

AMERICAN MUSEUM *Novitates*

PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY
CENTRAL PARK WEST AT 79TH STREET, NEW YORK, NY 10024

Number 3608, 33 pp., 86 figures, 3 maps

April 9, 2008

A Revision of the Endemic Californian Spider Genus *Titiotus* Simon (Araneae, Tenggellidae)

NORMAN I. PLATNICK¹ AND DARRELL UBICK²

ABSTRACT

Titiotus Simon is revised, and contains at least 16 species known only from California. Males of the type species, *T. californicus* Simon, are described for the first time, as are those of *T. flavescens* (Chamberlin and Ivie). *Eusparassus hansii* Schenkel is transferred from the Sparassidae to *Titiotus*, and its male is newly described. Thirteen new species are described.

INTRODUCTION

This paper, the fourth in a series on the North American spiders currently assigned to the family Tenggellidae, completes coverage of the *Liocranoides* complex of genera by revising *Titiotus* Simon (1897). As with the other members of the complex, very little has been published about these taxa, but they were of great interest to the late Willis Gertsch, who devoted considerable field effort to securing adequate samples of their extensive radiation within California. Although males of these species have been known in collections for

decades, it seems that the only illustrations of a male palp of any *Titiotus* species that have appeared to date are those of an unspecified species provided to accompany the generic key by Ubick and Richman (2005).

Only three species are currently assigned to *Titiotus*. Two of them are valid: the type species, *T. californicus* Simon (1897), and *Liocranoides flavescens* Chamberlin and Ivie (1941), which was correctly transferred to *Titiotus* by Lehtinen (1967). The third species was described by Mello-Leitão (1915) as *T. brasilienses* (a spelling that is presumably just a lapsus for *brasiliensis*), on the basis of a female from

¹ Peter J. Solomon Family Curator, Division of Invertebrate Zoology, American Museum of Natural History; Adjunct Professor, Department of Biology, City College, City University of New York; Adjunct Professor, Department of Entomology, Cornell University; Adjunct Senior Research Scientist, Center for Environmental Research and Conservation, Columbia University (platnick@amnh.org).

² Associate, Department of Entomology, California Academy of Sciences, 875 Howard Street, San Francisco, CA 94103 (dubick@calacademy.org).

“Retiro (Itatiaya)” in Brazil. That species is certainly misplaced in *Titiotus*. The type specimen should be in the collection of the Museu Nacional in Rio de Janeiro, but appears to be lost (Thiago de Silva Moreira and Adriano Kury, pers. commun.). Since the taxon (probably a ctenid or zorid) is unlikely ever to be recognizable from Mello-Leitão’s brief and unillustrated description, the name is here considered a *nomen dubium*.

Another indication of the obscurity of the genus, and of its relationships, is the more recent description of one of its species as a member of a distantly related family, the Sparassidae. That taxon, *Eusparassus hansii* Schenkel (1950), is transferred below to *Titiotus*.

Based on detailed habitat notes provided by Mr. Wendell Icenogle, *Titiotus* species seem to prefer steep, rocky canyon slopes near high montane streams. They seem to share microhabitat preferences with the Californian members of the basal araneomorph spider genus *Hypochilus* Marx. A female of *T. humboldt*, new species, was found clinging to the walls of a large pipe under a road in Humboldt Co., within a few feet of the webs of some *Hypochilus kastoni* Platnick. Similarly, specimens of *T. heberti*, new species, were taken in Kern Co., only a few feet from specimens of *Hypochilus petrunkevitchi* Gertsch (possibly the most southern record for that species).

At lower elevations, including the Coast Ranges, *Titiotus* species occur mostly in forests, especially oak and mixed evergreen, but also in rocky grasslands. These spiders are also strongly cavernicolous; almost half of the known species are recorded from caves, where they may be quite abundant. For example, in Speleogen Cave (Calaveras County, Aug. 8, 1986, D. Ubick) several subadult and earlier instar *Titiotus*, presumably *T. gertschi*, new species, the only species known from that cave, were observed in a small room (<5 m diameter). Additionally, the ceiling of this room contained over two dozen *Titiotus* exuviae of various size classes and, interspersed among the exuviae, several eggsacs, no doubt belonging to *Titiotus*. The eggsacs were spherical, about 1.5 cm in diameter, with a papery outer covering, and suspended from the ceiling by a thick cord of silk about 1–2 cm long. Additional specimens of probable

Titiotus eggsacs were collected from a woodpile in Scotts Valley (Santa Cruz County, Oct. 1999, N. Tunison and R. Morgan), and are probably of *T. flavescens* (Chamberlin). These closely resemble the eggsacs from Speleogen Cave, but have a pale bluish exterior. In dissecting one of these eggsacs, it was discovered that beneath the very thin outer silk covering is a brown filling of shredded leaf litter, which constitutes most of the mass of the eggsac and surrounds the central core of cottony silk containing the eggs. A third observation on *Titiotus* eggsacs is of one constructed by a gynandromorph (probably of *T. marin*, new species) collected in Mill Valley (Marin County, May 23, 2007, V. Smith). The specimen was maintained in a petri dish, mostly on a diet of muscoid flies, and after a month in captivity it constructed an eggsac. Although the initial stages of the process were not observed, the first construct noticed was a flat silken disk suspending from the ceiling of the dish by several threads extending from its perimeter. The eggs were attached to the underside of the disk and then covered by layers of silk to produce a hemispherical shape. The size of the eggsac, about 5 mm in diameter, is considerably smaller than the eggsacs in the previous examples, but comparable in size to the central core of the Scotts Valley specimens. As no source of litter was provided to the gynandromorph, it is not clear whether it would have produced a more typical eggsac in nature.

Specimens have been examined from the collections of the American Museum of Natural History (AMNH), California Academy of Sciences (CAS), Blaine Hebert (CBH), David Bixler (CDB), Darrell Ubick (CDU), James Cokendolpher (JCC), Los Angeles County Museum (LACM), Mel Thompson (MET), University of California, Berkeley (UCB), University of California, Riverside (UCR), National Museum of Natural History, Smithsonian Institution (USNM), and Wendell Icenogle (WRI). The format of the descriptions follows that of Platnick (1999); all measurements are in mm.

TITIOTUS SIMON

Titiotus Simon, 1897: 113 (type species by original designation *Titiotus californicus* Simon).

DIAGNOSIS: The unusual character combination of three claws plus claw tufts readily separates members of *Titiotus* and their closest relatives from most other North American spiders. Males of *Titiotus* differ from those of the other three closely related genera (*Lio-cranoides* Keyserling, *Anachemmis* Chamberlin, and *Socalchemmis* Platnick and Ubick) by having a tibial apophysis consisting of three or four prongs (rather than just one or two, figs. 9, 14); females differ by having a wide median septum that usually occupies more than two-thirds of the epigynal width (figs. 10, 15).

DESCRIPTION: Medium to large spiders, total length of males 8–17, of females 11–21. Carapace oval, widest at rear of coxae II, abruptly narrowed at level of palpi to less than two-thirds of maximum width; thoracic groove long, longitudinal, very deep; surface coated with short recumbent and fewer, longer, erect dark setae, erect setae most numerous along midline and in ocular area; eight eyes in two rows; from above, both eye rows slightly recurved; from front, anterior row recurved, posterior row slightly procurved; anterior median eyes round, smallest; other eyes oval, subequal, with canoe-shaped tapeta; anterior median eyes separated by roughly their diameter, slightly closer to anterior laterals; posterior medians separated by roughly their diameter, much farther from posterior laterals; lateral eyes of each side separated by almost their diameter; median ocular quadrangle wider in back than in front, wider in back than long; clypeal height about twice diameter of anterior median eyes, corners of clypeus with incised margins that overlie cheliceral boss; chilum weakly sclerotized, divided, composed of two triangular sclerites. Chelicerae vertical, anterior surface with few, erect setae; promargin with three teeth situated at proximal end of fang furrow, most proximal tooth smallest, middle tooth largest, retromargin with three larger, more distally situated teeth; very short, narrow, I-shaped posterior sclerite present, separating chelicerae at base. Labium short, only about half as long as endites, distally invaginated at middle, reflexed at almost 90° angle relative to sternum. Endites rectangular, distally slightly convergent, with anteromedian scopula and

anterolateral serrula consisting of single row of teeth. Sternum rounded, without extensions to coxae, with only slight angular projections between coxae, with erect setae; posterior margin only slightly extended between coxae IV.

Leg formula 4123. Typical leg-spination pattern (only surfaces bearing spines listed): femora: I d1-1-1, p0-2-1, r1-1-1; II d1-1-1, p2-2-1, r0-1-2; III d1-1-1, p2-1-1, r1-2-1; IV d1-1-1, p1-1-1, r0-0-2; patellae III, IV p0-1-0, r0-1-0; tibiae: I, II p1-1-0, v4-6-4; III d1-0-1, p0-1-1, v2-2-2, r1-1-1; IV d1-0-1, p0-1-1, v2-2-2, r1-0-1; metatarsi: I v2-2-2; II p1-0-0, v2-2-2, r1-0-0; III p1-1-2, v2-2-1r, r1-1-2; IV p1-1-2, v2-2-1r, r1-2-2; tarsi with three claws and claw tufts, superior claws with several weak teeth, most distal teeth largest, inferior claws unarmed; all tarsi with strong ventral scopulae, scopular hairs distinct from those of claw tufts; distal segments apparently with trichobothria in two rows; tarsal organ not scanned; all trochanters strongly notched; males without tibial crack; metatarsi without preening combs.

Abdomen without anterior or dorsal scutum; anterior lateral spinnerets large, composed of two articles, distal article with two major ampullate gland spigots and about 25 piriform gland spigots (figs. 1, 4); posterior median spinnerets composed of one article, small, triangular, those of female expanded posteriorly, where they bear single large and two smaller cylindrical gland spigots, preceded anteriorly by several smaller aciniform gland spigots and terminally by two minor ampullate gland spigots (figs. 2, 5); posterior lateral spinnerets composed of two articles, distal article about one-fourth as long as proximal article, with numerous long aciniform gland spigots and (in female) three larger cylindrical gland spigots (figs. 3, 6); colulus represented by setae on small lobe.

Male palp with patella not widened, tibial apophysis complex, consisting of three or four prongs, of which two or three most anterolateral often share common base (fig. 9); subtegulum and tegulum with interlocking lobes, median apophysis heavily sclerotized at least distally, bearing multiple processes; embolus short, arched, accompanied by hyaline conductor (figs. 7, 8). Female palp with extremely long, dentate claw. Epigynum with

wide median septum, usually occupying most of epigynal width (fig. 10); spermathecal bulbs situated posterolaterally.

SPECIES GROUPS: Two groups are recognized; the *californicus* group, containing most of the species, is characterized by having the most ventral prong of the tibial apophysis relatively long and narrow, and situated close to the base of the cymbium. Members of the *humboldt* group, containing only the new species *T. humboldt*, *T. marin*, and *T. costa*, have the most ventral prong of the tibial apophysis relatively short and wide, and situated close to base of the retrolateral prongs.

Titiotus californicus Simon

Figures 1–11; map 1

Titiotus californicus Simon, 1897: 113, fig. 97 (female holotype from California, no specific locality, in the Muséum National d'Histoire Naturelle, Paris, examined via sketches and detailed description by the late W. Peck).

NOTE: Simon did not specify the source of the female holotype, but it may have been provided by George Marx. The Marx collection in the USNM includes two females of this species, labelled with the nomen nudum *Cybaeus californicus*. Unfortunately, even if this was the source of Simon's specimen, the type locality remains unspecified, as the USNM females are labelled only as "occidental Cal."

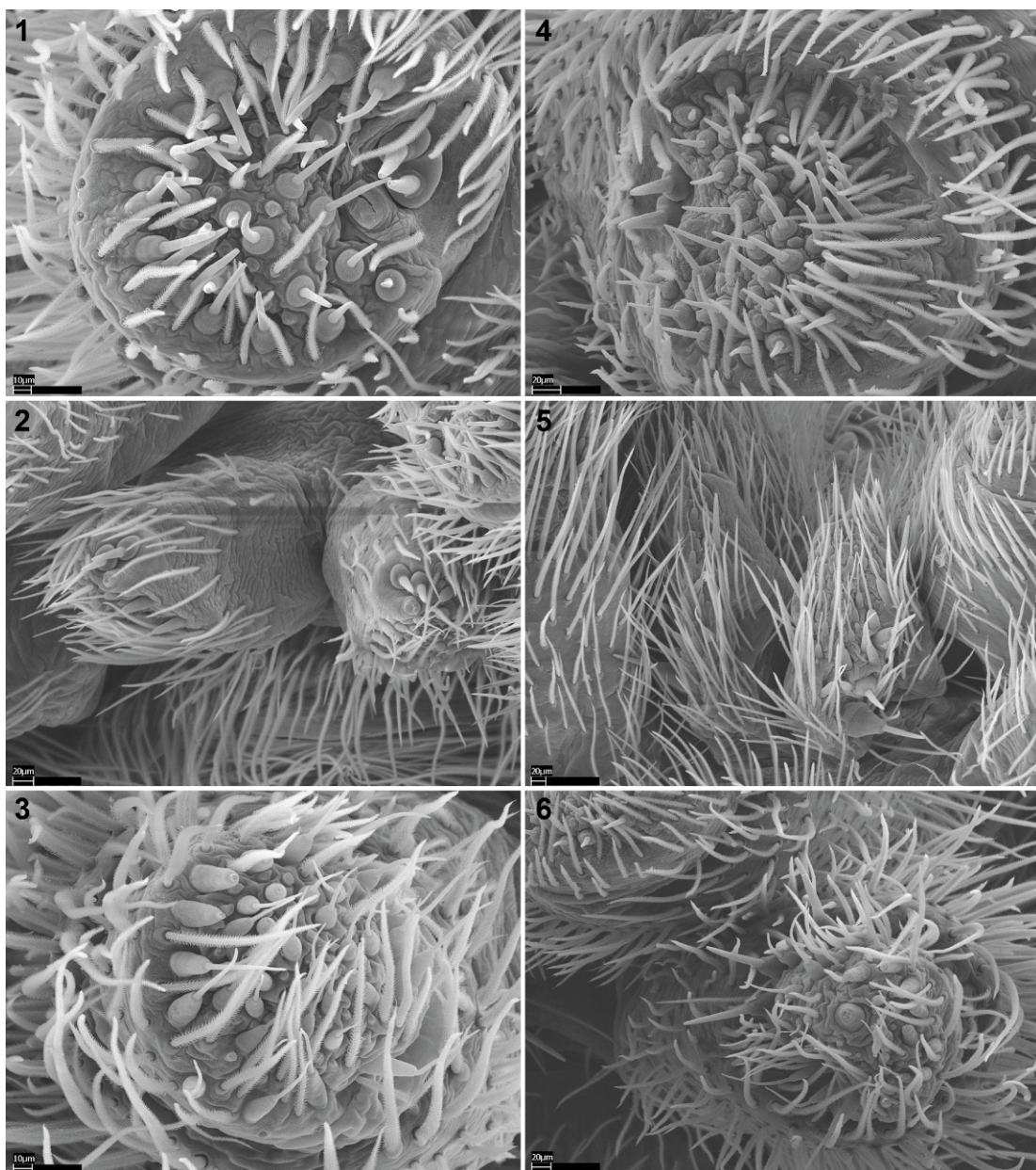
DIAGNOSIS: Males resemble those of the more northern species *T. hansii* but have a more pronounced dorsal extension on the middle prong of the tibial apophysis (fig. 9); females also resemble those of *T. hansii* but have a wider epigynal septum that is more narrowed anteriorly (fig. 10).

MALE: Total length 10. Carapace light brown, with slightly darker triangular markings radiating from thoracic groove to intercoxal areas; abdomen pale gray; femora light brown, more distal leg segments grading to reddish brown on metatarsi and tarsi. Leg spination: femora: I p0-3-1, r1-2-1; II r1-2-1; III r1-1-2; IV p1-2-1, r0-1-2; tibiae: I, II d1-0-1, v4-4-4, r1-1-0; III r0-1-1; metatarsi: I, II p1-1-0, r1-1-0; III p1-2-2, v2-2-1p, r1-1-1; IV p1-2-2, v2-2-1p. Embolus expanded prolaterally,

arched distally; median apophysis with subdistal projection; middle prong of tibial apophysis bifid, with enlarged, distally expanded dorsal branch (figs. 7–9).

FEMALE: Total length 12. Coloration as in male. Leg spination: femora II p1-2-1; tibiae I, II r1-1-0; metatarsi: I r1-0-0; III p1-2-2, r1-2-2. Epigynal septum wide, occupying most of epigynal width; posterior ducts transverse (figs. 10, 11).

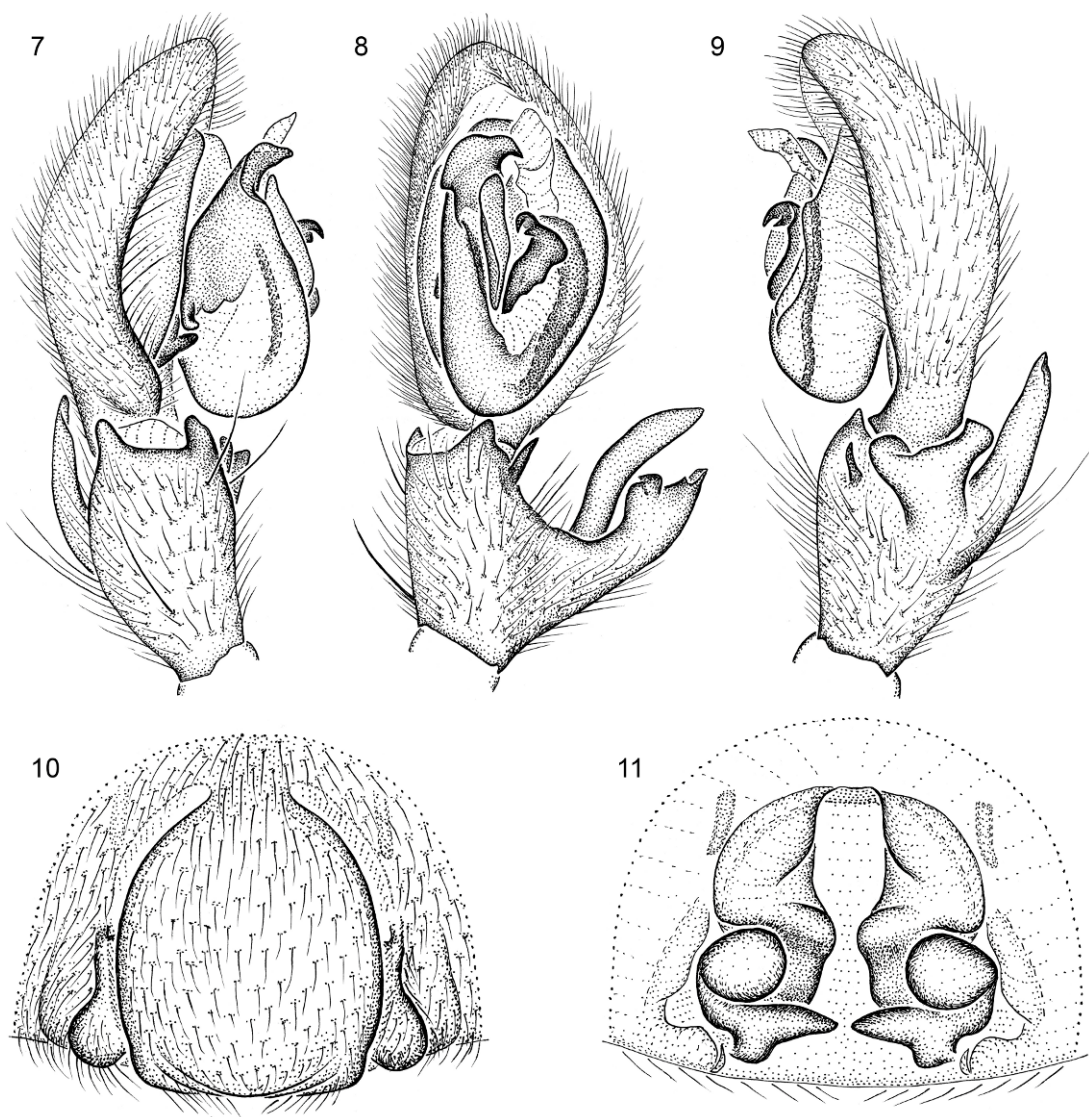
MATERIAL EXAMINED: United States: **CALIFORNIA: Alameda Co.:** no specific locality, May (AMNH), 1♂; Berkeley, May 22, 1945 (R. Smith, AMNH), 1♀, Aug. 1945 (R. Smith, AMNH), 1♂, July 7, 1969, in basement (J. Smith, CAS), 1♀, May 1976 (UCB), 1♂, Apr. 15, 1978 (N. Lavrov, CAS), 1♀, July 18, 2001, under pillow in bed (H. Netiv, UCR), 1♀; Berkeley Hills, May 5, 1978, in house (R. McGinley, UCB), 1♂; Camp Ohlone, Sunol Regional Wilderness, June 30, 1979 (S. Diers, MET), 1♂; Castro Valley, July 21, 2002, in bathroom (M. Curley, UCR), 1♂; Oakland, Aug. 22, 1965 (A. Wong, CAS), 1♀, May 4, 1993, in house (L. Alexander, CAS), 1♂; Pleasant Ridge Regional Park Headquarters, June 2, 1990 (M. Thompson, MET), 1♂; Strawberry Canyon, Berkeley, May 1981 (UCB), 1♂; Sunol, July 25, 1979 (A. Crawford, MET), 1♀; Sunol Regional Wilderness, July 21, 1989 (M. Thompson, MET), 1♂. **Amador Co.:** Amador Canyon, off Pardee Reservoir, July 7, 1958 (W. Gertsch, V. Roth, AMNH), 4♂, 9♀; canyon on Highway 49, 2–3 mi S Jackson, July 7, 1958 (W. Gertsch, V. Roth, AMNH), 1♀; Mokelumne River, S Jackson, July 7, 1958 (W. Gertsch, V. Roth, AMNH), 2♂, 1♀. **Calaveras Co.:** Cave City Cave, Feb. 7, 1954, on floor (R. de Saussure, AMNH), 1♂, June 13, 1960, on open rock (R. Graham, AMNH), 1♂, 1♀; Cave of the Catacombs, Sept. 1, 1961 (R. Graham, AMNH), 1♀; Hanging Gardens Cave, Sept. 4, 1961 (M. Ivie, R. Graham, AMNH), 1♀; King Tut Cave, Dec. 22, 1990 (D. Cowan, CDU), 1♀, Aug. 24, 1991, elev. 1900 ft (T. Briggs, D. Cowan, G. Malliet, D. Ubick, CDU), 1♀; Mountain Ranch, June 16, 2004 (J. Pargett, UCR), 1♂; 1 mi NW Murphys, June 11, 1994, under limestone rock (D. Ubick, CDU), 1♂; Stanislaus River, 5 mi S Dornington, Aug. 5, 1953 (W., J. Gertsch,



Figs. 1–6. *Titiotus californicus* Simon. 1–3. Male spinnerets, terminal views. 4–6. Female spinnerets, terminal views. 1, 4. Anterior lateral spinnerets. 2, 5. Posterior median spinnerets. 3, 6. Posterior lateral spinnerets.

