

AMERICAN PSYLLIDÆ II (Triozinæ)

BY D. L. CRAWFORD.

In studying a group which has been only locally systematized, one is apt to find that the anatomy of the species of the group is quite inadequately known. Dr. Franz Low has published an article on the anatomy of the Psyllidæ in which the nomenclature of most of the external anatomy is given. The thoracic and ventral anatomy, however, is not very thoroughly known and, therefore, not used in diagnosis. In order to bring out more clearly some of these little known characters and make them available for diagnostic use, another paper is being prepared on the external anatomy of the Triozinæ. Several structures have been noted in the course of this study which have hitherto been scarcely mentioned or figured in specific descriptions. Chief among these is a remarkable horn-like spur on each meta-coxa, and sometimes another pair distinct from these and extending in the opposite direction, (Fig. 128 i). These are present in both sexes and will perhaps offer a good character for separation of minor groups of species, at least.

In this paper the specific descriptions begun in the first article are continued. It is quite possible that a further anatomical study will reveal characters which will have to be added to these mentioned in this paper.

***Trioza collaris* n. sp.**

(Figs. 128 A, B; 129 A; 130 A.)

Length of body with ovipositor, 2.5 mm.; without ovipositor, 2.3 mm.; length of forewing, 3.8 mm.; greatest width of forewing, 1.6 mm.; width of vertex between eyes, .44 mm.; with eyes, .72 mm. General color, greenish yellow.

Head moderately deflexed; with eyes not quite as broad as thorax; finely punctate. Posterior margin of vertex arcuate, narrowly elevated over middle half; discal area of frontal plates with a distinct fovea midway between median suture and posterior ocellus on each side, with a diverging depression extending down toward face; frontal plates not raised plate-like, scarcely emarginate anteriorly at median suture. Anterior ocellus at angle of facial cones and under the slightly overhanging vertex, not visible from above. Facial cones short, scarcely divergent, acute at tip, subhorizontal but not visible from above, sparsely pubescent. Antennæ inserted at base of facial cones, without, beneath eyes; two basal segments large, subglobose; remaining segments destroyed.

Thorax arched, finely punctate; pronotum long, not depressed below dorsulum and head. Dorsulum strongly ascending, about as long as scutum, with a light brownish stripe on each side; scutum with a double stripe on each side a little darker than ground color. Wings hyaline, about two and one-half times as long as broad, broadest across first marginal cell, rounded apically; radius longer than second cubital; marginal cells subequal; apex

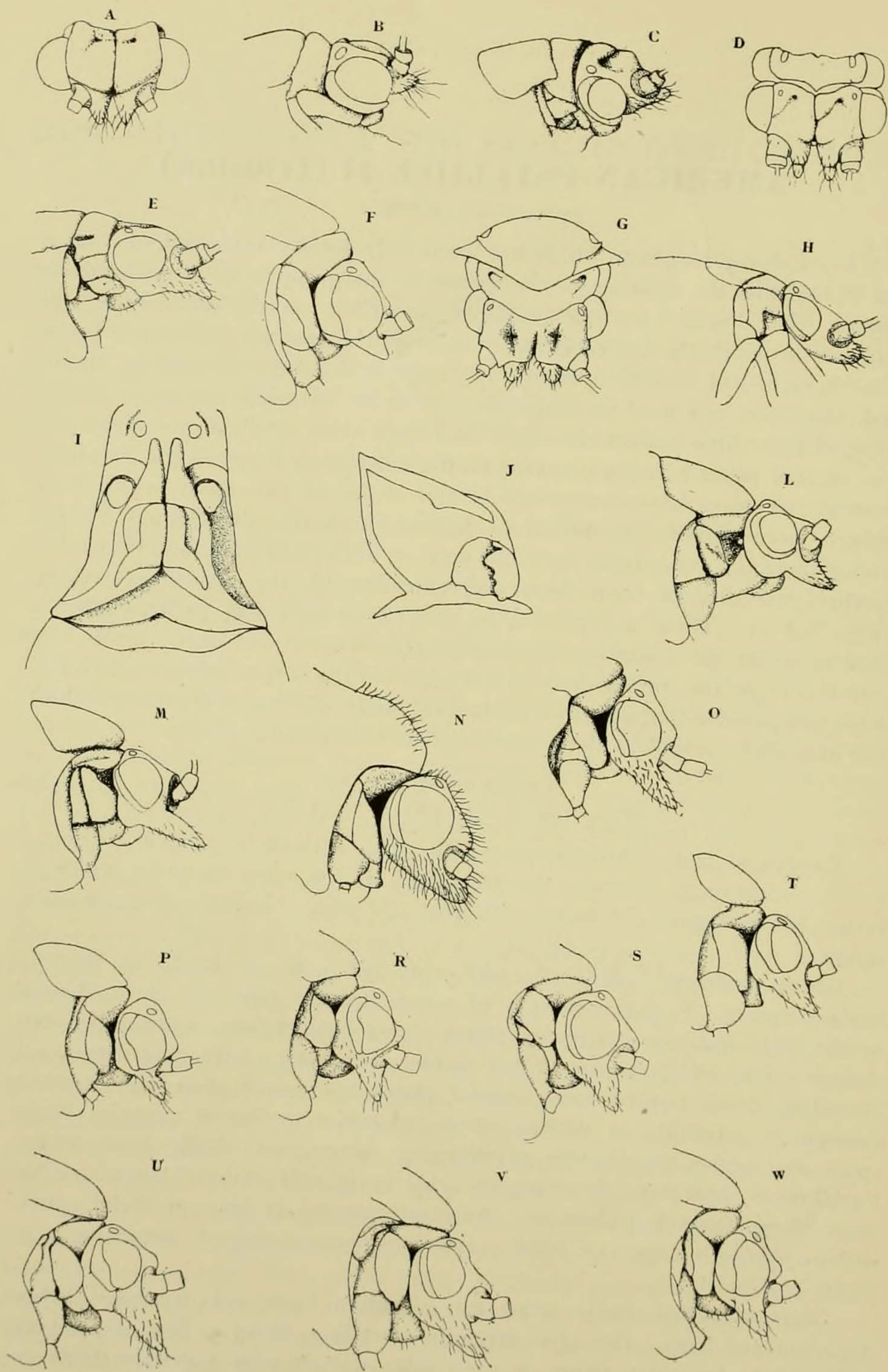


Figure 128. Head and Other Details of Triozinae.

