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SPIDERS OF THE FAMILY THOMISIDAE IN HAWAII[1]

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Abstract: The spider family Thomisidae in the Hawaiian Islands contains 30 species which constitutes approximately 20 % of the Hawaiian spider fauna. All of the species are endemic to the Hawaiian Islands. The 30 species of Hawaiian Thomisidae are grouped into 2 subfamilies and 5 genera. In the subfamily Misumeninae, 17 of the 21 species are placed in the genus *Misumenops* which has not been previously recorded for the Hawaiian Islands. The genus *Synaema* contains 1 species, and the endemic genus *Mecaphesa* contains 3 species. Five species are synonymized and 9 new species are described in this subfamily. In the subfamily Philodrominae, the endemic genus *Proernus* contains 5 species and the endemic genus *Pagiopalus* contains 4 species. One genus and 3 species are synonymized, and 1 new species is described in this subfamily. All species are described and 28 of the 30 species are illustrated. Type specimens are missing for the 2 species not illustrated. A key to the subfamilies, genera and species, and data on the distribution and ecology of each species are presented. Information on the biology and phylogeny of the Thomisidae in the Hawaiian Islands is included.

The crab-spider family Thomisidae is a moderately large group and is world-wide in distribution. In the Hawaiian Islands, this family consists of 30 species which is approximately 20 % of the spider fauna.

Karsch (1880) described *Diaea kanakana* (= *Misumenops kanakanus*), the first Hawaiian thomisid, from a group of spiders collected by O. Finsch from the island of Maui. The next species described was *Diaea insulana* Keyserling (1890) (=*Misumenops insulanus*) from specimens collected from the island of Oahu. All subsequent work on the Hawaiian Thomisidae, prior to this study, was done by the French Araneologist, Eugene Simon.

In 1899, Simon described a new species, *Misumena nesiotes* (=*Misumenops insulanus*), and a new genus and species, *Pterelas schauinslandi* (=*Proernus schauinslandi*), from specimens collected on Oahu by M. Schauinsland during an expedition in the Pacific during 1896 and 1897. Most of the thomisids, including redescriptions of 3 of the 4 species mentioned above, were described by Simon in 1900 and 1904 in *Fauna Hawaiiensis*. Simon referred to some of the Hawaiian species described by Karsch in other families but, for reasons unknown, did not mention *Diaea kanakana*. The specimens studied in the *Fauna Hawaiiensis* series were collected by R. C. L. Perkins in the 1890's.

The types of the Hawaiian Thomisidae are discussed at the beginning of the section on "Systematic Treatment."

This study is primarily a taxonomic revision of the Hawaiian Thomisidae. Included

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are descriptions of new species and information on the biology and phylogeny of the family in the Hawaiian Islands.

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MATERIALS AND METHODS

This study is based on examination of over 1,000 specimens which are deposited in the B. P. Bishop Museum, Honolulu; American Museum of Natural History, New York; Museum of Comparative Zoology, Cambridge; British Museum (Nat. Hist.), London; Museum National d'Histoire Naturelle, Paris; and the Universitets Zoologiske Museum, Copenhagen.

Research was conducted at the Bishop Museum from 1964 to 1967. Examination of type specimens was made through loans and during a trip to the British Museum (Nat. Hist.) and the Museum National d'Histoire Naturelle in 1967.

COLLECTING. Many of the specimens were collected on field trips to the Hawaiian Islands of Kauai, Oahu, Molokai, and Hawaii by myself and other staff members of Bishop Museum and the University of Hawaii. These specimens are deposited in Bishop Museum. Other specimens deposited in the above museums were collected by persons associated with the Hawaii State Board of Agriculture, the Hawaiian Sugar Planters' Association, and by amateur collectors. Most of the specimens were collected by beating and sweeping vegetation with an insect sweep net. Occasionally, a D-Vac vacuum machine was used and found to be very efficient in terms of retrieving more specimens, particularly more mature (larger) specimens, per unit of time spent collecting. Some specimens, primarily of the subfamily Philodrominae, were taken with a Malaise insect-trap net. Other specimens were found by searching under bark of trees and in dead fern fronds.

REARING. Immature spiders were reared individually in shell vials (22 × 85 mm).

They were fed a diet of *Drosophila*, occasionally supplemented by small Hemiptera, other small Diptera and small Lepidoptera.

PRESERVING. Most specimens were killed and preserved in 70 % ethyl alcohol. In the latter part of this study, specimens were killed and preserved in a modified Carnoy solution (3 parts isopropyl alcohol to 1 part glacial acetic acid) in order to make them suitable for future cytological investigation.

MEASUREMENTS AND ILLUSTRATIONS. An ocular micrometer in a stereo dissecting microscope was used for measuring. An ocular grid, in combination with various sizes of grid paper, was used in making illustrations.

SPECIES DESCRIPTIONS. The determination of species was based on morphological criteria with emphasis on differences in genitalia. Geographical data were helpful in some instances. Biological information was generally lacking and of very limited use.

The description and illustrations of each species are based on a single adult specimen of each sex, when they were available. Variation within the species is treated separately (see below). The specimens used for the descriptions are discussed more fully under "Types" in the section on Systematic Treatment.

Variation. Size range of a series is indicated by 2 measurements; carapace width, and femur I length. Color variation is indicated by reference to the predominant color patterns. When populations which appear to be distinctly allopatric in distribution show small but consistent differences not considered specific, the differences are pointed out and the populations are referred to by an island or geographical locality name. While some of these populations may be subspecies, they are not formally named because of insufficient evidence in terms of a large enough series of specimens and more extensive collecting throughout the Hawaiian Islands.

Records. The records for all type specimens are listed first. Data for other specimens, including immatures, are summarized and listed under "Specimens Examined".

Distribution. The distribution of the species is summarized from the records.

Ecology. A general description of the habitat of the species is discussed. Reference to bioclimatic zones, as indicated in Table I, provides additional information on the areas where the species has been collected.

Discussion. A diagnosis for separating the species from other closely related species, reasons for synonymies, and other pertinent information are discussed.

PHYSICAL AND BIOCLIMATIC DESCRIPTION OF HAWAIIAN ISLANDS

A general bioclimatic description of the Hawaiian Islands, adapted and modified from Krajina (1963), is given in Table I. Under dominant plant indicators, the scientific names of the plants are used. When there is a common name for a plant, it is placed in parentheses after the scientific name the first time is used.

Map 1 shows all of the islands concerned in this study. Maps 2 to 7 have each of the larger Hawaiian Islands separately illustrated for purposes of showing the principal physiographic features in greater detail. The localities listed on Maps 2 to 7 are where thomisids have been collected. The symbols associated with localities indicate the approximate location of the collecting sites on each of the islands.

The Hawaiian Islands are a chain of about 18 islands approximately 2,400 kilometers in length. They are located near the middle of the Pacific Ocean between 178°29′ and 154°51′ West longitude, and 18°5′ and 28°25′ North latitude. The nearest continental landmasses are the Aleutian Islands of Alaska, about 2,240 km to the north, and the coast of California, about 3,345 km to the east. The nearest major islands are the Marquesas which lie about 3,200 km to the south of the island of Hawaii. The Hawaiian Islands are oceanic and volcanic in origin. They may be divided into 2 groups. All of the islands to the NW of Kauai are designated as the leeward islands and the islands SE from and including Kauai designated as the main islands. The islands concerned in this study include 2 leeward islands, Necker and Nihoa, and the main islands of Kauai, Oahu, Molokai, Lanai, Maui, and Hawaii.

NECKER ISLAND (Map 1). The northernmost island concerned in this study is Necker which is located about 415 km NW of Kauai. It is a small ridge of volcanic rock with an area approximately 0.2 km^2. There are 5 small hills, the highest of which is approximately 83 m. Necker is a relatively dry island with about 50 cm of rain per year.

NIHOA ISLAND (Map 1). Nihoa is located about 225 km SE of Necker and about 190 km NW of Kauai. It is a remnant of a volcanic cone and is approximately 0.7 km^2 in area. The highest point is approximately 270 m. Nihoa is a relatively dry island with about the same amount of rainfall as Necker.

KAUAI ISLAND (Map 2). Kauai is the northernmost island of the main group. It is approximately 1,440 km^2 in area. The part of this island concerned in this study is the plateau region of Kokee and the Alakai Swamp. The Kokee area is over 900 m in elevation with the Alakai Swamp at approximately 1,200 m. The SE end of the Alakai Swamp ascends to the highest point of the island, Mt Waialeale, which is approximately 1,550 m.

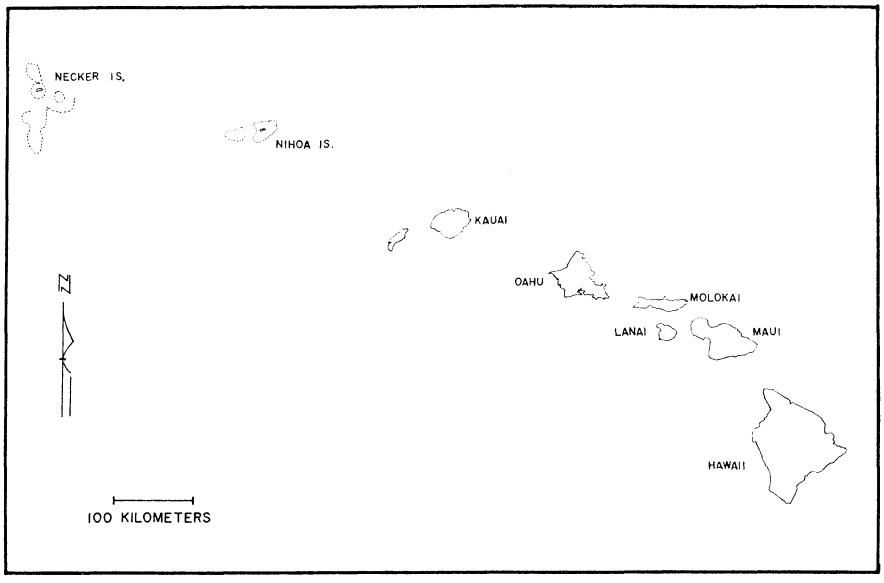
OAHU ISLAND (Map 3). Oahu is located about 117 km SE of Kauai. This island is approximately 1,555 km^2 in area. The major landforms consist of 2 parallel mountain ranges - the Waianae and the Koolau—located on opposite sides of the island. The Waianae Range is the shorter and drier of the 2 ranges with Mt Kaala the highest point on

Table I. Bioclimate Zones in Hawaiian Islands.

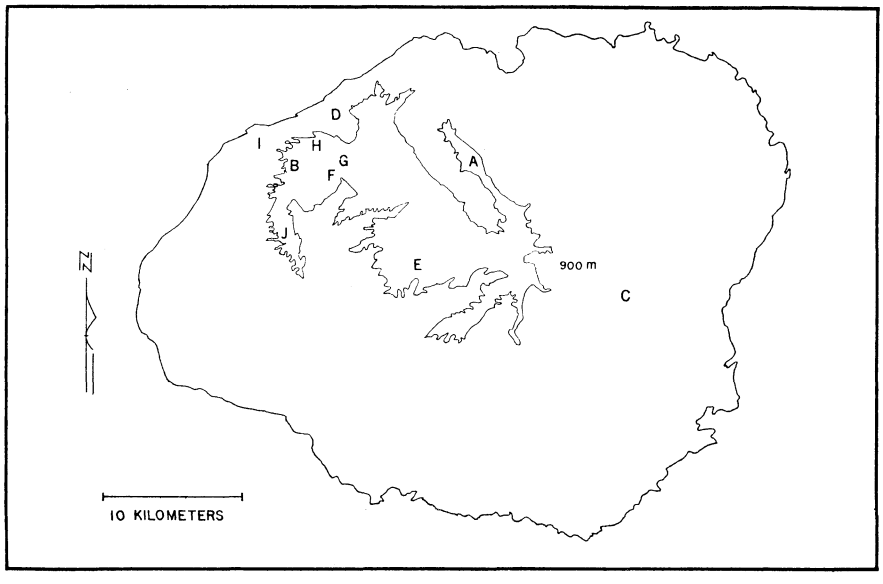
Zone	Altitude	Climate	Mean Annual Temperature
1.	Less than 900 meters on lee sides Less than 600 meters on windward sides	Subhumid marine tropical	22-24°C.
2.	750-1200 meters	Subhumid marine subtropical (mesothermal)	16-20°C.
3.	Less than 900 meters on lee sides Less than 600 meters on windward sides	Humid marine tropical	21-23°C.
4.	Less than 1200 meters on windward sides	Humid marine tropical or subtropical	16-23°C.

5.	Less than 1800 meters on windward sides	Very humid marine subtropical or tropical	16-21°C.
6.	600-1740 meters	Extremely rainy marine subtropical	16°C.
7.	1800-1950 meters (Maui-Hawaii)	Humid marine subtropical (warmer)	10-13°C.
8.	1950-2400 meters (Maui-Hawaii)	Humid marine mesothermal (cooler)	10°C.
9.	1200-2400 meters (Maui-Hawaii)	Subhumid marine mesothermal	10°C.
10.	2100-3000 meters (Maui-Hawaii)	Subsemiarid microthermal (subalpine)	5°C.

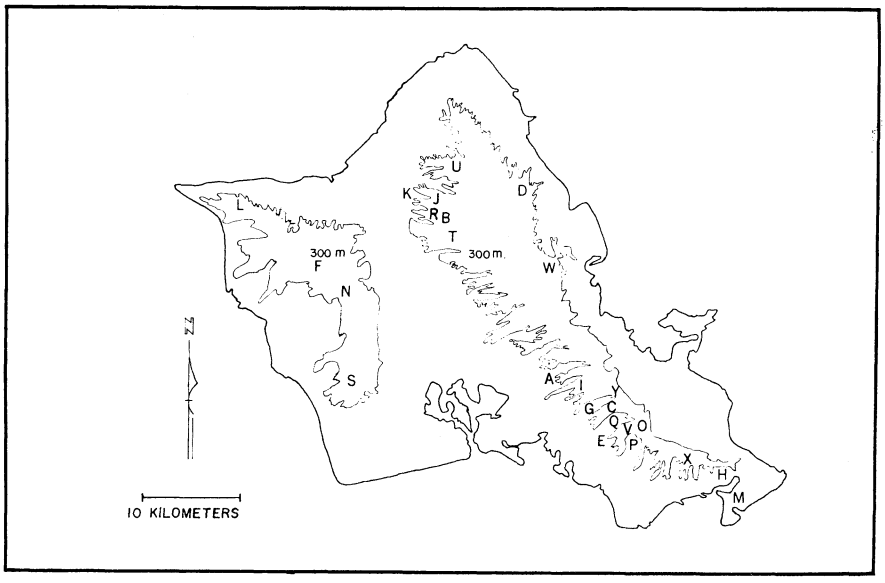
Zone	Vegetation Cover	Dominant Plant Indicators
1.	Mixed xerophytic and mesophytic scrub forest	*Psidium guajava* (guava), *Lantana camara* (lantana), *Styphelia tameiameiae* (pukeawe), *Sphenomeris chusana* (palaa), *Setaria geniculata* (yellow foxtail)
2.	More or less open mixed xerophytic and mesophytic forest	*Acacia koa* (koa), *Psidium guajava*, *Styphelia tameiameiae*, *Vaccinium* spp. (ohelo)
3.	Closed mixed mesophytic and xerophytic forest	*Acacia koa*, *Nephrolepus exaltata* (Boston fern), *Oplismenus hirtellus* (basket grass), *Paspalum conjugatum* (Hilo grass)
4.	Mesophytic marine tropical and subtropical forest	*Metrosideros polymorpha* (ohia lehua), *Cibotium* spp. (hapuu), *Dicranopteris* spp. (uluhe), *Lycopodium cernuum* (wawaeiole)
5.	Hygrophytic marine subtropical and tropical rainforest, sometimes rich in bryophytic epiphytes	*Cheirodendron trigynum* (olapa), *C. platyphyllum* (lapalapa), *C. dominii* (lapalapa), *Cibotium* spp., *Elaphoglossum* spp. (ekaha), *Mecodium recurvum* (ohiaku)
6.	Chamaephytic alakai bog	*Oreobolus furcatus*, *Panicum* spp., *Plantago* spp., *Lobelia* spp., *Metrosideros polymorpha*
7.	Mesophytic subtropical forest	*Metrosideros polymorpha*, *Sadleria* spp. (amarmau), *Nephrolepis exaltata*, *Dicranopteris* spp. (uluhe)
8.	Mixed mesophytic and xerophytic more or less open forest	*Acacia koa*, *Nephrolepis exaltata*, *Dicranopteris* spp., *Pteridium aquilinum* (brackenfern)
9.	Mixed mesophytic and xerophytic more or less open forest (chaparral-like)	*Acacia koa*, *Sophora chrysophylla* (mamani), *Styphelia* spp., *Vaccinium* spp., *Pteridium aquilinum*, *Eragrostis* spp. (lovegrass)
10.	More or less open xerophytic scrub	*Sophora chrysophylla*, *Myoporum sandwicense* (naio), *Styphelia* spp., *Vaccinium* spp., *Coprosma* spp. (kukainene)



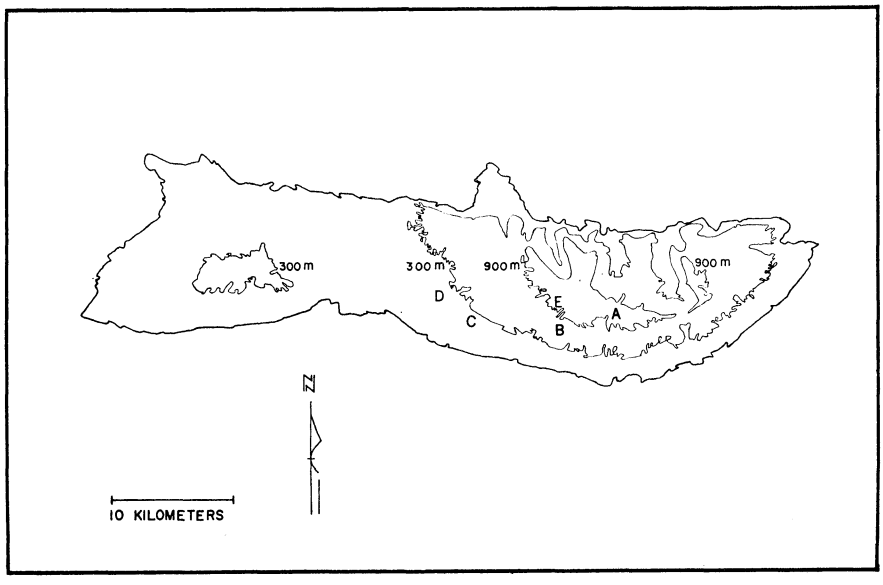
Map 1. Hawaiian Islands.



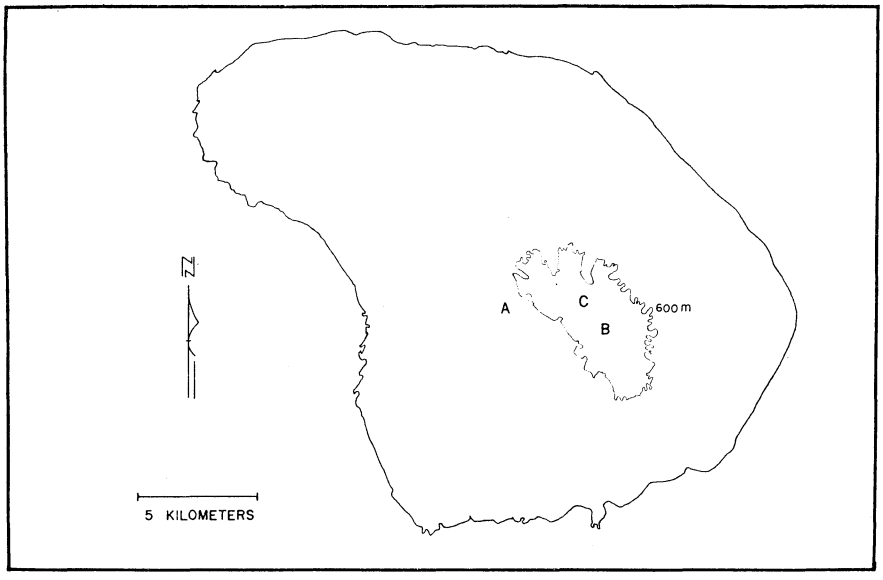
Map 2. Collecting Localities on Kauai Island. A, Alakai Swamp; B, Halemanu Stream; C, Hanahanapuni; D, Kalalau Valley; E, Kaholuamano; F, Kokee; G, Kumuwela; H, Mohihi Valley; I, Nualolo Valley; J, Waimea.



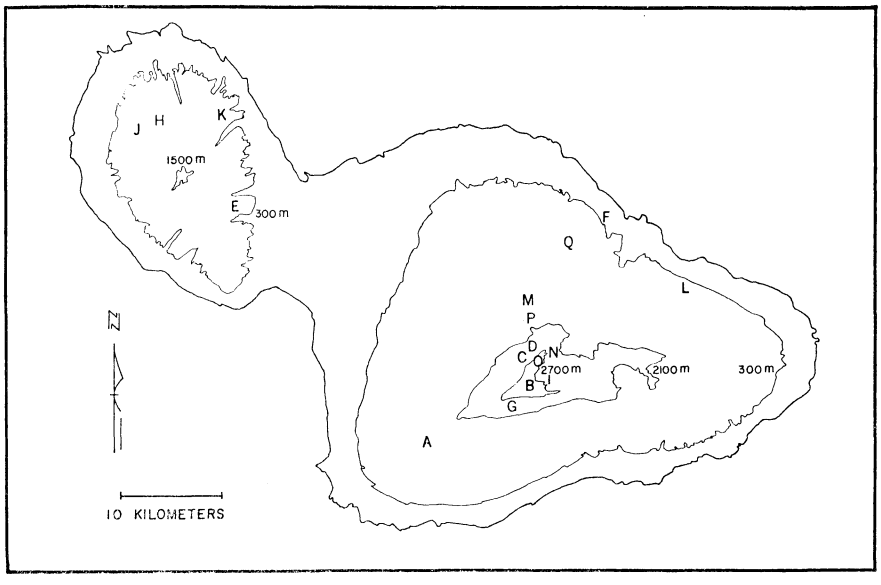
Map 3. Collecting Localities on Oahu Island. A, Aiea State Park; B, Drum Road; C, Halawa; D, Hauula; E, Honolulu; F, Kaala Mountain; G, Kalihi Valley; H, Kaluanui; I, Kapalama Valley; J, Kawaiiki Ditch Trail; K, Kawailoa River; L, Keekee Gulch; M, Koko Head; N, Kolekole Pass; O, Konahuanui; P, Manoa Valley; Q, Nuuanu Valley; R, Opaeula Valley; S, Palehua; T, Poamoho Trail; U, Pupukea; V, Tantalus; W, Waikane Trail; X, Wiliwilinui Ridge; Y, Wilson Tunnel.



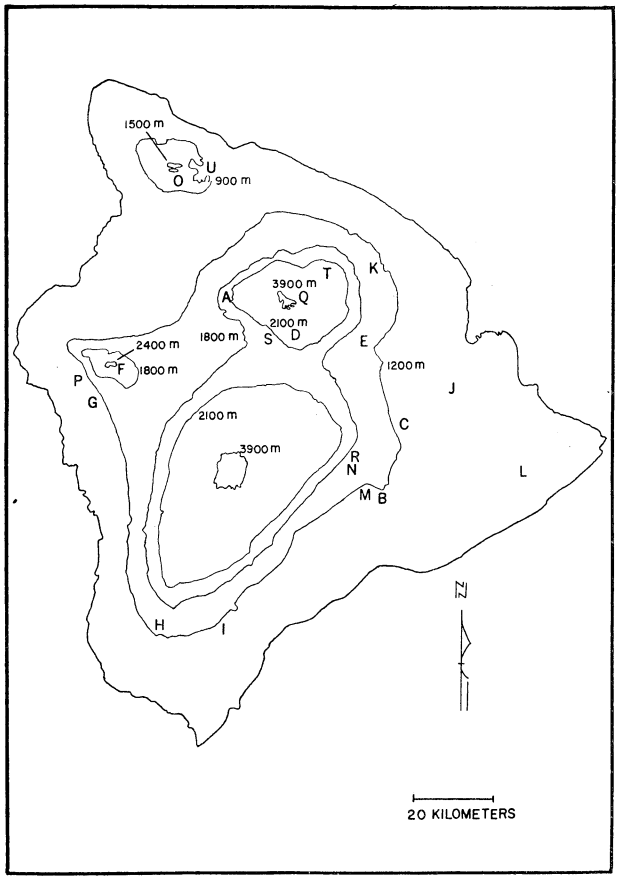
Map 4. Collecting Localities on Molokai Island. A, Kamoku Flats; B, Kawela Gulch; C, Kaunakakai; D, Manawainui Valley; E, Puu Kolekole.



Map 5. Collecting Localities on Lanai Island. A, Lanai City; B, Lanai Hale; C, Lanai Mountains.



Map 6. Collecting Localities on Maui Island. A, Auwahi; B, Haleakala Crater; C, Halemauu Trail; D, Holua; E, Iao Valley; F, Kailua; G, Kapalaoa Cabin; H, Kaulalewelewe; I, Kaupo Trail; J, Mahinahina; K, Makamakaola Valley; L, Nahiku; M, Olinda; N, Paliku Cabin; O, Paliku Trail; P, Puu Luau; Q, Waikamoi Stream.



Map 7. Collecting Localities on Hawaii Island. A, Ahumoa Crater; B, Chain of Craters Road; C, Glenwood; D, Halepohaku; E, Hilo Forest Reserve; F, Hualalai Mountain; G, Kahaluu Forest Reserve; H, Kahuku Ranch; I, Kau; J, Kaumana; K, Keanakolu; L, Keauohana Forest Reserve; M, Kilauea; N, Kipuka Puaulu; O, Kohala Mountains; P, Kona; Q, Mauna Kea; R, Mauna Loa Strip Road; S, Pohakuloa; T, Puu Kihi; U, Waipio Valley.

the island at approximately 1,210 m. The Koolau Range, located on the eastern side of the island, has several peaks approaching 900 m with the highest point at ca 945 m.

MOLOKAI ISLAND (Map 4). Molokai is located ca 42 km SE of Oahu. It is a long and narrow island with an area of approximately 675 km^2. There are 2 major landforms separated by a low area. Mauna Loa is located on the western side of the island and is approximately 420 m in elevation. Mt Kamalou is located on the eastern side and is the highest point of the island at approximately 1,590 m.

LANAI ISLAND (Map 5). Lanai is located about 15 km south of Molokai and west

of Maui. It is the smallest of the main islands with an area of approximately 360 km^2. The native forest is confined to a small area which reaches an elevation of approximately 1,010 m.

MAUI ISLAND (Map 6). Maui is located about 16 km SE of Molokai. It consists of 2 mountain areas separated by a low, narrow isthmus. The island has an area of approximately 1,880 km^2. The western mountain reaches an elevation of approximately 1,740 m and has several boggy areas near the summit. The eastern mountain, Haleakala, is a dormant volcano approximately 3,010 m in elevation with its summit practically devoid of vegetation and capped with snow occasionally in the winter months.

HAWAII ISLAND (Map 7). Hawaii is located about 45 km SE of Maui. It is larger than all of the other islands combined and has an area of approximately 10,475 km^2. There are 4 major landforms. In the north are the Kohala Mts with the highest elevation at ca 1,650 m. On the western side of the island is Mt Hualalai which is over 2,460 m. The highest elevations are found on Mauna Kea and Mauna Loa. Mauna Kea, ca 4,135 m, is generally snow-capped in the winter. Mauna Loa, ca 4,105 m, is separated from Mauna Kea by a high plateau, ca 1800 m in elevation. Located at the 1,200 m level on the SE slope of Mauna Loa is Kilauea Crater. Mauna Loa and Kilauea are active volcanos which add new land to the island when they erupt.

BIOLOGY

Information on the biology of the Thomisidae in Hawaii is very limited. The following information is based on literature containing references to the Hawaiian species, personal observations made during the present study, and where appropriate, literature dealing with Thomisidae of other areas of the world.

LIFE CYCLE. Immature Thomisidae are similar, excluding genitalic structures, to adults. The older immature thomisids often can be associated with the adults of the species due to similarity in color patterns. The number of instars is variable within the family. Gertsch (1939) mentions 7 instars for *Misumena vatia*, a species Holarctic in distribution. Four instars was the highest number attained by several individuals reared in the laboratory during the present study. These individuals were already in, at least, the 2nd or 3rd instar, as estimated by size, when collected in the field. The longevity of individuals and the number of generations per year of the Hawaiian species are not known. Dates on collector's labels indicate that adults of some species are present throughout the year.

EGGS. Thomisid egg sacs, which are lenticular in form, are constructed from silk into equal halves which are then fastened together at the border of the halves. The outer covering is white and fibrous in texture in the subfamily Misumeninae, and parchment-like in texture in the subfamily Philodrominae. Egg sacs of *Misumenops vitellinus* and *Misumenops editus* were found suspended between surrounding leaves with threads attached to all sides of the egg sac. Egg sacs of some species of the subfamily Philodrominae were found attached to the concave side of dead fern fronds. Swezey (1936) reported 2 to 6 egg sacs of *Pagiopalus atomarius* in a row attached along a midrib of a sugar-cane leaf with as many as 50 egg sacs on a single leaf. The number of eggs per egg sac is variable. An egg sac of a species of Philodrominae, probably *Pagiopalus*

atomarius, contained 98 eggs. A species of Misumeninae, *Misumenops vitellinus*, was found with 63 eggs.

DISPERSAL. Spiders are dispersed by 3 principal means; active movement in all directions by immature spiders after emerging from the egg sac; ballooning; and passive transport by man. Active movement of immature spiders undoubtedly is responsible for much of the dispersal on an island, but not between islands because of the water barrier. Ballooning is the process by which immature spiders, after emerging from the egg sac, release long threads of silk. Air currents carry the threads, with the spider attached, for varying distances. Gertsch (1949) mentions that oceanic islands are probably colonized almost exclusively by this means. Spiders belonging to several families have been collected during studies on air-borne insects trapped on ships on the Pacific Ocean by Gressitt, Leech & O'Brien (1960), Harrell & Holzapfel (1966), Harrell & Yoshimoto (1964), Yoshimoto & Gressitt (1959, 1960, 1961, 1963), Yoshimoto, Gressitt & Mitchell (1962), and Yoshimoto, Gressitt & Wolff (1962), but do not include thomisids. Specimens of Thomisidae have been intercepted by U. S. Quarantine inspectors in Honolulu. A female and her young were found on gardenias shipped to Hawaii by plane from Japan in 1966. These specimens belong to the subfamily Philodrominae and possibly the genus *Tibellus*. In 1964, 3 immature specimens were found on an airplane which had arrived from Australia. The specimens belong to the subfamily Misumeninae and possibly the genus *Misumenops*. Perkins (1913) mentions a possible introduced thomisid, but gives no further details.

PROTECTIVE RESEMBLANCE. The Thomisidae show characteristics in behavior and coloration which can be termed protective resemblance. This characteristic in Hawaiian Thomisidae was noted by Perkins (1913). He noted that species of the genera *Synaema*, *Misumena* (=*Misumenops*), and *Pagiopalus* often resembled the surfaces they were found on, such as lichen-covered tree limbs, and that some species of the genera *Pagiopalus* and *Proernus* were found living at the bases of leaves clasping the stems, and among dead leaves on growing trees. In the present study it was found that the color of many species matched the color of the vegetation on which they were found. For example, the grayish color of *Misumenops aridus* is similar to the filamentous lichens on tree branches from which specimens were collected. *Misumenops vitellinus* is green and closely matched the color of *Styphelia* leaves on which it was predominantly found. The abdomen of gravid females of *M. vitellinus* appeared to match the size and color of *Styphelia* berries. Species of the subfamily Philodrominae are generally dark brown and are found primarily in the brown dead leaves of trees and fern. *Proernus stigmaticus* was often found on small branches and twigs with the first 2 pairs of legs stretched out in front and the last 2 pairs stretched out behind which gave it the appearance of an inanimate part of a twig.

PARASITES AND PREDATORS. Parasites and predators of Hawaiian Thomisidae include species of Diptera and Hymenoptera. Dipteran parasites include species of the genus *Titanochaeta* (Drosophilidae) which is an egg parasite, and species of the genus *Leucopis* which attacks the egg sac of *Pagiopalus atomarius*. Hardy (1965) mentions that the species referred to as *Leucopis* sp. (Chamaemyiidae) is probably *Titanochaeta ichneumon*. Hymenopteran parasites include species of the genera *Hemiteles* (Ichneumonidae), *Baeus* (Scelionidae), and *Pison* and *Trypoxylon* (Sphecidae). Species of *Hemiteles* were reported

by Kirkaldy (1908) as parasitic on the eggs of *Pagiopalus atomarius*. Predaceous Hymenoptera include the mud-dauber *Sceliphron caementarium* (Sphecidae). Species of *Misumenops oreades* have been found in the cells of this wasp. Perkins (1913) mentions that many Hawaiian thomisid species are rare because of possible predation by birds that hunt for food along tree limbs.

ECONOMIC IMPORTANCE. Three species of Hawaiian Thomisidae are regarded as beneficial: *Pagiopalus atomarius*, *Proernus schauinslandi*, and *Adrastidia nebulosa* (=*Proernus stigmaticus*). These species are predators of the sugar-cane leafhopper, *Perkinsiella saccharacida*. Kirkaldy (1908) considers *Pagiopalus atomarius* the most important spider predator of the leafhopper with *Proernus schauinslandi* of some benefit. Van Dine (1904) reported *Proernus stigmaticus* feeding on leafhoppers. Swezey (1936) pointed out that at one time, sugar-cane leaves with attached egg cases of *Pagiopalus atomarius* were transferred from sugar-cane fields where the spider was abundant to fields where the spider was scarce or absent.

PHYLOGENY

All of the species and 3 of the 5 genera of Hawaiian Thomsidae presently are considered endemic to the Hawaiian Islands. The Hawaiian species of Thomisidae differ from those of other areas of the world by the morphological form of the genitalia; not by the loss or acquisition of morphological structures. The origin of the Hawaiian Thomisidae is difficult to determine at the present time. This family is considered to be an extremely ancient group in the Hawaiian Islands by Perkins (1913) and Berland (1934). Berland concluded that Hawaiian spiders show the closest affinity with the spider fauna in the Polynesian Island groups of Samoa, Fiji, Tonga, Marquesas, and Rapa-Nui, and that the Polynesian spider fauna probably originated in the Indo-Malayan region. Regarding the Hawaiian Thomisidae, Berland pointed out that this family is unique in the development of endemic species and genera, which indicates a long isolation and favorable conditions for speciation. Very few Thomisidae are known at the present time from the other Polynesian Islands.

The relative age of the Hawaiian Islands progresses from the oldest island (Kure) at the NW end of the chain to the youngest island (Hawaii) at the SE end of the chain. The only thomisid found on the older leeward group of islands is *Misumenops insulanus* which has been collected on Necker and Nihoa. This species is also found on Oahu, Molokai, and Hawaii which makes it difficult to determine whether the Necker and Nihoa populations are part of a relic fauna on formerly large islands, or re-colonizations from the younger main islands.

Most of the thomisids are found only at higher elevations, generally above 300 m, on the native vegetation of the younger main islands. *Pagiopalus atomarius*, *Proernus schauinslandi*, and *Proernus stigmaticus* have been found in sugar-cane fields at lower elevations.

Synaema naevigerum is quite distinct from the other species of the subfamily Misumeninae and undoubtedly represents a separate colonization. The 3 species of the genus *Mecaphesa* are probably derived from a single colonization. This genus is related to a wide-spread genus, *Oxyptila*, which is distinct from *Synaema* and *Misumenops*. It

is difficult to determine the phylogeny of the genus *Misumenops* in the Hawaiian Islands on the basis of present information. It is the largest genus of thomisids in the Hawaiian Islands and contains species formerly placed in the genera *Diaea*, *Misumena*, and *Synaema* as well as new species described in the present paper. In the subfamily Philodrominae, the 2 genera, *Pagiopalus* and *Proernus*, form distinct groups and probably are derived from 2 colonizations.

MORPHOLOGY

Morphological characteristics which are common to all of the species within a genus, subfamily or family are discussed once under the appropriate taxon. Certain characteristics are described more fully below.

COLOR. Coloration in the Hawaiian Thomisidae is a very conspicuous feature and ranges from an almost unicolorous condition in some species to a variegated, multicolored condition in other species. Colors are helpful in some instances for identifying a species but are not taxonomically reliable for 2 reasons. First, there is considerable variation within a species, and second, some colors are lost or changed in preserved specimens. The predominant color pattern is described for each species with variation within a species discussed under the section on "Variation". When the color in life is known and differs from the color in preserved specimens, it is indicated in the description.

EYES. Thomisidae have 8 eyes arranged in 2 transverse rows. The eyes are paired and designated as the anterior median eyes (AME), anterior lateral eyes (ALE), posterior median eyes (PME), and posterior lateral eyes (PLE). The eyes are all blackish with the anterior median eyes slightly paler than the others. All of the eyes are situated on tubercles. The median eyes are on very low tubercles while the lateral eyes are on more prominent tubercles. Both eye rows are usually recurved when viewed dorsally with the posterior row more strongly recurved than the anterior row. Eye measurements are given in micrometer units. Eye diameters are measured from the dorsal aspect of the eye. The median ocular area is the quadrangle formed by the anterior and posterior median eyes and is measured between the eyes.

LEGS. Four different leg characters are described: leg length, setae, trichobothria, and tarsal claw teeth. The legs are designated with Roman numerals from anterior to posterior. The relative length of the legs is indicated by listing the longest leg first and the shortest leg last (*e.g.*, I, II, III, IV). Leg segments are measured along the dorsal surface from a lateral aspect. Leg setae refer to the largest bristles located on the dorsal and lateral surfaces of the femora, patellae, tibiae, and metatarsi, and the more robust macrosetae located on the ventral surfaces of the tibiae and metatarsi. For the purpose of this study, no distinction is made between bristles and macrosetae. The setae are arranged either as pairs or in a single row along the longitudinal axis of a leg segment. Modified setae include the spatulate type forming the claw tuft, and the tenant type which forms the scopula and is located on the ventral surface of the tarsus and sometimes the metatarsus. Both of these types are found only in the subfamily Philodrominae. Trichobothria are sensory hairs and are located on 3 segments: the tibia, metatarsus, and tarsus. On the tibia, the trichobothria are arranged in 2 irregular

rows on the dorsal surface, usually on the proximal half of the segment. They are arranged in a single row on the dorsal surface, usually on the distal half, of the metatarsus and tarsus. The number of trichobothria on each segment is given in the species description. There is 1 pair of tarsal claws in the Thomisidae. Each claw has a single row of teeth with the largest teeth distal. The number of teeth per claw may vary between tarsi and between the 2 claws of a tarsus. In addition, the teeth may be free or fused together.

GENITALIA. Genitalia, as used in this paper, refers to the copulatory structures of the ♂ and ♀. These structures are located on the pedipalp of the ♂, and on the venter of the abdomen just anterior to the epigastric furrow of the ♀. The following morphological terminology is adapted and modified from Gering (1953), and Schick (1965).

