

# Occasional Papers

## IN ENTOMOLOGY

AKALYPTOISCHION, A NEW GENUS OF  
LATHRIDIIDAE  
FROM WESTERN NORTH AMERICA  
(COLEOPTERA)

FRED G. ANDREWS

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AKALYPTOISCHION, A NEW GENUS OF LATHRIDIIDAE  
FROM WESTERN NORTH AMERICA (COLEOPTERA)

by

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INTRODUCTION

In Fall's (1899) revision of the North American Lathridiidae, *Cartodere quadrifoveolata* Fall was described as the only native North American member of its genus. Fall based the species on a single specimen from Los Gatos, California and expressed his regret that the few members of the genus in North America were all introduced through commerce with the exception of *C. quadrifoveolata*.

Intensive collecting (Andrews, 1976) in California and adjacent states by means of Berlese sampling has revealed widespread occurrence of undescribed species that closely resemble *C. quadrifoveolata*. This assemblage of species is quite homogeneous morphologically and significantly different from those species included in the rather heterogeneous genus *Microgramme* Walkley (= *Cartodere* Fall). I believe this difference necessitates the removal of *quadrifoveolata* from *Microgramme* to a new genus which will include *quadrifoveolata* and seven new species.

ACKNOWLEDGEMENTS

I would like to thank Drs. R. D. Gordon and J. Kingsolver of the United States National Museum of Natural History (USNM) for the loan of type material.

The following institutions and individuals are gratefully acknowledged for the loan of specimens. Abbreviations indicate the repository of

specimens. California Academy of Science (H. B. Leech, D. H. Kavanaugh) [CASC]; University of California, California Insect Survey (J. T. Doyen) [CISC]; California State University at Long Beach (E. L. Sleeper) [CSLB]; Museum of Comparative Zoology (J. W. Lawrence) [MCZC]; University of California, Davis (R. O. Schuster) [UCDC]; University of California, Riverside (S. Frommer) [UCRC]. Specimens from the California Department of Food and Agriculture collection are cited [CDAE].

Special appreciation goes to Mr. D. Giuliani of Big Pine, California for running Berlese samples of litter from the eastern slopes of the Sierra Nevada and to Dr. E. L. Sleeper for allowing me to sort out Lathridiidae from Berlese samples he had taken in Southern California. A number of entomologists of the California Department of Food and Agriculture were helpful in collecting litter samples for me, including T. R. Haig, R. F. Hobza, E. L. Paddock, and R. E. Somerby. Scanning electron micrographs were at the courtesy of R. O. Schuster of U.C. Davis and the habitus illustration is the work of Ms. E. Parker. Ms. K. S. Corwin helped in preparation of specimens and manuscript.

## METHODS

The characters used to separate the various species are generally visible on point mounted specimens, but because of the small size, it is necessary to slide mount specimens for critical inspection. All measurements, descriptions of fovea and punctation, characterization of the antennal segments, and discussion of setation were taken from slide mounted specimens.

Measurements of the body length were made at 50X magnification; all other measurements were made at 200X. Description of setation, punctation, antennal segment character and sternal fovea were made at 160X. Outline drawings of head, pronotum, metasternum and first abdominal segment were prepared by tracing photomicrographs shot at 160X.

Field collected specimens are usually encrusted with debris that embeds itself in the wax that covers the specimens. The wax and debris can be removed by techniques described by the author (Andrews, 1976), but for SEM micrographs ultrasonic cleaning is necessary. Figure 38 shows the characteristic structures of the wax secretions.

## CLASSIFICATION

The generic relationships within the Lathridiini were last reviewed by Belon (1897). He included in the Lathridiini a number of genera that subsequently have been transferred to other families, and other genera have subsequently been described by other workers. A key to the genera was published by Hinton (1941), without an analysis of the morphological relationships. Regional faunas have been published for North America

(Fall, 1899), Europe (Von Peez, 1975) and Tropical Africa (Dajoz, 1971), each of these treating only parts of the Lathridiini.

A comprehensive morphological analysis of the subfamily is needed to review the generic relationships within the Lathridiinae, and it was with some hesitation that I described a new genus in this subfamily. However, I feel the group's distinctive morphology justifies the decision to do so.

*Akalyptoischion*, n. gen. (Fig. 1), is the most morphologically distinctive taxon within the Lathridiini, differing from all other Lathridiini in having open procoxal cavities (Fig. 36) and large serrate mandibles (Fig. 35). It is also separated from other genera by the large labrum which laterally encompasses the clypeus (Fig. 29), and the extremely reduced eyes (Fig. 31). The placement of *quadrifoveolata* in *Microgramme* (*Cartodere* of Fall and Europeans) by Fall (1899) was undoubtedly based on the shape (elongate, narrow, quadrate pronotum and trapezoidal head). It does not belong in *Microgramme*, which has closed coxal cavities, small non-serrate teeth, small labrum restricted to anterior of clypeus, and well-developed eyes. External sexual characters were not found, therefore all types are unsexed.

## BIOLOGY

The immature stages and food preferences of *Akalyptoischion* are not known. The various species are generally associated with dry litter, most commonly of oak, and are known from the litter of several other plants. Specimens have been taken at elevations ranging from 600 to 3000 meters (approx. 2000 to 10,000 feet).

The distribution appears to be limited to south western United States, but so little Berlese sampling has been done in most of the U. S. and Mexico that there is at present no way of delimiting the distribution.

### AKALYPTOISCHION NEW GENUS

[*akalyptos* Gr. = open; *ischion* Gr. = hip]

Small, elongate, subparallel, depressed. Pale yellowish-brown to reddish-brown; shiny or dull, setose or glabrous. Head trapezoidal, slightly wider than long, narrowed anteriorly to antennal insertions, anterior to which it is sharply constricted to median portion which is truncate; head surface granular, dorsally with two fovea at midline, one medially at posterior margin and an arcuate transverse impression behind clypeus and between antennae. Labrum large, wider than clypeus and laterally rounded; anterior margin even or emarginate. Eyes small, black, located at posterior angles, composed of few facets. Antennae eleven-segmented, inserted laterally behind base of mouthparts, basal two joints round, 3-8 or 9 moniliform, club 2- or 3-segmented. Mandibles large, may bear serrations. Maxillary palps 4-segmented, labial palps one-segmented.

Pronotum subquadrate, narrowed posteriorly, lateral margin depressed and flange-like, medially raised, each lateral margin of raised area with 2 fovea, raised area lightly to heavily punctate, margin serrate, hirsute or glabrous. Elytra elongate, sub-parallel, 6 rows of punctures, intervals 3, 5, 7, and 9 costate, intervals with or without long hair-like setae. Ventral surface usually with sparse hair-like setae, may be nearly glabrous. Gular area distinctly punctate; number varying between 8-33, species specific. Procoxal cavities open behind (Fig. 6). Trochanters slightly larger than wide (Fig. 30). Metasternum with small or large round fovea between mesocoxal cavities and transverse fovea between metacoxal cavities; with or without fovea posterior to mesocoxal cavities and anterior to metacoxal cavities; lateral fovea and carina extending one-half or full length of metasternum. First abdominal sternite with variously shaped fovea posterior to metacoxal cavities and with or without fovea between metacoxal cavities and posteriorly at midline. Male genitalia a crescent shaped tube.

