BULLETIN OF THE CALIFORNIA GEOLOGICAL SURVEY

THE SCOPE OF CALIFORNIA

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THE SCOLIIDAE OF CALIFORNIA

(Hymenoptera: Aculeata)

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THE SCOLIIDAE OF CALIFORNIA

(Hymenoptera Aculeata)

The members of the family Scoliidae are among the larger and more conspicuous wasps of our fauna. Colorationally the sexes are quite dissimilar, the males being more somber than their generally larger and more brightly maculated females. The Scoliidae may be recognized by the very oblique second transverse cubitus of the forewing (Plate 12, figs. 2 - 5). Additionally, the apical third of the forewing is virtually without venation (Plate 12, figs. 2 - 5). The males possess, at the apex of the abdomen, a retractile trident, a character which is sufficiently diagnostic to separate them from other scolioid wasps.

The species of this family are parasitic upon the larvae of the Scarabaeidae. According to Bradley (1945:1) the females do not construct a burrow of their own, but attach their eggs to the scarab larvae and prepare a crude cell around them leaving the paralyzed grub *in situ*. Rau and Rau (1918) and Rau (1932) have discussed certain aspects of the biology of the eastern subspecies of *Scolia dubia*. The Raus report having observed the wasps in a restricted habitat near St. Louis, Missouri wherein there was a considerable accumulation of stable waste. Examination of this material revealed the presence of many larvae of the scarab, *Cotinis nitida* (Linnaeus) -- the suspected host. However, field observations, as well as rearing attempts, failed to confirm the suspected host-parasite relationship. The courtship dance, mating, and the sleeping behaviour of this wasp have been described by Rau (1932:59-62). Linsley (1946:27) has reported *Campsomeris tolteca* (as *plumipes*) pollinating alfalfa in the Blythe region of California. Pollination was accomplished by tripping the flowers mechanically when alighting or taking flight from a raceme; however, pollination of the alfalfa flowers appeared to be incidental to the acquisition of nectar on the part of the wasp.

The wasps are frequently encountered in considerable numbers congregating on the flowers of various plants in search of nectar. The flowers of *Asclepias, Baccharis, Chilopsis, Erigonum, Lepidospartum, Pectis, Prosopis,* and *Tamarix* seem to be among the more attractive floral hosts upon which the California species have been collected.

The family, an austral intrusive element, is represented in California by eight species of three genera. Five of these species, three of which are members of the genus *Scolia*, are apparently restricted to the deserts or more arid regions of the state. The two species of *Campsomeris* are quite widely distributed in the austral regions of California, although *pilipes* is apparently not present on the California deserts, except perhaps marginally. Two species of the genus *Campsoscolia* are present in California and are allopatric in their distribution, one of the species, *flammicoma*, being found on the deserts is geographically replaced in the coastal and more northern austral regions of the state by *alcione*.

The present report is based primarily upon the material contained in the following institutional collections: California Academy of Sciences (C.A.S.), California Insect Survey (C.I.S.), University of California, at Davis (U.C.D.), at Los Angeles (U.C.L.A.), and at Riverside (U.C.R.). To the individuals in charge of these collections as well as those persons acknowledged elsewhere in the paper I would like to express my sincere appreciation for the privilege of examining the material in their care.

Key to the genera of California Scoliidae

1. Forewing with two recurrent nervures (Plate 12, figs. 2, 3) 2
   Forewing with one recurrent nervure (Plate 12, figs. 4, 5) ..... *Scolia*

2(1) Forewing with two submarginal cells (Plate 12, fig. 3) ..... *Campsomeris*
   Forewing with three submarginal cells (Plate 12, fig. 2) ..... *Campsoscolia*

Key to the California species of Scolia

1. Forewing with two submarginal cells (Plate 12, fig. 4) 2
   Forewing with three submarginal cells (Plate 12, fig. 5) ..... *ardens* (p. 151)

2(1) Abdominal tergites maculated with yellow; thorax bi- or tri-colorous, never wholly black ..... *otomita* (p. 143)
   Abdominal tergites not maculated with yellow; thorax wholly black ... *dubia haematodes* (p. 144)

Key to the California species of Campsomeris

1. Antennae thirteen segmented; abdomen composed of seven visible segments (males) .. 2
   Antennae twelve segmented; abdomen composed of six visible segments (females) .. 3

2(1) Pronotum with a yellow spot near the humeral angle; antennocellar groove present, deeply incised, extending from anterior ocellus nearly to base of interantennal crest, bounded on either side with an impunctate glabrous tubercle ..... *pilipes* (p. 144)
   Pronotum with a broad yellow transverse band extending to or near the tegulae; antennocellar groove absent, or if present, short, terminating in a pit, the swelling on each side, if at all evident, weak and punctate throughout ..... *tolteca* (p. 144)

3(1) Abdomen maculated with yellow bands; posterior face of propodeum punctate throughout; densely clothed with long hairs ..... *pilipes* (p. 144)
   Abdomen maculated with orange bands; posterior face of propodeum impunctate, glabrous, except on upper margin ..... *tolteca* (p. 144)

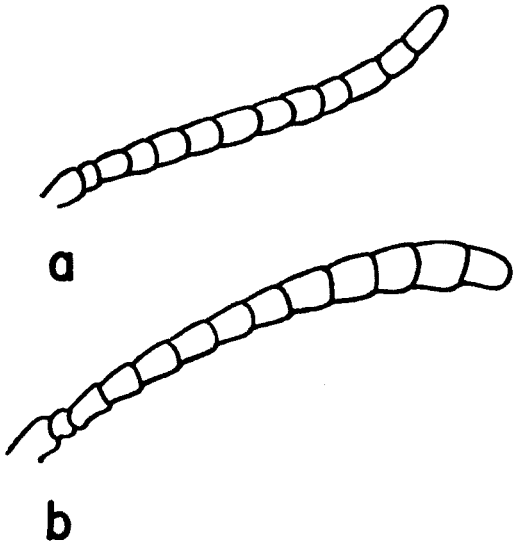

Fig. 1 - a, antenna of *Campsoscolia octomaculata;* b, antenna of *Campsoscolia alcione*.

