, while those of the second group are much more definitely ornamented and as far as known are tree or shrub inhabiting forms.

Van Duzee (1917) gives *Chloroneura* Walsh as a synonym of this genus, but it is a synonym of *Empoasca* Walsh instead. Walsh placed *abnormis* as his first species of *Chloroneura*, but his figures of the venation of the underwing and elytron, the characters on which he founded the genus, are those of *Empoasca*. In his description of *abnormis* he pointed out the variation from the characters of the genus.

Most authors have made use of color characters almost exclusively in separating the species, ignoring many good structural characters that might have been used to advantage and would have obviated much confusion of species and many errors of reference of specimens lacking the distinctive markings. In this study the size, the relative elongation of the vertex, the general form, the size, the shape, and relationships of the apical cells and the male genitalia, have all furnished relatively constant and valuable characters. In some groups certain color characters have been found to be constant and valuable and have been used.

KEY TO SPECIES OF DIKRANEURA.

- A. Fourth apical cell long and slender, extending one-third its length below base of third. Species long, slender, usually unicolorous (or with occasional red striped varieties).
- B. Broad, unicolorous, milky white, female segment concavely rounded, margin embrowned, male plates with slender divergent apices. . . . . 1. *mali* Prov.
- BB. Slender, greenish or yellowish, often with traces of red or white lines.
- C. Yellow, apex of head orange, no stripes, male plates ox-bowed. Female segment with large round central tooth. . . . . 2. *feberi* Löw.
- CC. Greenish or pale, often striped with red, male plates, not ox-bowed, often narrow, attenuate.
- D. Size large, more than 4 mm. in length. Elytra long and narrow. . . . . 3. *elongata* n. sp.
- DD. Smaller, not exceeding 3.5 mm. in length.
- E. Slender, vertex strongly produced, acute, at least three-fourths as long at middle as width between eyes at base.
- F. Small very narrow, female segment concavely rounded, center embrowned, lateral angles prominent, rounded. . . . . 4. *angustata*, n. sp.
- FF. More robust, female segment convexly rounded, not embrowned, lateral angles wanting.
- G. Greenish marked with yellow, male plates with narrow apices which are well rounded and blunt at tips. . . . . 5. *abnormis* Walsh.
- GG. Dull red in color, male plates with narrow pointed apices. . . . . 6. *rufula* Gill.
- EE. Normal shape, vertex obtusely angled only about half as long at middle as width between eyes at base. . . . . 7. *carucola* Stal.

- AA. Fourth apical cell shorter, extending but little if any below third. Species stouter or highly ornamented.
- H. Third apical cell nearly rectangular at base.
- I. Without a round black spot in the apical cell of elytra.
- J. Short and stout (2.5 mm.) dull green to brown.
- K. Pale green, vertex, pronotum and scutellum sprinkled with orange or dull red.....9. *S. kunzei* Gill.
- KK. Dark sordid green to brown, a pale band between eyes on margin of vertex with a transverse brown line at its center.....9. *marginata* DeLong.
- JJ. Pale in color white or yellowish, sometimes marked with red.
- L. Pale yellow or white usually with two oblique red lines on each elytron and black coloring on cross nervures. Face normal.....10. *cruentata* Gill.
- LL. Smaller, bright yellow marked with orange, female segment with posterior margin strongly produced, sharp pointed. Face very tumid.....11. *sandersi*, n. sp.
- II. White or pale yellow with a black spot in apical cell of elytra.
- M. White, no red markings, black spot at base of cross vein of outer apical cell.....12. *mera* McAtee.
- MM. Elytra white with red band, a black dot at base of inner apical cell.....13. *cockerelli* Gill.
- HH. Third apical cell triangular, specimens pale, heavily spotted with red. 14. *maculata* Gill.

### 1. *Dikraneura mali* (Prov.)

(Plate XXI, Fig. 1; Plate XXII, Figs. 1, 1a, 1b.)

