

INSECTS OF MICRONESIA
SCORPIONIDA

BY
EDWARD A. CHAPIN

AND

OPILIONES

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BERNICE P. BISHOP MUSEUM
INSECTS OF MICRONESIA
VOLUME 3, NUMBER 2

HONOLULU, HAWAII
Published by the Museum
1957

INSECTS OF MICRONESIA

Opiliones

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INTRODUCTION

This report covers material from the Mariana and Caroline Islands. No material is at hand from the Bonin, Volcano, Marshall, or Gilbert Islands.

The United States Office of Naval Research, the Pacific Science Board (National Research Council), the National Science Foundation, and Bishop Museum have made the survey and the publication of the results possible. Field research was aided by a contract between the Office of Naval Research, Department of the Navy, and the National Academy of Sciences, NR 160-175. Material from the Chicago Natural History Museum was made available for study by H. S. Dybas and R. L. Wenzel. Specimens from the Museum of Comparative Zoölogy, Harvard University, and those from Bernice P. Bishop Museum were sent by J. L. Gressitt. Most of the material was collected by Dybas, but Adams and Gressitt also contributed specimens. The following symbols indicate the museums in which specimens are stored: US (United States National Museum), BISHOP (Bishop Museum), CM (Chicago Natural History Museum), MCZ (Museum of Comparative Zoölogy), and AMNH (American Museum of Natural History).

ZOOGEOGRAPHY

The opilionids are poorly represented on oceanic islands such as those of Micronesia. Here they are found only on the larger islands where there is sufficient vegetation to provide cover and moisture for them.

From the material at hand, it appears that only a single family has become established in Micronesia. This is the family Phalangodidae, which is world wide in its distribution. Five genera, only one of which may be endemic, are found in Micronesia. Members of four of these genera are also found in New Guinea, the Philippines, and in some of the islands of the East Indies. From their relationships, it appears that the Micronesian fauna derives chiefly from New Guinea and the Philippines. Each genus is represented by but a single species except for one additional questionable form. All of these species are

endemic but, with one possible exception, are closely related to species from New Guinea and the Philippines.

SYSTEMATICS

ORDER OPILIONES SUNDEVALL, 1833

The order Opiliones includes those members of the class Arachnida with the following characteristics: unsegmented cephalothorax broadly joined with the abdomen; abdomen with nine tergites and sternites which are more or less united; cephalothorax with two simple eyes and a pair of scent glands; chelicerae chelate and three-segmented; palpus six-segmented; sternum small, a pair of spiracles on the second sternite; genital openings between the last coxae, with penis and ovipositor; respiration by trachea.

The order Opiliones is represented in Micronesia by the members of a single family, the Phalangodidae, which is in the suborder Laniatores.

SUBORDER LANIATORES THORELL, 1876

Opilionids with two eyes which may or may not be placed on a median eye tubercle; if not on a common tubercle, they are usually widely separated from each other on the surface of the carapace; scent glands not opening on a tubercle; abdomen with nine tergites, the first five of which are fused with the cephalothoracic carapace to form the dorsal scute; tergites six, seven, and eight are free; and tergite nine forms a movable plate over the anus; abdomen with nine sternites, first sternite rarely visible; sternites two and three fused, bearing the spiracle, four to seven free, eight and nine fused to one another behind the anal opening. Genital opening covered by a movable operculum. Palpus strong, usually bearing hair-tipped tubercles; tarsus with strong claw. Tarsi of first and second legs each with a single simple claw, tarsi of third and fourth legs each with paired claws or a single claw with lateral branches.

FAMILY PHALANGODIDAE SIMON, 1879

Laniatores with two simple eyes which may or may not be on a common, median tubercle; if tubercle is absent, the eyes are usually widely separated; openings of scent glands concealed; abdominal portion of dorsal scute with four or five areas which are indicated by transverse grooves; under surface of anterior margin of the carapace without five projections (2:1:2); coxae heavy, more or less parallel, but with fourth coxa heavier than the first three and directed back; second maxillary lobe immovable, with or without ventral projection; spiracle may be visible or concealed. First and second tarsi each with a simple single claw, third and fourth tarsi each with double claws which may or may not be toothed. Third and fourth tarsi without pseudonychium.

Distributional List of Micronesian Opiliones

1. *Dibunus marianae*, new species: South Marianas.
2. *Lomanius longipalpus*: Carolines (Palau).
3. *Metibalonius esakii*: Carolines (Ponape).
4. *Parasamoa gressitti*, new species: Carolines (Ponape).
5. *Zalmoxis solitaria*: Carolines (Ponape), Marshalls.
6. *Zalmoxis marchei*: South Marianas.

