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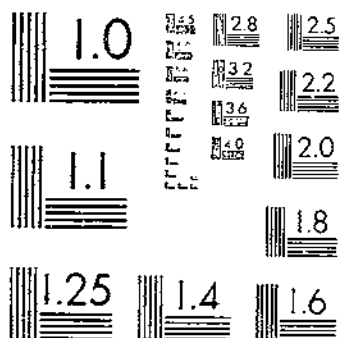
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A CLASSIFICATION OF NORTH AMERICAN AGALLIAN LEAF HOPPERS

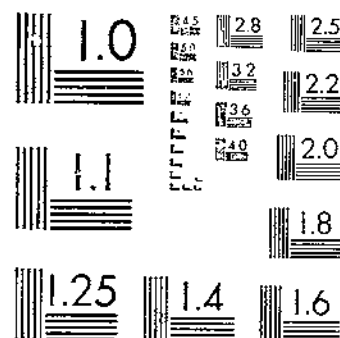
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UNITED STATES DEPARTMENT OF AGRICULTURE
WASHINGTON, D.C.A CLASSIFICATION OF NORTH AMERICAN
AGALLIAN LEAF HOPPERS¹

By P. W. OMAN, junior entomologist, Division of Taxonomy of Insects, Bureau of Entomology

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INTRODUCTION

The only previous study of all the North American species of the genus *Agallia* was that made by Osborn and Ball in 1898 (28),² in which 12 species were treated. Since that time various species have been described by Uhler, Baker, Ball, Osborn, Van Duzee, Olsen, and DeLong and Wolcott, and some of the described species have been synonymized. Because of the considerable number of species involved, their great similarity, the lack of published illustrations, and, in many cases, inadequate descriptions, identification of species has been very uncertain. Problems in insect interrelationship, requiring the accurate identification of species in this group, have made necessary an attempt at a revisional study of the classification of these insects, and the present bulletin is an outgrowth of such investigations.

Since the writer has had little opportunity for personal field observations, he has necessarily relied on other workers for most of the

¹ The preparation of this bulletin has been greatly facilitated by the assistance rendered by many entomological workers and institutions, without which many of the more difficult problems could not have been solved. The writer is particularly indebted to H. G. Barber, of the Bureau of Entomology, E. D. Ball, of the University of Arizona, and P. B. Lawson and R. H. Beamer, of the University of Kansas, for much constructive criticism and many helpful suggestions. The studies here presented have been based on several thousand specimens in the U.S. National Museum collection; on more than 5,000 specimens furnished by the Entomological Museum of the University of Kansas through Hungerford and Beamer; on valuable material and host-plant data supplied by E. D. Ball, of the University of Arizona, and F. W. Davis, of the sugar-beet leaf-hopper laboratory at Salt Lake City; and on specimens lent for study by D. M. DeLong, of Ohio State University, Herbert Osborn, of the Ohio Biological Survey, H. L. Dozier and Sam C. McCampbell, of Colorado State College, C. E. Olsen, of the American Museum of Natural History, D. A. Wilbur, of Kansas State College of Agriculture and Applied Sciences, and Harold Morrison and H. G. Barber, of the Bureau of Entomology. Type examples of various species have been received for study from E. D. Ball, D. M. DeLong, Herbert Osborn, and C. E. Olsen, of the above-named institutions, and from E. P. Van Duzee, of the California Academy of Sciences, and C. J. Drake, of Iowa State College. To all these the writer expresses his sincere thanks.

² Italic numbers in parentheses refer to Literature Cited, p. 71.

records concerning lost plants and habitats. The status of some of the forms treated remains in doubt, but it is hoped that the study may be continued and these points decided when more thorough and careful observations are made.

HISTORY

The genus *Agallia* was erected by Curtis in 1833 (11) to accommodate his *consobrina*. Scott in 1874 (32) placed *consobrina* Curt. as a synonym of *puncticeps* Germ., this being the present status of that species. The chief characters of the original description are as follows:

Rather short and ovate, face ovate-trigonal,--head from above forming a very narrow lunule, ocelli 2 in the forehead,--thorax narrower than the head, transverse-ovate.

Osborn and Ball (28), in their monograph of the North American species, pointed out the existence of three distinct groups within the genus, designating them as groups I, II, and III. Kirkaldy in 1907 (18, p. 11, 50-51) gave these groups generic rank and applied to them the names *Agallia*, *Agalliopsis*, and *Aceratagallia*, with *consobrina* Curt., *novella* Say, and *sanguinolenta* Prov., respectively, as types. Van Duzee (43) considered these groups as subgenera in the genus *Agallia*, but Lawson (22, p. 55-58) again gave them generic ranking. Because of the very distinct and constant differences existing between these groups, the writer also has deemed it advisable to treat them as distinct genera, rather than to place them under a single name and thus indicate a very close relationship that does not exist. As a result of these studies it has been necessary to describe a fourth, new genus to accommodate species that evidently do not come within the limits of those already established.

RELATIONSHIPS

The genus *Agallia* and related genera belong in the subfamily Bythoscopinæ, which is distinguished from other subfamilies of the Cicadellidæ by the position of the ocelli, which are always present on the front, below the vertex rather than on the disk of the vertex or the vertex margin, and by the character of the head, which has no distinct margin or carina between the vertex and the front. The genera treated in this bulletin may be separated from other North American genera of the Bythoscopinæ by the following key:

- 1 Form broad, rather depressed, front somewhat swollen; antennal pits with a distinct overhanging ledge which is transverse or nearly so. Elytra usually clothed with short setae.
 - Bythoscopus* and *Straganiopsis*.
- Form neither broad nor depressed, or, if so, then antennal pits without overhanging ledge. Ledge, when present, not transverse but distinctly oblique. Elytra not clothed with short setae.
 - 2 (1) Distance between ocelli distinctly greater than twice the distance from ocellus to eye; antennal pits deep; elytra broad, apical cells short.
 - Macropsis* and *Oncopsis*.
 - Distance between ocelli not over twice the distance from ocellus to eye; antennal pits shallow.
 - 3 (1) Elytra with distinct appendices; head, including eyes, distinctly wider than body.
 - Idiocerus*.
 - Elytra without distinct appendices; head not so distinctly wider than body.
 - Agalliopsis*, *Agallia*, *Aceratagallia*, and *Agalliana*.

These genera are differentiated on page 7.

All species of these genera are characterized by the robust form, short, broad vertex, shallow antennal pits, and the absence of appendices in the elytra. Osborn and Ball distinguished their three groups by differences in the shape of the posterior margin of the vertex, the character of the surface of the pronotum, the form of the vertex of the nymphs, and the wing venation. Lawson (21, p. 48-50) confirmed the correctness of this basis for segregation when he pointed out the differences in the internal male genitalia. The new genus herein described is distinguished by a combination of the above-mentioned characters.

ECONOMIC IMPORTANCE OF THE GROUP

Until DeLong and Davidson (12) discussed the common species attacking economic crops in the United States, *sanguinolenta* was the only species of the *Agallia* group to attract enough attention as a pest to receive more than an occasional brief reference to its economic importance. It is therefore safe to state that the damage done by the various species of the group has been greatly underestimated or overlooked. This, probably, is due chiefly to two things, the tendency to overlook the injury, and the habit of attributing injury, when observed, to *sanguinolenta*. These leaf hoppers are frequently overlooked entirely because of their dull colors and secretive habits, and the poor condition of a crop may be attributed to drought when in reality the plants have been weakened by the great numbers of tiny leaf hoppers sucking their sap.

Although the group is usually considered as one feeding primarily upon cereal, forage, and truck crops, Ball states that he has found that most of the species, under normal conditions, have as hosts a distinct plant or group of plants, from which they seldom stray. Thus most of the species become pests of economic crops only when their normal hosts are not available, as is often the case in extensively cultivated regions. As Ball (5, p. 50-51), Osborn (23, p. 15), Gibson (16), DeLong and Davidson (12, p. 377), and others have pointed out, the principal crops affected are clover, alfalfa, soybeans, and beets, as well as meadow and pasture lands.

DeLong and Davidson (12) treated 11 species in their paper, namely, *sanguinolenta*, *cinerea*, *uhleri*, *californica*, *lyrata*, *bigeloviae*, *gillettei*, *quadripunctata*, *constricta*, *deleta*, and *novella*, all as members of the genus *Agallia*. In this bulletin, inasmuch as the taxonomic treatment has been on the basis of genera rather than of subgenera, it seems best to consider the economic species in the same way.

The genus *Agalliopsis* is of relatively little importance, since only a single species, *novella*, occurs so commonly as to do damage, and then only in the eastern half of the United States and south into Texas. Van Duzee's *novella* var. *tropicalis*, described from Jamaica, but known to occur in Central America as well, is also fairly abundant and may be expected to cause injury to cultivated crops.

In the genus *Agallia* the best-known injurious species are *constricta* and *quadripunctata*. Of the two, *constricta* is the more common on economic crops and probably of considerably more importance. Its normal habitat is distinctly the southeastern part of the United States, as it is not found commonly west of eastern Kansas, Nebraska, and Texas, or north of the southern half of Pennsylvania, Ohio, and

Indiana. On the other hand, *quadripunctata* is found most abundantly in the northeastern part of the United States and eastern Canada, overlapping the northern limits of *constricta* in its southern distribution. It occasionally occurs, however, as far west as Colorado, Utah, Idaho, California, and Oregon in situations comparable to those of eastern Canada, but not in sufficient numbers to be of importance. *A. deleta*, found in Florida, South Carolina, Georgia, Virginia, Massachusetts, New Jersey, and New York, and included by DeLong and Davidson as an injurious species, is of extremely doubtful importance. *A. albidula* is a common pest of truck crops throughout the Antilles and probably assumes economic importance in South America also, since it is likewise abundant there. Among the crops reported as being injured by this common form are melon, asparagus, bean (*Phaseolus vulgaris*), and tomato. Little is known concerning *repleta* in Trinidad and Central America, or *modesta* and *lingula* in Central America, but these two species were taken in great numbers in that region by Harold Morrison, mostly by sweeping grasses, and cannot be ignored as potential pests of cultivated crops. In addition, both species occur in Mexico, and *lingula* is found in southern Texas.

It is in the genus *Aceratagallia* that the largest number of economic species occur, and also the species of greatest economic importance, at least in the United States. As a result of this study of the genus, 8 species, all from continental North America and 5 of them considered as new, have been definitely associated with economic crops, while 7 others are placed as possible, though doubtful, pests. The most common, of course, is *sanguinolenta*, found in large numbers on various crops in the eastern portion of the United States but much less abundantly west of eastern Kansas, and of questionable importance in that region. The writer has found this common species, in both nymph and adult stages, literally teeming on a pure stand of Japanese clover (*Lespedeza striata*) in the vicinity of Washington, D.C. In view of the fact that this is now a common and valuable forage crop as far west as eastern Kansas, the annual loss in pasturage due to the feeding of this insect must be enormous. This species is also common in all stages on *Cassia chamaecrista*, another legume. Its occurrence on alfalfa, clover, and bean is well known. The writer agrees with DeLong and Davidson in doubting the authenticity of records of *sanguinolenta* from California and is inclined to believe that it does not occur farther west than Utah and Arizona. The only other species common in the eastern half of the United States are *vulgaris* and *accola*. *A. uhleri* occurs from Kansas, Texas, and Iowa west into Arizona and southern Utah. DeLong and Davidson's records of *uhleri* from California apply to *curvata*, a new species. *A. calcearis* is a pest of beets in western Kansas and eastern Colorado; it occurs also in Texas but is not recorded from cultivated crops from that State. In western Colorado, Utah, Wyoming, Montana, and Idaho between the Rocky Mountains and the Sierra Nevadas, this species is replaced by *arida*, which also occurs on beets as well as other truck crops and wild host plants. Another common species farther north in this region is *fuscscripta*, which is found in northern Colorado, Wyoming, Montana, Idaho, Washington, and British Columbia, but apparently is not much of a crop pest. Most of Carter's references (10, p. 54-55) to *A. sanguinolenta* should be re-

ferred to this species. Two distinctly western species of importance are *curvata* and *obscura*, discussed by DeLong and Davidson under the names *uhleri* and *lyrata*, respectively. *A. curvata* was taken by DeLong on numerous crops, but mostly on alfalfa, and he reports the species here called *obscura* from 22 different crops. Both of these species are common in California and southern Oregon west of the mountains. Among the species of doubtful importance are true *lyrata* and *californica*, both occurring in California and southern Oregon, typically in alpine regions but occasionally found on cultivated crops. The importance of *bigeloviae*, *gillettei*, *inconspicua*, *cinerea*, *dondia*, *abrupta*, *vastitatis*, and others from the arid western and southwestern regions is as yet unknown, but the indications are that some of them will become pests as areas of cultivation are extended.

Agalliana sticticollis (Stål) has essentially the same distribution as *Agallia albidula* Uhl. and is of about the same importance as a pest of crops in the Antilles. DeLong and Wolcott (45, p. 258-259) reported it on carrots in Puerto Rico and applied the name *carrotovora*, and Osborn (27, p. 91) has reported it from sweetpotato. Fawcett (13, 14), Henderson (17), Severin and Henderson (33), and others have reported *A. sticticollis* (Fawcett (13) as *sanguinolenta*) as a transmitter of curly top of beets in the Argentine, but the writer believes that these references all apply to a distinct species, closely related to *sticticollis*. These investigations, however, would seem to indicate that *sticticollis* must be considered as a potential carrier of virus diseases.

CHARACTERS USED IN THE CLASSIFICATION

Since the external morphology of the Cicadellidae has been discussed adequately by several workers (20, p. 11-15; 21, p. 38-43), a brief résumé of the characters found to be of greatest diagnostic value in the genera and species here considered is believed to be sufficient for this study. The terminology in general use among workers in the group has been followed where possible, but a few additional terms have been used in referring to the characters of the internal male genitalia. These will be explained under the discussion of those characters.

In general the size and form of any species in this group have been found to be constant. Differences in size and general shape, heretofore attributed to variation, have been found in most cases to represent specific differences. The intensity of coloration is usually unreliable, but the color pattern is constant and, except in the genus *Aceratagallia*, is quite distinctive. The shape of the vertex and that of the pronotum are valuable as comparative characters, but are seldom conspicuous enough to be used in the written descriptions for species segregation. The contour and venation of the elytra are also valuable, but the best external characters for the separation of closely related species are those of the male and female genitalia, particularly the shape of the plates of the former; in fact, many of the species of *Aceratagallia* can be separated externally in no other way than by examination of these.

In a search for characters to supplement the external ones it was found that the internal male genitalia were usually, though not al-

ways, very distinctive. It was concluded that a combination of both internal and external characters must be used for the satisfactory differentiation of many of the species.

Lawson (21, p. 56-58) is the only worker who has discussed and figured the internal genital characters of the males of species of the *Agallia* group. He pointed out the existence, not only of specific characters, but of characters that were significant in the three genera treated. However, his statement that each style of the male genitalia of *Agalliopsis novella* consists of two distinct sclerites is erroneous, the error probably being due to the fact that the styles are very lightly sclerotized along the median line. No specimen examined by the writer in the course of this study has had the styles consisting of two pieces. All the species of *Agalliopsis* studied have the styles forked posteriorly, much as in *Agallia*, and the two forks are here designated as the inner and outer forks, the inner one being the one that arises from the shank of the style nearer the median line of the body, usually the more heavily sclerotized of the two. The processes of the pygofer, when not merely extensions of the posterior margins, are here called pygofer hooks, while the processes of the tenth segment are called dorsal spines, following the terminology used for corresponding structures in different genera of the Eupteryginae. The best specific characters are found in the aedeagus and dorsal spines, and, to a lesser extent, in the pygofer hooks.

In the genus *Agallia* the aedeagus is the chief internal structure presenting valuable characters, although the posterior margins of the pygofer, seldom seen until the genital capsule has been cleared, also show modifications useful in classification. In the genus *Aceratagallia*, on the contrary, the aedeagus is of little value, but the posterior portion of the styles furnishes excellent characters. The styles have typically a rather truncate tip, thus forming two quite distinct angles which are designated as the inner and outer points; of the two the inner point is the more nearly ventral in position and is placed nearer the median line of the body when the styles are in their normal position. There are no pygofer hooks in this genus, and the dorsal spines are of little or no diagnostic value. In the genus *Agalliana* both the aedeagus and the dorsal spines furnish reliable characters.

The construction of satisfactory keys for the species of the genera treated has been one of the most difficult parts of this study. Because of the similarity in appearance of many of the species it has been necessary to utilize to a considerable extent genitalia characters for the segregation of these species in the keys. The task has been further complicated by the fact that some of the species are known from only a single sex and others have evident specific characters in the male sex only. The usefulness of the keys can be greatly increased by frequently consulting the illustrations, especially those drawings referred to specifically in the keys.

TECHNIC USED IN THE STUDY

PREPARATION AND HANDLING OF THE SPECIMENS

Most workers are familiar with the essential process involved in preparing the male genitalia for study. The abdomen, or a considerable portion of the tip, is carefully removed with a sharp needle

and treated with a potassium hydroxide solution, either by being heated gently or soaked, until the genital capsule is sufficiently cleared to allow the internal structures to be seen. Staining is not necessary in this group, because the internal structures are usually heavily enough sclerotized to be easily distinguished.

After the specimen is sufficiently cleared, it should be allowed to remain in distilled water for a time to remove the excess potassium hydroxide, and then transferred to glycerin for study. The genital capsules may be temporarily retained by placing them in a small quantity of glycerin in a tiny vial, 5 mm or less in outside diameter and not over 15 mm long, which may be attached to the pinned specimen by thrusting the pin through the cork. Since glycerin is practically nonvolatile, the capsules can be kept in this way for some time without danger of loss or mixing with others.

In studying the genitalia the use of a hollow-ground slide permits easy manipulation of the specimen. The genitalia may be handled easily with a tiny loop in the end of a no. 0 or 00 pin thrust in a wooden handle. For manipulation of the specimen under the microscope "minuten Nadeln" thrust in a wooden handle were found to be satisfactory. These needles may also be used to remove such structures as are of diagnostic value but cannot be seen sufficiently in situ.

PREPARATION OF ILLUSTRATIONS

The illustrations used are of two types—outline drawings with stippling where needed to show the color pattern, and photographic enlargements.

A micrometer disk ruled in squares and placed in the ocular of a binocular microscope and coordinate paper ruled with pale-blue lines were used to secure accurate outlines for parts that are shown in line drawings. Unless otherwise stated in the explanation of the illustrations, all external drawings are enlarged approximately 25 times, lateral views of male genitalia approximately 45 times, and detail drawings of aedeagi, styles, etc., approximately 55 times. The drawings, therefore, give an accurate idea of the relative size in the various species.

The photographic enlargements were made by J. G. Pratt, of the Bureau of Entomology; and most of the prints have been worked over with a pencil to emphasize the color patterns. Photographic illustrations are not included for all the species discussed in the bulletin, since many of them do not show sufficient contrast in color pattern to photograph satisfactorily, and others are represented only by unique types.

KEY TO THE GENERA

- | | | |
|-------|--|---|
| 1 | Pronotum finely granulated, neither pitted nor transversely rugulose. | 2 |
| | Pronotum either pitted or transversely rugulose..... | 3 |
| 2 (1) | Vertex distinctly shorter medially than next the eye, posterior margin elevated medially and sinuately curved laterally..... | |
| | Vertex of nearly uniform length throughout its width, posterior margin smoothly rounded and not distinctly elevated..... | |
| 3 (1) | Pronotum pitted; styles of internal male genitalia forked posteriorly..... | |
| | Pronotum transversely rugulose; styles of internal male genitalia not forked posteriorly..... | |
- Agalliopsis*, p. 8.
Agallia, p. 24.
Agalliana, p. 70.
Aceratagallia, p. 45.

The genus *AGALLIOPSIS* Kirkaldy

Vertex very short medially, usually distinctly longer next the eyes, the hind margin sinuately curved laterally and extending some distance behind the eyes. Markings of head and pronotum usually consisting of dark spots. Pronotum with lateral margins obsolete, posterior margin often convex but usually faintly notched medially. Elytra long and slender, venation often obscure; with 4 apical and either 2 or 3 anteapical cells. Internal male genitalia with the styles forked, aedeagus often with accessory processes, tenth segment often quite distinct and bearing spines of various shapes; pygofer with hooklike processes in some species. Nymph with upward-projecting processes on the vertex.

Type of the genus, *Jassus novellus* Say.

There exist within the genus several quite distinct groups of closely related species, but none of them is now considered as deserving sub-generic rank. The most apparent group is made up of five West Indian species—namely, *ballii*, *pepino*, *conformis*, *maculata*, and *clitellaria*—all having very distinctive markings on the vertex and the pronotum. When the males of more species are available for examination, there will probably be found a distinct group in which the males have the type of genital plates peculiar to *oculata* and *peneoculata*, another group in which the male plates are of the *novella* and *variabilis* type, and a third of the type possessed by *huachucae* and *magnifica*.

Of the species in this genus, only the female sex of *clitellaria*, *scortea*, *tenella*, and *anomala* and the male sex of *conformis*, *magnifica*, *cervina*, *dubiosa*, *exilis*, *huachucae*, and *ancoralis* are known to the writer.

Key to the species of *AGALLIOPSIS*

- | | | |
|-------|---|---|
| 1 | Pronotum with discal spots each side of median line pale colored, and bordered, or partially so, with brown or fuscous, or, if not dark bordered, the elytra maculated. Veins of elytra broadly pale, at least apically, cells darker, or, if veins not pale, elytra with a broad yellow saddle. West Indian species..... | 2 |
| | Pronotum with discal spots dark, or, if pale colored, not bordered with brown or fuscous. Veins of elytra concolorous with, or paler than, the cells, but if paler usually narrowly so and without a distinct line of demarcation between light and dark areas..... | 6 |
| 2 (1) | Elytra fuscous with a bright lemon-yellow elytral saddle extending from tip of scutellum two thirds the distance to apex of clavus, narrowing to costal margin..... <i>clitellaria</i> , p. 13. | |
| | Elytra not as above..... | 3 |
| 3 (2) | Elytra maculated, with maculae arranged in rather indistinct transverse bands. Elytra with few cross veins..... <i>maculata</i> , p. 11. | |
| | Elytra not maculated, or, if appearing maculated, with numerous cross veins..... | 4 |
| 4 (3) | Elytra with numerous cross veins..... <i>ballii</i> , p. 10. | |
| | Elytra with few cross veins..... | 5 |
| 5 (4) | Length 3.5 mm or more; male plates bluntly subtriangular (fig. 1, B)..... <i>conformis</i> , p. 11. | |
| | Length 3 mm or less; male plates abruptly narrowed to pointed tips (fig. 1, P)..... <i>pepino</i> , p. 12. | |
| 6 (1) | Length 5.25 mm or more, species large and robust..... <i>magnifica</i> , p. 20. | |
| | Length not over 5 mm; if near 5 mm in length, very slender..... | 7 |

- 7 (6) Veins of elytra obscure, concolorous; elytral markings, if any, consisting of a smoky, transverse band behind the middle of the clavus. Female genital segment truncate. General ground color grayish or yellowish green, not brown; markings on vertex and pronotum consisting of small spots, or sometimes with a faint median line. Subtropical.----- 8
- Veins of elytra distinct, or, if obscure and concolorous, species brown or brownish and female genital segment not truncate.----- 9
- 8 (7) Pronotal markings usually very large and heavy.----- 9
- Elytra with a smoky, transverse band behind middle of clavus. Length 3.5 mm or less.----- *cincla*, p. 14.
- Elytra without smoky, transverse band. Length 3.75 mm.----- *scortei*, p. 13.
- 9 (7) Elytra deep brown with a broken transverse band of white behind middle of the clavus.----- *cervina*, p. 16.
- Elytra usually light brown or gray, no transverse white vitta.----- 10
- 10 (9) Pronotum with posterior margin broadly pale, remainder golden brown with narrow median line, oblique spots laterally on disk, and anterior margins laterally, fuscous. Female genital segment triangularly produced and notched at apex. Second cross vein present in elytra.----- *tenella*, p. 18.
- Pronotum not as above, or if so with elytra lacking second cross vein.----- 11
- 11 (10) Pronotum very pale yellowish brown, with a faint median line and small spots laterally on disk fuscous. Elytra with only cells of clavus, and corium adjacent to clavus, embrowned; costal margin broadly hyaline. Second cross vein between sectors absent or, if occasionally present, the resulting anteapical cell not over one third as long as the second anteapical cell. Female genital segment truncate or very shallowly concave. Length less than 4 mm.----- *anomala*, p. 23.
- Pronotum and elytra not marked as above or, if so, with second cross vein in elytra present and resulting cell one half as long as second anteapical cell, or with female segment not as above.----- 12
- 12 (11) Aedeagus of male with lateral processes at tip and base (fig. 14, K, L); pygofer hooks simple, male plates subtriangular.----- *dubiosa*, p. 18.
- Aedeagus with lateral processes only at tip or, if with basal lateral processes, pygofer hooks coarsely serrate or absent and male plates not subtriangular.----- 13
- 13 (12) Aedeagus of male slender, with long lateral processes extending latero-cephalad from tip.----- 14
- Aedeagus of male without such processes.----- 16
- 14 (13) Lateral processes of aedeagus forked (fig. 13, P, Q). Species long and slender, male plates subtriangular.----- *exilis*, p. 21.
- Lateral processes of aedeagus not forked, species more robust, male plates either subtriangular or flat and tapering.----- 15
- 15 (14) Male plates flat and tapering, lateral processes of aedeagus very slender, strongly diverging (fig. 13, M).----- *huachucae*, p. 14.
- Male plates subtriangular, lateral processes of aedeagus stouter, nearly parallel (fig. 13, O).----- *ancoralis*, p. 21.
- 16 (13) Aedeagus of male with lateral basal processes extending caudad (fig. 14, C, E). Female genital segment very broad, lateral angles strongly produced and posterior margin broadly concave from lateral angles.----- 17
- Aedeagus without lateral basal processes but sometimes with a fleshy sheath basally. Female genital segment narrow or, if at all broad, not concave.----- 18
- 17 (16) Posterior margin of female genital segment smoothly concavely excavated.----- *novella*, p. 23.
- Excavated portion of female segment with a tooth on each side, males usually dark.----- *var. tropicalis*, p. 24.
- 18 (16) Tip of aedeagus with forks resembling a pair of outside calipers (fig. 14, O). Female genital segment triangularly produced.----- *brunnea*, p. 19.
- Aedeagus, if forked, with forks diverging, not caliperlike. Female genital segment not triangularly produced.----- 19

- 19 (18) Aedeagus not bifid at tip, although sometimes bilobed. Posterior margin of female genital segment truncate or very slightly concave, not produced or lobed.----- 20
 Aedeagus bifid at tip, forks diverging. Posterior margin of female genital segment produced and obscurely 3-lobed. *oculata*, p. 17.
 20 (19) Second cross vein between sectors of elytra present. *variabilis*, p. 22.----- 21
 Second cross vein between sectors of elytra absent.
 21 (20) Species brownish with a transverse smoky band behind the middle of the clavus.----- *peneoculata*, p. 17.----- 22
 Species gray, without transverse smoky band on elytra.
 22 (21) Spots on vertex above ocelli extending to posterior margin of vertex. Length 3.5-4 mm.----- *fuscognata*, p. 15.-----
 Spots on vertex above ocelli not extending to posterior margin of vertex. Length 3-3.25 mm.----- var. *minor*, p. 16.

AGALLIOPSIS BALLII (Baker)

(Fig. 1, E, F, G; fig. 13, G; pl. 1, A)

Described as *Agallia reticulata* by Ball (4, p. 127) in 1900 (nec. Herrick-Schaeffer, 1853). Baker (3, p. 152) suggested the name *ballii* to take the place of the preoccupied *reticulata*. Strikingly distinct because of the reticulate venation and peculiar color. Length of male 3-3.25 mm, of female 3.5-3.75 mm.

Color.—Face creamy, antennal pits fuscous, frons and vertex below tinged with brownish yellow. Vertex with an oblique fuscous line at the inner margin of each eye, and on the posterior margin on each side a crooked fuscous line in the shape of an interrogation mark, the base of this joining the oblique line next the eye. Ground color of pronotum bluish white; olive-brown to brown markings partly margined with fuscous in the form of a broad anterior margin laterally, a narrow median line, and a large pyriform spot on each side posteriorly, the lateral spots connected anteriorly with the anterior brown margin. Scutellum yellowish, basal angles faintly brown to fuscous. Elytra with cells bluish brown to light fuscous, veins broadly bluish white; the extra veinlets in the elytra tending to give them a mottled appearance; tips of elytra brownish. Hind wings smoky, veins darker. Males usually distinctly darker than females.

Structure.—Broad, wedge shaped, rather depressed. Vertex distinctly shorter medially than next the eyes, hind margin sinuate and extending behind the eyes laterally. Pronotum long, scarcely humped in lateral view. Elytra long, with a few extra veinlets, especially in the clavus. Costal margins of elytra broadly rounded.

External genitalia.—Last ventral segment of female about $1\frac{1}{2}$ times as long as preceding segment, lateral angles broadly rounded, posterior margin broadly, angularly excavated one fourth the distance to the base. Male valve rather large, median length equal to one half the width of the posterior margin. Posterior and anterior margins parallel, lateral margins oblique. Plates rather small, together forming almost an equilateral triangle, lateral margins slightly convex. Pygofer visible laterally on each side of plates.

Internal male genitalia.—Aedeagus curved upward, tip with a tiny flangelike process dorsally and laterally. Forks of style long, inner fork exceeding outer and with apex obliquely truncate. Anal tube collar bearing a pair of spines on each side, the posterior ones longer and bent abruptly inward.

The peculiar color and color pattern, together with the broad, somewhat flattened form, will distinguish this species from other known forms.

Described from Haiti. Cotypes in collections of E. D. Ball and United States National Museum (catalog no. 43974). There are specimens at hand from Port-au-Prince, Hinche, Bayent, and Mount Puilsboreau, Haiti, collected by H. L. Dozier, and from Duarte, Santo Domingo, Dominican Republic, collected by Harold Morrison.

AGALLIOPSIS CONFORMIS n. sp.

(Fig. 1, A, B; fig. 13, K; pl. 1, B)

Brown, with veins of elytra broadly bluish white and with black to fuscous markings on the head and thorax. Aspect of a large, pale *ballii*, but without reticulate venation. Length of male 3.75 mm.

Color.—General ground color light brown, vertex and anterior margin of pronotum golden brown. Face light brown with fuscous marks as follows: Frontal sutures, antennal pits, ring around each ocellus, spots above antennal pits, and inverted Y on vertex fuscous. Vertex with a black spot dorsally next each eye and a portion of posterior margin over each ocellus fuscous. Base of inverted Y on vertex extending to posterior margin of vertex, widened dorsally. Pronotum with a small, median, elongate, longitudinal fuscous spot anteriorly and a similar elongate transverse fuscous spot on each side just back of this; anterior margin sometimes fuscous in lateral depressed area; posterior two thirds with a large, light brown, elongate median spot and a similar irregular round spot on each side, partially margined with fuscous; a creamy-yellow stripe extending in an anteromedian direction from the hind margin of the pronotum nearly through the outer edge of each lateral spot. Scutellum yellowish brown with black basal triangles; the median circular depressions and transverse suture fuscous. Elytra brown, subhyaline, veins broadly dirty white margined with fuscous dorsally. Hind wings smoky black, veins darker.

Structure.—Wedge shaped, more depressed than *A. oculata*. Vertex slightly longer next the eyes than medially, hind margin sinuate but extending only very slightly behind the eyes laterally. Pronotum long, hind margin slightly concave, lateral margins obsolete. Elytra long, narrow, second cross vein between sectors absent. Outer claval vein forked at tip, forks joining inner claval vein and commissural line, making a rough circle dorsally.

External genitalia.—Male valve short, broad, hind margin convex. Plates short, together triangular, lateral margins slightly convex, tips pointed, equaling pygofer in length. Pygofer but little wider than plates.

Internal male genitalia.—Aedeagus rather stout and curved. Dorsal spine of tenth segment forked, ventral fork much longer than dorsal. Inner process of style nearly straight, extending far beyond outer process.

Easily distinguished from *ballii* by the lack of reticulation in the elytra and by the male genitalia, as well as the greater size.

Holotype male from Blanton mine, north of San Cristobal, Dominican Republic, July 27, 1917, Harold Morrison (377). Paratype male from San Pedro Macoris, Dominican Republic, July 15, 1917, Harold Morrison (336). Types in the United States National Museum (catalog no. 43975).

AGALLIOPSIS MACULATA (Osborn)

(Fig. 1, R, S)

Described as an *Agallia* by Osborn (26, p. 339) in 1926. Intermediate in character between *ballii* Baker and *pepino* DeLong and Wolcott. Length 3 mm.

Color.—General ground color light gray. Face pale, frontal sutures and lateral margins of frons faintly fuscous marked, antennal pits dark. Inverted Y on vertex and tiny are next the inner margin of each ocellus brownish fuscous. Vertex with fuscous marks as follows: A short, median line, a short obliquely transverse line each side of this, a tiny spot above each ocellus and below the margin of the vertex, a similar spot behind each of these on the posterior margin of the vertex, and a slightly larger elongate spot next each eye. Pronotum with a very faint median line, a pair of small fuscous spots each side of this anteriorly, and a pair of larger brownish spots caudad and laterad of these. Scutellum with depressed pite and transverse suture dark. Elytra grayish subhyaline with brownish-fuscous spots arranged, dorsally at least, in rather indistinct transverse bands, 1 even with the apex of the scutellum, 1 each side of the middle of the clavus, and 1 at the apex of the clavus; the posterior 2 broader. Beyond tip of

clavus the maculae are restricted to the cells. Veins basally intermittently gray, apically solid whitish.

Structure.—Form of *ballii* but smaller, vertex proportionately longer than in most species of *Agalliopsis*, strongly curved and with the hind margin faintly sinuate laterally. Pronotum rather elongate, lateral margins obsolete, posterior margin truncate. Elytra elongate, slightly tapering, venation indistinct basally, second cross vein between sectors present. The maculae of the elytra give the appearance of reticulate venation, although this is not the case.

External genitalia.—No female specimens have been examined by the writer, but the original description of the species gives "last ventral segment short, scarcely longer than preceding, truncate." Male valve short, transverse, lateral margins oblique, posterior margin parallel to anterior. Plates small, almost triangular, lateral margins slightly convex.

This species closely resembles pale specimens of *pepino* in the pronotal markings, but the maculated elytra will distinguish it from that species and the venation will separate it from *ballii*.

Osborn's specimens, upon which the original description was based, were from Herradura, Cuba, taken on longleaf Cuban pine, which, as he suggests, is probably the normal host. At present, the species is known from no other locality. Male allotype examined through the courtesy of Professor Osborn, in whose collection the types are deposited.

AGALLIOPSIS PEPINO (DeLong and Wolcott)

(Fig. 1, N, O, P; fig. 13, J; pl. 1, C)

Described as an *Agallia* by DeLong and Wolcott (Wolcott 45, p. 258) in 1923. A small bluish-gray species marked with black on the vertex, and brown and fuscous on the pronotum. Length 2.5–3 mm.

Color.—General ground color light bluish gray. Front embrowned, with fuscous to black marks as follows: Frontal sutures, antennal pits, and inner margins of lora, inverted Y on vertex, rings around, or semicircles below, ocelli, and spots next the eyes on level with ocelli. Anterior margin of vertex with piceous marks as follows: A small median spot, a spot above each ocellus, and one next each eye. Anterior margin of pronotum black, sometimes only laterally. Pronotum with a narrow median fuscous line and two small fuscous spots on each side anteriorly. A large, irregularly pyriform area of yellowish gray margined with fuscous on each side posteriorly, and an indistinct brown spot near each posterior lateral angle. Scutellum with black triangular spots at basal angles, small round black spots centrally, and a dark median transverse suture. Elytra brownish with bluish-white veins; a bluish-white semicircle on the inner margin of each elytron slightly behind the midpoint of the clavus, these together forming a rough circle dorsally.

Structure.—Vertex longer next the eyes than medially, extending somewhat behind the eyes and with posterior margin slightly sinuate laterally. Elytra greatly exceeding abdomen, second cross vein present or absent.

External genitalia.—Last ventral segment of female about twice as long as preceding segment, lateral angles slightly produced and rounding, hind margin roundly excavated medially. Male valve short and transverse. Plates broad basally, narrowing sharply on basal one third, then together slender and tapering to a pointed apex, slightly exceeding pygofer. Pygofer in lateral view with posterior margins produced caudally into footlike protuberances.

Internal male genitalia.—Aedeagus heavy, ventral process in lateral view with tip obliquely truncate and with two short hooks ventrally.

This species may be easily distinguished from all others by the size and distinctive color pattern of the vertex and pronotum.

Described from Puerto Rico. There are specimens at hand from various localities in Puerto Rico, Dominican Republic, Haiti, Cuba and the Virgin Islands. Types in the collection of D. M. DeLong.

AGALLIOPSIS CLITELLARIA (Ball)

(Fig. 1, C, D)

Described by Ball (4, p. 127) as *Agallia clitellaria* in 1900. A striking, fuscous species with a wide saddle of bright yellow across the elytra. Length of female 2.75 mm.

Color.—Face black, with numerous testaceous spots, the most striking being an oval pair laterally and below ocelli, an oval pair above these on vertex, next the eyes, and the irregular testaceous median portion of vertex divided by a narrow longitudinal fuscous stripe which ends in a round spot at the apex of the vertex. The posterior margin of the vertex laterally is also testaceous. Ground color of pronotum dirty yellow with the following fuscous marks: The anterior margin, median line, small oval spots on each side anteriorly and large spots on each side posteriorly, the latter with the centers dirty testaceous. Scutellum fuscous except apex and a spot midway on each side, bright yellow. Elytra fuscous with a bright yellow saddle which extends from the tip of the scutellum two thirds the distance to the apex of the clavus along the commissural line, gradually narrowing laterally and extending nearly to the costal margin. Veins mostly obscure but occasionally marked with yellow.

Structure.—Vertex distinctly shorter medially than next the eye, posterior margin extending behind eyes laterally. Pronotum with lateral margins obsolete, posterior margin slightly concave. Elytra extending well beyond abdomen. The tips of the elytra of the type are damaged, but there is evidence of a second cross vein between the sectors of one elytron.

External genitalia.—Last ventral segment of female one half longer than preceding segment, posterior margin very shallowly and broadly concave, faintly notched medially.

This species is known only from the unique female type from Port-au-Prince, Haiti, but the color pattern is so striking that there can be no doubt concerning the distinctness of this species. The type, which is in the collection of E. D. Ball, has been examined through his courtesy.

AGALLIOPSIS SCORTEA (Van Duzee)

(Fig. 1, Q)

Described by Van Duzee (41, p. 56) in 1907 as *Agallia scortea*. Pale yellowish green with tiny fuscous spots on vertex, pronotum, and scutellum. Length 3.75 mm.

Color.—General ground color pale yellowish green with a slight tinge of olive. Face pale, with piceous to black marks as follows: Antennal pits, spots at the inner margins of the ocelli, and sutures between frons and genae, faint spots above the ocelli and larger spots next the eyes. Pronotum with the following fuscous marks: Very fine median line anteriorly, a pair of small round spots near anterior margin, and a larger, indistinct pair caudad and laterad of these. Anterior margin of pronotum laterally with traces of fuscous. Scutellum with tiny black basal triangles, the transverse suture and a pair of small spots in front of this also black. Elytra pale greenish subhyaline, veins concolorous except basally and apically, where they are somewhat lighter. Veins of hind wings dark.

Structure.—Distinctly wedge shaped. Face flat, vertex very short medially, longer next the eyes, with posterior margin sinuate and extended behind eyes laterally. Pronotum slightly humped in lateral view, long; posterior margin concavely curved. Elytra long and slender, tapering apically, second cross vein absent.

