

NORTH AMERICAN LEAFHOPPERS OF THE
ATHYSANELLA GROUP.*
(Homoptera Cicadellidæ.)

HERBERT OSBORN.

The leafhoppers of this group have been a source of much difficulty and confusion, owing partly to the fact that the species, or most of them, show marked cases of dimorphism. All have brachypterous forms and where macropterous forms have not been found the venation is too much modified to serve as a good taxonomic character. Not only the definition of species but their generic position has been a question of great difference of opinion and a careful revision of the whole group has been a matter of necessity if the species are to be properly classified.

Material for this study has been accumulating in the author's hands for many years but it has become more and more apparent with the increase of material that some more fundamental basis than the usual external characters must be found for the limitation of the species and the determination of their affinities. This it was hoped might be secured by a study of the male genitalia, both external and internal, and it was therefore counted a happy circumstance that I was able to have the assistance of Mr. J. N. Knull in the preparation of the genital structures for microscopic study. That these furnish a really good basis for some positive conclusions will, I think, be seen from the descriptions and figures presented here. One immediate conclusion is that these structures furnish sufficient basis for the formation of at least three new genera and as these species have up to the present, not figured to any great extent in economic or general literature it is best to designate them without further delay. Moreover it is believed best to separate them from the old world genera to which they have sometimes been assigned since most of the characters on which such

* Contribution No. 104, from the Department of Zoology and Entomology, Ohio State University.

disposition has been made are superficial and probably represent convergence rather than phylogentic affinity. A glance at the synonymy of some of the species will show how wide a divergence of opinion has existed as to relative importance of different characters. Considering all these points it seems certain that it will avoid many complications of nomenclature and give better stability to re-establish the genus *Athysanella* of Baker to include a small group of closely related forms and to propose two or three new genera to include certain species that present very well marked differences in structure as also associated or correlated features of pretty evident nature when once the groups are defined.

While the species discussed here have very few of them received mention as economic species it is only necessary to observe the immense numbers in which they occur, especially upon the grasses of the plains region east of the Rockies and in many of the dry or semi-arid sections of southern Texas, New Mexico and Arizona to appreciate that they must act as a very heavy drain upon the forage value of the native prairie and plains grasses.

So far as observations go all the species discussed here are restricted to species of the grass family and some of them have been very definitely connected with buffalo grass and the *Boutelouas* but the closer restriction to particular species of grasses, if it occurs for these species of leafhoppers, has not been determined with sufficient certainty to be recorded. This may now be undertaken with the separation of the species as a basis for exact observation. For additional references and synonymy the student may consult Van Duzee's, "Catalog of Hemiptera." Types and paratypes of the new species are in National Museum, the Ohio State University, and collections of Dr. E. D. Ball, Dr. Paul Lawson, Univ. of Kans., and the author. I am indebted to Dr. E. D. Ball, for generously turning over to me an extended series of specimens including some undescribed species. To Dr. P. B. Lawson and D. M. DeLong for loan of specimens and to Mr. J. N. Knull for dissections and drawings, and Miss Charlotte King for certain drawings.

KEY TO GENERA OF THE *ATHYSANELLA* GROUP.

1. Males without tibial spurs..... 2
Males with prominent tibial spurs..... 3
2. Head conic, vertex long, male genitalia small..... *Gillettiella*
Head short, rounded or faintly angular in front, vertex broader than long,
male genitalia enlarged..... *Amphipyga*
3. Male pygofer with pectinate appendage, tibial spur short, vertex wider
than long, ovipositor long..... *Pectinopyga*
Male pygofer without pectinate appendage, tibial spur usually long..... 4
4. Vertex usually short, wider than long, male pygofer large, usually rounded
behind, without acute tooth or process at tip, species more robust,
Athysanella Baker
Vertex usually longer than wide, male pygofer with acute tooth or long
process at tip, species usually small and slender..... *Gladionura*

Gillettiella n. g.

Head distinctly angular, subconical; vertex longer than width between eyes, flattened, margin bluntly angulate to front. Pronotum shorter than vertex; scutellum small, acuminate; elytra short, (micropterous) reaching second abdominal segment, venation faint; female ovipositor long, extending one-third beyond pygofer; male pygofer obliquely narrowed, rounded at apex, oedagus slender, basal part broad, apical part slender, curved to base, with rather thick basal process.

Type of the genus *Gillettiella labiata* Gillette.

This genus will include also *G. atropuncta* Gillette. These species differ so distinctly in genitalia from other species formerly grouped under *Aconura*, that it seems desirable to separate them as a distinct genus. They approach *Lonatura* in some characters, but considering details of elytra and head structure, it does not seem proper to refer them to that genus.

In a single macropterous specimen received from Dr. Lawson, the only one I have seen, the venation is quite different from any of the genera here given and peculiar in the apparent absence of cross nervures separating anteapical and apical cells.

Gillettiella labiata (Gill.)

(Plate IV, Fig. 20.)

Deltocephalus labiata Gillette, Colorado Exp. Sta. Bull. 43, p. 26, (1898).
Aconura labiata Van Duzee, Catalog, Hemip., p. 653, (1917).

Head slightly wider than pronotum, bluntly angular; ocelli close to margin, margin bluntly angular, front convex, one-half longer than wide; clypeus short, sides parallel. Pronotum a little more than half longer than vertex; scutellum minute; elytra minute, abbreviated, extending on to second abdominal segment.

Genitalia: Female ovipositor extended, half longer than pygofer; last ventral segment longer than preceding, hind border strongly sinuate, central part roundly produced; male valve long, acutely angular;

plates extending slightly beyond valve, tapering to blunt apex; pygofer obliquely narrowed to rounded apex, bearing a series of delicate bristles on the submargin, a small subapical spur; style broad at base, apex sharp and outcurved; aedeagus slender rod-like, base slender, outer part thickened at base, apex tapering, slender, basal tooth oblique, (See Fig. 50, a and b).

Color: Light gray, except in variety *rufus* Gillette; vertex slightly infusate, with pale border, central and crossline. Pronotum with faint series of spots, often obsolete; elytra concolorous; abdomen pale gray with faint dots; in male apical part of elytra with whitish veins; upper part of abdomen black with terminal segment next to pygofer white; pygofer black at base, white at tip; face whitish with fuscous arcs, apical part of clypeus and loræ fuscous; pectus and venter with white margins.

Numerous specimens from Pueblo, Garden of Gods, Ft. Collins, Colorado, (Herbert Osborn collector). Described by Gillette from Ft. Collins, Manhattan, Bellvue and Colhan, Colo. Variety *rufus*? Gillette, was taken on reddish soil in Garden of the Gods by the author.

***Gillettella atropuncta* (Gill.)**

(Plate IV, Fig. 21.)

Deltocephalus atropuncta Gillette, Colorado Exp. Sta., Bull. 43, p. 28, (1898).
Aconura atropuncta Van Duzee, Cat. Hemip., p. 653, 1917.

Head narrower than pronotum, sharply angular; vertex more than one-half longer than wide; ocelli close to margin, front long, faintly convex; clypeus long, sides parallel. Pronotum, short, a little more than half as long as vertex; scutellum small, acuminate. Elytra short, broadly rounded behind, reaching on to third abdominal segment. Abdomen sharply tapering, ovipositor extended.

Genitalia: Female last ventral segment sinuate; male valve long, slightly exceeded by plates which taper to nearly acute tips; pygofer obliquely narrowed, apex broadly rounded; internal genitalia slender; styles narrow, tips out-turned; aedeagus slender, basal process at right angles. (Fig. 51, a and b).

Color pattern similar to *labiata* Gillette, females with three distinct double stripes on abdomen; male with conspicuous median line and transverse bars on vertex, milky subapical band on elytra, and bluish white band on pygofer; male pygofer bare, jet black, apex dull whitish; face with distinct, transverse band including apex of front and base of clypeus and loræ white.

The species was described from La Porte and Ft. Collins, Colo., and the writer has collected it in 1910 at Brownsville and San Antonio, Texas, and Delphos, Kansas. Specimens in DeLong and Osborn collections from Clay Co., Kansas, and in the Lawson collection from Kansas and Nebraska.

Genus *Amphipyga* Osborn.

Ohio Biol. Sur., Bull. 14, p. 289, 1928.

Robust species with the vertex short, rounded or slightly angulate and usually with two conspicuous black spots or lines between the ocelli. There is no tibial spur in males and the females have long extruded ovipositors but not in most species so extremely elongate as in some of the species of *Athysanella* or *Gladionura*. The male pygofer is inflated or elongate, the valve large and the plates broad, often divergent. Type *Amphipyga balli*.

