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A Contribution to the Taxonomy of the Subfamily Issinae in America North of Mexico (Fulgoridae, Homoptera)

KATHLEEN C. DOERING, Department of Entomology, University of Kansas

PART I

ABSTRACT: This paper comprises the first part of a monograph dealing with the taxonomy of the subfamily Issinae (Fulgoridae, Homoptera) in America, north of Mexico. This section of the study includes only the genus *Dictyssa*, which is one of the few large genera in the subfamily. Of the ten established species the following five species of Melichar's are redescribed and comparative notes and drawings of structural details are given: *D. areolata*, *D. mutata*, *D. fusca*, *D. clathrata* and *D. marginipunctata*. Comparative notes and drawings are added for four other species; namely, *D. obliqua* Ball, *D. ovata* Ball, *D. fenestrata* Ball, and *D. transversa* Van Duzee. Material of *Dictyssa mira* Van Duzee was not available for study, but this species is included in the key. *Dictyssa semivitreata* Provancher is reduced to synonymy under *Dictyobia permutata* Uhler. The characters of most value for classification are the male genitalia, the shape of the tegmina and the venation of the wings. The following species are described as new: *D. maculosa*, *D. monroviana*, *D. quadravitreata*, *D. beameri* and *D. balli*.

INTRODUCTION

THE purposes in writing this paper are several: First, to assemble under one article all our knowledge to date concerning the taxonomy of the previously described species in this subfamily which occur in America, north of Mexico, since many species have been added to the group after the publication of Melichar's monograph in 1906; second, to make comprehensive keys to the genera and the species; third, to describe a number of new species and redescribe some of the older doubtful species; fourth, to study and figure the male genitalia of all available species, which, as far as the writer knows, has not hitherto been done in the Fulgoridae; lastly,

to present visual aids, such as the drawings of lateral views of the different species, which may help others in identifying the species.

FAMILY CHARACTERISTICS

Antennae placed on the side of the head below the eyes, very variable in shape and size, but usually consisting of two segments terminated by a very fine hair or bristle, rarely with basal appendages (*Otiocerus*); sense organs on antennae numerous and generally of a complex nature and mostly situated on the second segment; middle coxae articulated considerably apart, allowing for considerable range of movement, as opposed to those of the *Cicadoidea*, which are closer together and allow for very limited movements; hind coxae immobile and exterior part coalesced with metathorax; no filter present between midintestine and crop; ovipositor, with the exception of part of the *Cixiinae*, greatly reduced or incomplete, anterior and middle pairs of valves not fastened together by tongue and groove arrangements as in the *Cicadoidea*. Prothorax normally developed and unarmed.

NOTE.—The classification of the family Fulgoridae is today a controversial question. Some Homopterists believe that the family should remain as one family, which in turn is then subdivided into some ten or eleven subfamilies. Others believe that many of these subfamilies should be raised to family rank. Until we have completed more detailed morphological and taxonomic work of the entire group, especially in regard to wing venation and male genitalia, the writer does not feel that it is advisable to make too radical a departure from the generally accepted older view of keeping the family Fulgoridae intact. If this view is held, the family characteristics are the same as the superfamily Fulgoroidea.

SUBFAMILY CHARACTERISTICS

Head not narrower, or only slightly so, than pronotum. Clypeus convex, but not greatly produced beyond plane, its lateral margins not keeled. Pronotum posteriorly subquadrate, anteriorly roundly produced. Scutellum usually much longer than pronotum. Tegmina in texture either coriaceous, somewhat corneous, or vitreous, either entirely or with vitreous patches; held rooflike over body, their anal margins usually meeting, but sometimes widely separated. Hind wings very variable, being either absent, rudimentary, slight and narrow, or large and ample where they are notched at sides so that they can be folded in three. Hind legs with two to four spines on hind tibiae.

TECHNIQUE AND TERMINOLOGY

The only special technique which might be of interest to describe is that used in studying the male genitalia. Drawings of these structures were made from microscope slides, made in the following way. The specimens were relaxed either in a relaxing jar or by boiling them for a minute or two in hot water. The tip of the abdomen was carefully removed and this placed in 10 percent caustic potash which was heated to the boiling point and sometimes boiled for a moment or two (the exact time required should be tried out by the operator). After boiling in the caustic potash the tip of the abdomen was next placed in glycerine or water for dissection. The dissected parts were then allowed to stand in 95 percent alcohol for a few seconds. From this medium they were immediately mounted in diaphane on the slide. Drawings of the lateral views of the aedeagus, the harpagones and the anal flaps were made from these slides. All other drawings were drawn from the specimens.

The terminology for most of the morphological characteristics was obtained from Snodgrass' textbook "Principles of Insect Morphology" (1936) or Muir's paper, entitled, "On the Classification of the Fulgoroidea" (1923). Special terms used in the descriptions or keys are labeled or indicated on the first drawings of each plate.

THE GENUS DICTYSSA

DESCRIPTION OF THE GENUS

Small, robust insects with hemispherical tegmina which are held vertical to the body and whose greatest width is at tip of clavus or posterior to tip. The apical margin of the tegmen strongly rounding and the costal margin expanded. Vertex extremely short through middle, not produced much beyond eyes, usually depressed through middle and with elevated margins. Pronotum extremely narrow at sides where it tapers to almost a point; its anterior margin deeply emarginate into region of the vertex; its posterior margin shallowly concave. Mesonotum triangular, with or without a median carina present. Frons quadrangular, usually more or less parallel margined, truncate posteriorly, deeply emarginate anteriorly for the insertion of the postclypeus. Postclypeus moderately inflated. Anteclypeus and labrum small. Main veins of tegmen coarse, a network of finer veins between them; median cells or bands of cells frequently hyaline, which contrast sharply with the opaque or darker

outer cells. Wing venation, based on Muir, Tillyard and Snodgrass, show the following general characteristics: vein Sc divided, Sc_1 (= costal vein of Metcalf) running along costal border for at least half the length of the wing; Sc_2 and R united at base and then running more or less parallel with each other to apex where they are lost in the apical reticulation; vein R thus unbranched, as is typical for many Homoptera; vein M typically two branched, sometimes three branches present; vein Cu_1 divided into two branches, Cu_{1a} and Cu_{1b} ; vein Cu_2 forming the claval suture as in all Homoptera. Hind wings usually absent or rudimentary. Two spines present on hind tibiae.

HISTORY OF THE GENUS

To date the following eleven species have been described: *D. semivitrea* Provancher (1889), *D. areolata* Mel. (1906), *D. clathrata* Mel. (1906), *D. fusca* Mel. (1906), *D. marginepunctata* (1906), *D. mutata* Mel. (1906), *D. fenestrata* Ball (1910), *D. ovata* Ball (1910), *D. obliqua* Ball (1910), *D. transversa* Van Duz. (1914), and *D. mira* Van Duz. (1928).

In the opinion of Mr. E. D. Ball (University of Arizona, Tucson) and Mr. Paul Oman (Homopterist, U. S. National Museum) *Dictyssa semivitrea* Provancher is *Dictyobia permutata* Uhler (1889). The author agrees with this viewpoint, as Provancher's written description fits fairly accurately the species known as *Dictyobia permutata* Uhler, and cannot possibly be applied to any known species of *Dictyssa*. Melichar in his revision of the Issinae evidently mistook *Dictyonia obscura* Uhler (1889) for Provancher's *semivitrea*.

Of the ten known species in the genus the writer has studied types or paratypes of all species except *mira* Van Duz. To this list is being added in the present paper five new species.

KEY TO THE SPECIES

1. Tegmen with no hyaline cells or oblique band across center of corium distinctly separated from darker outer cells..... 2
- Tegmen with two or more large hyaline cells or an oblique band of hyaline cells across middle of corium, distinctly separated from the other opaque cells 4
2. (1) Entire tegmen translucent with occasional brown spots, elongate; smallest species in the genus; greatest width of tegmen in line with apex of clavus *transversa* Van Duzee, 440
- Tegmen opaque, greatest width at least two thirds of length and posterior to apex of clavus..... 3
3. (2) Tegmen entirely fuscous, semiopaque; vein M_{1+2} separated at center of tegmen; tegmen broadest just posterior to apex of clavus... *fusca* Melichar, 428
- Tegmen opaque black, with a marginal border of circular hyaline spots; angle in vein R nearer to M_{1+2} ; vein M_{1+2} simple. *marginepunctata* Melichar, 431

4. (1) Tegmen with hyaline band across corium composed of numerous cells, at least more than five..... 5
 Tegmen with three to five conspicuous hyaline cells across corium, in an oblique band 7
5. (4) Tegmen with width subequal to length, cells small; greatest width of tegmen in line or slightly anterior to apex of clavus; vein M_1+2 divided just beyond middle..... *clathrata* Melichar, 430
 Tegmen elongate, their greatest width either in line or posterior to apex of clavus; smaller insects 6
6. (5) Tegmen with large, angular cells, the hyaline band across corium broad in proportion to opaque part; vein M_1+2 unbranched and running straight across corium; base of wing greatly narrowed..... *quadravirea*, n. sp., 441
 Tegmen dark blackish-brown; hyaline band of cells composed of many small ones; vein M_1+2 branched..... *beameri*, n. sp., 443
7. (4) Larger insects, 4.5-5 mm. in length; elytra with oblique bands of fuscous and tan in addition to the vitreous cells..... 8
 Smaller insects, usually under 4.5 mm.; bicolored tegmina with vitreous and fuscous cells strongly contrasting..... 9
8. (7) Tegmina thickened, greenish-white with oblique fuscous and pale vittae, *mira* Van Duzee, 427
 Tegmina not particularly thickened, pale, clouded with fuscous; distinct large hyaline cells across corium; greatest width beyond apex of clavus; angle of R strongly pronounced so that vein R at this point comes nearer vein M_1+2 than Sc_2 *areolata* Melichar, 425
9. (7) Tegmina elongate, the large central hyaline cell of corium at least twice as long as its width; angle in vein R acute, at which point R is nearer vein M_1+2 than Sc_2 10
 Tegmina not elongate, the central hyaline cell subquadrate, its length approximating its width; vein R sinuate, making a less distinct angle at end of the central hyaline cell..... 11
10. (9) Tegmina distinctly elongate, its length approximately twice its width, the hyaline cells of corium extremely long, running more lengthwise of wing than in other species..... *balli*, n. sp., 445
 Tegmina not twice as long as wide; the central hyaline cell large, extending posteriorly beyond middle to about base of apical fourth, two other conspicuous hyaline cells placed between it and costal border; angle in vein R very acute..... *monroviaana*, n. sp., 448
11. (9) Similar to *areolata* in shape of tegmina; central hyaline cell of corium almost circular, the oblique hyaline band abbreviated, not reaching costa; costal border broad; angle in vein R acute and near center of tegmen. *ovata* Ball, 438
 Species elongate; the oblique hyaline band with cells irregular in size, reaching completely to costal border; costal border narrow..... 12
12. (11) Brown in general color with two transverse bands of hyaline spots behind middle of tegmina 13
 Brown with only one transverse band of hyaline spots, the conspicuous hyaline cells across apex lacking..... 14
13. (12) Head and pronotum dark; one transverse row of hyaline cells behind middle in corium of tegmen; hyaline cells across apex of corium large; angle of vein R nearer to vein M_1+2 than vein Sc_2 *fenestrata* Ball, 436
 Head and pronotum bright yellow; discs of many cells in corium hyaline, the apical hyaline cells not any larger or more conspicuous than others; two transverse rows of hyaline cells beyond middle; angle in vein R equidistant between veins M_1+2 and Sc_2 *maculosa*, n. sp., 450
14. (12) Dark tegmina with a yellow or light-colored head and thorax; angle in vein R at about base of apical third of tegmen; vein R at this point equidistant between veins M_1+2 and Sc_2 *mutata* Melichar, 433
 With a dark-colored head and thorax; angle in vein R located just slightly posterior to middle, vein R at this point nearer to vein M_1+2 than Sc_2 . *obliqua* Ball, 439

Dictyssa areolata Melichar, 1906

Melichar, Leopold. Monographie der Issiden (Homoptera). Abh. k. k. Zool.-Bot. Ges. Wien, III, pt. 4, 1906.