KEY TO MICRONESIAN GENERA OF PHALANGODIDAE

1. With eyes not on a common eye tubercle..... 2
- With eyes on a common eye tubercle..... 4
- 2(1). With a heavy spine between the eyes; five areas on dorsal abdominal scute;
first tarsus with two or three segments..... 3
- Without any spine between the eyes; four areas on dorsal abdominal scute;
first tarsus with more than six segments..... **Dibunus**
- 3(2). First tarsus with two segments; distitarsus of first tarsus with one
segment **Lomanius**
- First tarsus with three segments; distitarsus of first tarsus with two
segments **Metibalonius**
- 4(1). Tarsi of third and fourth legs with scopulae..... **Parasamoa**
- Tarsi of third and fourth legs without scopulae..... **Zalmoxis**

Genus **Dibunus** Loman

Dibunus Loman, 1906, Nova Guinea 5 (1): 5 (type: *Dibunus pseudobiantes* Loman; New Guinea).—Roewer, 1912, Archiv Naturgesch. A, 78 (3): 237; 1923, Die Weberknechte der Erde, 212.

Triacudorsum Roewer, 1912, Archiv Naturgesch. A, 78 (3): 240; 1923, Die Weberknechte der Erde, 214.

Tetracudorsum Roewer, 1915, Archiv Naturgesch. A, 81 (3): 67; 1923, Die Weberknechte der Erde, 214.

Anacudorsum Roewer, 1926, Philippine Jour. Sci. 29 (4): 551; 1927, Naturwiss. Ver. Bremen, Abhandl. 26 (2): 338.

Triacudorsulum Roewer, 1926, Philippine Jour. Sci. 29 (4): 555; 1927, Naturwiss. Ver. Bremen, Abhandl. 26 (2): 340.

Dibunellus Roewer, 1927, Naturwiss. Ver. Bremen, Abhandl. 26 (2): 341.

Phalangodids without a common eye tubercle, but often with a slight elevation between and in front of the eyes. Abdominal scute with four areas, first without a median line. Tarsi of third and fourth legs without scopulae and with simple untoothed double claws. Femur of first leg without large spines. All tarsi with more than six segments. Distitarsus of first tarsus with two segments; second with either two or three. Metatarsi of legs not divided into astragali and calcanea. Maxillary lobe of second coxa without a ventral projection. Palpus slightly longer than body. Secondary sexual characters of male consist only of the heavy chelicerae.

This genus is known from New Guinea, the Philippines, and the Moluccas.

1. *Dibunus marianae* Goodnight and Goodnight, n. sp. (fig. 1, a, b).

Male: Cephalothorax smooth. No common eye tubercle present, but with a slight elevation between and in front of eyes. Dorsal surface of abdomen with four areas, the first sometimes divided by a transverse line. In these specimens, first area may superficially look like two areas. Entire dorsum smooth except for a row of very fine tubercles along lateral margin. Free tergites smooth. Anal operculum and sternites smooth. Coxae smooth except for some small toothlike tubercles on ventral surface of first coxa and lateral margins of the third. Spiracle partially hidden. Maxillary lobe of second coxa without a ventral projection.

Legs smooth. Tarsal segments: 8 or 9-20-7-8. Distitarsus of first tarsus with two segments; second tarsus also with two segments. Third and fourth tarsi without scopulae and with smooth double claws.

Length of Legs

| | I | II | III | IV |
|------------------|----------|----------|----------|----------|
| Trochanter | 0.5 mm. | 0.5 mm. | 0.7 mm. | 0.7 mm. |
| Femur | 2.5 | 4.9 | 3.7 | 5.1 |
| Patella | 0.7 | 0.9 | 1.1 | 0.4 |
| Tibia | 2.1 | 3.4 | 2.3 | 2.9 |
| Metatarsus | 3.4 | 6.1 | 4.3 | 6.4 |
| Tarsus | 1.4 | 3.0 | 1.8 | 2.3 |
| Total | 10.6 mm. | 18.8 mm. | 13.9 mm. | 17.8 mm. |

Palpus: trochanter, 0.7 mm. long; femur, 1.4; patella, 1.1; tibia, 1.0; and tarsus, 0.8. Total length, 5 mm. Palpus armed retrolaterally as in figure 1, a, with three spines on tarsus. Prolaterally, femur has an apical median spine, patella has two spines, tibia and tarsus each has three.

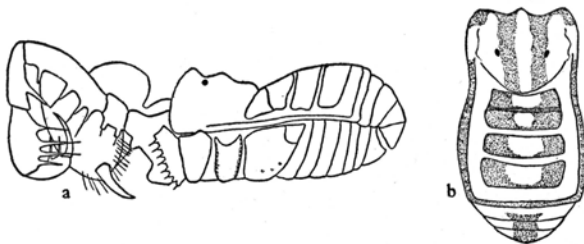


FIGURE 1.—*Dibunus marianae*, holotype, male; a, lateral view; b, dorsal view.

Chelicera has distal segment very much enlarged. Distal and proximal segments smooth except for a few tubercles on prolateral margin of distal segment. Claws large.

