

Occasional Papers of the Florida State Collection of Arthropods

Volume 11

2004

**REVISION OF THE JUMPING
SPIDERS OF THE GENUS
PHIDIPPUS
(ARANEAE: SALTICIDAE)**

by

G. B. Edwards



Florida Department of Agriculture and Consumer Services

Charles H. Bronson, Commissioner



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2004

**FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES
DIVISION OF PLANT INDUSTRY**

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Gainesville, Florida

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Inside Front: C1: *P. octopunctatus* ♀; C2: *P. putnami* ♂; C3,4: *P. richmani* ♂♀; C5,6: *P. carolinensis* ♂♀; C7: *P. comatus* ♂; C8: *P. pruinosis* ♂; C9,10: *P. asotus* ♂♀; C11,12: *P. arizonensis* ♂♂; C13: *P. cruentus* ♀; C14,15,16: *P. mystaceus* ♀♂♂; C17,18: *P. tigris* ♂♀; C19: *P. phoenix* ♂; C20: *P. carneus* ♂.

Inside Back: C21,22: *P. boei* ♂♀; C23: *P. tyrrelli* ♂; C24: *P. adumbratus* ♂; C25,26,27,28: *P. regius* ♂♀♀♀; C29: *P. otiosus* X *P. regius* hybrid ♂; C30,31: *P. otiosus* ♂♀; C32,33,34,35,36: *P. audax* ♀♂♀♂♀; C37,38: *P. princeps* ♂♀; C39,40: *P. pulcherrimus* ♂♀.

Back Cover: C41,42: *P. workmani* ♀♂; C43,44: *P. pius* ♀♂; C45,46: *P. clarus* ♀♂; C47,48: *P. cardinalis* ♀♂; C49,50,51: *P. whitmani* ♂♀♀; C52: *P. johnsoni* ♀; C53,54: *P. olympus* ♀♂; C55,56: *P. apacheanus* ♀♂; C57,58: *P. purpuratus* ♀♂; C59: *P. texanus* ♀; C60: *P. ardens* ♀.

Back Page: *P. cruentus* ♂, Fig. 350, scratchboard illustration by Eliza Karpook.

All photos by author unless otherwise credited: Wayne Maddison - Front Cover; Jeffrey Lotz - C1, C5, C24, C52; Eugene Miliczky - C7; David E. Hill - C59.

FOREWORD

Glavis Bernard (G. B.) Edwards, Jr., was born in Aberdeen, Maryland. As a young person and budding naturalist, he exhibited interests in prehistoric animals, reptiles, amphibians, and insects. As a teenager, he became interested in the behavior of spiders, especially that of jumping spiders, who usually prevailed when pitted against other spiders of similar size. *Phidippus audax* was often the heroine in these contests. He graduated from Northwestern High School in Hyattsville, Maryland, where he was well-known for his interest in “bugs.”

G. B. obtained a B.S. from the University of Maryland in Entomology. After realizing early in his college career that he was unlikely to become a professional basketball player, his interest in entomology, and more specifically, in arachnology, began to blossom. He was employed in the Entomology Department as a part-time curator of the arachnid collection developed by Martin H. Muma. This gave him his first opportunity to examine many kinds of identified spiders.

G. B. also developed an interest in the use of spiders for biological control. He discovered that a professor doing research on that topic, Dr. Willard H. Whitcomb, was at the University of Florida. He obtained a graduate assistantship at that institution, graduating with a M.S. and Ph.D. in Entomology while working on spiders in soybeans, and on life history, ecology, mimicry, predatory behavior, courtship behavior, and taxonomy of the jumping spider genus *Phidippus*. This Volume of the Occasional Papers is an outgrowth of that taxonomic research.

A continued interest in his these topics has expanded to include all jumping spiders, feeding a thriving interest in the biodiversity of this family. He has over 80 publications; most have been on spiders, but some on butterflies, centipedes, millipedes, and thrips. He has been employed by the FDACS/DPI for over 25 years, and has been the Curator of Arachnida and Myriapoda for most of that time.

John B. Heppner, Ph.D.
Series Editor

2003

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Division of Plant Industry, Florida Department of Agriculture and Consumer Services

DEDICATION

This revision is dedicated to my late wife, Cordia Sue Williams Edwards. Her premature death was a tragic loss to the many people whose lives were bettered by her caring and selflessness. Knowing that she would have wanted me to finish this work has helped me to persevere, despite subsequent setbacks, to its completion.

ACKNOWLEDGMENTS

It is difficult on a project of this scope to thank every person individually who contributed to its completion. My sincerest apologies and thanks to anyone whom I inadvertently omit.

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AMNH - American Museum of Natural History, New York, NY, USA; Norman I. Platnick, Louis Sorkin.

BMNH - British Natural History Museum, London, England; Fred Wanless, Paul Hillyard.

BMUW - Burke Museum, University of Washington, Seattle, Washington, USA; Rod Crawford.

CAS - California Academy of Science, San Francisco, California, USA; Charles E. Griswold, Walter Pulawski, Darrell Ubick.

CNC - Canadian National Collection, Ottawa, Canada; Charles E. Dondale, Jim H. Redner.

DMNH - Denver Museum of Natural History, Denver, Colorado, USA; Paula Cushing.

FMNH - Field Museum of Natural History, Chicago, Illinois, USA; Petra Sierwald, Larry Watrous.

FSCA - Florida State Collection of Arthropods, Gainesville, Florida, USA (includes most private collections of M. H. Muma and H. K. Wallace); G. B. Edwards.

MCZ - Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA; Herbert W. Levi, Laura Liebensperger.

MEM - Mississippi Entomological Museum, Starkville, Mississippi, USA; Richard Brown, Patricia R. Miller.

MPM - Milwaukee Public Museum, Milwaukee, Wisconsin, USA; Allen M. Young, Joan P. Jass.

MSU - Midwestern State University, Wichita Falls, Texas, USA; Norman Horner, James C. Cokendolpher.

OMNH - Sam Noble Oklahoma Museum of Natural History, University of Oklahoma, Norman, Oklahoma, USA; Victoria J. Byre.

OSU - Ohio State University, Columbus, Ohio, USA; Charles Triplehorn, Richard A. Bradley.

SMFD - Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt am Main, Germany; M. Grasshoff.

SWRS - Southwestern Research Station of the American Museum of Natural History, Portal, Arizona; Vincent D. Roth, Wade C. Sherbrooke.

TAMU - Texas A & M University, College Station, Texas, USA; Winfield L. Sterling, D. Allen Dean.

TMM - Texas Memorial Museum, University of Texas, Austin, Texas, USA; James R. Reddell.

UCB - University of California-Berkeley, Berkeley, California, USA; Evert I. Schlinger.

UCR - University of Costa Rica, San José, Costa Rica; Carlos Valerio, William G. Eberhard.

UNL - University of Nebraska, Lincoln, Nebraska, USA; Brett Ratcliffe.

USNM - United States National Museum of Natural History, Smithsonian Institute, Washington, D.C., USA; Jonathan Coddington, Scott Larcher.

VMNH - Virginia Museum of Natural History, Martinsville, Virginia, USA; Richard Hoffman.

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H. Don Cameron expertly checked the formation of the new species names and their derivations.

The Center for Systematic Entomology provided financial support for a trip to Arizona and New Mexico.

Valuable records from a survey of Eglin Air Force Base in northwest Florida were deposited in the FSCA as vouchers. Thanks are due Krista E. M. Galley, The Nature Conservancy, the Department of Defense, and the Eglin Natural Resources Division for providing these records.

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Helpful comments on the manuscript were made by Bruce Cutler, Wayne Maddison, David Richman, and Wayne Dixon (Chairman, Division of Plant Industry Publications Committee).

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ABSTRACT

The genus *Phidippus* now consists of 60 species which are naturally distributed in continental North America from Alaska to Costa Rica, the Bahamas, Bermuda, and the Greater Antilles. Two species have been introduced outside their natural ranges, *P. audax* into Nicobar, Hawaii, and southern California, and *P. regius* into Easter Island.

Of the 48 North American species most recently recognized, the following 36 names are considered to represent valid species: *P. adumbratus*, *P. apacheanus*, *P. ardens*, *P. arizonensis*, *P. asotus*, *P. audax*, *P. bidentatus*, *P. borealis*, *P. californicus*, *P. cardinalis*, *P. carneus*, *P. carolinensis*, *P. clarus*, *P. comatus*, *P. concinnus*, *P. cruentus*, *P. georgii*, *P. insignarius*, *P. johnsoni*, *P. mystaceus*, *P. nikites*, *P. octopunctatus*, *P. otiosus*, *P. pius*, *P. princeps*, *P. pruinus*, *P. pulcherrimus*, *P. purpuratus*, *P. putnami*, *P. regius*, *P. texanus*, *P. toro*, *P. tux*, *P. tyrrelli*, *P. whitmani*, *P. workmani*. In addition, one species is resurrected from synonymy: *P. albulatus* (from *P. tyrrelli*).

The following 23 New Species are described, all from the western United States and/or Mexico, except for the two species indicated from elsewhere: *P. adonis*, *P. amans*, *P. aureus*, *P. boei*, *P. cerberus*, *P. cryptus* (Canada - U.S. border), *P. dianthus*, *P. felinus*, *P. kastoni*, *P. lynceus*, *P. maddisoni*, *P. mimicus*, *P. morpheus*, *P. olympus*, *P. phoenix*, *P. pompatus*, *P. richmani* (Florida), *P. tigris*, *P. tyrannus*, *P. ursulus*, *P. venus*, *P. vexans*, *P. zethus*.

The following New Synonyms are created, Nomina Nova rejected, a Nomen Oblitum declared, and incorrectly synonymized unused senior synonyms (post-1899) proposed for suppression: *P. bardus* Peckham & Peckham 1901 and *P. ferrugineus* Scheffer 1904 (petition to suppress both) with *P. apacheanus* Chamberlin & Gertsch 1929; *P. obscurus* Peckham & Peckham 1888 with *P. arizonensis* (Peckham &

Peckham 1883); *P. togatus* C.L.Koch 1846, *P. electus* C.L.Koch 1846 (removed from synonymy with *P. purpuratus*), *P. mexicanus* Peckham & Peckham 1888, *Philaeus farneus* Peckham & Peckham 1888, *Phidippus howardii* Peckham & Peckham 1896, and *Megatimus severus* Thorell 1891 with *P. audax* (Hentz 1845); *P. foveolatus* F. O. P. C. 1901, *Dendryphantes (Phidippus) chilamae* Kraus 1955, and *Dendryphantes (Phidippus) lyratus* Kraus 1955 with *P. bidentatus* F. O. P. C. 1901; *P. coccineus* Peckham & Peckham 1909 and *Dendryphantes graciosus* Roewer 1951 (Nomen Novum) with *P. californicus* Peckham & Peckham 1901; *Attus rufus* Hentz 1846, *Attus m'cookii* Peckham & Peckham 1883, and *P. aureopilosus* F. O. P. C. 1901 with *P. cardinalis* (Hentz 1845); *P. montivagus* Peckham & Peckham 1901 (removed from synonymy with *P. tyrrelli*) and *P. reederi* Gertsch & Riechert 1976 with *P. carneus* Peckham & Peckham 1896; *P. testaceus* C.L.Koch 1846 (petition to suppress), *Attus flavus* Peckham & Peckham 1883 (Nomen Oblitum), and *P. homarinus* Cockerell 1924 (Nomen Novum) with *P. clarus* Keyserling 1885; *P. femoratus* Peckham & Peckham 1909 and *Dendryphantes consimilis* Roewer 1951 (Nomen Novum) with *P. comatus* Peckham & Peckham 1901; *P. pix* Pinter 1970 with *P. cruentus* F. O. P. C. 1901; *P. brunneus* F. O. P. C. 1901 (preoccupied) and *Dendryphantes deceptus* Petrunkevitch 1911 (Nomen Novum) with *P. georgii* Peckham & Peckham 1896; *P. auctus* C.L.Koch 1846 with *P. insignarius* C.L.Koch 1846; *P. carolinus* C.L.Koch 1846 and *P. dorsalis* Bryant 1942 with *P. otiosus* (Hentz 1846); *Dendryphantes (Phidippus) diabolus* Kraus 1955 and *P. volcanus* Gertsch & Riechert 1976 with *P. pius* Scheffer 1906; *Attus insolens* Hentz 1845 and *Phidippus castrensis* C.L.Koch 1846 (petition to suppress both) with *P. princeps* (Peckham & Peckham 1883); *P. purpurifer* C.L.Koch 1846 (removed from synonymy with *P. audax*) and *P. tullgreni* Wallace 1950 with *P. regius* C.L.Koch 1846; *P. pogonopus* Chamberlin 1925 and *P. kaibabensis* Gertsch 1934 with *P. tyrrelli* Peckham & Peckham 1901; *P. paludatus* C.L.Koch 1846 and *Phiale modesta* C.L.Koch 1846 (petition to suppress both) with *P. whitmani* Peckham & Peckham 1909; *P. xeros* Edwards 1978 with *P. workmani* Peckham & Peckham 1901.

Species whose types are lost or destroyed and descriptions insufficient for recognition are designated or confirmed as Nomina Dubia, including the following names of Walckenaer (1837): *Attus cinereus*, *A. dissimulator*, *A. excubitor*, *A. explorator*, *A. fraudulentus*, *A. infestus*, *A. insidiosus*, *A. investigator*, *A. latus*, *A. morsitans*, *A. multivagus*, *A. pileatus*, *A. pilosus*, *A. purpurarius*, *A. rimator*, *A. sagax*, *A. scrutator*, *A. signatus*, *A. tridentiger*; *A. nuttallii*, *A. podagrosus*, *A. rupicola* (all Hentz 1846); *Phidippus arrogans* C.L.Koch 1846; *Attus sinister* Hentz 1850; *Phidippus coloradensis* Thorell 1877; *Attus formosus* Peckham & Peckham 1883; and *Phidippus translatus* Peckham & Peckham 1901.

Lectotypes are designated for: *Attus arizonensis* Peckham & Peckham 1883, *Phidippus albomaculatus* Keyserling 1885, *P. borealis* Banks 1895, *P. comatus* Peckham & Peckham 1901, *P. obscurus* Peckham & Peckham 1888, *P. multiformis* Emerton 1891, *P. pruinosus* Peckham & Peckham 1909, *P. texanus* Banks 1906, *P. tuberculatus* F.O.P.C. 1901, and the following species described by C.L.Koch (1846): *P. alchymis* -ta, *P. dubiosus*, *P. mundulus*, *P. personatus*, *P. purpurifer*, *P. smaragdifer*, and *P. testaceus*. Two Nomina Nuda are declared.

The females of *P. adumbratus*, *P. asotus*, and *P. tux*, and the male of *P. pulcherrimus*, are described for the first time.

The genus *Paraphidippus* is removed from synonymy with the genus *Eris*. Nine species are returned to *Paraphidippus* [*P. aurantius* (Lucas 1833), *P. disjunctus* (Banks 1898), *P. fartilis* (Peckham & Peckham 1888), *P. funebris* (Banks 1898), *P. inermis* F.O.P.C. 1901, *P. lanipes* F.O.P.C. 1901, *P. luteus* (Peckham & Peckham 1896), *P. mexicanus* (Peckham & Peckham 1888), *P. nigropilosus* (Banks 1898)]. The following New Combinations are created from species incorrectly described in *Phidippus*: *Paraphidippus basalis* (Banks 1904), *Paraphidippus fulgidus* (C.L. Koch 1846), *Paraphidippus fuscipes* (C.L. Koch 1846), *Paraphidippus incontestus* (Banks 1909), and *Gastromicans tessellatus* (C.L.Koch 1846). *Eris rufa* (C.L.Koch 1846) [described as *Plexippus rufus*], New Combination, is a senior synonym of *Paraphidippus pineus* Kaston 1945, New Synonymy.

INTRODUCTION

Jumping spiders are the most well-represented of the families of spiders found in United States field crops, and with 14 species so far reported, the genus *Phidippus* is represented by more species than any other genus (Young and Edwards 1990). *Phidippus audax* (Hentz) has been identified as a predator of numerous major crop pests, including boll weevil, spotted cucumber beetle, and other beetles; bollworm, pink bollworm, cotton leaf worm, fall webworm, and other moths; cotton fleahopper, lygus bugs, stink bugs, three-cornered alfalfa hopper, leafhoppers, and other bugs; and sorghum midge, mosquitoes, and other flies (Bailey and Chada 1968, Clark and Glick 1961, Kagan 1943, Whitcomb et al. 1963, Young 1989b). *Phidippus audax* is considered so important as a predator of cotton pests that it is only one of two spider species whose populations are counted individually, and jumping spiders as a group are one of ten predator groups analyzed, for use in cotton IPM forecasting by the TEXCIM cotton model (Breene et al. 1993, Sterling et al. 1992). This speciose and important group of predators is in need of a modern systematic update. This revision is an addition to several recent papers which form the basis of an effort to document the salticid fauna of North America.

Phidippus, a genus in the subfamily Dendryphantinae, has not been revised since the Peckhams' pioneering work (1901, 1909). Their 1909 paper, "Revision of the Attidae of North America," still stands as the definitive work on many Nearctic salticids, although numerous species subsequently have been added to the faunal list. Some genera have been revised or the Nearctic species reworked, such as *Neon* (Gertsch and Ivie 1955), *Sitticus* (Proszynski 1968, 1971b, 1973, 1980), *Poultonella* (Cokendolpher and Horner 1978), *Habrocestum* (Richman 1981b), *Cheliferooides* (Platnick 1984), *Habronattus* (Griswold 1987), *Synageles* (Cutler 1987), *Hentzia* (Richman 1989), *Admestina* (Piel 1991), *Attidops* (Edwards 1999a), and *Anasaitis* (Edwards 1999b). The subfamily Marpissinae (Barnes 1955, 1958), and *Pelegrina* and other Nearctic species formerly placed in *Metaphidippus* (Maddison 1996), have also been revised. Little further work has been done on *Phidippus* other than new species descriptions, except for Bryant (1942), who redescribed several species. Unfortunately, her paper contained several errors, and the single new species she described is placed into synonymy herein.

Richman and Cutler (1978, 1988) have provided the most recent checklists of *Phidippus* species.

METHODS

Measurements (in mm) were made directly using a calibrated ocular grid in a Wild M5 binocular microscope. Illustrations were made by copying the image observed through the ocular grid onto #3 coquille board which had been prepared beforehand with lightly penciled grids. Scale lines are 2.0 mm for habitus figures and 0.5 mm (males) or 0.25 mm (females) for genitalic figures.

The following measurements were taken and ratios calculated (abbreviations in parentheses): distance from anterior lateral eyes to posterior median eyes (ALE-PME), distance from posterior median eyes to posterior lateral eyes (PME-PLE), ratio of distance of anterior lateral eyes to posterior median and posterior lateral eyes (ALE-PME/ALE-PLE), width of anterior eye row (AER), width of posterior eye row (PER), carapace width (CW), ratio of anterior eye row width to carapace width (ALE/CW), ratio of posterior eye row width to carapace width (PLE/CW), carapace length (CL), ratio of carapace width to carapace length (CW/CL), length of ocular quadrangle (LOQ), ratio of length of ocular quadrangle to carapace length (LOQ/CL), carapace height (CH) and total body length (BL). All measurements are given for new primary types and new alloparatypes. Figs. 1 and 2 illustrate the body parts used in the descriptions.

At least 10 specimens (field-captured adults, not reared specimens) of each sex (if available) were measured; for these, BL, CL, and CW ranges are given as low (mean) high. Leg segment lengths were measured for the *P. audax* neotype to give an idea of leg size relative to body size; other species were not measured as their proportions are similar to *P. audax*. In total, about 10,300 specimens were examined from approximately 8,100 vials.

Normally, measurements of carapace and body length in salticids are made from the front edge of the dorsal carapace integument. However, due to the highly hirsute nature of the species in this genus, which obscured the carapace front edge, I found it necessary to make such measurements from the front edge of the anterior median eyes (AME). Although not a large difference, this will slightly skew the ratios of measurements for this genus when compared to other genera. For consistency, the AME were also included when measuring the length of the ocular quadrangle (OQ; the dorsal region bounded by the anterior lateral and posterior lateral eyes). Male abdominal descriptions are

abbreviated; they are similar to the female abdomen for each species or the pattern is obscured.

Distribution records for described common species (>80 records) are given as **COUNTRY:** *State:* and County (U.S.) or *Locale* (other countries). Complete collection records are given for poorly known (<40 records) and new species. Label data followed by a colon include more than one record (immediately afterward). Records for which the county could not be found but are the only record for a state are enclosed in parentheses. Some obscure localities were found by searching the U.S. Geological Survey online mapping (<http://mapping.usgs.gov/www/gnis/gnisform.html>) information site. A complete database of records will be available online in the near future. Suspected intercepted specimens from accidental introductions outside the natural range of a species are so indicated. Specimens which were collected as immatures and reared are indicated by a small "r" following the date.

Descriptions and keys were produced with the aid of an early version of DELTA, a taxonomic description program (Dallwitz 1974, 1980; Dallwitz and Paine 1986). Phylogenetic analysis was done with Hennig86 Version 1.5 (Ferris 1988) and Clados Version 1.2 (Nixon 1992).

The primary criterion on which species were determined was consistent, diagnosable differences in genitalia. Geographic range and consistencies in color pattern were also considered. The latter two were of particular importance when matching sexes of new species, in addition to species group consistencies between genitalia of both sexes.

The International Code of Zoological Nomenclature has provisions for designating new type localities (I have done so) where the original type locality was erroneous or obscure. I follow Platnick (1989) in considering Bonnet's corrections of patronyms ending in *-ii* as valid emendations; under the Fourth edition of the Code, they would be incorrect original spellings accepted by general usage. Complete listings of synonyms of dubious assignment are omitted; these can be found in Bonnet (1958). The abbreviation F.O.P.C. is used throughout for F. O. Pickard-Cambridge.

BIOLOGY

The biology of the sixteen species of *Phidippus* found primarily in the eastern U.S. was recorded and summarized by Edwards (1980b). Biological data for a few of the western species is available (e.g., Gertsch and Riechert 1976). By far the most intensively studied species is *P. johnsoni*. Jackson (1976 a,b, 1977a,b,

1978a-c, 1979, 1980a-e, 1981a, 1986a) thoroughly analyzed the various courtship strategies and related interactions of *P. johnsoni*. He also provided data on the ecology of this species (Jackson 1979, Jackson and Griswold 1979).

Species of *Phidippus* seem to occur in all successional stages, and those that share a successional stage subdivide it by having different phenologies and/or different microhabitat requirements. Three life cycle maturation strategies occur: (1) spring - early summer, (2) mid-summer, (3) late summer - autumn. These are best defined by presence of males. In the more northerly climes with a shorter growing season, the mid-summer season is poorly represented, as the spring and autumn seasons are squeezed closer together.

The spring season is represented by those species that mostly overwinter as subadults, mature and mate in the spring, and produce eggsacs in the summer. The earliest maturing species in the southeastern U.S. is *P. pulcherrimus*, which matures in March (Edwards 1980b). Other common and familiar species which mature in the spring are *P. audax*, *P. princeps*, *P. purpuratus*, and *P. whitmani* (e.g., see Kaston 1948).

Mid-summer maturing species lay eggsacs in the fall and overwinter in the early instars. Typical summer species are *P. pius*, *P. putnami*, *P. richmani*, *P. workmani*, and *P. clarus* (which is a late summer species in Florida).

Autumn species typically mature September to October and overwinter as adult females. They make their eggsacs in late fall or winter (depending on climate) to early spring. Some species using this strategy are *P. apacheanus*, *P. cardinalis*, *P. mystaceus*, *P. otiosus*, and *P. regius*.

Typically a well-defined habitat will have two or three dominant species, but may also have lesser numbers of other species from similar habitats. For example, in Florida, xeric fields are dominated by *P. apacheanus* (autumn; shrubs), *P. cardinalis* (autumn; grasses), and *P. workmani* (summer; shrubs). Mesic fields are dominated by *P. clarus* (summer, grasses and perennials) and *P. regius* (autumn; shrubs, palms). Some overlap occurs where *P. regius* might occur on a palmetto in a xeric field, or *P. cardinalis* might occur in grasses in a mesic field. In ecotonal areas, as many as seven species have been found in one location in Florida (Edwards 1980b).

Typical grassland or prairie species include *P. ardens*, *P. audax*, *P. octopunctatus*, *P. pius*, and *P. texanus*. In peninsular Florida, *P. audax* is restricted to grass borders of lakes and streams (Edwards 1980b).

A few species are associated prominently with a

particular plant, e.g., *P. aureus* on creosote or *P. vexans* on sotol. Other species frequent a type of plant, e.g., *P. bidentatus* and *P. carneus* on *Agave* or *Opuntia* spp., but are not primarily found there. Spiny plants appear to afford protection from potential predators.

Open woodland typically functions as an ecotonal area, with field species in the more open areas and along the woods edge. Species which occur in the understory will occur on shrubs in overgrown old fields as well. Typical of this microhabitat are *P. pulcherrimus*, *P. princeps*, and *P. richmani*.

Canopy species also seem to prefer open woodland, perhaps because of the greater available light. Species usually found on hardwood trees in the eastern U.S. include *P. mystaceus*, *P. otiosus*, and *P. putnami*. In scrub habitats, it may be difficult to distinguish between understory and canopy.

I only know of one species which is consistently found in mature hardwood forest. This is *P. whitmani*, which is found on leaf litter. Other ground-dwelling species are known, but from more xeric habits, e.g., *P. boei*, or talus slopes, e.g., *P. purpuratus* and *P. tyrrelli*.

Some species in the *putnami* and *mystaceus* groups are frequently or only found on coniferous trees. For example, *P. pruinosus* has only been found on *Juniperus* in central Texas. Another frequent conifer-dweller is *P. carolinensis*. Other species in the same two groups are found in oak woodland at higher altitudes, like *P. cruentus* and *P. toro*. Species occurring on either type of tree include *P. asotus*, *P. comatus*, and *P. tigris*. Other high altitude species are *P. concinnus*, *P. olympus*, and *P. tyrrelli*.

Many species for which oviposition sites are known tend to place their eggsacs under bark. Species from more xeric habitats usually make their eggsacs under rocks. A few, like *P. pulcherrimus* and *P. whitmani*, use rolled leaves. Others, e.g., *P. clarus* and *P. octopunctatus*, make conspicuous large white eggsacs in the tops of tall herbs or grasses. Although the female remains with the eggs and presumably defends them from predators, the species with exposed eggsacs tend to be heavily attacked by specialized dipteran, hymenopteran, and mantispid egg predators and parasitoids (Edwards 1980b and references therein). A significant function of females seems to be to protect the eggs from drying out by repeatedly adding silk over the egg mass. Removing females from eggsacs will result in death of the eggs from dessiccation (Edwards 1980b).

Number of eggs in the first eggsac ranges from a few as 31 for *P. workmani* (Edwards 1980b) [16 in a

second eggsac of *P. pius* (Cutler 1979)] to as many as 439 for *P. regius* (Anderson 1978). In the wild, it seems unlikely that females usually have more than two eggsacs, although in captivity they will have up to six (Taylor and Peck 1975). This is true at least for females of species like *P. clarus*, which seem to stay with the eggsac until the young disperse and may not feed for a month, apparently resulting in death by starvation for the female. In other species (e.g., *P. richmani*), females may leave after the young molt to the first free-living instar but before they disperse, thus giving the female a chance to hunt, recover needed internal resources, and produce more eggsacs (Edwards 1980b).

Males of several species have been observed to cohabit with subadult and occasionally with adult females (Edwards 1980b; Jackson 1978a, 1986b). One interesting discovery was of two male *P. regius* cohabiting with a noticeably gravid female. This leads to the speculation that in addition to the previously reported cohabitation patterns, another strategy might be to mate with a female shortly after she has deposited eggs, when she is weakened.

Many species, especially in xeric habitats, appear to mimic mutillid wasps, at least as adults. Every species with a red abdomen and red or black carapace dorsally is a good candidate for this mimicry. At least one species, *P. apacheanus*, has males which move about with a jerky walk, apparently imitating both the color and movement patterns of its apparent model in Florida, *Dasymutilla occidentalis* (L.) (Edwards 1984). Some species which are red dorsally on both the carapace and abdomen have more or less the same color pattern from an early instar, such as *P. apacheanus* and southern forms of *P. whitmani*. Other species, like *P. cardinalis* and *P. nikites*, have cryptic coloration until they are subadults. A third variation regardless of carapace color is for adult males only to be mutillid mimics, while females and earlier instars are cryptic in color, e.g., *P. felinus*, *P. princeps*, and northern *P. whitmani*. White or yellow submarginal bands may enhance the hymenopterous appearance of the spider to a visually-oriented predator by creating the illusion of a thorax from the apparently narrower carapace.

It would be interesting to check the correlation of numbers of apparent mimics in the genus *Phidippus* to the habitats and latitude distribution of their apparent models. My impression is that there are more species of mimics in more southern regions and xeric habitats, which would appear to correspond to mutillid distribution (James P. Pitts, personal communication 2000).

GENUS *PHIDIPPUS* C.L.Koch 1846

PHIDIPPUS C.L.Koch 1846:125

Attus Walckenaer 1805:23; 1837:402 (in part)
Dendryphantes C.L.Koch 1837:31 (in part)
Phiale C.L.Koch 1846:195 (in part)
Phidippia Simon 1864:325
Cyrtonota Simon 1864:326 (in part)
Megatimus Thorell 1891:129

The type species of *Phidippus* is *Salticus variegatus* Lucas 1833 = *Attus audax* Hentz 1845. A petition was submitted (Levi and Pinter 1970) to the International Commission of Zoological Nomenclature to suppress *S. variegatus* in favor of the much more widely used and recognized *A. audax*. The types of both species are either lost or destroyed. Recently, I described neotypes for both species so that the original petition may be acted upon (Edwards 1994). I continue to favor the name *Phidippus audax* (Hentz), and it is so used in this revision.

In addition, four common species (*P. apacheanus* Chamberlin & Gertsch, *P. clarus* Keyserling, *P. princeps* (Peckham & Peckham), and *P. whitmani* Peckham & Peckham), have been found to have senior synonyms. The senior names were erroneously placed under the synonymy of different species by Banks (1901, 1910, 1913) and the Peckhams (1909), or in one case, totally overlooked by subsequent authors, effectively removing them from use. This is unfortunate, especially for the three species described by C.L.Koch (1846), because they are well illustrated in color and should have been recognized. However, these four common species have more recent names which have been used in the literature 25 or more times each by 10 or more authors, and to resurrect forgotten older names for them would not be consistent with promoting stability. Therefore, I am declaring one *Nomen Oblitum* and will petition the Commission to suppress the other names under Article 23.9 of the Fourth Edition of the International Code of Zoological Nomenclature.

The following species included in *Phidippus* by Chamberlin and Ivie (1944), based on the descriptions by Walckenaer (1837) of Abbot's (1792) unpublished illustrations, are considered to be *Nomen Dubia*. Many of these species are probably based on juveniles; their descriptions give little or no clue as to their specific identity, and the types are lost, represented by illustrations which contribute little to their identification. Also included here are species left in the genus *Attus* by Chamberlin & Ivie (1944), but which appear as well to be juvenile *Phidippus*; the latter are marked

with an asterisk. Most of those not marked have already been considered *Nomen Dubia* (Richman & Cutler 1978, Platnick 1993, 1997).

Attus cinereus Walckenaer 1837:440
A. dissimulator Walckenaer 1837:453
A. excubitor Walckenaer 1837:436
A. explorater Walckenaer 1837:450*
A. fraudulentus Walckenaer 1837:442
A. infestus Walckenaer 1837:468
A. insidiosus Walckenaer 1837:440
A. investigator Walckenaer 1837:445
A. latus Walckenaer 1837:438
A. multivagus Walckenaer 1837:438*
A. pileatus Walckenaer 1837:450
A. pilosus Walckenaer 1837:447
A. purpurarius Walckenaer 1837:446
A. rimator Walckenaer 1837:446
A. sagax Walckenaer 1837:449
A. scrutator Walckenaer 1837:446*
A. signatus Walckenaer 1837:434
A. tridentiger Walckenaer 1837:449

The descriptions and/or types of the following species are also unrecognizable and *Nomen Dubia* (a few other species considered *Nomen Dubia* are listed with their suspected synonyms):

Attus rupicola Hentz 1846:357, type destroyed
Attus sinister Hentz 1850:288, type destroyed
Phidippus arrogans C.L. Koch 1846:157 (type is a pinned juvenile ♀ from Brasil, somewhat similar to a *Paraphidippus* species)
Phidippus translatus Peckham & Peckham 1901:298, type lost (this species was described from Brasil and is unlikely to be properly placed to genus).

SPECIES MISPLACED IN *PHIDIPPUS*

I have examined the types of all species noted as NEW COMBINATION or NEW SYNONYMY. Proszynski (1990) correctly notes that all species from India described in *Phidippus* are misplaced to genus.

NEW WORLD:

P. basalis Banks 1904 = *Paraphidippus basalis* (Banks),
 NEW COMBINATION
P. [Attus] chrysis (Walckenaer 1837): Banks 1909 =
Paraphidippus aurantius (Lucas 1833): Lutz 1915

- P. disjunctus* Banks 1898 = *Paraphidippus disjunctus* (Banks): F.O.P.C. 1901
- P. [Philaeus] fertilis* (Peckham & Peckham 1888): Banks 1910 = *Paraphidippus fertilis* (Peckham & Peckham): F.O.P.C. 1901
- P. fraternus* Banks 1898 = *Paraphidippus aurantius* (Lucas 1833): Simon 1901, Petrunkevitch 1911
- P. fulgidus* C.L.Koch 1846 = *Paraphidippus fulgidus* (C.L.Koch), NEW COMBINATION
- P. funebris* Banks 1898 = *Paraphidippus funebris* (Banks): F.O.P.C. 1901
- P. fuscipes* C.L.Koch 1846 = *Paraphidippus fuscipes* (C.L.Koch), NEW COMBINATION
- P. incontestata* Banks 1909 = *Paraphidippus incontestatus* (Banks), NEW COMBINATION
- P. [Philaeus] luteus* (Peckham & Peckham 1896): Banks 1909 = *Paraphidippus luteus* (Peckham & Peckham): F.O.P.C. 1901
- P. [Paraphidippus] marmoratus* (F.O.P.C. 1901): Banks 1909 = *Paraphidippus fertilis* (Peckham & Peckham 1888): Peckham & Peckham 1909
- P. [Attus] multicolor* (Hentz 1845): Banks 1907 = *Paraphidippus aurantius* (Lucas 1833): F.O.P.C. 1901, Bonnet 1956
- P. nitens* C.L.Koch 1846 = *Paraphidippus nitens* (C.L. Koch), NEW COMBINATION
- P. nigropilosus* Banks 1898 = *Paraphidippus nigropilosus* (Banks): F.O.P.C. 1901
- P. [Plexippus] orichalceus* (C.L.Koch 1846) = *Paraphidippus aurantius* (Lucas 1833): Peckham & Peckham 1896, Simon 1901, Petrunkevitch 1911
- P. [Dendryphantes (Phidippus)] tenuis* (Kraus 1955): Proszynski 1990; I cannot at present place this species to genus but it is not a *Phidippus*; it should temporarily be retained in *Dendryphantes*
- P. [Attus] militaris* (Hentz 1845): Peckham & Peckham 1895 = *Eris militaris* (Hentz): Bonnet 1956, Maddison 1986
- P. molinor* Chamberlin 1925 = *Eris militaris* (Hentz 1845): Gertsch 1934, Maddison 1986
- P. [Plexippus] rufus* (C.L.Koch 1846) = *Paraphidippus pineus* Kaston 1945 = *Eris pinea*: Kaston 1973, NEW SYNONYMY;
Plexippus rufus therefore becomes *Eris rufa* (C.L.Koch), NEW COMBINATION
- P. chalcon* C.L.Koch = *Metaphidippus chalcon* (C.L.Koch): Mello-Leitao 1943
- P. [Attus] parvus* (Hentz 1846): Bonnet (1956:2811, 1958:3512) erroneously cited F.O.P.C. 1901:292 as placing *A. parvus* in *Phidippus*, but it was actually listed in *Zygoballus*
- P. capitatus* (Hentz 1845): Banks 1910 = *Pelegrina proterva* (Walckenaer 1837): F.O.P.C. 1901, Chamberlin & Ivie 1944, Maddison 1996
- P. galathea* (Walckenaer 1837): Simon 1864 = *Pelegrina galathea* (Walckenaer): Kaston 1973, Maddison 1996
- P. cyanidens* C.L.Koch 1846 = *Parnaenus cyanidens* (C.L.Koch): Peckham & Peckham 1896, Scioscia 1997
- P. metallicus* C.L.Koch 1846 = *Parnaenus metallicus* (C.L.Koch): Scioscia 1997
- P. albocinctus* Caporiacco 1947 ♂ is not a *Phidippus*
- P. guianensis* Caporiacco 1947 ♀ is not a *Phidippus*
*Note: Probably *P. albocinctus* and *P. guianensis* are conspecific. They are dendryphantines, perhaps *Messua*. They are either synonyms or a close relative of *Dendryphantes faustus* Peckham & Peckham 1901; I have not seen the latter's types.
- P. aeneidens* Taczanowski 1878 is not likely a *Phidippus* but is unknown to me
- P. birabeni* Mello-Leitao 1944 is a dendryphantine but not a *Phidippus*
- P. exlineae* Caporiacco 1955 is not likely a *Phidippus* but is unknown to me
- P. hingstoni* Mello-Leitao 1948 = *Lurio solennis* (C.L. Koch 1846): Scioscia (in press).
- P. tessellatus* C.L.Koch 1846 = *Gastromicans tessellatus* (C.L.Koch), NEW COMBINATION
*Note: This may be a senior synonym of *Gastromicans (=Beata) albopilosa* (Simon 1903; see Maddison 1996).
- P. triangulifer* Caporiacco 1954 is not likely a *Phidippus* but is unknown to me
- P. zebrinus* Mello-Leitao 1948 is not a dendryphantine; it appears to be related to a group of genera close to *Freya*.
- In addition to the species already noted above, the following species presently placed in *Eris* (Proszynski 1990 and references therein) are again placed into *Paraphidippus* (species not listed belong elsewhere):
- Salticus aurantius* Lucas 1833 = *Paraphidippus aurantius* (Lucas): Lutz 1915
- Paraphidippus inermis* F.O.P.C. 1901
- Paraphidippus lanipes* F.O.P.C. 1901
- Philaeus mexicanus* Peckham & Peckham 1888 = *Paraphidippus mexicanus* (Peckham & Peckham): F.O.P.C. 1901

OLD WORLD:

- P. indicus* Tikader 1974 = *Hyllus semicupreus* (Simon 1885): Proszynski 1990

- P. keratodes* Hasselt 1882 = *Hyllus keratodes* (Hasselt): Thorell 1892
- P. bengalensis* Tikader 1977 is not a *Phidippus*: Proszynski 1990
- P. calcuttaensis* Biswas 1984 is not likely a *Phidippus* but is unknown to me
- P. khandalaensis* Tikader 1977 is not a *Phidippus*: Proszynski 1990
- P. pateli* Tikader 1974 = *Telamonia* cf. *dimidiata* (Simon 1899): Proszynski 1990
- P. procus* Karsch 1879 (type is a juvenile ♂ in poor condition, cannot be determined): Proszynski 1973, NOMEN DUBIUM
- P. punjabensis* Tikader 1974 is not a *Phidippus*: Proszynski 1990
- P. yashodarae* Tikader 1977 is not likely a *Phidippus* but is unknown to me
- P. bucculentus* Gerstäcker 1873 = *Thyene bucculenta* (Gerstäcker): Simon 1901
- P. inflatus* Gerstäcker 1873 = *Thyene inflata* (Gerstäcker): Simon 1903
- P. orbicularis* Gerstäcker 1873 = *Thyene orbicularis* (Gerstäcker): Simon 1903

FOSSILS (all transferred by Menge 1854):

- P. fasciatus* Koch & Berendt 1854 = *Gorgopis fasciata* (Koch & Berendt)
- P. formosus* Koch & Berendt 1854 = *Gorgopis fasciata* (Koch & Berendt)
- P. frenata* Koch & Berendt 1854 = *Gorgopis frenata* (Koch & Berendt)
- P. impressus* Koch & Berendt 1854 = *Gorgopis melanocephala* (Koch & Berendt)
- P. marginatus* Koch & Berendt 1854 = *Gorgopis marginata* (Koch & Berendt)
- P. melanocephalus* Koch & Berendt 1854 = *Gorgopis melanocephala* (Koch & Berendt)
- P. paululus* Koch & Berendt 1854 = *Gorgopis frenata* (Koch & Berendt)
- P. pusillus* Koch & Berendt 1854 = *Gorgopis frenata* (Koch & Berendt)

GENERAL DESCRIPTION

Mostly medium to very large jumping spiders, 3.3 mm (small Canadian males of *P. clarus*) to 22 mm (large, gravid females of *P. regius*). Integument of prosoma and prosomal appendages reddish brown (may be yellowish brown to rarely yellow in paler individuals); ocular quadrangle (OQ) darker to black; venter often yellowish brown (may be reddish brown in darker individuals). Integumental surface highly reflective.

Carapace width 0.75 to 0.90 length, height 0.50 to 0.71 width (males typically higher than females). OQ (including AME) 0.40 to 0.50 carapace length, more coarsely reticulated than surrounding integument. PME 0.30 to 0.43 distance from ALE to PLE (nearer ALE); larger specimens have PME closer to ALE. PLE row 0.75 to 0.90 carapace width. ALE row 0.56 to 0.85 carapace width. Smaller specimens have higher eye row ratios. Clypeus height one radius of AME or less. Central short, longitudinal furrow within transverse depression just behind PER. Thoracic slope 0.33 carapace length, angled approximately 45°; cephalic area anterior to PLE slanted slightly downward.

Black vestitural setae more or less covering all of body surface, reduced on chelicerae and sometimes in OQ. Elongate black (or gray in a few species) setae also covering body to lesser extent, concentrated on lateral cephalic area and on anterior and lateral edges of OQ. Long setae on the anterior edge of the OQ form a fringe over the anterior eye row. Lateral OQ setae form distinct tufts, usually 2 or 4 (0-6), situated one laterally below and slightly anterior to each PME (sub-PME tuft; usually in the form of a compact horizontal fringe), one halfway between each PME and PLE dorsally (post-PME tuft; always present in females), and/or a pair in the middle of the OQ. Dorsal setal tufts are present in all free-living individuals of the genus except 1st free-living instars (5th instar of Galiano, 1990), and, in many species, adult males. Adpressed squamose setae ("scales") usually present on palpi, legs, clypeus (especially in females), and on various dorsal markings; sometimes covering most of dorsal surface and/or other somatic areas.

Chelicerae rugose, robust, slightly porrect (especially in males) and iridescent, usually yellow-green-blue, especially green (range: red-violet). Cheliceral promargin with two teeth, of which the more medial (proximal) tooth is smaller; retromargin with one tooth (usually somewhat larger than the larger promarginal tooth). Endites convergent in females, divergent and with anterolateral cusp in males. Labium longer than wide, half length of endites. Sternum slightly narrower to as wide as labium anteriorly, narrowed sharply posteriorly, 4th coxae nearly touching.

Abdomen ovoid, with dorsal pattern which varies from species to species, several variations on a common pattern of four pairs of light spots (spots I, II, III, IV from anterior to posterior) bordering a median dark stripe. In most species the 2nd spots is fused to form a central triangle or trapezoid, which may have posterior projections or be followed by one to three small chevrons. There also appear to be four pairs of lateral bands

(designated in like manner to the spots), the first of which is usually fused together anteriorly, forming a basal band. The second lateral band is usually a short unattached oblique stripe. The third band is missing in most species and is normally shorter than the other lateral bands when present. The fourth band is often attached either to the third and/or the fourth spots. Rarely, the lateral bands may be partly or entirely fused together. The whole dorsum may be overlaid with yellow to red, gray or tan scales which may or may not obscure the spot pattern; it is frequently obscured in males. Venter with four rows of dots between epigastric furrow and spinnerets; usually with light stripes bounding a dark central stripe, three light gray stripes on a pale background, all pale, or all dark. A few species have unique patterns.

Leg formula I, IV, II, III for males; usually IV, I, II, III or IV, I, III, II for females. In females, legs II and III are always nearly equal and sometimes are equal in length; rarely legs I are as long as legs IV (e.g., *P. workmani*). First pair of legs half again as stout and 2nd legs slightly stouter than 3rd and 4th pairs. All legs fringed at least ventrally, especially the first pair, with fringes much more developed in males. Leg I fringes of males show considerable variability among species, but commonly fringed as follows: femur with black fringes dorsally, and on pro- and retrolateral edges of venter (area between ventral fringes glabrous and reflective distally); patella with white fringes covering pro-, retrolateral, and ventral surfaces; tibia similar to patella but with black fringes; metatarsus and tarsus with similar but reduced fringes, white on proximal half and black on distal half of each segment. White scales on prolateral surface of segments with white fringes (patella and proximal halves of metatarsus and tarsus). In descriptions, alternating black and white fringes refers to this pattern of fringes and similar variations. Not all fringe variations are similar to the above arrangement (see Characters below).

Palpal femora have 1-3 dorsal macrosetae each. Leg macrosetation is restricted to the femur, patella, tibia, and metatarsus of each leg. Based on the spacing of macrosetae and the arrangement of macrosetae in other genera, the ancestral leg macrosetation is presumed to have been arranged in 4 sets on the femur and tibia and 3 sets on the patella and metatarsus. Otherwise the system of macroseta identification is similar to that used by Platnick & Shadab (1975). Ventral macrosetae are usually paired; dorsal and lateral macrosetae are usually single, with the dorsal macrosetae along the midline of the segment. The more proximal dorsal macrosetae on the femora are progressively

longer and more attenuate. Lateral macrosetae are sometimes marginal but are not identified as such unless confusion with another seta could occur. Marginal macrosetae are identified by the identification letters of both adjacent surfaces (e.g., DP = dorsoprolateral). If only one of a ventral pair is present, it is indicated as either pro- or retrolateral. Key: Roman numeral = leg (I-IV, anterior to posterior pair), D=dorsal, P=prolateral, R=retrolateral, V=ventral. Typical macrosetation (proximal to distal for each segment) is as follows: femur I*D 0-1-1-1, DP 0-0-0-2, patella I P 0-1-0, tibia I*V 0-2-2-2, metatarsus I*V 0-2-2; femur II D*0-1-1-1, DP 0-0-0-2, DR 0-0-0-1, patella II P 0-1-0, tibia II V 0-1R-2-2, P*0-0-1-0, metatarsus II* V 0-2-2; femur III*D 0-1-1-1, DP 0-0-0-2, DR 0-0-0-1, patella III R 0-1-0, tibia III V 0-1P-0-2*, P 0-0-1-0, R 0-1-1*-0, metatarsus III V 0-2-2*, P 0-1-2*, R 0-1-2*; femur IV* D 0-1-1-1, DP 0-0-0-1, DR 0-0-0-1, patella IV R 0-1-0, tibia IV V 0-1P-0-2*, P 0-0-1-0, R 0-1-1*-0, metatarsus IV V 0-2-2*, P 0-1-2*. Segments or individual sets of macrosetae marked with an asterisk (*) are invariable or nearly so. Those not so marked are more variable. Larger specimens tend to have a fuller complement of macrosetae. Smaller specimens tend to lose macrosetae, especially on legs III and IV on the proximal venter of the tibiae and the middle of the metatarsi. Since all species follow this pattern, individual species macrosetae formulas are not included with the species descriptions.

Scales, if present on legs, often denser on females and usually encompassing all but ventral surface of legs. Scales on legs of males predominantly on but not limited to legs I. Scales on palpi similar in females to leg scales; in males situated differently, apparently for courtship display as it has evolved for each species.

Females have a well-sclerotized epigynum (Figs. 3, 4), in most groups with well-developed primary and secondary rims and developed anterolateral flaps over the duct openings. The ducts usually bend away from each other just before approaching the duct openings, regardless of which way the duct openings are oriented. The duct openings usually curve back medially accompanied by a groove, resulting in an S-shaped entrance typical of many dendryphantine genera.

Each male palpus (Fig. 5) has a simple embolus, which arises from the dorsal side of the most distal of the haematodochae (the embolic haematodocha of Maddison 1996). On the opposing ventral side of this haematodocha is a rugose semi-sclerotized area (the embolic base of Maddison 1996). This area appears morphologically equivalent to that described for lycosids, which Dondale & Redner (1978) called the palea.

They state that, "The sclerites [embolus, terminal apophysis] arise on the periphery of a partly sclerotized pad, the palea... part of the wall of the distal haematodocha." Dondale and Redner's (1978) older terms 'distal haematodocha' and 'palea' apply well to the situation in *Phidippus*. However, Scharff & Coddington (1997) pointed out that distal haematodocha applies specifically to a character in araneoids that is not equivalent to the membrane between the embolus and tegulum; the latter is the case here. Therefore, I will continue to use Maddison's term embolic hematodocha, but the 'embolic base' is designated as the **salticid palea**. I do not mean to imply that this structure is homologous between lycosids and dendryphantines. In fact, it is likely that it is not, for neither character occurs among the putatively most primitive Salticidae (Spartaeinae, Lyssomaninae). Also, it is not clear that the 'embolic base' is actually the most basal part of the embolic division (*sensu* Coddington 1990; see below).

In other respects, I have followed Maddison's terminology. He states (1996:224), "The embolus of dendryphantines usually consists of a basal portion, which is transversely directed, and an apical portion, which is usually thin and erect and has the opening of the sperm duct at its tip... The dendryphantine embolus arises prolaterally and moves across toward the retrolateral side (the transverse basal portion of the embolus) and then folds back toward the prolateral and abruptly rises as the erect apical portion... A suture on the back side of the embolus (the embolic suture), between the transverse portion and the erect portion, is often present and indicates where the folded-back spiral has not completely fused." To clarify what constitutes the basal portion, I here stipulate that all of the embolus morphologically proximal to the free apical portion consists of the basal portion.

Taken together, the basal portion and apical portion of the embolus form a modified spiral. Maddison (1996) notes that, "the [left] embolus is coiled counterclockwise... In dendryphantines, the spiral [of the embolus] is hidden." The transverse basal portion of the spiral is more or less fused together (and typically, as in *Phidippus*, is attached to the embolic haematodocha), except for the proximal end which is separated from the fused part by the embolic suture. The apical portion functions as the intromittent organ. Sometimes the apical portion is bent at a point distal to its separation from the embolic haematodocha (and therefore from the basal portion). This short piece, the proximal end of the apical portion, I call the **embolic stalk**.

The tegulum has a visible bend of the sperm duct isolated (by the tegular ledge) along the distal retrolate-

ral edge (tegar shoulder; Maddison 1996), typical of dendryphantines. Usually there is a simple retrolateral tibial apophysis; in a few species, the apophysis is bifid either distally or basally.

In *Phidippus*, a long piece proximal to the embolus exists on the prolateral side, adjacent to the tegulum. It is attached to the embolus just prior to the embolic suture, after which the embolus sharply bends toward the venter, then continues on its path as described above. Maddison did not address the issue of the proximal long piece, so there is a question as to what this represents. It seems entirely plausible that those groups like dendryphantines which have a prolateral piece preceding the embolus are derived from ancestors resembling the genus *Menemerus*. This genus has an "intercalary sclerite" isolated along with the embolus as a separate sclerite which covers an embolic haematodocha (Wesolowska 1999). Subsequent reductions to this isolated piece, a change in the position of the embolus with respect to it, and changes in the position and shape of the embolic haematodocha, could produce a typical dendryphantine. There is a question if this prolateral piece is a true part of the embolus, and what to call it is problematic. Most likely it is equivalent to Logunov's (1998) Sclerite 1, even though it is still attached to the embolus. A question concerning tegular structure that needs answering is how does Maddison's (1996) tegular ledge relate to Logunov's (1998) salticid radix. Is it equivalent to the split between the tegulum and radix or to some other division within the functional salticid tegulum (*sensu* Logunov & Cutler 1999)?

CHARACTERS ANALYZED:

Over 240 characters (not including size measurements and ratios) were initially recorded for describing the species and formulating hypotheses about relationships. These are described briefly below in general terms. Color, shape, etc., are each coded as separate characters for each structure, so the actual character numbers are not shown. Order of presentation of characters is anterior to posterior, proximal to distal, and dorsal to ventral. Complete data sets are available from the author upon request.

Color is highly variable within species throughout the genus, especially among females. Normal setae are most often black, less often white, but may also be brindled (black proximally, white or yellow distally), gray, tan, brown, yellow, or red (rarely). Scales are most often white, but may be gray, tan, brown, yellow, orange, red, iridescent (clear, with reflections of copper, green or pink in *P. bidentatus* and *P. dianthus*) or gold (metallic yellow). Many of the following charac-

ters directly concern the placement, size, and color of scales and setae. Color ranges are listed for each character with the respective species descriptions.

Patterns are usually conservative within a species, even though, since the patterns are made up of setae and scales, they may be highly variable in color. Patterns consist of various types of markings which are defined as follows: Vertical face and median longitudinal body markings are stripes, while horizontal face and lateral and transverse body markings are bands. Small median or submedian markings are called spots. Stripes and bands may be reduced to spots.

MALES: Prosoma: Carapace: The anterior eye row (AER) usually has a simple fringe of long black, overhanging setae; this state is assumed unless otherwise indicated. Some species have other setal colors interspersed, and one species (*P. comatus*) may have a multiple row of clubbed setae.

Immediately behind the posterior median eyes (PME) may be a vertical tuft of long black setae (post-PME tuft). Four of the species of the *putnami* group have enlarged clumps of setae which angle inward and forward onto the OQ as a pair of crests. Many species lack any setal decoration there (but only in the males).

One species, *P. mystaceus*, has a rare morph in Florida which has a pair of black tufts in the middle of the OQ, but no other tufts (several species have females with mid-ocular tufts, but these also have other tufts).

A horizontal tuft of long black setae may be present below the PME (sub-PME tuft), most often as a short horizontal fringe rather than a distinct tuft. Males of a few species also lack this tuft. The length of all the ocular tufts (when present) varies from 1x-3x the width of an anterior median eye (AME), usually about 2x.

The ocular quadrangle (OQ), bounded by the anterior lateral eyes (ALE) and the posterior lateral eyes (PLE), may or may not be covered with scales. If scales are present, they may be all one color covering most of the OQ (OQ scales), or they may be in a variety of transverse, longitudinal, or median markings, or both types may exist, each of a different color of scales.

A distinct anterior ocular band of a different color than other OQ scales may be present just behind the anterior eye row. When present, this band is always complete, i.e., it covers the entire width of the OQ. If the area immediately behind the AER is covered with the same colored scales as on the rest of the OQ, the anterior ocular band is not considered to exist. The area may also be bare of scales (but may have short black or gray setae), while the remainder of the OQ is

covered with scales (e.g. *P. whitmani*).

A median ocular band of variable shape may occur at about the level of the PME. It may be complete (if appearing as five spots it is considered complete as well), broken into three distinct spots, or reduced to a median spot. A posterior ocular band of variable extent may occur between the PLE. This band is not as well-defined as the median ocular band (except in some members of the *putnami* group) and may essentially be a reduced area of OQ scales. Scales of the posterior ocular band or OQ may extend onto the upper part of the thoracic slope.

A few species have stripes of assorted types in the OQ area. These are noted with the pertinent species.

The sides and posterior of the carapace may be unmarked, may be entirely covered with scales (often of a different color than on the OQ), or the scales may have formed submarginal bands of various lengths and widths (white unless otherwise indicated). Some species groups also have a narrow marginal band, usually consisting of a single row of white scales. Many (but not all) species with a marginal band also have a cheek band (see below).

The thoracic slope may be unmarked, have scales on the upper part like on the OQ or like the lateral areas, have the ends of the submarginal bands, or rarely have its own central markings. It may have any of several combinations of the above.

A transverse integumental raised ridge is present across the middle of the OQ of *P. toro* and of *P. mystaceus* (in the latter, most noticeably in the rare Florida morph).

The clypeus usually has both a long fringe of setae and a band of scales, often both the same color (usually white), although that color varies among species.

An expanded area of the integument laterally below and behind the PME (the "cheek" area) is present in *P. adonis*, *P. arizonensis*, and *P. cruentus*. A number of species have a narrow band (cheek band) in this area which extends from the clypeus band.

Chelicerae: The chelicerae are iridescent (although not always along the entire length), except in *P. octopunctatus* and *P. georgii*. The amount of bare integument visible varies due to various overlays of horizontal bands, vertical stripes, and fringes, all of which may independently vary in color. Two species, *P. audax* and *P. regius*, have a well-developed anterior distal tubercle on the basal segment (paturon).

Palps: The endites (palp coxae) have an anterolateral cusp, which varies in shape and length among species. In most species, the endites are wider distally and the cusp is set on the anterolateral edge.

The palps usually have fringes and dorsal stripes on some or all segments from the femur to the cymbium. These may vary in color, but rarely are they more than black and one other color, most often white. In *P. carolinensis*, the cymbium lacks scales, has a pale semiglabrous integument, and has scattered small reddish brown spots dorsally.

The tibial apophysis of each palp is usually simple, although several species in the *aureus* clade are bifid at the tip, as is *P. cardinalis*, and *P. mystaceus* is bifid at the base, forming a pick for the stridulatory mechanism. In the latter species, an ectal (lateral) file exists along the edge of a depression on the cymbium, and enlarged macrosetae are present along the distal edge of the cymbium in order to engage the substrate to operate the stridulatory mechanism (Edwards 1981b). *Phidippus arizonensis* stridulates (Edwards 1980b) and both it and *P. cruentus* have an area of distal palpal macrosetae (although not as well developed as *P. mystaceus*), but the pick is not obvious on these two species.

The tibial apophysis is bent outward at the base in most species. It may be straight but usually is curved inward, and the tip may be straight, bent ventrally (most common), or bent dorsally.

Many species have denticles on the inner edge of the tibial apophysis, especially toward the distal end. The distribution of this character in other genera is unknown, therefore its value as a generic character is yet to be established.

Palea: The palea may have curving folds (wrinkles) or ridges that are primarily vertical (longitudinal), vertical bent (sideways v-shaped), horizontal (transverse), horizontal bent (medial side bent distally), medial diagonal, U-shaped, urn shaped (U-shaped with the tops of the U bent outward), or rarely the ridges may be partially fragmented (normal in *P. borealis*). In addition, small patches of vertical ridges (half-verticals) may be isolated centrally or ectally. Usually a combination of types is present. Some species groups have an isolated medial subdistal horizontal ridge which is a continuation of the posterior edge of the palea.

The palea may be roughly symmetrical or it may be expanded on the ectal margin, either laterally or distally. In dimensions, it may be distinctly wider than long, distinctly longer than wide, or approximately as long as wide (less than 10% difference). For diagnostic purposes, a distinction is made between those that are longer than wide (up to 1.6X as long as wide) and those that are much longer than wide (1.7X or greater as long as wide). Also, a distinction is made between those that are wider than long and those that are much wider than long, using the same ratios.

The ectal edge of the palea may be smoothly curved, notched or undulate (which may appear as a mid-ectal bulge). It may also have a noticeable crease projecting medially from the ectal edge. The crease, while usually obvious, otherwise can be detected by the ridges on either side of it being oriented in different directions. The crease is essentially the proximal edge of a distal ectal lobe (some species with bent vertical ridges, e.g., *P. carneus*, may appear to be creased if the ridge intersects the edge of the palea just proximal to the edge of the embolus basal portion on the ectal side, but this is not due to the presence of a lobe). The distal edge of the palea may or may not be strongly sclerotized. In a few species (mostly in the *insignarius* group), the proximal end of the embolus basal portion projects distally to form a translucent flange. In other species, there are membranous invaginations into the palea of various types. A distal shelf of various dimensions is present in most species groups.

Embolus: The embolus apical portion may emerge directly distal, adjacent to, and along the same plane as the palea, or it may be separated from the palea and pointed dorsally when it emerges. If it emerges distally, the embolus apical portion often is bent dorsally and then recurves. In some species, the apical part is stalked from the embolus basal portion prior to being bent and recurving. It may also curve toward the venter even if it is not bent. The embolus basal portion may not be visible from ventral view, but in most species it is and extends laterally along the distal edge of the palea. The proximal end of the spiral may have (*audax* group) a widened membranous area just below the embolus apical portion (part of the embolic suture).

In most species, the narrowest surface of the embolus apical portion faces ventrally, so that the embolus apical portion appears broader in ectal view. In a few species, the embolus apical portion is twisted 90°, so that the broader surface faces ventrally. Depending on its orientation, the embolus apical portion in ventral view may thus appear narrow or broad. Also, it is rarely uniform in width, usually tapering distally. The tapering may be gradual or abrupt toward the tip, and the tip may be notched or toothed, pointed or blunt.

The embolus apical portion varies among species in its curvature; it may be straight, bent dorsally at the tip, or slightly, moderately, strongly, or extremely recurved (best seen from retrolateral view). Definition of curvature depends on the relationship of the tip to the plane of the embolar base. Slightly curved does not reach the plane, somewhat does reach the plane, strongly extends past the plane, and extremely is used to describe the condition in *P. zethus*.

The embolus apical portion may vary in length from very short to extremely long. It is classified to size by comparing the length of the embolus apical portion to the embolar groove which contains it. Very short is a triangular or conical button; short is less than half the length of the embolar groove; half the length is self-explanatory; long is greater than half to the full length of the embolar groove; extremely long is greater than the embolar groove length and occurs only in *P. zethus*. For descriptive purposes, a spike is narrow in shape, a blade is broad.

Legs: There are 36 coded characters associated with the legs I alone. These include colors and lengths of fringes and tufts, colors of scales forming bands or stripes, and placement of fringes, tufts, and scales on each leg segment from femur to tarsus. Fringe lengths are determined by comparing the setae length to the distal dorsal width of the segment on which they occur. Short fringes are less than 1/2 the width of the segment at its distal end, medium fringes are 1/2 to equal the width of the segment, and long fringes are greater than the width of the segment.

Opisthosoma (hereafter referred to as *abdomen*): Males have an abdominal pattern which is similar to or a reduced version of the females. I analyzed the same characters for both sexes, but since the females have more variability, I describe the details in that section.

FEMALES: Except for palpal characters, leg I and most carapace decorations, and their own unique attributes, females are similar to males in overall appearance. They average slightly larger than males, mostly due to their larger abdomens. Their dorsal patterns tend to be more complex, and the color of these patterns much more varied, than occurs in males. Their legs I are slightly smaller than those of males with similar-sized carapaces. Sexual dimorphism frequently occurs where one sex has the dorsal abdomen overlaid with scales, but the other sex does not or not in the same way. Which sex has the dorsal scale cover depends on the species. Not all species are dimorphic in this manner.

Abdomen: Lateral bands I are usually fused together anteriorly (forming a basal band), but may be represented by only a median spot or separated short lateral bands. Typically, the basal band extends one-third the abdominal length, although it varies from absent to appearing (by fusions with other bands) to extend to spots IV. The band may be narrow or wide, and may end abruptly or as a gradual taper, or rarely be forked at the ends. The color varies among species, but is usually white.

There are two (sometimes three) sets of peripheral

bands, lateral bands II normally about level with spots II, and lateral bands IV more or less in between spots III and IV. These frequently appear as short unattached oblique stripes, but may be attached to the basal band or reduced to spots. Lateral bands II appear to form the outside edge of the transverse band in *P. mimicus*. In the *mystaceus* group, lateral bands III are present immediately behind lateral bands II and are usually reduced in size. Lateral bands IV may be fused to one or both of the posterior spots. These bands are almost always white, although sometimes they are intermixed with or overlaid by dorsal scales of a different color.

Spots I, when present, usually are small, oval, and separate. Rarely, they may appear as two short sub-median stripes, or be fused to the basal band, fused into a backward pointing triangle, or fused to spots II. They may be indicated by pale integumental spots under the dorsal scale cover.

Spots II may be small, oval, and separate like spots I, or they may be short, outwardly concave stripes, either separate or touching, or they may be fused together. Most often they appear together as a truncate triangle (trapezoid), but they may also form a rectangle (oriented longitudinally), a wide narrow triangle (*P. adonis*) or a wide transverse band (*P. mimicus*). There may be a posterior forked process, or one or more small chevrons may occur immediately posteriorly.

Spots III and IV are each distinctly separate and generally similar, and are oval or linear in shape. Spots III may be large or small, depending on whether it is more or less than half the width of the median stripe. Spots IV are usually small, except sometimes when linear, or in special cases (e.g., Florida *P. otiosus*). Either or both may fuse with lateral band IV, and spots III rarely may fuse with lateral band II or with spots II.

All the spots vary in color, but in all but one species are normally unicolorous, most often white. In *P. olympus*, spots I and II are yellow, but spots III and IV may be yellow or orange.

A median black stripe seems to be characteristic of the genus, but may be considerably modified. Usually the part not overlaid by another dorsal scale cover is overlaid by clear, iridescent scales, allowing the black integument color to show through. The black area may encompass all the spots and be unbroken, may be broken by other scales between spots I and II, may only include spots I and II, only include spots II-IV, only be posterior to spots II and between spots III and IV, be reduced to two parallel lines containing spots III and IV, or be completely overlaid by dorsal non-iridescent scales. A few species (mostly in the *audax* group) have a fairly extensive black median stripe containing up to

eight matte black rectangular patches (especially *P. audax*).

The overlying dorsal scale cover may encompass the entire dorsum, or may cover all but any of the following: the basal band, paired spots, all or part of the median black stripe or its remnant (e.g., the two parallel black stripes), or it may occur only on the lateral edges (outside the spots). The color varies, but is most frequently red. Many species that are usually red are sometimes yellow as well. As mentioned above, iridescent scales form at least part of the cover on the median black stripe in most cases.

The ventral integument varies from a pale off-white color (cream colored) to black. Many species have distinctive white, gray, or black stripes on a contrasting background. A few species have unique patterns (e.g., *P. otiosus*).

Epigynum: The epigynum is a sclerotized plate modified in a variety of ways. Typically there exists a primary rim on the epigynum which extends from the anterior edge slightly past the mid-point of the epigynum along the outer edge; it is not always well-defined. This may be followed by a secondary rim which, when present, forms the anterior edge of the atrial area (when the secondary rim is absent, the primary rim serves this function). The anterior part of the epigynum extends from its anterior edge to the posterior edge of the atria or the flaps, whichever extends further toward the posterior end. The atria leading to the duct openings (and the flaps over the duct openings when present) are flat to slightly concave and usually depressed below the level of the surrounding integument. A raised median longitudinal ridge may be present in the middle of the atrial area, which may be a rudimentary poorly-defined sagittal rise, or developed into a well-defined septum of varied length depending on the species.

The duct openings may be covered by integumental flaps. These flaps may diverge posteriorly, converge posteriorly (with anteromedial excavations), be parallel (more or less straight) posteriorly, or be parallel and curved so that the outer edge of each flap is convex and the inner edge concave. The flaps do not appear to be derived from the secondary rim. Rather, they appear to be outgrowths of the anterior edge of an atrial invagination (groove) which connects to the duct opening proper, forming the S-shaped opening. Five stages appear to exist in flap development: (1) absent, (2) raised ridge on anterior edge of groove (*P. mystaceus*), (3) incomplete flap, not covering duct opening (*P. adonis*), (4) complete flap except outer edge indistinct, (5) complete flap with outer edge distinct.

Some species in the *P. mystaceus* group have flaps

and some do not; *P. mystaceus* appears to have a rudimentary ridge-like development (or reduction) of the flaps, and *P. adonis* has the flaps further developed but incomplete posteriorly. In both species, the flaps appear to end under the duct openings rather than covering them, reminiscent of the *mannii* group of “*Metaphidippus*” (Maddison 1996). The *octopunctatus* and *putnami* groups lack flaps as well. The *putnami* group (as well as those *mystaceus* group members which lack flaps) has retained the atrial groove, perhaps an indication that the flaps were secondarily lost, whereas the *octopunctatus* group essentially has lost the median atria and grooves entirely.

The middle part of the epigynum may be raised, depressed, or raised medially and depressed laterally in relation to the surrounding integument. If this area is deeply depressed, it may be bounded by an extension of the secondary rim. This section may or may not have a median (sagittal) ridge, which may or may not be an extension of an anterior septum.

The posterior part of the epigynum is always raised above the adjacent integument (except for four species of the *putnami* group). Along the posterior median edge is a heavily sclerotized pocket. The male inserts the palpal tibial apophysis here to begin the process of mating. The anterior edge of the pocket may have a variety of shapes, and the relative dimensions of the pocket vary considerably among species. The pocket is usually more heavily sclerotized along its posterior and lateral edges. In a few species, the anterior (dorsal) edge may be modified, either by being also heavily sclerotized or, in addition, by projecting somewhat internally. The function of this modification is unknown; perhaps it correlates to the size of the tibial apophysis, but this has not been confirmed (although most of the species which have a pocket which projects internally also have a distally forked tibial apophysis).

The spermathecal ducts vary considerably. Most species have a well-defined spermathecal duct head (see Bennett 1992), either broad or narrow. A gland opening, appearing as a circle of short filaments or a small, rounded projection, often appears on the duct head. These are referred to by Maddison (1996) as flower-like gland openings. The rest of the duct bends at an angle from the duct head (when it is well-defined), the first bend helping to define the end of the duct head. The duct head in most species is immediately followed by 1-5 (most often 2) major bends or loops in the duct, usually followed by a few median minor bends. These are followed by a few posterior bends (beginning at the level of the spermathecae) which enter a pair of small spermathecae, from each of

which a flattened, somewhat elongate, sigmoid fertilization duct arises. Small supernumery bends may occur between major bends, although these seem to be a normal feature of the ducts of *P. concinnus*, *P. johnsoni*, *P. olympus*, and *P. tyrrelli*. The bend at the end of the duct head is not counted as a major bend. The difference between major and minor bends is strictly a matter of size and is almost always obvious. In order to be considered a major bend, both sides of the bend (from its midpoint) must be larger than the sides of any minor bend present. Conversely, only minor bends are considered to be present if no size dimorphism exists among bends and no bends are at least half the length of the duct head. If a bend is twisted into a loop, this is so stated. One species, *P. comatus*, has posterior major bends which are visible through the integument.

DEFAULT CHARACTER STATES:

Many species have the following character states absent or have the state indicated. These states are assumed and therefore omitted unless otherwise indicated in the individual species descriptions.

MALE: Default state is absent for: post-PME tufts; a pair of dense setal crests in OQ; two tufts in mid-ocular region; anterior ocular band; median ocular band; posterior ocular band; OQ scales; white ocular stripes; transverse integumental ridge; cheek expansion; submarginal band; cheek band; marginal band; clypeus band; cheliceral stripes, fringes, or bands; cheliceral distal dorsal tubercle.

Palp: Cymbium without dorsal cover of yellow scales. Dorsum of cymbium dark, densely setose. Distal cymbial macrosetae absent. Tibial apophysis simple. Palea approximately symmetrical. Ectal border distal to tegular shoulder smoothly curved, not creased.

Leg I: Default state is absent for: femur I with black dorsal subproximal tuft; prolateral stripe; prolateral proximal band; prolateral subdistal band; prolateral distal band; distal retroventral tuft; distal ventral bulge; ventral stripe; patella I and tibia I prolateral scale cover. Metatarsus and tarsus with white scales on proximal half, integument pale proximally, dark distally.

Abdomen: Default state is absent for: scale cover on entire dorsum; black ventral fringe.

FEMALE: Default state is absent for: mid-ocular tufts; anterior ocular band; median ocular band; posterior ocular band; OQ scales; submarginal band; clypeus band. Cheliceral band default is white along basal edge.

Abdomen: Default state is absent for: basal band; lateral bands II-IV; spots I-IV; scale cover on entire

dorsum. Median dorsal black stripe default is present, variable in extent, but not unusually modified.

Epigynum: With well-developed anterior flaps. Anterior shallowly depressed, septum absent. Middle same plane as surrounding integument. Zero pair supernumery bends; only minor posterior duct bends present, rarely visible through integument.

PHYLOGENY

RELATED GENERA:

I do not accept the synonymy of *Paraphidippus* with *Eris* (Kaston 1973), therefore I hereby resurrect ***Paraphidippus*, New Status**. Most species of *Eris* from North and Central America as listed in Proszynski (1990) are returned to *Paraphidippus* (see Species Misplaced in *Phidippus*).

The species of *Paraphidippus* are more closely related to *Phidippus* than they are to *Eris*. In general appearance and size, *Paraphidippus* species are similar to *Phidippus* except for lacking iridescent chelicerae and post-PME tufts, and the carapace tends to be slightly less elevated. The palps of *Paraphidippus* species share an embolus basal portion which is broadly elliptical in shape and covers over half of the width of the apex of the unexpanded embolic haematodocha (*Phidippus* is similar in this character state, see below). *Paraphidippus* shares a raised posterior median part of the epigynum with *Phidippus*. Support for this sister relationship was found by the recent molecular work of Hedin and Maddison (2001). The only other obvious outgroup for *Phidippus* would be *Parnaenus* because of its possession of iridescent green chelicerae, but *Parnaenus* is more closely related to *Lurio* based on the far retrolateral placement of the embolus apical portion due to the lack of folding of the embolus basal portion, possibly indicating an unfurling of the spiral.

Eris appears to be more closely related to *Bagheera*, *Gastromicans*, and *Messua*. It retains four species north of Mexico: *E. flava* (Peckham & Peckham), *E. floridana* (Banks), *E. militaris* (Hentz), and *E. rufa* (C.L.Koch) [= *E. pinea* (Kaston)] (Kaston 1973, Maddison 1986). *Eris* have the embolus basal portion slightly folded, small, and situated on the distal retrolateral corner of the embolic haematodocha, with a slender apical portion. If the palea (of the left palp) of *Eris* curled around the retrolateral edge (rotating and tilting the embolus toward the prolateral side), it would resemble *Messua*. If the embolus completely tilted to the prolateral side, with the apical portion bent dorsally and elongated, it would resemble *Gastromicans*. Then, if the embolus was broadened and its apical portion

curled clockwise, it would be like *Bagheera* (see Maddison 1996).

The *mannii* group of “*Metaphidippus*” resembles *Paraphidippus* and *Phidippus* in having a strong bend in Sclerite I just prior to the embolic suture and a transverse basal portion. It has the distal retrolateral corner of the basal portion extended distally into a flange which forms a blunt ramus. This approaches the condition found in such genera as *Dendryphantas* and *Rhene*. Some *Paraphidippus* and *Phidippus* have a flange also, but it is proportionately shorter and wider. The transversely folded and fused embolus basal portion appears to be a synapomorphy among several genera.

Interpretation of genitalic variation in other dendryphantine genera does not seem to be entirely consistent with how *Phidippus* varies. For example, incomplete flaps descending into the duct openings was one of the main reasons that Maddison (1996) was reluctant to include the “*Metaphidippus*” *mannii* group in the genus *Pelegrina*. In *Phidippus*, this is only one of four states that occur in the *toro* clade of the *mystaceus* group! On the other hand, the embolus structure of the *mannii* group resembles *Phidippus* in having a transverse basal portion. This clearly excludes it from *Pelegrina*, which has one of the most derived conditions in the subfamily, with the embolus spiral almost entirely fused.

It is probably an understatement to say that we do not yet completely understand how genitalic transformation series in the subfamily relate to genera. However, based on the above discussion of embolus characters and states (basal portion of spiral unattached, partially attached, or completely attached to embolic haematodocha; basal portion of spiral unfolded, slightly folded, greatly folded, or fused; embolus apical portion retrolateral, medial, or prolateral), a hypothetical cladogram might be coded: ((*Lurio*, *Parnaenus*) (((*Eris*) ((*Messua*) (*Gastromicans*, *Bagheera*))) ((*mannii* group) (*Paraphidippus*, *Phidippus*)) (*Pelegrina*))). As indicated above, a number of other genera will likely belong to the branch containing the *mannii* group.

The bronze/dark brown base color of *Eris* males is like males of *Gastromicans*, *Bagheera*, the *mannii* group, *Pelegrina*, and several other genera, therefore likely is plesiomorphic within the dendryphantines. At least *Parnaenus* and *Paraphidippus* also have bronze species. Many species in related genera, like *Messua*, *Lurio*, most *Parnaenus* and *Paraphidippus*, and even a species of *Phidippus*, are prominently covered with iridescent green body scales. A number of other salticids in tropical areas, particularly rainforests, are also mostly iridescent green dorsally, e.g., *Cobanus* in the subfamily Euophryinae. A typical weather feature of

rainforests is for a hard, tropical thunderstorm to briefly inundate the forest, after which the sun again shines brightly. After the rain stops, leaves (typically green in color) are covered with water droplets which reflect the sunlight. A salticid covered with iridescent green scales might similarly reflect sunlight, and gain protection from other visually-oriented predators by resembling a water droplet while hunting on the leaves after the rain. Therefore, my hypothesis concerning the iridescent green color of salticids is that those species so colored are raindrop mimics.

As I conclude my comments on the relationships of genera close to *Phidippus*, I would be remiss if I did not acknowledge the extensive and detailed contributions of Wayne Maddison (1988, 1996). His work is a tremendous start to understanding the subfamily Dendryphantinae, and, in part, the basis from which some of my own ideas on the higher phylogeny of the subfamily have been developed.

MONOPHYLY OF PHIDIPPUS:

The post-PME tufts of *Phidippus* species, to my knowledge, are unique for the genus and clearly the primary synapomorphy uniting them. This is the only character that appears in both the unweighted and weighted analyses of the genus (see below). These tufts are always present in females and all free-living juveniles except the first instar that leaves the eggsac. In some species males also have them (modified into crests in most species of the *putnami* group); in other species, they are absent in males. Perhaps in males these tufts have become involved in sexual selection or species recognition; at least in some cases, males of sympatric sister species are different (e.g., *P. regius* without and *P. otiosus* with post-PME tufts).

The iridescent chelicerae are an apparent synapomorphy of all species except the *octopunctatus* group (secondarily lost?). The presence of this character state in *Parnaenus* is considered to be convergent. Since *Parnaenus* is a tropical genus similar in body shape to the temperate *Phidippus*, it may be an ecological equivalent, and the evolution of iridescent chelicerae may be due to similar selection pressures.

Phidippus leg I fringes are more fully developed than other genera, although *Paraphidippus* have leg I fringes that alternate black and white in color like most *Phidippus* species. Fringes of other dendryphantine genera are poorly documented, so no hypothesis about fringe synapomorphies can be proposed.

The broadly fused, transverse, embolus basal portion is similar to *Paraphidippus*, except that this basal portion tends to be more narrow apically to basally,

almost rectangular in some species. It also is situated more dorsally, especially in the distal species groups of *Phidippus* (whereas in *Paraphidippus*, it is clearly apical). In the more distal species groups too, the embolus basal portion is reduced in size due either to an overall narrowing of the palp, or an expansion of the distal retrolateral part of the palea, producing the same effect.

Phidippus can typically be recognized in the field (i.e., without using a key) by the combination of post-PME tufts, iridescent chelicerae, relatively high carapace, conspicuous leg fringes, large size, and dense setal covering (i.e., they often appear “hairy”).

PHYLOGENY OF *PHIDIPPUS* SPECIES:

Within the genus, most species groups are well-defined; diagnoses of these groups are presented in *Analysis of Tree Branches* below, with further discussion under each species group. Some earlier versions of the phylogeny attempted to root the genus between the *insignarius* group and the *otiosus* group. Potential support for this root placement would be the presence of these states: (1) the proximal end of the embolus spiral with a flange, as in some members of the *insignarius* group, and (2) a broad longitudinal median raised area of the epigynum, most notably in *P. regius* (*otiosus* group). Both character states occur in *Paraphidippus*. The *insignarius* and *otiosus* groups are the only two groups not supported by a synapomorphy, suggesting that they are misplaced in respect to the phylogenetic hypothesis presented here.

According to Maddison (1988), the presence of flaps on the epigynum is plesiomorphic for the subfamily (or at least the containing clade of genera); therefore, the absence of flaps in the *octopunctatus*, *putnami* and *mystaceus* groups would be apomorphic reversals. The retention of atrial grooves in the *putnami* and *mystaceus* groups also suggests flap loss to be secondary, but the lack of extended grooves in the *octopunctatus* group is problematic. Furthermore, in some other dendryphantines, lack of flaps seems to be associated with a retrolateral shift of the embolus apical portion (Maddison 1996), which appears to be a tendency in the *octopunctatus* and *putnami* groups as well (but the *mystaceus* group species do not have the embolus noticeably shifted). There are other character states which might support separating the *octopunctatus* and/or *putnami* groups into their own genera. The *octopunctatus* group lacks iridescent chelicerae and has a different integumental color pattern. The duct openings are placed laterally on a broadly raised median longitudinal area with lateral atria, like *Paraphidippus*. Most of the *putnami* group has carapace, palp, and leg

modifications on the males (and corresponding courtship behavior) that are unique for the group, and females have lost the raised epigynal posterior. Despite these differences, and considering that these two groups do have the character states which presently define the genus, I prefer to be conservative in assigning generic names. A comparable situation occurs in the speciose genus *Habronattus* (Griswold 1987): each species group has its own unique set of modifications.

PHYLOGENETIC ANALYSIS: The following phylogenetic hypothesis was arrived at by recording and analyzing over 240 characters (see Introduction for types of characters examined). Most of these characters were of a traditional descriptive type, which by their nature are highly variable, e.g., color of dorsal abdominal scales. The successive weighting option of Hennig86 was used on the total character set to sort out the worst of these characters (those with zero weight). Therefore, characters that exhibited excessive homoplasy (characters lacking any states which defined groups) were eliminated. Also eliminated were characters for which there was insufficient data for most species. This left 70 characters for analysis. Numerous analyses were then performed using Hennig86 with the remaining characters to achieve the most parsimonious and highest resolved solution.

Unweighted, nonadditive analysis was performed on these 70 characters for 60 species of *Phidippus* plus two species of *Paraphidippus* used as the outgroup. Five hundred one (501) trees with a length of 353 steps, a consistency index (CI) of 0.49, and a retention index (RI) of 0.78 were found. A consensus tree identified only three species groups (the *insignarius*, *mystaceus* and *purpuratus* groups) which contained all the species assigned to them by a subsequent successive weighting analysis. This is particularly interesting in that one of the less well-supported groups (*insignarius* group) remained intact in both analyses.

There are seven unweighted synapomorphies which support the genus: (1) chelicerae iridescent (with loss in the *octopunctatus* group), (2) complete vertical ridges on palea lost (reversal to present in *octopunctatus* and *putnami* groups), (3) partial vertical ridges sharply bent (reversal to not bent in *octopunctatus* and *putnami* groups plus other states present), (4) palea with medial diagonal ridges (reversal to absent in *octopunctatus* and *putnami* groups plus other states present), (5) females with post-PME tuft, (6) female clypeus covered with a white band (with reversal to iridescent in a few species, gray, or absent), (7) spermathecal duct heads narrow (with reversal to broad

in the *mystaceus*, *octopunctatus*, and *putnami* groups). The inclusion of other genera in the analysis probably would have eliminated number (6). Characters (2), (3), (4), and (7) are better optimized (no reversals needed at the genus level) when applied as synapomorphies along the generic clade produced by the following method.

The successive weighting option of Hennig86 gave one tree with a weighted length of 1173 steps, a CI of 0.73, and a RI of 0.90 (Fig. 6). This same topology in Clados has an unweighted length of 355, a CI of 0.48, and a RI of 0.77, only two more steps and one less CI and RI percentage points than the unweighted versions. The weighted version resolves all of the species into nine distinct groups; all but two groups (and the basal species of two other groups) are well-supported by synapomorphies (the other two groups are supported by unique combinations of character states). Therefore, the following analysis of branches and discussion of species groups will follow the weighted version.

Analysis of Tree Branches: The numbers in the following list correspond to the branch numbers in Fig. 6. I have used the oldest named species within each species group to name that group in the traditional manner. When it is necessary to refer to a subset of a species group, the subject clade is named by using the name of the basal species (e.g., the *toro* clade) or the name of the oldest named species if no isolated basal species exists (e.g., the *asotus* clade). Synapomorphies of clades and a few homoplasies occurring only a few times in disparate groups are listed.

1. The two species of *Paraphidippus* are united by the embolus basal portion being in the shape of a broad, elliptical sclerotized plate covering most of the apical dorsum of the embolic haematodocha.

