# INSECTS OF MICRONESIA Coleoptera: Scaphidiidae

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Abstract: The Micronesian scaphidiid fauna, comprising the genera Baeocera Erichson, Scaphisoma Leach, and Scaphobaeocera Csiki, is reviewed for the first time. Of the 10 species treated, 5 are described as new. All species are keyed and the  $\mathring{\sigma}$  genitalia of 7 species, including those of all the new species, are illustrated.

#### INTRODUCTION

This paper records 3 genera and 10 species of Scaphidiidae belonging to 2 tribes (Scaphisomini, Toxidiini) from Micronesia. Most of the reported material was supplied by Dr. G. A. Samuelson, Bernice P. Bishop Museum in Honolulu (BISHOP). A smaller but interesting batch was received from Dr. T. Nakane, National Science Museum in Tokyo (NSM). I am indebted to Drs. Samuelson and Nakane for making this valuable material available for study.

Additional institutions involving material studied or deposited are: British Museum (Natural History) in London (BMNH), California Academy of Sciences in San Francisco (CAS), Field Museum of Natural History in Chicago (FMNH) [=CM], Kyushu University in Fukuoka (KU), Museum of Comparative Zoology, Harvard University in Cambridge (MCZ), Museum d'Histoire naturelle in Geneva (MHN), National Museum of Natural History in Washington (US), South Australian Museum in Adelaide (SAM), Staatliches Museum für Tierkunde in Dresden (SMT), and Termeszettudomanyi Muzeum in Budapest (TMB).

Scaphidiidae are associated with fungi and usually are very motile insects with fully developed wings. The greatest development of the family is to be found in the Oriental Region. Still, scaphidiids have not been adequately collected in most parts of Asia and it is likely that most of the tropical species remain to be described. The Micronesian scaphidiid fauna seems depauperate and apparently little known. Statements on geographical patterns and phylogenetic relations of many taxa have only limited value at present.

The 2 genera of Scaphisomini represented in Micronesia—Baeocera and Scaphisoma—are worldwide in distribution. Only 1 specimen of Baeocera is known from Micronesia and this specimen represents a new, possibly en-

demic species. Its closest known relatives are New Guinean and Taiwanese species. Members of this genus have cryptic habits and are rarely collected unless sifting and "Winkler" or Berlese techniques are applied. *Baeocera* species appear to have poor overseas dispersal abilities. Although 59 species are known from the Oriental Region, including Japanese ones derived from Indo-Chinese stock, only *Baeocera subaenea* Fauvel and *dugdalei* Löbl are reported from New Caledonia. In contrast, 27 species of *Scaphisoma* have been recognized from New Caledonia. Likewise, 15 species of *Scaphisoma* but only 2 of *Baeocera* are known from the Mascarenes.

The Micronesian Scaphisoma belong to 3 groups. S. liliputanum Löbl, previously known from Fiji, is related to several other Melanesian species. This group is not well understood but might be derived from Malayan stock of the boleti group. Also, the Australian instabile group shares characters indicating possible close relationships. The haemorrhoidale group is actually represented in the Oriental Region by 39 species, with 1 being widespread to the Mascarenes and 2 others occurring in Japan and the USSR Far East. This group, not yet recorded from Melanesia east of Papua New Guinea, includes 4 Micronesian species: tridentatum Löbl of probable Papuan origin; perkinsi Scott of Hawaii and the Bonins but related to the Vietnamese Lateapicale Pic; dybasi n. sp. and yapense n. sp. perhaps native, the former related to the Vietnamese tricoloroides Löbl. The tricolor group is known only by 5 or 6 species from SE Asia. The Micronesian specimens are with some doubt assigned to the Philippine species, tricolor Heller.

The Toxidiini are represented in Micronesia by 3 species of *Scaphobaeocera*. They are obviously closely related and are of probable New Guinea origin.

All Micronesian scaphidiids are fully winged and small enough to be dispersed by winds. *Scaphisoma* may have been carried eastwards with decayed wood covered with fungoid growth; however, there is no evidence for passive dispersion. Notable and difficult to explain is the absence of Scaphidiini, Cypariini and Heteroscaphini in Micronesia and other oceanic islands. Members of these tribes live in the same way as *Scaphisoma* and are widely distributed on continental islands of the western Pacific.

