

MISCELLANEOUS RECORDS OF TURBELLARIANS MAINLY FROM KAWAKATSU'S COLLECTION

I: A FRESHWATER PLANARIAN FROM THE CAVE
"NGALAU SURAT" IN SUMATRA, INDONESIA

II: FRESHWATER PLANARIANS FROM CAVES AND
EPIGEAN WATERS IN CHINA

III: A CORRECTION OF HONJÔ'S (1937) ANATOMICAL FIGURE OF
SCUTARIELLA JAPONICA (MATJAŠIČ, 1990) (TEMNOCEPHALIDA)

IV: TWO NEORHABDOCOELID SPECIES FROM THE PROFUNDAL
ZONE OF LAKE MASHÛ-KO, HOKKAIDÔ, JAPAN

by

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and
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I. A Freshwater Planarian from the Cave "Ngalau Surat" in Sumatra, Indonesia

In late autumn of 1995, KAWAKATSU received a small collection of freshwater planarian from Dr. L. DEHARVENG and Dr. A. BEDOS (Toulouse Cedex). Their samples were collected from two hypogean habitats in the cave "Ngalau Surat" in Sumatra, Indonesia. The cave is located in the west-central part of Sumatra, Tabatpanjang (lat. 0° 26' 51" S and long. 100° 50' E; alt. of the entrance, 400 m; cf. Expedition Sumatra 93) (Figs. 1 ① and 2).

The collection data with KAWAKATSU's observational note are as follows:

No. 1. KAWAKATSU's Specimen Lot No. 2249. *Dugesia* sp. of Ngalau Surat (Fig. 3 A). Five asexual specimens; pale brown to nearly white above with two eyes (each of them is enclosed in a pigment-free ocular area); a pair of auricular sensory organ is visible; 4.5 mm long and 0.5-0.8 mm wide. The animals were fixed with 70% ethanol. Cave habitat: Rocky pools located about 1.2 km inside from the entrance of the cave. August, 1993. Coll. Dr. A. BEDOS and Dr. L. DEHARVENG.

Note. According to the collectors (in litt.), those small underground pools were fed by percolation waters with very little organic matter. In 1995, no planarians were found here (Fig. 2).

No. 2. KAWAKATSU's Specimen Lot No. 2250. *Dugesia* sp. of Ngalau Surat (Fig. 3 B). Four asexual specimens;

pale brown to white above with two eyes (a pigment-free ocular area and auricular sensory organ can be seen); 3-4 mm long and 0.5-0.6 mm wide. The animals were fixed with 70% ethanol. Cave habitat: Rocky pools located about 4 km inside of the cave. August 2, 1995. Coll. Dr. A. BEDOS and Dr. L. DEHARVENG.

Note. According to the collectors (in litt.), bat guano was found on the bottom of these underground pools (Fig. 2).

Taxonomic remarks. The only known dugesiid planarian from Sumatra is *Dugesia indonesiana* KAWAKATSU, 1973. This species is distributed widely both in Sumatra and Java in Indonesia. The cave planarians examined do not show the external characters of a true troglobite. In the pharynx histology, its outer musculature consists of two layers, i. e., an outer thin longitudinal and the middle thick circular. There is a high possibility that the Ngalau Surat planarian is *D. indonesiana*.

II. Freshwater Planarians from Caves and Epigean Waters in China

1. Limestone Caves in Hunan Province

KAWAKATSU also received a small collection of Chinese freshwater planarians from Dr. DEHARVENG and Dr. BEDOS. Their samples were collected from hypogean habitats of three caves located in Hunan Province (Konan-Shô in Jap-

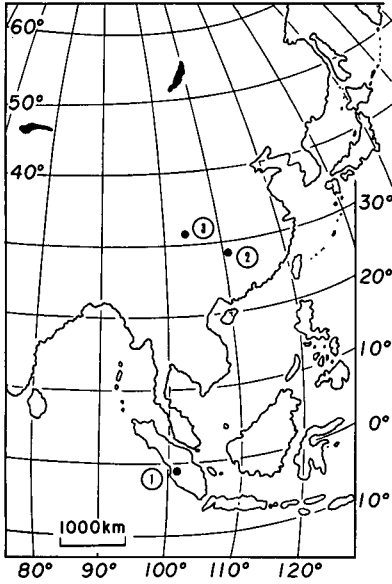


Fig. 1. A sketch map of the South-east Asia and the Far East, showing the localities of freshwater planarians reported in the present paper. ①: the cave "Ngalau Surat", Indonesia; ②: limestone caves in Hunan Province, China; ③: the mountainous area in Sichuan Province, China.