Size. Length of body to tip of tegmen, 3.6 mm. to 4.8 mm. Length of tegmen, 3.5 mm. to 3.9 mm.; width of tegmen, 2.7 mm. to 2.8 mm. This is one of the largest species in the genus.

Color. This is a variegated species in brownish-yellow and dark brown. Head and thorax from above uniformly golden tan or sometimes washed in fuscous. Below thorax light yellow. Abdomen tan, the genitalia frequently brownish. Tegmina variegated in coloring, the oblique hyaline band made up principally of 5 to 6 very large cells with the two central cells subequal and larger than the others and those touching the costal border the smallest of all; these hyaline cells bordered with opaque white and studded around entire margins by dark spurs of veins; anterior to the hyaline band the tegmen is golden brown shaded to very dark brown at base, the costal border at base whitish-yellow crossed by dark, elevated veinlets; posterior to hyaline band is a very dark brown area, occupying apical half of clavus, then extending on to corium where it ends as the posterior dark border of the large central cell; after this dark band occurs a much lighter band, starting just posterior to apex of clavus as a cluster of about 5 small white cells, then becoming a transverse band of light brown and ending at the more posterior hyaline discal cell; finally apex of corium pitch brown, studded all around apical border with semicircular and elongate white, subhyaline spots and sometimes in addition a cluster of three small round hyaline cells in the region of cell M_{1+2} anterior to the border.

Structural characteristics. Vertex extremely broad and short, depressed through middle, its lateral margins anteriorly converging, its length on median line approximately half length of pronotum at middle. Greatest width of eyes less than half the width of vertex. Frons with lateral margins subparallel although bulging slightly next to eyes, all its margins sharply elevated, median carina very distinct but disappearing before reaching clypeus.

Postclypeus with posterior margin angularly produced into the frons for a distance equal to about one fourth the length of the latter. Pronotum with anterior margin sharply elevated, roundly produced and its posterior margin very shallowly concave; its length through middle approximately one half the length of the mesonotum at middle; a median carina only faintly visible if at all; two small round depressed spots on disc, one on each side of median line. Mesonotum with only a very faint median carina present, a transverse groove following anterior margin but stopping at either side before reaching lateral margin. Tegmina one fourth longer than wide, their greatest width posterior to apex of clavus, hemispherical in outline, with oblique hyaline band across disc made up of 4 to 5

large cells, the largest one being the central one located between veins M and R, another one almost equaling it in size, posterior and ventrad of it between R and Sc, a large one in the anal region extending to the clavus, and one or two small ones touching costal border; across apex of tegmen large elongate hyaline spots alternating with small semicircular ones; the costal border expanded at base with round or rectangular spots in the cells between the veinlets; vein R making almost right-angled bends, extending very close to M_{1+2} so that the space between veins R and Sc_2 is about 3 times the distance between R and M_{1+2} ; vein M_{1+2} single.

Male genitalia. Anal flap (10th abdominal segment) in width about twice as wide as long, its posterior margin truncately emarginate. Eleventh segment scarcely visible, its dorsal stylus long and conspicuous.

Harpagones (genital styli), visible externally as two-pointed plates exceeded by anal tube for a short distance. From a flattened lateral view (see drawing 25, plate XLI) each harpago is roughly quadrangular, broadest through apical third, the dorsal margin of this region extended dorsad into a short, recurved hook, another small broad hook or flap just anterior to the latter.

The aedeagus as viewed from the right side is a long tube partially sclerotized, bearing a short recurved lateral hook attached slightly posterior to middle, and two large ventrad-curving basal hooks, the apical halves only of which extend beyond the theca. On the left side a short blunt hook is attached at middle. The theca in this species extends over about the basal third of the aedeagus; on the right side its posterior margin is truncate and on the left side posteriorly it is extended into a heavily sclerotized, strongly recurved hook which simulates the appearance of the thecal hooks.

Female genitalia. Anal flap (10th abdominal segment) broad, roundly pointed posteriorly. The external valves of the ovipositor widest at a point about midway of their length, their combined width greater than their length.

Comparative notes. This species is an easily recognized species externally by both color and structure. The variegated or mottled tan and brown of the tegmina and the cluster of small white spots in the region of cell M_{1+2} in addition to the usual oblique and apical bands separate it very distinctly. It is the largest species in the genus, excepting *D. mira* Van Duzee. It differs from all other species in the genus by having vein R bend at almost an acute angle and coming so close to M_{1+2} that the space between veins R and

Sc₂ is about three times the distance between R and M₁₊₂. The male genitalia are characteristic and distinctive for the species. (See plate XXXVIII, drawings 4a and 4b.)

Notes on distribution. This species was described from males collected at Los Angeles, Cal. The type is located in the museum at Washington. Since this species has been wrongly determined, drawings of the type are figured on plate XXXVI as well as that of a specimen recently collected. A large series of this species has been collected by R. H. Beamer from Monrovia, Cal., in July.

Dictyssa fusca Melichar, 1906

Melichar, Leopold. Monographie der Issiden (Homoptera). Abh. k. k. Zool.-Bot. Ges. Wien, III, pt. 4, 1906.

Size. Length of body to tip of tegmen, 3.3 mm. Length of tegmen, 2.85 mm.; width of tegmen, 2.4 mm.

Color. Most of body and tegmina uniform testaceous brown, occasionally with one or two small hyaline cells in corium of tegmen. Thorax light tan shaded with brown. Abdomen dark testaceous brown. Legs tannish to brown.

Structural characteristics. Vertex characteristic for the genus, very broad and short, length through middle approximately one half of pronotum at middle. Greatest width of eyes slightly over one third the width of the vertex. Front, parallel-margined, its greatest width through middle; the median carina distinct. Pronotum exceeded at sides by eyes. Mesonotum over one third longer than pronotum, a distinct transverse groove near anterior end and a faint median carina present but not reaching apex. Tegmina semiopaque, not much longer than wide, their greatest width just posterior to apex of clavus at which region they are distinctly inflated; the veins coarse, outlining small cells, the costal margin at base considerably reflexed; venation characteristic for the species with vein R not angled but merely rounding, distinctly nearer Sc than M, vein M forked very near base, vein M₁₊₂ separating into M₁ and M₂ slightly posterior to middle of tegmen, vein M₃₊₄ simple, curving more toward Cu_{1a} than in most species except *D. fusca*.

Male genitalia. Anal flap which is an external ventral extension of the tenth abdominal segment, not quite twice as long as broad, slightly bilobed at tip. Eleventh abdominal segment scarcely visible, its dorsal stylus long and slender.

Harpagones (genital styli of authors) visible externally on ventral side as two broad, platelike lobes, but which appear to be dovetailed into abdomen more than in most species. From a flattened lateral

view (see drawing 21, plate XLI) each harpago is subquadrangular and has its posterior dorsal corner prolonged dorsad into a slender process recurved at tip around aedeagus, a short broad spine or hook placed externally at the base of this dorsal extension. The aedeagus is distinctly different from *clathrata* and other species. Unfortunately the drawing is a composite one made from a poor slide, yet the differences are so distinct that it leaves little doubt as to this being a distinct species.

The aedeagus as viewed from the right side is a long slender tube bearing one long recurved hook midway of its length and a two-hooked extension attached at its extreme base, these hooks showing beyond the theca as two equal, adjoining and heavily sclerotized hooks which curve only slightly dorsad. As viewed from the left side the tips of the three hooks only are visible. The theca is a semimembranous tube, covering about one half of the aedeagus at its base. As viewed from the right side it has a truncate, posterior margin and from the left side has its ventral region extending more caudad into a broad truncate flap. (See drawings 2a and 2b, plate XXXVIII.)

Female genitalia. Anal flap (10th segment) as drawn attached to specimen about twice as long as broad with the genital stylus long and slender. The external valves of the ovipositor as viewed from the ventral side are broadest at a point from base which is about three-fourths of the total length of the valves, their combined widths at this point greater than the length of the valves.

Comparative notes. This species is distinguished externally from all other species by the uniform dark-brown color, the small size of the cells of the tegmen, the characteristic broadness of the tegmen and the forking of vein M_{3+4} . It more closely resembles *D. clathrata* than any other species, but it differs externally from this species by lacking the hyaline cells in the corium and by having vein M separated near base of wing and vein R distinctly nearer to Sc_2 than M. The male genitalia easily distinguish this species from all other species and are especially significant in separating it from *D. clathrata*.

Data on distribution. Melichar lists this from California. The data on paratype material assigns this species to Placer county, California, collected in October. Perhaps the lateness of the season accounts for the scarcity of specimens. It appears to be the rarest species in the genus.

Type specimens are located in the U. S. National Museum at Washington, D. C.

Dictyssa clathrata Melichar, 1906

Melichar, Leopold. Monographie der Issiden (Homoptera). Abh. k. k. Zool.-Bot. Ges. Wien, III, pt. 4, 1906.

Size. Length of body to tip of tegmen, 3.3 mm. to 3.6 mm. Length of tegmen, 2.7 mm. to 3.15 mm.; width of tegmen, 2.25 mm. to 2.7 mm.

Color. Body pitch brown except the ventral side of thorax, which is light brown. Margins and faint median line of vertex tan. Margins of pronotum darker brown than disc. Margins and carinae of mesonotum tan. Median carina of frons and clypeus tan, rest of frons pitch brown, clypeus somewhat lighter. Tegmina typically pitch brown except for oblique band of hyaline or milky, semi-transparent cells across clavus and corium and 5 small, round, whitish, semitransparent cells along extreme apical margin. Legs pitch brown.

NOTE.—Variation in color occurs in this species to the extent of the head and thorax being golden brown as opposed to pitch brown of the tegmina or sometimes the latter also become golden brown likewise.

Structural characteristics. Vertex broad and short, length through middle one half the length of pronotum at middle. Greatest width of eyes approximately one half the width of the vertex. Frons with lateral margins parallel, its length along middle equal to the length of the postclypeus; the median carina distinct, running into a faint transverse carina which does not reach to lateral margins. Mesonotum not quite twice as long as pronotum on median line; a distinct transverse groove along anterior border which does not reach to the lateral margins; a faint median carina present and two lateral carinae faintly indicated. Tegmina semiopaque, somewhat inflated, approximately one ninth longer than wide, their greatest width in line with apex of clavus; the veins coarse, outlining small cells, the costal margin narrowly expanded on basal half; venation characteristic of the species with vein R not angled but merely rounding, distinctly nearer to M_1 than Sc_2 , vein M forked only slightly anterior to middle, vein M_{1+2} separated posterior to middle, vein M_{3+4} curving more toward Cu_{1a} than in most species.

Male genitalia. Anal flap (10th segment) not quite twice as broad as long, slightly notched at tip. The eleventh segment slightly visible, its dorsal stylus approximating it in length.

Harpagones (genital styli) visible externally on ventral side as two slenderly pointed flaps, the rest of the abdomen showing considerably beyond them. From a flattened lateral view (see drawing 20, plate XLI) each harpago is roughly quadrangular but has

its posterior, dorsal region extended into a slender process, truncate at tip and only slightly curved, the whole process being shorter than that of *D. fusca*. At the base of this dorsal extension is a slender, pointed ventrad curving external hook.

