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Three New Species of Poecilosclerid Sponge from Korea

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Three species of Poecilosclerid sponge (class Demospongiae, subclass Ceractinomorpha) are newly described from the waters around Cheju Island, Keomun Island and Keoje Island. They are *Antho (Plocamia) bakusi, Clathria (Clathria) koreana* and *Oxymycale rhoi.*

Ninety percent of living sponges belong to the class Demospongiae (Hajdu, 1995). The order Poecilosclerida (subclass Ceractinomorpha) is the largest and most diverse among demosponge orders (Bergquist and Fromont, 1988). The shape varies from arborescent to massive or even encrusting, occurring in all seas from intertidal habitats to deep seas. Bakus (1966) reported 23 species of this order from the San Juan Archipelago, Washington, USA. Sim and Bakus (1986) reported 15 species from Santa Catalina Island, California. Bergquist and Fromont (1988) reported 108 species including 38 new species from New Zealand. Hooper (1996) described 459 species, including 52 new species in a phylogenetic revision of the Poecilosclerid Microcionidae. Among them, 148 species were recorded from the Australian fauna. Sixty-three species of Poecilosclerid sponges were recorded from Japan (Hoshino, 1981), and 55 species from Korea (Rho & Sim 1979, Sim 1981, Sim & Kim 1988, Sim & Byeon 1989). The materials examined in the present study were collected by SCUBA and fishing-nets from around Cheju Island, Keomun Island and Keoje Island, south of Korean mainland. Sponge identification requires examination of various characters, which may include shape, color, consistency, texture, skeletal arrangement, and spicules. For skeletal arrangement, thin free-hand sections were made with a surgical blade from specimens hardened in alcohol. Spicules were examined by dissolving a piece of sponge in sodium hypochlorite (bleach). For microsclere morphology, scanning electron microscope preparations were made by drying spicules on an AKASHI ISI- SS40 (SEM) at the Department of Biology, Hannam University. SEM study of spicules followed the procedure of Rützler (1978). Type specimens of three new species are stored at the Natural History Museum (NHM), Hannam University, Taejeon, Korea.

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Systematic Accounts

Class Demospongia Sollas, 1885
Subclass Ceractinomorpha Lévi, 1953
Order Poecilosclerida Topsent, 1928
Family Microcionidae Carter, 1875

Antho (Plocamia) bakusi n. sp.
(Fig. 1. A-H)

Type specimens: Holotype (Por. 23, NHM, Hannam Univ.), two paratypes (Por. 23-1, Por. 23-2, Dept. of Biology, Hannam Univ.), Daesambudo (Keomun Island) on 27 Nov. 1995, 25 m (SCUBA).

Description: Specimens always encrusting on sponge *Jaspis wondoensis* and measure up to 9×4.5×1 cm.

Surface rough with irregularly arranged tubercles. Oscules measure up to 1 mm in diameter. Texture firm and colour in life orange-red.

Ectosome. Thick styles arranged at right angles to body surface. Acanthostrongyles and acanthostyles arranged regularly. Isochelas, toxas and thin styles found in the cortex.

Choanosome. Acanthostrongyles irregularly arranged. Thick styles, isochelas and toxas rare.

Spicules. Megascleres
- Styles (thick) ---------- 225-650×10-25 μm
- Styles (thin) ---------- 160-445×4-6 μm
- Acanthostyles ---------- 110-185×5-10 μm
- Acanthostrongyles ---------- 115-145×9-15 μm

Microscleres
- Toxas (large) ---------- 107-207 μm
- Toxas (medium) ---------- 55-95 μm
- Toxas (small) ---------- 17.5-48 μm
- Isochelas ---------- 17.5-22.5 μm

Etymology: The specific name *bakusi* is named after Dr. Gerald J. Bakus, who is a professor at Department of Biological Science, University of Southern California, a marine ecologist and a sponge taxonomist.