AMNH), 3♀; Wilseyville, May 29, 2001 (K. Collins, UCR), 1♂. **Contra Costa Co.:** Antioch, May 15, 1956, on sand at night (M. Wasbauer, AMNH), 1♂, 1♀; Briones Reservoir, July 12–26, 1980 (J. Fraser, CAS), 3♂, 2♀; Byron, June 7–8, 2004, in sandblasting building (J. Miller,

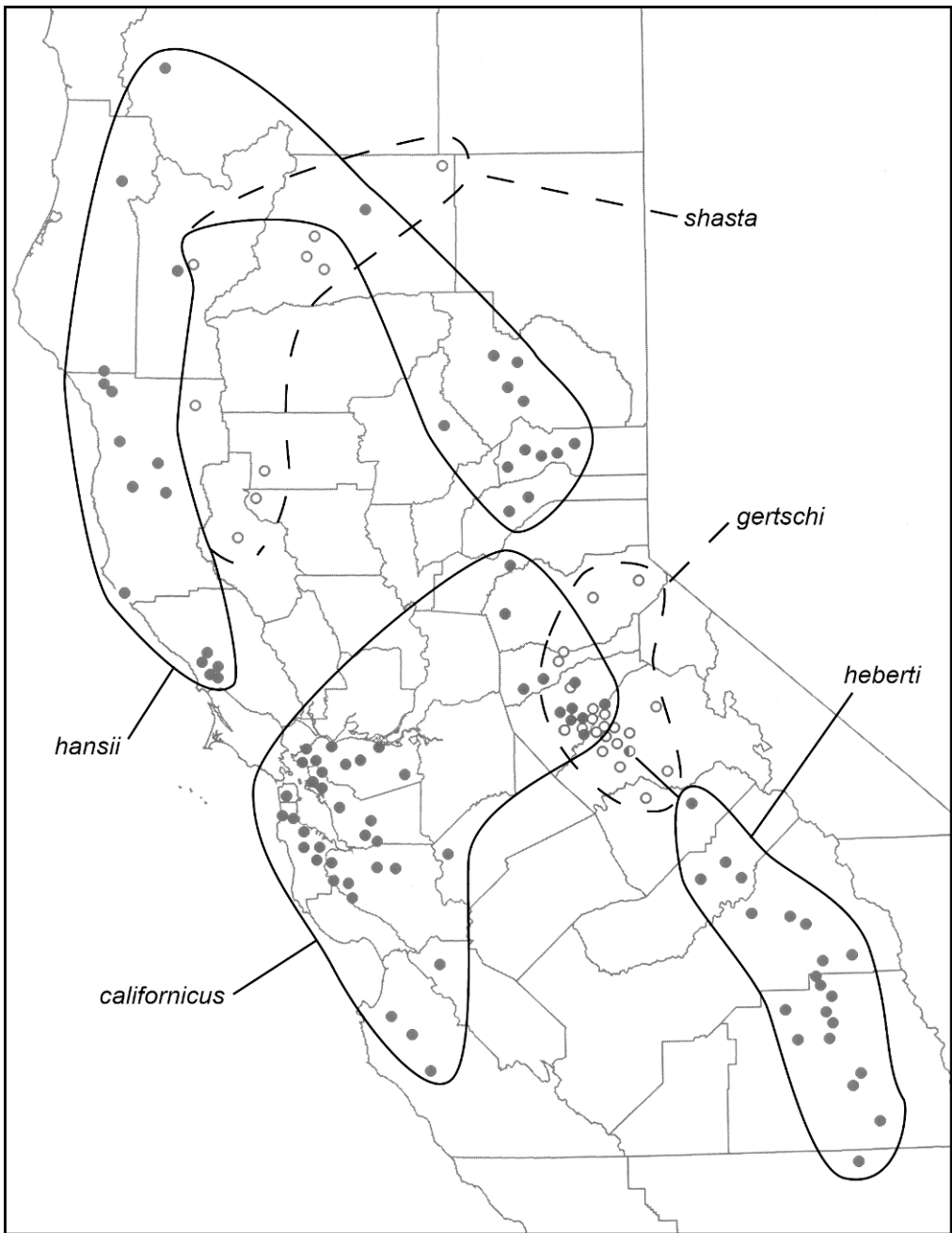
UCR), 2♂; Clayton, Apr. 2, 1941 (W. Pearce, UCR), 1♂, 1♀; El Cerrito, June 1955, in house (R. Black, CAS), 1♀; Kennedy Grove, May 2, 1980, in house (CAS), 1♀; Martinez, June 2001, in house (B. Crumrine, CDU), 1♂; Shell Ridge, Walnut Creek (J. Allen, CAS), 1♂. **El Dorado**



Figs. 7–11. *Titiotus californicus* Simon. 7. Left male palp, prolateral view. 8. Same, ventral view. 9. Same, retrolateral view. 10. Epigynum, ventral view. 11. Same, dorsal view.

Co.: Folsom Lake Campground, 9 mi SW Pilot Hill, May 22, 1993, in restroom at night (D. Ubick, CDU), 2♂, 1♀. **Monterey Co.:** Arroyo Seco, Indians Road, 36°13.7'N, 121°29.5'W, May 19, 2002, under rocks, mixed woods (D., S. Ubick, CDU), 1♀ (spinnerets scanned), May 19–Oct. 13, 2002, pitfalls, oak chaparral, elev. 1,100 ft (D., S. Ubick, CDU), 2♂, 1♀, July 8, 1995, at night (D. Ubick, S. Fend, W. Savary, CDU), 1♀; Carmel Valley, May 1996

(P. Stadille, CDU), 2♂; Hastings Natural History State Reserve, 36°22.8'N, 121°33.2'W, June 18, 1943 (J. Linsdale, CAS), 1♂, July 7, 1944 (J. Linsdale, CAS), 1♂, July 8, 1946 (J. Linsdale, JCC), 1♂, July 10, 1946 (J. Linsdale, AMNH), 1♂, June 1947 (J. Linsdale, AMNH), 1♂, June 22, 1948 (J. Linsdale, CAS), 1♂, June 24, 1948 (J. Linsdale, AMNH), 1♂, July 31, 1948 (J. Linsdale, AMNH), 2♂, Aug. 3, 1948, shower room (J. Linsdale, AMNH), 1♂, July 5,



Map 1. Central California, showing distributions of five species of *Titiotus*.

1950, in school at night (J. Linsdale, AMNH), 1 ♂, July 1–6, 1955, in house (J. Linsdale, AMNH), 2 ♂. **Placer Co.:** Ruck-A-Chucky Campground, middle fork, American River, May 22, 1993, litter, rocks, mixed forest, elev.

800 ft (D. Ubick, CDU), 1 ♂. **San Francisco Co.:** San Francisco, June 1985, in house (N. Ljubic, CDU), 1 ♀; Yerba Buena Island, Feb. 9, 2006, in house (P. Griffes, CAS), 1 ♀. **San Benito Co.:** Hollister, June 18, 1982 (C. Porter,

CAS), 1 ♂. **San Mateo Co.:** Atherton, Mar. 2, 1963 (D., R. Dailey, CDU), 1 ♂ (spinnerets scanned); Edgewood Park, Dec. 27, 1987, under serpentine rock (D. Ubick, S. Fend, CDU), 1 ♀; Indian Mortar, Jasper Ridge, Dec. 30, 1988, serpentine grassland (D. Ubick, CDU), 1 ♀; Pacifica, June 29–30, 1991, in house (D. Pledger, CDU), 1 ♂; 0.5 mi W San Bruno, May–Sept. 1962, pitfall (H. Stark, AMNH), 3 ♂; Valerga Drive, Belmont, June 26, 2006 (N. Teodoro, CAS), 1 ♂. **Santa Clara Co.:** Alum Rock Park, San Jose, Oct. 23, 1970 (E. Schlinger, CAS), 1 ♀; Highway 9 near Skyline Boulevard, near Castle Crags State Park, Sept. 1997, in house (E. Spitz-Blum, CAS), 1 ♀; Los Gatos, Nov. 1979, in house (W. Ferguson, CDU), 1 ♀; San Jose, Sept. 4, 2002, in house (N. Pepper, UCR), 1 ♀; Saratoga, July 4, 1981 (D. Ubick, CDU), 1 ♂, 1 ♀; Stanford University environs, Palo Alto, Dec. 25, 1920 (J. Chamberlin, AMNH), 2 ♂; vic. Stanford, 1927–1928 (C. Duncan, AMNH), 1 ♂. **Santa Cruz Co.:** Aptos, May 1994, biting human in school (S. Tjosvold, CAS), 1 ♂. **Stanislaus Co.:** Frank Raines State Park, Apr. 17, 1975, on brick wall at night (L. Vincent, UCB), 1 ♂.

DISTRIBUTION: Widespread in central California (map 1).

Titiotus hansii (Schenkel), new combination
Figures 12–16; map 1

Eusparassus hansii Schenkel, 1950: 70, fig. 24 (female holotype from Monte Rio, Russian River, Sonoma County, California, June 6, 1939, H. Schenkel-Rudin, in Basel, examined via photographs by A. Hänggi).

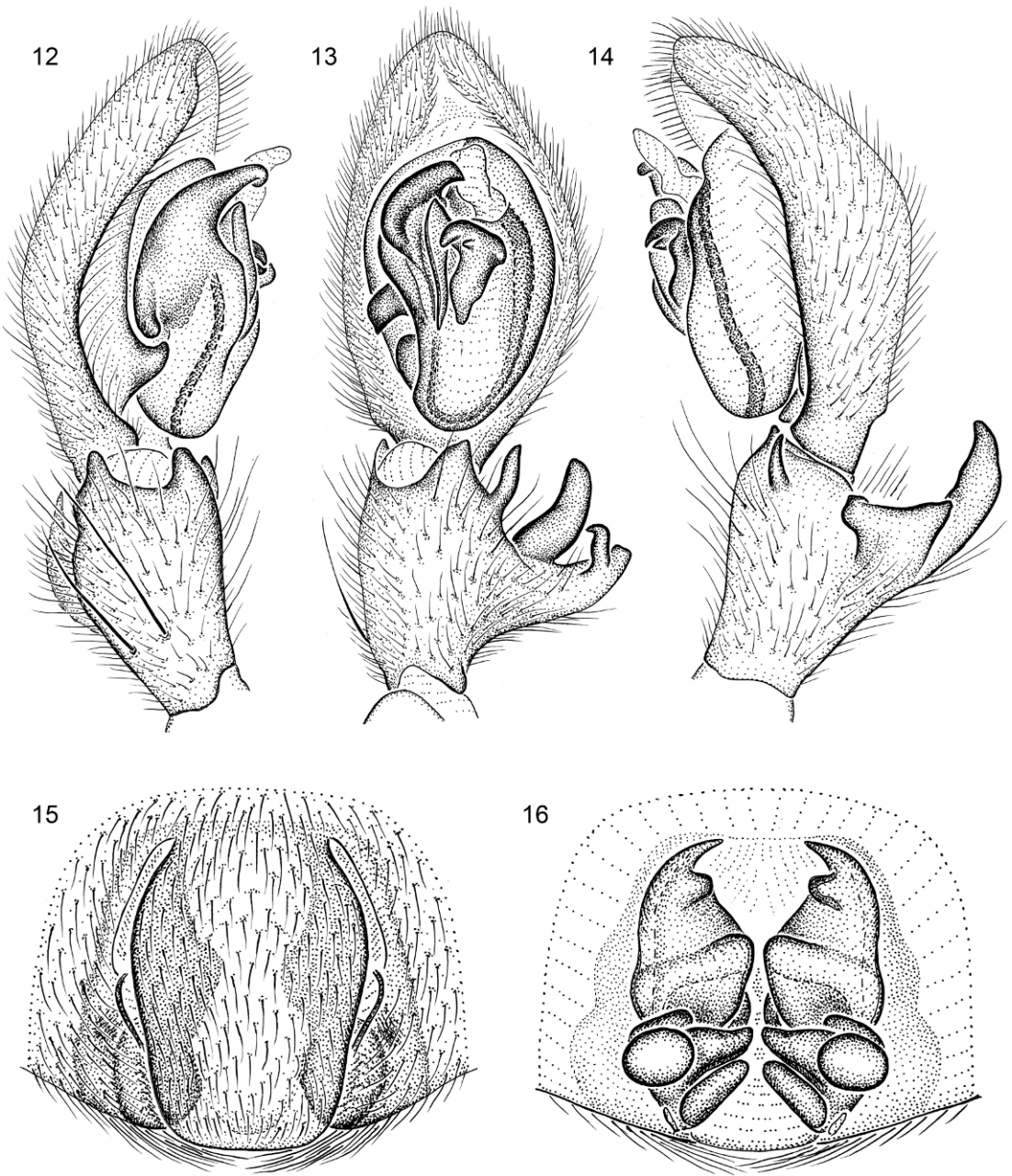
DIAGNOSIS: Males resemble those of the more southern species *T. californicus* but have a less pronounced dorsal extension on the middle prong of the tibial apophysis (fig. 14); females also resemble those of *T. californicus* but have a narrower epigynal septum that is wider anteriorly (fig. 15).

MALE: Total length 9. Coloration as in *T. californicus*. Leg spination: femora: I r2-1-1; II p2-1-1, r2-1-1; III r1-1-2; IV p2-1-1; tibiae: I, II d1-0-1, v4-4-4, r1-1-0; III r0-1-1; metatarsi: I p0-1-0, r0-1-0; II p1-1-0, r1-1-0; III p1-2-2. Embolus not expanded prolaterally, arched, narrowed distally; median apophysis with subdistal and retrolateral projections; middle prong

of tibial apophysis bifid, with dorsal branch smaller than ventral branch (figs. 12–14).

FEMALE: Total length 11. Coloration as in *T. californicus*. Leg spination: femora: I r1-2-1; II r1-1-2; IV p1-2-1; tibiae: I p0-0-0, v4-4-4; II p0-1-0, v4-4-4, r0-1-0; III p1-0-1, r1-0-1; metatarsi: II p0-0-0; III p1-2-2, r1-2-2; IV p1-2-2, r1-1-2. Epigynal septum relatively narrow, with almost straight sides; posterior ducts oblique (figs. 15, 16).

MATERIAL EXAMINED: United States: **CALIFORNIA: Butte Co.:** French Creek, 5 mi N, 2.5 mi E Madrone Lake, Plumas National Forest, July 22, 1970 (S. Frommer, UCR), 1 ♀. **Humboldt Co.:** Hoopa Valley Indian Reservation, Tish-Tang-a-Tang Campground, 41°01.4'N, 123°38.34'W, May 28, 2005, leaf litter, rocks, logs, oak forest with madrone and conifer (D. Ubick, CDU), 2 ♀; Phillipsville, 40°11'N, 123°45'W, Sept. 2, 1963 (W., J. Ivie, AMNH), 1 ♀. **Mendocino Co.:** Anchor Bay, June 28, 1952 (W. Gertsch, AMNH), 2 ♀; “Deerwood” (Leach family property), July 20, 1923 (E. Leach, CAS), 1 ♀; Hartsook Inn, Piercy, Sept. 23, 1963 (W. Gertsch, AMNH), 1 ♂, 1 ♀; Longvale, June 30, 1952 (W. Gertsch, AMNH), 10 ♂, 36 ♀; NCCRP, 3 mi N Branscomb, May 21–23, 1982, elev. 1400 ft (C. Griswold, CAS), 2 ♂, 4 ♀; Noyo River, 14.5 air mi E Fort Bragg, 39°25.5'N, 123°32'W, May 25, 1996 (matured Feb. 1997), redwood forest at night (D. Ubick, CDU), 1 ♀, May 25–26, 1996 (C. Griswold, CAS), 2 ♀, redwood forest (D. Ubick, CDU), 3 ♀, May 24–25, 1997 (C. Griswold, CAS), 1 ♂, 1 ♀; Piercy, S fork of Eel River, July 23, 1953 (W., J. Gertsch, AMNH), 5 ♀; 2 mi N Piercy, Aug. 19, 1959 (W. Gertsch, V. Roth, AMNH), 4 ♀; 5 mi N Piercy, Apr. 6, 1960 (W. Gertsch, W. Ivie, R. Schrammel, AMNH), 5 ♂, 13 ♀; Willits, no date (A. Dahl, UCR), 1 ♀, Aug. 10, 2000, in home, elev. 3000 ft, redwood forest area (R. Dixon, UCR), 1 ♀, early Oct. 2000 (R. Dixon, UCR), 1 ♂; Willits, Mendocino County Museum, Aug. 2001, sticky trap (E. Hamby, UCR), 1 ♀. **Nevada Co.:** Nevada City, Dec. 22, 1993, in house (T. Van Wagner, CDU), 1 ♂; White Cloud Campground, May 31, 1964 (P. Arnaud, Jr., CAS), 1 ♂. **Plumas Co.:** Juniper Cave [= Kloppenberg Cave], Oct. 17, 1959, on small landing at depth of 25 ft (R. Graham, AMNH), 1 ♀; Kloppenberg Cave, 7



Figs. 12–16. *Titiotus hansii* (Schenkel). 12. Left male palp, prolateral view. 13. Same, ventral view. 14. Same, retrolateral view. 15. Epigynum, ventral view. 16. Same, dorsal view.

air mi SE Quincy, Sept. 3, 1988, dark zone (D. Ubick, CDU), 1♀; 5 mi W Quincy, Mar. 25, 1977 (J. Dalbec, CAS), 1♂; Seneca, N fork of Feather River, Aug. 2, 1953 (W., J. Gertsch, AMNH), 5♀; Soda Springs Cave, 8 air mi N