KEY TO SPECIES OF AMPHIPYGA.

- 1. Elytra not reticulate or with fuscous maculations..... 2
Elytra with many cross veins and with fuscous maculations in cells, *reticulata* n. sp.
- 2. Male plates long, usually reaching nearly to tip of pygofer..... 3
Male plates short, much shorter than pygofer, usually divergent..... 6
- 3. Smaller species, 2 to 3 mm. long..... 4
Larger species, usually 4 to 5 mm. long..... 5
- 4. Vertex faintly angulate, spots usually present; male plates broad, divergent, tapering to blunt tips; pygofer without blunt tooth at tip; color gray or whitish..... *occidentalis* Baker
Vertex rounded, not at all angulate, spots often obsolete; male plates contiguous, scarcely divergent, tips broad and rounded; pygofer with small blunt tooth at apex..... *aridella* n. sp.
- 5. Male pygofer very long, obliquely truncate..... *alta* n. sp.
Male pygofer broad, rounded behind..... *stylata* n. sp.
- 6. A black dot at tip of vertex, usually distinct, sometimes obscure. Larger species, 3-4 mm..... 7
Spots of vertex near together, black dot at apex faint or wanting; small, 2 mm. or less..... *californica* n. sp.
- 7. Elytra with faint or narrow lines; female segment truncate or emarginate, striate; male plates longer than wide; pygofer oblique-elongate and with acute tip..... *acuticauda* Baker
Elytra with broad stripes; female segment bisinuate; male plates very short, wider than long; pygofer short, not acute at tip, style exposed, *balli* n. sp.

Amphipyga reticulata n. sp.

Head large, wider than pronotum; vertex wider than long, rounded, faintly depressed behind the middle; front broad, tumid, convex in profile. Pronotum nearly as long as vertex, distinctly concave behind. Elytra short, roundingly truncate. Ovipositor rather short, extending about one-fifth its length beyond the pygofer; last ventral segment short, scarcely as long as preceding, truncate or somewhat emarginate.

Color: Dull gray, with distinct fuscous markings, vertex with two large black spots, and some minute dots, spots obsolete in one specimen; frontal arcs distinct, sutures black. Pronotum with six dots near the anterior border, and a dot near the hinder edge at the side. Elytra hyaline, with fuscous maculations in the reticulate cells; veins whitish. Abdomen rather strongly marked with fuscous, the spots of the median and lateral lines merging into stripes. Pygofer with distinct fuscous stripe, hind border of segment and the ovipositor, especially

tip, blackish. Pectus and disc of venter, blackish. Legs somewhat infuscate.

Length: Female, 4 mm.

Described from two females from the collection of Doctor E. D. Ball, Elsinore, Utah, April 22, 1906.

A male which probably belongs with this species lacks the black spots of the vertex and the distinct reticulation of the elytra, and the front is less tumid. The pygofer is long, sloping, apex rather acute, valve short, angulate posteriorly, the plates widely separated, divergent, triangular, apex acute and reaching apex of pygofer. Style long, tip slender. One specimen Monroe, Utah, July 25, 1906, from the collection of Doctor E. D. Ball.

***Amphipyga occidentalis* (Baker).**

(Plate I, Fig. 2.)

Athysanella occidentalis Baker, *Psyche*, Vol. VIII, p. 186, 1898.

Athysanella minuta Baker, *Psyche*, Vol. VIII, p. 189, 1898.

Aconura occidentalis Van Duzee, *Catalog, Hemipt.*, p. 653, 1917.

Head as wide as pronotum, faintly angulate; vertex wider than long, as long as pronotum; front broad; clypeus slightly longer than wide; loræ broad; cheeks faintly sinuate. Elytra in macropterous form slightly exceeding ovipositor, brachypterous form extending on to base of abdomen. Female ovipositor about one-third longer than pygofer, last segment short, hind border distinctly sinuate. Male pygofer elongate, obliquely truncate, apex rounded, valve large, sub-angulate, plates triangular, scarcely longer than valve, diverging, outer border slightly sinuate. Style blunt with a blunt tooth near its apex. Aedeagus slender, curved, inner margin faintly serrate. (Fig. 30, a and b).

Color: Light gray; elytral veins faintly bordered with fuscous; brachypterous form sub-hyaline, scarcely marked; abdomen with a fairly distinct series of fuscous spots, bordering the median line, and fainter series laterally.

Length: 2.5 mm.

This species was described from Colorado, and besides the type specimens seen I have material from Fort Collins, Colo., Bismark, North Dakota, and Doctor Ball's collection includes specimens from North Colorado and Denver, as well as Fort Collins. Baker's *minuta* is evidently the male of this species as only females of *occidentalis* and males of *minuta* have been noticed in all the specimens examined, and considering close agreement in all general characters, and that they are often collected together, I am satisfied that they should be merged and *occidentalis* has priority on account of position in the published paper.

***Amphipyga aridella* n. sp.**

(Plate I, Fig. 4.)

Head wider than pronotum; vertex wider than long, as long as pronotum, front border rounded; front broad, scarcely longer than wide; clypeus wide, sides nearly parallel; pronotum short, hind border nearly straight; scutellum small, elytra extending on to second abdominal segment. Abdomen broad, contracted posteriorly; ovipositor exceeding the pygofer about one-fifth of its length; last ventral segment short, sinuate, median lobe polished. Male pygofer rather long, sloping, hind border sinuate, apex with a minute tooth; valve large rounded behind; plates broad, broadly rounded at apex, sides sinuate, reaching to tip of pygofer; style short, apical part enlarged, subcapitate; aedeagus curved, margins minutely serrate. (See Fig 31, a and b).

Color: Pale gray, somewhat tinged with fulvous, the usual round black spots of vertex often obsolete in many specimens. Elytra hyaline, veins faintly edged with fuscous; abdomen fuscous with yellow spots on the basal segments and at sides, or mostly fulvous with series of fuscous dots.

Length: Female, 2.5 mm.; male, 1.75 mm.

Described from a series of specimens collected by the author at Tucson, Arizona, Feb. 1910, (Type No. in National Museum 43177), and another collected by Dr. E. D. Ball, at Mojave, California. This is a small species about the size of *occidentalis* but with a different fulvous tinge, a more rounded vertex and very distinct genitalia.

***Amphipyga alta* n. sp.**

(Plate V, Fig. 24.)

Large, robust, head wider than thorax; vertex wider than long, a little longer than pronotum, pronotum short, distinctly convex behind. Elytra reaching third abdominal segment, broadly rounded behind in female, more nearly truncate in male. Male tibia not spurred, female ovipositor moderately long, extending beyond the pygofer about one-fourth its length; last ventral segment long, truncate or slightly convex, minutely rugose at middle; male pygofer very long, tapering toward a broad tip which has a strong, chitinous lobe or tooth at the inferior angle; valve long, angulate behind; plates long, reaching nearly to tip of pygofer, divergent, outer margin concave, apex bluntly angular; style long, nearly straight, with a broad lobe toward the base, aedeagus very long, curved, and expanded into three leaf-like parts, the edge of each being minutely serrate, (See Fig. 47a, 47b).

Color: Dull gray, distinctly marked with fuscous; vertex with lunate spot over the ocelli, a distinct one at apex, two brownish stripes on the disc, the front with a black point at base, a series of fuscous arcs and two diverging stripes toward apex, pronotum with black dots near the anterior margin, faint longitudinal stripe near the middle,

and a dusky patch toward the sides, elytra smoky hyaline, with the veins whitish; abdomen with series of black dots, merged into stripes in the male; beneath blackish; legs pale with series of black dots, middle of female segment, the male valve, styles and aedeagus, black.

Length: Female, 4.5 mm.; male, 3 mm.

Described from a series of specimens, Gallatin County, Montana, at elevation 4800 ft., April 26, 1902, (R. Benton,) and sent to me by Prof. R. A. Cooley. National Museum Type No. 43178.

A series of specimens from Pierre, S. Dak. and a specimen from Devil's Lake, N. Dak. evidently belong here, although slightly larger. This is the largest species of the genus, and the enormously expanded genitalia are a strong contrast with those in the related forms.

***Amphipyga stylata* n. sp.**

(Plate II, Fig. 7.)

