

AMERICAN PSYLLIDÆ I (Trioziinae)

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Although the Psyllidae have been quite thoroughly studied in Europe, chiefly by Dr. Franz Low, still the knowledge of the group in America is very scanty. A few papers have been published by E. A. Schwarz and by the late Mr. Riley and others, but no attempt has been made in America to systematically study this most interesting and important group as a whole. The large collection of Psyllidae presented to Pomona College by Prof. C. F. Baker, and also the extensive C. F. Baker collection from the National Museum at Washington are now before me for systematic study. These collections include specimens from the majority of the states, and also from Mexico and Central America.

In this first paper, I present a provisional key to the genera and species of the subfamily *Trioziinae*, together with the first installment of descriptions of the new species. Although the key is only provisional and will probably be extensively revised before the completion of the work, still I have chosen what seemed to me after very careful comparative study of the two collections to be the best diagnostic characters. It is quite possible that a few of the American species will be found to be identical or closely related to some European forms; representatives of many of the European species have been placed at my disposal, but not enough of them to make a systematic comparison.

In making the synopsis of genera of the subfamily, I am unable, from Mr. Scott's characterization of his genus *Petalolyma*, to find any generic differences between that genus and the typical genus *Trioza*. From the brief and wholly inadequate descriptions of *Trioza diospyri* Ashmead, *T. magnoliae* Ashmead and *T. pyrifoliae* Forbes, it is impossible to include these in the synopsis of species; it seems quite probable, however, that *T. magnoliae* is closely related to *Paratrioza arbolensis* n. sp.

In this and subsequent studies, the term *facial cones* is applied to the conical structures projecting outward or downward from the face; the term *frontal plates* is applied to the flat discal area of the upper anterior portion of head, whether that area is raised plate-like or not.

SYNOPSIS OF THE GENERA OF THE SUB-FAMILY TRIOZINÆ

- A. Radius longer than basal portion of subcosta.
- B. Facial cones entirely wanting. Fore femora long and distinctly broadened *Rhinopsylla* Riley.
- BB. Facial cones not entirely wanting.
- C. Labrum very large and distinctly visible below and between facial cones; facial cones extremely short and very broad and broadly rounded when viewed from in front, with antennae inserted near their base; cones slightly projecting beyond insertion of antennae. *Paratrioza* n. gen.

- CC. Labrum not visible from in front below the facial cones; facial cones at least moderately long and acute, and more or less divergent. Wings usually rather pointed apically, sometimes broadly rounded.....*Trioza* Forster, and *Petalolyma* Scott.
- AA. Radius shorter than basal portion of subcosta; discoidal portion of subcosta almost wanting.....*Ceropsylla* Riley.

SYNOPSIS OF THE GENUS PARATRIOZA

- A. Frontal plates distinctly raised plate-like; head and thorax conspicuously striped, usually black and white, or yellowish white; without emargination between frontal plates. Thorax distinctly arched.
- B. Anterior ocellus not visible from in front, under projecting frontal plates. With distinct fovea on each frontal plate posteriorly.
.....*Paratrioza ocellata* n. sp.
- BB. Anterior ocellus quite distinctly visible from in front; frontal plates not projecting so much. Without marked fovea on frontal plates.
- C. Stripes around frontal plates and on thorax white or nearly white.
.....*Paratrioza pulchella* n. sp.
- CC. Stripes orange colored, not very conspicuous.
.....*Paratrioza pulchella flava* n. var.
- AA. Frontal plates not raised plate-like. Head and thorax not striped as above. Thorax scarcely arched; pronotum scarcely depressed.
- B. With deep emargination between frontal plates. Radius shorter than second cubital. Pronotum not arched.
- C. First marginal cell larger than second; first cubital scarcely as long as first furcal; wing very acute apically. Labrum not conspicuously protruding, closely lying against ventral surface of head. Body large, greenish yellow throughout.
.....*Paratrioza arbolensis* n. sp.
- CC. Marginal cells subequal; rather small. Labrum very conspicuous, subpetiolate and globose. Frontal plates deeply depressed obliquely, with a deep emargination anteriorly at median suture, and anterior ocellus at apex of emargination. Color of body black to brownish yellow, rather small. Two basal antennal segments rather stout.....*Paratrioza antennata* n. sp.
- BB. Without deep emargination between frontal plates. Pronotum heavy and strongly arched. Facial cones (lobes) quite large and globose. Radius longer than second cubital. Body small, greenish yellow.
.....*Paratrioza medicaginis* n. sp.