Quincy, Sept. 4, 1988, dark zone (D. Ubick, CDU), 1♂, 1♀; Soda Springs Cave, 10 mi N Quincy (R. Graham, AMNH), 1♂, 1♀, Sept. 5, 1961 (W. Gertsch, W. Ivie, R. Graham, AMNH), 3♀. **Shasta Co.:** cave in Low Pass

Creek, Jan. 29, 1953, elev. 1600 ft (J. Gorman, AMNH), 1♂, 1♀. **Sierra Co.:** Bassetts, Aug. 18, 1993, in culvert, elev. 5400 ft (J. Boutin, CDU), 1♂; 4.8 mi N Camptonville, Aug. 21, 1993, in culvert, elev. 3000 ft (D. Ubick, CDU), 1♀; 5 mi E Camptonville, Aug. 15, 1993, in culvert, elev. 3000 ft (D. Ubick, CDU), 1♀, Aug. 9, 1999 (matured Sept.), elev. 3000 ft (D. Ubick, CDU), 1♂; the Cups, Sierra City, Sept. 6, 1959 (W. Gertsch, V. Roth, AMNH), 4♂, 5♀; Downieville, late July, 2004 (A. Faibish, UCR), 1♀; Downieville, at school, Sept. 24, 1993, elev. 2800 ft (T. Van Wagner, CDU), 1♀, Sept. 27, 1993, elev. 2800 ft (T. Van Wagner, CDU), 1♂; just E Loganville, no date, roadside rock outcrop at night (D. Ubick, CDU), 1♀; 7 mi W Sierra City, July 8, 1952 (W. Gertsch, AMNH, JCC), 1♂, 37♀. **Siskiyou Co.:** 20 mi N Somes Bar, July 20, 1962 (V. Roth, AMNH), 1♂ (single palp with broken tibial apophysis), 2♀. **Sonoma Co.:** Bohemian Highway, 2.4 mi SE Monte Rio, 38°26'37"N, 122°59'19"W, Dec. 20, 2001, oak-chaparral serpentine (T. Briggs, G. Giribet, D., S. Ubick, CDU), 1♂, 1♀; 0.2 mi NW Camp Meeker on Bohemian Highway, Jan. 5, 1984, elev. 120 m (D. Kavanaugh, CAS), 1♀; Guerneville, Apr. 4, 1960 (W. Gertsch, W. Ivie, R. Schrammel, AMNH), 20♂, 17♀, Aug. 2003, in house (R. Kaspar, UCR), 2♂; Monte Rio, May 5, 1996 (D. Ubick, CDU), 1♀, June 2003, in house (P. Craig, CDU), 2♂; 2.8 mi S Monte Rio, July 5, 1958 (W. Gertsch, V. Roth, AMNH), 2♀; Pine Glade Road, 1 air mi NE Monte Rio, Nov. 6, 1999, redwood forest (D., S. Ubick, CDU), 1♀; trail above Pine Glade Road, Monte Rio, June 30, 1996, redwood forest (P. Craig, W. Savary, D. Ubick, CDU), 1♀, Sept. 28, 1996, redwood forest (P. Craig, W. Savary, D. Ubick, CDU), 1♂, 1♀. **Trinity Co.:** Indian Valley Creek Cave, Oct. 27, 1990, elev. ca 1800 ft, on walls of cave (D. Ubick, W. Rauscher, CDU), 2♂, 1♀.

DISTRIBUTION: Widespread in northern California (map 1).

Titiotus shasta, new species

Figures 17–21; map 1

TYPE: Male holotype from McArthur, Shasta Co., California (June 18, 1942; W. Pearce), deposited in AMNH.

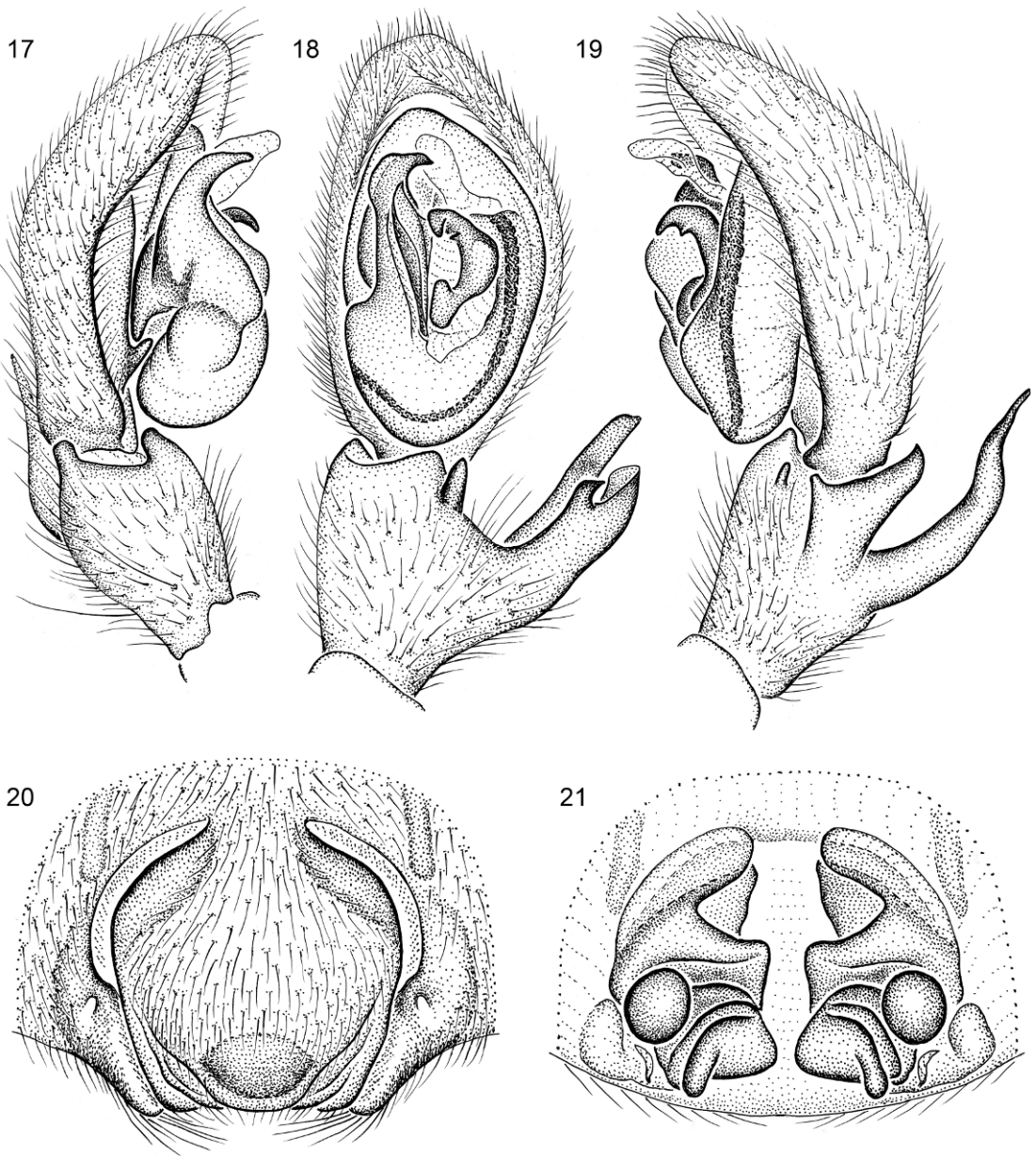
ETYMOLOGY: The specific name is a noun in apposition to the genus name taken from the type locality.

DIAGNOSIS: Males resemble those of *T. californicus* and *T. hansii* but have a much smaller ventral branch on the middle prong of the tibial apophysis (fig. 19); females resemble those of *T. californicus* but have a posteriorly narrowed epigynal septum (fig. 20).

MALE: Total length 10. Coloration as in *T. californicus*. Leg spination: femora: I, II r1-2-1; III, IV p1-2-1; tibiae: I, II d1-0-1, v4-4-4, r1-1-0; III r0-1-1; metatarsi: I, II p1-1-0, r1-1-0; III p1-2-2; IV r1-1-2. Embolus expanded prolaterally, beak-shaped distally; median apophysis with elongate tip, with only tiny subdistal projection; middle prong of tibial apophysis bifid, with ventral branch much smaller than dorsal branch (figs. 17–19).

FEMALE: Total length 12. Coloration as in *T. californicus*. Leg spination: femora: I, II r1-2-1; III r2-1-1; IV p2-0-1; tibiae: I v4-4-4, r0-1-0; II d1-0-1, v4-4-4, r1-1-0; III r0-1-1; metatarsi: I p0-1-0, r0-1-0; II p1-1-0, r0-1-0; III p1-2-2. Epigynal septum wide, occupying most of epigynal width, except posteriorly, where narrowed; posterior ducts elbowed (figs. 20, 21).

OTHER MATERIAL EXAMINED: United States: **CALIFORNIA:** **Colusa Co.:** Deafy (Dixie) Glade Campground on Forest Road, 13 mi W Stonyford, Mendocino National Forest, 39°21'N, 122°42'W, no date, elev. 1000 m (J. Schweikert, CAS), 1♂. **Glenn Co.:** Forest Road, 5.5 mi S County Road 308, 9 mi SW Elk Creek, Mendocino National Forest, 39°30'N, 122°39'W, Mar. 30, 1997, elev. 1100 m (J. Schweikert, CAS), 1♂. **Lake Co.:** Lucerne, Aug. 17, 1958, molasses bait trap (H. Leech, CAS), 1♀. **Mendocino Co.:** 7.5 km NE Covelo, 28201 Mendocino Pass Road, 39°50'N, 123°10.7'W, Sept. 2, 1996, elev. 1680 ft (C. Prince, CAS), 1♀. **Shasta Co.:** Lake Shasta, June 14, 2006 (C. Abreu, UCR), 1♂; Palo Cedro, June 17, 2006 (D. McConnel, UCR), 2♂; Redding, Aug. 26, 2004 (A. Tennett, UCR), 1♀, June 2, 2006, in bathtub (A. Olivias, UCR), 1♀, June 4, 2006 (H. Ray, UCR), 1♂, June 16, 2006 (G. Snook, UCR), 1♂, same date (W. Mapes, UCR), 1♀, June 28, 2006



Figs. 17–21. *Titiotus shasta*, new species. 17. Left male palp, prolateral view. 18. Same, ventral view. 19. Same, retrolateral view. 20. Epigynum, ventral view. 21. Same, dorsal view.

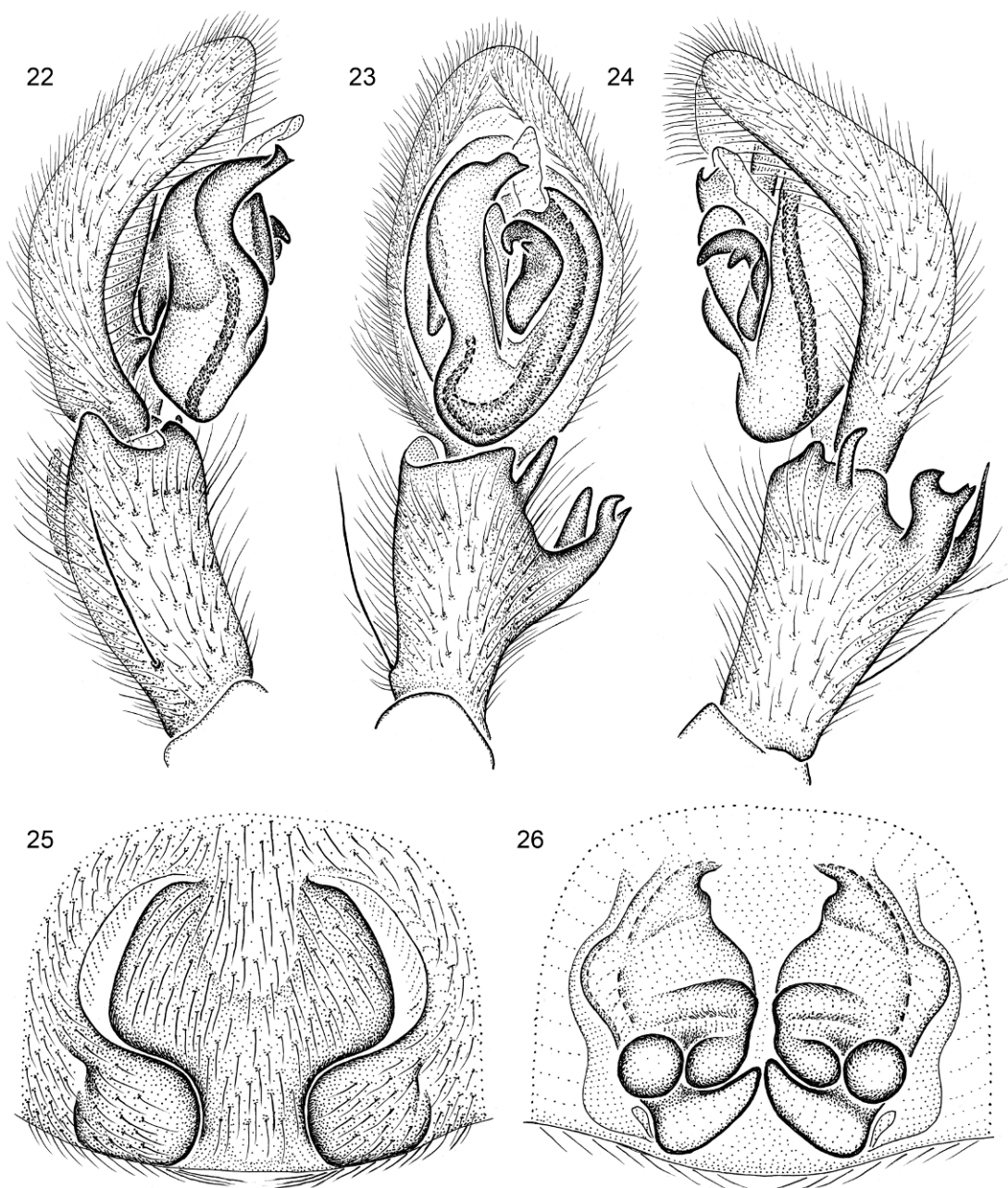
(T. Ressler, UCR), 1♀, June 29, 2006 (M. Wooden, UCR), 1♀. **Trinity Co.:** Hayfork Ranger Station, May 19, 1973 (M. Bentzien, UCB), 1♂.

DISTRIBUTION: Known only from north-western California (map 1).

Titiotus flavescens (Chamberlin and Ivie)
Figures 22–26; map 2

Liocranoides flavescens Chamberlin and Ivie, 1941: 24, fig. 18 (female holotype from Ben Lomond, Santa Cruz Co., in AMNH, examined).

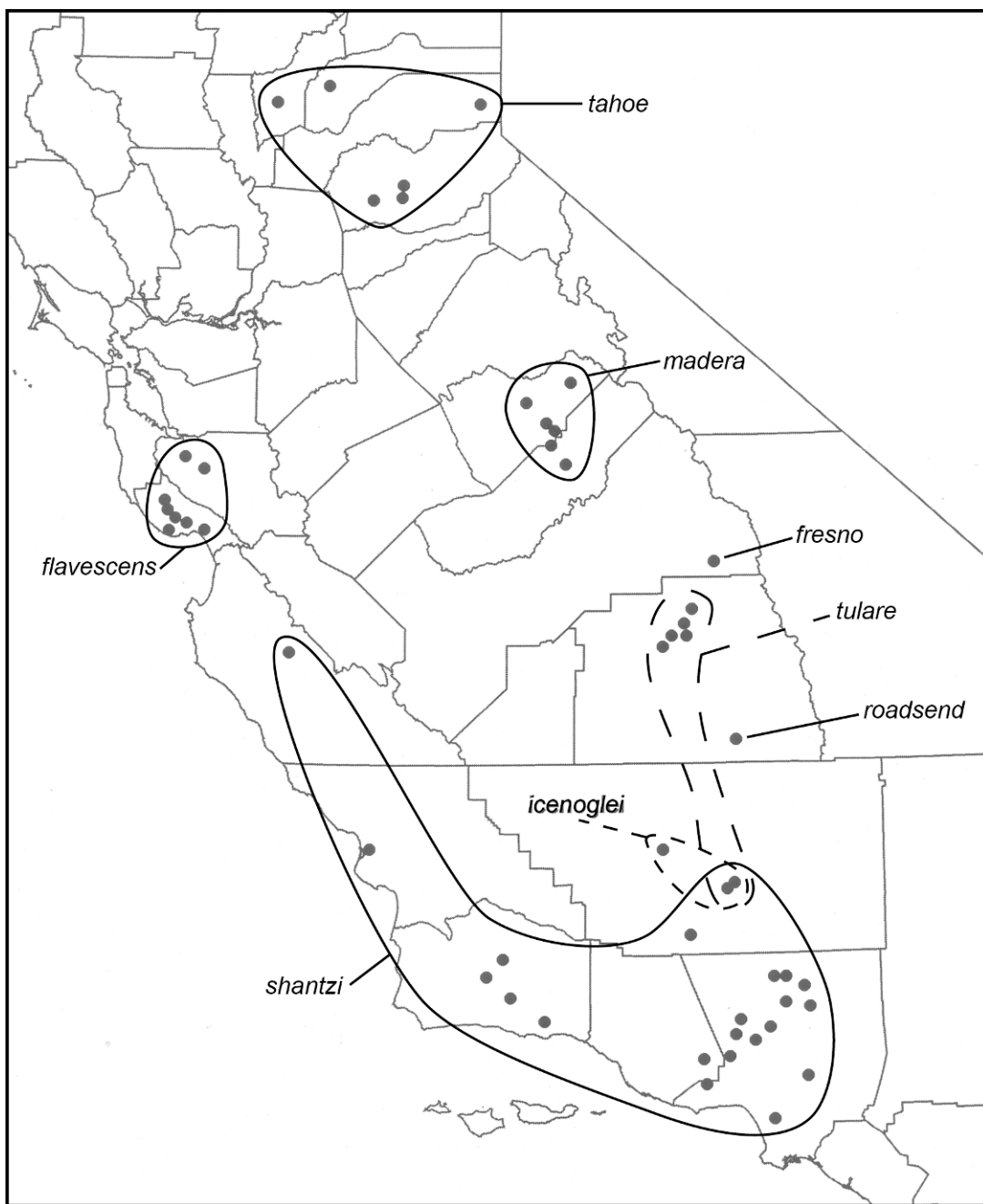
Titiotus flavescens: Lehtinen, 1967: 271.



Figs. 22–26. *Titiotus flavescens* (Chamberlin and Ivie). 22. Left male palp, prolateral view. 23. Same, ventral view. 24. Same, retrolateral view. 25. Epigynum, ventral view. 26. Same, dorsal view.

DIAGNOSIS: Males resemble those of *T. shantzi* in having the middle prong of the tibial apophysis relatively narrow and the dorsal prong relatively short, but differ in

having the middle prong more deeply incised (fig. 24); females have a distinctive epigynal septum, which is greatly narrowed posteriorly (fig. 25).



Map 2. Central California, showing distributions of eight species of *Titiotus*.

MALE: Total length 11. Coloration as in *T. californicus*. Leg spination: femora: I, II r1-2-1; IV p0-2-1, r0-1-1; tibiae: I, II d1-0-1, v4-4-4, r1-1-0; III r0-1-1; metatarsi: I p1-0-0, r0-1-0; II p1-1-0, r1-1-0; III p1-2-2. Embolus with

subapical, distally directed projection; median apophysis with subdistal projection; middle prong of tibial apophysis small, bifid, dorsal branch distally invaginated, dorsal prong relatively short (figs. 22–24).

FEMALE: Total length 14. Coloration as in *T. californicus*, except proximal leg segments with dorsal dusky markings. Leg spination: femora: I, II r1-2-1; III, IV p1-2-1; tibiae: I p1-0-0, v4-4-4, r1-0-0; II v4-4-4, r0-2-0; III, IV p1-0-1, r1-0-1; metatarsi: III p1-2-2. Posterior quarter of epigynal septum greatly narrowed, forming stalk; posterior ducts oblique (figs. 25, 26).

