

KAWAKATSU-&-SASAKI's WEBPAGES ON PLANARIANS, SAPPORO AND TÔKYÔ. No. 42. Jan. 24, 2004.
 (A continuation from the 'Occ. Publ., Biol. Lab. Fuji Women's College, Sapporo (Hokkaidô), Japan': Nos. 1-34, for 1970-2000; ISSN 0917-4362.)

The Present Status of Taxonomic Studies on Acoela (Platyhelminthes) in Japan

Last update: February 29, 2004
<http://planarian.net/kswp/42/acoela.pdf>

By Anno FAUBEL (E-mail: faubel@uni-hamburg.de),
 Masaharu KAWAKATSU (E-mail (Miss Miyuki Kawakatsu): DQA01524@nifty.ne.jp),
 Eudóxia Maria FROEHLICH (E-mail: emfroeh@ib.usp.br),
 Hugh D. JONES (E-mail: flatworm@btopenworld.com) and
 Gen-yu SASAKI (E-mail: gen-yu@mtc.biglobe.ne.jp)

Itemized Introduction

1) History of the Study of Acoela in Japan

The taxonomic history of the Japanese acoelan species is simple and clear. Bock (1923) described the first new acoelan genus and species from Japan, *Hofstenia atroviridis* Bock, 1923. The genus was placed by him in the new family Hofsteniidae Bock, 1923 (cf. Table 1 of the present article). Bock, who was Swedish, visited, and collected near, the Biological Station of Tokyo Imperial University at Misaki, Miura Peninsula, Kanagawa Prefecture, Kantô Region, Honshû.

Katô (1947) described the second new Japanese species, *Amphiscolops japonicus* Katô, 1947, from Kominato, Bôsô Peninsula, Chiba Prefecture, Kantô Region, Honshû. Katô (1951) described the third new Japanese species under the name *Convoluta japonica* Katô, 1951; this species is now classified as *Simsagittifera japonica* (Katô, 1951). The abundant occurrence of this species in the Urayasu seashore in Chiba Prefecture (Tôkyô Bay) was known as the red-tide causing heavy damage to the common edible clam in the summer of 1943 (cf. Katô, 1951; Kawakatsu, 1983). Minegishi (1986) reported the occurrence of this species at Miyako, Iwate Prefecture, Tôhoku Region, Honshû.

Other Japanese articles including items of Acoela by Katô (1943, 1960, 1965, 1979) were published for educational and popular scientific purpose. Minegishi's serial Japanese articles published after 1964 were also popular scientific in their nature.

In 1968, Dr. Saburô Nishimura published a short Japanese article on the occurrence of *Otocelis* sp. (Acoela) and *Coelogygnopora* sp. (Seriata) at Ogi, the Noto Peninsula, Ishikawa Prefecture, Chûbu Region, Honshû. Although his *Otocelis* sp. was not identified to species, he pointed out the taxonomic similarity of his *Otocelis* sp. to *Otocelis sacchalinesis* Ivanov, 1952, a species reported from Sakhalin Island in the Russian Far East.

After 1976, Dr. Terufumi Yamasu and his students studied the Japanese Acoela from an ecological viewpoint (mainly their symbiotic relationships). In 1982, he described 5 new convolutid species from Honshû (3 localities) and the Southwest Islands of Japan (5 localities): *Convoluta kikaiensis* Yamasu, 1982; *Convoluta naviculae* Yamasu, 1982; *Praesagittifera gracilis* (Yamasu, 1982); *Praesagittifera naikaiensis* (Yamasu, 1982); *Simsagittifera nitidae* (Yamasu, 1982). The latter 3 species of the genera *Praesagittifera* Kostenko & Mamkaev, 1990, and *Simsagittifera* Kostenko & Mamkaev, 1990, were described originally as members of the genus *Convoluta* von Graff, 1904. These reclassifications were made by Kostenko & Mamkaev (1990b; see also 1990a, and Mamkaev & Kostenko, 1990, 1991).

The acoelan fauna of the Amami Islands and the Okinawa Islands had been restudied by Yamasu & Okazaki (1987). They reported 8 genera and 18 (6 known and 12 undescribed) species. According to the current taxonomic system, 10 genera should be counted (see Table 1 and Figs. 3 and 4 in the present web article).

In the summer of 1982, Dr. Yurjy V. Mamkaev, a Russian turbellariologist, collected Acoela from the Harbor of Matsuyama City, Ehime Prefecture, Shikoku, Japan. This was described as a new genus and a new species: *Praesagittifera shikoki* Kostenko & Mamkaev, 1990 (cf. 1990b).

Kostenko & Mamkaev (1990a, b) also proposed a new taxonomic system based upon the establishment of a new family, 2 new subfamilies and 3 new genera as follows (see also Table 1 in the present web article):

Sagittiferidae Kostenko & Mamkaev, 1990

 Praesagittiferinae Kostenko & Mamkaev, 1990

Praesagittifera Kostenko & Mamkaev, 1990

 Sagittiferinae Kostenko & Mamkaev, 1990

Sagittifera Kostenko & Mamkaev, 1990

Simsagittifera Kostenko & Mamkaev, 1990

According to this new classification, 4 Japanese species described originally as members of the genus *Convoluta* Ørsted, 1843, should be placed into 2 new genera as follows:

Praesagittifera gracilis (Yamasu, 1982)

Praesagittifera naikaiensis (Yamasu, 1982)

Simsagittifera japonica (Katô, 1951)

Simsagittifera nitidae (Yamasu, 1982)

Mamkaev & Kostenko (1990, 1991) discussed the phylogenetic significance of sagittocysts and copulatory organs in Acoela. In their latter paper, an unjustified emendation of the genus *Simsagittifera* is found (see the next Section).

Yamasu (1990, 1991) reported the fine structure and function of ocelli and sagittocysts of Acoela. Yamasu (1991) employed the new classification system proposed by Kostenko & Mamkaev (1990a, b) and Mamkaev & Kostenko (1991). He accepted the unjustified emendation of *Simsagittifera*. Moreover, he gave tentative specific names for 4 undescribed species reported by Yamasu & Okazaki (1987). Those 4 specific names are clearly nomina nuda (see the Third Section).

2) Unjustified Emendation of the Genus *Simsagittifera* found in a paper by Mamkaev & Kostenko (1991)

Simsagittifera Kostenko et Mamkaev, gen. n.

 Type species: *Convoluta schultzei* Schmidt, 1852

This new genus was described in a Russian paper by Kostenko & Mamkaev (1990a: 12-13; English summary: 21-22). This generic name is found in their following papers (Kostenko & Mamkaev, 1990b; Mamkaev & Kostenko, 1990). However, in their 1991 paper by Mamkaev & Kostenko (p. 309), they wrote: ‘... the generic name *Symsagittifera* (lapsus *Simsagittifera*)’.

The Latin prefix ‘sym’ means ‘with’ in English; “sim” has no meaning in Latin. However, it should be noticed that *Simsagittifera* is a correct original spelling. “*Symsagittifera*” is an incorrect original spelling and is an unjustified emendation.

Cf. ICZN, 3rd Ed., 1964. Art. 32a; 33a, ii, b. ICZN, 4th Ed., 1999. Art. 32.2, 3, 4; Art. 33.3.

Note. Art. 33.3. Incorrect subsequent spellings. Any subsequent spellings of a name different from the correct original spelling, other than a mandatory change or an emendation, is an “incorrect subsequent spelling”; it is not an available name, and like an incorrect original spelling [Art. 32.4], it does not enter into homonymy and cannot be used as a substitute name, but....

3) Nomina Nuda found in a paper by Yamasu (1991)

Yamasu & Okazaki (1987) listed many undescribed species (6 genera and 12 spp.) from the Okinawa Islands. In

his 1991 paper, Yamasu (on p. 274) gave tentative specific names for 4 undescribed species as follows:

Convoluta 'luridus' for *Convoluta* sp. 1 (loc. Okinawa Is.)

Amphiscolops 'breviviridis' for *Amphiscolops* sp. 3 (loc. Okinawa Is.)

Amphiscolops 'magniviridis' for *Amphiscolops* sp. 4 (loc. Okinawa Is.)

Pseudaphanostoma 'luteocoloris' for *Pseudaphanostoma* sp. (loc. Okinawa Is.)

The above-mentioned 4 new scientific names are invalid (conditionally suppressed names).

Cf. ICZN, 3rd Ed., 1964. Art. 15. ICZN, 4th Ed., 1999. Art. 15.1.

Note. The Southwest Islands of Japan (Nansei Shotō).

Many islands arranged as a large arc-shaped between the southernmost part of Kyūshū in Southern Japan and Taiwan (approximately 1200 km distance) are called as the 'Nansei Shotō' in Japanese language (i.e., the Southwest Islands of Japan in English).

In various atlases published in Western countries, the explanation of names of the island groups and of individual islands of the south western islands of Japan is incomplete, and errors or misunderstandings also occur. Kawakatsu examined four different atlases: The Graphic Atlas of the World (10th Ed., 1956. John Bartholomew & Son Ltd., Edinburgh); The Times Concise Atlas of the World (Reprinted with Revisions, 1973. Times News Paper Ltd., London); The Times Atlas of the World (Comprehensive Ed., 1981. Times Books, London); National Geographic Atlas of the World (5th Ed., 1981. National Geographic Society, Washington, D.C.). In these, the Southwest islands of Japan are variously shown as 'Ryukyu Is.', 'Ryūkyū Rettō', 'Ryukyu Islands (Nansei Shotō)'. 'Amami Guntō' and Okinawa Guntō' are sometimes used. 'Rettō' and 'Guntō' in Japanese mean Islands. The indication of long vowels is very important for pronunciation of Japanese words.

Fig. 2 is a sketch-map showing the geographical names of the Islands and several (comparatively large) islands (see also Fig. 1).

The Southwest Islands of Japan consists of two arcs, i.e., the Satsunan Islands and the Ryūkyū Islands. The former includes the Ōsumi Islands, the Tokara Islands and the Amami Islands. The latter includes the Okinawa Islands, the Miyako Islands, the Yaeyama Islands, and the Senkaku Islands. The Daitō Islands are also included in the latter. For the names of several islands, see the sketch-map.

4) Construction and the Purpose of the Present Web Article

The present web article is an attempt to collect all known taxonomic information on the acoelan species of Japan. It consists of 3 main sections.

PART I. A Tentative Species List of Acoela from Japan.

PART II. A List of Species in Their Proper Classification.

PART III. A List of Species Arranged by Localities.

In Part I, the valid names of families, genera and species are arranged in alphabetical order. In each species list, items are arranged in alphabetical order of author(s) and chronological order of published articles. Variations of individual names (spelling errors, misprints, etc.) are also shown.