*Type species: Akalyptoischion tomeus.* Present designation.

### AKALYPTOISCHION

#### A Key to the Species of *Akalyptoischion*

1. Antennal club 2-segmented . . . . . 2  
    Antennal club 3-segmented . . . . . 4
2. Labrum with anterior margin entire (Fig. 16) . . . . . *sleeperi* n. sp.  
    Labrum deeply emarginate (Figs. 17 & 18) . . . . . 3
3. Pronotum and elytra with erect hairs that are appreciably longer and  
    stouter than decumbent hairs . . . . . *giulianii* n. sp.  
    Pronotum without erect hairs . . . . . *chandleri* n. sp.
4. Dorsal surface of head, pronotum and elytra glabrous . . . . . 5  
    Dorsal surface of head, pronotum and elytra setose . . . . . 6
5. Antennal segments 3-8 bead-like, width  
    subequal to length (Fig. 27) . . . . . *hormathos* n. sp.  
    Antennal segments 3-8 cylindrical, longer  
    than wide (Fig. 28) . . . . . *atrichos* n. sp.
6. Elytra without stiff, erect setae on raised intervals *quadrioveolata* Fall  
    Elytra with stiff erect seta on raised intervals (Fig. 33) . . . . . 7
7. Labrum deeply emarginate, (Fig. 21) mandible serrate along mesal  
    margin (Fig. 35) . . . . . *tomeus* n. sp.  
    Labrum not emarginate (Fig. 22), mandible with, at most, small teeth  
    apically . . . . . *anasillos* n. sp.

**AKALYPTOISCHION SLEEPERI N. SP.**

Length 1.2 – 1.3 mm. Width 0.22 – 0.26 mm. Body elongate, parallel sided, uniformly testaceous, shiny, setose. Head trapezoidal (Fig. 2), length-width ratio 65:55, lateral margins between eye and antennal insertions uniform, slightly narrowed, obtusely angled anterior to antennal insertion, median 1/3 truncate; 2 round depressions at midline of head near lateral margins. Eyes moderate, 4–5 large facets; tempora 1/2 eye width; obtuse constriction of form neck. Clypeal fovea small, occupying median 3/4 of anterior margin, not deeply projecting posteriorly. Labrum short, anterior margin not emarginate (Fig. 16); lateral margins rounded. Mandibles narrow, sharply pointed. Antennae 11-segmented, 2-segmented club; segment 1 globular, truncate, 2 ellipsoidal, 3–6 distinctly wider than long, subparallel, 7–9 width equals length, almost round, 10 slightly wider than long, gradually expanded, 11 appreciably wider than long, parallel sided. Pronotum length and width subequal, anterior pronotal margins rounded (Fig. 9), laterally evenly and gently narrowed, 10–12 tuberculate, each tubercle bearing a stout, hair-like seta; median raised 2/5 clothed with fine decumbent hair-like setae, sparsely punctate (29–31 punctures,  $n = 6$ ). Elytra subparallel, evenly convex, humeral flange weak; elytra interspaces 1, 3, 5, and 7 raised, with long, decumbent hair-like setae; interspaces 2, 4, and 6 flat, with short hair-like decumbent setae (Fig. 34). Undersurface, except gular area and lateral margins of pronotum sparsely clothed with fine hair-like setae; gular area with 13–20 generally distributed punctures ( $n = 7$ ). Metasternum with single fovea between mesocoxal cavities anterior to metacoxal cavities, 2 small fovea anterior to mesocoxal cavities, a transverse fovea between metacoxal cavities. First abdominal segment bifoveolate between coxae, with coalesced double foveae directly behind coxal cavities.

**Type:** CALIFORNIA: *Ventura Co.*; Frazier Mountain, I-14-1961, E. L. Sleeper, Oak duff. Type to be deposited in California Academy of Sciences; Type No. 12641.

**Paratypes:** Twenty-two specimens same data as type. Paratypes to be deposited in USNM, CSLB, and CDAE.

**Other Material Examined:** CALIFORNIA: *Kern Co.*; Frazier Park, 13-I-60 and 14-I-61, E. L. Sleeper, oak duff [CSLB] (12); Frazier Park, 13-I-61, E. L. Sleeper [CSLB] (2); 11 mi. W. Frazier Park, 13-I-61, E. L. Sleeper, oak duff [CSLB] (1). *Los Angeles Co.*; Angeles National Forest, Blue Ridge nr. Guffy, 700 ft., 10-VI-57, I. M. Newell [CDAE] (2); San Dimas, 14-II-60, E. L. Sleeper [CSLB] (3); San Dimas Exp. For. No. 2, 19-XII-59, E. L. Sleeper and M. Knox [CSLB] (2); South Fork San Gabriel Canyon, 14-V-66, R. Hardy, *Neotoma* next [CSLB] (1).

This species is presently known only from the coastal side of the transverse ranges of Southern California (Fig. 25) where in all known collections it has been Berlesed from Oak (*Quercus*) litter. Along with *A. giulianii* n. sp. and *A. chandleri* n. sp., it has a two segmented antennal

club. It can be distinguished from either of these species by the character of the labrum. The anterior margin of the labrum in *A. sleeperi* is entire (Fig. 16), while in both *A. giulianii* (Fig. 17) and *A. chandleri* (Fig. 18), it is emarginate. The three species can be differentiated by known geographical distribution; *A. sleeperi* occurs in the coastal foothills of Southern California (Fig. 25); *A. giulianii* is found only on the east side of the Sierra Nevada in Inyo Co., California (Fig. 25); and *A. chandleri* is restricted to south-central Arizona (Fig. 26).

*A. sleeperi* is named for E. L. Sleeper, who has Berlesed in many entomologically unexplored areas in California and Baja California and has generously made samples and specimens available to the author.