External genitalia.—The abdomen is missing from the specimen examined, but Van Duzee gives the "ultimate ventral segment of the female but little longer than the penultimate, apex truncated, almost parallel with the basal. Valve of the male inconspicuous, broad triangular, its apex truncated, plates hardly twice the length of the valve, much shorter than the pygofers which together with the plates form a long, triangular segment."

Described from four specimens taken in Jamaica at Mandeville and Montego Bay and known from no other localities. A paratype,

obtained through the kindness of E. P. Van Duzee, is the only example of this species examined by the writer. Types in the collection of the California Academy of Science.

AGALLIOPSIS CINCTA n. sp.

(Fig. 2, H, I; pl. 1, F)

Pale gray, resembling *A. anomala*, but more robust, with a faint transverse vitta on the elytra. Length of male 3 mm, of female 3.5 mm.

Color.—General ground color light gray. Front yellowish; sutures, sides of frons, and arms of inverted Y brownish. A tiny spot at inner margin of each ocellus and one on vertex above each ocellus fuscous; a larger spot at the inner margin of each eye black. A very fine, indistinct brown median line on posterior margin of vertex and anterior margin of pronotum. Pronotum with depressed anterior margin laterally and a small spot midway on each side smoky. Elytra uniformly grayish to subhyaline with a smoky black transverse vitta dorsally, half the distance back on the commissural line and broken at the claval sutures. In a somewhat teneral male that is at hand this vitta is not evident.

Structure.—Small, distinctly wedge shaped. Vertex very short medially, much longer next the eyes, posterior margin faintly sinuated and extending behind the eyes laterally. Anterior margin of pronotum strongly arched, posterior margin broadly rounded, lateral margins obsolete. Elytra long and tapering, second cross vein between sectors absent.

External genitalia.—Last ventral segment of female long but retracted, lateral angles rounded, posterior margin truncate. The abdomen of the single male at hand is badly shrunken, but the plates are evidently united basally, the lateral margins parallel, and the tips bluntly pointed.

The small size and distinctive color will distinguish this species from others in the group.

Holotype female from Key Largo, Fla., August 9, 1930, R. H. Beamer. Paratypes, 1 female with the same data and 1 male from Homestead, Fla., May 16, 1928, E. D. Ball. Holotype in the University of Kansas collection; paratypes in collection of E. D. Ball and in the United States National Museum collection (catalog no. 43976).

AGALLIOPSIS HUACHUCAE n. sp.

(Fig. 1, K, L, M; fig. 13, L, M; pl. 4, C)

Resembling *A. oculata* but lighter, pronotum shorter, posterior margin of vertex less curved forward, female segment produced medially and male plates broader basally and more tapering. Length 4-4.25 mm.

Color.—Vertex and pronotum yellowish white, tinged with brown. Face with black marks as follows: Tip of clypeus, margins of frons, circles around ocelli, a large spot above each ocellus on anterior margin of vertex, a small spot above inner margin of each eye, and the inverted Y on vertex. Pronotum with a fuscous patch on anterior margin behind each eye, sometimes extending toward middle to small black spots in depressions each side of median line anteriorly. Faint median line and large spots midway on each side black. Scutellum with three black triangles having bases at anterior margin, a black dot each side of the median one, and a fourth black triangle having its base at the transverse furrow. Elytra brownish with light veins; hind wings somewhat darkened, veins fuscous.

Structure.—Very similar to *oculata* but with vertex longer medially and pronotum shorter and less humped in lateral aspect. Vertex about one half longer next the eyes than medially, posterior margin produced slightly beyond anterior margin of eyes medially and extending for a short distance behind eyes laterally. Pronotum depressed near anterior margin, posterior margin nearly truncate, lateral margins slightly longer than in *oculata*. Elytra long; venation as in *oculata*.

External genitalia.—Last ventral segment of female three times as long as preceding segment, lateral angles strongly produced and rounded, central portion broadly produced from lateral angles to broadly rounded, slightly notched apex. Margin between apex and lateral angles slightly incurved. Male valve large, nearly square, appearing somewhat straplike. Plates broad at base, thin, closely appressed to pygofer, and tapering rather sharply to pointed, slightly divergent apices. Dorsocaudal angles of pygofer ending in short, stout spines.

Internal male genitalia.—In lateral view aedeagus slender, with a bracelike sheath enveloping median portion. Dorsal spine of tenth segment simple, stout, and slightly curved. In dorsal view aedeagus with a pair of long slender processes arising near the tip and extending laterally and slightly cephalad and another very short pair extending caudad and curved inward. In caudal view posterior margins of pygofer reflexed inward and bearing two broad, sclerotized spines, each of which ends in three sharp points dorsally on the inner margins.

Easily separated from closely related species by the distinctive genitalia of both sexes.

Holotype male, allotype female, and 1 male and 6 female paratypes from Huachuca Mountains, Ariz., August 2, 1927, R. H. Beamer. Holotype, allotype, and paratypes in the University of Kansas collection; paratypes in the collection of E. D. Ball and in the United States National Museum collection (catalog no. 43977).

AGALLIOPSIS FUSCOSIGNATA n. sp.

(Fig. 13, H, I; pl. 4, D)

Resembling *A. huachucae*, but smaller and more closely related to the *oculata* group. Length of male 3.5–3.75 mm, of female 3.75–4 mm.

Color.—Grayish white, tinted with brown. Face pale creamy with frontal sutures, antennal pits, and inverted Y on vertex fuscous; frons laterally with short transverse bars of brown; a black ring around each ocellus, a tiny black spot next the eye and a little higher than the ocelli, a pair of large black spots directly above ocelli on posterior margin of vertex, and a smaller pair at the inner corners of the eyes, also on the posterior margin of vertex. Pronotum with the following fuscous marks: A narrow median line, a pair of small spots close together and near anterior margin, and a large pair directly behind the large spots on vertex and about half way back; a faint spot near each lateral angle brownish fuscous. Posterior and anterior margins of pronotum sometimes smudged with brown. Basal triangles of scutellum black, barely showing behind pronotum; tip of scutellum fuscous; median transverse suture and spots in front of this brown. Elytra grayish brown, veins bluish white. Hind wings smoky, veins dark.

Structure.—Distinctly wedge shaped. Vertex very short medially, much longer next the eyes, posterior margin sinuately curved and extending behind eyes laterally. Pronotum roundly humped in lateral view, lateral margins obsolete, posterior margin convexly rounding, slightly notched medially. Elytra long, tapering toward apices, second cross vein between sectors missing.

External genitalia.—Last ventral segment of female slightly longer than preceding segment, lateral angles broadly rounded, posterior margin nearly truncate but slightly sinuated each side of a very short and almost obsolete median tooth. Male valve not visible, plates united except at the tips, lateral margins slightly concavely curved for two thirds their length, then converging to form a bluntly pointed tip which exceeds pygofer.

Internal male genitalia.—Aedeagus and connective long, slender, and slightly curved; aedeagus with an elongate flap on each side, attached at the base and appearing sheathlike. Tip of aedeagus broadened and with a pair of short, lateral processes, the whole resembling a pick with a heavy shank and short points. Inner fork of style slender and curved dorsad and caudad, outer fork stout and blunt. Posterior margins of pygofer broadly rounded.

This species might easily be confused with the variety *minor*, since the general aspect and markings are the same, but the difference in size will serve to separate the two. A study of the habits of the two forms will undoubtedly bring to light a difference in food plants correlated with the difference in size.

Holotype male and allotype female from Granite Dell, Ariz., July 17, 1929, E. D. Ball. Paratypes, 2 males and 8 females with the same data and 3 females from the above-mentioned locality, collected by Dr. Ball, October 6, 1929. Holotype, allotype, and paratypes in the collection of E. D. Ball. Paratypes in the United States National Museum collection (catalog no. 43978).

AGALLIOPSIS FUSCOSIGNATA var. *MINOR* n. var.

(Fig. 1, H, I, J; pl. 1, G)

Similar to the species but smaller. Length of male 3 mm, of female 3-3.25 mm.

Color.—Brownish gray, darker than typical *fuscosignata*, sometimes with a distinct whitish bloom. Face creamy gray; markings of face, vertex, pronotum, and scutellum as in *fuscosignata* but with the large spots on the vertex above the ocelli not extending over the margin posteriorly. Elytra gray-brown, veins bluish white.

Structure.—As in typical *fuscosignata*, but proportionately smaller.

Holotype male and allotype female from Tucson, Ariz., June 28, 1930, E. D. Ball. Paratypes, 14 females and 1 male from Tucson, Superior, and Apache Junction, Ariz., and Indio, Calif., collected on various dates by Dr. Ball. Holotype, allotype, and paratypes in the collection of E. D. Ball. Paratypes in the United States National Museum collection (catalog no. 43979).

AGALLIOPSIS CERVINA n. sp.

(Fig. 2, A, B; fig. 14, A, B)

Resembling *A. oculata* but slightly larger and with the elytra a deep brown. Length of male 4.25 mm.

Color.—General ground color deep brown. Upper margin of vertex creamy yellow, broad lateral margins of lora white, remainder of face brown, with fuscous marks as follows: Frontal sutures, sides of frons, antennal pits, semi-circular spots at inner margins of ocelli, and inverted Y on vertex. Vertex with four black spots near posterior margin, the inner two above the ocelli, the outer two next the eyes. Pronotum brown, paler each side of median line; lateral margins white; black marks as follows: Anterior margin laterally, a median line which widens at both ends, and a large spot on each side posteriorly. Scutellum brown; basal triangles, depressed median dots, and tip black; lateral margins posteriorly creamy white. Elytra uniformly brown subhyaline with a broken transverse whitish vitta dorsally one third the distance back, and spots along commissural line whitish at the junction of the claval veins. Abdomen dark.

Structure.—Similar to *A. oculata* but slightly more robust. Vertex very short, longer next the eyes than medially, posterior margin slightly sinuate and extending behind the eyes laterally. Elytra long, second cross vein between sectors absent.

External genitalia.—Male valve transverse, collarlike. Plates long, united nearly to tips, lateral margins concave, tips rather broad and blunt, slightly exceeding pygofer.

Internal male genitalia.—Aedeagus flattened dorsoventrally, ribbonlike, in lateral view extending nearly straight caudad almost half its length, then curved broadly downward and the tip curved slightly upward. Tip of aedeagus with long, slender lateral processes that extend laterally and ventrally, curving anteriorly from base, the distal portion extending nearly straight laterad.

Most easily separated from *A. oculata* by the color pattern, the uniformly brown elytra, and the characters of the internal male genitalia.

Holotype male from Douglas County, Kans., June 1928, P. B. Lawson. Type in the University of Kansas collection.

AGALLIOPSIS OCLATA (Van Duzee)

(Fig. 2, E, F, G; fig. 14, M; pl. 4, A)

Described by Van Duzee (38, p. 38) in 1890 as *Agallia oculata*. One of the largest of the North American species. Dark, with a pair of large black spots on the pronotum. Length of male 4 mm, of female 4.5-4.75 mm.

Color.—General ground color smoky brown. Front with fuscous marks as follows: Outer margins of frons marked with short transverse lines, a circle around and a longer transverse line under each ocellus, a small dot near each eye and a little above the level of the ocelli, another dot above each of these on the anterior margin of the vertex, a large dot on the anterior margin of the vertex directly above each ocellus, and a central, median, longitudinal line which widens dorsally. The median line and the four dorsally situated spots are visible on the vertex from above. Pronotum with black marks as follows: Two tiny spots near anterior margin, a narrow median line, two large spots on each side of median line midway between anterior and posterior margin, and a faint spot at each posterior angle. Scutellum with angles darkened and a pair of dots near anterior margin black. Elytra brown with whitish veins, sometimes apices and a median saddle slightly darkened.

Structure.—Long, wedge shaped. Vertex distinctly much shorter medially than next the eyes, extending behind the eyes laterally and with posterior margin curved far forward beyond anterior margin of eyes. Pronotum truncate behind, lateral margins very short, strongly oval, giving a somewhat humped appearance in lateral view. Elytra long, lacking second cross vein between sectors.

External genitalia.—Last ventral segment of female slightly longer than preceding segment, nearly truncate but usually slightly produced medially and faintly sinuate each side of median line. Ovipositor heavy, strongly exceeding pygofer. Male valve not visible, plates united basally for over one half their length, together broader basally, outer margins nearly parallel on median one third, curving gradually on posterior one third to appressed, bluntly pointed apices which exceed pygofer. Pygofer in lateral view rounded behind, with a tiny fingerlike projection on each side below the anal tube.

Internal male genitalia.—Aedeagus slender, in dorsal view bifid apically, tips diverging. A fleshy sheath on each side of penis extending nearly to tip.

Described from southern California from specimens collected by D. W. Coquillett. Common in the lower mountains of that area. Type in the collection of Iowa State College, Ames, Iowa. Specimens from the type series are now in the United States National Museum collection.

AGALLIOPSIS PNEOCULATA n. sp.

(Fig. 2, L, M, N; fig. 14, P; pl. 4, B)

Size and form of *A. oculata* but with the elytra concolorous except for an indistinct transverse smoky bar a little posterior to the forking of the first sector. Length of male 4 mm, of female 4.5 mm.

Color.—Lighter than *oculata*, with the fuscous markings of face, vertex, pronotum, and scutellum the same but usually smaller and less distinct. Elytra light-brownish subhyaline with a transverse smoky fuscous band across the middle of the clavus. Veins concolorous and indistinct.

Structure.—Distinctly wedge shaped, much like *oculata* in form. Vertex distinctly shorter medially than next the eyes, posterior margin sinuated and extending behind the eyes laterally. Pronotum with posterior margin nearly straight, lateral margins obsolete. Elytra long and tapering, about as in *oculata*, the second cross vein absent.

External genitalia.—Last ventral segment of female with posterior margin broadly, convexly rounded, about as in *oculata* but not sinuate. Valve of male not visible, plates long, united except distally, lateral margins concave on basal two thirds, tips bluntly rounded.

Internal male genitalia.—Aedeagus long and slender but stouter than in *oculata*, the tip in dorsal view very broad and appearing somewhat bilobed, not forked as in *oculata*. Penis sheath consisting of a short fleshy flap on each side but not attached to the penis.

Although strongly resembling *oculata* in size and general appearance, this species is easily separated by the lighter ground color, the transverse smoky band on the elytra, and the internal male genitalia.

Holotype male and allotype female from Lapeer, Mich., August 24, 1919, E. D. Ball. Paratypes, 1 male and 1 female, with the same data, 1 female from Gloversville, N.Y., C. P. Alexander, 1 male from Batavia, N.Y., August 13, 1915, H. H. Knight, and 1 female from Georgetown, Conn., September 23, 1910. Holotype and allotype in the collection of E. D. Ball, paratypes in the collection of C. E. Olsen and in the United States National Museum collection (catalog no. 43980).

AGALLIOPSIS DUBIOSA n. sp.

(Fig. 2, J, K; fig. 14, K, L)

Light orange yellow with four tiny black spots on the vertex. Length of male 4.25 mm.

Color.—Orange yellow with a faint whitish bloom. Face pale with faint brownish markings and a tiny fuscous spot at the inner margin of each ocellus. Vertex with four small black spots near posterior margin, one pair above the ocelli, and one pair next the inner corners of the eyes. Pronotum a deeper orange on anterior and posterior margins. Scutellum lighter on the anterior median portion and on lateral margins each side of the transverse suture. Elytra light yellowish-orange subhyaline, veins mostly concolorous and obscure, sometimes a little darker than the elytra and occasionally broadly milky white for short distances.

Structure.—Elongate, slender, vertex short, a little longer next the eyes than medially, posterior margin feebly sinuate and extending only a very little behind eyes laterally. Pronotum rather short, posterior margin straight. Elytra long, margins nearly parallel, second cross vein between sectors missing.

External genitalia.—Male valve long, nearly rectangular, slightly wider basally than median length, lateral margins slightly converging. Plates a little longer than valve, subtriangular, tips blunt.

Internal male genitalia.—Aedeagus long, extending first dorsad and then broadly bent so that the distal portion extends caudad, the base quite stout but the distal portion slender; a pair of rather stout processes arising a little before the middle, each of these bearing on the inner margin a short, pointed projection; another pair of processes extending laterally from just before the tip, these long and slender. Dorsal spine of tenth segment broad, tip hooked downward, posterior margin dorsally, coarsely serrate. Pygofer with a small hook on each posterior margin, these extending inward and a little upward and hooked caudally.

Holotype male and 1 paratype male from the Huachuca Mountains, Arizona, August 1, 1927, R. H. Beamer. Holotype in the University of Kansas collection; paratype in the United States National Museum collection (catalog no. 43982).

AGALLIOPSIS TENELLA (Osborn and Ball)

(Fig. 3, K, L)

Described as *Agallia tenella* by Osborn and Ball (28, p. 56-57) in 1898. Elongate, the elytra with two cross veins between sectors and the female segment triangularly produced and notched at the apex. Length of female 4.25 mm.

Color.—General ground color pale creamy. Face with fuscous marks as follows: Tip of clypeus, frontal sutures, antennal pits, inverted Y on vertex, and circles around ocelli; short, transverse marks laterally on frons brown to fuscous.

Elongate spots on vertex above ocelli brown to fuscous, those next the eyes round and brownish fuscous. Pronotum with the following markings golden brown in the type: Depressed anterior submargin laterally, narrow median line, and oblique oval spots on each side of median line; these markings fuscous in fully colored specimens. Broad posterior margin of pronotum unmarked and distinctly paler than anterior portion. Scutellum with basal triangles brown to fuscous, narrow median line and two small spots before transverse suture brown; transverse suture and a triangular area back of this brownish fuscous. Elytra faint brownish subhyaline, a faint brownish spot along commissural line between the claval veins and another just beyond the clavus; veins of elytra bluish white. Hind wings with veins dark.

Structure.—Distinctly wedge shaped, resembling *novella* but much more elongate. Vertex very short medially, pronotum short, lateral margins obsolete, posterior margin truncate. Elytra long and slender, slightly tapering, tips rounded, venation distinct, second cross vein between sectors present, the third anteapical cell nearly as long as the second.

External genitalia.—Last ventral segment of female with lateral margins short, the posterior margin triangularly produced and tip shallowly notched medially.

The shape of the female segment and the presence of the second cross vein between the sectors of the elytra are the most distinctive characters of this species. Osborn and Ball described *tenella* from 3 female specimens, 1 from Orizaba, Vera Cruz, Mexico, January 9-16, 1892, and 2 from Córdoba, Vera Cruz, Mexico, January 23, 1892, all collected by H. Osborn. Examination of the type material shows that there were two species involved, and since no specific localities were mentioned in the original description, the species from Orizaba, which has the characters of wing venation and form of female genitalia mentioned by Osborn and Ball, is here considered as representing *tenella*, while the species from Córdoba, which lacks the second cross vein, has the female segment roundly and very slightly produced, and differs in other respects, is a distinct and apparently undescribed species. Ball (4, p. 127) placed *producta* Baker (nec. Osborn and Ball) as a synonym of *tenella* Osborn and Ball, but an examination of Baker's types shows that they represent a distinct species. Thus there have been no less than three species confused under the single name *tenella*, which, as it now stands, is known from only the female sex. Records of *tenella* from the West Indies no doubt refer to *albida* Uhl. Examination of the type series of *tenella* was made possible through the kindness of C. J. Drake and H. H. Knight. Type in the collection of Iowa State College, Ames, Iowa.

AGALLIOPSIS BRUNNEA new name

(Fig. 3, A, B, C; fig. 14, N, O)

Described by Baker (2, p. 200) in 1898 as *Agallia producta*, but this name was used first by Osborn and Ball (28, p. 52). Smaller than *tenella*, and the elytra without the second cross vein between sectors. Length of male 3.5 mm, of female 3.75 mm.

Color.—General ground color pale olivaceous brown. Face bright yellow, without markings except the black antennal pits and dirty circles bordering ocelli. Vertex with a round black spot above each ocellus, one next each eye, and a transverse black spot medially on the posterior margin. Pronotum with a faint median line and a pair of tiny spots anteriorly. Borders of pronotum lighter. Basal triangles of scutellum and spots before transverse suture fuscous. Elytra subhyaline, veins very faintly brown.

Structure.—Not so distinctly wedge shaped as *tenella*. Vertex short, pronotum with lateral margins obsolete, posterior margin truncate or slightly concave.

Elytra long, scarcely tapering, second cross vein between sectors absent, venation obscure.

External genitalia.—Last ventral segment of female with lateral margins short, posterior margin triangularly produced, tip not notched. Male valve not visible, plates very long, slender and united for one half their length, widening rather abruptly at about the middle, then gradually narrowing to bluntly rounded tips which exceed pygofer.

Internal male genitalia.—Shanks of styles long and slender, forks short, together appearing almost clublike. Connective stout and nearly straight, the basal end swollen and forcepslike in dorsal view; attached to the styles by a long, slightly sclerotized, straplike process, while a similar process attaches the distal end of the connective to tenth segment. The aedeagus extends caudad from the distal end of the connective, forming an acute angle with the connective. Aedeagus slender, rather abruptly, sinuately bent near the tip, which is very slender and ends in a pair of forks which resemble outside calipers. Styles with numerous long, fine hairs on the inner surfaces. The internal genitalia of this species are unique in that there is a complete connection between the styles and the anal tube, and that a portion of the style-aedeagus connective is very much elongate and poorly sclerotized.

The external genital characters of either sex, together with the size and markings, should be sufficient to distinguish this species, while the internal male genitalia are unlike those of any other known species in the genus.

Baker described his *producta* from Mexico, but the name was preoccupied by Osborn and Ball's species from the same locality. Ball (4, p. 127) in 1900 mentioned that *producta* was preoccupied, but placed Baker's species as a synonym of *tenella* Osborn and Ball. Examination of the type material of both species, however, convinces the writer that Baker's *producta* is a valid species; so the name *brunnea* is here applied. Specimens at hand are from Medellin, Vera Cruz, Mexico, and La Ceiba, Honduras. Cotypes in the United States National Museum collection (catalog no. 43981).

AGALLIOPEIS MAGNIFICA n. sp.

(Fig. 3, I, J; fig. 14, Q, R)

Light brown with fuscous markings. Resembling *A. oculata* but even larger. Length of male 5.25 mm.

Color.—General ground color yellowish brown. Face light with brownish fuscous marks as follows: Frontal sutures, short dashes on frons laterally, inverted Y on vertex, and rings around ocelli; spots on posterior margin of vertex above ocelli fuscous and those at inner corner of eyes brown. Pronotum with fuscous median line that does not reach anterior margin, a very faint dark spot on each side near anterior margin, a large fuscous spot on each side of the disk, and a smaller fuscous spot near each lateral margin. Basal triangles of scutellum black, transverse suture, round depressions anterior to this, and a faint median line brownish fuscous. Elytra uniformly brownish subhyaline, veins paler.

Structure.—General shape of *oculata*, vertex very short medially, longer next the eyes, hind margin sinuate and extending behind eyes laterally but not so much as in many of the species. Pronotum distinctly humped in lateral view, lateral margins almost obsolete, hind margin very slightly angularly concave. Elytra long, rather slender, second cross vein between sectors missing.

External genitalia.—Male valve almost rectangular, slightly longer than basal width and with lateral margins very slightly converging. Plates long and slender, united except at tip, lateral margins nearly parallel for a short distance, then gradually converging. Tips bluntly rounded and plates curved upward close to hind margins of pygofer.

Internal male genitalia.—Aedeagus heavy, almost straight, the tip with a pair of rather heavy projections which extend laterally and anteriorly in the same plane with the aedeagus. Pygofer with posterior margins heavy, dorsally forming a pair of stout, heavy, inward-projecting spines. Anterior to these are a pair of

very slender spines, also projecting directly inward. Tenth segment without distinct spines but ending in sharp points caudally.

Although described from a single specimen, the large size, together with the distinctive markings and male genitalia, should easily separate this species from any previously described form.

Holotype male from Ayotla, Mexico, 11-4. No other data. Type in the collection of E. D. Ball.

AGALLIOPSIS ANCORALIS n. sp.

(Fig. 3, G, H; fig. 13, N, O)

Golden brown, resembling *A. tenella*, but with the second cross vein in the elytra absent and the posterior margin of the pronotum not pale. Length of male 4 mm.

Color.—General ground color golden brown. Face with fuscous marks as follows: Frontal sutures, marks laterally on frons, antennal pits, circles around ocelli, and inverted Y on vertex. Base of inverted Y broadened at apex of vertex to form a median spot from above. Vertex with a large fuscous spot on posterior margin above each ocellus and a smaller fuscous spot at the inner angle of each eye. Pronotum with a median fuscous stripe which broadens posteriorly and a fuscous spot covering each of the anterolateral depressions. Posterior margin a little darker with a brown lobelike spot extending anteriorly on each side, laterad of these indistinct clouds of brown. Scutellum with three basal and one apical fuscous triangles. Elytra mostly brownish subhyaline, with the veins pale, especially along the commissural line, and an indistinct transverse vitta of brown just posterior to the forking of the sectors.

Structure.—Vertex short, a little more angular than is usual in the genus. Pronotum short, with the anterolateral depressions quite distinct and posterior margin only slightly concave. Elytra slender, tapering to bluntly rounded apices, second cross vein absent.

External genitalia.—Male valve long, almost quadrangular, a little narrower distally than basally, and with lateral margins slightly concave. Plates almost triangular, lateral margins slightly convex, apices pointed and equaling pygofer in length.

Internal male genitalia.—Aedeagus rather stout basally, extending dorsocephalad from connective, then bending sharply caudad, slender distally, tip in dorsal view anchor shaped but with the arms almost parallel. In lateral view these arms are much broadened distally. Pygofer with hind margins bearing two hooklike projections on each side. Posterior margins of tenth segment produced into fingerlike projections at either angle.

The markings and male genital characters are sufficient to distinguish this species.

Holotype male from Jalapa, Vera Cruz, Mexico, collected June 20, 1898. Type in the collection of E. D. Ball.

AGALLIOPSIS EXILIS n. sp.

(Fig. 4, A, B; fig. 13, P, Q)

Distinct from all other species in the genus because of the very large elytra. Length of male 4.75 mm, length of elytra alone 4 mm.

Color.—General ground color dirty brownish gray, clypeus infuscated, frons, except basally, black, frontal sutures dark. Vertex with black marks as follows: Inverted Y, spots laterally next the eyes, projections from these which encircle ocelli, and large spots on margin above ocelli. Pronotum with anterior margin on median one fourth black; a median line on anterior two thirds and spots laterally on disk also black; lateral margins infuscated. Scutellum with dim fuscous triangles basally. Elytra dirty subhyaline, veins a little paler.

Structure.—Head and thorax a little depressed, vertex and pronotum short, the latter with posterior margin concave. Elytra extremely long and broad, scarcely tapering distally, the apices broadly rounded. Second cross vein between sectors absent.

External genitalia.—Male valve very long, nearly twice as wide basally as distally, lateral margins convex. Plates small, triangular, lateral margins convex, apices bluntly pointed.

Internal male genitalia.—Aedeagus much as in *A. ancoralis*, but more slender and with the lateral processes at the apex forked and not widened in lateral view.

The specimen upon which the description is based is somewhat teneral, which may account for some, but not all, of the depressed appearance of the head and thorax. However, the size of the elytra is so distinctive that the writer feels that the description from a single specimen is justified.

Holotype male from Trinidad, Colo., 9,000 feet, August 8, 1925, C. J. Drake. Type in the collection of E. D. Ball.

AGALLIOPSIS VARIABILIS n. sp.

(Fig. 3, D, E, F; fig. 13, R, S; pl. 1. E)

Most closely allied to *A. novella* and *A. anomala* but with the second cross vein between sectors of the elytra present and the third anteapical cell large. Length of male 3.5–3.75 mm, of female 3.75–4 mm.

Color.—General ground color very light yellowish brown. Front variously marked with light brown, a median line, a round dot above each ocellus, and an irregular spot against each eye visible on anterior margin of vertex from above. Eyes reddish brown. Pronotum with coppery brown to fuscous marks as follows: A narrow median line, one pair of elongate, longitudinal spots anteriorly and two smaller pair posteriorly, and anterior margin laterally. Scutellum with basal angles and median transverse furrow brown, remainder yellow. Elytra light brown to fuscous basally, fading to subhyaline apically, veins mostly creamy white. Two dark areas in clavus along commissural line and cells of corium often infuscated. Hind wings with veins dark.

Structure.—Not so distinctly wedge shaped as *oculata*, width across elytra about equal to width of head. Hind margin of vertex almost semicircular between eyes and produced slightly beyond anterior margin of eyes. Vertex much shorter medially than next the eyes, extending behind eyes laterally. Posterior margin of pronotum slightly concave, lateral margins very short, angles broadly curved. Elytra long, second cross vein between sectors present, third anteapical cell two thirds as long as second.

External genitalia.—Last ventral segment of female distinctly longer than preceding segment, posterior margin broadly but shallowly excavated. Ovipositor long, strongly exceeding pygofer. Male valve large, truncate behind, plates rather small, outer margins straight and slightly converging, apices slightly diverging and bluntly rounded. Plates exceeding pygofer.

Internal male genitalia.—Style apparently consisting of two sclerites but actually of one, posterior portion of inner fork footlike. Dorsal processes of aedeagus in lateral view very broad medially, tapering to a blunt point distally. Dorsal spines of tenth segment strongly curved, inner margins with footlike projections, tips sharply pointed and slightly reflexed. Viewed from above, the dorsal process of the aedeagus is narrow, the ventral process heavy and ending in a sharp median projection and a pair of long, caudally curved lateral processes.

This species may be separated from any other known forms by the markings of the vertex and pronotum, the size, the distinctive male genitalia, and the presence of the second cross vein between the first and second sectors of the elytra, making three anteapical cells instead of the usual two.

Holotype male and allotype female from Zion National Park, Utah, August 13, 1929, P. W. Oman. Paratypes, numerous specimens of both sexes with the same data and others from Grand Canyon, Tucson, Santa Rita Mountains, Granite Dell, and Baboquivari Mountains, Ariz.; Tehachapi and Riverside, Calif.; and Douglas County, Colo. Holotype, allotype, and paratypes in University of Kansas collection; paratypes in the collection of E. D. Ball and in the United States National Museum collection (catalog no. 43983).

AGALLIOPSIS ANOMALA (Baker)

(Fig. 2, C, D)

Described by Baker (2, p. 200) in 1898 as *Agallia anomala*. Allied to *A. novella* but smaller and more slender and with the female segment only shallowly excavated. Length of female 3.5-3.75 mm.

Color.—General ground color pale brownish gray. Face above pale with fuscous marks as follows: Clypeus, sides and tip of frons, frontal sutures, antennal pits, arms of inverted Y on vertex, small triangular spot next each eye in line with the ocelli, and small spots inside of and bordering each ocellus. Base of inverted Y on vertex brown; small spots on posterior margin of vertex above ocelli and similar spots next each eye fuscous. Pronotum with a faint brown median line, a pair of faint brown spots midway on each side, and with the anterior margin laterally brownish. Scutellum pale, depressed transverse suture and depressed spots in front of this pale brownish. Elytra mostly subhyaline, two brown areas in clavus along commissural line and cells of posterior half of corium embrowned. Veins partly yellowish white, mostly concolorous with membrane.

Structure.—Vertex strongly rounded; pronotum with lateral margins obsolete, posterior margin broadly rounding, scarcely subtruncate. Elytra long, more tapering than those of *novella*, venation mostly obscure; second cross vein between sectors nearly always absent; when present, the third anteapical cell very short.

External genitalia.—Last ventral segment of female much narrower than that of *novella*, lateral margins straight, lateral angles rounded, posterior margin shallowly, roundly excavated.

A. anomala may be separated from closely related species by the shape of the female genitalia and the fact that it has only one cross vein between the sectors of the elytra.

Baker described *anomala* from two females from the State of Vera Cruz, Mexico. Ball (4, p. 127) indicated that it might be a synonym of *tenella* Osborn and Ball, but an examination of Baker's specimens convinced the writer that they represent a distinct and valid species. Several specimens are at hand from Mexico, and a specimen from Costa Rica and another from Guatemala seem to belong here, extending the known range of the species far south. At present known only from the female sex. Cotypes in the United States National Museum (catalog no. 43973).

AGALLIOPSIS NOVELLA (Say)

(Fig. 3, M, N, O; fig. 14, C, D, E, F, G, H, J; pl. 1, D)

Described by Say (31, p. 309) in 1831 as *Jassus novellus* and redescribed by Forbes (15, p. 22) in 1884 as *Macropsis nobilis*. Wedge shaped, yellowish white to brown, marked with fuscous and black. Length of male 3-3.5 mm, of female 3.5-4 mm.

Color.—Usually light testaceous, often darker, the males sometimes almost fuscous. Face yellowish, variously embrowned, inner margins of ocelli black. Hind margin of vertex with a round black spot above each ocellus and a smaller, slightly oblong one next each eye. Pronotum with a median brown stripe and a fuscous spot on each side about equidistant from the front and back margins. Dark specimens often have the hind margin broadly, and the anterior margin narrowly, brown or fuscous; in pale specimens the median line and lateral spots may be faint or obsolete. Scutellum with basal triangles fuscous. Elytra testaceous to brown, veins light. Hind wings smoky, veins dark.

Structure.—Slender wedge shaped. Vertex very short, much longer next the eye than medially; hind margin sinuated and extending behind the eyes laterally. Pronotum humped in lateral view, hind margin straight, lateral margins obsolete. Elytra long and slender, second cross vein between sectors absent.

External genitalia.—Last ventral segment of female broad and greatly produced laterally, hind margin broadly, roundly excavated medially. The lateral lobes are usually rounded from the lateral margins, but sometimes quite pointed.

Male valve large, hind margin truncate. Plates small, semitubular, tips bluntly rounded. Pygofer greatly expanded, exceeding plates both laterally and caudally; the plates scarcely covering the ventral opening to the genital chamber.

Internal male genitalia.—Style appearing to consist of two sclerites. Ventral portion of aedeagus stout and nearly straight, with a pair of slender lateral processes arising basally and extending alongside the aedeagus for more than half its length. Pygofer hooks of various shapes, coarsely serrate on inner margins. Dorsal spine of tenth segment short, tip bent abruptly upward.

The internal genital characters of the males of this form present a very interesting problem relative to their significance as specific characters. The pygofer hooks, as mentioned above and shown by the illustrations (fig. 14, F, G, H, I, J), are of various shapes, while the dorsal spines of the tenth segment and the lateral processes of the aedeagus show similar, though less distinct, variations. While the males from a single locality are invariably almost identical, the material at hand, although consisting of several hundred specimens from many localities in North America, is insufficient to determine the true significance of the genital characters. The examination of large series of males, together with host plant and habitat data, may definitely associate the internal genital characters with certain hosts, habitats, or distribution, but until this can be done it seems best not to name the various forms.

Say described *novella* from Indiana specimens, and the species is found throughout eastern North America. Specimens from the western part of the United States are larger and have more brown in their color patterns and will probably prove to be a distinct variety. Location of type unknown, probably destroyed.

AGALLIOPSIS NOVELLA var. TROPICALIS (Van Duzee)

(Fig. 14, I)

Described as *Agallia novella* var. *tropicalis* by Van Duzee (41, p. 53) in 1907. Size and form of tropical *novella* but the males much darker. The female genital segment is somewhat less deeply excavated and is slightly notched on each side half way to the base of the excavation. The male internal genitalia differ from those of typical *novella* only in that the lateral processes of the aedeagus are slightly longer and slenderer and closely appressed to the aedeagus.

At the time he described this form, Van Duzee indicated that further study might show it to be deserving of specific rank. It is possible, however, that examination of a large series of specimens from a wide range of localities will show this to be merely a dark extreme of a very variable species. Until such studies can be made it seems best to consider this as merely a variety of the typical northern form.

Types from Jamaica in the collection of the California Academy of Science. Mr. Van Duzee has kindly compared specimens from Jamaica with his types and reports them to be the same. Specimens almost identical with the Jamaican form are at hand from various localities in Mexico and Central America.

The genus AGALLIA Curtis

Vertex short and usually of almost uniform length, posterior margin broadly and evenly curved, not extended behind the eyes laterally, usually a black spot above each ocellus. Pronotum short, lateral margins almost obsolete, posterior margin straight or shallowly con-

cave, entire surface finely granulate. Elytra usually broad, venation often obscure, and with 4 apical and either 2 or 3 anteapical cells. Internal male genitalia without pygofer hooks and with styles forked posteriorly. Nymphs with a pair of large lobate processes extending forward from the vertex.

Type of the genus, *Agallia consobrina* Curtis (= *puncticeps* Germar).

A careful study of the European species will probably show that few of the species here included in the genus are true *Agallia* and that most of them should be placed in a separate genus. The position of *nigricans* and *hystricula* is somewhat uncertain, but they are placed in the genus *Agallia* because of the character of the male styles and the fact that the pronotal striations are very faint. Further study may show that these forms deserve subgeneric rank. The status of *acuticauda* is also uncertain, in that it is the only species in the group with a dorsal spine on the tenth segment, a structure possessed by certain species of *Agalliopsis*.

Only the male sex of *hystricula* is known to the writer.

