

SOME NEW SPECIES OF BALLANA
(HOMOPTERA CICADELLIDAE)

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During the past six years the writer has been studying the species of this genus, determining and illustrating both male and female genital characters. It was planned to publish the illustrations with the descriptions of all the species in the genus. Certain conditions, however, have indicated the advisability of publishing the following descriptions in order to use the names for the identification of species. As a consequence the portions of the descriptions concerned with the dorsal pieces of the male genitalia, which offer excellent characters for separation, are omitted as are the several plates of illustrations. These will appear at a later date after the names are established. The material upon which this study has been based is contained in the collections of Dr. E. D. Ball and the author. Dr. Ball has furnished type material of previously described species and unidentified material, a considerable amount of which has proved to be undescribed. The author is greatly indebted for this assistance and desires to express his grateful appreciation to Dr. Ball.

Ballana atridorsum (Van Duzee)

Thamnotettix atridorsum V. D. Can. Ent. 36:92, 1894.

The original female type of this species was destroyed and Professor Herbert Osborn erected a topotype ♂ from the same series. This is in the Iowa State College Collection labeled Colo. 581. It is here designated as the neotype and the genitalia are thus described:

Male plates slightly longer than combined basal width, sides almost straight, apices rather broad, rounded, extending to the posterior spines. Male in dorsal view with ninth segment broader than long, narrowed from base to apex. Anterior spines very short, arising at posterior portion and directed caudally. Posterior spines long and heavy, extending beyond median line and slightly curving upward.

Ballana delea n. sp.

Resembling *atridorsum* but with distinct genitalia. Length 5 mm.

Vertex produced, bluntly angled, and bluntly angled with front, about one third wider between eyes than length at middle.

Genitalia: Female last ventral segment with lateral angles rounded, posterior margin between these slightly indented, forming a broad

median truncated portion. Male plates broad, only slightly longer than combined basal width, strongly convexly rounded to bluntly pointed apices which do not reach to the posterior spines.

Described from a pair of specimens from Santa Barbara, California, collected in June, 1918. Holotype male and allotype female in author's collection.

***Ballana calcea* n. sp.**

Resembling *atridorsum* in general appearance but smaller and with distinct genitalia. Length 5 mm.

Vertex bluntly angled, length at middle more than half basal width between eyes, margin of vertex thick.

Color: Pale green, vertex yellowish green.

Genitalia: Female last ventral segment with lateral margins convexly rounding to form broadly rounded lobes between which the central third of the posterior margin is slightly excavated. The posterior margin of the excavation slightly convexly rounded. Male plates long, slightly longer than combined basal width, sides almost straight, apices blunt, rounded, reaching almost to posterior spines.

Described from a series of six male and two female specimens collected at Bunkerville, Nevada, April 17, 1929, (Davis); two males and two females, Glendale, Nevada, May 5, 1929, (Fox) from *Hymenoclea salsola*; and one female as Mesquite, Nevada, June 7, 1929, from *Franseria eriocentra*. Holotype male, allotype female (Bunkerville, Nevada) and male and female paratypes in author's collection. Male and female paratypes in Ball collection.

***Ballana brevidens* n. sp.**

Resembling *atridorsum* in general form and appearance but with distinct genitalia. Length 5.5 mm.

Vertex slightly produced, bluntly angled, bluntly angled with front, twice as wide between eyes as length at middle.

Color: Yellowish, elytra very pale, dull green, apices of elytra slightly smoky.

Genitalia: Female last ventral segment with lateral angles broadly rounded to median third of posterior margin which is indented, almost truncate and black margined. Male plates about as long as combined width at base, sides almost straight, apices bluntly pointed, just reaching the posterior spines.

Described from one male and six female specimens collected at Minidoka, Idaho, June 24, 1930. Holotype male, allotype female and female paratypes in the author's collection. Female paratype in Ball Collection.

***Ballana transea* n. sp.**

Resembling *atridorsum* in general appearance but with vertex more produced and with distinct genitalia. Length 5 mm.

Vertex produced and bluntly angled, margin thick, bluntly angled with front about one third wider between eyes than length at middle.

Color: Vertex pronotum and scutellum yellowish, elytra dull green.

Genitalia: Female last ventral segment short, posterior margin practically truncate, scarcely indented, central two thirds broadly dark margined. Male plates about as long as combined basal width, sides almost straight, apices bluntly pointed, reaching to posterior spines.

Described from three specimens from Colorado without specific data. Holotype male, allotype female and female paratype in author's collection.

***Ballana adversa* n. sp.**

Resembling *atridorsum* in general form and appearance but smaller and with distinct genitalia. Length 4.5 mm.

Vertex produced and bluntly angled, two thirds as long at middle as basal width between eyes, margin thick and bluntly angled with front.

Color: Yellowish, pronotum and elytra tinged with green, apices of elytra slightly smoky.

Male plates a little longer than combined basal width, sides straight, apices blunt, rounded, reaching the posterior spines.

Described from two male specimens collected at Stansburg I. Park, Utah, June 13, 1913, by Hagan Titus; two males from Santa Clara, Utah, May 5, 1929, (Fox). Holotype male and male paratypes in author's collection. Paratype male in Ball collection.

***Ballana firma* n. sp.**

In form and general appearance resembling *atridorsum* but with distinct genitalia. Length 5 mm.

Vertex produced but bluntly angled and bluntly angled with front. One fifth wider between eyes than length at middle.

Color: Vertex, anterior margin of pronotum and scutellum yellow, disc of vertex and elytra dark green, veins paler. Apices of elytra black to anterior cross veins of inner and outer apical cells.