Robust, head broader than pronotum, vertex longer than pronotum, about as long as wide, with a distinct transverse depression behind the middle, and a small depression near the tip. Pronotum short, slightly emarginate. Elytra obliquely truncate, reaching to base of third abdominal segment. Ovipositor long, extending one-fourth its length beyond the long pygofer; last ventral segment convex, margins blackish; male pygofer broadly rounded behind; valve broad, obtusely angulate; plates triangular, separated at base, divergent, not reaching tip of pygofer; styles long, slender; aedeagus moderately expanded, furrowed, margins minutely serrate, inner apex with a minute sharp tooth. (See Fig. 33).

Color: Pale gray, distinctly marked with fuscous, vertex with a black line near the ocellus, black point at tip, with fainter branches extending back upon the apical depression, and faint transverse bar between the eyes, a minute black line near the base. Front with fine fuscous arcs, blackish sutures, and shaded median stripes on the apex of front. Pronotum with three pairs of black dots near the anterior margin, and, in the male, two short black stripes each side. Elytra pale fuscous, hyaline, with opaque whitish veins. Abdomen with series of black dots each side of the middle, and black lines at the sides of the usual pattern. Beneath black except at the margins, the apex of female segment, base of male valve, and inner genitalia, black.

Length: Female, 4 mm.; male, 3 mm.

Collected at Grand Junction, Colo., by the author, March 1910. Types in National Museum (No. 43179) and author's collection.

A possible variety is noted in a male specimen with markings obscure and with the internal genitalia, (Fig. 49) somewhat different but this was taken at same date and locality and I

believe it to be only a variation. Comparison of the internal genitalia of a number of specimens may be necessary to determine this matter. As seen in undissected specimens the one shown in Fig. 33 seems to be correct.

***Amphipyga acuticauda* (Baker).**

(Plate I, Fig. 1.)

Athysanella acuticauda Baker, Psyche V. VIII, p. 187, (1898).
Aconura acuticauda Van Duzee, Catalog, Hemip., p. 653, (1917).

Head wider than pronotum; vertex bluntly angular, two-thirds as long at middle as width between eyes. Pronotum about as long as vertex. Scutellum small in micropterous, larger in macropterous form. Elytral veins running to apex, no anteapical cells in micropterous, two and broad costal cells in macropterous form.

Female segment truncate or slightly concave; ovipositor extending a little more than one-fifth beyond pygofer; male valve large; hind border rounded; plates short, triangular, reaching a little more than half way to tip of pygofer; pygofer broad, short, somewhat produced and angular or bluntly dentate at tip, with stiff submarginal bristles above, (See Fig. 28).

Internal Genitalia: Styles elongate, simple, nearly reaching tip of plates, aedeagus strongly curved, tapering to sharp point with large basal spur.

Length: Female, 3.5-4 mm.; male, 3 mm.

Described from Illinois. I have collected specimens from Iowa, Maine, Kalispell, Mont., Brookings, S. D., Fort Collins, Colo., Devil's Lake, N. D., and it has been recorded from New York. It probably occurs throughout the range of Canadian blue grass which appears to be a favorite food plant. It often occurs in enormous numbers and must constitute a serious drain on the forage value of this grass.

***Amphipyga balli* Osborn**

(Plate I, Fig. 3.)

Amphipyga balli Osborn, Bull. 14, Ohio Biol. Survey, 1928, p. 289.

Resembling acuticauda in size and general appearance but with distinct stripes on the elytra and very different genitalia. Head slightly wider than pronotum; vertex broad, faintly angulate, as long as pronotum; front narrowing uniformly to clypeus; clypeus broad, slightly elevated medially; loræ large; cheeks narrow. Pronotum faintly striate. Elytra reaching base of abdomen, truncate behind. Abdomen broad. Female ovipositor extruded about one-fourth its length; last ventral segment short, scarcely longer than preceding, truncate or very faintly sinuate, polished. Male, pygofer, short, lower angle slightly produced; valve broad, rounded behind; plates short, triangular, inner border sinuate; style large, with a long spur; aedeagus expanded, furrowed and serrate. (See Fig. 29).

Color: Light gray, a large round black spot each side on border between vertex and front, a small black dot at apex, three pairs of small fuscous dots on pronotum, and three broad stripes and a wedge-shaped shorter one on the elytra; the abdomen with four series of fuscous dots each side; beneath fuscous, with yellowish patches at the sides and on the middle part of the abdomen.

Length: Female, 4 mm.; male, 3 mm.

Described from numerous specimens collected at Burlington, Iowa, by the writer, Ames, Iowa, (Ball and Osborn); Columbus, Bellaire, and Marietta, Ohio, (Herbert Osborn). This species has been confused with *acuticauda*, but the details of internal genitalia as well as other distinctive characters establishes its identity. Type and paratypes in collections of author and Dr. E. D. Ball and National Museum, (No. 43180).

***Amphipyga californica* n. sp.**

Small, dark colored, resembling *acuticauda* but smaller and with the veins of inner sector coalesced for some distance. Head slightly wider than pronotum, vertex short, broad, slightly longer than pronotum, very obtusely angulate; Pronotum slightly concave; scutellum small; Elytra obliquely truncate, the veins of inner sector of medius coalesced with radial for nearly one-third its length; abdomen broad; pygofer large, sloping, apex rounding with a minute process at tip, and a few scattering bristles near the upper border; valve large rounded behind; plates short, approximate, wide at base, narrowing sharply to blunt, black tipped apices.

Color: Dark gray, with fuscous markings; vertex with a dark gray band and short oblique stripe at base, two shiny black spots on front border, without central dot; front with short arcs, black sutures; pronotum with two black dots near the middle anteriorly, two larger dots behind the eye, a pair of dusky stripes near the middle, and a broader patch at the side; elytra with veins whitish, bordered with fuscous, and disc of the cells obscurely hyaline; abdomen with spots united to form fairly distinct stripes, pygofer with a black spot at base; valve and tips of plates, and apical tooth of pygofer, black.

Length: Male, 1.7-2 mm.

Described from a single male (holotype, author's collection) collected by the writer at Elsinore, Cal., Feb. 6, 1924. This species might be taken for a small *acuticauda*, but it differs distinctly in absence of the black dot at tip of vertex, the coalesced veins of elytra, and the shape of the plates. Dr. Ball has sent me a second specimen, from Ephriam, Utah, which agrees perfectly with the one described above except that there is a fairly distinct apical dot on vertex and a pair of dark lines on median line of front.

Pectinapyga n. g.

Vertex as long as broad, somewhat flattened, a little depressed toward the tip, rather distinctly angulate to front; ocelli distinctly above but close to the margin and very small. Pronotum short; scutellum small, wider than long, micropterous forms with elytra very short, barely reaching second abdominal segment; male hind tibia with a short spur half as long as first tarsal segment (Text Fig. 1a); ovipositor moderately long, extending about one-fourth its length beyond the pygofer, male pygofer with a chitinous tri-lobed or pectinate process on the lower hind border close to the apex, more or less concealed in the dry specimens, (See Fig. 48). Aedeagus with a slender basal rod, and expanded curved distal part, at the base of which is a large dorsal spur, style bilobed, acute at apex. Type species *Pectinapyga texana*.

Pectinapyga texana n. sp.

(Plate IV, Fig. 16.)

Small, rather slender, somewhat flattened. Head scarcely as wide as pronotum, distinctly angulate; vertex flattened, as long as broad, nearly twice as long at middle as next to eye; ocelli minute, close to anterior border; front slightly flattened, straight in profile, about as wide as long; clypeus half longer than width at base, sides nearly parallel, disk slightly elevated; loræ elongate, reaching nearly to border of cheek. Pronotum broad, short, about two-thirds the length of the vertex; scutellum very small; Elytra short, reaching to base of second abdominal segment; Ovipositor one-fourth longer than pygofer; last ventral segment half longer than preceding segment, hind border slightly sinuate. Male, valve short, obtusely angular; plates broad at base, elongate, more than twice as long as valve, distinctly expanded on basal fourth, inner border nearly straight, apex bluntly rounded; pygofer elongate, obliquely narrowed from base of anal tube, apex bearing a conspicuous black chitinous tridentate process, more or less concealed or enfolded in dry specimens, a small cluster of bristles near the upper hind border. Internal genitalia, style expanded, bilobed, aedeagus with slender basal rod, expanded apical part, strongly curved, with large basal process, (See Fig. 48a and b).

