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A Checklist and Bibliography of Parasites of Salmonids of Japan

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Abstract

Information on the parasites of salmonids in Japanese waters that was published during the years 1889-1986 is assembled in the form of Parasite-Host and Host-Parasite lists with accompanying bibliography. Ninety-four named species of parasites (18 Protozoa, 5 Monogenea, 21 Trematoda, 7 Cestoidea, 19 Nematoda, 15 Acanthocephala, 1 Hirudinoidea, 1 Mollusca, 1 Branchiura, 5 Copepoda, 1 Isopoda) have been reported, and numerous other parasites not identified to species level are also included. The Parasite-Host list, arranged on a taxonomic basis, includes for each parasite species its currently recognized scientific name, and synonyms occurring in the literature, habitat (freshwater or marine), location of infection (site) within the host, species of host(s), known geographical distribution in Japanese waters, and the published source for each host and locality record. Where necessary, remarks and footnotes dealing with such topics as taxonomy, nomenclature, and misidentifications are included. The Host-Parasite list summarizes the species of parasites from each species of salmonid and their geographical distributions. Although taxonomic revision is not the aim of the checklist, the following three new combinations and one new synonym are proposed: *Microsporidium takedai* (Awakura, 1974) n. comb. for *Nosema takedai*; *Sterliadochona ephemeridarum* (Linstow, 1872) n. comb. for *Cystidicoloides ephemeridarum*; and *Salvelinema ishii* (Fujita, 1941) new synonym of *S. salvelini* (Fujita, 1939) n. comb. for *Metabronema salvelini*.

Contents

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Introduction

In 1889, the first paper on parasites of Japanese salmonids was published by Prof. I. Ijima of Tokyo Imperial University. Since then, a number of papers dealing with parasites of salmonids in Japanese waters have been published. In 1958 and 1961, Prof. T. Fukui of Yokohama Municipal University compiled excellent reviews of parasites of Japanese salmonids. However, during the last two decades, our knowledge on this subject has increased considerably. Thus, it seems necessary and timely to make a new checklist and bibliography. Additionally, since many papers on salmonid parasites in Japanese waters have been written in Japanese, a checklist compiled in English will be useful to introduce our knowledge to foreign investigators.

This checklist involves records during the period 1889-1986 from published scientific literature and annual reports of national and prefectural government institutions. Where necessary, records contained in publications that do not provide original host or locality data and those from abstracts and proceedings of scientific meetings are also included. However, recent records of parasites of masu salmon from the Annual Reports of the Hokkaido Fish Hatchery are excluded, because based on the same material Dr. T. Awakura and his colleagues (1981-) have been publishing serial papers, records from which are included.

This checklist consists of seven sections: Introduction, Parasite-Host List, Host-Parasite List, Acknowledgments, References, Supplementary References, and Index. This composition is the same as given by Margolis and Arthur (1979).

In the PARASITE-HOST LIST, parasites are arranged by their phyla and classes in the following order: Sarcomastigophora (Zoomastigophorea), Apicomplexa (Sporozoea), Microspora (Microsporea), Ascetospora (Stellatosporea), Myxozoa (Myxosporea), Ciliophora (Kinetofragminophorea, Oligohymenophorea), Platyhelminthes (Monogenea, Trematoda, Cestoidea), Nemathelminthes (Nematoda, Nematomorpha), Acanthocephala, Annelida (Hirudinoidea), Mollusca, and Arthropoda (Crustacea: Branchiura, Copepoda, Isopoda). The basis of the system of higher classification used herein for the "Metazoa" follows that given by Margolis and Arthur (1979), whereas classification of the "Protozoa" follows that newly proposed by Levine et al. (1980). Families, genera, and species are listed alphabetically. For each species of parasite contained herein, the following information is provided:

1) The current *scientific name*, including author(s) and date(s), followed by any recognized synonyms that have been used in establishing records from Japanese salmonid(s). No attempt has been made to evaluate systematically the validity of the published reports. However, attention is drawn to obvious errors and tentative or uncertain identifications, and a few new name emendations are proposed where considered absolutely necessary. In addition, Harada's

(1935) view that the three species of *Acanthocephalus, A. oncorhynchi, A. aculeatus* and *A. acerbus*, are synomymous with *A. echigoensis* is not accepted herein because his proposal seems to require reassessment based on abundant material.

2) The *habitat* in which the parasite was acquired and normally completes its life cycle is given as FW for fresh water, and M for marine.

3) The *site(s)* or location(s) of infection of the parasite in or on its host(s). In cases where the site was not given in the original report, the typical site of occurrence was determined from other records and is enclosed in square brackets. Furthermore, attention is drawn to aberrant sites of infection.

4) The *host(s)*. Records are listed by host based on the scientific names used in the "List of Japanese Fishes" that appeared in the "Dictionary of Japanese Fish Names and Their Foreign Equivalents" edited by the Ichthyological Society of Japan (1981). In cases where only common names were given in original reports, assignment of species was based on the common name used or on collection locality. The specific names of Japanese charrs of the genus *Salvelinus* requires a special comment. Fujita (1928), Yamaguti (1935, 1941, 1954), and Fukui and Morisita (1937, 1938) used "*Salvelinus malma*" for charrs collected in Honshu, the main island of Japan. However, since in Japan this fish is restricted to Hokkaido, *Salvelinus pluvius* is used based on collection locality. Fujita (1940) also used "*Salvelinus malma*" for charrs from the Chitose River, Hokkaido, but as pointed out by Moravec et al. (1985) these charrs are apparently *Salvelinus leucomaenis*. In addition, although Seki (1975b) used "*Salvelinus malma*" for charrs caught in Lake Shikaribetsu, *Salvelinus malma miyabei*, which was given as "*S. miyabei*" in the "List of Japanese Fishes", is used because this local form is apparently a variant of *S. malma* and endemic in the lake. Numbers in parentheses after each host name correspond with the numbers assigned to the references establishing the particular parasite-host records.

5) The *distribution (Dist.)* of the parasite is indicated by Prefectural boundaries (Fig. 1) in geographical order from northeast to southwest. The records from the southern Kurile Islands such as Etorofu Island and Shikotan Island are also included. In cases of marine species, the name of the prefecture nearest the collection site is given.

6) The *record(s)*. The authors responsible for the records are listed in chronological order. Reference numbers correspond to those given after the appropriate host species. Each reference is followed by the locality or localities consisting of two parts, prefecture(s) and detailed collection locality or localities from which the parasite was reported. For references in which locality record was not given, the geographical locality is shown by a dash (−). When only one host species is listed for a particular parasite the references are not numbered, and when all records are from the same prefecture only detailed collection localities were listed after the authors' names.

7) *Remarks*. Under Remarks, comments are given on systematics, nomenclature, and the reassignment of misidentified material.

8) *Footnotes*. Under Footnotes are included notes on specific topics such as tentative identifications, aberrant sites of infection, and the misspelling of the parasite's scientific names

and of collection localities.

In the HOST-PARASITE LIST, genera and species of hosts are listed alphabetically. Each host's scientific name including author(s) is followed by the English common name and the Japanese common name(s). Host synonyms included are only those associated with Japanese parasite records. After the name of each species of parasite, its geographic distribution for the host in question is given in parentheses. A single asterisk (*) after the parasite name indicates a tentative or ambiguous parasite identification, and a double asterisk (**) after the parasite name shows that the occurrence of the parasite in the host in question has been considered as abnormal. An interrogation mark (?) preceding a parasite name indicates questionable validity of the parasite identification and the same mark after a locality citation indicates an ambiguous or uncertain locality record.

The REFERENCES include those directly referred to in the parasite-host list, and the SUPPLEMENTARY REFERENCES involve publications dealing with various aspects of parasites of Japanese salmonids but which do not contain original parasite-host records. In both reference lists, authors are listed in alphabetical and chronological orders. In cases where only a Japanese title was given by the original author(s), the equivalent English title is provided in square brackets.

An INDEX to parasite and host scientific names is given to facilitate access to information in the parasite-host and host-parasite lists.

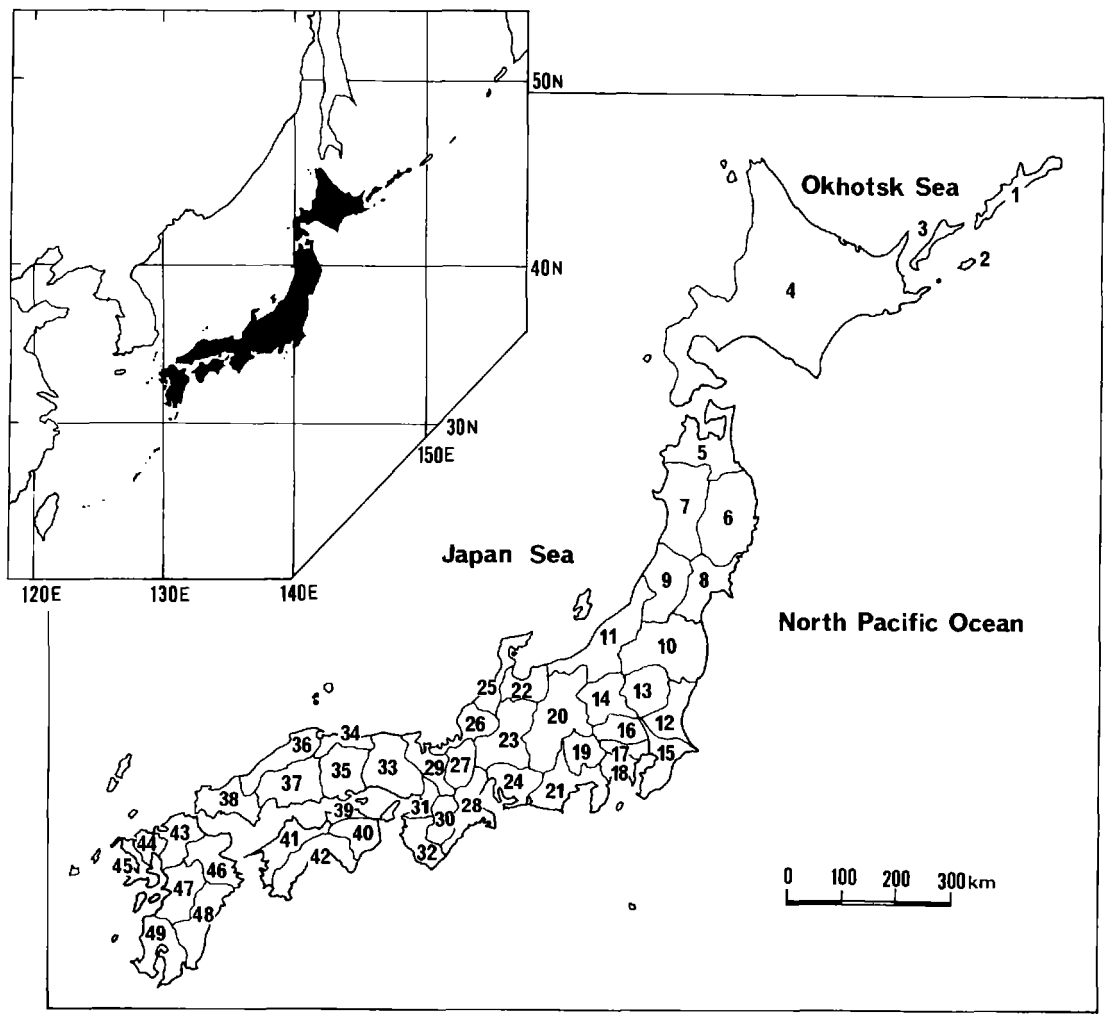

Fig. 1 A map of the Japanese Archipelago showing Prefectural boundaries. Prefectural names are arranged in alphabetical order.

Aichi : 24	Gunma : 14	Kochi : 42	Niigata : 11	Tochigi : 13
Akita : 7	Hiroshima : 37	Kumamoto : 47	Oita : 46	Tokushima : 40
Aomori : 5	Hokkaido : 4	Kunashiri Is. : 3	Okayama : 35	Tokyo : 17
Chiba : 15	Hyogo : 33	Kyoto : 29	Osaka : 31	Tottori : 34
Ehime : 41	Ibaraki : 12	Mie : 28	Saga : 44	Toyama : 22
Etorofu Is. : 1	Ishikawa : 25	Miyagi : 8	Saitama : 16	Wakayama : 32
Fukui : 26	Iwate : 6	Miyazaki : 48	Shiga : 27	Yamagata : 9
Fukuoka : 43	Kagawa : 39	Nagano : 20	Shikotan Is. : 2	Yamaguchi : 38
Fukushima : 10	Kagoshima : 49	Nagasaki : 45	Shimane : 36	Yamanashi : 19
Gifu : 23	Kanagawa : 18	Nara : 30	Shizuoka : 21	

Parasite-Host List

PHYLUM SARCOMASTIGOPHORA

SUBPHYLUM MASTIGOPHORA

CLASS ZOOMASTIGOPHOREA

ORDER KINETOPLASTIDA

SUBORDER BODONINA

Family BODONIDAE

Ichtyobodo necator (Henneguy, 1883) Pinto, 1928 (FW)

Syn.: *Costia necatrix* (Henneguy, 1883)

Includes: *Costia* sp. of Awakura, 1980

Sites: skin, fins, gills

Hosts: *Oncorhynchus gorbuscha* (8)
O. keta (8)
O. masou (7)
Salmo gairdneri (1, 2, 3, 4, 5)
Unspecified Salmonidae (6)

Dist.: Hokkaido, Yamanashi, Shizuoka, Nagano, Gifu, Shimane

Records: 1. Sano 1966 (Yamanashi: Oshino Trout Experimental Station, Shizuoka: Inokashira Trout Experimental Station, Nagano: Hotaka Trout Farm, Takabayashi Trout Farm, Hinode Trout Farm, Gifu: Gifu Prefectural Fisheries Experimental Station, Shimane: Yodoe Trout Farm), 2. 1970a (same localities as in Sano (1966)), 3. 1970b (Shizuoka: Taiheiyo Trout Farm, Onaka Trout Farm, Kiyokawa Trout Farm, Sei Trout Farm, Takeda Trout Farm, Kaihatsu-nokyo Trout Farm, Sendai Trout Farm, Gakunan Trout Farm); 4. Sano and Ushiyama 1970a (Shizuoka: "A, D, F, G, J, L, O" Trout Farms); 5. Tashiro and Yamazaki 1976 (Nagano: unspecified locality); 6. Awakura 1980 (Hokkaido: unspecified locality); 7. Awakura et al. 1984a (Hokkaido: Mori Branch of Hokkaido Fish Hatchery); 8. Urawa 1985 (Hokkaido: unspecified locality)

Ichtyobodo sp. (FW)

Syn.: *Costia* sp. of Nobusawa, Kimura, Arai and Satsunami, 1983

Site: gills

Host: *Salmo gairdneri*

Dist.: Gunma

Record: Nobusawa et al. 1983 (Agatsuma)

Family CRYPTOBIIDAE

Cryptobia branchialis Nie in Cheng, 1956 (FW)

Includes: *Cryptobia* sp. of Sano, 1970 and of Sano and Ushiyama, 1970

Site: gills

Hosts: *Oncorhynchus nerka* (1, 2)
Salmo gairdneri (3, 4)

Dist.: Saitama, Shizuoka

Records: 1. Sano 1966 (Saitama: Kumagaya Trout Experimental Station), 2. 1970a (same locality as in Sano (1966)), 3. 1970b (Shizuoka: Sendai Trout Farm); 4. Sano and Ushiyama 1970a (Shizuoka: "D, O" Trout Farms)

ORDER DIPLOMONADIDA

SUBORDER DIPLOMONADINA

Family HEXAMITIDAE

Hexamita salmonis (Moore, 1923) (FW)
Syn.: *Hexamita* sp. of Awakura, 1980[1]
Site: intestine
Hosts: *Oncorhynchus masou* (7, 8)
O. rhodurus (7)
Salmo gairdneri (1, 2, 3, 4, 5, 6)
Dist.: Hokkaido, Iwate, Yamanashi, Shizuoka
Records: 1. Miura and Oshima 1960 (Iwate: near Morioka); 2. Sano et al. 1961 (Iwate: Tamayama); 3. Sano 1970a (Yamanashi: Sanko Trout Farm), 4. 1970b (Shizuoka: Sendai Trout Farm, Sei Trout Farm, Kaihatsu-nokyo Trout Farm, Sukawa Trout Farm, Gotemba Fisheries Experimental Station); 5. Sano and Ushiyama 1970a (Shizuoka: "D, L, M, O, R" Trout Farms), 6. 1970b (Shizuoka: unspecified locality); 7. Awakura and Matsumoto 1970 (Hokkaido: Chitose Hatchery); 8. Awakura 1980 (Hokkaido: unspecified locality)

Hexamita sp. (FW)
Site: digestive tract
Host: *Salmo gairdneri*
Dist.: Shimane
Record: Murakami 1982d (unspecified locality)

SUBPHYLUM SARCODINA

SUPERCLASS RHIZOPODA

CLASS LOBOSEA

SUBCLASS GYMNAMOEBIA

ORDER AMOEBIDA

Unidentified "amoeba" (FW)
Site: gills
Host: *Oncorhynchus rhodurus*
Dist.: Shiga
Record: Kubota and Kamata 1971 (Samegai Trout Experimental Station)

PHYLUM APICOMPLEXA

CLASS SPOROZOEA

SUBCLASS COCCIDIA

ORDER EUCOCCIDIIDA

SUBORDER EIMERIINA

Family EIMERIIDAE

Eimeria truttae (Léger and Hesse, 1919) Stankovitch, 1924 (FW)
Syn.: *Eimeria* sp. of Awakura, Tanaka, Sakai and Koide, 1984
Site: pyloric caecal epithelium
Host: *Oncorhynchus masou*
Dist.: Hokkaido
Records: Awakura et al. 1983 (Atsuta River, Mena River, Masuhoro River, Kokamotsu River), 1984b (—)

[1]Awakura (1984) listed this parasite as *H. salmonis*.