#### **SYSTEMATICS**

## KEY TO MICRONESIAN GENERA OF SCAPHIDIIDAE

Ι.	and antennal segment short, asymmetrically triangular or subtriangular, with shape
	very different from 4th segment; 1st visible sternite with postcoxal plates
	Scaphisoma
	3rd antennal segment slender, cylindrical or subcylindrical, with shape similar or
	rather similar to 4th segment; 1st visible sternite without postcoxal plates 2
2.	Form narrow, conspicuously vaulted dorsoventrally, laterally compressed
	Form broad, normally vaulted and not compressed laterally Baeocera

Table 1. Distribution of Micronesian Scaphidiidae

-	Micronesian Island Groups											
				Caroline						_		
	Bonin	Volcano	S. Mariana	Palau*	Yap	Caroline Atolls	Truk	Ponape	Kusaie**	Marshall	Gilbert***	Other Localities
Scaphisomini											_	
1. Baeocera					X							
pacifica 2. Scaphisoma liliputanum					X	X		X				Fiji
3. S. perkinsi 4. S. tridentatum	X			X								Hawaiian Is. New Guinea, Samoa
<ul><li>5. S. dybasi</li><li>6. S. yapense</li><li>7. S. tricolor</li></ul>	X		X		X							Philippines
Toxodiini												<b>F F</b>
8. Scaphobaeocera remota				X								
9. S. ponapensis 10. S. sp.					X			X				

<sup>\*</sup> Now Belau. \*\* Now Kosrae. \*\*\* Western sector of Kiribati.

#### TRIBE SCAPHISOMINI

### Genus Baeocera Erichson

Baeocera Erichson, 1845, Naturg. Insecten Deutschl., Coleopt. 3: 4 (typespecies proposed: Baeocera falsata Achard of N America; pending ICZN ruling, see Löbl, 1977: 101).

Small-sized Scaphisomini (usually under 2 mm). 3rd antennal segment slender, maxillary galea narrow; pleural suture distinct, sutural striae of elytra not reduced; 1st visible sternite without basal plates.

CAROLINE ATOLLS. ULITHI ATOLL: 2  $\eth$ , 1  $\Im$ , Potangeras Islet, 10 Nov. 1947, H. S. Dybas (BISHOP, FMNH).

PONAPE: 3 &, Nipit, 20 Jul. 1939, Teiso Esaki (Візнор, КU).

In addition to *liliputanum*, the group includes *distans* Löbl, *zimmermani* Löbl and *aequatum* Löbl of Fiji, and *tannaense* Löbl of New Hebrides. These species possess a primitive aedeagus and are characterized by having the apex of the parameres expanded. Possibly, they may be derived from Oriental stock of the *boleti* group, although they share many characters with some New Caledonian forms (*perpusillum* Löbl, *nanulum* Löbl) and with the Australian *instabile* group.

## 3. Scaphisoma perkinsi Scott (Fig. 3)

Scaphisoma perkinsi Scott, 1908, Fauna Hawaiiensis 3(5): 534 (Hawaii; syntypes in BMNH).

Form average; length 1.45–1.6 mm. Dorsal surface reddish brown to black, except for testaceous apical  $^{1}/_{5}$  or  $^{1}/_{4}$  of elytra and pale brown to testaceous apical abdominal segments. Sutural striae of elytra straight, almost regularly divergent from apex to base. Visible abdominal segments and median portion of metasternum with microsculpture consisting of transverse waves. Aedeagus (Fig. 3) with dense strongly sclerotized spines in internal sac.

DISTRIBUTION: Hawaiian Is, Bonin Is.

BONIN IS. снісні JIMA: 2 &, Omura, 6 Jul. 1949, schoolhouse, under bark, A. R. Mead (Візнор, US).

S. perkinsi is a member of the haemorrhoidale group and is closely related to lateapicale Pic from Vietnam.

## 4. Scaphisoma tridentatum Löbl

Scaphisoma tridentatum Löbl, 1975, Revue Suisse Zool. 82: 408 (New Guinea; holotype in TMB).

Length 1.2–1.35 mm. Upper surface testaceous to pale brown, each elytron usually with darker brown base and a darker brown subapical transverse spot. Abdominal segments with microsculpture consisting of transverse lines. Punctuation of elytra dense and moderately coarse, sutural striae from apex to level of scutellum straight, at base somewhat curved externally.  $\delta$  with 5th visible sternite modified, in middle of apex expanded apically and bearing 3 minute denticules.