♂. The pedipalp consists of 6 segments: coxa, trochanter, femur, patella, tibia, and tarsus. The copulatory structures are located on the tibia and the tarsus. The structures on the tibia consist of 2 apophyses (fig. 1–3) : 1 on the distal retrolateral end, and the other on the distal ventral end of the segment. The retrolateral apophysis is designated as the "Retrolateral Tibial Apophysis." The ventral apophysis is designated as the "Ventral Tibial Apophysis." In the subfamily Misumeninae (fig. 1), the retrolateral tibial apophysis is variable in form and has certain parts which are useful for taxonomic purposes. The dorsal tooth is a strongly sclerotized projection on the distodorsal end of the apophysis. The ventral margin is usually notched to various degrees and sometimes has a ventral membranous lobe near the distal end. The ventral tibial apophysis is a small rounded lobe in this subfamily and is not taxonomically significant. The retrolateral tibial apophysis has 2 forms in the subfamily Philodrominae. In the genus *Proernus* (fig. 2), the apophysis is strongly bidentate. The apophysis is typically rectangular in shape with a serrated distal margin in the genus *Pagiopalus* (fig. 3). The ventral tibial apophysis is ventral to retrolateral in position in this subfamily and is often partially or completely fused to the retrolateral tibial apophysis. In both subfamilies, the retrolateral tibial apophysis is inclined outward to various degrees with respect to the longitudinal axis of the tibia. Illustrations of this apophysis were made by tilting the tibia so that the entire apophysis was in the same focal plane. The tarsus of the Thomisidae is a modified structure and includes the cymbium and the genital bulb. The cymbium has a depression or concavity on the ventral surface which contains the genital bulb. In 2 species, *Misumenops insulanus* and *M. cavatus*, the retrolateral side of the cymbium is emarginated or hollowed out and is designated as the "Tutaculum" (fig. 4). The tutaculum is not found in other species of Hawaiian Thomisidae. The genital bulb is a structure which functions as a sperm storage organ and is capable of expansion during periods of sperm induction and sperm transfer during copulation. The bulb is in a contracted condition at other times. The morphology of the genital bulb in the contracted condition is discussed below. In the subfamily Misumeninae (fig. 4), the main structures of the genital bulb are the tegulum and the embolus. The tegulum is a subround plate which covers most of the genital bulb. Visible through the tegulum is the crescent-shaped reservoir which is located on the retrolateral side. The embolus is divided into a "Basal Part" and an apical "Tip." The basal part is a broad, generally pale colored structure. In some species, there is a sclerotized plate on the basal part. The tip is strongly sclerotized and often black. It may be short or long and curved or almost straight. The origin of the embolus refers to the junction point

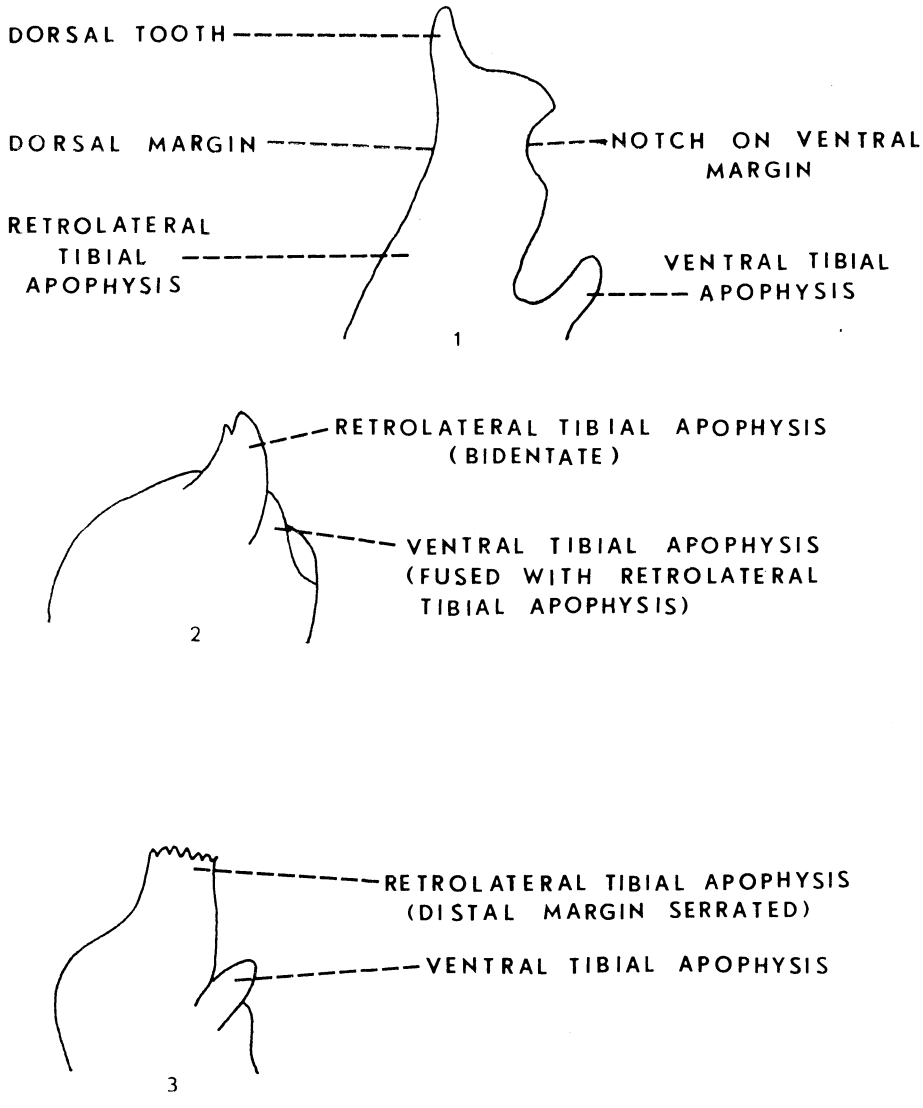


Fig. 1-3. ♂ right tibial apophyses, retrolateral view. 1, Subfamily Misumeninae; 2, Genus *Proernus*, Subfamily Philodrominae; 3, Genus *Pagiopalus*, Subfamily Philodrominae.

of the tegulum and basal end of the embolus. The origin is estimated in degrees from the distal border of the tegulum in a prolateral direction. The distal border of the tegulum is considered 0° with the proximal border 180° with respect to an imaginary line drawn through the center of the tegulum. In the subfamily Philodrominae (fig. 5), the main structures are the tegulum and the embolus. The tegulum has a suture on the prolateral side which is designated as the "Tegular Suture." The tip of the embolus

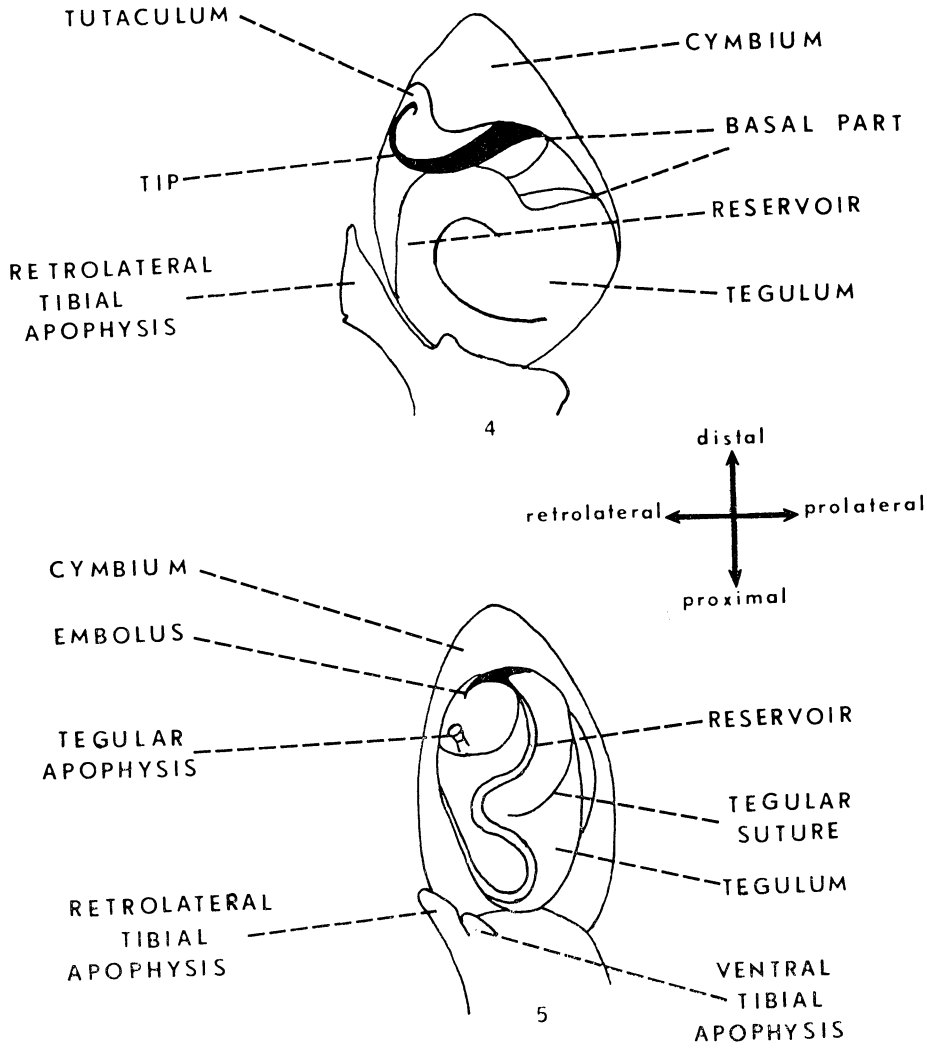
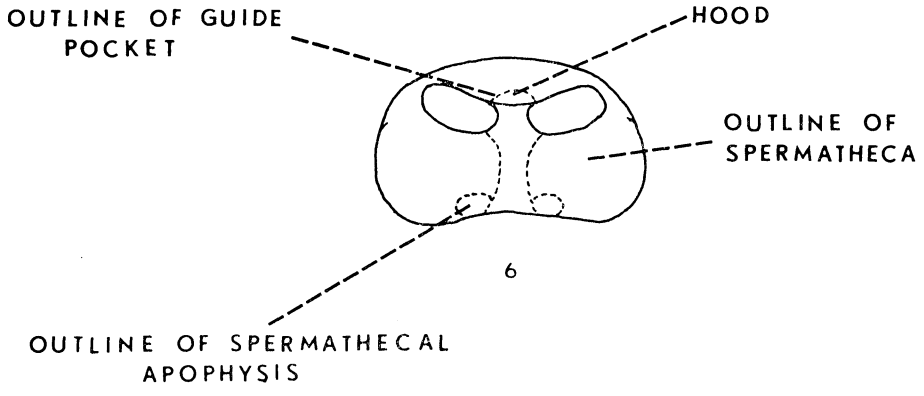


Fig. 4-5. ♂ right genitalia, ventral view. 4, Subfamily Misumeninae; 5, Subfamily Philodrominae.

lies on a membranous area of the tegulum. In some species, there is a small sclerotized structure found in the membranous area which is designated as the "Tegular Apophysis". The reservoir is visible through the tegulum and takes the form of a narrow curved duct.

♀. The external part of the ♀ copulatory structure is the epigynum. The epigynum is quite different in the 2 subfamilies. In the Misumeninae (fig. 6), the main parts of the epigynum include the guide pocket, hood, and intromittent orifice. The guide pocket is a concavity and is located in the middle of the epigynum near the anterior edge.



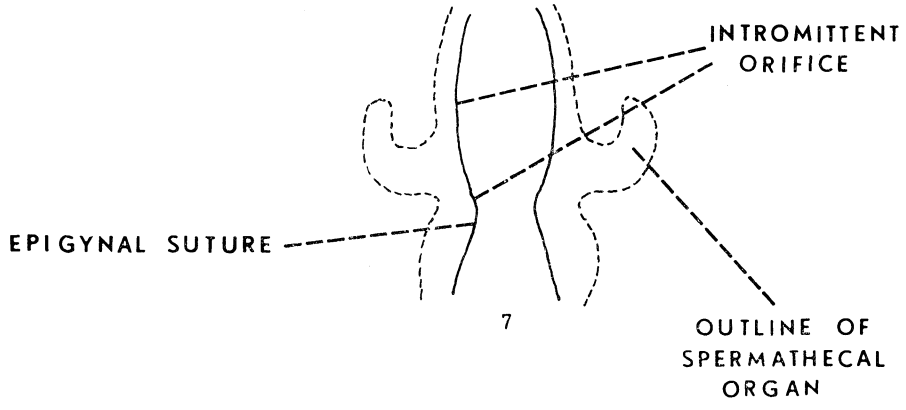


Fig. 6-7. ♀ epigynum, ventral view. 6, Subfamily Misumeninae; 7, Subfamily Philodrominae.

The hood is a sclerotized plate overlying the guide pocket. The hood may extend anterior to the epigynum or project posteriorly over the epigynum. The intromittent orifices are bilaterally paired openings to the internal bursae copulatrix. In the Philodrominae (fig. 7), the main structure is a bilaterally paired epigynal suture. The epigynal suture is a sclerotized ridge which is oriented in an anterior-posterior direction. The intromittent orifices and possibly the guide pockets (if present) appear to open between the sutures. The main internal structures of the Misumeninae include a bilaterally paired bursae copulatrix, spermathecae, spermathecal organs, spermathecal apophyses, and fertilization tubes (fig. 8). The bursa copulatrix opens at one end to the exterior through the intromittent orifice and at the other to the spermatheca. The bursa copulatrix may by membranous or sclerotized and may or may not be visible from a dorsal aspect. The spermatheca is a strongly sclerotized structure and is visible through the integument of the abdomen. The spermathecal organ is a small rounded lobe on the anterior side of the spermatheca and may or may not be visible from a dorsal aspect. The spermathecal apophysis is a small, strongly sclerotized structure located on the posterior

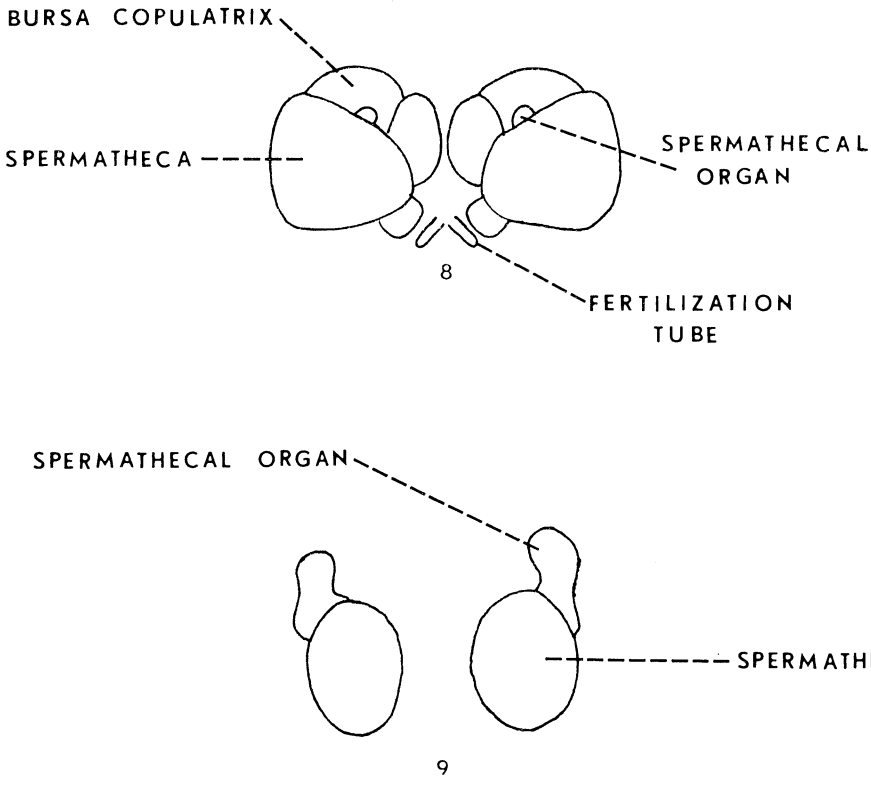


Fig. 8-9. ♀ internal genitalia. 8, Subfamily Misumeninae; 9, Subfamily Philodrominae.

side of the spermatheca. The apophysis is visible as a small dark structure through the integument of the abdomen. The fertilization tube appears to originate on the spermathecal apophysis. This tube connects the spermatheca to the vagina, but is broken off when the epigynum is dissected from the abdomen. The main internal structures of the Philodrominae include a bilaterally paired bursae copulatrix, spermathecae, and spermathecal organs (fig. 9). The bursa copulatrix is barely, if at all, visible from a dorsal aspect in the Hawaiian Philodrominae. The spermatheca is a subround strongly sclerotized structure. The spermathecal organ is strongly sclerotized and usually visible along the anterior side of the spermatheca.

The external structures of the epigynum of both subfamilies were studied and illustrated from the intact epigynum. The internal structures were studied and illustrated from the dissected epigynum while it was immersed and cleared in lactic acid.

SYSTEMATIC TREATMENT

A systematic list of the Hawaiian Thomisidae, arranged alphabetically, is given in Table II. Museums where specimens of the species are deposited are listed after the

species name, and are abbreviated as follows: American Museum of Natural History, (AMNH); B. P. Bishop Museum, Honolulu (BISHOP); British Museum (Nat. Hist.), London (BMNH); Museum of Comparative Zoology, Cambridge (MCZ); Museum National d'Histoire Naturelle, Paris (MNHN); and Universitets Zoologiske Museum, Copenhagen (UZM). These abbreviations are also used in the section on Records in the species descriptions.

TYPES. The specimen studied for the description of *Diaea kanakana* (=*Misumenops kanakanus*) was reported by Karsch (1880) as part of a collection in the Berliner Zoologisches Museum. The specimen was not available for study. The specimens of *Diaea insulana* (=*Misumenops insulanus*), studied by Keyserling, are deposited in the Universitets Zoologiske Museum. Simon did not designate type specimens. The specimens studied for the description of *Misumena nesiotes* and *Proernus schauinslandi* are probably the specimens in Simon's collection in the Museum National d'Histoire Naturelle. The specimens studied for the Fauna Hawaiiensis work were divided into 3 parts. The British Museum (Natural History) has representatives of all species except for specimens of *Adrastidia longula* (=*Proernus longulus*) which are not available. A second group of specimens is deposited in the Museum National d'Histoire Naturelle. The third group of specimens is deposited in the B. P. Bishop Museum. Lectotypes have not been designated. Some species are represented by unique specimens which make them holotypes. When several specimens represent a species which is redescribed

Table II. Systematic list of Hawaiian Thomisidae.

Subfamily Misumeninae Simon
Genus *Mecaphesa* Simon
cincta Simon - BISHOP, BMNH
perkinsi Simon - AMNH, BISHOP, BMNH, MNHN
semispinosa Simon - BISHOP, BMNH
Genus *Misumenops* F. O. P. Cambridge
anguliventris (Simon) - AMNH, BISHOP, BMNH, MCZ, MNHN
aridus n. sp. - BISHOP
balteus n. sp. - BISHOP
cavatus n. sp. - AMNH, BISHOP
discretus n. sp. - AMNH, BISHOP, MNHN
editus n. sp. - BISHOP
facundus n. sp. - AMNH, BISHOP, MCZ, MNHN
hiatus n. sp. - BISHOP
imbricatus n. sp. - AMNH, BISHOP
insulanus (Keyserling) - BISHOP, BMNH, MNHN, UMZ
junctus n. sp. - AMNH, BISHOP, MNHN
kanakanus (Karsch) - ?
nigrofrenatus (Simon) - AMNH, BISHOP, BMNH, MCZ, MNHN
oreades (Simon) - AMNH, BISHOP, BMNH, MCZ, MNHN
rufithorax (Simon) - AMNH, BISHOP, BMNH, MCZ, MNHN
velatus (Simon) - AMNH, BISHOP, BMNH, MCZ, MNHN
vitellinus (Simon) - AMNH, BISHOP, BMNH, MCZ, MNHN
Genus *Synaema* Simon
naevigerum Simon - AMNH, BISHOP, BMNH, MNHN
Subfamily Philodrominae Thorell
Genus *Pagiopalus* Simon
apiculus n. sp. - BISHOP, MCZ
atomarius Simon - AMNH, BISHOP, BMNH, MCZ, MNHN
nigriventris Simon - BISHOP, BMNH, MNHN
personatus Simon - BISHOP, BMNH, MNHN
Genus *Proernus* Simon
aculeatus Simon - AMNH, BISHOP, BMNH, MCZ, MNHN
longulus (Simon) - BMNH ?
schauinslandi Simon - AMNH, BISHOP, BMNH, MCZ, MNHN
stigmaticus (Simon) - AMNH, BISHOP, BMNH, MNHN
velox Simon - AMNH, BISHOP, BMNH, MNHN

in the present paper, they are regarded as syntypes. Information for all of the types is recorded in the section on Records in the species descriptions.

Family THOMISIDAE Sundevall

Thomisidae Sundevall, 1833: 315.

Type-genus: *Thomisus* Walckenaer, 1805: 28.

Eyes in 2 transverse rows, both rows recurved, posterior row more so; maxillae convergent and usually about 2 × as long as wide; labium about as wide as long and sometimes notched on sides at proximal end; legs with 1 pair of claws, each claw with single row of teeth, distal teeth largest; ♀ palpus with single tarsal claw with single row of teeth; trichobothria in 2 irregular rows on dorsal surface of tibiae, in single row on dorsal surface of metatarsi and tarsi; openings to book lungs in epigastric groove; single tracheal spiracle just anterior to spinnerets; 3 pairs of 2 segmented spinnerets, distal segment short, anterior pair largest, median pair smallest, colulus reduced to small sclerotized plate with short setae; anal tubercle well developed and 2 segmented.

The family Thomisidae is world-wide in distribution.

Key to subfamilies and genera of Thomisidae in Hawaii

1. Legs I and II subequal in length and much longer than legs III and IV; claw tufts absent; promargin of cheliceral fang furrow unarmed Misumeninae-2
   Leg II longer than other legs; claw tufts well-developed with spatulate hairs; promargin of cheliceral fang furrow with 2 teeth Philodrominae-4
2 (1). Carapace with blunt setae ..... **Mecaphesa**
   Carapace with setaceous setae 3
3 (2). Median ocular area slightly wider (behind) than long (23: 18 or less); posterior median eyes closer to each other than to posterior lateral eyes ..... **Misumenops**
   Median ocular area much wider (behind) than long (24: 15 or greater); posterior median eyes as close to posterior lateral eyes as to each other ..... **Synaema**
4 (1). Width of anterior end of carapace less than 1/2 greatest width of carapace; median ocular area slightly wider (behind) than long (18: 15 or less) ..... **Pagiopalus**
   Width of anterior end of carapace greater than 1/2 greatest width of carapace; median ocular area much wider (behind) than long (50: 28 or greater) ..... **Proernus**

Subfamily Misumeninae Simon

Misumeninae Simon, 1892-95, I: 968.

Type-genus: *Misumena* Latreille, 1804: 135.

Body with setaceous or blunt setae; carapace about as wide as long, widest and highest opposite legs II, convex on top, clypeus vertical; promargin of cheliceral fang furrow unarmed; legs I and II subequal in length and much longer than legs III and IV; claw tufts and scopula absent; abdomen usually ovoid, sometimes trapezoidal in shape.

This subfamily is represented in the Hawaiian Islands by 3 genera:

Mecaphesa, *Misumenops*, and *Synaema*.

The subfamily Misumeninae is world-wide in distribution.

Table III. Island distribution of Hawaiian Thomisidae.

Species	Necker	Nihoa	Kauai	Oahu	Molokai	Lanai	Maui	Hawaii
Genus Mecaphesa				X	X		X	?
cincta					X		X	
perkinsi				X				
semispinosa				X				?
Genus Misumenops	X	X	X	X	X	X	X	X
anguliventris			X	X	X	X	X	X
aridus							X	
balteus							X	
cavatus								X
discretus			X					
editus				X				
facundus								X
hiatus							X	
imbricatus				X	X	X	X	
insulanus	X	X		X	X			X
iunctus			X	X	X		X	X
kanakanus							X	
nigrofrenatus			X	X	X			X
oreades			X	X	X		X	X
rufithorax				X				
velatus				X	X		X	
vitellinus			X	X		X	X	X
Genus Synaema			X	X	X			X
naevigerum			X	X	X			X
Genus Pagiopalus			X	X	X	X	X	X
apiculus				X				
atomarius			X	X	X	X	X	X
nigriventris							X	X
personatus			X			X		
Genus Proernus			X	X	X	X	X	X
aculeatus			X				X	
longulus							X	
schauinslandi				X			X	
stigmaticus			X	X	X	X	X	X
velox				X			X	

Genus **Mecaphesa** Simon

Mecaphesa Simon, 1900: 495.

Type-species: *Mecaphesa cincta* Simon, 1900: 495. By designation of Simon, 1903: 1013.

Carapace convex and armed with blunt setae; abdomen oval in shape in ♂♂ and trapezoidal in shape in ♀♀; bursae copulatrix barely or not visible from a dorsal aspect.

Simon (1900) considered *Mecaphesa* related to the genera *Oxyptila* and *Heriaeus*. *Mecaphesa* differs from *Oxyptila* by having both eye rows equally recurved and from *Heriaeus* by having the posterior eye row more strongly recurved, a shorter clypeal height, and the integument armed with short setae.

The genus *Mecaphesa* is endemic to the Hawaiian Islands.

Key to species of Mecaphesa in Hawaii

♂♂ (the ♂ of *M. cincta* is unknown)

1. Tip of embolus strongly curved (fig. 14); dorsal tooth of retrolateral tibial apophysis short (fig. 15) ..... **perkinsi** Simon
   Tip of embolus short and almost straight (fig. 19); dorsal tooth of retrolateral tibial apophysis long (fig. 20) ..... **semispinosa** Simon

♀♀

1. Tibia I with 2 pairs of ventral setae; metatarsus I with 3 pairs of ventral setae..... ..... **perkinsi** Simon
   Tibia I with 3 to 4 pairs of ventral setae; metatarsus I with 5 pairs of ventral setae..... 2
2. Tibia III with 1 pair of ventral setae; tibia IV with 1 ventral seta..... **cincta** Simon
   Tibia III with 1 ventral seta; tibia IV without ventral seta ..... **semispinosa** Simon

Mecaphesa cincta Simon, 1900 Fig. 10–12.

M. cincta Simon, 1900: 495.

This species is redescribed from a ♀ from Molokai. The ♂ is unknown.

♀. Measurements (mm).

Carapace length, 1.96; width, 1.92; height, 0.83

Abdomen length, 2.73; width, 2.83; height, 1.92

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.03	0.96	1.50	1.33	0.92	6.74
II	2.03	0.96	1.46	1.30	0.92	6.67
III	1.20	0.66	0.83	0.69	0.59	3.97
IV	1.33	0.63	0.96	0.86	0.63	4.41
Palp	0.50	0.33	0.33	—	0.53	1.69

Cephalothorax dark brown with pale markings; legs I and II dark brown with scattered white spots; legs III and IV pale brown with dark brown bands; dorsum of abdomen reddish brown with black pattern; sides and venter of abdomen reddish brown with irregular black markings. *Eyes*: Ratio of AME: ALE: PME: PLE=5: 9: 6: 7; median ocular area as wide in front as behind (16: 16) and longer than wide (19: 16); AME closer to ALE than to each other (12:

16); PME closer to each other than to PLE (16: 22); clypeus over 2 × the diameter of an AME (14: 5). *Sternum*: Slightly longer than wide (31: 27): posterior end almost pointed and separates coxae IV by less than width of a coxa (7: 10). *Legs*: I, II, IV, III; setae — 3 in row prolateral on femur I, 1 dorsal on femora I, II, and III, 1 distodorsal on patellae I and II, 2 in row dorsal on patellae III and IV and all tibiae, 4 pairs ventral on tibiae I and II, 1 pair ventral on tibia III, 1 ventral on tibia IV, 5 pairs ventral on metatarsi I and II; trichobothria—4 dorsal on tibiae I and II, 5 dorsal on tibiae III and IV, 3 in row dorsal on metatarsi and tarsi I and II, 2 in row dorsal on metatarsi and tarsi III and IV; tarsal claws—4 teeth per claw on tarsi I and II, 3 teeth per claw on tarsi III and IV. *Epigynum* (fig. 11-12): Hood of guide pocket anterior to intromittent orifices; bursae copulatrix not visible from dorsal aspect. *Palp*: 5 to 6 trichobothria dorsal on tibia; tarsal claw with 3 teeth.

VARIATION. Carapace width: 3 ♀♀—1.79-1.92 mm; Femur I length: 2 ♀♀—2.07-2.17 mm. Color patterns are similar for the 3 ♀♀. One specimen is darker than the others.

RECORDS. Holotype: ♀ (BMNH 1904.X.24.351), Maui: Haleakala, 1500 m. Specimens examined: MOLOKAI: 2 ♀♀, E Kaimakakai, 900 m, 18.III.1966, C. M. Yoshimoto; 3 immatures, Kamoku Flats, 1050 m, 19.III.1966, Yoshimoto.

DISTRIBUTION. This species is presently known only from Molokai and the Haleakala region of Maui.

ECOLOGY. The exact locality on Haleakala where the type specimen was collected is unknown. On Molokai, the habitat of this species is best indicated by zone 2 (Table I) with some of the dominant plant indicators of zone 4.

DISCUSSION. This species is closely related to *M. semispinosa*. The hood of the epigynal guide pocket is more strongly arched in *semispinosa* and the intromittent orifices are smaller and more widely separated from each other.

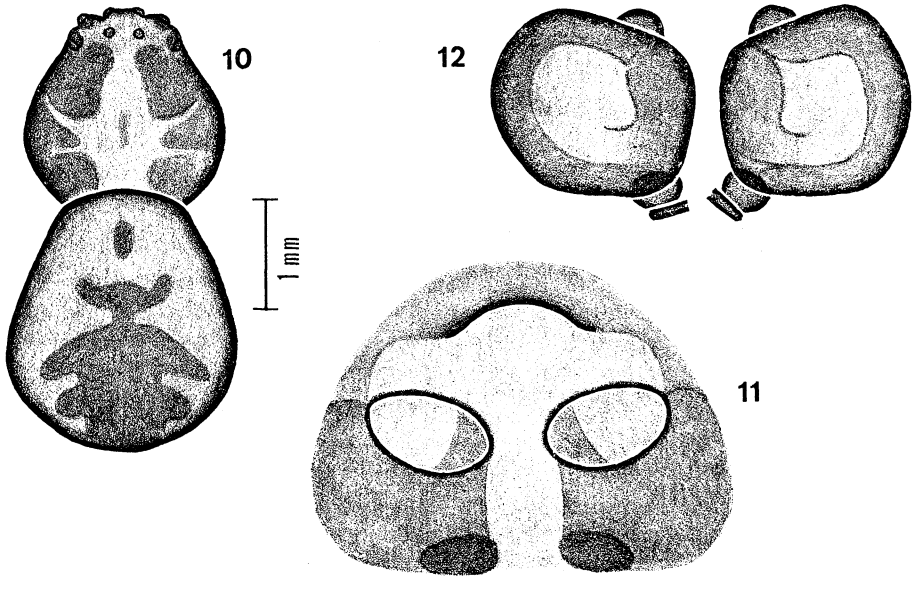


Fig. 10-12. *Mecaphesa cincta* Simon. 10, ♀, dorsal view; 11, ♀ epigynum, ventral view; 12, ♀ internal genitalia, dorsal view.

Mecaphesa perkinsi Simon, 1904 Fig. 13-17.

M. perkinsi Simon, 1904: 342.

This species is redescribed from a ♂ and ♀ from the Koolau Mountain Range on Oahu.

♂. Measurements (mm).

Carapace length, 1.23; width, 1.23; height, 0.50

Abdomen length, 1.56; width, 1.30; height, 1.03

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	1.79	0.66	1.46	1.26	0.73	5.90
II	1.73	0.63	1.43	1.20	0.69	5.68
III	0.76	0.33	0.53	0.40	0.36	2.38
IV	0.83	0.36	0.53	0.43	0.33	2.48
Palp	0.40	0.20	0.13	—	0.40	1.13

Carapace, chelicerae and legs I and II brown with irregular pale markings; sternum, maxillae and labium even brown; legs III and IV pale brown with dark brown bands; dorsum of abdomen brown with black markings; posterior end of abdomen white; venter of abdomen with broad dark stripe. *Eyes*: Ratio of AME: ALE: PME: PLE=5: 8: 5: 6; median ocular area slightly wider behind than in front (11: 9) and slightly longer than wide (13: 11); AME slightly closer to ALE than to each other (9: 8); PME closer to each other than to PLE (11: 7); clypeus height almost 2 × the diameter of an AME (9: 5). *Sternum*: Posterior end bluntly pointed and separates coxae IV by width of a coxa. *Legs:* I, II, IV, III; setae—2 in row prolateral near proximal end of femur I, 1 dorsal on femora II, III, and IV, 2 (strong) pairs disto-ventral on metatarsi I and II; trichobothria—4 dorsal on all tibiae, 3 in row dorsal on metatarsi and tarsi I and II, 2 dorsal on metatarsi and tarsi III and IV; tarsal claws—4 teeth per claw on tarsi I and II, 3 teeth per claw on tarsi III and IV. *Palp* (fig. 14-15): Embolus originates near distal border of tegulum; tip strongly curved; dorsal tooth of retrolateral tibial apophysis very short and projects dorsally; small membranous lobe on ventral margin of apophysis; 5 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 1.83; width, 1.83; height, 0.50

Abdomen length, 3.17; width, 3.23; height, 2.20

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	1.86	0.86	1.33	1.07	0.73	5.85
II	1.83	0.83	1.30	1.07	0.76	5.79
III	1.00	0.53	0.63	0.50	0.46	3.12
IV	1.13	0.50	0.73	0.63	0.46	3.45
Palp	0.43	0.30	0.26	—	0.43	1.42

Color similar to ♂. *Eyes*: Ratio of AME: ALE: PME: PLE=6: 11: 6: 8; median ocular area wider behind than in front (18: 14) and slightly wider than long (18: 17); AME slightly closer to ALE than to each other (12: 14); PME closer to each other than to PLE (18: 23); clypeus height almost 2 × the diameter of an AME (11: 6). *Sternum*: Posterior end almost pointed and separates coxae IV by slightly over half width of a coxa (6: 10). *Legs*: I, II, IV, III; setae—1 dorsal on femora II, III, and IV, 2 pairs ventral on tibiae I and II, 1 dorsal on

tibiae III and IV, 3 pairs ventral on metatarsi I and II; trichobothria—4 dorsal on all tibiae, 2 in row dorsal on all metatarsi and tarsi; tarsal claws—3 to 4 per claw on all tarsi. *Epigynum* (fig. 16-17): Hood of guide pocket in form of transverse ridge; bursae copulatrix barely visible from dorsal aspect. *Palp*: 7 trichobothria dorsal on tibiae; tarsal claw with 3 or 4 teeth.

VARIATION. Carapace width: 8 ♂♂—1.17-1.43 mm (mean, 1.30 mm); 7 ♀♀—1.43-2.07 mm (mean, 1.69 mm). Femur I length: 8 ♂♂—1.50-2.00 mm (mean, 1.76 mm); 7 ♀♀—1.43-2.10 mm (mean, 1.73 mm). There appears to be 2 allopatric populations of this species on Oahu. These populations occur in the Waianae Mountain Range and the Koolau Mountain Range. There are more irregular white markings on the specimens from the Waianae Mountains. Females from the Koolau Mountains are larger, darker, and more homogenous in color than this sex from the Waianae Mountains.

RECORDS. Syntypes: Oahu: 1 ♀ (BMNH 22202); 1 immature ♀ (BMNH 1904.X.3.54), Perkins; 1 immature ♀ (BMNH 1904.X.3.55) (varietas), Perkins. Specimens examined: OAHU: Wiliwilinui Ridge: 1 immature, 720-780 m, 19.VI.1964, J. W. Beardsley; 1 ♂, 1 ♀, 3 immatures, 510-690 m, 11.V.1965, Suman; 1 immature, 18.I.1966, P. D. Ashlock; Mt Tantalus: 4 immatures, 19.III.1940, E. C. Zimmerman; 1 ♀, VI.1957, D. E. Hardy; 1 ♂, 8.VII.1959, Quate; 1 immature, 350-450 m, 24.VII.1963, ex moss on log, H. Arakaki; 1 immature, 16.VI.1964, Suman; 1 immature, 450-600 m, 14.III.1965, Suman; 1 immature, 27.VII.1965, ex *Freycinetia*; 1 ♂, 540 m, 23.XI.1966, J. R. Vockeroth: 1 ♀, 360 m, 29.III.1967, ex *Freycinetia*, D. Tsuda; Pupukea: 2 immatures, 6.III.1932, O. Bryant; 1 ♂, 3 immatures, 660 m, 4.IV.1952, Hardy; 3 ♂♂, 4.IV.1952, W. C. Mitchell; 1 ♂, 1 ♀, 1 immature, beside Wilson Tunnel, Kaneohe side, 21.IV.1965, Suman; 1 immature, Kalihi Vall., 300-405 m, 10.XII.1960, Quate; 1 immature, Honolulu, Hardy; 1 immature, Manoa, 20.II.1944, N. L. H. Krauss; 1 immature, Opaeula Vall., 6.VII.1964, Suman; 6 immatures, Drum Rd, 6.VII.1964, Suman; 3 immatures, N end of Koolau Mts, 8.V.1964, Suman; 1 immature, Waikane Trail, 22.X.1947, H. S. Dybas; 1 immature, Haula, 22.XI. 1952, C. Hoyt; 1 immature, Kamokuiki Vall., Waianae Mts, 630 m, 13.IV.1933, E. H. Bryan; 3 ♂♂, 4 ♀♀, 3 immatures, Waianae Mts, behind Schofield, 450-600 m, 7.III.1965, Suman.

DISTRIBUTION. This species is found in the Waianae and Koolau Mountain Ranges of Oahu.

ECOLOGY. Individuals of this species have been collected from a variety of habitats, primarily in zones 1 to 3 (Table I). In the Mt Tantalus region (Koolau Mts), some specimens have been collected on *Freycinetia*.

DISCUSSION. This species is related to *M. cincta* and *semispinosa*. The distal end of the retrolateral tibial apophysis is almost truncate in *perkinsi* while in *semispinosa* the distal end of the apophysis is long and thin. The hood of the epigynal guide pocket is in the form of a transverse ridge in *perkinsi* while the hood is strongly arched in *cincta* and *semispinosa*.

Mecaphesa semispinosa Simon, 1900 Fig. 18-22.

M. semispinosa Simon, 1900: 496, pl. 17, fig. 4.

The locality of this species was originally recorded as Mauna Kea, Hawaii. The only known type of this species is a ♀ in the BMNH collection with an Oahu locality

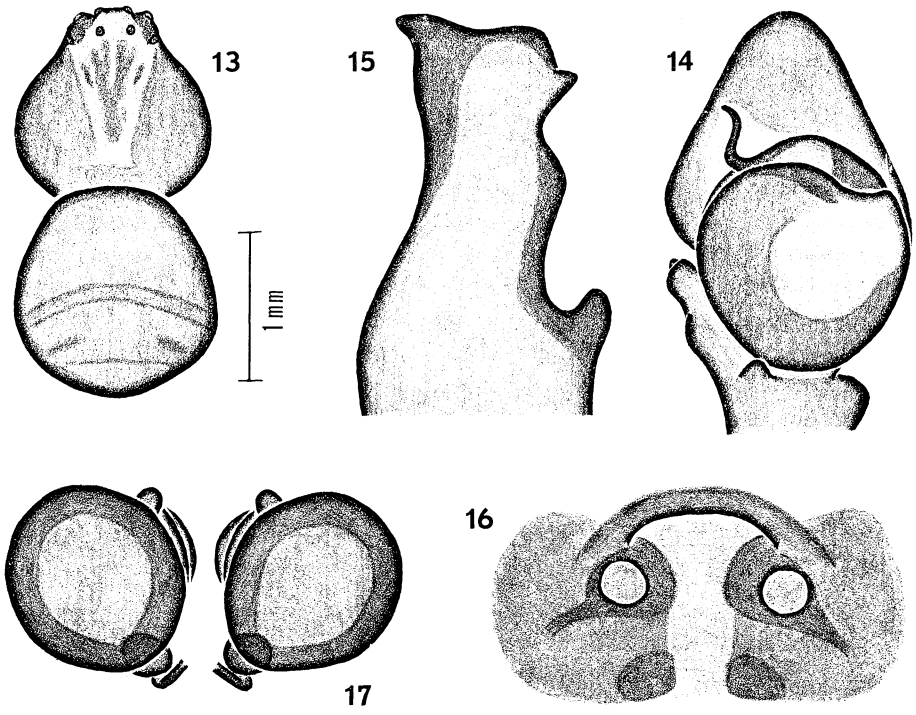


Fig. 13-17. *Mecaphesa perkinsi* Simon. 13, ♂, dorsal view; 14, ♂ right palp, ventral view; 15, ♂ right tibial apophysis, retrolateral view; 16, ♀ epigynum, ventral view; 17, ♀ internal genitalia, dorsal view.

label. The following redescription is based on a ♂ and ♀ from Oahu.

♂. Measurements (mm).

Carapace length, 1.46; width, 1.46; height, 0.46

Abdomen length, 2.00; width, 1.73; height, 1.40

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.23	0.83	1.96	1.73	0.92	7.67
II	2.23	0.76	1.89	1.63	0.89	7.40
III	1.20	0.46	0.83	0.69	0.46	3.64
IV	1.26	0.46	0.89	0.79	0.50	3.90
Palp	0.46	0.23	0.17	—	0.43	1.29

Carapace orange-brown, darker on sides; chelicerae, sternum, maxillae, labium, legs III and IV yellow-brown; legs I and II orange-brown with dark markings; femora I and II with thin black line running length of venter; dorsum of abdomen orange-brown with black pattern; venter of abdomen pale yellow-brown. *Eyes*: Ratio of AME: ALE: PME: PLE=4: 7: 4: 5.5; median ocular area very slightly wider behind than in front (15: 14) and very slightly longer than wide (16: 15); AME slightly closer to each other than to ALE (14: 16); PME closer to each other than to PLE (15: 20); clypeus height over 2 × the diameter of an AME (10: 4). *Sternum*: Posterior end almost pointed and separates coxae IV by slightly more than 1/2 width

of a coxa (5: 8). *Legs*: I, II, IV, III; setae—4 in row prolateral on femur I, 1 dorsal on all femora, 2 in row dorsal on patellae III and IV, 2 (weak) in row dorsal on all tibiae; trichobothria—4 dorsal on tibiae I and II, 5 to 6 dorsal on tibiae III and IV, 3 in row dorsal on metatarsi and tarsi I and II, 2 to 3 in row dorsal on metatarsi III and IV, 2 in row dorsal on tarsi III and IV; tarsal claws—3 teeth per claw on tarsi I and II, 2 teeth per claw on tarsi III and IV. *Palp* (fig. 19-20): Embolus originates about 45° from distal border of tegulum; tip short and slightly curved; dorsal tooth of retrolateral tibial apophysis long and not delimited from distal end of apophysis; 6 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 2.13; width, 2.00; height, 0.63

Abdomen length, 2.96; width, 2.13; height, 1.40

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.33	1.03	1.69	1.43	0.92	7.40
II	2.33	1.07	1.69	1.43	0.92	7.44
III	1.36	0.59	0.92	0.73	0.59	4.19
IV	1.46	0.63	1.10	0.92	0.63	4.74
Palp	0.53	0.33	0.33	—	0.53	1.72

Color similar to ♂. *Eyes*: Ratio of AME: ALE: PME: PLE = 6: 10: 6: 8; median ocular area as wide in front as behind (19: 19) and very slightly longer than wide (20: 19); AME closer to ALE than to each other (15: 19); PME closer to each other than to PLE (19: 26); clypeus height over 2× the diameter of an AME (14: 6). *Sternum*: Slightly longer than wide (33: 27); posterior end almost pointed and separates coxae IV by 1/2 width of a coxa. *Legs*: II, I, IV, III; setae—2 in row prolateral on femur I, 1 dorsal on femora I, II, and III, 2 (weak) in row dorsal on all patellae, 2 (weak) in row dorsal on all tibiae, 3 to 4 pairs ventral on tibiae I and II, 1 midventral on tibia III, 5 pairs ventral on metatarsi I and II; trichobothria—4 dorsal on tibiae I and II, 5 dorsal on tibiae III and IV, 3 in row dorsal on metatarsi and tarsi I and II, 2 in row dorsal on metatarsi and tarsi III and IV; tarsal claws—3 free teeth plus series of fused teeth on anterior claw of tarsi I and II, 3 free teeth on posterior claw of tarsi I and II and both claws of tarsi III and IV. *Epigynum* (fig. 21-22): Hood of guide pocket anterior to epigynum; bursae copulatrix not visible from dorsal aspect. *Palp*: 5 trichobothria dorsal on tibia; tarsal claw with 3 teeth.