PHYLUM MICROSPORA

CLASS MICROSPOREA

ORDER MICROSPORIDA

SUBORDER APANSPOROBLASTINA

Family GLUGEIDAE

Loma salmonae (Putz, Hoffman and Dunbar, 1965) Morrison and Sprague, 1981 (FW)
Syn.: *Plistophora salmonae* Putz, Hoffman and Dunbar, 1965[2]
Site: gills [cyst]
Host: *Salmo gairdneri*
Dist.: Hokkaido
Record: Awakura 1970 (Kamikawa)
Remarks: The identity of this parasite requires reassessment. It may be identical with *Loma* sp. reported by Awakura et al. (1982b).

Loma sp. (FW)
Site: gills [cyst]
Host: *Oncorhynchus masou*
Dist.: Hokkaido
Record: Awakura et al. 1982b (Mori Hatchery)

Microsporida of Uncertain Position

Microsporidium takedai (Awakura, 1974) n. comb. (FW)
Syn.: *Plistophora* sp. of Takeda, 1933; Awakura, 1965; Awakura, Kurahashi and Matsumoto, 1966
Glugea takedai Awakura, 1974
Nosema takedai (Awakura, 1974)
Sites: musculature, heart
Hosts: *Oncorhynchus gorbuscha* (5)
O. keta (2, 4, 5)
O. masou (2, 5, 8)
O. nerka (2, 5)
O. tshawytscha (5)
Salmo gairdneri (1, 2, 3, 4, 5, 6, 7, 8)
Salvelinus leucomaenis (1, 5)
Dist.: Hokkaido
Records: 1. Takeda 1933 (Chitose Hatchery); 2. Awakura 1965 (Chitose Hatchery, Chitose River); 3. Awakura et al. 1966 (Lake Tokito-numa); 4. Awakura and Kurahashi 1967 (Chitose Hatchery); 5. Awakura 1974 (Chitose Hatchery, Chitose River, Lake Tokito-numa); 6. Miki and Awakura 1977 (Chitose River); 7. Awakura 1978 (Lake Akan); 8. Anonymous 1985 (Chitose River)
Remarks: Based on Egusa's (1982) view that this parasite does not belong to *Nosema* and is systematically close to *Microsporidium seriolae*, this parasite is assigned to the collective group *Microsporidium*. Dyková and Lom (1980) and Anonymous (1985) treated this parasite as a species of *Microsporidium* without any comments.

Unidentified Microsporida

Microsporida gen. sp. (FW)
Sites: heart, musculature
Host: *Salmo gairdneri*
Dist.: Gifu, Mie
Records: Kubota 1967 (Mie: Kamori Trout Hatchery); Funahashi et al. 1973 (Gifu: Gifu Prefectural Fisheries Experimental Station)
Remarks: Awakura (1974) stated that this parasite is probably identical with

[2]Awakura (1970) reported this parasite as "*Plistophora salmonae* Putz and Hoffman 1964".

Microsporidium takedai (as "*Glugea takedai*").

PHYLUM ASCETOSPORA

CLASS STELLATOSPOREA

ORDER BALANOSPORIDA

Balanosporida gen. spp. (FW)
Syn.: "Haplosporidia-like organisms" of Awakura, Kojima and Sugiwaka, 1981
Haplosporidia gen. sp. of Awakura, Tanaka, Sakai and Koide, 1984
Includes: Haplosporidia gen. sp. of Kubota and Kamata, 1972
Site: kidney
Hosts: *Oncorhynchus gorbuscha* (2)
O. masou (2, 3)
O. rhodurus (1)
Salmo gairdneri (2)
Salvelinus leucomaenis (2)
Dist.: Hokkaido, Shiga
Records: 1. Kubota and Kamata 1972 (Shiga: Samegai Trout Experimental Station); 2. Awakura et al. 1981b (Hokkaido: Atsuta River, Shiribetsu River, Shakotan River, Kokamotsu River, Shari River, Kitamihorobetsu River, Nobusha River, Tokushibetsu River, Chitose Hatchery, Mori Hatchery, Erimo Hatchery, Shakotan Fish Farm, Adachi Fish Farm, Tenpoku Fish Farm, Kashima Fish Farm, Izawa Fish Farm, Saito Fish Farm, Yajima Fish Farm, Taisetsu Fish Farm, Okhotsk Sea off Omu, Japan Sea off Suttsu), 3. 1984b (Hokkaido: Shari River, Kitamihorobetsu River, Nobusha River, Mena River[3])
Remarks: Awakura et al. (1981b) stated that the parasite from *O. gorbuscha* is a different species from the parasite from the other salmonids.

PHYLUM MYXOZOA

CLASS MYXOSPOREA

ORDER BIVALVULIDA

SUBORDER BIPOLARINA

Family MYXIDIIDAE

Myxidium oncorhynchi Fujita, 1923 (FW)
Site: gall bladder
Host: *Oncorhynchus masou*
Dist.: Hokkaido
Records: Fujita 1923 (Ishikari River, Nishibetsu River); Awakura et al. 1984b (Nobusha River, Mena River)

Myxidium spp. (FW)
Site: kidney
Hosts: *Oncorhynchus gorbuscha* (1)
O. masou (1, 2)
Salvelinus leucomaenis (1)
Dist.: Hokkaido

[3]The Mena River is a branch of the Shiribetsu River reported by Awakura et al. (1981b).

Records: 1. Awakura et al. 1981b (Atsuta River, Shiribetsu River, Shakotan River, Shari River, Kitamihorobetsu River, Nobusha River, Tokushibetsu River, Shakotan Fish Farm, Adachi Fish Farm, Tenpoku Fish Farm, Saito Fish Farm), 2. 1984b (Shari River, Kitamihorobetsu River, Nobusha River, Mena River[4])

Remarks: Awakura et al. (1981b) stated that the parasite from *O. gorbuscha* is a different species from the parasite from the other salmonids.

SUBORDER EURYSPORINA

Family SPHAEROSPORIDAE

Chloromyxum giganteum Fujita, 1923 (FW)
Site: gall bladder
Host: *Oncorhynchus gorbuscha*
Dist.: Hokkaido
Record: Fujita 1923 (Nishibetsu River)

Chloromyxum oncorhynchi Fujita, 1936 (FW)
Site: gall bladder
Host: *Oncorhynchus masou*
Dist.: Etorofu Island[5]
Record: Fujita 1936 (Bettobi River)

Chloromyxum quadriforme Fujita, 1923 (FW)
Site: gall bladder
Hosts: *Oncorhynchus gorbuscha*
O. keta
O. masou
Dist.: Hokkaido
Record: Fujita 1923 (Nishibetsu River)

Chloromyxum salvelini Fujita, 1923 (FW)
Site: gall bladder
Hosts: *Oncorhynchus keta* (2, 3, 4)
Salvelinus leucomaenis (1)
Dist.: Hokkaido
Records: 1. Fujita 1923 (Lake Shikotsu); 2. Anonymous 1983 (Chitose River); 3. Urawa and Hiroi 1986 (Chitose River); 4. Urawa 1986 (Chitose River)

Chloromyxum tanakai Fujita, 1936 (FW)
Site: gall bladder
Host: *Oncorhynchus keta*
Dist.: Hokkaido
Record: Fujita 1936 (Kushiro River)

Chloromyxum wardi Kudo, 1920 (FW)
Syn.: *Chloromyxum chitosense* Fujita, 1923
Site: gall bladder
Host: *Oncorhynchus keta*
Dist.: Hokkaido
Records: Fujita 1923 (Chitose River); Anonymous 1983 (Chitose River); Urawa and Hiroi 1986 (Chitose River); Urawa 1986 (Chitose River)

Chloromyxum sp. (FW)
Site: gall bladder
Host: *Oncorhynchus masou*
Dist.: Hokkaido, Niigata, Hiroshima
Records: Murakami 1982d (Hiroshima: Tsutsuga); Awakura et al. 1984b (Hokkaido: Shari River, Kitamihorobetsu River, Nobusha River, Mena River, Furen River, Niigata: Miomote River)

SUBORDER PLATYSPORINA

Family MYXOBOLIDAE

Myxobolus arcticus Pugachev and Khokhlov, 1979 (FW)
Syn.: *Myxobolus neurobius* Schuberg and

[4]See footnote 3.
[5]The prefectural name was reported as "Hokkaido", but the Bettobi River is actually located on Etorofu Island.

Schröder, 1905 of Awakura, 1983, 1984, and of Anonymous, 1983

Myxobolus sp. B of Awakura, Kojima, Sugiwaka and Ogawa, 1982 and of Awakura, Tanaka, Sakai and Koide, 1984

Includes: *Myxobolus* sp. of Murakami, 1982

Myxosporidia gen. spp. of Murakami, 1979 (partim), 1980 (partim)

Myxosporea gen. sp. (Type C) of Murakami, 1982

Sites: brain, spinal cord

Hosts: *Oncorhynchus keta* (10, 13)

O. masou (1, 2, 3, 5, 6, 7, 8, 9, 11, 12)

O. rhodurus (1, 2, 3, 4, 5, 6, 7)

Dist.: Hokkaido, Niigata, Toyama, Hiroshima

Records: 1. Murakami, 1979a (Hiroshima: "A, B" Trout Farms), 2. 1979b (Hiroshima: "A, B" Trout Farms), 3. 1979c (Hiroshima: unspecified five trout farms, Oze River, Ota River, Takahashi River (Tojo River)), 4. 1980a (Hiroshima: "A, B" Trout Farms), 5. 1980b (Hiroshima: "B" Trout Farm), 6. 1982a (Hiroshima: "A, B, C, D, E, H" Trout Farms, Oze River, Ota River), 7. 1982e (Hiroshima: "A" and unspecified trout farms); 8. Awakura et al. 1982a (Hokkaido: Kenichi River, Furen River, Kokamotsu River, Shakotan River, Mori Hatchery, Otobe Hatchery, Adachi Fish Farm, Saito Fish Farm, Okhotsk Sea off Omu, Japan Sea off Kamuenai and Suttsu, Niigata: Miomote River, Toyama: Jinzu River[6]); 9. Awakura 1983a 1983a (Hokkaido: Okhotsk Sea, Japan Sea); 10. Anonymous 1983 (Hokkaido: Chitose River, Japan Sea off Atsuta); 11. Awakura et al. 1984b (Hokkaido: Furen River, Niigata: Miomote River, Toyama: Jinzu River); 12. Anonymous 1985 (Hokkaido: Chitose River); 13. Urawa 1986 (Hokkaido: Chitose River)

Remarks: Awakura (1983a, 1984a) treated *Myxobolus* sp. B reported by Awakura et al. (1982a, 1984b) as *Myxobolus neurobius*. However, *M. neurobius* regarded by him and also Anonymous (1983, [Urawa, unpublished]) is in accordance with *M. arcticus* described by Pugachev and Khokhlov (1979) in shape and size of spore. A pyriform myxosporean reported by Murakami (1979a, b, c, 1980a, b, 1982a, e) seems to be identical with *M. arcticus*. Because the parasite identification remains confused, there is a need for detailed comparative studies based on the materials from a number of host species and localities.

Myxobolus neurobius Schuberg and Schröder, 1905 (FW)

Syn.: *Myxobolus* sp. A of Awakura, Kojima, Sugiwaka and Ogawa, 1982 and of Awakura, Tanaka, Sakai and Koide, 1984

Myxobolus sp. of Awakura, 1983, 1984

Includes: *Myxobolus* sp. (Type p) of Murakami, 1982

Myxobolus sp. (Type P) of Murakami, 1983

Myxobolus sp. of Murakami, 1984

Myxosporidia gen. spp. of Murakami, 1979 (partim), 1980 (partim)

Myxosporea gen. sp. (Type P) of

[6]This river was reported as the "Jintsu River".

Murakami, 1982

Site: spinal cord

Hosts: *Oncorhynchus masou* (1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15)
O. rhodurus (1, 2, 3, 4, 5, 6, 9, 12, 13)

Dist.: Hokkaido, Hiroshima

Records: 1. Murakami 1979a (Hiroshima: "A, B" Trout Farms), 2. 1979b (Hiroshima: "A, B" Trout Farms), 3. 1979c (Hiroshima: unspecified five trout farms, Oze River, Ota River, Takahashi River (Tojo River)), 4. 1980a (Hiroshima: "A, B" Trout Farms), 5. 1980b (Hiroshima: "B" Trout Farm), 6. 1982a (Hiroshima: "A, B, J" Trout Farms, Oze River, Ota River), 7. 1982b (Hiroshima: "A, B" Trout Farms), 8. 1982c (Hiroshima: "A, B" Trout Farms), 9. 1982e (Hiroshima: unspecified three trout farms); 10. Awakura et al. 1982a (Hokkaido: Atsuta River, Mena River, Shari River, Shimonaefutoro River, Masuhoro River, Nobusha River, Kenichi River, Furen River, Kokamotsu River, Shakotan River, Shimamaki Hatchery, Chitose Hatchery, Shakotan Fish Farm, Okhotsk Sea off Omu, Japan Sea off Kamuenai and Suttsu); 11. Awakura 1983a (Hokkaido: Okhotsk Sea, Japan Sea); 12. Murakami 1983 (Hiroshima: unspecified trout farm), 13. 1984 (Hiroshima: unspecified trout farm); 14. Awakura et al. 1984b (Hokkaido: Shari River, Nobusha River, Mena River, Mena River, Furen River); 15. Anonymous 1985 (Hokkaido: Chitose River[7])

Remarks: Awakura (1983a, 1984a) treated *Myxobolus* sp. A described by Awakura et al. (1982a, 1984b) as *Myxobolus* sp. Based on Pugachev and Khokhlov (1979), this species is identifiable as *Myxobolus neurobius* by its shape and size of spore. An oviform myxosporean reported by Murakami (1979a, b, c, 1980a, b, 1982a, b, c, e, 1983, 1984) seems to be identical with *M. neurobius*. Because the parasite identification remains confused, there is a need for detailed comparative studies based on the materials from a number of host species and localities.

PHYLUM CILIOPHORA

CLASS KINETOFRAGMINOPHOREA

SUBCLASS HYPOSTOMATIA

SUPERORDER PHYLLOPHARYNGIDEA

ORDER CYRTOPHORIDA

SUBORDER CHLAMYDODONTINA

Family CHLAMYDODONTIDAE

Chilodonella piscicola (Zacharias, 1894) Jankowski, 1980 (FW)

Syn.: *Chilodonella cyprini* (Moroff, 1902)

Includes: *Chilodonella* sp. of Sano, 1966 and of Awakura, 1976, 1980[8]

Sites: skin, gills

[7] *Oncorhynchus masou* infected with *M. neurobius* were introduced from the Mena River to the Chitose River.

[8] Awakura (1984a) listed this parasite as *C. piscicola* (as "*C. cyprini*").

Hosts: *Oncorhynchus masou* (7)
O. nerka (1)
Salmo gairdneri (1, 2, 3, 4)
Unspecified Salmonidae (5, 6)
Dist.: Hokkaido, Saitama, Yamanashi, Shizuoka, Shimane
Records: 1. Sano 1966 (Saitama: Kumagaya Trout Experimental Station, Yamanashi: Oshino Trout Experimental Station, Shimane: Yodoe Trout Farm), 2. 1970a (Yamanashi: Oshino Trout Experimental Station), 3. 1970b (Shizuoka: unspecified locality); 4. Sano and Ushiyama 1970a (Shizuoka: unspecified locality); 5. Awakura 1976 (Hokkaido: unspecified locality), 6. 1980 (Hokkaido: unspecified locality), 7. 1984a (−)

Chilodonella sp. (FW)
Sites: gills, skin
Host: *Salmo gairdneri*
Dist.: Niigata, Nagano
Records: Tashiro and Yamazaki 1976 (Nagano: unspecified locality); Nomura and Seki 1977 (Niigata: Koide Branch of Niigata Prefectural Fisheries Experimental Station)

SUBCLASS SUCTORIA

ORDER SUCTORIDA

SUBORDER ENDOGENINA

Family DENDROSOMATIDAE

Trichophrya sp. (FW)
Site: gills
Host: *Salmo gairdneri*
Dist.: Gifu
Records: Sano 1966 (Gifu Prefectural Fisheries Experimental Station), 1970a (same locality as in Sano (1966))

Unidentified Suctoria

Suctoria gen. sp. (FW)
Syn.: "*Suctoria*" of Sano, 1970 and of Sano and Ushiyama, 1970
Site: not specified
Host: *Salmo gairdneri*
Dist.: Shizuoka
Records: Sano 1970b (Gakunan Trout Farm); Sano and Ushiyama 1970a ("K" Trout Farm)

CLASS OLIGOHYMENOPHOREA

SUBCLASS HYMENOSTOMATIA

ORDER HYMENOSTOMATIDA

SUBORDER OPHRYOGLENINA

Family OPHRYOGLENIDAE

Ichthyophthirius multifiliis Fouquet, 1876 (FW)
Includes: *Ichthyophthirius* sp. of Awakura, 1980
Sites: gills, skin
Hosts: *Oncorhynchus gorbuscha* (1)
O. keta (1)
O. masou (1, 9)
Salmo gairdneri (1, 2, 3, 4, 5, 6, 8)
Unspecified Salmonidae (7)
Dist.: Hokkaido, Gunma, Nagano, Shizuoka, Shimane
Records: 1. Watanabe 1935 (Hokkaido: Oshoro); 2. Sano 1966 (Nagano: Takabayashi Trout Farm, Ina Trout Farm, Shizuoka: Inokashira Trout Experimental Station, Shimane: Yodoe Trout Farm), 3. 1970a (Nagano: Takabayashi Trout Farm, Ina Trout Farm, Shizuoka: Inokashira Trout Experimental Station), 1970b (Shizuoka: Tsuchida Trout Farm, Mitsui Trout

Farm, Maeda Trout Farm, Gakunan Trout Farm, Takeda Trout Farm, Taiheiyo Trout Farm); 5. Sano and Ushiyama 1970a (Shizuoka: "A, B, C, F, I, K" Trout Farms); 6. Tashiro and Yamazaki 1976 (Nagano: unspecified locality); 7. Awakura 1980 (Hokkaido: unspecified locality); 8. Nobusawa et al. 1983 (Gunma: Agatsuma); 9. Awakura 1984a (−)

SUBCLASS PERITRICHIA

ORDER PERITRICHIDA

SUBORDER MOBILINA

Family URCEOLARIIDAE

Trichodina domerguei (Wallengren, 1897) Heider, 1964 (FW)
Syn.: *Cyclochaeta domerguei* Wallengren, 1897
Sites: skin, fins
Hosts: *Hucho perryi* (2)
Oncorhynchus keta (1, 2)
O. masou (2)
Salvelinus malma (2)
Dist.: Hokkaido
Records: 1. Takeda et al. 1969 (Ichani Hatchery); 2. Takeda 1971 (Rausu Hatchery, Nemuro Hatchery)
Remarks: The parasite identification is not based on morphological studies and requires reassessment.