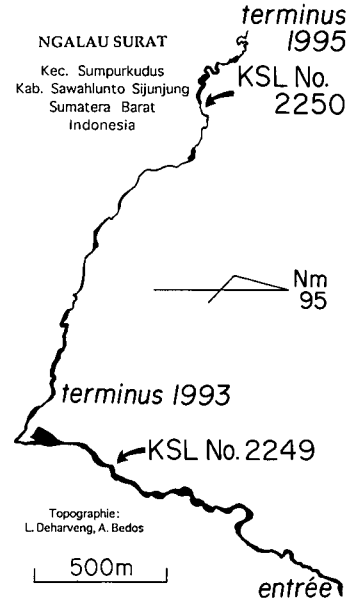


Fig. 2. Cave-map of the Ngalau Surat (after the "Expedition Sumatra 93"; modified). Two hypogean habitats of planarians are shown.

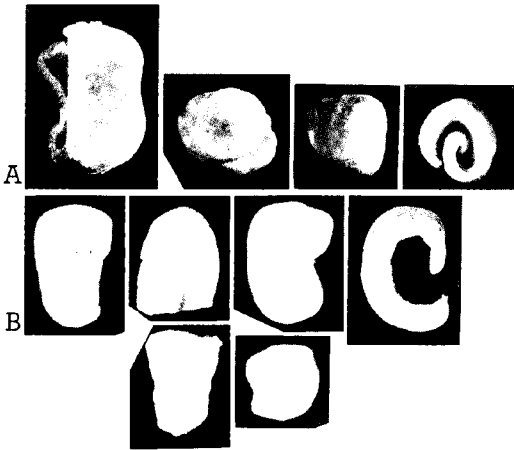


Fig. 3. Preserved specimens of *Dugesia* sp. of Ngalau Surat. A, KSL No. 2249; B, KSL No. 2250.

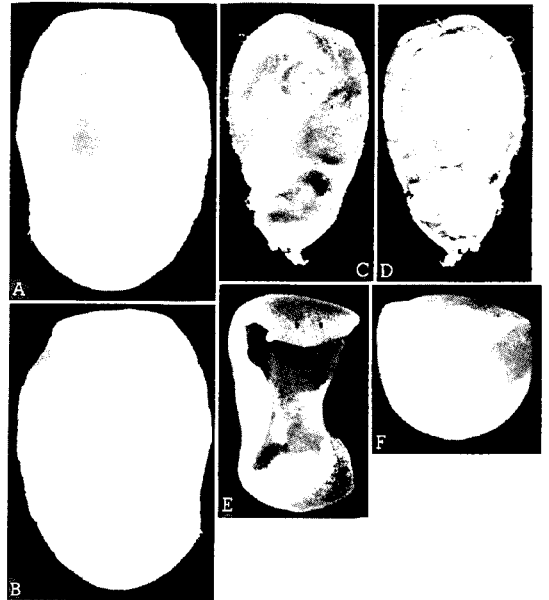


Fig. 4. Preserved specimens of *Dugesia* sp. from limestone caves in Hunan Province (A-D), and *Dugesia* sp. (E) and *Polycelis?* sp. (or *Seidlia?* sp.) (F) from the mountainous area in Sichuan Province, China. A (dorsal view) and B (ventral), KSL No. 2251 from the Tiger-Bat Caves; C (dorsal) and D (ventral), KSL No. 2252 from the White Rock Cave. E, KSL No. 2346 from the Yinxing locality; F, KSL No. 2347 from the Peimuping locality.