The eadeagus as viewed from the right side is a curved tubular structure bearing a short slender pointed hook midway of its length and a broad, well sclerotized hook attached near its base but extending well beyond the theca almost to the tip of the aedeagus. On the left side the aedeagus bears no hooks. The theca as viewed from the right side extends a little beyond the basal third of the aedeagus and is truncate anteriorly. From the left view it appears as an elongate broad flap, extending almost to apex of the aedeagus.

Female genitalia. Anal flap (10th segment) as drawn on specimen broader through basal half and tapering slightly to a truncate apex. The external valves of the ovipositor very broad in proportion to length, their greatest width being just slightly posterior to the middle.

Comparative notes. This species is separated externally from the majority of species by its very broad and characteristically shaped tegmina, and the small cells in the wing and especially those making up the hyaline or light band. It clearly resembles *D. fusca* Melichar in size and shape of tegmina. It is separated externally from the latter by the presence of the oblique band of hyaline cells and the apical row of five round white cells as well as by the fact that the greatest width of each tegmen is anterior to the apex of the clavus in *clathrata* but posterior in *fusca*, and that vein R is distinctly nearer to vein M than Sc_2 and vein M is separated only slightly anterior to middle. The male genitalia distinctly separate this species from every other member of the genus.

Notes on distribution. Melichar lists this species from California. Recently specimens have been taken by Mr. Paul Oman and R. H. Beamer from Redding, Cal., in June, and from Sacramento county, California, by L. D. Anderson in August. The author had available for study 8 specimens. Apparently this species, like *fusca*, is not a common one.

Dictyssa marginepunctata Melichar, 1906

Melichar, Leopold. Monographie der Issiden (Homoptera). Abh. k. k. Zool.-Bot. Ges. Wien. III, pt. 4, 1906.

Size. Length of body to tip of tegmen, 3.15 mm. to 3.5 mm. Length of tegmen, 2.7 mm. to 2.85 mm.; width of tegmen, 1.8 mm. to 2.1 mm.

Color. This is the darkest species in the genus. Body color is dark brown except for light brown or yellow on margins and median stripe on vertex, median carinae and lateral and posterior margins on pronotum and mesonotum, median carina of frons and two spots on gena, one dorsad of antenna and one ventrad. Tegmina uniform blackish-brown, the conspicuous veins lighter or even reddish and a conspicuous row of semitransparent white spots, numbering about twelve to fifteen, sometimes practically uniform in size, in other specimens alternately small and large, those in the costal margin rectangular and crowded together. Legs blackish-brown.

NOTE.—One color variation is noted in some specimens, namely a bright yellow head or thorax contrasting sharply with the pitch-black tegmina.

Structural characteristics. Vertex characteristically broad and short, slightly more than twice as broad as greatest width of eye, length through middle about half length of pronotum. Frons broad, subequal in length and width, with a distinct, well-elevated median carina. Pronotum with a faint median carina and laterad of it on either side a small circular depression. Mesonotum with a faint median carina and in center of each lateral third a shallow depression. Tegmina coriaceous with distinct elevated veins, their greatest width on a line even with apex of clavus, their posterior margins evenly rounding, the costal margin somewhat expanded at base; venation characteristic of the species with the angle in vein R indicated but not pronounced and vein R at this point closer to vein M_{1+2} than Sc_2 , mainly due to the fact that the latter runs nearer middle of tegmen; vein M_{1+2} single.

Male genitalia. Anal flap (10th segment) slightly broader than one half its length, with its apical margin shallowly emarginate. The eleventh segment not always visible, its dorsal stylus an elongate fingerlike lobe.

Harpagones (genital styli) from an external ventral view broad at base and tapering at their apices, not much of abdomen visible beyond them. From a flattened lateral view (see drawing 19, plate XLI) each harpago is roughly quadrangular with its posterior dorsal corner extended into a short, sharply pointed process, at base of which is a broad, shallow, small external hook.

The aedeagus as viewed on the right side is a long, curved tubular structure bearing a sharply pointed sclerotized hook attached at a point from apex of aedeagus, which equals in distance about one fourth the total length of the aedeagus and shows the apices of two heavily sclerotized, sharply pointed basal hooks, one of which ex-

tends beyond the theca a little more than twice as far as the other does. On the left side the aedeagus bears an apical hook which is attached at a point from apex of aedeagus that equals in distance about one third the total length of the aedeagus. The two basal hooks show again from this view. The theca on the right side extends over the aedeagus not quite half its length and is angularly produced on posterior margin. On the left side the theca is extended posteriorly into a finely tapering spinelike process. (See drawings 11a and 11b, plate XXXIX.)

Female genitalia. Anal flap (10th segment) broadest through middle, suddenly tapering to a roundly pointed apex. The external valves of the ovipositor very broad in proportion to length, their greatest width being just slightly posterior to the middle.

Comparative notes. In size and shape of tegmina very similar to the *obliqua* and *mutata* group. It differs from these species by the uniform dark-brown tegmina with the sharply contrasting white apical and costal spots and the small cells throughout the length of the tegmina. It differs from other species by the characteristic shape of the tegmina. The male genitalia definitely distinguish it from other species.

Notes on distribution. Melichar lists this species from California. It is described from a female specimen which is in the Signoret collection in Wien, Austria. The author studied nine specimens collected in San Diego county, California, by Paul Oman, and at Campo, Beaumont and Jacumba, Cal., by R. H. Beamer in July and August.

Dictyssa mutata Melichar, 1906

Melichar, Leopold. Monographie der Issiden (Homoptera). Abh. k. k. Zool.-Bot. Ges. Wien, III, pt. 4, 1906.

Size. Length of body to tip of tegmen, 3 mm. to 3.3 mm. Length of tegmen, 2.4 mm. to 2.7 mm.; width of tegmen, 1.8 mm.

Color. Head, pronotum and scutellum uniform pale-yellowish or brownish-yellow. Thorax tawny yellow. Abdomen somewhat darker yellow washed in brown, especially at lateral carinae and on the genitalia. Legs, tawny yellow. Tegmina with wing pattern characteristic of the *mutata-obliqua* group. In this species the vitreous, oblique band of cells starts at base of clavus, runs posteriorly slightly beyond middle, then bends abruptly ventrad, ending in the costal margin. The central hyaline cell located between veins M and R is much larger than any other cell in wing, is distinctly

ovate in shape, its posterior boundary situated two thirds of the wing length from the base of the wing, its margins studded with 5 to 9 short, dark spurs of veins. The second largest hyaline spot lies dorsad and cephalad of the central cell, a group of small, roundish hyaline cells, varying in number from 2 to 5, or else one large cell, adjoin the central cell at its caudo-ventral angle, and beyond these on the costal border is a median-sized elongate pellucid cell. The entire apical and costal margins of the tegmen are studded by pellucid disclike or semicircular spots which are not uniform in size but which frequently alternate between large and small ones.

Structural characteristics. Vertex broad and short, length through middle one half the length of the pronotum. Greatest width of eyes one half the width of vertex. Pronotum with anterior margin roundly produced and its posterior margin shallowly concave; its length through middle one half the length of mesonotum at middle; the median carina not present or only faintly discernible; two small, depressed, round spots on disc, one on each side of median line. Mesonotum with no median carina distinctly visible; a shallow depression in disc on each side of median line and a transverse groove at base of apical prolongation. Frons, subequal in length and width, parallel-margined, the median carina very distinct but fading away before reaching postclypeus. Postclypeus with posterior margin angularly produced into frons for a distance equal to about one third of the total length of the latter. Tegmina approximately one fourth longer than wide, their greatest width posterior to apex of clavus showing a great contrast between the hyaline cells and the opaque brown cells, both in texture and size; the largest cell in the wing, located on disc of corium between veins R and M, is in length approximately about one third the total length of the tegmen, and its width is approximately two thirds of its length, although its size is subject to some variation; veins of the tegmen coarse, outlining cells of varying sizes; the costal margin moderately expanded; wing venation characteristic of the species with a distinct angle in vein R, located more posteriorly than in some species, at a point approximately at base of apical third of wing, the area between R at this point and vein M_{1+2} equal to space between R and Sc_2 ; vein M_{1+2} single.

Male genitalia. Anal flap (10th abdominal segment), its width approximately two thirds of its length, its posterior margin truncate. Eleventh segment scarcely visible, its dorsal stylus a short finger-like projection.

Harpagones (genital styli) visible externally as two triangular plates, not much of abdomen visible beyond their apices. From a flattened lateral view (see drawing 22, plate XLI) each harpago is subquadrangular and has its posterior dorsal corner prolonged dorsad into a sharply pointed short process, at base of which is a recurved short broad external flap.

The aedeagus as viewed from the right side is a long slender tube bearing a slender, sclerotized, sharply pointed projection attached at the base of its apical third and two basal hooks, the apical half only of which shows beyond the theca. These latter two hooks are of unequal size, the dorsal one very slender and sharply pointed, the ventral one broad at base and gradually tapering to a recurved slender tip. On the left side the aedeagus bears an apical projection also, but this one is attached nearer to the middle of the aedeagus. The theca envelops the aedeagus at its base not quite half its length. On the right side it is truncate posteriorly. On the left side it extends posteriorly as a sharply pointed, slightly sclerotized spine, which very easily can be missed, since a process of the aedeagus usually covers it.

Female genitalia. Anal flap as drawn while attached to specimen approximately one third longer than wide, tapering posteriorly to a roundly pointed apex. The eleventh segment and dorsal stylus approximately very small. The external valves of ovipositor broadest at a point about midway of their length, their combined width much greater than their length.

Comparative notes. This species is quite easily separated from the majority of the species in the genus by the presence of the large central hyaline cell. Other species in the genus having a large central cell likewise are *D. areolata*, *D. obliqua*, *D. fenestrata*, *D. ovata* and *D. balli*. From *D. areolata* it is easily separated by the much larger size of body of *areolata* and by the fact that vein R in the latter is so far removed from Sc. From *D. fenestrata* it is likewise easily separated by lacking the second transverse band of hyaline cells across apex and by having the angle of vein R not as close to M_{1+2} as in that species. *D. balli* is easily distinguished from other species by its elongate form and very long central cell between veins R and M. In *D. ovata* the hyaline band does not reach the costal margin and the angle in vein R is very near the middle of the wing, both of which characters are distinctly different from *mutata*. From *D. obliqua* and *D. monroviae*, *mutata* is not so easily distinguished. In fact, these three species seem to be repre-

representatives of a rather unstable group in the genus, for specimens of various localities show any number of variations in the cells and veins of the tegmina. The writer believes that *D. mutata* and *D. obliqua* are both good species, since their genitalia are distinctly different. Externally the only distinguishable characters are the color of the head and thorax, which is yellow in *mutata* and dark in *obliqua*, and the angle of vein R being at base of apical third of tegmen in *mutata* but nearer the middle in *obliqua*, while vein R is equidistant from vein Sc_2 and vein M_{1+2} in the former and nearer M_{1+2} in the latter. Any number of gradations from these typical types can be found. The writer took only the form differing most widely from either of these forms, both in genitalia and external characters, and described it as a new species, namely *monrovia*. If typical examples of all three species are compared *monrovia* shows a noticeable difference in the tegmina by having much larger hyaline cells on both the discal area and apical margin. It is separated, furthermore, from *obliqua* by having the angle in vein R located as in *mutata* at base of apical third. It is separated from *mutata* by having R nearer vein M_{1+2} than vein Sc_2 , as in *obliqua*.

Notes on distribution. The species was described from a male taken in Los Angeles county, California, and one at Claremont, Cal., collected by Baker. The former type is in the U. S. National Museum and the latter in Melichar's collection. This seems to be a common species. Specimens are at hand for study from San Bernardino, Cal., collected by Coquillet, and the following places in California, collected by R. H. Beamer in August: Big Bear Lake, San Jacinto Mountains, Beaumont and Orange county.

