This page has been included to facilitate review of the pamphlet in a two-page PDF viewing mode. It is best viewed with two pages on screen at once.

This pamphlet has been designed for A5 size paper (5.8" x 8.3").

Guide to Common Parasites of Food Fish Species in the Northwest Territories and Nunavut

N. Zabel, H. Swanson, & D. Conboy

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Front Cover: Arctic Grayling (*Thymallus arcticus*);
Image: US Fish and Wildlife Service, Mountain-Prairie Region.

First Edition: March 2023

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Regional Map

Map: Wikimedia Maps

Fish Species Covered in this Guide

Arctic Charr (*Salvelinus alpinus*): Omble Chevalier, Omble Rouge, Truite Rouge, Dhik'ii, Iqalukpik, Iqaluk, Tariungmiutaq, Łiwezǫǫ̀ dek'oo

Arctic Cisco (*Coregonus autumnalis*): Herring, Cisco Arctique, Treeluk, Qaaktaq

Arctic Grayling (*Thymallus arcticus*): Grayling, Bluefish, Ombre Arctique, Ts'ánt'I/ts'aɻt'in, Cahcahkinosêw, Sriija, Sulukpaugaq, T'áe, Ts'ét'ɻah, Ts'étɻą

Atlantic Salmon (*Salmo salar*): Saumon Atlantique, Sama

Broad Whitefish (*Coregonus nasus*): Round-nosed Whitefish, River Whitefish, Corégone Tschir, Łu, Łuk zheii/Łuk dagaii, Anaakłiiq

Bull Trout (*Salvelinus confluentus*): Mountain Charr, Omble à Tête Plate

Burbot (*Lota lota*): Freshwater Cod, Ling, Loche, Methe, Moira, Lotte, Queue d'Anguille, Tı̨tel, Chehluk, Tiktaaliq, Nǫhkwǻ, Nǫhtthíe, Nǫhkwèe

Chinook Salmon (*Oncorhynchus tshawytscha*): King Salmon, Blackmouth, Saumon Chinook, Łuk choo

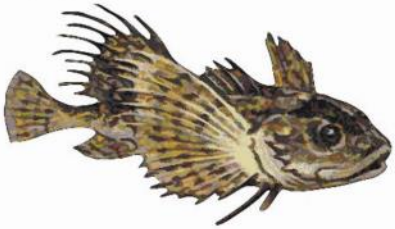
Chum Salmon (*Oncorhynchus keta*): Dog Salmon, Saumon Kéta, Shii, Paiirluq

Fish Species Covered in this Guide (continued)

Coho Salmon (*Oncorhynchus kisutch*): Silver Salmon, Saumon Coho

Dolly Varden (*Salvelinus malma*): Dolly Varden, Dhik'ii, Iqalukpik

Fourhorn Sculpin (*Myoxocephalus quadricornis*): Chaboisseau à quatre cornes, Kanajuq, Kanayuq



Inconnu (*Stenodus nelma*): Coney, Sheefish, Sruh, Inconnu, Beghúle, Sryuh, Siiraq, Siho, Mewúlı, Wıìle

Lake Cisco (*Coregonus artedi*): Lake Herring, Freshwater Herring, Tulibee, Tulabee, Cisco du Lac, Łuek'áta, Treeluk, Iqalusaaq, Łuehyaa, Edhíh, Łìhtsoa

Lake Trout (*Salvelinus namaycush*): Touladi, Truite Grise, Truite de Lac, Omble Gris, Łuezané, Namêkos, Vit, Ihuuqiq, Isiuralittaak, Iqaluaqpak (brackish), Singayuriaq (freshwater), Sahba, Łuezǫ, Łiwezǫǫ̀

Lake Whitefish (*Coregonus clupeaformis*): Humpback Whitefish, Crookedback, Grand Corégone, Poisson Blanc, Pointu, Łu, Dalts'an, Pikuktung, Lú, Łih

Least Cisco (*Coregonus sardinella*): Lake Herring, Cisco Sardinelle, Treeluk, Iriqpaligaurat

Longnose Sucker (*Catostomus catostomus*): Red Sucker, Meunier Rouge, Dëldële, Namêpiy/Namêpiń, Daats'at, Milugiaq, Dehdele, Dedelı, Dehdoo

Fish Species Covered in this Guide (continued)

Mountain Whitefish (*Prosopium williamsoni*): Ménomini de Montagnes

Northern Pike (*Esox lucius*): Jackfish, Jack Grand Brochet, Brochet Commun, ʔulday, Iyinito-kinosêw, Eltin, ʔǫ́hda, Udaa, Įhdaa

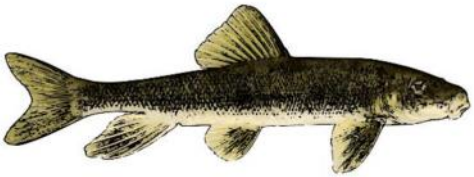
Pink Salmon (*Oncorhynchus gorbuscha*): Humpback Salmon, Humpy, Saumon Rose, Siulik

Round Whitefish (*Prosopium cylindraceum*): Ménomini Rond, Łu, Łih

Sockeye Salmon (*Oncorhynchus nerka*): Kokanee Salmon, Saumon Rouge

Walleye (*Sander vitreus*): Pickerel, Doré jaune, Doré blanc, ʔełch'úe, Okâw, ʔéhch'úę, Ehch'úę, Ehts'eę/Ehch'ęę

White Sucker (*Catostomus commersonii*): Meunier Noir, Dëldële, Namêpiy/Namêpiń, Daats'at, Milugiaq, Dehdele, Dedelı, Kwìezhìı



Common Fish Names

Salmon/Trout/Charr: Łuezánk'ozé, Sôsâsiw, Mistamek, Misiwâpamek, Iqaluk, Łue metth'ę detsılı

Suckers: Dëldële, Namêpiy/Namêpiń, Daats'at, Milugiaq, Dehdele, Dedelı

Whitefish: Łu, Atihkamêk, Kapihilik, Aanaakhiiq, Łuewá, Łúah, Łih

Fish names in English, French, Chipewyan (Denesuline), Northern Cree, Plains Cree, Gwich'in, Inuinnaqtun, Inuktitut, Inuvialuktun, North Slavey, South Slavey, and Tłįchǫ included, as available at the time of writing.
See pages 45 – 46 for references used.

Arctic Cisco, Broad Whitefish, Least Cisco: University of Guelph; Arctic Grayling & Dolly Varden: Fisheries and Oceans Canada; Fourhorn Sculpin: NOAA Great Lakes Environmental Research Laboratory; Longnose Sucker: Great Lakes Environmental Research Laboratory; Lake Cisco, Round Whitefish, White Sucker: New York State Department of Environmental Conservation; Pacific Salmon species: US Fish & Wildlife Service.

Where is the Parasite in the Female Fish?

