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**New species of *Apozomus* and *Orientzomus*
from the Marshall Islands, Micronesia
(Schizomida Hubbardiidae)**

Abstract - A new species of *Apozomus* is described from the Ratak Chain and a new species of *Orientzomus* is described from the Ralik Chain of the Marshall Islands. The male and female of *Apozomus brignolii* n. sp. are described and illustrated, but only the female of *Orientzomus ralik* n. sp. is known. The diagnosis of *Orientzomus* is slightly modified to accommodate the inclusion of the new species. The two species are the first members of the order to be named from the Republic of the Marshall Islands.

Riassunto - Nuove specie di *Apozomus* e di *Orientzomus* delle Isole Marshall, Micronesia (*Schizomida Hubbardiidae*).

Apozomus brignolii n. sp. (♂ ♀, loc. typ.: Ailuk Island, Ratak Chain) e *Orientzomus ralik* n. sp. (♀, loc. typ.: Jibu Island, Ralik Chain) vengono descritte ed è emendata la diagnosi del genere *Orientzomus* Cokendolpher & Tsurusaki, 1994. Le due specie sono i primi rappresentanti dell'ordine Schizomida descritti della Repubblica delle Isole Marshall.

Key words: Schizomida, Hubbardiidae, *Apozomus*, *Bamazomus*, *Orientzomus*, taxonomy, new species, Marshall Islands.

The Schizomida are well-represented on Pacific islands, but most species remain unidentified. Numerous undescribed species belonging to undetermined genera occur throughout the Pacific. The present paper deals with the two species found on the Marshall Islands. The nearest described species of Schizomida (all members of the Hubbardiidae) occur in Hawai'i, Japan, Philippines, Papua New Guinea, and Australia.

Members of *Apozomus* Harvey, 1992 are found from the Republic of China to Australia, Papua New Guinea and Japan. After Harvey (2000) removed five non-conforming species, *Apozomus* consist of 12 described and several undescribed species (Reddell & Cokendolpher, 1995). The genera *Bamazomus* Harvey, 1992 and *Apozomus* are primarily diagnosed on the morphology of the female genitalia, but the males of the two genera differ by the posterodorsal process on the male abdomen. This process is well developed on all described *Bamazomus*, but missing on *Apozomus*. The discovery of males from the Marshall Islands with a well-developed posterodorsal process immediately indicated that they were members of *Bamazomus*. Not only did they have the process, but the flagellum was similar in shape to the widespread species *Bamazomus siamensis* (Hansen, in Hansen & Sørensen, 1905) which is recorded from Hawai'i, Japan, Hong Kong, and Thailand. Study of females from the Marshall Islands that are clearly members of *Apozomus* and that were taken with the males closely resembling *Bamazomus siamensis* indicates that the male posterodorsal process has developed more than once in the Old World fauna, as it has

in the New World (Reddell & Cokendolpher, 1995). While it is possible that the males and females of *A. brignolii* n. sp. are mismatched and not conspecific, the remoteness of the Marshall Islands and the small size of Ailuk Island indicate that they do belong to the same species. A final decision on the status and relationships of *Apozomus* and *Bamazomus* will have to wait until numerous new species from throughout Australasia and the Pacific Islands are described. Harvey (pers. comm., 1999) further informed us that he has a new species of *Bamazomus* (that is similar to the type species) that does not have the process. The female genitalia remain the best diagnostic characters for recognition of *Apozomus* and *Bamazomus*.

Orientzomus Cokendolpher & Tsurusaki, 1994 consists of three species (Reddell & Cokendolpher, 1995). The type species, *Orientzomus sawadai* (Kishida, 1930), is known only from Ogasawara-shotô (= Bonin Islands), Japan. *Orientzomus luzonicus* (Hansen, in Hansen & Sörensen) is known only from Luzon Island, Philippines, and the third species from throughout the Mariana Islands remains undescribed. Geographically, the undescribed species is closest to the species of *Orientzomus* described herein from the Marshall Islands. *O. ralik* n. sp. differs from the other congeners in the number of spermathecal lobes so its sister species is not readily known. Like the undescribed species from the Mariana Islands, *O. ralik* has the fixed jaw tooth of the chelicerae depressed near the center making it appear somewhat bifid. Because this condition is not uncommon in schizomids this shared character is of uncertain value. The relationships of this genus should become clearer after further species are described from the various Pacific islands.

