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TYPE SERIES OF JAPANESE FRESHWATER "TURBELLARIANS"*

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Preface

This is the first attempt to clarify the present location of the type series of Japanese freshwater turbellarian species.

With respect to triclad planarians, the type series (both holotype and paratypes for each species) described by the late Drs. Ijima, Kaburaki, Katô, and Okugawa were lost. The majority of the holotypes of the species described by Kawakatsu is deposited in the Department of Zoology, National Science Museum (Nat. Hist.), Tôkyô. Several holotypes of the species described recently (and the holotypes of the species described by Ichikawa & Kawakatsu in the 1960's) are now retained in Kawakatsu's Collection. They (and some of their paratypes) will be sent to the same Museum after rearrangement of samples is completed.

Concerning freshwater microturbellarians, the species endemic in Japan are very limited in number. An inquiry on the locations of the type series of cosmopolitan species (mainly described from European waters) has not been made in the present report.

This article consists of 2 parts: Triclad Turbellarians Inhabiting Freshwater Biotopes in Japan, with Four Brackish Water Species (Part I) and the Species Group of Freshwater Microturbellarians (Part II).

The Japanese species of Turbellarians listed in the present article are based upon Kawakatsu's 1998 publication. Japanese names of taxa employed in that publication (and Sasaki's 2002 web article) are also shown with a few corrections. Additionally, the nature of Japanese names of animals (and plants) is explained well by Grygier (1993).

Basic References:

- Grygier, M. J., 1993. Japanese Zoological Nomenclature. *Amer. Ass. Zool. Nomenc.*, Sept. 1993, pp.5-8.
Ijima, I. & Kaburaki, T., 1916. Preliminary descriptions of some Japanese Triclad. *Annot. Zool. Japon.*, 9: 153-171.
Kaburaki, T., 1917. Notizen über Japanische Tricladen. *Annot. Zool. Japon.*, 9: 325-333.
Kaburaki, T., 1922. On some Japanese freshwater Triclads; with a note on the parallelism in their distribution in Europe and Japan. *Jour. Coll. Sci. Imp. Univ. Tôkyô*, 44 (Art. 2): 1-71 + pl. I.
Cf. <http://planarian.net/kswp/36/kaburaki.pdf>
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 (Other than Marine Species). Pp. 19-22. The Research Center of Natural Environment, Tôkyô. (In Japanese.)

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Web articles:

- Biodiversity Center of Japan, 2001. *Phagocata papillifera*. In: RDB Zukan. The Ministry of Environment of Japan. (In Japanese.) <http://www.sizenken.biodic.go.jp/rdb/content/O65.html>
- Sasaki, G.-Y., 2002. Japanese freshwater planarians in color (Dr. M. Kawakatsu).
http://www2u.biglobe.ne.jp/~gen-yu/plaj_list.html Japanese Version.
http://www2u.biglobe.ne.jp/~gen-yu/plaj_list_e.html English Version.
- Sasaki, G.-Y., Miyazaki, T., Murayama, H., Yamamoto, K., Hotta, Y. & Kawakatsu, M. 0000. Japanese freshwater planarians in color: Supplement. In preparation. <http://planarian.net> No. 38.

Abbreviations used:

KSL No.: Kawakatsu's Specimen Lot No. in Kawakatsu's Collection
ss: sagittal serial section; ts: transverse sections; hs: horizontal sections; wm: whole mount
DZNSM: Department of Zoology, National Science Museum.(Nat. Hist.), Tôkyô.
LBM: Lake Biwa Museum, Kusatsu.
ZMA: Zoological Museum, University of Amsterdam, Amsterdam.
LIRAS: Limnological Institute, Russian Academy of Science, Irkutsk.
USM: U. S. National Museum, Smithsonian Institution, Washington, D.C.

Old and Present Administrative Divisions of Japan:

Cf. Kawakatsu, M. & Sasaki, G.-Y., 2004. A blank topographical map of Japan, with explanatory maps of the Izu-Ogasawara Islands and the Southwest Islands for the chorological study of planarians.
<http://planarian.net/kswp/43/jmap.pdf>

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PART I

TYPE SERIES OF TRICLAD TURBELLARIANS INHABITING FRESHWATER BIOTOPES IN JAPAN, WITH FOUR BRACKISH WATER SPECIES

FRESHWATER SPECIES

Order **Seriata Bresslau, 1933** 順列目
Suborder **Tricladida Lang, 1884** ウズムシ亜目 (三岐腸目)
Infraorder **Paludicola Hallez, 1892** ウズムシ低亜目 (淡水生三岐腸亜目)
Family **Dugesidae Ball, 1974** サンカクアタマウズムシ科
Genus **Dugesia Girard, 1850** ナミウズムシ属

1) *Dugesia japonica* Ichikawa & Kawakatsu, 1964

Japanese name: Nami-uzumushi ナミウズムシ
Type locality: Genchi, Matsumoto, Nagano Pref., Chûbu Region, Honshû.
Holotype: KSL Nos. 102-c (ss, 3 slides). DZSNM, Tôkyô.
Paratypes: KSL Nos. 102-e (6 slides); 286-f (2 slides); 1385-g (9 slides); 1385-k (1 wm). DZSNM, Tôkyô.

Note. The species name on labels of type series is shown as *Dugesia japonica* (*D. j. japonica*) sp. nov.
DZSNM Registered Nos. 2949, 2950, 2951.
Original and redescrptions:

Ichikawa, A. & Kawakatsu, M., 1964. A new freshwater planarian, *Dugesia japonica*, commonly but erroneously known as *Dugesia gonocephala* (Dugès). *Annot. Zool. Japon.*, 37: 185-194.

Kawakatsu, M., Oki, I., Tamura, S. & Sugino, H., 1976. Studies on the morphology, karyology and taxonomy of the Japanese freshwater planarian *Dugesia japonica* Ichikawa et Kawakatsu, with a description of a new subspecies *Dugesia japonica ryukyuensis* subsp. nov. *Bull. Fuji Women's College*, (14), II: 81-126.

Misidentification:

Planaria gonocephala in Ijima & Kaburaki (1916) and Kaburaki (1922).

Ijima & Kaburaki (1916: 160-162)

Localities: “-- Under sunken objects in running as well as stagnant waters in various parts of Hondo. This species, which is also known from Europe and North America, is the commonest and the most widely distributed freshwater planarian in Japan”. Copulatory organ: Fig. 13 (on p. 161).

Kawakatsu's Note. “Hond” = Honshû, Japan.

Kaburaki (1922: 12-17)

“This species, which is well known from Europe and North America, is also the commonest and the most widely distributed freshwater planarian in Japanese territories. It is usually found beneath stones and other sunken objects in running and standing waters in various regions”. Copulatory organ: Text, fig. 5 (on p. 16).

2) *Dugesia ryukyuensis* Kawakatsu, 1976

Japanese name: Ryûkyû-nami-uzumushi リュウキュウナミウズムシ

Type locality: Nakayama-gawara, Urasoe, Okinawa, Okinawa Pref., Southwest Islands.

Holotype: KSL No. 1379-a (ss, 3 slides). DZNSM, Tôkyô.

Paratypes: KSL Nos. 1379-g (6 slides). 1379-h (2 slides); 1386-a and 1386-b (2 specimens mounted on one slide). DZNSM, Tôkyô.

Note. The species name on labels of the type series is shown as *Dugesia japonica ryukyuensis* subsp. nov. DZSNM Registered No. 2952.

Original description:

See *Dugesia japonica*.

Elevation to the species rank:

Kawakatsu, M., Oki, I. & Tamura, S., 1993. Taxonomy and geographical distribution of *Dugesia japonica* and *Dugesia ryukyuensis* in the Far East. VII ISBT Programme/ Abstracts (Åbo / Turku, June 17-22, 1993), p. 22.

[Proposal in the present paper: There are sufficient morphological and karyological differences between 2 subspecies of *D. japonica* to justify giving *D. j. ryukyuensis* the rank of a separate species.]

3) *Dugesia izuensis* Katô, 1943

Japanese name: Izu-uzumushi イズウズムシ

Type locality: Suzaki-chô, Shimoda, Shizuoka Pref. (Izu Peninsula), Chûbu Region, Honshû. Disappeared?

Holotype: lost.

Note. New material of this rare species has not obtained after the original description. For Katô's original and re-descriptions of this species, see Kawakatsu (1983).

Kawakatsu, M., 1983. A commentary on the late Dr. K. Katô's 1943 paper in Japanese including the original description of *Dugesia izuensis* (Turbellaria, Tricladida, Paludicola). *Occ. Publ., Biol. Lab. Fuji Women's College, Sapporo (Hokkaidô), Japan*, (9): 1-8.

Original and redescrptions:

Katô, K., 1943. On Japanese fresh-water planarians. Botany & Zoology, 11: 628-630. (In Japanese.)

Katô, K., 1950. A new fresh-water Triclad from Japan. Annot. Zool. Japon., 24: 45-48. Redescription.

4) *Dugesia austroasiatica* Kawakatsu, 1985

Japanese name: Tônan-azia-uzumushi トウナンアジアウズムシ

Type locality: The Nîgata City Aquarium, Nîgata, Chûbu Region, Honshû. This is an exotic species introduced into Japan from some SE Asian countries.

Holotype: KSL No. 707-e (ss, 2 slides).