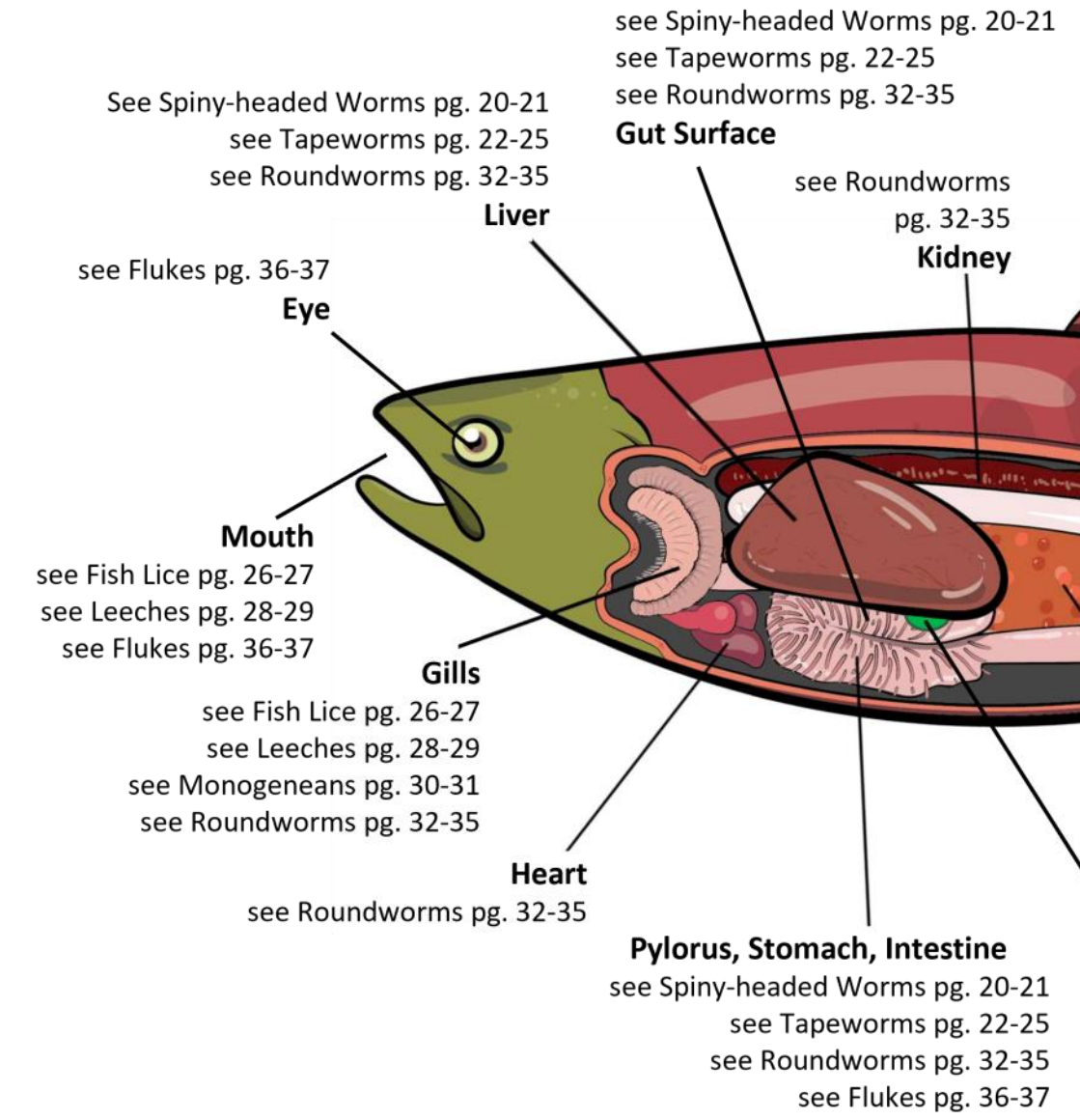
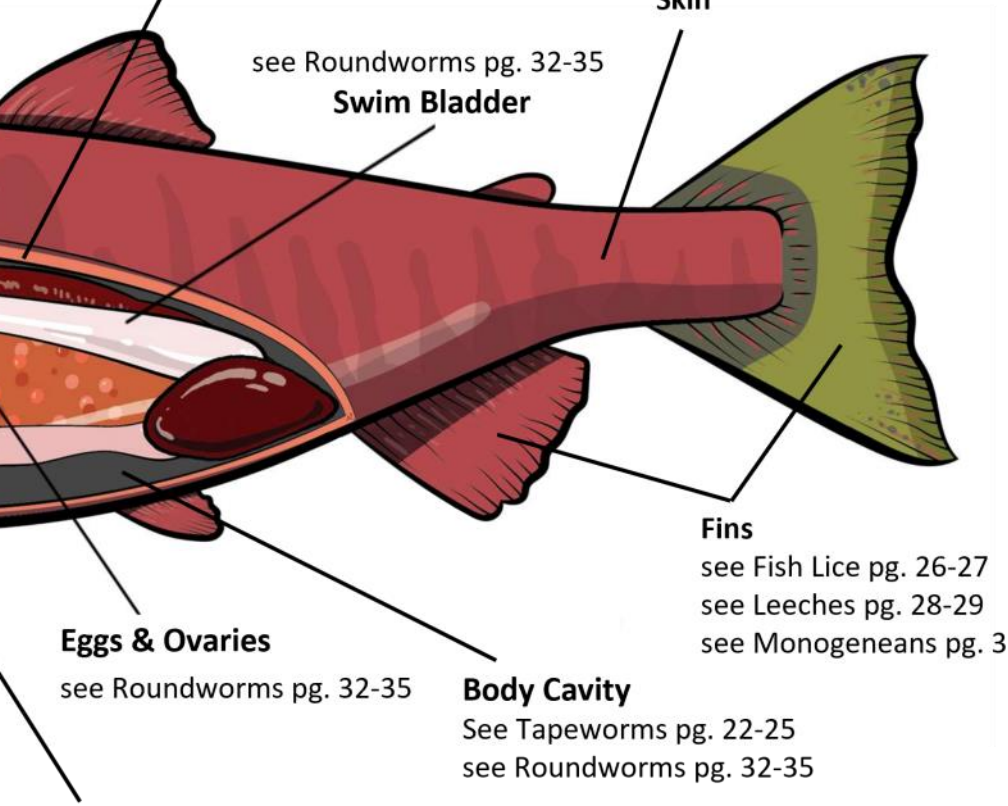


Image: Pacific Salmon Foundation; Illustrator: A. Parekh


See Tapeworms pg. 22-25
see Roundworms pg. 32-35
Muscle
see Fish Lice pg. 26-27
see Leeches pg. 28-59
see Monogeneans pg. 30-31
Skin
see Roundworms pg. 32-35
Swim Bladder
Fins
see Fish Lice pg. 26-27
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Eggs & Ovaries
see Roundworms pg. 32-35
Body Cavity
See Tapeworms pg. 22-25
see Roundworms pg. 32-35
Gall Bladder
see Roundworms pg. 32-35
see Flukes pg. 36-37

Where is the Parasite in the Male Fish?

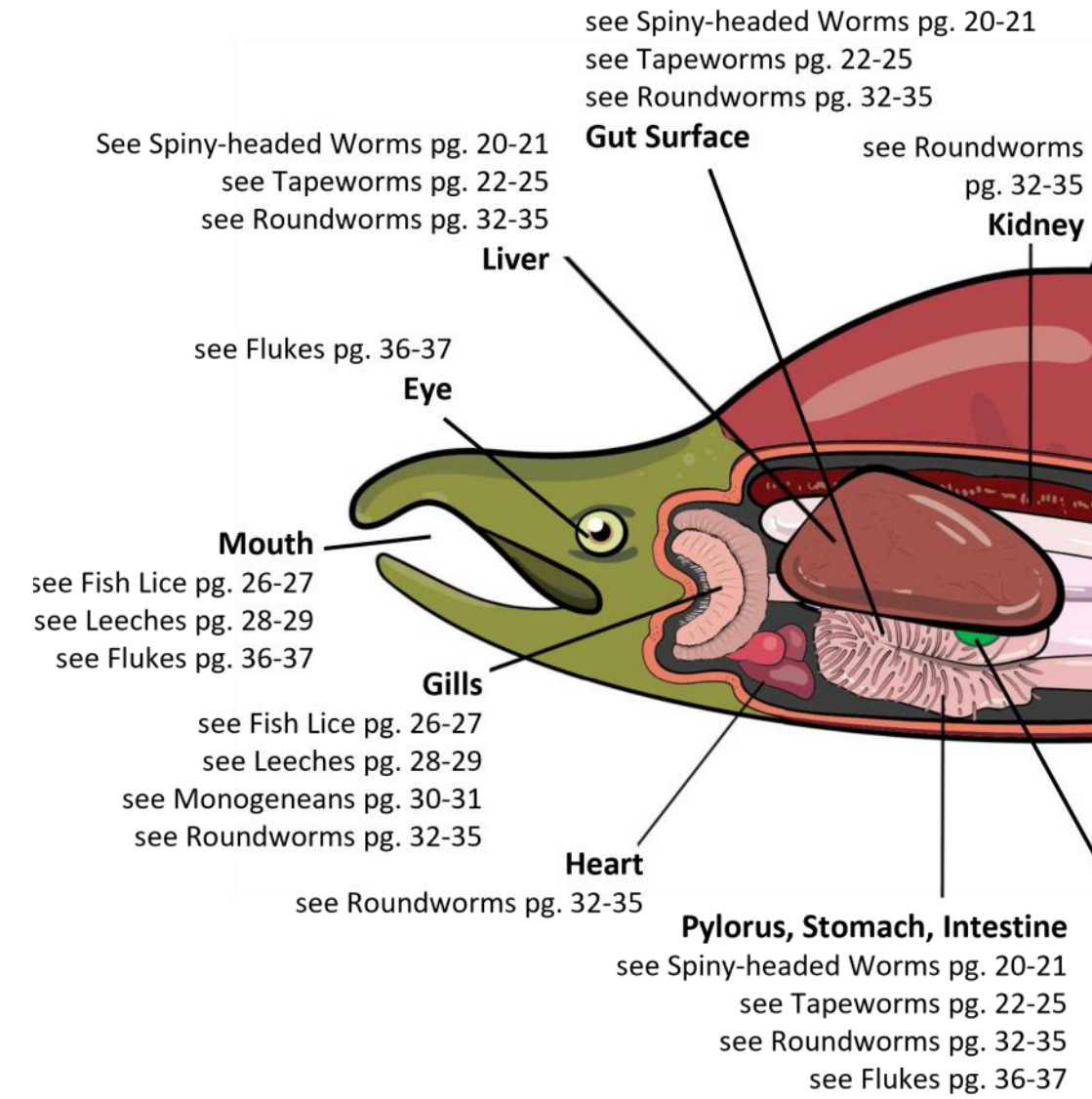
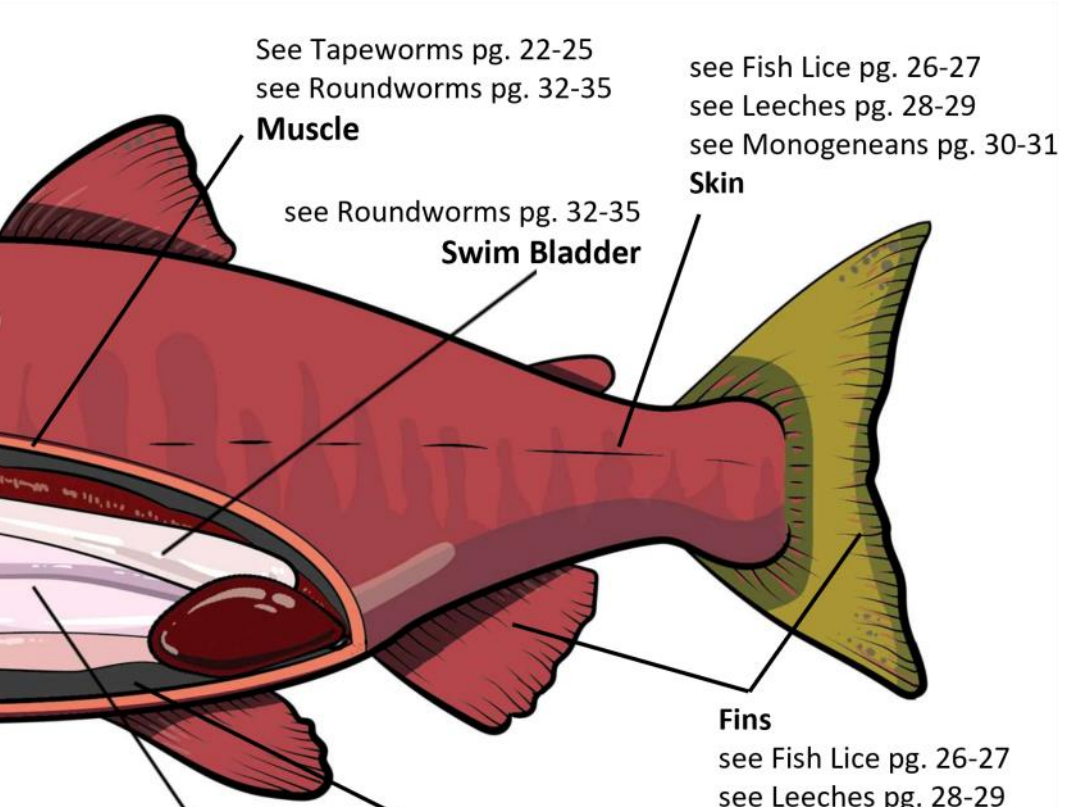