anese pronunciation), south-central China. Among them, two caves, i. e., Feihu Dong (飞虎洞; or La Grotte du tiger volant, or Flying Tiger Cave; Hiko-dô in Japanese pronunciation) and Feifu Dong (飞蝠洞; or La Grotte des chauves souris qui volent, or the Flying Bat Cave; Hifuku-dô in Japanese pronunciation) are located near the village of Huoyan, Longshan Town, Xiangsi (lat. ca. 29° N and

long. ca. 110° E; alt., 400 m) (Fig. 1 ②). The third cave, Baiyan Dong (白岩洞; or White Rock Cave; Hakugan-dô in Japanese pronunciation) is a small cave developed in the upper limestone strata (a few kilometers in distance from the first and the second caves mentioned above; alt. ca. 800 m) (Fig. 1 ②).

No. 1. KAWAKATSU's Specimen Lot No. 2251. *Dugesia*

sp. of the Tiger-Bat Caves (Fig. 4 A and B). Four asexual specimens; grayish brown above with two normal eyes and a pair of auricular sensory organs; 8 mm long and 4-5 mm wide. The animals were fixed with 70% ethanol. Cave habitats: Narrow underground streams located about 500 m inside of the Flying Tiger Cave and another stream in the Flying Bat Cave. August 12, 1995. Coll. Dr. A. BEDOS and Dr. DEHARVENG.

No. 2. KAWAKATSU's Specimen Lot No. 2252. *Dugesia* sp. of the White Rock Cave (Fig. 4 C and D). A single asexual specimen; dark, slightly reddish brown above with two eyes (the preserved condition of the animal is not good); 8 mm long and 4 mm wide. The animal was fixed with 70% ethanol. Cave habitat: An underground pool near the entrance. August 15, 1995. Coll. Dr. A. BEDOS and Dr. L. DEHARVENG.

Note. According to the collectors (in litt.), cave amphipods were rather abundant in the pool. However, specimens of planarians rare.

Taxonomic remarks. In the pharynx histology of these Chinese samples reported in the present paper, its outer musculature consists of three layers, i. e., an outer thin longitudinal, the middle thick circular, and an inner thin longitudinal. These unidentified dugesiid species from cave waters seem to be *Dugesia japonica* ICHIKAWA et KAWAKATSU, 1964.

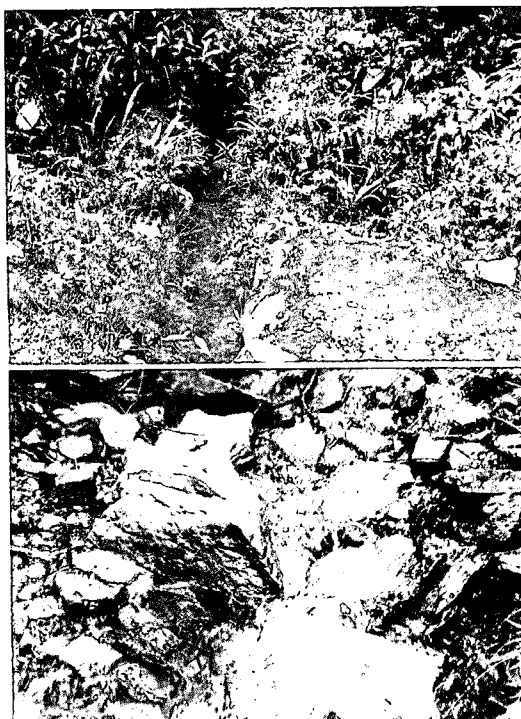
The occurrence of *D. japonica* in Hunan Province in China is reported in the following papers: LIU (1993, p. 158, fig.); KAWAKATSU (1994, p. 53, fig. 3; 1996, p. 6, fig. 4).