SYNOPSIS OF THE GENUS TRIOZA

- A. Pronotum rather broad and not depressed below anterior margin of mesonotum; mesonotum broad anteriorly and not subtriangular.
- B. Wings rounded or roundly pointed apically. Radius longer than second cubital; fourth furcal about one-third as long as second cubital.
.....*Trioza collaris* n. sp.

- BB. Wings pointed apically. Prothorax broader than usual.
- C. Radius shorter than second cubital. Discal area of vertex with a deep fovea on each side of median suture posteriorly; pronotum with a distinct pit on each side; facial cones subhorizontal. Wings more or less clouded or blotched.
- D. First marginal cell much larger than second; fourth furcal less than one-fourth as long as second cubital. With a large macula covering second marginal cell and part of cubital cell. Wing not acutely pointed at tip.
*Trioza maculata* n. sp.
- DD. Marginal cells subequal; fourth furcal fully one-third as long as second cubital; wings somewhat clouded, but without distinct maculae or spots; wings acutely pointed at tip.
*Trioza acutipennis* n. sp.
- CC. Radius very much longer than second cubital. Pronotum without pits; discal pits less pronounced. Facial cones horizontal. Wings not clouded.....*Trioza bakeri* n. sp.
- AA. Pronotum depressed; mesonotum roundly pointed anteriorly and more elevated than pronotum.
- B. Facial cones not vertical, distinctly visible from above.
- C. Radius distinctly shorter than second cubital.
- D. Wings with dark maculae and bands; body dark with lighter areas. Facial cones rather small and subacute.
*Trioza maculipennis*, n. sp.
- DD. Wings clear, not blotched.
- E. Facial cones short, stout and very blunt at tip. Second marginal cell extremely large; fourth furcal nearly as long as second cubital; wings very large and acutely pointed.*Trioza latipennis* n. sp.
- EE. Facial cones normal; second marginal cell not unusually large.
- F. Body small, greenish yellow throughout. Frontal plates depressed longitudinally in center, elevated along median suture; facial cones not acute. Radius very short, not longer than basal and discoidal portions of subcosta combined.....*Trioza viridis* n. sp.
- FF. Body medium, orange colored. Frontal plates depressed obliquely; facial cones acute. Radius almost as long as second cubital.
*Trioza frontalis* n. sp.
- CC. Radius as long as, or longer than second cubital.
- D. Wings more or less pointed apically. Frons and facial cones black; discal area of vertex quite deeply depressed.
*Trioza nigrifrons* n. sp.