VARIATION. Carapace width: 3 ♀♀—2.00-2.07 mm. Femur I length: 3 ♀♀—2.33-2.43 mm. The color pattern is very similar in all females.

RECORDS. Holotype: ♀ (BMNH 1904.X.352), Oahu: nr Honolulu, Waiolani side of Nuuanu Vall., VI.95, Perkins. Specimens examined: OAHU; 1 ♂, 3 ♀♀, 7 immatures, Mt Kaala, 1200 m, 7.VI.1965, 14.IV.1966, Suman, J. W. Beardsley.

DISTRIBUTION. This species is found in the Waianae and Koolau Mountain Ranges of Oahu.

ECOLOGY. The exact locality in Nuuanu Valley in the Koolau Mountains where the type specimen was collected is not known. Mt Kaala in the Waianae Mountains is a high elevation bog (zone 6, Table I).

DISCUSSION. This species is closely related to *M. cincta* and is discussed under *cincta*.

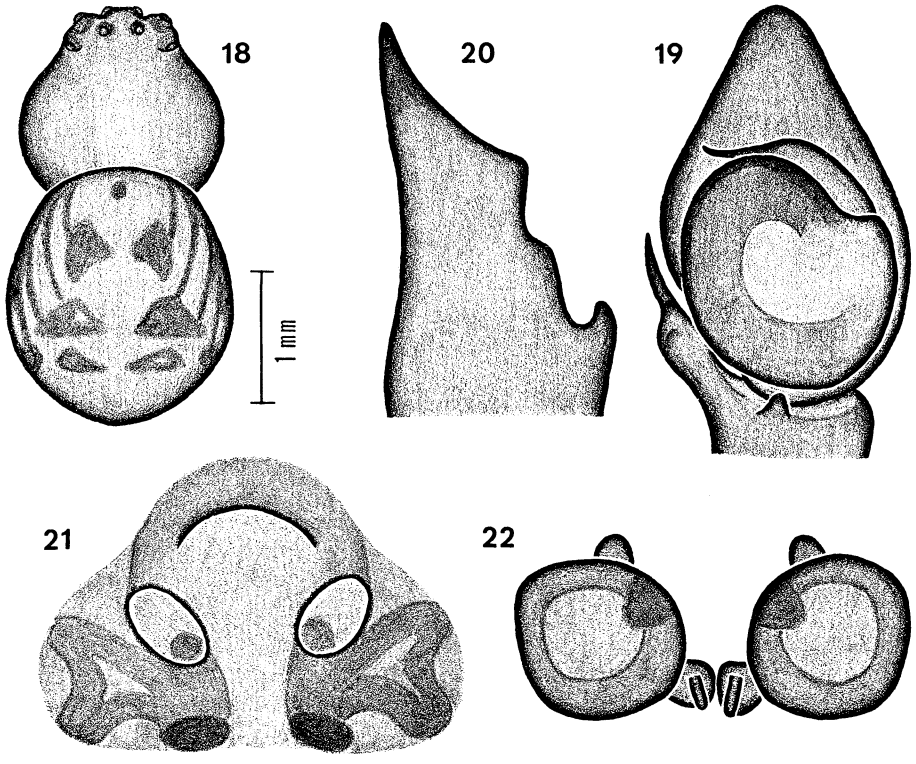


Fig. 18–22. *Mecaphesa semispinosa* Simon. 18, ♂, dorsal view; 19, ♂ right palp, ventral view; 20, ♂ right tibial apophysis, retrolateral view; 21, ♀ epigynum, ventral view; 22, ♀ internal genitalia, dorsal view.

Genus **Misumenops** F. Pickard-Cambridge

Misumenops F. Pickard-Cambridge, 1900: 141.

Type-species: *Misumena maculisparsa* Keyserling, 1891: 245. By designation of F. Pickard-Cambridge, 1900: 141.

Carapace armed with setaceous setae; lateral eyes on common tubercles; anterior lateral eyes larger than anterior median eyes; legs with robust setae on ventral surfaces of tibiae and metatarsi, strong setae on dorsal, prolateral, and sometimes retrolateral surfaces of femora, patellae, tibiae, and metatarsi.

This genus contains species formerly placed in the genera *Diaea*, *Misumena*, and *Synaema* as well as 9 species described as new in the present paper.

The genus *Misumenops* is world-wide in distribution with most species known from North and South America.

Key to species of Misumenops in Hawaii

♂♂ (♂ of *kanakanus* is unknown)

1. Tutaculum of palp present 2
   Tutaculum of palp absent 3
2 (1). Dorsal tooth of retrolateral tibial apophysis large; ventral margin of retrolateral apophysis notched (fig. 36) ..... **cavatus***
   Dorsal tooth of retrolateral tibial apophysis small; ventral margin of apophysis not notched (fig. 64) ..... **insulanus** (Keyserling)
3 (1). Embolus originates more than 90° from distal margin of tegulum in prolateral direction; tip as long as or longer than greatest width of tegulum (fig. 24, 50) 4
   Embolus originates less than 90° from distal margin of tegulum in prolateral direction; tip shorter than greatest width of tegulum (fig. 29, 83) 7
4 (3). Retrolateral tibial apophysis deeply notched between dorsal tooth and distal end of apophysis (fig. 94) ..... **vitellinus** (Simon)
   Retrolateral tibial apophysis not notched between dorsal tooth and distal end of apophysis 5
5 (4). Dorsal tooth of retrolateral tibial apophysis continuous (not delimited) from distal end of apophysis (fig. 41) ..... **discretus***
   Dorsal tooth of retrolateral tibial apophysis delimited (distinct) from distal end of apophysis 6
6 (5). Ventral margin of retrolateral tibial apophysis with large notch (fig. 51) ..... **facundus***
   Ventral margin of retrolateral tibial apophysis with small notch (fig. 25) ..... **anguliventris** (Simon)
7 (3). Prolateral margin of tegulum distinctly notched (fig. 68) 8
   Prolateral margin of tegulum either smooth or shallowly concave (fig. 45) 9
8 (7). Retrolateral tibial apophysis distinctly notched between dorsal tooth and distal end of apophysis; ventral margin of apophysis with small notch (fig. 59) ..... **imbricatus***
   Retrolateral tibial apophysis not notched between dorsal tooth and distal end of apophysis; ventral margin of apophysis with large notch (fig. 69) ..... **junctus***
9 (7). Dorsal tooth of retrolateral tibial apophysis distinctly delimited from distal margin of apophysis (fig. 46, 74) 10
   Dorsal tooth of retrolateral apophysis not delimited (continuous or almost so) from distal margin of apophysis (fig. 56, 84) 13
10(9). Retrolateral tibial apophysis strongly notched between dorsal tooth and distal margin of apophysis; dorsal tooth long (fig. 89) ..... **velatus** (Simon)
   Retrolateral tibial apophysis not notched between dorsal tooth and distal margin of apophysis; dorsal tooth short 11
11(10). Ventral margin of retrolateral tibial apophysis with distinctly delimited lobe (fig. 74) ..... **nigrofrenatus** (Simon)
   Ventral margin of retrolateral tibial apophysis with lobe not distinctly delimited from distal border of apophysis 12
12(11). Dorsal margin of retrolateral tibial apophysis concave; distal margin of apophysis convex (fig. 46) ..... **editus***
   Dorsal margin of retrolateral tibial apophysis not concave; distal margin of apophysis almost straight (fig. 79) ..... **oreades** (Simon)
13 (9). Ventral margin of retrolateral tibial apophysis with lobe distinctly delimited (fig. 56) 14
   Ventral margin of retrolateral tibial apophysis with lobe not distinct (fig. 33) 15

* Described as new.

14(13). Dorsal tooth of retrolateral tibial apophysis long and thin; tip of embolus straight (fig. 29, 30) ..... **aridus***
Dorsal tooth of retrolateral tibial apophysis short and broad; tip of embolus curved (fig. 55, 56) ..... **hiatus***
15(13). Distal part of ventral margin of retrolateral tibial apophysis straight; dorsal tooth thin (fig. 84) ..... **rufithorax** (Simon)
Distal part of ventral margin of retrolateral apophysis concave; dorsal tooth very broad (fig. 33) ..... **balteus***

♀♀ (♀♀ of *aridus*, *balteus*, and *hiatus* are unknown. Specimen of *kanakanus* was not available for study)

1. Hood of epigynal guide pocket extends posteriorly and overlaps part of intromittent orifices (fig. 47, 52, 75) 2
Hood of epigynal guide pocket anterior to and does not overlap intromittent orifices (fig. 26, 70) 9
2 (1). Margin of hood evenly curved (fig. 60) 3
Margin of hood quadrangular in outline (fig. 52, 75) 6
3 (2). Intromittent orifices of epigynum separated from each other by slightly more than the greatest diameter of an orifice (fig. 47) ..... **editus***
Intromittent orifices separated from each other by less than the greatest diameter of an orifice 4
4 (3). Intromittent orifices separated from each other by more than 1/2 the greatest diameter of an orifice (fig. 60) ..... **imbricatus***
Intromittent orifices separated from each other by less than 1/2 the greatest diameter of an orifice 5
5 (4). Intromittent orifices narrow and separated from each other by almost 1/2 the greatest diameter of an orifice (fig. 42) ..... **discretus***
Intromittent orifices extremely large and subround; orifices separated from each other by less than 1/4 the greatest diameter of an orifice (fig. 37) ..... **cavatus***
6 (2). Intromittent orifices separated from each other by slightly more than the greatest diameter of an orifice 7
Intromittent orifices separated from each other by less than the greatest diameter of an orifice 8
7 (6). Intromittent orifice subround in outline (fig. 75) ..... **nigrofrenatus** (Simon)
Intromittent orifice triangular in outline (fig. 95) ..... **vitellinus** (Simon)
8 (6). Intromittent orifice very large and much longer than wide (fig. 52) ..... **facundus***
Intromittent orifice small and slightly wider than long (fig. 80) ..... **oreades** (Simon)
9 (1). Intromittent orifices separated from each other by at least 2 × the greatest diameter of an orifice 10
Intromittent orifices separated from each other by much less than 2 × the greatest diameter of an orifice 11
10 (9). Hood of epigynal guide pocket strongly arched (fig. 90); tibia I with 3 to 4 pairs of ventral setae ..... **velatus** (Simon)
Hood of epigynal guide pocket not strongly arched (fig. 26); tibia I with 6 to 8 pairs of ventral setae ..... **anguliventris** (Simon)
11 (9). Hood of epigynal guide pocket not well-defined (fig. 85); metatarsus I with 3 pairs of ventral setae ..... **rufithorax** (Simon)
Hood of epigynal guide pocket well-defined; metatarsus I with 5 to 6 pairs of ven-

tral setae 12

12(11). Hood of epigynal guide pocket large and almost vertical in position (fig. 65); metatarsus I with 6 pairs of ventral setae ..... **insulanus** (Keyserling)

Hood of epigynal guide pocket small and not vertical in position (fig. 70); metatarsus I with 5 pairs of ventral setae ..... **junctus***

Misumenops anguliventris (Simon), 1900, new combination Fig. 23-27.

Misumena anguliventris Simon, 1900: 486, pl. 17, fig. 11.

This species is redescribed from a ♂ and ♀ from Hawaii Island.

♂. Measurements (mm).

Carapace length, 1.53; width, 1.53; height, 0.73

Abdomen length, 1.79; width, 1.40; height, 1.07

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.00	0.69	1.53	1.46	0.86	6.54
II	1.89	0.69	1.53	1.36	0.83	6.30
III	1.00	0.43	0.69	0.59	0.50	3.21
IV	1.03	0.40	0.69	0.63	0.50	3.25
Palp	0.46	0.23	0.13	—	0.50	1.32

Cephalothorax dark brown, paler around eyes, middle of carapace, and proximal end of chelicerae; legs I and II dark brown with irregular white patches on femora and pale banding on other segments; legs III and IV pale yellow-brown with brown bands; femora I, II, and III with thin black line running length of venter; dorsum of abdomen brown with transverse dark bands; venter of abdomen with broad dark stripe. *Eyes*: Ratio of AME : ALE : PME PLE=6 : 9 : 6 : 7; median ocular area wider behind than in front (23 : 19) and wider than long (23 : 19); AME closer to ALE than to each other (14 : 19); PME closer to each other than to PLE (23 : 26); clypeus height over 2 × the diameter of an AME (15 : 6). *Sternum*: Almost as wide as long (24 : 23); posterior end almost pointed and separates coxae IV by 5/8 width of a coxa. *Legs*: I, II, IV, III; setae—4 in row prolateral on femur I, 2 to 3 in row dorsal on all femora, 2 in row dorsal on all patellae, 2 in row dorsal on all tibiae, 3 in row prolateral and 3 in row retrolateral on tibiae I and II, 1 disto-retrolateral on tibiae III and IV, 3 pairs ventral on tibiae I and II, 1 pair midventral on tibiae III and IV, 2 in row prolateral and 2 in row retrolateral on metatarsi I and II, 1 mid-prolateral on metatarsus III, 2 in row prolateral on metatarsus IV, 1 mid-retrolateral on metatarsus IV, 4 pairs ventral on metatarsi I and II; trichobothria—7 dorsal on all tibiae, 3 in row dorsal on all metatarsi and tarsus III, 4 in row dorsal on tarsi I and II, 2 in row dorsal on tarsus IV; tarsal claws—anterior claw of tarsi I and II with 2 free teeth plus series of fused teeth, posterior claw of tarsi I and II with 5 free teeth, both claws of tarsi III and IV with 2 free teeth plus series of fused teeth. *Palp* (fig. 24-25): Embolus originates more than 90° from distal border of tegulum on prolateral side; tip wider than tegulum; distal end of tip slightly curved; ventral margin of retrolateral tibial apophysis not as strongly notched as other species in *Misumenops*: 9 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 2.36; width, 2.26; height, 1.07

Abdomen length, 2.86; width, 2.59; height, 1.83

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.56	1.13	1.89	1.63	1.07	8.28
II	2.46	1.00	1.79	1.59	1.03	7.87
III	1.43	0.73	0.89	0.79	0.66	4.50
IV	1.53	0.66	1.00	0.96	0.66	4.81
Palp	0.69	0.36	0.36	—	0.66	2.07

Similar in color to ♂; femur III without black line on venter. *Eyes:* Ratio of AME: ALE: PME: PLE=7:10:7:8; median ocular area much wider behind than in front (40: 31) and much wider than long (40:29); AME closer to ALE than to each other (24:31); PME slightly closer to PLE than to each other (38 : 40); clypeus height more than 3 × diameter of an AME (24:7). *Sternum*: Slightly longer than wide (32:29); posterior end almost pointed and separates coxae IV by 3/11 width of a coxa. *Abdomen:* widest posterior to center; prominent tubercle dorso-lateral at widest part. *Legs*: I, II, IV, III; setae—4 in row prolateral on femur I, 1 mid-dorsal on all femora, 2 (weak) in row dorsal on all patellae, 2 in row dorsal on all tibiae, 6 to 8 irregular pairs ventral on tibiae I and II, 1 to 2 pairs ventral on tibiae III and IV, 1 disto-prolateral on tibiae II and IV, 6 pairs ventral on metatarsi I and II, 2 to 3 pairs ventral on metatarsi II and IV, 1 retrolateral on metatarsi III and IV, 2 to 3 in row prolateral on metatarsi III and IV; trichobothria—10 to 11 dorsal on all tibiae, 3 in row dorsal on all metatarsi, 4 in row dorsal on all tarsi; tarsal claws—anterior claw of tarsi I and II with 4 free teeth plus series of fused teeth, posterior claw of tarsi I and II with 3 free teeth, both claws of tarsi III and IV with 5 free teeth. *Epigynum* (fig. 26-27): Hood of guide pocket anterior to intromittent orifices, intromittent orifices separated by more than twice the greatest diameter of an orifice; membranous bursa copulatrix anterior to spermatheca and with convoluted tube leading to spermatheca. *Palp*: 11 trichobothria dorsal on tibia; tarsal claw with 3 teeth.

VARIATION. Carapace width: 112 ♀♀—1.53-2.50 mm (mean, 2.13 mm); 80 ♂♂—1.23-1.73 mm (mean, 1.53 mm). Femur I length: 112 ♀♀—1.76-2.69 mm (mean, 2.26 mm); 80 ♂♂—1.66-2.33 mm (mean, 1.92 mm). There is considerable color variation in this species which does not appear to be associated with a particular habitat or island. The colors range from dark brown to pale gray. Most individuals are dark brown.

RECORDS. Syntypes: BISHOP: Hawaii: 2 ♀♀, 1 immature, Kona; 1 ♂, 7 ♀♀, 5 immatures, Kona, 600 m, IX.1892, Perkins; 2 ♀♀, 3 immatures, Kilauea; Molokai: 4 ♂♂, 2 ♀♀, 6 immatures, Molokai Mts, 600-1200 m, V-VI.1893, Perkins; Oahu: 5 ♀♀, 1 immature, Perkins; island not indicated: 12 ♀♀, Waimea; BMNH: Hawaii: Kilauea and Oahu: Kaala Mts, 600 m, 2 ♂♂, 3 ♀♀, 1 immature (1904.X.24.285-290); Hawaii: 4 ♂♂, 9 ♀♀, 6 immatures (1904.X.24.273-276), Kau, 1895 and Kona, 600 m, IX.1892, Perkins; Molokai: 5 ♀♀, 7 immatures (1904.X.26.279-284), Molokai Mts, 900-1200 m, V-VI.1893, Perkins; island not indicated: 2 ♂♂, 10 ♀♀, 4 immatures (1904.X.24.291-296), Waimea; MNHN: 1 ♂, 1 ♀ (80881), Iles Sandwich; Hawaii: 1 ♂, 4 ♀♀ (14290). Specimens examined: KAUAI: Kokee: 2 immatures, 8.I.1944, N. L. H. Krauss; 9 immatures, 1200 m, 4-6.VIII.1961, sweeping, Maa, Miyatake & Yoshimoto; 1 ♂, 1 immature, 9.IV.1963, J. L. Gressitt; 1 ♂, 4 ♀♀, 6 immatures, 1020-1050 m, 11-15.IX.1965, Suman; Alakai Swamp: 2 immatures, 1200 m, 21.VII.1964, Suman; 8 ♂♂, 19 ♀♀, 23 immatures, 1050-1200 m, 12-16.IX.1965, Suman; 1 immature, Kumuwela and Mahihi Ridge, 1200 m, 21.VII.1964, Suman. OAHU: 1 ♀, Manoa, 22.I.1930, Krauss; Poamoho Trail: 1 ♀, 4.IV.1950, Y. Tanada; 1 ♀, 22.V.1953, D. E. Hardy; 1 ♂, 1 immature, 5.X.1965, Yoshimoto; 5 immatures, Palehua, 600-750 m, 1 and 15.X.1960, T. C. Maa; 1 ♂, Mt Tantalus, 450 m, 4.VIII.1965, D. Tsuda. MOLOKAI: Puu Kolekole: 2 ♀♀, 1140 m, 7.VII.1952, Hardy; 3 ♂♂, 1 ♀, 7

immatures, 900-1050 m, 3.VIII.1965, Suman ; 2 immatures, E Kaunakakai, 900 m, 18.III. 1966, Yoshimoto. LANAI : 1 immature, Lanai Mts, 1.XI.1947, Krauss ; 2 immatures, Lanai Hale, 25.III.1961, Y. Kondo ; 1 ♀, Lanai City, VIII.1963, O. & I. Degener ; 4 immatures, Lanai Hale, 25.III.1966, Yoshimoto. MAUI : 1 immature, Nahiku, 30.XII.1931, G. & R. St Sure & Krauss ; 1 ♀, Mahinahina, 21.VI.1932, Krauss ; 1 ♀, West Maui Mts, 7.I.1932, Krauss ; Olinda : 2 ♀♀, 1 immature, 1.XII.1932, O. Bryant ; 1 immature, 28.VII. 1966, P. Gehring ; 1 ♀, 1 immature, nr Puuluau, Haleakala, 1650 m, 28.IV.1945, E. C. Zimmerman ; 1 immature, Kailua, 1956, Krauss ; 2 ♀♀, 1 immature, Waikamoi Str, 1200 m, 19.VII.1965, Suman ; Haleakala : 1 ♂, 2 ♀♀, 3 immatures, Kaupo Trail, 1800 m, 21.VII.1965, Suman ; 2 immatures, Paliku-Kaupo Trail, 1650 m, 21.VII.1965, Suman ; 7 ♂♂, 7 ♀♀, 7 immatures, Iao Valley, 450 m, 25.VII.1965, Suman ; 3 ♂♂, 2 ♀♀, 3 immatures, Kaulalewelewe, 900-1020 m, 24-27.X.1966, P. D. Ashlock & Yoshimoto. HAWAII : 11♀♀, 1 immature, Kilauea, 14-18.IV.1944, XII.1950, Krauss ; 3 ♂♂, 2 ♀♀, 1 immature, Kilauea Crater, 1140 m, 23.VI.1966, Suman ; 5 ♂♂, 5 ♀♀, 4 immatures, Kilauea Park Boundary-Hilo side, 1170 m, 25.VI.1966, Suman ; 1 ♂, 1 ♀, Kilauea-Kau, 1200 m, 22.VI.1966, Suman ; 9 ♂♂, 5 ♀♀, 1 immature, Kipuka Puaulu, Mauna Loa Strip Rd, 1140 m, 24.VI.1966, Suman ; Mauna Loa Strip Rd : 1 ♀, 29.XII.1949, NE Morton ; 1 ♂, 1 ♀, 1275 m, 7.VIII. 1952, W. C. Mitchell ; 2 ♂♂, 3 ♀♀, 3 immatures, 1350 m, 12.VI.1965, Suman ; 1 ♂, 1980 m, 24.

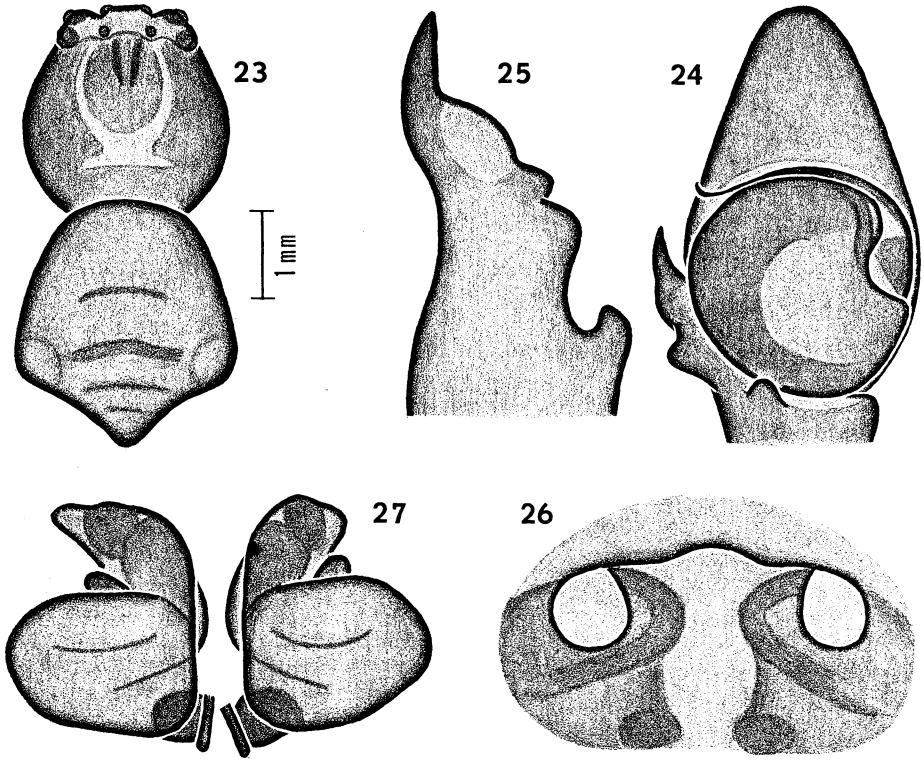


Fig. 23-27. *Misumenops anguliventris* (Simon). 23, ♀, dorsal view ; 24, ♂ right palp, ventral view ; 25, ♂ right tibial apophysis, retrolateral view ; 26, ♀ epigynum, ventral view ; 27, ♀ internal genitalia, dorsal view.

VI.1966, Suman ; Chain of Craters Rd : 4 immatures, 1050 m, 22.XII.1949, ex *Metrosideros-Sadlaria* Forest, Morton ; 1 ♀, 960 m, 23.III.1965, ex Sandalwood blossoms, W. C. Mitchell ; 2 ♂♂, 5 ♀♀, 6 immatures, 960 m, 23.VI.1966, Suman ; Hualalai : 3 ♀♀, 1800-2100 m, 20-21.IV.1944, Krauss ; 1 ♀, 2 immatures, 1200-1800 m, 13.VII.1953, Hardy ; 1 immature, 1650 m, 14.VI.1963, ex vegetation, Hardy ; 14 ♂♂, 7 ♀♀, 6 immatures, Kahaluu Forest Reserve, 900 m, 27.VI.1966, Suman ; 8 ♂♂, 7 ♀♀, 3 immatures, 750-1200 m, 28.VI. 1966, Suman ; 1 ♀, Kahuku Ranch, XI.1950, Krauss ; 2 ♀♀, Waimea, 26.IV.1944, Krauss ; 1 immature, 23.IV.1944, Krauss ; 1 immature, Glenwood, 30.IV.1944, Krauss ; Kohala : 1 ♂, 4.IV.1951, Mitchell ; 5 ♂♂, 2 ♀♀, 4 immatures, 1050 m, 29.VI.1966, Suman ; 1 ♀, Waipio Valley, 27.IV.1944, Krauss ; 1 ♂, Keauokana Forest Reserve, Puna Dist., 300 m, 23.VI.1966, Suman ; 2 ♀♀, Kaumana, Hilo, 4.V.1944, Krauss ; 1 ♂, 1 immature, Hilo Forest Reserve, 660 m, 30.VI.1966, Suman ; Saddle Rd : 1 ♂, 1 ♀, 2 immatures, 1500-2100 m, 15.VI.1965, Suman ; 1 ♀, VI.1966, P. Gehring.

DISTRIBUTION. This species is found on all of the main islands and on all of the major landforms on each island.

ECOLOGY. Specimens were collected predominantly from *Metrosideros* on all of the islands. The type of habitat is indicated best by zones 4 to 7 on Table I.

DISCUSSION. This species appears to be closely related to *M. cavatus*. The dorsal tooth of the retrolateral tibial apophysis of *anguliventris* is thinner, the tip of the embolus is straighter, and the tutaculum is not developed as in *cavatus*. The intromittent orifices of the epigynum are smaller in *anguliventris* than in *cavatus*.

Misumenops aridus Suman, new species Fig. 28-30.

♂. Measurements (mm).

Carapace length, 1.36 ; width, 1.30 ; height, 0.53

Abdomen length, 2.03 ; width, 1.30 ; height, 1.10

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.13	0.76	1.73	1.59	0.92	7.13
II	2.10	0.73	1.69	1.53	0.92	6.97
III	1.13	0.50	0.83	0.76	0.56	3.78
IV	1.17	0.46	0.89	0.86	0.56	3.94
Palp	0.43	0.23	0.13	—	0.43	1.22

Body and appendages gray-brown ; white around eyes and in center of carapace ; abdomen with 2 dorsal black spots. *Eyes* : Ratio of AME : ALE : PME : PLE = 5 : 6 : 4 : 4 ; median ocular area wider behind than in front (17 : 14) and as wide as long (17 : 17) ; AME closer to ALE than to each other (11 : 14) ; PME closer to each other than to PLE (17 : 19) ; clypeus height almost 3 × the diameter of an AME (14 : 5). *Sternum* ; As wide as long ; posterior end bluntly pointed and separates coxae IV by width of a coxa. *Legs* : I, II, IV, III ; setae (weak)—3 to 4 prolateral on femur I, 1 dorsal on femur I, 2 to 4 in row dorsal on femora II, III, and IV, 2 in row dorsal on patellae III and IV, 2 in row dorsal on tibiae III and IV, 3 pairs (distal 2 pairs strongest) ventral on metatarsi I and II ; trichobothria—7 dorsal on all tibiae, 2 to 3 in row dorsal on all metatarsi and tarsi I and II, 1 to 2 in row dorsal on tarsi III and IV ; tarsal claws—4 teeth per claw on tarsi I and II, 2 teeth per claw on tarsi III and IV. *Palp* (fig. 29-30) : Embolus originates near distal border of tegulum ; tip very short and twisted ; dorsal tooth of

retrolateral tibial apophysis long and thin; membranous lobe on ventral margin of apophysis; 7 trichobothria dorsal on tibia.

Penultimate ♀. Larger but very similar in color and general appearance to male.

VARIATION. Carapace width: 3 ♂♂—1.20–1.33 mm. Femur I length: 3 ♂♂—1.86–2.10 mm. The coloration is similar in all specimens.

RECORDS. Holotype: ♂ (BISHOP 7493), Maui: Auwahi, 1110 m, 20.VII.1965, Suman. Paratypes: 2 ♂♂ (BISHOP), same data. Specimens examined: 4 penultimate ♀♀, same data.

DISTRIBUTION. This species is found only on the south side of Haleakala Crater, Maui.

ECOLOGY. Specimens were collected predominantly from filamentous lichens on tree branches. The type of habitat is best indicated by zone 9 on Table I.

DISCUSSION. This species appears to be related to *M. hiatus* and *nigrofrenatus*. The dorsal tooth of the retrolateral tibial apophysis is much longer in *aridus* than in the other 2 species. The tip of the embolus is straight in *aridus* and curved in *hiatus* and *nigrofrenatus*.

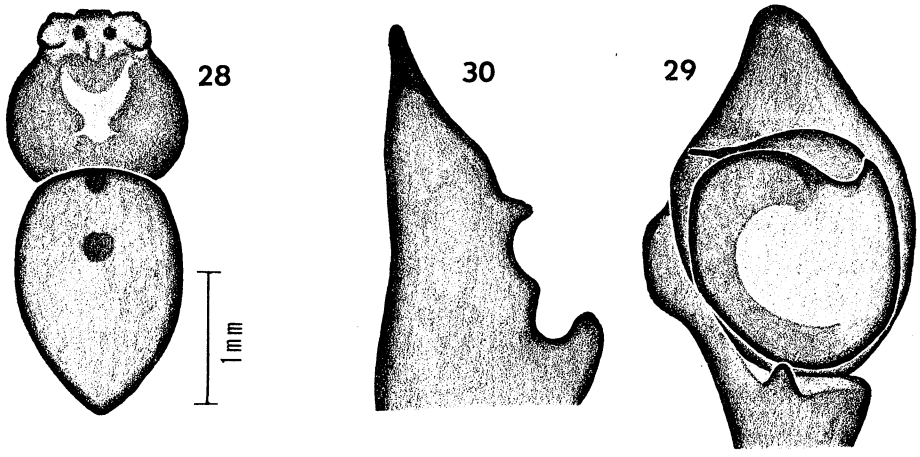


Fig. 28–30. *Misumenops aridus* n. sp. 28, ♂, dorsal view; 29, ♂ right palp, ventral view; 30, ♂ right tibial apophysis, retrolateral view.

Misumenops balteus Suman, new species Fig. 31–33.

♂. Measurements (mm).

Carapace length, 1.23; width, 1.23; height, 0.46

Abdomen length, 1.40; width, 0.89; height, 0.53

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	1.76	0.66	1.40	1.33	0.86	6.01
II	1.76	0.63	1.36	1.30	0.79	5.84
III	0.96	0.43	0.69	0.63	0.50	3.21
IV	1.00	0.43	0.73	0.69	0.50	3.35
Palp	0.46	0.23	0.13	—	0.50	1.32

Carapace dark brown on sides and on front; white stripe in middle; white around eyes; chelicerae, labium, maxillae, sternum, palp dark brown; legs pale yellow-brown with brown bands; femora I, II, and III with thin black line at distoventral end; dorsum of abdomen white with black pattern; venter of abdomen with broad dark stripe. *Eyes*: Ratio of AME: ALE : PME : PLE=5 : 8 : 5 : 6 ; median ocular area wider behind than in front (16:12) and slightly wider than long (16:15); AME closer to ALE than to each other (9:12); PME closer to each other than to PLE (16:19); clypeus height over 2 × the diameter of an AME (11:5). *Sternum:* As wide as long; posterior end almost pointed and separates coxae IV by width of a coxa (6:7). *Legs:* I, II, IV, III; setae (weak)—3 in row prolateral on femur I, 1 dorsal on all femora, 2 in row dorsal on all patellae, 2 in row dorsal on tibiae III and IV, 4 pairs (distal 2 pairs strongest) ventral on metatarsi I and II; trichobothria—6 dorsal on all tibiae, 4 in row dorsal on metatarsi and tarsi I and II, 3 in row dorsal on metatarsi III and IV and tarsus IV, 2 in row dorsal on tarsus III; tarsal claws—5 teeth per claw on tarsi I and II, 4 teeth per claw on tarsi III and IV. *Palp* (fig. 32-33) : Embolus originates about 90° from distal border of tegulum on prolateral side; tip strongly curved at distal end; dorsal tooth of retrolateral tibial apophysis short and thick, not sharply delimited from distal end of apophysis; 7 trichobothria dorsal on tibia.

♀. unknown.

VARIATION. Carapace width : 2 ♂♂— 1.23-1.33 mm. Femur I length : 2 ♂♂ —1.76-1.89 mm. The coloration of all specimens is very similar.

RECORDS. Holotype : ♂ (BISHOP 7494), Maui : Auwahi, 1110 m, 20.VII.1965, Suman. Paratype : ♂ (BISHOP), same data. Specimen examined : 1 immature, same data.

DISTRIBUTION. This species is found only on the south side of Haleakala Crater, Maui.

ECOLOGY. The type of habitat of this species is best indicated by zone 9 on Table I.

DISCUSSION. This species appears to be closely related to *M. hiatus*. The dorsal tooth of the retrolateral tibial apophysis is much wider in *balteus* and the lobe on the ventral margin is not as sharply delimited from the distal end of the apophysis as in *hiatus*. The females are unknown for both species.

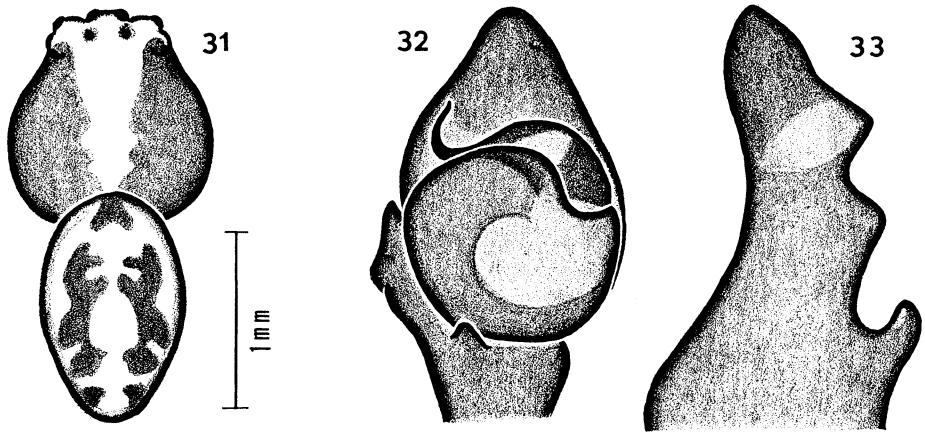


Fig. 31-33. *Misumenops balteus* n. sp. 31, ♂, dorsal view; 32, ♂ right palp, ventral view; 33, ♂ right tibial apophysis, retrolateral view.

Misumenops cavatus Suman, new species Fig. 34–38.

♂. Measurements (mm).

Carapace length, 1.53; width, 1.53; height, 0.50

Abdomen length, 1.79; width, 1.43; height, 1.03

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.17	0.79	1.79	1.73	1.07	7.55
II	2.10	0.76	1.69	1.59	0.96	7.10
III	1.10	0.50	0.76	0.66	0.53	3.55
IV	1.10	0.46	0.83	0.76	0.53	3.68
Palp	0.50	0.23	0.20	—	0.63	1.56

Cephalothorax yellow-brown (green in life); white around eyes and in middle of carapace; 2 parallel brown stripes on carapace; legs I and II brown with white, pink and black mottling; legs III and IV evenly pale yellow-brown; all femora and coxa I with thin black line running length of venter; dorsum of abdomen white with black pattern; venter of abdomen mostly pale yellow-brown. *Eyes*: Ratio of AME : ALE : PME : PLE=5 : 8 : 5 : 6; median ocular area wider behind than in front (17 : 15) and slightly wider than long (17 : 16); AME slightly closer to each other than to ALE (15 : 17); PME closer to each other than to PLE (17 : 21); clypeus height over 2 × the diameter of an AME (12 : 5). *Sternum*: As wide as long; posterior end almost pointed and separates coxae IV by 5/9 width of a coxa. *Legs*: I, II, IV, III; setae—3 to 4 in row prolateral on femur I, 3 to 5 in row dorsal on all femora, 2 (weak) in row dorsal on patellae III and IV, 2 in row dorsal on all tibiae, 1 to 2 prolateral on all tibiae, 1 retrolateral on all tibiae, 2 to 3 pairs ventral on tibiae I and II, 3 pairs ventral on metatarsi I and II, 1 prolateral, 1 retrolateral, and 1 mid-ventral on metatarsi III and IV; trichobothria—7 dorsal on tibiae I and II, 9 dorsal on tibiae III and IV, 4 in row dorsal on metatarsi and tarsi I and II, 3 in row dorsal on metatarsi and tarsi III and IV; tarsal claws—3 teeth on anterior claw of tarsi I and II, 4 teeth on posterior claw of tarsi I and II, 2 teeth on both claws of tarsi III and IV. *Palp* (fig. 35–36): Embolus originates about 45° from distal border of tegulum; tutaculum well-developed; tip strongly curved and follows curvature of tutaculum; dorsal tooth of retrolateral tibial apophysis large; ventral margin of apophysis with small notch; 9 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 1.89; width, 1.92; height, 0.69

Abdomen length, 2.59; width, 2.36; height, 1.73

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.07	0.92	1.56	1.36	0.89	6.80
II	2.07	0.89	1.50	1.33	0.86	6.65
III	1.03	0.56	0.69	0.63	0.50	3.41
IV	1.20	0.53	0.76	0.73	0.56	3.78
Palp	0.46	0.30	0.30	—	0.50	1.56

Color similar to male; venter of coxa I, femora I and II, and tibiae I and II with thin black line running length of segments. *Eyes:* Ratio of AME : ALE : PME : PLE=5 : 8 : 5 : 6; median ocular area wider behind than in front (23 : 19) and wider than long (23 : 19); AME closer to ALE than to each other (15 : 19); PME closer to each other than to PLE (23 : 28); clypeus height over 2 × the diameter of an AME (14 : 5). *Sternum*: As wide as long; posterior end almost pointed and separates coxae IV by 1/2 width of a coxa. *Legs*: I, II, IV, III; setae—4 in row prolateral on femur I, 1 dorsal on all femora, 2 (weak) in row dorsal on all patellae, 2 to

3 pairs ventral on tibiae I and II, 2 in row dorsal on tibiae III and IV, 5 to 6 pairs ventral on metatarsi I and II, 1 pair mid-ventral on metatarsus III, 1 mid-ventral on metatarsus IV; trichobothria—8 to 10 dorsal on all tibiae, 5 in row dorsal on metatarsi I and II, 3 in row dorsal on metatarsi III and IV, 4 in row dorsal on all tarsi; tarsal claws—4 free teeth plus series of fused teeth on anterior claw of tarsi I and II, 4 free teeth on posterior claw of tarsi I and II, 3 free teeth on both claws of tarsi III and IV. *Epigynum* (fig. 37-38): Hood of guide pocket extends slightly posterior over epigynum; intromittent orifices very large and close together; bursae copulatrix connected to spermatheca with convoluted tube. *Palp*: 10 trichobothria dorsal on tibia; tarsal claw with 4 teeth.

VARIATION. Carapace width: 22 ♂♂—1.36-1.66 mm (mean, 1.53 mm); 20 ♀♀—1.79-2.07 mm (mean, 1.89 mm). Femur I length: 22 ♂♂—1.89-2.50 mm (mean, 2.20 mm); 20 ♀♀—2.00-2.33 mm (mean, 2.07 mm). The pattern is similar in all specimens with some more deeply pigmented than others.