Image: Pacific Salmon Foundation; Illustrator: A. Parekh


See Tapeworms pg. 22-25
see Roundworms pg. 32-35
Muscle
see Fish Lice pg. 26-27
see Leeches pg. 28-29
see Monogeneans pg. 30-31
Skin
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Swim Bladder
Fins
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see Leeches pg. 28-29
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Gonads (Testes)
see Roundworms pg. 32-35
Body Cavity
See Tapeworms pg. 22-25
see Roundworms pg. 32-35
Gall Bladder
see Roundworms pg. 32-35
see Flukes pg. 36-37

Where is the Parasite in the Fish?

1. On the skin or fins?

   A. On the fins? ..... see Fish Lice (pg. 26)
   ..... see Leeches (pg. 28)
   ..... see Monogeneans (pg. 30)

   B. On the skin? ..... see Fish Lice (pg. 26)
   ..... see Leeches (pg. 28)
   ..... see Monogeneans (pg. 30)

2. In the eyes? ..... see Flukes (pg. 36)

3. In/around the gills? ..... see Fish Lice (pg. 26)
   ..... see Leeches (pg. 28)
   ..... see Monogeneans (pg. 30)
   ..... see Roundworms (pg. 32)
   ..... see Flukes (pg. 36)

4. In/around the mouth? ..... see Fish Lice (pg. 26)
   ..... see Leeches (pg. 28)
   ..... see Flukes (pg. 36)

5. Inside the body cavity? ..... see Tapeworms (pg. 22)
   ..... see Roundworms (pg. 32)

6. In the stomach, pylorus, or intestine? see Spiny-headed Worms (pg. 20)
   see Tapeworms (pg. 22)
   see Roundworms (pg. 32)
   see Flukes (pg. 36)

7. On the surface of the guts? ..... see Tapeworms (pg. 22)
   ..... see Roundworms (pg. 32)

8. In the gall bladder? …… see Roundworms (pg. 32)
…… see Flukes (pg. 36)

9. In/on the eggs or testes? …… see Roundworms (pg. 32)

10. In/on the heart or kidney? …….. see Roundworms (pg. 32)

11. In/on the liver? …… see Spiny-headed Worms (pg. 20)
…….. see Tapeworms (pg. 22)
…….. see Roundworms (pg. 32)

12. In the swim bladder? …….. see Roundworms (pg. 32)

13. In the flesh? …….. see Tapeworms (pg. 22)
…… see Roundworms (pg. 32)

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Table of Parasite Groups

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Tapeworms (Cestoda).....22

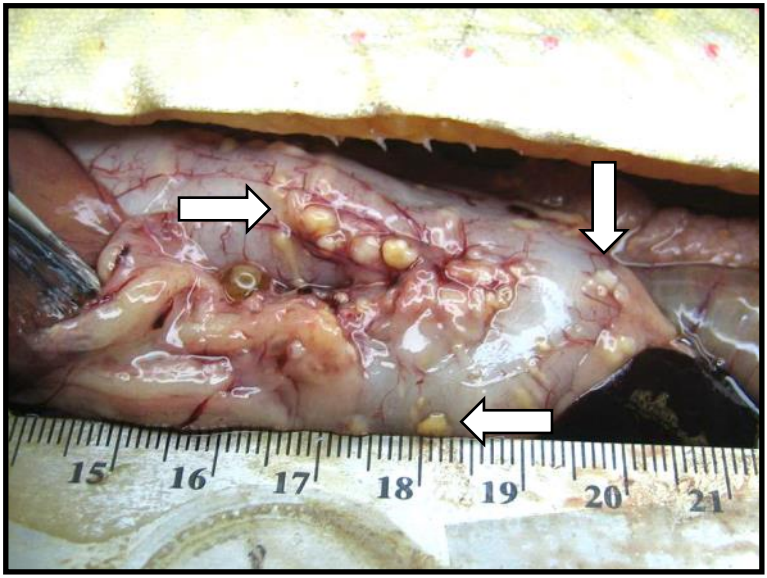
Fish Lice (Copepoda).....26

Leeches (Hirudinea).....28

Monogeneans (Monogenea).....30

Roundworms (Nematoda).....32

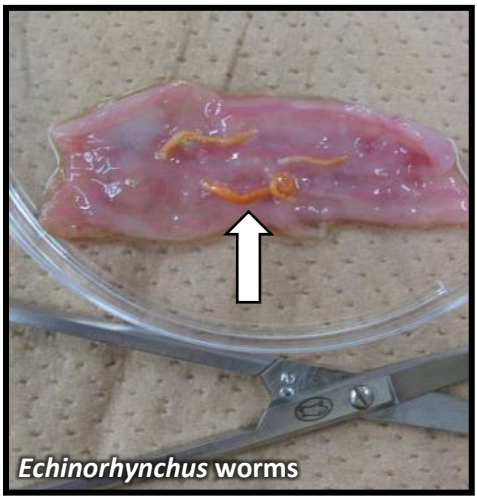
Flukes (Trematoda).....36



Multiple Cestoda or Tapeworm parasites (pg. 22) inside a trout: *Diphyllobothrium* cysts in the body cavity and on the organs.

(Image: C. Banner, ODFW/OSU , FishPathogens.net)

Spiny-headed Worms: Acanthocephala



Parts of fish affected

Found on the gut surface, and in the stomach, pylorus, intestines, and liver.

Species Affected

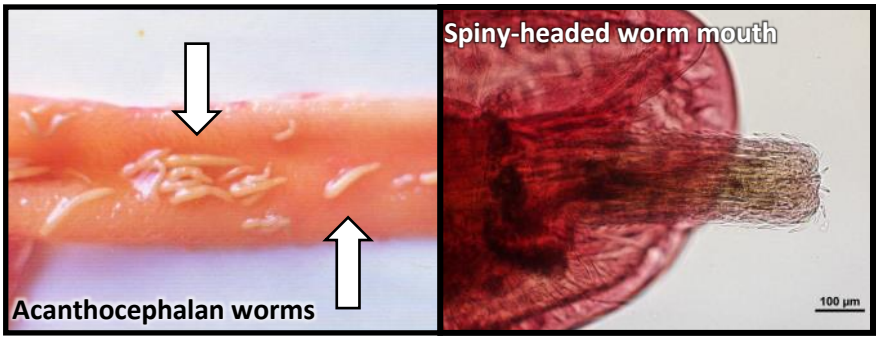
Arctic Charr, Arctic Cisco, Arctic Grayling, Atlantic Salmon, Broad Whitefish, Bull Trout, Chinook, Chum, Coho, Dolly Varden, Fourhorn Sculpin, Lake Cisco, Lake Trout, Lake Whitefish, Longnose Sucker, Northern Pike, Pink Salmon, Round Whitefish, Sockeye, Walleye, White Sucker.

Description

Spiny-headed worms are **small**, light-coloured worms, sometimes having a large-looking 'head' end that they use to attach to the guts of the fish. There are two kinds of spiny-headed worms found in this region: *Corynosoma* and *Echinorhynchus*. *Corynosoma* only affects sea-run fish species.

Safe to Eat? Safe for Pets?

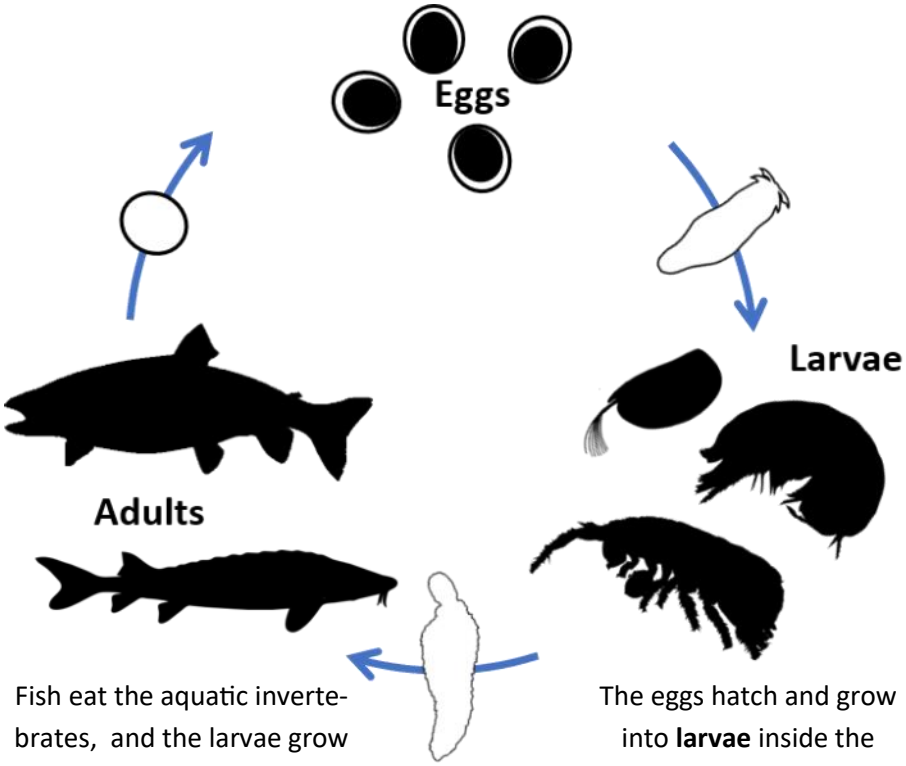
These parasites DO NOT affect people and DO NOT affect pets.