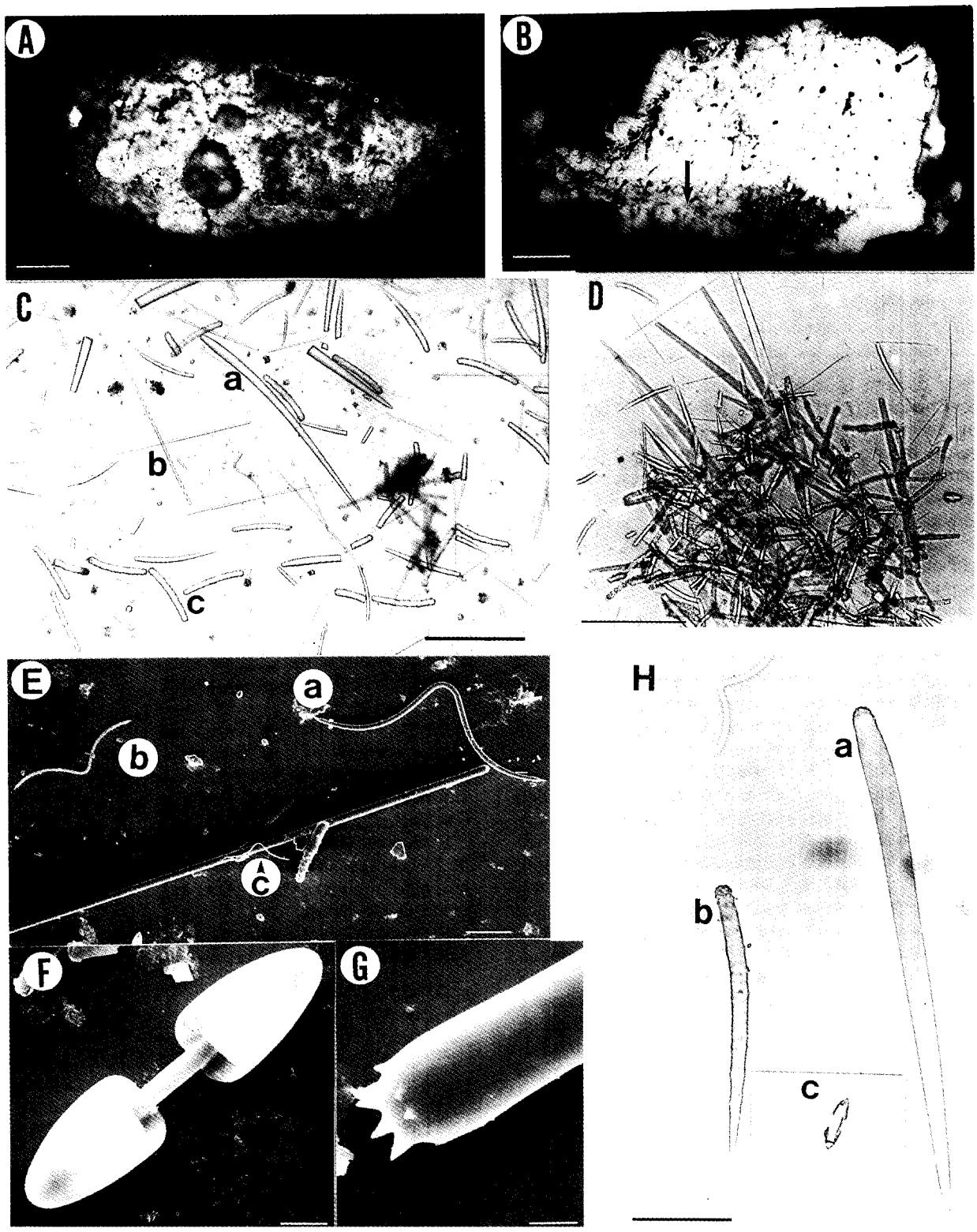

Fig. 1. *Antho (Procamia) bakusi* n. sp. A, Top-side view. B, Back-side view. C, Megascleres; a. thick style, b. thin style, c. acanthostrongyle. D, Skeletal structure. E-F, Microscleres. E, a. large toxa, b. middle toxa, c. small toxa, F, Isochela. G, Head of thin style. H, a. spined thik style, b. acanthostyle, c. isochela. Scale bars=1.35 μm (G), 2.59 μm (F), 26.2 μm (E), 150 μm (C, D), and 1 cm (A, B).

