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The Fauna of Thai Caves
I. Three Phalangids from Thailand (Arachnida)

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ABSTRACT

A new species of Phalangodidae, *Paratakaoia minima,* is described from Thailand. Further records for 1 assamiid and 1 gagrellid are cited. These phalangids were collected from Thai caves and adjacent forest litter, and environmental notes are included.

INTRODUCTION

A small collection of Thai phalangids deposited in the B.P. Bishop Museum, Honolulu, were sent to one of us (S.S.) for identification. The specimens, in 12 vials, consisted of 3 named species, including 1 new species, and unidentifiable juveniles. The present report describes the new species and records collections of the others.

The holotype and paratypes of the new species are deposited in the B.P. Bishop Museum (BPBM).

These phalangids were all collected by one of us (F.D.S.) from Thai caves and adjacent forest litter as part of a study of Thai cave biology begun in 1965 by F.D. Stone and F.G. Howarth (Stone 1983). The only previous published records of phalangids from Thai caves resulted from the "Skeat Expedition" of 1899–1900 to caves in southern Thailand (Simon 1901).

Forest litter, including partially decomposed surface material and the decomposed organic layer beneath, was collected from native forest about 50 m outside the entrance of Tham (cave) Thap Khwang, Saraburi Province, central Thailand (1, Fig. 10). Hand-sorting of the litter revealed *Paratakaoia minima,* n. sp., *Bandona palpalis* Roewer, and a juvenile Gagrellidae.

Tham Thap Khwang was carefully surveyed for organisms during several trips to the cave in 1972 and 1973. A dry, upper-level tourist passage, 500 m long and with artificial lighting, did not have phalangids, though vegetable debris was present. *Bandona palpalis* adults were found on plant litter recently washed into the dark zone of a 900-m-long, intermittent stream passage. Unidentifiable juveniles of Assamiidae, appearing pale and fragile, were present on the surface of litter near pools in the dark zone of this passage and apparently were restricted to areas of high humidity. Temperature of the stream passage was 22–23 °C. Near the inlet to the stream passage, a 300-m-long passage contained a large colony of the fruit bat *Rousettus leschenaulti* and abundant guano. *Gagrella spinulosa* Roewer was found walking on the surface of the guano in the transitional zone not far from an entrance.

A single specimen of a juvenile Assamiidae was collected in 1981 from Tham Kaew, a cave in Sai Yok Yai National Park, Kanchanaburi Province (2, Fig. 10). This specimen

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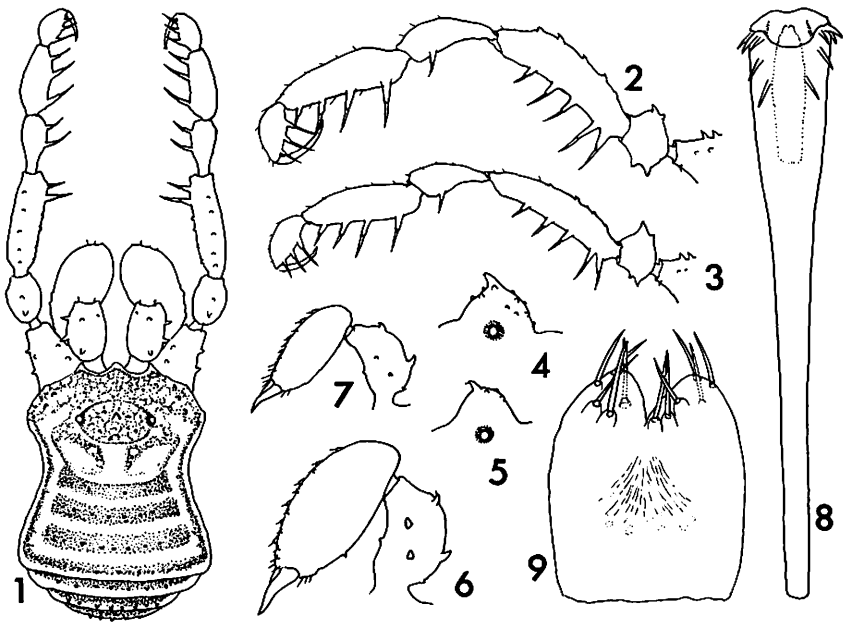