2. Weighted synapomorphies defining the genus *Phidippus* are: (1) embolus basal portion a transversely wide, semirectangular plate (with subsequent modifications of this state), (2) females with post-PME tufts, (3) epigynal flaps lost (regained at least twice later). Of the seven unweighted synapomorphies discussed above, four of the five reversals are lost at this level, the fifth is not reversed here, and a somatic character is replaced by a genitalic character. The post-PME tufts occur in both analyses.

3. The two species of the *octopunctatus* group are united by having six pair of integumental abdominal spots. They are also the only two species in the genus which always lack iridescent chelicerae (likely a plesiomorphy shared with *Paraphidippus* and other genera).

4. The synapomorphy uniting the rest of the genus is the presence of iridescent chelicerae. The presence of this character state in *Parnaenus* appears convergent.

5. No single synapomorphy unites all members of the *putnami* group. Shape of the palea (wide with distal median peak) unites *P. zethus* with *P. carolinensis*. The embolus basal portion not projecting distal to the palea is shared with the *asotus* clade (see branch 11).

6. The remainder of the *putnami* group is united by: (1) a pair of setal crests on the OQ of males, (2) prolateral surface of male patella I entirely covered with gray scales, (3) posterior part of epigynum on same plane as surrounding integument.

7. *P. comatus*, *P. richmani*, and *P. putnami* are united by three male characters on femur I: (1) white prolateral subdistal band, (2) distal ventral bulge (metallic blue in *P. comatus* and *P. richmani*, pale with dark spot in *P. putnami*), (3) distal retroventral tuft on bulge (gray in *P. comatus* and *P. richmani*, yellow in *P. putnami*).

8. *P. richmani* and *P. putnami* share three male synapomorphies: (1) narrow white stripe below posterior eyes laterally, (2) chelicerae with a median red band extending into basal half between basal white stripes, (3) femur I with white ventral stripe on basal half.

9. The remainder of the genus is united by three palea characters: (1) complete vertical ridges absent, (2) partial vertical ridges sharply bent, (3) medial diagonal ridges present. Some species in the *cardinalis* group have lost the last two secondarily.

10. The *mystaceus* group species are unique in having lateral bands III present. Most of them also have a median ocular band (which occurs elsewhere only in isolated instances) and all have male cheliceral decorations (as does the *putnami* group and a few other species).

11. The *asotus* clade shares two synapomorphies: (1) male OQ scales brown (actually a synapomorphy only for the *P. asotus* - *P. pruinosus* pair), (2) male femur I with retroventrolateral fringe brindled distally, white proximally (except *P. kastoni* is entirely brindled). All four species share a hidden embolus basal portion with the *putnami* group.

12. The unique character state shared by the *P. kastoni*-*P. vexans* pair is the median ocular band reduced to a median spot (usually absent in *P. kastoni*) in males. These are the only two species in the species group which have four white vertical stripes on each chelicera (although this state occurs outside the group). Both also have an abundance of iridescent OQ scales, although this state to lesser extent occurs elsewhere in several species groups.

13. Three male synapomorphies are present for the *P. asotus* - *P. pruinosus* pair (actually four, see branch 11): (1) tan anterior ocular band, (2) four gray vertical stripes on each chelicera, (3) femur I prolateral fringe

brindled.

14. The *toro* clade has five male synapomorphies with assorted distributions: (1) femur I with prolateral stripe (white or yellow), (2) femur I with complete ventral stripe (white or yellow), (3) patella I scales with a variable assortment of states that occur nowhere else (white stripe, yellow, pink), (4) chelicerae with a complete fringe (gray or yellow), (5) a transverse integumental ridge in middle of OQ (*P. toro* and *P. mystaceus*).

15. The five remaining species of this clade have some unique characters not shared by all species: (1) an expanded cheek area of the male carapace (*P. adonis*, *P. arizonensis*, *P. cruentus*), (2) convex epigynal flaps regained (except *P. cruentus* and only partially in *P. mystaceus*), (3) posterior of flaps indistinct, appearing to be underneath duct opening (*P. adonis* and *P. mystaceus*).

16. *P. arizonensis*, *P. cruentus*, and *P. mystaceus* share several unique male characters: (1) well-developed macrosetae on the distal end of the cymbium, (2) femur I with black dorsal subproximal tuft, (3) femur I prolateral stripe yellow, (4) leg I fringes all yellow (rest of *toro* clade all white except possibly *P. adonis*).

17. *P. arizonensis* and *P. cruentus* have the synapomorphies of the cymbial macrosetae restricted to the distal end of the embolar groove, and the venter of the female abdomen has a mottled coloration.

18. *P. adonis* and *P. tigris* share in males a narrow, short stripe from the ALE to below the PME, and the clypeal/cheliceral fringe is uniquely yellow.

19. The next generic subdivision is defined by two female synapomorphies: (1) flaps regained (parallel straight [most basal], divergent posteriorly, or excavate anteromedially [and often slightly convergent posteriorly], but not convex as in *mystaceus* group), (2) spermathecal duct heads narrow.

20. The *insignarius* group does not have a unique synapomorphy but is the only group in the genus with both a distal flange on the embolus basal portion and a rudimentary epigynal septum (a few scattered outliers have either but not both; *Paraphidippus* has both as well, which may indicate these are plesiomorphic states, although given the distribution within *Phidippus*, I suspect they are independently derived).

21. The *boei* clade (except *P. tyrrelli*) is nearly unique in having the male femur I prolateral fringe mostly black except white proximally (*P. tux* and *Paraphidippus basalis* also have this state).

22. *P. carneus*, *P. adumbratus*, and *P. tyrrelli* are nearly unique in having the male femur I retrolateral fringe mostly black except white proximally (*P. tux* also has this state).

23. *P. adumbratus* and *P. tyrrelli* are almost unique in having three complete vertical white stripes on each chelicera (as does *P. venus*). These two species also have leg I fringes that are unusually dense and similar in their striking banded coloration.

24. The *pompatus* clade shares within the group the state of having diverging epigynal flaps (although this state occurs elsewhere); *P. pompatus* and *P. phoenix* uniquely share sinuate inner flap edges.

25. *P. phoenix* and *P. insignarius* have a synapomorphy of the male femur I prolateral surface entirely covered with white scales. They share with the *P. whitmani* - *P. concinnus* pair having a white, complete cheliceral fringe.

26. This section of the genus is characterized by the loss of both the marginal band and the cheek band (although both are regained later in a few terminal groups). Two synapomorphies here are lengthening of the tibial apophysis and shortening of the embolus apical portion (with one and two reversals later, respectively).

27. The *otiosus* group, like the *insignarius* group, is not supported by a synapomorphy. Like the latter group, it shares two character states which together are not shared by any other group (but in this case, one other species, *P. workmani*, does share them). The two states are: (1) lack of a distal, submarginal ridge on the palea, (2) embolus apical portion about half length of embolar groove. Based on earlier analyses, this is the weakest supported group; in some versions it splits into two groups, with *P. dianthus* sometimes going with the *P. regius* - *P. otiosus* pair, and sometimes with the *P. californicus* - *P. pius* pair. The male of *P. dianthus* is unknown; more male characters than female are in the phylogenetic analysis, which undoubtedly contributes to this variability (see further discussion under *otiosus* group).

28. In this analysis, *P. dianthus* is linked with the *P. regius* - *P. otiosus* pair based on the female clypeus band being iridescent (few other species have this state, but it is variable in both *P. regius* and *P. otiosus*). I suspect *P. dianthus* may actually be the sister species of *P. californicus*, but without having the male of *P. dianthus*, the character states which could make this association are absent.

29. *P. regius* and *P. otiosus* are linked by having a broad rudimentary epigynal septum (which also occurs in the *insignarius* group and *Paraphidippus*) and by having the epigynal pocket about equal in width to the distance between the flaps (which occurs in three other terminal groups). Since they hybridize in the laboratory and occasionally in the wild, I feel confident about

their status as sister species despite the lack of a confirmed synapomorphy between them.

30. *P. californicus* and *P. pius* have the single synapomorphy of having the embolus apical portion narrow throughout its length.

31. All species from this juncture have the palea as long as or longer than wide; all previous species except *P. boei* (*insignarius* group) had the palea wider than long. Two synapomorphies are: (1) palea with a distal shelf only medial to the embolus apical portion (lost entirely in one later clade), (2) embolus apical portion slightly recurved (vs. moderate to strongly recurved). Also, here the embolus apical portion becomes distinctly shorter than half the embolar groove (reversals exist later).

32. Two distinct groups branch off here based on sharing two synapomorphies: (1) palea with horizontal ridges medially, (2) palea narrowly notched ectal distally (except *P. audax* and *P. tux*).

33. The *cardinalis* group consists of two subgroups which uniquely share the complete loss of the embolic haematodocha distal shelf.

34. The *tux* clade is synapomorphic for the palea and distal part of the tegulum having a concave shape (except for *P. clarus* which has this area flat like *P. bidentatus*).

35. *P. clarus*, *P. mimicus*, and *P. cardinalis* share the secondary loss of palea diagonal ridges and the presence of median and basal palea horizontal ridges with the *P. albulatus* - *P. maddisoni* pair (see branch 39). *P. clarus* and *P. cardinalis* share a heavily sclerotized, internally projecting pocket with the four terminal members of the *aureus* clade (see branch 55).

36. *P. mimicus* and *P. cardinalis* have four synapomorphies in male characters: (1) palea ectal border creased distally, (2) embolus basal portion not extending laterally, (3) embolus basal portion a moderately sclerotized abbreviated loop around a membranous area, (4) embolus tip strongly bent dorsally.

37. The *venus* clade is defined by reversals to a short tibial apophysis, the palea wider than long, an embolus apical portion longer than half the embolar groove, and the marginal band is present (see branch 26).

38. *P. cerberus*, *P. maddisoni*, and *P. albulatus* have the synapomorphy of the embolus apical portion being broad throughout with a forked tip (although barely forked in *P. cerberus*).

39. *P. maddisoni* and *P. albulatus* share a strongly forked embolus apical portion. They also secondarily lost the palea diagonal ridges and the palea has median and basal horizontal ridges like most of the *tux* clade (see branch 35).

40. The *audax* group contains six species which uniquely have partial vertical ridges in the central distal part of the palea.

41. The *felinus* clade uniquely has the embolic suture greatly expanded and strongly invaginated into the proximal medial side of the embolic stalk (except *P. bidentatus*), appearing as a pale membranous area. *P. felinus* shares with *P. audax* a short, broad embolus apical portion which abruptly tapers distomedially.

42. The four remaining group members share a reversal in the loss of the palea distal submarginal ridge with the *cardinalis* and *otiosus* groups. The synapomorphy at this branch is the lack of distinct spermathecal duct heads.

43. *P. pulcherrimus* and *P. princeps* uniquely share at least three male states: (1) palea extremely wide, (2) palea proximal ectal margin extended distal to embolus basal portion, (3) embolus apical portion toothed distally. A reversal also occurs here of the embolus apical portion being longer than half the embolar groove (as in branch 37).

44. *P. audax* and *P. bidentatus* share the synapomorphy of having the male endite concave laterally.

45. The last two groups are united by two uniquely shared states: (1) partial vertical ridges in the ectal distal area of the palea, (2) the distal ectal margin of the palea is extended (laterally at this branch, distally at branch 53).

46. The *johnsoni* group is not uniquely defined in this version of the phylogeny, although some earlier versions placed *P. amans* as sister species specifically with *P. lynceus*. *P. amans* lacks the character (ectal crease on the palea) which defines the rest of the group (perhaps secondarily lost?). All members of the group (except *P. lynceus*) have flaps which diverge posteriorly, which is shared with parts of other species groups. The embolus apical portion length is about half the embolar groove, which is also shared elsewhere (but not with the *purpuratus* group, which all have a very short embolus apical portion).

47. The *lynceus* clade is well-defined by the unique presence of a prominent ectal crease on the palea.

48. The remaining five species of this group do not share a single synapomorphy, but are united by sharing both a distinct septum in the anterior of the epigynum with a continuation of the septum as a narrow sagittal ridge in the middle of the epigynum (found elsewhere only in *P. workmani* and *P. pulcherrimus* in the *audax* group, and *P. tux* in the *cardinalis* group). Both *P. workmani* and *P. tux* are basal in their respective groups and also have diverging epigynal flaps (see branch 46).

49. *P. whitmani* and *P. concinnus* both have a complete white cheliceral fringe, which they share with the *P. phoenix* - *P. insignarius* pair. They also have completely white leg I fringes, which they share with the same two species plus some members of the *toro* clade.

50. *P. cryptus*, *P. johnsoni*, and *P. olympus* share with the *purpuratus* group (except *P. morpheus*) having the palea longer than wide.

51. *P. johnsoni* and *P. olympus* share three synapomorphies: (1) palea narrowly notched ectal distally, (2) four pair of major bends in the spermathecal ducts, (3) at least three pair of supernumerary bends in the spermathecal ducts. They also share with the *aureus* clade the presence of an enlarged tibial apophysis base.

52. The *purpuratus* group is defined by two synapomorphies: (1) a very short embolus apical portion that abruptly tapers distally, (2) lateral band II is absent (or at least obscured by the overlying scale cover).

53. The *purpuratus* group minus *P. morpheus* is well-defined by three male synapomorphies: (1) distal half of palea bent toward venter, (2) distal ectal margin of palea extended distally and lobed (except not lobed in *P. borealis*), (3) palea with mid-ectal bulge, usually notched on one or both sides of bulge.

54. The *aureus* clade uniquely shares the presence of extended vertical ridges in the ectal area of the palea.

55. The four terminal species of the *aureus* clade have a synapomorphy of the tibial apophysis bifurcate with pointed tips (although *P. ursulus* usually has the proximal tip poorly developed).

56. *P. nikites* and *P. apacheanus* uniquely have five major bends in the spermathecal ducts.

57. *P. tyrannus* and *P. ursulus* have three synapomorphies: (1) male endites convex laterally with cusps pointing inward, (2) anterior part of epigynum deeply depressed below secondary rim, (3) three pair of major bends in the spermathecal ducts (*P. dianthus* also has three pair, but the orientation is different).

58. The *borealis* clade is defined by three synapomorphies: (1) subdistal partial vertical ridges in the ectal part of the palea, (2) female clypeus band always gray, (3) middle of epigynum deeply depressed.

59. *P. ardens*, *P. texanus*, and *P. purpuratus* have three unique states among them: (1) male endite cusp set slightly medially from anterolateral edge, (2) median diagonal ridges present on palea, (3) palea horizontal ridges only present basally.

60. *P. texanus* and *P. purpuratus* are united by the embolus apical portion being angled dorsally without being recurved.

KEYS TO SPECIES

MALES:

- 1(0). Cheliceral distal dorsal tubercle absent 3
 – Cheliceral distal dorsal tubercle pronounced 2
- 2(1). Spots III linear; median iridescent scales, paired matte black patches on abdomen; membranous area apparent medially on embolic stalk . . . *audax*
 – Spots III oval; no iridescent scales or matte black patches on abdomen; no medial membranous area apparent on embolus *regius*
- 3(1). Integument expansion present laterally below and behind PME (“cheek” area; Fig. 79, 88, 100) 4
 – Lateral integument expansion absent 6
- 4(3). Without distal cymbial macrosetae and femur I black dorsal subproximal tuft *adonis*
 – With distal cymbial macrosetae and femur I black dorsal subproximal tuft (Fig. 80, 87, 94, 347) 5
- 5(4). With mostly black ventral abdominal fringe; embolus apical portion slender *arizonensis*
 – Without black ventral abdominal fringe; embolus apical portion broad and truncate *cruentus*
- 6(3). With distal cymbial macrosetae and femur I black dorsal subproximal tuft *mystaceus*
 – Without distal cymbial macrosetae and femur I black dorsal subproximal tuft 7
- 7(6). A pair of dense setal crests in OQ replace dorsal tufts (Fig. 19, 36) 8
 – No pair of dense setal crests in OQ 11
- 8(7). Dorsum of cymbium pale, semi-glabrous, with scattered setae and red-brown spots (Fig. 38); no femur I prolateral subdistal band *carolinensis*
 – Dorsum of cymbium dark, densely setose; white femur I prolateral subdistal band (Fig. 345) 9
- 9(8). Femur I distal ventral bulge pale with dark spot, distal retroventral tuft yellow (Fig. 345) . . . *putnami*
 – Femur I distal ventral bulge metallic blue and distal retroventral tuft gray 10
- 10(9). Femur I ventral stripe white basally; leg I fringes mixed black, brindled and white; red median band, short white stripes on chelicerae . . . *richmani*

- Femur I ventral stripe absent; leg I fringes mixed black, brindled, and yellow; chelicerae with complete white stripes, no red band *comatus*
- 11(7).** Cymbium covered dorsally with yellow (rarely white) scales *georgii*
- Cymbium without yellow scales dorsally 12
- 12(11).** Femur I ventral stripe white (Fig. 348) 13
- Femur I ventral stripe absent 16
- 13(12).** Three broad white OQ stripes present from AER to halfway between PME and PLE *tigris*
- Median white OQ stripes absent 14
- 14(13).** Transverse integumental ridge in middle of OQ present *toro*
- Transverse integumental ridge absent 15
- 15(14).** Leg I fringes all white; chelicerae completely fringed with white *insignarius*
- Leg I fringes alternating black (basal) and white (distal); chelicerae with white stripes *kastoni*
- 16(12).** Embolic stalk with expanded membranous area on medial edge 17
- Embolic stalk, if present, lacking an obvious membranous area 19
- 17(16).** Palea about as long as wide; embolus apical portion a short recurved blade (Fig. 247) *felinus*
- Palea much wider than long; embolus apical portion a long, medially recurved blade with distal tooth. (Fig. 226, 230) 18
- 18(17).** Submarginal band absent *princeps*
- Submarginal band present as a transverse spot behind and below each PLE *pulcherrimus*
- 19(16).** Endite wider both distally and basally (concave laterally); dorsal abdomen with copper or green scales *bidentatus*
- Endite convex or wider distally 20
- 20(19).** Endite very wide and rounded (convex laterally); endite cusps converging 21
- Endite wider distally, becoming narrower toward base; endite cusps diverging 22
- 21(20).** Palea ectal border distal to tegular shoulder notched; embolus apical portion a short recurved blade; OQ bare, abdomen only covered with red scales dorsally *ursulus*
- Palea exceptionally broad for its length with ectal border distal to tegular shoulder smoothly curved (Fig. 317); embolus apical portion a triangular or conical button; OQ and abdomen covered with red scales dorsally *tyrannus*
- 22(20).** Palea creased (e.g., Fig. 274, 279, 286) 23
- Palea not creased 29
- 23(22).** Leg I fringes all white; chelicerae completely fringed with white *whitmani*
- Leg I fringes alternating black and white; chelicerae not striped, fringed or banded 24
- 24(23).** Palea wider than long *lynceus*
- Palea as long as or longer than wide 25
- 25(24).** Palea distinctly longer than wide 26
- Palea about as long as wide (within 10%) 28
- 26(25).** Embolus apical portion a short recurved blade, abruptly tapering distally; OQ covered with red scales *morpheus*
- Embolus apical portion a short recurved spike, gradually tapering distally; OQ lacking red 27
- 27(26).** Tibial apophysis tip narrow, pointed; spots II separated *olympus*
- Tibial apophysis tip broad, flattened; abdominal spots usually absent (if present, spots II fused into trapezoid) *johnsoni*
- 28(25).** Femur I prolateral distal band white; submarginal band very broad *concinna*
- Femur I prolateral distal band absent; submarginal band absent *cryptus*
- 29(22).** Leg I fringes all white *phoenix*
- Leg I fringes bi- or tri-colored 30
- 30(29).** Leg I fringes mixed black, brindled and yellow (rare form lacks crests, femur I bulge) *comatus*
- Leg I fringes alternating black and white 31
- 31(30).** Endite cusp on anterolateral edge 32
- Endite cusp medial to anterolateral edge 59
- 32(31).** Embolus basal portion not projecting distal to palea, not visible from ventral view (if partially visible ectally, than dorsum all gray) 33

- Embolus basal portion visible from ventral view, projecting distal to palea 34
- 33(32).** Chelicerae striped; embolus apical portion extremely long and slender, longer than embolar groove; abdominal dorsum red *zethus*
- Chelicerae unstriped; embolus apical portion a long recurved spike; dorsum gray *octopunctatus*
- 34(32).** Palea distinctly longer than wide 35
- Palea as wide as or wider than long 39
- 35(34).** Tibial apophysis bifurcate 36
- Tibial apophysis simple 37
- 36(35).** Tibial apophysis tips diverging *apacheanus*
- Tibial apophysis tips converging *nikites*
- 37(35).** Palea ectal border notched distal to tegular shoulder, medial distal edge sclerotized; tibial apophysis tip elongate and flattened *aureus*
- Palea ectal border distal to tegular shoulder smoothly curved, distal edge not strongly sclerotized; tibial apophysis tip not elongate 38
- 38(37).** Posterodorsal U-shaped, dark, abdominal band; embolus apical portion a short straight spike *tux*
- Median black abdominal stripe not modified; embolus apical portion a short, wide blade apparently with three points *borealis*
- 39(34).** Palea about as long as wide (within 10%) 40
- Palea distinctly wider than long 45
- 40(39).** Chelicerae vertically striped; anterior ocular band white *venus*
- Chelicerae unstriped; no anterior ocular band 41
- 41(40).** Palea ectal border distal to tegular shoulder notched 42
- Palea ectal border distal to tegular shoulder smoothly curved 44
- 42(41).** Spots II fused into transverse red band (Fig. 194); femur I proximal band white *mimicus*
- Spots II otherwise; no femur I prolateral proximal band 43
- 43(42).** Submarginal band absent; abdomen black with white basal band, red lateral scale cover *clarus*
- Submarginal band a transverse spot behind and below PLE; abdomen black with white bands and spots (rarely red laterally) *workmani*
- 44(41).** Submarginal band absent; abdominal dorsum entirely red; femur I proventrolateral fringe black, white proximally *boei*
- Submarginal band white (variable in width) to absent; abdominal dorsum red, usually with white markings; femur I proventrolateral fringe black, white distally and proximally *californicus*
- 45(39).** Chelicerae striped 46
- Chelicerae unstriped 51
- 46(45).** Embolus apical portion broad entire length, tip forked; palea distal edge not strongly sclerotized *albulatus*
- Embolus apical portion tip not forked; palea distal edge strongly sclerotized 47
- 47(46).** Cheliceral stripes distinctly gray; basal band (and most of dorsal abdomen) tan 48
- Cheliceral stripes distinctly white; basal band white, dorsal abdomen mostly red or orange 49
- 48(47).** Embolus apical portion broad, tip tapering to point (if narrow, not in central Texas) *asotus*
- Embolus apical portion narrow (TX) *pruinus*
- 49(48).** Median ocular band a median spot; patella I prolateral scale cover white entire length *vexans*
- Median ocular band absent; patella I prolateral scale cover white proximally 50
- 50(49).** Dorsal abdominal scale cover red; basal and lateral bands often fused together; ventral abdominal integument black *tyrrelli*
- Dorsal abdominal (and OQ) scale cover orange; basal and lateral bands not fused; ventral abdominal integument gray *adumbratus*
- 51(45).** Tibial apophysis tip bifurcate; no femur I prolateral distal band; dorsum red *cardinalis*
- Tibial apophysis simple; femur I prolateral distal band white; dorsum, if red, only on abdomen 52
- 52(51).** Palea ectal border smoothly curved; embolus apical portion a long recurved spike 53
- Palea ectal border distal to shoulder notched; embolus apical part a short recurved spike *amans*
- 53(52).** Embolus apical portion wide entire length 54

- Embolus apical portion gradually tapering distally or slender throughout 55
 - 54(53).** Embolus tip strongly forked *maddisoni*
 - Embolus tip rounded, barely forked *cerberus*
 - 55(53).** Femur I prolateral proximal band absent; in Florida, leg I fringes alternate black and yellow, elsewhere, black and white *otiosus*
 - Femur I prolateral proximal band white; leg I fringes alternate black and white 56
 - 56(55).** Palea distal edge with prominent embolus basal portion (Fig. 125, 136) 57
 - Palea distal edge without prominent embolus basal portion 58
 - 57(56).** Femur I proventrolateral and retroventrolateral fringes black; embolus apical portion very broad but less broad distally *pompatus*
 - Femur I ventrolateral fringes black, white proximally; embolus apical portion narrow *carneus*
 - 58(56).** Median black abdominal stripe unmodified; femur I proventrolateral fringe black, white distally and proximally *californicus*
 - Median black abdominal stripe reduced to 2 parallel lines including spots III and IV; femur I proventrolateral fringe black *pius*
 - 59(31).** Palea distal ectal border undulate; palea length 1.7x or more its width *texanus*
 - Palea distal ectal border notched or smooth; length of palea 1.6x or less its width 60
 - 60(59).** Palea ectal border distal to tegular shoulder notched; abdominal dorsum entirely red *ardens*
 - Palea ectal border distal to tegular shoulder smoothly curved; abdominal dorsum color variable, scales only on lateral edges *purpuratus*
- FEMALES:**
- 1(0).** Epigynum with flaps absent (rudimentary ridges where flaps would be in one species) 2
 - Epigynum with well-developed anterolateral flaps (reduced but present in a few species) 17
 - 2(1).** Long dorsal setae in mid-ocular region (between PME) forming two tufts 3
 - Long dorsal setae in mid-ocular region absent or not forming distinct tufts 6
 - 3(2).** Major posterior duct bends present, visible through integument (Fig. 30) *comatus*
 - Only minor posterior duct bends present, rarely visible through integument 4
 - 4(3).** Posterior ocular band a forward-pointing triangular spot along posterior edge of OQ, reaching middle of OQ (Florida) *richmani*
 - Posterior ocular band absent, or if present, not triangular (not in Florida) 5
 - 5(4).** Epigynal atria lateral; submarginal band absent; carapace and abdominal dorsum mostly brown, the latter with white spots *putnami*
 - Epigynal atria large, circular; submarginal band broad; carapace and abdominal dorsum mostly gray or mixed gray and brown *carolinensis*
 - 6(2).** Anterior epigynum entirely depressed, secondary rim absent; duct heads enormous (Fig. 45) *zethus*
 - Anterior epigynum atria shallowly depressed, secondary rim variable; duct heads smaller 7
 - 7(6).** Median ocular band complete (Fig. 73) *toro*
 - Median ocular band broken or absent 8
 - 8(7).** Median ocular band broken into three spots or a median spot 9
 - Median ocular band absent 12
 - 9(8).** Epigynal flaps represented by rudimentary anterolateral ridges (Fig. 90) *mystaceus*
 - Epigynal flaps absent 10
 - 10(9).** Partial median white abdominal stripe present centrally (Fig. 54); abdominal venter usually dark, may have lighter stripes *vexans*
 - Median white abdominal stripe absent; abdominal venter usually pale or light gray, with or without stripes 11
 - 11(10).** Anterior epigynum same plane as surrounding integument; abdominal venter gray or pale (may have three light gray stripes) *asotus*
 - Mid-anterior epigynum raised above surrounding integument; abdominal venter gray with pale stripe each side *pruinosis*
 - 12(8).** Venter pale with black stripe each side (and sometimes a partial median stripe) (Fig. 187); epigynal middle entirely shallowly depressed [flaps present but very small] (Fig. 184) *clarus*

- Venter otherwise; epigynal middle shallowly depressed laterally, sagittal plane raised 13
- 13(12).** Dorsal abdominal pattern with three or four pairs of median scale-covered spots; epigynum with well-developed anterior atria 14
- Abdominal pattern without median spots formed from scales (if white spots present, dorsum of abdomen brown) or with at least six pairs of median integumental spots; epigynum lacks atria 16
- 14(13).** Anterior ocular band gray to tan *kastoni*
- Anterior ocular band absent (may have scattered iridescent scales) 15
- 15(14).** Abdominal dorsum mostly gray *asotus*
- Abdominal dorsum with yellow or red lateral scale cover (Fig. 78) *cruentus*
- 16(13).** Abdominal venter primarily dark, may have lighter stripes; dorsum mostly brown *georgii*
- Abdominal venter primarily pale or light gray, may have stripes; dorsum gray *octopunctatus*
- 17(1).** Abdominal dorsum with broad, dark, U-shaped area, darker posteriorly (like Fig. 181) *tux*
- Abdominal dorsum without U-shaped mark . . . 18
- 18(17).** Median black abdominal stripe reduced to two black parallel lines including spots III and IV . . 19
- Median black abdominal stripe variable in extent (but not unusually modified) to absent 21
- 19(18).** Epigynal flaps parallel posteriorly, slightly concave medially; width of pocket rim about equal to distance between posterior ends of flaps (Fig. 198); dorsum red or brown (rarely) *cardinalis*
- Epigynal flaps divergent posteriorly; width of pocket rim much less than distance between posterior ends of flaps; dorsum yellow or orange 20
- 20(19).** Epigynal middle entirely shallowly depressed; abdominal venter black with two white stripes submedially (central California) *aureus*
- Epigynal middle shallowly depressed laterally, sagittal plane raised; abdominal venter pale (may have three light gray stripes) *pius*
- 21(17).** Long dorsal setae in mid-ocular region forming two tufts 22
- Long dorsal setae in mid-ocular region absent or not forming tufts 26
- 22(21).** Median ocular band complete (may appear to be broken into five spots) 23
- Median ocular band absent 25
- 23(22).** Epigynal flaps parallel curved (outside edge of flap distinctly convex, anterior edges and posterior edges of each flap about equidistant from other flap); flap end indistinct (Fig. 96) *adonis*
- Epigynal flaps parallel straight posteriorly (more or less); flap end distinct 24
- 24(23).** Abdominal venter pale (may have three light gray stripes); lateral band II an oblique stripe *albulatus*
- Abdominal venter mostly gray or black; lateral band II a spot *maddisoni*
- 25(22).** Abdominal spots II fused into truncated triangle; epigynal middle entirely shallowly depressed *bidentatus*
- Abdominal spots II fused, expanded into broad red transverse band; epigynal middle shallowly depressed laterally, sagittal plane raised *mimicus*
- 26(21).** Anterior epigynum medially raised above surrounding integument *concinnum*
- Anterior epigynum not medially raised 27
- 27(26).** Anterior epigynum atria deeply depressed below secondary rim; flaps widely divergent, fused anteriorly, with long, slender, median septum . . 28
- Anterior epigynum atria shallowly depressed; flaps, septum otherwise 29
- 28(27).** Abdominal dorsum brown; OQ scales gray; clypeal band present (usually white) *tyrannus*
- Abdominal dorsum black with dark red stripe each side; OQ scales absent (or sparse and iridescent); clypeal band absent (or iridescent only) *ursulus*
- 29(27).** Median ocular band complete (may be broken into five spots) 30
- Median ocular band broken into three spots, one spot, or absent 32
- 30(29).** Epigynal flaps strongly divergent posteriorly and sinuate on inner edges *phoenix*
- Epigynal flaps parallel straight posteriorly or slightly convex, not sinuate medially 31
- 31(30).** Abdominal venter pale, variegated with irregular dark circular markings (Fig. 82) *arizonensis*

- Abdominal venter black to gray, may have lighter stripes *californicus*
- 32 (29).** Median ocular band broken into three spots or a median spot 33
- Median ocular band absent 36
- 33(32).** Median ocular band broken into three spots; epigynum without anterior septum *tigris*
- Median ocular band a median spot; epigynum with distinct anterior septum 34
- 34(33).** Epigynal flaps strongly divergent posteriorly; epigynal middle shallowly depressed . . . *workmani*
- Epigynal flaps parallel straight posteriorly; epigynal middle shallowly depressed laterally, sagittal plane raised 35
- 35(34).** Anterior ocular band white; abdominal venter pale (may have three gray stripes) . . . *adumbratus*
- Anterior ocular band absent (may have iridescent scales); abdominal venter black to gray . . . *regius*
- 36(32).** Anterior medial edges epigynal flaps excavate (may appear convergent posteriorly) 37
- Flaps parallel (even if curved) or divergent posteriorly, not excavate 40
- 37(36).** Epigynal middle entirely shallowly depressed 38
- Epigynal middle shallowly depressed laterally, sagittal plane raised 39
- 38(37).** Abdominal venter black to gray; OQ scales yellow to red (usually) *nikites*
- Abdominal venter pale with black stripe each side (and sometimes partial median black stripe); OQ scales absent or sparse, iridescent *clarus*
- 39(37).** Abdominal venter black with white stripe each side; OQ scales sparse, iridescent *audax*
- Abdominal venter black; OQ scales gray . . *lynceus*
- 40(36).** Epigynal flaps parallel straight posteriorly (more or less) 41
- Epigynal flaps strongly divergent posteriorly . . 63
- 41(40).** Epigynal middle deeply depressed, often transversely rectangular (may have sagittal ridge present) (Fig. 324, 329, 335) 42
- Epigynal middle shallowly depressed, never rectangular (may have sagittal ridge) 45
- 42(41).** Narrow median white abdominal stripe present centrally (Fig. 331) *texanus*
- No narrow median white abdominal stripe 43
- 43(42).** OQ scales gray; abdominal dorsum red laterally (Fig. 325); abdominal venter primarily dark, may have lighter stripes *ardens*
- OQ scales absent (or sparse and iridescent); abdominal dorsum usually with variegated white pattern laterally; abdominal venter primarily pale or light gray, with or without stripes 44
- 44(43).** Flaps complete (medial, lateral, and posterior edges well-defined); epigynal middle usually shallowly depressed, if deeply depressed, not rectangular, but with strong septum *borealis*
- Flaps incomplete laterally (Fig. 335); epigynal middle deeply depressed, rectangular (northern) or with circular depressions (eastern) and with median sagittal ridge across depression . . *purpuratus*
- 45(41).** Epigynal middle shallowly depressed 46
- Epigynal middle shallowly depressed laterally, sagittal plane raised 48
- 46(45).** OQ scales yellow to red; clypeal band absent (or iridescent only) *apacheanus*
- OQ scales absent or sparse, iridescent; clypeal band present (usually white) 47
- 47(46).** Abdominal venter black with white lateral stripes; submarginal bands transverse spots behind and below PME, sometimes fused into a single wide transverse band (SE U.S.) . . . *pulcherrimus*
- Abdominal venter primarily pale or light gray, may have stripes; no submarginal band . . *borealis*
- 48(45).** Abdominal venter pale, variegated with irregular dark circular markings *arizonensis*
- Abdominal venter not variegated 49
- 49(48).** Abdominal venter pale anteriorly, dark posteriorly with narrow anterior central black stripe and partial black lateral stripes (Florida) (Fig. 157). *otiosus*
- Abdominal venter stripes complete or absent . . 50
- 50(49).** Abdominal venter black with two white stripes submedially (Fig. 257) *whitmani*
- Abdominal ventral stripes different 51
- 51(50).** Abdominal venter black with white stripe each

- side (Fig. 240) 52
- Abdominal venter with three or no stripes 53
- 52(51).** OQ scales gray; clypeal band present (usually white); abdomen mostly brown *princeps*
- OQ scales absent or iridescent; clypeal band absent or iridescent; abdomen mostly black .. *audax*
- 53(51).** Abdominal venter black to gray 54
- Abdominal venter pale (may have three light gray stripes) 62
- 54(52).** Anterior ocular band white 55
- Anterior ocular band absent (may have iridescent scales) 56
- 55(54).** Epigynal flaps less than or equal to 30% total epigynal length; epigynal flaps distinctly connected anteriorly (Fig. 108) *tyrrelli*
- Epigynal flaps greater than 33% total epigynal length; epigynal flaps apparently connected by secondary rim (flaps proper not actually connected; Fig. 122) *carneus*
- 56(54).** OQ scales yellow; spermathecal duct first bend squared off (Fig. 296) *morpheus*
- OQ scales absent (or sparse, iridescent); spermathecal duct first bend not squared off 7
- 57(56).** Width of pocket rim clearly less than distance between posterior ends of flaps *boei*
- Width of pocket rim about equal to distance between posterior ends of flaps 58
- 58(57).** No spots IV, spots III large, oval (SE U.S., Caribbean) *regius*
- Spots IV usually present (if absent, abdomen only with dorsal scale cover); spots III otherwise ... 59
- 59(58).** Spots IV fused with spots III and lateral band IV on each side, forming a pair of enlarged, irregular tripronged spots (Fig. 156) *otiosus*
- Spots IV not fused with other spots or bands .. 60
- 60(59).** Epigynal flaps distinctly separated anteriorly (Fig. 163) *californicus*
- Flaps apparently connected anteriorly 61
- 61(60).** Epigynal flaps apparently connected by secondary rim (flaps proper not actually connected); primary and secondary rims moderately separated (Fig. 122) *carneus*
- Epigynal flaps distinctly connected anteriorly; primary and secondary rims noticeably separated (Fig. 154) *otiosus*
- 62(53).** Lateral band II an unattached oblique stripe; OQ scales gray, abdomen brown *felinus*
- Lateral band II an oblique stripe attached to spots III and IV; OQ scales sparse, iridescent, abdominal dorsum mostly iridescent *dianthus*
- 63(40).** Epigynal middle deeply depressed (sagittal ridge may be present); abdominal venter mostly pale or light gray, may be striped *purpuratus*
- Epigynal middle shallowly depressed laterally, sagittal plane raised; abdominal venter primarily dark, may have lighter stripes 64
- 64(63).** Abdominal venter striped 65
- Abdominal venter not striped 66
- 65(64).** Abdominal venter black with two white stripes submedially; anterior epigynal septum long; dorsum usually dull yellow *olympus*
- Abdominal venter black with white stripe each side; anterior epigynal septum very short (Fig. 143); with white submarginal bands and yellow to red lateral abdominal scale cover *insignarius*
- 66(65).** Width of pocket rim clearly less than distance between posterior ends of flaps; epigynum without anterior septum (mainland Mexico) 67
- Width of pocket rim about equal to distance between posterior ends of flaps; epigynum with distinct anterior septum (Canada, U.S., Baja California) 69
- 67(66).** Submarginal band absent; inner edge of epigynal flaps sinuate (Fig. 133) *pompatus*
- Submarginal band present; inner edge of epigynal flaps not sinuate 68
- 68(67).** Submarginal band broad from ALE to thoracic slope; abdominal dorsum brown *cerberus*
- Submarginal band narrow from ALE to thoracic slope; abdominal dorsum red *amans*
- 69(66).** Abdominal dorsum mostly brown; epigynal flaps 30-33% total epigynal length, ducts with two pair major bends (Fig. 261, 262) *cryptus*
- Abdominal dorsum mostly red; epigynal flaps 30% or less total epigynal length, ducts with four pair major bends (Fig. 268, 269) *johnsoni*

SPECIES GROUPS

octopunctatus group

This group consists of two species which have an underlying integumental pattern of six pair of pale spots on the abdominal dorsum that is different from other members of the genus (*P. georgii* may also have a typical pattern of four pair of scale spots). They also lack iridescent color on the chelicerae. The epigynal atria are lateral and poorly developed, lacking a medial lightly sclerotized area, and a groove extending from the duct opening is lacking. The duct openings are laterally placed on a broadly raised median longitudinal area, similar to *Paraphidippus*. The embolus spiral is attached somewhat dorsal to the palea (rather than immediately adjacent to it) with a distal "shelf" between them formed by a portion of the embolic haematodocha, like the *putnami* group.

Due to its tenuous position at the base of the genus and the variation which sometimes makes females difficult to identify to species, this group should be reexamined at a future date.

Phidippus octopunctatus (Peckham & Peckham 1883)

Figs. C1, 7-11; Map 1

Attus octopunctatus Peckham & Peckham 1883:6; holotype (♂) in MCZ, examined

Attus opifex McCook 1883:276 (actual date of publication: 15 January 1884) (first synonymized by Richman & Cutler 1978); holotype (♀) lost

Phidippus octopunctatus: Peckham & Peckham 1888: 21, 1909:385,421; Marx 1890:569; Banks 1910: 64; Bonnet 1958:3524; Proszynski 1971b:456; Jung & Roth 1974:33; Richman & Cutler 1978:96; Richman 1981a:19; Edwards 1984:48; Platnick 1993:795, 1997:920; Maddison 1996:231,243

P. opifex: Peckham & Peckham 1888:20, 1901:288, 1909:384,388,392; Marx 1890:569; McCook 1890:149-50, 1894:43; Coquillet 1893:24; Davidson 1893:194; Banks 1901:588, 1904:357, 1910: 64; Scheffer 1905a:99; Coolidge 1907:376; Cockerell 1911:256; Worley & Pickwell 1931:116-7,120; Gertsch & Jellison 1939:11; Bonnet 1958: 3524; Proszynski 1971b:456; Kaston 1978:258; Hill 1979a:195,202; Jackson 1986b:1195, 1987: 2,4

Parnaenus griseus Peckham & Peckham 1901:288,301 (first synonymized by Banks in Peckham & Peck-

ham 1909)

Dendryphantes opifex: Simon 1901:617; Petrunkevitch 1911:638; Moles 1921:45; Roewer 1954:1214; Proszynski 1976:148; Platnick 1993:752

D. octopunctatus: Petrunkevitch 1911:638; Lutz 1915: 105; Roewer 1954:1214; Platnick 1993:751

Etymology: Latin adjective, *octopunctatus*, 8-spotted (an unfortunate epithet, since the species does not obviously have 8 spots).

Type locality: USA: MISSOURI: H. C. McCook (only data given).

Geographic Range and Records: Missouri west to Pacific states, south to northern Mexico. **MEXICO:** Chihuahua: Catarinas; Jalisco: Guadalajara; Morelos: Tepotzlan; San Luis Potosi: Charcas; Sonora: Cananea (6mi.E.). **USA:** Arizona: Cochise, Maricopa, Pima, Pinal, Santa Cruz, Yavapai; California: Alameda, Contra Costa, Kern, Los Angeles, Mendocino, Riverside, San Bernardino, San Diego, San Francisco, San Luis Obispo, Santa Barbara, Sierra; Colorado: Boulder, Denver, Larimer, Pueblo; Iowa: Boone; Idaho: Payette; Kansas: (Sorkin); Missouri: (type); Montana: Jefferson; Nebraska: Dawes, Scotts Bluff, Sioux, Thomas; New Mexico: Bernalillo, Doña Ana, Eddy, Hidalgo, Lincoln, Quay, San Miguel; Nevada: Mineral, Washoe; South Dakota: Custer; Texas: Brewster, Jeff Davis, Montgomery; Utah: Cache, Piute, Salt Lake, Utah; Washington: Asotin, Columbia.

Biology: This is a field, prairie, and desert grassland species which matures in the summer.

Comments: This is the only large, gray species without markings throughout most of its range. Epigynal variation similar to *P. georgii* at scattered localities in a few western U. S. states is presumed not to reflect the presence of the latter species, since no males of *P. georgii* have ever been found within the United States. Also, fresh females with this epigynal variation have the gray dorsal color of *P. octopunctatus*.

Diagnosis: The males are uniquely black with a gray, unmarked dorsum. Preserved specimens also differ from *P. georgii* males by the longer embolus apical portion and by lacking the distinctive cymbial color of the latter species. In life, the light gray females are distinctive, but after prolonged preservation are very similar in appearance to some *P. georgii* females. Frequently six pairs of median pale integumental "spots" may be seen after preservation. The epigynum is usually distinctive, although an occasional female will have an epigynum like that of *P. georgii*.

Description:

MALE: BL 9.35 (11.17) 13.19, CL 2.91 (5.10) 6.64, CW 2.49 (4.33) 5.64.

Carapace: Post-PME tuft 2x width of AME. OQ scales gray, extending to upper thoracic slope, sparse lateral scale cover gray. Marginal band a narrow gray line from clypeus to PLE. Clypeus fringe white.

Palp: Dorsal stripe white or gray, mostly on distal edges of femur, or femur, patella, and tibia. Tibial apophysis stout, elongate triangular. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, gradually tapering distally, arising dorsal to and separated from distal edge of palea by a shelf.

Leg I: Fringes alternating black and white, short to medium length. Patella prolateral scale cover white proximally.

Abdomen: Scale cover gray on entire dorsum. Venter black.

FEMALE: BL 10.19 (14.92) 18.87, CL 4.81 (5.89) 6.81, CW 3.74 (4.77) 5.64.

Carapace: Sub-PME setae forming a horizontal fringe (double row). Tuft setae about 2x width of AME. OQ scales gray, or gray and tan; lateral scale cover gray. Clypeus fringe white; band white, gray or tan.

Abdomen: Scale cover gray on entire dorsum. Venter gray (with white or gray scale cover).

Epigynum: Flaps absent. Anterior deeply depressed only at duct openings, shallower depression connecting openings anteriorly. Middle shallowly depressed laterally, sagittal plane broadly raised, convex without sagittal ridge. Duct heads broad, 2 pair major bends, 3 pair median minor bends, 1 pair supernumerary bends, 4 pair posterior minor bends.

Phidippus georgii
Peckham & Peckham 1896

Figs. 12-16; Map 1

Phidippus georgii Peckham & Peckham 1896:12; holotype (♀) in MCZ, examined

P. georgii: Banks 1898:280; Peckham & Peckham 1901:286; F.O.P.C. 1901:282,285; Bonnet 1958:3520; Proszynski 1971b:455; Richman & Cutler 1988:77; Platnick 1993:795

Phidippus brunneus F.O.P.C. 1901:281 (preoccupied by *P. brunneus* Emerton 1891); holotype (♂) and allotype (♀) in BMNH, examined;
NEW SYNONYMY

Dendryphantus deceptus Petrunkevitch 1911:628 (NOMEN NOVUM for *P. brunneus* F.O.P.C.); Roe-

wer 1954:1193; Kraus 1955:73; Platnick 1993:750, 1997:920

Dendryphantus georgii: Petrunkevitch 1911:631; Roe-
wer 1954:1194; Platnick 1993:750

P. deceptus: Bonnet 1958:3519; Proszynski 1971b:
455; Platnick 1993:795

P. georgii (sic): Hoffman 1976:66

Etymology: Patronym, according to Bonnet (1958), after the latinized version (*Georgius*) of George Peckham's name (chosen by Elizabeth Peckham), therefore the *-ii* spelling is correct.

Type locality: MEXICO: (only data given).

Geographic Range and Records: Mexico. **MEXICO:** *Chihuahua*: Catarinas, 5800', 25-VII-1947, 1♂ (W.J. Gertsch, FSCA); *Colima*: Colima (20 mi. N.), 2-VIII-1956, 1♂ (V. Roth, W.J. Gertsch, AMNH); *Tecolapa*, 31-VII-1954, 1♂ (W.J. Gertsch, AMNH); *Guanajuato*: San Miguel de Allende (6.5 mi. NW.), 19-IX-1979, 2♀ (J.C. & J.E. Cokendolpher, FSCA); *Guerrero*: Chilapa: 29-X-1934, 4♀ (L. Schultze, AMNH); 29-X-?? 1♀ (Schulze-Fena, AMNH); 29-X-?? 1♀ (AMNH); Istapan (16.3 mi. SW.), 24-VII-1973, 1♀ (L.R. Erickson, M.A. Soleglad, SWRS); *Hidalgo*: Tenango, 5-X-1947, 1♀ (H.M. Wagner, AMNH); *Jalisco*: Ajijie, 28-VII-1954, 1♂ (W.J. Gertsch, FSCA); La Quemada (20 mi. N.), 28-VII-1959, 1♂ (W.J. Gertsch, AMNH); Lake Sayula, W. side, 3-VIII-1956, 3♀ (W.J. Gertsch, V.Roth, FSCA); San Juan Cosalá, 16-VI-1976, 1♂ (B. Cutler, Cutler coll.); Teguilá, 10-VII-1953, 1♂ (C. & P. Vaurie, FSCA); *Morelos*: Cuernavaca, VIII-1955, 2♂ (N.L.H. Krauss, FSCA); *Nayarit*: La Mesa de Nayarit, 16-21-VII-1955, 5♂ 2♀ (B. Malkin, FSCA); Tepic, 3♀ (N. Banks, MCZ); (no data) 1♀ (AMNH); *Oaxaca*: El Catrin, 3-IX-1964, 1♀ (J. & W. Ivie, AMNH); Oaxaca, 7-VII-1947, 1♀ (B. Malkin, AMNH); Oaxaca (7 mi. W.), Monte Alban Ruins, 17-VIII-1977, 1♀ (C.E. Griswold, T.C. Meikle, UCB); *Puebla*: Tehuiztingo (19 km. SE.), rocky hillside, scattered trees, 7-VIII-1983, 1♀ (W. Maddison, I. Nee, MCZ).

Biology: Unfortunately, little ecological data is available for this species, but I suspect it occurs in habitats similar to the related *P. octopunctatus*; like that species, it also matures in the summer.

Comments: Occasional females of *P. octopunctatus*, far north of the range of *P. georgii*, have epigyna which appear identical to those of *P. georgii*.

The color form with dorsal abdominal spots has spots II fused into a triangle, which to my knowledge is typical only for *Phidippus* and further supports the generic placement of this species.

Diagnosis: The brown males can be distinguished from *P. octopunctatus* by the bright yellow (rarely white) cymbial dorsum, the lack of a gray dorsal scale cover, and the shorter embolus apical portion. Females in alcohol may also show the median pale integumental spots; in these cases they can only be distinguished by the different epigynum, although when living, *P. georgii* females are brown like the males, whereas *P. octopunctatus* are distinctly light gray. F.O. Pickard-Cambridge (1901) even described the species as *P. brunneus*, and gave a color illustration of the brown female. Some females have a more typical pattern of four pair of white spots.

Description:

MALE: BL 7.01 (8.07) 9.27, CL 3.65 (4.17) 4.98, CW 2.82 (3.35) 4.07.

Carapace: Without distinctive markings. Clypeus fringe black.

Palp: Dorsal stripe yellow (rarely white) on femur, patella, tibia, and cymbium, or cymbium only. Cymbium covered dorsally with yellow scales (rarely white). Tibial apophysis stout, elongate triangular. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, gradually tapering distally, arising dorsal to and separated from distal edge of palea by a shelf.

Leg I: Fringes alternating black and white, short to medium in length. Patella prolateral scale cover white proximally. Tibia prolateral scale cover white on proximal edge.

Abdomen: Dorsum brown, sometimes with 4 pair of small white spots. Venter black.

FEMALE: BL 9.19 (11.48) 16.70, CL 4.23 (4.95) 6.31, CW 3.28 (3.90) 5.10.

Carapace: Tuft setae 1.5x or less width of AME. OQ scales gray. Sparse lateral scale cover white. Clypeus fringe white or yellow, band white or yellow (rarely).

Abdomen: Spots I and II small, oval (II rarely fused into triangle). Spots III and IV small, linear. Extra spots (if present) after spots II and III. All spots tan (if present). Scale cover brown or tan, on entire dorsum. Venter gray.

Epigynum: Flaps absent. Anterior deeply depressed only at duct openings, shallower depression connecting openings anteriorly. Middle shallowly depressed laterally, sagittal plane broadly raised (sloping upward posteriorly), convex without sagittal ridge. Duct heads broad, 2 pair major bends, 1 pair median minor bends, 2 pair posterior minor loops.

***putnami* group**

Genitalic synapomorphies, e.g., palea shape, between *P. zethus* and *P. carolinensis* are the main link between the former species and the remaining four species. Earlier versions of the phylogeny sometimes placed *P. zethus* in its own group intermediate between the *putnami* and *octopunctatus* or *mystaceus* groups, or in a group with *P. kastoni* and *P. vexans* from the *mystaceus* group. The placement of *P. zethus* should be regarded as tentative.

It would be interesting to know the courtship behavior of *P. zethus*, to see if it is like the other species of the *putnami* group. The four other species share a unique "rotary" male courtship (Edwards 1980b, Jackson 1982a). Other large genera, e.g., *Habronattus* (Griswold 1987), also have multiple species groups each of which has developed its own set of male decorations and courtship behaviors (e.g., Maddison and Stratton 1988a).

The four terminal species, *P. carolinensis*, *P. comatus*, *P. richmani*, and *P. putnami*, form a strongly unified group. Males have dorsal crests replacing the post-PME tufts, and they perform "rotary" courtships with the legs I and palps (these appendages are rotated in small circular motions). Typically, their leg I fringes are not as strikingly banded as in many other species, but instead have many brindled setae intermixed with monocolored setae (black and either white or yellow). Males except for *P. carolinensis* have a distinctive ventral distal swelling or bulge on femur I, from which a retrolateral tuft arises. The males of these three species also have the prolateral surface of femur I with a subdistal band (other species with femoral bands have them distally and/or proximally). Females typically have a median pair of dorsal ocular tufts in addition to the post-PME tufts and the sub-PME tufts. All females have the posterior part of the epigynum not raised, unique to these four species.

***Phidippus putnami*
(Peckham & Peckham 1883)**

Figs. C2, 17-21; Map 3

Attus putnamii Peckham & Peckham 1883:1; holotype (♂) in MCZ, examined

Phidippus gracilis Keyserling 1885:495; holotype (♂) in MCZ, examined (synonymized by Peckham & Peckham 1909)

Plexippus putnamii: Peckham & Peckham, 1888:35

Philaeus princeps (not Peckham & Peckham): Banks 1892:74

Phidippus putnamii: Peckham & Peckham 1901:286, 1909:384,385,417; Bryant 1942:702; Muma 1944: 11, 1945:61; Muma & Jeffers 1945:251

P. otiosus: Peckham & Peckham 1909 (in part, ♀; Plate 34, fig. 6a, f) (misidentification)

Dendryphantus putnami: Petrunkevitch 1911:641; Roe-
wer 1954:1216

Phidippus putnami: Bonnet 1958:3526; Proszynski 1971b:456; Richman & Cutler 1978:97; Oehler 1980:6-7; Richman 1981a:19; Edwards & Ross-
man 1981:30; Jackson 1982a:191; Roach & Ed-
wards 1984:54; Wolff 1984:60; Young et al. 1989:
41; Young & Lockley 1989:146; Edwards & Jack-
son 1993:712-4; Platnick 1993:796, 1997:921

P. putmanii (sic): Warren et al. 1967:389,394

Etymology: Possibly this should have been a matro-
nym after Mrs. Mary B. Putnam, but as she was not
identified in the original description (she was acknowl-
edged as a contributor in 1888), I am retaining the origi-
nal spelling (as later emended).

Type locality: USA: Iowa: (only data given).

Geographic Range and Records: Nebraska to Texas
east to Atlantic states except Florida. USA: *Alabama*:
Colbert, Lee, Pike; *Arkansas*: Carroll, Conway, Wash-
ington; *Washington, D.C.*: *Georgia*: Chatham, Clarke;
Illinois: Jackson, Johnson, Macoupin, Perry, Union;
Indiana: Knox; *Kansas*: Bourbon, Douglas, Potta-
watomie, Riley, Wyandotte; *Kentucky*: Trigg; *Louisia-
na*: Jefferson, Madison; *Maryland*: Calvert, Mont-
gomery, Prince Georges, Talbot; *Missouri*: Boone,
Franklin, Jackson, Johnson, Miller, St.Louis, Vernon;
Mississippi: Lafayette, Oktibbeha, Smith, Tishomingo,
Wilkinson; *North Carolina*: Carteret, Dare, Jackson,
Polk, Swain, Wake; *Nebraska*: Lancaster; *New Jersey*:
Burlington, Cape May, Ocean; *Ohio*: Champaign;
Oklahoma: Bryan, Payne; *Pennsylvania*: Bucks; *South
Carolina*: Aiken, Florence; *Tennessee*: Davidson, De
Kalb, Sevier; *Texas*: Brazos, Denton, Grayson, Tarrant;
Virginia: Campbell, Fairfax, Harrisonburg, Pittsylvan-
ia, Surry; *West Virginia*: Jefferson.

Biology: This is an open deciduous woodland species
which matures in the summer. Too few notes on ecol-
ogy exist to determine whether it is primarily a canopy
or an understory species, although the related *P. rich-
mani* is primarily an understory species.

Comments: The female was illustrated in 1909 by the
Peckhams, but thought a variety of *P. otiosus*.

Diagnosis: Male embolus apical portion is smoothly
tapering, unlike *P. richmani* which has the embolus
apical portion bulging medially, abruptly tapered, and
dilated at the tip. The femoral bulge of leg I is pale
with a dark spot and yellow tuft, unlike either *P. coma-*

tus or *P. richmani*. The spermathecal ducts are closer
together in *P. putnami* than in *P. richmani*.

Description:

MALE: BL 7.35 (7.87) 9.02, CL 3.74 (4.00) 4.48,
CW 2.95 (3.18) 3.65.

Carapace: AER fringe yellow. Posterior ocular
band a white, forward-pointing, triangular spot along
posterior edge of quadrangle. OQ scales iridescent.
Narrow white lines present each side from ALE to
PLE. Submarginal band an elongated spot just behind
and below PME. Marginal band a narrow white line
from clypeus to PLE. Clypeus fringe white. Chelicerae
with transverse median red band, white stripes on basal
half with red between stripes.

Palp: Dorsal stripe white, on femur and cymbium
(cymbium proximal edge only). Tibial apophysis stout,
elongate triangular. Palea distinctly wider than long.
Embolus basal portion a broad flat semirectangular
plate, moderately sclerotized, extending to ectal edge of
palea. Embolus apical portion a long recurved spike,
gradually tapering distally, arising dorsal to and sepa-
rated from distal edge of palea by a shelf.

Leg I: Fringes mixed black, brindled and yellow,
short to medium in length except prolateral femur and
tibia fringes and ventral patella and tibia fringes long.
Femur with prominent dark gray prolateral fringe, short
prolateral proximal band white; distal retroventral tuft
yellow, distal ventral bulge pale with dark spot, ventral
stripe white basally. Patella prolateral scale cover white
entire length. Tibia prolateral scale cover white entire
length on dorsal half. Metatarsus and tarsus with yel-
low scales on proximal half.

Abdomen: Dorsum black with white markings.
Venter black with white stripe each side.

FEMALE: BL 8.52 (9.82) 11.19, CL 4.07 (4.61)
5.31, CW 3.28 (3.71) 4.44.

Carapace: Tufts about 2x width of AME. Mid-
ocular tufts present (usually). OQ scales gray or tan;
lateral scale cover sparse, white. Clypeus fringe white,
band white.

Abdomen: Basal band not narrowed at ends. Lat-
eral band II an oblique stripe. Lateral band IV reduced
to spot. Spots I small, oval, or two short parasagittal
stripes. Spots II fused into truncated triangle. Spots III
and IV small, linear. All spots white. Scale cover gray
or tan, on lateral edges only. Venter black with white
stripe each side.

Epigynum: Flaps absent. Anterior shallowly de-
pressed. Middle shallowly depressed laterally, sagittal
plane broadly raised (slightly lower toward posterior),
convex without sagittal ridge. Duct heads broad, 1 pair

major bends, 1 pair median minor bends, 3 pair posterior minor bends (first bend is full loop).

***Phidippus richmani* Edwards, New Species**

Figs. C3-4, 22-28; Map 3

P. putnami (not Peckham & Peckham): Edwards & Hill 1978:117 (in part, ♀); Hill 1979a:195,198,202; Edwards 1982b:33-5; 1990:98; Young & Edwards 1990:22 (misidentification)

Holotype (♂), allotype (♀), and 9 (5♂ 4♀) topoparatypes in FSCA; 1 (♂) topoparatype in Johnson coll.

Etymology: Patronym for my friend, colleague, and fellow salticid enthusiast, Dr. David B. Richman, a dedicated field companion, and collector of the holotype of this and other species.

Type locality: USA: *Florida*: Marion Co., Ocala National Forest, Lynne (9-10 mi. E.), sweeping rosemary (*Ceratiola ericoides*) in sand pine understory, 17-VI-1975, D.B. Richman (collected as penultimate ♂, matured 2-VII-1975, preserved 18-VII-1975). This is the same area as the new type locality of *P. workmani*.

Geographic Range and Records: Florida. USA: *Florida*: Alachua Co., Archer, nest 8' high on branch of longleaf pine, 22-VII-1975, 1♂; Gainesville: turkey oak, 19-XI-1973 r, 1♀; xeric hammock, 15-III-1974 r, 1♂; turkey oak stump, 31-I-1975 r, 1♀; turkey oak, 31-III-1975 r, 1♀; turkey oak, 22-IV-1975 r, 1♀; xeric oak woods, 5-VI-1975 r, 1♂; junc. I-75 and Hwy. 24 (4 mi. W.): dead oak bark, 13-XII-1975 r, 1♂; dead oak bark, 4-II-1976 r, 2♀ (all G.B. Edwards, FSCA); Newberry, oriental persimmon (nest on fruit), 3-X-1998, 1♀ w/eggs (G.B. Edwards, FSCA); Dixie Co., Old Town (4 mi. N.), dead oak branches, 23-V-1979 r, 2♂ 2♀ (G.B. Edwards, FSCA); Jefferson Co., 27-VI-1968, 1♂ (W.H. Whitcomb, MCZ); Lake Co., Groveland, 3-IX-1985, 1♀ (H.L. Morrison, FSCA); Leon Co., Tall Timbers Res. Sta., 26-VII-1968, 1♀ (W.H. Whitcomb, Beatty coll.); Liberty Co., Torreya State Park, 17-IX-1968, 1♀ w/50 yg (J.A. Beatty, Beatty coll.); Marion Co.: 27-VIII-1957, 1♂ paratype (H.K. Wallace-1902, FSCA); Ocala National Forest: Mill Dam (1.5 mi. E.), rosemary, 24-III-1976 r, 1♀ paratype (G.B. Edwards, FSCA); Central Tower: rosemary, 17-VI-1975 r, 2♂ 2♀ paratypes (G.B. Edwards, FSCA); 24-VI-1978, 1♂ paratype (S.C. Johnson, Johnson coll.); 6-IV-1994 r, 1♂ 1♀ paratypes (G.B. Edwards, FSCA); 2-VIII-1994, 1♂ paratype (R. Bradley, FSCA); Martin Co., Jonathan Dickinson St. Pk., sand pine scrub, 4-IV-1995 r, 1♂ (G.B. Edwards, FSCA); Putnam Co., 24-XI-1951, 1♀ (H.K. Wallace-1623, FSCA).

Biology: This is an understory species of xeric wood-

land. It matures in the summer and females can be found until autumn. Eggsacs have been found on palmettoes and persimmon.

Comments: This species is a Florida isolate of the *putnami* species group.

Diagnosis: Almost identical in appearance to *P. putnami*, but the genitalia are distinct in both sexes (see *P. putnami* diagnosis); in the male, leg I lacks the yellow present in fringes of *P. putnami* and *P. comatus*, and femur I has the distal ventral bulge metallic blue and the retroventral tuft gray as in *P. comatus*.

Description:

HOLOTYPE MALE: ALE-PME 0.50, PME-PLE 0.68, ALE-PME/ALE-PLE 42%, ALE ROW 2.45, PLE ROW 2.82, CW 3.11, ALE/CW 79%, PLE/CW 91%, CW/CL 77%, CL 4.03, LOQ 1.91, LOQ/CL 47%, CH 1.99, BL 7.68.

MALE: BL 5.76 (7.32) 8.77, CL 3.32 (3.93) 4.36, CW 2.49 (3.06) 3.49.

Carapace: AER fringe yellow. Anterior ocular band represented by dense band of short yellow setae. Posterior ocular band white, a forward-pointing triangular spot or broad transverse band along posterior edge of quadrangle. OQ scales iridescent. Submarginal band an elongated spot just behind and below PME. Narrow white line each side from ALE to PLE. Marginal band a narrow white line from clypeus to PLE. Clypeus fringe white, band yellow. Chelicerae with transverse median red band, white stripes on basal half with red between stripes.

Palp: Dorsal stripe white on femur, or femur, patella, and tibia (distal edges of patella and tibia). Tibial apophysis stout, elongate triangular. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, notched distally, arising dorsal to and separated from distal edge of palea.

Leg I: Fringes mixed black, brindled and white, short to medium in length except prolateral femur and tibia fringes and ventral tibia fringe long. Femur with prominent dark gray prolateral fringe (distal edge white), prolateral proximal band white; distal retroventral tuft gray, distal ventral bulge metallic blue, ventral stripe white basally. Patella prolateral scale cover white entire length. Tibia prolateral scale cover white entire length on dorsal half.

Abdomen: Dorsum black with white markings. Basal band sometimes broken medially. Posterior lateral bands sometimes fused together. Venter black with white stripe each side attached to white posterior band in front of spinnerets.

ALLOPARATYPE FEMALE: ALE-PME 0.52, PME-PLE 0.72, ALE-PME/ALE-PLE 42%, ALE ROW 2.41, PLE ROW 3.03, CW 3.28, ALE/CW 73%, PLE/CW 92%, CW/CL 78%, CL 4.19, LOQ 1.99, LOQ/CL 48%, CH 2.08, BL 10.00.

FEMALE: BL 9.69 (10.72) 11.52, CL 3.90 (4.42) 4.73, CW 2.99 (3.44) 3.74.

Carapace: Tufts about 2x width of AME. Mid-ocular tufts present. Posterior ocular band white or gray, a forward-pointing triangular spot along posterior edge of quadrangle, reaching middle of quadrangle. OQ scales sparse, iridescent; lateral scale cover sparse, white. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, gradually narrowed, or not narrowed at ends. Lateral band II an oblique stripe. Lateral band IV reduced to spot. Spots I small, oval. Spots II fused into truncated triangle. Spots III and IV small, linear. All spots white. Scale cover gray or tan, on lateral edges only. Venter black with white stripe each side (and sometimes posteriorly).

Epigynum: Flaps absent. Anterior shallowly depressed. Middle shallowly depressed laterally, sagittal plane broadly raised (slightly lower toward posterior), convex without sagittal ridge. Duct heads broad, 1 pair major bends, 1 pair median minor bends, 3 pair posterior minor bends.

Phidippus comatus
Peckham & Peckham 1901

Figs. C7, 29-35; Map 2

Phidippus comatus Peckham & Peckham 1901:288, 291; 3 syntypes (♀), allotype (♂) in MCZ, examined; lectotype (♀) designated.

P. comatus: Banks 1901:588; Scheffer 1905c:185; Bryant 1908:97, 1942:696; Peckham & Peckham 1909:386,387,428; Bonnet 1958:3518; Proszynski 1971b:455; Richman & Cutler 1978:95; Coken-dolpher 1978:118; Platnick 1993:794

Phidippus femoratus Peckham & Peckham 1909:384, 386, 415; holotype (♂) supposed to be in MCZ, lost; NEW SYNONYMY

P. femoratus: Banks 1910:64; Schenkel 1951:37; Bonnet 1958:3519; Proszynski 1971b:455; Jung & Roth 1974:33; Richman & Cutler 1978:96; Jackson 1982a:187-94; Platnick 1993:794

Dendryphantès comatus: Petrunkevitch 1911:627; Roewer 1954:1209

D. femoratus: Petrunkevitch 1911:629; Roewer 1954:1210

Dendryphantès consimilis Roewer 1951:452 (NOMEN NOVUM), 1954:1209 (Roewer considered *P.*

comatus to be preoccupied by *Dendryphantès comatus* Karsch 1880); Platnick 1993:750

P. cf. comatus: Maddison & Stratton 1988b:267

Etymology: Latin adjective, *comatus*, hairy.

Type locality: USA: *New Mexico*: Las Vegas, coll. Mr. Bolter (only data given).

Geographic Range and Records: Saskatchewan, Canada, through western U.S. to central Mexico.

CANADA: *Saskatchewan*: Saskatoon; **MEXICO:** *Chihuahua*: La Saucerda (1mi. E.), Madera, Mesa del Havacan, Summit (W. of Primavera); *Coahuila*: Las Delicias, Matachic; *Durango*: Durango, El Salto (10 mi. E.), Las Puentes, Otinapa, Palos Colorados; *Guanajuato*: Guanajuato (21.6mi. S.); **USA:** *Arizona*: Cochise, Coconino, Pima, Santa Cruz; *California*: Fresno, Los Angeles, Mendocino, Mono, Napa, Placer, Riverside, San Bernardino, San Diego, San Francisco, Santa Clara, Shasta, Siskiyou; *New Mexico*: Bernalillo, Doña Ana, Hidalgo, Los Alamos, Santa Fe, Socorro; *Nevada*: Clark, Lincoln; *Oregon*: Grant, Jackson, Wheeler; *Texas*: Jeff Davis; *Utah*: Salt Lake, Washington; *Washington*: Kittitas, Klickitat, Yakima; *Wyoming*: Teton.

Biology: This is an understory species of mixed woodland, and apple and pear orchards, found from 1500-8200' elevation. It matures in summer, with females found up until the following spring. Specimens from under both bark and rocks have been recorded; eggsacs can probably be found in both situations.

Comments: Even though the type of *P. femoratus* is lost, the Peckhams' (1909) description leaves no doubt that they were describing the male of *P. comatus*. The dorsal pattern on the carapace is somewhat variable among populations. One male had a dense band of black, short, clubbed setae in the area of the anterior ocular band. Occasional males lack dorsal crests and/or femur I bulge and tuft, but can be distinguished by the genitalia.

Diagnosis: Male has femur I with dark metallic blue distal bulge with gray tuft like *P. richmani*, mixed yellow leg I fringes like *P. putnami*, but lacks the abbreviated ventral white stripe on femur I present in both of those species. Female similar to *P. carolinensis*, but epigynum has smaller atria and is unique in having major posterior bends in spermathecal ducts which are visible through the integument.

Description:

MALE: BL 5.68 (6.67) 8.02, CL 2.91 (3.33) 3.82, CW 2.37 (2.72) 3.20.

Carapace: Median ocular band white or white and red, complete or a median spot. Posterior ocular band white, a backward-pointing triangular spot from center of quadrangle to upper thoracic slope; may be fused

with median ocular band. OQ scales absent, or tan (when present in Mexican specimens). Submarginal band narrow or broad from ALE to thoracic slope. Cheek band white. Marginal band a narrow white line from clypeus to just anterior to PLE; gray line of scales below entire lateral carapace margin. Clypeus fringe white or yellow, band white. Chelicerae vertically striped with white.

Palp: Dorsal stripe white, on femur, patella, tibia, and cymbium (distal edges only except cymbium basal edge only). Tibial apophysis stout, elongate triangular. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, gradually tapering distally, arising dorsal to and separated from distal edge of palea by shelf.

Leg I: Fringes mixed black, brindled and yellow, short to medium in length except tibia ventral fringe long. Femur distal retroventral tuft gray (absent if bulge absent), ventral bulge metallic blue (rarely absent). Patella and tibia prolateral scale cover white entire length.

Abdomen: Scale cover gray on black integument, on entire dorsum except spots and basal band (significantly reduced in some populations so that dorsum mostly black with white markings). Venter all black or gray, or black with 2 white stripes medially.

FEMALE: BL 7.10 (8.41) 10.19, CL 3.32 (3.79) 4.15, CW 2.66 (3.03) 3.49.

Carapace: Tufts about 2x width of AME. Mid-ocular tufts present. Anterior ocular band usually absent, or white or tan (rarely). Median ocular band tan, white or white and red; either a median spot, complete or absent. Posterior ocular band white, gray or tan, a forward-pointing triangular spot along posterior edge of quadrangle, reaching middle of quadrangle (in some Mexican specimens, extended forward as a white line between AME). Submarginal band (when present) broad from ALE to thoracic slope, lateral scale cover sparse, white. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, gradually narrowed; or entirely narrow. Lateral band II an oblique stripe. Lateral band IV an oblique stripe attached to spots III. Spots I small, oval, or two short parasagittal stripes. Spots II fused into rectangle or truncated triangle. spots III and IV large, linear (IV sometimes small). All spots white. Scale cover sparse gray and white over brown integument, on entire dorsum except spots and basal band. Venter black with white stripe each side.

Epigynum: Flaps absent. Anterior shallowly de-

pressed. Middle shallowly depressed laterally, sagittal plane broadly raised (most elevated part of epigynum but abbreviated, flat toward posterior), convex then flat without sagittal ridge. Duct heads broad, 0 pair median major bends, 2 pair median minor bends, 1 pair major posterior duct bends present, visible through integument.

Phidippus carolinensis
Peckham & Peckham 1909

Figs. C5-6, 36-42; Map 2

P. obscurus Peckham & Peckham 1888:16 (in part, not lectotype); one of eight syntypes (♀) in MCZ, examined

Phidippus carolinensis Peckham & Peckham 1909: 385, 388, 422; holotype (♂) in MCZ, examined

P. carolinensis: Banks 1910:63; Worley & Pickwell 1931:116,118,119; Bonnet 1958:3517; Whitcomb & Tadic 1963:189; Whitcomb et al. 1963:657; Warren et al. 1967:389,394; Vogel 1970:19; Proszynski 1971b:454; Brown 1973:237; Richman & Cutler 1978:95; Young & Edwards 1990:22; Platnick 1993:794

Dendryphantus carolinensis: Petrunkevitch 1911:626; Roewer 1954:1207; Platnick 1993:749

Phidippus rauterbergii: Bryant 1942:703 (misidentification)

Etymology: Latin adjective from geographic name, the state of North Carolina.

Type locality: USA: "North Carolina". No other specimens from North Carolina are known for this Midwestern species, and it seems likely that the type was mislabeled.

NEW TYPE LOCALITY: USA: Texas: Erath Co., Stephenville. Multiple records exist from this locality.

Geographic Range and Records: One Mexican record, Texas north to Kansas. **MEXICO:** *Coahuila*: (no other data); **USA:** *Kansas*: Cowley, Meade, Rooks; *Oklahoma*: Comanche, Payne; *Texas*: Bell, Bexar, Cameron, Cherokee, Clay, Comanche, Coryell, Dallas, Dickens, Eastland, Erath, Frio, Gillespie, Haskell, Kerr, Kimble, McLennan, Montague, Nueces, Parker, Roberts, Sutton, Tarrant, Taylor, Travis, Weatherford, Wichita. Although reported from Arkansas (e.g., Whitcomb and Tadic 1963), I have not seen any records of *P. carolinensis* from this state.

Biology: This summer-maturing species has been found on conifers.

Comments: The one syntype of *P. obscurus* belonging here was clearly not the specimen used for the description of that species (see *P. arizonensis*).

Diagnosis: Males can be easily separated from other species with dorsal crests by their pale dorsal cymbia with scattered red-brown spots and sparse setae. The male chelicerae also have a solid gray fringe rather than the vertical stripes of related species. Femur I lacks the bulge and tuft of most other group members. Females can be separated by their large epigynal atria.

Description:

MALE: BL 7.01 (8.98) 11.02, CL 3.53 (4.60) 5.23, CW 2.99 (3.83) 4.44.

Carapace: Median ocular band white. OQ scales gray. Submarginal band very broad from ALE to thoracic slope. Marginal band a narrow white line from clypeus to just anterior to PLE; white line of scales below entire lateral carapace margin. Clypeus fringe white, band gray. Chelicerae with transverse median iridescent band, completely fringed with gray basally.

Palp: Dorsal stripe white, on femur, patella, and tibia (only distal edge of patella and tibia). Dorsum of cymbium pale, semi-glabrous, with scattered setae and red-brown spots. Tibial apophysis stout, elongate triangular. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, gradually tapering distally, arising dorsal to and separated from distal edge of palea by shelf.

Leg I: Fringes mixed black, brindled and white, medium in length except patella and tibia prolateral fringes long. Femur prolateral proximal and distal bands white. Patella and tibia prolateral scale cover white entire length. Metatarsus and tarsus entirely covered with white scales and fringes.

Abdomen: Scale cover gray, on entire dorsum except spots. Venter black with white stripe each side.

FEMALE: BL 9.02 (11.22) 13.36, CL 4.27 (5.00) 5.98, CW 3.57 (4.15) 5.15.

Carapace: Tufts about 2x width of AME. Mid-ocular tufts present. Anterior ocular band iridescent. OQ scales gray or tan. Submarginal band very broad from ALE to thoracic slope, sometimes indistinct. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, gradually narrowed. Lateral band II an oblique stripe. Lateral band IV an oblique stripe attached to spots III (in two pieces). Spots I two short parasagittal stripes. Spots II fused into truncated triangle (sometimes fused to lateral band II). Spots III large, linear. Spots IV small, linear. All spots white. Scale cover gray or tan, on entire dorsum except median black stripe, dorsal spots, and basal band. Venter black with white stripe each side.

Epigynum: Flaps absent. Anterior shallowly de-

pressed. Middle shallowly depressed laterally, sagittal plane broadly raised (most elevated part of epigynum), convex without sagittal ridge. Duct heads broad, 1 pair major bends, 0 pair median minor bends, 3 pair posterior minor bends.

***Phidippus zethus* Edwards, New Species**

Figs. 43-48; Map 2

Holotype (♂) and allotype (♀) in FSCA.

Etymology: Latin proper noun in apposition, from mythology, *Zethus*, a son of Jupiter.

Type locality: MEXICO: Jalisco: Guadalajara (14 km N.), red-topped grass, 10-X-1986, L.A. Stange. Both type specimens collected this date and locale.

Geographic Range and Records: Western Mexico. MEXICO: Nayarit: La Mesa de Nayarit, 16-21-X-1955, 1♀ (B. Malkin, AMNH).

Biology: The little information available indicates this is a field species which matures in autumn.

Comments: The allotype was in the penultimate instar when captured; it matured in captivity within two weeks after collection.

Diagnosis: Male is only species with extremely long embolus apical portion, extending beyond embolar groove, and the basal portion is narrower than any related species. Female has correspondingly enormous spermathecal duct heads.

Description:

HOLOTYPE MALE: ALE-PME 0.52, PME-PLE 0.80, ALE-PME/ALE-PLE 39%, ALE ROW 2.32, PLE ROW 2.95, CW 3.78, ALE/CW 62%, PLE/CW 78%, CW/CL 79%, CL 4.77, LOQ 1.95, LOQ/CL 41%, CH 2.24, BL 10.00.

Carapace: Posterior ocular band iridescent. Submarginal band broad from ALE to thoracic slope. Cheek band white. Marginal band a narrow white line from clypeus to posterior corners of carapace. Clypeus fringe white, band gray. Chelicerae vertically striped with white.

Palp: Dorsal stripe white, on femur, patella, tibia, and cymbium (proximal 1/3 of cymbium). Tibial apophysis stout, elongate triangular. Palea distinctly wider than long. Embolus basal portion narrow, heavily sclerotized, hooked around distal ectal corner of palea. Embolus apical portion a very long recurved spike (longer than groove), gradually tapering distally, arising dorsally from distal edge of embolus basal portion.

Leg I: Fringes alternating black and white, short to medium in length. Femur prolateral proximal and distal bands white. Patella sparse prolateral scale cover white

entire length. Tibia prolateral scale cover white proximally.

Abdomen: Scale cover red, on entire dorsum except white basal band. Venter black.

ALLOPARATYPE FEMALE: ALE-PME 0.52, PME-PLE 0.86, ALE-PME/ALE-PLE 38%, ALE ROW 2.45, PLE ROW 3.15, CW 3.74, ALE/CW 66%, PLE/CW 84%, CW/CL 76%, CL 4.90, LOQ 2.12, LOQ/CL 43%, CH 2.28, BL 9.85.

FEMALE: BL 11.52, CL 5.27, CW 4.19.

Carapace: Tufts about 2x width of AME. OQ scales sparse and iridescent. Submarginal band broad from ALE to thoracic slope. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, gradually narrowed. Lateral band II and IV are oblique stripes. Spots II fused into a white and red truncated triangle, extended posteriorly as three red chevrons separated from spots II. Spots I, III and IV not apparent. Scale cover red, on entire dorsum except median black stripe and basal band. Venter gray. (A second female has small red spots I and III, with spots II fused into a white chevron).

Epigynum: Flaps absent. Anterior deeply depressed, secondary rim absent. Middle shallowly depressed laterally, sagittal plane broadly raised, convex without sagittal ridge. Duct heads broad, 1 pair major bends immediately after duct heads (forming a loop), 1 pair median minor bends, 3 pair posterior minor bends.

***mystaceus* group**

There are 10 species in this group, most of which resemble the *octopunctatus* and *putnami* groups in lacking epigynal flaps (except for *P. adonis*, *P. arizonensis*, and *P. tigris* which secondarily regained them, and *P. mystaceus* which has an intermediate condition). It is synapomorphic for the presence of lateral band III (somewhat obscured in *P. adonis*, *P. arizonensis*, and *P. cruentus*). The group (minus *P. adonis* and *P. cruentus*) shares the presence of a median ocular band with a few outliers, primarily in the *cardinalis* group. With the exception of *P. kastoni* and *P. vexans* (both with median spots), the median ocular band is complete or broken into three spots.

The embolus apical portion is recurved directly where it arises from the ventral distal edge of the embolus basal portion, which in the *asotus* clade is hidden on the dorsal side of the palea (state shared with the *putnami* group). The proximal end of the embolus spiral is separated from the fused part by a continuation of the embolic suture. This state occurs in the

insignarius group and in *Paraphidippus* as well.

Phylogenetically, the long embolus apical portion is apparently plesiomorphic, yet the loss of flaps apomorphic (although plesiomorphic within *Phidippus*), as in the previous groups. Some species in the *asotus* clade, especially *P. kastoni*, are similar to *P. zethus* in genital structure. The majority of species share a suite of unique characters, although their distribution within the group is homoplasious.

The following unique character states are found in this group: 1) a palpal stridulatory organ, completely yellow leg I fringes, femur I with a black dorsal subproximal tuft, and a yellow ventral stripe on femur I (all on *P. arizonensis*, *P. cruentus*, *P. mystaceus*), 2) expanded carapace "cheeks" (*P. adonis*, *P. arizonensis*, *P. cruentus*), 3) a transverse integumental ridge on the carapace (*P. mystaceus*, *P. toro*), 4) a broad, recurved, pointed embolus apical portion (*P. mystaceus*, *P. asotus*), and 5) a broad, recurved, truncate embolus apical portion (*P. cruentus*).

***Phidippus kastoni* Edwards, New Species**

Figs. 49-53; Map 4

Phidippus chumash "Pinter": Kaston 1972:270 (in part); NOMEN NUDUM

Holotype (♂), alloparatype (♀), and 3 (♀) paratypes in FSCA; 1 (♂) paratype in SWRS.

Etymology: Patronym in honor of the late distinguished arachnologist, Dr. B. J. Kaston.

Type locality: USA: California: Monterey Co., J.P. Burns St. Pk. (3 mi. N.), 15-X-1978, D.J. Boe. Holotype and alloparatype collected this date and locale.

Geographic Range and Records: Coastal northern California. USA: California: ?Co., Hwy. 57, 23-III-1975, 1♀ (R.R. Jackson, FSCA); Monterey Co.: Big Sur (20 mi. S.), V-1978, 1♀ paratype (D.J. Boe, FSCA); Hastings Natur. Hist. Res., XII-1957, 1♂ paratype (B. Blomquist-1332, SWRS); Salmon Creek, 6-IV-1979, 2♀ paratypes (D.J. Boe, FSCA); Santa Barbara Co.: Santa Barbara, 5-X-1948, 1♂; 21-27-XI-1948, 1♂; 18-III-1950, 1♀; XI-XII-1950, 1♂ (all H.L. Shante, AMNH); Santa Barbara (23 mi. W.), 16-VI-1979, 1♀ (D.J. Boe, FSCA); Solvang, Happy Canyon, 22-XII-1974, 2♀; 21-III-1975, 3♀ (all R.R. Jackson, FSCA); Santa Clara Co.: Henry Coe St. Pk., 17-IV-1980, 1♀ (Ubick coll.); Mt. Hamilton (6 mi. E.), stream bank, 23-X-1953, 1♂ (J.G. Edwards, MCZ); San Jose, Silver Creek Hills, under loose *Eucalyptus* bark, 1-X-1955, 1♂ (J.G. Edwards, MCZ).

Biology: Ecological data is lacking; what little is available suggests this is a riparian woodland species. Re-

cords of adult males indicate this species matures in autumn.

Comments: The two line statement about *P. chumash* in Kaston (1972) "very similar in size and markings to [*P.*] *johnsoni*, with which it has been confused, but having the reddish areas more pinkish" is not only an insufficient description, it does not distinguish between the two species identified as *P. chumash* in collections.

Diagnosis: Male could only be confused with *P. boei* in California (although their ranges do not overlap), but the long embolus apical portion is not stalked where it attaches to the embolus basal portion. The female is superficially similar to *P. adumbratus*, which has a parapatric distribution, but the spermathecal duct heads of *P. kastonii* are much wider and lack obvious glands. Also see *P. adumbratus* diagnosis.

Description:

HOLOTYPE MALE: ALE-PME 0.48, PME-PLE 0.80, ALE-PME/ALE-PLE 38%, ALE ROW 2.32, PLE ROW 3.03, CW 3.82, ALE/CW 61%, PLE/CW 79%, CW/CL 82%, CL 4.65, LOQ 2.03, LOQ/CL 44%, CH 2.24, BL 9.52.