Dictyssa fenestrata Ball, 1910

Ball, E. D. New Genera and Species of Issidae. Proc. Biol. Soc. Wash. XXIII, pp. 41-46, 1910.

Comparative notes. *D. fenestrata* belongs in the *mutata-obliqua* group, which it resembles in shape of tegmina and size. Its measurements are as follows: length from tip of head to apex of tegmina, 3 mm. to 3.4 mm.; length of tegmen, 2.7 mm. to 2.9 mm.; width of tegmen, 1.8 mm. to 1.9 mm. This species is separated from other species by the following characteristics: the elongate tegmina, which are widest at a point some little distance back of apex of clavus, the uniform brown color of tegmina with lighter veins, the extremely large hyaline cells and spots across apex and in the oblique band of clavus and corium, and the presence of a transverse band of hyaline cells, numbering 5 or 6, just back of middle of

corium which no other species possesses; an acute angle is present in vein R just posterior to middle, at which point this vein is much closer to M_{1+2} than Sc_2 , vein M_{3+4} sometimes is crowded toward clavus so that it coalesces with or obliterates the tip of vein Cu_{1a} , and vein Cu_1 is usually two-branched.

Male genitalia. Anal flap (10th abdominal segment) twice as long as wide, only slightly emarginate at apex. Eleventh segment small and usually invisible, its dorsal stylus large and conspicuous.

Harpagones (genital styli) visible externally as two pointed triangular plates, the anal flap visible a short distance beyond their apices. From a flattened lateral view (see drawing 15, plate XLI) each harpago is subquadrangular in shape, narrowed at base, bulging at middle, and with the posterior, dorsal angle prolonged dorsad as a short, bluntly pointed projection, at base of which is a short, recurved, external hook.

The aedeagus is a slender, tubular structure, its apex curving toward its base in such a way as to almost outline a complete circle. On the right side it bears a flattened, very sharply tapering projection attached at about base of apical third and which extends to apex of the aedeagus. At base the latter bears also two heavily sclerotized hooks, of which only the apices show beyond the theca, the dorsal one of these hooks curving slightly dorsad, the ventral one almost straight and extending beyond theca for only half the distance that the other one does. On the left side the aedeagus bears another flattened, tapering projection which is attached at base of apical third and extends to apex of aedeagus. The theca envelops the aedeagus for approximately one third its length. On the right side the posterior margin is truncate. On the left side its posterior dorsal angle extends posteriorly as a sharply pointed process closely adpressed to the side of the aedeagus.

Female genitalia. Anal flap partially covered at base by ninth abdominal segment, roundly pointed at apex. The eleventh segment inconspicuous and bearing a slender dorsal stylus. The external valve of ovipositor broadest through middle, the length approximately one and one half times its width.

Notes on distribution. Doctor Ball described this species from six specimens collected at Tia Juana, Cal. The author greatly appreciated the gift of one type for study and from which the drawings have been made. Mr. Paul Oman of the United States National Museum collected a series of twenty-two specimens from Del Mar, Cal., on June 2, 1935.

Dictyssa ovata Ball, 1910

Ball, E. D. New Genera and Species of Issidae. Proc. Biol. Soc. Wash. XXIII, pp. 41-46, 1910.

Comparative notes. This is one of the broader species in the genus, with the following measurements: from tip of head to apex of tegmina, 3.3 mm. to 3.6 mm.; length of tegmen, 2.85 mm. to 3.15 mm.; width of tegmen, 2.1 mm. to 2.5 mm. It is easily separated from other species by the following characteristics; the circular shape of the tegmen with the very broadly expanded costal area, the abbreviated oblique hyaline band which does not reach the costal margin, and the almost circular central hyaline cell of this band between veins R and M, caused by vein M curving toward anal region and vein R toward the costal margin; a distinct angle present in vein R very near middle of wing, at which point R is much nearer to vein M_{1+2} than vein Sc_2 ; vein Sc_2 breaking up into a network of veins at a point midway of the length of the central cell.

Male genitalia. Anal flap (10th abdominal segment) very long, more than twice as long as wide, its posterior margin shallowly emarginate. Eleventh segment, short and inconspicuous, the dorsal stylus proportionally long and prominent.

Harpagones (genital styli) visible externally as two-pointed triangular plates, the anal flap visible for considerable distance beyond their apices. From a flattened lateral view (see drawing 17, plate XLI) each harpago is subquadrangular in shape, much more broadened across apical region than in most species, the posterior dorsal angle drawn out into a recurved projection, ventrad of which is a short, recurved, external hook.

The aedeagus is a much curved, tubular structure, bearing on the right side a sharply tapering flattened process which is broadly attached at base of apical third and two basal heavily sclerotized hooks, whose ventrad curving apices show considerably beyond the theca, the ventral one of the two about two thirds as long as the dorsal one. On the left side the aedeagus bears a sharply pointed flattened process attached slightly posterior to middle. The theca envelops the aedeagus for about half its length. On the right side its posterior margin is truncate. On the left side its posterior dorsal angle extends caudad as a sharply pointed projection to a point at about base of apical third of the aedeagus.

Female genitalia. Anal flap broad at base, roundly pointed at apex. Eleventh segment inconspicuous, bearing a slender dorsal

stylus. External valves of ovipositor longer than in most species, their combined width not much greater than their length, their greatest width at base of apical third.

Notes on distribution. Doctor Ball described this species from eight examples from Tia Juana, Mexico, and Tia Juana, Cal. He very kindly gave the author a type male and female for study. This seems to be a very rare species.

Dictyssa obliqua Ball, 1910

Ball, E. D. New Genera and Species of Issidae. Proc. Biol. Soc. Wash., pp. 41-46, 1910.

Comparative notes. This species is a trifle larger than *D. mutata*, measuring 3.3 mm. to 3.6 mm. from apex of head to tip of tegmina, and each tegmen 2.7 mm. to 3 mm. long and 1.8 mm. to 2.1 mm. wide. It is separated from the various species in the genus by the following characteristics; a dark-brown head and thorax, margined in yellow; its tegmina about one fourth longer than their width, their greatest width at a point even with apex of clavus or just slightly posterior, the hyaline oblique band of cells across corium and the apical row of semicircular or elongate ones arranged as, and similar in size to, those in *D. mutata*; the venation of these two species, however, differing in that *D. obliqua* has the angle of R more anterior than *D. mutata*, located just slightly posterior to middle and vein R is usually nearer to vein M_{1+2} than Sc_2 , while in *D. mutata* it is about equidistant from veins R and Sc_2 ; vein M_{1+2} single. For further comparative notes see the discussion under this heading in the description of *D. mutata*.

Male genitalia. The genitalia are distinctive for this species. Anal flap (10th abdominal segment) elongate, not quite twice as long as width, its posterior margin shallowly emarginate. Eleventh segment inconspicuous, its dorsal stylus small.

Harpagones (genital styli) visible externally as two pointed triangular plates, the anal flap visible for some distance as viewed from the ventral side, beyond their apices. From a flattened lateral view (see drawing 26, plate XLI) each harpago is subquadrangular in shape, its basal half somewhat narrowed, the posterior dorsal angle prolonged dorsad into a short, sharply pointed projection, at base of which is a short, broad, recurved external hook.

The aedeagus as viewed from the right side is a long, much curved tubular structure, bearing a sharply pointed flat projection attached at approximately the base of its apical fourth and two basal hooks,

whose apices show beyond the theca, the ventral one shorter and curved slightly dorsad, the other one extending beyond the thecal margin twice as long as the other one and curved ventrad at tip. On the left side the aedeagus bears a pointed flat projection attached at about base of apical third. The theca envelops the aedeagus at base for not quite half of its length. On the right side it is truncate posteriorly. On the left side its posterior dorsal angle extends caudad to a point a little beyond middle of aedeagus, but does not form the long slender hook as in *D. mutata* or *D. monrovia*na.

Female genitalia. Anal flap approximately one third longer than wide, tapering posteriorly to a roundly pointed apex. The eleventh segment small, showing very little, bearing a slender dorsal stylus. External valves of ovipositor broadest at a point midway of their length, their combined width greater than their length.

Notes on distribution. The type specimens are in Dr. E. D. Ball's collection, Tucson, Ariz. He collected twelve specimens from Tia Juana, Cal., and Tia Juana, Mexico. The writer had a long series of specimens to study collected from the following places in California: Alpine, Campo, San Diego county and Claremont county, by R. H. Beamer, in July and August.

Dictyssa transversa Van Duzee, 1914

Van Duzee, E. P. A Preliminary List of the Hemiptera of San Diego county, California. Trans. San Diego Soc. of Nat. Sci., 2, p. 41, 1914.

Comparative notes. This is the smallest species in the genus, with the following measurements: length from apex of head to tip of tegmina, 2.5 mm. to 2.75 mm.; length of tegmen, 2 mm. to 2.25 mm.; width of tegmen, 1.1 mm. to 1.25 mm. It is easily distinguished from other members of the genus by the whitish hyaline tegmina, reticulated with heavy brown nerves and crossed by two brownish fuscous bands, one located just anterior to apex of clavus and the other at base of apical fourth of the corium; the wing venation is characteristic; vein Sc is simple; vein R is not angled but broadly sinuate, extending nearer to vein M_{1+2} than Sc_2 ; veins M and Cu_1 both branched about the same distance from base at a point just anterior to middle; all veins rather straight and running more or less parallel.

Male genitalia. Anal flap (10th abdominal segment) long, slender with lateral margins parallel and posterior margin rather broadly concave, its length a little over twice its width. The eleventh segment inconspicuous and its dorsal stylus short and broad.

Harpagones (genital styli) visible externally as triangular plates, which are twice as broad at base as at their tips; the anal flap scarcely visible beyond their apices; each harpago is quadrangular with dorsal and ventral margins parallel, except for the posterior dorsal angle which is prolonged dorsad into a slender process which is slightly recurved at tip and at base of which is located a short, broad external hook.

The aedeagus is a curved tubular structure. On the right side it bears a small, sinuately curved, well-sclerotized spine attached at middle, and two sclerotized hooks or processes attached near base and which extend beyond theca for only part of their length. The dorsal one of these is almost straight and extends beyond theca only about one third as far as the other; the ventral one, curving to a sharp ventrad curving point, extends almost to middle of the aedeagus. On the left side the aedeagus bears a short projection attached at apex of its basal third. The theca on the right side envelopes the aedeagus for only about one fourth the length of the latter and is truncate posteriorly. On the left side its dorsal angle extends caudad as a sharply pointed, partially sclerotized projection for a distance equaling about two thirds the length of the aedeagus.

Female genitalia. Anal flap short, and in length about one fourth greater than wide. The eleventh segment is barely visible and possesses a long dorsal stylus. The external valves of the ovipositor have their greatest width at a point just posterior to the middle; the length of each valve is approximately one third greater than the width.

Notes on distribution. Mr. Van Duzee in the original description gives the following notations: "Described from numerous specimens mostly taken on the slopes of Mt. Soledad at La Jolla, from Sept. to Nov. Also taken at Alpine in Mar. and Oct. and at Torrey Pines in June. Like most of its congeners it lives on *Artemisia*." Dr. R. H. Beamer collected a small series of these at San Diego, Cal., in August, 1935.

Dictyssa quadravitrea, n. sp.

ORIGINAL DESCRIPTION

Size. Length of body from apex of head to tip of tegmen, 2.7 mm. Length of tegmen, 2.1 mm.; width of tegmen, 1.5 mm.

Color. General color of body yellowish-brown; tegmina also yellowish-brown with large hyaline cells through middle. Vertex, pronotum and mesonotum from above uniformly yellowish-brown.