Images—Top: K. Yamada, Database of Parasites of Fish and Diseases (Japan Bottom Left: K. Nagasawa, Database of Parasites of Fish and Diseases (Japan); Bottom Right: G. Conboy.

Spiny-headed Worms: Acanthocephala — Life Cycle

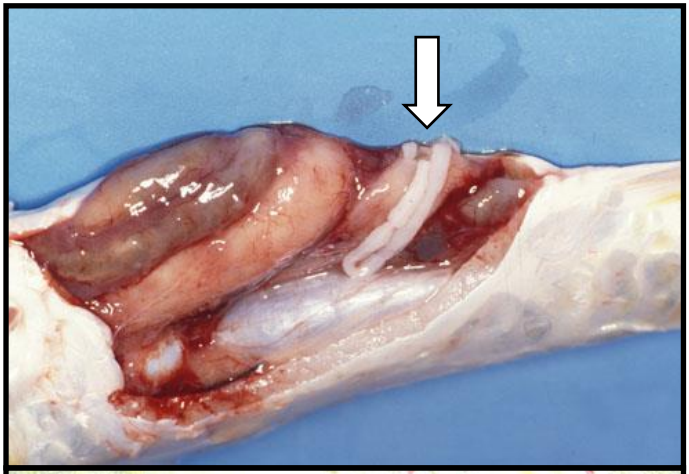
Spiny-headed worm **eggs** are released into the water through fish feces. The eggs are then eaten by aquatic invertebrates.



The eggs hatch and grow into **larvae** inside the aquatic invertebrates.

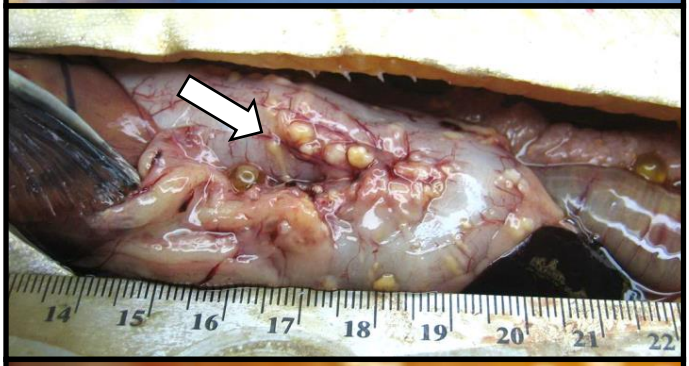
Fish eat the aquatic invertebrates, and the larvae grow into **adults** inside the fish.

Tapeworms: Cestoda



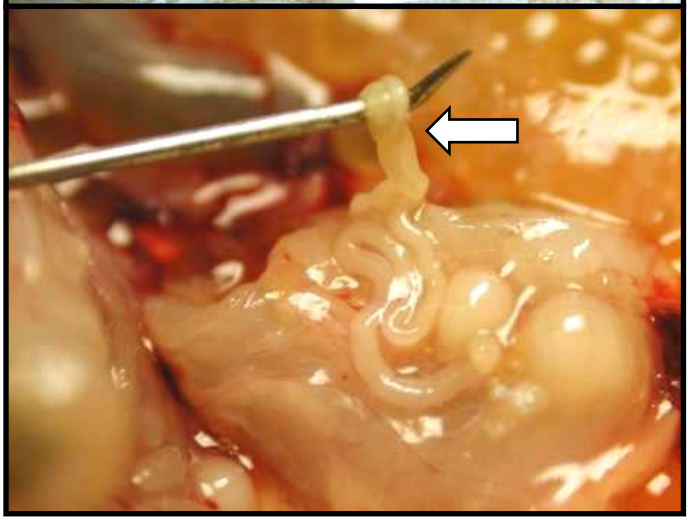
Bothriocephalus tapeworm

Image: K. Yamada, Database of Parasites of Fish and Diseases (Japan)



Diphyllobothrium cysts on the intestine

Image: S. Atkinson (Fishpathogens.net), OD-FW/OSU



Diphyllobothrium tapeworms

Image: Laboratory of Aquatic Pathobiology, Åko Akademi

Tapeworms: Cestoda (continued)

Proteocephalus tapeworms

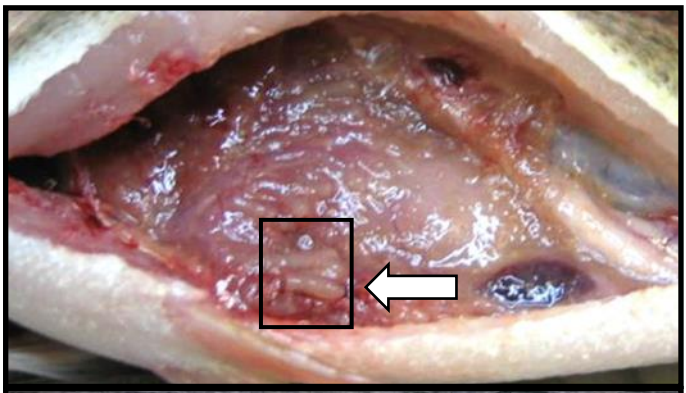


Image: C. Banner, (Fishpathogens.net), OD-FW/OSU

Schistocephalus tapeworms

Image: Laboratory of Aquatic Pathobiology, Åko Akademi

Triaenophorus tapeworms in muscle

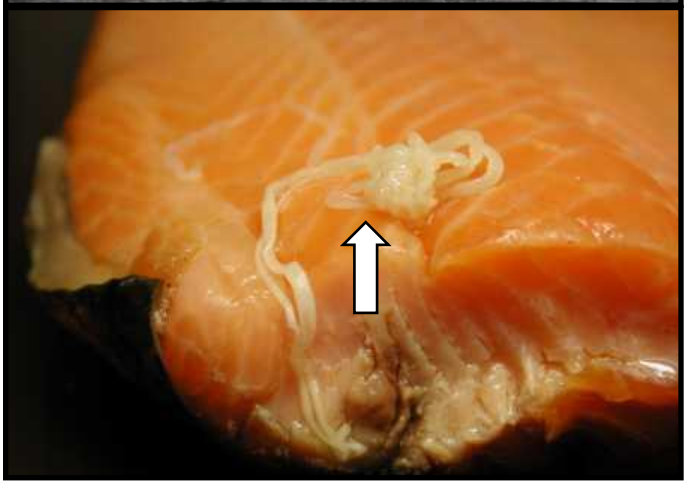
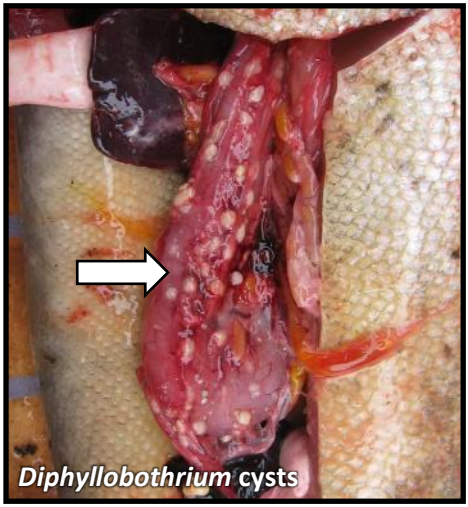


Image: L. Lönnström, Laboratory of Aquatic Pathobiology, Åko Akademi

Tapeworms: Cestoda



Parts of fish affected

Found in the body cavity, gut surface, stomach, pylorus, intestine, liver, and muscle.

Species Affected

Arctic Charr, Arctic Cisco, Arctic Grayling, Atlantic Salmon, Broad Whitefish, Bull Trout, Burbot, Chinook, Chum, Coho, Dolly Varden, Fourhorn Sculpin, Inconnu, Lake Cisco, Lake Trout, Lake Whitefish, Longnose Sucker, Mountain Whitefish, Northern Pike, Pink Salmon, Round Whitefish, Sockeye, Walleye, White Sucker.

Description

Tapeworms have a complex life cycle, and can be found in various stages inside fish. Generally, adult tapeworms are long, stringy, and white/light beige in colour. Larval tapeworms usually form cysts inside a fish, which look like small white or beige-coloured balls or round lumps. There are many kinds of tapeworms, but they usually only infect certain kinds of fish.

Safe to Eat? Safe for Pets?

SOME kinds of tapeworms can affect people and pets: ***Diphyllobothrium*** can infect humans. It is found in freshwater fish species, especially fish-eating species like Northern Pike and Walleye.