Genitalia: Female last ventral segment convexly rounded from near base to posterior margin which is deeply concavely rounded between these two pointed lobe-like portions. Male plates a little longer than combined basal width, side margins convexly rounded to blunt rounded apices which reach beyond the posterior spines.

Described from a series of two male and one female specimens collected at Alpine, California, July 5, 1931, by Dr. E. D. Ball. Holotype male and allotype female in Ball collection. Paratype male in author's collection.

***Ballana prava* n. sp.**

In form and general appearance resembling *firma* but more slender, with vertex more produced and with distinct genitalia. Length 5 mm.

Vertex produced and bluntly angled, almost one-half wider between eyes than length at middle.

Color: Vertex yellow, pronotum, scutellum and elytra green. Apices of elytra black as far forward as cross veins of apical cells.

Genitalia: Male plates not quite as long as combined basal width, triangular, sides almost straight, slightly concave, apices bluntly pointed, not reaching posterior spines by about one-third their length.

Described from two male specimens collected at San Luis Obispo, California, collected June 14, 1934, by Dr. E. D. Ball. Holotype male and paratype male in Ball collection.

***Ballana elexa* n. sp.**

Resembling *firma* in general appearance and coloration but with distinct genitalia. Length 5 mm.

Vertex bluntly angled, margin of vertex thick, one-third wider between eyes than length at middle.

Color: Vertex, anterior margin of pronotum and scutellum yellowish, disc of pronotum and elytra yellowish green, veins paler, apices of elytra dusky to brown.

Genitalia: Female last ventral segment convexly rounded from near base to form posterior margin which is almost truncate, slightly indented either side of median third. Male plates about as long as combined basal width side margins almost straight, apices broad, bluntly pointed on inner margin, not reaching to posterior spines.

Described from a series of two male and two female specimens collected at Pine Valley, California, July 6, 1931, by Dr. E. D. Ball. Holotype male and allotype female in Ball collection. Male and female paratypes in author's collection.

***Ballana attenuata* n. sp.**

Resembling *vivata* in general appearance but with distinct genitalia. Length 5 mm.

Vertex strongly produced and bluntly angled, bluntly angled with front, one-fourth wider between eyes than length at middle.

Color: Vertex and scutellum yellow, pronotum and elytra green washed with yellow, veins indistinct except at apex where they are pale on a slightly smoky, subhyaline apical portion.

Genitalia: Male plates as long as combined basal width, more than half as broad at apex as width at base, apices broadly rounded, reaching posterior spines.

Described from a single male specimen collected at Pine Valley, California, July 6, 1931, by Dr. E. D. Ball. Holotype male in Ball collection.

***Ballana filamenta* n. sp.**

Resembling *attenuata* in form and general appearance but with blunter head and distinct genitalia. Length 6-6.5 mm.

Vertex well produced and rather sharply angled, acutely angled with front, one-half wider between eyes at base than median length.

Color: Vertex and anterior portion of pronotum yellow, disc of pronotum, scutellum and elytra green. Veins of elytra pale, apices subhyaline.

Genitalia: Female last ventral segment with lateral margins slightly narrowed and produced, posterior margin forming two broadly rounding lobes between which is a broad U-shaped notch extending two thirds the distance to base and broadly black margined at apex. Male plates a little longer than combined basal width, at least one-third as wide at apex as base, apices broadly rounded, not reaching posterior spines.

Described from a male and female specimens from Yosemite, California, collected June 28, 1931, and a female from Santa Margarita, California, collected June 23, 1931, all by Dr. E. D. Ball. Holotype male, allotype female (both from Yosemite) in Ball collection. Female paratype in author's collection.

***Ballana mera* n. sp.**

Resembling *filamenta* in general form and appearance but with vertex more bluntly angled and with distinct genitalia. Length 5.5 mm.

Vertex produced and bluntly angled, one and one-third times as wide between eyes at base as length at middle.

Color: Vertex, yellow; pronotum, scutellum and elytra green washed with yellow, veins paler.

Genitalia: Female last ventral segment with lateral margins convexly rounded from about half its length to posterior margin which is truncate at middle. Male plates not quite as long as combined basal width, convexly rounded to broadly rounded apices which do not reach posterior spines by more than one-third their length.

Described from a series of two male and one female specimens collected at Muir Woods, California, June 17, 1934, by Dr. E. D. Ball. Holotype male, allotype female in Ball collection. Paratype male in author's collection.

***Ballana quira* n. sp.**

In form and general appearance resembling *atridorsum* but with distinct genitalia. Length 5-5.5 mm.

Margin of vertex thick, vertex bluntly angled, more than one-half wider between eyes than length at middle.

Color: Vertex, anterior margin of pronotum and scutellum yellowish. Disc of pronotum and elytra dull yellowish green.

Genitalia: Female last ventral segment strongly convexly rounding from about half its length to almost truncate posterior margin, the central third of which is slightly indented but truncate. Male plates about as long as combined basal width, sides almost straight, apices rather broad, rounded to bluntly pointed tips, not reaching to posterior spines.

Described from two male and two female specimens collected at Sunset Park, Arizona, June 23, 1935, by Dr. E. D. Ball. Male holotype, female allotype and male and female paratypes in Ball collection. Male and female paratypes in author's collection.

***Ballana nigridens* n. sp.**

Resembling *atridorsum* in general appearance but with vertex blunter and with distinct genitalia. Length 6.5 mm.

Vertex bluntly angled, margin thick, bluntly angled with front, more than twice as wide between eyes as length at middle.

Color: Vertex yellow, pronotum dull green, anterior margin yellowish. Elytra dull greenish, apices slightly smoky, arcs on face pale brown, slightly visible from above.