- DD. Wings distinctly rounded apically.
- E. Wings clouded; marginal cells unusually small; first and third furcals very short, second and fourth longer.
*Trioza tripunctata* (male) Fitch.
- EE. Wings clear; marginal cells normal.
- F. Frons and facial cones whitish. Radius about as long as second cubital.....*Trioza albifrons* n. sp.
- FF. Frons and facial cones not whitish.
- G. Radius about as long as second cubital; second cubital short; first marginal cell larger than second. Anal abdominal segment white, the rest dark.....*Trioza rotundipennis* n. sp.
- GG. Radius much longer than second cubital; marginal cells subequal. Abdomen entirely light colored.....*Trioza similis* n. sp.
- BB. Facial cones vertical, or nearly so, scarcely visible from above.
- C. Facial cones more or less divergent. Marginal cells subequal and of medium size.
- D. Genital segment of female very short, without exerted ovipositor blade.
- E. Wings slightly but distinctly fulvous, roundly pointed apically; margin of clavus (anal angle) usually heavy and black. Discal portions of vertex broadly depressed on each side of median suture; facial cones quite strongly divergent. Abdomen usually greenish white ventrally, darker dorsally.....*Trioza fulvida* n. sp.
- EE. Wings not fulvous, distinctly transparent and shining.
- F. Facial cones quite strongly divergent.
- G. Facial cones moderately acute at tips.
- H. Frontal plates yellow around margin and along median suture; facial cones long, usually somewhat subvertical.
*Trioza varians* n. sp.
- HH. Frontal plates not yellow as above.
- I. Frontal plates depressed as in *T. fulvida*; cones quite vertical, medium in length.....*Trioza fulvida similis* n. var.
- II. Frontal plates with small fovea posteriorly; cones subvertical, quite long.
*Trioza longicornis* n. sp.
- GG. Facial cones not moderately acute, quite blunt at tips.
- H. Posterior margin of vertex narrowly elevated over entire width; frontal plates deeply depressed, often dark colored. Radius usually at least as long as second cubital.....*Trioza aurantiaca* n. sp.

HH. Posterior margin of vertex not narrowly elevated over entire width, only over discal areas of frontal plates; frontal plates not deeply depressed, usually light colored.

.....*Trioza aurantiaca frontalis* n. var.

FF. Facial cones not strongly divergent, and not contiguous.

G. Wings with dark bands or stripes.

H. Wings with a broad brownish band on cubital margin from tip of wing to near base.*Trioza marginata* n. sp.

HH. Subcosta and anal angle with a black band or stripe for entire length. Radius very short.....*Trioza californica* n. sp.

GG. Wings clear, without bands or stripes. Head with eyes about as wide as thorax.

H. Wings moderately broad and not very acute apically. Frontal plates scarcely depressed.

I. Facial cones rather straight on inner margin and almost contiguous; frontal plates scarcely notched at median suture on anterior margin. Body usually light colored.....*Trioza salicis* Mally.

II. Facial cones distinctly conical, more diverging than in *T. salicis*. Frontal plates quite deeply notched at median suture. Body usually dark brown to black.....*Trioza nigra* n. sp.

HH. Wings slender and quite acute apically; first furcal very short. Facial cones short, slightly diverging, usually straight on inner margin. Body small.

.....*Trioza minuta* n. sp.

DD. Genital segment of female quite long, with or without an exerted ovipositor blade.

E. Wings striped; radius and first and second cubitals with a brown band on both sides; third furcal much shorter than fourth furcal. Facial cones rather large and blunt at tips, moderately divergent.

.....*Trioza tripunctata* Fitch

EE. Wings without stripes; third and fourth furcals subequal.

- F. Wings with four large black spots on dorsal margin easily visible to naked eye, one on margin of each marginal cell, one on margin of cubital cell and one on anal angle. Facial cones medium, moderately divergent.....*Trioza quadripunctata* n. sp.
- FF. Wings without four spots easily visible to unaided eye.
- G. Female with long exerted ovipositor blade.
- H. Prothorax large, only slightly depressed below anterior margin of mesonotum. Ovipositor style nearly twice as long as terminal abdominal segment, and very slender and acute. Body and wings large.
.....*Trioza longistylus* n. sp.
- HH. Prothorax not large, much depressed below mesonotum. Style not longer than terminal segment. Body and wings small.
.....*Trioza nicaraguensis* n. sp.
- GG. Female without exerted style.
- H. Frontal plates with a long oblique groove.
- I. Facial cones slender, acute and strongly divergent.....*Trioza sulcata* n. sp.
- II. Facial cones rather acute and only slightly divergent.
.....*Trioza sulcata similis* n. var.
- HH. Frontal plates without oblique furrow.
- I. Anterior ocellus in median notch of frontal plates and slightly visible from above. Frontal plates with fovea posteriorly.....*Trioza fovealis* n. sp.
- II. Anterior ocellus under projecting frontal plates and not visible from above. Frontal plates scarcely depressed.....*Trioza assimilis* n. sp.
- CC. Facial cones contiguous for entire length and very acute. Body very slender; head fully as broad as thorax.
- D. Third furcal longer than margin of cubital cell. Frontal plates black in center, bordered with yellow; cones long, slender, yellow, except black at tips.
.....*Trioza immaculata* n. sp.
- DD. Third furcal and cubital margin about equal. Frontal plates entirely black; cones medium in length.
.....*Trioza laticeps* n. sp.