Key to the California species of Campsoscolia

1. Antennae thirteen segmented; abdomen composed of seven visible segments (males) .. 2
   Antennae twelve segmented; abdomen composed of six visible segments (females) .. 4

2(1) Antennae clavate, apical flagellar segments noticeably enlarged (fig. 1b) 3
Antennae not clavate, apical flagellar segment not enlarged (fig. 1a) ..... *octomaculata texensis* (p.145)

3(2) Abdominal tergites with basal and apical bands entirely black ..... *alcione* (p.146)
Abdominal tergites with basal and apical bands ferruginous or predominantly so *flammicoma* (p.146)

4(1) Interantennal area markedly raised above the level of the face; inner hind tibial spur not spatulate, scarcely if at all expanded at its apex 5
Interantennal area scarcely raised above the level of the face; inner hind tibial spur spatulate ..... *octomaculata texensis* (p.145)

5(4) Abdominal tergites with basal and apical bands entirely black ..... *alcione* (p.146)
Abdominal tergites with basal and apical bands ferruginous ..... *flammicoma* (p.146)

Discussion of Species

Scolia (Triscolia) ardens Smith[1]

Scolia ardens Smith, 1855, Cat. Hym. Brit. Mus., 3;112.

Geographic range:
Mex., Tex., N. Mex., Ariz., and Calif.

California records:
RIVERSIDE CO.: Cottonwood Springs, ♂, IV-18-35 (C. M. Dammers, U.C.R.). Whitewater, 2 ♂, ♀, IX-24-33 (C. M. Dammers, U.C.R.); ♀, IX-28-33 (C. M. Dammers, U.C.R.); 12♂, X-10-33 (C. M. Dammers, U.C.R.); 17 ♂, 8 ♀, VIII-1-34 (C. M. Dammers, U.C.R.). Whitewater Canyon, 2 ♂, ♀, IX-11-35 (P. H. Timberlake, U.C.R.).

SAN BERNARDINO CO.: Twentynine Palms, ♂, 4 ♀, VIII-3-33 (P. H. Timberlake, C.I.S., U.C.R.); ♀, VIII-4-33 (P. H. Timberlake, U.C.R.).
SAN DIEGO CO.: San Felipe Creek, 3 ♂, IX-9-38 (P. H. Timberlake, U.C.R.).

Discussion:
This species is easily distinguished from the other members of the genus known to occur in California by the three submarginal cells of the forewing. The wings are heavily infuscated with black and are brilliantly violaceous, especially in bright light. The body is black, except for those abdominal segments posterior to the second which are reddish-brown.

Ardens is apparently restricted in its distribution within California to the Mojave and Colorado Deserts.

[1] *Scolia fervida* Burmeister (preoccupied) and *S. montezumae* Saussure are synonyms of this species.

Scolia otomita Saussure[2]

Scolia otomita Saussure, 1858, Ann. Soc. Ent. France, ser. 3, 6: 223. Type ♂.

Geographic range:
Mexico, N. Mex., Ariz., Nev., and Calif.

California records:
IMPERIAL CO.: Palo Verde, ♂, VIII-9-46 (P. D. Hurd, Jr., C.I.S.); 2 ♂, ♀, VIII-20-46 (W. F. Barr, C.I.S.): 4 ♂, 9 ♀, VIII-20-46 (P. D. Hurd, Jr., C.I.S.); 2 ♂, 8 ♀, VIII-20-46 (J. W. MacSwain, C.I.S.); ♂, VIII-22-46 (W. F. Barr, C. I.S.); 2 ♂, VIII-22-46 (P. D. Hurd, Jr., C.I.S.); ♀, VIII-27-46 (W. F. Barr, C.I.S.); ♂, ♀, VIII-27-46 (P. D. Hurd, Jr., C.I.S.).
RIVERSIDE CO.: Mission Canyon, ♂, X-1-32 (P. H. Timberlake, U.C.R.). Palm Springs, ♀, VIII-28-34 (P. H. Timberlake, U.C.R.). Andreas Canyon, 2 ♂, X-27-34 (P. H. Timberlake, U.C.R.). Blythe, 9 ♀, X-16-39 (C. M. Dammers, U.C.R.); ♂, 5 ♀, VIII-20-46 (J. W. MacSwain, C.I.S.). Indio, ♀, X-15-47 (P. H. Timberlake, U.C.R.).
SAN BERNARDINO CO.: Mexican Well, ♀, IX-10-34 (C. M. Dammers, U.C.R.). Twentynine Palms, 3 ♂, ♀, IX-5-36 (P. H. Timberlake, U.C.R.); ♀, VIII-9-46 (P. H. Timberlake, U.C.R.).
SAN DIEGO CO.: San Felipe Creek, ♂, VIII-8-35 (H. S. Gentry, U.C.D.); 14 ♀, IX-10-38 (P. H. Timberlake, U.C.R.); 2 ♂, X-11-38 (P. H. Timberlake, U.C.R.).

Discussion:
Previously unrecorded from California, this species appears to be restricted in its occurrence within the state to the Mojave and Colorado Deserts. It has been observed congregating in fairly large numbers upon the flowers of *Pectis papposa*.