Genitalia: Female last ventral segment strongly produced and narrowed, posterior margin broadly slightly indented forming a slightly

rounded median lobe. Male plates rather long, almost one-fourth longer than combined width at base, slightly concavely narrowed on outer margin about middle, apices bluntly pointed, not reaching end of anal tube.

Described from a pair of specimens collected at Jemez Springs, N. M., June 15, 1919. Holotype male and allotype female in the author's collection.

***Ballana spinosa* n. sp.**

Resembling *atridorsum* in general appearance but with more bluntly angled vertex and distinct genitalia. Length 6 mm.

Vertex very blunt, almost rounded in front, margin thick, rounding to front, almost twice as wide as length at middle.

Color: Vertex pale yellow, pronotum, scutellum and elytra dull greenish.

Genitalia: Female last ventral segment with posterior margin indented on median half forming a slightly sunken truncate lobe. Male plates short and broad, only slightly longer than combined basal width, convexly rounded to form obliquely rounding apices which do not reach the junction of the posterior spines.

Described from a series of four male and three female specimens collected at Idaho City, Idaho, July 13, 1930, by the author. Holotype male, allotype female and male and female paratypes in the author's collection.

***Ballana polica* n. sp.**

Resembling *spinosa* in general form and appearance but with distinct genitalia. Length 5.5 mm.

Vertex blunt, scarcely produced at middle, twice as wide between eyes at base as length at middle, margin thick, almost rounded to front.

Female last ventral segment with lateral angles rounded, median third of posterior margin indented, concavely rounded. Male plates about as long as combined basal width, sides convexly rounded, apices rather broad and blunt, reaching the posterior spines.

Described from a male specimen from Aberdeen, Idaho, June 26, 1930, (DeLong); and eight females and fourteen males from Craters of the Moon, Idaho, June 29, 1930. Holotype male, allotype female and male and female paratypes in the author's collection. Male and female paratypes in Ball collection.

***Ballana parallela* n. sp.**

Resembling *spinosa* in general appearance but with distinct male genitalia. Length 5 mm.

Vertex scarcely produced, rounded, almost half as long at middle as basal width between eyes, margin thick, bluntly angled with front.

Color: Yellowish, elytra slightly tinged with dull green.

Male plates a little longer than combined width at base, sides convexly rounded, apices blunt, rounded, not reaching the posterior spines. Male in dorsal view with ninth segment broader than long. Anterior spines and posterior spines long, straight and heavy, both pairs extending obliquely caudally so that they appear parallel.

Described from one male specimen collected at Twin Falls, Idaho, Aug. 30, 1927, which seems unique and to deserve specific treatment. Holotype male in author's collection.

Ballana curvidens n. sp.

Resembling *spinosa* in form and appearance but with distinct genitalia. Length 5.5 mm.

Vertex roundedly produced but scarcely angled, margin thick, rounding to front, almost twice as wide between eyes as length at middle.

Color: Vertex yellowish, pronotum, scutellum and elytra dull greenish.

Genitalia: Last ventral segment with posterior margin forming a slightly indented median lobe on central half. Male plates rather long, about one-fourth longer than combined basal width, slightly convexly rounded to bluntly pointed apices which do not reach the end of the anal tube.

Described from a series of 38 specimens. Four male specimens from Minidoka, Idaho, June 24, 1930; 7 males and 14 females from American Falls, Idaho, June 25, 1930; 8 males and 5 females, Twin Falls, Idaho, June 14, 1930; and one male, Craters of the Moon, Idaho, June 29, 1930, all collected by the author. Holotype male (Minidoka, Idaho) allotype female (American Falls) and male and female paratypes in author's collection. Male and female paratypes in Ball collection.

Ballana ortha n. sp.

Resembling *spinosa* in form and general appearance but with distinct genitalia. Length 5.5 mm.

Vertex produced and rounded at apex, margin very thick, rounded to front, about twice as wide between eyes as length at middle.

Color: Vertex and scutellum yellowish, pronotum and elytra dull green.

Genitalia: Last ventral segment of female with central half of posterior margin roundedly produced forming a broad, truncated lobe which is heavily black margined and more caudal than remainder of segment. Male plates not quite as long as combined basal width, triangular, gradually narrowed to bluntly pointed apices which do not reach to the branches of the posterior spines.

Described from a male specimen collected at Logan Canyon, Utah, July 24, 1930, (DeLong); four females and one male, Minidoka, Idaho, June 24, 1930, (DeLong); four males, Overton, Nevada, July 7, 1929, (Fox); one female, Cove Fort, Utah, July 6, 1928, (Davis); two females, Bliss, Idaho, June 6 and 16, 1930; and four males and four females from Dixie, Utah, June 27, 1931, (Ball). Holotype male allotype female (Minidoka, Idaho) and male and female paratypes in author's collection, male and female paratypes in Ball collection.

Ballana calcara n. sp.

Resembling *spinosa* in general form but with distinct genitalia. Length 5.5 mm.

Vertex bluntly angled, almost half as long at middle as basal width between eyes.

Color: Vertex and pronotum yellow, scutellum pale green, elytra rather bright green, margin thick.

Genitalia: Female last ventral segment with lateral margins produced almost straight from base to broadly curved outer lobes of posterior margin between which the central third is rather deeply, broadly excavated, the apical truncated margin of which is broadly embrowned. Male plates as long as combined basal width, convexly rounded to blunt apices, reaching only about two thirds the distance to the posterior spines.

Described from five male and five female specimens collected at Dunphy, Nevada, Aug. 5, 1930, from *Chrysothamnus* sp. Holotype male, allotype female and male and female paratypes in author's collection. Male and female paratypes in Ball collection.