Fig. 1–9. *Paratakaoia minima.* **1**, Dorsal view of body, ♂ (23×). **2–3**, Lateral views of palpi: **2**, ♂; **3**, ♀ (28×). **4–5**, Left side views of eye tubercle: **4**, ♂; **5**, ♀ (55×). **6–7**, Lateral views of chelicerae: **6**, ♂; **7**, ♀ (28×). **8**, Ventral view of penis (130×). **9**, Dorsal view of ovipositor (114×).

occurred in the same habitat as the juvenile Assamiidae from Tham Thap Khwang, in a moist spot above a pool in the dark zone (23 °C). This cave is frequently visited by tourists.

Tham Chiang Dao, in Chiang Mai Province, northern Thailand (3, Fig. 10), had the most abundant population of *B. palpalis.* This cave has a lighted tourist passage, which occasionally floods from a lower-level stream passage; it also has upper-level passages with insectivorous bat colonies (which appear to have declined recently). Tourists also visit the upper-level passages, using hand-held lights. Adults of *B. palpalis* were collected at 4 locations in the cave:

1. On decomposed wood next to a pool 125 m from the entrance, along the lighted tourist route (18.2 °C, RH 100%).

2. On woody debris from incense sticks near a Buddha image at the end of the lighted passage, 325 m from the entrance.

3. On moist bat guano in the first upper-level bat chamber, 100 m from the entrance (23.0 °C, RH 97%).

4. Walking on plant debris near small pools in the upper-level passage beyond the bat chamber (also a tourist route), 200 m from the entrance (23.0 °C, RH 97%). Juvenile assamiids (unidentifiable) were also collected at the same 4 locations as the adult *B. palpalis.*

In summary, it seems most likely that *B. palpalis* is a widespread troglophilic species in Thailand that lives in forest litter but is able to complete its life cycle in the dark zone of caves. It is almost always found in areas with abundant plant litter, the one exception being on bat guano.

SYSTEMATICS

Family PHALANGODIDAE Simon, 1879

Paratakaoia minima Suzuki, **new species** Fig. 1–9

Measurements (in mm) ♂ (♀): body 1.51(1.43) long, 1.13(1.10) wide; length of femora 0.75:0.98:0.80:0.94(0.65:0.89:0.72:0.84); total length of legs 2.66:4.04:2.98:3.70(2.52:3.82: 2.66:3.55); tarsal segments 5:13:6:7(5:11:6:7); penis 0.58 long.

♂. Body very small, as shown in Fig. 1. Carapace with 2 small tubercles on each side at anterior lateral region. Eye tubercle enlarged, with a low median spine and some scattered tubercles (Fig. 1, 4). All scutal areas and free tergites each with a row of small tubercles, tubercles slightly larger on free tergites; anal plate with coarse tubercles. Free sternites each with a row of fine tubercles. Coxae of all legs with scattered tubercles, tubercles larger on coxae I. Coxae III with a row of small tubercles anteriorly and posteriorly. *Chelicerae* (Fig. 1, 6) well developed, strong. Segment 1 with a large distodorsal elevation, 2 dorsal and 2 ventrolateral spines on elevation; segment 2 prominently swollen, frontally with hair-tipped tubercles, some tubercles larger than others. *Palpi* as shown in Fig. 1–2. Trochanter with 2 low dorsal and 2 low ventral spines. Femur dorsally with 2 rows of low tubercles, ventrally with 5 long spines, and distomedially with 2 spines. Patella with 2 medial and 1 lateral spine. Tibia with 3 medial and 4 lateral spines. Tarsus with 3 spines on either side of ventral surface. *Legs* unarmed; distitarsi I and II with 2 and 3 segments, respectively; tarsi III and IV with double simple claws. *Penis* (Fig. 8). Distal part somewhat widened; dorsal side of distal end with a shallow median indentation. Ventral side of shaft with 5 pairs of setae. Disposition of these setae as shown in Fig. 8.

Coloration. Body and all appendages rusty yellow; carapace and eye tubercles reticulated with brown; scutal areas each with a dark brown band, free tergites with a dark brown band, a dark brown stripe along scutal margins. Free sternites with a narrow brown band. Chelicerae and palpi obscurely reticulated, leg segments reticulated with dark brown.