### *AKALYPTOISCHION GIULIANII* N. SP.

Length 1.1 – 1.3 mm. Width 0.34 – 0.40 mm. Body elongate, parallel sided, shining, setose. Elytra pale reddish-brown, head and pronotum often darker. Head trapezoidal (Fig. 25), wider than long by ratio of 11:8, lateral margins narrowed, even between eye and antennal insertion; sharp arcuate constriction anterior to antennal insertion; medioanterior 1/2 distinctly convex; 2 irregular poorly defined depressions at midline of head. Eyes small, 3 or 4 faceted, tempora poorly defined; gentle arcuate constriction behind eyes forming neck. Clypeal fovea a distinct depression between antennae extending 1/4 of way back into head; surface shiny. Labrum short, lateral margins rounded (Fig. 17), anterior margin gently emarginate. Mandibles small, slender, apically with several small sharp points. Antenna 11-segmented, club 2-segmented; segment 1 globular, anteriorly truncated, 2 subovoid, 3 transverse, 4–5 appreciably wider than long and subparallel, 6–9 slightly wider than long, bead-like, 10 slightly wider than long, ellipsoidal, 11 appreciably wider than long. Pronotum wider than long by ratio of 52:48 (Fig. 10), anterior corners evenly rounded, lateral margins straight, 10–12 tuberculations with stout setae on lateral margins; setae on tubercles 2, 4, and 12 twice length of others; median 2/5 of dorsal surface raised, clothed with fine decumbent hair-like setae; heavily punctate (49–58 punctures,  $n = 3$ ). Elytra subparallel, evenly rounded in cross section; intervals 3 and 5 raised; upper surface densely clothed with fine, elongate recumbent setae; intervals 2 and 4 with double row of setae; remaining intervals with single row; lateral 1/2 of intervals 3 and 5 (raised carina) with setae erect. Undersurface except gular area densely clothed with fine hair-like setae. Gular area with 21–26 punctures ( $n = 3$ ) clumped in posterior band and anterior patch. Metasternum with round fovea between mesocoxal cavities, posteriorly with transverse fovea lying between metacoxal cavities; lateral fovea extending length of metacoxa; first abdominal segment with single fovea behind each coxal cavity.

*Type*: CALIFORNIA: Inyo Co.; Independence Creek, XII-1972, D. Giuliani, *Quercus kelloggii* duff. Type to be deposited in California Academy of Science; Type No. 12642.

**Paratypes:** Two specimens same data. Paratypes deposited in USNM and CDAE.

**Other Material Examined:** CALIFORNIA: Inyo Co.; 2 mi. SW Big Pine, XI-72, D. Giuliani, *Ceanothus* duff [CDAE] (1); Cottonwood Creek, 5600 ft., X-72, D. Giuliani, *Quercus chrysolepis* duff [CDAE] (1); Coyote Creek, 7 mi. SW Bishop, XI-72, D. Giuliani, *Pinus monophylla* duff [CDAE] (1); Division Creek, 5800 ft., IX-72, D. Giuliani, *Quercus chrysolepis* duff [CDAE] (1); Dry Mountain, 7200 ft., 18-VI-75, D. Giuliani, *Pinus monophylla* duff [CDAE] (1); Last Chance Mountains, 8000 ft., 20-VI-73, D. Giuliani, *Pinus monophylla* duff [CDAE] (1); N. Fork Oak Creek, 6000 ft., IX-72, D. Giuliani, *Quercus kelloggii* duff [CDAE] (3).

*Akalyptoischion giulianii* is separable from the other species of the genus with a two segmented club, *A. sleeperi* and *A. giulianii*, by erect bristle-like hairs on the raised elytral interspaces. In both of the other species all the elytral setation is decumbent. *A. giulianii* can further be distinguished from *A. sleeperi* by having a wider head (Figs. 2 & 3), deeply emarginate labrum (Figs. 16 & 17) and a more densely punctate raised pronotal area (59–60 opposed to 29–30). *A. giulianii* is separable from *A. chandleri* by having a wider head (Figs. 3 & 4). *A. giulianii* is sympatric with *A. atrichos* n. sp. and has been taken in the same Berlese sample, but is easily separable by having two rather than three segments in the antennal club.

This species is named for D. Giuliani, who has processed a large number of Berlese samples from Inyo and Mono Counties.

The known distribution (Fig. 25) shows *A. giulianii* limited to Inyo County at elevations between 1800 and 2500 meters (approximately 6000 to 8000 feet). It seems logical that sampling of higher elevation areas to the east in the basin ranges will show it to be more widespread. Several other lathridiids with desert distributions show ranges extending into the basin ranges (Andrews, in press). *A. giulianii* is most commonly and abundantly found in oak litter, but also has been Berlesed from *Pinus monophylla* and *Ceanothus* sp. litter.

#### **AKALYPTOISCHION CHANDLERI N. SP.**

Length 1.1 – 1.2 mm. Width 0.34 – 0.36 mm. (n = 2). Body elongate, subparallel, dark reddish-brown, opaque, setose. Head trapezoidal (Fig. 4), wider than long by ratio of 43:39 (n = 2); lateral margins narrowed evenly, arcuately from eye to anterior of antennal insertion; sharply constricted anterior to antennal insertion; medio-anterior 1/2 truncate; two oval depressions at midline of head. Eyes small, 4–5 faceted, at hind corners of head; tempora equal to width of one eye facet; sharp right angle constriction behind tempora to form neck. Clypeal fovea a distinct

depression lying between antenna and extending from anterior margin 1/4 of the way back into head. Labrum moderate in length, anterior margin distinctly and evenly concave (Fig. 18), lateral margins rounded. Mandibles narrow, anteriorly with several small teeth. Antennae 11-segmented, club 2-segmented; 1 globular, anteriorly rounded, posteriorly squared, 2 sub-ovoid, 3 transverse, bead-like, 4 and 5 parallel-sided, distinctly wider than long, 6-9 transverse, bead-like, 10 and 11 twice width of preceding, 10 transverse, 11 distinctly longer than wide. Pronotum wider than long by ratio of 50:47 (n = 2) (Fig. 11), pronotum viewed dorsally appears round except slight swelling at anterior corners; 11-13 tuberculations on lateral margins, all bearing stout, curved setae, median 3/5 of pronotum raised, clothed with decumbent hair-like setae; densely punctate (49-59 punctures, n = 2). Elytral sides subparallel, gently convex in cross-section. Interspaces 3 and 5 raised, lateral margins beaded; all interspaces bearing long decumbent hair-like setae. Undersurface of head glabrous, prosternum and mesosternum with scattered setae at midline; metasternum and abdominal sternites 1-4 sparsely clothed with fine long hair-like setae. Last abdominal segment densely clothed with fine decumbent setae. Gular area with 18-21 generally distributed punctures (n = 2). Metasternum with large fovea between mesocoxal cavities, an oblique fovea behind each coxal cavity, transverse fovea lying between metacoxae; lateral fovea limited to anterior 1/2. First abdominal sternite with irregular fovea at midline between metacoxal cavities and behind each coxal cavity.

**Type:** ARIZONA: *Pima Co.*, Mt. Lemon Highway 7600 ft., X-3-1971, D. S. Chandler, Oak duff. Type to be deposited in University of California, Davis collection. Type No. 878.

**Paratype:** Four specimens Bear Canyon on Mt. Lemmon Highway, Pima Co., Arizona, X-3-1971, D. S. Chandler, 5600 ft., Oak duff. Paratypes to be deposited in CASC, CDAE, USNM, and UCDC.

**Other Material Examined:** ARIZONA: *Santa Cruz Co.*, Madera Canyon, 23-X-71 and 20-XI-71, D. S. Chandler, Sycamore duff [UCDC] (4). County unknown: Santa Rita Mountains, V-20 [MCZC] (1).