*Erythroneura mali* Prov. Pet. Faune Ent. Can. III, p. 298, 1890.

*Dikraneura communis* Gill. Proc. U. S. Nat. Mus. XX, p. 718, 1898.

Rather broad, uniform, sordid milky white, with a yellowish shade on vertex, margin of the pronotum and the scutellum, vertex right angled; second and third apical cells rather broad, almost parallel margined, their bases almost equal, fourth apical cell of same width but much longer, extending one-third its length below the cross nervures. Length, 3.5 mm.

Genitalia: Female last ventral segment more than twice as long as preceding. Posterior margin gradually produced from about half its length to a slightly bilobed portion, formed by a shallow concavity, occupying the median half of the segment. This portion heavily embrowned. Male valve short and contained in concavity of last ventral segment. Plates broad at base, abruptly, convexly rounded to narrow, divergent upturned apices.

Habitat: Examples have been examined from Colorado, Iowa and Wisconsin (Ball); Michigan, New York and Canada (U. S. N. M.); Connecticut, New York, Pennsylvania (DeLong); Ohio, Maine and Illinois (Osborn); and Gillette records it from Michigan and Illinois.

This is one of the most common species from the Rocky Mountains to the Atlantic and is easily recognized by its breadth and uniform milky white appearance. The enlarged male genitalia are strikingly distinct and will at once separate it from any other species.

2. *Dikraneura fieberi* (L $\ddot{o}$ w.)

(Plate XXI, Fig. 2; Plate XXII, Figs. 3, 3a, 3b.)

*Notus fieberi* L $\ddot{o}$ w in *Thes. Kat. Osb. Cicada*, p. 39, 1886.*Dikraneura fieberi* Van Duzee *Cat.*, p. 791, 1917 (for Amer. ref.)*Dikraneura flavipennis* of Amer. Auth. (Not Zett or Europ. Ref.).

Small, narrow, inconspicuous, pale yellow with orange mottling on apex of head, sometimes bright yellow; vertex variable, about right angled; second apical cell parallel margined, third apical widening towards apex, its base some distance in advance of the second, fourth cell extending half its length below the third. Length, 3 mm.

Genitalia: Female last ventral segment, sharply convexly incised either side of a broad, produced median lobe with apex broadly rounded or slightly incised. Male valve swollen, semi-lobular, plates long, slender, curved, widely separated at base, together forming an oxbow or resembling the appendages of the Forficulidae. A pair of black spines just before the apex meet each other.

Habitat: Examples have been examined from Utah, Wyoming, Colorado, Iowa, Wisconsin, Vermont, New Hampshire and District of Columbia, (Ball); Wisconsin, Ohio, Tennessee, Connecticut (DeLong); Kansas, Illinois, Louisiana (U. S. N. M.); Maine, New York and Indiana (Osborn). Gillette records it from Massachusetts and New Jersey. This common European species seems to be widely distributed from the Atlantic as far west at least as the Wasatch Mountains in Utah. It is a small yellow species and is quite distinct and easily recognized. The golden yellow form has been determined as *flavipennis* Zett., but all the examples from this continent examined by the writers have proved to be the above species. The striking genitalia will at once distinguish the male and the female of *flavipennis* should have an acute vertex.

3. *Dikraneura elongata* n. sp.

(Plate XXI, Fig. 3; Plate XXII, Figs. 4, 4a.)

Resembling *abnormis*, but larger and with more bluntly angled vertex. Length 4.5 mm.

Vertex about three-fourths as long as width between eyes. Elytra very long and narrow, greatly exceeding abdomen. Face yellowish, body dull green to milky white, a pair of orange yellow stripes extending from anterior margin of vertex to basal angles of scutellum. Elytra washed with orange yellow, outer claval vein milky white.

Genitalia: Female last ventral segment long, posterior margin roundly produced, a slight emargination either side of central lobe and a median keel, from which a brownish line extends to base, gives the impression of a median incision.