2. The Mountainous Area in Sichuan Province

In early summer of 1999, MURAYAMA, who visited the mountainous area of Sichuan (also spelled as Ssüch'uan) Province in Central China, collected a small number of freshwater planarians from two localities (Fig. 1 ③). The collection data with KAWAKATSU's observational note are as follows:

No. 1. KAWAKATSU's Specimen Lot No. 2346. *Dugesia* sp. of Yinxing (Sichuan Province) (Fig. 4 E). Two asexual (?) specimens; grayish brown above with two eyes on the low-triangular head; 6-7 mm long and 1.5-2 mm wide. The animals were fixed with 80% ethanol. Locality: A narrow, slow-running mountain stream at Yinxing (Yinhsing), Wenchuan Pref., Sichuan Province (Shisen-shô in Japanese pronunciation) (alt. 1130 m; Fig. 5). June 13, 1999 (water temp., ca. 15°C). Coll. H. MURAYAMA.

No. 2. KAWAKATSU's Specimen Lot No. 2347. *Polycelis?* (or *Seidlia?*) sp. of Peimuping (Sichuan Province) (Fig. 4 F). Four asexual specimens; head slightly rotundate with bluntly pointed auricles; dark grayish brown above with numerous small eyes distributed on the semimarginal zone of the head; 2-3.5 mm long and 1-2.5 mm wide.



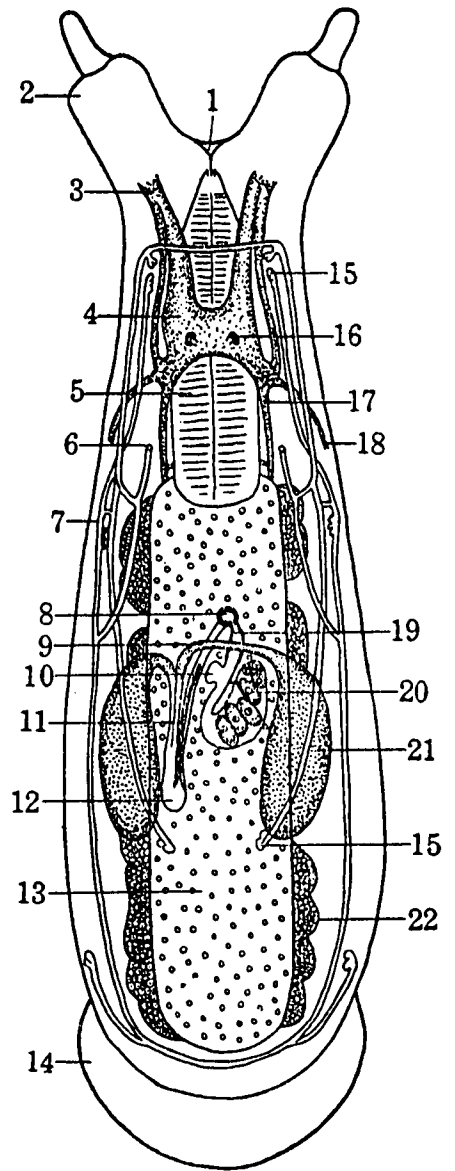
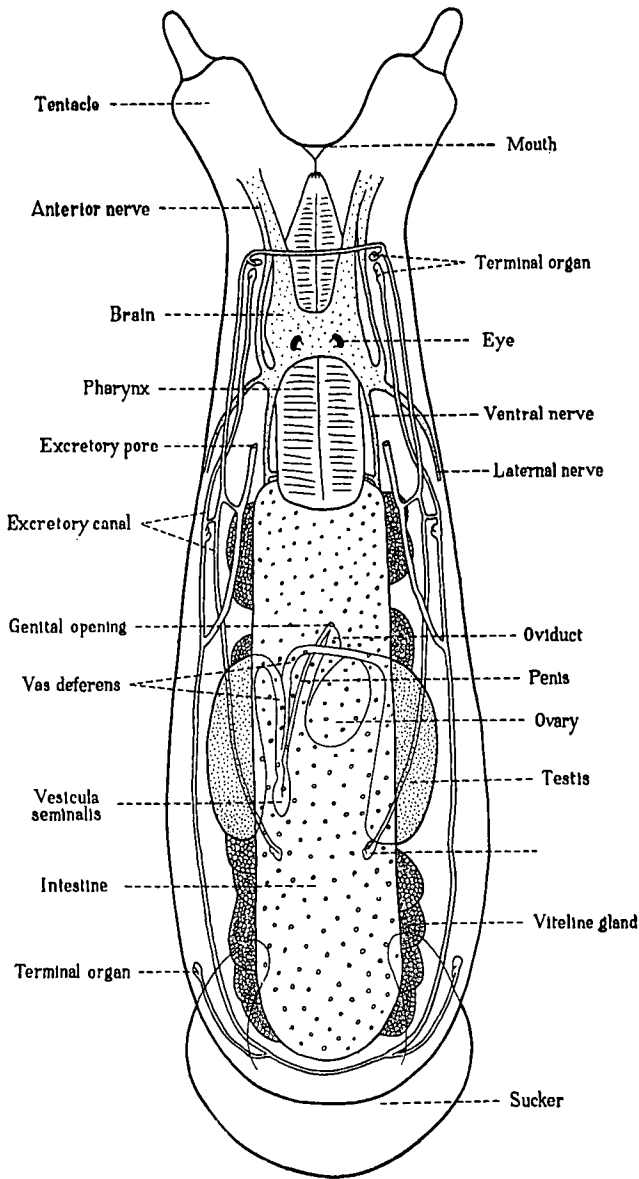
Figs. 5. (top) and 6 (bottom). Top, the Yinxing locality where *Dugesia* sp. (KSL No. 2346) were collected. Bottom, the Peimuping locality where *Polycelis?* sp. (or *Seidlia?* sp.) (KSL No. 2347) were collected. Photos by MURAYAMA.