MATERIAL EXAMINED: United States: CALIFORNIA: **Santa Clara Co.:** 27950 N Carnegie Ave., Santa Clara, June 8, 1993 (T. Carb, AMNH), 1♂; San Jose, Oct. 21, 1974, in house (D. Ubick, CDU), 1♂. **Santa Cruz Co.:** Aptos, July 10, 1946 (E. Ross, AMNH), 1♀; Bat Cave, Santa Cruz, Apr. 21, 1979 (D. Rudolph, Cowan, Van Ingen, AMNH), 2♂; Ben Lomond, May 1934 (L. Saylor, AMNH), 1♀ (holotype), June 25, 1952 (W. Gertsch, AMNH, JCC), 1♂, 21♀, July 4, 1958 (W. Gertsch, V. Roth, AMNH), 12♀, Apr. 3, 1960 (W. Gertsch, W. Ivie, R. Schrammel, AMNH), 9♂, 11♀, Sept. 23, 1961 (W. Gertsch, W. Ivie, AMNH), 5♂, 9♀; Boulder Creek, Aug. 1, 2004, in house (T. Nygard, UCR), 1♀, Oct. 7, 2004, in house (J. Sanchez, UCR), 1♂; 1 mi NE Boulder Creek, June 29, 1989, dry redwood forest, elev. ca 800 ft (A. Sundman, CDU), 1♀; Cave Gulch, Nov. 16, 1979, redwood forest (D. Ubick, CDU), 1♀; Cave Gulch, cave near Univ. of California, Santa Cruz, Nov. 4, 1972 (T. Stearns, CAS), 1♀; Cave Gulch, IXL Cave, Dec. 6, 1980, on cave wall (T. Briggs, CAS), 1♂; Felton, Aug. 16, 1959 (W. Gertsch, V. Roth, AMNH), 2♀, Apr. 3, 1960 (W. Gertsch, W. Ivie, R. Schrammel, AMNH), 1♀, June 1994 (S. Tjosvold, CAS), 1♀, Sept. 2001 (R. Knight, UCR), 1♂, Oct. 3, 2004, in shoe in bedroom (M. Mister, UCR), 1♂; N Soquel, Oct. 6, 2004 (A. Fournier, UCR), 1♂.

DISTRIBUTION: Known only from Santa Clara and Santa Cruz counties south of the San Francisco Bay (map 2).

Titiotus shantzi, new species

Figures 27–31; map 2

TYPES: Male holotype and female allotype from Santa Barbara, Santa Barbara Co., California (May 1948; H. Shantz), deposited in AMNH.

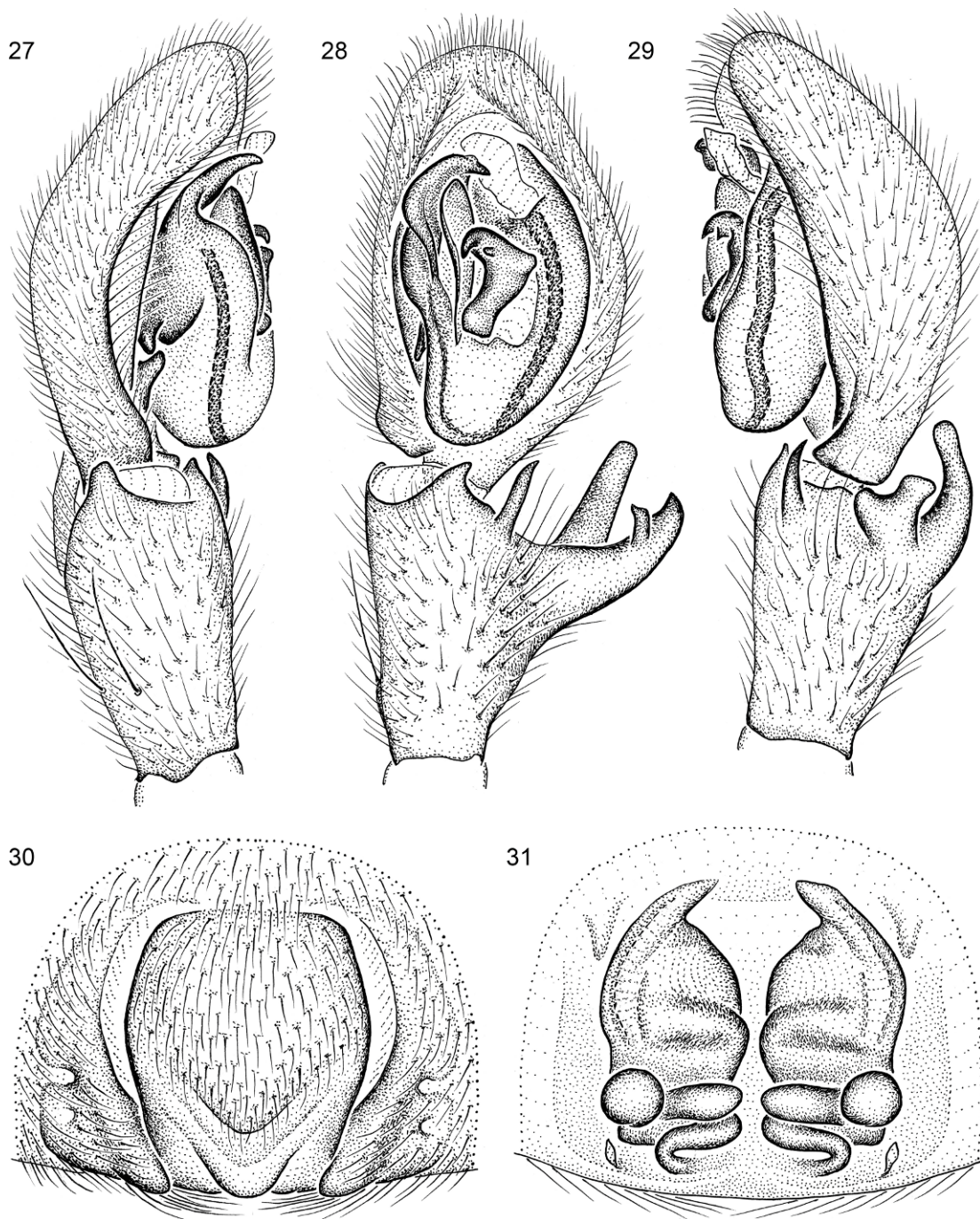
ETYMOLOGY: The specific name is a patronym in honor of the collector of the types.

DIAGNOSIS: Males resemble those of *T. flavescens* but have the middle prong of the tibial apophysis short, with a beak-shaped dorsal branch (fig. 29); females have the epigynal septum wider posteriorly than do those of *T. flavescens* (fig. 30).

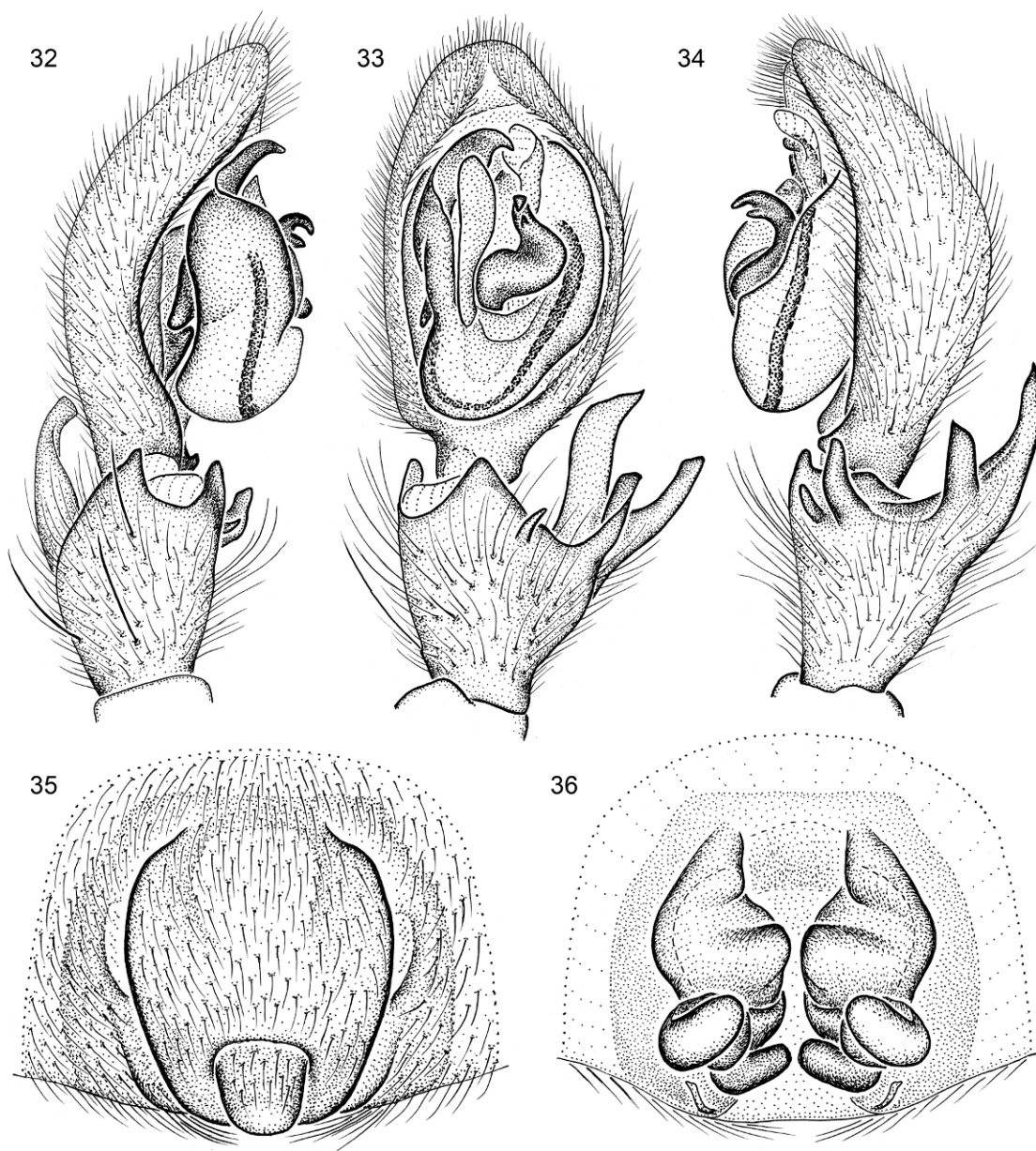
MALE: Total length 10. Coloration as in *T. californicus*. Leg spination: femora: I p1-2-1, r2-1-1; II r1-1-2; IV p1-2-1; tibiae: I, II d1-0-1, p0-1-1, v4-4-4, r0-1-1; III r0-1-1; metatarsi: I, II p1-1-0, r1-1-0. Embolus with small, subapical, distally directed projection; median apophysis with small, subdistal projection; middle prong of tibial apophysis small, bifid, with beak-shaped dorsal branch, dorsal prong relatively short (figs. 27–29).

FEMALE: Total length 14. Coloration as in *T. californicus*. Leg spination: femora: I, II r1-1-2; III r2-1-1; IV p1-2-1; tibiae: I, II d1-0-1, p0-1-1, v4-4-4, r0-1-1; III, IV r0-1-1; metatarsi: I, II p1-1-0, r1-1-0; III p1-2-2. Epigynal septum relatively narrow, only slightly narrowed posteriorly; posterior ducts recurved (figs. 30, 31).

OTHER MATERIAL EXAMINED: United States: CALIFORNIA: **Kern Co.:** Fort Tejon State Historic Park, June 15, 1975, at lights (M. Muma, AMNH), 2♂; Tehachapi, June 16, 1975, at light (M. Muma, AMNH), 2♂. **Los Angeles Co.:** Acton, May 14, 2000, in house, elev. 2,700 ft (C. Lutz, UCR), 1♀; Agoura, May 6, 2005, in bathroom (D. Trisler, UCR), 1♂; Agua Dulce, June 2, 1977 (F. Runyan, LACM), 1♂; Canyon Country, mid-May 2003, in house (R. Fridlund, UCR), 1♂; Elizabeth Lake, 34°39.7'N, 118°21.96'W, May 30, 2006, elev. 3,537 ft (C. Becker, UCR), 1♂; Kenneth Hahn State Recreation Area, Baldwin Hills, 34°00'N, 118°22'W, June 2000, pitfall, elev. 67 m (L. LaPierre, P. Williams, CBH), 1♂; La Canada, June 24, 1970 (A. Guldaro, LACM), 1♀; Lake Hughes, NW Palmdale, June 2, 2002, elev. 3,200 ft (M. Enright, UCR), 1♀; Lassen Street, Chatsworth, 0.25 mi W Browns Canyon Wash, Apr. 29–May 20, 1966, in house, elev. 950 ft (W. Icenogle, WRI), 2♀, May 23, 1966, in house, elev. 950 ft (W. Icenogle, WRI), 1♂; Leona Valley, May 9, 2002, elev. 3,200 ft (K. Smith, CAS), 2♂; Placerita Canyon Park, 3 mi E Newhall, July 26, 1972, elev. 1,550 ft (F.



Figs. 27–31. *Titiotus shantzi*, new species. 27. Left male palp, prolateral view. 28. Same, ventral view. 29. Same, retrolateral view. 30. Epigynum, ventral view. 31. Same, dorsal view.



Figs. 32–36. *Titiotus tahoe*, new species. 32. Left male palp, prolateral view. 33. Same, ventral view. 34. Same, retrolateral view. 35. Epigynum, ventral view. 36. Same, dorsal view.

Hovore, WRI), 1♀; Saugas, May 4, 2004 (B. Lytle, UCR), 1♂; Valencia, Dec. 1, 2003 (M. Pacheco, UCR), 1♂. **Monterey Co.:** Paraiso Hot Springs, July 4, 1954, elev. 1,400 ft (O. Bryant, CAS), 1♀. **San Luis Obispo Co.:** Morro Bay, May 26, 1984 (V. Lee, CAS), 1♂. **Santa Barbara Co.:** Lake Cachuma, 18 mi NE Santa

Barbara (W. Gertsch, W. Ivie, R. Schrammel, AMNH), 1♀; Santa Barbara, May 1948 (H. Shantz, AMNH), 2♂; Sedgwick Ranch Reserve, May 1997, Malaise trap, elev. 1,800 ft (E., M. Schlinger, CAS), 1♀; Superstar Ranch, Santa Barbara, 34°39'N, 120°04'W, May–June 1997, elev. 700 ft (E.,

M. Schlinger, CAS), 1 ♂. **Ventura Co.:** Simi Valley, May 6, 2003, in house (B. Moran, UCR), 1 ♂.

DISTRIBUTION: Known only from southwestern California (map 2).

Titiotus tahoe, new species

Figures 32–36; map 2

TYPE: Male holotype taken at an elevation of 6000 ft at Tahoe City, Placer Co., California (July 10, 1952; W. Gertsch), deposited in AMNH.

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males and females have not been collected together but are matched here on the basis of geography; males can easily be recognized by the tibial apophysis consisting of four prongs (fig. 34), females by the thumb-shaped median lobe situated posteriorly on the epigynal septum (fig. 35).

MALE: Total length 8. Coloration as in *T. californicus*. Leg spination: femora: I r1-2-1; II p2-1-1, r1-1-2; III r1-2-2; IV p1-2-1; tibiae: I, II d1-0-1, v4-4-4, r1-1-0; III, IV r0-1-1; metatarsi: I p1-1-0, r0-1-0; II p1-1-0, r1-1-0; III, IV p1-2-2. Embolus expanded prolaterally just beyond base; median apophysis long, with large, subdistal projection; tibial apophysis with four prongs, only two most distal sharing common base (figs. 32–34).

FEMALE: Total length 19. Coloration as in *T. californicus*. Leg spination: femora: II, III r1-1-2; tibiae: I, II r1-1-0; III r0-1-1; IV p1-0-1; metatarsi: II p1-1-0, r1-1-0; III p1-2-2. Epigynal septum with thumb-shaped median lobe occupying posterior fifth of septum length; posterior ducts oblique (figs. 35, 36).

OTHER MATERIAL EXAMINED: United States: **CALIFORNIA:** **El Dorado Co.:** Placerville, Jan. 1995 (UCR), 1 ♂; 5 mi N Pollock Pines, July 6, 1958 (W. Gertsch, V. Roth, AMNH), 13 ♀; Snowline Camp, July 15, 1948 (P. Hurd, AMNH), 1 ♂. **Nevada Co.:** S fork, Yuba River, 8 mi N Nevada City, Aug. 3, 1953 (W., J. Gertsch, AMNH), 5 ♀. **Placer Co.:** Tahoe City, July 10, 1952, elev. 6000 ft (W. Gertsch, AMNH), 1 ♂. **Yuba Co.:** Brown's Valley, June 28, 2004 (J. Crummett, UCR), 1 ♂.

DISTRIBUTION: Known only from four counties in the Sierras (map 2).

Titiotus gertschi, new species

Figures 37–41; map 1

TYPES: Male holotype and female allotype from Riverton, El Dorado Co., California (July 11, 1952; W. Gertsch), deposited in AMNH.

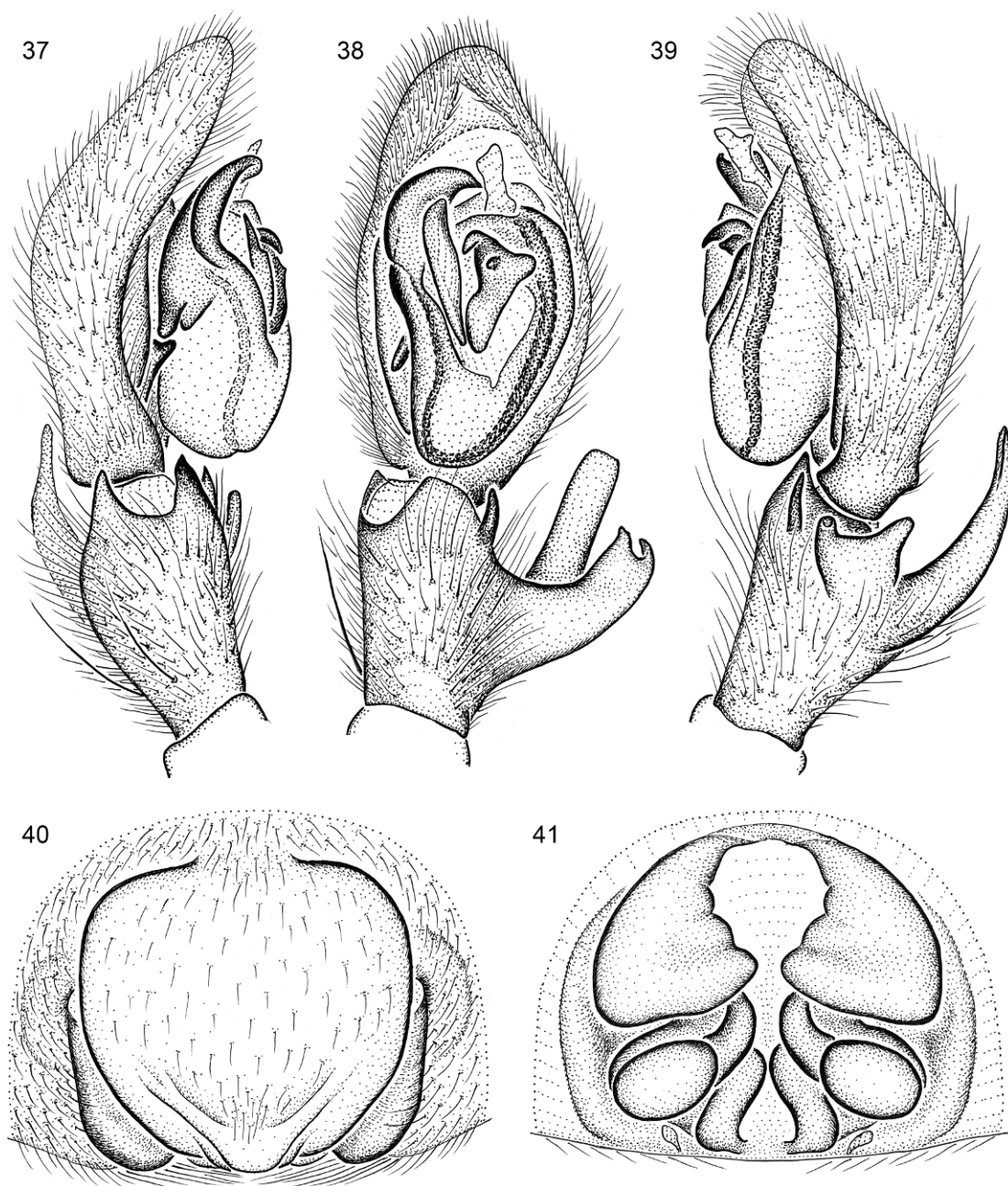
ETYMOLOGY: The specific name is a patronym in honor of the collector of the types.