Trichodina sp. (FW)
Sites: gills, skin
Host: *Salmo gairdneri*
Dist.: Niigata, Nagano, Shizuoka, Gifu
Records: Sano 1966 (Nagano: Ina Trout Farm, Hotaka Trout Farm, Shizuoka: Inokashira Trout Experimental Station, Gifu: Gifu Prefectural Fisheries Experimental Station), 1970a (same localities as in Sano (1966)), 1970b (Shizuoka: Maeda Trout Farm, Gakunan Trout Farm); Sano and Ushiyama 1970a (Shizuoka: "I, K" Trout Farms); Nomura and Seki 1977 (Niigata: Koide Branch of Niigata Prefectural Fisheries Experimental Station)

Urceolariidae gen. sp. (FW)
Syn.: *Trichodina* sp. of Awakura, 1976
"urceolarid" of Awakura, 1980
Sites: skin, gills
Hosts: *Oncorhynchus masou* (3)
Unspecified Salmonidae (1, 2)
Dist.: Hokkaido
Records: 1. Awakura 1976 (unspecified locality), 2. 1980 (unspecified locality), 3. 1984a (−)

PHYLUM PLATYHELMINTHES

CLASS MONOGENEA

ORDER MONOPISTHOCOTYLEA

Superfamily CAPSALOIDEA

Family CAPSALIDAE

Encotyllabe masu Ishii and Sawada, 1938 (M)
Site: gills
Host: *Oncorhynchus masou*
Dist.: not specified
Record: Ishii and Sawada 1938

Superfamily DACTYLOGYROIDEA

Family DACTYLOGYRIDAE

Dactylogyrus sp. (FW)
Sites: skin, gills
Host: *Salmo gairdneri*
Dist.: Niigata
Record: Nomura and Seki 1977 (Koide Branch of Niigata Prefectural Fisheries Experimental Station)

Superfamily GYRODACTYLOIDEA

Family GYRODACTYLIDAE

Gyrodactylus masu Ogawa, 1986 (FW)
Syn.: *Gyrodactylus* sp. of Ogawa, 1983
Includes: *Gyrodactylus* sp. of Awakura, 1984
Sites: fins, gills, gill arches, body surface
Hosts: *Oncorhynchus masou* (2, 3)
O. rhodurus (3)
Salmo gairdneri (1, 3)
Dist.: Hokkaido, Tokyo, Tokushima
Records: 1. Ogawa 1983 (−); 2. Awakura 1984a (−); 3. Ogawa 1986 (Hokkaido: Chitose Hatchery, Tokyo: Okutama Branch of Tokyo Metropolitan Fisheries Experimental Station, Tokushima: Kitoh)

Gyrodactylus sp. (FW)
Syn.: *Gyrodactylus elegans* Nordmann, 1832 of Sano, 1966, 1970
Includes: *Gyrodactylus* sp. of Sano, 1970; Sano and Ushiyama, 1970; Nobusawa, Kimura, Arai and Satsunami, 1983
Sites: gills, fins
Hosts: *Oncorhynchus masou* (5)
Salmo gairdneri (1, 2, 3, 4, 5)
Salvelinus pluvius (5)
Dist.: Gunma, Nagano, Shizuoka
Records: 1. Sano 1966 (Shizuoka: Inokashira Trout Experimental Staion, Nagano: Hotaka Trout Farm, Takabayashi Trout Farm, 2. 1970a (same localities as in Sano (1966)), 3. 1970b (Shizuoka: Gakunan Trout Farm, Takeda Trout Farm, Taiheiyo Trout Farm, Kaihatsu-nokyo Trout Farm, Watanabe Trout Farm); 4. Sano and Ushiyama 1970a (Shizuoka: "A, F, K, Q" Trout Farms); 5. Nobusawa et al. 1983 (Gunma: Tsumagoi, Agatsuma, Higashi, Onogami, Shirasawa, Kawaba, Kurohone, Nakasato, Kurabuchi)
Remarks: Ogawa (1983) treated *Gyrodactylus elegans* reported by Sano (1966) as *Gyrodactylus* sp.

Superfamily TETRAONCHOIDEA

Family TETRAONCHIDAE

Tetraonchus alaskensis Price, 1937 (FW)
Site: [gills]
Host: *Salvelinus leucomaenis*
Dist.: Hokkaido
Record: Awakura et al. 1981a (unspecified localities)
Remarks: Awakura et al. (1981a, p. 62) stated that this parasite occurred on the fish from Hokkaido lakes.

Tetraonchus awakurai Ogawa and Egusa, 1978 (FW)
Syn.: *Tetraonchus* (*Tetraonchus*) sp. of Awakura, 1966
Site: gills
Hosts: *Oncorhynchus masou* (1, 2, 3, 4, 5, 6)
O. rhodurus (4)
Salmo gairdneri (2)
Dist.: Hokkaido, Tokyo, Yamanashi, Nara, Okayama

Records: 1. Awakura 1966 (Hokkaido: Shibetsu River); 2. Ogawa and Egusa 1978 (Yamanashi: unspecified locality); 3. Awakura et al. 1981a (Hokkaido: Atsuta River, Shakotan River, Kokamotsu River, Mori Hatchery, Shakotan Fish Farm); 4. Anonymous 1982 (Tokyo, Yamanashi, Nara, Okayama: unspecified localities); 5. Awakura et al. 1984b (—); 6. Ogawa and Egusa 1985 (Tokyo: Okutama Branch of Tokyo Metropolitan Fisheries Experimental Station)

Tetraonchus oncorhynchi Ogawa and Egusa, 1978 (FW)
Site: gills
Host: *Oncorhynchus masou*
Dist.: Tokyo, Yamanashi
Records: Ogawa and Egusa 1978 (Yamanashi: unspecified locality), 1985 (Tokyo: Okutama Branch of Tokyo Metropolitan Fisheries Experimental Station)

ORDER POLYOPISTHOCOTYLEA

Superfamily MICROCOTYLOIDEA

Family MICROCOTYLIDAE

Microcotylidae gen. sp. (FW)
Syn.: "microcotylid monogenetic trematodes" of Shimazu, 1981
Site: gills
Host: *Hucho perryi*
Dist.: Hokkaido
Record: Shimazu 1981 (Kushiro River system and/or Bekanbeushi River system)

CLASS TREMATODA

SUBCLASS DIGENEA

ORDER STRIGEIDA

SUBORDER STRIGEATA

Superfamily STRIGEOIDEA

Family DIPLOSTOMATIDAE

Diplostomum sp. (FW)
Includes: "parasitic trematoda" of Kubota, 1976
Site: eye
Host: *Salmo gairdneri*
Dist.: Shizuoka
Records: Sato et al. 1975 (unspecified locality); Kubota 1976 (—)

SUBORDER AZYGIATA

Superfamily AZYGIOIDEA

Family AZYGIIDAE

Azygia perryii Fujita, 1918 (FW)
Syn.: *Azygia lucii* O. F. Müller, 1776 of Seki, 1975
Sites: stomach, esophagus (buccal cavity, branchial cavity, gills, operculum, pectoral fins)[9]
Hosts: *Hucho perryi* (1, 4)
Salvelinus leucomaenis (3, 4)
Unspecified Salmonidae (2)
Dist.: Hokkaido
Records: 1. Fujita 1918 (Lake Kussharo); 2. Seki 1975a (unspecified locality), 3. 1975b (Lake Panketo); 4. Shimazu 1981 (Kushiro River system, Bekanbeushi River system)

SUBORDER HEMIURATA

Superfamily HEMIUROIDEA

[9]The locations in parentheses are apparently the results of the parasite's migration after death of the fish.

Family HEMIURIDAE

Brachyphallus crenatus (Rudolphi, 1802) Odhner, 1905 (M)
Sites: stomach, pyloric caeca, intestine
Hosts: *Oncorhynchus gorbuscha* (2, 3, 4, 5)
O. keta (6, 8, 10)
O. masou (1, 7, 9)
Salvelinus leucomaenis (3)
Dist.: Shikotan Island, Hokkaido, Niigata
Records: 1. Yamaguti 1934a (−); 2. Margolis 1957 (Hokkaido: Yubetsu River); 3. Zhukov 1960 (Shikotan Island: unspecified locality); 4. Fukui 1960 (Hokkaido: unspecified locality), 5. 1961 (Hokkaido: Shari); 6. Machida et al. 1972 (Hokkaido: Samani); 7. Awakura and Nomura 1983 (Hokkaido: Okhotsk Sea off Omu, Japan Sea off Rebun, Kamuenai and Suttsu, Shari River, Nobusha River, Furen River, Niigata: Japan Sea off Miomote); 8. Anonymous 1983 (Hokkaido: Chitose River, Japan Sea off Atsuta); 9. Awakura et al. 1984b (−); 10. Urawa 1986 (Hokkaido: Chitose River)

Hemiurus levinseni Odhner, 1905 (M)
Site: stomach
Host: *Oncorhynchus gorbuscha*
Dist.: Shikotan Island, Hokkaido
Records: Margolis 1957 (Hokkaido: Yubetsu River); Anonymous 1958a (Hokkaido: unspecified locality); Zhukov 1960 (Shikotan Island: unspecified locality)

Parahemiurus merus (Linton, 1910) Woolcock, 1935 (M)
Site: digestive tract
Host: *Oncorhynchus masou*
Dist.: Niigata
Records: Awakura and Nomura 1983 (Japan Sea off Miomote, Miomote River); Awakura et al. 1984b (−)

Tubulovesicula lindbergi (Layman, 1930) Yamaguti, 1934 (M)
Sites: intestine, stomach
Hosts: *Oncorhynchus keta* (5, 7)
O. masou (3, 4, 6)
Salvelinus leucomaenis (1)
Unspecified Salmonidae (2)
Dist.: Shikotan Island, Hokkaido, Niigata
Records: 1. Zhukov 1960 (Shikotan Island: unspecified locality); 2. Seki 1975a (Hokkaido: unspecified locality), 3. 1975b (Hokkaido: Mena River); 4. Awakura and Nomura 1983 (Hokkaido: Okhotsk Sea off Omu, Japan Sea off Kamuenai and Suttsu, Nobusha River, Niigata: Japan Sea off Miomote); 5. Anonymous 1983 (Hokkaido: Chitose River); 6. Awakura et al. 1984b (−) 7. Urawa 1986 (Hokkaido: Chitose River)

Hemiuridae gen. sp (M)
Syn.: ? *Allocreadium* sp. of Shirahata and Hatori, 1979
Site: stomach
Host: *Oncorhynchus keta*
Dist.: Hokkaido
Record: Shirahata and Hatori 1979 (Lake Saroma)
Remarks: The material of Shirahata and Hatori (1979) was reexamined and identified as a hemiurid (Nagasawa, unpublished).

Family DEROGENIDAE

Derogenes varicus (O. F. Müller, 1784) Looss,

1901 (M)
Site: stomach
Host: *Salvelinus leucomaenis*
Dist.: Shikotan Island
Record: Zhukov 1960 (unspecified locality)

Genarchopsis mülleri (Levinsen, 1881) Yamaguti, 1954 (M)
Syn.: *Genarches mülleri* (Levinsen, 1881)
Site: [digestive tract]
Host: *Oncorhynchus masou*
Dist.: not specified
Record: Awakura et al. 1984b

Family BUNOCOTYLIDAE

Genolinea anura (Layman, 1930) Yamaguti, 1954 (M)
Site: intestine
Host: *Salvelinus leucomaenis*
Dist.: Shikotan Island
Record: Zhukov 1960 (unspecified locality)

Family LECITHASTERIDAE

Lecithaster gibbosus (Rudolphi, 1802) Lühe, 1901 (M)
Syn.: *Lecithaster salmonis* Yamaguti, 1934
Includes: *Lecithaster* sp. of Awakura, Tanaka, Sakai and Koide, 1984
Sites: intestine, pyloric caeca
Hosts: *Oncorhynchus gorbuscha* (2, 5)
O. keta (1, 3, 4, 6, 7, 8, 10, 12)
O. masou (9, 11)
Salvelinus leucomaenis (5)
Dist.: Shikotan Island, Hokkaido, Niigata?
Records: 1. Yamaguti 1934a (−); 2. Margolis 1957 (Hokkaido: Yubetsu River); 3. Fukui 1958b (Hokkaido: unspecified locality); 4. Anonymous 1959 (Hokkaido: unspecified locality); 5. Zhukov 1960 (Shikotan Island: unspecified locality); 6. Fukui 1960 (Hokkaido: unspecified locality), 7. 1961 (Hokkaido: Tanno); 8. Machida et al. 1972 (Hokkaido: Samani); 9. Awakura and Nomura 1983 (Hokkaido and/or Niigata: unspecified localities); 10. Anonymous 1983 (Hokkaido: Chitose River, Japan Sea off Atsuta); 11. Awakura et al. 1984b (−); 12. Urawa 1986 (Hokkaido: Chitose River)

Lecithaster sp. (M)
Site: not specified
Host: *Oncorhynchus rhodurus*
Dist.: Gifu, Mie
Record: Sorimachi et al. 1984 (Gifu: Nagara River, Mie: Ise Bay off Suzuka, Miya River)

SUBORDER BRACHYLAIMATA

Superfamily BUCEPHALOIDEA

Family BUCEPHALIDAE

Prosorhynchoides gracilescens (Rudolphi, 1819) Stunkard, 1976 (M)
Syn.: *Bucephalopsis gracilescens* (Rudolphi, 1819)
Sites: pyloric caeca, intestine
Host: *Salvelinus leucomaenis*
Dist.: Shikotan Island
Record: Zhukov 1960 (unspecified locality)

ORDER PLAGIORCHIIDA

SUBORDER PLAGIORCHIATA

Superfamily ALLOCREADIOIDEA

Family ALLOCREADIIDAE

Allocreadium sp. (FW)
Site: [digestive tract]

Hosts: *Oncorhynchus masou* (3)
Salvelinus leucomaenis (2)
Unspecified Salmonidae (1)
Dist.: Hokkaido
Records: 1. Seki 1975a (unspecified locality), 2. 1975b (Lake Panketo); 3. Awakura et al. 1948b (−)
Remarks: Shimazu (1981) stated that Seki's specimens from *Salvelinus leucomaenis* are probably identical with *Allocreadium transversale* or a closely related species.

Bunodera luciopercae (O. F. Müller, 1776) Lühe, 1909 (FW)
Sites: intestine, pyloric caeca
Hosts: *Hucho perryi*
Salvelinus leucomaenis[10]
Dist.: Hokkaido
Record: Shimazu 1981 (Kushiro River system)

Crepidostomum farionis (O. F. Müller, 1784) Lühe, 1909 (FW)
Sites: intestine, pyloric caeca
Hosts: *Salmo gairdneri* (3)
Salvelinus leucomaenis (1, 3, 4)
Unspecified Salmonidae (2)
Dist.: Shikotan Island, Hokkaido
Records: 1. Zhukov 1960 (Shikotan Island: unspecified locality); 2. Seki 1975a (Hokkaido: unspecified locality), 3. 1975b (Hokkaido: Lake Panketo, Lake Shikaribetsu); 4. Shimazu 1981 (Hokkaido: Kushiro River system)
Remarks: Shimazu (1981) stated that Seki's specimens from *Salvelinus leucomaenis* and *Salmo gairdneri* involved *C. metoecus*.

Crepidostomum metoecus (Braun, 1900) Braun, 1900 (FW)
Site: intestine
Hosts: *Salvelinus malma miyabei* (2)
Unspecified Salmonidae (1)
Dist.: Hokkaido
Records: 1. Seki 1975a (unspecified locality), 2. 1975b (Lake Shikaribetsu)

Crepidostomum salmonis Fujita, 1921 (FW)
Syn.: *Crepidostomum* sp. of Fujita, 1916
Site: intestine
Host: *Oncorhynchus keta*
Dist.: Hokkaido
Records: Fujita 1916 (Sapporo), 1921b (same locality as in Fujita (1916))
Remarks: Margolis (1982, p. 149) suggested that this species may be a synonym of *C. metoecus*.