[2] *Scolia fulviventris* Bartlett is a synonym of this species.

Scolia dubia haematodes Burmeister[3]

Scolia haematodes Burmeister, 1853, Abhandl. Naturf. Gesell. Halle, 1(4):33. Type ♀.

Geographic range:
Mex., Tex., N. Mex., Ariz., and Calif.

California records:
Bartlett (1912:321) recorded this species from California; however, the present writer has not found any representatives of this species from the area under consideration.

Campsomeris pilipes (Saussure)

Elis pilipes Saussure, 1858, Ann. Soc. Ent. France, Ser. 3, 6:245, 246. Type ♀.

Geographic range:
Tex., N. Mex., Ariz., Calif., Nev., Utah, Colo., Kans., *Neb., Wyo., and S. D.

California records:
ALAMEDA CO.: Livermore, ♂, III-1931 (E. S. Ross, C.A.S.).
BUTTE CO.: Butte Creek, nr. Chico, 24 ♂, IV-25-22 (E. P. Van Duzee, C.A.S.).
CALAVERAS CO.: Mokelumne Hill, ♂, April (F. E. Blaisdell, C.A.S.).
CONTRA COSTA CO.: Antioch, ♂, V-1-32 (C.I.S.); 3 ♀, V-15-32 (C.I.S.); ♀ VI-8-33 (M. A. Cazier, C.I.S.); 2 ♀, VI-12-35 (E. P. Van Duzee, C.A.S.); ♀, VI-2-36 (M. A. Emburg, C.I.S.); 2 ♀, VII-4-36 (R. M. Bohart, U.C.D.); ♀, VII-1937 (E. S. Ross, C.A.S.); 2 ♂, IV-9-49 (J. E. Gillaspy, C.I.S.); 2 ♂, ♀, V-21-49 (P. D. Hurd, Jr., C.I.S.) ♂, same data (L. W. Quate, C.I.S.); ♂, IV-29-50 (P. D. Hurd, Jr., C.I.S.); 2 ♂, same date (J. W. MacSwain, C.I.S.); 4 ♂, V-8-50 (R. S. Beal, C.I.S.).
EL DORADO CO.: Chile Bar, 2 ♀, VII-5-48 (P. D. Hurd, Jr., C.I.S.); ♀, same data (J. W. MacSwain, C.I.S.).
FRESNO CO.: Coalinga, ♂, III-10-31 (E. P. Van Duzee, C.A.S.). Selma, 46 ♀, VI-19-50 (R. C. Bechtel, U.C.D.).
KERN CO.: Mojave Desert, 2 ♂, V-9-37 (N. F. Hardman, C.I.S.): ♂, IV-23-39 (G. F. Smith, C.I.S.). Kernville, ♂, IV-26-50 (E. I. Schlinger, U.C.D.). Bakersfield, ♂, IV-15-49 (W. E. Hazeltine, C.I.S.).
LOS ANGELES CO.: Westwood Hills, 3 ♂, VI-2-35 (E. G. Linsley. C.I.S., U.C.R.). Little Rock, 2 ♂, IV-11-36 (G. E. & R. M. Bohart, U.C.D., UCLA). Palmdale, 3 ♂, IV-11-36 (G. E. & R. M. Bohart, U.C.D.). Acton, ♂, IV-15-36 (E. G. Linsley, C.I.S.). Castaic, 3 ♀, VII-4-50 (U.C.L.A.). Elizabeth Lake, ♂, V-6-50 (B. Lazaroff, U.C.L.A.).
MONTEREY CO.: Carmel, ♂, IV-20-30 (L. S. Slevin, C.A.S.). Carmel Valley, ♂, III-29-30 (C. W. Chancey, U.C.R.).
NAPA CO.: Sage Canyon, ♂, IV-25-48 (L. W. Isaak, U.C.D.). Monticello, ♂, IV-10-49 (IV-10-49 (R. C. Bechtel, U.C.D.). Conn Lake, V-30-50 (R. S. Beal, C.I.S.).
ORANGE CO.: Newport Bay, ♂, VIII-6-41 (P. D. Hurd, Jr., C.I.S.).
RIVERSIDE CO.: Riverside, ♂, IX-10-33 (P. H. Timberlake, U.C.R.). Hemet, ♀, VI-6-45 (J. W. MacSwain, C.I.S.); ♂, VIII-22-46 (J. W. MacSwain, C.I.S.); ♂, VII-5-50 (J. W. MacSwain, C.I.S.). Keen Camp, 6 ♀, VI-13-39 (E. G. Linsley, C.I.S.); Keen Camp, 4 mi. E., ♂, V-17-39 (B. Brookman, C.I.S.). Hemet Reservoir, 2 ♀, VI-13-39 (E. S. Ross, C.I.S.); ♂, V-22-39 (J. H. Dorman, C.I.S.); ♂, V-23-40 (F. H. Rindge, C.I.S.). Vandevanter Flat, ♀, VI-12-39 (B. Brookman, C.I.S.). Herkey Creek, ♀, VI-24-34 (P. H. Timberlake, U.C.R.); ♀, VI-8-34 (P. H. Timberlake, U.C.R.); ♀, V-20-39 (B. Brookman, C.I.S.); 2 ♂, ♀, V-22-39 (E. G. Linsley, C.I.S.); ♂, V-27-39 (E. G. Linsley, C.I.S.); ♀, VI-3-39 (E. G. Linsley, C.I.S.); ♀, VI-1-40 (C. D. Michener, C.I.S.); 4 ♀, VI-4-40 (C. D. Michener, C.I.S.); ♀, VI-13-40 (H. T. Reynolds, C.I.S.); 3 ♀, VI-14-40 (C. D. Michener, C.I.S.); ♀, VI-14-40 (F. H. Rindge, C.I.S.). Whitewater, ♀, VIII-1-34 (P. H. Timberlake, U.C.R.); ♂, III-13-39 (C. M. Dammers, U.C.R.). San Andreas Canyon, 2 ♂, 2 ♀, IV-25-50 (C. D. MacNeill).
SACRAMENTO CO.: Fair Oaks, 2 ♀, V-11-47 (A. T. McClay, U.C.D.).
SAN BERNARDINO CO.: Lee Lake, ♀, VI-2-33 (C. M. Dammers, U.C.R.). Victorville, 4 ♀, V-24-36 (C. M. Dammers, U.C.R.). Cajon Pass, ♀, VI-24-49 (L. W. Isaak, U.C.D.). Deep Creek, 3 ♂, IV-26-36 (K. A. Gaard, U.C.L.A.).
SAN DIEGO CO.: Warner Springs, ♂, V-9-36 (P. H. Timberlake, U.C.R.).
TULARE CO.: Exeter, ♀, VIII-25-38 (C.I.S.). Three Rivers, 3 mi. W., 2 ♂, IX-1-39 (P. H. Timberlake, U.C.R.).
VENTURA CO.: Saticoy, ♀, V-14-26 (S. F. Flanders, U.C.R.).
YOLO CO.: Putah Canyon, 2 ♂, V-1950 (J. C. Hall, U.C.D.).