DIAGNOSIS: Males resemble those of *T. madera* in having the dorsal prong of the median apophysis long and excavated, but differ in having only two projections on the middle prong of the tibial apophysis (fig. 39); females also resemble those of *T. madera* in having a gradually narrowed posterior projection on the epigynal septum, but have the septum much wider than in that species (fig. 40).

MALE: Total length 16. Coloration as in *T. flavescens*. Leg spination: femora: I r1-2-1; II r1-1-2; IV p2-1-1; tibiae: I, II d1-0-1, r1-1-0; III p1-0-1, r1-0-1; IV p1-0-1; metatarsi: I, II p1-1-0, r1-1-0; III p1-2-2. Embolus expanded prolaterally just beyond base; median apophysis with large, subdistal projection; middle prong of tibial apophysis bifid, dorsal prong long, ventrally excavated (figs. 37–39).

FEMALE: Total length 18. Coloration as in *T. flavescens*. Leg spination: femora: II p1-1-1, r1-1-1; III, IV p1-2-1; tibiae: I r1-1-0; II d1-0-1, r1-1-0; III p1-0-1, r1-0-1; metatarsi: I p1-0-0; II r0-1-0; III p1-2-2. Epigynal septum very wide, occupying most of epigynal width, with gradually narrowing posteromedian ledge; posterior ducts curved (figs. 40, 41).

OTHER MATERIAL EXAMINED: United States: **CALIFORNIA:** **Amador Co.:** Moss Cave, near Volcano, Oct. 17, 1987 (D. Cowan, F. Howarth, D. Ubick, CDU), 2 ♂, 1 ♀, Apr. 24, 1999 (R. Aalbu, CAS), 1 ♂, 1 ♀, Jan. 13, 2002 (R. Aalbu, CAS), 4 ♂; Pearl Cave, 0.2 mi NE Volcano, Sept. 13, 1980, on wall (T. Briggs, D. Ubick, CDU), 1 ♂; Pearl Cave, 1 mi N Volcano, Feb. 20, 1979 (D. Rudolph, S. Winterath, CAS), 1 ♀. **Calaveras Co.:** 7 mi W Angels Camp, Nov. 2, 1979 (R. Laughlin, CDU), 1 ♀; Brown Deer Cave, Grapevine Gulch, N Columbia, Nov. 27, 1958 (P. Anderson, AMNH), 1 ♂; Cave of Skulls,



Figs. 37-41. *Titiotus gertschi*, new species. 37. Left male palp, prolateral view. 38. Same, ventral view. 39. Same, retrolateral view. 40. Epigynum, ventral view. 41. Same, dorsal view.

3 mi N Columbia, Mar. 29, 1979 (D. Rudolph, B. Martin, S. Winterath, W. Elliott, J. Reddell, AMNH), 1♀; Crystal-Stanislaus Cave, 38°06'15"N, 120°24'45"W, Nov. 25, 1950 (E. Dansky, AMNH), 1♂;

Dublen Cave, Aug. 17, 1963 (R. Graham, AMNH), 2♀; Grapevine Gulch Cave, Oct. 18, 1987 (F. Howarth, D. Cowan, CAS), 1♂; Pseudoscorpion Cave, Aug. 17, 1963 (R. Graham, AMNH), 2♀; Speleogen Cave,

6 mi NW Columbia, 38°02.85'N, 120°28.4'W, Feb. 1, 1953, 100 ft in cave (R. de Saussure, AMNH), 1♂, Dec. 18, 1972 (W. Rauscher, CDU), 1♂, Mar. 24, 2000 (T. Briggs, J. Ledford, W. Rauscher, D., S. Ubick, CDU), 1♂; 2.5 mi S West Point, May 2, 1981 (S. Williams, CAS), 1♀; Wood Hollow Cave, Aug. 11, 1962 (R. Graham, AMNH), 1♀. **El Dorado Co.:** Fallen Leaf Lake, Apr. 9, 1959 (W. Gertsch, V. Roth, AMNH), 1♂, 1♀, Sept. 9, 1959 (W. Gertsch, V. Roth, AMNH, CAS), 10♂, 8♀; Riverton, July 11, 1952 (W. Gertsch, AMNH), 6♂, 17♀. **Mariposa Co.:** Water Pit Cave, 10 mi E Coulterville, Apr. 7, 1979 (D. Rudolph, B. Martin, S. Winterath, Cowan, Lahner, AMNH), 1♂. **Tuolumne Co.:** Bend Cave, 3 mi N Columbia, Feb. 27, 1979 (D. Rudolph, B. Martin, S. Winterath, AMNH), 1♀; mine, 2.5 mi N Columbia, Feb. 22, 1979 (D. Rudolph, S. Winterath, B. Martin, AMNH), 1♂; Crystal Palace Cave, 3 mi N Columbia, Feb. 4, 1979 (D. Rudolph, S. Winterath, AMNH), 1♂, Feb. 28, 1979 (D. Rudolph, S. Winterath, B. Martin, AMNH), 1♂, 1♀; Draper Mine Road, 6 mi E Sonora, Oct. 12, 1973 (matured Feb. 15, 1974), in ravine bank on turned soil, elev. 2,700 ft (W. Icenogle, WRI), 1♂; Fox Gulch, Transplant Mine, ca 2 mi N Columbia, Dec. 6, 1986, elev. 1,630 ft (D. Ubick, V. Lee, CDU), 1♂; McLean's Cave, Marble Quarry Road at South Fork, Stanislaus River, Mar. 5, 1981, on rock face (D. Ubick, CDU), 1♂, 1♀; McLean's Cave, 3 mi N Columbia, Mar. 25, 1979 (D. Rudolph, B. Martin, S. Winterath, W. Elliott, J. Reddell, AMNH), 1♂; Pine Log Cave, 2 mi W Columbia (D. Rudolph, B. Martin, S. Winterath, AMNH), 1♂, 1♀; Pinnacle Point Cave, 6 mi N Columbia, Feb. 8, 1979 (D. Rudolph, S. Winterath, AMNH), 2♂, 1♀, Oct. 4, 2004 (R. Aalbu, CAS), 1♀; Porcupine Skull Cave, 2 mi N Columbia, Feb. 11, 1979 (D. Rudolph, S. Winterath, AMNH), 1♀; 5 mi N Priest, July 8, 1959 (W. Gertsch, V. Roth, AMNH, JCC), 1♂, 23♀; Razorback Grotto Cave, 3 mi N Columbia, Mar. 28, 1979 (D. Rudolph, B. Martin, S. Winterath, AMNH), 1♂; Scorpion Cave, 12.6 km NNW Sonora, Feb. 1, 1978 (A. Grubbs, AMNH), 1♂; Sonora, June 2003 (J. Wenz, UCR), 1♀; Strawberry, Sept. 10, 1959 (W. Gertsch, V. Roth, AMNH), 14♂, 25♀; Tuolumne, Apr. 15,

1934 (CAS), 1♀, June 2005, in or around house (W. Rauscher, CDU), 2♀, June 2006, in house (W. Rauscher, CDU), 1♀; Tuolumne River at N entrance to Yosemite National Park, Aug. 7, 1953 (W., J. Gertsch, AMNH), 2♀; Windeler Cave, 11.3 km NNE Sonora, Jan. 12, 1978 (W. Elliott, A. Grubbs, S. Winterath, AMNH), 1♀.

DISTRIBUTION: Known only from the Sierras, generally to the south of *T. tahoe* (map 1).

Titiotus madera, new species

Figures 42–46; map 2

TYPES: Male holotype and female allotype from Bass Lake, Madera Co., California (July 9, 1958; W. Gertsch, V. Roth), deposited in AMNH.

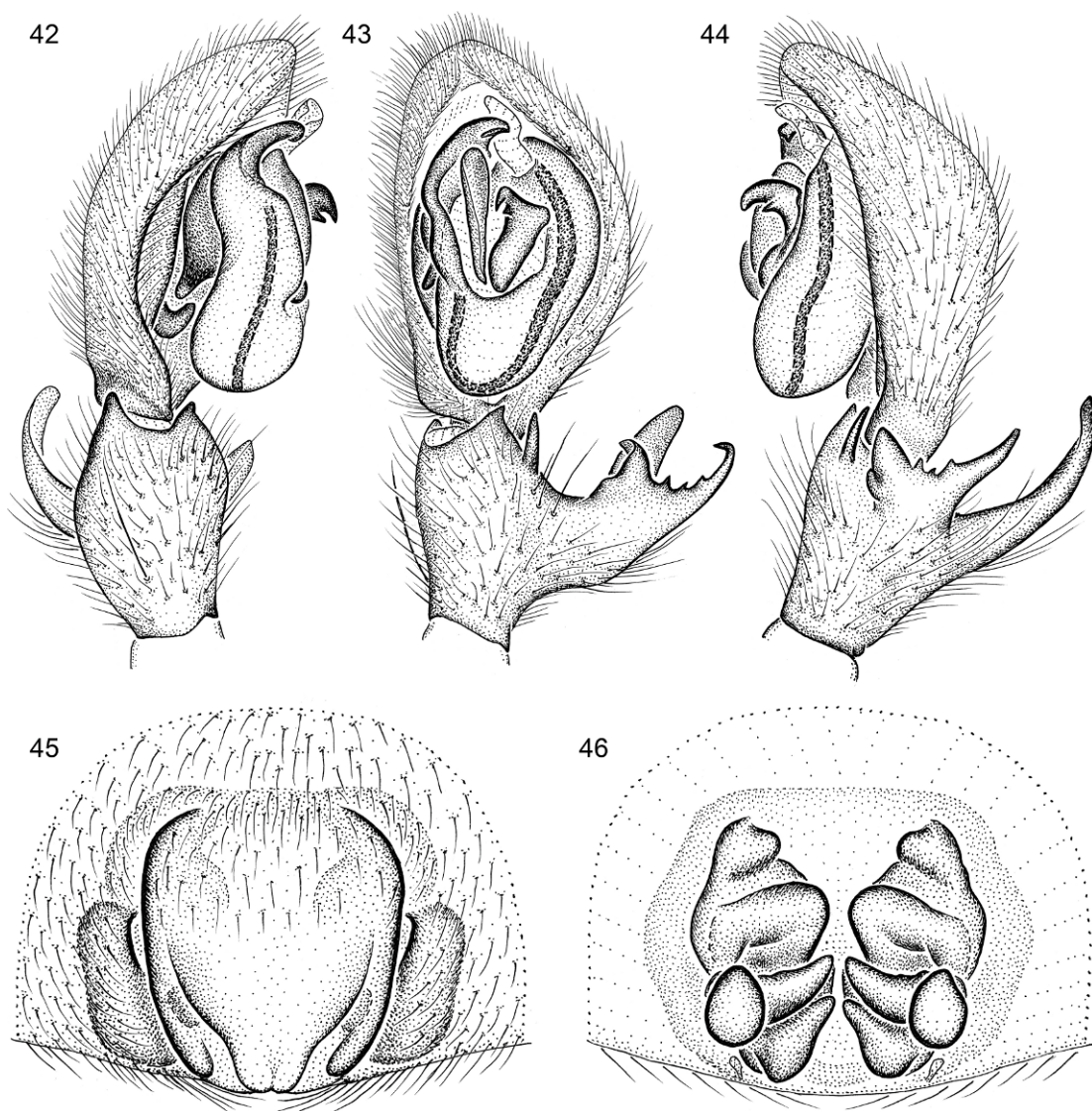
ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males resemble those of *T. gertschi*, but can easily be distinguished by the presence of multiple projections on the middle prong of the tibial apophysis (fig. 44); females also resemble those of *T. gertschi* but have a much narrower epigynal septum (fig. 45).

MALE: Total length 11. Coloration as in *T. californicus*. Leg spination: femora: I r1-2-1; II r1-1-2; III r1-1-2; tibiae: I d1-0-1, r1-1-1; II d1-0-1, r1-1-0; III r0-1-1; metatarsi: p1-0-0, r1-0-0; III p1-2-2. Embolus expanded prolaterally just beyond base, with short tip; median apophysis with small subdistal projection; middle prong of tibial apophysis bifid, bearing multiple projections, dorsal prong long, ventrally excavated (figs. 42–44).

FEMALE: Total length 14. Coloration as in *T. californicus*. Leg spination: femora: II p1-2-1, r1-1-2; III r2-1-1; tibiae: I, II p0-1-0, r1-1-0; metatarsi: II p0-0-0, v0-0-0; III p1-2-2. Epigynal septum wide, occupying about two-thirds of epigynal width, with gradually narrowing posteromedian ledge; posterior ducts oblique (figs. 45, 46).

OTHER MATERIAL EXAMINED: United States: CALIFORNIA: **Madera Co.:** Bass Lake, July 9, 1958 (W. Gertsch, V. Roth, AMNH), 1♂, 2♀; 5 mi S Fish Camp, just over county line, Sept. 23, 1961 (W. Gertsch, W. Ivie, AMNH), 1♂. **Mariposa Co.:** El Portal, Apr. 8, 1960 (W. Gertsch, W. Ivie, R. Schrammel, AMNH), 1♀; El Portal, outside entrance to Yosemite National Park, July 14,



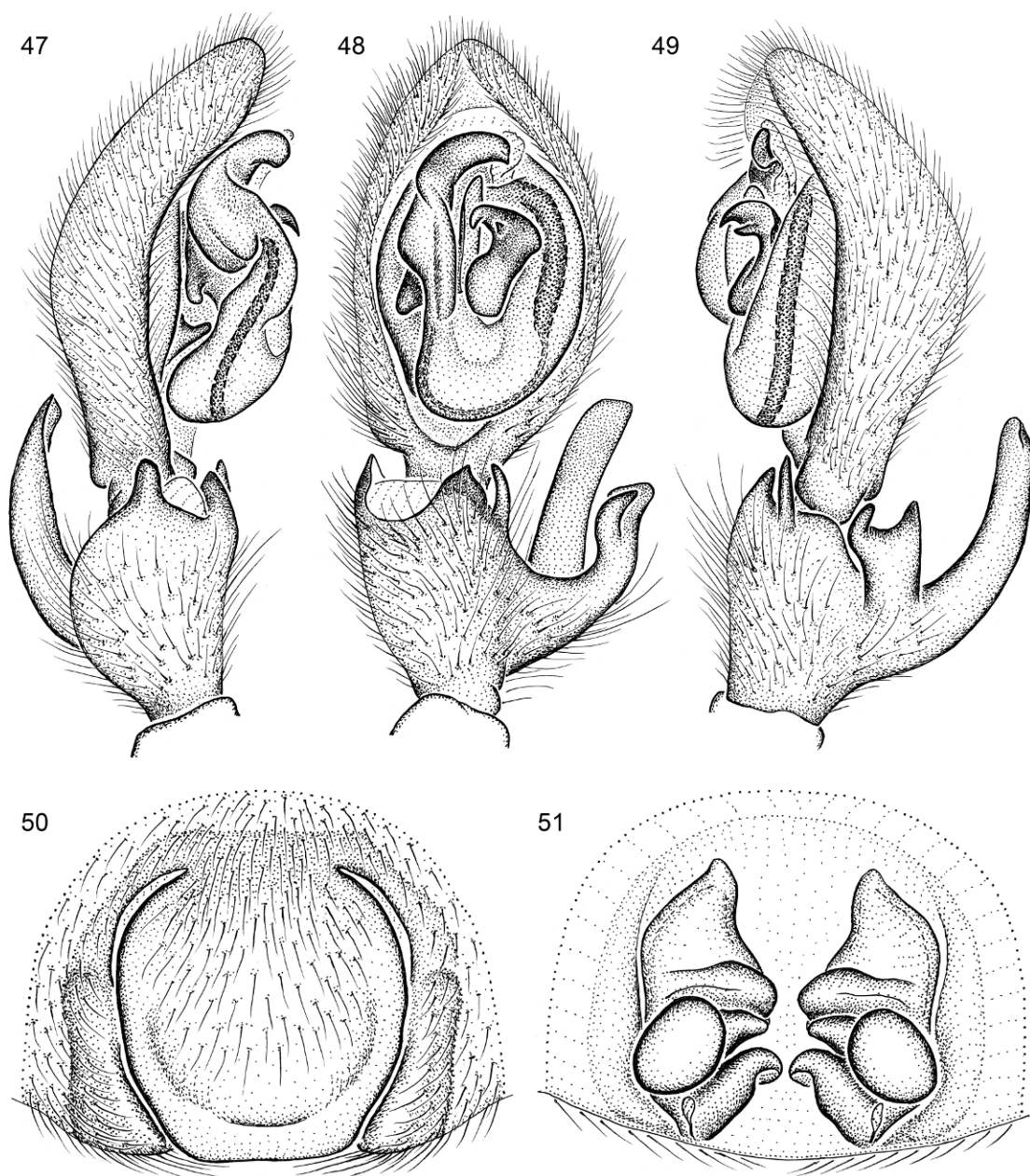
Figs. 42–46. *Titiotus madera*, new species. 42. Left male palp, prolateral view. 43. Same, ventral view. 44. Same, retrolateral view. 45. Epigynum, ventral view. 46. Same, dorsal view.

1952 (W. Gertsch, AMNH), 2♂, 11♀; 14 mi N Oakhurst, Aug. 7, 1953, elev. 5100 ft (W., J. Gertsch, AMNH), 1♂, 6♀; Sprinkle Cave, Apr. 7, 1979 (D. Rudolph, B. Martin, S. Winterath, AMNH), 1♀; Wawona Camp, 37°32'N, 119°10'W, Sept. 17, 1941 (W. Ivie, AMNH), 2♀; Yosemite National Park, July 1935 (AMNH), 1♀; Yosemite National Park, bridge below Nevada Falls, June 26, 1973 (P. Arnaud, Jr., CAS), 1♂.

DISTRIBUTION: Known only from the Sierras of Madera and Mariposa Counties (map 2).

Titiotus heberti, new species
Figures 47–51; map 1

TYPES: Male holotype and female allotype from Wilsonia, Kings Canyon National Park,



Figs. 47–51. *Titiotus heberti*, new species. 47. Left male palp, prolateral view. 48. Same, ventral view. 49. Same, retrolateral view. 50. Epigynum, ventral view. 51. Same, dorsal view.

Tulare Co., California (Sept. 13, 1959; W. Gertsch, V. Roth), deposited in AMNH.

ETYMOLOGY: The specific name is a patronym in honor of Mr. Blaine Hebert, assiduous collector of these and other Californian spiders.

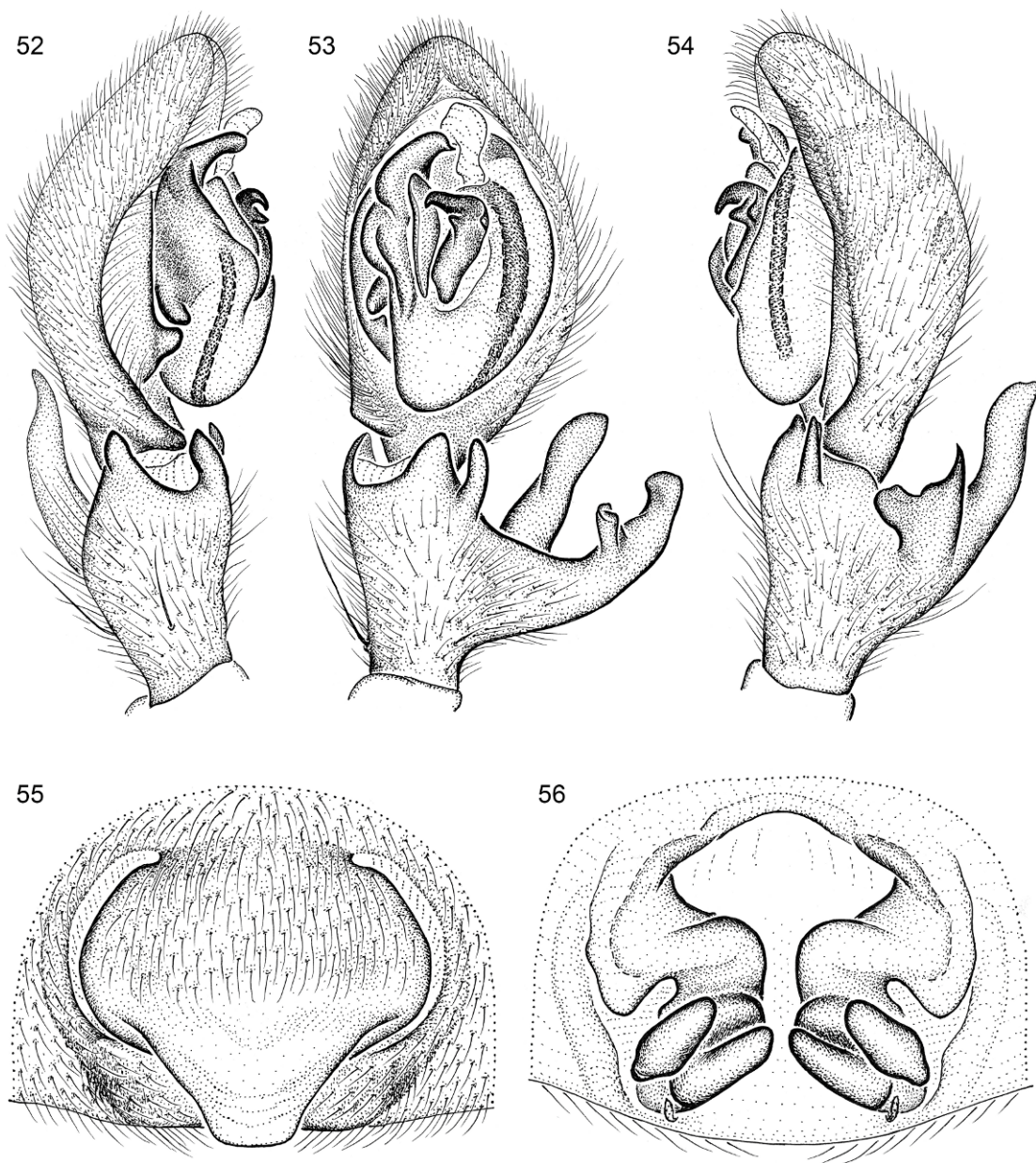
DIAGNOSIS: Males resemble those of *T. tulare* in having a large, wide dorsal prong on the tibial apophysis, but differ in having a distally narrower middle prong (fig. 49); females differ from those of *T. tulare* in having a posteriorly wider epigynal septum (fig. 50).

