

Description of the Immature Stages of *Trioza unica* (Caldwell) (Homoptera: Psyllidae)¹

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ABSTRACT. The taxonomic position of *Trioza unica* (Caldwell) and its evolutionary affinities with the genera *Kuwayama* and *Trioza* are reviewed. Detailed descriptions of the five nymphal instars are given.

Caldwell (1940) described an endemic species of Hawaiian psyllid, *Ceropsylla unica* Caldwell, which was collected from the host plant *Cryptocarya mannii* Hillebrand (Lauraceae) on the island of Kauai. Zimmerman (1948) surmised that Caldwell placed this species in the genus *Ceropsylla* out of convenience because of similarities in wing venation in *C. unica* and the type of the genus, *Ceropsylla sideroxyli* Riley (1885). The character in common is the presence of a short stalk or petiole which separates the R+M fork from the base of the Cu vein. Zimmerman considered the fusion of the R+M veins in *C. unica* and *C. sideroxyli* as parallel developments, since there is variation in the length of the stalk. Although Zimmerman (1948) indicated that there were morphological similarities between *C. unica* and one of the endemic Hawaiian species of *Kuwayama*, he did not consider *C. unica* to be allied to *Kuwayama* since it possessed well developed genal cones. Thus, Zimmerman, rather than propose a new but weak genus for *C. unica*, transferred this species to the genus *Trioza*, since he considered the small spots in the cells of the hind margin of the anterior wings of *C. unica* to be typical of Hawaiian species of *Trioza*.

Descriptions of the immature stages of *T. unica* are given below. The purpose of these detailed morphological descriptions of the immature stages is to provide more taxonomic information on this endemic species, which may help to resolve questions about evolutionary relationships among Hawaiian psyllid genera. The nymphal descriptions are presented in the style previously used by us (Uchida and Beardsley 1992).

***Trioza unica* (Caldwell).** (Figs. 1-5).

Ceropsylla unica Caldwell 1940, Proc. Hawaii. Entomol. Soc. 10:392.

Trioza unica (Caldwell), Zimmerman 1948, Insects of Hawaii. 5:24.

Type locality: Kokee, Kauai Island. Holotype male and allotype female located in B. P. Bishop Museum.

Distribution: Kauai Island.

Host: Found on ventral surface of leaves of *Cryptocarya mannii* Hillebrand.

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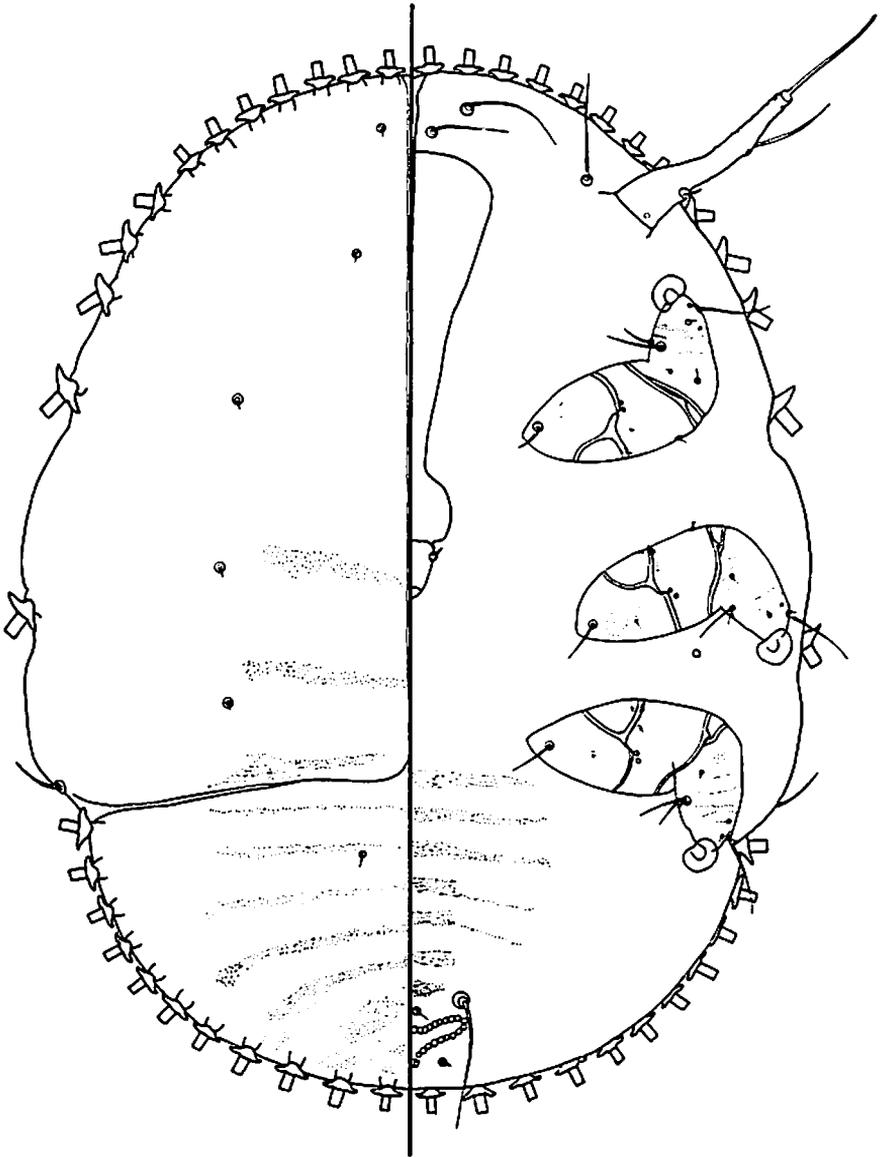