MALE: BL 6.85 (8.67) 9.69, CL 3.57 (4.39) 4.81, CW 2.82 (3.51) 3.82.

Carapace: Median ocular band absent or rarely a red median spot. OQ scales iridescent. Cheek band white. Marginal band a narrow white line from clypeus to posterior corners of carapace. Clypeus fringe white, band white. Chelicerae vertically striped with white.

Palp: Dorsal stripe white, on femur, patella, tibia, and cymbium. Tibial apophysis stout, elongate triangular, tip narrow and bent outward. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, gradually tapering distally, arising dorsally from distal edge of embolus basal portion.

Leg I: Fringes alternating black or brindled and white, short to medium in length with some long prolateral and ventral setae in the tibial fringes intermixed with shorter setae. Femur prolateral proximal band white, very wide, extending to middle of segment; distal band white; proventral stripe white. Patella and tibia prolateral scale cover white proximally. Tarsus integument pale proximally, dark distally, or integument entirely pale.

Abdomen: Scale cover red, on entire dorsum except basal band. Venter gray (with narrow pale edges).

ALLOPARATYPE FEMALE: ALE-PME 0.48, PME-PLE 0.84, ALE-PME/ALE-PLE 36%, ALE ROW 2.41, PLE ROW 3.15, CW 3.82, ALE/CW 63%, PLE/CW 83%, CW/CL 81%, CL 4.73, LOQ 2.08,

LOQ/CL 44%, CH 2.24, BL 10.52.

FEMALE: BL 8.93 (9.55) 10.52, CL 4.15 (4.44) 4.73, CW 3.20 (3.47) 3.82.

Carapace: Tufts 2.5x or more width of AME. Anterior ocular band gray. OQ scales sparse and iridescent, lateral scale cover sparse, white. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, gradually narrowed. Lateral band II an oblique stripe. Lateral band III an oblique stripe, or reduced to spot. Lateral band IV an oblique stripe. Spots I small, oval. Spots II fused into rectangle or truncated triangle (followed by two distinct chevrons). Spots III large, linear. Spots IV small, linear. All spots white or red. Scale cover yellow, orange or red, on entire dorsum except spots and basal band. Venter gray.

Epigynum: Flaps absent. Anterior shallowly depressed, septum absent to rudimentary. Middle depressed laterally, sagittal plane slightly raised (but depressed below anterior and posterior median areas), slightly convex without sagittal ridge. Duct heads broad, 2 pair major bends, 0 pair median minor bends, 2 pair posterior minor bends.

***Phidippus vexans* Edwards, New Species**

Figs. 54-58; Map 4

Holotype (♂), allotype (♀), and 15 (11♂, 4♀) topoparatypes deposited in FSCA.

Etymology: Latin present participle, *vexans*, from verb *vexo*, to annoy, an allusion to the difficulty in collecting the specimens from the spiny plant known as sotol (Agavaceae: *Dasyllirion* sp.).

Type locality: **USA:** *New Mexico:* Doña Ana Co., Las Cruces (17 mi. N.), Jornada Experimental Range, Doña Ana Mts., Mt. Summerford, on sotol (1♂, 2♀) and on rock (1♂), 1-VII-1987, Elizabeth Berry, J.E. Carico, G.B. Edwards, W.B. Peck. Second series from same locality, on sotol and shrubs, 24-VIII-1992, G.B. Edwards, D.B. Richman, W.D. Sissom (all juvenile, reared: 10♂, 3♀).

Geographic Range and Records: Western Texas to southern New Mexico. **USA:** *Texas:* Presidio Co., on *Bouteloua*, 25-XI-1972, 1♂ (T.P. Kaspar, FSCA); Wichita Co., on grass, 3-X-1972, 1♀ (H. Horry, FSCA).

Biology: Although the few records give a variable picture, from personal experience I've found this to be a desert species maturing in summer. Perhaps the Texas records are from desert grassland; both are in relatively poor condition, which may be a reflection of old age and explain their autumn collection dates.

Comments: Other than two topotypical series, this

species is only known from two records in Texas.

Diagnosis: Median white abdominal stripe on red dorsum is unique. Iridescent scales on OQ prominent. Palp similar to *P. kastoni* and *P. pruinosus*, neither of which is otherwise similar in appearance. Duct openings extremely far apart for the genus.

Description:

HOLOTYPE MALE: ALE-PME 0.38, PME-PLE 0.56, ALE-PME/ALE-PLE 40%, ALE ROW 2.03, PLE ROW 2.49, CW 2.82, ALE/CW 72%, PLE/CW 88%, CW/CL 83%, CL 3.4, LOQ 1.62, LOQ/CL 48%, CH 1.49, BL 6.68.

MALE: BL 6.43 (6.71) 7.01, CL 3.32 (3.38) 3.40, CW 2.66 (2.73) 2.82.

Carapace: Post-PME tuft present, length about equal to width of AME. Median ocular band a white median spot. OQ scales golden. Submarginal band broad from ALE to thoracic slope, lateral scale cover white. Cheek band white. Marginal band a narrow white line from clypeus to posterior corners of carapace (gray posterior to PLE). Clypeus fringe white, band white. Chelicerae vertically striped with white.

Palp: Dorsal stripe white, on femur, patella, tibia, and cymbium (proximal edge only). Tibial apophysis stout, elongate triangular, tip narrow and bent outward. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, gradually tapering distally, arising dorsally from distal edge of embolus basal portion.

Leg I: Fringes alternating black and white, short to medium in length except femur dorsal and retroventrolateral fringes, and patella and tibia ventral fringes long. Femur prolateral proximal band white on dorsal half; distal band white. Patella and tibia prolateral scale cover white entire length (tibia sometimes white only proximally). Tarsus integument entirely pale and entirely covered with white scales and fringes.

Abdomen: Scale cover red, on entire dorsum except spots and basal band. Venter pale with 3 light gray stripes.

ALLOPARATYPE FEMALE: ALE-PME 0.44, PME-PLE 0.66, ALE-PME/ALE-PLE 40%, ALE ROW 2.16, PLE ROW 2.66, CW 2.91, ALE/CW 74%, PLE/CW 91%, CW/CL 78%, CL 3.74, LOQ 1.78, LOQ/CL 48%, CH 1.74, BL 9.19.

FEMALE: BL 7.85 (8.73) 9.19, CL 3.49 (3.78) 3.94, CW 2.82 (3.02) 3.20.

Carapace: Tufts 1.5x or less width of AME. Anterior ocular band white or tan. Median ocular band a white median spot. Posterior ocular band red, broad,

between PLE and on apex of thoracic slope. OQ scales sparse and iridescent. Submarginal band broad from ALE to thoracic slope, lateral scale cover sparse, white. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, gradually narrowed. Lateral band II an oblique stripe. Lateral band III an oblique stripe, or reduced to spot. Lateral band IV an oblique stripe attached to spots III (under scales). Spots I small, oval. Spots II fused into rectangle. Spots III and IV small, linear. All spots white. Median white abdominal stripe present centrally (or extending posteriorly from spots II). Scale cover red, on lateral edges only. Venter gray (may have two rows of central white dots).

Epigynum: Flaps absent. Anterior shallowly depressed. Middle depressed laterally, sagittal plane slightly raised, slightly convex without sagittal ridge or with hint of sagittal ridge present. Duct heads broad, 2 pair major bends, 1 pair median minor bends, 3 pair posterior minor bends.

***Phidippus pruinosus*
Peckham & Peckham 1909**

Figs. C8, 59-64; Map 4

Phidippus pruinosus Peckham & Peckham 1909:388, 433; 2 syntypes (♀) in MCZ, examined; lectotype designated

Dendryphantès pruinosus: Petrunkevitch 1911:640; Roewer 1954:1215; Platnick 1993:752

Phidippus pruinosus: Banks 1910:65; Chamberlin & Gertsch 1928:187; Jones 1936:70; Vogel 1970:19; Proszynski 1971b:456; Richman & Cutler 1978:97; Platnick 1993:796

Etymology: Latin adjective, *pruinosus*, full of hoarfrost, an allusion to the dorsal cover of gray setae.

Type locality: USA: Texas: Travis Co., Austin (only data given)

Geographic Range and Records: Central Texas.

USA: Texas: Johnson Co., Cleburne Lake, 17-XII-1994, 1♂ (D.R. Maddison, Maddison coll. 94074); Llano Co., Llano, 28-XII-1936, 1♀ (L.I. Davis, AMNH); Taylor Co.: Abilene (15 mi. SW.), 2300', 1-III-1944, 1♀ (H.S. Dybas, FMNH); Lake Abilene, 11-VII-1993 r, 1♀ (G.B. Edwards, P.D. Barron, FSCA); Travis Co.: Austin: 1♀ (G.W. Peckham, MCZ); Austin (Barton Creek Greenbelt), mountain cedar, 15-VII-1993 r, 3♂ 4♀ (G.B. Edwards, P.D. Barron, FSCA); Austin (Indian Cove): 1-XI-1967, 1♀ (D. Simon, FSCA); 19-XI-1967, 2♀ (D. & W. Simon, FSCA).

Biology: Most specimens have been taken on *Juniperus* sp. in xeric habitats near water; mature individuals

have been collected in autumn.

Comments: Females have been collected in only a few places in central Texas. Of the few known males, all but one were reared from a few juveniles collected in Austin in 1993 (and the offspring of a mating of two reared specimens), the other was collected in vegetation along the shore of Cleburne Lake in 1994. Possibly this species originated as a central Texas isolate of *P. asotus*. The shape of the spermathecal duct head of *P. pruinus* would suggest that at some point in its history, introgression with *P. mystaceus* occurred.

Diagnosis: Male palp most similar to *P. kastoni*, male color pattern tan like *P. asotus*, but markings more distinct. Epigynum similar to *P. asotus*, but noticeably smaller with raised anterior, and duct heads more like *P. mystaceus*. Females with more complex dorsal pattern than either *P. asotus* or *P. mystaceus*, tan with almost purplish darker variegations.

Description:

MALE: BL 7.68, CL 4.15, CW 3.40.

Carapace: Post-PME tuft present (one prominent seta each side about 1.5x width of AME). Median ocular band tan, broken into three spots. OQ scales brown. Submarginal band tan (with white anterior and posterior edges), very broad from ALE to thoracic slope. Marginal band a narrow white line from clypeus to posterior corners of carapace (gray posterior to PLE). Clypeus fringe tan, band white or gray. Chelicerae vertically striped with gray.

Palp: Dorsal palpal stripe white on femur and patella, gray on tibia and cymbium (distal edges of femur, patella, and tibia, all of cymbium). Tibial apophysis stout, tip narrow and bent outward. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, gradually tapering distally, arising dorsally from distal edge of embolus basal portion.

Leg I: Fringes alternating black and white (the black noticeably brindled, especially on retroventrolateral femur and on tibia), short to medium in length except femur proximal dorsal and retroventrolateral fringes and tibia ventral fringe long. Femur prolateral proximal and distal bands white. Patella prolateral scale cover white entire length with a distinct horizontal white stripe in dorsal half. Tibia prolateral scale cover white proximally and white on distal edge (dorsal half).

Abdomen: Scale cover tan, on entire dorsum. Venter gray.

LECTOTYPE FEMALE: ALE-PME 0.50, PME-PLE 0.80, ALE-PME/ALE-PLE 38%, ALE ROW 2.49, PLE ROW 3.11, CW 3.53, ALE/CW 71%,

PLE/CW 8%, CW/CL 82%, CL 4.32, LOQ 2.08, LOQ/CL 48%, BL 9.52.

FEMALE: BL 9.52 (10.47) 12.02, CL 4.32 (4.44) 4.69, CW 3.53 (3.67) 3.86.

Carapace: Tufts about 2x width of AME. Median ocular band white or gray, broken into three spots. OQ scales gray. Submarginal band broad from ALE to thoracic slope and/or lateral scale cover white or gray. Clypeus fringe white, band white.

Abdomen: Basal band not narrowed at ends. Lateral bands II and III are oblique stripes. Lateral band IV an oblique stripe attached to spots III and IV. Spots I two short parasagittal stripes. Spots II fused into truncated triangle, extended posteriorly as forked process or one or two distinct chevrons. Spots III and IV large, linear. All spots white. Scale cover gray, on entire dorsum except basal band, spots, and median black stripe (posteriorly). Venter gray with pale stripe each side.

Epigynum: Flaps absent. Anterior raised medially, higher than duct openings. Middle broadly depressed laterally, sagittal plane slightly raised, slightly convex without sagittal ridge. Duct heads broad, 0 pair major bends, 2 pair median minor bends, 0-1 pair supernumerary bends, 3 pair posterior minor bends.

***Phidippus asotus* Chamberlin & Ivie 1933**

Figs. C9-10, 65-70; Map 5

Phidippus asotus Chamberlin & Ivie 1933:50; holotype (♂) in AMNH, examined

Dendryphantas asotus: Roewer 1954:1206; Platnick 1993:749

P. asotus: Bonnet 1958:3513; Proszynski 1971b:454; Richman & Cutler 1978:95; Platnick 1993:793

Etymology: Latin noun, *asotus*, a sensualist, libertine, debauchee.

Type locality: USA: Utah: Box Elder Co., Raft River Mountains, Lynn, Grouse Creek, 8-IX-1932, R. V. Chamberlin, W. Ivie.

Geographic Range and Records: Southwestern U.S. and northern Mexico. **MEXICO:** Chihuahua: Divisadero, Yepomera (6 mi. E.); Sonora: San Luis Mts. (U.S. border); **USA:** Arizona: Cochise, Graham, Pima, Pinal, Santa Cruz, Yavapai; California: Inyo, Mono, Monterey, Riverside, San Bernardino, San Diego, Sierra; Colorado: Boulder, Larimer; New Mexico: Doña Ana, Hidalgo, Lincoln, Otero, Rio Arriba, San Miguel, Sandoval, Socorro, Union; Nevada: Douglas, White Pine; Oklahoma: Cimarron; Texas: Jeff Davis; Utah: Beaver, Millard, Salt Lake, San Juan, Tooele, Utah, Washington.

Biology: Most records are between 5000-7100' (range

4000-9200'); oak is the most cited substrate, followed by juniper and shrubs. Maturation is in autumn.

Comments: This is the first description of the female.

Diagnosis: Males are unique in their combination of tan color and broad embolus apical portion, whereas females are gray or tan and similar to *P. mystaceus* females, although the abdominal markings and median ocular band are usually less developed, with the latter sometimes reduced to a diamond-shaped median spot or rarely absent. The spermathecal duct heads are more robust and less bent than are those of *P. mystaceus*. Epigynum very similar to *P. pruinosus*, but proportionally larger, with the anterior part not raised.

Description:

MALE: BL 6.68 (7.38) 9.02, CL 3.32 (3.74) 4.15, CW 2.66 (3.00) 3.32.

Carapace: Post-PME tuft present, length about 1.5x width of AME. Median ocular band tan, broken into three spots. Posterior ocular band tan. Submarginal band tan, very broad from ALE to thoracic slope. Marginal band a narrow white line from clypeus to PLE. Clypeus fringe white. Chelicerae vertically striped with gray.

Palp: Dorsal stripe tan, on femur, patella, and tibia. Tibial apophysis stout, tip narrow and bent outward. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, broad, tapering distally, arising dorsally from distal edge of embolus basal portion.

Leg I: Fringes alternating brindled and white, short to medium in length, except femur dorsal, patella prolateral, and tibia ventral fringes long. Femur prolateral proximal and distal bands white. Patella prolateral scale cover white entire length. Tibia prolateral scale cover white proximally. Metatarsus integument pale except for dark distal edge. Tarsus integument entirely dark, or pale proximally, dark distally.

Abdomen: Scale cover tan, on entire dorsum. Venter gray.

FEMALE: BL 7.18 (8.73) 11.36, CL 3.15 (3.92) 4.57, CW 2.41 (3.14) 3.78.

Carapace: Tufts about 2x width of AME. Anterior ocular band a very narrow line of white, or absent. Median ocular band white or gray, broken into three spots or a median diamond-shaped spot (rarely absent). OQ scales gray or tan. Submarginal band white or gray, broad from ALE to thoracic slope and/or lateral scale cover sparse, gray. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, gradually

narrowed, or entirely narrow. Lateral bands II and III are oblique stripes. Lateral band IV an oblique stripe attached to spots III. Spots I two short parasagittal stripes. Spots II fused into truncated triangle. Spots III large, linear. Spots IV small, oval. All spots white. Scale cover gray, on entire dorsum except spots and basal band. Venter gray.

Epigynum: Flaps absent. Anterior shallowly depressed. Middle depressed laterally, sagittal plane slightly raised (sometimes a slightly raised transverse bar immediately behind atria), convex without sagittal ridge. Duct heads broad, 0 pair major bends, 2 pair median minor bends, 0-2 pair supernumery bends, 2 pair posterior minor bends.

***Phidippus toro* Edwards 1978**

Figs. Front Cover, 71-75; Map 4

Phidippus n. sp.: Jung & Roth 1974:33; Richman & Cutler 1978:97

Phidippus toro Edwards 1978:80; holotype (♂) deposited in MCZ, paratypes (♂,♀) in AMNH, FSCA, MCZ, SWRS

P. toro: Richman 1979:125; Brignoli 1983:651

Etymology: Spanish noun in apposition, *toro*, an allusion to the "bull-like" appearance of the raised crest and large hair tufts of the male.

Type locality: USA: Arizona: Cochise Co., Chiricahua Mts., South Fork of Cave Creek, South Fork forest camp, sweeping bushes, 6-VII-1973, D.B. Richman, penultimate male which matured by 22-VII-1973.

Geographic Range and Records: Southeastern Arizona to northeastern Mexico. **MEXICO:** Chihuahua: Catarinas, 6000', 11-IV-1948, 1♀ (M.G. Bradt, AMNH); Nuevo Leon: Horsetail Falls, 31-VIII-1968, 2♀ (J.E. Carico-347, USNM); Tamaulipas: Ciudad Victoria (12.6 mi. SW.), 16-VI-1983, 1♀ (B.K. Dozier, FSCA); USA: Arizona: Cochise Co.: Chiricahua Mts.: XII-1964-I-1965, 1♀ paratype (V. Roth, MCZ); Ash Spring, 30-VI-1975, 1♀ (D. Ubick, Ubick coll.); Horseshoe Canyon, 6-VIII-1976, 1♂ 1♀ (S.C. Johnson, Johnson coll.); S. Fork Cave Creek Canyon: 27-VII-1963, 1♂ 4♀ (J.A. Beatty, Beatty coll.); 10-IX-1964, 1♀ (J.& W. Ivie, AMNH); 16-V-1982, 1♀ (F. Coyle, V. Roth, MCZ); S. of Cave Cr.: 24-IV-1970, 1♀ paratype (D.B. Richman, FSCA); on yucca, 7-IX-1983, 1♂ (D.B. Richman, FSCA); Portal (1mi. SW.), nest under rock edge of stream, 15-IV-1969, 1♀ (S. Riechert, TMM); Price Canyon (mouth of), 12-VIII-1968, 1♂ paratype (G. Batista, AMNH); Rustlers' Park, 24-IX-1956, 1♀ (A.M. Nadler, AMNH); Snowshed Tr. (3 mi. W. SWRS), on yucca, VIII-1972, 1♂ (D. Ubick,

SWRS); Southwestern Research Station: 8-V-1976, 1♀ (V. Roth, SWRS); on greenhouse trail, 24-VI-1972, 1♀ (D. Ubick, Ubick coll.); along creek bed, 21-VI-1976, 1♀ (R.J. Wolff, Wolff coll.); 5400', 24-VII-1976, 1♀ (S.C. Johnson, Johnson coll.); 28-VII-1976, 1♂ (S.C. Johnson, Johnson coll.); 29-VII-1976, 3♂ 1♀ (S.C. Johnson, FSCA); 18-VIII-1976, 1♂ (S.C. Johnson, Johnson coll.); 15-X-1984, 1♀ (V. Roth, SWRS); 5-X-1985, 1♀ (V. Roth, SWRS); E. Turkey Creek: 22-VIII-1972, 1♀ (FSCA); on yucca, 22-VIII-1972, 1♀ (D. Ubick, FSCA); under rock, 12-VIII-1971, 1♀ w/47 yg (A. Jung, FSCA); 24-VII-1976, 3♂ 1♀ (S.C. Johnson, Johnson coll.); E. Turkey Creek: Portal (6 mi. NW.), 24-VII-1976, 1♂ (S.C. Johnson, FSCA); Portal (9 mi. W.), 11-V-1972, 4♀ paratypes (W.J. Gertsch, AMNH); Portal (10 mi. W.): 7-VII-1972, 1♀ paratype (W.J. Gertsch, AMNH); 10-VII-1972, 2♀ (W.J. Gertsch, SWRS); Jct. Turkey Creek & FR 42, 6400', under rock near stream, 5-VI-1975, 1♀ (S.C. Johnson, Johnson coll.).

Biology: This summer-maturing species lives in mixed oak-conifer forest above 5000' elevation. Females make their eggsacs under rocks.

Comments: The Mexican females have the epigynal secondary rim slightly more arched.

Diagnosis: Male is only species (with exception of *P. mystaceus*, especially rare form in Florida) which has a dorsally raised transverse integumental ridge in ocular area. It can be distinguished from *P. mystaceus* by the narrow embolus apical portion and white leg I fringes. Pink scale patches on leg I, when present, are unique. Female looks like *P. tigris*, but the duct openings are farther apart and lack flaps, and the median ocular band is complete.

Description:

MALE: BL 6.01 (8.98) 10.35, CL 3.74 (4.59) 5.10, CW 2.91 (3.61) 4.03.

Carapace: Post-PME tuft present, length about 3x width of AME. Median ocular band yellow or orange, complete. Transverse integumental ridge in middle of OQ. Cheek band white. Marginal band a narrow white line from clypeus to posterior corners of carapace. Clypeus fringe white or gray, band white or gray. Chelicerae completely fringed with gray.

Palp: Dorsal stripe white or pink, on femur, patella, and cymbium (distal prolateral spot only). Tibial apophysis stout, elongate triangular, tip narrow and bent outward. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, gradually tapering distally, arising dorsally from distal

edge of embolus basal portion.

Leg I: Fringes all white, short to medium in length except femur dorsal and tibia prolateral and ventral fringes long. Femur prolateral stripe pink or white; distal band pink or yellow; ventral stripe white. Patella and tibia prolateral scale cover pink or white entire length. Metatarsus and tarsus entirely covered with pink or white scales. Tarsus integument pale proximally, dark distally, or entirely pale.

Abdomen: Venter black with white stripe each side, or gray with 2 white stripes medially.

FEMALE: BL 8.52 (10.60) 12.86, CL 3.65 (4.63) 4.98, CW 2.82 (3.69) 4.03.

Carapace: Tufts about 2x width of AME. Median ocular band white, yellow or both, complete. OQ scales sparse and iridescent. Submarginal band broad from ALE to thoracic slope, or broad from behind PME to thoracic slope, or absent, with lateral scale cover white. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, abruptly narrowed, or entirely narrow, or not narrowed at ends. Lateral bands II and III are oblique stripes (III may be reduced to spot). Lateral band IV an oblique stripe attached to spots III. Spots I small, oval. Spots II outwardly concave, slightly separated or touching. Spots III and IV small, linear (III may be large). All spots white. Scale cover gray, on lateral edges only. Venter gray.

Epigynum: Flaps absent. Anterior shallowly depressed. Middle broadly depressed laterally, sagittal plane slightly raised, slightly convex without sagittal ridge. Duct heads broad, 0 pair major bends, 2 pair median minor bends, 2 pair posterior minor bends.

***Phidippus cruentus* F.O.P.C. 1901**

Figs. C13, 76-81, 350; Map 6

Phidippus cruentus F.O.P.C. 1901:282,284; holotype (♀) in BMNH, examined

Dendryphantus cruentus: Petrunkevitch 1911:627; Roewer 1954:1192; Platnick 1993:750

Phidippus pix Pinter 1970:2; holotype (♂) in AMNH, examined; NEW SYNONYMY

P. cruentus: Bonnet 1958:3519; Proszynski 1971b: 455; Hoffman 1976:66; Richman & Cutler 1988: 76; Platnick 1993:794

P. pix: Brignoli 1983:650; Richman & Cutler 1988:77

Etymology: Latin adjective, *cruentus*, blood-red, an allusion to the color of the abdominal dorsum of the female.

Type locality: MEXICO: Jalisco: coll. Höge (only data given).

Geographic Range and Records: West-central Mexico. **MEXICO:** *Chihuahua:* Canon Prieta, near Primavera, 30-VI-1947, 1♀ (W.J. Gertsch & W. Ivie, AMNH); *Distrito Federal:* San Jeronimo, 11-VI-1946, 2♂ 1♀ (J.C. & D.L. Pallister, AMNH); *Durango:* Palos Colorados, 8000', 5-VIII-1947, 1♀ (W.J. Gertsch & W. Ivie, AMNH); *Guanajuato:* Santa Cruz de Juventina Rosas, oak forest, 10-VIII-1988, 1♀ (G.B. Edwards, FSCA); *Jalisco:* Acatlan (1mi.E.), 14-VI-1987, 1♂ 3♀ (B.K. Dozier, FSCA); Ciudad Guzman (10 mi. N.), 28-VIII-1965, 1♀ (R. Hastings, W.J. Gertsch, AMNH); Guadalajara: 1♂ 1♀ (C. & P. Vaurie, AMNH); 2♂ 2♀ (G.W. Peckham, MCZ); 3-VII-1953, 1♂ 2♀ (C. & P. Vaurie, AMNH); 7-14-VII-1953, 2♂ (C. & P. Vaurie, AMNH); (25 mi. E.), 16-VII-1963, 2♀ (J.A. Beatty, Beatty coll.); (4 mi. SW.), 20-VI-1941, 1♂ 1♀ (L.I. Davis, AMNH); (8-12 mi. W.), 31-VII-1964, 2♀ (W.J. Gertsch, J. Woods, AMNH); Lake Sayula (W. side), 3-VIII-1956, 1♀ (W.J. Gertsch, V. Roth, AMNH); San Antonio, S. Lake Chapala, 5-VII-1975, 1♀ (W.J. Gertsch, SWRS); Tlaquepaque: 28-VI-1945, 1♂ 1♀ (N.L.H. Krauss, AMNH); VII-1953, 1♀ N.L.H. Krauss, AMNH); Zapopan, 28-VI-1945, 1♂ 1♀ (N.L.H. Krauss, AMNH); *Michoacan:* Quiroga (3 mi. W.), 9-V-1963, 1♂ 1♀ (W.J. Gertsch, W. Ivie, AMNH); Tepetates Pass (15 mi. W. Hidalgo), 8-V-1963, 2♀ (W.J. Gertsch, W. Ivie, AMNH); *Nayarit:* Compostela (2.6 mi. N.), 1-VII-1983, 1♂ (B.K. Dozier, FSCA); Jalisco, 27-VII-1954, 1♀ (W.J. Gertsch, AMNH); Jesus Maria, 22-30-VI-1955, 1♂ 3♀ (B. Malkin, AMNH); Tepic, 24-VI-1940, 1♂ (*P. pix* paratype) (L.W. Saylor, AMNH).

Biology: This is another summer-maturing species which lives in oak woodland at moderately high elevation.

Comments: This is one example of several species which had each sex described as a different species.

Diagnosis: Of the species with males having expanded "cheeks", this is the only one with a broad embolus apical portion. Females are very similar to *P. arizonensis* (these are the only two species with mottled coloration on the ventral abdomen), but lack well-developed epigynal flaps.

Description:

MALE: BL 7.18 (7.82) 8.68, CL 3.57 (3.89) 4.23, CW 2.82 (3.11) 3.49.

Carapace: OQ scales iridescent. Cheek expansion present. Submarginal band narrow from PME to thoracic slope or absent. Cheek band white. Marginal band a narrow line from clypeus to PLE. Clypeus fringe white, band white. Chelicerae completely fringed with gray.

Palp: Dorsal stripe white or white and yellow, on femur, patella, tibia (sparse), and cymbium (on median stripe only). Cymbial macrosetae restricted to semicircle around distal end of embolar groove. Tibial apophysis stout, elongate triangular, tip narrow and bent outward. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, broad entire length, tip truncate, arising dorsally from distal edge of embolus basal portion.

Leg I: Fringes all yellow, short to mostly medium in length, femur retroventrolateral and tibia ventral fringes long. Femur with black dorsal subproximal tuft; prolateral stripe white; ventral stripe yellow. Patella and tibia prolateral scale cover yellow entire length. Metatarsus entirely covered with yellow scales. Tarsus with yellow scales on proximal half.

Abdomen: Scale cover yellow or red, on entire dorsum except spots and basal band. Venter black (with small yellow or red spots).

FEMALE: BL 6.01 (9.03) 12.11, CL 3.11 (4.03) 4.65, CW 2.41 (3.24) 3.82.

Carapace: Tufts about 2x width of AME. OQ scales sparse and iridescent. Submarginal band yellow, broad from ALE to thoracic slope. Clypeus fringe white, band yellow.

Abdomen: Basal band wider anteriorly, abruptly narrowed. Lateral band II an oblique stripe. Lateral band IV an oblique stripe attached to spots III. Spots I small, oval. Spots II fused into truncated triangle. Spots III large, linear. Spots IV small, linear. All spots white. Scale cover yellow or red, on lateral edges only. Venter pale, variegated with irregular dark circular markings.

Epigynum: Flaps absent. Anterior shallowly depressed. Middle depressed laterally, sagittal plane slightly raised (but depressed below anterior and posterior median areas), slightly convex without sagittal ridge. Duct heads broad, 2 pair major bends, 1 pair median minor bends, 1 pair supernumerary bends, 3 pair posterior minor bends.

***Phidippus arizonensis*
(Peckham & Peckham 1883)**

Figs. C11-12, 82-88; Map 6

Attus arizonensis Peckham & Peckham 1883:13; 3 syntypes (♂) in MCZ, examined; lectotype designated *Phidippus obscurus* Peckham & Peckham 1888:16 (in part); seven of eight syntypes (♀) in MCZ, examined (see *P. carolinensis*), lectotype designated; NEW SYNONYMY

Phidippus arizonensis: G&E. Peckham 1888:18, 1901:286, 1909:385,387,419; Marx 1890:568; F.O.P.C. 1901:280, 282, 284; Banks 1910:63; Chamberlin 1924:681 (probably misidentified); Chickering 1937:281; Bonnet 1958:3513; Vogel 1970:19; Proszynski 1971b:454; Hoffman 1976:66; Richman & Cutler 1978:95, 1988:76; Platnick 1993:793

Phidippus tuberculatus F.O.P.C. 1901:280, 282,283; 5 syntypes (2♂ 3♀ in 2 vials) in BMNH, examined, lectotype (♂) designated (synonymized by Peckham & Peckham, 1909)

Dendryphantus arizonensis: Simon 1901:617; Petrunkevitch 1911:643; Roewer 1954:1204; Platnick 1993:749

D. obscurus: Petrunkevitch 1911:638; Roewer 1954:1213; Platnick 1993:751

D. tuberculatus: Petrunkevitch 1911:643; Roewer 1954:1204; Platnick 1993:752

Phidippus tuberculatus: Hoffman 1976:66

P. obscurus: Richman & Cutler 1978:96; Platnick 1993:795

Etymology: Latin adjective derived from geographical name, the state of Arizona.

Type locality: USA: "Arizona": (only data given). The specimens were sent to the Peckhams by the Rev. H. C. McCook from "Arizona territory," an area larger than the present state. No other specimens from the state of Arizona are known, and the locality is considered ambiguous.

NEW TYPE LOCALITY: USA: Texas: Hidalgo Co., Santa Ana Wildlife Refuge.

Geographic Range and Records: Texas and New Mexico to southern Mexico. **MEXICO:** *Chihuahua*: Catarinas, La Saucerda (1 mi. E.), Santa Bárbara; *Durango*: Las Puentes, San Lucas; *Guanajuato*: Santa Cruz de Juventina Rosas; *Guerrero*: Acapulco, Chilpancingo (2-4 mi. N.); *Hidalgo*: Chapulhuacan, Jacala, Jacala (2 mi. SW.); *Jalisco*: Guadalajara; *Morelos*: Cuernavaca; *Nuevo Leon*: Chipinque Mesa (S. of Monterrey), Grutas de Garcia, Herras, Horsetail Falls, Santa Catarina (3 mi. SW.); *San Luis Potosi*: Ciudad del Maiz (4.1 mi. E.), Valles, Xilitla; *Tamaulipas*: El Tinieblo, Hidalgo, Rancho Santa Ana, Reynoso (W. near St. Line), Cd. Victoria: (5 mi. S.); (12.6 mi. SW.); (55 km S.); *Veracruz*: Acultzingo: (2 mi. NE.); (3 mi. E.); **USA:** *New Mexico*: Eddy, Lincoln, San Miguel, Union; *Texas*: Atascosa, Bexar, Brewster, Cameron, Coryell, Dallas, Frio, Hays, Hidalgo, Jim Wells, Karnes, Kleberg, Nueces, Refugio, San Patricio, Travis, Uvalde, Wichita, Williamson.

Biology: Few records give ecological data, but these

imply this species lives in understory of oak woodland; 5000-7000' is indicated for most records giving elevation. Maturation records for males are mostly distributed from summer to autumn.

Comments: Both the Peckhams' (1909) note that they have *P. arizonensis* from California and Chamberlin's (1924) identification of this species from the same state are probably misidentifications of *P. californicus*. Females of the two species are superficially similar. The description and illustrations of *P. obscurus* are clearly of *P. arizonensis*, and not of the single female of *P. carolinensis* included among the syntypes.

Diagnosis: Males of *P. arizonensis* are the only species with the combination of expanded carapace cheeks, all yellow leg I fringes, and a slender embolus apical portion. Females of *P. arizonensis* differ from *P. cruentus*, the only other species with mottling on the venter of the abdomen, by having well-developed epigynal flaps (the latter species lacks flaps). Mottling may have faded out on older specimens.

Description:

LECTOTYPE MALE: ALE-PME 0.32, PME-PL 0.84, ALE-PME/ALE-PL 28%, ALE ROW 2.32, PL 3.07, CW 3.44, ALE/CW 67%, PL/CW 89%, CW/CL 83%, CL 4.15, LOQ 1.91, LOQ/CL 46%, BL 8.35.

MALE: BL 8.35 (9.18) 10.02, CL 3.98 (4.17) 4.48, CW 3.32 (3.64) 3.90.

Carapace: Integument blue-black. AER fringe yellow. Post-PME tuft about 2x width of AME. Median ocular band yellow, complete, or absent. Posterior ocular band iridescent. Cheek expansion present. Submarginal band yellow, broad from behind PME to thoracic slope. Cheek band white. Marginal band a narrow line from clypeus to PLE. Clypeus fringe white. Chelicerae completely fringed with gray.

Palp: Dorsal stripe yellow, on patella, tibia, and cymbium. Cymbial macrosetae restricted to semicircle around distal end of embolar groove. Tibial apophysis stout, tip narrow and bent outward. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, gradually tapering distally, arising dorsally from distal edge of embolus basal portion.

Leg I: Fringes all yellow, short to medium in length except femur and tibia ventral fringes long. Femur with black dorsal subproximal tuft; prolateral stripe yellow; prolateral distal band yellow; ventral stripe yellow. Patella and tibia prolateral scale cover yellow entire length. Metatarsus and tarsus entirely covered with yellow scales. Tarsus integument pale

proximally, dark distally, or entirely pale.

Abdomen: Basal band white or yellow, sometimes encircling dorsal edge of abdomen to spots IV. Entire dorsum covered with short gray setae, color similar to female or dark blue-black like carapace. Venter black with white stripe each side and black ventral fringe edged laterally with white.

FEMALE: BL 9.02 (11.27) 13.36, CL 4.15 (4.61) 5.15, CW 3.49 (3.94) 4.32.

Carapace: Tufts about 2x width of AME. Median ocular band yellow, complete, or absent. OQ scales gray, or sparse and iridescent; lateral scale cover sparse, white. Clypeus fringe white, band white.

Abdomen: Basal band encircling dorsal edge of abdomen to spots IV. Lateral band II an oblique stripe fused to basal band. Lateral band IV an oblique stripe attached to spots III and IV and basal band. Spots I two short parasagittal stripes. Spots II fused into truncated triangle. Spots III large, linear. Spots IV small, linear. All spots white or yellow. Scale cover yellow or red, on entire dorsum except median black stripe, dorsal spots, and basal band. Venter pale, variegated with irregular dark circular markings; sometimes markings organized into two lateral "stripes."

Epigynum: Flaps parallel convex (southern Mexican specimens less rounded anterolaterally). Anterior shallowly depressed. Middle depressed laterally, sagittal plane slightly raised, slightly convex without sagittal ridge. Duct heads broad, 2 pair major bends, 0 pair median minor bends, 2 pair posterior minor bends.

Phidippus mystaceus (Hentz 1846)

Figs. C14-16, 89-94; Map 5

Attus mystaceus Hentz 1846:355; holotype (♂) destroyed

Phidippus asinarius C.L.Koch 1846:139; holotype (♀) in ZMHB (formerly pinned, now in vial) examined (synonymized by Marx 1890)

Phidippus electus C.L.Koch 1846:144; (incorrectly synonymized by Marx 1890; see *P. audax*)

Cyrtanota multivaga: Simon 1864:327 (misidentification); not *Attus multivagus* Walckenaer 1837, a NOMEN DUBIUM

Phidippus mystaceus: Emerton 1877:71, 1891:227; Banks 1892:73, 1900:539, 1910:64, 1916:82; Harrington 1896:13, 1897:191; Slosson 1898:249; Bryant 1908:97; Peckham & Peckham 1909:388, 435; Comstock 1913:681,684; Barrows 1918:317; Rau 1935:268-9; Muma 1944:11, 1945:60; Muma & Jeffers 1945:251; Bonnet 1958:3523; Whitcomb et al. 1963:657; Vogel 1970:19; Berry 1970:105;

Proszynski 1971b:455; Brown 1973:237; Edwards, in Richman & Cutler, 1978:96; Cokendolpher & Bryce 1980:16; Oehler 1980:6-7; Edwards 1981b: 200-13, 1990:98; Edwards & Rossman 1981:29; Jackson 1982b:214; Roach & Edwards 1984:54; Wolff 1984:60; Stietenroth & Horner 1987:240; Maddison & Stratton 1988a:199; Young & Edwards 1990:22; Platnick 1993:795, 1997:920

Phidippus albomaculatus Keyserling 1885:491 (incorrectly synonymized by Emerton 1891; see *P. purpuratus*)

Phidippus incertus Peckham & Peckham 1901:288, 292; holotype (♀) in MCZ, examined (synonymized by Peckham & Peckham 1909, but incorrectly resurrected by Bryant 1942)

Dendryphantus mystaceus: Petrunkevitch 1911:637; Roewer 1954:1213; Platnick 1993:751

Phidippus hirsutus Barrows 1919:358 (in part); holotype (♂) in OSU, examined (synonymized by Edwards in Richman & Cutler 1978)

P. incertus: Bryant 1942:698; Warren et al. 1967:389, 394; Vogel 1970:19

P. hirsutus: Bryant 1942:700; Kaston 1948:481,487; Bonnet 1958:3520; Specht & Dondale 1960:813; Whitcomb et al. 1963:657; Proszynski 1971b:455

Dendryphantus hirsutus: Roewer 1954:1211; Platnick 1993:751

Etymology: Latinized adjective, *mystaceus*, with a moustache, from the Greek *mystax*, moustache. The allusion is unclear, perhaps referring to the long setal tufts in the region of the OQ.

Type locality: USA: North Carolina: (only data given).

Geographic Range and Records: Texas and Oklahoma northeast to southern New England and south to Florida. USA: Alabama: Lee; Arkansas: Carroll, Clark, Faulkner, Washington, Colorado: Fremont; Connecticut: New Haven; Washington, D.C.; Florida: Alachua, Charlotte, Marion; Georgia: Chandler, Habersham, Hall, Monroe, Paulding; Illinois: Jackson, Macoupin; Kentucky: Breathitt, Meade; Maryland: Prince Georges, Wicomico, Worcester; Missouri: Miller; Mississippi: (Agr. College); North Carolina: Buncombe, Durham, Orange; New Jersey: Camden, Gloucester, Middlesex, Ocean, New York: Long Island, Suffolk; Ohio: Hocking; Oklahoma: Cleveland, Comanche, Le Flore, Love, Noble, Payne, Wichita, South Carolina: Pickens; Tennessee: Blount, Sevier; Texas: Anderson, Archer, Bexar, Brazos, Brown, Burnet, Clay, Colorado, Comanche, Coryell, Dallas, Denton, Frio, Grayson, Jones, Kerr, Kimble, Lampasas, Llano, McLennan, Potter, Taylor, Travis, Wichita; Virginia:

Campbell, Fairfax, Pittsylvania.

Biology: This autumn-maturing species is found in hardwood forest, but is occasionally found on pine. In the southern part of its range, it most often is found in xeric oak woodland.

Comments: Hentz's written description could fit either *P. mystaceus* or *P. purpuratus*, but his illustration of the extra long setal tufts on the carapace indicates that the species he was describing was *P. mystaceus*. Stability of nomenclature also favors retaining *P. mystaceus* for this species.

Diagnosis: Males have a stridulatory organ on the palp and yellow leg I fringes like *P. arizonensis*, but lack the expanded carapace "cheeks" of the latter species and have a much broader embolus apical portion. Usually males also uniquely have the median ocular band consisting of three red spots. The Florida form has the carapace mostly red, edged in yellow, with a pair of tufts in the middle of the OQ. Females are gray and similar among related species only to *P. asotus*, from which they can be distinguished by having smaller, more angled, spermathecal duct heads, apparent rudimentary flaps on the epigynum, and usually a more pronounced set of dorsal markings, especially the median ocular band.

Description:

MALE: BL 4.91 (6.96) 8.57, CL 3.30 (3.69) 4.00, CW 2.70 (3.09) 3.40.

Carapace: Post-PME tuft about 2.5x width of AME (or absent if mid-ocular tufts present). Two tufts in mid-ocular region absent or present (rarely in Florida). Median ocular band yellow to red, broken into three spots. OQ scales absent, or red with yellow lateral edge (in rare form). Transverse integumental ridge in middle of OQ (especially if mid-ocular tufts present). Cheek band white. Marginal band a narrow white line from clypeus to posterior corners of carapace (gray posterior to PLE). Clypeus fringe white. Chelicerae completely fringed with gray.

Palp: Dorsal palpal stripe white on femur, patella, tibia, and cymbium with yellow basal spot on cymbium. Macrosetae widely distributed over distal end of cymbium. Tibial apophysis with tooth along inner edge basally; stout, elongate triangular, tip narrow and bent outward. Palea distinctly wider than long. Ectal border distal to tegular shoulder smoothly curved (slightly indented). Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, broad, tapering distally, arising dorsally from distal edge of embolus basal portion.

Leg I: Fringes all yellow, short to medium in

length except femur, patella, and tibia ventral fringes long. Femur with black dorsal subproximal tuft; prolateral stripe yellow, or white (in rare form); prolateral distal band yellow; ventral stripe yellow. Patella and tibia prolateral scale cover yellow entire length (patella rarely white). Metatarsus and tarsus entirely covered with yellow scales. Tarsus integument entirely dark or entirely pale.

Abdomen: Scale cover gray, on entire dorsum except basal band. Venter black or gray.

FEMALE: BL 6.81 (9.84) 13.33, CL 4.30 (4.71) 5.20, CW 3.40 (3.77) 4.20.

Carapace: Tufts about 2x to 2.5x width of AME. Mid-ocular tufts present or absent. Median ocular band gray, broken into three spots. OQ scales gray; lateral scale cover sparse, gray. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, gradually narrowed; or encircling dorsal edge of abdomen to spots III. Lateral bands II and III are oblique stripes. Lateral band IV an oblique stripe attached to spots III. Spots I small, oval, or two short parasagittal stripes. Spots II large, oval, or concave laterally, separated or connected medially. Spots III and IV small, linear (III sometimes large). All spots white. Scale cover gray, on entire dorsum except spots and basal band. Venter gray.

Epigynum: Has rudimentary lateral ridges (but no flaps). Anterior shallowly depressed. Middle depressed laterally, sagittal plane slightly raised, slightly convex without sagittal ridge. Duct heads broad, 0 pair major bends, 2 pair median minor bends, 2 pair posterior minor bends.

***Phidippus adonis* Edwards, New Species**

Figs. 95-100; Map 6

Holotype (♂) and allotype (♀) in AMNH.

Etymology: Latin noun in apposition from mythology, *Adonis*, a beautiful youth beloved of Venus.

Type locality: MEXICO: *Morelos*: Cuernavaca, VII-1953, N. L. H. Krauss.

Geographic Range and Records: Mexico: *Morelos*.

Biology: Unknown other than the types were collected in summer.

Comments: The holotype and allotype were collected together and are the only specimens known.

Diagnosis: The male is the only one of the three species with wide "cheeks" which lacks yellow leg I fringes and scales, having instead (apparently; the color has faded and is uncertain) all white (or possibly black and white) fringes and a ventral white femoral stripe.

The female is similar to *P. arizonensis*, but the secondary rim of the epigynum is incomplete medially, the spermathecal ducts are closer together, and the abdomen lacks ventral mottling. Also, the flaps are not fully developed posteriorly and do not cover the duct openings. Both sexes uniquely have spots II fused into a very wide, foreshortened triangle.

Description:

HOLOTYPE MALE: ALE-PME 0.46, PME-PLE 0.86, ALE-PME/ALE-PLE 35%, ALE ROW 2.28, PLE ROW 2.95, CW 3.49, ALE/CW 65%, PLE/CW 85%, CW/CL 81%, CL 4.32, LOQ 2.12, LOQ/CL 49%, CH 2.05, BL 8.60.

Carapace: Anterior ocular band white. Median ocular band white, probably complete (partially rubbed). OQ scales iridescent. Cheek expansion present. Submarginal band yellow, narrow from ALE half way to PLE, then very broad to thoracic slope. Marginal band a narrow white line from clypeus to posterior corners of carapace (gray posterior to PLE). Clypeus fringe yellow, band yellow. Each chelicera with two submedian yellow stripes and a white stripe on lateral and medial edges.

Palp: Fringes yellow. Dorsal stripe white, on femur, patella, tibia, and cymbium. Tibial apophysis stout, tip narrow and bent outward. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, gradually tapering distally, arising dorsally from distal edge of embolus basal portion.

Leg I: Fringes all white (faded, could also be alternating black and white or all yellow), mostly short except patella and tibia ventral fringes medium. Femur prolateral stripe white; ventral stripe white. Patella prolateral scale cover white entire length. Tibia prolateral scale cover white proximally.

Abdomen: Black with white markings. Venter gray with large white quadrilateral spot in anterior half.

ALLOPARATYPE FEMALE: ALE-PME 0.44, PME-PLE 0.80, ALE-PME/ALE-PLE 35%, ALE ROW 2.24, PLE ROW 2.86, CW 3.32, ALE/CW 68%, PLE/CW 86%, CW/CL 80%, CL 4.15, LOQ 1.91, LOQ/CL 46%, CH 1.90, BL 10.70.

Carapace: Tufts about 2x width of AME. Mid-ocular tufts present. Median ocular band white, complete. OQ scales sparse and iridescent; lateral scale cover white. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, gradually narrowed. Lateral band II an oblique stripe. Lateral band IV an oblique stripe attached to spots III and IV. Spots I small, oval. Spots II fused into truncated trian-

gle (very wide and followed posteriorly by one distinct chevron). Spots III and IV large, linear. All spots white. Scale cover white, on lateral edges only (sparse). Venter pale with three light gray stripes.

Epigynum: Flaps parallel convex, incomplete posteriorly (flap end indistinct, apparently underneath duct opening). Anterior shallowly depressed. Middle depressed laterally, sagittal plane slightly raised, slightly convex without sagittal ridge. Duct heads broad, 2 pair major bends, 1 pair median minor bends, 4 pair posterior minor bends.

***Phidippus tigris* Edwards, New Species**

Figs. C17-18, 101-106; Map 4

Holotype (♂) and allotype (♀) in FSCA, 21 (7♂, 14♀) paratypes designated (see below).

Etymology: Latin noun in apposition, *tigris*, tiger, an allusion to the distinctive striping and face fringe of the males.

Type locality: USA: Arizona: Coconino Co., 3-4 mi. E. Sedona, Schnebly Hill Road, under rock in clearing, pinyon pine - juniper woods, 15-X-1988, C. Kristensen. Allotype ♀ and other paratypes all from type locality or Oak Creek Canyon.

Geographic Range and Records: Arizona. **USA:** *Arizona:* Cochise Co., Huachuca Mts., Garden Canyon, 6000', oak-pinyon-juniper, 14-VIII-1995 r, 2♂ 2♀ (G.B. Edwards et al., FSCA); Coconino Co.: Coconino Nat. For., 6500', loose rocks, juniper-pine, 18-XI-1987, 1♂ 1♀ (B. Hebert, SWRS); Flagstaff (20 mi. S.), Oak Creek Canyon, 111.44W 34.55N, IV-1935, 4♂ paratypes (W. Ivie, AMNH); 28-III-1972, 1♂ paratype (R.L. Aalbu, Lowe coll.); Sedona (E.), under rock in clearing, 17-IX-1988, 1♀ topoparatype (C.P. Kristensen, CAS); Sedona (4-5 mi. E.), 6000-6500', 1-XI-1988, 7♂ 3♀ topoparatypes (C.P. Kristensen, FSCA); Sedona (5 mi. NE.), Oak Creek Canyon.: 18-VII-1988, ♀ allotype (C.P. Kristensen, FSCA); 26-VII-1988, 2♀ paratypes (C.P. Kristensen, FSCA); Sedona (6 mi. N. on Hwy. 179), under rocks in leaf litter, 5-XI-1983, 3♀ paratypes (G. Lowe, Lowe coll.); Graham Co., Pinaleno Mts., Wet Canyon, Hwy. 366, 6300', fir-pine-oak, 7-IX-1992 r, 1♂ (W.P. Maddison, FSCA); Pima Co., Santa Rita Mts., Madera Canyon, high ridge, 11-VII-1962, 1♀ (A.R. Brady, FSCA).

Biology: This autumn-maturing species occurs in mixed oak-conifer woodlands, recorded from 6000-6500' elevation. Adult males have been collected in autumn, with females found from autumn to mid-summer.

Comments: Occurs in more northern and western

mountain ranges than the similar *P. toro*.

Diagnosis: The dense yellow to orange fringe on the chelicerae of the males is unique (in the sense that it is developed on the chelicerae as well as the clypeus, unlike *P. adonis*, which has its yellow fringe only on the clypeus). The three longitudinal stripes on the anterior dorsum of the carapace are unique as well. Leg I fringes are similar to *P. toro*, but the palpal tibial apophysis is much more stout. Females have reduced anterior stripes appearing as a median ocular band broken into three spots, otherwise they are similar to *P. toro*. Unlike *P. toro*, epigynal flaps are present, and the duct openings are closer together.

Description:

HOLOTYPE MALE: ALE-PME 0.46, PME-PLE 0.72, ALE-PME/ALE-PLE 39%, ALE ROW 2.41, PLE ROW 2.74, CW 3.57, ALE/CW 67%, PLE/CW 77%, CW/CL 82%, CL 4.36, LOQ 1.99, LOQ/CL 46%, CH 2.28, BL 8.93.

MALE: BL 6.18 (7.09) 8.93, CL 3.61 (4.09) 4.36, CW 2.86 (3.29) 3.57.

Carapace: Post-PME tuft about 1.5x width of AME. Median ocular band broken into three spots, extended forward to anterior margin as 3 broad stripes. Submarginal band narrow from ALE half way to PLE, then very broad to thoracic slope. Cheek band white, a narrow line above margin. Marginal band a narrow white line from clypeus to slightly past PLE. Clypeus fringe white, band white or gray. Chelicerae completely and heavily fringed with yellow to orange, the color corresponding respectively with the north to south range distribution.

Palp: Dorsal stripe white, on femur and cymbium (cymbium with distal prolateral spot). Tibial apophysis stout, elongate triangular, tip narrowed (but stout) and bent outward. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, gradually tapering distally, arising dorsally from distal edge of embolus basal portion.

Leg I: Fringes all white, mostly short to medium except tibia prolateral and ventral fringes long. Femur prolateral stripe white; distal band exceptionally wide, white; ventral stripe white. Patella and tibia prolateral scale cover white proximally (and tibia white on distal edge). Metatarsus and tarsus entirely covered with white scales.

Abdomen: Scale cover gray, on lateral edges only. Venter pale with 3 light gray stripes.

ALLOPARATYPE FEMALE: ALE-PME 0.40, PME-PLE 0.56, ALE-PME/ALE-PLE 42%, ALE

ROW 2.24, PLE ROW 2.66, CW 3.11, ALE/CW 72%, PLE/CW 85%, CW/CL 83%, CL 3.74, LOQ 1.83, LOQ/CL 49%, CH 1.83, BL 8.68.

FEMALE: BL 8.52 (9.66) 10.69, CL 3.82 (4.19) 4.86, CW 3.03 (3.32) 3.82.

Carapace: Tufts about 2x width of AME. Anterior ocular band gray. Median ocular band gray, broken into three spots. OQ scales sparse and iridescent; lateral scale cover white. Clypeus fringe white, band white or gray.

Abdomen: Basal band not narrowed at ends. Lateral bands II and III are oblique stripes. Lateral band IV an oblique stripe attached to spots III. Spots I two short parasagittal stripes. Spots II concave laterally, slightly separated or touching. Spots III and IV small, linear. All spots gray. Scale cover gray, on lateral edges only. Venter gray (may have two narrow median white stripes).

Epigynum: Flaps parallel convex. Anterior shallowly depressed. Middle depressed laterally, sagittal plane slightly raised, slightly convex without sagittal ridge. Duct heads broad (but small), 0 pair major bends, 2 pair median minor bends, 2 pair posterior minor bends.

***insignarius* group**

The seven species of this group all have the proximal end of the embolus spiral extending prominently distal to the palea (sometimes expanded as a flange). *Phidippus arizonensis* (*mystaceus* group) also has a flange. The embolus apical portion is slightly stalked, long, recurved, and slender to stout, and the proximal end of the spiral is separated from the fused part by the suture. Both these states also occur in the *mystaceus* group.

In most earlier versions of the phylogeny, the positions of *P. boei* and *P. carneus* were reversed, which appears to me to be more likely, based on the overall similarities (particularly in the shapes of the embolus and duct heads) of *P. boei* with *P. adumbratus*, and *P. carneus* with *P. pompatus*. Another variation was the separation of *P. insignarius* and *P. phoenix* into their own group, sometimes as sister to the *otiosus* group.

Phidippus tyrrelli

Peckham & Peckham 1901

Figs. C23, 107-114; Map 8

Phidippus tyrrelli Peckham & Peckham 1901:285,296; holotype (♂) in MCZ, examined

P. tyrrelli: Banks 1901:588, 1910:65; Emerton 1920:

- 336; Chamberlin 1924:681; Gertsch & Jellison - 1939:11; Proszynski 1971b:456, 1976:149-50; Hoffman 1976:66; Richman & Cutler 1988:77
- P. tyrrellii*: Peckham & Peckham, 1909:384,387,410 (valid emendation)
- P. montivagus* Peckham & Peckham 1901:293 (incorrectly synonymized by Peckham & Peckham 1909); see *P. carneus*
- P. albulatus* F.O.P.C. 1901:285 (incorrectly synonymized by Peckham & Peckham 1909); see *P. albulatus*
- Dendryphantas tyrrelli*: Petrunkevitch 1911:643; Roewer 1954:1205; Platnick 1993:752
- Phidippus pogonopus* Chamberlin 1925:132; holotype (♂) in MCZ, examined; NEW SYNONYMY
- Phidippus kaibabensis* Gertsch 1934:13; holotype (♂) in AMNH, examined; NEW SYNONYMY
- Dendryphantas kaibabensis*: Roewer 1954:1212; Platnick 1993:751
- D. pogonopus*: Roewer 1954:1215; Platnick 1993:752
- Phidippus kailabensis* (sic): Bonnet 1958:3522; Proszynski 1971b:455
- P. pogonopus*: Bonnet 1958:3525; Richman & Cutler 1978:96; Platnick 1993:796
- P. tyrrellii*: Bonnet 1958:3529; Jung & Roth 1974:33; Richman & Cutler 1978:97; Platnick 1993:796
- P. kaibabensis*: Richman & Cutler 1978:96; Platnick 1993:795

Etymology: Patronym for Mr. J. B. Tyrrell.

Type locality: "Canadian Rocky Mountains", J. B. Tyrrell (only data given)

Geographic Range and Records: Western North America from British Columbia to northern Mexico, primarily in states with Rocky Mountains and adjacent mountain ranges. **CANADA:** *British Columbia*: (type); **MEXICO:** *Sonora*: Sierra San Jose; **USA:** *Arizona*: Apache, Cochise, Coconino, Graham, Kaibab, Pima, Santa Cruz; *California*: Riverside; *Colorado*: Boulder, Chaffee, Custer, Denver, El Paso, Fremont, Gunnison, Larimer, Mesa, Montezuma, Summit; *Idaho*: Blaine; *Montana*: Beaverhead, Ravalli; *New Mexico*: Doña Ana, Grant, Otero, San Miguel, Sierra, Socorro, Valencia; *Oregon*: Baker; *Utah*: Beaver, Garfield, Rich, Salt Lake, Summit, Utah, Washington; *Wyoming*: Johnson, Platte, Teton.

Biology: This species is usually collected between 7000-10,000' elevation. It has been recorded from several types of conifers, low plants like *Agave* and *Opuntia*, and under rocks. It matures in the summer.

Comments: Both *P. pogonopus* and *P. kaibabensis* types appear to represent a northern variant with slightly longer, more slender embolus apical portion and

slightly wider palea. The tibial apophysis variant seen on both these specimens is also seen on the more typical palpal form of *P. tyrrellii*. No distinct females have ever been associated with the northern males; nevertheless, they might represent a distinct species, in which case, *P. pogonopus* has precedence. However, other variants, particularly concerning leg I color variations in males, are known in *P. tyrrellii*, probably due to the fact that this is a high altitude species that occurs on the tops of many mountain ranges in somewhat isolated populations. Even so, the California record (a male) seems atypical for the distribution of this species.

Diagnosis: Distinguished from most species in its range by having a white anterior ocular band in both sexes. Males often have the basal band nearly encircling the abdomen. It may be confused with *P. carneus*, especially the *montivagus* form, but *P. tyrrellii* occurs at higher altitude, is duller red, usually smaller, and the genitalia are less robust, although the spermathecal ducts are more complex. Males are one of two species (*P. insignarius* is the other) which have white or yellow dorsal stripes on leg I.

Description:

MALE: BL 6.93 (7.59) 8.35, CL 3.40 (3.82) 4.15, CW 2.66 (2.97) 3.24.

Carapace: Post-PME tuft about equal to width of AME. Anterior ocular band white. OQ scales iridescent. Submarginal band broad from ALE to thoracic slope. Cheek band white. Marginal band a narrow white line from clypeus to posterior corners of carapace. Clypeus fringe white, band white. Chelicerae vertically striped with white.

Palp: Dorsal stripe white, on femur, patella, tibia, and cymbium. Tibial apophysis stout, tip narrow and bent outward. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, gradually tapering distally, bent dorsally from slight stalk distal to edge of embolus basal portion.

Leg I: With a distinct dorsal white or yellow stripe. Dense fringes alternating black and white each segment, short to medium except femur retroventrolateral, tibia prolateral and ventral, metatarsus ventral and tarsus ventral fringes long. Femur prolateral proximal and distal bands white. Patella and tibia prolateral scale cover white proximally.

Abdomen: Scale cover red, on entire dorsum except basal band (which usually extends to spots IV, encompassing other lateral bands) and sometimes spots. Venter black.

FEMALE: BL 7.85 (10.10) 12.36, CL 3.82 (4.37)

4.77, CW 2.99 (3.40) 3.82.

Carapace: Tufts about 2x width of AME. Anterior ocular band white. Submarginal band broad from ALE to thoracic slope or absent, lateral scale cover white. Clypeus fringe white, band white.

Abdomen: Basal band entirely narrow. Lateral band II an oblique stripe. Lateral band IV an oblique stripe attached to spots III. Spots I two short parasagittal stripes. Spots II fused into truncated triangle (or rarely an rectangle). Spots III and IV small, linear (III sometimes large). All spots white or red. Scale cover red, on entire dorsum except basal band and sometimes spots. Venter black.

Epigynum: Flaps parallel straight posteriorly. Anterior shallowly depressed, septum rudimentary. Middle depressed laterally, sagittal plane slightly raised, convex without sagittal ridge. Duct heads narrow, 2 pair major bends, 2 pair median minor bends, 1 pair supernumerary bends, 4 pair posterior minor bends.

***Phidippus adumbratus* Gertsch 1934**

Figs. C24, 115-119; Map 8

Phidippus adumbratus Gertsch 1934:15; holotype (♂) in AMNH, examined

Dendryphantès adumbratus: Roewer 1954:1205; Platnick 1993:749

P. adumbratus: Proszynski 1971b:453; Richman & Cutler 1978:95; Platnick 1993:793

Phidippus chumash "Pinter": Kaston 1972:270 (in part); NOMEN NUDUM

Etymology: Latin adjective, *adumbratus*, secret, in the dark (perhaps alluding to the fact that the abdomen of the holotype is missing, and the describer was "in the dark" as to its appearance).

Type locality: USA: California: Los Angeles, coll. Grant (only data given).

Geographic Range and Records: Southern California. USA: California: Fresno, Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Barbara, Tulare, Ventura.

Biology: *P. adumbratus* is found in oak-sycamore-willow and chaparral associations from 500-3700' elevation; females make their eggsacs under rocks. The primary maturation season appears to be autumn, as that is when almost all known males have been collected, but females have been found throughout the year.

Comments: I have seen specimens of both this species and *P. kastoni* identified by L. J. Pinter as *P. chumash* in collections. See comments under *P. kastoni*.

Apparently no other specimens have been recog-

nized as belonging to this species since the original description until now. This appears to be due to the palp of the holotype being partially expanded; since this was not noted in the original description, the resulting illustration could not be matched with unexpanded palps of other specimens.

Diagnosis: Males can be distinguished from the closely related *P. boei* (and all other species of *Phidippus* in California except *P. aureus*) by the orange scales dorsally on both carapace and abdomen (*P. boei* is black with a red abdomen dorsally), although island populations have the OQ scales darker and reduced in number. *P. adumbratus* has a much longer, narrower embolus apical portion than *P. aureus*. Females can be distinguished from *P. kastoni* by the shape of the internal ducts of the epigynum; the duct heads are narrow in *P. adumbratus* (broad in *P. kastoni*) and the gland is visible as a rounded projection on the anterodorsal surface of the duct head (not visible in *P. kastoni*). Females are covered dorsally with orange or gray scales (usually with white abdominal spots), unlike the females of *P. boei*, which have a similar epigynum but are black in color without markings, or with red dorsal scales only on the abdomen (without spots).

Description:

MALE: BL 6.35 (8.02) 9.19, CL 3.74 (4.18) 4.65, CW 2.99 (3.35) 3.82.

Carapace: Anterior ocular band white, or replaced by dense band of short black setae. Median and posterior ocular bands coalesced, orange. OQ scales iridescent. Submarginal band very broad to broad from ALE to thoracic slope. Cheek band white. Marginal band a narrow white line from clypeus to posterior corners of carapace. Clypeus fringe white, band white. Chelicerae vertically striped with white.

Palp: Dorsal stripe white, on femur, patella, tibia, and cymbium. Tibial apophysis stout, tip narrow and bent outward. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, gradually tapering distally, bent dorsally from slight stalk distal to edge of embolus basal portion.

Leg I: Dense fringes alternating black and white each segment, short to medium in length except femur dorsal and retroventrolateral, patella ventral, and tibia ventral fringes long. Femur prolateral proximal and distal bands white. Patella and tibia prolateral scale cover white proximally.

Abdomen: Scale cover orange, on entire dorsum except sometimes spots. Venter gray.

FEMALE: BL 8.60 (11.04) 13.86, CL 4.15 (4.83)

5.23, CW 3.32 (3.91) 4.65.

Carapace: Tufts about 2x width of AME. Anterior ocular band white, or replaced by a dense row of short black setae (rarely). Median ocular band a white and tan or orange median spot. Posterior ocular band a gray or orange median spot. OQ scales tan or orange; lateral scale cover white. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, gradually narrowed, or entirely narrow. Lateral bands II and III are oblique stripes (III may be absent). Lateral band IV an oblique stripe attached to spots III. Spots I small, oval. Spots II outwardly concave, touching, or fused into truncated triangle. Spots III and IV small, oval, or large, linear. All spots white or tan. Scale cover gray or orange, on entire dorsum except spots and basal band. Venter black.

Epigynum: Flaps parallel straight posteriorly. Anterior shallowly depressed, septum absent to distinct. Middle shallowly depressed laterally, sagittal plane broadly raised or broadly depressed laterally, sagittal plane narrowly raised (more narrow as anterior septum more defined), slightly convex without sagittal ridge. Duct heads narrow, 2 pair major bends, 0 pair median minor bends, 1 pair supernumery bends, 3 pair posterior minor bends.

Phidippus carneus
Peckham & Peckham 1896

Figs. C20, 120-126; Map 7

Phidippus carneus Peckham & Peckham 1896:12,33; holotype (♀) in MCZ, examined

P. carneus: Peckham & Peckham 1901:286; F.O.P.C. 1901:283; Bonnet 1958:3517; Proszynski 1971b:454; Platnick 1993:794

Dendryphantès carneus: Petrunkevitch 1911:626; Røwer 1954:1192; Platnick 1993:749

Phidippus montivagus Peckham & Peckham 1901:287, 293; holotype (♀) in MCZ, examined (improperly synonymized with *P. tyrrelli* by Peckham & Peckham 1909); NEW SYNONYMY

P. n. sp. nr. tyrrelli Peckham & Peckham: Jung & Roth 1974:33

Phidippus reederi Gertsch & Riechert 1976:18; holotype (♂) in AMNH, examined; NEW SYNONYMY

P. pinteri Gertsch & Riechert 1976:19; NOMEN NUDUM

P. montivagus: Richman & Cutler 1978:96; Platnick 1993:795

P. reederi: Richman & Cutler 1978:97; Brignoli 1983:650

Etymology: Latin adjective, *carneus*, of the flesh, carnal.

Type locality: "Central America" (only data given).

NEW TYPE LOCALITY: MEXICO: *Chihuahua*: Santa Bárbara. There are several records from this locality.

Geographic Range and Records: Southwestern U.S. to central Mexico. **MEXICO:** *Aguascalientes*: Aguascalientes; *Baja California Norte*: Porta Prieta; *Chihuahua*: Buenaventura (9.5mi.S.), Chihuahua (50 mi. N.), Gallego, San Rafael, Santa Bárbara, Santa Bárbara (Clarines Mine), Sierra de Medio (Nogales Ranch), Sierra del Nido, Sierra del Nido (Arroyo Alamo); *Coahuila*: Cedritos (1 mi. S.); *Guanajuato*: San Jose de Allende, San Miguel de Allende, Tequisquiapan (0.25 mi. SE.); *Jalisco*: Guadalajara; *San Luis Potosi*: Charcas, Huizache (22 mi. S.); *Sonora*: Alamos (5 mi. W.); Alamos (7 mi. SE.); Cananea (6 mi. E.), Cananea (10 mi. S.), Naco (Sierra San Jose); Navojoa (25 km SW.); *Zacatecas*: Durango (120 mi. E.); **USA:** *Arizona*: Cochise, Coconino, Graham, Maricopa, Navajo, Pima, Pinal, Santa Cruz, Yavapai; *Colorado*: El Paso, Fremont; *New Mexico*: Doña Ana, Eddy, Grant, Hidalgo, Lincoln, Los Alamos, San Miguel, Santa Fe, Socorro, Union; *Texas*: Archer, Brewster, Presidio, Wichita.

Biology: This species occurs on assorted desert shrubs and cactus, and on oaks, from 420-7090' elevation. Females make eggsacs under rocks. Males are typically found from mid-summer through autumn, whereas females are found in every month.

Comments: An argument could be made for retaining *P. montivagus* as a subspecies, but considering the extensive overlap of this form with typical *P. carneus* in southeast Arizona and southwest New Mexico, resulting in numerous intergrades, I have chosen not to do so. Rarely melanistic females occur in New Mexico, totally lacking any red pattern.

A Nomen Nudum was created when this species was inadvertently referred to by a manuscript name in the description of *P. volcanus* (= *P. pius*).

Diagnosis: This species, especially the *montivagus* form, could be confused with *P. tyrrelli*, which is usually smaller and occurs at higher elevation. The embolus apical portion of *P. carneus* is more robust than in *P. tyrrelli*, and the epigynum has larger flaps and simpler ducts. The red color is usually brighter in *P. carneus* than it is in *P. tyrrelli*. Males never have the white band that often nearly encircles the abdomen in *P. tyrrelli*.

Description:

MALE: BL 7.18 (8.88) 10.35, CL 3.90 (4.47) 4.90, CW 3.07 (3.54) 3.94.

Carapace: Anterior ocular band white or absent. OQ scales sparse, iridescent. Submarginal band broad from ALE to thoracic slope or absent. Cheek band white. Marginal band a narrow white line from clypeus to posterior corners of carapace (gray posterior to PLE). Clypeus fringe tan, band iridescent.

Palp: Dorsal stripe white or iridescent, on femur, or femur and patella. Tibial apophysis stout, tip narrow and bent outward. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, gradually tapering distally, bent dorsally from slight stalk distal to edge of embolus basal portion. Apex may be constricted proximally in *montivagus* form.

Leg I: Fringes alternating black and white, short to medium except femur dorsal and tibia ventral fringes long. Femur prolateral proximal and distal bands white. Patella and tibia prolateral scale cover white proximally. Tarsus integument entirely dark, entirely pale, or pale proximally, dark distally.

Abdomen: Scale cover red, on entire dorsum except basal band and sometimes spots. Venter gray.

FEMALE: BL 8.35 (11.52) 15.20, CL 3.74 (4.86) 6.31, CW 2.91 (3.93) 4.98.

Carapace: Tufts about 1.5x to 2x width of AME. Anterior ocular band white or absent. Posterior ocular band usually absent (rarely a white median spot). OQ scales sparse, iridescent. Submarginal band broad or narrow from ALE to thoracic slope, or absent. Clypeus fringe white, band white or absent.

Abdomen: Basal band wider anteriorly, gradually narrowed, or encircling dorsal edge of abdomen to spots III. Lateral band II an oblique stripe. Lateral band IV an oblique stripe or absent. Spots I small, oval. Spots II fused into truncated triangle, or concave laterally, slightly separated, or small, oval (rarely). Spots III small, linear, or large, linear. Spots IV small, oval, or large, linear. All spots white or red. Scale cover red, on entire dorsum except median black stripe and sometimes spots and basal band, or absent (rarely). Melanistic form lacks dorsal markings. Venter black.

Epigynum: Flaps parallel straight posteriorly, may be shorter than illustrated. Anterior shallowly depressed, septum absent to distinct (rare in northern part of range). Middle shallowly depressed laterally, sagittal plane broadly raised, convex without sagittal ridge. Duct heads narrow, 2 pair major bends, 1 pair median minor bends, 3 pair posterior minor bends.

Phidippus boei Edwards, New Species

Figs. C21-22, 127-131; Map 7

Holotype (♂) in FSCA, allotype (♀) in SWRS.

Etymology: Patronym in honor of the late Don J. Boe, a dedicated recorder of the California spider fauna, who first brought this species to my attention and donated valuable specimens for this revision.

Type locality: MEXICO: *Baja California Sur*: near Guajademi, on rock along trail, 22-X-1972, D. B. Richman, P. D'Eliscu.

Geographic Range and Records: Southern California and Baja. MEXICO: *Baja California Norte*: El Rosario (41 mi. E.), San Bernardino Mission, 11-I-1965, allotype ♀ w/eggs (V. Roth, SWRS); La Tarquesa (22 mi. E. Rosario), 7-II-1947, 1♀ (I. La Rivera, UCB); Punta Banda, 2-XII-1973, 1♀ (S.C. Williams, C.L. Mullinax, CAS); *Baja California Sur*: Loreto (26 mi. S.), 2-I-1977, 1♀ (L.S. Vincent, UCB); USA: *California*: Riverside Co.: Mountain Spring, 13-IX-1941, 2♀ (W. Ivie, AMNH); Palm Desert (3.5 mi. S.), 1000-1500', under rock, 19-III-1978, 1♀ w/yg (R.I. Kavin, UCB); Santa Rosa Mts.: Deep Canyon: 3600', nest under rock, 15-II-1981, 1♀ w/eggs (W. Icenogle, Icenogle coll.); 3600', nest under rock, 22-II-1981, 1♀ w/eggs (W. Icenogle, Icenogle coll.); Horsethief Creek, 7000', pinyon-juniper, 26-III-1974, 1♀ (D.E. Bixler, AMNH); *San Diego Co.*: Anza Borego St. Pk.: Hwy. 78 (W. side), 28-XII-1978, 2♀ (D.J. Boe, FSCA); Hwy. S22 (W. side), 28-XII-1978, 2♀ (D.J. Boe, FSCA); desert scrub and granite, 26-III-1991, 1♀ (D. Ubick, Ubick coll.); Jacumba, IV-1961, 1♀ (V. Roth, SWRS). Four males and two females were reared from eggs laid in captivity by one of the females from Anza Borego St. Pk. (FSCA).

Biology: Most specimens taken have been females under rocks, some with eggsacs, in desert 1000-3600' elevation. One female was taken at 7000' in pinyon pine-juniper association. The only field-collected male (the holotype) was also taken on a rock, so perhaps this is a ground-dwelling species, although if typical like other desert species, the juveniles will occur on shrubs and scrub oak. This is probably an autumn-maturing species with females overwintering to spring.

Comments: This seems to be a species from inland and/or xeric habitats; the genitally similar *P. adumbratus* is coastal and from more mesic habitats.

Diagnosis: Males are black with the dorsum of the abdomen red, in one case (reared) with a narrow black median stripe posteriorly. Females are either colored like the male or all black, without dorsal abdominal markings. The palea is only as wide as long, unlike *P.*

adumbratus in which the palea is wider than long. The epigynal duct head is narrower than that of *P. adumbratus*, but the epigynum is otherwise similar and varies like the latter species in the presence or absence of a septum. Females are more easily distinguished by their color pattern (or lack thereof).

Description:

HOLOTYPE MALE: ALE-PME 0.48, PME-PLE 0.80, ALE-PME/ALE-PLE 38%, ALE ROW 2.41, PLE ROW 2.91, CW 3.53, ALE/CW 68%, PLE/CW 82%, CW/CL 77%, CL 4.57, LOQ 2.08, LOQ/CL 45%, CH 2.24, BL 8.77.

MALE: BL 7.35 (7.85) 8.77, CL 3.36 (3.78) 4.57, CW 2.66 (2.95) 3.53.

Carapace: OQ scales tan; lateral scale cover tan (scales not prominent, so carapace appears black to casual inspection). Cheek band white. Marginal band a narrow white line from clypeus to posterior corners of carapace (gray posterior to PLE). Clypeus fringe tan.

Palp: Dorsal stripe tan on femur. Tibial apophysis stout, tip narrow and bent outward. Palea about as long as wide. Embolus basal portion a broad flat semi-rectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, gradually tapering distally, bent dorsally from slight stalk distal to edge of embolus basal portion.

Leg I: Fringes alternating black and white, short to medium in length except femur dorsal fringe long. Femur prolateral proximal and distal bands white. Patella prolateral scale cover white proximally or white entire length. Tibia prolateral scale cover white on proximal edge.

Abdomen: Scale cover red, on entire dorsum (rarely with narrow posterior black median stripe). Venter black.

ALLOPARATYPE FEMALE: ALE-PME 0.50, PME-PLE 0.90, ALE-PME/ALE-PLE 36%, ALE ROW 2.66, PLE ROW 3.40, CW 4.15, ALE/CW 64%, PLE/CW 82%, CW/CL 80%, CL 5.19, LOQ 2.41, LOQ/CL 46%, CH 2.53, BL 10.86.

FEMALE: BL 9.35 (11.09) 13.44, CL 4.15 (4.52) 5.19, CW 3.32 (3.66) 4.07.

Carapace: Tufts about 2x width of AME. OQ scales sparse and iridescent; lateral scale cover gray, inconspicuous. Clypeus fringe white, band white. Cheliceral band absent.

Abdomen: Basal band usually absent, or rarely wider anteriorly, gradually narrowed. Lateral band II and IV are oblique stripes. Dorsal scale cover entirely red except median black stripe, or absent. Venter black.

Epigynum: Flaps parallel straight posteriorly. An-

terior shallowly depressed, septum absent to distinct. Middle depressed laterally, sagittal plane slightly raised, slightly convex without sagittal ridge. Duct heads narrow, 2 pair major bends, 1 pair median minor bends, 2 pair posterior minor bends.

***Phidippus pompatus* Edwards, New Species**

Figs. 132-136; Map 7

Holotype (♂) and alloparatype (♀) in AMNH.

Etymology: Latin adjective, *pompatus*, magnificent.

Type locality: MEXICO: *Morelos*: Cuernavaca, X-1944, 1♀ (and 6 subadults), N.L.H. Krauss.

Geographic Range and Records: Central Mexico. MEXICO: *Colima*: Colima (15 km NE.), 1230 m, 19-X-1988, 1♂ (E.S. Ross, CAS); *Distrito Federal*: Cerro de las Dos Cruces, 18-IX-1944, 2♂ (J. Hernandez, AMNH); *Guanajuato*: Santa Cruz de Juventina Rosas, oak woods, 10-VIII-1988 r, 1♂ (G.B. Edwards, FSCA); *Jalisco*: Acatlan (1mi. E.), 14-VI-1987, 1♀ (B.K. Dozier, FSCA); Jocotepec (5 mi. SE.), 18-IX-1976, 1♂ (R. Jackson, C. Griswold, FSCA); 18-IX-1976, 2♂ (C. Griswold, R. Jackson, UCB); Lago de Chapala, 18-IX-1976, 2♂ 1♀ (C.E. Griswold, UCB); *Michoacan*: Quiroga (3 mi. W.), 101.35W 19.4N, 9-V-1963, alloparatype ♀ (W.J. Gertsch, W. Ivie, AMNH); *State?*: Cerro Gordo, 5-IX-1943, 1♂ (C. Bolivar, B. Osorio, AMNH). There are several localities named Cerro Gordo in central Mexico.

Biology: This appears to be an autumn-maturing species, with some females surviving as long as the following early summer. One specimen was recorded from oak woodland.

Comments: Like the related *P. carneus*, this species may have or lack pronounced white carapace bands.

Diagnosis: Males have a distinctive broad embolus apical portion, while the female epigynum has posteriorly diverging flaps with sinuate inner edges. Otherwise, they are similar in appearance to *P. carneus*.

Description:

HOLOTYPE MALE: ALE-PME 0.42, PME-PLE 0.82, ALE-PME/ALE-PLE 34%, ALE ROW 2.07, PLE ROW 2.70, CW 3.32, ALE/CW 63%, PLE/CW 81%, CW/CL 77%, CL 4.32, LOQ 1.87, LOQ/CL 43%, CH 1.99, BL 8.85.

MALE: BL 6.85 (9.60) 11.11, CL 3.65 (4.91) 5.64, CW 2.91 (3.85) 4.40.

Carapace: Post-PME tuft about equal to width of AME. Submarginal band narrow from ALE to thoracic slope or absent. Cheek band white. Marginal band a narrow white line. Clypeus fringe black, band iridescent, white or gray.

Palp: Dorsal stripe white, on femur and patella, or femur, patella, tibia, and cymbium (sparse on tibia, cymbium proximal edge only). Tibial apophysis stout, elongate triangular. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long and wide recurved spike, gradually tapering distally, bent dorsally from slight stalk distal to edge of embolus basal portion.

Leg I: Fringes alternating black and white, short to medium in length except tibia ventral fringe long. Femur prolateral proximal and distal bands white. Patella and tibia prolateral scale cover white proximally (tibia on edge only).

Abdomen: Scale cover red, on entire dorsum. Venter black.

ALLOPARATYPE FEMALE: ALE-PME 0.46, PME-PLE 0.92, ALE-PME/ALE-PLE 33%, ALE ROW 2.28, PLE ROW 3.11, CW 3.82, ALE/CW 60%, PLE/CW 82%, CW/CL 81%, CL 4.73, LOQ 1.99, LOQ/CL 42%, CH 2.08, BL 10.30.

FEMALE: BL 10.19, CL 4.90, CW 3.82.

Carapace: Tufts about 1.5x width of AME. With or without a narrow white submarginal band from ALE to thoracic slope. Clypeus fringe black, band white or absent.

Abdomen: Basal band narrow, white, on lateral edges only, or absent. Spots I small oval; Spots II trapezoid in shape, separate; Spots III large, linear; Spots IV small, oval. All spots red or absent. Scale cover red on lateral edges only, but extensive enough to obscure markings in alloparatype. Venter black.

Epigynum: Flaps divergent posteriorly and sinuate on inner edge. Anterior shallowly depressed. Middle shallowly depressed laterally, sagittal plane broadly raised, convex without sagittal ridge. Duct heads narrow, 2 pair major bends, 1 ventral pair supernumerary bends, 3 pair posterior minor bends.

Phidippus phoenix Edwards, New Species

Figs. C19, 137-142; Map 10

Holotype (♂), alloparatype (♀), and 4 (3♂, 1♀) paratypes in FSCA.

Etymology: Latin noun in apposition, *phoenix*, from Greek mythology, the mythical bird that arose from its own ashes.

Type locality: USA: Arizona: Maricopa Co., Vulture Mts. (S. of Wickenburg), 23-III-1973, R. Reeder, D.B. Richman.

Geographic Range and Records: Southern Arizona, southern California, and Baja. MEXICO: Baja Cali-

fornia Norte: El Rosario, rocks along lagoon, V-1961, 3♀ (W.J. Gertsch, V. Roth, SWRS); Ensenada, 12-V-1963, 1♀ (N.L.H. Krauss, AMNH); Ensenada (15 mi. N.), 10-IV-1937, 1♂ 2♀ (AMNH); Punta Prieta (12.5 mi. SW.), 420', on *Salicornia*, 21-XII-1972, 1♂ paratype (E.L. Roth, FSCA); Punta Santo Tomas, 14-15-VII-1956, 2♀ (R.X. Schick, SWRS); San Pedro Bay, 1♂ (R.V. Chamberlin, MCZ); Baja California Sur: El Crucero (10 mi. N.), 15-II-1966, 1♀ (V. Roth, SWRS); Guajademi, crest of trail to, 23-X-1972, 1♂ paratype (R. Reeder, FSCA); Isla Carmen, 1♀ (E.P. Van Duzee, CAS); Isla Magdalena (Pto. Magdalena): 16-III-1957, 1♀ (R. Zweifel, AMNH); 17-III-1957, 1♀ (R. Zweifel, AMNH); La Ribera, 23.30'N 109.30'W, 10-II-1966, 1♀ (V. Roth, SWRS); Las Barracas (30 km ESE. Santiago), IV-1982, 1♂ 1♀ (P. DeBach, CAS); San Jose del Cabo (6 mi. W.), thorn forest under rock, 9-I-1982 r, 1♂ 1♀ (D. Ubick, Ubick coll.); USA: Arizona: Pima Co.: Santa Catalina Mts., Pima Canyon, Sonoran Desert: VI-1995 r, 1♂ (P. Gerba, FSCA); desert shrubs, 20-VIII-1992 r, 1♂ 1♀ (G.B. Edwards, D.R. Maddison, FSCA); Tucson Mts., Roble's Pass, 2600', N. Ajo Way, 29-VII-1973, 1♂ paratype (D. Richman, FSCA); California: Orange Co., Modjeska Canyon, 17-V-1979, 1♀ paratype (D.J. Boe, FSCA); San Diego Co.: La Mesa, 15-IV-1965, 3♀ (W.M. Pearce, AMNH); Lemon Grove: 22-IV-1965, 1♀ (W.M. Pearce, AMNH); 22-V-1965, 2♀ (W.M. Pearce, AMNH); Otay Mesa, Johnson Canyon: 5-V-1968, 1♂ (S.C. Johnson, Johnson coll.); pit trap: V-1970, 2♀; VI-1970, 2♀; IV-1971, 1♂; XI-1971, 3♀ (all B.J. Kaston, Johnson coll.); under rock, 9-IV-1976, 1♀ w/eggs (S.C. Johnson, Johnson coll.); under rock, 16-IV-1978, 1♂ (W. Icenogle, S. Johnson, Icenogle coll.); under rock, 16-IV-1978, 4♀ w/yg (W. Icenogle, S. Johnson, Icenogle coll.); trash on ground, 5-V-1979, 1♂ (W. Icenogle, Icenogle coll.); nest under rock, 7-II-1981, 1♂ (W. Icenogle, Icenogle coll.); 1 mi. N. Harvest Rd., 9-IV-1976, under rock, 2♀ (S.C. Johnson, Johnson coll.); N. end Harvest Rd.: under rock, 1-IV-1977, alloparatype ♀ (S.C. Johnson, FSCA); 22-IV-1978, 1♀ (S.C. Johnson, Johnson coll.); 22-IV-1978, 1♀ w/eggs (S.C. Johnson, Johnson coll.); 22-IV-1978, 2♀ (S.C. Johnson, Johnson coll.); Texas: Kerr Co., Raven Ranch, VI-1941, 1♀ (S.&D. Mulaik, AMNH).