In Part II, the known Japanese species list based upon the taxonomic data of Part I is given. The arrangement of taxa is the same as Part I.

In Part III, the known acoelan species are listed according to geographical localities (arranged from the North to the South) in the Japanese Islands. See Figs. (1-4).

The following abbreviations are used: n. g., new genus; nom. nud., nomen nudum; n. sp., new species; sp. and spp., undescribed species (sing. and pl.) // Is., island; Pref., Prefecture; DB, dorsal view of the body; DRB, diagrammatic representation of the body; FCA, figure of the copulatory apparatus; HI, histological figures; VB, ventral view of the body.

Authors' Note.

Kawakatsu overlooked a Russian paper that contains the original description of *Praesagittifera shikoki* Kostenko & Mamkaev, 1990, from Shikoku in Japan when he edited the serial article entitled 'A List of Publications on Japanese Turbellarians'. The papers by Kostenko & Mamkaev (1990a, b) will be included in the 2004 issue of Bull. Fuji Women's Univ., (42), II: 'Miscellaneous Papers on Turbellarians, Article I'.

The present web article is primarily designed as the Part II of the 2004 article mentioned above. However, Kawakatsu's preliminary Ms. became very long; its contents are highly specialized. Thus, it was decided to publish this as an independent web article by the members of the 'Miscellaneous Papers on Turbellarians.' However, none of the members are specialists on the Acoela, thus Dr. Faubel, who is, was asked to join us as coauthor.

It must be emphasized that the list of acolan species from Japan shown in the present web article is the result of the bibliographic study. The authors hope that the present web article will serve as the starting point for future taxonomic studies of the Acoela in Japan.

PART I

A LIST OF SPECIES IN THEIR PROPER CLASSIFICATION

Order A C O E L A Uljanin, 1870

Family C O N V O L U T I D A E von Graff, 1905

Type genus: *Convoluta* Ørsted, 1845

Genus *Amphicolops* von Graff, 1904

Type species: *Convoluta cinereus* von Graff, 1874

Amphicolops japonicus Katô, 1947

Amphicolops japonicus n. sp. Katô, 1947: 58-62, figs. 1-2 (DB, FCA). Kominato, Chiba Pref., Kantô Region, Honshû / Japan.

Note. For republished version with an English explanation of this Japanese article, see Kawakatsu (1983: 2-8).

Amphicolops japonicus: Okugawa, 1953: 23.

Note. Okugawa (1953) also listed *Amphicolops virescens* (Ørsted, 1845); this is due to his misunderstanding.

Amphicolops japonicus: Katô, 1965: 312, fig. 5 (DRB).

Amphicolops japonicus: Uchida, 1965: 60, fig. 52B (DB).

Amphicolops japonicus: Uchida, Kawakatsu & Minegishi, 1972: 155.

Amphicolopus japonicus: Minegishi, 1973: 21. Spelling error.

Amphicolops japonicus: Minegishi, 1975: 68.

Amphicolops japonicus n. sp. (republished version): Kawakatsu, 1983: 3, 9-12. See Katô (1947).

Note. The generic name is partly printed erroneously as "*Amphicolopus*".

Amphicolops japonicus: Uchida, Kawakatsu & Minegishi, 1988: 154.

Amphicolops japonicus: Kawakatsu, Nunomura & Suzuki, 1989: 41-42.

Amphicolops japonicus: Winsor, 1990: 796, table 1.

Amphicolops japonicus: Nunomura, 1992: 177-178, fig. 6 · 3A (DB)

Amphicolops japonicus: Tyler (& Bush), 2000.

Amphicolops langerhansi von Graff, 1882

Amphicolops langerhansi (?): Yamasu & Okazaki, 1987: 62. Chinen, Gushichan(= Gushikami-son), Nakagusuku Bay, Okinawa Is., the Okinawa Islands, the Southwest Islands of Japan.

Amphicolops langerhansi (?): Yamasu, 1991: 274.

Amphicolops sp. Minegishi, 1965

Amphicolops sp.: Minegishi, 1965: 312, fig. 6 (DRB). Misaki and Manazuru, Kanagawa Pref., Kantô Region, Honshû / Japan.

Amphicolops sp. Yamasu, 1982

Amphicolops sp.: Yamasu, 1982a: 42. Tateyama, Chiba Pref., Kantô Region, Honshû / Japan.

Amphicolops sp. 1: Yamasu & Okazaki, 1987

Amphicolops sp. 1: Yamasu & Okazaki, 1987b: 62. Gushichan, Komesu, Okinawa Is., the Okinawa Islands, the Southwest Islands of Japan.

- Amphicolops* sp. 1: Winsor, 1990: 796, table 1.
- Amphicolops* sp. 2 Yamasu & Okazaki, 1987
- Amphicolops* sp. 2: Yamasu & Okazaki, 1987b: 62. Gushichan, Okinawa Is., Sesoko Is. and Zamami Is., the Okinawa Islands, the Southwest Islands of Japan.
- Amphicolops* sp. 2: Winsor, 1990: 796, table 1.
- Amphicolops* sp. 3 Yamasu & Okazaki, 1987
- Amphicolops* sp. 3: Yamasu & Okazaki, 1987b: 63. Gushichan, Sunabe, Okinawa Is., Kudaka Is. and Sesoko Is., the Okinawa Islands, the Southwest Islands of Japan.
- Amphicolops* sp. 3: Winsor, 1990: 796, table 1.
- Amphicolops* sp. 3: Yamasu, 1991: 274.
- Amphicolops* 'breviviridis' nom. nud. Yamasu, 1991: 274.
- Amphicolops* sp. 4 Yamasu & Okazaki, 1987
- Amphicolops* sp. 4: Yamasu & Okazaki, 1987b: 63. Zanpa, Okinawa Is., the Okinawa Islands, the Southwest Islands of Japan.
- Amphicolops* sp. 4: Winsor, 1990: 796, table 1.
- Amphicolops* sp. 4: Yamasu, 1991: 274.
- Amphicolops* 'magniviridis' nom. nud. Yamasu, 1991: 274.
- Amphicolops* sp. 5 Yamasu & Okazaki, 1987
- Amphicolops* sp. 5: Yamasu & Okazaki, 1987b: 63. Gushichan, Komesu, Sunabe, Zanpa, Nakagusuku Bay, Okinawa Is. and Sesoko Is., the Okinawa Islands, the Southwest Islands of Japan.
- Amphicolops* sp. 5: Winsor, 1990: 796, table 1, 798.
- Note.** Kinjô & Yamasu (1987a) reported 3 *Amphicolops* spp. from the Southwest Islands of Japan (Amami-Ôshima Is. and Okinawa Is.). These unidentified species may be conspecific with 3 species of *Amphicolops* spp. 1-5 listed above.

Genus *Convoluta* Ørsted, 1843

Type species: *Convoluta convoluta* Åbildgard, 1806

Convoluta kikaiensis Yamasu, 1982

Convoluta kikaiensis n. sp. Yamasu, 1982b: 35, 38-41, 43, figs. 4 (A-B), 5 (A-E) (DB, DRB, HI). Kikai-jima Is., off the NE coast of Amami-Ôshima Is., the Amami Islands, the Southwest Islands of Japan; Tateyama in Chiba Pref., Kantô Region, and Shirahama in Wakayama Pref., Kinki Region, Honshû / Japan.

Convoluta kikaiensis: Yamasu & Okazaki, 1987: 64. Gushichan, Komesu and Chinen, Okinawa Is., Sesoko Is., the Okinawa Islands, the Southwest Islands of Japan.

Convoluta kikaiensis: Yamasu, 1991: 274.

Convoluta kikaiensis: Tyler (& Bush), 2000.

Convoluta naviculae Yamasu, 1982

Convoluta naviculae n. sp. Yamasu, 1982b: 35, 41-43, fig. 6 (A-E) (DB, DRB, HI). Shibukawa and Shimokarasu Is., off the Port of Uno, Tamano City, Okayama Pref., Honshû / Japan.

Convoluta naviculae: Yamasu, 1991: 274.

Convoluta naviculae: Tyler (& Bush), 2000.

Convoluta sp. Minegishi, 1965

Convoluta sp.: Minegishi, 1964: 305. Misaki, Kanagawa Pref., Kantô Region, Honshû / Japan.

Convoluta sp.: Minegishi, 1965: 312, fig. 4 (DRB). Honshû / Japan.

Convoluta sp.: Minegishi, 1968: 10-12, figs. 4-89 (DB, HI, etc.)

Convoluta sp.: Sugiura, Minegishi & Katô, 1979: 5-12, fig. 1 (graph), pl. I, figs. 1-7 (DB, etc.). Arai-hama Beach, Misaki, Kanagawa Pref., Kantô Region, Honshû / Japan.

Convoluta sp. 1 Yamasu & Okazaki, 1987

Convoluta sp. 1: Yamasu & Okazaki, 1987: 64. Gushichan, Komesu and Chinen, Okinawa Is., the Okinawa Islands, the Southwest Islands of Japan.

Convoluta sp. 1: Yamasu, 1991: 274.

Convoluta 'luridus' nom. nud. Yamasu, 1991: 274.

Convoluta sp. 2 Yamasu & Okazaki, 1987

Convoluta sp. 2: Yamasu & Okazaki, 1987: 64. Gushichan, Okinawa Is., Kudaka Is. and Sesoko Is., the Okinawa Islands, the Southwest Islands of Japan.

Convoluta sp. 3. Yamasu & Okazaki, 1987

Convoluta sp. 3: Yamasu & Okazaki, 1987: 64-65. Chinen and Sunabe, Okinawa Is., the Okinawa Islands, the Southwest Islands of Japan.

Genus *Haplodiscus* Weldon, 1888

Type species: *Haplodiscus piger* Weldon, 1888

Haplodiscus sp. Yamasu & Okazaki, 1978

Haplodiscus sp.: Yamasu & Okazaki, 1987: 65. Sesoko Is., the Okinawa Islands, the Southwest Islands of Japan.

Genus *Pseudaphanostoma* Westblad, 1946

Type species: *Pseudaphanostoma variabilis* Westblad, 1946

Pseudaphanostoma sp. Yamasu & Okazaki, 1987

Pseudaphanostoma sp.: Yamasu & Okazaki, 1987: 65. Gushichan, Chinen and Sunabe, Okinawa Is., the Okinawa Islands, the Southwest Islands of Japan.

Pseudaphanostoma sp.: Yamasu, 1991: 274.

Pseudaphanostoma '*luteocoloris*' nom. nud. Yamasu, 1991: 274.