METHODS. The description format and methods essentially follow those used in our other papers on schizomids (see Reddell & Cokendolpher, 1995). The female genitalia were examined on slides with lactophenol. The setae of the male flagellum were not numbered, but all setae or their pits are illustrated for future reference. We also did not record the number of setae on the sterna. After studying hundreds of specimens of numerous genera we have determined that the number of setae varies greatly and is not useful as a taxonomic character at or below the ordinal level. Acronyms for museum collections are given in the acknowledgments.

***Apozomus brignolii* n. sp. (figs 1-6)**

MATERIAL EXAMINED. ♂ holotype, ♂ paratype, two ♀♀ paratypes from Ailuk Island, Ailuk Atoll, Ratak Chain, Republic of the Marshall Islands, 23 February 1969 (Sabath) (MCZ).

ETYMOLOGY. This species is named for the late Prof. Paolo M. Brignoli in recognition of his contributions to the systematics of the Schizomida.

DIAGNOSIS. *Apozomus* with male flagellum having prominent medial depression and flanking lobes dorsally; with distinct posteriodorsal process on the abdomen. Female genitalia with short (?) gonopod and spermathecae with two pairs of long lobes with enlarged terminal bulbs.

DESCRIPTION. ♂ holotype (length from distal margin of propeltidium to base of flagellum, 3.94 mm). Orangish red, legs somewhat lighter.

Cephalothorax: Propeltidium 1.22 mm long, 0.70 mm wide; anterior process with two setae followed by single median seta; with four pairs of dorsal setae; with distinct oval eyespots. Metapeltidium divided by distinct suture.

Abdomen: Tergite I with one pair dorsal setae; tergite II with three pairs minute anterior and one pair large dorsal setae posteriorly; tergites III-VII each with one pair dorsal setae; tergite VIII with one pair dorsal and one pair lateral setae; tergite IX with one pair dorsal, one pair dorsolateral, and one pair lateral setae. Abdominal segment XII with prominent rounded posterodorsal process bearing pair of strong spinose setae and extending above base of flagellum. Flagellum (figs 1-4) 0.42 mm long, 0.34 mm wide; stalk distinct, anterior margins nearly straight, slightly rounded posteriorly; with distinct median depression from near middle of flagellum to posterior end; pair of prominent lobes flanking depression; posterior end with three small posterior lobes.

Pedipalps (fig. 5): Trochanter produced distally to rounded knob bearing spinose seta; with row of strong setae on ventral margin and spur on mesal margin. Tarsal spur about 0.14 and claw about 0.43 dorsal length of tarsus.

Chelicerae: Fixed digit with four smaller denticles between the two primary teeth, additional denticle on inner edge of mesal most primary tooth; serrula with 14 teeth; guard tooth present; moveable digit with single large accessory tooth. Setae: 1= 3, 2= 4, 3= 5(6?), 4= 4 long dorsally, 4 short laterally, 5 = 10, 6= 1. Numerous large spicules on ventral surface of chelicerae basally.

Legs: Leg I telotarsus segment proportions: 4:4:4:5:6:10. Leg IV much longer than body; femur IV about 3.4 times as long as deep; anterodistal margin gently sloping posteriorly.

Measurements (mm): pedipalp: trochanter 0.20, femur 0.56, patella 0.56, tibia 0.50, tarsus 0.28, total 2.10; leg I: coxa 0.74, trochanter 0.44, femur 1.70, patella 2.34, tibia 1.60, basitarsus 0.44, telotarsus 0.66, total 7.92; leg IV: trochanter 0.42; femur 1.48, patella 0.64, tibia 1.10, basitarsus 0.96, telotarsus 0.60, total 5.20.

♀ PARATYPE: As in male except as follows: Length from distal margin of propeltidium to base of flagellum, 3.28 mm. Propeltidium 1.26 mm long, 0.70 mm wide; with five (?) pairs of dorsal setae. Leg IV femur about 2.5 times as long as deep.