Key to the species of AGALLIA

- | | | |
|-------|--|---------------------------|
| 1 | Species typically black and yellow or blackish green and yellow; veins broadly marked with yellow; male plates slender, triangular, lateral margins straight and tips acutely pointed. West Indian species..... | 2 |
| | Species not as above..... | 4 |
| 2 (1) | Disk of pronotum without black markings; posterior margins of male pygofer bilobed (fig. 14, V)..... | <i>pulchra</i> , p. 30. |
| | Disk of pronotum normally with black markings; posterior margins of male pygofer not bilobed..... | 3 |
| 3 (2) | Posterior margin of male pygofer produced into long, ligulate processes which curve below the anal tube and up the opposite side (fig. 14, U). Female genital segment roundly produced..... | <i>fascigera</i> , p. 29. |
| | Posterior margins of male pygofer with only short processes (fig. 14, T). Female genital segment truncate..... | <i>bicolor</i> , p. 28. |
| 4 (1) | Elytra reticulately veined..... | <i>liturata</i> , p. 34. |
| | Elytra not reticulately veined..... | 5 |
| 5 (4) | Species typically yellowish brown to brown, with a large, oval, black spot on the vertex above each ocellus and 2 spots of approximately the same size and shape directly behind these near the posterior margin of the pronotum; other markings, if any, consisting of infuscation of areas medially and next the eyes on the vertex and anteriorly, laterally, and sometimes medially on the pronotum. Rarely with the posterior 2 spots nearly obsolete and the males of certain species almost wholly black..... | 6 |
| | Species with coloring not as above..... | 26 |
| 6 (5) | Species very robust, length 2.75 mm or less. Aedeagus of male forked at tip (fig. 15, W), genital segment of female with a small median notch (fig. 7, B)..... | <i>obesa</i> , p. 40. |
| | Species elongate, length 3 mm or more; if robust, the length at least 3.5 mm. Aedeagus of male not forked at tip or, if forked, the outer margins of forks not sinuated. Genital segment of female unnotched medially or with a broad excavation..... | 7 |
| 7 (6) | Males..... | 8 |
| | Females..... | 17 |
| 8 (7) | Aedeagus ending in a pair of long, lateral forks and a median tube which curves dorsad (fig. 16, E, F)..... | <i>ingens</i> , p. 43. |
| | Aedeagus not as above..... | 9 |
| 9 (8) | Aedeagus short, curved dorsad, tip hooked upward (fig. 15, E)..... | <i>modesta</i> , p. 32. |
| | Aedeagus not as above..... | 10 |

- 10 (9) Tip of aedeagus in dorsal view resembling a pair of outside calipers (fig. 16, D). Male plates with lateral margins straight (fig. 7, L). *bidactylata*, p. 42.
- Tip of aedeagus not as above, male plates either slightly constricted near the middle or with lateral margins convex. 11
- 11 (10) Tip of aedeagus with a pair of lateral processes which extend ventrad at right angles to the remainder of the aedeagus *peneconstricta*, p. 39.
- Aedeagus not as above. 12
- 12 (11) Aedeagus forked at tip. 13
- Aedeagus not forked at tip. 15
- 13 (12) Large species, length 3.75-4 mm. Distribution Mexico and Central America. *producta*, p. 38.
- Smaller species, length 3.25-3.5 mm. Distribution United States and Cuba. 14
- 14 (13) Pygofer with dorsal lobes more produced than ventral lobes, incisions between lobes shallow (fig. 15, O). *constricta*, p. 37.
- Pygofer with dorsal lobes less produced than ventral lobes, incisions between lobes deep and rounded (fig. 15, Q). var. *cubana*, p. 38.
- 15 (12) Species relatively slender, heavily marked with black; length 3.5 mm. *lingulata*, p. 33.
- Species robust, usually unmarked with fuscous except 2 spots each on vertex and pronotum; length 3.5-4 mm. 16
- 16 (15) Large, 4 mm in length; distribution northern and eastern United States and southern Canada. *quadripunctata*, p. 41.
- Smaller, 3.5 mm in length; distribution southwestern United States and Mexico. subsp. *excavata*, p. 41.
- 17 (7) Female genital segment with posterior margin produced into one or more fingerlike processes. 18
- Female genital segment without such processes. 19
- 18 (17) Genital segment with a single, median ligulate process (fig. 6, H). *lingulata*, p. 33.
- Genital segment with a short, median, bifid process and a longer, more slender process each side of this (fig. 7, K). *bidactylata*, p. 42.
- 19 (17) Genital segment subtriangularly produced (fig. 7, H; fig. 5, T). Large species, length 4.25 mm or more. 20
- Genital segment not at all subtriangularly produced or, if slightly so, species less than 4 mm in length. 21
- 20 (19) Species unmarked except for the 4 spots on vertex and pronotum *producta*, p. 38.
- Species considerably infuscated, the spots sometimes fused with these fuscous areas. *ingens*, p. 43.
- 21 (19) Genital segment with the posterior margin truncate or slightly excavated. 22
- Genital segment with posterior margin slightly produced. 24
- 22 (21) Species small, rather slender; length 3.75 mm or less. Color light yellowish brown with a large black spot on the vertex above each ocellus and a similar one behind each of these near the posterior margin of the pronotum. *modesta*, p. 32.
- Species larger, robust; length 3.75 mm or more. Color brown, spots less conspicuous. 23
- 23 (22) Genital segment with posterior margin not excavated; distribution northern and eastern United States and southern Canada; length 4 mm. *quadripunctata*, p. 41.
- Genital segment with posterior margin excavated; distribution southwestern United States and Mexico; length 3.75 mm subsp. *excavata*, p. 41.
- 24 (21) Length 3.5 mm or more; distribution United States and Cuba. 25
- Length 3.25 mm; distribution Central America *peneconstricta*, p. 39.
- 25 (24) Genital segment depressed laterally on the posterior one half; distribution the United States. *constricta*, p. 37.
- Genital segment not as above; distribution Cuba. var. *cubana*, p. 38.
- 26 (5) Species heavily marked with black over most of dorsal surface, rarely almost wholly reddish brown. 27
- Color not as above. 36

27 (26)	Males.....	28
	Females.....	34
28 (27)	Male plates clothed with coarse setae on posterior one half (fig. 6, F).....	29
	Male plates not as above.....	30
29 (30)	Aedeagus consisting of 2 spinelike processes (fig. 16, I). Length 2.5 mm.....	
	Aedeagus consisting of a single process (fig. 16, J). Length 3 mm.....	
	<i>nigricans</i> , p. 44.	
	<i>hystriacula</i> , p. 45.	
30 (28)	Aedeagus ending in a pair of long, lateral forks and a median tube which curves dorsad (fig. 16, E, F).....	
	Aedeagus not as above.....	31
31 (30)	Aedeagus straight distally, tip bifid (fig. 15, N); pygofer with posterior margins lobed (fig. 15, M).....	
	Aedeagus and pygofer not as above.....	32
32 (31)	Aedeagus ending in a single, slender process not hooked and without lateral processes (fig. 15, I).....	
	Aedeagus not as above.....	33
33 (32)	Aedeagus with tip hooked dorsally (fig. 15, E), lateral processes small, spinelike, and extending cephalad.....	
	Aedeagus not hooked at tip, lateral processes prominent, extending ventrad (fig. 16, G, H).....	
	<i>modesta</i> , p. 32.	
	<i>barretti</i> , p. 43.	
34 (27)	Genital segment subtriangularly produced (fig. 7, H); species large, length 4.25 mm.....	
	Genital segment subtruncate or somewhat rounded (fig. 7, N); species smaller, length 4 mm or less.....	35
35 (34)	Species with small white marks on dorsal surface; length less than 3 mm.....	
	Markings other than black, if any, consisting of reddish-brown areas. Species occasionally almost wholly reddish brown. Length 3.5 mm or more.....	
	<i>barretti</i> , p. 43.	
36 (26)	Species having a pair of round black or fuscous spots on the vertex above the ocelli.....	37
	Species not having such spots on vertex, usually unicolorous yellowish brown to brown.....	
37 (36)	Pronotal markings consisting of a broad median line and one or more rather large spots on each side of this; markings sometimes almost obsolete.....	38
	Pronotal markings consisting of spots only, these sometimes fused to make very large markings; median line, if present, very narrow and the spots on disk very small. Species sometimes testaceous brown without distinct markings on pronotum.....	43
38 (37)	Males.....	39
	Females.....	41
39 (38)	Male plates elongate, distinctly longer than basal width (fig. 5, F).....	
	Male plates short, length less than, or barely equaling, basal width.....	40
40 (39)	Aedeagus short and stout, tip with membranous processes (fig. 15, K).....	
	Aedeagus exceedingly long and slender, tip without processes (fig. 15, H).....	
	<i>albidula</i> , p. 35.	
	<i>lingula</i> , p. 33.	
41 (38)	Genital segment with a single, median, ligulate process (fig. 6, B).....	
	Genital segment without such a process.....	42
42 (41)	Genital segment with posterior margin subtruncate or angularly produced (fig. 5, B).....	
	Posterior margin of genital segment with a shallow median notch and the margin sinuated each side of this (fig. 5, E).....	
	<i>configurata</i> , p. 36.	
43 (37)	Pronotum with a narrow median line, sometimes obsolete, and a small black spot on the disk each side of this. Species slender.....	
	Pronotum without such a median line; spots usually 5 in number; if only 2, then situated near the anterior margin. Species sometimes testaceous brown without distinct markings on pronotum.....	44

- 44 (43) Species testaceous brown without distinct markings on pronotum; length 3.5-4 mm. Female genital segment with posterior margin sinuated each side of a median notch (fig. 5, E); male plates long (fig. 5, F)..... *configurata*, p. 36. 45
- 45 (44) Species brown with only one pair of oblique fuscous spots anteriorly on the pronotum. Length 4 mm..... *bidigitata*, p. 36. 46
- Species dirty yellowish white or olive brown, normally with five spots on the pronotum, occasionally these fused into an anterior and a posterior dark area, or the spots sometimes obsolete. Length 3.5 mm or less.....
- 46 (45) Posterior margin of female genital segment truncate (fig. 5, H); male pygofer with posterior margins coarsely serrate (fig. 15, A)..... *repleta*, p. 30.
- Posterior margin of female genital segment excavated medially (fig. 4, T); male pygofer not serrate on posterior margins (fig. 15, G)..... *munda*, p. 31.

AGALLIA ACUTICAUDA n. sp.

(Fig. 4, C, D, E; fig. 14, S; pl. 4, E)

Pale brownish gray, with black spots on head, pronotum, and scutellum. Length of male 2.75-3 mm, of female 3.25 mm.

Color.—General ground color dull gray tinged with brown. Face creamy, frontal sutures and antennal pits fuscous; frons tinted with pink and small spots below ocelli black. Vertex with a short black median line, a large oval piceous spot on posterior margin above each ocellus, and a faint black spot on the anterior margin next each eye. Pronotum with a fine median line of fuscous, not reaching posterior margin, and a fuscous spot on disk each side of median line. Basal triangles of scutellum black. Elytra brownish gray, subhyaline; veins broadly bluish gray.

Structure.—Rather slender, similar to *munda*. Vertex short, a very little longer laterally than medially. Pronotum short, posterior margin truncate. Elytra long, slightly tapering, costal margin broadly bowed, second cross vein between sectors absent.

External genitalia.—Last ventral segment of female very short, posterior margin slightly sinuate, truncate. Male valve narrow, nearly as long as apical width, apex truncate, slightly narrower than base, lateral margins straight. Plates extremely slender, together triangular, lateral margins straight, apices pointed and exceeding pygofer in length.

Internal male genitalia.—Aedeagus stout, U-shaped in lateral view, the ventral process being the longer and carrying the ejaculatory duct. Inner forks of styles sharply pointed. Dorsal spine of tenth segment heavy basally with ventral margin serrate, posterior portion slender and curved upward, ending in a sharp point. Posterior margins of pygofer bluntly rounded.

The long slender male plates and dull color with few markings will distinguish this species.

Holotype male from Port-au-Prince, Haiti, May 1, 1931, H. L. Dozier. Allotype female collected by Doctor Dozier at the same locality, May 5, 1931. Paratypes, 1 male with the same data as the holotype and 1 male from Doctor Ball's collection taken at Port-au-Prince, Haiti, in December. Holotype, allotype, and paratype in the United States National Museum collection (catalog no. 43984); paratype in the collection of E. D. Ball.

AGALLIA BICOLOR n. sp.

(Fig. 4, F, G, H; fig. 14, T; pl. 4, F)

Yellow and black; resembling *A. fascigera* but much darker. Length of male 3.25 mm, of female 3.5 mm.

Color.—General ground color yellow, but males frequently almost entirely black. Face wholly black to above ocelli except for the following yellow marks: Outer margins of lora, elongate spots inside antennal pits, and occasionally a

median spot on the frons basally. Antennae yellow. Vertex yellow except an obliquely set black spot above each ocellus and dorsal extensions of the black frontal area along median and lateral lines. In the males the spots above the ocelli are usually fused ventrally with the dorsal margin of the black area on the front. Eyes fuscous. Pronotum of males wholly black except posterior margin and occasionally small spots each side of the center yellow. In the female the pronotum is essentially yellow, with the anterior margin, a median oval spot, and a pair of irregular spots posteriorly on each side black; the lateral spots barely fused with the posterior lateral margins of the median oval spots. Scutellum black except lateral margins behind transverse suture. Elytra black, with broad yellow marks on the inner margins, claval sectors, claval suture, and cubitus and a costal area apically subhyaline. Body black, legs yellow.

Structure.—Similar to *A. repleta* but more slender. Vertex of uniform length and evenly rounded. Pronotum short, posterior margin very slightly concave. Elytra long and rather narrow, costal margin nearly straight, venation obscure, second cross vein absent.

External genitalia.—Last ventral segment of female about twice as long as preceding segment, posterior margin truncate. Male valve large, transverse, and collarlike, nearly as long as broad, and posterior margin slightly produced medially. Plates slender, inner margins straight, outer margins parallel for a short distance, then abruptly converging to pointed, appressed apices which exceed pygofer in length.

Internal male genitalia.—Aedeagus long and slender, curved slightly ventrad in lateral view. Inner fork of style long and sharply pointed. Posterior margins of pygofer with short, rounded projections caudally, each bearing basally on the inside a stout, blunt, slightly hooked spine.

In the color pattern of the elytra this species is much like *A. fascigera*, but it may be easily distinguished from that and other species by the coloration of the head and pronotum and by the male genitalia.

Holotype male, allotype female, and numerous paratypes of both sexes from Guadeloupe, West Indies, July 30, altitude 3,000 feet, August Busck. Holotype, allotype, and paratypes in the United States National Museum collection (catalog no. 43985); paratypes in the collection of E. D. Ball.

AGALLIA FASCIGERA Uhler

(Fig. 4, M, N, O; fig. 14, U; pl. 4, G)

Described as *fascigera* in 1895 by Uhler (37, p. 82) and again as *capitata* (37, p. 83). Yellow, with black or fuscous markings, about the size of *A. repleta* but with color pattern distinct. Length of male 3.5 mm, of female 3.75 mm.

Color.—General ground color light yellow. Frons, clypeus, and genae infuscated; a ring around each ocellus and a small oblong spot on anterior margin of vertex above each ocellus blackish. Eyes brown. Pronotum with black markings in the form of a narrow anterior margin, posterior submargin on middle one half, and a median bar connecting these. Scutellum dark basally. Elytra fuscous with bright yellow on the inner margins, sectors of clavus, claval suture, and cubitus except distally; distal two thirds of the anterior one half of the corium subhyaline. Hind wings hyaline, veins dark. Posterior margin of female genital segment dark brown.

Structure.—General shape of *Agallia repleta*. Vertex broadly rounded, slightly longer next the eyes than medially. Pronotum short, posterior margin straight. Elytra long, second cross vein absent.

External genitalia.—Last ventral segment of female about twice as long as preceding segment, posterior margin roundly produced from lateral margins, one half longer medially than laterally. Male valve large, transverse, collarlike. Plates slender, tapering to rather pointed apices which greatly exceed the short pygofer in length.

Internal male genitalia.—Aedeagus stout, very short, and curved sharply dorsad in lateral view. Posterior margins of pygofer bearing on each side a long ligulate extension which curves below the anal tube and up the opposite side to near the

top of the tube, where it bends sharply caudad, the tip almost equaling the basal segment of the anal tube in length.

Uhler described both *fascigera* and *capitata* from the island of St. Vincent, the chief differences mentioned in his description being that *capitata* was broader and had different markings and a slender process at the tip of the scutellum. Although the Uhler specimens are all badly broken, there is no doubt that the series of four represents but a single species, evidently variable in the extent of the color pattern. The species is quite distinct from all others and may be easily recognized by the ligulate extensions of the male pygofer. Cotypes in the United States National Museum collection (catalog no. 10218).

AGALLIA PULCHRA DeLong and Wolcott

(Fig. 4, P, Q, R; fig. 14, V; pl. 1, D)

Described by DeLong and Wolcott (Wolcott 45, p. 259) in 1923. Allied to *A. bicolor*. Face bright yellow, thorax and elytra yellow and black. Length of male 3-3.25 mm, of female 3.25-3.5 mm.

Color.—Face bright yellow, with dark antennal pits and black marks in the form of a spot on the vertex against each eye and a tiny elongate spot on the median line of vertex; a pair of tiny spots on posterior margin of vertex fuscous, these slightly closer together than ocelli. General ground color of pronotum bright yellow, fading to whitish on the posterior one third, with a black anterior margin and black marks in the form of a median line on the anterior one half and a spot each side of the middle anteriorly. Anterior black margin narrowed each side of middle. Discal portion of pronotum bright yellow, fading to whitish on posterior one third. Base of scutellum with three black triangles united basally, the two lateral ones longer than median one. Transverse suture and median pits faintly black, remainder of scutellum bright yellow. Elytra green to blackish, costal margin hyaline, veins broadly yellow or whitish, a yellow dorsal spot covering tips of claval veins. Hind wings smoky black, veins darker.

Structure.—Slender wedge shaped. Vertex of nearly uniform length, extending very slightly behind the eyes laterally. Posterior margin of pronotum slightly concave. Elytra long, slender; second cross vein absent.

External genitalia.—Last ventral segment of female broad, lateral angles produced, posterior margin broadly and shallowly excavated, slightly incised medially. Male valve small, triangular; plates slender, together triangular, lateral margins straight, tips pointed, exceeding pygofer in length.

Internal male genitalia.—Aedeagus slender, curved dorsad. Inner process of style produced beyond outer process much as in *A. bicolor*, but bearing a blunt ventral tooth. Posterior margins of pygofer bent inward, then produced caudad into bilobed flaps which lie in oblique planes, converging ventrally.

Described from specimens from Puerto Rico, and no other locality is represented in the material at hand. Male paratype examined. Types in the collection of D. M. DeLong.

AGALLIA REPLETA Van Duzee

(Fig. 5, G, H, I; fig. 15, A, B; pl. 1, H)

Described from Trinidad by Van Duzee (41, p. 57) in 1907. Olive-brown with two black spots on the vertex and usually five on the pronotum. Superficially identical with *A. laetus* (Stål). Length of male 2.75-3 mm, of female 3-3.5 mm.

Color.—General ground color light olivaceous brown, sometimes darker and lacking the greenish tinge. Face with black markings as follows: Antennal pits, a ring around each ocellus, arms of inverted Y, sides of frons, clypeus, except basally, and a spot on anterior margin of vertex above each ocellus, these sometimes fused below with the rings around ocelli. Pronotum typically with 5 black spots, a central elongate one, 2 near anterior margin and close together and 2 near posterior margin more widely separated. In pale specimens the posterior

pair of spots, and sometimes the central one also, may be indistinct or entirely missing, while in exceedingly dark forms the anterior pair may be fused with a dark area along the front margin of the pronotum and the central one fused with the two posterior spots to form a wide dark area along the hind margin of the pronotum. Scutellum yellowish with triangular black spots in basal angles and a pair of small, round black spots in front of the transverse furrow. Elytra typically with cells fuscous and veins broadly margined with greenish yellow, but exceedingly dark specimens have few or none of the veins pale.

Structure.—About the size of *A. lingula*, but less robust. Vertex very slightly longer next the eye than medially. Pronotum short, hind margin nearly straight or slightly concave. Elytra long, greatly exceeding abdomen in length, second cross vein absent.

External genitalia.—Last ventral segment of female about $1\frac{1}{2}$ times as long as preceding segment, a little longer medially than laterally, lateral angles slightly produced and posterior margin nearly truncate. Male valve large, wider than long, narrowing distally and with hind margin nearly truncate. Plates rather broad at base, narrowing gradually to truncate tips. Outer margins slightly longer than inner, the tips of the plates together thus having an incised appearance. Plates a little narrower than those of *A. lautus*. Pygofer truncate behind in lateral view, without heavy spinelike projections below.

Internal male genitalia.—Aedeagus in lateral view stout, arched, and ending in an obliquely set headlike knob with a pair of short projections dorsally and two pairs ventrally. Hind margins of pygofer angled dorsally, with corners turned inward and each bearing a stout spinelike projection.

Externally this species appears to be identical with what the writer believes to be *A. lautus*, but the male genitalia lack the long, curved dorsal spine of the tenth segment and the spinelike projection of the ventral portion of the hind margins of the pygofer characteristic of that species (fig. 15, C, D), and the form of the tip of the aedeagus is different. Stål (35, p. 55) described *lautus* as a *Bythoscopus* from Rio de Janeiro, Brazil, in 1860.

A. repleta was described from Trinidad from a single pair. There are many examples at hand from various localities in Trinidad, Tobago, Republic of Panama, and Honduras. The specimens from Tobago, Panama, and Honduras are darker than those from Trinidad, many of the Honduras specimens being almost entirely black. In all structural respects the various examples seem to be identical; so the species is apparently subject to considerable color variation, as might be expected of a widely distributed form. However, since all variations from the light to the dark form are evident, there seems to be no basis for the application of varietal names. Mr. Van Duzee has compared specimens from Trinidad with his types and reports them to be the same. Types in the collection of the California Academy of Science.

AGALLIA MUNDA n. sp.

(Fig. 4, S, T, U; fig. 15, G)

Resembling *A. repleta* but paler, with the female genital segment excavated posteriorly and the male plates pointed. Length of male 3 mm, of female 3.25 mm.

Color.—General ground color dirty yellowish white. Antennal pits, distal half of clypeus, and spots on vertex above ocelli black; frontal sutures fuscous. Pronotum with an elongate fuscous spot on the disk, and a paler, more rounded one on each side a little more anteriorly. Scutellum with two triangular black spots basally. Elytra subhyaline, clavi faintly brownish yellow, veins light. Hind wings smoky, veins dark.

Structure.—Very much like *A. repleta* in size and shape. Vertex of uniform length and smoothly rounded. Posterior margin of pronotum straight. Elytra long, costal margin broadly curved, venation as in *A. albidula*.

External genitalia.—Last ventral segment of female longer than preceding segment, lateral angles slightly produced and rounding, posterior margin roundly excavated, sometimes one fourth the distance to the base, often merely shallowly concave. Male valve large, collarlike, posterior margin truncate, length equaling width of hind margin. Plates small, narrowing rather abruptly to pointed tips, together triangular, exceeding pygofer in length.

Internal male genitalia.—Aedeagus in lateral view short, straight, and very broad, ending in two parts, the ventral one more slender and curved dorsally. Pygofer resembling that of *A. albidula*.

The size and the arrangement of the three pronotal spots of this species give it a striking resemblance to very pale examples of *A. repleta*, but the genital characters are very distinct. Further collecting will probably show this species to vary in color intensity, as do most of the related forms. Uhler had labeled the specimens upon which the foregoing description is based as his *albidula*, and they are probably those which he mentions as being in "incomplete states of coloration." However, both the color pattern and the genital characters readily separate these two forms.

Holotype male and allotype female from Mount Gay Estate (leeward side), Grenada, West Indies, H. H. Smith. Paratypes from Grenada, West Indies: 1 male and 1 female from Windsor, 1 female from Black Forest Estate (windward side), 1 female from Grand Etang (windward side), 1,900 feet, 1 male from Balthazar (windward side), 1 male from Wendome Estate (leeward side), all collected by H. H. Smith; and 1 female from the Botanical Gardens, November 12, 1918, Harold Morrison. Also one male from St. Vincent, West Indies. Types in the United States National Museum collection (catalog no. 43286).

AGALLIA MODESTA Osborn and Ball

(Fig. 4, I, J, K, L; fig. 15, E, F; pl. 1, J)

First described by Osborn and Ball (28, p. 51) in 1898. Re-described the same year by Baker (2, p. 200) as *Agallia mexicana*. Very variable in color, usually a uniform light brown with four black spots. Length of male 3-3.5 mm, of female 3.5-3.75 mm.

Color.—Usually a uniform light yellowish brown with a pair of black spots on the vertex above the ocelli and a larger black pair behind these on the posterior margin of the pronotum, but the males often with an additional pair of black spots on the pronotum anteriorly, another small pair near the lateral margins of the pronotum, and the face and elytra infuscated. The males furnish nearly all variations in the extent of the black coloring, the dark extremes being almost entirely black, except for light areas on the vertex around the spots above the ocelli, the elytra in such cases being dark but subhyaline. The female apparently does not have the dark forms.

Structure.—Smaller and slightly less robust than *A. constricta*. Vertex of nearly uniform length, head slightly wider than pronotum. Pronotum with anterior margin evenly curved, posterior margin nearly truncate, but slightly concave. Elytra long, venation obscure, second cross vein absent.

External genitalia.—Last ventral segment of female truncate, or sometimes slightly excavated. Male valve large, slightly narrower distally than at base. Plates broad basally, tapering sharply on posterior one half, together rather bluntly pointed and equaling pygofer in length.

Internal male genitalia.—Aedeagus in lateral view short, curved slightly upward and the tip hooked dorsally. In caudal view the tip appears truncate, and the aedeagus bears before the apex a pair of small spines which extend cephalad. Hind margins of pygofer turned inward and with a short, inwardly projecting spine dorsally.

Apparently a very common species throughout Mexico and Central America. A large series of specimens from Panama has the processes of the aedeagus longer and the pygofer a little longer, but as they are otherwise identical with Mexican specimens, they are not considered as representing a distinct form. Examination of specimens from localities between Panama and Honduras will no doubt show these characters to be variations. *A. modesta* was described from Vera Cruz, Mexico, and Baker's specimens, which he called *mericana*, were from the same locality. Many specimens are at hand from various localities in Mexico and Honduras, as well as the series from Panama. Cotypes in the United States National Museum (catalog no. 44076).

AGALLIA LINGULA Van Duzee

(Fig. 6, A, B, C; fig. 15, H; pl. 2, D)

Described by Van Duzee (41, p. 54) in 1907. Resembling *A. constricta* but without the black spots on the pronotum and the female segment with a slender, median, ligulate process. Length 3.5-3.75 mm.

Color.—General ground color light yellowish brown, occasionally approaching brown. Front variously embrowned, vertex with a black spot on anterior margin above each ocellus. A median line on vertex and pronotum and various areas anteriorly and laterally on the pronotum brownish to fuscous, as are two triangular spots on the scutellum near the basal angles. Elytra brown, veins yellowish.

Structure.—As in *A. constricta*, vertex of uniform length, hind margin of pronotum straight. Elytra long, second cross vein between sectors either present or absent.

External genitalia.—Last ventral segment of female well produced, posterior margin truncate except for a slender median ligulate projection more than half as long as the remainder of the segment. Male valve broad, posterior margin straight. Plates broad basally, sharply tapering half their length, then produced to bluntly rounded appressed tips which exceed pygofer. Posterior margin of pygofer bluntly produced caudally.

Internal male genitalia.—In lateral view connective long and slender, forming a semicircle; aedeagus broad basally but quickly narrowed to a long, slender, filamentlike process curved back along the connective and forming nearly a complete circle. Smaller and with male genitalia distinct from those of *A. lingulata*.

Described from Jamaica. There are specimens at hand from the Canal Zone; Salvador; Honduras; Vera Cruz, Mexico; Brazoria, Hidalgo, Harris, Orange, and Cameron Counties, Tex.; and Natchitoches Parish, La., indicating a wide distribution through subtropical North America. Type in the collection of the California Academy of Science. A cotype of this species has been examined through the courtesy of Mr. Van Duzee.

AGALLIA LINGULATA Olsen

(Fig. 6, G, H, I; fig. 15, I; pl. 2, C)

Described and figured by Olsen (22, p. 127) in 1922. Resembling *A. quadripunctata* but smaller and slightly less robust, the female segment with a ligulate process much as in *A. lingula*. Length of male 3.5 mm, of female 3.75 mm.

Color.—Varying from light brown to fuscous, the males darker than the females. A pair of large black spots on anterior margin of vertex above the ocelli and

another pair behind these near posterior margin of pronotum, all surrounded by lighter areas which merge into the ground color. Elytra brown to fuscous, veins pale, indistinctly so in very dark specimens. Hind wings smoky, veins dark.

Structure.—Vertex of almost uniform length, but anterior margin slightly flattened medially and thus shorter than next the eye. Pronotum short, $2\frac{1}{2}$ times wider than long, posterior margin nearly straight. Elytra broad, venation as in *A. constricta*.

External genitalia.—Last ventral segment of female broad, truncate, with a narrow, median ligulate process very similar to that of *A. lingula* but broader and widened slightly at the tip. Male valve transverse, bisinuate, longer medially than laterally. Plates together nearly triangular, lateral margins shallowly concave and apices not quite touching.

Internal male genitalia.—In lateral view connective stout and slightly curved. Aedeagus with dorsal process short and stout, ventral process more slender, curving first dorsally and then a little ventrally near the tip. Entire aedeagus much heavier than and not nearly so strongly curved as in *A. lingula*.

The female of this species might easily be confused with that of *A. lingula* except for its larger size and dark pronotal spots. The males, however, are easily distinguished by the size, color pattern, and internal or external genitalia.

Described from specimens taken in New York and New Jersey. The writer has examined the holotype and male paratypes from New York and a pair of specimens from Rock Bluff, Fla., that agree with the type series in every particular, and has collected two males near the South River, south of Annapolis, Md. The Maryland specimens were taken May 26, 1932, from weeds growing in sandy soil and were thought at the time to be dark extremes of *A. constricta*. It is probable that the species will be found to be fairly common early in the season, but when an attempt was made to get additional specimens in July none could be found. The foregoing records indicate a wide distribution in a rather restricted habitat along the eastern coast of the United States. Types in the collection of C. E. Olsen and the American Museum of Natural History.

AGALLIA LITURATA Van Duzee

(Fig. 6, M, N, O; fig. 15, J)

Described by Van Duzee (41, p. 56) in 1907. Form of *A. producta*, but smaller and with the veins of the elytra reticulate. Length of male 3.5 mm, of female 3.75 mm.

Color.—Yellowish brown with markings of light brown to fuscous. Front variously embrowned, distal portion of clypeus, antennal pits, and circles around ocelli approaching fuscous. Spots on anterior margin of vertex above ocelli black and median area and irregular spots on posterior margin next eyes brown or fuscous. Pronotum with brown to fuscous marks on the posterior margin and lateral margins; the anterior margin laterally and a median line that becomes wider caudally, infuscated. Scutellum with triangular spots near basal angles brown, as is the transverse median furrow. Cells of elytra brown, veins whitish. Hind wings smoky, veins dark. Tip of projection of female genital segment dark.

Structure.—Vertex of uniform length and evenly rounded. Hind margin of pronotum slightly concave. Elytra with supernumerary veinlets in cells of both clavus and corium.

External genitalia.—Last ventral segment of female short laterally, median one half produced caudally $1\frac{1}{2}$ times the length of the remainder of the segment. Projection tapering from base, tip less than one third as wide as the whole segment, ending in two lateral points with posterior margin angularly excavated between them. Male valve short, transverse. Plates together triangular, with lateral margins slightly concave, equaling pygofer in length. Pygofer broad basally, hind margins turned inward and bearing stout spines. Aedeagus often exposed.

Internal male genitalia.—Aedeagus stout, dorsal process short and heavy, ventral process longer and slightly curved.

Easily distinguished by the reticulate venation of the elytra and the form of the external genitalia.

Described from Jamaica, and the writer has seen no specimens from other localities. Paratypes examined through the courtesy of E. P. Van Duzee. Types in the collection of the California Academy of Science; paratypes in the United States National Museum collection (catalog no. 43987).

AGALLIA ALBIDULA Uhler

(Fig. 5, A, B, C; fig. 15, K; pl. 2, E)

Described by Uhler (37, p. 83) in 1895 as *albidula* and redescribed by Van Duzee (41, p. 55) in 1907 as *basiflava*. Yellowish, marked with light brown, male plates small and female genital segment produced. Length 3.25-3.75 mm.

Color.—General ground color yellowish white. Face with brown markings as follows: Frontal sutures, tip of clypeus, antennal pits, frons laterally, inverted Y on vertex, and areas next the eyes. Spots on anterior margin of vertex above ocelli black. Pronotum with an elongate brown median spot, large irregular brown spots on each side posteriorly, and an anterior brownish area laterally. Scutellum with brown triangular basal spots; transverse furrow and two small round spots before furrow brownish fuscous. Elytra with cells brownish, veins basally yellow, distally paler; a dark area on each elytron dorsally in the angle formed by the first and second claval sectors and the inner margin of the wing, in front of this a yellow patch formed by the widening of the yellow margins of the claval veins. Central portion of posterior margin of female genital segment brown.

Structure.—Similar to *A. modesta* but larger and slightly more slender. Vertex of nearly uniform length and broadly rounded. Eyes a little swollen. Pronotum short, hind margin nearly straight. Elytra long and rather narrow, second cross vein absent.

External genitalia.—Last ventral segment of female $1\frac{1}{2}$ times as long as preceding segment, lateral angles produced and rounded, posterior margin rounded and slightly produced medially. The median portion is often a little elevated and compressed laterally, appearing sinuate. Male valve large and transverse, twice as wide as long, covering base of plates snugly at sides. Plates small, proportionately rather broad basally, narrowing sharply on basal one half, then tapering gradually, tips together rounded and exceeding the short pygofer. Pygofer in lateral view very short dorsally, hind margin sloping to a short ventral projection caudally.

Internal male genitalia.—Aedeagus stout, curved dorsally in lateral view, a membranous sheath on each side of tip.

Described from the island of St. Vincent. Specimens at hand are from various localities in Cuba, Isle of Pines, Puerto Rico, Dominican Republic, Jamaica, St. Vincent Island, St. Thomas Island, Trinidad, and the States of Rio de Janeiro, Minas Geraes, Matto Grosso, Pernambuco, and Maranhão, Brazil. Apparently a very common species in the Tropics. It seems strange that this species was not among those described by Stål (34, p. 290-292; 35, p. 54-55), but the writer has been unable to find any of his descriptions that fit. Neither do Berg's descriptions (7, p. 270-272; 8, p. 176-178; 9, p. 205-206) seem to include this species. Van Duzee described his *basiflava* from Jamaica. The writer has examined a paratype of *basiflava* through the kindness of Mr. Van Duzee, and finds it to be only a pale example of Uhler's *albidula*. There are also, in the lot of *Agallia* sent the writer by C. E. Olsen, two males and a female of this species from Mount Desert, Maine. These examples check in every respect with typical *albidula*, and it seems probable that their occurrence so far north must be due to importation. In such

case it would be interesting to know whether or not they have survived. Cotypes in the United States National Museum collection (catalog no. 10221).

AGALLIA CONFIGURATA n. sp.

(Fig. 5, D, E, F; fig. 15, L; pl. 2, F)

Pale yellowish brown. Allied to *A. producta* but smaller and paler, with the male plates longer and the female genital segment truncately sinuate. Length of male 3.5-3.75 mm, of female 3.75-4 mm.

Color.—Yellowish cinereous to dirty yellow. Face variously embrowned, vertex with a small fuscous spot on posterior margin above each ocellus. Anterior margin of pronotum, median line, and a large spot on each side posteriorly, faintly brown to brownish fuscous. Basal triangles of scutellum brown. Elytra pale to subhyaline, sometimes marked basally with brown or yellow, veins faintly whitish. Hind wings with veins dark.

Structure.—About as in *A. constricta*. Vertex very short and parallel margined, pronotum short, hind margin nearly straight. Elytra long and rather slender, strongly exceeding abdomen, second cross vein between sectors missing.

External genitalia.—Last ventral segment of female over twice as long as preceding segment, lateral angles well produced and rounded, posterior margin sinuate each side of a shallow, median notch. Male valve long and collarlike, about $1\frac{1}{2}$ times as broad as long, inclosing base of plates laterally and with posterior margin slightly produced medially. Plates long and slender, narrowing sharply from base, tips slightly wider than median portion, bluntly pointed and exceeding pygofer in length.

Internal male genitalia.—Aedeagus long and slender, in lateral view sinuate. Tip not forked. Hind margins of pygofer produced and somewhat lobed next the plates.

Most easily separated from closely related species by the genital characters. As in most members of the genus, the color varies considerably in intensity, but the pattern is constant and quite distinctive.

Holotype male and allotype female from Mitchell Grove, Bayamon, Puerto Rico, June 26, 1917, Harold Morrison (251). Paratypes, 10 males and 2 females with the same data; 4 males and 1 female from Stanwood Grove, Bayamon, Puerto Rico, June 26, 1917, Harold Morrison (252); 3 males and 2 females from Parkhurst Grove, Bayamon, Puerto Rico, June 26, 1917, Harold Morrison (250); and 12 males and 2 females from Department of Agriculture grounds, Port of Spain, Trinidad, October 24, 1918, Harold Morrison (A-818).

There are also specimens at hand from the Dominican Republic and Corumba, Brazil. The South American specimens should not be confused with a closely related and apparently undescribed species which has the female genital segment similar to that of *A. albidula* and the second cross vein present in the elytra. Types in the United States National Museum collection (catalog no. 43988).

AGALLIA RHDIGITATA n. sp.

(Fig. 5, M, N, O; fig. 15, S)

Similar in size and form to *constricta* but with a golden-brown tinge and the female segment with a pair of short, fingerlike processes. Length 4 mm.

Color.—Head, thorax, and scutellum golden brown, clypeus and frontal sutures embrowned. Antennal pits black, inner margins of ocelli and oblique, oblong spots on vertex above ocelli fuscous, as are a pair of spots directly behind these and visible on the vertex below the somewhat elevated posterior margin. Pronotum with anterior submargins laterally and a pair of spots on each side of

median line anteriorly dark brown. Basal triangles of scutellum brown. Elytra brownish subhyaline, the darker hind wings and dorsum giving the clavi a dirty brown appearance.

Structure.—Similar to *constricta* but more elongate. Vertex short and of uniform length, very slightly elevated behind but not as in *Agalliopsis*. Pronotum very short, hind margin straight. Elytra long, extending well beyond tip of abdomen, second cross vein between sectors absent.

External genitalia.—Last ventral segment of female rather short, the posterior margin with a short, bluntly rounded, fingerlike process on each side about half way between middle and lateral margins of segment. Male valve large and collarlike, plates small and slender, turned upward behind and difficult to see.

Internal male genitalia.—Aedeagus broad and boxlike or troughlike, with a hooked spine-like process on each side dorsally. Connective long and threadlike, styles short and stubby. Hind margins of pygofer produced into two lobes on each side, the lower ones smaller and more rounded, both pairs bearing numerous setae.

Either the female genital segment or the male genitalia will serve to distinguish this species.

Holotype female and allotype male from Cacao, Trece Aguas, Alta V. Paz., Guatemala, Schwarz and Barber; one female paratype from Puerto Barrios, Guatemala, April 20, 1923, E. G. Smyth. Holotype in the collection of E. D. Ball, allotype and paratype in the United States National Museum collection (catalog no. 43989).

AGALLIA CONSTRICTA Van Duzee

(Fig. 5, P, Q, R; fig. 15, O, P; pl. 1, L)

Described by Van Duzee (40, p. 90) in 1894. Light brown with black spots on vertex and pronotum, less robust than *A. quadripunctata* and with the male genital plates constricted medially. Length of male 3.25 mm, of female 3.75 mm.

Color.—Typically light brown, the males frequently approaching fuscous. Front variously embrowned or infuscated, a pair of black spots on the anterior margin of the vertex above the ocelli and another pair behind these on the posterior margin of the pronotum. Median line, broad anterior margin laterally, and lateral submargin golden brown to fuscous. Elytra brown to fuscous, veins paler.

Structure.—Distinctly more slender than *quadripunctata*. Vertex of uniform length; anterior margin of pronotum evenly rounded, posterior margin slightly concave, lateral margins very short. Elytra not so broad as in *quadripunctata*, greatly exceeding abdomen in length, second cross vein between sectors either present or absent.

External genitalia.—Last ventral segment of female more than twice as long as preceding segment, lateral angles well produced and rounded, central portion slightly longer, a shallow notch on the median line. Posterior one half of segment depressed laterally, leaving a median keel. Male valve large, plates narrowing from the rather broad base to median constriction, then widening caudally. Plates together rounded apically. Pygofer compressed, exceeding plates in length; in lateral view the posterior portion curved dorsad and slightly notched behind.

Internal male genitalia.—Aedeagus stout and slightly exceeding pygofer in length, tapering to a sharp point in lateral view, in dorsal view forked at the tip.

Van Duzee described *constricta* from specimens from New Jersey, Mississippi, and Florida. It is probably the commonest species of the *Agallia* group to be found in the southeastern part of the United States, and its range extends west to central Texas, Oklahoma, Kansas, and Nebraska, and north into Iowa, central Indiana, Illinois, and Ohio, and still farther north along the Atlantic coast. Type in the collection of Iowa State College, Ames, Iowa.

AGALLIA CONSTRICTA var. CUBANA n. var.

(Fig. 6, J, K, L; fig. 15, Q, R)

Size and form of typical *constricta* but darker and with the hind margins of the male pygofer produced into two nearly equal lobes. Length 3.25-3.5 mm.

Color.—Similar to the darker extreme of *constricta*, particularly in that the markings of the vertex and pronotum are fuscous and that the elytra are dark brown with the veins broad and pale.

Structure.—Similar to typical *constricta*, the second cross vein of the elytra either present or absent.

External genitalia.—Last ventral segment of female with posterior margin subtriangularly produced and bluntly rounded, not constricted from the lateral margins to median ridge as in *constricta*. Male valve and plates about as in *constricta* but plates less constricted.