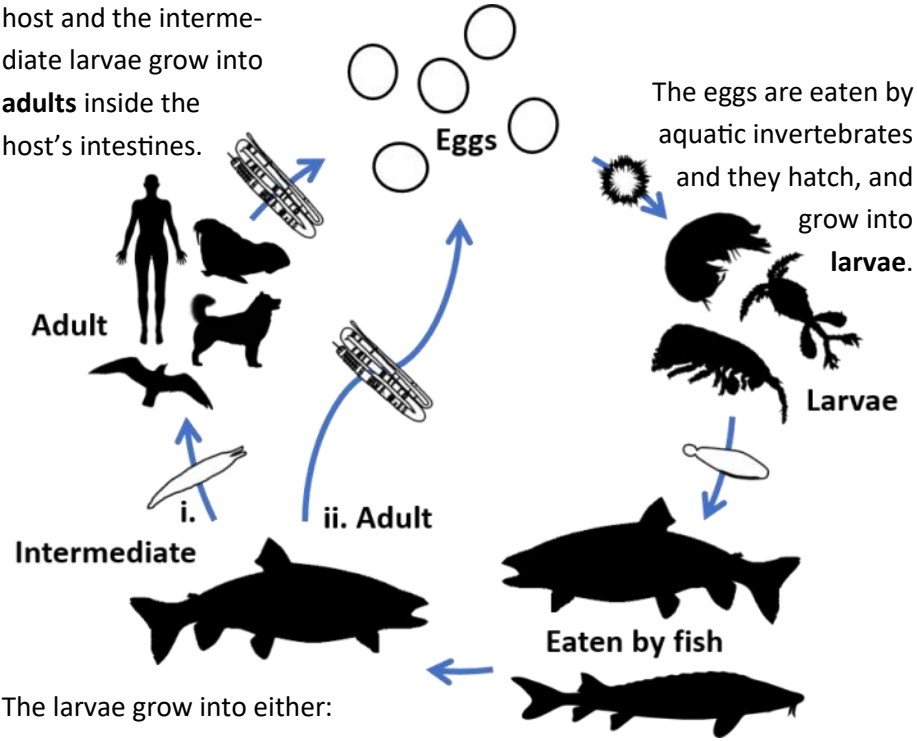
Getting Rid of Tapeworms in Food

If there are tapeworms in the muscle or organs of the fish, they can be killed by thoroughly cooking (to 63°C) or freezing the fish to –20°C for 7 days. Smoking **does not** kill this parasite. *Diphyllobothrium* cysts look like roundworms cysts: however, roundworm cysts are perfectly round and smaller than *Diphyllobothrium* cysts.

Tapeworms: Cestoda — Life Cycle

Tapeworm **eggs** are released into the water through the feces of the host.

The fish is eaten by a host and the intermediate larvae grow into **adults** inside the host's intestines.



The larvae grow into either:

i) **intermediate** larvae and form cysts inside the organs of the fish, waiting for the fish to be eaten by a suitable bird or mammal host; OR

ii) **adults** and attach to the intestines of the fish.

Image (Top): S. Atkinson (Fishpathogens.net), ODFW/OSU

Fish Lice: Copepoda


***Salmincola* fish lice**

Parts of fish affected

Found on the fins, skin, gills/gill cavity, mouth.

Species Affected

Arctic Charr, Arctic Cisco, Arctic Grayling, Atlantic Salmon, Broad Whitefish, Bull Trout, Burbot, Coho, Dolly Varden, Inconnu, Lake Cisco, Lake Trout, Lake Whitefish, Mountain Whitefish, Pink Salmon, Round Whitefish, Sockeye.

Description

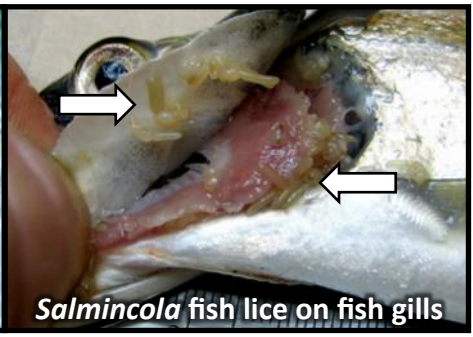
Fish lice are small, clear to white to brown, lice-looking parasites, often with long egg sacks attached to their bodies. There are two kinds of fish lice found in this region: *Coregonicola* and *Salmincola*. *Coregonicola* often have one long egg sack and are found on sea-run whitefish, while *Salmincola* has two egg sacks. Fish lice are sometimes called 'anchor worms', but they are not worms!

Only adult female fish lice are parasites: the adult males and the juveniles are free-living.

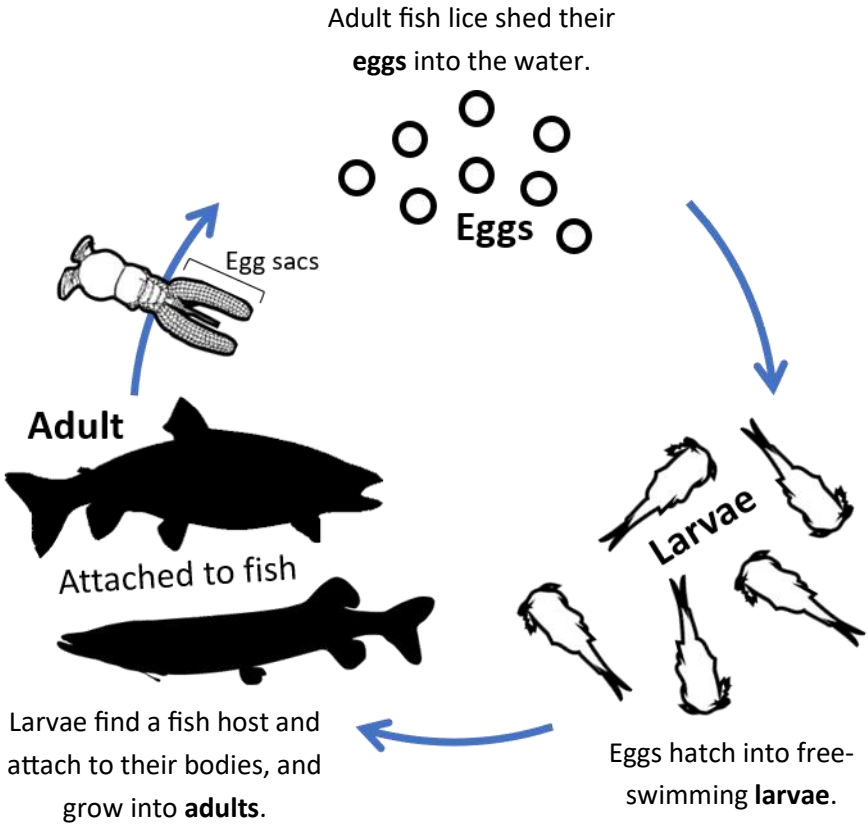
Safe to Eat? Safe for Pets?

These parasites DO NOT affect people and DO NOT affect pets.


***Coregonicola* on a Whitefish**


***Salmincola* fish lice on fish gills**

Fish Lice: Copepoda — Life Cycle



Opposite images—Top: T. Awakura, Database of Parasites of Fish and Diseases (Japan); Bottom Left: J. D. Reist; Bottom Right: C. Banner, ODFW/OSU , Fishpathogens.net

Leeches: Hirudinae


Piscicola leech on a Brown Trout

Parts of fish affected

Found on the fins, skin, mouth.

Species Affected

All species can be affected by leeches. They have been found on:

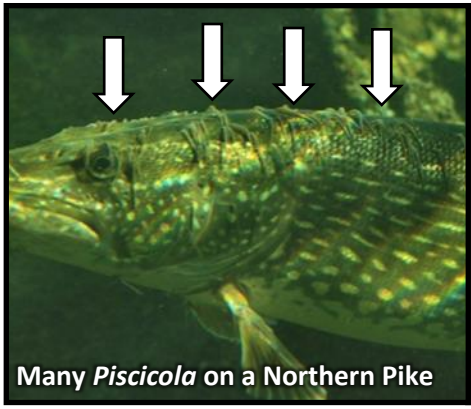
Broad Whitefish, Burbot, Coho, Inconnu, Lake Trout, Lake Whitefish, Mountain Whitefish, Northern Pike, Round Whitefish, Sockeye, Walleye

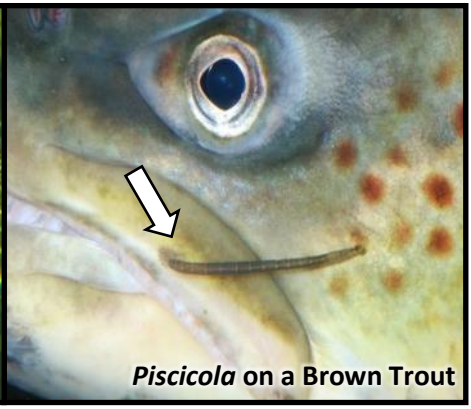
Description

Leeches are slender, worm-like parasite, between 2—3 cm long, and are usually clear to light brown with horizontal bands. Two kinds of Leeches are found in this region: *Cystobranchus* and *Piscicola*. They can leave small red bumps on fish when they fall off.

Safe to Eat? Safe for Pets?

