

THE GENUS *LONATURA* OSBORN AND BALL
(HOMOPTERA, CICADELLIDAE)

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The genus *Lonatura* contains only a small group of species, all of which are North American according to known records and our knowledge of world species. To date only nine species have been placed in this genus by North American workers on Homoptera and some of these are probably members of other genera. During a study of these species and those of allied genera the writer has placed in other genera three species now known as members of *Lonatura* and has described one new species from material in the collection of Dr. E. D. Ball, and another from specimens in the Osborn, Ball and DeLong collections.

The genus was established in 1898 by Osborn and Ball,¹ and *Lonatura catalina* O. & B. was cited as the type species. *Megalopa* was also described but the generic standing was questioned by the authors at that time. In describing these species *D. minuta* Van Duzee was mentioned although previously described as a species of *Deltocephalus*. It has been known as a *Lonatura* since this citation. In 1899 *salsura* was described by Ball and in 1900 two more species, *noctivaga* and *nebulosa*, were added by the same author. *Bicolor* was described by Van Duzee in 1909 from Florida and *notata* by Osborn from the same state in 1922. According to the original description of the genus it is thus characterized:

"Head conical, slightly obtuse, more than three times wider across eyes than length on the middle of vertex, curvature of posterior margin about one-half that of anterior. Front two and one-half times wider than on clypeus, width and length about equal, clypeus broad, parallel-margined, thorax broad distinctly angled within, genae rather narrow, roundly angled, extending very narrowly below lorae to clypeus. Pro-

¹ Proc. Davenport Acad. Sci., VII, p. 83, 1898.

notum scarcely as long as vertex, nearly truncate behind, humeral margin straight, nearly meeting the eye, which curves around the lateral margin. Abdomen normal in form, ovipositor very long in female, extending beyond the pygofers, occurs in two forms; macropterous with fully developed elytra and wings reaching well beyond the abdomen. Elytra long and narrow, the costal margin nearly straight, appendix large, venation obscure, veins on clavus nearly parallel, united by a cross-nerve, the two branches of the outer sector again uniting after the forking of the inner branch and then forming only two anteapical cells, of which the outer is the larger, inner three apical cells greatly elongate, as long as the antepicals, outer two on the costal margin smaller; in this form the scutellum is very large and strong. Brachypterous form in which the elytra only cover the second abdominal segment and the wings are rudimentary, the elytra are twice wider than long, broadest at the apex, venation obscure, the inner branch of the outer sector forking again before the apex, forming a single closed cell. In this form the pronotum covers the base of the elytra and most of the scutellum."

Although the genus description as originally stated probably included everything known at that time, it will not include certain species described since which undoubtedly should be placed in the same group. A previous paper by the writer² has discussed the characters of the first pair of wings as found in the species of this and related genera. In view of these more constant characters where most others are quite variable, probably the emphasis should be placed upon the wing character as given in the original description by Osborn and Ball. The genitalia are not of a constant type throughout the group, and the head in different species is quite different. The vertex is not flattened but usually is gently sloping to the front. In the subgenus *Dellocephalus* to which it is closely related the vertex is more strongly sloping to the front, the slope increasing toward the margin of the vertex. The size of species and the general body form is also variable in these species of *Lonatura*.

Within the genus the species could be divided into three separate groups. In one of these might be placed *L. catalina* a very

² Ohio Jour. Sci. Vol. xxvi No. 1. January, 1926.

minute species with a conical head character. In another group one might place *L. noctivaga*, *salsura* and *melina*. These three species are large in size and are more closely related to *Athysanella* than the previous species mentioned. In the third group might be placed the long headed forms *L. bicolor*, *notata* and *balli*. Although sufficient evidence is not available to place these in a separate genus, they differ from the preceding species in having a slightly different wing condition and minor body differences. These three southern species are apparently more closely related to each other than to the western species.

The other species previously included as members of the genus *Lonatura* are apparently more closely related to species of *Deltocephalus* and are placed at this time with their suggested relatives. *D. minuta* has already been cited in the subgenus *Deltocephalus* by the writer.³ A study of *D. megalopus* has revealed its close relationship to *D. pulicarius*, *castoreus* and related species. The type of wing, genitalia, body, head, and color characters would indicate this relationship. *D. nebulosus* seems to be related to *obtectus* because of its bluntly angled head which is strongly sloping to the front, the similar genitalia in both sexes, the type of elytra and the color pattern.