FIGURE 1. *Trioza unica*, First instar nymph, dorsal and ventral aspects.

Immature Stages:

FIRST INSTAR (Fig. 1).

Dimensions. Length 0.32-0.33mm; width 0.26mm.

Shape. Broadly elliptical; meso-, metathorax each laterally produced.

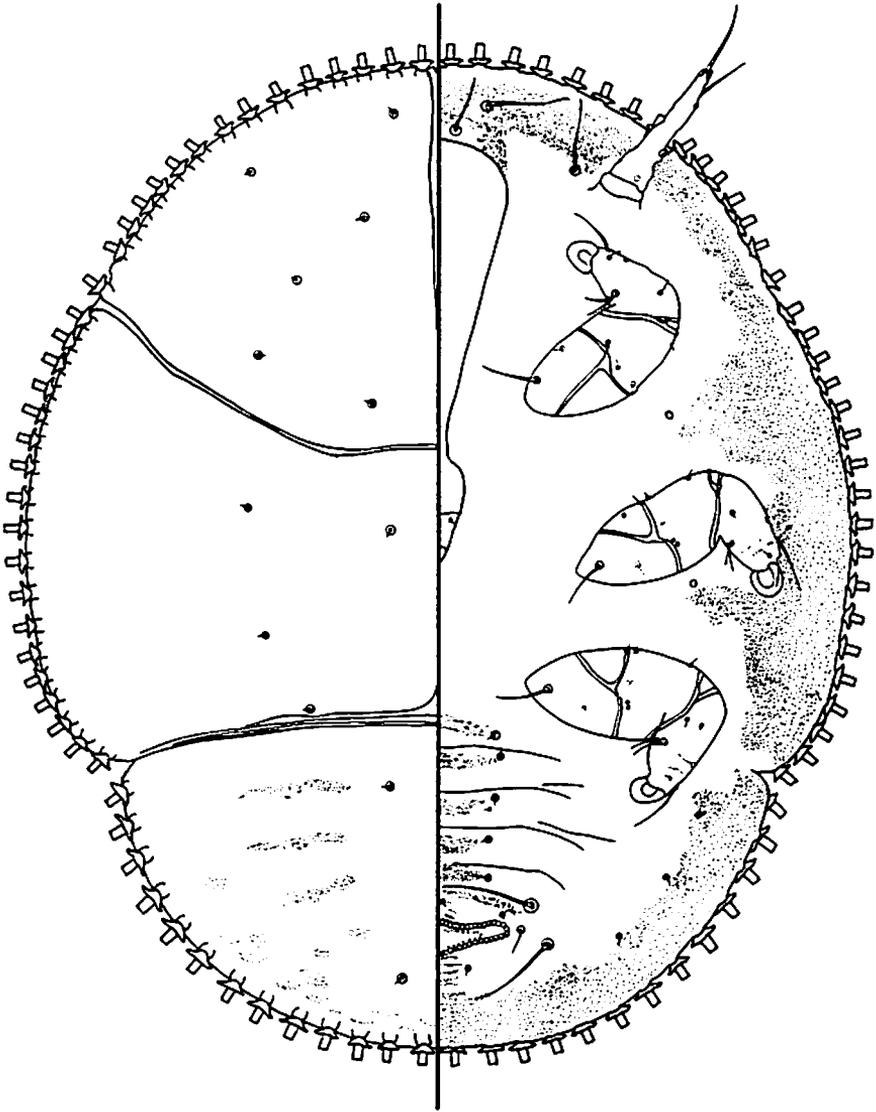


FIGURE 2. *Trioza unica*, Second instar nymph, dorsal and ventral aspects.

Margin. Specialized structures absent.

Dorsum. Sclerotization weak; head, thoracic segments fused, divided longitudinally by median groove; abdomen well defined by transverse suture, segments fused. **Indumenta:** sectasetae dorsoventrally compressed, borne on short protuberances; cephaloprothorax, abdomen with marginal row of sectasetae; cephalopro-, mesothorax with marginal sectasetae poste-