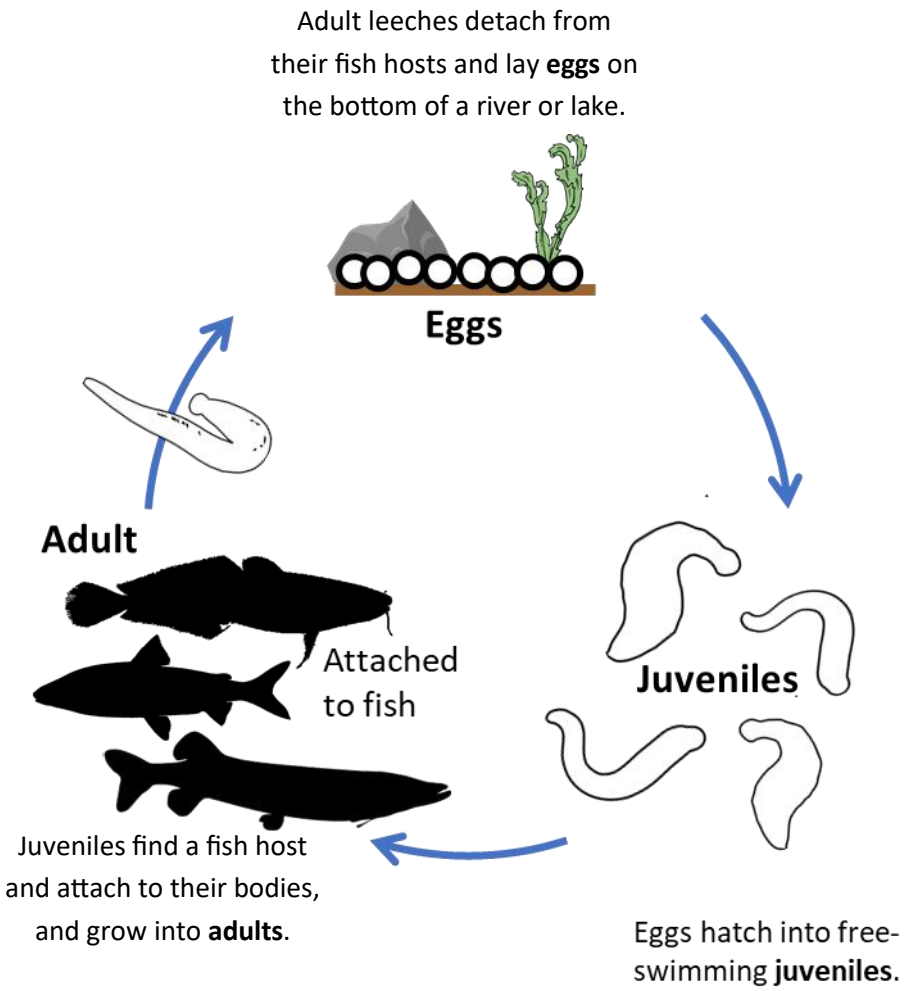
These parasites DO NOT affect people and DO NOT affect pets, although they may try to attach to your skin or your pet when handling a fresh fish.


Many *Piscicola* on a Northern Pike


Piscicola on a Brown Trout

Images—Top: Hundsbuckler (WikiMedia); Left: J. C. Chou, Biopix; Right: N. Sloth, Biopix

Leeches: Hirudinae — Life Cycle



Monogeneans: Monogenea

Parts of fish affected

Found on the fins, gills/gill cavity.

Species Affected

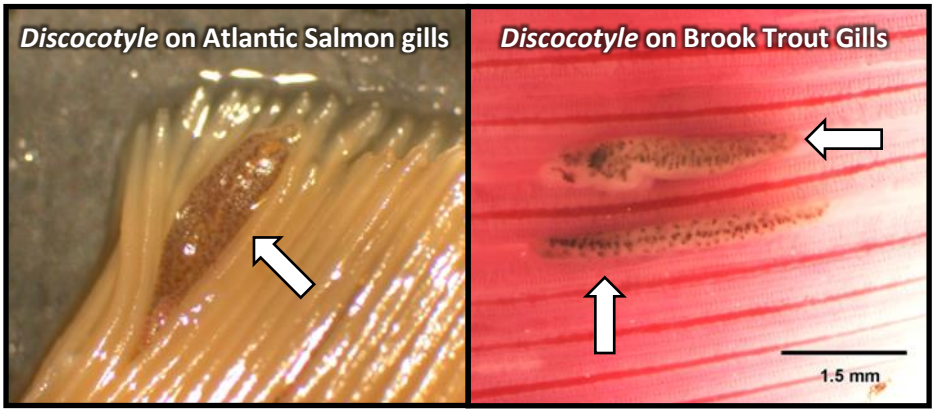
Arctic Charr, Arctic Grayling, Atlantic Salmon, Broad Whitefish, Bull Trout, Coho, Dolly Varden, Lake Cisco, Lake Trout, Lake Whitefish, Least Cisco, Longnose Sucker, Mountain Whitefish, Northern Pike, Round Whitefish, White Sucker.

Description

Monogeneans are **small** (less than 1 cm), clear/white worm-like parasites, sometimes with spots. They are not common and **often hard to see** on fish. They are found on the fins and/or gills of fish. Three kinds of monogeneans have been found in this region: *Anonchohaptor*, *Discocotyle*, and *Tetraonchus*.

Safe to Eat? Safe for Pets?

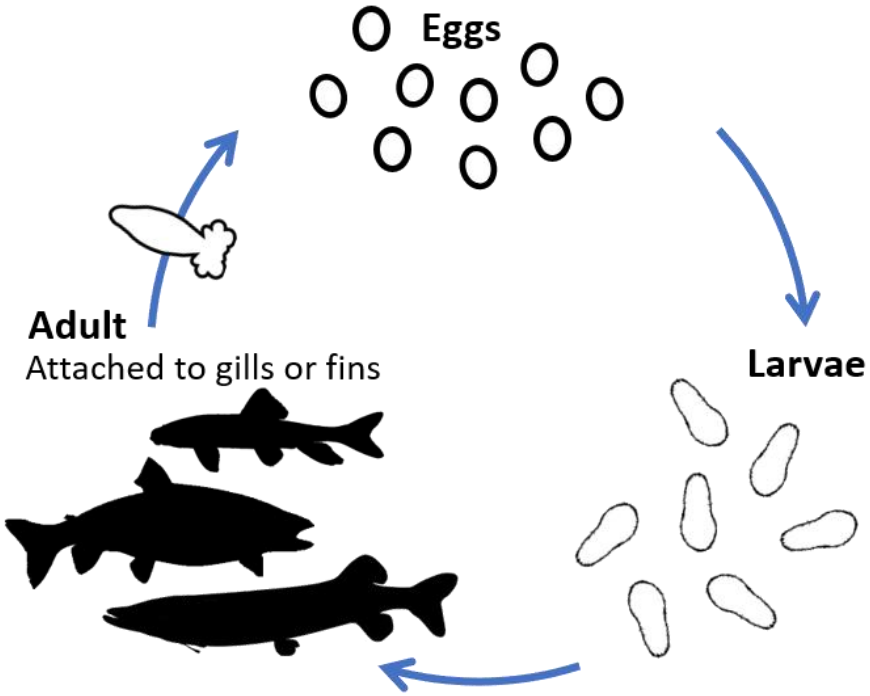
These parasites DO NOT affect people and DO NOT affect pets.



Images—Top: K. Okagawa, Database of Parasites in Fish and Shellfish; Left & Right: C. Blanar, Flickr.

Monogeneans: Monogenea — Life Cycle

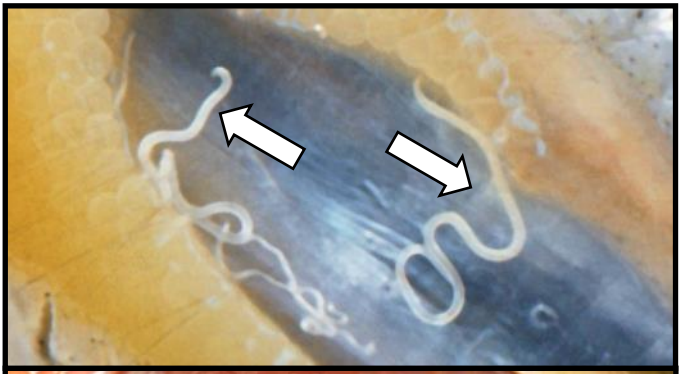
Adult monogeneans shed their **eggs** directly into the water.



Larvae find a fish host and attach to their gills or fins, and grow into **adults**.

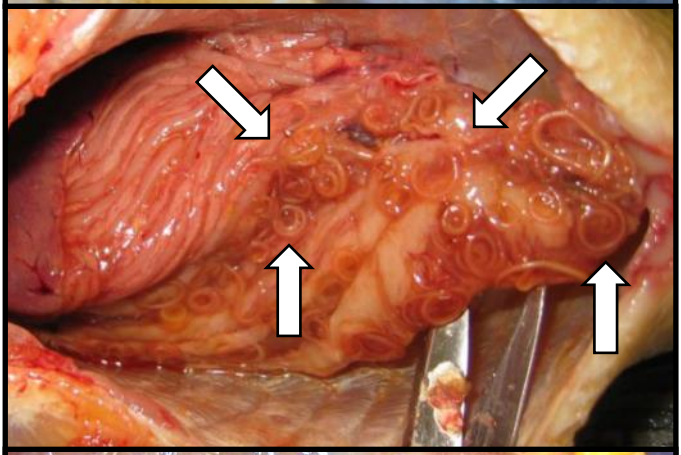
Eggs hatch into free-swimming **larvae**.