A, B, *collaris*; C, D, *maculata*; E, *acutipennis*; F, *collaris*; G, H, *viridis*; I, J, *diospyri*; L, *nigrifrons*; M, *similis*; N, *diospyri*; O, *frontalis*; P, *marginata*; R, *fulvida*; S, *nigra*; T, *albifrons*; U, *longicornis*; V, *variens*; W, *aurantiaca*.

of wing at termination of fourth furcal; venation very slightly darker than wing membrane, not conspicuous.

Female—Genital segment large, fully two-thirds as long as rest of abdomen; both plates about equal in length, moderately pubescent; ovipositor exerted, almost as long as genital segment, slender, acute at tip, much darker than abdomen.

Described from one female, taken by Prof. C. F. Baker at Claremont, California (mountains).

***Trioza maculata* n. sp.**

(Figs. 128 C, D; 129 B; 130 D.)

Length of body, 2.3 mm.; length of forewing, 3.1 mm.; greatest width of forewing, 1.05 mm.; width of vertex between eyes, .39 mm.; with eyes, .62 mm. General color greenish white, abdomen dorsally dark brown.

Head not deflexed; with eyes almost as broad as thorax; very finely punctate. Posterior margin of vertex arcuate, emarginate at median suture, distinctly elevated; with a fovea midway between median suture and posterior ocellus in each side and a diverging depression extending downward toward face, a sharp line of depression extending from fovea to near the front margin of eye and to center of median suture on each side; frontal plates not raised plate-like, emarginate anteriorly at median suture. Anterior ocellus imbedded at angle of facial cones and under the slightly overhanging vertex, scarcely visible from above. Facial cones moderately long, horizontal, visible from above, thick and scarcely divergent in basal half, smaller and more divergent in distal half, rounded apically, slightly angled outwardly at center; pubescence rather long and sparse. Antennæ inserted at base of cones without, insertion extending downward almost to center of cone; two basal segments large, subglobose, remaining eight segments filiform, dark brown at tip of each segment, the rest light brown.

Thorax only slightly arched, more coarsely punctate than head. Pronotum long, arcuate, not depressed below dorsulum and head; with a small acute projection midway on anterior margin; dorsulum horizontal; scutum slightly descending, indistinctly marked with three brownish stripes. Wings hyaline, three times as long as broad, broadest across first furcal; with a large brown macula covering most of both marginal cells and distal half of cubital cell, and another less distinct covering most of inner basal cell; radius shorter than second cubital; first marginal cell somewhat longer than second; moderately rounded at tip, with fourth furcal terminating at apex.

Female.—Abdomen dark brown dorsally, ventrally mottled brown and greenish-white. Genital segment almost one-half as long as rest of abdomen, moderately acute at tip, quite densely pubescent; dorsal plate slightly longer than ventral plate and less acute; ovipositor not exerted.

Described from one female from Arizona, in the C. F. Baker collection. Type specimen in the National Museum.

***Trioza acutipennis* n. sp.**

(Figs. 128 E; 129 D.)

Length of body, 2.7 mm.; length of forewing, 3.5 mm.; greatest width of wing, 1.3 mm.; width of vertex between eyes, .44 mm.; with eyes, .66 mm. General color, yellowish brown, scutum with brown stripes.

Head scarcely deflexed; with eyes about as broad as thorax; finely rugoso-punctate. Posterior margin of vertex broadly emarginate; discal portion of frontal plates with a fovea near center, slightly nearer to posterior margin and median suture; frontal plates not raised plate-like, emarginate anteriorly at median suture. Anterior ocellus at angle of facial cones, slightly visible from above. Facial cones moderately long, stout, quite divergent, rounded apically, subvertical but barely visible from above, very sparsely pubescent. Antennæ inserted on basal portion of cones without and above; basal segment subglobose, the remaining segments destroyed.

Thorax slightly arched, ascending from pronotum to middle of dorsulum; more coarsely rugulose than head. Pronotum very long, not depressed below dorsulum and head; with the posterior margin arcuate, emarginate at center of receive a small projection of dorsulum; anterior margin with an acute projection at center smaller than that on dorsulum; with a fovea on each side just above the episternum. Dorsulum ascending in anterior half, the rest horizontal; scutum descending posteriorly, with five brown stripes somewhat darker than ground color. Wings hyaline, about two and four-fifths times as long as broad, broadest across first marginal cell, acute apically; with several very light brown and indistinct maculae, one in inner basal cell beside the first furcal, another extending through first marginal cell to second cubital, a third at tip of wing in second marginal cell; radius longer than second cubital; fourth furcal terminating very near to apex of wing; venation brown, quite distinct.

Male.—Abdomen slender, larger basally; genital segment one-fourth as long as rest of abdomen.

Claspers attached to tip of genital segment, bilobate, with a projecting lobe extending posteriorly; anal segment produced dorsally into an arched process; penis between anal arch and claspers; claspers and anal arch quite thickly pubescent.