RECORDS. Holotype: ♂ (BISHOP 7495), Hawaii: Halepohaku on Mauna Kea, 2400 m, 20.VI.1966, Suman. Allotype: ♀ (BISHOP), same data. Paratypes: 21 ♂♂, 19 ♀♀ (BISHOP), same data. Specimens examined: HAWAII: 7 immatures, same data; 1 ♀, Pohakuloa, 30.V.1947, N. L. H. Krauss; 2 immatures, Pohakuloa, 1950 m, XII.1950, Krauss; 1 ♀, 3

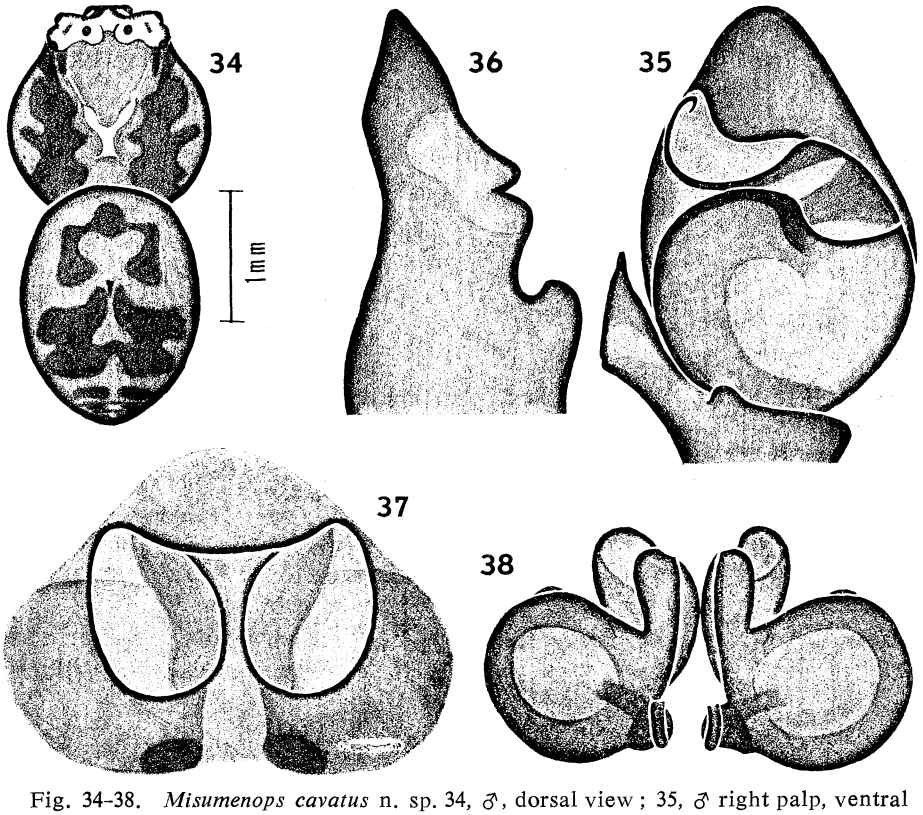


Fig. 34-38. *Misumenops cavatus* n. sp. 34, ♂, dorsal view; 35, ♂ right palp, ventral view; 36, ♂ right tibial apophysis, retrolateral view; 37, ♀ epigynum, ventral view; 38, ♀ internal genitalia, dorsal view.

immatures, Puu Kihi, N side of Mauna Kea, 28.X.1952, on *Sophora*, D. E. Hardy; 2 immatures, Keanakolu, 1560 m, 28-30.X.1952, C. Hoyt; 1 immature, Pohakuloa, 17.VI. 1966, on *Chenopodium oahuense*, J. W. Beardsley.

DISTRIBUTION. This species is presently found only at the higher elevations on the slopes of Mauna Kea, Hawaii.

ECOLOGY. Some of the specimens have been collected on *Sophora* and *Chenopodium oahuense*. The type of habitat is best indicated by zones 9 and 10 on Table I.

DISCUSSION. This species appears to be closely related to *M. anguliventris* and *insulanus* and is discussed under those species.

Misumenops discretus Suman, new species Fig. 39-43.

The description of this species is based partly on specimens identified as *Diaea insulana* Keyserling (= *Misumenops insulanus*) by Simon.

♂. Measurements (mm).

Carapace length, 1.40; width, 1.43; height, 0.43

Abdomen length, 1.69; width, 1.13; height, 0.73

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	1.83	0.69	1.50	1.40	0.83	6.25
II	1.79	0.69	1.46	1.36	0.79	6.09
III	0.92	0.43	0.69	0.59	0.46	3.09
IV	0.96	0.40	0.69	0.63	0.46	3.14
Palp	0.43	0.20	0.16	—	0.43	1.22

Cephalothorax, appendages yellow-brown (probably green in life); dark around eyes; parallel dark stripes on carapace; brown bands on legs; femora I and II with thin black line running length of venter; dorsum of abdomen pale yellow-brown with black pattern; venter of abdomen with broad dark stripe, sides of abdomen with dark stripe. *Eyes*: Ratio of AME: ALE: PME: PLE=5:9:5:6; median ocular area wider behind than in front (17:14) and wider than long (17:13); AME closer to ALE than to each other (10:14); PME closer to each other than to PLE (17:21); clypeus height 2 × the diameter of an AME (10:5). *Sternum*: As wide as long; posterior end bluntly pointed and separates coxae IV by width of a coxa. *Legs*: I, II, IV, III; setae—4 in row prolateral on femur I, 3 to 5 in row dorsal on all femora, 1 distodorsal on patellae III and IV, 2 pairs (weak) ventral on tibiae I and II, 1 pair (weak) ventral on tibiae II and IV, 2 in row dorsal, 1 disto-prolateral, 1 disto-retrolateral on tibiae III and IV, 3 pairs (2 pairs distal) ventral on metatarsi I and II, 2 (weak) in row prolateral on metatarsus I, 1 (weak) retrolateral on metatarsus II, 1 mid-prolateral and 1 mid-retrolateral on metatarsi III and IV; trichobothria—7 dorsal on all tibiae, 4 in row dorsal on metatarsi and tarsi I and II, 2 in row dorsal on metatarsi and tarsi III and IV; tarsal claws—anterior claw of tarsi I and II with 3 free teeth plus series of fused teeth, posterior claw of tarsi I and II with 6 free teeth, both claws of tarsi III and IV with 3 free teeth. *Palp* (fig. 40-41): Embolus originates more than 90° from distal border of tegulum; tip very long, distal end curved; dorsal tooth of retrolateral apophysis short and continuous with distal end of apophysis; 7 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 1.36; width, 1.53, height, 0.63
Abdomen length, 2.00; width, 1.76, height, 1.23

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	1.69	0.76	1.20	1.10	0.73	5.48
II	1.59	0.73	1.20	1.07	0.73	5.32
III	0.86	0.43	0.56	0.46	0.40	2.71
IV	0.96	0.43	0.63	0.56	0.40	2.98
Palp	0.46	0.26	0.23	—	0.40	1.35

Color similar to male. *Eyes:* Ratio of AME: ALE: PME: PLE=4:8:4:6; median ocular area slightly wider behind than in front (19:18) and wider than long (19:16); AME closer to ALE than to each other (13:18); PME closer to each other than to PLE (19:24); clypeus height over 2 × the diameter of an AME (11:4). *Sternum*: As wide as long; posterior end almost pointed and separates coxae IV by 1/4 width of a coxa. *Legs:* I, II, IV, III; setae—4 in row prolateral on femur I, 2 in row dorsal on femora I and II, 1 dorsal on femora III and IV, 2 (weak) in row dorsal on all patellae, 3 pairs ventral on tibiae I and II, 2 (weak) in row dorsal on tibiae III and IV, 4 irregular pairs ventral on metatarsi I and II; trichobothria—7 to 8 dorsal on all tibiae, 5 in row dorsal on metatarsi and tarsi I and II, 3 in row dorsal on metatarsi III and IV, 2 in row dorsal on tarsi III and IV; tarsal claws—anterior claw of tarsi I and II with 3 free teeth plus series of fused teeth, posterior claw of tarsi I and II with 3 free teeth, both claws of tarsi III and IV with 2 free teeth. *Epigynum* (fig. 42-43): Hood of guide pocket evenly curved and extends posteriorly over epigynum; membranous bursae copulatrix anterior to spermatheca and connected to spermatheca by large tube. *Palp*: 8 trichobothria dorsal on tibia; tarsal claw with 3 teeth.

VARIATION. Carapace width: 3 ♂♂—1.30-1.43 mm; 2 ♀♀—1.53-1.76 mm. Femur I length: 3 ♂♂—1.83-1.86 mm; 2 ♀♀—1.69-1.43 mm. The color pattern is similar in all specimens. Some specimens are faded more than others which is probably due to preservation.

RECORDS. Holotype: ♂ (BISHOP 7496), Kauai: Alakai Swamp, 1200 m, 21.VII.1964, Suman. Allotype: ♀ (BISHOP), Kauai: Alakai Swamp, 1200 m, 14.IX.1965, Suman. Paratypes: Kauai: 1 ♂, (MNHN 11905) *Diaea insulana*: det. Simon) (Haw. Is. Comm.); 1 ♂, 1 ♀ (BISHOP) (*Diaea insulana*: det. Simon), Koholuamamo, IV, Perkins; 1 ♂, 1 immature (AMNH), Kokee, 8.I.1944, N. L. H. Krauss; 1 ♂ (BISHOP), Kokee, Kumuwela, and Mohihi Ridges, 21.VII.1964, Suman. Specimens examined: KAUAI: 1 immature, Hanahanapuni nr Kapaia, 20.I.1944, Krauss.

DISTRIBUTION. This species is presently known only from the plateau region of Kauai.

ECOLOGY. The habitat of this species is best indicated by zones 4, 5, and 6 on Table I.

DISCUSSION. This species appears to be closely related to *M. facundus*. The dorsal tooth of the retrolateral tibial apophysis is continuous with the distal end of the apophysis in *discretus* while the dorsal tooth is distinctly delimited in *facundus*. The intromittent orifices of the epigynum are much smaller in *discretus* than in *facundus*.

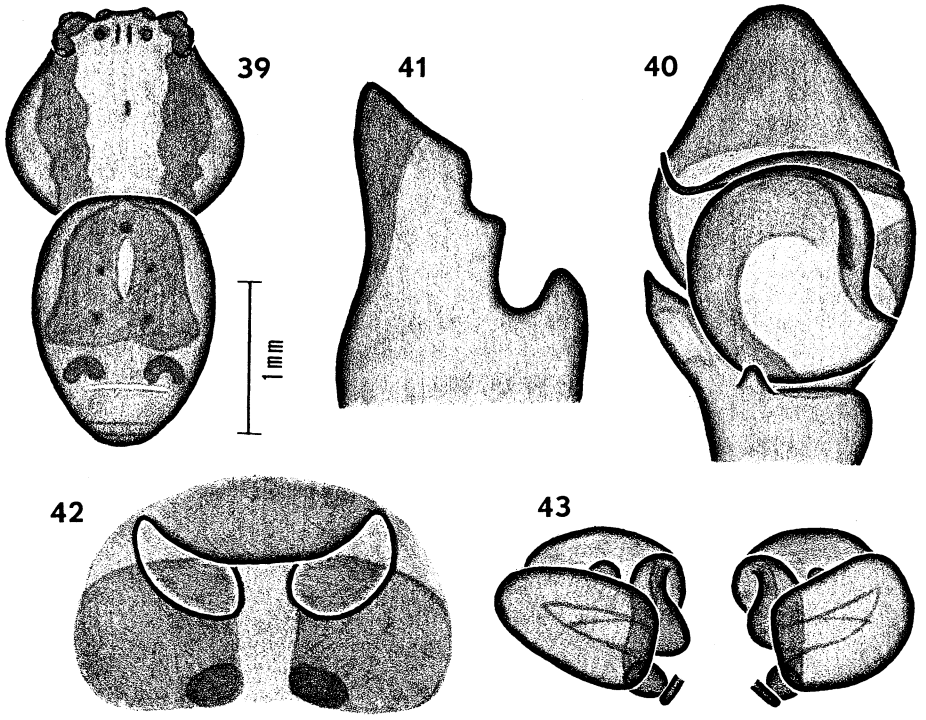


Fig. 39-43. *Misumenops discretus* n. sp. 39, ♂, dorsal view; 40, ♂ right palp, ventral view; 41, ♂ right tibial apophysis, retrolateral view; 42, ♀ epigynum, ventral view; 43, ♀ internal genitalia, dorsal view.

Misumenops editus Suman, new species Fig. 44-48.

♂. Measurements (mm).

Carapace length, 1.50; width, 1.53; height, 0.53

Abdomen length, 1.83; width, 1.30; height, 1.10

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.43	0.83	1.92	1.73	1.13	8.04
II	2.43	0.83	1.89	1.66	1.10	7.91
III	1.40	0.56	1.03	0.92	0.73	4.64
IV	1.46	0.53	1.10	1.07	0.73	4.89
Palp	0.50	0.26	0.20	—	0.50	1.46

Carapace dark yellow-brown with white pattern in middle; chelicerae, sternum, labium, maxillae, palp pale brown with scattered irregular white spots; legs pale brown with dark brown bands; dorsum of abdomen pale brown with white and dark pattern; venter of abdomen pale brown. *Eyes*: Ratio of AME : ALE : PME : PLE=6 : 8 : 6 : 6; median ocular area slightly wider behind than in front (14 : 13) and longer than wide (17 : 14); AME closer to ALE than to each other (10 : 13); PME closer to each other than to PLE (14 : 20); clypeus height over 2 × the diameter of an AME (13 : 6). *Sternum*: As wide as long; posterior end almost pointed and

separates coxae IV by 7/9 width of a coxa. *Legs*: I, II, IV, III; setae—3 in row prolateral on femur I, 1 dorsal on all femora, 2 (weak) in row dorsal on all tibiae; trichobothria—5 dorsal on tibiae I and II, 6 to 7 dorsal on tibiae III and IV, 3 to 4 in row dorsal on metatarsi and tarsi I and II, 2 in row dorsal on metatarsi and tarsi III and IV; tarsal claws—anterior claw of tarsi I and II with 4 free teeth plus series of fused teeth, posterior claw of tarsi I and II with 5 free teeth, both claws of tarsi III and IV with 4 free teeth. *Palp* (fig. 45-46): Embolus originates almost 90° from distal border of tegulum; tip strongly curved; membranous lobe on ventral margin of retrolateral tibial apophysis; 5 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 1.92; width, 1.89; height, 0.73

Abdomen length, 2.40; width, 2.07; height, 1.63

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.20	0.92	1.66	1.50	1.07	7.35
II	2.20	0.89	1.66	1.43	1.03	7.21
III	1.33	0.69	0.92	0.89	0.73	4.56
IV	1.50	0.66	1.07	1.07	0.76	5.06
Palp	0.50	0.33	0.33	—	0.59	1.75

Color similar to male. *Eyes*: Ratio of AME : ALE : PME : PLE=6 : 9 : 7 : 7; median ocular area wider behind than in front (20 : 17) and slightly longer than wide (22 : 20); AME closer to ALE than to each other (14 : 17); PME closer to each other than to PLE (20 : 26); clypeus height over 2 × the diameter of an AME (16 : 6). *Sternum*: As wide as long; posterior end almost pointed and separates coxae IV by 3/5 width of a coxa. *Legs*: I, II, IV, III; setae—3 in row prolateral on femur I, 1 dorsal on all femora, 2 in row dorsal on all patellae, 2 in row dorsal on all tibiae, 5 to 8 irregular pairs ventral on tibiae I and II, 1 mid-ventral on tibiae III and IV, 5 pairs ventral on metatarsi I and II, 1 mid-ventral on metatarsus III; trichobothria—4 to 6 dorsal on tibiae I and II, 7 to 8 dorsal on tibiae III and IV, 3 in row dorsal on all metatarsi, 4 in row dorsal on all tarsi; tarsal claws—anterior claw of tarsi I and II with 5 free teeth plus series of fused teeth, posterior claw of tarsi I and II with 5 free teeth, both claws of tarsi III and IV with 4 free teeth. *Epigynum* (fig. 47-48): Hood of guide pocket evenly curved and extends posteriorly over epigynum; intromittent orifices widely separated; membranous bursae copulatrix well developed and anterior to spermathecae. *Palp*: 8 trichobothria dorsal on tibia; tarsal claw with 4 teeth.

VARIATION. Carapace width: 2 ♂♂— 1.36-1.53 mm; 6 ♀♀— 1.89-2.23 mm (mean, 2.03 mm). Femur I length: 2 ♂♂—2.20-2.40 mm; 6 ♀♀— 2.17-2.33 mm (mean, 2.23 mm). The pattern is similar in all specimens with some more deeply pigmented than others.

RECORDS. Holotype: ♂ (BISHOP 7497), Oahu: Mt Kaala, 1200 m, 19.IV.1966, ex moss on tree, C. M. Yoshimoto. Allotype: ♀ (BISHOP), same data. Paratypes: 1 ♂, 2♀♀ (BISHOP), Oahu: Mt Kaala, 1200 m, 7.VI.1965, Suman. Specimens examined: OAHU: Mt Kaala, 1200 m: 4 immatures, 2.VIII.1964, Suman; 5 immatures, 7.VI.1965, Suman; 1 ♀, 10.XI.1965, J. W. Beardsley; 2 ♀♀, 14.IV.1966, Beardsley & Yoshimoto; 3 immatures, 19.IV.1966, ex moss on tree, Yoshimoto.

DISTRIBUTION. This species is presently found only on Mt Kaala, Oahu.

ECOLOGY. Some specimens have been collected from moss on trees. The type of habitat is best indicated by zone 6 on Table I.

DISCUSSION. This species appears to be closely related to *M. imbricatus*. The prolater-

al margin of the tegulum is slightly concave in *editus* and distinctly notched in *imbricatus*. The retrolateral tibial apophysis is notched between the dorsal tooth and distal margin in *imbricatus* and is not notched in *editus*. The intromittent orifices of the epigynum are farther apart in *editus* than in *imbricatus*.

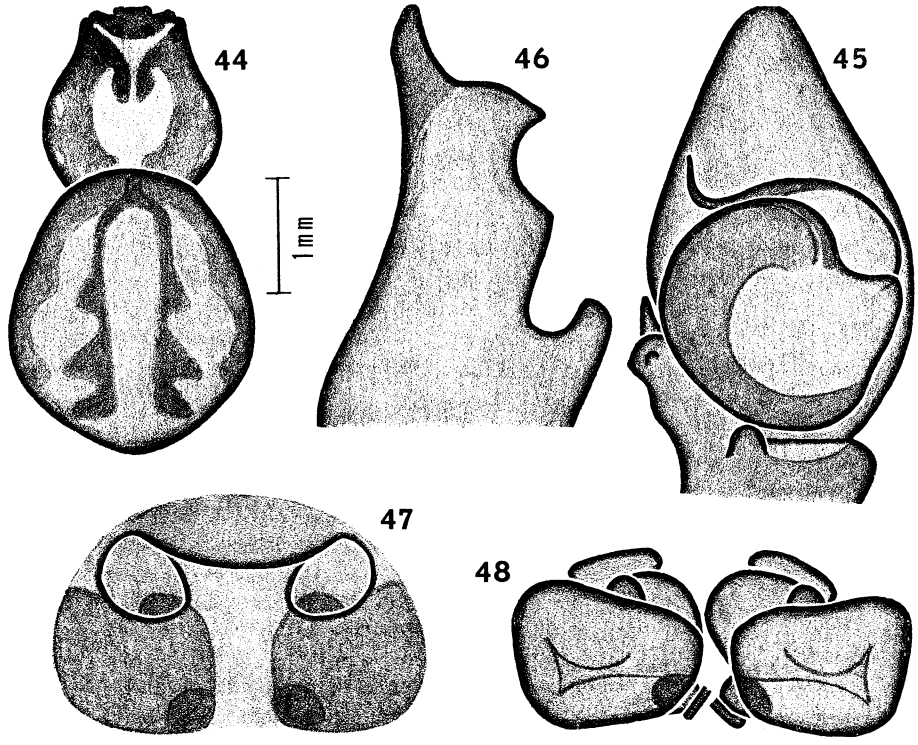


Fig. 44-48. *Misumenops editus* n. sp. 44, ♀, dorsal view; 45, ♂ right palp, ventral view; 46, ♂ right tibial apophysis, retrolateral view; 47, ♀ epigynum, ventral view; 48, ♀ internal genitalia, dorsal view.

Misumenops facundus Suman, new species Fig. 49-53.

The description of this species is based partly on specimens identified as *Diaea insulana* Keyserling (=*Misumenops insulanus*) by Simon.

♂. Measurements (mm).

Carapace length, 1.50; width, 1.56; height, 0.56

Abdomen length, 2.00; width, 1.33; height, 1.07

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.33	0.76	2.00	1.86	1.07	8.02
II	2.33	0.76	1.86	1.73	1.03	7.71
III	1.20	0.43	0.89	0.73	0.56	3.81
IV	1.23	0.43	0.89	0.79	0.53	3.87
Palp	0.56	0.23	0.20	—	0.56	1.55

Cephalothorax, appendages yellow-brown (green in life); white around eyes; femora I and II with thin black line running length of venter; legs I and II with red-brown bands; dorsum of abdomen white with black pattern; venter of abdomen with broad dark stripe, red around spinnerets. *Eyes*: Ratio of AME : ALE : PME : PLE=6 : 9 : 6 : 7; median ocular area wider behind than in front (16 : 12) and slightly wider than long (16 : 14); AME slightly closer to ALE than to each other (10 : 12); PME closer to each other than to PLE (16 : 20); clypeus height less than 2 × the diameter of an AME (10 : 6). *Sternum*: As wide as long; posterior end almost pointed and separates coxae IV by width of a coxa. *Legs*: I, II, IV, III; setae—3 to 4 in row prolateral on femur I, 5 to 6 in row dorsal on all femora, 2 (weak) in row dorsal on all patellae, 2 in row dorsal on all tibiae, 2 in row prolateral and 2 in row retrolateral on tibiae I and II, 1 prolateral and 1 retrolateral on tibiae III and IV, 2 to 4 irregular pairs ventral on tibiae I and II, 1 pair ventral on tibiae III and IV, 2 in row prolateral and 2 in row retrolateral on metatarsi I and II, 1 prolateral and 1 retrolateral on metatarsi III and IV, 3 pairs ventral on metatarsi I and II; trichobothria—7 dorsal on tibiae I and II, 8 to 9 dorsal on tibiae III and IV, 4 in row dorsal on metatarsi and tarsi I and II, 3 in row dorsal on metatarsi III and IV, 2 in row dorsal on tarsi III and IV; tarsal claws—anterior claw of tarsi I and II with 3 free teeth plus series of fused teeth, posterior claw of tarsi I and II with 5 free teeth, both claws of tarsi III and IV with 3 free teeth. *Palp* (fig. 50-51): Embolus originates more than 90° from distal border of tegulum on prolateral side; tip long and almost straight; 7 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 2.00; width, 2.00; height, 0.76

Abdomen length, 3.00; width, 2.33; height, 1.83

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.50	1.00	1.89	1.76	1.10	8.25
II	2.40	0.96	1.86	1.73	1.07	8.02
III	1.36	0.59	0.92	0.79	0.59	4.25
IV	1.43	0.59	1.03	0.86	0.59	4.50
Palp	0.59	0.30	0.33	—	0.59	1.81

Color similar to male. *Eyes*: Ratio of AME : ALE : PME : PLE=6 : 9 : 6 : 7; median ocular area wider behind than in front (21 : 19) and wider than long (21 : 18); AME closer to ALE than to each other (14 : 9); PME closer to each other than to PLE (21 : 27); clypeus height over 2 × the diameter of an AME (15 : 6). *Sternum*: slightly longer than wide (32 : 27); posterior end almost pointed and separates coxae IV by 7/10 width of a coxa. *Legs*: I, II, IV, III; setae—4 in row prolateral on femur I, 3 to 5 in row dorsal on all femora, 2 (weak) in row dorsal on all patellae, 4 to 5 pairs ventral on tibiae I and II, 2 in row dorsal on tibiae III and IV, 1 disto-prolateral and 1 disto-retrolateral on tibiae III and IV, 1 pair mid-ventral on tibiae III and IV, 5 to 6 pairs ventral on metatarsi I and II, 1 mid-prolateral and 1 mid-retrolateral on metatarsi III and IV; trichobothria—10 to 11 dorsal on all tibiae, 2 to 4 in row dorsal on all metatarsi, 4 to 5 in row dorsal on tarsi I and II, 3 in row dorsal on tarsi III and IV; tarsal claws—anterior claw of tarsi I and II with 3 free teeth plus series of fused teeth, posterior claw of tarsi I and II with 5 free teeth, both claws of tarsi III and IV with 3 free teeth. *Epigynum* (fig. 52-53): Hood of guide pocket extends posteriorly over epigynum; intromittent orifices extremely large; membranous bursae copulatrix well developed and anterior in position to spermathecae. *Palp*: 11 trichobothria dorsal on tibia; tarsal claw with 3 teeth.

VARIATION. Carapace width : 21 ♂♂—1.33-1.76 mm (mean, 1.59 mm) ; 27 ♀♀—1.46-2.30 mm (mean, 2.03). Femur I length : 21 ♂♂—1.86-2.66 mm (mean, 2.40 mm) ; 27♀♀—1.76-2.79 mm (mean, 2.43mm). There is considerable color variation in this species. Specimens from the Kohala Mountains and the Kilauea Crater region are green. Specimens from

Akumoa Crater and some specimens from Mt Hualalai are gray while others from Hualalai are green. The specimens, particularly the ♀♀ from Ahumoa Crater, are smaller than specimens from other localities on Hawaii.

RECORDS. Holotype : ♂ (BISHOP 7498), Hawaii : Kilauea Park boundary-Hilo side, 1170 m, 25.VI.1966, Suman. Allotype : ♀ (BISHOP), same data. Specimens examined : HAWAII : 2 ♀♀ (BISHOP) (*Diaea insulana* : det. Simon), K. ; 2 ♂♂, 1 ♀ (MNHN 9702) (*Diaea insulana* : det. Simon) (Haw. Is. Comm.) ; Kilauea : 1 ♀, 1 immature, 1200 m, VI.1905, moss, under bark, F. W. Terry ; 11 immatures, 1200 m, 15.X.1915, Muir & Giffard ; 6 ♂♂, 3 ♀♀, 4 immatures, 1200 m, 9.I.1917, 72 Muir & Giffard ; 2 ♀♀, 18.IV.1944, N. L. H. Krauss ; Mauna Loa Strip Rd : 1 ♀, 1350 m, 12.VI.1965, Suman ; 2 immatures, Kipuka Puaulu, 1140 m, 24.VI.1966, Suman ; 1 ♀, Chain of Craters Rd, 960 m, 23.VI.1966, Suman ; 2 ♂♂, 6 ♀♀, 1 immature, Kau Lava flows, 17.I.1917, Muir & Giffard ; Puu Hualalai : 3 ♂♂, 1 ♀, 1200-1800 m, 13.VIII.1953, D. E. Hardy ; 2 ♀♀, 1 immature, 750 m, 28.VI.1966, Suman ; 7 ♂♂, 1200 m, 28.VI.1966, Suman ; 3 ♂♂, 2 ♀♀, 4 immatures, Kahaluu Forest Reserve, 900 m, 27.VI.1966, Suman ; 4 ♂♂, 2 ♀♀, Ahumoa Crater on slopes of Mauna Kea, 2040 m, 21.VI.1966, Suman ; 2 ♀♀, 1 immature, Kohala Mts, 1050 m, 29.VI. 1966, Suman.

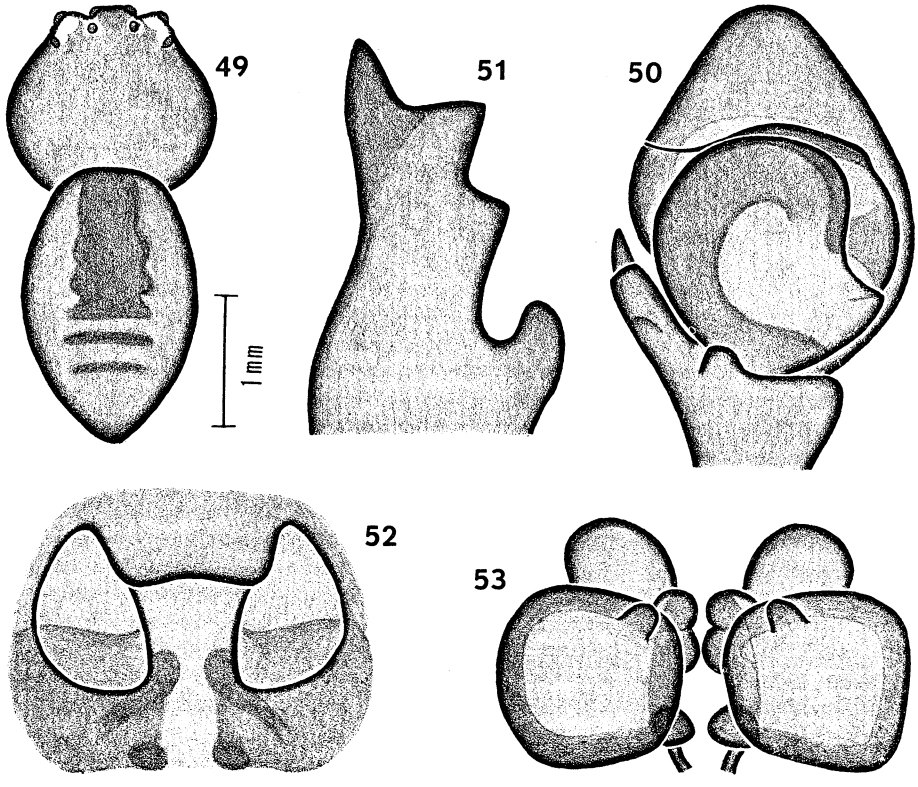


Fig. 49-53. *Misumenops facundus* n. sp. 49, ♂, dorsal view ; 50, ♂ right palp, ventral view ; 51, ♂ right tibial apophysis, retrolateral view ; 52, ♀ epigynum, ventral view ; 53, ♀ internal genitalia, dorsal view.

DISTRIBUTION. This species is presently found only on Hawaii and is found on all of the major landforms of this island.

ECOLOGY. Some specimens have been collected on moss and under bark and on *Metrosideros*. The type of habitat of this species is quite variable and is best indicated by zones 5 to 9 on Table I.

DISCUSSION. This species appears to be closely related to *M. discretus* and is discussed under that species.

Misumenops hiatus Suman, new species Fig. 54–56.

♂. Measurements (mm).

Carapace length, 1.10; width, 1.10; height, 0.40

Abdomen length, 1.30; width, 1.00; height, 0.73

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	1.26	0.53	0.96	0.86	0.59	4.20
II	1.26	0.53	0.96	0.83	0.59	4.17
III	0.66	0.33	0.46	0.40	0.36	2.21
IV	0.69	0.30	0.46	0.46	0.36	2.27
Palp	0.30	0.20	0.13	—	0.36	0.99

Carapace dark brown with black marking in center, white around eyes, and 2 white spots in thoracic region; dorsum of abdomen almost black with white marking near posterior end; coxae, chelicerae, maxillae, labium, and sternum dark brown; proximal 1/3 of femora I and II dark brown with a narrow white band; distal 2/3 of femora I and II pale brown with irregular white spots; all of femora and patellae and proximal half of tibiae, metatarsi and tarsi III and IV pale yellow with irregular white spots; distal half of tibiae, metatarsi and tarsi III and IV dark brown. *Eyes*: Ratio of AME : ALE : PME : PLE = 4 : 7 : 4 : 5; median ocular area wider behind than in front (13 : 10) and as long as wide (13 : 13); AME slightly closer to ALE than

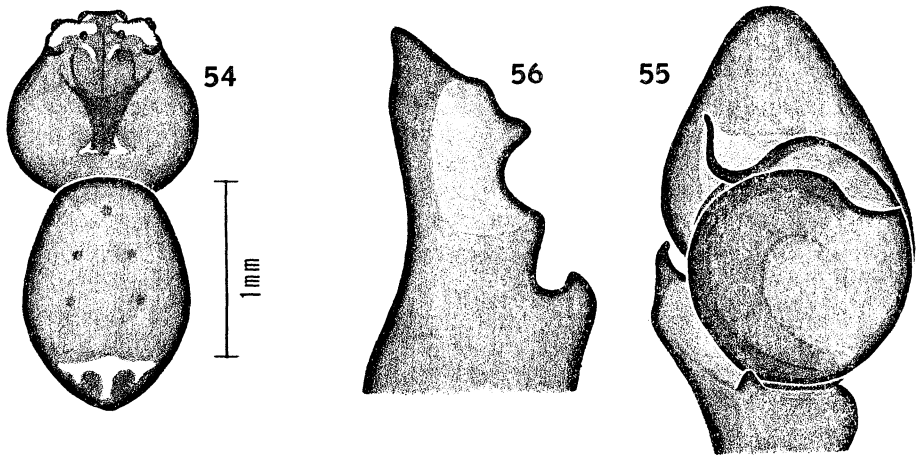


Fig. 54-56. *Misumenops hiatus* n. sp. 54, ♂, dorsal view; 55, ♂ right palp, ventral view; 56, ♂ right tibial apophysis, retrolateral view.

to each other (8:10); PME closer to each other than to PLE (13:16); clypeus height over 2 × the diameter of an AME (19:4). *Sternum*: Slightly longer than wide (18:17); posterior end almost pointed and separates coxae IV by width of a coxa. *Legs*: I, II, IV, III; setae—4 in row prolateral on femur I, 1 dorsal on all femora, 1 dorsal on tibiae I, II, and III, 2 in row dorsal on tibia IV, 3 pairs (2 pairs distal) ventral on metatarsi I and II; trichobothria—5 dorsal on all tibiae, 2 in row dorsal on all metatarsi and tarsi; tarsal claws—3 teeth per claw on all tarsi. *Palp* (fig. 55-56): Embolus originates near distal margin of tegulum; tip strongly curved; dorsal tooth of retrolateral tibial apophysis small; membranous lobe on ventral margin of apophysis; 6 trichobothria dorsal on tibia.

♀. unknown.

RECORDS. Holotype: ♂ (BISHOP 7499), Maui: Auwahi, 1110 m, 20.VII.1965, Suman.

DISTRIBUTION. This species is presently found only on the south slopes of Haleakala Crater, Maui.

ECOLOGY. The habitat of this species is best indicated by zone 9 on Table I.

DISCUSSION. This species appears to be related to *M. aridus* and *balteus* and is discussed under those species.

Misumenops imbricatus Suman, new species Fig. 57-61.

The description of this species is based partly on specimens identified as *Diaea insulana* Keyserling (=*Misumenops insulanus*) by Simon.

♂. Measurements (mm).

Carapace length, 1.40; width, 1.45; height, 0.56

Abdomen length, 1.83; width, 1.26; height, 1.00

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.00	0.73	1.63	1.56	0.86	6.78
II	2.00	0.73	1.56	1.46	0.86	6.61
III	1.03	0.43	0.73	0.59	0.40	3.18
IV	1.07	0.43	0.76	0.63	0.40	3.29
Palp	0.46	0.23	0.17	—	0.46	1.32

Carapace yellow-brown (green in life) with 2 parallel dark brown stripes; white around eyes; chelicerae and legs I and II yellow-brown with reddish brown bands; sternum, maxillae, labium, and legs III and IV pale yellow-brown; femora I and II with thin black line running length of venter; dorsum of abdomen with white, reddish brown, and black pattern; sides of abdomen with reddish brown stripe; venter of abdomen pale yellow-brown. *Eyes*: Ratio of AME : ALE : PME : PLE = 6 : 8 : 5 : 6; median ocular area wider behind than in front (15 : 12) and slightly wider than long (15 : 14); AME closer to ALE than to each other (9 : 12); PME closer to each other than to PLE (15 : 19); clypeus height less than 2 × the diameter of an AME (10 : 6). *Sternum*: As wide as long; posterior end almost pointed and separates coxae IV by width of a coxa. *Legs*: I, II, IV, III; setae—3 in row prolateral on femur I, 4 to 5 in row dorsal on all femora, 1 distodorsal on all patellae, 2 in row dorsal on all tibiae, 2 in row prolateral, 2 in row retrolateral, and 2 pairs ventral on tibiae I and II, 1 prolateral, 1 retrolateral, and 1 pair ventral on tibiae III and IV, 2 in row prolateral, 2 in row retrolateral, and 3 pairs ventral on metatarsi I and II, 1 prolateral and 1 retrolateral on metatarsi III and IV; trichobothria—7 to 8 dorsal on all tibiae, 4 in row dorsal on metatarsi and tarsi I and II, 3 in row dorsal on metatarsi III and IV, 2 in row dorsal on tarsi III and IV; tarsal claws—anterior

claw of tarsi I and II with 3 free teeth plus series of fused teeth, posterior claw of tarsi I and II with 5 free teeth, both claws of tarsi III and IV with 3 free teeth. *Palp* (fig. 58-59) : Embolus originates near distal border of tegulum ; tip strongly curved ; tegulum notched on prolateral side; dorsal tooth of retrolateral tibial apophysis curved ; notch on ventral margin small ; 7 to 8 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 1.59 ; width, 1.59 ; height, 0.66

Abdomen length, 2.43 ; width, 2.00 ; height, 1.56

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	1.89	0.73	1.43	1.36	0.86	6.27
II	1.86	0.73	1.43	1.33	0.83	6.18
III	1.00	0.43	0.69	0.59	0.50	3.21
IV	1.03	0.40	0.69	0.59	0.50	3.21
Palp	0.46	0.20	0.26	—	0.46	1.38

Color similar to but paler than male. *Eyes* : Ratio of AME : ALE : PME : PLE = 5 : 9 : 6 : 7 ; median ocular area slightly wider behind than in front (18 : 16) and slightly wider than long (18 : 15) : AME closer to ALE than to each other (12 : 16) ; PME closer to each other than to PLE (18 : 23) ; clypeus height slightly more than 2 × the diameter of an AME (11 : 5). *Sternum* : Longer than wide (27 : 22) ; posterior end almost pointed and separates coxae IV by 3/4 width of a coxa. *Legs* : I, II, III=IV ; setae—3 in row prolateral on femur I, 3 in row dorsal on femora I and II, 2 in row dorsal on femur III, 1 dorsal on femur IV, 2 (weak) in row dorsal on all patellae, 2 (weak) in row dorsal on all tibiae, 3 pairs ventral on tibia I, 2 pairs ventral on tibia II, 1 ventral on tibia III, 4 to 5 irregular pairs ventral on metatarsi I and II, 1 prolateral on metatarsus III ; trichobothria—8 dorsal on all tibiae, 4 in row dorsal on metatarsi I and II, 3 in row dorsal on metatarsi and tarsi III and IV, 5 in row dorsal on tarsi I and II ; tarsal claws—anterior claw of tarsi I and II with 3 free teeth plus series of fused teeth, posterior claw of tarsi I and II with 4 free teeth, both claws of tarsi III and IV with 3 free teeth. *Epigynum* (fig. 60-61) : Hood of guide pocket evenly curved and extends posteriorly over epigynum ; membranous bursae copulatrix anterior to spermathecae and visible from a dorsal aspect. *Palp* : 10 trichobothria dorsal on tibia ; tarsal claw with 3 teeth.

VARIATION. Carapace width : 3 ♂♂—1.33-1.43 mm ; 8 ♀♀—1.59-1.76 mm (mean, 1.63 mm). Femur I length : 3 ♂♂—2.00-2.07 mm ; 8 ♀♀—1.76-2.07 mm (mean, 1.92 mm). The color variation in this species appears to be due to fading of some specimens in the preservative.

RECORDS. Holotype : ♂ (BISHOP 7400), Oahu : Wiliwilinui Ridge, 18.I.1966, P. D. Ashlock ; Allotype : ♀ (BISHOP), Oahu : Mt Tantalus, 450 m, 28.XI.1966, Suman. Specimens examined : OAHU : 1 ♂ (BISHOP) (*Diaea insulana* : det. Simon), Perkins ; Manoa : 1 ♀, 22.I.1930, N. L. H. Krauss ; 1 immature, 300 m, 22.II.1940, E. C. Zimmerman ; Honolulu : 2 ♀♀, IV.1950, D. E. Hardy ; 2 immatures, 25.XI.1952, Hardy & M. S. Adachi ; 3 immatures, Wiliwilinui Ridge, 510-690 m, 11.V.1965, Suman ; 2 immatures, Mt Tantalus, 540 m, 17,23.XI.1966, ex Malaise trap, J. R. Vockeroth ; 1 immature, Halawa Ridge, 24.XI.1952, C. Hoyt ; 4 immatures, Opaeula Vall., 6.VII.1964, Suman ; 1 immature, head of Keekee Gulch, Waianae Mts, 25.IX.1934, Bryan ; 1 immature, nr Palehua, 600-750 m, 15.X.1960, ex *Metrosideros*, T. C. Maa ; MOLOKAI : 1 ♀ (BISHOP) (*Diaea insulana* : det. Simon) ; 1 ♀, 1 immature (BISHOP) (*Diaea insulana* var. e : det. Simon) ; HAWAII : Kona, 1200 m, VIII.1892, Perkins. LANAI : 1 ♀, Lanai Mts, 1.XI.1947, N. L. H. Krauss ;

MAUI : 1 ♂, West Maui Mts, 7.I.1932, Krauss ; 1 ♀, 2 immatures, Iao Vall., 450 m, 25. VII.1965, Suman.