Internal male genitalia.—Aedeagus similar in lateral view to that of *constricta*, but heavier, broader, and with wider forks at tip in dorsal view. Posterior margins of pygofer bilobed, the lower lobes slightly larger than the upper ones.

Although the internal male genitalia are quite distinct in the character of the aedeagus and form of the pygofer, this form is nevertheless placed as a variety of *constricta* because of the great similarity of the external characters.

Holotype male, allotype female, and one female paratype from Caimito del Guayabal, Havana Province, Cuba, August 23, 1917, Harold Morrison. Types in the United States National Museum collection (catalog no. 43990).

AGALLIA PRODUCTA Osborn and Ball

(Fig. 5, S, T, U; fig. 15, M, N; pl. 2, A)

Osborn and Ball (28, p. 52) described this species in 1898 as *producta* and the same year Baker (2, p. 199) described it as *heydei*. Resembling *A. constricta* but larger and with the female segment more produced and narrow. Length of male 4 mm, of female 4.25-4.75 mm.

Color.—Very similar to *A. constricta*. Light yellowish brown, with antennal pits, spots on vertex above ocelli and on pronotum near posterior margin black. Front variously embrowned. Rings around ocelli and inverted Y on front fuscous. Median line and anterior margin and lateral margins of pronotum brownish. Elytra brownish, veins lighter.

Structure.—Form of *A. constricta* but larger, more slender than *A. quadripunctata*. Vertex of uniform length, pronotum nearly truncate behind, lateral margins short. Elytra similar to those of *A. constricta*.

External genitalia.—Last ventral segment of female strongly produced, suddenly constricted one third its length from the base, leaving an elevated median portion. Constricted portion folded under basal portion of segment laterally, then tapering to a rather narrow, truncate tip. Male valve short and broad, plates as in *A. constricta*, constricted medially and together broadly rounded at the tip. Pygofer compressed, exceeding plates, and with hind margin roundly excavated in lateral view.

Internal male genitalia.—Very similar to those of *A. constricta*, aedeagus broad in lateral view and with forked tip in dorsal view.

Described from Vera Cruz, Mexico, as was Baker's *heydei*. There are also specimens at hand from La Cieba and Tegucigalapa, Honduras. This species is differentiated from *constricta* chiefly by the greater size and the more produced genital segment of the female. There is considerable variation in these characters in both *constricta* and *producta*, and it is very likely that an examination of a large series of specimens from northern Mexico and southwestern Texas

will show these to be only extremes of a single, variable form. Until such studies can be made it seems best to make no changes in the status of *producta*. Cotypes in the United States National Museum collection (catalog no. 44077).

AGALLIA PENECONSTRICTA n. sp.

(Fig. 6, P, Q, R; fig. 15, T)

Similar to, but smaller and slightly more robust than, *constricta*. Length 3.25 mm.

Color.—Tawny brown, face infuscated; a pair of fuscous to black spots on the vertex above the ocelli and a similar pair behind these near the posterior margin of the pronotum. Elytra brownish subhyaline, veins a little paler.

Structure.—Intermediate in form between *constricta* and *deleta*, vertex and pronotum very short, the latter truncate behind. Elytra broad but extending beyond the tip of the abdomen; venation obscure, second cross vein between sectors missing.

External genitalia.—Last ventral segment of female much as in *constricta*, hind margin very slightly sinuate each side of a faint median notch. Male valve transverse, collarlike, plates shorter and less distinctly constricted at the middle than those of *constricta*, narrowing from the base for one half their length, then almost parallel sided, tips together bluntly rounded.

Internal male genitalia.—Aedeagus almost straight, in lateral view broad basally and tapering gradually toward the tip, the tip broader from above and bearing at each side a short, truncate, parallel-sided process which is finely serrate on the posterior margin and which extends downward almost at right angles to the remainder of the aedeagus. At the base of each of these is a short, pointed tooth which extends caudad. Posterior margins of pygofer produced into short, truncate lobes.

The size, lack of color pattern, and characters of the male genitalia are sufficient to distinguish this species from all other described forms in the genus.

Holotype male and allotype female from La Ceiba, Honduras, F. J. Dyer. Types in the United States National Museum collection (catalog no. 43991).

AGALLIA DELETA Van Duzee

(Fig. 5, J, K, L; fig. 15, U; pl. 1, K)

Described as *deleta* by Van Duzee (42, p. 210) in 1909. Lathrop (19, p. 120) in 1917 described the same species as *immaculata*, but in 1919 (20, p. 23) placed his name as a synonym of *deleta*. Unicolorous tawny or golden brown; males usually darker, often fuscous. Length of male 2.5–2.75 mm, of female 2.75–3 mm.

Color.—Usually light brownish, occasionally with faint darker areas on pronotum of male. Eyes reddish brown. Elytra subhyaline but appearing darker because of the dark abdomen. Hind wings smoky. Dark males usually show pale areas dorsally.

Structure.—Very robust, form much as in *A. quadripunctata* but much smaller. Vertex of uniform length and evenly rounded, extending very slightly behind the eyes laterally. Elytra broad, venation as in *A. constricta*.

External genitalia.—Last ventral segment of female short, posterior margin truncate but often arched so as to appear concave. Male valve long and collarlike, median length exceeding lateral length and nearly equaling width. Plates small, rather broad basally but narrowed abruptly and with blunt tips which equal the pygofer in length.

Internal male genitalia.—Aedeagus in lateral view broad and almost straight, in dorsal view laterally compressed and with tip split for a short distance. Posterior margins of pygofer with small flaplike projections turned slightly inward.

Van Duzee's specimens, upon which the original description was based, were from Florida, whereas Lathrop's were from the long-leaf pine and coastal-marsh areas of South Carolina. C. E. Olsen has sent the writer specimens that he collected at Woods Hole, Mass., Rahway, N.J., Forest Hills, Long Island, and White Plains, N.Y.; the known range of this species is thus extended considerably northward along the Atlantic coast. Other specimens at hand are from Florida, Georgia, South Carolina, and Virginia. The writer has taken adults and last-stage nymphs in the short grass along the roadside in southern Georgia in January, an indication that they pass the winter season in both stages, at least in the southern part of the United States. Types in the collection of the California Academy of Science.

AGALLIA OBESA n. sp.

(Fig. 7, A, B, C; fig. 15, V, W; pl. 4, H)

Size of *A. deleta* but with the aspect of a very small *quadripunctata*. Length 2.5-2.75 mm.

Color.—About as in *quadripunctata*. Golden brown with two large black spots on vertex above ocelli and a similar pair behind these near the posterior margin of pronotum. Areas bordering spots usually creamy brown. Elytra brownish subhyaline, veins lighter.

Structure.—Quite robust, very much like *deleta* in this respect. Vertex of uniform width, eyes slightly bulbous. Pronotum very short, posterior margin straight or slightly concave. Elytra short and broad, sometimes barely exceeding tip of abdomen in length, second cross vein between sectors absent.

External genitalia.—Last ventral segment of female slightly longer than preceding segment, posterior margin slightly notched medially. Male valve large, lateral margins oblique, posterior margin slightly produced medially and less than twice as wide as median length. Plates slender, longer than those of *deleta* and slightly more pointed, tips exceeding pygofer in length.

Internal male genitalia.—Aedeagus longer than in *deleta*, with tip curved downward. Tip forked, the forks more divergent than those of *deleta* and coarsely serrate below. Hind margins of pygofer produced into subtruncated, somewhat bilobate processes, broadly constricted basally.

Easily separated from Van Duzee's *deleta* by the large black spots on vertex and pronotum, and by the above-mentioned differences in the male genitalia. Dozier reports that he collected the species from the short grass in flat pine woods, and it will probably be found to occur throughout the Gulf region in a similar habitat.

Holotype male and allotype female from Biloxi, Miss., August 1, 1921, H. L. Dozier. Paratypes, 3 males with the above data; 1 male and 2 females from Merrill, Miss., August 9, 1921; 1 male and 1 female from Hattiesburg, Miss., August 10, 1921; 1 female from Laurel, Miss., August 12, 1921; and 1 female from Gulfport, Miss., August 1, 1921, all collected by H. L. Dozier; 1 female from Woodville, Miss., July 25, 1921, C. J. Drake; 1 female from New Augusta, Miss., August 10, 1921, C. J. Drake; 1 female from Natchitoches Parish, La., August 16, 1928, A. M. James; and 2 males from Prattville, Ala., July 21, 1930, P. W. Oman. Holotype, allotype, and paratypes in the United States National Museum collection (catalog no. 43992); paratypes in the collection of the University of Kansas.

AGALLIA QUADRIPUNCTATA (Provancher)

(Fig. 8, D, E, F; fig. 16, A; pl. 2, B)

Described by Provancher (30, p. 376) in 1872 as *Bythoscopus quadripunctatus*. Van Duzee (39, p. 301) in 1892 described the nymphs as *Ulopa canadensis*. A robust, brown species with a pair of black spots on the vertex and pronotum. Length 4 mm, width 1.5 mm.

Color.—Ground color typically light brown but varying from yellowish brown to fuscous. Frontal sutures, apex of clypeus, and antennal pits infuscated; sides of frons and vertex next the eyes dark. Front margin of vertex with two obliquely converging black spots. Anterior margin of pronotum sometimes dark, the pair of black spots on pronotum near posterior margin and slightly farther apart than those on the vertex. Pronotal markings often obscure. Elytra uniformly light brown, veins pale.

Structure.—Robust. Vertex very short, as long next the eyes as medially. Pronotum short, three times as long as vertex, posterior margin slightly concave, lateral margins very short. Elytra broad, a second cross vein usually present between first and second sectors, making three anteapical cells.

External genitalia.—Last ventral segment of female about twice as long as preceding segment, lateral angles rounding, posterior margin truncate and slightly reflexed caudad of a transverse constricted portion in the posterior one half of the segment. Male valve large, slightly produced medially, lateral margins inclosing base of plates. Plates small and pointed, together forming an acute triangle, lateral margins slightly convex, tips equaling pygofer in length. Pygofer in lateral view with posterior margin broadly rounded.

Internal male genitalia.—Aedeagus long and slender, curving slightly ventrad and unforked at tip.

Provancher described *quadripunctata* from Canada, and the type is in the Museum of Public Instruction in Quebec. The species is common throughout the northeastern portion of the United States and eastern Canada, and is found commonly as far south as northern Alabama, Georgia, and Louisiana, and as far west as eastern Kansas and Nebraska. Farther north the species occurs in small numbers to the Pacific coast, there being specimens at hand from South Dakota, Colorado, Utah, Idaho, Oregon, California, Vancouver, and British Columbia. In the eastern part of the United States the writer has found it most abundant in moist, shaded situations, especially violet patches, in association with *Nionia palmeri* (Van D.). Males of the species are very rarely encountered in collections, but the writer has examined a considerable series through the courtesy of C. E. Olsen, of the American Museum of Natural History.

AGALLIA QUADRIPUNCTATA subsp. EXCAVATA n. subsp.

(Fig. 7, D, E, F; fig. 16, B)

Smaller than the species but with the male genital characters similar to those of typical *quadripunctata* and the female genital segment slightly, roundly excavated. Length of male 3.5 mm, of female 3.75 mm.

Color.—Typically light yellowish brown, lighter and with less golden-brown tinge than *A. constricta*, often darker, especially the males. A pair of black spots on the anterior margin of the vertex, slightly farther apart than the ocelli, and another pair caudad of these on the hind margin of the pronotum. Dark specimens have a median line on pronotum and vertex and areas on anterior margin of pronotum approaching fuscous. Elytra light yellowish brown to subhyaline.

Structure.—Males of general aspect of *A. constricta*, females more robust and intermediate between *A. constricta* and *A. quadripunctata*. Vertex of uniform length, eyes swollen beyond normal curve of vertex. Lateral margins of pronotum obscure. Elytra usually lacking second cross vein between sectors.

External genitalia.—Last ventral segment of female about twice as long as preceding segment, lateral angles well produced and broadly rounded, posterior margin with a broad but shallow and rounded excavation. Male valve large, twice as wide as long. Plates small and pointed, tapering gradually from a rather broad base, together somewhat rounded at the tips, very similar to those of typical *quadripunctata*. Pygofer slightly exceeding plates.

Internal male genitalia.—Very similar in general structure to typical *quadripunctata*, but all parts somewhat smaller.

Differs from typical *quadripunctata* in the size, female genitalia, and in the absence, usually, of the second cross vein of the elytra. This form has been given subspecific rank because specimens from Colorado seem to furnish the necessary intergradation to typical *quadripunctata*, which does not occur in the same region.

Holotype male from Tucson, Ariz., April 11, 1896, R. E. Kunze, C. F. Baker collection (1856). Allotype female from Tucson, Ariz., April 30, 1896, R. E. Kunze, C. F. Baker collection (2073). Paratypes, numerous examples of both sexes from Tucson, Huachuca Mountains, Granite Dell, Santa Catalina Mountains, Chiricahua Mountains, and Long Valley, Ariz.; Belen, Taos, Jemez Springs, and Albuquerque, N.Mex. There are also specimens at hand from Mexico and southern Colorado. Holotype, allotype, and paratypes in the United States National Museum collection (catalog no. 43993); paratypes in the collections of the University of Kansas and E. D. Ball.

AGALLIA BIDACTYLATA n.sp.

(Fig. 7, J, K, L; fig. 16, C, D)

General aspect of *quadripunctata* subsp. *excavata*, but larger and the female genital segment with three processes. Length 3.75–4.25 mm.

Color.—General color and markings as in subsp. *excavata* of *quadripunctata*, with which it has probably been confused. General ground color varying from light brown to dark brown, spots on vertex above ocelli and near posterior margin of pronotum piceous, other markings varying from golden brown to fuscous. Elytra brownish subhyaline, veins bluish white.

Structure.—Robust, vertex short and of uniform length, pronotum short and elytra broad with second cross vein between sectors absent.

External genitalia.—Last ventral segment of female longer than preceding segment, hind margin with a small, bluntly bifid median process and on each side of this a slender, tapering, fingerlike process which is curved slightly toward the median line. Male valve rather short and broad, posterior margin truncate. Plates almost parallel sided, appearing somewhat tubular, outer margins longer than inner margins, apices bluntly rounded and somewhat oblique, not equaling the heavy pygofer in length.

Internal male genitalia.—Aedeagus rather short and stout, in lateral view sinuately curved, in dorsal view broad, the tip terminating in a pair of forcepslike processes with lateral margins serrate.

The quite distinct genital characters of both sexes will at once separate this species from all other described forms in the genus.

Holotype male from Santa Rita Mountains, Ariz., July 13, 1930, E. D. Ball. Allotype female taken by Doctor Ball in the same locality, July 12, 1931. Paratypes, 1 male from Tucson, Ariz., September 1, 1929; 1 female with the same data as the allotype; and 1 male from the Santa Rita Mountains, Ariz., July 17, 1932, R. H. Beamer. Holotype and allotype in the collection of E. D. Ball; paratypes in the United States National Museum collection (catalog no. 43994) and the collection of the University of Kansas.

AGALLIA INGENS n. sp.

(Fig. 7, G, H, I; fig. 16, E, F)

Resembling *A. producta* but larger, darker, and more robust. Length of male 4 mm, of female 4.25 mm.

Color.—Light brownish, heavily marked with dark brown and fuscous. Face variously embrowned with distinct fuscous marks as follows: Tips of clypeus and genae, frontal sutures, sides of frons, antennal pits, spots above ocelli, and inverted Y on vertex. Pronotum with fuscous marks as follows: A median line, broad lateral submargins, anterior margin except next median line, and two large spots posteriorly. Scutellum with basal angles and median stripe brown to fuscous. Elytra uniformly brown to fuscous with veins distinct and light.

Structure.—Very robust, in form somewhat like the South American *sara* Baker (major of Osborn), but smaller. Vertex short, of uniform length, and smoothly rounded. Pronotum short, hind margin nearly straight, lateral margins more pronounced than is common in the group. Elytra long and broad, venation as in *A. constricta*.

External genitalia.—Last ventral segment of female with posterior margin triangularly produced from lateral angles, at the base of the triangle sharply constricted across entire width except medially, lateral margins appearing tucked under base. Male valve transverse, collarlike, one half as long as width of posterior margin, which is truncate. Plates short, broad on basal one third, then abruptly narrowed, tips together bluntly rounding, and exceeding pygofer, somewhat similar in shape to those of *A. albidula*, but larger.

Internal male genitalia.—Aedeagus in lateral view broad basally, becoming tubular apically and with the tip turned abruptly upward. A pair of long spines arise from the aedeagus just anterior to the curve upward and extend caudally and laterally, exceeding the upturned tip in length. Posterior margins of pygofer slightly produced ventrally.

The genital characters, especially those of the aedeagus, will separate this from any other known species.

Holotype male and allotype female from Frijoles, Canal Zone, October 23, 1918, Dietz and Zetek (G-291). Paratypes, 1 male from Juan Mina plantation, Canal Zone, July 13, 1918, Dietz and Zetek; 1 female, same locality and collectors, August 24, 1918; 1 male and 1 female from Chagres River, Flat Rock plantation, Canal Zone, August 24, 1918, Dietz and Zetek; and 1 male from Suiza, Turrialba, Costa Rica, P. Schild. Holotype, allotype, and paratypes in the United States National Museum Collection (catalog no. 43995); one paratype in the collection of E. W. Davis.

AGALLIA BARRETTI Ball

(Fig. 7, M, N, O; fig. 16, G, H; pl. 4, I)

Described by Ball (4, p. 128) in 1900. Black with reddish-brown markings, or rarely nearly wholly reddish brown. Length of male 3-3.5 mm, of female 3.5-4 mm.

Color.—Usually wholly piceous except for four small reddish-brown to yellowish spots on the posterior margin of the vertex and various pale spots on the front and on the veins of the elytra. Dark extremes have no light marks at all. Some specimens have pale rings around the ocelli which may be fused dorsally with the spots on the vertex, while extremely light examples are wholly reddish brown with only mottled fuscous marks on the front, pronotum, and scutellum.

Structure.—Robust, approaching the genus *Aceratagallia* in general shape but with the pronotum granulated and faintly transversely furrowed instead of coarsely transversely striated. Anterior margin of vertex not evenly rounded but straight or appearing slightly concave laterally, posterior margin broadly rounded, length of vertex between eyes and middle thus being less than the length medially or next the eyes. Posterior margin of pronotum shallowly concave. Elytra broad but strongly exceeding abdomen; second cross vein present.

External genitalia.—Last ventral segment of female $1\frac{1}{2}$ times as long as preceding segment, posterior margin broadly, roundly produced, often appearing slightly notched medially. Male valve moderately long, transverse, hind margin bisinuate, longer medially than laterally. Plates rather slender, sharply tapering to pointed apices, together triangular and equaling pygofer in length; lateral margins straight or faintly concave.

Internal male genitalia.—Aedeagus in lateral view heavy and curved sharply upward, the tip bearing a pair of downward projecting spines on each side. Styles ending in two points caudally, typical of the genus *Agallia*.

Original description based on two females from Cuernavaca, Mexico. Specimens at hand are from Durango, Mexico City, and the State of Guerrero, Mexico; and Pima and Mescal Counties, Ariz. The species probably occurs throughout the intervening territory and reaches its northern limits in southern Arizona. As Ball states in his description, this species is somewhat intermediate in general character between the *quadripunctata* and *sanguinolenta* groups, but the form of the styles and the character of the pronotum clearly place it in the former group, rather than the latter, to which it was referred by Ball. Type in the collection of E. D. Ball.

AGALLIA NIGRICANS Uhler

(Fig. 6, D, E, F; fig. 18, I; pl. 4, J)

Described by Uhler (37, p. 82) in 1895. A small, dark, robust species with light marks on vertex and scutellum and sometimes on pronotum. Length 2.5–2.75 mm.

Color.—Mostly black to fuscous. Light yellowish marks on genae, outer margins of lora, and frons. A spot below each ocellus and an irregular ring around the large piceous spots on anterior margin of vertex above ocelli yellowish, as are two small spots midway on the lateral margins of the scutellum. Pronotum occasionally with a small pair of oblique yellowish spots on each side centrally and a larger pair behind these on the posterior margin. Elytra dark, veins occasionally pale for short distances, the most constant mark being on the first sector of the corium, just before it branches. Hind wings black subhyaline, veins dark.

Structure.—Short and broad, vertex of uniform length or slightly longer medially. Posterior margin of pronotum slightly concave, elytra with costal margins strongly curved, venation often obscure, second cross vein present.

External genitalia.—Last ventral segment of female long and broad; lateral margins turned up, lateral angles well produced and rounded, posterior margin truncate but appearing slightly concave because of the curvature of the segment. Male valve transverse, short. Plates united on basal one half, twice as long as pygofer, tapering gradually from a rather narrow base to somewhat pointed apices, lateral margins curved upward, posterior one half of plates bearing coarse setae, an unusual character in this group.

Internal male genitalia.—Aedeagus in lateral view consisting of two sharp, caudally projecting spines, the ventral one shorter and nearly straight, the dorsal one, which carries the ejaculatory duct, longer and curved a little downward. Posterior margins of pygofer curved mesad and produced into long, stout spines which curve upward and then project directly caudad.

This interesting little species may easily be distinguished by its dark color and the unique genital characters.

Described from St. Vincent Island. Specimens at hand are from St. Vincent, a short series from Trinidad (Morrison collection), and a single male from Panama. Cotypes in the United States National Museum collection (catalog no. 10219).

AGALLIA HYSTRICULA n. sp.

(Fig. 7, P, Q; fig. 16, J)

Closely allied to *A. nigricans* but much larger and more robust and with the distal portion of the aedeagus simple, without spine basally. Length of male 3 mm.

Color.—Face brown, heavily marked with black. Vertex black with brown markings as follows: Posterior margin; U-shaped marks around ocelli, oblique arms connecting these with the hind margin, and a narrow median line. Pronotum mostly black; 2 triangular white spots each side of center, a pair of small brown spots anteriorly, and 3 brownish spots on each side laterally. Scutellum black, except posterior one half of lateral margins whitish. Elytra basally black with brown veins, tips fuscous, discal portions hyaline with fuscous veins; 2 white spots along commissural line, 2 faint ones basally on the claval veins, 1 on the corium at the forking of the first sector, and 1 on the claval suture. Hind wings hyaline, veins dark.

Structure.—Very robust, vertex slightly swollen medially, pronotum slightly concave behind. Elytra broad, second cross vein between sectors present.

External genitalia.—Male valve broad, rather short, hind margin convex. Plates long, united and broad basally, tapering to bluntly rounded tips, beset with coarse setae laterally, in all very similar to those of *A. nigricans* but proportionately larger. Lateral margins of plates turned up.

Internal male genitalia.—Aedeagus long and slender distally, in lateral view strongly curved, tip extending directly caudad. Hind margins of pygofer produced into long, slender pieces which extend caudally and curve upward, their tips equaling the plates in length.

The size and male genital characters serve to distinguish this species from Uhler's *nigricans*, which it closely resembles. Described from a single male.

Holotype male from San Jose, Costa Rica, March 1928, J. F. Tristram. Type in the United States National Museum collection (catalog no. 43996).

The genus ACERATAGALLIA Kirkaldy

Vertex short, usually distinctly longer medially than next the eyes, posterior margin broadly rounded and not noticeably produced behind the eyes. Markings of vertex, when present, consisting of a pair of oval spots above the ocelli, paired median stripes, and dark areas next the eyes. Markings occasionally entirely missing. Pronotum with lateral margins very short, posterior margin usually slightly concave, the whole pronotal surface transversely striated or rugulose. Pronotal markings, when present, consisting of five irregular, longitudinal stripes. Scutellum usually with a pair of dark triangles basally. Elytra equaling or exceeding tip of abdomen in length, venation usually distinct, with either 4 or 5 apical and 2 or 3 anteapical cells; markings, when present, of broken patches of brownish, fuscous, and black. Internal male genitalia with styles of various shapes but always unforked; aedeagus simple, strongly bent, spines of tenth segment long and unforked. Nymphs without processes on the vertex.

Type of the genus, *Bythoscopus sanguinolentus* Provancher.

The genus is apparently limited in distribution to North America. Osborn's citation (23, p. 18) of the European *venosa* (Fall) to this genus is erroneous, for *venosa*, although it possesses the transversely striated pronotum, has the styles of the male genitalia forked and therefore cannot be a true *Aceratagallia*. There are numerous South

American species which have a superficial resemblance to this genus; but, of those examined by the writer, none can be placed in the genus *Aceratagallia* as limited above. The species treated in this bulletin may be roughly divided into two groups. The first group includes those forms which have the female genital segment similar in general structure to that of *sanguinolenta* and also have the aedeagus of the male of the same general type as in that species. This group includes the majority of the species in the genus, but the limits are somewhat indefinite. The second and more distinct group is characterized by the distinctly 4-lobed posterior margin of the female genital segment and by the V-shaped aedeagus of the male. At present only six species are known to belong in this group, of which *bigeloviae* is a typical example. *A. uhleri* and *A. gillettei* do not properly belong in either of the above-named groups but in the character of the aedeagus seem to occupy a somewhat intermediate position.

Key to the species of ACERATAGALLIA¹

- | | | |
|---|--|----|
| 1 | Aedeagus of male rather V-shaped in lateral view (fig. 18, K).
Posterior margin of female genital segment with 3 incisions of almost equal depth and the segment thus distinctly 4-lobed (fig. 12, E)..... | 2 |
| | Aedeagus not V-shaped in lateral view (fig. 17, A, C, U). Posterior margin of female segment not as above..... | 7 |
| 2 | (1) Male plates in lateral view strongly arcuated, in ventral view with apices bluntly rounded and diverging (fig. 12, R)..... <i>aplopappi</i> , p. 67.
Male plates arcuated but little, if any, apices closely appressed and turned upward..... | 3 |
| 3 | (2) Outer point of style of male genitalia equal to or but little longer than inner point (fig. 18, V, X)..... | 4 |
| | Outer point of style of male genitalia long and much produced, several times as long as inner point, which is scarcely produced (fig. 18, R)..... | 5 |
| 4 | (3) Posterior margin of style convexly rounded; shank of style nearly straight, ventral tooth large. Species large and robust, length 3.25-3.75 mm..... <i>dondia</i> , p. 68.
Posterior margin of style nearly truncate, slightly sinuate, shank of style sinuately curved, ventral tooth small. Species small and relatively slender, length not over 3.25 mm..... <i>lobata</i> , p. 67. | |
| 5 | (3) Posterior margin of style evenly rounded from inner to outer point, the latter rather blunt..... <i>vastitatis</i> , p. 69.
Posterior margin of style not evenly rounded from inner to outer point, outer point very sharp..... | 6 |
| 6 | (5) Length 2.5-2.75 mm. Species usually well marked with black or fuscous..... <i>bigeloviae</i> , p. 66.
Length 3-3.25 mm. Species at most marked with tiny spots on vertex above ocelli, these often missing..... <i>tergata</i> , p. 69. | |
| 7 | (1) Male plates truncate apically, about as long as basal width; style broad and flat, subtruncate (fig. 18, N). Female genital segment with a flaring V-shaped notch in the posterior margin (fig. 12, B)..... <i>uhleri</i> , p. 62.
Species not as above..... | 8 |
| 8 | (7) Male plates comparatively slender, lateral margins curved upward and with a small notch on each side near the apex (fig. 18, G); style extremely broad apically (fig. 18, H). Female genital segment broadly notched with the sides of the notch sinuate or slightly toothed (fig. 12, H)..... <i>gillettei</i> , p. 66.
Species not as above..... | 9 |
| 9 | (8) Style of male genitalia strongly curved laterally, either flat or twisted and keeled (fig. 18, B, D, F)..... | 10 |
| | Style of male genitalia not strongly curved..... | 12 |

¹ Aside from the use in group segregation and in the differentiation of *uhleri* and *gillettei*, the characters of the female sex are not sufficiently definitive for use in the key.

- 10 (9) Style twisted and somewhat keeled, serrations along inner margin rather fine (fig. 18, B, D) 11
 Style flat, not twisted or keeled, serrations along inner margin coarse (fig. 18, F) *curvata*, p. 61.
- 11 (10) Length 3.25-3.75 mm. Species comparatively slender. Distribution west of Rocky Mountains *californica*, p. 59.
 Length 2.5-3 mm. Species robust. Distribution east of Rocky Mountains *vulgaris*, p. 60.
- 12 (9) Posterior portion of style boot shaped, the outer point, or toe, sharp (fig. 17, Z) 13
 Posterior portion of style not boot shaped (fig. 17, T, V, X) 26
- 13 (12) Male plates long, length clearly exceeding greatest width, lateral margins straight or nearly so, apices thin and bent slightly upward 14
 Male plates short, length less than or barely equaling greatest width, or, if longer, lateral margins convex or concave 15
- 14 (13) Style of male genitalia without a ventral tooth, posterior margin convex, serrations on inner margin fine and regular (fig. 17, N) *pallida*, p. 53.
 Style of male genitalia with a ventral tooth anterior to middle of posterior one half, posterior margin slightly concave, serrations on inner margin coarse and irregular (fig. 17, G, H) *abrupta*, p. 52.
- 15 (13) Male plates short and stubby, somewhat lyrate, length about equal to greatest width, lateral margins concave, tips bent upward (fig. 10, F) *obscura*, p. 63.
 Male plates never with lateral margins concave, not at all lyrate 16
- 16 (15) Style of male genitalia without ventral tooth 17
 Ventral tooth always present, although frequently small and indistinct 22
- 17 (16) Male plates shorter than basal width, lateral margins straight, apices truncate. Species very robust *robusta*, p. 48.
 Male plates equal to or longer than basal width, or, if short, with lateral margins convex. Species not exceedingly robust 18
- 18 (17) Species very small, 2.5 mm or less in length. Style of male genitalia with shank over one half as wide as distance between inner and outer points, outer point short (fig. 16, V) *nana*, p. 55.
 Species larger, at least 2.5 mm long, usually much longer. Style of male genitalia with shank much less than one half as wide as distance between inner and outer points, outer point well produced 19
- 19 (18) Male plates with lateral margins broadly convex, length greater than greatest width 20
 Male plates with lateral margins straight or nearly so, length less than or equaling greatest width 21
- 20 (19) Species distinctly fuscous marked, length 2.75-3.25 mm *sanguinolenta*, p. 58.
 Species dirty whitish, unmarked except for spots on vertex and scutellum, length 2.65-3 mm *cinerea*, p. 55.
- 21 (19) Length of male plates equal to basal width, species robust, marked with brown and fuscous *humilis*, p. 49.
 Length of male plates greater than basal width, species comparatively slender, pale yellowish, usually with few marks *nanella*, p. 56.
- 22 (16) Species heavily marked with fuscous and black 24
 Species pale dirty whitish, unmarked except for spots on vertex and scutellum, the latter often absent 23
- 23 (22) Ventral tooth of style large, situated anterior to the middle of the posterior one half; second cross vein between sectors of elytra nearly always absent, male plates resembling those of *sanguinolenta* (fig. 8, R) *inconspicua*, p. 53.
 Ventral tooth of style small, situated posteriorly; second cross vein between sectors of elytra nearly always present, male plates much shorter (fig. 8, O) *helveola*, p. 54.
- 24 (22) Male plates relatively small, lateral margins nearly straight and converging little, if any (fig. 11, U). Style slender (fig. 18, I) *fuscocriptus*, p. 61.
 Male plates either longer or wider, lateral margins slightly convex and converging posteriorly. Style relatively stout 25

- 25 (24) Male plates with apices truncate, angles between lateral and posterior margins distinct (fig. 9, I)..... *accola*, p. 57.
Male plates not truncate apically, but rounded rather smoothly from lateral to posterior margins (fig. 10, R)..... *poudria*, p. 57.
- 26 (12) Style of male genitalia with width at apex (distance between inner and outer points) less than width of shank at middle; points of style not produced (fig. 16, P)..... *curta*, p. 64.
Style of male genitalia with distance between inner and outer points greater than width of shank at middle, points of style well produced..... 27
- 27 (26) Male plates long, slender, and lyrate (fig. 11, I); tips not turned upward..... *lyrata*, p. 65.
Male plates not at all lyrate, or, if slightly so, with tips bent abruptly upward..... 28
- 28 (27) Male plates large, much longer than basal width and width one third the distance from apex almost equal to basal width, lateral margins slightly concave (fig. 10, U). Style with ventral tooth missing..... *sordida*, p. 58.
Male plates not as above, lateral margins usually convex or straight; if concave then narrow apically and with the tips bent abruptly upward. Ventral tooth of style present or absent..... 29
- 29 (28) Style of male genitalia without ventral tooth..... 33
Ventral tooth of style always present, sometimes small and obscure..... 30
- 30 (29) Male plates somewhat lyrate, lateral margins concave, tips bent abruptly upward (fig. 10, F). Ventral tooth of style small..... *obscura*, p. 63.
- 31 (30) Male plates not at all lyrate, lateral margins straight or nearly so..... 31
Tips of male plates thickened and bent abruptly upward. Ventral tooth of style large and situated near the apex of the style (fig. 17, V)..... *arida*, p. 64.
Tips of male plates not thickened, although sometimes bent slightly upward. Ventral tooth of style somewhat obscure and situated in the middle or anterior to the middle of the posterior portion..... 32
- 32 (31) Species large, 3.25 mm or more in length; ventral tooth of style anterior to middle of posterior portion..... *abrupta*, p. 52.
Species small, 3 mm or less in length; ventral tooth of style in middle of posterior portion..... *nitidula*, p. 52.
- 33 (29) Distance between inner and outer points of style about twice the width of shank at narrowest point..... 34
Distance between inner and outer points of style not over $1\frac{1}{2}$ times width of shank at narrowest point..... 35
- 34 (33) Posterior margin of style evenly convexly rounded, inner margin regularly serrate (fig. 17, N). Male plates relatively slender (fig. 9, F)..... *pallida*, p. 53.
Posterior margin of style sinuate, partly concave and partly convex, inner margin irregularly serrate (fig. 16, R). Male plates stouter (fig. 8, C)..... *texana*, p. 51.
- 35 (33) Outer point of style distinctly spurlike and situated distinctly basad of inner point, inner point forming an oblique angle with posterior margin (fig. 16, X)..... *calcaris*, p. 50.
Outer point of style not spurlike, situated about even with inner point, inner point forming a right angle with posterior margin (fig. 16, L)..... *compacta*, p. 51.

ACERATAGALLIA ROBUSTA n. sp.

(Fig. 8, J, K, L; fig. 16, S, T)

Pale and very robust, the spots on the vertex very small. Length of male 2.5 mm, of female 2.75-3 mm.

Color.—General ground color yellowish cinereous. Face creamy with frontal sutures and transverse bars laterally on frons brownish. Ocelli pink. Vertex with small black spots above ocelli, a faint longitudinal brownish stripe each side of median line, and a faint brownish area next each eye. Markings of pronotum very faint brown or obsolete. Elytra faint yellowish brown to subhyaline, marked with whitish on clavus and basally on corium, veins mostly

faintly brownish. Outer claval vein fuscous for a short distance on disk of clavus, the outer sector of corium fuscous basally and again even with the fuscous mark of the claval vein, the inner sector also lightly fuscous at this point. Male plates with apices and inner margins apically, black.

Structure.—Very robust, vertex distinctly longer medially than next the eyes, median length nearly one half the length of the pronotum. Elytra short and broad, barely exceeding the tip of the abdomen in some females, second cross vein between sectors present or absent.

External genitalia.—Last ventral segment of female twice as long as preceding segment, posterior margin nearly truncate but slightly produced and notched medially. Male valve very short and transverse, posterior margin truncate. Plates short and broad, broader basally than apically, apices subtruncate, lateral margins nearly straight.

Internal male genitalia.—Posterior portion of style stout, outer point produced and sharp, inner point short, inner margin coarsely serrate, apex truncate. Style with a faint indication of a ventral tooth near the apex. Aedeagus slender, tip pointed.

The small size, robust form, and male genitalia are distinctive characters.

Holotype male from Las Vegas, Nev., July 6, 1929, David E. Fox. Allotype female, same locality and collector, May 6, 1929. Paratypes, 51 specimens of both sexes from Las Vegas, Overton, and Glendale, Nev., collected in May and July 1929 by David E. Fox; from Phoenix and Granite Dell, Ariz., collected in 1929 and 1930 by E. D. Ball; and from Baboquivari Mountains, Ariz., collected July 19, 1932, by R. H. Beamer. The entire series from Nevada was taken on *Sphaeralcea munroana*, evidently the normal host plant, at least in southern Nevada. Ball's specimens were also on *Sphaeralcea*. Holotype, allotype, and paratypes in the United States National Museum collection (catalog no. 44004); paratypes in the collections of E. W. Davis, E. D. Ball, and the University of Kansas.

ACERATAGALLIA HUMILIS n. sp.

(Fig. 9, M, N, O; fig. 17, A, B)

Smaller and more robust than *sanguinolenta*, with male plates similar to those of *A. robusta*. Length of male 2.75–3 mm, of female 3–3.25 mm.

Color.—Usually similar to pale examples of *A. vulgaris* but apparently never so pale as the extreme forms of that species, usually well marked with brown in the females and fuscous in the males. Spots on vertex above ocelli small and black, median markings of vertex and pronotum usually the most distinct.

Structure.—Short and rather broad. Males less robust than females. Vertex moderately produced, somewhat tumid. Elytra with second cross vein usually present.

External genitalia.—Last ventral segment of female similar to that of *A. sanguinolenta*. Male plates resembling those of *A. robusta*, but longer in proportion to the width. Lateral margins nearly straight, apices truncate.

Internal male genitalia.—Posterior portion of style rather slender, outer point produced more than that of *A. accola*, posterior margin not sinuate as in *A. robusta*, inner margin irregularly serrate, ventral tooth obscure.

This species is most likely to be confused with *A. vulgaris*, which it resembles in general appearance. However, the characters of the male genitalia are very distinct, so there should be no difficulty in separating the two species. The writer collected both nymphs and adults of this species from weeds growing in dry, open places where the soil is rather sandy. The host plant is not known.

Holotype male, allotype female, and over 50 paratypes taken by the writer at Garnett, Kans., June 20, 1931. Other paratypes collected on the sand dunes at Medora, Kans., June 21, by D. A. Wilbur. There are also specimens at hand from Gallion and Marion Junction, Ala. Holotype, allotype, and paratypes in the United States National Museum collection (catalog no. 44649); paratypes in the collections of the University of Kansas, D. A. Wilbur, and E. D. Ball.

ACERATAGALLIA CALCARIS n.sp.

(Fig. 9, J, K, L; fig. 16, W, X; pl. 3, C)

Resembling *A. uhleri* but smaller, the female genital segment not deeply notched. Length of male 2.75-3 mm, of female 3-3.25 mm.

Color.—Brownish cinereous, marked with brown or fuscous; often pale. Front light yellowish with frontal sutures, median portion of clypeus, and broken transverse bars on sides of frons light brown. Arcs separating vertex and frons and the vertex next the eyes brownish. Spots on vertex above ocelli black, and stripes each side of median line faint brownish. Pronotum with anterior submargin and three pairs of indistinct longitudinal stripes light brown. Black basal triangles on scutellum small. Elytra subhyaline, veins mostly fuscous. Tips of male plates black.

Structure.—Smaller than *A. uhleri*, less robust than *A. sanguinolenta*. Vertex moderately produced, very slightly longer medially than next the eyes. Pronotum short, posterior margin slightly concave. Elytra long, second cross vein between sectors often absent.

External genitalia.—Last ventral segment of female twice as long as preceding segment, lateral margins straight, posterior margin slightly sinuate each side of a faint median notch. Male valve short, transverse, anterior and posterior margins parallel. Plates together slender and tapering, united except at tips, which are closely appressed and together bluntly rounded, equaling pygofer in length. Lateral margins of plates somewhat rounded upward.