MALE: Total length 12. Coloration as in *T. californicus*. Leg spination: femora: I p0-3-1, r1-2-1; II r1-2-1; IV p1-2-1; tibiae: I, II d1-0-1, r1-1-0; III r1-0-1; metatarsi: I p1-0-0, r1-1-0; III p1-2-2. Embolus twisted near base, distally wide; median apophysis with subdistal and retrolateral projections; middle prong of tibial apophysis bifid, with subequal branches, dorsal prong large, wide, flattened (figs. 47–49).

FEMALE: Total length 17. Coloration as in *T. californicus*. Leg spination: femora: I p0-3-1, r1-2-1; II r1-2-1; III r1-1-2; IV p1-2-1; patella III p0-0-0; tibiae I, II r1-1-0; metatarsi III, IV p1-2-2. Epigynal septum wide, with posteromedian bulge occupying most of septal width; posterior ducts oblique, arched (figs. 50, 51).

OTHER MATERIAL EXAMINED: United States: **CALIFORNIA:** **Fresno Co.:** Cedar Grove, Kings River Canyon, July 16, 1952, elev. 4633 ft (W. Gertsch, AMNH), 8♀, July 5, 1956, elev. 4633 ft (W., J. Gertsch, AMNH), 2♂, 6♀; Hume Lake, Dec. 17, 1984 (K. Walker, CAS), 1♀; Lily Pond, 2 mi W Wishon Lake, Oct. 31, 1982, in sandy soil (M. Marshall, CAS), 1♀; Ranger Station, Kings River, Kings Canyon National Park, June 17, 1969, in house (M. Zardus, CAS), 1♂; Shaver Lake, July 15, 1952 (W. Gertsch, AMNH), 5♀, Sept. 12, 1959 (W. Gertsch, V. Roth, AMNH), 12♂, 3♀; vicinity Wishon Resv., July 2–6, 1969 (D. Marqua, MET), 1♂, 2♀, May 28–June 14, 1972 (M. Thompson, MET), 2♀. **Kern Co.:** Cedar Creek Camp Ground, 0.25 mi N Highway 155, Greenhorn Mountains, 35°44.44'N, 118°35.54'W, Aug. 25, 2006, on wall of old mine shaft in steep, rocky canyon side near stream, conifer-oak forest, elev. 5000 ft (B. Hebert, W. Icenogle, WRI), 1♀, Aug. 26, 2006 (matured Sept. 4, 2006), on ceiling at mouth of old mine shaft in steep, rocky canyon side stream nearby conifer-oak forest, elev. 5000 ft (B. Hebert, W. Icenogle, WRI), 1♀, Aug. 26, 2006 (matured Dec. 9, 2006), on side of big rock near stream in steep-sided canyon, conifer-oak forest, elev. 5000 ft (B. Hebert,

W. Icenogle, WRI), 1♂. **Madera Co.:** Cascadel Woods, T8S,R23E,S16, July 1–3, 1983 (J. Aotok, CAS), 1♂; Coarsegold, no date (Oliva, UCR), 1♀, Apr. 21, 2004 (B. Harrigom, UCR), 1♀; Wishon, July 5, 1971 (D. Marqua, MET), 1♂. **Mariposa Co.:** Foresta Road, Yosemite National Park, 37°42.242'N, 119°43.989'W, June 15–18, 2003, pitfalls, elev. 1392 m (A. Leache, C. Conroy, UCB), 6♂. **Tulare Co.:** Ash Mountain, Sequoia National Park, Apr. 26, 1951 (E. Schlinger, AMNH), 1♂; near Ash Mountain, Sequoia National Park, July 9, 1958 (W. Gertsch, V. Roth, AMNH), 1♂, 5♀; 1 mi below Belnap Springs, near Camp Nelson, July 11, 1958 (W. Gertsch, V. Roth, AMNH), 2♂, 2♀; Carmoe Crevice, Nov. 3, 1993 (J. Krejca, CAS), 1♂; NE Case Mountain Peak, 36.41790°N, 118.7933°E, July 14–18, 2003, dry pitfall, elev. 1691 m (R. Fisher, AMNH), 1♂; NE Case Mountain Peak, 36.41870°N, 118.79264°E, July 14–18, 2003, dry pitfall, elev. 1672 m (R. Fisher, AMNH), 1♂; NNE Case Mountain Peak, E of E end of Salt Creek, 36.42059°N, 118.79776°E, May 2003, dry pitfall, elev. 1749 m (R. Fisher, AMNH), 1♂, 36.42083°N, 118.79163°W, Sept. 2002, dry pitfall, elev. 1609 m (R. Fisher, AMNH), 1♀; NW Case Mountain Peak, S of Salt Creek, 36.41871°N, 118.81930°W, May 2003, dry pitfall, elev. 1709 m (R. Fisher, AMNH), 1♂; just S Case Mountain Peak, 36.407°N, 118.8016°E, July 14–18, 2003, dry pitfall, elev. 1998 m (R. Fisher, AMNH), 1♂; SE Case Mountain Peak, Salt Creek Ridge, 36.39964°N, 118.77975°W, Sept. 2002, dry pitfall, elev. 1808 m (R. Fisher, AMNH), 1♂; W Case Mountain Peak, 36.41120°N, 118.80909°W, July 2002, dry pitfall, elev. 1951 m (R. Fisher, AMNH), 1♀, 36.41139°N, 118.80843°W, July 2002, dry pitfall, elev. 1932 m (R. Fisher, AMNH), 1♀, July 14–18, 2003, dry pitfall, elev. 1951 m (R. Fisher, AMNH), 1♀; just W Case Mountain Peak, 36.41139°N, 118.80843°W, July 14–18, 2003, dry pitfall, elev. 1932 m (R. Fisher, AMNH), 1♂; Cedar Cave, Redwood Canyon, Kings Canyon National Park, Aug. 16, 1984, under rock outside cave entrance, elev. 1,600 m (D. Ubick, CDU), 1♀; Crystal Sequoia Cave, Sequoia National Park, Apr. 16, 1946 (F. Oberhansley, AMNH), 1♀, July 26, 1991 (D. Ubick, CDU), 1♀; cave in bank on



Figs. 52–56. *Titiotus tulare*, new species. 52. Left male palp, prolateral view. 53. Same, ventral view. 54. Same, retrolateral view. 55. Epigynum, ventral view. 56. Same, dorsal view.

road to Crystal Cave, Sequoia National Park, Nov. 6, 1949, in total darkness (A. Lange, AMNH), 1 ♀; Harry's Bend Cave, July 10, 2004 (J. Krejca, A. Gluesenkamp, C. Richard, CAS), 1 ♂; Kaweah Power Station #3, Ash Mountain, 40 mi NE Visalia, July 6, 1983 (D.

Burdick, CAS, CDU), 2 ♂, May 9, 1993 (D. Burdick, CAS), 1 ♂, July 2, 1995 (D. Burdick, CAS), 1 ♂; Lindcove, July 13, 1976, dead on doorstep (D. Carroll, UCR), 1 ♀; McIntire Creek, near Camp Nelson, July 11, 1958 (W. Gertsch, V. Roth, AMNH), 1 ♂, 1 ♀; 5–10 mi

on Mineking Road from Three Rivers, July 4, 1956, elev. 2000–4000 ft (AMNH), 1 ♂, 4 ♀; Moorhouse Creek, near Camp Nelson, July 11, 1958 (W. Gertsch, V. Roth, AMNH), 1 ♂; 1 mi W Camp Nelson, July 11, 1958 (W. Gertsch, V. Roth, AMNH), 2 ♀; Roads End, Kern River, July 3, 1956 (W. Gertsch, AMNH), 1 ♂; Soda Creek, W Camp Nelson, July 11, 1958 (W. Gertsch, V. Roth, AMNH), 2 ♂, 2 ♀; Wilsonia, Kings Canyon National Park, Sept. 13, 1959 (W. Gertsch, V. Roth, AMNH), 2 ♂, 3 ♀; 9 mi N Woodlake, Mar. 22, 1941 (S., D. Mulaik, AMNH), 1 ♂. **Tuolumne Co.:** Tuolumne, May 2004, in house (M. Rauscher, CDU), 1 ♂.

DISTRIBUTION: Known only from the Sierras, generally to the south of *T. gertschi* (map 1).

Titiotus tulare, new species

Figures 52–56; map 2

TYPE: Male holotype from near Ash Mountain, Sequoia National Park, Tulare Co., California (July 9, 1958; W. Gertsch, V. Roth), deposited in AMNH.

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males and females have not been collected together, and it is possible that the females treated here as *T. tulare* are actually those of *T. icenoglei*, and vice versa. Males resemble those of *T. heberti* but differ in having the tibial apophysis with a distally wider middle prong (fig. 54); females differ from those of *T. heberti* in having a posteriorly narrowed epigynal septum (fig. 55).

MALE: Total length 16. Coloration as in *T. californicus*. Leg spination: femora: I p0-4-1, r1-2-1; II r1-2-1; III p1-1-2, r1-2-2; IV p1-2-1; tibiae: I v6-6-4, r1-2-0; II d1-0-1, v6-6-4, r1-2-0; III d1-0-0, p1-1-2, r0-1-1; IV r1-0-2; metatarsi: I, II p1-1-0, r1-1-0; III p1-2-2. Embolus twisted near base, distally narrow; median apophysis with subdistal and retro-lateral projections; middle prong of tibial apophysis bifid but not deeply incised, dorsal prong large, wide, flattened (figs. 52–54).

FEMALE: Total length 13. Coloration as in *T. californicus*. Leg spination: femora: I r1-2-1; II p1-1-2, r1-1-2; tibiae: I d1-0-0, v4-4-4, r1-1-0; II d1-0-1, v4-4-4, r1-1-0; III r0-1-1; metatarsi: II r1-1-0; III p1-2-2. Epigynal

septum wide but short, posterior portion restricted to narrow, triangular bulge; posterior ducts oblique, spermathecae narrow (figs. 55, 56).

OTHER MATERIAL EXAMINED: United States: **CALIFORNIA:** **Kern Co.:** Paradise Valley, Tehachapi Mountains, Aug. 18, 1959, in building, elev. 5000 ft (W. Icenogle, WRI), 1 ♀; Tehachapi Mountain County Park, Tehachapi Mountains, 35°04.680'N, 118°28.857'W, Sept. 9, 2004, crawling on road after rain, conifer-oak forest, elev. 5800 ft (W. Icenogle, WRI), 1 ♀. **Tulare Co.:** 3 mi W Giant Forest, Sequoia National Park, July 9, 1958 (W. Gertsch, V. Roth, AMNH), 1 ♂; Kaweah Power Station #3, Ash Mountain, 40 mi NE Visalia, Mar. 12, 1983 (CDU), 1 ♂, July 10, 1983 (D. Burdick, CAS), 1 ♂, Apr. 13, 1985 (CAS), 1 ♂, Apr. 25, 1996 (D. Burdick, CAS), 1 ♂; Kaweah River, 5 mi E Three Rivers, July 17, 1952, elev. 1258 ft (W. Gertsch, AMNH), 1 ♀; Lake Kaweah, Visalia, May 10, 1994 (D. Bixler, CDB), 1 ♂; Three Rivers, July 17, 1952, elev. 1268 ft (W. Gertsch, AMNH), 2 ♂.

DISTRIBUTION: Known only from Kern and Tulare Counties (map 2).

Titiotus roadsend, new species

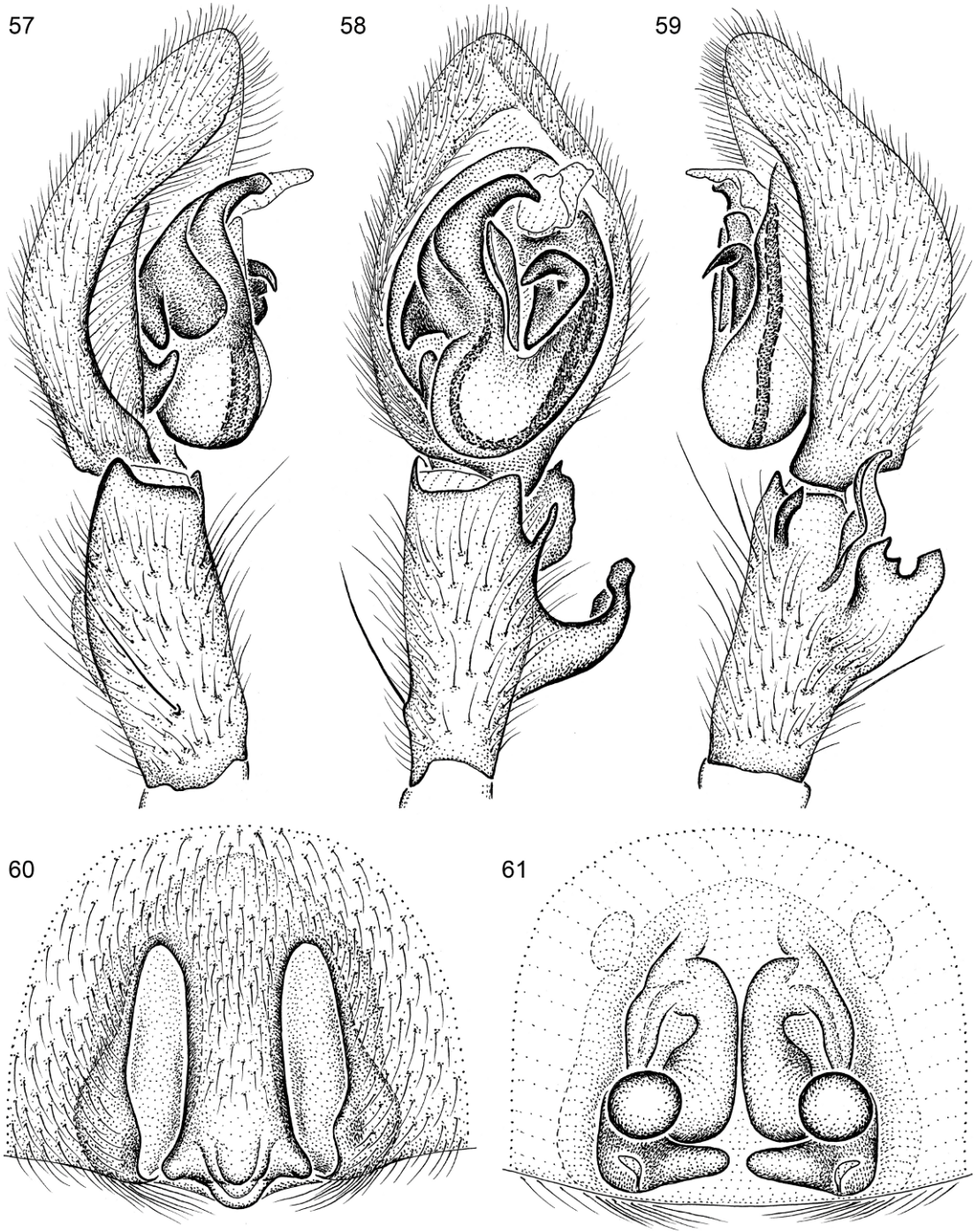
Figures 57–61; map 2

TYPES: Male holotype and female allotype from Roads End, Kern River, Tulare Co., California (July 3, 1956; W. Gertsch), deposited in AMNH.

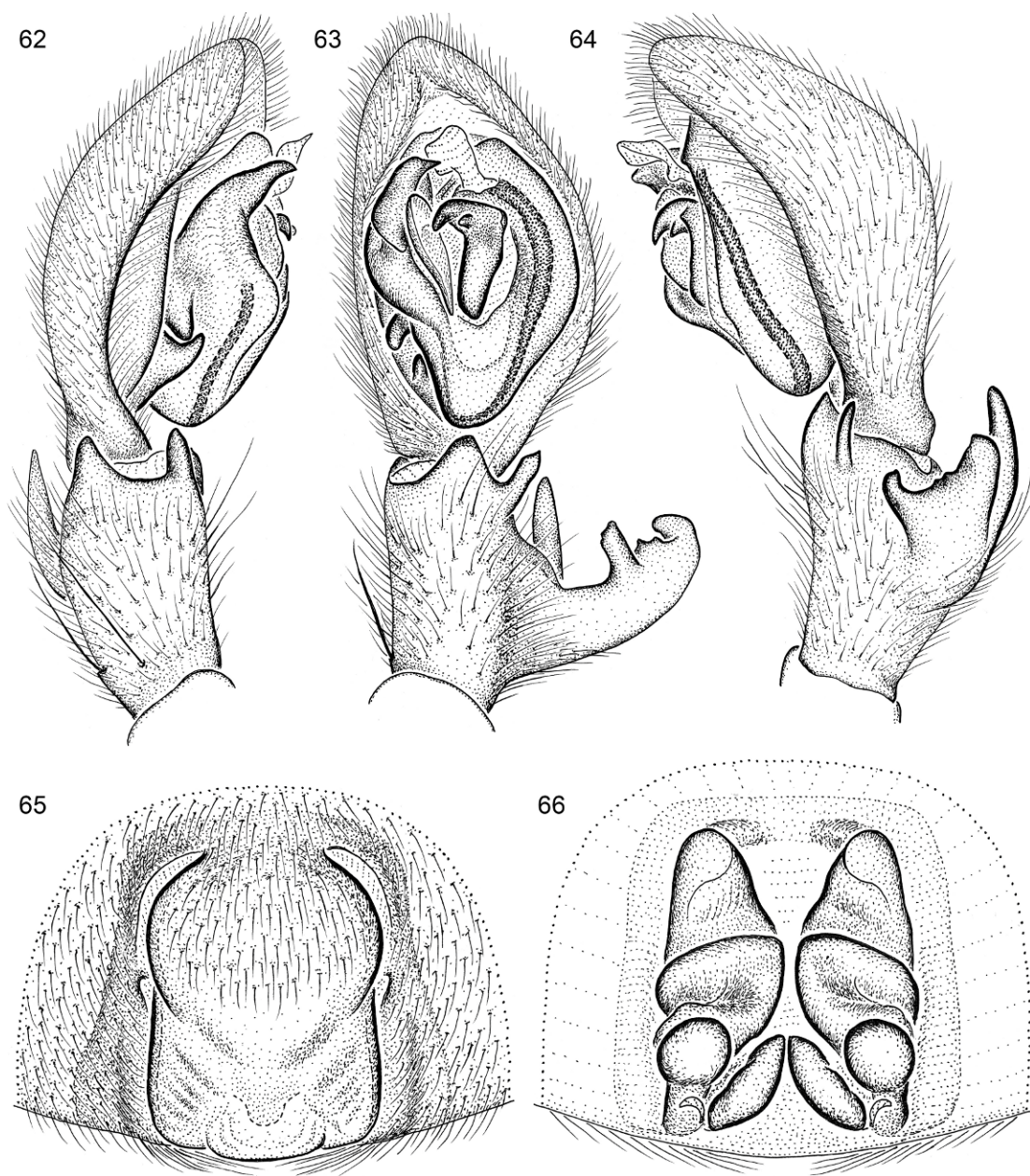
ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males of this distinctive species can easily be recognized by the short, sinuous dorsal prong of the tibial apophysis (fig. 59), females by the narrow, posteriorly expanded epigynal septum (fig. 60).

