

**A Freshwater Planarian from Lake Tonlé Sap in Cambodia:
Dugesia sp. (Plathelminthes, Tricladida, Paludicola)¹⁾**

By

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Introduction

Lake Tonlé Sap in Cambodia is the largest lake in Southeast Asia; it is also characterized by drastic change of the water level between the highest- and lowest-water seasons (ca. 8m; Fig. 1A). Although the lake is well known to have many species and high production of fishes, there has been little systematic and ecological research. There are no records in many groups of freshwater invertebrates, and the lake and its surrounding area are almost blank biogeographically.

To understand the lake ecosystem, zoo-faunistic researches have been carried out since 2000, in cooperation with Japanese and Cambodian scientists. In the course of a survey during the flooded season in the year of 2000, a small collection of freshwater planarians was made by Ohtaka and Dr. H. Katakura. The samples were sent to Kawakatsu for taxonomic examination.

Samples Examined and Methods

The planarian specimens were collected from two littoral sites with submerged macrophytes at northeastern part of Lake Tonlé Sap near Shem Reap (Fig. 1 A). The specimens from the two sites were separately fixed with a 10% formalin solution, and preserved in 70% ethanol. They have been designated as Kawakatsu's Specimen Lot Nos. 2367 and 2368, respectively.

- 1). KSL No. 2367. *Dugesia* sp. A single, small, asexual specimen (1.5 mm long and 0.3 mm wide) collected at Off Chong Kneas, Tonlé Sap (taken from bladderworts – *Utricularia* sp.); Aug. 30, 2000; collected by Ohtaka and Dr. H. Katakura (Fig. 1 C-a, -b).
- 2). KSL No. 2368. *Dugesia* sp. Eight, small, asexual specimens (1.5-2 mm long and 0.3 mm wide) collected at Phnom Krom, Tonlé Sap (taken from bladderworts); Aug. 31 to Sept. 1, 2000; collected by Ohtaka and Dr. H. Katakura (Fig. 1 B, C-c, -d).

1) This paper is affectionately dedicated to the late Dr. Wataru Teshirogi (Professor Emeritus, Hirosaki University), who passed away on March 7, 2007. He was 81 years old (born May 6, 1925).

Dr. Teshirogi was an active specialist on planarian regeneration. He was the Organizer of the VIth International Symposium on the Biology of the Turbellaria (Hirosaki, Japan, 7-12 August 1990). He was also the President of Hirosaki University (Feb. 1, 1992-Jan. 31, 1996). We will long remember the scientific life and work of Wataru Teshirogi as an excellent educator.

Preserved specimens were examined under a high magnification of a stereomicroscope and sketched briefly. Ohtaka has made a whole mount of a single specimen without stain (KSL No. 2368-a) and photographed (Fig. 1 B).

Taxonomic Observation

Class "TURBELLARIA"

Order SERIATA Bresslau, 1933

Suborder Tricladida Lang, 1884

Infraorder Paludicola Hallez, 1892

Family Dugesiidae Ball, 1974

Genus *Dugesia* Girard, 1850

Dugesia sp. (species of Tonlé Sap)

External Appearance. According to the field observations of living specimens made by Ohtaka, the head is subtriangular with bluntly pointed auricles. This character is also found in the preserved specimens examined by Kawakatsu.

There are 2 eyes on the dorsal side of the head. The distance between them is about one-fifth to one-sixth of the head at the level of eyes. The non-pigmented ocular area around each eye is small but conspicuous (Fig. 1 B and C).

The coloration of the body on the dorsal surface is pale brown with numerous indistinct pigment spots (Fig. 1 B).

Internal Character. Only the pharynx pigmentation was examined. The surface of the pharynx has no pigment spots. This is a typical character of the *Dugesia* species distributed widely in the southern part of Europe, Africa and the north-eastern part of Asia in the Holarctic region, the Palaeotropical region and the northeastern area of the Australian region (for the distribution of the genus, see Sluys, Grant & Blair, 2007, p. 18, fig. 12; Sluys, Kawakatsu & Winsor, 1998, fig. 20).