Described from two females collected by the senior author at Santa Barbara, California, April 25, 1908.

4. *Dikraneura angustata* n. sp.

(Plate XXI, Fig. 4; Plate XXII, Figs. 5, 5a, 5b.)

Form and general appearance of *abnormis*, but smaller, very slender, and with distinct genital characters. Length, 3-3.25 mm.

Vertex strongly produced and angled, slightly wider between eyes than length at middle. Elytra long and narrow; venation as in *abnormis*.

Color: Vertex, pronotum and scutellum yellowish, elytra subhyaline, appearing bluish green, due to dark color of abdomen. Face and venter dull yellow.

Genitalia: Female last ventral segment slightly shorter than preceding, lateral angle produced, posterior margin broadly, concavely rounded, central half embrowned. Male valve broad, as long as preceding segment, posterior margin almost truncated. Plates broad at base, convexly rounded to narrow, upturned divergent apices.

Described from a series of twenty-five specimens from Memphis, Knoxville, and Clarksville, Tennessee, collected during June, July, August and September, 1915, and cited as *abnormis* by the junior author. It can be separated from *abnormis* by the broad emarginate segment of the female instead of the produced narrow segment, and the divergent tapering plates of the male.

It is probable that most of the references to *abnormis* from the Southern States will be found to belong to this species.

Specimens are also at hand from Dallas, Texas (Urbahn), and Clemson, S. C. (Ainslie), in Osborn collection; and Kansas (Lawson).

5. *Dikraneura abnormis* (Walsh.)

(Plate XXI, Fig. 5; Plate XXII, Figs. 8, 8a, 8b.)

*Chloroneura abnormis* Walsh (Prairie Farmer, Sept. 6, 1862, reprint Boston Soc. Nat. Hist. IX, p. 316, 64).

Very slender, pale green, washed with pale yellow on vertex, pronotum and scutellum, sometimes with a median and two lateral white lines with a pair of red stripes between on vertex and pronotum; elytra pale green fading to subhyaline posteriorly inclined to be smoky at the apex. Vertex acutely angled. Second and third apical cells extremely narrow and parallel margined, together scarcely as wide as the first, third apical with the base definitely beyond the second, fourth extended one-third its length before the cross nervures. Length, 3.5 mm.

Genitalia: Female last ventral segment almost twice as long as preceding. Lateral margins gradually convexly rounded from base to

form posterior margin which is slightly indented at apex. Male valve broad concavely rounded posteriorly. Plates broad at base, gradually narrowed to narrow, rounded apices.

Habitat: Specimens have been examined from Kansas, Missouri, Iowa, Illinois, and Ohio (Ball); Wisconsin, Pennsylvania, New York, Connecticut (DeLong); District of Columbia and Virginia, (U. S. N. M.). It is probable that the records for Texas, Georgia, and North Carolina belong with the preceding species. As now defined this species appears to be limited to the regions east of the Rocky Mountains. The extremely acute head and slender form will at once separate this and the preceding species from all others.

Var. *urbana* n. var.

Resembling typical *abnormis* in form and structure, but lacking the red stripes. Vertex, pronotum and scutellum pale yellow; elytra milky, subhyaline.

Described from four examples of both sexes, from Ames, Iowa. Walsh described *abnormis* from examples with definite red stripes. The majority of the examples of this species do not possess these markings and will fall into the above variety.

6. *Dikraneura rufula* Gill.

(Plate XXII, Figs. 2, 2a, 2b.)

*Dikraneura abnormis* var. *rufula* Gill. Proc. N. M. XX, p. 720, 1898.

Resembling the former in general form and appearance. Entire dorsal surface with a distinct reddish tint. Vertex and pronotum often paler, elytra spotted or washed with red to cross veins.