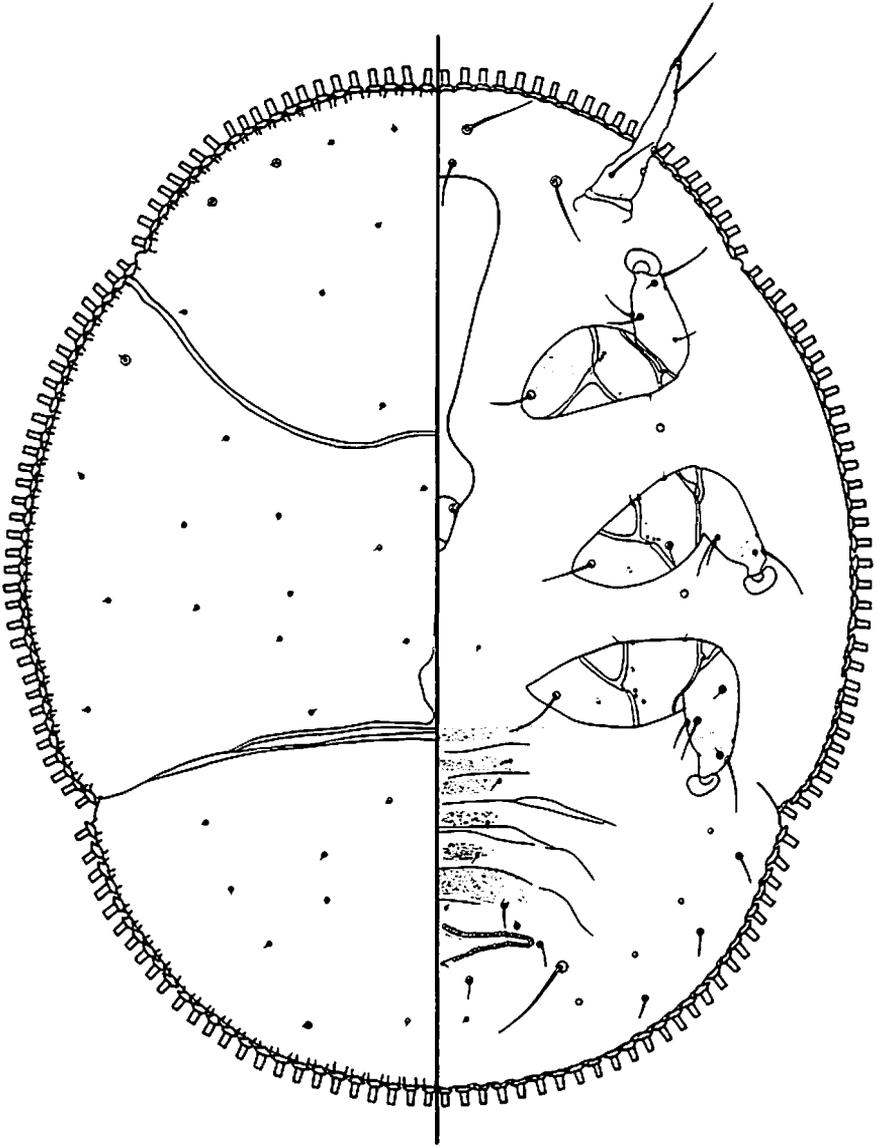


FIGURE 3. *Tioza unica*, Third instar nymph, dorsal and ventral aspects.

riorly on each side. Setae simple, few, mostly small; metathorax with stout acicular, anterolaterally directed seta posteriorly on each