Color: Quite variable, pale specimens, being almost devoid of markings, darker specimens possessing fairly well marked dots, or dashes of fucous, evident between the veins of elytra and markings on abdomen; a central patch on last ventral segment of female, a basal spot on pygofer both males and females dark; on abdomen the markings consist of series of basal dots and with marginal dashes next to spiracles.

Length: Females, 3 mm.; males, 2 mm.

Described from numerous specimens from Brownsville and San Antonio, Texas.

Holotype (female) and allotype (male) Brownsville, Texas, and paratypes, Brownsville, Corpus Christi and San Antonio,

Texas, collected by the writer. Specimens also from Wellington, Kansas, collected by W. H. Larrimer, and Clay Co., Kansas (J. H. Schaffner). (Type No. in National Museum 43181).

Genus *Athysanella* Baker.

Psyche, Vol. VIII, p. 185, (1898).

Aconura Leth., Horvath, *Ann. Mus. Nat. Hung.* VI, p. 567, 1908.
Nephotettix, Mats., Van D., *Catalog Hemip.*, p. 653, 1917, (in part).

The species of this genus have a superficial resemblance to species of *Euscelis*, *Lonatura*, and *Doratura*, and as restricted will include besides the type species, *magdalena*, several other forms occurring in the plains regions east of the Rocky Mountains.

Head wider than pronotum; vertex somewhat produced, obtusely angulate, rounded to the front, somewhat depressed on the vertex, and usually with two large and one small black spot, both macropterous and brachypterous forms, and the hind tibiae in the males bear a strong spine at tip usually about half as long as first tarsal segment; the male plates are variable in length and form styles strong; the pygofer truncate or rounded behind, without teeth or processes at the lower angle.

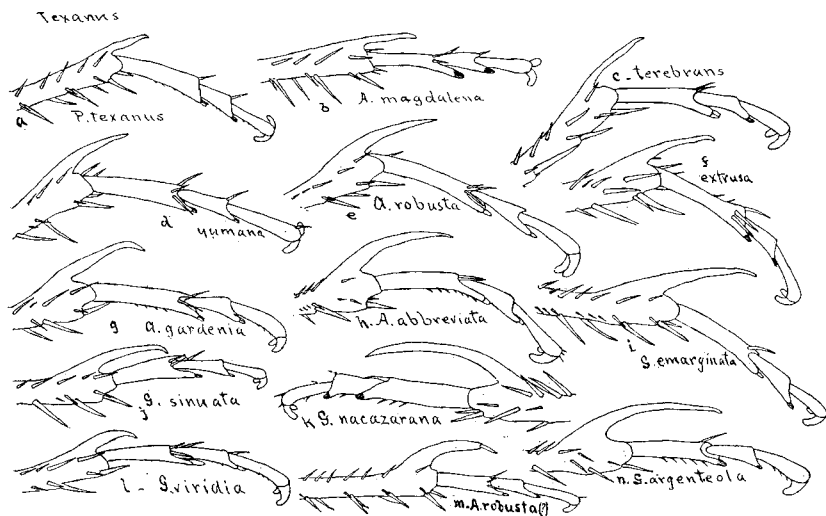
KEY TO SPECIES OF *ATHYSANELLA*.

- 1. Vertex longer than pronotum, obtusely angulate..... 2
 Vertex not longer than pronotum, broadly angulate..... 9
- 2. Female segment convex or produced, long at middle..... 3
 Female segment emarginate or short at middle..... 6
- 3. Male plates triangular..... 4
 Male plates obliquely truncate or quadrangular..... *terebrans* G. & B.
- 4. Male styles long capitate..... *attenuata* Baker
 Male styles slender at tip..... 5
- 5. Male pygofer rounded, plates longer than wide..... n. sp.
 Male pygofer truncate, plates wider than long..... *extrusa*
- 6. Female segment not deeply sinuate..... *utahna* n. sp.
 Female segment deeply emarginate or sinuate..... 7
- 7. Female segment cut half way to base, male plate triangular.... *yumana* n. sp.
 Female segment cut to base..... 8
- 8. Smaller, female 3 mm., male 2.25 mm..... *gardenia* n. sp.
 Larger, female 4.5 mm, male 3 mm..... *curtipennis* G. & B.
- 9. Female segment produced at middle..... 10
 Female segment emarginate or deeply sinuate at middle..... 11
- 10. Male plates long, female segment with long central lobe.... *magdalena* Bak.
 Male plates short, half as long as pygofer; female segment short, mid-lobe short..... *montana* n. sp.
- 11. Female segment emarginate half way to base, male plate short.. *robusta* Bak.
 Female segment cut to near base (Tex.)..... *excavata* n. sp.

***Athysanella robusta* Baker.**
(Plate V, Fig. 22.)

Athysanella robusta Baker, Psyche, Vol. VIII, p. 189, 1898.
Aconura robusta, Van Duzee, Catalog. Hemip., p. 653, 1917.
Aconura robusta, Lawson, Kansas Sci. Bull., XII, p. 164, 1920.

Head large, wider than pronotum; vertex short, scarcely longer than pronotum. Pronotum slightly concave; elytra truncate; male tibial spur short (Text Fig. 1e and m?); abdomen tapering; ovipositor extending about one-fourth its length, beyond the pygofer; last ventral segment long, deeply excavated, median lobe about half as long as lateral; male pygofer rounded, sub-angulate on posterior border; valve distinctly angular; plates short, about half as long as pygofer, divergent, hind border rounded; styles elongate, with two long widely separated spurs, curved at the tips; aedeagus narrow, sharply angled.



TEXT FIG. I. Tibial Spurs.
a, texanus; b, magdalena; c, terebrans; d, yumana; e, robusta; f, extrusa;
g, gardenia; h, abbreviata; i, emarginata; j, sinuata; k, nacazarana;
l, viridia; m, *A. robusta* var. (?); n, argenteola.

Color: Pale, gray, vertex with two shiny black spots near the eyes, and brown spots at apex and on the disc, frontal arcs distinct, sutures blackish, pronotum with three pairs of black dots near the front border; elytra hyaline, cells somewhat infuscate, veins whitish; abdominal dots merging into stripes, a fuscous stripe on the side of the pygofer of the female; tip of ovipositor, brown.

Length: Female, 3.75 mm.; male, 3 mm.

Redescribed from male and female specimens, collected at Ames, Iowa. The species was described from Colorado and

has been reported from Kansas, and I have specimens from various points in Colorado, and the DeLong collection includes one from Carns, Nebraska, collected by W. D. Pierce.

***Athysanella montana* n. sp.**

(Plate V, Fig. 23.)

Head broad, scarcely as wide as pronotum, vertex wider than long, as long as pronotum, sub-angulate, front convex. Pronotum slightly concave. Elytra hyaline, macropterous female with venation of typical form with an accessory cell on each elytron, but in different positions, and three or four cross veins at base of outer anteapical. Ovipositor about one-fifth longer than pygofer; last ventral segment short, broadly sinuate, middle lobe longest, polished black. Male pygofer short, but with a curved upturned extension posteriorly; valve rather narrow, long, obtusely angulate; plates short, half as long as extended pygofer, apex upturned, acute; styles short, tips exposed behind plates.

Color: Dull gray, with fuscous marking; vertex with a series of basal spots, a small black dot at apex; frontal arcs broken into dots, a double stripe near the apex; pronotum with a pair of dots near the middle in front, a series of fuscous patches across the disc, a central spot and triangles at base; the macropterous form with narrow fuscous edgings on the whitish veins. Male elytra unmarked; abdomen with the usual series of dots; beneath, pectus and venter on disc, blackish; legs pale with fuscous lines.

Length: Female, 3.5 mm.; male, 2.5 mm.

Described from one female, macropterous (National Museum No. 43182), one male, brachypterous, collected at Havre, Mont. by W. H. Larrimer. This species differs decidedly from *robusta* in the extended upturned tip of pygofer as well as in other details.

***Athysanella magdalena* Baker.**

(Plate III, Fig. 11.)

Athysanella magdalena, Baker Psyche, Vol. 8, p. 185, 1898.

Aconura magdalena Van Duzee, Catalog Hemip., p. 653, 1917.

Rather small, head wider than pronotum, angulate; vertex about as long as width between eyes, convex, somewhat depressed posteriorly, roundly angulate to front; front thick, slightly flattened. Pronotum as long as vertex; scutellum rather large; Elytra macropterous with two anteapical areoles, three oblique veins in costal areole, next the outer anteapical. Male tibial spur short, straight, (Text Fig. 1b).