Entire animal light yellow brown, dorsum with darker brown markings in median and lateral portions as shown in figure 1, b. Darker brown mottlings present on appendages. These are most abundant on patellae of legs.

Total length of body of male, 3.6 mm.; cephalothorax, 1.3 mm.; width of body at widest portion, 2.4 mm.

Female: Similar in appearance to male, but without the enlarged chelicerae. Total length of body, 3.3 mm.; cephalothorax, 1.3 mm.; width of body at widest portion, 2.4 mm.

Holotype, male (US), one mile southeast of Asan, Guam, Marianas, alt. 200 meters, Nov. 5, 1947, H. S. Dybas; allotype, female, same data (US); paratypes, same data, Oct. 31, 1947 and Nov. 5, 1947, Dybas (BISHOP, CM, AMNH).

DISTRIBUTION: Mariana Is. (Guam).

This species is related to *Dibunus bakeri* (Roewer) from the Philippines; it differs by having two rather than three segments in the distitarsus of the second tarsus.

Genus *Lomanius* Roewer

Podoctis (part) Loman, 1905, Mus. Hamburg, Mitt. 22 : 33 [type: *Lomanius tridens* (Loman); Java].

Erecanana (part) Roewer, 1912, Archiv Naturgesch. A, 78 (3) : 214.

Lomanius Roewer, 1923, Die Weberknechte der Erde, 187.

Paralomanius Goodnight and Goodnight, 1948, Am. Mus. Nov., 1371 : 9.—

Roewer, 1949, Senckenbergiana 30 (4/6) : 286.

Thaipea Roewer, 1949, Senckenbergiana 30 (4/6) : 284.

Maquilingius Roewer, 1949, Senckenbergiana 30 (4/6) : 284.

Eulomanius Roewer, 1949, Senckenbergiana 30 (4/6) : 286.

Phalangodids without a common eye tubercle, but with a heavy spine between eyes. Abdominal scute with five areas, the first without a median line. Tarsi of third and fourth legs without scopulae and with simple, untoothed double claws. Femur of first leg with long spines. Tarsal segments: 2-2-5-5. Distitarsi of both first and second legs with but a single segment. Metatarsi of legs not divided into astragali and calcanea. Maxillary lobe of second coxa without a ventral projection. Palpus elongate. Secondary sexual characters of male are variable; but usually, chelicerae are enlarged, spine between eyes is heavier than that of female, and palpus is very elongate.

These animals are found in Java, Formosa, Micronesia, and the Philippines.

The members of this genus are closely related to those of the genus *Erecanana* which is found in East Africa, Reunion, and Madagascar.

2. *Lomanius longipalpus* (Goodnight and Goodnight). (Figure 2, a-c.)

Paralomanius longipalpus Goodnight and Goodnight, 1948, Am. Mus. Nov.

1371; 9-11 (Palau Is., type in Chicago Natural History Museum).—

Roewer, 1949, Senckenbergiana 30 (4/6) : 286-287.

Paralomanius brevipalpus Goodnight and Goodnight, Am. Mus. Nov. 1371 : 11-13.

Eulomanius brevipalpus, Roewer, 1949, Senckenbergiana 30 (4/6) : 286.

Male: Cephalothorax with three spines at anterior lateral margin. Eyes not on a common eye tubercle; each eye with several small spines above it and one anterior spine which extends forward and downward to touch cephalothorax. Posterior to each eye on cephalothorax are three prominent spines; these are arranged in a row with the last the largest. This row of three spines slants on either side, forming a triangle. At apex of the triangle is a very large spine which slants strongly posteriorad. Area formed

between the rows of three spines is smooth. Lateral to eyes are scattered tubercles. Dorsal abdominal scute with five ill-defined areas; first without a median line. Fourth area with a median pair of spines; all areas with scattered tubercles. First free tergite with a row of three large spines, remaining free tergites with rows of tubercles. Free sternites with rows of small granulations. Spiracle concealed. Surface of coxae tuberculate. Anterior row of teeth on each of first three coxae and a posterior row on third coxa. Fourth coxa with a lateral spine.

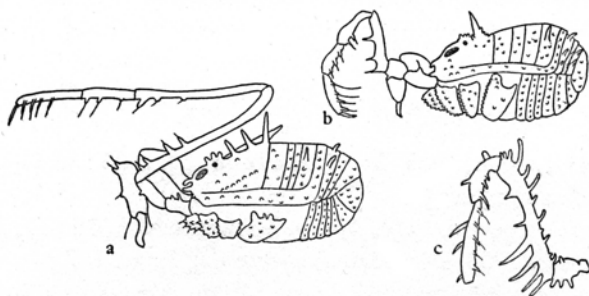


FIGURE 2.—*Lomanius longipalpus*; a, lateral view of male; b, lateral view of female; c, lateral view of trochanter, femur, patella, and tibia of first leg of male.