Family H A P L O P O S T H I I D A E Westblad, 1948

Type genus: *Haploposthia* An der Lan, 1936

Genus *Haplogonaria* Dörjes, 1968

Type species: *Haplogonaria simplex* Dörjes, 1968

Haplogonaria sp. Yamasu & Okazaki, 1987

Haplogonaria sp.: Yamasu & Okazaki, 1987: 66-67. Chinen, Sunabe and Gushichan, Okinawa Is., the Okinawa Islands, the Southwest Islands of Japan.

Family H O F S T E N I I D A E Bock, 1923

Type genus: *Hofstenia* Bock, 1923

Genus *Hofstenia* Bock, 1923

Type species: *Hofstenia atroviridis* Bock, 1923

Hofstenia atroviridis Bock, 1923

Hofstenia atroviridis n. g. et n. sp. Bock, 1923: 3-55, figs. 1-9 (DB, DRB, FCA, HI, etc.; pls. I-II, figs. 1-19 (HI). Biological Station zu Misaki in Japan (= The Misaki Marine Biological Station of Tokyo University), Misaki, Kanagawa Pref., Kantô Region, Honshû / Japan.

Hofstenia atroviris: Uchida, 1965: 60. Spelling error.

Hofstenia atroviris: Uchida, Kawakatsu & Minegishi, 1972: 155. Spelling error.

Hofstenia atroviridis: Uchida, Kawakatsu & Minegishi, 1988: 155.

Hofstenia atroviridis: Nunomura, 1992: 172.

Hofstenia atroviridis: Tyler (& Bush), 2000. Spelling error.

Family M E C Y N O S T O M I D A E Dörjes, 1968

Type genus *Mecynostomum* Beneden, 1870

Genus *Paedomecynostomum* Dörjes, 1968

Type species: *Paedomecynostomum bruneum* Dörjes, 1968

Paedomecynostomum sp. Yamasu & Okazaki, 1987

Paedomecynostomum sp.: Yamasu & Okazaki, 1987: 66. Chinen, Sunabe and Zanpa, Okinawa Is., the Okinawa Islands, the Southwest Islands of Japan.

Genus *Paramecynostomum* Dörjes, 1968

Type species: *Aphanostoma diversicolor* Ørsted, 1845

Paramecynostomum diversicolor (Ørsted, 1845)

Aphanostoma diversicolor : Minegishi, 1965: 311, fig. 2 (DRB). Misaki and Manazuru, Kanagawa Pref., Kantô Region, Honshû / Japan.

Aphanostoma diversicolor : Uchida, 1965: 60.

Aphanostoma diversicolor : Minegishi, 1975: 63.

Note. The occurrence of this European species in Japan is doubtful. Nishimura (1968) expressed that his *Otocelis* sp. reported from the Noto Peninsula, Ishikawa Pref., Chûbu Region, Honshû, seems to be conspecific with Mr. Minegishi's (1965) "*Aphanostoma diversicolor*". Nishimura (op. cit.) also noted that *Otocelis* sp. is closely similar to *Otocelis sacchalinensis* Ivanov, 1952.

Genus *Eumecynostomum* Faubel & Regier, 1983

Type species: *Pseudmecynostomum westbladi* Dörjes, 1968

Eumecynostomum bathycolum (Westblad, 1948)

Pseudmecynostomum bathycola (?): Yamasu & Okazaki, 1987: 65-66. Spelling error. Gushichan, Okinawa Is., the Okinawa Islands, the Southwest Islands of Japan.

Eumecynostomum bathycolum : Tyler (& Bush), 2000.

Note. *Eumecynostomum bathycolum* was at first described under the name of *Mecynostomum bathycola* Westblad, 1948. The occurrence of this European species in Southern Japan is not yet confirmed.

Family O T O C E L I D I D A E Westblad, 1948

Type genus: *Otocelis* Diesing, 1862

Genus *Otocelis* Diesing, 1862

Type species: *Proporus rubropunctata* Schmidt, 1852

Otocelis rubropunctata (Schmidt, 1852)

Otocelis rubropunctata : Minegishi, 1965: 311, fig. 1 (DRB). Misaki, Kanagawa Pref., Kantô Region, and Shirahama, Wakayama Pref., Kinki Region, Honshû / Japan.

Otocelis rubropunctata : Uchida, 1965: 60

Otocelis rubropunctata : Uchida, Kawakatsu & Minegishi, 1972: 155.

Otocelis rubropunctata : Minegishi, 1975: 69.

Otocelis rubropunctata : Yamasu & Okazaki, 1987: 67.

Otocelis rubropunctata : Uchida, Kawakatsu & Minegishi, 1988:

Otocelis rubropunctata : Nunomura, 1992: 178.

Otocelis rubropunctata : Tyler (& Bush), 2000.

Otocelis westbladi Ax, 1959

Otocelis westbladi (?): Yamasu & Okazaki, 1987: 67. Gushichan, Okinawa Is., the Okinawa Islands, the Southwest Islands of Japan.

Otocelis sp. Nishimura, 1968

Otocelis sp.: Nishimura, 1968: 304-305, fig. 1A (DRB). The Noto Marine Laboratory of Kanazawa University, Ogi, Uchiura-chô, Noto Peninsula, Ishikawa Pref., Chûbu Region, Honshû / Japan.

Note. Nishimura (1968) pointed out that his *Otocelis* sp. is very similar to *Otocelis sacchalinensis* Ivanov, 1952.

Family S A G I T T I F E R I D A E Kostenko & Mamkaev, 1990

Type genus: *Sagittifera* Kostenko & Mamkaev, 1990

Subfamily PRAESAGITTIFERINAE Kostenko & Mamkaev, 1990

Type genus: *Praesagittifera* Kostenko & Mamkaev, 1990

Genus *Praesagittifera* Kostenko & Mamkaev, 1990

Type species: *Praesagittifera shikoki* Kostenko & Mamkaev, 1990

Praesagittifera gracilis (Yamasu, 1982)

Convoluta gracilis n. sp. Yamasu, 1982b: 34-37, 43, fig. 3 (A-E) (DB, DRB, HI). The Ayamaru Cape in Amami-Ōshima Is. and Kikai-jima Is., the Amami-Ōshima Islands; Okinawa Is., the Okinawa Islands, the Southwest Islands of Japan.

Convoluta gracilis: Yamasu & Okazaki, 1987: 64.

Praesagittifera gracilis: Kostenko & Mamkaev, 1990b: 15. / Japan.

Praesagittifera gracilis: Kostenko & Mamkaev, 1991: 313.

Praesagittifera gracilis: Yamasu, 1991: 274-275, 278, fig. 1B (HI).

Praesagittifera gracilis: Tyler (& Bush), 2000.

Praesagittifera naikaiensis (Yamasu, 1982)

Convoluta naikaiensis n. sp. Yamasu, 1982: 30-34, 43, figs. 1 (A-B), 2 (A-H) (DB, DRB, HI). Desaki and Shibukawa, Tamano City, Okayama Pref., Chūgoku Region, Honshū / Japan.

Convoluta naikaiensis: Yamasu & Okazaki, 1987: 64.

Convoluta naikaiensis: Yamasu, 1988: 14, figs. 2-3 (symbiotic algae, electron photomicrographs).

Praesagittifera naikaiensis: Kostenko & Mamkaev, 1990b: 15.

Praesagittifera naikaiensis: Mamkaev & Kostenko, 1991: 313.

Praesagittifera naikaiensis: Yamasu, 1991: 273-278, 281, figs. 1A, 3A-B, 4 (graphs), 5A-B (HI).

Convoluta naikaiensis: Katayama, Wada, Satoh & Yamamoto, 1992: 1302.

Convoluta naikaiensis (by square Japanese syllabary): Wada, Katayama & Satoh, 1992: 51-56.

Convoluta naikaiensis: Katayama, Yamamoto, Wada & Satoh, 1993: 529-535, figs. 1-3 (phylogenetic trees).

Convoluta naikaiensis: Katayama, 1993: Prefatory color page.

Convoluta naikaiensis (by square Japanese syllabary): Tajika, Kobayashi, Katayama & Satoh, 1993: 17-19.

Convoluta naikaiensis: Katayama, Wada, Furuya, Satoh & Yamamoto, 1995: 82-89, figs. 1-4 (phylogenetic trees).

Convoluta naikaiensis: Katayama, Nishioka & Yamamoto, 1996: 748-754, figs. 1-2 (phylogenetic trees).

Convoluta naikaiensis: Katayama, Nishioka & Yamamoto, 1996: 81.

Convoluta naikaiensis: Nishioka, Katayama & Yamamoto, 1996: 81.

Convoluta naikaiensis: Hikosaka & Hikosaka-Katayama, 1997. 3 pages (with a color photomicrograph of a living specimen). A web page.

Convoluta naikaiensis: Hikosaka-Katayama, Nishioka, Nakasaka & Yamamoto, 1997: 43.

Convoluta naikaiensis: Hikosaka-Katayama, Orii, Yoshida, Agata, Yamamoto & Watanabe, 1998: 70.

Convoluta naikaiensis: Hori, Hikosaka & Kishida, 1997: 92.

Convoluta naikaiensis: Yoshida, Hikosaka-Katayama & Yamamoto, 1997: 43.

Convoluta naikaiensis: Orii, Katayama, Sakurai, Agata & Watanabe, 1998: 183-187.

Praesagittifera naikaiensis: Tyler (& Bush), 2000.

Convoluta naikaiensis: Minegishi, 2002: 41.

Praesagittifera shikoki Kostenko & Mamkaev, 1990

Praesagittifera shikoki n. g. et n. sp. Kostenko & Mamkaev, 1990b: 4, 6-9, 14, figs. 1A-B, 2 (DRB, HI). The Harbor of Matsuyama City, Ehime Pref., Shikoku / Japan.

Praesagittifera shikoki: Mamkaev & Kostenko, 1990: 44.

Praesagittifera shikoki: Mamkaev & Kostenko, 1991: 309-310, 313, fig. 11 (HI).

Praesagittifera shikoki: Yamasu, 1991: 273-274, 279, fig. 6 A-B (DRB).

Praesagittifera shikoki: Tyler (& Bush), 2000.

Subfamily SAGITTIFERINAE Kostenko & Mamkaev, 1990

Type genus: *Sagittifera* Kostenko & Mamkaev, 1990

Genus *Simsagittifera* Kostenko & Mamkaev, 1990
Type species: *Convolvata sagittifera* Ivanov, 1952

Simsagittifera japonica (Katô, 1951)

Convolvata schultzei: Kaburaki, 1927: 1669, fig. 3190 (DB). Misidentification.

Convolvata schultzei: Katô, 1943: 654. Misidentification.

Convolvata schultzei: Kaburaki, 1947: 1495, fig. 4214 (DB). Misidentification.