Campsomeris tolteca (Saussure)[4]

Elis tolteca Saussure, 1857, Rev. et Mag. Zool., ser. 2, 9:282. Type ♀.

Geographic range:
Haiti, Mex., Tex., Ariz., Lower Calif., and Calif.

[3] *Elis americana* Saussure is a synonym of this species.

[4] *Elis dives* Provancher and *Elis 4-cincta* Provancher are synonyms of this species.

California records:

CONTRA COSTA CO.: Antioch, ♀, V-8-32 (C.I.S.); ♂, 5 ♀, V-15-32 (C.I.S.); 3 ♀, VIII-22-33 (C.I.S.); ♀, IX-23-33 (B. J. Hall, U.C.R.); ♀, IX-1935 (E. S. Ross, C.A.S.); 2 ♀, IX-12-36 (E. G. Linsley, U.C.R.); 2 ♂, IV-11-37 (E. C. Van Dyke, C.A.S.); 3 ♂, IV-18-37 (E. C. Van Dyke, C.A.S.); 2 ♀, VII-15-37 (E. C. Van Dyke, C.A.S.); ♀, VIII-28-37 (T. H. G. Aitken, C.I.S.); ♀, VI-15-41 (C.I.S.); ♂, VIII-10-41 (E. C. Van Dyke, C.A.S.); ♂, X-16-48 (C. D. MacNeill); ♀, X-24-48 P. D. Hurd, Jr., C.I.S.); ♀, X-21-39 (C. D. MacNeill); ♀, IV-29-50 (P. D. Hurd, Jr., C.I.S.); ♂, 2 ♀, V-8-50 (R. S. Beal, C.I.S.).

FRESNO CO.: Coalinga, ♂, III-19-31 (E. P. Van Duzee, C.A.S.). Alcade Canyon, nr. Coalinga, ♂, IV-2-32 (H. Fincher, U.C.D.). Firebaugh, ♀, III-24-49 (R. F. Smith, C.I.S.); 2 ♂, VIII-16-49 (A. D. Telford, C.I.S.). Selma, ♀, VI-19-50 (R. C. Bechtel, U.C.D.). Raisin City, ♀, X-15-51 (E. G. Linsley, C.I.S.).

IMPERIAL CO.: Potholes, ♀, IV-7-23 (E. P. Van Duzee, C.A.S.). Holtville, ♀, VI-1936 (E. S. Ross, C.A.S.); ♂, VI-20-39 (E. S. Ross, C.A.S.); ♂, VI-23-40 (W. F. Barr, C.I.S.). Palo Verde, ♂, III-7-47 (E. G. Linsley, C.I.S.). Palo Verde, 3 mi. S., ♀, IV-8-49 (P. D. Hurd, Jr., C.I.S.). Westmorland, 2 ♀, V-6-39 (U.C.L.A.); ♂, IV-16-39 (U.C.L.A.).

KERN CO.: Arvin, ♀, III-31-37 (G. L. Smith, C.I.S.). Bakersfield, ♀, VII-1938 (C.I.S.). Bakersfield, 15 mi. E., ♂, VIII-4-46 (F. A. Ehrenford, C.I.S.). Shafter, ♀, VI-7-40 (C. G. Lewis, C.I.S.); ♂, VI-25-40 (C. G. Lewis, C.I.S.). Kern Park, ♂, VII-7-46 (F. A. Ehrenford, C.I.S.). Kern Canyon, ♀, VII-28-46 (F. A. Ehrenford, C.I.S.). Kern River County Park, 4 ♀, VI-27-49 L. W. Isaak, U.C.D.). Devils Den, ♀, IV-8-51 (J. W. MacSwain, C.I.S.).

LOS ANGELES CO.: Claremont, 2 ♂, VI-1-28 (E. L. Kessel, C.A.S.). Huntington Park, ♀, IV-28-50 (R. L. Langston, C.I.S.).

MERCED CO.: Cressy, 4 ♂, VII-21-48 (R. P. Allen, C.A.S.). Dos Palos, 2 ♂, ♀, IX-9-48 (R. F. Smith, C.I.S.); ♂, VI-21-50 (C. D. MacNeill). Dos Palos, 7 mi. E., ♂, VIII-16-49 (R. F. Smith, C.I.S.).