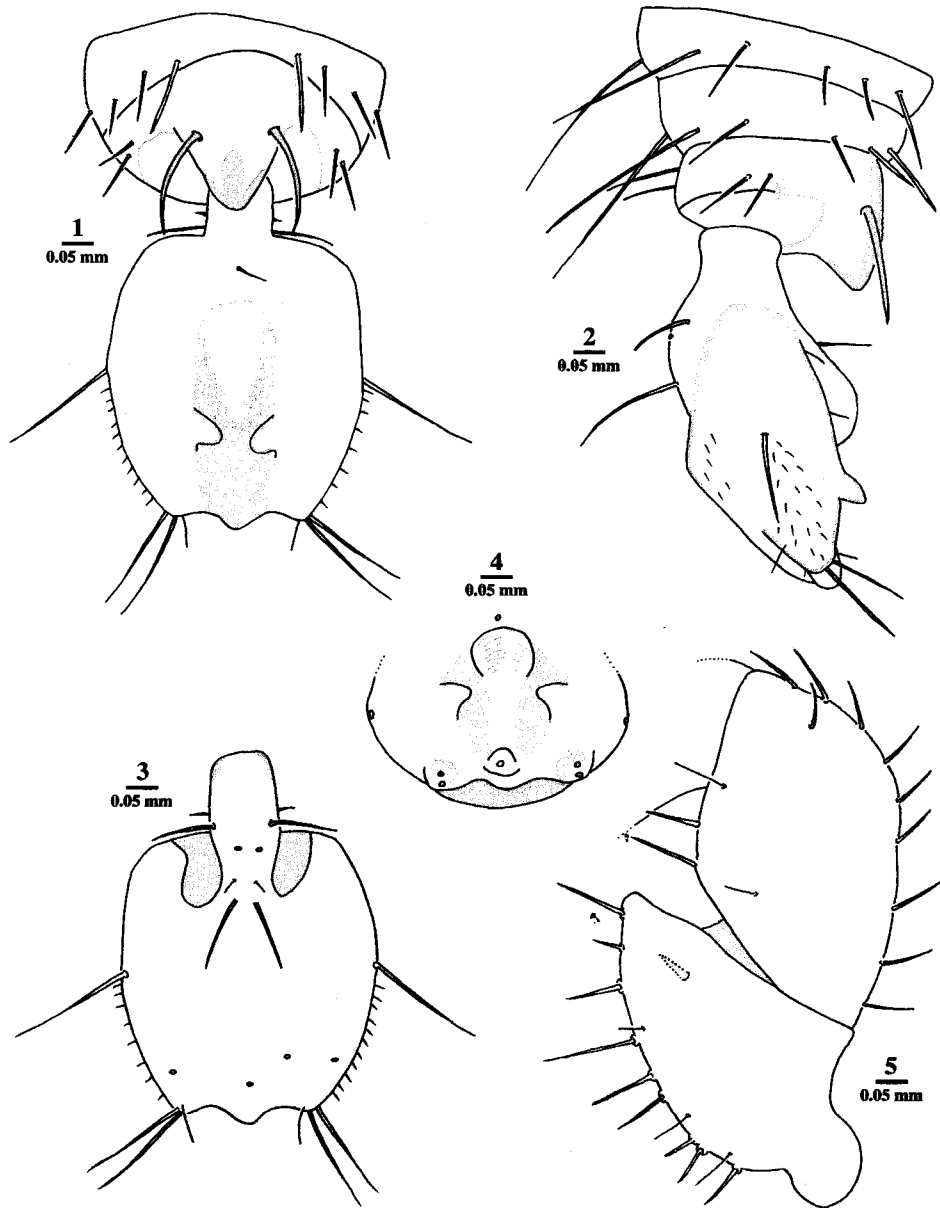
Flagellum 0.32 mm long, with three segments.

Chelicerae like holotype except: serrula with 14 teeth; Setae: 2= 5, 3= 4, 4= 5 long dorsally, 5 short laterally, 5 = 11. Numerous large spicules on ventral surface of chelicerae basally.

Spermathecae (fig. 6) with two pairs of long lobes ending in enlarged bulbs; gonopod short (?). Second female with lateral lobe of spermathecae on right side bifurcate. The additional bulb is smaller and apparently a deformity as it is not found on the left side or the other female.

Measurements (mm): pedipalp: trochanter 0.18, femur 0.48, patella 0.50, tibia 0.52, tarsus 0.16, total 1.84; leg I: coxa 0.56, trochanter 0.36, femur 1.14, patella 1.26, tibia 0.96, basitarsus 0.32, telotarsus 0.50, total 5.10; leg IV: trochanter 0.24; femur 1.16, patella 0.50, tibia 0.78, basitarsus 0.66, telotarsus 0.48, total 3.82.

VARIATION. The ♀ and ♂ paratypes have five pairs of dorsal setae on the propeltidium whereas the holotype has only four pairs.



Figs 1 - 5. *Apozomus brignolii* n. sp., holotype ♂: 1 - dorsal view of flagellum and abdominal posterodorsal process; 2 - lateral view of flagellum and abdominal posterodorsal process; 3 - ventral view of flagellum; 4 - posterodorsal view of end of flagellum; 5 - lateral view of pedipalpal trochanter and femur.