Paratypes: KSL No. 796-a (Nîgata City Aquarium); KSL No. 1202-a (Aquarium of Inokashira Park, Musashino in Metropolitan Tôkyô).

Note. The holotype specimen and some of the paratypes will be deposited in the DZNSM, Tôkyô. The copulatory apparatus of *Dugesia austroasiatica* from culture ponds of *Tirapia mossambica* in Saga City is reported by Kawakatsu, Takai, Oki, Tamura & Aoyagi (1986). Chromosome no.: $2x=16$, with a karyotype of $2m + 2m + 2sm + 2sm + 2st + 2sm + 2m + 2m$.

Kawakatsu, M., Takai, M., Oki, I., Tamura, S. & Aoyagi, M., 1986. A note on an introduced species of freshwater planarian *Dugesia austroasiatica* Kawakatsu, 1985, collected from culture ponds of *Tirapia mossambica* in Saga City, Kyûshû, Japan (Turbellaria, Tricladida, Paludicola). Bull. Fuji Women's College, (24), II: 87-94.

Original description:

Kawakatsu, M., Oki, I., Tamura, S. & Yamayoshi, T., 1985. Reexamination of freshwater planarians found in tanks of tropical fishes in Japan, with a description of a new species, *Dugesia austroasiatica* sp. nov. (Turbellaria; Tricladida; Paludicola). Bull. Biogeogr. Soc. Japan, 40: 1-19.

Genus *Girardia* Ball, 1974 アメリカナミウズムシ属

5) *Girardia tigrina* (Girard, 1850)

Japanese name: America-nami-uzumushi アメリカナミウズムシ

Type locality: New Jersey, U.S.A. (Cf. Girard, 1850: 264).

Holotype: not specified.

Note. This cosmopolitan species is now naturalized in some places of Japan (the Urakami River in Nagasaki, Lake Biwa-ko, etc.). Sexually mature specimens are not yet obtained in Japan.

Cf. Kawakatsu, M., Tamura, S., Takai, M., Yamamoto, K., Ueno, R. & Oki, I., 1993. The first record of occurrence of a naturalized population of *Dugesia tigrina* (Girard, 1850) at Nagasaki, Kyûshû, Japan (Turbellaria; Tricladida; Paludicola). Bull. Biogeogr. Soc. Japan, 48: 28-34.

Nishino, M., Ohtaka, A. & Kawakatsu, M., 2002. A naturalized population of an exotic freshwater planarian, *Girardia tigrina* (Girard, 1850), found in Lake Biwa-ko, Japan. Ohmia, (75): 4. (In Japanese.)

Family *Planariidae* Stimpson, 1857 ヒラタウズムシ科

Genus *Phagocata* Leidy, 1847 ホソウズムシ属

6) *Phagocata vivida* (Ijima et Kaburaki, 1916)

Japanese name: Miyama-uzumushi ミヤマウズムシ

Type locality: Mountainous areas of the Kantô and Tôhoku Regions in Honshû.

Holotype: lost.

Note. Copulatory apparatus of the following samples in Kawakatsu's Collection is reported: KSL Nos. 537-b, 1629-d,

1629-h. Copulatory apparatus of South Korean samples is also reported: KSL No. 427-c. Some of the samples separated from them will be deposited in the DZNSM, Tôkyô. Several sets of sections separated from Kawakatsu's Collection are also deposited in the ZMA, Amsterdam.

Original and redescrptions:

Ijima & Kaburaki, 1916. Kaburaki, 1922: Redescription.

Cf. Kawakatsu, M., Teshirogi, W. & Ishida, S., 1982. Morphology of *Phagocata vivida* (Ijima et Kaburaki, 1916) with supernumerary eyes collected from Mt. Iwaki-san in Aomori Prefecture, Tôhoku Region, Honshû, Japan. Sci. Rep. Hirosaki Univ., 29: 30-46.

Kawakatsu, M., Timoshkin, O. A., Porfirjeva, N. A. & Takai, M., 1994. Taxonomic notes on *Phagocata vivida* (Ijima et Kaburaki, 1916) from South Korea and Primorsky, Russia (Turbellaria: Tricladida: Paludicola). Bull. Biogeogr. Soc. Japan, 49: 1-12.

Sluys, R., Kawakatsu, M. & Timoshkin, O. A., 2001. Taxonomic redescription of *Phagocata sibirica* and comparison with *Phagocata vivida* (Tricladida, Paludicola). Belg. Jour. Zool., 131 (Suppl. 1): 193-199.

7) *Phagocata kawakatsui* Okugawa, 1956

Japanese name: Kogata-uzumushi コガタウズムシ

Type locality: A spring-fed brooklet on the grounds of Kawakatsu's country house, Bukuden-2, Hongô, Minoda, Asahi-chô, Kameoka City, Kyôto Pref., Kinki Region, Honshû.

Holotype: Slides used by Okugawa (1956) for the original description of this species were lost. The holotype specimen was not designated in his paper.

Note. Kawakatsu has the sample collected from the type locality: KSL No. 115-i (ss, 1 slide). It will be deposited in the DZNSM, Tôkyô, together with the following samples from the other 12 localities in Honshû (Chûgoku, Kinki, Chûbu, and Tôhoku Regions) and Shikoku: KSL Nos. 436-e (Takamatsu), 570-a (Kanazawa), 1251-b (Matsumoto), 1254-g (Shimo-Ina), 1269-i (Gongawa-Shimizu, Iida), 1280-1 (Toyo'oka), 1284-a (Toyo'oka), 1291-c (Komatsubara), 1327-c (Fujimi Pass), 1815-e (Hiruzen Height), 1262-b (Matsushiro), 1495-h (Fukushima), 1496-a (Fukushima). One set or serial sections separated from Kawakatsu's Collection (KSL No. 2232-c, ss, 2 slides; loc. Off Sabae station, Lake Biwa-ko) will be deposited in the LBM, Kusatsu.

Cf. Kawakatsu, M., Nishino, M., Tamura, S., Takai, M., Oki, I., Kuznedelov, K. D. & Timoshkin, O. A., 2000. Morphology of *Phagocata kawakatsui* Okugawa, 1956, from the bottom of Lake Biwa-ko in Honshû, Central Japan (Turbellaria, Tricladida, Paludicola). Acta Biol. Leopoldensia, 22 (1): 27-35.

Original and redescrptions:

Okugawa, K. I., 1956. A new fresh-water planaria *Phagocata kawakatsui* sp. nov. from Kyoto Prefecture. Bull. Kyoto Gakugei Univ., B, (8): 19-22 + photo pl. 1.

Kawakatsu, M. & Iwaki, S., 1967. Studies on the morphology, taxonomy and ecology of freshwater planarian, *Phagocata kawakatsui* Okugawa, with remarks on distribution. Jap. Jour. Ecol., 17: 214-224.

Kawakatsu, M., Oki, I. & Tamura, S., 1986. Redescription of *Phagocata kawakatsui* Okugawa, 1956, with special reference to local variation of its copulatory apparatus (Turbellaria, Tricladida, Paludicola). Bull. Fuji Women's College, (24), II: 95-120.

Kawakatsu, M., Nishino, M., Tamura, S., Takai, M., Oki, I., Kuznedelov, D. & Timoshkin, O. A., 2000. Morphology of *Phagocata kawakatsui* Okugawa, 1956, from the bottom of Lake Biwa-ko in Honshû, Central Japan (Turbellaria, Tricladida, Paludicola). Acta Biol. Leopoldensia, 22 (1): 27-35. UNISINOS, São Leopoldo, Brasil.

8) *Phagocata teshirogii* Ichikawa & Kawakatsu, 1962

Japanese name: Tôhoku-kogata-uzumushi トウホクコガタウズムシ

Type locality: Gozensui Spring, Hirosaki, Aomori Pref., Tôhoku Region, Honshû.

Holotype: KSL No. 231-f (ss, 1 slide).

Note. The holotype specimen and several other samples in Kawakatsu's Collection (KSL Nos. 1493-f, 1867-a, etc.)

will be deposited in the DZNSM, Tôkyô.

Original description:

Ichikawa, A. & Kawakatsu, M., 1962. *Phagocata teshirogii*, a new freshwater planarian, from Tôhoku Region in Honshû. Annot. Zool. Japon., 35: 112-120.

Karyology:

Oki, I., Tamura, S., Nishino, M., Takai, M., Kuznedelov, K. D., Timoshkin, O. A. & Kawakatsu, M., 1998. Chromosomes of *Phagocata kawakatsui* and *Bdellocephala annandalei* from Lake Biwa-ko in Honshû, Central Japan. Hydrobiologia, 383: 315-320.

9) *Phagocata iwamai* Ichikawa & Kawakatsu, 1962

Japanese name: Ezo-kogata-uzumushi エゾコガタウズムシ

Type locality: Nayoro, Hokkaidô.

Holotype: KSL No. 299-a (wm).

Note. The holotype specimen and several sets of serial sections from the type locality (KSL No. 291) and the Wakkanai locality (KSL No. 215) in Kawakatsu's Collection will be deposited in the DZNSM, Tôkyô.

Notice! The holotype specimen designated in the original description (Ichikawa & Kawakatsu, 1962: 45) is a whole mount animal. Redesignation of the holotype specimen (serial sections) from the following samples in Kawakatsu's Collection should be necessary: KSL No. 291-a~q (Nayoro, 17 sets of serial sections), KSL No. 215-a~t (Wakkanai, 20 sets of serial sections). Whole mounts are also there (KSL No. 299-b~z, Nayoro).