Described from one male, taken by C. F. Baker at Chinandega, Nicaragua.

***Trioza viridis* n. sp.**

(Figs. 128 G, H; 129 C; 130 B, C.)

Length of body, 2.2 mm.; length of forewing, 2.7 mm.; greatest width, 1.2 mm.; width of vertex between eyes, .47 mm.; with eyes, .62 mm. General color light yellowish green.

Head somewhat deflexed; with eyes not as broad as thorax; finely punctate. Posterior margin of vertex arcuate, not emarginate at median suture; discal area of frontal plates with large longitudinal depression in center leaving elevated margin posteriorly and along median suture; frontal

plates not raised plate-like, emarginate anteriorly. Anterior ocellus below emargination of frontal plates in angle of facial cones, slightly visible from above. Facial cones short, quite strongly divergent, rounded apically, almost horizontal, visible from above, pubescence sparse, fine and short. Antennæ inserted at base of cones without and slightly above; two basal segments large, the rest filiform, darker than two basal ones.

Thorax scarcely arched, finely punctate; pronotum somewhat longer than usual but depressed below head, ascending to dorsulum; dorsulum scarcely ascending, subequal in length with scutum. Wings hyaline, about two and one-third times as long as broad, broadest across first marginal cell, rather acute at tip; without maculæ; radial cell unusually short; first marginal cell distinctly larger than second; apex of wing distinctly within second marginal cell; venation light colored, not conspicuous.

Female.—Genital segment large and heavy, almost as long as rest of abdomen, broadly rounded apically; pubescence sparse, moderately long; style exerted, about half as long as genital segment, acute, dorsal blade overreaching ventral. *Male*.—Abdomen slender. Genital segment short, about one-fourth as long as rest of abdomen; claspers triangular in shape, broad at base, quite acute at tip; anal segment produced dorsally into a broad process, concave toward claspers, subacute at tip; pubescence moderately sparse, rather short.

Described from one female and two males, taken by C. F. Baker at Claremont, California (mountains).

***Trioza nigrifrons* n. sp.**

(Fig. 28 L; 129 I; 130 E.)

Length of body, 2.2 mm.; length of forewing, 3.6 mm.; greatest width of wing, 1.4 mm.; width of vertex between eyes, .49 mm.; with eyes, .71 mm. General color, orange yellow, abdomen whitish ventrally, face and facial cones black.

Head not deflexed, very finely punctate; with eyes almost as broad as thorax. Posterior margin of vertex slightly arcuate, narrowly elevated; discal area of frontal plates with a shallow depression triangular in shape, the apex near posterior margin of vertex; median suture arcuately elevated, emarginate anteriorly; frontal plates raised somewhat plate-like. Anterior ocellus imbedded at angle of facial cones under the slightly overhanging vertex, not visible from above. Facial cones black, moderately long, contiguous in basal two-thirds, distal third slightly divergent, subacute at tip, subvertical and slightly visible from above, scarcely pubescent, more coarsely punctate than head. Antennæ inserted on frons slightly without and partially on base of cones; two basal segments large, remaining segments destroyed.

Thorax slightly arched, more coarsely punctate than head. Pronotum very short, depressed below dorsulum and head, barely visible from above. Dorsulum triangular, roundly pointed anteriorly, slightly ascending, almost as long as scutum. Wings hyaline, about two and two-thirds times as long as broad, broadest across first furcal vein, subacute apically; radius fully as long as second cubital; fourth furcal terminating at apex of wing.

Female.—Abdomen somewhat dilated in center; dorsal segments dark brown, except posterior borders brownish yellow; ventral segments greenish white. Genital segment short, about as long as anal segment; dorsal plate longer than ventral; both plates with a short, acute projection apically; style slightly exerted; pubescence very short and sparse.

Described from one female, taken in Gunnison, Colorado, by C. F. Baker.

***Trioza similis* n. sp.**

(Figs. 128 M; 129 J; 130 F.)

Length of body, 2.6 mm.; length of forewing, 3.5 mm.; greatest width 1.6 mm.; width of vertex between eyes, .42 mm.; with eyes, .66 mm.; general color, light brownish yellow.

Head slightly deflexed, finely punctate; with eyes not as broad as thorax. Posterior margin of vertex arcuate, narrowly elevated in center; discal area with a fovea on each side near posterior margin and nearer to median suture than to posterior ocelli; with a narrow sulcus connecting the two fovea and an oblique depression extending from each fovea to insertion of antennæ; frontal plates not raised plate-like. Eyes not as prominent as usual; anterior ocellus at angle of facial cones, slightly visible from above. Facial cones quite long, strongly divergent, acute at tip, subhorizontal and distinctly visible from above, pubescence mostly basal, very sparse on distal half. Antennæ inserted on vertical frons above base of cones; two basal segments large, remaining segments filiform, black on apical half.

Thorax moderately arched, ascending somewhat beyond anterior margin of scutum; finely punctate. Pronotum short, depressed below dorsulum and head and scarcely visible from above. Dorsulum quite strongly ascending, roundly pointed anteriorly; both dorsulum and scutum faintly marked with light brown. Wings hyaline, about two and one-third times as long as broad, broadest across first marginal cell; rounded apically; radius longer than second cubital; fourth furcal terminating at apex of wing; venation light brown, not conspicuous.

Female.—Genital segment as long as two preceding segments, slightly deflexed; dorsal plate a trifle longer than ventral and less acute; pubescence sparse and very short.

Described from three females in the C. F. Baker collection, taken in Colorado. Type specimen in National Museum.

TRIOZA DIOSPYRI Ashmead.

Synonyms: *Psylla diospyri* Ashm.

Trioza latipennis Crawford.