Convolvata japonica n. sp. Katô, 1951: 66-67, figs. 1-2 (DB, DRB, sagittocytes). Urayasu, Chiba Pref., Kantô Region, Honshû / Japan.

Note. Katô (1951) pointed out that previous records of "*Convolvata schultzei*" from Japan (cf. Kaburaki, 1927, 1947, etc.) are misidentification of '*C. japonica*.'

For republished version with an English explanation of this Japanese article, see Kawakatsu (1983: 3, 9-12).

Convolvata schulzii: Okugawa, 1953: 22. Spelling error.

Convolvata japonica: Okugawa, 1953: 22.

Convolvata japonica: Katô, 1960: pl. 87, fig. 8 (DB).

Convolvata japonica: Katô, 1965: 311, fig. 3 (DB).

Convolvata japonica: Uchida, 1965: 60, fig. 52C (DRB).

Convolvata japonica: Uchida, Kawakatsu & Minegishi, 1972: 154.

Convolvata japonica: Minegishi, 1975: 65.

Convolvata japonica: Katô, 1979: 116, fig. 400 (DB).

Convolvata japonica: Minegishi, 1986: 57. Miyako, Iwate Pref., Tôhoku Region, Honshû / Japan.

Convolvata japonica: Uchida, Kawakatsu & Minegishi, 1988: 154.

Simsagittifera japonica: Kostenko & Mamkaev, 1990a: 11-12, 21. Japan.

Simsagittifera japonica: Kostenko & Mamkaev, 1990b: 15.

Convolvata japonica: Winsor, 1990: 793.

Simsagittifera japonica: Mamkaev & Kostenko, 1991: 313.

Symsagittifera japonica: Mamkaev & Kostenko, 1991: 313. Unjustified emendation. Cf. ICZN, 3rd Ed. (1964), Art. 33b; 4th Ed. (1999), Art. 33.3.

Convolvata japonica: Nunomura, 1992: 178.

Symsagittifera japonica: Tyler (& Bush), 2000. Misspelling.

Convolvata japonica: Minegishi, 2002: 41.

Simsagittifera nitidae (Yamasu, 1982)

Convolvata nitidae n. sp. Yamasu, 1982b: 35, 37, 43, fig. 3F-J (DB, DRB, HI). The Ayamaru Cape in Amami-Ôshima Is. and Kikai-jima Is., the Amami-Ôshima Islands; Okinawa Is., the Okinawa Islands, the Southwest Islands of Japan.

Convolvata nitidae: Yamasu & Okazaki, 1987: 64.

Simsagittifera nitidae: Kostenko & Mamkaev, 1990a: 11-12. Japan.

Simsagittifera nitidae: Kostenko & Mamkaev, 1990b: 15.

Simsagittifera nitidae: Mamkaev & Kostenko, 1991: 313.

Symsagittifera nitidae: Mamkaev & Kostenko, 1991: 313. Unjustified emendation. Cf. ICZN, 3rd Ed. (1964), Art. 33 b; 4th Ed. (1999), Art. 33.3

Symsagittifera nitidae: Yamasu, 1991: 274-275, 278, fig. 1C (HI). Misspellings.

Symsagittifera nitidae: Tyler (& Bush), 2000. Misspellings.

Addendum

Ishikawa & Yamasu (1992) reported the occurrence of 2 Acoela species related closely to *Convolutriloba retrogemma* Hendelberg & Åkesson, 1988, in Okinawa Island (locs. Zanpa Cape and Sesoko-jima Island; see Fig. 4). Both species have similar unicellular green symbionts with 4 flagella and reproduce by a budding.

The above-cited article is an English abstract of a lecture given at the 63rd Ann. Meet. of the Zool. Soc. of Japan (without species descriptions and figures). Thus, their records are only shown on Fig. 4: *Convolutriloba?* spp.

Additionally, the Swedish species was collected from a marine aquarium. Those asexual specimens repro-

duce by a budding. Tyler (& Bush, 2000) placed the genus *Convolutriloba* in the family Sagittiferidae (Subfamily Praesagittiferinae).

PART II

Table 1. A Tentative Species List of Acoela from Japan.

- Order A C O E L A Uljanin, 1870
Family C O N V O L U T I D A E von Graff, 1905
Genus *Amphicolops* von Graff, 1904
Amphicolops japonicus Katô, 1947
Amphicolops langerhansi von Graff, 1882
Amphicolops sp. Minegishi, 1965
Amphicolops sp. Yamasu, 1982
Amphicolops sp. 1 Yamasu & Okazaki, 1987
Amphicolops sp. 2 Yamasu & Okazaki, 1987
Amphicolops sp. 3 Yamasu & Okazaki, 1987
Amphicolops sp. 4 Yamasu & Okazaki, 1987
Amphicolops sp. 5 Yamasu & Okazaki, 1987
Genus *Convoluta* Ørsted, 1843
Convoluta kikaiensis Yamasu, 1982
Convoluta naviculae Yamasu, 1982
Convoluta sp. Minegishi, 1965
Convoluta sp. 1 Yamasu & Okazaki, 1987
Convoluta sp. 2 Yamasu & Okazaki, 1987
Convoluta sp. 3 Yamasu & Okazaki, 1987
Genus *Haplodiscus* Weldon, 1888
Haplodiscus sp. Yamasu & Okazaki, 1987
Genus *Pseudaphanostoma* Westblad, 1946
Pseudaphanostoma sp. Yamasu & Okazaki, 1987

Family H A P L O P O S T H I I D A E Westblad, 1948
Genus *Haplogonaria* Dörjes, 1968
Haplogonaria sp. Yamasu & Okazaki, 1987

Family H O F S T E N I I D A E Bock, 1923
Genus *Hofstenia* Bock, 1923
Hofstenia atroviridis Bock, 1923

Family M E C Y N O S T O M I D A E Dörjes, 1968
Genus *Paedomecynostomum* Dörjes, 1868
Paedomecynostomum sp. Yamasu & Okazaki, 1987
Genus *Paramecynostomum* Dörjes, 1968
Paramecynostomum diversicolor (Ørsted, 1845)
Genus *Eumecynostomum* Faubel & Regier, 1983
Eumecynostomum bathycolum (Westblad, 1948)

Family O T O C E L I D I D A E Westblad, 1948
Genus *Otocelis* Diesing, 1862
Otocelis rubropunctata (Schmidt, 1852)
Otocelis westbladi Ax, 1959

Otocelis sp. Nishimura, 1968

Family S A G I T T I F E R I D A E Kostenko & Mamkaev, 1990

Subfamily PRAESAGITTIFERINAE Kostenko & Mamkaev, 1990

Genus *Praesagittifera* Kostenko & Mamkaev, 1990

Praesagittifera gracilis (Yamasu, 1982)

Praesagittifera naikaiensis (Yamasu, 1982)

Praesagittifera shikoki Kostenko & Mamkaev, 1990

Subfamily SAGITTIFERINAE Kostenko & Mamkaev, 1990

Genus *Simsagittifera* Kostenko & Mamkaev, 1990

Simsagittifera japonica (Katô, 1951)

Misident. *Simsagittifera schultzei* (Schmidt, 1852)

Cf. Katô (1951).

Simsagittifera nitidae (Yamasu, 1982)

////////////////////////////////////

6 families,

2 subfamilies,

12 genera, and

30 (14 described and 16 undescribed) species.

PART III

A LIST OF SPECIES ARRANGED BY LOCALITIES

- 1). Miyako Harbor faced on the Pacific Ocean, Iwate Pref., Tôhoku Region, Honshû.
Simsagittifera japonica (Katô, 1951)
- 2). Urayasu City, a delta of the Edo-gawa River located in the deepest area of the Tôkyô Bay, the southwestern part of Chiba Pref., Kantô Region, Honshû.
Simsagittifera japonica (Katô, 1951)
- 3). The southern area of the Bôsô Peninsula (Kominato, Tateyama and Shirahama), Chiba Pref., Kantô Region, Honshû.
Amphiscolops japonicus Katô, 1947
Amphiscolops sp. Yamasu, 1982
Convoluta kikaiensis Yamasu, 1982
Otocelis rubropunctata (Westblad, 1946)
- 4). The southern area of Kanagawa Pref. (Misaki Harbor, the Miura Peninsula and Manazuru), Kantô Region, Honshû.
Amphiscolops sp. Minegishi, 1965
Convoluta sp. Minegishi, 1965
Hofstenia atroviridis Bock, 1923
Paramecynostomum diversicolor (Ørsted, 1845)
Otocelis rubropunctata (Westblad, 1946)
- 5). The Noto Peninsula faced on the Sea of Japan (Ogi, Uchiura-chô), the northern area of Ishikawa Pref., Chûbu Region, Honshû.
Otocelis sp. Nishimura, 1968
- 6). Shirahama, Tanabe Bay, Wakayama Pref., Kinki Region, Honshû.
Convoluta kikaiensis Yamasu, 1982.
- 7). Tamano City (Desaki, Shibukawa and the Port of Uno) faced on the Inland Sea of Japan (= Seto-naikai), Okaya-
yama Pref., Chûgoku Region, Honshû.