Trochanter of first leg with a number of prominent spines, a few smaller spines on the third and fourth trochanters. Femur, patella, and tibia of first leg with numerous long spines as in figure 2, c. Metatarsus and tarsus clothed only with hairs. Second, third, and fourth legs with scattered hairs and a few small spines at base of femora and on patella. Double claws of third and fourth legs simple; third and fourth tarsi without scopulae. Tarsal segments: 2-2-5-5. Distitarsi of both first and second tarsi with but a single segment.

Length of Legs

| | I | II | III | IV |
|------------------|---------|---------|---------|---------|
| Trochanter | 0.3 mm. | 0.2 mm. | 0.2 mm. | 0.3 mm. |
| Femur | 1.0 | 3.2 | 1.9 | 2.4 |
| Patella | 0.4 | 0.5 | 0.4 | 0.4 |
| Tibia | 0.6 | 2.7 | 1.4 | 1.9 |
| Metatarsus | 1.0 | 2.2 | 1.8 | 2.4 |
| Tarsus | 0.4 | 0.8 | 0.3 | 0.3 |
| Total | 3.7 mm. | 9.6 mm. | 6.0 mm. | 7.7 mm. |

Palpus: trochanter 0.3 mm. long; femur, 1.8, patella, 1.9, tibia, 0.6; and tarsus, 0.9. Total length, 5.5 mm. Palpus extremely long and slender, armed retrolaterally as in figure 2, a. Prolaterally, femur has one hair-tipped tubercle in median portion, patella has three in apical third, tibia has four, and tarsus has four.

Chelicerae enlarged, proximal segment elevated. A prominent spine on ventral pro-lateral margin. Distal segment swollen, with an anterior row of hair-tipped tubercles. Claw curved.

Body of entire animal reddish brown, dark, with lighter mottlings. Appendages lighter, legs marked with alternating dark and light bands.

Total length of body of male, 1.6 mm.; cephalothorax, 0.8 mm.; width of body at widest portion, 1.3 mm.

Female: Similar in appearance to male, but with palpus much shorter. Chelicerae are reduced in size, and areas of back are more clearly defined. Spines above and posterior to eye are reduced to tubercles, and median spine is smaller and situated immediately behind eyes. It slants slightly forward. In general, spines of dorsal areas and free tergites are somewhat larger in female than in male. Total length of body, 1.8 mm.; cephalothorax, 0.6 mm.; width of body at widest portion, 1.2 mm.

DISTRIBUTION: Western Caroline Is.

PALAU. Numerous specimens (US, BISHOP, CM, AMNH): NGERGOI (Garakayo): Aug. 1945, Dybas. PELELIU: July, Aug. 1945 and Jan., Feb. 1948, Dybas. BABELTHUAP: Dec. 1947, Dybas. KOROR: Nov. 1947 and Jan. 1948, Dybas. NGERMEYAOS: Nov. 1947, Dybas. ULEBSEHEL: Jan. 1948, Dybas.

For the original description of this species, only a small number of specimens was available for study. As a result, we (Goodnight and Goodnight, 1948) described the male as *P. longipalpus* and the female as *P. brevipalpus*. With a large collection available for study, the identity of the two was established.

Genus *Metibalonius* Roewer

Ibalonius (part) Strand, 1910, Mus. Dresden, Abhandl. 13 (5): 4 [type: *Metibalonius cervicornis* (Strand); New Guinea].

Metibalonius Roewer, 1912, Archiv Naturgesch. A, 78 (3): 39; 1923, Die Weberknechte der Erde, 212.

Sitalces (part) Roewer, 1912, Archiv Naturgesch. A, 78 (3): 199.

Strandibalonius Roewer, 1912, Archiv Naturgesch. A, 78 (3): 199.

Reclinobunus Roewer, 1915, Archiv Naturgesch. A, 81 (3): 36; 1923, Die Weberknechte der Erde, 170.

Homibalonius Roewer, 1915, Archiv Naturgesch. A, 81 (3): 39; 1923, Die Weberknechte der Erde, 165-166.

Serratobunus Roewer, 1915, Archiv Naturgesch. A, 81 (3): 43; 1923, Die Weberknechte der Erde, 169.

Trispinibunus Roewer, 1915, Archiv Naturgesch. A, 81 (3): 45; 1923, Die Weberknechte der Erde, 171 (misspelled *Tripinibunus*); 1949, Senckenbergiana 30 (4/6): 258.

Ibalonioides Roewer, 1923, Die Weberknechte der Erde, 172.

Celebesia Roewer, 1949, Senckenbergiana 30 (4/6): 257.

Fronticonus Roewer, 1949, Senckenbergiana 30 (4/6): 257.

Manema Roewer, 1949, Senckenbergiana 30 (4/6): 258.