The types of all the western species are contained in the private collection of Dr. E. D. Ball, who has very kindly loaned his material during this study. The writer is greatly indebted to Dr. Ball since it would have been impossible to make the accompanying figures and key without these specimens. The present arrangement is an attempt to form a working basis for this genus.

Key to Species of Lonatura.

1. Vertex rather sharply angled, longer on middle than basal width between eyes. Species known only from Florida or Gulf Coast..... 2
- Vertex more bluntly angled, length at middle not exceeding width between eyes, usually wider between eyes than length at middle..... 4

³ Ohio State Univ. Bull. Univ. Studies, II, No. 13, p. 88, 1926.

- 2. Vertex, at least anterior portion between ocelli, black, elytra yellowish, unmarked. *bicolor*
 Vertex dirty yellow, frequently with black markings, elytra marked with black spots usually in pairs. 3
- 3. Length not exceeding 3 mm., vertex almost one-fourth longer than basal width between eyes, two broken longitudinal stripes extending from apex of vertex to base of scutellum. *balli*
 Length 3.5 mm. or more, vertex only slightly longer than basal width, vertex mottled but not striped. *notata*
- 4. Size small, less than 3 mm., color varying from pale yellow to dark brown, without definite markings. *Catalina*
 Size larger, more than 3 mm. in length, some species with markings on vertex. 5
- 5. Female segment with central lobe scarcely produced or sunken and rather broadly rounded, usually with definite markings on vertex. 6
 Female segment with a deep notch either side of a produced center, both narrowly rounded at apex, without definite color markings on vertex. *salsura*.
- 6. Vertex with four distinct black spots just above margin, female central lobe slightly produced and bluntly pointed *noctivaga*
 Markings on vertex usually faint, female central lobe sunken and broadly rounded. *melina*

Lonatura bicolor Van Duzee (Plate IV, figs., 2, 2a, 2b)

Lonatura bicolor Van Duzee, Bul. Buf. Soc. Nat. Sci., xi, p. 221, 1909.

Easily distinguished from the other species of the genus by the black vertex, bright yellow elytra and usually black abdomen. Length 2.5 to 3 mm.

Vertex strongly produced and rather sharply angled, about one-fourth longer on middle than width between eyes. Pronotum one-third shorter than vertex and more than twice as wide as long. Elytra covering only two basal segments. No macrop-terous forms have been observed.

Color: Black, shining, traces of pale arcs on face; vertex with ocelli, a spot at apex, three round spots back of anterior margin, posterior margin and a pair of oblique dashes extending toward ocelli, yellow. Pronotum, scutellum, and elytra, bright yellow.

Genitalia: Female last ventral segment a little longer than preceding. Posterior margin with a rather deep notch on each side of a central rounded lobe occupying the central two-thirds of the segment. Notched in such a way as to give an impression of side plates of an underlying membrane. Male valve apparently concealed. Plates narrow, triangular, elongate, concavely narrowed toward apices.

Known only from Florida where it occurs abundantly on the small grasses of the prairies and pine savannahs. Taken abundantly on the prairie at La Belle, Florida, from an association of *Lachnocanlon anceps* and other minor species of plants.

***Lonatura bicolor* var. *melleus* DeLong**

Lonatura bicolor var. *melleus* DeLong, Jour. N. Y. Ent. Soc., xxxii, p. 64, 1924.

Differing from *bicolor* only in coloration. The most marked difference is the yellow coloration in place of the black shining abdomen and venter. On the vertex only a small amount of black mottling is left on the anterior portion. The last dorsal segment usually black. Venter yellow or light brown with dark markings.

As far as records go it occurs over the same area as typical *bicolor*.

***Lonatura balli* new species (Plate IV, figs., 3, 3a, 3b.)**

Resembling *notata* in general appearance but smaller, with distinct coloration and genitalia. Length 2.75 to 3 mm.

Vertex rather sharply produced, almost one-fourth longer on middle than basal width between eyes and one-fourth longer than pronotum which is more than twice as broad as long. Elytra short as in *notata*. Abdomen exposed dorsally. A broadly rounded segment covering basal dorsal portion of pygofers in male.

Color: Brownish yellow; two broken longitudinal lines arising just back of apex of vertex and extending to basal angles of scutellum where they end in a pair of black spots. Pronotum with two outer pairs of longitudinal stripes. Elytra with markings similar to *notata*. Always with the pair of spots on outer claval vein about its middle and usually with a pair on basal portion of inner anteapical cell. Abdomen with longitudinal rows of small darker spots.