DISTRIBUTION: New Guinea, Samoa, Caroline Is (Palau).

Scaphisoma tridentatum is evidently widely distributed on Pacific islands

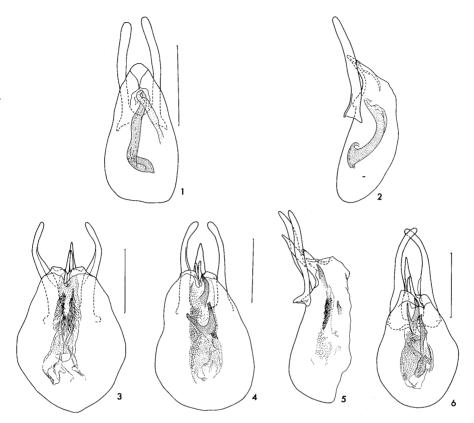


FIGURE 1-6. Aedeagi. 1-2, Baeocera pacifica n. sp., scale = 0.1 mm. 3, Scaphisoma perkinsi Scott, scale = 0.2 mm. 4-5, S. dybasi n. sp., scale = 0.2 mm. 6, S. tricoloroides Löbl, scale = 0.2 mm.

but details of its distribution are not adequately known. It belongs also to the *haemorrhoidale* group and its closest relative seems to be *beccarii* Löbl from New Guinea.

# 5. Scaphisoma dybasi Löbl, n. sp. (Fig. 4–5)

Length 1.3–1.4 mm. Body moderately convex. Head, pronotum, elytra in basal ½3, along suture and along lateral margins to apical ½3 dark reddish brown. Middle of elytra darkened with apical ½3 testaceous. Ventral surface of body, except for abdomen, about as dark as head and pronotum. Abdomen, femora and tibiae paler reddish brown, antennae and tarsi testaceous. Antennae moderately long, relative lengths of segments in following ratios: III 5:IV 12:V 16–18:VI 15–17:VII 20:VIII 15:IX 20:X 20:XI 25; IV slender, V distinctly wider, VI somewhat wider than V, about 4 × as long as wide; VII and VIII each about 3 × as long as wide, VIII wider than VI; XI 3.5 × as long as wide. Pronotum at base 0.83–0.86 mm wide; lateral margins regularly rounded; lateral keels in dorsal view not visible; dorsal punctuation

sparse and very fine, barely visible at 25 × magnification. Minute point of scutellum exposed. Elytra at longest point 0.89-0.96 mm long, at suture 0.81-0.85 mm long, combined 0.91-0.94 mm wide, the widest point being behind basal ¼ then apically feebly narrowed; lateral margins slightly rounded; in dorsal view lateral keels not visible or only visible at basal angle; apical margins straight; inner apical angle lying in or somewhat behind level of external angles; sutural margins not or somewhat elevated; intervals between suture and sutural striae flat, each in middle 0.05 mm wide, with a row of very fine punctures along sutural margin and a few very fine punctures along sutural striae (these punctures bigger than pronotal ones); sutural striae moderately deep, finely punctate, very slightly divergent from apex to about middle, then parallel to suture, ending still behind level of scutellum; discal punctuation in basal 1/3 to 1/2 about as fine as that of pronotum, and sparse, becoming denser and coarser apically, apical 1/3 (although still very fine when compared with most of the related species) with punctures for part as large as spaces between them. Pygidium covered with microsculpture consisting of transverse lines and very finely punctate. Mesepimera shorter than the distance to mesocoxae. Metasternum without microsculpture, except for a narrow area between metacoxae, very finely punctate all over; median portion without depressions, feebly vaulted and more densely punctate than lateral portions. Plates behind mesocoxae 0.06 mm long, their margins very finely punctate. Metepisterna at broadest point 0.15 mm wide, proximally narrowed, flat and impressed at internal suture, externally slightly vaulted; internal suture rounded, not punctate. Sternites with microsculpture as pygidium. Punctuation of 1st visible sternite as in metasternum; postcoxal plates 0.05-0.07 mm long with external margins coarsely and densely punctate, internally with fine, sparse punctures. Tibiae straight, slender, meso- and metatibiae somewhat slenderer than protibiae, becoming stouter at apex.