Biology: This is another desert species that seems to follow the typical pattern of juveniles on shrubs and adults on the ground, with eggsacs made under rocks. Maturation appears to be primarily in the spring.

Comments: Most records are from the San Diego, California, area.

Diagnosis: The tan males are superficially similar to *P. asotus* males in appearance. The embolus spiral has a

unique shape, with the embolus basal portion abbreviated laterally. The female epigynum is like a smaller, simpler version of *P. johnsoni*, but lacks a septum.

Description:

HOLOTYPE MALE: ALE-PME 0.44, PME-PLP 0.64, ALE-PME/ALE-PLP 41%, ALE ROW 2.32, PLP ROW 2.66, CW 2.91, ALE/CW 80%, PLP/CW 91%, CW/CL 74%, CL 3.90, LOQ 1.87, LOQ/CL 48%, CH 2.08, BL 8.02.

MALE: BL 7.35 (8.41) 9.19, CL 3.65 (4.09) 4.48, CW 2.86 (3.22) 3.61.

Carapace: Post-PME tuft about 1.5x width of AME. Median ocular band white. OQ scales white or iridescent. Submarginal band broad from ALE to thoracic slope, sometimes with lateral scale cover (sparser, below band). Cheek band white. Marginal band a narrow white line from clypeus to posterior corners of carapace. Clypeus fringe white, band white. Chelicerae completely fringed with white.

Palp: Dorsal stripe white, on femur, patella, tibia, and cymbium. Tibial apophysis stout, tip narrow and bent outward. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, gradually tapering distally, bent dorsally from slight stalk distal to edge of embolus basal portion.

Leg I: Fringes all white, short to medium in length except femur dorsal and tibia prolateral and ventral fringes long. Femur prolateral stripe white; proximal and distal bands white. Patella and tibia prolateral scale cover white proximally (and distal edge of tibia).

Abdomen: Scale cover tan, on entire dorsum, sometimes except dorsal spots and basal band. Venter gray, or pale with 3 light gray stripes.

ALLOPARATYPE FEMALE: ALE-PME 0.46, PME-PLP 0.7, ALE-PME/ALE-PLP 40%, ALE ROW 2.24, PLP ROW 2.70, CW 3.07, ALE/CW 73%, PLP/CW 88%, CW/CL 80%, CL 3.86, LOQ 1.91, LOQ/CL 49%, CH 2.08, BL 8.52.

FEMALE: BL 7.68 (8.97) 12.19, CL 3.65 (4.06) 4.57, CW 2.86 (3.16) 3.65.

Carapace: Tufts 1.5x or less width of AME. Median ocular band white. OQ scales sparse and iridescent; lateral scale cover white. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, gradually narrowed. Lateral band II an oblique stripe. Lateral band IV an oblique stripe attached to spots III and IV. Spots I small, oval. Spots II fused into truncated triangle. Spots III and IV small or large, linear. All spots white. Scale cover white or red, on lateral edges only.

Venter black with white stripe each side.

Epigynum: Flaps divergent posteriorly. Anterior shallowly depressed, septum rudimentary. Middle depressed laterally, sagittal plane slightly raised, slightly convex without sagittal ridge. Duct heads narrow, 2 pair major bends, 0 pair median minor bends, 1 ventral pair supernumery bends, 2 pair posterior minor bends.

***Phidippus insignarius* C.L.Koch 1846**

Figs. 143-147; Map 10

?*Attus nuttallii* Hentz 1846:352; holotype (♀) destroyed (synonymized by Roewer 1954);

NOMEN DUBIUM

Phidippus auctus C.L.Koch 1846:148; holotype (♀) in ZMHB, examined (improperly synonymized with *P. insolens*: Banks 1901, *P. rimator*: Banks 1910, and *P. tripunctatus*: Emerton 1930; Bonnet 1958); NEW SYNONYMY

Phidippus insignarius C.L.Koch 1846:150; holotype (♂) in ZMHB, examined

P. insignarius: C.L.Koch 1851:54; Simon 1864:327; Peckham & Peckham 1909:384,387,412; Emerton 1909:225; Barrows 1918:317; Worley & Pickwell 1931:115, 117; Kaston 1938:196, 1945:13, 1948:481,486; Lowrie 1942:168, 1948:338,347-8,350; Muma 1945:60; Muma & Muma 1949:490; Whitcomb & Tadic 1963:189; Warren et al. 1967:389, 394; Proszynski 1976:149-50; Cutler 1977:40; Richman & Cutler 1978:96; Oehler 1980:6; Roach & Edwards 1984:54; Wolff 1984:60; Edwards 1990:98; Young et al. 1989:41; Young & Edwards 1990:22; Platnick 1993:795, 1997:920; Maddison 1996:331

Cyrtanota insignaria: Simon 1864:327

P. insignarius: Marx 1890:568; Banks 1901:187, 1907: 745, 1910:64, 1911:454; Chickering 1944: 187-8, 195; Bonnet 1958:3520; Proszynski 1971b: 455

Philaeus monticola Banks 1896:73; holotype (♂) in MCZ, examined (synonymized by Peckham & Peckham 1909)

Phidippus comatus Peckham & Peckham 1901:286,291 (in part, ♂) (corrected by Peckham & Peckham 1909)

Phidippus monticolus: Banks 1910:64; Cockerell 1911: 256

Dendryphantes insignarius: Petrunkevitch 1911:633; Roewer 1954:1211; Platnick 1993:751

Phidippus fraudulentus: Chamberlin & Ivie 1944:208; not *Attus fraudulentus* Walckenaer 1837, a Nomen Dubium

Etymology: According to Bonnet (1958), a Latin adjective, from noun *insignis*, a badge or decoration (perhaps alluding to the unusual white leg I fringes). Bonnet noted that the correct Latin spelling of the specific epithet is *insigniarius*. If Koch had misspelled the name unintentionally, this correction would be valid. However, Koch used the same spelling again in 1851, indicating he deliberately spelled the name without the extra "i", therefore the original spelling must stand. Possibly Koch used the obscure Latin noun *insignarius*, keeper of the insignia (H.D. Cameron, pers. com.); it is so considered here.

Type locality: USA: *Pennsylvania*: coll. Zimmermann (only data given).

Geographic Range and Records: Middle U.S. from Colorado to southern New England, south to North Carolina. USA: *Arkansas*: Carroll, Johnson, Washington; *Colorado*: Archuleta, Denver, *Connecticut*: Fairfield, New Haven; *Washington, D.C.*; *Iowa*: Woodbury; *Illinois*: Cook, Washington; *Indiana*: Porter, Rush; *Kansas*: Douglas, Pottawatomie, Riley; *Kentucky*: Nicholas, Rockcastle; *Massachusetts*: Middlesex, Nantucket, Norfolk; *Maryland*: Prince Georges; *Michigan*: Midland; *Minnesota*: Wabasha; *Missouri*: Boone, Cole, Phelps, Vernon; *North Carolina*: Avery, Guilford; *Nebraska*: Greely, Thomas; *New Jersey*: Bergen, Hunterdon, Ocean; *New York*: Long Island; *Ohio*: Hocking; *Oklahoma*: Adair; *Pennsylvania*: Union, Westmoreland; *Tennessee*: Sevier; *Virginia*: Fairfax, Giles, Pittsylvania.

Biology: This is a species of open woodland understorey (oak-hickory, oak savannah, sand dune scrub) and prairie, with one record from a bog. Most maturation appears to be in summer, with females living until autumn.

Comments: As first reviser, I choose the name which has been frequently used rather than the name which was improperly synonymized and essentially forgotten, even though it has page priority. There are no authenticated records of *P. insignarius* occurring anywhere in Georgia. If it does occur there, I would expect it to be in the mountains of the northwest part of the state, not in the coastal plain of the southeast part from where Abbot made his drawings. *Attus fraudulentus* Walckenaer could be an immature of any of several southeastern species of *Phidippus*.

Diagnosis: This is one of few species in which the fused spots II is consistently in the shape of a rectangle. The palea seems slightly ectally expanded, but lacks either a notch or a crease. The epigynal atria are small and transverse, and are divided by a very short septum.

Description:

MALE: BL 4.91 (6.32) 7.81, CL 2.80 (3.33) 3.90, CW 2.30 (2.69) 3.10.

Carapace: Post-PME tuft about 2x width of AME. OQ scales iridescent. Submarginal band very broad from ALE to thoracic slope. Cheek band white. Marginal band a narrow white line from clypeus to PLE. Clypeus fringe white, band white. Chelicerae completely fringed with white.

Palp: Dorsal stripe white, on femur, patella, and tibia. Tibial apophysis stout, elongate triangular. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, gradually tapering distally, bent dorsally from slight stalk distal to edge of embolus basal portion.

Leg I: With white or yellow dorsal stripe. Fringes all white, medium in length except femur dorsal and retroventrolateral and tibia ventral fringes long. Femur prolateral stripe white; distal band white. Patella and tibia prolateral scale cover a distinct horizontal white stripe. Metatarsus and tarsus without prolateral scales. Tarsus integument entirely pale.

Abdomen: Scale cover yellow or orange, on entire dorsum except basal band. Venter black with white stripe each side.

FEMALE: BL 5.45 (7.65) 9.90, CL 3.10 (3.54) 4.00, CW 2.30 (2.79) 3.30.

Carapace: Tufts about 2x width of AME. OQ scales sparse, iridescent. Submarginal band very broad from ALE to thoracic slope. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, gradually narrowed, or entirely narrow. Lateral band II an oblique stripe. Spots I small, oval. Spots II fused into rectangle. Spots III and IV small, linear. All spots white. Scale cover white or tan, on lateral edges only. Venter black with white stripe each side.

Epigynum: Flaps divergent posteriorly. Anterior shallowly depressed, septum absent (rarely) or distinct (short). Middle shallowly depressed laterally, sagittal plane broadly raised, slightly convex without sagittal ridge or weak sagittal ridge present. Duct heads narrow, 2 pair major bends, 2 pair median minor bends, 3 pair posterior minor bends.

***otiosus* group**

Five species are tentatively assigned to the group. The *regius-otiosus* pair is linked with *P. dianthus* and the *californicus-pius* pair by the females of some members of both groups having an iridescent clypeal band,

which is almost unique to these species clusters (*P. audax* is another species with this state). All species (except *P. dianthus*, male unknown) lack a well-sclerotized distal paleal edge and they lack a marginal band. Since the latter two states are the normal condition "up" the phylogenetic tree, it is uncertain whether they are plesiomorphic at this level and unimportant in defining relationships within the *otiosus* group, or independently lost. Some preliminary analyses had these species split into two groups, with *P. dianthus* assigned to either of the other two pair. The shape of the epigynal flaps suggests to me that *P. dianthus* is the sister species of *P. californicus*.

Other character states imply that this is an artificial group. *Phidippus regius* males have a cheliceral tubercle which only occurs elsewhere in *P. audax*. *Phidippus californicus* has a color form of females which resembles several species in the *audax* group, i.e., the presence of paired matte black patches on the dorsum of the abdomen. *Phidippus pius* has a dorsal color pattern very similar to *P. cardinalis* and *P. clarus*. Although the slender embolus apical portion of *P. californicus* and *P. pius* is unique for *Phidippus*, it is typical of, e.g., the *Eris* group of genera. Perhaps this state is plesiomorphic, or if derived in *Phidippus*, it might be convergent in the two species with this state. At the very least, these characters would suggest this group is basal only to the *audax* and *cardinalis* groups (not to the entire rest of the genus), and possibly should be split up among these two groups.

***Phidippus regius* C.L.Koch 1846**

Figs. C25-28, 148-153; Map 9

Phidippus purpurifer C.L.Koch 1846:127; 3 syntypes (♀) in ZMHB (formerly pinned, now in alcohol, one with appendages on slide and abdomen missing), examined, lectotype (♀) designated (incorrectly synonymized with *P. audax* by Peckham & Peckham 1888); NEW SYNONYMY

Phidippus regius C.L.Koch 1846:146; pinned holotype (♀) in ZMHB, examined

Attus regius: Walckenaer 1847:418

Phidippus purpurifer: C.L.Koch 1851:54; Simon 1864:326; Banks 1913:185

Salticus sagraeus Lucas 1857:xxix (synonymized by Simon 1901)

Cyrtanota regia: Simon 1864:327

Attus miniatus Peckham & Peckham 1883:15 (synonymized by Edwards 1977)

Phidippus miniatus: Peckham & Peckham 1888:15, 1901:286, 1909:385,426; Marx 1890,569; Weed

1892:873; Tullgren 1901:25; Banks 1904:137, 1909:167, 1910:64; Comstock 1913:681; Bonnet 1958:3523; Proszynski 1971b:455, 1976:148

Dendryphantès morsitans (not Walckenaer): Simon 1916:142

D. variegatus: Franganillo 1930:46

D. variegatus var. *limbatus*: Franganillo 1930:46

Phidippus variegatus (not Lucas): Murrill 1942:9; Chamberlin & Ivie 1944:209; Wallace 1950:78; Gertsch 1979:plate 28

P. regius: C.L.Koch 1851:54; Banks 1909:167, 1913:185; Bryant 1943:514; Bonnet 1958:3526; Levi & Levi 1968:103; Levi & Pinter 1970:103; Proszynski 1971b:456; Kaston 1972:269, 1978:257; Jackson 1974:55; Edwards et al. 1974:345; Muma 1975:86,89; Edwards 1975:1-58, 1979:4, 1990:96-8; Richman 1977:10, 1981a:19; Cutler 1977:40, 1979:126; Anderson 1978:45,53; Hill 1978b:70, 1979a:195,202, 1979b:302; Richman & Cutler 1978:97; Edwards & Hill 1978:117, 1979a:195, 198; Jackson 1978b:9, 1978c:130, 1980a:218, 1986b:1195, 1987:2,4; Gertsch 1979:204; Edwards & Rossman 1981:30; Mansour et al. 1982:520; Roach & Edwards 1984:61; Wolff 1984:60; Young & Edwards 1990:22; Platnick 1993:796; Edwards & Jackson 1993:710-5, 1994:269-76; Edwards & Wolff 1995:50; Corey et al. 1998:309

Dendryphantès regius: Simon 1901:625; Petrunkevitch 1911:641; Lutz 1915:105; Franganillo 1930:46; Roewer 1954:1199; Platnick 1993:752

D. miniatus: Petrunkevitch 1911:636; Lutz 1915:105; Franganillo 1936:141; Roewer 1954:1204; Platnick 1993:751

Phidippus tullgreni Wallace 1950:79; holotype (♂), not in Zoologiska Museet (Uppsala), lost (?*P. otiosus* x *P. regius* hybrid); NEW SYNONYMY

Dendryphantès tullgreni: Roewer 1954:1200; Platnick 1993:752

Etymology: Latin adjective, *regius*, royal, regal

Type locality: CUBA: (only data given)

Geographic Range and Records: Southeastern U.S. from Mississippi to Virginia (most abundant in Florida), Bahamas, Bermuda, Greater Antilles; introduced to Easter Island. **BAHAMAS:** *Andros Island*: (no other data); *Grand Bahama*: Freeport; **BERMUDA:** (no other data); **CHILE:** *Easter Island*: Rano Kau: Kari Kari, Vai A Tare; **CUBA:** *State?*: Banos, Cayamas, Halcium, San Vicente, Sierra El Gorilla Madruga; *Camaguey*: Camaguey; *La Habana*: Cojimar, Havana, Mararao, Santiago de Las Vegas; *Cienfuegos*: Belmonte, Cienfuegos, Santa Clara, Soledad [Cienfuegos], Vega Alta; *Matanzas*: Bolondron, Mamarioca, Matan-

zas; *Guantanamo*: Guantanamo Bay; *Santiago de Cuba*: Santiago de Cuba; *Pinar del Rio*: Herradma, Laguna Rio Piedras, Pinar del Rio, Vinales (N.); **DOMINICAN REPUBLIC**: *La Altagracia*: Nisibon; *La Romana*: La Romana, La Romana (2 mi. NE.); *La Vega*: Jarabacoa; *Puerto Plata*: Puerto Plata; *San Cristobal*: San Cristobal, Villa Altagracia; **HAITI**: *Dept-Du Nord*: Trou; **JAMAICA**: (no other data); **USA**: *Alabama*: Baldwin, Macon, Mobile; *Florida*: Alachua, Baker, Brevard, Broward, Charlotte, Citrus, Clay, Collier, Columbia, Dade, Dixie, Duval, Escambia, Flagler, Franklin, Gadsden, Gilchrist, Glades, Hendry, Hernando, Highlands, Hillsborough, Indian River, Jackson, Jefferson, Lafayette, Lake, Lee, Leon, Levy, Madison, Manatee, Marion, Martin, Monroe, Nassau, Orange, Osceola, Palm Beach, Pasco, Pinellas, Polk, Putnam, Sarasota, Seminole, St.Johns, St.Lucie, Taylor, Union, Volusia; *Georgia*: Bulloch, Charlton, Chatham, Dougherty, Glynn, Pierce, Tattnall, Thomas; *Mississippi*: Forrest, George; *North Carolina*: Buncombe, Wake, Wayne; *South Carolina*: (no specific locality); *Virginia*: Alexandria. A Texas record without locality was probably an interception or mislabeled.

Biology: This is an old field species with younger juveniles in the herb/shrub layer and adults colonizing patches of saw palmetto or isolated palms and nearby oaks and pines. Eggsacs are laid under bark. The primary reproductive period is autumn, although both sexes can be found throughout the year in the southern part of the range of the species.

Comments: Although *P. purpurifer* has page priority, I choose to use the name which has been used numerous times in the literature, *P. regius*. This species has been confused with *P. audax* due to their similar appearance, and over use of the name *P. variegatus* (Levi and Pinter 1970, Edwards 1994).

The Easter Island population perhaps was started by a single gravid female, as it shows signs of a genetic bottleneck; it is distinctive in having mostly to all pale metatarsi.

Diagnosis: Male has a cheliceral tubercle like *P. audax*, but has a much larger embolus apical portion. Female epigynum has median epigynal area raised, in *P. audax* this area is depressed. The dorsal abdominal pattern of both sexes lack the paired matte black dorsal areas like on *P. audax*, or the dorsal variegation prominent on *P. otiosus*. Genitalia similar to *P. otiosus*, but more robust, and spermathecal ducts more complex.

Description:

MALE: BL 6.00 (11.78) 17.78, CL 4.80 (6.52) 8.30, CW 4.20 (6.22) 7.50.

Carapace: Submarginal band usually absent, or

broad from behind PME to thoracic slope (rare, possibly hybrid). Clypeus fringe black, band iridescent. Chelicerae green-blue-violet. Cheliceral distal dorsal tubercle well developed.

Palp: Dorsal stripe white on femur. Tibial apophysis stout, elongate triangular, tip attenuate. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a thick recurved spike, gradually tapering distally, bent dorsally from slight stalk distal to edge of embolus basal portion.

Leg I: Fringes alternating black and white, short to medium in length except tibia prolateral and ventral fringes long. Femur prolateral distal band white. Patella prolateral scale cover white proximally.

Abdomen: Dorsum black with white markings. Venter black.

FEMALE: BL 6.63 (14.80) 21.88, CL 6.20 (7.33) 8.30, CW 4.90 (5.87) 6.70.

Carapace: Tufts about 2x width of AME. Anterior ocular band usually absent, or gray or tan (rarely). OQ scales absent, or white, gray, brown or orange, sometimes reduced to a median spot (false median ocular band); lateral scale cover white or gray. Clypeus fringe black or white, band iridescent, white, gray or tan. Chelicerae green or red-violet.

Abdomen: Basal band wider anteriorly, abruptly narrowed. Lateral bands III and IV are oblique stripes. Spots I small, oval. Spots II fused into truncated triangle. Spots III large, oval. All spots white or orange. Scale cover gray, brown, tan or orange, on entire dorsum except spots and basal band, or absent (in which case appears black like male). Venter black.

Epigynum: Flaps parallel straight posteriorly. Anterior shallowly depressed, septum rudimentary (but enlarged). Middle shallowly depressed laterally, sagittal plane broadly raised, convex without sagittal ridge. Duct heads narrow, 2 pair major bends, 2 pair median minor bends, 2 pair posterior minor bends.

***Phidippus otiosus* (Hentz 1846)**

Figs. C30-31, 154-161; Map 12

Attus pulcher Walckenaer 1837:439

A. pulcher pallida Walckenaer 1837:439

A. peregrinus Walckenaer 1837:445

A. otiosus Hentz 1846:356; holotype (♀) destroyed; petition for retention submitted to I.C.Z.N. (Edwards 1982a); *A. otiosus* conserved (I.C.Z.N. opinion No. 1340)

Phidippus lunulatus C.L.Koch 1846:133 (incorrectly

synonymized by Banks, 1910; see *P. audax*)

Phidippus carolinus C.L.Koch 1846:136; pinned holotype (♀) in ZMHB, examined;

NEW SYNONYMY

P. carolinus: C.L.Koch 1851:54; Marx 1890:568; Banks 1901:187; 1910:63; 1913:184; Bonnet 1958:3 517; Proszynski 1971b:454; Platnick 1993:794

P. otiosus: Peckham & Peckham 1888:25, 1901:288, 1909:385,388,425; Marx 1890:569; Banks 1910:64; Bryant 1942:700; Murrill 1942:9; Wallace 1950:82; Bonnet 1958:3524; Anderson 1966:977; Levi & Levi 1968:103; Proszynski 1971b:456; Kaston 1972:269, 1978:257; Edwards et al. 1974:345; Muma 1975:86; Richman 1977; Kaston 1978; Hill 1979a:195,201-2; Gertsch 1979:plate 28; Richman 1981a:19; Edwards & Rossman 1981:29; Edwards 1982a:64-5, 1982b:33-5, 1990:96-8; Mansour et al. 1982:520; Reiskind 1982:40; Roach & Edwards 1984:54; Jackson 1987:2,4,7; Stietenroth & Horner 1987:241; Young et al. 1989:41; Cutler 1990:91; Edwards & Jackson 1993:711-4

Dendryphantus carolinus: Petrunkevitch 1911:626; Roewer 1954:1208; Platnick 1993:749

Dendryphantus otiosus: Petrunkevitch 1911:639; Roewer 1954:1214; Platnick 1993:752

Phidippus dorsalis Bryant 1942:697 (in part); holotype (♂) in MCZ, examined; NEW SYNONYMY

Dendryphantus dorsalis: Roewer 1954:1209; Platnick 1993:750

Dendryphantus pulcher Roewer, 1954:1215; Platnick 1993:752

P. pulcher: Richman 1978; Richman & Cutler 1978:97; Hill, in Edwards & Hill 1978:116; Platnick 1993:796

Etymology: Latin adjective, *otiosus*, free, at leisure.

Type locality: USA: "North Alabama:" (only data given).

Geographic Range and Records: Southeastern U.S. from Texas to Maryland, most abundant in Florida. **USA:** *Alabama:* Houston; *Arkansas:* Clark, Little River, Washington; *Washington, D.C.:* *Florida:* Alachua, Columbia, Duval, Gadsden, Glades, Gulf, Hamilton, Hillsborough, Jackson, Jefferson, Lafayette, Lake, Lee, Leon, Levy, Liberty, Madison, Manatee, Marion, Orange, Osceola, Pasco, Pinellas, Polk, Putnam, Sarasota, Seminole, St.Johns, St.Lucie, Suwannee, Volusia; *Georgia:* Bulloch, Chatham, Thomas, Ware; *Louisiana:* Grant, Madison; *Maryland:* Baltimore, Howard, Prince Georges, Wicomico; *Minnesota:* Ramsey (interception); *Mississippi:* Oktibbeha, Perry; *Missouri:*

Shannon; *North Carolina:* Carteret, Columbus, Currituck, Edgecombe, Harnett, Jackson, Lenoir, Moore, Orange, Pender?, Pitt, Wake; *South Carolina:* Florence; *Tennessee:* Blount, Hamilton; *Texas:* Colorado, Newton, Panola; *Virginia:* Fairfax, Grayson. A possible Oklahoma record could not be confirmed.

Biology: This is a canopy species of hardwood, mixed hardwood-pine forest, and cypress, from sub-xeric to hydric habitats. Eggsacs are made under bark of oak and pine; sometimes several individuals can be found under the loose bark of a single lightning-struck pine. It matures in autumn, with females sometimes surviving until the following summer.

Comments: The yellow in the color pattern of Florida specimens may be due to introgression with *P. regius*, as specimens from other parts of the range lack this color. A mixed pair has been found in the wild, and *P. otiosus* x *P. regius* hybrids have been produced in the laboratory (Edwards 1980b).

Diagnosis: The enlarged abdominal spots III and IV fused with lateral band IV are distinctive for both sexes when present (typical in Florida). In parts of the range in which individuals have these spots separated, the palp shape will distinguish males, while the noticeable separation of primary and secondary rims, as well as the reduced number of spermathecal duct bends, make the female epigyna distinctive. The ventral pattern of Florida specimens is unique as well.

Description:

MALE: BL 6.27 (10.04) 13.65, CL 4.80 (5.62) 6.40, CW 3.90 (4.77) 5.60.

Carapace: Post-PME tuft about 1.5x width of AME or absent. Posterior ocular band iridescent. Submarginal band white or yellow, very broad from ALE to thoracic slope, or broad from behind PME to thoracic slope. Clypeus fringe short, white or yellow, band iridescent. Chelicerae green-yellow-orange.

Palp: Dorsal stripe yellow, or white, or white and iridescent, on femur, patella, tibia, and cymbium (patella and tibia distal edge, cymbium proximal edge). Tibial apophysis stout, elongate triangular, tip attenuate. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a recurved spike, gradually tapering distally, bent dorsally from slight stalk distal to edge of embolus basal portion.

Leg I: Fringes alternating black and white (black and yellow in peninsular Florida), short to medium in length except patella and tibi a prolateral and ventral fringes at least partially long. Femur prolateral distal band white or yellow. Patella prolateral scale cover

yellow or white entire length. Metatarsus and tarsus with white or yellow scales on proximal half.

Abdomen: Venter black.

FEMALE: BL 7.63 (13.10) 17.10, CL 4.30 (6.33) 7.80, CW 3.50 (5.53) 7.00.

Carapace: Tufts about 2x width of AME. Submarginal band white or yellow, very broad from ALE to thoracic slope, or narrow from PME to thoracic slope, or absent, lateral scale cover white or yellow. Clypeus fringe white or yellow, band iridescent or white. Cheliceral color as in male.

Abdomen: Basal band not narrowed at ends. Lateral band II an oblique stripe. Lateral band IV an oblique stripe, sometimes attached to spots III and IV. Spots I small, oval. Spots II fused into truncated triangle, or concave laterally, slightly separated. Spots III small, linear. Spots IV small, oval or linear, or (in Florida) fused with spots III and lateral band IV on each side, forming a pair of enlarged, tri-pronged spots. All spots white or yellow. Scale cover white or yellow, on lateral edges only (extended between spots III and IV, forming middle projection of tri-pronged spot when present). Venter black, or paler anteriorly with black median stripe.

Epigynum: Flaps parallel straight to slightly convergent posteriorly. Anterior shallowly depressed, septum rudimentary. Middle slightly shallowly depressed laterally, sagittal plane broadly raised, convex, creating plateau including high anterior and posterior median areas, without sagittal ridge. Duct heads narrow, 1 pair major bends, 0 pair median minor bends, 1 pair posterior major bends.

Phidippus dianthus Edwards, New Species

Figs. 171-173; Map 11

Holotype (♀) in AMNH; only specimen known.

Etymology: Latin adjective, *dianthus*, pink, one of the colors of the iridescent scales on the dorsum.

Type locality: MEXICO: *Morelos*: Cuernavaca, VIII-1955, N.L.H. Krauss.

Geographic Range and Records: Mexico: *Morelos*.

Biology: Unknown other than the type was collected in summer.

Comments: This small species has an epigynum that superficially resembles that of *P. cerberus*, but the spermathecal ducts have a different configuration. The color pattern also separates it from similar species. The flap shape is quite similar to *P. californicus*, and may indicate a close relationship to that species.

Diagnosis: The combination of iridescent scale cover, encircling basal band, and spots I fused to spots II is

unique.

Description:

MALE: Unknown.

HOLOTYPE FEMALE: ALE-PME 0.38, PME-PLE 0.50, ALE-PME/ALE-PLE 43%, ALE ROW 1.78, PLE ROW 2.16, CW 2.49, ALE/CW 72%, PLE/CW 87%, CW/CL 78%, CL 3.20, LOQ 1.49, LOQ/CL 47%, CH 1.41, BL 6.85.

Carapace: Tufts 1.5x or less width of AME. OQ scales sparse, iridescent. Submarginal band broad from ALE to thoracic slope. Clypeus fringe white, band iridescent.

Abdomen: Basal band encircling dorsal edge of abdomen to spots IV. Lateral band II an oblique stripe. Lateral band IV an oblique stripe attached to spots III and IV. Spots I two parasagittal stripes attached to spots II. Spots II fused into curved transverse bar. Spots III large, linear. Spots IV small, linear. All spots white. Scale cover iridescent, on entire dorsum except spots and basal band. Venter pale with three light gray stripes.

Epigynum: Flaps nearly parallel straight posteriorly. Anterior shallowly depressed. Middle shallowly depressed laterally, sagittal plane broadly raised, without sagittal ridge. Duct heads narrow, 3 transverse pair major bends, 2 pair median minor bends, 1 pair supernumery bends, 3 pair posterior minor bends.

Phidippus californicus Peckham & Peckham 1901

Figs. 162-170; Map 11

Phidippus californicus Peckham & Peckham 1901: 285, 289; holotype (♂) in MCZ, examined

P. californicus: Peckham & Peckham 1909:384,402; Bryant 1942:704; Bonnet 1958:3516; Proszynski 1971b:454; Richman & Cutler 1978:95; Platnick 1993:794

Phidippus coccineus Peckham & Peckham 1909:384, 386, 413; holotype (♂) in MCZ, examined; NEW SYNONYMY

P. coccineus: Banks 1910:63; Bonnet 1958:3518; Gardner 1965:133; Proszynski 1971b:454, 1976:149-50; Horner & Starks 1972:602; Jung & Roth 1974:33; Richman & Roth 1976:201; Richman & Cutler 1978:95; Jackson 1978b:9, 1986b:1195; Richman 1981a:19; Platnick 1993:794, 1997:920

P. workmanii: Peckham & Peckham 1909:434; Richman 1965; Richman & Roth 1976:201 (Arizona specimens, misidentifications)

Dendryphantus californicus: Petrunkevitch 1911:625; Roewer 1954:1207; Platnick 1993:749

D. coccineus: Petrunkevitch 1911:627; Roewer 1954:1209; Platnick 1993:749

D. graciosus Roewer 1951:453 (NOMEN NOVUM), 1954:1210 (Roewer considered *P. californicus* to be preoccupied by *Maevia californica* Peckham & Peckham 1888 = *Terralonus californicus*, which he also considered to be a *Dendryphantes*); Platnick 1993:750

Etymology: Latin adjective derived from geographic name, the state of California.

Type locality: USA: *California*: (only data given).

Geographic Range and Records: Oregon south and east to Texas and northern Mexico. **MEXICO:** *Baja California Norte*: El Desengano Ruins (3 mi. S.), El Maneadero (5 mi. S.); *Baja California Sur*: San Antonio (3 mi. NW.), Santo Domingo; *Chihuahua*: Parrel (5 mi. E.), Primavera; *Sinaloa*: Culiacan (6 mi. S.), Culiacan (40 mi. S.), Villa Union (6 mi. E.); *Sonora*: Canoana (20 mi. W.), El Carrizo (13 mi. S.); **USA:** *Arizona*: Cochise, Coconino, Graham, Maricopa, Mohave, Pima, Santa Cruz, Yavapai, Yuma; *California*: Contra Costa, Imperial, Los Angeles, Mono, Monterey, Orange, Riverside, San Bernardino, San Diego, Santa Barbara, Stanislaus; *New Mexico*: Doña Ana, Grant, Hidalgo, Luna; *Nevada*: Clark, Nye; *Oregon*: Harney, Wasco; *Texas*: Brewster, Loving, Webb; *Utah*: Salt Lake, Washington.

Biology: *P. californicus* is found on desert shrubs (e.g., mesquite, tamarisk, sumac, oak, snakeweed), particularly those in bloom. It has been recorded from 140-7200' elevation, but mostly in desert at lower elevation than oak woodland (mostly below 5000'). It matures in summer, with females living as long as the following spring.

Comments: This is one of several species to which different names were given to the color forms. Males without carapace bands, primarily from the Pacific coast, were considered *P. californicus*, whereas males with carapace bands, mostly from further inland, were considered *P. coccineus*.

Diagnosis: The narrow embolus apical portion is similar only to *P. pius*, which has a much different color pattern. Some females are similar to *P. arizonensis*, but lack the ventral abdominal mottling of the latter species.

Description:

MALE: BL 5.51 (7.54) 10.27, CL 2.82 (3.86) 5.48, CW 2.24 (3.07) 4.48.

Carapace: Median ocular band white. Submarginal band broad or narrow from PME to thoracic slope, or absent. Clypeus fringe tan, band iridescent.

Palp: Dorsal stripe white, on femur, patella, tibia,

and cymbium (sometimes). Tibial apophysis stout, elongate triangular, tip not attenuate. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, very slender, bent dorsally from slight stalk distal to edge of embolus basal portion.

Leg I: Fringes alternating black and white, short to mostly medium in length except tibia ventral and sometimes femur dorsal fringes long. Femur prolateral proximal and distal bands white. Patella prolateral scale cover white entire length.

Abdomen: Scale cover red, on entire dorsum except basal band and/or except median black stripe and white spots. Venter black.

FEMALE: BL 8.68 (11.73) 15.53, CL 3.82 (4.59) 5.48, CW 2.99 (3.73) 4.65.

Carapace: Tufts about 2x to 2.5x width of AME. Median ocular band white or absent. OQ scales sparse, iridescent; lateral scale cover sparse, white. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, gradually narrowed, or not narrowed at ends. Lateral bands II and IV are oblique stripes. Spots I small, oval. Spots II fused into truncated triangle. Spots III and IV small, linear (III sometimes large). All spots white. Scale cover red (rarely white), on entire dorsum except spots. Venter black.

Epigynum: Flaps parallel straight posteriorly. Anterior shallowly depressed. Middle depressed laterally, sagittal plane slightly raised, convex without sagittal ridge. Duct heads narrow, 2 pair major bends, 0 pair median minor bends, 1 pair supernumery bends, 2 pair posterior minor bends.

***Phidippus pius* Scheffer 1906**

Figs. C43-44, 174-178; Map 11

Phidippus pius Scheffer 1906:123; 3 syntypes (♂, 2♀) supposed to be in USNM, lost

P. pius: Peckham & Peckham 1909:385,387,397; Chickering 1944:187-8,197; Bonnet 1958:3525; Proszynski 1971b:456; Edwards 1977:21, 1982b:35, 1990:98; Cutler 1977:40, 1979:126; Richman & Cutler 1978:96; Cokendolpher & Bryce 1980:16; Edwards & Rossman 1981:29; Wolff 1984:60; Young & Edwards 1990:22; Platnick 1993:796

Dendryphantes pius: Petrunkevitch 1911:640; Roewer 1954:1214; Platnick 1993:752

Phidippus abboti Chamberlin & Ivie 1944:205 (synonymized by Edwards 1977)

Dendryphantes abboti: Roewer 1954:1205; Platnick

1993:749

Dendryphantes (Phidippus) diabolus Kraus 1955:72; holotype (♂) in SMFD, examined;

NEW SYNONYMY

Phidippus abboti: Barnes & Barnes 1955:661; Berry 1970:105; Proszynski 1971b:453

P. n. sp. nr. johnsoni Peckham & Peckham: Jung & Roth 1974:33

Phidippus volcanus Gertsch & Riechert 1976:19; holotype (♂) in AMNH, examined;

NEW SYNONYMY

P. diabolus: Brignoli 1983:650

P. volcanus: Brignoli 1983:651

Etymology: Latin adjective, *pius*, dutiful, holy, godly, devoted.

Type locality: USA: Kansas: Manhattan, VII (2♀), X (♂)-1904, T. H. Scheffer.

Geographic Range and Records: Eastern U.S. except New England and peninsular Florida, west to Arizona and south to Costa Rica. **COSTA RICA:** Guanacaste: Los Cruces (12 mi. from); **EL SALVADOR:** San Salvador: San Salvador; **HONDURAS:** Francisco Morazan: Zamorano; **MEXICO:** Coahuila: Saltillo (22 km S.); **USA:** Alabama: Bibb; Arizona: Cochise; Florida: Franklin; Georgia: Tombs; Illinois: Pope; Indiana: Brown; Kansas: Chase, Douglas, Greenwood, Jefferson, Riley, Rooks; Louisiana: Grant, St. Tammany; Michigan: Hillsdale, Jackson, Lapeer, Livingston; Minnesota: Cottonwood, LeSeur, Lincoln; Missouri: Johnson; Mississippi: George; North Carolina: Durham, Swain; New Mexico: Eddy, Lincoln; Oklahoma: Osage, Payne; Pennsylvania: Bucks, Schuylkill; South Carolina: Charleston; Tennessee: Sevier; Texas: Archer, Carson, Comal, Grayson, Grimes, Kleberg, Sutton, Webb, Wichita; Virginia: Fairfax.

Biology: This old field, prairie, and desert grassland species matures in the summer, with females living until autumn.

Comments: Considerable variation in color pattern occurs in this uncommon but widespread species. In the typical form, females are yellow and males are orange; this color form holds throughout the northern range of the species and to the southwest (from New Jersey west to the plains states and south to Texas). Southeast of the Appalachian Mountains, from Virginia to northern Florida, females are orange and males are red (*P. abboti* color form) and the amount of black on the legs and palpi of males is increased. Males have the ventral half of the prolateral surface of femur I black and the cymbium is much darker than the other palpal segments. Toward the midwestern portion of the range, in Texas, some males are yellow with the black markings

on the legs and palpi only faintly indicated. From the western part of its range into Central America, males are more red like the southeastern form, but femur I is not abruptly dorsoventrally bicolored (the dark band gradually becomes lighter dorsally).

Diagnosis: The long slender embolus apical portion will distinguish this species from any other species except *P. californicus*, which has submarginal carapace bands where the two species overlap (*P. pius* never has carapace bands) and a different abdominal pattern. The epigynum is a similar but narrower version of that found in *P. cardinalis*. The color pattern of *P. pius* is very similar to *P. cardinalis*, but usually less red in both sexes.

Description:

MALE: BL 4.91 (7.43) 12.94, CL 3.50 (4.17) 5.64, CW 2.32 (3.33) 4.73.

Carapace: Post-PME tuft about 1.5x width of AME or absent. OQ scales yellow, orange, red, or iridescent. Clypeus fringe white or tan, band iridescent.

Palp: Dorsal stripe white or yellow, on femur, patella, tibia, and cymbium, or absent. Tibial apophysis stout, elongate triangular, not attenuate. Palea distinctly wider than long. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a long recurved spike, very slender, bent dorsally from slight stalk distal to edge of embolus basal portion.

Leg I: Fringes alternating black and white, short to medium in length except tibia ventral fringe long. Femur prolateral proximal and distal bands white. Patella and tibia prolateral scale cover white entire length (tibia I sometimes only proximal half).

Abdomen: Scale cover yellow, orange or red, on entire dorsum or except two parallel black stripes. Venter black, gray or pale.

FEMALE: BL 6.00 (8.50) 10.94, CL 3.50 (4.14) 4.90, CW 2.91 (3.25) 3.74.

Carapace: Tufts 1.5x or less width of AME. OQ scales yellow or orange; lateral scale cover white. Clypeus fringe white, band white.

Abdomen: Basal band usually absent, or only on anterolateral edges of abdomen (rarely). Lateral bands II and IV oblique stripes. Spots III and IV small, oval. All spots white. Median dorsal black stripe reduced to two black parallel lines which include spots III and IV, rarely absent. Scale cover yellow or orange, on entire dorsum or except two parallel black stripes. Venter pale with three light gray stripes.

Epigynum: Flaps slightly divergent posteriorly. Anterior shallowly depressed. Middle depressed laterally, sagittal plane slightly raised, slightly convex with-

out sagittal ridge. Duct heads narrow, 2 pair major bends, 0 pair median minor bends, 3 pair posterior minor bends.

cardinalis group

The eight members of this group all lack any part of the distal shelf between the palea and the embolus. The four *tux* clade members all have a relatively narrow tegulum, and unusual color patterns (two of which, those of *P. tux* and *P. mimicus*, are unique to the genus). The four *venus* clade members all revert back to a long embolus apical portion, wider than long palea, a short tibial apophysis, and a marginal band present. All *venus* clade members are restricted to central Mexico.

Five of the eight species have lost both the bent vertical and the medial diagonal ridges of the palea, a reversal unique to this species group.

Phidippus tux Pinter 1970

Figs. 179-183; Map 17

Phidippus tux Pinter 1970:1; holotype (♂) in AMNH, examined

P. tux: Brignoli 1983:651; Richman & Cutler 1988:77

Etymology: An arbitrary combination of letters.

Type locality: MEXICO: *Nayarit*: Tepic, 104° 53'W, 21° 31'N, 24-VI-1940, L.W. Saylor.

Geographic Range and Records: Southern Arizona to western Mexico. MEXICO: *Jalisco*: Acatlan (1 mi. E.), 14-VI-1987, 1♂ (B.K. Dozier, FSCA); *Sonora*: El Aigame (62 km SE. Hermosilla), 500m, mesquite desert, 1-IX-1992 r, 1♂ 1♀ (M. McMahon, FSCA); USA: *Arizona*: Santa Cruz Co., Pajarito Mts., Sycamore Canyon, sweep grass by stream, 28-VI-1973, 1♂ 1♀ (D.B. Richman, FSCA).

Biology: *P. tux* has been taken in mesquite desert and in grass along a stream in a desert canyon. It matures in the summer.

Comments: The Arizona and northern Mexican specimens are lighter in color and more yellow than the southern Mexican specimens, which have darker integument. Only four males and two females are known.

Diagnosis: The posterior abdominal U-shaped dark area is unique for both sexes. This is one of the few primarily yellow species.

Description:

MALE: BL 7.77 (8.77) 9.35, CL 3.94 (4.40) 4.65, CW 3.11 (3.54) 3.82.

Carapace: Long AER fringe yellow. OQ scales gray or yellow; lateral scale cover yellow. Clypeus fringe white, band white.

Palp: Dorsal stripe white or yellow, on femur, patella, tibia, and cymbium. Tibial apophysis triangular, not attenuate. Palea about as long as wide. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a short straight spike, gradually tapering distally, appearing to arise from distal edge of palea.

Leg I: Fringes alternating black and white, short to medium in length except tibia ventral fringe long. Femur prolateral proximal and distal bands white. Patella prolateral scale cover white entire length. Tibia prolateral scale cover white proximally.

Abdomen: Scale cover yellow, on entire dorsum or except black posteriorly (southern Mexican specimens). Venter gray or black (with white scale cover in southern Mexican specimens).

FEMALE: BL 11.02, CL 4.81, CW 3.82.

Carapace: Tufts about 2x width of AME. OQ scales yellow; lateral scale cover yellow. Clypeus fringe white, band white.

Abdomen: Lateral band II an oblique stripe. spots III and IV small, linear (seen under scales). All spots yellow. Median dorsal black stripe modified as broad, U-shaped area, darker posteriorly. Scale cover yellow, on entire dorsum. Venter pale.

Epigynum: Flaps divergent posteriorly. Anterior shallowly depressed. Septum distinct. Middle broadly depressed laterally, sagittal plane narrowly raised, sagittal ridge present (continuation of septum). Duct heads narrow, 1 pair major bends immediately after duct heads (looped from duct head), 1 pair median minor bends, 2 pair posterior minor bends.

Phidippus clarus Keyserling 1885

Figs. C45-46, 184-190; Map 16

?*Attus rimator* Walckenaer 1837:446 (considered a senior synonym of *P. auctus* C.L.Koch 1846 by Walckenaer 1847; misidentification, see *P. insignarius*); NOMEN DUBIUM

?*Attus podagrosus* Hentz 1846:160; type destroyed; NOMEN DUBIUM

Phidippus testaceus C.L.Koch 1846:160; 3 syntypes (1 ♀, 2 subadults of different species, probably *P. princeps*; formerly pinned, now in alcohol) in ZMHB, examined, lectotype (♀) designated; (incorrectly synonymized with *P. rufus*: Banks 1901) NEW SYNONYMY

P. testaceus: C.L.Koch 1851:55; Simon 1864:327; Marx 1890:569; Banks 1901:187, 1913:184; Petrunkevitch 1911:772

- Cyrtonota testacea*: Simon 1864:327
- ?*Phidippus coloradensis* Thorell 1877:523; holotype not in Naturhistoriska Riksmuseet (Stockholm), lost (synonymized by Richman & Cutler 1978); NOMEN DUBIUM
- Attus flavus* Peckham & Peckham 1883:9 holotype (♂) supposed to be in MCZ, lost; NEW SYNONYMY, NOMEN OBLITUM
- ?*Attus formosus* Peckham & Peckham 1883:23 (preoccupied by the fossil *Phidippus formosus* Koch & Berendt 1854); type lost (incorrectly synonymized with *P. johnsoni* by Kaston 1972:270); NOMEN DUBIUM
- Phidippus clarus* Keyserling 1885:497; holotype (♀) in MCZ, examined
- P. insolens* (not Hentz): Peckham & Peckham 1888:23
- P. multiformis* Emerton 1891:224; 4 syntypes (2♂, 2♀) in 2 vials in MCZ, examined, lectotype (♂) designated (synonymized by Peckham & Peckham 1909), 1902:49, 1913:156, 1919:168, 1924:124, 1930:171; Peckham & Peckham 1901:285,287; Scheffer 1906:124; Bryant 1908:97; Barrows 1918:317; Weese 1924:373; Rau 1935:268-9; Everly 1938:139
- P. minutus* Banks 1892:74; holotype (♀) in MCZ, examined (synonymized by Peckham & Peckham 1909)
- Philaeus princeps* (not Peckham & Peckham): Banks 1892:74
- Phidippus bilineatus* Tullgren 1901:26 (synonymized by Wallace 1950)
- Phidippus clarconensis* Tullgren 1901:28 (synonymized by Wallace 1950)
- Dendryphantes insolens*: Simon 1901:625
- D. multiformis*: Simon 1901:625
- Phidippus clarus*: Marx 1890:568; Banks 1893:126, 1901:188; Peckham & Peckham 1909:384, 386, 398; Comstock 1913:681,683; Rau 1926:216, 1935:268-9; Crosby & Bishop 1928:1072; Worley & Pickwell 1931:115,117,119; Worley 1932:61; Chickering 1932:354, 1944:193; Ewing 1933:173; Procter 1933:279, 1938:461; Issel 1935 (plate fig.); Kaston 1935:191,195,200,202, 1936:103, 118, 1938:196, 1948:481-2,484, 1978:256; Lowrie 1942:168, 1948:338, 347-8,350; Muma 1945:60; Muma & Muma 1949:490; Wallace 1950:82; Barnes & Barnes 1955:661,665; Bonnet 1958:3517; Whitcomb & Tadic 1963:189; Whitcomb et al. 1963:657; Warren et al. 1967:389,394; Drew 1967:178; Berry 1970:105; Proszynski 1971b:454; Brown 1973:237; Edwards et al. 1974:345; Hill 1977a:6, 1977c:9, 1977e:27, 1979a:195,198,201, 202,205, 1979b:302; Richman & Cutler 1978:95; Edwards & Hill 1978:116; Jackson 1978b, 1986b:1195; Gertsch 1979: plate 27; Cokendolpher & Bryce 1980:16; Oehler 1980:6-7; Richman 1981a:19; Edwards & Rossman 1981:29; Dean, Sterling, & Horner 1982:256; Edwards 1982b:34-5, 1990:96-8; Roach & Edwards 1984:54; Wolff 1984:60; Stietenroth & Horner 1987:240; Young 1989c:177; Young et al. 1989:41; Young & Edwards 1990:11,22; Breene et al. 1993:71; Edwards & Jackson 1993:712-4; Platnick 1993:794, 1997:920; Maddison 1996:229,231
- ?*P. coloradensis*: Peckham & Peckham 1909:384,386, 399; Worley & Pickwell 1931:116-7
- ?*P. formosus*: Peckham & Peckham 1909:384,386,407; Banks 1910:64; Chamberlin 1921:247, 1924:681; Chamberlin & Gertsch 1928:187; Chamberlin & Woodbury 1929:140; Worley & Pickwell 1931:116
- P. podagrosus*: Banks 1910:64
- Dendryphantes clarus*: Petrunkevitch 1911:627; Roewer 1954:1208; Platnick 1993:749
- ?*D. coloradensis*: Petrunkevitch 1911:627; Roewer 1954:1209; Platnick 1993:749
- ?*D. formosus*: Petrunkevitch 1911:630; Elliott 1932:430; Roewer 1954:1210; Platnick 1993:750
- Phidippus homarinus* Cockerell 1924:13 (NOMEN NOVUM for *P. formosus* Peckham & Peckham, preoccupied)
- P. rimator*: Chamberlin & Ivie 1944 (not *Attus rimator* Walckenaer 1837, a NOMEN DUBIUM); Kaston 1953:112, 1972:268, 1978:256; Snetsinger 1954:9-15; Vogel 1970:19; Cutler 1977:40; Hill 1977f:321, 1978a:68; Rymal & Folkerts 1982:**; Draney 1997:338
- ?*Dendryphantes castrensis*: Roewer, 1954:1208 (misidentification)
- Etymology:** Latin adjective, *clarus*, clear, evident.
- Type locality:** USA: *Maryland*: Charles Co. (only data given).
- Geographic Range and Records:** Widespread in southern Canada and U.S. except desert Southwest, with outlying record in western Mexico. **CANADA:** *Ontario*: Allisonville (1 mi. S.), Belleville, Belleville (Moirra River), Bloomfield (9 mi. NW.), Brantford, Chatterton (13 mi. N. Belleville), Corbyville, Elmira, Fuller, Gananoque, Grassie, Grenadier Island Centre, Hamilton, Holloway, Hope Bay, Iron Bridge, Kincardine, Lansing, London, Long Point Prov. Park, Marmora, Mt. Albert, N. Shamville (E. Belleville), Newmarket, Odessa, Ottawa (SW.), Port Credit, Port Elgin, Pottageville, Poverty Bay, Pt. Pelee, Turner (nr.

Holloway), Wellington, West Lake, Wheatley Prov. Park; *Saskatchewan*: Lady Lake; **MEXICO**: *Jalisco*: Guadalajara; **USA**: *Alabama*: Baldwin, Colb, Colbert, Greene, Hale, Lee, Shelby, Talladega, Tallapoosa, Tuscaloosa, Washington; *Arkansas*: Craighead, Hempstead, Polk, Washington; *Arizona*: Navajo; *California*: Colusa, El Dorado, Inyo, Marin, Mendocino, Monterey, San Francisco, San Fransisco, San Joaquin, San Mateo, Santa Clara, Sonoma, Tehama, Trinity; *Colorado*: Denver, El Paso; *Connecticut*: Fairfax, Fairfield, Hartford, Litchfield, Middlesex, New Haven, New London, Tolland, Windham; *Washington, D.C.*: *Delaware*: Sussex; *Florida*: Alachua, Baker, Bradford, Brevard, Dixie, Franklin, Gulf, Highlands, Indian River, Jackson, Jefferson, Leon, Levy, Liberty, Marion, Nassau, Orange, Pasco, Polk, Putnam, Sarasota, Seminole, St. Johns, Taylor, Volusia, Walton; *Georgia*: Bulloch, Charlton, Clarke, Cobb, Crawford, Floyd, Fulton, Glynn, Habersham, Hall, Morgan, Thomas, Towns, Ware; *Iowa*: Boone, Dickinson, Greene, Guthrie, Johnson, Shelby, Story, Woodbury; *Idaho*: Canyon, Jerome, Payette, Twin Falls; *Illinois*: Champaign, Clark, Cook, Jackson, Lake, Madison, Montgomery, Peoria, Richland; *Indiana*: Bartholomew, Hovey, Howard, Knox, Lake, Monroe, Noble, Porter, Starke, Tippecanoe, Vanderburgh; *Kansas*: Bourbon, Clark, Douglas, Jefferson, Miami, Riley; *Kentucky*: Boone, Breathitt, Cambell, Christian, Rockcastle; *Louisiana*: East Baton Rouge; *Massachusetts*: Barnstable, Dukes, Essex, Hampshire, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk, Worcester; *Maryland*: Worcester, Anne Arundel, Baltimore, Calvert, Cecil, Harford, Montgomery, Prince Georges, Talbot, Washington; *Maine*: Cumberland, Hancock, Knox, Oxford; *Michigan*: Alcona, Alger, Branch, Calhoun, Cass, Charlevoix, Clinton, Emmet, Gratiot, Hillsdale, Huron, Ingham, Isabella, Jackson, Kalamazoo, Livingston, Macomb, Midland, Ogemaw, Roscommon, Sanilac, St. Clair, Washtenaw, Wayne; *Minnesota*: Aitkin, Anoka, Brown, Hennepin, Lincoln, Ramsey, Rock, Scott, St. Louis; *Missouri*: Boone, Jackson, Johnson, Lincoln, St. Louis, St. Louis, Stoddard, Vernon, Warren; *Mississippi*: Amite, Forrest, George, Hancock, Hinds, Jackson, Lafayette, Madison, Marshall, Monroe, Newton, Oktibbeha; *Montana*: Lake; *North Carolina*: Avery, Buncombe, Carteret, Craven, Cumberland, Durham, Haywood, Hyde, Jackson, Macon, Stanly, Swain, Transylvania, Wake, Watauga, Wilkes; *North Dakota*: Sheridan; *Nebraska*: Douglas, Lancaster; *New Hampshire*: Carroll, Grafton, Hillsborough; *New Jersey*: Bergen, Burlington, Camden, Cape May, Hunterdon, Morris, Ocean, Passaic, Salem; *New York*: Albany, Columbia, Dutchess, Ful-

ton, Kings, Long Island, Monroe, Nassau, New York, Queens, Richmond, Rockland, Schohorie, Suffolk, Tompkins, Ulster, Warren, Wayne; *Ohio*: Belmont, Champaign, Cuyahoga, Franklin, Knox, Marion, Pike; *Oklahoma*: Caddo, Comanche, Le Flore, McIntoch, McIntosh, Payne, Wagoner; *Oregon*: Benton, Douglas, Jackson, Josephine, Lane, Linn, Marion, Washington, Yamhill; *Pennsylvania*: Adams, Bucks, Butler, Cumberland, Huntington, Lancaster, Potter, Schuylkill; *Rhode Island*: Newport; *South Carolina*: Bamberg, Berkeley, Jasper; *Tennessee*: Anderson, Cannon, Davidson, Lake, Loudon, Roane, Robertson, Sevier; *Texas*: Anderson, Brazos, Dallas, Denton, Falls, Grayson, Hood, Montgomery, Tyler, Walker, Wichita; *Utah*: Salt Lake, Sevier, Utah; *Virginia*: Amherst, Arlington, Augusta, Campbell, Charlottesville, Danville, Fairfax, Falls Church, Giles, Grayson, Halifax, Lancaster, Manassas, Pittsylvania, Powhatan, Pulaski, Surry, Virginia Beach; *Vermont*: Orleans; *Washington*: Columbia, Franklin, Kittitas, Thurston; *Wisconsin*: Burnett, Chippewa, Columbia, Dane, Door, Fond du Lac, Grant, Iowa, Jefferson, Milwaukee, Ozaukee, Polk, Racine, Rock, Vilas, Waushara, Woods; *West Virginia*: Jefferson, Marshall, Pocahontas.

Biology: This species is commonly found in old fields and in weedy areas of open woodland, particularly on tall annual and perennial woody herbs. Here it makes conspicuous large white sacs in the tops of the plants where it deposits the eggs, which are sometimes heavily parasitized. Maturation is in summer; females live until autumn.

Comments: The use of *P. rimator* (Walckenaer) for this species is completely unwarranted. The single illustration by Abbot (1792) given the name *Attus rimator* by Walckenaer (1837) was recognized as an immature by Chamberlin & Ivie (1944) when they resurrected the name. It is well known that immatures are often difficult, if not impossible, to identify to species. Furthermore, I have examined a color reproduction of the copy of Abbot's drawing kept at the Museum of Comparative Zoology, and cannot positively identify the drawing as a salticid, much less to species. The only way to determine that it is a salticid is by the accompanying illustration of the eye arrangement. However, the dorsal pattern cannot be matched with any known species. I have personally reared most of the species of *Phidippus* occurring in the eastern U.S., including *P. clarus*, and therefore have first hand acquaintance with their appearance as immatures.

Citations prior to Chamberlin & Ivie (1944) for *P. rimator* are of dubious assignment and are not listed (see Bonnet 1958).

Like a few other species, older names exist which were improperly synonymized and essentially forgotten, or were unrecognized. *Phidippus clarus* is one of the most abundant and most cited species in the genus; *P. testaceus* will be proposed for suppression.

The type locality of *Attus formosus* is Iowa, well out of the range of *P. johnsoni* with which it has been associated in the medical literature. Although the type of *A. formosus* is lost, the illustration of the abdominal pattern by the Peckhams (1883) most closely resembles that of *P. clarus* for the species that occur in Iowa.

The Peckhams (1909) identification of some specimens as *P. coloradensis* was probably erroneous. Unfortunately, they gave no figures of their specimens, only the following statements: "Excepting for its greater size, the male of this species is almost exactly like that of *clarus*... We give no figures of palpus and epigynum as these parts are almost identical with those of *clarus*." In all likelihood, the specimens they examined were large examples of *P. clarus*.

Diagnosis: Males are almost unique in having red lateral abdominal stripes (in Florida, this character state occurs in *P. purpuratus* and rarely in *P. workmani*) instead of having the abdominal dorsum entirely red. Both sexes have a unique ventral abdominal pattern (pale bounded by black stripes, sometimes with a partial black middle stripe), and the epigynal flaps are nearly absent. This ventral pattern is also distinctive for juveniles.

Description:

MALE: BL 3.27 (6.37) 10.10, CL 3.20 (3.92) 4.80, CW 2.50 (3.13) 3.90.

Carapace: OQ scales sparse, iridescent. Clypeus fringe black.

Palp: White dorsal stripe on palpi conspicuous on femur to cymbium. Tibial apophysis triangular, not attenuate. Palea about as long as wide, ectal border distal to tegular shoulder notched ectal distally. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a moderate recurved spike, gradually tapering distally, bent dorsally from slight stalk distal to edge of embolus basal portion.

Leg I: Fringes alternating black and white, short to mostly medium in length, sometimes tibia ventral fringe long. Femur prolateral distal band white. Patella prolateral scale cover white proximally.

Abdomen: Scale cover red on lateral edges only. Venter pale with black stripe each side (and sometimes in posterior half of middle).

FEMALE: BL 4.29 (8.48) 14.17, CL 3.80 (4.68) 5.90, CW 3.10 (3.90) 5.00.

Carapace: Tufts 1.5x or less width of AME. OQ scales sparse, iridescent; lateral scale cover white. Clypeus fringe white, band white.

Abdomen: Basal band entirely narrow. Lateral bands II and IV are oblique stripes. Spots I - IV small, oval. All spots white. Scale cover tan, yellow, orange or red, on entire dorsum except lateral edges of median black stripe, spots, and basal band, or absent (appearing black like male). Venter pale with black stripe each side (and occasionally partial black stripe centrally).

Epigynum: With small anterior flaps. Flaps parallel straight or slightly convergent posteriorly. Anterior shallowly depressed. Middle entirely shallowly depressed, slightly concave, sloping upward toward posterior, without sagittal ridge. Duct heads narrow, 1 pair major bends, 0 pair median minor bends, 1 pair posterior minor bends.

***Phidippus mimicus* Edwards, New Species**

Figs. 191-196; Map 17

Holotype (♂) in AMNH, allotype (♀) in FSCA.

Etymology: Latin adjective, *mimicus*, like a mime, an allusion to a supposed mimicry of mutillid wasps.

Type locality: MEXICO: Guerrero: Acapulco (2 mi. N.), 18-VI-1936, A.M. & L.I. Davis.

Geographic Range and Records: Southern Mexico. MEXICO: Oaxaca: Pinotepa Nacional (20 mi. W.), 23-VI-1983, allotype ♀ (B.K. Dozier, FSCA).

Biology: Unknown except the two specimens were collected in summer.

Comments: Known only from the type specimens.

Diagnosis: The transverse red mid-abdominal band in both sexes is unique for this species.

Description:

HOLOTYPE MALE: ALE-PME 0.44, PME-PL 0.92, ALE-PME/ALE-PL 32%, ALE ROW 2.57, PL ROW 2.99, CW 3.65, ALE/CW 70%, PL/CW 82%, CW/CL 83%, CL 4.40, LOQ 2.16, LOQ/CL 49%, CH 2.24, BL 8.77.

Carapace: Post-PME tuft about equal to width of AME. OQ scales iridescent. Submarginal band very broad from behind PME to thoracic slope. Clypeus fringe tan, band iridescent.

Palp: Dorsal stripe white, on femur, patella, tibia, and cymbium. Tibial apophysis stout, tip narrow and bent outward. Palea about as long as wide, ectal border distal to tegular shoulder notched ectal distally, creased distally. Embolus basal portion medial, not extending laterally. Embolus apical portion a long, almost straight spike, gradually tapering distally, appearing to arise from distal edge of palea and curved toward venter

(except tip bent distally).

Leg I: Fringes alternating black and white, short to mostly medium in length except femur dorsal and retroventrolateral fringes long. Femur prolateral proximal and distal bands white. Patella scale cover white entire segment. Tibia prolateral scale cover white on dorsal proximal and distal edges. Metatarsus entirely covered with white scales.

Abdomen: Dorsum similar to female. Venter black with white stripe each side (posterior only).

ALLOPARATYPE FEMALE: ALE-PME 0.58, PME-PL 0.96, ALE-PME/ALE-PL 38%, ALE ROW 2.78, PL ROW 3.45, CW 3.98, ALE/CW 70%, PL/CW 86%, CW/CL 80%, CL 4.98, LOQ 2.41, LOQ/CL 48%, CH 2.49, BL 11.4.

Carapace: Tufts about 2x width of AME. Mid-ocular tufts present. OQ scales sparse, iridescent. Submarginal band very broad from ALE to thoracic slope. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, abruptly narrowed then broadly forked. Lateral band II (and possibly IV fused with it) bordering transverse red band. Spots II fused and expanded into broad red transverse band. Spots III large, linear (fused together, forming posterior edge of transverse band). Spots IV large, oblique linear. All spots red (posteriorly edged with white). Median stripe scale cover gold (overlay on other scales and integument). Venter black with white stripe each side.

Epigynum: Flaps parallel straight posteriorly (dark areas posterolaterally make flaps appear divergent posteriorly). Anterior entirely shallowly depressed. Middle broadly depressed laterally, sagittal plane slightly raised, convex, sagittal ridge present. Duct heads narrow, 2 pair major bends, 1 pair median minor bends, 2 pair posterior minor bends.

***Phidippus cardinalis* (Hentz 1845)**

Figs. C47-48, 197-202; Map 17

Attus rufus Hentz 1835:552; NOMEN NUDUM

Attus cardinalis Hentz 1845:200; holotype (♂) destroyed

Attus rufus Hentz 1846:120; holotype (♀) destroyed; NEW SYNONYMY

Plexippus rufus C.L.Koch 1846:120; holotype (♀) in ZMHB, examined (synonymized by Marx 1890); (misidentification, see Species Misplaced in *Phidippus*)

Plexippus bivittatus C.L.Koch 1846:120; holotype (juvenile) in ZMHB, examined (synonymized by Marx 1890)

Attus m'cookii Peckham & Peckham 1883:16; holotype (♀) in MCZ, examined; NEW SYNONYMY

Phidippus ruber Keyserling 1885:493 (in part); holotype (♀) in BMNH, examined (synonymized by Banks 1893)

P. mccoookii: Peckham & Peckham 1888:17, 1901:288, 1909:383,386,396; Marx 1890:569; Muma 1945:60

P. cardinalis: Peckham & Peckham 1888:15; 1901:285; 1909:383,386,393; Marx 1890:568, 1892:161; Banks 1892:73, 1900:540, 1904:137, 1907:744, 1910:63; Scheffer 1905c:185; Crosby & Bishop 1928:1072; Worley & Pickwell 1931:115, 117,119; Banks *et al.* 1932:1845; Chickering 1934:580; Murrill 1942:9; Wallace 1950:83; Bonnet 1958:3516; Vogel 1970:19; Proszynski 1971b:454; Kaston 1972:270; Brown 1973:237; Richman & Cutler 1978:95; Edwards & Hill 1978:116; Cokendolpher 1978:118; Gertsch 1979:204; Hill 1979a:195,202; Richman 1981a:19; Dean, Sterling, & Horner 1982:256; Edwards 1984:48-9, 1990:96,98; Roach & Edwards 1984:54; Wolff 1984:60; Young & Edwards 1990:22; Breene *et al.* 1993:70; Platnick 1993:794, 1997:920; Edwards & Wolff 1995:50; Corey *et al.* 1998:309

Phidippus aureopilosus F.O.P.C. 1901:282, 283 holotype (♀) in BMNH, examined, label reads *P. aureopubescens*; NEW SYNONYMY

P. paludatus: Banks 1901:187 (misidentification); see *P. whitmani*

Dendryphantès cardinalis: Simon 1901:625; Petrunkevitch 1911:625; Roewer 1954:1207; Platnick 1993:749

D. mccoooki: Petrunkevitch 1911:635; Roewer 1954:1212; Platnick 1993:751

Phidippus oaklandensis Tullgren 1901:27 (synonymized by Petrunkevitch, 1911)

P. mccoooki: Lowrie 1942:168, 1948:338; Muma 1944:11; Kaston 1948:480-2,486; Whitcomb *et al.* 1963:657; Brown 1973:237; Proszynski 1976:150; Platnick 1993:795, 1997:920

P. maccooki (sic): Bonnet 1958:3522; Proszynski 1976:149

P. maccocki (sic): Proszynski 1971b:455

P. rufus: Proszynski 1971b:456

Etymology: Latinized adjective, *cardinalis*, presumably referring to cardinal red, an allusion to the dorsal color.

Type locality: Southern United States? (Hentz 1875). Hentz was apparently uncertain about the origin of his specimen.

NEW TYPE LOCALITY: USA: *Alabama*: (the type locality of *P. rufus*).

Geographic Range and Records: Southern New England south to Florida and west to Colorado and New Mexico, with outlying records in southern Mexico and Panama (the latter I consider questionable). **MEXICO:** *Oaxaca*: Juquila Nixes; **PANAMA:** (Bugaba); **USA:** *Alabama*: Jefferson, Lee, Mobile; *Arkansas*: Bradley, Calhoun, Clark, Logan, Randolph, Washington; *Colorado*: Fremont; *Connecticut*: Fairfield, Hartford, New London, Tolland, Windham; *Washington, D.C.*: *Florida*: Alachua, Clay, Dade, Highlands, Jackson, Jefferson, Levy, Marion, Monroe, Nassau, Okaloosa, Putnam, Santa Rosa, St. Johns, St. Lucie, Volusia; *Georgia*: Bibb, Clarke, Fulton, Hall, Morgan; *Illinois*: Jackson; *Kansas*: Douglas, Wallace; *Louisiana*: Catahoula, East Baton Rouge, Natchitochee; *Massachusetts*: Essex, Hampshire, Middlesex, Nantucket; *Missouri*: Boone, Greene, McDonald; *Mississippi*: Forrest, Newton, Oktibbeha; *New Mexico*: Doña Ana; *North Carolina*: Durham, Lee, Mecklenburg, Orange, Wake; *New York*: Long Island; *Ohio*: Guernsey; *Oklahoma*: Cleveland, Comanche, Kingfisher, Payne, Pontotoc, Roger Mills, Tillman, Wagoner; *Pennsylvania*: Armstrong, Chester; *Rhode Island*: Providence; *Tennessee*: Roane; *Texas*: Bexar, Brazos, Comanche, Coryell, Denton, Erath, Grayson, Hardin, Hidalgo, Johnson, Kerr, Kleberg, Knox, Runnels, Smith, Travis, Walker, Waller, Wichita, Zavala; *Virginia*: Fairfax, Falls Church, Giles, Montgomery, Pittsylvania; *West Virginia*: Mercer.

Biology: This autumn-maturing species occurs in all types of fields and in prairie, and in the herb/shrub zone of open woodland. In Florida, it seems to be more prevalent in xeric habitats. The pale yellow younger instars are usually found on dead grass, on which they are well-concealed. Older instars gradually turn orange, then red as subadults. Females can live until the following summer; eggsacs have been found under hickory bark.

Comments: Much confusion about the identities of *P. cardinalis* and *P. mccooki* has existed since the Peckhams (1909) illustrated both species in consecutive figures. Male *P. mccooki* are teneral specimens of *P. cardinalis*. When freshly molted, the body color is yellow instead of red, and the embolus apical portion is partially transparent; the tip of the embolus apical portion is invisible (unless pried from the embolar groove), resulting in a drawing as given by the Peckhams (1909, plate XXIX, 4C). The type of *P. mccooki* is a female with a typical *P. cardinalis* epigynum. Cheliceral color in the male of *P. cardinalis* agrees with Hentz's de-

scription and distinguishes this species from *P. apacheanus*.

Although the Peckhams (1909) were unable to recognize *P. rufus*, which they had previously attributed to what they renamed as *P. whitmani*, Hentz's description must be of the female of *P. cardinalis*. Only 3 eastern species (*P. cardinalis*, *P. pius*, *P. whitmani*) have 3 ventral, dark longitudinal stripes, and only 2 of these (*P. cardinalis*, *P. pius*) have 2 short dorsal, dark longitudinal stripes broken by 2 pairs of white spots. Since the type locality of *P. rufus* is Alabama, and the eastern U.S. red form of *P. pius* occurs east and south of the Appalachians, *P. rufus* must be *P. cardinalis*.

I was surprised to find the holotype of *P. aureopilosus* to belong here, expecting instead for it to be a synonym of *P. pius*. This leads me to suspect that the reported locality in Panama is erroneous.

Diagnosis: Males lack the bright green chelicerae seen in other mostly red species, e.g., *P. apacheanus* (those of *P. cardinalis* are weakly blue), and the flange on the embolus tip is unique. Females have the epigynal pocket as wide as the flaps are apart. The median area of the epigynum is a transverse narrow depression (unlike many other species which are red dorsally which have a broadly depressed median epigynal area), quickly rising to a broad posterior which is transversely raised.

Description:

MALE: BL 4.36 (6.90) 9.52, CL 3.80 (4.24) 4.70, CW 3.00 (3.44) 3.90.

Carapace: Post-PME tuft about 1.5x width of AME. OQ scales red. Clypeus fringe black. Chelicerae weakly blue.

Palp: Dorsal stripe absent. Tibial apophysis slightly bifurcate with rounded tips; short, knob-like. Palea about as long as wide. Embolus basal portion medial, not extending laterally. Embolus apical portion a long, almost straight spike, notched basally, appearing to arise from distal edge of palea and curved toward venter (except tip bent distally).

Leg I: Fringes alternating black and white, short to medium in length. Patella prolateral scale cover sparse, white proximally.

Abdomen: Scale cover red, on entire dorsum or except two parallel black stripes. Venter gray or pale.

FEMALE: BL 6.00 (10.06) 14.29, CL 4.50 (4.79) 5.10, CW 3.60 (3.89) 4.20

Carapace: Tufts 1.5x or less width of AME. OQ scales red or brown (rarely); lateral scale cover sparse, white. Clypeus fringe white, band white.

Abdomen: Basal band entirely narrow or absent. Lateral bands II and IV are oblique stripes. Spots III and IV small, oval. All spots white or red. Median dor-

sal black stripe reduced to two black parallel lines which include spots III and IV. Scale cover red or brown (rarely), on entire dorsum except parallel black stripes. Venter pale with three light gray stripes.

Epigynum: Flaps parallel straight to slightly convergent posteriorly. Anterior shallowly depressed. Middle depressed laterally, sagittal plane slightly raised (depression abbreviated, sloping upward rapidly to broad, raised posterior), slightly convex without sagittal ridge. Width of pocket about equal to distance between posterior ends of flaps. Duct heads narrow, 2 pair major bends, 0 pair median minor bends, 3 pair posterior minor bends.

Phidippus venus Edwards, New Species

Figs. 203-205; Map 13

Holotype (♂) in MCZ; only specimen known (Banks label in vial misidentifies specimen as *Dendryphantes dubitabilis* Peckham & Peckham 1896).

Etymology: Latin proper noun in apposition from mythology, *Venus*, Roman goddess of love.

Type locality: MEXICO: Veracruz: (only data given).

Geographic Range and Records: Eastern Mexico: Veracruz.

Biology: Unknown.

Diagnosis: Size and general appearance are similar to *P. tyrrelli*, but the distinctive palp seems to relate this species to the *P. cardinalis* group. The red clypeus is unique within the genus.

Description:

HOLOTYPE MALE: ALE-PME 0.32, PME-PLP 0.60, ALE-PME/ALE-PLP 35%, ALE ROW 1.87, PLP ROW 2.28, CW 2.86, ALE/CW 65%, PLP/CW 80%, CW/CL 79%, CL 3.61, LOQ 1.54, LOQ/CL 43%, CH 1.74, BL 7.18.

Carapace: Post-PME tuft about 2x width of AME. Anterior ocular band white. OQ scales iridescent. Submarginal band narrow from ALE to thoracic slope. Cheek band white. Marginal band white, several scales wide, from clypeus to posterior corners of carapace. Clypeus fringe red, band red. Chelicerae vertically striped with white.

Palp: Dorsal stripe white, on femur, patella, tibia, and cymbium. Tibial apophysis triangular, tip narrow and bent outward. Palea distinctly wider than long. Embolus basal portion an abbreviated semirectangular plate, moderately sclerotized. Embolus apical portion a long blade curving ventrally, gradually tapering distally, appearing to arise from distal edge of palea and curved toward venter.

Leg I: Fringes alternating black and white, short to mostly medium in length except femur retroventrolateral and tibia ventral fringes long. Femur prolateral proximal and distal bands white. Patella and tibia prolateral scale cover white proximally. Tarsus with white scales on proximal three-fourths. Tarsus integument entirely pale.

Abdomen: Scale cover red, on entire dorsum except white spots and basal band. Venter gray.

FEMALE: Unknown.

Phidippus cerberus Edwards, New Species

Figs. 206-210; Map 13

Holotype (♂), allotype (♀), and 15 (♀) paratypes in AMNH; 2 (♀) paratypes in FSCA.

Etymology: Latin proper noun in apposition, *Cerberus*, from Greek mythology, the dog that guards the underworld.

Type locality: MEXICO: Jalisco: Chapala, 8-VI-1955, B. Malkin.

Geographic Range and Records: Central Mexico. MEXICO: Distrito Federal: Pedregales, VIII-1909, 1♀ paratype (AMNH); 1 mi. SE. junc. Hwys. 55 & 57, 7375', dry alpine meadow, 19-VI-1970, 3♀ (S. Riechert, R. Reeder, TMM); Hidalgo: San Miguel, 2♀ (W.M. Mann, MCZ); Jalisco: Mazamitla (14 mi. E.), 28-VII-1954, 3♀ paratypes (W.J. Gertsch, V. Roth, AMNH); Michoacan: Jiquilpan (5 mi. W.), 29-VII-1964, 1♀ (W.J. Gertsch, J. Woods, AMNH); Quiroga (3 mi. W.), 9-V-1963, 1♀ paratype (W.J. Gertsch, W. Ivie, AMNH); Tuxcueca (1.5 mi. N.), 29-VII-1964, allotype ♀ (W.J. Gertsch, J. Woods, AMNH); Zamora, 1-VI-1956, 12♀ paratypes (W.J. Gertsch, V. Roth, AMNH, FSCA).

Biology: One record indicates this is a high elevation species from alpine meadow. All records are from the summer.

Comments: This is a small, dark species, which even though covered with gray scales, appears brown in alcohol. The holotype is the only male known.

Diagnosis: The long, broad embolus apical portion lacking a basal extension or modified palea seems to relate this species to *P. albulatus* and *P. maddisoni*. The tip has an incipient fork. The widely separated flaps and wide pocket, along with the transversely raised posterior part of the epigynum, are similar to *P. cardinalis*. The epigynum is also somewhat similar to *P. dianthus*, although the dark color of *P. cerberus* contrasts greatly with the iridescent dorsal pattern of that species.

Description:

HOLOTYPE MALE: ALE-PME 0.36, PME-
PLE 0.58, ALE-PME/ALE-PLE 38%, ALE ROW 1.83,
PLE ROW 2.16, CW 2.57, ALE/CW 71%, PLE/CW
84%, CW/CL 78%, CL 3.32, LOQ 1.66, LOQ/CL
50%, CH 1.45, BL 7.01.

Carapace: OQ scales gray. Submarginal band narrow from ALE to thoracic slope. Cheek band white. Marginal band a narrow white line from clypeus to PLE. Clypeus fringe white.

Palp: Dorsal stripe white, on femur and patella. Tibial apophysis triangular, tip attenuate. Palea distinctly wider than long. Embolus basal portion an abbreviated

semirectangular plate, moderately sclerotized. Embolus apical portion a long blade curving ventrally, broad entire length, tip rounded, appearing to arise from distal edge of palea and curved toward venter.

Leg I: Fringes alternating black and white, short to medium in length except tibia ventral fringe long. Femur prolateral proximal and distal bands white. Patella prolateral scale cover white entire length. Tibia prolateral scale cover white proximally. Metatarsus integument pale except for dark distal edge. Tarsus integument entirely pale.

Abdomen: Scale cover gray, on entire dorsum. Venter gray.

ALLOPARATYPE FEMALE: ALE-PME 0.40, PME-PLE 0.72, ALE-PME/ALE-PLE 36%, ALE ROW 2.03, PLE ROW 2.66, CW 3.11, ALE/CW 65%, PLE/CW 85%, CW/CL 77%, CL 4.03, LOQ 1.91, LOQ/CL 47%, CH 1.66, BL 9.69.

FEMALE: BL 7.85 (8.93) 10.19, CL 3.44 (3.99) 4.65, CW 2.66 (3.14) 3.74.

Carapace: Tufts 1.5x or less width of AME. Submarginal band broad from ALE to thoracic slope. Clypeus fringe white, band white.

Abdomen: Basal band entirely narrow. Lateral bands II and IV are oblique stripes. Spots I and II small, oval (II followed by an extra pair of spots and 3 chevrons). Spots III and IV small, linear. All spots white. Scale cover gray, on entire dorsum but more prominent laterally. Venter gray.

Epigynum: Flaps parallel straight to slightly divergent posteriorly. Anterior shallowly depressed. Middle shallowly depressed laterally, sagittal plane broadly raised, convex without sagittal ridge. Duct heads narrow, 2 pair major bends, 1 pair median minor bends, 3 pair posterior minor bends.

***Phidippus maddisoni* Edwards, New Species**

Figs. 211-214; Map 13

Holotype (♂) and alloparatype (♀) in CAS.

Etymology: Patronym for my friend, colleague, and fellow salticid enthusiast, Dr. Wayne P. Maddison, whose hospitality, discussions, and contributions to salticid systematics have been invaluable.

Type locality: **MEXICO:** *Jalisco:* Chamela (Est. Biologica), 175 m, 16-X-1988, Buickerood & E.S. Ross.

Geographic Range and Records: Central Mexico. **MEXICO:** *Michoacan:* Neuva Italia de Ruis (5.4 mi N.), 16-VI-1987, 1♀ (B.K. Dozier, FSCA).

Biology: I would speculate that this is an autumn-maturing species. It occurs at low elevation in mixed deciduous thorn scrub near a riparian area (B.K. Dozier, pers. comm.).

Comments: Clearly related to *P. albulatus*, but occurs in a different mountain range. Only known from one male and two females.

Diagnosis: Very similar in appearance to *P. albulatus*, but larger and with genitalic differences as described with that species.

Description:

HOLOTYPE MALE: ALE-PME 0.52, PME-
PLE 1.16, ALE-PME/ALE-PLE 31%, ALE ROW 3.32,
PLE ROW 4.23, CW 5.81, ALE/CW 57%, PLE/CW
73%, CW/CL 90%, CL 6.47, LOQ 2.74, LOQ/CL
42%, CH 3.24, BL 12.69.

Carapace: Posterior ocular band iridescent. Submarginal band broad from behind PME to thoracic slope. Cheek band white. Marginal band a narrow white line from clypeus extending slightly posterior to PLE, the part posterior to PLE gray. Clypeus fringe gray, band iridescent.

Palp: Dorsal stripe white, on femur and patella. Tibial apophysis triangular, tip narrow and bent outward. Palea distinctly wider than long. Embolus basal portion an abbreviated semirectangular plate, moderately sclerotized. Embolus apical portion a long blade curving ventrally, broad entire length, tip forked; appearing to arise from distal edge of palea and curved toward venter.

Leg I: Fringes alternating black and white, short to medium in length except tibia ventral fringe mixed medium and long. Femur prolateral proximal and distal bands white. Patella prolateral scale cover white on proximal edge, with a few scattered iridescent scales. Metatarsus integument entirely dark, without prolateral scales. Tarsus with white scales only on proximal edge, integument pale only on proximal and distal edges.

Abdomen: Venter black.

ALLOPARATYPE FEMALE: ALE-PME 0.60, PME-PLE 1.12, ALE-PME/ALE-PLE 35%, ALE ROW 3.07, PLE ROW 3.90, CW 4.90, ALE/CW 63%, PLE/CW 80%, CW/CL 84%, CL 5.85, LOQ 2.66, LOQ/CL 45%, CH 3.11, BL 13.19.

Carapace: Tufts about 2x width of AME. Mid-ocular tufts present. Median ocular band white, complete. OQ scales sparse, iridescent; lateral scale cover sparse, white. Clypeus fringe white, band white.

Abdomen: Basal band not narrowed at ends. Lateral band II reduced to spot. Spots I small, oval. Spots II fused into truncated triangle. Spots III large, linear. Spots IV small, linear. All spots white. Scale cover white and red, on lateral edges only. Venter gray with two short posterior pale stripes, or entirely black.

Epigynum: Flaps parallel straight posteriorly. Anterior shallowly depressed. Middle shallowly depressed laterally, sagittal plane broadly raised, slightly convex without sagittal ridge. Duct heads narrow, 2 pair major bends, 1 pair median minor bends, 2 pair posterior minor bends.

Phidippus albulatus F.O.P.C. 1901

Figs. 215-220; Map 13

Phidippus albulatus F.O.P.C. 1901:285; holotype (♂) in BMNH, examined

P. tyrrellii: Peckham & Peckham 1909:410 (*P. albulatus* was improperly synonymized with *P. tyrrellii* by the Peckhams and followed by later authors)

Etymology: Latin adjective, probably derived from *albulus* (diminutive of *albus*), whitish, perhaps referring to the broad, white carapace bands.

Type locality: MEXICO: Veracruz: Atoyac, coll. H. H. Smith (only data given).

Geographic Range and Records: Southern Mexico. MEXICO: Guerrero: Chilpancingo (3 mi. N.), 18-IX-1946, 1♂ (E.S. Ross, CAS); Iguala, 730 m, 27-X-1947, 1♂ 1♀ (H. Wagner, AMNH).

Biology: Unknown except some specimens were collected in autumn.

Comments: The pair collected together in the Mexican state of Guerrero includes the only known female. Three penultimate males suspected to be this species were collected in the states of Chiapas, Oaxaca, and Veracruz, respectively.