Taxonomic Remarks

The planarian reported here is a member of the genus *Dugesia* Girard, 1850. The close position of 2 eyes in this *Dugesia* sp. (see Fig. 1 B, C-a, -c, -d) is very similar to that of *Girardia tigrina* (Girard, 1850), an American dugesiid species but now distributed widely in

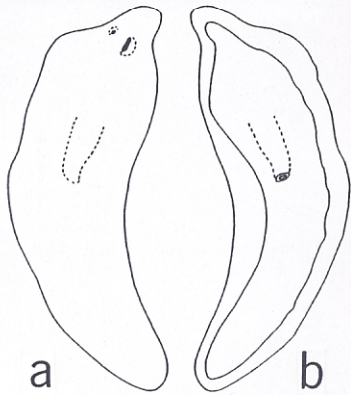
Fig. 1. Lake Tonlé Sap (A) and *Dugesia* sp. (species of Tonlé Sap) (B and C). A: The water level of Tonlé Sap in the dry season (May 2004) (top) and in the rainy season (Aug. 2000)(bottom). An open arrow indicates the collecting sites of planarians. B and C: *Dugesia* sp. B, Photo- micrograph of a whole mount asexual specimen (dorsal view, KSL No. 2368-a, =ZIHU-3251). A small arrow indicates the level of mouth opening. Scale = 1 mm. C, Sketches of 3 preserved, asexual specimens. a, Dorsal view of KSL No. 2367 (b, ventral view); c and d, dorsal views of two asexual specimens of KSL No. 2368. Scale = 1 mm.



カンボジア・トンレサップ湖：
乾期（上）と雨期（下）



A



a

b



c

d

C



B

Fig. 2. Sketch map of the northwestern area of Southeast Asia, showing the geographical distribution of known dugesiid species. The species from six countries are listed below:

Cambodia

⊙ : *Dugesia* sp. (species of Tonlé Sap)

Thailand

△ : *Dugesia siamana* Kawakatsu, 1980

▲ : *Dugesia deharvengi* Kawakatsu, 1989

⊙ : *Dugesia* sp. (species of Thailand)

**Myanmar
(Burma)**

△ : *Dugesia burmaensis* (Kaburaki, 1918)

**India
(Andaman
Islands)**

▲ : *Dugesia andamanensis* (Kaburaki, 1925)