♂. Segments 1–3 of protarsi moderately enlarged. Aedeagus (Fig. 4 & 5) 0.61 mm long. Holotype ♂ (FMNH), S. Mariana Is: Saipan: Mt. Tagpochau, 380 m, 15 Feb. 1945, in rotten log, H. S. Dybas. Paratypes: 1♀, same data as holotype; 1♀, Sadog Talofofo, Talofofo area, 9 Feb. 1945, underside of fungus covered log, Dybas (Візнор, МНN).

DISTRIBUTION: S. Mariana Is (Saipan).

This species is obviously closely related to *tricoloroides* Löbl from Vietnam. It may be readily distinguished from *tricoloroides* in having elytra with sutural striae shorter and straight basally and in the different shape of sclerites in the internal sac of the aedeagus (compare with Fig. 6). In general appearance *dybasi* resembles *perkinsi*. Both species are easy to separate by characters mentioned in the key; also *dybasi* is paler in color, has shallower and shorter sutural striae of the elytra, and metasternal microsculpture restricted to a smaller medio-apical area.

# 6. Scaphisoma yapense Löbl, n. sp. (Fig. 7-8)

Length 1.4–1.55 mm. Body moderately convex. Head and pronotum pale brown or pale reddish brown. Elytra paler than pronotum, yellowish brown except for base and a subapical spot which are as dark as pronotum. Abdomen, antennae and legs brown. Antennae long, relative lengths of segments in following ratios: III 7:IV 14–15:V 20:VI 19–20:VII 24–25:VIII 19–20:IX 23–24:X 21–23:XI 25–29; IV slender, V somewhat wider, about  $5\times as$  long as wide; VI still slender but decidedly wider than V, about  $4.5\times as$  long as wide; VII 3.5 × as long as wide; VII 4 × as long as wide; XI 3.5 to 4 × as long as wide. Pronotum at base 0.85–0.88 mm wide; lateral margins straight or almost straight in basal ½, then apically rounded; in dorsal view lateral keels visible from base to apical ½ or further to apical angles;

dorsal punctuation dense and fine, barely distinct at 12 × magnification. Point of scutellum exposed. Elytra at longest point 0.97-1.03 mm long, at suture 0.86-0.94 mm long, combined 0.95-0.99 mm wide, with broadest point situated behind basal \%, then rather strongly narrowed apically; lateral margins straight between largest point and apex; lateral keels visible in dorsal view except for a short area at broadest point; apical margins straight; inner apical angle situated behind level of external angles; sutural margin not elevated; intervals between sutural margin and sutural striae flat, each in middle 0.05-0.06 mm wide, with a dense row of slightly coarser punctures than those of pronotum; sutural striae divergent to suture from apex to about middle of elytra, then parallel, curved externally at base, ending behind pronotal lobe; discal punctuation very dense and rather coarse, punctures generally larger than spaces between them. Pygidium with extermely fine punctuation, covered with microsculpture consisting of transverse lines or waves. Mesepimera longer than the distance to mesocoxae. Metasternum in median portion vaulted, except for flat area between-metacoxae; medioapical depressions vague or absent; surface between meso- and metacoxae with microsculpture consisting of transverse waves; punctuation very fine and sparse laterally, becoming coarser and much denser between meso- and metacoxae, in median portion rather coarse and very dense except for area between the mesocoxae; each side parallel to metacoxae with a very dense row of rather coarse punctures. Plates behind mesocoxae 0.04 mm long, their margins densely punctate. Metepisterna vaulted, at internal suture impressed, at the broadest point 0.10 mm wide, proximally feebly narrowed; internal margin rounded at apical angle, otherwise straight. Sternites covered with microsculpture consisting of tranverse waves or lines. First visible sternite with postcoxal plates 0.07 mm long, rounded, very densely and coarsely punctate at apical margins; this segment sparsely and very finely punctate on lateral portions to near apical margin in median portion, becoming much denser and coarser mediobasally, sometimes nearly as dense as that of median portion of metasternum. Tibiae slender and straight, meso- and metatibiae stouter at apex.