Original description:

Ichikawa, A. & Kawakatsu, M., 1962. *Phagocata iwamai*, a new freshwater planarian, from Hokkaido. Annot. Zool. Japon., 35: 38-46.

10) *Phagocata papillifera* (Ijima & Kaburaki, 1916)

Japanese name: Kantô-ido-uzumushi カントウイドウズムシ

Type locality: An old unused well at Ichigaya, Shinjuku-ku, Tôkyô. Disappeared.

Holotype: lost.

Note. The following samples from the Mitsukaidô locality in Kawakatsu's Collection will be deposited in the DZNSM, Tôkyô. They are as follows: KSL No. 640-c (neotype); KSL Nos. 561-f, 640-g).

Original and redescrptions:

Ijima & Kaburaki, 1916. Kaburaki, 1922: Redescription.

Cf. Kawakatsu, M., Sugino, H., Oki, I., Tamura, S. & Horikoshi, I., 1984. Redescription of *Phagocata papillifera* (Ijima et Kaburaki, 1916), a subterranean planarian from Central Japan, with a comparative description of karyotypes of this species and another Japanese subterranean species *Phagocata suginoi* Kawakatsu, 1974 (Turbellaria, Tricladida, Paludicola). Bull. Fuji Women's College, (22), II: 79-104.

11) *Phagocata albata* Ichikawa & Kawakatsu, 1962

Japanese name: Sôya-ido-uzumushi ソウヤイドウズムシ

Type locality: A small spring-fed stream near Toyotomi Hot Spring, Toyotomi-chô, Teshio-gun, Hokkaidô.

Holotype: KSL No. 187-c (ss, 2 slides).

Note. The holotype specimen in Kawakatsu's Collection will be deposited in the DZNSM, Tôkyô.

Original description:

Ichikawa, A. & Kawakatsu, M., 1962. *Phagocata albata*, a new probably subterranean freshwater planarian, from Hokkaidô. Annot. Zool. Japon., 35: 29-37.

12) *Phagocata tenella* Ichikawa & Kawakatsu, 1963

Japanese name: Hidaka-hoso-uzumushi ヒダカホソウズムシ

Type locality: Mt. Apoi and the Horoman River system, Hidaka, Hokkaidô. Animals were collected from swampy land and spring-fed brooklets after heavy rains.

Holotype: KSL No. 271-c (ss, 5 slides).

Note. The holotype specimen in Kawakatsu's Collection will be deposited in the DZSMN, Tôkyô.

Original description:

Ichikawa, A. & Kawakatsu, M., 1963. *Phagocata tenella*, a new freshwater planarian, from Hokkaidô. Annot. Zool. Japon., 36: 102-107.

13) *Phagocata suginoi* Kawakatsu, 1974

Japanese name: Hokuriku-hoso-uzumushi ホクリクホソウズムシ

Type locality: A small spring at Soji, Kashiwazaki, Nîgata Pref., Chûbu Region, Honshû.

Holotype: KSL 1248-d (ss, 2 slides). DZNSM, Tôkyô.

Paratypes: KSL No. 1248-b, 1248-k, 1252-a (wm). DZNSM, Tôkyô.

DZSNM Registered Nos. 1797, 1798, 1799, 1800.

Original description:

Kawakatsu, M., Murayama, H. & Nîmura, F., 1974. *Phagocata suginoi* sp. nov., a new probably subterranean freshwater planarian from the Hokuriku district in Honshû. Annot. Zool. Japon., 47: 147-159.

Cf. Kawakatsu, Sugino, Oki, Tamura & Horikoshi, 1984. See *Phagocata papillifera*.

Genus *Polycelis* Ehrenberg, 1831 カズメウズムシ属

Subgenus *Polycelis* Ehrenberg, 1831

14) *Polycelis (Polycelis) sapporo* (Ijima & Kaburaki, 1916)

Japanese name: Kitashiro-kazume-uzumushi キタシロカズメウズムシ

Type locality: "The clear brook flowing through the grounds of 'Sapporo Agricultural College' (= now Hokkaido Univ.)", Sapporo, Hokkaidô. Disappeared.

Holotype: lost.

Note. Copulatory apparatus of the following samples in Kawakatsu's Collection is reported: KSL Nos. 183-e, 223-c, 225-e, 245-a, 259-a, 268-a, 313-a, 333-b, 667-b. Some of the samples separated from them will be deposited in the DZNSM, Tôkyô.

Original and redescrptions:

Ijima & Kaburaki (1916). Kaburaki (1922). Redescription.

Kawakatsu, M., Yanagita, Y., Teshirogi, W. & Ichikawa, A., 1974. Studies on the taxonomy and morphology of the Japanese freshwater planarian, *Polycelis sapporo* (Ijima et Kaburaki, 1916). Annot. Zool. Japon., 47: 239-260.

Kawakatsu, M., Teshirogi, W. & Tokui, T., 1976. Record of a freshwater planarian, *Polycelis sapporo* (Ijima et Kaburaki, 1916), from the bottom of Lake Towada-ko in North Japan, with a note on the southern limit of distribution of this species. Physiol. Ecol. Japan, 17: 477-483.

Genus *Seidlia* Zabusov, 1911 キタカズメウズムシ属

15) *Seidlia auriculata* (Ijima & Kaburaki, 1916)

Japanese name: Kazume-uzumushi カズメウズムシ

Type locality: Mountainous areas of Kanto and Tôhoku Regions, Honshû.
Holotype: lost.

Note. Copulatory apparatus of the following samples in Kawakatsu's Collection is reported: KSL Nos. 1536-c, 1537-a, 1538-a, 1538-b, 1539-e, 1625-a. Some of the samples separated from them will be deposited in the DZNSM, Tôkyô.

Original and redescrptions:

Ijima & Kaburaki (1916). Kaburaki (1922). Redescription.

Cf. Kawakatsu, M., Teshirogi, W. & Ishida, S., 1980. Morphological variation of the copulatory apparatus of a freshwater planarian, *Polycelis (Seidlia) auriculata* Ijima et Kaburaki, collected from five localities in the Tôhoku Region, Honshû. Sci. Rep. Hirosaki Univ., 27: 130-146.

Kenk, R., 1974. Freshwater triclad (Turbellaria) of North America. V. The genus *Polycelis*. Smithsonian Contrib. Zool., (135): 1-15.

16) *Seidlia schmidti* (Zabusov, 1916)

Japanese name: Kita-kazume-uzumushi キタカズメウズムシ

Type locality: Kamchatka, Russia.

Holotype: not specified.

Note. Copulatory apparatus of the following Samples from Japan (Hokkaidô) in Kawakatsu's Collection is reported: KSL Nos. 323-a, 506-a, 519-a. Some of the samples separated from them will be deposited in the DZNSM, Tôkyô.

Original description:

Zabusov, I. P., 1916. Russ. Zool. Zhur., 1916, pp. 273-286.

Cf. Kaburaki, T., 1917. Notizen über japanische Tricladen. Annot. Zool. Japon., 9: 325-333. Misidentification.

Kawakatsu, M., 1964. Studies on the taxonomy and morphology of the Japanese freshwater planarian, *Polycelis schmidti* (Zabusov). Annot. Zool. Japon., 37: 174-184.

Kawakatsu, M. & Yamada, T., 1966. Additional studies on the morphology of *Polycelis schmidti* (Zabusov), with remarks on distribution. Bull. Biogeogr. Soc. Japan, 24 (1): 1-8.

17) *Seidlia akkeshi* (Ichikawa & Kawakatsu, 1963)

Japanese name: Akkeshi-kazume-uzumushi アッケシカズメウズムシ

Type locality: Akkeshi-chô, Kushiro, Hokkaidô.

Holotype: KSL No. 314-f (ss, 3 slides).

Paratypes: KSL Nos. 314-a, 514-b, 314-c, 314-d, 314-e, 314-g, 314-h, 314-i, 314-j; KSL No. 341-a, 341-b, 341-c, 341-d; KSL No. 542, etc.

Note. Copulatory apparatus of the following samples in Kawakatsu's Collection is reported: KSL Nos. 321-d, 344-f. The holotype specimen and some of the samples separated from the paratypes will be deposited in the DZNSM, Tôkyô.

Original description:

Ichikawa, A. & Kawakatsu, M., 1965. *Polycelis akkeshi*, a new freshwater planarian, from Hokkaidô. Publ. Akkeshi Mar. Biol. Stat., (12): 1-18.

Family **Dendrocoelidae Hallez, 1892** オオウズムシ科

Subfamily **Kenkiinae Hyman, 1937** ホラアナウズムシ亜科

Genus ***Sphalloplana* de Beauchamp, 1931** ホラアナウズムシ属

00) *Sphalloplana* sp. 1 of Mt. Yatsugadake

Japanese name: Yatsugadake-izumi-uzumushi ヤツガダケイズミウズムシ

Locality: A spring fed brook at Utsukushi-no-Mori (Nemba-ga-hara Height), the southern slope of Mt. Yatsu-gadake, Yamanashi Pref., Honshû. Alt. 1480m. Collected by Kawakatsu, Tarui and Ogawara; Nov. 2, 1954.