Genitalia: Female ovipositor extended about one-third its length beyond pygofer; last ventral segment deeply sinuate, central lobe produced and bordered with black; male, valve short, rounded behind; plates elongate, divergent, inner border strongly curved, outer border nearly straight; pygofer of hind border truncate, excavated dorsally about one-half its length; internal genitalia; styles divergent, acutely pointed.

The type specimens of *Athysanella magdalena* were from Magdalena Mts., N. Mex., and Ft. Collins, Colo. Specimens collected by the writer at Pueblo, Colo., 1910, agree with type material and Baker's description.

***Athysanella attenuata* Baker.**

(Plate II, Fig. 5.)

Athysanella attenuata Baker, Psyche, Vol. 8, pp. 188.

Aconura attenuata Van Duzee, Catalog, Hemiptera, p. 653, 1917.

Head wider than pronotum, obtusely angular; vertex about as long as width between the eyes, rounded to front, depressed to behind the middle, and with a small depressed area near the tip; front narrowed below; clypeus longer than width, tapering slightly to truncate apex. Pronotum about two-thirds as long as vertex; scutellum wider than long. Elytra, brachypterous form, truncate behind, reaching on to second abdominal segment.

Genitalia: Female last ventral segment long, nearly twice as long as preceding, produced at middle. Male valve obtusely angular; plates short, broad, obliquely truncate behind, not reaching tip of pygofer; pygofer broad, obliquely rounded behind; styles reaching tip of plates, strongly bidentate; aedeagus large, expanded toward tip, with a strong ventral furrow.

Color: Light gray; vertex and pronotum with small brown or fuscous dots; elytra with dark stripes between the veins; abdomen dotted and lined with fuscous, a quite definite line below the spiracles; disk of last ventral segment in the female and valve of male, fuscous.

Length: Female, 3.5 to 4 mm.; male, 3 mm.

Described from Colorado. Numerous specimens collected by the writer at Pueblo, Colorado, April, 1910.

***Athysanella gardenia* n. sp.**

(Plate II, Fig. 10.)

Robust, rather short, head scarcely wider than pronotum, vertex wider than long, longer than pronotum, sub-angulate. Pronotum slightly sinuate. Elytra obliquely truncate. Male tibial spur curved at tip, (Text Fig. 1g). Ovipositor rather short, extending about one-fifth its length beyond the pygofer; last ventral segment very deeply excavate, lateral lobes and tip of median lobe only, showing. Male pygofer broad, hind border sinuate; valve long, narrow, sharply angular; plates broad, widely separate, quadrate, about half as long as pygofer; styles exposed, widened at the middle, extended into divergent curved tips; aedeagus abruptly curved, furrowed, margins faintly serrate (Fig. 42, a and b).

Color: Ashy gray; vertex with two conspicuous blackish spots between ocelli, a small round black spot at tip, with a minute dot each side, a faint fuscous triangle near the tip, a fuscous patch on the disc,

and a black dot near the base. The front with diminishing fuscous arcs, a double wedge-shaped spot toward the apex; pronotum with six dots near the margin; elytra ashy sub-hyaline, veins paler; abdomen with usual series of dots, apex of sixth segment black, disc of venter dusky, base of valve, style and aedeagus black; tip of ovipositor, reddish brown.

Length: Female, 3 mm.; male, 2.25 mm.

Described from a series of specimens collected by the author in the Garden of the Gods, Colorado, April, 1910. These are similar in size to *occidentalis* but differ in genitalia, and the males have a distinct tibial spur. National Museum Type No. 43183.

Athysanella curtipennis (G. & B.)

Athysanus curtipennis Gillette and Baker, Hemip. Colo., p. 92.
Nephotettix curtipennis, Van Duzee, Catalog Hemip., p. 653, 1895.

Varied with fuscous and light yellow; vertex with two prominent black spots, the elytra with fuscous stripes; abdomen rather strongly marked with fuscous; Head broader than prothorax; vertex bluntly rounded, a little more than one-half as long at middle as width between the eyes, one-fourth longer at middle than next the eye, rounded to front; front broad, narrowed uniformly to apex; clypeus, narrow toward tip, longer than width; loræ broad, not touching margin of cheek; margins of cheek slightly sinuate; pronotum short, scarcely as long as vertex; scutellum small, triangular; elytra short, extending to second abdominal segment; ovipositor long, extending one-third its length beyond tip of pygofer; last ventral segment, female, deeply excavate, lateral angles extended; male, valve large, rounded behind; plates broad, obliquely truncate at tip, outer angle rounded; pygofer elongate at lower margin, extended into slender curved spine; styles elongate and distinctly hooked at tip with a broad spur near the base. Aedeagus upturned, broad and furrowed, outer margins minutely dentate.

Color: Dull gray, the vertex with rounded black spots and triangular brown patches near occiput; pronotum with about six black dots behind the anterior margin; the elytra with six or seven fuscous stripes in the areoles; abdomen with a double median stripe, a lateral stripe interrupted by spots midway to pleura, and a pleural series of triangular spots. Face, light yellowish, the front with broken fuscous or brownish bars; beneath light yellowish with series of brownish spots on the abdomen and lateral stripes on the pygofer.

Length: Female, 4.5 mm.; male, 3 mm.

Redescribed from Colorado specimens. Numerous specimens referred here have been examined from various sources including records for "Colo", "La Salle, Col." "Dutch Gap," etc.

***Athysanella terebrans* (G. & B.)**

(Plate II, Fig. 6.)

Eutettix terebrans Gillette and Baker, Hemip. Colo., p. 102.
Athysanella incongrua Baker, Psyche, Vol. VIII, p. 188, (1898).
Aconura incongrua Van Duzee, Catalog, Hemip., p. 653, (1917).
Nephotettix terebrans, Van Duzee, Catalog, Hemip., p. 653, (1917).

Large, robust, head wider than pronotum, vertex longer than pronotum, wider than long, scarcely depressed on the disc, very obtusely angulate; pronotum short. Elytra nearly truncate, reaching base of third segment. Tibial spur of male slender, (Text Fig. 1c). Female, ovipositor long, reaching one-third its length beyond the pygofer; last ventral segment sinuate; middle lobe nearly as long as lateral, black margined; Male pygofer rounded, broad; valve long, distinctly angled; plates broad, divergent, truncate at apex; styles very large with a sharp lateral tooth; aedeagus much inflated, furrowed behind, the margins minutely serrate, apex recurved and sharp, (See Fig. 34).

Color: Pale gray; vertex with a prominent black lunate spot over ocelli, a small round black point at apex, faint brownish spots and a transverse broken bar, two minute dots at hind border; front with short fuscous arcs, an expanded double stripe on the middle; pronotum with three pairs of black dots; elytra ashy, sub-hyaline, veins a little lighter; claval suture black; abdomen with the usual arrangement of black dots, merging somewhat more into lines, disc of venter dark, and base of male valve, the styles and aedeagus, black.

Length: Female, 5 mm.; male, 3 mm.

Redescribed from specimens collected by the author at Pueblo, Colo., April, 1910. The males agree closely with the type specimen of *incongrua* in the National Museum, and females associated with them answer exactly to the description of *terebrans*. The much enlarged style and aedeagus are easily seen without dissection as they extend beyond the pygofer.

***Athysanella extrusa* n. sp.**

(Plate II, Fig. 8.)

Similar to *curtipennis*, large, robust, head wider than pronotum, vertex a little longer than pronotum, pronotum slightly concave, elytra extending on to second abdominal segment, hyaline. Male tibia with short spur, (Text Fig. 1f). Female ovipositor long, extending about one-third its length beyond the pygofer, female segment very long, truncate, and longitudinally striate; male pygofer broad, truncate behind; valve very broad, obtusely angulate; plates very short, wide apart, divergent, outer margin sinuate; styles with a very long slender appendage, entirely exposed beyond the short plates; aedeagus widening toward tip, coarsely serrate at apex and with a short sharp tooth at inner tip, (See Fig. 35a and b).

Color: Dull gray or ashy, vertex with two large black spots between ocelli, and a black spot at tip extending down to the front, which has a series of conspicuous fuscous arcs. Sutures black; pronotum with faint clusters of dots, more marked in the male. Elytra hyaline, abdomen with a series of dots in the female, which merge into black stripes on the male, the median and intermediate ones including white dots. Disc of venter, middle of female segment, most of the male valve, style, and aedeagus, black.

Length: Female, 5 mm.; male, 3 mm.