Genitalia: Female last ventral segment longer than preceding, posterior margin convexly, roundly produced, slightly indented at middle. Male valve transverse, short, side margins rounded. Plates rather suddenly narrowed at two-thirds their length to form prolonged slender apices.

Habitat: Examples have been examined from California (Ball) and Gillette's material was from the same region. A study of the additional material indicates that this is a much larger species than *abnormis* and quite distinct structurally. It probably replaces that species in the California region.

7. *Dikraneura carneola* (Stal.)

(Plate XXI, Fig. 6; Plate XXII, Figs. 9, 9a, 9b.)

*Typhlocyba carneola* Stal. Stet. Ent. Zeit. XIX, p. 196, 1858.

Form and venation of *feiberi* nearly, stouter, soiled pale greenish above, face smoky, venter dark, a definite light median line on vertex

and anterior half of pronotum; disc of the vertex and pronotum either side this line and the nervures of the clypea before the cross nervures irrorate with red. Length, 3.5 mm.

Genitalia: Female last ventral segment longer than preceding, lateral angles rounded to posterior margin, which is broadly roundly produced, often appearing slightly indented at middle. Male valve almost transverse, sides straight, plates broad at base, gradually sloping to narrow, slightly upturned apices.

Habitat: Specimens have been examined from British Columbia, Oregon, California, Santa Fe, Mexico, Utah, Idaho, and Colorado (Ball); Ontario and Minnesota (Lawson); Arizona and New Mexico (U. S. N. M.); South Dakota (Severin). Stal described it from Sitka and Gillette records it from Washington.

This is the most abundant and widely distributed species in the western region occurring from Alaska to California and East to New Mexico and Colorado. The smoky face and dark venter will serve to separate most specimens, the definite white line on the vertex is quite distinctive when present. The small triangular plates of the male will at once separate it from the other common meadow forms.

Var. *silkana* nov. var. Pale green, vertex, scutellum and the margins of pronotum yellowish, sometimes a white median line on vertex, face smoky, venter dark. Described from a pair from Salt Lake and another pair from Logan, Utah, collected by the senior author.

#### 8. *Dikraneura kunzei* Gill.

(Plate XXI, Fig. 13; Plate XXII, Figs. 7, 7a, 7b.)

*Dikraneura kunzei* Gill. Proc. U. S. Nat. Mus. XX, p. 721, 1898.

Small, green, with the vertex, margins of pronotum and the scutellum pale creamy, sometimes mottled with red; vertex obtusely angulate, apex rounding. First apical cell narrow, second apical very narrow, parallel margined, fourth apical over twice longer than wide, its basal cross nervure in line with the other cross nervures. Length, 2-2.5 mm.

Genitalia: Female last ventral segment twice length of preceding, lateral angles rounded to posterior margin which is gradually produced to a median blunt tooth at apex. Male valve contained within and almost concealed by last ventral segment. Plates rather broad at base, gradually narrowed to long, narrow, attenuate, upturned tips.

This neat and distinct species was described from Tucson, Arizona, and the National Museum has material from Victoria, Texas, labelled "defoliating huisache" (Mitchell). It is probably limited to the southwestern region.



9. *Dikraneura marginata* DeLong.

(Plate XXI, Fig. 12; Plate XXII, Figs. 6, 6a, 6b.)

*Dikraneura marginata* DeLong. Journ. N. Y. Ent. Soc., Vol. XXXII, p. 68, 1924.

Size and form of *D. kunzei*, but without the red markings, and with distinct genitalia. Length, 2-2.5 mm.

Vertex produced, slightly wider between eyes than length at middle. Elytra with outer cell lanceolate, venation differing from *kunzei* by a straight basal cross vein on the inner apical cell which is more posterior than in *kunzei*.