Opilionids without a common eye tubercle but with a large spine between eyes. Secondary spines or tubercles are on this large spine. Abdominal scute with five areas, the first with or without a median line. Tarsi of third and fourth legs with scopulae and with simple, untoothed double claws. Femur of first leg with large spines; first tarsus with three segments, remaining tarsi with a varying number of segments. Distitarsus of first tarsus with two segments; second with one. Metatarsi not divided into astragali

and calcanea. Maxillary lobe of second coxae without ventral projections. Palpus very elongate and slender. Secondary sexual characters of male consist usually of the longer palpus and the heavier spine between eyes.

These animals are known from New Guinea, Borneo, Celebes, and Sumbawa. Micronesia represents a new record for the genus. Most of the known species are found in New Guinea.

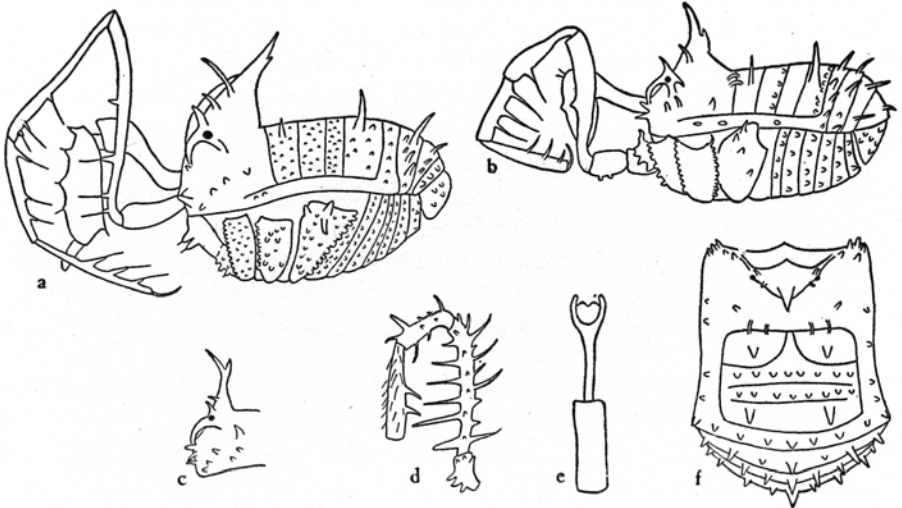


FIGURE 3.—*Metibalonius esakii*; a, lateral view of male; b, lateral view of female; c, lateral view of eye and median spine of female, showing variations found; d, lateral view of trochanter, femur, patella, and tibia of first leg of male; e, penis of male; f, dorsal view of male.

3. *Metibalonius esakii* Suzuki (fig. 3, a-f).

Metibalonius esakii Suzuki, 1941, Annot. Zool. Japon. 20 (2) : 100-103, figs. 9-16 (Ponape Island, type in Zoological Institute of Hiroshima).

Male: cephalothorax granulate; anterior margin with several prominent spines at anterior lateral border. A few other smaller spines along lateral margin. Eyes not on a common tubercle; between eyes is an enormous elevation which is tipped by a large spine. Three or four prominent spines are present on either side of this elevation. Usually there is a spine on each side at base which curves downward to touch surface of the cephalothorax. Dorsal portion of abdominal scute tuberculate, with five distinct areas. First area with a median line. Large paired median spines on first and fourth areas; second, third and fifth areas each with a transverse row of large tubercles. Each free tergite with a transverse row of large spines. Anal operculum tuberculate. Each free sternite with a transverse row of small tubercles. Spiracle concealed. Surface of coxae thickly covered with hair-tipped tubercles. A transverse row of teeth on anterior margin of second and third coxae.

Trochanter of first leg with four or five large spines; femur of first leg with an anterior and posterior row of large spines. Patella with four or five large spines irregularly scattered. Tibia with an anterior and posterior row of smaller spines and numerous tubercles. Remainder of leg clothed only with hairs. Second, third, and fourth legs

clothed throughout with hairs. Trochanters and bases of femora armed with a few spines; remainder of legs with only scattered small tubercles and an occasional small spine on patella. Tarsal segments: 3-2-5-5. Distitarsus of first tarsus with two segments; second with one. Double claws of third and fourth tarsi simple; third and fourth tarsi with scopulae. In an occasional specimen, scopulae are not well developed.