Internal male genitalia.—Posterior portion of style slender, almost straight, very similar to that of *A. lyrata*, outer point slender and sharp, situated anterior to apex of style, inner point blunt, inner submargin below serrate. Style without ventral tooth. Aedeagus strongly curved, tip bluntly pointed.

This is another form which has apparently been confused with *A. sanguinolenta*, as it occurs commonly in western Kansas and eastern Colorado and superficially resembles that species. However, aside from the less robust form, this species is easily distinguished from *A. sanguinolenta* by the shape of the style of the internal male genitalia and by the fact that the male plates are more slender and curved upward laterally. It may be distinguished from *A. uhleri* by the smaller size and the characters of the genitalia of both sexes.

Holotype male from Rocky Ford, Colo., August 7, 1912, on sugar beets. Allotype female from Rocky Ford, Colo., August 4, 1911, on sugar beets, H. O. Marsh. Paratypes, several specimens of both sexes from the same locality and from Garden City, Finney County, Kans., H. O. Marsh, and Finney County, Kans., August 15, 1924, P. B. Lawson and R. H. Beamer. There are also specimens at hand from various localities in Texas, New Mexico, and Arizona, indicating wide distribution in the arid and semiarid regions of the west. Holotype, allotype, and paratypes in the United States National Museum collection (catalog no. 44007).

ACERATAGALLIA TEXANA n.sp.

(Fig. 8, A, B, C; fig. 16, Q, R)

Allied to *A. calcaris* n.sp. but more robust, with the male plates longer, broader, and more truncate at the tips. Length 2.75-3 mm.

Color.—Whitish with markings varying from yellowish brown to fuscous. Face pale, seldom marked with brown, occasionally pinkish tinged. Markings of vertex and pronotum, except the two black spots above the ocelli, very pale and indistinct. Black triangles at base of scutellum small or obsolete. Elytra subhyaline, whitish tinged basally, veins basally and on clavus white, remainder dark. Hind wings milky, adding to the whitish appearance of the elytra. Tips of male plates black.

Structure.—Vertex moderately produced, very slightly longer medially than next the eye. Elytra broad but extending well beyond tip of abdomen, second cross vein between sectors either present or absent.

External genitalia.—Last ventral segment of female twice as long as preceding segment, posterior margin slightly notched medially, faintly or not at all sinuate each side of median notch. Male valve rather short and transverse, posterior margin truncate, lateral margins oblique. Plates large, about one half wider basally than at the subtruncate tips, inclosed laterally at base by pygofer and with lateral margins slightly convex. Plates longer than those of *A. compacta* n.sp.

Internal male genitalia.—Posterior portion of style nearly straight, outer point somewhat spinelike and a little longer than in the following species, inner point scarcely produced, inner margins serrate. Ventral tooth of style obsolete. Aedeagus distinctly widened, appearing somewhat flanged, then tapering to a sharp point.

The genital characters of the male and the shape of the rather short vertex will best distinguish this species.

Holotype male, allotype female, and 9 males and 4 female paratypes from Cameron County, Tex., August 3, 1928, R. H. Beamer. Holotype, allotype, and paratypes in the University of Kansas collection; paratypes in the United States National Museum collection (catalog no. 44006).

ACERATAGALLIA COMPACTA n.sp.

(Fig. 10, M, N, O; fig. 16, K, L; pl. 3, E)

Resembling *A. calcaris* but more robust and with the male plates larger and resembling those of *A. texana* n.sp. Length 2.5-2.75 mm.

Color.—General ground color dirty bluish white, almost obscured by the extensive fuscous and brown markings. Face heavily marked with brown, sometimes reddish tinged. Vertex with the two median brown stripes and brown areas next the eyes unusually large and distinct, spots above ocelli large and black. Anterior submargin of pronotum, and three pairs of longitudinal stripes behind this, brownish, the two pairs of stripes laterally often faint. Scutellum marked with black in varying amounts. Elytra subhyaline, but with the black dorsum giving a dark appearance, veins dark, intermittently marked with pale white basally and on clavus. Tips and inner submargins of male plates black.

Structure.—Robust, vertex well produced and tumid, distinctly longer medially than next the eye. Pronotum very short, hind margin truncate. Elytra short and broad, often barely equaling tip of abdomen in length, second cross vein between sectors present.

External genitalia.—Last ventral segment of female about $1\frac{1}{2}$ times as long as preceding segment, hind margin slightly notched medially and faintly sinuate each side between median notch and rounded lateral angles. Male valve short and transverse, posterior margin truncate, lateral margins oblique. Plates rather broad basally, twice as wide as at tips, lateral margins slightly convex. Tips truncate, not equaling pygofer in length. Pygofer inclosing plates laterally at base.

Internal male genitalia.—Posterior portion of style almost straight, outer point small and somewhat spurlike, shorter than in *A. texana*, inner point scarcely

produced, inner margin serrate. Ventral tooth of style obsolete. Aedeagus slender and strongly curved.

The internal genital characters of this species are similar to those of *A. texana*, but the two may be separated by the differences in size, the degree of production of vertex, and the shape of the aedeagus.

Holotype male and allotype female from San Diego County, Calif., July 4, 1929, P. W. Oman. Paratypes, 4 males and 4 females with the above data; 3 males and 3 females from San Jacinto Mountains, Calif., July 21, 1929, L. D. Anderson; 1 male and 1 female from the San Jacinto Mountains, July 21, 1929, R. H. Beamer; and 1 male from San Diego County, Calif., July 4, 1929, R. H. Beamer. Holotype, allotype, and paratypes in the University of Kansas collection; paratypes in the United States National Museum collection (catalog no. 44005).

ACERATAGALLIA ABRUPTA n. sp.

(Fig. 8, G, H, I; fig. 17, G, H)

Allied to *A. uhleri* (Van D.) but larger and with the male plates longer and more tapering. Length of male 3.25–3.5 mm, of female 3.5–3.75 mm.

Color.—About as in *A. uhleri*; pale yellowish white, seldom infuscated. Head and pronotum unmarked except for the small, round, black spots on the vertex above the ocelli. Black triangular spots at base of scutellum sharply outlined. Elytra subhyaline, veins on clavus and base of corium white, remainder brown. Tips of male plates with narrow black markings.

Structure.—Slightly more robust than *A. curvata*, distinctly larger. Vertex a little longer medially than laterally, pronotum short, posterior margin slightly angularly concave. Elytra broad, second cross vein between sectors nearly always absent; when present, the anteapical cell thus formed usually very short.

External genitalia.—Last ventral segment of female twice as long as the preceding segment, lateral margins straight, lateral angles well produced and rounded, posterior margin notched medially and distinctly sinuate on each side between middle and lateral margins. Male valve short and transverse, anterior and posterior margins parallel. Plates united, except tips which are bent obliquely upward, broad basally, lateral margins straight and converging, tips rather narrow, truncate.

Internal male genitalia.—Posterior portion of style long and nearly straight, outer point moderately produced and sharp, inner point short, sharp, and hooked downward, inner margins serrate. Ventral tooth of style blunt, swollen, rather obscure, and situated anterior to middle of posterior portion. Aedeagus with tip bent abruptly upward.

This species is best distinguished from *A. curvata* by the size and genital characters, which are quite distinct from those of any other forms.

Holotype male, allotype female, and 23 male and 27 female paratypes from Yuma, Ariz., near the Colorado River, June 17, 1915, Harold Morrison. Holotype, allotype, and paratypes in the United States National Museum collection (catalog no. 44009); paratypes in the collections of E. D. Ball and the University of Kansas.

ACERATAGALLIA NITIDULA n. sp.

(Fig. 10, G, H, I; fig. 17, W, X; pl. 3, H)

Apparently allied to *A. abrupta*, but much smaller and with the styles of the internal male genitalia resembling those of *A. lyrata*. Length of male 2.5–2.75 mm, of female 2.75–3 mm.

Color.—Pale yellow, front often tinged with pink. Spots on vertex above ocelli piceous, elytra with a soiled appearance, veins sometimes faintly brownish, venation rather obscure. Tips and inner margins of male plates black.

Structure.—Size and form about as in *A. sanguinolenta*, but slightly more robust and vertex a little more tumid. Elytra short, but extending beyond tip of abdomen; second cross vein between sectors absent.

External genitalia.—Last ventral segment of female about twice the length of the preceding segment, hind margin faintly notched medially and slightly sinuate between middle and rounded lateral angles. Male valve short and broad, posterior margin truncate, lateral margins oblique. Plates resembling those of *abrupta*, but smaller and with the tips not bent obliquely upward. Lateral angles slightly sinuate, width of truncate tips about one half that at base.

Internal male genitalia.—Posterior portion of style stout, outer point spurlike and situated even more distant anteriorly from apex than in *A. lyrata*, inner point blunt, inner margins serrate. Ventral tooth of style small and blunt, situated near apex as in *lyrata*. Aedeagus short and curved.

The styles of the internal male genitalia will distinguish this species from all others except *lyrata* and *calcaris*, and it may be easily distinguished from these two by the shape of the male plates.

Holotype male, allotype female, and 6 male and 9 female paratypes from Santa Rita Mountains, Ariz., 5,000–8,000 feet, June, F. H. Snow. Also two male paratypes from the Baboquivari Mountains, Ariz., July 18, 1932, R. H. Beamer. Holotype, allotype, and paratypes in the University of Kansas collection, paratypes in the United States National Museum collection (catalog no 44008).

ACERATAGALLIA PALLIDA n. sp.

(Fig. 9, D, E, F; fig 17, M, N)

Superficially identical with *A. abrupta* but with male plates wider apically. Length 3.25–3.75 mm.

Color.—Pale cinereous, veins of elytra sometimes marked with brown. Black spots on vertex above ocelli small. Basal spots on scutellum brownish fuscous.

Structure.—General form of *abrupta*, but the females slightly less robust. Second cross vein in elytra present.

External genitalia.—Last ventral segment of female as in *abrupta*. Male plates long, lateral margins straight, apices together appearing concave behind. Plates intermediate in character between those of *nitidula* and *abrupta*, broader apically than either, shorter than the latter.

Internal male genitalia.—Posterior portion of style with outer point well produced, inner point obsolete, posterior margin broadly convex, inner margin coarsely and irregularly serrate. Vent. al tooth absent.

It is necessary to examine the male genitalia to distinguish this species.

Holotype male and allotype female from St. George, Utah, September 3, 1929, D. E. Fox, collected on *Dicoria canescens*. Paratypes, 7 males and 9 females from St. George, Utah, Glendale, Nev., and Bright Angel and Tucson, Ariz. Holotype, allotype, and paratypes in the United States National Museum collection (catalog no. 44652), paratypes in the collection of E. D. Ball.

ACERATAGALLIA INCONSPICUA (Baker)

(Fig. 8, P, Q, R; fig. 17, K, L; pl. 3, J)

Described by Baker (2, p. 198) in 1898 as a variety of *sanguinolenta*. Uniformly pale yellowish white, smaller and more robust than *A. cinerea* or *A. sanguinolenta*. Length 2.5–2.75 mm.

Color.—Pale yellowish white, the front sometimes tinged with pink, the eyes dark and a deep black spot on the vertex above each ocellus. Tips and inner margins of male plates black.

Structure.—Short and robust, the vertex usually distinctly longer medially than next the eyes. Vertex more produced than in *A. fuscscripta*. Pronotum

short, hind margin slightly concave. Elytra short but exceeding the tip of the abdomen in length, second cross vein absent, venation obscure.

External genitalia.—Last ventral segment of female very short and broad, longer next the middle than laterally, posterior margin faintly sinuate each side of a faint median notch. Male valve short, posterior margin straight and parallel to anterior margin, lateral margins oblique. Plates resembling those of *A. sanguinolenta* but shorter, tips almost truncate and exceeded by pygofer, which incloses the bases of the plates laterally.

Internal male genitalia.—Posterior portion of style slender, nearly straight, the apex much as in *A. sanguinolenta* but with the outer point less strongly produced, inner margin serrate. Ventral tooth of style large and situated far anteriorly on posterior portion. Aedeagus strongly curved, bluntly pointed.

Although closely related to them, this species may be easily distinguished from the three following species (*helveola*, *cinerea*, and *nana*) by the more robust form, the absence of the second cross vein in the elytra, the larger male plates, and the larger size and more anterior position of the ventral tooth of the styles of the male genitalia.

Baker described *A. inconspicua* as a variety of *sanguinolenta*, giving as localities Los Angeles, Calif., and Arizona. Ball (4, p. 128) placed *inconspicua* as a synonym of *cinerea*. The Baker series includes two very distinct species, both closely related to *A. sanguinolenta*, but neither of them is *cinerea*. Since Baker's description does not differentiate the two species, the name *inconspicua* must be applied to the California specimens. Specimens at hand from Las Vegas, Nev., agree in every respect with the types and indicate a wide range in the arid areas of the West. The Nevada examples, collected by D. E. Fox and received through the kindness of E. W. Davis, of the Salt Lake City beet-leaf-hopper laboratory, were nearly all taken on *Atriplex garrettii*, which may prove to be the host of the species. Cotypes examined. Cotypes in the United States National Museum collection (catalog no. 44011).

ACERATAGALLIA HELVEOLA n. sp.

(Fig. 8, M, N, O; fig. 18, J; pl. 3, I)

Closely allied to, and easily confused with, *A. inconspicua*, but less robust, the female genital segment longer, and the male plates smaller. Length of male 2.5–2.75 mm, of female 2.75–3 mm.

Color.—Very much like *inconspicua* but with a dirty tinge. Black spots on vertex above ocelli very small, sometimes obsolete, as are the triangles at the base of the scutellum. Tips of male plates faintly dark.

Structure.—Decidedly less robust than *inconspicua*, with a greater difference in the sizes of the sexes. Vertex less produced than that of *inconspicua*, slightly longer medially than next the eye. Pronotum short. Elytra extending well beyond tip of abdomen, second cross vein between sectors present, venation obscure.

External genitalia.—Last ventral segment of female much longer than that of *inconspicua*, otherwise similar. Male valve much like that of *inconspicua* but a little longer. Plates much smaller than in Baker's species, resembling those of *A. fuscscripta* n. sp.

Internal male genitalia.—Posterior portion of style about as in *inconspicua*, but the inner point slightly hooked and the ventral tooth smaller and situated about midway on the posterior portion.

Aside from the above-mentioned differences, this species is easily and probably best separated from *inconspicua* by the presence of the second cross vein between the sectors of the elytra. From *fuscscripta* it may be distinguished by the much paler color.

Holotype male and allotype female from Overton, Nev., June 12, 1929, D. E. Fox. Paratypes, 2 males from the above locality, July 7, 1929, 8 females and 2 males from Las Vegas, Nev., August 22, 1928, E. W. Davis; 1 female from Las Vegas, Nev., July 1, 1928, E. W. Davis; 2 females from Overton, Nev., September 19, 1929, D. E. Fox; 5 females and 1 male from Bakersfield, Calif., July 24, 1929, R. H. Beamer; and 1 male and 1 female from Alpaugh, Calif., June 7, 1915, W. J. Hartung. Holotype, allotype, and paratypes in the United States National Museum collection (catalog no. 44012); paratypes in the collections of the University of Kansas, E. W. Davis, and E. D. Ball.

ACERATAGALLIA CINEREA Osborn and Ball

(Fig. 10, A, B, C; fig. 17, E, F)

Described as *Agallia cinerea* by Osborn and Ball (28, p. 62) in 1898. Aspect of *inconspicua* but larger. Length 2.65–3 mm.

Color.—Uniformly dirty yellowish white, unmarked except for a round, black spot on the vertex above each ocellus and the black triangles at the base of the scutellum, part or all of these sometimes obsolete. Face with a pinkish tinge. Male plates black apically and along inner margins.

Structure.—General shape about as in *inconspicua*. Vertex well produced, about one half as long as pronotum. Pronotum very short, posterior margin shallowly concave. Elytra short and broad, sometimes barely exceeding the tip of the abdomen in female, second cross vein usually absent.

External genitalia.—Last ventral segment of female short, about $1\frac{1}{2}$ times as long as preceding segment, lateral angles sharply rounded, posterior margin nearly truncate, notched medially and slightly, sinuately curved each side of median notch. Valve of male short, transverse, posterior margin truncate, lateral margins oblique. Plates similar to those of *sanguinolenta*, quite large, lateral margins convex, narrower apically than basally and apices truncate.

Internal male genitalia.—Posterior portion of style slightly curved near apex, outer point produced and sharp, inner point scarcely produced, inner margin serrate. Style without ventral tooth, the entire structure very similar to that of *sanguinolenta*. Aedeagus slender, tip blunt.

The shape of the apex of the style and the absence of a ventral tooth will distinguish this species from all others except *sanguinolenta*, and from this species it is easily distinguished by the color and smaller size.

The type series of Osborn and Ball was from "Iowa and Colorado." An examination of several specimens of the series convinced the writer that two quite distinct species were included in it, and that, although Iowa was the first locality mentioned, the salient features of the description, especially the characterization of the male plates, undoubtedly apply to the Colorado specimens. Consequently, the Colorado examples are here considered to represent *cinerea*, and the species to which the Iowa specimens belong is named as a new species. Examples of *cinerea* at hand are from western Colorado and Utah, and the species apparently does not occur east of the Rocky Mountains. Cotypes in collection of Iowa State College, Ames, Iowa.

ACERATAGALLIA NANA n.sp.

(Fig. 11, A, B, C; fig. 16, U, V; pl. 3, K)

Small, robust, pale, marked with brown. Length 2.25–2.5 mm.

Color.—General ground color pale yellowish white, face heavily marked with brown. Vertex with a large area next each eye and a distinct stripe each side the median line brown; spots above the ocelli large and black. Pronotum with

depressed anterior submargin, a pair of longitudinal stripes medially, and indistinct markings laterally, brown. In pale specimens all the dorsal markings except the black spots on the vertex may be faint or obsolete. Elytra subhyaline, often marked with brown basally. Tips, and inner margins of male plates distally, black.

Structure.—Smaller and slightly less robust than *A. inconspicua*, but with vertex proportionately more produced. Pronotum very short, hind margin nearly straight. Elytra short and broad, apices barely equaling tip of abdomen in length. Second cross vein between sectors usually absent.

External genitalia.—Last ventral segment of female short, lateral angles rounded, hind margin almost parallel to anterior margin but slightly notched medially and faintly sinuate each side of median notch. Male valve short and broad, hind margin truncate, lateral margins oblique. Plates resembling those of *A. calcaris* n.sp. but shorter. Lateral margins convex, tips together bluntly rounded.

Internal male genitalia.—Posterior portion of style broad, outer point much less produced than that of *A. sanguinolenta*, inner point forming a right angle, inner margin serrate. Ventral tooth of style obsolete.

This is one of the smallest species in the genus and may be distinguished from other small forms by the unusually large spots on the vertex and by the genital characters of the males.

Holotype male, allotype female, and 16 male and 11 female paratypes from Santa Rita Mountains, Ariz., 5,000–8,000 feet, June, F. H. Snow. Holotype, allotype, and paratypes in the University of Kansas collection; paratypes in the United States National Museum collection (catalog no. 44013).

ACERATAGALLIA NANELLA n. sp.

(Fig. 9, P, Q, R; fig. 17, O, P)

Most closely resembling *A. nana*, but less robust, longer, and with the male plates broader. Length of male 2.5–2.75 mm, of female 2.75–3 mm.

Color.—Pale yellowish brown, sometimes with a golden tinge, the spots on the vertex above ocelli black but smaller than those on *nana*; otherwise mostly unmarked but sometimes with brownish marks on pronotum and with veins of elytra intermittently brown.

Structure.—General shape of a small *sanguinolenta*, females more robust than males. Elytral venation obscure, second cross vein present or absent.

External genitalia.—Last ventral segment of female $1\frac{1}{2}$ times as long as preceding segment, the median notch in posterior margin deeper than in most species, margin each side of this scarcely sinuate. Male plates short and stubby, wider and less tapered than those of *nana*, apices subtruncate.

Internal male genitalia.—Posterior portion of style relatively slender, resembling that of *sanguinolenta* but with outer point shorter; inner margin irregularly serrate posteriorly. Ventral tooth obsolete.

This is the species from Arizona which Baker (2, p. 198) placed under *inconspicua*, but it may be separated from that species by the absence of a ventral tooth on the style and the shape of the male plates. It may be distinguished from *cinerea* by the shape of the male plates and from *nana* by the more elongate form.

Holotype male, allotype female, and 14 paratypes, representing both sexes, from Prescott, Ariz., July 15, 1896, R. E. Kunze, C. F. Baker collection (2123). Other paratypes from Santa Rita Mountains, Ariz., 5,000–8,000 feet, June, F. H. Snow; Patagonia, Ariz., May 21, 1931, Tucson, Ariz., May 26, 1929, and June 21, 1930, E. D. Ball. Holotype, allotype, and paratypes in the United States National Museum collection (catalog no. 44653); paratypes in the collections of the University of Kansas and E. D. Ball.

ACERATAGALLIA ACCOLA n. sp.

(Fig. 9, G, H, I; fig. 17, I, J)

Apparently heretofore mistaken for *A. sanguinolenta* but much smaller, darker, more robust, and with the male plates shorter. Length of male 2.5-2.75 mm, of female 2.75-3 mm.

Color.—Similar to *sanguinolenta* but usually appearing darker, actually with more brown and fuscous than *sanguinolenta*. Males much darker than females.

Structure.—Similar to *A. vulgaris* but smaller, vertex rather tumid. Elytra broad and short, barely extending beyond tip of abdomen; second cross vein either present or absent.

External genitalia.—Last ventral segment of female a little longer than preceding segment, a little longer medially than laterally, posterior margin with a small median notch and slightly concavely sinuate each side of this. Male valve short, truncate posteriorly. Plates short, tapering slightly to truncate apices, lateral margin convex.

Internal male genitalia.—Posterior portion of style similar to that of *A. nana* but with outer point a little more produced. Inner margin irregular serrate, ventral tooth blunt and obscure.

The writer has found this to be the most common species of *Aceratagallia* in dry, sandy places in the vicinity of the District of Columbia. Although not yet definitely determined, the host plant is apparently one of the common weeds found in these open fields where the vegetation is rather short.

Holotype male, allotype female, and over 100 paratypes of both sexes collected at Washington, D.C., August 28, 1932, by the writer. Other paratypes collected near the South River, 4 miles south of Annapolis, Md., July 17, 1932, by the writer. There are also specimens at hand from various other localities near Washington, taken mostly in the late summer of 1932. Holotype, allotype, and paratypes in the United States National Museum collection (catalog no. 44654) and in the collections of the University of Kansas and E. D. Ball.

ACERATAGALLIA POUDRIS n. sp.

(Fig. 10, P, Q, R; fig. 17, Q, R)

Resembling *A. accola* but more robust. Length of male 2.25-2.5 mm, of female 2.5-2.75 mm.

Color.—General ground color grayish cinereous, males heavily marked with fuscous. The most distinctive marks are a pair of brownish-fuscous vittae each side of the median line of the vertex and a brown cloud next each eye, these often entirely obsolete in the female. Spots on vertex above ocelli small, elongate, and set somewhat obliquely outward, these also variable in intensity.

Structure.—More robust than *accola*, the vertex more tumid. Elytra broad, sometimes barely exceeding abdomen in length; second cross vein present or absent.

External genitalia.—Last ventral segment of female as in *sanguinolenta*. Male plates very short, lateral margins convex, rounding to posterior margin with scarcely an indication of an angle.

Internal male genitalia.—Posterior portion of style with outer point well produced, similar to *accola* but with shank of style more slender. Serrations along inner margin irregular, ventral tooth small.

The shape of the male plates will distinguish this species.

Holotype, allotype, and numerous paratypes of both sexes from Poudre Canyon, Colo., August, 22, 1925, R. H. Beamer and P. B. Lawson. Holotype, allotype, and paratypes in the collection of the University of Kansas; paratypes in the United States National Museum collection (catalog no. 44655) and the collection of E. D. Ball.

ACERATAGALLIA SORDIDA n. sp.

(Fig. 10, S, T, U; fig. 16, M, N)

Allied to *A. sanguinolenta* but with male plates larger and female genital segment slightly produced and notched medially. Length 2.75-3 mm.

Color.—Brownish cinereous, marked with fuscous. Frontal sutures, tip of clypeus, and antennal pits black, sides of frons marked with broken transverse bars of fuscous. Arcs on front above frons and vertex next the eyes light fuscous, spots on vertex above ocelli black, and two median stripes on vertex brownish. Pronotum with anterior margin and three pairs of indistinct longitudinal stripes fuscous. Scutellum with triangles at base and median line black. Elytra fuscous to brownish basally, becoming subhyaline apically, veins of clavus and base of corium broadly white, remainder fuscous. Abdomen variously infuscated, tips and inner margins of plates black.

Structure.—More robust than *A. sanguinolenta*. Vertex slightly longer medially than laterally, pronotum short, hind margin nearly straight. Elytra broad, second cross vein between sectors absent.

External genitalia.—Last ventral segment of female short, longer medially than laterally, lateral margins straight, lateral angles rounded, posterior margin notched medially. Male valve large, posterior margin truncate, lateral margins straight, obliquely converging. Plates broad, united on basal two thirds, lateral margins nearly parallel but slightly concave, tips broadly rounded, almost truncate.

Internal male genitalia.—Posterior portion of style rather slender and nearly straight, outer point small and sharp, inner point well produced, stout, and hooked, inner margin serrate. Style without ventral tooth. Aedeagus strongly curved, tips pointed.

Probably heretofore confused with *A. sanguinolenta*, which it closely resembles. The genital characters are, however, quite distinct, especially the shape of the style of the internal male genitalia. Apparently widely distributed in Central America, Mexico, and lower Texas.

Holotype male and allotype female from La Ceiba, Honduras, December 13, 1915, F. J. Dyer. Paratypes of both sexes from La Ceiba, Honduras, F. J. Dyer; Vera Cruz, Mexico, H. Th. Heyde (C. F. Baker collection 1785 and 2154); Cuernavaca, Mexico, E. G. Smyth; Brooks, Brazoria, Hidalgo, and Karnes Counties, Tex., R. H. Beamer; Kendall County, Tex., L. D. Beamer; Cameron County Tex., E. I. and Jack Beamer; and Amarillo, Tex., L. D. Anderson. There are also at hand two females from Mitla, Mexico, which undoubtedly belong here. Aside from the customary variation in coloring, this large series is very constant in character. Holotype, allotype, and paratypes in the United States National Museum collection (catalog no. 44010); paratypes in the collections of the University of Kansas and E. D. Ball.

ACERATAGALLIA SANGUINOLENTA (Provancher)

(Fig. 11, D, E, F; fig. 17, Y, Z; pl. 2, K)

Described by Provancher (30, p. 376) in 1872 as *Bythoscopus sanguinolentus*. Uhler (36, p. 359) described the same species in 1876 as *B. siccifolius*. Light brownish gray, with fuscous markings. Rather robust. Length of male 2.75-3 mm, of female 3-3.25 mm.

Color.—General ground color light brown, the females lighter than the males. Front pale with brown markings as follows: Frontal sutures, antennal pits, broken transverse bars on sides of frons, and arcs between vertex and frons. Vertex with a black spot above each ocellus, a brown patch next each eye, and a

longitudinal brown stripe each side of the median line, these brown areas connected below with the arcs between the vertex and the frons. Pronotum with anterior depressed submargin irregularly fuscous and three pairs of indistinct longitudinal stripes brownish. Scutellum with basal triangles black and sometimes median portion infuscated. Elytra subhyaline to brownish, veins brown to fuscous, marked with white on the clavus and base of corium. Male plates black on tips and inner submargins.

Structure.—Short and broad, vertex a very little longer medially than next the eye, pronotum slightly concave behind. Elytra broad, rather short, second cross vein between sectors usually present.

External genitalia.—Last ventral segment of female $1\frac{1}{2}$ times as long as preceding segment, lateral angles rounded, posterior margin slightly notched medially and feebly sinuate each side of median notch. Male valve short, transverse, lateral margins oblique, anterior and posterior margins parallel. Plates rather broad and flat, lateral margins convex, narrowing to truncate tips which are slightly exceeded in length by the pygofer. Plates slightly inclosed by pygofer laterally at base.

Internal male genitalia.—Posterior portion of style straight, the apex foot shaped, outer point strongly produced and sharp, inner point obscure, inner margin coarsely serrate. Style without ventral tooth, but with a minute protuberance ventrally near the apex. Aedeagus strongly curved, bluntly pointed.

A. sanguinolenta was described from Canada and is the most abundant and injurious species of *Aceratagallia* in eastern North America. It has a wide distribution, occurring throughout the eastern part of the United States and Canada and west into Arizona and Utah. Although the western specimens differ decidedly in general appearance from the eastern form, no constant structural character of specific significance has been found. Because of this, Uhler's *siccifolius* is considered to be a synonym of this species. Published records of *sanguinolenta* from the Pacific coast are probably erroneous determinations of some of the common species of that region. The injury caused by this species, although extensive, is apparently limited to the feeding, as there has been no evidence of disease transmission. Poos (29) obtained only negative results in his attempts to connect this species with diseaselike injury to legumes. Type in the collection of the Museum of Public Instruction at Quebec, Canada.

ACERATAGALLIA CALIFORNICA (Baker)

(Fig. 11, M, N, O; fig. 18, A, B; pl. 2, J)

Described as *Agallia californica* by Baker (2, p. 199) in 1898. Resembling *A. lyrata* but smaller, with the male plates truncate. Length of male 3.25–3.5 mm, of female 3.5–3.75 mm.

Color.—Brownish cinereous, with fuscous markings. Front pale, sometimes marked with brown. Vertex next the eyes brownish, with a black spot over each ocellus. Eyes dark, with light borders. A faint brownish stripe each side of median line on vertex and pronotum, obscure anteriorly on pronotum. Pronotum laterally with indications of longitudinal stripes of brown. Scutellum with black triangular spots basally. Elytra as in *A. lyrata*. Tips of male plates black, female genital segment brown medially.

Structure.—Intermediate between *A. uhleri* and *A. lyrata*. Vertex slightly longer medially than laterally, hind margin broadly rounded. Elytra long, second cross vein present.

External genitalia.—Last ventral segment of female longer than preceding segment, posterior margin sinuate each side of a median notch, which is usually shallow but occasionally rather deep. The brownish median portion of the female segment gives the appearance of a deep notch. Male valve short, transverse, and truncate behind. Plates together rectangular, slightly longer than wide, united basally, and with lateral margins at base inclosed by pygofer. Pygofer exceeding plates in length.

Internal male genitalia.—Posterior portion of style curved laterally and twisted, outer point well produced and sharp, inner point obscure, inner margin serrate on curved portion. Ventral tooth of style blunt. Aedeagus in lateral view symmetrically curved, not abruptly bent near tip.

Described from California and common in the mountains of California and Oregon. The writer has taken this species in large numbers from spruce in the San Jacinto Mountains, Calif., which was apparently doing considerable damage to the trees. Cotypes in the United States National Museum collection (catalog no. 44001).

ACERATAGALLIA VULGARIS n. sp.

(Fig. 11, J, K, L; fig. 18, C, D; pl. 3, F)

Similar to *A. sanguinolenta* but smaller and slightly more robust. Length of male 2.5–2.75 mm, of female 2.75–3 mm.

Color.—Varying from light yellowish brown to dark cinereous. Front pale, sides of frons sometimes with short transverse brown lines; vertex brownish next the eyes and with a faint stripe each side of median line on vertex and pronotum in dark specimens. Spots on vertex above ocelli black, eyes dark. Irregular depressed line near anterior margin of pronotum sometimes dark. Scutellum with two small black triangles basally. Elytra subhyaline, veins brownish. Inner margins of male plates dark.

Structure.—Rather robust. Vertex well produced, longer medially than laterally. Elytra relatively broad, second cross vein between sectors usually absent.

External genitalia.—Last ventral segment of female short, about $1\frac{1}{2}$ times as long as preceding segment, posterior margin nearly truncate but slightly notched medially and faintly sinuate between notch and lateral margin. Male valve broad and very short, often hidden by last segment. Plates together short and broad, width near apex greater than at base and nearly equaling length, length of inner margins of plates exceeding that of outer margins. Pygofer inclosing base of plates laterally and slightly exceeding plates in length.

Internal male genitalia.—Posterior portion of style stout, curved laterally and twisted downward, outer point well produced and sharp, inner point rounded, inner margin serrate on curved portion. Ventral tooth of style stout, slightly hooked.

The peculiar twisted style of the male genitalia will distinguish this species from all others in the genus except *californica*, from which it may be distinguished by the smaller size and more robust form.

This is one of the most common species of *Aceratagallia* in the Mississippi Valley, the eastern part of the United States, and southern Canada, its range extending west into Colorado and Texas. It has long been known as *cinerea* Osborn and Ball because the type series of Osborn and Ball's *cinerea* contained specimens of this species from Iowa. It was treated as *cinerea* by DeLong and Davidson (12), and no doubt many eastern records under that name should be placed here, since true *cinerea*, judging from the many examples at hand, does not occur east of the Rocky Mountains.

The writer has taken both nymphs and adults in abundance from the common ragweed, *Ambrosia artemisiifolia* L., in the vicinity of Washington, D.C. In this locality, at least, this seems to be the normal food plant.

Holotype male, allotype female, and many paratypes of both sexes from Washington, D.C., September 11, 1932, collected on *Ambrosia artemisiifolia* by the writer. Other paratypes from the same locality and host, August 28, 1932, and from Greenwood County, Kans., August 2, 1923, R. H. Beamer and P. B. Lawson. Holotype, allotype, and paratypes in the United States National Museum collec-

tion (catalog no. 44002) and in the collections of the University of Kansas and E. D. Ball.

ACERATAGALLIA FUSCSCRIPTA n.sp.

(Fig. 11, S, T, U; fig. 18, I; pl. 4, L)

Aspect of *A. vulgaris*, with the male plates about as in that species, but the styles of the internal male genitalia closely resembling those of *A. sanguinolenta*. Length of male 2.5–2.75 mm, of female 2.5–3 mm.

Color.—Brownish cinereous. Face pale, sometimes pinkish, antennal pits dark and sides of frons marked with short brown lines. Eyes dark, black spots on vertex above ocelli slightly elongate. Pronotum with faint longitudinal brownish stripes; depressed anterior submargin with a pair of fuscous spots and sometimes a pair of dashes. Basal triangular spots on scutellum deep black. Elytra subhyaline, veins mostly brown but partly whitish basally and on the clavus. Apices of male plates black.

Structure.—Less robust than *vulgaris*, males sometimes slightly more slender than females. Vertex well produced, longer medially than next the eye. Pronotum short, slightly concave behind. Elytra extending well beyond tip of abdomen, quite slender in males, second cross vein between sectors nearly always present.

External genitalia.—Last ventral segment of female $1\frac{1}{2}$ times as long as preceding segment, lateral angles rounded, posterior margin slightly notched medially. Male valve rather short, but longer than that of *vulgaris*, anterior and posterior margins parallel, lateral margins oblique. Plates resembling those of *vulgaris* but with lateral margins convex rather than straight, width at apex not exceeding that at base, and tips more truncate than in that species. Plates nearly equal to pygofer in length.

Internal male genitalia.—Posterior portion of style rather short, outer point strongly produced, inner point obsolete, apical portion about as in *A. sanguinolenta*, inner margin serrate along apical one half. Ventral tooth of style small and obscure. Aedeagus short, tip blunt.

This is apparently the most common species of the genus in the northwestern part of the United States. It might easily be confused with *vulgaris*, but the styles of the internal male genitalia will distinguish these two, whereas it may be distinguished from *A. inconspicua* and *A. sanguinolenta* by the shape of the male plates.

Holotype male and allotype female from Grand Teton National Park, Wyo., August 18, 1931, R. H. Beamer. Paratypes, a great many specimens of both sexes with the data given above and others from Northgate, Colo., August 20, 1931, R. H. Beamer; Bennett, Mont., August 12, 1931, J. O. Nottingham; Burley, Idaho, July 16, 1931, R. H. Beamer; Murtaugh, Idaho, June 21, 1930, D. M. DeLong; and Lylton, British Columbia, August 2, 1931, R. H. Beamer. There are also specimens at hand in small series from other localities in Washington, Oregon, Idaho, Montana, Colorado, and British Columbia. Holotype, allotype, and paratypes in the University of Kansas collection; paratypes in the United States National Museum collection (catalog no. 44003) and the collections of E. W. Davis, E. D. Ball, and D. M. DeLong.

ACERATAGALLIA CURVATA n.sp.

(Fig. 11, P, Q, R; fig. 18, E, F; pl. 3, G)

Pale, rather robust, the female genital segment often shallowly excavated, the male plates broad. Stoutest and paler than *A. uhleri*. Length of male 2.75–3 mm, of female 3–3.25 mm.

Color.—Typically uniformly pale yellowish white, occasionally darker. Front faintly tinged with pink to brown. Spots on vertex above ocelli usually very small, but larger in the dark specimens. Triangular black spots at base of scutellum small, the anterior portion showing through the semitransparent pronotum. Elytra hyaline to whitish, veins obscure or sometimes brownish. Hind wings whitish, veins distinct. Tips of male plates blackish.

Structure.—Robust, but not so much so as *bigeloviae*. Vertex moderately produced, slightly longer medially than laterally. Posterior margin of pronotum nearly straight or slightly angularly concave. Elytra broad and short, sometimes barely exceeding the abdomen in length. Second cross vein between sectors usually present.

External genitalia.—Last ventral segment of female over twice as long as preceding segment, lateral margins straight, lateral angles produced and rounded, posterior margin shallowly, angularly excavated from lateral angles with a small median notch and the sides of the excavation sometimes faintly sinuate. Occasionally the excavation is of sufficient depth to resemble that of *uhleri*, but is normally much shallower. Male valve short, transverse, anterior and posterior margins parallel. Plates broad, broader than those of *A. uhleri*, united except on distal one third, slightly narrowed apically, lateral margins turned upward and exceeding inner margins in length, the tips of the plates thus appearing angularly excavated. Base of plates inclosed by pygofer laterally.

Internal male genitalia.—Posterior portion of style strongly curved laterally but not twisted and more broadly curved than in *californica*, outer point strongly produced and sharp, inner point short, slightly hooked, and sharp; inner margin coarsely serrate. Ventral tooth short and blunt, rather obscure. Aedeagus broadly curved, rather slender.

This species has evidently been confused with *A. uhleri*, as the writer has received from correspondents various specimens so labeled. However, the robust form and male genital characters will at once distinguish it from any other known species. Apparently of considerable importance as a truck-crop pest in California. This is the species treated as *uhleri* from that State by DeLong and Davidson (12) in their paper on the species of *Agallia* injurious to economic crops.

Holotype male and allotype female from Ashland, Oreg., September 7, 1897, A. Morse (C. F. Baker collection 2376). Paratypes, large numbers of both sexes from Ashland and Glendale, Oreg.; Tehama, Davis, Florin, Shasta County, Fresno, Chico, Bakersfield, El Centro, Santa Cruz, Santa Margarita, Lemoncove, Merced, Greenfield, Lodi, Tulare, Turlock, Salida, Hayward, and Sacramento, Calif., and Pintura, Utah. There are also specimens at hand from southern Nevada. Holotype, allotype, and paratypes in the United States National Museum collection (catalog no. 44000); paratypes in the collection of D. M. DeLong, Herbert Osborn, E. D. Ball, and the University of Kansas.

ACERATAGALLIA UHLERI (Van Duzee)

(Fig. 12, A, B, C; fig. 18, M, N; pl. 3, D)

This species was described by Van Duzee (40, p. 91) in 1894 as *Agallia uhleri*. More slender than *Aceteragallia sanguinolenta*, with the female genital segment deeply notched posteriorly. Length of male 3.25–3.5 mm, of female 3.5–3.75 mm.