DISTRIBUTION. This species is presently found on both mountain ranges on Oahu, Molokai, Lanai, and the western mountain range of Maui.

ECOLOGY. Specimens have been collected on *Metrosideros*. Two immature specimens were collected with a Malaise insect-trap net. The habitat is best indicated by zones 1 to 4 on Table I.

DISCUSSION. This species appears to be closely related to *M. editus* and is discussed under that species.

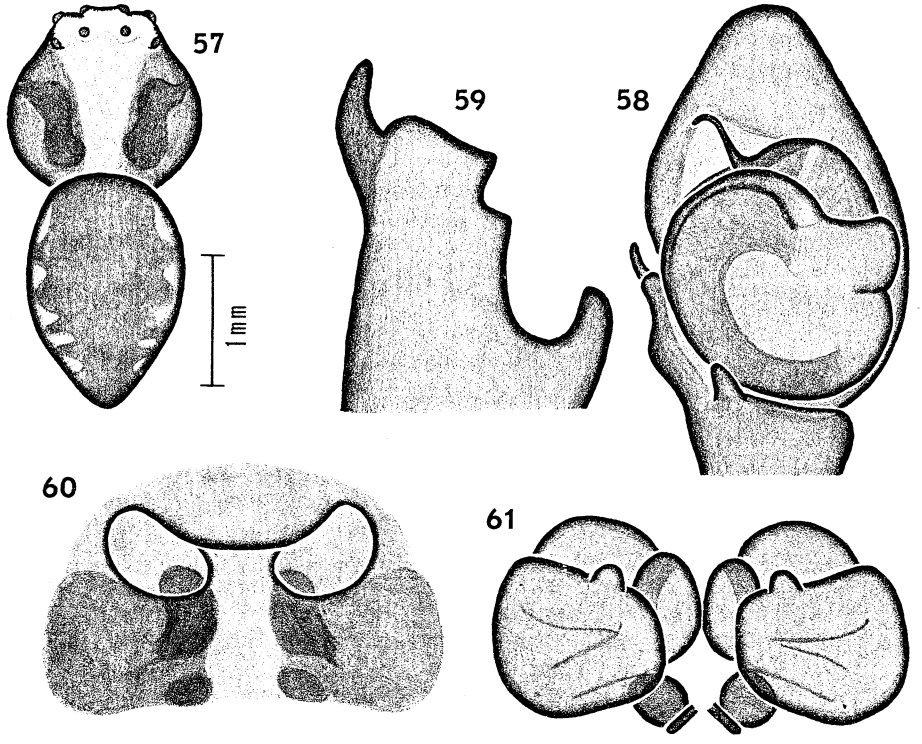


Fig. 57-61. *Misumenops imbricatus* n. sp. 57, ♂, dorsal view ; 58, ♂ right palp, ventral view ; 59, ♂ right tibial apophysis, retrolateral view ; 60, ♀ epigynum, ventral view; 61, ♀ internal genitalia, dorsal view.

Misumenops insulanus (Keyserling), new combination Fig. 62-66.

Diaea insulana Keyserling, 1890 : 261, pl. 24, fig. 3-4 (*nec Misumenops insulanus* Petrunkevitch, 1933).

Misumena nesiotes Simon, 1899 : 416. **New synonymy.**

♂. Measurements (mm).

Carapace length, 1.76 ; width, 1.79 ; height, 0.79

Abdomen length, 2.20 ; width, 1.66 ; height, 1.36

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.92	1.10	2.53	2.50	1.33	10.38
II	2.83	1.03	2.43	2.30	1.23	9.82
III	1.33	0.40	0.96	0.86	0.63	4.18
IV	1.33	0.36	1.00	0.96	0.59	4.24
Palp	0.56	0.30	0.17	—	0.63	1.66

Cephalothorax, appendages yellow-brown (probably green in life); abdomen white with dorsal pattern of black spots; femora I and II with thin black line running length of venter. *Eyes:* Ratio of AME : ALE : PME : PLE=5 : 7 : 5 : 5; median ocular area slightly wider behind than in front (19 : 18) and slightly longer than wide (19 : 17); AME closer to ALE than to each other (14 : 18); PME closer to each other than to PLE (19 : 24); clypeus height 3 × the diameter of an AME (15 : 5). *Sternum:* Slightly longer than wide (27 : 25); posterior end almost pointed and separates coxae IV by 1/2 width of a coxa. *Legs*: I, II, IV, III; setae—4 in row prolateral on femur I, 5 in row dorsal on femora I and II, 3 in row dorsal on femora III and IV, 1 (weak) distodorsal on patellae I and II, 2 (weak) in row dorsal on patellae III and IV, 3 in row dorsal on tibiae I and II, 2 in row dorsal on tibiae III and IV, 2 in row prolateral and 1 retrolateral on tibiae I and II, 1 disto-prolateral and 1 disto-retrolateral on tibiae III and IV, 3 pairs ventral on tibiae I and II, 1 mid-ventral on tibiae III and IV, 2 in row prolateral on all metatarsi, 2 in row retrolateral on metatarsi I and II, 1 retrolateral on metatarsi III and IV, 4 pairs ventral on metatarsi I and II; trichobothria—9 to 10 dorsal on all tibiae, 4 to 6 in row dorsal on metatarsi and tarsi I and II, 4 in row dorsal on metatarsi and tarsi III and IV; tarsal claws—anterior claw of tarsi I and II with 2 free teeth plus series of fused teeth, posterior claw of tarsi I and II with 3 free teeth, both claws of tarsi III and IV with 2 free teeth. *Palp* (fig. 63-64): Embolus originates near distal margin of tegulum; tutaculum well developed; tip long and strongly curved; dorsal tooth of retrolateral tibial apophysis small; ventral margin of apophysis not notched; 11 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 2.46; width, 2.40; height, 1.13

Abdomen length, 3.13; width, 2.50; height, 1.83

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	3.03	1.40	2.26	2.13	1.23	10.15
II	2.86	1.33	2.17	2.03	1.17	9.56
III	1.50	0.79	1.00	0.92	0.63	4.84
IV	1.63	0.73	1.13	1.13	0.66	5.28
Palp	0.66	0.36	0.40	—	0.66	2.08

Color similar to male; abdominal pattern not as well developed. Eyes: Ratio of AME : ALE : PME : PLE=5 : 7 : 5 : 6; median ocular area slightly wider behind than in front (27 : 26) and wider than long (27 : 23); AME closer to ALE than to each other (20 : 26); PME closer to each other than to PLE (27 : 33); clypeus height slightly over 4 × the diameter of an AME (21 : 5). *Sternum*: Slightly longer than wide (35 : 32); posterior end bluntly pointed and separates coxae IV by 3/14 width of a coxa. *Legs*: I, II, IV, III; setae—4 in row prolateral on femur I, 1 mid-dorsal on all femora, 2 (weak) in row dorsal on all patellae, 2 in row dorsal on tibiae III and IV, 1 disto-prolateral on tibia IV, 4 irregular pairs ventral on tibiae I and II, 1 pair ventral on tibia III, 6 pairs ventral on metatarsi I and II, 3 (1, 2) ventral on metatarsus III, 1 retrolateral on metatarsi III and IV, 2 in row prolateral on metatarsi III and IV; trichobothria—

11 dorsal on all tibiae, 6 in row dorsal on metatarsi I and II, 7 in row dorsal on tarsi I and II, 4 in row dorsal on metatarsi III and IV, 5 in row dorsal on tarsi III and IV; tarsal claws—anterior claw of tarsi I and II with 3 free teeth plus series of fused teeth, posterior claw of tarsi I and II with 4 free teeth, both claws of tarsi III and IV with 3 free teeth. *Epigynum* (fig. 65-66): Hood of guide pocket almost vertical; membranous bursae copulatrix connected to spermathecae by large tube. *Palp*: 12 trichobothria dorsal on tibia; tarsal claw with 3 teeth.

VARIATION. Carapace width: 8 ♂♂—1.66-1.92 mm (mean, 1.73 mm); 7 ♀♀—1.89-3.07 mm (mean, 2.26 mm). Femur I length: 8 ♂♂—2.76-3.79 mm (mean, 3.10 mm); 7 ♀♀—2.43-3.66 mm (mean, 2.86 mm). Some specimens have a more prominent pattern than others.

RECORDS. Types: Oahu: 1 ♂, 5 ♀♀, 2 immatures (UZM). Specimens examined: NECKER: 1 ♂, 1 ♀, 2 immatures, 11.VI.1962, 5 ♂♂, 3 ♀♀, 27 immatures, 26.IX.1964, ex *Chenopodium oahuense*; NIHOA: 1 immature, 23.IX.1964, ex *Chenopodium oahuense*, J. W. Beardsley; OAHU: 1 ♀ (BMNH 1904.X.3.38), Perkins; 2 ♀♀, immature, Hawaiian Islands, Blackburn; 2 immatures, Manoa, 6.XII.1931, N. L. H. Krauss; 3 ♂♂, 4 ♀♀, 7 immatures, Koko Head, 5.XII.1939, E. C. Zimmerman; 1 ♀, Kanaio, 28.III.1951, W. C. Mitchell; HAWAII and MOLOKAI: 2 ♀♀ (BMNH 1904.X.24.262-263), Kona; 1 ♀ (MNHN 6193); 1 ♀, 1 immature (BISHOP), Kona; HAWAII: 25 ♀♀, 6 immatures,

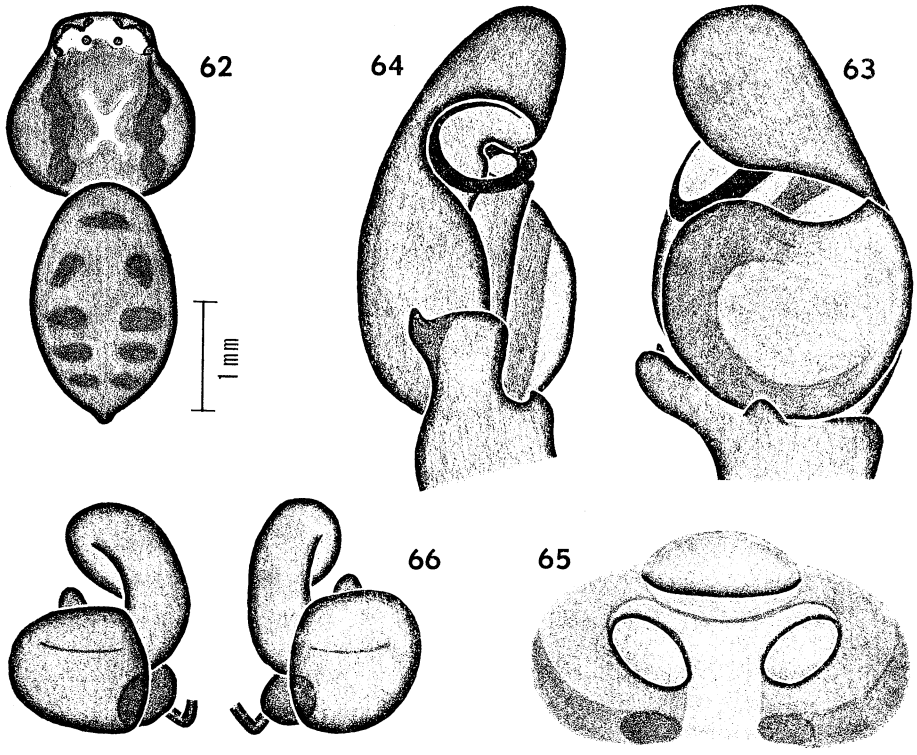


Fig. 62-66. *Misumenops insulanus* (Keyserling). 62, ♂, dorsal view; 63, ♂ right palp, ventral view; 64, ♂ right palp, retrolateral view; 65, ♀ epigynum, ventral view; 66, ♀ internal genitalia, dorsal view.

Sandwich Islands, late 1880's, W. T. Brigham.

DISTRIBUTION. Specimens of this species have been collected from the leeward islands, Necker and Nihoa, and the main islands of Oahu, Molokai, and Hawaii.

ECOLOGY. Specimens have been collected on *Chenopodium oahuense* on Necker and Nihoa. This species appears to be restricted to the drier areas of the islands. The type of habitat is best indicated by zone 1 on Table I.

DISCUSSION. After comparing type specimens of *Misumena nesiotes* Simon, 1899 with *Diaea insulana* Keyserling, 1890, these specimens were judged to be conspecific. The name *insulana* has priority. In transferring *insulana* to the genus *Misumenops*, *Misumenops insulanus* (Keyserling) becomes a senior secondary somonym of *Misumenops insulanus* Petrunkevitch, 1933. Therefore, the name **bubulcus** NEW NAME is proposed as a replacement name for *insulanus* Petrunkevitch, 1933 : 43, fig. 35-40.

Specimens determined as *Diaea insulana* Keyserling by Simon were found to belong to 4 species which are described as new in the present paper : *M. discretus*, *facundus*, *imbricatus*, and *junctus*. *M. insulanus* appears to be related to *cavatus*. The ventral margin of the retrolateral tibial apophysis is not notched in *insulanus* while there is a well developed notch in *cavatus*. The intromittent orifices of the epigynum are smaller and are more widely separated from each other in *insulanus* than in *cavatus*.

Misumenops junctus Suman, new species Fig. 67-71.

The description of this species is based partly on specimens identified as *Diaea insulana* Keyserling (= *Misumenops insulanus*) by Simon.

♂. Measurements (mm).

Carapace length, 1.69; width, 1.66; height, 0.50

Abdomen length, 2.17; width, 1.43; height, 1.17

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.73	0.83	2.20	2.17	1.23	9.16
II	2.69	0.83	2.20	2.10	1.17	8.99
III	1.33	0.56	1.00	0.83	0.59	4.31
IV	1.43	0.53	1.07	0.96	0.63	4.62
Palp	0.53	0.26	0.20	—	0.59	1.58

Cephalothorax, appendages pale yellow-brown (pale green in life); eye tubercles dark; 2 parallel dark stripes on carapace; legs with brown bands; dorsum of abdomen with black pattern; sides of abdomen dark brown; venter of abdomen with broad reddish brown stripe; femora I and II with thin black line running length of venter. *Eyes*: Ratio of AME : ALE : PME : PLE=7 : 10 : 7 : 8; median ocular area wider behind than in front (15 : 13) and longer than wide (17 : 15); AME slightly closer to ALE than to each other (11 : 13); PME closer to each other than to PLE (15 : 23); clypeus height 2 × the diameter of an AME (14 : 7). *Sternum*: Slightly longer than wide (28 : 25); posterior end almost pointed and separates coxae IV by 7/9 width of a coxa. *Legs*: I, II, IV, III; setae—4 in row prolateral on femur I, 2 in row dorsal on all femora, 2 (weak) dorsal on all patellae, 2 in row dorsal on all tibiae, 2 to 3 pairs ventral on tibiae I and II, 1 pair mid-ventral on tibiae III and IV, 3 to 5 pairs (distal 2 pairs strongest) ventral on metatarsi I and II; trichobothria—8 dorsal on tibia I, 9 dorsal on tibia II, 5 in row

dorsal on metatarsi I and II, 3 in row dorsal on metatarsi III and IV, 4 in row dorsal on all tarsi; tarsal claws—anterior claw of tarsi I and II with 4 free teeth plus series of fused teeth, posterior claw with 5 free teeth; anterior claw of tarsi III and IV with 3 free teeth plus series of fused teeth, posterior claw of tarsi III and IV with 4 free teeth. *Palp* (fig. 68-69): Embolus originates about 45° from distal border of tegulum on prolateral side; tegulum notched on prolateral side; tip short and evenly curved; dorsal tooth of retrolateral tibial apophysis short; 10 trichobothria dorsal on tibiae.

♀. Measurements (mm).

Carapace length, 1.92; width, 1.92; height, 0.86

Abdomen length, 2.59; width, 2.03; height, 1.43

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.36	0.92	1.76	1.66	1.10	7.80
II	2.33	0.92	1.76	1.63	1.07	7.71
III	1.30	0.63	0.89	0.76	0.59	4.17
IV	1.36	0.59	1.00	0.92	0.66	4.53
Palp	0.53	0.30	0.33	—	0.56	1.72

Color similar to male. *Eyes*: Ratio of AME : ALE : PME : PLE=7 : 11 : 7 : 8; median ocular area wider behind than in front (17 : 14) and slightly longer than wide (18 : 17); AME slightly closer to ALE than to each other (12 : 14); PME closer to each other than to PLE (17 : 26); clypeus height over 2 × the diameter of an AME (15 : 7). *Sternum*: Slightly longer than wide (31 : 28); posterior end almost pointed and separates coxae IV by 7/10 width of a coxa. *Legs*: I, II, IV, III; setae—3 in row prolateral on femur I, 1 dorsal on all femora, 2 in row dorsal on all patellae, 2 in row dorsal on all tibiae, 4 pairs ventral on tibiae I and II, 1 pair ventral on tibia III, 1 ventral on tibia IV, 5 pairs ventral on metatarsi I and II, 1 mid-ventral on metatarsi III and IV; trichobothria—6 dorsal on tibiae I and II, 8 dorsal on tibiae III and IV, 5 in row dorsal on metatarsi and tarsi I and II, 3 in row dorsal on metatarsi III and IV, 4 in row dorsal on tarsi III and IV; tarsal claws—anterior claw of tarsi I and II with 3 free teeth plus series of fused teeth, posterior claw of tarsi I and II with 5 free teeth; anterior claw of tarsi III and IV with 3 free teeth plus series of fused teeth, posterior claw of tarsi III and IV with 4 free teeth. *Epigynum* (fig. 70-71): Hood of guide pocket anterior to intromittent orifices; orifices close together; bursae copulatrix touching along center line and visible from a dorsal aspect. *Palp*: 8 trichobothria dorsal on tibia; tarsal claw with 4 teeth.

VARIATION. Carapace width: 14 ♂♂—1.26-1.63 mm (mean, 1.50 mm); 22 ♀♀—1.56-2.23 mm (mean, 1.89 mm). Femur I length: 13 ♂♂—2.13-2.76 mm (mean, 2.43 mm); 22 ♀♀—1.83-2.76 mm (mean, 2.26 mm). The pattern is similar in all specimens with some more deeply pigmented than others.

RECORDS. Holotype: ♂ (BISHOP 7401), W Maui: Kaulalewelewe, 900-1020 m, 24-27.X. 1966, C. M. Yoshimoto. Allotype: ♀ (BISHOP), same data, P. D. Ashlock. Paratypes: 2 ♂♂, 3 ♀♀, same data. Specimens examined: KAUAI: 1 immature (BISHOP) (*Diaea insulana*: det. Simon) Koholuamamo, IV.1895, Perkins; 1 ♂, 1 ♀ (MNHN 11905) (*Diaea insulana*: det. Simon) (Haw. Is. Comm.); 1 ♀, 1 immature, Kokee, 1200 m, VII.1952, D. E. Hardy; 2 immatures, Hualolo Vall., 1050 m, 11.VIII.1953, Hardy; 5 ♂♂, 4 ♀♀, 2 immatures, Kokee region, 1020-1050 m, 11-15.IX.1965, Suman; 2 ♀♀, Alakai region, 1050 m, 12.IX. 1965, Suman; 2 ♂♂, 2 immatures, Alakai Swamp, 1200 m, 16.IX.1965, Suman; OAHU: 1 ♂, 2 ♀♀, 1 immature (BISHOP) (*Diaea insulana*: det. Simon), Perkins; 1 ♀, 1 immature,

Pupukea, 27.XII.1952, C. Hoyt ; MOLOKAI : 1 immature (BISHOP) (*Diaea insulana* : det. Simon) ; 1 ♀, Maunawainui Vall., VII.1952, Hardy ; 1 ♂, 2 ♀♀, 1 immature, Puu Kolekole, 900–1050 m, 3.VIII.1965, Suman ; MAUI : 1 ♂, Olinda, 10.XII.1932, O. Bryant ; 1 immature, Waikamoi Str, 1200 m, 19.VII.1965, Suman ; 9 immatures, Kaulalewelewe, 900–1020 m, 24–27.X.1966, P. D. Ashlock & C. M. Yoshimoto ; HAWAII : 4 ♀♀, 1 immature (BISHOP) (*Diaea insulana* var. d : det. Simon), Kona ; 1 ♀ (MNHN 9702) (*Diaea insulana* var. : det. Simon) (Haw. Is. Comm.) ; 1 immature, Kilauea, VIII.1952, Hardy ; 1 ♂, Keanakolu, 1560 m, 28–30.X.1952, C. Hoyt ; 2 immatures, Hilo Forest Reserve, 600 m, 30.VI. 1966, Suman.

DISTRIBUTION. This species is presently known from all of the main islands except Lanai.

ECOLOGY. The habitat of this species is best indicated by zones 4 to 6 on Table I.

DISCUSSION. This species appears to be closely related to *M. velatus*. The dorsal tooth of the retrolateral tibial apophysis is much shorter in *junctus* and the prolateral margin of the tegulum is distinctly notched in *junctus* and slightly concave in *velatus*. The intromittent orifices of the epigynum are closer together in *junctus* than in *velatus*.

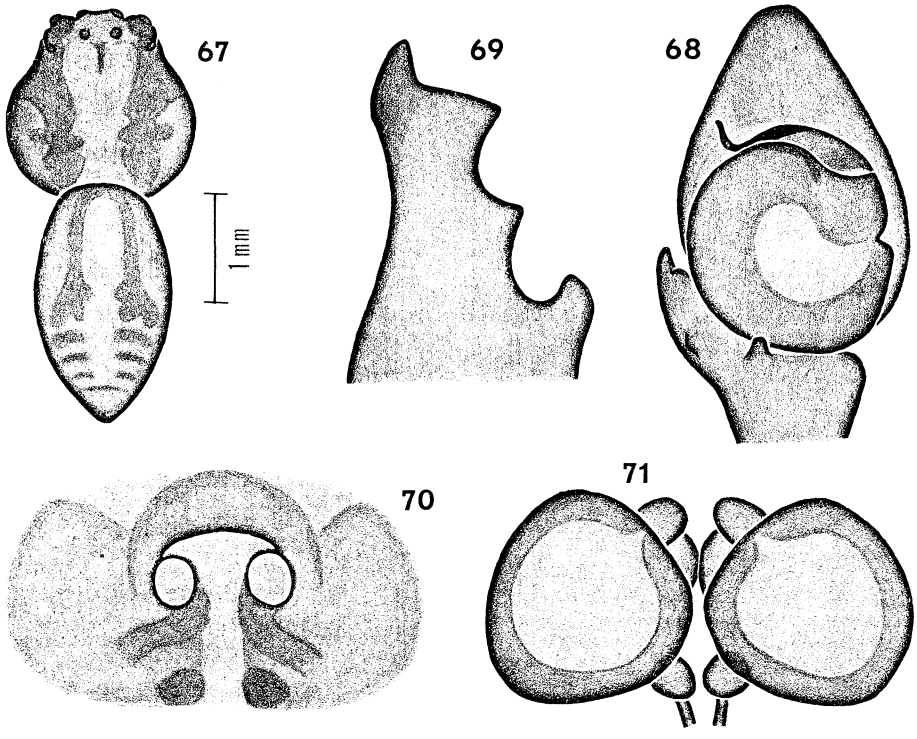


Fig. 67–71. *Misumenops junctus* n. sp. 67, ♂, dorsal view; 68, ♂ right palp, ventral view ; 69, ♂ right tibial apophysis, retrolateral view ; 70, ♀ epigynum, ventral view; 71, ♀ internal genitalia, dorsal view.

Misumenops kanakanus (Karsch), new combination

Diaea kanakana Karsch, 1880 : 80.

The type specimen was not available for study. The following description is a translation of the original description :

Cephalothorax and legs green ; ocular area reddish ; abdomen oval, longer than wide, yellow ; median longitudinal stripe dark brown, dorsal pattern weak in middle, anterior and posterior ends ; vulva reddish, subround. Body length 6.5-7 mm. This beautiful species is represented by a single ♀ specimen. In life : Thorax grass green ; abdomen delicate greenish-yellow.

Haleakala (Maui), about 2100 m.

DISCUSSION. The description of *kanakanus* agrees with *M. vitellinus* which is the only known thomisid on Haleakala with the same coloration. If *kanakanus* and *vitellinus* prove to be conspecific, the name *kanakanus* will have priority. The 2 species are retained in the present paper.

Misumenops nigrofrenatus (Simon), new combination Fig. 72-76.

Misumena nigrofrenata Simon, 1900 : 486, pl. 17, fig. 1.

Misumena cretacea Simon, 1900 : 487. **New synonymy.**

This species is redescribed from a ♂ and ♀ from Kauai.

♂. Measurements (mm).

Carapace length, 1.36 ; width, 1.46 ; height, 0.40

Abdomen length, 1.76 ; width, 1.33 ; height, 0.89

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	1.83	0.59	1.40	1.40	0.79	6.01
II	1.83	0.63	1.36	1.40	0.79	6.01
III	0.89	0.43	0.66	0.59	0.50	3.07
IV	0.96	0.36	0.66	0.66	0.50	3.14
Palp	0.43	0.23	0.17	—	0.43	1.26

Dorsal surface of body predominantly white with dark pattern ; ventral surface of body dark brown ; legs with brown bands on segments ; femora I and II with irregular white spots. *Eyes* : Ratio of AME, ALE : PME : PLE=6 : 8 : 6 : 5 ; median ocular area wider behind than in front (18 : 13) and slightly wider than long (18 : 17) ; AME closer to ALE than to each other (11 : 13) ; PME closer to each other than to PLE (18 : 20) ; clypeus height over 2 × the diameter of an AME (14 : 6). *Sternum* : As wide as long ; posterior end bluntly pointed and separates coxae IV by width of a coxa. *Legs* : I=II, IV, III ; setae—3 (weak) in row prolateral on femur I, 1 dorsal on femora I, III and IV, 2 in row dorsal on femur II, 2 (weak) in row dorsal on patellae III and IV, 2 (weak) in row dorsal on tibiae III and IV ; trichobothria—5 dorsal on all tibiae, 3 in row dorsal on metatarsi and tarsi I and II, 2 in row dorsal on metatarsi and tarsi III and IV ; tarsal claws—both claws of tarsi I and II with 4 teeth, both claws of tarsi III and IV with 3 teeth. *Palp* (fig. 73-74) : Embolus fairly short and originates near distal margin of tegulum ; tip evenly curved ; dorsal tooth of retrolateral tibial apophysis short ; membranous lobe on ventral margin of apophysis ; 6 to 7 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 2.00; width, 2.00; height, 0.56
Abdomen length, 2.40; width, 2.07; height, 1.00

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.03	0.89	1.50	1.43	0.89	6.74
II	2.00	0.89	1.50	1.40	0.86	6.65
III	1.07	0.56	0.69	0.73	0.53	3.58
IV	1.17	0.53	0.83	0.83	0.53	3.89
Palp	0.50	0.33	0.26	—	0.50	1.59

Color similar to male. *Eyes*: Ratio of AME : ALE : PME : PLE=5 : 7 : 5 : 5; median ocular area wider behind than in front (18 : 13) and as wide as long (18 :18); AME slightly closer to ALE than to each other (12 : 13); PME slightly closer to each other than to PLE (18 : 20); clypeus height 3 × the diameter of an AME (15 : 5). *Sternum*: Slightly longer than wide (32 : 23); posterior end bluntly pointed and separates coxae IV by 7/10 width of a coxa. *Legs*: I, II, IV, III; setae—2 in row prolateral on femur I, 1 dorsal on femora I, III, and IV, 2 in row dorsal on femur II, 1 short proximal dorsal on patellae III and IV, 2 to 3 pairs ventral on tibiae I and II, 2 in row dorsal on tibiae III and IV, 6 irregular pairs ventral on metatarsi I and II; trichobothria—5 dorsal on all tibiae, 3 in row dorsal on metatarsi I and II, 4 in row dorsal on tarsi I and II, 2 in row dorsal on metatarsi and tarsi III and IV. *Epigynum* (fig. 75-76): Hood of guide pocket extends slightly posteriorly over epigynum; intromittent orifices widely sepa-

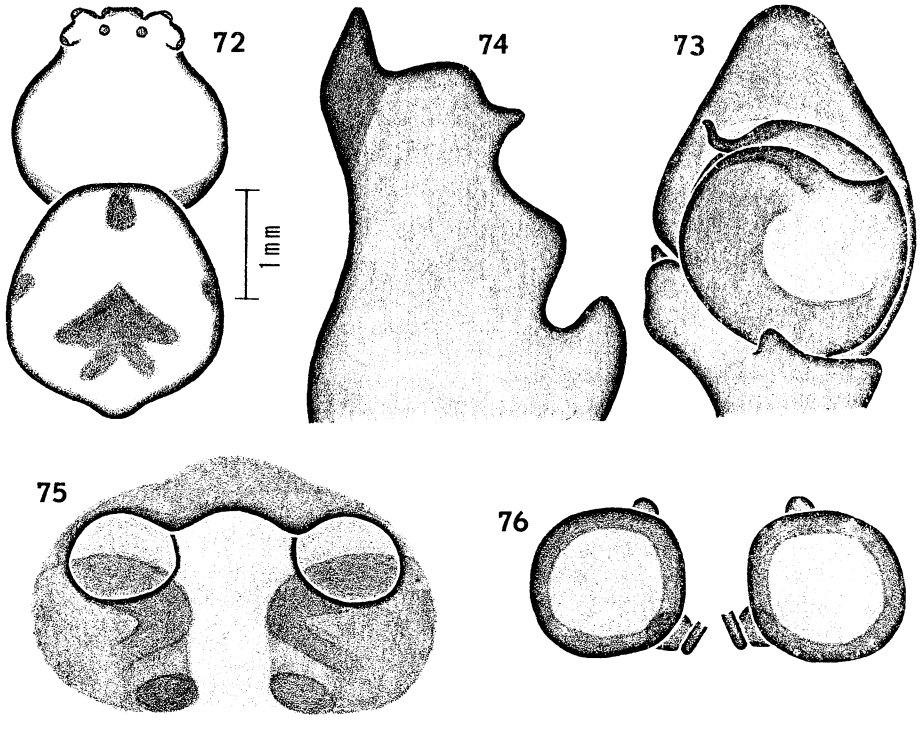


Fig. 72-76. *Misumenops nigrofrenatus* (Simon). 72, ♂, dorsal view; 73, ♂ right palp, ventral view; 74, ♂ right tibial apophysis, retrolateral view; 75, ♀ epigynum, ventral view; 76, ♀ internal genitalia, dorsal view.

rated ; bursae copulatrix not visible from dorsal aspect. *Palp :* 5 trichobothria dorsal on tibia ; tarsal claw with 3 teeth.

VARIATION. Carapace width : 6 ♀♀—1.69–2.00 mm (mean, 1.83 mm). Femur I length : 6 ♀♀—1.73–2.00 mm (mean, 1.89 mm). There is considerable color variation in this species ranging from almost completely white on the dorsal surface of the body to a black and white mottled condition. Several specimens have the same dorsal abdominal pattern as shown in fig. 72.

RECORDS. Syntypes : BISHOP : Hawaii : 1 ♀, 1 immature, Kau ; 1 ♀ ; BMNH : Kauai : 1 ♀ (1904.X.24.271), Waimea ; 1 ♂, 2 immatures (1904.X.24.286–270), Kohol, Waimea Mts, 1200 m, V. 1894, Perkins ; Hawaii : 2 ♀♀, 2 immatures (1904.X.24.264–267), Halemanu, Kona, 600 m, IX.1892, Perkins ; MNHN : Hawaii : 2 ♀♀ (20833). Other Specimens : *Misumena cretacea* : BISHOP : 1 ♀ ; BMNH : 1 ♀ (1904.X.24.272) ; MNHN : 1 ♀ (6193), Molokai. Specimens examined : KAUAI : 1 ♀, Kokee, 3.I.1944, N. L. H. Krauss ; OAHU : 1 immature, nr Palehua, 600–750 m, 15.X.1960, ex *Metrosideros*, T. C. Maa ; MOLOKAI : 1 ♀, E Kaumakakai, 900 m, 18.III.1966, C. M. Yoshimoto ; 1 ♀, Kawela Gulch, 1125 m, 21.III.1966, Yoshimoto ; LANAI : 1 immature, Lanai Mts, 1.XI.1947, Krauss ; HAWAII : 1 ♂, 2 ♀♀, 2 immatures, Kilauea, 1200 m, 9.I.1917, Muir & Giffard ; 1 ♀, Hualalai, 1800–2100 m, 21.IV.1944, Krauss ; 2 ♀♀, Hawaiian Is., Blackburn.

DISTRIBUTION. This species is presently known from all of the main islands.

ECOLOGY. An immature specimen was collected on *Metrosideros*. The type of habitat is best indicated by zones 3, 4, and 7 on Table I.

DISCUSSION. This species appears to be most closely related to *M. aridus* and is discussed under that species.

Misumenops oreades (Simon), new combination Fig. 77–81.

Misumena oreades Simon, 1900 : 485.

The following redescription is based on a ♂ and ♀ from Kauai.

♂. Measurements (mm).

Carapace length, 1.53 ; width, 1.50 ; height, 0.40

Abdomen length, 1.96 ; width, 1.07 ; height, 1.03

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.76	0.83	2.30	2.17	1.23	9.29
II	2.69	0.83	2.26	2.10	1.20	9.08
III	1.40	0.53	1.10	1.00	0.73	4.76
IV	1.46	0.53	1.10	1.10	0.69	4.88
Palp	0.46	0.26	0.17	—	0.50	1.39

Cephalothorax and appendages yellow-brown (probably green in life) ; abdomen white ; white around eyes ; 3 pairs of dark spots on dorsum of abdomen. *Eyes* : Ratio of AME : ALE : PME : PLE=6 : 8 : 5.5 : 6 ; median ocular area wider behind than in front (15 : 11) and slightly longer than wide (17 : 15) ; AME slightly closer to ALE than to each other (9 : 11) ; PME closer to each other than to PLE (15 : 18) ; clypeus height slightly over 2 × the diameter of an AME (13 : 6).

Sternum: As wide as long; posterior end almost pointed and separates coxae IV by almost the width of a coxa (7:9). *Legs*: I, II, IV, III; setae—3 to 4 in row prolateral on femur I, 4 to 5 in row dorsal on femur I, 3 to 4 in row dorsal on femora II and III, 1 to 2 in row dorsal on femur IV, 2 (weak) in row dorsal on all patellae, 2 in row dorsal on all tibiae, 2 in row prolateral on tibiae I and II, 2 in row retrolateral on tibiae I and II, 2 pairs ventral on tibiae I and II, 1 retrolateral on tibiae III and IV, 1 proximal retrolateral and 3 pairs ventral on metatarsi I and II, 1 retrolateral on metatarsus IV; trichobothria—6 to 8 dorsal on all tibiae, 4 in row dorsal on metatarsi and tarsi I and II, 3 in row dorsal on metatarsi III and IV, 2 in row dorsal on tarsi III and IV; tarsal claws—both claws of all tarsi with 3 teeth. *Palp* (fig. 78-79): Embolus short and originates near distal border of tegulum; tip of embolus evenly curved; tibia with 7 trichobothria dorsal.

♀. Measurements (mm).

Carapace length, 2.36; width, 2.23; height, 1.13

Abdomen length, 5.40; width, 3.90; height, 3.10

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.86	1.23	2.10	1.76	1.13	9.08
II	2.83	1.17	2.00	1.69	1.07	8.76
III	1.40	0.69	0.96	0.69	0.59	4.33
IV	1.59	0.69	1.07	0.83	0.56	4.74
Palp	0.56	0.36	0.40	—	0.56	1.88

Color similar to male; abdomen without dorsal pattern. *Eyes:* Ratio of AME : ALE : PME : PLE=4.5 : 7 : 4.5 : 5; median ocular area slightly wider behind than in front (15 : 14) and slightly wider than long (15 : 14); AME closer to ALE than to each other (10 : 14); PME closer to each other than to PLE (15 : 19); clypeus height slightly over 3 × the diameter of an AME (14 : 4.5). *Sternum*: Longer than wide (38 : 28); posterior end almost pointed and separates coxae IV by 1/2 width of a coxa. *Legs*: I, II, IV, III; setae—1 distodorsal on femora II and III, 3 (1, 2) ventral on tibiae I and II, 1 mid-ventral on tibia III, 5 pairs ventral on metatarsi I and II, 1 mid-ventral on metatarsi III and IV; trichobothria—8 dorsal on all tibiae, 4 in row dorsal on metatarsi and tarsi I and II, 3 in row dorsal on metatarsi and tarsi III and IV; tarsal claws—both claws of all tarsi with 3 teeth. *Epigynum* (fig. 80-81): Hood of guide pocket extends posteriorly over epigynum; bursae copulatrix well developed and visible from dorsal aspect. *Palp*: 8 trichobothria dorsal on tibia; tarsal claw with 3 teeth.

VARIATION. Carapace width: 30 ♀♀—2.10-2.66 mm (mean, 2.36 mm). Femur I length: 30 ♀♀—3.00-3.80 mm (mean, 3.06 mm). All specimens are similar in coloration.

RECORDS. Syntypes: BISHOP: Oahu: 27 ♀♀, 12 immatures; BMNH: Hawaii: 1 ♀, 2 immatures (1904.X.24.258-261), Mauna Loa, 600 m; Oahu: 30 ♀♀ (1904.X.24.28-34), Perkins; MNHN: 1 ♂, 6 ♀♀ (22216), Isles Sandwich. Specimens examined: KAUAI: 1 ♀, Nualolo Trail, Kokee, 31.I.1953, sweeping, W. C. Mitchell; OAHU: 11 ♀♀, 1 immature, Honolulu, VII.1907, ex cells of *Sceliphron caementarium*, F. W. Terry; 3 ♀♀, Manoa, 22.I.1930, 22.X.1933, N. L. H. Krauss; 1 ♀, Waianae Mts, Head of Keekee Gulch, 25.IX.1934, Bryan; 1 ♀, Kawaiiki Ditch Trail, Waialua Dist., 300-450 m, 3.V.1965, Suman; 1 ♀, Kawaiiki Ditch Trail, Koolau Mts, 16.VII.1966, P. Gehring; 1 ♀, Wiliwilinui Ridge, 510-750 m, 11.V.1965, Suman; 1 ♀, Aiea State Park, 300 m, 9.I.1966, Suman; MAUI: 3 ♀♀, 4 immatures, Iao Vall., 450 m, 25.VII.1965, Suman; HAWAII: 5 ♀♀, 1 immature, Hawaii (Sandwich Islands), 1800's, W. T. Brigham; Kilauea: 1 ♀, 1200 m, VI.

1905, under bark, moss, Terry; 1 ♀, 1200 m, 9.I.1917, Muir & Giffard; 1♀, 18.IV.1944, Krauss; 11 ♀♀, 1 immature, Kau lava flows, 17.I.1917, Muir & Giffard; 1 ♀, Kau Dist., Volcano Rd, 25.XII.1949, N. E. Morton; 1 immature, Chain of Craters Rd, 960 m, 23. VI.1966, Suman; 2 ♀♀, 1 immature, Kipuka Puaulu, Mauna Loa Strip Rd, 1140 m, 24.VI. 1966, Suman.

DISTRIBUTION. This species is presently found on the main islands of Kauai Oahu, Maui, and Hawaii.

ECOLOGY. The habitat of this species is best indicated by zone 2 on Table I. Specimens have been collected from under bark and on moss on Hawaii and from the nests of the hymenopteran, *Sceliphron caementarium* (Sphecidae), on Oahu.

DISCUSSION. This species appears to be closely related to *M. vitellinus*. The distal border of the retrolateral tibial apophysis is not notched in *oreades* as in *vitellinus* and the tip of the embolus is shorter and curved in *oreades* while the reverse is true for *vitellinus*. The intromittent orifices of the epigynum are closer together in *oreades* than in *vitellinus*.

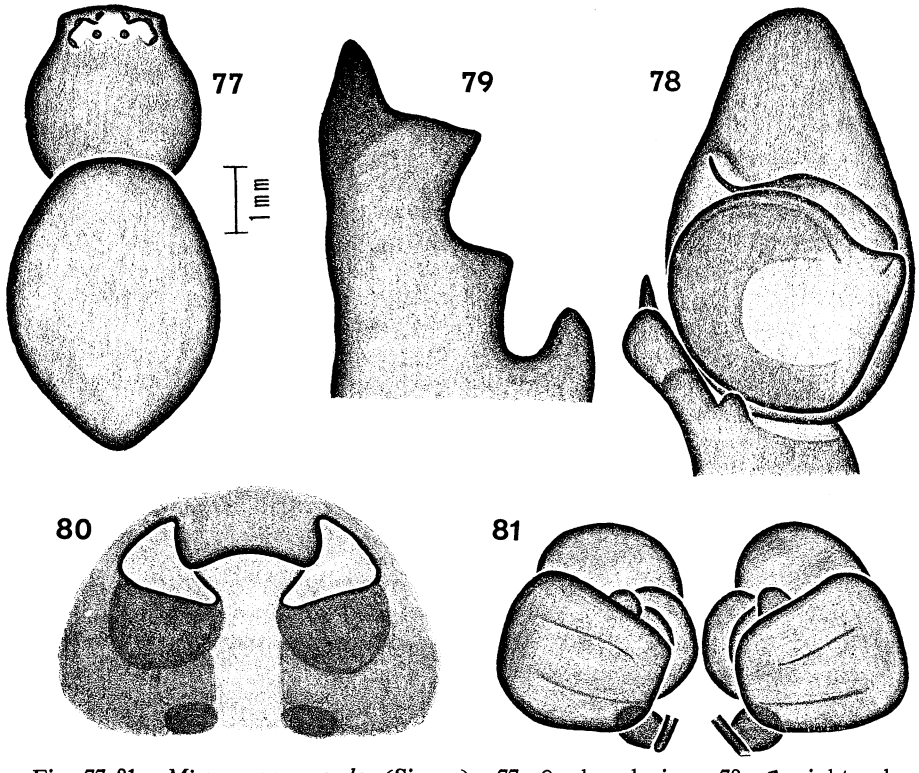


Fig. 77-81. *Misumenops oreades* (Simon). 77, ♀, dorsal view; 78, ♂ right palp, ventral view; 79, ♂ right tibial apophysis, retrolateral view; 80, ♀ epigynum, ventral view; 81, ♀ internal genitalia, dorsal view.

