

# Japanese Freshwater Planarians in Color (Dr. M. Kawakatsu)

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The taxonomy and distributional ecology of Japanese freshwater planarians ("Turbellaria": Seriata: Tricladida) have been studied by Dr. M. Kawakatsu and his team members for the past 50 years. In 1969, he published an illustrated list of this animal group with distribution maps and water color paintings of the 19 known species at that time (2 families and 6 genera; including 2 unidentified species of the genus *Sphalloplana*).

After the 1970s', 5 native species and 3 exotic species have been described and reported by Kawakatsu and his coauthors from Japan. The taxonomic system from the rank of suborder through infraorder, family, subfamily, genus, and subgenus was revised in 1974.

In the present web article a revised list of all the known species of Japanese freshwater planarians is given with their latest Linnean names and Japanese names (see Notes for the Taxonomic List) in the Roman alphabet (1 suborder, 2 infraorders, 4 families, 2 subfamilies, 8 genera, 1 subgenus, 27 species; including 2 undescribed species). Dr. Kawakatsu's (1969) original 2 color plates are also reproduced herein; no paintings of 8 species described after 1970 are included (see the mark "-" in the Taxonomic List).

## Notes for the Taxonomic List

In Japan both Japanese and Linnean names of animals (and plants) are employed in usual biology books and encyclopedias. For this custom a comprehensive explanation is given in the following English article.

- Grygier, M. J. 1993. Japanese zoological nomenclature. Amer. Assn. Zool. Nomenclature, for September 1993: 5-8.

The infraorder Cavernicola Sluys, 1990 (including 1 family and 5 genera), was established in the following publication.

- Sluys, R. 1990. A monograph of the Dimarcusidae (Platyhelminthes, Seriata, Tricladida). Zool. Scripta, 19 (1): 13-29.
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# Japanese Freshwater Planarians: Taxonomy

("Turbellaria": Seriata: Tricladida): mainly based on Kawakatsu, 1998.

## Paludicola Hallez, 1892 (TANSUISEI-SANKICHO-RUI TEIAMOKU)

### Dugesiiidae Ball, 1974 (SANKAKUATAMA-UZUMUSHI KA\*)

#### *Dugesia* Girard, 1850 (NAMI-UZUMUSHI ZOKU)

*Dugesia japonica* Ichikawa et Kawakatsu, 1964 Nami-uzumushi 1a, b.

*D. ryukyuensis* Kawakatsu, 1976 Ryukyu-nami-uzumushi -

[R] *D. izuensis* Kato, 1943 Izu-uzumushi 2.

[ET] *D. austroasiatica* Kawakatsu, 1985 Toonan-ajia-uzumushi(\*) -

#### *Girardia* Ball, 1974

[ET] *Girardia tigrina* (Girard, 1850) America-nami-uzumushi -

### Planariidae Stimpson, 1857 (HIRATA-UZUMUSHI KA\*)

#### *Phagocata* Leidy, 1847 (HOSO-UZUMUSHI ZOKU)

*Phagocata vivida* (Ijima et Kaburaki, 1916) Miyama-uzumushi 3.

*Ph. kawakatsui* Okugawa, 1956 Kogata-uzumushi 4.

*Ph. teshirogii* Ichikawa et Kawakatsu, 1962 Toohoku-kogata-uzumushi 5.

*Ph. iwamai* Ichikawa et Kawakatsu, 1962 Ezo-kogata-uzumushi 6.

[R] *Ph. papillifera* (Ijima et Kaburaki, 1916) Kantoo-ido-uzumushi 7.

*Ph. albata* Ichikawa et Kawakatsu, 1962 Sooya-ido-uzumushi 8.

*Ph. tenella* Ichikawa et Kawakatsu, 1963 Hidaka-hoso-uzumushi 9.

*Ph. suginoi* Kawakatsu, 1974 Hokuriku-hoso-uzumushi -

#### *Polycelis* Ehrenberg, 1831 (KAZUME-UZUMUSHI ZOKU)

*Polycelis (Polycelis) sapporo* (Ijima et Kaburaki, 1916) Kitashiro-kazume-uzumushi 12.

#### *Seidlia* Zabusov, 1911

*Seidlia auriculata* (Ijima et Kaburaki, 1916) Kazume-uzumushi 10.

*S. schmidti* (Zabusov, 1916) Kita-kazume-uzumushi 11.

*S. akkeshi* (Ichikawa et Kawakatsu, 1963) Akkeshi-kazume-uzumushi 13.