Roundworms: Nematoda



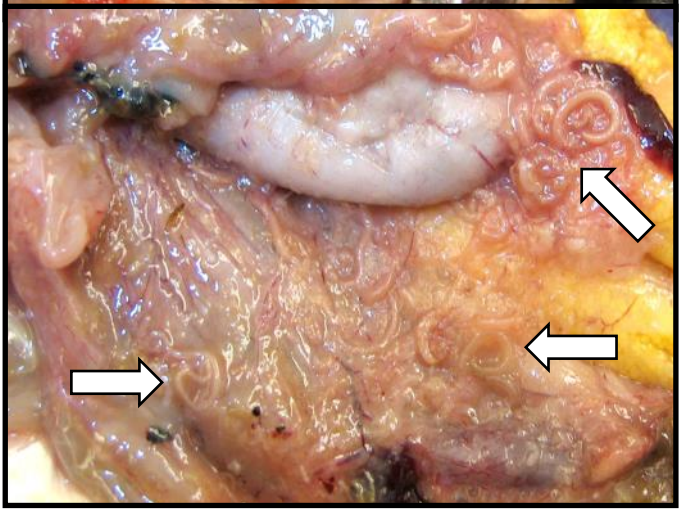
Cystidicola round-worms in the swim bladder

Image: CC. Banner, (Fishpathogens.net), OD-FW/OSU



Hysterothylacium roundworms in the body cavity

Image: C. Banner, (Fishpathogens.net), OD-FW/OSU



Hysterothylacium inside the body cavity

Image: C. Banner, (Fishpathogens.net), OD-FW/OSU

Roundworms: Nematoda (continued)

Raphidascaris roundworms cysts on the digestive tract

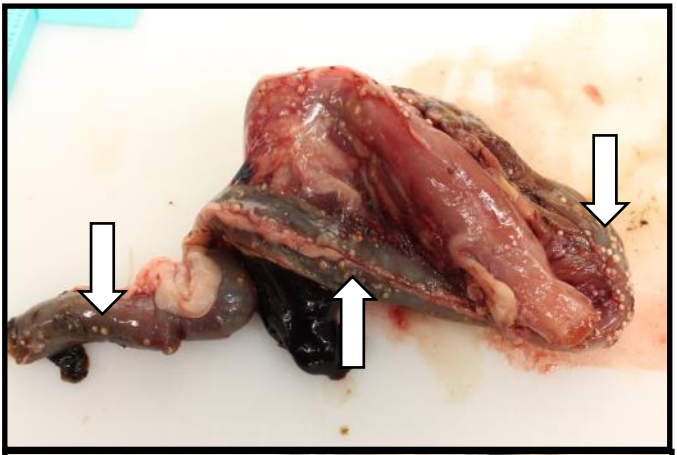


Image: D. Goldsmith (Diagnostic Service Unit, Faculty of Veterinary Medicine, University of Calgary)

Philonema roundworms in the body cavity

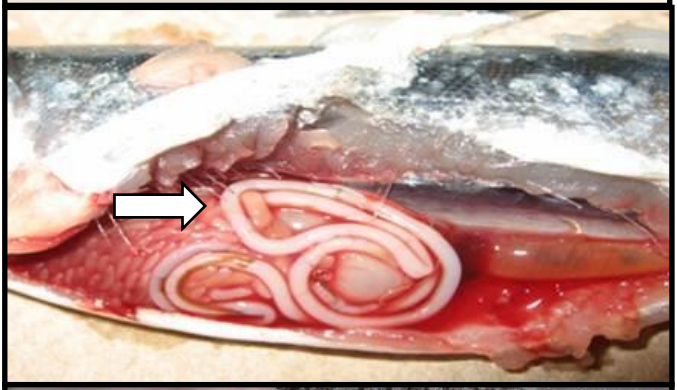


Image: C. Banner, (Fishpathogens.net), ODFW/OSU

Anisakis roundworms in the liver

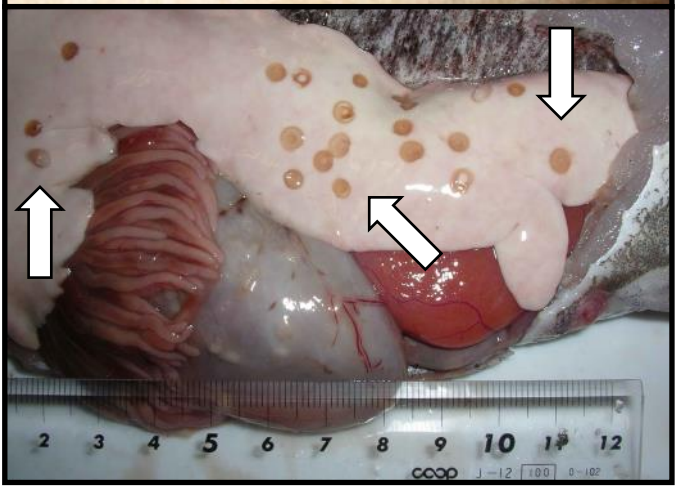
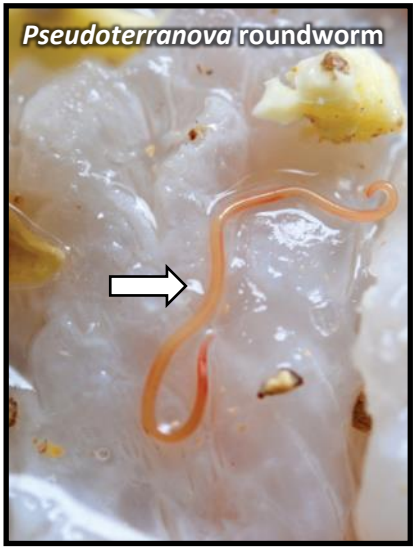


Image: S. Urawa, Database of Parasites of Fish and Diseases (Japan)

Roundworms: Nematoda



Image—P. Burgess.

Parts of fish affected

Found in the body cavity, gut surface, stomach, pylorus, intestine, sex organs, liver, swim bladder, and muscle. Rarely in the eyes, gills/gill cavity, gall bladder.

Species Affected

Arctic Charr, Arctic Grayling, Atlantic Salmon, Broad Whitefish, Bull Trout, Burbot, Chinook, Chum, Coho, Dolly Varden, Lake Cisco, Lake Trout, Lake Whitefish, Least Cisco, Longnose Sucker, Mountain Whitefish, Northern Pike, Pink, Round Whitefish, Sockeye, Walleye, White Sucker.

Description

Roundworms are clear, white, pink, or flesh-coloured round parasitic worms. Adults can be long (20 cm+) and are not segmented. Larval cysts are often white, hard, perfectly round, and small – smaller than tapeworm cysts (pg. 22). Ten kinds of roundworms are found in this region.

Safe to Eat? Safe for Pets?

SOME kinds of roundworms can affect people and pets: ***Anisakis*** and ***Pseudoterranova*** can affect humans and cause **Anisakidosis**, a sickness that can cause abdominal pain, nausea, and vomiting. Roundworms can also make pets sick. *Anisakis* and *Pseudoterranova* are only found in marine fish. No other roundworms found in this region can affect people or pets.

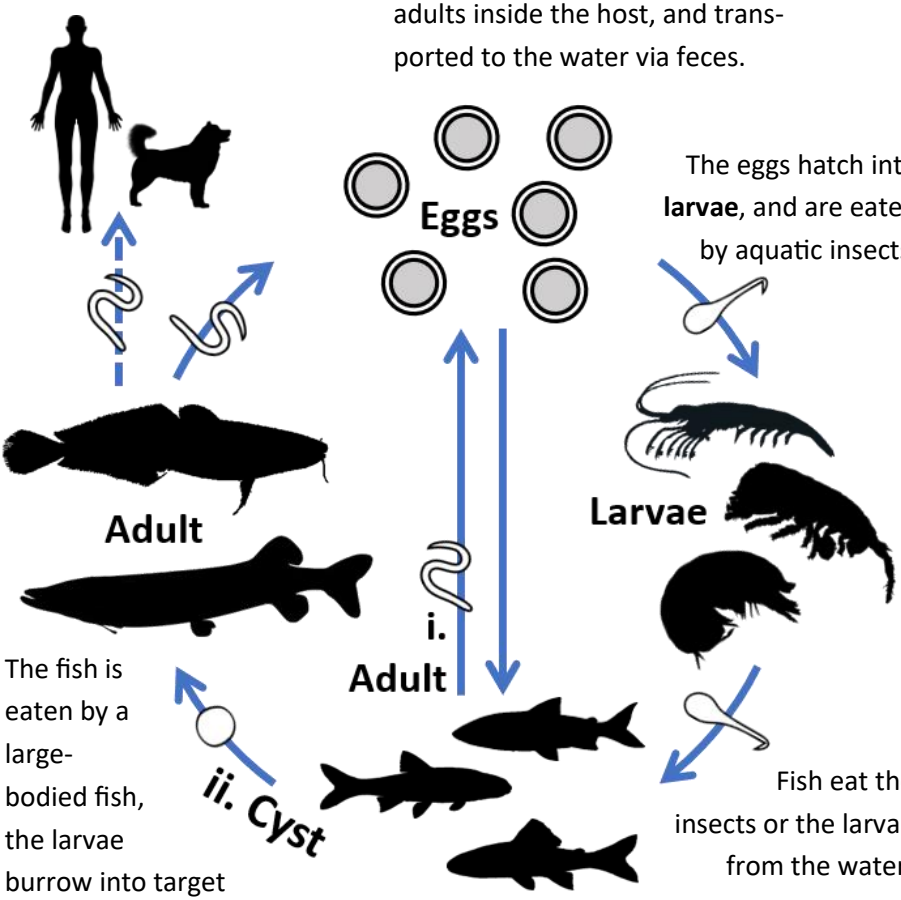
Getting Rid of Round Worms in Food

If there are *Anisakis or Pseudoterranova* roundworms in the muscle or organs of the fish, they can be killed by thoroughly cooking (to 63°C), or freezing the fish to –20°C for 7 days. Smoking **does not** kill these parasites.

Roundworms: Nematoda — Life Cycle

SOME kinds of roundworms can make people and pets sick if they're eaten.

Roundworm **eggs** are released by adults inside the host, and transported to the water via feces.