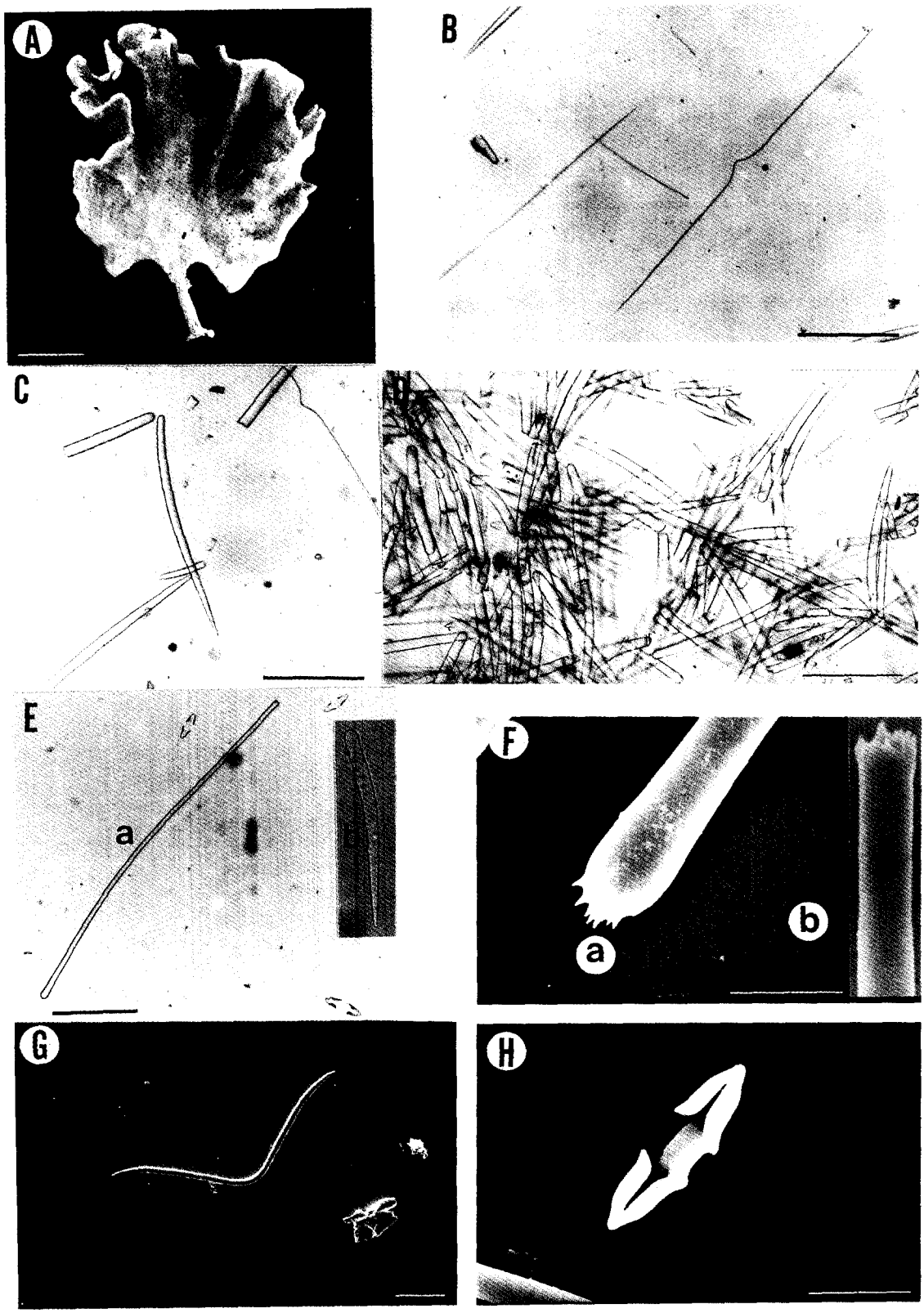

Fig. 2. *Clathria (Clathria) koreana* n. sp. A, Side view. B, Large toxa. C, Style. D, Skeletal structure. E, a. toronte, b. acanthostyle. F, a. head of acanthostyle, b. the other end. G, Small toxa. H, Isochela. Scale bars=10 μm (F, H), 13.3 μm (G), 100 μm (E), 200 μm (C, D), 230 μm (B), and 2 cm (A).