- Convoluta naviculae* Yamasu, 1982
Praesagittifera naikaiensis (Yamasu, 1982)
- 8). Matsuyama Harbor faced on the Inland Sea of Japan (= Seto-naikai), Ehime Pref., Shikoku.
Praesagittifera shikoki Kostenko & Mamkaev, 1990
- 9). Amami-Ōshima Is. and Kikai-jima Is. (off the NE coast of Amami-Ōshima Is.), the Amami Islands, the Southwest Islands of Japan.
Convoluta kikaiensis Yamasu, 1982
Praesagittifera gracilis (Yamasu, 1982)*
Simsagittifera nitidae (Yamasu, 1982)*
 * These 2 species are recorded from the Ayamaru Cape in Amami-Ōshima Island and Kikai-jima Island.
- 10-i). Sesoko-jima Is., the Nago Bay, Okinawa Is., the Okinawa Islands, the Southwest Islands of Japan.
Amphiscolops sp. 2 Yamasu & Okazaki, 1987
Amphiscolops sp. 5 Yamasu & Okazaki, 1987
Convoluta sp. 2 Yamasu & Okazaki, 1987
Haplodiscus sp. Yamasu & Okazaki, 1987
Praesagittifera gracilis (Yamasu, 1982)*
Simsagittifera nitidae (Yamasu, 1987)*
 * The correct localities of these 2 species in Okinawa Is. were not clarified.
- 10-ii). The Zanpa Cape and Suanbe in Chatan-chō, the SW coast of Okinawa Is., the Okinawa Islands, the Southwest Islands of Japan.
Amphiscolops sp. 3 Yamasu & Okazaki, 1987
Amphiscolops sp. 4 Yamasu & Okazaki, 1987
Amphiscolops sp. 5 Yamasu & Okazaki, 1987
Convoluta sp. 3. Yamasu & Okazaki, 1987
Pseudaphanostoma sp. Yamasu & Okazaki, 1987
Haplogonaria sp. Yamasu & Okazaki, 1987
Paedomecynostomum sp. Yamasu & Okazaki, 1987
- 10-iii). Kudaka-jima Is., near the Chinen Cape of Okinawa Is., the Okinawa Islands, the Southwest Islands of Japan.
Amphiscolops sp. 3 Yamasu & Okazaki, 1987
Convoluta sp. 2 Yamasu & Okazaki, 1987
- 10-iv). The southern area of Okinawa Is. (Chinen, Gushichan and Komesu), the Okinawa Islands, the Southwest Islands of Japan.
Amphiscolops langerhansi von Graff, 1882
Amphiscolops sp. 1 Yamasu & Okazaki, 1987
Amphiscolops sp. 2 Yamasu & Okazaki, 1987
Amphiscolops sp. 3 Yamasu & Okazaki, 1987
Amphiscolops sp. 5 Yamasu & Okazaki, 1987
Convoluta sp. 1 Yamasu & Okazaki, 1987
Convoluta sp. 2 Yamasu & Okazaki, 1987
Convoluta sp. 3 Yamasu & Okazaki, 1987
Pseudaphanostoma sp. Yamasu & Okazaki, 1987
Haplogonaria sp. Yamasu & Okazaki, 1987
Paedomecynostomum sp. Yamasu & Okazaki, 1987
Eumecynostomum bathycolum (Westblad, 1948)
Otocelis westbladi Ax, 1959
- 10-v). Zamami Is., the Okinawa Islands, the Southwest Islands of Japan.
Amphiscolops sp. 2 Yamasu & Okazaki, 1987

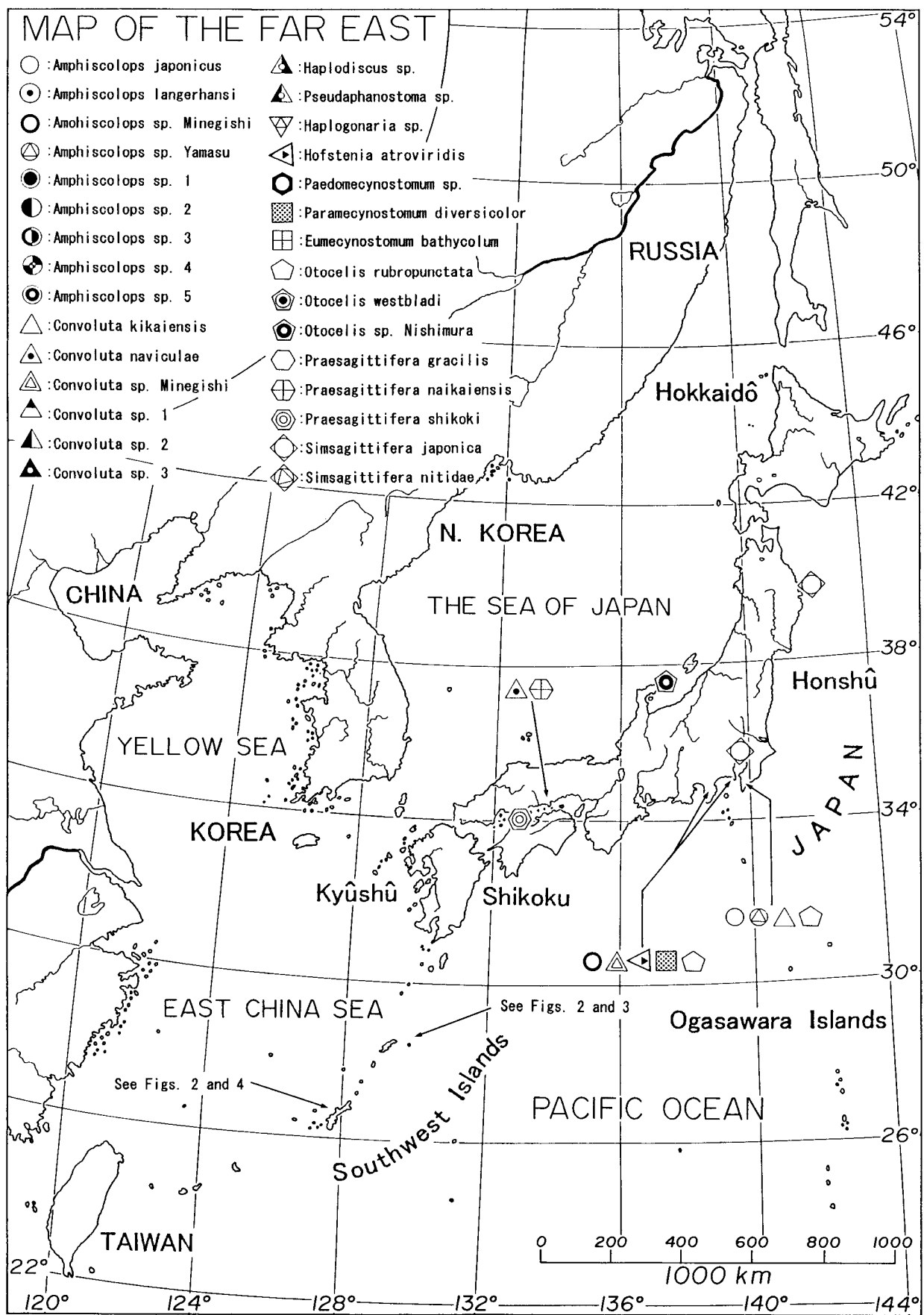


Fig. 1. Sketch map of the Japanese Islands showing the occurrence records of acoelan species. The names of 30 species (14 described species and 16 undescribed spp.) and their symbolized figures are shown on the top-left corner. For the occurrence records in the Southwest Islands of Japan, see Figs. 3 and 4 (see also Fig. 2)

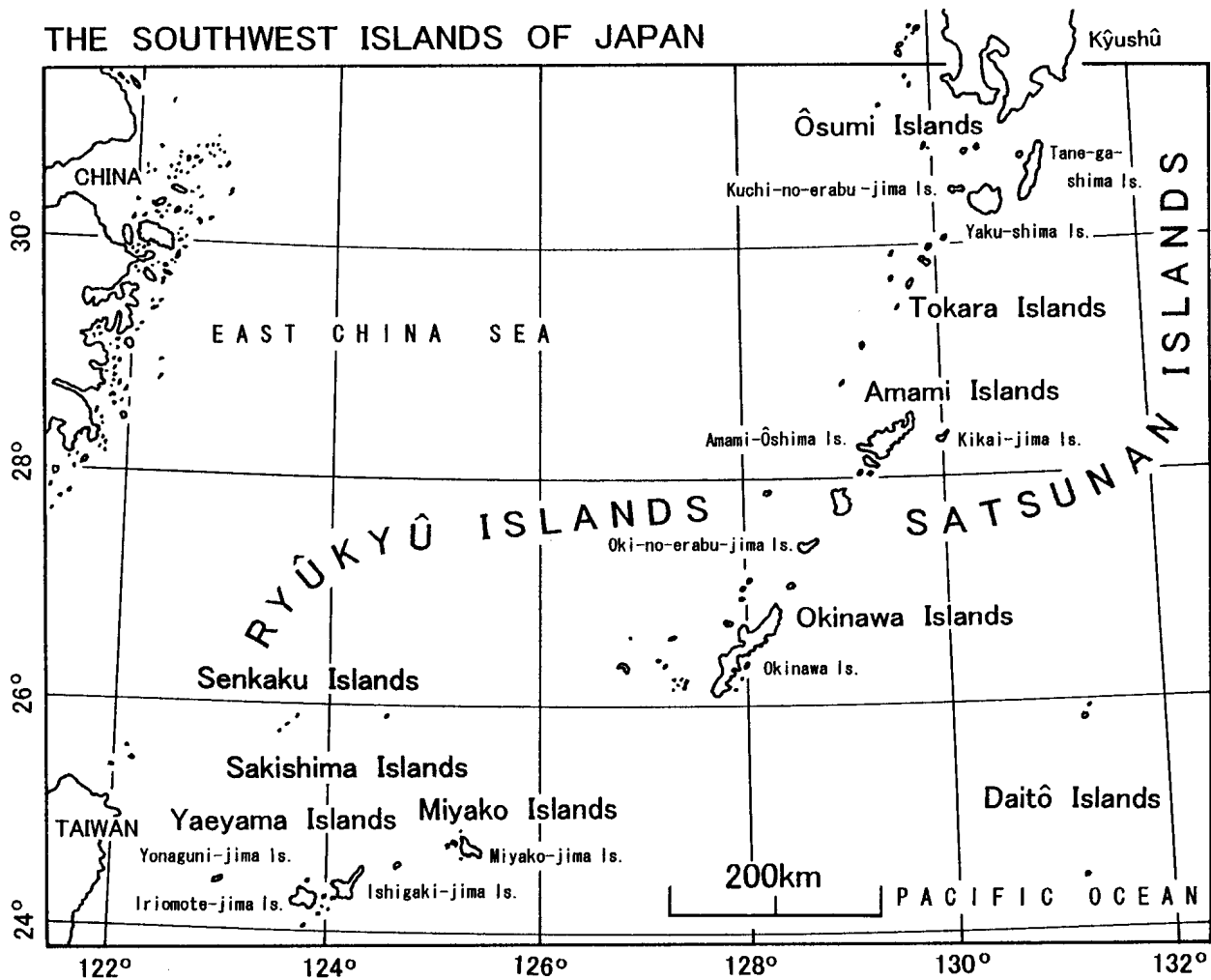


Fig. 2. The Southwest Islands of Japan (= Nansei Shotô). This arc-shaped islands consist of two arcs of islands: the Satsunan Islands (a northeastern arc) and the Ryûkyû Islands consist of the Okinawa Islands, the Miyako Islands, the Yaeyama Islands, the Sakishima Islands, and the Daitô Islands.

Acknowledgements

The authors are indebted to Dr. Seth Tyler and Dr. Matthew D. Hooge (Orno, Main, U.S.A.) for their kind supply of English translated versions of Russian papers (Kostenko & Mamkaev, 1990a, b). Dr. Oleg A. Timoshkin (Irkutsk, Russia) is thanked for giving to Kawakatsu the copies of Russian articles on Acoela.