Color: Vertex dull yellow, tinged with brown, median impressed line and a line just above margin and parallel with it, brownish. Margin below this line pale yellow with a narrow brown line slightly below middle, not extending to eyes. Face below brown, without traces of arcs. Pronotum with anterior third dull yellowish, disc and posterior margin sordid green. Scutellum dark green, apical third paler. Elytra sordid green tinged with yellow, apical portion paler, venation yellowish. Tergum black, venter dark brown marked with yellow.

Genitalia: Female, last ventral segment longer than preceding, posterior margin gradually produced and somewhat convexly rounded. Male valve short, broadly rounded, almost contained within the concavity of last ventral segment. Plates three times as long as width at base, gradually narrowed and produced into long attenuated apices.

Habitat: Specimens are at hand from Miami, Florida, (DeLong), and a series collected by Prof. J. G. Sanders at Panama City, Gamboa, Cristobal, and Alhajuela, Canal Zone, January to March, 1921.

10. *Dikraneura cruentata* Gill.

(Plate XXI, Fig. 9; Plate XXIII, Figs. 10, 10a, 10b.)

*Dikraneura cruentata* Gill. Proc. U. S. Nat. Mus. XX, p. 717, 1898.

Small, slender, vertex conical, slightly acute with the apex rounded, pale creamy, with sanguineous markings as follows: A median stripe on vertex, two stripes on pronotum arising just inside the eyes, the scutellum, and a pair of narrow oblique stripes on each elytron. The first arises at the base of the clavus next the suture and extends in nearly to the inner margin just before the middle of the clavus. The second arises on the first sector of the corium just before the end of the first stripe and extends along the sector to just before the cross vein. The first apical cell of elytra is very broad, the second and third about equal and the fourth small and triangular. Length, 2.75 mm.

Genitalia: Female, last ventral segment one-half longer than preceding, posterior margin rather strongly produced from lateral angles to a broad, median tooth. Male valve short, posterior margin slightly convexly rounded; plates broad at base convexly and rather abruptly constricted at about two-thirds their length to narrow appressed apices which are slightly upturned.

Habitat: Specimens have been examined from California, Colorado, British Columbia, Kansas, (Ball); Tennessee, (DeLong); Ohio, Maine, (Osborn); New York and District of Columbia (U. S. N. M.); and McAtee records it from Maryland and Virginia.

Var. *lavata* McA. Entirely pale, creamy or with slightly smoky indications on the sectors near the cross-veins.

Var. *rubricata* McA. Scutellum entirely red, red markings and smoky band broader than usual.

#### 11. *Dikraneura sandersi* n. sp.

(Plate XXI, Fig. 10; Plate XXIII, Figs. 12, 12a, 12b.)

A small yellow species superficially resembling *jieberi*, but closely related to *marginata*. Length, 2.5 mm.

Vertex bluntly produced, one-third wider between eyes than length at middle. Pronotum roundly produced from near its base. Face very tumid. Venation as in *kunzei*.

Color bright yellow to orange. Vertex, pronotum and scutellum often washed with orange. Elytra yellowish subhyaline, in well marked specimens with a minute black spot on inner basal angle of inner apical cell.

Genitalia: Female last ventral segment long, posterior margin produced from about its middle either side to form a sharp pointed margin. Male valve roundly produced, plates rather long and narrow, gradually tapering to narrow apices.

Described from a series of nine female and five male specimens collected by Prof. J. G. Sanders at Panama City, Canal Zone, January 31 and March 2, 1921. The bright yellow color and distinct female genitalia will readily distinguish it from other related species.

#### 12. *Dikraneura mera* McAtee.

(Plate XXI, Figs. 11; Plate XXIII, Fig. 11, 11a.)

*Dikraneura mera* McAtee, Proc. Ent. Soc. Wash., Vol. 26, p. 76, 1921.

Resembling *cruentata* in form, color, and general appearance, but with a black spot on base of outer apical cell. Length, 3 mm.

Vertex well produced but bluntly angled, almost as long at middle as width between eyes at base.