Samples: Two sets of sagittal serial sections (KSL No. 50-a). Lost.

Description:

Ichikawa, A. & Kawakatsu, M., 1967. Records of two planarian species of the family Kenkiidae from Japanese subterranean waters. Arch. Hydrobiol., 63: 512-519.

00) *Sphalloplana* sp. 2 of Himeji

Japanese name: Himeji-menashi-uzumushi ヒメジメナシウズムシ

Locality: A driven well at Yatabe, Taishi-chô, near Himeji City, Hyôgo Pref., Honshû. Alt. 100m. Coll. Y. Morimoto; Feb. 16, 1964.

Samples: One set of sagittal serial sections (KSL No. 395-a, 3 slides).

Description:

See *Sphalloplana* sp. 1.

Subfamily **Dendrocoelinae Hallez, 1892** オオウズムシ亜科

Genus ***Bdellocephala* de Man, 1875** オオウズムシ属

18) *Bdellocephala annandalei* Ijima & Kaburaki, 1916

Japanese name: Biwa-ô-uzumushi ビワオオウズムシ

Type locality: "Lake Biwa, a muddy bottom at a depth of 30-45 fathoms. Collected by Dr. N. Annandale and Mr. T. Kawamura" (cited from Ijima & Kaburaki, 1916).

Holotype: lost.

Original and redescrptions: Ijima & Kaburaki (1916). Kaburaki (1922).

Note. Copulatory apparatus of KSL No. 332-a is reported. The following samples in Kawakatsu's Collection will be deposited in the DZNSM, Tôkyô: KSL Nos. 392-a (ss, 55 slides), 392-c (hs, 45 slides), 381-e (ts, 24 slides), 394-c (wm). The following samples are deposited in the LBM, Kusatsu: KSL Nos. 381-c (ss, 37 slides), 381-d (ss, 29 slides), 381-g (hs, 24 slides), 392-e (ss, 57 slides). Several sets of sections separated from Kawakatsu's Collection are also deposited in the ZMA, Amsterdam, and LIRAS, Irkutsk. A few preserved specimens are deposited in the USM, Washington, D. C.

Cf. Kawakatsu, M., Sluys, R., Timoshkin, O. A., Naumova, T. V., Nishino, M. & Takai, M., 2001. Redescription of Japanese *Bdellocephala annandalei* from Lake Biwa-ko with comparative redescription of the Far Eastern and Kamchatkan *Bdellocephala* species (Tricladida, Paludicola). Belg. Jour. Zool., 131 (Suppl. 1): 205-211.

Redescription.

Karyology:

Oki, I., Tamura, S., Nishino, M., Takai, M., Kuznedelov, K. D., Timoshkin, O. A. & Kawakatsu, M., 1998. See *Phagocata kawakatsui*.

19) *Bdellocephala brunnea* Ijima & Kaburaki, 1916

Japanese name: Izumi-ô-uzumushi イズミオオウズムシ

Type locality: Tôhoku Region, Honshû.

Holotype: lost.

Note. Copulatory apparatus of KSL Nos. 1396-a and 1398-a is reported. Two figures of the copulatory apparatus published in Kawakatsu, Asai & Yamada's paper (1978: 89 fig. 7 C and D) are *Bdellocephala brunnea* from Okushiri Island, Hokkaidô. The following samples in Kawakatsu's Collection will be deposited in the DZNSM, Tôkyô. KSL Nos. 388-g (ss, 16 slides: Fukushima); 993-b (ss, 10 slides: Matsumoto). Several sets of sections

separated from Kawakatsu's Collection are also deposited in the ZMA, Amsterdam, and LIRAS, Irkutsk.

Cf. Kawakatsu, M., Asai, A. & Yamada, T., 1978. *Bdellocephala borealis* sp. nov., a new freshwater planarian from Rishiri and Okushiri Islands of Hokkaido. Bull. Natn. Sci. Mus., A (Zool.), 4: 79-98.

Teshirogi, W., Sasaki, S.-I. & Kawakatsu, M., 1981. Freshwater planarians from Lake Usoriyama-ko and its lake-side area, the Shimokita Peninsula, in North Japan. Sci. Rep. Hirosaki Univ., 28 (2): 84-96.

Original and redescrptions:

Ijima & Kaburaki (1916). Kaburaki (1922). Redescription.

20) *Bdellocephala borealis* Kawakatsu, 1978

Japanese name: Rishiri-ô-uzumushi リシリオオウズムシ

Type locality: An outlet of Hime-numa Pond, Rishiri Island, Hokkaidô.

Holotype: KSL No. 218-a (ss, 7 slides). DZNSM, Tôkyô.

Paratypes: KSL Nos. 218-h, 218-i, 218-p, 218-v, 218-aa, 218-cc; No. 420-a (wm), 420-b (wm). DZNSM, Tôkyô.

Note. Several sets of sections separated from Kawakatsu's Collection are also deposited in the ZMA, Amsterdam, and LIRAS, Irkutsk. DZSSM Registered No. 2945.

Original description:

Kawakatsu, M., Asai, E. & Yamada, T., 1978. *Bdellocephala borealis* sp. nov., a new freshwater planarian from Rishiri and Okushiri Islands of Hokkaidô. Bull. Natn. Sci. Mus., A (Zool.), 4 (2): 79-98.

Notice! Except for Fig. 7 (C, D). See *Bdellocephala brunnea*.

Genus *Dendrocoelopsis* Kenk, 1930 キタオオウズムシ属

21) *Dendrocoelopsis ezensis* Ichikawa & Okugawa, 1958

Japanese name: Ezo-uzumushi エゾウズムシ

Type locality: Brooklet on the school ground of Hokkaido University, Sapporo, Hokkaidô. Disappeared.

Holotype: Slides used by Okugawa (cf. Ichikawa & Okugawa, 1958) were lost. The holotype specimen was not designated in their paper.

Note. Kawakatsu has the samples collected from the type locality: KSL No. 154, etc. The following sample from the Otoineppu locality, N. Hokkaidô (KSL No. 288-g, ss, 27 slides) will be deposited in the DZNSM, Tôkyô. Several sets of sections separated from Kawakatsu's Collection are also deposited in the ZMA, Amsterdam.

Original description:

Cf. Ichikawa & Okugawa, 1958. Studies on the Probursalians (fresh-water Triclad) of Hokkaido. I. On two new species of the genus *Dendrocoelopsis* Kenk, *D. lacteus* and *D. ezensis*. Bull. Kyoto Gakugei Univ., B, (12): 9-18 + pls. 1-5.

22) *Dendrocoelopsis lactea* Ichikawa & Okugawa, 1958

Japanese name: Kita-shiro-uzumushi キタシロウズムシ

Type locality: Brooklet on the school ground of Hokkaido University, Sapporo, Hokkaidô. Disappeared.

Holotype: Slides used by Okugawa (cf. Ichikawa & Okugawa, 1958) were lost. The holotype specimen was not designated in their paper.

Note. Kawakatsu has the samples collected from the type locality: KSL Nos. 153-f (ss, 3 slides) and 153-h (ss, 4 slides). These samples will be deposited in the DZNSM, Tôkyô, together with the following samples from 3 different localities separated from Kawakatsu's Collection: KSL No. 216-a, 216-d (Wakkanai, Hokkaidô); Nos. 684-c and 1433-j (Kuroishi, Aomori Pref., Honshû); No. 1279-c (Hidaka, Hokkaidô). Several sets of sections separated from Kawakatsu's Collection are also deposited in the ZMA, Amsterdam.

Original description:

Ichikawa, A. & Okugawa, K. I., 1958. See *Dendrocoelopsis ezensis*.

23) *Dendrocoelopsis ichikawai* Kawakatsu, 1977

Japanese name: Rishiri-uzumushi リシリウズムシ

Type locality: An outlet of Hime-numa Pond, Rishiri Island, Hokkaidô.

Holotype: KSL No. 421-h (ss, 5 slides). DZNSM, Tôkyô.

Paratypes: KSL No. 421-m, 421-p, 421-r (wm). DZNSM, Tôkyô.

Note. Several sets of sections separated from Kawakatsu's Collection are also deposited in the ZMA, Amsterdam. DZNSM Registered No. 2946.

Original description:

Kawakatsu, M., Asai, E. & Yamada, T., 1978. *Dendrocoelopsis ichikawai* sp. nov., a new freshwater planarian from Rishiri Island in Hokkaido. Bull. Natn. Sci. Mus., A (Zool.), 3: 199-217.

24) *Dendrocoelopsis kishidai* Kawakatsu, 1978

Japanese name: Kyôto-uzumushi キョウトウズムシ

Type locality: A spring-fed water at Nishiôji-shichijô, Kyôto, Kinki Region, Honshû. Disappeared.

Holotype: KSL No. 10C-a (ss, 6 slides). DZNSM, Tôkyô.

Paratype: KSL No. 10C-b (ss, 7 slides). DZNSM, Tôkyô.

Note. This species was at first considered as *Bdellocephala brunnea*, which was very common in this locality; *Dugesia japonica* was also very common. When the slides of the former were examined, a new animal species with a well-developed penis papilla was found (*Bdellocephala* species has no penis papilla). We have not detailed data of an external morphology of *Dendrocoelopsis kishidai*.

DZNSM Registered No. 2948.