Diagnosis: Differs from *P. maddisoni* by having a narrower embolus apical portion which has a more slender pointed ectal spur, and the epigynal flaps are closer together.

Description:

MALE: BL 9.69 (10.44) 11.36, CL 4.57 (5.04) 5.48, CW 3.90 (4.26) 4.57.

Carapace: Median ocular band white, broken into three spots (rubbed, originally a complete band?). OQ scales sparse, iridescent, on lateral edges of quadrangle. Submarginal band broad from ALE to thoracic slope. Cheek band white. Marginal band a narrow white line from clypeus to posterior corners of carapace (gray posterior to PLE). Clypeus fringe tan, band white. Chelicerae vertically striped with white on basal half.

Palp: Dorsal stripe white, on femur, patella, tibia, and cymbium (short proximal prolateral stripe on cymbium). Tibial apophysis triangular, tip short, knob-like (may be slightly bifurcate). Palea distinctly wider than long. Embolus basal portion an abbreviated semirectangular plate, moderately sclerotized. Embolus apical portion a long blade curving ventrally, broad entire length, tip forked, appearing to arise from distal edge of palea and curved toward venter.

Leg I: Fringes alternating black and white, short to medium in length. Femur prolateral proximal band white; distal band white. Patella prolateral scale cover white entire length.

Abdomen: Dorsum black with white markings. Venter black.

FEMALE: BL 16.53, CL 5.98, CW 4.94.

Carapace: Tufts about 2x width of AME. Mid-ocular tufts present. Median ocular band white, complete. OQ scales sparse, iridescent (few behind median ocular band); lateral scale cover white, extending between PLE. Clypeus fringe white, band white.

Abdomen: Basal band entirely narrow. Lateral band II an oblique stripe. Lateral band IV an oblique stripe attached to spots III and IV. Spots I small, oval. Spots II fused into truncated triangle. Spots III and IV large, linear. All spots white. Venter gray.

Epigynum: Flaps parallel straight posteriorly. Anterior shallowly depressed. Middle shallowly depressed laterally, sagittal plane broadly raised, strongly convex without sagittal ridge. Duct heads narrow, 2 pair major bends, 1 pair median minor bends, 2 pair supernumery bends, 2 pair posterior minor bends.

audax group

The six group members all have the palea extended wider on the proximal side of a small ectal notch (*P. clarus* also has this state; some preliminary cladograms had this species basal within the *audax* group). This notch is missing in *P. audax* (although the palea is wider in the same area as the other species of the group). Several palpal features are restricted to this

group, particularly the embolus apical portion noticeably stalked and curved toward the median, the presence of an expanded embolic suture which appears as a proximal medial membranous area invaginated into the embolic stalk, and the presence of central vertical ridges in the distal half of the palea. The first two states indicate that the embolus apical portion has rotated toward the median in these species. The spermathecal ducts have the bends reduced or absent, and the duct heads are indistinct in the four terminal species.

Phidippus princeps
(Peckham & Peckham 1883)

Figs. C37-38, 221-226; Map 15

Attus insolens Hentz 1835:552, NOMEN NUDUM

A. insolens Hentz 1845:200; holotype (♂) destroyed

Phidippus castrensis C.L.Koch 1846:140; holotype (♂) formerly pinned (now in alcohol), examined;
NEW SYNONYMY

P. castrensis: C.L.Koch 1851:54; Simon 1864:327; Marx 1890:568; Banks 1901:187, 1910:63; Petrunkevitch 1911:771; Bonnet 1958:3517; Proszynski 1971b:454; Platnick 1993:794

Cyrtanota castrensis: Simon 1864:327

Attus princeps Peckham & Peckham 1883:18; holotype (♀) in MCZ, examined

Philaeus princeps: Peckham & Peckham 1888:31; Marx 1890:570

Phidippus brunneus Emerton 1891:225; holotype (♀) in MCZ, examined (synonymized by Bryant 1942)

P. mccoookii (not Peckham): Banks 1892:73, 1916:82

Dendryphantes castrensis: Simon 1901:625; Petrunkevitch 1911:627; Roewer 1954:1208

P. princeps: Peckham & Peckham 1901:288, 1909:388, 433; Banks 1910:65; Crosby & Bishop 1938:1072; Bryant 1942:701; Kaston 1945:13, 1948:481,484; Barnes & Barnes 1955:661; Bonnet 1958:3525; Warren et al. 1967:389,394; Berry 1970:105; Proszynski 1971b:456, 1976:149-50; Cutler 1977:40; Hill 1977a:5-7, 1977b:8, 1977g:44-9, 1979a:195,198,201-202, 1979b:302; Richman & Cutler 1978:97; Cokendolpher 1978:118; Oehler 1980:6-7; Richman 1981a:19; Coyle 1981:291; Edwards & Rossman 1981:29; Roach & Edwards 1984:54; Wolff 1984:60; Stietenroth & Horner 1987:240; Young et al. 1989:41; Edwards 1990:98; Platnick 1993:794, 1997:920; Draney 1997:338

P. insolens: Peckham & Peckham 1909:400 (in part, ♂); Comstock 1912:691; Muma 1945:60; Muma & Jeffers 1945:251; ?Muma & Muma 1949:490

Dendryphantes princeps: Petrunkevitch 1911:640; Roewer 1954:1215; Platnick 1993:752

Phidippus dorsalis Bryant 1942:697 (in part); paratypes (♀) in MCZ, examined (see *P. otiosus*)

P. brunneus: Lowrie 1942:168, 1948:338; Chickering 1944:187,191; Proszynski 1971b:454

Dendryphantes dorsalis: Roewer 1954:1209, Platnick 1993:750

Phidippus dorsalis: Proszynski 1971b:455; Edwards 1977:22; Platnick 1993:794

Etymology: Latin adjective, *princeps*, foremost.

Type locality: USA: *Pennsylvania*: (only data given).

Geographic Range and Records: New England south to northern Georgia and west to Saskatchewan, Utah, and northern Texas. **CANADA:** *Manitoba*: Cedar Lake; *Ontario*: Chatterton (13 mi. N. Belleville), Cornwall, Foxboro, Kinburn, Odessa, Windsor; *Saskatchewan*: Lady Lake; **USA:** *Alabama*: Washington; *Arkansas*: Faulkner, Hempstead, Ouachita, Washington; *Connecticut*: Fairfield, Hartford, Litchfield, Middlesex, New Haven, New London, Tolland; *Washington, D.C.*; *Georgia*: Clarke, DeKalb; *Iowa*: Boone, Story; *Illinois*: Cook, Jackson, Madison; *Indiana*: Parke, Posey, Tippecanoe; *Kansas*: Douglas, Riley; *Louisiana*: Caddo; *Massachusetts*: Barnstable, Berkshire, Essex, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk, Worcester; *Maryland*: Anne Arundel, Calvert, Frederick, Harford, Montgomery, Prince Georges; *Michigan*: Bay, Calhoun, Clinton, Hillsdale, Ingham, Jackson, Lake, Lapeer, Livingston, Midland, Oakland, St. Clair, Washtenaw; *Minnesota*: Aitkin, Anoka, Hennepin, Jackson, Lake of the Woods, Lincoln, Ramsey, Renville, Sherburne, Stearns, Wabasha, Wadena, Washington, Winona; *Missouri*: Boone, Cole, Douglas, Johnson, Vernon; *Mississippi*: Chickasaw, Lafayette, Pontotoc, Washington; *New Hampshire*: Belknap, Rockingham; *New Jersey*: Bergen, Hunterdon, Middlesex; *New York*: Bergen, Clinton, Dutchess, Long Island, Orange, Rensselaer, Rockland, Suffolk, Tompkins, Ulster, Warren; *North Carolina*: Buncombe, Catawba, Craven, Durham, Moore, Orange, Wake; *Ohio*: Ashtabula, Delaware, Franklin, Wayne; *Oklahoma*: Cleveland, Seminole, Tulsa, Wagoner; *Pennsylvania*: Bucks, Butler, Luzerne; *Rhode Island*: Newport; *South Carolina*: Florence, Newberry, Pickens; *Tennessee*: Blount, Knox, Washington; *Texas*: Wichita; *Utah*: Salt Lake; *Virginia*: Augusta, Campbell, Fairfax, Fauquier, Henry, Montgomery, Norfolk, Pittsylvania, Powhatan, Prince Edward; *Vermont*: Caledonia, Windham; *Wisconsin*: Crawford, Grant, Iowa, Marathon, Richland, Walworth; *West Virginia*: Greenbrier, Hampshire, Jefferson, Mercer, Monongalia, Raleigh, Summers, Wetzel.

I double-checked the Utah record and it is correct; likely the states between Minnesota, Iowa, and Utah will prove to have *P. princeps* as well.

Biology: This is a species found in old fields and hardwood understory. It matures in the spring.

Comments: The only eastern species that somewhat resembles Hentz's description of *Attus insolens* is *P. princeps*; Hentz's illustration is a reasonable representation of this species. However, *P. insolens* has not been used for this species since 1912 except by Muma and colleagues (see above synonymy) in the 1940s, but he was not followed by subsequent authors. *Phidippus princeps* has been used by the required number of authors and publications in the last 50 years to invoke Article 23.9.1.2 (International Code of Zoological Nomenclature, fourth edition, 1999). However, the use of *P. insolens* subsequent to 1899 violates Article 23.9.1.1 of the same edition, therefore petition will be made to the Commission to suppress *Attus insolens* Hentz.

The Peckhams (1909) misidentified the female of the species now known as *P. apacheanus* for *P. insolens*; a badly rubbed specimen of *P. apacheanus* could fit the simple description of *A. insolens*, but this is hardly a good reason on which to base a species name.

The only use of *P. castrensis* since its original description has been in lists and catalogs. With the exception of the catalogs of Bonnet (1958), Proszynski (1971), and Platnick (1993), it has not even been listed since 1916. Some authors (Banks 1901, 1910; Petrunkevitch 1911) considered it to be a possible synonym of *P. rufus*, *P. mccooki*, or *P. clarus*. It will be included in the petition to the Commission to be suppressed.

While most females are brown with few markings, some in the middle to southern part of the range may have a partial or complete (*dorsalis* form) median white stripe. Younger juveniles have a typical spot pattern with the second spots fused into a trapezoid.

Diagnosis: The different color pattern and more northern range separate this species from the closely related *P. pulcherrimus*. See also the diagnoses of *P. pulcherrimus* and *P. felinus*.

Description:

MALE: BL 4.36 (6.75) 8.54, CL 3.20 (3.71) 4.10, CW 2.50 (2.73) 2.90.

Carapace: Posterior ocular band sparse, iridescent. Marginal band a narrow white line from clypeus to posterior corners of carapace (gray posterior to PLE). Clypeus fringe black, band iridescent.

Palp: Dorsal stripe white, on femur and patella. Tibial apophysis triangular, tip bent ventrally, semi-attenuate. Palea distinctly much wider than long, proximal ectal margin extended laterally, ectal border distal

to tegular shoulder notched ectal distally. Embolus basal portion an abbreviated semirectangular plate, moderately sclerotized. Embolus apical portion a long, almost flat blade, toothed distally, bent laterally from stalk and recurved toward median.

Leg I: Fringes alternating black and white, short to medium in length except tibia ventral fringe long. Femur prolateral distal band white. Patella prolateral scale cover white entire length. Tibia prolateral scale cover white proximally.

Abdomen: Scale cover red or tan (northern end of range), on entire dorsum or except median black paired spots (rarely, in southern part of range). Venter black, or black with white stripe each side.

FEMALE: BL 6.00 (8.34) 11.46, CL 3.40 (3.96) 4.70, CW 2.90 (3.20) 3.60.

Carapace: Tufts 1.5x or less width of AME. OQ scales gray; lateral scale cover gray. Clypeus fringe white, band white.

Abdomen: Basal band usually absent, rarely complete or on anterolateral edges of abdomen. Lateral band II an oblique stripe. Spots usually absent, rarely II fused into truncated triangle, III small, linear, IV small, oval. All spots white or tan. Scale cover brown or tan, usually on entire dorsum. Venter black with white stripe each side.

Epigynum: Flaps parallel straight posteriorly. Anterior shallowly depressed, septum distinct. Middle broadly depressed laterally, sagittal plane slightly raised, slightly convex without or with slight sagittal ridge. Duct heads not well defined, 0 pair major bends, 0 pair median minor bends, 1 pair posterior minor bends.

***Phidippus pulcherrimus* Keyserling 1885**

Figs. C39-40, 227-231; Map 15

Phidippus pulcherrimus Keyserling 1885:492; holotype (♀) in MCZ, examined

P. pulcherrimus: Marx 1890:569; Banks 1901:188, 1904:137, 1910:65; Peckham & Peckham 1909:387, 429; Bonnet 1958:3525; Proszynski 1971b:456; Edwards 1977:22, 1982b:33-5, 1990:96,98; Richman & Cutler 1978:97; Edwards & Hill 1978:116; Hill 1979b:302; Richman 1981a:19, 1982:53; Edwards & Rossman 1981:29; Forster 1982b:171-2; Young & Edwards 1990:22; Edwards & Jackson 1993:712-4; Platnick 1993:796

Dendryphantus pulcherrimus: Petrunkevitch 1911:640; Roewer 1954:1199; Platnick 1993:752

Etymology: Latin adjective, *pulcherrimus*, the most beautiful.

Type locality: USA: *Florida*: (only data given).

Geographic Range and Records: Florida and the southern parts of Alabama and Georgia. USA: *Alabama*: Baldwin; *Florida*: Alachua, Baker, Columbia, Dade, Dixie, Hernando, Jefferson, Leon, Levy, Marion, Union; *Georgia*: Bulloch, Grady, Screven.

Biology: Like the closely related *P. princeps*, this species lives in overgrown old fields and woodland understory. It matures in early spring.

Comments: This is the first description of the male. The anecdote by Hill (Edwards & Hill 1978) proclaiming to be the first description of the male of *P. pulcherrimus* is insufficient for this purpose.

Diagnosis: The male has a more robust embolus apical portion than *P. princeps*, and the female has the median part of the epigynum distinctly depressed, which *P. princeps* does not. The color pattern and range are different (see *P. princeps* diagnosis).

Description:

MALE: BL 6.25 (7.32) 8.54, CL 3.30 (3.86) 4.50, CW 2.60 (3.02) 3.50.

Carapace: Posterior ocular band iridescent. Submarginal band a transverse quadrangular or oval spot behind and below PLE on upper thoracic slope. Marginal band a narrow white line from clypeus to PLE. Clypeus fringe black, band iridescent.

Palp: Dorsal stripe white, on femur and patella. Tibial apophysis triangular; tip bent ventrally, semi-attenuate. Palea distinctly much wider than long, proximal ectal margin extended laterally, ectal border distal to tegular shoulder notched ectal distally. Embolus basal portion an abbreviated semirectangular plate, moderately sclerotized. Embolus apical portion a long, almost flat blade, toothed distally, bent laterally from stalk and recurved toward median.

Leg I: Fringes alternating black and white, short to medium except tibia ventral fringe long. Femur prolateral distal band white. Patella prolateral scale cover white entire length.

Abdomen: Scale cover red or yellow, on entire dorsum except median black stripe and spots. Venter black.

FEMALE: BL 8.48 (9.87) 11.98, CL 4.10 (4.30) 4.60, CW 3.10 (3.42) 3.90.

Carapace: Tufts about 2x width of AME. OQ scales sparse and iridescent. Submarginal band a transverse quadrangular or oval spot behind and below PLE on upper thoracic slope, or absent, lateral scale cover white. Clypeus fringe white or tan, band white.

Abdomen: Basal band only on anterolateral edges of abdomen or absent. Spots II fused into truncated triangle. Spots III small, oval or linear, or absent (rare-

ly). All spots white. Scale cover red, on entire dorsum except median black stripe and spots. Venter black with white stripe each side.

Epigynum: Flaps parallel straight posteriorly. Anterior shallowly depressed, septum distinct. Middle broadly depressed laterally, sagittal plane narrowly raised, pronounced sagittal ridge present. Duct heads not well defined, 0 pair major bends, 0 pair median minor bends, 1 pair posterior minor bends.

***Phidippus bidentatus* F.O.P.C. 1901**

Figs. 232-236; Map 14

Phidippus bidentatus F.O.P.C. 1901:281, 286; holotype (♂) in BMNH, examined

Phidippus foveolatus F.O.P.C. 1901:282, 283; holotype (♀) in BMNH, examined; NEW SYNONYMY

Dendryphantes bidentatus: Petrunkevitch 1911:624; Roewer 1954:1191; Kraus 1955:72; Platnick 1993:749

D. foveolatus: Petrunkevitch 1911:630; Roewer 1954:1194; Platnick 1993:750

Dendryphantes (Phidippus) chilamae Kraus 1955:74; holotype (♀) in SMFD, examined; NEW SYNONYMY

Dendryphantes (Phidippus) lyratus Kraus 1955:75; holotype (♀) in SMFD, examined; NEW SYNONYMY

P. bidentatus: Bonnet 1958:3515; Proszynski 1971b:454; Hoffman 1976:66; Richman & Cutler 1988:76; Platnick 1993:793, 1997:920

P. foveolatus: Bonnet 1958:3519; Hoffman 1976:66; Richman & Cutler 1988:77; Platnick 1993:794

P. chilamae: Proszynski 1971b:454; Brignoli 1983:650

P. lyratus: Proszynski 1971b:455; Brignoli 1983:650

Etymology: Latin adjective, *bidentatus*, having two teeth; F.O.P.-Cambridge (1901) noted that the smaller promarginal tooth was nearly obsolete, thereby leaving only 2 teeth (1 promarginal, 1 retromarginal).

Type locality: MEXICO: *Chiapas*: coll. Höge (only data given).

Geographic Range and Records: Southern Mexico to northwestern Costa Rica. COSTA RICA: *Guanacaste*: Cañas (7 mi. N.), 4-II-1967, 1♀ (J.M. Nelson, MCZ); Cañas (Finca La Pacifica), 7-12-II-1967, 4♀ (C.E. Valerio, UCR); 7-12-II-1967, 1♀ (C.E. Valerio, FSCA); Bagacas (Palo Verde): 16-22-I-1978, 1♀ (C.E. Valerio, UCR); 16-22-I-1978, 2♀ (W. Eberhard, MCZ); Tilaren, VII-1964, 1♀ (C.E. Valerio, UCR); Tilaren, 29-XII-1967, 1♀ (C.E. Valerio, UCR); Tilaren, (UCR87) XII-1964, 1♂ 1♀ (C.E. Valerio, FSCA); EL

SALVADOR: (La Palma), 24-VI-1958, 1♀ (O.L. Cartwright, USNM); **GUATEMALA:** *State?*: 1♂ (Dr. Sherman, USNM); *Huehuetenango*: Huehue (13 mi. NW.), 25-I-1980, 1♀ (B. & V. Roth, AMNH); La Mesilla, 3500', 28-XII-1979, 1♂ (C. Gold, UCB); **MEXICO:** *State?*: 5100', 13-XI-1917, 1♂ (F.J. Dyer, AMNH); *Chiapas*: Rt. 90 (2 km S. road to Ocosingo), 20-IX-1977, 1♀ (N. Reichenback, Penniman coll.); San Cristobal, 8-13-III-1976, 3♀ (O. Peck, CNC); San Cristobal las Casas, 19-VIII-1977, 1♀ (T.C. Meikle, C.E. Griswold, UCB); 19-VIII-1977, 1♂ (C.E. Griswold, UCB); *Morelos*: Oaxtepec, 17-V-1942, 1♀ (Correa, Cardenas, AMNH); *Oaxaca*: Juquila Nixes, 16 58'N, 95 55'W, 1968, 1♀ (W.S. Miller, AMNH); 1977, 1♀ (W. Miller, SWRS); *Veracruz*: 1♀ (N. Banks, MCZ); El Tamarindo Junction, sweeping, 30-VII-1972, 1♀ (A.R. Brady, Brady coll.); Fortin, 28-IV-1944, 1♀ (C. Bolivar, I. Pina, AMNH); Fortin de las Flores: 1982, 1♂ (G. Uetz, FSCA); on *Opuntia*: 13-17-VIII-1988, 1♂ 6♀ (2♀ w/ 55 & 75 yg, respectively); 13-17-VIII-1988 r, 2♂ 5♀ (all G.B. Edwards, FSCA); Huatusco, 21-II-1965, 1♀ (A.B. Lau, USNM); Orizaba, 1♂ (Mann, MCZ); *Yucatan*: Grutas de Loltin, bush in clearing, 22-VII-1983, 2♀ (W. Maddison, MCZ).

Biology: This desert species occurs on *Opuntia* and shrubs. Records occur in every month, all males are only from late summer through autumn.

Comments: Even though the actual description of *P. foveolatus* has page priority over that of *P. bidentatus*, as first reviser I choose *P. bidentatus*, since the male is more distinctive. Females show variation (an epigynal septum may be present or absent) which resulted in Kraus (1955) describing two specimens as two different species.

Diagnosis: Similar in appearance to *P. audax*, but with median abdominal stripe iridescent green or copper colored, embolus basal portion much larger, embolus apical portion more slender, and epigynal flaps shorter.

Description:

MALE: BL 8.35 (10.99) 13.86, CL 4.19 (5.55) 7.47, CW 3.53 (4.67) 6.02.

Carapace: Posterior ocular band iridescent, sparse. Submarginal band very broad from behind PLE to thoracic slope or absent. Clypeus fringe black, band iridescent.

Palp: Dorsal stripe white, on femur and patella, or absent. Tibial apophysis triangular; tip narrow, semi-attenuate. Palea about as long as wide, proximal ectal margin extended laterally, ectal border distal to tegular shoulder notched ectal distally, creased distally. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of pa-

lea. Embolus apical portion a short recurved spike, gradually tapering distally, bent laterally from stalk and recurved toward median.

Leg I: Fringes alternating black and white, short to mostly medium in length. Femur prolateral distal band white. Patella prolateral scale cover white entire length. Tarsus integument entirely dark.

Abdomen: Scale cover iridescent (copper to green, or gold), on entire dorsum. Venter gray or pale.

FEMALE: BL 11.19 (13.84) 16.87, CL 5.10 (5.85) 7.06, CW 4.32 (4.94) 5.81.

Carapace: Tufts about 2x to 2.5x width of AME. Mid-ocular tufts present. OQ scales sparse, iridescent. Submarginal band very broad from ALE to thoracic slope or absent; lateral scale cover white. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, gradually narrowed. Lateral bands II and IV are oblique stripes. Spots I small, oval. Spots II fused into truncated triangle; sometimes followed posteriorly by one distinct chevron. Spots III and IV small, linear (III sometimes large). All spots white. Scale cover iridescent, on lateral edges only, or absent. Venter black with white stripe each side.

Epigynum: Flaps short, parallel straight to slightly convergent posteriorly. Anterior shallowly depressed, septum absent or distinct. Middle depressed laterally, sagittal plane slightly raised or entirely shallowly depressed (if no septum), without sagittal ridge. Duct heads not well defined, 0 pair major bends, 0 pair median minor bends, 1 pair posterior minor bends.

***Phidippus audax* (Hentz 1845)**

Figs. C32-36, 237-243; Map 14

?*Attus morsitans* Walckenaer 1805:23;

NOMEN NUDUM

Salticus variegatus Lucas 1833:478; type lost; petition to suppress (Levi & Pinter, 1970) under consideration by the I.C.Z.N.

Attus audax Hentz 1835:552; NOMEN NUDUM

A. tripunctatus Hentz 1835:552; NOMEN NUDUM

?*A. morsitans* Walckenaer 1837:432,484,488;

NOMEN DUBIUM

A. audax Hentz 1845:199; type destroyed; petition submitted to ICZN to designate as type species of genus (Levi & Pinter, 1970)

A. tripunctatus Hentz 1846:355 (synonymized by Peckham & Peckham 1888)

A. fasciolatus Hentz 1846:356 (synonymized by Banks 1910)

Phidippus variegatus: C.L.Koch 1846:126; Simon

- 1864:326; Banks 1898:142, 1904:137, 1910:65; Peckham & Peckham 1901:285, 1909:384,387, 390; Comstock 1913:681-682; Crosby & Bishop 1928:1073; Petrunkevitch 1928:205; Banks et al. 1932:20; Hubbell 1932:503; Chickering 1937: 281; Kaston 1938:197; Bryant 1942:694; Muma 1945:61; Vogel 1970:20; Hoffman 1976:66; Edwards 1994:143-4.
- Phidippus purpurifer* C.L.Koch 1846:127 (synonymized by Peckham & Peckham 1888); misidentification, see *P. regius*
- P. smaragdifer* C.L.Koch 1846:128; 2 syntypes (♀, penultimate ♂) in ZMHB (formerly pinned, now in alcohol), examined, lectotype (♀) designated (synonymized by Peckham & Peckham 1888); C.L. Koch 1851:54; Simon 1864:326; Banks 1913: 184
- P. togatus* C.L.Koch 1846:129; holotype (♀) in ZMHB, examined; NEW SYNONYMY
- P. alchymista* C.L.Koch 1846:131; 3 syntypes (♀) in ZMHB (formerly pinned, now in alcohol, appendages and epigynum of one on slide; one specimen subsequently labelled holotype, dismembered specimen has slide also labelled holotype in pencil and torso in vial labelled topotype!), examined, lectotype (♀ labelled holotype) designated (synonymized by Peckham & Peckham 1888); C.L. Koch 1851:54; Banks 1913:186
- P. rufimanus* C.L.Koch 1846:132; holotype not in ZMHB, lost (synonymized by Peckham & Peckham 1888); C.L.Koch 1851:54
- P. lunulatus* C.L.Koch 1846:133; holotype (♂) in ZMHB (formerly pinned, now in alcohol), examined (synonymized by Peckham & Peckham 1888); C.L. Koch 1851:54; Banks 1913:184
- P. dubiosus* C.L.Koch 1846:135; 2 syntypes (penultimate ♂ appendages on slide; subadult ♀ formerly pinned, now in alcohol) in ZMHB, examined, lectotype designated (subadult ♀) (synonymized by Banks 1901); C.L.Koch 1851:54; Marx 1890: 568; Banks 1901:187
- P. mundulus* C.L.Koch 1846:137; 4 (penultimate ♂) syntypes (3 formerly pinned, in alcohol, 1 set of appendages on slide) in ZMHB, examined, lectotype designated (synonymized by Peckham & Peckham 1888); C.L.Koch 1851:54; Simon 1864: 326; Peckham & Peckham 1888:11; Banks 1913: 186
- P. personatus* C.L.Koch 1846:141; 5 syntypes (3 penultimate ♂, 2 juveniles formerly pinned, now in alcohol; one of the juveniles with appendages on slide) in ZMHB, examined, lectotype (penultimate ♂) designated (synonymized by Banks 1901); C.L. Koch 1851:54
- P. electus* C.L.Koch 1846:144; holotype (juvenile ♀) in ZMHB, examined (*bryantae* form);
NEW SYNONYMY
- P. elegans* C.L.Koch 1846:145; holotype (juvenile ♀) in ZMHB, examined (*bryantae* form) (synonymized by Banks 1901); C.L.Koch 1851:54; Simon 1864:327; Marx 1890:568; Banks 1901:187, 1913: 185
- P. concinnatus* C.L.Koch 1846:145; 3 syntypes (♂) (formerly pinned, now in alcohol, one with appendages on slide) in ZMHB, examined, lectotype (♂) designated (synonymized by Banks 1901); C.L.Koch 1851:54; Simon 1864:327; Marx 1890:568; Banks 1901:187, 1913:186
- Attus audax*: Hentz 1868:104, 1875:50
- A. tripunctatus*: Hentz 1868:105, 1875:58; Emerton 1877:71; Peckham & Peckham 1883:33; Marx 1883:26
- A. fasciolatus*: Hentz 1868:105, 1875:60; Marx 1883: 26, 1885:106, 1890:578; Bryant 1908:105
- Cyrtonota purpurifera*: Simon 1864:326
- C. smaragdifera*: Simon 1864:326
- C. mundula*: Simon 1864:326
- C. variegata*: Simon 1864:326
- C. concinnata*: Simon 1864:327
- C. elegans*: Simon 1864:327
- Phidippus morsitans* (not Walckenaer): Peckham & Peckham 1888:11 (misidentification corrected by Peckham & Peckham 1909), 1889:10,45, 1895: 241,247, 256, 1901:285,287; Peckham & Peckham 1889:75; McCook 1889:276, 1890:33,59, 148,189, 190,295,297,335,350, 1894:59; Marx 1890a:208, 1890b:569, 1892a:161, 1892b:198; Fox 1892:269; Simon 1895:105; Tyrrell 1896:205; Tullgren 1901: 25; Britcher 1903:129; Scheffer 1905b:119, 1905 c:186; Strand 1906:476; Warburton 1909:365, 421; Berlese 1912:109; Berland 1932:170
- P. rauterbergii* Peckham & Peckham 1888:22; holotype (♀) in MCZ, examined (synonymized by Banks 1916)
- Phidippus mexicanus* Peckham & Peckham 1888:23; holotype (♂) in MCZ, examined;
NEW SYNONYMY
- Philaeus farneus* Peckham & Peckham 1888:26; holotype (♀) in MCZ, examined; NEW SYNONYMY
- Phidippus mexicanus*: Marx 1890:569; Banks 1898: 280, 1901:587, 1910:64; Peckham & Peckham 1901:285; F.O.P.C. 1901:286; Bonnet 1958:3523; Hoffman 1976:66; Richman & Cutler 1988:77
- Philaeus farneus*: Marx 1890:570

- Phidippus tripunctatus*: Emerton 1891:227, 1894:419, 1902:51, 1919:168, 1920:336; Banks 1892:73, 1893:126; Baker 1894:164; Scheffer 1905b:119; Petrunkevitch 1907:283; Bryant 1908:98; Rau 1922:70, 1926:216; Weese 1924:374
- Megatimus severus* Thorell 1891:7,130; holotype (♀) in National Museum of Ireland, Dublin, examined; NEW SYNONYMY
- Phidippus audax*: Banks 1893:126, 1895a:92, 1895b:430, 1895c:206, 1899:190, 1900:539, 1901:187, 1904:137, 1907:744, 1909:167, 1910:63, 1911:454; Peckham & Peckham 1909:384,387,389; Cockerell 1911:256; Rosenfeld 1911:402-9; Bilsing 1913:215, 1920:225,255; Comstock 1913:681; Adams 1915:138; Pratt 1916:435; Ressler 1918:223,224, 232; Shelford 1918:146; Barrows 1918:317, 1925:494, 510; Rau 1922:168; McAttee 1927:182; Crosby & Bishop 1928:1072; Worley & Pickwell 1931:116-8; Banks et al. 1932:18,44; Ewing 1933:173,193; Chickering & Bacorn 1933:527; Kaston 1935:191,198,200, 1936:103,120 1938: 196, 1945:12, 1948:480-2, 1953:111, 1972:267, 1978:256; Jones 1936:70; Stiles & Detwiler 1939: 286; Lowrie 1942:168, 1948:338; Murrill 1942:9; Chickering 1944:186,188-9; Muma 1945:60; Muma & Jeffers 1945:251; Muma & Muma 1949: 490; Bonnet 1958:3513; Lamore 1958:286; Specht & Dondale 1960:813; Whitcomb & Tadic 1963:189; Whitcomb et al. 1963:657; Anderson 1966:977; Warren et al. 1967:389, 394; Levi & Levi 1968:102; Vogel 1970:19; Proszynski 1971b:454, 1976:149-50; Brown 1973:236; Edwards et al. 1974:345; Richman 1977:10; Cutler 1977:40, 1990:91; Hill 1977a:6, 1977b:7-8, 1977d:25, 1977e:28, 1977f:319-37, 1978c:9, 1979a:194,195, 198,202, 1979b:302; Anderson 1978:45,53; Richman & Cutler 1978:95; Jackson 1978b:9, 1986b:1195; Givens 1978; Gertsch 1979:204,233,252, plates 27,28; Cokendolpher & Bryce 1980:16; Oehler 1980:6; Richman 1981a:19; Edwards & Rossman 1981:29; Dean, Sterling, & Horner 1982:252,256-257; Edwards 1982b:35, 1984:47, 1990:96-8; Roach & Edwards 1984:54; Wolff 1984:59; Freed 1984:49-51,53-60; Kim 1987:99; Stietenroth & Horner 1987:240; Young 1989a:43-46, 1989b:266-71, 1989c:177; Young et al. 1989:41; Young & Edwards 1990:10,22; Breene et al. 1993:70; Edwards & Jackson 1993:710-4; Platnick 1993:793, 1997: 920; Edwards 1994:143-4; Edwards & Wolff 1995:49; Maddison 1996:229,266-7,333, 335; Draney 1997:338
- Megatimus severus*: Workman 1894:13; Bonnet 1958:3528
- Phidippus howardii* Peckham & Peckham 1896:10,34; holotype (♂) in MCZ, examined; NEW SYNONYMY
- P. howardi*: Peckham & Peckham 1901:286, 1909:384, 391; F.O.P.C. 1901:281,285; Banks 1910:64; Banks et al. 1932:18; Bonnet 1958: 3520; Hoffman 1976:66; Richman & Cutler 1988: 77
- P. farneus*: Peckham & Peckham 1901:287, 1909:387, 430; Banks 1910:63; Bonnet 1958:3519; Proszynski 1971b:455; Richman & Cutler 1978:96
- P. rautenbergii*: Marx 1890:569; Peckham & Peckham 1901:295, 1909:387,429; Banks 1910:65; Banks et al. 1932:20; Bonnet 1958:3526; Vogel 1970:19; Cokendolpher & Bryce 1980:16
- Dendryphantes variegatus*: Simon 1901:617,624-5; Petrunkevitch 1911:643; Roewer 1954:1205
- D. severus*: Simon 1901:625; Roewer 1954:1190
- D. audax*: Petrunkevitch 1911:622; Roewer 1954:1206
- D. farneus*: Petrunkevitch 1911:629; Roewer 1954:1210
- D. howardi*: Petrunkevitch 1911:632; Roewer 1954:1203
- D. mexicanus*: Petrunkevitch 1911:636; Roewer 1954:1204
- D. rautenbergii* (sic): Petrunkevitch 1911:641
- D. rautenbergii*: Roewer 1954:1204
- Phidippus severus*: Petrunkevitch 1928:231
- Phidippus bryantae* Kaston 1945:12; holotype (♀) in AMNH, examined (synonymized by Kaston 1948)
- P. rautenbergi* (sic): Hoffman 1976:66
- P. rautenbergi*: Proszynski 1971b:456, 1976:149; Platnick 1993:796, 1997:921
- P. audax*: Edwards 1994:143-4 (neotype designated)
- Etymology:** Latin adjective, *audax*, audacious, bold.
- Type locality:** USA: *Massachusetts*: (only data).
- Geographic Range and Records:** Widespread from eastern U.S. and Ontario south to the Florida Keys, west to Washington, New Mexico, and eastern Mexico; introduced into Southern California, Hawaii, and Nicobar in the Indian Ocean (from where it was redescribed as *Megatimus severus*; this may have been an intercepted specimen and not established). **CANADA:** *Ontario*: Belleville, Brampton, Burlington, Haliburton, Kitchener, Lake Erie (Peloc Island), London, Ottawa, Rondeau, St. Thomas, Windsor; **MEXICO:** *Nuevo Leon*: Presa Nueva; *San Luis Potosi*: Ciudad del Maiz (6 mi. E.), Rio Verde (50 mi. E.), Tamazunchale (4 mi. N.), Tamazunchale (14.7 mi. S.), Tamazunchale (25 mi. N.), Valles, Valles (12 km S.), Xilitla; *Tamaulipas*: Ciudad Mante, Ciudad Montes (Rio Frio), Ciudad Valles (21 mi. N.), Ciudad Victoria, Cd. Victoria (55 km

S.), El Lemon (N. Monte), Juamave (4 mi. N.), La Pesca, Nacimiento del Rio Frio, Rancho El Milagro (Cruillas), Rancho Santa Ana; *Veracruz*: (no other data); **USA**: *Alabama*: Baldwin, Jackson, Jefferson, Lee, Macon, Marengo, Mobile, Tuscaloosa; *Arkansas*: Conway, Faulkner, Hempstead, IZard, Pulaski, Randolph, Washington; *Arizona*: Cochise, Coconino (both probably interceptions); *California*: Alameda, Los Angeles, Orange, San Diego; *Colorado*: Baca, Boulder, Conejos? (Oslan), Denver, El Paso, Larimer, Las Animas, Mesa, Morgan; *Connecticut*: Fairfield, Hartford, Litchfield, New Haven, New London, Tolland; *Washington, D.C.*; *Delaware*: New Castle, Sussex; *Florida*: Alachua, Citrus, Dade, Duval, Gadsden, Hardee, Hendry, Highlands, Jackson, Jefferson, Leon, Levy, Monroe, Okeechobee, Orange, Osceola, Palm Beach, Polk, Sarasota, Seminole, St. Johns, St. Lucie; *Georgia*: Bulloch, Clarke, DeKalb, Fulton, Grady, Hall, Jenkins, Macon, Monroe, Sumpter; *Hawaii*: Oahu; *Iowa*: Boone, Clayton, Dallas, Dickinson, Hardin, Polk, Story, Woodbury; *Idaho*: Ada, Payette; *Illinois*: Calhoun? (Salts), Cass, Cook, Jackson, Kankakee, Kankokee, Lake, Madison, Ogle, Peoria, Randolph, Richland; *Indiana*: Carroll, Crawford, La Porte, Marion, Monroe, Parke, Posey, Vermillion, Wayne; *Kansas*: Barber, Bourbon, Decatur, Douglas, Gray, Marshall, McPherson, Meade, Riley, Wyandotte; *Louisiana*: Acadia, Ascension, Avoyelles, Cameron, Catahoula, Concordia, East Baton Rouge, Grant, Jefferson, Jefferson Davis, Livingston, Madison, Natchitochee, Orleans, Pointe Coupee, Richland, St. Charles, Vermilion, Washington, West Feliciana; *Massachusetts*: Barnstable, Berkshire, Essex, Hampshire, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk, Worcester; *Maryland*: Anne Arundel, Baltimore, Charles, Harford, Montgomery, Prince Georges, Washington; *Michigan*: Allegan, Branch, Calhoun, Clinton, Gratiot, Ingham, Ionia, Isabella, Lapeer, Livingston, Midland, Ogemaw, Oseola, Ottawa, Washtena, Washtenaw, Wayne; *Minnesota*: Freeborn, Hennepin, Olmsted, Ramsey, Renville, Washington; *Missouri*: Boone, Jackson, Johnson, Livingston, St. Charles, St. Clair, St. Louis, Texas, Vernon, Wayne; *Mississippi*: Amite, Forrest, Greene, Hinds, Humphreys, Jackson, Lafayette, Madison, Noxubee, Oktibeha, Pearl River, Perry, Pontotoc, Wilkinson; *Nebraska*: Custer, Dawes, Dawson, Douglas, Lancaster; *New Hampshire*: Hillsborough; *New Jersey*: Bergen, Burlington, Essex, Gloucester, Hunterdon, Middlesex, Monmouth, Morris, Ocean; *New Mexico*: Bernalillo, Curry, Doña Ana, Lea, Roosevelt, Santa Fe, Valencia; *New York*: Chautauqua, Essex, Long Island, Monroe, Nassau, New York, Ontario, Queens, Rensselaer,

Rockland, Schoharie, Schuyler, Seneca? (Bergen Beach), Suffolk, Tioga, Tompkins, Warren; *North Carolina*: Alamance, Buncombe, Cleveland, Craven, Jackson, Montgomery, Nash, New Hanover, Onslow, Orange, Pasquotank, Randolph, Union, Wake; *Ohio*: Ashtabula, Champaign, Delaware, Erie, Franklin, Hamilton, Hocking, Miami, Trumbull, Wayne; *Oklahoma*: Cimarron, Cleveland, Comanche, Garfield, Garvin, Grady, Hughes, Mayos, Payne, Pontotoc, Tulsa; *Pennsylvania*: Adams, Berks, Bradford, Bucks, Cumberland, Fayette, Lancaster, Schuylkill, Washington; *Rhode Island*: Kent, Newport; *South Carolina*: Charleston, Pickens; *South Dakota*: Meade; *Tennessee*: Davidson, Sevier, Washington; *Texas*: Aransas, Atascosa, Austin, Bastrop, Bexar, Bosque, Brazoria, Brazos, Brooks, Brown, Burnet, Calhoun, Cameron, Chambers, Cherokee, Clay, Colorado, Comanche, Coryell, Dallas, Denton, Erath, Gaines, Galveston, Goliad, Gonzales, Gray, Grayson, Harris, Harrison, Hidalgo, Hunt, Jasper, Jeff Davis, Jefferson, Jim Wells, Jim Hogg, Karnes, Kenedy, Kerr, Kleberg, Lamb, Liberty, Lubbock, Mason, McLennan, Medina, Montgomery, Nueces, Orange, Potter, Randall, Runnels, Runnels, Rusk, San Patricio, Tarrant, Taylor, Travis, Uvalde, Val Verde, Victoria, Walker, Washington, Wichita, Williamson, Wilson, Zavala; *Utah*: Box Elder, Salt Lake, Sevier, Utah, Wasatch, Weber; *Virginia*: Accomack, Augusta, Fairfax, Giles, Gloucester, Grayson, Greensville, Montgomery, Nelson, Norfolk, Northampton, Page, Patrick, Portsmouth, Powhatan, Prince Edward, Roanoke, Rockbridge, Russell, Surry, Washington, Wythe; *Washington*: Benton; *Wisconsin*: Barron, Clark, Columbus, Crawford, Dane, Dodge, Jefferson, La Crosse, Milwaukee, Ozaukee, Racine, Sauk, Vernon, Washington, Waupaca; *West Virginia*: Hampshire, McDowell, Mercer, Pleasants, Pocahontas, Upshur, Wetzel; *Wyoming*: Laramie. A record from Brazil in the state of Pará is probably an interception.

Biology: This common species occurs in old fields, prairie, and the herb/shrub zone of open woodland. It is restricted to grassy areas near bodies of water in Florida. It is a spring-maturing species in the northern part of its range, but in peninsular Florida, adults of both sexes can be found in every month. Females make their eggsacs under the bark of logs.

Comments: *Phidippus morsitans* might also apply to *P. regius*. Several of the Peckhams' species were described on the basis of size and presence or absence of carapace bands, and variations in abdominal pattern. *Phidippus farneus* is an earlier description of the color form later described as *P. bryantae* (as are two of Koch's species), whereas *P. rauterbergii* (♀) and *P.*

howardii (small ♂) are of the color form the Peckhams (1909) considered to be *P. variegatus* (large ♂).

This is an extremely common species over most of eastern to midwestern North America. It varies considerably in both size and color pattern, although at least some individuals of a particular population retain the typical color pattern. The "Big Bend" area of northern Florida (see Hill 1978c) has a particularly variable population. Some individuals in Texas and Mexico reach nearly 20 mm in length, perhaps in part due to the lack of competition from another common, large species (like *P. regius* in Florida).

Diagnosis: Males have a distal cheliceral tubercle like *P. regius*. The embolus apical portion is a short blade similar to *P. felinus*, whereas the endite is concave laterally like *P. bidentatus*. The epigynal flaps are excavate anteromedially and are distinctly longer than those of *P. bidentatus*, but the spermathecal ducts are simple and similar to those of *P. bidentatus*. The genitalia of both sexes are distinctive, and will distinguish this species despite all its color and pattern variations. Juveniles frequently have orange abdominal spots which turn white at maturity, although in the "Big Bend" area of Florida, most individuals have yellow, orange, or red spots as adults, and the spots are frequently enlarged or even fused together.

Description:

NEOTYPE MALE: ALE-PME 0.40, PME-PLE 0.76, ALE-PME/ALE-PLE 34%, ALE ROW 2.28, PLE ROW 2.74, CW 3.53, ALE/CW 65%, PLE/CW 78%, CW/CL 85%, CL 4.15, LOQ 2.03, LOQ/CL 49%, CH 2.08, BL 8.85. Leg segment lengths (dorsal): I: femur 2.70, patella 2.08, tibia 2.16, metatarsus 1.83, tarsus 0.91; II: femur 2.24, patella 1.49, tibia 1.41, metatarsus 1.49, tarsus 0.83; III: femur 2.08, patella 1.25, tibia 1.33, metatarsus 1.37, tarsus 0.83; IV: femur 2.61, patella 1.41, tibia 1.83, metatarsus 1.66, tarsus 0.83.

MALE: BL 4.36 (8.39) 15.24, CL 3.60 (4.60) 6.30, CW 2.90 (3.86) 5.50.

Carapace: Posterior ocular band iridescent. Submarginal band very broad to broad from behind PME to thoracic slope, or absent. Clypeus fringe black, band iridescent. Cheliceral distal dorsal tubercle well developed.

Palp: Dorsal stripe white, on femur and patella. Tibial apophysis small, attenuate distally. Palea about as long as wide. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a short, almost flat blade, somewhat abruptly tapering distally, bent laterally from stalk and recurved toward median.

Leg I: Fringes alternating black and white, short to mostly medium in length. Femur prolateral distal band white. Patella prolateral scale cover white entire length.

Abdomen: Dorsum variable like female. Venter black, or black with white stripe each side.

FEMALE: BL 4.48 (10.93) 18.10, CL 4.50 (5.67) 7.00, CW 3.40 (4.34) 5.40.

Carapace: Tufts about 2x width of AME. OQ scales sparse, iridescent, or absent. Submarginal band broad from behind PME to thoracic slope, or absent. Clypeus fringe black, band iridescent.

Abdomen: Basal band usually wider anteriorly, gradually narrowed, or rarely encircling dorsal edge of abdomen from anterolateral edges to spots IV. Lateral bands II and IV are oblique stripes. Spots I small, oval, or fused into backward pointing triangle (rarely), or absent. Spots II fused into truncated triangle. Spots III small, linear, or large, linear, or large, oval (rarely). Spots IV small, linear. All spots usually white, or yellow, orange, or red (rarely). Scale cover white, on lateral edges only, or absent. Four pair matte black rectangular spots present submedially. Venter black with white stripe each side.

Epigynum: Flaps slightly convergent or parallel straight posteriorly. Anterior shallowly depressed, septum absent or distinct (rarely). Middle depressed laterally, sagittal plane slightly raised, convex without or with a very slight sagittal ridge present. Duct heads not well defined, 0 pair major bends, 0 pair median minor bends, 1 pair posterior minor bends.

***Phidippus felinus* Edwards, New Species**

Figs. 244-247; Map 15

Holotype (♂), **alloparatype** (♀), and 3 (1♂ 2♀) **paratypes** in FSCA; 1 (♂) **paratype** in NMSU.

Etymology: Latin adjective, *felinus*, cat-like.

Type locality: **USA:** *New Mexico:* Union Co., Amistad, Hwy. 18, milepost 28, on locoweed, 26-IX-1992, M. Pomerinke. Holotype and alloparatype collected together.

Geographic Range and Records: Northern parts of Arizona and New Mexico. **USA:** *Arizona:* Coconino Co.: Flagstaff (3 mi. NW.), 23-VI-1967, 1♀ paratype (R.S. Funk, FSCA); Williams, 29-V-1992, 1♀ paratype (K. Stephan, FSCA); Navajo Co., Adamana, exit 303 on I-40, sweep roadside, 18-VIII-1992 r (1 molt in captivity), 1♂ paratype (D.B. Richman, FSCA); *New Mexico:* Cibole Co., El Malpais Nat. Mon., on *Chrysanthemum*, 25-IX-1991, 1♂ paratype (D.C. Lightfoot, NMSU).

Biology: This species apparently occurs on desert

herbs. It probably matures in autumn, with females living as long as the following summer.

Comments: Only three females and three males are known. This species is a western isolate of the *audax* group.

Diagnosis: This species is very similar in appearance to, although smaller than, *P. princeps*, which has a mostly more eastern and northern distribution. The black and red male looks like *P. princeps*, although the short embolus apical portion is like *P. audax* but broader. The small, brown females are very similar to *P. princeps*, but have more complex spermathecal ducts with distinct duct heads.

Description:

HOLOTYPE MALE: ALE-PME 0.32, PME-PLE 0.56, ALE-PME/ALE-PLE 36%, ALE ROW 1.74, PLE ROW 2.12, CW 2.45, ALE/CW 71%, PLE/CW 86%, CW/CL 78%, CL 3.15, LOQ 1.54, LOQ/CL 49%, CH 1.45, BL 5.85.

MALE: BL 5.93 (6.21) 6.68, CL 3.20 (3.22) 3.24, CW 2.41 (2.43) 2.45.

Carapace: Post-PME tuft about 1.5x width of AME. Clypeus fringe black, band iridescent or absent.

Palp: Dorsal stripe absent. Tibial apophysis small, attenuate distally. Palea about as long as wide, proximal ectal margin extended laterally, ectal border distal to tegular shoulder notched ectal distally. Embolus basal portion an abbreviated semirectangular plate, moderately sclerotized. Embolus apical portion a short, almost flat blade, somewhat abruptly tapering distally, bent laterally from stalk and recurved toward median.

Leg I: Fringes alternating black and white, short to medium in length except femur dorsal and tibia ventral fringes long. Patella prolateral scale cover white proximally. Metatarsus integument entirely dark, without prolateral scales. Tarsus integument pale only on proximal and distal edges.

Abdomen: Scale cover red, on entire dorsum. Venter black.

ALLOPARATYPE FEMALE: ALE-PME 0.36, PME-PLE 0.56, ALE-PME/ALE-PLE 39%, ALE ROW 1.74, PLE ROW 2.20, CW 2.53, ALE/CW 69%, PLE/CW 87%, CW/CL 76%, CL 3.32, LOQ 1.41, LOQ/CL 43%, CH 1.49, BL 7.01.

FEMALE: BL 7.01 (7.82) 8.77, CL 3.28 (3.44) 3.74, CW 2.45 (2.60) 2.82.

Carapace: Tufts about 2x width of AME. OQ scales gray; lateral scale cover gray. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, gradually narrowed. Lateral band II an oblique stripe. Lateral band IV reduced to spot, or absent. Spots I small, oval.

Spots II concave laterally, slightly separated. Spots III and IV small, linear (IV oblique rather than transverse). All spots white. Scale cover tan, on entire dorsum. Venter gray.

Epigynum: Flaps parallel straight posteriorly. Anterior shallowly depressed, septum distinct. Middle depressed laterally, sagittal plane slightly raised, weak sagittal ridge present. Duct heads narrow, 2 pair major bends, 0 pair median minor bends, 3 pair posterior minor bends.

Phidippus workmani

Peckham & Peckham 1901

Figs. C41-42, 248-253; Map 13

Phidippus workmanii Peckham & Peckham 1901:287, 297; holotype (♀) in MCZ, examined

Phidippus workmani: Peckham & Peckham 1909:388, 434; Bonnet 1958:3530; Proszynski 1971b:457, 1976:149; Richman & Cutler 1978:97; Edwards 1982b:33, 1990:98; Mansour et al. 1982:520; Platnick 1993:796, 1997:921

Dendryphantès workmanni (sic): Petrunkevitch 1911: 644

D. workmanii: Roewer 1954:1217

Phidippus n. sp.: Richman & Cutler 1978:97

Phidippus xeros Edwards 1978:77; holotype (♂) in MCZ, examined; NEW SYNONYMY

P. xeros: Richman 1979:125; Brignoli 1983:651

P. xerus (invalid emendation): Richman 1981a:19

Etymology: Patronym for Mr. Workman.

Type locality: "North America" (from the Marx collection) (only data given).

NEW TYPE LOCALITY: USA: Florida: Marion Co., Ocala National Forest, powerline on hwy 40, 0.8 km W. of Central Tower (type locality of *P. xeros*).

Geographic Range and Records: Florida and a few sand dune areas in southern Georgia just north of the St. Mary's River. USA: Florida: Alachua Co.: Hwy. 24 (4 mi. W. of I-75), dead bark, xeric woods, 13-XII-1975, 1♀ (G.B. Edwards, FSCA); 20-VI-1976, 1♂ 1♀ (G.B. Edwards, FSCA); Gainesville: 28-II-1925, 1♀ (OSU); 3-III-1925, 1penult. ♀ (OSU); on okra by xeric woods, 14-VII-1976, 1♂ (G.B. Edwards, FSCA); Highlands Co.: Archbold Biol. Sta., 11-VIII-1991, 2♂ 1♀ (S. Marshall, FSCA); Lake Co.: Lake Mary Estates, VI-1996, 1 penult. ♀ (M.C. Thomas, FSCA); Levy Co.: Archer: (3.8 mi. SW.), 4-V-1988 r, 1♂; (4 mi. SW.), 4-VI-1994 r, 1♂ (both P.E. Skelley, FSCA); Liberty Co., Torreya State Park, 18-VII-1925, 1♀ (SWRS); Marion Co.: Ocala Nat. For. (near Central Tower): sweep woody herbs, 16-VII-1975, 1♂ (G.B. Edwards, FSCA);

sweep *Ceratiola*, 22-III-1977 r, 1♂ 3♀ (Edwards, Hill, Richman, FSCA); sweep woody herbs, 13-V-1977 r, 2♂ 1♀ (Edwards, Hill, Richman, FSCA); sweep young oaks, 1-VII-1977, 1♂ 2♀ (G.B. Edwards, D.B. Richman, FSCA); sweep woody herbs, palmetto, 28-VII-1979, 1♂ 1♀ (G.B. Edwards, FSCA); saw palmetto, 18-VIII-1979, 1♀ w/ yg (G.B. Edwards, FSCA); on *Quercus chapmanii*, 17-IX-1980, 1♀ w/ yg (D.H. Habeck, J. Gillmore, FSCA); sweep shrubs, 16-V-1981 r, 1♂ (G.B. Edwards, FSCA); 6-IV-1994 r, 2♀ (G.B. Edwards, FSCA); Pasco Co., Wasley, *Citrus* sp., 25-IX-1963, 1 juv (FSCA); Putnam Co., Florahome (2.5 mi. NE.), turkey oak, wire grass, 8-IV-1994 r, 1♀ (G.B. Edwards et al., FSCA); Interlachen, sweep *Ceratiola*, 6-IV-1975 r, 1♂ (G.B. Edwards, FSCA); Santa Rosa Co., Eglin AFB, 3-IX-1998, 1♂ (FSCA); *Georgia*: Charlton Co.: Okefenokee Swamp: Camp Cornelia, 16-IX-1978, 1♀ (M.C. Barber, UGA); Floyd's Is., 26-VI-1912, 3♀ 1 juv (AMNH).

Biology: All known specimens of this species have been collected from xeric habitats, either the scrub or sandhill habitats of Florida and southern Georgia. It is an early succession species, occurring on woody herbs and small scrub oaks. Maturation occurs in summer, with females living until autumn.

Comments: Females resemble the western *P. californicus* in size and general appearance. Confusion by earlier authors of the two species (see *P. californicus*) led Edwards (1978) to redescribe the real *P. workmani* as a new species.

Diagnosis: Male resembles a small *P. audax* or *P. regius*, but lacks cheliceral tubercles, and has a palp similar to *P. clarus* (three males from north Florida also had lateral red abdominal stripes like *P. clarus*). Female is only eastern species with unique-shaped spot in middle of ocular quadrangle (some *P. regius* females have a median ocular spot but not of this shape). Both sexes have transverse carapace bands like *P. pulcherri-mus*.

Description:

MALE: BL 5.90 (7.70) 10.20, CL 3.20 (3.62) 4.20, CW 2.60 (2.85) 3.20.

Carapace: Posterior ocular band iridescent. Submarginal band a transverse quadrangular or oval spot behind and below PLE on upper thoracic slope. Clypeus fringe black, band iridescent.

Palp: Dorsal stripe white, on femur and patella. Tibial apophysis triangular, tip attenuate. Palea about as long as wide. Palea proximal ectal margin extended laterally, ectal border distal to tegular shoulder notched ectal distally. Embolus basal portion a broad flat semi-rectangular plate, moderately sclerotized, extending to

ectal edge of palea. Embolus apical portion a short re-curved spike, gradually tapering distally, bent dorsally from slight stalk distal to edge of embolus basal portion.

Leg I: Fringes alternating black and white, short to medium in length except tibia ventral fringe long. Femur prolateral distal band white. Patella prolateral scale cover white proximally or entire length.

Abdomen: Dorsum black with white markings; similar to female but without scale cover. Two males at the northern extreme of the range had red lateral stripes similar to the female pattern. Venter black.

FEMALE: BL 8.60 (10.20) 11.70, CL 3.70 (4.17) 4.60, CW 2.80 (3.22) 3.60.

Carapace: Tufts 1.5x or less width of AME. Median ocular band white, a distinctive median spot. OQ scales sparse, iridescent; lateral scale cover yellow. Submarginal band yellow, usually broad from behind AME to thoracic slope, sometimes meeting posteriorly; rarely as in male. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, gradually narrowed. Lateral band II an oblique stripe. Lateral band IV reduced to spot. Spots I small, oval. Spots II fused into truncated triangle. Spots III small, linear. Spots IV small, oval. All spots white or yellow. Scale cover tan, yellow, orange or red, on lateral edges only. Venter black.

Epigynum: Flaps divergent posteriorly. Anterior shallowly depressed, septum distinct. Middle entirely shallowly depressed, flat without sagittal ridge. Duct heads narrow, 2 pair major bends, 0 pair median minor bends, 3 pair posterior minor bends.

johnsoni group

The seven species of this group have the palea distal ectal margin extended laterally and the palea with distal ectal vertical ridges (*P. morpheus* also has these features but less pronounced). The palea with a lateral crease (except *P. amans*) is a synapomorphy for the group. Except for *P. amans* and *P. lynceus*, the epigynum has a very distinct septum, and in most (*P. lynceus*, and *P. whitmani* to a lesser extent, are exceptions) the flaps diverge posteriorly. While several other species have one or the other of these epigynal characters, very few others have both (*P. tux*, *P. workmani*, and the *tyrannus-ursulus* pair; of these only *P. workmani* is partially similar in details). The *johnsoni-olympus* pair have an enlarged base of the tibial apophysis and more than two pair of major duct bends like the *aureus* clade of the *purpuratus* group.

Phidippus whitmani
Peckham & Peckham 1909
 Figs. C49-51, 254-260; Map 18

Phidippus paludatus C.L.Koch 1846:149; holotype (penultimate ♂) in ZMHB, examined (incorrectly synonymized by Banks (1901) with *P. cardinalis*); NEW SYNONYMY

Phiale modesta C.L.Koch, 1846:195; holotype (♀) in ZMHB, examined (incorrectly synonymized by Banks (1913) with *P. cardinalis*); NEW SYNONYMY

P. paludatus: C.L.Koch 1851:54; Simon 1864:327; Marx 1890:569; Banks 1901:187

P. rufus (not Hentz): Peckham & Peckham 1888:13 (in part, ♂), 1889:10,25,44; 1895:244,247,249; 1901:285

Dendryphantes rufus (not Hentz): Simon 1901:625; Bryant 1908:100

Phidippus whitmanii Peckham & Peckham 1909:383, 386,394; holotype (♂) in MCZ, examined

Dendryphantes whitmanni (sic): Petrunkevitch 1911:644; Elliott 1932:430

Phidippus whitmani: Emerton 1909:224, 1913:156, 1920:336; Comstock 1913:680-2; Barrows 1918:317; Crosby & Bishop 1928:1073; Worley & Pickwell 1931:115,117,121; Kaston 1938:197, 1945:134, 1948:480-1,485-6, 1953:112; Lowrie 1942:168, 1948:338; Bonnet 1958:3529; Warren et al. 1967:389,394; Berry 1970:105; Proszynski 1971b:457, 1976:148-9; Brown 1973:237; Edwards et al. 1974:345; Cutler 1977:40; Richman & Cutler 1978:97; Gertsch 1979:204; Hill 1979a:195,202; Richman 1981a:19; Edwards & Rossman 1981:30; Roach & Edwards 1984:55; Wolff 1984:60; Jackson 1987:2,4; Stietenroth & Horner 1987:241; Edwards 1990:98; Platnick 1993:796, 1997:921

P. whitmanni (sic): Chickering 1933:220, 1944:187-8, 200

P. insolens (not Hentz): Kaston 1938a:196, 1938b:16

Dendryphantes whitmani: Roewer 1954:1217

Etymology: Patronym for Prof. C. O. Whitman, University of Chicago.

Type locality: **USA:** *New York:* (only data given, but presumably Ithaca); the Peckhams (1909) gave several localities for this species, among which the only locality given for New York is Ithaca.

Geographic Range and Records: Eastern half of North America from Nova Scotia to Manitoba south to Florida and Texas. **CANADA:** *Manitoba:* Glenlea (10 mi. S. Winnipeg); *Nova Scotia:* Aldershot, Coldbrook, Kentville; *Ontario:* Chatterton (13 mi. N. Belleville),

Fritzroy, Lemington, Miller (2 mi. E.), Finn Hill, Newmarket; *Quebec:* Gatineau Park, Hull, Montreal; **USA:** *Alabama:* Cleburne, Houston, Lawrence, Pike, Talladega, Tuscaloosa; *Arkansas:* Carroll, Johnson, Newton; *Connecticut:* Fairfield, Hartford, Litchfield, Middlesex, New Haven, Tolland; *Washington, D.C.;* *Delaware:* New Castle; *Florida:* Alachua, Dixie, Leon, Liberty, Suwannee; *Georgia:* Chattooga, Rabun, Upson, White; *Iowa:* Hancock, Woodbury; *Illinois:* Jackson, Mason, Piatt, Union; *Indiana:* Putnam; *Kansas:* Wyandette; *Kentucky:* Rowan; *Louisiana:* West Feliciana; *Massachusetts:* Franklin, Middlesex, Norfolk, Suffolk; *Maryland:* Montgomery, Prince Georges; *Maine:* Hancock; *Michigan:* Allegan, Calhoun, Cheboygan, Clinton, Delta, Jackson, Lake, Lapeer, Livingston, St. Joseph; *Minnesota:* Hennepin, St. Louis, Washington, Winona; *Missouri:* Barry, Boone, Crawford, Johnson, St. Louis; *Mississippi:* Oktibbeha, Rankin, Tishomingo, Wilkinson; *North Dakota:* Divide; *Nebraska:* Jefferson; *New Hampshire:* Belknap, Carroll, Cheshire, Hillsborough, Merrimack?, Sullivan; *New Jersey:* Bergen, Middlesex, Morris; *New York:* Essex, Franklin, Long Island, Nassau, Orange, Otsego, Suffolk, Tompkins; *North Carolina:* Carteret, Durham, Jackson, Madison, McDowell, Orange, Wake; *Ohio:* Adams, Athens, Champaign, Delaware, Franklin, Hocking; *Oklahoma:* Payne, Pushmataha; *Pennsylvania:* Berks, Bradford, Bucks, McKean?, Pike, Schuylkill; *Rhode Island:* Kent; *South Carolina:* Oconee; *Tennessee:* Roane, Sevier; *Texas:* San Jacinto, Travis; *Virginia:* Augusta, Bath, Chesapeake, Fairfax, Giles, Montgomery, Prince Edward, Rockingham, Stafford; *Wisconsin:* Grant, Sauk, Vilas, Waukesha, Waushara, Wood.

Biology: This spring-maturing species is found on hardwood leaf litter and associated small herbs. This is the only species known to be found primarily in this particular microhabitat.

Comments: Banks' description (1913) of the pinned type of *P. paludatus* indicates it to be a specimen of *P. whitmani*. Koch's (1846) color illustration leaves no doubt about this, which I confirmed upon examining the type. The latter name has been used for the species ever since the Peckhams' description (1909). Females are brown dorsally in the northern states, red in the southern states. Northern males have a black band of setae between the AER and the PME with the rest of the OQ covered with red scales, whereas southern males are more completely covered with red scales with only anterior half of distance from PME to AER with black setae.

Diagnosis: Male is only eastern species with short black setae in place of anterior ocular band. Venter of abdomen unique for the genus in having three black stripes enclosing two white stripes, curiously like the dendryphantine genus *Ghelna*. Like most of the species in the latter genus (but unlike other species of *Phidippus*), *P. whitmani* live on hardwood leaf litter in forests. Other species of *Phidippus* with a pair of median pale ventral stripes do not so noticeably have three very dark stripes enclosing them (stripes of other species, when present, are gray).

Description:

MALE: BL 4.09 (6.38) 9.58, CL 3.50 (3.84) 4.30, CW 2.70 (2.99) 3.40.

Carapace: Post-PME tuft about equal to width of AME. Anterior ocular band replaced by dense band of short black setae. OQ scales red; lateral scale cover white. Cheek band absent (or obscured). Marginal band a narrow white line from clypeus to posterior corners of carapace. Clypeus fringe black, band white. Chelicerae usually black (occasionally faintly iridescent blue), completely fringed with white.

Palp: Tibial apophysis stout, triangular, tip bent ventrally. Palea about as long as wide, distal ectal margin extended laterally, ectal border distal to tegular shoulder creased ectally. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a short recurved spike, gradually tapering distally, bent dorsally from slight stalk distal to edge of embolus basal portion.

Leg I: Completely covered with white scales. Fringes all white, short to mostly medium in length except tibia prolateral (partially) and ventral fringes long. Tarsus integument entirely pale.

Abdomen: Scale cover red, on entire dorsum except spots and basal band. Venter black with 2 white stripes medially.

FEMALE: BL 5.18 (8.05) 11.56, CL 3.40 (4.03) 4.80, CW 2.50 (2.95) 3.50.

Carapace: Tufts 1.5x or less width of AME. Anterior ocular band replaced by a dense row of short black setae. OQ scales red or brown (northern half of range); lateral scale cover white. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, gradually narrowed. Lateral band II an oblique stripe. Lateral band IV reduced to spot. Spots III and IV small, oval. All spots white. Scale cover brown or red, on entire dorsum except spots and basal band. Venter black with two white stripes medially.

Epigynum: Flaps parallel straight or slightly di-

verging posteriorly. Anterior shallowly depressed, septum distinct. Middle broadly depressed laterally, sagittal plane narrowly raised, sagittal ridge present. Duct heads narrow, 1 pair major bends, 1 pair median minor bends, 3 pair posterior minor bends.

***Phidippus concinnus* Gertsch 1934**

Figs. 275-280; Map 18

Phidippus concinnus Gertsch 1934:16; holotype (♂) in AMNH, examined

Dendryphantus concinnus: Roewer 1954:1209; Platnick 1993:750

P. concinnus: Bonnet 1958:3519; Proszynski 1971b: 455; Richman & Cutler 1978:96; Platnick 1993: 794

Etymology: Latin adjective, *concinnus*, elegant.

Type locality: USA: Idaho: near Bear Lake, 12-VIII-1931, W. J. Gertsch, hot springs.

Geographic Range and Records: Idaho, California (Sierra Nevada Mountains and San Gabriel Mountains).

USA: California: El Dorado Co., Blodgett Exp. Forest, with *Cinara ponderosa* (aphids), summer-1975, 1♂ (UCB); Los Angeles Co.: San Gabriel Mts.: 4400', Cow Canyon, 31-V-1976, 1♂ (M.K. I., AMNH); Tanbark Flats, 20-VI-1952, 2♂ (W.J. Gertsch, AMNH); Inyo Co., Big Pine (3 mi S., 4 mi. W.), pitfall, 6-X-1985-28-VI-1986, 1♀ (D. Giuliani, CAS); San Bernardino Co.: Mt. Baldy, Manker Flats, 9-VI-1979, 1♂ 1♀ (D.J. Boe, FSCA); Seven Oaks, Mill Creek, 26-VI-1963, 1♂ (D. Miller, CAS); Tulare Co.: Ash Mt. (40 mi. NE. Visalia): 5-VII-1983, 1♂; 14-VIII-1983, 1♀; 28-V-1984, 1♀ (all D. Burdick, Ubick coll.); Kawweek Power Sta. #3, 30-V-1992, 1♀ (D. Burdick, CAS).

Biology: This appears to be a summer-maturing species occurring in coniferous forest at higher elevations. The female taken from a pitfall trap may indicate that this species makes eggsacs under rocks like other high altitude species.

Comments: Only nine males and four females are known. It is similar to *P. tyrrelli*, and may be an ecological replacement of that species in the mountain ranges of the Pacific coast and Sierra Nevadas. The habitus drawing was made from the most northern California male, as the abdomen of the otherwise similar holotype is damaged. The most southern males have white anterior ocular bands like *P. tyrrelli* and the abdominal spots are not coalesced. Females are superficially similar to *P. johnsoni*; specimens from higher altitudes should be examined carefully.

Diagnosis: The male palea has an ectal crease not present in *P. tyrrelli*, and the embolus basal portion is

mostly hidden behind (dorsal to in ventral view) the palea, whereas in *P. tyrrelli*, the embolar base is prominently partially distal to the palea. The spermathecal ducts of the epigynum are similar to those of *P. tyrrelli* in having supernumerary bends, but the ducts of *P. concinnus* are larger. The epigynal flaps of *P. concinnus* are smaller and more angled than the flaps of *P. tyrrelli*. The anterior part of the epigynum is almost unique in being medially raised above the surrounding integument; the only species with a comparable state is the unrelated *P. pruinosus*.

Description:

MALE: BL 6.68 (7.71) 8.35, CL 3.65 (3.92) 4.15, CW 2.91 (3.14) 3.36.

Carapace: Anterior ocular band white (in southern specimens) or absent. Posterior ocular band iridescent. Submarginal band very broad from ALE to thoracic slope. Cheek band white. Marginal band a narrow white line from clypeus to PLE. Clypeus fringe white or yellow, band white. Chelicerae completely fringed with white.

Palp: Dorsal stripe white, on femur, patella, and tibia, and sometimes cymbium. Tibial apophysis very stout; tip broadly attenuate, bent ventrally. Palea about as long as wide, distal ectal margin extended laterally, ectal border distal to tegular shoulder creased ectally. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a short recurved spike, gradually tapering distally, bent dorsally from slight stalk distal to edge of embolus basal portion.

Leg I: Fringes alternating black and white, short to mostly medium in length except femur dorsal and tibia ventral fringes long. Femur prolateral distal band white. Patella and tibia prolateral scale cover white entire length (only dorsal half of tibia).

Abdomen: Scale cover red, on entire dorsum. Venter gray, or pale with black stripe each side.

FEMALE: BL 9.27 (9.94) 10.86, CL 4.48 (4.57) 4.69, CW 3.53 (3.60) 3.74.

Carapace: Tufts about 2x width of AME. Anterior ocular band white, or replaced by a dense row of short black setae (in northern specimens). OQ scales sparse, iridescent; lateral scale cover white. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, gradually narrowed, or not narrowed at ends. Lateral band II an oblique stripe. Lateral band IV an oblique stripe attached to spots III (under scale cover). Spots II fused into truncated triangle, extended posteriorly as forked process. Spots III and IV small, linear. All spots white. Scale cover gray, on entire dorsum. Venter gray.

Epigynum: Flaps divergent posteriorly. Anterior raised medially higher than duct openings, septum distinct. Middle broadly depressed laterally, sagittal plane narrowly raised, sagittal ridge weak. Duct heads narrow, 2 pair major bends, 2 pair median minor bends, 2 pair supernumerary bends, 3 pair posterior minor bends.

Phidippus cryptus Edwards, New Species

Figs. 261-265; Map 18

Holotype (♂), allotype (♀), and 2 (♂) paratypes deposited in FSCA.

Etymology: Latinized Greek adjective, *cryptus*, hidden, an allusion both to its cryptic color and to its similarity to related species.

Type locality: USA: Minnesota: Lake of the Woods Co., Roosevelt, sweeping bluegrass, 27-VI-1970, A. G. Peterson.

Geographic Range and Records: Southern Canada from Ontario to Alberta, and northern U.S. from Michigan to Montana. CANADA: Alberta: Banff, 15-VI-1925, 1♂ 1♀ (O. Bryant, MCZ); Elkivatin (3 mi. S.), rocks on sparsely vegetated ground, 26-V-1977, 2♂ 1♀ (W. Maddison, MCZ); Manitoba: Aweme, 20-30-VIII-1917, 1♀ (CNC); Fort Whyte, pitfall, 11-VI-1980, 1♂ (C.W. Aitchison, CNC); Ontario: Rosport (28.8 mi. W.), under rock, grassy slope, 30-V-1977, 1♂ (W. Maddison, MCZ); Seachmont: 10-VI-1967, 1♀ (L. Smith, CNC); 13-VI-1967, 1♀ (L. Smith, CNC); Vermillion Bay (E. on Hwy. 17), dry leaves on sand with grass, 29-V-1977, 1♂ (W. Maddison, MCZ); Saskatchewan: Clavet, pitfall, cultivated field, 30-VI-1976, 1♂ (J.F. Doane, CNC); Jameson, on *Euphorbia*, 6-VI-1973, 1♀ (M. Maw, CNC); Lady Lake, summer-1963, 1♂ paratype (D.J. Buckle, FSCA); Outlook, dunes above S. Saskatchewan R., 28-V-1983, 1♂ (D.R. Maddison, Maddison coll.); USA: Minnesota: Itasca Co., Grand Rapids (7 mi. S.), emergence traps, white spruce, 25-V-1-VI-1978, 2♂ (B. Cutler, Cutler coll.); Wadena Co., Oylen (1.5 mi. N.), 7-VI-1969, 1♂ paratype (R.L. Huber, FSCA); Montana: Ravalli Co., Carnas Creek, 9-VII-1932, 1♂ (W.L. Jellison, AMNH); North Dakota: Ward Co., Minot (1.5 mi. E.), dry prairie debris, 1-VII-1970, allotype ♀ (P.D. Tobin, K.J. Stone, FSCA).

Biology: This late spring to summer-maturing species appears to occur on the ground and low vegetation in assorted open areas, particularly various types of grasslands.

Comments: Misidentified as *P. princeps* or *P. whitmani* in collections. The range of *P. cryptus* fills in the gap between *P. johnsoni* and *P. whitmani* in the north.

Diagnosis: Similar to *P. whitmani* but brown, lacking any red coloration in either sex, and median black stripe not reduced to two black lines containing spots III and IV. Palea more expanded than in *P. whitmani*, but less than in *P. johnsoni*. Spermathecal ducts broader than in the latter two species.

Description:

HOLOTYPE MALE: ALE-PME 0.40, PME-PLP 0.80, ALE-PME/ALE-PLP 33%, ALE ROW 1.99, PLP ROW 2.62, CW 3.24, ALE/CW 62%, PLP/CW 81%, CW/CL 78%, CL 4.15, LOQ 1.87, LOQ/CL 45%, CH 1.74, BL 8.77.

MALE: BL 6.35 (7.67) 8.77, CL 3.36 (4.01) 4.40, CW 2.57 (3.08) 3.40.

Carapace: Long AER fringe tan. No distinctive markings. Clypeus fringe tan.

Palp: No dorsal stripe. Tibial apophysis very stout, tip bent ventrally. Palea distinctly longer than wide, distal ectal margin extended laterally, ectal border distal to tegular shoulder creased ectally. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a short recurved spike, gradually tapering distally, bent dorsally from slight stalk distal to edge of embolus basal portion.

Leg I: Fringes alternating black and white, short to mostly medium in length. Patella prolateral scale cover white entire length. Metatarsus and tarsus integument entirely dark.

Abdomen: Scale cover tan, on entire dorsum. Venter gray.

ALLOPARATYPE FEMALE: ALE-PME 0.38, PME-PLP 0.84, ALE-PME/ALE-PLP 31%, ALE ROW 2.24, PLP ROW 2.91, CW 3.61, ALE/CW 62%, PLP/CW 80%, CW/CL 79%, CL 4.57, LOQ 2.03, LOQ/CL 45%, CH 1.78, BL 10.02.

FEMALE: BL 7.52 (9.95) 12.69, CL 3.82 (4.42) 4.81, CW 2.91 (3.43) 3.74.

Carapace: Tufts 1.5x or less width of AME. Iridescent OQ scales sparse. Clypeus fringe and band white.

Abdomen: Basal band entirely narrow. Lateral band II an oblique stripe. Lateral band IV an oblique stripe attached to spots III. Spots I small, oval. Spots II outwardly concave, touching. Spots III large, linear. Spots IV small, linear. All spots white. Venter gray.

Epigynum: Flaps divergent posteriorly. Anterior shallowly depressed, septum distinct. Middle broadly depressed laterally, sagittal plane narrowly raised (abbreviated, sloping upward posteriorly), sagittal ridge present (partially, extension of anterior septum). Duct heads narrow, 1 pair major bends, 1 pair median minor bends, 3 pair posterior minor bends.

Phidippus johnsoni
(Peckham & Peckham 1883)

Figs. C52, 266-274; Map 20

Attus johnsonii Peckham & Peckham 1883:22; holotype (♂) and allotype (♀) in MCZ, examined

Phidippus bicolor Keyserling 1885:496 (synonymized by Peckham & Peckham 1909)

P. johnsoni: Peckham & Peckham 1888:20, 1889:17, 1901:285,287, 1909:384,386,387,404; Marx 1890:569; McCook 1890:331, 1894:106; Davidson 1897:169; Banks 1904:357, 1910:64, 1916:71; Coolidge 1907; Emerton 1920:336; Chamberlin 1924:681; Chamberlin & Gertsch 1928:186; Worley & Pickwell 1931:116-7,120; Worley 1932:61; Chamberlin & Ivie 1933:50; Gertsch & Jellison 1939:12; Bryant 1942:704; Levi & Levi 1951:232, 1955:39, 1968:103; Bonnet 1958:3521; Proszynski 1971b:455, 1976:149-50; Kaston 1972:270, 1978:258; Jackson 1974:54-5, 1976a:243-53, 1976b:1-250; 1977a:953-6, 1977b:145-8, 1978a:185-226, 1978b:1-26, 1978c:123-131, 1979:47-57, 1980a:217-238, 1980b:241-248, 1980c:257-262, 1980d:129-132, 1980e:3-4, 1980f:5, 1981a:601-603, 1981b:23, 1982a:187-189, 193-194, 1982b:214-247, 1982c:333-334, 1986a:14, 1986b:1195, 1204, 1987:1-8; Carroll 1977:30-31; Hill 1977a:6, 1979a:195, 202,204,206; Richman & Cutler 1978:96, 1988:77; Jackson & Griswold 1979:59-67; Turner 1979:152-3; Richman 1981a:19; Forster 1982a:179; Edwards 1990:97; Platnick 1993:795, 1997:920

P. arizonensis (not Peckham & Peckham): Banks 1898:279

P. bicolor: Marx 1890:568; Banks 1901b:588, 1901c:188, 1902:217, 1904:357

P. rimator (not Walckenaer): Peckham & Peckham 1901:589

P. formosus (not Peckham & Peckham 1883): Peckham & Peckham 1909:384,386,407; Banks 1910:64; Chamberlin 1921:247, 1924:681; Chamberlin & Gertsch 1928:187; Chamberlin & Woodbury 1929:140; Worley & Pickwell 1931:116-117; Hoffman 1976:66; Jackson & Griswold 1979:60

Dendryphantus formosus: Petrunkevitch 1911:630; Elliott 1932:430; Roewer 1954:1210; Platnick 1993:750

D. johnsoni: Petrunkevitch 1911:633; Merian 1913:31; Moles 1921:44; Roewer 1954:1212; Platnick 1993:751

Etymology: Patronym for Prof. O. B. Johnson of Washington University, Seattle.

Type locality: USA: *Washington Territory:* (only data given).

Geographic Range and Records: Widespread in Western North America from Northwest Territories south to Baja California, east to Saskatchewan, South Dakota, Colorado, and western Arizona. **CANADA:** *Prov.?:* San Rafael River; *Alberta:* 114°9'W 49°48'N, Brocket, Devon, Edmonton, Edmonton (Patricia Ravine), Lake Waterton, Waterton Lakes Nat. Pk.; *British Columbia:* Chase, Commax, Cordova Bay, Duncan's, Edgewood (Arrow Lake Region), Juan Charlotte Island, Kamloops, Kamloops (Lac du Bois), Kasla, Kuskanook, Kyuquot, Kyuquot (Spring Island), Lillooet, Lillooet (Fountain Valley), Nanaimo, Nanoosa Bay, Nitinet (Heather Mt.), Oliver, Oliver (Madden Lake), Pender Harbour, Pender Harbour (S. Powell R.), Queen's Bay, Salmon Arm, Terrace, Tofino, Vancouver, Vernon, Victoria, Victoria (Finleyson Pt.), Wellington, Westbank, *Northwest Territories:* Great Slave Lake; *Saskatchewan:* Rockglen; **MEXICO:** *Baja California Norte:* El Maneadero (12 mi. SE.), La Misido (4 mi. S.), Los Frailes Bay, Punta Banda, San Telmo de Arriba; **USA:** *Arizona:* Cochise, Coconino, Maricopa, Mohave; *California:* Alameda, Alpine, Butte, Calaveras, Contra Costa, Del Norte, El Dorado, Fresno, Humboldt, Inyo, Kern, Lassen, Los Angeles, Marin, Mariposa, Mendocino, Modoc, Mono, Monterey, Napa, Nevada, Orange, Placer, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, San Joaquin, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Tehama, Tulare, Tuolumne, Yolo, Yuba; *Colorado:* Boulder, Denver, Gunnison, Larimer, Mineral, Pitkin, Saguache, San Juan, San Miguel; *Idaho:* Ada, Bear Lake, Franklin, Lewis, Payette, Twin Falls; *Montana:* Carbon, Flathead, Gallatin, Glacier, Granite, Missoula, Ravalli; *Nevada:* Clark, Douglas, Nye, Washoe; *Oregon:* Baker, Benton, Clatsop, Coos, Crook, Deschutes, Douglas, Jackson, Josephine, Klamath, Lake, Lane, Linn, Marion, Multnomah, Union, Wasco, Yamhill; *South Dakota:* Custer, Pennington; *Utah:* Box Elder, Cache, Daggett, Emery, Juab, Millard, Salt Lake, Sevier, Summit, Utah, Wayne, Weber; *Washington:* Chelan, Clallam, Columbia, Grant, Island, King, Kittitas, Mason, Pierce, San Juan, Snohomish, Spokane, Thurston, Whitman; *Wyoming:* Albany, Bighorn, Fremont, Goshen, Lincoln, Teton. Specimens were intercepted in Florida, Indiana, Kansas, and South Carolina. The Cochise County, Arizona, record may be an interception.

Biology: Perhaps the species occurring in the greatest diversity of habitats, *P. johnsoni* has been found from

coastal beaches to alpine meadows, from coastal sage to chaparral to coniferous forest, and from sea level to 12,000' elevation. Most inland collection sites are at moderately high elevation. It is found throughout the year, although there is a peak of males in spring. Egg-sacs are made under rocks and bark of logs.

Comments: *P. formosus* has frequently been used in the medical literature for this species. However, the type locality of *P. formosus* is Iowa, well out of the known range of *P. johnsoni* (see *P. clarus*).

Diagnosis: Both sexes of *P. johnsoni* are most similar to *P. olympus*, but the latter species has a different color pattern and more robust genitalia.

Description:

MALE: BL 6.18 (7.98) 10.69, CL 3.15 (3.98) 5.31, CW 2.32 (3.14) 4.32.

Carapace: Clypeus fringe black, band gray or iridescent.

Palp: No dorsal stripe. Tibial apophysis very stout, with broad tip bent ventrally and somewhat elongated. Palea distinctly longer than wide, distal ectal margin extended laterally, ectal border distal to tegular shoulder creased ectally. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a short recurved spike, gradually tapering distally, bent dorsally from slight stalk distal to proximal edge of embolus basal portion.

Leg I: Fringes alternating black and white, short to mostly medium in length. Femur prolateral proximal and distal bands white. Patella prolateral scale cover white entire length.

Abdomen: Scale cover red, on entire dorsum. Venter black.

FEMALE: BL 9.02 (11.85) 14.20, CL 4.32 (5.02) 5.64, CW 3.49 (4.07) 4.57.

Carapace: Tufts about 2x width of AME. Clypeus fringe black or white, band white or absent.

Abdomen: Basal band wider anteriorly, gradually narrowed, or entirely narrow. Lateral band II an oblique stripe. Lateral band IV an oblique stripe attached to spots III. Spots II concave laterally, slightly separated, or fused into truncated triangle. Spots III and IV small, linear (III sometimes large). All spots white, rarely absent. Scale cover red, on lateral edges only, rarely reduced to posterior margins (some higher altitude specimens). Some Alberta, Canada, specimens have median area posterior to Spots II covered with white. Venter gray.