Eyes dark brown. Disc of frons yellowish-brown; margins dark, outlined in brown. Postclypeus and genae likewise uniformly yellow-brown. Clavola of antennae dark brown. Thorax from under side slightly lighter than rest of body. Legs tan or yellow-brown as well as most of abdomen except for median margins of ovipositor valves, which are dark. Tegmina yellowish-brown except for the following variations: a dark spot at base; an oblique hyaline band, which starts on clavus at its middle, runs posteriorly to a point just beyond middle of corium, then bends ventrad and extends as a transverse band to the costal border; numerous ovate whitish hyaline spots in the apical and expanded costal borders.

Structural characteristics. Vertex somewhat produced cephalad beyond eyes, its anterior margin quite straight, its lateral margins slightly converging anteriorly, the length at this point equal to length of pronotum at middle. Greatest width of eyes approximately one third of the width of the vertex. Pronotum with anterior margin roundly produced and its posterior margin shallowly concave; its length through middle approximately two thirds of the length of the mesonotum; the disc somewhat depressed, in each half of which just laterad of median line is a faint round depression. Mesonotum with a faint median carina present, laterad of which on either side the disc is somewhat depressed; a faint transverse groove across base of apical projection. Frons slightly wedge-shaped, being broader at its extreme posterior end due to lateral margins converging slightly anteriorly; lateral margins considerably elevated; length and width subequal. Postclypeus dovetailed into frons a short distance only. A distinct median carina present on both frons and clypeus. Tegmina narrowed greatly at base where their width is only about one third of their width at apex; their greatest width beyond apex of clavus at a point which is at base of apical third; the costal border narrowly expanded; the cells large, very angular, many of them rectangular or hexagonal in shape, which together with the hyaline texture gives a characteristic look to the wing of resembling panes of glass in a window. Venation of the tegmen as follows: vein R mostly sinuate with a slight angle located just posterior to middle, at which point vein R is equidistant from Sc_2 and M_{1+2} ; vein M_{1+2} straight, running lengthwise at about median line of tegmen; vein M_{3+4} simple, but making a bend dorsad to meet Cu_{1a} .

Female genitalia. Anal flap (10th abdominal segment) two thirds as wide as long, its lateral margins parallel for two thirds of the length, from whence they taper to a rounded apex. The eleventh

segment only slightly visible and bearing a short dorsal stylus. External valves of ovipositor with their length one third greater than their width and their greatest width through middle.

Comparative notes. This species was described from only one female specimen but, since it was distinctly different from any other species in the genus or even in the subfamily, it seemed advisable to describe it even though lacking a series of specimens. The following structures are the most distinguishing characters: the somewhat anteriorly produced vertex, the wedge-shaped frons, the extreme narrowness at base of the tegmen, and the presence in the tegmen of extremely large angular cells and the broad oblique band of hyaline cells across the corium.

Location of types. The holotype female is in the National Museum at Washington, D. C. The labels on the specimen state that it is from the P. R. Uhler collection and was taken in Placer county, California, in October.

Dictyssa beameri, n. sp.

ORIGINAL DESCRIPTION

Size. Length of body from tip of head to apex of tegmina, 2.38 mm. to 2.75 mm. Length of tegmen, 1.875 mm. to 2.13 mm.; width of tegmen, 1.395 mm. to 1.5 mm. This is one of the smallest species in the genus.

Color. General color dark brown variegated with yellow on body and many whitish hyaline cells on tegmina. Vertex brown except for a yellow median line and a spot at each lateroposterior corner. Pronotum brown except for a narrow median line, a large spot occupying each lateral half of disc and all the margins yellow. Mesonotum dark brown through central half, each lateral fourth light yellow with a brownish spot in center and all margins light. Frons brown except for pale yellow on median carina, a narrow border inside brown outer margins and an irregular longitudinal streak down middle of each lateral half which converges with the one from opposite side below the abbreviated median carina. Postclypeus brown except for anterior border and median carina, which are somewhat lighter. Gena above and around antenna brown; just below a broad pale band. Underside of thorax pale yellow. Abdomen of male pitch brown. Abdomen of female yellowish-brown; genital appendages dark brown. Legs dark brown. Tegmina pitch brown with small whitish hyaline areas in the following places: on clavus in the center of each small cell; on corium, four elongate cells follow-

ing the claval suture and a cluster of cells just caudad of claval apex; an oblique band of many cells starting at a point midway of clavus and extending across corium to a point on costal border at about base of apical third of tegmen; in apical border small, round, uniform spots, numbering six or seven; costal border with spots between the brownish veinlets and two clusters of small cells just mesad of costal vein.

Structural characteristics. Vertex very broad and short, its lateral margins elevated and slightly converging anteriorly, somewhat depressed across disc. Greatest width of eye less than half the width of the vertex. Pronotum with anterior margin rounding and considerably produced forward; its length through middle about twice that of vertex at middle; a median carina only faintly discernible; two small, depressed, round spots on disc, one on each side of median line. Mesonotum with its anterior margin roundly produced; in length twice as long as pronotum at middle; a distinct median carina present and a transverse groove just posterior to anterior margin but not reaching to the sides; a transverse groove at base of apical prolongation; shallow depression in center of each lateral half. Tegmina broadest at a point in line with apex of clavus, the apical margin evenly rounding, the costal border moderately expanded; veins prominent, cells small; veins M and Cu_1 branching at a point just anterior to apex of clavus, vein M_{1+2} running through center of tegmen and branching at base of apical third, vein R with no acute angle, broadly sinuate, almost equidistant from veins M_1 and Sc_2 .

Male genitalia. Anal flap (10th abdominal segment) shorter than in most species, its width about three fifths of its length; its lateral margins slightly concave through middle; its posterior margin distinctly notched at middle. The eleventh segment only slightly visible externally and bearing a short dorsal stylus.

Harpagones (genital styli) visible externally as two triangular plates, which are broad at base but taper to slender apices beyond which is visible a small portion of the anal tube. Each harpago as viewed from a flattened lateral position (see drawing 16, plate XLI) is roughly rectangular, broadest through apical third, with the ventral margin outwardly curved and the dorsal posterior angle prolonged dorsad into a flat hook with a recurved, pointed apex. At the base of the dorsal projection is a ventrad curving flat external hook.

The aedeagus as viewed from the right side is a short tubular structure bearing a flat, pointed projection attached at middle and extending caudad to base of apical fourth. Another well-sclerotized

hook attached to base of aedeagus, whose apex only shows beyond theca as a dorsad-curving stout hook. On the left side the aedeagus is practically covered by the membranous theca, which is prolonged caudad more than in most species as a flat plate. On the right side the theca covers the aedeagus for only the basal third of the latter and has its posterior margin truncate.

Comparative notes. This little species is readily distinguished from other species by the following characters: the tegmina are reticulated into many small cells, of which many are whitish hyaline and contrast strongly with the deep fuscous or dark-brown coloration of the rest of the wing; in fact, the pattern of the wing is very similar to that of the genus *Dictyobia*; the wing venation is distinctive in that the veins all run more lengthwise of the wing; vein R is not angled but only broadly sinuate, and therefore equidistant from veins Sc_2 and M_1 and vein M_{1+2} divides before apex, which it does not do in any other species. The male genitalia is quite distinct from those of other species (see drawings 7a and 7b, plate XXXIX).

Location of types. This species was described from a holotype male, collected at Carson City, Nev., August 9, 1929, and an allotype female, same date, by R. H. Beamer. These types are in the Francis Huntington Snow Entomological Collection at the University of Kansas.

Dictyssa balli, n. sp.

ORIGINAL DESCRIPTION

Size. Length of body from apex of head to tip of tegmen, 3 mm. to 3.1 mm.; length of tegmen, 2.25 mm. to 3 mm.; width of tegmen, 1.5 mm. to 1.6 mm.

Color. General body color fulvous, washed in brown. Vertex dark brown with a faint yellow median line. Pronotum and mesonotum brown with a broadish white median line. Frons and clypeus uniform brown. Under side of thorax and abdomen yellow. Legs yellow with brown-tipped spines. Tegmina uniformly pitch brown with a greatly contrasting band of whitish hyaline cells extending lengthwise across corium from base of clavus to a point somewhat anterior to apical margin of corium; the entire apical margin studded by pellucid disclike or semicircular spots which are practically all of equal size.

Structural characteristics. Vertex broad and short, its lateral margins tapering anteriorly, its length through middle about one half the length of the pronotum. Greatest width of eyes about one

half the width of the vertex at its anterior margin. Pronotum with its anterior margin rounding and its posterior margin very shallowly emarginate; two small depressed, round spots on disc; its length through middle one half the length of the mesonotum at middle. Mesonotum with a transverse crease following posterior border of pronotum but not reaching to lateral margins; a faint median carina present; a shallow depression in disc on each side of median line and a transverse groove at base of apical prolongation. Frons with lateral margins outwardly bulging; length and width subequal; median carina distinct, not quite reaching clypeus. Postclypeus moderately inflated, dove-tailed into frons to a point about one fourth of the greatest length of the latter. Tegmina differing greatly from other members of the genus by their slenderness; each tegmen in length two fifths longer than wide, its greatest width at a point in line with apex of clavus; the apical margin sloping gently from apex of clavus, thence evenly rounding to the costal border; the costal border moderately expanded and crossed by numerous dark-brown veinlets; an oblique hyaline band present, made up of a spot on base of clavus and four cells on corium, the largest one of which is an elongate central cell between veins R and M and which is approximately twice as long as wide and has its border studded by 8 to 9 spurs of veins; the second largest cell lying posterior to this, usually angular in shape and about one fourth or one third of the size of the central cell; veins Sc and R running parallel and very close together for about two thirds of the length of the tegmen, at which point vein R makes a distinct bend toward vein M_{1+2} , which makes it in this region nearer to the latter vein than to vein Sc_2 ; M_{1+2} simple; vein Cu_1 branching somewhat more anteriorly than M.

Male genitalia. Anal flap (10th abdominal segment) narrow at extreme base, then broadening through basal third, from whence it narrows to a truncate apex; its length twice its width; a short dorsal stylus of the eleventh segment present, but none of the latter showing externally.

Harpagones (genital styli) visible externally as broad, triangular, flat plates whose apices are sharply pointed; the anal flap not visible to any extent beyond their apices. From a flattened lateral view (see drawing 24, plate XLI) each process is characteristically subquadrangular, broadest through apical third and with its posterior

dorsal corner prolonged dorsad into a short, pointed, slightly recurved process, at base of which is a short, broad, recurved external hook.

The aedeagus is a curved tubular structure. On the right side it bears a long, flat, sharply pointed projection attached midway of its length and extending posteriorly to about the base of the apical sixth of the aedeagus; also two hooks attached near base which are covered by the theca at their bases, the dorsal one extending beyond the theca about twice as far as the other, with its extreme apex curved ventrad and sharply pointed, the ventral one almost straight and bluntly pointed. On the left side the aedeagus bears also a flat, pointed projection which is attached somewhat posterior to the middle and extends almost to apex of the aedeagus. No additional basal hooks are found on this side. The theca on the right side covers the aedeagus at base for about one third the length of the latter; its posterior margin is shallowly concave. On the left side the theca is about the same as on the right side, except that its dorsal posterior angle is extended posteriorly as far as the middle as a slender, sharply pointed projection which resembles an aedeagal hook and its posterior margin seems to be divided at middle.

Female genitalia. Anal flap about one third longer than wide, sharply tapering to a blunt, narrowed apex. The eleventh segment scarcely visible, its dorsal stylus moderately long. The external valves of the ovipositor broadest through middle, in length about one third longer than wide.