(Figs. 128 I, J; 129 K; 130 L.)

Length of body, 2.5 mm.; length of forewing, 4.4 mm.; greatest width, 1.8 mm.; width of vertex between eyes, .47 mm.; with eyes, .79 mm. General color, shining black, legs partially yellow. Pubescence conspicuous.

Head moderately deflexed, very finely punctate on frons, with eyes almost as broad as thorax; pubescence moderately long and dense and covering most of head. Posterior margin of vertex sharply elevated, slightly arcuate, and

emarginate at median suture; discal area with a shallow transverse depression about midway; not raised plate-like; vertex quite deeply emarginate anteriorly at median suture; anterior ocellus in emargination at angle of facial cones, visible from above. Facial cones short, broadly rounded at tip, moderately divergent, subhorizontal and visible from above, quite densely pubescent. Antennæ inserted on frons and base of facial cones, above and without; two basal segments large, remaining segments filiform, yellowish except apical segment black. Labrum very prominent, with a seta on ventral surface.

Thorax arched, slightly saddle-shaped, finely punctate, moderately pubescent. Pronotum short, depressed below dorsulum and head; dorsulum strongly ascending in anterior half, posterior half and part of scutum depressed, posterior portion of scutum again ascending somewhat; entire dorsal surface pubescent. Wings hyaline, about two and one-half times as long as broad, broadest across first marginal cell, acute apically; second marginal cell very much longer than first; fourth furcal almost as long as second cubital; radius slightly longer than second cubital; fourth furcal terminating at apex of wing or slightly below it.

Female.—Abdomen quite stout. Genital segment fully half as long as abdomen, acute apically, quite densely pubescent; dorsal plate slightly longer than ventral, less acute; genital pore elliptical, entirely exposed, almost one-fourth as long as dorsal plate. *Male*.—Genital segment short, distinctly deflexed; claspers arched, laterally opposed, simple; anal segment produced dorsally into a short projection, concave toward claspers, broadest at distal end, appearing from above bicornate.

Redescribed from thirty males and females, collected by G. R. Pilate in Louisiana, and three females collected by Nathan Banks at West Falls Church, Virginia.

This species was first described by Ashmead in 1881 from specimens taken in Jacksonville, Florida. His description as published in the *Canadian Entomologist*, Vol. XIII, page 222, was wholly inadequate to distinguish it from any other species. I was obliged, therefore, to omit that from the synopsis of *Triozinæ*. Since the publication of the synopsis I have received three determined specimens of this species from Mr. Nathan Banks. Careful comparison of these specimens with the type specimen of *T. latipennis* Crawford proves that they are identical. The name *Trioza latipennis*, therefore, must drop into synonymy.

***Trioza frontalis* n. sp.**

(Figs. 128 O; 129 E; 130 N.)

Length of body, 2.1 mm.; length of forewing, 3.2 mm.; greatest width, 1.2 mm.; width of vertex between eyes, .41 mm.; with eyes, .71 mm. General color, brownish red, abdomen brownish.

Head slightly deflexed, with eyes about as broad as thorax, finely punctate. Posterior margin of vertex arcuate, ridged narrowly and not emarginate at median suture; discal area with an oblique sulcate depression extending