Epigynum: Flaps divergent posteriorly. Anterior shallowly depressed, septum distinct. Middle broadly depressed laterally, sagittal plane narrowly raised,

sagittal ridge present (extension of septum). Duct heads narrow, 4 pair major bends, 0-1 pair median minor bends, 2-3 pair supernumery bends, 1-2 pair posterior minor bends.

***Phidippus olympus* Edwards, New Species**

Figs. C53-54, 281-286; Map 20

Holotype (♂) in FSCA.

Etymology: Latin proper noun in apposition, *Olympus*, from Greek mythology, home of the gods, an allusion to the high elevation range of this species.

Type locality: USA: *New Mexico*: Catron Co., Negrito (N. of Gila Cliff Dwelling), 8366', under rock, 4-V-1979, D. B. Richman (a penultimate male which matured and died 24-VI-1979 in captivity).

Geographic Range and Records: Southeastern Arizona and western New Mexico. USA: *Arizona*: Apache Co.: Apache National Forest, Winn Campground, 9200', nests under rocks in meadow, 21-VII-1993, 2♀ (W. Maddison, FSCA); junc. National Forest Rds. 117A & 118 (1.3 mi. SE near Iris Springs), 109.50'W 34.13'N, 8400', rocky field with few pines, 20-VII-1993, 2♀ (W. Maddison, FSCA; +1♂ offspring reared from ♀); Coconino Co., Marshall Lake, 7090', sac under rock, 22-X-1995 r, 1♀ (T. Prentice, FSCA); *New Mexico*: Socorro Co., Sevilleta National Wildlife Refuge, Magdalena Mt., 3260m, grass site, VII-IX-1990, 1♀ (UNM).

Biology: Probably this high altitude species (records from 7090-10,000') matures in summer, with females living until autumn. Eggsacs are made under rocks.

Comments: This species probably derived from an eastern isolate of *P. johnsoni*.

Diagnosis: The palp is similar to but more robust than that of *P. johnsoni*. The holotype male has an olive green abdominal dorsum with yellow and orange spots, which is unique in the genus. A reared male has a dull yellow dorsal abdominal color. Females are also similar to *P. johnsoni*, but have a dull yellow scale cover and more robust epigynum, and spots II are not completely fused.

Description:

HOLOTYPE MALE: ALE-PME 0.40, PME-PLP 0.84, ALE-PME/ALE-PLP 32%, ALE ROW 2.24, PLP ROW 2.86, CW 3.65, ALE/CW 61%, PLP/CW 8%, CW/CL 76%, CL 4.81, LOQ 1.99, LOQ/CL 41%, CH 2.28, BL 9.10.

MALE:

Carapace: Post-PME tuft about 2x width of AME. Clypeus fringe tan, band gray.

Palp: Dorsal stripe gray, on femur, patella, and

cymbium. Tibial apophysis very stout, with narrow tip bent ventrally. Palea distinctly longer than wide, distal ectal margin extended laterally, ectal border distal to tegular shoulder creased ectally. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a short recurved spike, gradually tapering distally, bent dorsally from slight stalk distal to edge of embolus basal portion.

Leg I: Fringes alternating black and white, short to mostly medium except tibia ventral fringe long. Femur prolateral proximal and distal bands white. Patella prolateral scale cover white entire length.

Abdomen: Scale cover dull yellow to red, on entire dorsum including spots. Venter black.

FEMALE: BL 9.02 (10.59) 12.36, CL 4.52 (4.87) 5.06, CW 3.44 (4.02) 4.23.

Carapace: Tufts about 2x width of AME. OQ scales yellow; lateral scale cover dull yellow. Clypeus fringe white, band white or yellow with white along ventral edge.

Abdomen: Basal band entirely narrow. Lateral band II an oblique stripe. Lateral band IV an oblique stripe attached to spots III. Spots I small, oval. Spots II outwardly concave, slightly separated or touching. Spots III small, linear. Spots IV small, oval. All spots yellow. Scale cover yellow, on entire dorsum except lateral edges of median black stripe. Venter gray, may have two white stripes medially (with yellow scale cover).

Epigynum: Flaps divergent posteriorly. Anterior shallowly depressed, septum distinct. Middle broadly depressed laterally, sagittal plane narrowly raised, sagittal ridge present (extension of septum). Duct heads narrow, 4 pair major bends, 2 pair median minor bends, 2-3 pair supernumery bends, 3 pair posterior minor bends.

***Phidippus lynceus* Edwards, New Species**

Figs. 287-290; Map 20

Holotype (♂) in AMNH.

Etymology: Latin proper noun in apposition, from mythology, *Lynceus*, an Argonaut famed for his sharp eyesight.

Type locality: USA: *Oregon*: Baker Co., Sagebrush Hills near Baker, 27-VI-1956, J. Baker (♂ holotype). It appears from the way the label was written that Sagebrush Hills refers to a locality, but it may refer to a habitat.

Geographic Range and Records: Northeast Oregon to Nevada. USA: *Nevada*: Nye Co., Carvers (6 mi. N,

15 mi. E), Toquima Range, Charnock Pass, 8300', pitfall, IX-1986-IX-1987, 1♂ (D Giuliani, CAS); *Oregon*: Baker Co., Baker, 7-V-1957, 1♀ (J.H. Baker, AMNH).

Biology: Unknown, possibly a sagebrush-inhabiting species, maturing either spring or summer.

Comments: None of the specimens is in good condition. Therefore, the dorsal pattern descriptions should be regarded as tentative. I have placed the sexes together because what is visible of the color pattern seems to be compatible and the Oregon specimens were collected geographically very close to one another. However, the epigynal flaps do not diverge like other members of the species group, so some doubt remains as to the proper placement of the female.

Diagnosis: The male is very similar in size and appearance to *P. amans* (which occurs in eastern Mexico), but the palea is completely triangular, not truncated laterally, and the embolus apical portion is larger. Externally, the epigynum could easily be mistaken for *P. nikites*, but the spermathecal ducts have a different configuration. Also, the *P. lynceus* female appears to lack the red dorsal carapace present in *P. nikites*.

Description:

HOLOTYPE MALE: ALE-PME 0.32, PME-PLE 0.54, ALE-PME/ALE-PLE 37%, ALE ROW 1.78, PLE ROW 2.12, CW 2.45, ALE/CW 73%, PLE/CW 86%, CW/CL 77%, CL 3.20, LOQ 1.54, LOQ/CL 48%, CH 1.49, BL 6.26.

Carapace: Post-PME tuft about 1.5x width of AME. OQ scales gray. Clypeus fringe black.

Palp: No dorsal stripe. Tibial apophysis small with right-angled front edge; tip narrow, elongate, and bent ventrally. Palea distinctly wider than long, distal ectal margin extended laterally, ectal border distal to tegular shoulder creased ectally. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a short recurved spike, gradually tapering distally, bent dorsally from slight stalk distal to edge of embolus basal portion.

Leg I: Fringes alternating black and white, short to mostly medium in length except femur dorsal and tibia dorsal (partially) and ventral fringes long. Patella prolateral scale cover white entire length. Metatarsus and tarsus integument entirely dark, without prolateral scales.

Abdomen: Scale cover red, on entire dorsum. Venter black.

FEMALE: ALE-PME 0.46, PME-PLE 0.68, ALE-PME/ALE-PLE 40%, ALE ROW 2.08, PLE ROW 2.66, CW 3.03, ALE/CW 68%, PLE/CW 88%, CW/CL 79%, CL 3.82, LOQ 1.78, LOQ/CL 47%, CH

1.87, BL 9.19.

Carapace: Tufts 1.5x or less width of AME. OQ scales gray. Clypeus fringe white, band white.

Abdomen: Basal band wider anteriorly, gradually narrowed. Lateral band II an oblique stripe. Lateral band IV an oblique stripe (uncertain). Spots III and IV small, linear. All spots white. Scale cover yellow, on entire dorsum except spots. Venter black.

Epigynum: Flaps convergent posteriorly. Anterior shallowly depressed (with median lightly pigmented deeper depression). Middle depressed laterally, sagittal plane slightly raised, without sagittal ridge. Duct heads narrow, 2 pair major bends, 2 pair median minor bends, 1 pair supernumerary bends, 5 pair posterior minor bends.

***Phidippus amans* Edwards, New Species**

Figs. 291-294; Map 20

Holotype (♂) in AMNH.

Etymology: Latin participle from verb *amo*, to love; *amans*, affectionate.

Type locality: MEXICO: *Veracruz*: on road from Perote to peak of mountain "Cofre de Perote", 27-V-1984, W.D. Sissom, C.S. Colwell.

Geographic Range and Records: Eastern Mexico. **MEXICO:** *Hidalgo*: Apulco, 6-X-1947, 1♀ (H.M. Wagner, AMNH). Tentatively matched with male. Only two specimens known.

Biology: Unknown; a guess for primary maturation season would be summer.

Comments: The male and female of this species were matched by color pattern, small size, unicolorous tarsi, belonging to the same genitalic group, and geographic proximity. Nevertheless, it is possible that they are mismatched.

Diagnosis: This small species is distinguished primarily by the unique genitalia of both sexes. Unicolorous tarsi are uncommon and probably significant. It is remarkably similar to *P. lynceus* from the northwestern U. S., but differs in genitalic details.

Description:

HOLOTYPE MALE: ALE-PME 0.36, PME-PLE 0.58, ALE-PME/ALE-PLE 38%, ALE ROW 1.58, PLE ROW 2.12, CW 2.28, ALE/CW 69%, PLE/CW 93%, CW/CL 74%, CL 3.07, LOQ 1.33, LOQ/CL 43%, CH 1.54, BL 5.85.

Carapace: Post-PME tuft about 2x width of AME. OQ scales sparse, iridescent; lateral scale cover sparse, white. Clypeus fringe black, band gray.

Palp: Dorsal stripe white, on distal edges of femur and patella. Tibial apophysis small with right-angled

front edge; tip narrow, elongate, and bent ventrally. Palea about as long as wide, distal ectal margin extended laterally, ectal border distal to tegular shoulder slightly notched. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a short recurved spike, gradually tapering distally, bent dorsally from slight stalk distal to edge of embolus basal portion.

Leg I: Fringes alternating black and white, short to mostly medium in length except tibia ventral fringe long. Femur prolateral proximal and distal bands white (both bands sparse). Patella prolateral scale cover white entire length. Metatarsus integument entirely dark, tarsus entirely pale.

Abdomen: Scale cover red, on entire dorsum. Venter gray.

FEMALE: ALE-PME 0.38, PME-PLE 0.64, ALE-PME/ALE-PLE 37%, ALE ROW 1.91, PLE ROW 2.32, CW 2.57, ALE/CW 74%, PLE/CW 90%, CW/CL 73%, CL 3.53, LOQ 1.66, LOQ/CL 47%, CH 1.58, BL 6.68.

Carapace: Tufts about 2x width of AME. Submarginal band narrow from ALE to thoracic slope. Clypeus fringe white.

Abdomen: Basal band entirely narrow. Lateral band II an oblique stripe. Lateral band IV reduced to spot. spots I and II small, oval. Spots III and IV small, linear. All spots red. Scale cover red, on lateral edges only. Venter gray.

Epigynum: Flaps divergent posteriorly. Anterior shallowly depressed. Middle shallowly depressed laterally, sagittal plane broadly raised, convex without sagittal ridge. Duct heads narrow, 2 pair major bends, 1 pair median minor bends, 1 pair supernumerary bends, 3 pair posterior minor bends.

purpuratus group

The main synapomorphy of this group is the very short embolus apical portion. None of the species apparently have lateral bands II, although since all of them have an extensive to complete abdominal dorsal scale cover, it is difficult to be sure of this. Two distinct clades are represented in this group, with a basal species, *P. morpheus*, which is transitional from the *johnsoni* group. There are two basic body types, an all yellow to red dorsum which includes *P. morpheus* and all members of the *aureus* clade except *P. ursulus* (with *P. apacheanus* exhibiting both types of abdominal pattern), or with only a yellow to red abdominal dorsum (*P. purpuratus* may be white or gray as well) which

may be mostly divided by a median black stripe (all the *borealis* clade plus *P. ursulus*). Palea, tibial apophysis, and epigynal states define the two main clades (see Phylogeny section and below).

Phidippus morpheus Edwards, New Species

Figs. 295-299; Map 22

Holotype (♂) deposited in MCZ, alloparatype (♀) and 1 (♀) paratype in FSCA; 1 (♀) paratype in SWRS; 1 (♀) paratype in Johnson coll.

Etymology: Latinized proper noun in apposition from mythology, *Morpheus*, Greek god of dreams.

Type locality: USA: Arizona: Cochise Co., Portal, 15-VII-1974, B. Hölldobler.

Geographic Range and Records: Southern Arizona and New Mexico to northern Mexico. **MEXICO:** Coahuila: Cabos, 21-VIII-1947, 1♀ (W.J. Gertsch, AMNH); USA: Arizona: Cochise Co.: Chiricahua Mts., Upper Cave Creek, 6000-7500', VIII-1969, 1♀ paratype (V. Roth, SWRS); Portal (7 mi. N., San Simon Rd.), 17-VII-1973, alloparatype ♀ (A. Jung, FSCA); Southwestern Research Station, 5400', 1-VIII-1976, 1♀ paratype (S.C. Johnson, Johnson coll.); New Mexico: Doña Ana Co., Box Canyon, 18-VII-1982, 1♀ paratype (G. Forbes, FSCA); Eddy Co., Carlsbad (E. Cicadas), 28-VII-1940, 1♀ (AMNH).

Biology: No habitat data is available for this summer-maturing species, but based on available localities, mixed woodland at moderately high elevation might be a reasonable guess.

Comments: Only the holotype male and six females are known.

Diagnosis: The male looks like a small version of *P. apacheanus*, but the notch suggesting an ectal crease in the palea indicates affinities also to the *johnsoni* group. The small females have a dorsal scale cover which obscures any spot pattern which may be present. The spermathecal ducts have a squared-off major bend, which is uncommon and would help distinguish *P. morpheus* from similar species. This character state also occurs in *P. aureus* and may indicate a relationship between these two species.

Description:

HOLOTYPE MALE: ALE-PME 0.36, PME-PLE 0.70, ALE-PME/ALE-PLE 34%, ALE ROW 2.07, PLE ROW 2.53, CW 2.91, ALE/CW 71%, PLE/CW 87%, CW/CL 81%, CL 3.57, LOQ 1.70, LOQ/CL 48%, CH 1.83, BL 7.10.

Carapace: Post-PME tuft about 1.5x width of AME. Anterior ocular band replaced by dense band of short black setae. OQ scales orange (with sparse irides-

cent scales along anterior edge of orange scales). Clypeus fringe white, band iridescent.

Palp: Dorsal stripe iridescent, on femur and patella (sparse). Tibial apophysis small; tip broadly attenuate, bent ventrally. Palea about as long as wide, distal ectal margin extended laterally, ectal border distal to tegular shoulder slightly notched. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a short recurved blade, abruptly tapering distally, bent dorsally from slight stalk distal to edge of embolus basal portion.

Leg I: Fringes alternating black and white, short to medium in length except femur dorsal and retroventrolateral and tibia prolateral and ventral fringes long. Patella prolateral scale cover white entire length. Tibia prolateral scale cover white proximally.

Abdomen: Scale cover orange on entire dorsum. Venter gray.

ALLOPARATYPE FEMALE: ALE-PME 0.44, PME-PLE 0.80, ALE-PME/ALE-PLE 35%, ALE ROW 2.32, PLE ROW 2.99, CW 3.28, ALE/CW 71%, PLE/CW 81%, CW/CL 91%, CL 4.07, LOQ 1.91, LOQ/CL 47%, CH 2.12, BL 8.85.

FEMALE: BL 7.68 (8.80) 9.60, CL 3.57 (3.87) 4.07, CW 2.86 (3.15) 3.32.

Carapace: Tufts about 2x width of AME. Anterior ocular band iridescent. OQ scales yellow or orange; lateral scale cover gray. Clypeus fringe white, band iridescent or absent.

Abdomen: Basal band entirely narrow or absent. Scale cover gray, yellow, or orange, on entire dorsum. Venter black.

Epigynum: Flaps slightly divergent or parallel straight posteriorly. Anterior shallowly depressed. Middle broadly depressed laterally, sagittal plane slightly raised, slightly convex, weak sagittal ridge present. Duct heads narrow, 1 pair major bends, 0 pair median minor bends, 3-4 pair posterior minor bends.

***aureus* clade**

The five species of this group have the palea extended and notched laterally but not squared off distally as in most of the *borealis* clade. The epigynal pocket is very deep and broad (except *P. aureus*). This group is almost unique in having more than two major bends in the epigynal ducts (again with the exception of *P. aureus*). The *johnsoni-olympus* pair has this character state (and also has a similar tibial apophysis). While *P. ursulus* is distinctive in appearance, the other species in this group are very similar, although *P. aureus* is yellow instead of red dorsally.

Except for *P. aureus* and most *P. ursulus*, the tibial apophysis is bifurcate at the tip. The anterior and middle parts of the epigynum are shallowly depressed, except the *tyrannus-ursulus* pair which have the anterior part deeply depressed.

***Phidippus aureus* Edwards, New Species**

Figs. 300-304; Map 21

Holotype (♂), allotype (♀), 7 (3♂ 4♀) topoparatypes in FSCA; 31 (2♂ 29♀) topoparatypes in Icenogle coll., 10 (1♂ 9♀) topoparatypes in Johnson coll.

Etymology: Latin adjective, *aureus*, golden, an allusion to the color of this species.

Type locality: USA: California: San Bernardino Co., vic. Apple Valley, Victorville (11 mi. E.), E. end of Yucca Loma Rd., near base of Granite Mountains, 3000', beat creosote bush (*Larrea* sp.), 22-VII-1979, W. Icenogle.

Geographic Range and Records: Central California. USA: California: Inyo Co., Death Valley (8 mi. W. Shoshone), 3000', creosote upper stems, 29-IX-1981, 1♀ (W. Icenogle, Icenogle coll.); San Bernardino Co.: Victorville (11 mi. E.), junc. Yucca Loma Rd. & Milpas Dr., 3000', creosote upper stems (all paratypes): 18-IX-1977, 3♀ w/yg; 25-IX-1977, 9♀ w/yg; 2-X-1977, 2♀ w/yg; 18-VI-1978, 1♀ (all W. Icenogle, Icenogle coll.); 19-VIII-1978, 1♂ 9♀ (S.C. Johnson, Johnson coll.); 19-VIII-1978, 2♀ w/yg (W. Icenogle, S. Johnson, Icenogle coll.); 27-VIII-1978, 6♀ w/yg; 8-VIII-1982, 1♂ 1♀; 8-VIII-1982, 1♂ 5♀ (all W. Icenogle, Icenogle coll.); 18-IX-1977, allotype ♀ w/yg (W. Icenogle, FSCA); 2-VIII-1982, 3♂ 2♀ (W. Icenogle, FSCA); creosote bushes, 18-VIII-1979, 2♀ (W. Icenogle, FSCA).

Biology: This species occurs on creosote (where it also places its eggsacs) at moderate elevation. It matures in summer with females living to autumn.

Comments: This is the only consistently yellow species (males and some females of *P. adumbratus* are orange) in California. Possibly *P. nikites* may be yellow on occasion as an adult.

Diagnosis: The combination of yellow color (with a pair of posterior black stripes in females), short broad embolus apical portion, and small epigynal flaps distinguish this species. Females are like *P. morpheus* in having a squared-off major bend in the spermathecal ducts.

Description:

HOLOTYPE MALE: ALE-PME 0.40, PME-PLE 0.92, ALE-PME/ALE-PLE 30%, ALE ROW 2.32, PLE ROW 3.15, CW 3.57, ALE/CW 65%, PLE/CW

88%, CW/CL 83%, CL 4.32, LOQ 1.95, LOQ/CL 45%, CH 2.20, BL 9.02.

MALE: BL 8.18 (8.61) 9.02, CL 4.11 (4.24) 4.32, CW 3.40 (3.52) 3.65.

Carapace: Post-PME tuft about equal to AME width. Anterior ocular band replaced by dense band of short black setae. OQ scales yellow; lateral upper sides and thoracic slope covered with yellow scales like OQ. Clypeus fringe black.

Palp: Dorsal stripe white, on femur, patella, tibia, and cymbium. Tibial apophysis very stout, with a broad, elongated, abruptly attenuate tip. Palea distinctly longer than wide, distal margin extended distally into "neck," ectal border distal to tegular shoulder notched. Embolus basal portion a moderately sclerotized abbreviated loop around a membranous area. Embolus apical portion a short recurved blade, abruptly tapering distally, attached subdistally on dorsal surface of embolus basal portion.

Leg I: Fringes alternating black and white, short to medium in length. Femur prolateral distal band white. Patella prolateral scale cover white entire length. Tibia prolateral scale cover white proximally.

Abdomen: Scale cover yellow on entire dorsum. Venter gray.

ALLOPARATYPE FEMALE: ALE-PME 0.46, PME-PL 1.00, ALE-PME/ALE-PL 32%, ALE ROW 2.45, PLE ROW 3.20, CW 3.61, ALE/CW 68%, PLE/CW 89%, CW/CL 84%, CL 4.27, LOQ 2.12, LOQ/CL 50%, CH 2.41, BL 9.35.

FEMALE: BL 8.02 (10.40) 11.69, CL 4.23 (4.32) 4.40, CW 3.36 (3.55) 3.65.

Carapace: Tufts about 2x width of AME. OQ scales yellow; lateral scale cover white. Clypeus fringe white, band white.

Abdomen: Basal band entirely narrow. Spots II concave laterally, slightly separated, or fused into truncated triangle. Spots III and IV small, linear. All spots white. Median dorsal black stripe reduced to two black parallel lines which include spots III and IV. Scale cover yellow, on entire dorsum except two black stripes, spots, and basal band. Venter gray with two white stripes medially.

Epigynum: Flaps parallel straight to divergent posteriorly. Anterior shallowly depressed. Middle entirely shallowly depressed, slight partial sagittal ridge present. Duct heads narrow, 2 pair major bends, 0 pair median minor bends, 2 pair posterior minor bends.

Phidippus nikites Chamberlin & Ivie 1935

Figs. 305-308; Map 19

Phidippus nikites Chamberlin & Ivie 1935:41; holotype (♂) in AMNH, examined

Dendryphantès nikites: Roewer 1954:1213; Platnick 1993:751

P. apacheanus: Gardner 1965:133 (misidentification)

P. nikites: Bonnet 1958:3524; Proszynski 1971b:456, 1976:149-50; Richman & Cutler 1978:96; Platnick 1993:795, 1997:920

Etymology: Greek noun in apposition, *nikites* (correct spelling, according to H. D. Cameron, should be *niketes*), victor (play on words alluding to the type locality).

Type locality: USA: California: Victorville (12 mi. E.), in webs on creosote bushes, 28-VIII-1932, E. C. Jaeger. Note: this is essentially the same type locality as for *P. aureus*.

Geographic Range and Records: Idaho and west coast states from Oregon south to Baja California. **MEXICO:** Baja California Norte: Sta. Ives (24 mi. S.); **USA:** California: Alameda, Los Angeles, Monterey, Orange, Riverside, San Bernardino, San Diego, San Mateo; **Idaho:** Cassia, Elmore, Payette; **Nevada:** Washoe; **Oregon:** Harney, Union.

Biology: *P. nikites* is found on creosote, desert shrubs and grassland, and on coastal dunes. It is found throughout the year, although most males are found in autumn.

Comments: Unlike its close relative, *P. apacheanus*, which stays the same color (usually red, sometimes yellow) throughout its life cycle, younger instars of *P. nikites* are yellow, older instars are orange, and adults are red (I have seen yellow adults in the Gardner material, but this may have been an artifact of preservation). This color change is also typical for the distantly related *P. cardinalis*, and probably is evolutionarily related to their ecology.

Diagnosis: Male palpal tegulum more robust than in *P. apacheanus*. Unlike the latter species, the epigynal flaps distinctly converge posteriorly, and the ducts are more robust.

Description:

MALE: BL 8.18 (10.12) 11.52, CL 4.36 (4.99) 5.56, CW 3.36 (3.95) 4.27.

Carapace: Post-PME tuft about 2x width of AME. OQ scales red. Clypeus fringe black, band iridescent.

Palp: No dorsal stripe. Tibial apophysis very stout; tip broad, bifurcate with converging pointed tips. Palea distinctly longer than wide, distal margin extended distally into "neck," ectal border distal to tegular shoulder notched. Embolus basal portion a moderately

sclerotized abbreviated loop around a membranous area. Embolus apical portion a short recurved blade, abruptly tapering distally, attached subdistally on dorsal surface of embolus basal portion.

Leg I: Fringes alternating black and white, short to medium in length except tibia ventral fringe long. Patella prolateral scale cover white proximally.

Abdomen: Scale cover red or yellow (rarely) on entire dorsum. Venter black.

FEMALE: BL 9.44 (11.46) 12.94, CL 4.23 (5.36) 5.98, CW 3.32 (4.32) 4.81.

Carapace: Tufts about 2x width of AME. OQ scales red. Clypeus fringe white, band white or tan.

Abdomen: Spots III and IV large, linear, or absent. Scale cover red on entire dorsum. Venter black.

Epigynum: Flaps convergent posteriorly. Anterior shallowly depressed. Middle entirely shallowly depressed, slightly convex medially, may have sagittal ridge. Duct heads narrow, 5 pair major bends, 2 pair median minor bends, 1-2 pair supernumerary bends, 3 pair posterior minor bends.

Phidippus apacheanus

Chamberlin & Gertsch 1929

Figs. C55-56, 309-313; Map 19

P. insolens (not Hentz): Peckham & Peckham 1901: 285-286, 1909:383,386,400 (in part ♀); Proszynski 1971b:455; Platnick, 1993:795, 1997:920

Phidippus bardus Peckham & Peckham 1901:288,290; holotype (♀) in MCZ, examined (incorrectly synonymized with *P. insolens* by Peckham & Peckham 1909); NEW SYNONYMY

Dendryphantas insolens: Simon 1901:625; Roewer, 1954:1211; Platnick 1993:751

Phidippus ferrugineous Scheffer 1904:258; holotype (♀) in MCZ, examined (incorrectly synonymized with *P. insolens* by Peckham & Peckham 1909); NEW SYNONYMY

P. ferrugineous: Scheffer 1905a:99, 1905b:186

Phidippus apacheanus Chamberlin & Gertsch 1929: 109; holotype (♂) in AMNH, examined

P. nikites: Muma & Muma 1949:490,501 (misidentification)

Dendryphantas apacheanus: Roewer 1954:1206; Platnick 1993:749

P. apacheanus: Levi & Field 1954:464; Bonnet 1958: 3512; Levi & Levi 1968:103; Proszynski 1971b: 454, 1976:149-50; Jung & Roth 1974:33; Richman & Roth 1976:201; Edwards 1977:21, 1982b:33-4, 1984:46-8, 1990:96,98; Cutler 1977:40; Richman & Cutler 1978:95; Edwards & Hill 1978:116; Kas-

ton 1972:269, 1978:257; Gertsch 1979:plate 27; Hill 1979a: 195,202; Cokendolpher & Bryce 1980: 16; Richman 1981a:19; Edwards & Rossman 1981: 29; Roach & Edwards 1984:54; Wolff 1984: 60; Young & Edwards 1990:22; Edwards & Jackson 1993:712-4

P. cardinalis: Richman 1965:133 (misidentification)

P. paludatus: Kaston 1972:269 (incorrect synonymy); see *P. whitmani*

Etymology: Latinized adjective, meaning "of the Apache".

Type locality: USA: Utah: Tooele Co., Black Rock, 10-XI-1928, A. M. Woodbury.

Geographic Range and Records: Widespread in most of U.S., except Pacific states and New England, to Cuba and northern Mexico. **CUBA:** *La Habana:* Havana; **MEXICO:** *Durango:* Tlahualilo; *Sonora:* Nogales, Sierra San Jose; **USA:** *Alabama:* Barbour, Jefferson, Mobile, Shelby, Sumter; *Arkansas:* Randolph, Washington; *Arizona:* Cochise, Greenlee, Maricopa, Pima, Santa Cruz, Yavapai, Yuma; *California:* Placer (Lake Tahoe); *Colorado:* Arapahae, Boulder, Conejos? (Osler), Denver, Douglas, El Paso, LaPlata, Larimer, Mesa, Otero, Weld; *Washington, D.C.:* Florida: Alachua, Columbia, Duval, Gilchrist, Jefferson, Leon, Levy, Liberty, Marion, Okaloosa, Putnam, Walton; *Georgia:* Baker, Barrow or Butts (Thompsons Mill), DeKalb, Decatur, Dooley, Houston, Liberty, Macon, Mitchell, Screven, Ware; *Idaho:* Oneida; *Kansas:* Barber, Cowley, Dickinson, Douglas, Riley, Rooks, Wallace; *Louisiana:* East Baton Rouge; *Massachusetts:* (no locality); *Minnesota:* Wabasha; *Missouri:* Iron, McDonald; *Mississippi:* Forrest, Lincoln or Neshoba (Bogue Chitto); *Montana:* Cascade, Custer; *Nebraska:* Cheyenne, Jefferson, Thomas; *New Mexico:* Bernalillo, Curry, Doña Ana, Hidalgo, Lea, Luna, Otero, Roosevelt, Taos, Torrance; *Nevada:* Nye; *New York:* Long Island; *North Carolina:* Moore; *Oklahoma:* Alfalfa, Cimarron, Cleveland, Coal, Comanche, Cotton, Greer, Jackson, Kingfisher, Payne, Rogers, Wagoner; *South Carolina:* Aiken, Florence, Horry; *Texas:* Bexar, Brazos, Clay, Coryell, Crockett, Dallas, Erath, Floyd, Frio, Gaines, Gregg, Lubbock, Montague, Potter, Randall, San Jacinto, Smith, Sutton, Tarrant, Taylor, Travis, Uvalde, Wichita; *Utah:* Box Elder, Cache, Carbon, Duchesne, Emery, Juab, Millard, Salt Lake, Sanpete, Sevier, Tooele, Utah, Wasatch, Weber; *Wisconsin:* Dane, Iowa, Sauk; *Wyoming:* Platte.

Biology: This species prefers desert grassland and xeric fields, where it is found on shrubs, woody perennial herbs, and cactus. It is found from sea level up to 6000' elevation. Records occur throughout the year;

most male records are from autumn. Eggsacs have been found under bark of oak logs.

Comments: The Peckhams (1909) incorrectly synonymized *P. bardus* and *P. ferrugineous* with *P. insolens* (Hentz). They mistakenly matched a female of *P. apacheanus* with a male of *P. insolens* (= *P. princeps*). This confusion resulted in a redescription of the species by Chamberlin & Gertsch (1929) as *P. apacheanus*, by which name it has been known since. The lone exception was Kaston (1972) who used *P. paludatus* C.L.Koch, but later recognized and corrected his error (Kaston 1978). *Phidippus insolens* is a senior synonym of *P. princeps*, therefore the names *P. bardus* and *P. ferrugineous* must be resurrected. As with *P. princeps*, *P. apacheanus* has been used a sufficient number of times by enough different authors in the last 50 years to satisfy Article 23.9.1.2 of the Code, but since it has unused senior synonyms described later than 1899, a petition will be submitted to the Commission to suppress those senior synonyms.

Diagnosis: Males of *P. apacheanus* have a smaller tegulum than *P. nikitae*, a smaller palea than *P. tyrannus*, and red scales on the OQ which is lacking in *P. ursulus*. Females of *P. apacheanus* have epigynal flaps more or less parallel posteriorly, unlike *P. nikitae* where the flaps distinctly converge posteriorly, and the flaps are not completely depressed below the secondary rim as in *P. tyrannus* or *P. ursulus*.

Description:

MALE: BL 5.18 (7.25) 10.63, CL 3.80 (4.26) 5.00, CW 2.80 (3.22) 3.90.

Carapace: Post-PME tuft about 1.5x width of AME. OQ scales yellow to red (usually). Clypeus fringe black.

Palp: No dorsal stripe. Tibial apophysis very stout, broad and bifurcate distally, with diverging pointed tips. Palea distinctly longer than wide, distal margin extended distally into "neck," ectal border distal to tegular shoulder notched. Embolus basal portion a moderately sclerotized abbreviated loop around a membranous area. Embolus apical portion a short recurved blade, abruptly tapering distally, attached subdistally on dorsal surface of embolus basal portion.

Leg I: Fringes alternating black and white, short to medium in length. Patella prolateral scale cover white proximally or entire length. Metatarsi and tarsi with white or yellow scales on proximal half.

Abdomen: Scale cover red or yellow on entire dorsum. Venter black, gray, or pale.

FEMALE: BL 7.08 (10.69) 13.35, CL 5.70 (5.82) 5.90, CW 4.40 (4.46) 4.50.

Carapace: Tufts about 2x width of AME. OQ scales yellow to red. Clypeus fringe black.

Abdomen: Basal band wider anteriorly, gradually narrowed, or absent. Spots III and IV small, linear. All spots white, yellow, or red. Scale cover yellow, orange, or red, on entire dorsum except sometimes posterior half of median black stripe and basal band. Venter black.

Epigynum: Flaps parallel straight to slightly convergent posteriorly. Anterior shallowly depressed. Middle entirely shallowly depressed, concave without sagittal ridge. Duct heads narrow, 5 pair major bends, 0 pair median minor bends, 1 pair supernumerary bends, 0 pair posterior minor bends.

***Phidippus tyrannus* Edwards, New Species**

Figs. 314-317; Map 21

Holotype (♂) and allotype (♀) in FSCA.

Etymology: Latin noun in apposition, *tyrannus*, tyrant, despot.

Type locality: USA: Arizona: Cochise Co., Skeleton Canyon, 4-X-1958, P. Weems.

Geographic Range and Records: Texas to southeast Arizona south to central Mexico. **MEXICO:** *Aguascalientes:* Aguascalientes, 30-VI-1953, 1♀ (P. & C. Vaurie, AMNH); *Chihuahua:* Primavera, 1-VII-1967, 1♀ (W.J.Gertsch, AMNH); **USA:** *New Mexico:* Bernalillo Co., 23-IX-1949, 1♂ (C.C.Hoff, AMNH); Hidalgo Co., Hwy. 338 at milepost 33, mesquite, snakeweed, 22-VIII-1992 r, 1♀ (G.B. Edwards, D.B. Richman, FSCA); Roosevelt Co., Melrose (9 mi. W.), dead *Opuntia*, 7-VI-1985, allotype ♀ (J. Hurley, FSCA); Tarrant Co., McIntosh, 1♂ (C.C. Hoff, AMNH); *Texas:* Culberson Co., Kent (17.5 mi. N.), 3500', 2-VI-1978, 1♀ (Francke, Moody, and Hall, FSCA); Floyd Co., Montgomery Ranch, 14-X-1979, 1♂ (D. Myers, T. Parker, J. Wangberg, TMM).

Biology: This species has been taken from mixed mesquite and snakeweed, and on cactus, at moderate elevation. It appears to mature in autumn with females living as long as the following summer.

Comments: Four males and five females are known, mostly from pitfall traps.

Diagnosis: Males are red dorsally and look like large *P. apacheanus*, but can be distinguished by the extremely large palea. Females are large, brown, and when preserved superficially look like unmarked *P. georgii*. The epigynum clearly relates this species to *P. ursulus*, which also has the small flaps distinctly depressed below the secondary rim and a long, narrow

septum, but a different color pattern. Also, both *P. tyrannus* and *P. ursulus* have laterally convex endites which have inward-pointing cusps, unlike other species (see *P. ursulus*).

Description:

HOLOTYPE MALE: ALE-PME 0.52, PME-PLE 1.04, ALE-PME/ALE-PLE 33%, ALE ROW 2.45, PLE ROW 3.11, CW 4.65, ALE/CW 53%, PLE/CW 67%, CW/CL 84%, CL 5.56, LOQ 2.32, LOQ/CL 42%, CH 2.66, BL 11.69.

MALE: BL 10.02 (11.58) 13.03, CL 4.81 (5.53) 6.23, CW 3.78 (4.47) 4.98.

Carapace: Post-PME tuft about 2x width of AME. OQ scales red. Clypeus fringe black, band iridescent.

Palp: Dorsal stripe white, on femur and patella (sparse). Tibial apophysis very stout, broad and bifurcate distally, with diverging pointed tips. Palea distinctly much longer than wide, distal margin extended distally into "neck" (but not narrowed). Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a triangular or conical button, abruptly tapering distally, attached subdistally on dorsal surface of embolus basal portion and pointed dorsally.

Leg I: Fringes alternating black and white, short to mostly medium in length. Patella prolateral scale cover white proximally.

Abdomen: Scale cover red or yellow (rarely) on entire dorsum. Venter black.

ALLOPARATYPE FEMALE: ALE-PME 0.50, PME-PLE 1.20, ALE-PME/ALE-PLE 29%, ALE ROW 2.70, PLE ROW 3.65, CW 5.06, ALE/CW 53%, PLE/CW 72%, CW/CL 78%, CL 6.10, LOQ 2.57, LOQ/CL 42%, CH 2.91, BL 14.28.

FEMALE: BL 11.02 (13.17) 15.70, CL 5.48 (6.08) 6.47, CW 4.23 (4.76) 5.06.

Carapace: Tufts about 2x width of AME. OQ scales gray; lateral scale cover gray. Clypeus fringe white, band white or gray.

Abdomen: Scale cover tan on entire dorsum, or if absent, a dense cover of short, black setae present. Venter black.

Epigynum: Flaps divergent posteriorly. Anterior deeply depressed below secondary rim, septum distinct. Middle entirely shallowly depressed, sagittal ridge present as extension of septum. Duct heads narrow, 3 pair major bends immediately after duct heads (middle one a complete loop), 1 pair median minor bends, 3 pair posterior minor bends (middle one a complete loop).

***Phidippus ursulus* Edwards, New Species**

Figs. 318-322; Map 21

Holotype (♂), allotype (♀), and 30 (13♂ 17♀) topoparatypes in FSCA.

Etymology: Latin noun in apposition, diminutive of *ursus*, bear, i.e., little bear.

Type Locality: USA: *New Mexico:* Otero Co., Sacramento Mts., 7000', James Canyon Campground (2 mi. W. Mayhill), in silken sac on composite, 4-7-IX-1989, D. B. Richman.

Geographic Range and Records: New Mexico. USA: *New Mexico:* type locality: 15-VIII-1983 r, 3♀ paratypes (D.B. Richman, FSCA); on grass, 4-7-IX-1989 r, 2♂ 3♀ paratypes (D.B. Richman, FSCA); 6-IX-1990 r, 2♂ 2♀ paratypes (D.B. Richman, FSCA); 2-IX-1991 r, allotype ♀ 4♂ 1♀ paratypes (J.C. Cokendolpher, FSCA); sweep annuals, 26-VIII-1992 r, 5♂ 8♀ paratypes (G.B. Edwards, D.B. Richman, FSCA); Union Co.: Branson-Folsom Hwy (3 mi. N. Hwy 551), 7000', 10-VIII-1979 r, 1♂ (D.B. Richman, FSCA); Snyder Ranch, 6-VIII-1980 r, 1♀ (D.B. Richman, FSCA).

Biology: This autumn-maturing species was abundant in an old field habitat as subadults; all records are from about 7000' elevation.

Comments: So far only known from the type locality, and two records from Union Co., New Mexico.

Diagnosis: Although one of many mostly black species with red abdomens, the red of this species tends to be very dark, in some females so dark as to be barely noticeable. The palp is similar to *P. apacheanus*, but the palea is notched once or twice ectally. The epigynum is a smaller, reduced version of that found in *P. tyrannus*.

Description:

HOLOTYPE MALE: ALE-PME 0.38, PME-PLE 0.70, ALE-PME/ALE-PLE 35%, ALE ROW 1.83, PLE ROW 2.32, CW 2.91, ALE/CW 63%, PLE/CW 80%, CW/CL 75%, CL 3.86, LOQ 1.66, LOQ/CL 43%, CH 1.83, BL 8.18.

MALE: BL 6.68 (7.95) 8.85, CL 3.07 (3.97) 4.48, CW 2.24 (3.07) 3.49.

Carapace: Post-PME tuft about equal in width to AME. Clypeus fringe black.

Palp: No dorsal stripe. Tibial apophysis very stout, tip broad, distal shape as if bifurcate but proximal point usually missing. Palea distinctly longer than wide distal margin extended distally into "neck," ectal border distal to tegular shoulder notched. Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical

portion a short recurved blade, abruptly tapering distally, attached subdistally on dorsal surface of embolus basal portion.

Leg I: Fringes alternating black and white, short to medium in length except tibia ventral fringe mixed medium and long. Femur prolateral distal band white. Patella prolateral scale cover white entire length.

Abdomen: Scale cover red on entire dorsum. Venter black.

ALLOPARATYPE FEMALE: ALE-PME 0.48, PME-PL 0.92, ALE-PME/ALE-PL 34%, ALE ROW 2.16, PL ROW 2.82, CW 3.82, ALE/CW 57%, PL/CW 74%, CW/CL 80%, CL 4.77, LOQ 1.99, LOQ/CL 42%, CH 2.24, BL 12.00.

FEMALE: BL 7.52 (10.55) 13.78, CL 3.86 (4.38) 5.60, CW 2.95 (3.39) 4.52.

Carapace: Tufts about 2x width of AME. Clypeus fringe black.

Abdomen: Scale cover dark red on entire dorsum except median black stripe. Venter black.

Epigynum: Flaps divergent posteriorly. Anterior entirely deeply depressed below secondary rim, septum distinct. Middle entirely shallowly depressed, sagittal ridge present as extension of septum. Duct heads narrow, 3 pair major bends, 1 pair median minor bends, 2 pair posterior minor bends.

borealis clade

There are four species in this group, three of which are very closely related, and a fourth (*P. borealis*) which has several autapomorphies. Among the character states which unite the group are the deeply depressed epigynal middle (which in *P. borealis* may be shallowly depressed like *P. morpheus* and the members of the *aureus* clade) and the large, simple tibial apophysis, unique for this section of the genus. The endite cusp set slightly inward from the extreme anterolateral corner is unique to *P. ardens*, *P. purpuratus*, and *P. texanus*, as is the squared-off distal edge of the palea. These three species might constitute one widespread variable species. However, their ranges are essentially parapatric with little evidence of hybridization and I can diagnose them, so I consider them three species.

***Phidippus ardens* Peckham & Peckham 1901**

Figs. C60, 323-327; Map 23

Phidippus ardens Peckham & Peckham 1901:286,288; holotype (♀) in MCZ, examined

P. ardens: Scheffer 1905c:185; Peckham & Peckham 1909:384,386,406 (in part); Banks 1910:63; Cockerell 1911:256; Barrows 1924:314; Worley &

Pickwell 1931:116-8; Banks et al. 1932:18; Bonnet 1958:3513; Proszynski 1971b:454; Jung & Roth 1974:33; Hoffman 1976:66; Richman & Cutler 1978:95, 1988:76; Jackson 1982a:192-4, 1986b:1195; Platnick 1993:793

Dendryphantes ardens: Petrunkevitch 1911:622; Roewer 1954:1201; Platnick 1993:749

Etymology: Latin participle from verb *ardeo*, to burn, glow, gleam; *ardens*, glowing, gleaming (probably alluding to the bright red abdominal dorsum).

Type locality: USA: *New Mexico*: Santa Fe (only data given).

Geographic Range and Records: Widespread in Western North America from the west edge of the Great Plains to Washington, south to northwestern Mexico.

MEXICO: *Chihuahua*: La Saucerda (1 mi. E.); *Durango*: Durango (10 mi. W.); *Sonora*: Sierra Magallanes; **USA:** *Arizona*: Cochise, Coconino, Graham, Maricopa, Navajo, Pima, Pinal, Santa Cruz, Yavapai; *California*: Inyo, Riverside, San Diego; *Colorado*: Baca, Boulder, El Paso, Garfield; *Idaho*: Bonneville; *Kansas*: Barton, Cheyenne, Kearney, Scott, Wallace; *New Mexico*: Colfax, Curry, Doña Ana, Grant, Hidalgo, Lea, Lincoln, McKinley, Roosevelt, Santa Fe, Union; *Nevada*: Clark, Nye; *Oklahoma*: Cimarron; *Utah*: Salt Lake, Washington; *Washington*: Klickitat.

Biology: Found on shrubs, mesquite, creosote, and grassland, from 1500-8200' elevation. Found in all seasons, but males from spring to summer.

Comments: The width of the extended part of the palea can vary considerably.

Diagnosis: The male can be distinguished from *P. purpuratus* by having two notches on the ectal edge of the palea, and from *P. texanus* by the shorter palea. Females can be distinguished reliably from the latter two species only by color pattern.

Description:

MALE: BL 8.35 (10.22) 12.69, CL 4.15 (5.08) 6.47, CW 3.32 (4.22) 5.31.

Carapace: Post-PME tuft about 2x width of AME. OQ scales sparse, iridescent. Clypeus fringe black, band gray.

Palp: No dorsal stripe. Tibial apophysis narrow elongate triangular, tip hooked ventrally. Palea distinctly longer than wide distal margin extended distally into "neck," ectal border distal to tegular shoulder notched or undulate. Embolus basal portion a moderately sclerotized abbreviated loop around a membranous area. Embolus apical portion a triangular or conical button, abruptly tapering distally, attached subdistally on dorsal surface of embolus basal portion and slightly recurved.

Leg I: Fringes alternating black and white, short to medium in length. Patella prolateral scale cover white entire length (may be sparse). Metatarsus and tarsus with white scales only on proximal edge.

Abdomen: Scale cover red on entire dorsum. Venter black or gray.

FEMALE: BL 11.52 (12.83) 15.20, CL 4.98 (5.74) 6.89, CW 4.07 (4.68) 5.56.

Carapace: Tufts about 2x width of AME. OQ scales gray; lateral scale cover gray. Clypeus fringe black or white, band gray.

Abdomen: Scale cover usually red (sometimes yellow) on entire dorsum except median black stripe. Venter black.

Epigynum: Flaps parallel straight to divergent posteriorly. Anterior shallowly depressed. Middle deeply depressed, sagittal ridge present (variable in extent). Duct heads narrow, 1 pair major bends, 1 pair median minor bends, 2 pair posterior minor bends.

Phidippus texanus Banks 1906

Figs. C59, 328-333; Map 22

Phidippus albomaculatus Peckham & Peckham 1888: 19 (preoccupied by *P. albomaculatus* Keyserling 1885 = *P. purpuratus*) (synonymized by Peckham & Peckham 1909)

Phidippus texanus Banks 1906:98; 2 syntypes (♀) in MCZ, examined; lectotype designated

Dendryphantus texanus: Petrunkevitch 1911:642; Roewer 1954:1216; Platnick 1993:752

P. texanus: Scheffer 1906:124; Peckham & Peckham 1909:388,437; Banks 1910:65; Worley & Pickwell 1931:118; Banks et al. 1932:20; Chickering 1937:281; Bryant 1942:703; Muma & Muma 1949:490; Vogel 1970:19; Proszynski 1971b:456; Kaston 1972:268, 1978:256; Hoffman 1976:66; Richman & Cutler 1978:97, 1988:77; Gertsch 1979:204; Cokendolpher & Bryce 1980:16; Young & Edwards 1990:22; Breene et al. 1993:71; Platnick 1993:796, 1997:921

Phidippus peritus Gertsch 1934:14; holotype (♂) in AMNH (synonymized by Edwards 1977)

P. ardens: Muma & Muma 1949:490 (misidentification)

P. peritus: Vogel 1970:19; Proszynski 1971b:456

Etymology: Latin adjective derived from geographic name, the state of Texas.

Type locality: USA: Texas: Brazos Co., Sept. (only data given).

Geographic Range and Records: Primarily Great Plains region from Nebraska to northeastern Mexico.

MEXICO: *Coahuila*: Nueva Rosita, Sabinas; *Nuevo Leon*: Monterey, Santa Catarina (3 mi. SW.); *Tamaulipas*: Ciudad Victoria (12 mi. SE.), Cruillas (Rancho El Milagro); **USA:** *Arkansas*: Carroll; *Kansas*: Douglas, Anderson, Barton, Clark, Cowley, Ellis, Riley; *Missouri*: McDonald, St. Louis, Vernon; *Montana*: Lake, Ravalli; *Nebraska*: Lancaster; *New Mexico*: Lea; *North Dakota*: Divide; *Oklahoma*: Comanche, Dewey, Ellis, Greer, Jackson, Lincoln, Marshall, McCurtain, Payne, Roger Mills, Tillman, Woods; *Texas*: Archer, Atascosa, Austin, Bandera, Bastrop, Baylor, Bexar, Border, Brazos, Burnet, Cameron, Clay, Crosby, Dallas, De Witt, Denton, Duval, Eastland, Ector, Ellis, Erath, Foard, Garza, Gillespie, Grayson, Hall, Hemphill, Hidalgo, Hood, Howard, Jim Wells, Kerr, King, Kleberg, La Salle, Lampasas, Lipscomb, McLennan, Midland, Montague, Nolan, Nueces, Parker, Pecos, Starr, Tarrant, Terrell, Travis, Val Verde, Webb, Wharton, Wheeler, Wichita, Williamson.

Biology: This species is found on various cactus, yucca, mesquite, and assorted herbs in wild rangeland and open prairie. It matures in summer with females living until autumn.

Comments: This midwestern species divides the ranges of *P. ardens* and *P. purpuratus* except in the north.

Diagnosis: Male has a longer palea than *P. ardens* or *P. purpuratus*. Female has unique white median posterior abdominal stripe. See also *P. ardens* diagnosis.

Description:

MALE: BL 7.10 (11.53) 15.36, CL 3.65 (5.82) 7.47, CW 2.82 (4.78) 6.47.

Carapace: Post-PME tuft about 1.5x width of AME. Posterior ocular band iridescent. Clypeus fringe black, band iridescent.

Palp: Dorsal stripe white or iridescent, on femur and patella (sparse). Tibial apophysis narrow elongate triangular, tip hooked ventrally. Palea distinctly much longer than wide, distal margin extended distally into "neck," ectal border distal to tegular shoulder undulate. Embolus basal portion a moderately sclerotized abbreviated loop around a membranous area. Embolus apical portion a triangular or conical button, abruptly tapering distally, attached subdistally on dorsal surface of embolus basal portion and pointed dorsally.

Leg I: Fringes alternating black and white, short to medium in length except tibia ventral fringe mixed medium and long. Femur prolateral distal band white. Patella prolateral scale cover white entire length.

Abdomen: Scale cover red on entire dorsum (often median white stripe faintly indicated under scale cover). Venter black.

FEMALE: BL 11.52 (14.40) 20.04, CL 4.65 (6.04)

7.30, CW 3.82 (4.98) 6.31.

Carapace: Tufts about 2x width of AME. OQ scales gray or tan; lateral scale cover gray. Clypeus fringe white, band gray or tan.

Abdomen: Basal band not narrowed at ends. Lateral band II a fragmented oblique stripe. Lateral band IV reduced to fragmented spot. Spots I two short parasagittal stripes. Spots II fused and extended posteriorly as a long, narrow, median white stripe. Spots III and IV small, oval or linear. All spots white. Scale cover gray, on lateral edges only. Venter gray.

Epigynum: Flaps parallel straight to divergent posteriorly. Anterior shallowly depressed. Middle deeply depressed, sagittal ridge present. Duct heads narrow, 1 pair major bends, 1 pair median minor bends, 3 pair posterior minor bends.

Phidippus purpuratus Keyserling 1885

Figs. C57-58, 334-339; Map 23

Phidippus purpuratus Keyserling 1885:489; holotype (♂) lost.

Phidippus albomaculatus Keyserling 1885:491; syntypes (♀) in MCZ, BMNH, examined; lectotype designated from vial containing 2 syntypes (♀) in MCZ, previously labelled lectotype by L. J. Pinter (synonymized by Roewer 1954)

P. galathea (not Walckenaer): Peckham & Peckham 1888:14; 1901:286,288

P. mystaceus (not Hentz): Emerton 1875:59, 1891:227

P. purpuratus: Marx 1890:569; Banks 1901:188; Peckham & Peckham 1909:385,388,423; Montgomery 1909:549,558,563; McIndoo 1911:393,402,406; Comstock 1913:681,683; Crosby & Bishop 1928:1073; Chickering 1933:520, 1944:187,199; Worley & Pickwell 1931:116,118,120; Kaston 1936:103,121, 1938:197, 1948:481-3, 1953:112, 1972:268, 1978:256; Gertsch & Jellison 1939:11; Bonnet 1958:3525; Whitcomb et al. 1963:657; Drew 1967:178; Proszynski 1971b:456, 1976:149-50; Cutler 1977:40; Richman & Cutler 1978:97; Edwards & Hill 1978:117; Richman 1981a:19; Edwards 1982b:34; Roach & Edwards 1984:54; Wolff 1984:60; Young et al. 1989:41; Young & Edwards 1990:22; Platnick 1993:796, 1997:920; Maddison 1996:229

P. electus C.L.Koch 1846:144; (incorrectly synonymized by Banks 1901:187; see *P. audax*), Banks 1910:63, 1913:186

Dendryphantus purpuratus: Petrunkevitch 1911:641; Bishop 1923:22; Roewer 1954:1215; Platnick 1993:752

Etymology: Latin noun in apposition, *purpuratus*, person of high rank, courtier. Possibly also meaning clothed in purple (a color denoting high rank). The combination of many gray scales combined with darker colors and iridescent scales may give the illusion of a purplish tinge in some specimens.

Type locality: "North America." Maine and Utah both given; however, no specimens are known from Utah, where the related and similar *P. ardens* occurs, therefore Maine is considered to be the proper type locality.

Geographic Range and Records: Widespread in Eastern North America and across the north to British Columbia. **CANADA:** *Alberta:* Calgary, Medicine Hat; *British Columbia:* Nation Mts., Oliver, Oliver (E. side Vaseux Lake), Osoyoos, Vernon; *Manitoba:* Winnipeg; *Nova Scotia:* Aldershot, Kentville; *Ontario:* Actinolite (E.), Algonquin Pass (South Tea Lake), Algonquin Prov. Pk. (Lk. Kearny), Belleville, Belleville (30-50 mi. E.), Bondi Village, Chatterton (13 mi. N. Belleville), Cordova (Deer Lake), Dunrobin, Dwight, Eau Clair, Elmira, Gunter, Hope Bay, Huntsville (9 mi. SW.), Kenora (30 km. E.), Kingston (25 mi. N.), Lake Kearny, Lake Superior Prov. Park, Latta tsp., Metcalfe, Peninsula, Ottawa (30 km. W.), Ottawa (N.C.C. Beaver Tr.), Owen Sound, Point Ann, Severn Bridge Hwy. (N.), Shannonville, Shannonville (4 mi. N.), Square Bay (Manitoulin Island), St.Ola, Thunder Bay (Klotz Lake), Whitelake Prov. Pk.; *Quebec:* Chelsea, Kazabazua, Montreal; *Saskatchewan:* Robsart (15 mi. S.); **USA:** *Arkansas:* Pike; *Connecticut:* Fairfield, Hartford, Litchfield, New Haven, New London, Tolland; *Washington, D.C.:* Florida; Alachua, Bradford, Clay, Duval, Gadsden, Lake, Leon, Levy, Okaloosa, Putnam, Santa Rosa; *Kansas:* Riley; *Maine:* Hancock, Knox, Lincoln, Oxford, Penobscot, Washington, York; *Maryland:* Allegany, Harford; *Massachusetts:* Barnstable, Essex, Franklin, Middlesex, Norfolk, Worcester; *Michigan:* Charlevoix, Cheboygan, Clare, Crawford, Emmet, Iosco, Keweenaw, Manistee, Marquette, Otsego; *Minnesota:* Hennepin, Houston, Lake, Lincoln, Polk, St. Louis, Winona; *Missouri:* Boone; *Montana:* Fergus, Ravalli; *Nebraska:* Hall or Hamilton; *New Hampshire:* Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack; *New York:* Albany, Clinton, Dutchess, Essex, Onondaga, Saratoga, Suffolk, Tompkins; *North Dakota:* Divide, Ward; *Pennsylvania:* Carbon, Dauphin, Schuylkill, Warren; *Virginia:* Tazewell; *Vermont:* Caledonia, Windsor; *Wisconsin:* Buffalo, Dane, Marathon, Polk; *Wyoming:* Albany, Platte.

Biology: *P. purpuratus* is found on talus slopes and in an assortment of open shrub habitats and open woodland, mostly fairly xeric in nature. It has been recorded

from near sea level to 8500' elevation. Records occur from all seasons, but males are found from late spring to early autumn. Eggsacs have been found under rocks.

Comments: Banks (1910) considered *P. electus* to be a synonym of *P. albomaculatus* (= *P. purpuratus*). Later (1913) he examined the pinned type, found it be a juvenile, and made no comment on its identity. Other authors have considered it a synonym of *P. mystaceus*. Koch's (1846; fig.1201) illustration is somewhat equivocal, but appeared likely to be a juvenile *P. audax*; my examination of the type confirms this.

Diagnosis: Males lack a notch or undulation on the ectal side of the palea, unlike *P. ardens* or *P. texanus*, and the palea is shorter than in *P. texanus*. The male abdominal scale cover is only on the lateral edges, not on the entire abdominal dorsum as in *P. ardens* or *P. texanus*. Eastern specimens have the median depression of the epigynum with sides more rounded than square. See also *P. ardens* diagnosis.

Description:

MALE: BL 5.18 (8.31) 10.48, CL 4.40 (4.58) 4.70, CW 3.30 (3.77) 4.10.

Carapace: Post-PME tuft about 1.5x width of AME. OQ scales sparse, iridescent. Clypeus fringe black, band iridescent.

Palp: Dorsal stripe white, on femur and patella (sparse), or absent. Tibial apophysis narrow elongate triangular, tip hooked ventrally. Palea distinctly longer than wide, distal margin extended distally into "neck." Embolus basal portion a moderately sclerotized abbreviated loop around a membranous area. Embolus apical portion a triangular or conical button, abruptly tapering distally, attached subdistally on dorsal surface of embolus basal portion and pointed dorsally.

Leg I: Fringes alternating black and white, short to medium in length. Femur prolateral distal band white. Patella prolateral scale cover white entire length. Tibia prolateral scale cover white proximally.

Abdomen: Scale cover tan or red (in Florida) on lateral edges only. Venter black.

FEMALE: BL 8.18 (10.07) 14.76, CL 4.30 (4.59) 5.30, CW 3.50 (3.73) 4.30.

Carapace: Tufts 1.5x or less width of AME. OQ scales sparse and iridescent; lateral scale cover gray. Clypeus fringe white, band gray.

Abdomen: Basal band entirely narrow. Lateral band II an oblique stripe. Lateral band IV reduced to spot. Spots I small, oval, or two short parasagittal stripes. Spots II outwardly concave, slightly separated or touching. Spots III and IV small, oval or linear. All spots white. Scale cover gray, on lateral edges only. Venter gray.

Epigynum: Flaps parallel straight to divergent posteriorly. Anterior shallowly depressed, septum absent or distinct. Middle deeply depressed, sagittal ridge present. Duct heads narrow, 1 pair major bends, 1 pair median minor bends, 2 pair posterior minor bends.

***Phidippus borealis* Banks 1895**

Figs. 340-344; Map 24

Phidippus borealis Banks 1895:96; 2 syntypes (♀) in MCZ, examined; lectotype designated

Phidippus purpuratus: Peckham & Peckham 1909:423 (incorrect synonymy)

Phidippus altanus Gertsch 1934:12; holotype (♂) in AMNH (synonymized by Edwards 1977)

P. altanus: Gertsch & Jellison 1939:11; Chickering 1944:187-8; Levi & Levi 1951:232, 1955:39; Levi & Field 1954:464; Proszynski 1971b:454

P. borealis: Edwards 1977:21; Cutler 1977:40; Richman & Cutler 1978:95; Wolff 1984:59; Platnick 1993:793, 1997:920

Etymology: Latin adjective, *borealis*, of the north.

Type locality: USA: *New Hampshire*: Crawford Notch, N. Banks (only data given).

Geographic Range and Records: Northern North America from Massachusetts and Quebec to Alaska, south in the Rocky Mountains to Colorado. **CANADA:** *Prov.?*: Lac des Mille Lacs (La Siègne R.); *Alberta*: Bilby, Bragg Creek, Cypress Hills, Devil's Lake, Edmonton, Fawcett, Fort McMurray, Medicine Hat, Moose Lake, Peace River, Ricinus, Robb (15 mi. E.), Saba, Waterton Lake; *British Columbia*: Fort Nelson, Terrace, Tetsa River; *Manitoba*: Cedar Lake, Kiche Manitou Lake, Rennie; *Northwest Terr.:* Norman Wells, *Ontario*: Dorion (Cavern Lake Cave), Granite Lake, Lake of the Woods, Maynooth, Nipigon, Smoky Falls, Smoky Falls (Matagami River); *Quebec*: Fort Coulonge, Lake Ouareau, Lanoraie; *Saskatchewan*: Black Lake, Saskatoon, Uranium City; *Yukon*: Firth River; *Yukon (?)*: Picnic Bog Plot, Ste. Annes des Monts (Gaspé); **USA:** *Alaska*: Fairbanks North Star; *Colorado*: Gunnison, Larimar; *Idaho*: Clark; *Maine*: (no other data); *Michigan*: Cheboygan, Crawford, Emmet, Marquette, Mason; *Minnesota*: Hennepin, Itasca, Lake, St. Louis; *Montana*: Beaverhead, Glacier; *New Hampshire*: Carroll, Coos, Grafton; *New York*: Clinton, Essex, Franklin, Lewis, *South Dakota*: Custer, Pennington; *Utah*: (no other data); *Washington*: Stevens; *Wisconsin*: Bayfield, Oneida, Vilas; *Wyoming*: Albany, Park, Teton.

Biology: Specimens have been found on aspen, larch, willow, pine, and spruce, at 4000-9500' elevation.

Maturation is in summer, and eggsacs are found under bark and rocks.

Comments: *Phidippus borealis* was incorrectly synonymized with *P. purpuratus* by the Peckhams (1909), but it was infrequently cited under its junior synonym, *P. altanus*. Although superficially similar to *P. purpuratus*, it can be separated easily by the genitalia.

Diagnosis: Compared to *P. purpuratus*, the epigynal flaps are much larger, the median part of the epigynum less depressed, and the embolus apical portion longer, broader, and with three apparent points instead of one (two of which actually are part of the embolus basal portion).

Description:

MALE: BL 4.90 (7.58) 9.05, CL 3.90 (4.35) 4.60, CW 3.10 (3.36) 3.50.

Carapace: Post-PME tuft about 1.5x width of AME. OQ scales sparse, iridescent, or absent. Clypeus fringe black.

Palp: No dorsal stripe. Tibial apophysis stout, triangular, with broad tip bent ventrally. Palea distinctly longer than wide, distal margin extended distally but not forming "neck." Embolus basal portion a broad flat semirectangular plate, moderately sclerotized, extending to ectal edge of palea. Embolus apical portion a short, wide blade (in combination with proximal end of embolus basal portion appears to be three points), abruptly tapering distally, bent more distal than edge of embolus basal portion and pointed dorsally.

Leg I: Fringes alternating black and white, short to mostly medium in length except femur retroventrolateral fringe long. Femur prolateral distal band sparse, white. Patella prolateral scale cover white proximally and entire length on ventral half. Tibia prolateral scale cover white proximally.

Abdomen: Scale cover yellow or orange on basal band, spots, and lateral edges. Venter with three dark gray stripes on light gray.

FEMALE: BL 8.45 (10.96) 13.81, CL 4.15 (4.50) 4.90, CW 3.70 (3.79) 3.90.

Carapace: Tufts 1.5x or less width of AME. Lateral scale cover sparse, white. Clypeus fringe white, band white.

Abdomen: Basal band entirely narrow. Lateral band II an oblique stripe. Spots I small, oval. Spots II outwardly concave, slightly separated or touching. Spots III and IV small, oval (III sometimes large). All spots white. Scale cover white, tan, yellow, or orange, on lateral edges only. Venter pale with three light gray stripes.

Epigynum: Flaps parallel straight posteriorly. Anterior shallowly depressed, septum distinct. Middle entirely shallowly to deeply depressed, weak sagittal ridge present. Duct heads narrow, 1 pair major bends, 4 pair median minor bends, 2 pair posterior minor bends.

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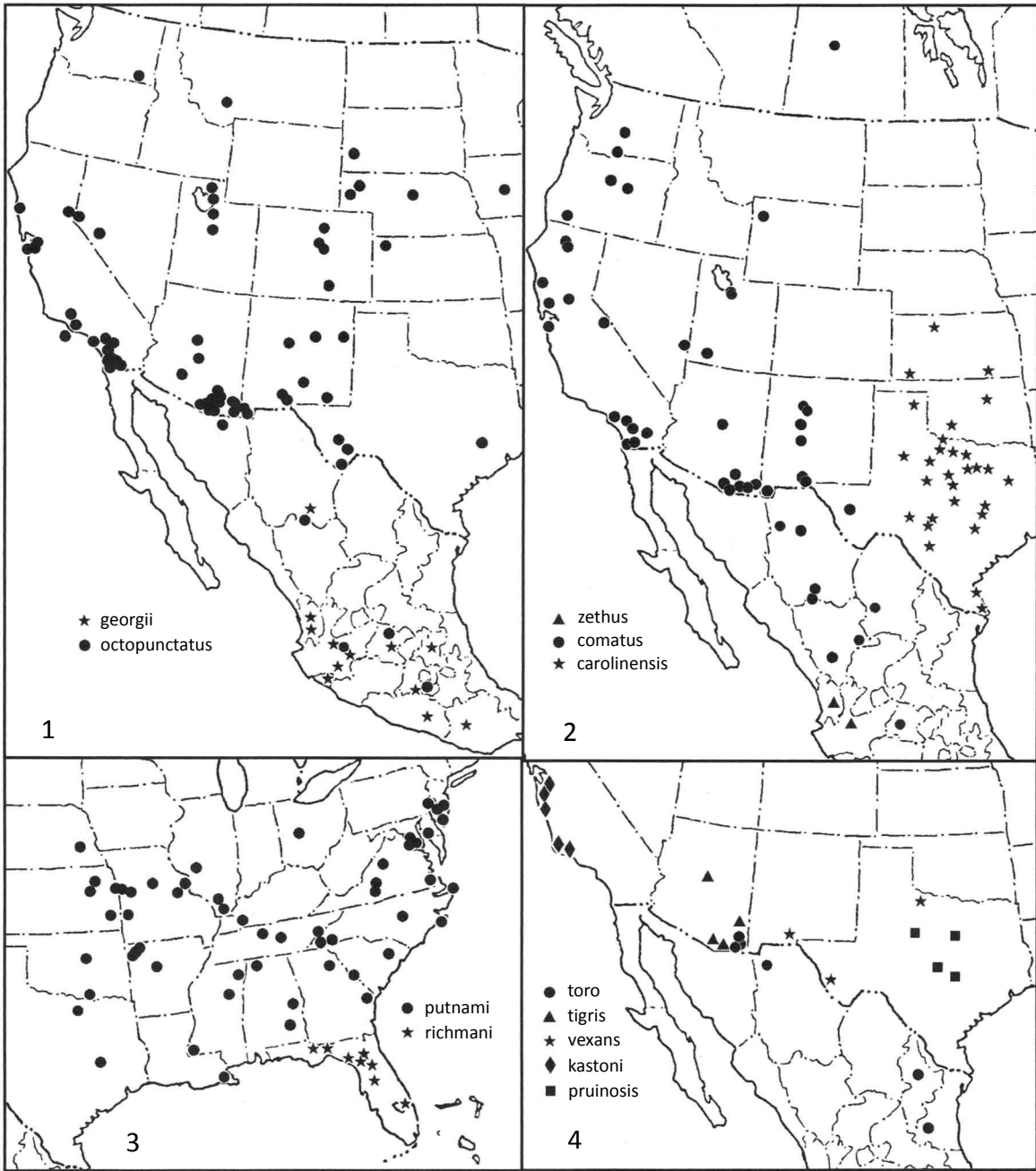
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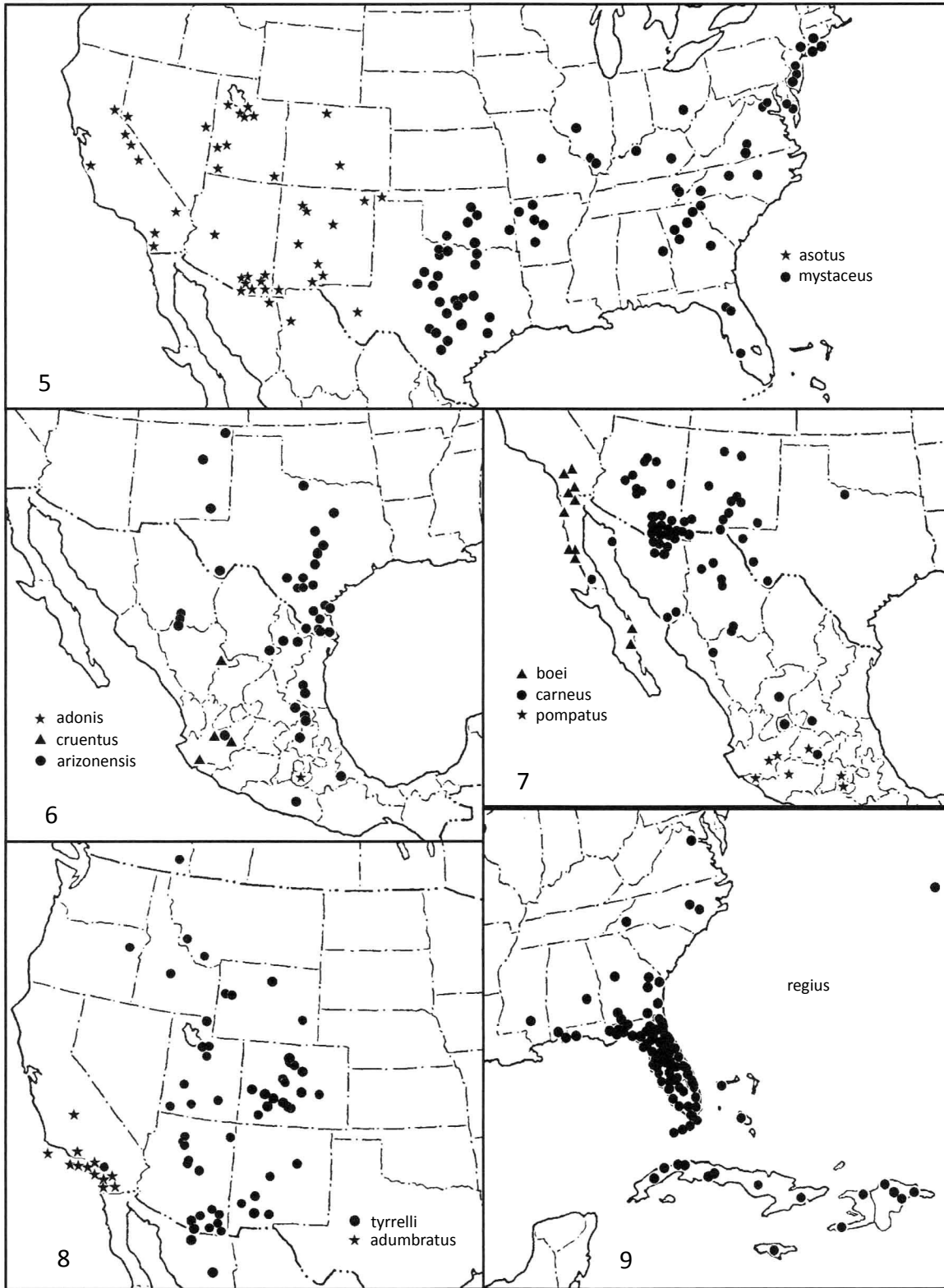
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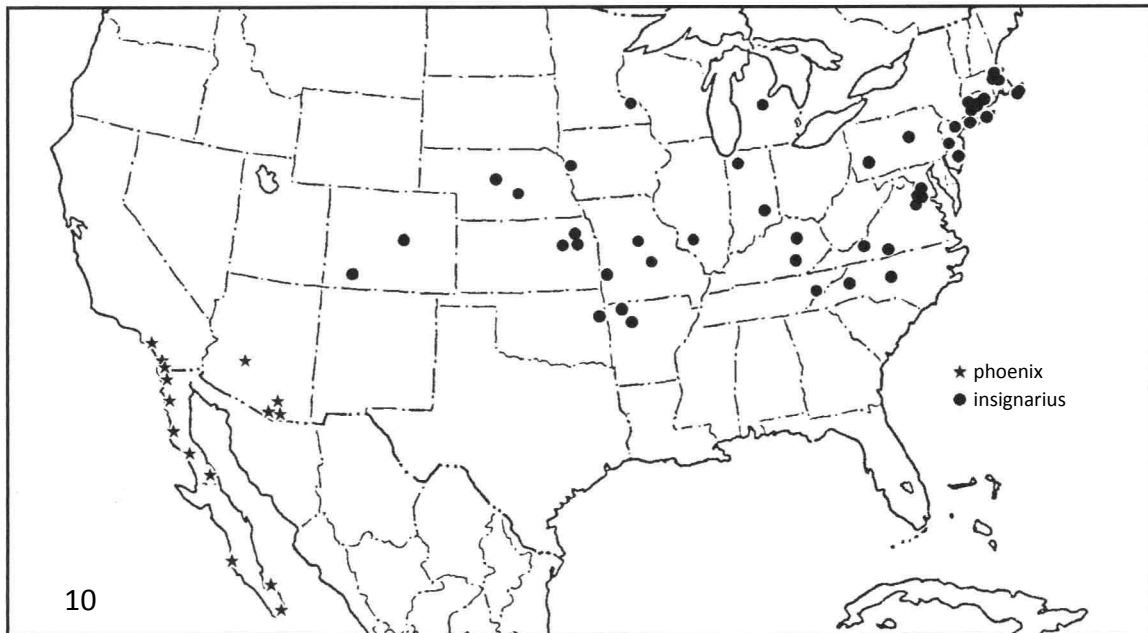
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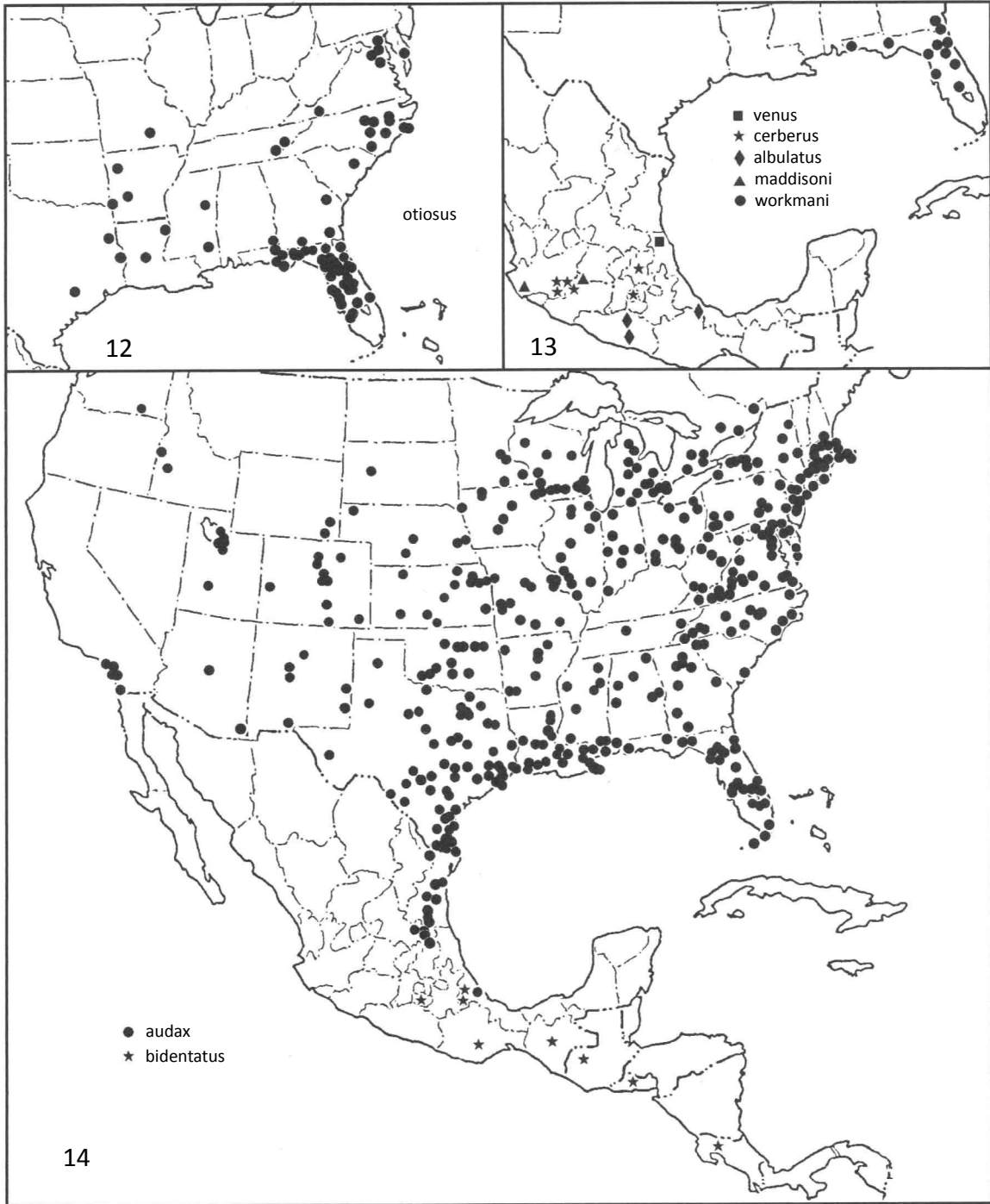
DISTRIBUTION OF *PHIDIPPUS* SPECIES

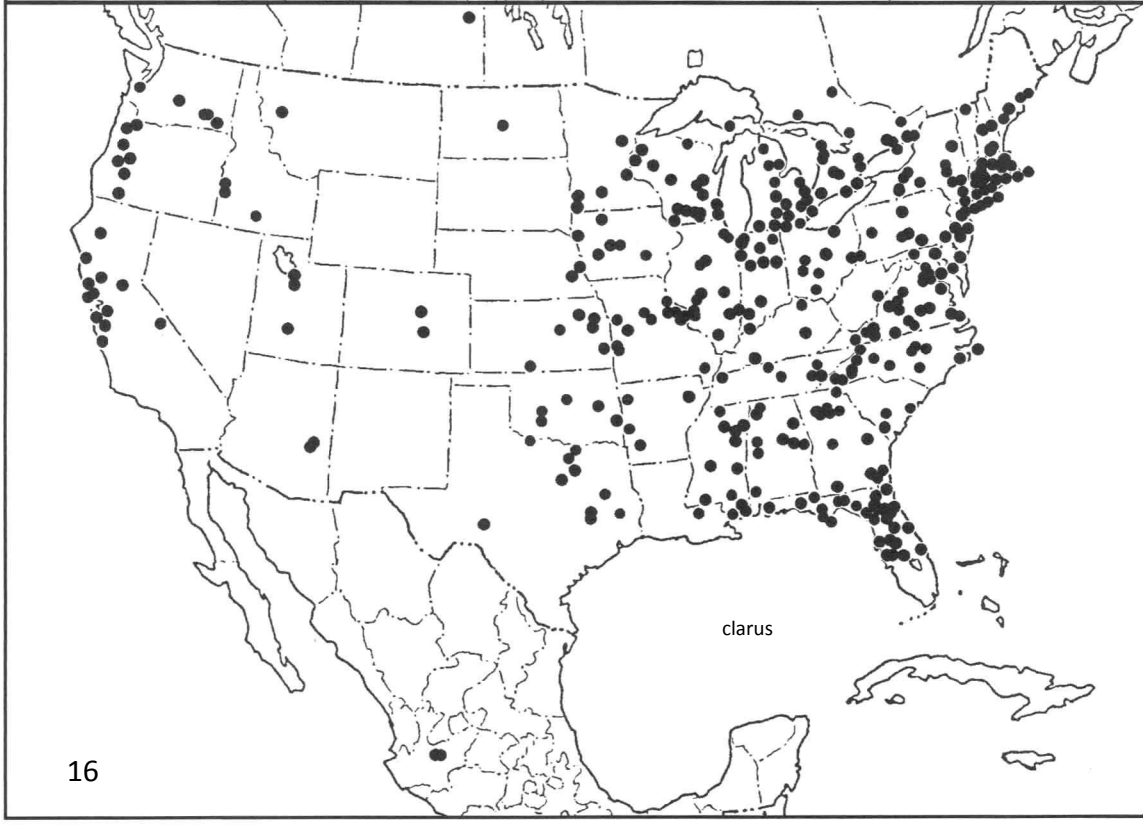
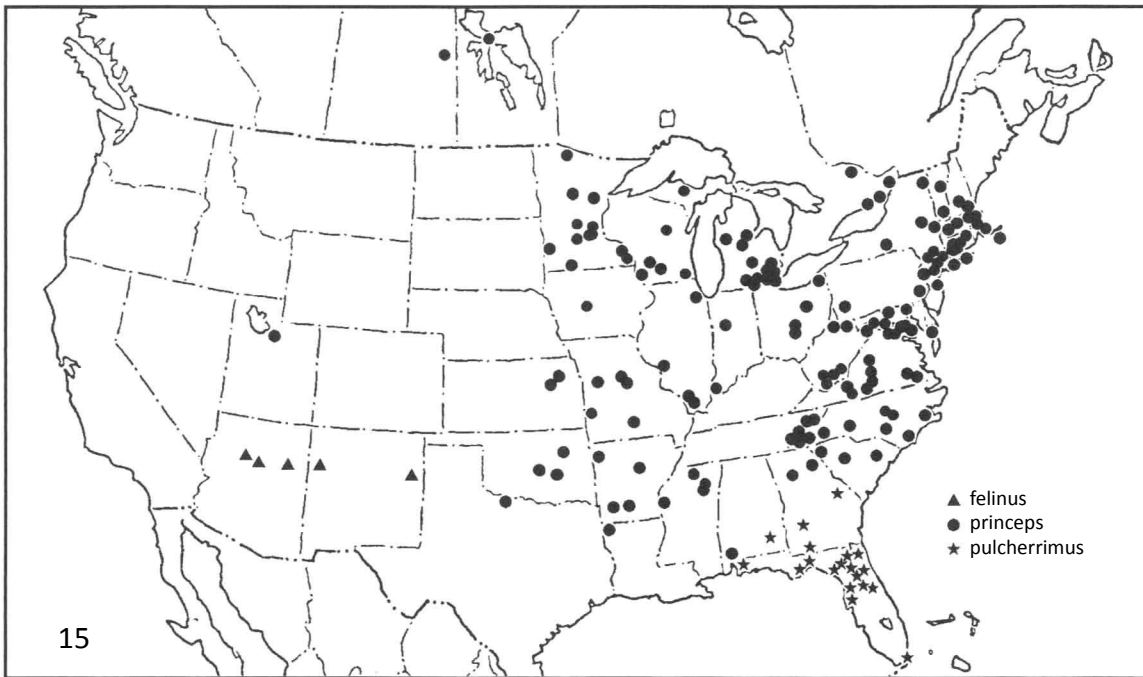
- Map 1. *P. georgii* Peckham & Peckham, *P. octopunctatus* Peckham & Peckham.
Map 2. *P. zethus* Edwards, *P. comatus* Peckham & Peckham, *P. carolinensis* Peckham & Peckham.
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Map 5. *P. asotus* Chamberlin & Ivie, *P. mystaceus* (Hentz).
Map 6. *P. adonis* Edwards, *P. cruentus* F.O.P.C., *P. arizonensis* (Peckham & Peckham).
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Map 14. *P. audax* (Hentz), *P. bidentatus* F.O.P.C.
Map 15. *P. felinus* Edwards, *P. princeps* Peckham & Peckham, *P. pulcherrimus* Keyserling.
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Map 18. *P. cryptus* Edwards, *P. concinnus* Gertsch, *P. whitmani* Peckham & Peckham.
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Map 20. *P. amans* Edwards, *P. lynceus* Edwards, *P. olympus* Edwards, *P. johnsoni* (Peckham & Peckham).
Map 21. *P. aureus* Edwards, *P. ursulus* Edwards, *P. tyrannus* Edwards.
Map 22. *P. texanus* Banks, *P. morpheus* Edwards.
Map 23. *P. ardens* Peckham & Peckham, *P. purpuratus* Keyserling.
Map 24. *P. borealis* Banks.