*Akalyptoischion chandleri* is at present the only species in the genus known to occur outside of California. It is restricted to higher elevations in South-central Arizona. It is named for D. S. Chandler, who has collected all known specimens, except one from the Fall collection. It is separable from *A. giulianii* and *A. sleeperi*, the other species having a two segmented club, by distribution (Figs. 25 & 26). Morphologically it can be distinguished from both of the above species by the shape of the pronotum, where the anterior corners are not produced (Figs. 9, 10, & 11). It also differs from *A. giulianii* in having a narrow head (Figs. 3 & 4) and *A. sleeperi* in having a more densely punctate, raised pronotal area (29-31 punctures vs. 49-59 punctures).

### *AKALYPTOISCHION HORMATHOS* N. SP.

Length 1.1 mm. Width 0.33 mm. Body elongate, subparallel, glabrous. Body testaceous. Head trapezoidal, wider than long by ratio of 63:60 (Fig. 5), lateral margins gently arcuate in posterior  $3/5$ , anterior  $2/5$  straight, anterior to antennal insertions sharply, evenly constricted, median  $3/5$  truncate, dorsally with two small depressions at midline, vertex depressed in median  $1/3$ . Eyes small, composed of 3 to 5 facets, tempora subequal to eye width, short right angle constriction immediately behind tempora. Clypeal fovea arcuate channel barely extending posteriorly beyond antennal insertion. Labrum rounded laterally, deeply emarginate anteriorly (Fig. 19), densely setose. Antennae 11-segmented, club 3-segmented; segment 1 truncate-globular, 2 oval, 3-8 bead-like, 9-10 transverse, 11 longer than wide. Pronotum wider than long by ratio of 35:35 (Fig. 12), narrowed posteriorly, medially with raised area with 2 faint depressions on each side of median, moderately punctate (37 punctures), lateral margins 9 or 10 tuberculate, asetose. Elytra slightly inflated laterally, dorsally flattened, shiny, glabrous; interspaces 3 and 5 distinctly keeled, lateral margins barely explanate. Undersurface glabrous, except for several short, fine scattered setae on metasternum and abdominal segments. Gular area with 12 distinct punctures generally distributed ( $n = 1$ ). Metasternum with small round fovea between mesacoxal cavities; lateral fovea limited to anterior  $1/2$ . First abdominal sternite with two small fovea between metacoxa and behind each coxal cavity.

**Type:** CALIFORNIA: *Monterey Co.*; 2 mi. SE Carmel Valley, III-31-1972, Fred G. Andrews and K. S. Corwin, Oak duff. Type to be deposited in California Academy of Sciences; Type No. 12643.

**Paratype:** Four specimens same data. Paratypes deposited USNM and CDAE.

**Other Material Examined:** CALIFORNIA: *Los Angeles Co.*; Santa Barbara Island, 6-IV-74, E. L. Paddock and R. F. Hobza [CDAE] (2). *Marin Co.*; Mill Valley, 8-VI-52, H. B. Leech, sifting debris under *Umbellularia californica* trees [CASC] (1); Samuel P. Taylor State Park, 13-XII-58, C. W. O'Brien [CDAE] (2).

The name is derived from the Greek *hormathos*, referring to a chain of things.

*Akalyptoischion hormathos* is one of the smallest species in the genus. It is known from only 4 collections and 11 specimens, all of which are from very near the coast north and south of the San Francisco Bay and from an offshore island in Southern California (Fig. 24). Like other members of the genus it has been associated with oak litter and additionally sifted from California Bay (*Umbellularia californica*) litter.

*A. hormathos* is separated from all other species in the genus, except *A. atrichos*, by its glabrous state. Very small setae are present under high magnification on slide mounted specimens, but none are visible when viewed with a binocular scope. *A. hormathos* can be differentiated from *A.*

*atrichos* by having the emarginate labrum (Figs. 19 & 20), narrow head (Figs. 5 & 6) and bead-like antennal segments 3–8 (Fig. 27) as opposed to elongate cylindrical (Fig. 28).

**AKALYPTOISCHION ATRICHOS N. SP.**

Length 1.2 – 1.5 mm. Width 0.41 – 0.47 mm. Body elongate, subparallel; elytra appreciably wider than pronotum and head; glabrous. Head and pronotum distinctly rugose, elytra smooth. Body varying from testaceous to reddish-brown. Head trapezoidal, wider than long by ratio of 55:50 (Fig. 6), narrowed anteriorly from midline. Two small, irregular pits at midline. Indistinct depression at midline of vertex. Eyes moderately large, 5 or 6 large facets. Tempora wanting, short constriction behind eyes evenly arcuate. Clypeal fovea irregular half-circle between bases of antennae. Labrum length narrow, densely setose (Fig. 20). Antenna 11-segmented, club 3-segmented; segment 1 truncate globular, 2 narrowly ovoid, 3–8 distinctly longer than wide, 9 expanding conically, longer than 10 and 11, which are equal, subrectangular in profile. Pronotal width, length subequal, slightly wider than long by ratio of 54: 51 (Fig. 13), slightly narrowed posteriorly, anterior gradually rounded, posterior 4/5 straight; entire lateral margin irregular tuberculate, tubercles bearing very small setae; median 3/5 raised, bordered on each side by 2 distinct depressions heavily punctate (46–60 punctures,  $n = 4$ ). Elytral sides subparallel, dorsally flattened, interspaces 3 and 5 raised, lateral margins barely explanate. Undersurface glabrous, smooth, shiny. Gular area heavily punctate with 28–33 generally distributed punctures ( $n = 4$ ). Metasternum with large distinct fovea between mesocoxal cavities; coalesced double puncture-fovea behind each mesocoxal cavity; transverse fovea between metacoxa and lateral fovea extending length of metasternum. First abdominal segment with two small fovea between metacoxal cavities; large transverse fovea behind each coxal cavity and a single large fovea at midline approximate to posterior margin.

**Type:** CALIFORNIA: *San Bernardino Co.*; Seven Oaks, I-26-1963, I. M. Newell, dry oak duff. Type to be deposited in California Academy of Sciences; Type No. 12644.

**Paratype:** Five specimens same data. Paratypes deposited in USNM, UCRC, and CDAE.

**Other Material Examined:** CALIFORNIA: *Inyo Co.*; Cottonwood Creek, X-73, D. Giuliani, *Quercus chrysolepis* duff [CDAE] (1); N. Fork Oak Creek, 6000 ft., IX-72, D. Giuliani, *Quercus kelloggii* duff [CDAE] (3); Tin Mountain, 9-VII-74, D. Giuliani [CDAE] (1); White Mts. nr. Schulman Grove 11,000 ft. 3-X-75, D. Giuliani, *Pinus aristata* duff [CDAE] (1). *Los Angeles Co.*; Angeles Crest Highway, 13.4 mi. W. Big

Pine Ranger Station, 10-IV-57, I. M. Newell [UCRC] (1). *Monterey Co.*; 2 mi. S. W. Carmel Valley, 3-III-72, F. G. Andrews and K. S. Corwin, oak duff [CDAE] (1). *Riverside Co.*; 10 mi. E. Hemet, 5-V-54, F. G. Andrews, swallow's nest [CDAE] (2). *San Diego Co.*; Borrego, Sheep Canyon, 27-IV-55, R. O. Schuster [UCDC] (2).