Genitalia: Female last ventral segment with produced, broadly rounded lateral margins; posterior margin excavated either side of a short sunken median tooth which is exceeded in length by the lateral angles. Male valve not visible. Plates short and blunt, well rounded at apex. Half as long as last ventral segment and less than half as long as pygofer.

Described from a pair of specimens from Sanford, Florida, Sept. 10th and 30th, 1925, collected by Dr. E. D. Ball. Four male specimens from McComb, Wade and Pascagoula, Mississippi, Feb. 20 to March 3, in the collection of Prof. Herbert Osborn and a series of specimens from Ft. Myers, Cleveland, and La Belle, Florida, collected by the author during April, 1921.

Type: Male; Cleveland, Florida, April 26, 1921. Collection of the author.

As compared with *notata* it is smaller with a more sharply angled vertex and the two longitudinal strips are characteristic of this species. The female tooth is more sunken and the male plates are broader and more blunt at the tips. The dorsal segment covering the male pygofer is triangular in *notata* while in *balli* it is broadly rounded.

Lonatura notata Osborn (Plate IV, figs., 1, 1a, 1b)

Lonatura notata Osborn. Florida Ent., vi, No. 2, p. 18, 1922.

A pale brown or yellowish species marked with brown spots in pairs on the pronotum, scutellum and elytra. Length 3.5 to 3.75 mm.

Vertex produced and bluntly angled, a little longer on middle than width between eyes. Elytra in brachypterous forms covering only first two dorsal segments. In macropterous forms covering first seven abdominal segments.

Color: Yellow to pale brown; vertex mottled with darker brown, and in well marked specimens with three pairs of darker marks on the median portion. Four other pairs of dark spots are conspicuous, a proximal pair on anterior margin of pronotum, a pair in basal angles of scutellum, one on outer claval vein about its middle and one on basal portion of inner ante-apical cell of each wing. Dorsal portion of abdomen where exposed marked with pairs of dark brown spots.

Genitalia: Female last ventral segment as long as preceding. Posterior border slightly emarginate; a rather broad median produced tooth which is slightly notched at apex. Male valve very small, only about one-fourth as wide as last ventral segment and slightly produced beyond it. Plates only one-third as long as last ventral segment and together about half as wide, triangular with blunt tips.

Reported only from Florida and Mississippi. It is probably distributed along the Gulf Coast. In Florida it occurs in great abundance on the short grasses of the prairie and open pine woods, especially in an association of *Dichromena floridensis*, *Rhynchospora divergens* and *Distichlis spicata*.

Lonatura catalina Osborn and Ball (Plate IV, figs., 5, 5a, 5b)

Lonatura catalina Osborn and Ball, Proc. Dav. Acad. Sci., vii, p. 83, 1898.

The smallest species and type of the genus varying in color from light yellow to dark brown. Usually orange yellow in color. Length 1.85 to 2.75 mm.

Vertex flat, bluntly angled, length at middle equaling basal width between eyes. Pronotum a little shorter than vertex and more than twice as wide as long. Elytra in brachypterous forms covering only two abdominal segments; in macropterous forms extending beyond abdomen.

Color varying from pale yellow to dark brown. Vertex almost always pale; ovipositor black, most are yellowish washed with orange.

Genitalia: Female last ventral segment longer than preceding, side margins short, narrowed from these to form rounded angles. Posterior margin shallowly emarginate, either side of a broad bifid tooth, at middle. Lobes of underlying membrane conspicuous. Male valve short, broadly triangular. Plates three-fourths as long as combined width at base, slightly concavely narrowed to pointed apices.

Described from Iowa and South Dakota by Osborn and Ball. It has since been reported for Tennessee (De Long) and Chicago, Illinois (Ball). It occurs in great abundance in the *Aristida gracilis* association of the *Andropogan* area in Tennessee. In Iowa, Ball reports it occurring on *Sporobolus*.

Lonatura salsura Ball (Plate IV, figs., 9, 9a, 9b)

Lonatura salsura Ball, Can. Ent., xxxi, p. 310, 1899.

A rather large, blunt headed species without definite color markings. Length 4 to 4.5 mm.

Vertex bluntly angled, one-third wider between eyes than length at middle. Pronotum longer than vertex and twice as wide as long. Elytra covering only first two dorsal segments of abdomen in brachypterous forms or exposing only the tip of the ovipositor in the long winged form.

Color: Pale sordid yellow, sometimes washed with brownish on vertex and pronotum. Tergum often with brown lines or markings. In well marked specimens a pair of dark spots are on the apex and an oblique pair are near the base of the vertex.