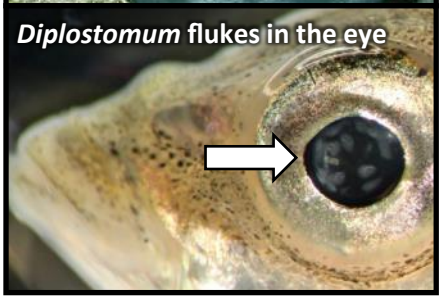
The eggs hatch into **larvae**, and are eaten by aquatic insects.

Fish eat the insects or the larvae from the water:

i) the larvae burrow into target organs, and grow to **adults**; OR
ii) the larvae form **cysts** inside the fish, waiting for it to be eaten by a large-bodied fish.

The fish is eaten by a large-bodied fish, the larvae burrow into target organs and grow to **adults**.

Flukes: Trematoda



Parts of fish affected

Found in the eyes, body cavity, stomach, pylorus, intestine, and gall bladder. Occasionally in/on the mouth.

Species Affected

All food fish species: Arctic Charr, Arctic Cisco, Arctic Grayling, Atlantic Salmon, Broad Whitefish, Bull Trout, Burbot, Chinook, Chum, Coho, Dolly Varden, Lake Cisco, Lake Trout, Lake Whitefish, Least Cisco, Longnose Sucker, Mountain Whitefish, Northern Pike, Pink, Round Whitefish, Sockeye, Walleye, White Sucker

Description

Flukes are small, worm-looking parasites. They are **not often seen** or noticed because of their **small size**. Adults attach to their host using suckers on their head and belly. Seven kinds of flukes are found in this region.

Adult *Diplostomum* flukes infect the eyes of fish and can cause cataracts. Flukes also form cysts inside some hosts: the cysts are **tiny**.

Safe to Eat? Safe for Pets?

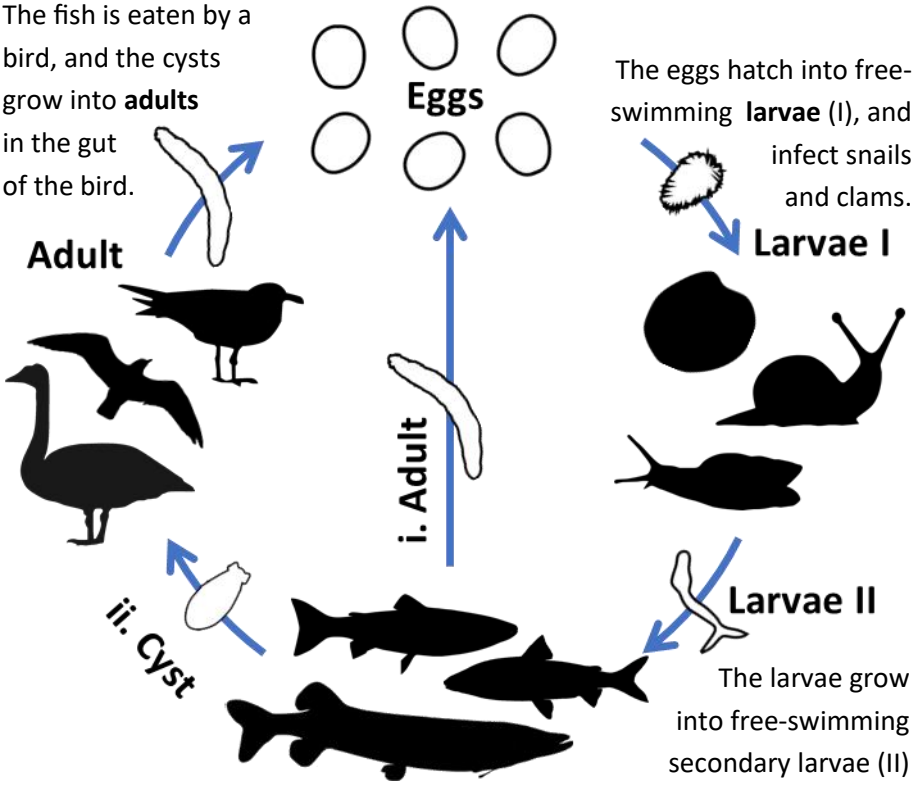
These parasites DO NOT affect people and DO NOT affect pets.

Images—*Upper:* Fish Vet Group*; Lower*: N. Erin; *Bottom Right*: J Harms, Yukon Environment.

Flukes: Trematoda — Life Cycle

Fluke **eggs** are releases inside the host, and transported to the water via feces.

The fish is eaten by a bird, and the cysts grow into **adults** in the gut of the bird.



The eggs hatch into free-swimming **larvae** (I), and infect snails and clams.

The larvae grow into free-swimming secondary larvae (II) and leave the snail/clam host.

Fish become infected by the secondary larvae, and:

i) the larvae burrow into target organs, and grow to **adults**; OR

ii) form **cysts**, waiting for the fish to be eaten by a bird.

Parasites & People—Cooking and Food Safety

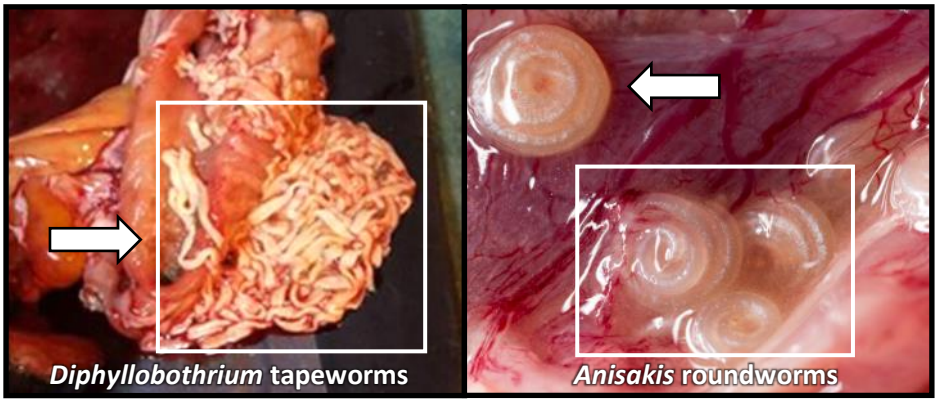
Parasites are a natural part of the environment and are found in all water-bodies, both freshwater and saltwater. They can be found in clean water and polluted water. Ecosystems that are rich in parasites are often healthy ones. Parasites are generally not a problem for people or for pets: parasite-related diseases are relatively rare.

You can avoid parasites in fish in several ways:

1. By catching and eating younger or smaller fish. Parasites accumulate and grow over time, so a younger and/or smaller fish may have fewer parasites.
2. By eating certain kinds of fish. Some parasites grow to adults inside large, fish-eating species like Northern Pike or Lake Trout.
3. By eating different species from different lakes and rivers.

For the few parasites that can infect people or pets (roundworms including *Anisakis* & *Pseudoterranova*, tapeworms including *Diphyllobothrium*), the fish can be made safe by cleaning the fish thoroughly after being caught, freezing the fish to –20°C for at least 7 days, and thoroughly cooking the fish (to at least 63°C/145°F).

Smoking, salting/salt curing, or marinating fish **will not** kill any parasites. Thoroughly cooking and/or freezing **will** kill any parasites in the fish.



Images—Left: JM Johnson

Parasites & Climate Change

Climate change is expected to have profound effects on the environment of the North. Changes in local climate, water temperature, amount and extent of winter ice cover, and nutrient levels in water bodies are expected, which will have complicated effects on fishes and the parasites which affect them.

Parasites are sensitive to changes in environmental conditions, particularly temperature, as these changes can influence their life cycles. Life cycles of parasites are tied to the life cycles and timing of their hosts. Climate change may change the overlap between parasites and their hosts: decreased overlap may cause decreases or even local disappearance of some parasite species. On the other hand, warmer water temperatures may increase parasite growth rate and maturation, and could lead to shorter generation times and therefore greater frequency and prevalence of parasitic infections.

Climate change, and human actions, may result in the introduction of exotic or non-native species, that bring associated parasites with them. These parasites could then infect new hosts that are not used to dealing with them and may have lower resistance to infection. The effects of climate change combined with the added stress of competing with new exotic species could result in changes in fish populations and associated parasites.

Warmer waters could also result in the northern movement of parasites, with southern parasites possibly being found in northern ecosystems. However, as parasites are sensitive to temperature, climate change might result in parasites having a similar sized range but just further north. Continued climate changes may even result in smaller ranges for species that prefer colder temperatures.

The overall effect of climate change on parasites and parasite-host relationships is complex and difficult to predict. It is likely that increased parasite loads may be found in northern fish species, and that there will be changes in what parasite species are present or absent, as parasites and hosts both respond to environmental changes.

List of Parasite Genera in the NWT and Nunavut

Acanthocephala—Spiny-headed Worms

- Corynosoma
- Echinorhynchus

Cestoda—Tapeworms

- Bothrimonus
- Bothriocephalus
- Cyathocephalus
- Diphyllobothrium
- Eubothrium
- Glaridacris
- Protecocephalus
- Schistocephalus
- Triaenophorus

Copepoda—Fish Lice

- Coregonicola
- Salmincola

Hirudinea—Leeches

- Cystobranchus
- Piscicola

Monogenea—Monogeneans

- Anonchohaptor
- Discocotyle
- Tetraonchus

Nematoda—Roundworms

- Anisakis
- Cystidicola
- Haplonema
- Hysterothylacium
- Philonema
- Pseudocapillaria
- Pseudoterranova
- Raphidascaris
- Salmonema
- Truttaedacnitis

Trematoda—Flukes

- Allocredium
- Brachyphallus
- Crepidostomum
- Derogenes
- Diplostomum
- Lecithaster
- Prosorhyncoides

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Notes

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