Color milky white, eyes dark, clavus, tip of ovipositor and small spot on inner angle of outer apical cell black.

Genitalia: Female, last ventral segment longer than preceding, posterior margin roundly produced, slightly keeled at middle, lateral angles wanting.

Known at present only from a female Holotype in the collection of W. L. McAtee, taken at Beltsville, Md., June 23, 1918.

13. *Dikraneura cockerellii* Gill.

(Plate XXI, Fig. 7; Plate XXIII, Figs. 13, 13a, 13b.)

*Dikraneura cockerellii* Gill. Psyche VII, Supp. p. 11, 1896.

Pale straw, the elytra white with an irregular slightly oblique red band across the anterior third, a definite round black dot in the basal angle of the first apical cell and sometimes smoky margins to the outer cross nervures. Vertex acutely angled, the first apical cell extremely broad at the base, the first apical nervure arising as a continuation of the second sector, then curving around the black dot to its normal position, the third apical is narrow and almost parallel margined, the fourth slightly wider but shorter, the cross nervure arising just below the base of the third apical. Length, 3 mm.

Genitalia: Female, last ventral segment twice as long as preceding segment, lateral angles prominent posterior margin, deeply broadly excavated to a slight notch at middle. Male valve very short, slightly concave or transverse. Plates gradually narrowed from base to rather narrow but blunt apices.

Habitat: Specimens have been examined from Los Angeles, California, St. George in Southwestern Utah (Ball); Los Cruces, New Mexico (U. S. N. M.); and McAtee reports it from Arizona. Specimens in Sanders collection are from Phoenix, Arizona (Cockerell) "on grape."

This is a strikingly distinct but very puzzling species; superficially it resembles an *Erythroneura*, while in some of its structural characters it has affinities with *Alconeura*. It is apparently confined to the Southwestern region. Professor Cockerell reported the New Mexico examples as abundant on grapes.

14. *Dikraneura maculata* Gill.

(Plate XXI, Fig. 8; Plate XXIII, Figs. 16, 16a.)

*Dikraneura maculata* Gill. Proc. U. S. Nat. Mus. XX, p. 716, 1898.

Slender, pale yellow, heavily spotted with red, omitting a light band before the eyes, an oval spot on the anterior disc and the posterior margin of the pronotum. Elytra irrorate with minute red points which are more or less aggregated into larger spots in a definite pattern. A dark spot on face. Vertex rectangular, the apex acute. First and second apical cells large, the third and fourth smaller, triangular. Length, 3 mm.

Genitalia: Female last ventral segment twice as long as preceding, posterior roundly produced from near base.

The unique type of this species bears no locality or other label. Gillette states that it was sent from the Illinois State Laboratory of Natural History, so the general inference has been

that it was from Illinois. Mr. T. H. Frison, the present curator, informs us that there are no specimens of the species in the Illinois collection. In the writers' experience specimens sent out from the Illinois collection without locality labels usually proved to be from the Summers material taken in northern South America. The striking color pattern is also characteristic of tropical forms. There are two examples of this species in the National Museum Collection from Louisiana (C. F. Baker) and McAtee lists it from North Carolina and Maryland, so that it now can be recorded as occurring along the Atlantic and Gulf coast region of the United States.

Genus *Alconeura* n. gen.

Resembling *Dikraneura*, underwing with marginal nervure and two closed cells at apex; elytra with four apical cells, the third one always triangular and pedicellate, due to the union of the second and third nervures for some distance at the base, the fourth cell distinct but irregular in shape; small, robust, usually highly ornamented leafhoppers.

Type of Genus *Alconeura rotundata* n. sp.

KEY TO THE SPECIES OF *Alconeura*.