***Ballana hebea* n. sp.**

Resembling *calcara* in form and size but with distinct genitalia. Length 5 mm.

Vertex bluntly angled, more than half as long on middle as basal width between eyes, margin thick.

Color: Pale, dirty yellow, elytra slightly tinged with green. Veins pale, conspicuous.

Genitalia: Female last ventral segment with lateral margins convexly rounding to form rounded lobes of posterior margin between which the median third is distinctly abruptly excavated, the apex of which is truncated. Male plates a little longer than combined basal width, appearing long, sides almost straight, apices blunt, slightly longer than distance to posterior spines.

Described from a series of two male specimens collected at Benjamin, Utah, July 23, 1930, (DeLong); one male from Brigham, Utah, July 5, 1929, (Knowlton); five males and two females, Ely, Nevada, July 9, 1930 (Davis and Dorst); four females, N. Payson, Utah, July 25, 1930, (DeLong); two males, Richfield, Utah, July 15, 1929, (Dorst); June 21, 1930, (Davis); one male, Elko, Nevada, July 12, 1930, (Dorst).

Holotype male (Benjamin, Utah) allotype female (N. Payson) and male and female paratypes in author's collection. Male and female paratypes in Ball collection.

***Ballana occidentalis* n. sp.**

Resembling *calcara* in form and general appearance but with vertex more blunt and with distinct genitalia. Length 5.5 mm.

Vertex bluntly angled, not more than one-half broader between eyes than length at middle.

Color: Vertex yellow, pronotum, scutellum and elytra pale, dull green, apices of elytra smoky.

Male plates together slightly broader than long, lateral margins convexly rounded, apices blunt, rounded, extending only about two-thirds the distance to posterior spines.

Described from two male specimens from Elko, Nevada, collected July 12, 1930, from *Chrysothamnus*. Holotype male and paratype male in author's collection.

Ballana absenta n. sp.

Resembling *calcara* in general form but paler in color and with distinct genitalia. Length 5.5 mm.

Vertex bluntly angled, almost twice as wide between eyes as length at middle, anterior margin thick.

Color: Pale straw yellow, elytra slightly tinted with green.

Genitalia: Female last ventral segment with lateral margins convexly rounding to form produced, angular lobes either side of a broad excavated central half with truncated margin and excavated about one-fourth the distance to the base. Male plates small, about as long as combined width at base, sides almost straight, apex blunt, rounded, not reaching posterior spines by about one-third their length.

Described from six female and one male specimens collected at Overton, Nevada, June 6 and July 7, 1929, (Fox); one female and one male, St. George, Utah, June 4, 1930, (Davis); three females, Glendale, Nevada, May 5, 1929, (Fox); one female, Richfield, Utah, August 7, 1916. Holotype male (Overton, Nevada) allotype female (same) and male and female paratypes in author's collection. Male and female paratypes in Ball collection.

Ballana coarcta n. sp.

Resembling *callida* in general appearance but with blunter vertex and distinct genitalia. Length 5 mm.

Vertex strongly produced, apex bluntly angled, one-fourth wider between eyes at base than median length.

Color: Vertex and scutellum yellowish, elytra and disc of pronotum dull greenish, apex of elytra black.

Genitalia: Female last ventral segment decidedly narrowed to posterior margin which is broadly, shallowly emarginate more than half its width. Male plates long and slender, longer than combined basal width, sides concave, apices bluntly pointed, almost reaching to posterior spines.

Described from a male and two female specimens collected at Alpine, California, July 5, 1931, by E. D. Ball. Holotype male and allotype female in Ball collection, female paratype in author's collection.

Ballana sera n. sp.

Resembling *atridorsum* in form and general appearance but larger, with vertex more bluntly angled and with distinct genitalia. Length 6-6.5 mm.

Anterior margin thick, vertex bluntly angled, one and one-half times as wide between eyes as length at middle.

Color: Vertex, anterior margin of pronotum and scutellum yellowish. Disc of pronotum and elytra yellowish, appearing green where covering abdomen.

Genitalia: Female last ventral segment with lateral margins convexly rounding from near base to posterior margin, the central third of which is abruptly excavated about one-fourth the distance to base, the base of which is slightly convexly rounded. Male plates about as long as

combined basal width, sides convexly rounded, apices bluntly pointed, not reaching to posterior spines by about one-fourth their length.

Described from a series of two female and three male specimens collected at Beaumont, California, June 12, 1931, by Dr. E. D. Ball. Male holotype, female allotype in Ball collection. Male paratype in author's collection.

***Ballana plena* n. sp.**

Resembling *sera* in general appearance but with broader head and distinct genitalia. Length 5.5-6 mm.

Vertex very broadly, bluntly angled, margin thick, slightly more than one and one-half times as wide as median length.

Color: Vertex, anterior margin of pronotum and scutellum yellow, brownish arcs of front extending up onto anterior margin of vertex. Disc of pronotum and elytra green washed with yellow, veins of wing paler.

Genitalia: Female last ventral segment with lateral margins convexly rounding from near base to posterior margin which is broadly V-shaped, notched at center, about one-third the distance to base. Apex of notch broadly black. Male plates as long as combined basal width, sides slightly convexly rounded, apices broad, obliquely sloping to blunt apices, not reaching posterior spines.

Described from one male and one female specimens collected at Pine Valley, California, July 6, 1931, by Dr. E. D. Ball. Male holotype and female allotype in Ball collection.

***Ballana gruis* n. sp.**

Resembling *vesca* in general form and appearance but with distinct genitalia. Length 4-5 mm.

Vertex bluntly angled, almost rounded in front, margin thick, one-fourth wider between eyes than length at middle.