Crepidostomum uchimii Fujita, 1920 (FW)
Site: intestine
Host: *Oncorhynchus masou*
Dist.: Hokkaido
Record: Fujita 1920a (Nishibetsu River)
Remarks: Margolis (1982, p. 149) suggested that this species may be a synonym of *C. farionis*.

Crepidostomum sp. (FW)
Site: not specified
Hosts: *Salvelinus malma miyabei* (2)
Unspecified Salmonidae (1)
Dist.: Hokkaido
Records: 1. Seki 1975a (unspecified locality), 2. 1975b (Lake Shikaribetsu)
Remarks: Shimazu (1981) stated that this parasite resembled *C. farionis*.

Family LEPOCREADIIDAE

[10]The record from this host is based on a tentative parasite ientification.

Pseudolepidapedon kobayashii Yamaguti, 1938 (M)
Syn.: *Lepodora* sp. of Kobayashi, 1921
Site: intestine
Host: *Oncorhynchus masou*
Dist.: not specified
Record: Kobayashi 1921
Remarks: Yamaguti (1938) treated *Lepodora* sp. reported by Kobayashi (1921) as a new species of *Pseudolepidapedon*.

Family OPECOELIDAE

Dimerosaccus oncorhynchi (Eguchi, 1931) Shimazu, 1980 (FW)
Syn.: *Allocreadium oncorhynchi* Eguchi, 1931
Sites: intestine, pyloric caeca
Hosts: *Oncorhynchus masou* (3)
O. rhodurus (1, 2, 3)
Salvelinus pluvius (3)
Dist: Iwate, Nagano, Gifu
Records: 1. Eguchi 1931 (Gifu: Nagara River), 2. 1932a (same locality as in Eguchi (1931)); 3. Shimazu 1980 (Iwate: Horei River, Nagano: Samu River, Hime River, Gifu: Nagara River)

Plagioporus zacconis (Yamaguti, 1934) Yamaguti, 1954 (FW)
Syn.: *Caudotestis zacconis* Yamaguti, 1934
Site: intestine
Host: *Oncorhynchus masou*
Dist.: Ibaraki
Record: Yamaguti 1942 (Lake Kasumigaura)

Podocotyle atomon (Rudolphi, 1802) Odhner, 1905 (M)
Site: intestine
Hosts: *Oncorhynchus gorbuscha*
Salvelinus leucomaenis
Dist.: Shikotan Island
Record: Zhukov 1960 (unspecified locality)

Superfamily TROGLOTREMATOIDEA

Family NANOPHYETIDAE

Nanophyetus japonensis Saito, Saito, Yamashita, Watanabe and Sekikawa, 1982 (metacercaria) (FW)
Sites: gills, musculature, kidney, intestine
Hosts: *Oncorhynchus masou* (1, 3)
O. rhodurus (2)
Salmo gairdneri[11] (2)
Salvelinus pluvius (1)
Dist.: Iwate, Yamagata, Hiroshima
Records: 1. Saito et al. 1982 (Yamagata: Yonezawa, Kaminoyama); 2. Saito 1984b (Hiroshima: unspecified locality), 3. 1985 (Iwate: Yasuka Fish Farm)

ORDER OPISTHORCHIIDA

SUBORDER OPISTHORCHIATA

Superfamily OPISTHORCHIOIDEA

Family HETROPHYIDAE

Metagonimus yokogawai (Katsurada, 1912) Katsurada, 1912 (metacercaria) (FW)
Syn.: *Metagonimus yokogawai ovatus* (Kobayashi, 1912)
Site: scales
Hosts: *Oncorhynchus masou* (2, 3)
O. rhodurus (1)
Dist.: Shiga, Oita
Records: 1. Muto 1917 (Shiga: Lake Biwa); 2. Koga 1939 (Oita: Chikugo River); 3. Okabe 1939 (Oita: Chikugo River)

Metagonimus sp. metacercaria (FW)

[11]This fish was collected from an unknown locality.

Site : scales
Hosts : *Oncorhynchus masou*
Salvelinus pluvius
Dist. : not specified
Record : Saito 1984a
Remarks : Saito (1984a) stated that this species is probably distinct from *Metagonimus yokogawai* and *M. takahashii*.

Unidentified Digenea

Digenea gen. sp. metacercaria (FW)
Site : heart
Host : *Salmo gairdneri*
Dist. : Mie
Record : Kubota 1967 (Kamori Trout Hatchery)

CLASS CESTOIDEA

SUBCLASS CESTODA

ORDER SPATHEBOTHRIIDEA

Family CYATHOCEPHALIDAE

Bothrimonus sp. (M)
Syn. : *Diplocotyle* sp. of Zhukov, 1960
Site : pyloric caeca
Host : *Salvelinus leucomaenis*
Dist. : Shikotan Island
Record : Zhukov 1960 (unspecified locality)
Remarks : Burt and Sandeman (1969) suppressed *Diplocotyle* as a synonym of *Bothrimonus* and assigned *Bothrimonus* to Cyathocephalidae.

ORDER TRYPANORHYNCHA

Family TENTACULARIIDAE

Nybelinia surmenicola Okada in Dollfus, 1929 (plerocercoid) (M)
Sites : body cavity, musculature
Hosts : *Oncorhynchus keta* (1, 3)
O. masou (2)
Dist. : Hokkaido, Niigata, Toyama
Records : 1. Anonymous 1983 (Hokkaido : Japan Sea off Atsuta, Chitose River) ; 2. Awakura et al. 1984b[12] (Hokkaido : Shari River, Nobusha River, Mena River, Furen River, Niigata : Miomote River, Toyama : Jinzu River) ; 3. Urawa 1986 (Hokkaido : Chitose River)

Tentacularia sp. plerocercoid (M)
Site : musculature
Host : *Salvelinus leucomaenis*
Dist. : Hokkaido
Record : Shimazu 1981 (Kushiro River system)

ORDER PSEUDOPHYLLIDEA

Family AMPHICOTYLIDAE

Eubothrium crassum (Block, 1776) Nybelin, 1922 (M)
Syn. : *Eubothrium* sp. of Anonymous, 1958 and of Anonymous, 1983
Sites : intestine, pyloric caeca
Hosts : *Oncorhynchus gorbuscha* (1)
O. keta (2, 3, 4, 5)
Dist. : Shikotan Island, Hokkaido
Records : 1. Zhukov 1960 (Shikotan Island : unspecified locality) ; 2. Anonymous 1958b (Hokkaido : Tanno[13], Abashiri, two locations in Nemuro and Tokachi) ; 3. Fukui 1961 (Hokkaido : Abashiri, Tanno) ; 4. Anonymous 1983 (Hokkaido : Chitose River) ; 5. Urawa 1986 (Hokkaido : Chitose River)

Eubothrium sp. (M)
Site : digestive tract

[12]The generic name of this species was misspelled as "*Nibelinia*".
[13]This locality was misreported as "Hatano".

Hosts: *Oncorhynchus gorbuscha* (1)
O. masou (2)
Dist.: Hokkaido
Records: 1. Margolis 1957 (Yubetsu River); 2. Awakura et al. 1984b (−)

Family BOTHRIOCEPHALIDAE

Bothriocephalus sp. (?)
Site: pyloric caeca
Host: *Hucho perryi*
Dist.: Hokkaido
Record: Shimazu 1981 (Kushiro River system)

Family DIPHYLLOBOTHRIIDAE

Diphyllobothrium latum (Linnaeus, 1758) Lühe, 1910 (plerocercoid)[14] (M)
Syn.: *Bothriocephalus latus* (Linnaeus, 1758)
Dibothriocephalus latus (Linnaeus, 1758)
Diphyllobothrium sp. of Margolis, 1957 and of Awakura, Tanaka, Sakai and Koide, 1984
Site: musculature
Hosts: *Oncorhynchus gorbuscha* (8, 10, 11, 13, 14, 19, 23, 25, 32)
O. masou (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34)
O. masou × *O. rhodurus* (6, 7)
O. nerka (10)
O. rhodurus (4, 6, 7)
Salmo gairdneri (4, 6, 7)
Dist.: Kurile Islands, Hokkaido, Aomori, Iwate, Akita, Miyagi, Yamagata, Niigata, Ibaraki and/or Chiba?, Tokyo, Toyama, Gifu, Aichi, Ishikawa, Fukui, Kyoto
Records: 1. Ijima 1889 (Hokkaido: unspecified locality, Ibaraki and/or Chiba?: Tone River?); 2. Eguchi 1922 (Gifu: Jinzu River), 3. 1924 (same locality as in Eguchi (1922)), 4. 1925 (Gifu and/or Toyama: Jinzu River, Gifu: Kiso River), 5. Seno et al. 1925 (Iwate: Miyako, Toyama: Jinzu River); 6. Eguchi 1926a (Gifu and Toyama: Jinzu River, Gifu: Shira River, Kiso River), 7. 1926b (Gifu and Toyama: Jinzu River, Gifu: Shira River, Kiso River), 8. 1929 (Hokkaido: unspecified locality, Gifu and Toyama: Jinzu River[15], Shira River[15], Gifu: Nagara River[15], Hida River[15], Aichi: Kiso River[15]); 9. Imagawa 1929 (Niigata: Aga River); 10. Kato 1931 (Kurile Islands and Hokkaido: unspecified localities, Toyama and/or Gifu: Jinzu River); 11. Eguchi 1932b (same localities as in Eguchi (1929)); 12. Eguchi et al. 1935 (Fukui: Kuzuryu River); 13. Margolis 1957 (Hokkaido: Yubetsu River); 14. Anonymous 1973 (Hokkaido: unspecified locality); 15. Seki 1975a (Hokkaido: Mena River), 16. 1975b (same locality as in Seki (1975a)); 17. Oshima 1976 (Hokkaido: Shiribetsu River); 18. Yoshimura et al. 1976 (Toyama: Jinzu River); 19. Ohbayashi et al. 1977 (Hokkaido: Mena River, Shari, Monbetsu); 20. Anonymous 1977 (Toyama: Jinzu River, Japan Sea); 21. Yamaguchi 1978 (Hokkaido: Mena River); 22. Yamaguchi et al. 1978 (Aomori?: unspecified locality); 23. Hotta et al.

[14]See addendum (p. 74).

[15]These rivers were reported as the "Jintsu River", "Shirakawa River", "Nagaragawa River", "Hidagawa River", and "Kisogawa River", respectively.

1978 (Niigata: Japan Sea off Sado Island, Uono River, Agano River); 24. Murata et al. 1978 (Hokkaido: Suttsu, Aomori: Oohata, Akita: Hachimori, Oga, Kisakata, Yamagata: Sakata, Niigata: Ryotsu, Toyama: Kurobe); 25. Hotta et al. 1979 (Niigata: Agano River, Uono River, Japan Sea near Sado Island); 26. Yokogawa et al. 1979 (Hokkaido: Suttsu[16], Miyagi: Shizugawa); 27. Yoshida et al. 1979a (Kyoto: Yura River), 28. 1979b (Ishikawa: Japan Sea off Noto Peninsula and Hokuriku District, Kyoto: Yura River); 29. Maejima et al. 1983 (−); 30. Oshima and Wakai 1983 (Hokkaido: Suttsu, Kamuenai, Wakkanai, Yoichi, Aomori: Kodomari, Ajigasawa, Hachinohe, Iwate: Kamaishi, Akita: Noshiro, Hachimori, Yamagata: Sakata, Niigata: Naoetsu); 31. Awakura et al. 1984b (Hokkaido: Shari River, Nobusha River, Mena River, Furen River, Niigata: Miomote River, Toyama: Jinzu River); 32. Awakura 1984b (Hokkaido: Japan Sea off Suttsu, Shari River, Furen River, Shikyu River, Nobusha River, Mena River, Niigata: Miomote River, Toyama: Jinzu River); 33. Awakura et al. 1985 (Hokkaido: Japan Sea off Shakotan, Suttsu and Rumoi, Shari River, Furen River, Bettoga River, Shikyu River, Nobusha River, Shokotanbetsu River, Mena River, Niigata: Japan Sea off Miomote, Miomote River, Toyama: Jinzu River[17]); 34. Urawa 1986 (Hokkaido: Chitose River)

Remarks: As pointed out by Kamo (1978), although all plerocercoids in Pacific salmon of Japan were believed to be *D. latum*, its exact identification has not been made so far, except for the work by Hotta et al. (1978), and there is a need for detailed comparative studies based on the materials from Europe and other countries (see addendum [p. 74]).

Family LIGULIDAE

Ligulidae gen. sp. plerocercoid (FW)
Site: [body cavity]
Host: *Oncorhynchus masou*
Dist.: Gunma
Record: Ishii 1915 (Lake Maru-numa)

ORDER TETRAPHYLLIDEA

Family PHYLLOBOTHRIIDAE

Pelichnibothrium sp. plerocercoid (M)
Site: [intestine]
Hosts: *Oncorhynchus masou* (2)
Unspecified Salmonidae (1)
Dist.: Hokkaido
Records: 1. Seki 1975a (unspecified locality), 2. 1975b (Mena River)

Phyllobothrium caudatum (Zschokke and Heitz, 1914) Zmeev, 1936 (plerocercoid) (M)
Syn.: *Phyllobothrium* sp. of Awakura, Tanaka, Sakai and Koide, 1984
Sites: intestine, pyloric caeca
Hosts: *Oncorhynchus gorbuscha* (1)
O. keta (2, 4)
O. masou (3)
Dist.: Hokkaido
Records: 1. Margolis 1957 (Yubetsu River); 2. Anonymous 1983 (Chitose River, Japan Sea off Atsuta); 3. Awakura et al. 1984b (−); 4. Urawa 1986 (Hokkaido: Chitose River)

[16]This locality was reported as "Sutsu".
[17]See footnote 15.

Remarks: Awakura (1984a) treated *Phyllobothrium* sp. reported by Awakura et al. (1984b) as *Phyllobothrium caudatum*.

Phyllobothrium salmonis Fujita, 1922 (plerocercoid) (M)
Sites: intestine, pyloric caeca
Hosts: *Oncorhynchus keta*
O. masou
Dist.: Hokkaido, Niigata, Ibaraki and/or Chiba, Toyama
Record: Fujita 1922 (Hokkaido: Ishikari River[18], Nishibetsu River[18], Ibaraki and/or Chiba: Tone River[18], Niigata: Miomote River[18], Toyama: Jinzu River[18])

Phyllobothrium speciousum Monticelli, 1889 (plerocercoid) (M)
Syn.: *Pelichnibothrium speciosum* (Monticelli, 1889)
Site: [intestine]
Hosts: *Oncorhynchus keta*[19]
O. masou
Dist.: Aomori
Record: Yamaguti 1934b (Mutsu Bay[20])
Remarks: Yamaguti (1934b) suggested that *Phyllobothrium* (as "*Pelichnibothrium*") *caudatum* and *P. salmonis* are synonymous with this parasite. Margolis (Pacific Biological Station, personal communication) also believes that the metacestodes reported from Pacific salmon under the names *P. caudatum*, *P. salmonis*, and *P. speciosum*, all belong to one species. However, Williams (1968) regarded the three species as independent ones.

Phyllobothrium sp. plerocercoid (M)
Site: intestine
Host: *Oncorhynchus gorbuscha*
Dist: Hokkaido
Record: Fukui 1961 (Yubetsu)

Tetraphyllidea of Uncertain Position

Scolex pleuronectis O. F. Müller, 1778 (plerocercoid) (M)
Includes: *Plecocercoide* sp. Fujita, 1922
Sites: intestine, gall bladder
Hosts: *Oncorhynchus gorbuscha* (2)
O. keta (1)
Salvelinus leucomaenis (2)
Dist.: Shikotan Island, Hokkaido
Records: 1. Fujita 1922 (Hokkaido: Ishikari); 2. Zhukov 1960 (Shikotan Island: unspecified locality)

ORDER PROTEOCEPHALIDEA

Family PROTEOCEPHALIDAE

Proteocephalus sp. (M)
Sites: intestine, pyloric caeca
Hosts: *Oncorhynchus gorbuscha* (1)
O. rhodurus (2)
Dist.: Hokkaido, Gifu, Mie
Records: 1. Fukui 1961 (Hokkaido: Yubetsu); 2. Sorimachi et al. 1984 (Gifu: Nagara River, Mie: Ise Bay off Suzuka, Miya River)

Unidentified Cestoda

Cestoda gen. spp. (M, FW)
Includes: "larval tapeworms" of Anonymous, 1958
Sites: stomach, intestine
Hosts: *Oncorhynchus keta* (1)
O. rhodurus (2)

[18]These localities were reported as the "Ishikarigawa", "Nishibetsugawa", "Tonegawa", "Miomotegawa", and "Jintsugawa", respectively.
[19]This host was collected in an unknown locality.
[20]This locality was reported as "Mutu Bay".

Dist.: Hokkaido, Mie
Records: 1. Anonymous 1958b (Hokkaido: Tanno[21], Abashiri, two locations in Nemuro and Tokachi); 2. Shiraishi 1958 (Mie: Bano River)

PHYLUM NEMATHELMINTHES

CLASS NEMATODA

SUBCLASS ADENOPHOREA

ORDER ENOPLIDA

Superfamily TRICHUROIDEA

Family CAPILLARIIDAE

Pseudocapillaria salvelini (Polyansky, 1952) Moravec, 1982 (FW)
Syn.: *Capillaria curilica* Zhukov, 1960
Includes: *Capillaria* sp. of Seki, 1975
Site: intestine
Hosts: *Oncorhynchus masou* (4)
O. rhodurus (4)
Salmo gairdneri (3)
Salvelinus leucomaenis (1, 3)
S. malma (3)
S. malma miyabei (3)
Unspecified Salmonidae (2)
Dist.: Shikotan Island, Hokkaido, Kyoto, Okayama, Miyazaki
Records: 1. Zhukov 1960 (Shikotan Island: unspecified locality); 2. Seki 1975a (Hokkaido: unspecified locality), 3. 1975b (Hokkaido: Lake Shikaribetsu, Lake Shizunai, Lake Oku-niikappu); 4. Moravec and Nagasawa 1985 (Kyoto: Yura River, Okayama: Yoshii River, Miyazaki: Oyodo River)
Remarks: Moravec (1980) regarded *Capillaria curilica* described by Zhukov (1960) as a synonym of this species. Moravec and Nagasawa (1985) suggested that *Capillaria* sp. reported by Seki (1975a, b) might be identical with this species.