♀. With a slightly larger body; eye tubercle not as distended as that of ♂ (Fig. 5). Chelicerae, especially segment 2, not swollen but normal (Fig. 7). Palpi less strong than those of the ♂ (Fig. 3). Coloration paler. *Ovipositor* as shown in Fig. 9; both lobes with 3 dorsal and 2 or 3 ventral setae.

Type data. Holotype ♂, THAILAND: Changwat Saraburi: Amphoe Kaeng Khoi: nr Tham Thap Khwang, forest litter, 12.VIII.1973 (F. Stone) (BPBM 13,432). 2♀ paratypes, same data as holotype.

Distribution. Thailand.

Remarks. This species differs from *P. parva* Suzuki, the only other known species of this genus from Thailand, by the penis [compare Fig. 8 with Suzuki's (1985) fig. 6G, J, K].

Family ASSAMIIDAE Soerensen, 1884

Bandona palpalis Roewer, 1927: 389; 1935: 15, fig. 8.—Suzuki 1985: 92, fig. 12.

Material examined. THAILAND: Changwat Saraburi: Amphoe Kaeng Khoi: Tham Thap Khwang, in cave, 27.V.1973, 2♀; same data except forest litter nr cave, 12.VIII.1973, 1♀. Changwat Chiang Mai: Amphoe Chiang Dao: Tham Chiang Dao, in cave, 14.VIII.1981, 7♀; same data except 16.VIII.1981, 1♀.

Distribution. Thailand

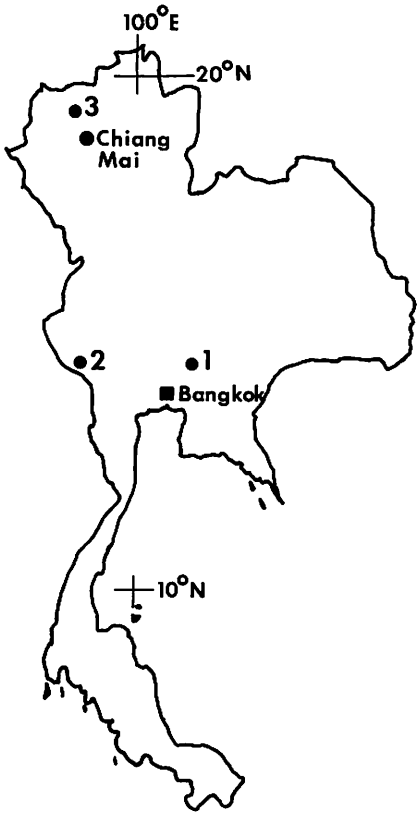

Fig. 10. Map of central and northern Thailand showing location of caves from which phalangids were collected: 1—Tham (=cave) Thap Khwang, Saraburi Prov; 2—Tham Kaew, Sai Yok Yai National Park, Kanchanaburi Prov; 3—Tham Chiang Dao, Chiang Mai Prov.

Undetermined genus and species

Material examined. THAILAND. Changwat Saraburi: Amphoe Kaeng Khoi: Tham Thap Khwang, in cave, 27.V.1973, 1 juv.; same data except 22.XII.1973, 3 juv., Changwat Chiang Mai: Amphoe Chiang Dao: Tham Chiang Dao, in cave, 14.VIII.1981, 4 juv.; same data except 16.VII.1981, 1 juv., Changwat Kanchanaburi: Amphoe Sai Yok: Tham Kaew, in cave, 22.VII.1981, 1 juv.

Family GAGRELLIDAE Thorell, 1876

Gagrella spinulosa Thorell, 1889.—Roewer 1923: 961, fig. 1091; 1954: 205.—Suzuki 1969: 99, fig. 14–15.

Material examined. THAILAND: Changwat Saraburi: Amphoe Kaeng Khoi: Tham Thap Khwang, in cave (accidental?), 30.XII.1973, 2♂.

Distribution. Burma, Thailand.

Undetermined genus and species

Material examined. THAILAND: Changwat Saraburi: Amphoe Kaeng Khoi: Tham Thap Khwang, forest litter nr cave, 12.VIII.1973, 1 juv.

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