Color: Vertex pronotum and scutellum yellowish, disc of pronotum green. Elytra green, veins yellowish.

Genitalia: Female last ventral segment convexly roundedly narrowed to posterior margin which occupies the middle half of segment and is truncated or slightly convexly rounded. Lateral plates prominent. Male plates about as long as combined basal width, sides almost straight, apices bluntly pointed, almost rounded, not quite reaching to posterior spines.

Described from a male and two female specimens collected at Oxnard, California, June 21, 1931, by Dr. E. D. Ball. Holotype male allotype female in Ball collection. Paratype female in author's collection.

***Ballana indens* n. sp.**

In general appearance resembling *vetula* but with distinct genitalia. Length 5-5.5 mm.

Vertex bluntly angled, almost rounded, one-third wider between eyes at base than median length. Margin thick.

Color: Pale yellow, pronotum and elytra slightly darker.

Genitalia: Female last ventral segment narrowed to apex, lateral angles bluntly rounded between which the posterior margin is slightly emarginate and truncate. A heavy black mark causes it to appear rather deeply and doubly notched. Male plates about as long as combined basal width, broadly triangular, apices broadly blunt and rounded, not reaching posterior spines by about one-third their length.

Described from two male and two female specimens collected at Doyle, California, July 21, 1912. Holotype male, and allotype female in Ball collection. Male and female paratypes in author's collection.

***Ballana diutia* n. sp.**

In form and appearance resembling *vesca* but with distinct genitalia. Length 4.5 mm.

Vertex bluntly angled almost twice as wide between eyes as length at middle. Margin thick, almost rounded to front.

Color: Vertex and scutellum yellow, pronotum and elytra gray tinged with yellow.

Male plates about as long as combined basal width, sides convexly rounded, apices broad, rounded, reaching almost to posterior spines.

Described from a single male specimen collected at Mojave, California, July 1, 1931, by E. D. Ball. Holotype male in Ball collection.

***Ballana pleura* n. sp.**

Resembling *atridorsum* in general form and appearance but with distinct genitalia. Length 5-5.5 mm.

Vertex produced and bluntly angled, one and one-half times as wide between eyes at base as median length.

Color: Male, vertex and scutellum yellow, pronotum and elytra green, veins paler, apices of elytra smoky. Female yellowish washed with brown, veins pale.

Genitalia: Female last ventral segment with lateral margins strongly, convexly rounded from base to posterior margin which is truncated on central third and slightly indented. Male plates about as long as combined basal width, concavely rounded on outer margins to form bluntly pointed apices, which do not reach to the posterior spines.

Described from a series of three male and one female specimens collected at Santa Margarita, California, June 23, 1931, by Dr. E. D. Ball. Holotype male, allotype female and male paratype in Ball collection. Paratype male in author's collection.

***Ballana hama* n. sp.**

Resembling *pleura* in general appearance but with more produced vertex and distinct genitalia. Length 4.5 mm.

Vertex strongly produced and bluntly angled, one and one-half times as wide between eyes as length at middle.

Color: Greenish washed with yellow, pale brownish arcs extending onto margin of vertex from front. A pair of small brown spots on base of vertex. Elytra with apices smoky, veins pale.

Genitalia: Female last ventral segment with lateral margins obliquely sloping to posterior margin which is slightly excavated on

median third and truncated. Male plates as long as combined width at base, sides almost straight, apices bluntly pointed, almost reaching posterior spines.

Described from a series of two male and one female specimens collected at Beaumont, California, June 12, 1921, by Dr. E. D. Ball. Holotype male and allotype female in Ball collection. Paratype male in author's collection.

***Ballana valga* n. sp.**

Resembling *pleura* in form but with pale yellow color and distinct genitalia. Length 5 mm.

Vertex bluntly angled only slightly produced, one and two-thirds times as wide between eyes as median length, margin thick.

Color: Pale yellowish without definite markings, veins pale.

Genitalia: Female last ventral segment with lateral margins strongly convexly rounding from base to posterior margin which is shallowly, evenly and rather broadly concave. Male plates as long as combined basal width, side margins slightly concavely rounded to form bluntly pointed apices which do not reach the posterior spines by about one-fourth their length.

Described from a series of one male and two female specimens collected at Provo, Utah, August 9, 1930. Holotype male and allotype female in Ball collection. Paratype female in author's collection.

***Ballana angula* n. sp.**

In general form resembling *valga* but with greenish color and distinct genitalia. Length 5 mm.

Vertex only slightly produced and bluntly angled, twice as wide between eyes at base as median length.

Color: Male pale green tinged with yellow, female pale yellow, unmarked.

Genitalia: Female last ventral segment with lateral margins strongly convexly rounded from base to posterior margin which is slightly and broadly excavated, the posterior margin of which is convexly rounded. Male plates about as long as combined basal width, side margins straight, apices rather broad, rounded, not reaching posterior spines by about one-third their length.

Described from four male and two female specimens collected at Gila Bend, Arizona, April 13, 1933, by Dr. E. D. Ball. Holotype male, allotype female and paratype males in Ball collection. Paratype male and female in author's collection.

***Ballana tiaja* n. sp.**

Resembling *vetula* in general appearance and coloration but larger and with distinct genitalia. Length 5.5-6 mm.

Vertex broadly rounded, one and one-half times as wide between eyes at base as median length, margin thick bluntly angled with front.

Color: White to pale yellow, disc of pronotum and elytra appearing gray.

Genitalia: Female last ventral segment narrowed to bluntly rounded lateral angles between which the posterior margin is slightly excavated and the margin is slightly convexly rounded. Male plates about as long as combined basal width, broadly triangular, sides slightly concave at middle, apices broad, blunt, rounded, not reaching to posterior spines.