Capillariidae gen. sp. (FW)
Syn.: *Capillaria* sp. of Awakura, Tanaka, Sakai and Koide, 1984
Site: [digestive tract]
Host: *Oncorhynchus masou*
Dist.: not specified
Record: Awakura et al. 1984b
Remarks: This parasite is probably identical with *P. salvelini*.

SUBCLASS SECERNENTEA

ORDER ASCARIDIDA

Superfamily ASCARIDOIDEA

Family ANISAKIDAE

Anisakis simplex (Rudolphi, 1809) Dujardin, 1845 (larva) (M)
Syn.: *Anisakis salaris* (Gmelin, 1790) of Yamaguti, 1935 and of Fujita, 1939, 1940
Sites: body cavity, musculature, digestive tract
Hosts: *Oncorhynchus gorbuscha* (1, 2)
O. keta (1, 2, 3, 4, 5)
O. masou (2, 5)
Salvelinus leucomaenis (3)
Dist.: Hokkaido
Records: 1. Yamaguti 1935 (−); 2. Fujita 1939 (Tonbetsu, Tokushibetsu, Shokotsu, Yubetsu, Shari), 3. 1940

[21]See footnote 13.

(Shubuto, Mashike, Chitose); 4. Anonymous 1983 (Chitose River); 5. Urawa 1986 (Chitose River, Shiriuchi River, Omu)

Anisakis sp. larva (M)

Includes: *Anisakis* sp. Type I auct.

Sites: mesenteries, musculature, body cavity

Hosts: *Oncorhynchus gorbuscha* (1, 4)
O. keta (2, 3, 8, 14)
O. masou (5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21, 22)
Salmo gairdneri (15)
Salvelinus leucomaenis (4)
Unspecified Salmonidae (18)

Dist.: Shikotan Island, Hokkaido, Aomori?, Niigata, Tokyo, Toyama

Records: 1. Margolis 1957 (Hokkaido: Yubetsu River); 2. Uzmann 1957 (Hokkaido: unspecified locality); 3. Anonymous 1958c (Hokkaido: unspecified locality); 4. Zhukov 1960 (Shikotan Island: unspecified locality); 5. Kobayashi et al. 1966 (?: northern sea of Japan); 6. Oshima 1966 (Tokyo: Tokyo Central Market); 7. Oyanagi 1967 (−); 8. Otsuru 1968 (Niigata: Japan Sea); 9. Kato et al. 1968 (Tokyo: Tokyo Central Market); 10. Yamaguchi et al. 1968 (Aomori: Hirosaki); 11. Yamada and Nishimura 1968 (−); 12. Ichihara et al. 1968 (−); 13. Koga et al. 1968 (Hokkaido: unspecified locality); 14. Shiraki 1969 (−); 15. Kagei 1969 (?: northern sea of Japan); 16. Koyama et al. 1969 (−); 17. Shiraki 1974 (?: northern sea of Japan); 18. Seki 1975a (Hokkaido: unspecified locality), 19. 1975b (Hokkaido: Mena River); 20. Yamaguchi et al. 1978 (Aomori?: unspecified locality); 21. Awakura et al. 1984b (Hokkaido: Shari River, Kitamihorobetsu River, Nobusha River, Mena River, Furen River, Niigata: Miomote River, Toyama: Jinzu River); 22. Awakura and Hara 1984 (Hokkaido: Okhotsk Sea off Omu, Japan Sea off Rebun, Kamuenai and Suttsu, Shari River, Kitamihorobetsu River, Furen River, Shikyu River, Nobusha River, Mena River, Niigata: Miomote River, Toyama: Jinzu River)

Remarks: Although Kagei (1970, 1974) listed *Oncorhynchus nerka* as a host of this parasite, its information was based on the records from the fish collected in offshore waters of the North Pacific Ocean. Thus, *O. nerka* is not included in the present checklist. *Salmo gairdneri* reported by Kagei (1969) is an experimental host.

Contracaecum osculatum (Rudolphi, 1802) Baylis, 1920 (larva) (M)

Syn.: *Contracaecum tridentatum* Fujita, 1939
Contracaecum sp. Type B of Koyama, Kobayashi, Kumada, Komiya, Oshima, Kagei, Ishii and Machida, 1969

Site: body cavity[22]

Hosts: *Oncorhynchus keta* (1, 3, 4)
O. masou (1, 2)

Dist.: Hokkaido

Records: 1. Fujita 1939 (Monbetsu): 2. Kagei et al. 1970 (−); 3. Anonymous 1983 (Chitose River); 4. Urawa 1986 (Chitose River)

[22]Fujita (1939) reported the site of infection as the "body", but it is probably erroneous for the body cavity.

Remarks: Koyama (1974) treated *Contracaecum* sp. Type B described by Koyama et al. (1969) as *Contracaecum* Type A. However, Sheenko and Pozdnyakov (1981) suppressed this new type, *Contracaecum tridentatum*, and *C. unidentatum* as synonyms of *C. osculatum*.

Contracaecum sp. larva (M, FW ?)
Site: [digestive tract]
Hosts: *Oncorhynchus gorbuscha* (1, 2)
O. masou (3, 5, 6)
O. rhodurus (7)
Unspecified Salmonidae (4)
Dist.: Hokkaido, Tokyo, Gifu
Records: 1. Margolis 1957 (Hokkaido: Yubetsu River); 2. Anonymous 1958a (Hokkaido: unspecified locality); 3. Kato et al. 1968 (Tokyo: Tokyo Central Market); 4. Seki 1975a (Hokkaido: unspecified locality), 5. 1975b (Hokkaido: Mena River); 6. Awakura et al. 1984b (−); 7. Sorimachi et al. 1984 (Gifu: Yamato)
Remarks: The identity of Sorimachi et al.'s (1984) material requires reassessment because they obtained their material from *O. rhodurus* cultured in fresh waters, although *Contracaecum* sp. (e. g. *C. rudolphii*) can occur in freshwater hosts.

Hysterothylacium aduncum (Rudolphi, 1802) Deardorff and Overstreet, 1981 (larva and adult) (M, FW)
Syn.: *Contracaecum hippoglossi* Fujita, 1932
Contracaecum hypomesi Fujita, 1932
Contracaecum okadai Fujita, 1940
Contracaecum salvelini Fujita, 1940
Contracaecum oshoroensis Fujita, 1940
Contracaecum aduncum (Rudolphi, 1802) of Zhukov, 1960 and of Fukui, 1961
Contracaecum sp. of Kobayashi, Koyama, Kumada, Komiya, Oshima, Kagei, Ishii and Machida, 1967
Contracaecum sp. Type C of Koyama, Kobayashi, Kumada, Komiya, Oshima, Kagei, Ishii and Machida, 1969
Contracaecum sp. Type D of Koyama, Kobayashi, Kumada, Komiya, Oshima, Kagei, Ishii and Machida, 1969
Thynnascaris sp. of Anonymous, 1983
Sites: stomach, pyloric caeca, intestine, body cavity
Hosts: *Oncorhynchus gorbuscha* (3, 4)
O. keta (1, 2, 8, 9, 10)
O. kisutch (2)
O. masou (2, 5, 6, 7)
Salmo gairdneri (9)
Salvelinus leucomaenis (2, 3, 9)
Dist.: Etorofu Island, Shikotan Island, Hokkaido, Aomori, Toyama
Records: 1. Fujita 1932 (Hokkaido: Ishikari River), 2. 1940 (Etorofu Island[23]: Bettobi, Hokkaido: Kushiro, Oshoro, Chitose River, Aomori: Aisaka, Toyama: Uotsu); 3. Zhukov 1960 (Shikotan Island: unspecified locality); 4. Fukui 1961 (Aomori: Ajigasawa); 5. Kobayashi et al. 1966 (?: northern sea of Japan); 6. Koyama et al. 1969 (−); 7. Kagei et al. 1970 (−); 8. Anonymous 1983 (Hokkaido: Chitose River); 9. Moravec et al. 1985 (Ho-

[23]See footnote 5.

kkaido: Lake Toro, Chitose Salmon Hatchery); 10. Urawa 1986 (Hokkaido: Chitose River)

Remarks: Koyama (1974) treated *Contracaecum* sp. Types C and D described by Koyama et al. (1969), respectively, as *Thynnascaris* sp. Types B and C. However, Sheenko and Pozdnyakov (1981) regarded these new types and the eleven species of *Contracaecum* described by Fujita (1932, 1939, 1940) (*C. hippoglossi, C. hypomesi, C. ochotense, C. benimasu, C. crassicaudatum, C. elongatum, C. okadai, C. salvelini, C. longispiculum, C. mesopi, C. oshoroensis*) as synonyms of this species, and Moravec et al. (1985) supported their proposal. Although this species is originally a marine parasite, it is also found in freshwater fishes and amphipods (see Moravec et al., 1985; Moravec and Nagasawa, 1986). On the other hand, the nematode reported as "*Thynnascaris* sp." (Anonymous, 1983) was treated as this species by Urawa (1986).

Pseudoterranova decipiens (Krabbe, 1878) Gibson and Colin, 1982 (larva) (M)

Syn.: *Terranova decipiens* (Krabbe, 1978)
Site: musculature
Host: *Oncorhynchus keta*
Dist.: Hokkaido
Records: Anonymous 1983 (Chitose River); Urawa 1986 (Chitose River)

Raphidascaris biwakoensis Fujita, 1928 (FW)

Syn.: *Raphidascaris gigi* Fujita, 1928
Sites: stomach, intestine
Host: *Salmo gairdneri*
Dist.: Shiga
Record: Kataoka and Momma 1934 (Lake Biwa)

Remarks: Smith (1984) reviewed the synonymy of *Raphidascaris* including this species.

Family GOEZIIDAE

Goezia oncorhynchi Fujita, 1940 species inquirenda (FW)

Site: body cavity
Host: *Oncorhynchus keta*
Dist.: Hokkaido
Record: Fujita 1940 (Mashike)
Remarks: Margolis (1982, p. 157) stated that the true identity of this parasite remains obscure.

Superfamily SEURATOIDEA

Family CUCULLANIDAE

Cucullanus sp. (FW, M)

Site: [digestive tract]
Hosts: *Oncorhynchus masou* (3)
Salvelinus malma miyabei (2)
Unspecified Salmonidae (1)
Dist.: Hokkaido
Records: 1. Seki 1975a (unspecified locality), 2. 1975b (Lake Shikaribetsu); 3. Awakura et al. 1984b (−)

Family QUIMPERIIDAE

Ezonema bicornis Boyce, 1971 (FW)

Sites: intestine, swim bladder
Hosts: *Salvelinus leucomaenis* (1, 3)
Unspecified Salmonidae (2)
Dist.: Hokkaido
Records: 1. Boyce 1971 (Chihase River); 2. Seki 1975a (unspecified locality), 3. 1975b (Lake Shizunai)

ORDER SPIRURIDA

Superfamily CAMALLANOIDEA

Family CAMALLANIDAE

Camallanidae gen. sp. (FW)
Syn.: "camallanid nematodes" of Shimazu, 1981
Site: digestive tract
Hosts: *Hucho perryi*
Salvelinus leucomaenis
Dist.: Hokkaido
Record: Shimazu 1981 (Kushiro River system and/or Bekanbeushi River system)

Superfamily DRACUNCULOIDEA

Family PHILOMETRIDAE

Philometroides masu (Fujita, 1940) Rasheed, 1963 (M)
Syn.: *Philometra masu* Fujita, 1940
Site: body cavity
Host: *Oncorhynchus masou*
Dist.: Hokkaido
Record: Fujita 1940 (Obihiro River)

Philonema oncorhynchi Kuitunen-Ekbaum, 1933 (FW)
Syn.: *Philonema salvelini* Fujita, 1939
Philonema elongata Fujita, 1940
Site: body cavity
Hosts: *Oncorhynchus kawamurai* (2)
O. keta (3)
Salvelinus leucomaenis (1)
Dist.: Etorofu Island, Hokkaido, Akita
Records: 1. Fujita 1939 (Etorofu Island: Rausu Hatchery), 2. 1940 (Akita: Lake Tazawa); 3. Urawa 1986 (Hokkaido: Chitose River)
Remarks: Ivashkin et al. (1971) gave the following synonyms of *Philonema oncorhynchi*: *Philonema kondai* Fujita, 1939, *P. ochotense* Fujita, 1939, *P. salvelini* Fujita, 1939, *P. tenuicauda* Fujita, 1939, and *P. elongata* Fujita, 1940.

Philonema sp. (FW)
Site: not specified
Hosts: *Salvelinus leucomaenis* (2)
Unspecified Salmonidae (1)
Dist.: Hokkaido
Records: 1. Seki 1975a (unspecified locality), 2. 1975b (Lake Panketo)
Remarks: This species is probably identical with *P. oncorhynchi*.

Philometridae gen. sp. (FW)
Syn.: "philometrid nematodes" of Shimazu, 1981
Site: body cavity
Hosts: *Hucho perryi*
Salvelinus leucomaenis
Dist.: Hokkaido
Record: Shimazu 1981 (Kushiro River system and/or Bekanbeushi River system)

Superfamily HABRONEMATOIDEA

Family CYSTIDICOLIDAE

Ascarophis sp. (M)
Site: not specified
Host: *Oncorhynchus gorbuscha*
Dist.: Hokkaido
Record: Margolis 1957 (Yubetsu River)

Cystidicola brevicauda Fujita, 1939 species inquirenda (FW)
Site: intestine
Host: *Salvelinus malma*
Dist.: Etorofu Island
Record: Fujita 1939 (Rausu Hatchery)
Remarks: Margolis (1968) stated that this

species cannot be accurately assigned generically until the structure of the buccal region is better known and the male is discovered.

Cystidicola sp. (FW)
Site: not specified
Host: *Oncorhynchus rhodurus*
Dist.: Gifu, Mie
Record: Sorimachi et al. 1984 (Gifu: Nagara River, Yamato, Mie: Miya River)

Cystidicolidae gen. sp. larva (FW)
Site: stomach
Host: *Oncorhynchus masou*
Dist.: Kumamoto
Record: Moravec and Nagasawa 1985 (Kikuchi River)
Remarks: Moravec and Nagasawa (1985) suggested that this species belongs to either *Salvelinema* or *Cystidicola*.

Salvelinema amemasu (Fujita, 1939) Margolis, 1968 (FW)
Syn.: *Metabronema amemasu* Fujita, 1939
Cystidicola amemasu (Fujita, 1939)
Site: intestine
Host.: *Salvelinus leucomaenis*
Dist.: Etorofu Island
Record: Fujita 1939 (Rausu Hatchery)
Remarks: Although Rasheed (1965) tentatively assigned this species to *Cystidicola*, Margolis (1968) reviewed its taxonomic history and transferred it to *Salvelinema*. Margolis and Kabata (1967) suggested that this species is probably synonymous with *S. salmonicola* or *S. walkeri*.

Salvelinema iwana (Fujita, 1928) Margolis, 1968 (FW)
Syn.: *Cystidicola iwana* Fujita, 1928
Metabronema iwana (Fujita, 1928)
Site: body cavity[24]
Host: *Salvelinus pluvius*
Dist.: Shiga
Record: Fujita 1928 (Lake Biwa)
Remarks: Although Fujita (1937) transferred *Cystidicola iwana* to *Metabronema*, Margolis (1968) assigned it to *Salvelinema*. Margolis and Kabata (1967) suggested that this species is probably synonymous with *S. salmonicola* or *S. walkeri*.

Salvelinema kosugii (Fujita, 1939) Margolis, 1968 (FW)
Syn.: *Metabronema kosugii* Fujita, 1939
Site: body cavity
Host: *Salvelinus leucomaenis*
Dist.: Etorofu Island
Record: Fujita 1939 (Rausu Hatchery)
Remarks: Margolis (1968) reviewed the taxonomic history of this species and assigned it to *Salvelinema*. This species was suggested to be possibly identical with *S. salmonicola* or *S. walkeri* (Margolis and Kabata, 1967).

Salvelinema oncorhynchi (Fujita, 1939) Margolis, 1968 (FW)
Syn.: *Metabronema oncorhynchi* Fujita, 1939
Cystidicola oncorhynchi (Fujita, 1939)
Site: body cavity
Host: *Oncorhynchus masou*
Dist.: Etorofu Island
Record: Fujita 1939 (Rausu Hatchery)

[24]Fujita (1928) reported the site of infection as the "pleural cavity" in the English text, but he described it as the "body cavity" in the Japanese text.

Remarks: Although Yamaguti (1961) transferred *Metabronema oncorhynchi* to *Cystidicola*, Margolis (1968) reviewed its taxonomic history and transferred it to *Salvelinema*. Margolis and Kabata (1967) suggested that it is probably synonymous with *S. salmonicola* or *S. walkeri*.