Original description:

Kawakatsu, M., Ôgawara, G. & Tarui, Y., 1978. *Dendrocoelopsis kishidai* sp. nov., a new freshwater planarian from Kyoto, the Kinki District, Honshu. Annot. Zool. Japon., 51: 146-154.

Publications (Probursalia)

Papers on the geographical distribution of wide-distributed, 6 species of stream-dwelling planarians (*Dugesia japonica*, *Dugesia ryukyensis*, *Phagocata vivida*, *Polycelis (Polycelis) sapporo*, *Seidlia auriculata*, and *Seidlia schmidtii*) are given here. For their distributional ecology, see Kawakatsu (1965, 1967, 1974).

Kawakatsu, M., 1965. On the ecology and distribution of freshwater planarians in the Japanese Islands, with special reference to their vertical distribution. *Hydrobiologia*, 26: 349-408.

Kawakatsu, M., 1967. On the ecology and distribution of freshwater planarians in the Japanese Islands, with special reference to their vertical distribution (Revised Edition). *Bull. Fuji Women's College*, (5): 117-177.

Kawakatsu, M., 1974. Further studies on the vertical distribution of freshwater planarians in the Japanese Islands. In: Riser, N. W. & Morse, M. P. (eds.), *Libbie H. Hyman Memorial Volume --- Biology of the Turbellaria ---*, pp. 291-338. McGraw-Hill Book Company, New York, etc.

Kawakatsu, M., Oki, I. & Tamura, S., 1995. Taxonomy and geographical distribution of *Dugesia japonica* and *D. ryukyensis* in the Far East. *Hydrobiologia*, 305: 55-61.

Kawakatsu, M. & Timoshkin, O. A., 1998. The geographical distribution of *Polycelis (Polycelis) sapporo* and *Seidlia schmidtii* in the Far East. *Hydrobiologia* 383: 307-313.

Kawakatsu, M., Timoshkin, O. A., Porfirjeva, N. A. & Takai, M., 1995. Geographical distribution of *Phagocata vivida* in the Far East. *Hydrobiologia*, 305: 63-70.

- Kawakatsu, M., Yamada, T., Murayama, H. & Naoki, Y., 1991. Geographical distribution of *Polycelis (Seidlia) auriculata* in Japan. *Hydrobiologia*, 227: 355-363.
- Oki, I., Tamura, S., Yamayoshi, T. & Kawakatsu, M., 1981. Karyological and taxonomic studies of *Dugesia japonica* Ichikawa et Kawakatsu in the Far East. *Hydrobiologia*, 84: 53-68.
- Tamura, S., Oki, I. & Kawakatsu, M., 1988. Karyological and taxonomic studies of *Dugesia japonica* from the Southwest Islands of Japan. *Fortsch. Zool.*, 36: 123-128.
- Tamura, S., Oki, I. & Kawakatsu, M., 1991. Karyological and taxonomic studies of *Dugesia japonica* from the Southwest Islands of Japan - II. *Hydrobiologia*, 227: 157-162.
- Tamura, S., Oki, I. & Kawakatsu, M., 1995. A review of chromosomal variation in *Dugesia japonica* and *D. ryukyensis* in the Far East. *Hydrobiologia*, 305: 79-84.
- Tamura, S., Yamamoto, K., Takai, M., Oki, I. & Kawakatsu, M., 1998. Karyology and biogeography of *Dugesia japonica* and *Dugesia ryukyensis* in Kyūshū, Southern Japan. *Hydrobiologia*, 383: 321-327.

Taxonomic redescriptions of *Dugesia japonica* and *Dugesia ryukyensis* with schematic figures of the copulatory apparatus were published in many papers from Kawakatsu's team. Cf. References in Kawakatsu, Oki & Tamura (1995: 59-61) listed above.

Additionally, 18 schematic figures of the copulatory apparatus of these 2 species from the Southwest Islands of Japan are shown in Kawakatsu, Oki, Tamura, Takai, Timoshkin & Porfirjeva (1993: on pp. 10-11, Fig. 12 A-Q). Additional 9 schematic figures of them from Kyūshū are also shown in Kawakatsu, Oki, Tamura, Takai, Yamamoto, Nishino, Timoshkin, Kuznedelov & Sluys (1996: 3-5, Fig. 2 A-D).

- Kawakatsu, M., Oki, I., Tamura, S., Takai, M., Timoshkin, O. A. & Porfirjeva, N. A., 1993. Preprint of papers given at the Seventh International Symposium on the Turbellaria, Åbo, Finland, June 17-22, 1993. *Occ. Publ., Biol. Lab. Fuji Women's College, Sapporo (Hokkaidō), Japan*, (25): 1-20.
- Kawakatsu, M., Oki, I., Tamura, S., Takai, M., Yamamoto, K., Nishino, M., Timoshkin, O. A., Kuznedelov, K. D. & Sluys, R., 1996. Preprint of papers given at the Eighth International Symposium on the Biology of the Turbellaria, Brisbane, Australia, August 19-23, 1996. *Occ. Publ., Biol. Lab. Fuji Women's College, Sapporo (Hokkaidō), Japan*, (27): 1-16.

Infraorder **Cavernicola** Sluys, 1990 地下水三岐腸低亜目

Family **Dimarcusidae** Mitchell & Kawakatsu, 1972 メキシコチカスイウズムシ科

Genus **Rhodax** Marcus, 1946 ブラジルウズムシ属

25) *Rhodax evelinae* Marcus, 1946?

Japanese name: Brazil-uzumushi ブラジルウズムシ

Type locality: Brooks, rivers and ponds in São Paulo, Brazil.

Holotype: Departamento de Zoologia, Instituto de Biociências, Universidade de São Paulo, São Paulo, Brazil.

Paratypes: Ditto.

Note. *Rhodax?* sp. was at first found in tanks for tropicalfish culture in the Biological Laboratory, Faculty of Science, Nagoya University. Karyotypes of those asexual specimens were studied (Kawakatsu, Oki, Tamura & Yamayoshi, 1985). The second occurrence of *Rhodax?* sp. in Japan (Sapporo) has been listed in the 1993 Åbo Symposium preprint, abstract and the 1995 publication (Kawakatsu, Oki, Tamura, Takai, Timoshkin & Porfirjeva, 1993; Oki, Tamura, Takai & Kawakatsu, 1993, 1995). A more detailed report on the second record of *Rhodax?* sp. from Sapporo is found in a paper by Kawakatsu, Tamura, Oki, Takai & Froehlich (1995).

Publications (Cavernicola):

- Kawakatsu, M., Oki, I., Tamura, S., Takai, M., Timoshkin, O. A. & Porfirjeva, N. A., 1995. Preprint of papers given at the Seventh International Symposium on the Turbellaria, Åbo, Finland, June 17-22, 1993. *Occ. Publ., Biol. Lab. Fuji Women's College, Sapporo (Hokkaidō), Japan*, (25): 1-20.
- Kawakatsu, M., Oki, I., Tamura, S. & Yamayoshi, T., 1985. Reexamination of freshwater planarians found in tanks of tropical fishes in Japan, with a description of a new species, *Dugesia austroasiatica* sp. nov. (*Turbellana*;

Tricladida; Paludicola). Bull. Biogeogr. Soc. Japan, 40: 1-19.

Oki, I., Tamura, S., Takai, M. & Kawakatsu, M., 1993. Chromosomes of *Temnocephala minor*, an ectosymbiotic turbellarian on Australian crayfish found in Kagoshima Prefecture, with karyological notes on exotic turbellarians found in Japan. VII ISBT Åbo / Turku Abstract, p. 91.

Oki, I., Tamura, S., Takai, M. & Kawakatsu, M., 1995. Chromosomes of *Temnocephala minor*, an ectosymbiotic turbellarian on Australian crayfish found in Kagoshima Prefecture, with karyological notes on exotic turbellarians found in Japan. Hydrobiologia, 305: 71-77.

BRACKISHWATER SPECIES

Order **Seriata Bresslau, 1933** 順列目

Suborder **Tricladida Lang, 1884** ウズムシ亜目(三岐腸目)

Infraorder **Maricola Hallez, 1892** (=Retrobursalia) ウミウズムシ低亜目(海生三岐腸亜目)

Family **Uteriporidae Bohmig, 1906** コガタウミウズムシ科

Subfamily **Ectoplaninae Bresslau, 1933**

Genus ***Paucumara* Sluys, 1989**

1) *Paucumara trigonocephala* (Ijima & Kaburaki, 1916)

Japanese name: Sankaku-umi-uzumushi サンカクウミウズムシ

Type locality: "Estuary of a rivulet in Oginohama Port, Rikuzen Province" (=Hagi-no-hama Beach, Miyagi Pref., Tōhoku Region, Honshū).

Holotype: lost.

Paratypes: lost.

Distribution in Japan: Type locality; Itsukushima Island, Hiroshima Pref., Chūgoku Region, Honshū (cf. Kaburaki, 1922: Itsukushima, Province Aki); Asamo at Tsutsu, Tsushima Islands, Nagasaki Pref., Kyūshū; Nago, Okinawa Island, Okinawa Pref. Cf. Sluys & Kawakatsu (2000). This species is also distributed in Queensland, Australia; the Bismarck Islands (and Hong Kong?). Cf. Sluys (1989); Sluys & Kawakatsu (2000).

New samples: KSL No. 588 (NSMT-PL-5045). DZSMN. KSL Nos. 588 and 690. ZMA.