Comparative notes. This species is easily recognizable by its elongate form. Dr. E. D. Ball, recognizing this species as new, was preparing to call this species *elongata*, but when the writer started revising this genus he very graciously relinquished any prior claim to it and told the writer to describe it. For this generosity and magnanimity of spirit the writer preferred to name the species in his honor, although *elongata* would have been a very descriptive name. It is much the longest and narrowest species in the genus. It can be recognized furthermore by the fact that the hyaline band on tegmen runs more nearly lengthwise than in other species, is abbreviated before reaching apex and has the central clear cell about twice as long as wide. For further comparative notes see the discussion under this heading in the description of *mutata*. The male genitalia are distinctive.

Notes on distribution. A long series of this species was taken by R. H. Beamer in August at Campo, Cal.

Location of types. In the Francis Huntington Snow Entomological Collection at the University of Kansas. Holotype, allotype, and paratypes from Campo, Cal., August 10, 1935, collected by R. H. Beamer.

Dictyssa monroviana, n. sp.

ORIGINAL DESCRIPTION

Size. Length of body from tip of head to tip of tegmen, 2.4 mm. to 2.9 mm. Length of tegmen, 2 mm. to 2.3 mm.; width of tegmen, 1.5 mm. to 1.6 mm.

Color. A fuscous brown species marked with hyaline on the tegmina. Vertex uniformly yellowish-brown with a faint median yellow line. Pronotum and mesonotum, uniformly yellowish or fuscous brown. Frons and clypeus uniformly brown. Underside of thorax and legs yellowish-brown. Abdomen dark brown. Tegmina with the oblique hyaline band very conspicuous and proportionally long; large, round or hemispherical whitish hyaline cells, alternating with small ones across apical margin and a cluster of three to four small hyaline cells just beyond apex of clavus in cells Cu_{1a} and Cu_{1b} ; rest of wings dark fuscous with veins frequently lighter in color.

Structural characteristics. Vertex slightly narrowed anteriorly, depressed through middle, its length through middle about one half the length of the pronotum. Greatest width of eye less than one half the width of vertex. Pronotum with all its margins elevated, usually no median carina present; two small faint depressed spots on disc. Mesonotum with median carina lacking or at most only faintly indicated; a transverse groove following anterior margin, but stopping either side before reaching lateral margins; length through middle twice that of pronotum. Frons with lateral margins parallel, considerably elevated; median carina distinct, but abbreviated before reaching apex; a broad depression on each side between lateral margin and median carina. Postclypeus with posterior margin angularly produced into the frons for a distance equal to about one third the length of the latter. Tegmina about one fourth longer than wide, broadest through base of apical fourth; its posterior margin truncate rounding, the costal margin broadly expanded; cells large with the hyaline area large in proportion to the opaque regions, the oblique hyaline band starting on clavus where it is very broad and

continuing across corium as about five very large angular cells, the largest one being on the disc between veins R and M and which is elongate oval in shape, in size at least twice as long as wide, and with its margins studded by 9 to 10 spurs of veins; two other large cells ventrad to this, the one on coastal border especially so; typically four to five large round or oval cells present on apical border, with smaller ones in between; vein R at apex of central hyaline cell making an acute angle which is at a point nearer to vein M_{1+2} than Sc_2 and as in *mutata* more posterior in the wing, usually at base of apical fourth; vein M_{1+2} simple.

Male genitalia. Anal flap (10th abdominal segment) about twice as long as wide and with an evenly rounding apex. Eleventh segment scarcely visible, its dorsal stylus very long and slender, reaching almost to apex of the flap.

Harpagones (genital styli) visible externally as triangular plates, broad at base and with tapering apices. Each harpago, from a flattened lateral view (see drawing 23, plate XLI), is rectangular in outline and has its posterior, dorsal corner prolonged dorsad into a slenderly pointed projection at the base of which is a slender, recurved, external hook.

The aedeagus is a curved, tubular structure, shorter than in many species. On the right side it bears a flat, sharply pointed process, attached at base of apical third and extending almost to apex. Attached to its base are two well-sclerotized hooks which are covered at their bases by the theca but extend beyond it, the ventral one to a point beyond middle of aedeagus and the dorsal one somewhat anterior to it. The ventral hook is more slender and has its pointed apex curved ventrad. The dorsal hook is blunt and nearly straight. On the left side the aedeagus bears no basal hooks. There is present a flattened, sharply pointed projection attached at base of apical third which almost reaches the apex. The theca on the right side covers slightly over one third of the aedeagus at base and has the posterior margin somewhat triangularly produced caudad. On the left side the theca also covers the basal third of the aedeagus, but has its dorsal angle prolonged caudad as a long, sharply pointed flap which in typical forms reaches almost to apex of the aedeagus.

Comparative notes. This species is recognized by the large hyaline cells and spots of the tegmina, especially that of the very large central cell, which is at least twice as long as broad. It more nearly resembles *D. mutata* and *D. obliqua* in size and shape. It resembles *D. obliqua* by having the head and thorax fuscous or darkish, but it

differs from it by having the angle of vein R located more posteriorly, approximately at base of apical fourth. It differs externally from *D. mutata* by having the head and thorax darkish or washed with fuscous, while in the latter the head is bright yellow; also, because vein R in *monroviana* approaches nearer to vein M_{1+2} than vein Sc. The aedeagus is more similar to *D. mutata* than that of any other species. Typical examples of the two species show the following differences: in *D. monroviana* the thecal hook is longer and is always visible, extending to middle at least and in some cases almost to tip of aedeagus, while in *D. mutata* the thecal hook is transparent, not readily distinguishable and does not extend beyond middle; as a general rule the dorsal aedeagal hook is proportionally smaller in *D. mutata* than in *D. monroviana*. Many gradating forms of the aedeagus between these two have been found, however, but all dark-headed specimens with the large hyaline cells have been placed under *monroviana*. For further discussion see notes under this heading in the description of *mutata*.

Location of types. Holotype male, allotype female and eleven paratypes, Monrovia, Cal., August 27, 1935, collected by R. H. Beamer, in the Snow Entomological Collection at the University of Kansas. In the same collection other paratypes from Laguna Beach, August 25, 1933, from Claremont, Cal., Aug. 29, 1935, and a long series from Orange county, California, collected by R. H. Beamer in August, 1929, and two paratypes from San Jacinto mountains, California, collected by L. D. Anderson and R. H. Beamer in August, 1929.

Dictyssa maculosa, n. sp.

ORIGINAL DESCRIPTION

Size. Length of body from apex of head to tip of tegmen, 2.5 mm. Length of tegmen, 2.13 mm.; width of tegmen, 1.38 mm.

Color. General color similar to *D. mutata* in that both species have dark-brown tegmina with bright-yellow heads and pronota. Vertex bright yellow with margins etched in dark brown. Eyes reddish-brown. Pronotum uniformly bright yellow except darker at extreme lateral margins. Mesonotum bright yellow except fuscous at lateral corners and in the depressed area either side of the median carina. Front uniformly yellow in the type female with margins faintly etched in dark brown; in the paratype female a group of dark spots speckled along lateral margins. Postclypeus bright yellow with traces of reddish or brownish oblique stripes on each side. Gena and rest of head bright yellow except pedicel of antenna, which

is fuscous. Underside of thorax bright yellow. Legs bright yellow with carinae of femora and tibiae and tips of tarsi and tarsal claws fuscous. Abdominal segments mostly yellow, a little darker at sides. External valves of ovipositor brown with their median margins much darker. Tegmina blackish-brown and very opaque except for the numerous whitish hyaline spots which in the main occur in the following regions: an oblique band starting on clavus where it occupies the basal third, then extends across corium to just beyond middle, at which point it joins a transverse band of hyaline cells, about equal in size and which extends from a point just posterior to apex of clavus across to the costal border; between the larger transverse band and the apical margin a second but more abbreviated transverse band made up of four ovate spots, the apical margin studded with ovate or round spots, the larger ones, of which there are four, alternating with either one or two small ones; the costal border with numerous white spots between the dark margined veinlets; a group of three to four uniformly ovate spots in the cells between veins R and Sc.

Structural characteristics. Vertex not greatly produced beyond the eyes; its anterior margin almost straight; its lateral margins distinctly converging anteriorly; all margins greatly elevated; length through middle a little over one half the length of pronotum at middle; a very shallow round depression in the mesoposterior corner of each lateral fourth. Greatest width of eyes one third the width of the vertex. Pronotum with anterior margin strongly roundly emarginate; posterior margin shallowly concave; all margins greatly elevated; a median carina only faintly indicated, laterad of which on each side in the disc is a faint round depressed spot. Mesonotum triangular; the disc depressed; a transverse ridge across middle half, running parallel with anterior margin; a median carina present and a faint groove indicated across base of apical extension; length about twice that of pronotum. Frons with anterior margin almost straight and lateral margins slightly bulging outwardly, all margins considerably elevated; a distinct median carina present on posterior two thirds but completely gone from apex. Postclypeus dovetailed into frons for not more than one sixth of the length of the latter and moderately inflated. Tegmina with apical and costal margins rounding, the latter expanded somewhat but not greatly reflexed; greatest width of tegmen near base of apical fourth; the largest cells of wing found in the oblique hyaline band, consisting of one large elongate cell about one third to one half longer than wide, whose margins are studded with triangular dark-brown spurs of veins num-

bering about eight to nine and whose apex reaches not far beyond middle of the wing; a second large hyaline cell somewhat anterior to the central cell, which is angular in shape, and a third bilobed and somewhat smaller posterior cell which extends into the transverse row of small, ovate hyaline cells. Wing venation as follows: veins Sc and R united for only a short distance from base of wing, vein R broadly sinuate with a slight angle indicated at apex of the central hyaline cell, at which point R is equidistant from veins Sc₂ and M₁₊₂; vein M₁₊₂ makes the characteristic bend towards the costal border; vein M₃₊₄, separated at base of apical third or else the tip of Cu_{1a}, which seems to be lost in the apical network, has secondarily united to the stem of M₃₊₄, thus giving that vein a two-branched appearance.

Female genitalia. Anal flap (10th abdominal segment) broad at base, tapering to a bluntly rounding apex; in length one-third longer than wide. The eleventh abdominal segment inconspicuous, but bearing a slender, tubular dorsal stylus. The external valves of the ovipositor conspicuous, their length not quite twice the width, their greatest width at middle.

Comparative notes. This species is easily separated from other species in the genus by the bright-yellow head and thorax, which contrasts greatly with heavy pitch-brown tegmina, by the large number of ovate or round whitish hyaline cells which are present not only as an oblique band across corium but are arranged in two transverse rows through apical third of tegmen and also in apical region between the costal vein and vein R.

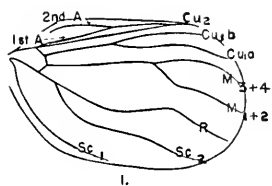
Location of types. Holotype female, collected at Anza, Cal., Aug. 6, 1935, by R. H. Beamer, and one paratype female, collected at Idyllwild, Cal., Aug. 8, 1935, by R. H. Beamer, in the Francis Huntington Snow Entomological Collection at the University of Kansas.

PLATE XXXVI

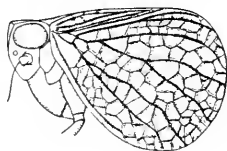
FIGURE

1. Diagram of a tegmen.
2. Lateral view of *Dictyssa fusca*.
3. Lateral view of *Dictyssa clathrata*.
4. Lateral view of *Dictyssa monroviana*.
5. Lateral view of *Dictyssa ovata*.
6. Lateral view of *Dictyssa maculosa*.
7. Lateral view of *Dictyssa obliqua*.
8. Lateral view of *Dictyssa marginepunctata*.
9. Lateral view of *Dictyssa beameri*.
10. Lateral view of *Dictyssa quadravitrea*.
11. Lateral view of *Dictyssa fenestrata*.
12. Lateral view of *Dictyssa mutata*.
13. Lateral view of *Dictyssa transversa*.
14. Lateral view of *Dictyssa balli*.
15. Lateral view of *Dictyssa areolata*—type specimen.
16. Lateral view of *Dictyssa arcolata*—perfect specimen.