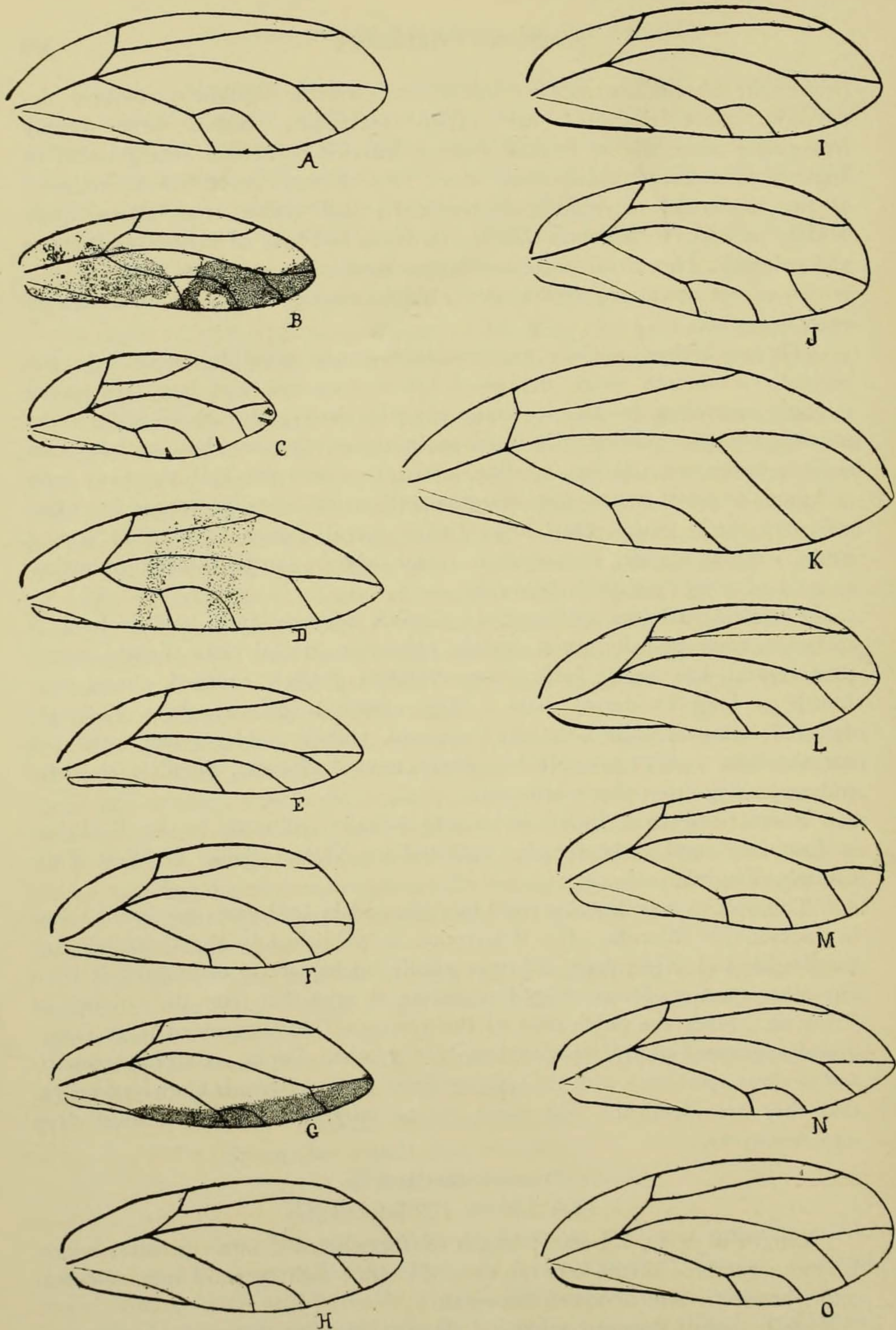


Figure 129. Wings of Triozinae.

A, collaris; B, maculata; C, viridis; D, acutipennis; E, frontalis; F, albifrons; G, marginata; H, nigra; I, nigrifrons; J, similis; K, diospyri; L, fulvida; M, longicornis; N, aurantiaca; O, varians.

from near posterior margin and closer to median suture than to posterior ocelli toward lower margin of eyes; sulcæ connected posteriorly by a shallower transverse sulcus; frontal plates not raised plate-like; vertex distinctly emarginate anteriorly at median suture, making anterior ocellus visible from above. Facial cones moderately long scarcely divergent, acute at tips, subhorizontal and visible from above, slightly pubescent. Antennæ inserted on frons between lower margin of eye and base of facial cone on each side; two basal segments large, not globose, the remaining segments filiform.

Thorax somewhat arched, slightly punctate. Pronotum very short, depressed below dorsulum and head, ascending toward dorsulum, with a fovea on each side just above episternum. Dorsulum ascending strongly, triangular, roundly pointed anteriorly. Wings hyaline, moderately slender, about two and two-thirds times as long as broad, broadest across first furcal, quite acute apically; radius distinctly shorter than second cubital; second marginal cell smaller than first; second cubital terminating at apex of wing.

Female.—Abdomen darker in color than thorax. Genital segment long, almost as long as rest of abdomen, distinctly deflexed; dorsal plate slender, quite acute, overreaching ventral plate and receding farther back basally; genital pore large, elliptical, conspicuous; pubescence very light and sparse.

Male.—Abdomen more slender than in female. Genital segment longer than two preceding, quite stout, tapering toward tip; claspers simple, curved inward and slightly serrated apically; anal segment produced dorsally into a large, broad double projection, bilobate when viewed from the side, with a more or less distinct ridge extending from the base into each lobe; posterior lobe, viewed from behind, with two recurved flaps; upper rim of projection bordered with a fringe of about twenty-four long hairs; pubescence sparse but moderately conspicuous. (In the accompanying illustrations the claspers are shown as partially enclosed and held by anal projection, which may or not be the natural position for them in all specimens.)

Described from two females and three males in the C. F. Baker collection, taken in Colorado. Type specimen in National Museum.

***Trioza albifrons* n. sp.**

(Figs. 128 T; 129 F; 130 M.)

Length of body, 2.0 mm.; length of forewing, 3.0 mm.; greatest width, 1.3 mm.; width of vertex between eyes, .38 mm.; with eyes, .60 mm. General color, yellowish green to greenish white, abdomen ventrally darker, apical half of antennæ and middle tarsi black.

Head slightly deflexed, with eyes fully as broad as thorax, coarsely punctate; posterior margin of vertex arcuate, not emarginate at median suture, scarcely elevated; discal area with fovea on each side between median suture and posterior ocelli near posterior margin; depression scarcely sulcate; vertex roundly emarginate anteriorly at median suture; anterior ocellus barely visible from above. Facial cones rather short, stout at base, acute, quite divergent, subvertical but slightly upcurved and partially visible from above, sparsely

and inconspicuously pubescent. Antennæ inserted above base of cones, slightly without.

Thorax arched, punctate. Pronotum quite short, depressed below dorsulum and head; dorsulum quite strongly ascending, with a brownish spot on each side of median line anteriorly; roundly pointed at anterior margin. Wings hyaline, about two and one-third times as long as broad, broadest across first marginal cell, round and very slightly angulated apically; radius somewhat flexed midway, fully as long as second cubital; first furcal very short; venation inconspicuous.

Male.—Abdomen slender; dorsal segmental plates very short, reaching about to middle of third ventral segment; anal end of abdomen dorsally concave. Genital segment moderately large, semi-erect; claspers quite long, simple, laterally opposed, recurved at tips; anal projection long, spatulate when viewed from the side, anterior margin longer than posterior; upper margin with several conspicuous hairs; pubescence sparse.

Described from three males taken by C. F. Baker at Claremont, California (mountains).

***Trioza marginata* n. sp.**

(Figs. 128 P; 129 G; 130 O.)

Length of body, 2.2 mm.; length of forewing, 3.3 mm.; greatest width, 1.2 mm.; width of vertex between eyes, .44 mm.; with eyes, .71 mm. General color, orange yellow, abdomen whitish ventrally, antennæ and legs light colored.