Described from a series of thirteen specimens, five females and eight males, type and paratypes, from Springer, N. M., collected by C. M. Ainslee. National Museum Type No. 43184. This agrees in many respects with *curtipennis* but the female segment and male genitalia both appear very distinct.

***Athysanella yumana* n. sp.**

(Plate II, Fig. 9.)

Robust, head broader than pronotum; vertex wider than long, distinctly longer than pronotum. Pronotum short, angularly emarginate behind; scutellum minute. Elytra reaching on to second abdominal segment, slightly convex on hind border. Male with a short tibial spur, (Text Fig. 1*d*). Female, ovipositor long, extending one-third its length beyond the pygofer, last ventral segment broadly excavate, the median lobe little more than half as long as the lateral lobes. Pygofer sparsely bristled. Male, pygofer rounded behind; plates elongate triangular, divergent, apex bluntly rounded; valve short, styles broadly bifid, the outer lobe slightly curved; aedeagus expanding dorsally, minutely serrate on hind border, tip slightly notched.

Color: Pale gray, or ashy, vertex with a black point at tip, and one over each ocellus, a faint sutural line on the elytra, the abdominal series of black points, those near the middle and at margin more distinct. A few median spots on the venter, the middle of the female segment, base of male valve, blackish.

Length: Female, 4 mm.; male, 2.75 mm.

Described from numerous specimens collected by the author at Yuma, Arizona, February, 1910. This species resembles *curtipennis* but the genital structures of both sexes differ in important details. Types in author's collection and National Museum. (Type No. 43185.)

***Athysanella excavata* n. sp.**

(Plate V, Fig. 25.)

Robust, head slightly wider than pronotum, vertex short, wider than long, scarcely longer than pronotum. Elytra extending on to second abdominal segment. Ovipositor long, extending one-third its

length beyond the pygofer; last segment deeply excavate, leaving a triangular lateral lobe and barely showing a central lobe at base.

Color: Dull gray, markings indistinct, a faint cloud on the vertex; elytra hyaline, veins obscure; abdomen with minute dots in a series at base of segments; ovipositor tipped with brown; venter dark on the disc.

Length: Female, 4.5 mm.

Described from four specimens, two collected at Brownsville, Texas, one at Corpus Christi, and one at San Antonio, Texas, by the writer. National Museum Type No. 43186. These resemble *curtipennis* in the female segment but have no trace of the black spots and can hardly be referred to that species with certainty.

***Athysanella utahna* n. sp.**

(Plate III, Fig. 12.)

Pale gray, or distinctly yellowish, variable with, in some cases very faint traces of dots; length, female 4.5 mm.; male, 2.5 mm.

Head, scarcely wider than pronotum, vertex long, slightly depressed behind, the middle obtusely angulate, twice as long at middle as next the eye, rounded to front; front broad, narrowing abruptly to clypeus; clypeus narrowing to tip; loræ rather narrow and short; margins of cheek faintly sinuate under the eye, otherwise nearly straight; margin, pronotum short, about three-fourths as long as vertex; hind margin sinuate; scutellum small, elytra obliquely truncate, transparent, the veins very indistinct, faintly punctured; tibial spur over half as long as first tarsal segment; ovipositor nearly one-half longer than pygofer; last ventral segment rather long, truncate or very slightly emarginate, lateral angles nearly acute; male, valve broad, hind border rounded or slightly produced medially; plates broad at base, narrowing toward the tip, divergent, outer margin concave, pygofer broad, short, hind margin rounded; styles, divergent, sharply curved toward tips, aedeagus broad, furrowed, faintly dentate, with a strong dorsal tooth. (Fig. 41, a and b).

Color: Varying from pale gray to rather bright greenish-yellow; in the male there are fairly distinct frontal arcs, otherwise markings are very faint or absent.

Described from a series of specimens from Dr. E. D. Ball, collected at Richfield, Utah, Aug. 24, Sept. 3, 1915, Sept. 6, 1915, Ephriam, July 20, Monroe, July 25, 1906, also Wray, Col., July 13, 1899, Grand Junc. Colo. July 27, 1900, Aug. 7, 1906. Types in collections of E. D. Ball, the author, and U. S. National Museum. (Type No. 43187).

Genus *Gladionura* n. g.

Slender, vertex usually longer than wide, distinctly angular, female ovipositor long, the male pygofer oblique and terminating in an acute tip, recurved hook or long process more or less curved at tip. Plates long often exceeding the pygofer, styles blunt or with blunt process, aedeagus upturned not or scarcely furrowed on the hind border but with a distinct emargination on inner part of apex. (See Fig. 44-46). Males with a long spine at tip of tibia often as long as first tarsal joint. Type species *argenteola*, Uhl.

KEY TO THE SPECIES OF GLADIONURA.

1. Male pygofer short, sloping, ending in acute tip or blunt spur..... 2
Male pygofer narrowing and extended into a long process often curved
and hooked at tip..... 6
2. Male pygofer with a blunt upturned recurved spur at tip..... *recurvata* n. sp.
Male pygofer with acute tip or short apical spur..... 3
3. Female segment not emarginate, convex and sinuate, male pygofer with
blunt spur..... *sinuata* n. sp.
Female segment emarginate on hind border, male pygofer acute..... 4
4. Female ovipositor short, scarcely exceeding pygofer..... *abbreviata* n. sp.
Female ovipositor considerably longer than pygofer..... 5
5. Male plates long, not or slightly divergent, 4 mm..... *emarginata* n. sp.
Male plates short, divergent. Small, 2-3 mm..... *frigida* n. sp.
6. Vertex long, rather sharply angular, female segment emarginate,
argenteola Uhl. 7
Vertex shorter, bluntly angled..... 7
7. Larger, 4 mm., Grass green..... *viridia* n. sp.
Smaller, pale gray or whitish..... 8
8. Male pygofer with very long slender extension..... *extensa* n. sp.
Male pygofer with produced sharp tip not elongate..... *nacazarana* n. sp.

Gladionura recurvata n. sp.

(Plate IV, Fig. 17.)

Similar to *argenteola*, but with produced female segment, short male pygofer, and slender style. Head slightly wider than pronotum, vertex as long as broad, nearly half longer than pronotum, distinctly depressed behind the middle, and with a shallow depression near the apex. Pronotum sinuate, elytra extending to base of third segment. Tibiæ of the male with a short spine. Female (?) ovipositor long, extending more than one-third its length beyond the pygofer; last ventral segment produced medially, lateral angles scarcely visible; male pygofer long, tapering to near tip, apex strongly bent, recurved; valve long, angulate; plates broad, outer margins sinuate; style with a rather thick elongate process directed backward, aedeagus broad, inner tip emarginate, (Fig. 38).

Color: Pale gray, markings very faint, elytra milky hyaline, disc of venter dusky.

Described from one specimen, male, (holotype) collected at Yuma, Arizona, by the writer, Feb. 1910. The female associated

with this specimen with some doubt has the segment as described, and the markings of the vertex somewhat more distinct. It is possible that it belongs to a different species.

***Gladionura aridicola* n. sp.**

(Plate IV, Fig. 18.)

Head as wide as pronotum, angulate; vertex scarcely as long as width between eyes, longer than pronotum; pronotum short, slightly concave behind; elytra, micropterous form, short, reaching second abdominal segment, truncate. Female last ventral segment nearly twice as long as preceding, truncate; ovipositor short scarcely one-fourth longer than pygofer. Male valve obtusely angular; plates broad outer margin sinuate; pygofer obliquely truncate, with a cluster of spines dorsally; style with sharp dorsal tooth; aedagus curved, outer border sinuate, faintly serrate. (Fig. 39.)

Color: Ashy gray with dots of fuscous in series on base of abdominal segments and a dark band at base of pygofer and a central dark patch on female segment.

Length: Female, 3.5 mm.; male, 2.5 mm.

Described from one female (holotype) Yuma, Ariz. (H. O.) one female (paratype) Tucson, Ariz. and two males (allotype and paratype) Yuma, Ariz. The males placed here cannot be connected with the females with absolute certainty but agree so closely that it seems best to associate them.

In the key this would fall near *recurvata*.

***Gladionura sinuata* n. sp.**

(Plate III, Fig. 13.)

Small, size of *argenteola*, slender, head wider than pronotum, vertex a little longer than wide, more than half longer than pronotum, faintly depressed. Elytra extending half way on second segment. Female ovipositor more than one-third longer than pygofer; last ventral segment produced, nearly twice as long as preceding, hind border sinuate, the middle lobe longest; male pygofer short, with a blunt spur at the hind angle; valve sub-angulate; plates large, extending beyond the pygofer, apex acute; style broad toward the tip, slightly emarginate on outer margin, aedeagus broad, tip rather slender, deeply emarginate on inner border, (Fig. 43).