The animals were fixed with 80% ethanol. Locality: Narrow mountain rapids at Peimuping (P'eimup'ing), Wenchuan Pref., Sichuan Province (alt. 3100 m; Fig. 6). June 15, 1999 (water temp., ca. 10°C). Coll. H. MURAYAMA.

Taxonomic remarks. For the occurrence of *D. japonica* in Sichuan Province in China, a few distribution records are shown on the maps of previous papers by LIU (1993) and KAWAKATSU (1994, 1996). (See the "Taxonomic remarks" in the foregoing paragraph on page 87.)

Up to the present, 10 species of planariids with numerous marginal (or submarginal) eyes are known from China (ZABUSOV, 1911; LIU, 1993, 1996; KAWAKATSU, 1994, 1996; KAWAKATSU & MITCHELL, 1998). Nine of these species are placed in the genus *Polycelis* EHRENBERG, 1831, and the subgenus *Polycelis* EHRENBERG, 1831; the remained one is placed in the genus *Seidlia* ZABUSOVA, 1936 (cf. KAWAKATSU, 1996; KAWAKATSU & MITCHELL, 1998).

No previous records of the species of the genera *Polycelis* and/or *Seidlia* are found in Sichuan Province. Future studies on the planarian fauna of this area (the eastern end of the Kunlun Mountains) are very desirable.



I. HONJŌ del.

第 594 圖

Fig. 7. Reproduction of anatomical figures of *Scutariella japonica* from HONJŌ (1937, left) and KATŌ (1943, right). Index letters, numbers, and the Japanese explanation of KATŌ's figure were taken from original papers.

截頭類 *Caridinicola indica* ANNANDALE の體制を示す模型圖 1. 口, 2. 觸角, 3. 前行神經, 4. 腦, 5. 咽頭, 6. 排泄孔, 7. 排泄管, 8. 生殖孔, 9. 輸精管, 10. 受精囊, 11. 陰莖, 12. 貯精囊, 13. 腸, 14. 吸盤, 15. 末端器, 16. 眼, 17. 腹行神經, 18. 側行神經, 19. 子宮, 20. 卵腺, 21. 精巢, 22. 卵黃腺

(本城原圖, 少しく改變)

III. A Correction of HONJŌ's (1937) Anatomical Figure of *Scutariella japonica* (MATJAŠIČ, 1990) (Temocephalida)

Scutariella japonica (MATJAŠIČ, 1990) is the only described temnocephalid species reported from Japan. This animal is found in branchial chambers of Japanese freshwater shrimps (Fig. 8). For many years, this species was erroneously known as "*Caridinicola indica* ANNANDALE, 1912." References for the correction of its taxonomic position and scientific name are as follows: KAWAKATSU, NUNOMURA & SUZUKI (1989); KAWAKATSU (1998 a). (See also KAWAKATSU, 1998b, p. 22.)