Described from a series of two female and three male specimens collected at Tia Juana, Mexico, August 2, 1912, and one male, same locality, June 15, 1908, by Dr. E. D. Ball. Holotype male, allotype female and male paratypes in Ball collection. Male and female paratypes in author's collection.

***Ballana recurvata* n. sp.**

Resembling *vastula* in form and appearance but with distinct genitalia. Length 5-5.5 mm.

Vertex sharply angled, apex blunt, bluntly angled with front, about one-fourth wider between eyes than length at middle.

Color: Vertex and scutellum yellowish, pronotum dull green, elytra dull greenish, apical portion posterior to cross veins brownish.

Genitalia: Female last ventral segment roundedly produced, central third forming a slightly sunken almost truncated lobe. Male plates rather long, about one-fourth longer than combined width at base, gradually sloping to bluntly pointed apices which extend just to apex of anal tube.

Described from four female and two male specimens collected from carrots, turnips, and beans at Boise, Idaho, July 11, 1930, (DeLong); five males and three females collected at Santa Margarita, California, June 23, 1931, (Ball); and four females and two males from Medford, Oregon, June 26, 1934, (Ball). Holotype male, allotype female (Boise, Idaho) and male and female paratypes in author's collection. Male and female paratypes in Ball collection.

***Ballana bifida* n. sp.**

Resembling *titusi* but with vertex more bluntly angled and with distinct genital characters. Length 4.5 mm.

Vertex bluntly angled, about one-fourth wider between eyes at base than length at middle.

Color: Vertex, pronotum and scutellum yellowish, disc of pronotum dark green. Elytra dark green, venation pale, apices subhyaline.

Genitalia: Female last ventral segment with lateral margins rounded to form outer rounded lobes of posterior margin between which the central third is broadly shallowly emarginate. Male plates long and narrow, a little longer than combined width at base, sides slightly concave, apices bluntly pointed reaching the posterior spines.

Described from a series of four male and seven female specimens collected at Craters of the Moon, Idaho, June 29, 1930, Idaho City, Idaho, July 13, 1930, and Murtaugh, Idaho, June 21, 1930, by the author; Holotype male and allotype female (both from Craters of the Moon) and male and female paratypes in author's collection. Male and female paratypes in Ball collection.

***Ballana dira* n. sp.**

Resembling *attenuata* in general form but pale in color and with distinct genitalia. Length 5.5–6 mm.

Vertex rather sharply angled, one-third wider between eyes at base than median length, rather sharply angled with front.

Color: Vertex and scutellum yellowish, pronotum and elytra rather pale dull green.

Genitalia: Female last ventral segment sloping from base to narrowed posterior margin which is rather squarely, broadly and shallowly excavated on median half, base of excavation black margined. Male plates as long as combined width at base, sides convexly rounded, apices broad, bluntly rounded, almost reaching to posterior spines.

Described from a series of two male and one female specimens collected at Tucson, Arizona, April 10, 1931; two male and two female specimens at Tinajas Altas, Ariz., March 27, 1932, and three male and one female specimens at Ajo Mts., Ariz., April 21, 1930, all by Dr. E. D. Ball. Holotype male, allotype female (Tucson, Ariz.), and male and female paratypes in Ball collection. Male and female paratypes in collection of the author.

***Ballana cuna* n. sp.**

Resembling *ortha* in form and general appearance but with head even more blunt and with distinct genitalia. Length 5–5.5 mm.

Vertex very blunt, almost rounded in front, almost twice as wide between eyes as length at middle, margin of vertex thick.

Color: Vertex yellow, pronotum, scutellum and elytra green, tinged with yellow, veins of elytra paler.

Genitalia: Female last ventral segment with lateral margins sloping and posterior margin narrowed, sinuate, a narrow shallow U-shaped notch at center. Male plates as long as combined width at base, sides slightly convexly rounded, apices bluntly pointed, not reaching to posterior spines.

Described from a series of four male and four female specimens collected at Weed, California, June 22, 1934, by Dr. E. D. Ball. Holotype male, allotype female and male and female paratypes in Ball collection. Male and female paratypes in author's collection.

***Ballana seca* n. sp.**

Resembling *cuna* in form and general appearance but with distinct genitalia. Length 5.5–6 mm.

Vertex broadly rounded, almost twice as wide between eyes as median length. Margin thick, rounded to front.

Vertex and scutellum yellowish, pronotum and elytra dull green, veins pale.

Genitalia: Female last ventral segment narrowed to posterior margin which is broadly rather squarely excavated on median half. Male plates not quite as long as combined basal width, sides slightly concave, apices rather broad, bluntly pointed, not reaching posterior spines by about one-third their length.

Described from a series of four male and four female specimens collected at Lebec, California, June 28, 1934, by E. D. Ball. Holotype male, allotype female and male and female paratypes in Ball collection. Male and female paratypes in author's collection.

***Ballana mana* n. sp.**

Resembling *seca* in form and general appearance but with distinct genitalia. Length 5-5.5 mm.

Vertex broadly rounded, almost twice as long between eyes at base as median length. Margin thick, rounded to front.

Color: Vertex and scutellum dull yellow, pronotum and elytra dull greenish.

Genitalia: Female last ventral segment with side margins sloping and narrowed to posterior margin which is broadly, squarely emarginate one-fourth the distance to base. Male plates short, not as long as combined basal width, sides convexly rounded, apices rather broad, bluntly rounded, not reaching posterior spines by at least half their length.

Described from two male and one female specimens collected at Mojave, California, July 1, 1931, by E. D. Ball. Holotype male and allotype female in Ball collection. Male paratype in author's collection.