- A. Vertex short, bluntly angular, extending but little before the eyes; species usually definitely lined or spotted.  
 B. First apical cell very broad, the first apical nervure almost in line with the second sector, a black dot in the inner basal angle of the first apical cell.  
 C. First apical nervure curved around the black dot, species red with pale lines.....1. *quadrivittata* Gill.  
 CC. First apical nervure straight arising on a line with second sector, species pale with red lines.....2. *rotundata* n. sp.  
 BB. First apical cell normal, the first apical nervure arising midway between the first and second sectors. The black dot located on the nervure or in the second cell just before the middle.....3. *unipuncta* Gill.  
 AA. Vertex long, acute, one-half its length before the eyes, species small.  
 D. Vertex longer than basal width between eyes; vertex, pronotum and scutellum bright red.....4. *tricolor* Van D.  
 DD. Width of vertex between eyes greater than length; color of vertex, pronotum and scutellum green.....5. *planata* n. sp.

1. *Alconeura 4-vittata* (Gill.)

(Plate XXI, Fig. 15; Plate XXIII, Figs. 19, 19a.)

*Dikraneura 4-vittata* Gill. Proc. U. S. Nat. Mus. XX, p. 723, 1898.

Broad with an obtusely angled, thick margined vertex, tawny red to just before the apical cells. The anterior margin and a median stripe on vertex white, three narrow stripes and the lateral margins of the pronotum white. Elytra pale, all the clavus except the margin, an interrupted stripe on the corium next the suture and an oblique dash near the middle tawny. Nervures and cross-veins on apical third thickened, pale yellow with smoky margins. A large black dot in the angle of the first apical cell. First apical broad, its base oblique, first

apical nervure arising from apex of second sector and curving around the black dot. Third apical small, triangular, almost oval, with a short pedicel, fourth apical semi-circular. Length, 2.5 mm.

Genitalia: Male valve apparently concealed, plates rather long, gradually tapering to acute tips, apparently with side margins folded upward.

Known only from the unique male type in the National Museum labeled L. I. Bah. 4-1-1879, Swartz. Dr. Swartz states that this insect was taken on Long Island, Bahamas. This island is one of the most southern in the group, its southern extremity extending well below the tropic of cancer and is directly east of Havana, Cuba. This species is undoubtedly West Indian and semi-tropical in its affinities, and should not be listed as from the United States.

### 2. *Alconeura rotundata* n. sp.

(Plate XXI, Fig. 14; Plate XXIII, Figs. 14, 14a, 14b.)

Broad, creamy yellow, with two irregular pale red stripes on the vertex and four on the pronotum. Elytra pale creamy, with traces of two oblique orange stripes, a black dot in the inner angle of the first apical cell and smoky margins to the costal nervures. Vertex obtusely angular, apex rounding, margin very thick, pronotum broader than head, clytra moderately long, the first apical cell very broad with the black dot in its inner basal angle, the first apical nervure straight and arising almost directly from second sector, third apical cell triangular with a definite pedicel, fourth apical cell large semi-circular, the bounding nervures smoky margined. Length, 3 mm.

Genitalia: Female, last ventral segment longer than preceding, lateral angles rounded then gradually produced to form a broad, produced median tooth. Male valve broadly convexly rounded. Plates with posterior portion folded and turned upward so that they appear to gradually slope to pointed apices.

Described from three females and one male from Ames, Iowa. Taken by the senior author August 5, 1895 on *Amorpha fruticosa*, and one male from Onaga, Kansas, July 9, 1898 (Crevecoeur), and five specimens from Ames, Iowa, in collection of Prof. Herbert Osborn. This is the stoutest species in the genus. It is much broader than *unipuncta*, which it otherwise resembles.

### 3. *Alconeura unipuncta* (Gill)

(Plate XXI, Fig. 16; Plate XXIII, Figs. 15, 15a, 15b.)

*Dikraneura unipuncta* Gill. Proc. U. S. Nat. Mus. XX, p. 718, 1898.