The most detailed anatomical figure of this species

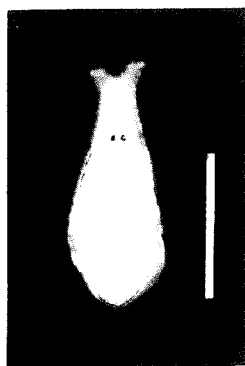


Fig. 8. A live specimen of *Scutariella japonica* collected from the branchial chamber of a freshwater shrimp, *Paratya compressa improvisa* (loc. Chiba Pref., Japan). Scale, 1mm. Photo by NISHINO.

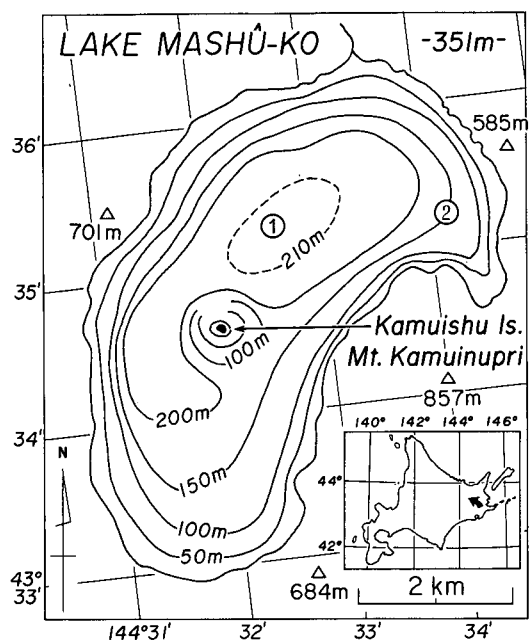


Fig. 9. A lake-basin figure of Lake Mashū-ko (modified from SHIRAIISHI, 1972). Two stations surveyed on September 5, 1999, are shown: ①, 210 m in depth (KSL No. 2348); ②, 150 m in depth (KSL No. 2349).

was published by HONJŌ (1937, pl. XIII). Its reproduction is cited in a paper by KAWAKATSU & NISHINO (1993, p. 99, pl. II, fig. P). At that time, KAWAKATSU overlooked the content of the letter received from the late Dr. Ichijirō HONJŌ (dated Sept. 2, 1966) intimating that "... According to Dr. Kōjirō KATŌ, my plate figure of *Caridinicola indica* may contain some errors. Those were corrected in Dr. KATŌ's figure published in 1943 (p. 669, fig. 594)."

Reproductions of both figures are given in Fig. 7 (A and B).

IV. Two Neorhabdocoelid Species from the Profundal Zone of Lake Mashū-ko, Hokkaidō, Japan

Lake Mashū-ko, a caldera lake formed in the Holocene (less than 7×10^3 y. ago; KATSUI, ANDO & INABA, 1975), is located in the eastern part of Hokkaidō (the Akan National Park) at an elevation of 351m. It is 6.7 km long, 2.7 km wide, has a 20-km shoreline, a maximum depth of 212 m, and is the fifth deepest lake in Japan. Its transparency was reported as 41.6 m in 1931.

In early September of 1999, several species of benthonic animals were taken by OHTAKA and NISHINO with a 15 cm \times 15 cm Ekman dredge in depths of 150 m and 210 m of the lake. Only two specimens of small, whitish planarians were obtained from the near deepest point of the lake (lat. $43^{\circ}35'12.1''$ N, long. $144^{\circ}32'39.2''$ E; 210 m in