The name is derived from the Greek: *a*, without, and *trichos*, hair.

*Akalyptoischion atrichos* is the most diversely distributed species in the genus. It is found in the Southcoast Ranges, Transverse Ranges, Peninsular Range, Mojave Desert, Eastern Sierra Nevada, and White Mountains (Fig. 23). As is obvious from the above distribution, this species occurs in a number of diverse habitats including moist, low elevation, coastal woodland, dry high elevation, 3500 meters (approximately 11,000 feet), pine forests, mid elevation mixed woods, and dry high desert pinyon areas. The host litter includes several species of *Quercus*, several species of *Pinus* and a swallow nest.

The glabrous state of *A. atrichos* separates it from all the other species in the genus except *A. hormathos*. These differences are discussed in the *A. hormathos* "remarks" section.

#### **AKALYPTOISCHION TOMEUS N. SP.**

Length 1.3 – 1.6 mm. Width 0.39 – 0.46 mm. Body elongate, parallel, shiny, setose; color reddish-brown, head and pronotum darker. Head subquadrate, wider than long by ratio of 57:50 (Fig. 7), lateral margins in posterior 1/2 parallel, very slightly narrowed anteriorly to antennal insertion; sharp, arcuate constriction anterior to antennae; medio-anterior 1/2 abruptly truncate. Eyes small, 4 or 5 large facets, tempora wanting, right angle constriction immediately behind eyes. Clypeal fovea a broad semicircular depression occupying anterior one-fifth of head. Labrum long, anteriorly emarginate (Fig. 21), laterally appearing lobed. Mandibles large and knife-like, each 4 toothed (Fig. 35). Antenna 11-segmented, club 3-segmented, segment 1 truncate-globular, 2 narrowly ovoid, 3 transverse, 4–5 distinctly longer than wide, 6–8 transverse, bead-like, 9–10 transverse, equal in length, shorter than 11 which is slightly longer than wide. Pronotal length subequal to width, lateral margins gently rounded anteriorly (Fig. 14), posterior 3/4 straight; margins tuberculate with 1st, 3rd, and terminal tubercles bearing large spine-like setae; median 3/5 of pronotum raised, bordered on each side by 2 distinct depressions; median area sparsely punctate (24–34 punctures,  $n = 4$ ); dorsal surface glabrous except for large lateral setae and small hair-like setae apparent only under very high magnification of slide mounted specimens. Elytra subparallel, rounded in cross-section, interspaces 1, 3, and 5 raised; raised carinae and lateral margin bearing heavy spine-like setae opposite every 3rd puncture. Metasternum and abdominal sternites sparsely covered with fine short

setae, remainder of undersurface glabrous. Gular area with 8–10 ( $n = 4$ ) coarse punctures arranged in median transverse band. Metasternum with a small round fovea between mesocoxal cavities and behind each coxal cavity; large transverse fovea lying between metacoxal cavities; lateral fovea limited to anterior 1/2. First abdominal segment with transverse furrow behind each coxal cavity.

**Type:** CALIFORNIA: *Monterey Co.*; 20.9 mi. E. San Lucas, III-24-1972, E. A. Kane, *Heteromeles duff* [CDAE]. Type to be deposited in California Academy of Sciences. Type No. 12645.

**Paratypes:** Two specimens same data [CDAE]; CALIFORNIA: *Monterey Co.*; 19.8 mi. E. San Lucas. X-28-1971. Fred G. Andrews, *Heteromeles duff* (1); 19.4 mi. E. San Lucas, XI-16-1971 Fred G. Andrews, *Heteromeles arbutifolia* duff (1). Paratypes to be deposited in USNM and CDAE.

**Other Material Examined:** CALIFORNIA: *Colusa Co.*; 12.4 mi. N. Rumsey, I-V-70, F. L. Blanc, oak duff [CDAE] (1). *Fresno Co.*; Ciervo Hills, 18 air mi. S. W. Mendota, 16-III-75, J. T. Doyen, *Atriplex guitierrezia* litter, [UCBC] (1). *Lake Co.*; Clearlake Oaks, 29-III-73, T. R. Haig, oak duff [CDAE] (1). *Mendocino Co.*; U. C. Hopland Field Station, 3-VII-68, J. P. Anderson, P. Rubtzoff, M. Winter, feces and soil in wood rat house [CASC] (2). *Orange Co.*; Cleveland National Forest, 15-VI-57, I. Newell, *Ilex* litter [UCRC] (1). *Santa Barbara Co.*; Figueroa Mountains, E. L. Sleeper [CSLB] (4); New Cuyama, 28-VI-75, Hobza and Muldowney, inland oak litter [CDAE] (2). *Shasta Co.*; Platina, 6-VI-75 R. E. Somerby [CDAE] (4). *Solano Co.*; Solano Lake, 28-II-71, D. S. Chandler [UCDC] (1). *Yolo Co.*; Cache Creek, 3 mi. N. Rumsey, 3-II-71, D. S. Chandler, maple-cottonwood duff [UCDC] (2). Putah Canyon, 16-V-50, A. T. McClay, wood rat nest [UCDC] (4).

The name is derived from the Greek: *tomeus*, meaning knife.

*Akalyptoischion tomeus* has the most developed mandibles (Fig. 35) in the genus. Fungi is the food of all Lathridiids whose food preference is known. Most Lathridiids have narrow pointed mandibles with poorly developed teeth at the apices. The large heavy mandibles with large teeth of *A. tomeus* may indicate a carnivorous lifestyle.

*A. tomeus* is the most widespread species in the genus (Fig. 23). It is the only species whose distribution extends into northern California (Shasta Co.). It is most frequently taken in oak litter or wood rat nest, but has been taken in very sparse *Atriplex* litter (J. Doyen per com.).

### AKALYPTOISCHION QUADRIFOVEOLATA FALL

*Cartodere quadrifoveolata* Fall. 1899: 136.

Length 1.1 mm. Width 0.4 mm. Body elongate, parallel sided, uniformly reddish-brown, shiny, finely setose. Head trapezoidal, longer than wide; lateral margins between eye and antennae straight (outline similar to *A. atrichos*). Eyes small, 3–4 small facets; tempora equal to 2/3

width of eye, abruptly narrowed to form neck. Clypeal fovea distinct, transverse foveae and median posterior fovea very lightly impressed. Labrum long, anterior margin distinctly emarginate (as in *A. tomeus*). Antennae 11-segmented; club 3-segmented; 1st segment globular truncate, 2nd ellipsoidal, 3-8 bead-like, 9 transverse, slightly wider than 8, 10 transverse, wider than 9, 11 slightly wider than long, equal in length to ten. Pronotal length equal to width, central raised area convex (outline similar to *A. chandleri*). Elytral setation decumbent, evident only under high magnification (75-100X).