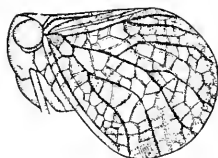
PLATE XXXVI



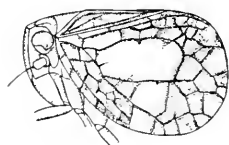
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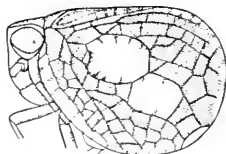
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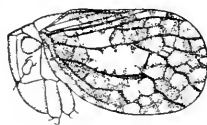
3. *D. clathrata*



4. *D. manroviiana*



5. *D. ovata*



6. *D. maculosa*



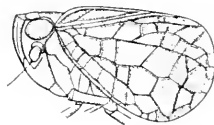
7. *D. obliqua*



8. *D. marginepunctata*



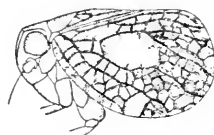
9. *D. beameri*



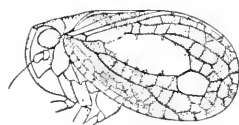
10. *D. quadrivittata*



11. *D. fenestrata*



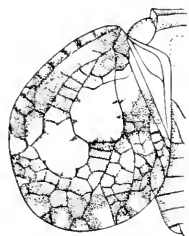
12. *D. mutata*



14. *D. balli*



13. *D. transversa*



15. *D. areolata* --type



16. *D. areolata*

PLATE XXXVII

FIGURE

1. Dorsal view of head and thorax of *Dictyssa clathrata*.
2. Dorsal view of head and thorax of *Dictyssa fusca*.
3. Dorsal view of head and thorax of *Dictyssa ovata*.
4. Dorsal view of head and thorax of *Dictyssa transversa*.
5. Dorsal view of head and thorax of *Dictyssa mutata*.
6. Dorsal view of head and thorax of *Dictyssa obliqua*.
7. Dorsal view of head and thorax of *Dictyssa areolata*.
8. Dorsal view of head and thorax of *Dictyssa beameri*.
9. Dorsal view of head and thorax of *Dictyssa marginepunctata*.
10. Dorsal view of head and thorax of *Dictyssa maculosa*.
11. Dorsal view of head and thorax of *Dictyssa balli*.
12. Dorsal view of head and thorax of *Dictyssa quadravitrea*.
13. Dorsal view of head and thorax of *Dictyssa fenestrata*.
14. Dorsal view of head and thorax of *Dictyssa monroviana*.
15. Cephalo-ventral aspect of head of *Dictyssa clathrata*.
16. Cephalo-ventral aspect of head of *Dictyssa fusca*.
17. Cephalo-ventral aspect of head of *Dictyssa areolata*.
18. Cephalo-ventral aspect of head of *Dictyssa balli*.
19. Cephalo-ventral aspect of head of *Dictyssa transversa*.
20. Cephalo-ventral aspect of head of *Dictyssa monroviana*.
21. Cephalo-ventral aspect of head of *Dictyssa fenestrata*.
22. Cephalo-ventral aspect of head of *Dictyssa maculosa*.
23. Cephalo-ventral aspect of head of *Dictyssa quadravitrea*.
24. Cephalo-ventral aspect of head of *Dictyssa ovata*.
25. Cephalo-ventral aspect of head of *Dictyssa beameri*.
26. Cephalo-ventral aspect of head of *Dictyssa mutata*.
27. Cephalo-ventral aspect of head of *Dictyssa obliqua*.
28. Cephalo-ventral aspect of head of *Dictyssa marginepunctata*.

PLATE XXXVII

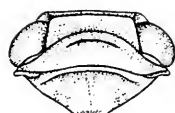
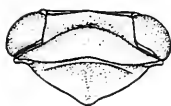
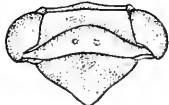
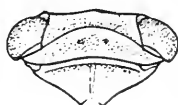
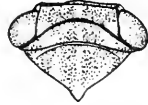
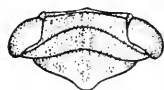
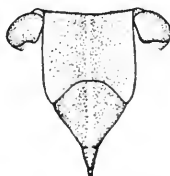
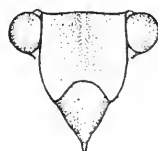
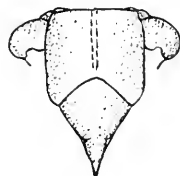
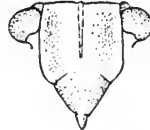
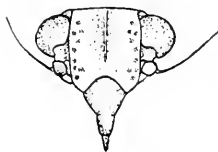
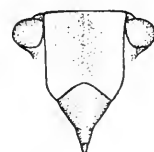
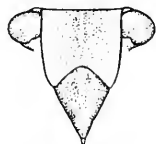
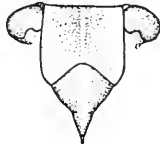
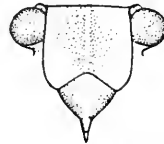
1. *D. clathrata*2. *D. fusca*3. *D. ovata*4. *D. transversa*5. *D. mutata*6. *D. obliqua*7. *D. areolata*8. *D. beameri*9. *D. marginepunctata*10. *D. maculosa*11. *D. balli*12. *D. quadravitrea*13. *D. fenestrata*14. *D. monroviana*15. *D. clathrata*16. *D. fusca*17. *D. areolata*18. *D. balli*19. *D. transversa*20. *D. monroviana*21. *D. fenestrata*22. *D. maculosa*23. *D. quadravitrea*24. *D. ovata*25. *D. beameri*26. *D. mutata*27. *D. obliqua*28. *D. marginepunctata*

PLATE XXXVIII

FIGURE

- 1a. Lateral aspect as viewed from left side of male genitalia of *Dictyssa clathrata*.
- 1b. Lateral aspect as viewed from right side of male genitalia of *Dictyssa clathrata*.
- 2a. Lateral aspect as viewed from right side of male genitalia of *Dictyssa fusca*.
- 2b. Lateral aspect as viewed from left side of male genitalia of *Dictyssa fusca*.
- 3a. Lateral aspect as viewed from right side of male genitalia of *Dictyssa ovata*.
- 3b. Lateral aspect as viewed from left side of male genitalia of *Dictyssa ovata*.
- 4a. Lateral aspect as viewed from left side of male genitalia of *Dictyssa areolata*.
- 4b. Lateral aspect as viewed from right side of male genitalia of *Dictyssa areolata*.
- 5a. Lateral aspect as viewed from left side of male genitalia of *Dictyssa balli*.
- 5b. Lateral aspect as viewed from right side of male genitalia of *Dictyssa balli*.

PLATE XXXVIII

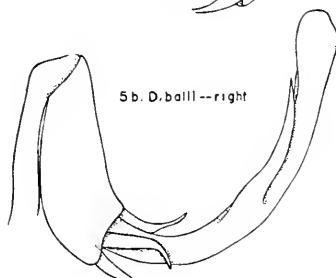
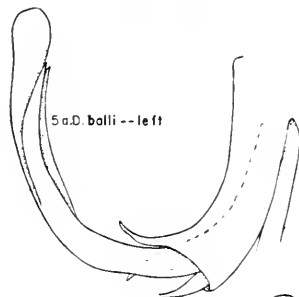
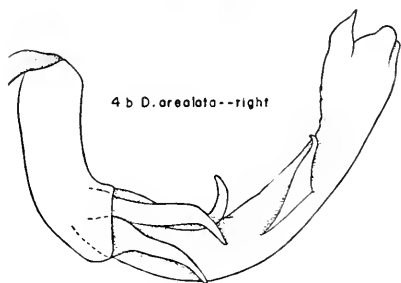
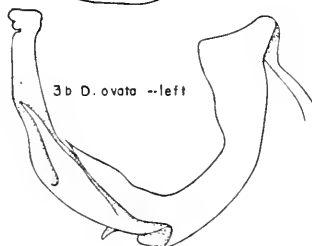
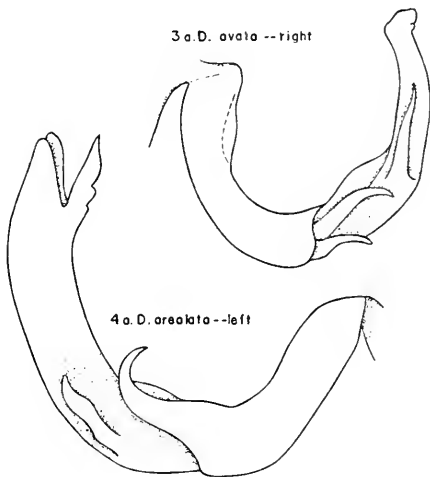
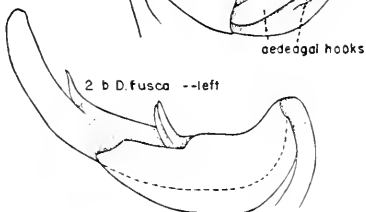
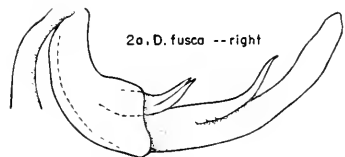
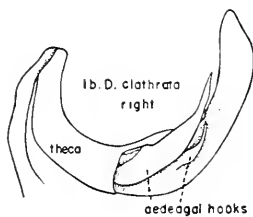
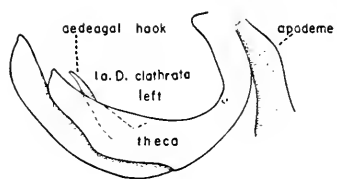


PLATE XXXIX

FIGURE

- 6a. Lateral aspect as viewed from right side of male genitalia of *Dictyssa fenestrata*.
- 6b. Lateral aspect as viewed from left side of male genitalia of *Dictyssa fenestrata*.
- 7a. Lateral aspect as viewed from left side of male genitalia of *Dictyssa beameri*.
- 7b. Lateral aspect as viewed from right side of male genitalia of *Dictyssa beameri*.
- 8a. Lateral aspect as viewed from left side of male genitalia of *Dictyssa transversa*.
- 8b. Lateral aspect as viewed from right side of male genitalia of *Dictyssa transversa*.
- 9a. Lateral aspect as viewed from left side of male genitalia of *Dictyssa obliqua*.
- 9b. Lateral aspect as viewed from right side of male genitalia of *Dictyssa obliqua*.
- 10a. Lateral aspect as viewed from left side of male genitalia of *Dictyssa monrovia*.
- 10b. Lateral aspect as viewed from right side of male genitalia of *Dictyssa monrovia*.
- 11a. Lateral aspect as viewed from left side of male genitalia of *Dictyssa marginepunctata*.
- 11b. Lateral aspect as viewed from right side of male genitalia of *Dictyssa marginepunctata*.
- 12a. Lateral aspect as viewed from left side of male genitalia of *Dictyssa mutata*.
- 12b. Lateral aspect as viewed from right side of male genitalia of *Dictyssa mutata*.