Color.—General ground color brownish cinereous. Front pale yellowish, sides of frons occasionally with numerous short transverse brown lines. Spots on vertex above ocelli round and black. Sometimes vertex and pronotum with a faint grayish longitudinal stripe each side of median line. Irregular impressed line on anterior margin of pronotum usually dark. Scutellum with triangular basal spots black and transverse suture dark. Elytra subhyaline, sometimes fuscous along commissural line, veins dark except for occasional whitish portions basally and on clavi. Apices and inner submargins of male plates narrowly black.

Structure.—Less robust than *A. sanguinolenta*, approaching *A. lyrata* but smaller. Vertex slightly swollen between ocelli, longer medially than laterally,

posterior margin broadly and evenly rounded. Posterior margin of pronotum slightly concave. Elytra long, with three anteapical cells.

External genitalia.—Last ventral segment of female twice as long as preceding segment, lateral margins straight, lateral angles rounded, hind margin broadly, angularly excavated nearly half way to the base. Male valve rather short, transverse, lateral margins oblique, hind margin truncate. Plates heavy, lateral margins straight, slightly converging, tips truncate. Sides of plates curving slightly upward. Plates about equalling pygofer in length.

Internal male genitalia.—Posterior portion of style broad, tip truncate, outer point slightly produced, inner margin serrate. Ventral tooth of style sharp, very slightly hooked. Tip of aedeagus in lateral view sharply bent upward.

In his description of the species Van Duzee mentions, as localities in which it occurs, Colorado, Arizona, and California. The writer has seen no examples of *A. uhleri* from California, and it seems probable that Van Duzee's specimens from that State were *A. curvata*, a species which resembles *uhleri* closely in male genital characters and sometimes has the female genital segment rather deeply notched. *A. uhleri* is apparently the most common species of the genus in western Kansas and eastern Colorado, and occurs in great numbers on sugar beets, probably doing considerable damage. Its distribution seems to cover primarily the plains region west of the Mississippi, extending west into Utah and Arizona. Types in the collection of Iowa State College, Ames, Iowa. A female cotype from Arizona has been examined through the courtesy of Drake and Knight.

ACERATAGALLIA OBSCURA n. sp.

(Fig. 10, D, E, F; fig. 17, C, D; pl. 3, B)

Pale cinereous, much lighter and more robust than *A. lyrata*. Male plates somewhat lyrate but much shorter and stouter than those of *lyrata*. Length 3.25–3.5 mm.

Color.—Whole insect with a soiled appearance, paler than *lyrata*. Black spots on vertex above ocelli very small, usually slightly oval. Triangular spots on scutellum very small or obsolete, veins of elytra usually pale, occasionally partly brownish. Apices and inner margins of male plates black.

Structure.—About as in *A. arida* n. sp. Vertex moderately produced, slightly longer medially than next the eye. Elytra extending well beyond tip of abdomen, venation obscure, second cross vein between sections usually present.

External genitalia.—Last ventral segment of female about twice as long as preceding segment, lateral angles well produced and bluntly rounded, posterior margin notched medially and faintly sinuate each side of middle. Male valve short, anterior and posterior margins straight. Plates short and stout, extending downward with the tips bent up as are those of *arida* but even shorter and stouter and with the lateral margins concave. Plates not equalling pygofer in length and much shorter and stouter than those of *A. lyrata*.

Internal male genitalia.—Posterior portion of style broad and rather flat, apex obliquely truncate, outer point not greatly produced, inner point hooked downward, inner margin serrate. Ventral tooth of style moderately produced, less prominent than in *A. arida* and situated farther forward. Aedeagus strongly curved near tip.

This species, a truck-crop pest of considerable importance in California, has apparently been confused with *lyrata*, as it was treated as such by DeLong and Davidson, probably because of the somewhat lyrate male plates. True *lyrata* is primarily a mountain form and may be distinguished from this species by the fact that it is more slender and by the unique characters of both external and internal male genitalia.

Holotype male and allotype female from Davis, Calif., May 25, 1912, on sugar beets (*Beta vulgaris*), W. B. Parker. Paratypes, numerous specimens with the above data and many examples of both

sexes from Grant's Pass, Oreg.; Chico, Ontario, San Jose, Dublin, Lodi, Mount Eden, Davis, Elk Grove, and Greenfield, Calif. Holotype, allotype, and paratypes in the United States National Museum collection (catalog no. 43998); paratypes in the collections of D. M. DeLong, Herbert Osborn, E. D. Ball, and the University of Kansas.

ACERATAGALLIA ARIDA n. sp.

(Fig. 10, J, K, L; fig. 17, U, V; pl. 3, A)

Allied to *A. lyrata* and *A. obscura*, but with the male plates not at all lyrate. Length 3.25-3.75 mm.

Color.—About as in *A. lyrata* but often pale and with a dirty tinge. Face usually pale, marked with brown; often pinkish. The spots on the vertex over the ocelli comparatively small, sometimes rather elongate. Basal triangles of scutellum usually small, veins of elytra mostly dark.

Structure.—Rather robust. Vertex well produced, distinctly longer medially than next the eyes. Pronotum short, hind margin slightly concave. Elytra moderately long, second cross vein between sectors present.

External genitalia.—Last ventral segment of female about as in *A. sanguinolenta*, posterior margin notched medially and sinuate each side of median notch, lateral angles well produced, bluntly rounded. Male valve very short, sometimes almost covered by preceding abdominal segment, posterior margin truncate. Plates stout and compact, extending a little downward, the tips closely appressed and bent upward. Width at tips a little over one half basal width, tips not equaling pygofer in length. Plates more slender than those of *A. obscura* and with lateral margins straight or nearly so.

Internal male genitalia.—Posterior portion of style rather stout, slightly curved, outer point moderately produced, inner point stout and hooked, inner margin serrate on apical one half. Ventral tooth of style large, situated near apex. Aedeagus short, strongly curved near tip.

This species is probably most closely related to *obscura*, a California form which it resembles very closely. It may be distinguished from that species, however, by the difference in the male plates mentioned above and by the fact that the styles of the internal genitalia are not so broad and have the ventral tooth more pronounced and nearer the apex. Apparently a very common species in the arid region between the Rocky Mountains and the Sierra Nevada Mountains from Texas, Utah, and Colorado north into Montana and Idaho. Part of Carter's references to *sanguinolenta* (10, p. 54-55) apply to this species.

Holotype male and allotype female from Fort Collins, Colo., C. F. Baker collection (1811). Paratypes, a great many specimens of both sexes, taken on various dates by numerous collectors, from the following localities: Fort Collins, Steamboat Springs, Paonia, Mancos, Sloss, Grand Junction, and Durango, Colo.; Snowville, Ogden, Elsinore, Garland, Delta, Blue Creek, Logan, Magna, Collinston, Elberta, Provo, Grantsville, Richmond, Brigham, Rosette, Fielding, Richfield, and Monroe, Utah; Willow Creek, Stevensville, and Whitehall, Mont. Specimens at hand from Texas and Idaho also belong here. Holotype, allotype, and paratypes in the United States National Museum collection (catalog no. 43999); paratypes in the collections of E. W. Davis, E. D. Ball, D. M. DeLong, and the University of Kansas.

ACERATAGALLIA CURTA, n. sp.

(Fig. 9, A, B, C; fig. 16, O, P)

Allied to *A. obscura* in the shape of the male plates, but more robust and paler. Length 3-3.5 mm.

Color.—Uniform tawny; eyes, spots on vertex above ocelli, and tips of male plates, black. Ocelli pink.

Structure.—Very robust, pronotum short, elytra barely exceeding abdomen in length, second cross vein between sectors of elytra present.

External genitalia.—Last ventral segment of female similar to that of *obscura*. Male plates broader and flatter than those of *obscura*, the apices thick but not bent upward as in that species.

Internal male genitalia.—Posterior portion of style with both points obsolete, narrowing to apex, inner margin irregularly serrate. Ventral tooth short and hooklike. Dorsal spine of tenth segment unusually long and slender.

Usually it is not advisable to describe species in this genus from so few specimens, but the characters of the styles and male plates are so unique that only three males seemed sufficient.

Holotype male and allotype female from Tucson, Ariz., June 21, 1930, E. D. Ball, and 2 male paratypes from Mescal, Ariz., July 28, 1927, R. H. Beamer. Holotype and allotype in E. D. Ball's collection, 1 paratype in the University of Kansas collection, and 1 paratype in the United States National Museum collection (catalog no. 44651).

ACERATAGALLIA LYRATA (Baker)

(Fig. 11, G, H, I; fig. 17, S, T; pl. 4, K)

Described as *Agallia lyrata* by Baker (2, p. 199) in 1898. A large species with the male plates slender and lyrate. Length of male 3.5–4 mm, of female 3.5–3.75 mm.

Color.—Grayish brown, marked with fuscous and black. Front pale, faintly tinged with pinkish, frontal sutures and ends of transverse arcs on frons sometimes brown. Ocelli pinkish, vertex brownish laterally, bluish brown medially, spots above ocelli slightly oval and black, obliquely diverging anteriorly. Eyes dark with light margins. An indistinct, double, median stripe of fuscous on vertex and pronotum and two wider ones on each side on the posterior one half of the pronotum; a pair of round black spots in depressions near the anterior margin of pronotum, elongate depressions laterad and caudad of these also occasionally dark. Scutellum with black triangles at base; transverse suture and two spots anterior to transverse suture dark. Elytra subhyaline, narrowly fuscous along commissural line, claval veins white, except median portion of outer vein; veins of corium pale basally, dark beyond fork of first sector. Hind wings clear, veins dark. Abdomen above black, below tawny; male plates bluish, tips and inner margins black.

Structure.—More slender than *A. sanguinolenta*, the female slightly more robust than the male. Vertex distinctly longer medially than laterally, broadly and evenly rounded behind. Posterior margin of pronotum slightly angularly concave. Elytra long, second cross vein present.

External genitalia.—Last ventral segment of female $1\frac{1}{2}$ times as long as preceding segment, lateral angles slightly produced and rounding, posterior margin notched medially and faintly, concavely sinuate on each side between middle and lateral angles. Median notch variable, usually faint but sometimes quite deep. Male valve short, transverse, posterior margin convexly curved. Plates together of greatest width a short distance from base, then narrowing to a slender neck; apices slightly wider than neck, hind margins truncate, slightly shorter than heavy pygofer.

Internal male genitalia.—Posterior portion of style with outer point spurlike and situated anterior to apex of style, inner point blunt, inner submargin serrate below. Ventral tooth of style short and blunt, situated near apex.

Described from California, where it is quite common in the higher mountains. Ball (4, p. 128) placed this species as a synonym of *A. peregrinans* (Stål), but the writer agrees with Baker (3, p. 162) that Stål's *peregrinans* must surely be a composite species and that the name may apply to a Hawaiian form. The drawing of Stål's type by Madame Ekblom, published by Osborn (25, pl. 55, fig. 2), indicates

that the species belongs in the genus *Agallia* rather than in *Aceratagallia*, and is apparently closely related to several South American species. Berg (6, p. 276) refers to Argentinian specimens as *peregrinans*, but these may represent still another species. Specimens of *lyrata* at hand are from California, southern Oregon, southern Nevada, and Utah. Cotypes in the United States National Museum collection (catalog no. 43997).

ACERATAGALLIA GILLETTEI (Osborn and Ball)

(Fig. 12, G, H, I; fig. 18, G, H; pl. 2, L)

Described as *Agallia gillettei* by Osborn and Ball (28, p. 60) in 1898. General shape of *A. uhleri* but smaller, with the male plates tubular and the female genital segment broadly, angularly excavated behind. Length of male 2.75–3 mm, of female 3–3.25 mm.

Color.—Light brown, marked with dark brown and fuscous. Front pale, marked with brown on clypeus and sides of frons. Vertex brown next the eyes and with a round fuscous spot above each ocellus on anterior margin. An indistinct brown stripe each side of median line extending across vertex and pronotum. Pronotum with lateral submargins brown and four faint fuscous dots anteriorly. Scutellum with black triangles basally, transverse suture and central spots brown. Elytra subhyaline, veins, except on clavus and base of corium, dark. First two cells of clavus narrowly fuscous along commissural line. Tip of male plates dark.

Structure.—Less robust than *A. sanguinolenta*. Vertex very slightly longer medially than next the eye. Pronotum shallowly, roundly concave behind. Elytra rather broad, second cross vein present.

External genitalia.—Last ventral segment of female twice as long as preceding segment, lateral margins produced and lateral angles rounded, posterior margin excavated across entire width half way to the base. Excavation roughly a broad V-shape, becoming suddenly wider half the way from the bottom. Male valve with lateral margins straight and converging, anterior and posterior margins parallel, anterior margin nearly twice as wide as posterior margin. Plates slender, outer margins parallel and curved upward, the plates thus appearing tubular. Outer margins of plates notched near tip. Tips of plates curved upward and folded together caudally, exceeding pygofer.

Internal male genitalia.—Posterior portion of style very broad apically, outer point slightly longer than inner. Inner margin of styles serrate distally, outer submargins bearing a few fine hairs. Ventral tooth of style very blunt. Aedeagus short, spines of the anal tube collar long.

Described from Arizona. There are specimens at hand from numerous localities in that State and from Texas, Florida, and Mexico. DeLong and Davidson (12) also recorded this species from Florida. Cotypes examined. Types in the collection of Iowa State College, Ames, Iowa.

ACERATAGALLIA BIGELOVIAE (Baker)

(Fig. 12, D, E, F; fig. 18, K, L; pl. 2, I)

Baker (1, p. 26) described this species as an *Agallia* in 1896. Robust, the female genital segment divided into four lobes and the male plates resembling those of *A. gillettei*. Length 2.5–2.75 mm.

Color.—Pale cinereous to brown with fuscous to black markings. Face pale, frontal sutures, median line on clypeus, broken transverse bars on frons, and arcs between frons and vertex, fuscous to brown. Vertex next the eyes and each side of median line faintly brown; spots above ocelli black. Pronotum with depressed anterior submargin and six longitudinal stripes irregularly, and often indistinctly, fuscous. Basal triangles of scutellum black or sometimes obsolete. Elytra brownish or sometimes with a whitish bloom; veins, except on clavus and base of corium, fuscous. Clavus often with black marks. Inner margins of male plates black.

Structure.—Small and robust. Vertex strongly produced and somewhat tumid, a very little longer medially than next the eyes. Pronotum usually very short, hind margin nearly straight. Elytra broad, sometimes barely exceeding abdomen in length, usually longer; second cross vein between sectors usually present.

External genitalia.—Last ventral segment of female rather short, lateral margins straight, hind margin consisting of a pair of bluntly pointed lateral lobes and a smaller pair of lobes each side of the middle, the segment thus incised three times. Male valve short and transverse, shorter than in *A. gillettei*, lateral margins oblique, posterior margin concave. Plates long, slender, and curving, lateral margins turned up, tips appressed, narrower than in *A. gillettei* and turned upward less abruptly.

Internal male genitalia.—Posterior portion of style distinctly foot shaped, outer point much produced, inner point obsolete, inner margin serrate apically. Ventral tooth situated near apex. Aedeagus short, dorsal and ventral portions at right angles in lateral view.

The small size and the internal and external genital characters of the male will separate this species from other closely related forms. *A. bigeloviae* is much less common than the larger *A. dondia* n. sp.

Baker described *bigeloviae* from a single female from New Mexico. Specimens are at hand from Colorado, Texas, Arizona, Kansas, Utah, and Idaho. Type in the United States National Museum collection (catalog no. 44014).

ACERATAGALLIA LOBATA n. sp.

(Fig. 12, M, N, O; fig. 18, U, V)

Most closely allied to *A. bigeloviae* but longer and less robust. Length 2.75–3.25 mm.

Color.—Much darker than *bigeloviae*, almost identical in general markings with *gillettei*.

Structure.—In structure, aside from genital characters, as well as color, this species is almost identical with *gillettei*, but the vertex is a little more produced.

External genitalia.—Last ventral segment of female as in *bigeloviae*. Male plates also similar to those of *bigeloviae* but proportionately larger.

Internal male genitalia.—Posterior portion of style with inner and outer points about equal, apex not at all footlike, posterior margin obliquely subtruncate, slightly sinuate. Ventral tooth a little larger and situated more basad than in *bigeloviae*.

The differences in size and the form of the male styles are characters sufficient to distinguish this species from *bigeloviae*, the only one with which it is likely to be confused.

Holotype male from Glendale, Nev., May 5, 1929, D. E. Fox. Allotype female from Las Vegas, Nev., June 8, 1929, D. E. Fox. Paratypes, numerous specimens of both sexes from St. George, Utah; Mesquite and Glendale, Nev.; Sacaton, Yavapai County, and Santa Cruz County, Ariz.; and Alpine, Winters, San Diego County, and San Jacinto Mountains, Calif. The specimens of this species that were first received for identification were placed as *A. bigeloviae*, but subsequent studies established its distinctiveness. Holotype, allotype, and paratypes in the United States National Museum collection (catalog no. 44650); paratypes in the collections of the University of Kansas, E. D. Ball, and E. W. Davis.

ACERATAGALLIA APLOPAPPI n. sp.

(Fig. 12, P, Q, R; fig. 18, O, P; pl. 2, H)

Very robust, the female genital segment similar to that of *A. bigeloviae* but with lobes pointed; the male plates strongly curved, tips blunt and diverging. Length 2.75–3 mm.

Color.—General ground color pale yellowish. Front very faintly tinged with pink. Eyes dark, spots on vertex above ocelli black. Vertex and pronotum faintly longitudinally marked with brown. Scutellum sometimes with fuscous triangular spots basally. Elytra whitish, veins brown. Median pair of lobes of female genital segment brown, tips and posterior one half of inner margins of male plates smoky black.

Structure.—Short and broad, vertex strongly produced, rather tumid, very slightly longer medially than laterally. Head much wider than pronotum. Pronotum very short, anterior margin broadly rounded, posterior margin straight. Elytra short and broad, barely exceeding tip of abdomen in length in both sexes. Second cross vein between sectors present.

External genitalia.—Last ventral segment of female short, lateral margins straight, posterior margin angularly notched half way to the base medially and nearly to the base on each side, leaving two lateral and two median lobes, all bluntly pointed and closely appressed to the pygofer, the median pair appearing imbricated. Male valve rather narrow, about three times as wide as median length, lateral margins straight, obliquely converging, posterior margin concave. Plates arched downward, united and broad basally, narrowing gradually to near tips, then becoming slightly wider, tips diverging and bluntly rounded, exceeding pygofer in length. Pygofer covered laterally with fine whitish hairs.

Internal male genitalia.—Posterior portion of style somewhat foot shaped, outer point bluntly rounded, inner point scarcely produced, inner margin minutely serrate, outer margin and under side set with very fine straight hairs. Style without ventral tooth. Distal portion of aedeagus bent at right angles, short.

Superficially this species resembles *A. bigeloviae*, but is larger and easily distinguished by the genital characters of both sexes. All the specimens of the large series at hand are very light, but darker forms may be expected.

Holotype male and allotype female from Pima County, Ariz., July 27, 1927, R. H. Beamer. Paratypes, many specimens of both sexes from the same locality and from Mescal, Maricopa County, Phoenix, Tempe, Benson, Coconino County, and Tucson, Ariz.; and Belen, N. Mex. E. D. Ball reports that this species is taken commonly on *Aplopappus*, and this is no doubt the normal host. Holotype, allotype, and paratypes in the collection of the University of Kansas; paratypes in the United States National Museum collection (catalog no. 44015) and in the collections of E. D. Ball and Kansas State College.

ACERATAGALLIA DONDIA n. sp.

(Fig. 12, J, K, L; fig. 18, W, X; pl. 2, G)

Robust, but much larger than *A. bigeloviae*, and with the apices of the male styles much more convex. Length of male 3.25–3.5 mm, of female 3.5–3.75 mm.

Color.—Light yellowish brown, marked with brown and fuscous, about as in *A. bigeloviae*. Very pale specimens may have only the black spots on vertex and scutellum.

Structure.—General proportions about as in *bigeloviae*, vertex a little less produced but distinctly longer medially than next the eye. Pronotum short, posterior margin shallowly concave. Elytra long, extending well beyond abdomen, second cross vein between sectors present.

External genitalia.—Last ventral segment of female as in *bigeloviae*, with the hind margin 4-lobed. Male valve rather short and transverse, posterior margin truncate, lateral margins oblique. Plates slender, closely appressed, tapering to slender tips, lateral margins curved upward and tips bent broadly upward behind. Plates more tapering than in *bigeloviae* and more slender than in the following species.

Internal male genitalia.—Posterior portion of style long, tip club shaped, outer point well produced and sharp, inner points more produced than in *A. bigeloviae*, inner margin serrate on apical one half, very coarsely so distally, apex broadly, convexly rounded, ventral tooth of style situated near apex, large and slightly hooked. Aedeagus proportionately small, abruptly bent at right angles medially.

This form is very closely related to *A. bigeloviae*, but because of the genital characters and the great difference in size it can hardly be considered the same. Most references in literature to *bigeloviae* probably apply to this species, the commonest species of the *bigeloviae* group.

Holotype male and allotype female from Thermal, Calif., February 14, 1913, from *Dondia* sp., H. O. Marsh. Paratypes, numerous specimens of both sexes from the same locality and from Ontario, Calif.; Overton, Glendale, and Las Vegas, Nev.; Tucson and Sacaton, Ariz. Specimens also at hand from Colorado. Most of the specimens at hand are from *Dondia*, evidently the normal host. Holotype, allotype, and paratypes in the United States National Museum collection (catalog no. 44016); paratypes in the collections of the University of Kansas, E. D. Ball, E. W. Davis, and Colorado State College.

ACERATAGALLIA VASTITATIS n.sp.

(Fig. 12, S; fig. 18, Q, R)

Superficially identical with *A. dondia*, but with the male plates broader and scarcely or not at all narrowed apically. Length 3.5-3.75 mm.

Color.—About as in very pale examples of *dondia*, but darker specimens may be expected. In the specimens at hand the inner margins of the male plates are not black.

Structure.—Slightly less robust and with the vertex less produced than in *dondia*. Elytra extending well beyond apex of abdomen, the tips, especially of the males, flaring. Second cross vein between sectors present.

External genitalia.—Female genital segment apparently identical with that of *A. dondia*, but male valve longer than in that species and male plates broader, less tapering, and with the lateral margins not so much reflexed upward.

Internal male genitalia.—Posterior portion of style intermediate in character between *dondia* and *aplopappi*, apex foot shaped, outer point broad and bluntly rounded, inner point scarcely produced, inner margin very finely serrate near apex, outer submargin below bearing a few very fine hairs. Ventral tooth of style situated near apex as in *dondia* but much smaller than in that species.

This form is much less common than the preceding one. It probably occurs on *Pluchea sericea*. Holotype male and allotype female from Lund, Utah, July 13, 1928, E. W. Davis. Paratypes, numerous specimens of both sexes from St. George and Lund, Utah; Overton and Glendale, Nev.; and Littlefield, Ariz. Types in the United States National Museum collection (catalog no. 44017) and the collection of E. W. Davis.

ACERATAGALLIA TERGATA (Var. Duzee)

(Fig. 13, A, B, C; fig. 18, Y, Z)

Described as an *Agallia* by Van Duzee (44, p. 172) in 1923. Robust, allied to *A. dondia*, but smaller and without the black spots on the vertex. Length 3-3.25 mm.

Color.—General ground color pale dirty cinereous, covered with a whitish bloom. Head and anterior margin of pronotum tinged with yellowish orange, eyes dark. Elytra whitish, venation obscure. Median portion of female genital segment and inner margins of male plates brown.

Structure.—Quite robust, vertex well produced and distinctly longer medially than next the eyes. Pronotum short, posterior margin broadly and shallowly excavated. Elytra short and broad, second cross vein between sectors present.

External genitalia.—Last ventral segment of female with posterior margin incised three times nearly to the base, making four lobes, the outer ones larger and blunt, the inner pair short and pointed. Male valve transverse, rather short, posterior margin slightly concave, lateral margins oblique. Plates broad,

lateral margins curved upward and narrowing slightly to upturned tips which exceed pygofer in length. Plates inclosed by pygofer laterally at base.

Internal male genitalia.—Posterior portion of style slender and sinuately curved, outer point broad, but narrowing and with apex sharp, inner point scarcely produced, entire tip boot shaped, inner margin serrate posteriorly, outer submargin bearing slender hairs above. Ventral tooth of style prominent. Style much as in *A. vastitatis* but with shank more curved, outer point sharper, and ventral tooth situated farther from the apex.

Although closely related to the other species of the *bigeloviae* group, this form should be easily identified by the whitish bloom and the absence of the black spots on the vertex. Described from Tortuga Island and San Marcos Island, Gulf of California. Mr. Van Duzee collected his type series on *Encelia*, which is probably the normal host. There are also specimens at hand from Arizona. Paratypes examined through the kindness of Mr. Van Duzee. Types in collection of California Academy of Science; paratypes in United States National Museum collection (catalog no. 44018).

The genus AGALLIANA new genus

Form and general aspect of *Aceratagallia*, but with the surface of the pronotum coarsely punctate instead of transversely striated and with the styles of the male genitalia forked posteriorly.

Vertex short and of almost uniform length, with a pair of dark spots on the posterior margin above the ocelli. Pronotum with anterior margin broadly and evenly curved, lateral margins short, posterior margin nearly straight, the entire surface, except the lateral margins and the anterior margin laterally, marked with small round, or sometimes transversely elongate pits, which are usually black. Elytra longer than abdomen, without appendices; venation distinct, each elytron with four apical and three anteapical cells. Ovipositor of female exceeding pygofer in length. Internal male genitalia with the styles forked posteriorly, spine of tenth segment large, either forked or single.

Type of the genus, *Bythoscopus sticticollis* Stål.

At present only the above-named species is included in this genus, but several apparently unnamed forms from South America also belong here.

AGALLIANA STICTICOLLIS (Stål)

(Fig. 13, D, E, F; fig. 18, S, T; pl. 3, L)

Stål (34, p. 291) described this species in 1859 as a *Bythoscopus*. It was described again in 1895 by Uhler (37, p. 81) as *Agallia ustulata* and again in 1923 by DeLong and Wolcott (Wolcott, 45, p. 258) as *Agallia carotovora*. Resembling *Aceratagallia sanguinolenta* in form but pronotum with many tiny, circular pits. Length 3.25–3.5 mm.

Color.—Yellowish brown to brown, marked with fuscous. Frontal sutures, antennal pits, tips of transverse arcs on frons, arms of inverted Y, and narrow, double median line on vertex and sides of vertex next eyes varying from brown to fuscous. Spots on posterior margin of vertex above ocelli black. Entire surface of pronotum with black points except anterior margin laterally, these areas margined behind by brown or fuscous. Scutellum with basal angles and sometimes median stripe dark. Elytra brown to subhyaline with veins black or correspondingly darker, except first sector of clavus, tip of second sector of clavus, claval suture basally and apically, and a portion of base of radius. Edges of notch in posterior margin of female genital segment brown.

Structure.—Vertex subangularly rounded, slightly longer medially than next the eyes. Pronotum except anterior margin laterally covered with shallow,

pitlike depressions. Hind margin of pronotum slightly angularly concave. Elytra long, second cross vein present.

External genitalia.—Last ventral segment of female nearly twice as long as preceding segment, lateral angles produced and subangularly rounded, hind margin shallowly concave with a median v-shaped notch. Male valve rather short and transverse. Plates nearly parallel sided, slightly broadened basally and gradually rounded distally, slightly exceeding pygofer in length.

Internal male genitalia.—Aedeagus in lateral view stout and short, near the tip bearing a pair of lateral spines that curve sharply downward. The position of these spines varies from near the tip to almost the middle of the distal portion of the aedeagus. Dorsal spine of tenth segment appearing as a long, straight spine in lateral view but in caudal aspect forked, with the inner fork the shorter of the two. Styles ending caudally in two parts, the inner foot shaped, the outer blunt.

Described from Rio de Janeiro. There are specimens at hand from the States of Rio de Janeiro, Minas Geraes, Matto Grosso, Amazonas, and Pernambuco, Brazil; and from British Guiana, Trinidad, Tobago, St. Vincent, Dominican Republic, Puerto Rico, and Cuba. The specimens of this long series agree in every respect except that the position of the lateral spines on the aedeagus seems to be variable and the character evidently has no specific significance. In general the spines are nearer the tip of the aedeagus in specimens from the Greater Antilles and nearer the middle of the distal portion in examples from Rio de Janeiro, while those from intervening localities are intermediate in position. Osborn (24, p. 12) has identified a specimen from Bolivia as *A. sticticollis* (Stål), but specimens at hand from Bolivia and Argentina, while superficially very like those from Rio de Janeiro, differ markedly in internal male genitalia and slightly in size, coloring, and external male genitalia. Since Stål's specimens were from Brazil, it is probable that the Bolivian and Argentine specimens represent an unnamed form, while Stål's name should be applied to the species here described and figured. Type probably lost. O. Lundblad states that the type is not in the Stockholm Museum at Stockholm, Sweden.

LITERATURE CITED

- (1) BAKER, C. F.
1896. NEW HOMOPTERA RECEIVED FROM THE NEW MEXICO AGRICULTURAL EXPERIMENT STATION 2. *Psyche* 7, sup. 12:24-26.
- (2) ———
1898. SOME NEW BYTHOSCOPIINAE WITH NOTES ON OTHERS. *Psyche* 8:197-201.
- (3) ———
1901. NOTES ON MACROPSIS AND AGALLIA (JASSIDAE). *Psyche* 9:151-153.
- (4) BALL, E. D.
1900. NOTES ON THE SPECIES OF MACROPSIS AND AGALLIA OF NORTH AMERICA. *Psyche* 9:126-130.
- (5) ———
1909. SOME INSECTS INJURIOUS TO TRUCK CROPS. IV. THE LEAFHOPPERS OF THE SUGAR BEET AND THEIR RELATION TO THE "CURLY-LEAF" CONDITION. U.S. Dept. Agr., Bur. Ent. Bul. 66 (pt. 4):33-52, illus.
- (6) BERG, C.
1879. HEMIPTERA ARGENTINA, ENUMERAVIT SPECIESQUE NOVAS DESCRIPSIT. 316 p. [Reprinted from An. Soc. Cient. Argentina, v. 7-8, 1878-79.]
- (7) ———
1881. SINONIMIA Y DESCRIPCION DE ALGUNOS HEMIPTEROS DE CHILE, DEL BRASIL Y DE BOLIVIA. An. Soc. Cient. Argentina 12: [259]-272.
- (8) ———
1884. ADDENDA ET EMENDANDA AD HEMIPTERA ARGENTINA. 213 p. [Reprinted from An. Soc. Cient. Argentina, v. 16-17, 1883-84.]

- (9) ———
1895. HEMIPTEROS DE LA TIERRA DEL FUEGO. COLECCIONADOS POR EL SEÑOR CARLOS BACKHAUSEN. An. Mus. Nac. Hist. Nat. Buenos Aires 4 : [195]-206.
- (10) CARTER, W.
1930. ECOLOGICAL STUDIES OF THE BEET LEAF HOPPER. U.S. Dept. Agr. Tech. Bul. 206, 115 p., illus.
- (11) CURTIS, J.
1833. CHARACTERS OF SOME UNDESCRIBED GENERA AND SPECIES, INDICATED IN THE "GUIDE TO AN ARRANGEMENT OF BRITISH INSECTS." Ent. Mag. 1:186-199.
- (12) DeLONG, D. M., AND DAVIDSON, R. H.
1931. THE GENUS AGALLIA—EXTERNAL CHARACTERS USED TO DISTINGUISH THE SPECIES INJURING ECONOMIC CROPS. Ohio Jour. Sci. 31: 377-385, illus.
- (13) FAWCETT, G. L.
1925. ENCRESPAMIENTO DE LAS HOJAS DE LA REMOLACHA AZUCARERA. Rev. Indus. y Agri. de Tucumán 16 : [39]-46, illus.
- (14) ———
1927. THE CURLY TOP OF SUGAR BEET IN THE ARGENTINE. Phytopathology 17 : 407-408.
- (15) FORBES, S. A.
1885. 14TH REPORT OF THE STATE ENTOMOLOGIST ON THE NOXIOUS AND BENEFICIAL INSECTS OF THE STATE OF ILLINOIS [REPORT FOR 1884]. 136 p., illus.
- (16) GIBSON, E. H.
1916. THE CLOVER LEAFHOPPER AND ITS CONTROL IN THE CENTRAL STATES. U.S. Dept. Agr. Farmers' Bul. 737, 8 p., illus.
- (17) HENDERSON, C. F.
1928. EXPLORATION IN THE ARGENTINE REPUBLIC FOR PARASITES OF THE BEET LEAFHOPPER, EUTETTIX TENELLUS (BAKER). Jour. Econ. Ent. 21: 863-871, illus.
- (18) KIRKALDY, G. W.
1907. LEAFHOPPERS-SUPPLEMENT (HEMIPTERA). Hawaii. Sugar Planters' Assoc. Expt. Sta., Div. Ent. Bul. 3, 186 p., illus.
- (19) LATHROP, F. H.
1917. A PRELIMINARY LIST OF THE CICADELIDAE (HOMOPTERA) OF SOUTH CAROLINA, WITH DESCRIPTIONS OF NEW SPECIES. Ohio Jour. Sci. 17:119-131, illus.
- (20) ———
1919. THE CICADELIDAE OR LEAF-HOPPERS OF SOUTH CAROLINA. S.C. Agr. Expt. Sta. Bul. 199, 119 p., illus.
- (21) LAWSON, P. B.
1920. THE CICADELIDAE OF KANSAS. Kans. Univ. Sci. Bul. (whole ser. 22, no. 1) 12, no. 1, 306 p., illus.
- (22) OLSEN, C. E.
1922. A NEW SPECIES OF AGALLIA (A. LINGULATA N. SP.), WITH NOTES ON OTHER CICADELIDAE. Bul. Brooklyn Ent. Soc. 17:127-131, illus.
- (23) OSBORN, H.
1912. LEAFHOPPERS AFFECTING CEREALS, GRASSES, AND FORAGE CROPS. U.S. Dept. Agr., Bur. Ent. Bul. 108, 123 p., illus.
- (24) ———
1923. NEOTROPICAL HOMOPTERA OF THE CARNEGIE MUSEUM. PART 1. REPORT UPON THE UNDESCRIBED SPECIES OF AGALLIA AND IDIOCERUS FROM TROPICAL AMERICA CONTAINED IN THE CARNEGIE MUSEUM, 1920. Ann. Carnegie Mus. 15 (1):8-26, illus.
- (25) ———
1924. NEOTROPICAL HOMOPTERA OF THE CARNEGIE MUSEUM. PARTS 3 AND 4. REPORT UPON THE COLLECTIONS IN THE SUBFAMILY BYTHOSCOPIINAE, WITH DESCRIPTION OF NEW SPECIES. Ann. Carnegie Mus. 15:383-462, illus.
- (26) ———
1926. FAUNISTIC AND ECOLOGIC NOTES ON CUBAN HOMOPTERA. Ann. Ent. Soc. Amer. 19:335-366, illus.
- (27) ———
1929. NOTES ON PORTO RICAN HOMOPTERA. Jour. Dept. Agr. Porto Rico 13:81-112, illus.

- (28) ——— AND BALL, E. D.
1899. STUDIES OF NORTH AMERICAN JASSOIDEA. Davenport Acad. Nat. Sci. Proc. (1897-99) 7:45-100, illus.
- (29) POOS, F. W.
1929. LEAFHOPPER INJURY TO LEGUMES. Jour. Econ. Ent. 22:146-153, illus.
- (30) PROVANCHER, L.
1872. DESCRIPTION DE PLUSIERS HÉMIPTÈRES NOUVEAUX. Nat. Canad. 4:73-79, 103-108, 319-320, 350-352, 376-379.
- (31) SAY, T.
1830-31. DESCRIPTIONS OF NEW NORTH AMERICAN HEMIPTEROUS INSECTS, BELONGING TO THE FIRST FAMILY OF THE SECTION HOMOPTERA OF LATREILLE. Jour. Acad. Nat. Sci. Phila. 6:235-244, 299-314. (Reprinted in The Complete Writings of Thomas Say on the Entomology of North America, [etc.] 1859.)
- (32) SCOTT, J.
1874. ON CERTAIN BRITISH HEMIPTERA-HOMOPTERA. Ent. Mo. Mag. 10:235-242.
- (33) SEVERIN, H. H. P., AND HENDERSON, C. F.
1928. BEET LEAFHOPPER, EUTETTIX TENELLUS (BAKER), DOES NOT OCCUR IN THE ARGENTINE REPUBLIC. Jour. Econ. Ent. 21:542-544.
- (34) STÅL, C.
1859. HEMIPTERA. K. Svenska Fregatten Eugenies resa omkring Jorden under befäl af C. A. Virgin Åren 1851-1853, v. 2, Zoologi, pt. 4, Insekter, p. 219-298, illus.
- (35) ———
1858-60. BIDRAG TILL RIO JANEIRO-TRAKTENS HEMIPTERA-FAUNA. K. Svenska Vetensk. Akad. Handl. (n. F.) 2, no. 7, 84 p., 1858; 3, no. 6, 75 p., 1860.
- (36) UHLER, P. R.
1876. LIST OF HEMIPTERA OF THE REGION WEST OF THE MISSISSIPPI RIVER, INCLUDING THOSE COLLECTED DURING THE HAYDEN EXPLORATIONS OF 1873. U.S. Dept. Int., Geol. and Geogr. Survey Bul. 5 (n.s.): [269]-361, illus.
- (37) ———
1895. AN ENUMERATION OF THE HEMIPTERA-HOMOPTERA OF THE ISLAND OF ST. VINCENT, W. I. Zool. Soc. London, Proc. 1895: 55-84.
- (38) VAN DUZEE, E. P.
1890. NEW CALIFORNIA HOMOPTERA. Ent. Amer. 6:35-38.
- (39) ———
1892. A SYNOPTICAL ARRANGEMENT OF THE GENERA OF THE NORTH AMERICAN JASSIDAE, WITH DESCRIPTIONS OF SOME NEW SPECIES. Amer. Ent. Soc. Trans. 19:295-307.
- (40) ———
1894. NEW NORTH AMERICAN HOMOPTERA—NO. VII. Canad. Ent. 26:89-93.
- (41) ———
1907. NOTES ON JAMAICAN HEMIPTERA. A REPORT ON A COLLECTION OF HEMIPTERA MADE ON THE ISLAND OF JAMAICA IN THE SPRING OF 1906. Bul. Buffalo Soc. Nat. Sci. 8, no. 5, 97 p.
- (42) ———
1909. OBSERVATIONS ON SOME HEMIPTERA TAKEN IN FLORIDA IN THE SPRING OF 1908. Bul. Buffalo Soc. Nat. Sci. 9:[149]-230, illus.
- (43) ———
1917. CATALOGUE OF THE HEMIPTERA OF AMERICA NORTH OF MEXICO, EXCEPTING THE APHIDIDAE, COCCIDAE, AND ALBURODIDAE. Calif. Univ. Pubs., Tech. Bul., v. 2, 902 p.
- (44) ———
1923. EXPEDITION OF THE CALIFORNIA ACADEMY OF SCIENCE TO THE GULF OF CALIFORNIA IN 1921. THE HEMIPTERA (TRUE BUGS, ETC.). Calif. Acad. Sci. Proc. (4) 12:[123]-200.
- (45) WOLCOTT, G. N.
1923. "INSECTAE PORTORICENSIS." A PRELIMINARY ANNOTATED CHECK-LIST OF THE INSECTS OF PORTO RICO, WITH DESCRIPTIONS OF SOME NEW SPECIES. Jour. Dept. Agr. Porto Rico 7:1-313, illus.