Length of Legs

| | I | II | III | IV |
|------------------|---------|----------|----------|----------|
| Trochanter | 0.4 mm. | 0.5 mm. | 0.4 mm. | 0.5 mm. |
| Femur | 1.8 | 6.3 | 4.0 | 5.5 |
| Patella | 0.7 | 1.1 | 0.7 | 0.9 |
| Tibia | 1.2 | 5.7 | 3.0 | 4.1 |
| Metatarsus | 2.2 | 4.6 | 4.5 | 5.7 |
| Tarsus | 0.7 | 1.3 | 0.5 | 0.5 |
| Total | 7.0 mm. | 19.5 mm. | 13.1 mm. | 17.2 mm. |

Palpus: trochanter, 0.7 mm. long; femur, 2.4; patella, 2; tibia, 1.3; and tarsus, 1.4. Total length, 7.8 mm. Trochanter with small tubercles. Retrolateral surface of femur with four hair-tipped tubercles, two at base and two in median portion; prolaterally, there is a single hair-tipped tubercle, no median apical tubercle present. Long, slender patella is curved and has a single hair-tipped spine at apical portion of retrolateral surface. Prolaterally, there are two hair-tipped tubercles at apical portion. Tibia with three hair-tipped spines on either side, tarsus with three on either side. In a series of specimens which were measured, femur varied in length from 1.3 to 2.4 mm.

Chelicerae enlarged; proximal segments tuberculate, curved, with distinct swellings at apical portions. Distal segments also enlarged, with a few anterior spines. Claws prominent.

Entire animal dark reddish brown, with some lighter mottling on appendages.

Total length of body of male, 2.9 mm.; cephalothorax, 1.2 mm.; width of body at widest portion, 2.1 mm.

Female: Similar in appearance to male, but with much shorter palpi (femur varies in length from 1 to 1.3 mm.) and a less massive spine between eyes. Total length of body, 2.5 mm.; cephalothorax, 0.9 mm.; width of body at widest portion, 2 mm.

DISTRIBUTION: Eastern Caroline Is.

PONAPE. Numerous specimens (US, BISHOP, CM, AMNH): Mt. Dolen Kiepw, June-Sept. 1950, P. A. Adams; Mt. Pairot, 300-600 m., Mar. 1948, Dybas and June-Sept. 1950, Adams; Mt. Kupwurisio, 300-600 m., Mar. 1948, Dybas; Mt. Temwetemwensikir, 150-450 m., Feb., Mar. 1948, Dybas and June-Sept. 1950, Adams; Mt. Nahnalaud, 150-600 m., Mar. 1948, Dybas; Nanipil, Feb. 1948, Dybas; Dolen Eireke, Sept. 1950, Adams.

Genus *Parasamoa*, new genus

Opilionids with a common eye tubercle which is bluntly rounded above; eye tubercle armed only with tubercles above. Abdominal scute with five dorsal areas, first without a median line. Tarsi of third and fourth legs with heavy scopulae and with simple untoothed double claws. Femur of first leg not elongate or heavily spined. Tarsus of first leg with three segments. Distitarsus of first tarsus with two segments; second, with three. Metatarsi of legs not divided into astragali or calcanei. Maxillary lobe of second coxa without a ventral projection. Palpus not unusually elongate.

Type: *Parasamoa gressitti* Goodnight and Goodnight, new species.

Range: Eastern Caroline Islands, Ponape.

This new genus is related to *Samoa*, from which it differs in having three instead of four segments in the first tarsus. The genus *Samoa* is known from the islands of Samoa. Other, more distantly related, genera have been found in the Seychelles.

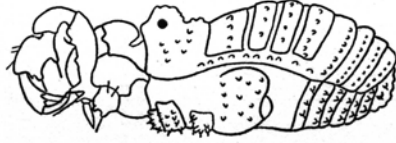


FIGURE 4.—*Parasamoa gressitti*, lateral view of male holotype.

4. *Parasamoa gressitti* Goodnight and Goodnight, n. sp. (fig. 4).

Male: Cephalothorax with a few scattered granulations and three small spines at anterior lateral margin. Eye tubercle rounded and slightly removed from anterior margin of cephalothorax; eye tubercle with scattered tuberculations above. Dorsal abdominal scute with five areas. First area without median line and somewhat bowed. A row of tubercles across each area. Lateral margin of scute with a row of tubercles. Free tergites, each with a row of very low tubercles. Anal operculum with scattered tuberculations, each free sternite with a row of low tubercles. Coxae tuberculate. Spiracle visible, but partially hidden by fourth coxa. Maxillary lobe of second coxa without a projection.

Trochanters of legs with scattered tuberculations. Fourth femur slightly curved and with scattered tubercles. Remainder of legs clothed throughout with hairs and occasional small tuberculations. Metatarsi not divided into astragali and calcanei. Tarsal segments: 3-7-5-5. Distitarsus of first tarsus with two segments; second tarsus, with three. Tarsi of third and fourth legs with heavy scopulae and with simple double claws.