Genus ***Procerodella* Sluys, 1989**

2) *Procerodella asahinai* (Katō, 1943)

Type locality: Lake Yūdōnuma (=Yūdō-numa), Tokachi, Hokkaidō.

Holotype: lost

Paratypes: lost

Distribution: Type locality; a pond on Hegura-jima Island, approximately 48km NW of Suzu-zaki Cape of the Noto Peninsula, Ishikawa Pref., Chūbu Region, Honshū. Cf. Sluys & Kawakatsu (2004).

Japanese samples deposited: KSL Nos. 1797, 1816. ZMA.

3) *Procerodella japonica* (Katō, 1955)

Type locality: Lake Hōjōzu-gata, Toyama Pref., Chūbu Region, Honshū.

Holotype: ? (probably lost)

Paratypes: ? (probably lost)

Distribution: known only from the type locality.

Note: Lake Hōjōzu-gata is a lagoon connected with the Toyama Bay and is now used at the New Harbor at Toyama. Cf. Kawakatsu, Nunomura & Suzuki (1989: 43, Note).

Genus ***Miropiana* Katō, 1931**

4) *Miropilana trifasciata* Katô, 1931

Type locality: Shimura and Akabane, the Arakawa River (the upper part of the Sumida-gawa River: approximately 32 km distant from the estuary). Cited from Katô (1931, 1965).

Holotype: lost

Paratypes: lost

Distribution in Japan: Type locality; a brackish water pond located in the riverbed of the lower part of the Tamagawa River system, the SW of Tôkyô. Cf. Sasaki (2000). *M. trifasciata?* is also recorded from a narrow stream near Kimpo Airport, Seoul, South Korea. Cf. Sluys & Kawakatsu (2004).

Korean sample deposited: KSL No. 1337. ZMA.

References Cited (Maricola)

Except for taxonomic papers concerning taxons' names above a higher level of the subfamily.

- Ijima, I. & Kaburaki, T., 1916. Preliminary descriptions of some Japanese Tricladids. *Annot. Zool. Japon.*, 9: 153-171.
- Kaburaki, T., 1922. On some Japanese Tricladida Maricola, with a note on the classification of the group. *Jour. Coll. Sci., Imp. Univ. Tôkyô*, 44 Art. 3: 1-54 + pl. I. For this paper, see Kawakatsu & Sasaki (2002).
- Katô, K., 1931. A new Triclad Turbellarian. *Proc. Imp. Acad.*, Tôkyô, 7: 363-366.
- Katô, K., 1943. A new marine Triclad from northern Japan. *Bull. Biogeogr. Soc. Japan.*, 13: 1-6.
- Katô, K., 1955. A new brackish-water Turbellaria from Japan. *Bull. Biogeogr. Soc. Japan*, 16-19: 21-24.
- Katô, K., 1965. *Miropilana trifasciata* Katô. In: Okada, Yô K., Uchida, S. & Uchida, T. (eds.), *New Illustrated Encyclopedia of the Fauna of Japan.*, Part I: 318, fig. 30. Hokuryû-kan Publ. Co. Ltd., Tôkyô. (In Japanese.)
- Kawakatsu, M., Nunomura, N. & Suzuki, H., 1989. Corrections and emendations of species names of several Japanese species of Turbellarians (Acoela, Tricladida-Maricola, Polycladida-Cotylea, and Temnocephalida-Scutariellidata) and Nemertinea (Enopla-Hoploneurtea-Monostylifera). *Bull. Fuji Women's College*, (27), II: 41-51.
- Kawakatsu, M. & Sasaki, G.-Y., 2002. An electronic reproduction of the late Dr. T. Kaburaki's three color plates attached to his 1922 papers on Japanese marine, freshwater and land planarians (Plathelminthes, "Turbellaria", Tricladida), with a taxonomic commentary. Web article. <http://planarian.net/kswp/36/kaburaki.pdf>
- Sasaki, G.-Y., 2000. *Miropilana trifasciata?* Web article. <http://www.ct.sakura.ne.jp/~gen-yu/2000/miropilana.html> (text in Japanese.); <http://www.ct.sakura.ne.jp/~gen-yu/2000/09030014.jpg> (color photograph only.)
- Sluys, R., 1989. A Monograph of the Marine Tricladids. i-xii + 1- 463 (+ pls. 1-12). A. A. Balkema, Rotterdam & Brookfield.
- Sluys, R. & Kawakatsu, M., 2000. New, southernmost record of *Paucumara trigonocephala* (Platyhelminthes, Tricladida, Maricola) from Queensland, with documentation of earlier records from Japan. *Queensland Nat. (Jour. Queensland Nat. Club Inc.)*, 38: 24-30.
- Sluys, R. & Kawakatsu, M., 2004 (In press). Biodiversity of marine planarians revisited (Platyhelminthes, Tricladida, Maricola). *Jour. Nat. Hist.*

PART II

TYPE SPECIES IN THE SPECIES GROUP OF FRESHWATER MICROTURBELLARIANS

Taxonomic study of Japanese freshwater microturbellarians has been neglected after Okugawa's (1930) classical paper was published (cf. Kawakatsu & Nishino, 1995, 1994). Explanatory notes with, or without, figures of Japanese freshwater microturbellarians were published by Okugawa (1932a, b, 1947, 1953, 1960, 1965, 1970, 1973, 1979). These articles in Japanese (except for 1953) include a few new taxonomic findings.

Kawakatsu (1998) made a few bibliographic corrections of scientific names in this animal group. (For the history of the study of Turbellarians in Japan, see Kawakatsu, 1991).

Information on the following microturbellarians has been extracted from Kawakatsu (1998) and concerns 7 Orders (including 6 Suborders), 14 Families (including 5 Subfamilies), 25 Genera, and 39 Species (including 2 Subspecies).

Note. A few corrections are given for Kawakatsu's (1998) List of Turbellarians (pp. 20-22).

- P. 20. Prorhynchidae. Add the following subspecies. *Prorhynchus stagnalis biwaensis* Timoshkin, Grygier & Kawakatsu, 2004 (In press.) This new subspecific name may be disclaimed. Cf. ICZN, 4th Ed., 1999, Art. 8.3.
- P. 20. Maricola. "Procerodidae" is replaced by Uteriporidae.
- P. 22. Dalyelliidae. "*D. oruzae*" should read as *D. oryzae*.
- P. 22. "Rhynchomesostomatinae" should read as Rhynchomesostominae.
- P. 22. "Mesostomatinae" should read as Mesostominae.

Order **Catenulida Meixner, 1924** (=Notandropora) カテヌラ目(小鎖状目)
Family **Catenulidae von Graff, 1905** イトヒメウズムシ科
Genus ***Catenula* Dugès, 1832**

1) ***Catenula lemnae* Dugès, 1832**

Japanese name: Itohime-uzumushi イトヒメウズムシ
Type locality: Europe
Holotype: ?
Paratypes: ?
Distribution in Japan: Lake Biwa-ko. Cf. Okugawa (1930)

Family **Stenostomidae Vejdovský, 1880** クサリヒメウズムシ科
Genus ***Stenostomum* Schmidt, 1848**

2) ***Stenostomum agile japonicum* Okugawa, 1930**

Type locality of this subspecies: Miyazu, Kyôto Pref.
Holotype: lost?
Paratypes: ?
Distribution: known only from the type locality. Cf. Okugawa (1930).

3) ***Stenostomum ignavum* Vejdovský, 1880**

Type locality: Europe
Holotype: ?
Paratypes: ?
Distribution in Japan: 'Kiredo See bei Tsuruga'; Lake Biwa (=Biwa-ko). Cf. Nasonov (1929).

4) ***Stenostomum leucops* (Dugès, 1928)**

Japanese name: Kusari-hime-uzumushi クサリヒメウズムシ
Type locality: Europe
Holotype: ?
Paratypes: ?
Distribution in Japan: Tsuruga? (Kireto See); rice-field in the vicinity of Ôtsu, Shiga Pref. Cf. Nasonov (1929); Okugawa (1930).

Note. Nasonov (1929) wrote as 'Kireto-See bei Tsuruga'. The location of 'Kireto-See bei Tsuruga' is unknown. Tsuruga City is located in Fukui Pref. There is a possibility that it is Kiredo (or Kirido), the southern part of Ama-no-Hashidate, Miyazu, Kyôto Pref.

5) ***Stenostomum unicolor* Schmidt, 1848**

Type locality: Europe
Holotype: ?
Paratypes: ?
Distribution in Japan: Lake Biwa-ko. Cf. Okugawa (1930).

Genus *Rhynchoscolex* Leidy, 1851

6) *Rhynchoscolex simplex* Leidy, 1851

Japanese name: Nagafun-hime-uzuniushi ナガフンヒメウズムシ
Type locality: U.S.A.
Holotype: ?
Paratypes: ?
Distribution in Japan: Sapporo, Hokkaidô. Cf. Okugawa (1932, 1965).

Order **Macrostomida** Karling, 1940 (=Opisthandropora) ヒメウズムシ目 (多食目)

Family **Macrostomidae** Luther, 1907 ホソクチヒメウズムシ科

Genus *Microstomum* Schmidt, 1848

7) *Microstomum giganteum* Hallez, 1878

Type locality: Europe
Holotype: ?
Paratypes: ?
Distribution in Japan: Kiredo, Miyazu; Kyôto. Cf. Nassonov (1929); Okugawa, (1930).