MALE: Total length 13. Coloration as in *T. californicus*. Leg spination: femora: I p0-4-1, r1-2-1; II r1-2-2; III r2-1-1; IV p1-2-2; tibiae: I d1-0-1, p1-2-0, v6-6-4, r1-1-1; II d1-0-1, p1-2-0, v6-6-4, r1-2-0; metatarsi: I, II p1-1-0, r1-1-0; III p1-2-2. Embolus twisted near base, distally narrow; median apophysis with submedian projection; middle prong of tibial apophysis bifid, incised, dorsal prong short, twisted, situated near cymbium (figs. 57–59).



Figs. 57–61 *Titiotus roadsend*, new species. 57. Left male palp, prolateral view. 58. Same, ventral view. 59. Same, retrolateral view. 60. Epigynum, ventral view. 61. Same, dorsal view.



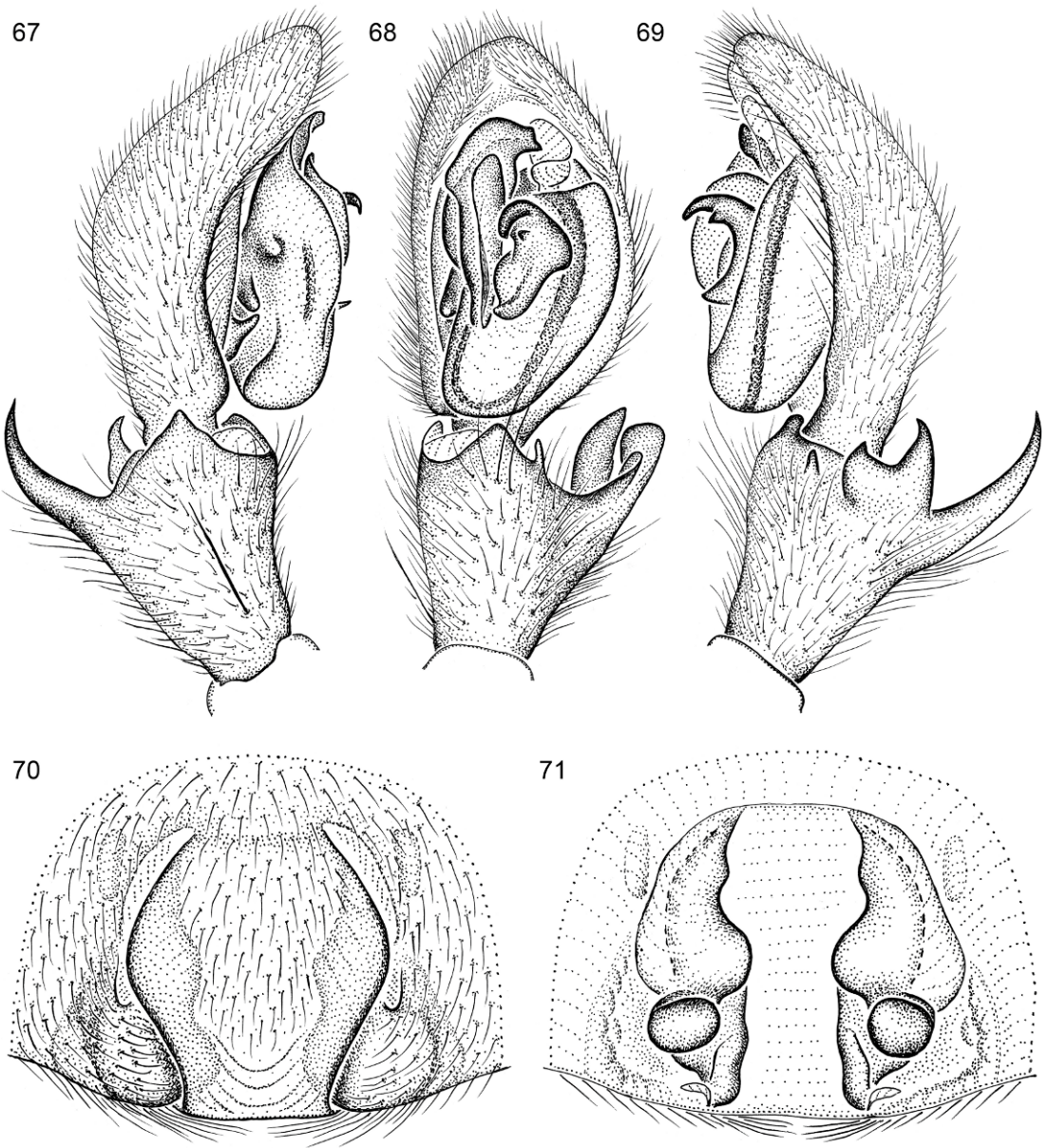
Figs. 62–66. *Titiotus fresno*, new species. 62. Left male palp, prolateral view. 63. Same, ventral view. 64. Same, retrolateral view. 65. Epigynum, ventral view. 66. Same, dorsal view.

FEMALE: Total length 18. Coloration as in *T. californicus*. Leg spination: femora: I p1-3-2, r1-2-1; II r1-2-1; III p2-1-2; tibiae: I, II p1-0-0, v6-6-4, r1-0-0; III r0-1-1; IV d1-0-0, r0-1-1; metatarsi: II p0-1-0; III p1-2-2, r1-2-2; IV r2-2-2. Epigynal septum narrow, anterior with

parallel sides, posteriorly expanded, wrinkled; posterior ducts almost transverse (figs. 60, 61).

OTHER MATERIAL EXAMINED: One male and one female taken with the types (AMNH).

DISTRIBUTION: Known only from the type locality in Kern County (map 2).



Figs. 67–71. *Titiotus icenoglei*, new species. 67. Left male palp, prolateral view. 68. Same, ventral view. 69. Same, retrolateral view. 70. Epigynum, ventral view. 71. Same, dorsal view.

***Titiotus fresno*, new species**

Figures 62–66; map 2

TYPES: Male holotype and female allotype taken at an elevation of 4633 ft at Cedar Grove, Kings River Canyon, Fresno Co., California (July 16, 1952; W. Gertsch), deposited in AMNH.

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males of this distinctive species can easily be recognized by the relatively small embolus (fig. 63) and the relatively wide middle prong of the tibial apophysis (fig. 64), females by the anteriorly rounded epigynal septum (fig. 65).

MALE: Total length 17. Coloration as in *T. californicus*. Leg spination: femora: I p0-4-1, r1-3-1; II p1-2-1, r1-1-3; III p2-2-1, r1-2-2; IV p1-2-1; tibiae: I d1-0-1, v6-6-8, r1-2-1; II p1-2-1, v6-6-6, r1-2-0; IV r1-1-1; metatarsi: I p2-0-0, r2-0-0; II p2-0-0, r1-2-0; III p1-2-2. Embolus twisted near base, distally very narrow; median apophysis with subdistal and retrolateral projections; middle prong of tibial apophysis wide, with two incisions, dorsal prong relatively short, blade-shaped (figs. 62–64).

FEMALE: Total length 21. Coloration as in *T. californicus*. Leg spination: femora: I p0-3-1, r1-2-1; II p1-2-1, r1-2-2; III r2-1-1; IV p1-2-1; tibiae: I, II p1-2-0, v6-6-6, r1-2-0; IV r1-0-2; metatarsi: I p1-0-0, r1-1-0; II p2-0-0, r1-1-0. Epigynal septum anteriorly with convex lateral margins, posteriorly with straight lateral margins; posterior ducts approximate through much of their length (figs. 65, 66).

OTHER MATERIAL EXAMINED: Two males taken with the types (AMNH).

DISTRIBUTION: Known only from the type locality in Fresno Co. (map 2).

***Titiotus icenoglei*, new species**

Figures 67–71; map 2

TYPE: Male holotype taken on the ground below a yellowish floodlight in a conifer-oak forest at an elevation of 5800 ft at Tehachapi Mountain County Park, Tehachapi Mountains, 35°04.068'N, 118°28.857'W, Kern Co., California (June 26, 2004; W. Icenogle), deposited in AMNH courtesy of Mr. Icenogle.

ETYMOLOGY: The specific name is a patronym in honor of the collector of the type (and many other) specimens.

DIAGNOSIS: As noted above, the females here placed as *T. icenoglei* and *T. tulare* may actually be mismatched. Males of this distinctive species can easily be recognized by the short, deeply incised middle prong of the tibial apophysis (fig. 69), females by the medially expanded epigynal septum (fig. 70).

MALE: Total length 10. Coloration as in *T. californicus*. Leg spination: femora: I r1-2-1; II p1-2-1, r1-2-1; IV p1-2-1; tibiae I, II d1-0-1, v4-4-4, r1-1-0; metatarsi: I p1-1-0, r0-1-0; II p1-1-0, r1-1-0; III p1-2-2. Embolus prolaterally expanded at base, distally blunt; median apophysis with subdistal and retrolateral

projections; middle prong of tibial apophysis very short, deeply incised, dorsal prong relatively short, blade-shaped (figs. 67–69).

FEMALE: Total length 13. Coloration as in *T. californicus*. Leg spination: femora: I p0-3-1, r1-2-1; II p1-3-1, r1-1-3; III p1-2-1, r1-1-2; IV p2-2-1; tibiae: I d0-0-1, v4-4-4, r1-2-0; II d1-0-1, v4-4-4, r1-1-0; III, IV r0-1-1; metatarsi: I p0-1-0, r0-1-0; II p1-1-0, r1-1-0; III p1-2-2. Epigynal septum much narrower anteriorly and posteriorly than at midlength; posterior ducts widely separated (figs. 70, 71).

OTHER MATERIAL EXAMINED: One female taken at Bakersfield, Kern Co. in mid-June 1999 (J. Sparks, UCR).

DISTRIBUTION: Known only from Kern Co. (map 2).

***Titiotus humboldt*, new species**

Figures 72–76; map 3

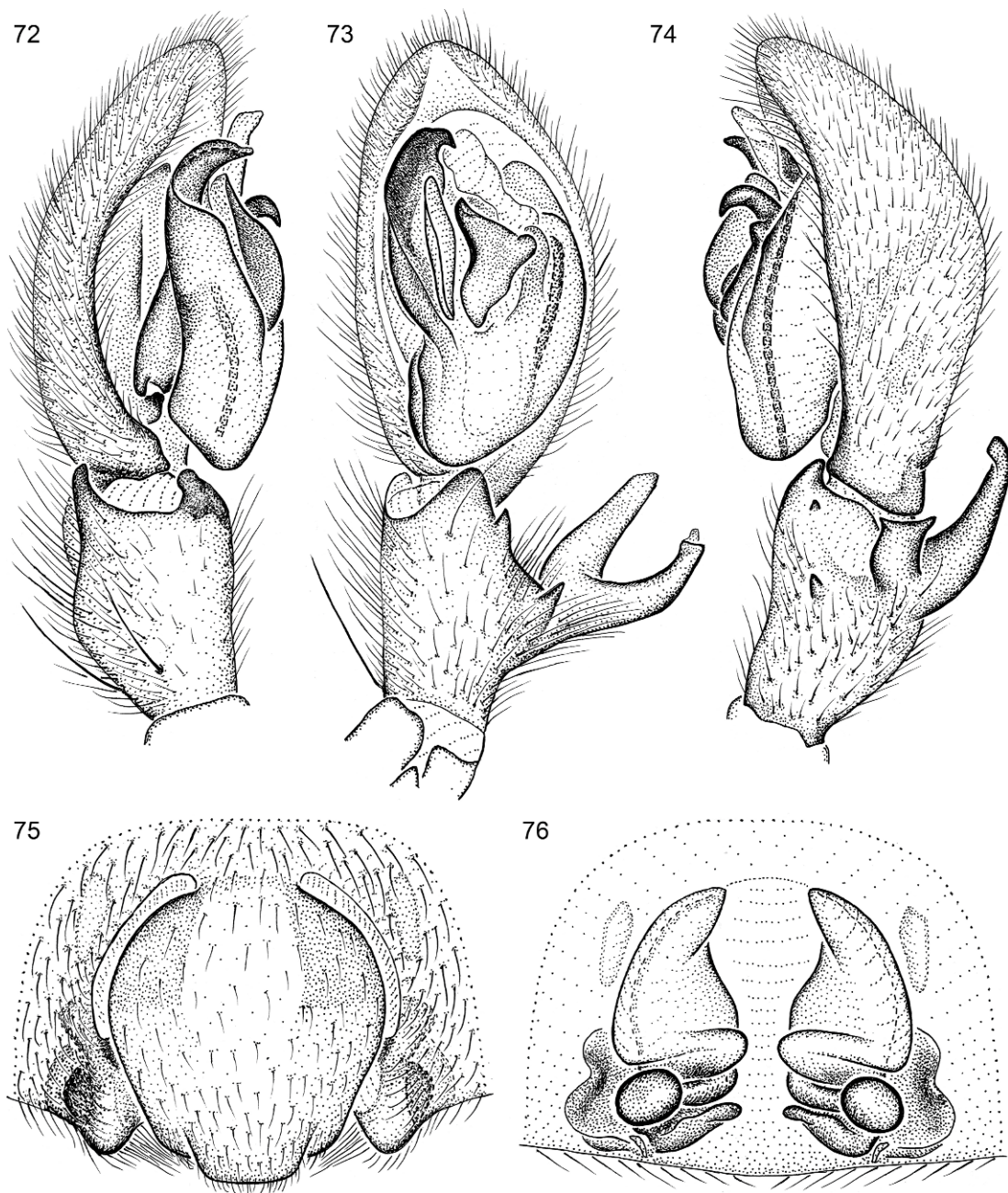
TYPES: Male holotype and female allotype taken 10 mi east of Bridgeville, Humboldt Co., California (Aug. 20, 1959; W. Gertsch), deposited in AMNH.

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: This species resembles *T. marin* and *T. costa* in having the ventral prong of the tibial apophysis relatively short and wide, and situated close to the base of the middle prong; males can be distinguished by having the third most ventral prong of the tibial apophysis relatively short, only slightly expanded distally, and not incised (fig. 74), females by the relatively wide epigynal septum and protuberant posterolateral epigynal margins (fig. 75).

MALE: Total length 11. Coloration as in *T. californicus*. Leg spination: femora: I p1-2-1; II r1-2-1; IV p1-2-1; tibiae: I d1-0-1, v4-4-4, r0-1-0; II d1-0-1, p1-0-0, v4-4-4, r1-1-0; III r0-1-1; metatarsi: I, II p1-1-0, r1-1-0; III p1-2-2. Embolus prolaterally expanded at base, distally narrow; median apophysis with only tiny subdistal projection; two most ventral prongs of tibial apophysis small, third relatively short, square (figs. 72–74).

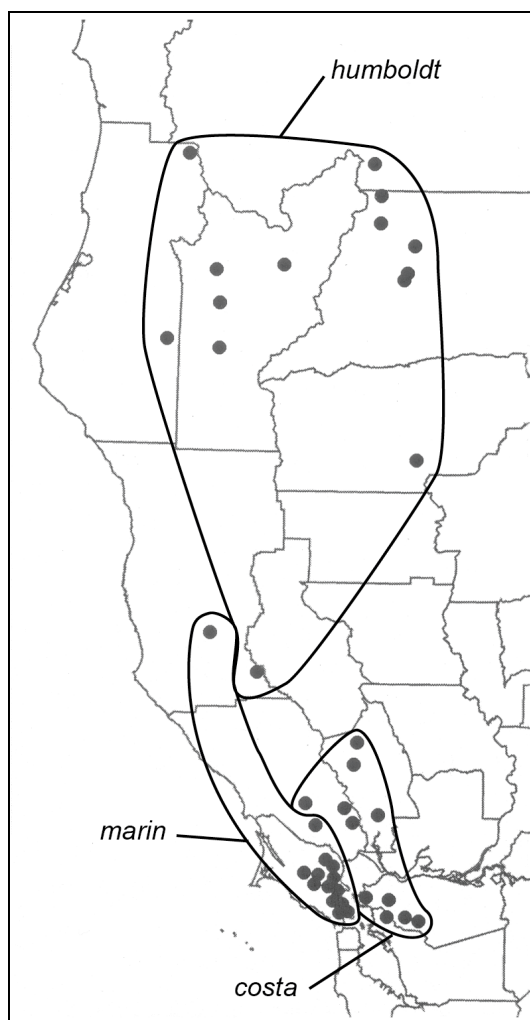
FEMALE: Total length 12. Coloration as in *T. californicus*. Leg spination: femora: I, II r1-2-1; III p2-1-2, r1-1-3; IV p2-1-1; tibiae: I v4-4-



Figs. 72–76. *Titiotus humboldti*, new species. 72. Left male palp, prolateral view. 73. Same, ventral view. 74. Same, retrolateral view. 75. Epigynum, ventral view. 76. Same, dorsal view.

4, r1-0-0; II v4-4-4, r1-1-0; III r0-1-1; metatarsi: I, II p1-1-0, r1-1-0; III p1-2-2. Epigynal septum wide, wider anteriorly than posteriorly, posterolateral epigynal margins protuberant; posterior ducts widely separated (figs. 75, 76).

OTHER MATERIAL EXAMINED: United States: CALIFORNIA: **Humboldt Co.**: Five Mile Creek at junction of Highway 96, 4.2 mi S Somes Bar, Oct. 2, 1979, on wall of 6 ft diameter conduit under highway, elev. 450 ft



Map 3. Northern California, showing distributions of three species of *Titiotus*.

(W. Icenogle, WRI), 1♀. **Mendocino Co.:** near Headquarters, Hopland Field Station, 4 mi E Hopland, Apr. 6, 1972, matured Apr. 28, 1972 (M. Bentzien, UCB), 1♂. **Shasta Co.:** Castle Crags State Park, 4 mi W Castella, July 26, 1953 (W., J. Gertsch, AMNH), 1♀; Hazel Creek, July 4, 1952 (W. Gertsch, AMNH), 2♂, 4♀; Potter Creek Cave, 40°47'00"N, 122°16'45"W, Nov. 24, 1950 (N. Bostick, AMNH), 1♂, Sept. 7, 1961 (W. Gertsch, AMNH), 1♀; Samwell Cave, 25 mi N Redding, no date (R. de Saussure, AMNH), 1♀, Apr. 28, 1959, at entrance (AMNH), 1♀, June 5, 1959 (R. de

Saussure, AMNH), 1♀, Apr. 9, 1979 (D. Rudolph, B. Martin, S. Winterath, AMNH), 1♂; Samwell Cave, 40°55'N, 122°14'2"W, June 7, 1995, elev. 1450 ft (D. Ubick, CDU), 1♀, Aug. 30, 1996, elev. 1450 ft (D. Ubick, CDU), 1♀; Shasta Lake Caverns, N side Shasta Lake, 16 mi NNE Redding, Apr. 10, 1979 (D. Rudolph, B. Martin, S. Winterath, AMNH), 1♀. **Siskiyou Co.:** Ney Springs, 5 mi W Mount Shasta, Sept. 2, 1959 (W. Gertsch, V. Roth, AMNH), 1♀. **Tehama Co.:** Woodson Bridge State Recreation Area, 7 mi E Corning, Aug. 29, 1996, oak camp, at night (D. Ubick, CDU), 1♀. **Trinity Co.:** Big Canyon, 2.6 mi E Camp Trinity, Aug. 12, 1990, under rock (D. Ubick, CDU), 1♀; Del Loma, N fork, Trinity River, July 25, 1953 (W., J. Gertsch, AMNH), 15♀; Forest Glen Cave, on open wall, dry, 75 ft inside cave (R. Graham, AMNH), 2♂; Weaverville to 10 mi E Weaverville, Apr. 6, 1960 (W. Gertsch, W. Ivie, R. Schrammel, AMNH), 2♂.

DISTRIBUTION: Northwestern California (map 3).