Salvelinema salmonicola (Ishii, 1916) Margolis, 1966 (FW)

Syn.: *Oxyuris* sp. of Koshida, 1905[25]
Ancyracanthus salmonicola Ishii, 1916
Cystidicola salmonicola (Ishii, 1916)
Cystidicola chitosensis Fujita, 1940
Cystidicola farionis Fisher, 1798 of Zhukov, 1960

Sites: swim bladder, body cavity[26]

Hosts: *Oncorhynchus keta* (1, 2, 5, 7, 8, 9, 10, 11)
O. kisutch (7)
O. masou (1, 2, 3, 4, 5, 7, 13)
O. nerka (1, 2, 5)
Salmo gairdneri (4, 5, 12)
Salvelinus leucomaenis (5, 7, 14)
S. pluvius (6)

Dist.: Etorofu Island, Shikotan Island, Hokkaido, Aomori, Niigata, Ishikawa, Shiga

Records: 1. Koshida 1905 (Hokkaido: Chitose River), 2. 1910 (Hokkaido: Hokkaido Fisheries Experimental Station); 3. Ishii 1916 (Hokkaido: Chitose Hatchery); 4. Fujita 1931 (Hokkaido: Chitose Hatchery, Aomori: Aisaka Hatchery); 5. Okada 1935 (Hokkaido: Chitose Hatchery); 6. Yamaguti 1935 (Shiga: Lake Biwa); 7. Fujita 1940 (Etorofu Island: Bettobi[27], Hokkaido: Shiraoi, Chitose River, Aomori: Aisaka, Ishikawa: Tetori); 8. Fukui 1960 (Aomori: unspecified locality), 9. 1961 (Aomori: Aisaka Hatchery); 10. Margolis 1967 (−); 11. Margolis and Kabata 1967 (−); 12. Awakura 1968a (Hokkaido: unspecified locality); 13. Awakura et al. 1984b (−); 14. Moravec and Nagasawa 1986 (Aomori: Rokumaibashi River)

Salvelinema salvelini (Fujita, 1939) n. comb. (FW)

Syn.: *Metabronema salvelini* Fujita, 1939
Metabronema ishii Fujita, 1941
Rhabdochona ishii (Fujita, 1941)
Salvelinema ishii (Fujita, 1941) (new synonym)

Site: intestine

Host: *Salvelinus leucomaenis*

Dist.: Etorofu Island

Record: Fujita 1939 (Rausu Hatchery)

Remarks: *Metabronema salvelini* was renamed *M. ishii* by Fujita (1941) because the former name was pre-occupied. Although Yamaguti (1961) later transferred *M. ishii* to *Rhabdochona*, Margolis (1968) reviewed its taxonomic history and assigned it to *Salvelinema* (as *S. ishii*). However, *S. ishii* should be correctly *S. salvelini* in accordance with the valid zoological nomenclatorial rules. This species was suggested by Margolis and Kabata (1967) to be possibily identical with *S. salmonicala* or *S. walkeri*.

Sterliadochona ephemeridarum (Linstow,

[25]Koshida (1905) reported this parasite as "*Oxguris* sp.".

[26]This site of infection is apparently the result of the parasite's migration after death of the fish.

[27]See footnote 5.

1872) n. comb. (FW)

Syn.: *Spiroptera salvelini* Fujita, 1922
Cystidicola salvelini (Fujita, 1922)
Metabronema salvelini (Fujita, 1922)
Cystidicoloides salvelini (Fujita, 1922)
Sterliadochona salvelini (Fujita, 1922)
Cystidicoloides ephemeridarum (Linstow, 1872)

Sites: stomach, intestine

Hosts: *Oncorhynchus masou* (6, 7, 8)
O. nerka (1, 5)
O. rhodurus (7)
Salmo gairdneri (5)
Salvelinus leucomaenis (1, 3)
S. malma miyabei (5)
S. pluvius (2)
Unspecified Salmonidae (4)

Dist.: Shikotan Island, Hokkaido, Aomori, Shiga, Kyoto, Nara, Hyogo, Okayama, Shimane, Hiroshima, Tokushima, Ehime, Kochi, Oita, Miyazaki, Kumamoto, Kagoshima

Records: 1. Fujita 1922 (Hokkaido: Lake Shikotsu), 2. 1928 (Shiga: Lake Biwa); 3. Zhukov 1960 (Shikotan Island: unspecified locality); 4. Seki 1975a (Hokkaido: unspecified locality), 5. 1975b (Hokkaido: Lake Mashu, Lake Shikaribetsu); 6. Awakura et al. 1984b (−); 7. Moravec and Nagasawa 1985 (Hokkaido: Amano River, Aomori: Omine River, Shiga: Ado River, Kyoto: Yura River, Nara: Yoshino River, Hyogo: Kishida River, Okayama: Takahashi River, Shimane: Takatsu River, Hiroshima: Ota River, Tokushima: Kaifu River, Ehime: Niyodo River, Kochi: Shimanto River, Oita: Ono River, Miyazaki: Nanuki River, Oyodo River, Sendai River, Hiroto River, Kumamoto: Kikuchi River, Kagoshima: Komenotsu River); 8. Kitamura 1986 (Hokkaido: Shokanbetsu River)

Remarks: The taxonomy of this species remains confused. Moravec (1981) discussed this problem and used *Cystidicoloides ephmeridarum* as a valid name of this nematode, and Moravec and Nagasawa (1985) followed him. However, Petter (1984) also discussed the taxonomy of the species and stated that holarctic species placed in *Cystidicoloides* should be taken out of the genus and placed in *Sterliadochona*. Thus, the nematode is herein assigned to the latter genus.

Superfamily THELAZIOIDEA

Family RHABDOCHONIDAE

Rhabdochona oncorhynchi (Fujita, 1921) Fujita, 1927 (FW)

Syn.: *Cucullanus* sp. of Fujita, 1916
Cystidicola oncorhynchi Fujita, 1921
Cystidicola fujiii Fujita, 1921
Rhabdochona fujiii (Fujita, 1921)
Rhabdochona salvelini Fujita, 1927
Rhabdochona amago Yamaguti, 1935
Rhabdochona oncorhynchi Fujita, 1940

Sites: intestine, pyloric caeca, body cavity[28]

Hosts: *Oncorhynchus iwame* (13)
O. keta (1, 2, 6, 11)
O. masou (12, 13, 14)
O. nerka (2)
O. rhodurus (5, 9, 13)
Salmo gairdneri (12)

[28]This site of infection was reported by Fujita (1927b) as "visceral cavity". However, its site is probably the result of the parasite's migration after death of the fish.

S. trutta (12)
Salvelinus fontinalis (12)
S. leucomaenis (2, 10, 12)
S. pluvius (3, 4, 7, 8)

Dist.: Shikotan Island, Hokkaido, Aomori, Akita?, Tochigi, Nagano, Toyama, Shiga, Kyoto, Nara, Hyogo, Okayama, Hiroshima, Ehime, Oita, Miyazaki, Kumamoto

Records: 1. Fujita 1916 (Hokkaido: Sapporo), 2. 1921c (Hokkaido: Sapporo, Lake Shikotsu), 3. 1927a (Shiga: Lake Biwa), 4. 1927b (same locality as in Fujita (1927a)); 5. Yamaguti 1935 (Kyoto: Tazima); 6. Fujita 1940 (Hokkaido: Sapporo); 7. Yamaguti 1941 (Toyama: Ozidaira); 8. 1954 (Nagano: Tsumetagawa); 9. Shiraishi 1958 (Mie: Bano River); 10. Zhukov 1960 (Shikotan Island: unspecified locality); 11. Fukui 1961 (Aomori: Aisaka Hatchery); 12. Moravec et al. 1981 (Hokkaido: Shikyu River, Nishibetsu River, Aomori: Oirase River[29], Aomori and/or Akita: Lake Towada, Tochigi: Lake Chuzenji); 13. Moravec and Nagasawa 1985 (Kyoto: Yura River, Nara: Yoshino River, Hyogo: Kishida River, Okayama: Takahashi River, Hiroshima: Ota River, Ehime: Niyodo River, Oita: Ono River, Miyazaki: Nanuki River, Oyodo River, Hiroto River, Kumamoto: Kikuchi River); 14. Moravec et al. 1985 (Hokkaido: Lake Shirarutoro)

Remarks: The taxonomic confusion of this species was solved by Moravec (1975) and Moravec et al. (1981).

Rhabdochona sp. (FW)

Syn.: "rhabdochonid nematodes" of Shimazu, 1981

Site: digestive tract

Hosts: *Hucho perryi* (3)
Oncorhynchus masou (4)
Salvelinus leucomaenis (2, 3)
S. malma (2)
Unspecified Salmonidae (1)

Dist.: Hokkaido

Records: 1. Seki 1975a (unspecified locality), 2. 1975b (Lake Panketo, Lake Shizunai, Lake Oku-niikappu, Hoheikyo); 3. Shimazu 1981 (Kushiro River system and/or Bekanbeushi River system); 4. Awakura et al. 1984b (−)

Unidentified Nematoda

Nematoda gen. sp. (FW)

Site: intestine

Host: *Salmo gairdneri*

Dist.: Hokkaido, Nagano

Records: Awakura 1968a (Hokkaido: unspecified locality); Oshima 1976 (Nagano: unspecified locality)

CLASS NEMATOMORPHA

ORDER BORDIOIDEA

Family CHORDODIDAE

Chordodes sp.[30] (FW)

Site: stomach

Host: *Oncorhynchus rhodurus*

Dist.: Mie

Record: Shiraishi 1958 (Bano River)

Remarks: The record of Shiraishi (1958) is based on a tentative parasite identifi-

[29]Moravec, Margolis and Boyce (1981) misspelled the "Towada River" as the "Owada River" (Margolis, Pacific Biological Station, personal communication). However, the Towada River does not exist and corresponds to the "Oirase River".

[30]The generic name of this parasite was misreported as "*Choldodes*".

cation. The identity of this parasite requires reassessment.

PHYLUM ACANTHOCEPHALA

ORDER EOACANTHOCEPHALA

Family NEOECHINORHYNCHIDAE

Neoechinorhynchus sp. (FW)

Site: not specified

Hosts: *Salvelinus leucomaenis* (2)
Unspecified Salmonidae (1)

Dist.: Hokkaido

Records: 1. Seki 1975a (unspecified locality), 2. 1975b (Lake Panketo)

ORDER PALAEACANTHOCEPHALA

Superfamily ECHINORHYNCHOIDEA

Family ECHINORHYNCHIDAE

Acanthocephalus acerbus Van Cleave, 1931 (FW)

Syn.: *Acanthocephalus* sp. of Nakano and Kawamura, 1924
Acanthocephalus echigoensis Fujita, 1920 of Harada, 1935 and of Hoshina, Egusa and Shikama, 1965

Site: intestine

Hosts: *Oncorhynchus masou* (3)
O. nerka (1, 4)
Salmo gairdneri (1, 2, 3, 5, 6)
Salvelinus fontinalis (3)
Unspecified Salmonidae (7)

Dist.: Yamanashi, Nagano

Records: 1. Nakano and Kawamura 1924 (Nagano: Kizaki Fish Cultural Station); 2. Van Cleave 1931 (Nagano[31]: Kizaki Fish Cultural Station); 3. Nakai and Kokai 1932 (Nagano: Kizaki Fish Cultural Station); 4. Harada 1935 (Nagano: Lake Kizaki); 5. Hoshina et al. 1965 (Yamanashi: Oizumi Hatchery); 6. Nagasawa and Egusa 1981b (Yamanashi: Oizumi Hatchery); 7. Nagasawa and Egusa 1983 (−)

Remarks: Harada's (1935) relegation of *A. acerbus* to a synonym of *A. echigoensis* was accepted by Petrochenko (1956) and Golvan (1969). However, Yamaguti (1963) regarded the two species as separate ones. We also treat the two species as independent because Harada's view seems to require reassessment.

Acanthocephalus aculeatus Van Cleave, 1931 (FW)

Site: [intestine]

Host: *Oncorhynchus nerka*

Dist.: Nagano[32]

Record: Van Cleave 1931 (Lake Aoki)

Remarks: Harada (1935), whom Petrochenko (1956) and Golvan (1969) followed, relegated *A. aculeatus* to a synonym of *A. echigoensis*. However, Yamaguti (1963) listed the two species as separate ones. Because Harada's proposal seems to require reassessment, we also treat them as independent species.

Acanthocephalus echigoensis Fujita, 1920 (FW)

[31]The prefectural name was reported as "Shinano", but it is now called "Nagano".

[32]See footnote 31.

Sites: pyloric caeca, intestine
Hosts: *Oncorhynchus keta* (1)
O. masou (2)
Salmo gairdneri (3)
Dist.: Niigata, Yamanashi
Records: 1. Fujita 1920b (Niigata: Miomote River); 2. Fukui and Morisita 1936 (Yamanashi: Sano River); 3. Kagei 1980 (−)
Remarks: Harada (1935) synonymized the three species, *Acanthocephalus oncorhynchi*, *A. acerbus*, and *A. aculeatus*, with *A. echigoensis*. However, because his view seems to require reassessment, we treat the four species as separate ones. In addition, although the material of Fukui and Morisita (1936) is probably different from *A. echigoensis*, it is tentatively included herein.

Acanthocephalus lucidus Van Cleave, 1925 (FW)
Site: intestine
Host: *Salmo gairdneri*
Dist.: Yamanashi
Record: Nagasawa and Egusa 1981b (Oizumi Hatchery)
Remarks: Since this species is an amphibian parasite, its occurrence in rainbow trout is considered to be accidental.

Acanthocephalus minor Yamaguti, 1935 (FW)
Syn.: *Acanthocephalus echigoensis* Fujita, 1920 of Anonymous, 1972 and of Awakura, 1973
Site: intestine
Hosts: *Oncorhynchus masou* (1, 2, 3, 5)
Salmo gairdneri (1, 2, 3)
Salvelinus malma (1, 2, 3)
Unspecified Salmonidae (4)
Dist.: Hokkaido
Records: 1. Anonymous 1972 (Mori Branch of Hokkaido Fish Hatchery); 2. Awakura 1972 (Mori Branch of Hokkaido Fish Hatchery), 3. 1973 (same locality as in Awakura (1972)); 4. Nagasawa and Egusa 1983 (−); 5. Awakura et al. 1984b (−)

Acanthocephalus oncorhynchi Fujita, 1921 、 (FW)
Syn.: *Acanthocephalus* sp. of Fujita, 1916
Site: digestive tract
Host: *Oncorhynchus keta*
Dist.: Hokkaido
Records: Fujita 1916 (Sapporo), 1921a (Hassabu River)
Remarks: This species was relegated to a synonym of *A. echigoensis* by Harada (1935), whom Petrochenko (1956), Yamaguti (1963) and Golvan (1969) followed. However, we treat the two species as different ones until Harada's view is verified.

Acanthocephalus opsariichthydis Yamaguti, 1935 (FW)
Syn.: *Acanthocephalus* sp. of Ito, 1959[33]
? *Acanthocephalus* sp. of Matsumoto, 1972
Site: intestine
Hosts: *Oncorhynchus nerka* (6)
O. rhodurus (6)
Salmo gairdneri (1, 2, 3, 4, 5)
Salvelinus fontinalis (3, 6)
Dist.: Tochigi, Tokyo, Shiga
Records: 1. Ito 1959 (Shiga: Samegai Trout Experimental Station); 2. Ichihara 1964 (Tokyo: Akigawa valley); 3. Matsumoto 1972 (Tochigi: Lake Yuno-

[33]The generic name of this parasite was misreported as "*Acanthocepharus*".

ko); 4. Nakajima et al. 1975 (Shiga: Samegai Trout Experimental Station); 5. Nakajima and Egusa 1975a (Shiga: Samegai Trout Experimental Station); 6. Nagasawa et al. 1983 (Tochigi: Lake Yunoko)

Acanthocephalus spp. (FW)
Site: intestine
Hosts: *Oncorhynchus masou* (3)
O. rhodurus (4)
Salmo gairdneri (1, 2)
Dist.: Niigata, Gifu
Records: 1. Sano 1976 (—); 2. Nomura and Seki 1977 (Niigata: Koide Branch of Niigata Prefectural Fisheries Experimental Station); 3. Awakura et al. 1984b (—); 4. Sorimachi et al. 1984 (Gifu: Yamato)

Echinorhynchus cotti Yamaguti, 1935 (FW)
Site: intestine
Hosts: *Oncorhynchus masou* (2)
Salmo gairdneri (2)
Salvelinus leucomaenis (1, 2)
Dist.: Aomori
Records: 1. Nagasawa 1980 (—); 2. Nagasawa and Egusa 1981a (Kanita River)

Echinorhynchus gadi Zoega in O. F. Müller, 1776 (M)
Syn.: *Echinorhynchus ekbaumi* Golvan, 1969
Site: intestine
Hosts: *Oncorhynchus gorbuscha* (3)
O. keta (1, 4, 5, 7)
O. masou (2, 6)
Dist.: Hokkaido, Tokyo, Niigata
Records: 1. Fujita 1920b (Niigata[34]: Miomote River); 2. Van Cleave 1925[35] (Tokyo: unspecified locality); 3. Margolis 1957 (Hokkaido: Yubetsu River); 4. Anonymous 1958b (Hokkaido: Tanno[36], Abashiri, two locations in Nemuro and Tokachi); 5. Anonymous 1983 (Hokkaido: Chitose River, Japan Sea off Atsuta); 6. Awakura et al. 1984b (—); 7. Urawa 1986 (Hokkaido: Chitose River)
Remarks: Although Golvan (1969) proposed a new species, *Echinorhynchus ekbaumi*, for *E. gadi* reported by Fujita (1920b), Margolis and Arthur (1979, p. 121) did not accept it.