Length of Legs

| | I | II | III | IV |
|------------------|---------|---------|---------|----------|
| Trochanter | 0.4 mm. | 0.5 mm. | 0.5 mm. | 0.6 mm. |
| Femur | 1.3 | 2.1 | 1.7 | 2.5 |
| Patella | 0.6 | 0.9 | 0.7 | 0.8 |
| Tibia | 1.0 | 2.0 | 1.3 | 2.2 |
| Metatarsus | 1.4 | 2.5 | 2.1 | 2.8 |
| Tarsus | 0.7 | 1.8 | 1.0 | 1.2 |
| Total | 5.4 mm. | 9.8 mm. | 7.3 mm. | 10.1 mm. |

Palpus: trochanter, 0.4 mm. long; femur, 0.8; patella, 0.5; tibia, 0.7; and tarsus, 0.5. Total length, 2.9 mm. Palpus armed retrolaterally as in figure 4; prolaterally, femur has an apical median spine; patella has an apical median spine; tibia and tarsus each with three hair-tipped spines.

Chelicerae somewhat enlarged, clothed with scattered hairs.

Entire body of animal dark reddish brown with some mottling. Appendages yellowish brown.

Total length of body of male, 4 mm.; cephalothorax, 1.2 mm.; width of body at widest portion, 2.6 mm.

Holotype, male (US), from Mt. Pairot, Ponape, eastern Caroline Is., Mar. 13, 1948, Dybas. Paratype from Mt. Nahnalaud, Mar. 18, 1948, Dybas.

Genus *Zalmoxis* Soerensen

Zalmoxis Soerensen, 1886, in L. Koch (Keyserling), *Arachniden Australiens* (2): 62, 64 [type: *Zalmoxis robusta* Soerensen; Fiji Is. (?)].—Roewer, 1912, *Archiv Naturgesch. A*, 78 (3): 126.—Hirst, 1912, *Ann. Mag. Nat. Hist.* VIII, 10: 64.—Müller, 1917, *Zool. Anzeiger* 48: 251.—Roewer, 1923, *Die Weberknechte der Erde*, 85.

Chondrobunus Loman, 1902, *Zool. Jahrb. Abt. Syst.* 16: 207.

Euzalmoxis Roewer, 1915, *Archiv Naturgesch. A*, 81 (3): 15; 1923, *Die Weberknechte der Erde*, 92.

Hoplozalmoxis Roewer, 1915, *Archiv Naturgesch. A*, 81 (3): 18; 1923, *Die Weberknechte der Erde*, 95.

Parazalmoxida Roewer, 1916, *Archiv Naturgesch. A*, 82 (2): 93; 1923, *Die Weberknechte der Erde*, 96.

Zalmoxilla Roewer, 1926, *Philippine Jour. Sci.* 29 (4): 546; 1927, *Naturwiss. Ver. Bremen, Abhandl.* 26 (2): 286-287.

Zalmoxana Roewer, 1927, *Naturwiss. Ver. Bremen, Abhandl.* 26 (2): 294.

Metagjelleruja Goodnight and Goodnight, 1947, *Am. Microscopical Soc., Trans.* 66 (4): 328.

Foella Goodnight and Goodnight, 1948, *Am. Mus. Nov.* 1371: 1.

Pygozalmoxis Roewer, 1949, *Senckenbergiana* 30 (1/3): 28.

Gagirius Roewer, 1949, *Senckenbergiana* 30 (1/3): 28.

Sepikusta Roewer, 1949, *Senckenbergiana* 30 (1/3): 29.

Linabia Roewer, 1949, *Senckenbergiana* 30 (1/3): 29.

Gjellerupiola Roewer, 1949, *Senckenbergiana* 30 (1/3): 29.

Papuodes Roewer, 1949, *Senckenbergiana* 30 (1/3): 29-30.

Phalangodids with a common rounded eye tubercle which is usually removed from the anterior margin of the cephalothorax. Tubercle without a median spine and smooth or with small tubercles or spinules above. Abdominal scute with five dorsal areas, the first without a median line. Tarsi of third and fourth legs without scopulae and with simple untoothed double claws. Femur of first leg normal, not elongate or heavily spined. Tarsus of first leg with three segments; distitarsus of first tarsus with two segments, second with three. Tarsi of other legs with a varying number of segments. Metatarsi not divided into astragali and calcanea. Maxillary lobe of second coxa without a ventral projection. Palpus of normal length, not elongate. Secondary sexual characters of male variable, but usually consist of heavier spines on fourth leg.

The members of this genus are found in New Guinea, New Caledonia, Australia, the Celebes, Micronesia, the Bismarck Islands, and the Philippines. The greatest number of species are found in New Guinea and the Philippines.

This genus is very close to *Cynortina* found in tropical America. It is possible that further studies will show that *Cynortina* is a synonym of *Zalmoxis*.

5. *Zalmoxis solitaria* (Roewer). (Figure 5, a, b.)

Parazalmoxida solitaria Roewer, 1916, Archiv Naturgesch. A, 82 (2): 94 (Jaluit Island, Marshalls, type in Roewer's collection); 1923, Die Weberknechte der Erde, 96-97.—Suzuki, 1941, Annot. Zool. Japon. 20 (2): 98-100.