### Dendrocoelidae Hallez, 1892 (OO-UZUMUSHI KA\*)

#### Kenkiinae Hyman, 1937 (HORA'ANA-UZUMUSHI AKA\*)

#### *Sphalloplana* de Beauchamp, 1931 (HORA'ANA-UZUMUSHI ZOKU)

*Sphalloplana* sp.1 Yautsugadake-izumi-uzumushi 14.

*Sphalloplana* sp.2 Himeji-mekura-uzumushi 15a, b.

#### Dendrocoelinae Hallez, 1892 (OO-UZUMUSHI AKA\*)

#### *Bdellocephala* de Man, 1875 (OO-UZUMUSHI ZOKU)

*Bdellocephala annandalei* Ijima et Kaburaki, 1916 Biwa-oo-uzumushi 16.

*B. brunnea* Ijima et Kaburaki, 1916 Izumi-oo-uzumushi 17.

*B. borealis* Kawakatsu, 1978 Rishiri-oo-uzumushi -

#### *Dendrocoelopsis* Kenk, 1930 (KITA-OO-UZUMUSHI ZOKU)

*Dendrocoelopsis ezensis* Ichikawa et Okugawa, 1958 Ezo-uzumushi 18.

*Den. lactea* Ichikawa et Okugawa, 1958 Kitashiro-uzumushi 19.