Genitalia: Female last ventral segment roundly emarginate, either side of a prominent median tooth as long as its basal width. The lateral angles are deeply roundly excised to expose a rounded lobe at either side, portions of an underlying membrane. Male valve very small only one-third the width of the last ventral segment and scarcely produced beyond it. Plates triangular concavely rounded to pointed apices.

Specimens in the Ball collection are from Ft. Collins, Greely, Lamar, Holly, and Julesburg, Colorado, and Monroc and Dixie, Utah, and Stratton, Nebraska.

Lonatura melina, new species (Plate IV, figs., 7, 7a, 7b)

Resembling *salsura* in form and appearance but with more produced vertex and female segment without a tooth. Length 3.75 to 4.25 mm.

Vertex bluntly angled, a little wider between eyes than length at middle. Pronotum twice wider than long and a little shorter than vertex. Elytra as in *salsura* covering only the first two segments of abdomen.

Color: Pale sordid yellow, with a few mottled darker markings. Ocelli reddish, a row of four very pale spots extending between these along margin of vertex.

Genitalia: Female last ventral segment a little longer than preceding. Side margins short, gradually narrowed to posterior margin, which is slightly trilobate. The central lobe is more narrow and slightly sunken and is separated from the broader outer lobes by a slight indentation. Lobes of underlying membrane conspicuous. Male valve rounded and only slightly visible in concavity of last ventral segment. Plates longer than last ventral segment. Gradually narrowed to rather blunt tips.

Described from a series of eight females and nine males collected by Dr. E. D. Ball and in his collection. Specimens are from Richfield, Utah, Aug. 8, 1906, Monroe, Utah, July 25, 1906, Ephraim, Utah, July 20, 1914, Manti, Utah, Aug. 31, 1905, and Ridgeway, Colo., July 31, 1900. These are the only specimens now known.

Type: Male; Richfield, Utah, August 8, 1906. Collection of Dr. Ball.

Lonatura noctivaga Ball (Plate IV, figs., 4, 4a, 4b)

Lonatura noctivaga Ball, Can. Ent., xxxii, p. 342, 1900.

Resembling *salsura* in general form and appearance, but larger and with four large black spots above margin of vertex and two on each elytron. Length 4 to 5.5 mm.

Vertex bluntly angled, almost one-fourth wider between eyes than length at middle. Pronotum rather short and broad. Elytra in brachypterous forms covering only first two abdominal segments, in macropterous forms reaching to tip of ovipositor.

Color: Pale dirty yellow, vertex with a pair of large black spots just above apex and another pair between these and ocelli dark brown. Some darker irregular markings on disc of vertex. Elytra with a spot on middle of outer clavus and another on posterior margin near middle dark brown.

Genitalia: Female last ventral segment longer than preceding, side margins short, posterior margin roundly produced to form posterior margin. Central fourth in the form of a broad, slightly produced, brown margined tooth. This portion apparently forming a broad keel. Side lobes of underlying membrane conspicuous. Male valve short, and broad, roundly triangularly produced. Plates rather long gradually narrowed to rather blunt apices. Known at present only from the type specimens in the collection of Dr. Ball from Lamar and Rocky Ford, Colorado.

Doltocephalus nebulosus Ball (Plate IV, figs., 8, 8a, 8b)

Doltocephalus nebulosa Ball, Can. Ent., xxxii, p. 342, (1900).

Resembling *D. obtectus* in form, coloration and general appearance, with four black spots just back of vertex between ocelli and with female segment slightly roundly produced. Length 3 to 3.5 mm.

Vertex blunt, scarcely angled, a little wider between eyes than median length. Pronotum longer than vertex and twice as wide as long. Elytra longer than in related species, rounded at the apex instead of squarely incised and extending over the first five abdominal segments.