ORANGE CO.: Anaheim, ♀, V-14-27 (E. L. Kessel, C.A.S.). Seal Beach, 5 ♂, 21 ♀, VIII-25-38 P. H. Timberlake, U.C.R.). Newport Bay, ♂, ♀, VII-17-41 (P. D. Hurd, Jr., C.I.S.); 4 ♂, 5 ♀, VII-25-41 (P. D. Hurd, Jr., C.I.S.).

RIVERSIDE CO.: Riverside, 32 ♂, 18 ♀, February-October 1929-1938 (P. H. Timberlake, U.C.R.). Soboba Hot Springs, ♀, II-22-36 (P. H. Timberlake, U.C.R.). Ribbonwood, 3 ♀, V-20-39 (C.I.S.). Fairmont Lake, 3 ♂, VII-13-36 (W. C. Reeves, C.I.S.). Neuvo, ♂, VIII-2-48 (P. H. Timberlake, U.C.R.). Palm Desert, ♀, IV-12-50 (P. D. Hurd, Jr., C.I.S.). Banning, 2 ♂, VII-16-50 (J. C. Hall, U.C.D.); 3 ♂, ♀, same data (W. C. Marshall, U.C.D.). Cathedral City, ♀, VII-20-50 (L. W. Isaak, U.C.D.). Gilman Hot Springs, 2 ♀, V-14-41 (E. C. Van Dyke, C.A.S.). Whitewater, ♀, VIII-9-50 (J. W. MacSwain, C.I.S.); ♀, same data (J. D. Paschke, C.I.S.). Hemet, 2 ♀, VII-15-45 (J. W. MacSwain, C.I.S.); 3 ♀, VIII-4-46 (J. W. MacSwain, C.I.S.); ♀, VIII-26-46 (J. W. MacSwain, C.I.S.); ♂, VIII-28-46 (J. W. MacSwain, C.I.S.). Hemet, 6 mi. S. W., VIII-7-46 (J. W. MacSwain, C.I.S.). Palm Springs, ♂, IV-1-46 (C. L. Fox, C.A.S.); 3 ♀, III-26-32 (P. H. Timberlake, U.C.R.); ♀, V-11-33 (P. H. Timberlake, U.C.R.). Ripley, 7 mi. S., ♀, VII-10-46 (J. W. MacSwain, C.I.S.). Blythe, 3 ♀, IX-25-32 (C. M. Dammers, U.C.R.); 9 ♀, X-16-34 (C. M. Dammers, U.C.R.); ♀, VII-29-35 (C. M. Dammers, U.C.R.); ♀, IX-1-35 (P. H. Timberlake, U.C.R.); 3 ♂, 2 ♀, XI-2-36 (C. M. Dammers, U.C.R.); 6 ♂, VII-15-38 (P. H. Timberlake, U.C.R.); ♂, ♀, VI-23-45 (E. G. Linsley, C.I.S.); 3 ♂, same data (J. W. MacSwain, C.I.S.; 2 ♂, VI-25-45 (E. G. Linsley, C.I.S.); 2 ♀, VII-27-46 (P. D. Hurd, Jr., C.I.S.); ♀, VIII-13-46 (P. D. Hurd, Jr., C.I.S.); ♀, VIII-20-46 (J. W. MacSwain, C.I.S.); ♂, VII-6-47 (W. F. Barr, C.I.S.); 3 ♀, IV-27-49 (C. D. MacNeill).

SACRAMENTO CO.: Sacramento, 1 ♀, VI-15-48 (C. D. MacNeill).

SAN BERNARDINO CO.: Needles, 2 ♂, VII-4-21 (J. A. Kusche, C.A.S.). Yermo, 2 ♂, XI-5-33 (C. M. Dammers, U.C.R.); ♂, IV-24-50 (U.C.L.A.). Mojave River at Apple Valley, 2 ♂, ♀, VI-29-40 (J. W. MacSwain, C.I.S.); ♀, same data (P. H. Timberlake, U.C.R.). Morongo, 2 ♂, IX-29-34 (P. H. Timberlake, U.C.R.); ♀, IX-26-44 (P. H. Timberlake, U.C.R.). Morongo Valley, ♂, VIII-20-36 (P. H. Timberlake, U.C.R.). Victorville, ♀, IV-18-33 (C. M. Dammers, U.C.R.); ♀, IV-17-36 (C. M. Dammers, U.C.R.); 2 ♀, VIII-17-36 (C. M. Dammers, U.C.R.); 2 ♀, IX-28-38 (P. H. Timberlake, U.C.R.).

SAN DIEGO CO.: Jacumba, ♂, X-3-25 (J. D. Gunder, C.A.S.). Coronado Beach, ♀, IX-26-35 (L. S. Slevin, C.A.S.). San Felipe Creek, ♀, IX-2-35 (F. T. Thorne, U.C.R.); ♀, IX-7-38 (P. H. Timberlake, U.C.R.). Oak Grove, ♀, VI-6-40 (F. H. Rindge, C.I.S.). Borego Valley, 2 ♂, ♀, III-30-? (W. A. MacDonald, U.C.L.A.).

TULARE CO.: Lindsay, 2 ♂, ♀, IX-6-32 (P. H. Timberlake, U.C.R.). Wood Lake, ♂, IV-23-47 (N. W. Frazier, C.I.S.).

VENTURA CO.: Santa Susana, 7 ♀, VIII-13-32 (C.I.S.); ♀, VIII-15-32 (C.I.S.); ♀, VIII-23-32 (C.I.S.). Saticoy, ♀, V-19-36 (U.C.R.).

Campsoscolia octomaculata texensis (Saussure)[5]

Elis texensis Saussure, 1858, Ann. Soc. Ent. France, ser. 3, 6:224. Type ♂.