Head somewhat deflexed, with eyes not quite as broad as thorax, very finely punctate; posterior margin of vertex arcuate, narrowly elevated, not emarginate at median suture; discal area with an oblique and diverging depression on each side extending from near median suture posteriorly toward insertion of antennæ; vertex scarcely emarginate anteriorly at median suture, distinctly overhanging and concealing anterior ocellus when viewed from above. Facial cones rather short, subacute, only slightly divergent, subvertical and not visible from above, darker than vertex, very sparsely pubescent. Antennæ inserted between lower margin of eye and base of facial cone, a trifle within; two basal segments large as usual in genus, the remaining segments slender, filiform.

Thorax arched, finely punctate. Pronotum moderately short, depressed below dorsulum and head; dorsulum quite heavy, ascending to scutum, about equal to scutum in length, roundly pointed anteriorly. Wings hyaline, except lower margin bordered with brown stripe extending through marginal cells and from anal angle to apex of wing; a little less than three times as long as broad, broadest across first furcal; somewhat angulate on radial margin apically, quite acute; radius distinctly shorter than second cubital.

Female.—Abdomen quite stout. Genital segment very short, scarcely longer than anal segment; dorsal plate slightly overreaching ventral, arched dorsally; both plates with short, acute, beak-like projection apically; posterior dorsal surface of anal segment concave, with genital pore partially concealed

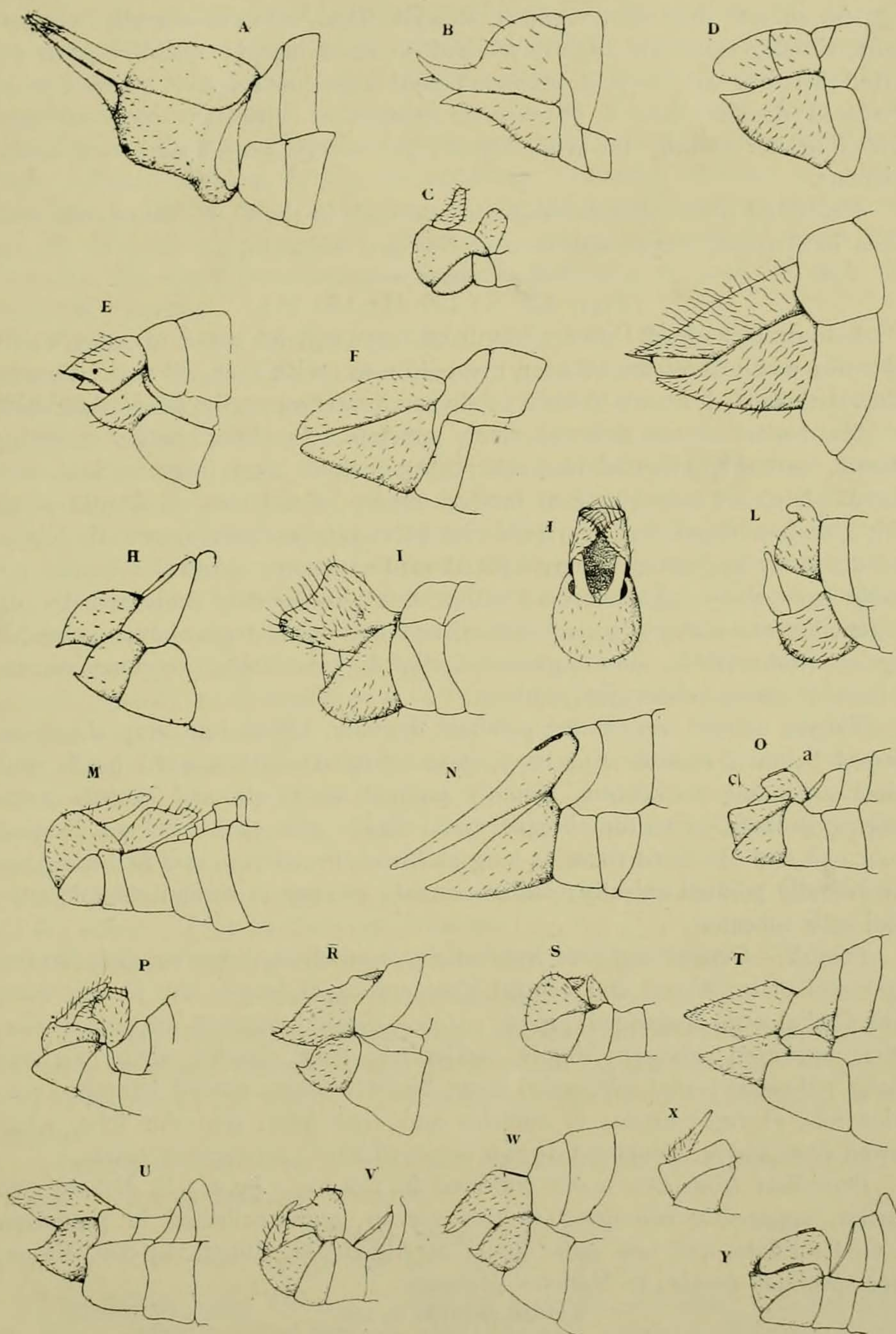


Figure 130. Genitalia of Triozinae.

A, collaria; B, C, viridis; D, maculata; E, nigrifrons; F, similis; G, diospyri; H, marginata; I, J, frontalis; L, diospyri; M, albifrons; N, frontalis; O, marginata; P, nigra; R, S, fulvida; T, longicornis; U, V, varians; W, X, Y, aurantiaca.

therein; pubescence very sparse. *Male*.—Abdomen more slender. Genital segment shorter than anal segment, subcylindrical, concave dorsally; claspers short, simple, acute and slightly toothed on inner margin apically; penis exerted between and behind claspers; anal segment concave as in female, produced dorsally into a short erect projection with two recurved flaps extending horizontally toward claspers; pubescence very sparse and inconspicuous.