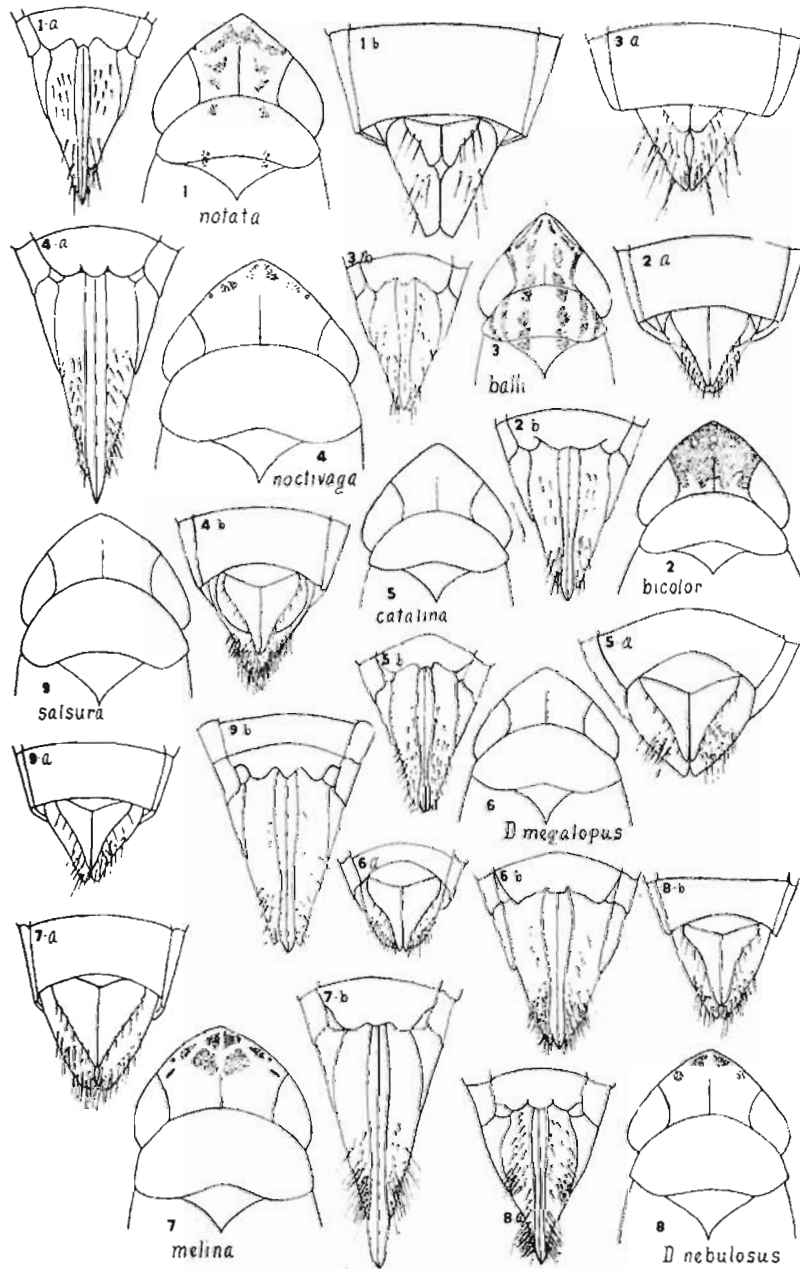
Color: Dirty straw; a pair of large angular spots just above apex of vertex and a pair of large round ones between these and ocelli. A paler interrupted band behind these and an oblique dash next either eye at the base. Pygofer with a black marking dorsally.

Genitalia: Female last ventral segment as long as preceding, side margins very short, concavely narrowed to posterior margin which is slightly produced and sinuated. Disc strongly elevated and embrowned. Male valve short, about two-thirds as wide as last ventral segment and lying in its concavity. Plates rather long, concavely constricted at half their length, then produced and convexly sloping to bluntly tipped apices.

Known only from the type pair in the collection of Dr. E. D. Ball, collected at Fort Collins, Colorado, July 24, 1899, and Aug. 16, 1902. A close examination of this species and a comparison with others in the *Deltocephaloid* group, seems to indicate that *nebulosus* is more closely related to *D. oblectus* and related species than to species of *Lonatura*. It is therefore referred to that genus.

EXPLANATION OF PLATE IV.

- Fig. 1. *Lonatura notata* Osb. Head; 1a female genitalia; 1b male genitalia.
 Fig. 2. *Lonatura bicolor* V. D. Head; 2a male genitalia; 2b female genitalia.
 Fig. 3. *Lonatura balli* DeL. Head; 3a male genitalia; 3b female genitalia. Fig.
 4. *Lonatura noctivaga* Ball. Head; 4a female genitalia; 4b male genitalia. Fig.
 5. *Lonatura catalina* O & B. Head; 5a male genitalia; 5b female genitalia. Fig.
 6. *Deltocephalus megalopus* Ball. Head; 6a male genitalia; 6b female genitalia.
 Fig. 7. *Lonatura melina* DeL. Head; 7a male genitalia; 7b female genitalia.
 Fig. 8. *Deltocephalus nebulosus* Ball. Head; 8a female genitalia 8b male genitalia.
 Fig. 9. *Lonatura salsura* Ball. Head; 9a male genitalia; 9b female genitalia.



DELONG—NORTH AMERICAN CICADELLIDAE