Euzalmoxis ponapea Roewer, 1949, Senckenbergiana 30 (1/3): 24.

Male: Cephalothorax smooth except for a few irregular granules. Eye tubercle low, unarmed dorsally except for scattered tuberculations, distinctly removed from anterior margin of cephalothorax. Abdominal scute with five distinct areas, a row of low hair-tipped tubercles across each area and along lateral margin of scute. Free tergites smooth except for a few irregular granules. Anal operculum, free sternites, and coxae smooth, a few tuberculations present on anterior margin of first coxa and distal portion of fourth. Spiracles partially hidden by fourth coxa. Maxillary lobe of second coxa without ventral projection, with only a small, rounded anterior tubercle.

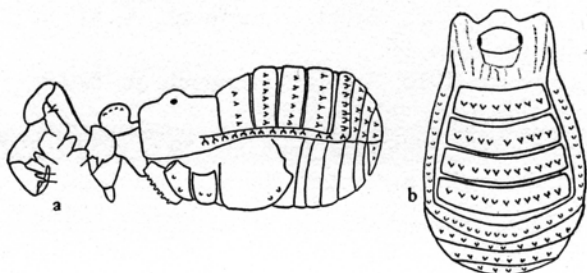


FIGURE 5.—*Zalmoxis solitaria*; a, lateral view of male; b, dorsal view of male.

Trochanters of legs globular, a few small granulations on third and fourth legs. In some specimens small spines are present on fourth leg; and trochanter, femur, and tibia are slightly enlarged. Remaining segments of legs smooth except for numerous hairs. In one male, metatarsus of third leg was greatly enlarged. Tarsal segments: 3-7-5-5 or 6. Distitarsus of first tarsus with two segments, second, with three. Tarsal claws smooth, without scopulae.

Length of Legs

| | I | II | III | IV |
|------------------|---------|---------|---------|---------|
| Trochanter | 0.3 mm. | 0.4 mm. | 0.4 mm. | 0.5 mm. |
| Femur | 1.0 | 1.8 | 1.4 | 2.0 |
| Patella | 0.5 | 0.7 | 0.5 | 0.8 |
| Tibia | 0.7 | 1.5 | 1.0 | 1.5 |
| Metatarsus | 1.2 | 1.7 | 1.6 | 2.2 |
| Tarsus | 0.8 | 1.5 | 1.0 | 1.3 |
| Total | 4.5 mm. | 7.6 mm. | 5.9 mm. | 8.3 mm. |

Palpus: trochanter 0.4 mm. long; femur, 0.7; patella, 0.4; tibia, 0.6; and tarsus, 0.5. Total length, 2.6 mm. Palpus armed retrolaterally as in figure 5, a. Prolaterally, femur with an apical median spine, patella with a median spine, tibia and tarsus, each with three. Chelicera slightly enlarged, smooth.

Entire animal dark reddish brown.

Total length of body of male, 2.9 mm.; cephalothorax, 1.2 mm. Width of body at widest portion, 1.9 mm.

Female: Similar in appearance to male, but with the chelicerae slightly smaller in size. Total length of body, 3 mm.; cephalothorax, 0.9 mm.; width of body at widest portion, 1.9 mm.

DISTRIBUTION: Marshall Is. and eastern Caroline Is.

PONAPE. Numerous specimens (US, BISHOP, CM, AMNH): Mt. Nahnalaud, Mar. 1948, Dybas; Mt. Kupwuriso, Mar. 1948, Dybas; Mt. Temwetemwensekir, Mar. 1948, Dybas.

Zalmoxis solitaria was originally described from Jaluit Island in the Marshalls. Unfortunately no specimens were available from these islands for our study, but the specimen from Ponape agreed so closely with the description that there is little doubt that they belong to the species. Suzuki (1941) agrees with this conclusion. Roewer (1949) describes an animal from Ponape as *Euzalmoxis ponapea*. As his specimen had paired tubercles over the eye and a very large first area, he considered it different from *Z. solitaria*. Our specimens from Ponape do not show this difference. The eye tubercles are covered with small tubercles, which in some specimens may appear paired. Also our specimens did not have unusually wide first areas. For these reasons, we believe the specimens from Ponape should be considered as *Z. solitaria*. Roewer (1923) also records *Z. austera* Hirst from Ponape, but this is undoubtedly a misidentified specimen of *Z. solitaria*.

6. *Zalmoxis marchei* Roewer.

Zalmoxis marchei Roewer, 1912, Archiv Naturgesch. A, 78 (3): 129; 1923, Die Weberknechte der Erde, 88.

Another species described from Micronesia is *Z. marchei* Roewer from the Marianas. While it is impossible to be sure of the identity of this animal from the material at hand, it appears possible that this is another form of *Z. solitaria*. At present, however, it appears best to consider it a different species.