Misumenops rufithorax (Simon), new combination Fig. 82-86.

Synaema rufithorax Simon, 1904: 342.

This species is redescribed from a ♂ and ♀ from Oahu.

♂. Measurements (mm).

Carapace length, 1.63; width, 1.69; height, 0.40

Abdomen length, 2.30; width, 1.66; height, 1.03

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.40	0.86	2.03	1.69	1.00	7.98
II	2.43	0.86	2.00	1.66	0.92	7.87
III	1.26	0.56	0.89	0.66	0.53	3.90
IV	1.30	0.53	0.89	0.73	0.53	3.98
Palp	0.50	0.23	0.17	—	0.50	1.40

Carapace orange-brown; legs I and II darker than carapace; legs III and IV, sternum, maxillae, labium, and chelicerae slightly paler than carapace; abdomen dusky white with black on sides just anterior to spinnerets. *Eyes*: Ratio of AME : ALE : PME : PLE=6 : 8 : 5 : 7; median ocular area wider behind than in front (14 : 11) and slightly wider than long (14 : 12); AME as close to ALE as to each other (11 : 11); PME closer to each other than to PLE (14 : 22); clypeus height slightly more than the diameter of an AME (8 : 6). *Sternum*: Slightly longer than wide (28 : 25); posterior end almost pointed and separates coxae IV by almost the width of a coxa (8 : 9). *Legs*: I, II, IV, III; setae (weak)—4 in row prolateral on femur I, 1 dorsal on all femora, 2 in row dorsal on all patellae and tibiae, 1 pair distoventral on tibiae I and II, 1 pair (weak) mid-ventral on tibiae III and IV; trichobothria—5 dorsal on tibiae I and II, 8 dorsal on tibiae III and IV, 4 in row dorsal on metatarsi and tarsi I and II, 2, in row dorsal on metatarsi and tarsi III and IV; tarsal claws—both claws of tarsi I and II with at least 4 teeth, both claws of tarsi III and IV with at least 3 teeth. *Palp* (fig. 83-84): Embolus originates almost 90° from distal border of tegulum on prolateral side; tip evenly curved; dorsal tooth of retrolateral tibial apophysis curves dorsal and is continuous with distal end of apophysis; 7 to 8 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 2.90; width, 2.80; height, 0.70

Abdomen length, 4.20; width, 3.20; height, 1.30

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.96	1.33	2.30	2.00	1.30	9.89
II	2.96	1.33	2.30	1.96	1.23	9.78
III	1.83	0.86	1.26	0.89	0.69	5.53
IV	1.96	0.86	1.36	1.07	0.73	5.98
Palp	0.73	0.40	0.40	—	0.66	2.19

Color similar to male; carapace flattened compared to other species of *Misumenops*. *Eyes*: Ratio of AME : ALE : PME : PLE=7 : 11 : 6 : 9; median ocular area wider behind than in front (25 : 19) and wider than long (25 : 17); AME as close to ALE as to each other (19 : 19); PME closer to each other than to PLE (25 : 34); clypeus height less than 2 × the diameter of an AME (12 : 7). *Sternum*: Longer than wide (46 : 37); posterior end almost pointed and separates coxae IV by 12/15 width of a coxa. *Legs*: I, II, IV, III; setae—4 in row prolateral on femur

I, 1 dorsal on all femora, 2 (weak) in row dorsal on patellae III and IV, 2 (weak) in row dorsal on all tibiae, 6 irregular pairs ventral on tibiae I and II, 2 to 3 pairs ventral on tibia III, 1 pair midventral on tibia IV, 3 pairs ventral on metatarsi I and II; trichobothria—7 dorsal on tibiae I and II, 8 dorsal on tibiae III and IV, 4 in row dorsal on metatarsi and tarsi I and II, 3 in row dorsal on metatarsi and tarsi III and IV; tarsal claws—at least 6 teeth per claw on tarsi I and II, at least 5 teeth per claw on tarsi III and IV. *Epigynum* (fig. 85-86): Hood of guide pocket on anterior margin of epigynum; intromittent orifices widely separated; membranous bursae copulatrix just showing along anterior side of spermathecae from dorsal aspect. *Palp*: 7 to 8 trichobothria dorsal on tibia; tarsal claw with several teeth.

VARIATION. All specimens are similar in coloration.

RECORDS. Syntypes : BISHOP : Oahu : 1 immature, Perkins ; BMNH : Oahu : 2 immatures (1904.X.3.50), Perkins ; MNHN : Oahu : 1 ♂, 1 immature (22208). Specimens examined: 1 ♀, Hawaii (Sandwich Islands), late 1880's, W. T. Brigham (probably from Oahu); OAHU : 1 immature, Mt Tantalus, IV.1957, D. E. Hardy ; 1 immature, Mt Tantalus, 360 m, 29.III.1967, ex *Freycinetia*, D. Tsuda.

DISTRIBUTION. This species is presently known only from the Koolau Mountains on Oahu.

ECOLOGY. A specimen was collected on *Freycinetia*. The habitat is best indicated by zone 1 on Table I.

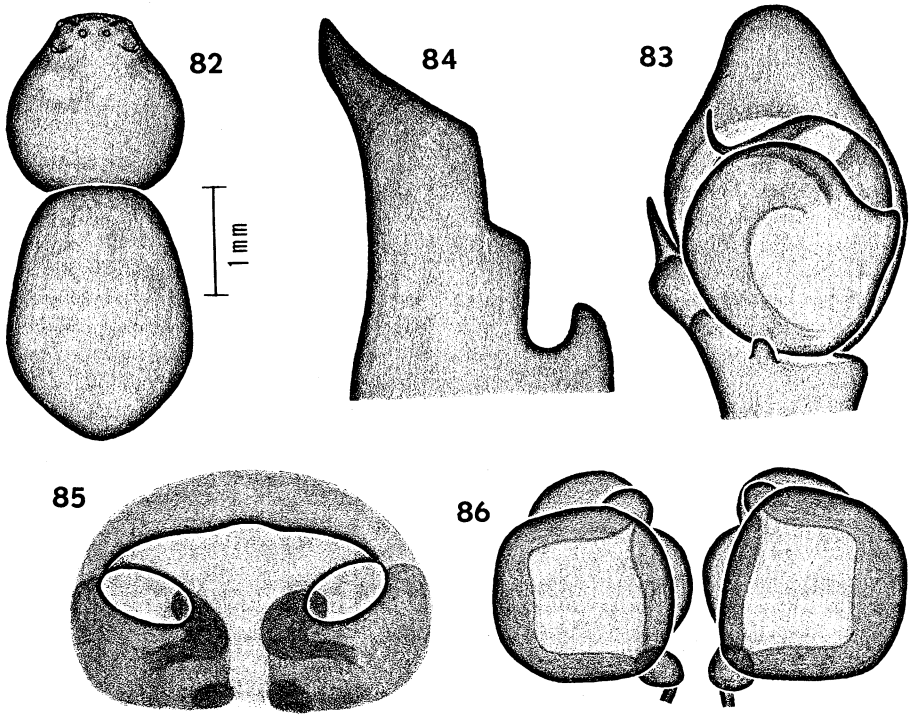


Fig. 82-86. *Misumenops rufithorax* (Simon). 82, ♂, dorsal view ; 83, ♂ right palp, ventral view; 84, ♂ tibial apophysis, retrolateral view ; 85, ♀ epigynum, ventral view ; 86, ♀ internal genitalia, dorsal view.

DISCUSSION. This species does not appear to be closely related to other species of *Misumenops*. It is tentatively placed in *Misumenops* because the carapace is armed with setaceous setae, the anterior lateral eyes are larger than the anterior median eyes, and the median ocular area is not considerably wider than long, particularly in the male.

Misumenops velatus (Simon), new combination Fig. 87-91.

Misumena velata Simon, 1900: 489, pl. 17, fig. 12.

This species is redescribed from a ♂ and ♀ from Maui.

♂. Measurements (mm).

Carapace length, 1.50; width, 1.56; height, 0.50

Abdomen length, 1.89; width, 1.69; height, 1.23

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.13	0.76	1.69	1.50	0.96	7.04
II	2.00	0.73	1.66	1.50	0.92	6.81
III	1.03	0.43	0.73	0.63	0.50	3.32
IV	1.03	0.43	0.73	0.66	0.50	3.35
Palp	0.40	0.20	0.10	—	0.46	1.16

Cephalothorax, legs I and II dark green-brown with irregular white markings; legs III and IV pale yellow-brown with brown bands; femora I and II with thin black line running length of venter; dorsum of abdomen with black pattern, white transverse band, and white on posterior end; venter of abdomen with broad brown stripe. *Eyes*: Ratio of AME : ALE : PME : PLE =5 : 8 : 5 : 6; median ocular area slightly wider behind than in front (18 : 16) and slightly wider than long (18 : 17); AME closer to ALE than to each other (12 : 16); PME closer to each other than to PLE (18 : 22); clypeus height slighty over 2 × the diameter of an AME (11 : 5). *Sternum*: As wide as long; posterior end almost pointed and separates coxae IV by 3/4 width of a coxa. *Legs*: I, II, IV, III; setae—4 in row prolateral on femur I, 5 in row dorsal on femora I and II, 3 to 4 in row dorsal on femora III and IV, 2 (weak) in row dorsal on patellae III and IV, 2 (weak) in row dorsal on tibiae III and IV,1 pair (weak) ventral on tibiae III and IV, 1 (weak) prolateral and 1 (weak) retrolateral on tibia IV, 2 pairs distoventral on metatarsi I and II; trichobothria—7 dorsal on all tibiae, 4 in row dorsal on metatarsi and tarsi 1 and II, 3 in row dorsal on metatarsi III and IV, 2 in row dorsal on tarsi III and IV; tarsal claws—anterior claw of tarsi I and II with 3 free teeth plus series of fused teeth, posterior claw of tarsi I and II with 4 free teeth, both claws of tarsi III and IV with 4 free teeth. *Palp* (fig. 88-89): Embolus originates near distal border of tegulum; tip short and evenly curved; dorsal tooth of retrolateral tibal apophysis long and originates sub-distal on apophysis; 6 to 7 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 1.69; width, 1.73; height, 0.53

Abdomen length, 2.56; width, 2.53; height, 1.86

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	1.89	0.83	1.36	1.23	0.89	6.20
II	1.89	0.83	1.33	1.20	0.86	6.11
III	1.00	0.53	0.66	0.56	0.50	3.25
IV	1.07	0.50	0.69	0.63	0.50	3.29
Palp	0.46	0.23	0.23	—	0.46	1.38

Color similar to male. *Eyes*: Ratio of AME : ALE : PME : PLE=6 : 8 : 6 : 7; median ocular area wider behind than in front (19 : 16) and slightly wider than long (19 : 18); AME closer to ALE than to each other (13 : 16); PME closer to each other than to PLE (19 : 23); clypeus height over 2 × the diameter of an AME (14 : 6). *Sternum*: As wide as long; posterior end almost pointed and separates coxae IV by 7/9 width of a coxa. *Legs*: I, II, IV, III; setae—3 in row prolateral on femur I, 1 dorsal on femora I, II, and III, 2 (weak) in row dorsal on all patellae, 3 to 4 pairs ventral on tibiae I and II, 2 in row dorsal on tibiae III and IV, 5 pairs ventral on metatarsi I and II; trichobothria—5 to 8 dorsal on all tibiae, 4 in row dorsal on metatarsi and tarsi I and II, 3 in row dorsal on metatarsi III and IV, 2 in row dorsal on tarsi III and IV; tarsal claws—anterior claw of tarsi I and II with 3 free teeth plus series of fused teeth, posterior claw of tarsi I and II with 4 free teeth, both claws of tarsi III and IV with 4 free teeth. *Epigynum* (fig. 90-91): Hood of guide pocket extends anterior to epigynum; intromittent orifices widely separated; bursae copulatrix and spermathecal organs not visible from dorsal aspect. *Palp*: 5 trichobothria dorsal on tibia; tarsal claw with 3 teeth.

VARIATION. Carapace width: 11 ♂♂—1.30-1.59 mm (mean, 1.46 mm); 7 ♀♀—1.63-1.96 mm (mean, 1.76 mm). Femur I length: 11 ♂♂—1.79-2.50 mm (mean, 2.17 mm); 7 ♀♀—1.92-2.30 mm (mean, 2.07 mm). The specimens from Maui are green-brown and those Oahu are yellow-brown.

RECORDS. Syntypes: BISHOP: Maui: 2 ♀♀, Haleakala, 1500 m, V.1896, Perkins; BMNH: Maui: 2 ♀♀, 1 immature (1904.X.24.297-299), Haleakala, 1500 m, Perkins; MNHN:

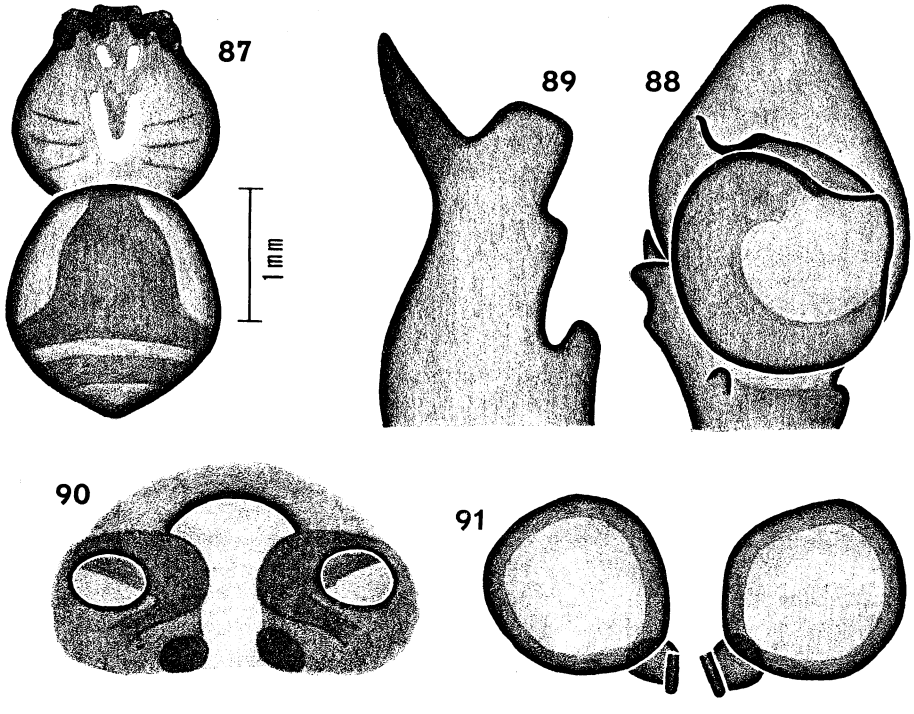


Fig. 87-91. *Misumenops velatus* (Simon). 87, ♂, dorsal view; 88, ♂ right palp, ventral view; 89, ♂ right tibial apophysis, retrolateral view; 90, ♀ epigynum, ventral view; 91, ♀ internal genitalia, dorsal view.

Maui : 2 ♀♀ (12110), Haleakala. Specimens examined : OAHU : Mt Tantalus : 1 ♂, 2 immatures, 6.VIII.1950, W. C. Mitchell ; 2 ♂♂, 1 ♀, 3 immatures, 16.VII.1964, sweeping, Suman ; 1 ♂, 1 ♀, 5 immatures, 450–600 m, 14.III.1965, Suman ; 1 ♀, 4 immatures, 450 m, 4.VIII.1965, D. Tsuda ; 1 ♀, 23.I.1966, Tsuda ; 1 ♂, 1 immature, 450 m, 28.XI.1966, Suman ; 2 immatures, 540 m, 17.XI.1966, ex Malaise trap, J. R. Vockeroth ; 1 immature, Manoa Vall. 300 m, 22.II.1940, E. C. Zimmerman ; 1 ♂, Mt Kaala, base of trail, 11.IV.1943, beating dying tree, H. S. Dybas ; 2 ♂♂, Pupukea trail, 4.IV.1952, W. C. Mitchell ; 1 immature, Kalihi Vall., 300–405 m, 10.XII.1960, L. Quate ; 4 immatures, Opaeula Vall., 6.VII. 1964, Suman ; 1 ♂, 2 immatures, N end of Koolau Mts, 8.V.1964, sweeping, Suman ; 2 immatures, ridge above Wilson Tunnel, 22.II.1965, Suman ; MAUI : 1 ♂, Waikamoi Str, 1200 m, 19.VII.1965, Suman : 2 ♂♂, 2 ♀♀, 3 immatures, W Maui, Kaulalewelewe, 900–1020 m, 24–27.X.1966, P. D. Ashlock & C. M. Yoshimoto.

DISTRIBUTION. This species is presently known from the Koolau and Waianae Mountains on Oahu and Haleakala and the West Maui Mountains on Maui.

ECOLOGY. Two specimens have been collected with a Malaise insect-trap net. The habitat is best indicated by zones 1 to 4 on Table I.

DISCUSSION. This species appears to be closely related to *M. junctus* and is discussed under that species.

Misumenops vitellinus (Simon), new combination Fig. 92–96.

Diaea vitellina Simon, 1900: 497, pl. 17, fig. 14.

The following redescription is based on a ♂ and ♀ from Maui.

♂. Measurements (mm).

Carapace length, 1.26; width, 1.33; height, 0.53

Abdomen length, 2.03; width, 1.46; height, 1.00

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.40	0.79	1.86	1.69	0.86	7.60
II	2.03	0.69	1.56	1.40	0.86	7.54
III	0.96	0.40	0.69	0.53	0.40	2.98
IV	1.00	0.40	0.69	0.56	0.40	3.05
Palp	0.43	0.20	0.10	—	0.43	1.16

Cephalothorax, legs yellow-brown (green in life); abdomen white with broken black stripe bordered with red on middle of dorsum; pink to white around eyes; pink on distal end of femora and proximal end of patellae. *Eyes*: Ratio of AME : ALE : PME : PLE=3 : 6 : 4 : 4; median ocualr area slightly wider behind than in front (16 : 15) and slightly wider than long (16 : 13); AME closer to ALE than to each other (10 : 15); PME closer to each other than to PLE (16 : 20); clypeus height over 3 × the diameter of an AME (11 : 3). *Sternum*: Longer than wide (20 : 15); posterior end bluntly pointed and separates coxae IV by 1/2 width of a coxa. *Legs*: I, II, IV, III; setae—5 in row prolateral on femur I, 4 in row dorsal on femora I and II, 2 in row dorsal on femora III and IV, 1 (weak) distodorsal on patellae III and IV, 2 (weak) in row dorsal on tibiae III and IV, 2 pairs distoventral on metatarsi I and II; trichobothria—8 dorsal on tibiae I and II, 6 to 7 dorsal on tibiae III and IV, 4 in row dorsal on metatarsi and tarsi I and II, 3 in row dorsal on metatarsi III and IV, 2 in row dorsal on tarsi III and IV; tarsal claws—3 to

4 teeth on all claws. *Palp* (fig. 93-94) : Embolus originates more than 90° from distal border of tegulum on prolateral side ; tip longer than width of tegulum ; retrolateral tibial apophysis strongly notched between dorsal tooth and distal end of apophysis ; tibia with 8 trichobothria dorsal.

♀. Measurements (mm).

Carapace length, 1.89 ; width, 2.00 ; height, 0.83

Abdomen length, 3.03 ; width, 2.00 ; height, 1.63

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.59	1.03	1.86	1.66	1.07	8.21
II	2.59	1.03	1.86	1.63	1.00	8.11
III	1.23	0.59	0.79	0.69	0.46	3.76
IV	1.40	0.56	0.92	0.79	0.46	4.13
Palp	0.50	0.33	0.30	—	0.50	1.63

Similar to ♂ in color. *Eyes* : Ratio of AME : ALE : PME : PLE=5 : 8 : 6 : 7 ; median ocular area as wide in front as behind (20 : 20) and wider than long (20 : 16) ; AME closer to ALE than to each other (12 : 20) ; PME closer to each other than to PLE (20 : 26) ; clypeus height over 3 × the diameter of an AME (16 : 5). *Sternum* : Longer than wide (38 : 32) ; posterior end almost pointed and separates coxae IV by 1/3 width of a coxa. *Legs* : I, II, IV, III ; setae—1 small distodorsal on all patellae, 2 to 3 pairs ventral on tibiae I and II, 2 in row dorsal on tibiae III and IV, 5 irregular pairs ventral on metatarsi I and II ; trichobothria—10 to 11 dorsal on all tibiae, 4 in row dorsal on metatarsi and tarsi I and II, 3 in row dorsal on metatarsi and tarsi III and IV ; tarsal claws—anterior claw of tarsi I and II with 3 free teeth plus series of fused teeth, posterior claw of tarsi I and II with 4 free teeth, both claws of tarsi III and IV with 4 free teeth. *Epigynum* (fig. 95-96) : Hood over guide pocket extends posteriorly over epigynum ; membranous bursae copulatrix well developed and extends anterior of spermathecae. *Palp* : 16 trichobothria dorsal on tibia ; tarsal claw with 4 teeth.

VARIATION. Carapace width : 28 ♂♂—1.33-1.59 mm (mean, 1.43 mm) ; 39 ♀♀—2.10-2.92 mm (mean, 2.43 mm). Femur I length : 28 ♂♂—2.07-2.89 mm (mean, 2.46 mm) ; 39 ♀♀-3.00-3.90 mm (mean, 3.30 mm). There are two color forms in this species. Some specimens have red around the eyes, on the patellae and distal ends of the femora, and bordering the pattern on the dorsum of the abdomen and sides of the abdomen. Other specimens lack the red pigment.

RECORDS. Syntypes : BISHOP : Hawaii : 1 ♂, Kona, 1200 m, VIII.1892, Perkins ; BMNH : Hawaii : 1 ♂ (1904.X.24.333), Kona, 1200 m, VIII.1892, Perkins ; MNHN : Oahu : 1 ♂ (21160). Specimens examined : KAUAI : 2 immatures, Kokee, 4-6.VIII.1961, Maa, Miyatake & Yoshimoto ; 3 ♂♂, 1 ♀, 3 immatures, Kokee, Halemanu Str., 900 m, 15.IX.1965, Suman ; OAHU : 1 ♂, Tantalus, 540 m, 15.XII.1915, Muir & Giffard ; 2 immatures, Waianae Mts, Head of Keekee Gulch, 25.IX.1934, Bryan ; 1 immature, Manoa, 20.II.1944, N. L. H. Krauss ; 1 ♂, North ridge of Mt Konahuanui, 450-600 m, 14.I.1945, Werner, Levy & Parsons ; 1 ♂, Poamoho, III.1950, on Litchi leaf, Y. Tanada ; 1 ♂, Honolulu, IV.1950, D. E. Hardy ; 2 ♂♂, Pupukea Trail, 4.IV.1952, W. C. Mitchell ; 1 immature, Kawaiiki Ditch trail, Waialua Dist., 300-450 m, 3.V.1965, Suman ; 2 ♂♂, Wiliwilinui Ridge, 510-690 m, 11.V.1965, 18.I.1966, Suman & J. W. Beardsley ; 1 ♂, Aiea State Park, 300 m, 9.I.1966, Suman ; LANAI : 1 ♂, 1 ♀, Lanai City, X.1947, Krauss ; MAUI : 1 ♂, West Maui Mts, 7.I.1932, Krauss ; 4 ♂♂, 1 immature, Iao Vall., 450 m, 25.VII.1965, Suman ; 1 immature, Olinda, 10.XII.1932, O. Bryant ; 1 immature, Waikamoi Str, 1200 m, 19.VII.1965,

Suman ; Haleakala : 1 ♀, 1 immature, 24.VIII.1929, R. St Sure & Krauss : 2 ♂♂, 1 ♀, 1 immature, Haleakala Rd, 765 m, 25.IV.1945, E. C. Zimmerman ; 2 immatures, crater rim, 875 m, 25.IV.1945, Zimmerman ; 6 ♂♂, 3 immatures, Halemauu trail, 720 m, 30.IV.1945, Zimmerman ; 2 ♀♀, 10.XI.1947, Krauss ; 1 ♂, 2100 m, VI.1952, Hardy ; 1 ♂, 1 ♀, 3 immatures, Kolua, 29.VI.1953, Hardy ; 3 immatures, 2180 m, 6.II.1964, ex *Ohelio* on S slope, D. Tsuda ; 1 immature, Paliku and Kaupo trails, 1650–1950 m, 21.VII.1965, Suman ; 2 ♀♀, 1 immature, Kaupo trail, 1800 m, 21.VII.1965, Suman ; 4 ♂♂, 11♀♀, 15 immatures, nr Kapalaoa cabin, 2160 m, 21.VII.1965, Suman ; 2 ♂♂, 5 ♀♀, 1 immature, nr Paliku cabin, 1950 m, 21.VIII.1965, Suman ; 1 ♂, 5 ♀♀, 2 immatures, nr Holua cabin, 2100 m, 23.VII. 1965, Suman & J. W. Beardsley ; 1 ♂, 9 ♀♀, 6 immatures, Paliku-Holua trail 1950–2100 m, 23.VII.1965, Suman & C. M. Yoshimoto ; 4 ♂♂, 7 ♀♀, 11 immatures, Halemauu trail, 2400 m, 24.VII.1965, Suman ; HAWAII : 3 ♂♂, 1 ♀, 15 immatures, 1200 m, 15.X.1915, 9.I. 1917, 17.I.1917, Muir & Giffard ; 1 ♂, VI.1953, Hardy ; 1 ♂, Kipuka Puaulu, Mauna Loa Strip Rd, 1140 m, 24.VI.1966, Suman ; 1 ♀, Hualalai, 1800–2100 m, 21.IV.1944, Krauss ; 1 ♂, Pohakuloa, XII.1950, Krauss ; 1 ♂, 4 immatures, Puu Kihi, N side Mauna Kea, 28. X.1952, ex *Sophora*, Hardy ; 2 immatures, Keanakolu, 1560 m, 28–30.X.1952, C. Hoyt ; 4 ♂♂, 2 ♀♀, 5 immatures, Halepohaku on Mauna Kea, 2400 m, 20.VI.1966, Suman.

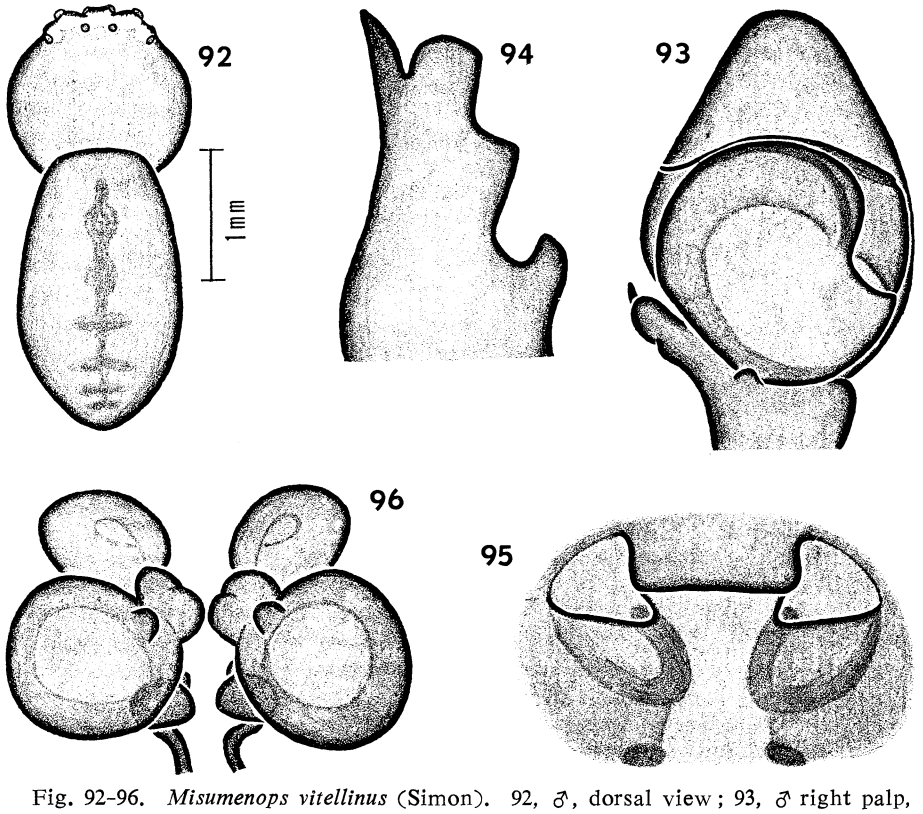


Fig. 92–96. *Misumenops vitellinus* (Simon). 92, ♂, dorsal view ; 93, ♂ right palp, ventral view ; 94, ♂ right tibial apophysis, retrolateral view ; 95, ♀ epigynum, ventral view ; 96, ♀ internal genitalia, dorsal view.

DISTRIBUTION. This species is presently found on the main islands of Kauai, Oahu, Lanai, Maui, and Hawaii.

ECOLOGY. Specimens have been collected on *Sophora*. Most of the specimens collected during this study were found on *Styphelia*. The habitat of this species is best indicated by zones 2 to 3 and 8 to 10 on Table I.

DISCUSSION. This species appears to be closely related to *M. oreades* and *kanakanus* and is discussed under those species.

Genus **Synaema** Simon

Synaema Simon, 1864 : 433.

Type-species : *Synaema globosum* (Fabricius), 1775 : 452. By designation of Simon, 1875 : 197.

Carapace strongly convex ; face of chelicerae flat ; median ocular area much wider (behind) than long ; posterior median eyes as close to posterior lateral eyes as to each other.

The genus *Synaema* is world-wide in distribution.

Synaema naevigerum Simon Fig. 97-101.

S. naevigerum Simon, 1900 : 494, pl.17, fig. 2.

S. dimidiatipes Simon, 1900 : 493, pl. 17, fig. 3. **New synonymy.**

S. fronto Simon, 1900 : 493. **New synonymy.**

S. impotens Simon, 1900 : 494. **New synonymy.**

The following redescription is based on a ♂ and ♀ from Molokai.

♂. Measurements (mm).

Carapace length, 1.63 ; width, 1.69 ; height, 0.63

Abdomen length, 2.36 ; width, 1.60 ; height, 1.26

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.10	0.89	1.63	1.46	0.96	7.04
II	2.10	0.83	1.63	1.40	0.92	6.88
III	1.17	0.53	0.79	0.63	0.56	3.68
IV	1.13	0.53	0.73	0.66	0.56	3.61
Palp	0.46	0.26	0.20	—	0.50	1.42

Cephalothorax and appendages dark reddish-brown ; legs III and IV paler ; white around eye tubercles ; dorsum of abdomen dark with small scattered white spots ; venter of abdomen dark. *Eyes :* Ratio of AME : ALE : PME : PLE=5 : 7 : 5 : 6 ; median ocular area wider behind than in front (24 : 21) and much wider than long (24 : 15) ; AME much closer to ALE than to each other (13 : 21) ; PME almost as close to each other as to PLE (24 : 23) ; clypeus height almost 3 × the diameter of an AME (14 : 5). *Sternum* : Slightly longer than wide (26 : 24) ; posterior end almost pointed and separates coxae IV by 3/5 width of a coxa. *Legs* : I, II, III, IV ; setae—4 in row prolateral on femur I, 3 to 4 in row dorsal on all femora, 2 (weak) pairs ventral on tibia III, 1 (weak) pair ventral on tibia IV, 2 (strong) pairs distoventral on metatarsi I and II, 1 (weak) mid-ventral on metatarsi III and IV ; trichobothria—4 to 5 dorsal on all tibiae, 4 in row dorsal on metatarsi I and II, 3 in row dorsal on metatarsi III and IV, 2 in row dorsal on tarsi III and IV ; tarsal claws—all claws with at least 5 teeth. *Palp* (fig. 98-99) : Embolus very

short and originates near distal border of tegulum; tip of embolus very short and slightly curved; dorsal tooth of retrolateral tibial apophysis blunt; 7 to 8 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 2.00; width, 2.93; height, 0.66

Abdomen length, 3.50; width, 2.83; height, 2.26

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	1.92	0.89	1.50	1.26	0.96	6.53
II	1.89	0.83	1.33	1.20	0.89	6.14
III	1.23	0.59	0.76	0.59	0.59	3.76
IV	1.23	0.56	0.83	0.69	0.59	3.90
Palp	0.53	0.33	0.30	—	0.46	1.62

Color similar to male; legs III and IV with brown bands. *Eyes:* Ratio of AME : ALE : PME : PLE=6 : 8 : 5 : 6; median ocular area wider behind than in front (28 : 24) and much wider than long (28 : 18); AME much closer to ALE than to each other (16 : 24); PME as close to PLE as to each other (28 : 28); clypeus height over 2 × the diameter of an AME (15 : 6). *Sternum*: Slightly longer than wide (30 : 27); posterior end almost pointed and separates coxae IV by 5/11 width of a coxa. *Legs*: I, II, IV, III; setae—4 in row prolateral on femur I, 1 mid-dorsal on all femora, 2 pairs ventral on tibiae I and II, 5 pairs ventral on metatarsi I and II, 1 mid-ventral on metatarsi III and IV; trichobothria—8 to 9 dorsal on all tibiae, 4 in row dorsal on metatarsi and tarsi I and II, 2 in row dorsal on metatarsi and tarsi III and IV, 3 in row dorsal on metatarsi and tarsi III and IV; tarsal claws—both claws of tarsi I and II with 6 teeth, both claws of tarsi III and IV with 4 teeth. *Epigynum* (fig. 100-101): Hood of guide pocket anterior to intromittent orifices; bursae copulatrix nearly touching from dorsal aspect. *Palp*: 8 to 9 trichobothria dorsal on tibia; tarsal claw with 4 teeth.

VARIATION. Carapace width: 5 ♂♂—1.66-2.07 mm (mean, 1.76 mm); 6 ♀♀—2.03-2.73 mm (mean, 2.33 mm). Femur I length: 5 ♂♂—2.07-2.59 mm (mean, 2.23 mm); 6 ♀♀—1.92-2.69 mm (mean, 2.33 mm). The dorsal abdominal pattern is variable with some specimens almost black and others with large areas of white bordered with black. The number of leg setae is variable within the species with some specimens having a different number on each leg of a pair.

RECORDS. Syntypes: BISHOP: Molokai: 2 ♂♂, 3 immatures; Hawaii: 1 ♀, Kona, Perkins; BMNH: Molokai: 2 ♀♀, 5 immatures (1904.X.24. 341-346); Hawaii: 1 ♀ (1904.X. 24. 340), Kona, 900 m, IX.1892, Perkins; 1 ♀ (1904. X.24. 349), Kona, 900 m, IX.1892, Perkins; 1 ♀ (1904.X.24. 350), Kau; 1 ♀, 1 immature (1904.X.24.347-348), Kau, 1895, Perkins; MNHN: Molokai: 1 ♂, 1 immature (7706); Hawaii: 1 ♀ (19,976). Other Specimens: *S. dimidiatipes:* BISHOP: Hawaii: 1 immature; BMNH: Hawaii: 1 ♀, 1 immature (1904.X.24. 334); 1 ♂, 1 immature (1904.X.24. 335-336); *S. fronto:* BISHOP: Oahu: 3 immatures, Perkins; BMNH: Oahu: 1 ♀ (1904.X.24. 337), Waianae Mts, IV.1892, Perkins; 1 ♀, 2 immatures (1904.X.3. 51-53), Perkins; *S. impotens:* BISHOP: Hawaii: 2 immatures, Kona, 1200 m, VIII.1892, Perkins; BMNH: Hawaii: 2 immatures (1904.X.24.338-339), Kona, 1200 m, VIII.1892, Perkins; MNHN: Hawaii: 1 immature (13183). Specimens examined: KAUAI: 1 ♂, Kokee, 4-6.VIII.1961, Maa, Miyatake, & Yoshimoto; 1 immature, Kokee, 1050 m, 15.IX.1965, Suman; OAHU: 1 immature, Mt Tantalus, 360 m, 29.III.1967, D. Tsuda; MOLOKAI: 1 ♂, Puu Kolekole, 1140 m, 7.VII.1952, D. E. Hardy; Hawaii: 1 immature, Ahumoa Crater on Mauna Kea, 2040 m, 21.VI.1966, Suman; 2 ♀♀, Hawaiian Islands, 1870's, Blackburn.

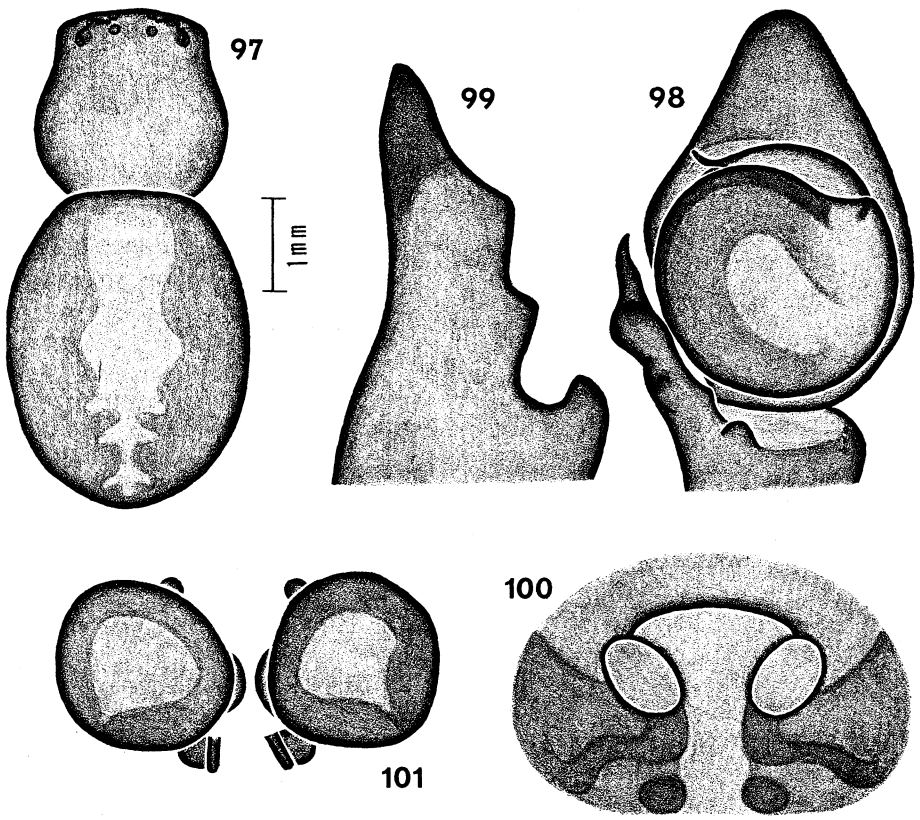


Fig. 97-101. *Synaema naevigerum* Simon. 97, ♀, dorsal view ; 98, ♂ right palp, ventral view ; 99, ♂ right tibial apophysis, retrolateral view ; 100, ♀ epigynum, ventral view ; 101, ♀ internal genitalia, dorsal view.

DISTRIBUTION. This species is presently known from the main islands of Kauai, Oahu, Molokai, and Hawaii.

ECOLOGY. The type of habitat of this species is best indicated by zones 4, 5, and 9 on Table I.

DISCUSSION. Specimens of *S. dimidiatipes*, *fronto*, and *impotens* do not differ significantly from *naevigerum*. The main differences between the specimens are color and leg setae, neither of which is reliable in the Hawaiian specimens of this genus. The name *naevigerum* is retained for this species because the original description included both sexes and the distribution included more islands.

Subfamily PHILODROMINAE Thorell

Philodrominae Thorell, 1870 : 173-174

Type genus : *Philodromus* Walckenaer, 1826 : 86.

Body with setaceous and prone setae ; carapace widest and highest opposite legs II and III,

moderately convex in some species, flattened in others; promargin of cheliceral fang furrow with 2 teeth; leg II much longer than other legs; claw tufts well developed with spatulate hairs; scopula on venter of tarsi and sometimes metatarsi.

This subfamily is represented in the Hawaiian Islands by two genera: *Pagiopalus* and *Proernus*.

The subfamily Philodrominae is world-wide in distribution.

Genus **Pagiopalus** Simon

Pagiopalus Simon, 1900: 499

Type-species: *Pagiopalus atomarius* Simon, 1900: 500, pl. 17, fig. 7. By designation of Simon, 1903; 1019.

Anterior end of carapace less than 1/2 the greatest width of carapace; median ocular area wider behind than in front, slightly wider than long; retrolateral tibial apophysis of male either pointed or rectangular in shape.

The genus *Pagiopalus* is endemic to the Hawaiian Islands.