[5] *Scolia regina* Cresson, *Scolia flavosignata* Cresson, *Scolia consors* Cresson (*nec* Saussure), *Elis (Trielis) zonaria* Cresson, and *Elis lupina* Cresson are synonyms of this subspecies.

Geographic range:
Tex., Kans., Colo., N. Mex., Ariz., Lower Calif., and Calif.

California records:
IMPERIAL CO.: Palo Verde, ♂, VIII-15-46 (P. D. Hurd, Jr., C.I.S.); ♀, VIII-20-46 (W. F. Barr, C.I.S.); ♀, VIII-20-46 (P. D. Hurd, Jr., C.I.S.); ♀, VIII-27-46 (P. D. Hurd, Jr., C.I.S.).
RIVERSIDE CO.: Blythe, 17 mi. W., ♀, VIII-27-46 (P. D. Hurd, Jr., C.I.S.).
SAN BERNARDINO CO.: Twentynine Palms, 17 mi. W., 5 ♂, VIII-9-42 (P. H. Timberlake, U.C.R.).

Campsoscolia alcione (Banks)

Trielis alcione Banks, 1917, Bull. Mus. Comp. Zoöl., Harvard College, 61:112. Type ♂.

Geographic range:
Calif., Nev., N. Mex., Utah, Colo., and Wash.

California records:
ALAMEDA CO.: Murrieta Caves, ♂, VIII-1937 (T. H. G. Aitken, C.I.S.). Tesla, Corral Hollow, 3 ♂, ♀, VII-16-46 (P. D. Hurd, Jr., C.I.S.); ♂, 2 ♀, IX-19-49 (P. D. Hurd, Jr., C.I.S.); 14 ♂, IX-21-51 (W. C. Bentinck, C.I.S.); ♀, X-4-51 (J. E. Gillaspy, C.I.S.). Livermore, 2 ♂, IV-7-37 (U.C.L.A.)
ALPINE CO.: Woodfords, 3 mi. N. E., 1 ♂, 13 ♀, VIII-21-49 (C. D. MacNeill).
CONTRA COSTA CO.: Antioch, ♀, IX-1-37 (M. A. Cazier, C.I.S.); ♀, IX-18-38 (E. C. Van Dyke, C.A.S.).
FRESNO CO.: Firebaugh, ♀, VII-25-49 (R. v. d. Bosch, C.I.S.); ♂, VIII-4-47 (R. v. d. Bosch, C.I.S.). Kingsburg, 3 ♂, 3 ♀, VII-10-39 (R. M. Bohart, U.C.L.A.).
INYO CO.: Owens Valley, ♀, VIII-2-36 (R. M. Bohart, U.C.D.). Bishop, ♂, VIII-1-36 (R. M. Bohart, U.C.D.). Bishop, 15 mi. N., 11 ♂, 29 ♀, VIII-5-48 (P. D. Hurd, Jr. & J. W. MacSwain, C.I.S.).
KERN CO.: Greenfield, 8 mi. W., 2 ♂, VIII-31-49 (P. H. Timberlake, U.C.R.). Walker Pass, ♂, VI-26-47 (H. E. Cott, U.C.D.). Shafter, 2 ♂, VI-8-40 (C. G. Lewis, C.I.S.); ♂, ♀, VI-25-40 (C. G. Lewis, C.I.S.); ♀, VIII-10-40 (C. G. Lewis, C.I.S.). Grapevine, ♂, 4 ♀, VI-10-47 (R. F. Smith, C.I.S.). Bakersfield, ♀, VIII-1938 (C.I.S.). Lerdo, ♀, VII-17-46 (F. A. Ehrenford, C.I.S.). Arvin, 2 ♂, V-29-40 (C. G. Lewis, C.I.S.). Keene, ♂, VII-4-46 (F. A. Ehrenford, C.I.S.). Kern River County Park, ♂, ♀, VI-27-49 (L. W. Isaak, U.C.D.). Poso Creek, ♀, VI-5-29 (E. P. Van Duzee, C.A.S.).
LASSEN CO.: Hallelujah Jct., ♀, VII-13-49 (P. D. Hurd, Jr., C.I.S.). Constantia, 4 mi. S., 6 ♂, VII-2-51 (C. D. MacNeill).
LOS ANGELES CO.: Los Angeles, ♀, VII-1931 (E. S. Ross, C.A.S.).
MARIPOSA CO.: Yosemite, ♀, VI-1926 (E. O. Essig, C.I.S.).
MERCED CO.: Dos Palos, 2 ♀, VIII-15-49 (A. D. Telford, C.I.S.).
MODOC CO.: Lake City, ♂, VIII-4-22 (C. L. Fox, C.A.S.).
ORANGE CO.: Laguna Beach, ♀, VII-19-21 (E. O. Essig, C.I.S.); ♂, VI-1930 (E. L. Kessel, C.A.S.). Laguna Canyon, 3 ♀, VI-28-29 (E. L. Kessel, C.A.S.). Newport Bay, 3 ♀, VI-25-41 (P. D. Hurd, Jr., C.I.S.).
RIVERSIDE CO.: Corona, ♂, VII-1929 (C. I.S.). Winchester, 2 ♀, VII-25-46 (J. W. MacSwain, C.I.S.). Temecula, 12 ♂, 2 ♀, VII-4-50 (E. G. Linsley & J. W. MacSwain, C.I.S.). Banning, ♂, 4 ♀, VII-9-50 (M. J. Stebbins, U.C.D.); ♂, ♀, same data (H. N. Yokoyama, C.I.S.); 2 ♂, 6 ♀, same data (T. R. Haig). Hemet, ♀, VII-5-50 (E.G. Linsley, C.I.S.). Hemet, 6 mi. S.W., ♀, VIII-7-46 (J. W. MacSwain, C.I.S.). Elsinore, ♀, VII-4-50 (J. W. MacSwain, C.I.S.).
SAN BERNARDINO CO.: Morongo Valley, ♂, VIII-4-33 (P. H. Timberlake, U.C.R.). Yucca Valley, ♂, VIII-3-33 (P. H. Timberlake, U.C.R.). Mojave River at Apple Valley, ♂, VI-29-40 (J. W. MacSwain, C.I.S.); 2♀, same data (P. H. Timberlake, U.C.R.). Cajon Canyon, 2,700 ft., ♀, VII-21-36 (P. H. Timberlake, U.C.R.). Lone Pine Canyon, San Gabriel Mts., 6,000 ft., VII-21-36 (P. H. Timberlake, U.C.R.). Oak Glen Lodge, 3 ♀, (F. Daggett, C.A.S.).
SAN JOAQUIN CO.: Tracy, ♀, IX-3-46 (P. D. Hurd, Jr., C.I.S.).
SIERRA CO.: Calpine, ♀, VIII-27-48 (E. G. Linsley, C.I.S.).
STANISLAUS CO.: Patterson, ♂, ♀, VI-30-49 (T. F. Leigh, C.I.S.); Westley, 2 ♂, ♀, VII-25-49 (T. F. Leigh, C.I.S.).
TULARE CO.: Kaweah, 3 ♂, VI-19-36 (F. T. Scott, U.C.R.). California Hot Springs, ♂, ♀, V-25-40 (C. G. Lewis, C.I.S.). Wood Lake, ♂, VI-12-47 (N. W. Frazier, C.I.S.). Strathmore, 4 ♂, 2 ♀, VI-8-28 (T. Craig, C.A.S.).
VENTURA CO.: Santa Susana, ♀, VIII-13-32 (C.I.S.). Santa Paula, 2 ♀, VII-23-? (D. Burk, (C.I.S.); ♀, VII-13-31 (C.I.S.).