Described from three females and one male in the C. F. Baker collection, taken in Arizona. Type specimen in National Museum.

***Trioza nigra* n. sp.**

(Figs. 128 S; 129 H; 130 P.)

Length of body, 2.1 mm.; length of forewing, 3.5 mm.; greatest width, 1.4 mm.; width of vertex between eyes, .46 mm.; with eyes, .74 mm. General color, dark reddish brown to black, abdomen lighter ventrally, head quite black.

Head more or less deflexed, finely punctate. Posterior margin of vertex arcuate, narrowly elevated between posterior ocelli over inner half of each frontal plate, not emarginate at median suture; discal area of frontal plates with a shallow depression over posterior half; anterior portion roundly lobate, and distinctly projecting, emarginate at median suture. Anterior ocellus not visible from above. Facial cones rather short, moderately acute apically, divergent but not strongly so, subvertical and not visible from above, somewhat rugulose transversely, almost glabrous, slightly pubescent. Antennæ inserted at base of cones below eyes, without.

Thorax arched, very finely punctate dorsally. Pronotum very short, depressed below dorsulum and head, descending strongly toward head; dorsulum ascending to scutum, roundly pointed anteriorly and slightly overhanging pronotum; scutum broader than head, with eyes. Wings, hyaline, about two and one-third times as long as broad, broadest across first marginal cell, roundly pointed apically; radius scarcely as long as second cubital; marginal cells subequal.

Female.—Genital segment very short, scarcely as long as anal ventral segmental plate; dorsal and ventral plates of equal length, the former more acute; pubescence sparse and apical. *Male*.—Genital segment medium in size, rather upcurved; claspers simple, moderately long, slender, acute, arcuate, briefly pubescent; anal projection long, bilobate when viewed laterally, posterior lobe at right angles to anterior and erect lobe; posterior lobe, when viewed from above, composed of two recurved flaps; pubescence sparse.

Described from five males collected in Colorado by C. F. Baker; two females, apparently belonging to this species, were collected in Louisiana by G. R. Pilate, and two other males at Algonquin, Illinois, by Dr. Nason. Type specimen (male) in National Museum.

***Trioza fulvida* n. sp.**

(Figs. 128 R; 129 L; 130 R, S.)

Length of body, 2.2 mm.; length of forewing, 3.4 mm.; greatest width, 1.3 mm.; width of vertex between eyes, .47 mm.; with eyes, .75 mm. General color, fulvous brown, abdomen lighter ventrally.

Head deflexed, with eyes not as broad as thorax, finely punctate. Posterior margin of vertex very narrowly elevated over middle half, arcuate, not emarginate at median suture; discal area with a small fovea midway between median suture and each posterior ocellus, and a shallow divergent depression extending about to anterior margin of eyes, frontal plates raised plate-like, emarginate at median suture anteriorly and sutural angle of each plate deflexed making double emargination. Anterior ocellus not visible from above. Facial cones rather long, strong divergent, acute, subvertical and not visible from above, sparsely pubescent. Antennæ inserted between base of cones and eyes; insertion cone-shaped, converging to point on each side of anterior ocellus.

Thorax strongly arched, punctate. Pronotum short, depressed below dorsulum and head, with a small fovea on each side just above pleurites. Dorsulum strongly ascending, narrowly rounded anteriorly, quite coarsely punctate. Wings subhyaline, fulvous, about two and one-half times as long as broad, broadest across first marginal cell, rounded apically but not broadly so; radius fully as long as second cubital, flexed midway; marginal cells subequal; venation brownish, anal angle black or dark brown.

Female.—Genital segment short, a little longer than anal ventral segmental plate; dorsal plate overreaching ventral, and less acute; genital pore contiguous to and about as long as anal dorsal segmental plate; ventral plate with an up-curved acute prolongation; pubescence inconspicuous. *Male*.—Abdomen recurved caudad, much slenderer than in females; dorsal segmental plates depressed beyond third and scarcely visible from side. Genital segment as long as two preceding, semierect; claspers very small and short, triangular when viewed laterally; anal projection small, simple erect, about twice as long as broad and slightly broader than base of claspers; pubescence short, sparse and inconspicuous.

Described from numerous males and females collected in Colorado by C. F. Baker. Type in National Museum.

This species is apparently closely related to *T. aurantiaca*.

***Trioza fulvida* var *similis* n. var.**

Although this species presents more or less gradual variations, still there seems to be a quite distinct varietal group which has the forewings hyaline and not fulvous as in the species. The structural characters are the same in both groups.

Described from several males and females taken in Colorado by C. F. Baker. Type in National Museum.

***Trioza longicornis* n. sp.**

Figs. 128 U; 129 M; 130 T.)

Length of body, 2.4 mm.; length of forewing, 3.6 mm.; greatest width, 1.5 mm.; width of vertex between eyes, .45 mm.; with eyes, .72 mm. General color greenish yellow, notum slightly darker.

Head scarcely deflexed, conspicuously lower than dorsal margin of dorsulum, very finely punctate. Posterior margin of vertex arcuate, narrowly

elevated over middle half of line between posterior ocelli; discal area with a shallow depression on each side in the shape of a spherical triangle with the bases coincident and raised slightly at median suture, and apices near anterior margin of eyes; frontal plates raised plate-like, deflexed and emarginate at median suture anteriorly. Anterior ocellus not visible from above, imbedded between frontal emargination, angle of facial cones, and the intermediate converging antennal insertions, as in *T. fulvida*. Facial cones long, divergent, acute, subvertical but very slightly visible from above, moderately pubescent.