Echinorhynchus truttae Schrank, 1778 (FW)
Site: intestine
Host: *Salvelinus leucomaenis*
Dist.: Shikotan Island
Record: Zhukov 1960 (unspecified locality)

Rhadinorhynchoides miyagawai Fukui and Morisita, 1937 (FW)
Site: intestine
Host: *Salvelinus pluvius*
Dist.: Niigata
Records: Fukui and Morisita 1937 (Taguti River), 1938 (same locality as in Fukui and Morisita (1937))

Family ILLIOSENTIDAE

Pseudorhadinorhynchus samegaiensis Nakajima and Egusa, 1975 (FW)
Site: intestine
Host: *Salmo gairdneri*
Dist.: Shiga

[34]The prefectural name was reported as "Echigo", but it is now called "Niigata".

[35]The record of Van Cleave (1925) is based on a tentative parasite identification.

[36]See footnote 13.

Records: Nakajima et al. 1975 (Samegai Trout Experimental Station); Nakajima and Egusa 1975b (Samegai Trout Experimental Station)

Family RHADINORHYNCHIDAE

Rhadinorhynchus trachuri Harada, 1935 (M)
Site: intestine
Host: *Oncorhynchus keta*
Dist.: Hokkaido
Records: Anonymous 1983 (Chitose River, Japan Sea off Atsuta); Urawa 1986 (Chitose River)

Superfamily POLYMORPHOIDEA

Family POLYMORPHIDAE

Bolbosoma caenoforme (Heitz, 1920) Meyer, 1933 (juvenile) (M)
Includes: *Bolbosoma* sp. of Margolis, 1957 and of Anonymous, 1958
Site: intestine
Hosts: *Oncorhynchus gorbuscha* (1, 2, 3)
O. keta (4, 5, 7)
O. masou (6)
Dist.: Shikotan Island, Hokkaido
Records: 1. Margolis 1957 (Hokkaido: Yubetsu River); 2. Anonymous 1958a (Hokkaido: unspecified locality); 3. Zhukov 1960 (Shikotan Island: unspecified locality); 4. Kamegai 1962[37] (Hokkaido: unspecified locality); 5. Anonymous 1983 (Hokkaido: Chitose River, Japan Sea off Atsuta); 6. Awakura et al. 1984b (—); 7. Urawa 1986 (Hokkaido: Chitose River)

Corynosoma strumosum (Rudolphi, 1802) Lühe, 1904 (juvenile) (M)
Site: mesenteries
Host: *Salvelinus leucomaenis*
Dist.: Shikotan Island
Record: Zhukov 1960 (unspecified locality)

Unidentified Acanthocephala

Acanthocephala gen. spp. (FW)
Includes: "acanthocephalans" of Shimazu, 1981
Site: intestine
Hosts: *Hucho perryi* (3)
Salmo gairdneri (1, 2)
Dist.: Hokkaido, Saitama, Nagano
Records: 1. Abe 1973 (Saitama: unspecified locality); 2. Oshima 1976 (Nagano: unspecified locality); 3. Shimazu 1981 (Hokkaido: Kushiro River system and/or Bekanbeushi River sytem)

PHYLUM ANNELIDA

CLASS HIRUDINOIDEA

ORDER RHYNCHOBDELLIDA

Family GLOSSIPHONIIDAE

Hemiclepsis marginata (O. F. Müller, 1884) (FW)
Sites: body surface, fins
Hosts: *Oncorhynchus keta*
O. masou
Salmo gairdneri
Salvelinus fontinalis
Dist.: Toyama

[37]The record of Kamegai (1962) is based on a tentative parasite identification.

Record: Hayaguri 1934 (Shogawa Trout Farm)

PHYLUM MOLLUSCA

CLASS PELECYPODA

ORDER EULAMELLIBRANCHIA

Family UNIONIDAE

Margaritifera laevis (Haas, 1910) Taylor and Uyeno, 1966 (FW)
Syn.: *Margaritifera margaritifera* (Linnaeus, 1758)[38]
Site: gills
Hosts: *Oncorhynchus keta* (1, 2)
O. masou (1, 2)
O. nerka (1, 2, 3)
Salmo gairdneri (1, 2)
Salvelinus leucomaenis (2)[39]
Dist.: Hokkaido
Records: 1. Awakura 1964 (Chitose River, Chitose Hatchery), 2. 1968b (same localities as in Awakura (1964)), 3. 1969 (Chitose River)

PHYLUM ARTHROPODA

CLASS CRUSTACEA

SUBCLASS BRANCHIURA

ORDER ARGULOIDEA

Family ARGULIDAE

Argulus coregoni Thorell, 1864 (FW)
Site: body surface
Hosts: *Oncorhynchus masou* (4, 5, 6, 7, 8, 9, 10, 11)
O. rhodurus (2, 3, 12)
Salmo gairdneri (1, 2, 3, 5, 6, 7, 10, 11)
Salvelinus fontinalis (1, 4, 5)
S. pluvius (3)
Dist.: Nagano, Tokyo, Aichi, Wakayama
Records: 1. Hoshina 1950 (Tokyo: Yoshino Fish Farm, Nagano: Akashina Fisheries Experimental Station, Kizaki Branch of National Fisheries Experimental Station, Wakayama: Yamajigori); 2. Uno et al. 1975 (Aichi: Horai Branch of Aichi Prefectural Fisheries Experimental Station); 3. Ishii et al. 1978 (Aichi: Horai Branch of Aichi Prefectural Fisheries Experimental Station); 4. Inoue et al. 1980 (Tokyo: Okutama Branch of Tokyo Metropolitan Fisheries Experimental Station); 5. Shimura and Egusa 1980 (Tokyo: Okutama Branch of Tokyo Metropolitan Fisheries Experimental Station); 6. Shimura 1981 (Tokyo: Okutama Branch of Tokyo Metropolitan Fisheries Experimental Station); 7. Shimura 1983a (Tokyo: Okutama Branch of Tokyo Metropolitan Fisheries Experimental

[38]Awakura (1964) misspelled this species as "*Marguritifera marguritifera*".

[39]Although the glochidia attached to the gill filaments of this host, they did not grow normally.

Station); 8. Shimura et al. 1983b (Tokyo: Okutama Branch of Tokyo Metropolitan Fisheries Experimental Station); 9. Shimura 1983b (Tokyo: Okutama Branch of Tokyo Metropolitan Fisheries Experimental Station); 10. Shimura et al. 1983a (Tokyo: Okutama Branch of Tokyo Metropolitan Fisheries Experimental Station); 11. Shimura and Inoue 1984 (Tokyo: Okutama Branch of Tokyo Metropolitan Fisheries Experimental Station); 12. Takegami 1984 (Wakayama: Hiki River)

SUBCLASS ENTOMOSTRACA

ORDER COPEPODA

SUBORDER CYCLOPOIDA

Family LERNAEIDAE

Lernaea cyprinacea Linnaeus, 1758 (FW)
Site: [head embedded in musculature with body protruding externally]
Hosts: *Salmo gairdneri* (2)
Unspecified Salmonidae (1)
Dist.: Kanagawa, Shizuoka
Records: 1. Kasahara 1962 (Kanagawa: Enoshima Aquarium); 2. Otaki and Yamashita 1978 (Shizuoka: Ito)

SUBORDER SIPHONOSTOMATOIDA

Family CALIGIDAE

Lepeophtheirus salmonis (Krøyer, 1837) Krøyer, 1863 (M)
Syn.: *Lepeophtheirus uenoi* Yamaguti, 1939
Site: body surface
Hosts: *Oncorhynchus gorbuscha* (1)
O. keta (2, 3, 6, 8, 9)
O. masou (4, 7)
Unspecified Salmonidae (5)
Dist.: Kurile Islands, Hokkaido
Records: 1. Yamaguti 1939a (Hokkaido: Lake Mokoto); 2. Shiino 1952 (Kurile Islands: unspecified locality), 1959 (Hokkaido: Shibetsu River); 4. Kimura 1970 (Hokkaido: Okhotsk coast); 5. Awakura 1980 (Hokkaido: unspecified locality); 6. Anonymous 1983 (Hokkaido: Japan Sea off Atsuta); 7. Awakura et al. 1984b (—); 8. Nagasawa 1985 (Hokkaido: western North Pacific Ocean); 9. Urawa 1986 (Hokkaido: Chitose River)

Family LERNAEOPODIDAE

Salmincola californiensis (Dana, 1852) Wilson, 1915 (FW)
Syn.: *Salmincola falculata* (Wilson, 1908)
Salmincola yamame Hoshina and Suenaga, 1954
Includes: *Salmincola* sp. of Awakura et al., 1984
Sites: gills, gill cavity, mouth cavity, operculum, body surface
Hosts: *Oncorhynchus masou* (2, 3, 4, 6)[40]
O. nerka (1)
Salvelinus pluvius (5)
Dist.: Hokkaido, Gunma, Nagano
Records: 1. Yamaguti 1939b (Hokkaido: Lake Penke); 2. Hoshina and Suenaga 1954 (Nagano: Kiso River); 3. Kabata 1976 (Gunma[41]: unspecified locality); 4. Hoshina and Nishimura 1967 (Gunma: Masutani Trout Culture Farm); 5. Nishimura and Hoshina 1977 (Nagano: Koakagawa); 6. Awakura et al. 1984b (—)

[40]Hoshina and Nishimura (1976) suggested that the host reported by Hoshina and Suenaga (1954) was probably *Oncorhynchus rhodurus*.
[41]The prefectural name was reported as "Gumma".

Salmincola carpionis (Krøyer, 1837) Wilson, 1915 (FW)
Syn.: *Salmincola smirnovi* Markevich, 1940
Site: mouth cavity
Host: *Salvelinus malma*
Dist.: not specified
Record: Markevich 1956
Remarks: Markevich (1956) stated that this parasite was obtained in "Japan", but he (1940) reported in its original description that it was collected in "the Far East".

Salmincola stellatus Markevich, 1936 (FW)
Site: skin
Host: *Hucho perryi*
Dist.: Hokkaido
Record: Kabata 1986 (Sun Piazza Aquarium[42])

Salmincola sp. (FW)
Site: not specified
Hosts: *Salmo gairdneri*
Salvelinus leucomaenis
Dist.: Iwate
Record: Kumagai 1985 (Matsuo Inland Fisheries Experimental Station)

SUBCLASS MALACOSTRACA

ORDER ISOPODA

SUBORDER FLABELLIFERA

Family AEGIDAE

Rocinela maculata Schioedte and Meinert, 1897 (M)
Site: body surface
Host: *Oncorhynchus kisutch*
Dist.: Hokkaido
Records: Awakura 1980[43] (unspecified locality), 1983b (Hamanaka)

[42]Although the collection locality was reported as "a hacthery", the parasite was actually found on the fish reared at this aquarium in Sapporo.

[43]The generic name of this parasite was misspelled as "*Rocinera*".

Host-Parasite List

CLASS OSTEICHTHYES

ORDER SALMONIFORMES

Family SALMONIDAE

Hucho perryi (Brevoort) huchen, "ito"

Ciliophora

? *Trichodina domerguei* (Hokkaido)

Monogenea

Microcotylidae gen. sp. (Hokkaido)

Trematoda

Azygia perryii (Hokkaido)

Bunodera luciopercae (Hokkaido)

Cestoidea

Bothriocephalus sp. (Hokkaido)

Nematoda

Camallanidae gen. sp. (Hokkaido)

Philometridae gen. sp. (Hokkaido)

Rhabdochona sp. (Hokkaido)

Acanthocephala

Acanthocephala gen. sp. (Hokkaido)

Copepoda

Salmincola stellatus (Hokkaido)

Oncorhynchus gorbuscha (Walbaum) pink salmon, "karafutomasu"

Syn.: *Salmo gorbuscha* Walbaum

Sarcomastigophora

Ichtyobodo necator (Hokkaido)

Microspora

Microsporidium takedai (Hokkaido)

Ascetospora

Balanosporida gen. sp. (Hokkaido)

Myxozoa

Chloromyxum giganteum (Hokkaido)

C. quadriforme (Hokkaido)

Myxidium sp. (Hokkaido)

Ciliophora

Ichthyophthirius multifiliis (Hokkaido)

Trematoda

Brachyphallus crenatus (Shikotan Island, Hokkaido)

Hemiurus levinseni (Shikotan Island, Hokkaido)

Lecithaster gibbosus (Shikotan Island, Hokkaido)

Podocotyle atomon (Shikotan Island)

Cestoidea

Diphyllobothrium latum plerocercoid (Kurile Islands, Hokkaido)*

Eubothrium crassum (Shikotan Island)

Eubothrium sp. (Hokkaido)

Phyllobothrium caudatum plerocercoid (Hokkaido)

Phyllobothrium sp. plerocercoid (Hokkaido)

Proteocephalus sp. (Hokkaido)

Scolex pleuronectis plerocercoid (Shikotan Island)

Nematoda

Anisakis simplex larva (Hokkaido)

Anisakis sp. larva (Shikotan Island, Hokkaido)

Ascarophis sp. (Hokkaido)

Contracaecum sp. larva (Hokkaido)

Hysterothylacium aduncum larva (Shikotan Island, Aomori)

Acanthocephala

Bolbosoma caenoforme juvenile (Shikotan Island, Hokkaido)

Echinorhynchus gadi (Hokkaido)

Copepoda

Lepeophtheirus salmonis (Hokkaido)

Oncorhynchus iwame Kimura and Nakamura[44] "iwame"

[44]Although this fish is treated as an independent species throughout the text, it may be regarded as a local form of *Oncorhynchus rhodurus*.

Nematoda
Rhabdochona oncorhynchi (Oita)

Oncorhynchus kawamurai Jordan and McGregor[45] "kunimasu"
Syn.: *Oncorhynchus kawamurae* Jordan and McGregor
Nematoda
Philonema oncorhynchi (Akita)

Oncorhynchus keta (Walbaum) chum salmon, "sake"
Syn.: *Salmo keta* Walbaum
Oncorhynchus haberi Hilgendorf
Sarcomastigophora
Ichtyobodo necator (Hokkaido)
Microspora
Microsporidium takedai (Hokkaido)
Myxozoa
Chloromyxum quadriforme (Hokkaido)
C. salvelini (Hokkaido)
C. tanakai (Hokkaido)
C. wardi (Hokkaido)
Myxobolus arcticus (Hokkaido)
Ciliophora
Ichthyophthirius multifiliis (Hokkaido)
? *Trichodina domerguei* (Hokkaido)
Trematoda
Brachyphallus crenatus (Hokkaido)
? *Crepidostomum salmonis* (Hokkaido)
Hemiuridae gen. sp. (Hokkaido)
Lecithaster gibbosus (Hokkaido)
Tubulovesicula lindbergi (Hokkaido)
Cestoidea
Cestoda gen. sp. (Hokkaido)
Eubothrium crassum (Hokkaido)
Nybelinia surmenicola plerocercoid (Hokkaido)
Phyllobothrium caudatum plerocercoid (Hokkaido)
P. salmonis plerocercoid (Hokkaido, Niigata, Toyama, Ibaraki and/or Chiba)
P. speciosum plerocercoid (−)
Scolex pleuronectis plerocercoid (Hokkaido)
Nematoda
Anisakis simplex larva (Hokkaido)
Anisakis sp. larva (Hokkaido, Niigata)
Contracaecum osculatum larva (Hokkaido)
? *Goezia oncorhynchi* (Hokkaido)
Hysterothylacium aduncum adult and larva (Etorofu Island, Hokkaido)
Philonema oncorhynchi (Hokkaido)
Pseudoterranova decipiens larva (Hokkaido)
Rhabdochona oncorhynchi (Hokkaido, Aomori)
Salvelinema salmonicola (Hokkaido, Aomori)
Acanthocephala
Acanthocephalus echigoensis (Niigata)
A. oncorhynchi (Hokkaido)
Echinorhynchus gadi (Hokkaido, Niigata)
Rhadinorhynchus trachuri (Hokkaido)
Bolbosoma caenoforme juvenile (Hokkaido)*
Hirudinoidea
Hemiclepsis marginata (Toyama)
Mollusca
Margaritifera laevis (Hokkaido)
Copepoda
Lepeophtheirus salmonis (Kurile Islands, Hokkaido)

[45]Although this fish is treated as an independent species throughout the text, it may be regarded as a local form or subspecies of *Oncorhynchus nerka*. This fish is land-locked in Lake Tazawa, Akita Prefecture, but may disappear there due to environmental changes.