COMMENTS. Both ♀♀ had dried sometime in the past and have been rehydrated. The morphology of the gonopod is not certain. Either it is very short or it is inverted and the terminal end is not visible (fig. 6). Probably it is short since a long gonopod was not observed in either specimen. The lobes on the left side of our drawing of the female genitalia (fig. 6) are partially collapsed. Those on the right side are apparently more normal. The genitalia of the second ♀ were also somewhat distorted. The type series was collected with two immature specimens which are probably conspecific, but because of the uncertainty they are not described here.

A. brignolii differs from all congeners for which are known by the presence of a posterodorsal process on the abdomen and by the two large dorsal projections on the flagellum. The ♀♀ of *A. brignolii* resemble those of the type species of the genus from Australia (*A. watsoni* Harvey, 1992) in that both have two pair of long spermathecal lobes which end in enlarged bulbs. The median pair of bulbs on both species are larger than the lateral pairs. If *A. brignolii* does indeed have a short gonopod, this will readily distinguish it from *A. watsoni* which has a long bifurcate gonopod.

Orientzomus Cokendolpher & Tsurusaki, 1994

REVISED DIAGNOSIS. To the diagnosis provided by Reddell & Cokendolpher (1995), the following change should be made regarding the female genitalia: spermathecae with 2-3 pairs of wide, short unbranched lobes; without nodules; gonopod long, bifurcate.

COMMENTS. The discovery of the genitalia of the female of *O. ralik* n. sp. necessitated the modification of the diagnosis we presented in our generic revision. The female genitalia with a bifurcate gonopod and multiple short unbranched lobes places *Apozomus* near *Orientzomus*. The southeast Asian genus *Apozomus* Harvey is the only other group known to have a bifurcate gonopod, but members of this taxa have thin, elongate spermathecae which end in bulbs.

Orientzomus ralik n. sp. (fig. 7)

MATERIAL EXAMINED. ♀ holotype from Jibu (= Jebu) Island, Jaluit Atol, Ralik Chain, 29 April 1968 (J. L. Gressitt) (BPBM).

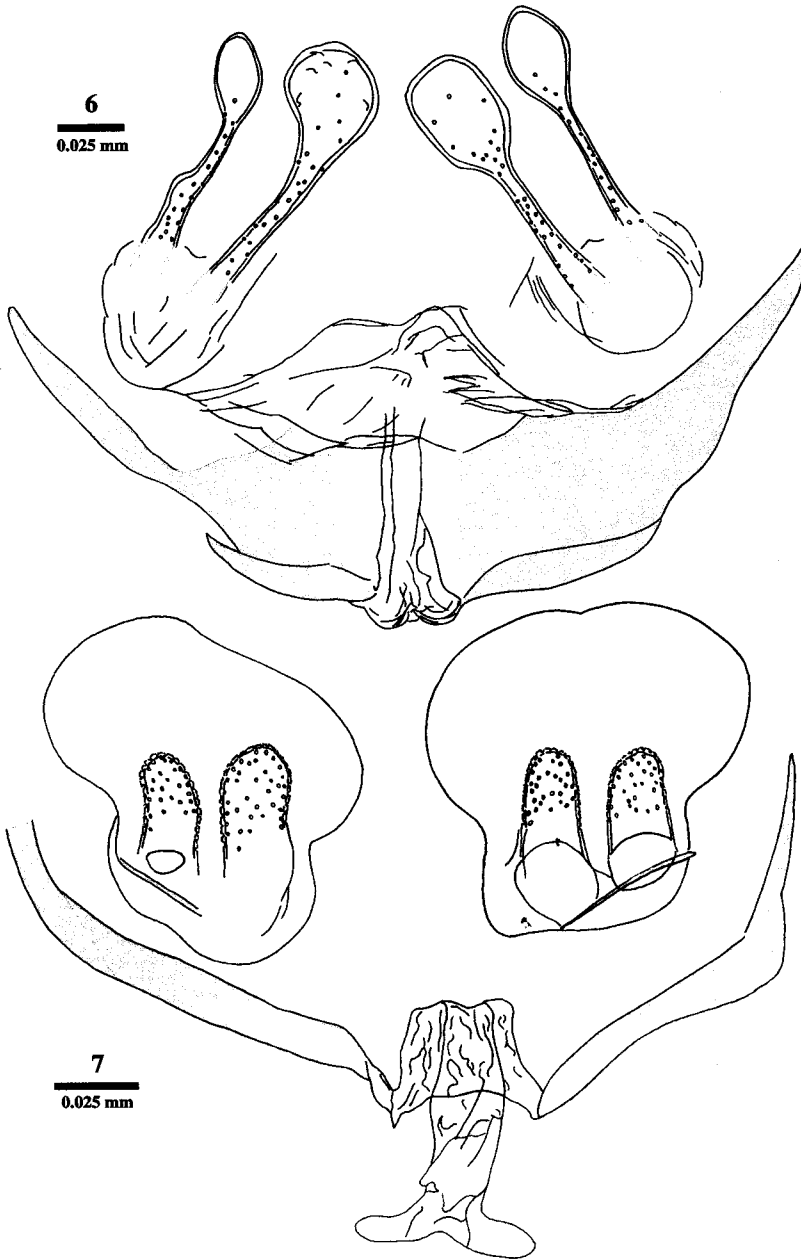
ETYMOLOGY. This species is named from the Marshallese word for the Sunset Island chain on which this species was collected. It is used as a noun in apposition.