Key to species of Pagiopalus in Hawaii

1. Dorsum of body with extensive white pigmentaion 2
   Dorsum of body without white pigmentation 3
2 (1). Ventral tibial apophysis of ♂ narrow and fused to retrolateral tibial apophysis (fig. 114); ♀ with 3 pairs of setae ventral on tibia I, 4 pairs of setae ventral on tibia II ..... **nigriventris** Simon
   Ventral tibial apophysis of ♂ rounded and not fused to retrolateral tibial apophysis (fig. 119); ♀ with 4 pairs of setae ventral on tibia I, 5 pairs of setae ventral on tibia II ..... **personatus** Simon
3 (1). Retrolateral tibial apophysis of ♂ pointed (fig. 104); epigynal suture of ♀ almost straight (fig. 105) ..... **apiculus***
   Retrolateral tibial apophysis of ♂ rectangular and serrated on distal margin (fig. 109); epigynal suture of ♀ strongly curved (fig. 110) ..... **atomarius** Simon

Pagiopalus apiculus Suman, new species Fig. 102–106.

♂. Measurements (mm).

Carapace length, 2.43; width, 2.50; height, 0.56

Abdomen length, 2.76; width, 2.17; height, 1.46

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	3.30	1.40	2.80	2.70	1.50	11.70
II	5.00	1.90	4.70	4.60	2.60	18.80
III	3.10	1.10	2.40	2.40	1.20	10.20
IV	3.30	1.10	2.50	2.70	1.30	10.90
Palp	1.60	0.70	1.10	—	0.80	4.20

Body and appendages pale-brown; scattered dark spots on carapace, dorsal and lateral surfaces of appendages, and dorsum of abdomen; spots becoming bands on legs and stripes on side of abdomen. *Eyes:* Ratio of AME : ALE : PME : PLE=11 : 9 : 8 : 10; median ocular area wider

behind than in front (23 : 14) and slightly wider than long (23 : 21); AME much closer to ALE than to each other (4 : 14); PME closer to PLE than to each other (13 : 23); clypeus height less than 2 × the diameter of an AME (17 : 11). *Sternum*: Slightly wider than long (40 : 39); posterior end bluntly pointed and separates coxae IV by slightly more than the width of a coxa (15 : 14). *Legs*: II, I, IV, III; setae—3 in row prolateral on femur I, 3 in row dorsal on all femora, 2 in row retrolateral on femora I, II, and IV, 1 disto-retrolateral on femur III, 1 dorsal on all tibiae, 3 in row prolateral on tibiae I and II, 2 in row prolateral on tibiae III and IV, 3 in row retrolateral on tibiae I, III, and IV, 2 in row retrolateral on tibia II, 4 pairs ventral on tibia I, 5 pairs ventral on tibia II, 3 pairs ventral on tibiae III and IV, 3 in row prolateral and 3 in row retrolateral on all metatarsi, 3 pairs ventral on metatarsus I, 4 pairs ventral on metatarsus II, 3 pairs ventral (plus 1 distoventral) ventral on metatarsi III and IV; trichobothria—7 dorsal on tibiae I and II, 8 dorsal on tibiae III and IV, 5 in row dorsal on metatarsus I, 6 in row dorsal on metatarsus II, 4 in row dorsal on metatarsi III and IV, 6 in row dorsal on tarsus I, 7 in row dorsal on tarsus II, 5 in row dorsal on tarsi III and IV; scopula on metatarsi and tarsi I and II composed of very short thick blunt hairs, scopula of metatarsi and tarsi III and IV composed of tenent hairs; tarsal claws with series of fine teeth. *Palp* (fig. 103-104): Conductor well developed; tegular apophysis a long ridge; retrolateral tibial apophysis tapering to a blunt point; ventral tibial apophysis a large rounded lobe; 10 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 2.73; width, 2.73; height, 0.83

Abdomen length, 4.80; width, 3.60; height, 3.30

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.69	1.33	2.17	1.96	1.26	9.41
II	3.76	1.69	3.30	3.00	1.66	13.41
III	2.56	1.07	1.83	1.79	1.00	8.25
IV	2.69	1.07	1.96	1.96	0.96	8.64
Palp	1.00	0.53	0.63	—	0.86	3.02

Color similar to ♂. *Eyes*: Ratio of AME : ALE : PME : PLE=11 : 9 : 8 : 9.5; median ocular area wider behind than in front (23 : 14) and slightly wider than long (23 : 21); AME much closer to ALE than to each other (6 : 14); PME closer to PLE than to each other (16 : 23); clypeus height less than 2 × the diameter of an AME (19 : 11). *Sternum*: As wide as long; posterior end bluntly pointed; coxae IV separated by more than width of a coxa (20 : 17). *Legs*: II, I, IV, III; setae—3 in row prolateral on femur I, 3 in row dorsal on all femora, 1 disto-prolateral on femur II, 2 in row retrolateral on femora I and II, 1 disto-retrolateral on femora III and IV, 1 dorsal on all tibiae, 3 in row prolateral and 3 in row retrolateral on tibiae I and II, 2 in row prolateral and 3 in row retrolateral on tibiae III and IV, 4 pairs ventral on tibia I, 5 pairs ventral on tibia II, 3 pairs ventral on tibiae III and IV, 3 in row prolateral and 3 in row retrolateral on all metatarsi, 3 pairs ventral on metatarsi I, III, and IV (plus 1 distoventral on metatarsus IV), 4 pairs ventral on metatarsus II; trichobothria—6 dorsal on tibiae I, III, and IV, 7 dorsal on tibia II, 4 to 5 in row dorsal on metatarsi I, III, and IV, 6 to 8 in row dorsal on metatarsus II, 6 to 7 in row dorsal on tarsi I, III, and IV, 8 in row dorsal on tarsus II; tarsal claws with series of fine teeth; scopula of tenent hairs on all tarsi and distal part of metatarsi I, II, and III. *Epigynum* (fig. 105-106): Epigynal sutures short and widely separated; spermathecal organ barely visible anterior to spermathecae from dorsal aspect. *Palp*: 10 trichobothria dorsal on tibia; tarsal claw with series of fine teeth.

VARIATION. Carapace width : 4 ♂♂—2.40-2.56 mm; 3 ♀♀—2.43-2.76 mm. Femur I length :

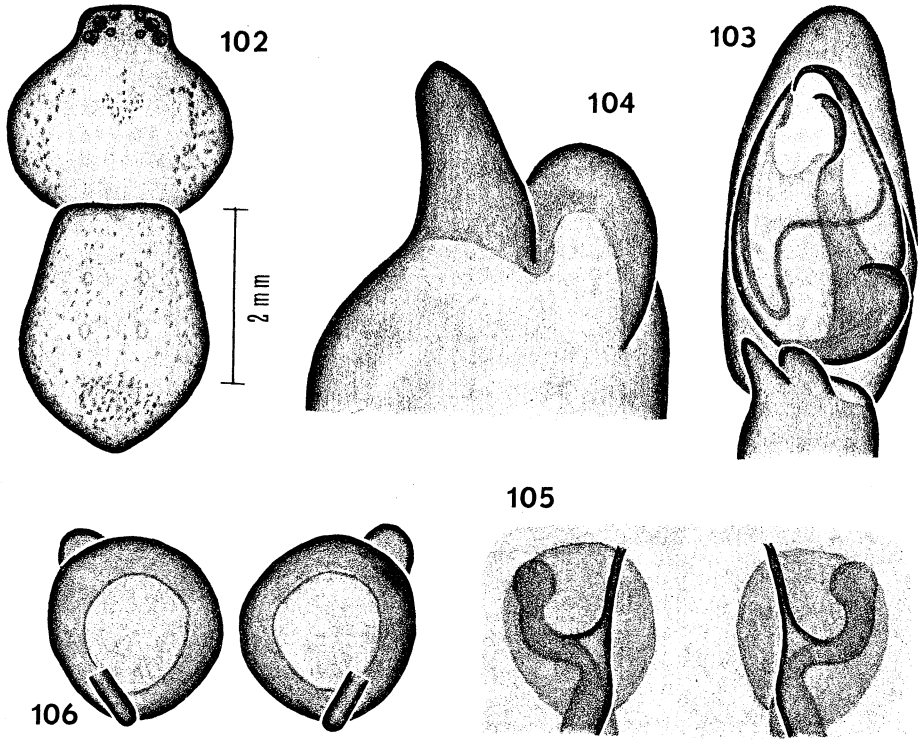


Fig. 102-106. *Pagiopalus apiculus* n. sp. 102, ♂, dorsal view; 103, ♂ right palp, ventral view; 104, ♂ right tibial apophysis, retrolateral view; 105, ♀ epigynum, ventral view; 106, ♀ internal genitalia, dorsal view.

4 ♂♂—3.17-3.40 mm; 3 ♀♀—2.33-2.69 mm. All specimens are similar in coloration.

RECORDS. Holotype: ♂ (BISHOP 7502), Oahu: Kolekole Pass, 515 m, 13.II.1967, ex Malaise trap, J. R. Vockeroth. Allotype ♀ (BISHOP), same data, 30.I.1967. Paratypes: 2 ♂♂, 2 ♀♀ (BISHOP), Oahu: Kolekole Pass, 300 m, 515 m, 18.XII.1966, 16,30.I.1967, 21.II. 1967, ex Malaise trap, B. Sugerman, Vockeroth. Specimens examined: OAHU: 1 ♂, Tantalus, 450 m, 15.XII.1915, Muir & Giffard; 1 ♂, Tantalus, 400 m, 5.XI.1963, D. Tsuda & J. Harrell.

DISTRIBUTION. This species is presently known only on Oahu and is found on both mountain ranges.

ECOLOGY. Most specimens of this species were collected with a Malaise insect-trap net. The habitat of this species is best indicated by zone 1 on Table I.

DISCUSSION. This species appears to be closely related to *P. atomarius*. The ♂ of *apiculus* can be readily distinguished from the ♂ of *atomarius* by the pointed retrolateral tibial apophysis and the very short blunt setae composing the scopula on the venter of tarsi and metatarsi I and II of *apiculus*. The ♀♀ of the 2 species are difficult to distinguish. The epigynal sutures are wider apart in *apiculus* than in *atomarius*. The dark brown spots tend to be restricted more to the sides of the carapace in *apiculus*

while the spots are more uniform over the carapace in *atomarius*.

Pagiopalus atomarius Simon Fig. 107-111.

P. atomarius Simon, 1900: 500, pl. 17, fig. 7.

P. semipunctatus Simon, 1900: 501, pl. 17, fig. 15. **New synonymy.**

The following redescription is based on a ♂ and ♀ from Hawaii.

♂. Measurements (mm).

Carapace length, 2.60; width, 2.80; height, 0.50

Abdomen length, 3.00; width, 2.00; height, 1.40

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	4.00	1.50	3.60	3.60	2.10	14.80
II	5.70	2.10	5.60	5.60	2.90	21.90
III	3.80	1.30	3.30	3.30	1.60	13.30
IV	3.80	1.33	3.50	3.70	1.70	14.00
Palp	2.00	0.80	1.50	—	0.90	5.20

Carapace and appendages yellow-brown with numerous scattered dark brown spots; entire venter of body pale yellow-brown with few scattered dark brown spots; dorsum of abdomen with pattern of dark brown spots; spots almost becoming stripes on sides of abdomen. *Eyes*: Ratio of AME: ALE: PME: PLE=11: 9: 8: 9; median ocular area wider behind than in front (22: 15) and slightly wider than long (22: 19); AME closer to each other (14: 15) than to ALE; PME closer to PLE than to each other (14: 22); clypeus height more than the diameter of an AME (16: 11). *Sternum*: Slightly wider than long (41: 37); posterior end bluntly pointed and separates coxae IV by almost width of a coxa (15: 16). *Legs*: II, I, IV, III; setae—3 in row dorsal and 1 disto-retrolateral on all femora, 3 in row prolateral on femur I, 1 disto-prolateral on femur II, 4 pairs ventral on tibiae I and II, 3 pairs ventral on tibiae III and IV, 3 in row prolateral and 3 in row retrolateral on tibia I, 2 in row retrolateral on tibiae II, III, and IV, 2 in row prolateral on tibiae II, III, and IV, 1 prolateral on tibiae III and IV, 1 dorsal on all tibiae, 4 pairs ventral on metatarsi I and II, 3 pairs ventral on metatarsi III and IV, 3 in row prolateral and 3 in row retrolateral on all metatarsi; trichobothria—at least 4 dorsal on all tibiae, 6 in row dorsal on metatarsus I, 8 in row dorsal on metatarsus II, 5 in row dorsal on metatarsi III and IV, 7 in row dorsal on tarsi I and II, 6 in row dorsal on tarsi III and IV; tarsal claws—anterior claw of all tarsi with series of fine teeth, posterior claw of all tarsi with series of coarse teeth; scopula sparse. *Palp* (fig. 108-109): Tegular apophysis present; tegular suture present; ventral tibial apophysis not completely fused to retrolateral tibial apophysis; 5 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 2.60; width, 2.80; height, 0.90

Abdomen length, 3.40; width 2.60; height, 1.90

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	3.10	1.40	2.60	2.30	1.70	11.10
II	4.20	1.80	3.80	3.30	2.20	15.30
III	2.80	1.20	2.30	2.10	1.40	9.80
IV	3.00	1.20	2.40	2.30	1.40	10.30
Palp	1.10	0.60	0.80	—	1.00	3.50

Coloration similar to ♂. *Eyes*: Ratio of AME : ALE : PME : PLE=9 : 7 : 6 : 7; median ocular area wider behind than in front (27 : 19) and wider than long (27 : 22); AME closer to ALE than to each other (8 : 19); PME closer to PLE than to each other (19 : 27); clypeus height almost 2 × the diameter of an AME (17 : 9). *Sternum*: As wide as long; posterior end bluntly pointed and separates coxae IV by 14/17 width of a coxa. *Legs*: II, I, IV, III; setae—3 in row dorsal on femora I, III, and IV, 4 in row dorsal on femur II, 3 in row prolateral and 2 in row retrolateral on femur I, 1 disto-prolateral on femur II, 1 disto-retrolateral on femora II, III, and IV, 4 pairs ventral on tibia I, 5 pairs ventral on tibia II, 3 pairs ventral on tibia III and IV, 2 in row dorsal on tibia I, 1 dorsal on tibiae II, III, and IV, 3 in row retrolateral on all tibiae, 3 in row prolateral on tibia I, 2 in row prolateral on tibiae II, III, and IV, 3 in row retrolateral and 3 in row prolateral on all metatarsi, 4 pairs ventral on metatarsi I and II, 3 pairs plus 1 (2, 2, 3) ventral on metatarsi III and IV; trichobothria—at least 3 to 5 dorsal on all tibiae, 6 in row dorsal on metatarsus I, 7 in row dorsal on metatarsus II, 5 in row dorsal on metatarsi III and IV, 7 in row dorsal on tarsus I, 8 in row dorsal on tarsus II, 6 in row dorsal on tarsi III and IV; tarsal claws—anterior claw of all tarsi with series of fine teeth, posterior claw of all tarsi with series of coarse teeth; scopula sparse. *Epigynum* (fig. 110-111): Epigynal sutures short; spermathecal organ barely visible from dorsal aspect. *Palp*: 7 trichobothria dorsal on tibia; tarsal claw with series of teeth.

VARIATION. Carapace width: 10 ♂♂—2.10-2.80 mm (mean, 2.66 mm) 10 ♀♀—2.20-2.80 mm (mean, 2.65 mm). Femur I length: 10 ♂♂—2.80-4.00 mm (mean, 3.60 mm) 10 ♀♀—2.20-3.10 mm (mean, 2.70 mm). The coloration varies from pale yellow-brown to dark yellow-brown. The small dark brown spots appear to have coalesced into larger markings in some specimens. There appears to be two predominant ♂ forms with intergradation. In some ♂♂, the femur of the palp is at least 2 × as long as the tarsus and the tibia is about 1.5 × as long as the tarsus. In other ♂♂, the femur and tibia are much shorter and are about the same length as the tarsus.

RECORDS. Syntypes: BISHOP: Oahu: 2 immatures, Perkins; 1 immature, Perkins; Molokai: 1 ♀ Kohol; Hawaii: 3 immatures, Kona, 1200 m, VI.1892, Perkins; BMNH: Kauai and Hawaii: 1 ♂, 2 ♀♀, 1 immature (1904.X.24.365-368), Kaui (Kauai), Hawaii, Kona, 1200 m, VII.1892, Perkins; Oahu: 3 immatures (1904.X.3.68-69), Perkins; Molokai: 1 ♀, 4 immatures (1904.X.24.361-364), Kohol, Koele; Hawaii: 1 ♂ (1904.X.24. 360), Kona; MNHN: Hawaii: 2 ♂♂, 2 ♀♀ (12221). Other specimens: *P. semipunctatus*: BISHOP: Maui: 2 immatures, Haleakala; BMNH: Maui: 2 ♀♀, 1 immature (1904.X.21.369-370), Haleakala; MNHN: Maui: 1 immature (828), Haleakala. Specimens examined: KAUAI: Kokee: 1 ♀, 1200 m, VI.1952, D. E. Hardy; 1 ♂, 9.IV.1963, J. L. Gressitt; 1 ♂, 1 ♀, 1020 m, 11.IX.1965, Suman; 1 ♀, 1050 m, 15.IX.1965, Suman; 1 ♂, nr Kokee cabins, 1050 m, 16.IX.1965, Suman; 1 ♀, Alakai region, 1050 m, 12.IX.1965, Suman; OAHU: Tantalus: 1 ♀, 450 m, 15.XII.1915, Muir & Giffard; 1 ♀, IV.1953, Hardy; 4 ♂♂, 450-600 m, 14.III.1965, Suman; 1 ♀, ex *Freycinetia*; 2 ♂♂, 540 m, 17.XI.1966, ex Malaise trap, J. R. Vockeroth; 1 ♂, 4 ♀♀, 540 m, 23.XI.1966, Vockeroth; 1 ♀, 450 m, 28.XI.1966, Suman; 2 ♂♂, 3 ♀♀, 540 m, 8.XII.1966, Vockeroth; Kolekole Pass: 1 ♀, 300 m, 18.XII.1966, B. Sugerman; 1 ♂, 5 ♀♀, 515 m, 3,9,16,23,30.I.1967, Vockeroth; 1 ♂, 11 immatures, 515 m, 20,21.II.1967, ex Malaise trap, Vockeroth; 5 ♂♂, 2 ♀♀, 1 immature, 6, 20, 27.III.1967, ex Malaise trap, Vockeroth; 1 ♂, 4 ♀♀, 515 m, 1,10.IV.1967, ex Malaise trap, Vockeroth; 3♂♂, 2 ♀♀, Mt Kaala, 1200 m, 7.IV.1965, Suman; MOLOKAI: 1 ♂, 2 ♀♀, Puu Kolekole, 900-1050 m, 3.VIII.1965, Suman; 1 ♀, E Kaumakakai, 900 m, 18.III.1966, C. M. Yoshimoto; MAUI: 1 ♀, Iao Vall., 450 m, 25.VII.1965, Suman; 2 ♀♀, Kaulalewelewe, 900-1020 m, 24-27.V.1966, Yoshimoto; 1 ♀, West Maui Mts, 7.I.1932, N. L. H. Krauss; 1 ♂, 3 ♀♀, Waikamoi Str, 1200 m, 19.VII.

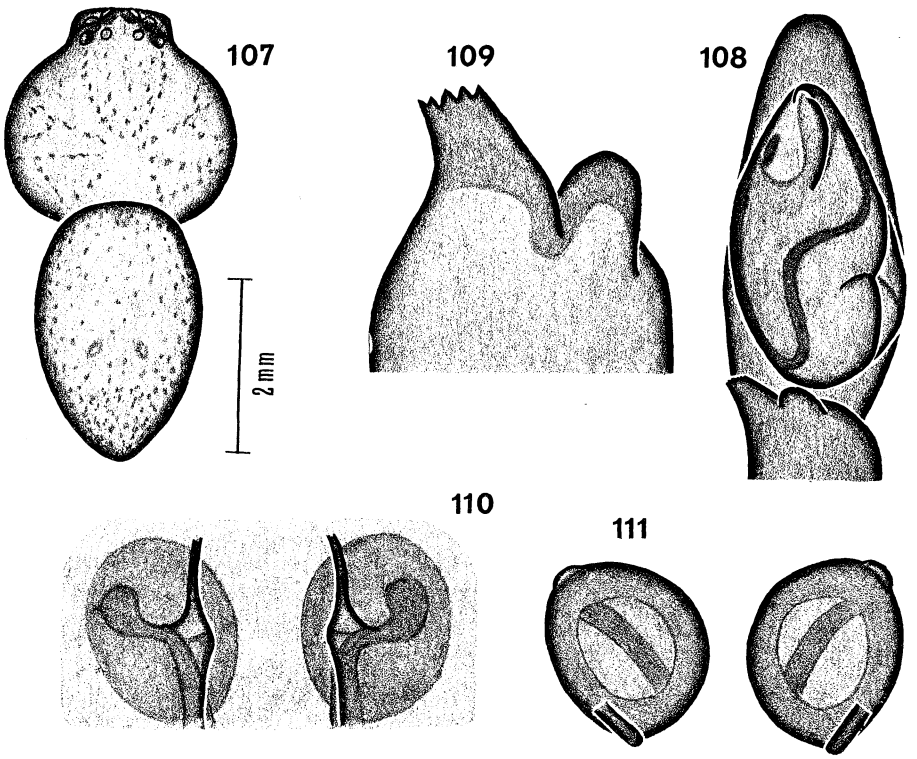


Fig. 107–111. *Pagiopalus atomarius* Simon. 107, ♂, dorsal view; 108, ♂ right palp, ventral view; 109, ♂ right tibial apophysis, retrolateral view; 110, ♀ epigynum, ventral view; 111, ♀ internal genitalia, dorsal view.

1965, Suman; Haleakala: 1 ♀, Halemauu trail, 2400 m, 30.IV.1945, E. C. Zimmerman; 1 ♀, nr Puupuau, 1650 m, 27.IV.1945, Zimmerman; 2 ♀♀, 20.VII.1965, under bark of *Sophora* trees, Hardy; 1 ♀, nr Holua cabin, 2100 m, 23.VII.1965, Suman; 2 ♂♂, 2 ♀♀, nr Kapalaoa cabin, 2160 m, 21.VII.1965, Suman; 1 ♂, 1 ♀, nr Paliku cabin, 1950 m, 21.VII.1965, Suman; 3 ♀♀, Paliku and Kaupo trail, 1650–1950 m, 21.VII.1965, Suman; 1 ♂, 2 ♀♀, Halemauu trail, 2400 m, 24.VII.1965, Suman; 1 ♂, 3 ♀♀, Kaupo trail, 1800 m, 21.VII.1965, Suman; HAWAII: 2 ♂♂, 9 ♀♀, 3 immatures, Kau lava flows, 17.I.1917, Muir & Giffard; 2 ♀♀, Kilauea, 1140–1200 m, 22–23.VI.1966, Suman; 4 ♂♂, 2 ♀♀, Kilauea Park boundary-Hilo side, 1170 m, 25.VI.1966, Suman; 1 ♀, Chain of Craters Rd, 960 m, 23.VI.1966, Suman; 2 ♂♂, 2 ♀♀ Hilo Forest Reserve, 660 m, 30.VI.1966, Suman; 1 ♂, 1 ♀, Puu Hualalai, Kahaluu Forest Reserve, 1000 m, 27.VI.1966, Suman; 2 ♀♀, Puu Kihi, N side of Mauna Kea, 28.X.1952, on *Sophora*, Hardy; 2 ♂♂, 2 ♀♀, Halepohaku on Mauna Kea, 2400 m, 20. VI.1966, Suman; 4 ♂♂, 2 ♀♀, 1 immature, Ahumoa Crater on Mauna Kea, 2040 m, 21.VI. 1966, Suman; 1 ♂, 2 ♀♀, Kohala Mts, 1050 m, 29.VI.1966, Suman.

DISTRIBUTION. This species is found on all of the main islands except Lanai.

ECOLOGY. Some specimens have been collected on *Freycinetia*, under bark on *Sophora*, and with a Malaise insect-trap net. The type of habitat of this species is best indicated by zones 1 to 9 on Table I.

DISCUSSION. Specimens of *P. semipunctatus* do not differ significantly from specimens of *atomarius*. *P. atomarius* is closely related to *apiculus* and is discussed under that species.

Pagiopalus nigriventris Simon Fig. 112–116.

P. nigriventris Simon, 1900: 502.

This species is redescribed from a ♂ and ♀ from Maui.

♂. Measurements (mm).

Carapace length, 1.56; width, 1.76 height, 0.56

Abdomen length, 1.92; width, 1.56; height, 1.23

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	1.86	0.83	1.53	1.46	0.92	6.60
II	2.53	1.10	2.26	2.10	1.30	9.29
III	1.59	0.69	1.30	1.26	0.76	5.60
IV	1.56	0.63	1.26	1.30	0.83	5.58
Palp	0.56	0.30	0.30	—	0.56	1.72

Carapace white with brown around eyes; face of chelicerae with dark brown spots; legs yellow-brown with dark brown bands; ventral surface of body pale yellow-brown; dorsum of abdomen white with dark brown pattern. Eyes: Ratio of AME : ALE : PME : PLE=7.5 : 7 : 6.5 : 7; median ocular area wider behind than in front (18 : 11) and wider than long (18 : 15); AME closer to ALE than to each other (4 : 11); PME closer to PLE than to each other (12 : 18); clypeus height less than 2 × the diameter of an AME (12 : 7.5). *Sternum*: Slightly wider than long (28 : 25); posterior end blunt and separates coxae IV by width of a coxa. *Legs*: II, I, III, IV; setae—3 in row prolateral on femur I, 3 in row dorsal on all femora, 1 disto-prolateral on femur II, 2 in row retrolateral on femur I, 1 disto-retrolateral on femora II, III, and IV, 1 dorsal on all tibiae, 3 in row prolateral and 3 in row retrolateral on tibia I, 2 in row prolateral and 2 in row retrolateral on tibiae II, III, and IV, 2 pairs ventral on tibiae I, III, and IV, 3 pairs ventral on tibia II, 3 in row prolateral and 3 in row retrolateral on all metatarsi, 3 pairs ventral on metatarsus I, 4 pairs ventral on metatarsus II, 3 pairs (plus 1 distoventral) ventral on metatarsi III and IV; trichobothria—at least 4 dorsal on all tibiae, 4 in row dorsal on all metatarsi, 5 in row dorsal on tarsi I, III, and IV, 7 in row dorsal on tarsi II; tarsal claws—anterior claw of all tarsi with series of fine teeth, posterior claw of all tarsi with series of coarse teeth; scopula sparse. *Palp* (fig. 113–114): Tegular apophysis present; distal margin of retrolateral tibial apophysis with 7 teeth; ventral tibial apophysis fused to retrolateral apophysis; 7 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 1.89; width, 2.00; height, 0.59

Abdomen length, 2.40; width, 1.92; height, 1.50

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	1.89	0.92	1.53	1.36	0.89	6.59
II	2.56	1.20	2.13	1.92	1.20	9.01
III	1.79	0.79	1.33	1.30	0.76	5.97
IV	1.73	0.69	1.33	1.33	0.76	5.84
Palp	0.63	0.33	0.40	—	0.66	2.02

Coloration similar to ♂ ; legs with more brown markings ; some brown spots on ventral surface of body. *Eyes* : Ratio of AME : ALE : PME : PLE=8 : 7.5 : 5.5 : 7 ; median ocular area wider behind than in front (20 : 15) and wider than long (20 : 18) ; AME much closer to ALE than to each other (5 : 15) ; PME closer to PLE than to each other (14 : 20) ; clypeus height less than 2 × the diameter of an AME (14 : 8). *Sternum* : Slightly wider than long (32 : 29) ; posterior end blunt and separates coxae IV by width of a coxa. *Legs* : II, I, III, IV ; setae—3 in row prolateral on femur I, 1 disto-prolateral on femur II, 3 in row dorsal on all femora, 1 disto-retrolateral on all femora ; 1 dorsal on all tibiae, 3 in row prolateral and 3 in row retrolateral on all tibiae, 3 pairs ventral on tibia I, 4 pairs ventral on tibia II, 2 pairs ventral on tibiae III and IV, 3 in row prolateral and 3 in row retrolateral on all metatarsi, 3 pairs on metatarsus I, 4 pairs ventral on metatarsus II, 3 pairs (plus 1 distoventral) ventral on metatarsi III and IV ; trichobothria—at least 4 dorsal on all tibiae, 4 in row dorsal on metatarsi I and II, 3 in row dorsal on metatarsi III and IV, 6 in row dorsal on all tarsi ; tarsal claws—anterior claw of all tarsi with series of fine teeth, posterior claw of all tarsi with series of coarse teeth ; scopula sparse. *Epigynum* (fig. 115-116) : Epigynal suture short ; spermathecal organ visible along margin of spermathecae from dorsal aspect. *Palp* : 7 trichobothria dorsal on tibia ; tarsal claw with series of fine teeth.

VARIATION. Carapace width : 3 ♀♀—2.00-2.40 mm. Femur I length : 3 ♀♀—1.89-2.20 mm.

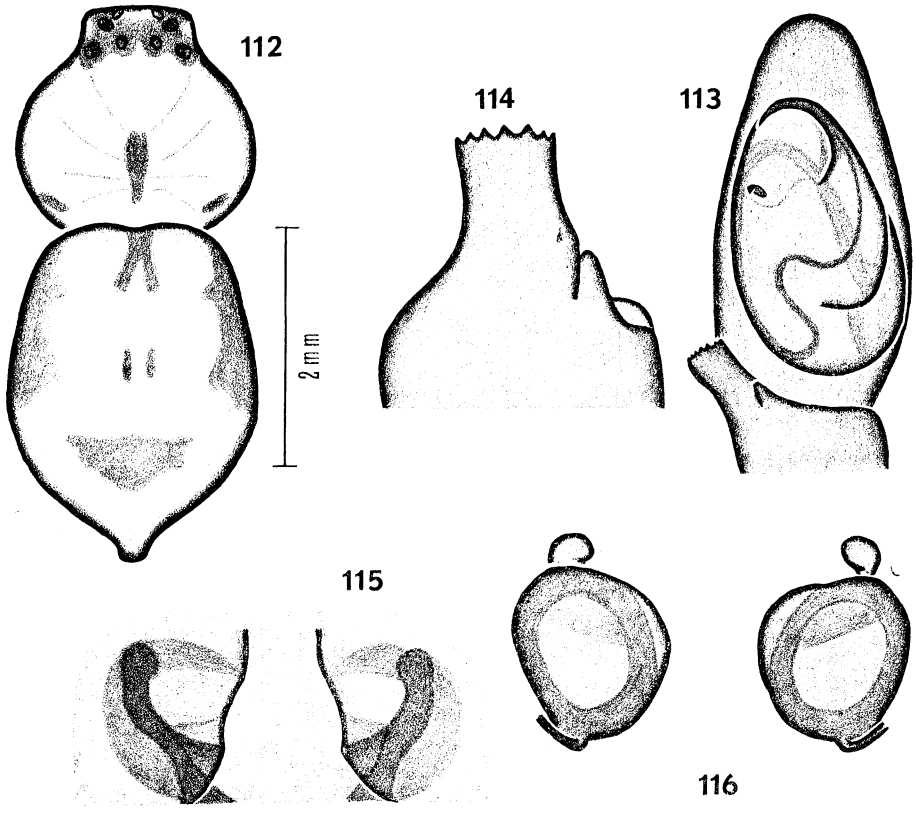


Fig. 112-116. *Pagiopalus nigriventris* Simon. 112, ♀, dorsal view ; 113, ♂ right palp, ventral view ; 114, ♂ right tibial apophysis, retrolateral view ; 115, ♀ epigynum, ventral view ; 116, ♀ internal genitalia, dorsal view.

All specimens are similar in coloration.

RECORDS. Syntypes: BMNH: Hawaii: 1 ♀ (1904.X.24. 372), Kau; MNHN: 1 ♀ (12760). Specimens examined: MAUI: 1 ♂, 3 ♀♀, 1 immature, Auwahi, 1110 m, 20.VII.1965, Suman.

DISTRIBUTION. This species is presently known from Haleakala on Maui and the Kau region on Hawaii.

ECOLOGY. The habitat of this species is best indicated by zone 9 on Table I.

DISCUSSION. This species appears to be related to *P. personatus*. The ventral tibial apophysis is narrow and fused to the retrolateral tibial apophysis in *nigriventris* while in *personatus*, the ventral tibial apophysis is rounded and not fused to the retrolateral apophysis. The ♀ of *nigriventris* has 3 pairs of ventral setae on tibia I while the ♀ of *personatus* has 4 pairs.

Pagiopalus personatus Simon, 1900 Fig. 117-121.

P. personatus Simon, 1900: 501, pl. 18, fig. 8.

This species is redescribed from a ♀ from Lanai. A ♂ from Kauai appears to agree in structure with the ♀ and is tentatively considered as the ♂ of this species.

♀. Measurements (mm).

Carapace length, 1.89; width, 2.13; height, 0.53

Abdomen length, 3.33; width, 3.03; height, 1.33

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.03	0.92	1.59	1.50	1.00	7.04
II	2.83	1.20	2.36	2.17	1.36	9.92
III	1.83	0.76	1.30	1.26	0.83	5.98
IV	1.86	0.69	1.33	1.33	0.83	6.04
Palp	0.59	0.33	0.40	—	0.66	1.98

Carapace with white on anterior part and darker on posterior part, dark reticulations on sides; sternum, maxillae, labium, chelicerae pale brown with scattered dark spots; legs pale brown with dark banding and scattered dark spots; dorsum of abdomen dark with white pattern; venter of abdomen pale. *Eyes*: Ratio of AME : ALE : PME : PLE=8 : 7 : 6.5 : 7; median ocular area wider behind than in front (21 : 14) and wider than long (21 : 19); AME much closer to ALE than to each other (5 : 14); PME closer to PLE than to each other (14 : 21); clypeus height almost 2 × the diameter of an AME. *Sternum*: Slightly wider than long (33 : 31); posterior end truncate; coxae IV separated by more than the width of a coxa (4 : 3). *Legs*: II, I, IV, III; setae—3 in row prolateral on femur I, 3 in row dorsal on all femora, 1 disto-retrolateral on all femora, 2 in row dorsal on tibia I, 1 dorsal on tibiae II, III, and IV, 3 to 4 in row prolateral and 3 in row retrolateral on tibiae I and II, 2 in row prolateral and 2 in row retrolateral on tibiae III and IV, 4 pairs ventral on tibia I, 5 pairs ventral on tibia II, 2 pairs plus 1 (2, 1, 2) ventral on tibiae III and IV, 3 in row prolateral and 3 in row retrolateral on all metatarsi, 3 pairs ventral on metatarsi I, III, and IV, 4 pairs ventral on metatarsis II; trichobothria—at least 4 dorsal on all tibiae, 4 to 6 dorsal on all metatarsi and tarsi; tarsal claws—anterior claw of all tarsi with series of fine teeth, posterior claw of all tarsi with series of coarse teeth; claw tufts well-developed; scopula sparse. *Epigynum* (fig. 120-121): Epigynal suture short; spermathecal

organ not visible from a dorsal aspect. *Palp*: At least 4 trichobothria dorsal on tibia; tarsal claw with series of teeth.

♂. Measurements (mm).

Carapace length, 1.50; width, 1.73; height, 0.20

Abdomen length, 1.76; width, 1.53; height, 0.93

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.17	0.86	1.79	1.73	1.07	7.62
II	3.17	1.23	2.83	2.76	1.66	11.65
III	1.92	0.69	1.40	1.43	0.83	6.27
IV	1.89	0.66	1.40	1.46	0.83	6.24
Palp	0.60	0.20	0.36	—	0.65	1.81

Color similar to female; abdominal pattern not well defined. *Eyes*: Ratio of AME : ALE : PME : PLE=7 : 5 : 5 : 6; median ocular area wider behind than in front (17 : 13) and wider than long (17 : 14); AME much closer to ALE than to each other (4 : 13); PME closer to PLE than to each other (12 : 17); clypeus height more than the diameter of an AME (8 : 7). *Sternum*: Wider than long (25 : 22); posterior end truncate; coxae IV separated by slightly more than the width of a coxa (8 : 7). *Legs*: II, I, III, IV; setae—3 in row dorsal on all femora, 3 in row

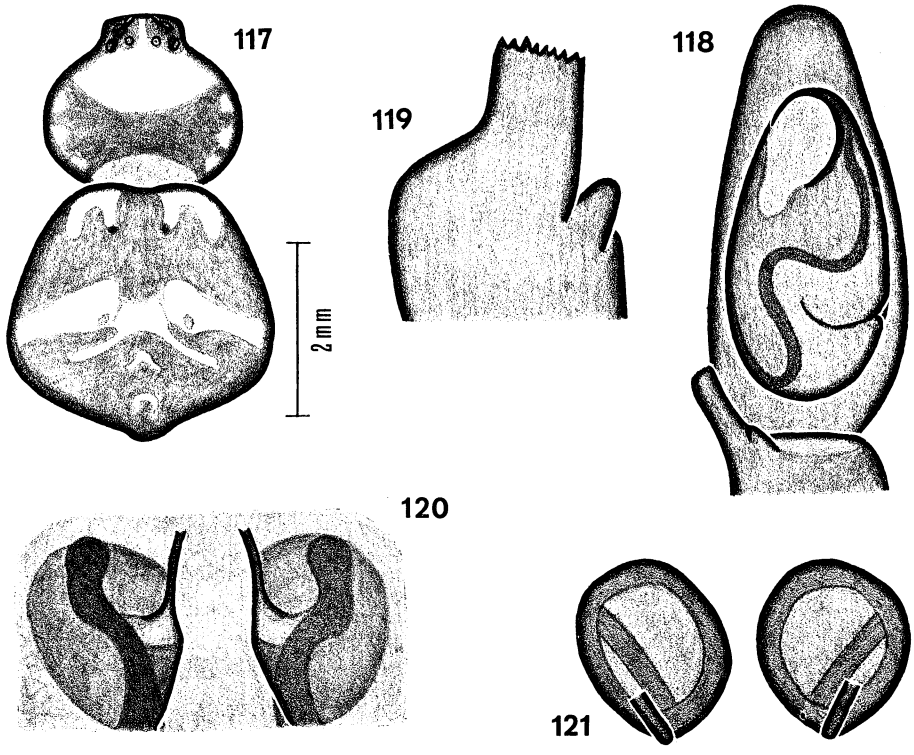


Fig. 117-121. *Pagiopalus personatus* Simon. 117, ♀, dorsal view; 118, ♂ right palp, ventral view; 119, ♂ right tibial apophysis, retrolateral view; 120, ♀ epigynum, ventral view; 121, ♀ internal genitalia, dorsal view.

prolateral and 3 in row retrolateral on femur I, 2 in row retrolateral on femora II, III, and IV, 1 dorsal on all tibiae, 3 in row prolateral and 3 in row retrolateral on tibia I, 2 in row prolateral and 2 in row retrolateral on tibiae II, III, and IV, 4 pairs ventral on tibia I, 5 pairs ventral on tibia II, 2 pairs ventral on tibiae III and IV, 3 in row prolateral and 3 in row retrolateral on all metatarsi, 3 pairs ventral on metatarsus I, 4 pairs ventral on metatarsus II, 2 pairs ventral plus 1 (2, 2, 3) on metatarsi III and IV; trichobothria—at least 3 dorsal on all tibiae, 4 to 5 in row dorsal on all metatarsi, 6 in row dorsal on tarsus I, 7 in row dorsal on tarsus II, 5 in row dorsal on tarsi III and IV; tarsal claws—anterior claw of all tarsi with series of fine teeth, posterior claw of all tarsi with series of coarse teeth; scopula sparse. *Palp* (fig. 118-119): Tegular apophysis not evident; distal border of retrolateral tibial apophysis with 9 teeth; ventral tibial apophysis not fused to retrolateral apophysis; 6 trichobothria on tibia.

RECORDS. Syntypes: BMNH: Lanai: 1 ♀ (1904.X.24. 371), Kohol; MNHN: Lanai: 1 ♀ (12765), Kohol. Specimens examined: KAUAI: 1 ♂, Kokee, 1050 m, 15.IX.1965, Suman.

DISTRIBUTION. This species is presently found on Kauai and Lanai.

ECOLOGY. The habitat of this species is best indicated by zone 2 on Table I.

DISCUSSION. This species appears to be related to *P. nigriventris* and is discussed under that species.

Genus **Proernus** Simon

Pterelas Simon, 1899: 417 (preoccupied).

Proernus Simon, 1900: 497. New name for *Pterelas*.

Adrastidia Simon, 1900: 503. **New synonymy.**

Type-species: *Proernus schauinslandi* (Simon), 1899: 418. By monotypy.

Width of anterior end of carapace greater than 1/2 greatest width of carapace; median ocular area much wider behind than in front and much wider than long; retrolateral tibial apophysis of ♂ palp bidentate.

The genus *Adrastidia* is synonymized under the genus *Proernus* because of the similarity of the genitalia and of the characters mentioned above of the genus. The specimens of *A. longula* were not available for study. The description and illustration of *longula* indicates that it is similar to species of *Proernus*.

The genus *Proernus* was considered by Simon to be closely related to *Psellonus* Simon.

The genus *Proernus* is endemic to the Hawaiian Islands.

KEY TO SPECIES OF PROERNUS

♂♂ and ♀♀ (Specimens of *longulus* not available for study)

1. Posterior median, posterior lateral, and anterior lateral eyes forming 2 triads (fig. 132); anterior lateral eyes either equal to or larger than anterior median eyes .... **stigmaticus** (Simon)
   Eyes not forming triads; anterior lateral eyes smaller than anterior median eyes 2
2 (1). All of tarsi and most of metatarsi I and II with dense scopula; metatarsi I and II with 1 pair of setae at proximal end ..... **schauinslandi** (Simon)
   Tarsi and metatarsi I and II with sparse scopula; metatarsi I and II with 3 pairs of

ventral setae 3
3 (2). Carapace very flat ..... **velox** Simon
Carapace strongly convex ..... **aculeatus** Simon

Proernus aculeatus Simon Fig. 122-126.