side. **Cuticular structures:** spinules forming narrow transverse bands across meso-, meta-thoracic and abdominal segments. Minute points absent.

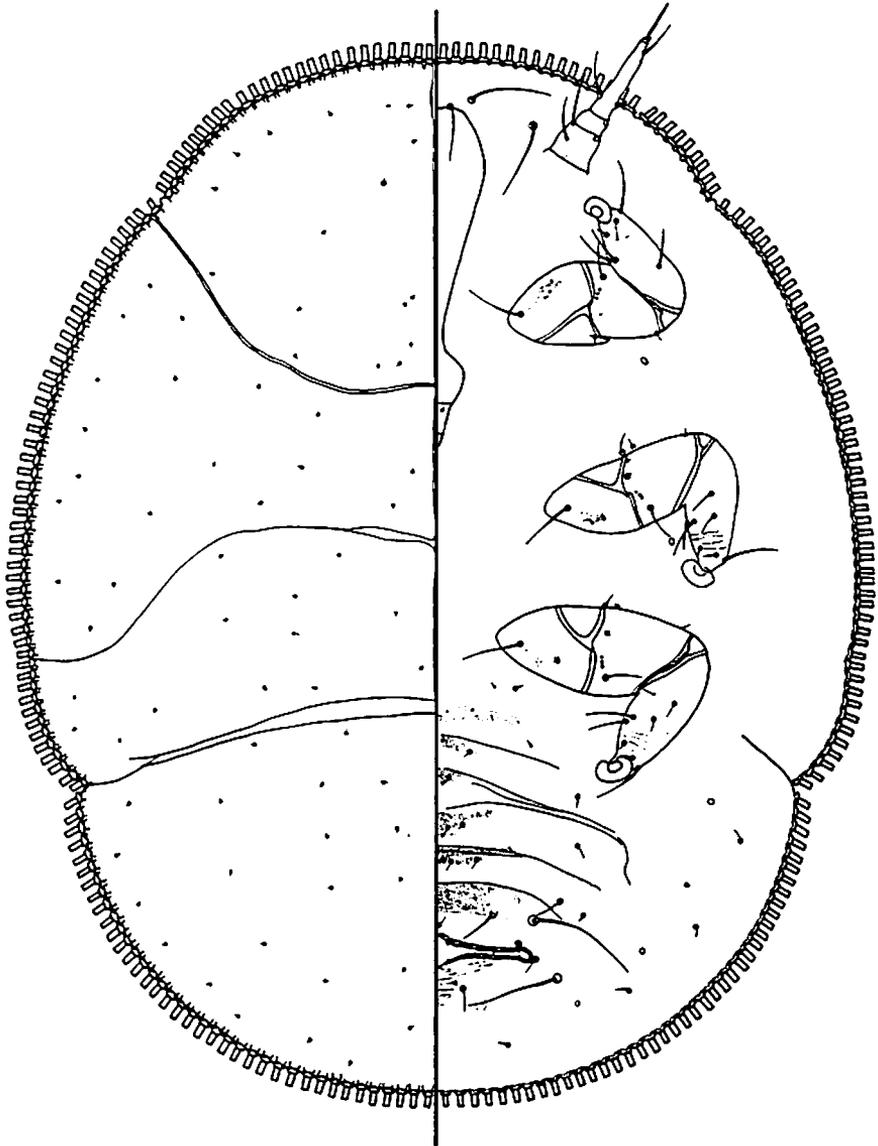


FIGURE 4. *Trioza unica*, Fourth instar nymph, dorsal and ventral aspects.