*Type*: A single type in the USNM labeled: 1) Los Gatos, California, 2) Coll Hubbard and Schwarz, 3) H. C. Fall det., 4) Type (underlined in red) 5) Type No. 4498 U.S.N.M., 6) Cartodere 4-foveolata Fall.

There is a single specimen with the head and pronotum missing in the MCZ with the following labels: 1) Santa Rita Mts., 20-5, Ar., 2) Type: 4-foveolata. The handwriting of 4-foveolata is Fall's, however there is no mention of this specimen in his revision (Fall, 1899). The specimen is assignable to *A. chandleri*, which has different setation. Fall probably removed it from the manuscript at the last minute because of the discrepancy in setation and possibly because of the loss of head and pronotum.

Intensive Berlese sampling of litter in the area surrounding Los Gatos has yielded no additional specimens. The absence of an additional specimen prevented the preparation of a slide mounted specimen and the accurate measurement and description of setation afforded the other species.

*A. quadrifoveolata* is a distinctive species and is easily separated from the other species with a three segmented club and setose upper surface (*A. tomeus* and *A. anasillos*) by the lack of stout erect bristling setae on the elytral interspaces. It also is distinctive because of the deeply emarginate labrum.

#### **AKALYPTOISCHION ANASILLOS N. SP.**

Length 1.3 - 1.4 mm. Width 0.41 - 0.45 mm. Body elongate, parallel, reddish-brown, opaque, setose. Head trapezoidal, wider than long by ratio of 55:50 (Fig. 8), lateral margins narrowed anteriorly from eye to anterior of antennal insertion; gentle arcuate constriction anterior to antennal insertion; medio-anterior 1/2 slightly convex; two oblique depressions at midline of head. Eyes small, 4-faceted, at hind corners of head; tempora wanting; arcuate constriction behind eyes forming neck. Clypeal fovea a distinct depression lying between antennae and extending from anterior margin 2/5 of the way back into head. Labrum long, anterior margin gently concave, rounded laterally (Fig. 22). Mandibles small, teeth poorly defined. Antennae 11-segmented, club 3-segmented, segment 1 globular, anteriorly rounded, posteriorly squared, 2 sub-ovoid, 3-5 cylindrical, distinctly longer than wide, 6-8 cylindrical, slightly longer than wide,

9-10 transverse, equal in length, 11 longer than wide. Pronotum wider than long by ratio of 43:55 (Fig. 15), lateral margins with anterior portion rounded, narrowing evenly; 14 large tuberculations with stout setae on lateral margin, setae on tubercles 4, 6, 8, 10, and 12 twice length of those on 1, 3, 5, 7, 9, and 11; median raised 2/5 clothed with fine decumbent, hair-like setae, moderately punctate (34-36 punctures, n = 2). Elytra subparallel, evenly rounded in cross-section; intervals 1, 3, and 5 gently raised; interspaces 1 and 3 with a single row of hair-like decumbent setae; interspaces 5 and 7 and lateral margin with stout erect setae; interspaces 2, 4, and 6 with double row of fine hair-like setae; setae on all intervals occurring opposite each puncture. Under surface, except gular area and lateral margins of pronotum sparsely covered with fine setae. Gular area with 14-16 punctures (n = 2) in posterior 1/2. Metasternum with a small round fovea between mesocoxal cavities, posterior to mesocoxal cavities and anterior to metacoxal cavities; large transverse fovea lying between metacoxal cavities; lateral fovea extending length of metacoxae. First abdominal segment bifoveolate between coxa, fovea may coalesce; single fovea behind coxae; two small fovea near midline on posterior margin.

**Type:** CALIFORNIA: *Kern Co.*; Frazier Park, I-13-1960, E. L. Sleeper, oak duff. Type deposited in California Academy of Sciences; Type No. 12646.

**Paratype:** Seven specimens same data; 3 specimens same data, except collected I-14-1961. Paratypes to be deposited in USNM, CSLB, and CDAE.

**Other Material Examined:** CALIFORNIA: *Orange Co.*; Trabuco Canyon, E. L. Sleeper, oak duff [LBSC] (5). *Riverside Co.*; Joshua Tree National Monument, Pleasant Valley, Fried Liver Wash, 3-XII-66, E. L. Sleeper and S. L. Jenkins, ground trap [LBSC] (1).

The name is derived from the Greek: *anasillos*, meaning bristling hair.

*Akalyptoischion anasillos* occurs sympatrically with *A. sleeperi* at Frazier Park; having been taken in the same Berlesed litter sample. It is immediately distinguishable from this species by having a 3 as opposed to 2-segmented antennal club. The two species that it most closely resembles are *A. quadrifoveolata* and *A. tomeus*, but is easily separated from both. It is different from *A. quadrifoveolata* in having erect bristling setae on the elytral interspaces and from *A. tomeus* in having the anterior margin of the labrum entire (Figs. 22 & 21).

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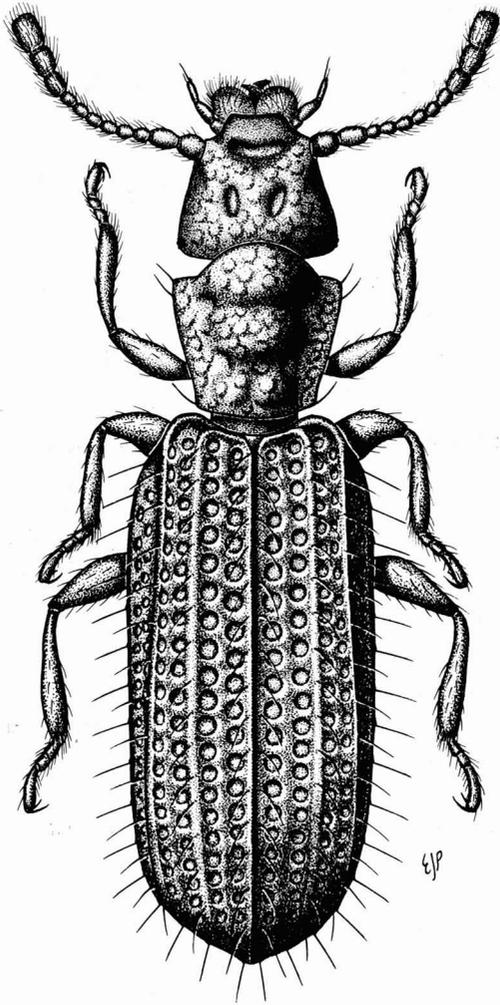
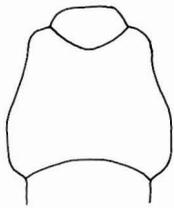
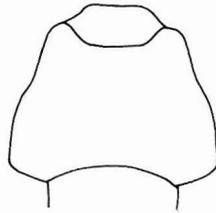


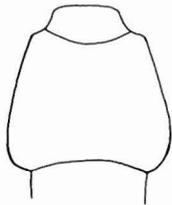
Figure 1, Habitus *Akalyptoischion tomeus* Andrews.