***Ballana bicornis* n. sp.**

Resembling *atridorsum* in general appearance, bright green with distinct genitalia. Length 5.5 mm.

Vertex broad, bluntly angled, about one-third wider between eyes than length at middle.

Color: Vertex, pronotum and scutellum yellow, disc of pronotum green. Elytra bright green veins paler.

Genitalia: Female last ventral segment narrowed to apical margin which is broadly roundedly, almost squarely excavated one-fifth the distance to base. Male plates about equal in length to combined basal width, side margins slightly convexly rounded, apices bluntly pointed, not reaching posterior spines.

Described from two male and one female specimens from Logan Mt., Utah, July 22, 1930, (DeLong); one female, Sardine Canyon, Utah, July 28, 1930, (DeLong); one female, Nampa, Idaho, July 12, 1930, (DeLong); five male and five female specimens from Santa Margarita, California, June 23, 1931, (Ball); a male and a female from Yosemite, California, June 21, 1931, (Ball). Holotype male, allotype female (Logan Mt., Utah) and male and female paratypes in author's collection. Male and female paratypes in Ball collection.

***Ballana velosa* n. sp.**

Resembling *bicornis* in general appearance but with distinct genitalia. Length 5 mm.

Vertex bluntly angled, not quite twice as wide between eyes as length at middle; margin thick.

Color: Vertex pronotum and scutellum pale yellow, disc of pronotum dark green. Elytra dark green, apices subhyaline.

Male plates slightly longer than basal width, side margins slightly, convexly rounded, apices bluntly rounded, not reaching posterior spines by about one-fourth their length.

Described from two male specimens collected at Murtaugh, Idaho, June 21, 1930, (DeLong). Holotype male and paratype male in author's collection.

***Ballana antlera* n. sp.**

Resembling *velosa* in form and general appearance but with distinct genitalia. Length 5 mm.

Vertex bluntly angled, not quite twice as wide between eyes as length at middle. Margin thick.

Vertex, scutellum and anterior portion of pronotum yellow, part of pronotum and elytra dull green.

Genitalia: Female last ventral segment with lateral margins strongly convexly rounding to form outer rounded lobes between which the posterior margin is broadly excavated about one-fourth the distance to the base. Male plates about as long as combined basal width, sides almost straight, apices broad and bluntly rounded, almost one-third their basal width, not reaching posterior spines by about one-fourth their length.

Described from a pair of specimens collected at Murtaugh, Idaho, June 21, 1930, by the author. Male holotype and female allotype in author's collection.

***Ballana aris* n. sp.**

Resembling *velosa* in form and general appearance but with distinct genitalia. Length 5 mm.

Vertex bluntly angled, not quite as wide between eyes at base as length at middle. Margin thick.

Color: Dull green, vertex and scutellum yellowish.

Genitalia: Female last ventral segment with lateral margins obliquely sloping to form bluntly rounded lobes between which the posterior margin is broadly excavated about one fourth the distance to base. Male plates not quite as long as combined basal width, sides almost straight, apices bluntly pointed, not reaching to posterior spines.

Described from a male specimen from Rosette, Utah, June 28, 1929, Knowlton; and a pair of specimens from Kelsaw Canyon, Idaho, collected September 2, 1925, Haegele. Holotype male, allotype female (Kelsaw Canyon, Idaho) and female paratype in author's collection.

***Ballana dena* n. sp.**

In form and general appearance resembling *velosa* but with distinct genitalia. Length 5 mm.

Vertex bluntly angled, not quite twice as wide between eyes at base as length at middle.

Color: Dull grayish green, unmarked.

Genitalia: Male plates not as long as combined width at base, apices more than two-thirds the width at base, blunt, broadly rounded, almost truncate.

Described from a single male specimen from Santa Barbara, California, May, 1918. Holotype male in author's collection.

Ballana calipera n. sp.

Resembling *velosa* in form and general appearance but with distinct genitalia. Length 6 mm.

Vertex bluntly angled, not quite twice as wide between eyes at base as length at middle.

Color: Vertex pronotum and scutellum yellow, disc of pronotum and elytra dark green.

Genitalia: Female last ventral segment with lateral margins strongly convexly rounding to posterior margin which has a rounded outer lobe either side of a central half which is excavated one-fifth the distance to the base, the central portion of which is gently convexly rounded. Male plates about as long as combined basal width, apices blunt, rounded, not reaching posterior spines by about one-fourth their length.

Described from five male and six female specimens collected at Logan Canyon, Utah, July 24, 1930, (DeLong); one female and three male specimens, Tahoe National Park, California, August 6, 1930, (DeLong); four males, Craters of the Moon, Idaho, June 29, 1930, (DeLong); three female specimens, Colfax, California, August 7, 1930; two males, Glendale, Nevada, May 5, 1929, (Fox); one male, Overton, Nevada, June 6, 1930, (Davis); one male, St. George, Utah, June 4, 1930, (Davis); and four male and three female specimens, Medford, Oregon, June 26, 1934, (Ball). Holotype male and allotype female (Logan Canyon, Utah) and male and female paratypes in author's collection. Male and female paratypes in Ball collection.

Ballana chelata n. sp.

Resembling *titusi* in form and appearance but with distinct genitalia. Length 5 mm.

Vertex produced and angled, about one-fifth wider between eyes than length at middle, vertex bluntly angled with front.

Color: Vertex yellow, pronotum, scutellum and elytra green, veins paler, apex subhyaline.

Genitalia: Female last ventral segment rather long, lateral margins strongly convexly rounded to produce outer lobes on last ventral segment between which the central third is slightly excavated, the basal margin of excavation slightly convexly rounded. Male plates a little longer than combined basal width, sides almost straight, apices bluntly pointed, not reaching posterior spines.