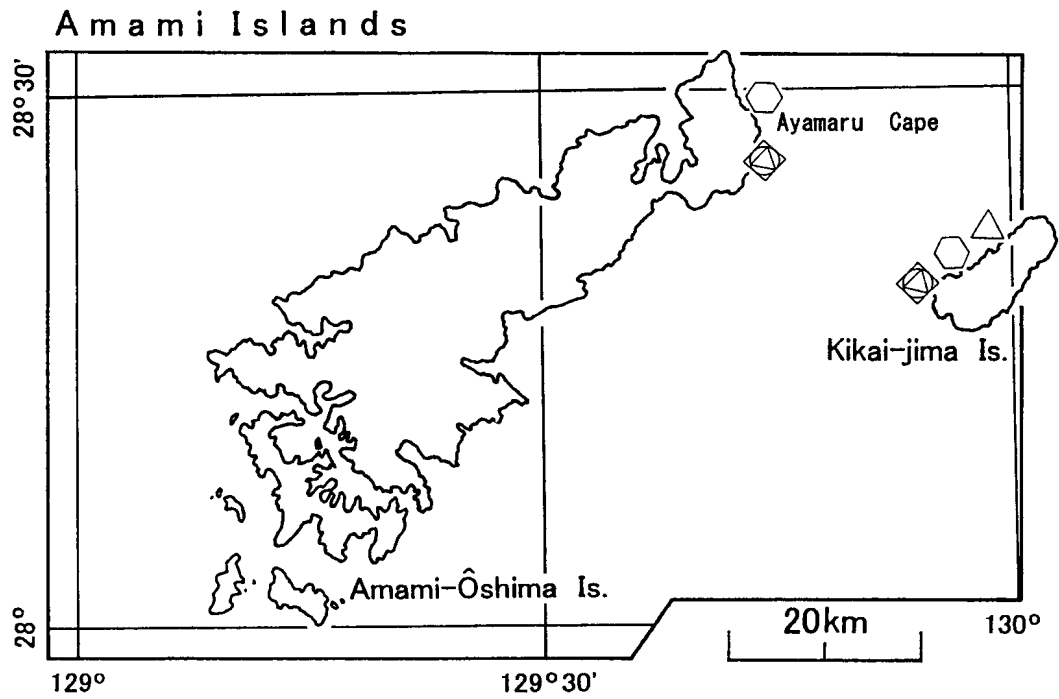


Fig. 3. Amami-Ōshima Island and Kikai-jima Island in the Amami Islands. For 3 acolan species occurred, see the top-left corner in Fig. 1.

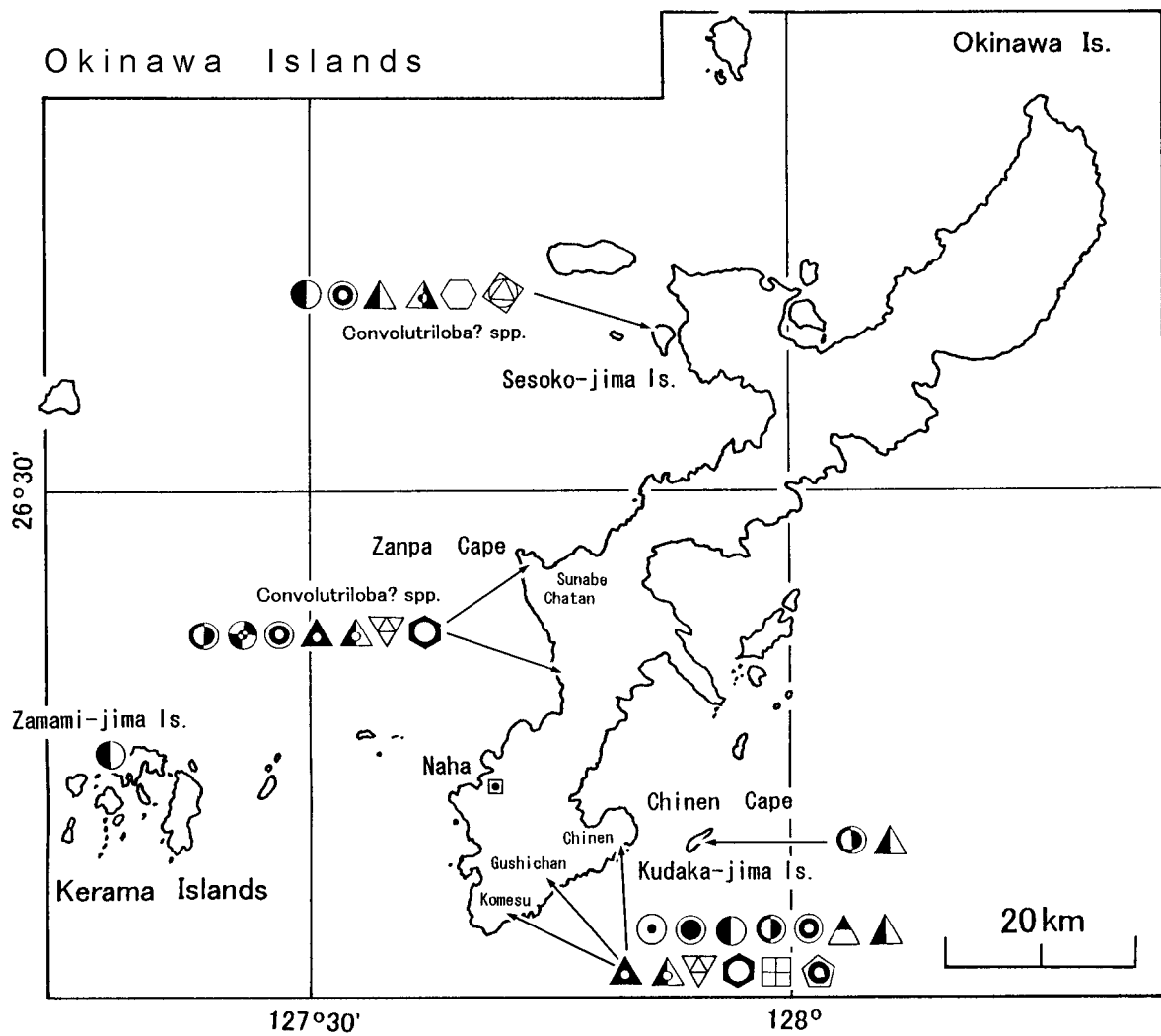


Fig. 4. Okinawa Island and Zamami Island in the Okinawa Islands. For 17 acolan species occurred, see the top-left corner in Fig. 1.

References

* Non-collected literature in Kawakatsu's Library on Turbellarians. Cited by Dörjes (1968) and von Graff (1904-1908). Kawakatsu has added the English titles of Japanese articles which have none of any foreign language ([]).

- Åbildgaard, P. C., 1806*. *Zoologia danica seu Animalium Danicae et Norvegiae rariorum ac mines notorum descriptiones et historia* aus O. F. Müller. *Zoologica Danica*, 4. 26 pages.
- An der Lan, H., 1936. Ergebnisse einer von E. Reisinger und O. Steinböck mit Hilfe des Rask-Ørsted-Fonds durchgeführten zoologischen Reise in Grönland 1926. 7. Acoela I. Vidensk. Medd. Dansk. Naturh. Foren., 99: 289-330 + pls. I-III.
- Ax, P., 1959*. Zur Systematik, Ökologie und Tiergeographie der Turbellarienfauna in den ponto-kaspischen Brackwassermeeren. *Zool. Jb. Abt. Syst.*, 87: 43-184.
- Beneden, E. von, 1870. Etude zoologique et anatomique du genre *Macrostomum* et description de deux especes nouvelles. *Bull. Acad. Sci. Belg.*, 30: 116-133.
- Bock, S., 1923. Eine neue Marine Turbellariengattung aus Japan. *Uppsala Univ. Årsskrift, Mathem. och Naturvet.*, 1: 1-55, pls. I-II.
- Diesing, K. M., 1862*. Revision der Turbellarien. Abt. Rhabdocoelen. *Sber. Akad. Wiss. Math.-nat. Kl. Wien*, Abt. 1, 45: 485-578.
- Dörjes, J., 1968. Die Acoela (Turbellaria) der Deutschen Nordseeküste und ein neues System der Ordnung. *Zeitschr. Zool. Syst. Evolutions.*, 6: 56-452.
- Faubel, A. & Regier, S., 1983. Anatomy and taxonomy of new Acoela (Turbellaria) from the sublittoral of the Northern North Sea. *Senckenbergiana maritima*, 15 (1/3): 1-17.
- Graff, L. von, 1874*. Zur Kenntnis der Turbellarien. *Zeitschr. Wiss. Zool.*, 24: 123-160.
- Graff, L. von, 1904*. Marine Turbellarien Orotavas und der küsten Europas. *Arb. aus dem Zool. Inst. Graz*, 7: 190-244.
- Graff, L. von, 1904-1908. Acoela und Rhabdocoelida. In: Dr. H. G. Bronn's Klassen und Ordnungen des Tier-Reichs, Bd. 4 (Vermes), Abt. Ic (Turbellaria), "Abtheilung" I. Pp. i-xxii + 1733-2599 + pls. I-XXX. C. F. Winter Verlags, Leipzig.
- Hendelberg, J. & Åkesson, B., 1988. *Convolutriloba retrogemma* gen. et sp. n., a turbellariann (Acoela, Platyhelminthes) with reversed polarity of reproductive buds. *Fortschr. Zool./Progr. Zool.*, 36: 321-327.
- Hikosaka, A. & Hikosaka-Katayama, T., 1997. [Flatworms (web article)]. (In Japanese.)
<http://home.hiroshima-u.ac.jp/akirahs/flatworm.html>
- Hikosaka-Katayama, T., Nishioka, M., Nakasuka, F. & Yamamoto, M., 1997. Phylogenetic study of the Acoela (Turbellaria, Platyhelminthes) on the basis of the mitochondrial codon. *Zool. Sci., Tôkyô*, 14-Suppl.: 43.
- Hikosaka-Katayama, T., Orii, H., Yoshida, A., Agata, K., Yamamoto, M. & Watanabe, K., 1998. Cloning of a homologue of *dpp/bmp2/bmp4* and its expression in the acoel turbellarian *Convoluta naikaiensis*. *Zool. Sci., Tôkyô*, 15-Suppl.: 70.
- Hori, I., Hikosaka, T. & Kishida, Y., 1997. Electron microscopic observations on regeneration of acoel turbellarian *Convoluta naikaiensis*. *Zool. Sci., Tôkyô*, 14-Suppl.: 92.
- International Commission on Zoological Nomenclature, 1964. International Code of Zoological Nomenclature Adopted by the XV International Congress of Zoology, 3rd Ed., pp. i-xvi + 1-176 + List of Amendments. London.
- International Commission on Zoological Nomenclature, 1999. International Code of Zoological Nomenclature, 4th Ed., pp. i-xxix + 1-306. London.
- Ishikawa, K. & Yamasu, T., 1992. An acoel flat worm species related closely to the species *Convolutriloba retrogemma* Hendelberg and Åkesson occurs in Okinawa Island, Ryukyu Archipelago. *Zool. Sci., Tôkyô*, 9: 1281.
- Ivanov, A. V., 1952*. Darmlose Turbellarien (Acoela) vom südlichen Ufer Sacchalins. *Akad. Wiss. USSR., Arb. Zool. Inst.*, 12: 40-132. (In Russian.)
- Kaburaki, T., 1927. [Platyhelminthes-Turbellaria]. In: Uchida, S., Ed., *Figuraro de Japonaj Bestojo*, pp: 1667-1681 (figs. 3190-3214). Hokuryû-kan Publ. Co., Tôkyô. (In Japanese.)
- Kaburaki, T., 1947. [Platyhelminthes-Turbellaria]. In: Uchida, S., Ed., *Illustrated Encyclopedia of the Fauna of Japan (Rev. Ed.)*, pp. 1488-1492, 1495 (figs. 4193-4194, 4197-4291, 4204-4205, 4214). Hokuryû-kan Publ. Co., Tôkyô. (In Japanese.)