*sleeperi*



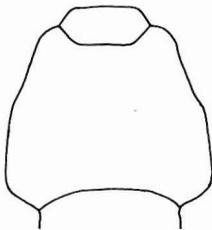
*giulianii*



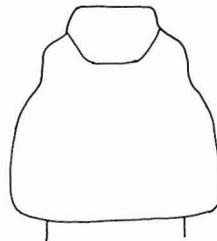
*chandleri*



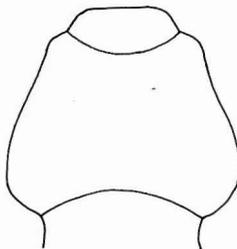
*hormathos*



*atrichos*

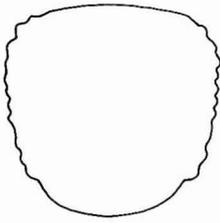


*tomeus*

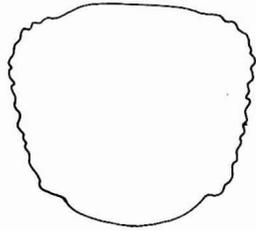


*anasillos*

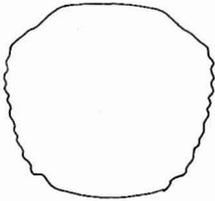
Figures 2–8, Head outlines of *Akalyptoischion* species.



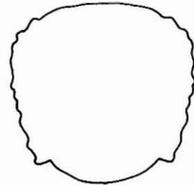
*sleeperi*



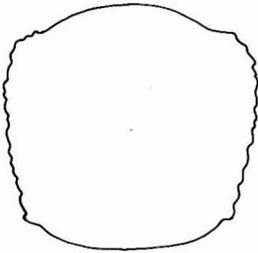
*giulianii*



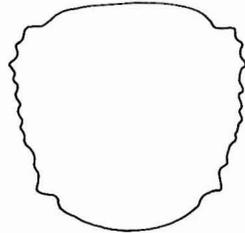
*chandleri*



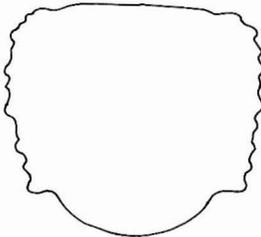
*hormathos*



*atrichos*



*tomeus*



*anasillos*

Figures 9–15, Pronotal outlines of *Akalyptoischion* species.



*sleeperi*



*giulianii*



*chandleri*



*hormathos*



*atrichos*

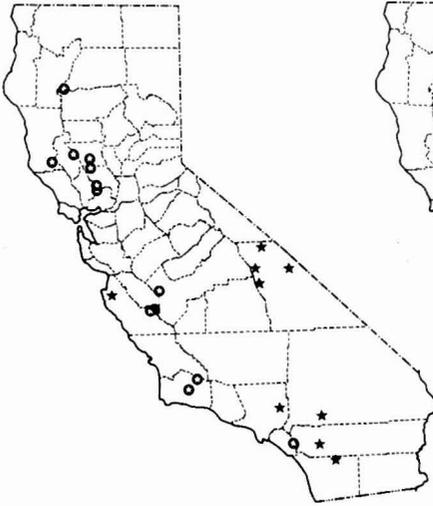


*tomeus*

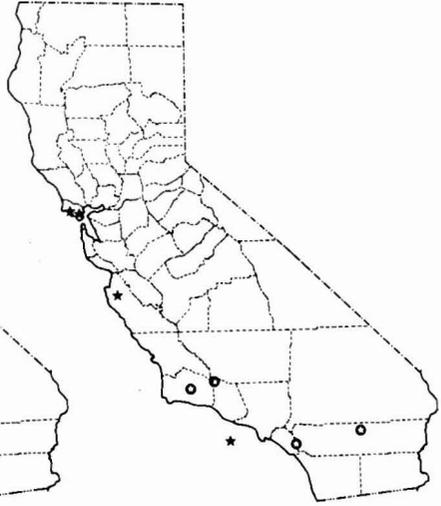


*anasillos*

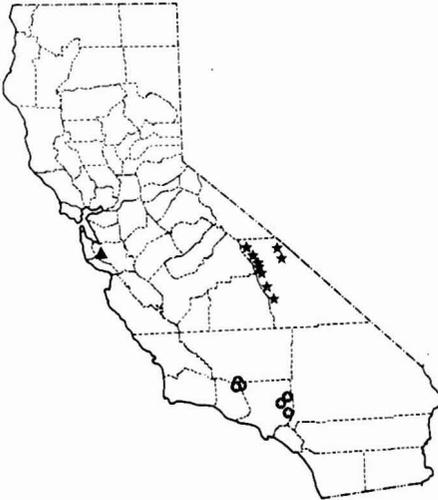
Figures 16–22, Labrum outlines of *Akalyptoischion* species.