Color: Dull gray, with very faint marks, ocelli blackish elytra hyaline; abdomen with minute dots in basal series, disc of venter blackish; female segment bordered with black.

Length: Female, 3.5 mm.; male, 2.5 mm.

Described from a long series, collected by the writer in the Garden of the Gods, Colo., April, 1910.

Gladionura abbreviata n. sp.

(Plate V, Fig. 27.)

Head wide, wider than pronotum, vertex broad, somewhat depressed, longer than pronotum, bluntly angulate to front. Pronotum rather deeply concave; scutellum minute, Elytra truncate. Female ovipositor short, barely passing the pygofer, last ventral segment emarginate, hind border sinuate; male pygofer short, apex acute, not produced; valve short, angulate; plates long, tips acuminate, extending beyond the tip of pygofer; styles shorter than plates, ending abruptly in a flattened knob; aedeagus short nearly straight, not inflated, the tip emarginate on the inner face, (Fig. 45). Tibiæ of male with a long spur curved at base and a little upturned at tip, (Text Fig. 1*h*).

Color: Pale gray, some of the specimens suffused with greenish, vertex with markings obsolete, or faintly indicated; frontal arcs very faint; elytra hyaline, veins very indistinct, in one specimen a row of dots on the hind border; abdomen with minute dots; beneath, pectus and venter blackish.

Length: Female, 3.25 mm.; male, 3 mm.

Described from four specimens, one female (type) and three males (allotype and paratypes), Capa, S. Dak., Aug. 12, 1922, H. C. Severin. (U. S. National Museum Type No. 43188.) This species is unusual in the group on account of the very short ovipositor, possibly an abnormal case as only one specimen was in hand. The male genitalia, however, are quite distinct from those of any other species, although falling in the *argenteola* group.

Gladionura emarginata n. sp.

(Plate IV, Fig. 19.)

Resembling *argenteola* but larger, the female segment obliquely excavate, male pygofer shorter. Head wider than pronotum; vertex as long as broad, nearly half longer than pronotum, distinctly angulate. Pronotum short, distinctly concave. Elytra, (brachypterous) reaching second abdominal segment, macropterous female, reaching to tip of pygofer. Male tibial spur thick at base, long, (Text Fig. 1). Female ovipositor long, extending one-third its length beyond the pygofer; last ventral segment deeply emarginate, the lateral angles incurved, the hind border sinuate, scarcely visible beyond the preceding segment, except at center where there is a short lobe. Male, pygofer sloping, rather short, the apex bluntly toothed; the valve short, slightly angulate; plates very broad, extending up onto the pygofer, tip acute, meeting on the inner border near the tip; style very broad, with two prominent lobes, reaching about to tip of plate. Aedeagus broad, with a broad emargination on inner tip, (Fig. 37).

Color: Dull gray or ashy, the markings very faint, nearly obsolete

on vertex and pronotum; elytra sub-hyaline; the veins narrowly milky; abdomen with usual dots merging into stripes in the male.

Length: Female, 4.5 mm.; male, 3 mm.

Described from a number of specimens (type and paratypes) collected at Corpus Christi and San Antonio, Texas, by the writer, Feb. 1910. National Museum Type No. 43189. Quite a number of specimens, particularly those from San Antonio, are long winged for the females and show a typical venation. Fresh specimens have a brilliant metallic green-gold color which disappears soon after they are killed.

***Gladionura frigida* n. sp.**

Light gray, faintly marked, tinged with brownish; length female, 3 mm.; male, 2.25 mm.

Head wider than pronotum; the vertex sub-angulate, depressed behind the middle, one-third longer at middle than next the eye; front broad; clypeus distinctly narrowing toward tip; loræ elongate, cheeks slightly sinuate; pronotum, strongly arched, scarcely as long as vertex, distinctly concave behind; scutellum short, wider than long; elytra obliquely truncate, reaching apex of the second abdominal segment; ovipositor about one-fourth longer than pygofer; female, last ventral segment, broadly excavated behind; lateral angles rounded; male pygofer short, produced below but not spined; valve short, produced at center to a sharp angle; plates broad, short, divergent; claspers broad with a strong outer spur, aedeagus strongly upturned and polished, expanding dorsally.

Color: Pale gray, somewhat tinged with brown; vertex and pronotum with faint, minute brownish dots; abdomen with a series of dots at base of each segment; the front with distinct brownish or fuscous arcs. Five specimens, 3 female and 2 male.

N. Colo. 5-18, and 4-2 '98. Holotype, allotype and paratypes. Collection of E. D. Ball. (Paratypes in Osborn Collection and National Museum, No. 43190.)

***Gladionura argenteola* (Uhler).**

(Plate III, Fig. 14.)

Deltoccephalus argenteolus Uhler, Bull. U. S. Geol. & Geog. Surv. III, p. 473, 1877.
Aconura argenteola, Van Duzee, Catalog Hemipt., 653, 1917.

Small, slender, head as wide as pronotum, produced angular, but rounded at tip, vertex slightly depressed on the disc, as long as wide, longer than pronotum; scutellum minute; elytra reaching to hind border of second abdominal segment. Tibia of male with a strong, curved spine. (Text Fig. 1*n*). Female segment broadly emarginate; hind border within the lateral lobes, straight or slightly convex, narrow, scarcely as long as preceding segment. Male, pygofer sloping, pro-

duced into a sharp spine slightly curved at tip; plates broad, divergent, slightly sinuate on the margin with acute angle at tip; style blunt, as long as plate; aedeagus rather long, slender, emarginate at inner part of tip, (Fig. 36).

Light gray, or sometimes greenish white, fresh specimens with brilliant metallic luster, vertex with faint brown dot at tip, and brown ocelli, elytra tinged with greenish, abdomen with faint minute dots at base. The apex of sixth segment in female, tips of pygofer and style, and the tarsal claws blackish.

Length: Female, 3 mm.; male, 2.5 mm.

This species was described from Colorado and is common in western half of Kansas, being taken as far east as Ottawa County in the plains grasses. It has been taken in great numbers by the author and by Dr. Lawson and must be a heavy drain upon the forage value of the range grasses.

***Gladionura viridia* n. sp.**

(Plate V, Fig. 26.)

Resembling *argenteola* but larger, and retaining green color, and differing in genitalia. Head, scarcely wider than pronotum; vertex as long as wide, nearly half longer than pronotum, with a slight depression toward the tip; elytra reaching hind border of second abdominal segment, sub-truncate behind; male tibial spine short, (Text Fig. 17). Ovipositor long, extending one-third its length beyond the pygofer; last ventral segment of female emarginate, and with the border between the lateral angles rather distinctly sinuate and about half as long as lateral angles. Male pygofer elongate, narrowed from the middle, and extending into a long process sharply hooked at tip; valve triangular, about half as long as plates; plates large, broad, covering sides of pygofer, divergent, apex acute; styles flat, broadly expanded at tip into three broad lobes. Aedeagus rather short and broad, slightly curved, deeply emarginate on inner tip. (See Fig. 44).

Color: Grass green, persisting in the dried specimens, with very minute dark dots. Vertex with a black dot each side at base; ocelli black; frontal arcs pale; elytra hyaline, suffused with green; abdomen with a series of fine dots at base; ovipositor tipped with brown; venter mostly green; border of the female segment, base of valve, style and aedeagus, black.

Length: Female, 4 mm.; male, 3 mm.

Described from a series of specimens, (types and paratypes), seven females, six males, collected at Montgomery County, Kansas, Aug. 3, 1923, (Beamer-Lawson) and kindly forwarded by Doctor Lawson. (National Museum Type No. 43191.) This belongs to the *argenteola* group but has a very distinct difference in the male styles and a somewhat different outline for the female segment.

Gladionura extensa n. sp.

(Plate VII, Fig. 46.)

Apparently nearly related to *argenteola*, but distinguished by the enormously elongated pygofer which forms a strong hook. Head broad; vertex short, a little longer than pronotum, scarcely angular, faintly depressed near the base, but not at tip, polished; pronotum concave. Elytra reaching to tip of second abdominal segment. Male pygofer broad at base, narrowing abruptly beyond the middle, and extended into a very long process, curved at the tip; valve long, angular; plates elongate, rather narrow, tips bluntly angular; styles much swollen toward the tip, incurved; aedeagus thin, curved, emarginate on inner tip. (Fig. 46).