- Katayama, T., 1993. [Color photographs of *Dicyema orientale*, *Dugesia japonica*, *Planocera multitentaculata*, and *Convoluta naikaiensis*]. The Heredity (Iden), Tôkyô, 47 (12): Prefatory color page. (In Japanese.)
- Katayama, T., Nishioka, M. & Yamamoto, M., 1996a. Phylogenetic relationships among turbellarian orders inferred from 18S rDNA sequences. Zool. Sci., Tôkyô, 13: 747-756.
- Katayama, T., Nishioka, M. & Yamamoto, M., 1996b. A method for obtaining capsule-free egg in the acoel turbellarian, *Convoluta naikaiensis*. Zool. Sci., Tôkyô, 13-Suppl.: 81.
- Katayama, T., Wada, H., Furuya, H., Satoh, N. & Yamamoto, M., 1995. Phylogenetic position of the dicyemid Mesozoa inferred from 18S rDNA sequences. Biol. Bull., 189: 81-90.
- Katayama, T., Wada, H., Satoh, N. & Yamamoto, M., 1992. The phylogenetic relationships of free living Platyhelminthes based on partial nucleotide sequences of 18S rDNA. Zool. Sci., Tôkyô, 9: 1302.
- Katayama, T., Yamamoto, M., Wada, H. & Satoh, N., 1993. Phylogenetic position of acoel turbellarians inferred from partial 18S rDNA sequence. Zool. Sci., Tôkyô, 10: 529-536.
- Katô, K., 1943. [Platyhelminthes-Turbellaria]. In: Ôshima, H. & Okada, Y., Ed., [Systematic Zoology], I, pp. 623-670. Yôkendô Publ. Co., Tôkyô. (In Japanese.)
- Katô, K., 1947. A new species of the Convolutidae (Acoela, Turbellaria). Seibutsu, Sapporo, Suppl. (1): 58-62. (In Japanese, with English summary.) See Kawakatsu (1983).
- Katô, K., 1951. *Convoluta*, an acoelous Turbellarian, destroyed the edible clam. Miscellaneous Reports of the Res. Inst. for Nat. Resources, (19-21): 64-67. (In Japanese.) See Kawakatsu (1983).
- Katô, K., 1960. [Platyhelminthes-Turbellaria]. In: Okada, Yô K. & Uchida, T., Eds., Encyclopedia Zoologicae Illustrated in Colours, IV, pp. 170-175, pls. 86 (figs. 1-13) and 87 (figs. 6-9). Hokuryû-kan Publ. Co., Tôkyô. (In Japanese.)
- Katô, K., 1965. [Platyhelminthes-Turbellaria]. In: Okada, Yo K., Uchida, S & Uchida, T., Eds., New Illustrated Encyclopedia of the Fauna of Japan, Part I, pp. 311-312 (figs. 3, 5), 316-318 (figs. 18-19, 23-24, 26-31), 322-330 (figs. 47-79). Hokuryû-kan Publ. Co., Tôkyô. (In Japanese.)
- Katô, K., 1979. [Platyhelminthes-Turbellaria]. In: Uchida, T., Imajima, M. & Tadedo, M., Eds., Illustrated Encyclopedia of the Fauna of Japan, Newly Compiled, pp. 116-118 (figs. 400, 406-409), 120-123 (figs. 418-431). Hokuryû-kan Publ. Co., Tôkyô. (In Japanese.)
- Kawakatsu, M., 1983. Commentaries on two Japanese papers of the late Dr. K. Katô describing new species of acoelous Turbellarians, with their reproduction. Occ. Publ., Biol. Lab. Fuji Women's College, Sapporo (Hokkaidô), Japan, (10): 1-12.
- Kawakatsu, M., Nunomura, N. & Suzuki, H., 1989. Corrections and emendations of specific 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.
- Kinjô, M. & Yamasu, T., 1987. [Morphology on the symbiotic Dinoflagellates from three acoel flatworms, *Amphiscolops* spp.] Biol. Mag. Okinawa, (25): 68. (In Japanese.)
- Kostenko, A. G. & Mamkaev, Yu. V., 1990a. Polozhenie "Zelenykh Konvoliut" b sisteme beskishechnykh Turbellariï (Acoela, Turbellaria). 1. *Simsagittifera* gen. n. (The place of green convoluts in the system of Acoela, Turbellaria. 1. *Simsagittifera* gen. n.). Zool. Zh., 69, 6: 11-22. (In Russian, with English summary.)
- Kostenko, A. G. & Mamkaev, Yu. V., 1990b. Polozhenie "Zelenykh Konvoliut" b sisteme beskishechnykh Turbellariï (Acoela, Turbellaria). 2. Sagittiferidae fam. n. (The position of "green convolutas" in the system of Turbellaria (Acoela). 2. Sagittiferidae fam. n.). Zool. Zh., 69, 7: 5-16. (In Russian, with English summary.)
- Mamkaev, Yu. V. & Kostenko, A. G., 1990. Westpacific as a center of acoelan evolution. VI ISBT Programme/Abstracts, p. 44. Hirosaki.
- Mamkaev, Yu. V. & Kostenko, A. G., 1991. On the phylogenetic significance of sagittocytes and copulatory organs in acoel turbellarians. Hydrobiologia, 227: 307-314.
- Minegishi, H., 1964. [On the development of Turbellaria Acoela]. Zool. Mag., Tôkyô, 73: 305. (In Japanese.)
- Minegishi, H., 1965. [Acoela-Turbellaria]. In: Okada, Yô K., Uchida, S. & Uchida, T., Eds., New Illustrated Encyclopedia of the Fauna of Japan, Part I, pp. 311-312 (figs. 1-2, 4, 6). Hokuryû-kan Publ. Co., Tôkyô. (In Japanese.)
- Minegishi, H., 1968. [On the origin of the Metazoa, with special reference to the species of Acoela]. The Heredity (Iden), Tôkyô, 22 (4): 8-12. (In Japanese.)
- Minegishi, H., 1973. [On the genus *Amphiscolops* (Turbellaria, Acoela)]. Jap. Soc. Syst. Zool. Circular, (46): 21. (In Japanese.)

- Minegishi, H., 1975. List of Acoela (Turbellaria Plathelminthes). Nihon Joshi-Daigaku Fuzoku Kôtôgakkô Kenkyû-kiyô, (3): 56-70.
- Minegishi, H., 1986. [Rediscovery of *Convoluta japonica* Katô, 1951]. Proc. Japan. Soc. Syst. Zool., (33): 57. (In Japanese.)
- Minegishi, H., 2002. [Several *Convoluta* species from the Far East are very similar to European *Convoluta roscoffensis* von Graff, 1891]. Taxa (Jap. Soc. Syst. Zool.), (13): 41. (In Japanese.)
- Nishimura, S., 1968. An acoel and proseriate turbellarian from the Noto-Ogi, Southern Sea. Collect. & Breed., Tôkyô, 30 (9): 304-305. (In Japanese.)
- Nishioka, M., Katayama, T. & Yamamoto, M., 1996. Formation of the epidermis-muscle complex during development of the Acoel. Zool. Sci., Tôkyô, 13-Suppl.: 81.
- Nunomura, N., 1992. Platyhelminthes-Turbellaria. In: Nishimura, S., Ed., Guide to Seashore Animals of Japan with Color Pictures and Keys, I: pl. 43 + pp. 175-193. Hoikusha Publ. Co., Ltd., Ôsaka. (In Japanese.)
- Okugawa, K. I., 1953. A monograph of Turbellaria (Acoela, Rhabdocoela, Alloecoela and Tricladida) of Japan and its adjacent regions. Bull. Kyoto Gakugei Univ., B, (3): 20-43.
- Orii, H., Katayama, T., Sakurai, T., Agata, K. & Watanabe, K., 1998. Immunohistochemical detection of opsins in turbellarians. Hydrobiologia, 383: 183-187.
- Ørsted, A. S., 1843*. Entwurf einer systematischen Einteilung und speziellen Beschreibung der Plattwürmer auf mikroskopische Untersuchungen gegründet. Kopenhagen, 96 pages.
- Ørsted, A. S., 1845*. Fortegnelse over Dyr, samlede i Christiana-fjord ved Dobrak fra 21-24 Juli 1844. Naturh. Tidssk., udgivet of H. Kroyer, 2: 400-427.
- Schmidt, E. O., 1852*. Neue Rhabdocoelen aus dem nordischen und adriatischen Meere. Sitz.-Ber. Mat. Nat. Kl. Akad. Wien, 9: 490-505.
- Sugiura, Y., Minegishi, H. & Kato, N., 1979. Studies on the Acoela, *Convoluta* sp. with zoochlorella. I. On the effects of the continuous dark condition to the *Convoluta* sp. and its symbiont. Dokkyô Univ. Bull. Liberal Arts, 14: 5-12. (+ pls. I in color). (In Japanese, with English summary.)
- Tajika, K.-I., Kobayashi, M., Katayama, T. & Satoh, N., 1993. [Systematics of the Acoelomata: the origin of the multicellular animals, with special reference to the ancestral form of the Bilateria]. The Heredity (Iden), Tôkyô, 47 (12): 12-20. (In Japanese.)
- Tyler, S. (& Bush, L. F.), 2000. Acoela Uljanin 1870 [update: June 8, 2000 (11 pages)]. In: Tyler, S., Ed., Turbellarian taxonomic Database. <http://linius.umesci.maine.edu/turbellaria/turb2.php?action=1&code=12>
- Uchida, T., 1965. Platyhelminthes-Turbellaria. In: Uchida, T., Ed., Dôbutsu Keitôbunrui-gaku (Systematic Zoology), vol. 3, pp. 9-78. Nakayama-shoten Publ. Co., Tôkyô. (In Japanese.)
- Uchida, T., Kawakatsu, M. & Minegishi, H., 1972. Platyhelminthes-Turbellaria. In: Uchida, T., Ed., Yatsu & Uchida, Dôbutus-bunruimei Jiten (Classification Tables of Animals), pp. 152-170. Nakayama-shoten Publ. Co., Tôkyô. (In Japanese.)
- Uchida, T., Kawakatsu, M. & Minegishi, H., 1988. Ditto. Second Printing (with minimal corrections and additions), pp. 152-170. Nakayama-shoten Publ. Co., Tôkyô. (In Japanese.)
- Uljanin, W., 1870*. Turbellarien der Bucht von Sewastopol. Arb. d. II. Vers. Russ. Naturf. zu Moskau, Abt. Zool. und Physiologie, 96 pages. (In Russian.)
- Wada, H., Katayama, T. & Satoh, T., 1992. [Phylogeny and relationship of animals deduced from 18S rDNA sequences]. The Heredity (Iden), Tôkyô, 46 (10): 51-56. (In Japanese.)
- Weldon, W. F. R., 1889*. *Haplodiscus piger*, a new pelagic organism from the Bahamas. Quart. Jour. Micros. Soc., 29: 1-8.
- Westblad, E., 1946*. Studien über skandinavische Turbellarien. Acoela IV. Ark. Zool., 38A, (1): 1-56.
- Westblad, E., 1948*. Studien über skandinavische Turbellarien. Acoela V. Ark. Zool., 41A, (7): 1-82.
- Winsor, L., 1990. Marine Turbellaria (Acoela) from North Queensland. Mem. Queensland Mus., 28 (2): 785-800.
- Yamasu, T., 1982a. [Acoel turbellarians and their symbiotic algae]. Biol. Mag. Okinawa, (20): 41-42. (In Japanese.)
- Yamasu, T., 1982b. Five new species of Acoel flatworms from Japan. Galaxea (Publ. Sesoko Mar. Sci. Center, Univ. Ryukyû), 1: 29-43.
- Yamasu, T., 1988. [Symbiosis of marine algae and invertebrates]. The Heredity (Iden), Tôkyô, 42 (2): 12-20. (In Japanese.)
- Yamasu, T., 1990. Fine structure of acoel flatworms (Genera, *Convoluta* and *Amphiscolops*). VI ISBT Programme/Abstracts, p. 82. Hirosaki. No specific names are there.