Thorax strongly arched, finely punctate. Pronotum short, depressed below head and dorsulum; dorsulum strongly ascending to scutum, narrowly rounded anteriorly, not quite as long as scutum. Wings hyaline, about two and a half times as long as broad, broadest across first marginal cell, broadly rounded apically; radius flexed midway, fully as long as second cubital; marginal cells rather small, subequal; venation yellowish.

Female.—Abdomen dorsally brownish gray, ventrally greenish white. Genital segment rather short, about as long as anal ventral segmental plate; dorsal plate longer and more acute than ventral; genital pore about one-fourth as long as dorsal plate, inclined toward anal segment.

Described from one female in the C. F. Baker collection, taken in Vancouver. Type specimen in National Museum.

***Trioza aurantiaca* n. sp.**

(Figs. 128 W; 129 N; 130 W, X, Y.)

Length of body, 2.3 mm.; length of forewing, 3.4 mm.; greatest width, 1.35 mm.; width of vertex between eyes, .44 mm.; with eyes, .72 mm. General color orange, varying from light yellowish brown in some specimens to deep orange in others; abdomen ventrally and anally greenish white.

Head moderately deflexed, very finely punctate, with eyes not as broad as thorax. Posterior margin of vertex arcuate, not emarginate at median suture, slightly and narrowly elevated over middle three-fifths of line between posterior ocelli; discal area with a small shallow fovea midway near posterior ridge, and a diverging depression extending obliquely toward front and lower margin of eyes; frontal plates slightly raised plate-like, deeply emarginate at median suture. Anterior ocellus not visible from above. Facial cones quite long, acute, only slightly divergent, subvertical and not visible from above, sparsely pubescent. Antennae inserted at base of cones, mostly in front.

Thorax arched, finely punctate. Pronotum short, depressed below dorsulum and head; dorsal portion almost vertical, ascending to lower margin of slightly overhanging dorsulum. Dorsulum strongly ascending, acutely rounded anteriorly. Wings hyaline, about two and a half times as long as broad, broadest across base of first marginal cell, subacute apically; marginal cells subequal; venation yellowish.

Female.—Genital segment short, scarcely as long as ventral segmental plate preceding it; dorsal plate longer and less acute than ventral; genital pore about one-fourth as long as dorsal plate, declinate toward anal segment;

ventral segment short, produced apically into a short and acute point. *Male*.—Abdomen slender, arched dorsally, broadest across third dorsal segmental plate, the anal dorsal plate scarcely visible above ventral segmental plate. Genital segment about as long as two preceding, somewhat reflexed, with apical margin horizontal; claspers rather short, simple, slender and acute in distal half, arcuate and briefly pubescent. Anal projection bilobate when viewed laterally; the longest lobe horizontal and at right angles to the other, reaching fully to base of claspers; pubescence short, whitish.

Described from numerous females and several males taken in Ormsby County, Nevada, and Santa Clara County, California, by C. F. Baker.

This species is more or less variable in some respects and it is therefore, quite difficult to determine the line of separation between this and closely related species. Wherever a large number of specimens belonging to some common species is studied this difficulty of gradual variation is nearly always encountered. It is quite possible that these variations are slowly giving rise to new species, but while the variations are slight and grade into each other the only course possible is to class the entire group of slightly varying forms into one species. In this specific group the genital characters are the most constant and reliable for diagnosis.

***Trioza varians* n. sp.**

(Figs. 128 V; 129 O; 130 U, V.)

Length of body, 2.1 mm.; length of forewing 3.3 mm.; greatest width of wing, 1.4 mm.; width of vertex between eyes, .41 mm.; with eyes, .70 mm. General color, dark brown to black with conspicuous stripes and bands of yellowish white; frontal plates bordered with light band; whitish band on pedicle of eye; on posterior margin of dorsulum and several stripes on dorsal surface of scutum and dorsulum; upper margin of ventral abdominal plates whitish.

Head somewhat deflexed, finely punctate. Posterior margin of vertex narrowly and sharply elevated into a ridge over three-fifths of the line between posterior ocelli; discal area with a sulcus extending parallel with median suture; margin of frontal plates elevated arcuately; when viewed from side raised plate-like; deeply emarginate anteriorly. Anterior ocellus not visible from above. Facial cones medium in length, divergent, subacute, subvertical and not visible from above, slightly rugulose, sparsely pubescent. Antennæ inserted below frontal plates, in front.

Thorax strongly arched, finely punctate. Pronotum short, depressed below dorsulum and head; with a fovea on each side above pleurites; lighter in color than dorsulum. Dorsulum quite strongly ascending, roundly pointed anteriorly; with a stripe of lighter brown on dorsal surface. Wings hyaline, about two and a half times as long as broad, broadest across middle of first marginal cell, quite broadly rounded apically; radius as long as second cubital; first marginal cell smaller than second.

Female.—Abdomen arched dorsally; borders of ventral segmental plates lighter colored. Genital segment about as long as anal segment; concolorous

with rest of abdomen except a yellow band around middle of dorsal plate; dorsal plate longer and less acute than ventral; genital pore about one-third as long as dorsal plate. *Male*.—Abdomen more slender than in female. Genital segment longer than anal ventral plate; claspers of medium length, simple, tapering, acute and recurved apically; anal projection bilobate, the posterior lobe horizontal to other lobe and composed of two lateral flaps, reaching to middle of genital segment; pubescence very short and sparse.

Described from five males and two females collected in Colorado by C. F. Baker.

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