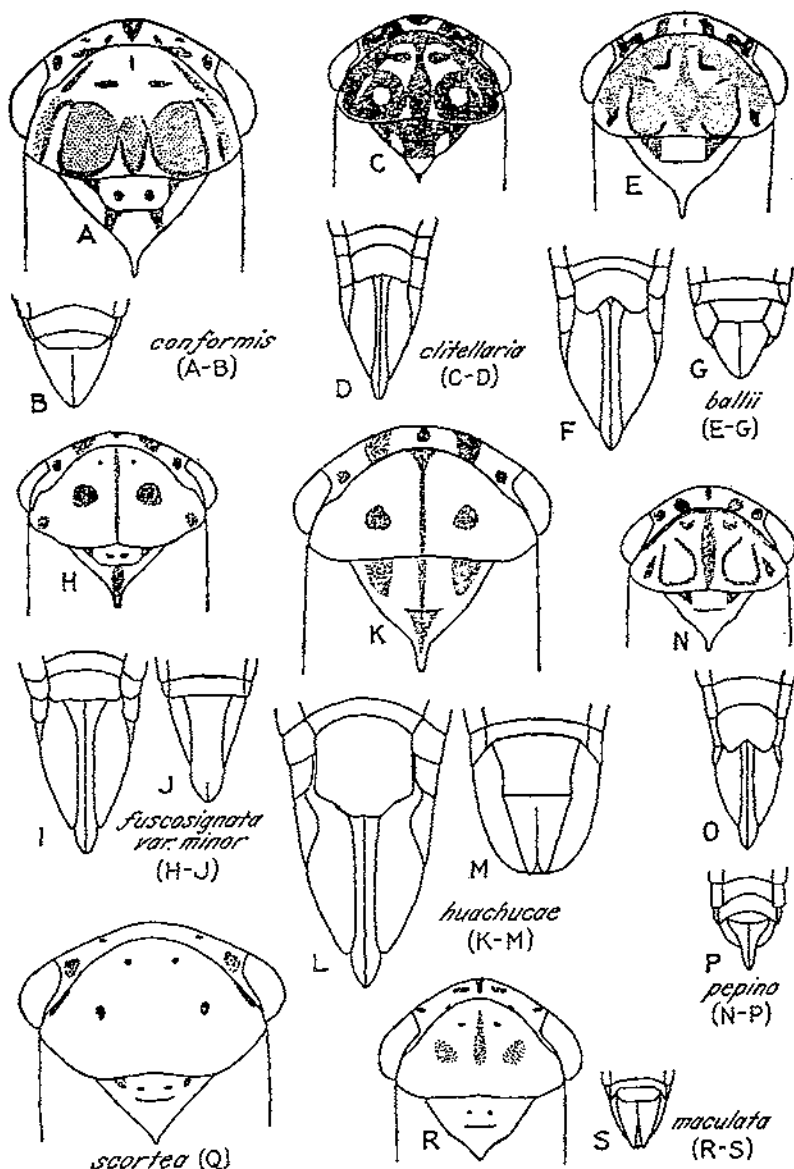


FIGURE 1.—External details of *Agalliopsis* spp.: A, Head and thorax, and B, male genitalia, of *A. conformis*; C, head and thorax, and D, female genitalia, of *A. clitellaria*; E, head and thorax, F, female genitalia, and G, male genitalia, of *A. ballii*; H, head and thorax, I, female genitalia, and J, male genitalia, of *A. fuscicornis* var. *minor*; K, head and thorax, L, female genitalia, and M, male genitalia, of *A. huachucae*; N, head and thorax, O, female genitalia, and P, male genitalia, of *A. pepino*; Q, head and thorax of *A. scortei*; R, head and thorax, and S, male genitalia, of *A. maculata*.

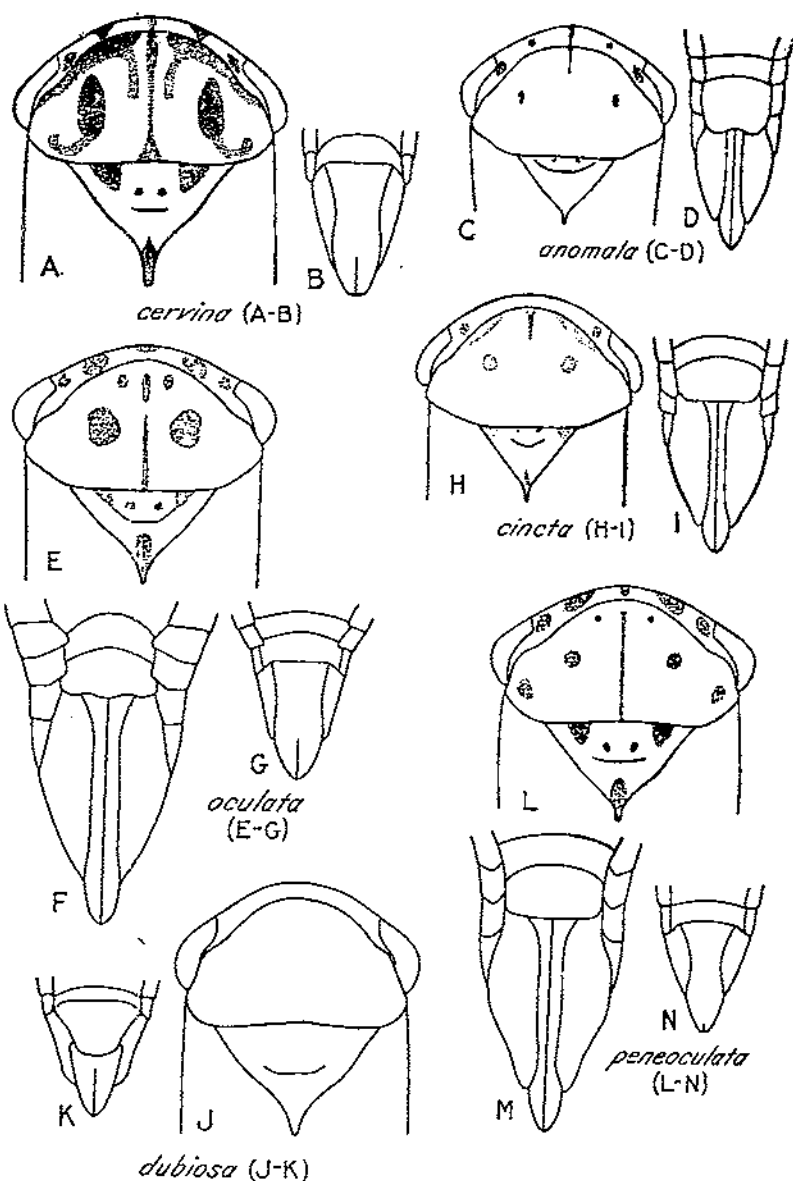


FIGURE 2.—External details of *Agalliopsis* spp.: A, Head and thorax, and B, male genitalia, of *A. cervina*; C, head and thorax, and D, female genitalia, of *A. anomala*; E, head and thorax, F, female genitalia, and G, male genitalia, of *A. oculata*; H, head and thorax, and I, female genitalia, of *A. cincta*; J, head and thorax, and K, male genitalia, of *A. dubiosa*; L, head and thorax, M, female genitalia, and N, male genitalia, of *A. peneoculata*.

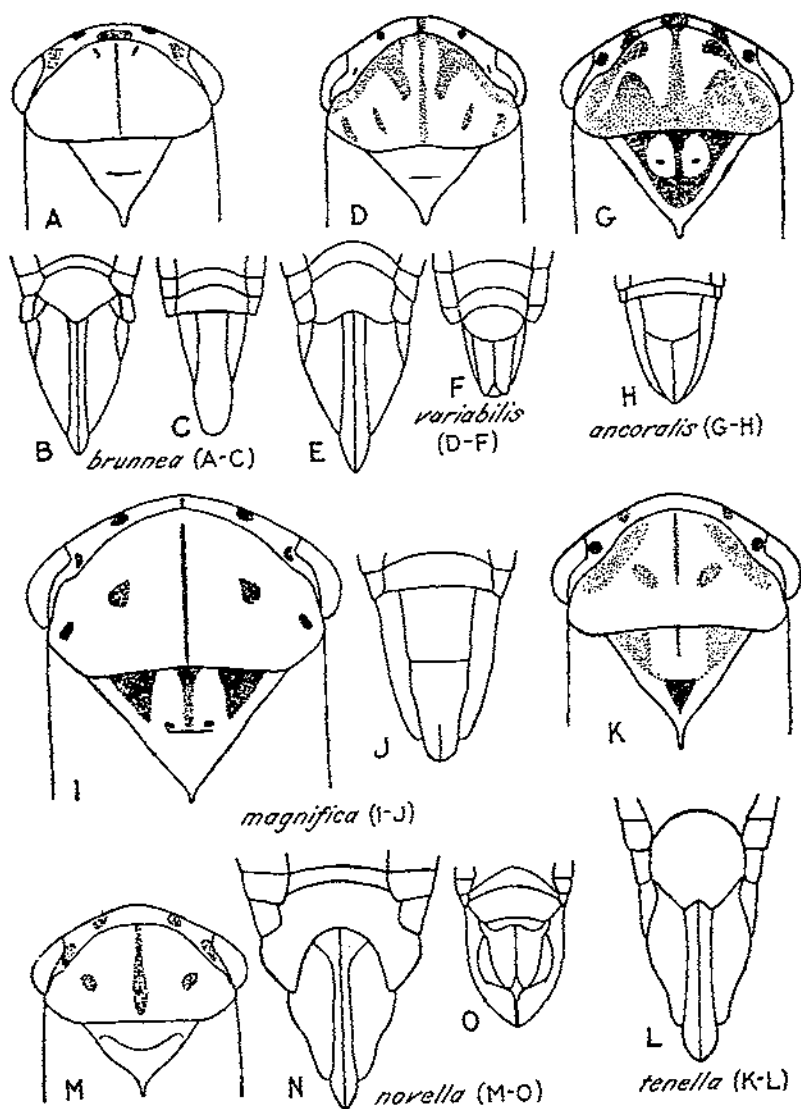


FIGURE 3.—External details of *Agalltopsis* spp.: A, Head and thorax, B, female genitalia, and C, male genitalia, of *A. brunnea*; D, head and thorax, E, female genitalia, and F, male genitalia, of *A. variabilis*; G, head and thorax, and H, male genitalia, of *A. ancoralis*; I, head and thorax, and J, male genitalia, of *A. magnifica*; K, head and thorax, and L, female genitalia, of *A. tenella*; M, head and thorax, N, female genitalia, and O, male genitalia, of *A. novella*.

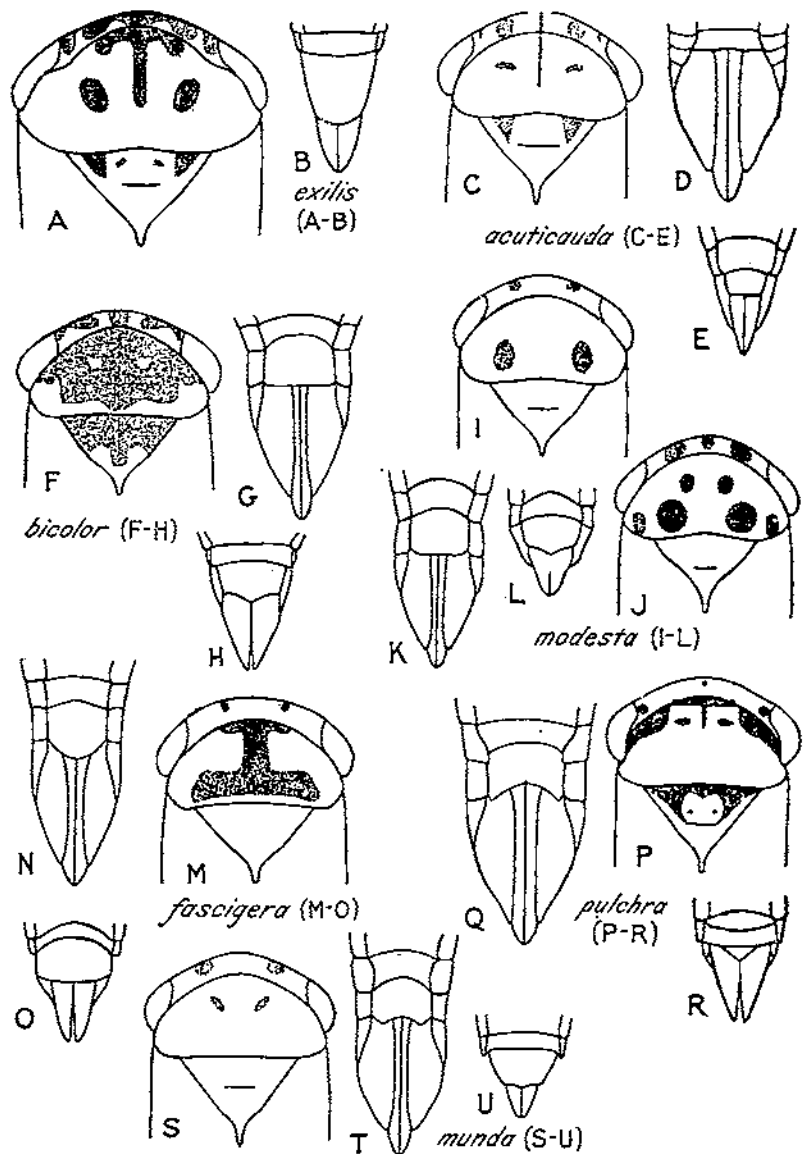
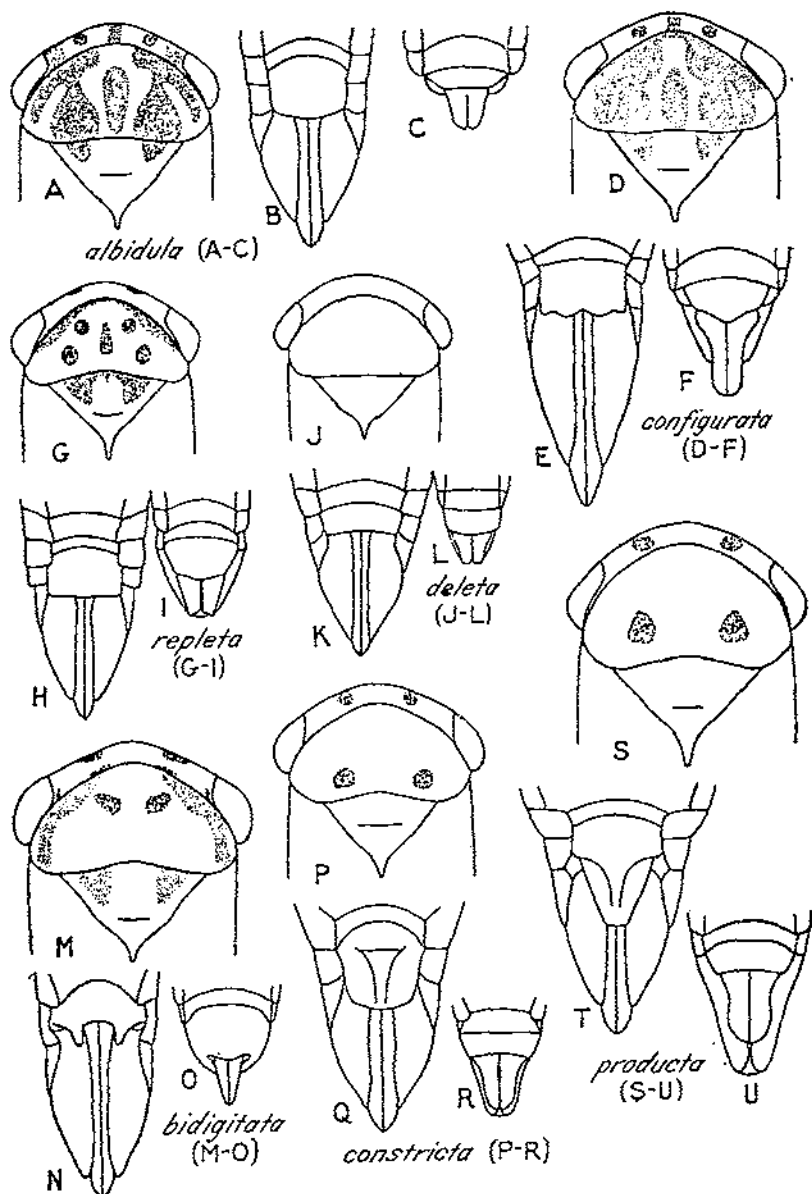


FIGURE 4.—External details of *Agalliptopsis exilis* and *Agallia* spp.: A, Head and thorax, and B, male genitalia, of *A. exilis*; C, head and thorax, D, female genitalia, and E, male genitalia, of *Agallia acuticauda*; F, head and thorax, G, female genitalia, and H, male genitalia, of *A. bicolor*; I, head and thorax, J, same showing variation in color pattern, K, female genitalia, and L, male genitalia, of *A. modesta*; M, head and thorax, N, female genitalia, and O, male genitalia, of *A. fascigera*; P, head and thorax, Q, female genitalia, and R, male genitalia, of *A. pulchra*; S, head and thorax, T, female genitalia, and U, male genitalia, of *A. munda*.



FIGURES 5.—External details of *Agallia* spp.: A, head and thorax, B, female genitalia, and C, male genitalia, of *A. albidula*; D, head and thorax, E, female genitalia, and F, male genitalia, of *A. configurata*; G, head and thorax, H, female genitalia, and I, male genitalia, of *A. repleta*; J, head and thorax, K, female genitalia, and L, male genitalia, of *A. deleta*; M, head and thorax, N, female genitalia, and O, male genitalia, of *A. bidigitata*; P, head and thorax, Q, female genitalia, and R, male genitalia, of *A. constricta*; S, head and thorax, T, female genitalia, and U, male genitalia, of *A. producta*.

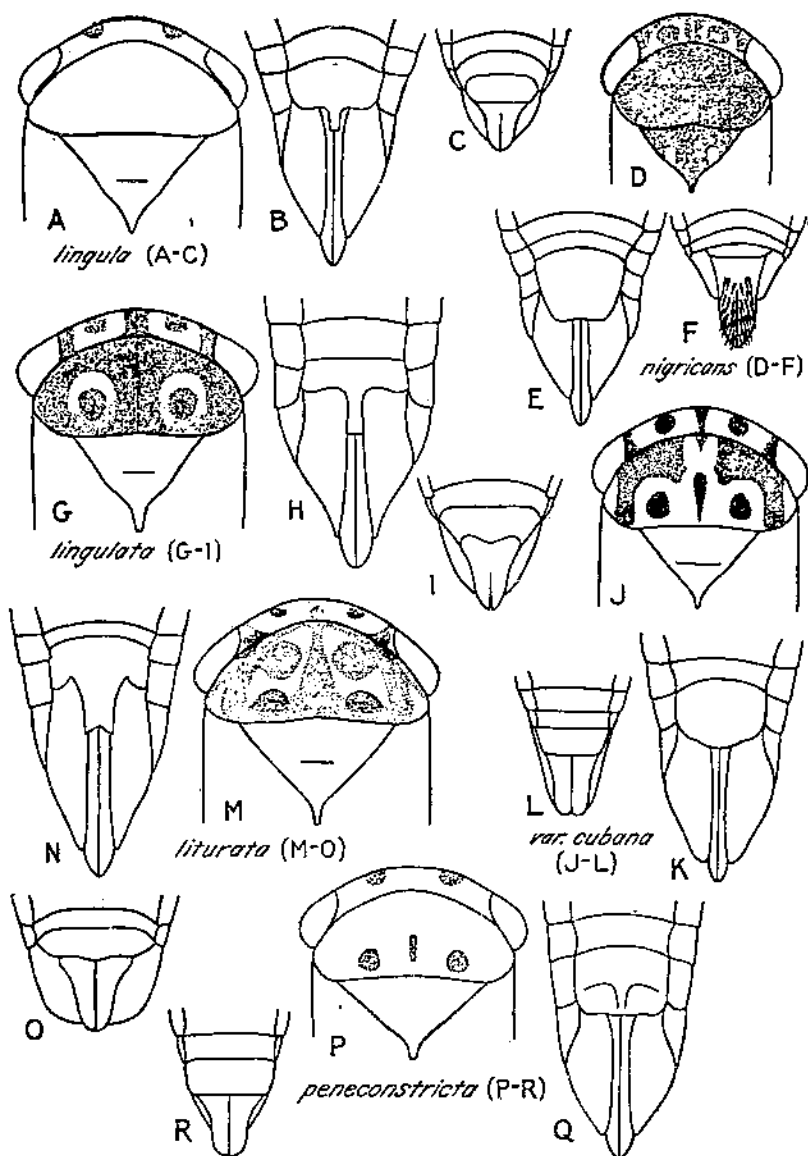


FIGURE 6.—External details of *Agallia* spp.: A, head and thorax, B, female genitalia, and C, male genitalia, of *A. lingula*; D, head and thorax, E, female genitalia, and F, male genitalia, of *A. nigricans*; G, head and thorax, H, female genitalia, and I, male genitalia, of *A. lingulata*; J, head and thorax, K, female genitalia, and L, male genitalia, of *A. constricta* var. *cubana*; M, head and thorax, N, female genitalia, and O, male genitalia, of *A. liturata*; P, head and thorax, Q, female genitalia, and R, male genitalia, of *A. peneconstricta*.

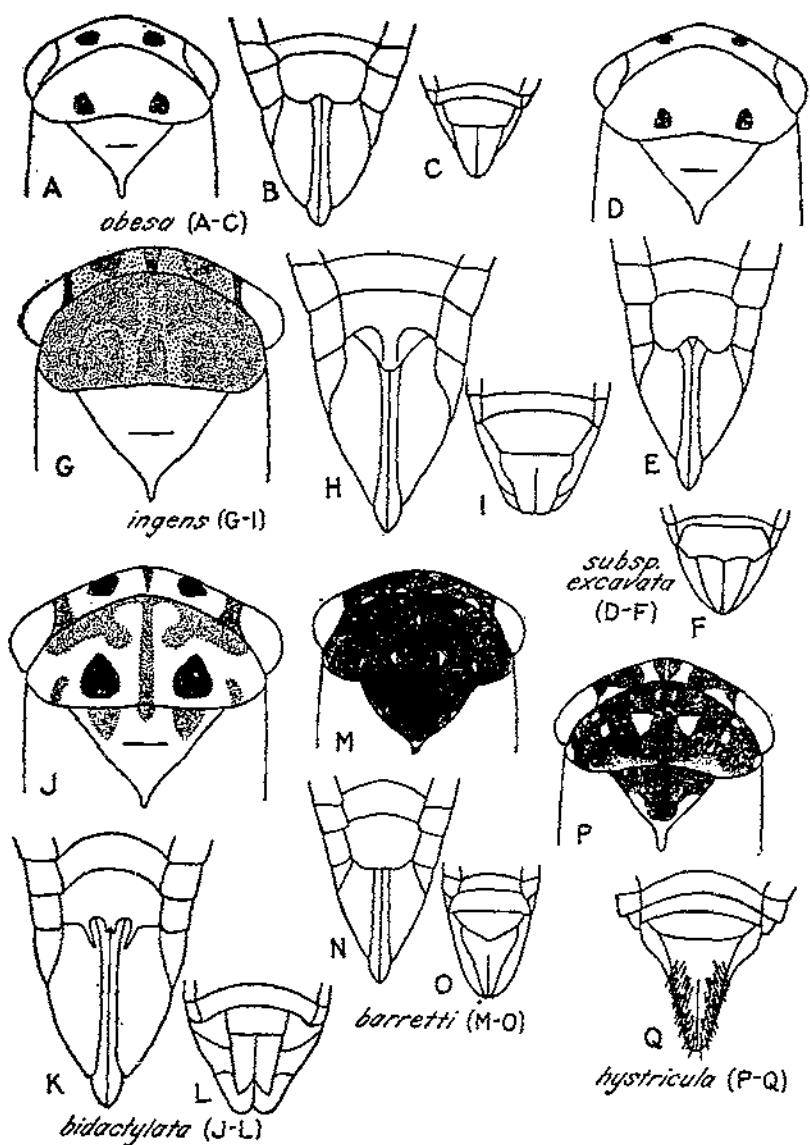


FIGURE 7.—External details of *Agallia* spp.: A, Head and thorax, B, female genitalia, and C, male genitalia, of *A. obesa*; D, head and thorax, E, female genitalia, and F, male genitalia, of *A. quadripunctata* subsp. *excavata*; G, head and thorax, H, female genitalia, and I, male genitalia, of *A. ingens*; J, head and thorax, K, female genitalia, and L, male genitalia, of *A. bidactylata*; M, head and thorax, N, female genitalia, and O, male genitalia, of *A. barretti*; P, head and thorax, and Q, male genitalia, of *A. hystericula*.

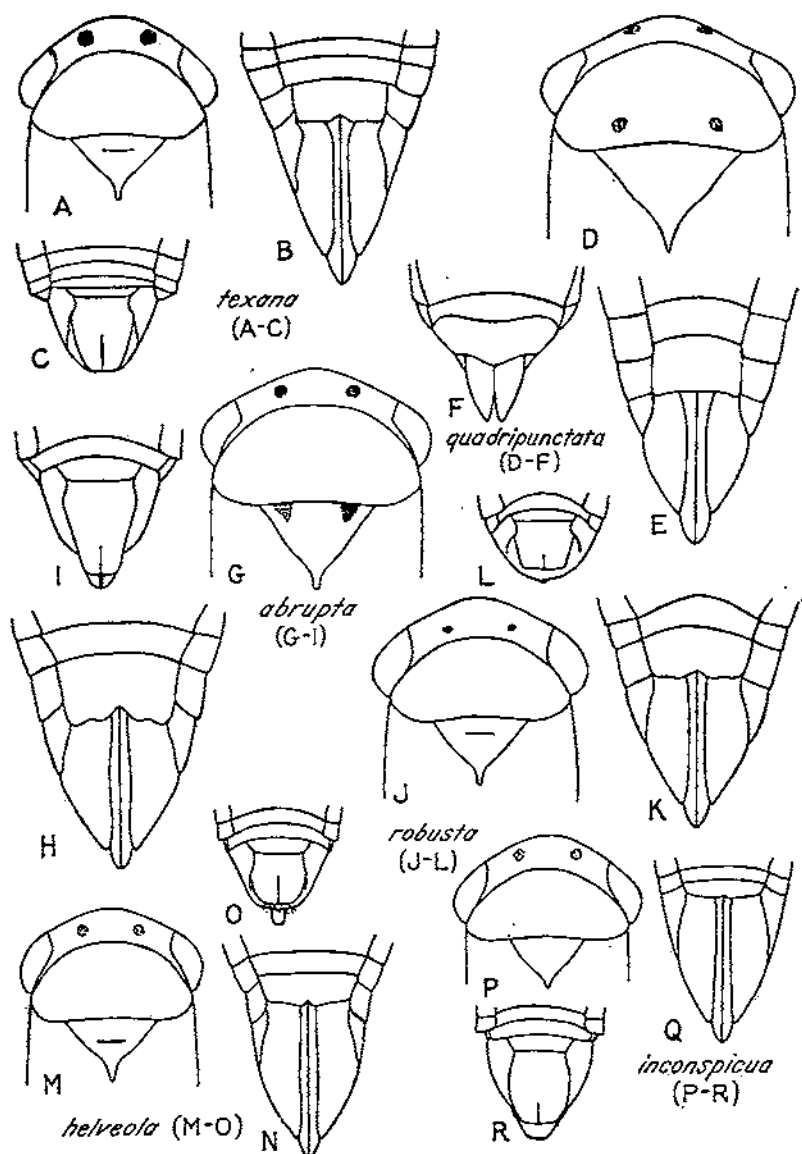


FIGURE 8.—External details of *Aceratagallia* spp and *Agallia quadripunctata*: A, head and thorax, B, female genitalia, and C, male genitalia, of *Aceratagallia texana*; D, head and thorax, E, female genitalia, and F, male genitalia, of *Agallia quadripunctata*; G, head and thorax, H, female genitalia, and I, male genitalia, of *Aceratagallia abrupta*; J, head and thorax, K, female genitalia, and L, male genitalia, of *A. robusta*; M, head and thorax, N, female genitalia, and O, male genitalia, of *A. helveola*; P, head and thorax, Q, female genitalia, and R, male genitalia, of *A. inconspicua*.

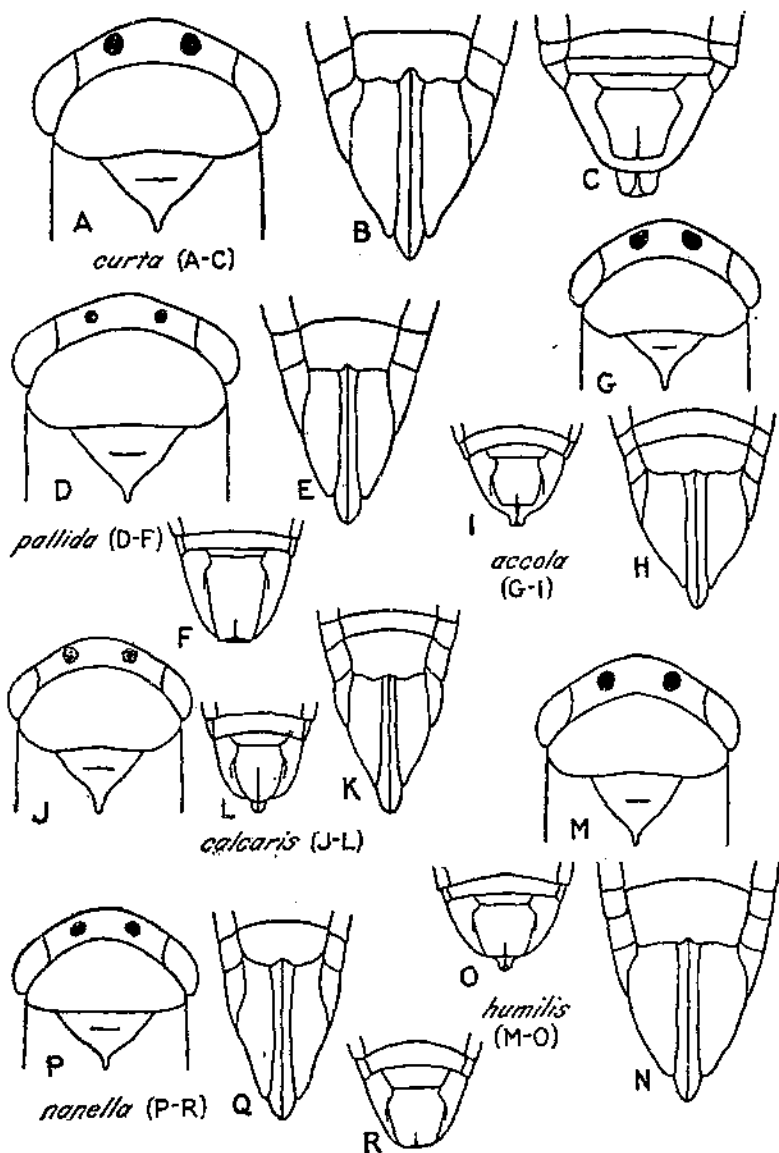


FIGURE 9.—External details of *Aceratagallia* spp.: A, Head and thorax, B, female genitalia, and C, male genitalia, of *A. curta*; D, head and thorax, E, female genitalia, and F, male genitalia, of *A. pallida*; G, head and thorax, H, female genitalia, and I, male genitalia, of *A. accola*; J, head and thorax, K, female genitalia, and L, male genitalia, of *A. calcaris*; M, head and thorax, N, female genitalia, and O, male genitalia, of *A. humilis*; P, head and thorax, Q, female genitalia, and R, male genitalia, of *A. nanella*.

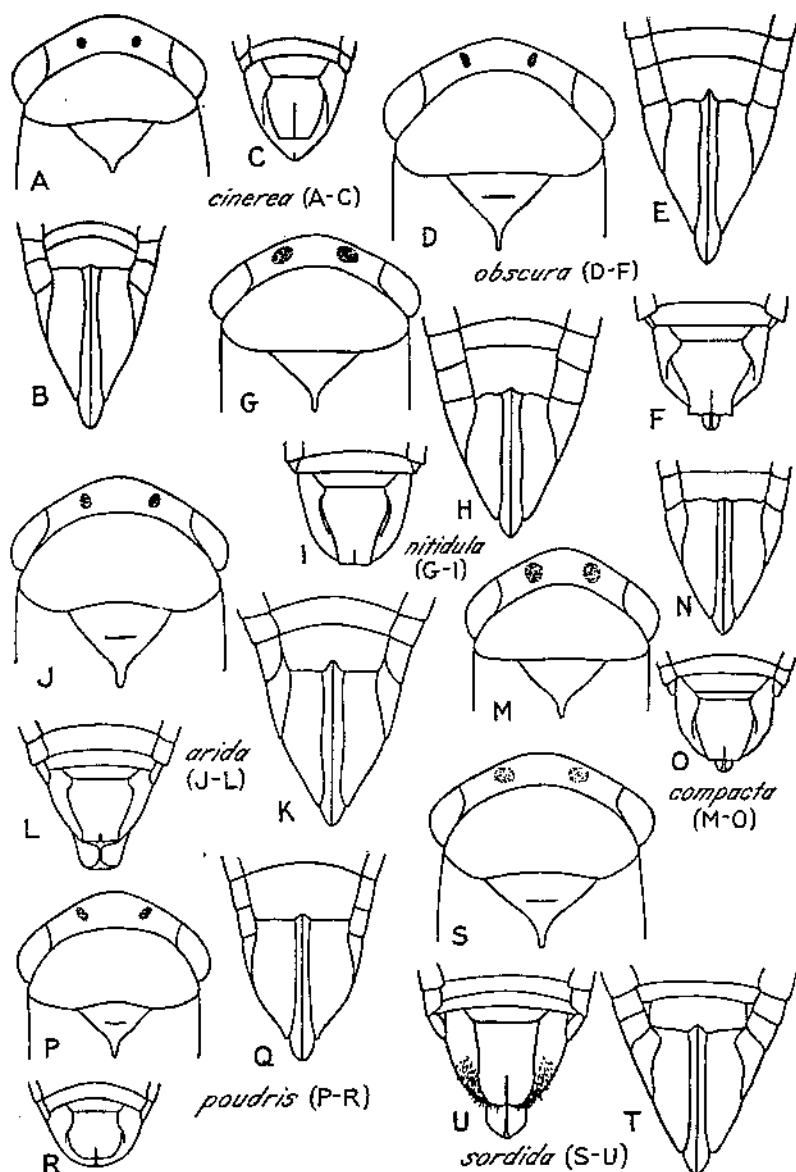


FIGURE 10.—External details of *Aceratagalla* spp.: A, Head and thorax, B, female genitalia, and C, male genitalia, of *A. cinerea*; D, head and thorax, E, female genitalia, and F, male genitalia, of *A. obscura*; G, head and thorax, H, female genitalia, and I, male genitalia, of *A. nitidula*; J, head and thorax, K, female genitalia, and L, male genitalia, of *A. arida*; M, head and thorax, N, female genitalia, and O, male genitalia, of *A. compacta*; P, head and thorax, Q, female genitalia, and R, male genitalia, of *A. poudris*; S, head and thorax, T, female genitalia, and U, male genitalia, of *A. sordida*.

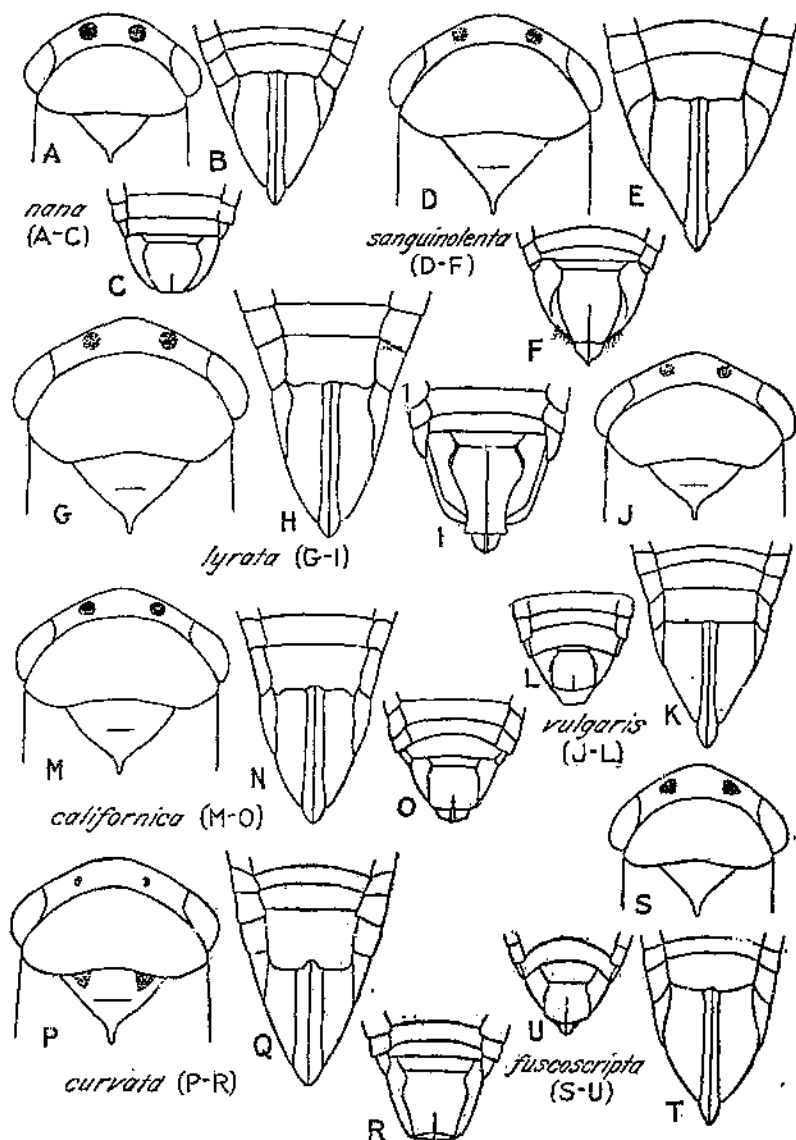


FIGURE 11.—External details of *Aceratagallia* spp.: A, Head and thorax, B, female genitalia, and C, male genitalia, of *A. nana*; D, head and thorax, E, female genitalia, and F, male genitalia, of *A. sanguinolenta*; G, head and thorax, H, female genitalia, and I, male genitalia, of *A. lyrata*; J, head and thorax, K, female genitalia, and L, male genitalia, of *A. vulgaris*; M, head and thorax, N, female genitalia, and O, male genitalia, of *A. californica*; P, head and thorax, Q, female genitalia, and R, male genitalia, of *A. curvata*; S, head and thorax, T, female genitalia, and U, male genitalia, of *A. fuscscripta*.