GENUS TRIOZA

Trioza californica n. sp.

(Fig. 99, A, B, G, H, I), (Fig. 98, A).

Length of body, 2 mm.; length of forewings 3.35 mm. General color dark brown to orange; head almost black, darker than thorax; abdomen greenish white ventrally, dorsally as dark as thorax; legs uniform reddish brown; antennae brown to black, except segments II-III whitish. Head and thorax finely punctate.

Head not strongly deflexed; with eyes, almost as broad as thorax, slightly and finely punctate; vertex posteriorly nearly straight, somewhat arcuate; discal area of frontal plates obliquely and broadly depressed, elevated along median suture posteriorly and emarginate anteriorly; frontal plates not raised plate-like; facial cones moderately large, rather acute, not strongly divergent, almost vertical, quite densely hirsute. Antennae inserted beneath the slightly projecting vertex, filiform, except two basal segments large, subglobose. Eyes large, hemispherical; anterior ocellus imbedded at angle of facial cones.

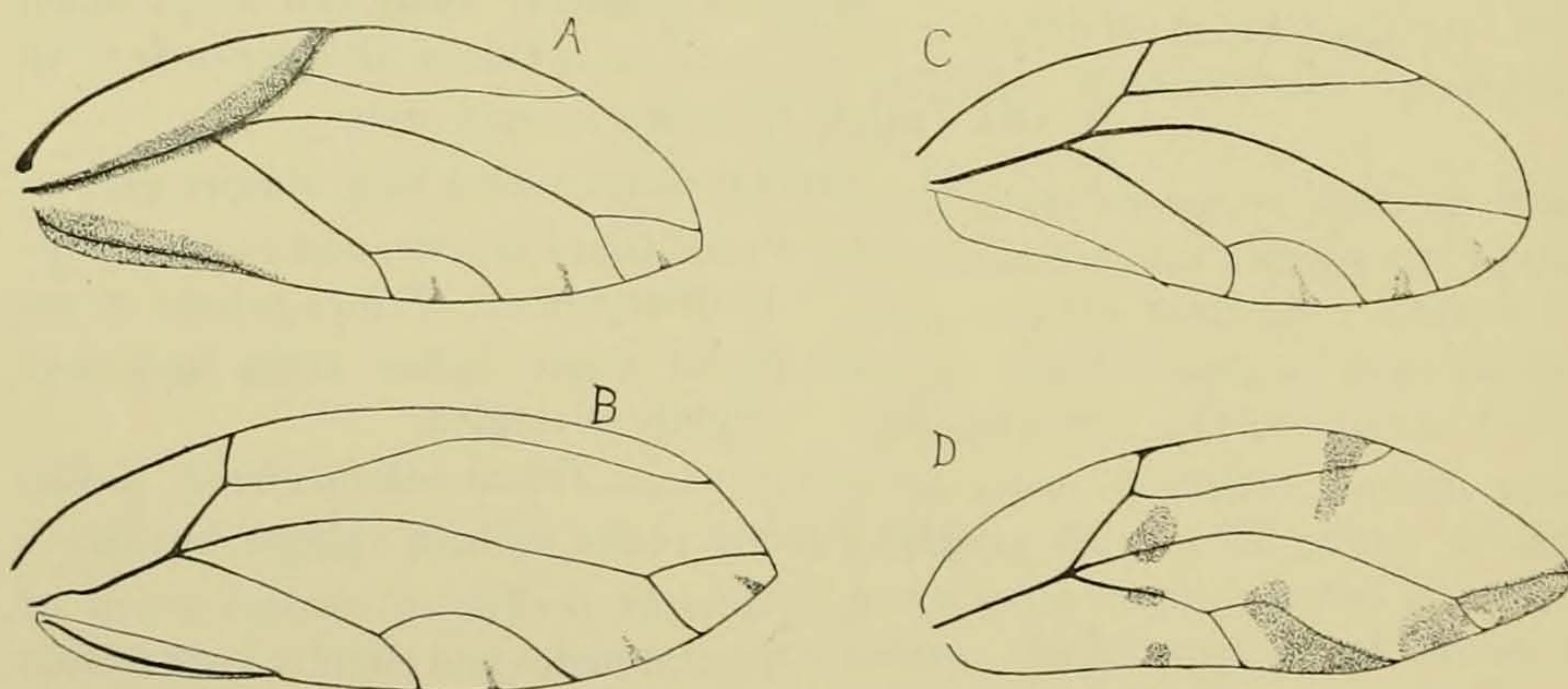


Figure 98. A, *Trioza californica*; B, *T. bakeri*; C, *T. rotundipennis*; D, *T. maculipennis*.

Thorax arched, distinctly punctate. Pronotum depressed below dorsulum and head; dorsulum strongly ascending posteriorly, about as long as scutum. Wings hyaline, about two and one-half times as long as broad, broadest across middle, subacute apically; subcosta and anal angle bordered on both sides with black band, giving appearance of one long-curved stripe and one shorter one; radius shorter than second cubital; marginal cells quite small; apex of wing distinctly within second marginal cell; venation reddish brown, except subcosta.

FEMALE—Genital segment not long, scarcely twice as long as preceding segment; dorsal plate somewhat longer than ventral plate, arched, and acute at the tip; both plates hirsute. MALE—Genital segment reflexed dorsally, large, hirsute dorsally in the center.

Described from seven males and one female, taken by C. F. Baker, near Claremont, Calif. (mountains). Co-type in National Museum, Washington.

Trioza bakeri n. sp.

(Fig. 99, C, D, J, K, L), (Fig. 98, B).

Length of body about 2.2 mm.; length of forewings 3.5 mm. General color brown with fulvus; head brown, except frontal plates fulvous yellow; dorsulum posteriorly, median dorsal portion of scutum, and scutellum fulvous; rest of thorax brown; abdomen whitish ventrally, black dorsally; antennae yellow, except terminal segment black.