**Malaysia
(West)**

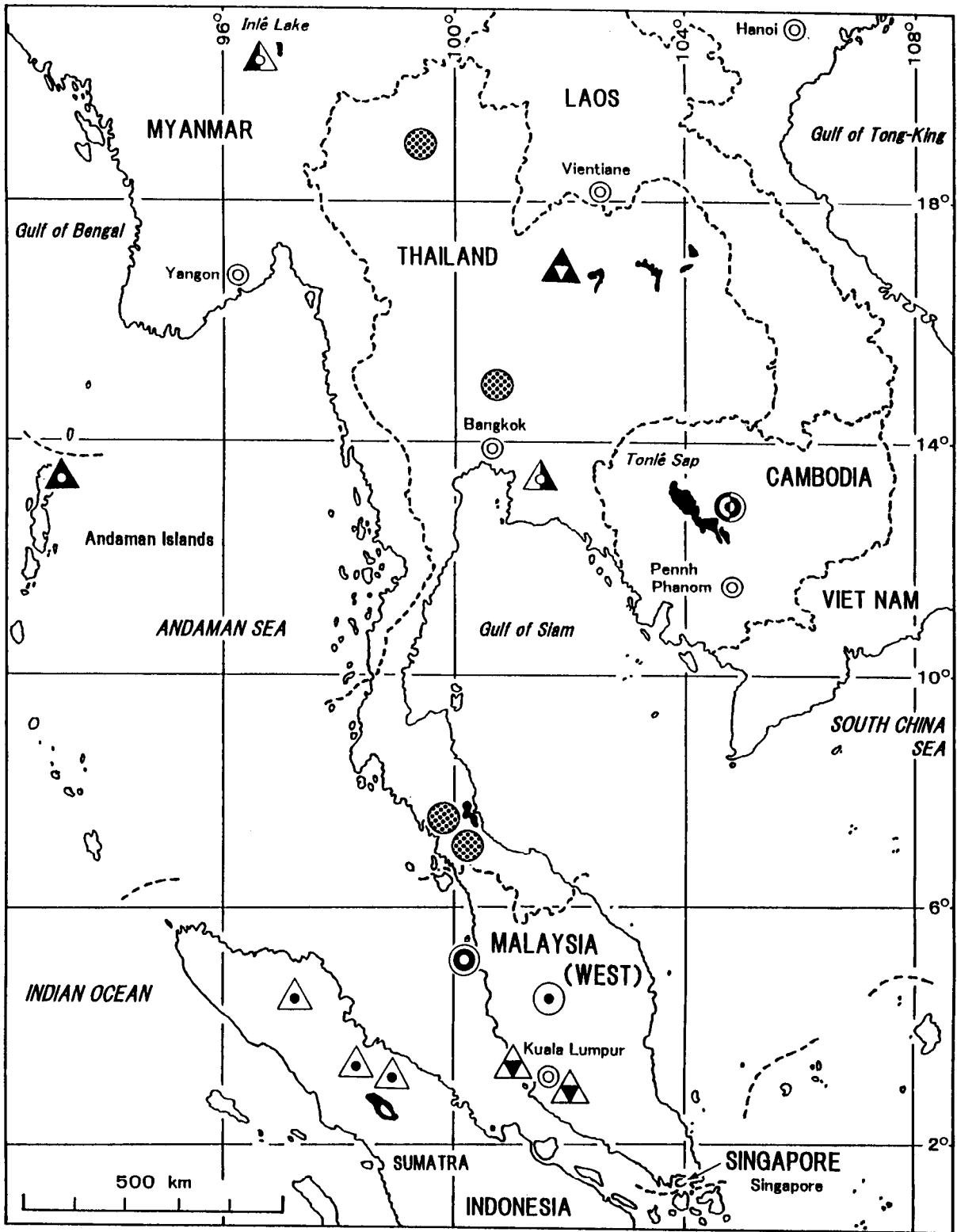
△ : *Dugesia batuensis* Ball, 1970

⊙ : *Dugesia* sp. (species of Cameron Highlands)

⊙ : *Dugesia* sp. (species of Penang)

**Indonesia
(Sumatra)**

△ : *Dugesia indonesiana* Kawakatsu, 1973



various areas of the world as a cosmopolitan species. However, *G. tigrina* has a wide and conspicuous pigment-free ocular area surrounding each eye. Moreover, *G. tigrina* has a pair of conspicuous auricles, many pigmented patterns on the dorsal side of the body and a conspicuous pigmented pharynx (see Kawakatsu, Nishino, Ohtaka, Yamamoto & Sasaki, 2007, in the following web site: <http://victoriver.com> Matsuyama, Mar. 22 2007).

Dugesia sp. from Tonlé Sap reported in the present web article is the first record of any freshwater planarian in Cambodia. However, specific identification is not possible because the specimens were all asexual.

The known *Dugesia* species in the neighboring countries of Cambodia are: *Dugesia siamana* Kawakatsu, 1980, from Bang Pro Reservoir, near Bangkok, Thailand; *Dugesia deharvengi* Kawakatsu, 1989, from Kubio Cave, Thailand (a true troglobite); *Dugesia burmaensis* (Kaburaki, 1918) from Inle Lake in Myanmar (Burma); *Dugesia andamanensis* (Kaburaki, 1925) from Ross Island of the Andaman Islands, India; *Dugesia batuensis* Ball, 1970, from Batu Caves and the vicinity, Kuala Lumpur, Malaysia (West) (cf. Kawakatsu, 1972 a, b); *Dugesia indonesiana* Kawakatsu, 1973, from Indonesia (Sumatra and Java). Occurrence records of undescribed *Dugesia* spp. are also known from Thailand and Malaysia (West) (cf. Kawakatsu, 1972; Kawakatsu & Mitchell, 2004; Kawakatsu & Ôgawara, 1974).

The above-cited distribution in Southeast Asia is shown in Fig. 2.

Karyological Remarks. Among the *Dugesia* species mentioned above, the karyological data are known only in the following 2 species.

Dugesia siamana: $2x$ & $3x = 16$ & 24 . The karyotype of diploid cells consists of 7 pairs of meta- or submetacentric chromosomes in descending order of size and 1 pair of large subtelo-centric chromosomes: $2m + 2m + 2sm + 2sm + 2st + 2sm + 2m + 2m$ (Kawakatsu, Tamura, Yamayoshi & Oki, 1980).

Dugesia batuensis: $2x=14$. The karyotype of diploid cells consists of 6 pairs of metacentric chromosomes in descending order and one pair of submetacentric chromosomes: $2m + 2m + 2m + 2m + 2sm + 2m + 2m$ (Kawakatsu, Mitchell, Oki, Tamura & Yussof, 1989).

Samples Examined. A whole mount specimen (KSL No. 2368-a) is deposited in the Department of Natural History Sciences, Faculty of Science, Hokkaido University (ZIHU-3251), Sapporo, Hokkaidô, Japan. The other preserved specimens (KSL No. 2367 and No. 2368 except 2368-a) are deposited in Ohtaka's Office in the Department of Education, Hirosaki University, Hirosaki, Japan.

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Dr. Hugh D. Jones (Manchester) kindly read the draft of this web article.

Summary

Samples of a freshwater planarian species were collected from the littoral sites at the northeastern part of Lake Tonlé Sap, Cambodia. Judging from the external morphology and without pharynx pigmentation of non-sexual specimens, the animal was recorded as *Dugesia* sp. (species of Tonlé Sap). This is the first record of a freshwater planarian in Cambodia.

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