Venter. Sclerotization absent except for cuticular structures and circumanal pore ring plate. **Indumenta:** setae simple, few; cephaloprothorax with 3 long submarginal setae on each side; few small ventral setae lateral to leg bases; abdomen with enlarged submedial seta anterior to circumanal pore ring on each side; circumanal pore ring surrounded by 3 setae on each side

(1 anterior, 2 posterior). **Cuticular structures:** spinules forming narrow transverse bands across each abdominal segment. Minute points absent. **Antennae:** 1 segmented, elongate; with 3 simple setae (1 long blunt apical seta, 1 long submedial seta, 1 specialized seta) and 4 sensoria (2 subapical, 1 submedial, 1 dorsal near base). **Labium:** basal segment with minute seta on each side. **Legs:** stout; trochanter undefined; femora not reaching margin of body; tibiotarsal articulations absent; claws present; pulvillus reniform; armed with few setae, subequal in size; tibiotarsus with long, slender subapical setae; spinules present; femora with 2 sensoria near base. **Circum-anal pore ring:** pores in single row.

SECOND INSTAR (Fig. 2)

Dimensions. Length 0.44-0.46mm; width 0.35-0.39mm.

Shape. Anterior, posterior wing pads laterally produced.

Dorsum. Cephaloprothorax separated from fused meso-, metathorax by distinct suture. **Indumenta:** body with marginal row of sectasetae; marginal modified sectasetae absent. Setae simple, small, few, more numerous than in first instar. **Cuticular structures:** spinules absent on thorax, in an interrupted band across medial region of each abdominal segment, irregularly distributed along margin.

Venter. **Indumenta:** setae simple, small to long; abdomen with 1 submedial, 1 submarginal row of small setae on each side, posterior segment with 2 enlarged setae; circumanal pore ring surrounded by 5 setae on each side (2 anterior, 2 posterior, 1 lateral). **Cuticular structures:** spinules in short transverse band across each abdominal segment. Minute points dense in submarginal region of body. **Antennae:** two segmented; basal segment short, lacking setae, sensoria; apical segment resembling antennae of first instar. **Circumanal pore ring:** inner pore ring with single pore row.

THIRD INSTAR (Fig. 3).

Dimensions. Length 0.58-0.60mm; width 0.47-0.50mm.

Dorsum. **Indumenta:** setae small to minute, scattered over dorsum. **Cuticular structures:** spinule distribution similar to second instar (not illustrated).

Venter. **Cuticular structures:** spinule, minute point distribution similar to second nymphal instar (not illustrated). **Antennae:** resembling second instar antennae except proximal half of apical segment with 1 long seta, 1 lateral sensorium near base. **Legs:** femora with 3 sensoria near base.

FOURTH INSTAR (Fig. 4).

Dimensions. Length 0.87-0.93mm; width 0.67-0.71mm.

Shape. Anterior and posterior wing pads well defined.

Dorsum. Meso- and metathoracic segments separated by suture. **Indumenta:** setae many, scattered.

Venter. **Antennae:** three segmented; basal segment with 2 setae (1 subapical, 1 medial) and 2 sensoria (1 subapical, 1 dorsal near base); second segment lacking setae, with subapical sensorium; apical segment resembling apical segment of third instar, except lacking 2 submedial sensoria.