8) *Microstomum lineare* (Müller, 1774)

Japanese name: Chôzume-hime-uzumushi チョウヅメヒメウズムシ
Type locality: Europe
Holotype: ?
Paratypes: ?
Distribution in Japan: 'Kiredo See bei Tsuruga'; Lake Biwa (=Biwa-ko). Cf. Nassonov (1929). Rice-field, ponds in the vicinity of Ôtsu, etc. Common species. Cf. Okugawa (1930, 1965).

Family **Macrostomidae** Beneden, 1870 ヒトクチヒメウズムシ科

Genus *Macrostomum* Schmidt, 1848

9) *Macrostomum gigas* Okugawa, 1930?

Japanese name: Hira-hime-uzunaushi ヒラヒメウズムシ
Type locality: Lake Biwa-ko.
Holotype: lost?
Paratypes: ?
Distribution in Japan: Lake Biwa-ko; ponds and rice-fields in Kyôto and Ôsaka. Cf. Okugawa (1930: 77-78).

Note: This species was at first described as *M. tuba* var. *gigas*. Marcus (1946) classified this variety as *M. gigas* Okugawa, 1930. Cf. Okugawa (1973: 218-219); Kawakatsu & Nishino (1994: 95, Note 6). It is highly probable that *M. gigas* is a synonym of *Macrostomum tuba* (von Graff, 1882) reported from Europe. Cf. Yamamoto, Sasaki & Kawakatsu (2003); Sasaki (2003).

10) *Macrostomum hystricinum* Beklemishev, 1951

Type locality: Europe

Holotype: ?

Paratypes: ?

Distribution in Japan: Brackish water at Miyazu; rice-field and Lake Biwa-ko. Cf. Okugawa (1930: 77, under the name of *M. appendiculatum* (Fabricius, 1886)).

Note: *Macrostomum appendiculatum* (Fabricius, 1886), in Okugawa (1930), is a synonym of *M. hystricinum* Beklemishev, 1951. Cf. Beklemishev (1951: 32); Luther (1960: 67-68); Okugawa (1973: 218); Kawakatsu & Nishino (1994: 95, Note 4).

11) *Macrostomum japonicum* Okugawa, 1930

Type locality: Central Japan (Honshû)

Holotype: lost?

Paratypes: ?

Distribution: lakes and ponds in Central part of Honshû. Cf. Okugawa (1930).

12) *Macrostomum saifunicum* Nasonov, 1929

Type locality: 'Insel Chondo in der Nähe der Stadt Tsuruga im Kireto-See und eines Netzfanges im Biva-See bei der Biologischen Station'. Cf. Nasonov (1929).

Holotype: ?

Paratypes: ?

Distribution: Tsuruga, Fukui Pref.; Lake Biwa-ko. Cf. Nasonov (1929); Okugawa (1930: 78-79, under the name of *M. kawamurai*).

Note: The correct location of Nasonov's type locality is uncertain. *Macrostomum kawamurai* Okugawa, 1930, from Lake Biwa-ko is a synonym of *M. saifunicum*. Cf. Okugawa (1973: 219); Kawakatsu & Nishino (1994: 95, Note 5).

Order **Lecithoepitheliata Reisinger, 1924** ヒラウズムシ目(卵黄皮目)

Suborder **Prorhynchida Hallez, 1894** プロリンクス亜目(原有吻亜目)

Family **Prorhynchidae Hallez, 1894** マエクチコケウズムシ科

Genus ***Prorhynchus* Schultze, 1851**

13) *Prorhynchus stagnalis* Schultze, 1851

Japanese name: Koke-uzumushi コケウズムシ

Type locality: Europe

Holotype: ?

Paratypes: ?

Distribution in Japan: Ôtsu and the bottom of Lake Biwa-ko. It is also reported from Kiso in Nagano Pref. in Honshû and Hokkaidô. Cf. Okugawa (1930: 84; 1953, 1965, 1970, 1973).

14) *Prorhynchus stagnalis biwaensis* Timoshkin, Grygier & Kawakatsu, 2003 (in press)*

*This new subspecific name may be disclaimed. Cf. ICZN, 4th Ed., 1999, Art. 8.3.

Type locality: Kitakomatsu, Lake Biwa-ko, Shiga Pref., Honshû.

Holotype:

Paratypes:

Distribution: known only from the type locality.

Note. The question of the endemicity of *P. s. biwaensis* can be resolved only after investigation of populations of *P. stagnalis* inhabiting Lake Biwa's neighbouring water bodies.

Genus *Geocentrophora* de Man, 1876

15) *Geocentrophora sphyrocephala* de Man, 1876

Japanese name: Kokehira-uzumushi コケヒラウズムシ

Type locality: Europe

Holotype: ?

Paratypes: ?

Distribution in Japan: Kyôto; Kiso in Nagano Pref., Honshû. Cf. Okugawa (1930: 83; 1953, 1965, 1970, 1973).

Order **Prolecithophora Karling, 1940** (=Holocoela; =Cumulata) プラギオストームム目(原卵黄目)

Family **Plagiostomidae von Graff, 1908** アミメウズムシ科

Genus *Plagiostomum* Schmidt, 1852

16) *Plagiostomum lemani* (du Plessis, 1874)

Japanese name: Kuro-amime-uzumushi クロアミメウズムシ

Type locality: Europe

Holotype: ?

Paratypes: ?

Distribution in Japan: Lake Biwa-ko and the vicinity of Shiga Pref. in Honshû. Cf. Okugawa (1930: 84; 1953; 1965, 1970, 1973).

Order **Proseriata Meixner, 1938** (=Seriata) ヒメヒラウズムシ目(原順列目)

Family **Bothrioplanidae Hofsten, 1907** スイツキヒメウズムシ科

Genus *Bothrioplana* Braun, 1881

17) *Bothrioplana semperi* Braun, 1881

Japanese name: Hime-hira-uzumushi ヒメヒラウズムシ

Type locality: Europe

Holotype: ?

Paratypes: ?

Distribution in Japan: Pools at the Ôsaka City Water-Works. Cf. Okugawa (1950: 84; 1953, 1965, 1970, 1973). *B. semperi* is also reported from underground pools of Komakado-no-kaza-ana Cave and Hito-ana Cave on the foot of Mt. Fuji-san, Shizuoka Pref., Honshû. *Bothrioplana* sp. from Sakishirazu-no-iana Cave, Fukue-jima Is. in the Gotô Islands, Nagasaki Pref., Kyûshû, may be the same species. Cf. Mack-Firã & Kawakatsu (1972: 639-640, fig. 1, pl. 1, fig. A-C); Kawakatsu & Mack-Firã (1975: 78-80, fig. 1).

Japanese samples deposited: KSL Nos. 1048, 1049 and 1050. DZSMN. KSL No. 1043. DZSMN. Some of the samples separated from these collections are deposited in the Laboratoire de Zoologie (Invertebres) de la Faculte de Biologie de l'Universite de Bucarest, Roumanie. Some of the samples in Kawakatsu's Collection will be sent to the ZMA.

Order **Neorhabdoceola Meixner, 1938** ヤドリウズムシ目(新棒腸目)

Suborder **Dalyellioida von Graff, 1882** ダリエリア亜目(たる咽頭亜目)

Family **Dalyelliidae von Graff, 1908** タルクチヒメウズムシ科

Genus *Dalyellia* Flemming, 1822

18) *Dalyellia brevispina* Hofsten, 1907

Type locality: Europe

Holotype: ?

Paratypes: ?

Distribution in Japan: pools at the Ôsaka City Water-works; Kyôto, Honshû. Cf. Okugawa (1930: 80; 1953).

19) *Dalyellia inflata* Okugawa, 1930

Type locality: rice-fields in Awaji-shima Island, Hyôgo Pref., Honshû.

Holotype: lost?

Paratypes: ?

Distribution: known only from the type locality. Cf. Okugawa (1930: 81; 1953).

20) *Dalyellia japonica* Okugawa, 1930

Type locality: A pool at the Ôsaka City Water-works, Honshû.

Holotype: lost?

Paratypes: ?

Distribution: known only from the type locality. Cf. Okugawa (1930: 82; 1953).

21) *Dalyellia okugawai* Ruebush & Hayes, 1939

Type locality: a rice-field in Awaji-shima Island, Hyôgo Pref., Honshû.

Holotype: lost?

Paratypes: ?

Distribution: known only from the type locality.

Note: This species was at first described as a new species: *Dalyellia gracilis* Okugawa, 1930. Cf. Okugawa (1930: 81). A new name was given for this Japanese species by Ruebush & Hayes (1939: 149).

22) *Dalyellia oryzae* Nasonov, 1929

Type locality: 'Reisfeldern in der Nähe von Fusiki' (Takaoka, Toyama Pref., Honshû).

Holotype: ?

Paratypes: ?

Distribution in Japan: known only from the type locality. Cf. Okugawa (1953).

23) *Dalyellia striata* (Plotnikov, 1905)

Type locality: Europe

Holotype: ?

Paratypes: ?

Distribution in Japan: a rice-field in Awaji-shima Island, Hyôgo Pref., Honshû. Cf. Okugawa (1930: 80-81; 1953).

24) *Dalyellia tsurugae* Nasonov, 1929

Type locality: 'Kireto-See bei Tsuruga' (Tsuruga, Fukui Pref., Honshû).