Oncorhynchus kisutch (Walbaum)
coho salmon, "ginzake"

Nematoda
Hysterothylacium aduncum larva (Etorofu Island)
Salvelinema salmonicola (Etorofu Island)

Isopoda
Rocinela maculata (Hokkaido)

Oncorhynchus masou (Brevoort)
masu salmon, "sakuramasu, yamame, yamabe"

Syn.: *Oncorhynchus masou* f. *ishikawai* Jordan and McGregor
Oncorhynchus milktschitsch (Tanaka)
Oncorhynchus perryi Hilgendorf of Ijima, 1889
Salmo masou Brevoort
Salmo milktschitsch Tanaka

Sarcomastigophora
Hexamita salmonis (Hokkaido)
Ichtyobodo necator (Hokkaido)

Apicomplexa
Eimeria truttae (Hokkaido)

Microspora
Loma sp. (Hokkaido)
Microsporidium takedai (Hokkaido)

Ascetospora
Balanosporida gen. sp. (Hokkaido)

Myxozoa
Choloromyxum oncorhynchi (Etorofu Island)
C. quadriforme (Hokkaido)
Chloromyxum sp. (Hokkaido, Niigata, Hiroshima)
Myxidium oncorhynchi (Hokkaido)
Myxidium sp. (Hokkaido)
Myxobolus arcticus (Hokkaido, Niigata, Toyama, Hiroshima)
M. neurobius (Hokkaido, Hiroshima)

Ciliophora
Chilodonella piscicola (−)
Ichthyophthirius multifiliis (Hokkaido)
? *Trichodina domerguei* (Hokkaido)
Urceolariidae gen. sp. (Hokkaido)

Monogenea
Encotyllabe masu (−)
Gyrodactylus masu (Hokkaido, Tokyo)
Gyrodactylus sp. (Gunma)
Tetraonchus awakurai (Hokkaido, Tokyo, Yamanashi)
T. oncorhynchi (Tokyo, Yamanashi)

Trematoda
Allocreadium sp. (−)
Brachyphallus crenatus (Hokkaido, Niigata)
? *Crepidostomum uchimii* (Hokkaido)
Dimerosaccus oncorhynchi (Iwate)
Genarchopsis mülleri (−)
Lecithaster gibbosus (Hokkaido and/or Niigata)
Metagonimus yokogawai metacercaria (Oita)
Metagonimus sp. metacercaria (−)
Nanophyetus japonensis metacercaria (Iwate, Yamagata)
Parahemiurus merus (Niigata)
Plagioporus zacconis (Ibaraki)
Pseudolepidapedon kobayashii (−)
Tubulovesicula lindbergi (Hokkaido, Niigata)

Cestoidea
Diphyllobothrium latum plerocercoid (Hokkaido, Aomori, Iwate, Akita, Miyagi, Yamagata, Ibaraki and/or Chiba, Tokyo, Niigata, Toyama, Ishikawa, Fukui, Kyoto)*
Eubothrium sp. (−)
Ligulidae gen. sp. plerocercoid (Gunma)

Nybelinia surmenicola plerocercoid (Hokkaido)
Pelichnibothrium sp. plerocercoid (Hokkaido)
Phyllobothrium caudatum plerocercoid (−)
P. salmonis plerocercoid (Hokkaido, Niigata, Toyama, Ibaraki and/or Chiba)
P. speciosum plerocercoid (Aomori)
Nematoda
Anisakis simplex larva (Hokkaido)
Anisakis sp. larva (Hokkaido, Aomori, Tokyo, Niigata, Toyama)
Capillaridae gen. sp. (Hokkaido)
Contracaecum osculatum larva (Hokkaido)
Contracaecum sp. larva (Hokkaido, Tokyo)
Cucullanus sp. (−)
Cystidicolidae gen. sp. (Kumamoto)
Hysterothylacium aduncum larva (Toyama)
Philometroides masu (Hokkaido)
Pseudocapillaria salvelini (Kyoto, Miyazaki)
Rhabdochona oncorhynchi (Hokkaido, Aomori and/or Akita, Kyoto, Hyogo, Kumamoto, Miyazaki)
Rhabdochona sp. (Hokkaido)
? *Salvelinema oncorhynchi* (Etorofu Island)
S. salmonicola (Hokkaido, Ishikawa)
Sterliadochona ephemeridarum (Hokkaido, Aomori, Kyoto, Hyogo, Shimane, Kumamoto, Miyazaki, Kagoshima)
Acanthocephala
Acanthocephalus acerbus (Nagano)
? *A. echigoensis* (Yamanashi)
A. minor (Hokkaido)
Acanthocephalus spp. (−)
Bolbosoma caenoforme juvenile (−)
Echinorhynchus cotti (Aomori)
E. gadi (Tokyo)*
Hirudinoidea
Hemiclepsis marginata (Toyama)
Mollusca
Margaritifera laevis (Hokkaido)
Branchiura
Argulus coregoni (Tokyo)
Copepoda
Lepeophtheirus salmonis (Hokkaido)
Salmincola californiensis (Nagano?, Gunma)

Oncorhynchus masou (Brevoort) × *Oncorhynchus rhodurus* Jordan and McGregor
Cestoidea
Diphyllobothrium latum plerocercoid (experimental)*

Oncorhynchus nerka (Walbaum)
sockeye salmon, kokanee, "benizake, himemasu"
Syn.: *Oncorhynchus adonis* Jordan and McGregor
Oncorhynchus nerka adonis Jordan and McGregor
Oncorhynchus nerka var. *adonis* Jordan and McGregor
Sarcomastigophora
Cryptobia branchialis (Saitama)
Microspora
Microsporidium takedai (Hokkaido)
Ciliophora
Chilodonella piscicola (Saitama)
Cestoidea
Diphyllobothrium latum plerocercoid (Kurile Islands)*
Nematoda
Rhabdochona oncorhynchi (Hokkaido)

Salvelinema salmonicola (Hokkaido)
Sterliadochona ephemeridarum (Hokkaido)
Acanthocephala
Acanthocephalus acerbus (Nagano)
A. aculeatus (Nagano)
A. opsariichthydis (Tochigi)
Mollusca
Margaritifera laevis (Hokkaido)
Copepoda
Salmincola californiensis (Hokkaido)

Oncorhynchus rhodurus Jordan and McGregor "amago, biwamasu"
Syn.: *Oncorhynchus macrostomus* Günther
Oncorhynchus rhodurus f. *macrostomus* Günther
Oncorhynchus rhodurus var. *macrostomus* Günther
Salmo (*Oncorhynchus*) *masou macrostomus* Günther
Sarcomastigophora
Hexamita salmonis (Hokkaido)
Unidentified amoeba (Shiga)
Ascetospora
Balanosporida gen. sp. (Shiga)
Myxozoa
Myxobolus arcticus (Hiroshima)
M. neurobius (Hiroshima)
Monogenea
Gyrodactylus masu (Tokushima)
Tetraonchus awakurai (Nara, Okayama)
Trematoda
Dimerosaccus oncorhynchi (Gifu)
Lecithaster sp. (Gifu, Mie)
Metagonimus yokogawai metacercaria (Shiga)
Nanophyetus japonensis metacercaria (Hiroshima)
Cestoidea
Cestoda gen. sp. (Mie)
Diphyllobothrium latum plerocercoid (Aichi, Gifu)*
Proteocephalus sp. (Gifu, Mie)
Nematoda
? *Contracaecum* sp. (Gifu)
Cystidicola sp. (Gifu, Mie)
Pseudocapillaria salvelini (Okayama)
Rhabdochona oncorhynchi (Mie, Nara, Kyoto, Okayama, Hiroshima, Ehime, Oita)
Sterliadochona ephemeridarum (Shiga, Nara, Okayama, Hiroshima, Tokushima, Ehime, Kochi, Oita)
Nematomorpha
Chordodes sp. (Mie)*,**
Acanthocephala
Acanthocephalus opsariichthydis (Tochigi)
Acanthocephalus sp. (Gifu)
Branchiura
Argulus coregoni (Aichi, Wakayama)

Oncorhynchus tshawytscha (Walbaum) chinook salmon, "masunosuke"
Microspora
Microsporidium takedai (Hokkaido)

Salmo gairdneri Richardson rainbow trout, "nijimasu"
Syn.: *Salmo gairdneri gairdneri* Richardson
Salmo gairdneri irideus Gibbons
Salmo gairdnerii irideus Gibbons
Salmo irideus Gibbons
Sarcomastigophora
Cryptobia branchialis (Shizuoka)
Hexamita salmonis (Iwate, Yamanashi, Shizuoka)
Hexamita sp. (Shimane)
Ichtyobodo necator (Nagano, Yama-

nashi, Shizuoka, Gifu, Shimane)
Ichtyobodo sp. (Gunma)
Microspora
? *Loma salmonae* (Hokkaido)
Microsporidium takedai (Hokkaido)
Microsporida gen. sp. (Gifu, Mie)
Ascetospora
Balanosporida gen. sp. (Hokkaido)
Ciliophora
Chilodonella piscicola (Saitama, Yamanashi, Shizuoka, Shimane)
Chilodonella sp. (Niigata, Nagano)
Ichthyophthirius multifiliis (Hokkaido, Gunma, Nagano, Shizuoka)
Suctoria gen. sp. (Shizuoka)
Trichodina sp. (Niigata, Nagano, Shizuoka, Gifu)
Trichophrya sp. (Gifu)
Monogenea
Dactylogylus sp. (Niigata)
Gyrodactylus masu (Tokyo)
Gyrodactylus sp. (Gunma, Nagano, Shizuoka)
Tetraonchus awakurai (Yamanashi)
Trematoda
Crepidostomum farionis (Hokkaido)
Digenea gen. sp. metacercaria (Mie)
Diplostomum sp. metacercaria (Shizuoka)
Nanophyetus japonensis metacercaria (−)
Cestoidea
Diphyllobothrium latum plerocercoid (experimental)*
Nematoda
Anisakis sp. larva (experimental)
Hysterothylacium aduncum adult and larva (Hokkaido)
Nematoda gen. sp. (Hokkaido, Nagano)
Pseudocapillaria salvelini (Hokkaido)
Raphidascaris biwakoensis (Shiga)
Rhabdochona oncorhynchi (Hokkaido, Aomori, Tochigi)
Salvelinema salmonicola (Hokkaido, Aomori)
Sterliadochona ephemeridarum (Hokkaido)
Acanthocephala
Acanthocephala gen. sp. (Saitama, Nagano)
Acanthocephalus acerbus (Nagano, Yamanashi)
A. echigoensis (−)
A. lucidus (Yamanashi)**
A. minor (Hokkaido)
A. opsariichthydis (Tokyo, Shiga)
Acanthocephalus sp. (Niigata)
Echinorhynchus cotti (Aomori)
Pseudorhadinorhynchus samegaiensis (Shiga)
Hirudinoidea
Hemiclepsis marginata (Toyama)
Mollusca
Margaritifera laevis (Hokkaido)
Branchiura
Argulus coregoni (Tokyo, Aichi, Wakayama)
Copepoda
Lernaea cyprinacea (Shizuoka)
Salmincola sp. (Iwate)

Salmo trutta Linnaeus
brown trout, "burauntorauto"
Nematoda
Rhabdochona oncorhynchi (Tochigi)

Salvelinus fontinalis (Mitchill)
brook trout, "kawamasu"
Nematoda
Rhabdochona oncorhynchi (Hokkaido)
Acanthocephala

Acanthocephalus acerbus (Nagano)
A. opsariichthydis (Tochigi)
Hirudinoidea
Hemiclepsis marginata (Toyama)
Branchiura
Argulus coregoni (Tokyo, Nagano)

Salvelinus leucomaenis (Pallas)
whitespotted charr, "amemasu, ezoiwana"
Syn.: *Salvelinus kundscha* Jordan and Evermann
Salvelinus malma (Walbaum) of Fujita, 1940
Microspora
Microsporidium takedai (Hokkaido)
Ascetospora
Balanosporida gen. sp. (Hokkaido)
Myxozoa
Chloromyxum salvelini (Hokkaido)
Myxidium sp. (Hokkaido)
Monogenea
Tetraonchus alaskensis (Hokkaido)
Trematoda
Allocreadium sp. (Hokkaido)
Azygia perryii (Hokkaido)
Brachyphallus crenatus (Shikotan Island)
Bunodera luciopercae (Hokkaido)*
Crepidostomum farionis (Shikotan Island, Hokkaido)
Derogenes varicus (Shikotan Island)
Genolinea anura (ShikotanIsland)
Lecithaster gibbosus (Shikotan Island)
Podocotyle atomon (Shikotan Island)
Prosorhynchoides gracilescens (Shikotan Island)
Tubulovesicula lindbergi (Shikotan Island)
Cestoidea
Bothrimonus sp. (Shikotan Island)
Scolex pleuronectis plerocercoid (Shikotan Island)
Tentacularia sp. plerocercoid (Hokkaido)
Nematoda
Anisakis simplex larva (Hokkaido)
Anisakis sp. larva (Shikotan Island)
Camallanidae gen. sp. (Hokkaido)
Ezonema bicornis (Hokkaido)
Hysterothylacium aduncum adult and larva (Shikotan Island, Hokkaido)
Philometridae gen. sp. (Hokkaido)
Philonema oncorhynchi (Etorofu Island)
Philonema sp. (Hokkaido)
Pseudocapillaria salvelini (Shikotan Island, Hokkaido)
Rhabdochona oncorhynchi (Shikotan Island)
Rhabdochona sp. (Hokkaido)
? *Salvelinema amemasu* (Etorofu Island)
? *S. kosugii* (Etorofu Island)
S. salmonicola (Shikotan Island, Hokkaido, Aomori)
? *S. salvelini* (Etorofu Island)
Sterliadochona ephemeridarum (Shikotan Island)
Acanthocephala
Corynosoma strumosum juvenile (Shikotan Island)
Echinorhynchus cotti (Aomori)
E. truttae (Shikotan Island)
Neoechinorhynchus sp. (Hokkaido)
Mollusca
Margaritifera laevis (Hokkaido)
Copepoda
Salmincola sp. (Iwate)

Salvelinus malma (Walbaum)
Dolly Varden, "oshorokoma"
Ciliophora
? *Trichodina domerguei* (Hokkaido)

Nematoda
? *Cystidicola brevicauda* (Etorofu Island)
Pseudocapillaria salvelini (Hokkaido)
Rhabdochona sp. (Hokkaido)
Acanthocephala
Acanthocephalus minor (Hokkaido)
Copepoda
Salmincola carpionis (—)

Salvelinus malma miyabei Oshima
Miyabe charr, "miyabeiwana"
Syn.: *Salvelinus malma* (Walbaum) of Seki, 1975 (partim)
Trematoda
Crepidostomum metoecus (Hokkaido)
Crepidostomum sp. (Hokkaido)
Nematoda
Cucullanus sp. (Hokkaido)
Pseudocapillaria salvelini (Hokkaido)
Sterliadochona ephemeridarum (Hokkaido)

Salvelinus pluvius (Hilgendorf)
charr, "iwana"
Syn.: *Salvelinus leucomaenis pluvius* (Hilgendorf)
Salvelinus malma (Walbaum) of Fujita, 1928; Yamaguti, 1935, 1941, 1954; Fukui and Morisita, 1937, 1938
Monogenea
Gyrodactylus sp. (Gunma)
Trematoda
Dimerosaccus oncorhynchi (Nagano)
Metagonimus sp. metacercaria (—)
Nanophyetus japonensis metacercaria (Yamagata)
Nematoda
Rhabdochona oncorhynchi (Nagano, Toyama, Shiga)
? *Salvelinema iwana* (Shiga)
S. salmonicola (Shiga)
Sterliadochona ephemeridarum (Shiga)
Acanthocephala
Rhadinorhynchoides miyagawai (Niigata)
Branchiura
Argulus coregoni (Aichi)
Copepoda
Salmincola californiensis (Nagano)

Salmonidae of Undetermined Species
Salmonidae gen. spp.
Sarcomastigophora
Ichtyobodo necator (Hokkaido)
Ciliophora
Chilodonella piscicola (Hokkaido)
Ichthyophthirius multifiliis (Hokkaido)
Urceolariidae gen. sp. (Hokkaido)
Trematoda
Allocreadium sp. (Hokkaido)
Azygia perryii (Hokkaido)
Crepidostomum farionis (Hokkaido)
C. metoecus (Hokkaido)
Crepidostomum sp. (Hokkaido)
Tubulovesicula lindbergi (Hokkaido)
Cestoidea
Pelichnibothrium sp. plerocercoid (Hokkaido)
Nematoda
Anisakis sp. larva (Hokkaido)
Contracaecum sp. larva (Hokkaido)
Cucullanus sp. larva (Hokkaido)
Ezonema bicornis (Hokkaido)
Philonema sp. (Hokkaido)
Pseudocapillaria salvelini (Hokkaido)
Rhabdochona sp. (Hokkaido)
Sterliadochona ephemeridarum (Hokkaido)
Acanthocephala
Neoechinorhynchus sp. (Hokkaido)
Acanthocephalus acerbus (—)

A. minor (−)
Copepoda

Lernaea cyprinacea (Kanagawa)
Lepeophtheirus salmonis (Hokkaido)

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HOSTS

Addendum

A cestode species known as *Diphyllobothrium latum* in Japan will be described as *D. nihonkaiense* in the following paper:

Yamane, Y., H. Kamo, G. Bylund, and B.-J. P. Wikgren (1986): *Diphyllobothrium nihonkaiense* sp. nov. (Cestoda: Diphyllobothriidae) - revised identification of Japanese broad tapeworm. *Shimane J. Med. Sci.*, **10**: (in press).

Checklist of Parasites of Japanese Salmonids

日本産サケ科魚類の寄生虫目録

長澤和也・浦和茂彦・粟倉輝彦

1889～1986年に発表された日本産サケ科魚類の寄生虫に関する情報を2つのリスト，寄生虫一宿主リストと宿主一寄生虫リストに整理した。本目録には，94種の寄生虫（原生動物18種，単生類5種，吸虫類21種，条虫類7種，線虫類19種，鉤頭虫類15種，ヒル類1種，軟体動物1種，鰓尾類1種，橈脚類5種，等脚類1種）と，種名がまだ決定されていない寄生虫の情報が含まれる。寄生虫一宿主リストは寄生虫の分類に基づいて配列してあり，各寄生虫毎に最新の学名，シノニム，寄生部位，宿主，地理的分布および報告者の情報が示されている。宿主一寄生虫リストには，各宿主毎に寄生虫とその地理的分布が整理されている。本目録は寄生虫の分類学的再検討が目的ではないが，微胞子虫 *Nosema takedai* と線虫 *Cystidicoloides ephemeridarum* に対して，それぞれ *Microsporidium* 属と *Sterliadochona* 属に所属を変更するように提案した。また，線虫 *Salvelinema ishii* に対して，*S. salvelini* と種名を変更するように提案した。