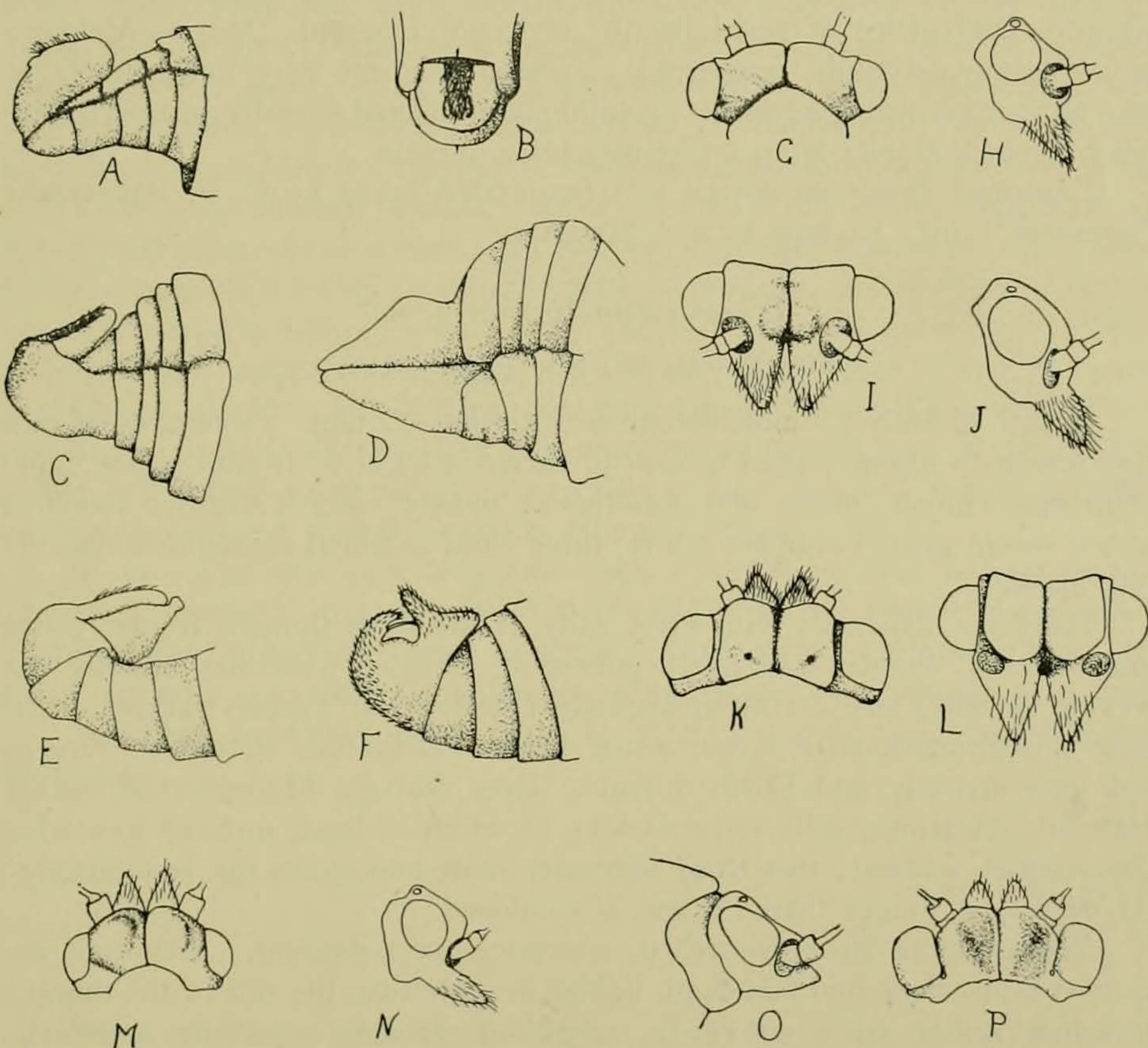


Figure 99. A, B, G, H, I, *T. californica*; E, M, N, *T. rotundipennis*; F, O, P, *T. maculipennis*; C, D, J, K, L, *T. bakeri*.

Head not deflexed, but continuing uniformly the descending arch of thorax and head, almost as broad as thorax; frontal plates large, flat, pubescent, distinctly raised plate-like, with a small, deep fovea posteriorly on each side of median suture; facial cones black, subhorizontal, projecting forward beyond frontal plates, acute, quite strongly divergent, and moderately hirsute. Eyes not hemispherical, somewhat flattened. Antennae twice as long as width of head, inserted near base of cones, without; two basal segments larger, subglobose, the rest filiform, terminal segment slightly clavate.

Thorax arched, rather coarsely punctate and finely pubescent or pulverulent. Pronotum large, broad, somewhat arched; pubescence almost as long

as on frontal plates; not depressed below dorsulum and head; dorsulum broad anteriorly, ascending posteriorly, nearly as large as scutum. Wings hyaline, two and two-thirds times as long as broad, broadest across middle, acute apically, apex within second marginal cell; first marginal cell a little larger than second marginal; radius longer than second cubital, curved midway; venation brown to black.