Campsoscolia flammicoma (Bradley)

Campsomeris (Trielis) flammicoma Bradley, 1928, Trans. Amer. Ent. Soc., 54:199, 200, 209-211. Type ♀.

Geographic range:
Mex. (Sonora), N. Mex., Ariz., and Calif.

California records:
IMPERIAL CO.: Holtville, ♀, VI-1936 (E. S. Ross, C.I.S.). Salton Sea, ♂ (C.I.S.). Westmorland, 4 ♀, V-24-46 (P. D. Gerhardt, U.C.R.). Palo Verde, 3 ♀, VIII-10-46 (W. F.

Barr, C.I.S.); ♂, VIII-15-46 (P. D. Hurd, Jr., C.I.S.); 2 ♀, VIII-20-46 (P. D. Hurd, Jr., C.I.S.); ♀, same data (J. W. MacSwain, C.I.S.). Niland, ♂, X-24-51 (P. D. Hurd, Jr., C.I.S.).

RIVERSIDE CO.: Coachella, ♀, X-13-39 (E. G. Linsley, U.C.R.). Blythe, 2 ♂, VII-10-46 (W. F. Barr, C.I.S.); 2 ♂, 17 ♀, VII-4-51 (J. W. MacSwain, R. F. Smith, C.I.S.). Indio, 3 ♀, X-23-51 (P. D. Hurd, C.I.S.).

SAN BERNARDINO CO.: Twentynine Palms, ♂, VIII-3-33 (H. L. McKenzie, U.C.R.); ♂, same data (P. H. Timberlake, U.C.R.). Cronise, 5 ♂, VII-7-38 (P. H. Timberlake, U.C.R.). Vidal Jct., 20 mi. N., 3 ♀, VI-19-49 (R. F. Fritz, C.I.S.).

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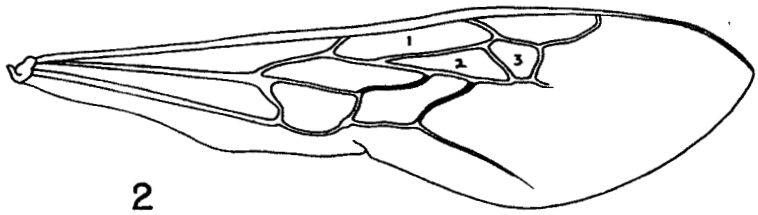
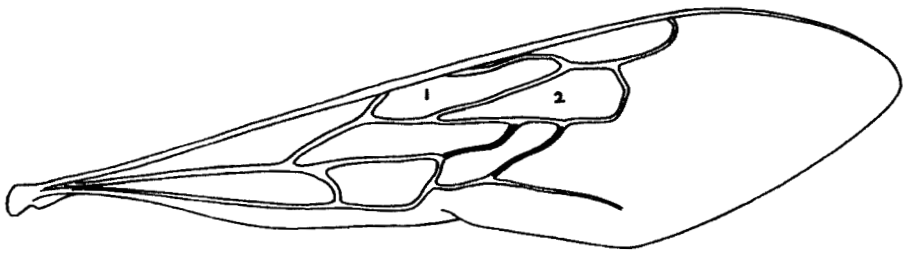
PLATES