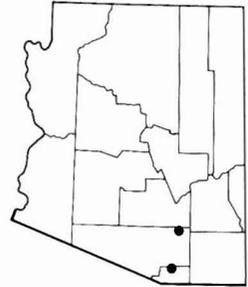
○ *tomeus*  
★ *atrichos*



★ *hormathos*  
○ *anasillos*

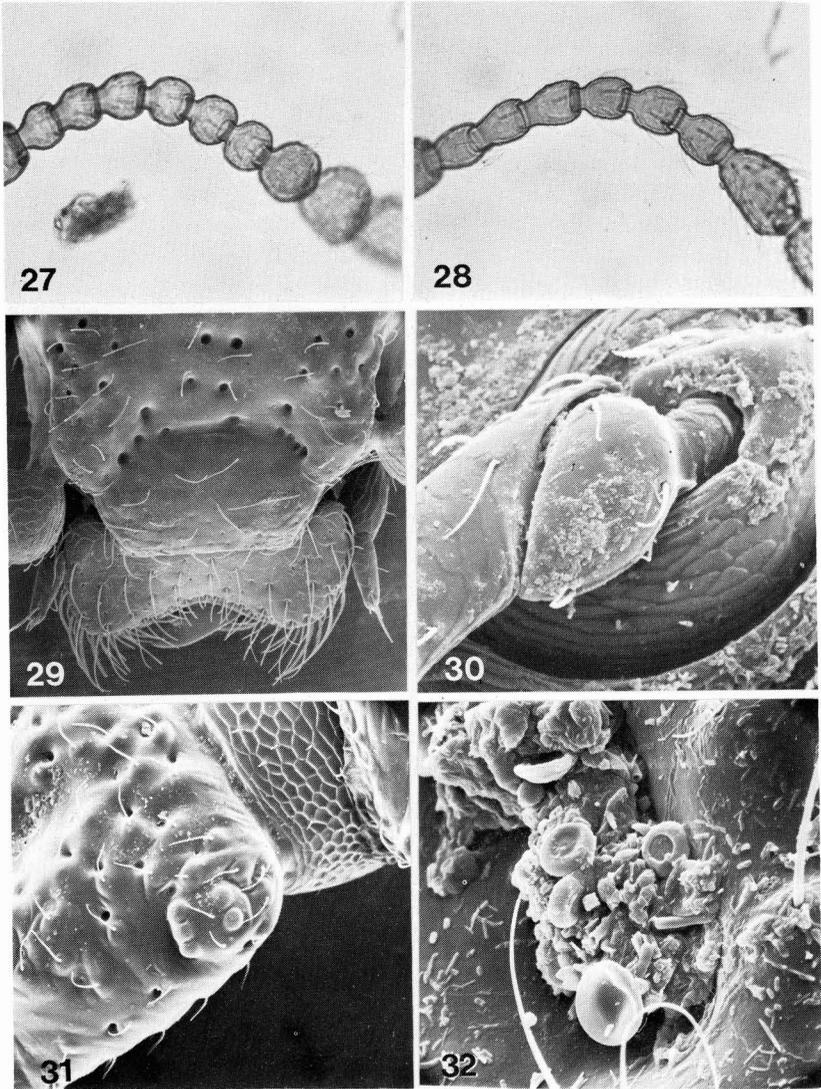


★ *giulianii*  
▲ *sleeperi*  
○ *quadrifoveolata*

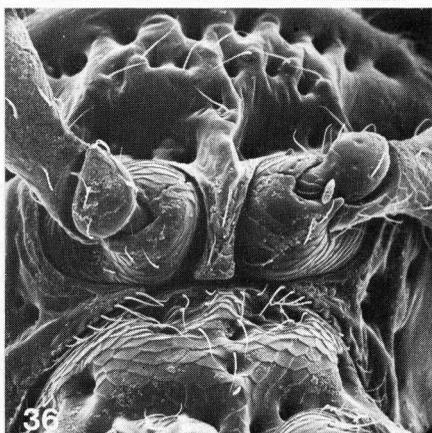
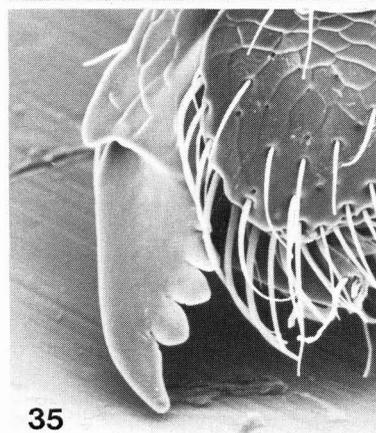
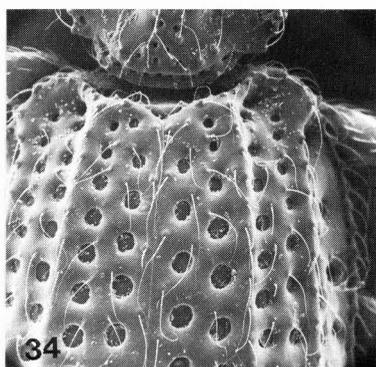
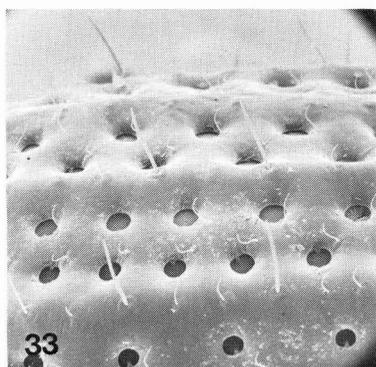


● *chandleri*

Figures 23–26, Known geographical distribution of *Akalyptoischion* species.



Figures 27–32: Fig. 27, *A. hormathos*, antennal segments 3–8. Fig. 28, *A. atrichos*, antennal segments 3–8. Fig. 29, *A. tomeus*, Clypeus and labrum. Fig. 30, *A. tomeus*, trochanter. Fig. 31, *A. tomeus*, eye. Fig. 32, *A. sleeperi*, wax exudate.



Figures 33–36: Fig. 33, *A. tomeus*, elytral setation. Fig. 34, *A. sleeperi*, elytral setation. Fig. 35, *A. tomeus*, mandible. Fig. 36, *A. tomeus*, procoxal cavities.

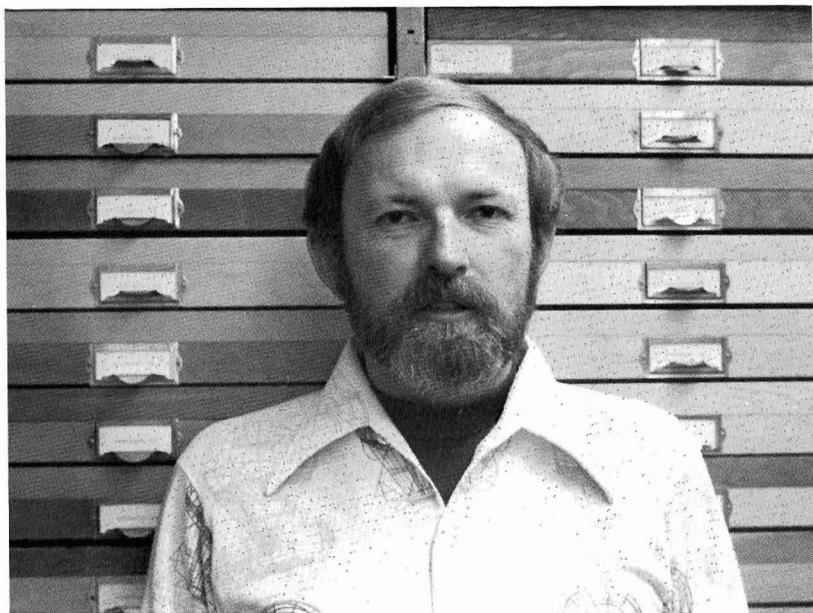


PHOTO BY C. S. PAPP

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Dr. Fred G. Andrews has been employed by the California Department of Food and Agriculture for the past seven years. His area of specialization is Coleoptera. His research is concerned with the systematics of larval and adult Lathridiidae including studies on host preferences, distribution and life histories. Other interests include the coleoptera associated with sand dunes in the western United States.

Fred is a native Californian, born and raised in Glendale, California. His wife's name is Julie and they have a daughter, Laura, and a son, Daniel. He received his B.A. in Education at California State University at Los Angeles and subsequently taught in the Montebello School District in Southern California. This was followed by graduate work in zoology at California State University, Los Angeles, followed by two years as a technician in the field of medical entomology at the University of California, Riverside. His doctoral work was also at Riverside and was a biosystematic study of the hymenopteros aphid-hyperparasites in the subfamily Alloxystinae. Employment in Sacramento followed graduation. Fred is currently serving as the President of the Pacific Coast Entomological Society.