FEMALE—Abdomen very broad dorso-ventrally, strongly arched dorsally. Genital segment hirsute, fully as long as four preceding segments, subacute apically; both plates of equal length; style not exerted. MALE—Abdomen broad basally, strongly converging. Genital segment very long, nearly as long as four preceding segments; genital plate reflexed dorsally; claspers elliptically arched, closely lying on genital plate, hirsute.

Described from one female and two males, taken by C. F. Baker near Claremont, Calif. Co-type in Nat. Museum.

***Trioza rotundipennis* n. sp.**

(Fig. 99, E, M, N), (Fig. 98, C).

Length of body 1.9 mm.; length of forewing 2.9 mm. General color reddish brown to orange; head brownish, except margin of frontal plates light; prothorax whitish; meso- and metathorax mostly reddish brown; abdomen brown except genital segment white; three basal antennal segments white, the rest black.

Head not deflexed; with eyes, fully as broad as thorax; frontal plates subhorizontal, slightly and finely pubescent, elevated plate-like, broadly depressed discally, and deeply emarginate anteriorly at median suture; facial cones black, moderately large, acute, almost horizontal, strongly divergent and very sparsely and briefly hirsute. Eyes scarcely hemispherical, rather flattened. Antennae fully twice as long as width of head, inserted somewhat above cones, without; two basal segments short and stout, the rest filiform; III very long, longer than IV and V combined.

Thorax quite strongly arched, punctate, not pubescent. Pronotum depressed below dorsulum and head, lighter in color than the rest of the thorax; dorsulum rather acute anteriorly, ascending strongly especially anteriorly, about as long as scutum. Wings hyaline, about two and one-fourth times as long as broad, broadest across first marginal and radial cells midway, very broadly rounded apically; radius very short, but fully as long as second cubital, which is only twice as long as fourth furcal; marginal cells about equal; venation yellow.

MALE—Abdomen quite broad basally, dorsal segments descending and almost disappearing on anal half of abdomen. Genital segments partially reflexed dorsally, larger than preceding segment; genital plate reflexed; claspers laterally opposed, fully as long as genital segment, acute at tips, moderately hirsute.

Described from two males, taken by C. F. Baker near Claremont, Calif. (mountains). Co-type in Nat. Museum.

***Trioza maculipennis* n. sp.**

(Fig. 99, F, O, P), (Fig. 98, D).

Length of body 1.7 mm.; length of forewings 2.85 mm. General color reddish brown to dark brown or black; head fulvous brown; thorax darker, somewhat mottled; abdomen almost black; intermediate antennal segments tipped with black, terminal segment black, the rest yellowish brown.

Head somewhat deflexed; with eyes, almost as broad as thorax; frontal plates raised plate-like, large, broadly depressed obliquely, slightly elevated along median suture, scarcely emarginate anteriorly, quite pubescent; facial cones fulvous, short, subacute, strongly divergent, almost horizontal and sparsely hirsute. Eyes large, hemispherical. Antennae fully twice as long as width of head, filiform, except two basal segments; third segment very long.

Thorax not strongly arched, coarsely punctate. Pronotum depressed below dorsulum and head, rather light colored; dorsulum pubescent, acute anteriorly, strongly ascending on anterior half, posteriorly, and the rest of thorax not very strongly arched; scutum very slightly pubescent anteriorly. Wings angulated and acute apically, about two and two-thirds times as long as broad, broadest subapically; semihyaline, not fully transparent, with several brown maculae in apical half covering both marginal cells and part of cubital and radial cells; first marginal cell much larger than second; radius straight, shorter than second cubital; venation yellowish brown.

MALE—Abdomen quite long and stout. Genital segment as long as two preceding segments, rounded apically and not reflexed; genital plates small, slightly flexed anteriorly; penis exerted toward claspers; claspers large, bilobed, laterally opposed. Genital segment and plates very densely pubescent.

Described from two males, taken by C. F. Baker in San Mateo County, California.

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