Table 1. Comparison of spicule size in *Anto (Plocamia) bakusi* n. sp. with *P. illgi* and *P. burtoni*

Spicules	Size of spicule (μm)		
	P. illgi	*P. burtoni*	*Antho (Plocamia) bakusi* n. sp.
Megascleres (μm)			
Styles (thick)	254-333×18-23	100-350×5-7	225-650×10-25
Styles (thin)	160-252×4-7	190-260×2-3	160-445×4-6
Acanthostyles	179-219×10-19	75-100×7	110-185×5-10
Acanthostrongyles	120-159×10-17	75-100×7	115-145×9-15
Microscleres (μm)			
Toxas (large)	55	85-130×3	107-207
Toxas (medium)	40	75×1-2	55-95
Toxas (small)	29	15-40×0.5	17.5-48
Isochelas	19-25	13-14	17.5-22.5

Remark: This new species appears to be closely related to *Procamia illgi* Bakus, 1966 and *P. burtoni* Lévi, 1952. Large styles and toxas of *P. illgi* and *P. burtoni* are shorter than those of this species (Table 1).

Clathria (Clathria) koreana n. sp.
(Fig. 2. A-H)

Type specimens: Holotype (Por. 24, NHM, Hannam Univ.), Sogwipo (Cheju Island), on 14 Jul. 1982 (fishing-net).

Description: Shape flabellate with flared margins. Sponge 200 mm high with a short, firm stalk (65 mm long, 8 mm diameter), 150 mm wide, with 3-4 mm thick lamellae. Colour dark brown in alcohol. Surface velvety, and texture firm. Oscules up to 1 mm diameter.

Ectosome. Thin membrane, single principal styles protrude through surface. Subectosomal auxiliary styles tangential or paratangential and scattered over surface.

Choanosome. A reticulate skeletal architecture present with large multispicular tracts of principal styles ascending to surface, and with transverse spicules. Spicules bound together at ends by abundant spongin.

Spicules. Megascleres
Choanosomal principal styles ---------- 400-600×20-25 μm
Subectosomal auxiliary torontes with blunt hastate microspined point ---------- 230-390×2-4.5 μm
Acanthostyles (with very small spines) ---------- 115-145×8-10 μm
Microscleres
Wing-shaped toxas (large) ---------- 300-1030 μm
(small) ---------- 43-78 μm
Palmate isochelas ---------- 15-20 μm

Etymology: The specific name *koreana* is named for Republic of Korea.

Remark: This new species has spicules similar to those of *Axociella bitoxifera* Koltun, 1970 except that it has large spicules and lacks acanthostyles. This genus was transferred from *Axociella* to *Clathria (Thalysias)* by Hooper's (1996) definition of auxiliary spicules. The large toxas and acanthostyles with small spines in this species are different from those of other species.

Family Mycalidae Lundbeck, 1905

Oxymycale rhoi n. sp.
(Fig. 3. A-G)

Type specimens: Holotype (Por. 22, NHM, Hannam Univ.), Memuldo (Keoje Island), on 9 Jul. 1996 (fishing-net) 40 m depth. Four Species Paratypes (Por. 22-1, Por. 22-2, Por. 22-3, Por. 22-4, Dept. of Biology, Hannam Univ.), collected with holotype

Description: Specimens irregularly cushion-shaped with a size up to 14.5×8×5 cm. Surface even to conulose with several oscula of 0.8-4 mm diameter. Texture soft, compressible, and fragile like wet bread, and sponge easily torn. Colour in life dirty yellowish grey.

Ectosome. Skeleton composed of oxeas in confusion arranged parallel to surface with anisochelas (rosettes of anisochelas do not occur, only loose groups of 3-5 anisochelas).

Choanosome. Skeleton has long ascending tracts of oxeas, 50-1,000 μm in diameter, which form subectosomal tufts. Deeper part of the choanosome has much spongin mixed with oxeas.

Spicules. Megascleres
Oxeas ---------- 500-660×8-18 μm
Microscleres
Anisochela ---------- 90-110 μm
Anisochela 2 ---------- 50-80 μm
Anisochela 3 ---------- 30-37 μm
Anisochela 4 ---------- 80-90 μm
Early stage of anisochela 4 ---------- 80-90 μm
Sigmas (large) ---------- 55-70 μm
(small) ---------- 17.5 μm
Raphides ---------- 75-87 μm

Remark: This new species is similar in spicules to *Oxymycale koreana* Sim (1982), but the new species has three size categories of anisochelas whereas *O. koreana* has only two size categories. The arrangement of anisochelas is not in rosettes. The specimen of *O. koreana* is club-shaped and hard in texture.

Etymology: This specific name *rhoi* is named for Dr. Boon Jo Rho, who has contributed greatly to sponge taxonomy since 1996.