 $\delta$ . Segments 1–3 of protarsi and 1 & 2 of mesotarsi enlarged. Fifth visible sternite without sexual characters, 6th with a 0.07 mm long subtriangular medio-apical lobe. Aedeagus (Fig. 7–8) 0.79–0.88 mm long, strongly sclerotized.

Holotype & (Bishop 12,119), Yap: Tomil Distr, 7 Aug. 1950, R. J. Goss. Paratypes: Yap: 2 &, 2 ♀, Tomil Distr, Jul.–Aug. 1950, Goss; E. Rumung I: 1 ♂, 7 Aug. 1950, Goss (Bishop, CAS, MCZ, MHN, US).

DISTRIBUTION: Caroline Is (Yap).

S. yapense is a member of the haemorrhoidale group but deviates strongly from all other species in shape of median lobe and apical portion of parameres of the aedeagus. Externally, the species is rather similar to tridentatum Löbl, although larger, differently colored on upper surface and with coarser punctuation on elytra and on median portions of metasternum and of first visible sternite.

# 7. Scaphisoma tricolor Heller

Scaphisoma tricolor Heller, 1917, Wien Entomol. Ztg. 36: 46 (Luzon; holotype in SMT).

Length 1.8–2.2 mm. Head and pronotum pale ochraceous to dark brown. Elytra dark brown to black, except for testaceous to yellowish apical ¼. Abdomen testaceous or ochraceous. Elytra coarsely punctate, with sutural striae straight and divergent from apex to base. Abdominal segments and median and latero-apical portion of metasternum with microsculpture consisting of transverse lines.  $\delta$  with stouter and relatively strongly curved mesotibiae;

1st segments of protarsi and mesotarsi conspicuously enlarged, wider than apex of tibiae.  $\mathcal{Q}$  with apical margin of elytra at inner angle with a shallow incision. Aedeagus as in other related species with asymmetrical apical part of median lobe and asymmetrical, strongly expanded parameres.

DISTRIBUTION: Philippines, Bonin Is.

BONIN IS. HAHA JIMA: 2 &, 12 Jul. 1969, T. Nakane; 1 &, 2 \, 2, 15 Jul. 1969, Nakane; 6 &, 1 \, 2, Okimura, 2 Jun. 1976, Nakane; 1 &, same loc., 7 Jun.1976, Nakane (NSM, MHN).

Scaphisoma tricolor is to be placed in a small group including 5 or 6 species from the Philippines, Indonesia and Nicobar Is.

The aedeagi of the specimens from the Bonins are not quite like those of the 2 known Philippine males. I cannot make any inferences based on the differences between these specimens until more males from Luzon are available for study.

## TRIBE TOXIDIINI Genus **Scaphobaeocera** Csiki

Scaphobaeocera Csiki, 1909, Ann. Hist.-Nat. Mus. Nath. Hung. 7: 341 (typespecies: S. papuana Csiki, of New Guinea).

Small-sized Toxidiini with basal pronotal angles prolongated over proximal portion of metepisterna and with well developed mesepimera. Surface usually very shiny often with microsculpture, especially on elytra, metasternum and abdominal segments. Elytra usually with parasutural striae.

The taxonomy of *Scaphobaeocera* and related genera is not very satisfactory at the present. *Scaphobaeocera* is widely distributed from Japan to Australia, southern Asia, Sri Lanka, the Mascarenes and Seychelles, Madagascar and probably also in Africa. It is notable that the genus has not yet been found in Eastern Melanesia.

#### KEY TO MICRONESIAN SPECIES OF SCAPHOBAEOCERA

1.	Lateral portion of metasternum and lateral-basal portions of 1st visible sternite with-
	out microsculpture; base of 1st visible sternite not rugose
	Lateral portions of metasternum and 1st visible sternite with conspicuous microsculp-
	ture; base of 1st visible sternite rugose
2.	Sutural margins of elytra not elevated; antennal segment VI as long or longer than
	IV 8. remota n. sp.
	Sutural margins of elytra elevated; antennal segment VI slightly shorter than V

### 8. Scaphobaeocera remota Löbl, n.sp. (Fig. 9–10)

Length 1.05–1.17 mm, dorsoventral average 0.63–0.68 mm, pronotum at base 0.56–0.60 mm wide, elytra combined 0.60–0.62 mm wide. Dorsal surface reddish brown, elytra opalescent, apically darkened but at apical margin narrowly pale. Punctuation, microsculpture of dorsal surface and most of structural characters as in *antennalis* Löbl from New Guinea. Relative lengths of antennal segments in following ratio: III 7:IV 10–11:V 13–15:VI 11–