*Den. ichikawai* Kawakatsu, 1977 Rishiri-uzumushi -

[R] *Den. kishidai* Kawakatsu, 1978 Kyoto-uzumushi -

### Cavernicola Sluys, 1990

#### Dimarcusidae Mitchell et Kawakatsu, 1972

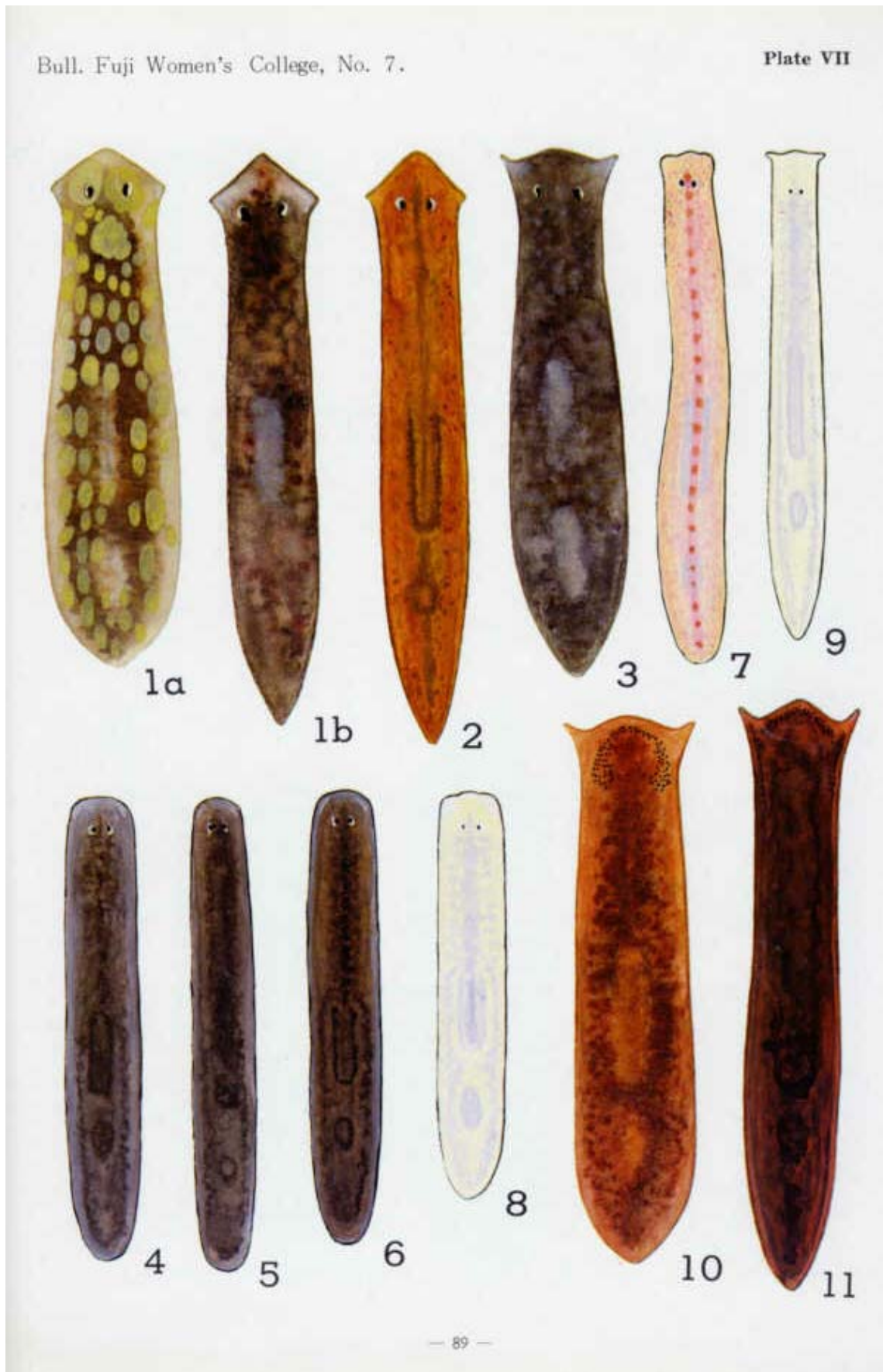
#### *Rhodax* Marcus, 1946

[ET] *Rhodax?* sp. Brazil-uzumushi(\*) -

In the taxonomic list the figures of 8 species with a mark "-" are not presented in this web article.

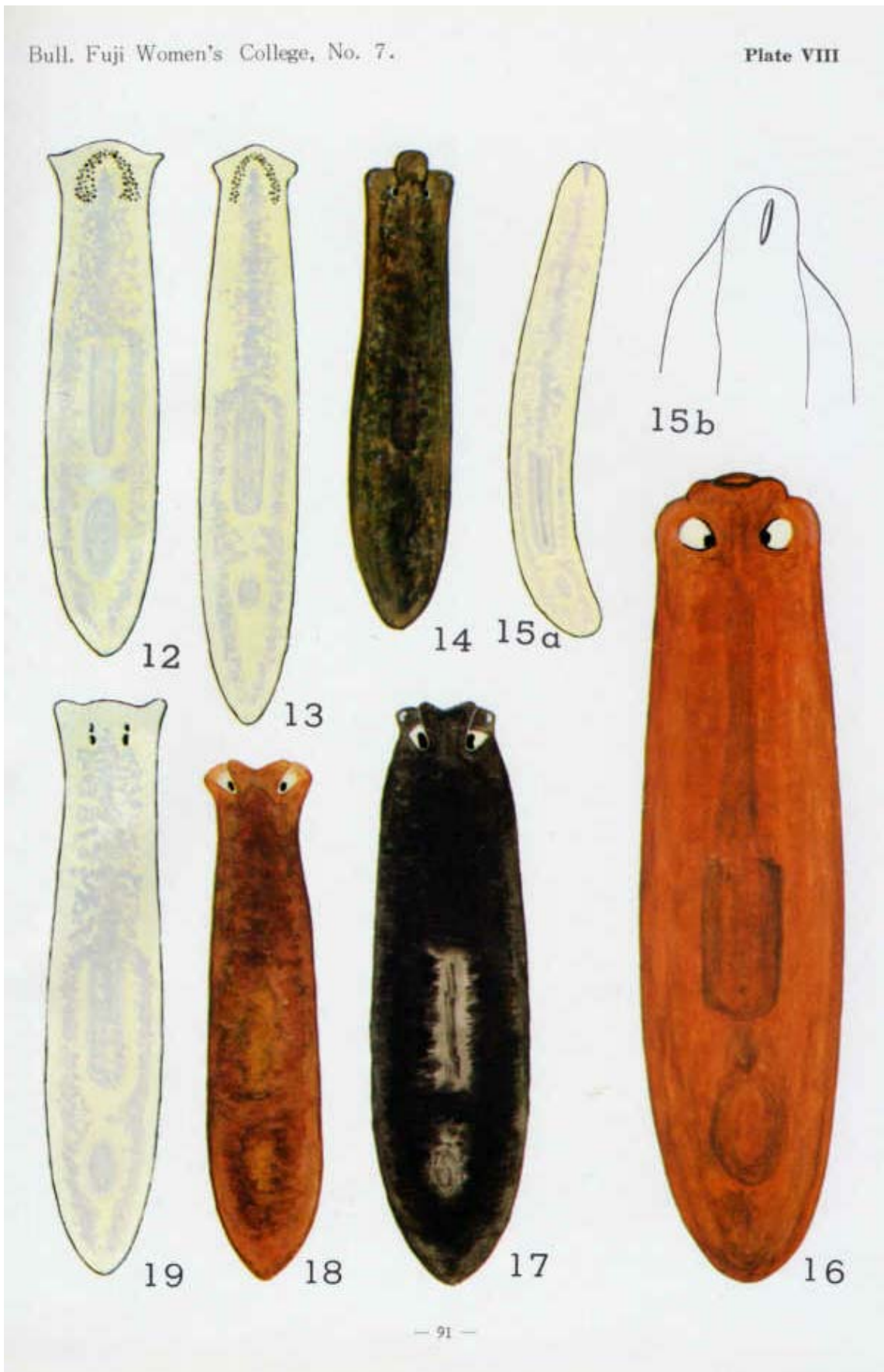
[R]: Rare species listed in Kawakatsu (1991); [ET]: Exotic species in Japan; \*: A new Japanese name was given by Kawakatsu (1998).