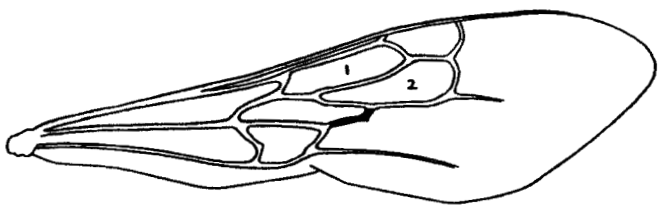
2

Campsoscolia



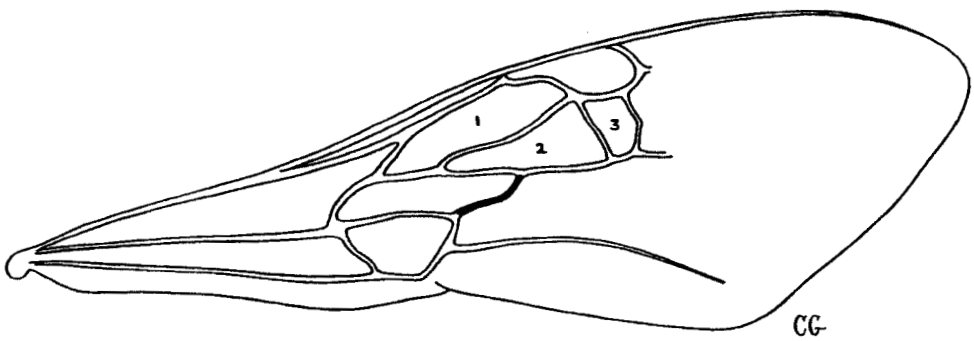
3

Campsomeris



4

Scolia



5

Scolia (Triscolia)

Plate 12

Forewings of Scoliid wasps. Fig. 2, *Campsoscolia;* Fig. 3, *Campsomeris;* Fig. 4, *Scolia;* Fig. 5, *Scolia (Triscolia).* Recurrent nervures indicated in black.

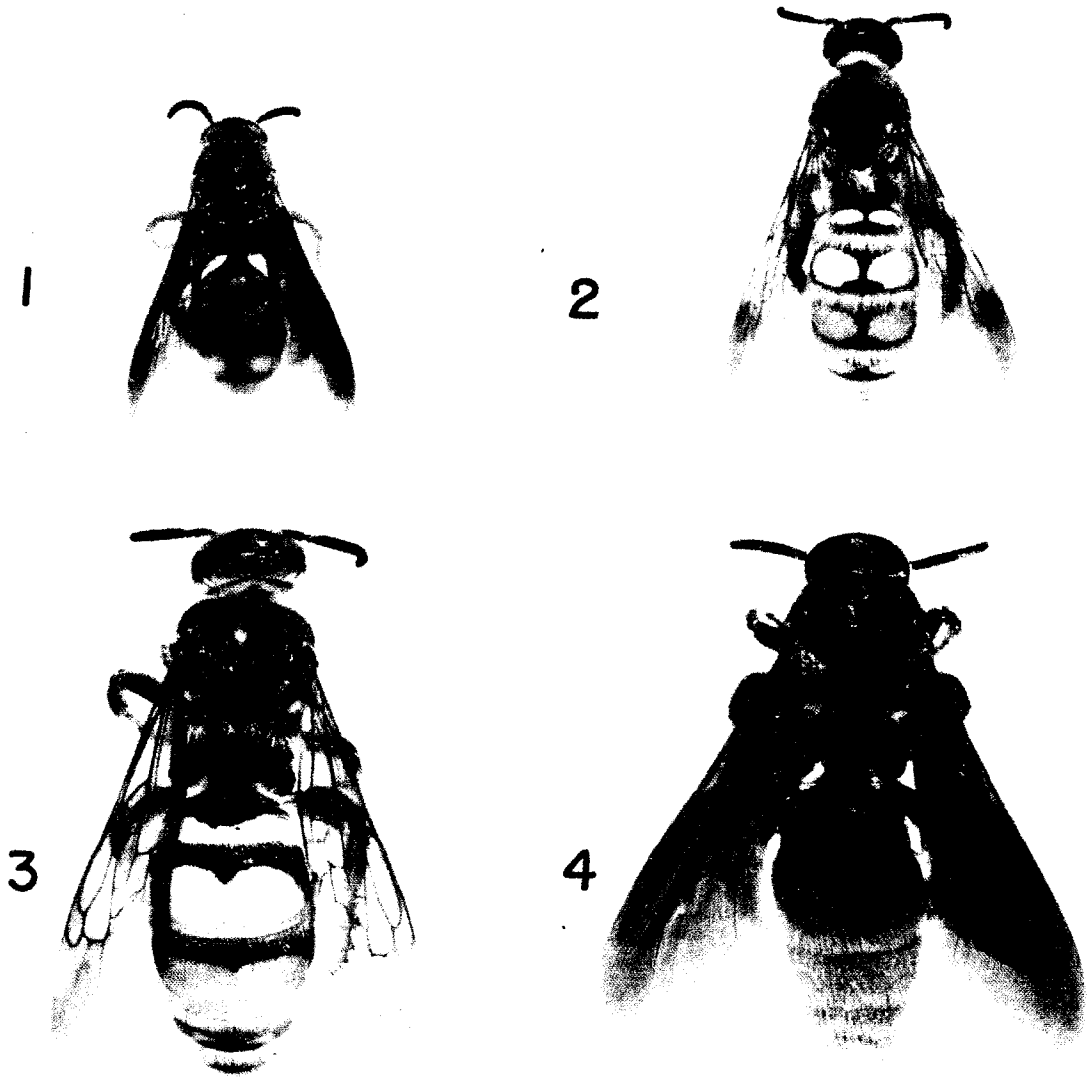


Plate 13

Scoliid wasps (females). 1, *Scolia otomita* Saussure; 2, *Campsoscolia alcione* (Banks); 3, *Campsomeris tolteca* (Saussure); 4, *Scolia ardens* Smith.