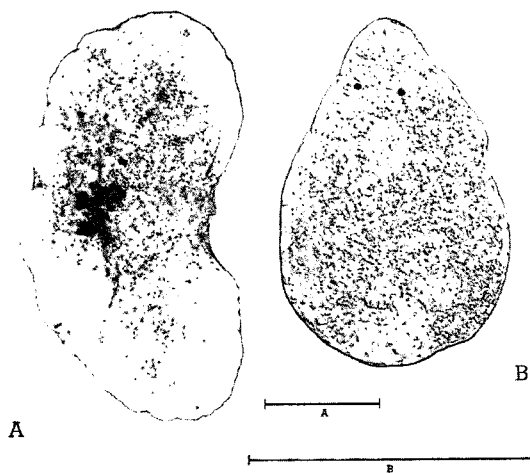


Fig. 10. Preserved specimens of *Mesostoma*? sp. (A: KSL No. 2348) and *Gyatrix*? sp. (B: KSL No. 2349); coll. A. OHTAKA and M. NISHINO. Scales (A and B), 0.5mm. Photomicrographs of whole-mounted specimens were taken by OHTAKA.

depth : Fig. 9 ①) and another profundal site (lat. 43° 35' 11.5" N, long. 144° 34' 11.0" E ; 150 m in depth : Fig. 9 ②). These animals fixed with 70% ethanol were sent to KAWAKATSU for taxonomic examination.

Order NEORHABDOCOELA

Suborder TYPHLOPLANOIDA

Family Typhloplanidae VON GRAFF, 1908

Subfamily Mesostomatinae VON GRAFF, 1908

Genus *Mesostoma* EHRENBERG, 1836

Mesostoma? sp.

KAWAKATSU's Specimen Lot No. 2348. *Mesostoma?* sp. (Fig. 10 A ; a whole-mounted specimen). A single sexual (?) specimen ; pale brown above with a pair of small eyes at the anterior level of the body ; a rosulate pharynx is found at about the middle of the body ; irregular-shaped, dark-brown colored yolk glands (?) can be seen on both sides of the pharynx ; 2 mm long and 0.5 mm wide (preserved specimen). Lake habitat : Muddy bottom of the center of Lake Mashū-ko (depth, 210 m ; Fig. 9 ①). September 5, 1999 (bottom temp., 3.7°C). Coll. A. OHTAKA and M. NISHINO.

The sample examined (a whole-mounted specimen without staining prepared by OHTAKA) is retained in OHTAKA's Collection (Hirosaki University), Hirosaki.

Taxonomic remarks. In Japan, the occurrence of two *Mesostoma* species is known : *Mesostoma productum* (SCHMIDT, 1848) and *Mesostoma lingua* (ÅBILDGAARD, 1789). Cf. OKUGAWA (1953, 1965, 1973) ; UCHIDA (1965) ; KAWAKATSU & NISHINO (1994) ; KAWAKATSU (1998 b) ; see also DE BEAUCHAMP (1961), HYMAN (1951) and CANNON (1986).

Both species are common in the Palaearctic subregion. The Lake Mashū-ko animal is somewhat similar to *M. lingua*.

Suborder KALYPTORHYNCHIA

Family Gytrixidae VON GRAFF, 1905

Genus *Gytrix* EHRENBERG, 1831

Gytrix? sp.

KAWAKATSU's Specimen Lot No. 2349. *Gytrix?* sp. (Fig. 10 B : a whole-mounted specimen). A single, sexual (not fully matured?) specimen ; nearly white to translucent with a pair of small eyes at the anterior level of the body (just behind the proboscis ; Fig. 10 B) ; a large, rosulate pharynx is found at the anterior level of the middle of the body ; slightly pigmented yolk glands can be seen ; penis stylets are found at the posterior part of the body (Fig. 10 B) ; 0.6 mm long and 0.4 mm wide (preserved specimen). Lake habitat : Muddy bottom of a profundal site at the eastern part of Lake Mashū-ko (depth, 150 m ; Fig. 9 ②). September 5, 1999 (bottom temp., 3.9°C). Coll. A. OHTAKA and NISHINO.

The sample examined (a whole-mounted specimen with-

out staining prepared by OHTAKA) is retained in OHTAKA's Collection (Hirosaki University), Hirosaki.

Taxonomic remarks. In Japan, the occurrence of *Gytrix hermaphroditus* EHRENBERG, 1831, is known. For reference, see the section *Mesostoma?* sp. The Lake Mashū-ko animal is somewhat similar to *G. hermaphroditus*.

ACKNOWLEDGEMENTS

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