DIAGNOSIS. Female genitalia with bifurcate gonopod and two pairs of even-sized, unbranched spermathecal lobes.

DESCRIPTION. ♀ holotype (length from distal margin of propeltidium to base of flagellum, 3.52 mm). Orangish red, legs somewhat lighter.

Cephalothorax: Propeltidium 1.12 mm long, 0.74 mm wide; anterior process with two setae followed by single median seta; with four pairs of dorsal setae; with distinct oval eyespots. Metapeltidium divided by distinct suture.

Abdomen: Due to clearing of the abdomen, some small setae may have been missed. Tergite I with one pair dorsal setae; tergite II with three pairs minute anterior and



Figs 6-7. 6 - *Apozomus brignolii* n. sp., paratype ♀: ventral view of genitalia; 7 - *Orientzomus ralik* n. sp., holotype ♀: ventral view of genitalia.

one pair large dorsal setae posteriorly; tergites III-IV each with one pair dorsal setae; tergite V with two pairs dorsal setae; tergite VI with one pair dorsal, one pair large dorsolateral, and one pair small dorsolateral setae; tergite VII with one pair large dorsal, one pair small dorsal, and one pair lateral setae; tergite VIII with one pair small dorsal setae near middle of tergite, one pair large dorsolateral setae, and one pair lateral setae; tergite IX with two pairs dorsolateral and one pair lateral setae. Flagellum three segmented, 0.28 mm long.

Pedipalps: Trochanter produced to distinct sharp triangular point bearing prominent setae and spur on mesal margin.

Chelicerae: Fixed digit with four smaller denticles between the two primary teeth, additional denticle on inner edge of mesal most primary tooth; serrula with 17 teeth; guard tooth present; moveable digit with single large medial accessory tooth and five very small teeth in more external row. Setae: 1= 3, 2= 5, 3= 4, 4= 4 long dorsally, 4 short laterally, 5 = 8, 6= 1. Numerous large spicules on ventral surface of chelicerae basally.

Legs: Leg I telotarsus segment proportions: 2:4:3:3:4:8. Leg IV much longer than body; femur IV about 2.3 times as long as deep; anterodistal margin gently sloping posteriorly.

Spermathecae (fig. 7) with two pairs of short, equal sized lobes. Individual lobes thick walled and filled with many pores making the surface look crenulate under lower magnifications; microtubules not observed connecting to the pores.

Measurements (mm): pedipalp: trochanter 0.20, femur 0.58, patella 0.50, tibia 0.48, tarsus 0.28, total 2.04; leg I: coxa 0.56, trochanter 0.24, femur 1.22, patella 1.36, tibia 1.06, basitarsus 0.32, telotarsus 0.46, total 5.22; leg IV: trochanter 0.34; femur 1.10, patella 0.50, tibia 0.78, basitarsus 0.68, telotarsus 0.46, total 3.86.

COMMENTS

Females of *O. ralik* differ from all other congeners by having the spermathecae consisting of a pair of unbranched lobes on each side. All other known species have three pairs. Microtubules connecting to the pores of the spermathecae (see Cokendolpher, 1988: fig. 4) were not found in the single specimen examined. Possibly the specimen was not adequately preserved, or they may actually not be present. Among the schizomids which have bifurcate gonopods (*Orientzomus*, *Bamazomus*, *Apozomus*), *Apozomus* and *O. ralik* have two pairs of spermathecal lobes and the other *Orientzomus* species and *Bamazomus* have three or numerous lobes, respectively. *O. ralik* has the lobes short and rounded like congeners and *Bamazomus*. The lobes of *Apozomus* are long and enlarged distally.

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