Holotype: ?

Paratypes: ?

Distribution: known only from the type locality. Cf. Okugawa (1953).

Genus *Microdalyellia* Gieysztor, 1938

25) *Microdalyellia armiger* (Schmidt, 1861)

Japanese name: Taru-hime-uzumushi タルヒメウズムシ

Type locality: Europe

Holotype: ?

Paratypes: ?

Distribution in Japan: rice-fields near Kyôto and Ôsaka, Honshû; Yaku-shima Island, Kyûshû. Cf. Okugawa (1930: 80; 1953, 1965, 1970, 1973).

26) *Microdalyellia biwae* (Okugawa, 1930)

Japanese name: Biwa-hime-uzumushi ビワヒメウズムシ

Type locality: Lake Biwa-ko; ponds near Kyôto, Honshû.

Holotype: lost?

Paratypes: ?

Distribution: known only from the type locality, etc.

Note: Luther (1955: 151) classified *Dalyellia biwae* Okugawa, 1930, as *Microdalyellia biwae* (Okugawa, 1930). Cf. Okugawa (1973: 235); Kawakatsu & Nishino (1994: 95, Note 8).

Suborder **Typhloplanoida von Graff, 1905** ティフロプラーナ亜目(無吻亜目)

Family **Typhloplanidae von Graff, 1908** バラクチヒメウズムシ科

Subfamily **Typhloplaninae von Graff, 1908** バラクチヒメウズムシ亜科

Genus ***Typhloplana* Ehrenberg, 1831**

27) *Typhloplana viridata* (Abildgaard, 1789)

Type locality: Europe

Holotype: ?

Paratypes: ?

Distribution in Japan: Kiso, Nagano Pref., Honshû. Cf. Okugawa (1930: 82; 1953).

Genus ***Strongyrostoma* Ørsted, 1843**

28) *Strongyrostoma radiatum* (Müller, 1774)

Type locality: Europe

Holotype: ?

Paratypes: ?

Distribution in Japan: bottom of Lake Biwa-ko; Kyôto, Honshû. Cf. Okugawa (1950: 82; 1953).

Genus ***Castrada* Schmidt, 1862**

29) *Castrada hofmanni* Braun, 1858

Type locality: Europe

Holotype: ?

Paratypes: ?

Distribution in Japan: Benkei-no-Asigata-ike Pond, Kyôto, Honshû. Cf. Okugawa (1930: 82; 1953).

Subfamily **Rhynchomesostominae Luther, 1904**

Genus ***Rhynchomesostoma* Luther, 1904**

30) *Rhynchomesostoma rostratum* (Muller, 1774)

Japanese name: Aka-hime-uzumushi アカヒメウズムシ

Type locality: Europe

Holotype: ?

Paratypes: ?

Distribution in Japan: a temporary ditch at Ôtsu, Shiga Pref., Honshû; a rice-field in Awaji-shima Island, Hyôgo Pref. Cf. Okugawa (1930: 82; 1953, 1965, 1970, 1973).

Subfamily **Olisthanellinae Voigt, 1892** ホソサヤガタウズムシ亜科

Genus ***Olisthanella* Voigt, 1892**

31) *Olisthanella truncula fusikosum* Nassonov, 1929

Type locality: 'Reisfelde bei Fusiki' (Takaoka, Toyama Pref., Honshû).

Holotype: ?

Paratypes: ?

Distribution: known only from the type locality. Cf. Okugawa (1953).

Note: In the original description of this subspecies, the generic name is erroneously printed as "*Olistanella*". Cf. Nassonov (1929: 428).

Subfamily **Mesostominae Ehrenberg, 1837** タンボヒメウズムシ亜科

Genus ***Mesostoma* Ehrenberg, 1837**

32) *Mesostoma lingua* (Abildgaard, 1789)

Japanese name: Tanbo-hime-uzumushi タンボヒメウズムシ

Type locality: Europe

Holotype: ?

Paratypes: ?

Distribution in Japan: rice-fields in various parts of Honshû; also occurred in Hokkaido. Cf. Okugawa (1930: 83; 1953, 1965, 1970, 1973).

33) *Mesostoma productum* (Schmidt, 1848)

Japanese name: Dorota-hime-uzumushi ドロタヒメウズムシ

Type locality: Europe

Holotype: ?

Paratypes: ?

Distribution in Japan: rice-fields in various parts of Middle Honshû. Cf. Okugawa (1930: 83; 1953, 1965, 1970, 1973).

Genus ***Bothromesostoma* Braun, 1885**

34) *Bothromesostoma personatum* (Schmidt, 1848)

Japanese name: Koicha-hime-uzumushi コイチャヒメウズムシ

Type locality: Europe

Holotype: ?

Paratypes: ?

Distribution in Japan: 'Reisfelde bei Miazû' (Miyazu, Kyôto Pref.); Ôtsu, Shiga Pref., Honshû. Cf. Nassonov (1929: 428); Okugawa (1930: 83; 1953, 1965, 1970, 1973),

Suborder **Kalyptorhynchia von Graff, 1905** カリプトリンクス亜目(隠吻亜目)
Family **Polycystidae von Graff, 1905** イボクチヒメウズムシ科
Genus ***Macrorhynchus* von Graff, 1882**

35) *Macrorhynchus goettei* (Bresslau, 1906)

Type locality: Europe

Holotype: ?

Paratypes: ?

Distribution in Japan: pools at Ôsaka City Water-works, Honshû. Cf. Okugawa (1930: 83; 1953).

Family **Gyratricidae Karling, 1955** ハリヒメウズムシ科
Genus ***Gyratrix* Ehrenberg, 1831**

36) *Gyratrix hermaphroditus* Ehrenberg, 1831

Japanese name: Hari-hime-uzumushi ハリヒメウズムシ

Type locality: Europe

Holotype: ?

Paratypes: ?

Distribution in Japan: 'Kireto-See und einem Reisfelde bei Fusiki' (the vicinity of Tsuruga in Fukui Pref. and Fusiki in Toyama Pref.; Cf. Nassonov, 1929: 428). Ponds, pools and rice-fields in Middle Honshû; Hokkaidô. Cf. Okugawa (1930: 83; 1953, 1965, 1970, 1973). The occurrence of this species in Lake Biwa-ko (Kitakomatsu) is reported by Timoshkin, Kawakatsu, Korgina & Vvedenskaya (2004 - In press).

Order **Temnocephalida Blanchard, 1849** テムノケファーラ目 (切頭目)

Suborder **Scutariellidata Baer, 1953**

Family **Scutariellidae Annandale, 1912** ヤドリフタツノムシ科

Subfamily **Scutariellinae Baer, 1953** ヤドリフタツノムシ亜科

Genus ***Scutariella* Mrázek, 1907**

37) *Scutariella japonica* (Matjašič, 1990)

Japanese name: Ebi-yadori-tsunomushi エビヤドリツノムシ

Type locality: Japan (not specified).

Holotype: ?

Paratypes: ?

Hosts: *Paratya compressa compressa* (De Haan, 1844); *P. c. improvisa* Kemp, 1917; *Neocaridina denticulata* (De Haan, 1849). Numa-ebi, Nuka-ebi, Minami-numa-ebi.

Distribution: Honshû (Chûgoku, Kinki, Chûbu, Kantô and Tôhoku Regions); China? Cf. Honjô (1937); Katô (1943, 1965); Kawakatsu (1998a, 1998b: 72-74); Kawakatsu, Nunomura & Suzuki (1989); Kawakatsu & Nishino (1994: 95, Note 9); Matjašič (1990); Nishino (2002).

Suborder **Temnocephalata Baer, 1953**

Family **Temnocephalidae Monticelli, 1899** ヤドリイツツノムシ科

Genus ***Temnocephala* Blanchard, 1849**

38) *Temnocephala minor* Haswell, 1887

Japanese name: Australia-zarigani-yadori-tsunomushi オーストラリアザリガニヤドリツノムシ

Type locality: Australia

Holotype: ?

Paratypes: ?

Host: freshwater crayfish of Western Australia, *Cherax tenuimanus* (Smith, 1912).

Distribution in Japan: an introduced species; only recorded from the Ibusuki Branch of the Kagoshima Prefectural Fisheries Experimental Station. Cf. Tamura, Oki, Kawakatsu, Ninagawa, Matsusato & Suzuki (1985); Kawakatsu, Oki, Tamura, Takai, Timoshkin & Porfirjeva (1993); Oki, Tamura, Takai & Kawakatsu (1995).

39) *Temnocephala semperi* Weber, 1889

Japanese name: Kani-yadori-tsunomushi カニヤドリツノムシ

Type locality and Distribution: The Philippines (Luzon and Mindanao); Indonesia (Sumatra, Java and Celebes).

Holotype: ?

Paratypes: ?

Hosts: *Geothelphusa miyazakii* Miyake & Chiu, 1965; *Eriocheir japonicus* De Haan, 1835. Iriomote-jima Island.

Distribution: Iriomote-jima Island, Okinawa Pref. Cf. Suzuki (1977); Suzuki, Ninagawa & Kawakatsu (1983).

Note: The samples from Iriomote-jima Island may be *T. semperi* (not yet identified). The other sample from Tanega-shima Island, Kagoshima Pref., may also be the same species. See Suzuki, Ninagawa & Kawakatsu (1983).

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