P. aculeatus Simon 1900 : 498

This species is redescribed from a ♂ and ♀ from Molokai.

♂. Measurements (mm).

Carapace length, 3.70 ; width, 3.40 ; height, 1.00

Abdomen length, 4.80 ; width, 3.00 ; height, 2.60

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	4.20	2.00	3.60	3.00	1.80	14.60
II	5.80	2.30	5.20	4.40	2.40	20.10
III	3.50	1.40	2.70	2.40	1.40	11.40
IV	3.70	1.40	2.80	2.60	1.50	12.00
Palp	1.20	0.60	0.80	—	0.90	3.50

Body and appendages dark orange-brown ; dark markings on carapace. *Eyes* : Ratio of AME : ALE : PME : PLE=14 : 12 : 10 : 12 ; median ocular area wider behind than in front (49 : 34) and wider than long (49 : 27) ; AME closer to ALE than to each other (11 : 34) ; PME closer to PLE than to each other (29 : 49) ; clypeus height less than 2 × the diameter of an AME (25 : 14). *Sternum* : Slightly longer than wide (54 : 50) ; posterior end almost pointed and separates coxae IV by 2/3 width of a coxa. *Legs* : II, I, IV, III ; setae—3 in row dorsal on all femora, 2 in row prolateral and 2 in row retrolateral on femora I and II, 2 in row prolateral on femur III, 1 prolateral on femur IV, 3 pairs ventral on tibia I, 4 pairs ventral on tibia II, 2 pairs ventral on tibiae III and IV, 3 in row retrolateral and 1 prolateral on tibia I, 2 in row prolateral and 1 disto-retrolateral on tibiae III and IV, 3 pairs ventral on all metatarsi, 2 in row retrolateral on metatarsus I, 3 in row prolateral and 1 disto-retrolateral on metatarsi III and IV ; trichobothria—7 dorsal on all tibiae, 5 in row dorsal on metatarsi I and II and tarsi III and IV, 4 in row dorsal on metatarsi III and IV, 6 in row dorsal on tarsi I and II ; tarsal claws—anterior claw on all tarsi with series of fine teeth, posterior claw of all tarsi with series of coarse teeth ; scopula sparse and runs length of venter of all tarsi and distal end of metatarsi I and II. *Palp* (fig. 123-124) : Tegular apophysis present ; retrolateral tibial apophysis bidentate ; ventral tibial apophysis partially fused to retrolateral apophysis ; 7 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 4.70 ; width, 4.40 ; height, 1.20

Abdomen length, 5.30 ; width, 4.00 ; height, 3.00

Leg	Femur	Patella	Tibia	Meatatarsus	tarsus	Total
I	4.60	2.30	3.60	2.90	2.00	15.40
II	6.00	2.70	4.80	3.80	2.30	19.60
III	4.00	1.80	2.80	2.40	1.60	12.60
IV	4.10	1.80	3.00	2.70	1.60	13.20
Palp	1.50	0.90	0.90	—	1.10	4.40

Color similar to ♂. *Eyes* : Ratio of AME ; ALE ; PME ; PLE=11 ; 10 ; 8 ; 10 ; median ocular

area wider behind than in front (17 : 48) and wider than long (73 : 38); AME closer to ALE than to each other (23 : 48); PME closer to PLE than to each other (42 : 73); clypeus height slightly less than 4 × the diameter of an AME (42 : 11). *Sternum*: Slightly longer than wide (68 : 65); posterior end almost pointed and separates coxae IV by 4/5 width of a coxa. *Legs*: II, I, IV, III; setae—3 dorsal on all femora, 2 in row prolateral and 2 in row retrolateral on femur I, 1 to 2 in row prolateral on femora II and III, 4 pairs ventral on tibia I, 5 pairs ventral on tibia II, 3 pairs ventral on tibiae III and IV, 2 in row retrolateral on tibia I, 1 prolateral on tibiae III and IV, 3 pairs ventral on metatarsi I and II, 3 pairs plus 1 (2, 2, 3) ventral on metatarsi III and IV, 2 in row retrolateral on metatarsus I, 3 in row prolateral on metatarsi III and IV; tarsal claws—anterior claw of all tarsi with series of fine teeth, posterior claw of all tarsi with series of coarse teeth; scopula sparse and runs length of all tarsi and distal end of metatarsi I and II. *Epigynum* (fig. 125-126): Epigynal suture curved; part of bursae copulatrix visible from dorsal aspect. *Palp*: 8 trichobothria dorsal on tibia; tarsal claw with series of teeth.

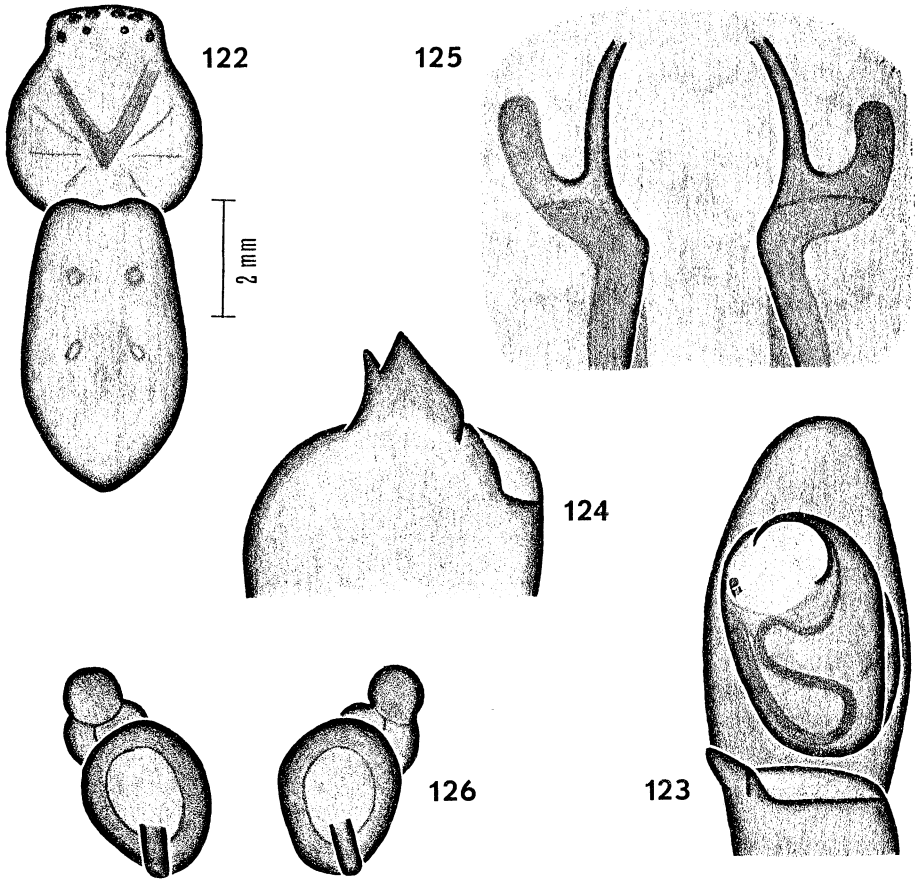


Fig. 122-126. *Proernus aculeatus* Simon. 122, ♂, dorsal view; 123, ♂ right palp, ventral view; 124, ♂ right tibial apophysis, retrolateral view; 125, ♀ epigynum, ventral view; 126, ♀ internal genitalia, dorsal view.

VARIATION. Carapace width : 2 ♂♂—3.40-3.60 mm ; 6 ♀♀—4.10-4.40 mm (mean, 4.30 mm). Femur I length : 2 ♂♂—4.20-4.30 mm ; 6 ♀♀—4.20-4.60 mm (mean, 4.40 mm). The coloration is similar in all specimens.

RECORDS. Holotype : ♂ (BMNH 1904.X.24.357), Kauai : Koholuamano, IV.1895, Perkins. Specimens examined : KAUAI : 1 immature, Mohihi Vall., 28.1940, E. H. Bryan ; 1 immature, Kokee, 1200 m, 4-6.VIII.1961, sweeping, Maa, Miyatake & Yoshimoto ; MOLOKAI 1 immature, Puu Kolekole, 1140 m, 7.VII.1952, D. E. Hardy ; 1 immature, Puu Kolekole, 1080 m, 10.VI.1964, in rain forest, Hardy ; 1 immature, Puu Kolekole, 29.VIII.1964, Hardy ; 1 ♂, 1 ♀, 2 immatures, Puu Kolekole region, 900-1050 m, 3.VIII.1965, Suman ; 1 ♀, 2 immatures, E Kaunakakai, 900 m, 19.III.1966, C. M. Yoshimoto ; 1 ♂, 1 ♀, Kawela Gulch, 1125 m, 21.III.1966, Yoshimoto ; MAUI : 1 immature, Mahinahina, 21.VI.1943, N. L. H. Krauss ; 3 immatures, nr Puuluau, Haleakala, 1650 m, 28.IV.1945, E. C. Zimmerman ; 1 ♀, 3 immatures, Waikamoi Str, 1200 m, 19.VII.1965, Suman ; 1 ♀, 1 immature, Kaupo trail, Haleakala Crater 1800m, 21.VII.1965, Suman ; 1 immature, Waikamoi, X.1965, ex vegetation, Hardy; HAWAII : 3 immatures, 1800-2100 m, 20-21.IV.1944, Krauss ; 1 ♀, Keanakolu, 1560 m, 28.X.1952, Hardy.

DISTRIBUTION. This species is presently known from the islands of Kauai, Molokai, Maui, and Hawaii.

ECOLOGY. The habitat of this species is best indicated by zones 4 and 5 on Table I.

DISCUSSION. This species appears to be closely related to *P. velox*. The most distinguishing characteristic is the convex carapace in *aculeatus* and the flat carapace of *velox*.

Proernus longulus (Simon), new combination

Adrastidia longula Simon, 1900 : 504, pl. 17, fig. 9.

Type specimens of this species were not available for study. In the accession catalog of the British Museum (Natural History), Arachnida Section, reference is given to a postcard either to or from D. Sharp which presumably contains information about the type specimen. The postcard was not available.

The following description is a translation of the original description :

"♀. length - 8 mm. Cephalothorax yellowish-brown with white pubescence ; cephalic part with median line, lateral lines strongly bending and branching, markedly convergent posteriorly, thoracic part strongly and darkly reticulated on both sides toward margin and marked with thin short radial lines ; ocular tubercles white ; abdomen longly oblong, anterior end deeply emarginated, posterior end raised and gradually widened, neither angular nor truncate, yellowish brown above, dark speckled, white margin and white spots, short median stripe indicated above, whitish below ; chelicerae, mouthparts, sternum, legs pale yellowish brown ; face of chelicerae with dark speckling ; legs with few distinct pale dark punctations above ; tibia and metatarsus I with 3-3 spines below and 2 small spines on retrolateral surface ; tibia and metatarsus II with similar spines below but without lateral spines. Differs from *stigmaticus* by the median ocular area less transverse, nearly 2 × as wide as long and the posterior median eyes not as close to the posterior lateral eyes. Habitat : Maui, Haleakala."

Proernus schauinslandi (Simon) Fig. 127-131.

Pterelas schauinslandi Simon, 1899 : 418.

Proernus castaneus Simon, 1900 : 498. **New synonymy.**

This species is redescribed from a ♂ and ♀ from Oahu.

♂. Measurements (mm).

Carapace length, 5.10; width, 5.00; height, 1.40

Abdomen length, 6.10; width, 6.20; height, 3.50

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	5.50	2.90	4.20	3.60	2.10	18.30
II	6.50	3.50	5.80	5.00	2.70	23.50
III	4.00	2.00	2.90	2.50	1.70	13.10
IV	4.30	1.50	3.10	2.80	1.70	13.80
Palp	1.60	0.90	1.00	—	1.20	4.70

Body and appendages dark orange-brown; carapace with dark brown marking in center; dorsum of abdomen with dark brown transverse bars on posterior half. *Eyes*: Ratio of AME : ALE : PME : PLE=10 : 8.5 : 7 : 8.5; median ocular area wider behind than in front (85 : 62) and wider than long (85 : 45); AME closer to ALE than to each other (27 : 62); PME closer to PLE than to each other (50 : 85); clypeus height over 3 × the diameter of an AME (35 : 10). *Sternum*: Slightly longer than wide (78:75); posterior end almost pointed and separates coxae IV by 4/7 width of a coxa. *Legs*: II, I, IV, III; setae—2 in row dorsal, 2 in row prolateral and 2 in row retrolateral on femora I and II, 3 in row dorsal and 2 in row prolateral on femora III and IV, 3 pairs ventral on tibiae I and II, 2 pairs ventral on tibiae III and IV, 2 in row retrolateral on tibia I, 1 disto-retrolateral on tibiae II, III, and IV, 2 in row prolateral on tibiae III and IV, 1 pair ventral at proximal end of metatarsi I and II, 3 pairs plus 1 (2, 2, 3) ventral on metatarsus III, 5 (1, 1, 3) ventral on metatarsus IV, 1 proximal retrolateral on metatarsi I and IV, 1 proximal prolateral on metatarsi III and IV; trichobothria—10 to 12 dorsal on all tibiae, 8 in row dorsal on metatarsi I and II, 5 to 6 in row dorsal on metatarsi III and IV, 9 to 10 in row dorsal on tarsi I and II, 7 to 8 in row dorsal on tarsi III and IV; tarsal claws—anterior claw of all tarsi with series of fine teeth, posterior claw of all tarsi with series of coarse teeth; all tarsi with dense scopula running length of venter, metatarsi densely scopulated on venter for 3/4 length of I and II, 1/2 of length of III and distal end of IV. *Palp* (fig. 128-129): Tegular apophysis present; retrolateral tibial apophysis bidentate; ventral tibial apophysis partially fused with retrolateral apophysis; 10 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 4.00; width, 4.00; height, 1.10

Abdomen length, 5.00; width, 3.40; height, 2.70

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	3.00	2.10	2.80	2.60	1.50	12.80
II	4.80	2.60	3.70	3.40	1.80	16.30
III	3.00	1.50	2.00	1.90	1.10	9.50
IV	3.40	1.40	2.30	2.20	1.10	10.40
Palp	1.30	0.70	0.70	—	1.00	3.70

Color similar to male. *Eyes*: Ratio of AME : ALE : PME : PLE=10 : 8 : 6 : 8; median ocular area wider behind than in front (46 : 22) and wider than long (46 : 22); AME closer to ALE than to each other (12 : 22); PME closer to PLE than to each other (26 : 46); clypeus height less than 2 × the diameter of an AME (14 : 10). *Sternum*: Slightly longer than wide (60 : 58);

posterior end almost pointed and separates coxae IV by 1/2 width of a coxa. *Legs*: II, I, IV, III; setae—2 in row dorsal and 2 in row prolateral on femora I and II, 2 in row retrolateral on femur I, 3 in row dorsal on femora III and IV, 2 in row prolateral on femora III and IV, 3 pairs ventral on tibiae I and II, 2 pairs ventral on tibia III, 1 ventral on tibia IV, 2 in row retrolateral on tibia I, 1 disto-prolateral on tibia IV, 1 pair proximal ventral on metatarsi I and II, 3 pairs ventral on metatarsi III and IV, 1 retrolateral on metatarsus I, 1 proximal prolateral on metatarsi III and IV; trichobothria—8 dorsal on all tibiae, 7 in row dorsal on all metatarsi, 8 in row dorsal on all tibiae; tarsal claws—anterior claw of all tarsi with series of fine teeth, posterior claw of all tarsi with series of coarse teeth. *Epigynum* (fig. 130-131): Epigynal suture long; part of bursae copulatrix visible from dorsal aspect. *Palp*: 9 trichobothria dorsal on tibia; tarsal claw with series of teeth.

VARIATION. Carapace width: 4 ♂♂—3.40-5.30 mm; 2 ♀♀—4.00-4.50 mm. Femur I length: 4 ♂♂—3.30-5.80 mm; 2 ♀♀—3.90-4.30 mm. The coloration is similar in all specimens.

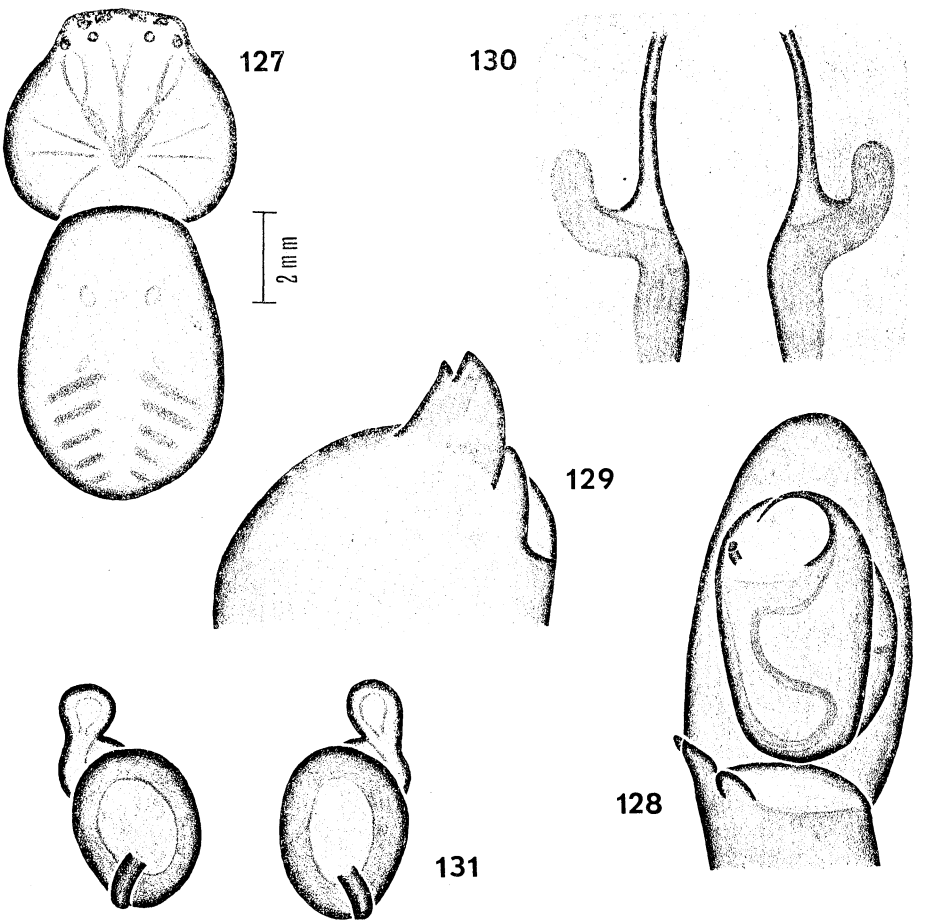


Fig. 127-131. *Proernus schauinsilandi* Simon. 127, ♂, dorsal view; 128, ♂ right palp, ventral view; 129, ♂ right tibial apophysis, retrolateral view; 130, ♀ epigynum, ventral view; 131, ♀ internal genitalia, dorsal view.

RECORDS. Syntypes: BISHOP: Oahu: 1 ♀, 5 immatures, Perkins; 2 immatures, Koolau Range, 600 m, X.1892, Perkins; BMNH: Oahu: 1 ♂ (1904.X.24. 356); 4 immatures (1904. X.3.56-59), Perkins; 3 immatures (1904.X.24.353-355), Koolau Range, 600 m, X.1892, Perkins; MNHN: Sandwich Islands: 2 ♂♂ (19059). Other Specimens: *P. castaneus:* BMNH: Maui: 1 ♂, 1 immature (1904.X.24.358), Haleakala; MNHN: Maui: 1 ♂ (14231), Haleakala. Specimens examined: OAHU: Tantalus: 2 immatures, 420-450 m, 15.X.1915, Muir & Giffard; 4 ♀♀, 450-540 m, 15.XII.1915, Muir & Giffard; 1 ♀, IV.1924, E. H. Bryan; 1 immature, 540 m, 23.XI.1966, J. R. Vockeroth; 2 immatures, IV.1957, D. E. Hardy; 2 immatures, Kapalama Vall., Honolulu, 17.VIII.1929, Bryan; 1 immature, Halawa Ridge, 24. XI.1952, C. Hoyt; MAUI: 1 immature, Puu Kukui trail, 25.VI.1953, Hardy.

DISTRIBUTION. This species is presently found on the islands of Oahu and Maui.

ECOLOGY. The habitat of this species is best indicated by zones 1 and 4 on Table I.

DISCUSSION. No significant differences were found between specimens of *castaneus* and *schauinslandi*. The most conspicuous differences between *schauinslandi* and other species of *Proernus* is the presence of a dense scopula on the venter of all tarsi and most of metatarsi I and II and 1 pair of setae on the ventral side of metatarsi I and II at the proximal end.

Proernus stigmaticus (Simon), new combination Fig. 132-136.

Adrastidia stigmatica Simon, 1900: 503, pl. 17, fig. 10.

Adrastidia nebulosa Simon, 1900: 503. **New synonymy.**

This species is redescribed from a ♂ and ♀ from Kauai.

♂. Measurements (mm).

Carapace length, 2.17; width, 2.03; height, 0.40

Abdomen length, 2.66; width, 2.03; height, 1.23

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.66	1.17	2.23	1.96	1.20	9.22
II	3.23	1.20	2.60	2.23	1.33	10.59
III	1.56	0.63	1.07	1.13	0.69	5.08
IV	1.86	0.66	1.23	1.33	0.83	5.91
Palp	0.63	0.38	0.30	—	0.58	1.89

Carapace yellow-brown with dark marking in center and dark brown lines radiating from center, white around eyes; legs pale yellow-brown with scattered dark brown spots; entire ventral surface of body pale yellow-brown; dorsum of abdomen whitish with dark brown pattern. *Eyes*: Ratio of AME: ALE: PME: PLE=6: 6: 5: 6; median ocular area much wider behind than in front (67: 26) and much wider than long (67: 27); AME slightly closer to ALE than to each other (23: 26); PME much closer to PLE than to each other (20: 67); clypeus height over 2 × the diameter of an AME (14: 6). *Sternum*: Slightly longer than wide (32: 30); posterior end almost pointed and separates coxae IV by 1/2 width of a coxa. *Legs*: II, I, IV, III; setae—3 in row dorsal, 3 in row prolateral, 3 in row retrolateral on all femora, 5 pairs ventral, 2 in row prolateral and 2 in row retrolateral on tibiae I and II, 2 in row ventral on tibiae III and IV, 1 retrolateral on tibia III, 2 in row retrolateral on tibia IV, 3 pairs ventral and 2 in row prolateral on metatarsi I and II, 1 disto-prolateral and disto-retrolateral on metatarsi III and IV, 4 (1, 3)

ventral on metatarsus III, 1 pair disto-ventral on metatarsus IV; trichobothria—5 dorsal on tibiae I and II, 4 dorsal on tibiae III and IV, 4 in row dorsal on all metatarsi and tarsi III and IV, 5 in row dorsal on tarsi I and II; tarsal claws—anterior claw of all tarsi with series of fine teeth, posterior claw of all tarsi with series of coarse teeth. *Palp* (fig. 133-134): Tegular suture absent; tegular apophysis present; retrolateral tibial apophysis bidentate; ventral apophysis completely fused to retrolateral apophysis; 7 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 2.66; width, 2.50; height, 0.50

Abdomen length, 3.17; width, 2.00; height, 1.17

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	2.33	1.23	2.07	1.53	1.07	8.23
II	2.89	1.30	2.26	1.73	1.17	9.35
III	1.63	0.76	1.17	1.13	0.73	5.42
IV	2.00	0.79	1.26	1.30	0.76	6.11
Palp	0.66	0.40	0.36	—	0.50	1.92

Coloration similar to ♂. *Eyes*: Ratio of AME : ALE : PME : PLE=7 : 9 : 7 : 9; median ocular area much wider behind than in front (75 : 24) and much wider than long (75 : 32); AME closer to each other than to ALE (24 : 29); PME much closer to PLE than to each other (22 : 75); clypeus height more than 2 × the diameter of an AME (17 : 7). *Sternum*: Slightly wider than long (35 : 34); posterior end almost pointed and separates coxae IV by 1/2 width of a coxa. *Legs*: II, I, IV, III; setae—2 in row prolateral and 2 in row retrolateral on femur I, 1 prolateral and 1 retrolateral on femur II, 3 in row dorsal on femur III, 2 in row dorsal on femur IV, 5 pairs ventral on tibiae I and II, 2 in row retrolateral on tibia I, 1 retrolateral on tibia II, 3 in row ventral on tibia III, 4 (1, 1, 2) ventral on tibia IV, 3 pairs ventral on metatarsi I, II, and IV, 3 pairs plus 1 (2, 2, 3) ventral on metatarsus III, 3 in row retrolateral on metatarsus I, 1 disto-prolateral on metatarsi I, III, and IV; trichobothria—5 dorsal on tibiae I and II, 4 dorsal on tibiae III and IV, 4 in row dorsal on all metatarsi and tarsi III and IV, 5 in row dorsal on tarsi I and II; tarsal claws—anterior claw of all tarsi with series of fine teeth, posterior claw of all tarsi with series of coarse teeth. *Epigynum* (fig. 135-136): Epigynal sutures convergent. *Palp*: 7 trichobothria dorsal on tibia; tarsal claw with series of teeth.

VARIATION. Carapace width: 12 ♂♂—1.69-2.23 mm (mean, 2.03 mm); 25 ♀♀—2.00-2.73 mm (mean, 2.30 mm). Femur I length: 12 ♂♂—2.20-3.07 mm (mean, 2.59 mm); 25 ♀♀—2.20-3.00 mm (mean, 2.43 mm). The coloration varies from pale forms with numerous brown markings scattered over the body to dark forms where the markings appear to have coalesced into various shaped markings.

RECORDS. Syntypes: BISHOP: Oahu: 1 ♀, Kawailou Riv; 3 immatures, Perkins; BMNH: Oahu: 2 immatures (1904.X.3.40), Perkins; 1 ♀, 1 immature (1904.X.24. 374-75), Kawailou Riv; Maui: 1 ♀ (1904.X.24. 378), Haleakala, 1500 m; Hawaii: 1 ♀ (1904.X.24. 373). Kona; 2 immatures (1904.X.24. 376-77), Kona; island not indicated: 1 ♀, 1 immature (1904.X.24. 379-380). Koele; MNHN: 1 ♀ (7766). Other specimens: *Adrastidia nebulosa*: BMNH: Maui: 1 ♀, 1 immature (1904.X.24. 381-382), Haleakala. Specimens examined: KAUAI: 1 immature, Kawaikoa Str, 5.VIII.1953, D. E. Hardy; 1 ♀. Mohihi Vall., 1050 m, 17.VIII.1953, Hardy; 1 immature, W rim of Kalalau Vall., 29.XI.1960, D. & I. Degener; 8 immatures, Kokee, 1200 m, 4-6.VIII.1961, sweeping, Maa, Miyatake & Yoshimoto; 1 ♀, 1 immature, Kokee region, 1020 m, 11.IX.1965, Suman; 4 ♂♂,

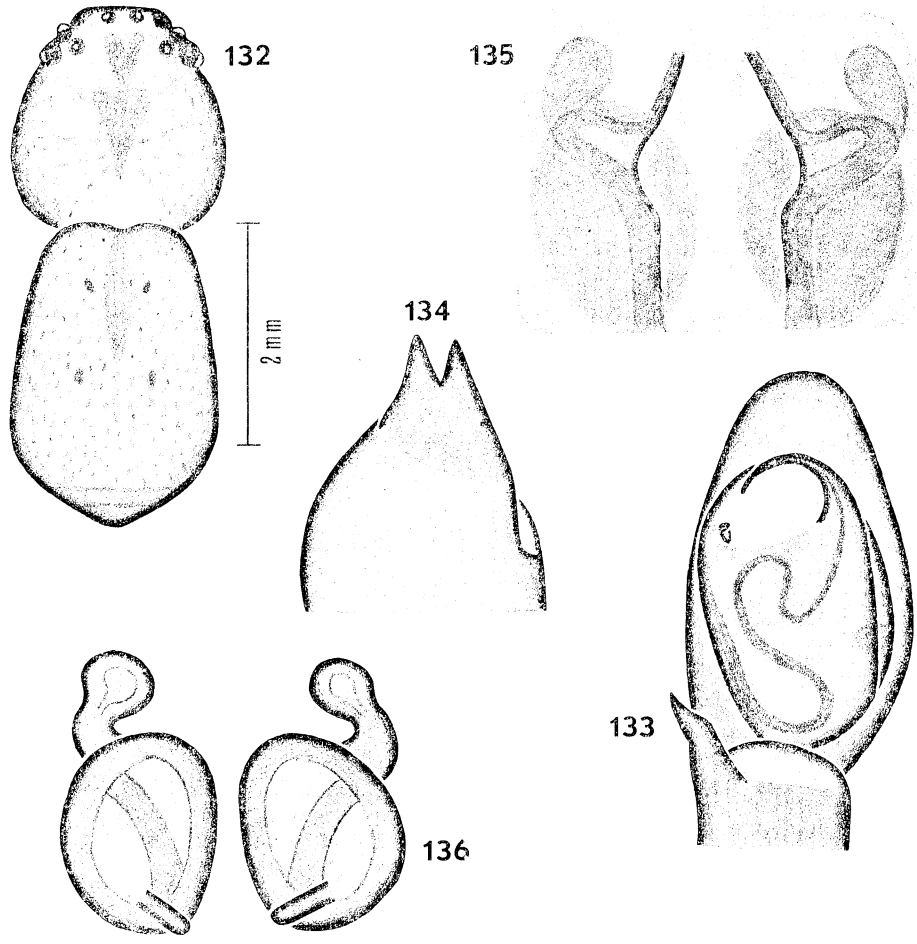


Fig. 132-136. *Proernus stigmaticus* (Simon). 132, ♂, dorsal view; 133, ♂ right palp, ventral view; 134, ♂ right tibial apophysis, retrolateral view; 135, ♀ epigynum, ventral view; 136, ♀ internal genitalia, dorsal view.

2 ♀♀, 13 immatures, Kokee region, 1050 m, 12-15.IX.1965, Suman; 1 immature, Alakai Swamp, 1200 m, 14.IX.1965, Suman; OAHU: 3 immatures, Manoa Vall., 300 m, 22.XI. 1940, E. C. Zimmerman; 1 immature, Tantalus, I.1950, on bark and foliage, Hardy; 1 immature, Tantalus, 6.VIII.1950, W. C. Mitchell; 1 immature, head of Kaluanui Vall., 23. V.1951, Hardy; 1 ♀, Tantalus, IV.1953, Hardy; 1 ♀, 1 immature, Pelahua, 600-750 m, 1, 15.X.1960, T. C. Maa; 1 immature, N end of Koolau Mts, 8.V.1964, sweeping, Suman; 1 immature, Tantalus, 16.VII.1964, Suman; 1 immature, Tantalus, 450-600 m, 14.III.1965, Suman; 3 ♀♀, 21 immatures, S end of Waianae Mts, 600 m, 25.VI.1965, Suman; 3 ♂♂, 4 immatures, Tantalus, 510-540 m, 8,17.XI.1966, 8.XII.1966, ex Malaise trap, J. R. Vockeroth; MOLOKAI: 3 immatures, Maunawainui Vall., VII.1952, Hardy; LANAI: 1 immature, Lanai Mts, 1.XI.1947, N. L. H. Krauss; 1 ♀, Lanai City, VIII.1963, O. Degener; 1 ♀, 3 immatures, Lanai Hale, 25.III.1966, J. W. Beardsley & Yoshimoto; MAUI: 1 imma-

ture Makamakaloa Vall., 11.IV.1952, Hardy; 1 ♀, Makamakaloa Vall., 24.VI.1953, Hardy; 2 ♀♀, 4 immatures, Auwahi, 1110 m, 19-20.VII.1965, Suman; 2 ♂♂, 10 ♀♀, 16 immatures, Iao Vall., 450 m, 25.VII.1965, Suman; 1 ♂, 6 immatures, W Maui, Kaulalewelewe, 900-1020 m, 24-27.X.1966, Yoshimoto; HAWAII: 1 ♀, 1 immature, Chain of Craters Rd, 960 m, 23.VI.1966, Suman; 1 ♂, 5 immatures, Puu Hualalai, 750 m, 28.VI.1966, Suman; 1 immature, Hilo Forest Reserve, 660 m, 30.VI.1966, Suman; 1 ♂, slopes of Mauna Kea, 1800 m, 24.VIII.1966, Y. Hirashima; 1 ♀, Hawaii (Sandwich Islands), late 1880's, W. T. Brigham.

DISTRIBUTION. This species is presently found on all of the main islands.

ECOLOGY. The type of habitat of this species is best indicated by zones 1, 2, 3, 4, and 7 on Table I.

DISCUSSION. No significant differences were found between the specimens of *nebulosa* and *stigmaticus*. This species can be readily distinguished from other species of *Proernus* by the arrangement of the eyes. The posterior median, posterior lateral, and the anterior lateral eyes form a triad in *stigmaticus*, a condition not found in the other species of *Proernus*.

Proernus velox Simon Fig. 137-141.

P. velox Simon, 1900: 499, pl. 17, fig. 5.

This species is redescribed from a ♂ from Maui and a ♀ from Oahu,

♂. Measurements (mm).

Carapace length, 3.10; width, 3.23; height, 0.86

Abdomen length, 4.10; width, 2.80; height, 2.00

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	4.10	1.90	3.40	2.90	1.60	13.90
II	5.70	2.30	5.10	4.30	2.20	19.60
III	3.40	1.40	2.60	2.30	1.30	11.00
IV	3.70	1.30	2.80	2.60	1.30	11.70
Palp	1.20	1.10	1.20	—	0.80	4.30

Body and appendages dark orange-brown; carapace with dark brown reticulations on sides; dark brown pattern on dorsum of abdomen. *Eyes*: Ratio of AME : ALE : PME : PLE=12 : 10 : 8 : 10; median ocular area wider behind than in front (50 : 35) and wider than long (50 : 28); AME closer to ALE than to each other (12 : 35); PME closer to PLE than to each other (29 : 50); clypeus height slightly more than 2 × the diameter of an AME (25 : 12). *Sternum*: Slightly longer than wide (51 : 49); posterior end almost pointed and separates coxae IV by almost 1/2 width of a coxa (12 : 21). *Legs*: II, I, IV, III; setae—2 in row prolateral on femur I, 1 prolateral on femur II, 3 in row dorsal on all femora, 4 pairs ventral on tibiae I and II, 3 in row retrolateral on tibia I, 1 prolateral and 1 retrolateral on tibia III, 2 pairs ventral on tibiae III and IV, 3 pairs ventral on metatarsi I and II, 3 in row prolateral on metatarsus III, 1 distoprolateral on metatarsus IV, 3 pairs plus 1 (2, 2, 3) ventral on metatarsi III and IV; trichobothria—at least 3 dorsal on all tibiae, at least 3 dorsal on all metatarsi, 4 to 6 in row dorsal on all tarsi; tarsal claws—anterior claw of all tarsi with series of fine teeth, posterior claw of all tarsi with series of coarse teeth; scopula sparse and runs length of all tarsi and distal part of metatarsi I and II. *Palp* (fig. 138-139): Tegular apophysis present; retrolateral tibial apophysis bidentate; ventral tibial apophysis fused with retrolateral apophysis; 5 trichobothria dorsal on tibia.

♀. Measurements (mm).

Carapace length, 6.20; width, 6.50; height, 1.20

Abdomen length, 11.00; width, 7.00; height, 5.50

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	7.00	3.40	5.30	4.20	2.60	22.50
II	8.90	3.90	7.30	5.70	3.20	29.00
III	4.70	2.30	3.40	2.90	1.90	15.20
IV	5.30	2.30	3.90	3.40	1.80	16.70
Palp	2.10	1.10	1.20	—	1.50	5.90

Color similar to ♂. *Eyes*: Ratio of AME : ALE : PME : PLE=7 : 6.5 : 4.5 : 6; median ocular area wider behind than in front (38 : 20) and wider than long (38 : 15); AME closer to ALE than to each other (9 : 20); PME closer to PLE than to each other (16 : 38); clypeus height less than 2 × the diameter of an AME (13 : 7). *Sternum*: As wide as long; posterior end almost pointed and separates coxae IV by 5/6 width of a coxa. *Legs* : II, I, IV, III; setae—3 in row

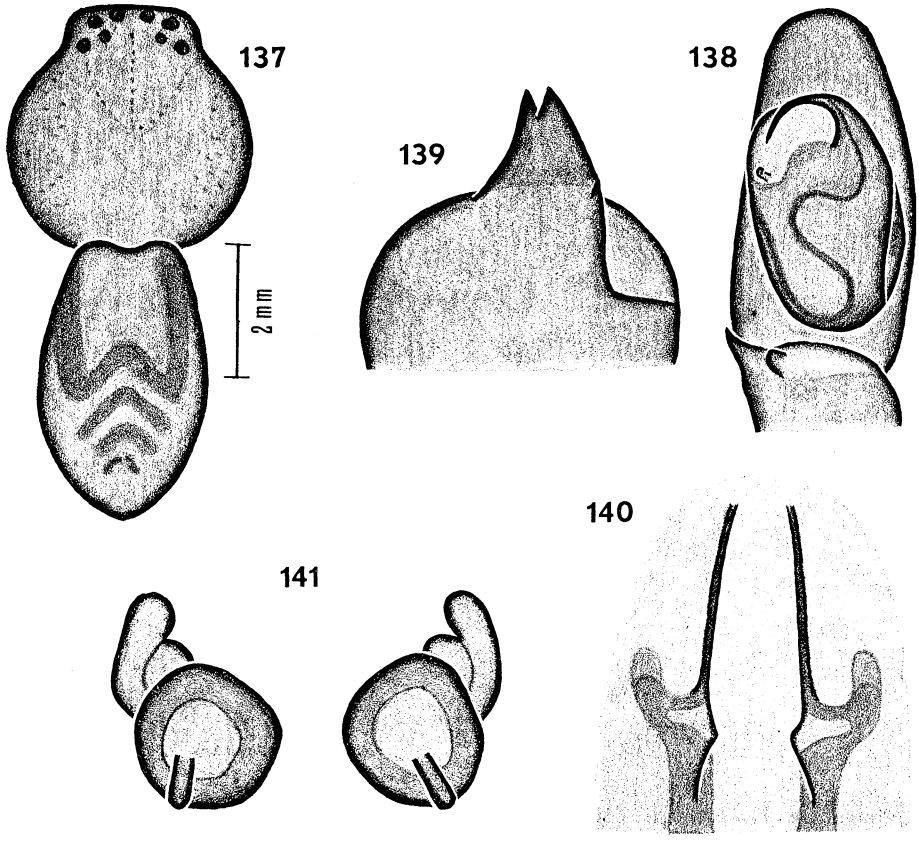


Fig. 137-141. *Proernus velox* Simon. 137, ♂, dorsal view; 138, ♂ right palp, ventral view; 139, ♂ right tibial apophysis, retrolateral view; 140, ♀ epigynum, ventral view; 141, ♀ internal genitalia, dorsal view.

dorsal on all femora, 2 in row prolateral and 2 in row retrolateral on femora I and II, 3 in row prolateral on femora III and IV, 2 in row retrolateral on femur III, 4 pairs ventral on tibiae I and II, 3 in row retrolateral on tibia I, 2 pairs ventral on tibiae III and IV, 2 in row prolateral and 3 in row retrolateral on tibiae III and IV, 3 pairs ventral on metatarsi I and II, 2 in row retrolateral on metatarsus I, 3 pairs plus 1 (2, 2, 3) ventral on metatarsi III and IV, 3 in row prolateral and 1 retrolateral on metatarsi III and IV; trichobothria—at least 6 dorsal on all tibiae, 8 to 9 in row dorsal on metatarsi I and II, 5 in row dorsal on metatarsi III and IV, 10 in row dorsal on tarsi I and II, 8 to 9 in row dorsal on tarsi III and IV; tarsal claws—anterior claw of all tarsi with series of fine teeth, posterior claw of all tarsi with series of coarse teeth. *Epigynum* (fig. 140-141): Epigynal sutures very long; membranous bursae copulatrix visible from dorsal aspect. *Palp*: 9 trichobothria dorsal on tibia; tarsal claw with series of teeth.

VARIATION. Carapace width: 3 ♂♂—5.60-5.70 mm; 2 ♀♀—6.60-7.10 mm. Femur I length: 3 ♂♂—6.40-6.80 mm; 2 ♀♀—7.00 mm. All specimens are similar in coloration.

RECORDS. Syntypes: BISHOP: Oahu: 1 ♂, 1 ♀, 7 immatures, 1890's, Perkins; BMNH: Oahu: 1 ♂ (1904.X.24. 359); 1 ♂, 3 ♀♀, 5 immatures (1904.X. 3.60-64), Perkins; MNHN: Maui: 2 ♂♂ (1.045), Haleakala. Specimens examined: OAHU: 1 immature, Halawa Ridge, 10.XII.1952, C. Hoyt; 1 ♀, Waianae Mts behind Scofield Barracks, 450-600 m, 7. III.1965, Suman; MAUI: 1 ♀, Auwahi, 1110 m, 19.VII.1965, Suman; 1 immature, Waikamoi Str, 1200 m, 19.VII.1965, Suman.

DISTRIBUTION. This species is presently found on both mountain ranges on Oahu and on the slopes of Haleakala on Maui.

ECOLOGY. One ♀ was found in a dead banana leaf. The habitat of this species is best indicated by zones 1, 4, and 9 on Table I.

DISCUSSION. This species appears to be closely related to *P. aculeatus* and is discussed under that species.

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