Described from two female and one male specimens collected at Pacific Grove, California, Aug. 17, 1930, (DeLong); and two male and three female specimens from Muir Woods, California, June 17, 1934, (Ball). Holotype male and allotype female (Pacific Grove, California) and female paratype in author's collection. Male and female paratype in Ball collection.

Ballana callida n. sp.

Resembling *chelata* in form and general appearance but with distinct genitalia. Length 5-5.5 mm.

Vertex strongly produced and angled, about one-fifth wider between eyes than length at middle and acutely angled with face.

Color: Vertex yellowish, pronotum, scutellum and elytra green tinged with yellow. Elytra with apical cells black.

Genitalia: Female last ventral segment with side margins sloping, narrowed to posterior margin which is broadly squarely and rather shallowly notched two-thirds its width. Male plates about as long as combined width at base, sides straight, apices bluntly pointed, not reaching to posterior spines.

Described from two male and two female specimens collected at Riverside, California, June 13, 1931, and a male from Alpine, California, collected July 5, 1931, all by Dr. E. D. Ball. Holotype male, allotype female and male paratype in Ball collection. Male and female paratypes in collection of the author.

***Ballana repa* n. sp.**

Resembling *angula* in form and general appearance but with distinct genitalia. Length 5-5.5 mm.

Vertex produced but broadly rounded, twice as wide between eyes at base as median length. Margin thick rounded to front.

Color: Yellowish, tinged with green on pronotum, scutellum and elytra.

Genitalia: Female last ventral segment convexly roundedly produced from base to form a narrow posterior margin about half the width of segment which is truncate. Male plates a little longer than combined width at base, side margins concave at middle, apices bluntly rounded, not quite reaching posterior spines.

Described from a male and three female specimens collected at Yuma, Ariz., April 14, 1933, by E. D. Ball. Holotype male, allotype female and female paratype in Ball collection. Female paratype in author's collection.

***Ballana latula* n. sp.**

Female resembling *vapida*, male greenish and with distinct genitalia. Length 6.5 mm.

Vertex broadly, very bluntly angled, twice as wide between eyes at base as median length, sharply angled with front.

Color: Female pale brown on vertex and scutellum. Pronotum and elytra dark brown flecked with yellow, apical veins yellow. Male vertex yellowish, pronotum, scutellum and elytra bright green, apices of elytra smoky.

Genitalia: Female last ventral segment broken but appearing truncate or slightly emarginate. Male plates one-fourth longer than combined width at base, convexly rounded apical fourth more rapidly tapered to form bluntly pointed tips which are produced about as long as anal tubes.

Described from one female and three male specimens collected at Weed, California, June 27, 1934, by E. D. Ball. Holotype male, allotype female and male paratype in Ball collection. Male paratype in author's collection.

Ballana paridens n. sp.

Resembling *vapida* in appearance and coloration but with distinct genitalia. Length 6 mm.

Vertex produced but bluntly angled, about one and two-thirds times as wide between eyes as length at middle.

Color: Brownish tinged with yellow, face with a series of conspicuous arcs broken at middle. Vertex pale brownish, reflexed arcs of face usually visible on margin from above. A pair of faint spots just above apex and a longitudinal stripe on disc either side, darker. Pronotum dark brown, paler on anterior margin. Elytra dark brown irrorate with yellow, veins yellow.

Genitalia: Female last ventral segment narrowed at base, lateral margins produced to posterior margin which is broadly, rather shallowly but squarely excavated and heavily black margined. Male plates about as long as combined basal width, sides concavely rounded. Apices rather broad, rounded, not reaching posterior spines by more than one-third their length.

Described from a series of four male and four female specimens collected at Pine Valley, California, July 6, 1931, by Dr. E. D. Ball. Holotype male, allotype female and male and female paratypes in Ball collection. Male and female paratypes in author's collection.

Ballana latera n. sp.

In form and appearance resembling *dissimilata* but with distinct genitalia. Length 6.5 mm.

Vertex bluntly angled, more than one and one-half times as wide between eyes at base as median length. Margin acutely angled with front.

Color: Vertex tawny, ocelli black, recurved arcs from front visible from above on margin of vertex. Pronotum, scutellum and elytra dull greenish, washed with yellow, veins yellowish.

Male plates about as long as combined basal width, triangular, sides slightly concave at middle, apices bluntly pointed, not reaching posterior spines by at least one-third their length.

Described from a single male specimen collected at Santa Margarita, California, June 25, 1909, by E. D. Ball. Holotype male in Ball collection.

Ballana arma n. sp.

In coloration resembling *dissimilata* but smaller with blunter vertex and with distinct genitalia. Length 6.5-7 mm.

Vertex broad, scarcely produced, bluntly angled, about one-half wider between eyes at base than length at middle.

Color: Male green, female brown. In both sexes the vertex is yellowish with reflexed arcs of face visible on margin from above. In male, pronotum green with yellowish anterior margin, elytra green with paler veins. Female pronotum brown with paler margin, elytra dark brown with paler veins.

Genitalia: Female last ventral segment only two-thirds as wide at base as previous segment, gradually narrowed to posterior margin which is broadly rather shallowly excavated between prominent angles. Male plates not quite as long as combined basal width, sides concavely rounded at middle, apices rather broad, bluntly rounded, not reaching posterior spines by half their length.

Described from two male and two female specimens collected at Yarnell Heights, Arizona, June 21, 1935, by Dr. E. D. Ball. Male holotype and female allotype in Ball collection. Male and female paratypes in author's collection.