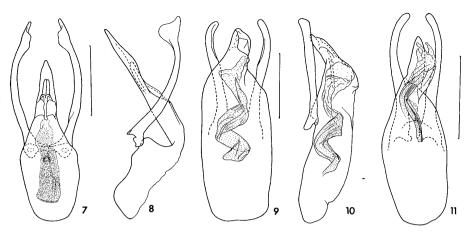


FIGURE 7-11. Aedeagi. 7-8, Scaphisoma yapense n. sp., scale = 0.3 mm. 9-10, Scaphobaeocera remota n. sp., scale = 0.1 mm. 11, S. ponapensis n. sp., scale = 0.1 mm.

12:VII 13–15:VIII 9–10:IX 13–14:X 13–14:XI 29–32; VIII nearly 2  $\times$  as long as wide, XI 4–5  $\times$  as long as wide. Mesepiterna, mesepimera and metasternum without microsculpture. Metepisterna wider than in *antennalis*, 0.07–0.08 mm wide, proximally not narrowed, with straight inner suture. Microsculpture of 1st visible sternite extremely fine, visible only at high magnification (200  $\times$ ) and located on apical portion of segment. Following sternites distinctly microsculptured. Parasutural striae of elytra shorter than in *antennalis*, ending 0.15–0.25 mm behind level of point of scutellum.

3. Segments 1-3 of protarsi distinctly enlarged. Aedeagus (Fig. 9-10) 0.32-0.34 mm long. Holotype 3 (FMNH), Palau Is: Peleliu, near coast, 2 Aug. 1945, sifting *Pandanus* log on ground, H. S. Dybas.

DISTRIBUTION: Caroline Is (Palau).

PALAU. PELEIU: 1 ♀ paratype, same data as holotype, but 3 Mar. 1945. KOROR: 2 ♀ paratype, limestone ridge S of inlet, 21 Jan. 1948, under dead bark, Dybas; 1 ♀, same data, but 17 Jan. 1948. Aurapushekaru: 1 ♂ paratype, 13 Jan. 1948, beating vegetation, Dybas (Bishop, CAS, MCZ, MHN, US).

In *remota* n. sp. the parameres of the aedeagus are not enlarged internally at the apex as in *antennalis* Löbl and the shorter apical portion of median lobe lacks a slender dorso-apical apophysis. Externally *antennalis* may be separated from *remota* in having shorter parasutural striae of elytra and visible microsculpture on metepisterna, mesepimera, metasternum and 1st sternite.

## 9. Scaphobaeocera ponapensis Löbl, n. sp. (Fig. 11)

Length 1.05 mm, dorsoventral average 0.61 mm, pronotum at base 0.58 mm wide, elytra combined 0.62 mm wide. With characters of *remota* but with elytra with elevated sutural margins and darkened over the whole apical ¼, antennal segments VI–X shorter (relative

lengths of segments being in following ratio: III 7:IV 10:V 13:VI 9:VII 13:VIII 8:IX 12-13:X 12:XI 31-35), metepisterna somewhat narrow and aedeagus (Fig. 11) smaller, 0.23-0.25 mm long, with apical portion of median lobe slender and with a less curved internal sac.

Holotype & (US 100086), Ponape: Uh Distr., Awakpa, 2 Mar. 1948, in banyon log, H. S. Dybas; 1 & paratype, same data as holotype (Візнор). DISTRIBUTION: Caroline Is (Ponape).

### 10. Scaphobaeocera species

A single of from the western Caroline Islands [YAP: 14 Aug. 1950, R. J. Goss (Bishop)] represents an additional species, but it is not described at this time due to its poor condition. The general appearance and structural characters are as in *remota* n. sp., except for the longer parasutural striae of the elytra and the coarser microsculpture of the lateral portions of the metasternum and 1st visible sternite.

#### LITERATURE CITED

Löbl, I. 1977. Baeocera Erichson, 1845 (Coleoptera, Scaphidiidae): Request for the designation of type-species in harmony with the intention of its author. Bull. Zool. Nomencl. 34: 1–103.