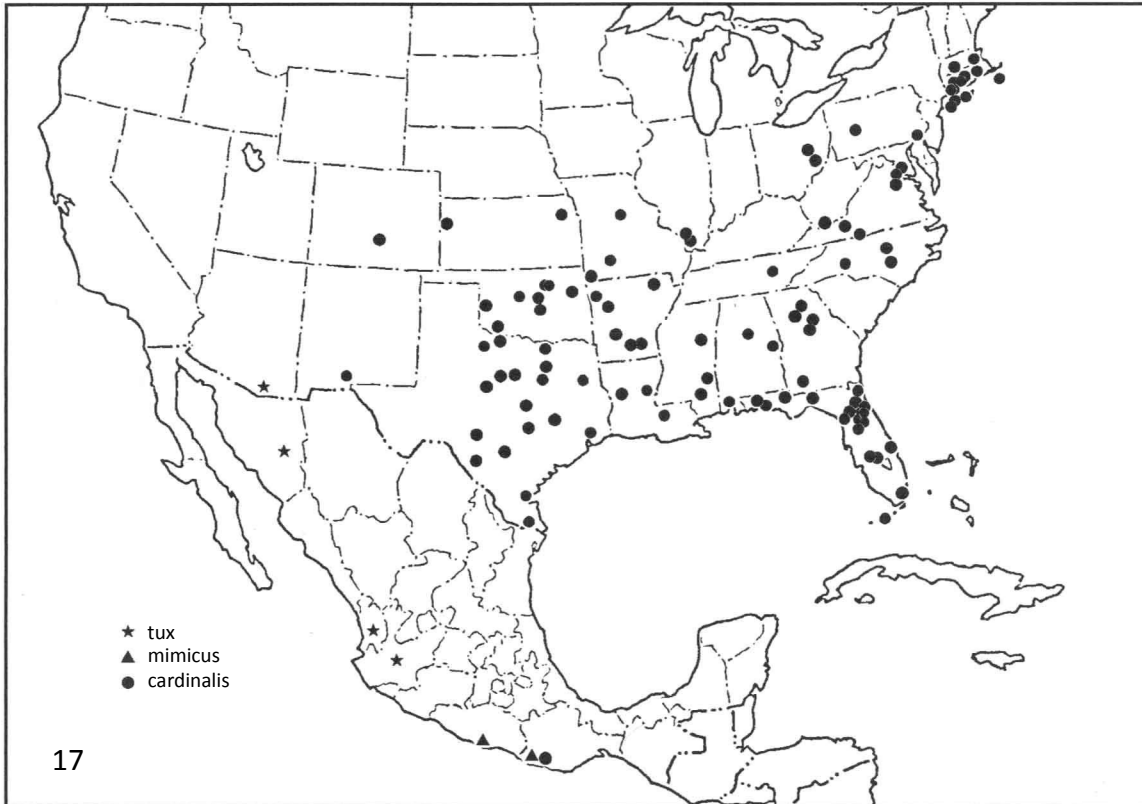




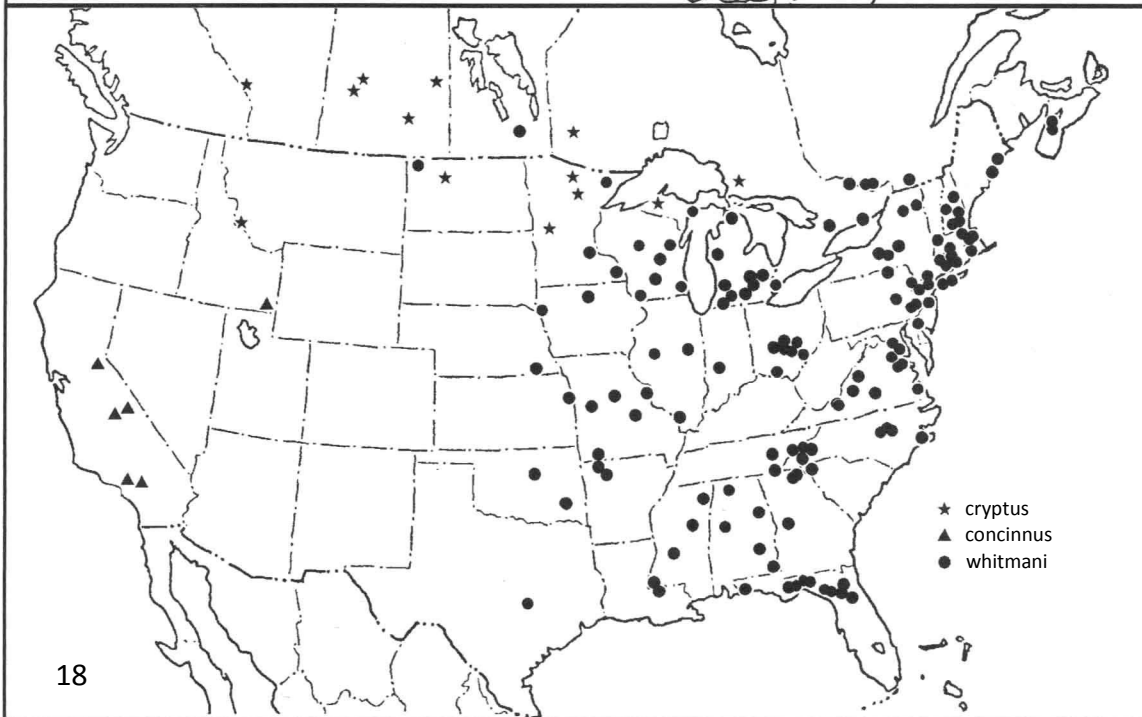




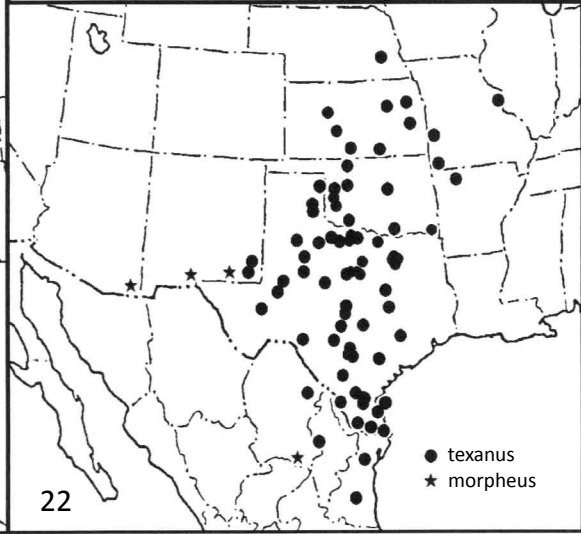
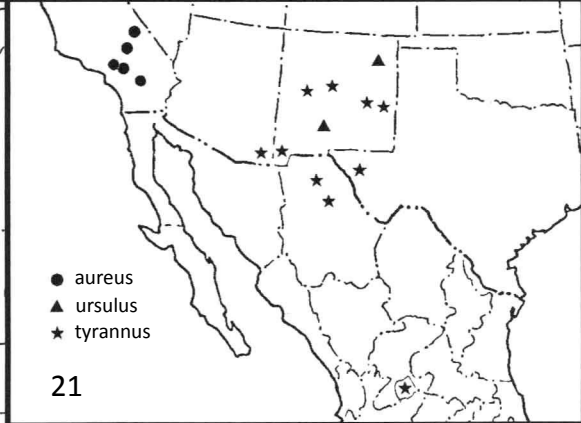
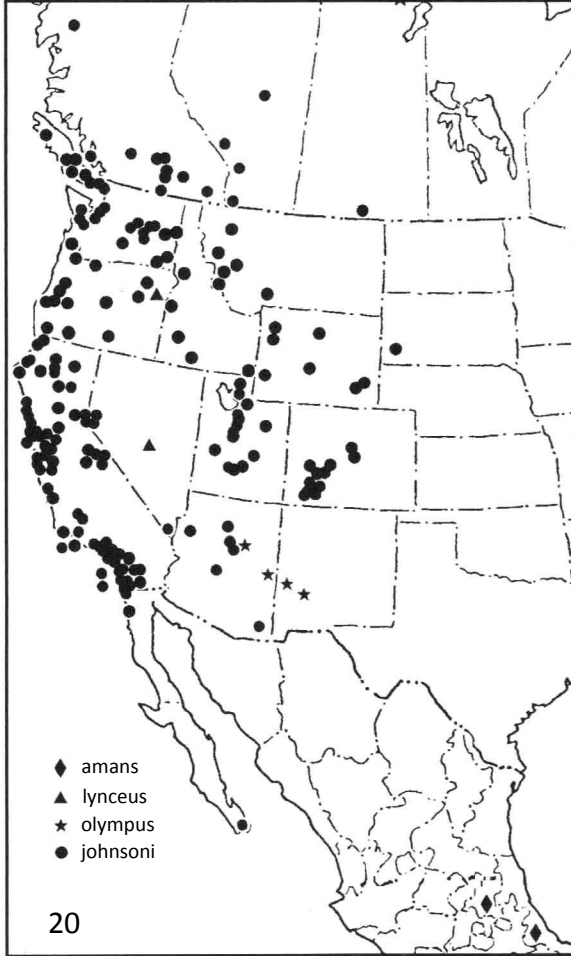
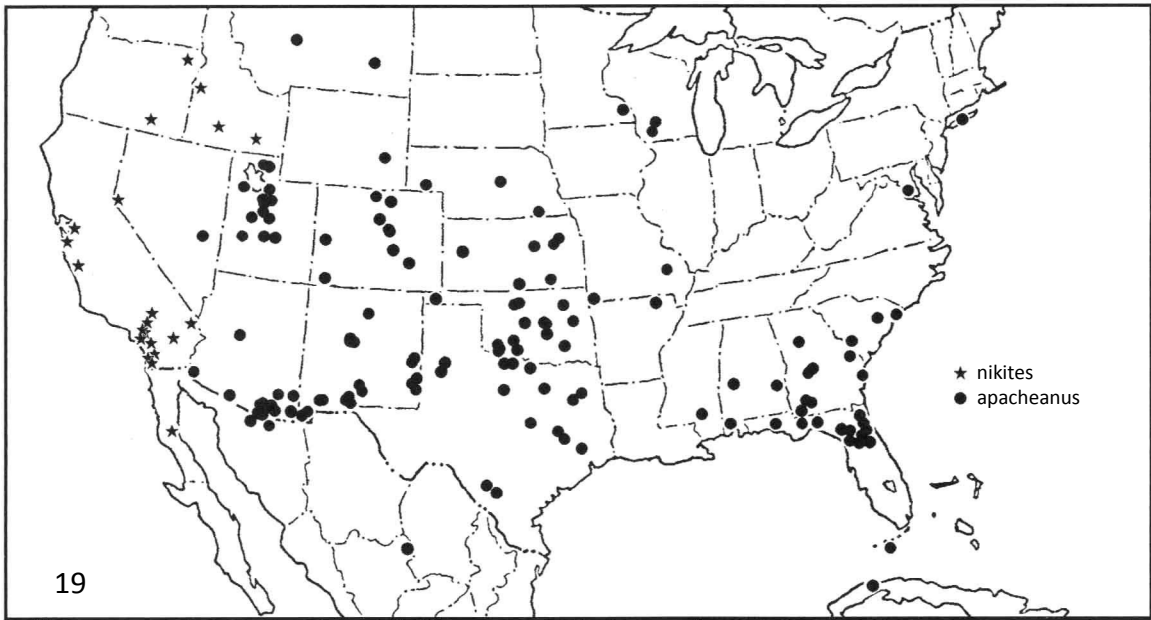


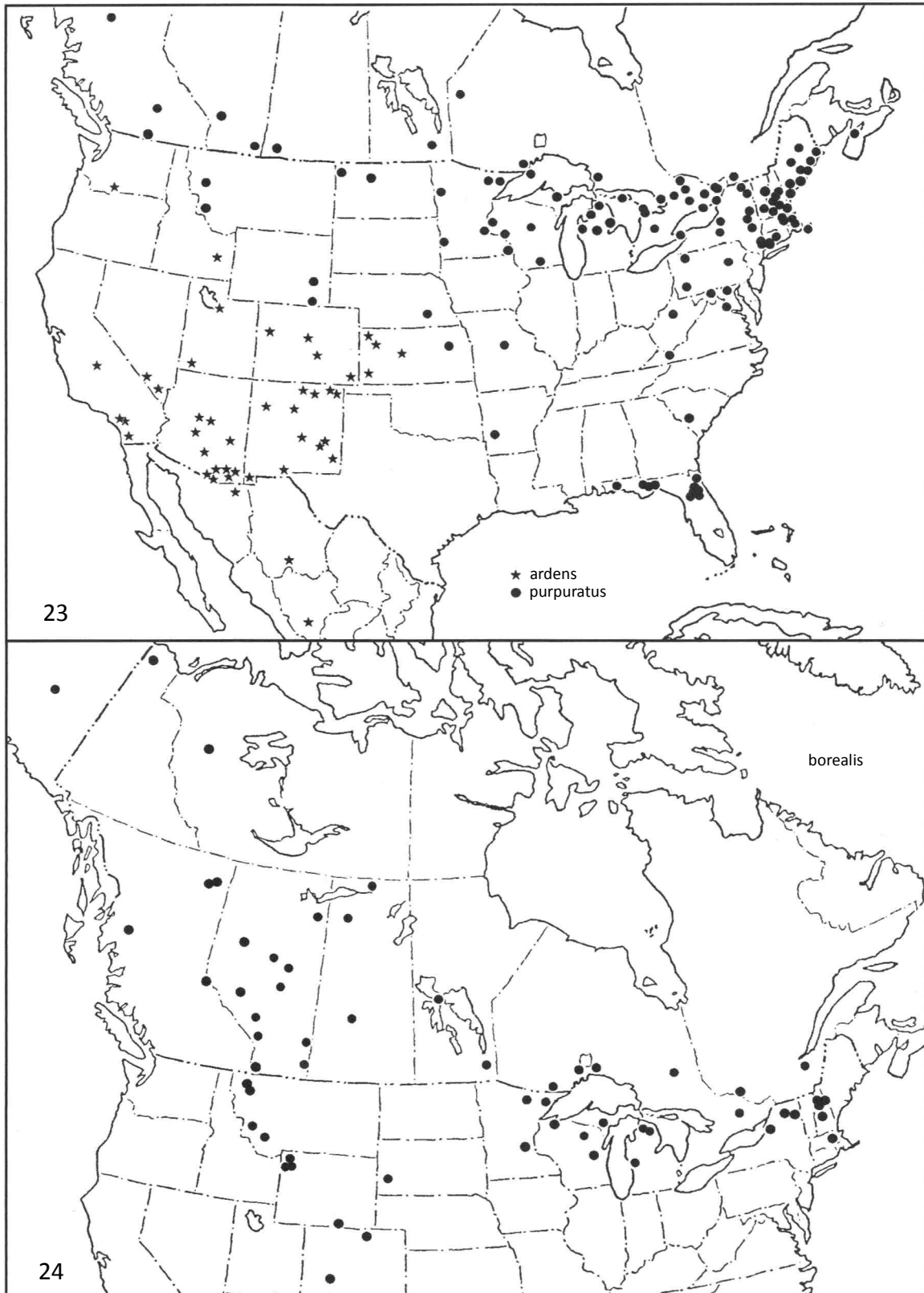


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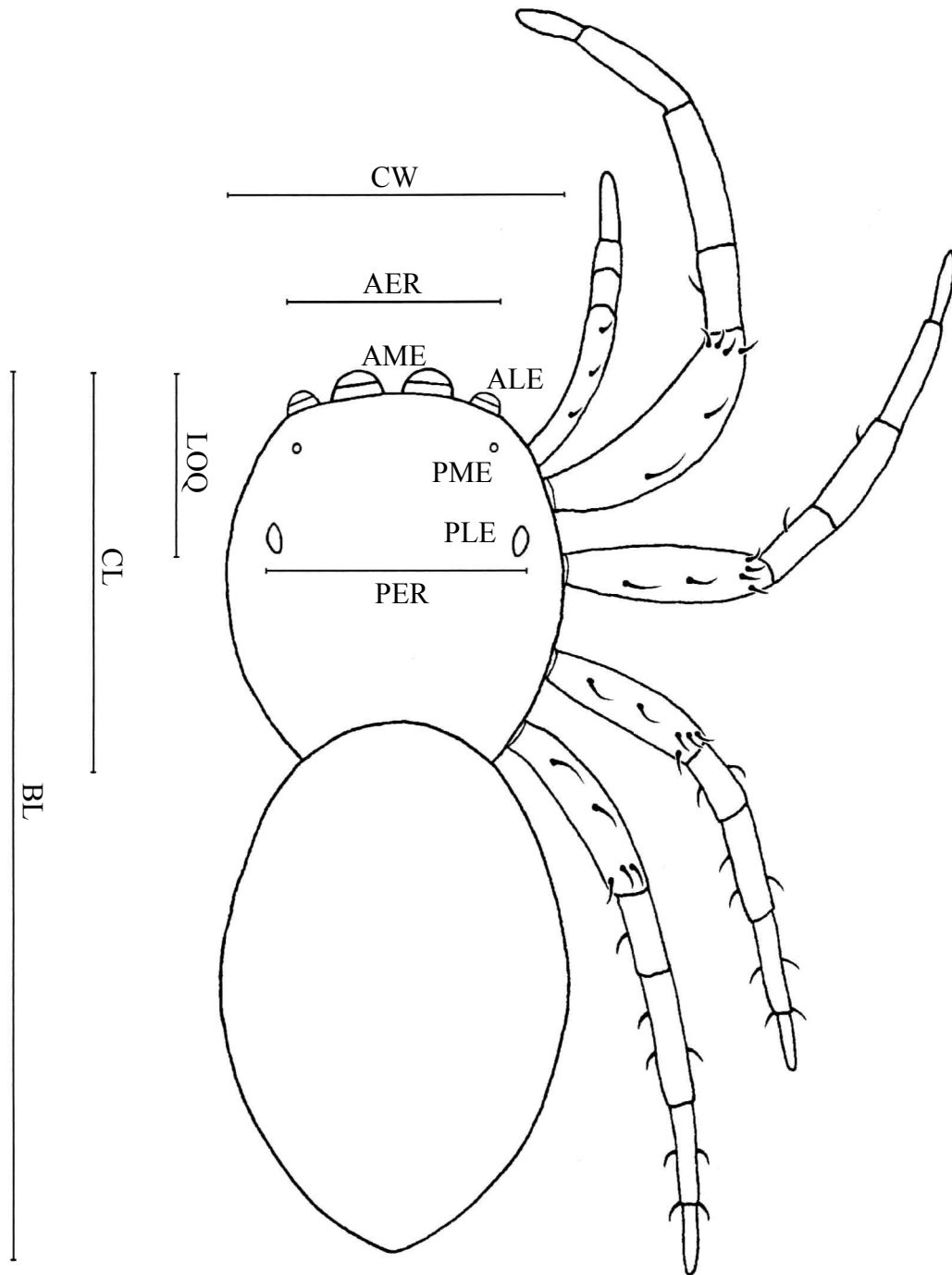


Fig. 1. Diagrammatic illustration of *Phidippus* showing dorsal characters measured, plus dorsal (and lateral) leg and palp macrosetae.

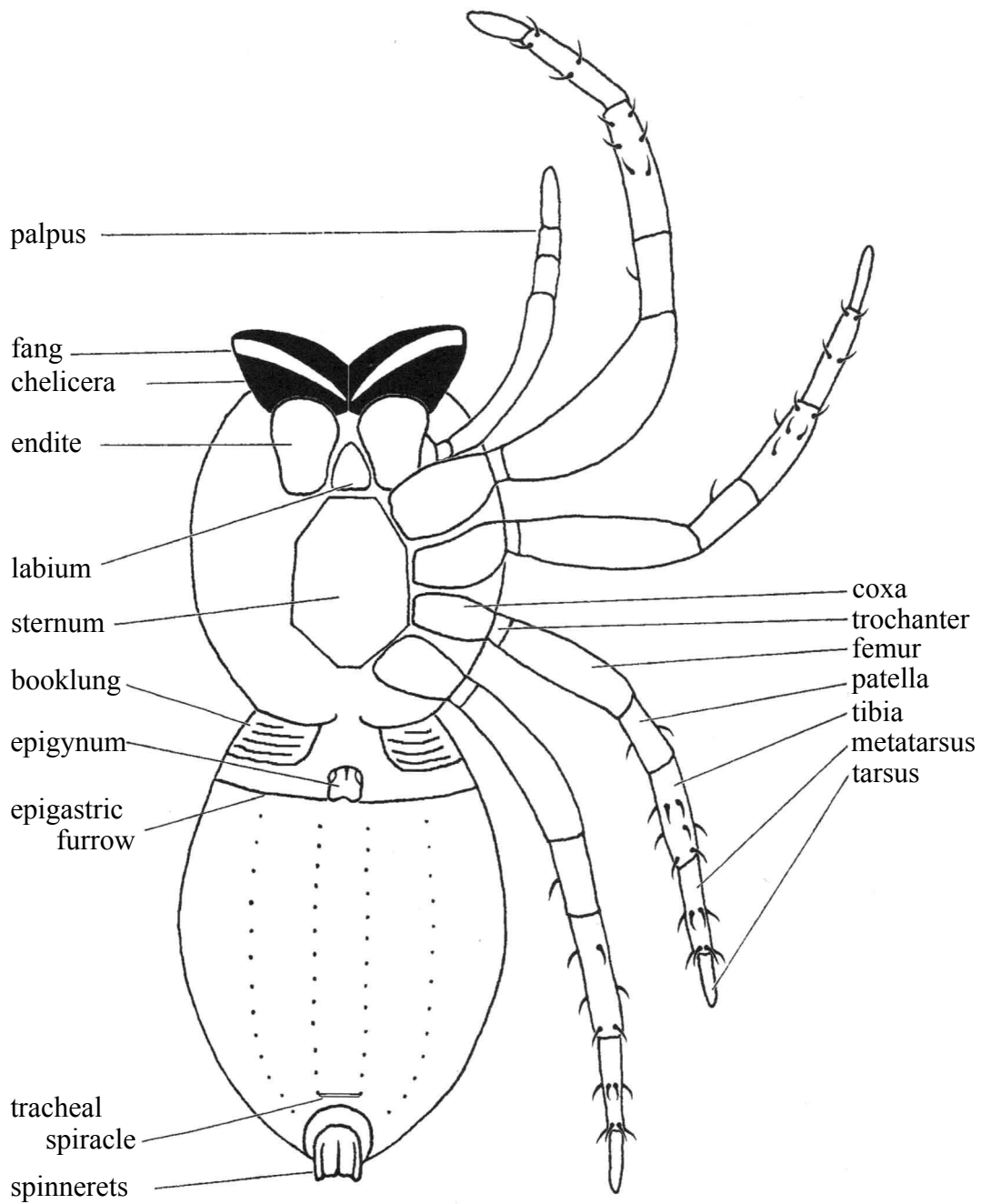


Fig. 2. Diagrammatic illustration of *Phidippus* female showing ventral characters, and ventral (and lateral) leg macrosetae.

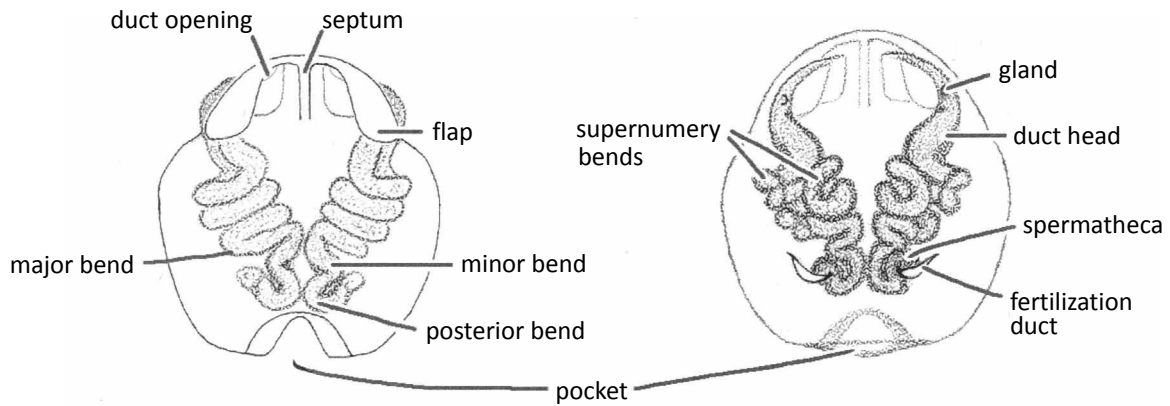


Fig. 3. Epigynum of *Phidippus johnsoni*, ventral (A) and dorsal (B) views, cleared.

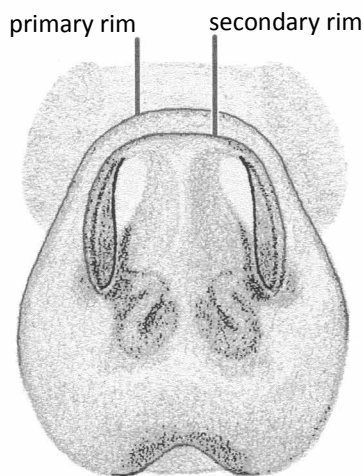


Fig. 4. Epigynum of *Phidippus carneus*, ventral view.

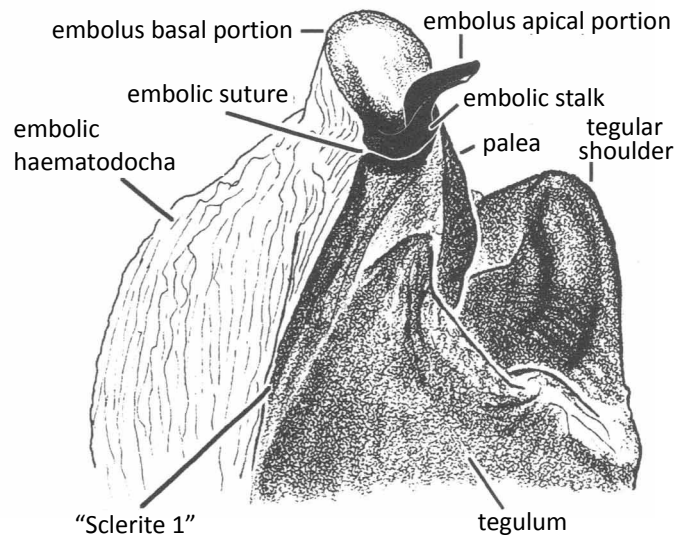
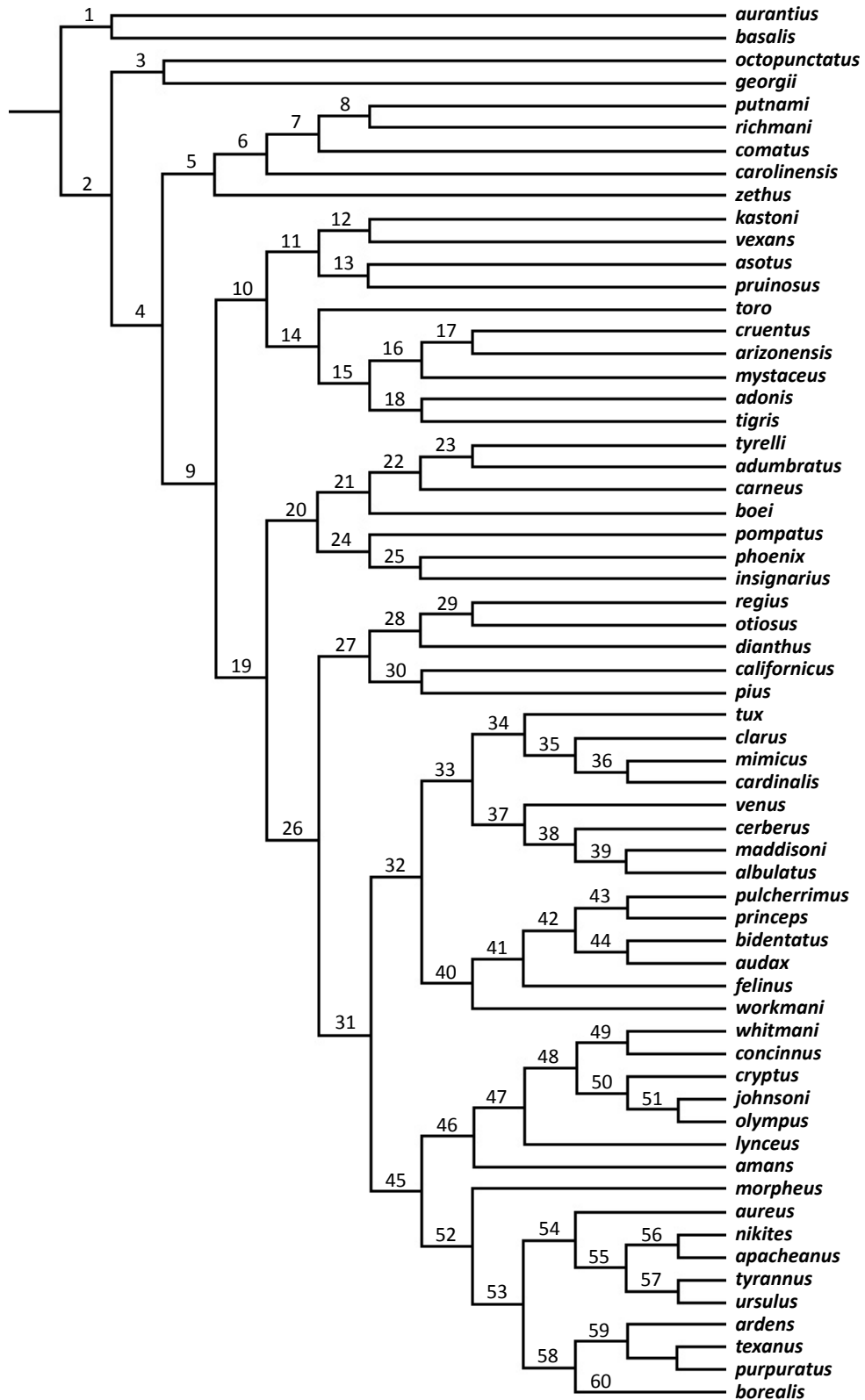
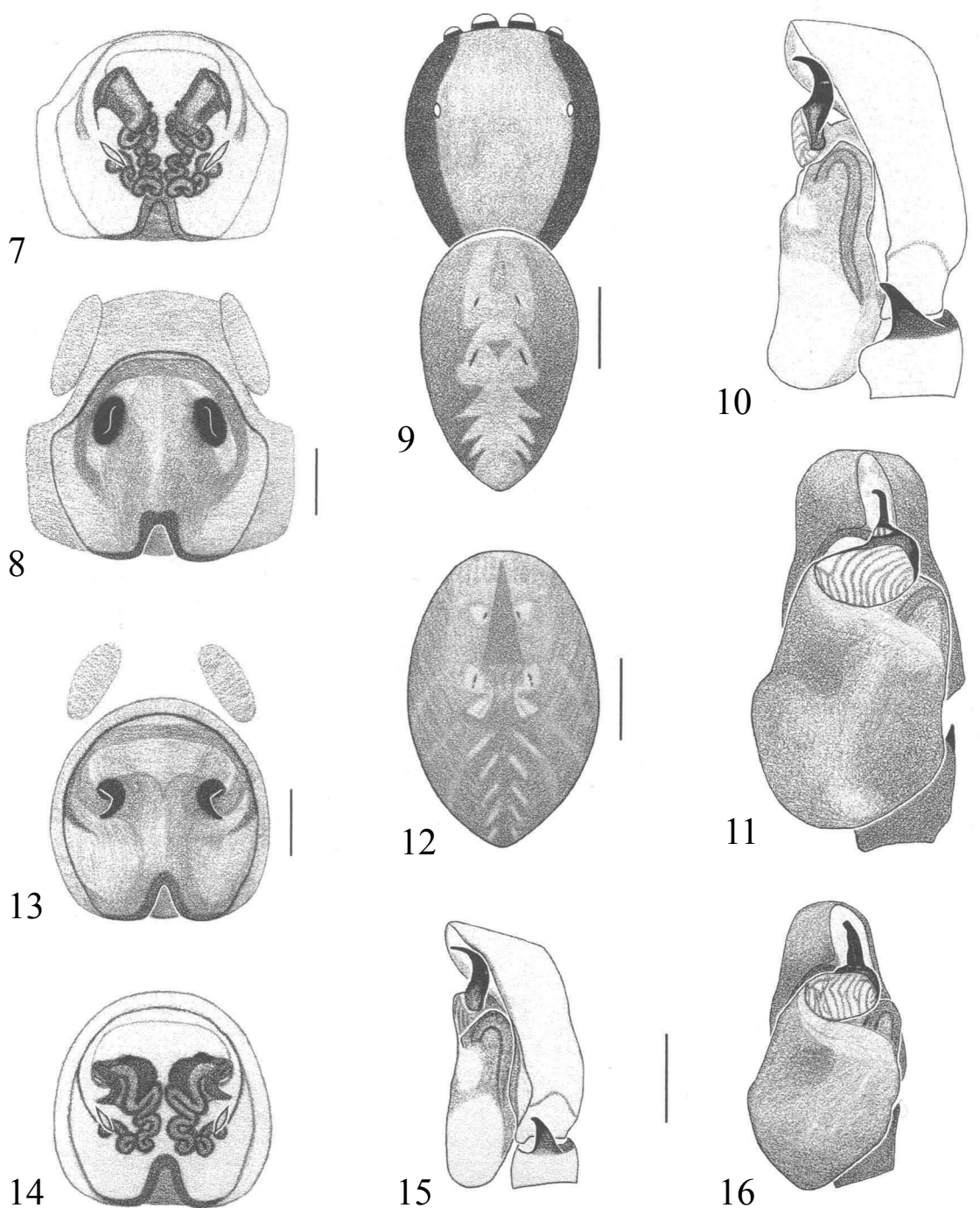


Fig. 5. Distal bulb of left palp of *Phidippus insignarius*, prolateral view, cymbium removed (adapted from Maddison 1996)

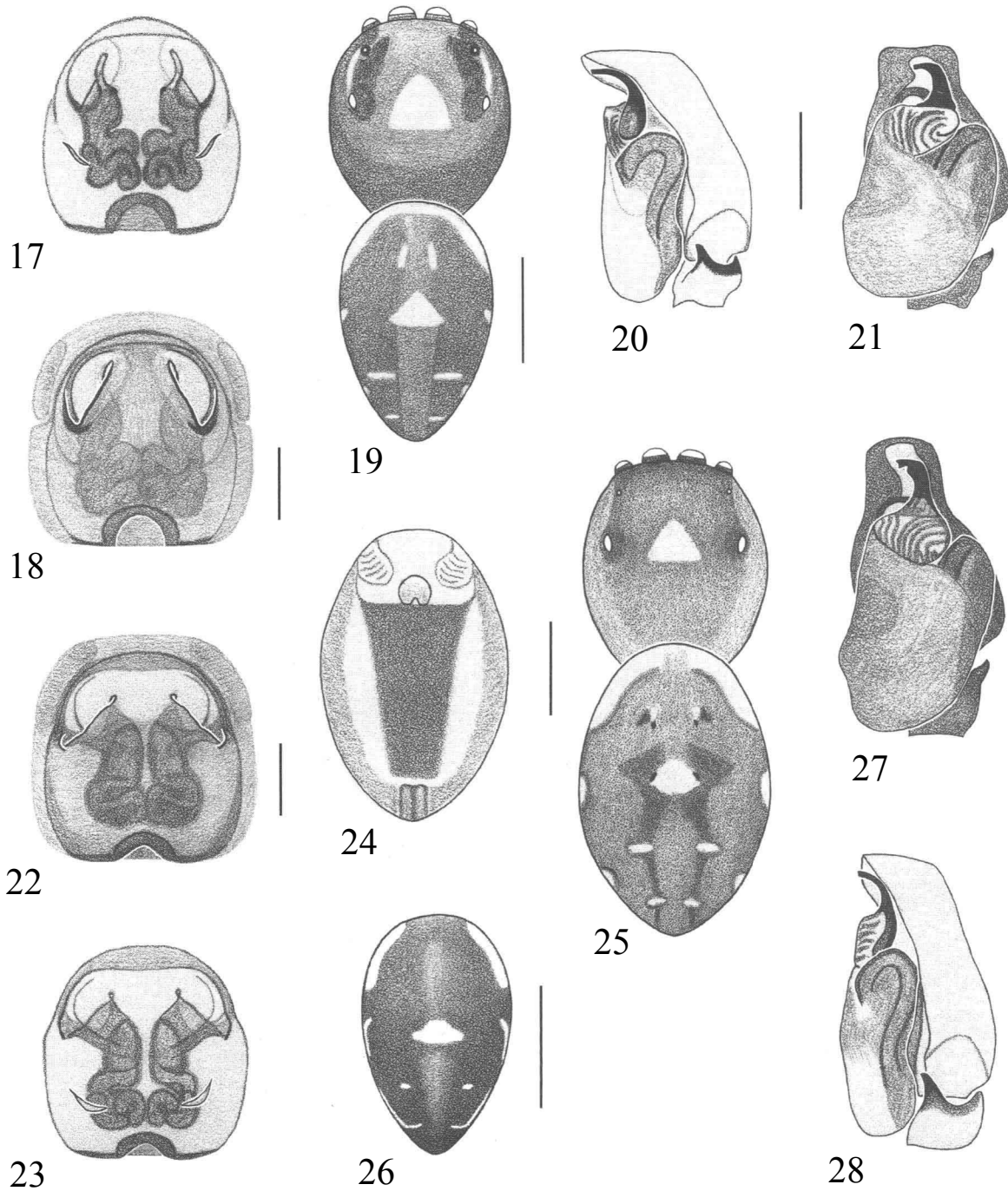
Fig. 6. Phylogenetic tree of *Phidippus* species with outgroup consisting of two species of *Paraphidippus* (opposite page). See text for explanation of branch numbers.



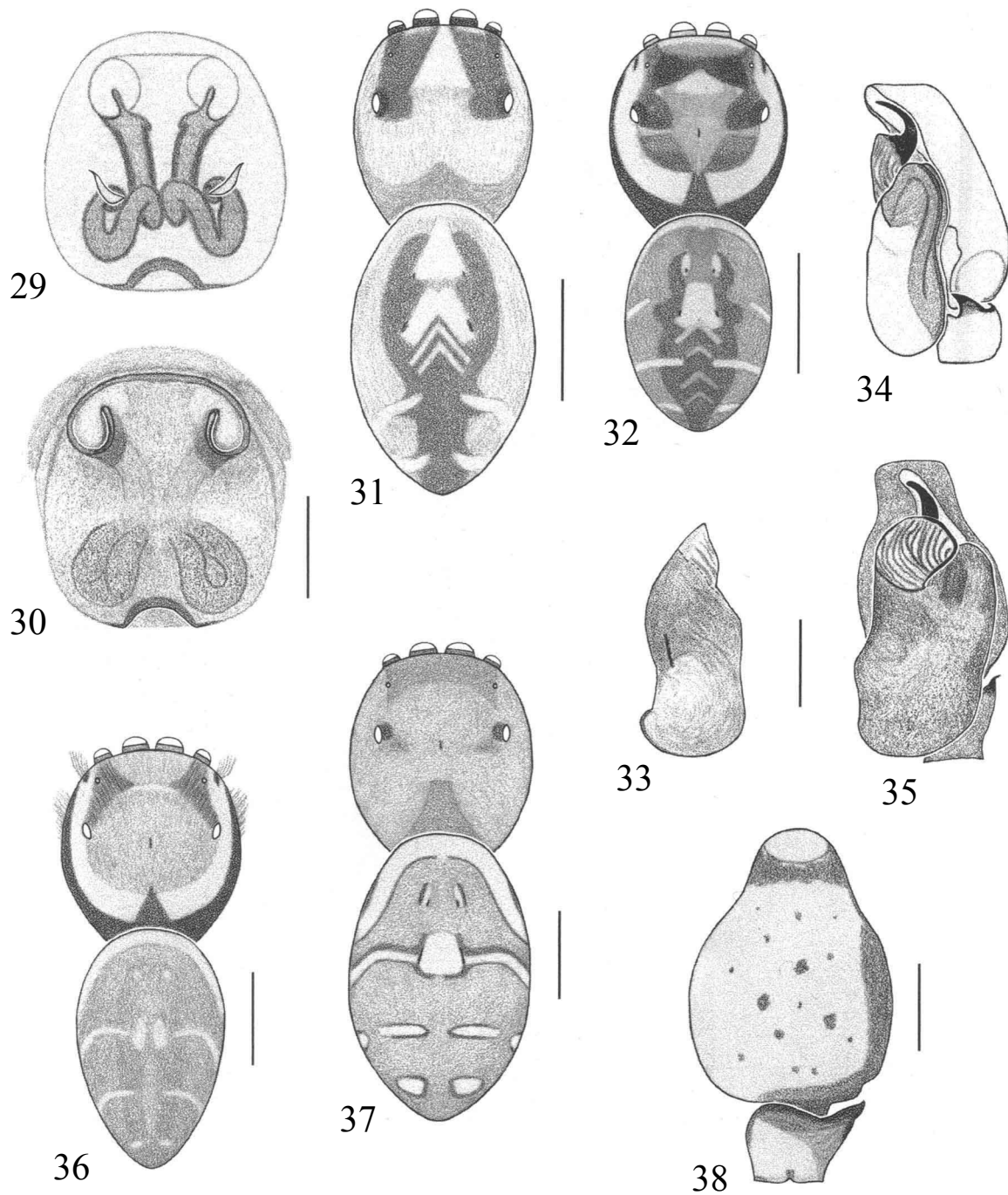


Figs. 7-11. *Phidippus octopunctatus* (Peckham & Peckham). Female: 7-8. epigynum: 7. dorsal view, 8. ventral view. Male: 9. habitus. 10-11. palp: 10. retrolateral view, 11. ventral view.

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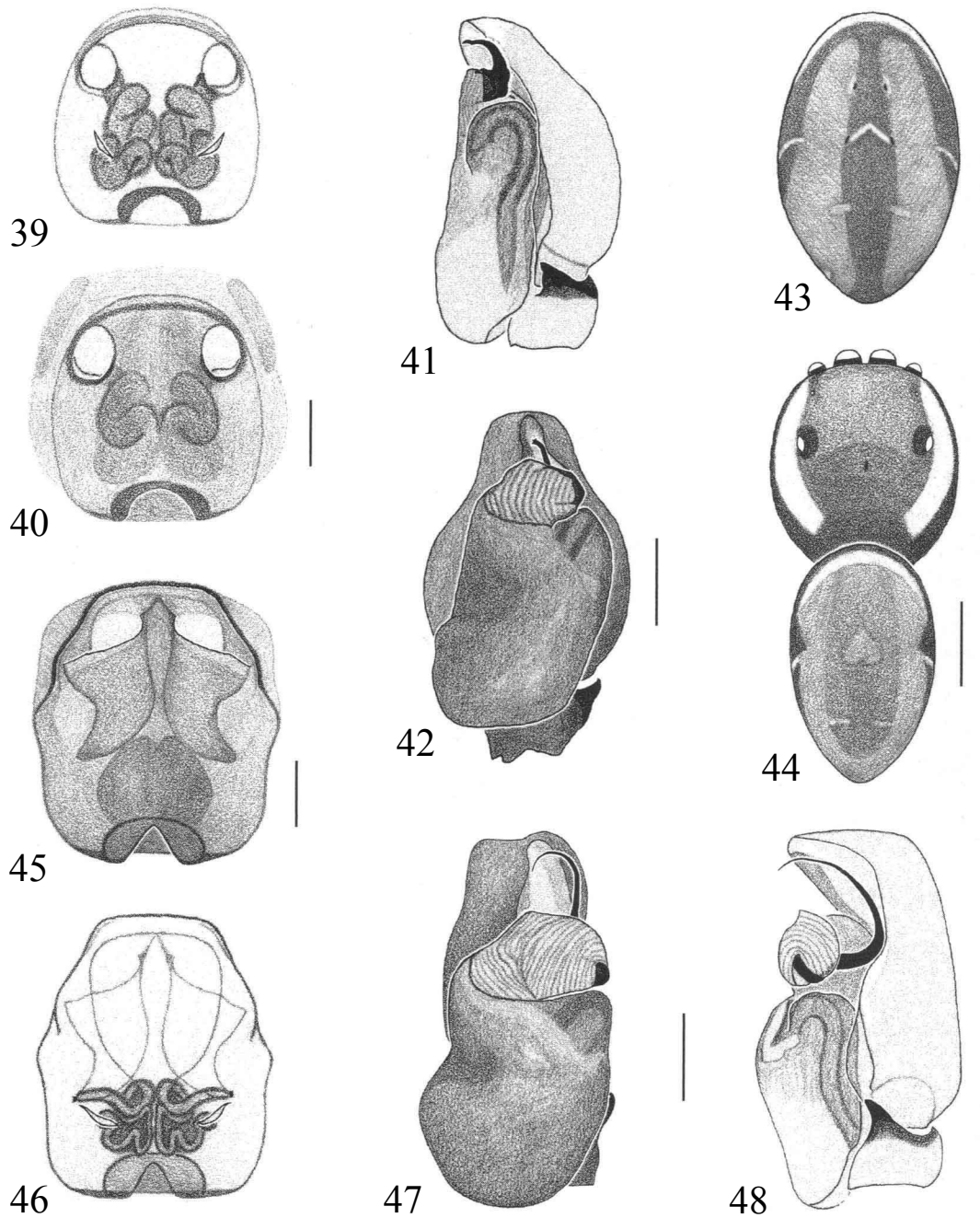


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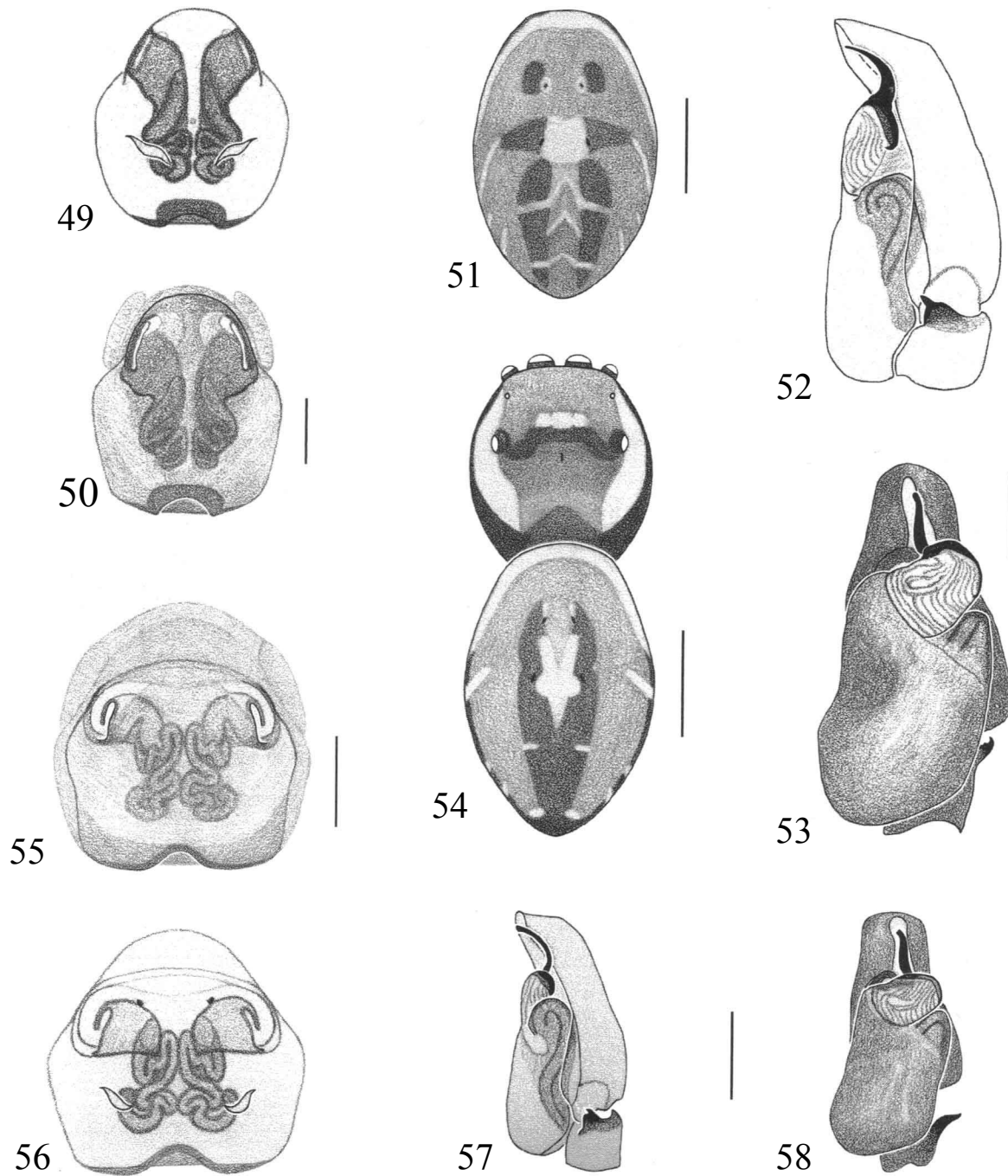
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Figs. 36-38. *Phidippus carolinensis* Peckham & Peckham. Female: 37. habitus. Male: 36. habitus. 38. palp cymbium and tibia, dorsal view.

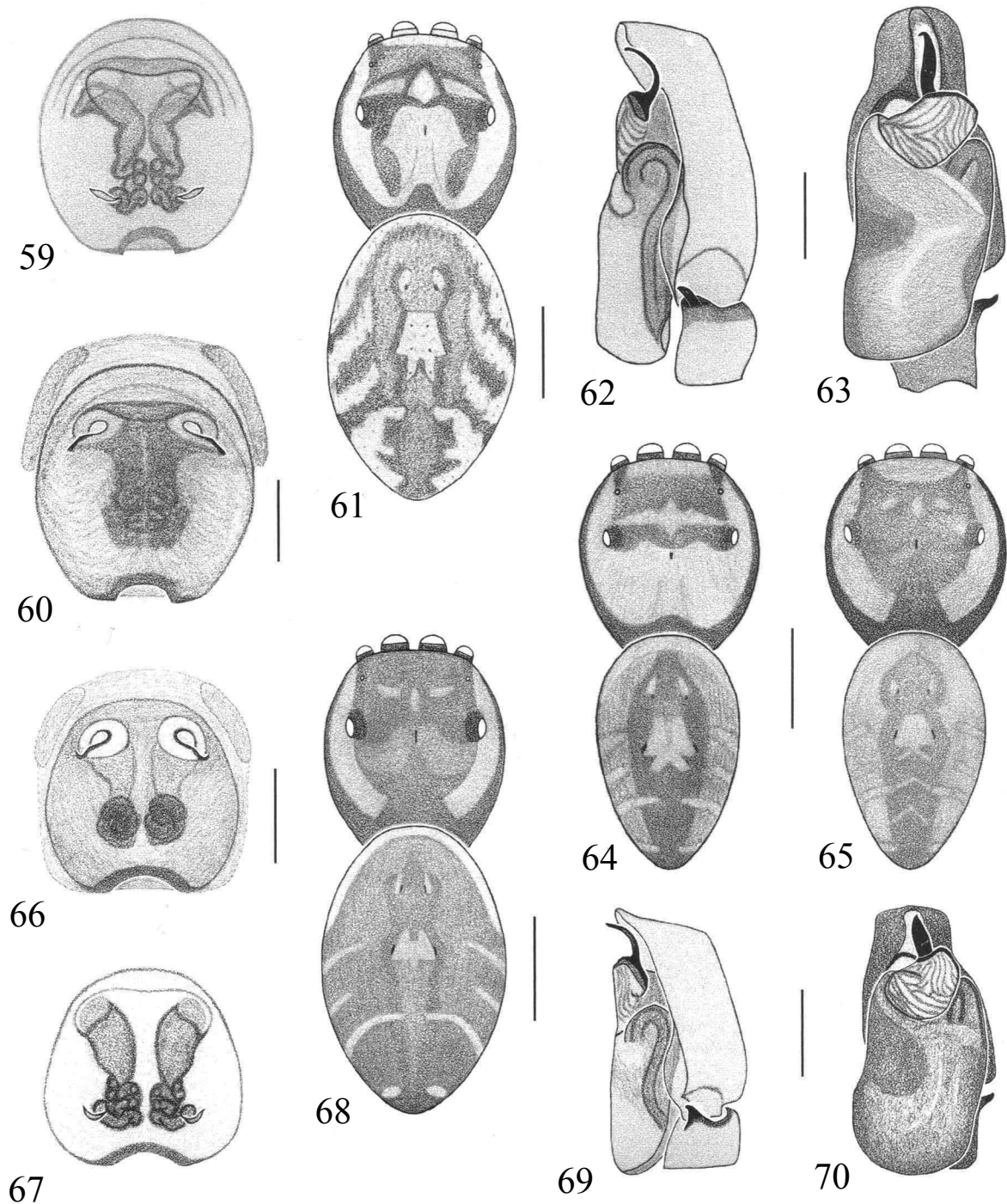


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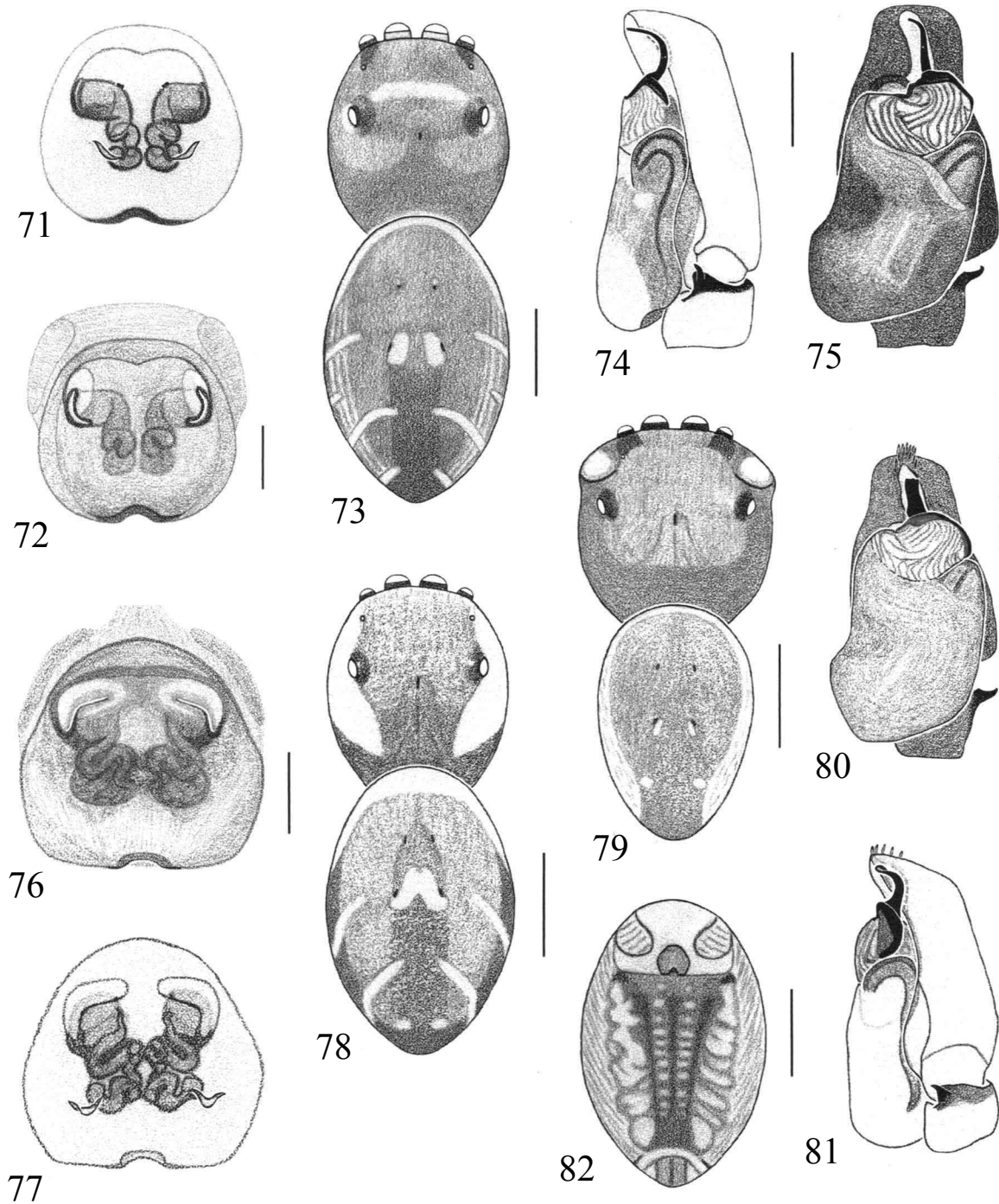
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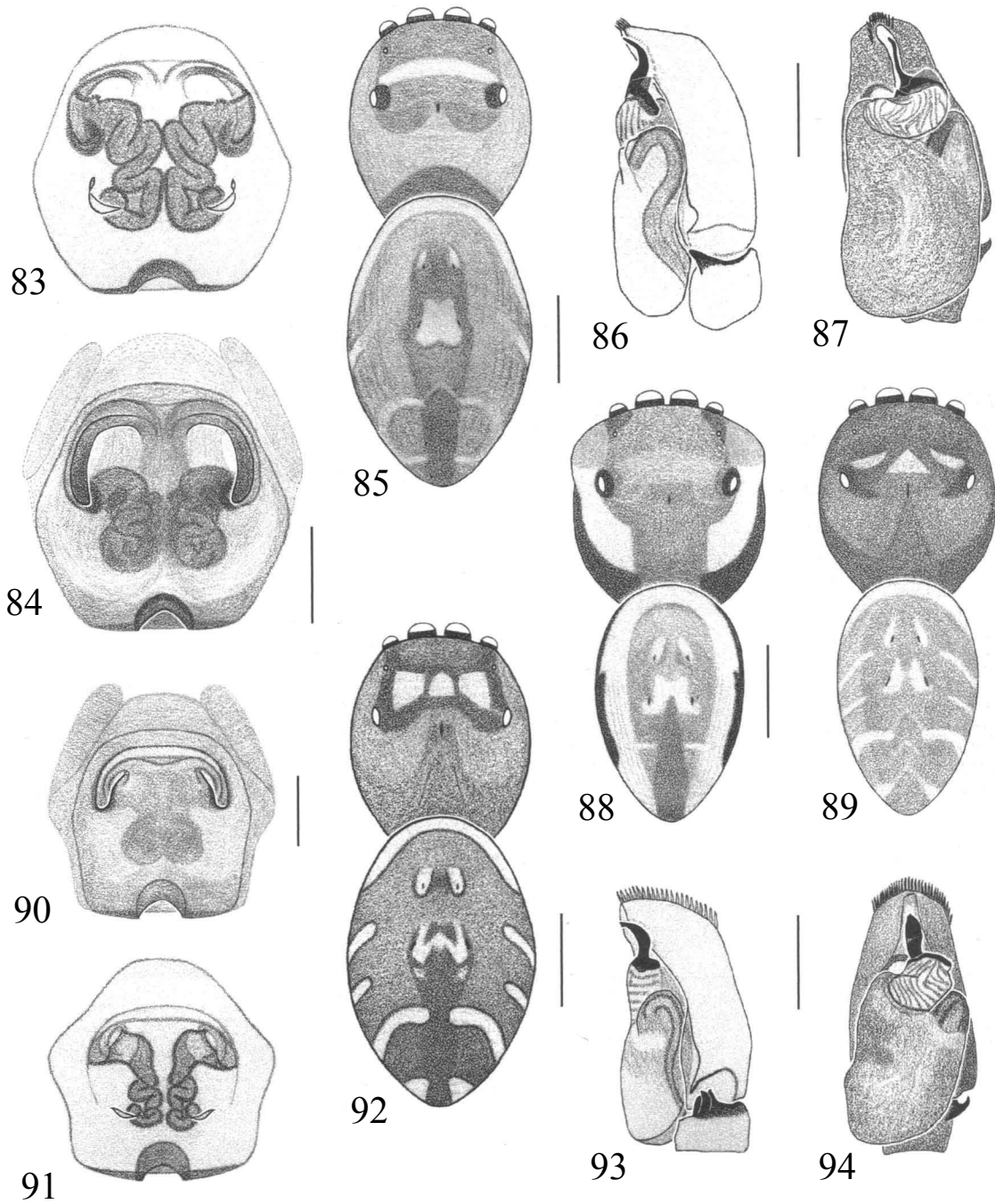
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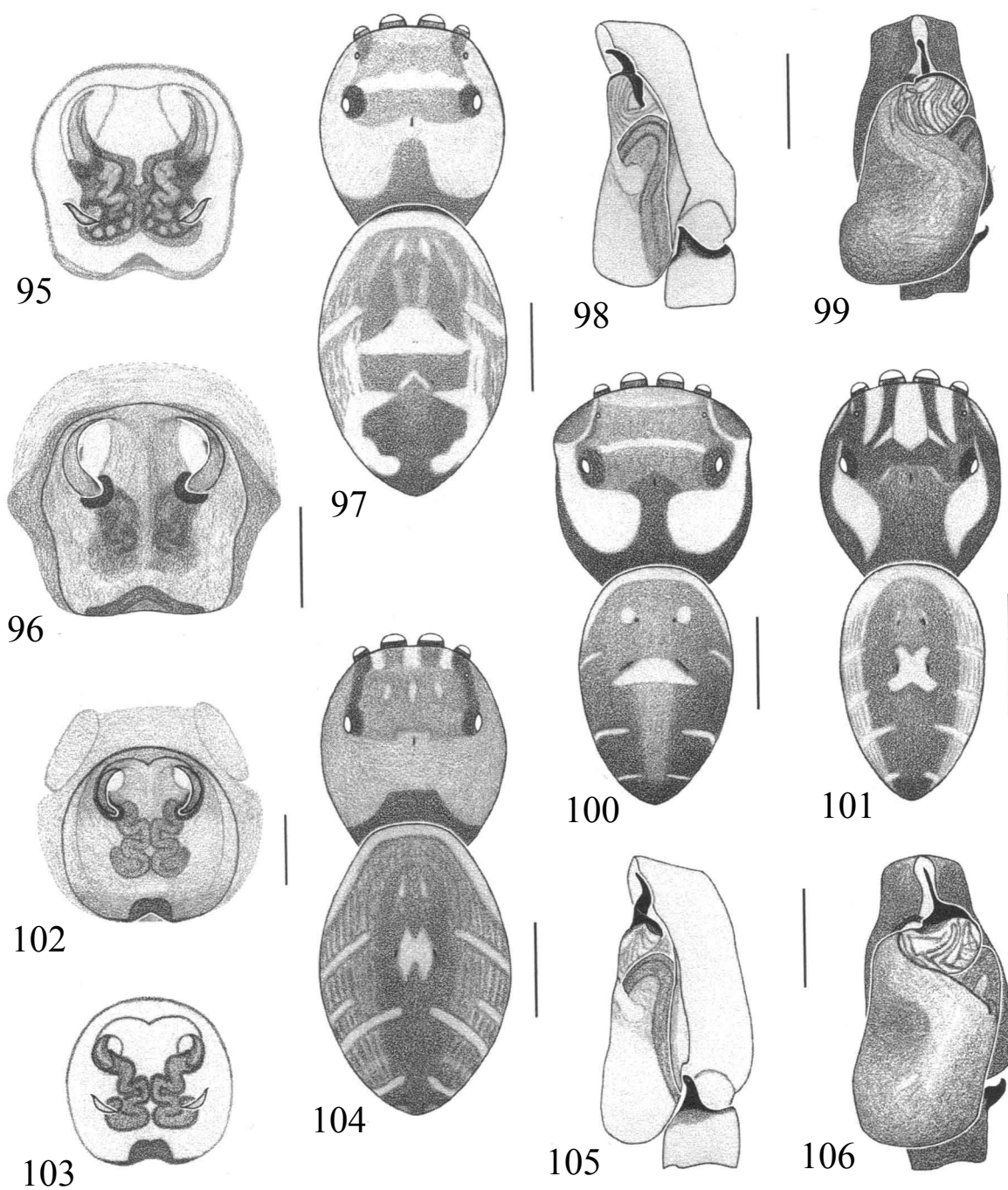
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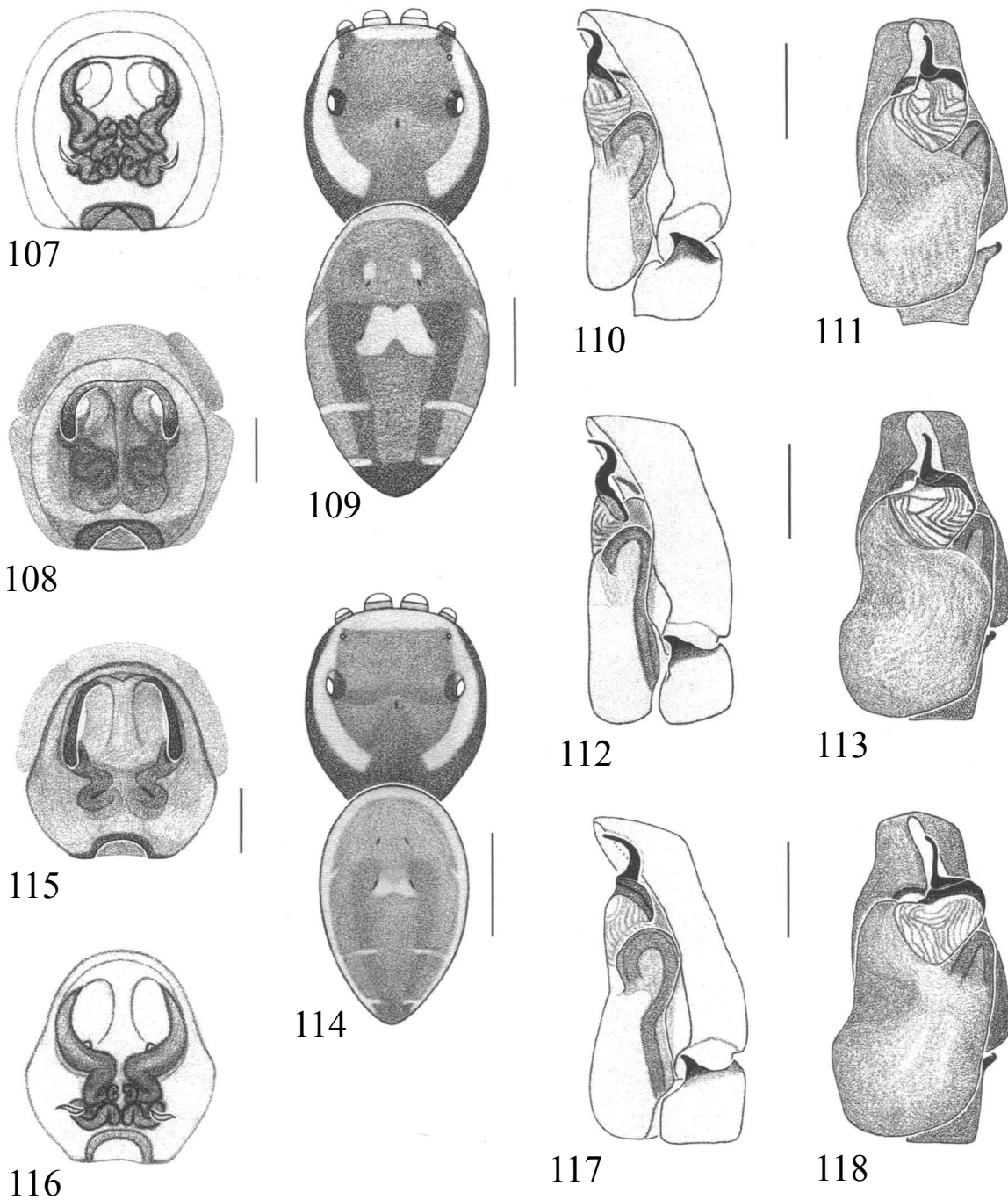
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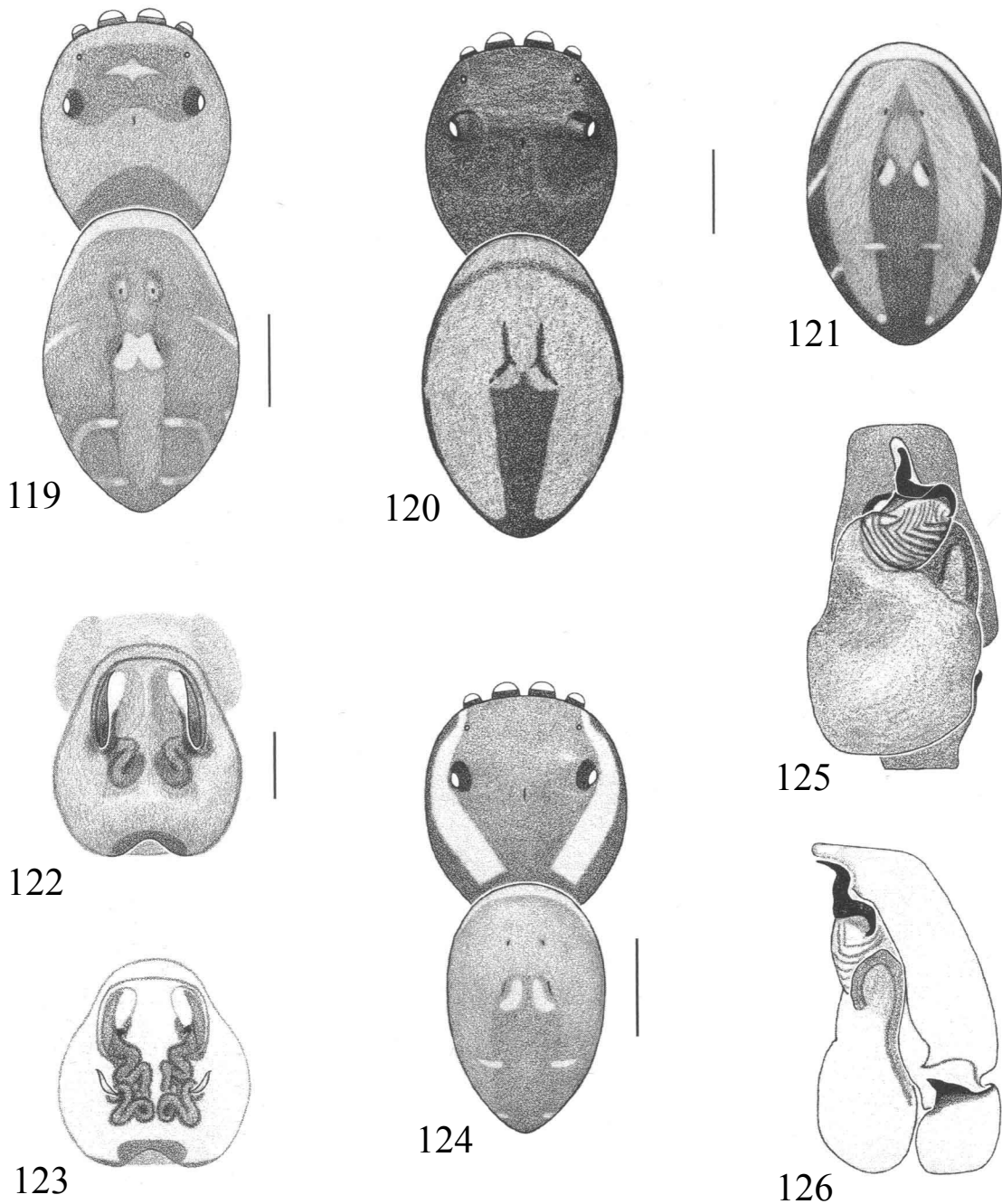
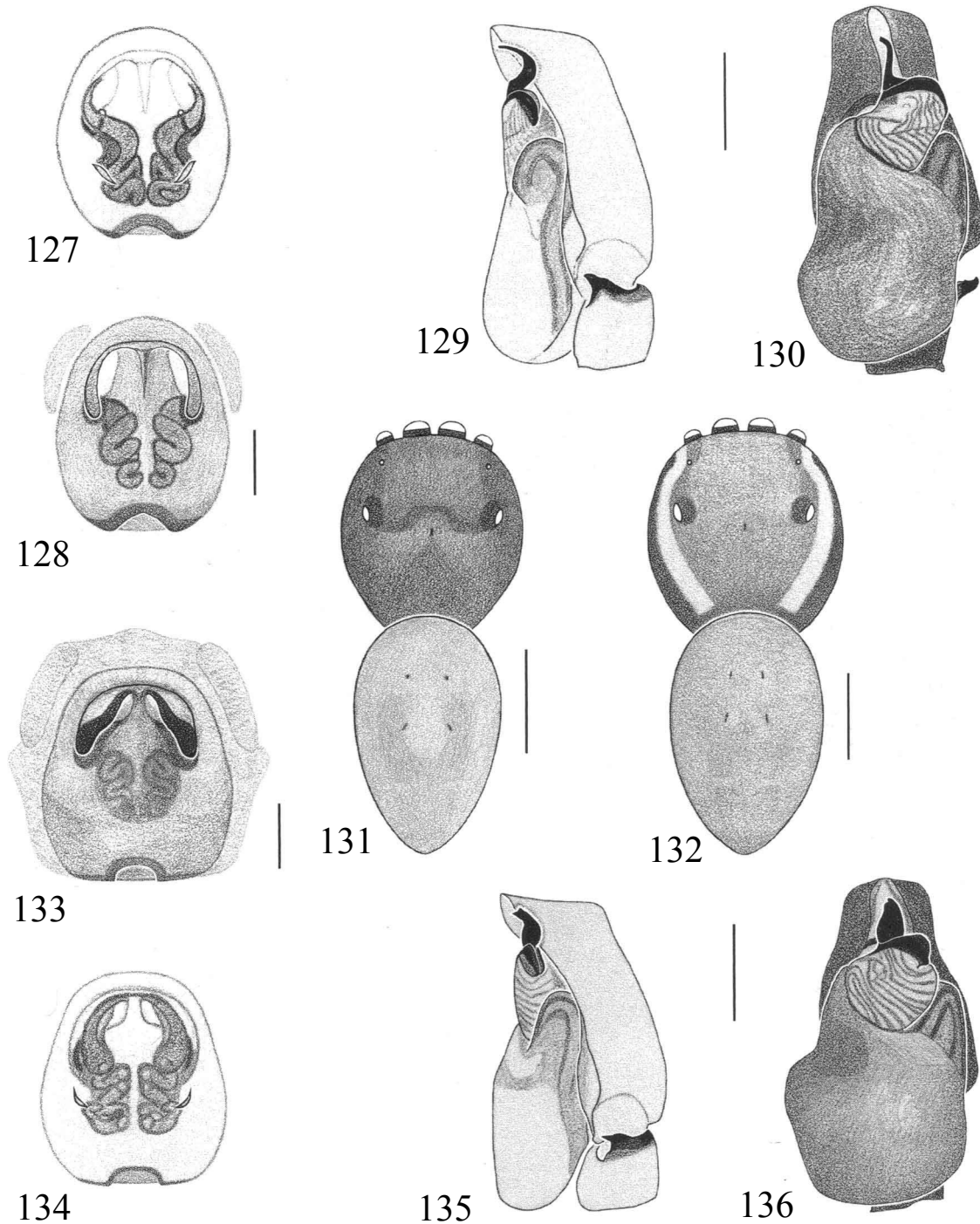
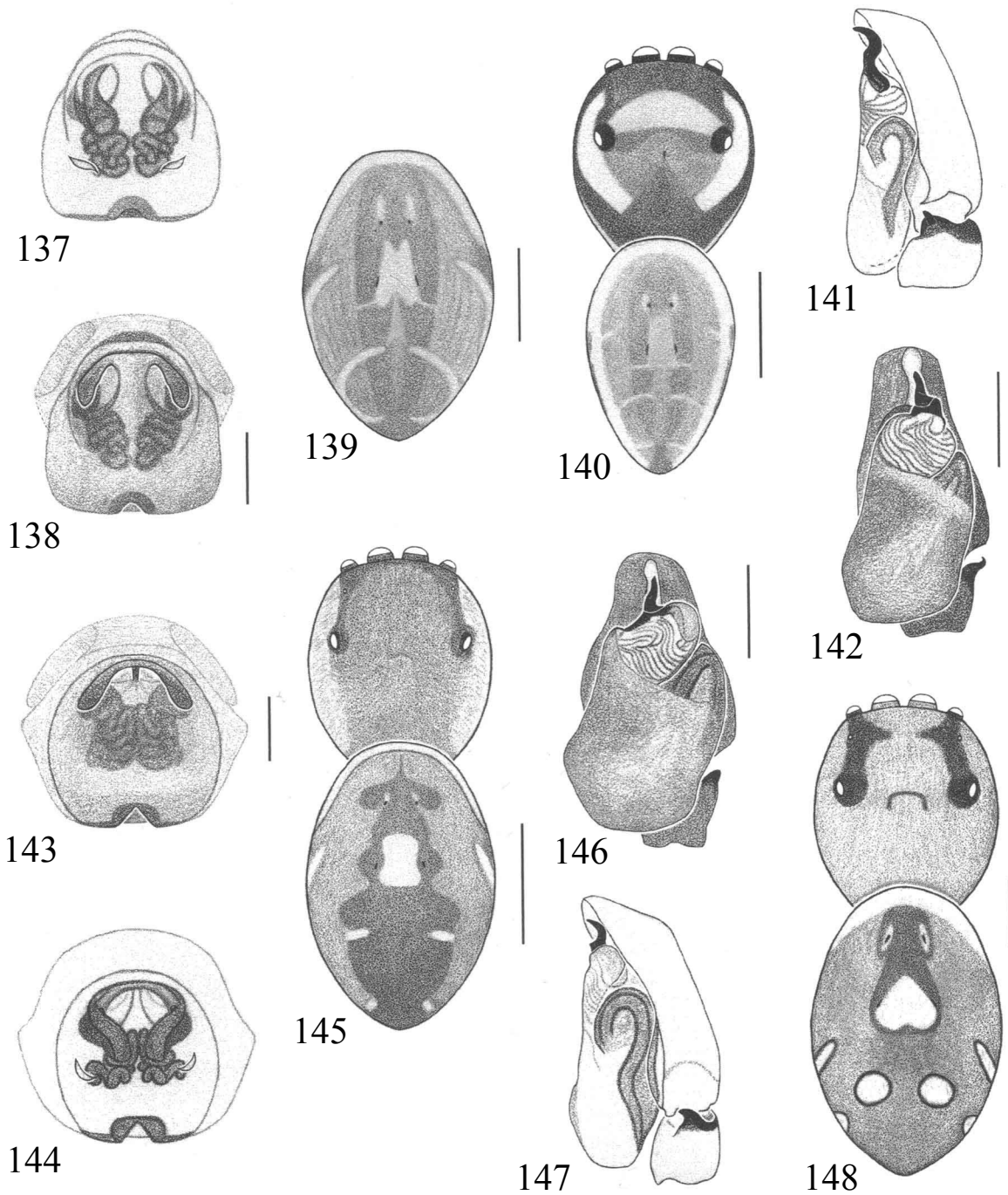


Fig. 119. *Phidippus adumbratus* Gertsch. Female: 119. habitus.