PLATE XXXIX

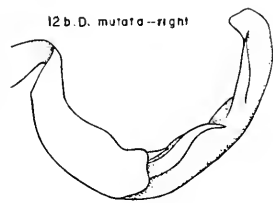
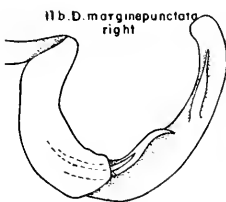
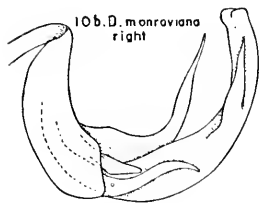
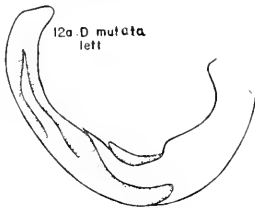
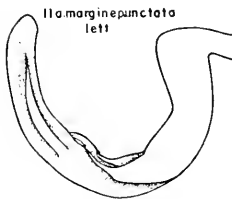
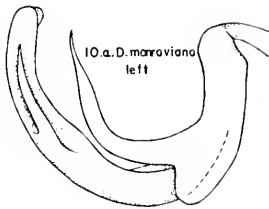
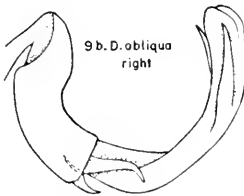
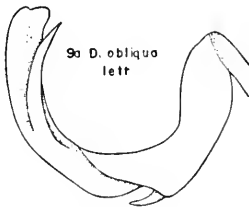
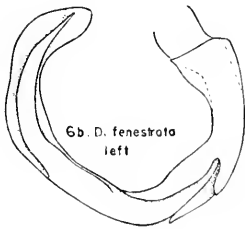
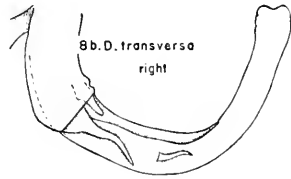
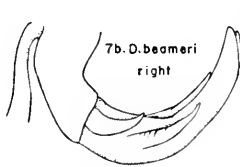
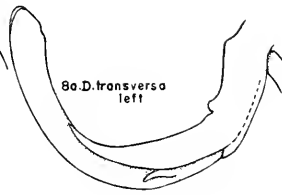
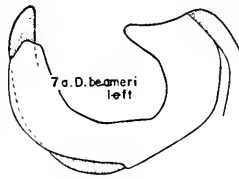
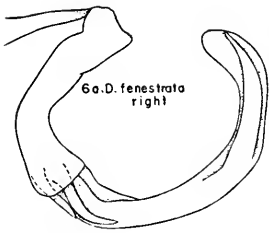


PLATE XL

FIGURE

1. Dorsal aspect of the tenth abdominal segment (anal flap) of the male of *Dictyssa ovata*.
2. Same for *Dictyssa transversa*.
3. Same for *Dictyssa monrovia*.
4. Same for *Dictyssa balli*.
5. Same for *Dictyssa beameri*.
6. Same for *Dictyssa fusca*.
7. Same for *Dictyssa clathrata*.
8. Same for *Dictyssa obliqua*.
9. Same for *Dictyssa mutata*.
10. Same for *Dictyssa fenestrata*.
11. Same for *Dictyssa areolata*.
12. Same for *Dictyssa marginipunctata*.
13. Ventral aspect of the tip of the abdomen of the male of *Dictyssa beameri*.
14. Same for *Dictyssa transversa*.
15. Same for *Dictyssa balli*.
16. Same for *Dictyssa marginipunctata*.
17. Same for *Dictyssa monrovia*.
18. Same for *Dictyssa fenestrata*.
19. Same for *Dictyssa obliqua*.
20. Same for *Dictyssa clathrata*.
21. Same for *Dictyssa ovata*.
22. Same for *Dictyssa mutata*.
23. Same for *Dictyssa fusca*.

PLATE XL

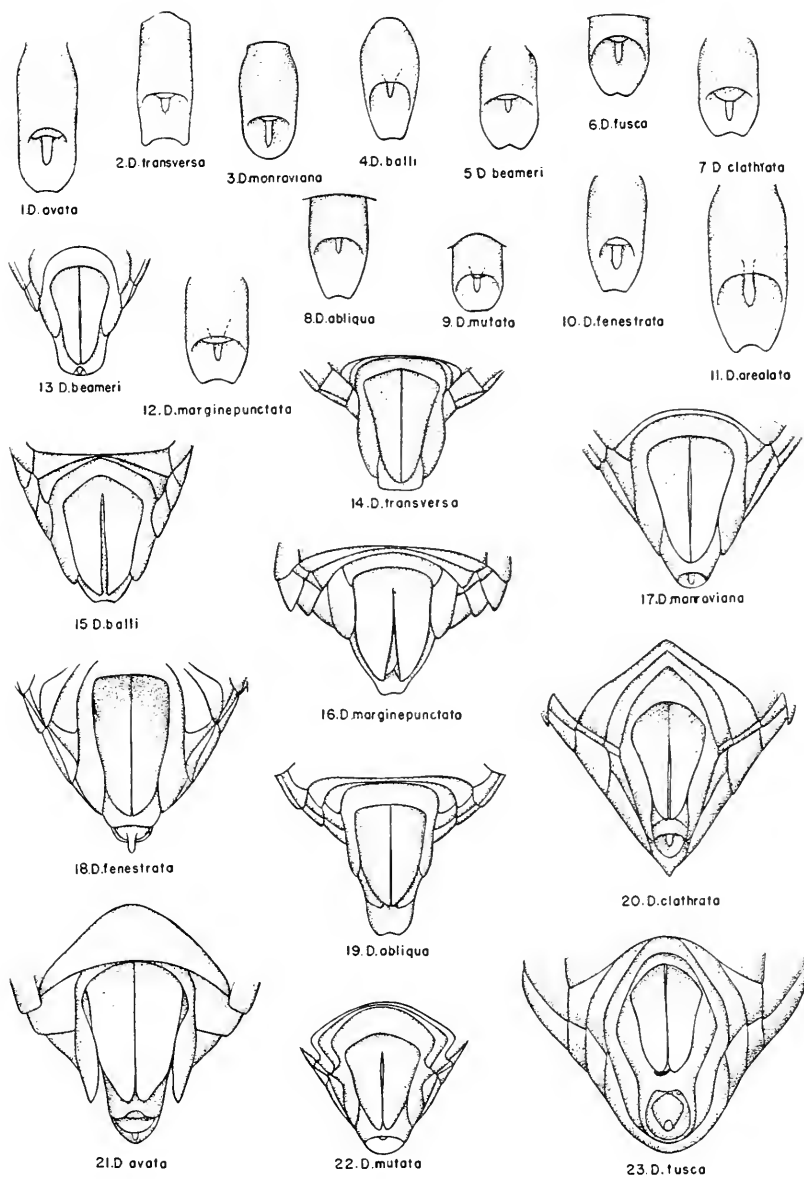


PLATE XLI

FIGURE

1. Dorsal aspect of the tenth abdominal segment of the female of *Dictyssa ovata*.
2. Same for *Dictyssa transversa*.
3. Same for *Dictyssa marginpunctata*.
4. Same for *Dictyssa monrovia*.
5. Same for *Dictyssa mutata*.
6. Same for *Dictyssa obliqua*.
7. Same for *Dictyssa fusca*.
8. Same for *Dictyssa clathrata*.
9. Same for *Dictyssa fenestrata*.
10. Same for *Dictyssa balli*.
11. Same for *Dictyssa arcolata*.
12. Same for *Dictyssa quadravitrea*.
13. Same for *Dictyssa maculosa*.
14. Same for *Dictyssa beameri*.
15. Lateral aspect of harpago (male genital stylus) of *Dictyssa fenestrata*.
16. Same for *Dictyssa beameri*.
17. Same for *Dictyssa ovata*.
18. Same for *Dictyssa transversa*.
19. Same for *Dictyssa marginpunctata*.
20. Same for *Dictyssa clathrata*.
21. Same for *Dictyssa fusca*.
22. Same for *Dictyssa mutata*.
23. Same for *Dictyssa monrovia*.
24. Same for *Dictyssa balli*.
25. Same for *Dictyssa arcolata*.
26. Same for *Dictyssa obliqua*.

PLATE XLI

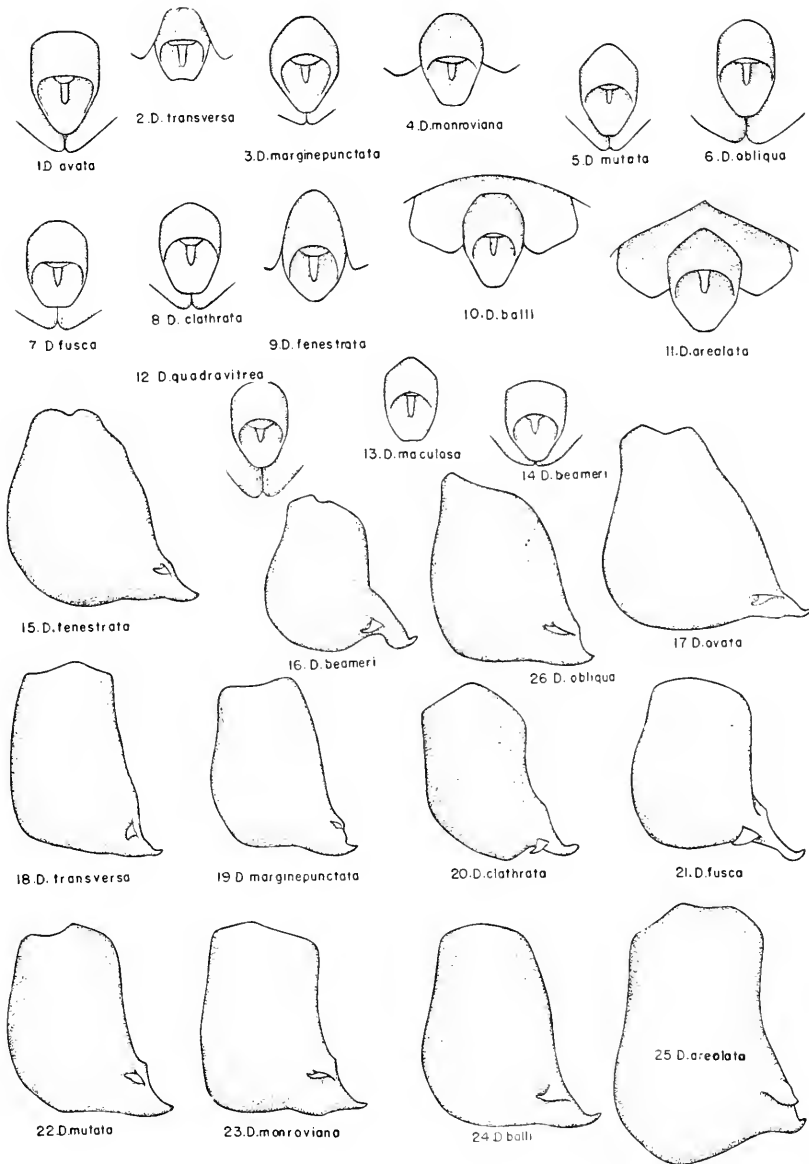


PLATE XLII

FIGURE

1. Ventral aspect of the tip of the abdomen of the female of *Dictyssa marginpunctata*.
2. Same for *Dictyssa quadravitrea*.
3. Same for *Dictyssa monrovia*.
4. Same for *Dictyssa fenestrata*.
5. Same for *Dictyssa beacri*.
6. Same for *Dictyssa arcolata*.
7. Same for *Dictyssa balli*.
8. Same for *Dictyssa clathrata*.
9. Same for *Dictyssa maculosa*.
10. Same for *Dictyssa mutata*.
11. Same for *Dictyssa fusca*.
12. Same for *Dictyssa transversa*.
13. Same for *Dictyssa obliqua*.
14. Same for *Dictyssa ovata*.

PLATE XLII