Titiotus marin, new species

Figures 77–81; map 3

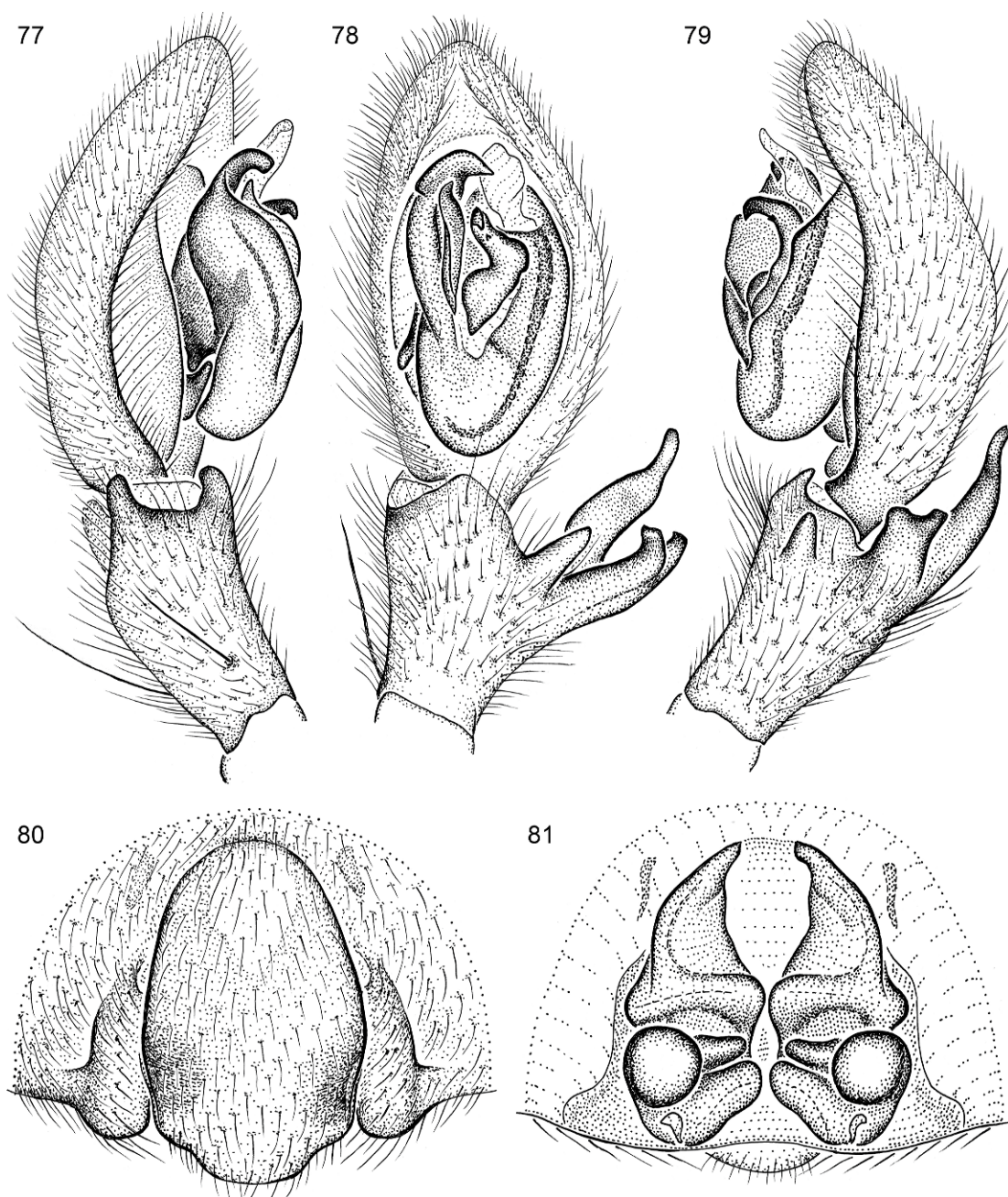
TYPE: Male holotype from Mill Valley, Marin Co., California (June 1951; D. Hardy), deposited in AMNH.

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males resemble those of *T. humboldt* and *T. costa* but can be distinguished by having the third most ventral prong of the tibial apophysis notched (fig. 79); females have a relatively narrow, ovoid epigynal septum (fig. 80).

MALE: Total length 11. Coloration as in *T. californicus*. Leg spination: femora: I p0-3-1, r1-2-1; II r0-2-1; III r1-1-2; IV r0-1-2; tibiae: I, II d1-0-1, v4-4-4, r1-1-0; III r0-1-1; metatarsi: I, II p1-1-0, r1-1-0; III p1-2-2; IV r1-2-1. Embolus prolaterally expanded near tip, distally narrow; median apophysis with only tiny subdistal projection; most ventral prong of tibial apophysis triangular, middle prong relatively short, distally incised, dorsal prong distally narrowed (figs. 77–79).

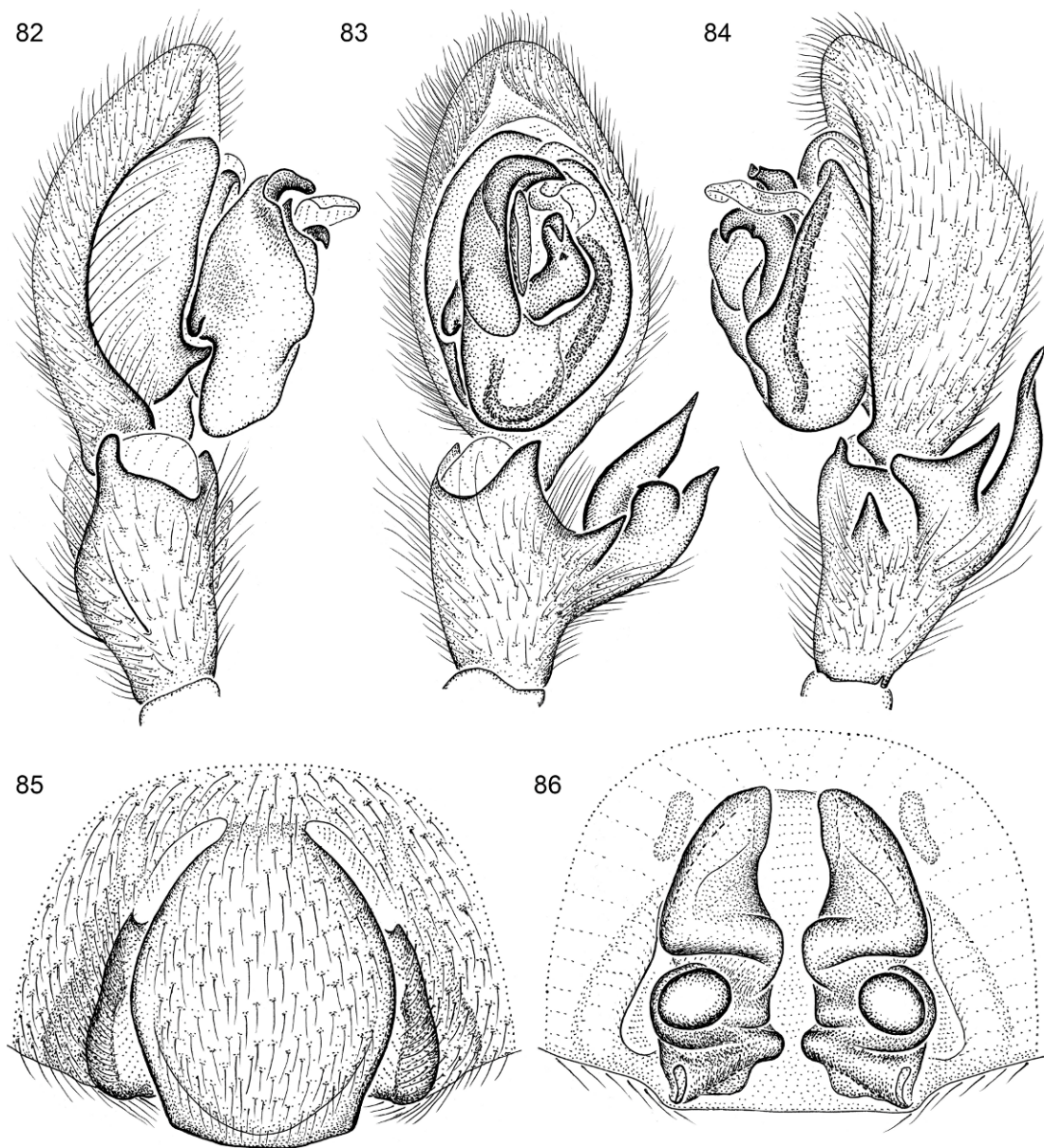
FEMALE: Total length 11. Coloration as in *T. californicus*. Leg spination: femora: I–III r1-1-2; IV p1-2-1, r0-1-2; tibiae: I p1-0-0, v4-4-



Figs. 77–81. *Titiotus marin*, new species. 77. Left male palp, prolateral view. 78. Same, ventral view. 79. Same, retrolateral view. 80. Epigynum, ventral view. 81. Same, dorsal view.

4, r1-0-0; II d1-0-0, p0-1-1, v4-4-4, r1-1-0; III r0-1-1; metatarsi III p1-2-2. Epigynal septum relatively narrow, ovoid, posterolateral epigynal margins protuberant; posterior ducts oblique (figs. 80, 81).

OTHER MATERIAL EXAMINED: United States: CALIFORNIA: **Marin Co.:** Burdell Mountain, SE slope, Novato, 38°07'48"N, 122°34'09"W, Mar. 16, 1990, serpentine grassland with adjacent mixed woodland (D.



Figs. 82–86. *Titiotus costa*, new species. **82.** Left male palp, prolateral view. **83.** Same, ventral view. **84.** Same, retrolateral view. **85.** Epigynum, ventral view. **86.** Same, dorsal view.

Ubick, T. Briggs, CDU), 1♂, Mar. 8, 1991, oak woodland, under serpentine (D. Ubick, CDU), 1♀; Fairfax, Nov. 15, 1974 (CAS), 1♂, 38°00.0'N, 122°36.0'W, May 6, 1999, in house in oak woodland (J. Schweikert, CAS), 1♂, Mt. View Road, Apr. 28, 2004 (D. Giampietro, CAS), 1♂; Marinero

Estates, Tiburon Peninsula, Apr. 9, 1994, serpentine grassland (D. Ubick, CDU), 2♂; Mill Valley, no date, running on floor in house (E. Ross, CAS), 1♀, June 1951 (D. Hardy, AMNH), 1♂, June 7, 1954 (H. Leeche, AMNH), 1♂, June 17, 1955, at light (H. Leeche, AMNH), 1♂, June 1956 (E. Ross,

AMNH), 1 ♂, Aug. 1956, in house (E. Ross, AMNH), 1 ♀; Apr. 1957, in empty bathtub at night (E. Ross, AMNH), 1 ♂, June 14, 1957, in house (H. Leech, AMNH), 1 ♂, June 1, 1958 (F. Leech, CAS), 1 ♂, Sept. 22, 1958 (H. Leech, CAS), 1 ♂, Oct. 1, 1958, in house (E. Ross, AMNH), 1 ♀, Aug. 1, 1963, in house at night (E. Ross, CAS), 1 ♀, May 1965, house basement (E. Ross, CAS), 2 ♂, 1 ♀, June 6, 1988, in basement of house (C. Hausner, CDU), 1 ♀, Sept. 5, 1991 (L. Alderson, CDU), 1 ♀, June 9, 1995 (V. Roth, CAS), 1 ♂, June 11, 1996, in house (E. Ross, CAS), 1 ♂, Aug. 4, 2002 (S. Hall, UCR), 1 ♀, May 30, 2003 (E. May, UCR), 1 ♀; Mount Tamalpais, Mar. 14, 1909 (E. VanDyke, CAS), 1 ♂; Novato, May 6, 1973 (B. Kessel, CAS), 1 ♂, Mar. 14, 1982, under serpentine (D. Ubick, CDU), 1 ♂, Apr. 25, 1982, under serpentine float (D. Ubick, CDU), 1 ♂, Jan. 1990, under serpentine (D. Ubick, CDU), 1 ♂; Ring Mountain, Tiburon Peninsula, Apr. 15, 1994, serpentine grassland (D. Ubick, J. Boutin, CDU), 1 ♂ (penultimate, but palp details visible through cuticle); San Anselmo, May 22, 1998, in house (CAS), 1 ♀, Aug. 29, 2000, in house (D. Burns, CAS), 1 ♀; San Geronimo, Jan. 15, 1994 (matured Mar. 24, 1994), serpentine grassland (D. Ubick, J. Boutin, CDU), 1 ♂; San Rafael, June 28, 1993, in house (N. Durighello, CDU), 1 ♀, mid-May 2000, in house (D. Halliday, UCR), 1 ♂; N San Rafael, Feb. 6, 1988 (♂ matured Mar. 21, 1988, ♀ Apr. 4, 1988), serpentine grassland (D. Ubick, CDU), 1 ♂, 1 ♀; San Rafael Ridge, San Anselmo, May 27, 1996 (L. Freihofer, CAS), 1 ♀; Sausalito (hilly part), May 23, 2000, in house (A. Weisskopf, CAS), 1 ♂; South Tiburon Ridge, 37°53'05"N, 122°27'06"W, Feb. 27, 1993, serpentine grassland (D. Ubick, J. Boutin, C. Kellner, CDU), 2 ♀, Apr. 18, 1993, serpentine grassland (D. Ubick, CDU), 2 ♂, 1 ♀; Terra Linda, San Rafael, 38°01.2'N, 122°34.5'W, all border of suburb and open space, grassy hills, oaks, laurels, shrubs, elev. 100 m (J. Schweikert, CAS): June 4, 2003, 1 ♂, June 22, 2003, 1 ♂, July 15, 2003, 1 ♂, July 31, 2003, 1 ♀, Aug. 23, 2003, 1 ♀, Apr. 13, 2004, 1 ♂, Apr. 25, 2004, 1 ♂, May 2, 2004, 1 ♂, July 18, 2004, 1 ♂, May 29, 2005, 1 ♂, May 13, 2006, 1 ♂; Tiburon, Dec. 21, 1988 (L. Cheng, T. Briggs, CAS), 1 ♀, mid-April 2002 (K. Passaretti, UCR), 2 ♂; Woodacre, Apr. 21,

1981, in house (P. Signet, UCB), 1 ♂. **Mendocino Co.:** Ukiah, June 5, 2000, in house (E. Nicolait, CAS), 1 ♂. **Sonoma Co.:** Petaluma, May 16, 2003, in bathroom (H. Stavropoulos, UCR), 1 ♂.

DISTRIBUTION: Coastal California, from the San Francisco Bay area north (map 3).

Tititotus costa, new species

Figures 82–86; map 3

TYPES: Male holotype and female allotype taken in pitfall traps at Canyon, Contra Costa Co., California (Aug. 25, 1981; D. Denning), deposited in AMNH.

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males resemble those of *T. humboldti* and *T. marin* but can be distinguished by the distally expanded middle prong of the tibial apophysis (fig. 84), females by the rounded epigynal septum, less protuberant posterolateral epigynal margins, and more massive posterior ducts (figs. 85, 86).

MALE: Total length 11. Coloration as in *T. flavescens*. Leg spination: femora: I, II r1-2-1; III p0-2-1, r1-1-1; IV r1-2-1; tibiae: I d1-0-1, p1-0-0, v4-4-4, r0-1-1; II d1-0-1, v4-4-4, r0-1-1; III r2-0-1; metatarsi: I, II p1-1-0, r1-1-0; III p1-2-2. Embolus prolaterally expanded near tip, distally arched; median apophysis with only tiny subdistal projection; most ventral prong of tibial apophysis triangular, middle prong greatly expanded distally incised, dorsal prong distally narrowed (figs. 82–84).

FEMALE: Total length 11. Coloration as in *T. flavescens*. Leg spination: femora: II p0-2-2, r1-2-1; III r1-1-2; IV p1-2-1; tibiae: I p0-0-0, v4-4-4; II p1-0-0, v4-4-4, r1-0-0; III r1-0-1; metatarsi III p1-2-2. Epigynal septum widest at about half its length, posterolateral epigynal margins only slightly protuberant; posterior ducts massive, triangular (figs. 85, 86).

OTHER MATERIAL EXAMINED: United States: **CALIFORNIA:** **Alameda Co.:** Berkeley Hills, May 19, 1976, in house (C. Prince, UCB), 1 ♂. **Contra Costa Co.:** Canyon, June 21, 1979, redwood grove (D. Denning, AMNH), 1 ♂, July 1–10, 1981 (D. Denning, AMNH), 1 ♂, Aug. 25, 1981, pitfalls (D. Denning, AMNH), 1 ♂; Moraga, Sept. 14, 1973 (D. Denning, AMNH), 1 ♀; Tilden

Regional Park, pitfalls (J. Fraser, CAS): June 20, 1980, 7♂, 2♀, July 4, 1980, 3♂, July 16, 1980, 10♂, 1♀, Aug. 1, 1980, 5♂, 3♀, Aug. 15, 1980, 2♂, 4♀, Aug. 29, 1980, 6♀, Sept. 12, 1980, 4♀, Sept. 26, 1980, 1♀; Univ. of California Richmond Field Station, Richmond, July 11, 1961, ground, on canvas (P. Craig, CDU), 1♀. **Napa Co.:** N side, Howell Mountain, 2 mi NNE Angwin, all elev. 1300 ft (H. Leech, CAS): June 9, 1975, 1♂, May 26, 1977, 1♂, June 19, 1977, 2♂, 1♀, Aug. 16, 1977, 1♀, July 1, 1978, 1♂, June 27, 1980, 1♀, Aug. 18, 1980, 1♀; Napa City, May 27, 2000, in linen closet of vacation home, riparian (K. Stockwell, UCR), 1♂; St. Helena, May 22, 2004, in wine cellar (J. Martel, UCR), 1♂, 1♀. **Sonoma Co.:** Boyes Springs, Sept. 19, 1993, in house (J. Dorard, S. Meehl, CDU), 1♀; Sonoma, Sept. 12, 2002, in garage (UCR), 1♀; Sonoma Mountain, just E Cotati, June 6, 1973 (F. DeOme, CAS), 1♂.

DISTRIBUTION: Eastern San Francisco Bay region, generally to the east of *T. marin* (map 3).

ACKNOWLEDGMENTS

We thank all the private collectors listed above, and the following curators of institutional collections, for their help in making specimens available for this revision: Charles Griswold (CAS), Brian Brown (LACM), Cheryl Barr and Steve Lew (UCB), and Rick Vetter and Tom Prentice (UCR). Mohammad

Shadab and Steve Thurston of the American Museum of Natural History helped greatly with the illustrations. Special thanks go to Ambros Hänggi for providing photographs of the Schenkel type specimen, to Wendell Icenogle for his dedicated collecting efforts, and to Daniel Palmer for donating large samples of southern Californian tengelloids.

REFERENCES

- Chamberlin, R.V., and W. Ivie. 1941. Spiders collected by L. W. Saylor and others, mostly in California. *Bulletin of the University of Utah* 31(8): 1–49.
- Lehtinen, P.T. 1967. Classification of the cribellate spiders and some allied families, with notes on the evolution of the suborder Araneomorpha. *Annales Zoologici Fennici* 4: 199–468.
- Mello-Leitão, C.F.de. 1915. Algumas generos e especies novas de araneidos do Brasil. *Broteria* 13: 129–142.
- Platnick, N.I. 1999. A revision of the Appalachian spider genus *Liocranoides* (Araneae: Tengellidae). *American Museum Novitates* 3285: 1–13.
- Schenkel, E. 1950. Spinnentiere aus dem westlichen Nordamerika, gesammelt von Dr. Hans Schenkel-Rudin. *Verhandlungen der Naturforschenden Gesellschaft in Basel* 61: 28–92.
- Simon, E. 1897. *Histoire naturelle des araignées*. 2. Paris: Roret, 192 pp.
- Ubick, D., and D.B. Richman. 2005. Tengellidae. In D. Ubick, P. Paquin, P.E. Cushing and V. Roth (editors), *Spiders of North America: an identification manual*: 230–231. Poughkeepsie, N.Y. American Arachnological Society.

Complete lists of all issues of the *Novitates* and the *Bulletin* are available at World Wide Web site <http://library.amnh.org/pubs>. Inquire about ordering printed copies via e-mail from scipubs@amnh.org or via standard mail from: American Museum of Natural History, Library—Scientific Publications, Central Park West at 79th St., New York, NY 10024. TEL: (212) 769-5545. FAX: (212) 769-5009.