Color: Light gray, with very distinct fuscous markings, the vertex with two large round black dots, a small dot at apex, and an interrupted transverse band with two minute oblique bands at base. Pronotum with three pairs of dots anteriorly, and three short stripes posteriorly, the middle one continued on the scutellum. Elytra with distinct fuscous stripes in the cells. Abdomen with the usual dots and stripes well-marked; beneath darker; the face with short arcs and an interrupted double stripe on the middle, a large dot just outside the loræ, and the sutures black.

Described from one specimen, male (type) Delphos, Kansas, collected by the writer, April, 1910. Possibly the females are not easily distinguished from *argenteola*.

Gladionura nacazarana n. sp.

(Plate III, Fig. 15.)

Similar to *argenteola* but slightly larger with shorter vertex and with quite different genitalia; head wider than pronotum; vertex as long as wide, one-fourth longer than pronotum; pronotum sinuate; elytra short, reaching on to second segment, convex behind. Male tibia with a long slender spur, (Text Fig. 1g). Female, ovipositor long one-third longer than pygofer, last segment emarginate, the middle section not produced: Male pygofer short, sloping, tip produced into a sharp point; valve long, angled behind; plates large, outer angle acute; styles rather slender, obtusely pointed; aedeagus short.

Color: Pale gray, suffused with yellowish in the female, pinkish in the male; vertex with faint brown dots over ocelli; abdomen with minute blackish dots in the usual series, mostly obsolete in the male; disc of venter, base of male valve, tips of pygofer, styles and aedeagus, black.

Length: Female, 3.75 mm.; male, 2.75 mm.

Described from two specimens, holotype (female) and allotype (male) in Osborn collection, collected at Nacazara, Mexico, July 25, 1907, by J. S. Hine. The difference in color is, I

believe, simply a variation as in all other respects these two specimens collected at the same time appear to agree perfectly in structure.

EXPLANATION OF FIGURES IN THE PLATES.

PLATE I.

- Fig. 1. *Amphipyga acuticauda*: 1a, nymph; 1b, brachypterous female; 1c, vertex and pronotum; 1d, female; 1e, male genitalia, lateral view; 1f, ventral view; 1g, another lateral view; 1h, elytra macropterous, female.
- Fig. 2. *Amphipyga occidentalis*: dorsal view macropterous female: 2a, face; 2b, vertex and pronotum; 2c, female; 2d, male lateral; 2e, ventral view genitalia; 2f, elytron.
- Fig. 3. *Amphipyga balli*, vertex and pronotum: b, female; c, male lateral; d, ventral view genitalia.
- Fig. 4. *Amphipyga aridella*: a, vertex and pronotum; 4b, female; c, male lateral; d, ventral view.

PLATE II.

- Fig. 5. *Athysanella attenuata*: a, vertex and pronotum; b, female; c, male lateral; d, ventral genitalia.
- Fig. 6. *Athysanella terebrans*: a, vertex and pronotum; b, female; c, male lateral; d, ventral view genitalia.
- Fig. 7. *Amphipyga stylata*: a, vertex and pronotum; b, female; c, male lateral; d, ventral view, genitalia.
- Fig. 8. *Athysanella extrusa*: a, vertex and pronotum; b, female; c, male lateral; d, ventral view, genitalia.
- Fig. 9. *Athysanella yumana*: a, vertex and pronotum; b, female; c, male lateral; d, ventral view, genitalia.
- Fig. 10. *Athysanella gardenia*: a, vertex and pronotum; b, female; c, male lateral; d, ventral view, genitalia.

PLATE III.

- Fig. 11. *Athysanella magdalena*: a, face; b, vertex and pronotum; c, female; d, lateral; e, ventral view genitalia; f, female elytra; macropterous female.
- Fig. 12. *Athysanella utahna*: a, vertex and pronotum; b, female; c, male lateral; d, ventral view, genitalia.
- Fig. 13. *Gladionura sinuata*: a, vertex and pronotum; b, female; c, male lateral; d, ventral view, genitalia.
- Fig. 14. *Gladionura argenteola*: a, vertex and pronotum; b, female; c, male lateral; d, ventral view, genitalia.
- Fig. 15. *Gladionura nacazarana*: a, vertex and pronotum; b, female; c, male lateral; d, ventral view, genitalia.

PLATE IV.

- Fig. 16. *Pectinopyga texana*, head: a, female; b, male lateral view, genitalia.
- Fig. 17. *Gladionura recurvata*, vertex and pronotum: a, female; b, lateral; c, ventral, genitalia.
- Fig. 18. *Gladionura aridicola*, vertex and pronotum: a, female; b, lateral; c, ventral view male, genitalia.

- Fig. 19. *Gladionura emarginata*, vertex and pronotum: *a*, female; *b*, lateral; *c*, ventral view male, genitalia.
 Fig. 20. *Gilletteiella labiata*, vertex and pronotum: *a*, female; *b*, lateral; *c*, ventral view male, genitalia.
 Fig. 21. *Gilletteiella atropuncta*: *a*, dorsal view; *b*, vertex and pronotum; *c*, female; *d*, male lateral; *e*, ventral view, genitalia; *f*, elytron.

PLATE V.

- Fig. 22. *Athysanella robusta*: *a* ♀, vertex; *b*, female; *c*, lateral; *d*, ventral male, genitalia; *e* ♂, vertex.
 Fig. 23. *Athysanella montana*: *a*, vertex; *b*, female; *c*, male side view; *d*, male ventral view, genitalia.
 Fig. 24. *Amphipyga alta*: *a*, vertex; *b*, female; *c*, male genitalia.
 Fig. 25. *Gladionura excavata*: *a*, vertex; *b*, female genitalia.
 Fig. 26. *Gladionura viridia*: *a*, head; *b*, female; *c*, lateral; *d*, ventral view male, genitalia.
 Fig. 27. *Gladionura abbreviata*: *a*, female; *b*, lateral; *c*, ventral view male, genitalia.

PLATE VI.

Internal genitalia of males.

- Fig. 28. *Amphipyga acuticauda*: *a*, lateral; *b*, dorsal view.
 Fig. 29. *Amphipyga balli*: *a*, lateral; *b*, dorsal view.
 Fig. 30. *Amphipyga occidentalis*: *a*, lateral; *b*, dorsal view.
 Fig. 31. *Amphipyga aridella*: *a*, lateral; *b*, dorsal view.
 Fig. 32. *Athysanella attenuata*: *a*, lateral; *b*, dorsal view.
 Fig. 33. *Amphipyga stylata*: *a*, lateral; *b*, dorsal view.
 Fig. 34. *Athysanella terebrans*: *a*, lateral; *b*, dorsal view.
 Fig. 35. *Athysanella extrusa*: *a*, lateral; *b*, dorsal view.
 Fig. 36. *Gladionura argenteola*: *a*, lateral; *b*, dorsal view.
 Fig. 37. *Gladionura emarginata*: *a*, lateral; *b*, dorsal view.
 Fig. 38. *Gladionura recurvata*: *a*, lateral; *b*, dorsal view.
 Fig. 39. *Gladionura aridicola*: *a*, lateral; *b*, dorsal view.

PLATE VII.

Internal genitalia of males.

- Fig. 40. *Athysanella yumana*: *a*, lateral; *b*, dorsal view.
 Fig. 41. *Athysanella utahna*: *a*, lateral; *b*, dorsal view.
 Fig. 42. *Athysanella gardenia*: *a*, lateral; *b*, dorsal view.
 Fig. 43. *Gladionura sinuata*: *a*, lateral; *b*, dorsal view.
 Fig. 44. *Gladionura viridia*: *a*, lateral; *b*, dorsal view.
 Fig. 45. *Gladionura abbreviata*: *a*, lateral; *b*, dorsal view.
 Fig. 46. *Gladionura extensa*: *a*, lateral; *b*, dorsal view.
 Fig. 47. *Amphipyga alta*: *a*, lateral; *b*, dorsal view.
 Fig. 48. *Pectinopyga texana*: *a*, lateral; *b*, dorsal view.
 Fig. 49. *Amphipyga stylata* var. (?): *a*, lateral; *b*, dorsal view.
 Fig. 50. *Gilletteiella labiata*: *a*, lateral; *b*, dorsal view.
 Fig. 51. *Gilletteiella atropuncta*: *a*, lateral; *b*, dorsal view.