- Yamasu, T. 1991. Fine structure and function of ocelli and sagittocysts of acoel flatworms. *Hydrobiologia*, 227: 273-282.
- Yamasu, T. & Okazaki, A., 1987. Preliminary faunal list of acoel turbellarian species from the Ryukyu Islands. *Galaxea*, 6: 61-68.
- Yoshida, A., Hikosaka-Katayama, T. & Yamamoto, M., 1997. Development of *Convoluta naikaiensis* (Acoel, Turbellaria, Platyhelminthes). *Zool. Sci.*, Tôkyô, 14-Suppl.: 43.

=====

The following articles on Acoela do not include Japanese species names (mainly give only generic names of undescribed and/or uncertain species in many cases).

- Katô, K. (& Minegishi, H.), 1983. Plathelminthes-Turbellaria. In: Dan, K., Sekiguchi, K., Andô, Y & Watanabe, H., Eds., *Musekitsu-Dôbutsu no Hassei, Jô* (Development of Invertebrate Animals, Part D), pp. 145-158. Baifû-kan Publ. Co., Tôkyô. (In Japanese.)
- Minegishi, H., 1990. Acoela from Japan. VI ISBT Programme/Abstracts, p. 87. Hirosaki.
- Provasol, L., Yamasu, T. & Manton, I., 1968. Experiments on the resynthesis of symbiosis in *Convoluta roscoffensis* with different flagellate cultures. *Jour. Mar. Biol. Ass. U.K.*, 48: 465-479.
- Yamasu, T., 1969. Culture experiment and the morphological observation of *Convoluta* sp. (Turbellaria, Acoela) with *Zoochlorella*. *Zool. Mag.*, Tôkyô, 78: 426-427. (In Japanese.)
- Yamasu, T., 1970a. Observations on the acoel flatworms collected in the Amami Islands and their symbiotic algae. *Zool. Mag.*, Tôkyô, 79: 276. (In Japanese.)
- Yamasu, T., 1970b. On the nutrition of acoel flatworms with symbiotic algae. *Zool. Mag.*, Tôkyô, 79: 381. (In Japanese.)
- Yamasu, T., 1971. Observations on the acoel flatworms with symbiotic algae and their fine structure. *Zool. Mag.*, Tôkyô, 80: 475-476. (In Japanese.)
- Yamasu, T. 1972. The evolution in symbiosis. Protein, Nucleic Acid and Enzyme, Separate Vol.: 221-229. (In Japanese.)
- Yamasu, T. 1973. Fine structure of acoel flat worm. *Zool. Mag.*, Tôkyô, 82: 355. (In Japanese.)
- Yamasu, T. 1974. Comparative electron microscopy on the acoel flatworm of genus *Amphiscolops*. *Zool. Mag.*, Tôkyô, 83: 446. (In Japanese.)
- Yamasu, T., 1976a. [Symbiosis]. In: Ôsawa, F., Ôi, T., Okazaki, R., Ishihama, A., Asakura, M., Eguchi, G., Tsukahara, N., Mori, S. & Iwasa, K., Eds., *Seibutsu-kagaku kôza* (Biological Science Lectures), Vol. 9, Chapt. 5, pp. 167-217. Asakura-shoten Publ. Co., Tôkyô. (In Japanese.)
- Yamasu, T., 1976b. On two quadriflagellated algae in an acoel flatworm, *Amphiscolops*. *Zool. Mag.*, Tôkyô, 85: 507. (In Japanese.)
- Yamasu, T., 1977a. [Comparison of the structure of acoel flatworms]. Programme of the Symposium on the Physiology, Ecology, Embryology, and Evolution of Coelenterata and Some Lower Invertebrates, pp. 5-6. (In Japanese.)
- Yamasu, T., 1977b. Fine structure of the rhabdites and sagittocysts of acoel flatworm. *Zool. Mag.*, Tôkyô, 86: 495. (In Japanese.)
- Yamasu, T. (with Fuji'i, M. & Koike, Y.), 1977c. [Observations of plants and animals found in the pools and beaches]. *Anima*, Tôkyô, (53): 41-64. (In Japanese.)
- Yamasu, T., 1978. [Some problems on commensalism]. *the Heredity (Iden)*, Tôkyô, 32 (4): 46-54. (In Japanese.)
- Yamasu, T., 1983. Fine structure of acoel flatworms, *Haplogonaria* and *Otocelis* sp. *Zool. Mag.*, Tôkyô, 92: 638. (In Japanese.)
- Yamasu, T., 1987. [Structure of eyes in two turbellarian species]. *Biol. Mag. Okinawa*, (25): 69. (In Japanese.)
- Yamasu, T. & Fuji'i, K., 1978. On the morphological changes of algal cells in the relationship between *Convoluta* and its symbiont. *Zool. Mag.*, Tôkyô, 87: 506. (In Japanese.)
- Yamasu, T., Ichinomiya, Y. & Kameda, K., 1979. The structure and function of the ocelli of a[n] acoel flatworm. *Photomedicine & Photobiology*, 1: 141-142. (In Japanese.)
- Yamasu, T. & Kinjô, M., 1984. Cultures and comparative morphology on the symbiotic Dinoflagellates from three acoel flat worms, *Amphiscolops* spp. *Zool. Mag.*, Tôkyô, 1: 982.
- Yamasu, T. & Masuda, Y., 1980. Two new symbiotic algae, *Platymonas* sp. and *Exuviaella*, from the acoel flat worm, *Amphiscolops* sp. *Zool. Mag.*, Tôkyô, 89: 584.
- Yamasu, T. & Okazaki, A., 1982. On the acoel flat worms from Japan. *Zool. Mag.*, Tôkyô, 91: 666. (In Japanese.)

nese.)

Yamasu, T. & Sakabe, T., 1980. Fine structure of the sagittocysts of a[n] acoel flatworm, *Convoluta* sp. Zool. Mag., Tôkyô, 89: 585. (In Japanese.)

=====

Four atlases cited in the Introduction (Note. The Southwest Islands of Japan) are excluded from the References. See the next web article. <http://planarian.net/kswp/43/jmap.pdf>

Addresses of the Authors :

Dr. Anno FAUBEL, Institut für Hydrobiologie und Fischereiwissenschaft, Zeiseweg 9, D-22765 Hamburg, Bundesrepublik Deutschland.

Tel: International: +49 040 42838 6690 / Fax: +49 040 42838 6696

E-mail: faubel@uni-hamburg.de

Dr. Masaharu KAWAKATSU, 9jô 9chôme 1-8, Shinkotoni, Kita-ku, Sapporo (Hokkaidô) 001-0909, Japan.

Tel & Fax (International: +81 11 762 4450); (Domestic: 011 762 4450).

E-mail (Miss Miyuki Kawakatsu): DQA01524@nifty.ne.jp (The 4th character is "zero", not the letter O.)

Dr. Eudóxia Maria FROEHLICH, Professor of Biology, Emeritus, Departamento de Zoologia, Instituto de Biociências, Universidade de São Paulo, Rua do Matão, Travessa 14, No. 101, Butantã - São Paulo / SP - 05598-900, Caixa Postal 11461, Brasil.

Tel: International: +55 11 3091-7575 / Fax (International: +55 11 818 7416). E-mail: emfroeh@ib.usp.br

Home address: Al. J. E. de Lima, 1095/102, CEP 01403-003, São Paulo, SP-Brasil.

Dr. Hugh D. JONES, School of Biological Sciences, 3.239 Stopford Building University of Manchester, Manchester, M13 9PT, UK.

Phone/FAX +44 161 275 3885. Email: hugh.jones@man.ac.uk

Home address: 4 Vine Cottages, off Hayfield Road, Birch Vale, High Peak, SK22 1DG, UK.

Phone: +1663 745438. Email: flatworm@btopenworld.com

Mr. Gen-yu SASAKI, Biology teacher of Jôtô High School of Tôkyô. Home address: Roppongi 1-3-49, Minato-ku, Tôkyô 106-0032, Japan.

Tel. (International: +81 3 3585 1785); (Domestic: 03 3585 1785).

E-mail: gen-yu@mtc.biglobe.ne.jp