Slender with a roundly right angled vertex, pale milky with traces of pale red stripes on vertex and pronotum, traces of three oblique

pale yellow or brown stripes on the elytra, the one on clavus obliquely interrupted just back of the middle. Elytra subhyaline with the apical nervures and cross-nervures distinct, milky with smoky margins, apex broadly smoky, the black dot in the second cell touching the first nervure nearly half way from cross nervure to apex of elytra, first apical nervure arising midway between first and second sector. Third apical cell pedicellate, its margins rounded, fourth apical broader than its length on costa. Length, 3 mm.

Genitalia: Female, last ventral segment long, posterior margin produced, slightly indented either side of a broad, produced blunt pointed median tooth. Male valve apparently concealed; plates broad at base, narrowed and inner margins convexly rounded at half their length to form narrow divergent apices.

Habitat: Specimens have been examined from Grant's Pass, Oregon; San Francisco, Sacramento, and Pasadena, California (Ball); Ash Creek, Arizona; Utica, Mississippi; Alabama and Biscayne Bay, Florida, (U. S. N. M.); Miami, Florida, (DeLong). This species can be instantly separated from all others in the genus by its slender form and the location of the black dot.

Var. *nudata* n. var. Pale creamy, the elytra milky subhyaline, the cross nervures distinct, slightly smoky margined. Black dot prominent. Described from five examples from Pasadena and San Francisco, California. Collected by the senior author.

Var. *dorsalis* DeLong.

*Dikraneura unipuncta dorsalis* DeLong. Jl. N. Y. Ent. Soc. 32, p. 67, 1924.

Disc of vertex and pronotum, scutellum and claval areas of elytra covered with a broad longitudinal brownish band which is bordered by a white band extending along the margins of vertex from apex across margins of pronotum on to elytra at base and along claval suture half way to apex. Remainder of clavus brownish. Apical cross-veins pale, fuscous margined.

Very abundant in Florida everglade hammocks on *Trima floridana*.

4. *Alconeura tricolor* (Van Duzee).

(Plate XXI, Fig. 18; Plate XXIII, Figs. 17, 17a, 17b.)

*Dikraneura tricolor* Van Duzee. Trans. San Diego. Soc. Nat. Hist. II, p. 56, 1914.

Vertex strongly produced longer at middle than width between eyes. Black, upper portion of face, vertex, pronotum and scutellum

bright red, a pale median line crossing vertex and pronotum. Elytra golden green, costal margin tinged with red. Length, 2.5-3 mm.

Genitalia: Female last ventral segment longer than preceding, posterior margin sloping from lateral angles to a rounded median tooth which appears incised at middle. Male valve apparently concealed. Plates rather short, gradually narrowed to slender apices.

A distinct and beautiful little species known only from California and New Mexico. The bright red color of the vertex and pronotum will easily distinguish this species.

##### 5. *Alconeura planata* n. sp.

(Plate XXI, Fig. 17; Plate XXIII, Figs. 18, 18a, 18b.)

A very small stout greenish species superficially resembling *D. kunzei*, but with a black dot and a petiolate third apical. Vertex acutely angulate, twice as long as the eyes, width between eyes greater than length at middle. Pronotum broader than head, elytra broad and short. First apical with the black dot in the inner basal angle, the nervure straight and arising half way between the sectors. Third apical long, triangular, petiolate. Fourth apical very broad and short against costa.

Color, green; vertex, scutellum and margins of pronotum pale yellow, a round black dot on first apical and sometimes a narrow light line on vertex and pronotum. Length, 2.5 mm.

Genitalia: Female, last ventral segment as long as preceding, lateral angles prominently rounded. Posterior margin concavely excavated either side of a produced median tooth about one-third the width of segment. Male valve convex posteriorly, exposed by concavity of preceding segment. Male plates rather long, broad at base, gradually narrowed to rather long, narrow apices.

Described from eight examples taken by the senior author at Helper and Soldiers Summit, Utah, August 13, 1906. A remarkably distinct little species from the Wasatch Mountains.