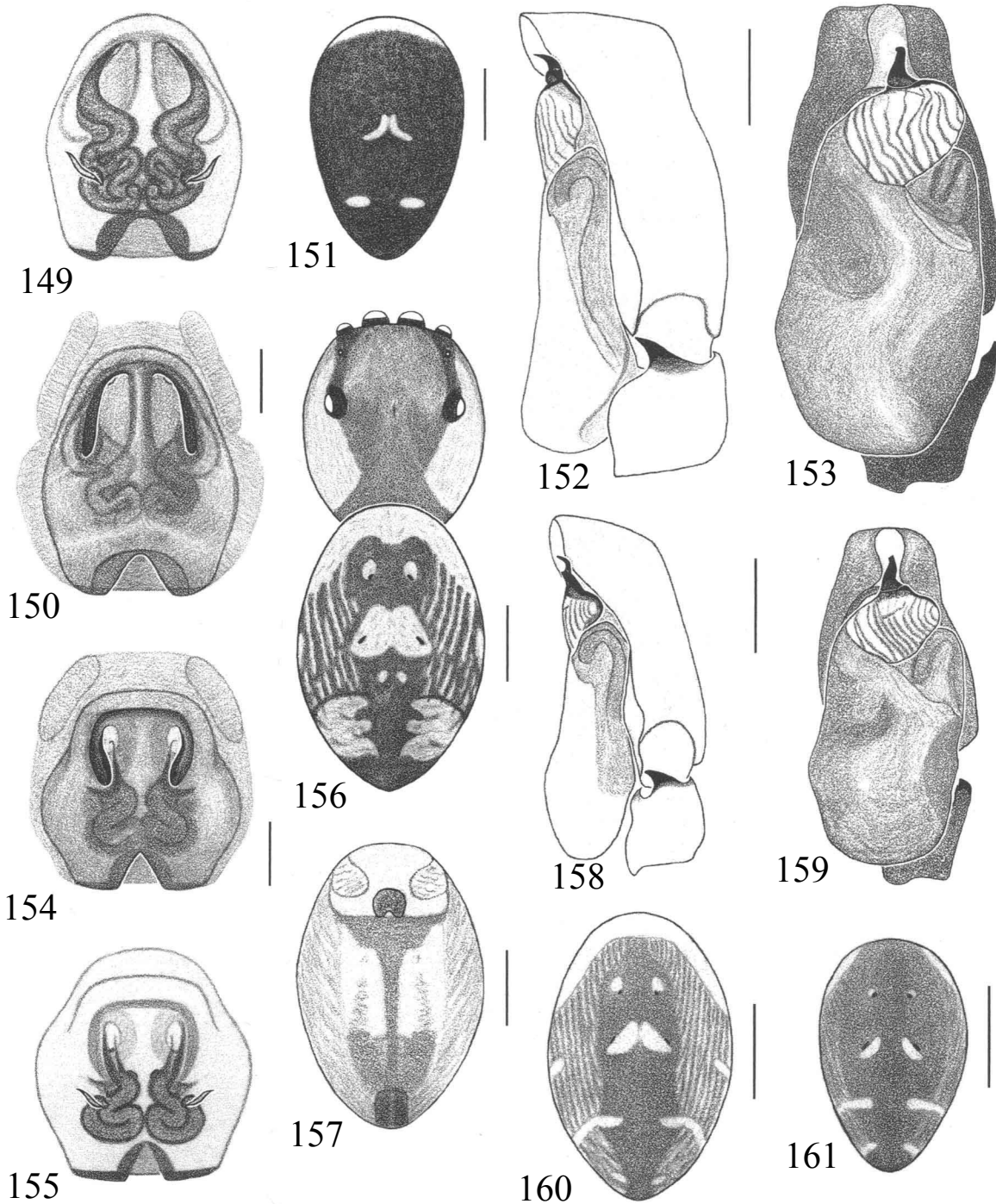
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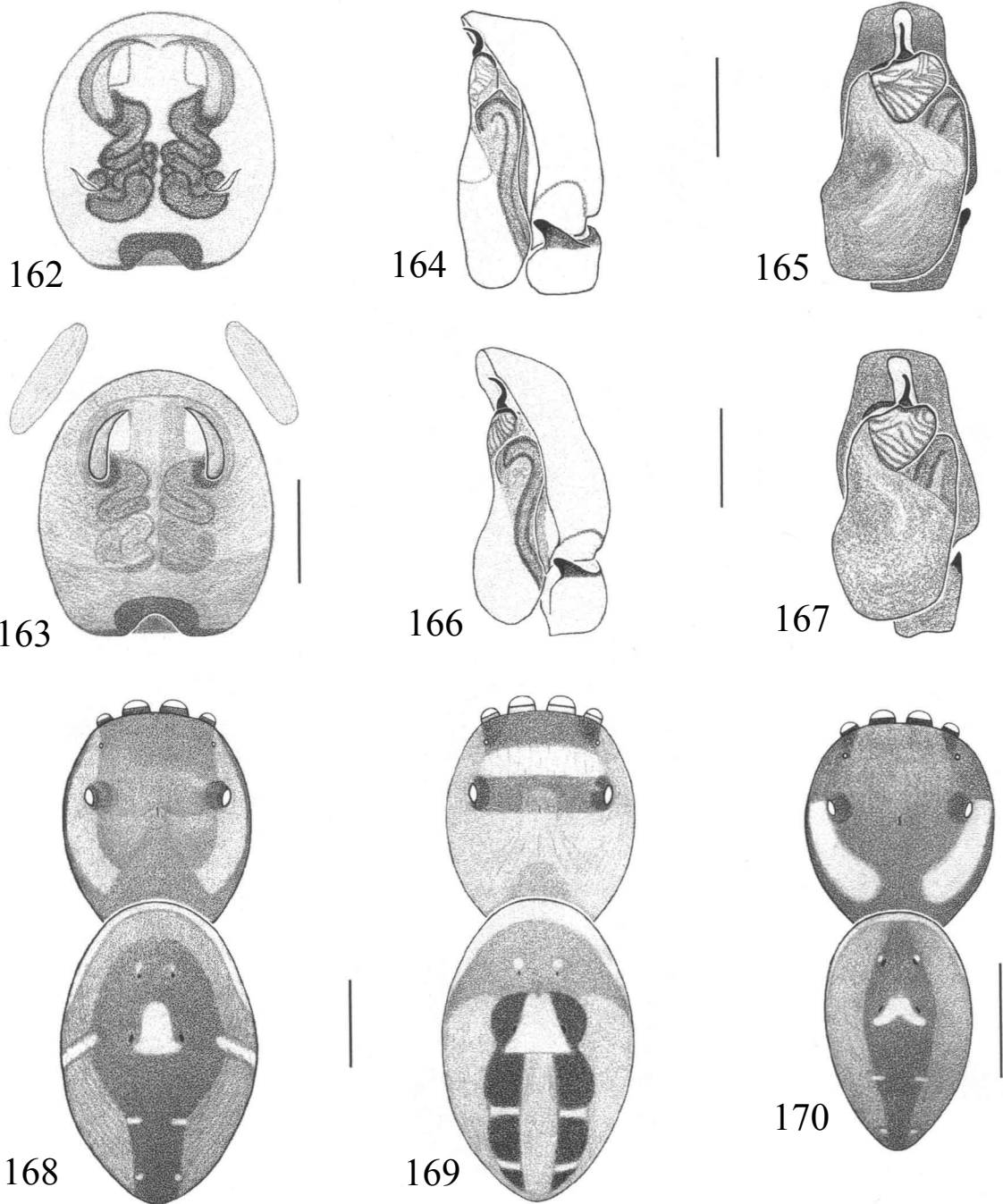
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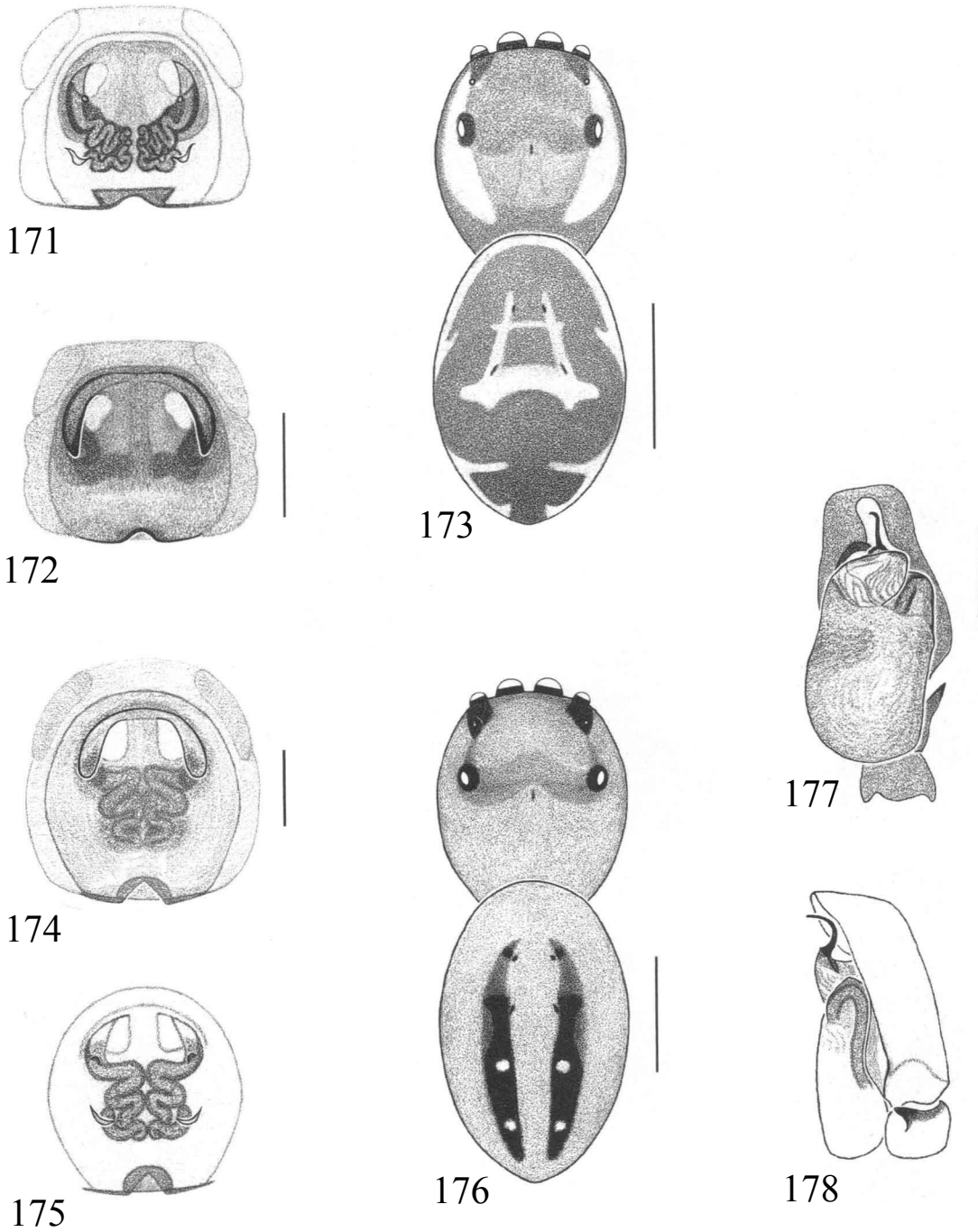
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 Figs. 154-161. *Phidippus otiosus* (Hentz). Female: 154-155. epigynum: 154. ventral view, 155. dorsal view. 156. habitus (Florida). 157. abdominal venter (Florida). 160. abdominal dorsum (Maryland). Male: 158-159. palp: 158. retrolateral view, 159. ventral view. 161. abdominal dorsum (Missouri).

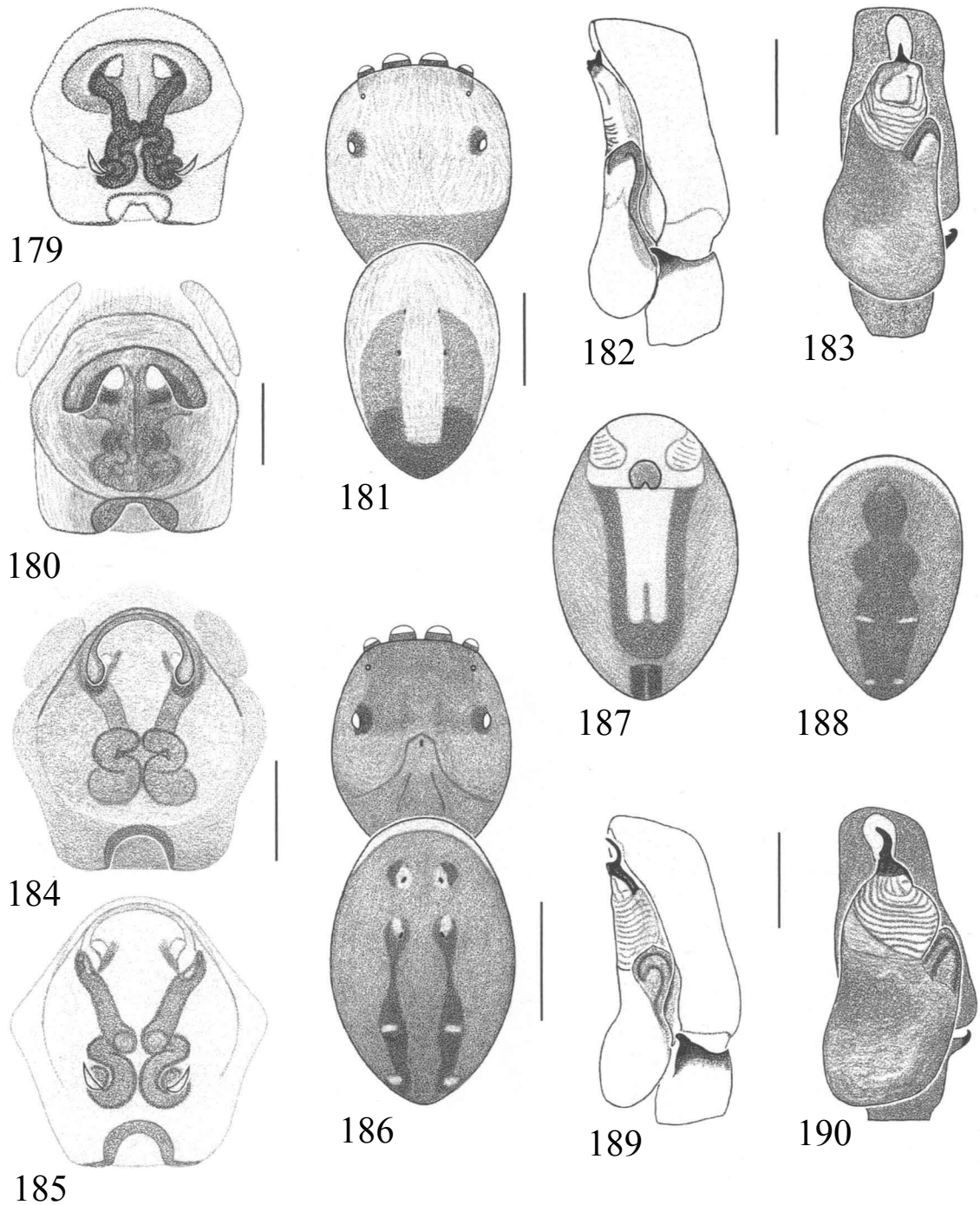


Figs. 162-170. *Phidippus californicus* Peckham & Peckham. Female: 162-163. epigynum: 162. dorsal view, 163. ventral view. 168. habitus (Arizona). 169. habitus (Utah). Male: 164-167. palp: 164, 166. retrolateral view, 165, 167. ventral view (164-165 California, 166-167 Arizona). 170. habitus (Arizona).

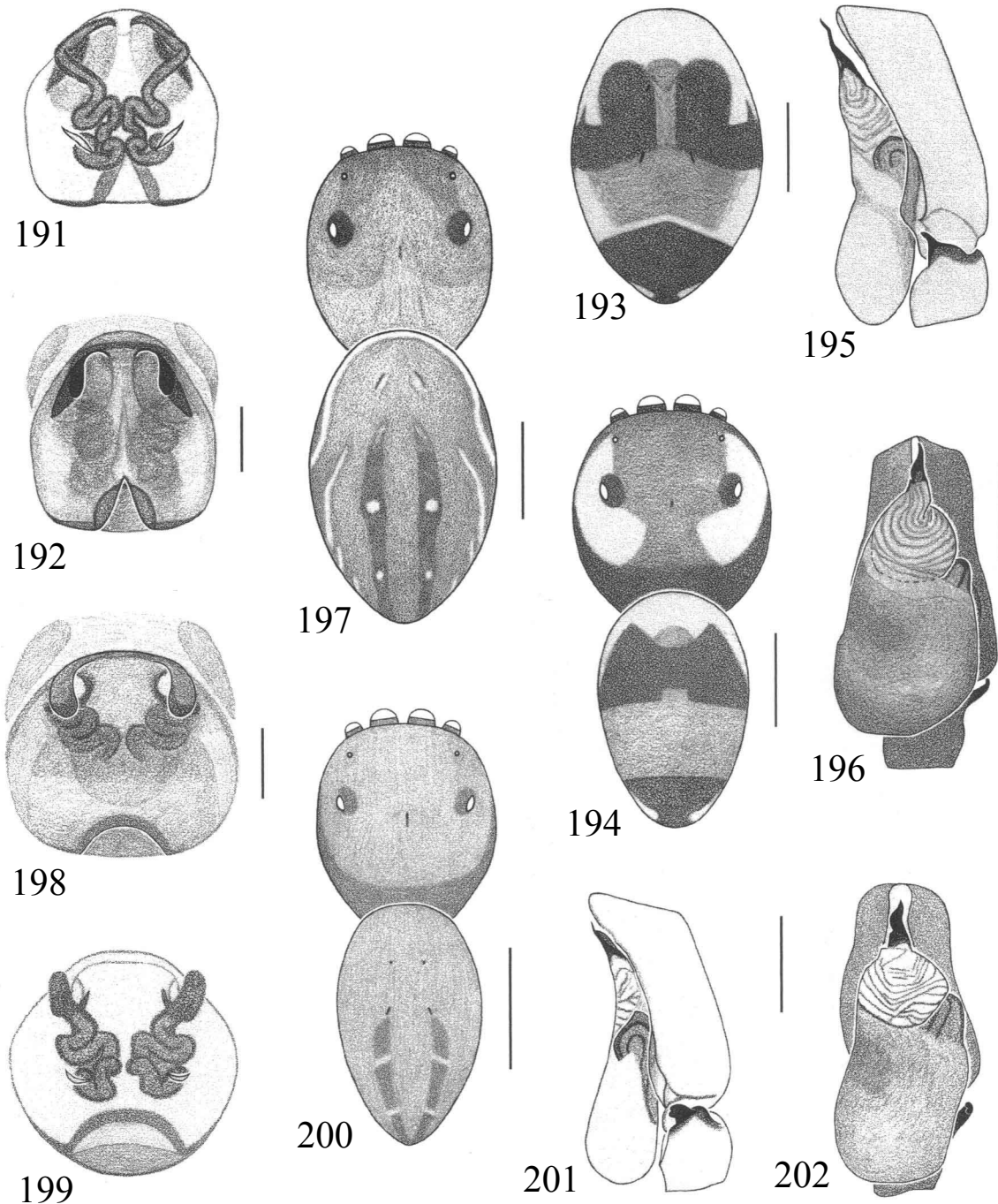


Figs. 171-173. *Phidippus dianthus* Edwards. Female: 171-172. epigynum: 171. dorsal view, 172. ventral view. 173. habitus.

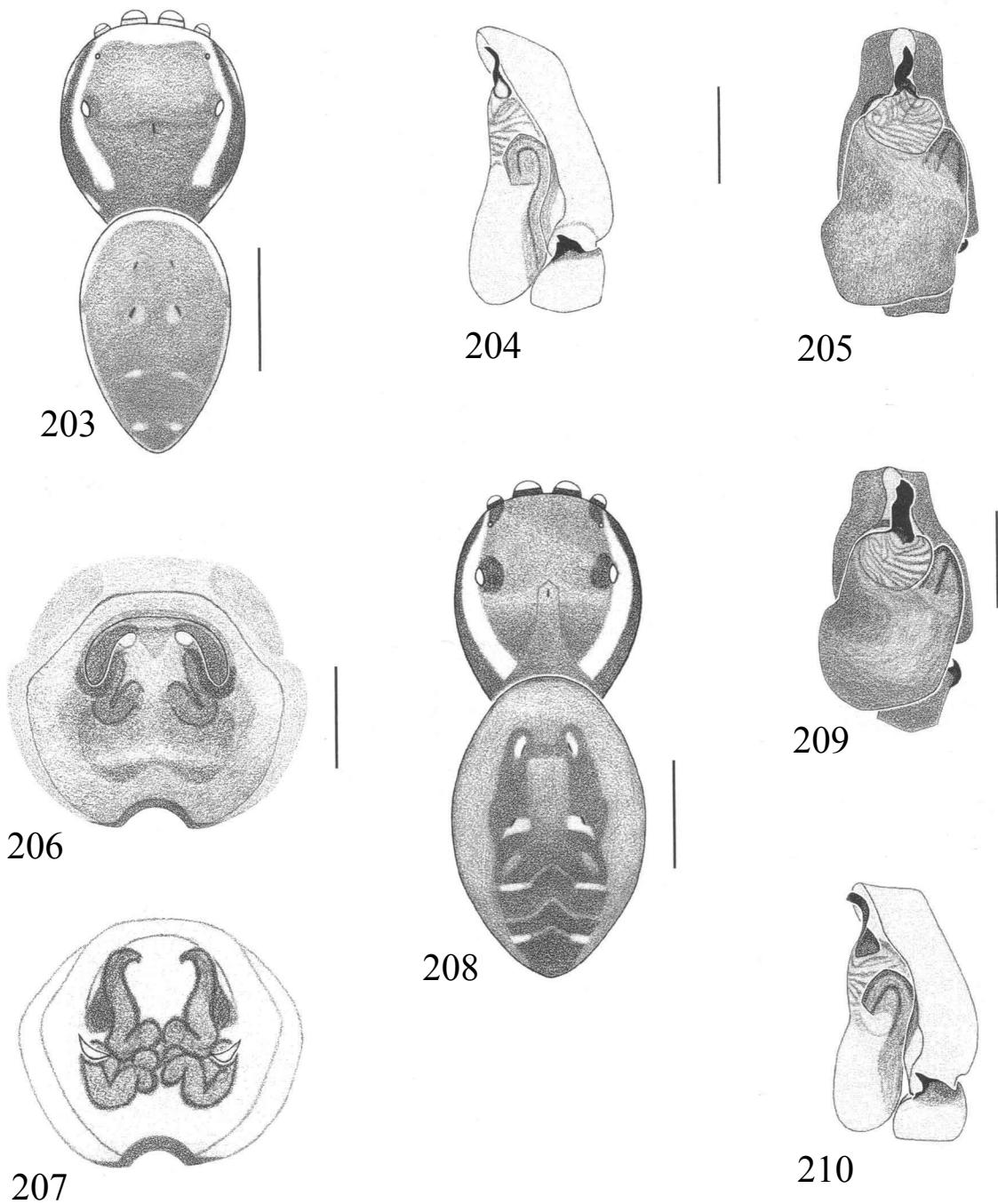
Figs. 174-178. *Phidippus pius* Scheffer. Female: 174-175. epigynum: 174. ventral view, 175. dorsal view. 176. habitus. Male: 177-178. palp: 177. ventral view, 178. retrolateral view.



Figs. 179-183. *Phidippus tux* Pinter. Female: 179-180. epigynum: 179. dorsal view, 180. ventral view. Male: 181. habitus. 182-183. palp: 182. retrolateral view, 183. ventral view.
 Figs. 184-190. *Phidippus clarus* Keyserling. Female: 184-185. epigynum: 184. ventral view, 185. dorsal view. 186. habitus. 187. abdominal venter. Male: 188. abdominal dorsum. 189-190. palp: 189. retrolateral view, 190. ventral view.

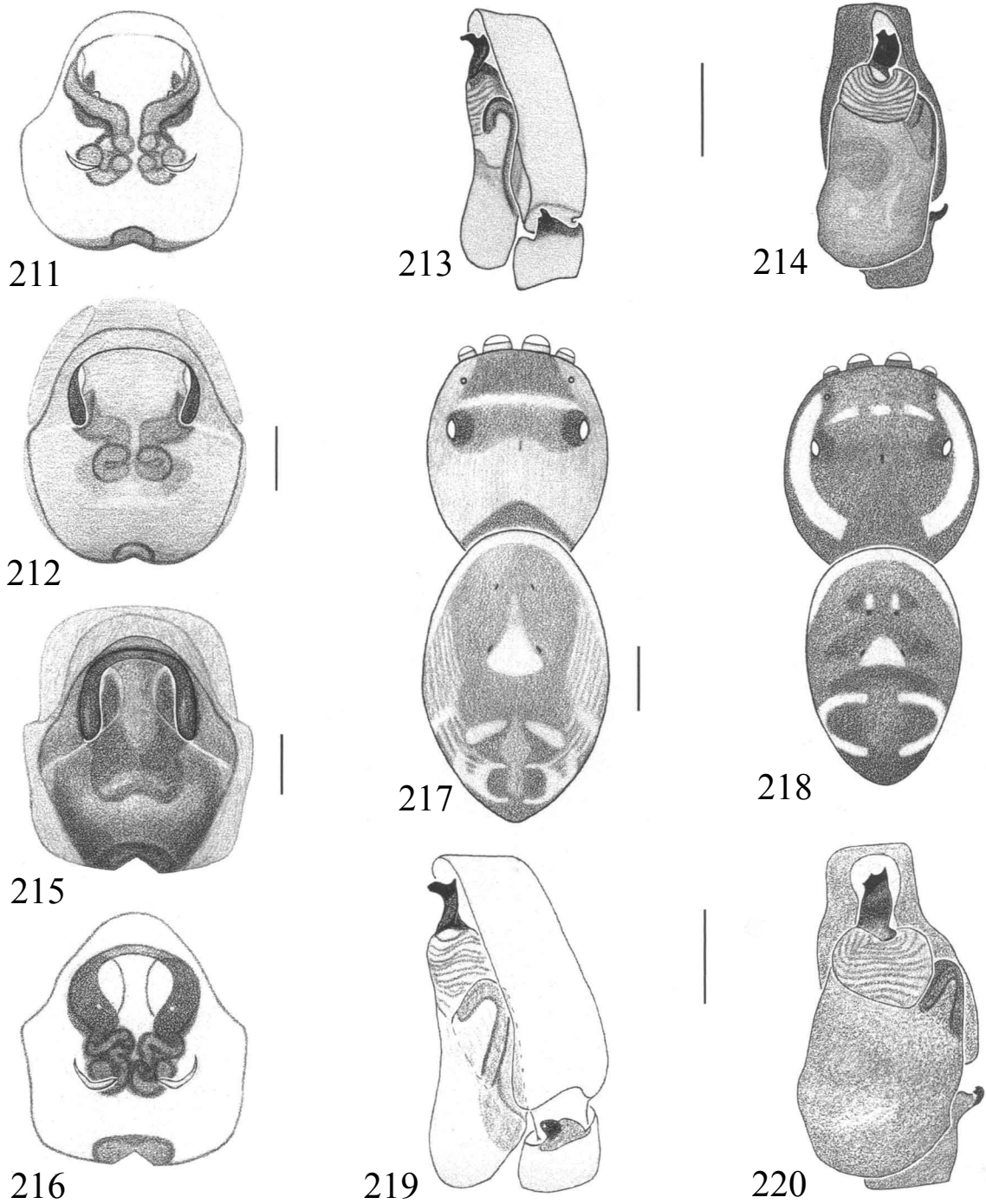


Figs. 191-196. *Phidippus mimicus* Edwards. Female: 191-192. epigynum: 191. dorsal view, 192. ventral view. 193. abdominal dorsum. Male: 194. habitus. 195-196. palp: 195. retrolateral view, 196. ventral view.
 Figs. 197-202. *Phidippus cardinalis* (Hentz). Female: 197. habitus (Florida). 198-199. epigynum: 198. ventral view, 199. dorsal view. Male: 200. habitus (Arkansas). 201-202. palp: 201. retrolateral view, 202. ventral view.

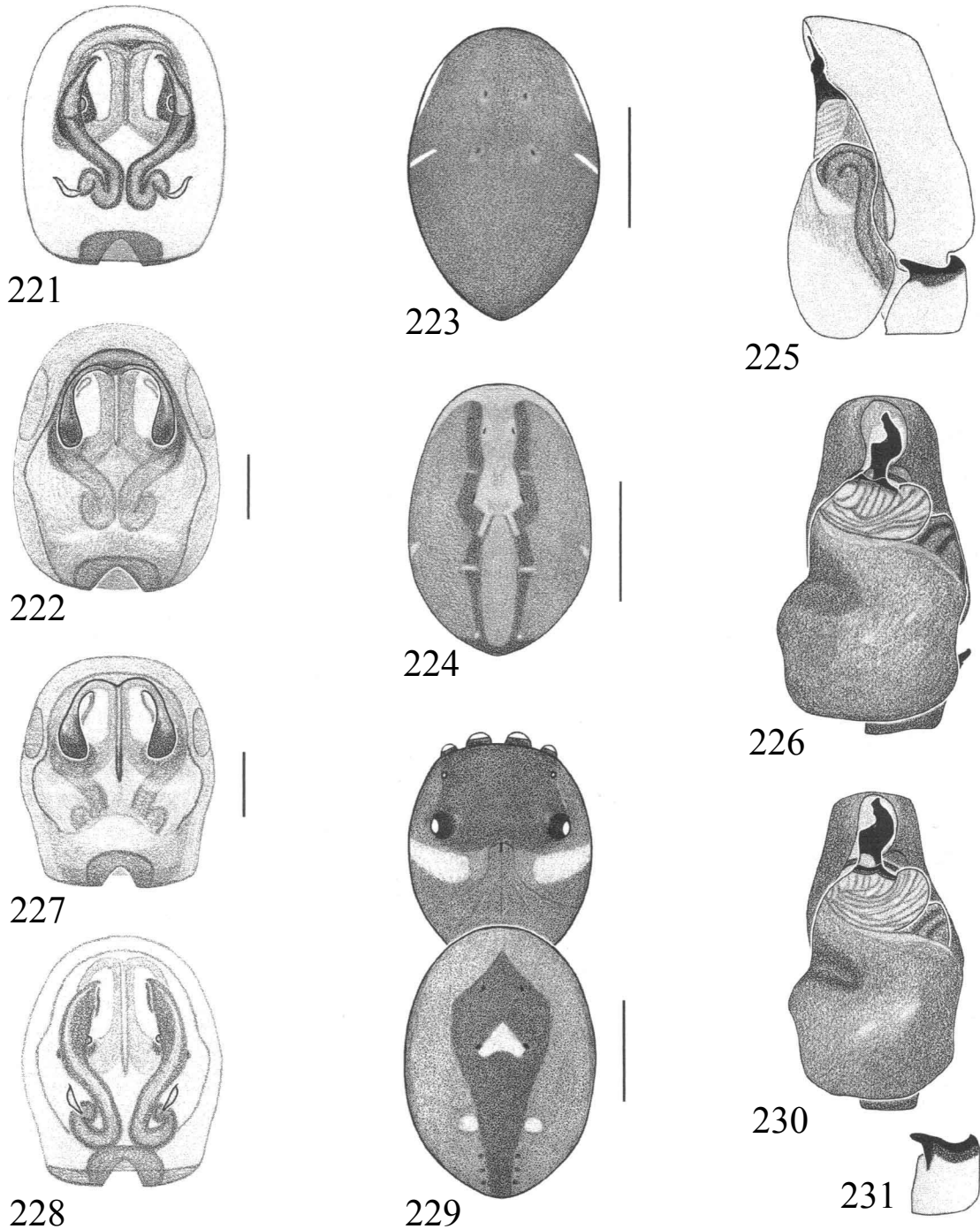


Figs. 203-205. *Phidippus venus* Edwards. Male: 203. habitus. 204-205. palp: 204. retrolateral view, 205. ventral view.

Figs. 206-210. *Phidippus cerberus* Edwards. Female: 206-207. epigynum: 206. ventral view, 207. dorsal view. 208. habitus. Male: 209-210. palp: 209. ventral view, 210. retrolateral view.

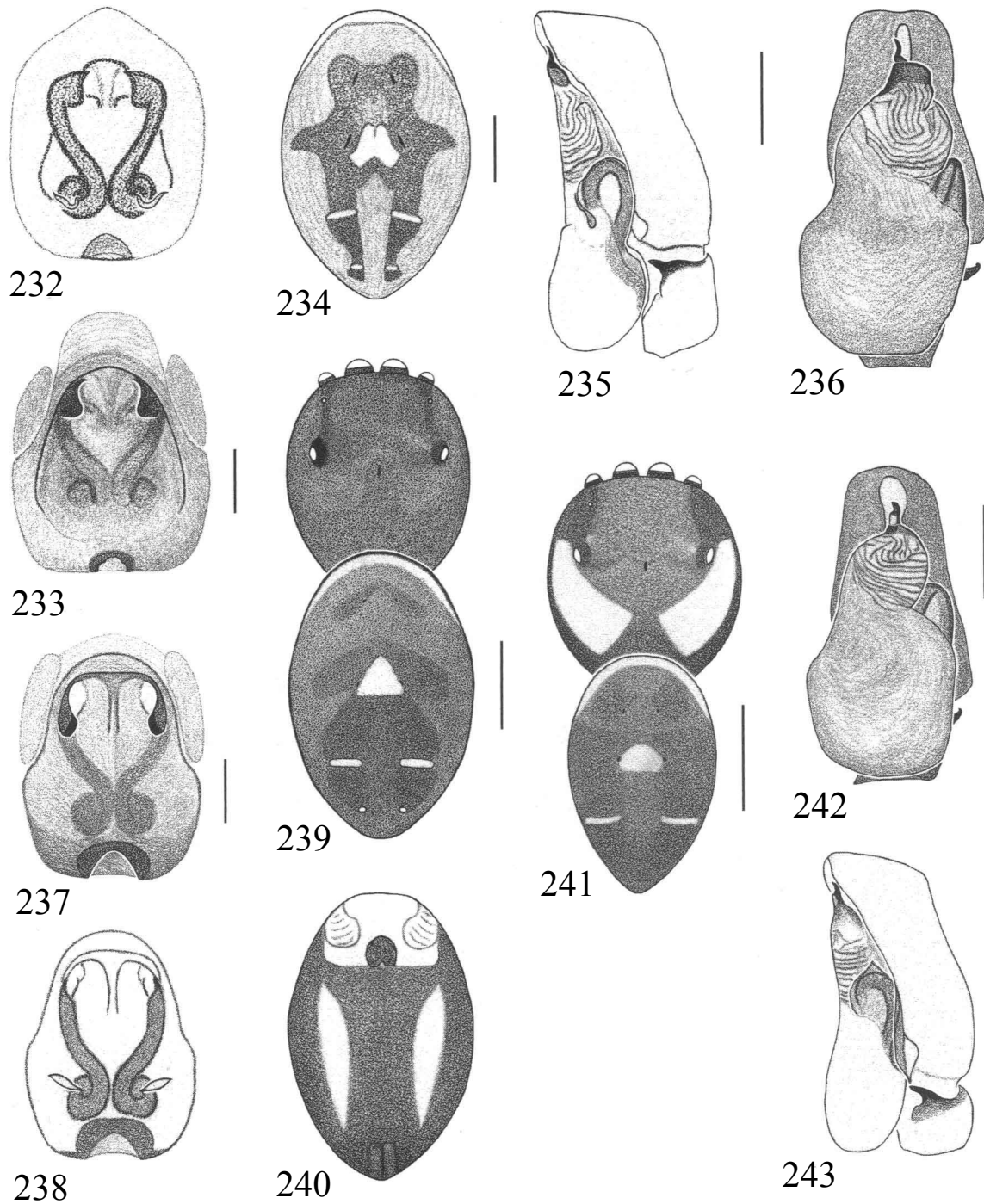


Figs. 211-214. *Phidippus maddisoni* Edwards. Female: 211-212. epigynum: 211. dorsal view, 212. ventral view. Male: 213-214. palp: 213. retrolateral view, 214. ventral view.
 Figs. 215-220. *Phidippus albulatus* F.O.P.C. Female: 215-216. epigynum: 215. ventral view, 216. dorsal view. 217. habitus. Male: 218. habitus. 219-220. palp: 219. retrolateral view, 220. ventral view.

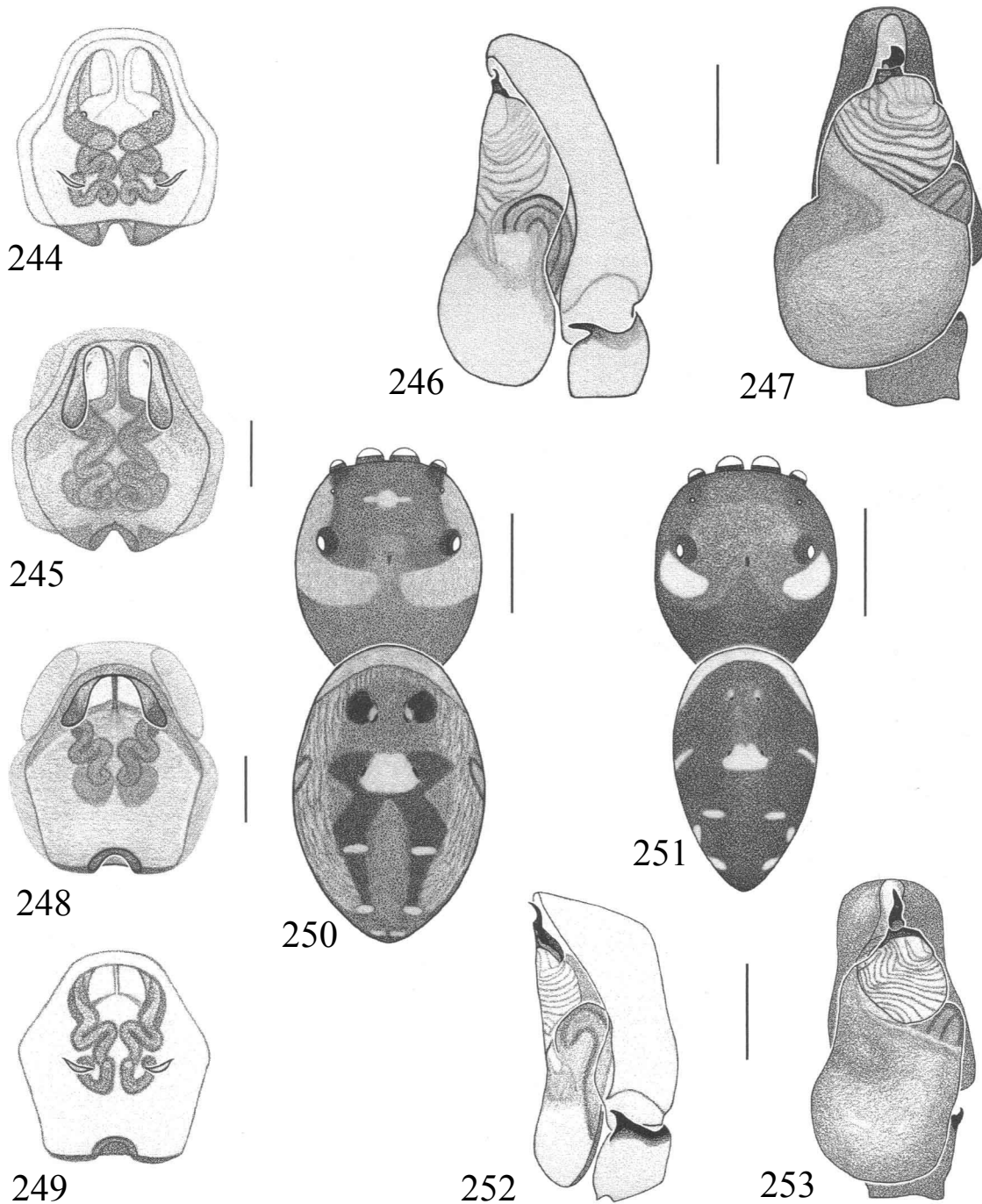


Figs. 221-226. *Phidippus princeps* (Peckham & Peckham). Female: 221-222. epigynum: 221. dorsal view, 222. ventral view. 223. abdominal dorsum (Illinois). 224. abdominal dorsum (North Carolina, *dorsalis* form). Male: 225-226. palp: 225. retrolateral view, 226. ventral view.

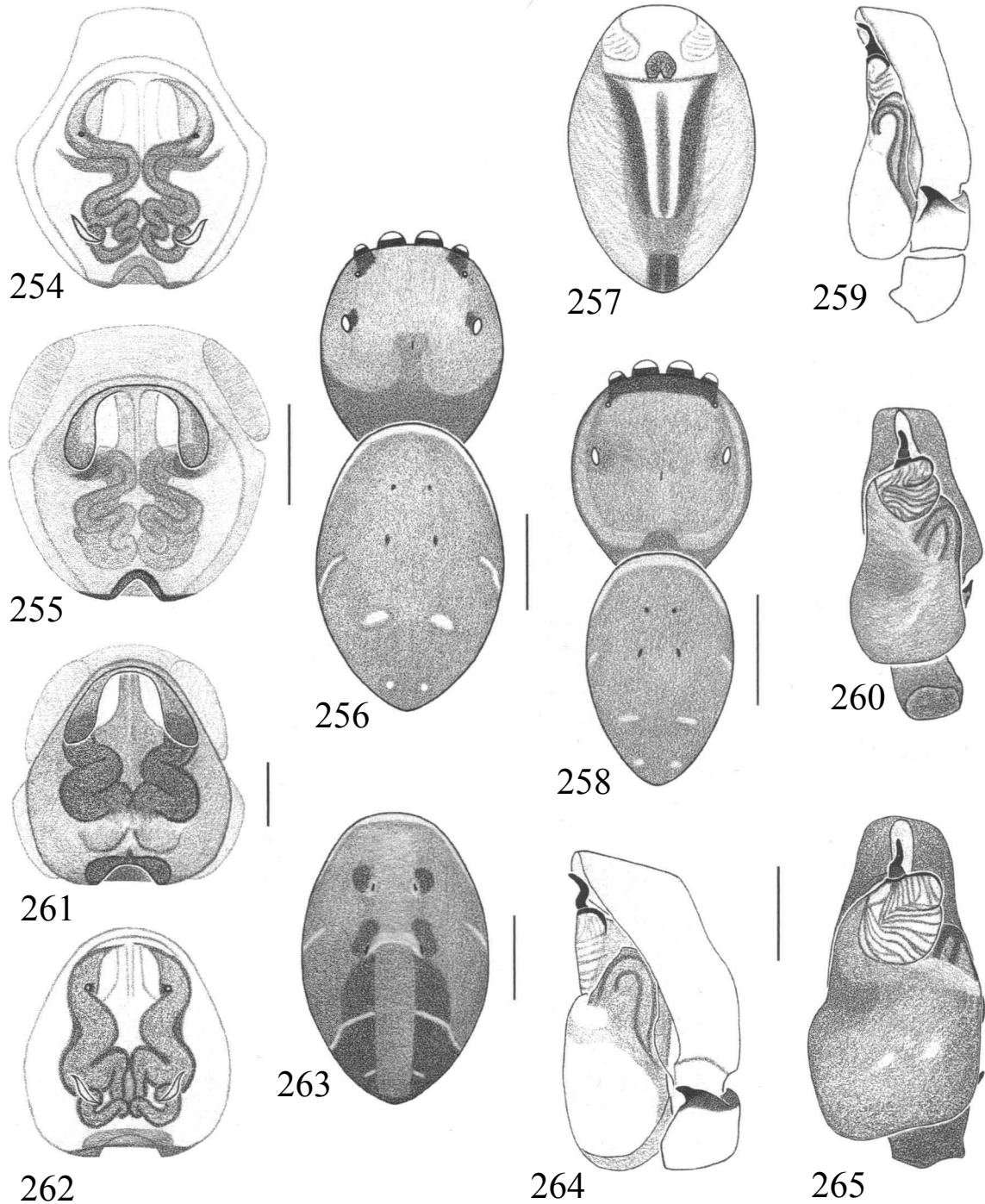
Figs. 227-231. *Phidippus pulcherrimus* Keyserling. Female: 227-228. epigynum: 227. ventral view, 228. dorsal view. 229. habitus. Male: 230-231. palp: 230. ventral view, 231. tibia retrolateral view.



Figs. 232-236. *Phidippus bidentatus* F.O.P.C. Female: 232-233. epigynum: 232. dorsal view, 233. ventral view. 234. abdominal dorsum. Male: 235-236. palp: 235. retrolateral view, 236. ventral view.
 Figs. 237-243. *Phidippus audax* (Hentz). Female: 237-238. epigynum: 237. ventral view, 238. dorsal view. 239. habitus (Arkansas). 240. abdominal venter. Male: 241. habitus (Florida). 242-243. palp: 242. ventral view, 243. retrolateral view.

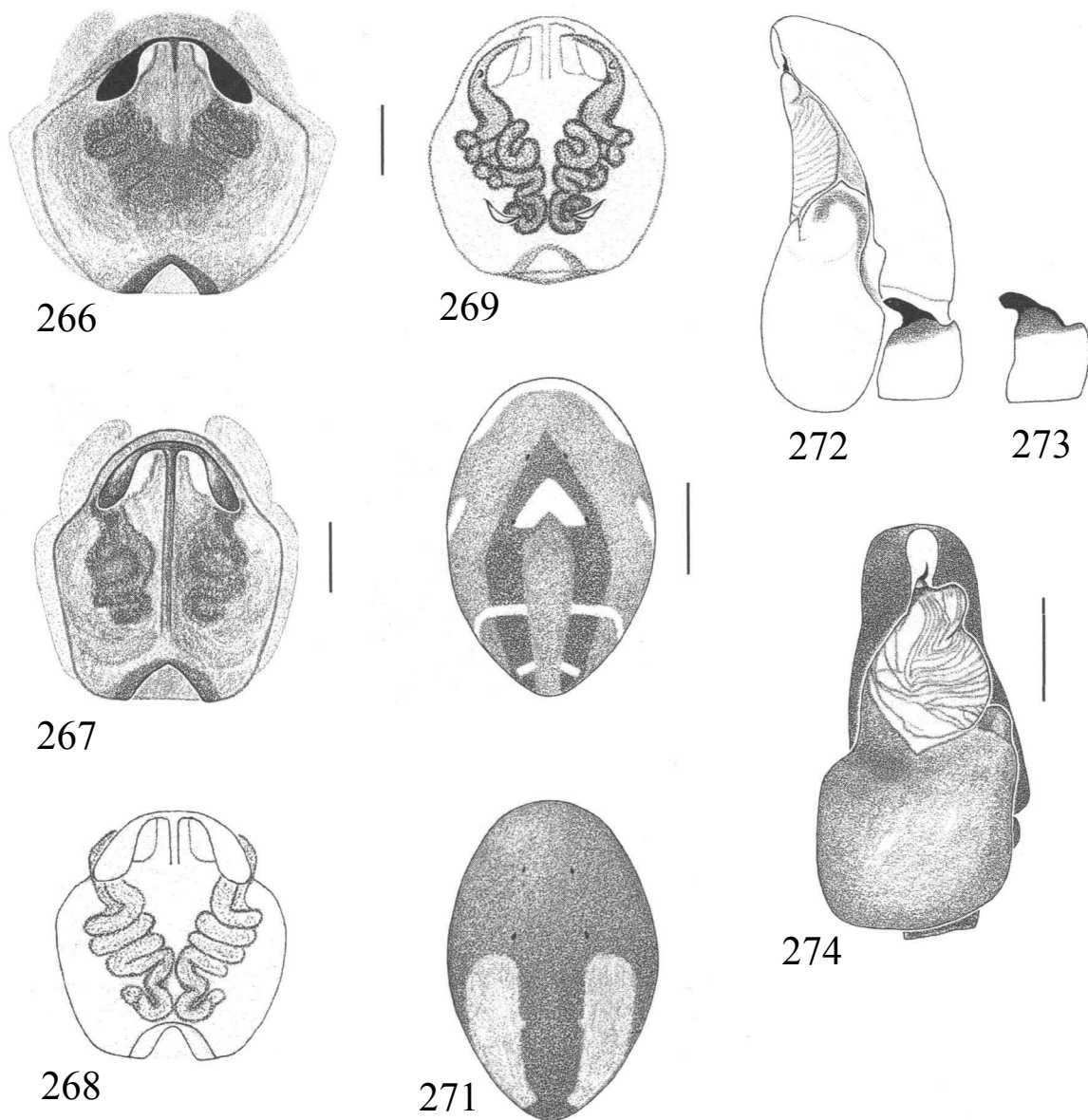


Figs. 244-247. *Phidippus felinus* Edwards. Female: 244-245. epigynum: 244. dorsal view, 245. ventral view. Male: 246-247. palp: 246. retrolateral view, 247. ventral view.
 Figs. 248-253. *Phidippus workmani* Peckham & Peckham. Female: 248-249. epigynum: 248. ventral view, 249. dorsal view. 250. habitus. Male: 251. habitus. 252-253. palp: 252. retrolateral view, 253. ventral view.

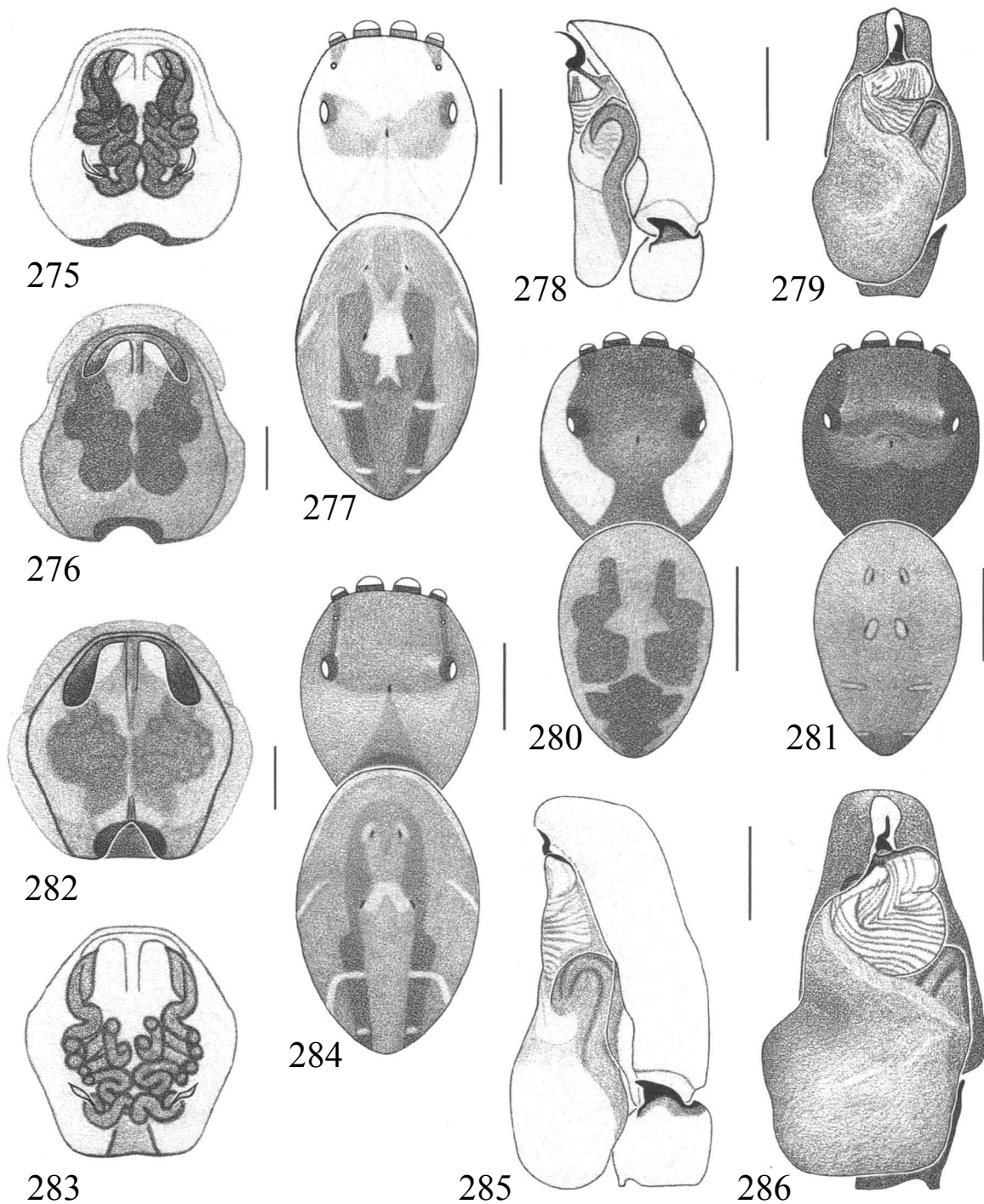


Figs. 254-260. *Phidippus whitmani* Peckham & Peckham. Female: 254-255. epigynum: 254. dorsal view, 255. ventral view. 256. habitus. 257. abdominal venter. Male: 258. habitus. 259-260. palp: 259. retrolateral view, 260. ventral view.

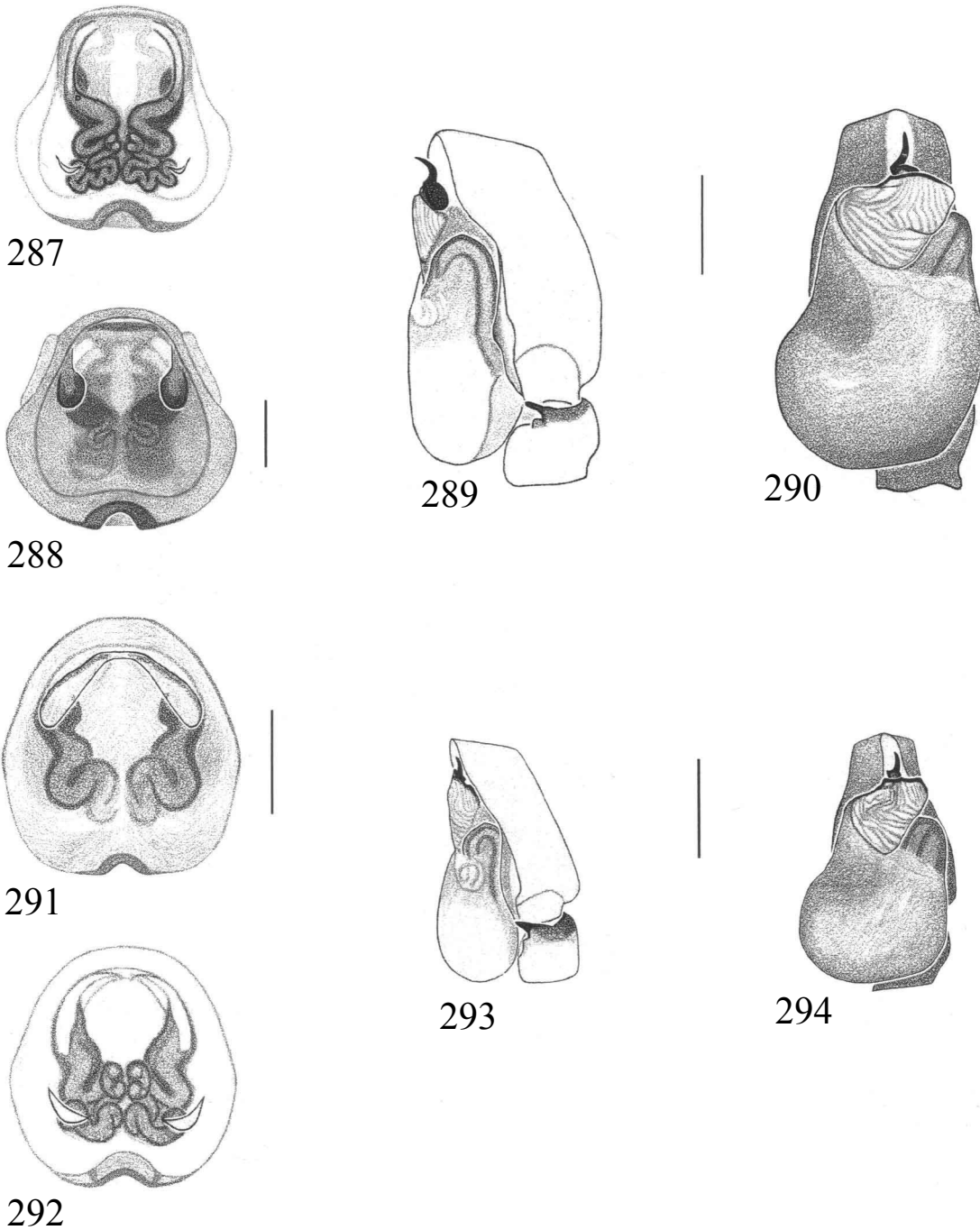
Figs. 261-265. *Phidippus cryptus* Edwards. Female: 261-262. epigynum: 261. ventral view, 262. dorsal view. 263. abdominal dorsum. Male: 264-265. palp: 264. retrolateral view, 265. ventral view.



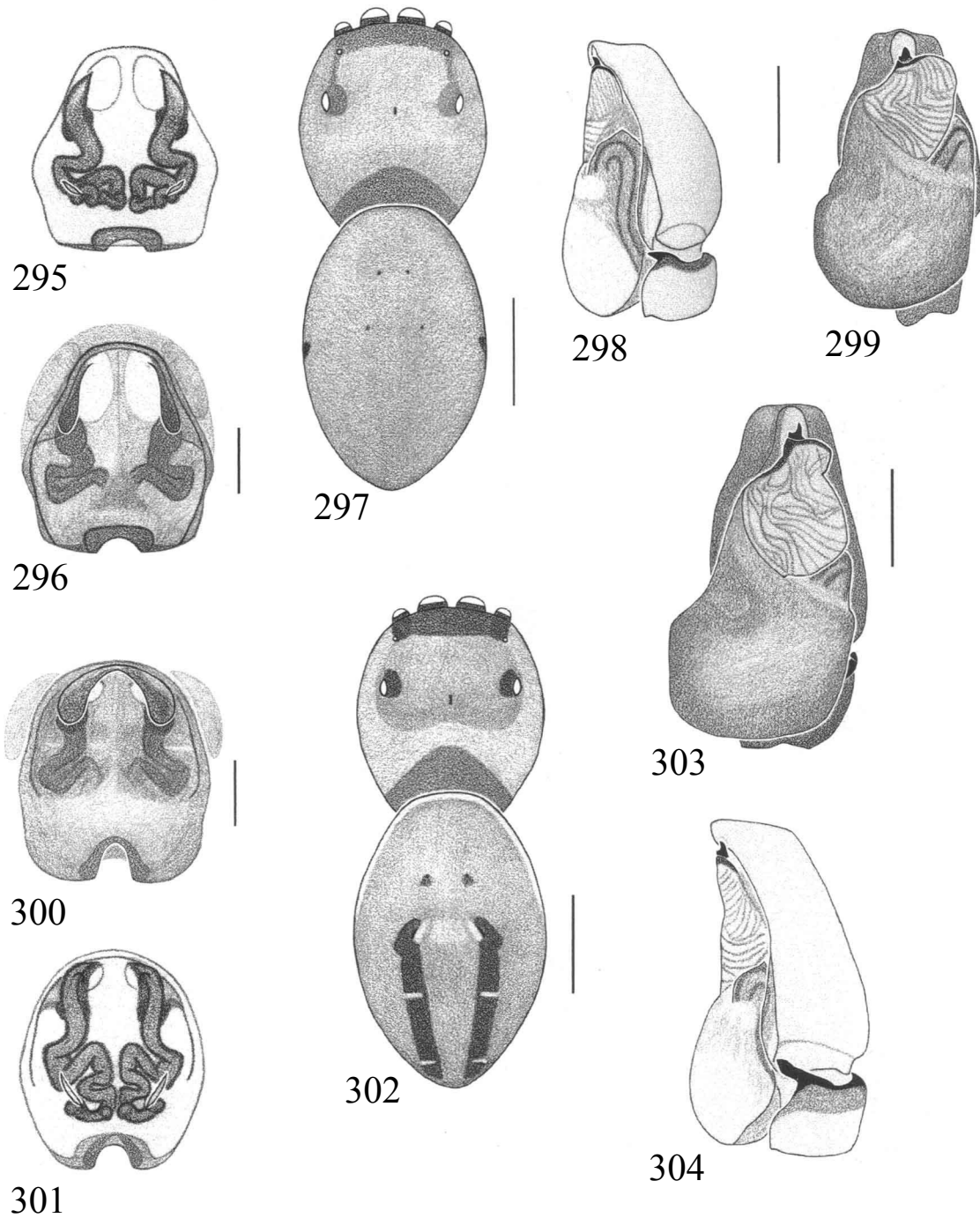
Figs. 266-274. *Phidippus johnsoni* (Peckham & Peckham). Female: 266-269. epigynum: 266. ventral view, 267. ventral view, variant, 268. ventral view, cleared, 269. dorsal view. 270. abdominal dorsum (California). 271. abdominal dorsum (Wyoming). Male: 272-274. palp: 272. retrolateral view, 273. tibia retrolateral view, common variant, 274. ventral view.



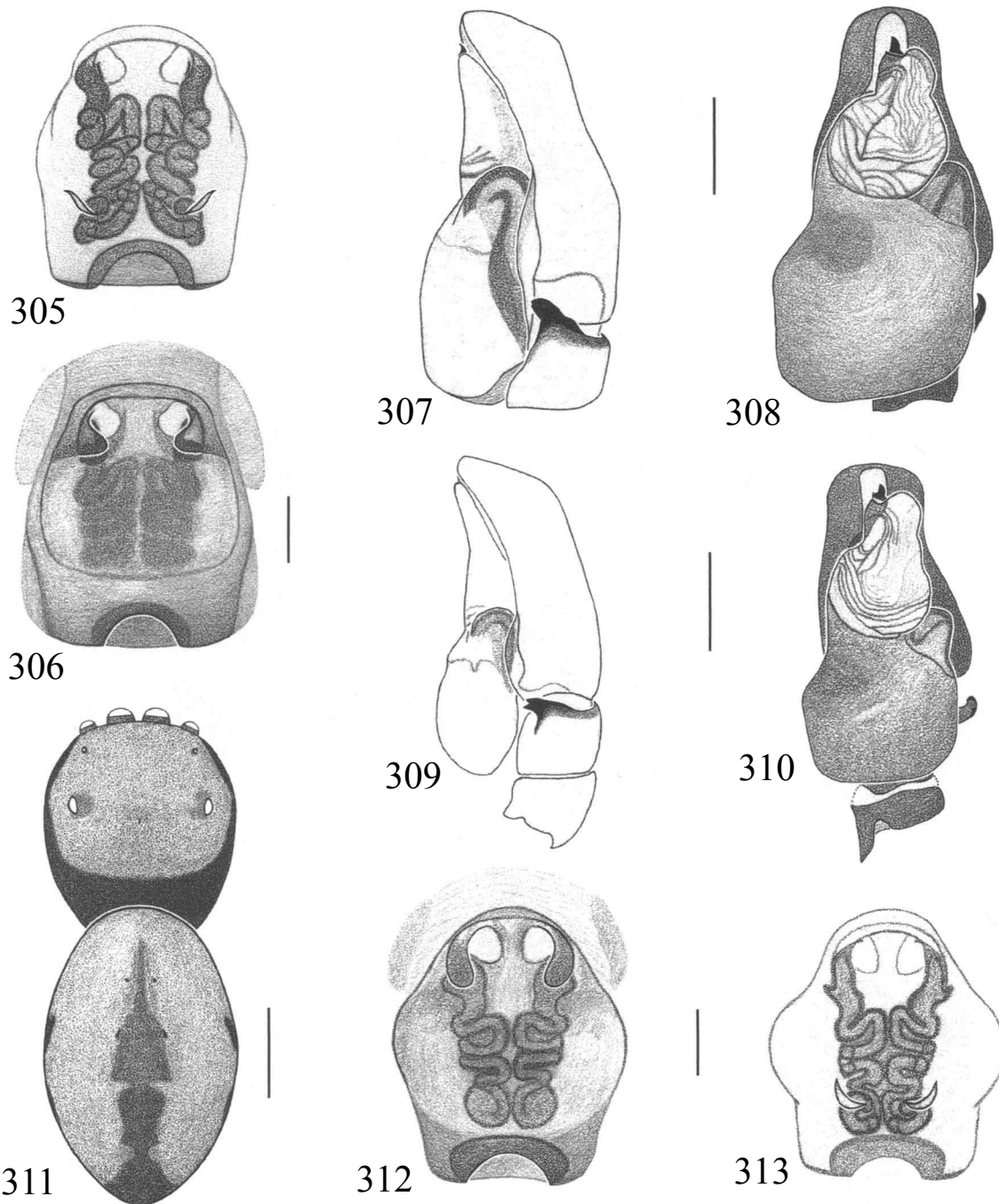
Figs. 275-280. *Phidippus concinnus* Gertsch. Female: 275-276. epigynum: 275. dorsal view, 276. ventral view. 277. habitus. Male: 278-279. palp: 278. retrolateral view, 279. ventral view. 280. habitus.
 Figs. 281-286. *Phidippus olympus* Edwards. Female: 282-283. epigynum: 282. ventral view, 283. dorsal view. 284. habitus. Male: 281. habitus. 285-286. palp: 285. retrolateral view, 286. ventral view.



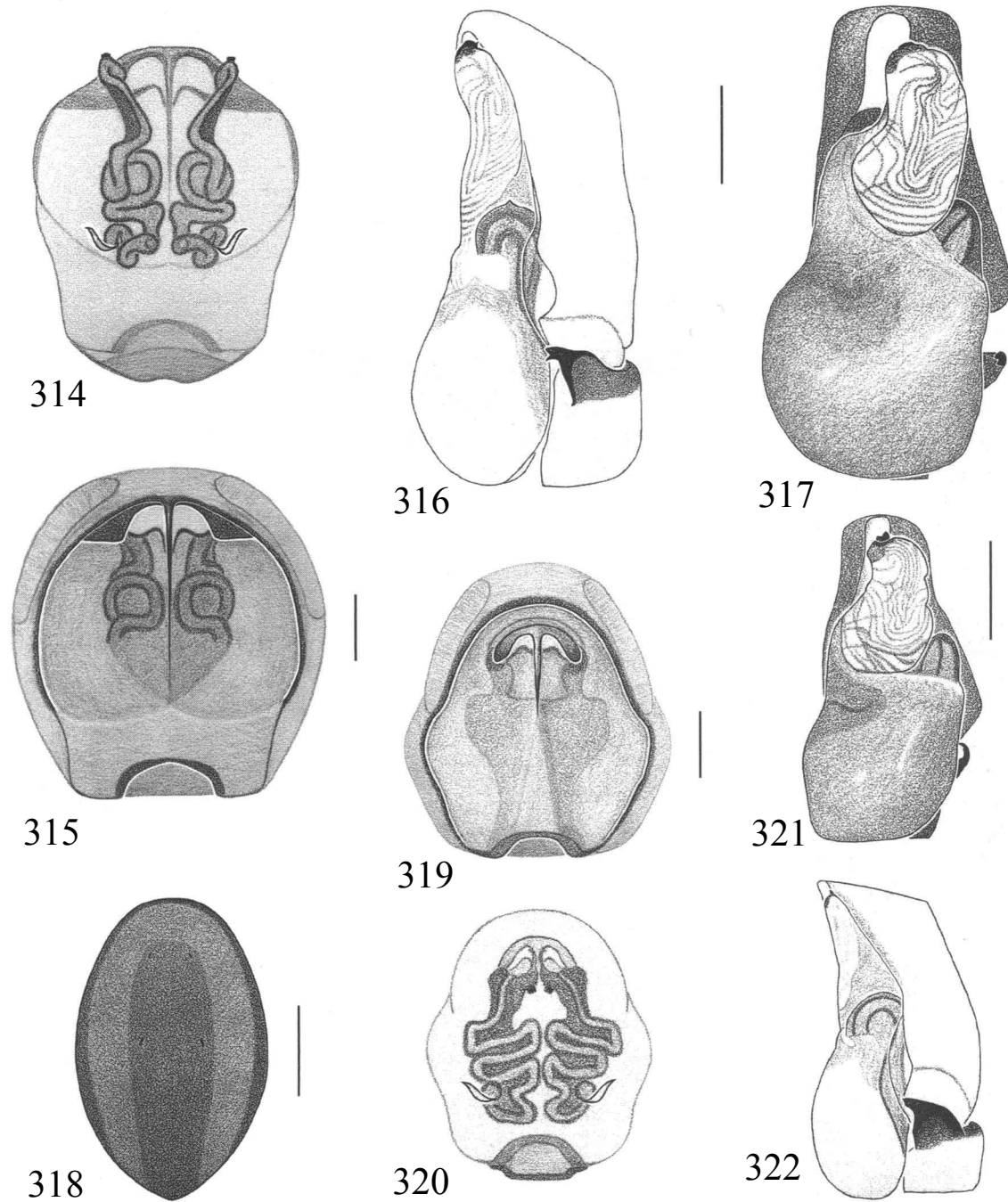
Figs. 287-290. *Phidippus lynceus* Edwards. Female: 287-288. epigynum: 287. dorsal view, 288. ventral view. Male: 289-290. palp: 289. retrolateral view, 290. ventral view.
 Figs. 291-294. *Phidippus amans* Edwards. Female: 291-292. epigynum: 291. ventral view, 292. dorsal view. Male: 293-294. palp: 293. retrolateral view, 294. ventral view.



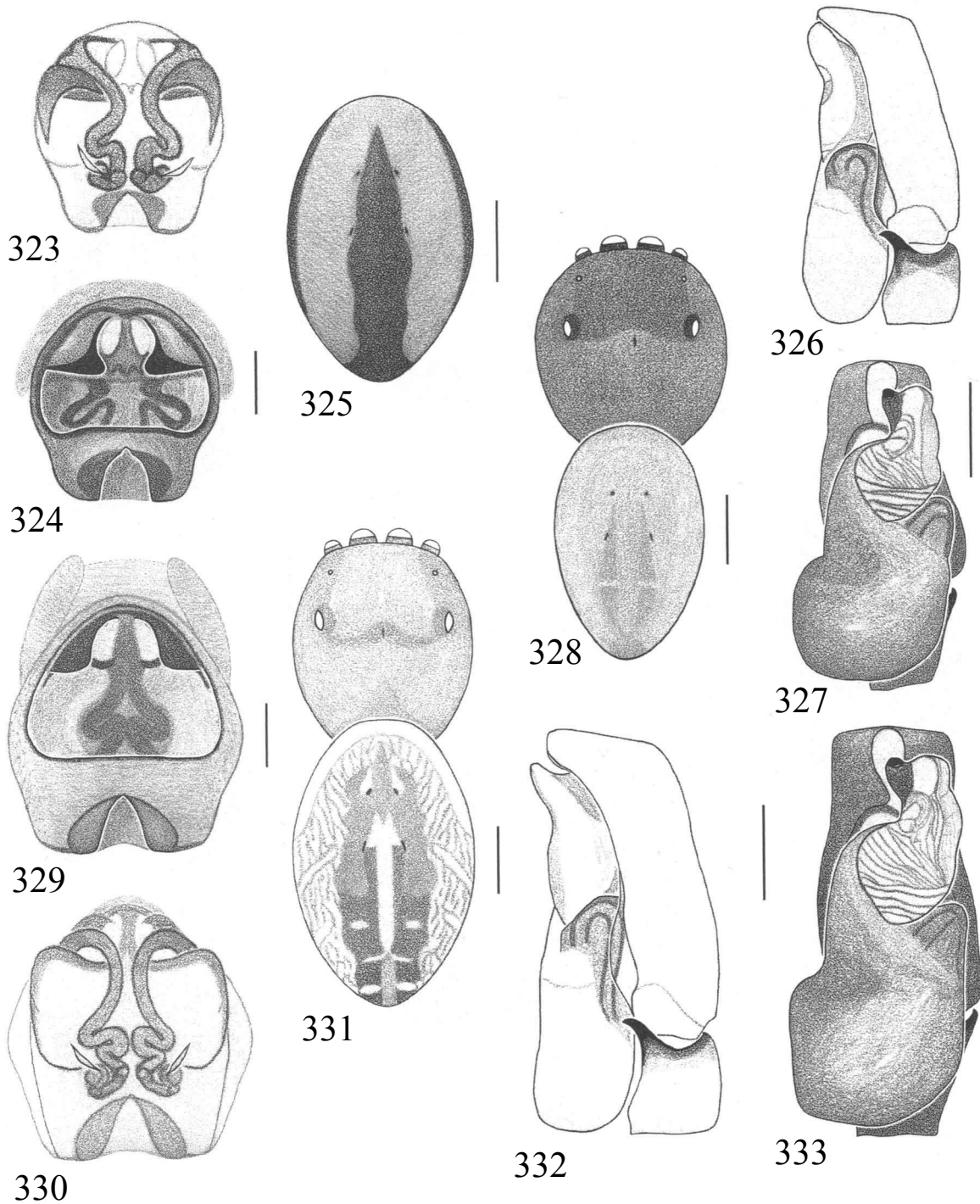
Figs. 295-299. *Phidippus morpheus* Edwards. Female: 295-296. epigynum: 295. dorsal view, 296. ventral view. 297. habitus. Male: 298-299. palp: 298. retrolateral view, 299. ventral view.
 Figs. 300-304. *Phidippus aureus* Edwards. Female: 300-301. epigynum: 300. ventral view, 301. dorsal view. 302. habitus. Male: 303-304. palp: 303. ventral view, 304. retrolateral view.



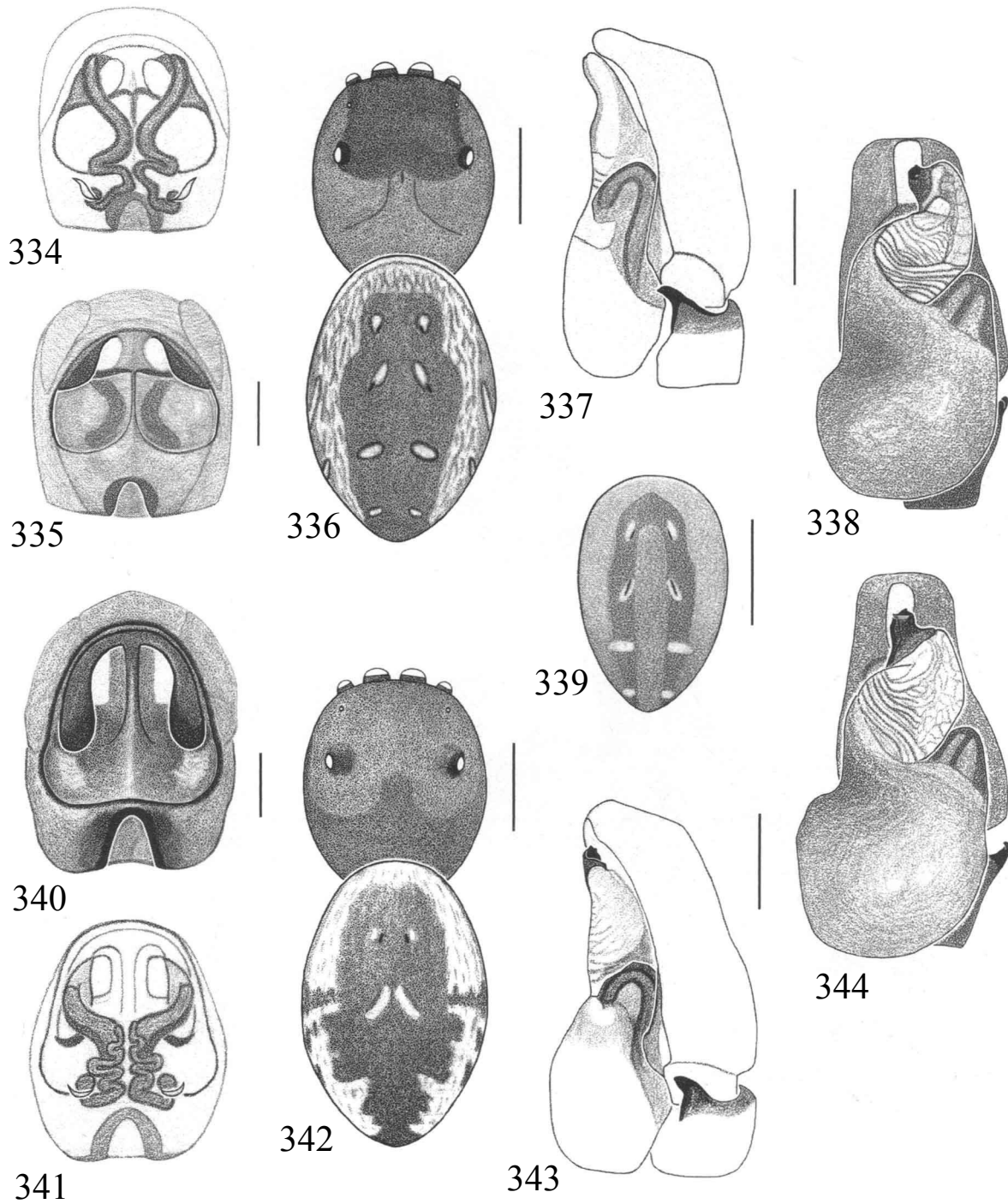
Figs. 305-308. *Phidippus nikites* Chamberlin & Ivie. Female: 305-306. epigynum: 305. dorsal view, 306. ventral view. Male: 307-308. palp: 307. retrolateral view, 308. ventral view.
 Figs. 309-313. *Phidippus apacheanus* Chamberlin & Gertsch. Male: 309-310. palp: 309. retrolateral view, 310. ventral view. Female: 311. habitus. 312-313. epigynum: 312. ventral view, 313. dorsal view.



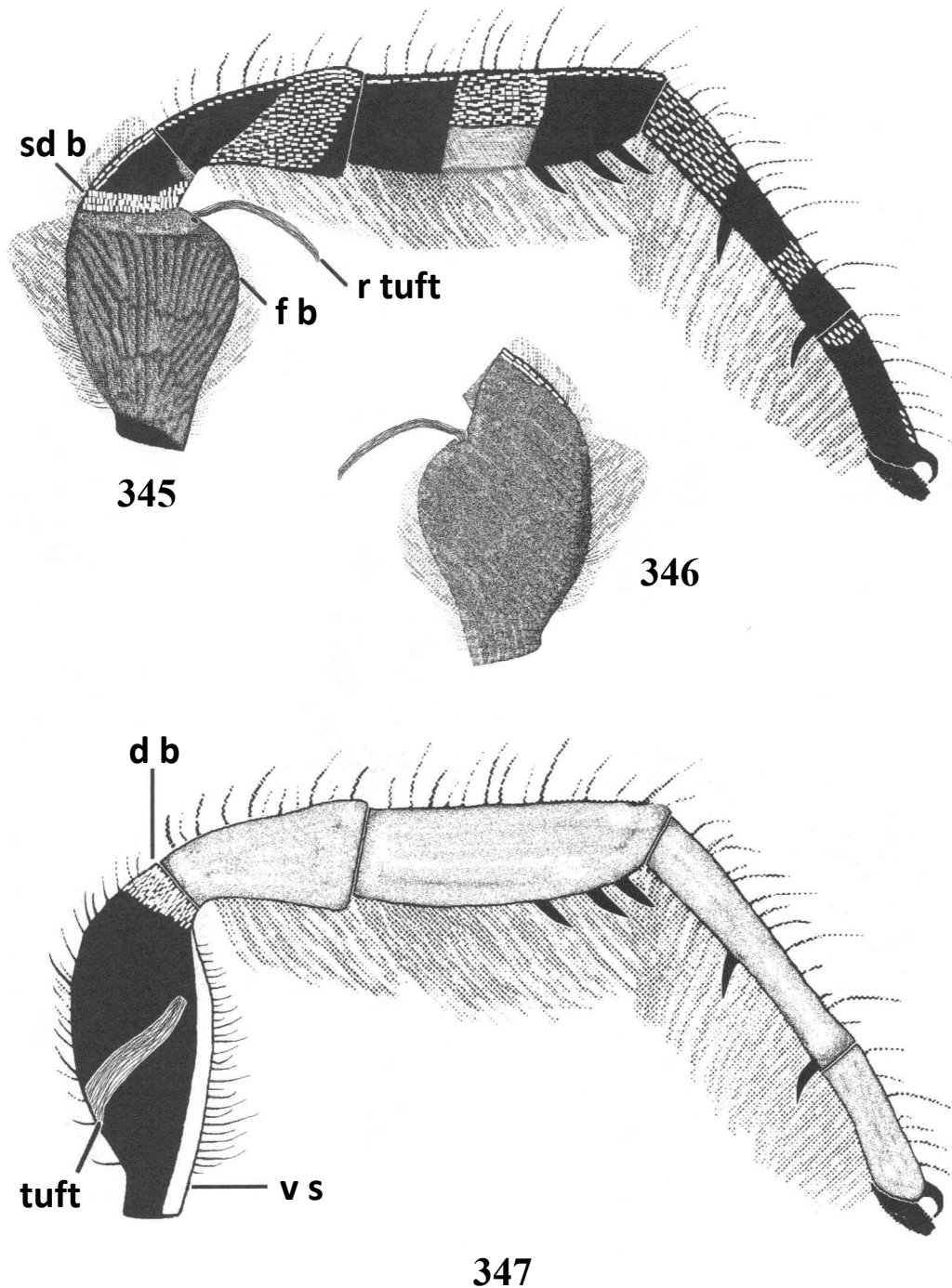
Figs. 314-317. *Phidippus tyrannus* Edwards. Female: 314-315. epigynum: 314. dorsal view, 315. ventral view. Male: 316-317. palp: 316. retrolateral view, 317. ventral view.
 Figs. 318-322. *Phidippus ursulus* Edwards. Female: 318. abdom. dorsum. 319-320. epigynum: 319. ventral view, 320. dorsal view. Male: 321-322. palp: 321. ventral view, 322. retrolateral view.



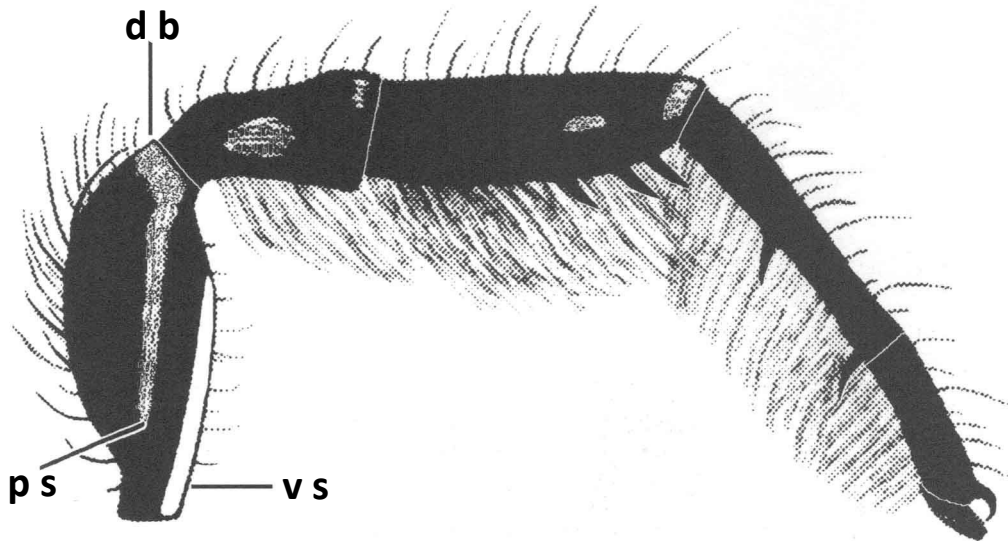
Figs. 323-327. *Phidippus ardens* Peckham & Peckham. Female: 323-324. epigynum: 323. dorsal view, 324. ventral view. 325. abdominal dorsum. Male: 326-327. palp: 326. retrolateral view, 327. ventral view. Figs. 328-333. *Phidippus texanus* Banks. Female: 329-330. epigynum: 329. ventral view, 330. dorsal view. 331. habitus. Male: 328. habitus. 332-333. palp: 332. retrolateral view, 333. ventral view.



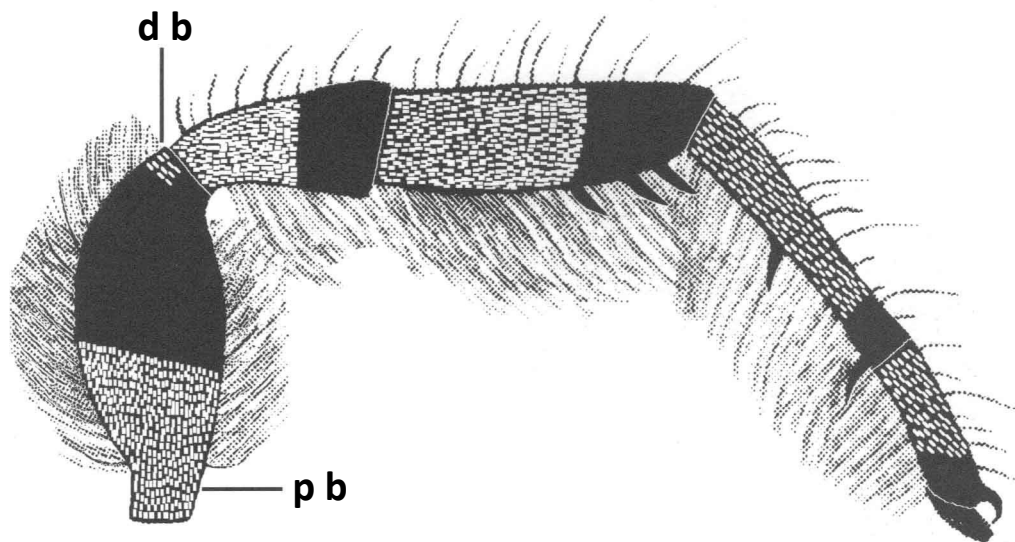
Figs. 334-339. *Phidippus purpuratus* Keyserling. Female: 334-335. epigynum: 334. dorsal view, 335. ventral view. 336. habitus. Male: 337-338. palp: 337. retrolateral view, 338. ventral view. 339. abdominal dorsum. Figs. 340-344. *Phidippus borealis* Banks. Female: 340-341. epigynum: 340. ventral view, 341. dorsal view. 342. habitus. Male: 343-344. palp: 343. retrolateral view, 344. ventral view.



Figs. 345-347. Left leg I. 345, 347: prolatral view. 346: femur retrolateral view. 345-346. *Phidippus putnami* (Peckham & Peckham) [r tuft = retrolateral tuft]. 347. *Phidippus mystaceus* (Hentz) [tuft originates dorsally]. db = distal band, fb = femoral bulge, sdb = subdistal band, vs = ventral stripe.



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Figs. 348-349. Left leg I, prolatral view. 348. *Phidippus toro* Edwards. 349. *Phidippus adumbratus* Gertsch. db = distal band, pb = proximal band, ps = prolateral stripe, vs = ventral stripe.

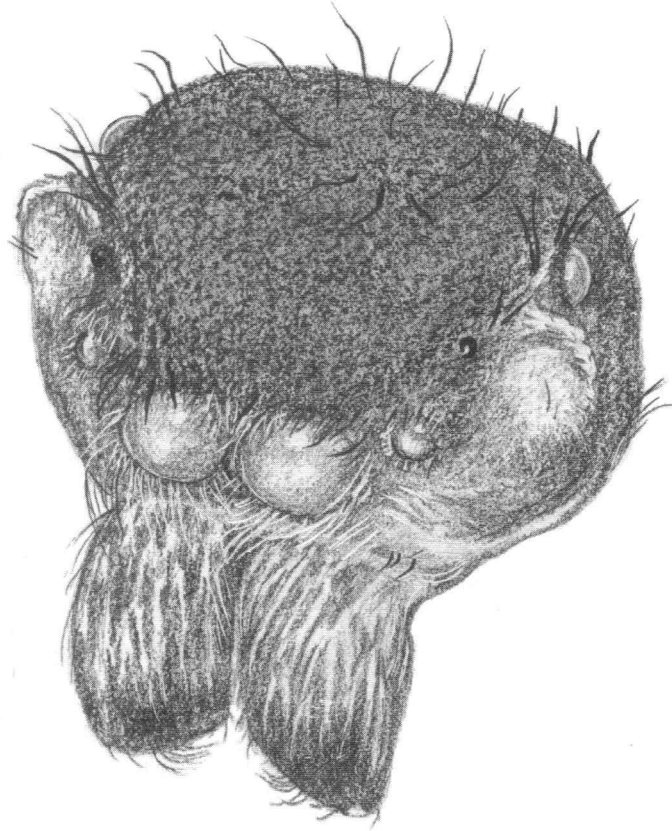
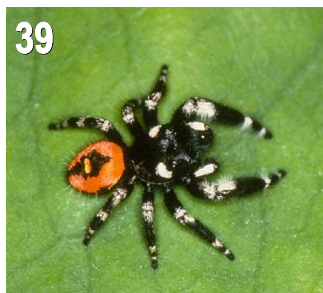
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Fig. 350. *Phidippus cruentus* F.O.P.C. male cephalothorax, dorsoanterolateral view.



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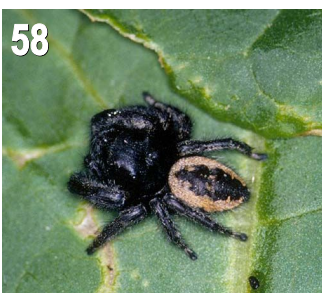
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