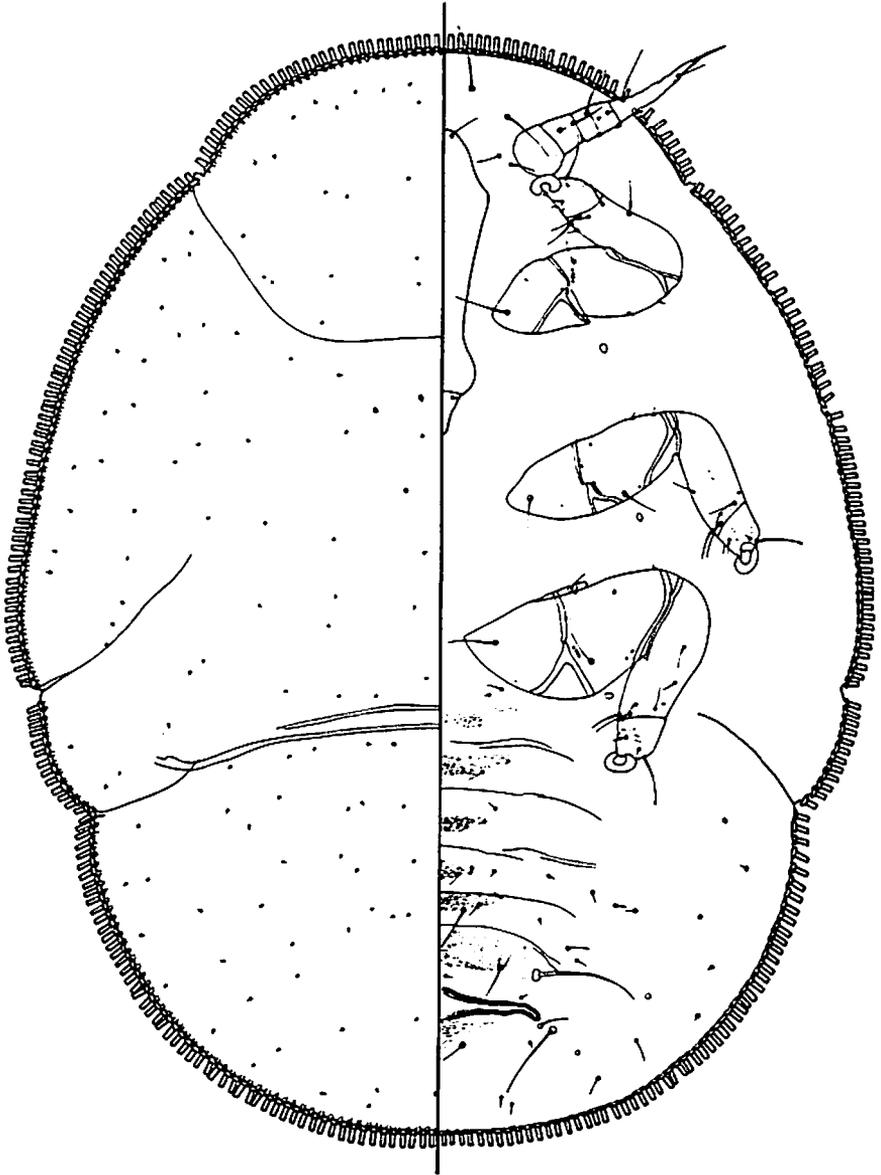


FIGURE 5. *Trioza unica*, Fifth instar nymph, dorsal and ventral aspects.

FIFTH INSTAR (Fig. 5).

Dimensions. Length 1.29-1.37mm; width 0.98-1.07mm.

Dorsum. Meso- and metathoracic segments fused. **Indumenta:** setae more numerous than in fourth instar.

Venter. Indumenta: cephaloprothorax with four long setae on each side, subequal in length; abdomen with two or more setae in transverse row across each abdominal segments. **Antennae:** five segmented; basal segment lacking setae, with 1 dorsal sensorium; second segment with 2 setae (1 subapical, 1 submedial), and 1 subapical sensorium; third segment with 1 subapical seta, and 1 sensorium; fourth segment with 2 submedial setae and 1 subapical sensorium. **Legs:** femora with 4 sensoria near base.

Types. Holotype female, allotype male (BISHOP 5530), Trail from Kokee to Kalalau, Kauai, 8-15-25; O.H. Swezey Collector; *Cryptocarya*.

Other Specimens Examined. Hawaii; Kauai I.; Awaawapuhi Tr., 17•X•1987, ex. *Cryptocarya manni*, G.K. Uchida, 30 nymphs (6 I, 6 II, 6 III, 6 IV, 6 V).

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