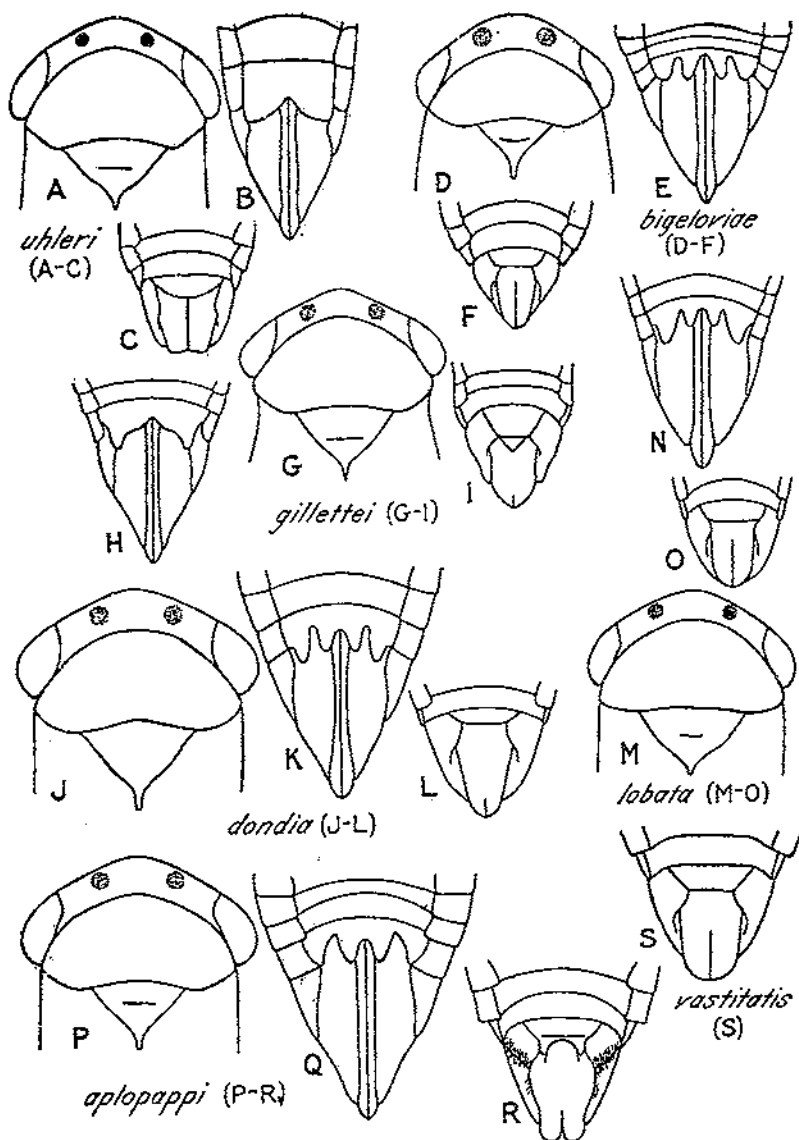


FIGURE 12.—External details of *Aceratagallia* spp.: A, Head and thorax, B, female genitalia, and C, male genitalia, of *A. uhleri*; D, head and thorax, E, female genitalia, and F, male genitalia, of *A. bigeloviae*; G, head and thorax, H, female genitalia, and I, male genitalia, of *A. gillettei*; J, head and thorax, K, female genitalia, and L, male genitalia, of *A. dondia*; M, head and thorax, N, female genitalia, and O, male genitalia, of *A. lobata*; P, head and thorax, Q, female genitalia, and R, male genitalia, of *A. aptopappi*; S, male genitalia of *A. vastitatis*.

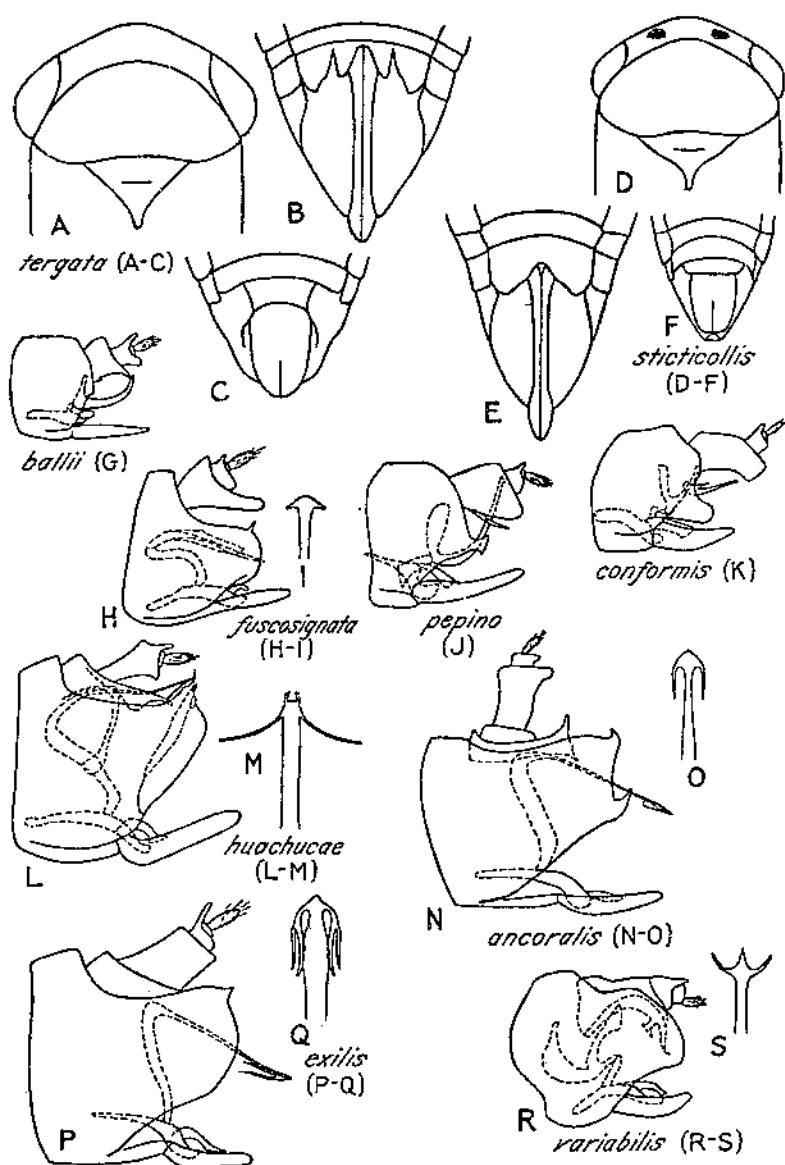


FIGURE 23.—External details of *Aceratagalla tergata* and *Agalliana sticticollis* and internal male genitalia of *Agalliotopsis* spp.: A, Head and thorax, B, female genitalia, and O, male genitalia, of *A. tergata*; D, head and thorax, E, female genitalia, and F, male genitalia, of *A. sticticollis*; G, genital capsule of *Agalliotopsis ballii*; H, genital capsule, and I, tip of aedeagus, of *A. fuscicornis*; J, genital capsule of *A. pepino* (X55); K, genital capsule of *A. conformis*; L, genital capsule, and M, tip of aedeagus, of *A. huachucae*; N, genital capsule, and O, tip of aedeagus, of *A. ancoralis*; P, genital capsule, and Q, tip of aedeagus, of *A. exilis*; R, genital capsule, and S, tip of aedeagus, of *A. variabilis*. Drawings of genital capsules are of the lateral view; drawings of aedeagi are of the dorsal view.

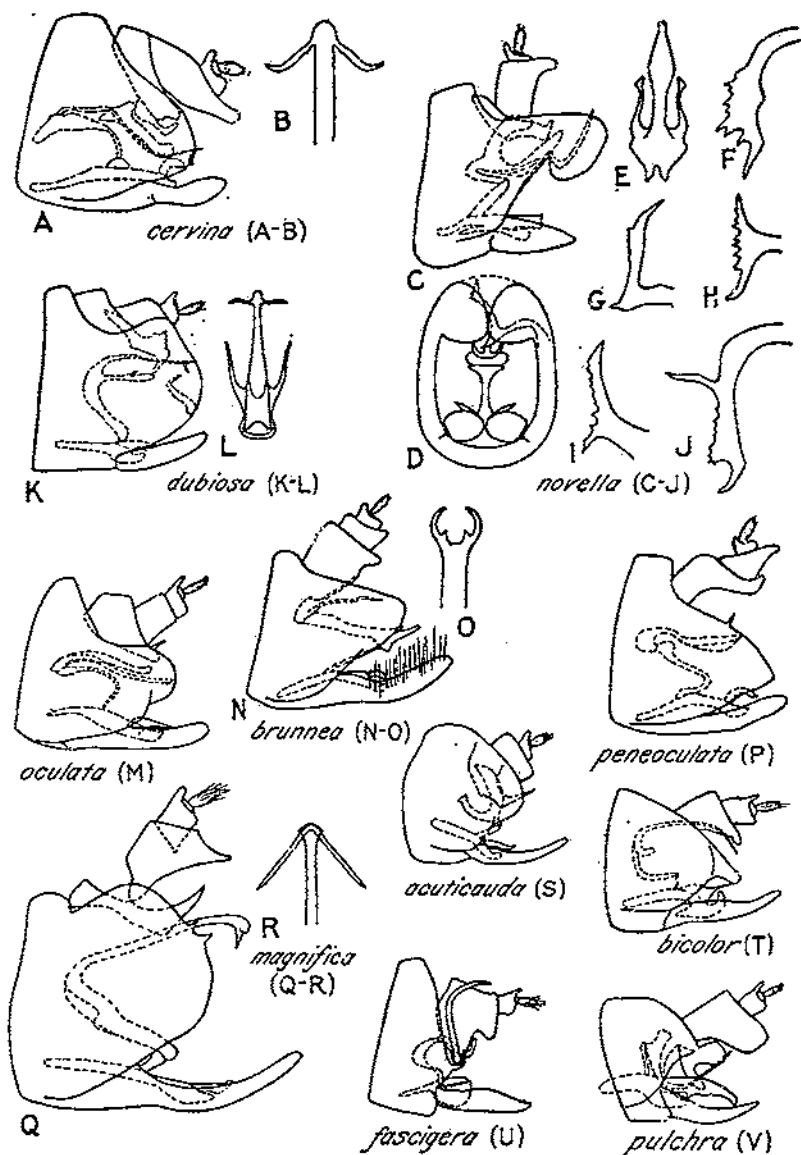


FIGURE 14.—Internal male genitalia of *Agalliopterus* and *Agallia* spp.: A, Genital capsule, and B, tip of aedeagus, of *Agalliopterus cervina*; C, genital capsule, D, caudal view of same, E, aedeagus, F, pygofer hook, of Colorado specimen, G, same of Washington, D.C., specimen, H, same of Texas specimen, I, same of Jamaican specimen, and J, same of Ontario, Canada, specimen, of *A. norella*; K, genital capsule, and L, aedeagus, of *A. dubiosa*; M, genital capsule of *A. oculata*; N, genital capsule, and O, tip of aedeagus, of *A. brunnea*; P, genital capsule of *A. peneoculata*; Q, genital capsule, and R, tip of aedeagus, of *A. magnifica*; S, genital capsule of *Agallia acuticauda*; T, genital capsule of *A. bicolor*; U, genital capsule of *A. fascigera*; V, genital capsule of *A. pulchra*. Drawings of genital capsules, except D, are of the lateral view; drawings of aedeagi are of the dorsal view; and drawings of pygofer hooks are of the caudal view of the right hook.

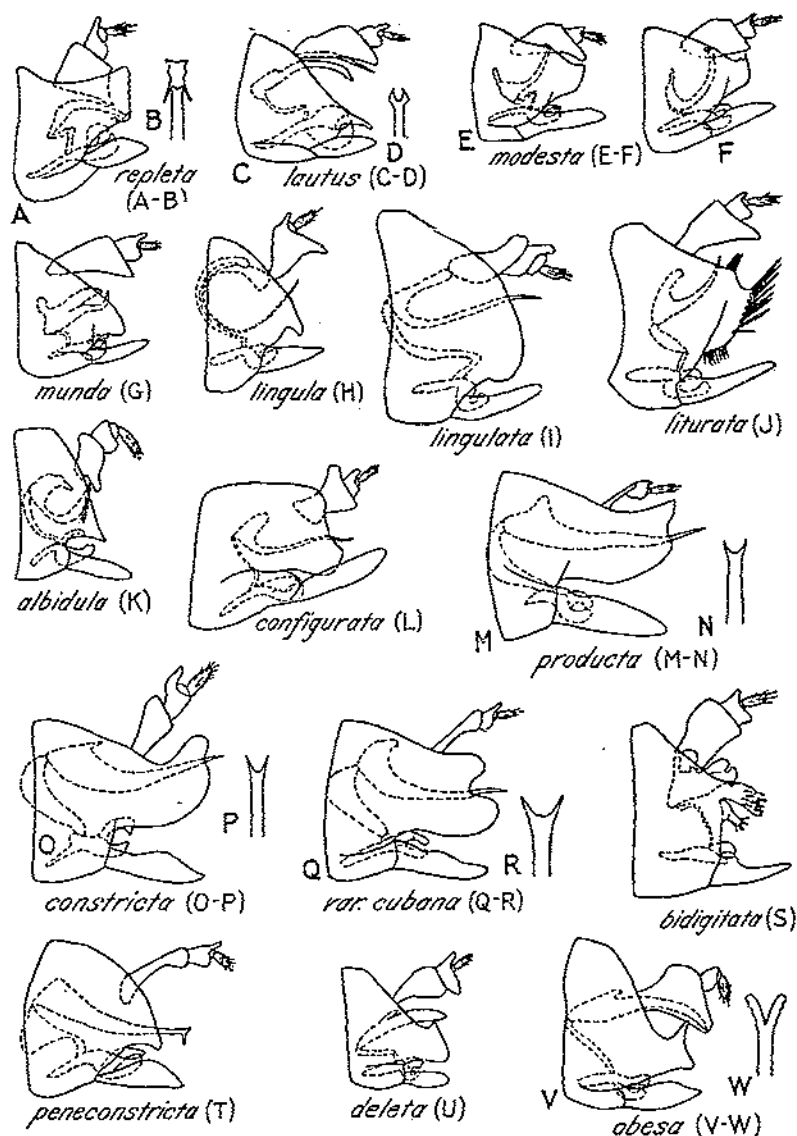


FIGURE 15.—Internal male genitalia of *Agallia* spp.: A, Genital capsule, and B, ventral view of tip of aedeagus, of *A. repleta*; C, genital capsule, and D, tip of aedeagus, of *A. lautus*; E, genital capsule, and F, some showing variation of pygifer, of *A. modesta*; G, genital capsule of *A. munda*; H, genital capsule of *A. lingula*; I, genital capsule of *A. lingulata*; J, genital capsule of *A. liturata*; K, genital capsule of *A. albidula*; L, genital capsule of *A. configurata*; M, genital capsule, and N, tip of aedeagus, of *A. producta*; O, genital capsule, and P, tip of aedeagus, of *A. constricta*; Q, genital capsule, and R, tip of aedeagus, of *A. constricta* var. *cubana*; S, genital capsule of *A. bidigitata*; T, genital capsule of *A. peneconstricta*; U, genital capsule of *A. deleta*; V, genital capsule, and W, tip of aedeagus, of *A. obesa*. Drawings of genital capsules are of the lateral view, drawings of aedeagi, except B, are of the dorsal view.

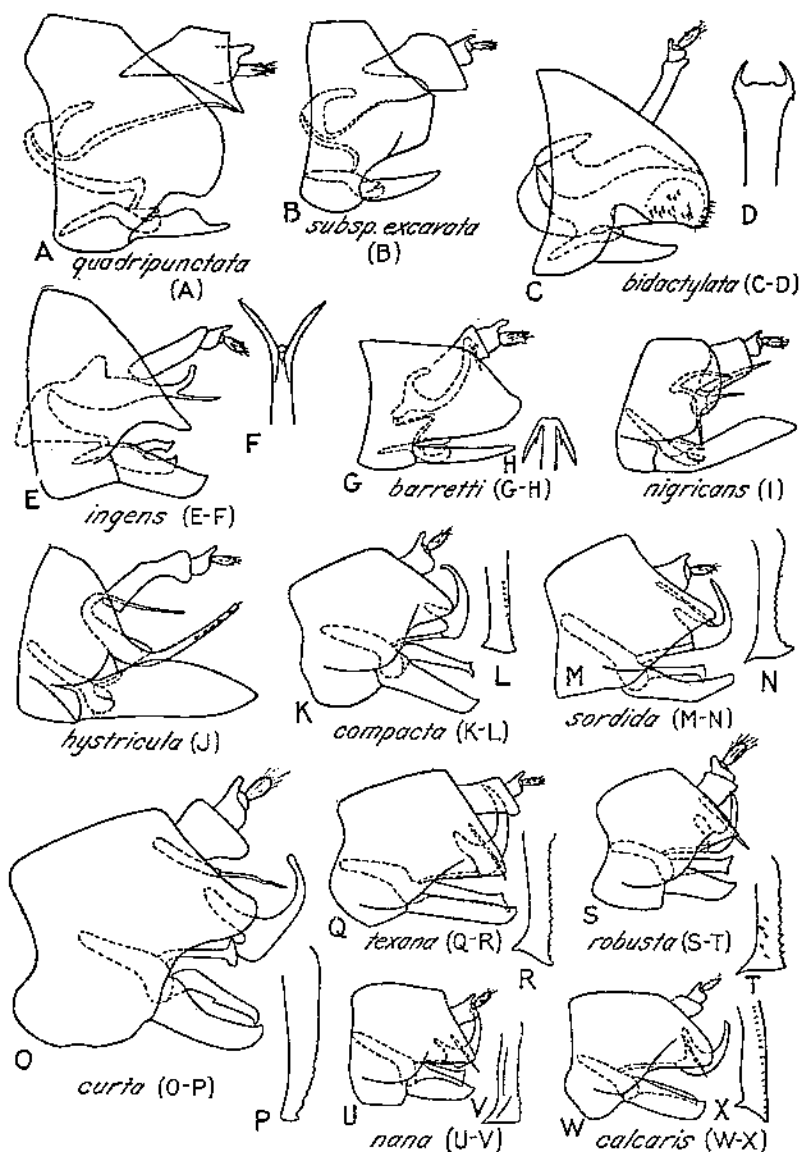


FIGURE 16.—Internal male genitalia of *Agallia* and *Aceratagallia* spp.: A, Genital capsule of *A. quadripunctata*; B, genital capsule of *A. quadripunctata* subsp. *excavata*; C, genital capsule, and D, tip of aedeagus, of *A. bidactylata*; E, genital capsule, and F, tip of aedeagus, of *A. ingens*; G, genital capsule, and H, caudal view of tip of aedeagus, of *A. barretti*; I, genital capsule of *A. nigricans*; J, genital capsule, and K, style, of *Aceratagallia compacta*; L, style, of *A. compacta*; M, genital capsule, and N, style, of *A. hystricula*; O, genital capsule, and P, style, of *A. curia*; Q, genital capsule, and R, style, of *A. texana*; S, genital capsule, and T, style, of *A. robusta*; U, genital capsule, and V, style, of *A. nana*; W, genital capsule, and X, style, of *A. calcaris*. Drawings of genital capsules are of the lateral view, drawings of aedeagi, except H, are of the dorsal view, and drawings of styles are of the ventral view of the right style.

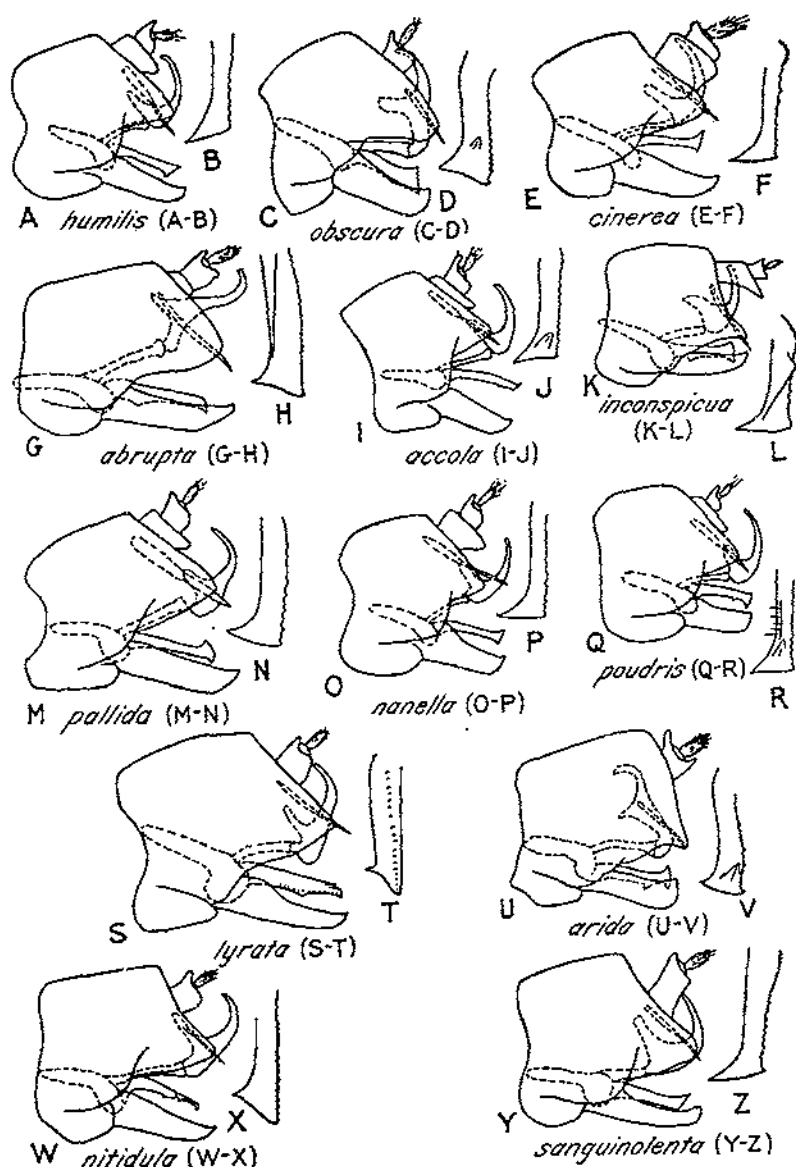


FIGURE 17.—Internal male genitalia of *Aceratagallia* spp.: A, Genital capsule, and B, style, of *A. humilis*; C, genital capsule, and D, style, of *A. obscura*; E, genital capsule, and F, style, of *A. cinerea*; G, genital capsule, and H, style, of *A. abrupta*; I, genital capsule, and J, style, of *A. accola*; K, genital capsule, and L, style, of *A. inconspicua*; M, genital capsule, and N, style, of *A. pallida*; O, genital capsule, and P, style, of *A. nanella*; Q, genital capsule, and R, style, of *A. poudris*; S, genital capsule, and T, style, of *A. lyrata*; U, genital capsule, and V, style, of *A. arida*; W, genital capsule, and X, style, of *A. nitidula*; Y, genital capsule, and Z, style, of *A. sanguinolenta*. Drawings of genital capsules are of the lateral view, drawings of styles are of the ventral view of the right style.

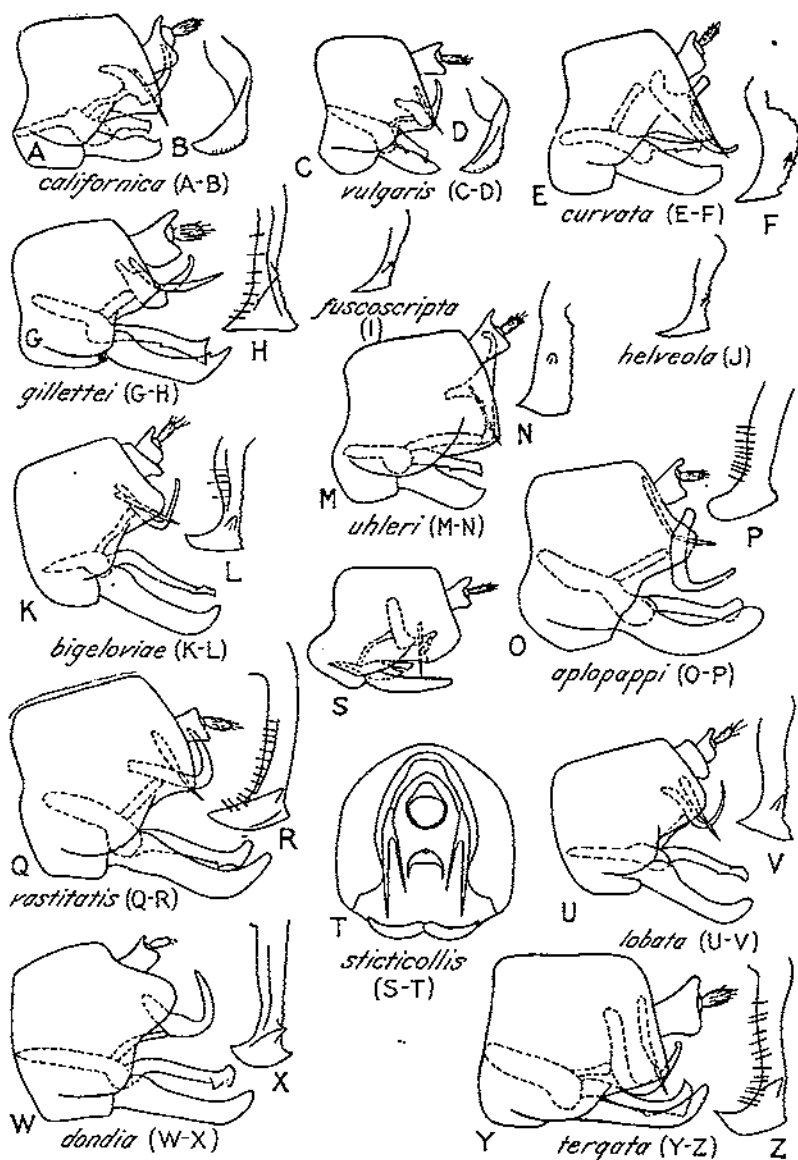
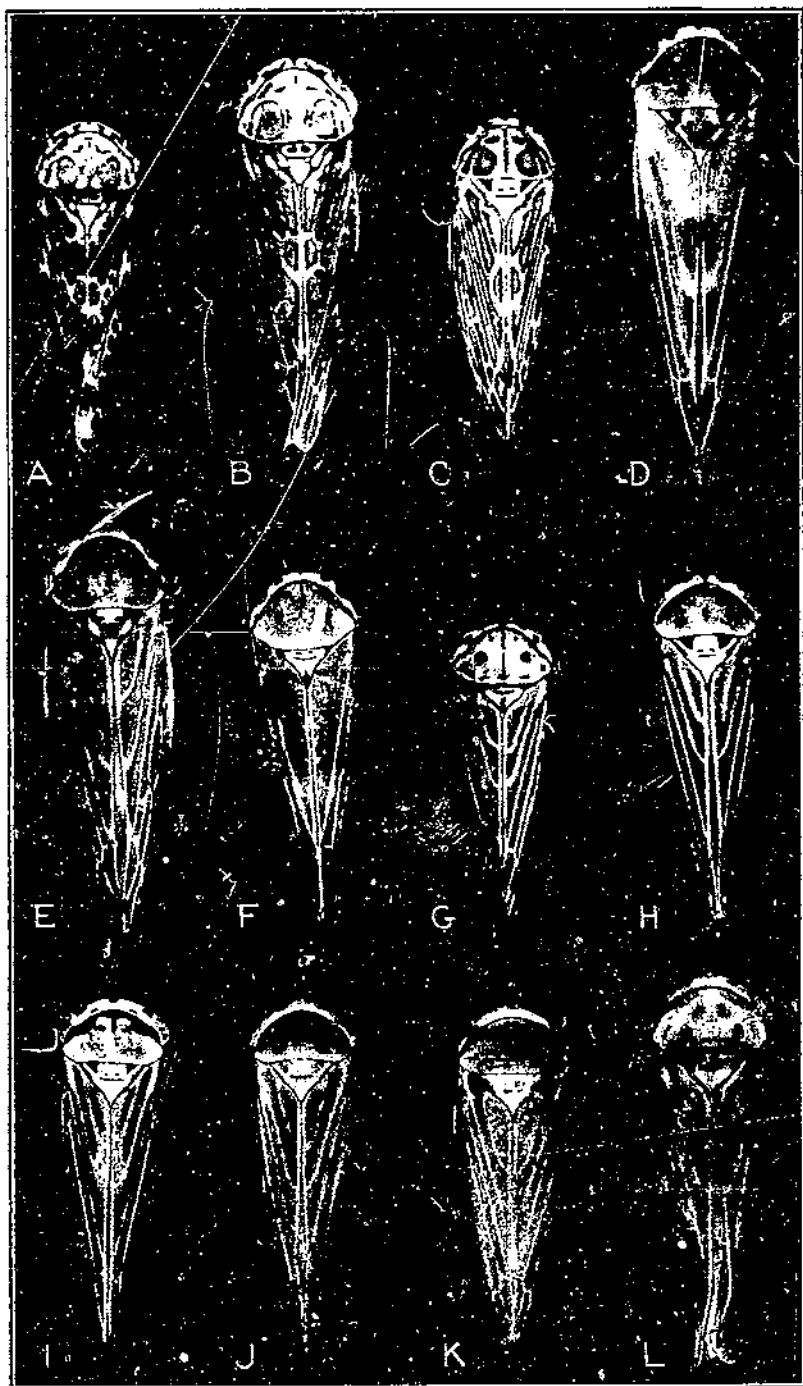
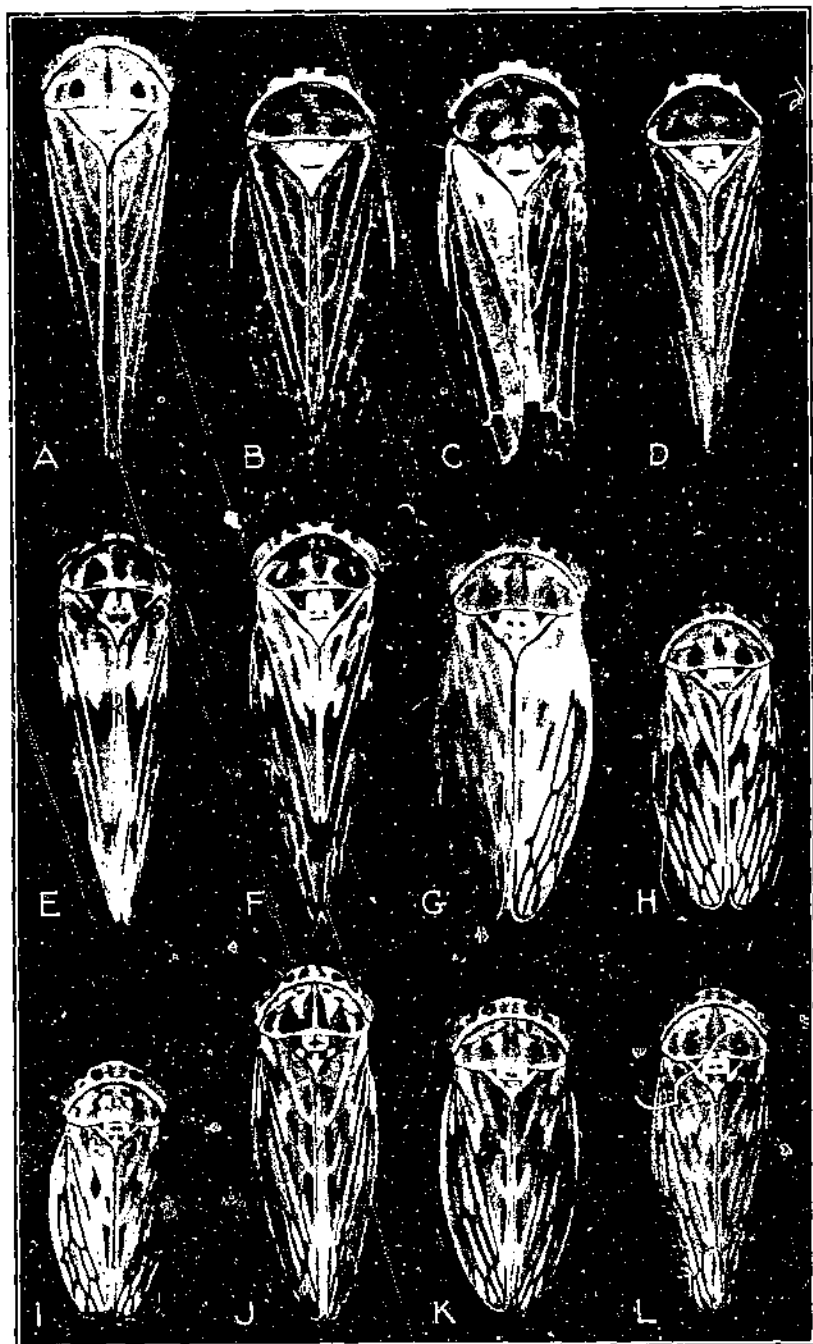


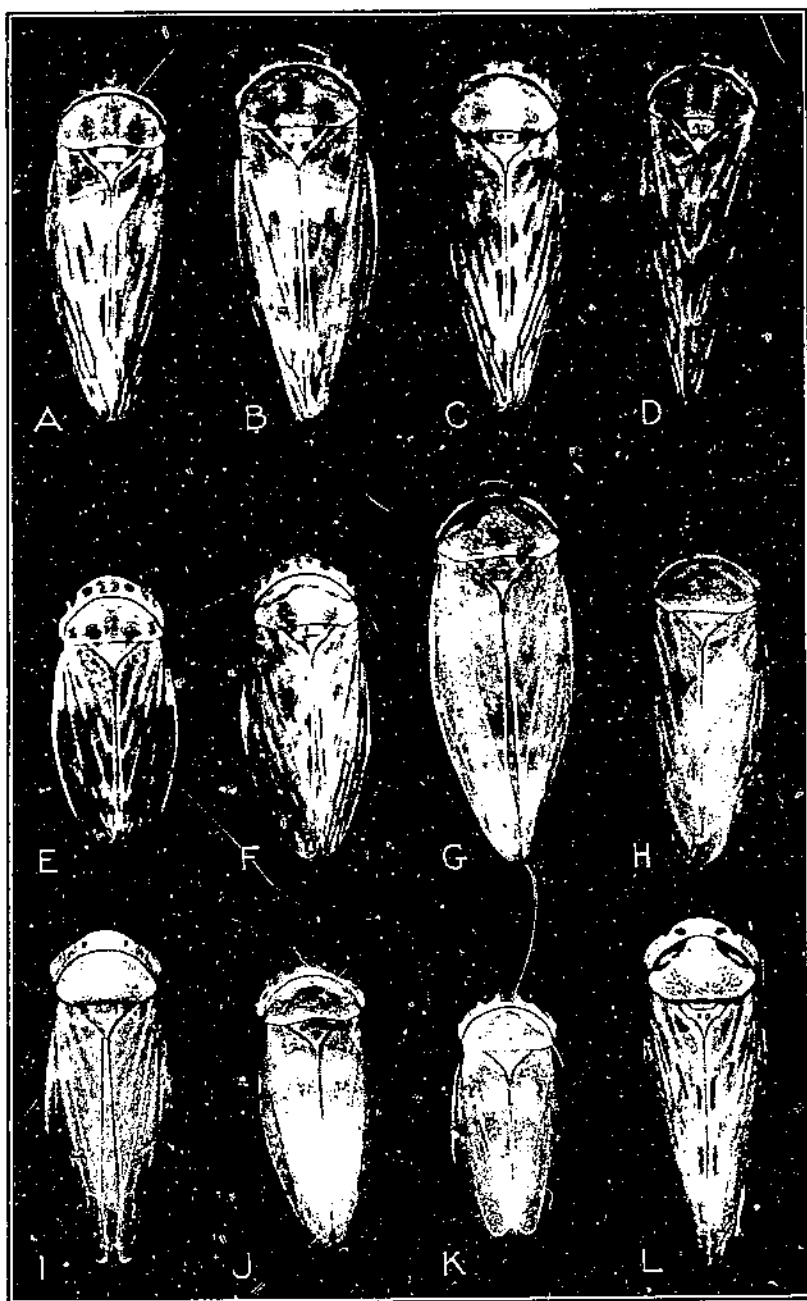
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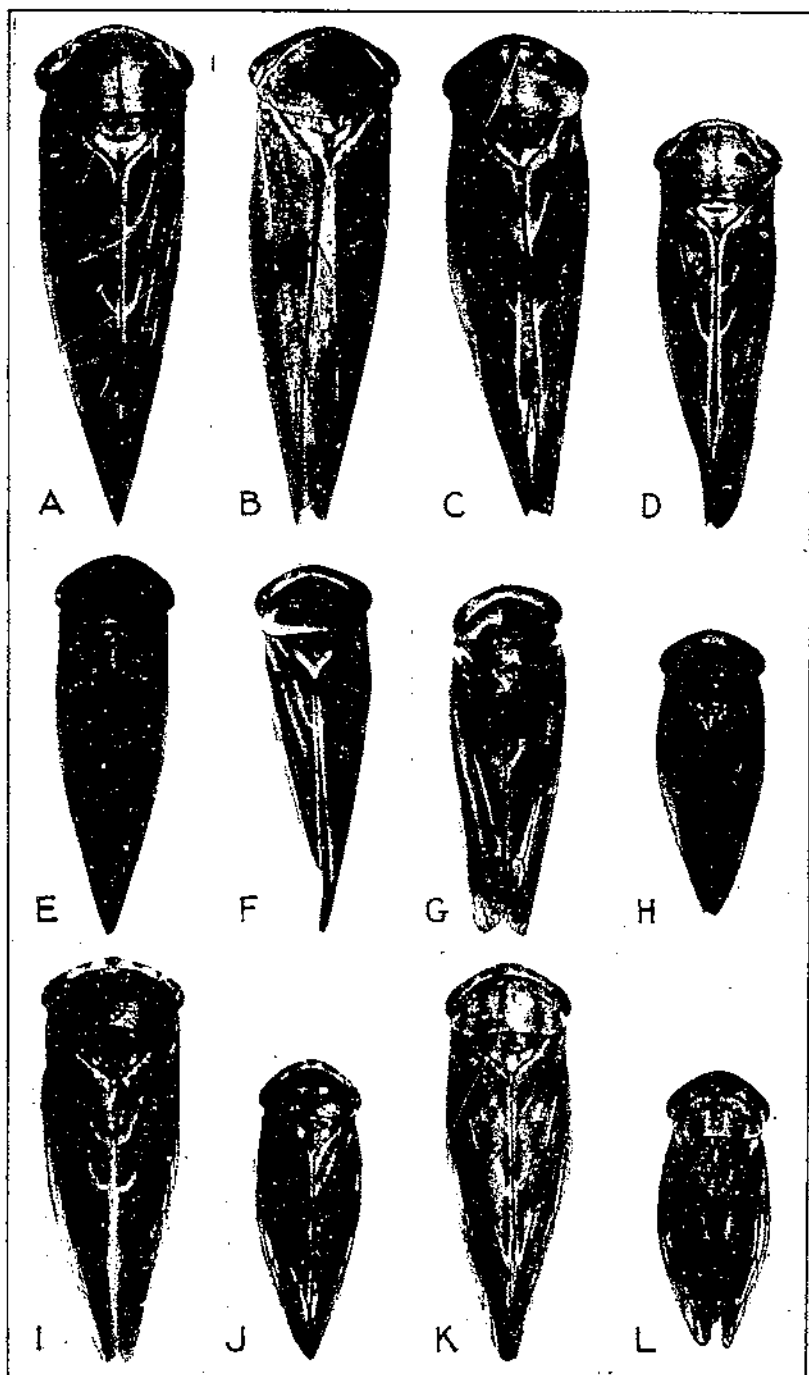
A, *Apaltipsia ballii*; B, *A. conformis*; C, *A. pepino*; D, *A. norella*; E, *A. variabilis*; F, *A. cineta*; G, *A. fuscosignata* var. *minor*; H, *Agallia repleta*; I, *A. pulchra*; J, *A. modesta*; K, *A. delata*; L, *A. constricta*.



A, *Agallia producta*; B, *A. quadripunctata*; C, *A. lingulata*; D, *A. lingula*; E, *A. albidula*; F, *A. confusata*; G, *Aceratagallia dondia*; H, *A. aptopompi*; I, *A. bigelovici*; J, *A. californica*; K, *A. sanguinolenta*; L, *A. gillettei*.



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