The right-side numbers (1-19) given in the taxonomic list are correspond to the number of figures of animals in the next 2 plates (VII and VIII).



Kawakatsu, 1969: Plate VII

*Dugesia japonica*: 1a. The Matsumoto stock (sexual race). 1b. The Kyushu stock (asexual race).



Kawakatsu, 1969: Plate VIII

*Sphalloplana* sp. 2: 15a. The Himeji stock. 15b. Adhesive organ (an enlarged, ventral view of the head).

## Order and Suborders of Japanese Planarians ("Turbellaria")

So-called "planarians" in a narrow sense indicate macroscopic flatworms in the order Tricladida. In a wide sense, however, that word means a general, collective name of animals in a few orders (and suborders) of the class "Turbellaria". The order Polycladida is a large group of marine planarians.

The following tabular list is a summary of the taxa and their numbers listed in a Japanese paper published by Kawakatsu (1998). His list includes flatworms of 8 orders, 20 families, 93 species, and 3 subspecies. According to Dr. Kawakatsu that list was prepared as basic data for the compilation of the Japanese Red Data Book of Endangered Species: The Invertebrates (First Ed., 1991; see the References in the previous section of this web article).

CATENULIDA (=NOTANDROPORA)		2f. 6spp.
MACROSTOMIDA (=OPISTHANDROPORA)		2f. 6spp.
LECITHOEPITHELIATA		1f. 2spp.
Prorhynchida		1f. 2spp.
PROLECITHOPHORA (=HOLOCOELA; =CUMULATA)		1f. 1sp.
PROSERIATA (=SERIATA)		1f. 1sp.
TRICLADIDA		7f. 57spp.
Maricola (=Retrobursalia)	Marine planarians	1f. 5spp.
Paludicola (=Probursalia)	Freshwater planarians	3f. 27spp.
Terricola	Land planarians	3f. 25spp.
NEORHABDOCOELA		4f. 20spp.
Dalyellioida		1f. 10spp.
Typhloplanoida		1f. 8spp.
Kalyptorhynchia		2f. 2spp.
TEMNOCEPHALIDA		2f. 3spp.

Kawakatsu's (1998) list of "Turbellarians" includes macroscopic, freshwater and terrestrial species and only a single marine triclad, *Ectoplana limuli* (Ijima et Kaburaki, 1916), an ectoparasitic species of the Japanese helmet crab (*Tachypleus tridentatus*). This probably results from *T. tridentatus* approaching beaches at spring tide to lay their eggs in the sand.

In this list, *Rhodax?* sp. in the Cavernicola is placed in the Paludicola. Additionally, the class "Turbellaria" is now considered a non-monophyletic group.

## Acknowledgements

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## References

1. Kawakatsu, M. 1968. An illustrated list of Japanese freshwater planarians. Collect. and Breed. (Saishu-to-Shi'iku), Tokyo, 30 (2): 40-45. (In Japanese.)
2. Kawakatsu, M. 1969. An illustrated list of Japanese freshwater planarians in color. Bull. Fuji Women's

College, (7), Ser. II: 45-91 (+ pls. VII-VIII).

3. Kawakatsu, M. 1973. Taxonomy and ecology of planarians, 1 and 2. The Nature and Animals (Doubutsu-to-Sizen), Tokyo, 3 (5): prefatory page; (6): 11-16. (In Japanese.)
4. Kawakatsu, M. 1991. Entry in the Japanese Red Data Book: *Ectoplana limuli* (Ijima et Kaburaki, 1916), *Dugesia izuensis* Kato, 1943, *Pahagocata papillifera* (Ijima et Kaburaki, 1916), and *Dendrocoelopsis kishidai* Kawakatsu, 1978. In: Environmental Agency of the Prime Minister's Office (ed.), "The Japanese Endangered Species, Invertebrates Other than Insects", pp. 233, 241, 249, 259. The Research Center of Wild Animals and Plants in Japan, Tokyo. (In Japanese.)
5. Kawakatsu, M. 1998. Plathelminthes: Turbellaria. In: Environmental Agency of the Prime Minister's Office (ed.), "A list of Japanese Wild Species of Plants and Animals: Invertebrates III", Chapt. 42. pp.19-22. (In Japanese.)

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