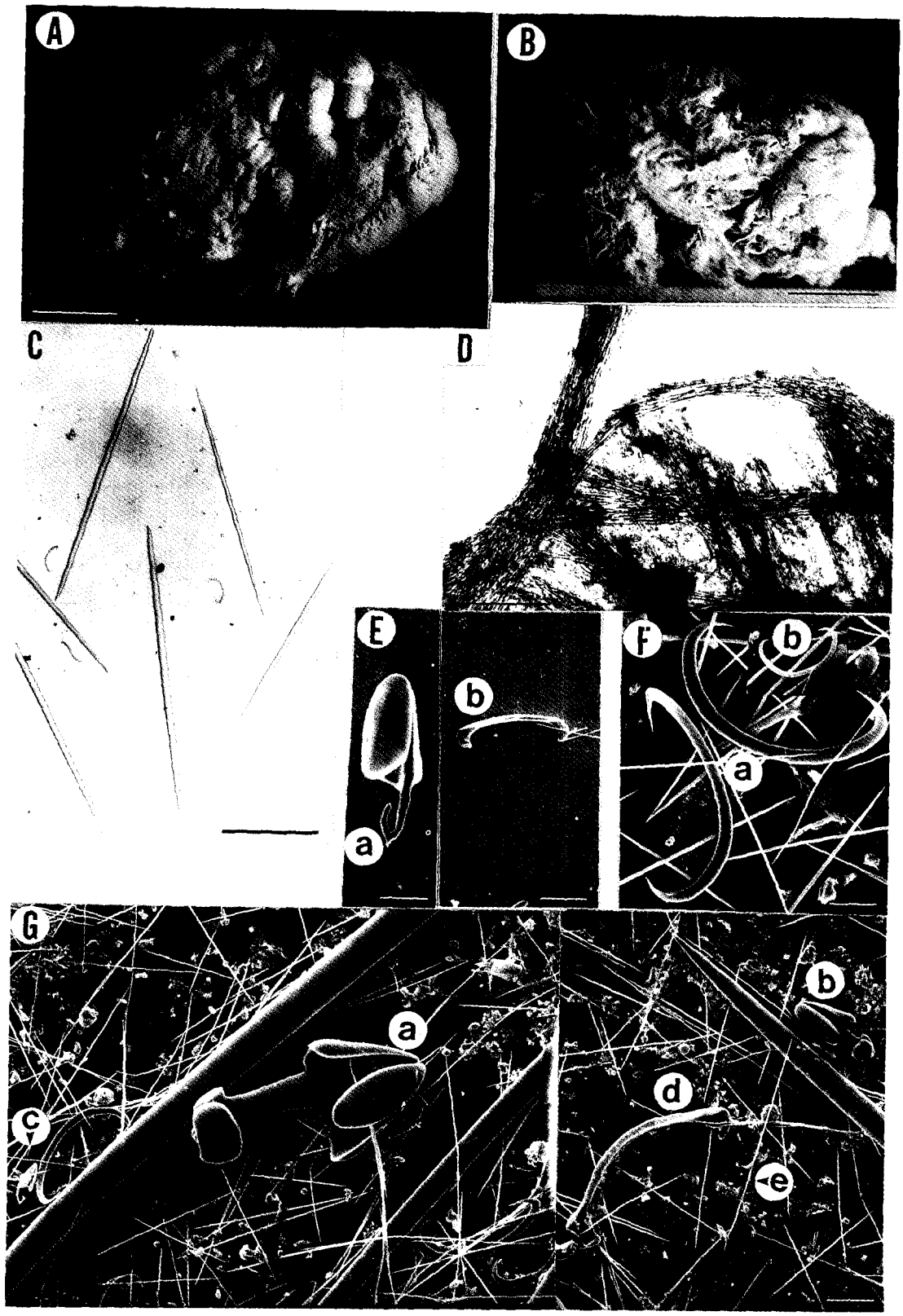

Fig. 3. *Oxymycale rhoi* n. sp. A, Top-side view. B, Back-side view. C, Oxea. D, Skeletal structure of fiber. E-G, Microscleres; E, a. anisochela 3, b. early stage of anisochela 4. F, a. large sigma, b. small sigma. G, a. anisochela 1, b. anisochela 2, c. anisochela 3, d. anisochela 4, e. raphid. Scale bars=5.08 μm (E. a), 10.2 μm (F), 20.4 μm (G), 34.4 μm (E. b), 200 μm (C), 400 μm (D), and 3 cm (A, B).

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